

**South Boulder Creek Flood Mitigation
PUBLIC OPEN HOUSE
April 23, 2018, 5:30-7:30 PM
Millennium Harvest House, Grand Ballroom
Meeting Summary**

ATTENDANCE

This was a public meeting with over 100 community members in attendance.

Speakers – Staff/Contractor Panel: Kurt Bauer, Steve Blake, Don D’Amico, Rod Eisenbraun, Mary Powell, Molly Scarbrough, Shea Thomas

Speakers - Different Perspectives Panel: Ben Binder, Marki LeCompte, Pete Palmer, Ruth Wright

Closing Remarks: Sam Weaver

Facilitation Team: Heather Bergman, Dan Myers

STAFF PRESENTATION

Kurt Bauer, Engineering Project Manager with City of Boulder Public Works, and Molly Scarbrough, Senior Project Manager with City of Boulder Public Works, began the open house with a presentation on efforts to evaluate a regional flood detention facility on the University of Colorado (CU) South property. The presenters reviewed the timeline and project options for Phase 1 of the South Boulder Creek Flood Mitigation Project and provided an overview of next steps. Highlights of the presentation are summarized below.

Project Overview

- South Boulder Creek flooding impacts have been significant historically, as is illustrated by presentation maps that depict how South Boulder Creek floods through the city in a storm event. The creek channel is relatively small, and during significant storm events it overtops its banks outside of the city. Flood waters then flow north around the existing CU levee, run into the US Highway 36 embankment, and flow to the northwest corner of the CU South property. In significant storm events, the water overtops US36 and flows through Boulder's West Valley, where approximately 4,000 people reside within the Federal Emergency Management Agency (FEMA) regulatory 100-year floodplain. In 1938, the 1950s, 1969, and 2013, significant flooding events occurred along South Boulder Creek, the latter two of which overtopped US Highway 36 and caused substantial damage through the West Valley.
- The South Boulder Creek Flood Mitigation Master Plan was initiated in 2010 by the City of Boulder and the Urban Drainage and Flood Control District (UDFCD) and recommended mitigating the risk of flooding in three phases. Phase 1 involved regional stormwater detention (“Option D”) at the CU South property and was identified as the top priority because it offers the most downstream flood benefits. Phase 2 creates flood mitigation improvements in the West Valley and Phase 3 includes stormwater detention at Flatirons Golf Course.
- The estimated benefits of constructing Phase One at US Highway 36 include removing approximately 2,700 people and over 200 structures from the FEMA regulatory 100-year floodplain.
- The City hired RJH Consulting (RJH) to develop the Phase 1 flood mitigation project. RJH hired a project team that includes personnel from Muller Engineering, DHI, Corvus Environmental Consulting, and Architerra.

- The Boulder Valley Comprehensive Plan (BVCP) created guiding principles for a future agreement between the City and CU concerning the CU South property. These principles include land use designations for some of the areas to be developed in the future by CU, for some to be used as open space, and for some to be used for flood detention and parkland. With annexation, the City would be able to use the flood detention capacity of the property as part of this project. However, flood mitigation cannot take place on this land unless there is an agreement with CU.
- The City is aware that community members want more certainty on the future of the CU South property. This awareness led to the creation of the guiding principles as part of an update to the Boulder Valley Comprehensive Plan. The City of Boulder Planning Board, City Council, Boulder County Planning Commission and the Boulder County Board of County Commissioners adopted the Boulder Valley Comprehensive Plan Update, including the CU South guiding principles in July of 2017. The guiding principles provide direction for flood mitigation and require the evaluation of mitigation strategies based on a variety of possible flood events, including a 100-year storm, a 500-year storm, the long-duration storm, and the potential removal of the existing CU levee. The guiding principles also require that project leaders evaluate opportunities for conserving or restoring areas with potentially high ecological value.
- Before the City can move forward with annexation, there needs to be additional conversation with the community about habitat protection and open space, among other things. However, the project team believes that it is vital to move forward with the flood mitigation process before further discussions with the community about annexation to understand where the flood detention facility on the site would be located. The City needs to know how much land it will require from CU for the project as part of the annexation negotiation. The answer to these questions will inform the community engagement that needs to happen around the annexation process.

Flood Mitigation Concepts

Kurt Bauer next described the different flood mitigation concepts that the City is evaluating for the Phase 1 project. These concepts include the Master Plan concept, Variant I (Dam Modified to Avoid Viele Channel), and Variant II (Flow Restriction at US36 Bridge). For each of these concepts, staff and consultants are also exploring variations for addressing the 100-year storm, the 500-year storm, the long-duration storm, and with and without the existing CU levee. The diagrams for each of the concepts also show the buffer around South Boulder Creek for Preble's Meadow Jumping Mouse (PMJM) critical habitat as designated by US Fish and Wildlife Service (USFWS).

Master Plan Concept

- The Master Plan Concept includes a flood wall and a dam that would run from the US Highway 36 bridge along the south side of the Colorado Department of Transportation (CDOT)'s right-of-way corridor. The dam embankment wraps around the northwest side of CU South.
- When the City undertakes any project, it cannot negatively impact existing floodplains upstream or downstream of the project. Viele Channel has a regulatory floodplain, so the Master Plan concept requires a siphon to convey the channel under the detention area. Without a siphon, water would back up during a flood event and negatively impact the Viele Channel floodplain.
- Renderings of the Master Plan concept illustrate that while the proposed dam has a fixed elevation, it will have different perceived heights based on the location of observation. For instance, when observing the dam from inside the CU South parcel (facing north), the dam would appear to be 30 feet tall, while from the perspective from the opposite side (from US 36 facing south) the dam would appear to be roughly 18 feet high.

Variants I and II

- Variant I is similar to the Master Plan concept, but a portion of the proposed dam would be shifted south to avoid impacts to the Viele Channel floodplain, which would eliminate the need for a siphon.
- Variant II differs more substantially from the Master Plan concept. This concept would feature a flow restriction at the US Highway 36 bridge, storing most of the stormwater in a significant flooding event on Boulder Open Space and Mountain Parks (OSMP) lands adjacent to the creek. Flows would need to be restricted at the bridge in one of several ways (the next open house will feature concepts of what that might look like). The floodwall would be placed along the CDOT right-of-way corridor and would not require excavation. This variation removes the CU levee and conveys floodwater onto the OSMP land.

Project Next Steps

- The primary next steps for the project will be to evaluate the three project concepts and their variations by conducting hydraulic modeling, completing a baseline environmental evaluation, collecting other data to differentiate between the concept variants, and seeking input from the public and relevant boards.
- Staff noted that they would not only evaluate the three concepts based on a FEMA 100-year flood event but also examine a 500-year flood event and a long-duration, high-intensity flood event similar to those that occurred in 1969 and 2013. The team is also looking at concepts with and without the CU levee, except in the case of Variant II, which would include removing the levee. There are 15 project variations.
- The baseline criteria that these concepts must meet are preventing overtopping of US Highway 36 during a 100-year flood, obtaining all necessary permits from regulatory agencies, securing acceptance by FEMA and the State Engineer, securing acceptance by landowners (including CU, OSMP, and CDOT), and addressing potential groundwater impacts.
- In addition to these baseline criteria, the City is seeking input on additional evaluation criteria important to the community. The City has provided a list of draft criteria and encourages community members to fill out the criteria matrix with what is most important to them.
- The proposed additional criteria were designed to be objective, to be quantifiable, and to avoid duplication.
- Once a project configuration is selected, the next steps in the project are preliminary design, final design, and construction.
- Preliminary design entails collecting groundwater data and securing permits and agreements with landowners to create design concepts for construction. The feedback on criteria will inform the concept variations.
- The City will bring feedback to a second open house, Boulder City Council (Council), and the City of Boulder Water Resources Advisory Board, and Open Space Board of Trustees. The next round of input for the community will be in early summer, but this timing is flexible and contingent upon feedback.
- Following City Council 's decision on which project configuration to move forward with into the next steps of preliminary design, staff will have a better idea of what land the City needs from CU South for flood mitigation, and there will be public input on future annexation based on the guiding principles. This input will happen concurrently with the preliminary engineering side of the project so that the City can obtain the approval of landowners before the final design and construction phases. By moving forward with the CU South annexation process in step with flood mitigation, the City can know if it can use CU South property for flood mitigation before spending any more time and money.

Community Questions

The presentation was followed by a question-and-answer session with a panel composed of Bauer, Scarbrough, and the following City staff members and consultants: Steve Blake of DHI, Don D'Amico of OSMP, Rod Eisenbraun of RJH, Mary Powell of Corvus Environmental, and Shea Thomas of the Urban Drainage and Flood Control District (UDFCD). Questions are indicated in italics, with responses below.

Will the 500-year flood assessment change the calculation of how many homes would be impacted by flooding even if the City built the dam?

Yes, there would be more houses removed from flood zones. The modeling results shared at the next open house will include the 500-year storm event.

Will there be funding for Phase 2 of the flood mitigation process?

As of now, there is no funding for the future two phases.

How will other members of the community who are not present tonight (particularly young people) enter the feedback loop for this project?

City staff will post the presentation online. There is also a questionnaire on the project website and the Be Heard portal. The City has also spread the word with postcards, on Nextdoor, and via email. City staff welcomes other suggestions on how to get more people involved.

Will CU allow Boulder to complete this project on their property?

CU has indicated that they will allow flood mitigation on the property if it is annexed. CU wants CU South to be within City limits.

One of the baseline criteria is to address groundwater impacts. The study is still being permitted, so the engineers have not done this assessment yet. Why is the City moving forward with the design phase before it has groundwater data?

The project team has installed eight of 32 groundwater monitoring wells and has permits to install the remaining ones in the next month. The City can select a project configuration without groundwater data because the features of this project that are affected by groundwater modeling are common to all three design concepts. Nothing that the project team discovers in the well-monitoring process will impact the selection of a project concept.

The presentation mentioned the possibility of tearing down the CU levee. That area has a berm adjacent to South Creek Seven subdivision and Tantra Lake. What will happen to the berm?

The portion of the levee that the project team is considering removing is shown as a white line on the map and is located on the east side of the property, not adjacent to existing neighborhoods.

Are there concerns about this project causing flooding upstream or downstream? Are there regulations that avoid putting residents in that area at risk?

The City cannot adversely impact flooding upstream or downstream of the project. That rule is a key component of the Master Plan and requirement for the project.

Is there any weather modeling that may make the 100- or 500-year floods obsolete now or in future because of climate change? Would that kind of modeling impact the project or urgency of the project?

One of the draft criteria that the City is considering for evaluating different project concepts (listed at the bottom of the questionnaire available at this open house and on the project website) identifies how easy it would be to adapt any of these concepts for bigger flood events that could occur when the climate

changes. The climate here might get drier or wetter, but it is predicted that there may be fewer and more intense storms.

In the draft evaluation criteria, did the City consider how tough it would be to raise the height of these concepts in the future?

Yes. That is one aspect of the draft criteria related to adaptability for climate change.

Would the existing levee stay in place under Variant I?

This concept is being considered with and without the levee.

What is the function of the outlet tunnel in Variant I? Where would the water go?

The outlet tunnel is meant to drain floodwater in 72 hours or less. As part of this early concept, the tunnel would slowly release floodwater into Dry Creek Ditch #2 or Viele Channel, and from there into South Boulder Creek. That is one option that will need further consideration in the next phase of design of the project. Any concept cannot increase flooding downstream, so the slow release would be designed to ensure this. A portion of the proposed concept on the CU South property is an excavation to install the tunnel under US Highway 36 and into Dry Creek.

Would the floodwater stay in the ditch?

Yes. The outlet tunnel would be big enough to drain the area in 72 hours and keep the flows to levels that would stay in the ditch because the project cannot increase flooding downstream.

When will the groundwater study be completed?

Data from the study will be collected indefinitely (it is also collected automatically). Some of the groundwater data will inform preliminary design. The project team will install the rest of the groundwater monitors as soon as possible.

In the past, there have been conflicts around the predictions and estimated costs made by consultants and other experts. Were any of the project team members involved in the East Boulder Recreation Center project?

No one on the panel was involved in the engineering or analysis of that project.

The big hook on the northwest corner of CU South property that the proposed dam makes in the Master Plan Concept is absent in Variant I. How is the rest of the 100-year floodplain impacted if you lose that capacity?

Doing so would mean losing a portion of the storage in the northwest part of the parcel. The project would require greater excavation, more inundation capacity on the rest of the property, or a higher dam to compensate for this.

The presentation proposed channeling more water east into South Boulder Creek. Why does Boulder need a dam there at all? US Highway 36 is like a dam. There needs to be more flow under US 36 that runs along Foothills Parkway and Boulder Creek. There are culverts under the roads that could accomplish this. What are the potential flows from neighborhoods running south to north?

The City cannot negatively impact the downstream floodplain. That restriction means that the project cannot push more water under the US Highway 36 bridge, because that increases the flooding risk in the main stem of South Boulder Creek. The culverts that the question references have legally-decreed flow levels that cannot disrupt. However, Variant II could detain some of this water in the creek upstream of US36.

In 2013, culverts were not adequately maintained, and Arapahoe Road and US Highway 36 served as dams. If the old culverts were not blocked and were working, the flooding would not have been as severe. It seems as though the project team is merely changing the way that a flood will happen by running water west to east instead of north to south, which will increase flooding in the Old Tale and Gapter Road areas. Will the project maintain the culverts or make sure that they are clear?

The model of South Boulder Creek includes all these flow paths. The project team included culverts in the models, but it is hard to predict their condition in the future.

What is the plan for keeping the culverts clear of debris?

The model assumes that debris will largely block the culverts. That is the engineering team's professional judgment based on the characteristics of the upstream watershed. In RJH's analysis, small culverts are assumed to be blocked entirely by debris, and larger ones are up to 50% blocked.

What happens if the large reservoir dam upstream of the project fails?

Denver Water is required to prepare a dam failure inundation map. If that dam failed, the City would be completely inundated by floods.

How high is the area of fill shown on the map?

In the Master Plan, this was designed to be a foot above the maximum water surface elevation.

How would you characterize the 1969 and 2013 floods?

It depends on if one looks at peak flows or the total volume of those storms. It also depends on what "year" flood event it is (e.g., 100, 500, etc.). After the 2013 flood, the National Weather Service said it was a 1000-year event. The volume of water was large, but it was never very intense. There was a lot of rain over an extended period. Wright Water Engineers estimated how the 2013 flood event compared to FEMA regulatory storms. The peak flows ranged from a 25-year storm on Boulder Creek to over 100-years on Upper Goose Creek to nearly a 100-year event on the area shown along South Boulder Creek in this concept. These values vary depending on where one is in the city.

When evaluating taking out the levee, how do you factor in the cost to CU for levee maintenance? Does the fact that CU owns the levee change the maintenance and evaluation costs for this project?

The project team evaluated operations and maintenance costs for these three concepts, but not the costs of CU continuing to operate the levee. That is at the University's expense.

When will other City advisory boards interested in what happens here become involved in the process?

The next step in the project is to conduct the evaluation of the different concept variations and share that information with the public. Information will also be shared with the Water Resources Advisory Board (WRAB) because it has the jurisdiction to review flood mitigation designs. The project team will also go to the Open Space Board of Trustees (OSBT) as a relevant property owner, and to Council. City staff have heard interest in an information session for the City of Boulder Planning Board, so the project team may check in with Planning Board as well. Note that all of the outreach described here pertains to flood mitigation. The annexation of CU South falls within the purview of the Planning Board, which will review any future annexation agreement and provide a corresponding recommendation on the issue to Council.

Where will the money for the project originate?

The city has received \$1.35 million from UDFDC and will obtain the remaining money from bond proceeds.

The noise level from US Highway 36 is unbearable for residents of this area. Has the project team considered the noise level of building a dam and noise impacts to homes in the area?

The project team will consider this and come back with a response at the next open house.

When will the environmental assessment (EA) start? Should community members assume that all impacts from these variants will be mitigated? If the effects could not be mitigated, would the variants be removed from consideration?

The project team is examining environmental impacts under the evaluation criteria. Key impacts to consider include those to PMJM, wetlands, Ute ladies-tresses orchid, critical habitat, and sensitive plants. The project team will provide a high-level assessment of those resources based on existing documentation to evaluate the potential impacts under each project alternative. There will be a more detailed survey after a project alternative is selected. Many of the resources require impact mitigation, including threatened and endangered species and wetlands. OSMP has concerns about impacts on this area. Fortunately, there are excellent opportunities for mitigation in the area, so Corvus does not anticipate many challenges. If an unforeseen concern does arise, this will be considered for permissibility.

There is always the possibility of a flood bigger than what the dam can handle coming along. Each variant should indicate what would happen if the dam overflows. Will the berm stay there?

Any flood mitigation project has to be vetted by the State Engineer to determine whether it can withstand the probable maximum flood. A 100-year flood entails about 7,000 cubic feet per second (CFS) of water flow. The probable maximum flood is 85,000 CFS. The dam must withstand this, but it might be the only thing still intact if a flood like that occurred.

The 2013 flood was at its worst at 9:00 PM, so not many people were out going to work or school. What is the potential damage if a flood occurred during a busier time of day?

A potential benefit of building the project for a 100- or 500-year flood event is that US Highway 36 or Foothills Parkway would not flood. Other critical transportation facilities would be protected as well. If the project moves forward, the City will also consider implementing an early warning system for floods.

Have staff modeled what would happen in the next flood if nothing is done?

4,000 people living in the floodplain now. Of those, 2,700 people would be removed from the floodplain under the proposed concept. Hopefully, no one would die. Two people died in Two Mile Canyon Creek in 2013.

Are there any reasons why this project would not move forward?

The project needs to go through several more steps including engineering, permitting, and regulatory processes. Additionally, there are concerns from many individuals and organizations about various aspects of the project. The project team will continue to move forward until Council gives other direction. There could also be unworkable flaws in the project or a lack of agreement from landowners.

DIFFERENT PERSPECTIVES PANEL

The Different Perspectives Panel was comprised of Ben Binder, Marki LeCompte, Pete Palmer, and Ruth Wright. Each panel member gave a presentation covering their thoughts on the project. The members of this panel are part of an ad-hoc group who requested to meet with staff and consultants regarding the project. The group has nine members, including six West Valley resident representatives. The West Valley is on the other side of US Highway 36 and in the western portion of the Boulder Creek Valley; it includes Martin Acres, Frasier Meadows, and the surrounding subdivisions. The members of the Different Perspectives Panel do not necessarily speak for the entire ad-hoc group.

- The panel stated that there was no flood control in the West Valley until large-scale development began. The panel feels that because government mistakenly allowed this development to proceed, it must solve the problem. The panel wants to get the best possible project completed.
- LeCompte started Save South Boulder (SOBO), which began with a mailing list and an interest in doing the right thing for flood mitigation. South Boulder Creek Action Group (SBCAG) is another community group active in flood mitigation.
- The first phase of the South Boulder Creek Flood Mitigation Project was completed by CH2M HILL, which prepared the Master Plan that was adopted in 2015 and resulted in the decision to pursue the Option D configuration.
- Panel members expressed concern about a scenario in which the capacity of the detention pond proposed in Option D was exceeded. They presented a map depicting the portion of the CU property where the project will be built overlaid with a map of the neighborhoods of the West Valley. The map showed that if the detention pond volume was exceeded, floodwaters would flow onto US Highway 36, hit the concrete median barrier, and flow down the hill into the neighborhoods.
- Panel members also expressed concern with the configuration of the proposed spillway in Option D, stressing that this spillway would funnel water to the West Valley if the dam.
- Panel members stated that the size of the proposed detention pond for the Master Plan Option D is inadequate due to high local groundwater levels and the presence of a former gravel pit on the other side of the berm that is 15 feet lower than the rest of the floodplain.
- Panel members expressed concern with treatment of the Viele Channel in Option D. In this configuration, water from Viele Channel is directed through a siphon, which the panel believes would increase the risk of the flows exceeding the capacity of the detention area and flooding the West Valley. Variant I is revised to avoid Viele Channel so that water continues down an outlet tunnel, but the panel is concerned that this would only necessitate a bigger outlet.
- Panel members expressed support for Variant II because it removes the existing levee and utilizes a 500-year floodplain as open space and for flood detention. Additionally, restoration is a possibility here for endangered species. However, this variant has the same issue as the other two: the spillway would flow onto US 36 and into the West Valley. In fact, none of the project configurations show a change in the spillway location. The Different Perspective Panel believes that constructed project must detain as much water as possible on the south side of US 36 without locating the spillway to push water into the West Valley.
- Panel members stressed that a 500-year storm is not five times larger than a 100-year storm, but rather is 60% larger. The panel acknowledged the complexity and uncertainty of modeling flows but encouraged RJH to provide more information and modeling based on a 500-year storm. The panel suggested that instead of precisely determining the geographic center or flow rates and volumes of a design storm that the project team utilize the 500-year storm as a conservative predictor of large storm events.
- The Different Perspectives Panel expressed interest in learning more about where the flood waters came from in 2013 and stated that focusing only on waters from South Boulder Creek may not be an appropriate approach. The storm model used in project configuration

development was based on maximum flows in South Boulder Creek. However, the water that hit the West Valley in 2013 came from further north. The design storm's center was over Eldorado Springs, but flood waters mostly avoided the mainstem of South Boulder Creek in 2013. The Panel stated that they think if the project team does move forward with the 100-year theoretical storm model it would be more accurate if the design storm's center were closer to the city.

- Panel members pointed out that the design storm is based on four inches of rain falling over a given period. However, during the worst day of the 2013 flood, there were five or six inches of rain falling on an already saturated area in 2013, which is above the rate estimated in a 100-year flood. It is possible that designing for a 100-year storm will keep water behind the dam and protect downstream residents more than it did in 2013. It does not matter what model is used if the model is accurate. However, the panel would like to see flood mitigation efforts evaluate long-duration, high-intensity storms with centers closer to where the actual center was in 2013 rather than something farther southwest.
- The Panel stated that FEMA established its flood insurance and floodplain mapping program in 1968. The federal government paid for insurance, and local governments mapped the flood areas. Since then, intense development has changed the size of a 100-year storm. Because of this change, the Panel believes that it makes more sense to look at a 500-year storm event to hopefully prevent overtopping of the dam. A flood struck Fort Collins in 1997 after that city had recently completed a project designed to contain a 100-year flood. In January 2017, the former mayor of Fort Collins urged Boulder to take a more cautious approach to flood planning and emphasized that a 100-year flood was not sufficient for flood mitigation.
- In 1996, CU agreed to purchase the gravel pit on the current CU South property. Panel members stated that a study that year by Love and Associates showed that hundreds of homes and the CU property were in the floodplain, but CU kept the levee anyway. Peak flows can overtop a detention pond, so it is often necessary to detain flood water on a plain. A 2000 study specified that the area needed 1,100 acre-feet of detention capacity, but this was lowered to 560 and then 370 acre-feet by CH2M HILL in 2014 and 2015. There is also a high groundwater level in these areas. The berm was built as a temporary structure to keep water out of the detention pond. Panel members stated that it was not certified or built to FEMA specifications. At the same time, a reclamation plan proposed adding 40 acres of ponds and wetlands to the property, but CU opposed this. Panel members said that the City and County of Boulder supported the reclamation plan at the State level, but CU changed it by lobbying the Colorado Reclamation Board. In the 2013 flood, the gravel pit was dry, and the berm diverted water around it. FEMA flood maps show that the CU South property is protected only by the levee, even though federal, county and city policies forbid this. Fortunately, Councilmember Sam Weaver wanted the City to use this land as open space, and now it is being used as such.
- The primary recommendations of the Different Perspective Panel are:
 - Adding a "safety factor" by designing for the 500-year flood.
 - Ensuring that any flood control measures would have contained the 2013 flood.
 - Contouring the south end of the CU South property to add detention capacity.
 - Increasing the channel capacity downstream of US Highway 36.
 - Addressing impacts and delays associated with design constraints (e.g., open space, wetlands, habitat, CU ownership)
 - Making the scope of work available to the public.
- The panel also recommends restoring wetlands in the area and contouring the ground with berms. Additionally, the panel recommends constructing another detention pond for more detention capacity and removing the CU levee. It also notes the problem posed by this project necessitating a high hazard dam: groundwater needs to be moveable from south to north.
- Additionally, the Different Perspectives Panel called for the development of a detailed project schedule, expediting agreements with CU, and speeding up the environmental permitting

process. Panel members hoped that CU would work with the City to approve the use of the land as quickly as possible before the next round of annexation discussions.

Community Questions

The Different Perspectives Panel took questions from the community on their presentation. Questions are indicated in italics with responses below in plain text.

Can you explain the difference between the Variant I dam and Variant II dam? Why is the Variant II dam preferred in terms of elevation and water flow?

The Variant II dam does not require excavation, so it does not have the accompanying problems. It also does not affect Viele Channel. This dam seems more straightforward to design and build and takes advantage of the levee. Variant II also integrates well with improvements to open space in that area. The levee currently protects a former gravel pit that is 15 feet below the rest of the floodplain. That area can be used for detention, thereby creating less pressure on the West Valley.

Why would the dam in the version of Variant I that removes the levee not provide the same detention function for the gravel pits?

Variant I does not show the removal of the levee. RJH will run studies of all three options with and without the levee. However, that data is not available.

Did anyone collect data on the Big Thompson Flood in the 1970s and determine the floodplain for that event? How much did the flood exceed the "worst case scenario"? Can that inform what the City is proposing?

The best models in the world cannot predict the exact form of a storm. The assumptions made in models can be wrong about, for example, the anticipated moisture levels in the ground. These assumptions are why it makes sense to build in safety factors. The project team should see how much it costs to build the most protection possible. An excellent example of this approach is Gross Reservoir. Since it was constructed, there have not been any floods through Eldorado Springs. The question this panel raises is what happens with flooding in front of the mountains.

DISCUSSION WITH THE PROJECT TEAM AND DIFFERENT PERSPECTIVES PANEL

Following both presentations, the project team and Different Perspectives Panel discussed issues raised during the open house. Highlights are summarized below.

- The project team appreciates the feedback provided by the Different Perspectives Panel and hears that they are advocating for a project with no levee that accounts for a 500-year flood event.
- The project team also hears the concerns raised about the spillway. There needs to be some spillway because it would be impossible to store the water of the probable maximum flood without one. The spillway would not come into use until the design event (100-year flood or 500-year flood) occurred. That means that it would be exceedingly rare for the spillway to spill in the first place. However, in the event of overtopping, water would flow down US36 and spill through the West Valley as it would today.
- The project team feels confident that it is using the right design storm because maps of the floodplain from the 2013 event and the 100-year floodplain are virtually identical. However, the Different Perspectives Panel stated that while the channel was the same in those two events, the proposed dam and detention pond will potentially create different impacts based on where the water comes from (north, from the mainstem, etc.). The Different Perspectives Panel is concerned that the proposed detention pond will not have sufficient capacity to mitigate this. City staff and consultants stated that the design storm was developed to identify the storm that

would result in the highest flows along the mainstem of South Boulder Creek, including flows from contributing tributaries that result in overtopping of US36.

- The project team clarified that each of the storm events (100-year, 500-year, etc.) provide a foot of freeboard, meaning that a spillway crest would be a foot over the maximum water surface elevation in the detention pond.
- The Different Perspectives Panel reiterated their concern that a detention pond based on a 100-year flood event was not sufficient and stressed their support for a 500-year flood event modeling approach. The staff panel clarified that whatever flood event the City decides to build for will be addressed by the project.

Closing Remarks

Councilmember Sam Weaver provided a few closing remarks for the evening. He pointed out that there were two Council members present at the open house, as well as two members of the Planning Board, one from the OSBT, and one from WRAB. Council member Weaver stressed that this project is an intense focus for the City. The project is complicated because it includes issues of development for CU, flood mitigation, and the desire to protect open space. As an engineer, Councilmember Weaver often says that in engineering there are three key aspects: performance, cost, and time. One can only pick two of these. The 500-year flood project will cost more to build. Analyzing a multitude of design storms will result in a delay. These are tradeoffs that must be balanced, and the community needs to come together to address them.