Welcome

Storm Water Awareness Week!!

Pitfalls and Tips in Developing Effective Industrial, Commercial, and Institutional Stormwater Pollution Prevention Programs

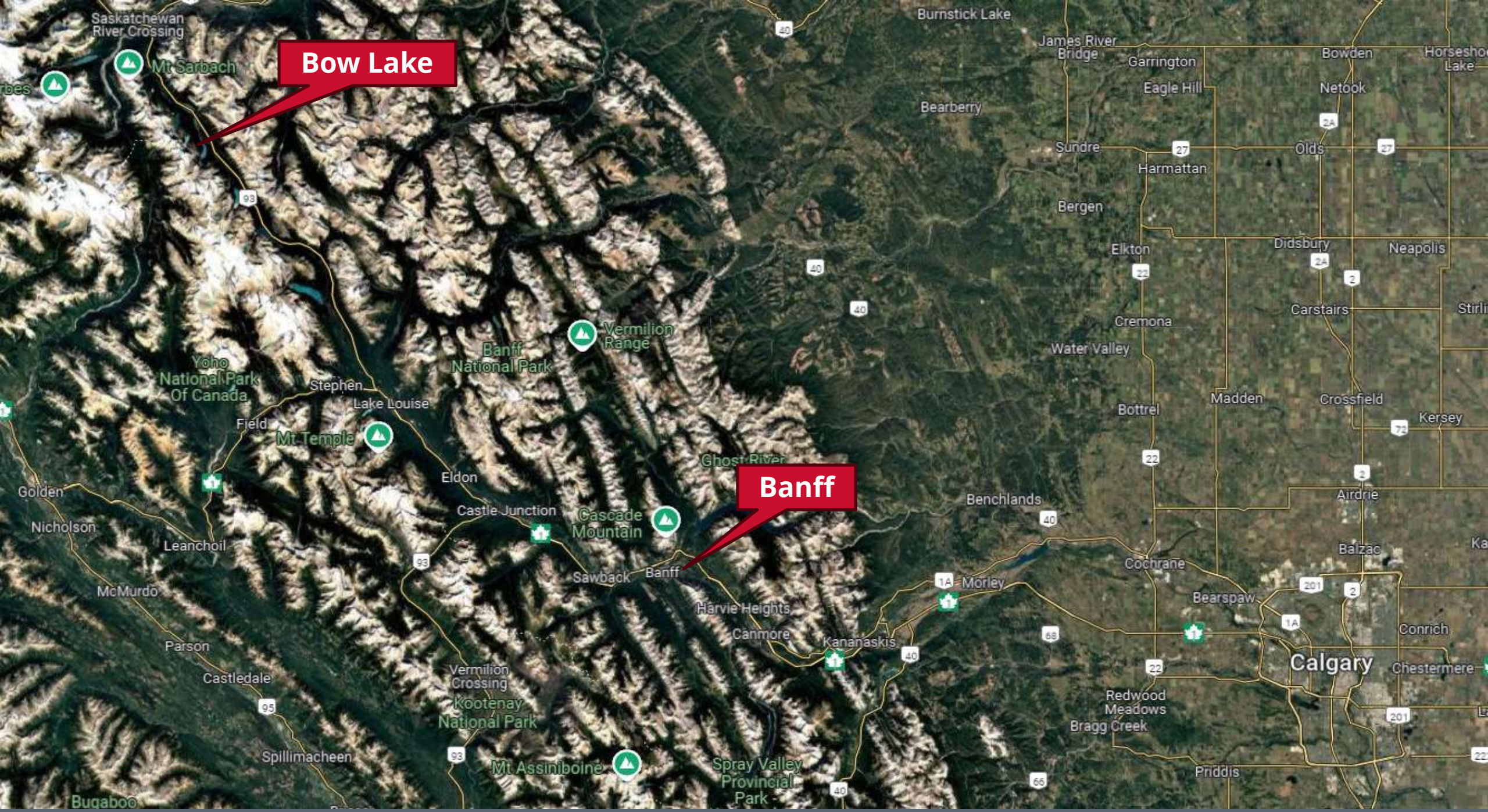
Graham Tait, CPESC, CPSWQ, CESSWI

September 25, 2024

[What is Land Acknowledgement?]
Source: The Calgary Foundation

The City of Calgary, located in the heart of Southern Alberta, both acknowledges and pays tribute to the traditional territories of the peoples of Treaty 7, which include the Blackfoot Confederacy (comprised of the Siksika, the Piikani, and the Kainai First Nations), the Tsuut'ina First Nation, and the Stoney Nakoda (including Chiniki, Bearspaw, and Goodstoney First Nations). The City of Calgary is also home to the Métis Nation of Alberta (Districts 5 and 6).

Calgary is situated on land where the Bow River meets the Elbow River, a site traditionally known in the Blackfoot language as Moh'kins'tsis. On this land and in this place, we strive to work together, walk together, and grow together in a good way.


Bow Lake
Banff
Saskatchewan River Crossing
Mt Sarbach
Burnstick Lake
James River Bridge
Garrington
Bowden
Eagle Hill
Netook
Bearberry
Sundre
Harmattan
Olds
Bergen
Elkton
Didsbury
Neapolis
Cremona
Carstairs
Water Valley
Vermilion Range
Banff National Park
Yoho National Park Of Canada
Stephen
Lake Louise
Field
Mt Temple
Bottrel
Madden
Crossfield
Kersey
Airdrie
Golden
Eldon
Ghost River
Benchlands
Nicholson
Castle Junction
Cascade Mountain
Leanchoil
Sawback
Banff
Cochrane
Balzac
Morley
McMurdo
Harvie Heights
Bearspaw
Canmore
Kananaskis
Conrich
Parson
Castledale
Vermilion Crossing
Kootenay National Park
Calgary
Chestermere
Redwood Meadows
Bragg Creek
Spillimacheen
Mt Assiniboine
Spray Valley Provincial Park
Priddis
Bugaboo

Objectives

1. Why Stormwater Pollution Prevention? Calgary Context
2. The Case for Proactive Facility Inspections & Assessments
3. Innovation: Integrating Geospatial Tools into ICI Workflow
4. ICI Inspection Example
5. Summary
6. Workshop Q&A

Our webpage: https://calgary.ca/stmpp


stormwater
210 AV SE
wastewater
B158
Stormwater outfall
Drinking water
Advancing Canadian Wastewater Assets (University of Calgary / City of Calgary)
210 AV SE
BOW RIVER
The City of Calgary | City of Calgary | Challenger Geomatics Ltd

- Storm Water Awareness!!
- The City “doing the right thing”.
- The City “seen to be doing the right thing”.

(Reference: Hoggan, J. (2009). *Do the Right Thing: PR Tips for a Skeptical Public*. Capital Books. www.hoggan.com/our-strategy)

Why Stormwater Pollution Prevention?

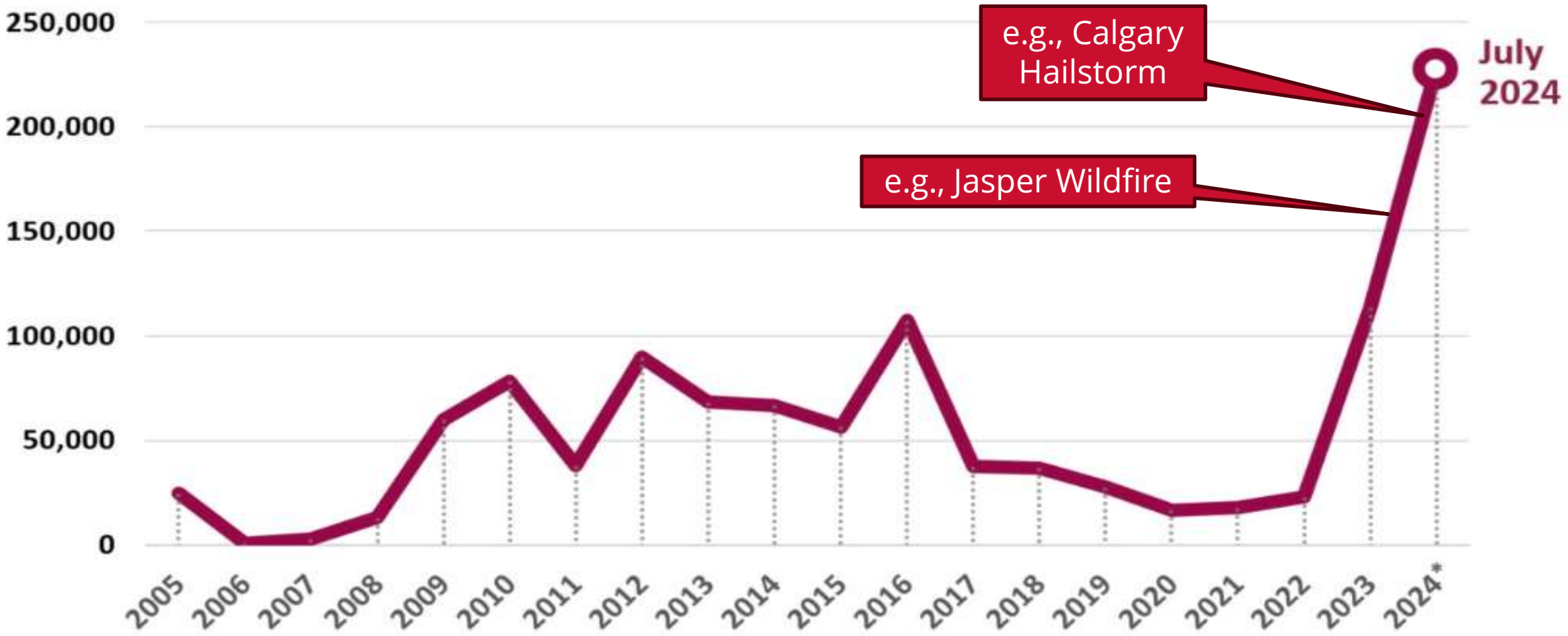
Calgary and Watershed Context

City of Calgary – Water Utility

Stormwater Pollution Prevention

- Erosion & Sediment Control
  - Approvals
  - Compliance Inspections
- Drainage Permits
- Industrial, Commercial, Institutional (ICI)
- Drainage Control

Claims Counts July and August



IBC BAC

Source: IBC analysis with data from PCS Canada, Swiss Re, Deloitte and CatIQ Inc. (www.catiq.com under license to IBC).
**IBC survey from participating member companies.*

- Some aspects of climate change in the Calgary Region are increasing stormwater pollution risk.
- We need to include climate adaptation and resiliency into our SWPPP strategies and programs.

ate Change Implications
Rainfall Duration Example

	ear m)	100-year (mm)	200-year (mm)	500-year (mm)	1000-year (mm)
1997[1]	13.7	19.4	35.1	46.0	52.0	57.0
2020[2]	14.6	21.8	41.6	46.0	51.9	56.3
2050s[2]	18.7	27.9	53.2	58.9	66.4	72.0
2080s[2]	22.2	33.2	63.2	69.9	78.8	85.5

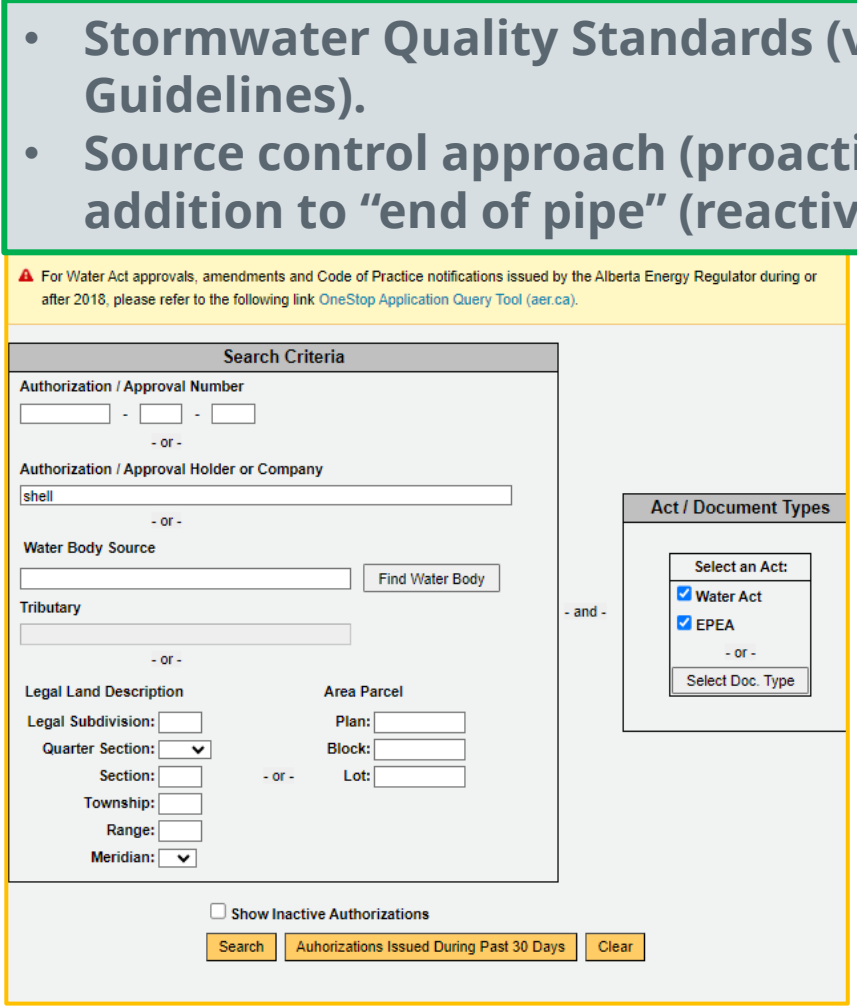
[1] City of Calgary (2011). *Stormwater Management and Design Manual*

[2] GHD (2020). Climate Data for Hydrologic and Hydraulic Analysis, Technical Memorandum #3: IDF Curves

Slide courtesy of Bert van Duin, City of Calgary,

Water Resources

- **Stormwater Quality Standards (vs. Guidelines).**
- **Source control approach (proactive) in addition to "end of pipe" (reactive).**



[Alberta - Environmental Authorization Viewer]

TABLE 4.2-A INDUSTRIAL RUNOFF CONTROL SYSTEM LIMITS

PARAMETER	LIMITS
96-Hour Acute Lethality Test Using Rainbow Trout (*Oncorhynchus mykiss*)	100% survival in 100% industrial runoff sample
pH	≥ 6.0 and ≤ 8.5 pH units
Chemical Oxygen Demand	≤ 50 mg/L
5-Day Biochemical Oxygen Demand	≤ 10 mg/L
Total Suspended Solids	≤ 20 mg/L
Chloride	< 120 mg/L
Ammonia-Nitrogen	≤ 1 mg/L
Total Nitrogen as N	≤ 2 mg/L
Total Phosphorus as P	≤ 0.5 mg/L
Oil and Grease	5 mg/L and no visible film or sheen
Floating Solids	Must not be visible
Visible Foam	Must not be visible

AB Environmental Protection & Enhancement Act → EPEA Approval – Industrial Runoff Control (example) → Joint Inspection

- The City doing the right thing.
- The City is seen to be doing the right thing.
- We take an ‘education first’ approach and, when needed have an escalating enforcement strategy.

Calgary's Stormwater Management Strategy

BYLAW NUMBER 37M2005

BEING A BYLAW OF THE CITY OF CALGARY TO REGULATE STORM SEWERS AND STORMWATER IN THE CITY OF CALGARY

(Amended by 15M2006, 57M2009, 50M2011, 13M2012, 14M2012, 7M2015, 47M2016, 58M2018, 41M2019, 43M2020, 41M2021, 72M2021, 35M2022, 51M2022, 32M2023, 45M2023)

WHEREAS the *Municipal Government Act* (R.S.A. 2000, c. M-26) authorizes a municipality to pass Bylaws for municipal purposes respecting public utilities and services provided by the municipality;

AND WHEREAS the *Municipal Government Act* authorizes a municipality to pass Bylaws for municipal purposes respecting the safety, health and welfare of people and the protection of people and property;

AND WHEREAS the *Municipal Government Act* authorizes a municipality to pass Bylaws for municipal purposes respecting people, activities and things in, on or near a public place or place that is often open to the public;

AND WHEREAS the *Municipal Government Act* authorizes a municipality to pass Bylaws for municipal purposes respecting nuisances;

AND WHEREAS the *Municipal Government Act* authorizes a municipality to pass Bylaws for municipal purposes respecting systems of licenses, permits or approvals;

AND WHEREAS the *Municipal Government Act* authorizes a municipality to pass Bylaws for municipal purposes respecting the enforcement of bylaws including providing for inspections to determine if bylaws are being complied with;

AND WHEREAS regulating storm sewers and stormwater within the City of Calgary is desirable;

(41M2021, 2021 May 10)

AND WHEREAS it is deemed expedient to update and consolidate the bylaws which control and regulate storm sewers and stormwater in The City of Calgary;

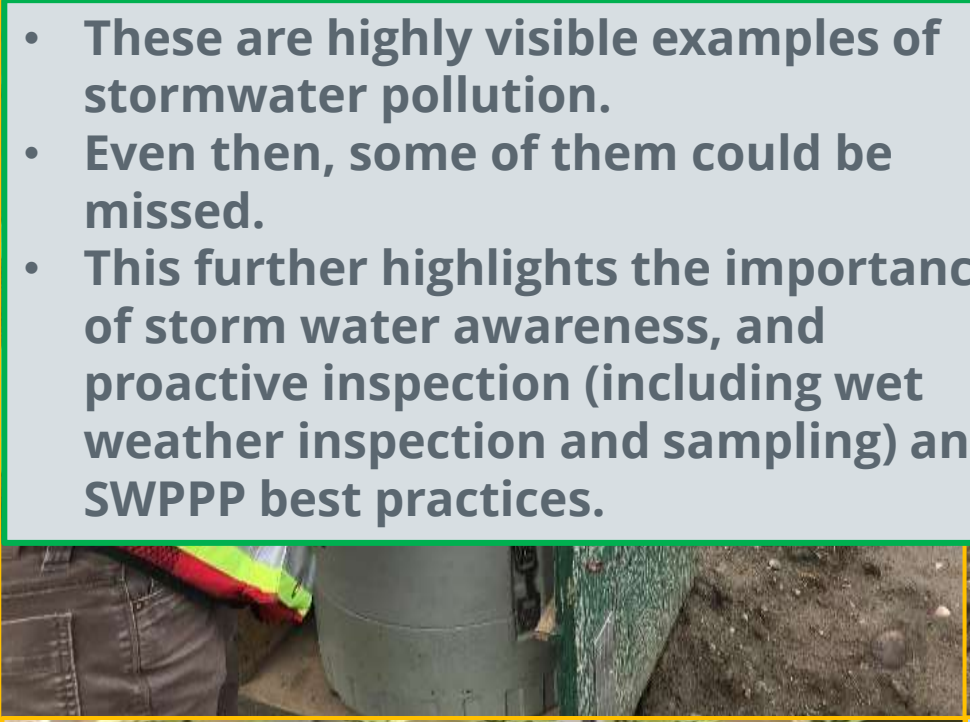
(41M2021, 2021 May 10)

NOW THEREFORE THE COUNCIL OF THE CITY OF CALGARY ENACTS AS FOLLOWS:

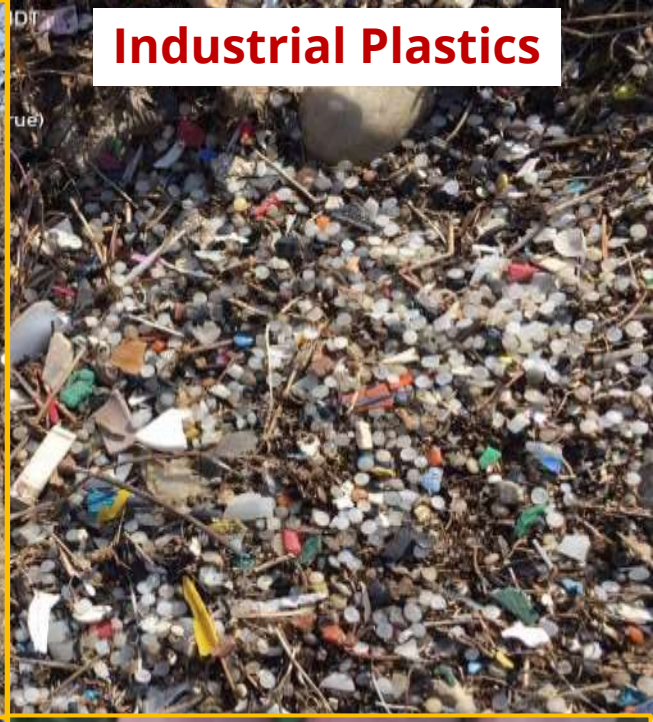
Calgary Stormwater Bylaw 37M2005

Corporate Level & Integrated Water Utility Staff → Water Utility

- These are highly visible examples of stormwater pollution.
- Even then, some of them could be missed.
- This further highlights the importance of storm water awareness, and proactive inspection (including wet weather inspection and sampling) and SWPPP best practices.



Metal Plating Spill



Industrial Plastics

- Plastic resin and pellet spills received significant media attention.
- Plastics manufacturers joined ‘Operation Clean Sweep’.
- City partnered with Alberta Plastics Recycling Association (APRA).
- Calgary recently collaborated with an Australian non-profit and large City on this topic.
- Calgary also participates in the University of Toronto’s ‘Trash Team’.

2023

Improved spill control and site perimeter containment

Industrial Plastics

Spillage of resins and pellets common at loading/unloading

Innovation: Proactive Facility Inspections & Assessments

Industrial, Commercial, and Institutional (ICI) Stormwater Pollution Prevention

- **The best SWPPP practices are sometimes the most common sense, cost-effective, and can often be cost-saving!**

- The U.S. EPA content on ICI-SWPPP has been really invaluable in the development of City of Calgary content!
- Kudos to all of you in delivering Storm Water Awareness to diverse audiences!

Maintain a clean and orderly facility by keeping exposed areas free of waste, garbage and floatable debris.

3. Manage runoff

Manage runoff by reducing the volume and rate at which it leaves your facility and preventing stormwater from coming into contact with pollutants on your site.

4. Erosion and sediment control

Prevent erosion and sedimentation by:

- installing stormwater collection areas to capture any contaminated runoff.
- covering exposed soils (including stockpiles) with an appropriate erosion control.

5. Prevent and prepare for spills

Prevent spills by mapping your site to identify those areas where spills might occur and implementing primary and secondary containment measures.

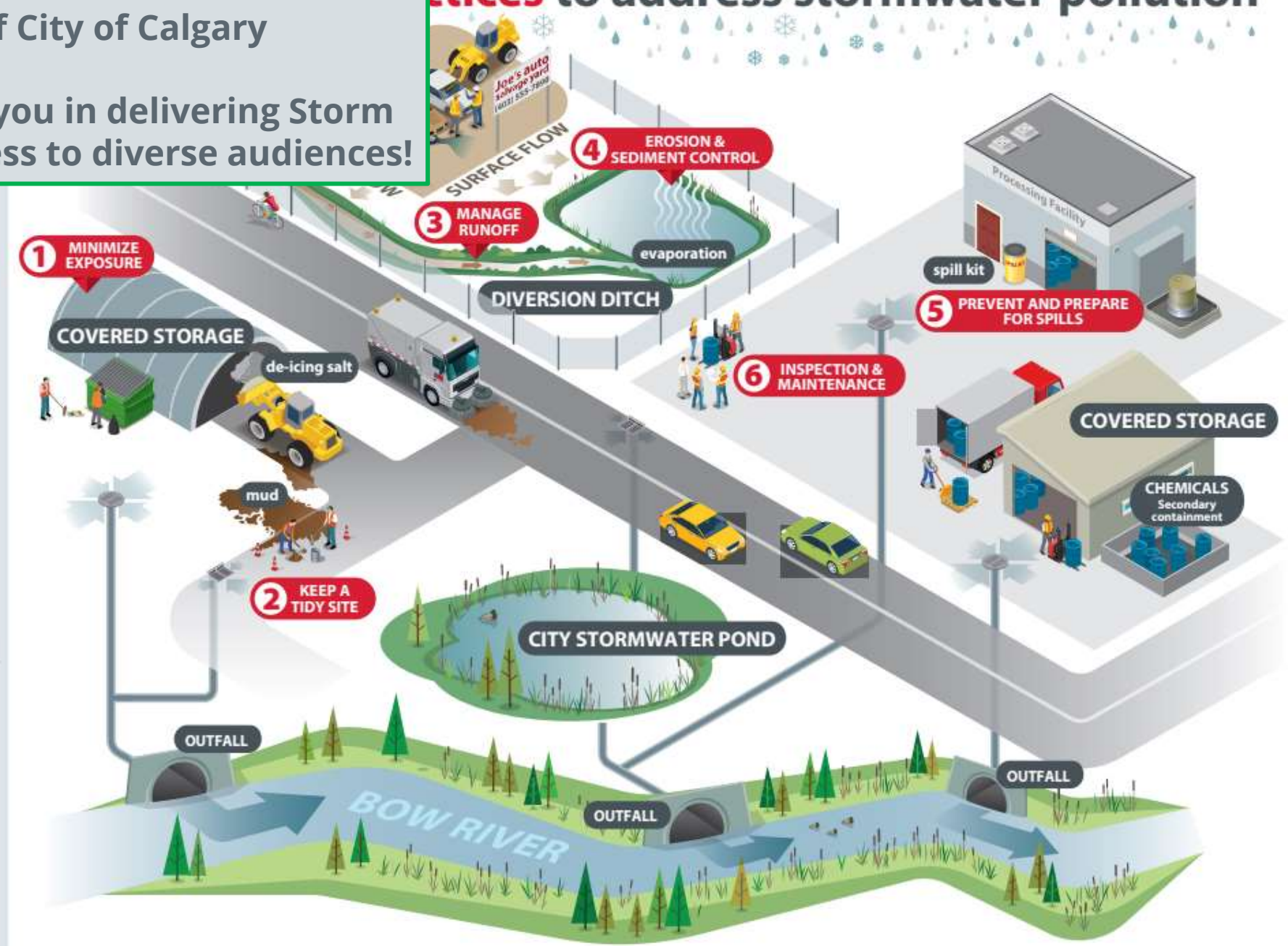
Prepare for spills by ensuring appropriate spill kit(s) are on site and easily accessible.

6. Inspection and maintenance

Prevent stormwater pollution by performing regular inspections, testing and preventative maintenance of equipment and following best management practices.

For more information visit **calgary.ca/stmpp**

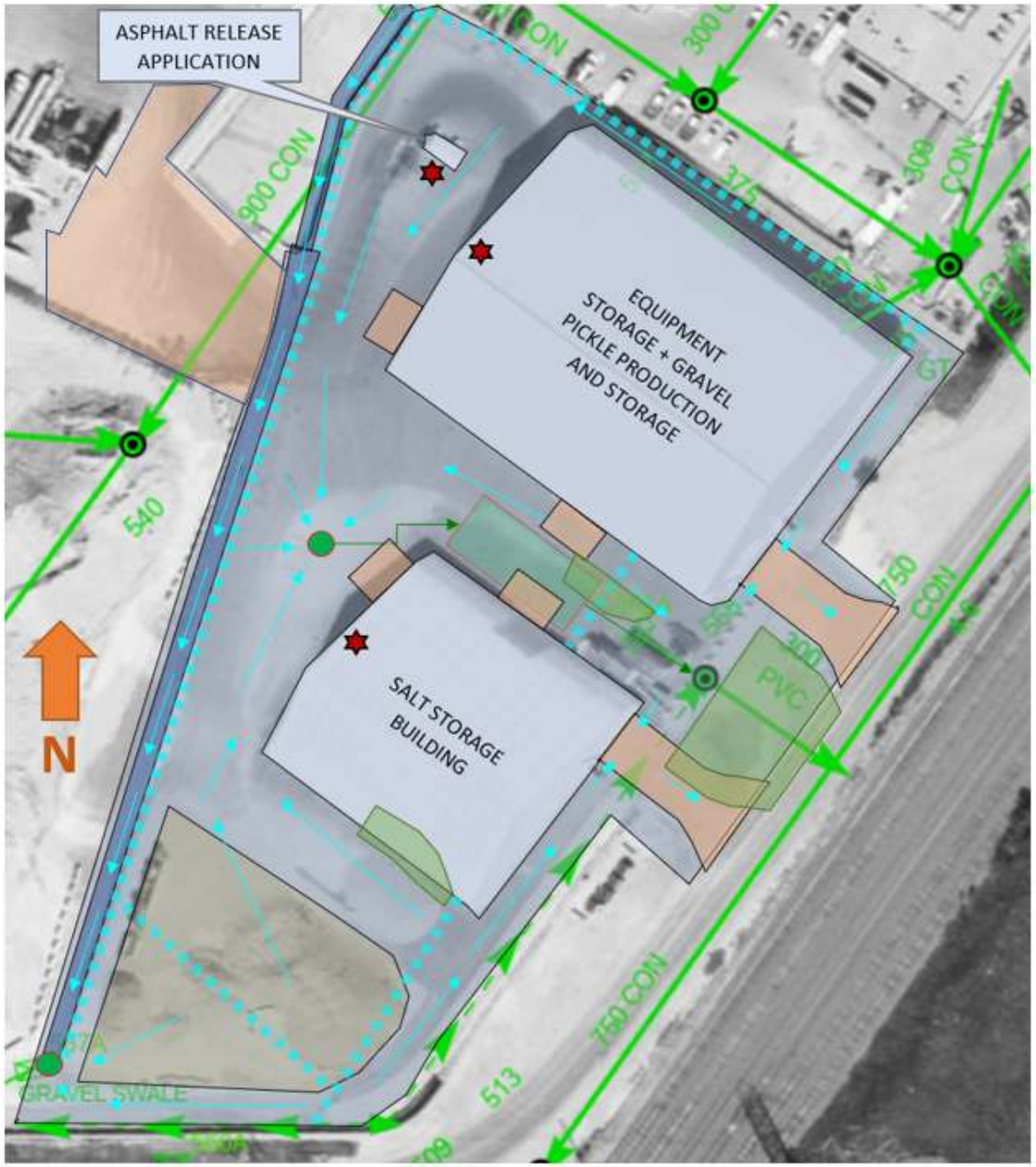
ctices to address stormwater pollution



- **We've developed a 'Mapping your Site' tool to assist customers as part of their facility SWPPP development.**
- **Thanks to Jonah and the WGR Southwest SWPPP Team for this video – still one of my favorite SWAW sessions!**

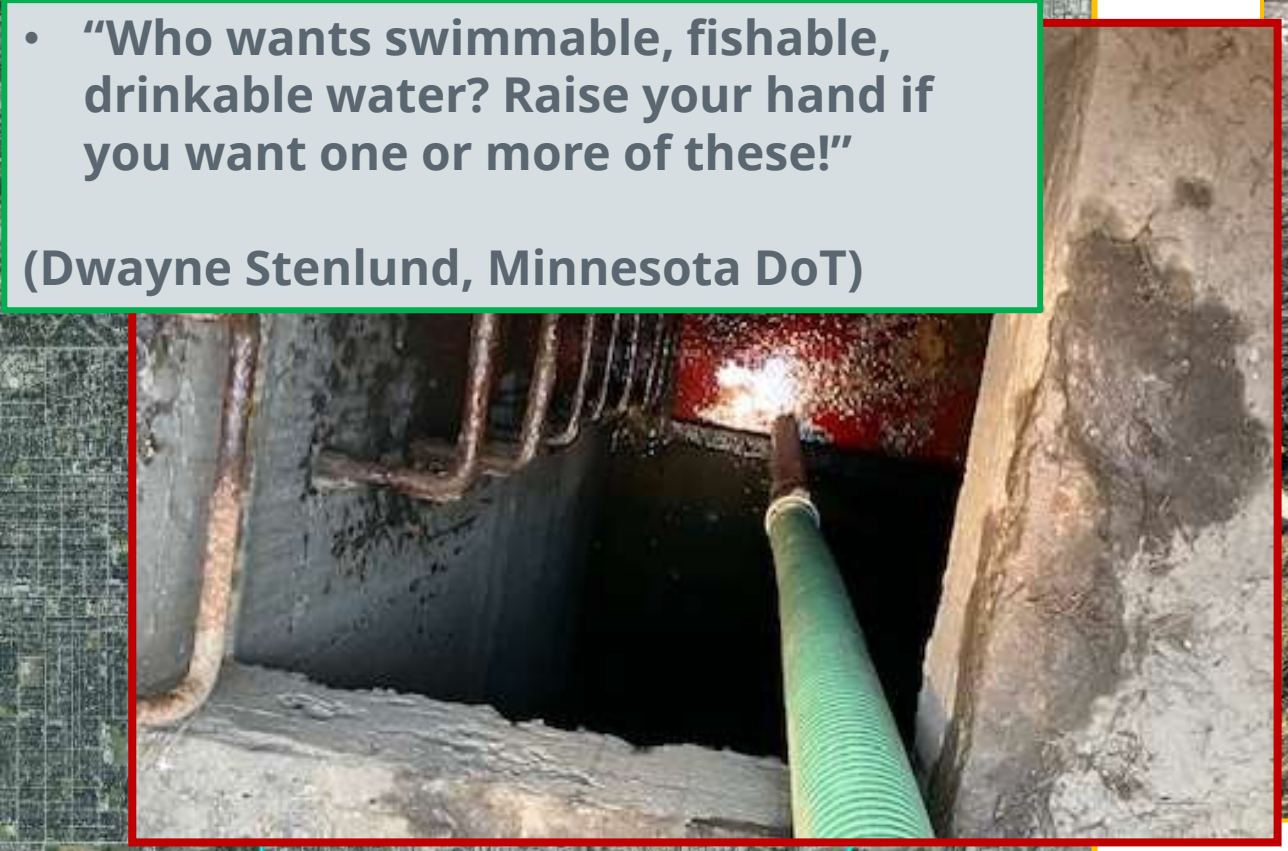
[Creating a Compliant Site Map](#) (2016, 28 mins)

Source: [California Stormwater Awareness Week](#) (Jonah Sonner, WGR Southwest).



- **“Who wants swimmable, fishable, drinkable water? Raise your hand if you want one or more of these!”**

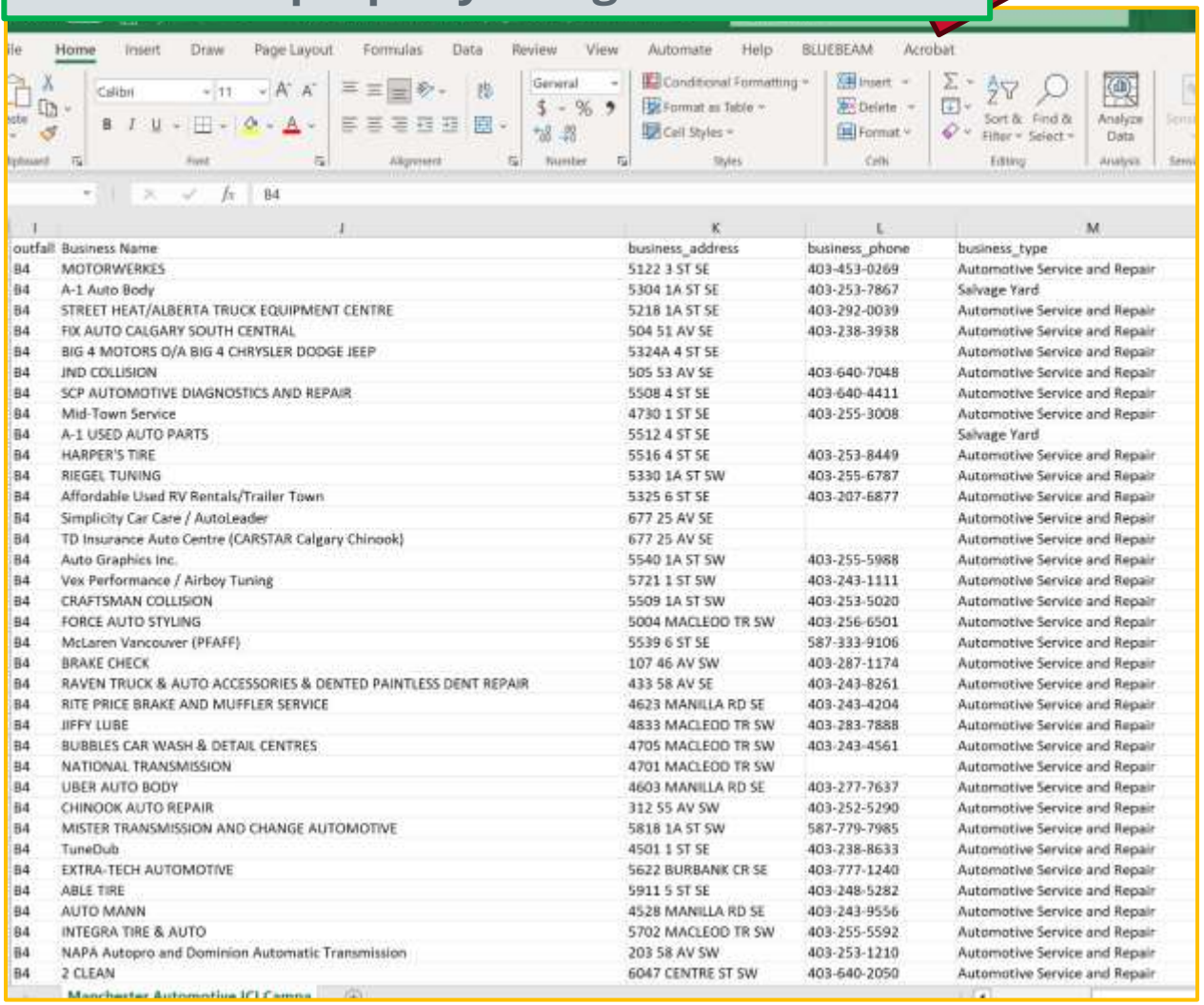
(Dwayne Stenlund, Minnesota DoT)



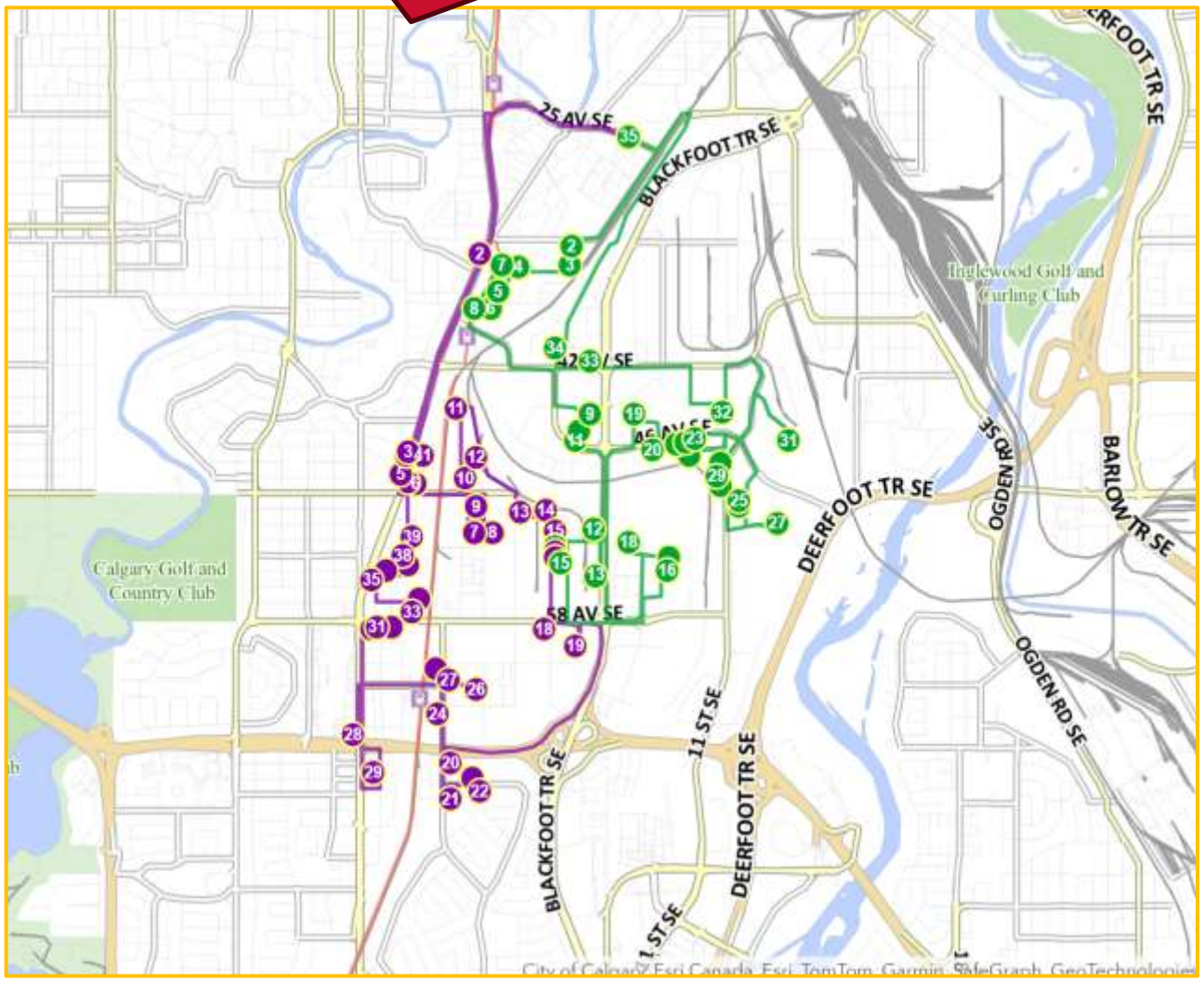
- **How accurate is the business license data?**
- **Are industrial and commercial business properly categorized?**

ating a business
MS Excel file for
otive businesses

GIS Tools optimized facility inspection map



outfall	Business Name	business_address	business_phone	business_type
B4	MOTORWERKES	5122 3 ST SE	403-453-0269	Automotive Service and Repair
B4	A-1 Auto Body	5304 1A ST SE	403-253-7867	Salvage Yard
B4	STREET HEAT/ALBERTA TRUCK EQUIPMENT CENTRE	5218 1A ST SE	403-292-0039	Automotive Service and Repair
B4	FIX AUTO CALGARY SOUTH CENTRAL	504 51 AV SE	403-238-3938	Automotive Service and Repair
B4	BIG 4 MOTORS O/A BIG 4 CHRYSLER DODGE JEEP	5324A 4 ST SE		Automotive Service and Repair
B4	JND COLLISION	505 53 AV SE	403-640-7048	Automotive Service and Repair
B4	SCP AUTOMOTIVE DIAGNOSTICS AND REPAIR	5508 4 ST SE	403-640-4411	Automotive Service and Repair
B4	Mid-Town Service	4730 1 ST SE	403-255-3008	Automotive Service and Repair
B4	A-1 USED AUTO PARTS	5512 4 ST SE		Salvage Yard
B4	HARPER'S TIRE	5516 4 ST SE	403-253-8449	Automotive Service and Repair
B4	RIEGEL TUNING	5330 1A ST SW	403-255-6787	Automotive Service and Repair
B4	Affordable Used RV Rentals/Trailer Town	5325 6 ST SE	403-207-6877	Automotive Service and Repair
B4	Simplicity Car Care / AutoLeader	677 25 AV SE		Automotive Service and Repair
B4	TD Insurance Auto Centre (CARSTAR Calgary Chinook)	677 25 AV SE		Automotive Service and Repair
B4	Auto Graphics Inc.	5540 1A ST SW	403-255-5988	Automotive Service and Repair
B4	Vex Performance / Airboy Tuning	5721 1 ST SW	403-243-1111	Automotive Service and Repair
B4	CRAFTSMAN COLLISION	5509 1A ST SW	403-253-5020	Automotive Service and Repair
B4	FORCE AUTO STYLING	5004 MACLEOD TR SW	403-256-6501	Automotive Service and Repair
B4	McLaren Vancouver (PFAFF)	5539 6 ST SE	587-333-9106	Automotive Service and Repair
B4	BRAKE CHECK	107 46 AV SW	403-287-1174	Automotive Service and Repair
B4	RAVEN TRUCK & AUTO ACCESSORIES & DENTED PAINTLESS DENT REPAIR	433 58 AV SE	403-243-8261	Automotive Service and Repair
B4	RITE PRICE BRAKE AND MUFFLER SERVICE	4623 MANILLA RD SE	403-243-4204	Automotive Service and Repair
B4	JIFFY LUBE	4833 MACLEOD TR SW	403-283-7888	Automotive Service and Repair
B4	BUBBLES CAR WASH & DETAIL CENTRES	4705 MACLEOD TR SW	403-243-4561	Automotive Service and Repair
B4	NATIONAL TRANSMISSION	4701 MACLEOD TR SW		Automotive Service and Repair
B4	UBER AUTO BODY	4603 MANILLA RD SE	403-277-7637	Automotive Service and Repair
B4	CHINOOK AUTO REPAIR	312 55 AV SW	403-252-5290	Automotive Service and Repair
B4	MISTER TRANSMISSION AND CHANGE AUTOMOTIVE	5818 1A ST SW	587-779-7985	Automotive Service and Repair
B4	TuneDub	4501 1 ST SE	403-238-8633	Automotive Service and Repair
B4	EXTRA-TECH AUTOMOTIVE	5622 BURBANK CR SE	403-777-1240	Automotive Service and Repair
B4	ABLE TIRE	5911 5 ST SE	403-248-5282	Automotive Service and Repair
B4	AUTO MANN	4528 MANILLA RD SE	403-243-9556	Automotive Service and Repair
B4	INTEGRA TIRE & AUTO	5702 MACLEOD TR SW	403-255-5592	Automotive Service and Repair
B4	NAPA Autopro and Dominion Automatic Transmission	203 58 AV SW	403-253-1210	Automotive Service and Repair
B4	2 CLEAN	6047 CENTRE ST SW	403-640-2050	Automotive Service and Repair



- Most jurisdictions have good geospatial data, including up-to-date aerial imagery and ‘pictometry’ you see in the example.
- An objective is to get businesses to understand the concepts of ‘watershed’, ‘stormwater’ and help them connect these things.
- Example messaging: “The Bow is Below” or “Big City on a Small River”.

creek, fish creek, etc.)

Unknown stormwater discharge pathway (snow/ice covered site or otherwise unable to determine stormwater discharge pathways)

Does there appear to be outdoor storage of erodible/mobile material on site? *

Eg. soils, small plastics, litter, etc.

Yes

No

Unknown

Does ther

Eg. used/wa

Yes

No

Unkno

Any visible evidence of spills or releases onto the ground? *

Eg. staining on ground? stains in common drainage pathways?

Yes

No

Unknown

Does the respect to

Eg. is there s site?

Yes

No

Unkno

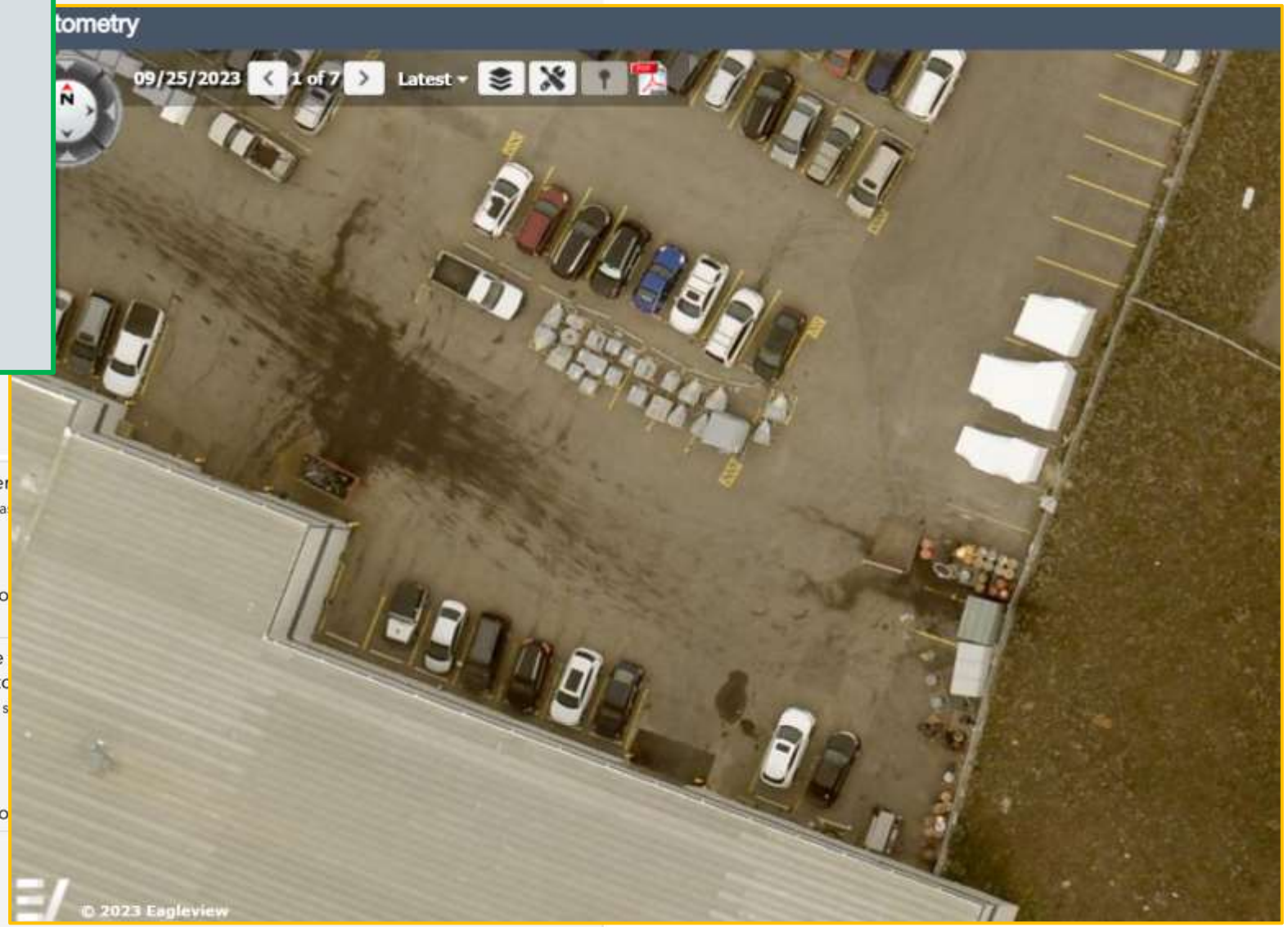
Is the business a located in a multi-tenant building? *

Yes

No

Based on the available aerial imagery or fenceline field observations, rate the site on it's risk of stormwater pollution discharging into City infrastructure from 1 (lowest risk) to 5 (highest risk) *

1 (lowest risk) 2 3 4 5 (highest risk)



- **Laminated photos of the motor oil spill at the storm pond was a really compelling, motivating part of our conversation with the majority of automotive service customers.**
- **Many have retained our contact information and are now actively reporting spills, lack if SWPPP BMPs, etc.**

Number of Employees
Can be approximate. Leave blank if unknown

equipment loading, unloading, or general traffic
facturing activity
d above) high risk pollution generating activities

based on the grades & layout of the site, is there a real risk of pollutants/contaminants from the site's pollutant-generating activities entering storm infrastructure during a typical rain/snow melt event? *
Eg. catchbasin located downgradient of outdoor work/storage area? Site graded back to front so that all contaminants would drain directly onto the adjacent street in typical rain events?
Yes No

Does the site have an OGS unit as part of their stormwater system? *
Yes No Unknown

If OGS present, describe condition of OGS unit.
Satisfactory condition
Maintenance and/or Inspection required
N/A
Unable to determine

If OGS present, does facility have inspection/maintenance records?
Yes
No
N/A

Can the facility identify connection points to the stormwater and wastewater systems?
Yes No N/A

Outdoor Storage of Hazardous Waste & Other Miscellaneous Materials

Select all materials observed stored outdoors

Acids	Antifreeze	Automotive Parts
Batteries	Caustic Bases	Fuel (gasoline, diesel)
Landscaping Materials	Metals	Paints / Coatings
Pesticides / Herbicides/ Fertilizers	Petroleum / Oils (e.g., hydraulic, cutting, motor oil)	Plastics
Recycling	Restaurant Grease	Solid Waste
Solvents	Tires	Other (see notes)

Materials/waste stored outdoors are appropriately covered and contained?
Satisfactory Action required Not applicable

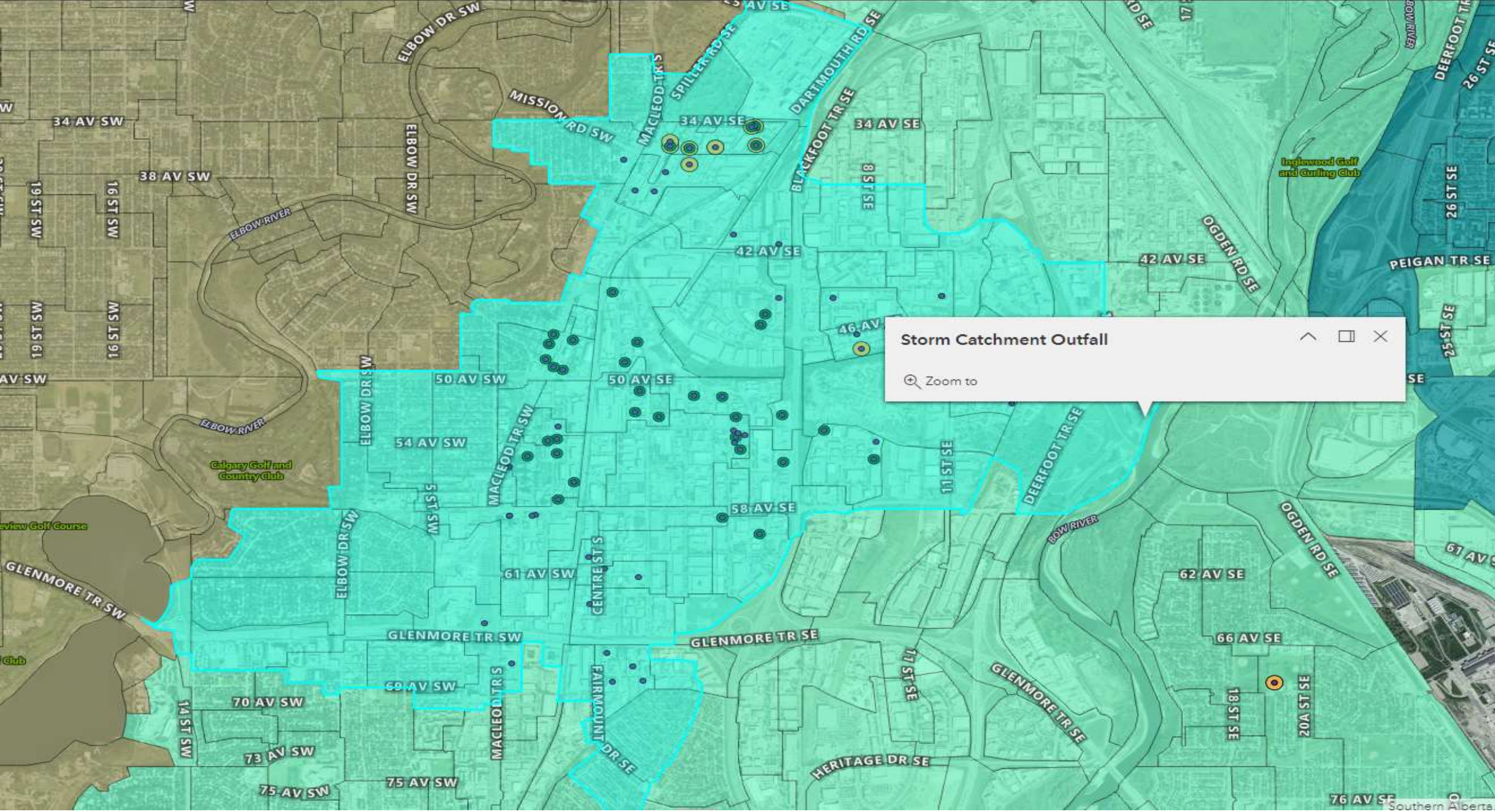
Material/waste container(s) suitable for content?
Satisfactory Action required Not applicable

Secondary containment installed in required areas for all material/waste container(s)?
Satisfactory Action required Not applicable

Has the facility/business established an appropriate method & frequency of material/hazardous waste disposal? Disposal records being kept?
Satisfactory Action required Not applicable

Does the site have appropriate Spill Kit resources?
(properly stocked, located in key areas, with appropriate signage)
Satisfactory Action required Not applicable

Outdoor Work/Manufacting/ Activities Areas


Storm Catchment Outfall
Zoom to
ELBOW DR SW
MISSION RD SW
MACLEOD TR S
SPILLER RD SE
DARTMOUTH RD SE
BLACKFOOT TR SE
34 AV SW
34 AV SE
38 AV SW
ELBOW RIVER
19 ST SW
16 ST SW
8 ST SE
Inglewood Golf and Curling Club
OGDEN RD SE
42 AV SE
PEIGAN TR SE
26 ST SE
25 ST SE
46 AV
50 AV SW
50 AV SE
54 AV SW
MACLEOD TR SW
5 ST SW
11 ST SE
DEERFOOT TR SE
Calgary Golf and Country Club
58 AV SE
BOW RIVER
61 AV SW
CENTRE ST S
GLENMORE TR SW
GLENMORE TR SE
62 AV SE
66 AV SE
69 AV SW
70 AV SW
14 ST SW
73 AV SW
75 AV SW
FAIRMOUNT DR SE
17 ST SE
18 ST SE
20A ST SE
HERITAGE DR SE
76 AV SE
Southern Alberta

Innovation: Integrating Geospatial Tools into Workflow

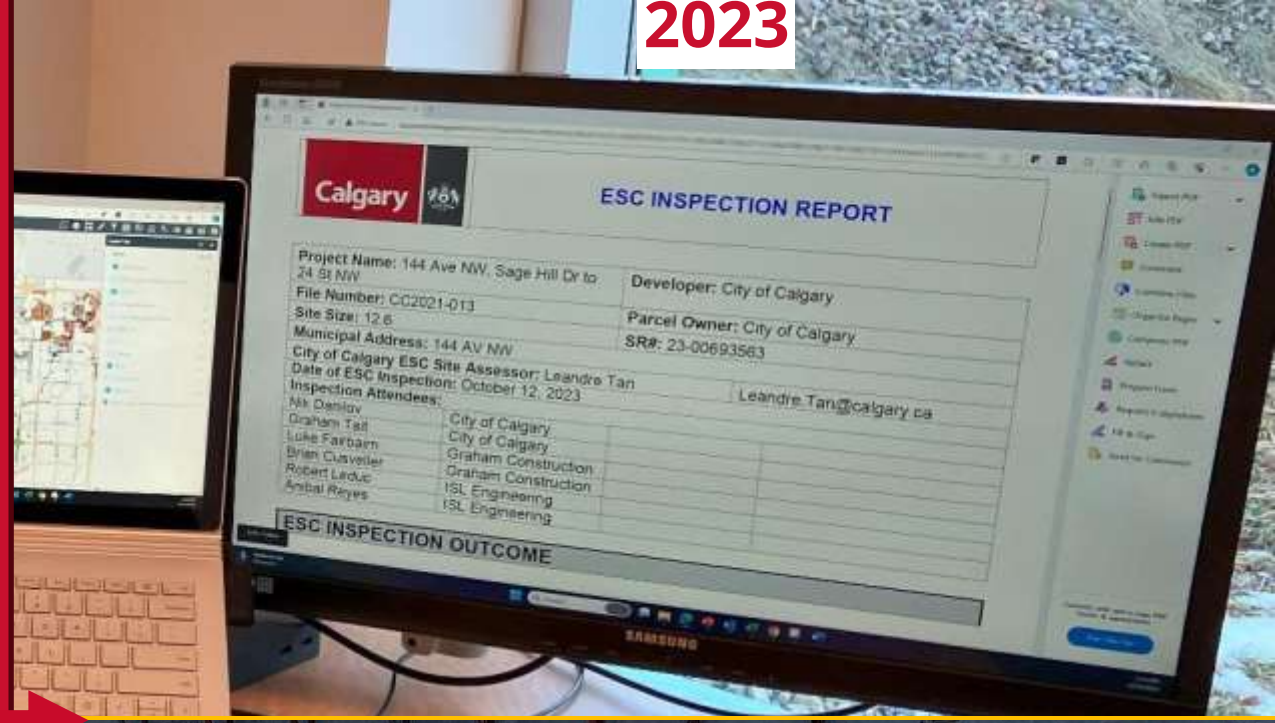
Problem: Calgary's StmPP team programs had been historically reliant on paper copies of Plans, Drawings & amendments all the way until 2020. Required our inspectors to locate physical folders in the office, bring folders into field, and return them to the correct location when finished. Many issues with this system in the age of digital record keeping, not to mention resistance from consultants who are required to pay printing costs for each plan submission (documents and drawings than can exceed hundreds of pages).

Solution: Leverage existing GIS technology (ESRI) to build a geospatial dataset & visualization platform that is specific to the Stormwater Pollution Prevention team.

- **Developed and implemented for ESC**
- **Developed and implemented for ICI Inspection**

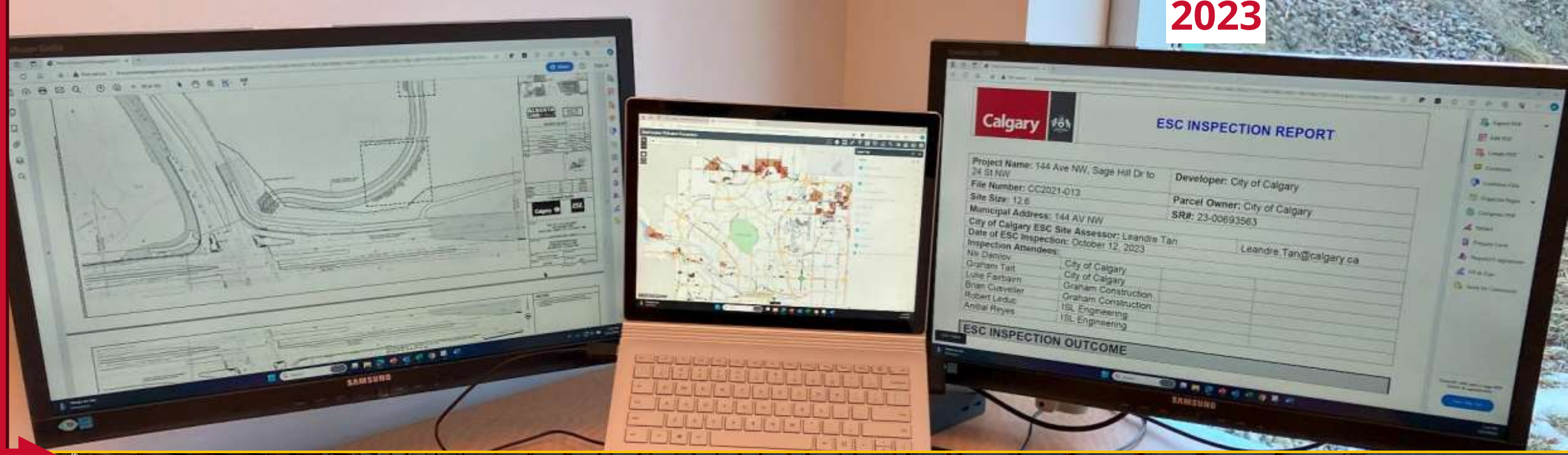
Pre-2020

2023

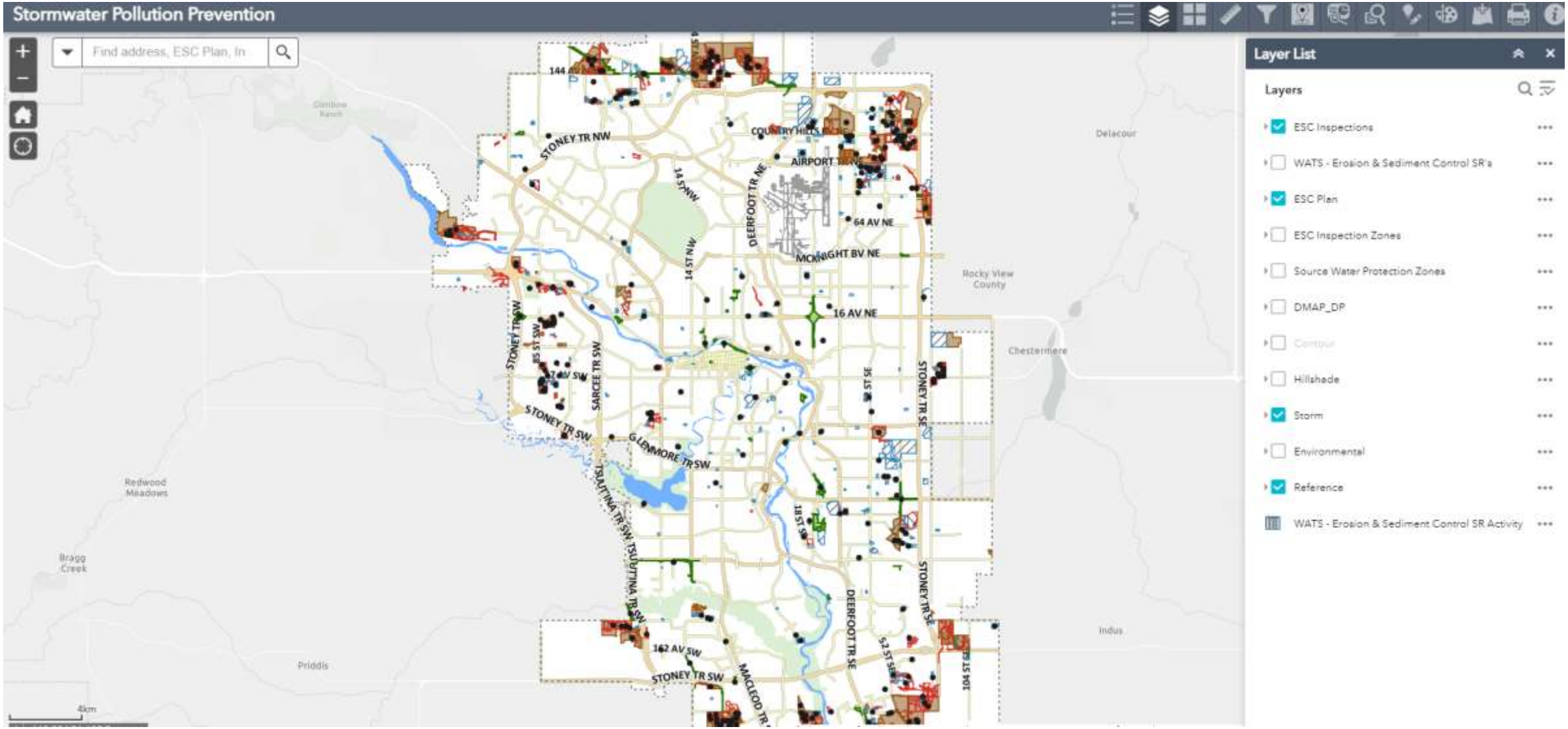


Pre-2020

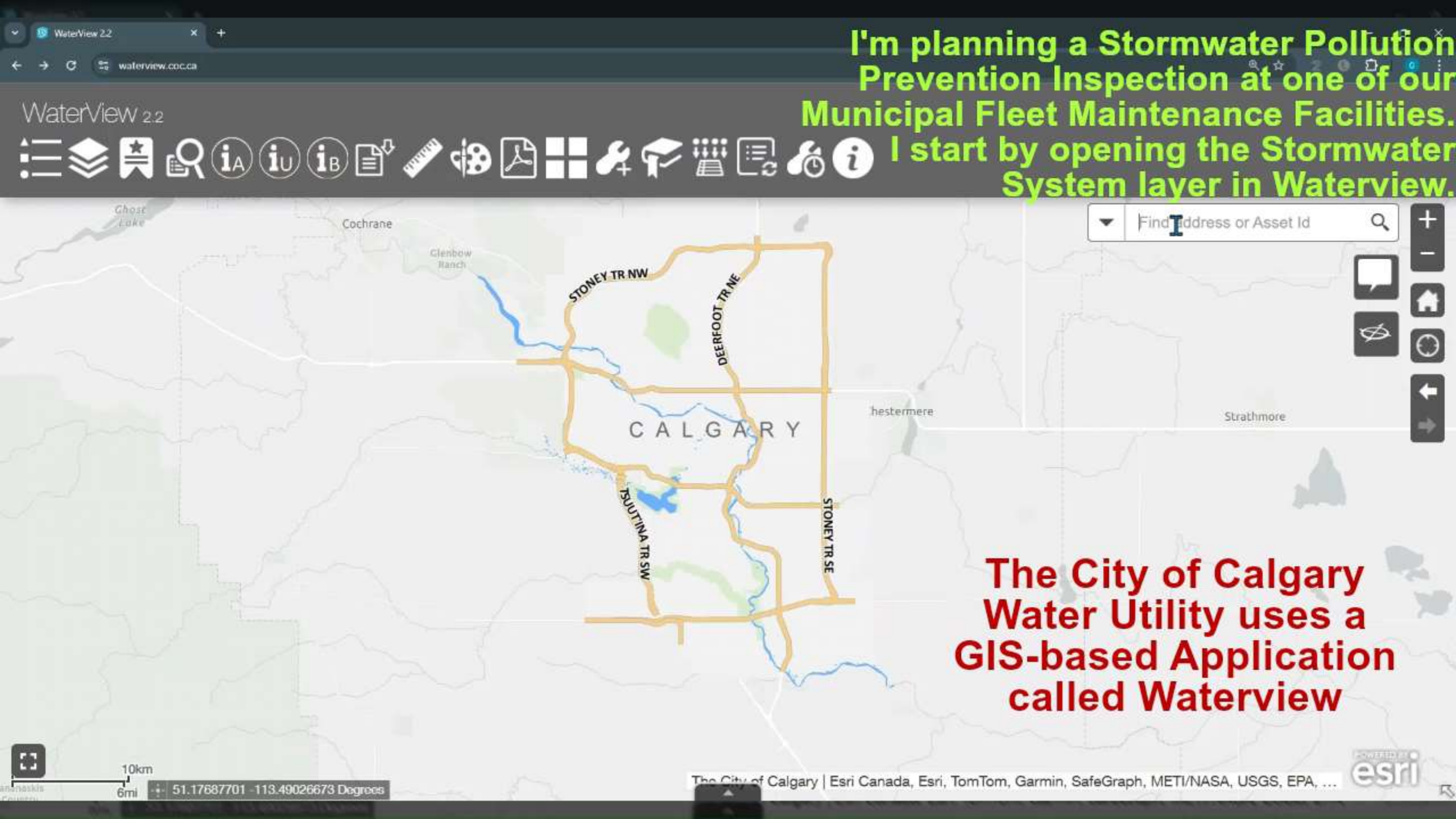
2023


Calgary
ESC INSPECTION REPORT
Project Name: 144 Ave NW, Sage Hill Dr to 24 St NW
Developer: City of Calgary
File Number: CC2021-013
Site Size: 12.6
Parcel Owner: City of Calgary
Municipal Address: 144 AV NW
SR#: 23-00693563
City of Calgary ESC Site Assessor: Leandre Tan
Date of ESC Inspection: October 12, 2023
Leandre.Tan@calgary.ca
Inspection Attendees:
Nik Danilov City of Calgary
Graham Tait City of Calgary
Luke Fairbairn Graham Construction
Brian Clavelier Graham Construction
Robert Leduc ISL Engineering
Anithal Reyes ISL Engineering
ESC INSPECTION OUTCOME
SAMSUNG

Functionality of Geospatial tool – Desktop/Planning



Geospatial Tools Applied: Erosion & Sediment Control


WaterView 2.2
waterview.coc.ca
WaterView 2.2
I'm planning a Stormwater Pollution Prevention Inspection at one of our Municipal Fleet Maintenance Facilities. I start by opening the Stormwater System layer in Waterview.
Find address or Asset Id
Ghost Lake
Cochrane
Glenbow Ranch
STONEY TR NW
DEERFOOT TR NE
CALGARY
hestermere
Strathmore
TSUUT'INA TR SW
STONEY TR SE
The City of Calgary Water Utility uses a GIS-based Application called Waterview
10km
6mi
51.17687701 -113.49026673 Degrees
The City of Calgary | Esri Canada, Esri, TomTom, Garmin, SafeGraph, METI/NASA, USGS, EPA, …
esri

Summary

Summary

- Urban municipalities at 'ground zero' when it comes to preventing 'end-of-pipe' discharges of stormwater pollutants to receiving waters.
- Effective, up-to-date regulations, standards/limits, etc., are needed.
- Communication: Framing the problem, telling the story effectively, and supporting best management practices is a key skill that we, as stormwater professionals need to develop and demonstrate.
- Communication: Firstly, we need to incorporate this mindset and approach at our municipal facilities and operations. Then we can more effectively apply a 'compliance continuum' to private industrial and commercial facilities.

Our webpage: https://calgary.ca/stmpp

Workshop Q&A

Graham Tait, CPESC, CPSWQ, CESSWI
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