I ask that this letter be included as part of the public record at the Utilities and Corporate Services meeting of February 14, 2018

Dear Councillor Druh Farrell, Ward 7

Last year in late March I attended and spoke at the UCS meeting about the impact the 2013 Calgary Flood made on me, and the citizens who experienced the direct results of flooding. It was your call to action for flood mitigation to be a top priority for the City of Calgary. Thank you.

I was recovering from Hip Surgery and still on crutches. I had delayed surgery in the hopes my body could fix the problem with my damaged hip joint. No such luck. In hindsight, I should have had the surgery a few years earlier. Life has been dramatically improved now that my hip pain has been addressed.

I mention my delay for surgery and pain experienced till I finally had hip surgery because it reminds me that the City of Calgary is still in the painful position of being exposed to a flood event that might be even greater than that experienced in 2013. We know nature will not provide the solution. The solutions of building berms of sufficient height, dealing with storm water being deposited into Sunnyside, and a dam on the bow river are now better understood. These projects need continued funding and action to relieve the pain of a future potential flood event.

I have been attending Sunnyside meetings chaired by Charlie Lund. I am aware that stormwater and groundwater projects in Sunnyside are approved and moving to construction. I request these be expedited.

Charlie and I also walked to a potential site for a new upstream dam on the Bow. I ask the city to encourage the province to press forward to build it ASAP which will protect all communities and the downtown core much better/earlier. Delay by the province is not a good option.

I feel the berm improvements proposed by the city to be inadequate and want to see the planned height of the Sunnyside berm be reviewed and raised to reflect the risk exposure our community deals with each year of the currently projected years to completion of an upstream dam on the Bow River.

The City of Calgary and the Province of Alberta will be remiss by not addressing the needs of the Calgary communities and the downtown core if flood mitigation is slowed or delayed.

Yours truly,
Richard BOLT
403.560.7651

PS: If requested to once again abandon our homes at the last minute due to Bow River flooding, we all know we will likely be safe camping out at the Zoo.

Linda Grandinetti
940 5th Street NW
Calgary, AB
T2N 1R2

February 12, 2018

Councillor Druh Farrell
City of Calgary
800 Macleod Trail SE
Calgary, Alberta
T2P 2M5

Dear Councillor Farrell,

I ask that this letter be included as part of the public record at he Utilities and Corporate Services meeting of February 14, 2018.

I am writing to express concerns about the protection of Sunnyside in a possible future flood. I am pleased to see the progress being made to upgrade the sanitary lift station and the storm water pump stations in Sunnyside. Although I support the raising of the berm on the south side of the river to protect downtown, as well as the reinforcement of the south side of the riverbank and the causeway to Prince's Island, I am concerned these measures will serve to increase the risk of flooding in Sunnyside if similar protection is not provided for the north bank of the Bow River. Specifically, I would like to see the berm height increased by one meter.

The Sunnyside berm height was inadequate in 2013. We had close to six feet of water in our basement during the flood. I have since come to understand that had the weather event of 2013 parked over the Bow River instead of the Elbow, flooding in our community would have been significantly worse. This is a difficult reality to come to terms with. We know the future holds an increase in extreme weather events due to climate change, and this creates a very worrisome situation.

I feel that a new dam would provide the best protection, and I ask that you continue to press this issue with the province, but as a new dam may be decades away, increasing the berm height in Sunnyside as an interim measure should be a high priority.

Thank you for taking my concerns into consideration, and for all the good work that you do our behalf.

Sincerely,

Linda Grandinetti

February 6, 2018

Councillor Druh Farrell
City of Calgary
800 Macleod Trail SE
Calgary, AB
T2P 2M5

Dear Ms. Farrell,

I ask that this letter be included as part of the public record at the Utilities and Corporate Services meeting of February 14, 2018.

I am a resident of Sunnyside, the inner-city Calgary neighbourhood that experienced the brunt of the disastrous 2013 flood. As a result of the flood, the basements of several friends in my neighbourhood were completely filled with flood water. They experienced much loss and trauma, and some of them are still dealing with the aftereffects of the flood.

I commend the City of Calgary for undertaking a number of important measures to mitigate the effects of future floods, including stormwater and groundwater projects that are approved and moving toward construction.

Since Calgary's downtown and inner-city neighbourhoods remain extremely vulnerable, ***I request that the projects that have been approved be expedited as much as possible and that the additional stormwater projects that are planned be approved so that they can move forward in the next couple of years.***

Experts say that future floods are likely to be far worse than the 2013 flood, for a variety of reasons, including the fact that climate change will inevitably get worse even if drastic measures were taken immediately to reduce it. Therefore, I support the building of an upstream dam on the Bow River, and ***I ask the City to encourage the Province to begin building it as soon as possible, since a large project such as that will take some time.***

I am extremely concerned and disappointed about the inadequate berm improvement proposed by the City. The residents of Sunnyside are particularly vulnerable. Even if the Province does build an upstream dam, there will be considerable delay before the benefits of such a project will be evident.

Therefore, I ask that the planned height of the Sunnyside berm be reviewed and raised to reflect this risk. An increase in height of one-half to one metre is asking very little in terms of financial expenditure, and I simply don't understand the City's reluctance to undertake such a project.

Sincerely,

Jo Hildebrand
809, 235 – 9A St. NW, Calgary

From: Jans, Reg
Sent: Thursday, February 8, 2018 6:20 PM
To: caward7@calgary.ca
Cc: Charlie Lund (Sunnyside) (cdlund2@yahoo.com)
Subject: SPC-UCS meeting on Wednesday February 14

To: Druh Farrell, Ward 7

Re: Keeping Flood Resiliency a Priority

I ask that this letter be included as part of the public record at the Utilities and Corporate Services meeting of February 14, 2018.

I am a resident of Sunnyside and was significantly affected by the flood in 2013. While I understand that a significant amount of work is underway on projects within the community that will reduce the impact of future flooding in the community from storm water, I am writing today to express my concern that little has been done to date to reduce the impact of flooding from the Bow River.

As an active member to the Community Flood Task Force I am aware of, and in agreement with, the City's strategy to provide flood protection for both the Elbow and Bow Rivers with a combination of Berms within the City and upstream Dams. I support a new dam on the Bow River, upstream of Calgary, and would ask that the City push the province to move forward on that objective and immediately begin the necessary feasibility reviews and studies. A project of this magnitude will take years to complete, and until it is completed Calgarians will face the possibility of a repeat of 2013. As a resident of Sunnyside, every year from June to mid July I face the very real possibility of losing all that I have invested in my home, my Community and my City. I cannot continue to face this year after year without an end in sight.

The announcement that the City is proceeding with the early stages of a project to improve the existing berms along the Bow River adjacent to East Sunnyside was welcome news. However, the proposal to reduce the protection level to 1200 cms is totally unacceptable. The 2013 flood was approximately 1800 cms at that location and by all accounts overtopped the berm in a few locations. Subsequent re-constructions after the flood, particularly the Princes Island causeway (totally irresponsible!) have raised the flood levels along this stretch of the river meaning a repeat of the 2013 would overtop the existing berm even more. With the completion of post-flood studies, the 2013 flood has now been determined to have a 1:70 return probability. A 1.4% chance of occurring each year.

The berm along the Bow River must be raised. We cannot continue year after year facing the very real possibility of losing everything that we have invested in our Homes, our Communities and our City while we wait for an upstream dam on the Bow River to be built.

To come forward with a proposal to the residents of Sunnyside that reduces the level of service of the berm is unacceptable. I fully understand that a berm to completely protect Sunnyside is unfeasible, but to propose lowering it to an arbitrary 1200cms level of service is not acceptable. By all accounts an upstream dam is at least 10, if not 20 years away and the project to raise the berms adjacent to Sunnyside needs to take that into account and be designed based on cost - benefit.

In closing, I would like to thank the City and in particular; the Water Resources group, for all their efforts to improve flood protection for Sunnyside to date, and trust that they will continue to do that for the Sunnyside Berm project.

Thank you.

Reg Jans P.Eng.

CAWard7 - Dale Calkins

From: Darvin Knorr <darvin_k@yahoo.com>
Sent: Friday, February 9, 2018 11:28
To: aep.minister@gov.ab.ca; CAWard7 - Dale Calkins; Budget.Feedback@gov.ab.ca
Cc: cdlund2@yahoo.com
Subject: [EXT] Critical Upstream Feasibility Studies and Existing Commitments

Good Day,

I am writing to you to ask that the province promptly implement recommendations in the "Advice to Government on Water Management in the Bow River Basin" study that they commissioned from the Bow River Working Group (new upstream dam in particular). I ask that this letter be included as part of the public record at the Utilities and Corporate Services meeting of February 14, 2018.

I want to thank the City of Calgary for the storm water and groundwater projects approved and moving to construction, and ask that these be expedited as much as possible. I ask that the additional storm water projects planned be approved to move forward in the next couple of years. I support a new upstream dam on the Bow and ask the city to encourage the province to build it ASAP and **I am disappointed by the inadequate berm improvements proposed by the City and demand that the planned height of the Sunnyside berm be reviewed and raised to reflect the risk we are exposed to during the long delay before an upstream dam is built.**

Key Points:

- Investments in flood mitigation infrastructure must be made, particularly a new dam upstream on the Bow River.
- Calgary is a key economic engine for Alberta yet it remains exceptionally vulnerable to flooding from both the Bow and Elbow rivers.
- If effects of climate change were considered, the urgency for additional flood mitigation infrastructure would be even more apparent.
- The provincial government must live up to its existing commitments as well as starting the work on a new dam

Kindest regards,

Darvin Knorr

"Who looks outside, dreams; who looks inside, awakes." Carl Gustav Jung

HSCA
Hillhurst Sunnyside Community Association

February 12, 2018

Councillor Druh Farrell
City of Calgary
800 Macleod Trail SE
Calgary, Alberta
T2P 2M5

Dear Councillor Farrell,

I am writing on behalf of the Infrastructure Group of the HSCA Emergency Planning and Response Committee. Please arrange for this letter be included as part of the public record at the Utilities and Corporate Services meeting of February 14, 2018.

We wish to extend thanks to the city that the projects to improve stormwater and groundwater management already approved are moving forward to design and construction. We ask that the additional Hillhurst-Sunnyside stormwater projects on the Community Drainage Improvement list be approved to move forward as soon as possible.

We support the overall strategy for Bow River flood mitigation combining a new upstream dam and reservoir with improved local barriers/berms and other minor upstream improvements. We ask that the UCS committee members join with our community in advocating to the province that feasibility studies for the new dam and reservoir be initiated in the first half of 2018.

We are disappointed by the inadequate Sunnyside berm improvements proposed by the city. We are not asking for a berm that precludes a new upstream dam, but the Sunnyside berm effectiveness should be restored at least to what it was before 2013. We ask that the planned height of the Sunnyside berm be reviewed and raised to reflect the risk that our community will continue to be exposed to during the long delay before an upstream dam is built.

In December 2017 we outlined several points supporting the restoration of the Sunnyside berm effectiveness and copies of this letter are available upon request. We ask for an opportunity for our community to engage with the city to elaborate on these points in more detail. This engagement must occur early enough in the process that community input can still influence the final design.

We believe in flood protection for the entire community versus each individual home. Non-structural elements (land use regulation, public awareness/education, insurance, lot level, and flood proofing incentives) are needed but can only meaningfully be developed with structural mitigation firmly committed and configured.

I plan to attend the meeting on February 14 and would welcome any questions on the above.

Sincerely

Charlie Lund

Charlie Lund
Chair, Infrastructure Group
HSCA Emergency Planning and Response Committee

1320 – 5 Ave NW, Calgary, Alberta T2N 0S2

Ph: 403- 283-0554 * Fax: 403- 270-3130, www.hsca.ca

February 13, 2018

John Masterson
711 3 street NW
Calgary, Alberta T2N 1P1

Councillor Druh Farrell, Ward 7

Dear Druh,
I am a long time resident of Sunnyside and I experienced the 2013 flood first hand. In anticipation of your February 14 meeting with Utilities and Corporate Services, I wish to apprise you of my views concerning the need for greater berm flood protection for my community. Please **include this letter as part of the public record** for this meeting.

Request:
Raise the height of the Sunnyside berm to a level that is comparable to other communities with recent berm improvements (Inglewood, Eau Claire, City zoo). I understand that the Sunnyside berm would need to be raised by as much as one meter in some places whereas Water Resources is currently considering raising it by only one foot.

Considerations:
1. An upstream dam and reservoir on the Bow River is ultimately needed. Such infrastructure is however likely two decades away from completion. Berm improvements will provide a significant level interim protection.

2. Water Resources argues that raising Sunnyside's berm by one meter (comparable with other recent berm improvements) will lessen the resolve of the provincial government to build an upstream and reservoir on the Bow River. While this could have some bearing provincial decision-making, I nevertheless do not want to be the 'sacrificial' community that is left with a low berm height simply as an enticement to the province to build upstream flood infrastructure.

3. Temporary flood barriers (Aqua Dams) do not offer a real level of secure protection against flooding. Their effectiveness and timely deployment are suspect. Moreover, it is not even clear whether such measures are being considered by the City for Sunnyside flood protection.

4. Recent flood infrastructure, namely the hardening of the Prince's Island causeway, has increased the flood risk for Sunnyside. The original causeway was designed to 'washout' but now with the completed hardening, it will instead impede river flow and divert water toward Sunnyside.

Conclusion:
On the basis of equity, Sunnyside deserves a level of flood berm protection comparable to other communities that have had recent berm improvements. I trust that the City will be undertaking a Sunnyside engagement session on this matter in the near future so broader community views can be gathered and considered. Thank you.

Sincerely John Masterson

Cc Charlie Lund, Chair, HSCA EPARC Infrastructure Group

February 8, 2018

From: Peggi McDougall, Sunnyside Resident

To: Councillor Druh Farrell
City of Calgary, via email to Dale Calkins at caward7@calgary.ca

Please include in the Public Record my letter below, to the SPC-UCS meeting on February 14th. I would be there if I could, but I will be unable to attend.

Dear Councillor Farrell,

RE: SUNNYSIDE NEEDS A HIGHER BERM ON THE BOW RIVER

We appreciate and are truly grateful for all the City projects that have been approved for implementation to provide protection against flooding. However, most recently, we in Sunnyside are feeling very concerned about our higher level of vulnerability, with regards to the Bow River over-topping the area between 10th Street NW and surrounding the Centre Street Bridge (North). Our reasons for increased concern stem from our trauma of 2013, but more recently from bolstered protection for the Zoo and Eau Claire by berms and barriers. Many of us feel an increased vulnerability due to:

1) Reduced capacity of the Bow River due to significant gravel bars
2) Higher berms and barriers provided for Eau Claire West area and the Zoo
3) The permanent structure built under the Prince's Island Causeway creating an inadvertent dam

These measures have made Sunnyside more vulnerable with less protection than we had in 2013, and at increased risk of flooding due to the walls that will push the water to the north into Sunnyside.

As you know, Sunnyside was flooded via a few different ways:
1) storm-water from the Upper Plateau inundating the storm system with river gates closed, then covering the surface of our properties;
2) groundwater migrating from the Bow River into Sunnyside; and
3) the Bow River overtopping the current inadequate berm.

A higher berm would decrease our vulnerability to the river overtopping and the barrier portion of the berm would decrease our groundwater migration issue. This two-pronged approach of a barrier and higher berm is critical to protecting the increased vulnerability of the community. A flood equal to the 2013 would be even more devastating with current conditions. Please protect Sunnyside to the same level as the Zoo animals and the Eau Claire area with a higher berm.

Many of us feel reverberations of the trauma we felt from 2013 and are asking for your help to guide Water Services to build a berm, between 10th St. and Centre St., that is 1 metre higher than we currently have. This would protect us while we wait a decade or two for an upstream dam on the Bow to be built.
Thank you for your help in protecting our community.

Peggi McDougall

Mary Louise Mitchell
#102, 709- 2nd Ave NW
Calgary, Alberta T2N 0E4
February 13, 2017

Councillor Druh Farrell
Councillor Ward 7
Calgary

Dear Councillor Farrell,

I wish to request your support for the improvement of flood mitigation infrastructure for the protection of Sunnyside. As a low income senior living in one of the Norfolk Housing Association buildings in Sunnyside, I saw the destruction done to my neighbourhood by the 2013 flood. I had to leave my home during the flooding.

I appreciate very much what has already been done, or is in the planning stage, to prevent future floods. However, to avoid overland flooding both higher berms and an upstream dam are needed. Please add your voice to that of the residents of Sunnyside in favour of adequate protection to prevent such damage in future floods. Thank you for all your support for us in the past.

Sincerely,

Mary Louise Mitchell

February 8, 2018

To the honorable City of Calgary Councillor Druh Farrell, Ward 7

May I request that this letter be included as part of the public record at the Utilities and Corporate Services meeting of February 14, 2018.

I am a resident of Sunnyside. This older inner city community is vibrant, diverse, family orientated and has many sought after amenities. It would be such a huge loss if this community experienced another major flood that could have been prevented.

In June & early July 2013 I experienced first hand the damage that can result from a storm sewer backup during major flooding. The flooding that my neighbourhood experienced was caused by inadequate storm sewer infrastructure. There was also substantial flooding caused east of my neighbourhood due to the Bow River overflowing its banks. The berm was not high enough. Some improvements have been made since, but more needs to be done. The berm needs to be higher.

The residents of Sunnyside are thankful for the projects that have been approved for construction, but we ask that the storm water and groundwater projects be expedited for completion in a couple of years; because Calgarians do not want to experience another devastating flood similar to 2013. All Calgarians felt the loss, anxiety and heartache of their fellow citizens.

I recall all the debates surrounding the proposals and construction of the Red River Floodway when I was a child living in Manitoba. The project had a lot of opposition due to its financial burden on future citizens. However, all Winnipeggers are now so very proud of their floodway; because it most likely has saved thousands of lives and billions of dollars in flood damage. The leaders who made the decision to built it; had vision, courage and a determination to serve their past, current and future citizens well.

I believe the future generations of Calgarians will show the same pride if we invest in flood mitigation upstream and along our riverbanks where higher berms are indicated; and storm water and groundwater projects are constructed with some urgency and completed in a timely manner.

Respectfully,
Marion Musial

cc:
Dale Calkins
Charles Lund

February 12, 2018

Councillor Druh Farrell
City of Calgary
800 Macleod Trail SE
Calgary, AB T2P 2M5

Dear Councillor Farrell,

I live in an area of the city (Sunnyside) that was affected in the 2013 flooding of the Bow River. Because of my background in satellite meteorology, I also had the privilege to serve as an advisor to the expert management panel on the city's 2014 flood mitigation report.

I'd like to add a few short points in support of Water Service's set of official recommendations to City Council. First, those of us in the atmospheric sciences have strong reasons to believe that the potential for flooding is higher today than is even indicated by the historical record. To put it briefly, the mechanisms of the atmosphere are moving toward weather that develops with more force and in a more prolonged fashion, leading to both more intense drought and flooding. These trends are not just *increasing*; they are *accelerating*. The need for mitigation against these two extremes, if anything, is actually being understated in this latest report.

Second, in my studies of severe weather and its effects, I have rarely come across a community protection infrastructure project that did not pay for itself many times over by mitigating disaster. The plan for upstream dams and raised river barriers easily falls into this category.

Finally, I have a personal experience to address a question you may have about an issue that comes up sometimes in the discussion of flood safety, and that is flood insurance. Why not, you may ask, have property owners deal with this risk with their own flood insurance policies? Well, I've tried. I had an insurance broker seek out policies from the five companies that offer them in Canada. None were willing to insure my house. (And I only had a small amount of groundwater seepage in my basement in 2013, and sewer backup, which has been fixed.) I'm only left to guess the reason why, but I think the lesson here is that this is more than a simple actuarial problem. Above all it appears to be a structural problem – and one that requires a collective will to insure the future survival of the city. Based on the official recommendations of Water Services I'm happy to see this is falling on receptive ears.

Thank you,

Anthony Wimmers
731 5 St NW
Calgary, AB T2N1R1

EAWard1 - Tomi Neilson

From: Jean Woeller <jwoeller@shaw.ca>
Sent: Monday, February 12, 2018 4:13 PM
To: City Clerk
Cc: EAWard1 - Tomi Neilson; Jean Woeller
Subject: [EXT] Proposed Barriers in Bowness - Utilities & Corporate Services meeting on Feb 14, 2018
Attachments: UCS Standing committee letter.docx

Follow Up Flag: Follow up
Flag Status: Completed

To the City Clerk:

I ask that this letter be included as part of the public record at the Utilities and Corporate Services meeting of February 14, 2018.

I am planning to attend this meeting and would like to read this letter committee members and answer questions if required.

Please acknowledge the receipt of this email and the attached letter.

Kind Regards
Jean Woeller

Homeowner of 6138 Bow Crescent NW, Calgary
403-606-7100

February 12, 2018

City Clerk #8007, The City of Calgary
P.O. Box 2100, Station "M"
Calgary, Alberta T2P 2M5

To Members of the Standing Policy Committee (SPC) on Utilities and Corporate Services (UCS):

I am homeowner living with my husband at 6138 Bow Crescent NW. I would like to add to the record and ask that you consider my concerns regarding the proposal for local barriers in the community of Bowness. I am confident that these same concerns are held by the many of the homeowners that are directly affected by this proposal.

My concerns are as follows:

1. Property owners have not been given adequate opportunity to understand technical information and the details of the cost / benefit analysis that was considered in the recommendation for local barriers in Bowness and the subsequent approval of the recommendation by City Council.

   On a personal level the costs of this proposal far outweigh the benefits. The costs to me as a homeowner are as follows:

   - Anticipated four years of construction, with heavy equipment, noise, dust and general disruption of the enjoyment of our yard.
   - Irreversible damage to the natural environment, including but not limited to loss of mature trees, loss of habitat for birds, fish and mammals resulting in population declines, potential downstream erosion as a result of increased river flow rates.
   - Proposed barriers may limit my direct access to the river from my backyard.
   - Proposed barriers may open the door to public access (e.g. public pathway, use as a corridor for utility services, etc.).
   - Uncertainty of the impact of this proposal on the value of my property and the liquidity of my largest personal asset.

   The benefits are more difficult to understand for the following reasons:

   - Our house and many others included in the proposal lie outside the 1:20 inundation area shown on the inundation maps yet a barrier is proposed for these properties.
   - In 2013, our home and many others included in the proposal were flooded as a result of sewer backup, not overland flooding. Many others had home flooding from egress of groundwater. The proposed local barriers will not address these causes.

At this point in time, it is very difficult to accept the proposal for local barriers in Bowness, given my current understanding.

2. The timing of proposed barriers seems premature. In my opinion, local mitigation should come after commitment to upstream mitigation and after planning has begun by the Province. The City should be pushing hard for upstream mitigation.

   Moving forward on local mitigation may reduce Council's resolve to advocate for upstream mitigation. Upstream mitigation serves a far greater good than any local measures in Bowness; for example, downtown businesses and their employees, the zoo, citizens who enjoy recently renewed places like St. Patrick Island Park, residents of the new condominiums in Eau Claire and East Village, to name only a few.

3. Proposed barriers may disturb natural run-off back to the river during heavy rainfall events and possibly exacerbate basement flooding.

4. In the unforeseen event that my husband and I need to sell our property during this time of uncertainty, we could suffer a significant personal financial loss. Both of us are of an age where this kind of loss could be very difficult to recover.

As a directly impacted stakeholder in the proposal for local barriers in Bowness I ask that Council consider the following actions:

1. Continue the discussion of alternative approaches to barriers that could offer similar protection without destroying the natural river environment while continuing to advocate for upstream mitigation on the Bow River.

2. Provide opportunities to residents of Bowness to better understand the technical details for the proposal for barriers and the details of the cost / benefit analysis that contributed to the recommendation and approval of local barriers in Bowness. A suggestion is to arrange meetings between residents and the experts who developed the recommendations, to answer questions and build understanding of the inputs to the proposals.

Sincerely,
Jean Woeller
Homeowner of 6138 Bow Crescent NW, Calgary

Are we safe considering current mitigation and related construction projects?

(Springbank dry dam (SR1) / Elbow River Bridge Crossing)

Do we have better options?

A senior hydraulic engineer in a meeting with Dutch engineers said "when they asked what we designed for-we said 100 years, they design for a 1,000-year event."

The government Alberta has commissioned the world renowned Dutch consultant Deltares to evaluate and compare different projects.

The designers of the Springbank dry dam (SR1) and the Elbow River Bridge Crossing indicated that the design is for 1 in 100.

Hydroelectric dams in the Ottawa River basin are dealing with historic water levels, but the structures are safe and up to the challenge, says Quebec Environment Minister David Heurtel.

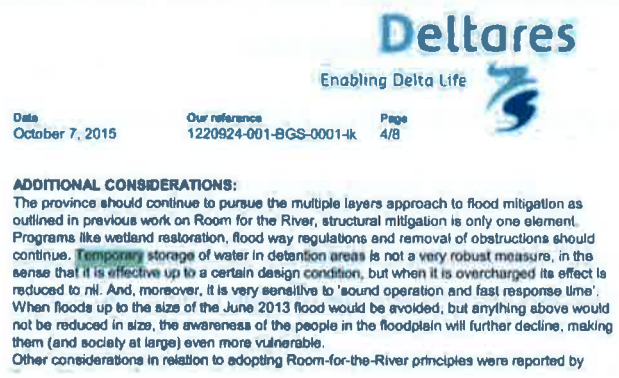
"Our dams are made to withstand flows of water that you see once every 10,000 years." (Hydro-Québec spokesperson Serge Abergel).

A- Springbank dry dam (SR1)

Fact first:

World renowned consultant Deltares, which was commissioned by the government of AB to evaluate and compare different projects including the proposed Springbank dry dam, warns:

1- "Temporary storage of water in a detention area (dry dam) is not a very robust measure, in the sense that it is effective up to a certain design condition, but when it is overcharged its effect is reduced to nil".
2- It is very sensitive to sound operation and fast response time… anything above the 2013 flood would not be reduced in size, the awareness of the people in the floodplain will further decline making them (and society at large) even more vulnerable.
3- "It is also recommended to explore possibilities for future modifications in reservoir design to cope with increased floods".



Deltares
Enabling Delta Life

Date: October 7, 2015 | Our reference: 1220924-001-BGS-0001-ik | Page: 4/8

ADDITIONAL CONSIDERATIONS:
The province should continue to pursue the multiple layers approach to flood mitigation as outlined in previous work on Room for the River, structural mitigation is only one element. Programs like wetland restoration, flood way regulations and removal of obstructions should continue. Temporary storage of water in detention areas is not a very robust measure, in the sense that it is effective up to a certain design condition, but when it is overcharged its effect is reduced to nil. And, moreover, it is very sensitive to 'sound operation and fast response time'. When floods up to the size of the June 2013 flood would be avoided, but anything above would not be reduced in size, the awareness of the people in the floodplain will further decline, making them (and society at large) even more vulnerable.
Other considerations in relation to adopting Room-for-the-River principles were reported by

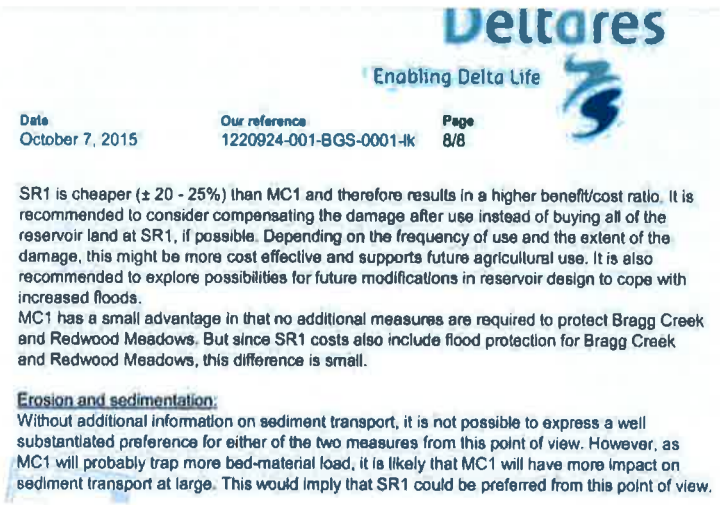
The Minister of Environment announced that one of the main three reasons (faster, safer and cheaper) of choosing the SR1 is that it is "cheaper".

CBC News Posted: Oct 26, 2015 7:43 AM MT: The province is committing $297 million, in total, to mitigation projects on the Elbow River.

4- The current provincial government sticks to its guns as the controversial Springbank dam price climbs to $432M, (August 11, 2017). Cost has jumped from $297 million to $432M (1.5 increase) within two years even before any construction started.
On October 7, 2015, Deltares report compared SR1 to MC1 indicating that SR1 was cheaper…BUT, is it true in 2018? –MC1 assumed cost is $360M vs. $432M current estimated cost for SR1.

Mayor Nenshi confirmed that the Springbank reservoir is expected to "attenuate" only 81 per cent [?] of the water that Calgary saw from that waterway during the 2013 flood.

5- Also Minister Phillips said, "This option will protect everyone involved much quicker" (Almost 5years have passed…not a single shovel hit the ground).
6- Chief Crowchild believes that P.M. Justin Trudeau's federal Liberal government's signing of the United Nations Declaration on the Rights of Indigenous Peoples, means that the Tsuut'ina must approve of any project that will affect their lands before construction can begin.
7- City of Calgary documents distributed during flood mitigation workshops on October 2017 acknowledged that dams can fail. How many times do we need the SR1 to fail (a dam that is only 15km. away from Calgary?



Deltares

Enabling Delta Life

Date	Our reference	Page
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SR1 is cheaper (± 20 - 25%) than MC1 and therefore results in a higher benefit/cost ratio. It is recommended to consider compensating the damage after use instead of buying all of the reservoir land at SR1, if possible. Depending on the frequency of use and the extent of the damage, this might be more cost effective and supports future agricultural use. It is also recommended to explore possibilities for future modifications in reservoir design to cope with increased floods.
MC1 has a small advantage in that no additional measures are required to protect Bragg Creek and Redwood Meadows. But since SR1 costs also include flood protection for Bragg Creek and Redwood Meadows, this difference is small.

Erosion and sedimentation:
Without additional information on sediment transport, it is not possible to express a well substantiated preference for either of the two measures from this point of view. However, as MC1 will probably trap more bed-material load, it is likely that MC1 will have more impact on sediment transport at large. This would imply that SR1 could be preferred from this point of view.

The Springbank Off-stream Reservoir (SR1) does not meet modern design requirements of "triple-bottom-line"

In May 2017, the City of Calgary released the Flood Mitigation Options Assessment Report, prepared by the IBI Group and Golder Associates.

The report is a further and more refined study to the initial study work conducted by IBI in 2015. The research used sophisticated modelling data to provide a cost-benefit analysis to various upstream and community-level mitigation options being analyzed in the months after the 2013 flood. The results showed that the Springbank Off-stream Reservoir (SR1) was not a "triple-bottom-line" assessment that would include **environmental and social costs** alongside economic costs.

Elbow River Bridge Crossing

Fact first:

Alberta Environment and Sustainable Resource Development acknowledged that 2013 flood was 1/100. Officials with Alberta Environment and Sustainable Resource Development said the province's current analysis of data still suggests it was a 1-in-100-year flood. "That is what the models are based on," said spokeswoman Nikki Booth.

The information in the table that was used to design the Elbow River Bridge, "*Segment 1, Elbow River Drainage Report, Bridges 28 (82468 N), 29 (82468 S) & 30 (82468 WSR)*" contradicts the Province conclusion basing the entire design of the bridge on an assumption of a lower peak flow rate of 954 cms, while the peak flow rate in 2013 was 1240 cms according to city information.

Questions	ELBOW RIVER DRAINAGE MODEL COMPARISON		
	2015 City of Calgary 1D	2017 SWCRR 2D	2017 SWCRR 1D
Date	2015	2016/2017	2017
Flow capacity (cubic metres/second)	954 cms (1/100 year flood)	954 cms (1/100 year flood)	954 cms (1/100 year flood)
Will 2013 water level overtop the Elbow River proposed bridges?	No 1240 cms (1/200 year flood)	No 1240 cms (1/200 year flood)	No 1240 cms (1/200 year flood)
Risk embankment will fail during a flood	No	No	No
Does the bridge crossing increase risk to the closest upstream community? (Discovery Ridge)	No and the linear extent of backwater impacts are not identified in the city report.	No and backwater impacts for the 2013 flood event dissipate 1.4 km downstream from Discovery Ridge.	No and backwater impacts for the 2013 flood event dissipate 1.4 km downstream from Discovery Ridge.
Will the opening be blocked by debris during a flood?	No	No	No
Will vehicle pollutants discharge to Elbow River?	———	No, the pollutants from the roadway will be captured in the drainage system and conveyed to ponds for containment and cleanup.	No, the pollutants from the roadway will be captured in the drainage system and conveyed to ponds for containment and cleanup.
Will roadway discharge directly to Elbow River?	———	No, the pollutants from vehicles will be captured in the drainage system and conveyed to ponds for water quality treatment.	No, the pollutants from vehicles will be captured in the drainage system and conveyed to ponds for water quality treatment.
Will ponds washout during 1/200 year flood?	———	No, the pond embankments are higher than the 1/200 year river water surface	No, the pond embankments are higher than the 1/200 year river water surface

(On the Elbow River, the estimated flow rate coming into the Glenmore Reservoir in a 1:100 year flood is about 950 m3/s).Segment 1, Elbow River Drainage Report, Bridges 28 (82468 N), 29 (82468 S) & 30 (82468 WSR)
Elbow River Drainage Model Comparison HEC-RAS Summary

Inadequate flood protection in the design of SR1 and Elbow River Bridge

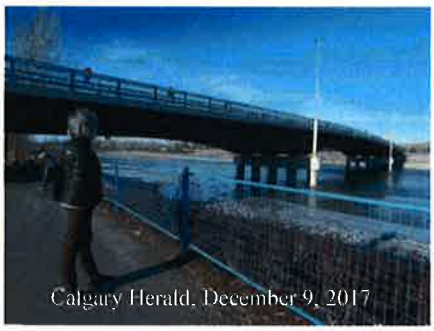
In a research paper titled, "*The 2013 flood event in the Bow and Oldman River basins; causes, assessment, and damages*" by John Pomeroy, Ronald E. Stewart, and Paul H. Whitfield,

(*Prof. John Pomeroy is Chair of Climate Change Canada who was given $77.8 million grant, the largest grant ever given to the university, and the largest grant for any university water research program in the world*).

The research paper stated: The potential for greatest benefits to society must come from a re-evaluation of the level of preparation for floods and the degree of warning that was available for this flood.
Alberta only protects to the 1% flood event which is recognized as the lowest level of flood protection that is politically acceptable (Lord, 2011). The substantial destruction in Calgary resulted from a flood with a return period of approximately 1:40 years.
With the continued development in this region of Alberta, **it was hoped that discussions of higher levels of protection and risk reduction from avoidance might occur following this event.**
https://erwp.org/index.php/data-and-research/67-pomeroy-et-al-bow-river-flood-2013-handout/file

The need and the wisdom in exceeding the 1/100 design

The 12th Street Bridge in Calgary



December 2, 2015

The city considered three concepts, including another steel truss design, before settling on the arched steel box girder bridge, which has fewer piers in the river and no height restrictions.

Commenting on the Calgary's 12th Street S.E. bridge replacement, project manager Katherine Hikita said: The chosen design has "enhanced flood resiliency features" such as a higher clearance over the river, allowing it to withstand a 1-in-200-year flood.

"We also have to have it pass the 1-in-200 flood," she said. "We're actually exceeding what the city's requirements are."

http://calgaryherald.com/storyline/behold-the-final-concept-for-the-19-million-bridge-linking-inglewood-and-the-calgary-zoo

(This is the proper and responsible design philosophy when it comes to highly sensitive structures that are involving flood protection measures).

Is the overall design acceptable?

Assessment of Elbow River Upstream Bridge

Structures Impact on Glenmore Dam

KLOHN CRIPPEN BERGER LTD. November 2015

P. 36: It is noted that the hydraulic assessments were based on conceptual designs of the 2007 and 2015 bridges and may not reflect the eventual transition from the realigned river channel to the existing Elbow River. **This transition and required erosion protection should be evaluated in further phases of design.**

Recommendations (P. 37)

The following recommendations are drawn from the analysis:

- The hydrotechnical assessments of the SWCRR bridges were based on the 2007 and 2015 conceptual-level bridge and road designs provided by Alberta Transportation. Upon completion of the final design, the conclusions of this report should be confirmed by the City to verify that the final crossing configuration (i.e. bridge span, river realignment, and minimum road elevation) does not have adverse impacts to the Glenmore Dam, Glenmore Trail SW Causeway, and the Southeast Dyke.
- Channel mobility in this reach of the Elbow River is naturally high. **Attempting to prevent or control that mobility would be difficult and would have morphological consequences upstream and downstream.** Therefore the design should accept and expect river mobility as much as possible. The design philosophy should be **to protect the infrastructure (i.e. road embankment**, bridge piers and abutments, and stormwater ponds) to an appropriate level, rather than to attempt to control the river.

Does the overall design meet sustainability analysis and all other vital criteria?

Calgary Flood Mitigation Measures Assessment Report

Prepared by IBI Group Professional Service (Canada) Inc.

March 30, 2017

- **The monetized costs and benefits captured in the damage model included those impacts that were judged by The Consultant to be applicable and quantifiable, but did not represent an exhaustive list of all financial, social and environmental impacts (positive and negative) related to flooding and mitigation measures. Further details on parameters that were and were not included in the model are described in the Phase 1 section of the report.**
- **Given the point above, the benefit-cost results should be taken into consideration alongside the Triple Bottom Line (TBL, also called the "sustainability analysis") results, which provide a more fulsome analysis of mitigation measures based on expanded social, environmental and implementation feasibility criteria.**

Important relevant information

- 1 in 100 year flood

A large flood that has a one per cent chance of occurring in any given year. Although called a "1 in 100 year flood" there will not necessarily be one every 100 years. It is even possible to have more than one 1 in 100 year flood in the same year.
City of Calgary website
http://www.calgary.ca/_layouts/cocis/DirectDownload.aspx?target=http%3a%2f%2fwww.calgary.ca%2fTransportation%2fTI%2fDocuments%2fRoad-projects%2fSW-ring-road%2fswrr-elbow-river-bridge-crossing-faq-water-services-Aug-2017.pdf&noredirect=1&sf=1

January 29, 2018:

- Spokeswoman Nikki Booth stated, "They will definitely be looking at the same data that Dr. Pomeroy has looked at," adding, "We're not ruling anything out. "We want as much information as we can get." She also said they welcome any new information as department staff plan for the future.

On January 29, 2018

- Minister Shannon Phillips stated, "The appeals have made it clear that **we need to do a better job in designing [?] and approving roadways.**
http://calgaryherald.com/news/local-news/environment-minister-orders-ring-road-wetlands-saved-admits-project-overdesigned

Conclusion

A cascade of catastrophic events:

Based on the above facts, is the SR1project cheaper, faster or safer? It was assessed as inadequate and not robust by the consultants. Thus, it does not meet reasonable safety standards. A possible breach of the SR1 dam or a failure would impact the city of Calgary, including Discovery Ridge community.

Subsequently, the Elbow River Bridge embankments (about 15 km. away from the SR1 dam) could be destroyed.

The debris resulting from the destruction of the dam and the bridge embankments will be rushing full-force towards Glenmore dam (just 6 km away from the bridge) slamming at the dam that is almost a century old. You can imagine the possible destructive outcome.

Do we have better options?

Our government has hired consultants to study and evaluate 18 different proposed projects covering all four rivers in southern Alberta.

Why can't they do the same to the proposed TRJR solution?

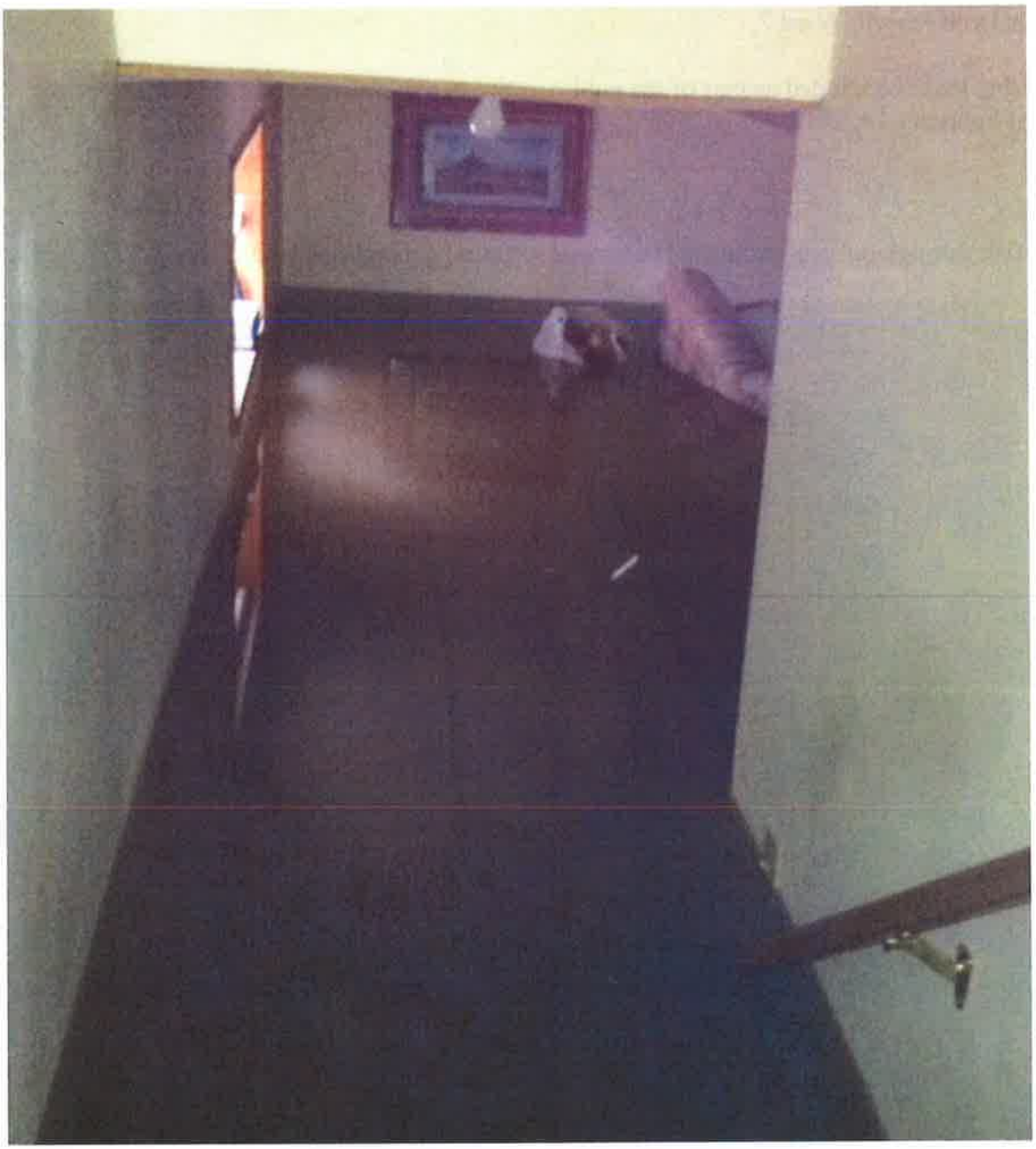
It is an investment that would yield revenue to our province and it is a gift from nature, where much of the engineering work has already been done naturally.

Councillor Druh Farrell, Ward 7,

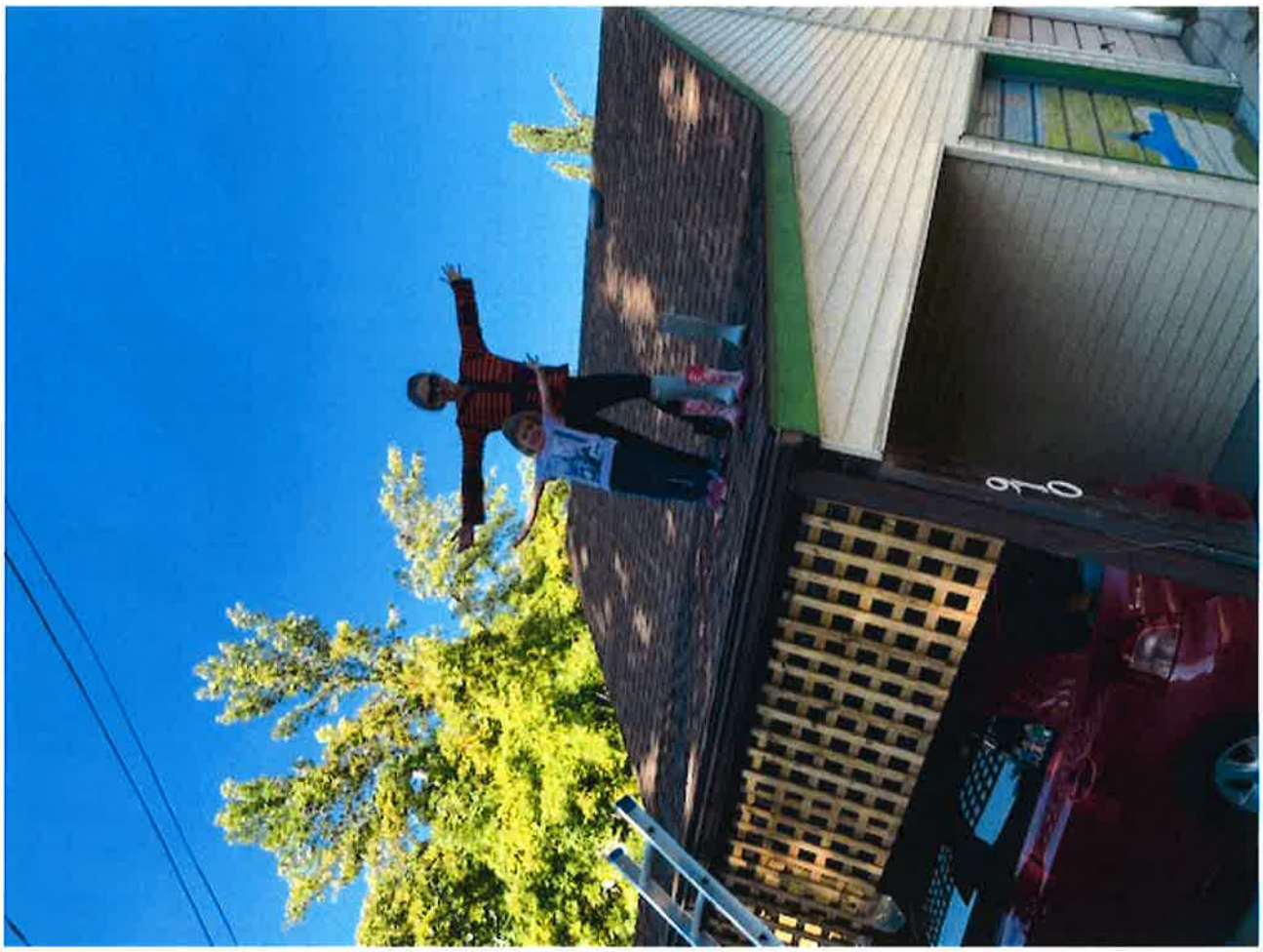
I ask that this letter be icluded as part of the public record at the Utilities and Corporate Services meeting of February 14, 2018.

I painted fish through out our unfinished basement so future generations would know....

that this place floods.



I nailed my rubber boots to my garage roof....



to save them from being added to the landfill, the garbage after the flood haunts me.

I painted a bathtub because every time we get a summer storm our ally and garages flood on Sunnyhill lane....

and it brings back flash backs of how our infrastructure will not keep my home dry.

I conclude:

(1) In Thanking the city for the storm water and groundwater projects approved and moving to construction, and ask that these be expedited as much as possible. I ask that the additional storm water projects planned be approved to move forward in the next couple of years.

(2) I express support for a new upstream dam on the Bow and ask the city to encourage the province to build it ASAP.

(3) I express disappointment at the inadequate berm improvements proposed by the city and demand that the planned height of the Sunnyside berm be reviewed and raised to reflect the risk we are exposed to during the long delay before an upstream dam is built.

Sincerely,

Christie Page
c 403.478.3357
h 403.255.3357

Subject: The high risk of near-future flooding in Sunnyside when the Bow River overflows its berm:

Councillor Farrell:

Please see the letter below about flood mitigation in Sunnyside.
Please circulate it at SPC-UCS on February 14 and place it in the public record.
We sincerely appreciate all your and your staffs efforts to help with floor mitigation for Sunnyside.

To the Mayor and City Council:

Subject: Water Services is refusing to entertain raising the berm that protects Sunnyside from future Bow River flooding, flooding that is a certainty due to a berm that is old, out of date, and far too low to provide even moderate flood protection.
Sunnyside residents just want the same protection for Sunnyside that the zoo animals are getting.

The berm along the Bow River that nominally protects Sunnyside from the risk of Bow River flooding is much too low to provide flood protection from the large near-future floods that we and Water Services have identified are
a certainty for Sunnyside. It is now recognized that this berm only provides a 1:20 year protection for Sunnyside, not the 1:100 year
protection that it was formerly thought to provide. We were shocked to hear this, and we trust that council and the mayor will
also be shocked to hear that Sunnyside only has 1: 20 year protection from near-future Bow River flooding.

The residents, their property, the tax base of Sunnyside, and future infill buildings in
Sunnyside, including numerous
TOD buildings (transit oriented development) of 4 to 8 storeys. are all at imminent risk of being "High Rivered"
and destroyed during, or condemned after, the next moderate Bow River flood event.

It is now widely recognized, including by the engineers in Water Services, that it is a certainty that the Bow River
will overflow the berm that runs along the river through Sunnyside during the next moderate flood.
The river did overflow the berm in the 2013 flood. It overflowed the berm over a distance of at least 1000 feet,
and overtopped the berm by up to 10 inches. Sod that the Parks department had just laid down was rolled back up into rolls beside the Peace Bridge.
All of East Sunnyside was flooded by the river right back to the north bluff inside of an hour when the berm overflowed in 2013.

The next flood is predicted to be even higher. A true 1:100 or 1:200 flood will overtop the berm by up to
2 or 3 feet. This will immediately flood all properties in Sunnyside up to the level of the main floor.
As happened in High River, the mayor will then order the evacuation of all of Sunnyside. The police will place a perimeter around
Sunnyside and not allow anyone in for 4-6 weeks until power, water and sewer have been checked,

the Roads department has checked for road damage, and all properties have been inspected - all of which the city will attempt to
do while there will be an extreme shortage of available engineers to even do inspections.

While everyone is kept out of their properties, black mold will infiltrate each property including the first
and second floors and be left untreated for weeks. All properties will then be condemned by the city due to the black mold
and due to severe water damage on the first floor levels. This exact scenario happened in High River in 2013.

All owners in Sunnyside will be forbidden from moving back home for 4-6 weeks or longer.
Sunnyside will become a ghost town, a newly abandoned area where black mold spreads, floors rot and cave in, vandals break in, and
fires are started. Weeds will cover all the lawns while the 3 levels of government fight bitterly over who will
pay for the abandoned properties. Five to ten years of political argument will ensure that Sunnyside homeowners
will have to move away but still pay their mortgages on rotting homes and apartment buildings.
Law suits and class action law suits against the city will proliferate, all while politicians kick the can down the road over who should pay to buy out the properties of Sunnyside.
Does this sound unlikely? It happened just a few years ago in High River.

The Sunnyside berm is at least 60 years old and was built in a time when the risks of river flooding of Sunnyside were not
as well understood as they are today. Today we, and the engineers at Water Services, recognize and have publicly stated
that the Bow River will overflow this berm during the next Bow River flood of any size.

In 2013 the Sunnyside Bow River berm was thought to be almost good for a 1:100 year flood.
However, it was overtopped in the 2013 flood. The 2013 Bow River flood level was later re-rated to only 1:70 when the statistics were re-done in 2015.

Changes in the river have also reduced the effectiveness of the Sunnyside berm.
The City Parks department rebuilt the Princes Island Causeway basically as a dam
which will raise the water levels on the north side of the river during the next flood by 20 cm.
Changes to the river bank east of the curling club etc have also reduced the effectiveness of the Sunnyside berm.

A 0.5 m engineering allowance or freeboard should also be provided for.

So the tired old Sunnyside berm is good for a mere 1:20 year flood protection.
At a 1:20 flow the water would still be 0.5m below the top of the berm.
If we forget about the 0.5m freeboard that engineers are supposed to demand as a safety factor, the existing berm would be OK to about 1:50.
But is having no safety factor an allowable engineering practice? Please ask Frank Frigo this question directly.

But remember that Mr. Frigo does not want to raise the berm and will beat around the bush to avoid giving you direct answers.

If the Transalta agreement works as it is supposed to and reduces the peak flow by 300 cms our berm might be good to 1:70.
At the pedestrian bridge by 3 St NW there is one area that is much less than 1:20.

Summary:
All we are asking for is the same protection that the city gave to the zoo animals!
Surely city council places the same value on the citizens of Sunnyside as it does the zoo animals?
Plus, we pay taxes and vote - the zoo animals do neither!

Members of council and Mayor Nenshi, please instruct the head of Water Services Rob Spackman and his chief engineer Frank Frigo to immediately begin planning to raise the Sunnyside berm a minimum
of one meter. And in addition to purchase a two meter temporary berm to be held in stock for Sunnyside's exclusive use.
One kilometer of two meter high temporary berms can be purchased for less than $2 million - ask us how.

After you read this letter aloud, Mr. Spackman, through his engineer Mr. Frigo, will try to refute what we have said,
for their own reasons that are not clear to us. They do not want the berm to be raised. Perhaps they are trying to
increase pressure on the Province to fund a new reservoir west of Calgary, but at great risk to Sunnyside in the meantime while we
wait for 30 years for this reservoir to be built. You on council must persevere now.

You are the condo board - Water Services is just the management company.
The condo board always has to push the management company hard to get done what the condo board wants done.
Lets get this done!

Sincerely
Deborah Murray and Michael Bradfield
702 First Ave NW,
Calgary

403-263-4512

Every year the community of Sunnyside braces for another flood season, tensions rise and the risk of a potential flood occurring occupies every day. I would be curious to know how many people undergo council ling or therapy and how much it costs the community, the city and the provincial health care system. If you compound the number of river communities the financial losses from lost productivity or absenteeism could be staggering.

It is impossible to plan for retirement or for a future in the community where we have invested our lives because of the uncertainty of what each years flood season will bring and the risk of losing everything.

Sunnyside should be a thriving inner city community conveying the vibrancy of Calgary's core. Instead; uncertainty, the loss of a level of protection due to the reinforced Princes Island causeway, upstream uncertainty both with Trans-Alta and a potential new dam on the Bow which would certainly be 15-20 years away if at all, and a lack of insurance coverage in the case of a flood leaves the perception that all could be lost.

Reinforcement of the Princes Island causeway has cost the community of Sunnyside 20cm of river level, a considerable level of protection. Technically, can you still call it an island if the river can no longer flow around it? A commitment was made early in the flood mitigation process to make up for this loss of protection with increased berm height. What the city is proposing for a berm height for Sunnyside does not offer this protection let alone additional protection since 2013.

The flood wall the city has built on the west Eau Claire pathway protects the downtown core to a 1:200 level of protection. The zoo has been fortified to a 1:100 level. All we ask is that we get the same consideration as the zoo animals.

There are still gaps in berm protection such as the low at the pedestrian bridge and gravel bars built up in the river during the flood could become barriers to flow in the future.

With a calculated risk of 1:4 that a flood the magnitude of 1850 m3/sec could occur in the next 20 years before any upstream dam could be built leaves the communities along the Bow at an unacceptable risk. Regardless of the TransAlta agreement which may or may not exist in the future we need to bring the community back to the level of protection we had before the 2013 flood at the minimum.

The city is providing new infrastructure in Sunnyside to prevent sewer backup, high runoff due to heavy rains and runoff from the Upper Plateau and pumping to rid the neighborhood of high volumes of runoff during heavy rains when the gates to the river are closed.

Although greatly appreciated by the community these changes offer little protection once the berm is overtopped. Only higher berms with groundwater protection can protect the community from flooding until a permanent upstream dam can be built.

With more extreme weather events happening all the time the time is now to protect the river communities from potential flooding.

- Pat Jans