

Stormwater Integrated Resource Planning – SIRP Developing the Risk Framework

June 8th 2018
Utility Committee Update

Future Utility Committee Meeting - SIRP Project Updates

April
2018

- Insurance Perspective jointly with IBC – Finding the Balance between Utility Investment and Insurance and Disaster Recovery

June
2018

- Risk Framework Working Model – Capacity, Condition and Social Risk Ranking Components.

October
2018

- Stakeholder Engagement - Risk Framework Weightings Analysis
- Council direction on relative rankings for Risk Framework and Design Standard for Existing areas

April
2019

- Capital and Operational recommendations to support Accelerated Flood Mitigation including rate impacts. Council direction on Future Capital expenditure levels.

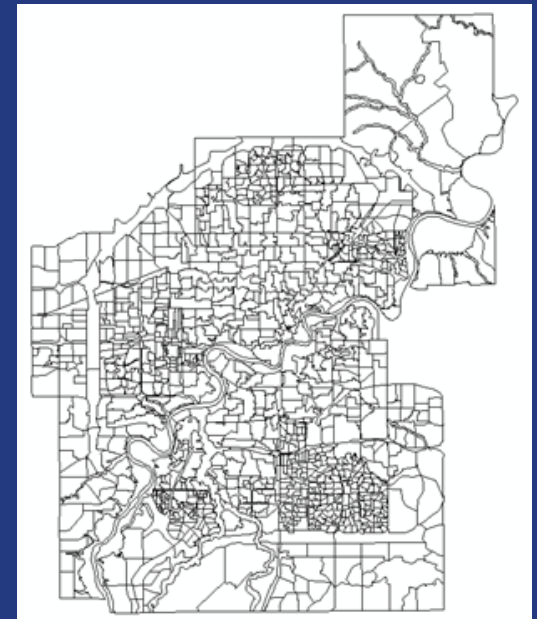
Additional flood mitigation project specific updates for active construction projects will be included in the Drainage utility reports

Risk Ranking by Stormwater Sub-basin

Capacity – Assessment of Sub-basins at most risk of flooding under different storm event scenarios

Condition – Assessment of existing asset health and operational maintenance requirements

Social – Assessment of impact to community infrastructure due to a flooding event – linked to Climate Change Adaptation Initiative led by City



Approx. 1200 Sub-basins



Risks assessed considering Health and Safety, Environment, Social, and Financial impacts on an aligned consequence scale for all dimensions

PROVIDING MORE

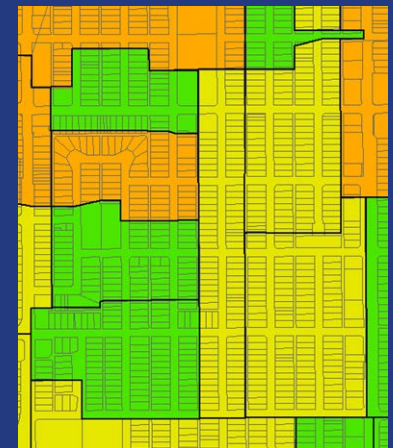
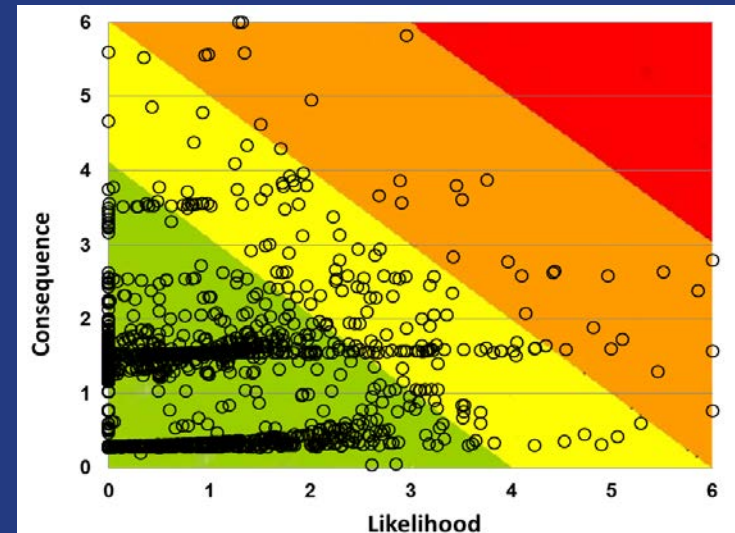
EPCOR

Risk Level / Mitigation Alternatives

Clustering of Mitigation Alternatives

- High Consequence \ High Likelihood – Intolerable – capital intervention needed
- High Consequence \ Low Likelihood – increased Contingency Planning
- Low Consequence \ High Likelihood – increased Monitoring and Maintenance
- Low Consequence \ Low Likelihood – regular reviews to confirm risk

Provides ability to test and illustrate impact of different mitigation strategies across multiple storm water sub-basins



Risk Consequences Scales

Risk Consequence Level	Health and Safety	Environment	Social (Service Impact)	Financial
5-Extreme				
4-Major				
3-Moderate				
2-Minor				
1-Negligible				
0-No Impact				

Risk Consequence Scores Assessed on Each Scale

For Each Sub-basin
For Each Data Set

For this example

- Maximum = 4
- Average = 3.25

Risk Scales align with City Climate Change Adaptation Initiative

Public Engagement will be utilized to validate consequence levels within each scale and across the four scales for use at the sub-basin level

Require Utility Committee Feedback - do we need to consider additional risk scales?

Risk Consequence Levels – Preliminary Risk Statements

Risk Consequence Score	Health and Safety	Environment	Social	Financial
5 – Extreme	Fatalities or Severe Injuries Risk or severe vector borne disease risk	Permanent loss of local eco-system or species	Inability to access a social service facility for greater than 6 months	TBD
4 – Major	Severe Injuries or major vector borne disease risk	Major damage of local ecosystem or species or impairment of more than 2% of the resource	Inability to access an social service facility for 1 to 6 months	TBD
3 – Moderate	Moderate Injuries or moderate vector borne disease risk	Moderate damage or impairment of more than 0.2% local ecosystem or species	Inability to access a social service facility from 1 to 4 weeks	TBD
2 – Minor	Minor injuries or minor vector borne disease risk	Minor damage or impairment of more than .02% of local ecosystem or species	Inability to access an essential service between 12-24 hours	TBD
1 –Negligible	Minor injuries	Negligible damage with 0.002% of impact on local ecosystem or species	Inability to access an essential service between 0-12 hours	TBD
0 – No Impact	No impact	No Impact	No Impact	No Impact

Upcoming Engagement in Risk Framework Development

The third phase of public engagement focuses on using citizen input to improve the design of the risk model. Trade-off exercises will help measure preferences, learn how adjusting factors affects preferences, and forecast the likely acceptance of scenarios.

Phase III

Development

- Ensure the right inputs are included for testing
- Pre-testing of inputs through focus groups to ensure relevancy and comprehension

Choice modelling

- Identify citizen priorities through choice modelling exercise
- Views on risk mitigation priorities, flood mitigation strategies and status against competing priorities

Analysis and Reporting

- Integrate citizen views into technical analysis
- Develop a framework for assessing mitigation strategies and communications
- Risk framework and Utility Committee direction

Capacity Data Sets

Capacity Data Set

Sanitary Surcharge Modelling

Overland Flooding Modelling

311 Flooding Reports

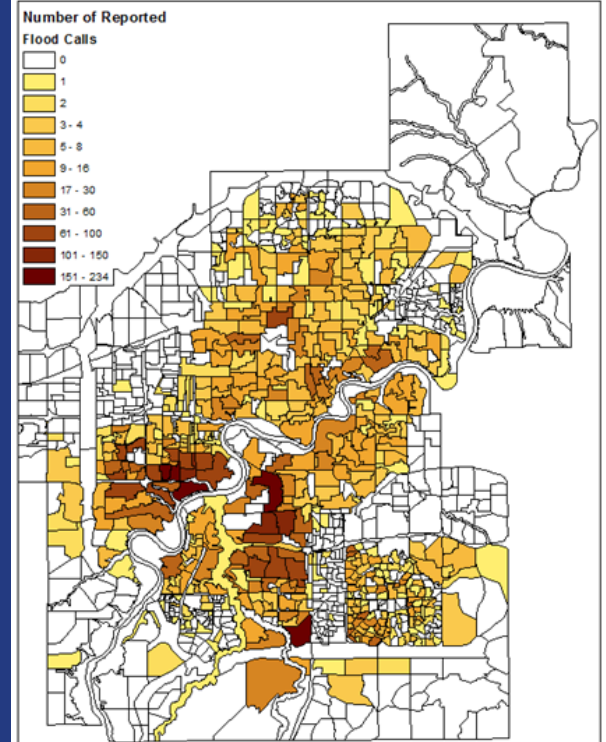
Underpass Flood Modelling

River Valley Neighbourhood Modelling

Insurance Flood Maps – Rivers and Surface w/o pipe network

Alberta North Saskatchewan River Flood Maps

311 Reported Basement Flooded Calls from 2003 to 2016

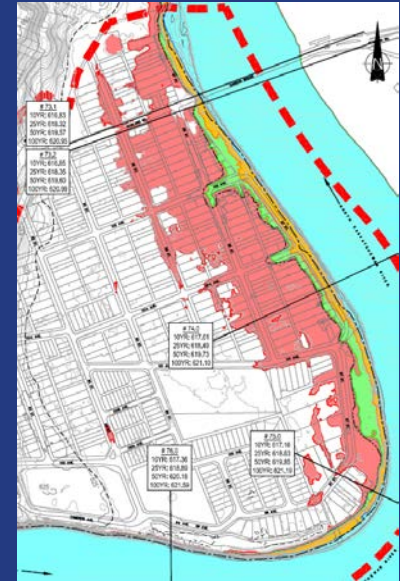
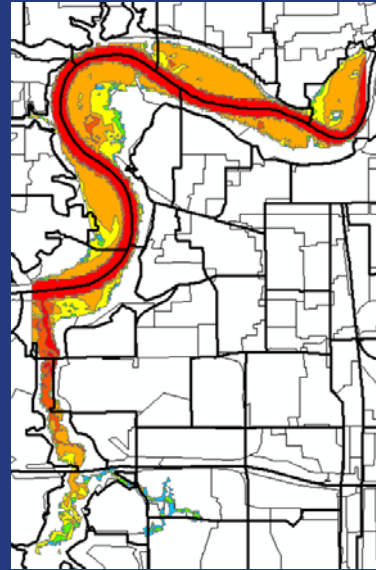


Require Utility Committee Feedback – Additional capacity data to include?

River Flood Mapping

Multiple Data sets

- Insurance Industry Maps
- Alberta Government Flood Maps
- EPCOR commissioned modelling (includes stormwater pipes and gates)



Insurance and Provincial Government are topography based covering different storm scenarios in watershed

EPCOR is participating at National level with NRCan, CWN and IBC supporting the development of the National Flood Maps

Condition Data Sets

Condition Data Set
Stormwater and Combined Trunk Pipes
Stormwater and Combined Local Pipes
Stormwater Control Elements
Stormwater Management Ponds
Outfalls
Neighbourhood Improvement and City Paving Plans
Historical Maintenance - Blockages, root intrusion, catch basin cleaning, sewer flushing frequency

Incorporating Impact to multiple Stormwater Sub-basins due to infrastructure failure

And

Identifying opportunities to upgrade for flooding in conjunction with rehabilitation activities

Require Utility Committee Feedback – Additional condition data to include?

Social Risk – Critical Buildings and Facilities

Critical Buildings and Facilities
Hospitals
Fire Halls, Police and Ambulance Stations
Emergency Relief Shelters
Seniors Homes, Long term Care Facilities
Schools – Elementary through University
Shopping Malls
Recreation \ Leisure Centers
Transit Centers & LRT Corridors
Water\Wastewater Plants, Reservoirs and Pump stations
Electrical Sub-stations

Two step
assessment

First – location
of these
facilities

Second –
detailed review
of specific risk
only for sub-
basins at higher
risk of flooding

Require Utility Committee Feedback – Additional Sectors to include?

Next Steps

- Public Engagement to inform consequence levels for each risk scale
- Continued compilation of data sources to sub-basins
- Preliminary risk ranking based on four consequence scales

Next Utility Committee Presentations

October
2018

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2019

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Questions