# City of Calgary

## NWWA Conference, Winnipeg

## Fish Creek WWTP and WSER

## November 4, 2024

# Outline

- Background
- WSER context
- Mitigation of Risk - Current Operations and Future Planning

# 1. Background

# City of Calgary Wastewater Treatment Plants

- The City of Calgary has 3 wastewater treatment plants
- Provide wastewater treatment for Calgary and regional customers

# Calgary Wastewater Treatment: Strong Environmental Performance

- Calgary began treating wastewater in 1932 at Bonnybrook and we have been adding capacity at our wastewater plants ever since.
- Regulated to provide secondary treatment by Alberta Environment and Parks (AEP)
- AEP focus in the Bow River watershed has been on minimizing nutrient loadings (TP, TN, TSS).
- Pine Creek Wastewater Plant - innovative ACWA facility

# City of Calgary Wastewater Infrastructure

- Each of the wastewater treatment plants has different processes:

| Process | Bonnybrook | Fish Creek | Pine Creek |
|---|---|---|---|
| Screening | ✓ | ✓ | ✓ |
| Grit Removal | ✓ | ✓ | ✓ |
| Primary Clarification | ✓ | ✓ | ✓ |
| Primary Sludge Fermentation | ✓ | | ✓ |
| Biological Treatment | ✓ | ✓ | ✓ |
| Secondary Clarification | ✓ | ✓ | ✓ |
| Phosphorus Control | ✓ | ✓ | ✓ |
| Effluent Filtration | | | ✓ |
| Ammonia Nitrogen Control | ✓ | | ✓ |
| Treated Effluent Disinfection | ✓ | ✓ | ✓ |
| Anaerobic Sludge Digestion | ✓ | ✓ | ✓ |
| | | | |
| | | | |

# 2. WSER Context

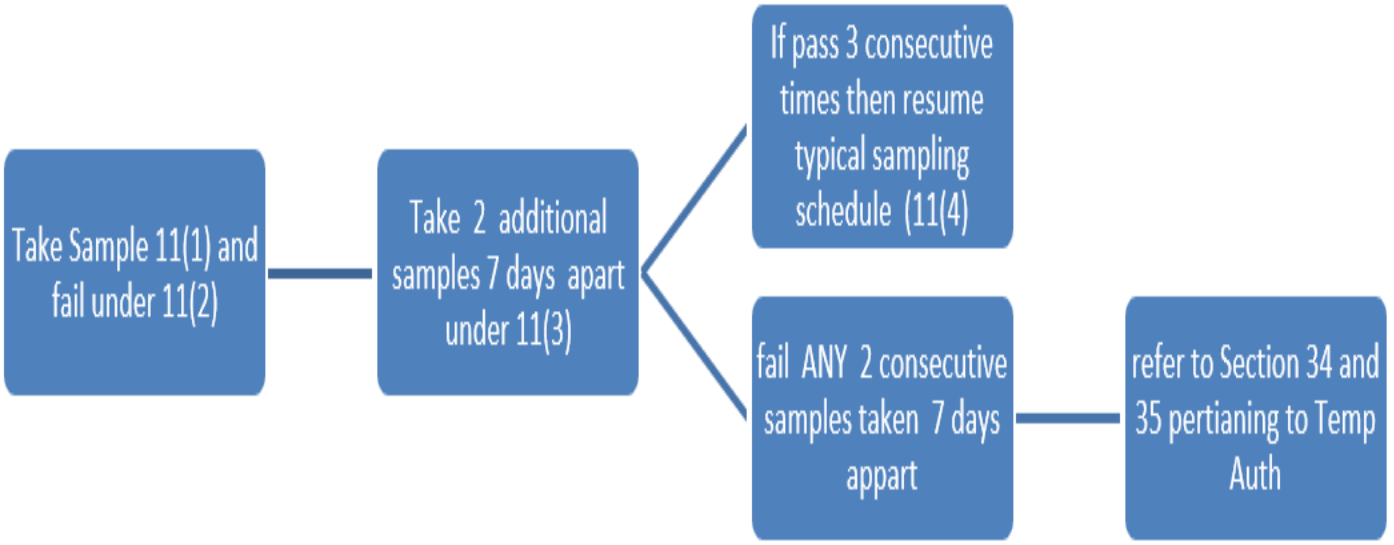
# WSER – Early days

- Goal was to ensure a minimum standard of secondary treatment in Canada
- Bill passed in 2012
- Identification reporting in 2013
- Minimum end of pipe limits in effect in 2014
- Calgary did not foresee any compliance challenges

# How It All Started – Fish Creek WWTP (2014)

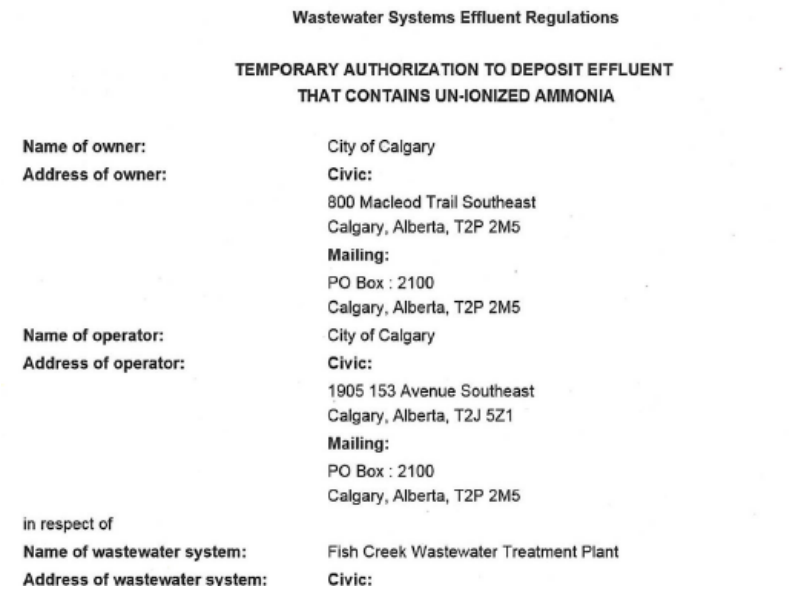

Began FC Acute Lethality Testing

# WSER – Acute Lethality Failure Path




# Fish Creek – TA under WSER

- In March 2015, EC granted Calgary a Temporary authorization to deposit effluent that contains un-ionized ammonia.
- Toxicity Identification Evaluation pointed to un-ionized ammonia as toxicant
- EC inspectors visited when the TA was in place (2016)



**Wastewater Systems Effluent Regulations**

**TEMPORARY AUTHORIZATION TO DEPOSIT EFFLUENT THAT CONTAINS UN-IONIZED AMMONIA**

| | |
|---|---|
| **Name of owner:** | City of Calgary |
| **Address of owner:** | **Civic:**<br>800 Macleod Trail Southeast<br>Calgary, Alberta, T2P 2M5<br>**Mailing:**<br>PO Box : 2100<br>Calgary, Alberta, T2P 2M5 |
| **Name of operator:** | City of Calgary |
| **Address of operator:** | **Civic:**<br>1905 153 Avenue Southeast<br>Calgary, Alberta, T2J 5Z1<br>**Mailing:**<br>PO Box : 2100<br>Calgary, Alberta, T2P 2M5 |
| in respect of | |
| **Name of wastewater system:** | Fish Creek Wastewater Treatment Plant |
| **Address of wastewater system:** | **Civic:** |

# FC and *WSER – Timeline of Compliance*

2018-2019

- Unable to renew the temporary authorization to discharge effluent containing un-ionized ammonia in 2018 and 2019
- Toxicant not un-ionized ammonia so therefore did not meet requirements in S.34 of WSER
- Toxicant likely a combination of the CO2 used to stabilize pH and high concentration of CO2 due to FC HPO process

# FC and *WSER – Timeline of Compliance*

2020

- Nov sample was acutely lethal (failures were due to test method, NOT effluent quality).
- Follow up testing required under WSER
- Since not “caught” by provisions of WSER EC directs City of S.36 of Fisheries Act
- Meeting with EC Inspectors
- EC directs Calgary to develop a plan to indicate measures over short, med and long-term time horizons

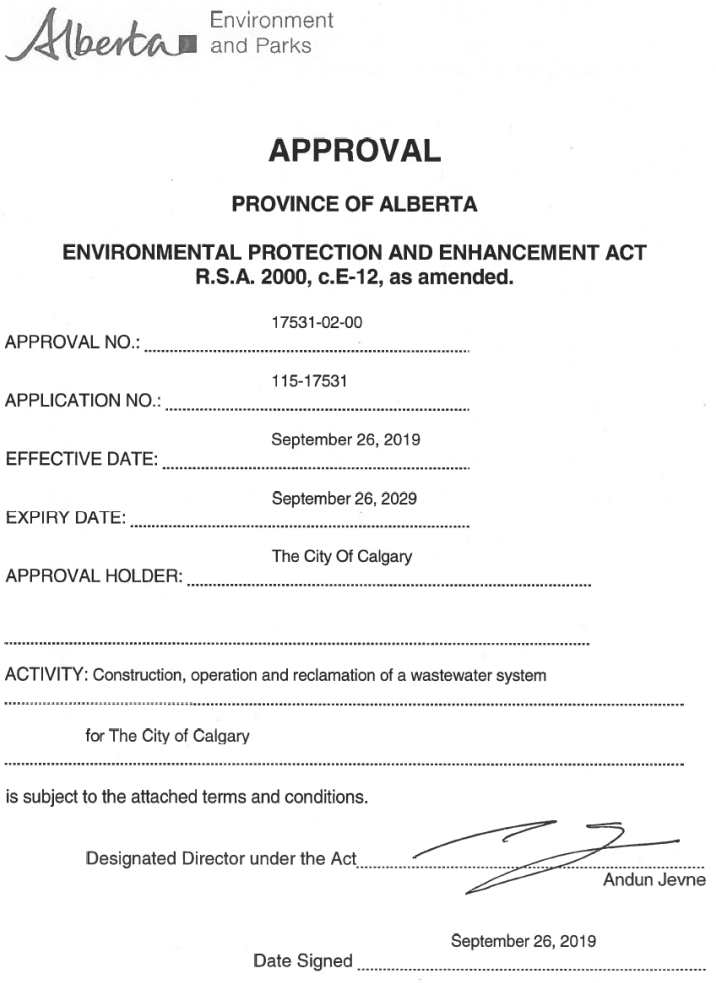
# 3. Mitigation Proposal EC Current Operations and Future Planning

# Measures proposed to EC

- Efforts are made to operate Pine Creek WWTP close to capacity, thereby allowing FC to operate below capacity.
- FC Facility must be kept online to manage wastewater flows, alongside the other two WWTPs (Pine Creek and Bonnybrook).
- The planned upgrades will reduce the risk of acute lethality and provide nitrification.
- Continued compliance with provincial regulatory approval

# Fish Creek and the EPEA *(provincial)*

- Approval issuance tied to CCME wastewater strategy.
- Focus is on modelling to predict and control risk
- Receiving Water Assessment was completed evaluating instream ammonia levels downstream of FC facility
- Focus is on modelling to predict and control risk
- Licence condition: City must apply to upgrade FC to



Alberta Environment and Parks

**APPROVAL**

**PROVINCE OF ALBERTA**

**ENVIRONMENTAL PROTECTION AND ENHANCEMENT ACT**
**R.S.A. 2000, c.E-12, as amended.**

APPROVAL NO.: 17531-02-00

APPLICATION NO.: 115-17531

EFFECTIVE DATE: September 26, 2019

EXPIRY DATE: September 26, 2029

APPROVAL HOLDER: The City Of Calgary

ACTIVITY: Construction, operation and reclamation of a wastewater system

for The City of Calgary

is subject to the attached terms and conditions.

Designated Director under the Act

Andun Jevne

Date Signed September 26, 2019

# Other Considerations

- City developed a site-specific UIA guideline to assess the suitability and applicability of 0.016 mg/L instream guideline.
- Site specific UIA guideline was used to determine appropriate ammonia limits for the City's WWTPs
- During drought conditions in the Bow River, a plan is in place to conduct limited in-stream sampling near the FC Diffuser to better understand instream impacts.

# Relationships are Key

- The City takes the FC ammonia toxicity risk seriously and is working towards upgrading the FCWWTP to provide nitrification in a timely manner.
- We comply with all *WSER* and *Fisheries Act* requirements when failure occurs
- Focus on working cooperatively with EC and Province.
- Final design of FC upgrades on track by Q4 2025

# FC Upgrades Project – Key Activities

- 2019 - FCWWTP nitrification upgrades project kickoff
- October 2020 - Aerobic Granular Sludge (AGS) selected
- Fall 21/Winter 22 - AGS conceptual design advanced
- Fall 22 - City review of AGS conceptual design. Risks identified (cost and schedule) due to proprietary technology. City decided to reevaluate AGS against BNR (Biological Nutrient Removal)
- May 2023 - City team reassessment. BNR technology will be implemented instead to address risks. Faster timeline than AGS.
- Summer 2023 - Presentations to AEPA and EC

# Questions ?


Flood Proofing
Wastewater Approval
Environmental Policy
Reporting
Wet Weather Management
Water Quantity
Air Quality
Risk Management
Understanding
Toxicity
Regulatory
Research
Emerging Substances of Concern
Operator Certification
Odours
Effluent Limits
Water
Dissolved Oxygen
Water Quality
Team
Consultation
Infrastructure Costs
Stakeholder Engagement
Fish Creek
Total Loading Management
Plant D Expansion
Excellence
Work
Environmental Stewardship
First Nations
Renewal
Bonnybrook
Pine Creek
Total Suspended Solids
Phosphorus
Training
Quality
Dewatering Facility
Laboratory Accreditation
Compliance
Triple Bottom line
Amendment