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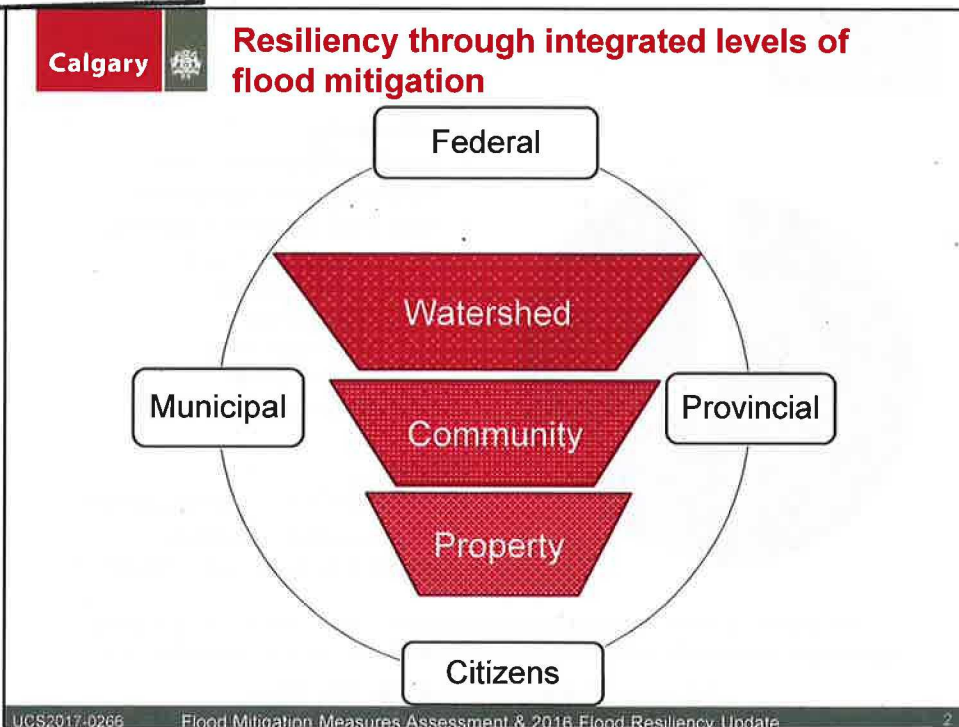
Flood Mitigation Measures Assessment and 2016 Flood Resiliency Update

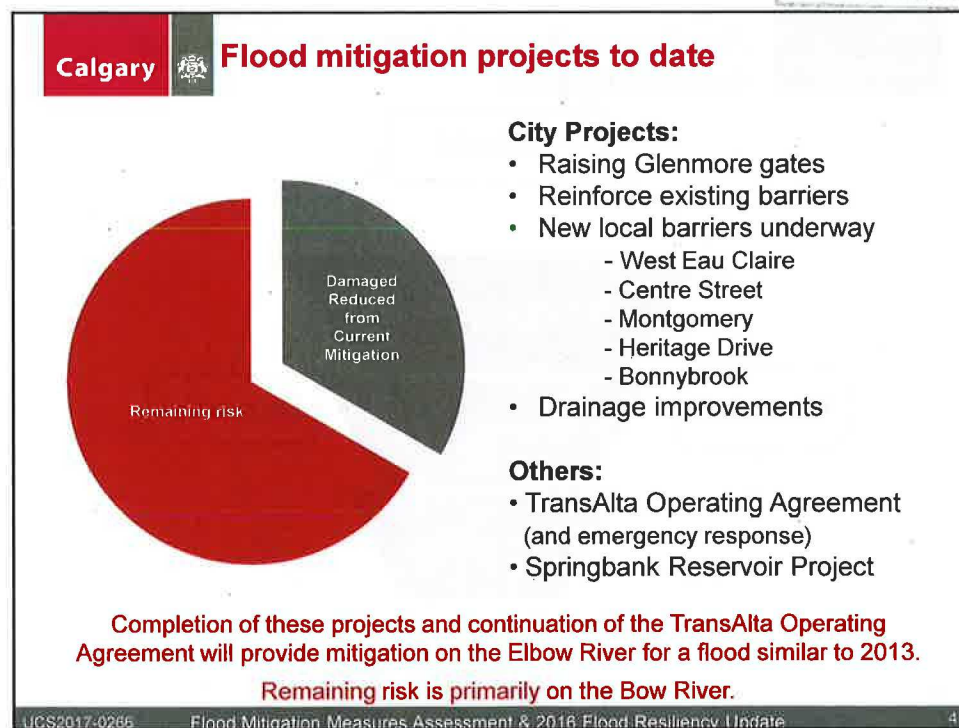
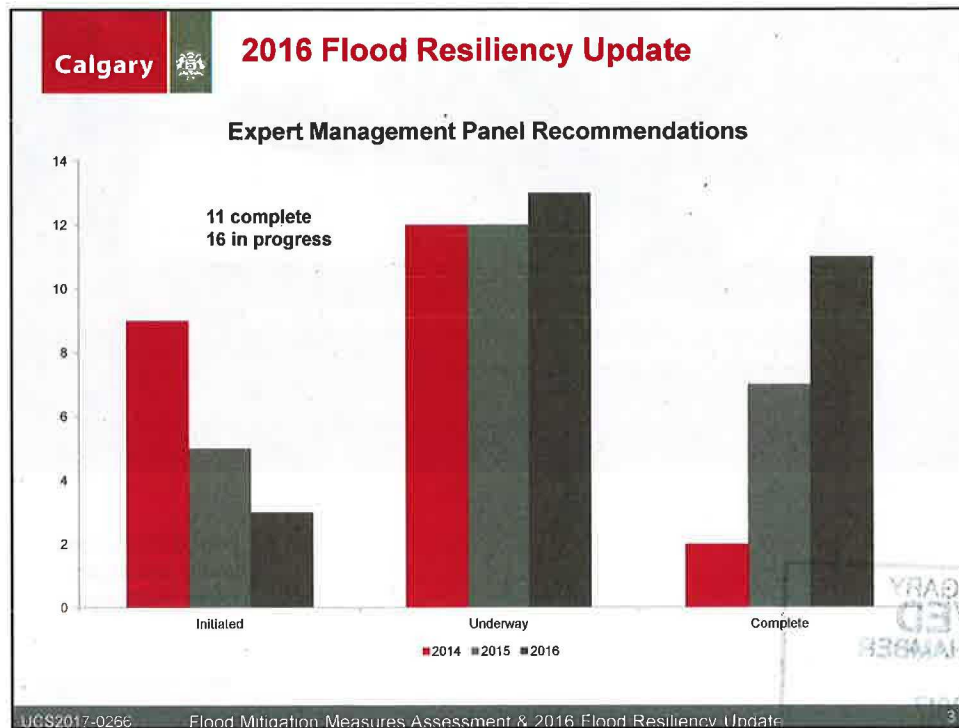
Presentation to Standing Policy Committee on Utilities and Corporate Services
March 22, 2017

UCS2017-0266
The City of Calgary
Water Resources

ISC: Unrestricted

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IN COUNCIL CHAMBER
MAR 22 2017
ITEM: UCS2017-0266
Distribution
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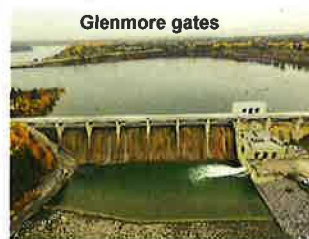
Flood mitigation underway

Elbow River

Springbank Reservoir + Increasing size of Glenmore gates

= manage flood similar to 2013 on the Elbow River

 **Underway**



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5

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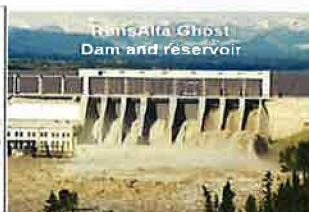
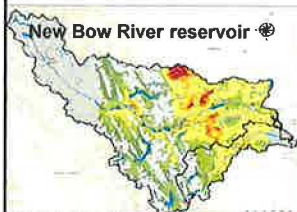
Recommended flood mitigation

Bow River

**New upstream reservoir + TransAlta agreement
+ Complementary barriers**

= manage flood similar to 2013 on the Bow River, and other potential benefits: water supply and drought protection, climate resilience and energy generation

 **Commitment required**




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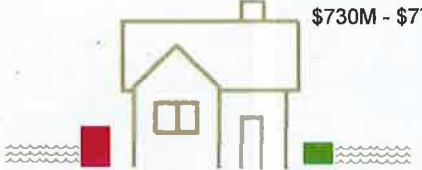
6

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Mitigation scenarios – Bow River

Fortification of the Bow River by barriers alone	New Bow reservoir & complementary barriers
<div style="color: red; font-size: 1.2em; margin-bottom: 5px;">✗</div> All barriers within 30 years	<div style="color: green; font-size: 1.2em; margin-bottom: 5px;">✓</div> Complementary barriers within 15 years, Bow Reservoir within 30 years
<div style="color: red; font-size: 1.2em; margin-bottom: 5px;">✗</div> Intrusive barrier height (1.1m – 2.2m)	<div style="color: green; font-size: 1.2em; margin-bottom: 5px;">✓</div> Moderate barrier height (0.6m – 1.1m)
<div style="color: red; font-size: 1.2em; margin-bottom: 5px;">✗</div> Low sustainability ranking (significant community disruption, only provides benefits during flood)	<div style="color: green; font-size: 1.2em; margin-bottom: 5px;">✓</div> High sustainability ranking (minimal community disruption, potential water supply, climate resilience benefits, etc.)
<div style="color: red; font-size: 1.2em; margin-bottom: 5px;">✗</div> Barriers along entire river	<div style="color: green; font-size: 1.2em; margin-bottom: 5px;">✓</div> Barriers at four specific locations
\$350M - \$650M	\$730M - \$775M



Maximum barrier heights scaled to average one-storey home

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7

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Potential barrier concepts



South Bowness
1:20 year
barrier concept



West Eau Claire
1:200 year
barrier concept

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Flood Mitigation Measures Assessment & 2016 Flood Resiliency Update
8

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Property level flood mitigation

- Explore the development of a property level mitigation program.
 - Explore feasibility of an incentive program.
 - Include an education/resource component.
- Assess additional policy measures for flood-affected areas.
 - Future policy changes must align with structural investments and future Provincial policy and Federal floodplain guidelines.

UCS2017-0266

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9

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ADMINISTRATION RECOMMENDATION

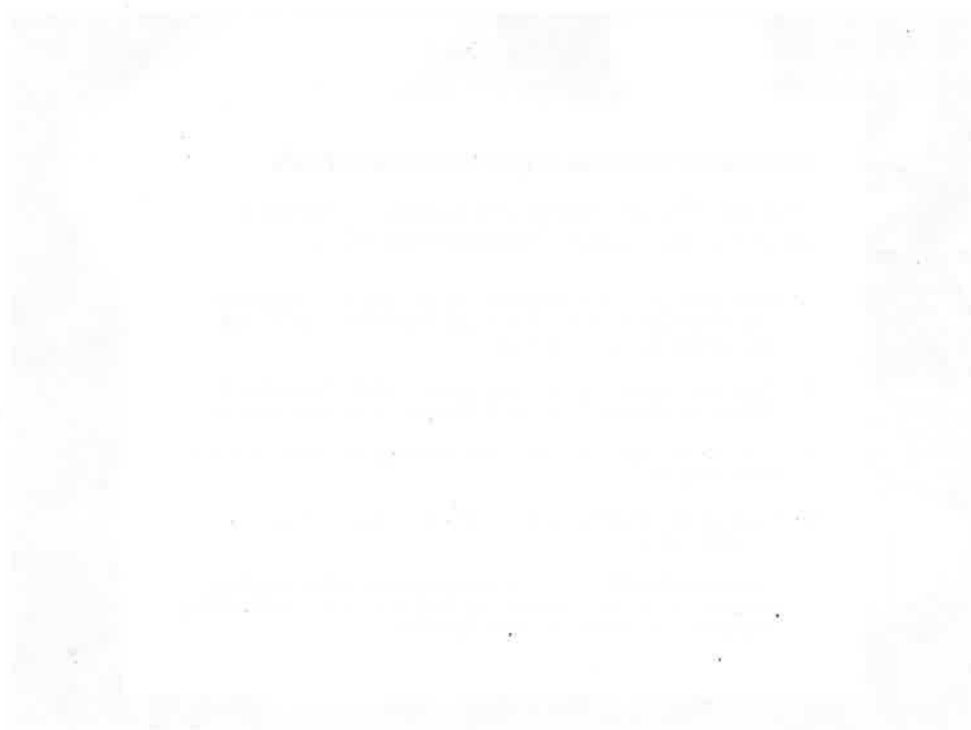
That the SPC on Utilities and Corporate Services direct Council to direct Administration to:

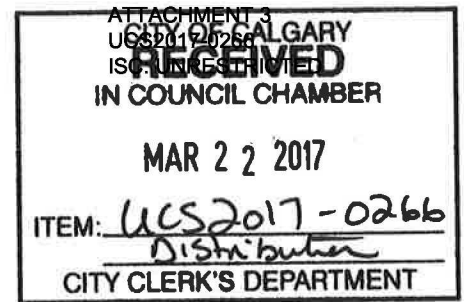
1. Work with Council to advocate for an upstream reservoir and continuation of the Provincial-TransAlta operational agreement for the Bow River;
2. Continue supporting the development of the Springbank Off-stream Reservoir on the Elbow River by the Province;
3. Develop an implementation and funding plan for community level flood mitigation;
4. Explore the development of a property level mitigation program; and
5. In alignment with Provincial mapping and policy updates, conduct further investigation on land use policy and building regulations for areas prone to flooding.

UCS2017-0266

Flood Mitigation Measures Assessment & 2016 Flood Resiliency Update

10





March 20, 2017

The City of Calgary
P.O. Box 2100 Station M, #412
Calgary AB T2P 2M5

Attn: Mr. Rob Spackman, Director, Water Resources

Dear Mr. Spackman:

Re: Utilities & Environmental Protection Report to SPC on Utilities and Corporate Services – UCS2017-0266, Flood Mitigation Measures Assessment Report and 2016 Flood Resilience Update

On behalf of the Board of Directors of the Calgary Downtown Association and The Calgary Stampede, I would like to thank you for the opportunity to be part of the Community Advisory Group. The engagement was handled in a very professional manner and was inclusive. Congratulations to you and your team for a benchmark engagement process.

The Community Advisory Group was diverse, knowledgeable and passionate. It was comforting to see how much support there was from the group for protecting the downtown, deemed to be Calgary's economic engine, from future floods. Additionally, a lot of credit was given to the Calgary Stampede for the investment in flood mitigation and preparedness, already completed, to protect a major social and economic contributor the city.

The five recommendations in the report are supported. However, several of the risks outlined in the report should not be underestimated. The updated Provincial Flood Hazard Area Mapping could have a significant impact on future development in the city. Both the new Bow River Reservoir and the Springbank Off-stream Reservoir have high levels of uncertainty of being built, and would render the other mitigation recommendations inadequate.

The recommendation for low-height barriers on the Bow River is well received. Integrating the flood-mitigating functionality of barriers with public realm amenities and landscaping, similar to those found along the pathway along Memorial Drive, or proposed for West Eau Claire, demonstrate that mitigation infrastructure can positively contribute to the community and cause minimal disruption.





Future consideration of land use policies and best practices potentially restricting sensitive uses like daycares, assisted living facilities and protective and emergency services may change the aspirations of planning documents to create complete communities with increased residential density in the inner city, especially in the downtown. These changes would need to be carefully investigated with all stakeholders.

It will be important to expedite implementation of the flood mitigation measures recommended, while respecting those impacted, ensuring Calgary's flood resiliency negates another experience similar to 2013.

Should you require anything further, please call me directly at (403) 215-1565.

Yours truly,



M. A. (Maggie) Schofield
Executive Director, Calgary Downtown Association and Director, Calgary Stampede Board

cc: **Peter Demong, Chairman, Utilities and Corporate Services SPC**
Brad Krizan, Calgary Downtown Association Chairman of the Board
Bill Gray, Calgary Stampede, President and Chairman of the Board



March 9, 2017

Mr. Rob Spackman,
Director Water Resources (#412)
P.O. Box 2100, Station M,
800 Macleod Trail SE
Calgary, AB
T2P 2M5



Dear Mr. Spackman,

Recently staff from your Administration asked the Expert Management Panel on Flood Resilience to reconvene in order to review and provide input on work produced by City staff and independent consultants on the optimum next steps to improve The City's flood resilience.

We were impressed to hear how much progress has been made with respect to the 27 recommendations in our report (2014 June) to Council. We also understand there is significant work underway and with City Council's leadership on these challenges we are assured the citizens of Calgary will see further improvements in flood safety and resilience. It appears, however, there is an additional new factor that requires careful consideration by The City.

Information and data developed by Administration and external consultants subsequent to our Expert Management Panel report now clearly shows that it will not be possible to protect residences, businesses and municipal infrastructure along the Bow River against a 2013 type of event without new upstream storage capacity. Ongoing management of the Ghost reservoir for flood control and improved diking within the City will improve the situation but simply will not be enough to prevent potential future damage from large floods. While a new structure or reservoir may be a controversial solution and one likely to take substantial time, effort and money to achieve, the calculations show that the level of protection provided would justify the necessary investment. Without a plan to further reduce peak flows on the Bow, we believe Calgary continues to be exposed to an unacceptable level of risk. We therefore recommend this item be added to the suite of actions to reduce flood risk and that the Province be formally approached by the City of Calgary to take action on the issue.

It goes without saying the Province will be hard pressed to find the funding for such a project in these economic times, however, we believe the case should be made and the project should at least be defined and scoped as soon as possible so it can be put on the list of capital priorities of the Province (and certainly the Federal Government) to be considered as the economy stabilizes and funds can be allocated.

Good progress has been made addressing vulnerabilities on the Elbow River in terms of physical improvements within the city coupled with the Province's commitment to develop the Springbank reservoir. This combination of investments will provide a high degree of protection at an appropriate cost. We would urge Council to keep the Springbank reservoir high on the

Province's agenda to ensure it is completed in a timely manner and its protective impact is in fact realized.

We appreciate the opportunity to provide our input on this important program and wish you and Council continued success in making Calgary safer and better able to withstand these damaging natural events.

Best regards on behalf of the Panel,



Wolf Keller
Chair
Expert Management Panel of River Flood Mitigation

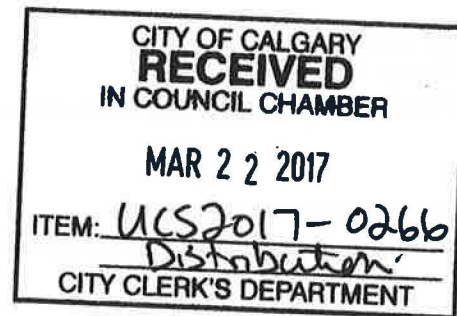


Chinatown
District BRZ

March 21, 2017

City of Calgary
Standing Policy Committee on
Utilities and Corporate Services Committee
800 Macleod Trail SE,
Calgary AB

Attention: Councillor Peter Demong
Chairman



Re: Flood Mitigation Measures Assessment Report

We are writing on behalf of the Chinatown District Business Improvement Area and the presentation from City of Calgary Administration identified as UCS2017-0266.

As you are aware, the Chinatown district was greatly affected by the floods of 2013, a great number of business suffered flood damages, loss of business due to the closure of access to the Chinatown area, and no electricity for an extended period of time. Many residents of Chinatown were evacuated, thus putting strain on social and emergency resources.

We are aware that upstream flood mitigation measures are outside of the City of Calgary's realm, however we would ask that the City of Calgary pursue the continued implementation and funding plan for community level flood mitigation that would include the Chinatown District. This will include the installation of low-height barriers and should be designed to mitigate to a 1:200 year event. The Downtown Core is the economic engine of Calgary and we are of the opinion that it should be protected to mitigate flood damages, as well as economic loss due to the failure of many businesses to operate during flood events.

We would also ask that the City of Calgary continue to work with the Province of Alberta in assisting with the continuation of the Provincial operational agreement with TransAlta regarding the Bow River, and that it be extended beyond the current 2021 expiration date.

-2-

We trust as committee members that you will proceed with the Administration's recommendations and that remediation work will continue to protect the Chinatown District from future flood events.

Sincerely


Rod Olsen
Director/Treasurer
Chinatown District Business Improvement Area

Cc: Mayor Naheed Nenshi
Councillor Diane Colley-Urquhart
Councillor Druh Farrell
Councillor Shane Keeting
Councillor Joe Magliocca
Councillor Jim Stevenson
Councillor Ward Sutherland
Carolyn Bowen – City of Calgary

MAR 22 2017

Protection against flooding in Sunnyside: March 22 meeting, 5 min.

Good morning. My name is Mary Louise Mitchell and I live in Sunnyside. I wish for the approval of this report and ask that as the city works out the details they consider my comments as to improvements needed to protect Sunnyside from future flooding.

ITEM: UCS 2017-0266
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Record

I moved into a building of the Norfolk Housing Association in Sunnyside ten years ago, about a year and a half after I moved to Calgary. I had lived with family until I got a job, then, in a house with four other women. At last, I could afford an apartment of my own and I chose an apartment in a Norfolk Housing Association building in Sunnyside for two reasons: I could afford the rent and knew that I could apply for subsidised rent when I retired. This meant that I would be able to afford Calgary rent, then very high for a one bedroom apartment. I also wanted a home near a Ctrain station, so that I could get to my work without having a vehicle. I do not regret this decision.


At the time, I was not aware that Sunnyside was considered vulnerable to flooding. I knew that it was one of the oldest neighbourhoods in the city and I later found out that Calgary had put in city water about 100 years ago, when Sunnyside was established as a city neighbourhood.

The 2013 flood affected me as I was evacuated from my home for a week. Since I was informed of this evacuation while I was at work, I could not go home to get anything, so was left in what I had on. Fortunately, I was able to stay with family. I returned after a week to a home without damage, except for a stinking fridge full of rotten food. Others in Norfolk Housing Association buildings were less fortunate, as two buildings were flooded and serious damage done which took some time to repair.

The city has worked at repairing and updating flood related infrastructure in Sunnyside, and I hope that this work will continue, to prevent serious damage from flooding in the future. I should like to see barrier improvements being considered for Sunnyside, including ground water protection, recommended, funded, and built as soon as possible. I am concerned that this barrier protection is intended to provide only 1 in 20 year flood protection for Sunnyside, as contrasted to the 1 in 200 year flood protection provided for the downtown area on the other side of the Bow River from Sunnyside. In the event of another major flood, it seems

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inevitable that flood water diverted from the barriers on the downtown side of the river would overflow the lesser protection on the opposite side of the river in Sunnyside, causing major flooding. In addition, if water behind the dam is kept high in the spring for as long as possible, to provide for possible drought conditions and for recreation and electrical generation, rapid release of this high water in the event of a flood warning could overflow the planned low barriers in Sunnyside and cause significant flooding. The construction of a new dam upstream of Calgary in conjunction with significantly improved barriers would greatly improve flood protection in Sunnyside. But such a new dam currently appears to be a long-term project and there is a real possibility that another major flood will happen in the meantime.

The cost of rebuilding Sunnyside has been considerable and the risk to the lives and property of its residents continues as construction of planned flood mitigation projects progresses slowly. I encourage the city to continue to move forward with these projects as quickly as possible. In particular, the Upper Plateau Separation Project and major improvements in the barrier adjacent to Sunnyside, preferably raising it  at least 1 metre in height, would provide us with significantly improved protection against flooding.

Thank you for the opportunity to speak to this issue, which is of major concern to the residents of Sunnyside.

Response to Possible Question

Why should all the taxpayers in Calgary and Alberta pay for flood mitigation that only benefits a few?

Calgary is a community. The city authorities determine what needs to be done to help it to continue as a functioning community and all residents pay whatever the city decides to carry out those decisions.

