Questions Raised by Save South Boulder about the Variant 1 100-year Flood Mitigation Project for South Boulder Creek at the “CU-South” Property

Compiled from Public Comment Made in meetings of City Council, the Open Space Board of Trustees, the Water Resources Advisory Board, and the CU-South Process Subcommittee

Flood Mitigation Project Cost Estimates and Areas/Items Missing Cost Estimates

1. Why is earth fill that will provide CU with 129 acres of developable land included in the cost that the Utility Department will have to issue a bond for? This fill does not benefit flood protection and should not be borne by the Stormwater and Flood enterprise fund of the Utility Dept.
2. Since the earth fill requested by CU allows the university to develop, isn’t this a broader community benefit that should be covered by the City’s General Fund or some other fund? Not the Utilities Department budget?
3. Why wasn’t the cost/benefit to people, structures and homes of the varying flood size designs presented to WRAB and the public? The 500-year design saves more people, structures and dwellings from flooding and is far more cost-effective than the 100-year design. If the cost of earth-fill for CU was removed from project costs, there is only a $6M difference in costs between the 100-year and 500-year designs.
4. What would be the Utilities cost increase for a single-family residence if the costs of the earth fill were excluded from the flood mitigation project? The WRAB’s 4/20 meeting packet Executive Summary stated that the cost increase of the project would be about $8.75/month for a single-family residence
5. How much will it cost to remove the CU levee? And how much will it cost to restore the underlying land?  Out of which Department’s budget will each of these costs be paid?
6. The WRAB’s 4/20 meeting packet Executive Summary stated that the cost increase of the project would be about $8.75/month for a single-family residence. Please explain why this cost was described in the 4/20 meeting as being $10/month?
7. Discharging water detained behind the flood control structure requires that the Viele Channel undergo an extensive rehabilitation effort to remove vegetation and sediment in order to minimize the risk of flooding if this channel overflows. Why are there no costs for these efforts provided nor any mention of Viele Channel in any of the documents provided to WRAB or City Council?
8. What is the estimated cost for the excavation and the slurry wall that surrounds the excavated land on the northwest part of the CU-South property?
9. What will be the cost for restoration of each acre of OSMP land subject to ponding under the 100-year storm event with the constructed project?

Groundwater Issues

1. What are the impacts of the floodwall located along Rt 36 on groundwater levels and groundwater flow? Since the groundwater impacts are coming from a groundwater model, how are the model results being checked? And by which experts are they being checked?
2. How will the engineering plans and modeling analyses guarantee that the historic underground water flow will be maintained in the OSMP State Natural Area (especially in the 90 acres near Hwy 36) to protect those wetlands in wet, dry, and flood years?
3. What plans are there for the maintenance and operation in perpetuity of any groundwater conveyance structures proposed for guaranteeing this groundwater flow?
4. The proposed groundwater conveyance system is critical. The floodwall along US 36, with a foundation to bedrock as required by the State Engineer has the potential to intercept the flow of ground water that supports critical wet meadow ecosystems above and below the highway. These ecosystems provide habitat for two listed species and one of the rarest ecotypes in Boulder County and the state. How, then, can the perpetual functioning of groundwater conveyance systems be assured? What evidence-based assurance about the project plan, SOP and long-term budgets and maintenance, gathered from other similar systems, will be given?
5. Since impacts to wet meadows from short-term, infrequent inundation cannot be compensated by enhancement of adjacent lands at CU-South, given the permanent degradation of the wet meadow ecosystem due to prior mining activities and disruption of the underlying groundwater regime, how can the perpetual functioning of groundwater conveyance systems be assured? What evidence-based assurance about the project plan, SOP and long-term budgets and maintenance gathered from other similar systems can be given?
6. How commonly used is the proposed groundwater conveyance system? Can the City provide examples where this system has been installed at other sites? Please provide information for sites similar to CU-South in which the conveyance system will need to work equally well for ambient groundwater levels and for water levels 10-15 feet higher when the dam is full of water.
7. Will staff consider a foundation design that is inherently less obstructive to groundwater movement than the typical cutoff wall to bedrock? For example, could you consider a pier/caisson design rather than a typical cutoff wall to bedrock?
8. What are the impacts on groundwater levels and groundwater flow of constructing a barrier wall that surrounds the excavated land on the northwest part of the CU-South property?

Protection Level and Flood Size

1. Based on public comments made at the July 2018 and April 2020 WRAB meetings the public is overwhelmingly in favor of a 500-year level of flood protection. Why is the City staff not factoring the public’s desires into its decision-making?
2. Why was the fact that the 500-year design would give Hwy 36 greater protection against being overtopped not presented to the public or factored into the discussions on the level of flood design? Preventing Hwy36 from being overtopped was the #1 reason for the entire flood mitigation project from 2010 to about 2017—even before protection of lives and property.
3. The flood designs use historic flows for the designs. Why wasn’t the increased flood intensity and amount in the future, which is highly likely due to climate change, factored into the designs and into the discussion?
4. Why weren’t the added benefits and cost-effectiveness of the 500-year design over the 100-year design considered? The 500 year design saves more people, structures and dwellings from flooding and is far more cost-effective than the 100-year design. If the cost of earth-fill for CU was removed from project costs, there is only a $6M difference in costs between the 100-year and 500-year designs.

Challenges to Obtaining Necessary Regulatory Agency Permits

* 1. Since CDOT has said in writing that no above-ground structures can be placed in its right-of-way, why is the Utility Department pursuing Variant 1 designs, all of which, regardless of the level of flood protection, require that a dam be placed between the Rt 36 embankment and the floodwall that runs parallel to it? Why is the Utility Department not first obtaining written approval for such a structure from CDOT?
	2. What is the City’s plan for flood mitigation if CDOT maintains its position that there can be no above-ground structures within its Rt 36 right-of-way? Is the City looking at alternatives?
	3. The WRAB information packet for its 4/20 meeting states on pg 78 that FEMA issued a Letter of Map Revision (LOMR) for the Rt 36 widening. Doesn’t this mean that FEMA has approved Rt 36 as a flood control structure? If so, why is a floodwall being built parallel to it?
	4. Page 92 of the WRAB information packet for its 4/20 meeting states that the outlet piping that will discharge detained water will require 600 ft of tunneling under Rt 36 to connect to Viele Channel. What is CDOT’s opinion on this tunneling, and when does the City expect to get a written response from CDOT on this? What is the City’s plan if CDOT refuses to allow tunneling under Rt 36?
	5. What conversations have been held with USFWS and USACE to determine ways to avoiding or minimizing adverse impacts to high quality ecosystems, OSMP resources and listed species? Also, could the dam design place most or all of the foundation underneath and downstream of the main flood wall?
	6. Given that obtaining permits from regulatory agencies in response to the submission of a mitigation plan presents a significant challenge, especially because of the sensitive environment in which the project is to be placed, have discussions begun regarding obstacles to obtaining regulatory approval? If not, why not?
	7. The WRAB information packet for its 4/20 meeting states on page 78 that FEMA issued a Letter of Map Revision (LOMR) for the Hwy 36 widening. Doesn’t this mean that FEMA has approved Hwy 36 as a flood control structure? If so, why is a floodwall being built parallel to it?
	8. Page 91 of the WRAB information packet for its 4/20 meeting states that the existing culverts under Rt 36 will have water discharging through them with velocities of up to 25 feet per second. What type of downstream protection is envisioned to avoid scouring and other impacts to the downstream areas, including those of the State Natural Area lands?

Monitoring Issues

* 1. What will be the impact of the preliminary flood work and construction on projected sedimentation, groundwater flow, debris accumulation, and required vegetative maintenance in city-owned Open Space? How will this be documented and measured in order to identify and clarify additional mitigation and compensation measures?
	2. Will Public Works staff conduct and present to OSMP and OSBT a review and assessment of 30%, 60%, and 90% completion of design plans to ensure that all open space concerns are getting addressed? Will the staff process require input from OSBT at each stage before advancement through preliminary design to construction? How will this be facilitated?

Upstream Options

* 1. Why did the WRAB information packet for the 4/20 meeting fail to mention that the OSBT requested a significant evaluation that includes a side-by-side analysis and comparison of the benefits and costs of the revised Variant I and an upstream option? On page 22, the OSBT’s September 2019 requests are described simply as ‘information requirements the Board would first need [before considering] a disposal motion,’ not imperatives that needed to be addressed prior to OSBT’s decision about disposal.
	2. Why was the WRAB asked to decide on the level of flood protection provided by the Variant 1 dam without being able to review the results of the OSBT’s requested comparison of Variant 1 with an upstream option?
	3. Could we please have a side-by-side analysis and comparison of the benefits and costs between the revised Variant I (one that uses OSMP land, instead of CDOT land, for the floodwall) and an upstream option which would capture enough flow upstream and west of the CU-South property to eliminate the need for a floodwall to bedrock on OSMP land? That upstream variation would creatively and strategically place minimally invasive structures to guide the flood flows in one or more places west of Hwy 93 to Hwy 36.

Habitat Restoration and Environmental Impact

* 1. Given that compensation for loss of this habitat cannot be achieved or offset by anything other than additional mature wet meadows, and given that additional mature wet meadow habitat cannot be created anew, how will this dire risk to the wet meadow ecosystem be avoided?
	2. What steps will be taken in the design and construction of the proposed flood mitigation structures to minimize impacts to OSMP lands and critical habitat?
	3. Given that monitoring and inspection of the dam needs to be instituted in perpetuity, could the system for doing that put most or all inspection access downstream of the structure?
	4. Will the construction process be designed specifically to minimize OSMP impacts in the area of the floodwall and even limit the impact to the footprint of the floodwall itself? i.e. will excavating, transporting, staging and constructing be done from within the floodwall footprint?
	5. How were the acreages of Threatened and Endangered Species Habitat that are shown on Table 2 in the WRAB information packet determined? How many of those acres are associated with the floodwall compared to those associated with CU’s demand for earth fill?

Detention and Flow Modelling

* 1. How was the size of the detention pond needed at the North end of the CU-South property determined? Given that the various flood designs over the years have consistently estimated the acre feet needed for such detention to be far larger than what’s being considered currently, what evidence gives the staff confidence that such a small detention pond would be sufficient?
	2. The flow amounts and inundation volumes used in the current designs were determined using hydraulic modeling. What steps has the City taken to verify the accuracy of those results? What steps will the City take in the future to verify the modeling? On what bases does the City have confidence in those modeling results?
	3. The flow model used for this project shows considerable flooding west of South Boulder Creek, approximately where Dry Creek Ditch #2 is located. How much water is this, and what percentage is it of a given flood event? Why has the City not looked into ways of capturing this flood water?

Equity

1. The issue of equity was raised during the 4/20 WRAB meeting, in the context that some other areas of the City have levels of flood protection far below the 100-year level. Why wasn’t the fact that the area where the Phase 1 South Boulder Creek flood mitigation project is to be situated is undeveloped, whereas most of the City’s other drainages are almost fully developed, presented clearly? And why wasn’t this fact used as a reason to justify the higher level of flood protection for South Boulder Creek?

Dry Creek Ditch #2

* 1. How will the ownership and management of Dry Creek Ditch #2’s water rights and open space be altered in order that the project results in clear net benefits for open space? How will the current owners be compensated for loss of open space, needed restoration, and land required for flood mitigation?
	2. What plans exist for restoration and realignment of Dry Creek Ditch #2 west of the restoration area? How will these plans assure sufficient water rights in Dry Creek Ditch #2 to support the restoration goals?

Miscellaneous

* 1. To what extent does the Public Works Department support OSMP efforts to convey and/or permanently protect CU South’s remaining OS-O acreage to the west and north of the CU levee for long-term protection and possible restoration? How will this be done? Through annexation? Or other means?
	2. When will an agreement between OSMP and Public Works to address long-term needs to keep the project functional and within design parameters be developed and implemented?
	3. What plans exist to modify or realign the city’s sanitary sewer that runs along South Boulder Creek to allow for OSMP projects to open up the floodplain, as part of preliminary design and construction?
	4. How will the design and construction provide for enhanced wildlife passage under US36 beyond current concepts indicated in the preliminary design and construction?