

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

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Standards and Technical Services

Facility: Huntington Wastewater Treatment Facility
Castle Valley Special Service District
UPDES Permit No. UT0021296

Receiving water: Huntington Creek (2B, 3C, 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

Outfall 001: Huntington Creek (Stream Discharge) → Cottonwood Creek → San Rafael River
→ Colorado River

0.9 MGD maximum daily design discharge, 0.4 MGD maximum monthly design discharge

Receiving Water

Per UAC R317-2-13.1(b), the designated beneficial uses for Huntington Creek and tributaries, from the confluence with Cottonwood Creek to Highway U-10 crossing are 2B, 3C and 4.

- *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*
- *Class 3C - Protected for nongame fish and other aquatic life, including the necessary aquatic organisms in their food chain.*

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- *Class 4 - Protected for agricultural uses including irrigation of crops and stock watering. Site-specific total dissolved solids (TDS) criteria are associated with this use. Huntington Creek and tributaries from the confluence with Cottonwood Creek to Highway U-10 is 4,800 mg/l total dissolved solids.*

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). Flow data was insufficient to calculate the annual or seasonal 7Q10 values. Due to a lack of flow records for Huntington Creek, the seasonal 20th percentile flow measurements taken immediately upstream of the outfall were calculated to estimate the critical flow in the receiving water (Table 1). Results were calculated using data from DWQ monitoring station 4930520 HUNTINGTON CREEK ABOVE HUNTINGTON LAGOONS OUTFALL for the period 1978-2019.

Table 1. Seasonal Flow Data at MLID 4930520

Season	20 th percentile Flow Data (cfs)
Summer	1.30
Fall	2.00
Winter	2.00
Spring	1.60
Annual Overall	1.60

Ambient receiving water quality was characterized using data from DWQ monitoring station 4930520 HUNTINGTON CREEK ABOVE HUNTINGTON LAGOONS OUTFALL for the same period (1978-2019). The average seasonal value was calculated for each constituent with available data in the receiving water. Effluent parameters were characterized using data from the Discharge Monitoring Report (DMR) at monitoring site 4930510 HUNTINGTON LAGOONS OUTFALL.

Total Maximum Daily Load (TMDL)

According to the Utah's 2016 303(d) [Water Quality Assessment Report](#) dated December 7, 2016, the receiving water for the discharge, Huntington Creek (UT14060009-010_00) is impaired for dissolved selenium. The San Rafael River downstream of the confluence with Cottonwood Creek is listed as impaired for benthic macroinvertebrates. A site specific standard for total dissolved solids was adopted for Huntington Creek to address the impairment. The site specific criterion is based upon the EPA approved Total Maximum Daily Load (TMDL) Price River, San Rafael River, and Muddy Creek TMDLs for Total Dissolved Solids, West Colorado Watershed Management Unit, Utah (MFG Inc., 2004). The standard is as follows per UAC R317-2-14.1, Footnote (4).

Huntington Creek and tributaries from the confluence with Cottonwood Creek to Highway U-10 is 4,800 mg/l total dissolved solids.

Mixing Zone

The maximum allowable mixing zone is 15 minutes of travel time for acute conditions, not to exceed 50% of stream width, and for chronic conditions is 2500 ft, per UAC R317-2-5. Water

quality standards must be met at the end of the mixing zone.

The actual length of the mixing zone was not determined; however, it was presumed to remain within the maximum allowable mixing zone dimensions. 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 were total suspended solids (TSS), dissolved oxygen (DO), BOD₅, total phosphorus (TP), total nitrogen (TN), total ammonia (TAN), E. coli, pH, and total residual chlorine (TRC) as determined in consultation with 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.

Table 2: WET Limits for IC₂₅

Outfall	Percent Effluent
Outfall 001	51.7%

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.

The effluent limits for DO and BOD₅ in order to meet minimum DO criteria in the receiving water was evaluated using the Utah River Model. The analysis is summarized in the Wasteload Addendum.

The limits for total residual chlorine were determined assuming a decay rate of 32 /day (at 20 °C) and a travel time of 25 minutes; 10 minutes in the outlet pipe prior to discharge to Huntington Creek (approximately 500 linear feet at 1.0 feet per second velocity) and 15 minutes in the mixing zone. The analysis for TRC is summarized in the Wasteload Addendum.

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Table 3: Water Quality Based Effluent Limits Summary

Effluent Constituent	Acute			Chronic		
	Standard	Limit	Averaging Period	Standard	Limit	Averaging Period
Flow (MGD)		0.9	1 day		0.34	30 days
Ammonia (mg/L)			1 hour			30 days
Summer (Jul-Sep)	3.6	12.2		1.3	5.6	
Fall (Oct-Dec)	3.6	11.8		2.0	5.7	
Winter (Jan-Mar)	3.6	14.1		2.1	5.9	
Spring (Apr-Jun)	3.6	12.5		2.0	6.2	
BOD ₅ (mg/L)	N/A	65	7 days	N/A	45	30 days
Dissolved Oxygen (mg/L)	3.0	5.0	Minimum	5.0	5.0	30 days
Total Dissolved Solids (mg/L)	4,800	4,800	Maximum			
Total Residual Chlorine (mg/L)	0.019	0.40	1 hour	0.011	0.44	4 days

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.

A Level II Antidegradation Review (ADR) is not required for this facility. The proposed permit is a simple renewal of an existing UPDES permit. No increase in effluent flow or concentration of pollutants over those authorized in the existing permit is being requested.

Documents:

WLA Document: *Huntington_POTW_WLA_2020.docx*

Wasteload Analysis and Addendums: *Huntington_POTW_WLA_2020.xlsm*

References:

Lewis, B., J. Saunders, and M. Murphy. 2002. Ammonia Toxicity Model (AMMTOX, Version2): A Tool for Determining Effluent Ammonia Limits. University of Colorado, Center for Limnology.

MFG Inc. 2004. Price River, San Rafael River, and Muddy Creek TMDLs for Total Dissolved Solids, West Colorado Watershed Management Unit, Utah. Utah Division of Water Quality.

Utah Division of Water Quality. 2012. *Utah Wasteload Analysis Procedures Version 1.0*.