

Utah Department of Environmental Quality

P.O. Box 144870

Salt Lake City, UT 84114-4870

Attention: Jennifer Robinson

Subject: Local limits

Jen,

Enclosed you will find the local limits calculations for North Davis Sewer District. The data for these calculations is from influent and effluent samples collected in 2021 and 2022. Flow data is from 2017 to 2022. Domestic and commercial sampling was done in July and August of 2022.

North Davis's UPDES permit does not have a Waste Load Allocation for water quality; therefore, we used biosolids as the criteria for calculating the limits for metals. However, as directed by DWQ, the water quality standard for the Great Salt Lake for chromium was used to establish an acute limit (Daily Maximum Limit) for chromium. For conventional pollutants BOD, TSS, and fats, oil and grease (FOG), plant treatment design capacities were used as the criteria for the calculations. However, the District's Board of Trustees has determined it is not in the best interest of the District to allocate a percentage of treatment capacity to industry for conventional pollutants. Thus, the limits for Significant Industrial Users (SIU) that need an allocation for conventional pollutants will remain unchanged.

Please contact me should you have any questions.

Respectfully,

North Davis Sewer District

NORTH DAVIS SEWER DISTRICT

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Plant Superintendent

Tom Anderson

Pretreatment Coordinator

Jonas Reeder

NORTH DAVIS SEWER DISTRICT INDUSTRIAL PRETREATMENT PROGRAM

LOCAL LIMITS DEVELOPMENT

This local limits development report was prepared in accordance with Title 40 of the Code of Federal Regulations Part 403.5(c), and UPDES permit #UT0021741 for North Davis Sewer District.

The data for this submittal is from samples collected from the treatment plant influent channel, the treatment plant effluent channel, the biosolids storage pile, and from a point in the collection system where there is a combination of commercial and domestic wastewater with a flow volume that allowed sufficient flow monitoring throughout a 24-hour sampling episode to collect adequate wastewater for the samples and obtain an accurate flow measurement. Flow-proportioned samples were collected from all of the wastewater sampling points and representative grab samples from the biosolids storage pile periodically over a two-year time span.

SECTION ONE- EXPLANATION AND OVERVIEW OF LOCAL LIMITS DEVELOPMENT

DISTRICT COLLECTION SYSTEM AND TREATMENT PLANT

North Davis Sewer District (District) collects and treats wastewater from Roy, Sunset, Clearfield, Layton, Syracuse, West Point, Clinton, Hill Air Force Base, a small portion of Kaysville, and some unincorporated parts of northern Davis and southern Weber counties. The population served is estimated at 250,000.

The District owns and operates approximately 100 miles of collection lines which convey and transport wastewater to the treatment plant, which is located near the boundary of the Great Salt Lake in the city of Syracuse. The treatment plant is designed to treat 34 million gallons per day of wastewater, 51,600 lbs/day of Biochemical Oxygen Demand (BOD) as a daily average and up to 77,390 lbs/day as a daily maximum, and 57,820 lbs/day of Total Suspended Solids (TSS) as a daily average and up to 86,740 lbs/day as a daily maximum.

Presently, there are 7 Significant Industrial Users (SIU), approximately 300 industrial users deemed to not meet the criteria for an SIU, and approximately 310 restaurants and other Food Service Establishments (FSE) within the District boundaries.

SECTION TWO – SAMPLING AND FLOW MEASUREMENT

SAMPLING PLAN

Samples collected from the collection system to represent loadings from both domestic and commercial sources were collected from a manhole designated as LA03043 in Roy, Utah at approximately 2300 West 5600 South near a Roy City park. This location was determined to have sufficient flow to facilitate flow measurement even during low-flow times in the early morning hours and have a good representation of both commercial and domestic wastewater. It was determined that there were no significant industrial sources flowing through that portion of the collection system.

Pollutant	Average Domestic Concentration (mg/L)
Arsenic	0.00096
Cadmium	0.00079
Chromium	0.02861
Copper	0.07849
Lead	0.00227
Mercury	0.00002
Molybdenum	0.00232
Nickel	0.01354
Selenium	0.00084
Zinc	0.16750

Samples collected to represent the total influent loading were collected at the treatment plant influent channel downstream of the confluence of the four collection lines entering the plant, and upstream of the ferric sulfate feed point. The point selected was well-mixed, had good flow measurement, and had no contribution from plant return flows.

Samples collected to represent total treated effluent loading were collected at the effluent structure downstream of the chlorine contact chambers and upstream of the confluence with the stormwater drainage ditch.

All composite sampling was flow proportioned. Collection system samples employed the use of the Isco 6712 autosampler connected to an Isco 2650 Area Velocity flow meter. The plant influent and effluent samples used the plant's ultrasonic profiling-type flow meter to measure flow.

Determining the 5-year projected plant influent and effluent flow presents a challenge. The daily average flow for the past 5 years has decreased, making a usable projected flow impossible. The decreased flow measured at the treatment plant is explained by the extensive work done on the collection system in lining all of the District owned lines, and subsequent replacement of all manhole structures (ongoing) on all District owned lines. This work has virtually eliminated or at least significantly reduced the infiltration in the collection system thus reducing flow to the plant. Therefore, a 5-year average flow for the years from 2017 to 2022 was used instead. We have opted to use the 25% factor

for Safety and Growth. Since growth models and collection system lining projects have remained relatively consistent, North Davis concludes that it is reasonable that a combined 10% growth and 15% safety factor is adequate to calculate limits based on the District's current operational model. Additionally, North Davis is designed to have the capacity to consistently treat a specified amount of conventional pollutants to acceptable levels for discharge and holds in reserve a portion of its Maximum Allowable Headworks Loading (MAHL) for growth.

Influent and effluent 24-hour composite samples were collected and analyzed for pollutants required by the District's UPDES permit. The mercury field blank was a grab sample. Collection system samples were collected and analyzed, then compared to 40 CFR Part 503 Table 1 (for the allowable ceiling concentration of molybdenum) and Table 3 (for the allowable maximum average monthly concentration for other metals). Analytical methods were used that would provide the lowest available Method Detection Limit. Method 200.8 was used for metals except mercury, for which method 1631 with a field blank for sample integrity was used.

All collection system sampling and flow measurement was done by the Pretreatment Coordinator with assistance from collection system personnel. Proper Confined Space Entry procedures were followed. Plant samples were collected using refrigerated autosamplers by lab personnel. Aliquots for local limit samples were collected by the Pretreatment Coordinator. Samples of biosolids were collected from the dried storage piles by the Biosolids Manager. Proper Chain of Custody procedures were followed, and a carbonless copy of the completed Chain of Custody form was filed and retained in the sampling log.

Contract laboratories performed analyses for metals and cyanide.

SECTION THREE – IDENTIFICATION AND EVALUATION OF POLLUTANTS OF CONCERN

Prior to development of local limits, North Davis Sewer District conducted an evaluation of potential Pollutants of Concern (POCs) in accordance with 40 CFR 403.5(c) and the EPA Local Limits Development Guidance Manual.

Potential POCs were evaluated using the following criteria:

- Potential to cause pass-through or interfere with treatment processes
- Potential to adversely affect biosolids quality under 40 CFR Part 503
- Potential to violate applicable water quality standards
- Potential to inhibit biological treatment processes
- Potential impacts on worker health and safety
- Potential impacts to collection system integrity
- Operational experience at the treatment facility

- Historical influent and effluent monitoring data
- Industrial user inventory
- Existing permit limitations

Because North Davis Sewer District discharges directly to the Great Salt Lake, the District's UPDES permit does not establish Waste Load Allocations for most pollutants. Consequently, protection of biosolids under 40 CFR Part 503 served as the primary limiting criterion for metals. Chromium was additionally evaluated using applicable Great Salt Lake water quality criteria, as recommended by the Utah Division of Water Quality.

The District reviewed the pollutants identified in EPA Local Limits Development Guidance Exhibit 3-1, including conventional pollutants, metals, cyanide, volatile organic compounds, semi-volatile organic compounds, pesticides, PCBs, oil and grease, sulfide, ammonia, pH, temperature, and other pollutants commonly associated with industrial wastewater.

Evaluation of these pollutants included review of:

- Historical analytical data
- Industrial user discharge characteristics
- Pretreatment inspection records
- Plant operational records
- Biosolids monitoring results
- Collection system observations
- Existing UPDES permit requirements

Based upon this evaluation, the District determined that only the following pollutants presently warrant development of technically based numeric local limits:

- Arsenic
- Cadmium
- Chromium
- Copper
- Lead
- Mercury
- Molybdenum

- Nickel
- Selenium
- Zinc

Pollutants Evaluated But Not Selected

The following pollutants identified within the EPA Local Limits Development Guidance were evaluated but were not determined to require numerical local limits during this review cycle.

Conventional Pollutants

Biochemical Oxygen Demand (BOD), Total Suspended Solids (TSS), and Fats, Oils and Grease (FOG) were evaluated using treatment plant design capacity. Existing allocation procedures and permit requirements continue to provide adequate protection of treatment capacity, and no modification to existing conventional pollutant limits was determined to be necessary.

Treatment Inhibition Parameters

The District reviewed available information regarding ammonia, sulfide, pH, temperature, chlorine demand, and other pollutants identified in EPA guidance as potential causes of biological inhibition.

Historical plant performance demonstrates stable biological treatment with no documented inhibition attributable to industrial discharges. Consequently, inhibition-based local limits were not developed during this evaluation. Should future industrial activities or treatment performance indicate a potential for inhibition, these pollutants will be reevaluated using the methodologies contained in Sections 5.2.4 and 5.5 of the EPA Local Limits Development Guidance Manual.

Worker Health and Safety

Potential pollutants capable of creating unsafe atmospheric conditions, fire hazards, explosive conditions, or toxic workplace exposures were reviewed.

Existing prohibited discharge standards, sewer use regulations, and permit conditions are considered adequate to control these pollutants. No numerical local limits were determined to be necessary at this time.

Air Quality

Potential volatile pollutants were evaluated.

The District does not currently receive industrial discharges that would reasonably be expected to create air quality concerns within the treatment process. Existing prohibited discharge provisions remain protective.

Organic Pollutants

Historical monitoring, industrial user inventories, and compliance history indicate that volatile organic compounds, semi-volatile organic compounds, pesticides, PCBs, and similar constituents are not discharged at concentrations that warrant development of numerical local limits at this time.

The District will continue to evaluate these pollutants during future local limits reviews or whenever new industrial activities indicate a potential concern.

SECTION THREE – EVALUATION TABLE

Pollutant Category	Evaluated	Basis for Evaluation	Local Limit Required	Basis for Decision
Metals	Yes	40 CFR Part 503, Water Quality	Yes	Biosolids/Water Quality
Chromium	Yes	Water Quality	Yes	Great Salt Lake Criteria
BOD/TSS	Yes	Plant Design Capacity	Existing Limits Maintained	Capacity Allocation
Oil & Grease	Yes	Collection System Protection	Existing Limits Maintained	Historical Operational Experience
Ammonia	Yes	Inhibition Screening	No	No Historical Inhibition
Sulfide	Yes	Worker Safety/Inhibition	No	Existing Prohibited Discharge Standards
VOCs/SVOCs	Yes	Industrial Inventory	No	No Significant Sources
Cyanide	Yes	Historical Monitoring	No	No Industrial Loading of Concern
Temperature	Yes	Operational Review	No	Existing General Prohibitions
pH	Yes	Collection System & Treatment	Existing Limits Maintained	Existing Standards Protective

SECTION FOUR – CALCULATIONS

MAXIMUM ALLOWABLE HEADWORKS LOADING

The criteria used to determine the Maximum Allowable Headworks Loading (MAHL) include: UPDES permit limits (pass-through), process inhibition, protection of biosolids, and worker safety. Protection of biosolids and water quality provided the most sound criteria from which to develop local limits at this time.

BIOSOLIDS PRODUCTION

Biosolids Production Equation:

$$\frac{((\text{biosolids produced, lbs/day})(503 \text{ criteria, mg per kg/1,000,000}))}{\text{POTW removal efficiency, \%}}$$

In order to calculate an MAHL for a pollutant, the amount of biosolids produced in a given time period must first be determined. At the District, all treated sludge from the anaerobic digesters is dewatered using a belt filter press. The dewatered sludge is moved via screw conveyor to a large end-dump semi-trailer that is parked on a scale. Each load is weighed and samples are collected at the beginning of the loading process, about half-way through the loading process, and at the end of the loading process to be tested for percent solids. Thus, an accurate measurement of daily production of dry biosolids can be obtained. The average production of dry biosolids at North Davis for the year 2017 through 2022 was 15,664 lbs/day. This value was derived from converting 2,596 dry metric tons of biosolids produced per year to pounds produced/day using the following formula:

$$\text{Biosolids Produced, lbs/day} = \frac{(2,596 \text{ DMT/yr})(1,000 \text{ kg/DMT})/0.4536 \text{ kg/lb}}{365.2524 \text{ days/yr}}$$

Therefore, Biosolids Produced = 15,664 lbs/day.

40 CFR PART 503, TABLE 3 LIMITS

As previously mentioned, the criteria used for calculating the MAHL for metals is the concentration in milligrams per kilogram for each metal found in Table 3 of 40 CFR 503.13. That table is included below. Table 3 does not include a limit for molybdenum. It is, however, included in Table 1 of § 503.13 as one of the “Ceiling Concentration” limits. We used the Table 1 ceiling concentration of 75 mg/kg in our calculations for molybdenum.

Table 3 of § 503.13—Pollutant Concentrations

Pollutant	Monthly Average Concentration (mg/kg) ¹
Arsenic	41
Cadmium	39

Copper	1500
Lead	300
Mercury	17
Nickel	420
Selenium	100
Zinc	2800

¹Dry weight basis

REMOVAL EFFICIENCIES

The removal efficiencies of the District's POTW for each of the listed pollutants were calculated using data from analysis of the samples collected from the treatment plant's influent and effluent for the previous 2021 and 2022 years. A table showing the various removal efficiencies is included with the spreadsheets attached to this report.

Pollutant	Removal Efficiencies (%)
Arsenic	6
Cadmium	91
Chromium	78
Copper	89
Lead	85
Mercury	92
Molybdenum	20
Nickel	38
Selenium	40
Zinc	83

ALLOCATION OF MAHL

The District's UPDES permit does not have a Waste Load Allocation for water quality. Therefore, we used biosolids protection as the criterion for calculating the limits for metals. However, the water quality standard for the Great Salt Lake for chromium was used to establish an acute limit (Daily Maximum Limit) for chromium. That value came back high at 81.74 mg/L. However, we note that if an Industrial User (IU) is found discharging chromium above 5 mg/L, the IU must notify the District per 40 CFR 403.12(p).

After the MAHL is calculated, the next step in the development of local limits is to allocate to the various sources of these pollutants a portion of the total MAHL in such a way that the objectives of the local limits development may be achieved. A portion of the MAHL must be allocated to the following:

- Safety- This provides a margin of safety between the maximum allowable discharges and possible higher-than-normal discharges contributed by industrial, domestic, and commercial sources.
- Growth- This provides a margin for growth in the population and industrial expansion.
- Domestic/commercial- A portion of the MAHL must be allocated to these sources. Pollutants from these sources are detected at the headworks but are considered uncontrolled sources.
- Industrial- After appropriate portions of the MAHL have been allocated to safety and growth and to domestic and commercial sources, the remainder is allocated to industrial users as the Maximum Allowable Industrial Load (MAIL).

In order to calculate a local limit for each of the POCs, it is necessary to first subtract the domestic and commercial contribution for each of the pollutants. The data used to determine the domestic and commercial contributions of each POC is derived from analysis of the samples collected at a representative location in the collection system. The concentration of each POC is then multiplied by the flow at the Plant Influent flow meter in Million Gallons per Day (MGD) times 8.34, a unit conversion factor, to arrive at a representative headworks loading of that POC from domestic/commercial sources. A summary of the loading for each POC is included in the spreadsheets included with this report.

The next step in arriving at a local limit for each POC is to subtract the domestic/commercial loading from the MAHL. This gives a value in lbs/day as Net Allocatable Load. From that is subtracted the factor for safety and growth. The remaining value is then converted to a concentration which results in the local limit for that POC. The District has determined that a **uniform** allocation of each POC provides sufficient protection of the environment and simplifies the administration of the Pretreatment Program. The uniform allocation does not include the conventional pollutants BOD, TSS, and oil and grease, which are allocated as loads to SIUs.

While the limit for oil and grease could be further developed following the EPA Local Limits Development Guidance Manual, this POC is extremely problematic for the collection system. The District is concerned that any modifications to the current allocation for oil and grease may adversely impact District-owned lines. Thus, the District will not make any adjustments to the current limit for polar or non-polar oil and grease. North Davis will continue to follow the EPA Local Limits Guidance Manual in the adoption of 100 mg/L as our local limit for petroleum-based oil and grease. Based on historical evaluations, 500 mg/L for animal and vegetable oils and grease will remain the maximum concentration the District will allow for the protection of the POTW.

For pH, besides the low-end limit specified in the General Pretreatment Regulations, the District has adopted the EPA recommendation to set upper pH limits if corrosion damage attributable to high-pH discharges is identified. Since an upper limit pH of 12.5 may be appropriate in lieu of any identified high pH corrosion concerns, the District has adopted this value as our upper limit. The included tables and spreadsheets show the method used to calculate the local limits and the non-uniform conventional POC

allocations. The Local Limit Concentration table below was provided to all the District's permitted SIUs, and each was given a reasonable period to provide comments. No concerns regarding the proposed limits were raised. The lack of concerns, combined with a review of historical analytical data, suggests that no SIU will violate the new limits.

Pollutant	Local Limits Concentration (mg/L)	Limit Type
Arsenic	2.25	30 Day Average
Cadmium	0.11	30 Day Average
Chromium	81.74	Daily Maximum
Copper	2.12	30 Day Average
Lead	1.08	30 Day Average
Mercury	0.061	30 Day Average
Molybdenum	1.15	30 Day Average
Nickel	3.10	30 Day Average
Selenium	0.80	30 Day Average
Zinc	3.78	30 Day Average