City of Calgary Flood Resilience

CRCAG AGM

Sep, 2019

Outline

- *Calgary's Flood Resilience Strategy Overview*
- *Elbow River Resilience Updates*
- *Glenmore Reservoir Crest Gates*
- *Springbank Off-Stream Reservoir*
- *Bow River Resilience Updates*
- *BRWG*
- *Ghost Reservoir Operational Agreement*
- *ACRP & Local Mitigation*
- *Land Use Policy and Regulation*
- *Flood Response, Forecasting, Preparedness*

V05

2013 Changed Things

Calgary

- Largest disaster in Canadian history at the time
- ~$2B in losses locally
- 3rd fatality in Calgary since 2005 due to river flood
- Largest event since 1897 on Bow River
- Largest event recorded on Elbow River
- Major river bank erosion and deposition
- Public, administrators, politicians now understand the risk
- River Flood remains CEMA's top hazard
- River flood resilience remains a top investment priority

Key resilience elements

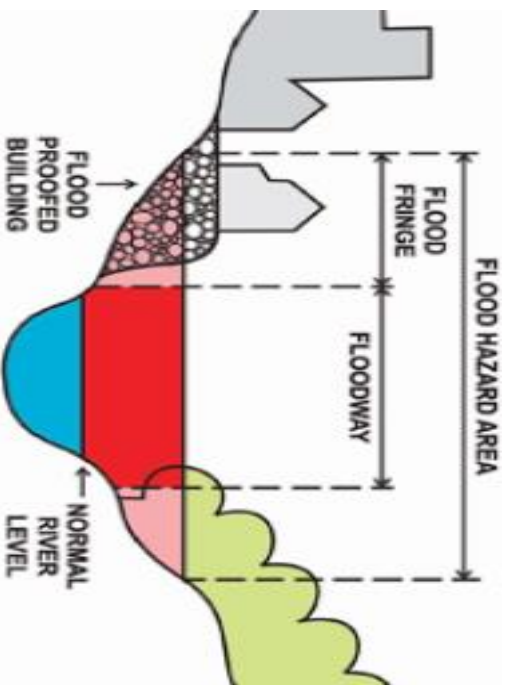**New reservoirs upstream**

New property –level programs and education

New operational approaches & efficiencies

TransAlta Ghost Dam and reservoir

Update land use policy & development

FLOOD PROOFED BUILDING

FLOOD FRINGE

FLOODWAY

FLOOD HAZARD AREA

NORMAL RIVER LEVEL

New community flood barriers & local improvements

Improved forecasting/emergency response

Structural Mitigation : The Backbone of Flood Resilience for Calgary

Elbow River
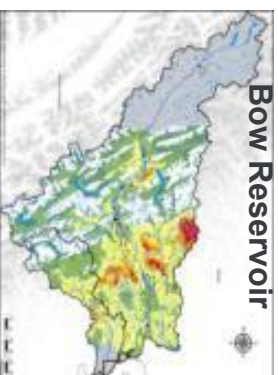
Springbank Reservoir

+ new Glenmore gates

Springbank Off Stream Dry reservoir

Glenmore gates

Bow River

New upstream reservoir (BRWG)

+ 2016 TransAlta agreement

+ Local barriers & Drainage Works

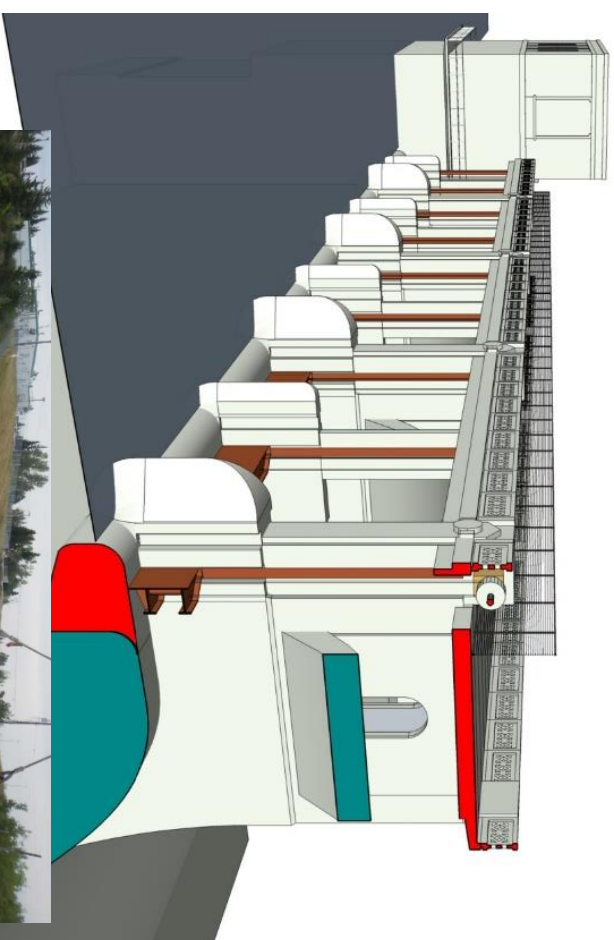Bow Reservoir

TransAlta Ghost Dam and reservoir

Barriers

+ Land use policy / building regulations refinement

+ Education and awareness, lot level programs

+ Emergency preparedness, response, forecasting

Resilience strategy endorsed by Council in 2017

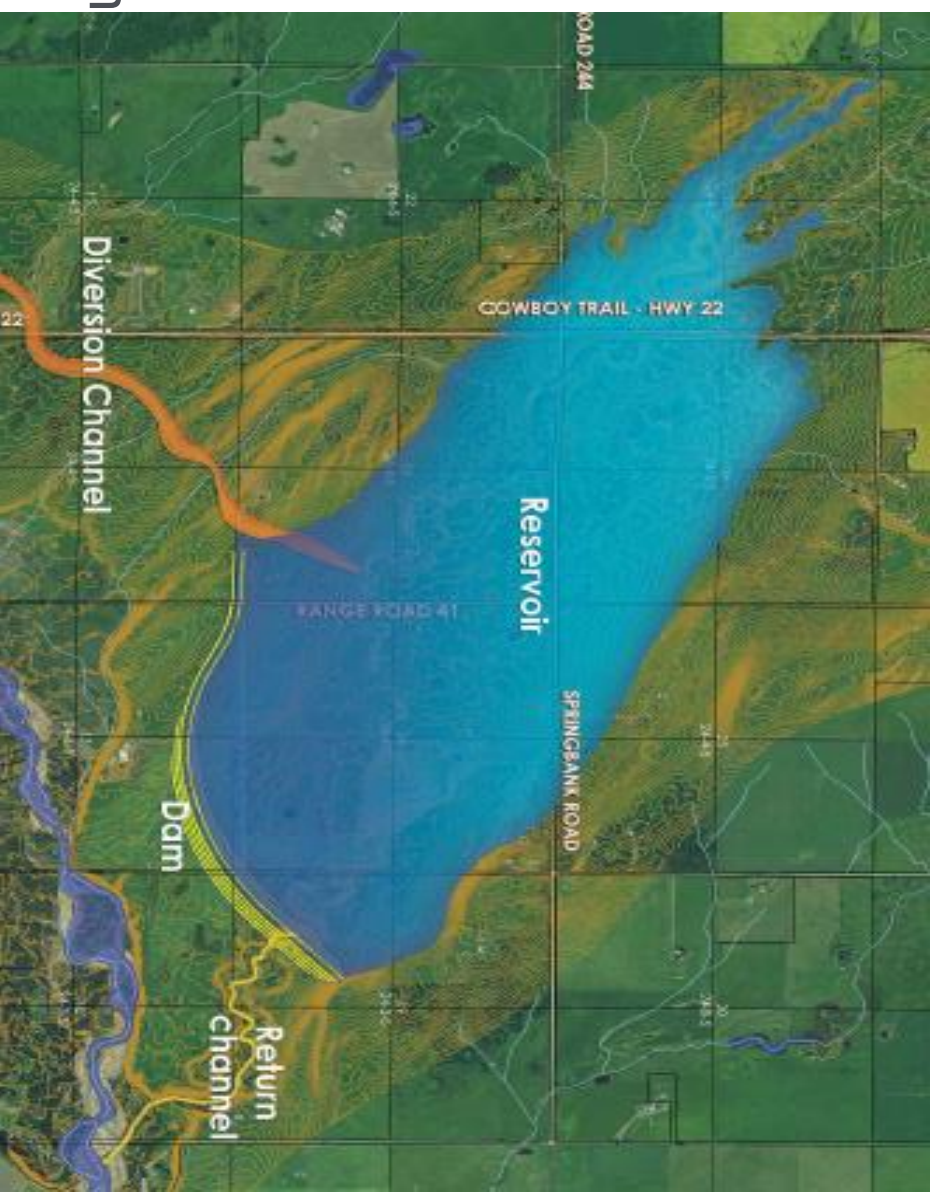# Glenmore Reservoir Crest Gates

- ~$77M investment; $7M ACRP

- Utilities Relocated 2017/2018

- Bridge Deck & Superstructure 2018/2019

- New 2.5 m high crest gates operable for 2020 flood season

- Doubles live storage for attenuation of intermediate sized floods

- Improves drought resilience

Springbank Off-Stream Reservoir

- ~ 5 x storage of Glenmore Reservoir

- Ongoing Provincial & Federal Environmental Assessments

- City part of CEAA's TAG

- with Glenmore gates, can manage Elbow to 2013 level

- Offstream – no impact to stream or habitat when river is not in flood

- Ongoing engagement with Province on operations / design

Bow River Working Group – Upstream Storage

- City continues to work with Province within the BRWG

- **14 options for flood/drought storage narrowed to 3 for further study**

- Work continues to show that no single reservoir large enough to manage floods to Calgary's damage thresholds appears to be practical

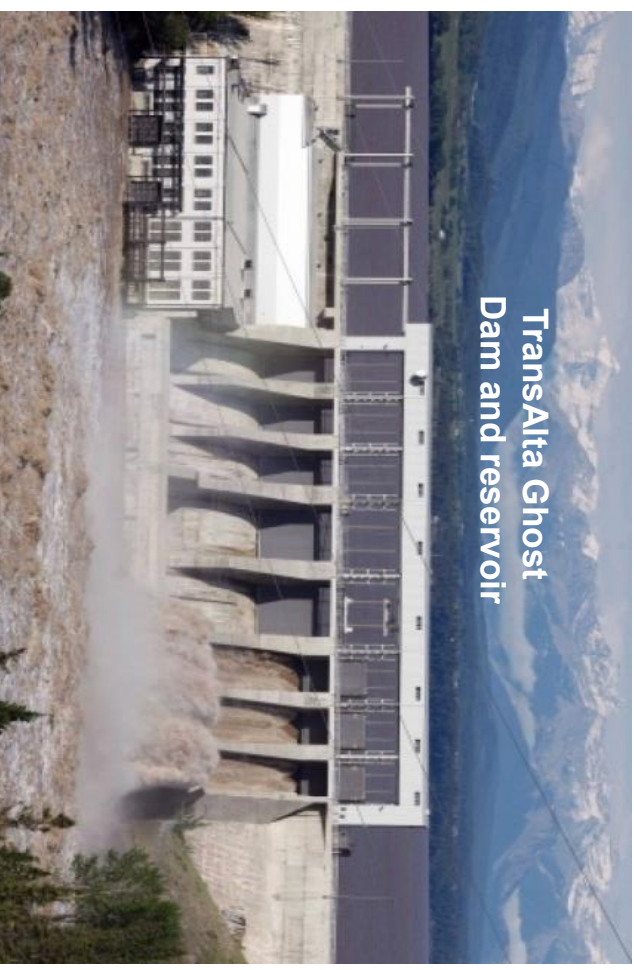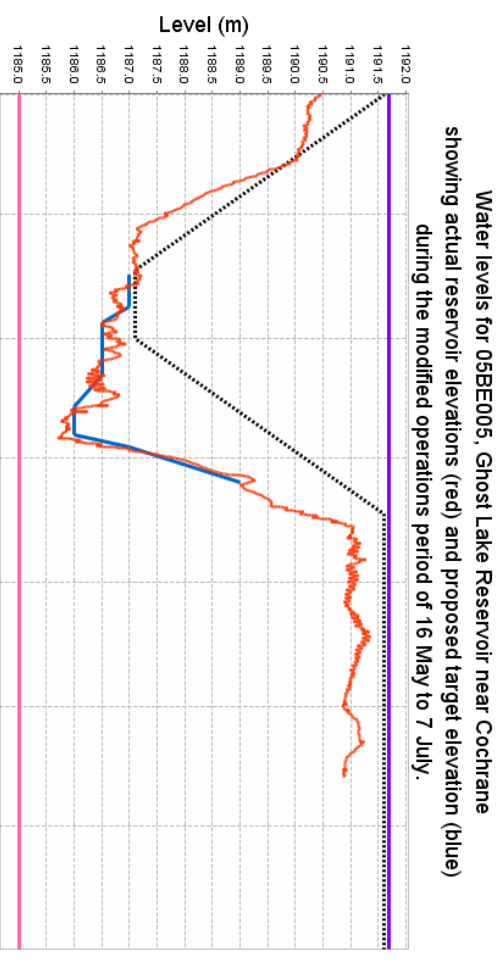- New storage is key to resilience

Government of Alberta and TransAlta Operations

- 2016 Government of Alberta and TransAlta Operations Agreement

- Five year term

- Rules for operating Ghost and Kananaskis reservoirs

  - Major benefits for intermediate size floods

  - Damage 'threshold' raised

  - Immediate benefit

- Reservoir operation working well

- Low and high flows managed well in 2017, 2018 and 2019

TransAlta Ghost
Dam and reservoir

Water levels for 05BE005, Ghost Lake Reservoir near Cochrane showing actual reservoir elevations (red) and proposed target elevation (blue) during the modified operations period of 16 May to 7 July.

Level (m)

Date (2019)

Generated at: 2019-09-18 16:27:14

— Recorded level — Full Supply Level ···· Historic operating level — Lower operating threshold — Proposed fill level

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Local flood resilience infrastructure

- ~$68M of $150M ACRP committed
- City funding portion remains committed

- New Glenmore crest gates
- Stormwater outfall backflow gates
- New local barriers
  - West Eau Claire
  - Centre Street Low Deck
  - Montgomery
  - Heritage Drive
  - Downtown / Chinatown
  - Bonnybrook
- Drainage & stormwater improvements
  - Sunnyside lift stations
  - Upper Plateau Separation
  - Sanitary lift stations
- Bridge resilience
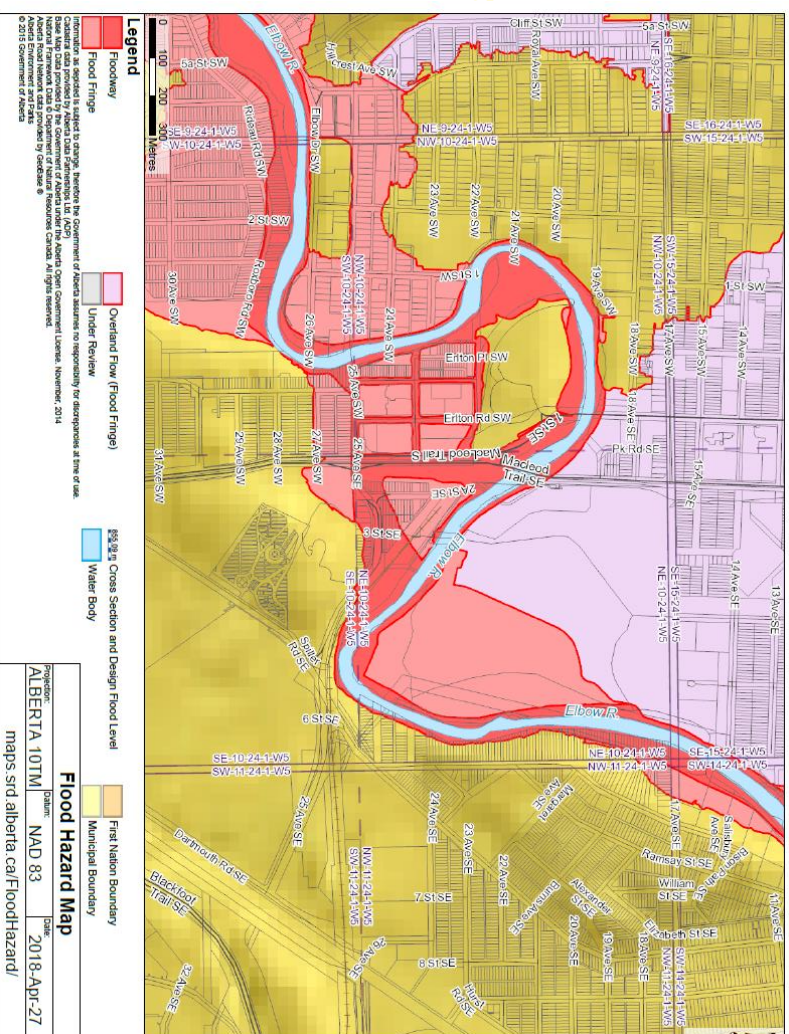 - 9th Avenue
  - 12 Street
- Gravel bar shaping

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Land Use Regulation and Policy

New provincial mapping under development

- DRAFT mapping & studies under review
- City sees that mapping or other products that communicate risk must reflect resilience investments
- Significant refinement of policy can only be made with understanding of remaining or residual risk
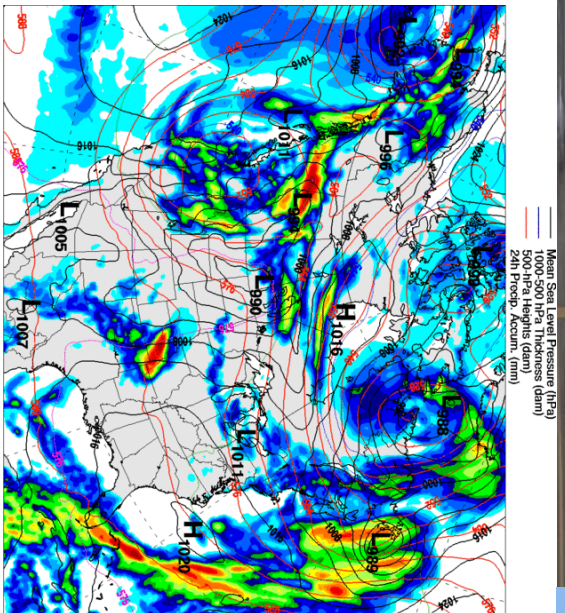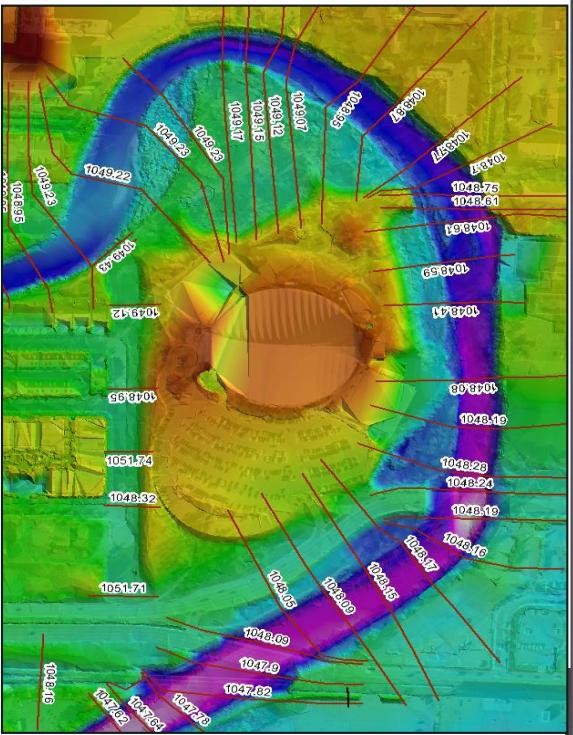- City aims to continue to work closely with Province and through CMRB to ensure thoughtful engagement

Calgary River / Flood Policy

- Environmental Reserve Setback Policy (2007)
- Riparian Action Plan (2014)
- FHA Land-Use Bylaw (updated 2014)
- Source Water Protection Plan (2019)

Flood Hazard Map

maps.srd.alberta.ca/FloodHazard/

Flood Response, Forecasting, Preparedness

Calgary

Thank-you CRCAG, FFYYC and Community groups

Your involvement is making Calgary more resilient

Calgary