

**From:** Emily Baker

**Sent:** Friday, August 05, 2011 1:32 PM

**To:** Bert Ely; Andrew MacDonald

**Cc:** Chris Ballard; Mindy Lyle; Nathan Macek; Dave Olinger; Elliot Rhodese; Bob Wood; Faroll Hamer; Paul Smedberg; Rich Baier; Karl Moritz; Nancy Williams; Brian Rahal; Maurice Daly; Sherry Schiller

**Subject:** RE: Flood mitigation

Bert,

Thanks for the email. I believe there is some misunderstanding of my responses to Andrew... I will try to clarify here briefly but will be able to respond in more detail next week at the Work Group meeting.

The \$6.5 million estimate for the flood mitigation project is a planning level estimate that is prepared at the early stages for any capital project that we consider. An estimate must be prepared based on conceptual planning, engineering judgment and experience with similar type projects. An estimate must be prepared so that money can be budgeted for the project, including the design costs, before the design can begin.

The Potomac River Waterfront Flood Mitigation Study did prepare estimates for annual operating costs for all of the options evaluated in the study, as well as cost/benefit analyses (except for the roadway drainage improvements at King/Strand/Union), permitting requirements and potential impacts to natural and cultural resources. In response to Andrew's question, the study did NOT perform these analyses for mitigation measures that would protect to levels BELOW Elevation 6.0. The complete study is on the City's website at <http://alexandriava.gov/tes/info/default.aspx?id=3530>.

The option of raising the street at King/Strand/Union Streets will not involve any pumping, it will simply raise the roadway slightly, including the drainage structures. Staff has not contacted any property owners in the vicinity of the project to discuss potential impacts because we have not been directed to begin work on the project. Staff did work closely with property and business owners in this area during the development of the Flood Mitigation Study. The intention of the project is to provide some level of additional protection while avoiding any potential negative impacts to adjacent properties. This is the only option for which a cost/benefit analysis was not performed, because the impacts are primarily associated with street closures and access to some businesses.

I look forward to discussing this in more detail at the Work Group meeting on the 10<sup>th</sup>.

Emily

Emily A. Baker, P.E.

City Engineer

Transportation & Environmental Services

**From:** Bert Ely

**Sent:** Thursday, August 04, 2011 1:28 PM

**To:** Emily Baker; Andrew MacDonald

**Cc:** Chris Ballard; Mindy Lyle; Nathan Macek; Dave Olinger; Elliot Rhodeside; Bob Wood; Faroll Hamer; Paul Smedberg; Rich Baier; Karl Moritz; Nancy Williams; Brian Rahal; Maurice Daly; Sherry Schiller

**Subject:** RE: Flood mitigation

**Subject:** RE: Flood mitigation

Dear Emily:

Thank you for sharing with the Waterfront Plan Work Group your response to Andrew Macdonald's questions about the flood mitigation aspects of the proposed waterfront plan. I am highly skeptical about the flood-mitigation aspects of the proposed waterfront plan for the following reasons:

One, I question the accuracy or reasonableness of the \$6.5 million cost estimate for the proposed flood mitigation given that, as I understand it from a well-placed source within City Hall, detailed engineering work has not been prepared for the street-elevation project and for other flood-mitigation measures.

Two, I have not seen estimates for annual operating, maintenance, and repair costs associated with whatever flood-mitigation is constructed along the waterfront.

Three, I have not seen any analysis of the federal and state permitting that may be required before the City can construct any aspect of the flood mitigation that has been proposed. I have been advised by folks quite knowledgeable in this field that significant, and potentially costly, issues might arise in any initiative to mitigate nuisance flooding in the King-Union-Strand area, specifically with regard to pumping any flood waters back into the Potomac.

Four, I have seen no indication that property owners in the King-Union-Strand area have been consulted regarding the potentially negative impact of flood-mitigation projects on their properties.

Five, to the extent that flood mitigation expenditures would increase the value of properties in the King-Union-Strand area, I have seen no proposal as to the extent to which these property owners should contribute to the capital and annual costs of providing flood mitigation for their properties. To pose this issue as a question: Why should Alexandria taxpayer dollars be spent to directly benefit a few private-property owners by enhancing the value of their properties, which would be the effect of a successful flood-mitigation initiative?

Six, and most important of all, why can't the economic benefits of spending \$6.5 million on flood mitigation, or whatever the ultimate cost might be, be quantified? If the benefits can't be demonstrated in a convincing manner, then most likely there would be no net benefit from efforts to mitigate nuisance flooding at the bottom of King Street or worse, there may be a net negative impact. To put this point as a question: What is the real force driving the proposed flood

mitigation at the bottom of King Street -- addressing a real problem, politics, or just feeling good that TV trucks are no longer periodically putting lower King Street on the map?

The burden is on City Staff to present a convincing case that it is worth spending \$6.5 million of taxpayer monies, or more, plus whatever annual costs would be incurred, to reduce nuisance flooding at the bottom of King Street. To date, I have yet to see that case. During these tough economic times the City cannot afford to spend \$6.5 million, or whatever the cost might be, just to make some people feel better and to enrich a few property owners by reducing the effects of nuisance flooding on the value of their properties. It is my understanding that the Army Corps of Engineers prepares such cost-benefit studies for its flood-control projects. Why can't the City?

Bert

At 05:07 PM 8/3/2011, Emily Baker wrote:

Hi Andrew,

I have attempted to answer your questions below, and staff will be prepared to discuss them in more detail at the next Waterfront Plan Work Group meeting, if requested. I will also have a contour map at the meeting which will clarify some of your questions about the elevations.

Thanks,  
Emily

Emily A. Baker, P.E.  
City Engineer  
Transportation & Environmental Services

**From:** Andrew Macdonald

**Sent:** Tuesday, July 26, 2011 2:30 PM

**To:** Emily Baker

**Cc:** Chris Ballard; Bert Ely; Mindy Lyle; Nathan Macek; Dave Olinger; Elliot Rhodeside; Bob Wood; Faroll Hamer

**Subject:** Re: Flood mitigation

Emily,

I have several additional questions about the flood mitigation analysis. We seem to have made this a priority of any waterfront development plan yet it is quite unclear what needs to be done, and how that will affect the waterfront visually, etc.

Your analysis suggests that you have accounted for impact of rising sea levels on the Potomac but over what time frame? What amount of sea level rise are you using to make your calculations and recommendations regarding a "need for" Elevation 6.0 flood protection?

Elevation 6.0 was chosen as the recommended flood mitigation elevation because there is a logical tie-in to the existing topography at that elevation (I can explain this more clearly with a map showing the topographic contours). The flood mitigation study identified Elevation 4.0 as the target for nuisance flood mitigation. While the recommended mitigation to El. 6.0 isn't based on a specific amount of sea level rise, it does provide mitigation of an additional two feet that can accommodate that amount of rise and still provide nuisance flood protection.

Have you conducted a cost-benefit analysis of implementing a plan that would prevent flooding at elevations ranging from between 2 and 3.2, or 4.0 only?

The flood mitigation study also recommended a mitigation measure that will protect to some level near Elevation 4.0, which involves raising the streets and drainage structures in the vicinity of King, Union and Strand Streets. A cost-benefit analysis was not performed for this primarily because the benefits are difficult to quantify. These benefits consist of road closures and reduced access to some businesses, not damage to properties.

The exact level of mitigation (elevation that can be achieved) will be determined as the design of this mitigation project moves forward. The design will take into consideration the first floor elevations of existing buildings to prevent introducing flood waters and drainage into these properties. The intent is to get as close to Elevation 4.0 as possible, but will likely be something between 3.0 and 4.0.

What levels pose a serious threat -- damage not just nuisance flooding --to buildings and commerce?? Torpedo Factory? King and Union? Along the Strand shoreline? the Cummins-Turner properties? The Post warehouse?

Both of the Post warehouse properties are above Elevation 6.0. The Cummings/Turner block transitions from above El. 10.0 at the Duke/Union corner down to about El. 4.0 at the Prince/Strand corner. The Torpedo Factory is between 4.0 and 6.0. The intersection of King and Union is about El. 3.0. The Strand shoreline is about El. 2.0. Flooding to El. 4.0 does begin to impact the Starbucks and Mai Thai restaurant at the corner of King and Union.

When does Founders Park flood? (at what level)

The edges of Founders Park begin to flood below El. 4.0, but the majority of the park is above El. 6.0.

How much more will it cost to prevent flooding up to 6.0 levels? Can the lower level flooding be prevented without raising streets etc?

The estimated construction cost is \$6.5 million. The first area of the Waterfront where flooding occurs is on the Strand behind the Mai Thai restaurant, where water backs-up through low drainage structures. Some raising of these structures in the streets will be needed to alleviate the flooding in this area.

Thank you.

Andrew

Begin forwarded message:

**From:** Emily Baker  
**Date:** May 26, 2011 4:10:44 PM EDT  
**To:** Andrew MacDonald  
**Cc:** Faroll Hamer; Karl Moritz; Rich Baier; **Subject: RE: Flooding**

Hi Andrew,

For the purposes of our Potomac River Waterfront Flood Mitigation Study, nuisance flooding is flooding that occurs up to Elevation 4.0 NAVD (North American Vertical Datum). That flood elevation has a return period of 1.5 years. I would like to point out, however, that Elevation 4.0 has been exceeded four times in the past two weeks, due to a tidal anomaly that we are experiencing. The 1.5 year return period was computed through a statistical regression analysis of a U.S.G.S. tidal stream gage on the Potomac River.

The lowest point in the King/Strand area that begins to experience nuisance flooding is at Elevation 2.0. The study reviewed tidal elevations over a one-year period and found that Elevation 2.0 was exceeded 186 times. During the same period, Elevation 3.2 was exceeded 10 times. This should give you an idea of the frequency of varying minor flood events.

The proposed flood mitigation included in the Waterfront Plan provides protection to Elevation 6.0 NAVD. This is based on optimizing the design for the mitigation with the adjacent grade. By doing so, it allows us to continue to provide a protection against nuisance flooding with some anticipated sea level rise. The proposed flood mitigation extends from roughly Duke Street to Queen Street. The ground elevation adjacent to all of the buildings to the south of Duke Street and north of Queen Street is already at or above Elevation 6.0.

I hope this helps address your questions,  
Emily

Emily A. Baker, P.E.  
City Engineer  
Transportation & Environmental Services

-----Original Message-----

From: Andrew Macdonald

Sent: Thursday, May 26, 2011 1:28 PM

To: Emily Baker

Subject: Flooding

Emily,

Can you give me a definition of nuisance flooding? How many times a year does it occur on average - say over the last 10 years?

Has sea level rise been factored in to this analysis at all?

Thanks,

Andrew