INFORMATION ITEM
MEMORANDUM

To: Mayor and Members of Council

From: Jane S. Brautigam, City Manager
Joe Taddeucci, Interim Public Works Director for Utilities
Dan Burke, Director of Open Space & Mountain Parks
Kathleen Bracke, GO Boulder Manager and Interim Co-Director of Public Works for Transportation
Jim Robertson, Comprehensive Planning Manager, Planning Dept.

Date: October 1, 2019

Subject: South Boulder Creek Flood Mitigation Project Update and Next Steps

EXECUTIVE SUMMARY
During the September 10, 2019 City Council CIP Study Session, staff provided an update on the South Boulder Creek (SBC) Flood Mitigation Project. The update was intended to clarify staff’s analysis of whether the Variant II design concept should be revisited as a viable option relative to clarifications from the Colorado Department of Transportation (CDOT).

A September 9, 2019 CDOT letter to the city (Attachment A) confirmed CDOT’s position on the flood mitigation project and stated that any “floodwall concept” be located outside of CDOT existing right of way, that flood restriction features not be attached to the US-36 SBC bridge and that CDOT was impartial to any of city’s flood mitigation “variants.”

Staff has re-evaluated the Variant I and Variant II flood mitigation concepts and finds that Variant II is not a viable option based upon the clarifications in CDOT’s letter. To meet CDOT’s criteria, the flow restriction structure that was originally proposed as part of Variant II would need to be moved upstream of the CDOT ROW at the US-36 SBC bridge and into more sensitive habitat on city open space property. This would present additional engineering and permitting challenges. In addition to these challenges, staff does not feel there are feasible options to mitigate for the impacts Variant II would have on OSMP resources.

On July 16, council requested the city’s Open Space Board of Trustees provide feedback about additional open space impacts as a result of placing the proposed floodwall on and underneath...
city open space land. The board conducted a study session on Aug. 14, 2019 and a public hearing and deliberation on Sept. 11 to develop feedback to City Council on the South Boulder Creek Flood Mitigation Project.

This memo is prepared in response to council’s request that staff summarize its analysis of Variant II in relation to CDOT’s requirements and to summarize the OSBT feedback that was requested by City Council in July 2019.

BACKGROUND
A Flood Mitigation Study for South Boulder Creek was accepted by council in 2015. On February 5, 2019 council directed staff to move forward with preliminary engineering for the Variant I of regional detention at US-36 based on a 500-year-flood design storm. Subsequent to the February 5 meeting, the city has been in discussions with CDOT concerning use of its right-of-way for the city’s flood mitigation purposes. Relevant meeting minutes from those discussions are included in Attachment B and are posted to the South Boulder Creek Flood Mitigation webpage.

On August 13, 2019, University of Colorado-Boulder representatives presented to City Council and questioned whether the city had fully considered cost impacts associated with Variant I relative to the university’s annexation plans and requested that the city prepare a comparison of Variant I and II costs. The university’s request resulted in questions about whether CDOT had directly rejected the city’s Variant II concept. In its September 9 letter to the city, CDOT clarified that it was impartial to the city’s flood mitigation concepts as long as flood mitigation features were not attached to its US-36 bridge and that the floodwall was located outside of CDOT right-of-way.

ANALYSIS
Staff has evaluated the Variant II concept in relation to the September 9, CDOT letter. Attachment C presents a map depicting the boundaries of the CDOT right of way in the proximity of the bridge over US-36 at SBC. One of the primary benefits of the original Variant II concept was that it would take advantage of existing CDOT infrastructure by making use of the existing US-36 Bridge over South Boulder Creek and adjacent roadway embankments to restrict flow and create upstream flood detention. From an engineering design standpoint, if the CDOT structures cannot be integrated into the design and the embankment and flow restriction features had to be newly constructed upstream of CDOT right of way, the option becomes less preferable, especially in considerations of additional environmental impacts.

Because of the sensitive nature of the area that would be impacted with Variant II and its designation as critical habitat for a federally protected species, staff believes it will be difficult for US Fish and Wildlife (one of the key regulatory agencies) to find Variant II to be less environmentally damaging than Variant I. In addition, with the increased impacts to city open space land, there are likely not enough feasible mitigation options for Variant II. For these reasons, staff does not believe additional staff time and funds are warranted to revisit the Variant II concept. SBC flood mitigation was discussed at September 2019 meetings for both the Open Space Board of Trustees (OSBT) and the Water Resources Advisory Board (WRAB), and neither board expressed interest in further study of Variant II.
Staff has been working to estimate the potential impacts to the South Boulder Creek Flood mitigation project and working with the Open Space Board of Trustees to provide feedback to Council. The Open Space Board developed feedback to council related to the South Boulder Creek Flood mitigation at their board meeting on September 11, 2019. This feedback has been included as Attachment D and is subject to change depending on approval of the September meeting minutes to be considered at the October Open Space Board of Trustees meeting.

NEXT STEPS
City staff will continue to proceed with preliminary design activities for the SBC flood mitigation project per council’s February 2019 direction. Preliminary design will include the Variant I 500-yr alternative, while also evaluating potential site flood inundation associated with a storm event in between the 100-yr. and 500-yr. events. As preliminary design proceeds, staff will incorporate the collective OSBT and Council guidance into the project, and staff will also continue to coordinate with CDOT.

Staff will continue to coordinate with the university on its annexation plans and will work to be responsive to the University’s August 2019 information request, including comparative cost information. Staff anticipates developing estimated costs such as construction-related activities, wetland mitigation and modifications to South Loop Drive. Other costs will be negotiated through the annexation process have not been included yet, such as land acquisition, reconstruction of the CU Boulder maintenance building and tennis courts, and fill on CU South should the university be permitted to development in the area designated, “Open Space – Other” in the Boulder Valley Comprehensive Plan. Staff will comment on these additional annexation costs as they relate the flood mitigation alternatives in early 2020.

ATTACHMENTS

Attachment A – September 9, 2019 CDOT letter
Attachment B – May 28, 2019 CDOT/City Meeting Minutes
Attachment C – Map of CDOT US-36 Right of Way at SBC
Attachment D – Draft September 11, 2019 OSBT Meeting Minutes
September 9, 2019

Ms. Kathleen Bracke
Interim Director of Transportation/Go Boulder Manager
City of Boulder
1777 Broadway
Boulder, CO 80302

Dear Kathleen,

This letter is for follow-up to the May 28, 2019 meeting held at the City of Boulder, in which proposed South Boulder Creek flood mitigation concepts along US-36 were discussed. The purpose of this letter is to provide clarity regarding the position of the Colorado Department of Transportation (CDOT) with respect to the South Boulder Creek flood mitigation concepts being considered and reviewed by the City of Boulder. Below are three specific points that CDOT has previously articulated and desires to reinforce as our position, as you consider South Boulder Creek flood mitigation along US-36:

1. **Floodwall Concept**: CDOT is open to the idea of supporting a flood control wall being located just outside the existing right-of-way line of US-36 with superstructure elements being located outside of the existing ROW. CDOT will evaluate and consider potential substructure elements being located inside the existing ROW, but not inside the roadway prism, as long as no jeopardy occurs to CDOT regarding complete control, operation, maintenance or function of said roadway happens due to the City of Boulder’s flood mitigation project. The roadway prism is defined by the Federal Highway Administration (FHWA) as everything between toe of slope to opposite toe of slope, including embankment fill slopes, shoulders, wearing surface, median, etc.

2. **Variants**: CDOT is not part of the “variant” discussion/question and is impartial as to the variants being considered by the City as they pertain to flood mitigation concepts, as long as Item 1. is satisfied.

3. **South Boulder Creek/US-36 Bridge**: CDOT does not support any flood mitigation design options which would involve attaching flood restriction or appurtenances to the US-36 bridge over South Boulder Creek, or adjacent to the bridge within CDOT ROW, or within the existing roadway prism. Flood mitigation concepts of this type could be placed upstream of the bridge and completely outside of the US-36 ROW, as long as concentrated flow through CDOT’s bridge is mitigated and placed at the City of Boulder’s expense and approved with Special Use permits at the CDOT regional level.

I trust this letter will provide clarification you are seeking. Please contact me if you have any questions.

Respectfully,

Heather Paddock
Region 4 Director

HP:GS:mbc
cc: Gerrit Slatter, Boulder PW Dept.
    Keith Sheaffer, CDOT South PE
    File
Attachment B - US-36 Bridge at South Boulder Creek
MEETING NOTES

Discussion regarding the proposed S. Boulder Creek Flood Mitigation Project and US-36 right-of-way
City of Boulder, Colorado Department of Transportation, Boulder County and University of Colorado

Meeting Date: Wednesday, May 28, 2019, 4:30pm-5:30pm
Location: City of Boulder – 1777 Broadway, Boulder, Colorado

These meeting notes present a summary of items discussed during the May 28, 2019 meeting between
the City of Boulder (City) and the Colorado Department of Transportation (CDOT) regarding the South
Boulder Creek Regional Detention Preliminary Design (Project). This is a summary of the key and salient
points of the meeting and is not intended to be a verbatim account of what transpired.

Meeting Objective: To identify options and ideas for meeting City of Boulder and CDOT goals and
interests to set the context for identifying and exploring mutually-beneficial opportunities.

Attendees

Colorado Department of Transportation
- Shoshanna Lew, Executive Director
- Heather Paddock, Action Regional Transportation Director, Region 4
- Dan Marcucci, Resident Engineer, Region 4
- Brian Varrella, Hydraulics Unit Lead, Region 4

City of Boulder
- Suzanne Jones, Mayor, City of Boulder
- Kathleen Bracke, Acting Co-Director of Public Works for Transportation
- Jeff Arthur, Director of Public Works for Utilities
- Carl Castillo, Policy Advisor, City Manager Office
- Gerrit Slatter, Principal Transportation Engineer
- Douglas Sullivan, Principal Engineer for Utilities
- Kevin Clark, Engineering Project Manager, Public Works-Utilities

Boulder County
- Elise Jones, Boulder County Commissioner
- Varda Blum, Boulder County Floodplain Administrator

University of Colorado-Boulder
- Derek Silva, Executive Director of Real Estate Services
Key Discussion Items

- City staff provided an overview of the purpose of the meeting, described that staff from CDOT Region 4 and City of Boulder have been meeting over past several months to identify goals, interests and options for current and future US-36, the City flood mitigation project, development of CU-South and protecting environmentally sensitive habitat on City and State Lands open space. A summary of the items staff discussed over the course of these meetings is attached to this meeting summary.

- City staff noted that an option was explored which entailed locating the proposed floodwall where it is currently designed (inside existing CDOT right-of-way) and adjusting the existing US36 right-of-way (ROW) line such that the floodwall would no longer be in CDOT ROW. CDOT was not interested in pursuing this option because it might preclude their ability to properly service operational and maintenance needs and additionally that it presented liability concerns that would be in violation of 2008 FHWA & USDOT guidance to state DOT organizations that recommend not co-locating flood control facilities with highways embankment prisms.

- CDOT staff inquired why the City has proposed a flood detention structure within and adjacent to CDOT ROW along US-36. CDOT posed the question why not locate the detention structure upstream of the ROW? City staff responded that placing a flood detention structure upstream (as well as other locations along the creek) was studied and evaluated in the South Boulder Creek Flood Mitigation Study and the recommendation from that study (which was accepted by Boulder City Council in 2015) was to locate the flood detention adjacent to US-36.

- Some CDOT staff noted it is necessary to preserve existing and proposed (as depicted in the US-36 Environmental Impact Statement) ROW for future mobility options and safety enhancements along US-36 and the future reconfiguration of the interchange with Foothills Parkway.

- Questions were posed from CDOT regarding how the proposed flood structure would function along US-36. City staff stated that the proposed flood structure/wall (as currently conceived) would overtop in a 500 year flood event onto US-36, however lesser precipitation events would be detained by the structure, preventing the highway from being flooded as it does in its existing form. City staff also noted that there would need to be an easement provided within CDOT ROW in order to access the highway side of the flood structure for periodic maintenance. It is expected the existing US-36 bikeway would be located on the highway side of the flood wall and could provide vehicular access to maintain the wall. Maintenance access would also need to provided on the OSMP (non-highway) side of the flood wall.

- There was discussion amongst the group where and how close the US-36 ROW line the flood structure wall could be built. There was general consensus around the idea that the exposed face of the flood wall could be located just outside the CDOT US-36 ROW line where the superstructure could reside outside of the ROW, and the buried substructure could be located in both US-36 ROW and on City OSMP land but not within the roadway prism (the roadway prism is defined by FHWA as everything between toe of slope to opposite toe of slope, including embankment fill slopes, shoulders, wearing surface, median, etc.).
CDOT staff prepared an exhibit (attached to these meeting minutes) that shows the existing US-36 ROW line, existing A-Line, future EIS proposed US-36 ROW and three options for implementing a flood control wall along the south side of US-36.

1. Option 1 depicts a flood control wall being located within the existing US-36 ROW. This option was dismissed from further consideration due to liability and maintenance concerns expressed by CDOT staff commensurate with 2008 FHWA & USDOT Guidance.

2. Option 2 depicts a flood control wall being located just outside of the existing US-36 ROW. It was generally agreed that the flood superstructure wall face could be located along this line, which is depicted in yellow on the exhibit.

3. Option 3 shows flood control being implemented along the future US-36 ROW. This line is depicted in red on the exhibit. CDOT staff acknowledged that while it may be preferable to preserve future ROW for future transportation enhancements along the corridor, they would be open to supporting the flood control wall just outside the existing line as shown in yellow. It is also important to note that Option 3 presupposes that CDOT would be able to acquire OSMP land for the expansion of US-36 for transportation enhancements commensurate with EIS-approved plans. The viability of the acquisition of OSMP land for US-36 is questionable and uncertain. Thus, Option 3 was not further considered or discussed.

4. Landing on the idea that Option 2 is one that CDOT can support, they noted a primary concern would be the need to safely maintain the existing highway facilities and having the space, access and land to do so as a top priority. The ability to expand US-36 to accommodate mobility enhancements and congestion relief in the future was identified as a secondary consideration.

5. Staff from City Utilities/Flood provided some visual exhibits of how the proposed flood wall could be configured to fit against the yellow line (US-36 ROW). City staff stated that the design team needs to spend time working on and developing the design options and then presenting cross sections for review by CDOT staff.

6. The City staff inquired about an option known as Variant 2, which would entail a flow restriction appurtenance being attached to or placed adjacent to the US-36 bridge over South Boulder Creek. CDOT stated they oppose any type of modification to the bridge structure or any type of flow restriction being placed inside the ROW. Flood mitigation of this type could be placed upstream of the bridge and completely outside of the US-36 ROW so long as concentrated flow through CDOT’s bridge is mitigated and placed at City expense and approved with special use permits at Region level.

Guidance/Decisions Made

- CDOT supports the concept of locating the South Boulder Creek Floodwall along the existing US-36 ROW with superstructure elements being outside of the existing ROW and substructure elements being located inside the existing ROW, but not in any roadway prism.

- CDOT does not support any flood mitigation design options which would involve attaching flood restriction or appurtenances to the US-36 bridge over South Boulder Creek within CDOT ROW, or within the existing roadway prism.
**Next Steps**
City Utilities staff will further develop the flood-wall design and then bring back a preliminary design for CDOT staff to review and consider.

**Attachments:**
- City/CDOT Interests Summary
- CDOT Right-of-Way Exhibit
On July 16, City Council directed staff to continue work on the floodwall concept along the US36 CDOT right-of-way and requested the city’s Open Space Board of Trustees feedback related to additional OSMP impacts that such a floodwall to be constructed on and underneath OSMP lands may have. The Open Space Board of Trustees conducted a study session on August 14, 2019 and a public hearing and deliberation on September 11, 2019 to develop feedback to City Council on the South Boulder Creek Flood Mitigation Project.

The following draft motion was passed unanimously at the September 11, 2019 meeting (subject to approval of minutes on October 9, 2019):

**Tom Isaacson moved that the Open Space Board of Trustees communicate to City Council the following feedback regarding the South Boulder Creek Flood Mitigation Project. Curt Brown seconded. This motion passed four to zero; Hal Hallstein was absent for this meeting.**

1. **What is OSBT’s view on whether the construction of a floodwall or other flood mitigation structures on Open Space (the proposal) would require a disposal?**

   Yes, because flood control to protect development in a floodplain is not an Open Space Charter purpose, among other reasons, this would require a disposal. If council has a different view, we would request the opportunity to discuss the matter, as it raises important questions regarding the Board’s Charter responsibilities.

2. **Does OSBT believe that its responsibilities inherently preclude it from making a disposal for “the proposal,” even if the mitigation plan is expected to be highly effective?**

   Tom Isaacson, Curt Brown, and Dave Kuntz would answer this question “no.” Karen Hollweg believes the question cannot be answered.

3. **For OSBT to consider a disposal motion what information would OSBT first need?**
a. A side-by-side analysis and comparison of the benefits and costs of the revised Variant I (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.

b. The engineering plans and modeling analyses to show that the historic underground flow will be maintained in the OSMP State Natural Area (especially in the 90 acres near Hwy 36) in wet, dry, and flood years, including the maintenance and operation of any structures proposed for doing this in perpetuity.

c. Explanation of how the proposed flood mitigation structures will be designed and constructed to minimize impacts to OSMP lands and critical habitat.

d. Identified mitigation of impacts to high quality ecosystems and listed species informed by conversations with the USFWS and USACE to determine ways of avoiding or minimizing adverse impacts to OSMP resources and listed species.

4. If the answer to #2 is other than “yes”:

A. What are the key elements of a mitigation plan that OSBT believes could support its approval of the revised Variant I?

The items identified in the July 11, 2018 memo OSBT recommendation of mitigation measures plus additional measures to offset the new impacts of construction of any flood mitigation structures on Open Space.

B. Are there any metrics/criteria that OSBT would recommend for evaluating such a mitigation plan?
1. Curt Brown, Karen Hollweg and Dave Kuntz would recommend a standard of net Open Space benefit; Tom Isaacson would not require that Open Space be net better off as a result of the mitigation plan.

2. Approval of the mitigation plan by USFWS and USACE

C. Does OSBT have any feedback on the likely feasibility/effectiveness of such a mitigation plan in achieving its goals?

In-kind mitigation (creation of similar habitats elsewhere for these specific listed species) for loss of this type of riparian and wet meadow habitats has proven to be extremely difficult and to date has not been possible for spiranthes in particular. Sufficiency of out-of-kind mitigation is a complex judgment that will require input from both city/OSMP staff and FWS/USACE.

5. Does OSBT have any feedback on potential means of avoidance, i.e., ways to lessen the ecological impact of the revised Variant I project?

a. A dam design that places most or all of the foundation underneath and downstream of the main flood wall.

b. A foundation design that is inherently less obstructive to GW movement, e.g., a pier/caisson design rather than a typical cutoff wall to bedrock.

c. A robust groundwater maintenance and monitoring system.

d. A design for the dam and monitoring system that put most or all inspection access behind the structure.

e. A construction process specifically designed to minimize upstream OSMP impacts, e.g., excavating, transporting, staging and constructing from within the floodwall footprint or the downstream side.

f. For other project designs similar approaches should be considered.