

# Industrial Pretreatment Local Limits Evaluation Wildcat Hill & Rio de Flag Water Reclamation Plants

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Prepared for  
City of Flagstaff, AZ  
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# Executive Summary

Brown and Caldwell (BC) conducted a Local Limits Evaluation (LLE) in accordance with Arizona Department of Environmental Quality (ADEQ) and the United States Environmental Protection Agency (EPA) for the City of Flagstaff, AZ (City). This report provides guidance for the development of local limits on discharges to Wildcat Hill Water Reclamation Plant (WRP) & Rio de Flag Water WRP.

This report addresses the development of local limits on industrial discharges to the Wildcat Hill WRP and Rio de Flag WRP. Local limits were calculated for both WRPs individually and then calculations were discussed with the City. Each pollutant of concern (POC) was addressed, and one set of local limits was chosen to be implemented to regulate both WRPs. Important findings noted during the evaluation and recommendations for future reviews and reevaluations are also provided.

## Applied Methodology and Approach

This LLE was prepared in accordance with ADEQ and EPA requirements. Details on the applied methodology, assumptions, and approach used during development of the proposed new local limits for the Wildcat Hill WRP and Rio de Flag WRP are described below.

- The industrial local limits for pollutants of concern (POCs) were derived based on the following criteria:
  - Revised AZPDES limits
  - EPA POC
  - Protection of receiving stream water quality due to pass-through
  - Recent detections in the influent, effluent, or industrial wastewaters
  - Updated Water Quality Standards (WQS) and sludge disposal criteria
  - Prevention of treatment plant performance problems due to process interference or inhibition
  - Prevention of hazardous sludge disposal.
- Site-specific removal efficiencies were calculated for the conventional pollutants based on Wildcat Hill WRP and Rio de Flag WRP averages of influent and effluent analytical results data from the second quarter of 2018 through the third quarter of 2019. The USEPA Local Limits Guidance Document suggests that sampling should be conducted randomly and should be representative of different days, months, and conditions throughout the year. Six data points over a year and half period worth of data provided by the City encompasses this sampling recommendation. In addition, removal efficiencies were calculated for those non-conventional POCs detected in the influent and/or effluent samples during the same time frame. Literature values were used for POCs with no available site-specific removal efficiencies or in cases where not enough data was provided. Going forward, it is recommended that data be collected and analyzed on a yearly basis to calculate maximum allowable headworks loadings (MAHLs). This will allow the WRPs to make the necessary changes in the local limits to properly protect treatment process. Future sampling recommendations are discussed in Section 6 of this report.

- Literature values were used where site-specific domestic/commercial concentrations of POCs in wastewater were not available. Background levels were assumed to be negligible when domestic/commercial levels were not available.
- Allowable headworks loadings were calculated based on the design criteria, AZPDES permit limits, activated sludge and nitrification treatment inhibition, sludge disposal standards, and acute and chronic WQS.
- All inhibition thresholds were based on literature values with the median threshold value, or minimum when there was no median, to provide a conservative limit.
- Currently, sludge from the Wildcat Hill WRP is land injected at one biosolids surface disposal site adjacent to the facility.
- Arizona acute and chronic WQS are from The Arizona Administrative Code Title 18, Environmental Quality, Chapter 11, Department of Environmental Quality - Water Quality Standards. Standards that are hardness-dependent were first adjusted for hardness of the receiving stream and dissolved metals were then converted to total recoverable. The most stringent acute and chronic water quality standard for each parameter was used. Per the Effluent Average from Wildcat Hill WRP Bench Sheets provided by the City, a level of 167.0 milligrams per liter (mg/L) was used for calculations containing Hardness.
- The monthly average influent flow of 3.69 million gallons per day (mgd) for Wildcat Hill WRP and 1.81 mgd for Rio de Flag WRP, was based on data provided by the City and shown in Table A1 (Appendix A). The monthly average effluent flow of 3.64 mgd for Wildcat Hill WRP and 0.75 mgd for Rio de Flag WRP was also based on data provided by the City and shown in Table A1 (Appendix A).
- The AZPDES flows used for Wildcat Hill WRP and Rio de Flag WRP are provided in the fact sheet for each permit. Permit AZ0020427 became effective on June 1, 2020 and expires on May 31<sup>st</sup>, 2025. Permit AZ0023639 became effective on January 15, 2020 and expires on January 14, 2025. The Rio de Flag river originates in several springs on the south slope of the San Francisco Peaks and is the receiving water for effluent from the Wildcat Hill WRP and Rio de Flag WRP.
- A safety factor of 10 percent was used to adequately address data uncertainties in this LLE.

The following presents the important findings noted during the evaluation and also provides recommendations for future reviews and reevaluations.

## Important Findings of the LLE

The major findings of this LLE are listed below.

- Per EPA guidance, the AZPDES permitted flow should be used in the AZPDES AHL calculations. The updated NPDES permits issued by ADEQ include the permitted flows on the permit fact sheet for each facility and were used for calculations.
- The Rio de Flag is effluent dependent; therefore, there are no background stream concentrations. The flow used to calculate WQS AHLs were average effluent flow for both Wildcat Hill WRP and Rio de Flag WRP.
- In calculating the proposed local limits, stream hardness upstream was assumed to be 167 mg/L based on the effluent average of Wildcat Hill WRP.
- The current local limits used a 10 percent safety factor.
- The proposed local limits consist of 18 parameters compared to the 25 current limits.
- The proposed local limits for Biochemical Oxygen Demand (BOD) and Total Suspended Solids (TSS) were calculated per mass-based based on industrial concentrations and flow.

- The copper local limit calculations are based on the water quality standard of 0.018 mg/L. Additional raw wastewater sampling is recommended to determine the potential copper sources in the raw wastewater; however, the City should also investigate the current copper concentration in the drinking water system.

## Recommendation for Future Review and Reevaluations

Recommendations for future reviews and reevaluations of local limits are as follows:

- Local limits should be reevaluated in the event of major changes that may affect local limits. These changes include, but are not limited to:
  - Revised AZPDES limits
  - Changes associated with industrial users; for example, the addition of a new major industry
  - Significant domestic and/or commercial growth in the County
  - Additions or improvements of treatment processes occurring at the WRPs
  - The revision of state and/or national water quality criteria
  - Changes in sludge disposal methods
  - Changes in the Industrial Pretreatment Program.

## Local Limits Revisions

This report was originally submitted to the City on February 18, 2020. This report has been revised per the updated NPDES permits for the WRF facilities issued by ADEQ in January and July 2020. Revisions to the calculations included in the document are as follows:

- Revision October 6, 2020: Comments from ADEQ were received on August 18, 2020. The report was revised to include permitted flows and updated permit values for current AZPDES Permit AZ0020427 for Wildcat Hill WRP at 6 mgd, and AZPDES permit AZ0023639 for Rio de Flag at 4 mgd. The letter from ADEQ is included in Appendix F of this report for reference.

# Final Proposed Local Limits

Table 7-1 provides a summary of the calculated concentration and mass-based local limits for the Wildcat Hill WRP and Rio de Flag WRP. Both WRPs were assessed individually, and one set of limits were chosen to protect both. Reasonings for final decisions are found in Section 3.11 of this report. The final proposed local limits are as follows:

Table 7-1. Summary of Local Limits for the City of Flagstaff					
Pollutant	Current Local Limits (mg/L)	Wildcat Hill WRP Calculated Local Limit (mg/L)	Rio de Flag WRP Calculated Local Limits (mg/L)	Recommended Local Limits (mg/l unless noted)	Technical basis
<b>Conventional pollutants</b>					
Ammonia (as N)	173 <sup>b</sup>	1,472	576	173	City Decision to Remain Unchanged
Biochemical Oxygen Demand <sup>c</sup>	1,000	23,925	7,849	700 lb/d	Mass-based Calculation
Total Suspended Solids <sup>c</sup>	1,200	25,192	4,988	130 lb/d	Mass-based Calculation
Kjeldahl Nitrogen, Total (TKN)	173 <sup>b</sup>	1,015	672	173	City Decision to Remain Unchanged
<b>Inorganic Pollutants</b>					
Arsenic	0.31	0.18	0.44	0.18	Wildcat Hill WRP/Sludge Disposal
Bromide	0.05	0.50	0.50	0.50	TTHM Formation/City Decision based on reporting limits
Copper	0.15	0.412	0.273	0.20	City Decision to Lower
Cyanide	0.24	0.102	0.104	0.24	Based on 2015 Limit/City Decision based on Minimal Loading
Lead	0.04	0.37	0.08	0.08	Rio de Flag WRP/ Chronic State WQS
Mercury	0.017	0.006	0.008	0.017	Based on 2015 Limit/City Decision based on Minimal Loading
Selenium	0.015	0.063	0.025	0.015	Based on 2015 Limit
Zinc	1.4	6.81	4.85	3.0	City decision to lower
<b>Organic Pollutants</b>					
TTHMs <sup>a</sup>	0.32	Not Calculated	Not Calculated	0.32	Based on 2015 Limit
Toluene	0.14	5.78	4.72	0.14	Based on 2015 Limit
<b>Other Pollutants</b>					
Oil and Grease	152*Qmax	1,186	753	200	City Decision to Lower
Nitrate/Nitrite as N	173 <sup>b</sup>	312	66	10	City Decision based on WQSS
Sulfide	4.5	231	131	5	City Decision to Lower
pH	6.5-11	Not Calculated	Not Calculated	6-11	City Decision- included in Municipal Code

<sup>a</sup> TTHM Local Limit was not calculated, instead the Local Limit Calculation was broken down into the four main compounds, bromoform, bromodichloromethane, chloroform, and dibromochloromethane. See Appendix D and E for specific Calculations.

<sup>b</sup> Total Nitrogen Local Limit of 173 mg/L was not reanalyzed, instead the Local Limit Calculation was broken down into ammonia, TKN, and nitrate/nitrite. The local limit for total nitrogen will be removed with the ammonia, TKN, and nitrate/nitrite taking its place.

<sup>c</sup> Per the request of the City, BOD and TSS local limits are based on lb/day, and a lower limit was selected by the City to protect the WRPs.