WORK SESSION AGENDA

CITY COUNCIL WORK SESSION
TUESDAY
MARCH 30, 2021

STAFF CONFERENCE ROOM
SECOND FLOOR - CITY HALL
211 WEST ASPEN AVENUE
3:00 P.M.

ATTENTION

IN-PERSON AUDIENCES AT CITY COUNCIL MEETINGS HAVE BEEN SUSPENDED UNTIL FURTHER NOTICE

The meetings will continue to be live streamed on the city's website (https://www.flagstaff.az.gov/1461/Streaming-City-Council-Meetings)

PUBLIC COMMENT PROTOCOL

The process for submitting a public comment has changed and public comments will no longer be read by staff during the Council Meetings.

All public comments will be taken either telephonically or accepted as a written comment.

Public comments may be submitted to publiccomment@flagstaffaz.gov

If you wish to address the City Council with a public comment by phone you must submit the following information:

First and Last Name
Phone Number
Agenda Item number you wish to speak on

If any of this information is missing, you will not be called. We will attempt to call you only one time. We are unable to provide a time when you may be called.

All comments submitted otherwise will be considered written comments and will be documented into the record as such.

If you wish to email Mayor and Council directly you may do so at council@flagstaffaz.gov.

AGENDA

1. Call to Order

NOTICE OF OPTION TO RECESS INTO EXECUTIVE SESSION

Pursuant to A.R.S. §38-431.02, notice is hereby given to the members of the City Council and to the general public that, at this work session, the City Council may vote to go into executive session, which will not be open to the public, for legal advice and discussion with the City's attorneys for legal advice on any item listed on the following agenda, pursuant to A.R.S. §38-431.03(A)(3).

2. **Pledge of Allegiance and Mission Statement**

MISSION STATEMENT

The mission of the City of Flagstaff is to protect and enhance the quality of life for all.

3. **ROLL CALL**

NOTE: One or more Councilmembers may be in attendance telephonically or by other technological means.

MAYOR DEASY
VICE MAYOR DAGGETT
COUNCILMEMBER ASLAN
COUNCILMEMBER MCCARTHY
COUNCILMEMBER SALAS
COUNCILMEMBER SHIMONI
COUNCILMEMBER SWEET

4. **Public Participation**

Public Participation enables the public to address the council about items that are not on the prepared agenda. Public Participation appears on the agenda twice, at the beginning and at the end of the work session. You may speak at one or the other, but not both. Anyone wishing to comment at the meeting is asked to fill out a speaker card and submit it to the recording clerk. When the item comes up on the agenda, your name will be called. You may address the Council up to three times throughout the meeting, including comments made during Public Participation. Please limit your remarks to three minutes per item to allow everyone to have an opportunity to speak. At the discretion of the Chair, ten or more persons present at the meeting and wishing to speak may appoint a representative who may have no more than fifteen minutes to speak.

5. **Review of Draft Agenda for the April 6, 2021 City Council Meeting**

Citizens wishing to speak on agenda items not specifically called out by the City Council may submit a speaker card for their items of interest to the recording clerk.

6. **Proclamation: Bipolar Awareness Day**

7. **Recognition: W.F. Killip Elementary School Recognition**

8. **Northern Arizona Intergovernmental Public Transportation Authority (NAIPTA) Downtown Connection Center Update**

9. **Economic Development Quarterly Update**

10. **COVID-19 Update**

11. **Surface Transportation Reauthorization Project Authorization Request**

12. **Public Works Division Overview**

13. Proposed changes to Local Limits for Significant Industrial Users and changes to Cross Connection Code

14. Regional Plan 2045 Update Potential Process and Strategies

15. Public Participation

16. Informational Items To/From Mayor, Council, and City Manager; future agenda item requests

17. Adjournment

<u>CERTIFICATE OF POSTING OF NOTICE</u>

The undersigned hereby certifies that a copy of the foregoing notice was duly posted at Flagstaff City Hall on ___________, at _______ a.m./p.m. in accordance with the statement filed by the City Council with the City Clerk.

Dated this ______ day of ___________________, 2021.

____
Stacy Saltzburg, MMC, City Clerk

8.

CITY OF FLAGSTAFF

STAFF SUMMARY REPORT

To:	The Honorable Mayor and Council
From:	Dan Folke, Community Development Director
Co-Submitter:	Deputy City Manager Shane Dille
Date:	03/22/2021
Meeting Date:	03/30/2021

TITLE:

Northern Arizona Intergovernmental Public Transportation Authority (NAIPTA) Downtown Connection Center Update

DESIRED OUTCOME:

NAIPTA is seeking input on the current concept and would like to proceed with next steps to complete design of a new Downtown Connection Center.

EXECUTIVE SUMMARY:

The Northern Arizona Intergovernmental Public Transportation Authority (NAIPTA), commonly known as Mountain Line has considered a number of concepts for a new connection center located at the downtown location on Phoenix Avenue. Mountain Line will provide an update on the concept and project timeline.

INFORMATION:

NAIPTA has prepared a memo and presentation which are attached.

Attachments: NAIPTA DCC Update memo
DCC Presentation

Northern Arizona Intergovernmental Public Transportation Authority
3773 N. Kaspar Drive • Flagstaff, AZ 86004 • 928-679-8900 • FAX 928-779-6868 • www.mountainline.az.gov

NAIPTA MEMORANDUM

DATE: March 27, 2020

TO: The Honorable Mayor and City Council

FROM:
Kate Morley, Mountain Line Deputy General Manager
Heather Dalmolin, Mountain Line CEO & General Manager

SUBJECT: Mountain Line Downtown Connection Center (DCC) Project

Background and Existing Conditions:

A new Downtown Connection Center (DCC) is identified in Mountain Line's 2020 Strategic Plan as the highest priority capital project in order to support public transit service within the community. Since 2009, Mountain Line has operated the existing DCC under an Intergovernmental Agreement (IGA) and licensing agreement with the City of Flagstaff for use of City owned parcels on Phoenix Avenue. This transit hub serves approximately 52,000 riders monthly and has upwards of 300 buses accessing the site daily at our current level of service.

The existing DCC has capacity for nine buses at two curb islands and two on-street loading zones developed for 30' buses, the size that were in operation in 2009. Mountain Line currently operates 40' and 60' buses and has had to make minor accommodations and upgrades to the site to fit our new fleet into the existing DCC. The existing loading zones have no additional capacity for transit service expansion and presents significant operational challenges for existing service levels. Under our current conditions, Mountain Line has to get creative about connection schedules and actively manage bus dwell locations.

The existing DCC has minimal amenities for riders and drivers. A portion of the existing City warehouse is used for a driver comfort station with restrooms and a breakroom for staff. Aside from two bus shelters, there are no customer service or amenities for patrons.

Due to these limitations, in FY2018, NAIPTA applied for and received a $6,777,938 Federal Transit Administration (FTA) Section 5307/5339 grant (80% federal/20% local) awarded through ADOT for acquisition, design and construction of a new connection center. Then, in 2019, NAIPTA applied for and received a second FTA Section 5339 grant bringing an additional $15,675,000 in federal funds to the project. Mountain Line now believes it has adequate funding to develop a true, multimodal, community asset in the heart of downtown.

Alternatives Analysis

In the fall of 2019, Mountain Line conducted an Alternatives Analysis to evaluate a variety of sites for the new connection center. It was determined that sites needed to be a minimum of 141,000 square feet to accommodate bus maneuvering and an administration facility. Sites also needed to be within ¼ mile of the downtown core to ensure the connection center would be within walking distance of that major activity center. Four sites met the criteria and were further analyzed using 66 criteria in 10 overall categories. The site screening criteria included: site access for buses, pedestrians and bicycles: route network impacts; appropriate land use and zoning; community support; railroad/utility impacts; environmental; cost; and existing ownership. Expanding the current site on Phoenix Avenue was identified as the highest-ranking alternative.

Downtown Connection Center Needs and Programming

Mountain Line has identified the following items as key elements of the connection center.

- Provide improvements for the ingress/egress of buses to connect to major arterials.
- Develop an inviting, welcoming space for customers with focus on safety and security and a context-sensitive, sustainable design.
- Provide customer service office(s), safety/operations supervisor offices.
- Separate transit operations from personal vehicles and provide for long-term service expansion with capacity for up to 13 bus bays.
- Develop administrative offices with the possibility of conference or community space.
- Develop opportunities for other transportation modes such as bike share, car share and/or ride hailing services, connection with regional services, bike lockers, rider drop off and customer parking.

Additional items have been identified as desired, but not required:

- Revenue generation component such as building space for partnership opportunities including office or other uses to be determined.
- Public art.
- Community space.
- Civic space.
- Other partner needs.

Concepts

Over the last year, Mountain Line has developed many concepts, trying to maximize use of the property. In coordination with city staff, compatibility with the Rio de Flag project has been the driving factor in design. Mountain Line has fully explored the opportunity to provide space for a P3 partnership; however, the best-practice needs of a transit center coupled with the extensive easements existing across the site have so constrained the developable area so as to virtually eliminate the potential for P3 opportunities.

Attached to this report is what we believe to be the best concept plan for the transit center. Benefits include:

- Pedestrian and bike connection to the site,
- forward facing building on Milton Ave,
- bus bays that allow for safe movements and provide opportunity for intercity and tour bus use,
- capacity, though reduced, for special parking uses such as Amtrak and winter ordinance overnight permits, and
- opportunity for civic space to meet southside community desires.

With these benefits, its important to realize that expansion of the transit center means reduction of other uses on site, mainly parking. The current site has 159 parking spaces including 7 for over sized vehicles such as RVs and trailers. The concept in front of you has approximately 65 spaces and currently does not have capacity for oversized vehicles. While Mountain Line will explore opportunities to support this type of parking, Mountain Line cannot commit to finding a way to accommodate large vehicle or RV parking on the site. It is important to note that any potential solution for in this regard would come at the expense of civic space desires.

Next Steps

Mountain Line will continue to develop a design through the support of the DCC stakeholders groups which has representatives from Southside neighborhood, La Plaza Vieja neighborhood, transit riders, the Chamber of Commerce, the Downtown Business Alliance and the county's Sustainable Building Program. Mountain Line will submit an application for a Conditional Use Permit to the City for approval by Planning and Zoning Commission. Mountain Line has committed to bring the CUP to the City Council for their full review regardless of the Planning Commission's formal recommendation. Because the project is federally funded, an environmental review will also be conducted.

Mountain Line recognizes time is of the essence to develop the plans for a new DCC due to the pending Rio de Flag Project. The Rio de Flag project construction will impact the current downtown connection center, meaning plans for the permanent DCC need to be well ahead of the Rio de Flag Project.

Connection to City Plan's

Climate Action and Adaption Plan (implementation is a City Council Goal)

- STRATEGY 2. Prioritize, incentivize, and promote transportation by biking, walking, and transit.

Flagstaff Regional Plan

- Policy LU.5.5. Plan for and promote compact commercial development as activity centers with mixed uses, allowing for efficient multi-modal transit options and infrastructure.

- Policy T.1.7. Coordinate transportation and other public infrastructure investments efficiently to achieve land use and economic goals
- Goal T.7. Provide a high-quality, safe, convenient, accessible public transportation system, where feasible, to serve as an attractive alternative to single-occupant vehicles.
- Policy T.7.3. Support a public transit system design that encourages frequent and convenient access points, for various transportation modes and providers, such as private bus and shuttle systems, park-and-ride lots for cars and bicycles, and well-placed access to bus, railroad, and airline terminal facilities

Southside Neighborhood Specific Plan

- The Downtown Connection Center at this location is supported.

Mountain Line
Downtown Connection Center
(DCC)

Overview of Presentation

- DCC History
- Goals and Needs
- Site Selection
- Concept
- Next Steps

DCC History

- Located on Phoenix Ave: City owned property
- At MAXIMUM capacity
- Challenging access for buses and patrons
- Lacks customer amenities

	2008	2019
Total Annual Riders	1,000,000	2,500,000
Routes	6	10
Buses	30’	40’ and 60’
Buses per day	158	355

Mountain Line
Facility Goals/ Needs

Goals:

- Elevate the transit experience in community
- Reflect who we are and how we treat customers
- Elevate Mountain Line throughout community
- Maintain support of Southside community

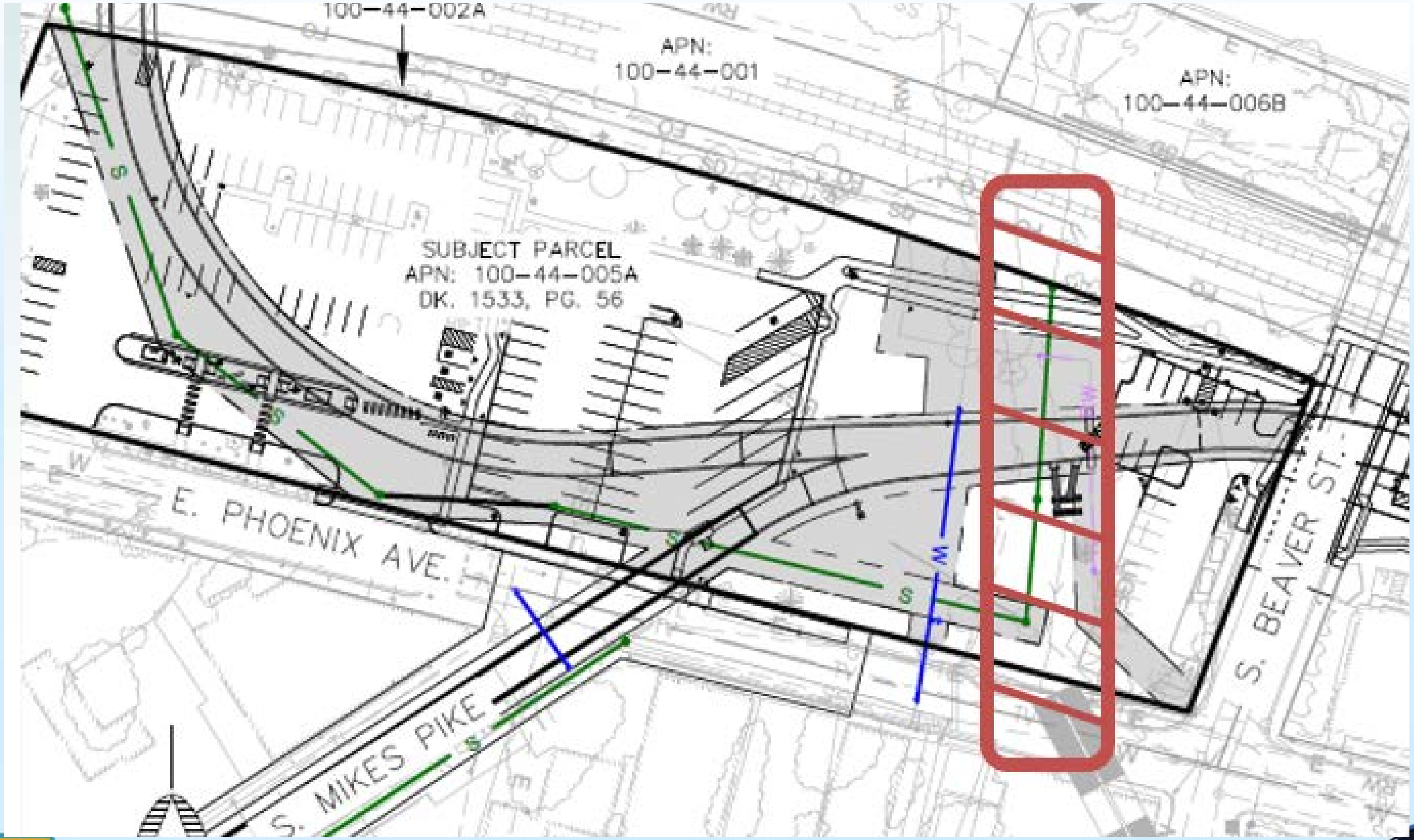
Needs:

- Bus Bays (11 today, 13 long term bays)
- Enhanced safety operations (separate cars and buses, light at Phoenix, alignment with Mike's Pike.
- Admin offices with customer services

Our show case piece. Inviting and welcoming for riders.

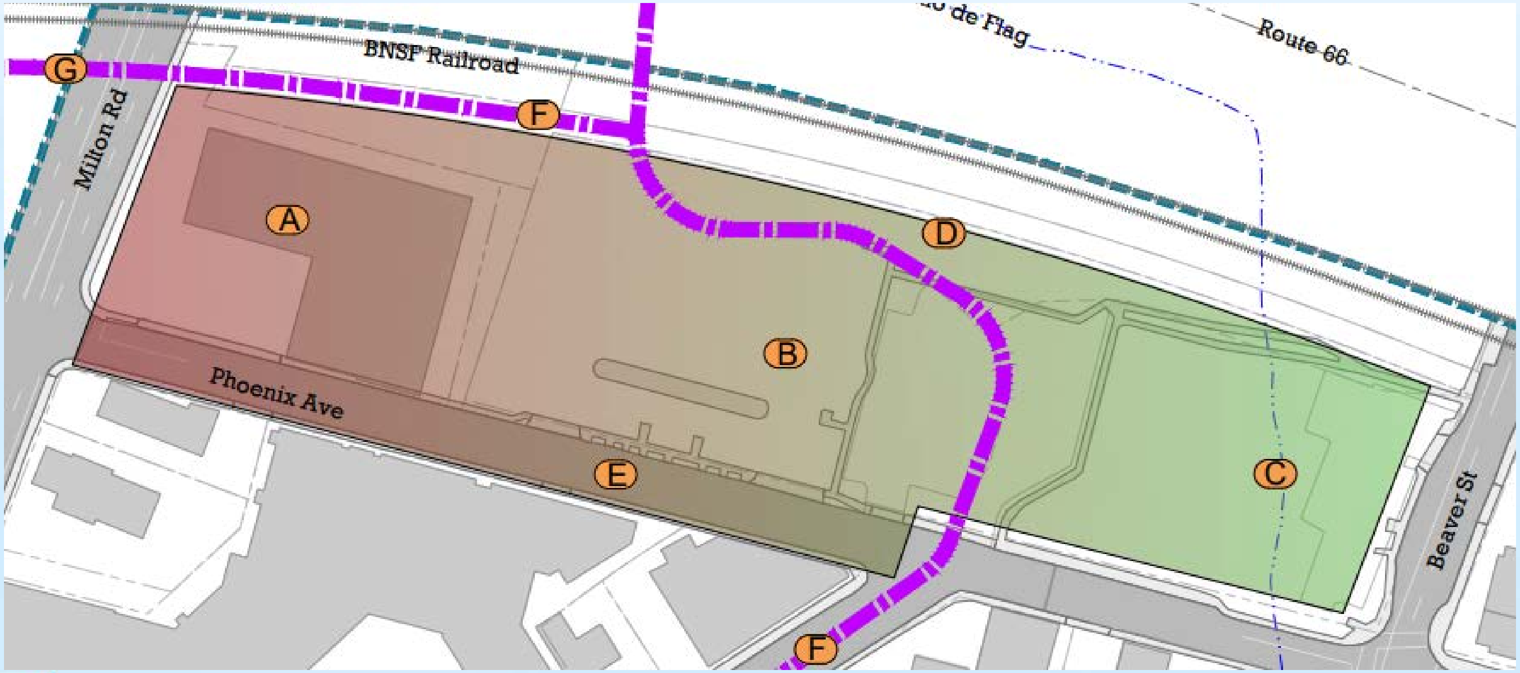
City

Number 1 priority is compatibility with Rio de Flag project



Southside Plan

A. The western end of the property could be more industrial and support bus operations with site screening, a welcoming area, and community amenities.
B. The middle of the site may be used for commercial mixed use, civic space, or as another type of transition area.
C. The east end could be programmed for civic/park space with park spaces that invite people into the greater DCC site.
D. Amtrak is considering moving the location where passengers board and disembark, Keeping Amtrak in the core of town with connectivity to other transportation services could be an overall asset.
E. The design of Phoenix Avenue between South Milton Road and South Beaver Street could be altered.
F. The Active Transportation Master Plan shows pedestrian and bike routes that will run through the future DCC.
G. Crossings of Milton



Input

PAC and Stakeholder Input Summary

- **A community amenity:**
  - Community space accessible to all
  - Active, people-friendly
  - A safe and inviting place, community pride
  - Minimize parking
- **DCC Building:**
  - Mountain Line and potentially City of Flagstaff offices only, less receptive to other users on site
- **Transit Hub:**
  - Efficient bus operations
  - Safe connections for people who walk or bike to the site
- **Site should:**
  - Reflect the diverse history of Flagstaff
  - Have elements that represent a cultural connection to surrounding neighborhoods

FCF Survey

Beautiful civic space but low maintenance requirements, e.g. shade, benches, hardscape.

Create a space high income people would want to use that genuinely supports everyone's transportation needs. I would like to see a mix of people from a variety of economic levels coming and going in a safe manner.

The whole design needs to say, "Welcome to this amazing town!“

I want it to be a place where people want to be and linger, the civic space invites passer-by use, people choose to socialize and get a coffee or snack on their way to or from

I would like social services to include assistance and resources for our neighbors experiencing homelessness. I would just love to see a space that is welcoming to people from all walks of life.

Alternatives Analysis

Table 12 Site Selection Ranking Summary

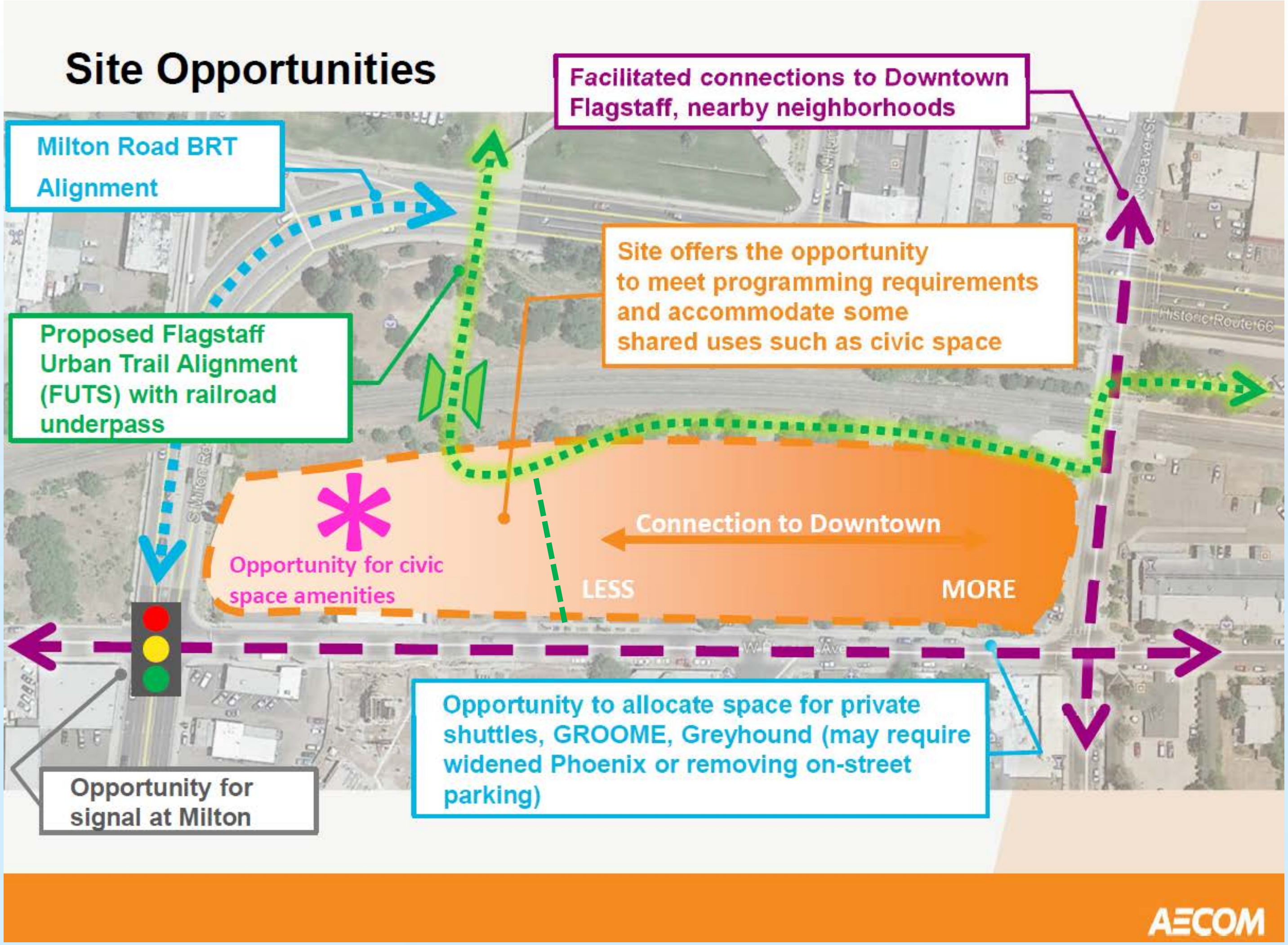
	Site 1	Site 2	Site 3
	Ranking by Category		
Category A - Contiguous Parcels	◐	●	◔
Category B - Site Access	◕	◐	◐
Category C - Land Use & Zoning	◕	◕	◐
Category D - Railroad & Utility Conflicts	●	◔	○
Category E - Environmental Concerns	◕	◔	◕
Category F - Bus Route Efficiency	◕	◕	◕
Category G - Sensitive Adjacent Parcels/Owners	◐	●	◕
Category H - Partnership Opportunities	◕	◕	◐
Category I - Site Characteristics	◕	●	●
Category J - Cost	◐	◕	◕
Total Weighted Score*	**313**	**296**	**274**

*Based on the points by metric, as shown in Table 11

MOUNTAIN LINE

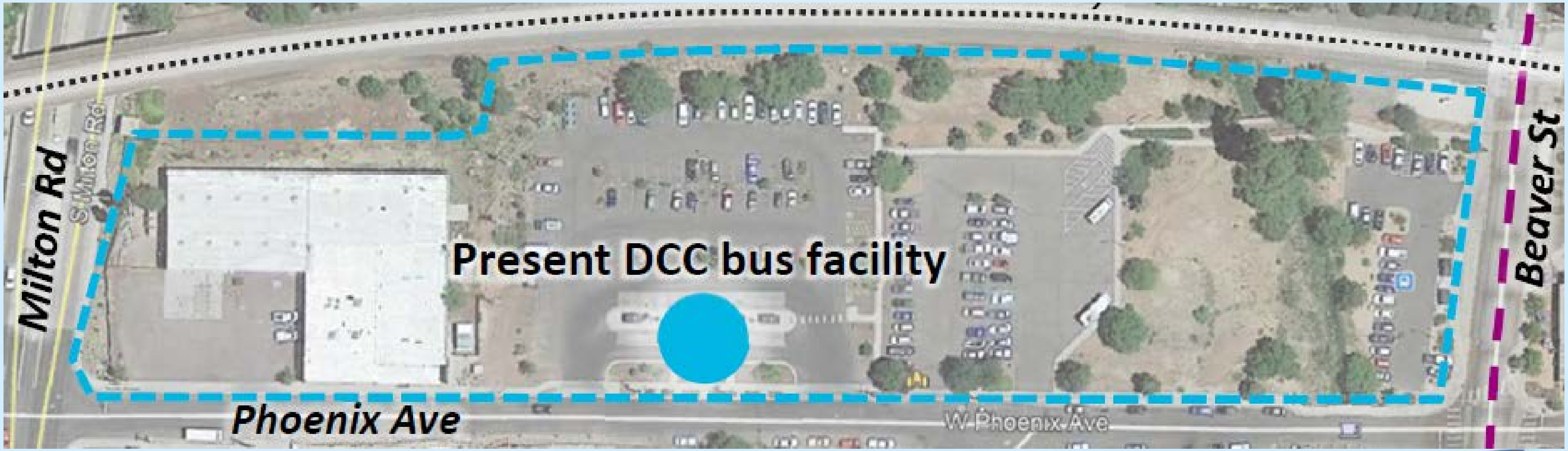
Getting you where you want to go

Site Opportunities

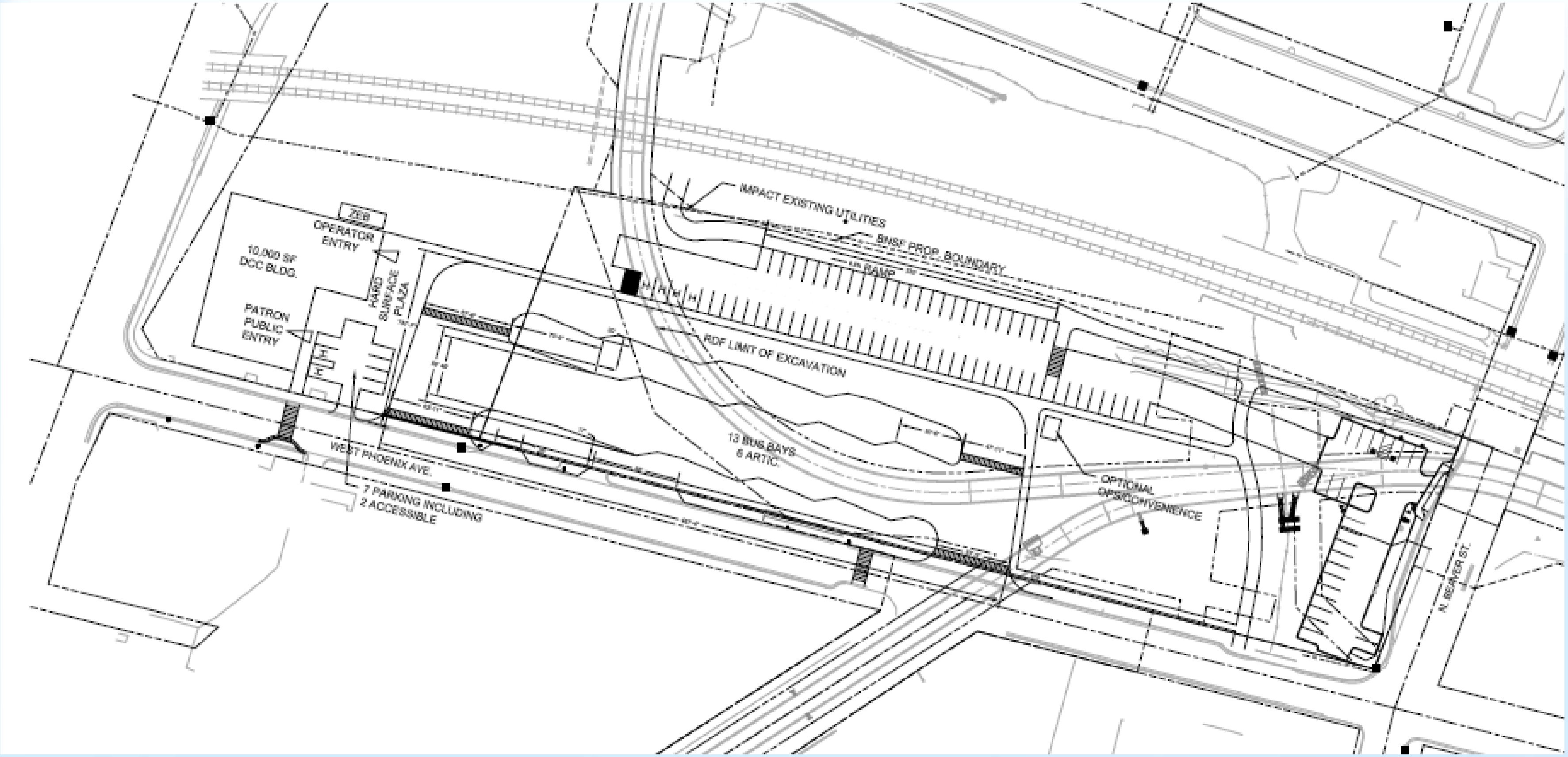


Site Constraints/ Challenges

- Rio Timing
- Space for all desired uses
  - ParkFlag- 159 spaces (includes 7 RV)
  - Southside desire for civic space



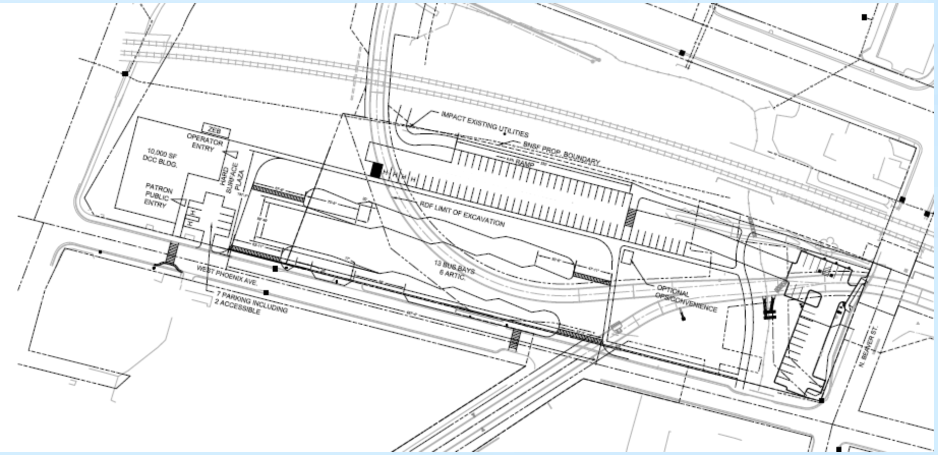
Concept


IMPACT EXISTING UTILITIES
BNSF PROP. BOUNDARY
RAMP
ZEB
OPERATOR ENTRY
10,000 SF DCC BLDG.
HARD SURFACE PLAZA
PATRON PUBLIC ENTRY
RDF LIMIT OF EXCAVATION
13 BUS BAYS 6 ARTIC.
WEST PHOENIX AVE.
7 PARKING INCLUDING 2 ACCESSIBLE
OPTIONAL OPS/CONVENIENCE
N. BEAVER ST.

Concept

Prioritizes:

- Out of way of Rio de Flag, limits impacts
- Extra bus bays for growth and tour buses
- Building forward on Milton
- Ability to have civic space
- Safety
- PD substation
- Human services



BPAC funds for art: Haddad Drugan

Concept

Parking Impacts:

- Approximately 65 spaces versus 159
- Winter ordinance overnight parking
- Amtrak parking
- RV/ Trailer parking

Next Steps

CUP:

- Continue to refine design, review by City staff
- Input from stakeholder group as well as broad outreach

Federal Approvals:

- NEPA clearance
- FTA concurrence

Final Site Selection:

- IGA/Acquisition agreement

Stakeholder group
Southside neighborhood
La Plaza Vieja neighborhood
Transit rider
DBA
Chamber of Commerce
County Sustainable Building
ParkFlag
Parks and Rec
Heritage Preservation

Project Delivery

- **Schedule:**
  - CUP: Fall 2021
  - Final Design: Spring 2022
  - Construction Phase: 2022-2023
- **Budget:** FTA Grant $22M

Discussion

Is there support for continuing to design the Downtown Connection Center at this site?

CITY OF FLAGSTAFF

STAFF SUMMARY REPORT

To:	The Honorable Mayor and Council
From:	John Saltonstall, Business Retention & Expansion Manager
Co-Submitter:	David McIntire, Community Investment Director
Date:	02/23/2021
Meeting Date:	03/30/2021

TITLE:

Economic Development Quarterly Update

DESIRED OUTCOME:

Council will receive information regarding economic development efforts and business activities that have been happening in our community.

EXECUTIVE SUMMARY:

The City of Flagstaff Economic Development staff provide quarterly updates that often include inviting businesses or economic development partners to present to City Council. These generally relate to a specific business sector and include tours of their facilities or relate to local and regional business development activities. This current presentation will include an update on the economic development website known as chooseflagstaff.com, an introduction of the new Business Attraction Manager Jack Fitchett, and brief presentations by three different businesses that have been awarded a Business Attraction Job Creation Incentive, an Innovate Waste/Personal Protection Equipment Challenge award, or a Business Retention and Expansion Incentive.

INFORMATION:

The City of Flagstaff Economic Development staff have historically used the fifth Tuesday of a single month (which occurs once each quarter) to present an Economic Development Quarterly Update or a Council Business Listening Tour.

The Economic Development Quarterly Update has served as an opportunity for staff to present updates or detailed information to Council and the public on the local economy including any significant changes. It has also served to introduce local and regional partners so that they may provide information specific to their agencies and activities.

The Council Business Listening Tours have served as an opportunity for Council to hear from Flagstaff businesses directly about their operations and any significant developments or challenges within those businesses or their sectors. As the presentations occur on the fifth Tuesday, prior to the pandemic Council had been invited to tour the facilities of the businesses that presented on the following Thursday. The tour itself provided Council and the business greater freedom to engage with each other and to learn more about each other in the process. We look forward to providing those tours again once further progress is made in containing the pandemic.

This Economic Development Quarterly Update also serves as a chance for staff to present updates within the Economic Development Offices. This will include updates to the chooseflagstaff.com website which is the website for the City's Economic Development Program, an introduction of the new Business Attraction Manager Jack Fitchett, and brief presentations by the three businesses that have participated in recent City of Flagstaff initiatives to positively impact the Flagstaff community. These recipients will discuss their use of the financial incentives. Those programs are the Business Attraction Job Creation Incentive which has been awarded to Katalyst Space Technologies, the Innovate Waste/Personal Protection Equipment (PPE) Challenge award which has been awarded to Bee Well, and the Business Retention and Expansion Incentive which will be discussed by its recipient, Cozy Homes.

Attachments: Final Presentation

Economic Development Quarterly Update

3-30-2021

TEAM FLAGSTAFF

WE MAKE THE CITY BETTER

The Run-Down

ChooseFlagstaff Website

Business Attraction Manager

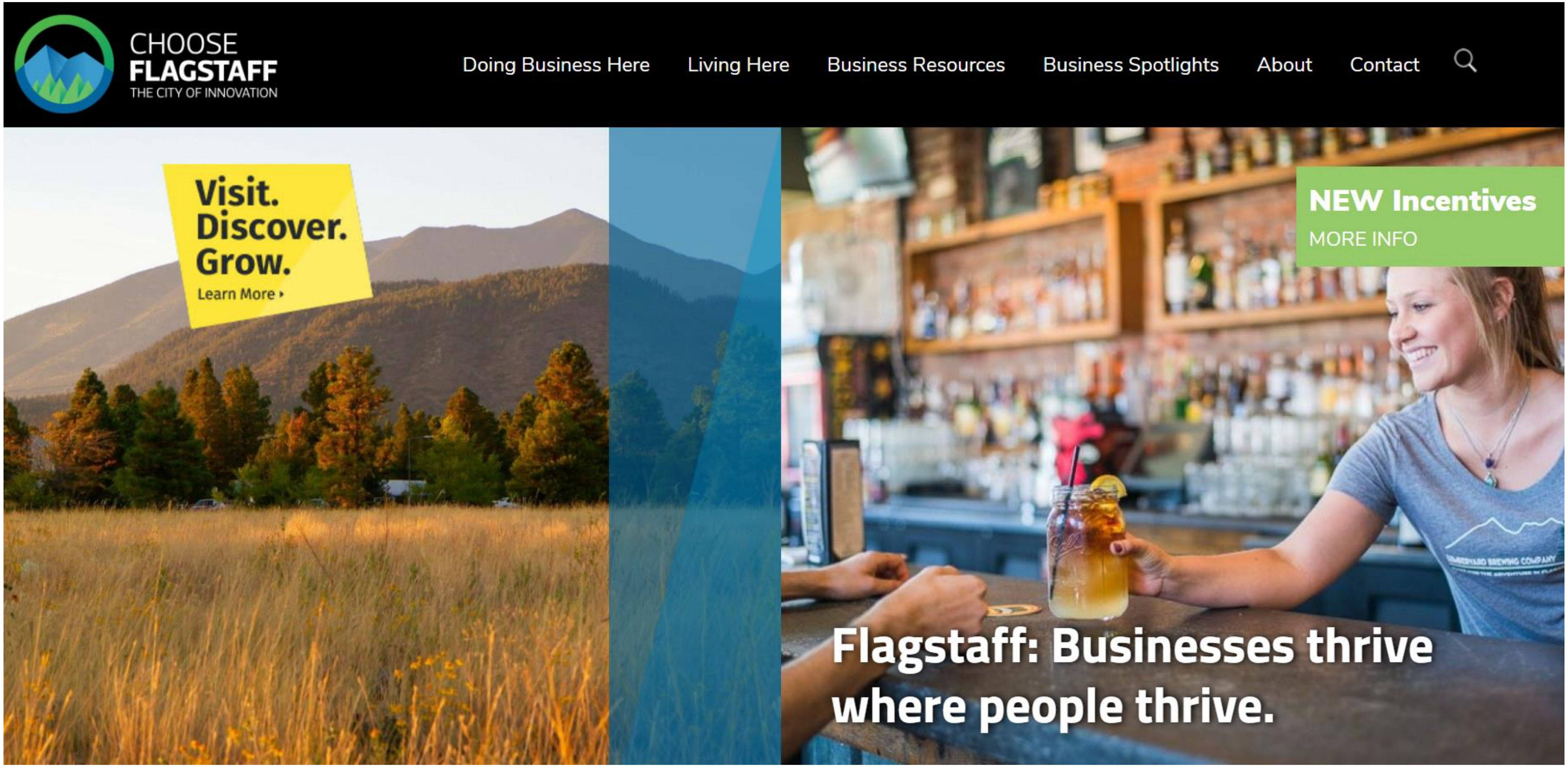
Job Creation Incentive – Katalyst

Business Retention & Expansion Incentive – CozyHome

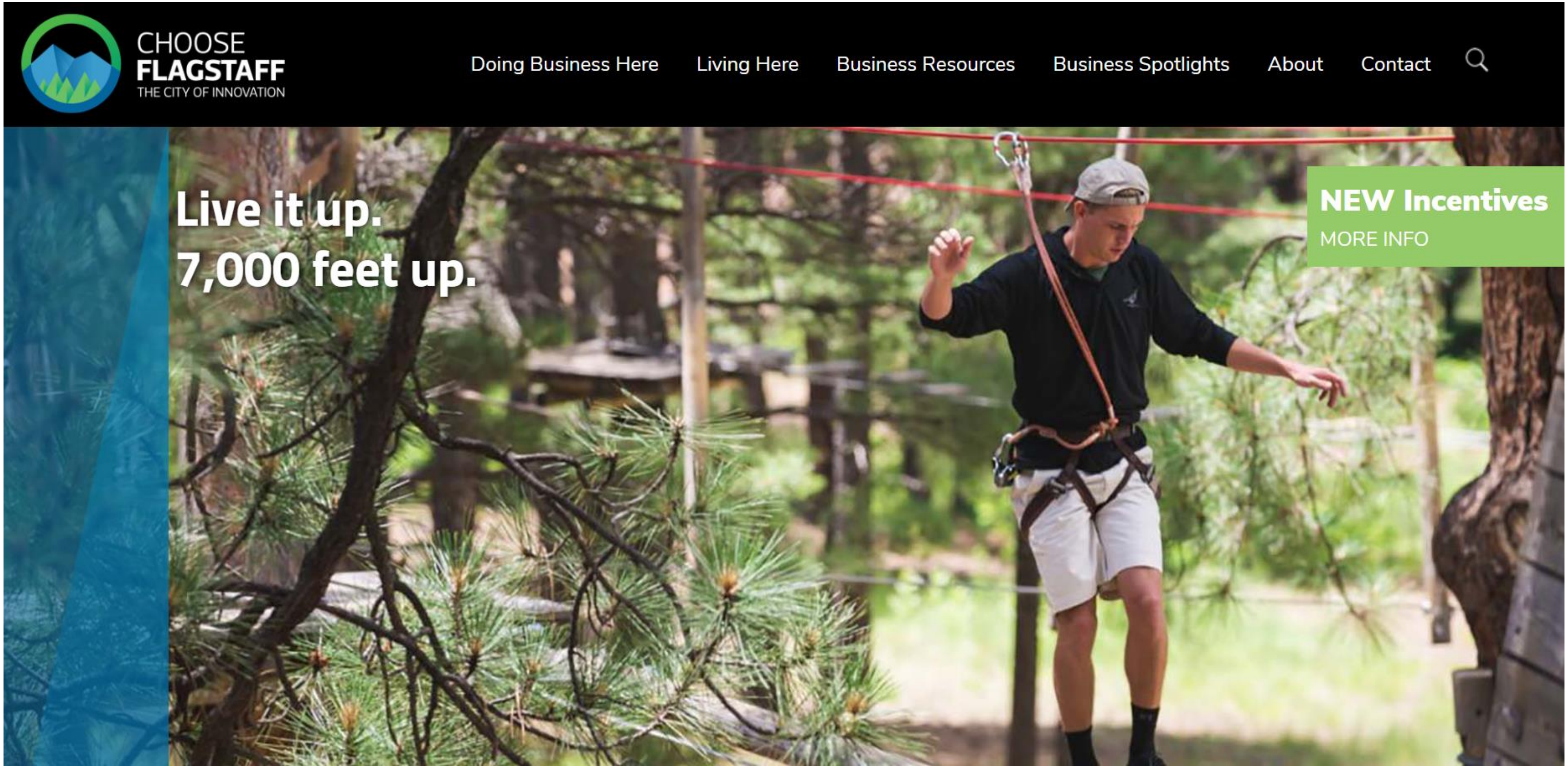
Innovate Waste/Personal Protection Equipment (PPE) – Bee Well

ChooseFlagstaff.com

TEAM FLAGSTAFF
WE MAKE THE CITY BETTER



ChooseFlagstaff.com



ChooseFlagstaff.com

TEAM FLAGSTAFF
WE MAKE THE CITY BETTER

CHOOSE FLAGSTAFF
THE CITY OF INNOVATION

Doing Business Here | Living Here | Business Resources | Business Spotlights | About | Contact

Flagstaff's key industry sectors include:

- Advanced Manufacturing
- Astronomy
- Bioscience
- Craft Brewing
- Digital/e-Commerce
- Entrepreneurship
- Health Care
- Retail
- Tourism

Explore these businesses and learn why Flagstaff is home to:

- ATC Materials
- Machine Solutions
- Deckers Brands
- Mack Automation
- Electric Torque Machines
- Nestle-Purina PetCare
- W.L.Gore & Associates
- Northern Arizona Healthcare
- Joy Cone Company
- Novakinetics
- Lowell Observatory
- Senes Tech
- Planet Rider
- T-Gen North

NEW Incentives
MORE INFO

New Business Attraction Manager

- Born & raised in Flagstaff
- 4th generation Flagstaff resident
- Graduated from The University of Arizona
- Worked for the Town of Sahuarita, Coconino County and The UofA
- Interim Business Attraction Manager for 13 months before starting the role full time.

Job Creation Program

Katalyst Space Technologies

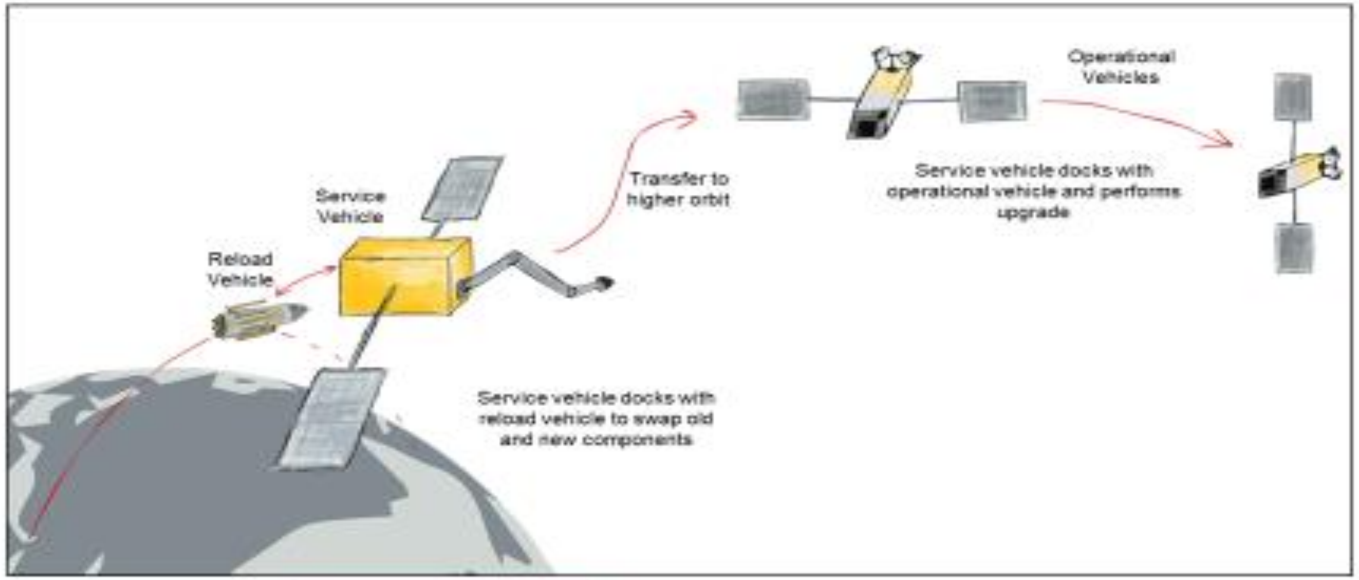
Mr. Ghonhee Lee

The Katalyst Vision

KATALYST SPACE TECHNOLOGIES

Problem

- Current satellites are designed as "Single-Use" items costing hundreds of millions of dollars
- Pace of technology development has outgrown the capabilities of current operational model
- Proliferation of artificial satellites and space debris in orbit threaten future access to space



Solution

Katalyst envisions a sustainable satellite architecture with three parts:

1. Modular satellites designed to be upgraded in-space
2. Robotic servicing infrastructure to perform routine service
3. "Plug-and-play" modules that serve as accessories to rapidly meet customer needs

Value Proposition

- Decreased cycle time
- Significantly lower costs for satellite operators
- Secure sustainable access to space domain

Job Creation Program

TEAM FLAGSTAFF
WE MAKE THE CITY BETTER

Katalyst Roadmap

KATALYST SPACE TECHNOLOGIES

- Launched in May 2020
- Current team includes 5 members
- Relocating to Flagstaff, AZ in partnership with NACET & City of Flagstaff in May 2021

Air Force R&D Pathway (2021 - 2022): Initial R&D → Prototyping & Further Dev

Product Transition (2023 - 2024): In-Space Demo Mission / Low-Rate Satellite Production → Commercialize with Govt Customers

Scaling (2025+): Full Rate Production → Sell to Commercial Market

Staffing (2021 - 2022)
- 5-10 Full-time members
- 3-6 interns

Staffing (2023 - 2024)
- 15-25 Full-time members
- 3-6 interns

Staffing (2025+)
- 25+ Full-time members

Job Creation Program

TEAM FLAGSTAFF
WE MAKE THE CITY BETTER

Current Accomplishments

- Validation of concept from target customers & industry experts
- Provisional patents filed on core technology
- Full-time team at 5 with move to Flagstaff in May 2021
- Awarded Air Force R&D Contract, Pending NASA contracts, Close of "Pre-Seed" investment round

BEE WELL HAND SANITIZER

Bee Well
Natural Skincare

Innovate Waste/PPE Challenge 2020

Bee Well 2020

Award use and business expansion

- IP lawyer
- Overhead costs/ facility fees
- Natural deet-free bug repellent to market Spring 2021
- Continue working towards patent partnership with NAU

CozyHome

Energy Efficiency and Comfort Specialists

Eli Chamberlain- Owner/Operator

Background

- Started in 2012, 8 employees
- Energy audits, retrofits, HVAC
- APS Home Performance w/ Energy Star participating contractor
- Performed energy retrofits on over 800 houses in Flagstaff, over 200 Hopi houses
- Energy savings equivalent of making 150+ houses carbon neutral

ARIZONA
Daily Sun
Serving Flagstaff and northern Arizona since 1883

The new Ball coach
Northern Arizona introduces new leader of the football program SPORTS, B1

US identifies crash victims
Arizona native among five Marines dead in Japan ARIZONA, A3

SUNSHINE 41 • 15 FORECAST, A2 | THURSDAY, DECEMBER 13, 2018 | azdailysun.com

JAKE BACON, ARIZONA DAILY SUN

Eli Chamberlain, right, owner of Cozy Home, stands with Michael Scott, energy auditor, as the two prepare to conduct an energy audit on a west Flagstaff home Wednesday morning.

Outfitting Flagstaff homes

Sustainability Program working to cut energy costs, waste in city

SYRA CONRAD
Arizona Daily Sun

For many, the arrival of winter means cranking up the thermostat, taking longer showers, running a space heater on high and using whatever other mechanisms available to help fight the cold.

The season doesn't have to mean that, however, according to the city of Flagstaff Sustainability Program, which works to help Flagstaff residents weatherize their homes and lower their utility bills via their Energy Efficiency 101 workshops.

The Sustainability Program, funded through the city, began offering the free workshops in 2013 in an effort to help individuals and households cut down on energy costs — heating, water and other utilities — as well as to reduce energy waste within the city overall.

Flagstaff City Council's recent approval of the Climate Action and Adaptation Plan — which, among other goals, seeks to reduce greenhouse gas emissions by 80 percent by 2050 — renews the focus on energy and electricity use, as both are big drivers in greenhouse gasses.

"The energy efficiency workshops are a resource for people not only to combat high energy bills that come from say, cracked walls or an attic without sufficient insulation, but to remedy those issues," Lee Bryant, Climate Education VISTA with the City of Flagstaff Sustainability Program, said.

Where to find help

The workshops are offered on a monthly and bi-monthly basis from October through April and cover fixes that individuals can do themselves to decrease energy waste: Saving water by installing a low-flow shower head; how to seal leaks and apply caulking; how to place shrink film on windows to create an extra barrier from the cold; sealing drafty doors with weather stripping; replacing light bulbs with LEDs; programmable thermostats and more.

Please see EFFICIENCY, Page A7

Energy Efficiency 101 Workshop

The next Energy Efficiency 101 Workshop will be held on Wednesday, Jan. 16, from 6 to 7 p.m. at the Hal Jensen Recreation Center (2403 N. Izabel St.). Those interested in attending can sign up online at www.flagstaff.az.gov/628/Energy-Efficiency-at-Home or by calling the Sustainability Program at 928-213-2144.

Bickford's death currently not charged

Investigators waiting on report from Medical Examiner's Office

SCOTT BUFFON
Sun Staff Reporter

Just looking at the charges that Anson Hurley pleaded not guilty to — three counts of domestic violence and one count of aggravated assault — it would not be clear that victim Kevin Bickford died from the alleged crime.

Bickford died after a fight broke out between him and Hurley, Bickford's former roommate. The Coconino County Attorney's Office did not pursue any homicide or manslaughter charges against Hurley in response to Bickford's death. Cory Runge, spokesperson for the Flagstaff Police Department, said investigators could not conclusively determine whether the death was the result of the fight or natural causes.

"It's an odd case that the police department is working on in collaboration with the Medical Examiner's Office," Runge said. "We don't have any clear answers."

Please see DEATH, Page A7

City vape decision concerns industry

ADRIAN SKABELUND
Sun Staff Reporter

Services

- Energy audits (APS- Home Energy Checkup)
- Insulation
- Air sealing
- Duct sealing
- Mini split heat pumps

Currently serving on Sustainability Commission and teaching HEE 101

Phase Change Material

- Building material that can be easily retrofitted into homes/business to save energy
- Acts as a thermal “battery” to absorb and release heat energy as material changes phases
- “Ice” that melts at room temperature
- Ice takes a lot of energy to make, and a lot of energy to melt


Infinite R

BRE Grant Proposal

- Initiate pilot program to test Phase Change Material in Flagstaff homes and businesses
- Goals
  - Demonstrate PCMs effectiveness for Flagstaff climate
  - Save energy by reducing heating and cooling, eliminate need for AC in homes
  - Shift heating and cooling loads to non peak hours (reduces peaker plant reliance)
  - Save water by reducing energy usage
  - Create and maintain good paying skilled labor jobs

THANK YOU

Thank you!

10.

CITY OF FLAGSTAFF

STAFF SUMMARY REPORT

To:	The Honorable Mayor and Council
From:	Stacy Saltzburg, City Clerk
Date:	03/31/2021
Meeting Date:	03/30/2021

TITLE:

COVID-19 Update

DESIRED OUTCOME:

EXECUTIVE SUMMARY:

INFORMATION:

Attachments: City Presentation
Dr. Engelthaler Presentation

COVID-19 Update

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Agenda

- Update from Dr. Engelthaler
- Re-Entry Plan Discussion
  - Field permits
  - Jay Lively Ice Arena
  - Special Event Permits
  - Temporary Use Permits

Dr. Engelthaler Update

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Re-Entry Plan Discussion

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Re-Entry Plan: Field Permits

- April 1st begins outdoor field permitting
- Currently includes groups up to 30 individuals per field
- Return to Play guidelines and adherence
- Fall sports capacity success

Re-Entry Plan: Field Permits

- CDC guidelines for youth sports

Stay home when appropriate	Don't spit
Wash/sanitize before & after	Bring own equipment
Physical distancing	Don't share towels or clothing
Face coverings	Separate bags and equipment
Cover coughs & sneezes	Avoid physical contacts

https://www.cdc.gov/coronavirus/2019-ncov/community/schools-childcare/youth-sports.html

- Recommend increasing to 50 individuals per field
  - Allows space for physical distancing
  - Permits larger number of spectators
  - Continue return to play guidelines and adherence

Re-Entry Plan: Jay Lively

- Remained opened upon return to Phase 2 in November 2020
- COVID mitigation efforts in Tier 1 of Site Specific Plan
  - Limit to groups of up to 20 individuals
  - Closed between groups for cleaning
  - Protective guards and markings
  - Masks required when not playing
  - Restrooms and locker rooms closed
  - Bleachers closed to spectators

Re-Entry Plan: Jay Lively

- Recommend increasing to 50 individuals at a time
  - Continue closure between groups for cleaning
  - Maintain protective guards and markings
  - Masks to be worn when not playing and by spectators, coaches and staff
  - Allow for spectators with physical distancing in bleachers
  - Open restrooms and locker rooms to appropriate capacity

Re-Entry Plan: Event Permits

- Outdoor Special Event Permits on City Property for up to 50 individuals currently
- City's Special Event Ordinance
  - allows the City to place reasonable conditions on any permit approval, including conditions that require the permittee to take measures to provide for the health, safety, and welfare of the public
  - allows the City to deny a permit on the grounds that the event would present an unreasonable danger to the public health or safety

Re-Entry Plan: Event Permits

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CDC Guidelines

- Recommends large gatherings be avoided, particularly when physical distance cannot be maintained
- Promoting healthy behaviors to reduce the spread

Stay home when appropriate	Cleaning & disinfection
Physical distancing	Limit restroom occupancy
Wear masks	Ventilation
Hand hygiene	Modified layouts
Respiratory etiquette	Physical barriers and guides
Signs and messages	Discourage shared objects

https://www.cdc.gov/coronavirus/2019-ncov/community/large-events/considerations-for-events-gatherings.html

Re-Entry Plan: Event Permits

- Recommendations for Special Event Permits
  - Use capacity calculator instead of limiting event to 50 people
  - Continue with COVID mitigation efforts such as:
    - Displaying signs and message boards
    - Wearing masks
    - Physical distancing
    - Planning for modified layouts, physical barriers and guides
    - Hand cleaning/sanitizing stations
    - Cleaning and disinfection protocols
    - Ventilation (for indoor events)
  - Event organizers demonstrate measures to provide for the health, safety, and welfare of the public

Re-Entry Plan: Event Permits

- Recommendation for Temporary Use Permits on Private Property
  - Remove restrictions from Re-Entry Plan
  - Continue to enforce regulations in City Zoning Code

Re-Entry Plan: Options

Update Phase 2 of the Re-Entry Plan to include:

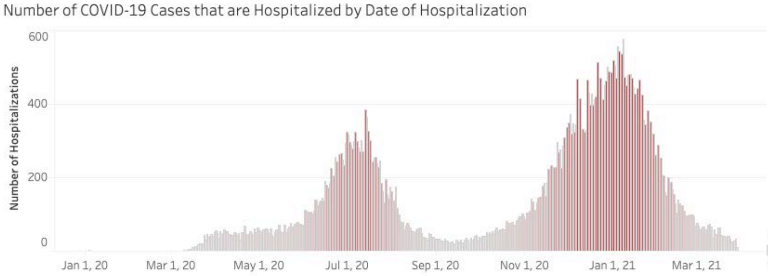
- Field permits up to 50 individuals per field with Return to Play guidelines and adherence
- Jay Lively Ice Arena groups up to 50 individuals including spectators, opening of restrooms and locker rooms and maintain recommended mitigation efforts
- Outdoor special events based on capacity calculator with COVID mitigation efforts
- Temporary Use permits on private property as allowed per the Zoning Code

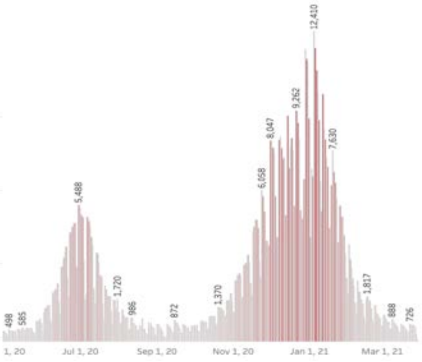
COVID-19: The Update

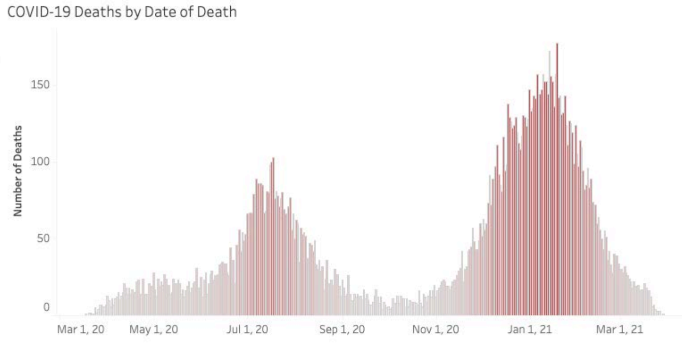
March 30, 2021

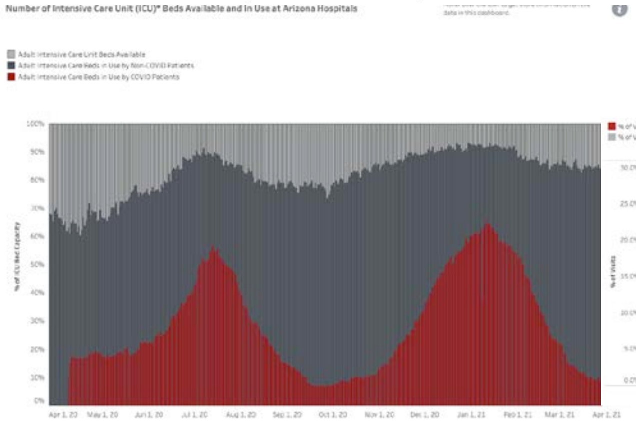
Dave Engelthaler, PhD, MS
Director, TGen North
Translational Genomics Research Institute

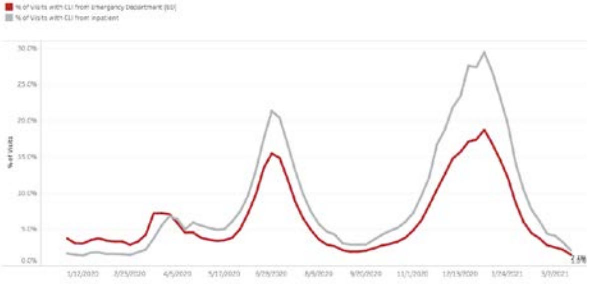
The State of COVID – March 30,2021

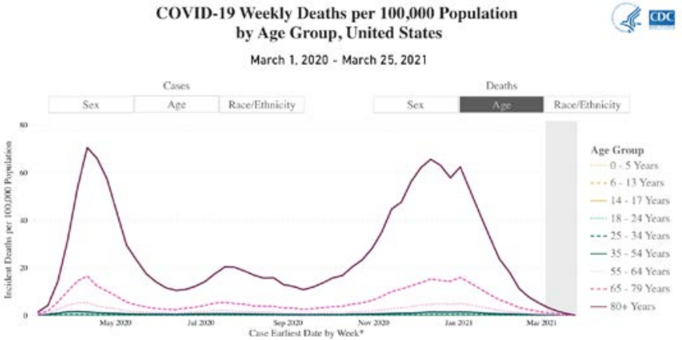






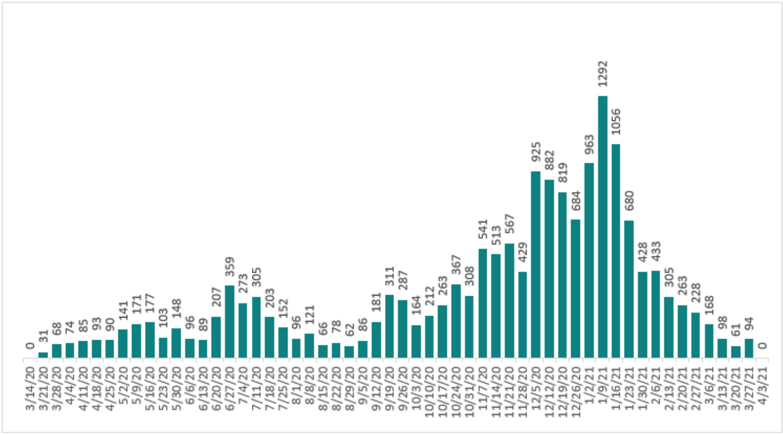




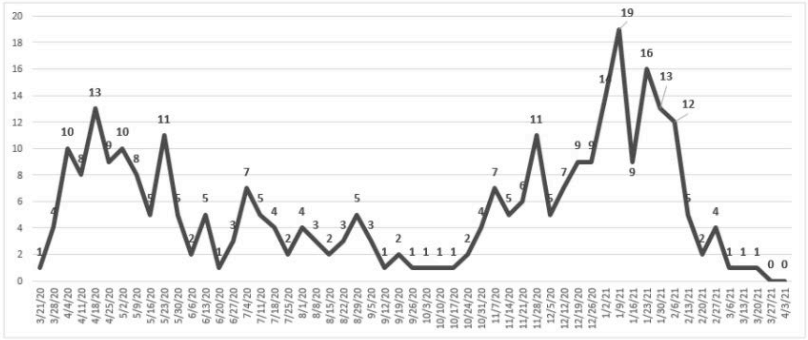


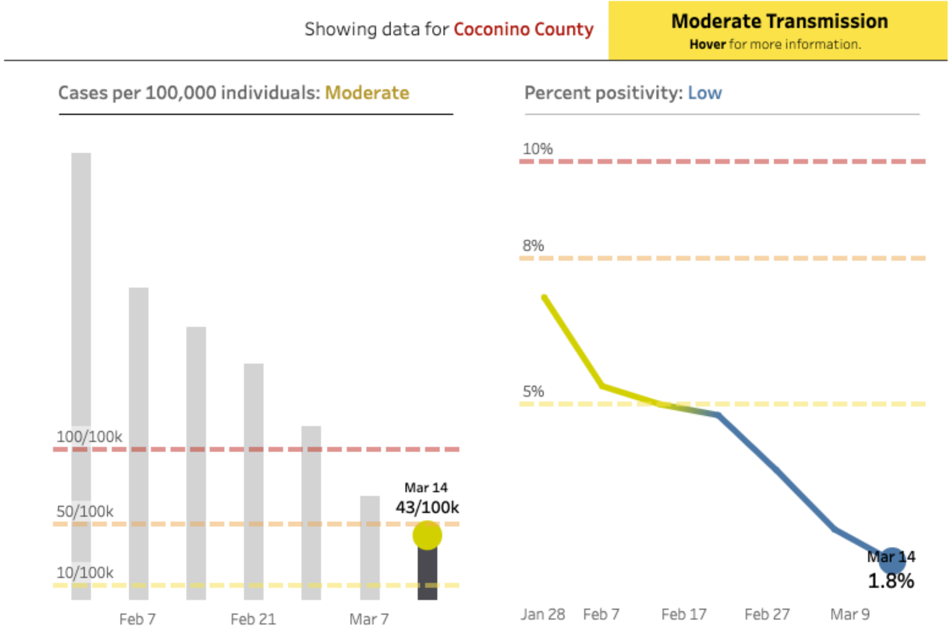
The County View

Coconino County COVID-19 Weekly Cases

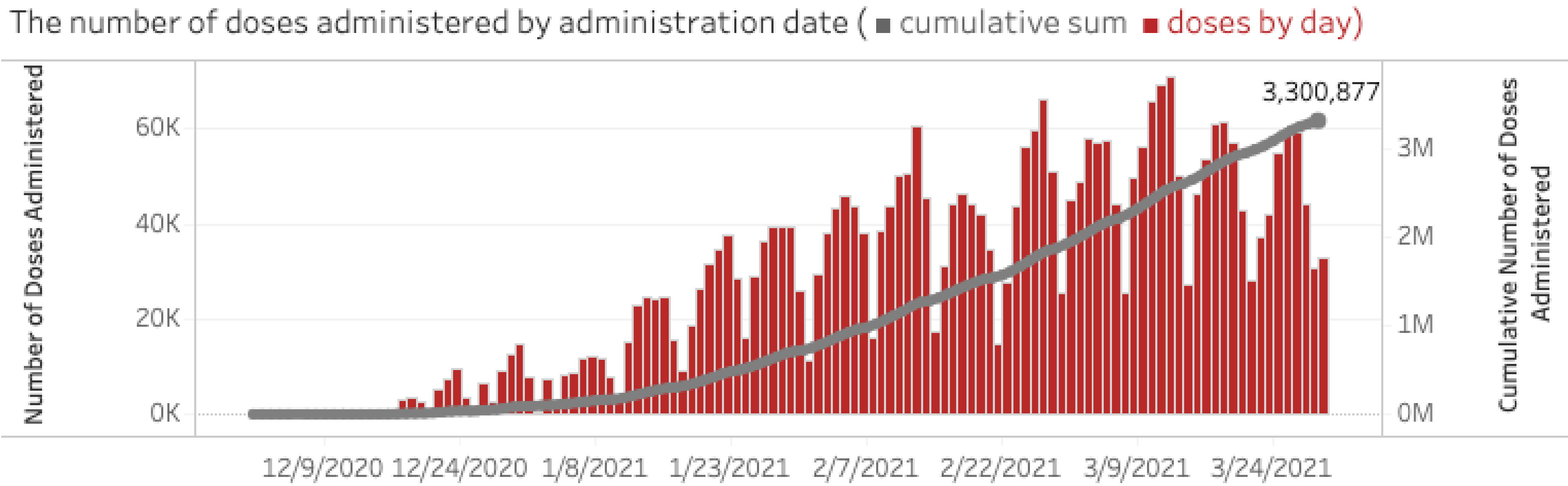


Coconino County COVID-19 Deaths per Week





AZ Vaccine and Community Immunity – Almost There

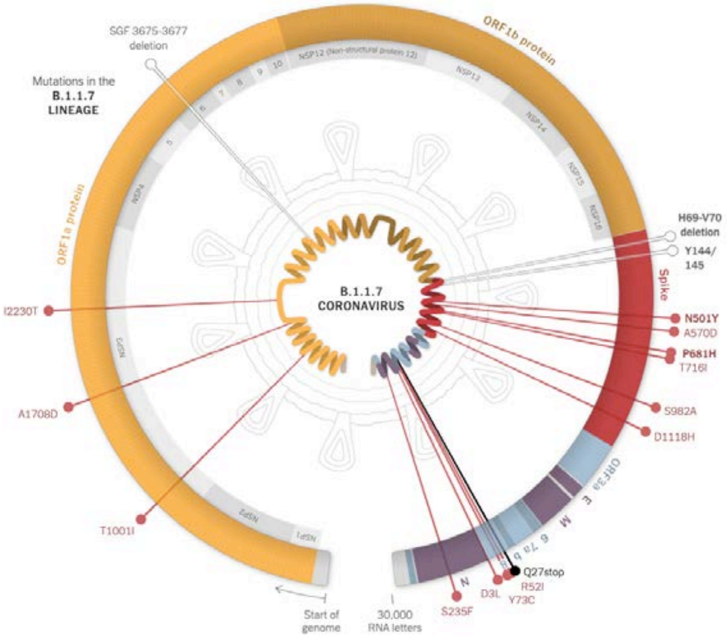


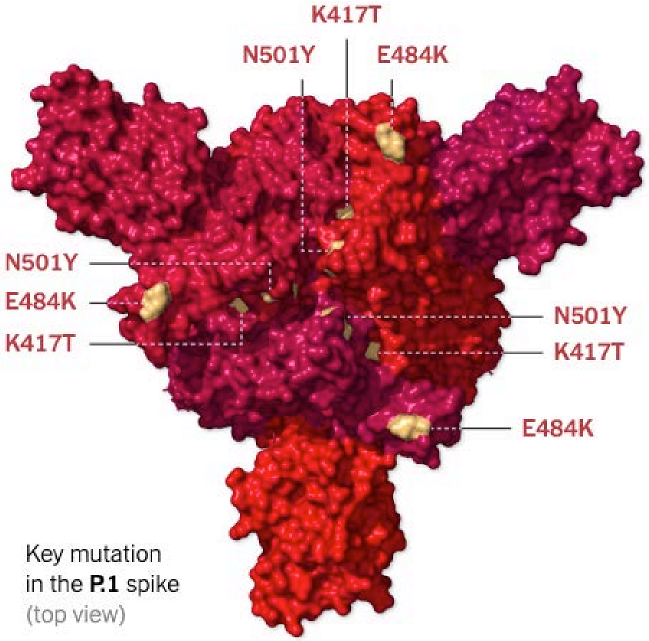
Full Dose = 1.3M X 95% effect = 1.2M
One Dose = 0.8M X 80% effect = 0.6M
Total with Vaccine Immunity = 1.8M

Cases = 0.84M X 2 = 1.68M
1.68M X 90% effect = 1.5M Case Immunity
Total Vaccine & Case Immunity = 3.3M

AZ Population >17 = 5.3M 3.3M/5.3M = 60% Immunity

But what about the Variants?





AZ – COVID Genomics Tracking Dashboard (https://pathogen.tgen.org/covidseq-tracker/)

Variants | Arizona Trends | Summary

tgen NORTH
AN AFFILIATE OF City of Hope

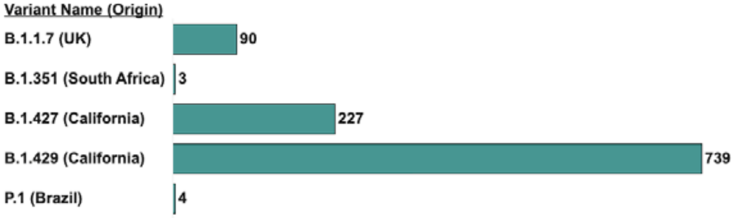
Arizona COVID-19 Sequencing Dashboard

Total Genomes: 10,905 **Number of Genomes Since January 1, 2021:** 3,493

Hover over the bars to view proportions.

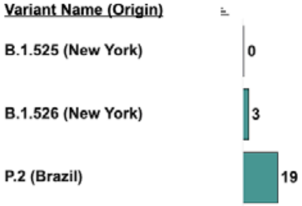
Variants of Concern (VOC)

Number of Genomes Sequenced December - Present



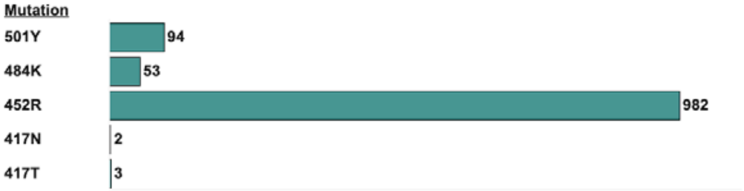
Variants of Interest (VOI)

Number of Genomes Sequenced December - Present



Mutations of Interest

Number of Genomes Sequenced December - Present



Description of Mutations of Interest

The mutations shown on the graph to the left are all in the "S" or spike protein of SARS-CoV-2.

The **501Y** mutation has been associated with increased ACE2 receptor binding.
The **484K** mutation has been associated with reduced antibody binding and immune escape.
The **452R** mutation has been associated with increased transmissibility, infectivity, and potentially impacts effectiveness of some clinical treatments.
The **417N/T** mutation has been associated with immune evasion.

The VOC/VOI displayed are reflective of CDC's new SARS-CoV-2 variant classification scheme. https://www.cdc.gov/coronavirus/2019-ncov/cases-updates/variant-surveillance/variant-info.html. These variants and mutations have been associated with increased transmission, increased severity of illness, and natural or vaccine-induced immune escape. These sequences may not represent the true prevalence of the variants or mutations in the population.

Data displayed are from sequencing conducted by TGen North, Arizona State Public Health Laboratory, Centers for Disease Control, Arizona State University, University of Arizona, U.S. Air Force and Quest Diagnostics.
Enabled, in part, by data made available from GISAID.

GISAID

Updated 03/29/2021

AZ – COVID Genomics Tracking Dashboard (https://pathogen.tgen.org/covidseq-tracker/)

tgen NORTH
AN AFFILIATE OF City of Hope.

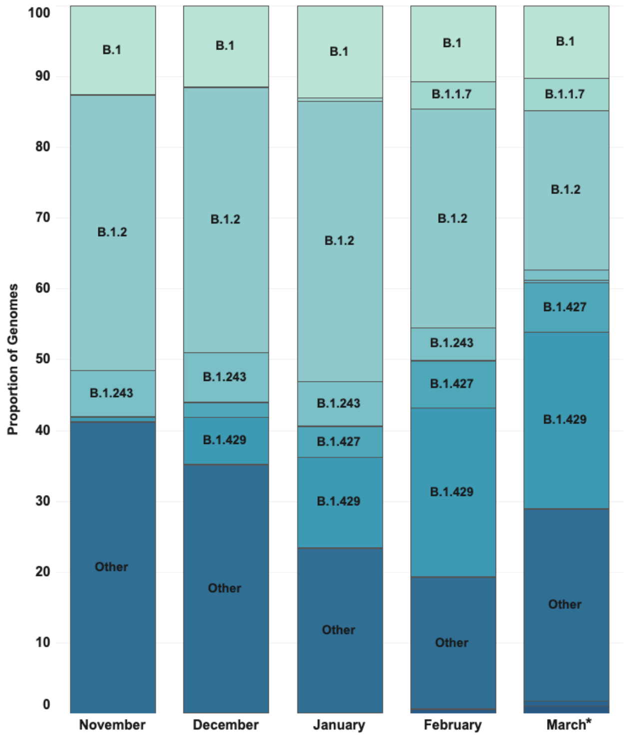
Arizona COVID-19 Sequencing Dashboard

Total Genomes: 10,905

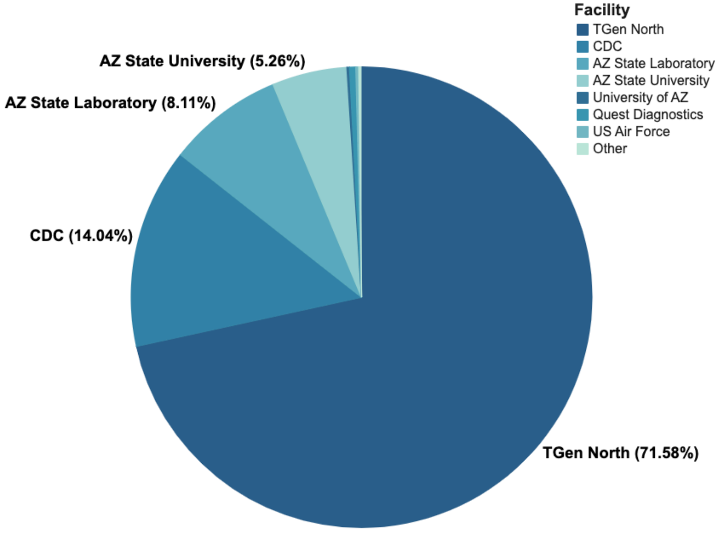
Hover over the bars to view proportions.

Circulating Variants over Time

**Data are displayed month-to-date*



Proportion of Total Genomes Sequenced by Facility



Data displayed are from sequencing conducted by TGen North, Arizona State Public Health Laboratory, Centers for Disease Control, Arizona State University, University of Arizona, U.S. Air Force and Quest Diagnostics.

Data are aggregated at the county level and do not represent any specific population within a county. County of origin is not available for all genomes. Enabled, in part, by data made available from GISAID.

GISAID

Updated 03/29/2021

Science and Humanity

- "Use science neither as a punchline nor as a weapon, but rather as a tool to illuminate the best way to serve humanity"
- We are getting to the end of the Pandemic …

  ….We need to start thinking how to act like it
- We need another month to ensure the numbers stay low and everyone who wants a vaccine can get it … especially the vulnerable
- Accept that there will still be risk – virus won't go away
- Accept that people will still be afraid/concerned – fear won't immediately go away
- We should neither "mask-shame" or "vax-shame"
  - People will make their own choices … and that's okay
- Long Haul COVID is a real thing, so is the Post-COVID Mental Health Challenge

The Other Impacts COVID-19 Impacts

- Mental health pandemic will lead to prolonged mistrust and substance abuse
- Business changes and business closures will prevent many from getting back to the workforce – unemployment, homelessness
- Greater use of technology may make big cities less relevant, except to house unemployed and impoverished – small towns will absorb
- Governments have stronger capacity for surveillance
- Trust in science is lower in many and is more like religion for others
- Elder-care and public health will no longer be ignored

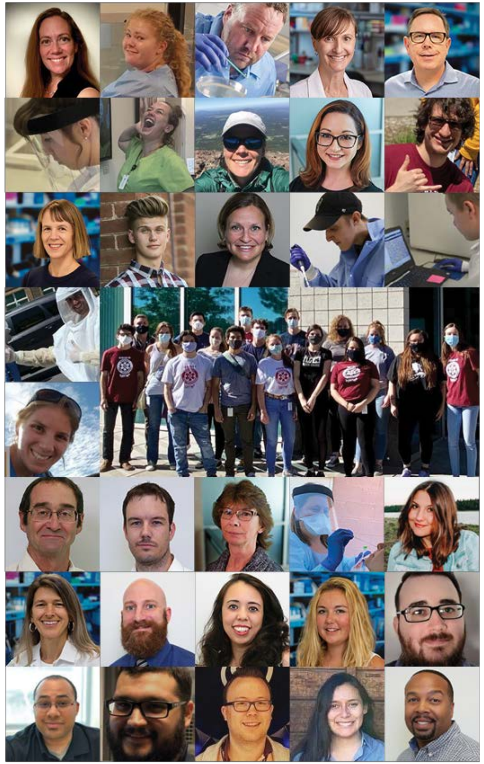
Still all in this together …

There's no question of heroism in all this. It's a matter of common decency. That's an idea which may make some people smile, but the only means of fighting a plague is — common decency."

A. Camus *The Plague*

The AZ Genomic First Responders

COVID Heroes



COVID-19
GENOMIC FIRST RESPONDER

tgen
City of Hope

The TGen COVID Funding Partners

the narbha institute

Ben and Catherine Ivy Foundation

COVID-19 GENOMIC FIRST RESPONDER

BlueCross BlueShield of Arizona

FLINN FOUNDATION

VIRGINIA G. PIPER CHARITABLE TRUST

tgen AN AFFILIATE OF City of Hope

City of Hope.

GarciaFamily foundation

ARIZONA DEPARTMENT OF HEALTH SERVICES

Jeffrey M. Trent, Ph.D., F.A.C.M.G.
President and Research Director
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602.343.8419 • jtrent@tgen.org

David Engelthaler, Ph.D.
Associate Professor and Co-Director
Pathogen and Microbiome Division, TGen North
928.226.6356 • dengelthaler@tgen.org

CDC CENTERS FOR DISEASE CONTROL AND PREVENTION

11.

CITY OF FLAGSTAFF

STAFF SUMMARY REPORT

To:	The Honorable Mayor and Council
From:	Sarah Langley, Management Analyst
Date:	03/23/2021
Meeting Date:	03/30/2021

TITLE

Surface Transportation Reauthorization Project Authorization Request

STAFF RECOMMENDED ACTION:

Staff is seeking Council feedback on submitting an authorization request for the Lone Tree Corridor project within the upcoming surface transportation reauthorization legislation.

EXECUTIVE SUMMARY:

In preparation for the upcoming surface transportation reauthorization legislation effort, the federal Committee on Transportation and Infrastructure has asked its members to determine their policy priorities and collect project requests focused on highways and transit from their constituents.

To participate in this process, city staff recommends submitting an authorization request for the Lone Tree Corridor project to the Committee on Transportation and Infrastructure. The Lone Tree Corridor project is seen as a competitive request for this opportunity as the project would improve important north-south arterial connectivity from Sawmill Road to J.W. Powell Boulevard by adding lanes for capacity, medians for safety, filling gaps in the pedestrian and bicycle systems, improving transit stops and shelters and adding new I-40 bridges. The corridor would also include conduit for fiber optic line, laying the necessary groundwork for high-speed communications for transportation facilities and public buildings, including schools.

Additionally, the Lone Tree Corridor project is recommended by staff for an authorization request in relation to upcoming surface transportation reauthorization legislation because the project is voter approved, it benefits a variety of community partners and funding is readily available for a local match. Additionally, federalization of this project would result in significant savings of local funding, which could then be used for other high priority transportation and infrastructure projects.

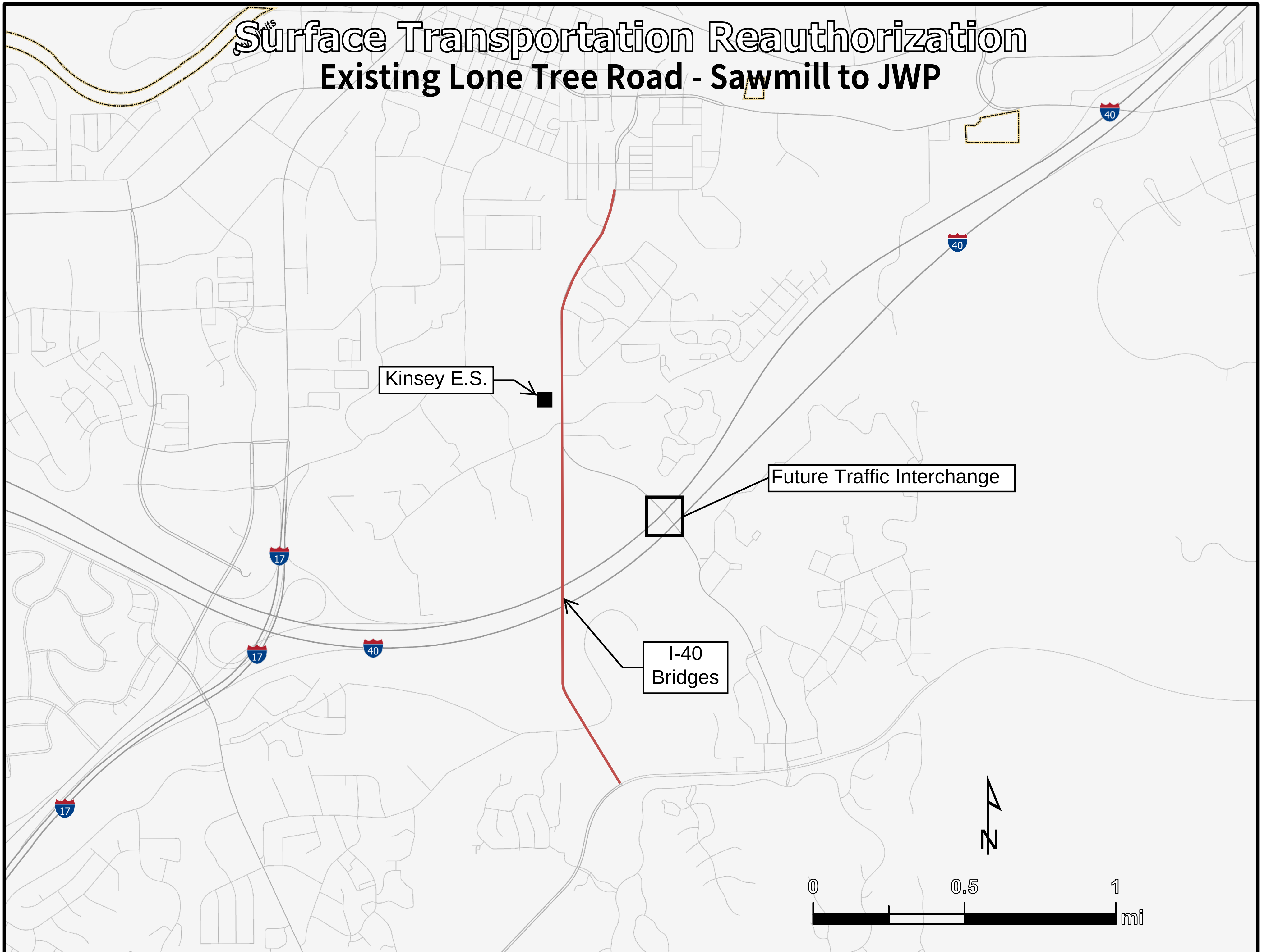
INFORMATION:

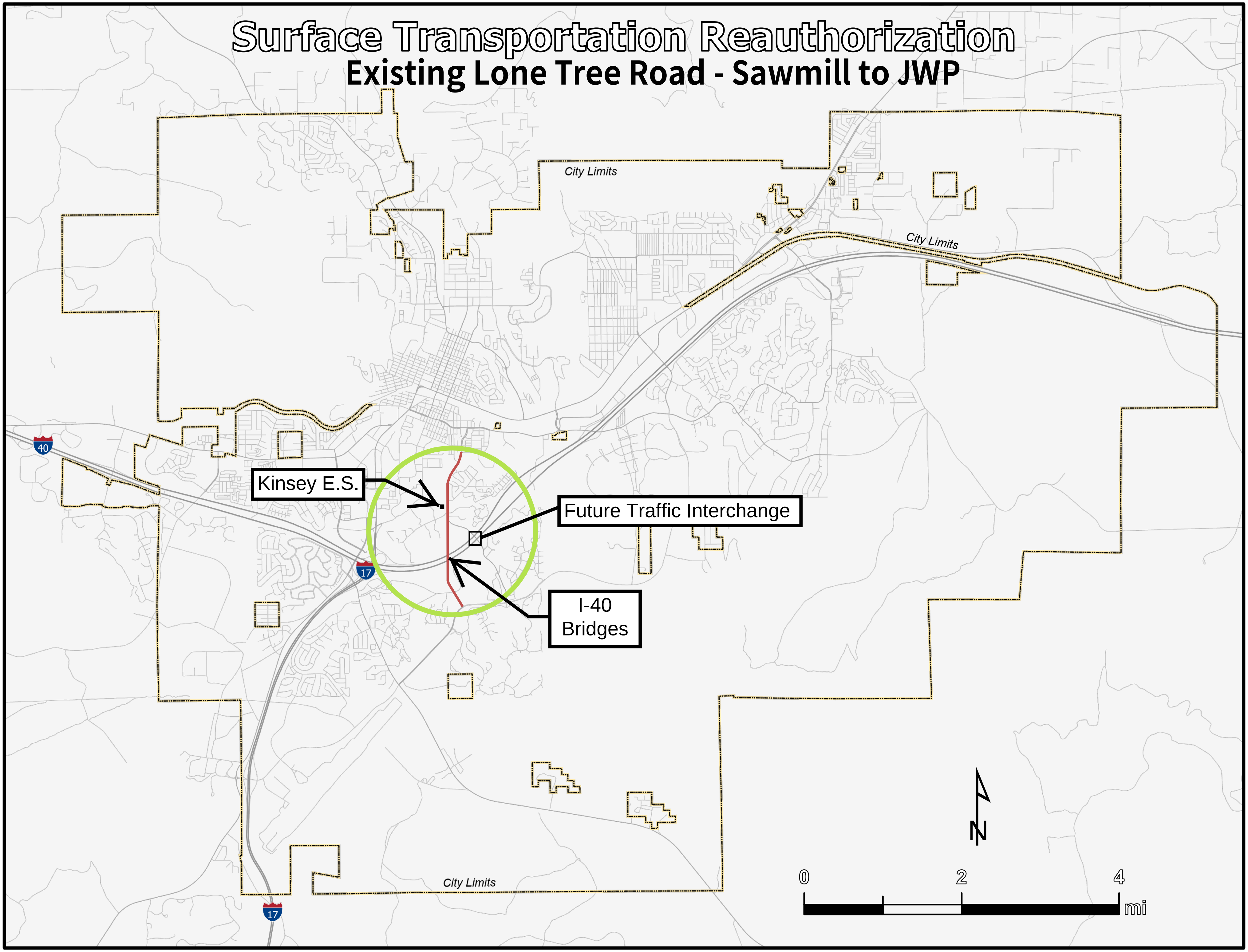
Please see presentation attached

Attachments: Vicinity Map - Surface Transportation Reauthorization
Context Map - Surface Transportation Reauthorization
Presentation

Surface Transportation Reauthorization

Existing Lone Tree Road - Sawmill to JWP




Surface Transportation Reauthorization
Existing Lone Tree Road - Sawmill to JWP
City Limits
City Limits
City Limits
40
17
17
Kinsey E.S.
Future Traffic Interchange
I-40 Bridges
N
0
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Surface Transportation Reauthorization

Project Authorization Request

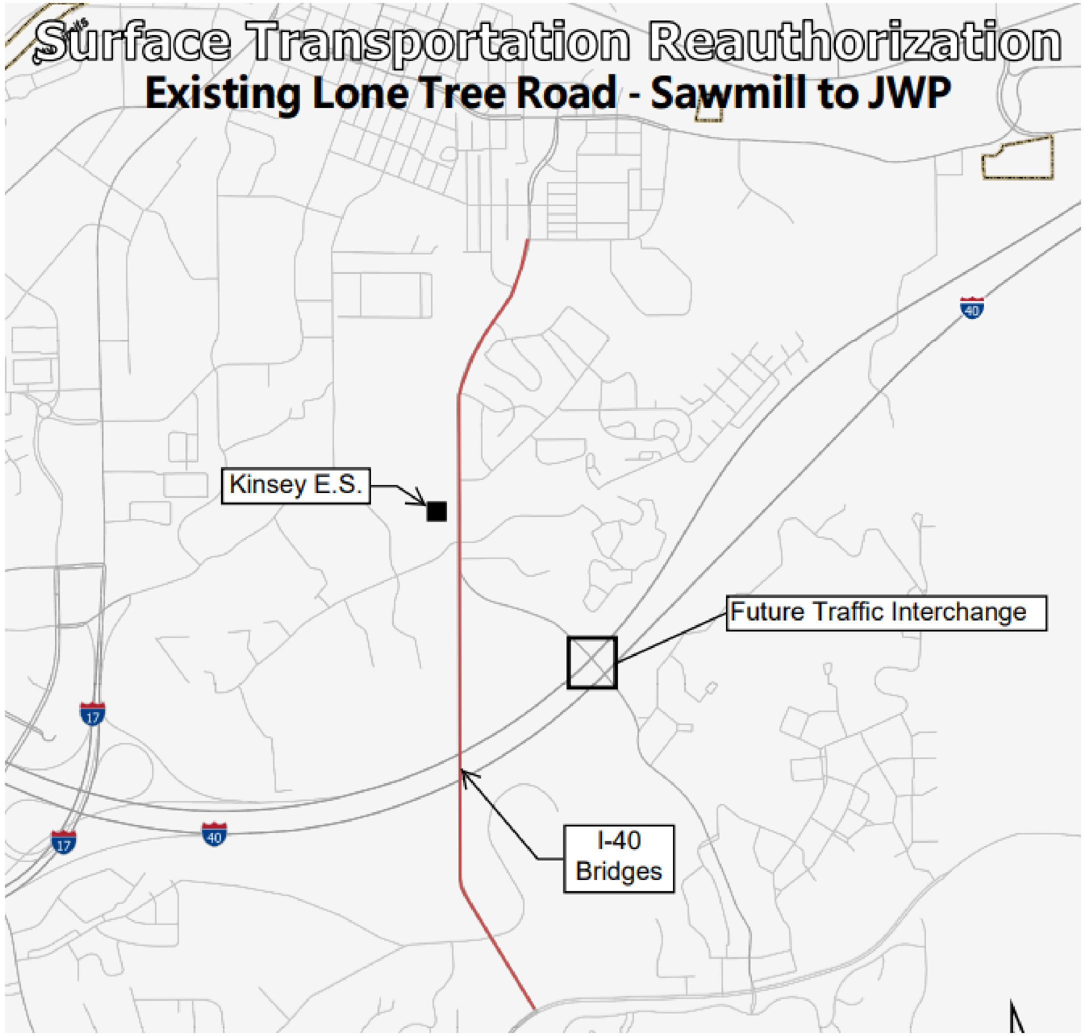
Surface Transportation Reauthorization

Background

- Current surface transportation act expires on Sept. 30, 2021
  - Totaled $305 billion
- The upcoming reauthorization is anticipated to total over $3 trillion
- Project requests must focus on highways and transit

Project Request – Lone Tree Corridor - $46.9M

- Improving north-south connectivity from Sawmill Road to JW Powell Boulevard
  - Filling gaps in pedestrian and bicycle systems
  - Improving transit stops & shelters
  - Installing conduit for fiber optic cable
  - Adding medians for safety
  - Adding lanes for capacity
  - Mitigating impacts to Kinsey Elementary School
  - New I-40 bridges

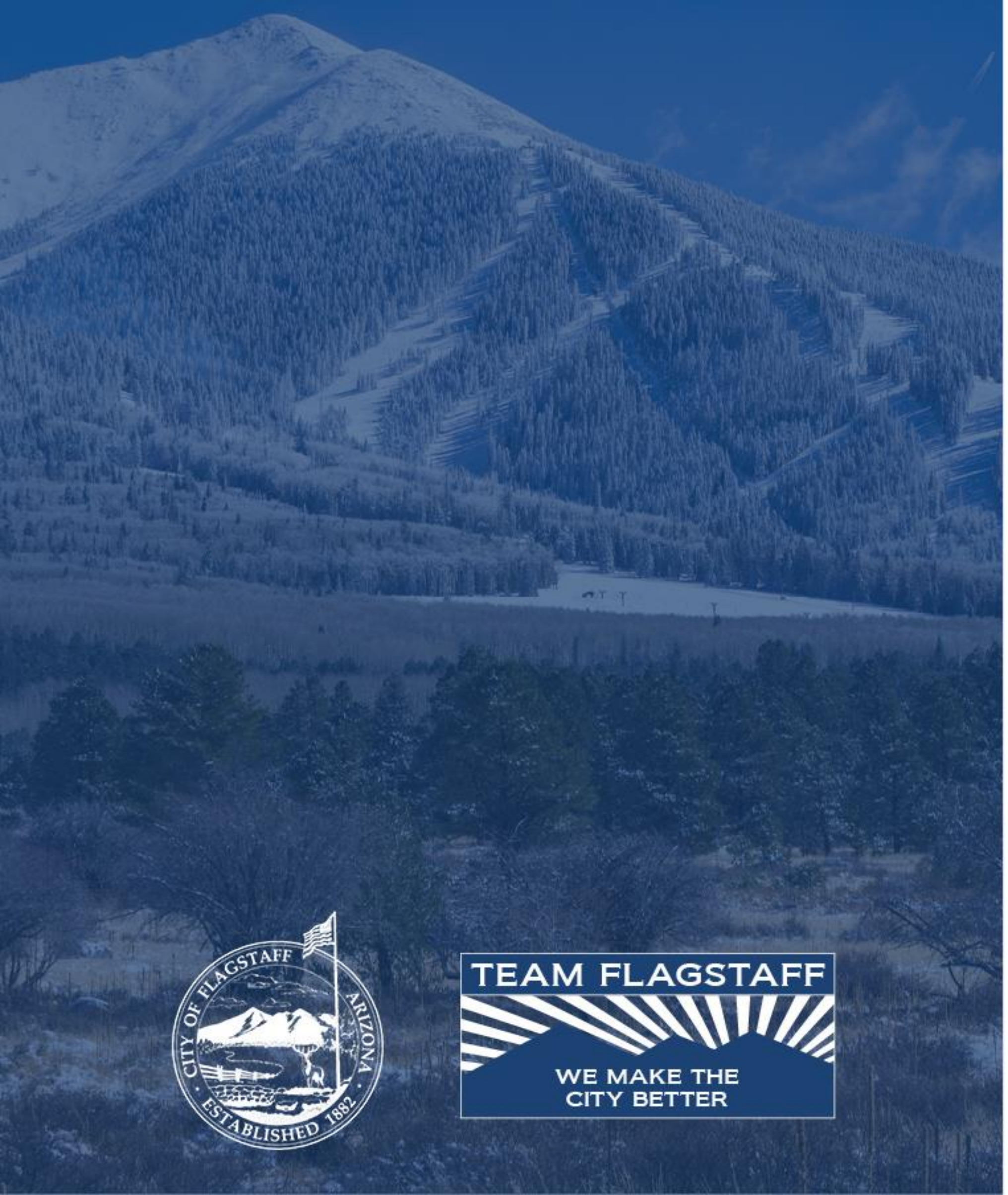


Surface Transportation Reauthorization

Project Eligibility and Benefits

- Matches funding opportunity
- Project is voter approved and has community support
- Funds for the local match are available through Prop 419
- Project benefits the City and its partners (ADOT, CCC, Coconino County, Metroplan, Mountain Line & NAU)
- Federal funding would save approximately $25M (TBD) in local funding

Next Steps



1. Project authorization request
   - Letter to be sent to the Committee on Transportation & Infrastructure by April 14, 2021

2. Future lobbying for a grant or appropriation for actual funding

Additional Federal Funding Opportunities

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Environmental Infrastructure Assistance

- $150M for water infrastructure in AZ only, including wastewater, water supply, environmental restoration and surface water protection

Community Directed Spending (Earmarks)

- Smaller requests submitted for forest restoration, open space and home energy retrofits and rebates in line with the Carbon Neutrality Plan

American Rescue Plan

- $15.2M to the City allows to use funding in four areas: revenue losses for the cities, local aid, premium pay and investments in water, sewer or broadband

Questions

CITY OF FLAGSTAFF ARIZONA ESTABLISHED 1882

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12.

CITY OF FLAGSTAFF

STAFF SUMMARY REPORT

To:	The Honorable Mayor and Council
From:	Andy Bertelsen, Public Works Director
Date:	03/24/2021
Meeting Date:	03/30/2021

TITLE:

Public Works Division Overview

DESIRED OUTCOME:

This is a Division Overview of the Public Works Division being given to the City of Flagstaff City Council by Public Works Leadership. Section overviews include presentations from Adam Miele on Project Management, Scott Overton and Craig Smith on Facilities Maintenance, Greg Conlin on Fleet Services, Rebecca Sayers on Parks, Recreation, and Open Space, Todd Hanson on Solid Waste, and Scott Overton on Streets.

EXECUTIVE SUMMARY:

The Public Works Division manages the core services functions, providing direct service to the residents and visitors of our Flagstaff Community. Core functions include Project Management, Facilities Maintenance, Fleet Services, Parks, Recreation, and Open Space, Solid Waste, and Street Maintenance.

The purpose of this work session is to provide the Flagstaff City Council with an overview of the services provided by the Public Works Division and to have a discussion with City Council on these services.

INFORMATION:

This agenda item is an informational work session on the services provided by the Public Works Division.

Attachments: Public Works Division Overview

CITY COUNCIL - DIVISION INTRODUCTION

Public Works

MARCH 30, 2021

Overview of Public Works

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Project Management – Adam Miele

Facilities Maintenance – Craig Smith

Fleet Services – Greg Conlin

Parks, Recreation, and Open Space – Rebecca Sayers

Solid Waste – Todd Hanson

Streets – Scott Overton

Organizational Chart

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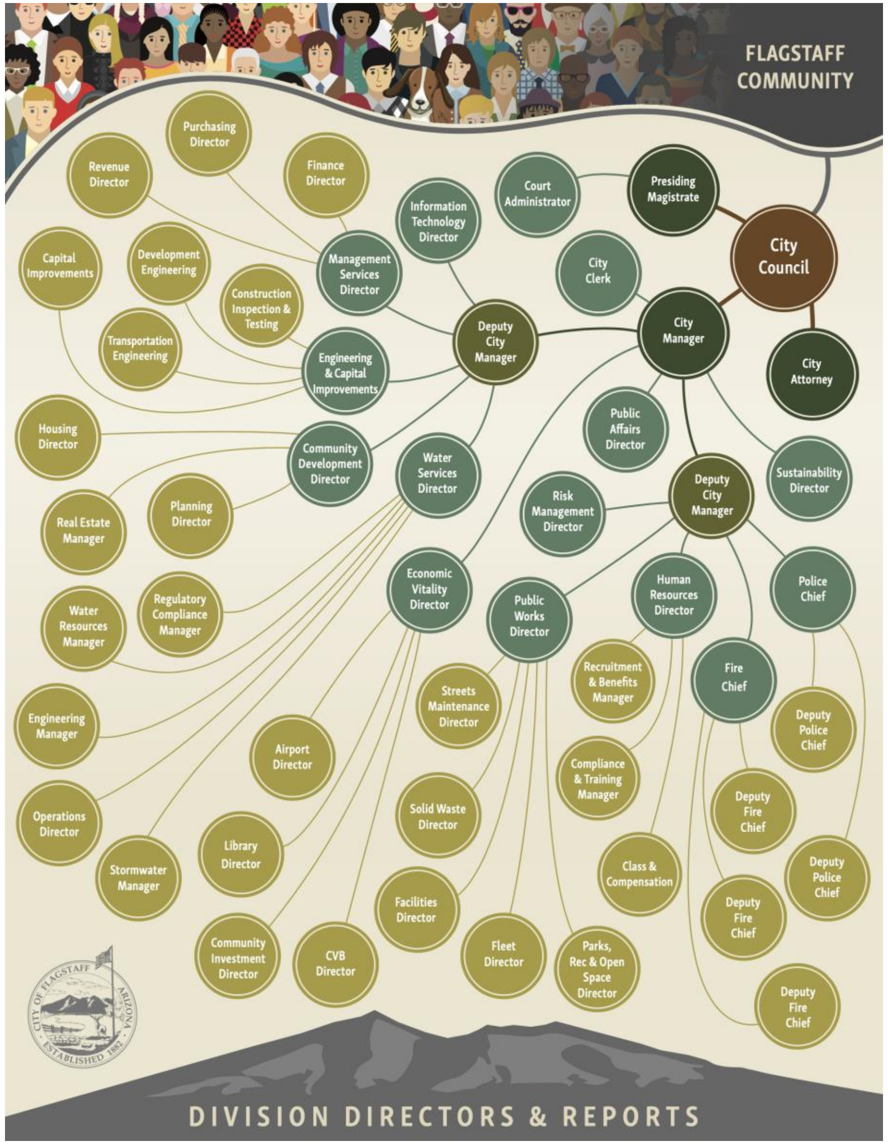
PUBLIC WORKS
CITY OF FLAGSTAFF



Project Management

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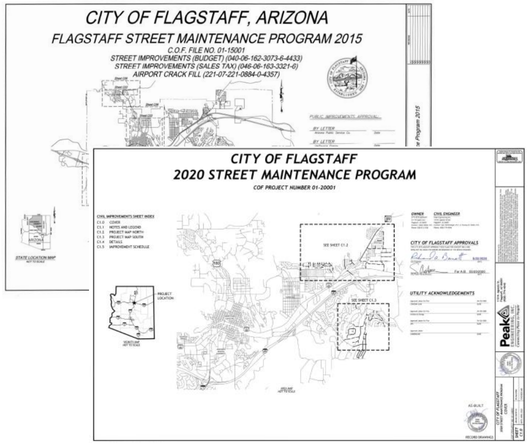
Project Management

Recently Completed Projects

- Public Works - Core Services Maintenance Facility

- Pulliam Airport 3-21 mill and overlay and shoulder improvements

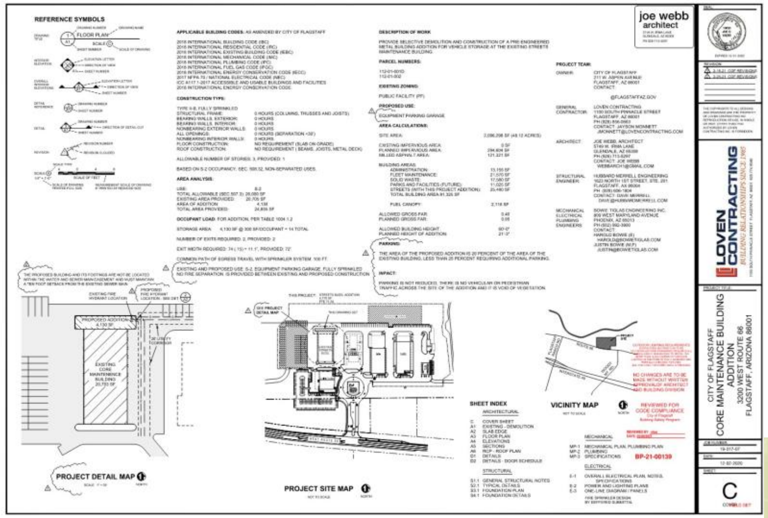


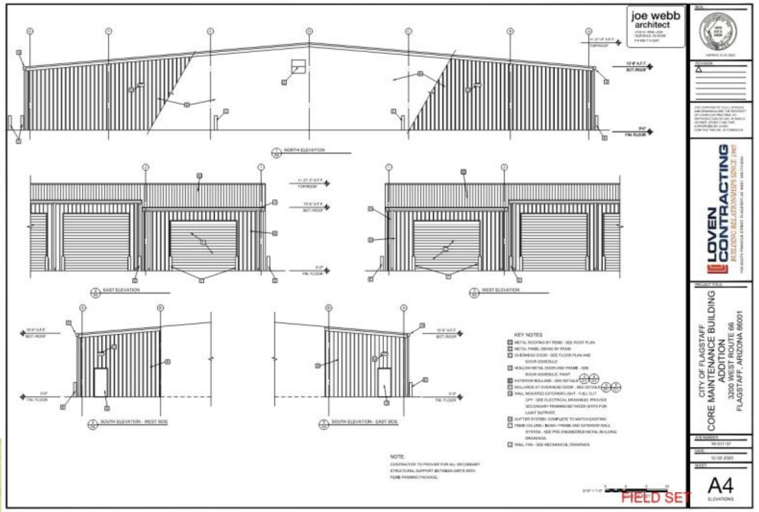
- Street Maintenance Projects 2015 - 2020
- Overflow parking at Pulliam Airport

Project Management

Current projects in development - Streets

- Sweeper Bay Improvements



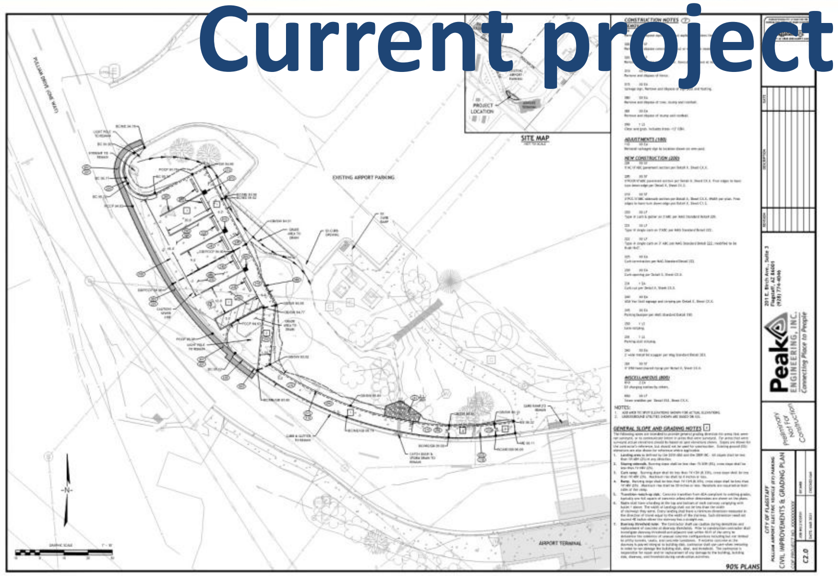


- Street Maintenance projects

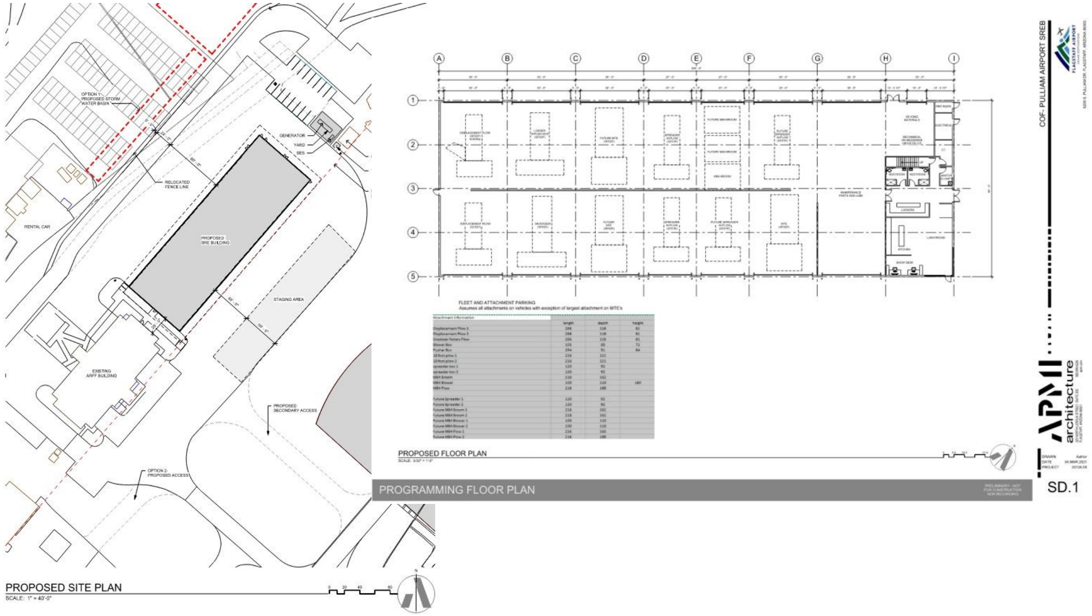
  - Prop 406 (asphalt overlays)
    - 133.07 lane miles improved
    - Over 8.6 million square feet of asphalt placed
    - 152 roadway segments improved
  - Highway User Roadway Fund (HURF) (chip seals)
    - 355.13 lane miles improved
    - Over 22.7 million square feet of surface treatment placed
    - 521 roadway segments improved

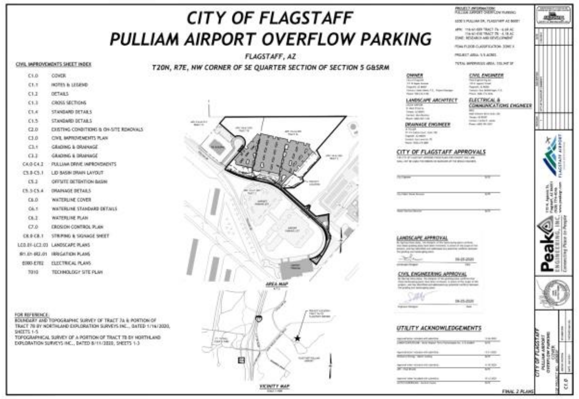
Project Management

Current projects in development - Airport



- Electric Vehicle Parking improvements
- Snow Removal Equipment Building - $16M
- CARES Grant Funding ($18.1 + $1.44 = $19.54)
  - Job Order Contractor - Delivery System
    - Horizontal Improvements
    - Vertical Improvements
- Long-Term Parking Lot - $4M
- Drainage Masterplan update
- Environmental Assessment





Facilities Maintenance

The Facilities Maintenance Team provides a safe, functional, and aesthetic work environment and maximizes resources through maintenance of all City buildings in a safe and efficient manner for all users.

Overall building maintenance/upkeep of all city facilities.

- 938,000 square feet of unique building types
- 94 buildings and structures
- 11 skilled trade employees

Facilities Maintenance

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Roles and Services

- Delivering quality maintenance service with professional skill, a friendly attitude, and creative problem-solving best practices.
- Utilizing sound planning and organization of our work.
- Adapting to the changing needs of our organization.
- Supporting Sustainability Programs and the Climate Action and Adaptation Plan.

Facilities Maintenance

Building Maintenance

- **Building Inspections and Assessments**
  - City buildings inspected on a regular schedule based on age, size, user type, and construction used to develop repair estimates, schedules and work orders along with the long-range capital replacement planning.

- **Maintenance Program**
  - City staff support; Electrical, Flooring, General HVAC, Moving/Relocations, Painting, Plumbing, Pool System Operation, Preventative Maintenance, Records, Storage, Roofing, Security/Locksmith and overall upkeep.
  - The City of Flagstaff currently contracts with local custodial vendors.

Facilities Maintenance

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Recent work program efforts -

- Construction/commissioning/relocation support for new Courthouse facility.
- Replacement of primary cooling system for the City's Main Library and Aquaplex.
- Completed engineering designs for replacement of City Hall/City Main Library hot water boiler systems with 95% high efficiency units and system controls.
- Continued support for the COVID-19 enhanced cleaning/disinfecting protocols as directed by the CDC and Coconino County Health Department.
- Major roof repair at City Hall addressing the chronic leaking in the main lobby.

Facilities Maintenance

Coming Soon -
Facilities Advisory Committee

Fleet Management/Fleet Services

Fleet Management Committe

- PURPOSE/POLICY: Together with City Leadership, the Fleet Management Committee shall establish policies, procedures and best practices designed to meet the operational needs of the City and operate the fleet under its control at the most effective and efficient cost per mile for the life of the vehicle and that there is sound justification for retaining or replacing them.

- To support the use of clean, energy-efficient vehicles that align with the City's Climate Action and Adaptation Plan.

- BUDGET: General Fund capital equipment $765,000.00.

  Enterprise Divisions budget capital from revenue.

Fleet Management/Fleet Services

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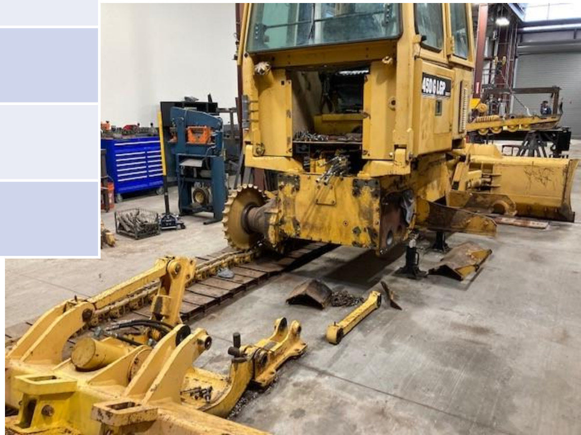
CURRENT FLEET-688 VEHICLES & EQUIPMENT	
DESCRIPTION	**QUANITY**
Trucks over 1.5 Tons	66
Sedans and Motorcycles	49
Vans	8
Light Duty Trucks and SUV's	229
Fire Apparatus	26
Refuse Trucks	32
Heavy Equipment	64
Miscellaneous Construction Equipment	40
Trailers	62
Miscellaneous Welders, Generators, etc.	112

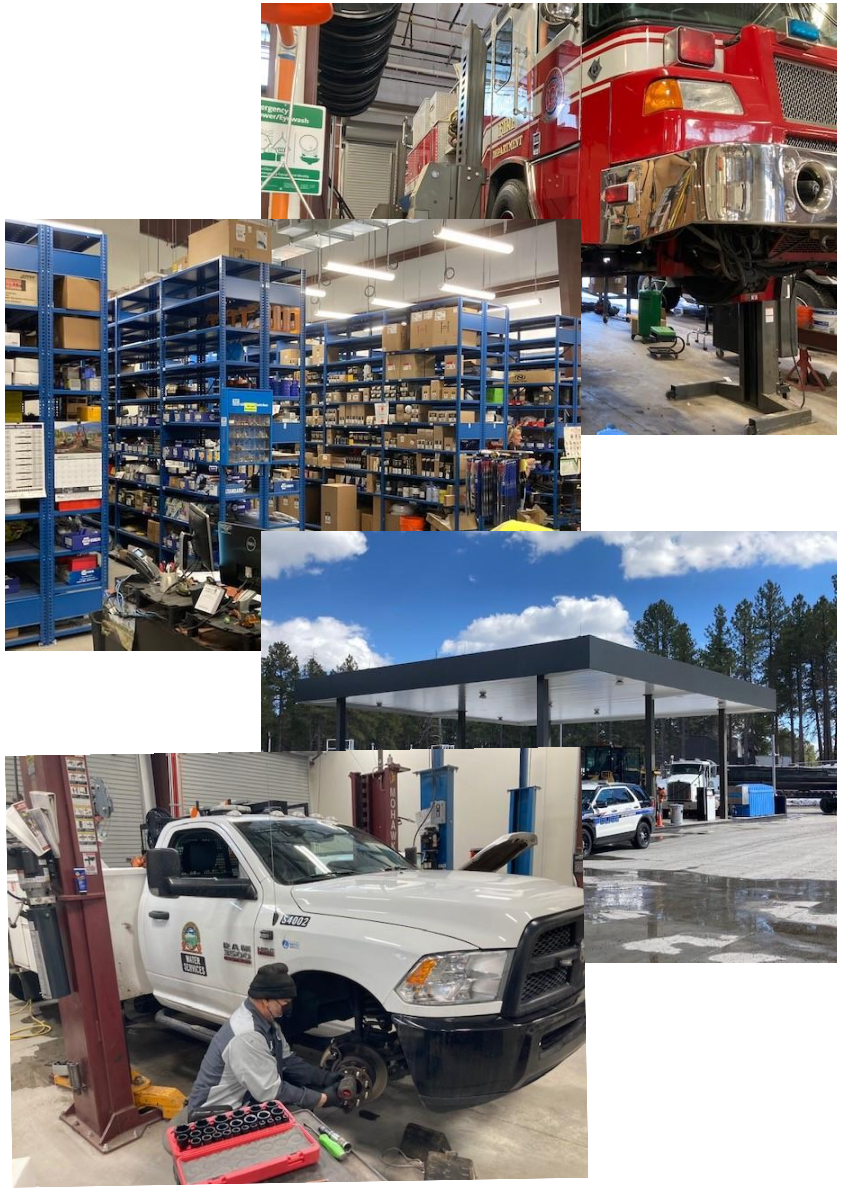


Fleet Management/Fleet Services

Fleet Services

- Budget: $1,145,871.00
- Full time employees: 15
- Parts/Supplies Inventory: $289,145.
- Fuel Dispensed Fiscal 20-21:

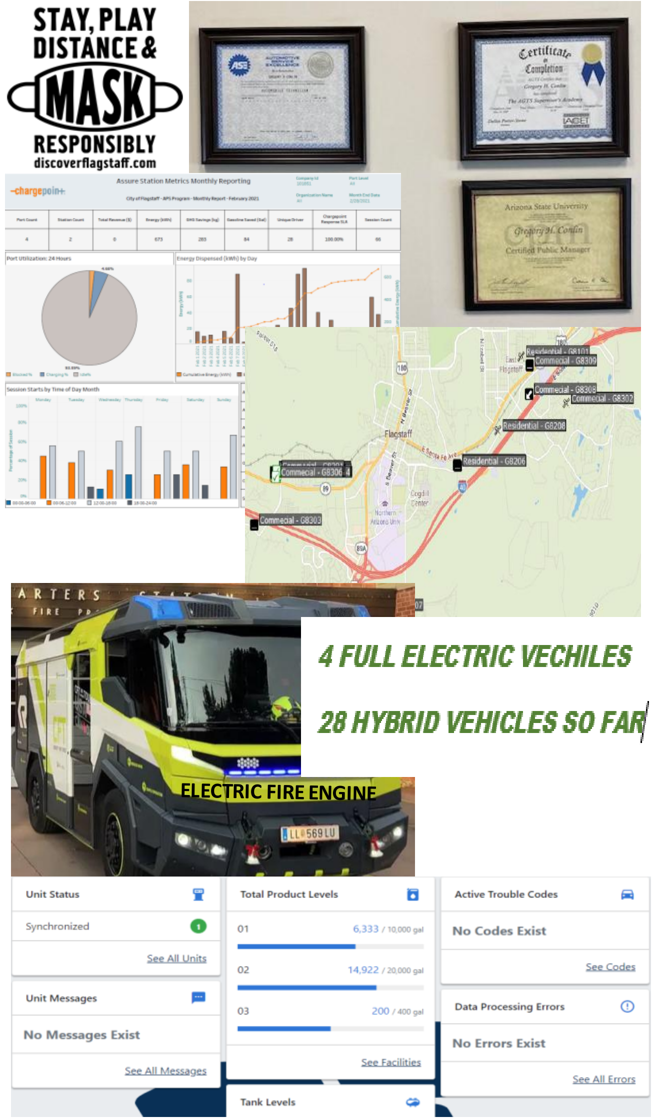
Unleaded 149,221 gallons
Diesel 267,918 gallons
Electricity 5390.898 KWH
(676.5 gal saved)



Fleet Management/Fleet Services

Accomplishments

- COVID response (to date, no staff contracted)
- ChargePoint EV charging stations
- Introduced Telematics
- State of the art fuel management system
- Remained almost fully staffed, despite highly competitive employment environment
- Staff holds 49 ASE and EVT certificates



What's next?

- Continue investment in Staff's education and certification
- Partner with City Section, APS and ChargePoint, expanding EV charging station access
- Continue to expand use of Telematics to over 125 vehicles and equipment
- Spearhead research and investment in new EV and plug in hybrid equipment

Parks, Recreation, and Open Space

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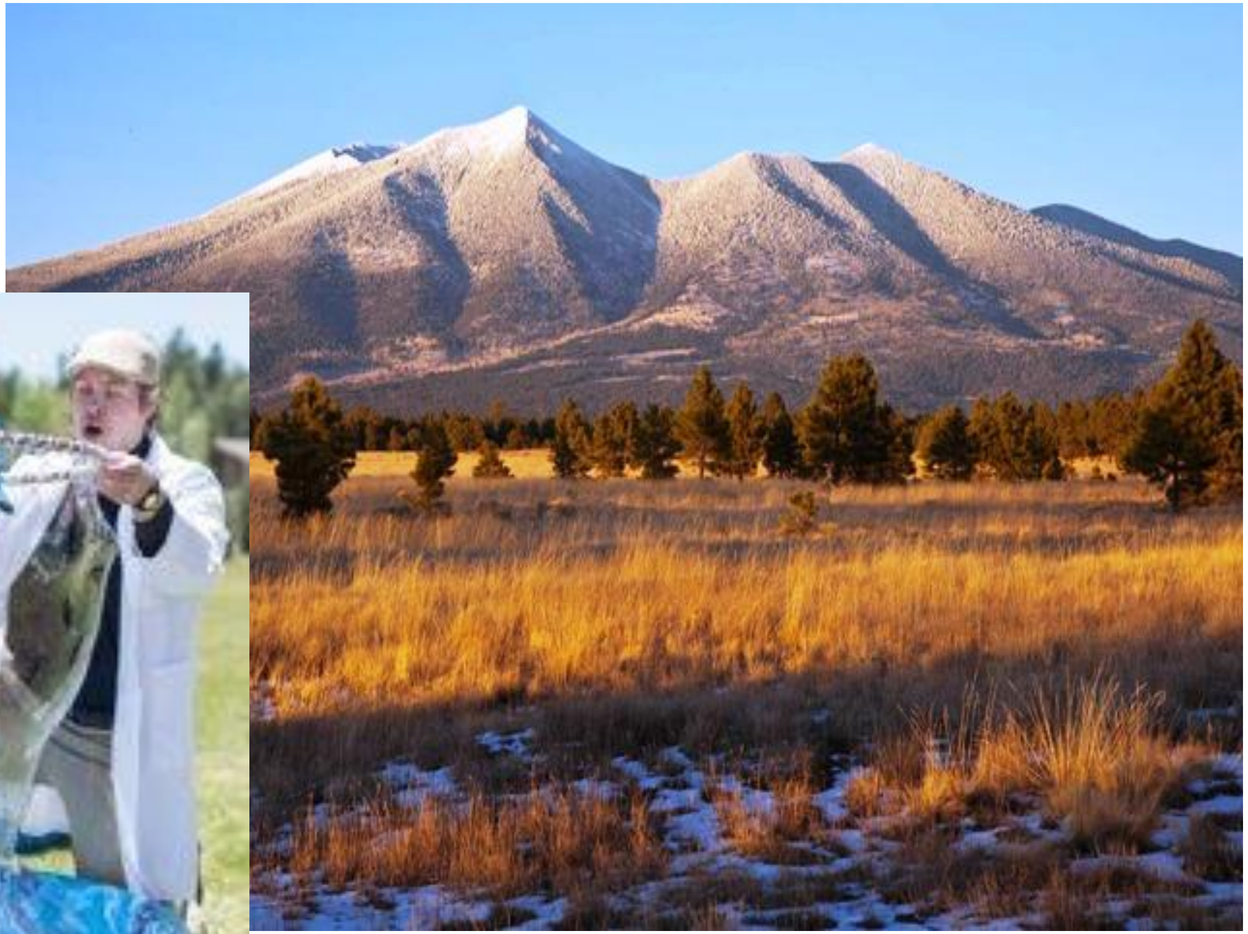
Enhancing our community through people, parks, and programs



Parks, Recreation, and Open Space

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Budgets

Parks	
BBB Rec Fund	$1,600,000
General Fund	$1,966,642
Total	**$3,566,642**

Recreation	
BBB Rec Fund	$1,000,000
General Fund	$3,051,973
Total	**$4,051,973**

Open Space	
General Fund	**$125,151**

Personnel

Parks	
Full time employees	27.00
Temp/Contract employees	7.67
Total	**34.67**

Recreation	
Full time employees	20.50
Temporary employees	38.68
Total	**59.18**

Open Space	
Full time employees	**1.00**
Americorps VISTA	1.00

Parks

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Parks

Accomplishments

- COVID response
- Greenhouse Pilot Project
  - Pollinator starter plants
- Expanded Use of Rights of Way (EUROW) Team
  - Heritage Square tables and gazebos
- Completion of deferred maintenance projects

What's next?

- Thorpe Park Annex public engagement and planning
- Phoenix Suns/APS Rebound project at Ponderosa Park

- Focus on Flagstaff Urban Trail System for accessibility and inclusion

Recreation

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Recreation

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Accomplishments

- Continued meal service at Joe C. Montoya
  - Drive through and delivery
- COVID pivot to online programming and cross training
- Halloween drive through event with Libraries

What's next?

- Safely reopen recreation centers and reintroduce events
- Outdoor recreation focus
- Continue virtual programs
  - Wellness
  - Fitness
  - Arts and crafts
  - Mindfulness

Open Space

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Open Space

Accomplishments

- Invasive plant management project at Picture Canyon
- McMillan Mesa graffiti and litter removal

- Picture Canyon self-guided tour and map

What's next?

- Re-start tours and education programs
- Complete the McMillan Mesa rezone
- McMillan Mesa invasive tree project (grant)
- Observatory Mesa trail planning

Solid Waste

Section Overview

- **Mission:**
  - To provide the community with affordable, efficient, and sustainable comprehensive solid waste solutions

- The Solid Waste Section is part of the Public Works Division. Programs include collection of garbage and recycling from residential, commercial and City Facilities, operating the City owned Cinder Lake Landfill, Hazardous Products Center, and oversight of the Materials Recovery Facility (MRF) operated by Norton Environmental.
- Operates as an Enterprise Fund
- 47 FTE
- FY 21-22 Budget Revenue $14m
- FY 21-22 Base Budget Expenditures $13.7m

Solid Waste

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Solid Waste Collection

- **Residential Trash/ Recycle Collection**
- The residential collection program is responsible for servicing over 19,000 homes per week.
- Approximately 14,500 tons or trash and 3,800 tons of recyclables were collected last year.
- Exploring electrification of collection vehicles. Diesel Emissions Reduction Act Grant opportunities.

Solid Waste

Solid Waste Collection

- **Bulky Trash Collection**
- This program is responsible for the curbside collection of household bulky items as well as tree limbs, yard waste, etc.
- The work is performed by 3 trucks with 2 operators each during peak volume. The trucks are loaded by hand and with an articulated loader. This program collects approximately 4,700 tons of material annually.

Solid Waste Collection

- **Commercial Trash/Recycle Collection and Roll-Off**
- This program collects trash and recyclables from approximately 1,300 accounts generating 26,500 tons of trash and 3,800 tons of recyclables per year.
- Two Roll-Off trucks operate daily and Saturdays upon approved requests.
    - Deliver and remove 20,30 and 40 cubic yard boxes for debris disposal.

Solid Waste

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Landfill

Solid Waste

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Landfill

Landfill Overview

- Opened in 1965, The Cinder Lake Landfill is the only permitted landfill within Coconino County and is considered a Regional Sanitary Landfill.
- 284 acres of operating space 343 acres total
- In 2020 the landfill accepted approximately 98,000 tons. The daily disposal rate is approximately 315 tons per day
- Staff ensures the maximum life of the Landfill now estimated at 2063 vs the previous estimate of 2049 only two years ago. Ongoing efficiencies and further life of Landfill achievements are anticipated.

Landfill

Current and future projects

- Begin Landfill Cell D Construction
- Landfill Road Reconstruction and Infrastructure including 3 phase power, water and future fiber optics
- Initiate planning for the closure of the current active cells at the Landfill (estimate of 2025-2027). Planning includes:
- Use of closed area (solar array, wind turbines, biogas generation, etc.)

Hazardous Products Center

- 3 employees trained to properly handle and process the materials the center takes in.
- The HPC accepts approximately 173 tons of household hazardous waste from County and City residents and business every year.
- The HPC staff also collect material from several City sponsored drop-off events throughout the year.

Solid Waste

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Hazardous Products Center

Materials Recovery Facility

- The City of Flagstaff contracts with Norton Environmental Inc. to operate the Materials Recovery Facility (MRF).
- The facility processes approximately 8,500 tons of material annually.
- The current agreement began in December 1997 and expires September 2023.

Streets

The Streets Section is responsible for the maintenance and operation of our complete transportation network -

- 700 Lane miles of roadway, 16 miles of alley and dirt roads
- 270 miles of sidewalk
- 45 signalized intersections, 3,600 streetlights
- 15,000 signs
- Hundreds of miles of line striping and markings
- Highway User Revenue Funds (HURF) 5M+
- 31 Skilled Employees assigned to 4 main programs

Streets

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Roadway Maintenance - Asphalt, Concrete and Grading

Streets

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Signalized Intersections and Streetlighting Program -

Streets

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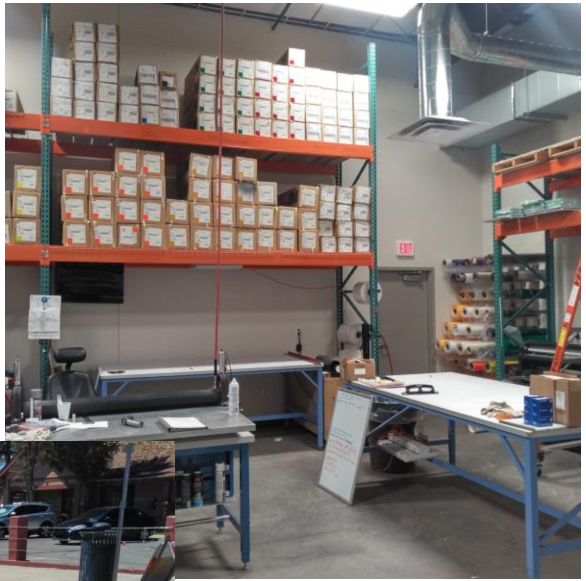
Signs and Markings Program-



Streets

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Street Sweeping, Debris Removal and Vegetation Work

Streets

Snow Operations-

- ALL Streets Employees, cross trained operators and external temporary operators.

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Specialized Snow Operations-

Streets

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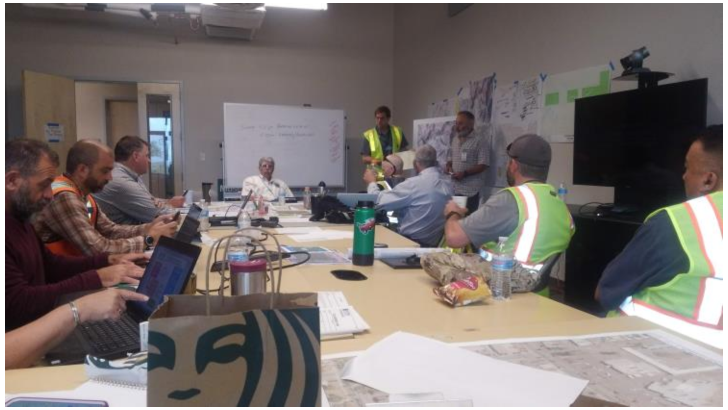
Special Projects and Emergency Response -


Thank you

CITY OF FLAGSTAFF

STAFF SUMMARY REPORT

To:	The Honorable Mayor and Council
From:	Steve Camp, Regulatory Compliance Section Manager
Co-Submitter:	Jolene Montoya
Date:	03/03/2021
Meeting Date:	03/30/2021

TITLE:

Proposed changes to Local Limits for Significant Industrial Users and changes to Cross Connection Code

DESIRED OUTCOME:

Water Services is proposing two changes to the City Code. The first change is an update to the current local discharge limits for permitted industrial users within the City limits. The second change is a revision to clean up and clarify the cross-connection code.

The first change will impact the permitted industrial users within City limits by updating the standards for discharge, changing sampling requirements, and other miscellaneous updates. The desired outcome is to adopt these changes and issue new permits to the industries. This change may require a slight change to the Council-approved enforcement response plan.

The second change has the potential to impact all water users that have backflow prevention devices or could use in the future. These users consist of industrial and commercial customers. The desired outcome is the adoption of these changes to clarify rules governing cross-connection control devices and protect our drinking water distribution system.

Water Services has provided outreach to permitted industries and customers with a cross-connection control device to solicit comments regarding the changes.

EXECUTIVE SUMMARY:

Water Services is proposing changes to the City Code. The first changes include an update and clarification to the current local discharge limits for permitted industrial users within the City limits. The second change is a revision to clean up and clarify the cross-connection code.

The first change will impact the permitted industrial users within City limits by updating the standards for discharge, changing sampling requirements, and other miscellaneous updates. The United States Environmental Protection Agency (USEPA) recommends that pretreatment programs reevaluate their local limits every 5 years. This 5-year recommendation coincides with the Arizona Pollutant Discharge Elimination System (AZPDES) permit issued by the state Arizona Department of Environmental Quality (ADEQ) to our water reclamation plants. Water Services contracted with Brown and Caldwell in 2020 to complete a local limit study for the Pretreatment Program. The proposed standards for discharge are taken from this study and will be used to issue revised discharge permits to our Significant Industrial

Users (SIU).

Included in the local limit code change is a requirement for SIUs to conduct self-monitoring in the 1st and 3rd quarters of the year. SIUs are currently conducting self-monitoring in the 2nd and 4th quarters. This change will allow SIUs to conduct any required confirmation sampling within the same calendar year. If an SIU collects a sample in the 4th quarter that exceeds a local limit, there may not be sufficient time to collect a confirmation sample within the same calendar year.

The change to the local limits will also require a slight change to the Council-approved Enforcement Response Plan (ERP). Sewer rates are set up in code with different classes, depending on the user. Users with a higher Biological Oxygen demand (BOD) and Total Suspended Solids (TSS) have a class with a higher rate. This higher rate is based on the costs the wastewater plant encounters to treat these wastes. However, some of these BOD and TSS limits are above our already existing local limits. City Code also allows the use of surcharges to be assessed to a user that exceeds the local limits. A change in the ERP is necessary to allow staff the flexibility to not enforce exceedances to Local Limits of BOD and TSS. All other local limits will remain in the ERP as approved.

The second proposed change has the potential to impact most of our industrial and commercial water customers that have backflow prevention or cross-connection devices, as well as any future installation of these devices. The proposed changes are to Flagstaff City Code 7-03-01-0015. These changes will streamline code language to increase clarity and reduce redundancy. These changes will make code easier to understand and provide better guidance to the public as to the expectation of the cross-connection program.

Flagstaff Water Services has conducted outreach to the permitted SIUs, customers that may be impacted by the cross-connection changes and the general public through individual email, information included in customer water bills, a notice published in the Arizona Daily Sun, information published on Flagstaff Water Services website, and in a presentation to the Water Commission. Staff also conducted public on-line meetings with potentially impacted customers. One meeting was held with the permitted SIUs and a second meeting was held to address questions/comments to the cross-connection changes.

These recommended code changes will serve to protect our water reclamation plants, bring clarity to the City's code, and ensure staff's consistency in administering the program.

INFORMATION:
The City of Flagstaff has a pretreatment program as required by USEPA and ADEQ to protect the water reclamation plants and the wastewater collection system. The pretreatment program monitors all businesses to find actual or potential threats to this system. We currently have 6 businesses or SIUs that have industrial discharge permits. The proposed code changes will keep the permitted industries from impacting plant operations and meet our compliance obligations to the state ADEQ and USEPA. The state-mandated cross-connection control program is housed within the pretreatment program. The cross-connection oversees protecting the water distribution system through the use of backflow devices. These devices are very important to keep any contaminants and pollutants from entering the drinking water distribution system. This program continues to enforce cross-connection compliance and protect Flagstaff’s drinking water.

Attachments: Proposed changes to 7-02
Proposed changes to 7-03-001-0015
Local Limit presentation
Presentation for Cross-connection
Local Limit report with attachments

CHAPTER 7-02

WASTEWATER REGULATIONS

7-02-001-0002 DEFINITIONS

The general definitions found in Section 7-01 (Water Services) shall apply to this chapter. In addition, for the purposes of this chapter, the following words and terms shall have the following meanings, unless the context indicates otherwise:

ALERT LIMIT: The level at which, if exceeded by a significant industrial user, it is recommended that the POTW or City conduct an evaluation to determine if that discharge had or is having impact on the plant effluent quality, and if pass-through or interference was or is occurring leading to compliance concerns at the POTW, then voluntary correction or enforcement action is recommended.

APPROVED LABORATORY PROCEDURES: The measurements, tests and analysis of the characteristics of water and wastes in accordance with analytical procedures as established in 40 CFR Part 136 as revised.

AVERAGE QUALITY: The arithmetic average (weighted by flow value) of all the "daily determinations of concentration," as that term is defined herein, made during a calendar month.

BEST MANAGEMENT PRACTICES or BMPs: The schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to implement the prohibitions listed in 40 CFR 403.5(a)(1) and (b). BMPs also include treatment requirements, operating procedures, and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw materials storage.

BOD (biochemical oxygen demand): The quantity of oxygen utilized in the biochemical oxidation of organic matter under standard laboratory conditions for five (5) days at a temperature of twenty degrees (20°) centigrade, expressed in milligrams per liter.

BRANCH SEWER: An arbitrary term for a sewer which receives sewage from lateral sewers from a relatively small area.

BUILDING CONNECTION: The connection to the public sewer and extension therefrom of the sewer to the property line in an alley or street, or to the easement line in an easement, whichever is applicable, depending on the location of the public sewer.

BUILDING OFFICIAL: The Chief Building Inspector, or authorized representative.

BUILDING SEWER: The service line from the building to the sewer main.

BYPASS: The intentional diversion of waste streams from any portion of an industrial user’s facility.

CATEGORICAL STANDARD: Limits for pollutants that are set by the EPA for individual types of industry listed in 40 CFR 403.

COD (chemical oxygen demand): The quantity of oxygen consumed from a chemical oxidation of inorganic and organic matter present in the water or wastewater, expressed in milligrams per liter.

COLLECTION SYSTEM: Any and all lines, manholes, or other mechanical or physical appurtenances which may be involved with the conveyance of wastewater to or from the City water reclamation plant(s).

COOLING WATER: The clean wastewater discharged from any heat transfer system such as condensation, air conditioning, cooling, or refrigeration.

DAILY COMPOSITE SAMPLE: A sample of effluent, discharge or other source of pollutants continuously collected, manually or automatically, over a normal operating day. Samples ~~should~~ shall be collected over a twenty-four (24) hour period or at least an eight (8) hour period during production, ~~but preferably over a twenty-four (24) hour period,~~ with one (1) sample being drawn at least once every two (2) hours. Composites should be flow proportional wherever feasible~~. Volatile pollutant aliquots must be combined in the laboratory immediately before analysis.~~

DAILY DETERMINATION OF WASTEWATER QUALITY: For composite samples, "daily determination of wastewater quality" shall be the concentration of any parameter tested in a daily composite sample. For grab samples, the "daily determination of wastewater quality" shall be the arithmetic average (weighted by flow value) of the concentrations of any parameter in each grab sample obtained in any calendar day.

DEVELOPER: Any person engaged in the organizing and financing of a sewage collecting system within an area contributing to a branch, main or a trunk sewer of the City sewer system. Such may be either a subdivider or a legally constituted improvement district.

DISCHARGE: The disposal of sewage, water or any liquid from any sewer user into the sewerage system.

DOMESTIC WASTE: A typical, residential-type waste which requires no pretreatment under the provisions of this chapter before discharging into the sanitary sewer system, excluding all commercial, manufacturing and industrial wastes.

EFFLUENT: Wastewater or other liquid - raw, partially or completely treated - flowing from a basin, treatment process, or treatment plant.

FINAL: The local limits established by ordinance and to remain in effect which are recommended to remain until the system is reevaluated as a whole, during the next local limits update.

GRAB SAMPLE: An individual sample of effluent, discharge or other source of pollutants collected in less than fifteen (15) minutes.

HAZARDOUS DISCHARGE: A discharge which is considered by the City to be an imminent hazard to health, the environment, or the POTW.

INDIRECT DISCHARGE: The introduction of pollutants into a POTW from any nondomestic source regulated under Section 307(b), (c) or (d) of the Clean Water Act as amended 33 U.S.C. § 1251, et seq.

INDUSTRIAL PRETREATMENT DISCHARGE PERMIT: The permit granted by the City to an industrial user granting the right to discharge to the sewer works subject to the terms and conditions set forth in the permit.

INDUSTRIAL USER: A source of indirect discharge.

INDUSTRIAL WASTE: Any liquid, free-flowing waste, including cooling water, resulting from any industrial or manufacturing process or from the development, recovery or processing of natural resources, with or without suspended solids excluding uncontaminated water.

INFLOW: Water other than wastewater that enters a sewer system (including sewer service connections) from sources such as roof leaders, cellar drains, foundation drains, drains from springs and swampy areas, manhole covers, cross connections between stormwater, surface runoff, street wash waters or drainage.

INTERFERENCE: Inhibition or disruption of the sewer system, treatment processes or operations which contribute to a violation of any requirement of a National Pollutant Discharge Elimination System permit. The term includes prevention of sewage sludge use or disposal by the cities in accordance with Section 405 of the Act, or any criterial guidelines or regulations developed pursuant to the Solid Waste Disposal Act (SWDA), the Clean Air Act, the Toxic Substances Control Act, or more stringent State criteria (including those contained in any State sludge management plan prepared pursuant to Title IV of SWDA) applicable to the method of disposal or use employed by the City.

INTERIM: Guiding limits while the POTW or City investigates other sources of pollutants and ways of controlling those sources.

LATERAL SEWER: A sewer which discharges into a branch or other sewer and has no other common tributary to it.

MAIN SEWER: A sewer which receives sewage from one (1) or more branch sewers as tributaries.

MAINTENANCE: Keeping the treatment works in a state of repair, including expenditures necessary to maintain the capacity (capability) for which said works were designed and constructed.

NATURAL OUTLET: Any outlet into a watercourse, ditch, or other body of surface or ground water.

NPDES PERMIT: The permit or permits issued to and held by the City under the National Pollutant Discharge Elimination System, pursuant to 33 U.S.C. § 1342 and 40 CFR Parts 122 through 125.

PARAMETER: See "TREATMENT PARAMETER."

PASS-THROUGH: An effluent flow which exits the POTW in quantities or concentrations which alone or in conjunction with a discharge or discharges from other sources is a cause of a violation of any requirement of the POTW’s NPDES permit (including an increase in the magnitude or duration of a violation).

PERMITTEE, PERMIT HOLDER: Any person, firm, association, corporation or trust which owns, operates, possesses or controls an establishment or plant being operated under a valid industrial pretreatment permit to discharge waste into the City sewer system.

pH: The logarithm of reciprocal of the weight of hydrogen ions in grams per liter of solution.

POTW: Publicly owned treatment works.

PRETREATMENT: The reduction of the amount of pollutants, the elimination of pollutants, or the alteration of pollutant properties in wastewater prior to or in lieu of discharging or otherwise introducing such pollutants into the POTW, as further defined and described in 40 CFR 403.3(q).

PRETREATMENT STANDARDS or PRETREATMENT REQUIREMENTS: Any substantive or procedural requirements relating to pretreatment, including the specific pollutant limits set forth in Section 7-02-001-0008.

PUBLIC SEWER: A lateral, branch, main or trunk sewer controlled and maintained by the City of Flagstaff.

RECLAIMED WASTEWATER: The treated effluent which is the product of the municipal wastewater system, although not suitable for human consumption, may be used for certain industrial or commercial purposes.

REPLACEMENT: Those expenditures made for obtaining and installing equipment, accessories and/or appurtenances during the useful life of the treatment works which are necessary to maintain the capacity and performance of the treatment works for which they were designed and constructed.

REPRESENTATIVE SAMPLE: A sample which takes a portion of the user’s discharge which will be indicative of all the constituents of the discharge.

SANITARY SEWER: A sewer which carries sewage and to which storm, surface, and ground waters are not intentionally admitted.

SEVERE PROPERTY DAMAGE: Substantial physical damage to property, damage to the treatment facilities which caused them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. "Severe property damage" does not mean economic loss caused by delays in production.

SEWAGE/SEWERAGE: A combination of water-carried wastes from residences, business buildings, institutions, and industrial establishments, together with such ground, surface, and stormwater as may be present.

SEWAGE TREATMENT PLANT: Any arrangement of devices and structures used for treating sewage.

SEWER: A pipe or conduit for carrying sewage.

SEWER TAP: Includes hole cut into main line and saddle to which to connect.

SLUG LOAD: Any pollutant discharged in quantities large enough to cause interference, upset, or pass-through at the POTW.

STANDARD INDUSTRIAL CLASSIFICATION (SIC): A coded classification of industries based upon economic activity developed by the U.S. Department of Commerce as published in the Standard Industrial Classification Manual, 1987, Office of Management and Budget.

STANDARD METHODS: The procedure as described in the most current edition of Standard Methods for the Examination of Water and Wastewater published by the American Health Association, or the most current edition of Manual of Methods for Chemical Analysis of Water and Wastes published by the U.S. Environmental Protection Agency.

STORM SEWER or STORM DRAIN: A sewer or drainage which carries storm and surface waters, but excludes sewage and polluted industrial wastes.

SURCHARGE: An additional charge levied against industrial users for exceeding certain thresholds of BOD or TSS, as described in Section 7-02-001-0040(H) and set forth in Section 7-02-001-0041(A).

SUSPENDED SOLIDS (SS): Solids measured in milligrams per liter that either float on the surface of or are in suspension in water, wastewater or other liquids and which are largely removable by a laboratory filtration device, as defined in the "Standard Methods" as defined herein.

SYSTEM DESIGN CAPACITY: The design capacity for normal domestic wastewater as established by accepted engineering standards.

TREATMENT PARAMETER: A fundamental characteristic of sewage around which treatment is designed, such as, but not limited to, flow, BOD, and suspended solids.

TSS: Total suspended solids, expressed in milligrams per liter, in a user's discharge.

TRUNK SEWER: A sewer which receives sewage from many tributary main sewers and serves as an outlet for a large territory.

UPSET: An exceptional incident in which there is unintentional and temporary noncompliance with categorical pretreatment standards because of factors beyond the reasonable control of the industrial user. This does not include noncompliance due to operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

U.S.C.: The United States Code, as amended.

USER: Any person, lot, parcel of land, building, premises, municipal corporation or other political subdivision that discharges, causes or permits the discharge of wastewater into the sewage system.

VOC (volatile organic compounds): Those parameters included in EPA method 624/625.

WASTEWATER SYSTEM: All facilities for collection, pumping, treating, and disposing of sewage. As used in this chapter the terms "sewer system" or "wastewater system" shall have the same meaning and definition.

WATERCOURSE: A channel in which a flow of water occurs, either continuously or intermittently. (Ord. 1104, 12/04/1979; Ord. 1236, 11/29/1982; Ord. 1681, Amended, 12/04/1990; Ord. 1693, Amended, 05/07/1991; Ord. 1723, Amended, 04/07/1992; Ord. 1950, Revised, 08/05/1997; Ord. 2015-09, Amended, 06/02/2015; Ord. 2018-32, Amended, 12/04/2018. Formerly 7-02-001-0004)

7-02-001-0007 PROHIBITED SUBSTANCES

A. The Water Services Director shall have the authority to regulate the volume and flow rate of discharge to the sewage works and to establish permissible limits of concentration for various specific substances, materials, or wastes that can be accepted into the sewage works, and to specify those substances, materials, waters or wastes that are prohibited from entering the sewage works.

B. The following are prohibited from the City wastewater collection system:

1. Any substance that interferes with the POTW or wastewater collection system.

2. Any liquids, solids, or gases which by reason of their nature or quantity could be sufficient, either alone or by interaction with other substances, to cause injury to the POTW from fire or explosion. At no time shall two (2) successive readings on an explosion hazard meter, at the point of discharge to the POTW, be more than five percent (5%), nor any single reading over ten percent (10%), of the lower explosive limit (LEL) of the meters. Prohibited materials include, but are not limited to: gasoline, kerosene, naphtha, trichloroethylene, xylene, ethers, alcohols, ketones, aldehydes, peroxides, chlorates, perchlorates, bromates, carbides, hydrides and sulfides, waste streams with a closed cup flash point of less than one hundred forty degrees (140°) Fahrenheit or sixty degrees (60°) centigrade using the test methods specified in 40 CFR 261.21.

3. Any water which contains a solid or viscous substance which could obstruct the flow in the collection system or interfere with the POTW.

4. Any particles greater than one-half (1/2) inch in any dimension, animal tissues, manure, ashes, cinders, sand, metal, glass, straw, paper, wood, plastics, gas, tar, asphalt and grinding wastes.

5. Any substance that can cause corrosive damage to the POTW or collection system and any substance with a pH of less than 6.0~~5~~ standard units (s.u.) or greater than 11.0. s.u.

6. Any liquid or vapor which causes the temperature entering the POTW to exceed one hundred four degrees (104°) Fahrenheit (40° C) or any liquid or vapor with a temperature greater than one hundred sixty degrees (160°) Fahrenheit (71° C).

7. Any toxic or radioactive substance in sufficient quantity to interfere with the POTW or collection system or to create a health or environmental hazard.

8. Any substance requiring unusual attention or expense of the City unless specifically authorized. Compensatory payments be determined by the City to be paid by the user who contributes any such authorized substance.

9. Any noxious or malodorous liquid, gas or solid which creates a public nuisance, health or environmental hazard, or inhibits entry into any part of the wastewater system for maintenance or monitoring.

10. Any water with a volume greater than twenty (20) GPM containing dyes, inks or other color-causing substances that change the typical color in the wastewater collection system.

11. Any substance causing a hazard to health or to the environment.

12. Petroleum oil, nonbiodegradable cutting oil or products of mineral oil origin in amounts that cause interference or pass-through.

13. Any trucked or hauled pollutants, except at discharge points designated by the POTW.

14. Unless otherwise approved by the Water Services Director, any stormwater, surface water, groundwater, roof runoff, surface drainage, or unpolluted process waters that may constitute inflow as defined herein.

15~~4~~. Any combination of substances contributed by one (1) or more users which results in any of the above situations.

16~~5~~. The following pesticides are expressly prohibited from discharge into the City sewer system: 4,4'-DDD; 4,4'-DDE; 4,4'-DDT; Aldrin, and Heptachlor. (Ord. 1693, Amended, 05/07/1991; Ord. 1896, Amended, 11/21/1995; Ord. 1958, Amended, 10/07/1997; Ord. 1989, Amended, 01/19/1999; Ord. 2002-08, Amended, 07/16/2002; Ord. 2007-23, Amended, 03/20/2007; Ord. 2015-09, Amended, 06/02/2015; Ord. 2018-32, Amended, 12/04/2018. Formerly 7-02-001-0009)

7-02-001-0008 STANDARDS FOR DISCHARGE

A. A technically based determination of local industrial user discharge limits for heavy metals, organics and other pollutants, for which there exists a specific discharge limit at the POTW, be made by the City Water Services Director and EPA. Such determination shall take into account removal percentages of the POTW, and dilution factors.

B. The following specific limits shall apply to all industrial user discharges and may be modified, with prior notice to the industrial user and an opportunity to respond, to comply with applicable State and/or Federal regulations.

Parameter Maximum	**(mg/L)**
Inorganics	
Lead	0.08~~41~~
Copper	0.20~~15~~
Zinc	~~1.40~~ 3.0
Mercury	0.017 ~~BMP (interim)~~
Cyanide (total)	0.24
Arsenic	0.18~~31~~
~~Silver~~	~~0.30~~
Selenium	0.015
Sulfides	5~~4.5~~
HEM [a]	~~(152 mg/L) *(Qmax)= lb/day load (interim)~~200
Volatile Organic Compounds	
~~Methylene Chloride~~	~~4.1~~
Toluene	0.14
~~Benzene~~	~~0.102~~
Total Trihalomethanes	0.32 ~~alert~~
~~Bromodichloromethane~~	~~0.08 alert~~
~~Bromoform~~	~~0.08 alert~~
~~Chloroform~~	~~0.08 alert~~
~~Dibromochloromethane~~	~~0.08 alert~~
Bromide	0.5~~05~~
~~**Semivolatile Organic Compounds**~~	

Parameter Maximum	**(mg/L)**
~~Bis(2-ethylhexyl) phthalate (BEHP)~~	~~Best management practices (BMP)~~
~~**Pesticides**~~	
~~Aldrin~~	~~Prohibited~~
Conventional Pollutants	
BOD	~~1,000 mg/L (surcharges if >400 mg/L)~~ 700 lb/day*
TSS	~~1,200 mg/L (surcharges if >450 mg/L)~~ 130 lb/day*
~~Total Nitrogen~~	~~173 mg/L~~
pH	6.0~~5~~<pH≤11.0
Ammonia	173
Total Kjeldahl Nitrogen (TKN)	173
Nitrate/Nitrite	10

* lbs/day = pollutant concentration in mg/L x 8.34 (pounds/gallon) x flow in million gallons per period

C. The City may set limits based on mass measurements of pollutants for a particular substance or a particular user if it is necessary for adequate regulation. Discharge limits be set in order to meet any limits set for sludge disposal.

D. Industrial users meet the requirements of the U.S. Code of Federal Regulations, 40 CFR 403 and the amendments thereof. No discharge may exceed any Federal categorical standard or cause the POTW to exceed its AZPDES or APP Permit. The City may request approval to modify a Federal categorical standard, according to 40 CFR 403.

E. Dilution may not be used to meet a standard or limit unless it is expressly authorized by the categorical standard set by the EPA or by the City.

F. Bypass Prohibition.

1. Notice of Bypass to Occur.

a. If an industrial user knows in advance of the need for a bypass, it shall submit prior notice to the ~~Utilities~~ Water Services Director, if possible, at least ten (10) days before the date of the bypass.

b. An industrial user shall submit oral notice of an unanticipated bypass that exceeds applicable pretreatment standards to the Water Services Director within twenty-four (24) hours from the time the industrial user becomes aware of the bypass. A written submission shall also be provided within five (5) days of the time the industrial user becomes aware of the bypass. The written submission shall contain a description of the bypass and its cause; the duration of the bypass, including exact dates and times, and, if the bypass has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the bypass.

2. Prohibition of Bypass. Bypass is prohibited, and the Water Services Division may take enforcement action against an industrial user for a bypass unless:

a. Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;

b. There were no feasible alternatives to the bypass;

c. The user submitted notices as required above.

G. O&M Requirements.

1. Industrial users required to install suitable pretreatment facilities to treat waste streams which do not meet City discharge limits shall provide necessary maintenance on such equipment to ensure their continued and efficient operation. ~~Such facilities shall be attended by a person who has obtained certification as a wastewater operator by ADEQ at a level appropriate for the facilities being tended.~~

2. An industrial violation of City discharge limits, which is due to operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventative maintenance, carelessness or improper operation will not be considered unintentional by the City of Flagstaff.

3. All industrial users shall maintain their general facilities in such a manner as to eliminate or minimize the possibility of discharge of substances by that industry, which are in violation of applicable pretreatment standards. (Ord. 1693, Amended, 05/07/1991; Ord. 1896, Amended, 11/21/1995; Ord. 1950, Revised, 08/05/1997; Ord. 2002-08, Amended, 07/16/2002; Ord. 2007-23, Amended, 03/20/2007; Ord. 2015-09, Amended, 06/02/2015; Ord. 2018-32, Amended, 12/04/2018. Formerly 7-02-001-0010)

7-02-001-0010 INDUSTRIAL SELF-MONITORING

A. Significant industrial users, at the user's expense, must provide safe and convenient access for sampling by the City. A City approved manhole must be provided from which a sample that is representative of the total discharge can be taken. There must be unobstructed access to the open flow in the manhole so that a grab sample can be taken and so that sampling equipment can be set up in the manhole.

B. Sampling and analysis must be performed by significant industrial users, at their own expense, at least twice each year, in two (2) separate quarters, (~~April – June and October – December~~ January – March and July - September), and results of such sampling submitted to the City before the last day of each respective quarter or as directed by the City. ~~The City may perform such sampling for the significant industrial user if they so choose~~.

C. If a test result is not within the limits of this chapter or the categorical standards from any semiannual sampling, completed by the permitted industrial user, the industrial user shall immediately notify the City within 24 hours of becoming aware of the violation (i.e. issuance of final lab report) ~~If any sample that is taken by the industrial user or the City is not within the limits of this chapter or the categorical standards, then t~~The industrial user, or the City if they so choose, shall repeat the sampling within thirty (30) days of becoming aware of the violation, or more often if it is determined to be necessary by the City.

D~~C~~. ~~A minimum of four (4) grab samples, pulled at least every two (2) hours,~~ Grab samples must be used when sampling for pH, cyanide, total phenols, oil and grease, sulfide, and volatile organics. ~~For all other pollutants,~~

E. ~~t~~Twenty-four (24) hour composite samples must be obtained through flow-proportional composite sampling techniques, where feasible. The City may waive flow-proportional composite sampling for any industrial user that demonstrates that flow proportional sampling is infeasible. In such cases, samples may be obtained through time-proportional composite sampling techniques or through a minimum of four (4) grab samples where the user demonstrates that this will provide a representative sample of the effluent being discharged. ~~Sampling must be performed for five (5) consecutive days and be representative of the effluent being discharged on a typical production day or as directed by the City.~~

F~~D~~. The flow must be measured by the industrial user at the time that the sample is taken, according to 40 CFR 403.12.

G~~E~~. The methods of sampling must be performed in accordance with 40 CFR 136 and any other applicable Federal, State, or local requirements. ~~and t~~The sampling location and type must be approved by the City. An authorized representative of the industry (see Section 7-02-001-0012) shall sign and submit with these sample results, a statement verifying the validity of the methods and location.

H~~F~~. All records of sampling, analysis and flows must be kept by the industrial user and the City for at least three (3) years. All records must be available to the City upon request. (Ord. 1693, Enacted, 05/07/1991; Ord. 2015-09, Amended, 06/02/2015; Ord. 2018-32, Amended, 12/04/2018. Formerly 7-02-001-0012)

7-02-001-0011 REPORTING REQUIREMENTS

A. Within one hundred eighty (180) days of the promulgation by the EPA of a categorical standard or within one hundred eighty (180) days of a final administrative decision, the industrial users that are subject to the standard must report the information provided for in 40 CFR 403.12(b). This information must also be supplied by existing sources of discharge as well as new sources that discharge after the standards have been promulgated.

B. All industrial users must immediately report to the Water Services Division any discharge, including accidental discharge, which contains a slug load, a prohibited substance, or any substance which might be harmful to the POTW, the collection system, the environment or to any person.

C. The industrial user must provide a written report (separate from the immediate report) within five (5) days of the detection of the upset. The report must include the nature and volume of the discharge, the period of noncompliance including exact dates and time or if not corrected the anticipated time the upset is expected to continue, the action being taken by the industrial user to correct the problem and preventive measures needed to avoid future spills.

D. The significant industrial user shall report to the City ~~immediately~~ prior to any significant changes in production, including, but not limited to, production rate, product, raw materials utilized, rate of discharge, concentration of pollutants being discharged, etc.

E. If in the course of self-monitoring, a categorical or significant industrial user becomes aware of a violation of ~~their~~ the ~~categorical~~ limits set forth in their discharge permit, they shall notify the City within twenty-four (24) hours of becoming aware of such.

~~F. If an industrial user subject to reporting requirements of this section monitors any pollutant more frequently than required by the City, using the procedures prescribed in Section 7-02-001-0010, the results of this monitoring shall be submitted to the City also.~~

~~G~~F. All industrial users shall notify the POTW, the EPA Regional Waste Management Division Director, and State hazardous waste authorities in writing and within one hundred eighty (180) days of any discharge into the POTW of a substance, which, if otherwise disposed of would be a hazardous waste under 40 CFR Part 261 as required in 40 CFR 403.12(p)(1) through (4). (Ord. No. 1693, Enacted, 05/07/1991; Ord. 2018-32, Amended, 12/04/2018. Formerly 7-02-001-0013)

7-02-001-0016 INSPECTIONS AND MONITORING

A. Any authorized employee of the Water Services Division shall, upon presentation of ~~his~~ their credentials, have ~~free~~ access ~~at all reasonable hours~~ to any commercial or industrial premises connected to or disposing of any type waste to the City wastewater system for the purpose of surveillance and/or an inspection of the premises to determine the nature and quantity of wastes discharged to the City wastewater system, or for examining or copying records, required by 40 CFR 403.12(m). The commercial/industrial user must make ~~freely~~ available to the City any and all records which would enable them to make an accurate determination of the constituents and flow of the user’s waste stream.

B. ~~Servicemen, industrial pretreatment inspectors, sanitary engineers, or other designated representatives~~Authorized employee of the Division, whose duty it may be to enter upon commercial or industrial premises to make inspections and collect samples or measure the quantity of wastes discharged to the City sewer, shall be provided with credentials to identify them as authorized representatives for the Division.

C. No person, except an authorized employee of the Division, shall have or exhibit any credentials of that Division. It shall be the responsibility of each employee or authorized representative of the Division, upon resignation or dismissal, to deliver and surrender at the office of the Water Services Director all credentials of the Division in his/her possession.

D. Questionnaires will be provided to all new businesses entering the City of Flagstaff to gather information pertaining to waste that may be generated by such. If any waste other than domestic is discharged from such an establishment, the City may perform an inspection of such premises at least annually or more often as necessary to determine its status of compliance with this chapter.

E. The City of Flagstaff or its designated representative shall have the authority to randomly sample industrial user waste streams and analyze for any pollutants that would be anticipated to be present for that particular user utilizing EPA approved methods. The City will review and analyze self-monitoring reports submitted by industrial users and make notification to such user of any compliance action to be taken as a result of such.

F. The information from the City's inspection and monitoring activity will be available to the administrative authority of the State and/or EPA. This information will also be made available to the general public upon request with the exception of that information protected by Section 7-02-001-0013. The City will maintain these records for a minimum of three (3) years.

~~G~~. ~~The industrial user shall be financially responsible for any sampling and analysis performed by the City which is not routine as provided for in this chapter~~. (Ord. 1693, Amended, 05/07/1991; Ord. 2018-32, Amended, 12/04/2018. Formerly 7-02-001-0018)

7-02-001-0018 PUBLIC NOTIFICATION, DEFINITION OF SIGNIFICANT VIOLATION

A. The City shall give notice of any decisions being made about the pretreatment program which may interest the public, special interest groups, or government agencies. Information about the operation or requirements of the program will be given to any party which requests it. The water commission~~An advisory committee~~ may be used for public information and input if there is an interest expressed in this.

B. The City will publish in the largest local newspaper, at least once each year, a list of industrial users who have not been in compliance with any substantial portion of this chapter at any time during the previous year. For the purpose of this section, an industrial user is in significant noncompliance if its violation meets one or more of the following criteria:

1. Chronic violation of wastewater discharge limits, defined here as those in which sixty-six percent (66%) or more of all of the measurements taken during a six (6) month period exceed (by any magnitude) the daily maximum limit or the average limit for the same pollutant parameter;

2. Technical review criteria (TRC) violations, defined here as those in which thirty-three percent (33%) or more of all of the measurements for each pollutant parameter taken during a six (6) month period equal or exceed the product of the daily maximum limit or the average limit multiplied by the applicable TRC (TRC = 1.4 for BOD, TSS, fats, oil and grease, and 1.2 for all other pollutants except pH);

3. Any other violation of a pretreatment effluent limit (daily maximum or longer-term average) that the Control Authority determines has caused, alone or in combination with other discharges, interference or pass through (including endangering the health of POTW personnel or the general public);

4. Any discharge of a pollutant that has caused imminent endangerment to human health, welfare or to the environment or has resulted in the POTW's exercise of its emergency authority to halt or prevent such a discharge;

5. Failure to meet within ninety (90) days after the schedule date, a compliance schedule milestone contained in a local control mechanism or enforcement order for starting construction, completing construction, or attaining final compliance;

6. Failure to provide, within thirty (30) days after the due date, required reports such as baseline monitoring reports, ninety (90) day compliance reports, periodic self-monitoring reports, and reports on compliance with compliance schedules;

7. Failure to accurately report noncompliance;

8. Any other violation or group of violations which the Water Services Director determines will adversely affect the efficient operation of the City water reclamation plants or implementation of this chapter. (Ord. 1693, Rep&ReEn, 05/07/1991; Ord. 2018-32, Amended, 12/04/2018. Formerly 7-02-001-0020)

7-02-001-0049 PERMITS REQUIRED FOR INDUSTRIAL USERS
All significant industrial users, as defined by Section 7-02-001-0009(A)(1), shall obtain a permit for connection and discharge or any modification that changes the treatment, production, flow, etc. of the existing facility. to the City's sewer system from the Director. (Ord. 1693, Amended, 05/07/1991; Ord. 2018-32, Amended, 12/04/2018)

7-02-001-0050 INDUSTRIAL USER PERMITS
A. The significant industrial user shall make application for such permit, at least ninety (90) days prior to commencement of discharge, on a form provided by the Director. An applicant shall pay a fee as determined by the City of Flagstaff for each application and thereafter be issued an industrial pretreatment discharge permit which shall be valid for a period of five (5) years from the date of issuance or less as determined by the Director.

Industrial Pretreatment Discharge Permit Fee

(Effective 1-1-07)	(Effective 1-1-08)	(Effective 1-1-09)	(Effective 1-1-10)
$100 per year	$150 per year	$200 per year	$250 per year

B. Upon expiration of such permit, an applicant who holds a valid wastewater discharge permit and is in compliance with the terms and conditions established by this chapter shall file an application for renewal of an industrial pretreatment discharge permit, at least ninety (90) days prior to the expiration date of the previous permit, together with the existing fee and, thereafter, shall be issued a renewed industrial pretreatment discharge permit, which shall be valid for a period of five (5) years from the date of issuance of the renewal or less as determined by the Director.

C. The applicant shall submit the information contained in subsections (D) through (G) of this section and any other information requested by the City at the time of submittal, or the application will be rejected and the applicant required to resubmit with the appropriate fee.

D. An applicant seeking an industrial pretreatment discharge permit or renewal shall submit, as part of its application, the results of an analysis, compliant with standard methods, conducted by a laboratory certified by the State of Arizona Department of Health Services, of a representative daily composite sample of the effluent discharge from the applicant's plant.

E. An applicant shall submit as part of its application for a permit a discharge report which includes, but not be limited to, the nature of process, volumes, rates of flow, production quantities, concentrations in the wastewater discharge and any other information that may be relevant to the generation of waste.

F. An applicant, as part of its application for a permit, shall submit a plan showing the location and size of on-site sewers, sampling point, pretreatment facilities, City sewers and any other pertinent physical details.

G. An applicant as part of its application for a permit shall list each product manufactured, the type, amount and rate of production and the chemical components and quantity of liquid or gaseous materials stored on site, even though they may not normally be discharged into the sewer system.

H. In the event a producer of industrial waste which is authorized to make a connection to the City sewer for pretreated industrial waste disposal under the provisions hereof is sold, leased, or its operation is assumed or taken over by another person, firm or corporation other than that named in the permit, a new application for a permit shall be made by the new owner, lessee or operator. No permit issued under the provisions hereof shall be assignable and a violation of this provision shall be grounds for summary suspensions or revocation of such permit by the Director.

I. It shall be a condition of the permit that the City may at any time test any of the wastes being discharged by the company or plant for quality or quantity. A duly authorized City representative may enter the permittee's premises at any time during business or operational hours for the purpose of inspecting plant operations to estimate quality or quantity of wastes.

J. It shall be a condition of the permit that the permittee shall install facilities, approved by the City Engineer at the permittee's expense for the purpose of the City's representative inspecting, observing and sampling representative flows in accordance with Section 7-02-001-0016~~5~~.

K. It shall be a condition of the permit that additional periodic reports as may be required by the Director to properly monitor the discharge of the industrial wastes, be submitted to the Director.

L. Issuance of an industrial pretreatment discharge permit shall not release the permit holder from the obligation to comply with all other provisions of this chapter.

M. The City may change the conditions of any permit ~~from time to time as may be necessary~~ in order to comply with requirements of Federal or State regulations. An industrial user may petition the Director to modify their permit for monitoring parameters or process changes. The User must submit sampling reports and/or documentation to support their petition. (Ord. 1693, Amended, 05/07/1991); Ord. 2002-08, Amended, 07/16/2002; Amended Ord.

ded, 09/07/2010; Ord. 2017-28, Amended, 11/21/2017)

CHAPTER 7-03

CITY WATER SYSTEM REGULATIONS

7-03-001-0015 CROSS CONNECTION CONTROL

~~Table of Contents~~

(Amended Ord. 2010-06, 04/20/10)

A. Definitions

Approved: The term "approved" as herein used in reference to a water supply shall mean a water supply that has been approved by the Arizona Department of Environmental Quality (ADEQ) and the City of Flagstaff. (Amended Ord. 2010-06, 04/20/10)

The term "approved" as herein used in reference to backflow prevention assemblies or methods shall mean an approval by the City of Flagstaff, Utilities Division based on a favorable laboratory and field evaluation report by a testing laboratory recognized by the Division.

Assembly: Any system for backflow protection consisting of more than one component and having been tested as one unit, and approved as one unit by the Division.

AWWA: American Water Works Association. (Amended Ord. No. 2010-06, 04/20/10)

Backflow: The undesirable reversal of flow of water or mixtures of water and other liquids, gases, or other substances into the distribution pipes of the potable water supply from any source or sources. Backflow is caused by either backpressure or backsiphonage. (Amended Ord. No. 2010-06, 04/20/10)

Backflow Prevention Assembly Approval: Any backflow prevention assembly equipped with test cocks shall have been issued a certificate of approval by the USC Foundation for Cross-Connection Control and Hydraulic Research. Any backflow prevention assembly not equipped with test cocks shall be certified by a third party entity unrelated to the product’s manufacturer or vendor and approved by the Arizona Department of Environmental Quality (ADEQ).

A backflow prevention assembly not listed by USC-FCCCHR cannot be used for containment, fire line or landscape protection.

Backflow Prevention Assembly Tester (registered): A person who is currently certified by an authority recognized in the Arizona Department of Environmental Quality regulations and is approved and registered with the City of Flagstaff to test, repair, and maintain backflow prevention assemblies. (Amended Ord. No. 2010-06, 04/20/10)

Backflow prevention method: A backflow prevention method may be approved by the City of Flagstaff if it is contained in the most current edition of the USC-FCCCHR Manual of Cross-Connection Control

Backpressure: Any Elevation of pressure in the customer's water distribution system (by pump, elevation of piping, or steam and/or air pressure) above the public potable water supply pressure which could cause a reversal of the normal direction of water flow from the consumer's water supply system into the public potable water supply system.

Backsiphonage: A form of backflow due to a reduction in the public water supply system pressure which causes a negative or sub-atmospheric pressure to exist at a site in the water system. A reversal in the normal flow of water results.

Check Valve~~-~~:~~–~~ A valve that allows free flow in one direction and stops flow in the other direction. (Amended Ord. No. 2010-06, 04/20/10)

Close as practicable: is the point nearest the service connection where the assembly can be installed. Where the assembly installation location may interfere with obstacles such as driveways and sidewalks, then close as practicable is the nearest point after the obstacle, but in no event beyond the first tap.

Compliance date: The annual date by which the annual backflow prevention assembly compliance test report must be received by the City of Flagstaff Cross Connection Control office~~,~~. ~~and that the backflow assembly meets the requirements of the most current section of the Arizona Administrative Code (AAC) referencing cross connection control and the City of Flagstaff Cross Connection Control Code 7-03-001-0016. For violations of this code, the specified date by which a violation must be remedied.~~ (Amended Ord. No. 2010-06, 04/20/10)

Consumer or Customer: The owner, official custodian or person in control of any premises or any property supplied by or in any manner connected to the City of Flagstaff public water supply system.

Contamination: An impairment of the quality of the water which creates an actual hazard to the public health through poisoning or through the spread of disease by sewage, industrial fluids, waste, etc. (Amended Ord. No. 2010-06, 04/20/10)

Cross-Connection: Any unprotected actual or potential connection or structural arrangement between a public or a consumer's potable water system and any other source or system through which it is possible to introduce into any part of the potable system any used water, industrial fluid, gas, or substance other than the intended potable water with which the system is supplied. By-pass arrangements, jumper connections, removable sections, swivel or change-over devices and other temporary or permanent devices through which or because of which "backflow" can or may occur are considered to be cross-connections.

Division: The City of Flagstaff, ~~Utilities~~ Water Services Division.

Hazard: A cross connection or potential cross connection between the public water supply and a private plumbing system involving any substance that could, if introduced into the public water supplies, be aesthetically objectionable or a nuisance (pollution), cause severe damage to the physical facilities of the public water supply systems, cause death, illness, or spread disease (contamination), or have a high probability of causing such effects. (Amended Ord. No. 2010-06, 04/20/10)

Hazard, Degree of: Evaluation of the potential risk to the public health and/or adverse effects upon the potable water supply system. Health hazards shall be classified as contamination while non-health hazards shall be classified as pollution.

Health Hazard: Any condition, device or practice in a water system or its operation resulting from a real or potential danger to the health and well-being of consumers. The word "severe" as used to qualify "health hazard" means a hazard to the health of the user that could be expected to result in death or significant reduction in the quality of life.

Improper: Not functioning within the manufacturer’s or City of Flagstaff’s specifications or the requirements of this section. (Amended Ord. No. 2010-06, 04/20/10)

Inspection: A visual examination of a premise or any backflow protection equipment, materials, workmanship and operational performance. (Amended Ord. No. 2010-06, 04/20/10)

Maintenance: Work performed or repairs made to keep backflow prevention assemblies operable and in compliance. (Amended Ord. No. 2010-06, 04/20/10)

O.S. & Y. Valve: Outside screw and yoke control valve for fire sprinkler systems. (Amended Ord. No. 2010-06, 04/20/10)

Pollution: An impairment of the quality of the water to a degree which does not create a hazard to the public health but which does adversely and unreasonably affect the aesthetic qualities of such waters for domestic use. (Amended Ord. No. 2010-06, 04/20/10)

Proper: Functioning within the parameters of the manufacturer’s and City of Flagstaff’s specifications and the requirements of this article. (Amended Ord. No. 2010-06, 04/20/10)

Public Water Supply System: All mains, pipes and structures owned and/or maintained by the City of Flagstaff, through which water is obtained and distributed to the public, including wells and well structures, intakes and cribs, pumping stations, treatment plants reservoirs, storage tanks and appurtenances, collectively or separate, actually used or intended for use for the purpose of furnishing potable water.~~ Any mains, pipes or structures connected to the above listed system and supplying potable water to the customers of the City of Flagstaff~~. (Amended Ord. No. 2010-06, 04/20/10)

Reclaimed water: Wastewater that has been sufficiently treated by the City of Flagstaff’s ~~Wastewater Treatment~~Water Reclamation Plants for approved use, ~~e.g., irrigation, ~~and is provided through the City of Flagstaff’s reclaimed water system. (Amended Ord. No. 2010-06, 04/20/10)

Retrofit: Furnish new parts, equipment, or method of installation, any existing assembly that does not meet the requirements of this ordinance in such a way that will bring the assembly into compliance with this Ordinance.

Service Connection: The terminal end of a water tap from the public potable water system, (i.e. where the water purveyor may lose jurisdiction and sanitary control over the water at its point of delivery to the consumer’s water system). If a city-owned meter is installed at the end of the service connection, then the service connection shall mean the discharge end of the meter. ((Amended Ord. No. 2010-06, 04/20/10)

Service Protection: The acceptable backflow prevention method installed between a City of Flagstaff’s water meter and a customer’s private plumbing system. (Amended Ord. No. 2010-06, 04/20/10)

Testing: An authorized procedure to determine the operational and functional status of a backflow prevention assembly. (Amended Ord. No. 2010-06, 04/20/10)

(Amended Ord. No. 2010-06, 04/20/10)

B. Purpose and Application

1. To protect the public water supplies of the City of Flagstaff from the possibility of contamination or pollution by preventing the backflow of contaminants and pollutants into the public water supply systems.

2. To promote the elimination or control of cross-connections, actual or potential, between a customer’s internal water systems, plumbing fixtures, industrial piping systems, and the public water supply.

3. To provide for a continuing program of cross-connection control which will prevent the contamination or pollution of the public water supply systems.

4. To implement the requirements of the most current AAC pertaining to the cross connection control program requiring public water systems to protect against backflow, and to this end, this ordinance shall be construed and applied consistently with the requirements of ~~this~~ the most current AAC.

(Amended Ord. No. 2010-06, 04/20/10)

C. General Requirements

1. Cross-connections prohibited. Connections between the public water supply system and other systems or equipment containing water or other substances of unknown or questionable quality are prohibited except when and where approved backflow prevention assemblies or methods are installed or implemented, tested and maintained to Division specifications to insure proper operation on a continuing basis.

2. Rights and Responsibilities of the Division. It shall be the right and responsibility of the Division to evaluate and investigate as deemed necessary, industrial and ~~other~~ commercial properties served by the public water supply to determine whether actual or potential hazards to the public water supply exist. Such evaluations and investigations shall be repeated as often as the Division deems necessary.

It shall also be the right and responsibility of the Division to require the installation and ~~periodic~~ annual testing of backflow prevention assemblies at any premises or property where such potential or actual hazards are found to exist.

3. Responsibility of the Consumer. The consumer, as defined by Section 7-03-001-0015~~6~~(A), shall be responsible and financially obligated for the protection of the public water supply system from the possibility of contamination or pollution due to backflow or backsiphonage of contaminants through the customer's water service connection into the public potable water system.

~~If, in the judgment of the Division, an approved backflow prevention assembly is necessary for the protection of the public water system, the Division shall give notice to the consumer to install such. The consumer, after due written notice and within the prescribed time indicated on the notice, shall install such approved assembly(ies) at their own expense. Installation of such assembly(ies) shall be in accordance with the manufacturer's instructions, and the Division's installation requirements~~. ~~The consumer shall provide for the maintenance, testing, and repair of the assembly(ies) and shall provide all reports as required by the City of Flagstaff. Failure, refusal or inability on the part of the consumer to install, have tested and/or maintain said assembly(s) or failure of the consumer to file required reports shall constitute a ground for discontinuing water service to the premises until such requirements have been satisfactorily met.~~

~~It shall be the responsibility of the consumer to make arrangements for an authorized representative of the City of Flagstaff to, upon presentation of his or her credentials, have free access at all reasonable hours to any property served by a connection to the public water distribution system of the City of Flagstaff and/or any backflow assemblies on the property and any related records for the purpose of verifying the presence or absence of actual or potential cross-connections and/or required assemblies.~~

4. Existing facilities

a. All presently installed backflow prevention assemblies, devices, or methods which do not meet the requirements of the Division and/or applicable state or federal regulations but were approved for the purposes described herein at the time of installation shall be evaluated for their ability to efficiently and satisfactorily protect the public water system from potential or existing cross connections with the private water supply. If, upon such evaluation, the Division determines that an existing device, method or assembly does not meet existing requirements, the customer shall at their own expense, upon due written notice and within the prescribed time indicated on the notice; retrofit, replace or modify the installation of such to meet current standards or show just cause for noncompliance.

b. Whenever an existing device, method or assembly is removed or moved from the present location, ~~or~~ requires more than minimum maintenance, or when the Division finds that the maintenance constitutes a hazard to health, the unit shall be replaced by an approved backflow prevention assembly meeting the requirements of these regulations.

c. If an existing facility undergoes construction for improvements or change of use, the installed backflow assemblies will be evaluated for hazard. If it is found the current backflow assembly(s) is inadequate protection, the customer will be required to replace with a device suited for the hazard.

5. New Facilities

a. ~~All facilities constructed after the effective date of this Ordinance,~~ New facilities shall present their plans for review by an authorized representative of the Division for determination of cross-connection hazards.

b. All backflow prevention assemblies to be installed shall be shown on all required building and engineering plans. No installation of assemblies shall be made unless these plans are reviewed and approved by an authorized representative of the Division.

c. During construction of new facilities, water shall not be used for construction purposes until the containment backflow assembly has been tested.

d. All assemblies shall be inspected by an authorized representative of the Division upon installation and the consumer shall provide written verification that the assembly has been successfully tested as described in section (K~~D~~) of this Ordinance, prior to issuance of certification of occupancy. Water service may be withheld if the assembly is not installed and tested in accordance with this ordinance and Division requirements.

~~6. Backflow prevention is required~~

~~The following conditions shall warrant the installation of an approved backflow prevention assembly:~~

~~a. When the City of Flagstaff determines that the water supplied by the public water systems may be subject to contamination or pollution, an approved backflow prevention method shall be required at every service connection to a customer's water system. The customer shall install the required backflow protection within the time specified by the City of Flagstaff. In determining the time in which backflow protection shall be installed, the City of Flagstaff shall consider the degree of hazard potential to the public water supplies.~~

~~b. The backflow prevention method required shall be determined by the City of Flagstaff. The method required by the City of Flagstaff shall be sufficient to protect against the hazard potential as stated in the most current edition of the University of Southern California Foundation for Cross-Connection Control and Hydraulic Research (USC-FCCCHR) Manual of Cross-Connection Control.~~

~~c. Premises with internal cross-connections which the Division determines to be non-correctable, or premises with plumbing systems so intricate that a cross-connection inspection is impossible or impractical.~~

~~d. Premises with security restrictions or other access prohibitions which make cross-connection inspections impossible or impractical.~~

~~e. Premises with an existing unprotected cross-connection or with a history of cross-connection violations.~~

~~The type of assembly required shall be determined by the Division according to the degree of hazard present as recommended by the most current USC-FCCHR Manual of Cross-Connection Control. Containment and landscape assemblies shall be installed as close as possible to the service connection before the first branch line leading off the service line. Fire line backflow prevention assemblies may be installed in fire riser rooms with adequate drainage for the size of the assembly and the water pressure in that area of the system. All drains for fire risers with antifreeze and reduced pressure principle backflow~~

~~prevention assemblies must go to the sanitary sewer system, not the storm drain system. In all cases, the backflow prevention assembly shall protect against the highest hazard present.~~

~~7~~6. Adoption of Public Record

The most current edition of the USC-FCCCHR Manual of Cross Connection Control.

(Amended Ord. No. 2010-06, 04/20/10)

D. List of Backflow Prevention Methods

A backflow prevention method shall be any assembly or other means designed to prevent backflow. The following are the recognized backflow prevention methods which the City of Flagstaff may require (in order of degree of protection):

1. Air Gap (AG): The unobstructed vertical distance through the free atmosphere between the opening of the pipe or faucet supplying potable water to a tank, plumbing fixture or other device. An approved air gap shall be at least double the effective opening of the supply pipe or faucet and in no case less than one (1) inch above the flood rim.

2. Reduced Pressure Principle Assembly (RPA or RP): An assembly containing two (2) independently acting approved check valves together with a hydraulically operating, mechanically independent pressure differential relief valve located between the check valves, and at the same time, below the first check valve. The assembly shall include properly located test cocks and tightly closing shutoff valves located at each end of the assembly.

3. Reduced Pressure Principle Detector Assembly (RPDA): An assembly composed of a line sized approved reduced pressure principle assembly with a bypass containing a specific water meter and an approved reduced pressure principle assembly.

4~~3~~. Double Check Valve Assembly (DCVA or DC): An assembly composed of two (2) independently acting, approved check valves, including tightly closing shutoff valves located at each end of the assembly and fitted with properly located test cocks.

5~~6~~. Double Check Detector Assembly (DCDA or DDCVA): An assembly composed of a line size approved double check valve assembly with a bypass containing a specific water meter and an approved double check valve assembly.

6~~4~~. Pressure Vacuum Breaker Assembly (PVB): An assembly containing an independently operating, loaded check valve and an independently operating, loaded air inlet valve located on the discharge side of the check valve. The assembly shall be equipped with properly located test cocks and tightly closing shutoff valves located at each end of the assembly.

~~5~~7. Spill-resistant Pressure Vacuum Breaker (SVB): An assembly containing an independently operating internally loaded check valve and an independently operating loaded air inlet valve located on the discharge side of the check valve. The assembly shall be equipped with a properly located resilient seated test cock, properly located bleed/vent valve and tightly closing resilient seated shutoff valves located at each end of the assembly.

~~6. Double Check Detector Assembly (DCDA or DDCVA): An assembly composed of a line size approved double check valve assembly with a bypass containing a specific water meter and an approved double check valve assembly.~~

~~7. Reduced Pressure Principle Detector Assembly (RPDA): An assembly composed of a line sized approved reduced pressure principle assembly with a bypass containing a specific water meter and an approved reduced pressure principle assembly.~~

~~8. Backflow prevention method: A backflow prevention method may be approved by the City of Flagstaff if it is contained in the most current edition of the USC-FCCCHR Manual of Cross-Connection Control~~. ~~The current list of approved methods shall be available for inspection at the City of Flagstaff Industrial Waste Section to any customer required to install a backflow prevention assembly.~~

~~9. Backflow Prevention Assembly Approval: Any backflow prevention assembly equipped with test cocks shall have been issued a certificate of approval by the USC Foundation for Cross-Connection Control and Hydraulic Research. Any backflow prevention assembly not equipped with test cocks shall be certified by a third party entity unrelated to the product's manufacturer or vendor and approved by the Arizona Department of Environmental Quality (ADEQ). A backflow prevention assembly not listed by USC-FCCCHR cannot be used for containment, fire line or landscape protection.~~

(Amended Ord. No. 2010-06, 04/20/10)

E. Backflow Prevention Methods Required

1. The following conditions shall warrant the installation of an approved backflow prevention assembly:

a. When the City of Flagstaff determines that the water supplied by the public water systems may be subject to contamination or pollution, an approved backflow prevention method shall be required at every service connection to a customer's water system. The customer shall install the required backflow protection within the time specified by the City of Flagstaff. In determining the time in which backflow protection shall be installed, the City of Flagstaff shall consider the degree of hazard potential to the public water supplies.

b. The backflow prevention method required shall be determined by the City of Flagstaff. The method required by the City of Flagstaff shall be sufficient to protect against the hazard potential as stated in the most current edition of the University of Southern California Foundation for Cross-Connection Control and Hydraulic Research (USC-FCCCHR) Manual of Cross-Connection Control.

c. Premises with internal cross-connections which the Division determines to be non-correctable, or premises with plumbing systems so intricate that a cross-connection inspection is impossible or impractical.

d. Premises with security restrictions or other access prohibitions which make cross-connection inspections impossible or impractical.

e. Premises with an existing unprotected cross-connection or with a history of cross-connection violations.

2. Whenever the following items exist or activities are conducted on premises served by the public water systems, a potential hazard to the public water supplies shall be presumed, and a backflow prevention method of the type specified herein for that item or activity must be utilized or installed at each service connection for that premise. If an activity or item is not on the following list, it shall be evaluated by the City of Flagstaff and a method of backflow prevention will be determined.

~~1~~a. Cooling tower, boiler, condenser, chiller, and other cooling systems: RP

~~2~~b. Tank, vessel, receptacle, and all other water connections, including mobile units, except emergency vehicles and private swimming pools: RP

~~3~~c. Ice maker (other than a residential service): RP

~~4~~d. Water-cooled equipment, boosters, pumps or autoclaves: RP

~~5~~e. Water treatment facilities and all water processing equipment (other than residential water softeners): RP

~~6~~f. Bottle washer, bedpan washer, garbage can washer: RP

~~7~~g. Pesticide, herbicide, fertilizer, and chemical applicators (other than typical in-home use): RP

~~8~~h. Aspirator: RP

~~9~~i. Commercial dishwashers, food processing and/or preparation equipment, carbonation equipment or other food service processes: RP

~~10~~j. Decorative fountain, baptismal, non-residential swimming pool or spa, or any location water is exposed to atmosphere: RP

~~11~~k. X-ray equipment, plating equipment, or any other photographic processing equipment: RP

~~12~~l. Auxiliary water supply and/or connections to unapproved water supply systems: RP

~~13~~m. Reclaimed water sites with potable water connections: RP on the potable meter, AG between feed line from supplemental domestic water supply to a holding tank to reclaim water lines.

~~14~~n. Recreational vehicle dump stations (sewer), or any other location where water may be exposed to bacteria, virus or gas: RP

~~15~~o. Any premises on which chemicals, oils, solvents, pesticides, disinfectants, cleaning agents, acids or other pollutants and/or contaminants are handled in a manner by which they may come in direct contact with water, or there is evidence of the potential to contact water: RP

~~16~~p. Materials and piping systems unapproved by the currently adopted City of Flagstaff Plumbing Code or Environmental Protection Agency (EPA) for potable water usage: RP

~~17~~q. Separately metered or unprotected irrigation systems, and construction water services: RP or PVB/SVB as allowed.

~~18~~r.. Any premises where a cross-connection is maintained or where internal backflow protection is required pursuant to the City of Flagstaff adopted plumbing code: RP

~~19~~s. Multimetered properties with more than one (1) meter connected to another or any building three (3) stories or greater than thirty-four (34) feet in height from service level: RP

~~20~~.t. Fire systems - AWWA Classes 1 and 2 and all systems constructed of a piping material not approved for potable water pursuant to the City of Flagstaff Plumbing Code: DCVA (DC) or Double Detector CVA (DCDVA): DC Residential fire sprinklers shall be exempt from this requirement.

~~21~~u. Fire systems – AWWA Class 3, 4, 5, 6: RP or RP with detector

v. Fire systems which require backflow protection and where backflow protection is required on the industrial/domestic service connection that is located on the same premises, both service connections will have adequate backflow protection for the highest degree of hazard affecting either system: RP

~~22~~w. Any premise which has a source of water supply that is not accepted by the public water system or not approved by the Arizona Department of Environmental Quality: RP or AG as determined by the City of Flagstaff

~~23~~x. Any premise where an unprotected cross-connection exists or where there has previously occurred a cross connection problem within the premises: AG or RP as determined by the City of Flagstaff

~~24~~y. Any premise where there is a significant possibility that a cross-connection problem will occur and entry onto the premises is restricted to the extent that cross-connection inspections cannot be made with sufficient frequency or on sufficiently short notice to assure that unprotected cross-connections do not exist: RP or AG as determined by the City of Flagstaff

~~25~~z. Multi-use commercial property: RP

~~26~~aa. Properties with active private wells: RP

~~27~~bb. Consecutive systems, when required by the City of Flagstaff: RP

~~28~~cc. Fire hydrant/construction water: RP

~~29~~dd. Jumper connection to new water mains: RP

~~30~~ee. Post mix soda machine with a carbonator: ~~Stainless Steel RP~~ASSE 1022

~~31~~ff. Shampoo sink: RP

gg.. Brewery, distillery, meadery, or alcohol making process: RP or AG

hh. Hospitals and medical offices.: RP

~~a. When two (2) or more of the activities listed above are conducted on the same premises and served by the same service connection or multiple service connections, the most restrictive backflow prevention method required for any of the activities conducted on the premises shall be required to be installed at each service connection. The order of the most restrictive to least restrictive backflow prevention methods shall be as follows:~~

~~1. Air gap (AG).~~

~~2. Reduced pressure principle assembly (RP or RPA).~~

~~3. Reduced pressure principle detector assembly (RPDA).~~

~~4. Double check valve assembly (DCVA).~~

~~5. Double check detector assembly (DCDA).~~

~~6. Pressure vacuum breaker assembly (PVB).~~

~~7. Spill resistant pressure vacuum breaker (SVB).~~

(Amended Ord. No. 2010-06, 04/20/10)

F. Installation Requirements

1. The Division shall use the most current edition of the USC-FCCCHR Manual of Cross Connection Control for list of approved assemblies.~~maintain a list of approved backflow prevention assemblies, by type and manufacturer. Any consumer required by the Division to install an approved backflow prevention assembly must utilize an assembly included in such list.~~

2. Backflow prevention assemblies shall have a diameter at least equal to the diameter of the service connection.

3. Backflow prevention assemblies shall be installed and maintained by the customer, at the customer's expense and in compliance with the standards and specifications adopted by the City of Flagstaff at each

service connection. The customer is responsible for notifying the City of Flagstaff Industrial ~~Waste~~ Pretreatment Section of any installation, repair, relocation, removal, or replacement.

4. The approved assembly shall be installed above ground, as close as practicable, to the service connection before the first branch line leading off the service line, and in a hot box with electricity for heat. The heated enclosure must be ASSE 1060 certified or similar. The electrical for the heat must be installed in accordance with City approved Building Code and City Engineer standard drawing 19-02-025. Assemblies shall be installed per manufacturer's specifications with adequate clearances for testing and maintenance, and not installed in a meter box, pit or vault.

~~A backflow prevention assembly shall be installed as close as practicable to the service connection outside the building unless it is for a fire line.~~

a. Where containment at the property line cannot be achieved or is waived based on extenuating circumstances, installation within a building can be completed, ~~A waiver may be granted by the Industrial Waste Manager for the retrofit installation of a backflow prevention assembly inside the building~~ provided a City of Flagstaff Attorney approved "Backflow Prevention Assembly Hold Harmless Agreement" is signed by the property owner and notarized. This document must be received and approved the City of Flagstaff Industrial ~~Waste Manager~~Pretreatment Supervisor prior to the installation of the backflow prevention assembly. The interior installation of a backflow assembly must be done as close as practicable to the incoming water line.

b. Internal installations shall have clearance on all sides and ends for testing and maintenance. RP and DC assemblies must have 12" bottom clearance from lowest point on the assembly (i.e. relief valve on RP style).

~~RP's for fire line assemblies may be installed inside a fire riser room provided they have an adequate drain for a full port discharge for the size of the assembly per the manufacturer's specifications into the sanitary sewer system, not the storm water system. If a drain cannot be provided that can contain a full port discharge to the sanitary sewer system from a fire line with chemical additives such as anti-freeze or glycerin, the assembly must be installed outside the building in an insulated enclosure with electricity for a heat source for freeze protection and a check valve must be installed in the system to prevent the discharge of antifreeze onto the ground.~~

~~The assembly shall be in an accessible location approved by the Division and protected from freezing. The RP, RPDA, DC, DCDA, PVB and SVB shall be installed above ground and per City of Flagstaff standard details. Backflow prevention assemblies shall not be installed in a meter box, pit or vault~~.

~~A double check valve assembly may be installed, upon approval of the Division, below ground in a vault which meets standard specifications established by the City.~~

5~~4~~. When a customer requires a continuous water supply, two backflow prevention assemblies shall be installed parallel to one another at the service connection to allow a continuous water supply during testing, repair and/or maintenance of the backflow prevention assemblies. When backflow prevention assemblies are installed parallel to one another, the sum of the cross-sectional diameters of the assemblies shall be at least equal to the cross-sectional diameter of the service connection or service line piping at the point of installation and the assemblies shall be of the same type.

6~~5~~. For an AG installation all piping installed between the user's connection and the receiving tank shall be entirely visible unless otherwise approved in writing by the City of Flagstaff Industrial ~~Waste~~ Pretreatment Section.

~~6. It shall be unlawful for any person to bypass or remove a backflow prevention method without the approval of the Division.~~

7. Any property with more than one water service connection shall install backflow prevention assemblies on each service connection to the property, unless otherwise designated by the Division.

8. Fiberglass insulation cannot be wrapped or otherwise placed around a backflow prevention assembly as a form of freeze protection as it allows condensation to occur and subsequent degradation of the backflow

prevention assembly. There must be adequate air flow around the backflow prevention assembly to prevent the formation of condensation on the assembly~~.~~ or for a purge event by a RP relief valve.

9. All test cocks and relief ports on a backflow prevention assembly must be accessible for testing and for release of water from the relief port during a discharge event.

10. PVB, AVB, or RP backflow assemblies are approved for irrigation systems. Valves shall not be installed downstream from an AVB. If chemicals will be used, a RP assembly is required. ~~A PVB or SVB assembly may be installed for use on a landscape water irrigation system if:~~

~~a.~~ Condominiums and townhomes that are part of a Home Owners Association (HOA) will need to test the irrigation backflow assemblies each year.~~The water use beyond the assembly is for irrigation purposes only.~~

~~b. The PVB/SVB is installed in accordance with the manufacturer's specifications.~~

~~c. The irrigation system is designed and constructed to be incapable of inducing backpressure.~~

~~d. Chemigation, an injection of chemical pesticides and fertilizers, is not used or provided for in the irrigation system.~~

~~e. No other source of water is available on the premises.~~

~~f. Single family residences with testable backflow prevention assemblies will not need to test the assemblies on the landscape irrigation assemblies each year. Condominiums and townhomes that are part of a Home Owners Association (HOA) do need to test the backflow prevention assemblies on the landscape irrigation system each year.~~

~~If the criteria are not met, then an RP assembly is required.~~

~~11. No person shall alter, modify, bypass or remove a backflow prevention method without the approval of the City of Flagstaff Industrial Waste Section.~~

~~12~~. ~~Installation of the backflow prevention assembly must be completed within the time specified in the notice to install or within forty-five (45) days of the water meter installation. A time extension may be granted by the City of Flagstaff provided no cross-connection hazards exist at the site.~~

1~~3~~1. If a customer fails to install a backflow prevention assembly pursuant to this article, the City of Flagstaff shall discontinue water service and assess a compliance fee pursuant to this article.

1~~4~~2. ~~All backflow prevention assemblies shall be installed with a y-strainer or fire line strainer unless the manufacturer states that the assembly cannot have one. The y-strainer or fire line strainer shall be installed directly upstream of the assembly.~~ If, in the judgment of the Division, an approved backflow prevention assembly is necessary for the protection of the public water system, the Division shall give notice to the consumer to install such. The consumer, after due written notice and within the prescribed time indicated on the notice, shall install such approved assembly(ies) at their own expense. Installation of such assembly(ies) shall be in accordance with the manufacturer's instructions, and the Division's installation requirements. Installation of the backflow prevention assembly must be completed within the time specified in the notice to install or within forty-five (45) days of the water meter installation. A time extension may be granted by the City of Flagstaff provided no cross-connection hazards exist at the site.

1~~5~~3. A backflow prevention assembly for containment or landscape may need to have a pressure reducing valve upstream of it if the water line pressure is higher than 80 psi. This does not apply to fire lines.

(Amended Ord. No. 2010-06, 04/20/10)

G. Installation of Backflow Prevention Assemblies for Fire Systems

~~Fire Systems~~

1. Fire protection systems may consist of sprinklers, hose connections, and hydrants for commercial, industrial or residential structures and services. Sprinkler systems may be dry or wet, open or closed. Systems consisting of fixed-spray nozzles may be used indoors or outdoors for protection of flammable-liquid and other hazardous processes. It is standard practice, especially in cities, to equip automatic sprinkler systems with fire department pumper connections.

2. A meter (compound, detector check) should not ~~normally~~ be permitted as part of a backflow prevention assembly. An exception may be made if the meter and backflow prevention assembly are specifically designed for that purpose.

3. For cross-connection control, fire protection systems shall be classified ~~on the basis of~~based on water source and arrangement of supplies as follows:

a. Class 1: Direct connections from public water mains only; no pumps, tanks or reservoirs; no physical connection from other water supplies; no antifreeze or other additives of any kind; all sprinkler drains discharging to atmosphere, dry wells or other safe outlets.

b. Class 2: Same as class 1, except that booster pumps may be installed in the connections from the street mains. It is necessary to avoid drafting so much water that pressure in the water main is reduced below twenty (20) psi.

c. Class 3: Direct connection from public water supply main plus one (1) or more of the following: elevated storage tanks; fire pumps taking suction from above-ground covered reservoirs or tanks; and pressure tanks (all storage facilities are filled or connected to public water only, the water in the tanks to be maintained in a potable condition). ~~Otherwise, Class 3 systems are the same as class 1.~~ Class 3 systems will ~~generally~~ require minimum protection (approved double check valves) to prevent stagnant waters from backflowing into the public potable water system.

d. Class 4: Directly supplied from public mains ~~similar to~~like classes 1 and 2, and with an auxiliary water supply on or available to the premises; or an auxiliary supply may be located within seventeen hundred (1,700) feet of the pumper connection. Class 4 systems will ~~normally~~ require backflow protection at the service connection. The type (air gap or reduced pressure) will ~~generally~~ depend on the quality of the auxiliary supply.

e. Class 5: Directly supplied from public mains, and interconnected with auxiliary supplies, such as: pumps taking suction from reservoirs exposed to contamination, or rivers and ponds; driven wells, mills or other industrial water systems; or where antifreeze or other additives are used. Class~~es~~ 4 and 5 systems ~~normally would~~will need maximum protection (air gap or reduced pressure) to protect the public water system.

f. Class 6: Combined industrial and fire protection systems supplied from the public water mains only, with or without gravity storage or pump suction tanks. Class 6 system protection would depend on the requirements of both industry and fire ~~protection, and~~protection and could only be determined by a survey of the premises.

4.~~g~~. Installation of assembly

a. When a backflow assembly is required for a water service connection supplying water only to a fire system, the assembly shall be installed on the service line in compliance with standard specifications adopted by the city. ~~(~~Installation of DC or DCDVA~~)~~ may be allowed on fire systems with the City of Flagstaff approval provided both the manufacturer's specifications and USC approval allow such an installation. ~~If an RP is needed for a fire line system and the RP is inside a structure, that room must have a drain large enough to contain the full port discharge volume for that size of assembly with that areas water pressure. The drain must go to the sanitary sewer and not the storm sewer.~~

b. RP's for fire line assemblies may be installed inside a fire riser room provided they have an adequate drain for a full port discharge for the size of the assembly per the manufacturer's specifications into the sanitary sewer system, not the storm water system. If a drain cannot be provided that can contain a full port discharge to the sanitary sewer system from a fire line with chemical additives such as anti-freeze or glycerin, the assembly must be installed outside the building in an insulated enclosure with electricity for a heat source for freeze protection and a check valve must be installed in the system to prevent the discharge of antifreeze onto the ground.

5. All backflow assemblies installed on fire sprinkler systems shall have a chain with a padlock from the first O.S. & Y. valve to the second O.S. & Y. valve, or an operable alarm system or both.

6. For looped fire lines, a DC or RP backflow prevention assembly is required on both ends of a private water main that is connected to the public water services at two or more locations.

(Amended Ord. No. 2010-06, 04/20/10)

H. Removal requirement

1. It shall be unlawful for any person to alter, modify, bypass or remove a backflow prevention method without the written approval of the Division.
2. If a device is removed without the approval of the City, the City reserves the right to visually inspect the piping to verify there is a physical separation and/or no piping is connected before an existing backflow assembly.
3. The device and piping shall be removed as close as possible to the main service connection and any property connections to mitigate the possibility of stagnating water in the piping.
4. A device will not be deactivated in the City's records unless there is a physical separation between the piping and no possibility of connecting the two ends. An inspection of the removal by the City will need to be completed before removal from the records.

~~H~~I. Inspections

1. A customer's water system shall always be available ~~at all times~~ during business operations for premises inspection ~~and backflow prevention assembly testing~~ by City of Flagstaff personnel and backflow prevention assembly testing, if necessary. The inspection shall be conducted to determine whether any cross-connection or other hazard potentials exist and to determine compliance with this article and modifications.

2. City of Flagstaff shall inspect all new sites, assembly installations, assembly relocations, assembly removal and assemblies that have been repaired for compliance.

3. A waived premise is a property for which the City of Flagstaff has determined there are currently no hazard potentials. All waived premises shall be inspected periodically or when there has been a change in owner/tenant or there has been a use change.

4. If a customer refuses entry to a premise for inspection during business operations, the City of Flagstaff may discontinue water service, require backflow prevention or take any steps allowed by law to gain entry to the premises.

(Amended Ord. No. 2010-06, 04/20/10)

J~~I~~. ~~Permit~~Authorization

1. Installation ~~permits~~ authorizations for the installation of all backflow prevention assemblies required by the City of Flagstaff shall be obtained from the City of Flagstaff prior to installation. ~~A separate permit shall be obtained for each required backflow prevention assembly to be installed, including replacement or relocation.~~

2. It shall be the duty of the person doing the work ~~authorized by the permit~~ to notify the City of Flagstaff, ~~orally or~~ in writing, that the work is ready for inspection. Such notification shall be given not less than twenty-four (24) hours before the work is to be inspected and shall be given only if there is reason to believe that the work done will meet current city codes and regulations.

3. Whenever any work is being done contrary to the provisions of the city's adopted plumbing code or this article, the City of Flagstaff or an authorized representative may order the work stopped by notice in writing served on any persons engaged in the doing or causing such work to be done; and any such person shall forthwith stop such work until authorized by City of Flagstaff to proceed with the work.

~~4. Any City of Flagstaff employee may, in writing, suspend or revoke a permit issued under provisions of this article, whenever the permit is issued in error or on the basis of incorrect information supplied, or in violation of any ordinance or regulation of any provision of the City Plumbing Code or this article.~~

(Amended Ord. No. 2010-06, 04/20/10)

K~~J~~. Maintenance and Testing

1. The annual test compliance date shall be set by the City of Flagstaff Industrial Waste Section. The consumer shall have backflow prevention assemblies tested upon installation and at least once per year, or more frequently if deemed necessary by the Division, at the consumer's expense. ~~The customer shall arrange for repairs if the testing reveals the assembly to be defective or in unsatisfactory operating condition. If the testing reveals the assembly to be defective or in unsatisfactory operating condition, the customer shall arrange for repairs. The customer shall have performed, by an appropriately licensed contractor, any necessary repairs within 30 days or as directed by the Division, including replacement or overhaul of the assembly if necessary, which will return the assembly to satisfactory operating condition. The customer shall then have the assembly retested, within 30 days following repairs, until testing reveals no defects or unsatisfactory operating conditions.~~ If the Division determines that a health hazard exists, they may specify a more restrictive ~~repair~~ testing schedule. ~~All residences with fire line backflow prevention assemblies shall have the assemblies tested annually on the anniversary date. Single family residences with testable backflow prevention assemblies will not need to test the assemblies on the landscape irrigation assemblies each year. Condominiums and townhomes that are part of a Home Owners Association (HOA) do need to test the backflow prevention assemblies on the landscape irrigation system each year.~~

2. The customer may request ~~orally or~~ in writing a change of the annual test compliance date for any assembly. No compliance date may be changed to be more than twelve (12) months after the most recent test.

3. The consumer shall be responsible for maintenance of all backflow assemblies at his/her expense. If the Division or customer learns or discovers, during the interim period between tests that an assembly is defective or in unsatisfactory operating condition, the customer shall arrange for repairs. The customer shall have any necessary repairs performed by an appropriately licensed contractor, including replacement or overhaul of the assembly, if necessary, which will return the assembly to satisfactory operating condition within 30 days of discovery. Such assembly shall be retested within 30 days following repairs, until testing reveals no defects or unsatisfactory operating conditions.

4. All testing shall be performed by an individual who holds a valid "General" Tester Certification issued by the California-Nevada American Water Works Association (Cal-Nev AWWA), the Arizona State Environmental Technical Training (ASETT) Center, or other certifying authority approved by the Division. A list of certified testers registered with the City of Flagstaff ~~shall be maintained by the City of Flagstaff Industrial Waste Section and~~ shall be available upon request to all persons required to install or maintain a backflow prevention assembly. Test procedures shall be performed as required by ~~the~~ ADEQ as set forth in ~~Chapter Nine of~~ the most current edition of the USC-FCCCHR Manual Cross-Connection Control. The tester shall provide a copy of the test report to the customer and to the City of Flagstaff Industrial ~~Waste~~ Pretreatment Section within five (5) working days from the date of the test and shall maintain a copy for their records for at least three years. ~~If the tester fails to submit a test result within 5 days from the date of the test, their name shall be removed from the tester list.~~

5. No existing backflow prevention assembly shall be altered, disconnected or replaced without prior approval of the Division.

6. ~~All backflow assemblies installed on fire sprinkler systems shall have a chain with a padlock from the first O.S. & Y. valve to the second O.S. & Y. valve, or an operable alarm system or both~~ During construction, any new ~~.~~backflow assemblies must be tested before the water is used for any purpose, including construction uses.

7. Test cocks are to be used for testing only and shall be installed in accordance with Division requirements. Any unauthorized use of these test cocks is a violation of this code.

8. Each backflow prevention assembly shall be easily identified by displaying the following in a conspicuous manner on the assembly:

a. Manufacturer

b. Model Number

c. Serial Number

This information must also be provided to the Division by the consumer promptly upon installation.

9. The customer shall maintain records~~, on forms approved by the City of Flagstaff,~~ of the results of all tests and all servicing, repairs, or replacements of the backflow prevention assembly. A copy of the records shall be provided to the City of Flagstaff within five (5) days after completion of the activity for which the record is made.

10. The consumer shall notify and receive approval from the City of Flagstaff Fire Marshall, at least 24 hours in advance, of any maintenance or testing performed upon assemblies installed upon fire sprinkler systems which requires discontinuance of water supply to that system. Fire systems shall not be out of service for more than eight (8) consecutive hours due to testing, maintenance or repairs. The fire department shall be notified immediately of any changes in fire service status.

11. ~~City of Flagstaff may test any backflow prevention assembly at any time.~~ In lieu of discontinuance of service, City of Flagstaff may take action to install, test, repair, or replace a backflow device at the customer's point of service and bill the customer for all costs associated with the installation, test, repair, or replacement of a backflow prevention device.

12. The City of Flagstaff will return incomplete and erroneous test forms to the tester and customer for correction and resubmission by the compliance date. Information on submitted test forms can only be changed or modified by the tester who has signed the form and is responsible for that test. Test reports must have a clear description of the location of the backflow device.

13. Test equipment shall be maintained and calibrated annually by an agency approved by the City of Flagstaff as required by the cross connection manual. A copy of the annual equipment calibration certificates shall be submitted to the City of Flagstaff Industrial ~~Waste~~ Pretreatment Section (or proctor) to maintain equipment registration and certification. ~~Test equipment for testing backflow prevention assemblies in the City of Flagstaff service area shall be registered with and approved by the City of Flagstaff~~. Test equipment used on anything other than potable water backflow prevention assemblies shall not be used to test such assemblies and shall be identified as non-potable test equipment.

14. Testers shall register with the City of Flagstaff Industrial ~~Waste~~ Pretreatment Section (or proctor) if they are conducting backflow assembly testing in City of Flagstaff service area. Testers shall submit a current copy of their certification or recertification upon registration. ~~Testers, upon renewal of tester certification, shall be certified on all backflow prevention assemblies that may be used for service protection~~. A City of Flagstaff registration issued to a backflow prevention assembly tester for testing backflow prevention assemblies in the City of Flagstaff service area may be revoked or suspended upon certification expiration or for improper testing, maintenance, reporting or other improper practices.

(Amended Ord. No. 2010-06, 04/20/10)

L~~K~~. Enforcement~~General Penalty and Fees~~

1. ~~Violation of any section of this Ordinance shall constitute a misdemeanor and shall result in a fine of no less than one hundred dollars ($100.00) and not to exceed twenty-five hundred dollars ($2,500.00) for any one offense. A separate offense shall be committed for each day of noncompliance with any of the requirements of this Ordinance.~~ This chapter will be enforced pursuant to the general enforcement provisions found in Chapter 7-01, and any additional specific enforcement procedures set forth herein.

2. When convicted of a violation of this Ordinance, any license previously issued to that person by the City may be revoked by the Flagstaff City Council or any proper court, if there may be reasonable relationship between the activities listed and the offense. Revocation of license shall not be considered a recovery of penalty so as to bar any other penalty being enforced.

3. The Division may deny or discontinue, after reasonable notice to the occupants thereof, the water service to anyone using the City of Flagstaff water distribution system or to any premise wherein any backflow prevention assembly or method required by these regulations is not installed, tested, maintained and repaired in a manner acceptable to the Division, or if required reports and/or records are not properly filed, or if it is found that the backflow prevention assembly or method has been removed or bypassed, or if an unprotected cross-connection exists on the premises. Reasonable notice shall be sent in writing at least two weeks prior to the disconnection, unless the Division determines that a potential for a severe health hazard exists.

4. If the Division determines that a potential for a severe health hazard exists, the Division may immediately discontinue water service without notice. Notice by telephone will be given as soon as possible and written notice will be sent within five (5) days, following discontinuance of water service.
Water service to such premises shall not be restored until the consumer has corrected or eliminated such conditions or defects in conformance with these regulations and to the satisfaction of the Division.

5. Fire sprinkler systems shall not be subject to disconnection without the explicit approval of the City Fire Marshall, but will be subject to other penalties as provided for in this Ordinance. (Ord. 1736, 4-2-92)

~~L. Administrative appeal.~~

~~An administrative appeal may be taken whenever a question arises over any of the requirements of this article, and the applicant wishes to appeal the decision of the City of Flagstaff or seek a variance from the requirements of this article. The appeal may be made to the City of Flagstaff Industrial Waste Section Manager as follows:~~

~~1. The applicant shall file a written appeal on the forms provided by the City of Flagstaff Industrial Waste Section within ten (10) days from the date of the decision by the City of Flagstaff that the applicant wishes to appeal. The applicant shall set forth, in detail, and on the form provided, the basis for their request, and may attach additional documentation to the form.~~

~~2. The appeal will be heard by the hearing committee within seven (7) working days after receipt of the written appeal. Formal Arizona Rules of Evidence will not apply but any testimony or evidence offered must be relevant to the issue in question.~~

~~3. The hearing committee shall consist of at least one member of the Industrial Waste Section that is an active Cross Connection Control Specialist and one building inspector from the City of Flagstaff Community Development. If the question involves a fire line backflow prevention assembly, a member of the City of Flagstaff Fire Department plan review team may also be present.~~

~~4. The applicant shall provide adequate information at the appeal hearing to fully describe the conditions in question and to establish the justification and basis for the applicant's request.~~

~~5. The applicant may, but is not required to, personally attend the hearing.~~

(Amended Ord. No. 2010-06, 04/20/10; Amended Ord. No. 2010-23, 09/07/10)

2010-23, Amended, 09/07/2010; Ord. 2017-28, Amended, 11/21/2017)

Permitted Industry Code Changes

Industrial Pretreatment

CITY OF FLAGSTAFF ARIZONA ESTABLISHED 1882

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Summary of 7-02 changes

- 0008: Standards for discharge
- 0010: Industrial self-monitoring
- 0050: Industrial user permits
- General language clean-up

What Are Local Limits?

0008 Standards for discharge:

- Local Limits are maximum discharge limits of pollutants that Industrial Users are allowed to discharge to our sewer system
- Limits are derived to prevent a “pass thru” of a contaminant that can cause our plant to be out of compliance with our regulatory permits

- Also prevent interference with plant operations

Why are we proposing new Limits?

- EPA recommends every 5 years
- We renewed the Wildcat and Rio AZPDES permit in 2020

- Local Limit study approved by ADEQ in December 2020

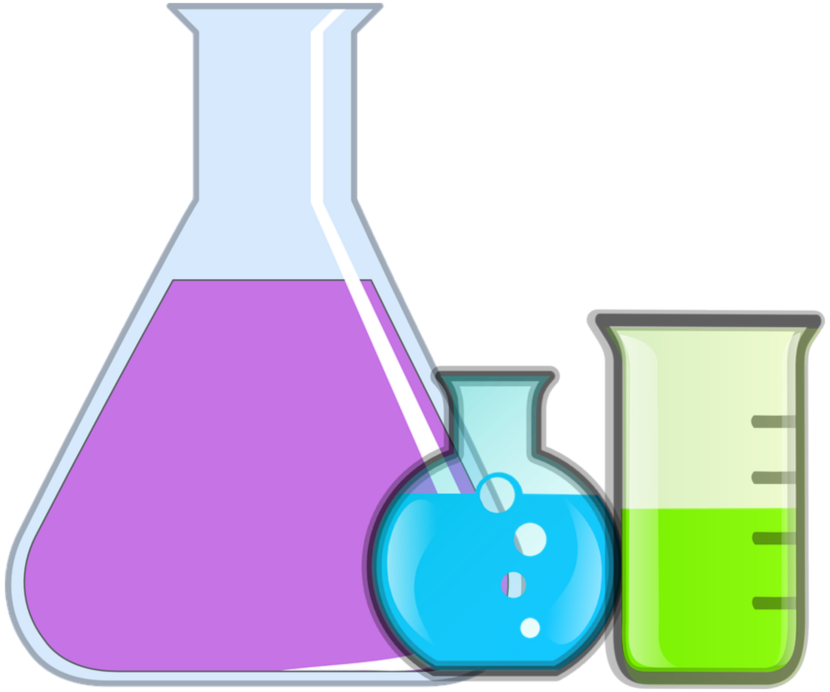
Who Does This Impact?

Permitted Industrial Users

- Permitted Industrial Users
  - WL Gore (Woody Mountain)
  - FMC
  - NAU
  - Nestle Purina
  - Mission Linen
  - Joy Cone
  - WL Gore (4th Street)

What Changes are we Proposing?

- More stringent limit for Arsenic
- Loosened limits for Copper, Lead, Zinc & Bromide
- Removes:
  - Silver
  - Benzene
  - Methylene Chloride
  - Bis(2-ethylhexyl) phthalate(BEHP)
  - Moved Aldrin to prohibited substance code



What Changes are we Proposing?

- Separate Total Nitrogen into constituents:
  - Ammonia
  - TKN
  - Nitrate/Nitrite
- Set new limits for BOD/TSS
  - Pounds per day limit instead of concentration
  - Conflicting limits in code due to specific sewer rates
- Remove interim and BMP language in current local limits

What Changes are we Proposing?

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0010: Industrial Self-monitoring

- Sampling
  - Change sampling quarter requirement from 2nd & 4th to 1st & 3rd.
  - With Council approval – implement 3rd Q ’21.
  - Separate grab & composite sample requirement language.

What Changes are we Proposing?

0050: Industrial User Permits

- Allow a permitted industry user to petition the City for a permit modification.
- Will need to submit documentation and data to support proposed changes.

Public Outreach

90-day Public outreach plan:

- Water commission meeting (Nov.)
- Permitted industries specific letter/emails/meeting
- Public comment meeting - virtually
- Information on Water Services website and in newspaper
- Notice in January water bills

Public Outreach

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Permitted industries meeting:

- Representatives from all permittees except one
- Short presentation on proposed changes
- Concern about fee increases – none presently
- Modified one limit after discussion
- Clarified language in a couple of sections
- Upcoming rate study discussion
- Concerns w/BOD & TSS – changes to ERP


Questions?
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Cross-Connection Code Changes

Industrial Pretreatment

Summary of 7-03-01-0015 changes

- Reorganization of information
- Removal of redundant and vague language
- Removal requirement section

What is Cross-Connection?

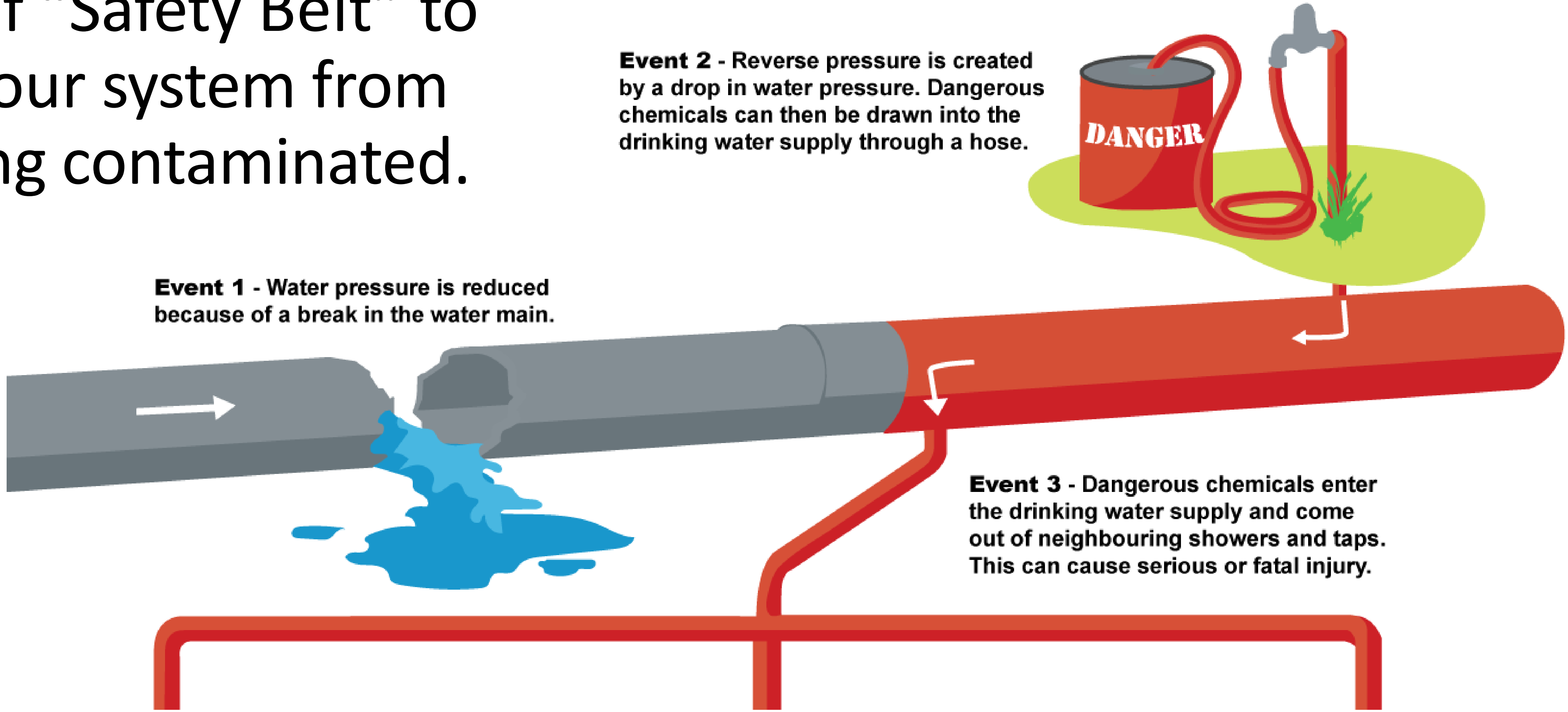
Cross-Connection program:

- Cross Connection program consists of Backflow prevention devices on service connection to customers to prevent hazards from entering our distribution system.
- Typically found on businesses and some residential, if a hazard is found
- Approximately 2700 backflow devices within City limits

Why We Have Cross-Connection

Cross-Connection:

- A type of "Safety Belt" to protect our system from becoming contaminated.



Changes Cross-Connection code

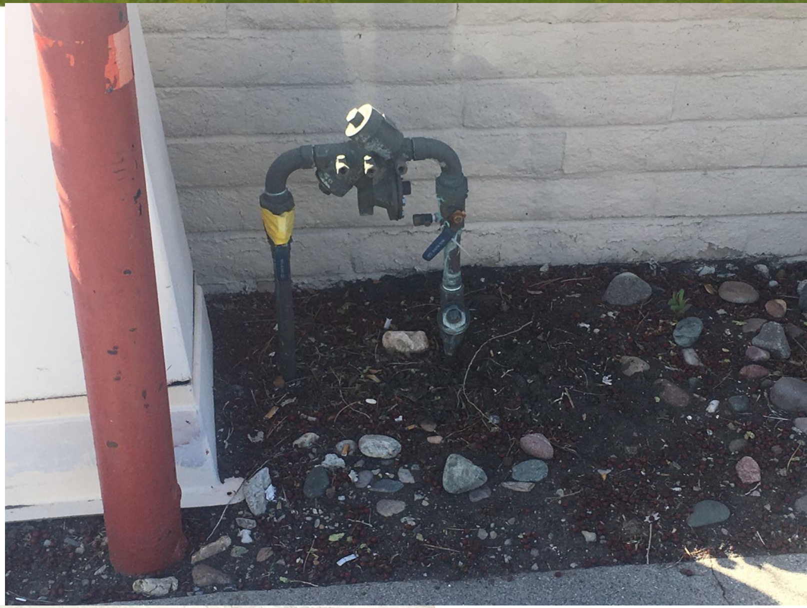
Code changes:

- Current program is in compliance with federal and state code
- Remove vague language.
  - i.e. “generally”, “normally would”, etc
- Require backflow assemblies be tested before using water on construction sites.

Cross-Connection code

Removal requirement:

- Removed redundant language through out the code about removing backflow preventers.
- Guidelines for removal process
  - Contact the City
  - Removing as close as possible to main service
  - Deactivation process



Who Will This Impact

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Commercial and Industrial

- Current installations and new construction

Residential

- Class 1 & 2 fire sprinkler systems exemption for residents

What is Next?

90-day Public outreach plan:

- Water commission meeting – November 19th
- Water bill message – on January bills
- Virtual public comment meeting on Feb. 4th
- Information on Water Services website and in newspaper
- Emails to testers and plumbers


Questions?
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CITY OF FLAGSTAFF ARIZONA
ESTABLISHED 1882

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

Prepared for

City of Flagstaff, AZ

February 18, 2020

Revised October 6, 2020

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

Prepared for

City of Flagstaff, AZ

February 18, 2020

Revised October 6, 2020

2 N Central Ave Suite 1600,

Phoenix, AZ 85004

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List of Abbreviations

AIL	allowable industrial loading
AHL	allowable headworks loading
AZPDES	Arizona Pollutant Discharge Elimination System
BOD	biochemical oxygen demand
$CaCO_3$	calcium carbonate
CF	Conversion Factor
CFR	Code of Federal Regulations
cfs	cubic foot/feet per second
COD	chemical oxygen demand
d	day(s)
DO	dissolved oxygen
EPA	United States Environmental Protection Agency
FOG	fats, oils, and greases
HEM	Hexane Extractable Material
kg	kilogram(s)
lb	pound(s)
LLE	Local Limits Evaluation
MAIL	maximum allowable industrial loading
MAHL	maximum allowable headworks loading
MBAS	methylene blue active substances
mgd	million gallons per day
mg/L	milligram per liter
POC	pollutant of concern
POTW	publicly owned treatment works
SGF	safety and growth factor
TCLP	toxicity characteristic leaching procedure
TDR	total dissolved residue
TDS	total dissolved solids
TKN	total Kjeldahl nitrogen
TPH	total petroleum hydrocarbons
TRC	total residual chlorine
TSS	total suspended solids
TTO	total toxic organics
USGS	United States Geological Survey
UV	ultraviolet
WQS	water quality standards
WRP	water reclamation plant

List of Variables

1Q10	lowest average flow for a 1-day period that is expected to occur once every 10 years
7Q10	lowest average flow for a 7-day period that is expected to occur once every 10 years
AHL_{DESIGN}	AHL based on WRP design criteria, lb/d
AHL_{AZPDES}	AHL based on AZPDES permit limit for effluent discharge, lb/d
AHL_{SEC}	AHL based on inhibition of secondary treatment processes, lb/d
AHL_{TER}	AHL based on inhibition of tertiary treatment processes, lb/d
AHL_{WQS}	AHL based on water quality standards, lb/d
AIL_{IU}	allowable industrial loading, lb/d
C_{DOM}	domestic and commercial background levels, mg/L
C_{HW}	concentrations in septic/hauled waste, mg/L
C_{INHIB2}	inhibition criterion for secondary treatment, mg/L
C_{INHIB3}	inhibition criterion for tertiary treatment, mg/L
C_{LIM}	uniform concentration-based local limit, mg/L
C_{AZPDES}	AZPDES permit limit for effluent discharge, mg/L
C_{STR}	receiving stream background concentration, mg/L
C_{WQS}	in-stream state water quality standard, mg/L
CF	conversion factor to convert dissolved to total metals fraction, unitless
DC	WRP design criteria, mg/L
E_{WRP}	WRP effluent pollutant concentration, mg/L
I_r	WRP influent pollutant concentration at headworks, mg/L
$L_{\%}$	percentage of MAHL currently utilized, percent
L_{INFL}	current influent loading (average or daily maximum), lb/d
L_{UNC}	loadings from uncontrolled sources, lb/d
PL	pollutant loading, lb/d
Q_{DOM}	domestic and commercial flow, mgd
Q_{HW}	septic and hauled waste flow, mgd
Q_{IND}	industrial flow, mgd
Q_{IU}	flow from an industrial user, mgd
Q_{AZPDES}	AZPDES permitted flow for effluent discharge, mgd
Q_{STR}	receiving stream (upstream) flow rate, mgd
Q_{WRP}	WRP average effluent flow rate, mgd
R_{PRIM}	removal efficiency from headworks to primary effluent, decimal
R_{SEC}	removal efficiency from headworks to secondary effluent, decimal
R_{WRP}	plant removal efficiency from headworks to effluent, decimal
WQS_{DISS}	WQS for the dissolved fraction, µg/L
WQS_{TOTAL}	WQS for the total recoverable fraction, µg/L

Executive Summary

Brown and Caldwell (BC) conducted a Local Limits Evaluation (LLE) in accordance with Arizona Department of Environmental Quality (ADEQ) and the United Stated 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 31st, 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.

Section 1

Introduction

The City of Flagstaff, AZ (City) operates the Wildcat Hill WRP and Rio de Flag WRP that serve the city of Flagstaff, AZ. Because of changes in regulatory-driven permits and Water Quality Standards (WQS) and Pollutants of Concern (POCs), local limits were reevaluated to meet regulatory requirements, to help protect wastewater systems, personnel, and the environment, and to help maintain sludge quality.

Wildcat Hill WRP was re-issued an Arizona Pollutant Discharge Elimination System (AZPDES) Permit by the Arizona Department of Environmental Quality (ADEQ) on June 1,2020. Rio de Flag WRP was re-issued an AZPDES Permit by the ADEQ on January 15, 2020. In accordance with Part V.B of both permits, adopted local limits must be revised to help ensure that they continue to prevent interference with the operation of both plants, prevent pass-through of pollutants in violation of the AZPDES permit, prevent municipal sludge contamination, and prevent toxicity to life in the receiving stream.

This Local Limits Evaluation (LLE) is a technical and detailed evaluation of the local limits developed for the Wildcat Hill WRP and Rio de Flag WRP.

1.1 Project Objective

The objective of this effort was to update industrial local limits for the Wildcat Hill WRP and Rio de Flag WRP to enforce the specific and general prohibitions as well as state and local regulations, address site-specific concerns, and provide WRP protection limits. The specific and general prohibitions along with categorical standards are designed to provide a minimum acceptable level of control over industrial user discharges. Local limits are established to provide additional control to prevent site-specific and environmental problems due to non-domestic discharges. Therefore, this LLE used site-specific data to identify POCs that may be expected to be discharged in quantities sufficient to cause plant or environmental problems. Some of the factors considered in developing local limits included:

- Efficiency of the WRP in treating wastes
- Compliance with AZPDES permit limits
- Condition of the water body that receives treated effluent
- State and/or federal WQS that are applicable to the water body receiving treated effluent
- Retention, use, and disposal of sewage sludge
- Worker health and safety concerns.

This LLE provides documentation and reasoned guidance on the following:

- Determining POCs
- Gathering and analyzing data
- Calculating allowable headworks loadings (AHLs) for each POC based on applicable criteria
- Determining maximum allowable headworks loadings (MAHLs) and maximum allowable industrial loadings (MAILs) for each POC, and converting these loadings to local limits

- Comparing industrial loadings to MAILs to ensure that local limits meet the needs of the industries to the extent possible.

1.2 Organization of Report

This LLE report is organized into seven sections as follows:

- **Section 1** is an introduction to the LLE and describes the project objectives.
- **Section 2** describes how POCs were chosen for inclusion in the LLE and the general methodology followed through the LLE.
- **Section 3** provides details regarding the development of local limits for Wildcat Hill WRP and Rio de Flag WRP .
- **Section 4** lists the industrial allocations.
- **Section 5** provide protection to the collection system.
- **Section 6** lists future sampling recommendations.
- **Section 7** lists the final proposed local limits.
- **Section 8** provides the limitations.
- **Section 9** lists the references.

A large volume of data and calculations was utilized to complete the LLE for the City, including site-specific data, literature values, and calculation spreadsheets. The tables and appendices of this LLE contain the information needed to reproduce the local limits.

The following data and calculation spreadsheets can be found in the appendices to this LLE:

- **Appendix A** contains site-specific data for Wildcat Hill WRP and Rio de Flag WRP used to develop the local limits. Included in this appendix are the following:
  - Monthly average estimations for the influent and effluent flows (Table A1)
  - Monthly estimations of volumes of sludge to disposal from Wildcat Hill WRP (Table A1)
  - Monthly estimations of volumes of sludge to Wildcat Hill WRP from Rio de Flag WRP (Table A1)
  - Concentrations of conventional pollutants in influent and effluent samples collected from October 2018 through September 2019 averaging from Wildcat Hill WRP and Rio de Flag WRP (Table A2)
  - Concentrations of metals in influent and effluent samples collected between Q2 2018 through Q3 2019 averaging from Wildcat Hill WRP and Rio de Flag WRP (Table A3)
  - Concentrations of organics in influent and effluent samples collected between Q2 2018 through Q3 2019 averaging from Wildcat Hill WRP and Rio de Flag WRP (Table A4)
  - Removal efficiencies calculated for conventional pollutants, inorganics, and organics based on average influent and effluent concentrations from Wildcat Hill WRP and Rio de Flag WRP (Tables A2 through A4)
- **Appendix B** contains the literature data used in the LLE when site-specific data were not available. Included in this appendix are the following:
  - Removal efficiencies for priority pollutants, including overall treatment plant removal efficiencies as well as removal efficiencies through primary, secondary, and tertiary treatment processes (Tables B1 through B4)

  - Treatment inhibition threshold levels for activated sludge and nitrification treatment (Tables B5 and B6)
  - Domestic and commercial pollutant loadings (Table B7).
- **Appendix C** contains the regulatory limits and/or criteria applicable to Wildcat Hill WRP and Rio de Flag WRP, including the following:
  - Design-based wastewater treatment plant capacity criteria. Design criteria for conventional pollutants was provided by the City. The average maximum monthly influent criteria was used. (Table C1)
  - AZPDES permit limits (Table C2)
  - Biosolids land disposal regulatory limits (Table C3)
  - WQS for Wildcat Hill WRP and Rio de Flag WRP (Tables C4 and C5)
  - Worker protection screening levels based on fume toxicity and explosivity (Tables C6 and C7).
- **Appendix D** contains the calculation worksheets used to calculate all allowable headworks loadings, allowable industrial loadings, and local limits for Wildcat Hill WRP including the following:
  - Allowable headworks and industrial loadings based on design criteria, AZPDES permit, activated sludge and nitrification inhibition threshold levels, sludge disposal, and acute and chronic WQS (Tables D1 through D8)
  - Summary of allowable headworks and industrial loadings (Tables D9 and D10)
  - Maximum allowable headworks loadings and local limits (Table D11).
- **Appendix E** contains the calculation worksheets used to calculate all allowable headworks loadings, allowable industrial loadings, and local limits for Rio de Flag WRP including the following:
  - Allowable headworks and industrial loadings based on design criteria, AZPDES permit, activated sludge and nitrification inhibition threshold levels, sludge disposal, and acute and chronic WQS (Tables E1 through E8)
  - Summary of allowable headworks and industrial loadings (Tables E9 and E10)
  - Maximum allowable headworks loadings and local limits (Table E11).

Section 2

Pollutants of Concern: Screening and General Methodologies

This section describes how POCs were chosen for inclusion in the LLE and the general methodology followed through the evaluation.

2.1 Screening for Pollutants of Concern

A POC is any pollutant that may be expected to be discharged to a WRP in sufficient amounts to cause pass-through or interference or present risk to workers. Pollutants that are contributing to or known to cause operational problems (i.e., inhibition of a treatment process) are also considered POCs even if the pollutants are not currently causing permit violations. The United States Environmental Protection Agency (EPA) has identified 15 pollutants often found in WRP sludge and effluent that it considers potential POCs. These include arsenic, cadmium, chromium, copper, cyanide, lead, mercury, nickel, silver, zinc, molybdenum, selenium, 5-day biochemical oxygen demand (BOD), total suspended solids (TSS), and ammonia as nitrogen (for plants that accept non-domestic sources of ammonia). Additional POCs listed in Table 2-1 were identified using applicable EPA screening criteria contained in the EPA *Local Limits Development Guidance Manual* (EPA 2004):

- **AZPDES permit limits:** These permit conditions establish the objectives that the WRP must meet to prevent pass-through and interferences. The WRP is required to prohibit discharge from industrial users in amounts that result in or cause a violation of any requirement of the WRP's AZPDES permit.
- **Water quality criteria:** Water quality criteria have been developed by EPA and/or ADEQ for protection of surface water, including the receiving waters for permitted dischargers. The WRP does not have to develop a local limit for every pollutant for which there is a water quality standard or criterion. However, EPA recommends that any pollutant that has a reasonable potential to be discharged in amounts that could exceed WQS or criteria should be considered a POC and evaluated accordingly.
- **Sludge quality standards:** WRP's must prohibit industrial user discharges in amounts that cause a violation of applicable sludge disposal regulations, or that restrict the WRP's use of its chosen sludge disposal option. Currently, only the Wildcat Hill WRP disposes of sludge through land injection. Rio de Flag WRP transfers its sludge through the collection system to Wildcat Hill WRP for disposal.
- **Prohibition on treatment plant interference:** The General Pretreatment Regulations prohibit any user of a WRP from discharging pollutants that cause interference (i.e., a discharge that inhibits or disrupts a WRP resulting in a violation of the WRP's AZPDES permit or noncompliance with the WRP's sewage sludge requirements). EPA recommends that the WRP consider pollutants that have previously interfered with or may potentially interfere with the treatment works' operation to be a potential POC.

- **Influent, effluent, and sludge scans at the WRP:** EPA recommends that the WRP conduct additional screening for any pollutant found in the priority pollutant scans of its influent, effluent, or sludge to determine whether the pollutant should be listed as a POC. Although a pollutant found in this way is a potential POC, the WRP may determine based on the pollutant's concentration that the pollutant need not be selected as a POC for which local limits are developed.
- **Industrial discharge scans:** An additional screening was conducted to identify pollutants detected in the industrial users' discharge. Although a pollutant found in this way is a potential POC, the WRP may determine, based on the pollutant's concentration, that the pollutant need not be selected as a POC for which local limits are developed.

In general, EPA recommends that an LLE be conducted for EPA's 15 POCs, as well as any pollutant for which the WRP has a preexisting local limit or an applicable AZPDES limit or sludge disposal limit, or that has caused inhibition or other problems in the past.

2.1.1 Pollutants of Concern

Table 2-1 provides the parameters and criteria used for this screening and identifies those pollutants for which local limits are needed based on the screening for both Wildcat Hill WRP and Rio de Flag WRP.

In addition to EPA's 15 POCs, based on the above guidelines, 8 additional parameters were identified as POCs for Wildcat Hill WRP and Rio de Flag WRP. Additionally, the pollutants oil and grease, nitrate-nitrite as N and total nitrogen were also included in the evaluation.

2.2 General Methodologies

This section presents the methodology used to calculate MAHLs. A MAHL is an estimate of the upper limit of pollutant loading to a WRP intended to prevent pass-through or interference. Methodologies for calculating MAHLs are well established in EPA's *Local Limits Development Guidance Manual* (EPA 2004) and can be broken down into a three-step procedure: (1) calculation of removal efficiencies, (2) calculation of AHLs for each environmental criterion, and (3) designation of the most stringent AHL as the MAHL for each POC.

2.2.1 Calculation of Removal Efficiencies

Removal efficiency is the fraction or percentage of the influent pollutant loading that is removed from the waste stream across an entire wastewater treatment works (plant removal efficiency) or through specific wastewater treatment processes within the works (primary, secondary, and/or tertiary removal efficiencies). Removal efficiencies are based largely on site-specific conditions such as climate, WRP design, operation and maintenance, plant conditions, and sewage characteristics.

EPA recommends that site-specific data be used to calculate removal efficiencies. Since Wildcat Hill WRP and Rio de Flag WRP are existing treatment plants, average plant removal efficiencies were calculated from the Wildcat Hill WRP and Rio de Flag WRP available influent and effluent data from October 2018 through September 2019, as presented in Tables A2; and Q2 2018 through Q3 2019 in A3 through A4 in Appendix A.

The proposed removal efficiencies reported by other WRPs by studies that have been published in professional journals or by EPA were used in developing local limits. These literature-based data are presented in EPA's *Local Limits Development Guidance Manual* (EPA 2004) and can be found in Appendix B. Those POCs with data available to calculate site-specific removal efficiencies are discussed in further detail in Section 3.

Table 2-1. Pollutants of Concern Screening

Parameter	Is the parameter a USEPA POC[a]?	Is the parameter detected in influent/ effluent/ sludge scans?	Is the parameter detected/ reported in industrial effluent?	Is there an existing AZPDES[b] permit for the parameter?	Is there an existing local limit for the parameter?	Is there an existing industrial permit for the parameter?	Is there an applicable WQS[c] for the parameter?	Are inhibition threshold values reported (default) for the parameter?	Are worker protection screening values for the parameter?	Is there an applicable sludge disposal criterion for the parameter?	Is there a need for a local limit based on screening?
Conventional Pollutants											
Ammonia	Yes	Yes	Yes	Yes	No	No	Yes	Yes	No	No	YES
Biochemical Oxygen Demand (BOD)	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	YES
Chemical Oxygen Demand (COD)	No	Yes	Yes	No	No	No	No	No	No	No	YES
Phosphorus, Total (as P)	No	Yes	Yes	No	No	No	No	No	No	No	
Suspended Solids, Total (TSS)	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	YES
Inorganic Pollutants											
Antimony	No	Yes	Yes	No	No	No	Yes	No	No	No	YES
Arsenic	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	No	Yes	YES
Barium	No	Yes	Yes	No	No	No	Yes	No	No	Yes	YES
Beryllium	No	Yes	No	No	No	No	Yes	No	No	No	YES
Boron	No	Yes	Yes	No	No	No	Yes	No	No	No	YES
Bromide	No	Yes	Yes	No	Yes	Yes	No	No	No	No	YES
Cadmium	Yes	Yes	Yes	No	No	No	Yes	Yes	No	Yes	YES
Calcium	No	Yes	Yes	No	No	No	No	No	No	No	
Chromium III	No	No	Yes	No	No	No	Yes	Yes	No	No	YES
Chromium VI	No	Yes	Yes	No	No	No	Yes	Yes	No	No	YES
Chromium, Total	Yes	Yes	Yes	No	No	No	Yes	Yes	No	Yes	YES
Cobalt	No	Yes	No	No	No	No	No	No	No	No	
Copper	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	YES
Cyanide	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	YES

Table 2-1. Pollutants of Concern Screening

Parameter	Is the parameter a USEPA POC[a]?	Is the parameter detected in influent/ effluent/ sludge scans?	Is the parameter detected/ reported in industrial effluent?	Is there an existing AZPDES[b] permit for the parameter?	Is there an existing local limit for the parameter?	Is there an existing industrial permit for the parameter?	Is there an applicable WQS[c] for the parameter?	Are inhibition threshold values reported (default) for the parameter?	Are worker protection screening values for the parameter?	Is there an applicable sludge disposal criterion for the parameter?	Is there a need for a local limit based on screening?
Fluoride	No	Yes	Yes	No	No	No	Yes	No	No	No	YES
Iron	No	Yes	Yes	No	No	No	Yes	No	No	No	YES
Lead	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	No	Yes	YES
Magnesium	No	Yes	Yes	No	No	No	No	No	No	No	
Manganese	No	Yes	Yes	No	No	No	Yes	No	No	No	YES
Mercury	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	YES
Molybdenum	Yes	Yes	Yes	No	No	No	Yes	No	No	Yes	YES
Nickel	Yes	Yes	Yes	No	No	No	Yes	Yes	No	Yes	YES
Potassium	No	Yes	No	No	No	No	No	No	No	No	
Selenium	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	YES
Silver	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	No	Yes	YES
Thallium	No	Yes	No	No	No	No	Yes	No	No	No	YES
Uranium	No	Yes	Yes	No	No	No	Yes	No	No	No	YES
Vanadium	No	No	No	No	No	No	No	No	No	No	
Zinc	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	No	Yes	YES
Organic Pollutants											
Acenaphthene	No	No	No	No	No	No	Yes	No	No	No	
Acetone	No	Yes	No	No	No	No	No	No	No	No	
Acrolein	No	No	No	No	No	No	Yes	No	Yes	No	
Acrylonitrile	No	No	No	No	No	No	Yes	No	Yes	No	
Aldrin	No	No	No	No	No	No	Yes	No	Yes	No	
Anthracene	No	No	No	No	No	No	Yes	Yes	No	No	

Table 2-1. Pollutants of Concern Screening

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Aroclor 1232	No	No	No	No	No	No	Yes	No	No	No	
Aroclor 1242	No	No	No	No	No	No	Yes	No	Yes	No	
Aroclor 1254	No	No	No	No	No	No	Yes	No	Yes	No	
Benzene	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	YES
Benzidine	No	Yes	No	No	No	No	Yes	No	No	No	
Benzyl Alcohol	No	Yes	No	No	No	No	No	No	No	No	
Benzo(a)Anthracene	No	No	No	No	No	No	Yes	No	No	No	
Benzo(a)Pyrene	No	No	No	No	No	No	Yes	No	No	No	
Benzo(k)Fluoranthene	No	No	No	No	No	No	Yes	No	No	No	
Benzofluoranthene, 3,4-	No	No	No	No	No	No	Yes	No	No	No	
Benzoic Acid	No	Yes	No	No	No	No	No	No	No	No	
BHC-Alpha, a-	No	No	Yes	No	No	No	No	No	No	No	
BHC-Beta, b-	No	No	No	No	No	No	No	No	No	No	
BHC-Delta, d-	No	No	No	No	No	No	No	No	No	No	
Bis(2-chloroethyl)Ether	No	No	No	No	No	No	Yes	No	Yes	No	
Bis(2-chloroisopropyl)Ether	No	No	No	No	No	No	Yes	No	No	No	
Bis(2-chloromethyl)Ether	No	No	No	No	No	No	No	No	No	No	
Bis(2-ethylhexyl)Phthalate	No	Yes	Yes	No	No	Yes	No	No	No	No	YES
Bromodichloromethane	No	Yes	Yes	No	Yes	Yes	Yes	No	No	No	YES
Bromoform	No	Yes	No	No	Yes	Yes	Yes	No	Yes	No	YES
Butyl benzyl Phthalate	No	No	Yes	No	No	No	Yes	No	No	No	YES
Carbon Disulfide	No	No	No	No	No	No	No	No	Yes	No	

Table 2-1. Pollutants of Concern Screening											
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Carbon Tetrachloride	No	No	No	No	No	No	Yes	No	Yes	Yes	
Chlordane	No	No	No	No	No	No	Yes	No	Yes	Yes	
Chlordane, Gamma	No	No	No	No	No	No	No	No	No	No	
Chlorobenzene	No	No	No	No	No	No	Yes	No	Yes	Yes	
Chloroethane	No	No	No	No	No	No	No	No	Yes	No	
Chloroform	No	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	YES
Chloronaphthalene, 2-	No	No	No	No	No	No	Yes	No	No	No	
Chlorophenol, 2-	No	No	No	No	No	No	Yes	Yes	No	No	
Chrysene	No	No	No	No	No	No	Yes	No	No	No	
DDD, 4,4'-	No	No	No	No	No	No	Yes	No	No	No	
DDE, 4,4'-	No	No	No	No	No	No	Yes	No	No	No	
DDT, 4,4'-	No	No	No	No	No	No	Yes	No	No	No	
Dibenzo(a,h)Anthracene	No	No	No	No	No	No	Yes	No	No	No	
Dibromochloromethane	No	Yes	Yes	No	Yes	Yes	Yes	No	No	No	YES
Dichlorobenzene, 1,2-	No	No	No	No	No	No	Yes	Yes	Yes	No	
Dichlorobenzene, 1,3-	No	No	No	No	No	No	Yes	Yes	No	No	
Dichlorobenzene, 1,4-	No	No	Yes	No	No	No	Yes	Yes	Yes	Yes	YES
Dichlorobenzidine, 3,3-	No	No	No	No	No	No	Yes	No	No	No	
Dichlorobromomethane	No	No	No	No	No	No	Yes	No	Yes	No	
Dichlorodifluoromethane	No	No	No	No	No	No	No	No	No	No	
Dichlorofluoromethane	No	No	No	No	No	No	No	No	No	No	
Dichloroethane, 1,1-	No	No	No	No	No	No	No	No	Yes	No	

Brown AND Caldwell

Table 2-1. Pollutants of Concern Screening

Parameter	Is the parameter a USEPA POC[a]?	Is the parameter detected in influent/ effluent/ sludge scans?	Is the parameter detected/ reported in industrial effluent?	Is there an existing AZPDES[b] permit for the parameter?	Is there an existing local limit for the parameter?	Is there an existing industrial permit for the parameter?	Is there an applicable WQS[c] for the parameter?	Are inhibition threshold values reported (default) for the parameter?	Are worker protection screening values for the parameter?	Is there an applicable sludge disposal criterion for the parameter?	Is there a need for a local limit based on screening?
Dichloroethane, 1,2-	No	No	No	No	No	No	Yes	No	Yes	Yes	
Dichloroethylene, 1,1-	No	No	No	No	No	No	Yes	No	Yes	Yes	
Dichloroethylene, cis-1,2-	No	No	No	No	No	No	Yes	No	No	No	
Dichloroethylene, trans-1,2-	No	No	No	No	No	No	Yes	No	Yes	No	
Dichlorophenol, 2,4-	No	No	No	No	No	No	Yes	Yes	No	Yes	
Dichloropropane, 1,2-	No	No	No	No	No	No	Yes	No	Yes	No	
Dichloropropylene, 1,3-	No	No	No	No	No	No	Yes	No	Yes	No	
Dieldrin	No	No	No	No	No	No	Yes	No	Yes	No	
Diethyl phthalate	No	Yes	Yes	No	No	No	Yes	No	Yes	No	YES
Dimethyl phthalate	No	Yes	No	No	No	No	Yes	No	Yes	No	
Dimethylphenol, 2,4-	No	No	No	No	No	No	Yes	Yes	No	No	
Di-n-butyl phthalate	No	No	Yes	No	No	No	Yes	No	No	No	YES
Dinitro-o-cresol, 4,6-	No	No	No	No	No	No	Yes	No	Yes	No	
Dinitrophenol, 2,4-	No	No	No	No	No	No	Yes	No	No	No	
Dinitrophenol, 2-Methyl-4,6-	No	No	No	No	No	No	No	No	No	No	
Dinitrotoluene, 2,4-	No	No	No	No	No	No	Yes	Yes	Yes	No	
Diphenyl hydrazine, 1,2-	No	No	No	No	No	No	Yes	Yes	No	No	
Endosulfan Sulfate	No	No	No	No	No	No	Yes	No	No	No	
Endosulfan, alpha-	No	No	No	No	No	No	Yes	No	No	No	
Endosulfan, beta-	No	No	No	No	No	No	Yes	No	No	No	
Endrin	No	No	No	No	No	No	Yes	No	Yes	Yes	
Endrin Aldehyde	No	Yes	No	No	No	No	Yes	No	No	No	

Table 2-1. Pollutants of Concern Screening

Parameter	Is the parameter a USEPA POC[a]?	Is the parameter detected in influent/ effluent/ sludge scans?	Is the parameter detected/ reported in industrial effluent?	Is there an existing AZPDES[b] permit for the parameter?	Is there an existing local limit for the parameter?	Is there an existing industrial permit for the parameter?	Is there an applicable WQS[c] for the parameter?	Are inhibition threshold values reported (default) for the parameter?	Are worker protection screening values for the parameter?	Is there an applicable sludge disposal criterion for the parameter?	Is there a need for a local limit based on screening?
Ethanol	No	Yes	No	No	No	No	No	No	No	No	
Ethylbenzene	No	Yes	Yes	No	No	No	Yes	Yes	Yes	No	YES
Fluoranthene	No	No	No	No	No	No	Yes	No	No	No	
Fluorene	No	No	No	No	No	No	Yes	No	No	No	
Formaldehyde	No	No	No	No	No	No	No	No	Yes	No	
Heptachlor	No	Yes	Yes	No	No	No	Yes	No	Yes	Yes	YES
Heptachlor Epoxide	No	No	No	No	No	No	Yes	No	No	Yes	
Hexachlorobenzene	No	No	No	No	No	No	Yes	Yes	No	Yes	
Hexachlorobutadiene	No	No	No	No	No	No	Yes	No	Yes	Yes	
Hexachlorocyclopentadiene	No	No	No	No	No	No	Yes	No	Yes	No	
Hexachloroethane	No	No	No	No	No	No	Yes	No	Yes	Yes	
Indeno(1,2,3-cd)Pyrene	No	No	No	No	No	No	Yes	No	No	No	
Isophorone	No	No	No	No	No	No	Yes	No	No	No	
Isopropyl toluene, p-	No	No	No	No	No	No	No	No	No	No	
Lindane (alpha- and beta-BHC)	No	No	No	No	No	No	Yes	No	No	Yes	
Methyl Bromide (Bromomethane)	No	No	No	No	No	No	Yes	No	Yes	No	
Methyl Chloride (Chloromethane)	No	Yes	No	No	No	No	Yes	No	Yes	No	YES
Methyl ethyl ketone (2-Butanone)	No	No	No	No	No	No	No	No	Yes	Yes	
Methyl tert-butyl ether	No	No	No	No	No	No	No	No	No	No	
Methylphenol, 3 + Methylphenol, 4	No	Yes	No	No	No	No	No	No	No	No	
Methylphenol, 4-chloro-3- (P-chloro-m-cresol)	No	Yes	No	No	No	No	No	No	No	No	

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Methylene blue active substances (MBAS)	No	No	No	No	No	No	No	No	No	No	
Methylene chloride	No	No	No	No	Yes	Yes	No	No	Yes	No	YES
Methoxychlor	No	No	No	No	No	No	Yes	No	No	Yes	
Naphthalene	No	Yes	No	No	No	No	Yes	Yes	Yes	No	YES
Nitrobenzene	No	No	No	No	No	No	Yes	Yes	Yes	Yes	
N-Nitrosodi-n-propylamine	No	Yes	No	No	No	No	Yes	No	No	No	YES
N-Nitrosodimethylamine	No	No	No	No	No	No	Yes	No	No	No	
N-Nitrosodiphenylamine	No	No	No	No	No	No	Yes	No	No	No	
Nonylphenol	No	No	No	No	No	No	No	No	No	No	
PCBs	No	No	No	No	No	No	Yes	No	No	No	
Pentachlorophenol	No	No	No	No	No	No	Yes	Yes	Yes	Yes	
Phthalate, Di-n-octyl	No	No	No	No	No	No	Yes	No	No	No	
Phenanthrene	No	No	No	No	No	No	Yes	Yes	No	No	
Phenol	No	No	Yes	No	No	No	Yes	Yes	Yes	No	YES
Phenolics, Total Recoverable	No	No	No	No	No	No	Yes	No	No	No	
Pyrene	No	No	No	No	No	No	Yes	No	No	No	
Silvex (2,4,5-TP)	No	No	No	No	No	No	Yes	No	No	No	
Styrene	No	No	No	No	No	No	Yes	No	No	No	
TCDD, 2,3,7,8-	No	No	No	No	No	No	Yes	No	No	No	
Tetrachloroethane, 1,1,2,2-	No	No	No	No	No	No	Yes	No	Yes	No	
Tetrachloroethylene	No	No	Yes	No	No	No	Yes	No	Yes	Yes	YES
Toluene	No	No	Yes	No	Yes	Yes	Yes	Yes	Yes	No	YES

Table 2-1. Pollutants of Concern Screening

Parameter	Is the parameter a USEPA POC[a]?	Is the parameter detected in influent/ effluent/ sludge scans?	Is the parameter detected/ reported in industrial effluent?	Is there an existing AZPDES[b] permit for the parameter?	Is there an existing local limit for the parameter?	Is there an existing industrial permit for the parameter?	Is there an applicable WQS[c] for the parameter?	Are inhibition threshold values reported (default) for the parameter?	Are worker protection screening values for the parameter?	Is there an applicable sludge disposal criterion for the parameter?	Is there a need for a local limit based on screening?
Toxaphene	No	No	No	No	No	No	Yes	No	Yes	Yes	
Trichlorobenzene, 1,2,4-	No	No	No	No	No	No	Yes	No	Yes	No	
Trichlorobenzene, 1,2,3-	No	No	No	No	No	No	No	No	No	No	
Trimethylbenzene, 1,3,5-	No	No	No	No	No	No	No	No	No	No	
Trichloroethane, 1,1,1-	No	No	No	No	No	No	Yes	No	Yes	No	
Trichloroethane, 1,1,2-	No	No	No	No	No	No	Yes	No	Yes	No	
Trichloroethylene	No	No	No	No	No	No	Yes	No	Yes	Yes	
Trichlorofluoromethane	No	No	No	No	No	No	Yes	No	Yes	No	
Trichlorophenol, 2,4,6-	No	No	No	No	No	No	Yes	Yes	No	Yes	
Trihalomethanes, Total	No	No	Yes	No	Yes	Yes	Yes	No	No	No	
Vinyl Chloride	No	No	No	No	No	No	Yes	No	Yes	Yes	
Xylenes, Total	No	No	No	No	No	No	Yes	No	No	No	
Other Pollutants											
Chloride	No	No	No	No	No	No	No	No	No	No	
DRO	No	Yes	Yes	No	No	No	No	No	No	No	
Hydrogen Cyanide	No	No	No	No	No	No	No	No	Yes	No	
Hydrogen Sulfide	No	No	No	No	No	No	No	No	Yes	No	
Iodine	No	No	No	No	No	No	No	Yes	No	No	
Kjeldahl Nitrogen, Total (TKN)	No	Yes	Yes	No	No	No	No	No	No	No	YES
Nitrate as N	No	Yes	No	No	No	No	Yes	No	No	No	
Nitrite as N	No	Yes	No	No	No	No	Yes	No	No	No	
Nitrate-Nitrite as N	No	Yes	Yes	No	No	No	Yes	No	No	No	YES

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Nitrogen, Total	No	No	No	No	Yes	Yes	No	No	No	No	
Oil & Grease	No	Yes	Yes	Yes	Yes	Yes	No	No	No	No	YES
Organic Nitrogen	No	No	No	No	No	No	No	No	No	No	
ORO	No	Yes	Yes	No	No	No	No	No	No	No	
Ortho-Phosphorus	No	Yes	No	No	No	No	No	No	No	No	
Sodium	No	No	No	No	No	No	No	No	No	No	
Sulfide	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	YES
Surfactants	No	No	No	No	No	No	No	Yes	No	No	
Total Dissolved Residue (TDR)	No	No	No	No	No	No	No	No	No	No	
Total Dissolved Solids (TDS)	No	Yes	No	No	No	No	No	No	No	No	
Total Petroleum Hydrocarbons (TPH)	No	Yes	Yes	No	No	No	No	No	No	No	
Total Residual Chlorine (TRC)	No	No	No	Yes	No	No	No	No	No	No	
Total Toxic Organics (TTO)	No	No	No	No	No	No	No	No	No	No	

2.2.2 Calculation of Allowable Headworks Loadings

In this step, an AHL is calculated for each applicable criterion: WRP design criteria, AZPDES permit limits, state WQS, and the various forms of interference that can occur through the treatment processes. Equations for calculating AHLs are based on a concentration-based and mass-based approach. Equations are presented and described in Section 3. Once WRP and POC-specific AHLs are calculated for each of the applicable criteria, the lowest, or most stringent, of the AHLs is chosen as the MAHL. This helps ensure that the resulting local limits are protective of each environmental criterion considered in the development of local limits.

2.2.3 Determination of Maximum Allowable Industrial Loadings and Local Limits

Once MAHLs are identified, they are used to calculate the MAILs and the concentration-based industrial local limits. The concentration-based industrial local limits are compared to screening levels protective of the WRP workers, and the more stringent values are selected as the final local limits. Several methods are commonly used to allocate local limits to industrial users, including uniform industrial local limits, flow- or mass-based limits, and other limits developed on a case-by-case basis. Based on the needs of Wildcat Hill WRP and Rio de Flag WRP, the City has chosen to implement concentration-based limits for each treatment facility, and mass-based limits for BOD and TSS, only.

Section 3

Wildcat Hill WRP and Rio de Flag WRP: Local Limits Development

The primary objective of this section is to describe the methodologies used to develop local limits for Wildcat Hill WRP and Rio de Flag WRP. Included in this section are descriptions of AHL calculations based on various environmental criteria, including:

- Design criteria
- AZPDES permits
- State acute and chronic WQS
- Activated sludge treatment inhibition
- Nitrification treatment inhibition
- Sludge disposal regulations.

Also included in this section are references to data sources used for calculating AHLs and the rationale for assumptions. Results of AHL calculations, determinations of the MAHLs, and calculations for MAILs and industrial local limits are also provided.

3.1 Introduction

The Wildcat Hill WRP is located at 2800 N El Paso in Flagstaff, AZ (Figure 3-1). The receiving water of effluent from Wildcat Hill WRP is the Rio de Flag.

Figure 3-1. Aerial Photograph of the Wildcat Hill WRP (January 2020)

The Rio de Flag WRP is located at 600 Babbitt Drive in Flagstaff, AZ (Figure 3-2). The receiving water of effluent from Rio de Flag WRP is the Rio de Flag.

Figure 3-2. Aerial Photograph of the Rio de Flag WRP (May 2019)

3.1.1 AZPDES Permit

The permitted design flow for Wildcat Hill WRP and Rio de Flag WRP is provided on the fact sheet of each permit. Permit AZ0020427 became effective on June 1, 2020 and expires on May 31, 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.

3.1.2 Treatment Processes

Wildcat Hill Water Reclamation Plant

The Wildcat Hill WRP receives hauled waste and liquid from car wash mud combined with influent, where a bar screen removes large debris. Then an aerated grit tank removes inorganics and heavy material. The influent then goes into four primary sedimentation tanks, and then to a secondary treatment which consists of an Integrated Fixed-Film Activated Sludge process (IFAS) with five sedimentation tanks. The influent then goes to tertiary treatment through three sand filters and two disc filters. Disinfection is done in two chlorine contact basins after the filters. Then after dechlorination using sulfur dioxide the treated effluent passes through the sampling point and is discharged to the outfalls. The effluent discharge is split between the Rio de Flag under a surface water (AZPDES) permit, the Continental Country Club golf course ponds under a separate AZPDES permit, or the reclaim water distribution system under a Type 3 recycled water permit. Wildcat has a grease receiving station which is pumped to the digesters on a daily basis. Primary and WAS sludge gets thickened using a disc thickener before being processed through two anaerobic digesters and further stabilized in two sludge stabilization basins before being injected into the soil (April through November) at one dedicated biosolids surface disposal site adjacent to the facility. Geobags are sometimes used during the winter if the ponds get full.

Rio de Flag Water Reclamation Plant

The Rio de Flag WRP is located before Wildcat in the middle of Flagstaff. It draws influent flow from two different collection lines at a headworks building located in the Rio de Flag riverbed. Flow that is not accepted at the Rio de Flag WRP is flows to the Wildcat WRP. After bar screen removal, the influent is pumped to the treatment plant. There are two primary sedimentation tanks before the Bardenpho process, which is then followed by 2 secondary sedimentation tanks. The flow then goes through tertiary filtration, consisting of 1 sand filter and 3 disc filters before being disinfected through two UV channels. The effluent is used in the reclaim water distribution system under a Type 3 recycled water permit or is discharged to the Rio de Flag. Sludge is conveyed through the collection system to the Wildcat Hill WRP for solids processing.

3.2 Site-Specific Flows and Removal Efficiencies

Average flow rates and plant removal efficiencies are used to calculate AHLs for all criteria. Influent, effluent, and sludge flows for the Wildcat Hill WRP and Rio de Flag WRP are summarized in Appendix A, Table A1.

Influent and effluent concentrations of conventional pollutants from Wildcat Hill WRP and Rio de Flag WRP, including biochemical oxygen demand (BOD) and TSS, from October 2018 through September 2019 are summarized in Appendix A, Table A2. For non-conventional pollutants, influent and effluent data sets were averaged between October 2018 through September 2019 for use in this evaluation from Wildcat Hill WRP and Rio de Flag WRP, and detections are presented in Appendix A, Tables A3 and A4. Site-specific removal efficiencies, R_{WRP}, were calculated for the following POCs using average influent and effluent pollutant concentrations (Appendix A, Tables A2 through A4). Due to occurrences like single detections causing negative removal efficiencies for non-conventional pollutants, literature values were used in cases of negative percent removals (Appendix B).

Wildcat Hill WRP:

- **Ammonia**: A plant removal efficiency of 98.3 percent was calculated using average influent and effluent concentrations of 37.2 mg/L and 0.637 mg/L, respectively.
- **BOD**: A plant removal efficiency of 99.3 percent was calculated using average influent and effluent concentrations of 697 mg/L and 4.59 mg/L, respectively.
- **TSS**: A plant removal efficiency of 99.9 percent was calculated using average influent and effluent concentrations of 674 mg/L and 0.705 mg/L, respectively.
- **TKN**: A plant removal efficiency of 97.5 percent was calculated using average influent and effluent concentrations of 72.3 mg/L and 1.82 mg/L, respectively.
- **Nitrate as N**: A plant removal efficiency of 46.8 percent was calculated using average influent and effluent concentrations of 1.25 mg/L and 0.664 mg/L, respectively. This removal value was used for the calculations of Nitrate/Nitrite as N.
- **Sulfide**: A plant removal efficiency of 48.7 percent was calculated using average influent and effluent concentrations of 0.049 mg/L and 0.025 mg/L, respectively.
- **Antimony**: A plant removal efficiency of -2.00 percent was calculated using an influent concentration of 0.0005 mg/L and an average effluent concentration of 0.00051 mg/L. There is no literature value for Antimony; therefore, the removal was assumed negligible since the pollutant loading was non-detect.
- **Arsenic**: A plant removal efficiency of 34.7 percent was calculated using an influent concentration of 0.0036 mg/L and an average effluent concentration of 0.0024 mg/L.

- **Beryllium**: A plant removal efficiency of 27.6 percent was calculated using an influent concentration of 0.0005 mg/L and an average effluent concentration of 0.0004 mg/L.
- **Cadmium**: A plant removal efficiency of 76.1 percent was calculated using an influent concentration of 0.0002 mg/L and an average effluent concentration of 0.000043 mg/L.
- **Chromium**: A plant removal efficiency of 79.7 percent was calculated using an influent concentration of 0.0035 mg/L and an average effluent concentration of 0.0007 mg/L.
- **Copper**: A plant removal efficiency of 93.9 percent was calculated using an influent concentration of 0.098 mg/L and an average effluent concentration of 0.0060 mg/L.
- **Cyanide**: A plant removal efficiency of 34.8 percent was calculated using an influent concentration of 0.004 mg/L and an average effluent concentration of 0.003 mg/L.
- **Iron**: A plant removal efficiency of 94.5 percent was calculated using an influent concentration of 1.148 mg/L and an average effluent concentration of 0.064 mg/L.
- **Lead**: A plant removal efficiency of 75.2 percent was calculated using an influent concentration of 0.0023 mg/L and an average effluent concentration of 0.001 mg/L.
- **Manganese**: A plant removal efficiency of 83.0 percent was calculated using an influent concentration of 0.0510 mg/L and an average effluent concentration of 0.009 mg/L.
- **Mercury**: A plant removal efficiency of 98.8 percent was calculated using an influent concentration of 0.0001 mg/L and an average effluent concentration of 0.000001 mg/L.
- **Molybdenum**: A plant removal efficiency of 29.0 percent was taken from literature values.
- **Nickel:** A plant removal efficiency of 61.4 percent was calculated using an influent concentration of 0.004 mg/L and an average effluent concentration of 0.002 mg/L.
- **Selenium:** A plant removal efficiency of 74.2 percent was calculated using an influent concentration of 0.0015 mg/L and an average effluent concentration of 0.0004 mg/L.
- **Silver:** A plant removal efficiency of 92.5 percent was calculated using an influent concentration of 0.0005 mg/L and an average effluent concentration of 0.00004 mg/L.
- **Thallium:** A plant removal efficiency of 99.5 percent was calculated using an influent concentration of 0.0064 mg/L and an average effluent concentration of 0.00004 mg/L.
- **Uranium:** A plant removal efficiency of 92.2 percent was calculated using an influent concentration of 0.0006 mg/L and an average effluent concentration of 0.00005 mg/L.
- **Zinc**: A plant removal efficiency of 66.52 percent was calculated using an influent concentration of 0.2067 mg/L and an average effluent concentration of 0.069 mg/L.
- **Organics**: Plant removal efficiencies were calculated for Toluene (48.0 percent) and Hexane Extractable Material (HEM)/Oil and Grease (92.9 percent). Literature values were used for Benzene (50.0 percent), Bis(2-ethylhexyl)Phthalate (63.0 percent), Butyl benzyl Phthalate (63.0 percent), Chloroform (53.0 percent), Diethyl Phthalate (38.0 percent), Di-n-butyl Phthalate (50.0 percent), Ethylbenzene (89.0 percent), Methylene Chloride (57.0 percent), Naphthalene (73.0 percent), Phenol (88.0 percent) and Tetrachloroethylene (91.0 percent).

Rio de Flag WRP:

- **Ammonia**: A plant removal efficiency of 99.7 percent was calculated using average influent and effluent concentrations of 39.3 mg/L and 0.1013 mg/L, respectively.
- **BOD**: A plant removal efficiency of 99.4 percent was calculated using average influent and effluent concentrations of 367 mg/L and 2.09 mg/L, respectively.
- **TSS**: A plant removal efficiency of 99.6 percent was calculated using average influent and effluent concentrations of 281 mg/L and 1.3 mg/L, respectively.

- **TKN**: A plant removal efficiency of 97.2 percent was calculated using average influent and effluent concentrations of 61.3 mg/L and 1.72 mg/L, respectively.
- **Sulfide**: A plant removal efficiency of 74.6 percent was calculated using average influent and effluent concentrations of 0.099 mg/L and 0.025 mg/L, respectively.
- **Antimony**: A plant removal efficiency of 21.0 percent was calculated using an influent concentration of 0.0005 mg/L and an average effluent concentration of 0.0004 mg/L.
- **Arsenic**: A plant removal efficiency of 26.1 percent was calculated using an influent concentration of 0.004 mg/L and an average effluent concentration of 0.003 mg/L.
- **Cadmium**: A plant removal efficiency of 71.4 percent was calculated using an influent concentration of 0.0001 mg/L and an average effluent concentration of 0.000032 mg/L.
- **Chromium**: A plant removal efficiency of 71.2 percent was calculated using an influent concentration of 0.002 mg/L and an average effluent concentration of 0.001 mg/L.
- **Copper**: A plant removal efficiency of 83.3 percent was calculated using an influent concentration of 0.071 mg/L and an average effluent concentration of 0.012 mg/L.
- **Cyanide**: A plant removal efficiency of 37.5 percent was calculated using an influent concentration of 0.004 mg/L and an average effluent concentration of 0.003 mg/L.
- **Iron**: A plant removal efficiency of 93.8 percent was calculated using an influent concentration of 0.664 mg/L and an average effluent concentration of 0.041 mg/L.
- **Lead**: A plant removal efficiency of 52.0 percent was taken from literature values due to a calculated negative percent removal.
- **Manganese**: A plant removal efficiency of 74.7 percent was calculated using an influent concentration of 0.034 mg/L and an average effluent concentration of 0.009 mg/L.
- **Mercury**: A plant removal efficiency of 99.2 percent was calculated using an influent concentration of 0.0001 mg/L and an average effluent concentration of 0.000001 mg/L.
- **Molybdenum**: A plant removal efficiency of 29.0 percent was taken from literature values due to minimal data.
- **Nickel:** A plant removal efficiency of 44.1 percent was calculated using an influent concentration of 0.0023 mg/L and an average effluent concentration of 0.0013 mg/L.
- **Selenium:** A plant removal efficiency of 62.6 percent was calculated using an influent concentration of 0.0012 mg/L and an average effluent concentration of 0.0004 mg/L.
- **Silver:** A plant removal efficiency of 94.7 percent was calculated using an influent concentration of 0.0003 mg/L and an average effluent concentration of 0.00002 mg/L.
- **Uranium:** A plant removal efficiency of 89.5 percent was calculated using an influent concentration of 0.0005 mg/L and an average effluent concentration of 0.0001 mg/L.
- **Zinc**: A plant removal efficiency of 78.0 percent was taken from literature values due to minimal data.
- **Organics**: Plant removal efficiencies were calculated for Bis(2-ethylhexyl)Phthalate (72.0 percent), Butyl benzyl Phthalate (72.0 percent), Chloroform (84.6 percent), Diethyl Phthalate (72.0 percent), Di-n-butyl Phthalate (72.0 percent), Heptachlor (93.4 percent), Naphthalene (72.0 percent), N-Nitrosodi-n-propylamine (72.0 percent), Toluene (74.4 percent) and HEM (93.7 percent). Literature values were used for Benzene (50.0 percent), Ethylbenzene (89.0 percent), Methylene Chloride (57.0 percent), Phenol (88.0 percent) and Tetrachloroethylene (91.0 percent).

Sufficient data above reporting limits were not available for other POCs for plant removal efficiency calculations; therefore, literature values from EPA's Local Limits Development Guidance Manual (EPA 2004) were used. These values are provided in Appendix B, Tables B1 through B4.

3.3 Calculation of AHLs Based on AZPDES Permit

An effective means of restricting the discharge of pollutants into receiving waters is through an AZPDES permit limit. AZPDES is the permitting system established by the Clean Water Act that regulates the discharge of pollutants into the waters of the United States. Such discharges are prohibited unless an AZPDES permit is issued by EPA or the state. AZPDES permit limits applied to discharges from WRPs are used in the derivation of local limits to prevent pollutant pass-through. Pass-through is defined as a discharge that enters the waters of the United States from a WRP in quantities or concentrations, alone or in complex mixtures, that cause a violation of any requirement of the WRP's AZPDES permit.

The AZPDES permit limit for each POC, if applicable, can be found in the WRPs current AZPDES permit and is commonly expressed in mg/L and/or kilograms per day (kg/d). The Wildcat Hill WRP and Rio de Flag WRP AZPDES permits includes limitations for discharging effluent from the WRP into the receiving stream. Therefore, AHLs are calculated based on the AZPDES permit limits for discharge, as described further below.

3.3.1 Calculation of AHLs Based on Effluent Discharge

Wildcat Hill WRP's AZPDES permit for effluent discharge includes monthly average and/or weekly average discharge limitations for BOD, TSS, E. coli, Total Residual Chlorine, Copper, Cyanide, , Selenium, Oil and Grease and Ammonia Impact Ratio. The permit also includes reporting requirements for temperature, flow, Total Dissolved Solids (TDS), Ammonia and a minimum and maximum for pH. Rio de Flag WRP's AZPDES permit for effluent discharge includes monthly average and/or weekly average discharge limitations for BOD, TSS, E. coli, Total Residual Chlorine, Copper, Ammonia, Ammonia Impact Ratio, Hydrogen Sulfide, and Oil and Grease. The permit also includes reporting requirements for flow, sulfides, temperature, TDS, and a minimum and maximum for pH. EPA recommends that only the more conservative monthly average concentrations be used in calculating AZPDES-based AHLs.

As illustrated in Equation 3-1, an AHL based on an AZPDES permit limit (AHL_{AZPDES}) is the pollutant loading at the AZPDES permitted flow (C_{AZPDES} * Q_{AZPDES}) divided by the fraction of the pollutant not removed by the plant (1 – R_{WRP}).

Equation 3-1 $$AHL_{NPDES} = \frac{(8.34)(C_{AZPDES})(Q_{AZPDES})}{(1-R_{WRP})}$$

Where: $$R_{WPCP} = \frac{\bar{I}_r - \bar{E}_{WPCP}}{\bar{I}_r}$$

and:

AHL_{AZPDES}	= AHL based on AZPDES permit limit, lb/d
C_{AZPDES}	= AZPDES permit limit for effluent discharge, mg/L
Q_{AZPDES}	= AZPDES permitted flow rate for effluent discharge, mgd
R_{WRP}	= Plant removal efficiency from headworks to plant effluent, as decimal
I_r	= WRP influent pollutant concentration at headworks, mg/L
E_{WRP}	= WRP effluent pollutant concentration, mg/L
8.34	= Conversion factor, lb/gal

3.3.1.1 Data Sources and Assumptions

Calculations were performed based on the following components.

3.3.1.1.1 Flow Rates

Permitted Flows from ADEQ Fact Sheets for Wildcat Hill WRP and Rio de Flag WRP were used in this calculation: Q_{AZPDES}, for Wildcat Hill WRP of 6 mgd and for Rio de Flag WRP of 4 mgd. The permitted flow is based on future growth and expansion expected in the coming years.

3.3.1.1.2 Permit Limits

Wildcat Hill WRP and Rio de Flag WRP AZPDES monthly average permit limits for POCs, C_{AZPDES}, are shown in Appendix C, Table C2. The concentration-based limits are identical between the two WRPs.

3.3.1.1.3 Plant Removal Efficiencies

Site-specific removal efficiencies, R_{WRP}, described in Section 3.2 were used in this calculation where possible. When site-specific removal efficiencies were not available, literature values from EPA's *Local Limits Development Guidance Manual* (EPA 2004) were used. These values are provided in Appendix B, Table B1.

3.3.1.2 Calculation Results

The data used and calculation results for the AHLs based on AZPDES permit limits at the Wildcat Hill WRP and Rio de Flag WRP are provided in Appendix C, Table C2. AHLs based on AZPDES permits were calculated only for those pollutants with established permit limits and sufficient data to support the calculations. A summary of AHLs based on AZPDES permit limits is provided in Appendix D, Table D3.

3.4 Calculation of AHLs Based on Water Quality Standards

Acute and chronic WQS established by ADEQ were used to calculate AHLs for the protection of the receiving stream. As illustrated in Equation 3-2, AHLs based on state WQS (AHL_{WQS}) are calculated as the pollutant loading to the water body at the water quality limit [C_{WQS} (Q_{STR} + Q_{WRP})], adjusted for the background loading of the water body (C_{STR} * Q_{STR}), and divided by the fraction of the pollutant not removed by the plant (1 - R_{WRP}).

Equation 3-2

$$AHL_{WQS} = \frac{(8.34)[C_{WQS}(Q_{STR}+Q_{WRP})-(C_{STR}*Q_{STR})]}{(1-R_{WRP})}$$

Where:

AHL_{WQS}	= AHL based on state WQS, lb/d
C_{STR}	= Receiving stream background concentration, mg/L
C_{WQS}	= In-stream state WQS, mg/L
Q_{STR}	= Receiving stream (upstream) flow rate, mgd
Q_{WRP}	= WRP average flow rate, mgd
R_{WRP}	= Plant removal efficiency from headworks to plant effluent, as decimal
8.34	= Conversion factor, lb/gal

3.4.1 Data Sources and Assumptions

AHLs based on WQS were calculated using Equation 3-2. The following data sources and assumptions were used.

3.4.1.1 Receiving Stream Flow Rates

For the AHLs based on acute WQS, Q_{STR} is not based on "1Q10" and "7Q10", due to the Rio de Flag being an effluent dependent water source. The river depends on Wildcat Hill WRP and Rio de Flag WRP flow and therefore average effluent flows (Table A1) were used in the calculations (Appendix D & E, Table D1 & E1).

3.4.1.2 Water Quality Standards

The water use classification for the Rio de Flag is drinking water and recreation. Therefore, sections of the WQS are applicable to the stream per The Arizona Administrative Code Title 18. Environmental Quality, Chapter 11. Department of Environmental Quality - Water Quality Standards:

- In-stream acute and chronic criteria for toxic priority pollutants based on effluent dependent criteria,
- Partial-body Contact (PBC) due to recreation,
- And aquifer water quality standards since water is being discharged to the surface.

3.4.1.2.1 Metals

WQS for metals are reported for the dissolved fraction of the metal. Most metals measurements, however, are reported in the total or total recoverable form. Total and total recoverable metals concentrations are always at least as high as dissolved metals concentrations because a fraction of the metal may be adsorbed onto particulates in the water. Therefore, EPA recommends that WRPs convert dissolved metals WQS into the total metals form before using the standards to calculate water quality-based AHLs. Metals are also often hardness-dependent. The standards must be adjusted according to the hardness of the receiving stream (upstream, in mg/L as calcium carbonate [$CaCO_3$]). The background hardness of the Rio de Flag is 167 mg/L based on the effluent of the Wildcat Hill WRP. Equations 3-3 through 3-22, listed in Table 3-1 below, were used to calculate total recoverable acute and chronic WQS adjusted for stream hardness.

Table 3-1. Recoverable Acute and Chronic WQS for Metals

Metal	Equation No.	Equation
Arsenic	3-3	Acute WQS $_{\text{DISSOLVED}}$ (mg/L) = Not hardness-dependent Acute WQS $_{\text{TOTAL}}$ (mg/L) = Acute WQS $_{\text{DISSOLVED}}$ / CF Where CF = 1.0
	3-4	Chronic WQS $_{\text{DISSOLVED}}$ (mg/L) = Not hardness-dependent Chronic WQS $_{\text{TOTAL}}$ (mg/L) = Chronic WQS $_{\text{DISSOLVED}}$ / CF Where CF = 1.0
Cadmium	3-5	Acute WQS $_{\text{DISSOLVED}}$ (mg/L) = $e^{1.0166(ln(hardness))-3.924} * CF/1000$ Acute WQS $_{\text{TOTAL}}$ (mg/L) = Acute WQS $_{\text{DISSOLVED}}$ / CF Where CF = (1.136672 - [(ln(*hardness*) (0.041838)])
	3-6	Chronic WQS $_{\text{DISSOLVED}}$ (mg/L) = $e^{0.7409(ln(hardness))-4.719} * CF/1000$ Chronic WQS $_{\text{TOTAL}}$ (mg/L) = Chronic WQS $_{\text{DISSOLVED}}$ / CF Where CF = (1.101672 - [(ln(*hardness*) (0.041838)])
Chromium (III)	3-7	Acute WQS $_{\text{DISSOLVED}}$ (mg/L) = $e^{0.819(ln(hardness))+3.7256} * CF/1000$ Acute WQS $_{\text{TOTAL}}$ (mg/L) = Acute WQS $_{\text{DISSOLVED}}$ / CF Where CF = 0.316
	3-8	Chronic WQS $_{\text{DISSOLVED}}$ (mg/L) = $e^{0.819(ln(hardness))+0.6848} * CF/1000$ Chronic WQS $_{\text{TOTAL}}$ (mg/L) = Chronic WQS $_{\text{DISSOLVED}}$ / CF Where CF = 0.86
Chromium (VI)	3-9	Acute WQS $_{\text{DISSOLVED}}$ (mg/L) = Not hardness-dependent Acute WQS $_{\text{TOTAL}}$ (mg/L) = Acute WQS $_{\text{DISSOLVED}}$ / CF Where CF = 1.0
	3-10	Chronic WQS $_{\text{DISSOLVED}}$ (mg/L) = Not hardness-dependent

Table 3-1. Recoverable Acute and Chronic WQS for Metals		
Metal	**Equation No.**	**Equation**
		Chronic WQS $_{TOTAL}$ (mg/L) = Chronic WQS $_{DISSOLVED}$ / CF Where CF = 1.0
Copper	3-11	Acute WQS $_{DISSOLVED}$ (mg/L) = $e^{0.9422(ln(hardness))-1.700} * CF/1000$ Acute WQS $_{TOTAL}$ (mg/L) = Acute WQS $_{DISSOLVED}$ / CF Where CF = 0.960
	3-12	Chronic WQS $_{DISSOLVED}$ (mg/L) = $e^{0.8545(ln(hardness))-1.702} * CF/1000$ Chronic WQS $_{TOTAL}$ (mg/L) = Chronic WQS $_{DISSOLVED}$ / CF Where CF = 0.960
Lead	3-13	Acute WQS $_{DISSOLVED}$ (mg/L) = $e^{1.273(ln(hardness))-1.460} * CF/1000$ Acute WQS $_{TOTAL}$ (mg/L) = Acute WQS $_{DISSOLVED}$ / CF Where CF = (1.46203 - [(ln(*hardness*) (0.145712)])
	3-14	Chronic WQS DISSOLVED (mg/L) = $e^{1.273(ln(hardness))-4.705} * CF/1000$ Chronic WQS TOTAL (mg/L) = Chronic WQS DISSOLVED / CF Where CF = (1.46203 - [(ln(hardness) (0.145712)])
Mercury	3-15	Acute WQS $_{DISSOLVED}$ (mg/L) = Not hardness-dependent Acute WQS $_{TOTAL}$ (mg/L) = Acute WQS $_{DISSOLVED}$ / CF Where CF = 1.0
	3-16	Chronic WQS $_{DISSOLVED}$ (mg/L) = Not hardness-dependent Chronic WQS $_{TOTAL}$ (mg/L) = Chronic WQS $_{DISSOLVED}$ / CF Where CF = 1.0
Nickel	3-17	Acute WQS $_{DISSOLVED}$ (mg/L) = $e^{0.8460(ln(hardness))+2.255} * CF/1000$ Acute WQS $_{TOTAL}$ (mg/L) = Acute WQS $_{DISSOLVED}$ / CF Where CF = 0.998
	3-18	Chronic WQS $_{DISSOLVED}$ (mg/L) = $e^{0.8460(ln(hardness))+0.0584} * CF/1000$ Chronic WQS $_{TOTAL}$ (mg/L) = Chronic WQS $_{DISSOLVED}$ / CF Where CF = 0.997
Silver	3-19	Acute WQS $_{DISSOLVED}$ (mg/L) = $e^{1.72(ln(hardness))-6.59} * CF/1000$ Acute WQS $_{TOTAL}$ (mg/L) = Acute WQS $_{DISSOLVED}$ / CF Where CF = 0.85
	3-20	Chronic WQS $_{DISSOLVED}$ (mg/L) = Not available
Zinc	3-21	Acute WQS $_{DISSOLVED}$ (mg/L) = $e^{0.8473(ln(hardness))+0.884} * CF/1000$ Acute WQS $_{TOTAL}$ (mg/L) = Acute WQS $_{DISSOLVED}$ / CF Where CF = 0.978
	3-22	Chronic WQS$_{TOTAL}$ (mg/L) = $e^{0.8473(ln(hardness))+0.884} * CF/1000$ Chronic WQS $_{TOTAL}$ (mg/L) = Chronic WQS $_{DISSOLVED}$ / CF Where CF = 0.978

3.4.1.3 Upstream Background Concentrations

No background concentrations for the Rio de Flag are provided due to the stream being effluent dependent on the Wildcat Hill WRP and the Rio de Flag WRP.

3.4.1.4 Flow Rates

The Rio de Flag is an effluent dependent water source depending on Wildcat Hill and Rio de Flag WRPs. Average effluent flows (Table A1) were used in the calculations for Wildcat Hill WRP and Rio de Flag WRP.

3.4.2 Calculation Results

The calculations for total recoverable metals standards adjusted for stream hardness are provided in Appendix C, Table C4. The final state WQS for POCs are listed in Appendix C, Table C5. The data and calculation results for the AHLs to ensure compliance with the state and/or federal WQS at the WRP and WRP are provided in Appendix D, Tables D7 and D8. AHLs based on WQS were calculated only for those pollutants with established standards or criteria. A summary of AHLs based on WQS is provided in Appendix D, Table D9.

3.5 Calculation of AHLs Based on Treatment Inhibition

Inhibition-based AHLs were calculated to protect against operational problems for biological treatment processes during secondary and/or tertiary treatment. This inhibition can interfere with a WRPs ability to remove pollutants, including BOD. EPA does not require WRPs to calculate AHLs based on inhibition threshold levels if current loadings are acceptable to the treatment processes. For WRPs, AHLs were calculated to prevent future loadings that may cause inhibition. Although site-specific inhibition data are preferred, literature data are available for use in developing AHLs when there are no current inhibition problems.

3.5.1 Activated Sludge Treatment Inhibition

As illustrated in Equation 3-23, the AHL based on inhibition of activated sludge treatment (AHL_{SEC1}) is calculated by dividing the pollutant loading to the secondary treatment unit at the inhibition criterion (C_{INHIB2} * Q_{WRP}) by the fraction of the pollutant not removed after primary treatment (1 - R_{PRIM}).

Equation 3-23 $$AHL_{SEC} = \frac{(8.34)(C_{INHIB2})(Q_{WRP})}{(1-R_{PRIM})}$$

Where:

AHL_{SEC}	= AHL based on inhibition of activated sludge treatment, lb/d
C_{INHIB2}	= Inhibition criterion for activated sludge treatment, mg/L
Q_{WRP}	= WRP average flow rate, mgd
R_{PRIM}	= Removal efficiency from headworks to primary treatment effluent, decimal
8.34	= Conversion factor, lb/gal

3.5.1.1 Data Sources and Assumptions

AHLs based on activated sludge treatment inhibition were calculated using Equation 3-23. The following data sources and assumptions were used.

Activated Sludge Treatment Inhibition Thresholds. Inhibition threshold levels have been reported at other WRPs, as provided in EPA's *Local Limits Development Guidance Manual* (EPA 2004). These literature-based inhibition threshold levels for nitrification treatment, C_{INHIB2}, are provided in Appendix B, Table B5. Site-specific inhibition threshold levels were not available. Therefore, all inhibition threshold levels are based on literature values. Where the literature provided a range of inhibition thresholds values, the median reported threshold levels (or minimum when there was no median) were used in calculating the AHLs.

Flow Rate, Permitted Flows from ADEQ Fact Sheets for Wildcat Hill WRP and Rio de Flag WRP were used in this calculation: for Wildcat Hill WRP of 6 mgd and for Rio de Flag WRP of 4 mgd. The permitted flow is based on future growth and expansion expected in the coming years.

Primary Removal Efficiencies. Site-specific activated sludge removal efficiencies were not available, literature values from EPA's *Local Limits Development Guidance Manual* (EPA 2004) were used. These values are provided in Appendix B, Table B1.

3.5.1.2 Calculation Results

The data and calculation results for the AHLs to protect against activated sludge treatment inhibition at the WRP are provided in Appendix D (Appendix e for Rio de Flag WRP), Table D4. A summary of AHLs based on activated sludge treatment inhibition is provided in Appendix D, Table D9.

3.5.2 Nitrification Treatment Inhibition

As illustrated in Equation 3-24, the AHL based on inhibition of nitrification treatment (AHL_{TER}) is calculated by dividing the pollutant loading to the secondary treatment unit at the inhibition criterion (C_{INHIB3} * Q_{WRP}) by the fraction of the pollutant not removed after secondary treatment (1 - R_{PRIM}).

Equation 3-24 $$AHL_{TER} = \frac{(8.34)(C_{INHIB3})(Q_{WRP})}{(1-R_{SEC})}$$

Where:

AHL_{TER} = AHL based on inhibition of nitrification treatment, lb/d
C_{INHIB3} = Inhibition criterion for nitrification treatment, mg/L
Q_{WRP} = WRP average flow rate, mgd
R_{PRIM} = Removal efficiency from headworks to primary treatment effluent, decimal
8.34 = Conversion factor, lb/gal

3.5.2.1 Data Sources and Assumptions

AHLs based on nitrification treatment inhibition were calculated using Equation 3-24. The following data sources and assumptions were used.

Nitrification Treatment Inhibition Thresholds. Inhibition threshold levels have been reported at other WRPs, as provided in EPA's *Local Limits Development Guidance Manual* (EPA 2004). Site-specific inhibition threshold levels were not available. Therefore, all inhibition threshold levels are based on literature values. These literature-based inhibition threshold levels for nitrification treatment, C_{INHIB3}, are provided in Appendix B, Table B5. Where the literature provided a range of inhibition thresholds values, the median reported threshold levels (or minimum when there was no median) were used in calculating the AHLs.

Flow Rate. Permitted Flows from ADEQ Fact Sheets for Wildcat Hill WRP and Rio de Flag WRP were used in this calculation: for Wildcat Hill WRP of 6 mgd and for Rio de Flag WRP of 4 mgd. The permitted flow is based on future growth and expansion expected in the coming years.

Secondary Removal Efficiencies. Site-specific removal efficiencies through secondary treatment were not available. Therefore, literature values from EPA's *Local Limits Development Guidance Manual* (EPA 2004) were used. The medians of reported values were used in Equation 3-24 (Appendix B, Table B3).

3.5.2.2 Calculation Results

The data and calculation results for the AHLs to protect against nitrification treatment inhibition at the WRP are provided in Appendix D (Appendix E for Rio de Flag WRP), Table D5. A summary of AHLs based on nitrification treatment inhibition is provided in Appendix D, Table D9.

3.6 Calculation of AHLs Based on Sludge Disposal Regulations

Sludge disposal-based AHLs can be calculated for sludge depending on its end use. For example, sludge may be applied to land to condition the soil or fertilize crops, disposed of in a landfill, or incinerated. As stated earlier, sludge from Wildcat Hill WRP is currently land injected. Currently, ADEQ has implemented a general permit for treatment works treating domestic sewage as biosolids for dedicated land disposal. Property line boundary limits applied are 0 to less than 25 meters for arsenic, total chromium, and nickel. These concentrations are found in Table C3 of Appendix C.

As illustrated in Equation 3-25, the AHL based on sludge regulations (AHL_{SLDG}) is calculated by dividing the pollutant loading of sludge at the sludge standard ($C_{SLDGSTD}$ * Q_{SLDG}) by the overall plant removal efficiency (R_{WRP}).

Equation 3-25 $$AHL_{SLDG} = \frac{(C_{SLDGSTD})(Q_{SLDG})(0.0022)}{(R_{WRP})}$$

Where:

AHL_{SLDG}	= AHL based on sludge regulations, lb/d
$C_{SLDGSTD}$	= Most stringent sludge standard, mg/kg-dry
Q_{SLDG}	= Total sludge flow to disposal, dry metric tons/d
R_{WRP}	= Removal efficiency from headworks to final effluent, decimal
0.0022	= Conversion factor

3.6.1 Data Sources and Assumptions

AHLs based on sludge regulations were calculated using Equation 3-25. The sludge standard used in the equation, $C_{SLDGSTD}$, is the permitted criteria listed in Table C3 of Appendix C. Sludge generated at Rio de Flag WRP is sent to Wildcat Hill WRP. Therefore, the sludge flow to disposal (Q_{SLDG}) is equal to the average flow of dry sludge to disposal of 4.42 tons per day (ton/d) based on data from Wildcat Hill WRP (Appendix A, Table A1).

Sludge for Rio de Flag WRP is sent to Wildcat Hill WRP for processing; therefore, sludge calculations for Rio de Flag WRP were not calculated.

Plant removal efficiencies were applied as discussed in Section 3.3.1.1.

3.6.2 Calculation Results

The data and calculation results for the AHLs based on sludge disposal regulations for the WRP are provided in Appendix D (Appendix E for Rio de Flag WRP), Table D6. A summary of AHLs based on sludge disposal regulations is provided in Appendix D, Table D9.

3.7 Calculation of AHLs Based on Design Criteria

Some pollutants such as ammonia, BOD, and TSS require additional evaluation before MAHLs are established because WRPs are typically designed to treat these pollutants. EPA recommends that WRPs develop AHLs based on design criteria when the WRP begins to operate at 80 to 90 percent of its design capacity for 3 to 6 consecutive months. In addition, if the rate of increase in pollutant loadings suggests that the full capacity of the WRP will be used within 5 to 7 years, then planning to avoid future violations should begin immediately.

As illustrated in Equation 3-26, the AHL based on design criteria (AHL_{DESIGN}) is calculated by multiplying the design criteria (mg/L) by the WRP permitted flow (mgd).

Equation 3-26 $$AHL_{DESIGN} = 8.34 \times DC \times Q_{AZPDES}$$

Where:

AHL_{DESIGN}	= AHL based on design criteria, lb/d
DC	= Design criteria, mg/L
Q_{AZPDES}	= WRP permitted flow rate, mgd
8.34	= Conversion factor, lb/gal

3.7.1 Data Sources and Assumptions

AHLs based on design criteria were calculated using Equation 3-26. The following data sources and assumptions were used.

3.7.1.1 Design Criteria

Wildcat Hill WRP was designed to treat maximum month BOD, TSS, COD, TKN, and ammonia and influent concentrations of 1920 mg/L, 1964, mg/L, 3216 mg/L, 74.0 mg/L, and 121 mg/L, respectively. Rio de Flag WRP was designed to treat maximum month BOD, TSS, COD, TKN, and ammonia influent concentrations of 865 mg/L, 560 mg/L, 545 mg/L, 64 mg/L, and 64 mg/L respectively. The influent design criteria are from calculations made by the City provided in Table C1 (Appendix C) and in Tables D2 and E2 (Appendix D and E).

Flow Rate. Permitted Flows from ADEQ Fact Sheets for Wildcat Hill WRP and Rio de Flag WRP were used in this calculation: Q_{AZPDES}, for Wildcat Hill WRP of 6 mgd and for Rio de Flag WRP of 4 mgd. The permitted flow is based on future growth and expansion expected in the coming years.

3.7.2 Calculation Results

The data and calculation results for the AHLs based on design criteria for the Wildcat Hill WRP and Rio de Flag WRP are provided in Appendix D and E, Table D2 and E2. A summary of AHLs is provided in Appendix D and E, Table D9 and E9.

3.8 Special Cases

The following sections describe the methods for developing local limits for other parameters.

3.8.1 Fats, Oils, and Greases

Fats, oils, and greases (FOG) includes materials of vegetable, animal, and mineral origin. The pretreatment regulations in 40 CFR 403.5(b)(6) prohibit the discharge of “petroleum oil, non-biodegradable cutting oil, or products of mineral oil origin in amounts that will cause interference or pass-through." If treatment inhibition is occurring, WRPs could calculate FOG removal efficiencies, determine FOG inhibition criteria, and determine AHLs based on inhibition.

According to EPA, most WRPs have adopted a limit between 100 and 400 mg/L limit for FOG of animal or vegetable origin as determined by an approved analytical procedure for oil and grease analysis. The City has historically used 152 mg/L multiplied by maximum flow as the local limit for oil and grease. The calculated limits are 1,186 mg/L for Wildcat Hill WRP and 753 mg/L for Rio de Flag WRP. Based on these calculations, the City has decided to increase the limit to 200 mg/L without multiplication by max flow.

3.9 Maximum Allowable Headworks Loadings

Appendix D and E, Table D9 and E9 provide a summary of the AHLs calculated to ensure compliance with each of the environmental criteria: design criteria, AZPDES permit limits, activated sludge treatment inhibition, nitrification treatment inhibition, sludge disposal, and WQS. Appendix D and E, Table D11 and E11 identifies the most stringent AHL for each POC, referred to as the MAHL. This loading is the maximum loading the WRP can accept at the headworks, and it is used to calculate the MAILs and local limits.

EPA recommends that local limits are needed when the current average influent loading of a toxic pollutant exceeds 60 percent of the MAHL or when the maximum daily influent loading of a toxic pollutant exceeds 80 percent of the MAHL any time during the 12-month period preceding the analysis. Equation 3-27 compares WRP loadings based on permitted flow to the calculated MAHLs for individual POCs and can be used to calculate the percentage of the MAHL currently being received at the WRP. The average influent loading was used in this equation for all POCs.

Equation 3-27 $$L_{\%} = \frac{L_{INFL}}{MAHL} * 100$$

Where: $$L_{INFL} = 8.34 \times Q_{WRP} \times PL$$

and:

$L_{\%}$	=	Percentage of MAHL currently utilized, percent
L_{INFL}	=	Current influent loading (average or daily maximum), lb/d
MAHL	=	Calculated MAHL, lb/d
Q_{WRP}	=	WRP average flow rate, mgd
PL	=	Average influent pollutant loading, lb/d
8.34	=	Conversion factor, lb/gal

3.9.1 Data Sources and Assumptions

Average influent and effluent concentrations of conventional pollutants were available for October 2018 through September 2019 (Appendix A, Table A2). Using the average flow rate at the Wildcat Hill WRP and Rio de Flag WRP of 3.69 and 1.81 mgd and the conversion factor 8.34, the average influent concentrations were converted to average influent loadings for use in Equation 3-27.

3.9.2 Calculation Results

Calculated percentages of MAHLs currently received at the Wildcat Hill WRP are provided in Appendix D, Table D11. For those that have been detected, most conventional POCs are below 60 percent of the MAHL (Appendix D, Table D11).

Calculated percentages of MAHLs currently received at the Rio de Flag are provided in Appendix E, Table E11. For those that have been detected, most conventional POCs are below 60 percent of the MAHL (Appendix E, Table E11). Copper is above 60 percent of the MAHL but below 80 percent.

The City has not eliminated any POCs from the evaluation based on current utilizations. Therefore, all POCs included in Table 2-1 were retained for the remainder of the LLE.

3.10 Maximum Allowable Industrial Loadings and Local Limits

The MAIL is the estimated maximum loading of a pollutant that can be received at a WRP's headworks from all permitted industrial users and other controlled sources without causing pass-through or interference. As shown in Equation 3-28, the MAIL is calculated by subtracting estimates of loadings from uncontrolled sources (L_{UNC}), including septic/hauled waste, from a MAHL adjusted with a safety and growth factor (SGF).

Equation 3-28 $$MAIL = MAHL(1 - SGF) - (L_{UNC})$$

Where: $$L_{UNC} = (C_{DOM} \times Q_{DOM} \times 8.34) + (C_{HW} \times Q_{HW} \times 8.34)$$

and:

MAIL	=	Maximum allowable industrial loading, lb/d
MAHL	=	Maximum allowable headworks loading, lb/d
L_{UNC}	=	Loadings from uncontrolled sources, lb/d (uncontrolled sources = domestic/commercial + septic/hauled waste)
SGF	=	Safety and growth factor, decimal, if desired
C_{DOM}	=	Domestic and commercial background levels, mg/L
Q_{DOM}	=	Domestic and commercial flow, mgd
C_{HW}	=	Septic/hauled waste levels, mg/L
Q_{HW}	=	Septic/hauled flow, mgd
8.34	=	Conversion factor, lb/gal

A WRP can then use several basic approaches to assign limits to its controlled or permitted dischargers, including limits based on industrial user contributions of a pollutant, uniform limits for all controlled dischargers, as needed case-by-case, or creative allocation methods. These approaches can vary between WRPs and pollutants. For this LLE, the concentration-based limits methods, described in EPA's *Local Limits Development Guidance Manual* (EPA 2004), were used to calculate local limits. As illustrated in Equation 3-29, this method of allocating MAILs for conservative pollutants yields one concentration-based limit per pollutant (C_{LIM}) that applies to every controlled discharger. In this equation, the calculated MAIL for each pollutant is divided by the total industrial flow rate, Q_{IND}.

Equation 3-29 $$C_{LIM} = \frac{MAIL}{(Q_{IND})(8.34)}$$

Where: $$Q_{IND} = Q_{WRP} - Q_{DOM} - Q_{HW}$$

and:

C_{LIM}	=	Concentration-based local limit, mg/L
MAIL	=	Maximum allowable industrial loading, lb/d
Q_{IND}	=	Total flow rate from industrial sources, mgd
Q_{DOM}	=	Total flow rate from domestic/commercial sources, mgd
Q_{HW}	=	Total flow rate from septic/hauled waste, mgd
Q_{WRP}	=	WRP average flow rate, mgd
8.34	=	Conversion factor, lb/gal

3.10.1 Data Sources and Assumptions

Flow Rates. Average Wildcat Hill WRP flow from domestic and commercial sources (Q_{DOM}) is 3.27 mgd and was calculated by subtracting total industrial flow, 0.394 mgd, (Q_{IND}) and septic/hauled waste flow, 0.018 mgd, (Q_{HW}) from the Wildcat Hill WRP average influent flow rate (Q_{WRP}) of 3.69 mgd (Appendix A, Table A1).

Average Rio de Flag WRP flow from domestic and commercial sources (Q_{DOM}) is 1.47 mgd and was calculated by subtracting total industrial flow, 0.343 mgd, (Q_{IND}) from the Rio de Flag WRP average influent flow rate (Q_{WRP}) of 1.81 mgd (Appendix A, Table A1). There is no septic/hauled waste delivered to the Rio de flag WRP.

Domestic and Commercial Wastewater Background Concentrations. When site-specific domestic/commercial background concentrations of POCs in wastewater were not available, literature values from EPA's *Local Limits Development Guidance Manual* (EPA 2004) were used for domestic and commercial background levels (C_{DOM}) of POCs in wastewater (Appendix B, Table B7).

In cases where C_{DOM} values were not available, and for those pollutants not detected in the plant's influent, C_{DOM} was assumed to be negligible.

Safety and Growth Factor. A safety and growth factor is site-specific and depends on local conditions and incorporates both a safety factor and a growth factor. The main purpose of a safety factor is to address data "uncertainties" that can affect the ability of the WRP to calculate accurate local limits. At a minimum, EPA recommends a 10 percent safety factor. Safety factors can vary between POCs and should depend on the variability of the WRP's data, amount of data the WRP used to develop its MAHLs, quality of the WRP's data, amount of literature data used, history of compliance with the parameter, and potential for industrial user slug loadings (for example, because of a chemical spill or flood event). In addition to the safety factor, a growth factor can be incorporated to account for anticipated growth in the county from present until the local limits will be reevaluated.

A safety factor of 10 percent was used in the evaluation. No additional growth factor was used.

3.10.2 Calculation Results

Appendix D (Appendix E Tables E2-E8 for Rio de Flag WRP), Tables D2 through D8 provide the results of converting commercial/domestic background levels and/or septic/hauled waste concentrations to pollutant loadings from these sources and calculates the AILs. A summary of AILs is provided in Appendix D, Table D10 (E10), and the MAILs are identified in Appendix D, Table D11 (E11). In some cases, the total domestic/commercial loadings for a POC approached or exceeded the MAHL, resulting in a negative MAIL and local limits. In these cases, little or no pollutant loading is available for industrial users. In the case of negative MAILs, the domestic/commercial background concentrations were used as the industrial local limits. The calculated MAILs were then used to calculate industrial local limits, which are also summarized in Appendix D Table D11 (E11).

3.10.3 Worker Safety and Protection

The safety and protection of the WRP workers are also considered in an LLE. In 1990, EPA issued guidance for reactive and gas/vapor-toxic discharges to WRPs for the purpose of protecting WRP workers. This guidance requires WRPs to identify and control potential exposures to substances in industrial wastewaters that are reactive or that create toxic gases and vapors.

The City has implemented a ban on these substances in the Flagstaff Municipal Code in section 7-02-001-0007.B.7 and 9 Prohibited Substances.

3.10.3.1 Data Sources and Assumptions

Worker Protection Screening Levels for fume toxicity and for explosivity are available in EPA's *Local Limits Development Guidance Manual* (EPA 2004). Similar screening levels are found in EPA's *Guidance to Protect POTW Workers from Toxic and Reactive Gases and Vapors* (EPA 1992). These values are provided in Appendix C Tables C6 and C7. For the organic POCs evaluated, Worker Protection Screening Level was not applied.

3.10.4 Domestic and Commercial Background Concentrations

In some cases, the total domestic and commercial loadings for a POC approached or exceeded the MAHL, resulting in a negative MAIL and local limits. In these cases, little or no pollutant loading is available for industrial users. This situation may arise in part because some of the facilities considered "uncontrollable" are commercial facilities such as gas stations, radiator repair shops, car washes, or hospitals, which may discharge high levels of pollutants. The WRP may need to evaluate the sources it considers uncontrollable to see if some of them would be better classified as controlled sources with reducible pollutant loadings. There were no negative MAIL or local limits calculated in this evaluation.

3.10.4.1 Data Sources and Assumptions

There were no negative MAIL or local limits calculated in this evaluation.

3.10.5 Calculation Results

Since the municipal code covers worker protection and there were no negative calculated local limits, there are no results included in Tables D11 and E11.

3.11 Summary

The calculated and proposed local limits that apply to all non-domestic dischargers to the Wildcat Hill WRP and Rio de Flag WRP are discussed below. Based on this comprehensive evaluation, influent loadings below the proposed limits are not expected to cause interferences with treatment processes at the Wildcat Hill WRP and Rio de Flag WRP.

3.11.1 Conventional Pollutants

The following local limits were developed for conventional pollutants:

- **Ammonia:** For Wildcat Hill WRP- The calculated local limit of 1,472 mg/L is based on the most stringent design criteria limit of 121 mg/L. Based on this criterion, the MAHL is 6,055 lb/d with an 18.9 percent current utilization. For Rio de Flag WRP- The calculated local limit of 576 mg/L is based on the most stringent design criteria limit of 64 mg/L. Based on this criterion, the MAHL is 2,135 lb/d with a 27.8 percent current utilization. The local limit will stay at 173 mg/L per the City's request for nitrogen-based limits. Total nitrogen will be removed from the local limits and Ammonia, TKN, and Nitrate/Nitrite as N will be added in its place.
- **Biological oxygen demand:** For Wildcat Hill WRP- The calculated local limit of 23,925 mg/L is based on the design criteria of 1,920 mg/L. Based on this criterion, the MAHL is 96,077 lb/d with a 22.3 percent current utilization. For Rio de Flag WRP- The calculated local limit of 7,849 mg/L is based on the design criteria of 865 mg/L. Based on this criterion, the MAHL is 28,856 lb/d with a 19.2 percent current utilization. The City has requested the BOD limit be based on mass-based calculations. The mass-based was calculated per each SIU in Table 3-2 with a maximum allowable loading of 2,990 lbs/day based on Joy Cone Company. The maximum actual loading from a SIU is 921 lbs/day based on Joy Cone Company. Per a discussion with the City and to protect the treatment plants, a mass-based local limit of 700 lbs/day will be recommended for all SIUs unless

otherwise defined in individual industry discharge permits upon completion of SIU rate studies. The potential for excursion exists with Joy Cone Company and Wis-Pak Bottling. This is discussed further in Section 3.12.

Table 3-2. Mass-based Loading Calculations for BOD		
Industry	Actual Average Loading (lb/d)	Mass-Based Local Limit Calculated (lb/d)
Flagstaff Medical Center	140	456
Joy Cone Company	921	2990
Mission Linen	55	179
Mother Road Brewing (not regulated)	408	1326
Nestle	412	1338
Northern Arizona University	319	1036
W.L. Gore	86	279
Wis-Pak Bottling	892	2896

- **Chemical oxygen demand:** For Wildcat Hill WRP- The calculated local limit of 44,098 mg/L is based on the design criteria of 3216 mg/L. Based on this criterion, the MAHL is 160,929 lb/d. For Rio de Flag WRP- The calculated local limit of 5,719 mg/L is based on the design criteria of 545 mg/L. Based on this criterion, the MAHL is 18,181 lb/d. There is no local limit recommended at this time due to less than 1% of the MAIL currently in use.
- **Total suspended solids:** For Wildcat Hill WRP- The calculated local limit of 25,192 mg/L is based on the design criteria of 1,964 mg/L. Based on this criterion, the MAHL is 98,279 lb/d with a 21.1 percent current utilization. For Rio de Flag WRP- The calculated local limit of 4,988 mg/L is based on the design criteria of 560 mg/L. Based on this criterion, the MAHL is 18,682 lb/d with a 22.7 percent current utilization. The City has requested the TSS limit be based on mass-based. The mass-base was calculated per each SIU with a maximum allowable loading of 2,280 lbs/day based on Northern Arizona University. The maximum actual loading from a SIU is 253 lbs/day based on Northern Arizona University. Per a discussion with the City and to protect the treatment plants, a mass-based local limit of 130 lb/day will be recommended for all SIUs unless otherwise defined in individual industry discharge permits upon completion of SIU rate studies.

Table 3-3. Mass-based Loading Calculations for TSS		
Industry	Actual Average Loading (lb/d)	Mass-Based Local Limit Calculated (lb/d)
Flagstaff Medical Center	79	716
Joy Cone Company	23	206
Mission Linen	18	166
Mother Road Brewing (not regulated)	120	1086
Nestle	51	459
Northern Arizona University	253	2280
W.L. Gore	124	1122
Wis-Pak Bottling	25	228

If additional loading or changes to loadings are applied to the Wildcat Hill WRP or Rio de Flag WRP, a new LLE will need to be completed to assess if pollutant limits will need to be revised.

3.11.2 Inorganic Pollutants

For the current evaluation, the receiving stream's hardness was assumed at 167 mg/L, based on the effluent average from Wildcat Hill WRP Bench Sheets provided by the City.

A total of 25 inorganic POCs were evaluated in this LLE. These sixteen (16) POCs, antimony, barium, beryllium, boron, cadmium, trivalent chromium, hexavalent chromium, total chromium, fluoride, iron, manganese, molybdenum, nickel, thallium, and uranium, had local limits calculated; however, the percent of the MAHL and MAIL for each POC were less than 10% utilized. No local limits are required for these POCs.

The following Inorganic POCs were evaluated in greater detail:

- **Arsenic:** For Wildcat Hill WRP- The calculated local limit of 0.181 mg/L is based on sludge disposal of limit of 30 mg/kg. For Rio de Flag WRP- The calculated local limit of 0.440 mg/L is based on the chronic water quality standard of 1.26 mg/L. The Arsenic local limit is recommended to lower from 0.31 mg/L to 0.18 mg/L.
- **Bromide:** The recommended local limit of 0.50 mg/L is based on laboratory reporting limits. This local limit increases from 0.05 mg/L which is unachievable for laboratories to report to. The Bromide limit is kept due to the possibility of an increase in TTHM formation.
- **Copper:** For Wildcat Hill WRP- The calculated local limit of 0.412 mg/L is based on the site-specific standard of 0.018 mg/L. For Rio de Flag WRP- The calculated local limit of 0.273 mg/L is also based on the site-specific standard of 0.018 mg/L . Per a discussion with the City, a limit of 0.20 mg/L will be recommended which will increase from the previous 0.15 mg/L limit.
- **Cyanide:** For Wildcat Hill WRP- The calculated local limit of 0.104 mg/L is based on the chronic water quality standard of 0.82 mg/L. For Rio de Flag WRP- The calculated local limit of 0.104 mg/L is based on the chronic water quality standard of 0.299 mg/L. Since the MAIL loading is less than 20% and per a discussion with the City, the current limit of 0.24 mg/L will be recommended.
- **Lead:** For Wildcat Hill WRP- The calculated local limit of 0.373 mg/L is based on the chronic water quality standard of 1.23 mg/L. For Rio de Flag WRP- The calculated local limit of 0.076 mg/L is based on the chronic water quality standard of 0.217 mg/L. Per a discussion with the City, the limit will be raised for 0.08 mg/L from the 2015 limit of 0.04 mg/L.
- **Mercury:** For Wildcat Hill WRP- The calculated local limit of 0.006 mg/L if based on the chronic water quality standard of 0.043 mg/L. For Rio de Flag WRP- The calculated local limit of 0.008 mg/L if based on the chronic water quality standard of 0.023 mg/L. Since the MAIL loading is less than 2% and per a discussion with the City, the current limit of 0.017 mg/L will be recommended.
- **Selenium:** For Wildcat Hill WRP- The calculated local limit of 0.063 mg/L is based on the chronic water quality standard of 0.419 mg/L. For Rio de Flag WRP- The calculated local limit of 0.025 mg/L is based on the chronic water quality standard of 0.103 mg/L. Per a discussion with the City, the current limit of 0.015 mg/L will be recommended.
- **Silver:** For Wildcat Hill WRP- The calculated local limit of 2.03 mg/L is based on the acute water quality standard of 6.68 mg/L. For Rio de Flag WRP- The calculated local limit of 1.15 mg/L is based on the acute water quality standard of 3.30 mg/L. The 2015 local limits evaluation recommended that no limit was needed. The industrial loading is below 1%, and it is recommended that the silver limit be removed from the local limits.
- **Zinc:** For Wildcat Hill WRP- The calculated local limit of 6.81 mg/L, based on the acute state water quality standard of 22.4 mg/L. For Rio de Flag WRP- The calculated local limit of 4.85 mg/L, based

on the acute state water quality standard of 13.9 mg/L. Per a discussion with the City, the current limit of 1.4 mg/L will be recommended. After a discussion with industries, the limit was increased to 3.0 mg/L.

3.11.3 Organic Pollutants

Based on the initial screening for POCs, organic pollutants were added to the evaluation based on their detection in the plant's influent or effluent scans, or an industrial user's effluent, and if there is an applicable criterion on which to base a defensible local limit. MAHLs, MAILs, and local limits were calculated for these parameters.

A total of 19 organic POCs were evaluated in this LLE. The twelve (12) POCs, bis(2-ethylhexyl)phthalate, butyl benzyl phthalate, 1,4-dichlorobenzene, diethyl phthalate, di-n-butyl phthalate, ethylbenzene, chloromethane, heptachlor, naphthalene, N-nitrosodi-n-propylamine, phenol, and tetrachloroethylene, had local limits calculated; however, the percent of the MAHL and MAIL for each POC were less than 20% utilized. No local limits are required for these POCs.

The following Organic POCs were evaluated in greater detail:

- **Benzene:** For Wildcat Hill WRP- The calculated local limit of 0.167 mg/L is based on the chronic state water quality standard of 0.550 mg/L. For Rio de Flag WRP- The calculated local limit of 0.067 mg/L is based on the chronic state water quality standard of 0.192 mg/L. The MAHL is below 2% and there is no industrial loading for both plants. It is recommended that the benzene limit be removed from the local limits.
- **Bromodichloromethane:** For Wildcat Hill WRP- The calculated local limit of 313 mg/L is based on the chronic state water quality standard of 1,027 mg/L. For Rio de Flag WRP- The calculated local limit of 126 mg/L is based on the chronic state water quality standard of 359 mg/L. Per a discussion with the City, it is recommended that this limit will be removed, and one limit for TTHMs will be kept.
- **Bromoform:** The calculated local limit of 167 mg/L is based on the chronic state water quality standard of 550 mg/L. For Rio de Flag WRP- The calculated local limit of 67.3 mg/L is based on the chronic state water quality standard of 192 mg/L. Per a discussion with the City, it is recommended that this limit will be removed, and one limit for TTHMs will be kept.
- **Chloroform:** The calculated local limit of 32 mg/L is based on the chronic state water quality standard of 105 mg/L. For Rio de Flag WRP- The calculated local limit of 39.3 mg/L is based on the chronic state water quality standard of 112 mg/L. Per a discussion with the City, it is recommended that this limit will be removed, and one limit for TTHMs will be kept.
- **Dibromochloromethane:** The calculated local limit of 313 mg/L is based on the chronic state water quality standard of 1027 mg/L. For Rio de Flag WRP- The calculated local limit of 126 mg/L is based on the chronic state water quality standard of 359 mg/L. Per a discussion with the City, it is recommended that this limit will be removed, and one limit for TTHMs will be kept.
- **Total Trihalomethanes (TTHMs):** In place of bromodichloromethane, bromoform, chloroform, and dibromochloromethane, one local limit for TTHMs is recommended. Per a discussion with the City, the current limit of 0.32 mg/L will be recommended.
- **Methylene Chloride:** There is no loading for methylene chloride calculated for Wildcat Hill WRP and Rio de Flag WRP. Per a discussion with the City, it is recommended that the local limit be removed from the local limits.
- **Toluene:** For Wildcat Hill WRP- The calculated local limit of 5.78 mg/L is based on the chronic state water quality standard of 19.0 mg/L. For Rio de Flag WRP- The calculated local limit of 4.72 mg/L is based on the chronic state water quality standard of 13.5 mg/L. Per a discussion with the City, the current limit of 0.14 mg/L will be recommended.

3.11.4 Other Pollutants

The following local limits were developed for other pollutants:

- **Total Kjeldahl Nitrogen:** For Wildcat Hill WRP- The calculated local limit of 1,015 mg/L is based on the design criteria of 74 mg/L. Based on this criterion, the MAHL is 3,703 lb/d with a 48 percent current utilization. For Rio de Flag WRP- The calculated local limit of 672 mg/L is based on the design criteria of 64 mg/L. Based on this criterion, the MAHL is 2,135 lb/d with a 32 percent current utilization. Per a discussion with the City, a limit of 173 mg/L will be recommended. Total nitrogen will be removed from the local limits and Ammonia, TKN, and Nitrate/Nitrite as N will be added in its place.
- **Nitrate/Nitrite as N:** For Wildcat Hill WRP- The calculated local limit of 1,218 mg/L is based on the chronic state water quality standard of 1,024 mg/L. For Rio de Flag WRP- The calculated local limit of 66 mg/L is based on the chronic state water quality standard of 188 mg/L. Per a discussion with the City, a limit of 10 mg/L will be recommended based on the WQS of 10 mg/L. Total nitrogen will be removed from the local limits and Ammonia, TKN, and Nitrate/Nitrite as N will be added in its place.
- **Oil & Grease:** For Wildcat Hill WRP -The calculated local limit of 1,186 mg/L is based on AZPDES Permit Limits of 3896 mg/L. For Rio de Flag WRP- The calculated local limit of 753 mg/L is based on AZPDES Permit Limits of 2,156 mg/L. Per a discussion with the City, the limit will be raised from the 2015 LL of 152*Qmax mg/L to 200 mg/L. The limit of 200 mg/L is lower than the calculated limits and will better protect the City.
- **Sulfide:** For Wildcat Hill WRP -The calculated local limit of 231 mg/L is based on the Activated Sludge Treatment Inhibition of 759 mg/L. For Rio de Flag WRP- The calculated local limit of 131 mg/L is based on the Activated Sludge Treatment Inhibition of 373 mg/L. Per a discussion with the City, the limit will be raised from the 2015 LL of 4.5 mg/L to 5 mg/L. The limit of 5 mg/L is lower than the calculated limits and will better protect the City.
- **Aldrin:** In the 2015 LLE, aldrin was prohibited. Aldrin will now be included in the Municipal Code with the other prohibited pesticides and will be removed from the LLE.
- **pH:** In the 2015 LLE, pH was changed to above 6.5 and below 11 s.u. The City has decided to increase the range to 6 to 11 s.u. This lower pH is still above EPA recommended lower limit of 5 s.u. and will still keep the treatment plants protected.

3.12 Beneficial COD

Per request of the City, Brown and Caldwell has reviewed the Boulder Colorado Ordinance 8355 provided by the City of Flagstaff, AZ on beneficial COD. The document updates rules on COD loading: if any permittee measures a floc-filtered COD (ffCOD)/COD ratio of 80% or higher they will not have to pay the COD fee. Since the City is not recommended to have a COD local limit, after further review, a change could be implemented in place of or with the BOD local limit suggested in this Study.

There are two SIUs that could benefit from an implementation of this rule to the City: Joy Cone Company and Wis-Pak Bottling. Both SIUs have readily degradable COD due to the high amounts of sugar in their processes. Since the City has chosen to recommend the BOD limit of 700 lb/d and both SIUs will be above that limit, this would prevent the penalization of the SIUs.

Floc-filtered COD means small and soluble molecules can be separated from the remaining fraction through a flocculation-filtration protocol. Both Wildcat Hill WRP and Rio de Flag WRP could benefit from ffCOD during the treatment process; however, there are a few potential concerns for high ffCOD:

1. With a high F/M ratio and a low SRT, bulking and foaming can occur.

2. With high COD uptake and limited oxygenation, this can create an unwanted anoxic zone and possible septicity.
3. With limited hydraulic retention time, partial nitrification can develop and risk nitrite in the effluent.

Given the current loading of BOD and the role of beneficial COD, Brown and Caldwell believes that a similar program could be implemented for the City of Flagstaff, AZ. However, additional investigation is recommended to determine the effectiveness of the ffCOD ratio prior to implementation. Assistance with calculating, sampling, and developing an ordinance can be provided under a separate task order upon request. Since Joy Cone Company and Wis-Pak Bottling will not be able to meet the new BOD limit of 700 lb/d, it is recommended that the BOD limit not be implemented until the rate study can be performed.

Section 4

Industrial Allocations

This section describes the methodologies used to allocate the MAILs to the permitted industries.

4.1 Introduction

A WRP has several options available for applying limits to its controllable sources, including permitted industries. Limits can be applied as concentration-based limits (typically in mg/L) or mass-based limits (typically in lb/day), or both. The type of limit is in part dependent on the type of method used by the WRP to allocate the MAILs among the dischargers. There are several methods commonly used to allocate limits.

The uniform method of allocating MAILs is a very commonly used method that yields one limit per pollutant that applies to all IUs regardless of size, permitted flow, or discharge. This method is not always preferred, since some IUs that do not discharge the pollutant may be given an allocation of the MAIL that they may not need whereas other IUs that do discharge that same pollutant may have to pretreat to comply with the uniform local limit.

Two additional methods of allocating MAILs among IUs are flow-based or mass-based limits. Flow-based limits are based on the permitted flows of each IU, whereas the mass-based limits are based on the proportion of the discharger's loadings to the total influent loadings at the WRP.

Finally, a WRP may set limits specific to each IU on a case-by-case basis. This type of allocation allows the WRP personnel to use their knowledge of each IU discharge in conjunction with their own judgment in setting limits. This method can be used in conjunction with either flow-based or mass-based limits.

4.2 Allocations of MAILs

For this evaluation, industrial limits were allocated to the IU's using a combination of flow basis and case-by-case basis. Once the MAIL for each pollutant was calculated, it was distributed between current and future potential industries.

Equation 5.1 was used to calculate flow-based allocations of the MAILs.

Equation 5.1 $$ALLOC_{PP} = (MAIL) - (L_{FUTURE})$$

Where: $$L_{FUTURE} = (MAIL) \times (F_{FUTURE})$$

and:

$ALLOC_{PP}$ = Portion of the MAIL allocated to SIUs, lb/day
MAIL = Maximum allowable industrial loading, lb/day
L_{FUTURE} = Amount of loading allocated to future potential industries, lb/day
F_{FUTURE} = Fraction of MAIL to be allocated to future potential industries, decimal

4.2.1 Data Sources and Assumptions

The permitted industrial flow was based on the division of flows to Wildcat Hill WRP and Rio de Flag WRP. The flow used for calculations was 0.394 mgd for Wildcat Hill WRP and 0.343 mgd for Rio de Flag WRP.

Average effluent concentrations of conventional pollutants and priority pollutants from IU's are provided upon request. Current IU discharging to the Wildcat Hill WRP and Rio de Flag WRP are Flagstaff Medical Center, Joy Cone Company, Mission Linen, Nestle, Northern Arizona University, WL Gore and Wis-Pak. Mother Road Brewing was also included in the calculations as requested by the City. Mother Road Brewing is currently not a SIU.

4.2.2 Calculation Results

The data and calculation results for the allocations of industrial loadings to IU's are provided in Appendix D and F. The allocated loadings to current and future potential industries at Wildcat Hill WRP and Rio de Flag WRP is summarized in Section 7.

4.3 Summary

Concentration-based permit limits were developed for IU's for discharge to Wildcat Hill WRP and Rio de Flag WRP with the exception of BOD and TSS which are mass-based. The permit limits for the Wildcat Hill WRP and Rio de Flag WRP are summarized in Section 7.

Section 5

Protection to the Collection System

This section describes the method to protect the health and safety of the collection system.

5.1 Introduction

The Local Limits Guidance document provided by the USEPA address multiple collection system concerns: fires and explosions, corrosion, flow obstructions, temperature, and toxic gases, vapors, and fumes.

5.1.1 Fires and Explosions

General Pretreatment Regulations prohibit the discharge of pollutants that will create a fire or explosion. The City has already adopted the prohibition of the following:

Any liquids, solids, or gases which by reason of their nature or quantity could be sufficient, either alone or by interaction with other substances, to cause injury to the POTW from fire or explosion. At no time shall two (2) successive readings on an explosion hazard meter at the point of discharge to the POTW be more than five percent (5%), nor shall any single reading be over ten percent (10%) of the Lower Explosive Limit (LEL) of the meters. Prohibited materials include, but are not limited to: Gasoline, kerosene, naphthalene, trichloroethylene, xylene, ethers, alcohols, ketones, aldehydes, peroxides, chlorates, perchlorates, bromates, carbides, hydrides and sulfides, waste streams with a closed cup flash point of less than one hundred forty degrees Fahrenheit (140 °F) or sixty degrees Centigrade (60 °C) using the test methods specified in 40 CFR 261.21. (Ord. 1693, 5/7/91)

5.1.2 Corrosion

General Pretreatment Regulations prohibit the discharge of pollutants that will cause corrosive structural damage to the Collection system and treatment facilities. The City has already adopted the prohibition of the following:

Any substance that can cause corrosive damage to the POTW or collection system and any substance with a pH of less than 6.5 standard units (s.u.) or greater than 11.0. s.u.

Other corrosive pollutants have been addressed in Section 3 of this report: sulfide, nitrate/nitrite, suspended solids, and organic compounds.

Per a discussion with the City, the pH will change to 6.0 to 11 s.u.

5.1.3 Flow Obstruction

General Pretreatment Regulations prohibit the discharge of pollutants obstruct the flow to a treatment facility. The City has already adopted the prohibition of the following:

Any water which contains a solid or viscous substance which could obstruct the flow in the collection system or interfere with the POTW. (Ord. 1989, 1/19/99)

Any particles greater than one-half inch (1/2") in any dimension, animal tissues, manure, ashes, cinders, sand, metal, glass, straw, paper, wood, plastics, gas, tar, asphalt and grinding wastes. (Ord. 1896, 11/21/95)

A main threat of obstruction in collection systems and treatment facilities are fats, oils, and grease. A local limit has been discussed in Section 3 of this report at 200 mg/L.

5.1.4 Temperature

General Pretreatment Regulations prohibit of heat discharge that will result in treatment interference. The City has already adopted the prohibition of the following:

Any liquid or vapor which causes the temperature entering the POTW to exceed one hundred four degrees Fahrenheit (104 °F) forty degrees Centigrade (40 °C) or any liquid or vapor with a temperature greater than one hundred sixty degrees Fahrenheit (160 °F) seventy-one degrees Centigrade (71°C). (Ord. 1693, 5/7/91) .

5.1.5 Toxic Gases, Vapors, and Fumes

General Pretreatment Regulations prohibit the discharge of pollutants that lead to the accumulation of toxic gases, vapors, or fumes in the POTW in sufficient quantity to cause acute worker health and safety problems. The City has already adopted the prohibition of the following:

Any toxic or radioactive substance in sufficient quantity to interfere with the POTW or collection system or to create a health or environmental hazard.

Any noxious or malodorous liquid, gas or solid which creates a public nuisance, health or environmental hazard, or inhibits entry into any part of the City's wastewater system for maintenance or monitoring.

5.1.6 Other Controls

Other controls have been adopted by the City to protect the treatment facilities:

Any substance that interferes with the POTW or wastewater collection system.

Any substance requiring unusual attention or expense of the City unless specifically authorized. Compensatory payments shall be determined by the City to be paid by Permitee as a result of contributing any such specifically authorized substance.

Any water with a volume greater than twenty (20) GPM containing dyes, inks or other color causing substances that change the typical color in the City's wastewater collection system.

Any substance, causing a hazard to health or to the environment. Petroleum oil, non-biodegradable cutting oil or products of mineral oil origin in amounts that will cause interference or pass through. (Ord. 1693, 5/7/91)

Any trucked or hauled pollutants, except at discharge points designated by the POTW. (Ord. 1693, 5/7/91)

Any combination of substances contributed by one or more users, which results in any of the above situation

The following pesticides are expressly prohibited from discharge into the City sewer system: 4,4'-DDD; 4,4'-DDE; 4,4'-DDT; and Heptachlor. (Ord. 1693, Amended, 05/07/1991; Ord. 1896, Amended, 11/21/1995; Ord. 1958, Amended, 10/07/1997; Ord. 1989, Amended, 01/19/1999; Ord. 2002-08, Amended, 07/16/2002; Ord. 2007-23, Amended, 03/20/2007; Ord. 2015-09, Amended, 06/02/2015; Ord. 2018-32, Amended, 12/04/2018. Formerly 7-02-001-00009).

5.1.7 Recommendations

Brown and Caldwell recommends keeping the adopted rules to continue to protect the collection system and treatment facilities. The City has indicated that Aldrin, listed on the 2015 LL as prohibited will be added to the list of prohibited pesticides and will be removed from the local limits.

Section 6

Future Sampling Recommendations

Outlining a sampling plan for local limits evaluation is not required by 403 regulations; however, the EPA highly recommends that a treatment facility develop a sampling program to ensure that it has adequate data for developing and maintaining local limits. A sampling program can also enable a treatment facility to use fewer resources for evaluating local limits by providing the data necessary to determine and justify that local limits are not necessary for some pollutants and by enabling the treatment facilities to manage its data and ensure that unnecessary sampling is not performed.

A sampling plan will aid in the periodic reevaluation of the local limits to ensure protection or determine if a revision is necessary.

Multiple points of sampling must be established and sampled on a periodic based to ensure proper data analysis and evaluation of local limits. At a minimum, BC recommends sampling at these locations for all local limit parameters and any other POCs the City wishes to monitor or investigate:

1. Influent: sampled monthly
2. Effluent: sampled monthly
3. Sludge: sampled quarterly, at a minimum
4. Collection system (one or more points): sampled annually, at a minimum
5. Septic and Hauled Waste Stream: sampled annually, at a minimum
6. All Significant Industrial Users: sampled per Permit Requirements, at a minimum
7. Non-regulated Industrial Users: sampled as needed

With this data, it is recommended to calculate MAHLs and MAILs annually to ensure protection and proper function of the treatment facilities.

A specific and detailed sampling plan and system to manage data can be provided under a separate task order upon request.

Section 7

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
Conventional pollutants					
Ammonia (as N)	173[b]	1,472	576	173	City Decision to Remain Unchanged
Biochemical Oxygen Demand[c]	1,000	23,925	7,849	700 lb/d	Mass-based Calculation
Total Suspended Solids[c]	1,200	25,192	4,988	130 lb/d	Mass-based Calculation
Kjeldahl Nitrogen, Total (TKN)	173[b]	1,015	672	173	City Decision to Remain Unchanged
Inorganic Pollutants					
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
Organic Pollutants					
TTHMs [a]	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
Other Pollutants					
Oil and Grease	152*Qmax	1,186	753	200	City Decision to Lower
Nitrate/Nitrite as N	173[b]	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

[a] 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.
[b] 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.
[c] 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.

Section 8

Limitations

This document was prepared solely for the City of Flagstaff, AZ in accordance with professional standards at the time the services were performed and in accordance with the Agreement for General Engineering Services between the City of Flagstaff, AZ and BC dated October 3, 2019 and the Notice to Proceed dated October 19, 2019. This document is governed by the specific scope of work authorized by the City of Flagstaff, AZ ; it is not intended to be relied upon by any other party except for regulatory authorities contemplated by the scope of work. We have relied on information or instructions provided by the City of Flagstaff, AZ and other parties and, unless otherwise expressly indicated, have made no independent investigation as to the validity, completeness, or accuracy of such information.

Section 9

References

Arizona Administrative Code, December 19, 2017, *Title 18. Environmental Quality, Chapter 11. Department of Environmental Quality - Water Quality Standards.*

Arizona Department of Environmental Quality, December 24, 2013, ADEQ Permit No: AZGP2013-001, Biosolids for Land Application, effective December 24, 2013, expires December 23, 2018.

Arizona Department of Environmental Quality, May 19, 2015, *AZPDES Permit No. AZ0020427, Wildcat Hill Wastewater Treatment Plant,* effective May 19, 2015, expires May 18, 2020.

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United States Environmental Protection Agency, 2012, *Controlling Fats, Oils, and Grease Discharges from Food Services Establishments,* EPA-833-F-12-003.

United States Environmental Protection Agency, 2017, *Water Quality Standards Handbook, Chapter 3: Water Quality Criteria,* EPA-823-B-17-001.

Appendix A: Wildcat Hill WRP and Rio de Flag WRP Data

Table A1. Flow Summary for City of Flagstaff Industrial Pretreatment Program: Local Limits Evaluation City of Flagstaff											
Date	Wildcat Hill WRP						Rio de Flag WRP				
	Influent Flow (mgd)		Effluent Flow (mgd)		Sludge to Disposal		Influent Flow (mgd)		Effluent Flow (mgd)		Sludge to Wildcat
	Monthly Average	Monthly Maximum	Monthly Average	Monthly Maximum	Monthly Average (gallons/day)	Monthly Average (dry tons/day)	Monthly Average	Monthly Maximum	Monthly Average	Monthly Maximum	Average WAS (mgd)
Oct-18	3.77	5.86	3.78	5.98	35,290	3.97	1.87	2.00	1.57	1.73	0.065
Nov-18	3.32	3.76	3.23	4.52	35,333	3.98	1.75	1.83	0.46	1.24	0.068
Dec-18	3.17	3.69	3.08	3.69	34,419	3.88	1.79	1.90	0.52	1.58	0.070
Jan-19	3.44	4.35	3.35	4.60	37,452	4.22	1.82	2.00	0.97	1.79	0.071
Feb-19	4.57	8.12	4.84	10.42	39,643	4.46	1.63	1.96	1.21	1.72	0.052
Mar-19	5.27	8.55	5.50	8.78	42,387	4.77	1.95	2.19	1.52	1.77	0.049
Apr-19	3.72	4.20	3.59	4.15	40,033	4.51	1.90	2.13	0.65	1.24	0.046
May-19	3.66	4.53	3.51	4.49	37,484	4.22	1.88	2.00	0.78	1.29	0.051
Jun-19	3.31	3.98	3.12	4.12	44,567	5.02	1.79	1.86	0.33	1.00	0.043
Jul-19	3.22	3.54	3.05	3.49	38,452	4.33	1.69	1.90	0.25	0.96	0.045
Aug-19	3.29	3.79	3.21	3.82	44,032	4.96	1.82	1.87	0.45	0.99	0.016
Sep-19	3.48	3.92	3.44	4.49	42,200	4.75	1.83	1.87	0.35	0.93	0.014
Averages	3.69	4.86	3.64	5.21	39,274	4.42	1.81	1.96	0.75	1.35	0.05
Maximum	5.27	8.55	5.50	10.42	44,567	5.02	1.95	2.19	1.57	1.79	0.07
Minimum	3.17	3.54	3.05	3.49	34,419	3.88	1.63	1.83	0.25	0.93	0.01

To calculate Dry tons/day an Average Percent Total Solids of 2.7% was used

WAS - Waste Activated Sludge

MGD - Million Gallons per Day

Table A2. Influent and Effluent Summary for Conventional Pollutants for Wildcat Hill WRP & Rio de Flag WRP
Industrial Pretreatment Program: Local Limits Evaluation
City of Flagstaff, AZ

Wildcat Hill WRP

Date	Influent BOD (mg/L)		Effluent BOD (mg/L)		Influent TSS (mg/L)		Effluent TSS (mg/L)	
	Monthly Average	Monthly Maximum	Monthly Average	Monthly Maximum	Monthly Average	Monthly Maximum	Monthly Average	Monthly Maximum
Oct-18	559	832	3.44	4.00	508	740	*0.50*	1.00
Nov-18	654	762	3.75	4.00	434	553	*0.50*	*0.50*
Dec-18	670	832	3.86	5.00	617	1141	1.00	1.00
Jan-19	708	853	4.00	5.00	600	724	0.89	2.00
Feb-19	479	742	4.63	5.00	423	637	1.25	2.00
Mar-19	450	960	5.50	6.00	416	712	1.25	3.00
Apr-19	563	813	3.07	4.00	779	1964	0.38	1.00
May-19	778	1530	3.63	4.00	853	1451	0.40	3.00
Jun-19	888	1220	5.88	7.00	958	1345	1.00	1.00
Jul-19	958	1800	5.78	7.00	861	1448	0.33	2.00
Aug-19	773	890	5.17	9.00	849	1152	0.71	2.00
Sep-19	883	1135	6.38	9.00	784	1178	0.25	1.00
Average	697	1031	4.59	5.75	674	1087	0.705	1.63
Maximum	958	1800	6.38	9.00	958	1964	1.25	3.00
Minimum	450	742	3.07	4.00	416	553	0.25	0.50
Removal Efficiency (%)	99.34%				99.90%			

Rio de Flag WRP

Date	Influent BOD (mg/L)		Effluent BOD (mg/L)		Influent TSS (mg/L)		Effluent TSS (mg/L)	
	Monthly Average	Monthly Maximum	Monthly Average	Monthly Maximum	Monthly Average	Monthly Maximum	Monthly Average	Monthly Maximum
Oct-18	339	406	1.2	2.0	288	371	1.2	3.0
Nov-18	397	485	1.4	2.0	281	344	*0.5*	*0.5*
Dec-18	399	453	2.0	2.0	270	281	1.0	1.0
Jan-19	412	495	2.0	2.0	252	339	1.3	2.0
Feb-19	299	356	1.8	2.0	238	255	1.0	2.0
Mar-19	264	279	2.0	2.0	191	203	1.0	2.0
Apr-19	336	381	2.5	3.0	308	356	0.5	1.0
May-19	334	381	2.0	2.0	267	312	0.3	1.0
Jun-19	380	433	2.3	3.0	307	462	0.8	1.0
Jul-19	376	403	3.5	4.0	309	394	2.8	4.0
Aug-19	385	493	2.5	3.0	294	370	1.0	2.0
Sep-19	490	493	2.0	2.0	375	439	4.0	9.0
Average	367	422	2.1	2.4	281	344	1.3	2.38
Maximum	490	495	3.5	4.0	375	462	4.0	9.00
Minimum	264	279	1.2	2.0	191	203	0.3	0.50
Removal Efficiency (%)	99.43%				99.55%			

Abbreviations:

mg/L - milligrams per liter.

BOD - Biochemical Oxygen Demand.

TSS - Total Suspended Solids.

Notes:

Values in italics were nondetect and are therefore represent half the reporting limit

Table A3. Influent and Effluent Summary for Inorganic Pollutants for Wildcat Hill WRP & Rio de Flag WRP

Industrial Pretreatment Program: Local Limits Evaluation

City of Flagstaff, AZ

Wildcat Hill WRP

Quarter	Ammonia (mg/L)		Boron (mg/L)		Bromide (mg/L)		Calcium (mg/L)		Cyanide (mg/L)		Total Phosphorus (mg/L)		Sulfides (mg/L)		TKN (mg/L)		Nitrate as N (mg/L)		Antimony (mg/L)		Arsenic (mg/L)		Barium (mg/L)		Beryllium (mg/L)		Cadmium (mg/L)	
	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent
2018 2nd Qtr	37	*0.055*	0.19	NA	*0.25*	NA	38	35	NA	*0.0025*	11	2.8	NA	*0.025*	74	1.5	1.315	0.661	NA	0.00045	0.0046	0.0027	NA	0.37	NA	*0.0001*	NA	0.000033
2018 3rd Qtr	44	*0.055*	0.18	0.2	*0.25*	NA	NA	29	*0.004*	0.0039	NA	4.7	NA	*0.025*	75	1.1	1.195	0.640	*0.0005*	0.00045	0.0029	0.0022	NA	0.29	*0.0005*	*0.0005*	0.00018	0.000053
2018 4th Qtr	39	*0.055*	0.19	NA	*0.25*	NA	50	30	*0.004*	0.0025	2.4	3.8	*0.025*	*0.025*	90	1.6	1.118	0.515	NA	0.00073	0.0056	0.0022	NA	NA	*0.0005*	0.00021	NA	0.000045
2019 1st Qtr	27	3.5300	0.16	NA	*0.25*	NA	40	NA	*0.004*	*0.00025*	2.1	4.2	*0.025*	*0.025*	49	5.10	0.924	0.731	NA	0.0004	0.0027	0.0027	NA	0.3900	*0.0005*	NA	NA	0.0000
2019 2nd Qtr	35	0.07	0.2	0.21	*0.25*	NA	36	NA	*0.004*	0.0025	2.3	2.5	*0.025*	*0.025*	69	1.4	1.680	0.610	NA	0.00049	0.0028	0.0023	NA	0.28	*0.0005*	*0.0005*	NA	*0.00005*
2019 3rd Qtr	41	*0.055*	0.17	NA	NA	NA	48	32	*0.004*	0.004	2.8	NA	0.12	*0.025*	77	0.24	1.250	0.827	NA	0.00054	0.0030	0.002	NA	NA	*0.0005*	*0.0005*	NA	0.000052
Average	37.2	0.64	0.1817	0.2050	0.2500	N/A	42.4000	31.5000	0.0040	0.0026	4.12	3.60	0.0488	0.0250	72.3333	1.8233	1.2470	0.6638	0.0005	0.00051	0.0036	0.0024	N/A	0.3325	0.0005	0.0004	0.0002	0.0000
Maximum	44.0000	3.5300	0.2000	0.2100	0.2500	N/A	50.0000	35.0000	0.0040	0.0040	11.0000	4.7000	0.1200	0.0250	90.0000	5.1000	1.6800	0.8270	0.0005	0.0007	0.0056	0.0027	N/A	0.3900	0.0005	0.0005	0.0002	0.0001
Minimum	27.0000	0.0550	0.1600	0.2000	0.2500	N/A	36.0000	29.0000	0.0040	0.0003	2.1000	2.5000	0.0250	0.0250	49.0000	0.2400	0.9240	0.5151	0.0005	0.0004	0.0027	0.0020	N/A	0.2800	0.0005	0.0001	0.0002	0.0000
Removal Efficiencies (%)	98.29%		-12.84%		N/A		25.71%		34.79%		12.62%		48.72%		97.48%		46.77%		-2.00%		34.72%		N/A		27.60%		76.11%	

Quarter	Chromium (mg/L)		Copper (mg/L)		Iron (mg/L)		Lead (mg/L)		Magnesium (mg/L)		Manganese (mg/L)		Mercury (mg/L)		Molybdenum (mg/L)		Nickel (mg/L)		Selenium (mg/L)		Silver (mg/L)		Thallium (mg/L)		Uranium (mg/L)		Zinc (mg/L)	
	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent
2018 2nd Qtr	NA	0.0007	0.11	0.0051	0.93	0.069	0.0022	0.0019	21	22	NA	NA	NA	0.0000015	NA	NA	0.0041	0.0016	0.0016	0.00035	0.00057	0.000016	NA	*0.0000065*	0.00084	NA	0.2	0.068
2018 3rd Qtr	0.0035	0.0007	0.076	0.0062	NA	0.046	0.0016	*0.00025*	NA	16	0.051	0.0063	*0.0001*	0.0000013	0.0075	NA	0.0048	0.0017	0.001	0.00022	0.00042	0.000073	*0.025*	*0.00005*	NA	0.000048	0.17	0.07
2018 4th Qtr	NA	0.0008	0.15	0.0079	1.8	0.047	0.0034	0.00033	24	16	NA	NA	*0.0001*	9.8E-07	NA	NA	0.0025	0.002	0.0025	0.00043	0.0008	0.000044	*0.0005*	*0.00005*	0.00012	NA	0.33	0.075
2019 1st Qtr	NA	0.0009	0.0820	0.0072	1.2	0.0950	0.0022	0.0003	18	27	NA	NA	*0.0001*	0.0000018	NA	NA	0.0041	0.0016	0.0013	0.0006	0.0004	0.0000	*0.0065*	*0.0001*	0.00076	NA	0.19	0.0590
2019 2nd Qtr	NA	0.0006	0.074	0.0052	0.81	0.074	0.0019	0.00024	19	19	NA	0.0110	*0.0001*	9.6E-07	NA	NA	0.0039	0.002	0.0012	0.00037	0.00029	0.000047	*0.00005*	*0.00005*	0.00062	NA	0.15	NA
2019 3rd Qtr	NA	*0.0005*	0.096	0.0045	1	*0.05*	0.0025	0.00042	25	18	NA	NA	*0.0001*	8.7E-07	NA	NA	0.0049	0.0005	0.0014	0.00037	0.00033	0.000019	*0.00005*	*0.000005*	0.00074	NA	0.2	0.074
Average	0.0035	0.0007	0.0980	0.0060	1.1480	0.0635	0.0023	0.0006	21.4000	19.6667	0.0510	0.0087	0.0001	0.0000	0.0075	N/A	0.0041	0.0016	0.0015	0.0004	0.0005	0.0000	0.0064	0.0000	0.0006	0.0000	0.2067	0.0692
Maximum	0.0035	0.0009	0.1500	0.0079	1.8000	0.0950	0.0034	0.0019	25.0000	27.0000	0.0510	0.0110	0.0001	0.0000	0.0075	N/A	0.0049	0.0020	0.0025	0.0006	0.0008	0.0001	0.0250	0.0001	0.0008	0.0000	0.3300	0.0750
Minimum	0.0035	0.0005	0.0740	0.0045	0.8100	0.0460	0.0016	0.0002	18.0000	16.0000	0.0510	0.0063	0.0001	0.0000	0.0075	N/A	0.0025	0.0005	0.0010	0.0002	0.0003	0.0000	0.0001	0.0000	0.0001	0.0000	0.1500	0.0590
Removal Efficiencies (%)	79.67%		93.9%		94.47%		75.22%		8.10%		83.04%		98.77%		N/A		61.44%		74.22%		92.54%		99.45%		92.21%		66.52%	

Rio de Flag WRP

Quarter	Ammonia (mg/L)		Bromide (mg/L)		Boron (mg/L)		Calcium (mg/L)		Cyanide (mg/L)		Total Phosphorus (mg/L)		Sulfides (mg/L)		TKN (mg/L)		Antimony (mg/L)		Arsenic (mg/L)		Barium (mg/L)		Beryllium (mg/L)		Cadmium (mg/L)		Chromium (mg/L)	
	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent
2018 2nd Qtr	42	0.068	*0.25*	NA	0.17	NA	NA	32	*0.004*	NA	7.4	NA	0.063	*0.025*	64	1.4	NA	NA	0.0037	NA	NA	NA	*0.0005*	NA	NA	NA	NA	NA
2018 3rd Qtr	44	*0.055*	*0.25*	NA	0.15	0.15	NA	31	*0.004*	*0.0025*	NA	1.9	0.068	*0.025*	60	1.0	*0.0005*	0.0005	0.0036	0.0031	NA	0.27	*0.0005*	0.0005	0.00011	0.000027	0.0021	0.00058
2018 4th Qtr	41	*0.055*	*0.25*	NA	0.18	NA	42	33	*0.004*	NA	2.4	NA	*0.025*	*0.025*	78	1.4	NA	NA	0.0046	NA	NA	NA	*0.0005*	NA	NA	NA	NA	NA
2019 1st Qtr	21	0.320	*0.25*	NA	0.13	NA	38	50	*0.004*	NA	2.0	NA	*0.025*	*0.025*	36	1.7	NA	NA	0.0025	NA	NA	NA	*0.0005*	NA	NA	NA	NA	NA
2019 2nd Qtr	34	*0.055*	*0.25*	NA	0.13	NA	28	31	*0.004*	NA	2.2	NA	0.24	*0.025*	51	3.2	NA	NA	0.0025	NA	NA	NA	*0.0005*	NA	NA	NA	NA	NA
2019 3rd Qtr	54	*0.055*	*0.25*	NA	0.12	0.16	37	31	*0.004*	*0.0025*	2.5	1.5	0.17	*0.025*	79	1.6	NA	0.0003	0.0046	0.0022	NA	0.2	*0.0005*	*0.0005*	NA	0.000036	NA	0.00063
Average	39.3333	0.1013	0.2500	N/A	0.1467	0.1550	36.2500	34.6667	0.0040	0.0025	3.3000	1.7000	0.0985	0.0250	61.3333	1.7167	0.0005	0.0004	0.0036	0.0027	#DIV/0!	0.2350	0.0005	0.0005	0.0001	0.0000	0.00210	0.0006
Maximum	54.0000	0.3200	0.2500	N/A	0.1800	0.1600	42.0000	50.0000	0.0040	0.0025	7.4000	1.9000	0.2400	0.0250	79.0000	3.2000	0.0005	0.0005	0.0046	0.0031	0.0000	0.2700	0.0005	0.0005	0.0001	0.0000	0.0021	0.0006
Minimum	21.0000	0.0550	0.2500	N/A	0.1200	0.1500	28.0000	31.0000	0.0040	0.0025	2.0000	1.5000	0.0250	0.0250	36.0000	1.0000	0.0005	0.0003	0.0025	0.0022	0.0000	0.2000	0.0005	0.0005	0.0001	0.0000	0.0021	0.0006
Removal Efficiencies (%)	99.74%		N/A		-5.68%		4.37%		37.50%		48.48%		74.62%		97.20%		21.00%		26.05%		N/A		0.00%		71.36%		71.19%	

Quarter	Copper (mg/L)		Iron (mg/L)		Lead (mg/L)		Magnesium (mg/L)		Manganese (mg/L)		Mercury (mg/L)		Molybdenum (mg/L)		Nickel (mg/L)		Selenium (mg/L)		Silver (mg/L)		Thallium (mg/L)		Uranium (mg/L)		Zinc (mg/L)	
	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent
2018 2nd Qtr	0.067	0.012	0.4	0.025	0.00093	NA	19	17	NA	NA	*0.0001*	NA	NA	NA	0.0023	NA	0.0008	0.0004	0.00022	NA	*0.00005*	NA	0.00047	NA	0.12	NA
2018 3rd Qtr	0.061	0.012	NA	0.037	0.00084	0.0005	NA	16	0.034	0.0052	*0.0001*	1E-06	0.018	NA	0.0028	0.0013	0.0011	0.0004	0.00028	0.000015	*0.00005*	*0.00005*	NA	0.000047	0.11	0.058
2018 4th Qtr	0.1	0.017	1	*0.05*	0.0015	NA	21	18	NA	NA	*0.0001*	NA	NA	NA	*0.00025*	NA	0.0015	0.0004	0.00051	NA	*0.00005*	NA	0.00053	NA	0.17	NA
2019 1st Qtr	NA	0.0087	0.69	0.036	0.0009	NA	18	26	NA	NA	*0.0001*	NA	NA	NA	0.0024	NA	0.0006	0.0005	0.00023	NA	*0.00005*	NA	0.00046	NA	0.082	NA
2019 2nd Qtr	0.051	0.0078	0.63	*0.05*	0.0012	NA	13	16	NA	NA	*0.0001*	NA	NA	NA	0.0028	NA	0.0014	0.0005	0.00019	NA	*0.00005*	NA	0.0003	NA	0.11	NA
2019 3rd Qtr	0.078	0.014	0.6	*0.05*	0.0014	*0.05*	20	16	NA	0.012	0.00039	1E-06	NA	NA	0.0034	0.0013	0.0015	0.0004	0.00027	0.000015	*0.00005*	*0.00005*	0.00055	*0.00005*	0.18	0.071
Average	0.07140	0.0119	0.6640	0.0413	0.00113	0.02526	18.2000	18.1667	0.0340	0.0086	0.0001	######	0.0180	N/A	0.0023	0.0013	0.0012	0.0004	0.0003	0.0000	0.0001	0.0001	0.0005	0.0000	0.1287	0.0645
Maximum	0.1000	0.0170	1.0000	0.0500	0.00150	0.05000	21.0000	26.0000	0.0340	0.0120	0.0004	0.0000	0.0180	N/A	0.0034	0.0013	0.0015	0.0005	0.0005	0.0000	0.0001	0.0001	0.0006	0.0001	0.1800	0.0710
Minimum	0.0510	0.0078	0.4000	0.0250	0.0008	0.0005	13.0000	16.0000	0.0340	0.0052	0.0001	0.0000	0.0180	N/A	0.0003	0.0013	0.0006	0.0004	0.0002	0.0000	0.0001	0.0001	0.0003	0.0000	0.0820	0.0580
Removal Efficiencies (%)	83.31%		93.78%		-2138.70%		0.18%		74.71%		99.16%		N/A		44.09%		62.57%		94.71%		0.00%		89.50%		49.87%	

*Infuent and Effluent Sampling events were taken at different dates within the quarter
**Where there are negative removal efficiencies, a literature value was used for calculations
***Effluent Ammonia data was pulled and averaged from the monthly DMRs

Abbreviations:
mg/L - milligrams per liter.
TKN - Total Kjeldahl Nitrogen

Notes:
Values in italics were nondetect and are therefore represent half the reporting limit.

NA - Not Analyzed.
N/A - Not available.
Qtr - Quarter

Table A4. Influent and Effluent Summary for Organics for Wildcat Hill WRP & Rio de Flag WRP
Industrial Pretreatment Program: Local Limits Evaluation
City of Flagstaff, AZ

Wildcat Hill WRP

Quarter	HEM (oil and grease) (mg/L)		Benzene (mg/L)		BHC-Alpha, a- (mg/L)		Bis(2-ethylhexyl)Phthalate (mg/L)		Bromodichloromethane (mg/L)		Bromoform (mg/L)		Butyl benzyl Phthalate (mg/L)		Chloroethane (mg/L)		Chloroform (mg/L)		Dibromochloromethane (mg/L)		Dichlorobenzene, 1,4- (mg/L)	
	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent
2018 2nd Qtr	58.8	*2.00*	*0.00025*	*0.00100*	*0.00025*	NA	0.056	NA	*0.00025*	0.0078	*0.0005*	*0.001*	*0.021*	NA	*0.0005*	*0.0025*	0.0034	0.041	*0.00025*	*0.001*	*0.0005*	*0.001*
2018 3rd Qtr	23.1	*2.05*	*0.00025*	NA	*0.00025*	NA	*0.021*	NA	*0.00025*	NA	*0.0005*	NA	*0.021*	NA	*0.0005*	NA	0.0044	NA	*0.00025*	NA	*0.0005*	NA
2018 4th Qtr	35.2	*2.05*	*0.00025*	*0.00100*	*0.00025*	NA	0.051	NA	*0.00025*	0.013	*0.0005*	*0.001*	*0.0105*	NA	*0.0005*	*0.0025*	0.0065	0.082	*0.00025*	0.0013	*0.0005*	*0.001*
2019 1st Qtr	26.0	*2.05*	*0.00025*	NA	*0.001*	NA	*0.055*	NA	*0.00025*	NA	*0.0005*	NA	*0.055*	NA	*0.0005*	NA	0.0054	NA	*0.00025*	NA	*0.0005*	NA
2019 2nd Qtr	19.9	*2.05*	*0.00025*	*0.00100*	*0.000125*	NA	0.053	NA	*0.00025*	0.0095	*0.0005*	*0.001*	*0.0215*	NA	*0.0005*	*0.0025*	0.0075	0.044	*0.00025*	0.001	*0.0005*	*0.001*
2019 3rd Qtr	19.2	*2.65*	*0.00025*	0.00088	*0.00025*	NA	*0.021*	NA	*0.00025*	0.0071	*0.0005*	*0.001*	*0.021*	NA	*0.0005*	*0.0025*	0.0029	0.047	*0.00025*	0.00062	*0.0005*	*0.001*
Averages	30.3667	2.1417	0.0003	0.0010	0.0004	N/A	0.0428	N/A	0.0003	0.0094	0.0005	0.0010	0.0250	N/A	0.0005	0.0025	0.0050	0.0535	0.0003	0.0010	0.0005	0.0010
Maximum	58.8000	2.6500	0.0003	0.0010	0.0010	N/A	0.0560	N/A	0.0003	0.0130	0.0005	0.0010	0.0550	N/A	0.0005	0.0025	0.0075	0.0820	0.0003	0.0013	0.0005	0.0010
Minimum	19.2000	2.0000	0.0003	0.0009	0.0001	N/A	0.0210	N/A	0.0003	0.0071	0.0005	0.0010	0.0105	N/A	0.0005	0.0025	0.0029	0.0410	0.0003	0.0006	0.0005	0.0010
Removal Efficiencies (%)	92.9%		-288.0%		N/A		N/A		-3640.0%		-100.0%		N/A		-400.0%		-966.4%		-292.0%		-100.0%	

Quarter	Diethyl phthalate (mg/L)		Di-n-butyl phthalate (mg/L)		Ethylbenzene (mg/L)		Heptachlor (mg/L)		Methyl Chloride (Chloromethane) (mg/L)		Methylene Chloride (mg/L)		Naphthalene (mg/L)		N-Nitrosodi-n-propylamine (mg/L)		Phenol (mg/L)		Tetrachloroethene (mg/L)		Toluene (mg/L)	
	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent
2018 2nd Qtr	*0.021*	NA	*0.021*	NA	*0.00025*	*0.001*	*0.0005*	NA	*0.0005*	*0.0025*	*0.0025*	*0.0025*	*0.021*	NA	*0.021*	NA	0.066	NA	*0.00025*	*0.001*	0.0032	*0.001*
2018 3rd Qtr	*0.021*	NA	*0.021*	NA	*0.00025*	NA	*0.0005*	NA	*0.0005*	NA	*0.0025*	NA	*0.021*	NA	*0.021*	NA	*0.021*	NA	*0.00025*	NA	0.00081	NA
2018 4th Qtr	*0.0105*	NA	*0.0105*	NA	*0.00025*	*0.001*	*0.0005*	NA	*0.0005*	*0.0025*	*0.0025*	*0.0025*	*0.0105*	NA	*0.0105*	NA	*0.0105*	NA	*0.00025*	*0.001*	0.00089	*0.001*
2019 1st Qtr	*0.055*	NA	*0.055*	NA	*0.00025*	NA	*0.002*	NA	*0.0005*	NA	*0.0025*	NA	*0.055*	NA	*0.055*	NA	*0.055*	NA	*0.00025*	NA	0.0011	NA
2019 2nd Qtr	*0.0215*	NA	*0.0215*	NA	*0.00025*	*0.001*	*0.00025*	NA	*0.0005*	*0.0025*	*0.0025*	*0.0025*	*0.0215*	NA	*0.0215*	NA	*0.0215*	NA	*0.00025*	*0.001*	0.0018	0.00035
2019 3rd Qtr	*0.021*	NA	*0.021*	NA	*0.00025*	*0.00025*	*0.0005*	NA	*0.0005*	*0.0025*	*0.0025*	*0.0025*	*0.021*	NA	*0.021*	NA	0.055	NA	*0.00025*	*0.001*	0.0012	0.00077
Averages	0.0250	N/A	0.0250	N/A	0.0003	0.0008	0.0007	N/A	0.0005	0.0025	0.0025	0.0025	0.0250	N/A	0.0250	N/A	0.0382	N/A	0.0003	0.0010	0.0015	0.0008
Maximum	0.0550	N/A	0.0550	N/A	0.0003	0.0010	0.0020	N/A	0.0005	0.0025	0.0025	0.0025	0.0550	N/A	0.0550	N/A	0.0660	N/A	0.0003	0.0010	0.0032	0.0010
Minimum	0.0105	N/A	0.0105	N/A	0.0003	0.0003	0.0003	N/A	0.0005	0.0025	0.0025	0.0025	0.0105	N/A	0.0105	N/A	0.0105	N/A	0.0003	0.0010	0.0008	0.0004
Removal Efficiencies (%)	N/A		N/A		-225.0%		N/A		-400.0%		0.0%		N/A		N/A		N/A		-300.0%		48.0%	

Rio de Flag WRP

Quarter	HEM (oil and grease) (mg/L)		Benzene (mg/L)		BHC-Alpha, a- (mg/L)		Bis(2-ethylhexyl)Phthalate (mg/L)		Bromodichloromethane (mg/L)		Bromoform (mg/L)		Butyl benzyl Phthalate (mg/L)		Chloroethane (mg/L)		Chloroform (mg/L)		Dibromochloromethane (mg/L)		Dichlorobenzene, 1,4- (mg/L)	
	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent
2018 2nd Qtr	40.6	*2.0*	*0.00025*	NA	*0.0005*	NA	*0.0215*	NA	*0.00025*	NA	*0.0005*	NA	*0.0215*	NA	*0.0005*	NA	0.0024	NA	*0.00025*	NA	*0.0005*	NA
2018 3rd Qtr	33.1	*2.05*	*0.00025*	*0.0005*	*0.00025*	*0.000055*	*0.021*	*0.005*	*0.00025*	*0.0005*	*0.0005*	*0.0005*	*0.021*	*0.005*	*0.0005*	*0.0005*	0.0022	0.00043	*0.00025*	*0.0005*	*0.0005*	*0.0005*
2018 4th Qtr	32.2	*2.0*	*0.00025*	NA	*0.00025*	NA	*0.011*	NA	*0.00025*	NA	*0.0005*	NA	*0.011*	NA	*0.0005*	NA	0.0017	NA	*0.00025*	NA	*0.0005*	NA
2019 1st Qtr	26.6	*2.0*	*0.00025*	NA	*0.001*	NA	*0.0215*	NA	*0.00025*	NA	*0.0005*	NA	*0.0215*	NA	*0.0005*	NA	0.005	NA	*0.00025*	NA	*0.0005*	NA
2019 2nd Qtr	31.3	*2.0*	*0.00025*	NA	*0.000125*	NA	*0.0225*	NA	*0.00025*	NA	*0.0005*	NA	*0.0225*	NA	*0.0005*	NA	0.0065	NA	*0.00025*	NA	*0.0005*	NA
2019 3rd Qtr	30.1	*2.1*	*0.0005*	*0.001*	*0.00025*	*0.000025*	*0.0205*	*0.006*	*0.0005*	*0.001*	*0.001*	*0.001*	*0.0205*	*0.006*	*0.001*	*0.0025*	0.0022	0.0006	*0.0005*	*0.001*	*0.001*	*0.001*
Averages	32.3167	2.0250	0.0003	0.0008	0.0004	0.0000	0.0197	0.0055	0.0003	0.0008	0.0006	0.0008	0.0197	0.0055	0.0006	0.0015	0.0033	0.0005	0.0003	0.0008	0.0006	0.0008
Maximum	40.6000	2.1000	0.0005	0.0010	0.0010	0.0001	0.0225	0.0060	0.0005	0.0010	0.0010	0.0010	0.0225	0.0060	0.0010	0.0025	0.0065	0.0006	0.0005	0.0010	0.0010	0.0010
Minimum	26.6000	2.0000	0.0003	0.0005	0.0001	0.0000	0.0110	0.0050	0.0003	0.0005	0.0005	0.0005	0.0110	0.0050	0.0005	0.0005	0.0017	0.0004	0.0003	0.0005	0.0005	0.0005
Removal Efficiencies (%)	93.7%		-157.1%		89.9%		72.0%		-157.1%		-28.6%		72.0%		-157.1%		84.6%		-157.1%		-28.6%	

Quarter	Diethyl phthalate (mg/L)		Di-n-butyl phthalate (mg/L)		Ethylbenzene (mg/L)		Heptachlor (mg/L)		Methyl Chloride (Chloromethane) (mg/L)		Methylene Chloride (mg/L)		Naphthalene (mg/L)		N-Nitrosodi-n-propylamine (mg/L)		Phenol (mg/L)		Tetrachloroethene (mg/L)		Toluene (mg/L)	
	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent
2018 2nd Qtr	*0.0215*	NA	*0.0215*	NA	*0.00025*	NA	*0.001*	NA	*0.0005*	NA	*0.0025*	NA	*0.0215*	NA	*0.0215*	NA	*0.0215*	NA	*0.00025*	NA	0.0021	NA
2018 3rd Qtr	*0.021*	*0.005*	*0.021*	*0.005*	*0.00025*	*0.0005*	*0.0005*	*0.000055*	*0.0005*	*0.0005*	*0.0025*	*0.002*	*0.021*	*0.005*	*0.021*	*0.005*	*0.021*	*0.005*	*0.00025*	*0.0005*	0.004	*0.0005*
2018 4th Qtr	*0.011*	NA	*0.011*	NA	*0.00025*	NA	*0.0005*	NA	*0.0005*	NA	*0.0025*	NA	*0.011*	NA	*0.011*	NA	*0.011*	NA	*0.00025*	NA	0.0023	NA
2019 1st Qtr	*0.0215*	NA	*0.0215*	NA	*0.00025*	NA	*0.002*	NA	*0.0005*	NA	*0.0025*	NA	*0.0215*	NA	*0.0215*	NA	*0.0215*	NA	*0.00025*	NA	0.0011	NA
2019 2nd Qtr	*0.0225*	NA	*0.0225*	NA	*0.00025*	NA	*0.00025*	NA	*0.0005*	NA	*0.0025*	NA	*0.0225*	NA	*0.0225*	NA	*0.0225*	NA	*0.00025*	NA	0.005	NA
2019 3rd Qtr	*0.0205*	*0.006*	*0.0205*	*0.006*	*0.0005*	*0.001*	*0.0005*	*0.00005*	*0.001*	*0.0025*	*0.005*	*0.0025*	*0.0205*	*0.006*	*0.0205*	*0.006*	*0.0205*	*0.006*	*0.0005*	*0.001*	*0.0031*	*0.001*
Averages	0.0197	0.0055	0.0197	0.0055	0.0003	0.0008	0.0008	0.0001	0.0006	0.0015	0.0029	0.0023	0.0197	0.0055	0.0197	0.0055	0.0197	0.0055	0.0003	0.0008	0.0029	0.0008
Maximum	0.0225	0.0060	0.0225	0.0060	0.0005	0.0010	0.0020	0.0001	0.0010	0.0025	0.0050	0.0025	0.0225	0.0060	0.0225	0.0060	0.0225	0.0060	0.0005	0.0010	0.0050	0.0010
Minimum	0.0110	0.0050	0.0110	0.0050	0.0003	0.0005	0.0003	0.0001	0.0005	0.0005	0.0025	0.0020	0.0110	0.0050	0.0110	0.0050	0.0110	0.0050	0.0003	0.0005	0.0011	0.0005
Removal Efficiencies (%)	72.0%		72.0%		-157.1%		93.4%		-157.1%		22.9%		72.0%		72.0%		72.0%		-157.1%		74.4%	

*Infuent and Effluent Sampling events were taken at different dates within the quarter

**Where there are negative removal efficiencies, a literature value was used for calculations

Abbreviations:
mg/L - milligrams per liter.

Notes:
Values in italics were nondetect and are therefore represent half the reporting limit.

NA - Not Analyzed.
N/A - Not available.
Qtr - Quarter

Appendix B: Literature Data

Table B1. Treatment Plant Removal Efficiencies - Literature Values Industrial Pretreatment Program: Local Limits Evaluation City of Flagstaff, AZ		
Pollutant	Median (%)	No. of POTWs with Removal Data
Metal/Nonmetal Inorganics		
Barium	73	1 of 47
Cadmium	28	7 of 47
Chromium	68	10 of 47
Copper	65	25 of 47
Cyanide	18	3 of 47
Lead	45	12 of 47
Nickel	34	10 of 47
Silver	41	4 of 47
Zinc	62	27 of 47
Organics		
1,2-trans-Dichloroethylene	86	1 of 47
Phenols	64	9 of 47
Bis(2-Ethylhexyl)Phthalate	26	7 of 47
Di-N-Butyl Phthalate	52	1 of 47
Di-N-Octyl Phthalate	78	2 of 47
Diethyl Phthalate	70	3 of 47
Trichloroethylene	97	1 of 47

Source: USEPA's Region 8 *Technically-Based Local Limits Development Strategy*, April 11, 2003, page 113.

Table B2. Primary Treatment Removal Efficiencies[a] - Literature Values
Industrial Pretreatment Program: Local Limits Evaluation
City of Flagstaff, AZ

Pollutant	Median (%)	No. of POTWs with Removal Data[b]
Metal/Nonmetal Inorganics		
Cadmium	15	6 of 40
Chromium, Total	27	12 of 40
Copper	22	12 of 40
Cyanide	27	12 of 40
Lead	57	1 of 40
Mercury	10	8 of 40
Nickel	14	9 of 40
Silver	20	4 of 40
Zinc	27	12 of 40
Organics		
1,1,1-Trichloroethane	40	10 of 40
1,2-trans-Dichloroethylene	36	9 of 40
Benzene	25	8 of 40
Butyl benzyl phthalate	62	4 of 40
Chloroform	14	11 of 40
Diethyl phthalate	56	1 of 40
Di-n-butyl phthalate	36	3 of 40
Ethylbenzene	13	12 of 40
Naphthalene	44	4 of 40
Phenol	8	11 of 40
Tetrachloroethylene	4	12 of 40
Trichloroethylene	20	12 of 40

[a] Pollutant removals between POTW influent and primary effluent. From *Fate of Priority Pollutants in Publicly Owned Treatment Works,* Volume I (EPA 440/1-82/303), USEPA, Washington, DC, September 1982, page 61.

[b] Median removal efficiencies from a database of removal efficiencies for 40 POTWs. Only POTWs with average influent concentrations exceeding three times each pollutant's detection limit were considered.

Source: *EPA Guidance Manual - Local Discharge Limitations Under the Pretreatment Program,* page 3-55, Table 3-9.

Table B3. Removal Efficiencies Through Activated Sludge Treatment[a] - Literature Values Industrial Pretreatment Program: Local Limits Evaluation City of Flagstaff, AZ					
Pollutant	Range (%)	Second Decile (%)	Median (%)	Eighth Decile (%)	No. of POTWs with Removal Data
Metal/Nonmetal Inorganics[b]					
Arsenic	11-78	31	45	53	5 of 26
Cadmium	25-99	33	67	91	19 of 26
Chromium	25-97	68	82	91	25 of 26
Copper	2-99	67	86	95	26 of 26
Cyanide	3-99	41	69	84	25 of 26
Lead	1-92	39	61	76	23 of 26
Mercury	1-95	50	60	79	20 of 26
Molybdenum[c]	6-71		29		6
Nickel	2-99	25	42	62	23 of 26
Selenium	25-89	33	50	67	4 of 26
Silver	17-95	50	75	88	24 of 26
Zinc	23-99	64	79	88	26 of 26
Organics[b]					
1,1,1-Trichloroethane	18-99	75	85	94	23 of 26
1,2-trans-Dichloroethylene	17-99	50	67	91	17 of 26
Anthracene	29-99	44	67	1	5 of 26
Benzene	25-99	50	80	96	18 of 26
Bis (2-ethylhexyl) phthalate	17-99	47	72	87	25 of 26
Butyl benzyl phthalate	25-99	50	67	92	16 of 26
Chloroform	17-99	50	67	83	24 of 26
Diethyl phthalate	17-98	39	62	90	15 of 26
Di-n-butyl phthalate	11-97	39	64	87	19 of 26
Ethylbenzene	25-99	67	86	97	25 of 26
Methylene Chloride	2-99	36	62	77	26 of 26
Naphthalene	25-98	40	78	90	16 of 26
Phenanthrene	29-99	37	68	86	6 of 26
Phenol	3-99	75	90	98	19 of 26
Pyrene	73-95	76	86	95	2 of 26
Tetrachloroethylene	15-99	50	80	93	26 of 26
Toluene	25-99	80	93	98	26 of 26
Trichloroethylene	20-99	75	89	98	25 of 26

[a] Pollutant removals between POTW influent and secondary effluent (including secondary clarification). Based on a computer analysis of POTW removal efficiency data, (derived from actual POTW influent and effluent sampling data) provided in the *Fate of Priority Pollutants in Publicly Owned Treatment Works,* Volume II (EPA 440/1-82/303), USEPA, Washington, DC, September 1982.

[b] For the purpose of deriving removal efficiencies, effluent levels reported as below the detection were set equal to the reported detection limits. All secondary activated sludge treatment plants sampled as part of the study were considered.

[c] Source: USEPA Region 8, Technically Based Local Limits Development Strategy, April 11, 2003.

Source (unless otherwise noted): *EPA Guidance Manual - Local Discharge Limitations Under the Pretreatment Program,* page 3-57, Table 3-11.

Table B4. Removal Efficiencies Through Tertiary Treatment[a] - Literature Values Industrial Pretreatment Program: Local Limits Evaluation City of Flagstaff, AZ					
Pollutant	Range (%)	Second Decile (%)	Median (%)	Eighth Decile (%)	No. of POTWs with Removal Data
Metal/Nonmetal Inorganics[b]					
Cadmium	33-81	50	50	73	3 of 4
Chromium	22-93	62	72	89	4 of 4
Copper	8-99	58	85	98	4 of 4
Cyanide	20-93	32	66	83	4 of 4
Lead	4-86	9	52	77	3 of 4
Mercury	33-79	43	67	75	4 of 4
Nickel	4-78	17	17	577	3 of 4
Silver	27-87	55	62	82	3 of 4
Zinc	1-90	50	78	88	4 of 4
Organics[b]					
1,1,1-Trichloroethane	50-98	79	94	97	4 of 4
1,2-trans-Dichloroethylene	50-96	50	83	93	2 of 4
Benzene	5-67	40	50	54	2 of 4
Bis (2-ethylhexyl) phthalate	45-98	59	76	94	4 of 4
Butyl benzyl phthalate	25-94	50	63	85	4 of 4
Chloroform	16-75	32	53	64	3 of 4
Diethyl phthalate	20-57	29	38	50	3 of 4
Di-n-butyl phthalate	14-84	27	50	70	4 of 4
Ethylbenzene	65-95	80	89	94	3 of 4
Methylene Chloride	11-96	31	57	78	4 of 4
Naphthalene	25-94	33	73	86	3 of 4
Phenol	33-98	80	88	96	4 of 4
Tetrachloroethylene	67-98	80	91	97	4 of 4
Toluene	50-99	83	94	97	4 of 4
Trichloroethylene	50-99	62	93	98	4 of 4

[a] Pollutant removals between POTW influent and tertiary effluent (including final clarification). Based on a computer analysis of POTW removal efficiency data, (derived from actual POTW influent and effluent sampling data) provided in the *Fate of Priority Pollutants in Publicly Owned Treatment Works,* Volume II (EPA 440/1-82/303), USEPA, Washington, DC, September 1982.
Tertiary treatment was taken to include POTWs with effluent microscreening, mixed media filtration, post aeration, and/or nitrification/denitrification.

[b] For the purpose of deriving removal efficiencies, effluent levels reported as below the detection were set equal to the reported detection limits. All tertiary treatment plants sampled as part of the study were considered.

Source: *EPA Guidance Manual - Local Discharge Limitations Under the Pretreatment Program,* page 3-58, Table 3-12.

Table B5. Activated Sludge Inhibition Threshold Levels[a] - Literature Values Industrial Pretreatment Program: Local Limits Evaluation City of Flagstaff, AZ			
Pollutant	Minimum Reported Inhibition Threshold (mg/L)	Reported Range of Inhibition Threshold Level (mg/L)	Laboratory, Pilot, or Full-Scale
Metal/Nonmetal Inorganics			
Cadmium	1	1-10	Unknown
Chromium, Total	1	1-100	Pilot
Chromium III	10	10-50	Unknown
Chromium VI	1	1	Unknown
Copper	1	1	Pilot
Lead	0.1	0.1-5.0	Unknown
		10-100	Lab
Nickel	1	1.0-2.5	Unknown
		5	Pilot
Zinc	0.8	0.8-5	Unknown
		5-10	Pilot
Arsenic	0.1	0.1	Unknown
Mercury	0.1	0.1-1	Unknown
		2.5 as Hg(II)	Lab
Silver	0.25	0.25-5	Unknown
Cyanide	0.1	0.1-5	Unknown
		5	Full
Ammonia	480	480	Unknown
Iodine	10	10	Unknown
Sulfide	25	25-30	Unknown
Organics			
Anthracene	500	500	Lab
Benzene	100	100-500	Unknown
		125-500	Lab
2-Chlorophenol	5	5	Unknown
		20-200	Unknown
1,2 Dichlorobenzene	5	5	Unknown
1,3 Dichlorobenzene	5	5	Unknown
1,4 Dichlorobenzene	5	5	Unknown
2,4-Dichlorophenol	64	64	Unknown
2,4-Dimethylphenol	50	40-200	Unknown
2,4-Dinitrotoluene	5	5	Unknown
1,2-Diphenylhydrazine	5	5	Unknown
Ethylbenzene	200	200	Unknown
Hexachlorobenzene	5	5	Unknown
Naphthalene	500	500	Lab
		500	Unknown
		500	Unknown
Nitrobenzene	30	30-500	Unknown
		500	Lab
		500	Unknown
Pentachlorophenol	0.95	0.95	Unknown
		50	Unknown
		75-150	Lab
Phenathrene	500	500	Lab
		500	Unknown
Phenol	50	50-200	Unknown
		200	Unknown
		200	Unknown
Toluene	200	200	Unknown
2,4,6 Trichlorophenol	50	50-100	Lab
Surfactants	100	100-500	Unknown

[a] References/Sources did not distinguish between total or dissolved pollutant levels.

Source: *EPA Guidance Manual - Local Discharge Limitations Under the Pretreatment Program* ; pages 3-44 and 3-45, Table 3-2.

Table B6. Nitrification Inhibition Threshold Levels[a] - Literature Values Industrial Pretreatment Program: Local Limits Evaluation City of Flagstaff, AZ			
Pollutant	Minimum Reported Inhibition Threshold (mg/L)	Reported Range of Inhibition Threshold Level (mg/L)	Laboratory, Pilot, or Full-Scale
Metal/Nonmetal Inorganics			
Cadmium	5.2	5.2	Lab
Chromium, Total	0.25	0.25-1.9	Unknown
		1-100 (trickling filter)	Unkown
Chromium VI	1	1-10	As CrO_4^{2-}; Unknown
Copper	0.05	0.05-0.48	Unknown
Lead	0.5	0.5	Unknown
Nickel	0.25	0.25-0.5	Unknown
		5	Pilot
Zinc	0.08	0.08-0.5	Unknown
Arsenic		1.5	Unknown
Cyanide	0.34	0.34-.5	Unknown
Chloride		180	Unknown
Organics			
Chloroform	10	10	Unknown
2,4-Dichlorophenol	64	64	Unknown
2,4-Dinitrophenol	150	150	Unknown
Phenol	4	4	Unknown
		4-10	Unknown

[a] References/sources did not distinguish between total or dissolved pollutant levels.

Source: *EPA Guidance Manual - Local Discharge Limitations Under the Pretreatment Program,* page 3-47, Table 3-4.

Table B7. Domestic/Commercial Pollutant Loadings Industrial Pretreatment Program: Local Limits Evaluation City of Flagstaff, AZ										
Pollutant	USEPA Literature Values[a]					Flagstaff 2015 LLE Values[b]				
	Number of Detections	Number of Samples	Minimum Concentration (mg/L)	Maximum Concentration (mg/L)	Average Concentration (mg/L)	Number of Detections	Number of Samples	Minimum Concentration (mg/L)	Maximum Concentration (mg/L)	Average Concentration (mg/L)
Conventional Pollutants										
BOD	-	-	-	-	-	5	5	198	345	287.5
TSS	-	-	-	-	-	5	5	128	300	208
Ammonia	-	-	-	-	-	5	5	16.8	31.2	22.4
Nitrate	-	-	-	-	-	5	5	0.12	0.93	0.33
Total Nitrogen	-	-	-	-	-	5	5	44.4	74.4	53.2
Metal/Nonmetal Inorganics										
Arsenic	140	205	0.0004	0.088	0.007	5	5	0.0016	0.0048	0.0034
Barium	3	3	0.04	0.216	0.115	5	5	0.39	0.86	0.503
Boron	4	4	0.1	0.42	0.3	-	-	-	-	-
Cadmium	361	538	0.00076	0.11	0.008	0	5	ND	ND	ND
Chromium III	1	2	<0.005	0.007	0.006	-	-	-	-	-
Chromium VI	-	-	-	-	-	2	5	0.0086	0.028	0.0072
Chromium, Total	311	522	<0.001	1.2	0.034	1	5	ND	0.010035	0.002
Copper	603	607	0.005	0.74	0.14	5	5	0.041	0.077	0.056
Cyanide	7	7	0.01	0.37	0.082	0	5	ND	ND	ND
Fluoride	2	2	0.24	0.27	0.255	-	-	-	-	-
Iron	18	18	0.0002	3.4	0.989	-	-	-	-	-
Lead	433	540	0.001	2.04	0.058	0	5	ND	ND	ND
Lithium	2	2	0.03	0.031	0.031	-	-	-	-	-
Manganese	3	3	0.04	0.161	0.087	-	-	-	-	-
Mercury	218	235	<0.0001	0.054	0.002	0	5	ND	ND	ND
Molybdenum	-	-	-	-	-	1	5	0.0022	0.0022	0.00044
Nickel	313	540	<0.001	1.6	0.047	1	5	ND	0.0043	0.00087
Phosphate	2	2	27.4	30.2	28.8	-	-	-	-	-
Total Phosphorus	1	1	0.7	0.7	0.7	-	-	-	-	-
Silver	181	224	0.0007	1.052	0.019	0	5	ND	ND	ND
Zinc	636	638	0.01	1.28	0.231	5	5	0.14	0.21	0.19
Organics										
Chloroform	21	30	<0.002	0.069	0.009	5	5	ND	0.018	0.0056
1,1-Dichloroethene	2	29	0.005	0.008	0.007	-	-	-	-	-
1,1-Dichloroethane	1	28	0.026	0.026	0.26	-	-	-	-	-
Trans-1,2-Dichloroethene	1	28	0.013	0.013	0.013	-	-	-	-	-
Fluoranthene	2	5	0.00001	<0.001	0.001	-	-	-	-	-
Methylene Chloride	7	30	0.00008	0.055	0.027	0	5	ND	ND	ND
Phenol	2	2	0.00002	0.00003	0.000025	-	-	-	-	-
Bis(2-ethylhexyl)Phthalate	5	5	0.00002	0.022	0.006	0	5	ND	ND	ND
Pyrene	2	3	0.00001	<0.005	0.0002	-	-	-	-	-
Tetrachloroethylene	5	29	0.00001	0.037	0.014	-	-	-	-	-
Toluene	-	-	-	-	-	1	5	0.0058	0.0058	0.0012
1,2,4-Trichlorobenzene	1	3	<0.002	0.035	0.013	-	-	-	-	-
Pesticides										
Total BHC	3	3	0.001	0.001	0.001	-	-	-	-	-
4,4-DDD	3	3	0.00026	0.0004	0.0003	-	-	-	-	-
Total Endosulfan	3	3	0.002	0.002	0.002	-	-	-	-	-

[a] Source: USEPA *Local Limits Development Guidance Appendices* and USEPA *Supplemental Manual on the Development and Implementation of Local Discharge Limitations Under the Pretreatment Programs* , May 1991. "Pollutant levels reported below specified detection limit were considered in the data analysis and, for the purpose of statistical analysis, were considered equal to the detection limit"
[b]Source: GHD Inc., *City of Flagstaff Local Limits Study,* Pg 4-42. March 2015.

Appendix C: Regulatory Limits and Criteria

Table C1. Influent Basis of Design for Wildcat Hill WRP & Rio de Flag WRP Industrial Pretreatment Program: Local Limits Evaluation City of Flagstaff, AZ						
Parameter	Wildcat Hill WRP Design Influent Criteria[a]			Rio de Flag WRP Design Influent Criteria[a]		
	Average	Maximum Month	Calculated from the City (actual max month)[c]	Average	Maximum Month	Calculated from the City (actual max month)[c]
Design Flow, mgd	6.0	7.2	5.3	4.0	5.2	2.7
Biochemical Oxygen Demand (BOD) (mg/L)	443	576	1920	312	368	865
Chemical Oxygen Demand[b] (COD) (mg/L)	939	1221	3216	661	780	545
Ammonia (mg/L)	32	36	121	22	-	64
Suspended Solids, Total (TSS) (mg/L)	574	746	1964	238	293	560
Total Kjeldahl Nitrogen (TKN) (mg/L)	55	64	74	31	-	64
Temperature, °C (Winter)	19	14	-	-	-	-
Temperature, °C (Summer)	19	23	-	-	-	-

a Influent-based design criteria are from the April 14, 2014 Tetra Tech Comprehensive Evaluation and Improvements Priority List for Wildcat Hill WRP and the 2015 Local Limits Evaluation

[b] Design Criteria for COD is based on a COD/BOD ratio of 2.12.

[c] Design Criteria was calculated from the City of Flagstaff to represent current conditions of each plant and was used in the calculations

Table C2. AZPDES Permit Limits for Wildcat Hill WRP & Rio de Flag WRP Industrial Pretreatment Program: Local Limits Evaluation City of Flagstaff, AZ				
Parameter	Wildcat Hill WWTP Discharge Limitations to the Rio de Flag River[a]		Rio de Flag WRP Discharge Limitations to the Rio de Flag River[a]	
	Monthly Average	Weekly Average	Monthly Average	Weekly Average
Flow, mgd	Report (6)	Report	Report (4)	Report
Biochemical Oxygen Demand (BOD), mg/L (kg/day)	30 (680)	45 (1000)	30 (450)	45 (680)
Total Suspended Solids (TSS), mg/L (kg/day)	30 (680)	45 (1000)	30 (450)	45 (680)
E. Coli (#/100 mL)	126 (575)[b]	-	126 (575)[b]	-
Chlorine, Total Residual, ug/L (g/day)	9.0 (200)	18 (410)[b]	9.0 (140)	18 (270)[b]
Copper, ug/L (g/day)	24 (550)	36 (820)[b]	18 (270)	36 (550)[b]
Cyanide, ug/L (g/day)	7.9 (180)	16 (360)[b]	-	-
Selenium, ug/L (g/day)	2 (40)	3 (64)[b]	-	-
pH, Minimum to Maximum, Standard Unit (SU)	6.5 to 9.0		6.5 to 9.0	
Ammonia[d], mg/L	Report	Report	Report	Report
Ammonia Impact Ratio (AIR)	1	1	1	2[b]
Hydrogen Sulfide[c], ug/L	-	-	2	3[b]
Oil & Grease, mg/L	10	15[b]	10	15[b]
Sulfides	Report	Report	Report	Report
Temperature	Report	Report	Report	Report
Total Dissolved Solids (source and effluent), mg/L	Report	Report	Report	Report

[a] Wildcat WWTP Discharge limitations are from the Authorization to Discharge Under the Arizona Pollutant Discharge elimination System, NPDES Permit No. AZ0020427, effective June 1, 2020. Rio de Flag Discharge Limitations are from the Authorization to Discharge Under the Arizona Pollutant Discharge elimination System, NPDES Permit No. AZ0023639, effective January 15, 2020.

[b] Indicates a daily maximum value

Table C3. Biosolids for Dedicated Land Disposal Regulatory Limits Industrial Pretreatment Program: Local Limits Evaluation City of Flagstaff, AZ	
Parameter	Pollutant Concentration (mg/kg)
	Distance to property line (0 to less than 25)
Inorganic Pollutants	
Arsenic	30
Chromium, Total	200
Nickel	210

Table C4. Derivation of State Water Quality Standard for Wildcat Hill WRP and Rio de Flag WRP Industrial Pretreatment Program: Local Limits Evaluation City of Flagstaff, AZ								
	Arizona WQS for Freshwater							
Metal	Arizona WQS, Dissolved[a] (mg/L)		Conversion Factor (CF) for Acute (CMC)[a]	Conversion Factor (CF) for Chronic (CCC)[a]	Arizona WQS, Dissolved, Adjusted for Receiving Stream Hardness of 167 mg/L[b] (mg/L)		Arizona WQS, Total Recoverable, Adjusted for Receiving Stream Hardness of 167 mg/L[c] (mg/L)	
	Acute (A&Wedw)	Chronic (A&Wedw)			Acute (A&Wedw)	Chronic (A&Wedw)	Acute (A&Wedw)	Chronic (A&Wedw)
Arsenic[d]	0.34	0.15	1	1	0.34	0.15	0.34	0.15
Cadmium[d,e]	----	----	0.923	0.888	0.00331	0.000351	0.00359	0.000396
Chromium (III)[d,e]	----	----	0.316	0.86	0.87	0.113	2.744	0.131
Chromium (VI)[d]	0.0160	0.0110	1	1	0.0160	0.0110	0.0160	0.0110
Chromium, Total	----	----	----	----	----	----	----	----
Copper[d,e]	----	----	0.960	0.960	0.0360	0.0360	0.038	0.0375
Cyanide	0.041	0.0097	1	1	0.041	0.0097	0.041	0.0097
Lead[d,e]	----	----	0.716	0.892	0.1123	0.00545	0.1568	0.00611
Mercury	0.0024	0.00001	1	1	0.0024	0.00001	0.0024	0.000010
Nickel[d,e]	----	----	0.998	0.997	0.723	0.080	0.724	0.080
Selenium	----	0.002	----	1	----	0.002	----	0.002
Silver	----	----	0.85	----	0.00777	----	0.00914	----
Zinc[d,e]	----	----	0.978	0.978	0.181	0.181	0.185	0.185

WQS = Water Quality Standard.

$A\&W_{edw}$ = Aquatic and Wildlife Effluent Dependent Standard

CMC = Criterion Maximum Concentration.

CCC = Criterion Continuous Concentration.

[a] Conversion Factors for Acute and Chronic Standards are from the National Recommended Water Quality Criteria, USEPA accessed 12/17/18 and available at: https://www.epa.gov/wqc/national-recommended-water-quality-criteria-aquatic-life-criteria-table.

[b] In-stream criteria for freshwater bodies are from The Arizona Administrative Code Title 18. Enivronmental Quality, Chapter 11. Department of Environmental Quality - Water Quality Standards. For those hardness-dependant metals, criteria are calculated from the following:

CMC (dissolved) = exp{mA [ln(hardness)]+ bA} (CF).

[c] For those metals reported in Title 18. Chapter 11. of The Arizona Administatrive Code in terms of dissolved fraction, total recoverable critera are calculated from the following:

CMC (total) = CMC (dissolved) / CF.

CCC (total) = CCC (dissolved) / CF.

[d] Values are expressed in terms of the dissolved fraction in the water column.

[e] The freshwater aquatic life criteria for these metals are expressed as a function of total hardness (mg/L) in a water body.

[f]The Hardness dependent calculations are based on a hardness of 167 mg/L from the effluent average from Wildcat and Rio de Flag

Table C5. Summary of Water Quality Standards for Wildcat Hill WRP and Rio de Flag WRP Industrial Pretreatment Program: Local Limits Evaluation City of Flagstaff, AZ							
Pollutant	Arizona State WQS[a]						
	PBC	A&Wedw		R18-11-406	Acute WQS	Most Stringent Chronic WQS	Most Stringent WQS
	Partial-body Contact	Acute WQS for Effluent Dependent Waters	Chronic WQS for Effluent Dependent Waters	Aquifer WQS			
Conventional Pollutants (mg/L)							
Ammonia	----	36.1	4.7	----	36.1	4.7	4.7
Biochemical Oxygen Demand (BOD)	----	----	----	----	----	----	----
Chemical Oxygen Demand (COD)	----	----	----	----	----	----	----
Phosphorus, Total (as P)	----	----	----	----	----	----	----
Kjeldahl Nitrogen, Total (TKN)	----	----	----	----	----	----	----
Suspended Solids, Total (TSS)	----	----	----	----	----	----	----
Inorganic Pollutants (mg/L)							
Antimony	0.747	----	----	0.006	----	----	0.006
Arsenic	0.28	0.34	0.15	0.05	0.34	0.15	0.05
Barium	98	----	----	2	----	----	2
Beryllium	1.867	0.065	0.0053	0.004	0.065	0.0053	0.004
Boron	186.667	----	----	----	----	----	186.667
Cadmium	0.7	0.00359	0.000396	0.005	0.0036	0.0004	0.000396
Chromium III	1400	2.744	0.131	----	2.744	0.131	0.131
Chromium VI	2.8	0.016	0.0110	----	0.016	0.0110	0.011
Chromium, Total	----	----	----	0.1	----	----	0.1
Copper	1.3	0.0375	0.0375	----	0.038	0.0375	0.0375
Cyanide	18.667	0.041	0.01	0.2000	0.041	0.0097	0.0097
Fluoride	140	----	----	4.0	----	----	4
Iron	----	----	1.00	----	----	1.0000	1
Lead	0.015	0.1568	0.00611	0.05	0.157	0.0061	0.0061
Manganese	130.667	----	----	----	----	----	130.667
Mercury	0.28	0.002400	0.000010	0.002	0.0024	0.00001	0.00001
Molybdenum	----	----	----	----	----	----	----
Nickel	28	0.724	0.080	0.1	0.724	0.080	0.080

Table C5. Summary of Water Quality Standards for Wildcat Hill WRP and Rio de Flag WRP Industrial Pretreatment Program: Local Limits Evaluation City of Flagstaff, AZ							
Pollutant	Arizona State WQS[a]						
	PBC	A&Wedw		R18-11-406	Acute WQS	Most Stringent Chronic WQS	Most Stringent WQS
	Partial-body Contact	Acute WQS for Effluent Dependent Waters	Chronic WQS for Effluent Dependent Waters	Aquifer WQS			
Selenium	4.667	----	0.002	0.05	----	0.002	0.002
Silver	4.667	0.00914	----	----	0.009	----	4.667
Thallium	0.075	----	----	0.002	----	----	0.002
Uranium	2.8	----	----	----	----	----	2.8
Zinc	280	0.185	0.185	----	0.185	0.185	0.185
Organic Pollutants (mg/L)							
Acenaphthene	56	0.85	0.55	----	0.85	0.55	0.550
Acrolein	0.467	0.034	0.03	----	0.034	0.03	0.03
Acrylonitrile	37.333	3.8	0.25	----	3.8	0.25	0.25
Aldrin	0.028	0.003	----	----	0.003	----	0.028
Anthracene	280	----	----	----	----	----	280
Aroclor 1232 (PCBs)	----	----	----	0.0005	----	----	0.0005
Aroclor 1242 (PCBs)	----	----	----	0.0005	----	----	0.0005
Aroclor 1254 (PCBs)	----	----	----	0.0005	----	----	0.0005
Benzene	3.733	8.8	0.56	0.005	8.8	0.56	0.005
Benzidine	2.8	1.3	0.089	----	1.3	0.089	0.089
Benzo(a)Anthracene	0.0002	----	----	----	----	----	0.0002
Benzo(a)Pyrene	0.0002	----	----	0.0002	----	----	0.0002
Benzo(k)Fluoroethene	0.0019	----	----	----	----	----	0.0019
Benzofluoranthene, 3,4-	----	----	----	----	----	----	----
BHC-Alpha, a-	----	----	----	----	----	----	----
BHC-Beta, b-	----	----	----	----	----	----	----
Bis(2-chloroethyl)Ether	0.001	120	6.7	----	120	6.7	0.001
Bis(2-chloroisopropyl)Ether	37.333	----	----	----	----	----	37.333
Bis(2-chloromethyl)Ether	----	----	----	----	----	----	----

Table C5. Summary of Water Quality Standards for Wildcat Hill WRP and Rio de Flag WRP Industrial Pretreatment Program: Local Limits Evaluation City of Flagstaff, AZ							
Pollutant	Arizona State WQS[a]						
	PBC	A&Wedw		R18-11-406	Acute WQS	Most Stringent Chronic WQS	Most Stringent WQS
	Partial-body Contact	Acute WQS for Effluent Dependent Waters	Chronic WQS for Effluent Dependent Waters	Aquifer WQS			
Bis(2-ethylhexyl)Phthalate	----	----	----	----	----	----	----
Bromoform	18.667	15	10	----	15	10	10
Bromodichloromethane	18.667	----	----	----	----	----	19
Butylbenzyl Phthalate	186.667	1.7	0.13	----	1.7	0.13	0
Carbon Disulfide	----	----	----	----	----	----	----
Carbon Tetrachloride	0.98	18	1.1	0.005	18	1.1	0.005
Chlordane	0.467	0.0024	0.0002	0.0020	0.0024	0.0002	0.0002
Chlorobenzene	18.667	0.26	3.8	----	0.26	3.8	3.8
Chlorodibromomethane	18.667	----	----	----	----	----	18.667
Chloroethane	----	----	----	----	----	----	----
Chloroform	9.333	14	0.9	----	14	0.9	0.9
Chloronaphthalene, 2-	74.667	----	----	----	----	----	74.667
Chlorophenol, 2-	4.667	0.00008	0.00004	----	0.00008	0.00004	0.00004
Chrysene	0.019	----	----	----	----	----	0.019
DDD, 4,4'-	0.467	0.0011	0.000001	----	0.0011	0.000001	0.000001
DDE, 4,4'-	0.467	0.0011	0.000001	----	0.0011	0.000001	0.000001
DDT, 4,4'-	0.467	0.0011	0.000001	0.001	0.0011	0.000001	0.000001
Dibenzo(a,h)Anthracene	0.0019	----	----	----	----	----	0.0019
Dichlorobenzene, 1,2-	84	1.2	0.47	0.6	1.2	0.47	0.47
Dichlorobenzene, 1,3-	----	2.5	0.97	----	2.5	0.97	0.97
Dichlorobenzene, 1,4-	0.373	2	0.78	0.075	2	0.78	0.075
Dichlorobenzidine, 3,3-	0.003	----	----	----	----	----	0.003
Dibromochloromethane	18.667	----	----	----	----	----	18.667
Dichlorodifluoromethane	----	----	----	----	----	----	----
Dichlorofluoromethane	----	----	----	----	----	----	----

Table C5. Summary of Water Quality Standards for Wildcat Hill WRP and Rio de Flag WRP Industrial Pretreatment Program: Local Limits Evaluation City of Flagstaff, AZ							
Pollutant	Arizona State WQS[a]						
	PBC	A&Wedw		R18-11-406	Acute WQS	Most Stringent Chronic WQS	Most Stringent WQS
	Partial-body Contact	Acute WQS for Effluent Dependent Waters	Chronic WQS for Effluent Dependent Waters	Aquifer WQS			
Dichloroethane, 1,1-	----	----	----	----	----	----	----
Dichloroethane, 1,2-	186.667	59	41	0.005	59	41	0.005
Dichloroethylene, 1,1-	46.667	15	0.95	0.007	15	0.95	0.007
Dichloroethylene, trans-1,2-	18.667	68	3.9	0.1	68	3.90	0.1
Dichlorophenol, 2,4-	2.8	1	0.088	----	1	0.088	0.088
Dichloropropane, 1,2-	84	26	9.2	0.005	26	9.2	0.005
Dichloropropylene, 1,3-	----	----	----	----	----	----	----
Dieldrin	0.047	0.0002	0.00006	----	0.0002	0.00006	0.00006
Diethyl phthalate	746.667	26	1.6	----	26	1.6	1.6
Dimethyl phthalate	----	17	1	----	17	1.0	1.0
Dimethylphenol, 2,4-	18.667	1	0.31	----	1	0.31	0.31
Di-n-butyl phthalate	93.333	0.47	0.035	----	0.47	0.035	0.035
Dinitro-o-cresol, 4,6-	0.0037	0.31	0.024	----	0.31	0.024	0.0037
Dinitrophenol, 2,4-	1.867	0.11	0.0092	----	0.11	0.0092	0.0092
Dinitrophenol, 2-Methyl-4,6-	----	----	----	----	----	----	----
Dinitrotoluene, 2,4-	1.867	14	0.86	----	14	0.86	0.86
Diphenylhydrazine, 1,2-	0.0018	0.13	0.011	----	0.13	0.011	0.0018
Endosulfan Sulfate	5.6	0.0002	0.00006	----	0.0002	0.00006	0.00006
Endosulfan, alpha-	5.6	0.0002	0.00006	----	0.0002	0.00006	0.00006
Endosulfan, beta-	5.6	0.0002	0.00006	----	0.0002	0.00006	0.00006
Endrin	0.28	0.00009	0.00004	0.002	0.00009	0.00004	0.00004
Endrin Aldehyde	----	0.00009	0.00004	----	0.00009	0.00004	0.00004
Ethylbenzene	93.333	23	1.4	0.7	23	1.4	0.7
Fluoranthene	37.333	2	1.6	----	2	1.6	1.6
Fluorene	37.333	----	----	----	----	----	37.333

Table C5. Summary of Water Quality Standards for Wildcat Hill WRP and Rio de Flag WRP Industrial Pretreatment Program: Local Limits Evaluation City of Flagstaff, AZ							
Pollutant	Arizona State WQS[a]						
	PBC	A&Wedw		R18-11-406	Acute WQS	Most Stringent Chronic WQS	Most Stringent WQS
	Partial-body Contact	Acute WQS for Effluent Dependent Waters	Chronic WQS for Effluent Dependent Waters	Aquifer WQS			
Formaldehyde	----	----	----	----	----	----	----
Heptachlor	0.467	0.0006	0.00001	0.0004	0.0006	0.00001	0.00001
Heptachlor Epoxide	0.0112	0.0006	0.00001	0.0002	0.0006	0.00001	0.00001
Hexachlorobenzene	0.747	0.006	0.0037	0.001	0.006	0.0037	0.001
Hexachlorobutadiene	0.187	0.045	0.0082	----	0.045	0.0082	0.0082
Hexachlorocyclopentadiene	9.8	0.0035	0.0003	0.05	0.0035	0.0003	0.0003
Hexachloroethane	0.933	0.49	0.35	----	0.49	0.35	0.35
Indeno(1,2,3-cd)Pyrene	0.0019	----	----	----	----	----	0.0019
Isophorone	186.667	59	43	----	59	43	43
Lindane	----	0.95	----	0.0002	0.95	----	0.0002
Methyl Bromide (Bromomethane)	1.307	5.5	0.36	----	5.5	0.36	0.36
Methyl Chloride (Chloromethane)	----	270	15	----	270	15	15
Methyl ethyl ketone (2-Butanone)	----	----	----	----	----	----	----
Methyl isobutyl ketone (MIBK)	----	----	----	----	----	----	----
Methylene blue active substances (MBAS)	----	----	----	----	----	----	----
Methylene chloride	----	----	----	----	----	----	----
Methoxychlor	4.667	----	0.00003	0.04	----	0.00003	0.00003
Naphthalene	18.667	3.2	0.58	----	3.2	0.58	0.58
Nitrobenzene	0.467	1.3	0.85	----	1.3	0.850	0.467
N-Nitrosodimethylamine	0.00003	----	----	----	----	----	0.00003
N-Nitrosodiphenylamine	0.29	2.9	0.2	----	2.9	0.2	0.2
N-Nitrosodi-n-propylamine	88.667	----	----	----	----	----	88.7
Nonylphenol	----	----	----	----	----	----	----
PCBs	280	0.002	0.00002	0.001	0.002	0.00002	0.00002
Pentachlorophenol	28	0.0091	0.0057	0.001	0.009070252	0.006	0.001

Table C5. Summary of Water Quality Standards for Wildcat Hill WRP and Rio de Flag WRP
Industrial Pretreatment Program: Local Limits Evaluation
City of Flagstaff, AZ

Pollutant	Arizona State WQS[a]						
	PBC	A&Wedw		R18-11-406	Acute WQS	Most Stringent Chronic WQS	Most Stringent WQS
	Partial-body Contact	Acute WQS for Effluent Dependent Waters	Chronic WQS for Effluent Dependent Waters	Aquifer WQS			
Phenanthrene	----	0.03	0.0063	----	0.03	0.0063	0.0063
Phenol	280	7	1	----	7	1	1
Pyrene	28	----	----	----	----	----	28
Silvex (2,4,5-TP)	7.467	----	----	0.05	----	----	0.05
Tetrachloroethane, 1,1,2,2-	56	4.7	3.2	----	4.7	3.2	3.2
Tetrachloroethylene	9.333	6.5	0.68	0.005	6.5	0.68	0.005
Toluene	280	8.7	0.18	1	8.7	0.18	0.1800
Toxaphene	0.933	0.0007	0.0000002	0.0030	0.0007	0.0000002	0.0000002
Trichlorobenzene, 1,2,4-	9.333	1.7	0.3	0.07	1.7	0.3	0.07
Trichloroethane, 1,1,1-	1866	2.6	1.6	0.2	2.6	1.6	0.2
Trichloroethane, 1,1,2-	3.733	18	12	0.005	18	12	0.005
Trichloroethylene	0.28	20	1.3	0.005	20	1.3	0.005
Trichlorofluoromethane	----	----	----	----	----	----	----
Trichlorophenol, 2,4,6-	0.13	0.16	0.025	----	0.16	0.025	0.025
Vinyl Chloride	2.8	----	----	0.002	----	----	0.002
Other Pollutants (mg/L)							
Sulfide	----	----	----	----	----	----	0.0
Nitrate as N	3733.33	----	----	10	----	----	10.0
Nitrite as N	233.333	----	----	1	----	----	1.0
Nitrate/Nitrite as N	----	----	----	10	----	----	10.0

$A\&W_{edw}$ = Aquatic and Wildlife Effluent Dependent Standard

WQS = Water Quality Standard.

[a] In-stream criterion from The Arizona Administrative Code Title 18. Enivronmental Quality, Chapter 11. Department of Environmental Quality - Water Quality Standard.

Note: pH dependent pollutants, ammonia and pentachlorophenol, are based on a pH of 7 and a temperature of 19° C

Table C6. Screening Levels for WRP Worker Protection Industrial Pretreatment Program: Local Limits Evaluation City of Flagstaff, AZ			
Pollutant	Discharge Screening Levels[a]		Most Stringent Screening Level for Worker Protection (mg/L)
	Based on Fume Toxicity (mg/L)	Based on Explosivity (mg/L)	
Acrolein	0.047	13,163	0.047
Acrylonitrile	4.822	14,586	4.822
Benzene	0.014	169	0.014
Bromoform	0.227		0.227
Carbon Tetrachloride	0.011		0.011
Chlorobenzene	2.290	395	2.290
Chloroethane	5.880	222	5.880
Chloroform	0.060		0.060
Dichloroethane, 1,1-	1.685	909	1.685
Dichloroethane, 1,2-	0.168	5,221	0.168
Dichloroethylene, 1,1-	0.016	215	0.016
Dichloroethylene, trans-1,2-	2.040	571	2.040
Dichloropropane, 1,2-	4.289	1,326	4.289
Ethylbenzene	1.659	106	1.659
Hydrogen Cyanide	1.149	13,529	1.149
Hydrogen Sulfide	0.034	96	0.034
Methyl Bromide (Bromomethane)	0.305	1,521	0.305
Methyl Chloride (Chloromethane)	0.557	450	0.557
Methylene chloride	4.139	4,307	4.139
Tetrachloroethane, 1,1,2,2-	1.847		1.847
Toluene	2.075	152	2.075
Trichloroethane, 1,1,1-	2.759	591	2.759
Trichloroethane, 1,1,2-	1.601	9,611	1.601
Trichloroethylene	0.026	1,029	0.026
Vinyl Chloride	0.012	88	0.012

[a] Source: EPA Guidance Manual - Local Limits Development Guidance, Appendix I.

Table C7. Secondary Screening Levels for WRP Worker Protection Industrial Pretreatment Program: Local Limits Evaluation City of Flagstaff, AZ			
Pollutant	Discharge Screening Levels		Most Stringent Screening Level for Worker Protection (mg/L)
	Gas/Vapor Toxicity Screening Level[a] (mg/L)	Explosivity Screening Level[b] (mg/L)	
Acrylonitrile	1.19	1794	1.19
Aldrin	0.38		0.38
Aroclor 1242	0.01		0.01
Aroclor 1254	0.005		0.005
Benzene	0.13	20	0.13
Bis(2-chloromethyl)Ether	0.0005		0.0005
Bromoform	0.24		0.24
Carbon Disulfide	0.06	6.3	0.06
Carbon Tetrachloride	0.03		0.03
Chlordane	1.27		1.27
Chlorobenzene	2.31	40	2.31
Chloroethane	5.73	1.6	1.60
Chloroform	0.41		0.41
Dichlorobenzene, 1,2-	3.75	165	3.75
Dichlorobenzene, 1,4-	3.55	104	3.55
Dichlorodifluoromethane	0.04		0.04
Dichloroethane, 1,1-	4.58	128	4.58
Dichloroethane, 1,2-	1.05	660	1.05
Dichloroethylene, 1,1-	0.003	3.3	0.003
Dichloroethylene, trans-1,2-	0.28	14	0.28
Dichloropropane, 1,2-	3.62	164	3.62
Dichloropropylene, 1,3-	0.08	435	0.08
Dieldrin	13		13
Diethyl phthalate	107		107
Dinitro-o-cresol, 4,6-	10.78		10.78
Dinitrotoluene, 2,4-	7.21		7.21
Endrin	4.9		4.9
Ethylbenzene	1.59	16	1.59
Formaldehyde	0.06	412	0.06
Heptachlor	0.003		0.003
Hexachlorobutadiene	0.0002		0.0002
Hexachlorocyclopentadiene	658		658
Hexachloroethane	0.093		0.093
Methyl Bromide (Bromomethane)	0.002	4.7	0.002
Methyl Chloride (Chloromethane)	0.06	1.1	0.06
Methyl ethyl ketone	249	2486	249
Methylene chloride	2.06	494	2.06
Napthalene	2.65	240	2.65
Nitrobenzene	9.41	17046	9.41
Pentachlorophenol	4.37		4.37
Phenol	1,024		1,024
Tetrachloroethane, 1,1,2,2-	0.44		0.44
Tetrachloroethylene	0.53		0.53
Toluene	1.36	17	1.36
Toxaphene	0.003		0.003
Trichlorobenzene, 1,2,4-	0.39	197	0.39
Trichloroethane, 1,1,1-	1.55	33	1.55
Trichloroethane, 1,1,2-	1.15		1.15
Trichloroethylene	0.71	114	0.71
Trichlorofluoromethane	1.23		1.23
Vinyl Chloride	0.004	2.2	0.0040

[a] Gas/Vapor Toxicity Screening Levels from Tables 4-2 and/or B-1 of USEPA's *Guidance to Protect POTW Workers from Toxic and Reactive Gases and Vapors* (EPA 812-B-92-001), June 1992.

[b] Explosivity Screening Levels from Table 4-2 of USEPA's *Guidance to Protect POTW Workers from Toxic and Reactive Gases and Vapors* (EPA 812-B-92-001), June 1992.

Appendix D: Maximum Allowable Headworks Loadings Analysis for the Wildcat Hill WRP

Table D1. Maximum Allowable Headworks Loading Analysis for Wildcat Hill WRP
Industrial Pretreatment Program: Local Limits Evaluation
City of Flagstaff

WPCP Name:	Wildcat Hill WRP
Date:	6-Oct-20
Average WPCP Flow (mgd):	3.69
Total Actual Industrial Flow (mgd):	0.394
Septic/Hauled Waste Flow (mgd):	0.018
Domestic/Commercial Flow (mgd):	3.27
Dry Sludge to Disposal (tons/day):	4.42
Dry Sludge to Disposal (lbs/day):	8,844
Sludge Percent Solids (%)	2.7
Specific Gravity of Sludge (kg/L)	NA
NPDES Permit Number:	AZ0020427
NPDES Permitted Discharge (mgd):	6.00
Receiving Stream:	Rio de Flag
Effluent Dependent Stream Flow (mgd):	3.64
Stream Classification:	Recreation, Effluent Dependent
Safety and Growth Factor (%):	10

Table D2. Local Limits Determination Based on Design Criteria for Wildcat Hill WRP
Industrial Pretreatment Program: Local Limits Evaluation
City of Flagstaff

Pollutant	IU Flow (mgd) (Q_{IND})	WPCP Effluent Flow (mgd) (Q_{EFF})	WPCP Permitted Flow (mgd) (Q_{NPDES})	Septic/Hauled Waste Flow (mgd) (Q_{HW})	Septic/Hauled Waste Conc.[a] (mg/L) (C_{HW})	Domestic & Commercial Flow (mgd) (Q_{DOM})	Domestic & Commercial Bkgd Conc.[a] (mg/L) (C_{DOM})	Design Criteria[a] (mg/L) (DC)	NPDES Permitted Flow (mgd) (Q_{NPDES})	Allowable Headworks Loading (lb/day) (AHL_{DESIGN})	Domestic & Commercial Loading (lb/day) (L_{UNC})	Allowable Industrial Loading (lb/day) (AIL_{DESIGN})	Industrial Local Limit (mg/L) ($C_{LIM-DESIGN}$)	Safety and Growth Factor (%) (SGF)
Conventional Pollutants														
Ammonia	0.394	3.685	6.000	0.018	235	3.29	22.4	121	6	6055	615	4834.5	1472	10
Biochemical Oxygen Demand (BOD)	0.394	3.685	6.000	0.018	1335	3.29	288	1920	6	96077	7892	78577	23925	10
Chemical Oxygen Demand (COD)	0.394	3.685	6.000	0.018		3.29		3216	6	160929	0	144836	44098	10
Suspended Solids, Total (TSS)	0.394	3.685	6.000	0.018	29367	3.29	208	1964	6	98279	5709	82741	25192	10
Inorganic Pollutants														
Antimony	0.394	3.685	6.000	0.018		3.29			6	-----	0	-----	-----	10
Arsenic	0.394	3.685	6.000	0.018	0.003	3.29	0.0034		6	-----	0.09	-----	-----	10
Barium	0.394	3.685	6.000	0.018	0.503	3.29	0.5030		6	-----	13.81	-----	-----	10
Beryllium	0.394	3.685	6.000	0.018		3.29			6	-----	0	-----	-----	10
Boron	0.394	3.685	6.000	0.018		3.29	0.1817		6	-----	4.99	-----	-----	10
Bromide	0.394	3.685	6.000	0.018		3.29			6	-----	0	-----	-----	10
Cadmium	0.394	3.685	6.000	0.018	0.046	3.29	0.0002		6	-----	0.0	-----	-----	10
Chromium III	0.394	3.685	6.000	0.018		3.29	0.0060		6	-----	0.2	-----	-----	10
Chromium VI	0.394	3.685	6.000	0.018	0.000	3.29	0.0072		6	-----	0.197634	-----	-----	10
Chromium, Total	0.394	3.685	6.000	0.018	1.420	3.29	0.0020		6	-----	0.05	-----	-----	10
Copper	0.394	3.685	6.000	0.018	35.000	3.29	0.0560		6	-----	1.54	-----	-----	10
Cyanide	0.394	3.685	6.000	0.018	0.000	3.29			6	-----	0	-----	-----	10
Iron	0.394	3.685	6.000	0.018		3.29	0.9890		6	-----	27.15	-----	-----	10
Lead	0.394	3.685	6.000	0.018	0.450	3.29	0.0023		6	-----	0.06	-----	-----	10
Manganese	0.394	3.685	6.000	0.018		3.29	0.0510		6	-----	1.4	-----	-----	10
Mercury	0.394	3.685	6.000	0.018	0.012	3.29			6	-----	0	-----	-----	10
Molybdenum	0.394	3.685	6.000	0.018	0.150	3.29	0.0004		6	-----	0.012078	-----	-----	10
Nickel	0.394	3.685	6.000	0.018	0.313	3.29	0.0009		6	-----	0.02	-----	-----	10
Selenium	0.394	3.685	6.000	0.018	0.054	3.29			6	-----	0	-----	-----	10
Silver	0.394	3.685	6.000	0.018	0.055	3.29	0.0020		6	-----	0.05	-----	-----	10
Thallium	0.394	3.685	6.000	0.018		3.29			6	-----	0	-----	-----	10
Uranium	0.394	3.685	6.000	0.018		3.29			6	-----	0	-----	-----	10
Zinc	0.394	3.685	6.000	0.018	18.800	3.29	0.1900		6	-----	5.2	-----	-----	10
Organic Pollutants														
Benzene	0.394	3.685	6.000	0.018	0.001	3.29			6	-----	0	-----	-----	10
Bis(2-ethylhexyl)Phthalate	0.394	3.685	6.000	0.018		3.29	0.0060		6	-----	0.165	-----	-----	10
Bromodichloromethane	0.394	3.685	6.000	0.018		3.29			6	-----	0	-----	-----	10
Bromoform	0.394	3.685	6.000	0.018		3.29			6	-----	0	-----	-----	10
Chloroform	0.394	3.685	6.000	0.018		3.29	0.0056		6	-----	0.154	-----	-----	10
Dibromochloromethane	0.394	3.685	6.000	0.018		3.29			6	-----	0	-----	-----	10
Methylene chloride	0.394	3.685	6.000	0.018	0.000	3.29			6	-----	0	-----	-----	10
Toluene	0.394	3.685	6.000	0.018	0.140	3.29	0.0012		6	-----	0.03293905	-----	-----	10
Other Pollutants														
TKN	0.394	3.685	6.000	0.018		3.29		74	6	3703	0	3333	1015	10
Nitrate/Nitrite as N	0.394	3.685	6.000	0.018		3.29	0.3300		6	-----	9.06	-----	-----	10
Oil & Grease	0.394	3.685	6.000	0.018		3.29			6	-----	0	-----	-----	10
Sulfide	0.394	3.685	6.000	0.018	9.900	3.29			6	-----	0	-----	-----	10

[a]Design Criteria was calculated and provided by the City in Appendix C

(Q_{IND})	Industrial flow in mgd.	(Q_{NPDES})	WPCP's permitted flow in mgd.
(Q_{EFF})	WPCP's average flow in mgd.	(L_{UNC})	Domestic/commercial loading in lb/day.
(Q_{DOM})	Domestic/commercial background flow in mgd.	(L_{HW})	Septic/Hauled waste loading in lb/day.
(Q_{HW})	Septic/Hauled Waste flow in mgd.	(AIL_{DESIGN})	Allowable industrial loading to the WPCP in lb/day
(C_{DOM})	Domestic/commercial background concentrations in mg/L.	($C_{LIM-DESIGN}$)	Local limits for industrial users in mg/L.
(C_{HW})	Septic/Hauled waste concentrations in mg/L.	(SGF)	Safety and growth factor as a percent.
(DC)	The pollutant concentration the WPCP was designed to treat in mg/L.	8.34	Unit conversion factor.
(Q_{NPDES})	NPDES permitted flow for the POTW in mgd.		

Table D3. Local Limits Determination Based on Monthly NPDES Permit Levels for Wildcat Hill WRF Industrial Pretreatment Program: Local Limits Evaluation City of Flagstaff																
Pollutant	IU Flow (mgd) (Q_{IND})	WPCP Effluent Flow (mgd) (Q_{EFF})	WPCP Permitted Flow (mgd) (Q_{NPDES})	Domestic & Commercial Flow (mgd) (Q_{DOM})	Septic/Hauled Waste Flow (mgd) (Q_{HW})	Pollutant Loading[a] (mg/L) (PL)	Domestic & Commercial Bkgd Conc.[a,b] (mg/L) (C_{DOM})	Septic/Hauled Waste Conc.[a,c] (mg/L) (C_{HW})	Removal Efficiency[a] (%) (R_{WPCP})	NPDES Monthly Limit for Discharge (mg/L) (C_{NPDES})	Allowable Headworks Loading (lb/day) (AHL_{NPDES})	Domestic & Commercial Loading (lb/day) (L_{UNC})	Septic/Hauled Waste Loading (lb/day) (L_{HW})	Allowable Industrial Loading (lb/day) (AIL_{NPDES})	Industrial Local Limit (mg/L) ($C_{LIM-NPDES}$)	Safety and Growth Factor (%) (SGF)
Conventional Pollutants																
Ammonia	0.394	3.685	6.000	3.291	0.018	37.2	22.4	235	98.3		-----	615	35.4	-----	-	10
Biochemical Oxygen Demand (BOD)	0.394	3.685	6.000	3.291	0.018	697	288	1335	99.3	30	139698	7892	201	117636	35817	10
Chemical Oxygen Demand (COD)	0.394	3.685	6.000	3.291	0.018						-----	0	0	-----	-	10
Suspended Solids, Total (TSS)	0.394	3.685	6.000	3.291	0.018	674	208	29367	99.9	30	922008	5709	4422	819676	249568	10
Inorganic Pollutants																
Antimony	0.394	3.685	6.000	3.291	0.018	*0.0005*					-----	0	0	-----	-	10
Arsenic	0.394	3.685	6.000	3.291	0.018	0.004	0.0034	0.003	34.7		-----	0.09	0.00051	-----	-	10
Barium	0.394	3.685	6.000	3.291	0.018		0.5030	0.503			-----	13.81	0.07574	-----	-	10
Beryllium	0.394	3.685	6.000	3.291	0.018	*0.0005*			27.6		-----	0	0	-----	-	10
Boron	0.394	3.685	6.000	3.291	0.018	0.182	0.1817				-----	4.99	0	-----	-	10
Bromide	0.394	3.685	6.000	3.291	0.018						-----	0	0	-----	-	10
Cadmium	0.394	3.685	6.000	3.291	0.018	0.0002	0.0002	0.046	76.1		-----	0.00	0.00693	-----	-	10
Chromium III	0.394	3.685	6.000	3.291	0.018		0.0060				-----	0.16	0	-----	-	10
Chromium VI	0.394	3.685	6.000	3.291	0.018		0.0072	0.000008			-----	0.20	0.00000	-----	-	10
Chromium, Total	0.394	3.685	6.000	3.291	0.018	0.004	0.0020	1.420	79.7		-----	0.05	0.21382	-----	-	10
Copper	0.394	3.685	6.000	3.291	0.018	0.098	0.0560	35	93.9	0.018	9	1.54	5.27025	1	0.41	10
Cyanide	0.394	3.685	6.000	3.291	0.018	*0.004*		0.00024	34.8	0.0079	0.372	0	0.00004	0	0.10	10
Iron	0.394	3.685	6.000	3.291	0.018	1.1480	0.9890		94.5		-----	27.15	0	-----	-	10
Lead	0.394	3.685	6.000	3.291	0.018	0.0023	0.0023	0.450	75.2		-----	0.06	0.06776	-----	-	10
Manganese	0.394	3.685	6.000	3.291	0.018	0.051	0.051		83.0		-----	1.40	0	-----	-	10
Mercury	0.394	3.685	6.000	3.291	0.018	*0.00010*		0.012	98.8		-----	0	0.00181	-----	-	10
Molybdenum	0.394	3.685	6.000	3.291	0.018	0.00750	0.0004	0.150	29.0		-----	0.01	0.02259	-----	-	10
Nickel	0.394	3.685	6.000	3.291	0.018	0.00410	0.0009	0.313	61.4		-----	0.02	0.04713	-----	-	10
Selenium	0.394	3.685	6.000	3.291	0.018	0.0015		0.054	74.2	0.002	0.24	0	0.00813	0	0.06	10
Silver	0.394	3.685	6.000	3.291	0.018	0.00050	0.00196	0.055	92.5		-----	0.054	0.00828	-----	-	10
Thallium	0.394	3.685	6.000	3.291	0.018	*0.01140*			99.5		-----	0	0	-----	-	10
Uranium	0.394	3.685	6.000	3.291	0.018	0.0006			92.2		-----	0	0	-----	-	10
Zinc	0.394	3.685	6.000	3.291	0.018	0.2067	0.1900	18.800	66.5		-----	5.2	2.83088	-----	-	10
Organic Pollutants																
Benzene	0.394	3.685	6.000	3.291	0.018	*0.0003*		0.0005	50.0		-----	0	0.00008	-----	-	10
Bis(2-ethylhexyl)Phthalate	0.394	3.685	6.000	3.291	0.018	0.043	0.0060		63.0		-----	0.16	0	-----	-	10
Bromodichloromethane	0.394	3.685	6.000	3.291	0.018	*0.0003*					-----	0	0	-----	-	10
Bromoform	0.394	3.685	6.000	3.291	0.018	*0.0005*					-----	0	0	-----	-	10
Chloroform	0.394	3.685	6.000	3.291	0.018	0.005	0.0056		53.0		-----	0.15	0	-----	-	10
Dibromochloromethane	0.394	3.685	6.000	3.291	0.018	*0.0003*					-----	0	0	-----	-	10
Methylene chloride	0.394	3.685	6.000	3.291	0.018	*0.003*		0.000025	57.0		-----	0	0.00000	-----	-	10
Toluene	0.394	3.685	6.000	3.291	0.018	0.002	0.0012	0.1400	48.0		-----	0.033	0.02108	-----	-	10
Other Pollutants[d]																
TKN	0.394	3.685	6.000	3.291	0.018	57.8			97.5		-----	0	0	-----	-	10
Nitrate/Nitrite as N	0.394	3.685	6.000	3.291	0.018	1.25	0.330		46.8		-----	9.06	0	-----	-	10
Oil & Grease	0.394	3.685	6.000	3.291	0.018	30.4			92.9	10	4329	0	0	3896	1186.16	10
Sulfide	0.394	3.685	6.000	3.291	0.018	0.049		9.9	48.7		-----	0	1.49073	-----	-	10

[a] Values in red are literature values.
[b] If the domestic & commercial background concentration was greater than the pollutant loading)PL), the PL was used as the domestic & commercial background concentration. If the domestic & commercial background concentration was greater than a non-detect PL, the domestic and commercial background concentration was assumed to be negligible.
[c] Values in red are literature values from Appendix L from the USEPA Local Limits Development Guidance Document Appendices.
[d] TKN Pollutant Loading is from the Bench Data Sheet provided by the City.

(Q_{IND})	Industrial flow in mgd.	(R_{WPCP})	Removal efficiency across WPCP as a percent.	(SGF)	Safety and growth factor as a percent.
(Q_{EFF})	WPCP's average flow in mgd.	(C_{NPDES})	NPDES monthly average permit limit for a particular pollutant in mg/L.	8.34	Unit conversion factor.
(Q_{DOM})	Domestic/commercial background flow in mgd.	(AHL_{NPDES})	Allowable headworks pollutant loading to the WPCP in lb/day.	(Q_{NPDES})	WPCP's permitted flow in mgd.
(Q_{HW})	Septic/Hauled Waste flow in mgd.	(L_{UNC})	Domestic/commercial loading in lb/day.		
(C_{DOM})	Domestic/commercial background concentrations in mg/L.	(L_{HW})	Septic/Hauled waste loading in lb/day.		
(C_{HW})	Septic/Hauled waste concentrations in mg/L.	(AIL_{NPDES})	Allowable industrial loading to the WPCP in lb/day.		
(PL)	Pollutant concentration in influent in mg/L.	($C_{LIM-NPDES}$)	Local limits for industrial users in mg/L.		

Table D4. Local Limits Determination Based on Activated Sludge Inhibition Threshold Levels for Wildcat Hill WRP
Industrial Pretreatment Program: Local Limits Evaluation
City of Flagstaff

Pollutant	IU Flow (mgd) (Q_{IND})	WPCP Effluent Flow (mgd) (Q_{EFF})	WPCP Permitted Flow (mgd) (Q_{NPDES})	Domestic & Commercial Flow (mgd) (Q_{DOM})	Domestic & Commercial Bkgd Conc.[a] (mg/L) (C_{DOM})	Septic/Hauled Waste Flow (mgd) (Q_{HW})	Septic/Hauled Waste Conc.[a] (mg/L) (C_{HW})	Removal Efficiency[a] (%) (R_{PRIM})	A.S. Inhibition Level (mg/L) (C_{INHIB1})	Allowable Headworks Loading (lb/day) (AHL_{SEC1})	Domestic & Commercial Loading (lb/day) (L_{UNC})	Septic/Hauled Waste Loading (lb/day) (L_{HW})	Allowable Industrial Loading (lb/day) (AIL_{SEC1})	Industrial Local Limit (mg/L) ($C_{LIM\text{-}SEC1}$)	Safety and Growth Factor (%) (SGF)
Conventional Pollutants															
Ammonia	0.394	3.685	6.000	3.273	22.40	0.018	235		480	14752	611	35.38599	12630	3845	10
Biochemical Oxygen Demand (BOD)	0.394	3.685	6.000	3.273	287.50	0.018	1335			-----	7848	201.02256	-----	-----	10
Chemical Oxygen Demand (COD)	0.394	3.685	6.000	3.273		0.018				-----	0	0	-----	-----	10
Suspended Solids, Total (TSS)	0.394	3.685	6.000	3.273	208.00	0.018	29367			-----	5678	4422.04468	-----	-----	10
Inorganic Pollutants															
Antimony	0.394	3.685	6.000	3.273		0.018				-----	0	0	-----	-----	10
Arsenic	0.394	3.685	6.000	3.273	0.0034	0.018	0.003		0.100	3.1	0.09	0.00051	2.7	0.81	10
Barium	0.394	3.685	6.000	3.273	0.5030	0.018	0.503			-----	13.731	0.07574	-----	-----	10
Beryllium	0.394	3.685	6.000	3.273		0.018				-----	0	0	-----	-----	10
Boron	0.394	3.685	6.000	3.273	0.182	0.018				-----	4.960	0	-----	-----	10
Bromide	0.394	3.685	6.000	3.273		0.018				-----	0	0	-----	-----	10
Cadmium	0.394	3.685	6.000	3.273	0.0002	0.018	0.046	15.0	5.50	199	0.0	0.00693	179	54.49	10
Chromium III	0.394	3.685	6.000	3.273	0.0060	0.018			30.0	922.0	0.2	0	829.64	252.60	10
Chromium VI	0.394	3.685	6.000	3.273	0.00720	0.018	0.000008		1.00	30.7	0.196550	0.00000	27.5	8.36	10
Chromium, Total	0.394	3.685	6.000	3.273	0.00200	0.018	1.42	27.0	50.5	2126.1	0.05	0.21382	1913.2	582.52	10
Copper	0.394	3.685	6.000	3.273	0.0560	0.018	35.0	22.0	1.00	39.4	1.53	5.27025	28.7	8.73	10
Cyanide	0.394	3.685	6.000	3.273		0.018	0.0002	27.0	2.55	107	0	0.00004	97	29.42	10
Iron	0.394	3.685	6.000	3.273	0.989	0.018				-----	26.998	0	-----	-----	10
Lead	0.394	3.685	6.000	3.273	0.0023	0.018	0.450	57.0	2.55	182	0.06	0.06776	164	49.90	10
Manganese	0.394	3.685	6.000	3.273	0.0510	0.018				-----	1.4	0	-----	-----	10
Mercury	0.394	3.685	6.000	3.273		0.018	0.012	10.0	0.550	18.8	0	0.00181	16.90	5.15	10
Molybdenum	0.394	3.685	6.000	3.273	0.00044	0.018	0.150			-----	0.012011	0.02259	-----	-----	10
Nickel	0.394	3.685	6.000	3.273	0.00087	0.018	0.313	14.0	1.75	62.5	0.02	0.04713	56.2	17.12	10
Selenium	0.394	3.685	6.000	3.273		0.018	0.054			-----	0	0.00813	-----	-----	10
Silver	0.394	3.685	6.000	3.273	0.002	0.018	0.055	20.0	2.63	101	0.05	0.008	90.70	27.62	10
Thallium	0.394	3.685	6.000	3.273		0.018				-----	0	0	-----	-----	10
Uranium	0.394	3.685	6.000	3.273		0.018				-----	0	0	-----	-----	10
Zinc	0.394	3.685	6.000	3.273	0.190	0.018	18.8	27.0	2.90	122	5.2	2.83088	102	31.0	10
Organic Pollutants															
Benzene	0.394	3.685	6.000	3.273		0.018	0.001	25.0	300	12293	0	0.00008	11064	3369	10
Bis(2-ethylhexyl)Phthalate	0.394	3.685	6.000	3.273	0.0060	0.018				-----	0.16	0	-----	-----	10
Bromodichloromethane	0.394	3.685	6.000	3.273		0.018				-----	0	0	-----	-----	10
Bromoform	0.394	3.685	6.000	3.273		0.018				-----	0	0	-----	-----	10
Chloroform	0.394	3.685	6.000	3.273	0.0056	0.018		14.0		-----	0.15	0	-----	-----	10
Dibromochloromethane	0.394	3.685	6.000	3.273		0.018				-----	0	0	-----	-----	10
Methylene chloride	0.394	3.685	6.000	3.273		0.018	0.00003			-----	0	0.00000	-----	-----	10
Toluene	0.394	3.685	6.000	3.273	0.0012	0.018	0.140		200	6147	0.033	0.02108	5532	1684	10
Other Pollutants															
TKN	0.394	3.685	6.000	3.273		0.018				-----	0	0	-----	-----	10
Nitrate/Nitrite as N	0.394	3.685	6.000	3.273	0.3300	0.018				-----	9.01	0	-----	-----	10
Oil & Grease	0.394	3.685	6.000	3.273		0.018				-----	0	0	-----	-----	10
Sulfide	0.394	3.685	6.000	3.273		0.018	9.90		27.5	845	0	1.49073	759.17	231.14	10

(Q_{IND})	Industrial flow in mgd.	(Q_{NPDES})	WPCP's permitted flow in mgd.
(Q_{EFF})	WPCP's average flow in mgd.	(AHL_{SEC})	Allowable headworks pollutant loading to the WPCP in lb/day.
(Q_{DOM})	Domestic/commercial background flow in mgd.	(L_{UNC})	Domestic/commercial loading in lb/day.
(Q_{HW})	Septic/Hauled Waste flow in mgd.	(L_{HW})	Septic/Hauled waste loading in lb/day.
(C_{DOM})	Domestic/commercial background concentrations in mg/L.	(AIL_{SEC})	Allowable industrial loading to the WPCP in lb/day.
(C_{HW})	Septic/Hauled waste concentrations in mg/L.	($C_{LIM\text{-}SEC}$)	Local limits for industrial users in mg/L.
(R_{PRIM})	Removal efficiency after primary treatment as a percent.	(SGF)	Safety and growth factor as a percent.
(C_{INHIB2})	Activated sludge treatment inhibition threshold level for a particular pollutant in mg/L.	8.34	Unit conversion factor

Table D5. Local Limits Determination Based on Nitrification Inhibition Threshold Levels for Wildcat Hill WRP
Industrial Pretreatment Program: Local Limits Evaluation
City of Flagstaff

Pollutant	IU Flow (mgd) (Q_{IND})	WPCP Effluent Flow (mgd) (Q_{EFF})	WPCP Permitted Flow (mgd) (Q_{NPDES})	Domestic & Commercial Flow (mgd) (Q_{DOM})	Domestic & Commercial Bkgd Conc.[a] (mg/L) (C_{DOM})	Septic/Hauled Waste Flow (mgd) (Q_{HW})	Septic/Hauled Waste Conc.[a] (mg/L) (C_{HW})	Removal Efficiency[a] (%) (R_{SEC})	Nitrification Inhibition Level (mg/L) (C_{INHIB2})	Allowable Headworks Loading (lb/day) (AHL_{SEC2})	Domestic & Commercial Loading (lb/day) (L_{UNC})	Septic/Hauled Waste Loading (lb/day) (L_{HW})	Allowable Industrial Loading (lb/day) (AIL_{SEC2})	Industrial Local Limit (mg/L) ($C_{LIM\text{-}SEC2}$)	Safety and Growth Factor (%) (SGF)
Conventional Pollutants															
Ammonia	0.394	3.685	6.000	3.273	22.40	0.018	235			-----	611	35.38599	-----	-----	10
Biochemical Oxygen Demand (BOD)	0.394	3.685	6.000	3.273	287.50	0.018	1335			-----	7848	201.02256	-----	-----	10
Chemical Oxygen Demand (COD)	0.394	3.685	6.000	3.273		0.018				-----	0	0	-----	-----	10
Suspended Solids, Total (TSS)	0.394	3.685	6.000	3.273	208.00	0.018	29367			-----	5678	4422.04468	-----	-----	10
Inorganic Pollutants															
Antimony	0.394	3.685	6.000	3.273		0.018				-----	0	0	-----	-----	10
Arsenic	0.394	3.685	6.000	3.273	0.0034	0.018	0.00	45	1.50	84	0.09	0.00051	75.34	22.94	10
Barium	0.394	3.685	6.000	3.273	0.5030	0.018	0.50			-----	13.73	0.07574	-----	-----	10
Beryllium	0.394	3.685	6.000	3.273		0.018				-----	0	0	-----	-----	10
Boron	0.394	3.685	6.000	3.273	0.182	0.018				-----	4.96	0	-----	-----	10
Bromide	0.394	3.685	6.000	3.273		0.018				-----	0	0	-----	-----	10
Cadmium	0.394	3.685	6.000	3.273	0.0002	0.018	0.05	67	5.20	484.3	0.0	0.00693	435.846	132.703	10
Chromium III	0.394	3.685	6.000	3.273	0.006	0.018				-----	0.2	0	-----	-----	10
Chromium VI	0.394	3.685	6.000	3.273	0.00720	0.018	0.00		5.50	169.03	0.196550	0.00000	151.93	46.26	10
Chromium, Total	0.394	3.685	6.000	3.273	0.00200	0.018	1.42		1.08	33.04	0.05	0.21382	29.47	8.97	10
Copper	0.394	3.685	6.000	3.273	0.0560	0.018	35.00	86	0.265	58	1.53	5.27025	45.56	13.87	10
Cyanide	0.394	3.685	6.000	3.273		0.018	0.00	69	0.420	42	0	0.00004	37.48	11.41	10
Iron	0.394	3.685	6.000	3.273	0.989	0.018				-----	27.00	0	-----	-----	10
Lead	0.394	3.685	6.000	3.273	0.0023	0.018	0.45	61	0.500	39.4	0.06	0.06776	35.33	10.76	10
Manganese	0.394	3.685	6.000	3.273	0.051	0.018				-----	1.4	0	-----	-----	10
Mercury	0.394	3.685	6.000	3.273		0.018	0.01	60		-----	0	0.00181	-----	-----	10
Molybdenum	0.394	3.685	6.000	3.273	0.00044	0.018	0.15	29		-----	0.012011	0.02259	-----	-----	10
Nickel	0.394	3.685	6.000	3.273	0.00087	0.018	0.31	42	0.375	19.87	0.02	0.04713	17.81	5.42	10
Selenium	0.394	3.685	6.000	3.273		0.018	0.05	50		-----	0	0.00813	-----	-----	10
Silver	0.394	3.685	6.000	3.273	0.002	0.018	0.06	75		-----	0.05	0.008	-----	-----	10
Thallium	0.394	3.685	6.000	3.273		0.018				-----	0	0	-----	-----	10
Uranium	0.394	3.685	6.000	3.273		0.018				-----	0	0	-----	-----	10
Zinc	0.394	3.685	6.000	3.273	0.190	0.018	18.80	79	0.290	42.4	5.2	2.83088	30.18	9.19	10
Organic Pollutants															
Benzene	0.394	3.685	6.000	3.273		0.018	0.00	80		-----	0	0.00008	-----	-----	10
Bis(2-ethylhexyl)Phthalate	0.394	3.685	6.000	3.273	0.0060	0.018				-----	0.16	0	-----	-----	10
Bromodichloromethane	0.394	3.685	6.000	3.273		0.018				-----	0	0	-----	-----	10
Bromoform	0.394	3.685	6.000	3.273		0.018				-----	0	0	-----	-----	10
Chloroform	0.394	3.685	6.000	3.273	0.0056	0.018		67	10.0	931.32	0.15	0	838.04	255.16	10
Dibromochloromethane	0.394	3.685	6.000	3.273		0.018				-----	0	0	-----	-----	10
Methylene chloride	0.394	3.685	6.000	3.273		0.018	0.00	62		-----	0	0.00000	-----	-----	10
Toluene	0.394	3.685	6.000	3.273	0.00120	0.018	0.14	93		-----	0.033	0.02108	-----	-----	10
Other Pollutants															
TKN	0.394	3.685	6.000	3.273		0.018				-----	0	0	-----	-----	10
Nitrate/Nitrite as N	0.394	3.685	6.000	3.273	0.3300	0.018				-----	9.01	0	-----	-----	10
Oil & Grease	0.394	3.685	6.000	3.273		0.018				-----	0	0	-----	-----	10
Sulfide	0.394	3.685	6.000	3.273		0.018	9.90			-----	0	1.49073	-----	-----	10

[a] Pollutant concentrations in italics are non-detect (reported as 1/2 reporting limit). Values in red are literature values.

(Q_{IND})	Industrial flow in mgd.	(Q_{NPDES})	WPCP's permitted flow in mgd.
(Q_{EFF})	WPCP's average flow in mgd.	(AHL_{SEC})	Allowable headworks pollutant loading to the WPCP in lb/day.
(Q_{DOM})	Domestic/commercial background flow in mgd.	(L_{UNC})	Domestic/commercial loading in lb/day.
(Q_{HW})	Septic/Hauled Waste flow in mgd.	(L_{HW})	Septic/Hauled waste loading in lb/day.
(C_{DOM})	Domestic/commercial background concentrations in mg/L.	(AIL_{SEC})	Allowable industrial loading to the WPCP in lb/day.
(C_{HW})	Septic/Hauled waste concentrations in mg/L.	($C_{LIM\text{-}SEC}$)	Local limits for industrial users in mg/L.
(R_{PRIM})	Removal efficiency after primary treatment as a percent.	(SGF)	Safety and growth factor as a percent.
(C_{INHIB2})	Activated sludge treatment inhibition threshold level for a particular pollutant in mg/L.	8.34	Unit conversion factor.

Table D6. Local Limits Determination Based on Sludge Disposal for Wildcat Hill WRP
Industrial Pretreatment Program: Local Limits Evaluation
City of Flagstaff

Pollutant	IU Flow (mgd) (Q_{IND})	WPCP Effluent Flow (mgd) (Q_{EFF})	Domestic & Commercial Flow (mgd) (Q_{DOM})	Domestic & Commercial Bkgd Conc.[a] (mg/L) (C_{DOM})	Septic/Hauled Waste Flow (mgd) (Q_{HW})	Septic/Hauled Waste Conc.[a] (mg/L) (C_{HW})	Dry Sludge to Disposal (lbs/day) (Q_{SLUDGE})	Removal Efficiency[a] (%) (R_{WPCP})	Sludge Criteria (mg/kg) (C_{SLUDGE})	Allowable Headworks Loading (lbs/day) (AHL_{SLUDGE})	Domestic & Commercial Loading (lbs/day) (L_{UNC})	Septic/Hauled Waste Loading (lbs/day) (L_{HW})	Allowable Industrial Loading (lbs/day) (AIL_{SLUDGE})	Industrial Local Limit (mg/L) ($C_{LIM\text{-}SLUDGE}$)	Safety and Growth Factor (%) (SGF)
Conventional Pollutants															
Ammonia	0.394	3.685	3.273	22.40	0.018	235	8,844	98.29		-----	611	35.38599	-----	-----	10
Biochemical Oxygen Demand (BOD)	0.394	3.685	3.273	287.50	0.018	1335	8,844	99.34		-----	7848	201.02256	-----	-----	10
Chemical Oxygen Demand (COD)	0.394	3.685	3.273		0.018		8,844			-----	0	0	-----	-----	10
Suspended Solids, Total (TSS)	0.394	3.685	3.273	208.00	0.018	29367	8,844	99.90		-----	5678	4422.04468	-----	-----	10
Inorganic Pollutants															
Antimony	0.394	3.685	3.273		0.018		8,844			-----	0	0	-----	-----	10
Arsenic	0.394	3.685	3.273	0.0034	0.018	0.00	8,844	34.72	30	0.763	0.09	0.00051	0.59	0.181	10
Barium	0.394	3.685	3.273	0.5030	0.018	0.50	8,844			-----	13.73	0.07574	-----	-----	10
Beryllium	0.394	3.685	3.273		0.018		8,844	27.6		-----	0	0	-----	-----	10
Boron	0.394	3.685	3.273	0.182	0.018		8,844			-----	4.96	0	-----	-----	10
Bromide	0.394	3.685	3.273		0.018		8,844			-----	0	0	-----	-----	10
Cadmium	0.394	3.685	3.273	0.0002	0.018	0.05	8,844	76.11		-----	0.0	0.00693	-----	-----	10
Chromium III	0.394	3.685	3.273	0.0060	0.018		8,844			-----	0.2	0	-----	-----	10
Chromium VI	0.394	3.685	3.273	0.00720	0.018	0.00	8,844			-----	0.196550	0.00000	-----	-----	10
Chromium, Total	0.394	3.685	3.273	0.00200	0.018	1.42	8,844	79.67	200	2.22	0.05	0.21382	1.73	0.53	10
Copper	0.394	3.685	3.273	0.0560	0.018	35.00	8,844	93.9		-----	1.53	5.27025	-----	-----	10
Cyanide	0.394	3.685	3.273		0.018	0.00	8,844	34.79		-----	0	0.00004	-----	-----	10
Iron	0.394	3.685	3.273	0.989	0.018		8,844	94.47		-----	27.00	0	-----	-----	10
Lead	0.394	3.685	3.273	0.0023	0.018	0.45	8,844	75.22		-----	0.06	0.06776	-----	-----	10
Manganese	0.394	3.685	3.273	0.0510	0.018		8,844	83.04		-----	1.4	0	-----	-----	10
Mercury	0.394	3.685	3.273		0.018	0.01	8,844	98.77		-----	0	0.00181	-----	-----	10
Molybdenum	0.394	3.685	3.273	0.00044	0.018	0.15	8,844	29		-----	0.012011	0.02259	-----	-----	10
Nickel	0.394	3.685	3.273	0.00087	0.018	0.31	8,844	61.44	210	3.02	0.02	0.04713	2.65	0.81	10
Selenium	0.394	3.685	3.273		0.018	0.05	8,844	74.22		-----	0	0.00813	-----	-----	10
Silver	0.394	3.685	3.273	0.002	0.018	0.06	8,844	92.54		-----	0.05	0.008	-----	-----	10
Thallium	0.394	3.685	3.273		0.018		8,844	99.45		-----	0	0	-----	-----	10
Uranium	0.394	3.685	3.273		0.018		8,844	92.21		-----	0	0	-----	-----	10
Zinc	0.394	3.685	3.273	0.190	0.018	18.80	8,844	66.52		-----	5.2	2.83088	-----	-----	10
Organic Pollutants															
Benzene	0.394	3.685	3.273		0.018	0.00	8,844	50		-----	0	0.00008	-----	-----	10
Bis(2-ethylhexyl)Phthalate	0.394	3.685	3.273	0.0060	0.018		8,844	63		-----	0.16	0	-----	-----	10
Bromodichloromethane	0.394	3.685	3.273		0.018		8,844			-----	0	0	-----	-----	10
Bromoform	0.394	3.685	3.273		0.018		8,844			-----	0	0	-----	-----	10
Chloroform	0.394	3.685	3.273	0.0056	0.018		8,844	53		-----	0.15	0	-----	-----	10
Dibromochloromethane	0.394	3.685	3.273		0.018		8,844			-----	0	0	-----	-----	10
Methylene chloride	0.394	3.685	3.273		0.018	0.00	8,844	57		-----	0	0.00000	-----	-----	10
Toluene	0.394	3.685	3.273	0.0012	0.018	0.14	8,844	48		-----	0.03	0.02108	-----	-----	10
Other Pollutants															
TKN	0.394	3.685	3.273		0.018		8,844	97.48		-----	0	0	-----	-----	10
Nitrate/Nitrite as N	0.394	3.685	3.273	0.3300	0.018		8,844	46.77		-----	9.01	0	-----	-----	10
Oil & Grease	0.394	3.685	3.273		0.018		8,844	92.9		-----	0	0	-----	-----	10
Sulfide	0.394	3.685	3.273		0.018	9.90	8,844	48.72		-----	0	1.49073	-----	-----	10

(Q_{IND})	Industrial flow in mgd.	(Q_{NPDES})	WPCP's permitted flow in mgd.
(Q_{EFF})	WPCP's average flow in mgd.	(AHL_{SEC})	Allowable headworks pollutant loading to the WPCP in lbs/day.
(Q_{DOM})	Domestic/commercial background flow in mgd.	(L_{UNC})	Domestic/commercial loading in lbs/day.
(Q_{HW})	Septic/Hauled Waste flow in mgd.	(L_{HW})	Septic/Hauled waste loading in lbs/day.
(C_{DOM})	Domestic/commercial background concentrations in mg/L.	(AIL_{SEC})	Allowable industrial loading to the WPCP in lbs/day.
(C_{HW})	Septic/Hauled waste concentrations in mg/L.	($C_{LIM\text{-}SEC}$)	Local limits for industrial users in mg/L.
(R_{PRIM})	Removal efficiency after primary treatment as a percent.	(SGF)	Safety and growth factor as a percent.
(C_{INHIB2})	Activated sludge treatment inhibition threshold level for a particular pollutant in n	8.34	Unit conversion factor

Table D7. Local Limits Determination Based on Acute State Water Quality Standards for Wildcat Hill WRP Industrial Pretreatment Program: Local Limits Evaluation City of Flagstaff																	
Pollutant	IU Flow (mgd) (Q_{IND})	WPCP Effluent Flow (mgd) (Q_{EFF})	WPCP Permitted Flow (mgd) (Q_{NPDES})	Domestic & Commercial Flow (mgd) (Q_{DOM})	Domestic & Commercial Bkgd Conc.[a] (mg/L) (C_{DOM})	Septic/Hauled Waste Flow (mgd) (Q_{HW})	Septic/Hauled Waste Conc.[a] (mg/L) (C_{HW})	Removal Efficiency[a] (%) (R_{WPCP})	Stream Flow (mgd) (Q_{ASTR})	Upstream Conc. (mg/L) (C_{STR})	Acute State WQS[a] (mg/L) (CA_{WQS})	Allowable Headworks (lb/day) ($AHLA_{WQS}$)	Domestic & Commercial Loading (lb/day) (L_{UNC})	Septic/Hauled Waste Loading (lb/day) (L_{HW})	Allowable Industrial Loading (lb/day) ($AILA_{WQS}$)	Industrial Local Limit (mg/L) ($C_{LIM\text{-}AWQS}$)	Safety and Growth Factor (%) (SGF)
Conventional Pollutants																	
Ammonia	0.394	3.685	6.000	3.273	22.40	0.018	235.00	98	3.64		36.1	129005.51	611	35.38599	115458.087	35153.6533	10
Biochemical Oxygen Demand (BOD)	0.394	3.685	6.000	3.273	287.50	0.018	1335.00	99.34	3.64			-----	7848	201.02256	-----	-----	10
Chemical Oxygen Demand (COD)	0.394	3.685	6.000	3.273		0.018			3.64			-----	0	0	-----	-----	10
Suspended Solids, Total (TSS)	0.394	3.685	6.000	3.273	208.00	0.018	29367.00	99.9	3.64			-----	5678	4422.04468	-----	-----	10
Inorganic Pollutants																	
Antimony	0.394	3.685	6.000	3.273		0.018			3.64			-----	0	0	-----	-----	10
Arsenic	0.394	3.685	6.000	3.273	0.0034	0.018	0.00	34.72	3.64		0.340	32	0.09	0.00051	29	9	10
Barium	0.394	3.685	6.000	3.273	0.5030	0.018	0.50		3.64			-----	13.73	0.07574	-----	-----	10
Beryllium	0.394	3.685	6.000	3.273		0.018		27.6	3.64		0.065	5	0	0	5	2	10
Boron	0.394	3.685	6.000	3.273	0.182	0.018			3.64			-----	4.96	0	-----	-----	10
Bromide	0.394	3.685	6.000	3.273		0.018			3.64			-----	0	0	-----	-----	10
Cadmium	0.394	3.685	6.000	3.273	0.0002	0.018	0.05	76.11	3.64		0.004	0.92	0.00	0.00693	0.82	0.25	10
Chromium III	0.394	3.685	6.000	3.273	0.006	0.018			3.64		2.74	167.7	0.16	0	150.8	45.90	10
Chromium VI	0.394	3.685	6.000	3.273	0.00720	0.018	0.00		3.64		0.016	1.0	0.20	0.00000	0.7	0.21	10
Chromium, Total	0.394	3.685	6.000	3.273	0.00200	0.018	1.42	79.67	3.64			-----	0.05	0.21382	-----	-----	10
Copper	0.394	3.685	6.000	3.273	0.0560	0.018	35.00	93.9	3.64		0.018	18	1.53	5.27025	9	3	10
Cyanide	0.394	3.685	6.000	3.273		0.018	0.00	34.79	3.64		0.041	3.84	0	0.00004	3.46	1.053	10
Iron	0.394	3.685	6.000	3.273	0.989	0.018		94.47	3.64			-----	27.00	0	-----	-----	10
Lead	0.394	3.685	6.000	3.273	0.0023	0.018	0.45	75.22	3.64		0.157	38.68	0.06	0.06776	34.68	10.56	10
Manganese	0.394	3.685	6.000	3.273	0.051	0.018		83.04	3.64			-----	1.39	0	-----	-----	10
Mercury	0.394	3.685	6.000	3.273		0.018	0.01	98.77	3.64		0.002	11.9	0	0.00181	10.7	3.27	10
Molybdenum	0.394	3.685	6.000	3.273	0.00044	0.018	0.15	29	3.64			-----	0.01	0.02259	-----	-----	10
Nickel	0.394	3.685	6.000	3.273	0.00087	0.018	0.31	61.44	3.64		0.724	114.7393	0.02	0.04713	103.1945	31.4198	10
Selenium	0.394	3.685	6.000	3.273		0.018	0.05	74.22	3.64			-----	0	0.00813	-----	-----	10
Silver	0.394	3.685	6.000	3.273	0.002	0.018	0.06	92.54	3.64		0.009	7.489	0.05	0.00828	7	2	10
Thallium	0.394	3.685	6.000	3.273		0.018		99.45	3.64			-----	0	0	-----	-----	10
Uranium	0.394	3.685	6.000	3.273		0.018		92.21	3.64			-----	0	0	-----	-----	10
Zinc	0.394	3.685	6.000	3.273	0.190	0.018	18.80	66.52	3.64		0.185	34	5.2	2.83088	22	6.81	10
Organic Pollutants																	
Benzene	0.394	3.685	6.000	3.273		0.018	0.00	50	3.64		8.80	1075	0	0.00008	968	295	10
Bis(2-ethylhexyl)Phthalate	0.394	3.685	6.000	3.273	0.0060	0.018		63	3.64			-----	0.16	0	-----	-----	10
Bromodichloromethane	0.394	3.685	6.000	3.273		0.018			3.64			-----	0	0	-----	-----	10
Bromoform	0.394	3.685	6.000	3.273		0.018			3.64		15.0	917	0	0	825	251	10
Chloroform	0.394	3.685	6.000	3.273	0.0056	0.018		53	3.64		14.0	1820	0.15	0	1638	499	10
Dibromochloromethane	0.394	3.685	6.000	3.273		0.018			3.64			-----	0	0	-----	-----	10
Methylene chloride	0.394	3.685	6.000	3.273		0.018	0.00	57	3.64			-----	0	0.00000	-----	-----	10
Toluene	0.394	3.685	6.000	3.273	0.0012	0.018	0.14	48	3.64		8.70	1022	0.03	0.02108	920	280	10
Other Pollutants																	
TKN	0.394	3.685	6.000	3.273		0.018		97.48	3.64			-----	0	0	-----	-----	10
Nitrate/Nitrite as N	0.394	3.685	6.000	3.273	0.3300	0.018		46.77	3.64			-----	9.01	0	-----	-----	10
Oil & Grease	0.394	3.685	6.000	3.273		0.018		92.9	3.64			-----	0	0	-----	-----	10
Sulfide	0.394	3.685	6.000	3.273		0.018	9.90	48.72	3.64			-----	0	1.49073	-----	-----	10

[a]Copper WQS was manually changed to 0.018 mg/L per specified limits for the Rio de Flag River

(Q_{IND})	Industrial flow in mgd.	(Q_{NPDES})	WPCP's permitted flow in mgd.
(Q_{EFF})	WPCP's average flow in mgd.	(C_{WQS})	Water quality standard for a particular pollutant in mg/L.
(Q_{DOM})	Domestic/commercial background flow in mgd.	(AHL_{WQS})	Allowable headworks pollutant loading to the WPCP in lb/day.
(Q_{HW})	Septic/Hauled Waste flow in mgd.	(L_{UNC})	Domestic/commercial loading in lb/day.
(C_{DOM})	Domestic/commercial background concentrations in mg/L.	(L_{HW})	Septic/Hauled waste loading in lb/day.
(C_{HW})	Septic/Hauled waste concentrations in mg/L.	(AIL_{WQS})	Allowable industrial loading to the WPCP in lb/day.
(Q_{STR})	Receiving stream (upstream) flow in mgd; equal to the dilution factor multiplied by the WPCP's average flow.	($C_{LIM\text{-}WQS}$)	Local limits for industrial users in mg/L.
(R_{WPCP})	Removal efficiency across WPCP as a percent.	(SGF)	Safety and growth factor as a percent.
(C_{STR})	Receiving stream background level, where available, in mg/L.	8.34	Unit conversion factor.

Table D8. Local Limits Determination Based on Chronic State Water Quality Standards for Wildcat Hill WRP Industrial Pretreatment Program: Local Limits Evaluation City of Flagstaff																	
Pollutant	IU Flow (mgd) (Q_{IND})	WPCP Effluent Flow (mgd) (Q_{EFF})	WPCP Permitted Flow (mgd) (Q_{NPDES})	Domestic & Commercial Flow (mgd) (Q_{DOM})	Domestic & Commercial Bkgd Conc.[a] (mg/L) (C_{DOM})	Septic/Hauled Waste Flow (mgd) (Q_{HW})	Septic/Hauled Waste Conc.[a] (mg/L) (C_{HW})	Removal Efficiency[a] (%) (R_{POTW})	Stream Flow (mgd) (Q_{CSTR})	Upstream Conc. (mg/L) (C_{STR})	Chronic State WQS[a] (mg/L) (C_{CWQS})	Allowable Headworks (lb/day) (AHL_{CWQS})	Domestic & Commercial Loading (lb/day) (L_{UNC})	Septic/Hauled Waste Loading (lb/day) (L_{HW})	Allowable Industrial Loading (lb/day) (AIL_{CWQS})	Industrial Local Limit (mg/L) ($C_{LIM\text{-}CWQS}$)	Safety and Growth Factor (%) (SGF)
Conventional Pollutants																	
Ammonia	0.394	3.685	6.000	3.273	22.40	0.018	235.00	98	3.642		4.70	16795.73	611	35.38599	14469.283	4405.4789	10
Biochemical Oxygen Demand (BOD)	0.394	3.685	6.000	3.273	287.50	0.018	1335.00	99.34	3.642			-----	7848	201.02256	-----	-----	10
Chemical Oxygen Demand (COD)	0.394	3.685	6.000	3.273		0.018			3.642			-----	0	0	-----	-----	10
Suspended Solids, Total (TSS)	0.394	3.685	6.000	3.273	208.00	0.018	29367.00	99.9	3.642			-----	5678	4422.04468	-----	-----	10
Inorganic Pollutants																	
Antimony	0.394	3.685	6.000	3.273		0.018			3.642		0.006	0	0	0	0	0.10	10
Arsenic	0.394	3.685	6.000	3.273	0.0034	0.018	0.00	34.72	3.642		0.05	4.68	0.09	0.00051	4.119	1.25	10
Barium	0.394	3.685	6.000	3.273	0.5030	0.018	0.50		3.642		2.00	122.216	13.7312	0.07574	96.187	29.29	10
Beryllium	0.394	3.685	6.000	3.273		0.018		27.6	3.642		0.004	0.34	0	0	0.304	0.0925	10
Boron	0.394	3.685	6.000	3.273	0.182	0.018			3.642		187	11406.82	4.96	0	10261.18	3124.23	10
Bromide	0.394	3.685	6.000	3.273		0.018			3.642			-----	0	0	-----	-----	10
Cadmium	0.394	3.685	6.000	3.273	0.0002	0.018	0.05	76.11	3.642		0.0004	0.101	0.0	0.00693	0.08	0.0241	10
Chromium III	0.394	3.685	6.000	3.273	0.006	0.018			3.642		0.131	8.0151	0.2	0	7.05	2.15	10
Chromium VI	0.394	3.685	6.000	3.273	0.00720	0.018	0.00		3.642		0.011	0.672	0.20	0.00000	0.4084	0.1244	10
Chromium, Total	0.394	3.685	6.000	3.273	0.00200	0.018	1.42	79.67	3.642		0.100	30.0580	0.05	0.21382	26.7838	8.1549	10
Copper	0.394	3.685	6.000	3.273	0.0560	0.018	35.00	93.9	3.642		0.018	18.03	1.53	5.27025	9.430	2.87	10
Cyanide	0.394	3.685	6.000	3.273		0.018	0.00	34.79	3.642		0.010	0.909	0	0.00004	0.818	0.25	10
Iron	0.394	3.685	6.000	3.273	0.989	0.018		94.47	3.642		1.00	1105.02	27.00	0	967.52	294.58	10
Lead	0.394	3.685	6.000	3.273	0.0023	0.018	0.45	75.22	3.642		0.006	1.51	0.06	0.06776	1.23	0.37	10
Manganese	0.394	3.685	6.000	3.273	0.051	0.018		83.04	3.642		131	47080.1	1.4	0	42370.686	12900.650	10
Mercury	0.394	3.685	6.000	3.273		0.018	0.01	98.77	3.642		0.000010	0.0497	0	0.00181	0.04	0.01	10
Molybdenum	0.394	3.685	6.000	3.273	0.00044	0.018	0.15	29	3.642			-----	0.01	0.02259	-----	-----	10
Nickel	0.394	3.685	6.000	3.273	0.00087	0.018	0.31	61.44	3.642		0.080	12.7568	0.02	0.04713	11.4102	3.4741	10
Selenium	0.394	3.685	6.000	3.273		0.018	0.05	74.22	3.642		0.002	0.474	0	0.00813	0.419	0.13	10
Silver	0.394	3.685	6.000	3.273	0.002	0.018	0.06	92.54	3.642		4.67	3822.928	0.05	0.00828	3440.57	1047.555	10
Thallium	0.394	3.685	6.000	3.273		0.018		99.45	3.642		0.002	22.221	0	0	19.999	6.0891	10
Uranium	0.394	3.685	6.000	3.273		0.018		92.21	3.642		2.80	2196	0	0	1977	601.88	10
Zinc	0.394	3.685	6.000	3.273	0.190	0.018	18.80	66.52	3.642		0.185	34	5.2	2.83088	22	6.81	10
Organic Pollutants																	
Benzene	0.394	3.685	6.000	3.273		0.018	0.00	50	3.642		0.005	1	0	0.00008	1	0.17	10
Bis(2-ethylhexyl)Phthalate	0.394	3.685	6.000	3.273	0.0060	0.018		63	3.642			-----	0.16	0	-----	-----	10
Bromodichloromethane	0.394	3.685	6.000	3.273		0.018			3.642		18.7	1141	0	0	1027	312.58	10
Bromoform	0.394	3.685	6.000	3.273		0.018			3.642		10.0	611	0	0	550	167.45	10
Chloroform	0.394	3.685	6.000	3.273	0.0056	0.018		53	3.642		0.900	117	0.15	0	105	32.02	10
Dibromochloromethane	0.394	3.685	6.000	3.273		0.018			3.642		18.7	1141	0	0	1027	312.58	10
Methylene chloride	0.394	3.685	6.000	3.273		0.018	0.00	57	3.642			-----	0	0.00000	-----	-----	10
Toluene	0.394	3.685	6.000	3.273	0.0012	0.018	0.14	48	3.642		0.180	21	0.033	0.02108	19	5.78	10
Other Pollutants																	
TKN	0.394	3.685	6.000	3.273		0.018		97.48	3.642			-----	0	0	-----	-----	10
Nitrate/Nitrite as N	0.394	3.685	6.000	3.273	0.3300	0.018		46.77	3.642		10.0	1148	9.01	0	1024	311.84	10
Oil & Grease	0.394	3.685	6.000	3.273		0.018		92.9	3.642			-----	0	0	-----	-----	10
Sulfide	0.394	3.685	6.000	3.273		0.018	9.90	48.72	3.642			-----	0	1.49073	-----	-----	10

[a]Copper WQS was manually changed to 0.018 mg/L per specified limits for the Rio de Flag River

(Q_{IND})	Industrial flow in mgd.	(Q_{NPDES})	WPCP's permitted flow in mgd.
(Q_{EFF})	WPCP's average flow in mgd.	(C_{WQS})	Water quality standard for a particular pollutant in mg/L.
(Q_{DOM})	Domestic/commercial background flow in mgd.	(AHL_{WQS})	Allowable headworks pollutant loading to the WPCP in lb/day.
(Q_{HW})	Septic/Hauled Waste flow in mgd.	(L_{UNC})	Domestic/commercial loading in lb/day.
(C_{DOM})	Domestic/commercial background concentrations in mg/L.	(L_{HW})	Septic/Hauled waste loading in lb/day.
(C_{HW})	Septic/Hauled waste concentrations in mg/L.	(AIL_{WQS})	Allowable industrial loading to the WPCP in lb/day.
(Q_{STR})	Receiving stream (upstream) flow in mgd; equal to the dilution factor multiplied by the WPCP's average flow.	($C_{LIM\text{-}WQS}$)	Local limits for industrial users in mg/L.
(R_{WPCP})	Removal efficiency across WPCP as a percent.	(SGF)	Safety and growth factor as a percent.
(C_{STR})	Receiving stream background level, where available, in mg/L.	8.34	Unit conversion factor.

Table D9. Summary of Allowable Headworks Loadings (AHLs) for Wildcat Hill WRP Industrial Pretreatment Program: Local Limits Evaluation City of Flagstaff							
Pollutant	Allowable Headworks Loadings (lb/day)						
	Design Criteria (AHL_{DC})	NPDES Discharge Permit Limits (AHL_{NPDES})	Activated Sludge Treatment Inhibition (AHL_{SEC1})	Nitrification Treatment Inhibition (AHL_{SEC2})	Sludge Disposal (AHL_{SLUDGE})	Acute Water Quality Standards (AHL_{AWQS})	Chronic Water Quality Standards (AHL_{CWQS})
Conventional Pollutants							
Ammonia	6,055	-----	14,752	-----	-----	129,006	16,796
Biochemical Oxygen Demand (BOD)	96,077	139,698	-----	-----	-----	-----	-----
Chemical Oxygen Demand (COD)	160,928.6	-----	-----	-----	-----	-----	-----
Suspended Solids, Total (TSS)	98,279	922,008	-----	-----	-----	-----	-----
Inorganic Pollutants							
Antimony	-----	-----	-----	-----	-----	-----	0.367
Arsenic	-----	-----	3.07	83.8	0.76	31.8	4.68
Barium	-----	-----	-----	-----	-----	-----	122
Beryllium	-----	-----	-----	-----	-----	5.49	0.338
Boron	-----	-----	-----	-----	-----	-----	11,407
Bromide	-----	-----	-----	-----	-----	-----	-----
Cadmium	-----	-----	199	484	-----	0.919	0.101
Chromium III	-----	-----	922	-----	-----	168	8.02
Chromium VI	-----	-----	30.7	169	-----	0.978	0.672
Chromium, Total	-----	-----	2126	33.0	2.2	-----	30.1
Copper	-----	9.07	39.4	58.2	-----	18.0	18.0
Cyanide	-----	0.372	107	41.6	-----	3.84	0.909
Iron	-----	-----	-----	-----	-----	-----	1,105
Lead	-----	-----	182	39.4	-----	38.676	1.51
Manganese	-----	-----	-----	-----	-----	-----	47,080
Mercury	-----	-----	18.8	-----	-----	11.9	0.050
Molybdenum	-----	-----	-----	-----	-----	-----	-----
Nickel	-----	-----	62.5	19.9	3.02	115	12.8
Selenium	-----	0.238	-----	-----	-----	-----	0.474
Silver	-----	-----	101	-----	-----	7.49	3,823
Thallium	-----	-----	-----	-----	-----	-----	22.2
Uranium	-----	-----	-----	-----	-----	-----	2196
Zinc	-----	-----	122	42.4	-----	33.8	33.8
Organic Pollutants							
Benzene	-----	-----	12,293	-----	-----	1075	0.611
Bis(2-ethylhexyl)Phthalate	-----	-----	-----	-----	-----	-----	-----
Bromodichloromethane	-----	-----	-----	-----	-----	-----	1141
Bromoform	-----	-----	-----	-----	-----	917	611
Chloroform	-----	-----	-----	931	-----	1820	117
Dibromochloromethane	-----	-----	-----	-----	-----	-----	1141
Methylene chloride	-----	-----	-----	-----	-----	-----	-----
Toluene	-----	-----	6,147	-----	-----	1022	21.2
Other Pollutants							
TKN	3,703	-----	-----	-----	-----	-----	-----
Nitrate/Nitrite as N	-----	-----	-----	-----	-----	-----	1,148
Oil & Grease	-----	4329	-----	-----	-----	-----	-----
Sulfide	-----	-----	845	-----	-----	-----	-----

Table D10. Summary of Allowable Industrial Loadings (AILs) for Wildcat Hill WRF Industrial Pretreatment Program: Local Limits Evaluation City of Flagstaff							
Pollutant	Allowable Industrial Loadings (lb/day)						
	Design Criteria	NPDES Discharge Permit Limits	Activated Sludge Treatment Inhibition	Nitrification Treatment Inhibition	Sludge Disposal	Acute Water Quality Standards	Chronic Water Quality Standards
	(AIL_{DC})	(AIL_{NPDES})	(AIL_{SEC1})	(AIL_{SEC2})	(AIL_{SLUDGE})	(AHL_{AWQS})	(AHL_{CWQS})
Conventional Pollutants							
Ammonia	4,834	-----	12,630	-----	-----	115,458	14,469
Biochemical Oxygen Demand (BOD)	78,577	117,636	-----	-----	-----	-----	-----
Chemical Oxygen Demand (COD)	144,836	-----	-----	-----	-----	-----	-----
Suspended Solids, Total (TSS)	82,741	819,676	-----	-----	-----	-----	-----
Inorganic Pollutants							
Antimony	-----	-----	-----	-----	-----	-----	0.330
Arsenic	-----	-----	2.67	75.3	0.594	28.6	4.12
Barium	-----	-----	-----	-----	-----	-----	96.2
Beryllium	-----	-----	-----	-----	-----	4.94	0.304
Boron	-----	-----	-----	-----	-----	-----	10261
Bromide	-----	-----	-----	-----	-----	-----	-----
Cadmium	-----	-----	179	436	-----	0.815	0.079
Chromium III	-----	-----	830	-----	-----	151	7.05
Chromium VI	-----	-----	27.5	152	-----	0.683	0.408
Chromium, Total	-----	-----	1913	29.5	1.7	-----	26.8
Copper	-----	1.35	28.7	45.6	-----	9	9.430
Cyanide	-----	0.335	96.6	37.5	-----	3.46	0.82
Iron	-----	-----	-----	-----	-----	-----	968
Lead	-----	-----	164	35.3	-----	34.7	1.23
Manganese	-----	-----	-----	-----	-----	-----	42371
Mercury	-----	-----	16.9	-----	-----	10.7	0.043
Molybdenum	-----	-----	-----	-----	-----	-----	-----
Nickel	-----	-----	56.2	17.8	2.65	103	11.4
Selenium	-----	0.206	-----	-----	-----	-----	0.419
Silver	-----	-----	90.7	-----	-----	6.68	3441
Thallium	-----	-----	-----	-----	-----	-----	20.0
Uranium	-----	-----	-----	-----	-----	-----	1,977
Zinc	-----	-----	102	30.2	-----	22.4	22.4
Organic Pollutants							
Benzene	-----	-----	11,064	-----	-----	968	0.550
Bis(2-ethylhexyl)Phthalate	-----	-----	-----	-----	-----	-----	-----
Bromodichloromethane	-----	-----	-----	-----	-----	-----	1,027
Bromoform	-----	-----	-----	-----	-----	825	550
Chloroform	-----	-----	-----	838	-----	1638	105
Dibromochloromethane	-----	-----	-----	-----	-----	-----	1027
Methylene chloride	-----	-----	-----	-----	-----	-----	-----
Toluene	-----	-----	5,532	-----	-----	920	19.0
Other Pollutants							
TKN	3,333	-----	-----	-----	-----	-----	-----
Nitrate/Nitrite as N	-----	-----	-----	-----	-----	-----	1,024
Oil & Grease	-----	3896	-----	-----	-----	-----	-----
Sulfide	-----	-----	759	-----	-----	-----	-----

Table D11. Maximum Allowable Headworks Loadings and Local Limits for Wildcat Hill WRP
Industrial Pretreatment Program: Local Limits Evaluation
City of Flagstaff

Pollutant	Most Stringent Criterion	Maximum Allowable Headworks Loadings			Maximum Allowable Industrial Loadings			Local Limit Needed?	Calculated Industrial Local Limit (mg/L)	Worker Protection Screening Level[c] (mg/L)	Domestic/ Commercial Background Levels[d] (mg/L)	Final Industrial Local Limit[e] (mg/L)
		Calculated MAHL (lbs/day)	Current Influent Loading Based on Actual Flow[a] (lb/day)	Percent of MAHL Currently in Use[b] (%)	Calculated MAIL (lbs/day)	Current Industrial Loading Based on Actual Flow[a] (lb/day)	Percent of MAIL Currently in Use[b] (%)					
Conventional Pollutants												
Ammonia	Design Criteria	6,055	*1,142*	18.9%	4,834	*35.8*	0.74%	Yes	1,472	-----		1472
Biochemical Oxygen Demand (BOD)	Design Criteria	96,077	*21,421*	22.3%	78,577	*1645*	2.09%	Yes	23,925	-----		23925
Chemical Oxygen Demand (COD)	Design Criteria	160,929			144,836	*0*	0.00%		44098	-----		44098
Suspended Solids, Total (TSS)	Design Criteria	98,279	*20,714*	21.1%	82,741	*434*	0.524%	Yes	25,192	-----		25192
Inorganic Pollutants												
Antimony	Chronic State WQS	0.367	*0.015*	4.2%	0.330	*0.000*	0.050%		0.100	-----		0.100
Arsenic	Sludge Disposal	0.76	*0.111*	14.5%	0.594	*0.013*	2.25%	Yes	0.181	-----		0.181
Barium	Chronic State WQS	122			96.2	*0.09*	0.09%		29.3	-----		29.3
Beryllium	Chronic State WQS	0.338	*0.015*	4.6%	0.304	*0.001*	0.467%		0.093	-----		0.093
Boron	Chronic State WQS	11,407	*5.584*	0.0%	10,261	*0.169*	0.0016%		3124	-----		3124
Bromide	Based on TTHM Formation							Yes		-----		0.5
Cadmium	Chronic State WQS	0.101	*0.006*	5.5%	0.079	*0.0000*	0.021%		0.024	-----		0.024
Chromium III	Chronic State WQS	8.02			7.05				2.15	-----		2.15
Chromium VI	Chronic State WQS	0.672			0.408				0.124	-----		0.124
Chromium, Total	Sludge Disposal	2.2	*0.108*	4.9%	1.7	*0.001*	0.031%		0.53	-----		0.53
Copper	Chronic State WQS	9.07	*3.012*	33.2%	1.35	*0.219*	16.1%	Yes	0.412	-----		0.412
Cyanide	Chronic State WQS	0.372	*0.123*	33.0%	0.335	*0.070*	21.0%	Yes	0.102	-----		0.102
Iron	Chronic State WQS	1,105	*35.282*	3.2%	968	*1.12*	0.116%		295	-----		295
Lead	Chronic State WQS	1.51	*0.071*	4.7%	1.23	*0.007*	0.537%	Yes	0.373	-----		0.373
Manganese	Chronic State WQS	47,080	*1.567*	0.0%	42,371	*0.086*	0.0002%		12901	-----		12901
Mercury	Chronic State WQS	0.050	*0.003*	6.2%	0.043	*0.000*	0.68%	Yes	0.013	-----		0.013
Molybdenum			*0.231*			*0.004*				-----		0.000
Nickel	Sludge Disposal	3.02	*0.126*	4.2%	2.65	*0.009*	0.323%		0.81	-----		0.81
Selenium	Chronic State WQS	0.238	*0.046*	19.3%	0.206	*0.024*	11.6%	Yes	0.063	-----		0.063
Silver	Acute State WQS	7.49	*0.015*	0.2%	6.68	*0.011*	0.167%		2.033	-----		2.03
Thallium	Chronic State WQS	22.2	*0.350*	1.6%	20.0	*0.0001*	0.0007%		6.1	-----		6.1
Uranium	Chronic State WQS	2,196	*0.018*	0.0%	1977	*0.465*	0.024%		602	-----		602
Zinc	Acute State WQS	33.8	*6.353*	18.8%	22.4	*0.219*	0.98%	Yes	6.81	-----		6.81
Organic Pollutants												
Benzene	Chronic State WQS	0.611			0.550				0.167	-----		0.167
Bis(2-ethylhexyl)Phthalate										-----		0
Bromodichloromethane	Chronic State WQS	1,141			1,027	*0.238*	0.023%		313	-----		313
Bromoform	Chronic State WQS	611			550				167	-----		167
Chloroform	Chronic State WQS	117	*0.1537*	0.13%	105	*0.447*	0.425%		32.0	-----		32.0
Dibromochloromethane	Chronic State WQS	1,141			1,027	*0.149*	0.015%		313	-----		313
Methylene chloride										-----		0
Toluene	Chronic State WQS	21.2	*0.0461*	0.22%	19.0	*0.005*	0.027%	Yes	5.78	-----		5.78
Other Pollutants												
TKN	Design Criteria	3,703	*1776*	48.0%	3,333	*142*	4.3%	Yes	1,015	-----		1015
Nitrate/Nitrite as N	Chronic State WQS	1,148	*38*	3.3%	1,024			Yes	312	-----		312
Oil & Grease	NPDES Permit Limits	4,329	*933*	21.6%	3,896	*20.8*	0.54%	Yes	1,186	-----		1186
Sulfide	Activated Sludge Treatment Inhibition	845	*1.50*	0.177%	759	*2.69*	0.355%	Yes	231	-----		231

[a] Influent loadings are provided only for those parameters detected in influent samples.
[b] MAHL and MAIL utilizations are calculated only for those pollutants detected in the influent and industrial effluent, respectively.
[c] Worker Protection Screening Levels are the most stringent of discharge screening levels based on fume toxicity and explosivity. Refer to Table D6. Secondary source for worker protection screening level is provided in Table D7.
[d] Domestic/commercial background levels are provided only for those parameters with negative calculated local limits.
[e] Industrial local limits are the more stringent of the calculated industrial local limits and Worker Protection Screening Levels. In the case of negative local limits where domestic/commercial background levels are not available, the laboratory practical quantitation limit was used.

Appendix E: Maximum Allowable Headworks Loadings Analysis for the Rio de Flag WRP

Table E1. Maximum Allowable Headworks Loading Analysis for Rio de Flag WRP
Industrial Pretreatment Program: Local Limits Evaluation
City of Flagstaff

WRP Name:	Rio de Flag WRP
Date:	6-Oct-20
Average WRP Flow (mgd):	1.81
Total Actual Industrial Flow (mgd):	0.343
Septic/Hauled Waste Flow (mgd):	0
Domestic/Commercial Flow (mgd):	1.47
Dry Sludge to Disposal (tons/day):	WAS sent to Wildcat
Dry Sludge to Disposal (lbs/day):	NA
Sludge Percent Solids (%)	NA
Specific Gravity of Sludge (kg/L)	NA
NPDES Permit Number:	AZ0023639
NPDES Permitted Discharge (mgd):	4.0
Receiving Stream:	Rio de Flag
Effluent Dependent Stream Flow (mgd):	0.75
Stream Classification:	Recreation, Effluent Dependent
Safety and Growth Factor (%):	10

Table E2. Local Limits Determination Based on Design Criteria for Rio de Flag WRP
Industrial Pretreatment Program: Local Limits Evaluation
City of Flagstaff

Pollutant	IU Flow (mgd) (Q_{IND})	WRP Effluent Flow (mgd) (Q_{EFF})	WRP Permitted Flow (mgd) (Q_{NPDES})	Septic/Hauled Waste Flow (mgd) (Q_{HW})	Septic/Hauled Waste Conc. (mg/L) (C_{HW})	Domestic & Commercial Flow (mgd) (Q_{DOM})	Domestic & Commercial Bkgd Conc.[a] (mg/L) (C_{DOM})	Design Criteria[a] (mg/L) (DC)	NPDES Permitted Flow (mgd) (Q_{NPDES})	Allowable Headworks Loading (lb/day) (AHL_{DESIGN})	Domestic & Commercial Loading (lb/day) (L_{UNC})	Allowable Industrial Loading (lb/day) (AIL_{DESIGN})	Industrial Local Limit (mg/L) ($C_{LIM\text{-}DESIGN}$)	Safety and Growth Factor (%) (SGF)
Conventional Pollutants														
Ammonia	0.343	1.809	4.000	0.000		1.466	22.4	64	4	2135	274	1647.6	576	10
Biochemical Oxygen Demand (BOD)	0.343	1.809	4.000	0.000		1.466	288	865	4	28856	3515	22455	7849	10
Chemical Oxygen Demand (COD)	0.343	1.809	4.000	0.000		1.466		545	4	18181	0	16363	5719	10
Suspended Solids, Total (TSS)	0.343	1.809	4.000	0.000		1.466	208	560	4	18682	2543	14270	4988	10
Inorganic Pollutants														
Antimony	0.343	1.809	4.000	0.000		1.466			4	-----	0	-----	-----	10
Arsenic	0.343	1.809	4.000	0.000		1.466	0.0034		4	-----	0.0416	-----	-----	10
Barium	0.343	1.809	4.000	0.000		1.466	0.5030		4	-----	6.1506	-----	-----	10
Beryllium	0.343	1.809	4.000	0.000		1.466			4	-----	0	-----	-----	10
Boron	0.343	1.809	4.000	0.000		1.466	0.1817		4	-----	2.2218	-----	-----	10
Bromide	0.343	1.809	4.000	0.000		1.466			4	-----	0	-----	-----	10
Cadmium	0.343	1.809	4.000	0.000		1.466	0.0002		4	-----	0.0022	-----	-----	10
Chromium III	0.343	1.809	4.000	0.000		1.466	0.0060		4	-----	0.0734	-----	-----	10
Chromium VI	0.343	1.809	4.000	0.000		1.466	0.0072		4	-----	0.0880	-----	-----	10
Chromium, Total	0.343	1.809	4.000	0.000		1.466	0.0020		4	-----	0.0245	-----	-----	10
Copper	0.343	1.809	4.000	0.000		1.466	0.0560		4	-----	0.6848	-----	-----	10
Cyanide	0.343	1.809	4.000	0.000		1.466			4	-----	0	-----	-----	10
Iron	0.343	1.809	4.000	0.000		1.466	0.9890		4	-----	12.0933	-----	-----	10
Lead	0.343	1.809	4.000	0.000		1.466	0.0023		4	-----	0.0281	-----	-----	10
Manganese	0.343	1.809	4.000	0.000		1.466	0.0510		4	-----	0.6236	-----	-----	10
Mercury	0.343	1.809	4.000	0.000		1.466			4	-----	0	-----	-----	10
Molybdenum	0.343	1.809	4.000	0.000		1.466	0.0004		4	-----	0.0054	-----	-----	10
Nickel	0.343	1.809	4.000	0.000		1.466	0.0009		4	-----	0.0106	-----	-----	10
Selenium	0.343	1.809	4.000	0.000		1.466			4	-----	0	-----	-----	10
Silver	0.343	1.809	4.000	0.000		1.466	0.0020		4	-----	0.0240	-----	-----	10
Thallium	0.343	1.809	4.000	0.000		1.466			4	-----	0	-----	-----	10
Uranium	0.343	1.809	4.000	0.000		1.466			4	-----	0	-----	-----	10
Zinc	0.343	1.809	4.000	0.000		1.466	0.1900		4	-----	2.3233	-----	-----	10
Organic Pollutants														
Benzene	0.343	1.809	4.000	0.000		1.466			4	-----	0	-----	-----	10
Bis(2-ethylhexyl)Phthalate	0.343	1.809	4.000	0.000		1.466	0.0060		4	-----	0.0734	-----	-----	10
Bromodichloromethane	0.343	1.809	4.000	0.000		1.466			4	-----	0	-----	-----	10
Bromoform	0.343	1.809	4.000	0.000		1.466			4	-----	0	-----	-----	10
Chloroform	0.343	1.809	4.000	0.000		1.466	0.0050		4	-----	0.0611	-----	-----	10
Dibromochloromethane	0.343	1.809	4.000	0.000		1.466			4	-----	0	-----	-----	10
Methylene chloride	0.343	1.809	4.000	0.000		1.466			4	-----	0	-----	-----	10
Toluene	0.343	1.809	4.000	0.000		1.466	0.0012		4	-----	0.0147	-----	-----	10
Other Pollutants														
TKN	0.343	1.809	4.000	0.000		1.466		64	4	2135	0	1922	672	10
Nitrate/Nitrite as N	0.343	1.809	4.000	0.000		1.466			4	-----	0	-----	-----	10
Oil & Grease	0.343	1.809	4.000	0.000		1.466			4	-----	0	-----	-----	10
Sulfide	0.343	1.809	4.000	0.000		1.466			4	-----	0	-----	-----	10

[a]Design Criteria was calculated and provided by the City in Appendix C

(Q_{IND})	Industrial flow in mgd.	(Q_{NPDES})	WRP's permitted flow in mgd.
(Q_{EFF})	WRP's average flow in mgd.	(L_{UNC})	Domestic/commercial loading in lb/day.
(Q_{DOM})	Domestic/commercial background flow in mgd.	(L_{HW})	Septic/Hauled waste loading in lb/day.
(Q_{HW})	Septic/Hauled Waste flow in mgd.	(AIL_{DESIGN})	Allowable industrial loading to the WRP in lb/day
(C_{DOM})	Domestic/commercial background concentrations in mg/L.	($C_{LIM\text{-}DESIGN}$)	Local limits for industrial users in mg/L.
(C_{HW})	Septic/Hauled waste concentrations in mg/L.	(SGF)	Safety and growth factor as a percent.
(DC)	The pollutant concentration the WRP was designed to treat in mg/L.	8.34	Unit conversion factor.
(Q_{NPDES})	NPDES permitted flow for the POTW in mgd.		

Table E3. Local Limits Determination Based on Monthly NPDES Permit Levels for Rio de Flag WRP
Industrial Pretreatment Program: Local Limits Evaluation
City of Flagstaff

Pollutant	IU Flow (mgd) (Q_{IND})	WRP Effluent Flow (mgd) (Q_{EFF})	WRP Permitted Flow (mgd) (Q_{NPDES})	Domestic & Commercial Flow (mgd) (Q_{DOM})	Septic/Hauled Waste Flow (mgd) (Q_{HW})	Pollutant Loading[a] (mg/L) (PL)	Domestic & Commercial Bkgd Conc.[a,b] (mg/L) (C_{DOM})	Septic/Hauled Waste Conc.[a,c] (mg/L) (C_{HW})	Removal Efficiency[a] (%) (RWRP)	NPDES Monthly Limit for Discharge (mg/L) (C_{NPDES})	Allowable Headworks Loading (lb/day) (AHL_{NPDES})	Domestic & Commercial Loading (lb/day) (L_{UNC})	Septic/Hauled Waste Loading (lb/day) (L_{HW})	Allowable Industrial Loading (lb/day) (AIL_{NPDES})	Industrial Local Limit (mg/L) ($C_{LIM-NPDES}$)	Safety and Growth Factor (%) (SGF)
Conventional Pollutants																
Ammonia	0.343	1.809	4.000	1.466	0.000	39.3	22.4		99.7		-----	274	0	-----	-	10
Biochemical Oxygen Demand (BOD)	0.343	1.809	4.000	1.466	0.000	367	288		99.4	30.0	79415	3515	0	67958	23753	10
Chemical Oxygen Demand (COD)	0.343	1.809	4.000	1.466	0.000						-----	0	0	-----	-	10
Suspended Solids, Total (TSS)	0.343	1.809	4.000	1.466	0.000	281	208		99.6	30.0	100592	2543	0	87989	30754	10
Inorganic Pollutants																
Antimony	0.343	1.809	4.000	1.466	0.000	*0.0005*			21.0		-----	0	0	-----	-	10
Arsenic	0.343	1.809	4.000	1.466	0.000	0.0036	0.0034		26.1		-----	0.04	0	-----	-	10
Barium	0.343	1.809	4.000	1.466	0.000		0.5030				-----	6.15	0	-----	-	10
Beryllium	0.343	1.809	4.000	1.466	0.000	*0.0005*					-----	0	0	-----	-	10
Boron	0.343	1.809	4.000	1.466	0.000	0.1467	0.1817				-----	2.22	0	-----	-	10
Bromide	0.343	1.809	4.000	1.466	0.000	*0.2500*					-----	0	0	-----	-	10
Cadmium	0.343	1.809	4.000	1.466	0.000	0.0001	0.0002		71.4		-----	0.00	0	-----	-	10
Chromium III	0.343	1.809	4.000	1.466	0.000		0.0060				-----	0.07	0	-----	-	10
Chromium VI	0.343	1.809	4.000	1.466	0.000		0.0072				-----	0.09	0	-----	-	10
Chromium, Total	0.343	1.809	4.000	1.466	0.000	0.00210	0.0020		71.2		-----	0.02	0	-----	-	10
Copper	0.343	1.809	4.000	1.466	0.000	0.0714	0.0560		83.3	0.018	2	0.68	0	1	0.27	10
Cyanide	0.343	1.809	4.000	1.466	0.000	*0.00400*			37.5		-----	0	0	-----	-	10
Iron	0.343	1.809	4.000	1.466	0.000	0.6640	0.9890		93.8		-----	12.09	0	-----	-	10
Lead	0.343	1.809	4.000	1.466	0.000	0.0011	0.0023		52.0		-----	0.03	0	-----	-	10
Manganese	0.343	1.809	4.000	1.466	0.000	0.034	0.051		74.7		-----	0.62	0	-----	-	10
Mercury	0.343	1.809	4.000	1.466	0.000	0.00000125			99.2		-----	0	0	-----	-	10
Molybdenum	0.343	1.809	4.000	1.466	0.000	0.01800	0.0004		29.0		-----	0.01	0	-----	-	10
Nickel	0.343	1.809	4.000	1.466	0.000	0.00230	0.0009		44.1		-----	0.01	0	-----	-	10
Selenium	0.343	1.809	4.000	1.466	0.000	0.0012			62.6		-----	0	0	-----	-	10
Silver	0.343	1.809	4.000	1.466	0.000	0.00030	0.00196		94.7		-----	0.024	0	-----	-	10
Thallium	0.343	1.809	4.000	1.466	0.000	*0.00005*					-----	0	0	-----	-	10
Uranium	0.343	1.809	4.000	1.466	0.000	0.0005			89.5		-----	0	0	-----	-	10
Zinc	0.343	1.809	4.000	1.466	0.000	0.1287	0.1900		78.0		-----	2.3	0	-----	-	10
Organic Pollutants																
Benzene	0.343	1.809	4.000	1.466	0.000	*0.0003*			50.0		-----	0	0	-----	-	10
Bis(2-ethylhexyl)Phthalate	0.343	1.809	4.000	1.466	0.000	*0.0197*	0.0060		72.0		-----	0.07	0	-----	-	10
Bromodichloromethane	0.343	1.809	4.000	1.466	0.000	*0.0003*					-----	0	0	-----	-	10
Bromoform	0.343	1.809	4.000	1.466	0.000	*0.0006*					-----	0	0	-----	-	10
Chloroform	0.343	1.809	4.000	1.466	0.000	0.0033	0.0050		84.6		-----	0.06	0	-----	-	10
Dibromochloromethane	0.343	1.809	4.000	1.466	0.000	*0.0003*					-----	0	0	-----	-	10
Methylene chloride	0.343	1.809	4.000	1.466	0.000	*0.0029*			57.0		-----	0	0	-----	-	10
Toluene	0.343	1.809	4.000	1.466	0.000	0.0029	0.0012		74.4		-----	0.015	0	-----	-	10
Other Pollutants																
TKN	0.343	1.809	4.000	1.466	0.000	45.8			97.2		-----	0	0	-----	-	10
Nitrate/Nitrite as N	0.343	1.809	4.000	1.466	0.000	0.70	0.330				-----	4.04	0	-----	-	10
Oil & Grease	0.343	1.809	4.000	1.466	0.000	32.3			93.7	10.00	2395	0	0	2156	753.42	10
Sulfide	0.343	1.809	4.000	1.466	0.000	0.0985			74.6		-----	0	0	-----	-	10

[a] Values in red are literature values.

[b] If the domestic and commercial background concentration was greater than the pollutant loading (PL), the PL was used as the domestic and commercial background concentration. If the domestic and commercial background concentration was greater than a non-detect PL, the domestic and commercial background concentration was assumed to be negligible.

[c] Values in red are literature values from Appendix L from the USEPA Local Limits Development Guidance Document Appendices.

(Q_{IND})	Industrial flow in mgd.	(RWRP)	Removal efficiency across WRP as a percent.	(SGF)	Safety and growth factor as a percent.
(Q_{EFF})	WRP's average flow in mgd.	(C_{NPDES})	NPDES monthly average permit limit for a particular pollutant in mg/L.	8.34	Unit conversion factor.
(Q_{DOM})	Domestic/commercial background flow in mgd.	(AHL_{NPDES})	Allowable headworks pollutant loading to the WRP in lb/day.	(Q_{NPDES})	WRP's permitted flow in mgd.
(Q_{HW})	Septic/Hauled Waste flow in mgd.	(L_{UNC})	Domestic/commercial loading in lb/day.		
(C_{DOM})	Domestic/commercial background concentrations in mg/L.	(L_{HW})	Septic/Hauled waste loading in lb/day.		
(C_{HW})	Septic/Hauled waste concentrations in mg/L.	(AIL_{NPDES})	Allowable industrial loading to the WRP in lb/day.		
(PL)	Pollutant concentration in influent in mg/L.	($C_{LIM-NPDES}$)	Local limits for industrial users in mg/L.		

Table E4. Local Limits Determination Based on Activated Sludge Inhibition Threshold Levels for Rio de Flag WRP
Industrial Pretreatment Program: Local Limits Evaluation
City of Flagstaff

Pollutant	IU Flow (mgd) (Q_{IND})	WRP Effluent Flow (mgd) (Q_{EFF})	WRP Permitted Flow (mgd) (Q_{NPDES})	Domestic & Commercial Flow (mgd) (Q_{DOM})	Domestic & Commercial Bkgd Conc.[a] (mg/L) (C_{DOM})	Septic/Hauled Waste Flow (mgd) (Q_{HW})	Septic/Hauled Waste Conc.[a] (mg/L) (C_{HW})	Removal Efficiency[a] (%) (R_{PRIM})	A.S. Inhibition Level (mg/L) (C_{INHIB1})	Allowable Headworks Loading (lb/day) (AHL_{SEC1})	Domestic & Commercial Loading (lb/day) (L_{UNC})	Septic/Hauled Waste Loading (lb/day) (L_{HW})	Allowable Industrial Loading (lb/day) (AIL_{SEC1})	Industrial Local Limit (mg/L) ($C_{LIM-SEC1}$)	Safety and Growth Factor (%) (SGF)
Conventional Pollutants															
Ammonia	0.343	1.809	4.000	1.466	22.40	0.000			480	7243	274	0	6244	2183	10
Biochemical Oxygen Demand (BOD)	0.343	1.809	4.000	1.466	287.50	0.000				-----	3515	0	-----	-----	10
Chemical Oxygen Demand (COD)	0.343	1.809	4.000	1.466		0.000				-----	0	0	-----	-----	10
Suspended Solids, Total (TSS)	0.343	1.809	4.000	1.466	208.00	0.000				-----	2543	0	-----	-----	10
Inorganic Pollutants															
Antimony	0.343	1.809	4.000	1.466		0.000				-----	0	0	-----	-----	10
Arsenic	0.343	1.809	4.000	1.466	0.0034	0.000			0.10	1.5	0.04	0	1.3	0.46	10
Barium	0.343	1.809	4.000	1.466	0.5030	0.000				-----	6.151	0	-----	-----	10
Beryllium	0.343	1.809	4.000	1.466		0.000				-----	0	0	-----	-----	10
Boron	0.343	1.809	4.000	1.466	0.182	0.000				-----	2.222	0	-----	-----	10
Bromide	0.343	1.809	4.000	1.466		0.000				-----	0	0	-----	-----	10
Cadmium	0.343	1.809	4.000	1.466	0.0002	0.000		15.0	5.5	98	0.0	0	88	30.71	10
Chromium III	0.343	1.809	4.000	1.466	0.0060	0.000			30	452.7	0.1	0	407.32	142.37	10
Chromium VI	0.343	1.809	4.000	1.466	0.00720	0.000			1.00	15.1	0.088040	0	13.5	4.72	10
Chromium, Total	0.343	1.809	4.000	1.466	0.00200	0.000		27.0	50.5	1043.8	0.02	0	939.4	328.35	10
Copper	0.343	1.809	4.000	1.466	0.0560	0.000		22.0	1.00	19.3	0.68	0	16.7	5.85	10
Cyanide	0.343	1.809	4.000	1.466		0.000		27.0	2.55	53	0	0	47	16.58	10
Fluoride	0.343	1.809	4.000	1.466	0.255	0.000				-----	3.118	0	-----	-----	10
Iron	0.343	1.809	4.000	1.466	0.989	0.000				-----	12.093	0	-----	-----	10
Lead	0.343	1.809	4.000	1.466	0.0023	0.000		57.0	2.55	89	0.03	0	81	28.14	10
Manganese	0.343	1.809	4.000	1.466	0.0510	0.000				-----	0.6	0	-----	-----	10
Mercury	0.343	1.809	4.000	1.466		0.000		10.0	0.55	9.2	0	0	8.30	2.90	10
Molybdenum	0.343	1.809	4.000	1.466	0.00044	0.000				-----	0.005380	0	-----	-----	10
Nickel	0.343	1.809	4.000	1.466	0.00087	0.000		14.0	1.75	30.7	0.01	0	27.6	9.65	10
Selenium	0.343	1.809	4.000	1.466		0.000				-----	0	0	-----	-----	10
Silver	0.343	1.809	4.000	1.466	0.002	0.000		20.0	2.625	50	0.02	0	44.54	15.57	10
Thallium	0.343	1.809	4.000	1.466		0.000				-----	0	0	-----	-----	10
Uranium	0.343	1.809	4.000	1.466		0.000				-----	0	0	-----	-----	10
Zinc	0.343	1.809	4.000	1.466	0.190	0.000		27.0	2.9	60	2.3	0	52	18.0	10
Organic Pollutants															
Benzene	0.343	1.809	4.000	1.466		0.000		25.0	300	6036	0	0	5432	1899	10
Bis(2-ethylhexyl)Phthalate	0.343	1.809	4.000	1.466	0.0060	0.000				-----	0.07	0	-----	-----	10
Bromodichloromethane	0.343	1.809	4.000	1.466		0.000				-----	0	0	-----	-----	10
Bromoform	0.343	1.809	4.000	1.466		0.000				-----	0	0	-----	-----	10
Chloroform	0.343	1.809	4.000	1.466	0.0050	0.000		14.0		-----	0.06	0	-----	-----	10
Dibromochloromethane	0.343	1.809	4.000	1.466		0.000				-----	0	0	-----	-----	10
Methylene chloride	0.343	1.809	4.000	1.466		0.000				-----	0	0	-----	-----	10
Toluene	0.343	1.809	4.000	1.466	0.0012	0.000			200	3018	0.015	0	2716	949	10
Other Pollutants															
TKN	0.343	1.809	4.000	1.466		0.000				-----	0	0	-----	-----	10
Nitrate/Nitrite as N	0.343	1.809	4.000	1.466	0.3300	0.000				-----	4.04	0	-----	-----	10
Oil & Grease	0.343	1.809	4.000	1.466		0.000				-----	0	0	-----	-----	10
Sulfide	0.343	1.809	4.000	1.466		0.000			27.5	415	0	0	373.45	130.53	10

(Q_{IND})	Industrial flow in mgd.	(Q_{NPDES})	WRP's permitted flow in mgd.
(Q_{EFF})	WRP's average flow in mgd.	(AHL_{SEC})	Allowable headworks pollutant loading to the WRP in lb/day.
(Q_{DOM})	Domestic/commercial background flow in mgd.	(L_{UNC})	Domestic/commercial loading in lb/day.
(Q_{HW})	Septic/Hauled Waste flow in mgd.	(L_{HW})	Septic/Hauled waste loading in lb/day.
(C_{DOM})	Domestic/commercial background concentrations in mg/L.	(AIL_{SEC})	Allowable industrial loading to the WRP in lb/day.
(C_{HW})	Septic/Hauled waste concentrations in mg/L.	($C_{LIM-SEC}$)	Local limits for industrial users in mg/L.
(R_{PRIM})	Removal efficiency after primary treatment as a percent.	(SGF)	Safety and growth factor as a percent.
(C_{INHIB2})	Activated sludge treatment inhibition threshold level for a particular pollutant in mg/L.	8.34	Unit conversion factor

Table E5. Local Limits Determination Based on Nitrification Inhibition Threshold Levels for Rio de Flag WRP
Industrial Pretreatment Program: Local Limits Evaluation
City of Flagstaff

Pollutant	IU Flow (mgd) (Q_{IND})	WRP Effluent Flow (mgd) (Q_{EFF})	WRP Permitted Flow (mgd) (Q_{NPDES})	Domestic & Commercial Flow (mgd) (Q_{DOM})	Domestic & Commercial Bkgd Conc.[a] (mg/L) (C_{DOM})	Septic/Hauled Waste Flow (mgd) (Q_{HW})	Septic/Hauled Waste Conc. (mg/L) (C_{HW})	Removal Efficiency[a] (%) (R_{SEC})	Nitrification Inhibition Level (mg/L) (C_{INHIB2})	Allowable Headworks Loading (lb/day) (AHL_{SEC2})	Domestic & Commercial Loading (lb/day) (L_{UNC})	Septic/Hauled Waste Loading (lb/day) (L_{HW})	Allowable Industrial Loading (lb/day) (AIL_{SEC2})	Industrial Local Limit (mg/L) ($C_{LIM\text{-}SEC2}$)	Safety and Growth Factor (%) (SGF)
Conventional Pollutants															
Ammonia	0.343	1.809	4.000	1.466	22.40	0.000				-----	274	0	-----	-----	10
Biochemical Oxygen Demand (BOD)	0.343	1.809	4.000	1.466	287.50	0.000				-----	3515	0	-----	-----	10
Chemical Oxygen Demand (COD)	0.343	1.809	4.000	1.466		0.000				-----	0	0	-----	-----	10
Suspended Solids, Total (TSS)	0.343	1.809	4.000	1.466	208.00	0.000				-----	2543	0	-----	-----	10
Inorganic Pollutants															
Antimony	0.343	1.809	4.000	1.466		0.000				-----	0	0	-----	-----	10
Arsenic	0.343	1.809	4.000	1.466	0.0034	0.000		45	1.5	41	0.04	0	36.99	12.93	10
Barium	0.343	1.809	4.000	1.466	0.5030	0.000				-----	6.15	0	-----	-----	10
Beryllium	0.343	1.809	4.000	1.466		0.000				-----	0	0	-----	-----	10
Boron	0.343	1.809	4.000	1.466	0.182	0.000				-----	2.22	0	-----	-----	10
Bromide	0.343	1.809	4.000	1.466		0.000				-----	0	0	-----	-----	10
Cadmium	0.343	1.809	4.000	1.466	0.0002	0.000		67	5.2	237.8	0.0	0	213.985	74.793	10
Chromium III	0.343	1.809	4.000	1.466	0.006	0.000				-----	0.1	0	-----	-----	10
Chromium VI	0.343	1.809	4.000	1.466	0.00720	0.000			5.5	82.99	0.088040	0	74.60	26.08	10
Chromium, Total	0.343	1.809	4.000	1.466	0.00200	0.000			1.075	16.22	0.02	0	14.57	5.09	10
Copper	0.343	1.809	4.000	1.466	0.0560	0.000		86	0.265	29	0.68	0	25.02	8.75	10
Cyanide	0.343	1.809	4.000	1.466		0.000		69	0.42	20	0	0	18.40	6.43	10
Iron	0.343	1.809	4.000	1.466	0.989	0.000				-----	12.09	0	-----	-----	10
Lead	0.343	1.809	4.000	1.466	0.0023	0.000		61	0.5	19.3	0.03	0	17.38	6.08	10
Manganese	0.343	1.809	4.000	1.466	0.051	0.000				-----	0.6	0	-----	-----	10
Mercury	0.343	1.809	4.000	1.466		0.000		60		-----	0	0	-----	-----	10
Molybdenum	0.343	1.809	4.000	1.466	0.00044	0.000		29		-----	0.005380	0	-----	-----	10
Nickel	0.343	1.809	4.000	1.466	0.00087	0.000		42	0.375	9.76	0.01	0	8.77	3.07	10
Selenium	0.343	1.809	4.000	1.466		0.000		50		-----	0	0	-----	-----	10
Silver	0.343	1.809	4.000	1.466	0.002	0.000		75		-----	0.02	0	-----	-----	10
Thallium	0.343	1.809	4.000	1.466		0.000				-----	0	0	-----	-----	10
Uranium	0.343	1.809	4.000	1.466		0.000				-----	0	0	-----	-----	10
Zinc	0.343	1.809	4.000	1.466	0.190	0.000		79	0.29	20.8	2.3	0	16.43	5.74	10
Organic Pollutants															
Benzene	0.343	1.809	4.000	1.466		0.000		80		-----	0	0	-----	-----	10
Bis(2-ethylhexyl)Phthalate	0.343	1.809	4.000	1.466	0.0060	0.000				-----	0.07	0	-----	-----	10
Bromodichloromethane	0.343	1.809	4.000	1.466		0.000				-----	0	0	-----	-----	10
Bromoform	0.343	1.809	4.000	1.466		0.000				-----	0	0	-----	-----	10
Chloroform	0.343	1.809	4.000	1.466	0.0050	0.000		67	10.0	457.24	0.06	0	411.45	143.81	10
Dibromochloromethane	0.343	1.809	4.000	1.466		0.000				-----	0	0	-----	-----	10
Methylene chloride	0.343	1.809	4.000	1.466		0.000		62		-----	0	0	-----	-----	10
Toluene	0.343	1.809	4.000	1.466	0.00120	0.000		93		-----	0.015	0	-----	-----	10
Other Pollutants															
TKN	0.343	1.809	4.000	1.466		0.000				-----	0	0	-----	-----	10
Nitrate/Nitrite as N	0.343	1.809	4.000	1.466	0.3300	0.000				-----	4.04	0	-----	-----	10
Oil & Grease	0.343	1.809	4.000	1.466		0.000				-----	0	0	-----	-----	10
Sulfide	0.343	1.809	4.000	1.466		0.000				-----	0	0	-----	-----	10

(Q_{IND})	Industrial flow in mgd.	(Q_{NPDES})	WRP's permitted flow in mgd.
(Q_{EFF})	WRP's average flow in mgd.	(AHL_{SEC})	Allowable headworks pollutant loading to the WRP in lb/day.
(Q_{DOM})	Domestic/commercial background flow in mgd.	(L_{UNC})	Domestic/commercial loading in lb/day.
(Q_{HW})	Septic/Hauled Waste flow in mgd.	(L_{HW})	Septic/Hauled waste loading in lb/day.
(C_{DOM})	Domestic/commercial background concentrations in mg/L.	(AIL_{SEC})	Allowable industrial loading to the WRP in lb/day.
(C_{HW})	Septic/Hauled waste concentrations in mg/L.	($C_{LIM\text{-}SEC}$)	Local limits for industrial users in mg/L.
(R_{PRIM})	Removal efficiency after primary treatment as a percent.	(SGF)	Safety and growth factor as a percent.
(C_{INHIB2})	Activated sludge treatment inhibition threshold level for a particular pollutant in mg/L.	8.34	Unit conversion factor.

Table E6. Local Limits Determination Based on Sludge Disposal for Rio de Flag WRP
Industrial Pretreatment Program: Local Limits Evaluation
City of Flagstaff

Pollutant	IU Flow (mgd) (Q_{IND})	WRP Effluent Flow (mgd) (Q_{EFF})	Domestic & Commercial Flow (mgd) (Q_{DOM})	Domestic & Commercial Bkgd Conc.[a] (mg/L) (C_{DOM})	Septic/Hauled Waste Flow (mgd) (Q_{HW})	Septic/Hauled Waste Conc.[a] (mg/L) (C_{HW})	Dry Sludge to Disposal (lbs/day) (Q_{SLUDGE})	Removal Efficiency (%) (RWRP)	Sludge Criteria (mg/kg) (C_{SLUDGE})	Allowable Headworks Loading (lbs/day) (AHL_{SLUDGE})	Domestic & Commercial Loading (lbs/day) (L_{UNC})	Septic/Hauled Waste Loading (lbs/day) (L_{HW})	Allowable Industrial Loading (lbs/day) (AIL_{SLUDGE})	Industrial Local Limit (mg/L) ($C_{LIM-SLUDGE}$)	Safety and Growth Factor (%) (SGF)
Conventional Pollutants															
Ammonia	0.343	1.809	1.466	22.40	0.000		NA	99.74		-----	274	0	-----	-----	10
Biochemical Oxygen Demand (BOD)	0.343	1.809	1.466	287.50	0.000		NA	99.43		-----	3515	0	-----	-----	10
Chemical Oxygen Demand (COD)	0.343	1.809	1.466		0.000		NA			-----	0	0	-----	-----	10
Suspended Solids, Total (TSS)	0.343	1.809	1.466	208.00	0.000		NA	99.55		-----	2543	0	-----	-----	10
Inorganic Pollutants															
Antimony	0.343	1.809	1.466		0.000		NA	21		-----	0	0	-----	-----	10
Arsenic	0.343	1.809	1.466	0.0034	0.000		NA	26.05		-----	0.04	0	-----	-----	10
Barium	0.343	1.809	1.466	0.5030	0.000		NA			-----	6.15	0	-----	-----	10
Beryllium	0.343	1.809	1.466		0.000		NA			-----	0	0	-----	-----	10
Boron	0.343	1.809	1.466	0.182	0.000		NA			-----	2.22	0	-----	-----	10
Bromide	0.343	1.809	1.466		0.000		NA			-----	0	0	-----	-----	10
Cadmium	0.343	1.809	1.466	0.0002	0.000		NA	71.36		-----	0.0	0	-----	-----	10
Chromium III	0.343	1.809	1.466	0.0060	0.000		NA			-----	0.1	0	-----	-----	10
Chromium VI	0.343	1.809	1.466	0.00720	0.000		NA			-----	0.088040	0	-----	-----	10
Chromium, Total	0.343	1.809	1.466	0.00200	0.000		NA	71.19		-----	0.02	0	-----	-----	10
Copper	0.343	1.809	1.466	0.0560	0.000		NA	83.31		-----	0.68	0	-----	-----	10
Cyanide	0.343	1.809	1.466		0.000		NA	37.5		-----	0	0	-----	-----	10
Iron	0.343	1.809	1.466	0.989	0.000		NA	93.78		-----	12.09	0	-----	-----	10
Lead	0.343	1.809	1.466	0.0023	0.000		NA	52		-----	0.03	0	-----	-----	10
Manganese	0.343	1.809	1.466	0.0510	0.000		NA	74.71		-----	0.6	0	-----	-----	10
Mercury	0.343	1.809	1.466		0.000		NA	99.16		-----	0	0	-----	-----	10
Molybdenum	0.343	1.809	1.466	0.00044	0.000		NA	29		-----	0.005380	0	-----	-----	10
Nickel	0.343	1.809	1.466	0.00087	0.000		NA	44.09		-----	0.01	0	-----	-----	10
Selenium	0.343	1.809	1.466		0.000		NA	62.57		-----	0	0	-----	-----	10
Silver	0.343	1.809	1.466	0.002	0.000		NA	94.71		-----	0.02	0	-----	-----	10
Thallium	0.343	1.809	1.466		0.000		NA			-----	0	0	-----	-----	10
Uranium	0.343	1.809	1.466		0.000		NA	89.5		-----	0	0	-----	-----	10
Zinc	0.343	1.809	1.466	0.190	0.000		NA	78		-----	2.3	0	-----	-----	10
Organic Pollutants															
Benzene	0.343	1.809	1.466		0.000		NA	50		-----	0	0	-----	-----	10
Bis(2-ethylhexyl)Phthalate	0.343	1.809	1.466	0.0060	0.000		NA	72		-----	0.07	0	-----	-----	10
Bromodichloromethane	0.343	1.809	1.466		0.000		NA			-----	0	0	-----	-----	10
Bromoform	0.343	1.809	1.466		0.000		NA			-----	0	0	-----	-----	10
Chloroform	0.343	1.809	1.466	0.0050	0.000		NA	84.6		-----	0.06	0	-----	-----	10
Dibromochloromethane	0.343	1.809	1.466		0.000		NA			-----	0	0	-----	-----	10
Methyl Chloride (Chloromethane)	0.343	1.809	1.466		0.000		NA			-----	0	0	-----	-----	10
Toluene	0.343	1.809	1.466	0.0012	0.000		NA	74.4		-----	0.01	0	-----	-----	10
Other Pollutants															
TKN	0.343	1.809	1.466		0		NA	97.2		-----	0	0	-----	-----	10
Nitrate/Nitrite as N	0.343	1.809	1.466	0.3300	0		NA			-----	4.04	0	-----	-----	10
Oil & Grease	0.343	1.809	1.466		0		NA	93.7		-----	0	0	-----	-----	10
Sulfide	0.343	1.809	1.466		0		NA	74.62		-----	0	0	-----	-----	10

(Q_{IND})	Industrial flow in mgd.	(Q_{NPDES})	WRP's permitted flow in mgd.
(Q_{EFF})	WRP's average flow in mgd.	(AHL_{SEC})	Allowable headworks pollutant loading to the WRP in lbs/day.
(Q_{DOM})	Domestic/commercial background flow in mgd.	(L_{UNC})	Domestic/commercial loading in lbs/day.
(Q_{HW})	Septic/Hauled Waste flow in mgd.	(L_{HW})	Septic/Hauled waste loading in lbs/day.
(C_{DOM})	Domestic/commercial background concentrations in mg/L.	(AIL_{SEC})	Allowable industrial loading to the WRP in lbs/day.
(C_{HW})	Septic/Hauled waste concentrations in mg/L.	($C_{LIM-SEC}$)	Local limits for industrial users in mg/L.
(R_{PRIM})	Removal efficiency after primary treatment as a percent.	(SGF)	Safety and growth factor as a percent.
(C_{INHIB2})	Activated sludge treatment inhibition threshold level for a particular pollutant in n	8.34	Unit conversion factor

Table E7. Local Limits Determination Based on Acute State Water Quality Standards for Rio de Flag WRP
Industrial Pretreatment Program: Local Limits Evaluation
City of Flagstaff

Pollutant	IU Flow (mgd) (Q_{IND})	WRP Effluent Flow (mgd) (Q_{EFF})	WRP Permitted Flow (mgd) (Q_{NPDES})	Domestic & Commercial Flow (mgd) (Q_{DOM})	Domestic & Commercial Bkgd Conc.[a] (mg/L) (C_{DOM})	Septic/Hauled Waste Flow (mgd) (Q_{HW})	Septic/Hauled Waste Conc.[a] (mg/L) (C_{HW})	Removal Efficiency[a] (%) (RWRP)	Stream Flow (mgd) (Q_{ASTR})	Upstream Conc. (mg/L) (C_{STR})	Acute State WQS[a] (mg/L) (CA_{WQS})	Allowable Headworks (lb/day) ($AHLA_{WQS}$)	Domestic & Commercial Loading (lb/day) (L_{UNC})	Septic/Hauled Waste Loading (lb/day) (L_{HW})	Allowable Industrial Loading (lb/day) ($AILA_{WQS}$)	Industrial Local Limit (mg/L) ($C_{LIM-AWQS}$)	Safety and Growth Factor (%) (SGF)
Conventional Pollutants																	
Ammonia	0.343	1.809	4.000	1.466	22.40	0		100	0.75		36.1	296917.89	274	0	266952.196	93306.3690	10
Biochemical Oxygen Demand (BOD)	0.343	1.809	4.000	1.466	287.50	0		99.43	0.75			-----	3515	0	-----	-----	10
Chemical Oxygen Demand (COD)	0.343	1.809	4.000	1.466		0			0.75			-----	0	0	-----	-----	10
Suspended Solids, Total (TSS)	0.343	1.809	4.000	1.466	208.00	0		99.55	0.75			-----	2543	0	-----	-----	10
Inorganic Pollutants																	
Antimony	0.343	1.809	4.000	1.466		0			0.75			-----	0	0	-----	-----	10
Arsenic	0.343	1.809	4.000	1.466	0.0034	0		26.05	0.75		0.34	10	0.04	0	9	3	10
Barium	0.343	1.809	4.000	1.466	0.5030	0			0.75			-----	6.15	0	-----	-----	10
Beryllium	0.343	1.809	4.000	1.466		0			0.75		0.07	1	0	0	1	0	10
Boron	0.343	1.809	4.000	1.466	0.182	0			0.75			-----	2.22	0	-----	-----	10
Bromide	0.343	1.809	4.000	1.466		0			0.75			-----	0	0	-----	-----	10
Cadmium	0.343	1.809	4.000	1.466	0.0002	0		71.36	0.75		0.0036	0.27	0.00	0	0.24	0.08	10
Chromium III	0.343	1.809	4.000	1.466	0.006	0			0.75		2.74	58.7	0.07	0	52.7	18.43	10
Chromium VI	0.343	1.809	4.000	1.466	0.00720	0			0.75		0.02	0.3	0.09	0	0.2	0.08	10
Chromium, Total	0.343	1.809	4.000	1.466	0.00200	0		71.19	0.75			-----	0.02	0	-----	-----	10
Copper	0.343	1.809	4.000	1.466	0.0560	0		83.31	0.75		0.018	2	0.68	0	1	0	10
Cyanide	0.343	1.809	4.000	1.466		0		37.5	0.75		0.041	1.40	0	0	1.26	0.441	10
Iron	0.343	1.809	4.000	1.466	0.989	0		93.78	0.75			-----	12.09	0	-----	-----	10
Lead	0.343	1.809	4.000	1.466	0.0023	0		52	0.75		0.16	6.99	0.03	0	6.26	2.19	10
Manganese	0.343	1.809	4.000	1.466	0.051	0		74.71	0.75			-----	0.62	0	-----	-----	10
Mercury	0.343	1.809	4.000	1.466		0		99.16	0.75		0.0024	6.1	0	0	5.5	1.92	10
Molybdenum	0.343	1.809	4.000	1.466	0.00044	0		29	0.75			-----	0.01	0	-----	-----	10
Nickel	0.343	1.809	4.000	1.466	0.00087	0		44.09	0.75		0.72	27.6927	0.01	0	24.9128	8.7076	10
Selenium	0.343	1.809	4.000	1.466		0		62.57	0.75			-----	0	0	-----	-----	10
Silver	0.343	1.809	4.000	1.466	0.002	0		94.71	0.75		0.0091	3.696	0.02	0	3	1	10
Thallium	0.343	1.809	4.000	1.466		0			0.75			-----	0	0	-----	-----	10
Uranium	0.343	1.809	4.000	1.466		0		89.5	0.75			-----	0	0	-----	-----	10
Zinc	0.343	1.809	4.000	1.466	0.190	0		78	0.75		0.19	18	2.3	0	14	4.85	10
Organic Pollutants																	
Benzene	0.343	1.809	4.000	1.466		0		50	0.75		8.80	376	0	0	339	118	10
Bis(2-ethylhexyl)Phthalate	0.343	1.809	4.000	1.466	0.0060	0		72	0.75			-----	0.07	0	-----	-----	10
Bromodichloromethane	0.343	1.809	4.000	1.466		0			0.75			-----	0	0	-----	-----	10
Bromoform	0.343	1.809	4.000	1.466		0			0.75		15.00	321	0	0	289	101	10
Chloroform	0.343	1.809	4.000	1.466	0.0050	0		84.6	0.75		14.00	1944	0.06	0	1750	612	10
Dibromochloromethane	0.343	1.809	4.000	1.466		0			0.75			-----	0	0	-----	-----	10
Methyl Chloride (Chloromethane)	0.343	1.809	4.000	1.466		0			0.75		270.00	5774	0	0	5196	1816	10
Methylene chloride	0.343	1.809	4.000	1.466		0		57	0.75			-----	0	0	-----	-----	10
Toluene	0.343	1.809	4.000	1.466	0.0012	0		74.4	0.75		8.70	727	0.01	0	654	229	10
Other Pollutants																	
TKN	0.343	1.809	4.000	1.466		0		97.2	0.75			-----	0	0	-----	-----	10
Nitrate/Nitrite as N	0.343	1.809	4.000	1.466	0.3300	0			0.75			-----	4.04	0	-----	-----	10
Oil & Grease	0.343	1.809	4.000	1.466		0		93.7	0.75			-----	0	0	-----	-----	10
Sulfide	0.343	1.809	4.000	1.466		0		74.62	0.75			-----	0	0	-----	-----	10

[a]Copper WQS was manually changed to 0.018 mg/L per specified limits for the Rio de Flag River

(Q_{IND})	Industrial flow in mgd.	(Q_{NPDES})	WRP's permitted flow in mgd.
(Q_{EFF})	WRP's average flow in mgd.	(C_{WQS})	Water quality standard for a particular pollutant in mg/L.
(Q_{DOM})	Domestic/commercial background flow in mgd.	(AHL_{WQS})	Allowable headworks pollutant loading to the WRP in lb/day.
(Q_{HW})	Septic/Hauled Waste flow in mgd.	(L_{UNC})	Domestic/commercial loading in lb/day.
(C_{DOM})	Domestic/commercial background concentrations in mg/L.	(L_{HW})	Septic/Hauled waste loading in lb/day.
(C_{HW})	Septic/Hauled waste concentrations in mg/L.	(AIL_{WQS})	Allowable industrial loading to the WRP in lb/day.
(Q_{STR})	Receiving stream (upstream) flow in mgd; equal to the dilution factor multiplied by the WRP's average flow.	($C_{LIM-WQS}$)	Local limits for industrial users in mg/L.
(RWRP)	Removal efficiency across WRP as a percent.	(SGF)	Safety and growth factor as a percent.
(C_{STR})	Receiving stream background level, where available, in mg/L.	8.34	Unit conversion factor.

Table E8. Local Limits Determination Based on Chronic State Water Quality Standards for Rio de Flag WRP
Industrial Pretreatment Program: Local Limits Evaluation
City of Flagstaff

Pollutant	IU Flow (mgd) (Q_{IND})	WRP Effluent Flow (mgd) (Q_{EFF})	WRP Permitted Flow (mgd) (Q_{NPDES})	Domestic & Commercial Flow (mgd) (Q_{DOM})	Domestic & Commercial Bkgd Conc.[a] (mg/L) (C_{DOM})	Septic/Hauled Waste Flow (mgd) (Q_{HW})	Septic/Hauled Waste Conc.[a] (mg/L) (C_{HW})	Removal Efficiency[a] (%) (R_{POTW})	Stream Flow (mgd) (Q_{CSTR})	Upstream Conc. (mg/L) (C_{STR})	Chronic State WQS[a] (mg/L) (C_{CWQS})	Allowable Headworks (lb/day) (AHL_{CWQS})	Domestic & Commercial Loading (lb/day) (L_{UNC})	Septic/Hauled Waste Loading (lb/day) (L_{HW})	Allowable Industrial Loading (lb/day) (AIL_{CWQS})	Industrial Local Limit (mg/L) $(C_{LIM\text{-}CWQS})$	Safety and Growth Factor (%) (SGF)
Conventional Pollutants																	
Ammonia	0.343	1.809	4.000	1.466	22.40	0.000		100	0.755		4.70	38656.90	274	0	34517.307	12064.6492	10
Biochemical Oxygen Demand (BOD)	0.343	1.809	4.000	1.466	287.50	0.000		99.43	0.755			-----	3515	0	-----	-----	10
Chemical Oxygen Demand (COD)	0.343	1.809	4.000	1.466		0.000			0.755			-----	0	0	-----	-----	10
Suspended Solids, Total (TSS)	0.343	1.809	4.000	1.466	208.00	0.000		99.55	0.755			-----	2543	0	-----	-----	10
Inorganic Pollutants																	
Antimony	0.343	1.809	4.000	1.466		0.000			0.755		0.01	0	0	0	0	0.04	10
Arsenic	0.343	1.809	4.000	1.466	0.0034	0.000		26.05	0.755		0.05	1.45	0.04	0	1.260	0.44	10
Barium	0.343	1.809	4.000	1.466	0.5030	0.000			0.755		2.00	42.769	6.1506	0	32.342	11.30	10
Beryllium	0.343	1.809	4.000	1.466		0.000			0.755		0.0040	0.09	0	0	0.077	0.0269	10
Boron	0.343	1.809	4.000	1.466	0.182	0.000			0.755		186.67	3991.81	2.22	0	3590.41	1254.94	10
Bromide	0.343	1.809	4.000	1.466		0.000			0.755			-----	0	0	-----	-----	10
Cadmium	0.343	1.809	4.000	1.466	0.0002	0.000		71.36	0.755		0.00	0.030	0.0	0	0.02	0.0085	10
Chromium III	0.343	1.809	4.000	1.466	0.006	0.000			0.755		0.13	2.8049	0.1	0	2.45	0.86	10
Chromium VI	0.343	1.809	4.000	1.466	0.00720	0.000			0.755		0.01	0.235	0.09	0	0.1237	0.0432	10
Chromium, Total	0.343	1.809	4.000	1.466	0.00200	0.000		71.19	0.755		0.10	7.4227	0.02	0	6.6559	2.3264	10
Copper	0.343	1.809	4.000	1.466	0.0560	0.000		83.31	0.755		0.018	2.31	0.68	0	1.391	0.49	10
Cyanide	0.343	1.809	4.000	1.466		0.000		37.5	0.755		0.01	0.332	0	0	0.299	0.10	10
Iron	0.343	1.809	4.000	1.466	0.989	0.000		93.78	0.755		1.00	343.80	12.09	0	297.33	103.92	10
Lead	0.343	1.809	4.000	1.466	0.0023	0.000		52	0.755		0.006	0.27	0.03	0	0.22	0.08	10
Manganese	0.343	1.809	4.000	1.466	0.051	0.000		74.71	0.755		130.67	11048.9	0.6	0	9943.399	3475.463	10
Mercury	0.343	1.809	4.000	1.466		0.000		99.16	0.755		0.000010	0.0255	0	0	0.02	0.01	10
Molybdenum	0.343	1.809	4.000	1.466	0.00044	0.000		29	0.755			-----	0.01	0	-----	-----	10
Nickel	0.343	1.809	4.000	1.466	0.00087	0.000		44.09	0.755		0.08	3.0789	0.01	0	2.7604	0.9648	10
Selenium	0.343	1.809	4.000	1.466		0.000		62.57	0.755		0.0020	0.114	0	0	0.103	0.04	10
Silver	0.343	1.809	4.000	1.466	0.002	0.000		94.71	0.755		4.67	1886.621	0.02	0	1697.93	593.470	10
Thallium	0.343	1.809	4.000	1.466		0.000			0.755		0.0020	0.043	0	0	0.038	0.0135	10
Uranium	0.343	1.809	4.000	1.466		0.000		89.5	0.755		2.80	570	0	0	513	179.39	10
Zinc	0.343	1.809	4.000	1.466	0.190	0.000		78	0.755		0.19	18	2.3	0	13.86	4.85	10
Organic Pollutants																	
Benzene	0.343	1.809	4.000	1.466		0.000		50	0.755		0.01	0	0	0	0	0.07	10
Bis(2-ethylhexyl)Phthalate	0.343	1.809	4.000	1.466	0.0060	0.000		72	0.755			-----	0.07	0	-----	-----	10
Bromodichloromethane	0.343	1.809	4.000	1.466		0.000			0.755		18.67	399	0	0	359	125.57	10
Bromoform	0.343	1.809	4.000	1.466		0.000			0.755		10.00	214	0	0	192	67.27	10
Chloroform	0.343	1.809	4.000	1.466	0.0050	0.000		84.6	0.755		0.90	125	0.06	0	112	39.29	10
Dibromochloromethane	0.343	1.809	4.000	1.466		0.000			0.755		18.67	399	0	0	359	125.57	10
Methylene chloride	0.343	1.809	4.000	1.466		0.000		57	0.755			-----	0	0	-----	-----	10
Toluene	0.343	1.809	4.000	1.466	0.0012	0.000		74.4	0.755		0.18	15	0.015	0	14	4.72	10
Other Pollutants																	
TKN	0.343	1.809	4.000	1.466		0.000		97.2	0.755			-----	0	0	-----	-----	10
Nitrate/Nitrite as N	0.343	1.809	4.000	1.466	0.3300	0.000			0.755		10.0	214	4.04	0	188	65.86	10
Oil & Grease	0.343	1.809	4.000	1.466		0.000		93.7	0.755			-----	0	0	-----	-----	10
Sulfide	0.343	1.809	4.000	1.466		0.000		74.62	0.755			-----	0	0	-----	-----	10

[a]Copper WQS was manually changed to 0.018 mg/L per specified limits for the Rio de Flag River

(Q_{IND})	Industrial flow in mgd.	(Q_{NPDES})	WRP's permitted flow in mgd.
(Q_{EFF})	WRP's average flow in mgd.	(C_{WQS})	Water quality standard for a particular pollutant in mg/L.
(Q_{DOM})	Domestic/commercial background flow in mgd.	(AHL_{WQS})	Allowable headworks pollutant loading to the WRP in lb/day.
(Q_{HW})	Septic/Hauled Waste flow in mgd.	(L_{UNC})	Domestic/commercial loading in lb/day.
(C_{DOM})	Domestic/commercial background concentrations in mg/L.	(L_{HW})	Septic/Hauled waste loading in lb/day.
(C_{HW})	Septic/Hauled waste concentrations in mg/L.	(AIL_{WQS})	Allowable industrial loading to the WRP in lb/day.
(Q_{STR})	Receiving stream (upstream) flow in mgd; equal to the dilution factor multiplied by the WRP's average flow.	$(C_{LIM\text{-}WQS})$	Local limits for industrial users in mg/L.
(RWRP)	Removal efficiency across WRP as a percent.	(SGF)	Safety and growth factor as a percent.
(C_{STR})	Receiving stream background level, where available, in mg/L.	8.34	Unit conversion factor.

Table E9. Summary of Allowable Headworks Loadings (AHLs) for Rio de Flag WRP Industrial Pretreatment Program: Local Limits Evaluation City of Flagstaff							
Pollutant	Allowable Headworks Loadings (lb/day)						
	Design Criteria (AHL_{DC})	NPDES Discharge Permit Limits (AHL_{NPDES})	Activated Sludge Treatment Inhibition (AHL_{SEC1})	Nitrification Treatment Inhibition (AHL_{SEC2})	Sludge Disposal (AHL_{SLUDGE})	Acute Water Quality Standards (AHL_{AWQS})	Chronic Water Quality Standards (AHL_{CWQS})
Conventional Pollutants							
Ammonia	2,135	-----	7,243	-----		296,918	38,657
Biochemical Oxygen Demand (BOD)	28,856	79,415	-----	-----		-----	-----
Chemical Oxygen Demand (COD)	18,181	-----	-----	-----		-----	-----
Suspended Solids, Total (TSS)	18,682	100,592	-----	-----		-----	-----
Inorganic Pollutants							
Antimony	-----	-----	-----	-----		-----	0.128
Arsenic	-----	-----	1.51	41.2		9.83	1.45
Barium	-----	-----	-----	-----		-----	42.8
Beryllium	-----	-----	-----	-----		1.39	0.086
Boron	-----	-----	-----	-----		-----	3,992
Bromide	-----	-----	-----	-----		-----	-----
Cadmium	-----	-----	97.6	238		0.268	0.030
Chromium III	-----	-----	453	-----		58.7	2.80
Chromium VI	-----	-----	15.1	83.0		0.342	0.235
Chromium, Total	-----	-----	1044	16.2		-----	7.42
Copper	-----	1.63	19.3	28.6		2.31	2.31
Cyanide	-----	-----	52.7	20.4		1.40	0.332
Iron	-----	-----	-----	-----		-----	344
Lead	-----	-----	89.5	19.3		6.99	0.272
Manganese	-----	-----	-----	-----		-----	11,049
Mercury	-----	-----	9.2	-----		6.11	0.025
Molybdenum	-----	-----	-----	-----		-----	-----
Nickel	-----	-----	30.7	9.76		27.7	3.08
Selenium	-----	-----	-----	-----		-----	0.114
Silver	-----	-----	49.5	-----		3.70	1,887
Thallium	-----	-----	-----	-----		-----	0.043
Uranium	-----	-----	-----	-----		-----	570
Zinc	-----	-----	59.9	20.8		18.0	18.0
Organic Pollutants							
Benzene	-----	-----	6,036	-----		376	0.214
Bis(2-ethylhexyl)Phthalate	-----	-----	-----	-----		-----	-----
Bromodichloromethane	-----	-----	-----	-----		-----	399
Bromoform	-----	-----	-----	-----		321	214
Chloroform	-----	-----	-----	457		1944	125
Dibromochloromethane	-----	-----	-----	-----		-----	399
Methylene chloride	-----	-----	-----	-----		-----	-----
Toluene	-----	-----	3,018	-----		727	15.0
Other Pollutants							
TKN	2,135	-----	-----	-----		-----	-----
Nitrate/Nitrite as N	-----	-----	-----	-----		-----	214
Oil & Grease	-----	2395	-----	-----		-----	-----
Sulfide	-----	-----	415	-----		-----	-----

Table E10. Summary of Allowable Industrial Loadings (AILs) for Rio de Flag WRF Industrial Pretreatment Program: Local Limits Evaluation City of Flagstaff							
Pollutant	Allowable Industrial Loadings (lb/day)						
	Design Criteria	NPDES Discharge Permit Limits	Activated Sludge Treatment Inhibition	Nitrification Treatment Inhibition	Sludge Disposal	Acute Water Quality Standards	Chronic Water Quality Standards
	(AIL_{DC})	(AIL_{NPDES})	(AIL_{SEC1})	(AIL_{SEC2})	(AIL_{SLUDGE})	(AHL_{AWQS})	(AHL_{CWQS})
Conventional Pollutants							
Ammonia	1,648	-----	6,244	-----		266,952	34,517
Biochemical Oxygen Demand (BOD)	22,455	67,958	-----	-----		-----	-----
Chemical Oxygen Demand (COD)	16,363	-----	-----	-----		-----	-----
Suspended Solids, Total (TSS)	14,270	87,989	-----	-----		-----	-----
Inorganic Pollutants							
Antimony	-----	-----	-----	-----		-----	0.115
Arsenic	-----	-----	1.32	37.0		8.81	1.26
Barium	-----	-----	-----	-----		-----	32.3
Beryllium	-----	-----	-----	-----		1.25	0.077
Boron	-----	-----	-----	-----		-----	3590
Bromide	-----	-----	-----	-----		-----	-----
Cadmium	-----	-----	87.9	214		0.239	0.024
Chromium III	-----	-----	407	-----		52.7	2.45
Chromium VI	-----	-----	13.5	74.6		0.220	0.124
Chromium, Total	-----	-----	939	14.6		-----	6.66
Copper	-----	0.780	16.7	25.0		1.39	1.39
Cyanide	-----	-----	47.4	18.4		1.26	0.299
Iron	-----	-----	-----	-----		-----	297
Lead	-----	-----	80.5	17.4		6.26	0.217
Manganese	-----	-----	-----	-----		-----	9943
Mercury	-----	-----	8.30	-----		5.50	0.023
Molybdenum	-----	-----	-----	-----		-----	-----
Nickel	-----	-----	27.6	8.77		24.9	2.76
Selenium	-----	-----	-----	-----		-----	0.103
Silver	-----	-----	44.5	-----		3.30	1698
Thallium	-----	-----	-----	-----		-----	0.038
Uranium	-----	-----	-----	-----		-----	513
Zinc	-----	-----	51.6	16.4		13.9	13.9
Organic Pollutants							
Benzene	-----	-----	5,432	-----		339	0.192
Bis(2-ethylhexyl)Phthalate	-----	-----	-----	-----		-----	-----
Bromodichloromethane	-----	-----	-----	-----		-----	359
Bromoform	-----	-----	-----	-----		289	192
Chloroform	-----	-----	-----	411		1750	112
Dibromochloromethane	-----	-----	-----	-----		-----	359
Methylene chloride	-----	-----	-----	-----		-----	-----
Toluene	-----	-----	2,716	-----		654	13.5
Other Pollutants							
TKN	1,922	-----	-----	-----		-----	-----
Nitrate/Nitrite as N	-----	-----	-----	-----		-----	188
Oil & Grease	-----	2156	-----	-----		-----	-----
Sulfide	-----	-----	373	-----		-----	-----

Table E11. Maximum Allowable Headworks Loadings and Local Limits for Rio de Flag WRP
Industrial Pretreatment Program: Local Limits Evaluation
City of Flagstaff

Pollutant	Most Stringent Criterion	Maximum Allowable Headworks Loadings			Maximum Allowable Industrial Loadings			Local Limit Needed?	Calculated Industrial Local Limit (mg/L)	Worker Protection Screening Level[c] (mg/L)	Domestic/ Commercial Background Levels[d] (mg/L)	Final Industrial Local Limit[e] (mg/L)
		Calculated MAHL (lbs/day)	Current Influent Loading Based on Actual Flow[a] (lb/day)	Percent of MAHL Currently in Use[b] (%)	Calculated MAIL (lbs/day)	Current Industrial Loading Based on Actual Flow[a] (lb/day)	Percent of MAIL Currently in Use[b] (%)					
Conventional Pollutants												
Ammonia	Design Criteria	2,135	593	27.8%	1,648	22.9	1.39%	Yes	576	-----		576
Biochemical Oxygen Demand (BOD)	Design Criteria	28,856	5,538	19.2%	22,455	4735	21.1%	Yes	7,849	-----		7849
Chemical Oxygen Demand (COD)	Design Criteria	18,181			16,363				5719	-----		5719
Suspended Solids, Total (TSS)	Design Criteria	18,682	4,240	22.7%	14,270	806	5.65%	Yes	4,988	-----		4988
Inorganic Pollutants												
Antimony	Chronic State WQS	0.128			0.115	0.0025	2.122%		0.040	-----		0.040
Arsenic	Chronic State WQS	1.45	0.054	3.76%	1.26	0.006	0.48%	Yes	0.440	-----		0.440
Barium	Chronic State WQS	42.8			32.3	0.633	1.958%		11.3	-----		11.3
Beryllium	Chronic State WQS	0.086			0.077	0.001	0.65%		0.027	-----		0.027
Boron	Chronic State WQS	3,992	2.21	0.06%	3,590	0.068	0.002%		1255	-----		1255
Bromide	Based on TTHM Formation							Yes		-----		
Cadmium	Chronic State WQS	0.030	0.002	5.11%	0.024	0.00028	1.127%		0.009	-----		0.009
Chromium III	Chronic State WQS	2.80			2.45				0.857	-----		0.857
Chromium VI	Chronic State WQS	0.235			0.124				0.043	-----		0.043
Chromium, Total	Chronic State WQS	7.42	0.032	0.427%	6.66	0.008	0.123%		2.33	-----		2.33
Copper	Chronic State WQS	1.63	1.08	66.2%	0.780	0.099	12.8%	Yes	0.273	-----		0.273
Cyanide	Chronic State WQS	0.332			0.299	0.016	5.3%	Yes	0.104	-----		0.104
Iron	Chronic State WQS	344	10.0	2.91%	297	1.34	0.452%		103.9	-----		103.9
Lead	Chronic State WQS	0.272	0.017	6.26%	0.217	0.003	1.41%	Yes	0.076	-----		0.076
Manganese	Chronic State WQS	11,049	0.513	0.005%	9,943	0.048	0.000%		3475	-----		3475
Mercury	Chronic State WQS	0.025			0.023	0.000	0.48%	Yes	0.008	-----		0.008
Molybdenum										-----		
Nickel	Chronic State WQS	3.08	0.035	1.13%	2.76	0.011	0.415%		0.965	-----		0.965
Selenium	Chronic State WQS	0.114	0.018	15.8%	0.103	0.007	7.2%	Yes	0.036	-----		0.036
Silver	Acute State WQS	3.70	0.005	0.122%	3.30	0.002	0.060%		1.15	-----		1.15
Thallium	Chronic State WQS	0.043			0.038	0.000	0.195%		0.013	-----		0.013
Uranium	Chronic State WQS	570	0.008	0.001%	513	0.128	0.025%		179	-----		179
Zinc	Acute State WQS	18.0	1.94	10.8%	13.9	0.167	1.21%	Yes	4.85	-----		4.85
Organic Pollutants												
Benzene	Chronic State WQS	0.214			0.192				0.067	-----		0.067
Bis(2-ethylhexyl)Phthalate										-----		
Bromodichloromethane	Chronic State WQS	399			359	0.715	0.199%		126	-----		126
Bromoform	Chronic State WQS	214			192				67.3	-----		67.3
Chloroform	Chronic State WQS	125	0.050	0.040%	112	1.505	1.339%		39.3	-----		39.3
Dibromochloromethane	Chronic State WQS	399			359	0.444	0.124%		126	-----		126
Methylene chloride										-----		
Toluene	Chronic State WQS	15.0	0.044	0.291%	13.5	0.053	0.388%	Yes	4.72	-----		4.72
Other Pollutants												
TKN	Design Criteria	2,135	691	32%	1,922	554	28.8%	Yes	672	-----		672
Nitrate/Nitrite as N	Chronic State WQS	214	10.6	4.9%	188			Yes	66	-----		66
Oil & Grease	NPDES Permit Limits	2,395	488	20.4%	2,156	384.4	17.834%	Yes	753	-----		753
Sulfide	Activated Sludge Treatment Inhibition	415	1.49	0.358%	373	3.32	0.890%	Yes	131	-----		131

[a] Influent loadings are provided only for those parameters detected in influent samples.

[b] MAHL and MAIL utilizations are calculated only for those pollutants detected in the influent and industrial effluent, respectively.

[c] Worker Protection Screening Levels are the most stringent of discharge screening levels based on fume toxicity and explosivity. Refer to Table D6. Secondary source for worker protection screening level is provided in Table D7.

[d] Domestic/commercial background levels are provided only for those parameters with negative calculated local limits.

[e] Industrial local limits are the more stringent of the calculated industrial local limits and Worker Protection Screening Levels. In the case of negative local limits where domestic/commercial background levels are not available, the laboratory practical quantitation limit was used.

Appendix F: ADEQ Letter

August 18, 2020

City of Flagstaff
Jolene Hayes
211 W. Aspen Ave.
Flagstaff, AZ 86001

Re: Completion of City of Flagstaff Pretreatment Program Modification Review

Dear Ms. Hayes,

Thank you for your submission to modify the City of Flagstaff Pretreatment Program, which was received on July 22, 2020. Pursuant to 40 CFR § 403.18 (2003 Edition) we completed this non-substantial modification review within 45 days of receipt by the Department.

During our review of the Brown & Caldwell 2020 Local Limits Study (Study), we determined that the following revisions are required to correct several deficiencies:

- Page “x” of the Study indicates that per EPA guidance, the AZPDES permitted flow should be used in the AZPDES AHL calculations. Page x of the report also indicates that the Wildcat Hill WRP and Rio de Flag WRP do not have specified permitted flows; however, our records indicate the current AZPDES Permit AZ0020427 for Wildcat Hill WRP indicates on the first page that the permitted flow is 6 mgd. The current AZPDES permit AZ0023639 for Rio de Flag WRP indicates on the first page that the permitted flow is 4 mgd. Revise this statement in the Study.
- In Appendix D of the Study, the calculation of the maximum allowable headworks loading (MAHL) for Wildcat Hill WRP uses an incorrect value of 7.2 mgd for the NPDES permitted discharge. Amend the Study, using 6 mgd in the MAHL calculation.
- In Appendix E of the Study, the calculation of the MAHL for Rio de Flag WRP uses an incorrect value of 2.7 mgd for the NPDES permitted discharge. Amend the Study, using 4 mgd in the MAHL calculation.
- After addressing the above revisions, reinterpret the results of the Study and revise the proposed local limits. Verify that the proposed local limits consisting of 18 parameters, compared to the 25 current limit parameters, did not change due to the above revisions. Modify all parts of the Study that may have been affected by addressing the above revisions.

Due to requirements within 40 CFR § 403.18(d)(2) (2003 Edition), we are denying this non-substantial modification.[1] Once the above revisions are addressed, please resubmit your request for a modification of the City of Flagstaff’s approved pretreatment program. We will verify that the required changes were completed, and review the modification. It is possible that upon resubmission, we may elevate this submission to a substantial modification due to the potential relaxed local limits (40 CFR 403.18(b)(2) (2003 Edition)). We completed a cursory review of the draft FOG manual included in the submission. If any revisions to the FOG manual are necessary after completing the above revisions of the local limits study, please resubmit the manual to ADEQ. ADEQ will provide a comprehensive review at that time.

Should you have any questions, please contact Kristie Chavero at 602-771-4575.

Sincerely,

Justin Bern

Justin Bern, Manager
Surface Water Protection Value Stream
Water Quality Division

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[1]This determination is an appealable agency action under A.R.S. § 41-1092. You have the right to request a hearing and file an appeal under A.R.S. § 41-1092.03. To do this you must file a Request for Hearing or Notice of Appeal within thirty (30) days of receipt of this notice. A request for Hearing or Notice of Appeal is filed when it is received by ADEQ's Hearing Administrator as follows:

Hearing Administrator
Office of Administrative Counsel
Arizona Department of Environmental Quality
1110 West Washington Street
Phoenix, AZ 85007

The Request or Notice must contain the following:

1. The name of the party that is filing the appeal;
2. The address of the party that is filing the appeal;
3. The action being appealed; and
4. A concise statement of the reasons for the appeal.

Upon proper filing of a Request for Hearing or Notice of Appeal, ADEQ will serve a Notice of Hearing on all parties to the appeal. If you file a timely Request for Hearing or Notice of Appeal, you have the right to request an informal settlement conference with ADEQ under A.R.S § 41-1092.06. This request must be made in writing no later than 20 days before a scheduled hearing and must be filed with the Hearing Administrator at the above address.

14.

CITY OF FLAGSTAFF

STAFF SUMMARY REPORT

To:	The Honorable Mayor and Council
From:	Sara Dechter, AICP, Comprehensive Planning Manager
Date:	02/23/2021
Meeting Date:	03/30/2021

TITLE

Regional Plan 2045 Update Potential Process and Strategies

STAFF RECOMMENDED ACTION:

Discussion of the proposed public participation approach and schedule and any topics or concerns that Council would like to make sure staff factors into the process early.

EXECUTIVE SUMMARY:

The Flagstaff Regional Plan 2030 was ratified by Flagstaff voters in 2014. According to Arizona Revised Statutes, the City is required to send the plan to voters for readoption or an updated general plan for adoption within 10 years.

Flagstaff has also combined our general plan with an area plan for Coconino County that encompasses unincorporated areas within the Metroplan for Greater Flagstaff jurisdiction. This intergovernmental approach creates a stronger foundation for land, transportation, water, and natural resources management and planning. Staff recommends, given the County's willingness to participate, following this same approach in our upcoming planning and community engagement efforts.

INFORMATION:

The Regional Plan is a policy guide, serving as the general plan for the City of Flagstaff and an amendment to the Coconino County Comprehensive Plan. As mandated by state law, the plan covers a range of topics with information on current conditions and our vision for the future as it relates to the topic at hand. In addition, the plan outlines carefully developed goals and policies to realize the future vision. Strategies to accomplish these goals and policies are located in a separate documents, such as neighborhood plans, master plans and strategic plans, so that they can remain dynamic, and can be updated with City Council and public direction on a more frequent basis

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The Flagstaff Regional Plan is: • a collaborative community vision • a collection of goals and policies to achieve that vision • a tool for decision makers, developers, businesses, and citizens • a framework for general planning.

The Flagstaff Regional Plan is not: • a mandate for or against development • a zoning ordinance • a Capital Improvement Plan • a City budget • an unchangeable plan, or a law

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Analysis and Data Management
The Regional Plan is also a rich and integrated assessment of resources, drivers, and systems that work together to produce and protect the built, social and natural environment of the Greater Flagstaff area. Completion of a Regional Plan update requires complex data analysis and scenario planning that considers over 150 data sources and requires software and analytical efforts. The Plan provides the analytical foundation for:

- Development of Area, Neighborhood and Specific Plans for the City and County
- City and County capital improvement plans,
- Metroplan's Regional Transportation Plan,
- Mountain Line 5 year Plan
- VISSM regional traffic model which is used in all Traffic Impact Analysis,
- Water Services Master Plan,
- Flagstaff's 100 year water supply certification with Arizona Department of Water Quality
- Open Space Planning and management
- Economic Development planning and assessments
- Analysis of conformance for Major Plan Amendment
- Conformance of Zoning Code amendments and annexation cases

Data Management Framework
In order to complete the maps and information required by statue and anticipated information needed by decision makers, staff anticipates needing to organize, evaluate and analyze over 180 different metrics and geospatial datasets. The document with a list of anticipated Regional Plan Data needs attached to this report, provides a list compiled by staff at the City, County, Metroplan, and Mountain Line based on meetings between November 2020 and February 2021. The Regional Plan's data management team has already been discussing the nature of this work and how we can best organize and maintain access and ensure the quality of this work. It is anticipated that organizing and evaluating these metrics and creating informational material our of them could take 9 to 12 months to complete and would be ongoing throughout the Regional Plan update process.

Public Participation
The heart of the Regional Plan is the vision of the community for its future. Developing this vision is a process that engages a broad and diverse population of nearly 90,000 to 100,000 residents of Coconino County and the City of Flagstaff. The draft Public Participation Plan attached to this report is designed to reflect on past visioning and design a process that will allow the community to take and active and empowered role in developing the next Regional Plan. The Public Participation Plan is broken into four phases:

1. Get Curious and Gain Understanding - focuses on sharing information, generating excitement and listening to feedback
2. What's Possible/What's the Vision - focuses on the art of what is possible and how the community's shared values and concerns for the future can guide the process
3. Plan Creation - focuses on writing, reviewing and revising the Plan
4. Plan Adoption - focuses on approval of the plan through public hearings and required ballot initiative

Emerging issues
The Flagstaff Regional Plan 2030 covered a wide variety of topics that affect the Natural, Built, and Human Environment. However, some issues that were not discussed and have grown in importance and focus for the City include Equity, Climate Change Action, and emerging technologies such as broadband, automated vehicles, electric vehicles and smart street technology.

Attachments: Public Participation Plan
Presentation

Table of Anticipated Data Needs

Regional Plan 2045 Comprehensive Update Public Participation Plan Outline

Introduction, Purpose and Requirements

What is the Regional Plan?

The Flagstaff Regional Plan is a policy guide, serving as the general plan for the City of Flagstaff and an amendment to the Coconino County Comprehensive Plan. As mandated by state law, the plan covers a range of topics with information on current conditions and our vision for the future as it relates to the topic at hand. In addition, the plan outlines carefully developed goals and policies to realize the future vision.

Project Purpose

The purpose of this project is to:

- Meet the Arizona State requirements that the City's General Plan be updated and sent back to City voters, every 10 years with all appropriate content outlined in ASRS 9-461.
- Create a shared land use and transportation vision for the City and surrounding areas of the County within the Metroplan boundary.
- Ensure sustainable and adequate public facilities for all residents.
- Ensure all relevant natural, economic, and social resources and issues are included in the plan with appropriate goals and policies.

Importance of Public Participation

Public participation is central to the creation of the City's general plan. The document that is created or updated as part of the process should embody the desires, vision and trade-offs that the community will face for the next 20 or more years. The State statute require municipalities to provide for "effective, early and continuous public participation in the development … of general plans from all geographic, ethnic and economic areas of the municipality." The Regional Plan is a touchstone for all other policy work and land use decision within the City and for the surrounding communities in the County. Both organizations have taken a people-centered approach to this public engagement and have seen it as an important step in establishing a transparent and two-way dialogue with the community.

Level of Public Participation and Objectives

Since November 2012, the City of Flagstaff has had a Public Participation policy that uses the International Association for Public Participations, Spectrum of Public Participation chart as a communication tool that ensures the expectations of the public and the organization are aligned. The General Plan for the city, is by requirement an "Empower" level of participation because the final product is ultimately sent to the City voters for approval on a ballot. However, that is only the final step, and the public does not get to vote on individual portions of the plan but on the document as a whole. Therefore, most of the intermediate steps and the adoption of the plan by the County are at the "Collaborate" level of the spectrum. This plan outlines strategies that could be used to implement this level of public participation for the nearly 100,000 residents of Flagstaff and the surrounding areas of Coconino County in a manner that is transparent, accessible, and equitable to all participants.

IAP2 Spectrum of Public Participation

iap2 international association for public participation

IAP2's Spectrum of Public Participation was designed to assist with the selection of the level of participation that defines the public's role in any public participation process. The Spectrum is used internationally, and it is found in public participation plans around the world.

INCREASING IMPACT ON THE DECISION

	INFORM	CONSULT	INVOLVE	COLLABORATE	EMPOWER
PUBLIC PARTICIPATION GOAL	To provide the public with balanced and objective information to assist them in understanding the problem, alternatives, opportunities and/or solutions.	To obtain public feedback on analysis, alternatives and/or decisions.	To work directly with the public throughout the process to ensure that public concerns and aspirations are consistently understood and considered.	To partner with the public in each aspect of the decision including the development of alternatives and the identification of the preferred solution.	To place final decision making in the hands of the public.
PROMISE TO THE PUBLIC	We will keep you informed.	We will keep you informed, listen to and acknowledge concerns and aspirations, and provide feedback on how public input influenced the decision.	We will work with you to ensure that your concerns and aspirations are directly reflected in the alternatives developed and provide feedback on how public input influenced the decision.	We will look to you for advice and innovation in formulating solutions and incorporate your advice and recommendations into the decisions to the maximum extent possible.	We will implement what you decide.

Throughout the public participation process, the team will adhere to the Core Values for the Practice of Public Participation:

1. Public participation is based on the belief that those who are affected by a decision have a right to be involved in the decision-making process.
2. Public participation includes the promise that the public's contribution will influence the decision.
3. Public participation promotes sustainable decisions by recognizing and communicating the needs and interests of all participants, including decision makers.
4. Public participation seeks out and facilitates the involvement of those potentially affected by or interested in a decision.
5. Public participation seeks input from participants in designing how they participate.
6. Public participation provides participants with the information they need to participate in a meaningful way.
7. Public participation communicates to participants how their input affected the decision.

Intergovernmental Coordination and Partnerships

While the City could complete a General Plan update independently, the practice over that last 25 years in Flagstaff has been to create a shared vision for the County, City and Metroplan for land use and transportation objectives based on a shared scenario planning and analysis process. This is done not only for organization alignment but to increase the communities competitiveness for State and Federal funding and to ensure a solid understanding of trade-offs in transportation and land use decision making and funding. Partners also benefit from shared terminology, policies and definitions in joint decision-making.

The City and County both use the Flagstaff Regional Plan to make coordinated land use decisions, such as annexations, rezoning cases, new subdivisions and use permits, as the County's Comprehensive Plan does not have a future land use map. Planning efforts with the City of Flagstaff, Coconino County and community partners that directly use the data, assumptions and policies of the Regional Plan include:

- City Specific Plans: Southside, La Plaza Vieja, John Wesley Powell Area, High Occupancy Housing, etc.
- County Area Plans: Bellemont, Doney Park-Timberline-Fernwood, Fort Valley, Mountainaire, and Kachina Village
- Metroplan Regional Transportation Plan
- Mountain Line 5-year Strategic Plan
- City of Flagstaff Water Services 100-year Water supply study, submitted to ADEQ every 5 years
- City of Flagstaff Climate Change Action and Adaptation Plan and Carbon Neutrality Plan
- City of Flagstaff Active Transportation Master Plan

Also, it is common for community non-profits and business to reference the Regional Plan in their long ranging planning efforts, such as the Flagstaff Trails Initiative.

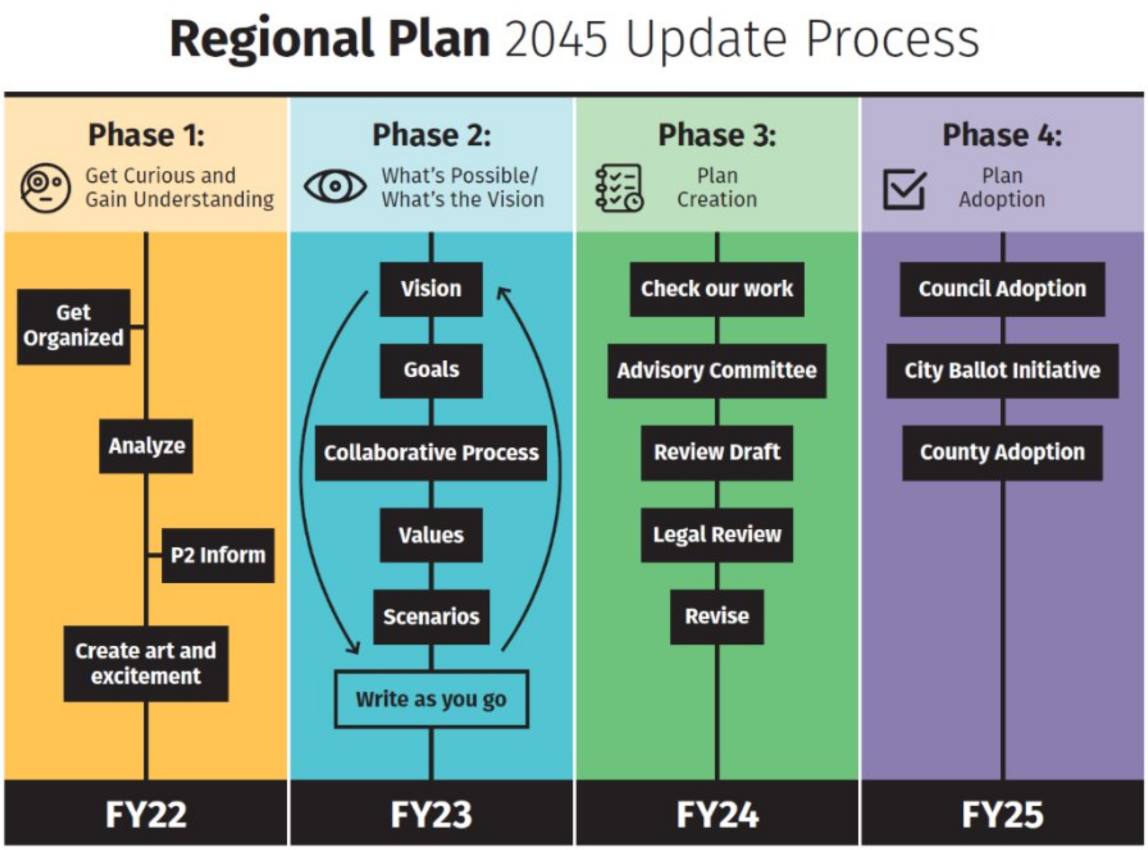
Regional Plan Update Guiding Principles

The following are Guiding Principles for the process of updating the Regional Plan, based on lessons learned from interviews with participants in previous efforts. These principles have been refined in specific planning efforts over the last 7 years and may be added to or revised for new feedback from the public and elected officials.

- Right People, Right Agenda, Right Timing – Conversations and decisions about the Regional Plan need to have all three of these elements to be a good use of staff and participant's time. Committing to all three elements requires giving time to ensure everyone who is essential to the conversation can be present and that everyone is clear on roles and meeting objectives before making a decision.
- Experts and Public Work Together – The plan must be developed together with knowledge and perspectives from inside the City and County government, the point of view of researchers and outside experts, and the diverse community members woven together into a shared vision that is founded in both hope and reality.
- Need for Outside Facilitation – City and County staff are not always the right facilitators of every conversation or part of the process and the need for neutral outside facilitation should be considered carefully at each step.

- Equity and Inclusion – The participants of the process should reflect the diversity of our community and the table should be set for every age, gender, race, and neighborhood to have conversations about our community's future.
- Clear expectations for Endorsement – Elected officials, appointed officials, City and County management, and the public all have a role in endorsing the next Regional Plan and ensuring that it describes a future and a path forward that creates shared purpose. It is important that the manner and order of this endorsement is clear to all participants so they can understand the role they can play and the timing of that role.

Public Participation Proposed Phases and Strategies



The process outlined in the graphic above are dependent on the available resources and direction from the City Council and Board of Supervisors in work sessions in the Spring 2020. All the strategies listed below need detailed legal review and possibly review by Human Resources before the City or County can commit to it. Staff also has contingency plans if resources are limited or there are unforeseen delays in the process.

Phase 1: Get Curious, Create Excitement, and Gain Understanding

Phase 1 will invite the public to engage the process with curiosity, imagination and hope. The goal is to inform the public about the process, its meaning and to solicit feedback on the qualities values and challenges that should be addressed in the plan update. In addition to surveys, educational webinars, and traditional means of public engagement. Phase 1 would also incorporate art and youth as a basis for creating excitement and forward thinking touchpoints for the more interactive public engagement.

In the background, the City, County, Metroplan and other partners will be organizing and analyzing hundreds of data points that are required for the plan and creating summaries for the City and County's Boards and Commissions to evaluate and provide feedback. This will be the basis for understanding the story of the Flagstaff Region's growth and what it means for our community's future.

Proposed strategies:

- Fun outdoor kick-off event and Public event booths
- Strength Weakness Opportunity and Threat assessment with Boards and Commissions on required and emerging topics of concern
- Focus groups or stakeholder interviews with key stakeholders, community organizations
- Educational webinars and talks
- Online Surveys
- Opportunities to incorporate artists into visioning, such as an art contest or juried event or graphic notetaking
- Youth-specific activities
- Targeted outreach for hard to reach communities to be developed with appropriate partners
- Develop a media plan to launch/kick off the process, promote events and engagement

Phase 2: Vision and Goals

Establish Planning Questions

Phase 2 will open with a review of the learning and sharing from Phase 1 designed to generate planning questions and prioritizing them during a series of workshops, accompanied by an online survey. The objective of these engagements will be to identify critical success factors that the project will need to address and to get conceptual feedback on anticipated trade-offs and decision points.

Collaborative Process

Concurrent with Charettes and other workshops, the City and County would convene a collaborative group process, using one or several of the following techniques:

- Informal Working Groups – The Planning and Zoning and other Boards and Commissions Could convene informal working groups to discuss specific aspects of the Regional Plan revision and update that would consider the planning questions and provide advise to staff on what to include in the draft plan.
- Study Circles – Study circles are a small group deliberative process that are formed of volunteers who have a common interest on a very specific issue, and are facilitated by a non-expert that keeps the discussion on track. Staff could participate as a member of the circle but some circles may form without staff representation. Participation in each study circle could be up to 15 people before a second study group would be formed. Study groups could be hosted by nonprofits and community organizations with a materials box and support from City staff.
- Citizen Assembly - A Citizen Assembly is a group of a residents that meet in a legislative fashion to create recommendations on an issue or topic, and a Citizen's Panel would be a similarly

formed body that is more focused on evaluating material and participating in writing with staff. A citizen assembly is formed by participants that are randomly selected based on characteristics such as geography, income, gender, age, race, etc. to ensure the make up of the group is representative of the population within the planning area. Often Citizen assembly participants are paid and provided child care vouchers as an equity measure and to ensure representativeness of the group.

- Citizen Panel – A Citizen Panel is a group similar to a focus group, except that the volunteers meet over several months on a series of topics. The Panel does not have to arrive at consensus but can deliberate and debate the topics they are asked to consider. If more than one recommendation is made, the panel members can offer majority and minority opinions to the project team.

The selection of technique would be dependent on feedback from the Board of Supervisor's and City Council in a future work session and the availability of resources appropriate to each technique. The objectives of this step would be to ensure diversity in participants and to gather input on a values, attitudes, beliefs and to share knowledge and insights.

The defined activities of a Working Group, Study Circle, Assembly or Panel in Phase 2 would be:

1. To draft the Community Vision and solicit feedback,
2. To assess the strength and weakness of the existing plan,
3. To answer the planning questions identified in early outreach
4. To make recommendations to staff on how to address emerging issues in the plan, and
5. To assist in writing the first draft of the plan including

Charettes and Workshops, Roadshows and Tours

The City and County would also convene design charettes and workshops for the general public that would encourage the consideration of future scenarios and how they could impact the City's balance of resources, especially land, water, transportation, natural resources and climate change impacts. Roadshows would be designed to take the workshops into County neighborhoods. At this stage it could be beneficial to organize bus tours of the planning area.

Metroplan and Mountain Line may be engaged in parallel planning processes during this Phase to create their 5-year plans that are used for project planning. This is a ripe opportunity to combine resources in discussing the transportation future of the community. There is the potential for shared public workshops or events that will be discussed as the projects move forward.

Phase 3: Create and Review the Plan

For Phase 3, the Board of Supervisors and City Council may chose to convene and appoint a volunteer advisory committee. The committee's task would be to review the drafts of the Regional Plan being created and to provide recommendations to staff on resolving any conflicts that arise from the public review.

Workshops would also be held and opportunities to review the plan in study groups or at public events would also be incorporated into Phase 3. As the draft chapters are endorsed by the Advisory Committee, they will also be presented to relevant boards and commissions at the City and the County.

After the full plan has been reviewed and endorsed by the advisory committee, the plan will be released for a 60-90 day public review. Open Houses and webinars will support this effort and public surveys and comment portals will be made available.

After the public review period, the advisory committee could reconvene to review comments and provide direction to staff. Staff would make appropriate revisions and provide it to the advisory committee for endorsement.

Phase 4: Steps to Adopt the Plan

1. The public hearing draft of the Plan would be released at least 30 days prior to a Planning and Zoning working retreat that would be held jointly between the City and County's Planning and Zoning Commissions. This retreat would be open to the public and would be held at least 30 days before the first public hearing for either of the Commissions to allow adequate time for revisions.
2. The City Council and Board of Supervisors may also elect to have a retreat with the plan with or without the Planning and Zoning Commissions prior to the commencement of the Planning and Zoning Commissions public hearing processes.
3. The Planning and Zoning Commissions will make recommendations to the elected officials after holding a public hearing and receiving public comment.
4. City Council will hold a public hearing on the Regional Plan and may approve the ballot initiative by special election or in conjunction with an appropriate election that is already scheduled. City voters will then be given the opportunity to ratify the Regional Plan as scheduled by the Council.
5. The Board of Supervisors will hold a public hearing and may vote to approve the Regional Plan as an amendment to the County Comprehensive Plan by resolution. Staff recommends the Board of Supervisor's considers voting after the Ballot Initiative for the City is canvassed.

Communication Strategies

Project Branding

Part of the advertising budget for this process will be used to develop and test project branding that will unify the message of the project and allow for easy identification of events and work products.

Media

The City's Associate Planner will be the primary point of contact for media calls and will route and coordinate the media requests through the appropriate Public Affairs department at the City or County.

Media releases will be drafted by the project team and reviewed and released by the appropriate Public Affairs department at the City or County.

Interview requests will be coordinated with the Directors of the City and County Public Affairs programs.

Online Outreach and Accessibility

The existing Facebook page for the Flagstaff Regional Plan 2030 will be rebranded and expanded onto Instagram as part of the project launch. There will be a coordinated effort on which City and County social media accounts should share and promote the project.

The City of Flagstaff will host the project website and web maps and will include the County staff in the design and messaging.

In-Person

For the duration of the COVID-19 pandemic, in-person events will follow social distancing and public health guidelines of Coconino County.

Mail and Notices

City and County area-wide publications, water bills and other notices, and direct mailings may all be use to notify citizens and residents about the project. Notice requirements will follow the Arizona State Revised Statues for a General Plan Update and Comprehensive Plan Amendment (See Public Participation Requirements in Appendix E).

Appendix A: Vision 2020 and the Flagstaff Regional Plan 2030 Lessons

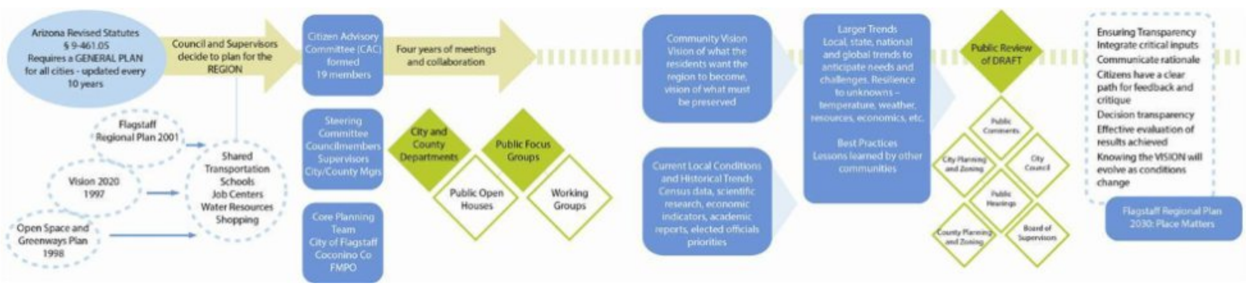
Flagstaff Vision 2020 Process and Outcome

The City of Flagstaff undertook its first visioning process in the mid-1990s. Like the process that the City will embark on in 2021, this process involved research, sharing information and a large effort in community outreach and participatory planning. The process was broken into three Phases 1) Setting a Context, 2) Creating a Vision and 3) Charting a Course. You can review a full archive of the Vision 2020 process at the NAU Cline Library Digital Exhibit and oral history site: https://library.nau.edu/speccoll/exhibits/scaexhibits/flagstaff2020/

The effort resulted in the adoption of the Flagstaff Regional Land Use and Transportation Plan in 2001.

Flagstaff Regional Plan 2030 Process

The process of revisioning and re-adopting the Regional Plan occurred between 2009 and 2014. Instead of reimagining the 2020 Vision, the process began with the formation of the Citizen Advisory Committee or CAC, which was made up of both City and County residents. The CAC met from the beginning to the end of the process of developing the plan and was supported by scenario planning analysis that provided rich and meaningful data behind the plan. The data developed in this process has been used by the City in strategic planning for utilities, transportation, neighborhood planning and other related issues over the last 7 years. You can find a full description of the process for developing the plan is available for review on the City's website in the Regional Plan archives. The process resulted in the Flagstaff Regional Plan 2030 being ratified by voters in 2014.



In 2014, Sara Dechter, the Comprehensive and Neighborhood Planning Manager, was hired at the end of this process and she conducted a series of after action interviews with former CAC members to gain their perspectives on the process and what could be done to make it better next time. These interviews resulted in lessons learned that the program has been applying and testing in neighborhood plans for La Plaza Vieja and the Southside Community Specific Plans as well as the High Occupancy Housing Plan. The result has been innovative and inclusive projects and plans that created trust and community empowerment. The practice of these lessons is now ready to be applied to the update of the Regional Plan and to provide Regional Plan Update Guiding Principles (found on page 3) for public participation, partnerships and project management.

Appendix B: Stakeholder Assessment

Flagstaff population estimate 2020: 75,219[1]

Age Characteristics

Median Age 25.8 years old

Flagstaff youth population (under 18): 12,085

NAU Fall 2020 enrollment: 21,495

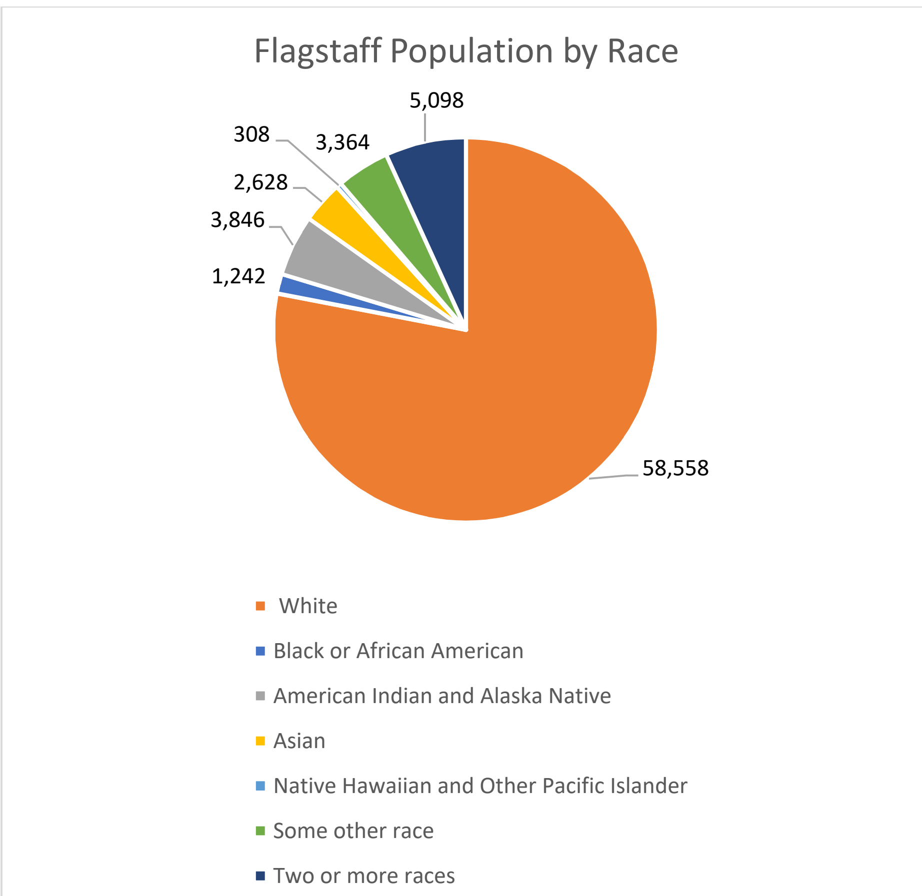
Flagstaff Population age 65 years old and over: 6,527

Other Characteristics

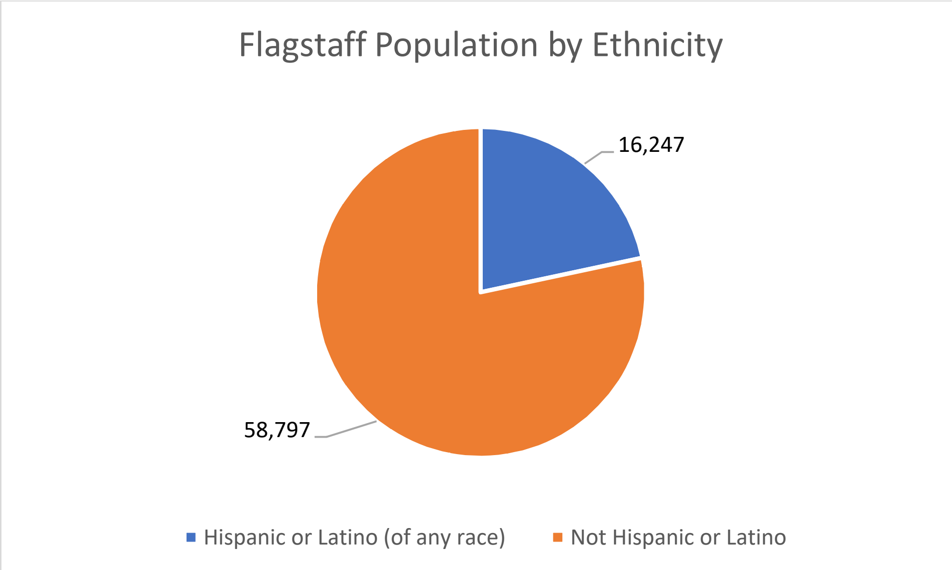
Flagstaff Households that Speak a language other than English at home: 9,941 (6,390 Spanish and the remainder are other)

Population estimate 2020 within the Metroplan boundary but outside the City: To be determined with the 2020 Census redistricting data release in September 2021.

Race and Ethnicity Characteristics



[1] Office of Economic Opportunity estimate



Barriers and Challenges to Participation

Flagstaff and the surrounding areas of Coconino County have a few known barriers to participation in area wide efforts that will need to be incorporated into the 2020 Regional Plan update. This section outlines a few of those issues and may be updated as work on the project continues:

1. Youth and College age participation – Flagstaff's median age is 25.8 yet the majority of participants in public processes are over the age of 25. Online engagement has been shown as more successful in engaging this population.
2. Language – 13.2% of Flagstaff's population speaks a language other than English at home. These residents that are hard to reach and require additional project resources to ensure their inclusion.
3. Lack of broadband and internet access – outlying areas of Flagstaff lack reliable internet access which can limit the effectiveness of social media outreach and will require specific techniques for communication and engagement.

Appendix C: Anticipated Costs and Funding

Staff estimates that a minimum of $124,000 will be needed to meet the minimum requirements for notice, mailings, outreach, and analysis of a joint City-County Regional Plan. This amount of funding would not allow for the Public Participation Outline to be fully implemented and would require a scaled back approach to analysis and public engagement, especially in Phase 2. Full funding of the project as presented in this outline requires approximately $400,000 to $500,000 in funding over several years, part of which may be supported by grants, as staff is able to apply for them. This estimate also includes the cost of a special election. Funding sources to be determined and may be provided over several budget years.

The FY22 City Manager's Budget includes funding for noticing of City residents and consulting services to support data management, analysis and presentation that supports scenario planning. The City's Beautification and Public Arts Commission has augmented this funding to bring artists and youth into

Phase 1 of the process in order to promote creative thinking and visual outputs that can support the vision of the Plan. See the January 11, 2021 BPAC Meeting Minutes and Video for details.

Coconino County is providing dedicated staff time and resources to assist with facilitating the process, data collection, analysis and public outreach efforts of the Regional Plan update. County staff anticipates that funding specifically targeted for public noticing and mailings necessary for this project will be requested in future budget cycles. At this time funding that the County may be able to commit to this project for portions of the Regional Plan update beyond notices and mailings is uncertain. County staff will continually apprise the Board of Supervisors as decisions are made by the City during the project development.

Appendix D: Endorsements and Evaluation Outcomes and Adjustments

This section will provide a summary of how the project will be evaluating the success of public participation efforts. Evaluation Questions (based on P2 objectives) will be created by September 2021 based on feedback from City Council, the Board of Supervisors and City and County Board and Commissions. And details of what products will be endorsed by which groups and when will be drafted and reviewed by City Council and the board of Supervisors by the end of 2021.

Project Endorsement

- City Council
- Board of Supervisors
- City Planning and Zoning
- County Planning and Zoning
- Other Boards and Commissions
- City Management
- County Management
- Appointed or selected review assembly, panel or committee.

Appendix E: Statutory Public Participation Requirements

Municipal Requirements

Excerpts relevant to public participation from Arizona Revised Statutes 9-461.06. Adoption and amendment of general plan; expiration and readoption

A. In municipalities that have territory in a high noise or accident potential zone as defined in section 28-8461, the legislature finds that in general plans and amendments to general plans land use compatibility with the continued operation of a military airport or ancillary military facility as defined in section 28-8461 is a matter of statewide concern.

B. The general plan and any amendment to such plan shall be adopted or readopted in the manner provided in this article.

C. The governing body shall:

1. Adopt written procedures to provide effective, early and continuous public participation in the development and major amendment of general plans from all geographic, ethnic and economic areas of the municipality. The procedures shall provide for:

(a) The broad dissemination of proposals and alternatives.

(b) The opportunity for written comments.

(c) Public hearings after effective notice.

(d) Open discussions, communications programs and information services.

(e) Consideration of public comments.

2. Consult with, advise and provide an opportunity for official comment by public officials and agencies, the county, school districts, associations of governments, public land management agencies, the military airport if the municipality has territory in the vicinity of a military airport or ancillary military facility as defined in section 28-8461, other appropriate government jurisdictions, public utility companies, civic, educational, professional and other organizations, property owners and citizens generally to secure maximum coordination of plans and to indicate properly located sites for all public purposes on the general plan.

D. At least sixty days before the general plan or an element or major amendment of a general plan is noticed pursuant to subsection E of this section, the planning agency shall transmit the proposal to the planning commission, if any, and the governing body and shall submit a copy for review and further comment to:

1. The planning agency of the county in which the municipality is located.

2. Each county or municipality that is contiguous to the corporate limits of the municipality or its area of extraterritorial jurisdiction.

3. The regional planning agency within which the municipality is located.

4. The Arizona commerce authority or any other state agency that is subsequently designated as the general planning agency for this state.

5. The department of water resources for review and comment on the water resources element, if a water resources element is required.

6. If the general plan or an element or amendment of the general plan is applicable to territory in the vicinity of a military airport or ancillary military facility as defined in section 28-8461, the military airport.

7. If the general plan or an element or major amendment of the general plan is applicable to property in the high noise or accident potential zone of a military airport or ancillary military facility as defined in section 28-8461, the attorney general. For the purposes of this paragraph, "major amendment" means a substantial alteration of the municipality's land use mixture or balance as established in the municipality's existing general plan land use element.

8. Any person or entity that requests in writing to receive a review copy of the proposal.

E. … When the general plan or any major amendment is being adopted, planning commissions in municipalities having populations over twenty-five thousand persons shall hold two or more public hearings at different locations within the municipality to promote citizen participation. Notice of the time and place of a hearing and availability of studies and summaries related to the hearing shall be given at least fifteen and not more than thirty calendar days before the hearing by:

1. Publication at least once in a newspaper of general circulation published or circulated in the municipality, or if there is none, the notice shall be posted in at least ten public places in the municipality.

2. Such other manner in addition to publication as the municipality may deem necessary or desirable.

F. Action by the planning commission on the general plan or any amendment to the plan shall be transmitted to the governing body of the municipality.

G. Before adopting the general plan, or any amendment to it, the governing body shall hold at least one public hearing. Notice of the time and place of the hearing shall be given in the time and manner provided for the giving of notice of the hearing by the planning commission as specified in subsection E of this section.

H. The adoption or readoption of the general plan or any amendment to such plan shall be by resolution of the governing body of the municipality, after notice as provided for in subsection E of this section. The adoption or readoption of or a major amendment to the general plan shall be approved by affirmative vote of at least two-thirds of the members of the governing body of the municipality. …..

J. A copy of the adopted general plan of a municipality shall be sent to the planning agency of the county within which the municipality is located, and such plan or any portion of the plan may be adopted as a part of the county general plan.

K. A general plan, with any amendments, is effective for up to ten years from the date the plan was initially adopted and ratified pursuant to subsection M of this section, or until the plan is readopted pursuant to this subsection and ratified pursuant to subsection M of this section or a new plan is adopted pursuant to this subsection and ratified pursuant to subsection M of this section, and becomes effective. On or before the tenth anniversary of the plan's most recent adoption, the governing body of the municipality shall either readopt the existing plan for an additional term of up to ten years or shall adopt a new general plan as provided by this article....

M. The governing body of a city or town having a population of more than two thousand five hundred persons but less than ten thousand persons and whose population growth rate exceeded an average of two per cent per year for the ten year period before the most recent United States decennial census, and any city or town having a population of ten thousand or more persons, shall submit each new general plan adopted pursuant to subsection K of this section to the voters for ratification at the next regularly scheduled municipal election or at a special election scheduled at least one hundred twenty days after the governing body adopted the plan pursuant to section 16-204. The governing body shall include a general description of the plan and its elements in the municipal election pamphlet and shall provide public copies of the plan in at least two locations that are easily accessible to the public and may include posting on the municipality's official internet website. If a majority of the qualified electors voting on the proposition approves the new plan, it shall become effective as provided by law. If a majority of the qualified electors voting on the proposition fails to approve the new plan, the current plan remains in effect until a new plan is approved by the voters pursuant to this subsection. The governing body shall either resubmit the proposed new plan, or revise the new plan as provided by this section, for subsequent submission to the voters at the next regularly scheduled municipal election or at a special election scheduled at least one hundred twenty days after the governing body readopted the new or revised new plan. All subsequent adoptions and submissions of the new plan or revised plans must comply with the procedures prescribed by this section until the plan is ratified….

O. A person, after having participated in the public hearing pursuant to subsection H of this section, may file a petition for special action in superior court to review the governing body's decision that does not comply with the mandatory requirement prescribed in section 9-461.05, subsection C, paragraph 1, subdivision (g) within thirty days after the governing body has rendered its decision. The court may affirm, reverse or remand to the governing body, in whole or in part, the decision reviewed for further action that is necessary to comply with the mandatory requirements prescribed in section 9-461.05, subsection C, paragraph 1, subdivision (g)

Additional Requirements from Flagstaff City Code Title 11-10.20.010 Comprehensive Plan Updates relevant to Public Participation

….B. The adoption of a new General Plan or readoption of the General Plan shall follow the common procedures for General Plan amendments (Section 11-10.10.020) and the procedures for a major plan amendment (Section 11-10.20.020), except that it need not be heard at a single public hearing held during the calendar year in which the application was filed. ….

E. All Comprehensive Plan updates are subject to the public participation procedures established in Section 10-20.30.060, Neighborhood Meeting

F. Ratification.

1. Each new or readopted General Plan shall be submitted to the voters for ratification at the next regularly scheduled municipal election or at a special election scheduled at least one hundred twenty (120) days after the governing body adopted the General Plan pursuant to A.R.S. Section 16-204. The Council shall include a general description of the General Plan and its elements in the municipal election pamphlet and shall provide copies of the proposed General Plan to the public in at least two (2) locations that are easily accessible to the public, which may include posting on the City's official Internet website.

2. If a majority of the qualified electors voting on the proposition approves the new or readopted General Plan, it shall become effective as provided by law.

3. If a majority of the qualified electors voting on the proposition fails to approve the new or readopted General Plan, the current General Plan remains in effect until a new or readopted General Plan is approved by the voters pursuant to this section. The Council may resubmit the proposed new or readopted General Plan, or revise the new or readopted General Plan as provided by this section for subsequent submission to the voters. (Ord. 2015-13, Amended, 06/02/2015)

County Requirements

Public participation and adoption requirements from Arizona Revised Statutes Section 11-805: Comprehensive plan adoption; notice; hearing; amendment; expiration; readoption.

NOTE: For procedural purposes, the County process for adopting the Regional Plan update is assumed to be a "major amendment" to the comprehensive plan.

A. The board shall adopt a comprehensive plan and subsequently amend or extend the adopted plan as provided by this article. On adoption or readoption, the plan, or any part of the plan, shall be the official guide for the development of the area of jurisdiction. Any change, amendment, extension or addition of the comprehensive plan may be made only pursuant to this chapter.

B. The board of supervisors shall:

1. Adopt written procedures to provide effective, early and continuous public participation in the development and major amendment of the comprehensive plan from all geographic, ethnic and economic areas of the county. The procedures shall provide for:

(a) The broad dissemination of proposals and alternatives.

(b) The opportunity for written comments.

(c) Public hearings after effective notice.

(d) Open discussions, communications programs and information services.

(e) Consideration of public comments.

2. Consult with, advise and provide an opportunity for official comment by public officials and agencies, municipalities, school districts, associations of governments, public land management agencies, the military airport if the county's area of jurisdiction includes territory in the vicinity of a military airport or ancillary military facility as defined in section 28-8461, other appropriate government jurisdictions, public utility companies, civic, educational, professional and other organizations, property owners and citizens generally to secure the maximum coordination of plans and to indicate properly located sites for all public purposes on the plan.

C. The commission shall confer with the state land department and the governing bodies and planning commissions of cities and towns in the county for the purpose of guiding and accomplishing a coordinated, adjusted and harmonious development of the county, of zoning districts, of urban growth and of public improvements and utilities that do not begin and terminate within the boundaries of any single city or town and that will, pursuant to the present and future needs of the county, best promote with efficiency and economy the health, safety, morals, order, convenience or general welfare of the public.

D. The commission shall coordinate the production of the comprehensive plan with the creation of the conceptual state land use plans under title 37, chapter 2, article 5.1. The commission shall cooperate with the state land department regarding integrating the conceptual state land use plans into the comprehensive plan.

E. The commission may formulate and draft the comprehensive plan as a whole, or as separate parts of the plan corresponding with functional divisions of the subject matter, and, subject to the limitations of this chapter, may amend, extend or add to the comprehensive plan.

F. At least sixty days before the comprehensive plan or an element or major amendment of a comprehensive plan is noticed pursuant to subsection G of this section, the commission shall transmit the proposal to the board of supervisors and submit a copy for review and further comment to:

1. Each municipality in the county.

2. Each other county that is contiguous to the county.

3. The regional planning agency in the county.

4. The Arizona commerce authority or any other state agency that is subsequently designated as the general planning agency for this state.

5. The department of water resources for review and comment on the water resources element, if a water resources element is required.

6. If the comprehensive plan or an element or amendment of the comprehensive plan is applicable to territory in the vicinity of a military airport or ancillary military facility as defined in section 28-8461, the military airport.

7. If the comprehensive plan or an element or major amendment of the comprehensive plan is applicable to property in the high noise or accident potential zone of a military airport or ancillary military facility as defined in section 28-8461, the attorney general. For the purposes of this paragraph, "major amendment" means a substantial alteration of the county's land use mixture or balance as established in the county's existing comprehensive plan land use element for that area of the county.

8. Any person or entity that requests in writing to receive a review copy of the proposal.

G. After considering any recommendations from the review required under subsection F of this section, the commission shall hold at least one public hearing. Notice of the time and place of a hearing and availability of studies and summaries related to the hearing shall be given at least fifteen and not more than thirty calendar days before the hearing by:

1. Publication at least once in a newspaper of general circulation in the county seat.

2. Publication at least once in a newspaper of general circulation in the area to be affected, or adjacent to the area to be affected, if the area affected is other than the county seat.

3. Such other manner in addition to publication as the county may deem necessary or desirable.

H. After the commission recommends the comprehensive plan or any section of the plan, the plan shall be submitted to the board of supervisors for its consideration and official action.

I. Before the adoption, amendment or extension of the plan, the board shall hold at least one public hearing on the plan. After the board considers the commission's recommendation and any recommendations from the review required under subsection F of this section, the board shall hold at least one public hearing at which residents of the county shall be heard concerning the matters contained in the plan. At least fifteen days' notice of the hearing shall be given by one publication in a newspaper of general circulation in the county seat. The board shall consider protests and objections to the plan and may change or alter any portion of the comprehensive plan. However, before any change is made, that portion of the plan proposed to be changed shall be re-referred to the commission for its recommendation, which may be accepted or rejected by the board.

J. The board of supervisors may adopt the county comprehensive plan as a whole or by successive actions adopt separate parts of the plan. The adoption or readoption of the comprehensive plan or any amendment to the plan shall be by resolution of the board. The adoption or readoption of, or a major amendment to, the county comprehensive plan shall be approved by the affirmative vote of at least two-thirds of the members of the board. All major amendments proposed for adoption to the comprehensive plan by the board shall be presented at a single public hearing during the calendar year the proposal is made. The adoption or readoption of the comprehensive plan, and any major amendment to the comprehensive plan, shall not be enacted as an emergency measure and is subject to referendum as provided by article IV, part 1, section 1, subsection (8), Constitution of Arizona, and title 19, chapter 1, article 4. For the purposes of this section, "major amendment" means a substantial alteration of the county's land use mixture or balance as established in the county's existing comprehensive plan land use element for that area of the county. The county's comprehensive plan shall define the criteria to determine if a proposed amendment to the comprehensive plan effects a substantial alteration of the county's land use mixture or balance as established in the county's existing comprehensive plan land use element for that area of the county.

K. N/A

L. If the motion to adopt or readopt the plan or an amendment to the plan fails to pass, the board may reconsider the motion in any manner allowed by the board's rules of procedure, but any subsequent motion for the adoption or readoption of the plan or a major amendment to the plan must be approved by an affirmative vote of at least two-thirds of the members of the board. If the board fails to adopt or readopt the plan, the current plan remains in effect until a new plan is adopted. The board shall either reconsider the proposed plan or consider a revised plan within one year and shall continue to do so until one is adopted. All subsequent considerations of a new or revised plan must comply with the procedures prescribed by this article.

M. A county comprehensive plan, with any amendments, is effective for up to ten years from the date the plan was initially adopted or until the plan is readopted or a new plan is adopted pursuant to this subsection and becomes effective. On or before the tenth anniversary of the plan's most recent adoption, the board shall either readopt the existing plan for an additional term of up to ten years or shall adopt a new comprehensive plan as provided by this article.

N. A person, after having participated in the public hearing pursuant to subsection I of this section, may file a petition for special action in superior court to review the board of supervisor's decision that does not comply with the mandatory requirement prescribed in section 11-804, subsection B, paragraph 1, subdivision (e) within thirty days after the board has rendered its decision. The court may affirm, reverse or remand to the board of supervisors, in whole or in part, the decision reviewed for further action that is necessary to comply with the mandatory requirements prescribed in section 11-804, subsection B, paragraph 1, subdivision (e).

Flagstaff Regional Plan Update Strategies and Process Work Session

March 30, 2021

Sara Dechter, AICP CP3

Comprehensive and Neighborhood Planning Manager

CITY OF FLAGSTAFF ARIZONA ESTABLISHED 1882

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Work Session Objectives

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- Introduce the process of Regional Plan development and adoption
- Answer questions about the schedule and potential work
- Feedback from Council on data analysis, public participation and intergovernmental coordination efforts

Flagstaff Regional Plan 2030 Vision

"The Greater Flagstaff community embraces the region's extraordinary cultural and ecological setting on the Colorado Plateau through active stewardship of the natural and built environments. Residents and visitors encourage and advance intellectual, environmental, social, and economic vitality for today's citizens and future generations."

What is the Regional Plan

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Photo by: A. Leggett

While the plan serves many purposes, it is important to distinguish what the plan is, and what it is not. Specifically, the *Flagstaff Regional Plan* is:

- a collaborative community **vision**
- a collection of **goals and policies** to achieve that vision
- a **tool** for decision makers, developers, businesses, and citizens
- a **framework** for general planning.

The *Flagstaff Regional Plan* is not:

- a mandate for or against development
- a zoning ordinance
- a Capital Improvement Plan
- a City budget
- an unchangeable plan, or a law

What is the Regional Plan

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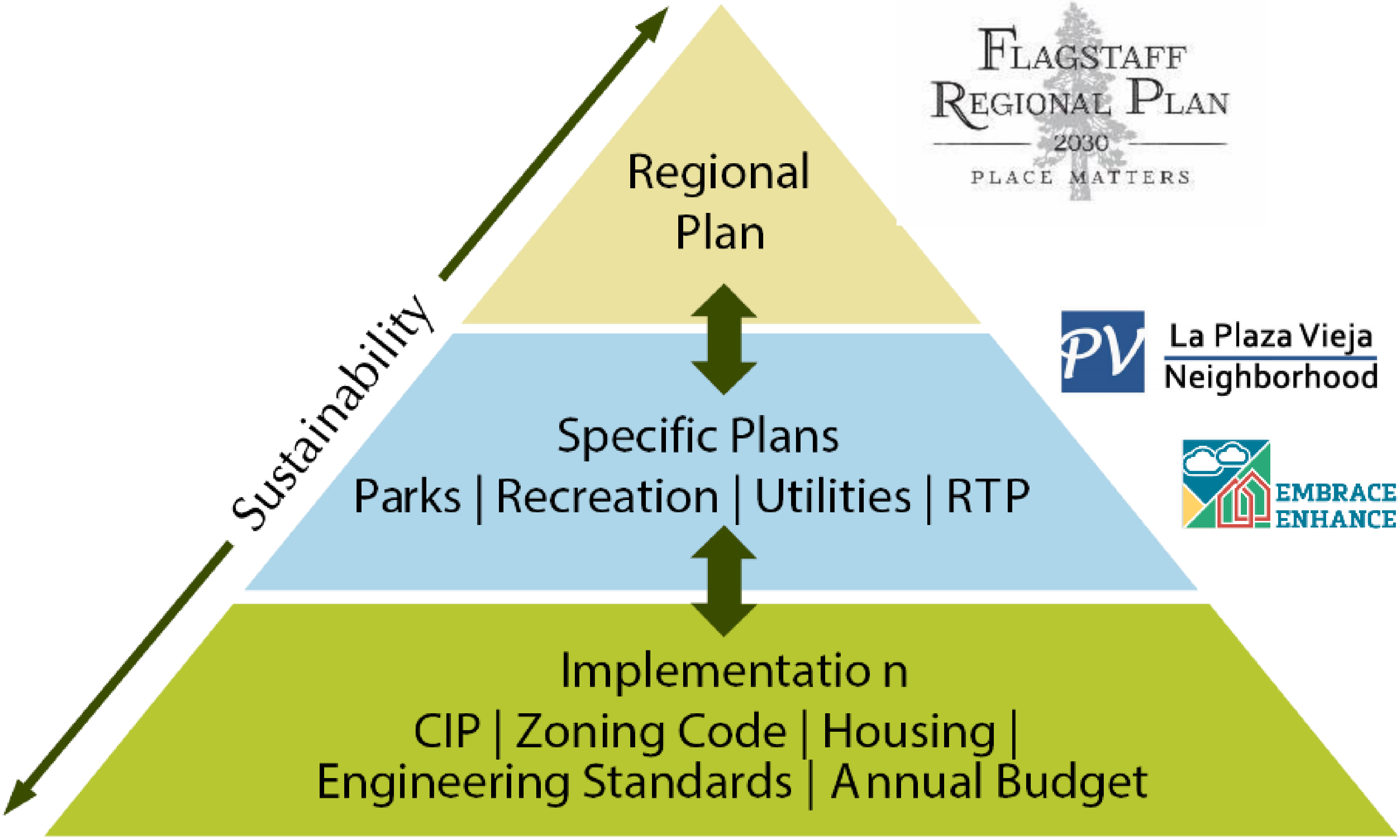
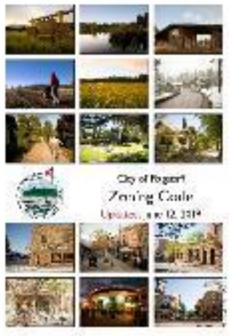
Hierarchy of Planning Documents



FLAGSTAFF REGIONAL PLAN 2030
PLACE MATTERS

PV La Plaza Vieja Neighborhood

EMBRACE OUR HERITAGE
ENHANCE OUR FUTURE



Why is it a "Regional Plan"?

City of Flagstaff

- Serves as the General Plan
- Must be ratified by voters every 10 years
- Supports land use decisions, policy making, the 100-year water supply designation and transportation planning plus many other efforts

Coconino County

- Is an amendment to the County Comprehensive Plan*
- Adopted by the Board of Supervisors as a Major Amendment
- Provides a map of area and place types that is further refined by area plans

*The Comprehensive Plan has no land use map.

How has the Plan evolved?

Regional Land Use and Transportation Plan

- Started with narrower planning efforts that were rolled into a larger integrated document
  - Vision 2020 efforts (1997) and the Open Space and Greenways Plan and West side Plans (1998)
  - Specific Plans adopted by ordinance in the 1990s for McMillan Mesa and Woodlands Village
- Parcel specific land use map and clearly identified future roadways
- Discussed activity centers without identifying them
- Little emphasis or use of goals and policies

How has the Plan evolved?

Flagstaff Regional Plan 2030

- More emphasis on goals and policies than maps
  - 97 goals
  - 508 policies
- Generalized land use map with clearly identified activity centers based on scenario planning
- Robust basis for transportation modeling with Metroplan based on background data
- Multimodal transportation emphasis
- Foundation for 100-year water supply designation by Arizona Department of Water Quality

What did the public want the Flagstaff Regional Plan 2030 to do?

- Hold government accountable for publicly derived policy outcomes and goals
- Guide physical and economic development
- Establish priorities for public action
- Direction for complementary private decisions
- Encourage predictable decision making

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The Next Regional Plan

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What are the ingredients of the Regional Plan?

Strategic Organizational Planning

Specific and Area Plans

Other Policies and Master Plans

Data Analysis and Forecasting

Community Vision and Values

Intergovernmental Coordination

The Next Regional Plan

Guiding Process Principles

Based on:

- *Lessons Learned*
- *Practice from specific and area plans*
- *Feedback from partners and staff*

Right People, Right Agenda, Right Timing

Experts and Public Work Together

Need for Outside Facilitation

Equity and Inclusion

Clear Expectations for Endorsement

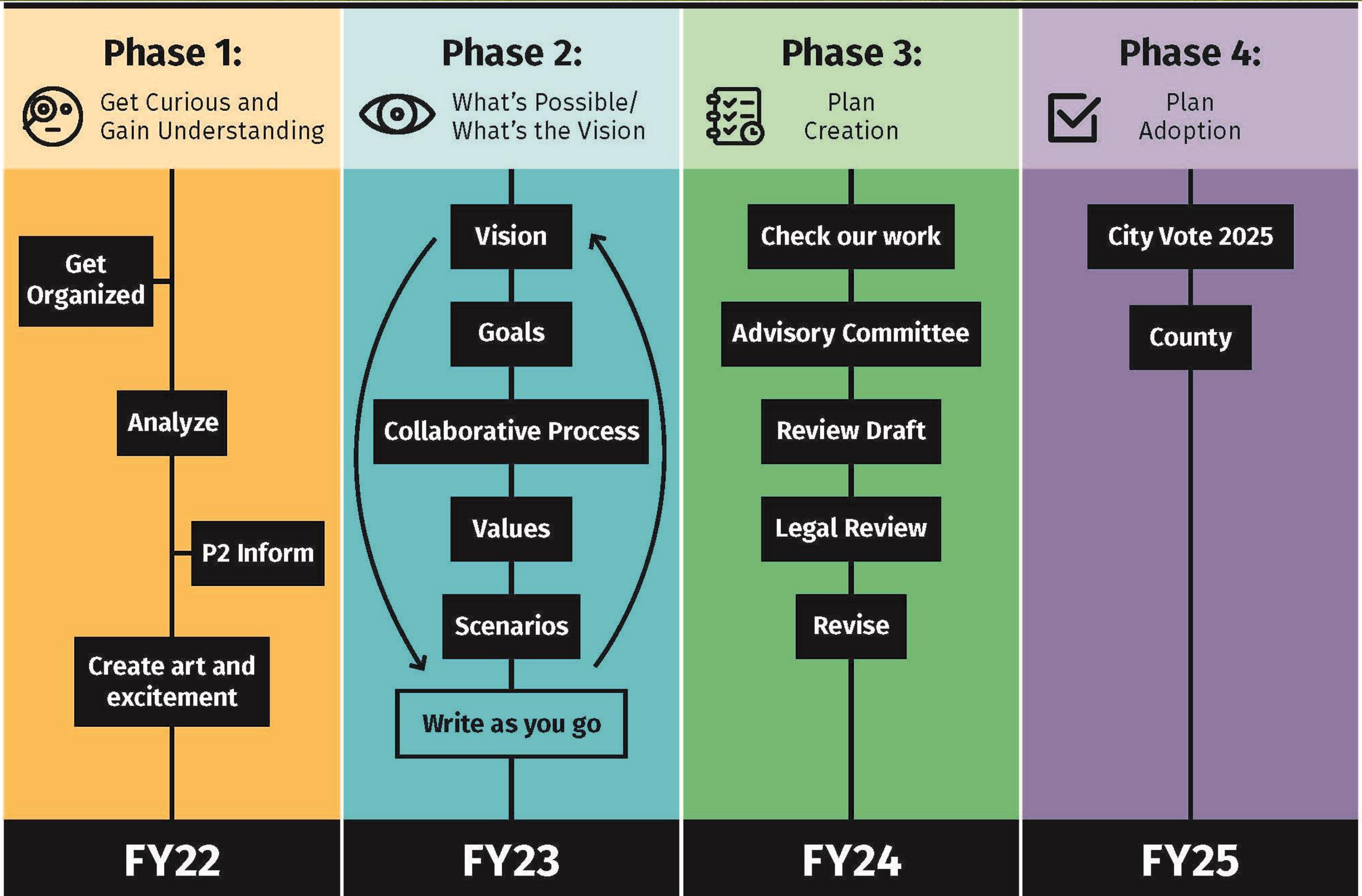
The Next Regional Plan

Proposed Public Participation Process

Levels of Public Participation

Plan Development & County Adoption: *Collaborate*

City Adoption: *Empower*



Data Analysis and Forecasting

- Requires managing and analyzing over 180 data metrics
- Looking within and beyond the plan area
- Scenario planning and sensitivity testing ensure longevity and flexibility of plan

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Demographics
Air Quality
Transportation
Energy
Land Use
Emerging Technology
Natural Resources
History
Climate Action
Geography
Housing
Social Issues
Economic
Public Facilities

Emerging Issues

- Carbon Neutrality
  - Stronger emphasis on bicycle, pedestrian and transit
  - More integration of climate change into land use, economic development and housing
- Equity
  - Consideration of disproportionate impacts and opportunities on race, ethnicity, income status, family status, gender, age
- New Housing Affordability strategies

Emerging Issues

- Public Health
  - Food Systems
  - Health resources and accessibility
  - Health system capacity and resiliency
- Emerging Technology
  - Vehicle Automation and transportation electrification
  - Broadband as an essential utility

City Council Discussion

Questions after the meeting can be directed to:

Sara Dechter

928-213-2631

sdechter@flagstaffaz.gov

Staff is requesting input and discussion of:

- The proposed approach for public participation and guiding principles
- Concerns and inquiries about intergovernmental coordination
- Questions about the anticipated work and data management

Regional Plan Anticipated Data Needs

Data Required by Statue or utilized in the last Regional Plan	Category	City Required	County Required
Annual NOx Emissions	Air quality		Yes
Annual VOC Emissions	Air quality		Yes
Annual CO2 Emissions	Air quality		Yes
Current population	Demographics		Yes
University enrollment and projections	Demographics		
Population by age	Demographics		Yes
Race and ethnicity	Demographics		Yes
Household Types	Demographics		
Population projections	Demographics		Yes
Population Density	Demographics		Yes
Household density	Demographics		
Household size	Demographics		
Educational Attainment	Demographics		
School enrollment	Demographics		
business density	Economics		Yes
tax revenues	Economics		
employment (by sector)	Economics		
Household income	Economics		
Poverty data	Economics		
Flagstaff Occupations	Economics		
Flagstaff Employers	Economics		
Household Expenditures estimates	Economics		
renewable energy installations	Energy		Yes
Age of housing units	Energy		

Regional Plan Anticipated Data Needs

Data Required by Statue or utilized in the last Regional Plan	Category	City Required	County Required
APS Energy Mix	Energy		
Access to incident solar energy	Energy	yes	Yes
Steep slopes	Environment		Yes
NAU Centennial Forest	Environment		
Prairie Dog colonies	Environment	Yes (as a component of "wildlife" but prairie dog not specifically called-out)	Yes
Springs and Seeps	Environment	yes	Yes
Important Birding Area Boundaries	Environment	Yes (as a component of "wildlife" but migratory birds not specifically called-out)	
Terrestrial Ecosystem Survey Data	Environment	yes (but worded different, "forests, soils, rivers and other waters, harbors, fisheries, wildlife, minerals, and other natural resources")	
The conservation element may also cover:(a) The reclamation of land. (b) Flood control.(c) Prevention and control of the pollution of streams and other waters.(d) Regulation of the use of land in stream channels and other areas required for the accomplishment of the conservation plan.(e) Prevention, control and correction of the erosion of soils, beaches and shores.(f) Protection of watersheds.	Environment	"may also cover"	

Regional Plan Anticipated Data Needs

Data Required by Statue or utilized in the last Regional Plan	Category	City Required	County Required
NRCS Soil data	Environment	yes (but not specific to NRCS)	
HUCS watersheds	Environment		
Watchable Wildlife Areas	Environment		
Water Courses and bodies	Environment	yes	
Wildlife Corridors	Environment	yes	Yes
historic timeline	Flagstaff History		
FMPO boundary	Geography		
Topography	Geography		
Land Ownership	Geography		
Land Management	Geography		
Urban Growth Boundary	Geography		
City Limits	Geography		
Existing mines, influences of mining operations, and suitable geologic resources	Geology	Yes	
Identified sources of aggregates	Geology	Yes	Yes
Geologic hazard mapping in areas of known geologic hazards	Geology	yes	
Historic Districts	Historic		
Age of Neighborhoods	Historic		
Historic Route 66 alignments	Historic		
Individual Historic Register listings	Historic		
Beal Wagon Road alignments	Historic		
Housing Units	Housing	yes	yes

Regional Plan Anticipated Data Needs

Data Required by Statue or utilized in the last Regional Plan	Category	City Required	County Required
Housing demand	Housing	yes	
Second home data	Housing		
Housing construction projections	Housing		
Housing Affordability and costs	Housing		
Median Housing values	Housing		
Identify City programs that promote home ownership, that provide assistance for improving the appearance of neighborhoods and that promote maintenance of both commercial and residential buildings in neighborhoods	Housing	yes	
Identify City programs that provide for the safety and security of neighborhoods	Housing/public safety	yes	
Developed v. undeveloped parcels	Land Use		
building footprints	Land Use		
Vacant Land Available for Development Based on Current Zoning	Land Use		
DEVELOPMENT POTENTIAL OF VACANT PARCELS	Land Use		
Commercial/Industrial Square footage by type	Land Use		
Existing Land Use profile for scenario modeling; County includes compact form development and activity center locations	Land Use	yes	Yes
population within 1/2 mile of a park	Parks, Open Space, and Recreation		

Regional Plan Anticipated Data Needs

Data Required by Statue or utilized in the last Regional Plan	Category	City Required	County Required
County Open Space	Parks, Open Space, and Recreation		yes
City Open Space	Parks, Open Space, and Recreation	yes	
City Natural Reservations	Parks, Open Space, and Recreation	yes	
City Parks	Parks, Open Space, and Recreation	yes	
City Parkways and scenic drives	Parks, Open Space, and Recreation	yes	
City Beaches	Parks, Open Space, and Recreation	yes	
City Playgrounds and playfields	Parks, Open Space, and Recreation	yes	
City Bicycle routes	Parks, Open Space, and Recreation	yes	
Other recreation areas	Parks, Open Space, and Recreation	yes	
County Parks and Recreation	Parks, Open Space, and Recreation		Yes
Designated wilderness	Parks, Open Space, and Recreation		
Other federally protected or designated areas	Parks, Open Space, and Recreation		
Cinder Hills OHV area	Parks, Open Space, and Recreation		
Kelly Trails OHV area	Parks, Open Space, and Recreation		
State Trust Lands - High Priority for Retention	Parks, Open Space, and Recreation		
civic and community centers	Public facilities	yes	
public schools	Public facilities	yes	
libraries	Public facilities	yes	

Regional Plan Anticipated Data Needs

Data Required by Statue or utilized in the last Regional Plan	Category	City Required	County Required
police stations	Public facilities	yes	
fire stations	Public facilities	yes	
other public buildings	Public facilities	yes	
Flood management infrastructure	Stormwater		
Rural floodplain	Stormwater/Zoning Code		
Visitation	Tourism		
Vehicle Miles Traveled	Transportation		
Journey to Work data	Transportation		
transit ridership	Transportation		
transit service levels	Transportation		
Circulation system - freeways, arterial and collectors, bicycle routes and any other modes	Transportation	yes	Yes
Minimum road widths according to function, clearances around structures	Transportation	yes	
Evacuation routes	Transportation/public safety	yes	
Water Demand - residential, commercial, industrial	Water Services	Yes	Yes
Peak load water supply requirements	Water Services	yes	
Historic Average water sources	Water Services		
Reclaimed water distribution	Water Services		
gpcpd over time	Water Services		

Regional Plan Anticipated Data Needs

Data Required by Statue or utilized in the last Regional Plan	Category	City Required	County Required
adequate water supply calculation	Water Services		
Surface water sources	Water Services		Yes
Groundwater sources, well locations	Water Services		Yes
Effluent supplies	Water Services		Yes

Regional Plan Anticipated Data Needs

Metrics that may be needed for emerging issues or decision-making	Category
Annual Community Greenhouse Gas Emissions	Climate action metrics
Annual Community Greenhouse Gas Emissions per capita	Climate action metrics
Energy use by housing type	Climate action metrics
Natural Gas usage - residential - annual - total and per building	Climate action metrics
Natural Gas usage - commercial - annual - total and per building	Climate action metrics
Natural Gas usage - industrial - annual - total and per building	Climate action metrics
Electricity usage - residential - annual - total and per building	Climate action metrics
Electricity usage - commercial - annual - total and per building	Climate action metrics
Electricity usage - industrial - annual - total and per building	Climate action metrics
# of electric only buildings - by sector - new and total	Climate action metrics
Energy use per gallon of potable water produced	Climate action metrics
Energy use per gallon of reclaimed water produced	Climate action metrics
# of people living locally, but working remotely	Climate action metrics
# of electric vehicles registered (resident and fleet)	Climate action metrics
VMT by electric vehicles (resident and fleet)	Climate action metrics
# of publicly available EV charging stations	Climate action metrics
Amount of energy distributed by publicly available EV charging stations	Climate action metrics

Regional Plan Anticipated Data Needs

Percentage of households living in 15-minute/complete neighborhoods	Climate action metrics
Average annual temperature (regional)	Climate change metrics
Days above 90 degrees	Climate change metrics
Average precipitation - spring	Climate change metrics
Average precipitation - summer (monsoon)	Climate change metrics
Average precipitation - fall	Climate change metrics
Average precipitation - winter	Climate change metrics
Annual snowpack	Climate change metrics
Temperature, humidity, wind, precipitation records broken	Climate change metrics
Extreme weather events	Climate change metrics
Hazardous air quality days per year	Climate change metrics (+ public health)
Annual streamflow	Climate change/Stormwater
Opportunity Areas	Equity
Accessibility measures by mode (accessibility to jobs, health care etc.)	Equity metrics

bike and ped level of service at the TAZ level comparing Title VI v. wider community	Equity metrics
transit propensity	Equity metrics
Mode share by gender, race, poverty and disability status	Equity metrics
Crime Patterns	Equity metrics
Ways of mapping vulnerable populations that are finer than Title VI	Equity metrics
Disparate impacts to Title VI neighborhoods (positive and negative)	Equity metrics
Internet and Phone Connectivity within the area by population	Equity metrics
Emergency Management communications infrastructure (equity)	Equity metrics
Acreage of agricultural land	Food Systems
% of Population at low-income and low accessibility	Food Systems
Food deserts	Food Systems
Food Insecurity rate	Food Systems
Location of existing and planned utilities	Land Use
Development proposals	Land Use
Capital Improvement Programs	Land Use
Percent increase in capacity to serve residents with 15-minute (1/4 mile) walking access time to City open space	Open Space
Percent increase in access points to open space	Open Space

Regional Plan Anticipated Data Needs

Percent use of open space by underrepresented groups	Open Space
Percent use of open space by American with Disabilities	Open Space
Number of annual open space users	Open Space
The economic value derived from open space visitor attraction	Open Space
The health benefits related to open space use for mental and physical health	Open Space
Leading causes of death in the county and possible causes that are tied to the urban and rural environment	Public Health Metrics
Health Care deserts	Public Health Metrics
Medical infrastructure to support the Region (look at COVID patients from out of the area)	Public Health Metrics
COVID data that show where systems were stressed by the pandemic	Public Health Metrics
Quality of prenatal care [possibly by race] (access indicator)	Public Health Metrics
Percent insured (health insurance)	Public Health Metrics
multigenetic stormwater facilities - LID water quality basins, and recreational ponds.	Stormwater
Number or regional flood mitigation facilities. Multi-use for regional flood control and recreation/open space.	Stormwater
Flood frequency	Stormwater
Stream channel health	Stormwater
Acreage of rural floodplains	Stormwater
Acreage of administrative floodplains	Stormwater
recreation impacts	Tourism
Trip Length	Transportation
Concentration of traffic and associated impacts (corresponds to race and income	transportation/public health

Regional Plan Anticipated Data Needs

Crash History (possibly by Title VI locations, Age, gender)	Transportation/public safety
Per Capita Waste Generation	Waste and Consumption
Pounds of recycling per household per week	Waste and Consumption
Single family recycling rate	Waste and Consumption
Commercial & Multifamily recycling rate	Waste and Consumption
Community-wide diversion rate	Waste and Consumption
Consumption-based greenhouse gas emissions	Waste and Consumption
Type of Water Source for County areas (access in general, healthy water, wastewater system)	Water access and availability in rural areas