

**Appendix H-3**  
**Public Workshop #3 Summary**

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## City of Reno TRAction Project, Workshop #3 Summary

ATTENDEES: Members of the Public  
Neil Mann/City of Reno  
Kerri Lanza/City of Reno  
Auro Majumdar/City of Reno  
Joe Coudriet/City of Reno  
Naomi Duerr/Truckee River Flood Project  
Paul Urban/Truckee River Flood Project  
Mimi Fujii-Strickler/Truckee River Flood Project

Bill Crawford/ CH2M HILL  
Glenn Sorensen/CH2M HILL  
Mark Gallegos/CH2M HILL  
Leslie Regos/CH2M HILL  
David Roundtree/CH2M HILL  
Barb Santner/PLACES, Inc.

FROM: Leslie Regos/CH2M HILL  
Mark Gallegos/CH2M HILL

MEETING DATE: October 21, 2008

On Tuesday, October 21, 2008, the third workshop for the City of Reno Bridge Visioning TRAction Project was held at the McKinley Arts Center, 925 Riverside Drive, Reno, Nevada. Following is the summary of the workshop, including a summary of the presentation, the questions and comments collected during the workshop, attendee sign-in sheets and meeting notification methods used. A summary of survey findings is also included reflecting attendees' structure type and level of flood protection preferences.

### 1. General Workshop Summary

Kerri Lanza greeted attendees, thanked them for their participation, and advised that their feedback is important during this planning phase of determining the future look and feel of the downtown river corridor. Kerri introduced the Project Team that would be available to answer questions during the Open House. Attendees were asked to provide input on bridge structure types and the different level of flood protection.

### 2. Presentation Content

Workshop #3 consisted of a formal presentation and an open-house format allowing attendees the opportunity to speak with project representatives and ask questions regarding the presentation materials and informational boards provided for review.

The focus of Workshop #3 was to obtain public input/preferences regarding bridge types (above or below supported) and preferred level of flood protection (74 year or 100 year

design). Simulations were presented to provide attendees with visual references to better understand the potential aesthetic impacts and potential impacts to surrounding sidewalks, roadways, and business access associated with the various structure types and flood protection levels. Cost comparisons of the various alternatives were also presented.

Additionally, there was a discussion of other flood protection strategies/concepts to provide attendees with additional information about upstream detention, dredging/widening of the river and the use of moveable/lift bridges. This part of the presentation was developed in response to public inquiries regarding these options and to provide the public with a better understanding of the implementation and maintenance costs involved in adopting these strategies as well as the associated pros and cons.

## Formal Presentation

Kerri Williams-Lanza welcomed attendees, provided introductions, outlined the goals of the study and provided an overview of the findings from the previous workshops. Kerri also provided a brief overview of the the topics that would be covered during this workshop.

Bill Crawford presented an overview of the bridge types being considered, including some of the pros and cons for each. Conceptual graphics were provided to allow attendees to visualize what the bridges might look like along the corridor once constructed. Bridges supported by a single center pier, tied-arch bridges, cable-stay bridges, and moveable/lift bridges options were presented and discussed.

Leslie Regos presented graphics to illustrate the different grade elevation changes of the different bridge types from a street level view. These conceptual renderings provided perspective as to how much the roadway and sidewalk grades at the four different bridge locations would be elevated. Leslie also presented graphics to give attendees perspective on the extent to which existing walkways and roads would need to be reconstructed in order to accommodate the grade changes needed to tie new construction to existing roadways and walkways. High level, order of magnitude construction cost comparisons for the various bridge types and levels of flood protection were also provided.

Glenn Sorensen provided an overview of additional flood control alternatives that had been analyzed and considered during previous studies through the City and the U.S. Army Corps of Engineers. Upstream detention, channel dredging, and channel widening options and their analysis were summarized for participants along with pros and cons to illustrate why these options were determined to be undesirable options for the Truckee River corridor both from an environmental and cost/benefit perspective.

## Open-House

During the open-house segment of the workshop (half an hour prior to the formal presentation and half an hour following the formal presentation), attendees were encouraged to review study information provided on display boards and speak with Study Team Members about the project..

### 3. Survey/Comment Results

Attendees were provided with a survey/comment form and asked to provide their preferences and comments regarding the various structure types and levels of flood protection. A total of 40 survey/comment forms were submitted by attendees during the workshop. The results are represented in the following tables:

#### *Bridge Types*

	Above-supported	Below-supported	Moveable/lift
Highly Favorable	15	10	5
Favorable	9	17	2
Unfavorable	6	7	5
Highly Unfavorable	4	4	23

#### *Level of Flood Protection*

	74-Year Design	100-year Design	Maintain current conditions
Highly Favorable	11	19	4
Favorable	16	10	7
Unfavorable	5	3	8
Highly Unfavorable	3	3	15

#### *Flood Insurance Rates Considerations*

Very important consideration	20
Somewhat important consideration	13
Unimportant consideration	3

### Summary Findings

There is a relatively even split with regard to support for below-supported bridges versus above-supported bridges. This split is also apparent when viewing from the perspective of how individual respondents rated bridge types in direct comparison to each other.

There were 13 respondents rating both bridge types as favorable to some degree. Within this category, 10 respondents rated above-supported bridges as “highly favorable” with below-supported rated as “favorable.” Pointing to the conclusion that respondents may have a

preference for the above-supported bridge type but would support the below-supported as an acceptable alternative.

There were 13 respondents that rated the below-supported structure as favorable to some degree while rating above-supported structures as unfavorable to some degree. The primary concern within this group appears to be the viewshed and overall aesthetic/architectural theme, believing that below-supported would be more aesthetically cohesive.

There were 10 respondents that rated above-supported bridges as favorable to some degree while rating below-supported bridges as unfavorable to some degree. The couple of comments provided in support of this stance seem to be primarily in favor of more “iconic structures” as well as citing the reduced opportunity for debris build-up.

Based on comments, cost did not appear to be a significant factor in expressed preferences for above versus below-supported bridges for the majority of respondents. It is possible that artistically embellished/iconic, below-supported structures reflecting existing architectural themes within the corridor would prove to be a strong middle ground.

A large majority of respondents found moveable/lift bridges to be an unfavorable option. Based on comments received, those in this majority appear to have strong feelings against moveable/lift bridges due to expense, practicality, and aesthetics.

There is also a relatively even split with regard to the level of flood protection desired by respondents. However, the majority in this category (15 respondents) identified the 100-year design as “highly favorable” while ranking the 74-year design as “favorable” leading to the conclusion that the preference is for 100-year design while the 74-year design is considered among this group to be acceptable alternative. Most comments take the perspective that it is worthwhile to spend a little more in order to obtain greater protection.

Those expressing an opposition to the 100-year design appear primarily concerned with the large footprint and maintaining existing access. Conceptual renderings detailing how access might be perpetuated may prove helpful in mitigating these concerns.

The vast majority (33 respondents) regarded potential flood insurance savings as an important consideration to some degree.

## 4. Comments Summary

### Below-supported Bridges

#### *Comments For:*

*Cheaper and more architectural variation.*

*Favored if only one pier and no wall between walkways at every corner.*

*Provides access for pedestrians, bike riders, roller bladders, etc. and allows good views of the river. Also prefer the lower cost.*

*Structure fits in better with the river corridor. I like the architectural designs similar to what we have now. They are also less costly and allow better views of the river.*

*Preferred because it minimizes visual impact.*

*Keeps historical character and provides architectural consistency.*

*I like the bridges as they are because I like the view and history they have.*

*I favor below supported bridges with arch incorporated into the design as a nod to history and tradition.*

*Favor below supported with 3 foot freeboard.*

*I have no strong preference provided that bike travel is feasible under the bridges on at least one bank of the river with stairs or ramps up to the street.*

### **Comments Against:**

*No columns [below-supported], I've been on those bridges during the floods of '97 and '05 w/excavator operators. We need to do the best we can do now even though these [above supported bridges] are slightly more expensive.*

*Debris and scour issues.*

*The existing below supported bridges are proven debris catchers which backs up water during floods.*

*Below supported bridges are old and out-of-date and need improvements.*

*Too much of what we have now.*

*Below supported bridge structures have serious debris problems.*

*The below-supported bridge is much less favorable even though it is less expensive.*

*Keep piers out of the river.*

## **Above-supported Bridges**

### **Comments For:**

*I like the look of the cable-stay bridge, do not favor the tied-arch.*

*Needs to be built as iconic modern structure.*

*Highly favored if done as new history and not old history.*

*Least concern for debris and scour.*

*Could gain 6" of freeboard if elevation of roads kept at heights needed for below supported.*

*Reasonably pleasing design and generally practical.*

*We need modern, iconic structures.*

*Above supported has more eye appeal.*

*I like the idea that downtown Reno won't flood as severely with above supported bridges.*

*Prefer above supported with 2 foot freeboard (less obstruction = less need for freeboard).*

*I have no strong preference provided that bike travel is feasible under the bridges on at least one bank of the river with stairs or ramps up to the street.*

*The above-supported design is superior, especially the cable-stay. However, the tied-arch is a close second.*

*The new bridges should be the above-supported type and modern in design, not replicating the old bridges at all. It is the 21<sup>st</sup> century and the new bridges offer the opportunity to create iconic new images for downtown Reno. They can be designed to be above as well as transparent like the Redding, Calaveras bridge.*

### **Comments Against:**

*Ugly, cheap looking design and obstructive to view (as per example on display board), could be considered with proper architectural elements.*

*Architectural tone would not go well with downtown feel.*

*No access for pedestrians and blocks views of river. Also higher cost.*

*The difference in height for above vs. below supported structure does not seem to be enough to warrant additional visual impact [caused by above supported].*

*In very high floods they could catch debris if water reached street-height, if raised more, could reduce debris.*

*I like the architectural design [of the above supported bridges] but does not fit well with this area.*

*Above supported bridges are interesting but worried about affects on store fronts.*

*Access to river for debris removal during flooding is a practical/functional question – above supported structures may present problems.*

## **Moveable/lift Bridges**

### **Comments For:**

*I do not want above street structures. I think they will impact views from riverside walkways. I favor lifts without above street structures.*

*If these could be designed more aesthetically they would be more favorable, especially for the heaviest floods. The pictures showed it as heavy and designed strictly for industrial uses, nearly without aesthetics.*

*Should be used at Lake Street.*

*Would be nice as an option for Lake Street.*

*You could leave the bridges at the same current levels and raise during floods.*

*Appear to be capable of accommodating 100+ year floods.*

*You haven't done enough research on draw/lift bridge designs. You have ignored the possibilities at least for Lake Street. Your work is incomplete.*

*I think the lift bridge makes the most sense. Why design for a 74 or 100-year event?*

*Surely modern engineering can provide a solution using a lift type bridge.*

***Comments Against:***

*Too costly and unnecessary.*

*Ugly and expensive.*

*Not very conventional for cityscape. Maybe in an industrial park, but not in downtown.*

*Ugly. High operations and maintenance costs. Reliability issues.*

*Not a desirable option.*

*This design does not fit in with downtown Reno and would be very expensive. Why would we need a draw bridge?*

*Draw/lift bridges are bad for Reno area.*

*Draw/lift bridges are unneeded as we do not have large boats that travel down the river, so why pay for the maintenance?*

*Draw/lift bridges would be too noisy due to steel roadbed.*

*Draw/lift bridges are just not needed. Would be a waste of money as the only time it would be used is if the river floods.*

*Draw/lift bridges not practical for Reno.*

*Draw/lift bridge is highly unfavorable, the Truckee River is not a commercially navigable river.*

## **74-year Design**

*If City does choose this, follow-up with sand-bagging plan.*

*Only favorable for lower construction costs.*

*This could work if the overflow area is adjusted (i.e., buildings redesigned or raised to withstand floods) to function as an overflow floodplain.*

*If you have a 74-year plan and have an option of a 100-year plan, go with the 100-year while you have the finances.*

*Only seven more buildings appear to be flooded under present conditions at 100-year than at 74-year. Why not just armor those few buildings.*



*Seems better for the cost.*

*Highly favorable with above support and 2 foot freeboard.*

*If we are going to do this, with the cost and attendant traffic disruptions, we should get maximum benefit.*

*As long as buildings with businesses and homes have as little damage possible, I am for it.*

*If you are going to spend the money on a 74-year protection, why not go for 100-year design? The overall cost would be less.*

*1997 flood = \$700 billion in damages. Must reduce chance of catastrophic losses.*

## **100-year Design**

*Only way to go. Do it right the first time.*

*Favorable if there are no unattractive walls and/or canalling.*

*If you are going to spend the money, build it correctly the first time.*

*Best for long-term improvement of the downtown area.*

*Lake Street would require the most "lift" and therefore the biggest challenge to design.*

*I prefer the 100 year design. The cost difference is not significant enough to build for 74 year design.*

*Obviously confining waters closer to the existing channel would appear to property owners.*

*Spend now while you have it, you never know later on what our finances will be.*

*The inundation map does not reflect the fact that several recent buildings were built above flood level (e.g., theater and Palladio).*

*I find this highly favorable except at Lake Street due to the Siena Hotel depending on transition design and cost.*

*Too much of a footprint.*

*With more technology we'd be able to design this better in the future vs. current cost/expenses.*

*Bridge approaches are a day-to-day issue for access to Park Tower parking garage entrances.*

*It really depends on how great of a bridge system you can create to save the spread of flooding in a 100-year period.*

*Spend now for future saving and peace of mind.*

*I think this should be considered at minimum.*

## **Flood Insurance Considerations**

*Biggest consideration is flood impact.*

*There will likely not be much of a difference with hurricanes and floods throughout the U.S. that are going to keep costs up.*

*Any additional costs added to local businesses during floods hurts not only the business owners but the community as a whole.*

*It is important for property owners who would want compensation for their losses.*

*Most property owners will still need insurance or contingency funds for the 100+ year events that will occur.*

*Would their savings go toward funding this project?*

*Definitely a very important issue.*

*As a homeowner at Park Tower, I am very much in favor of this flood protection project.*

*If you are going to completely eliminate flooding, then flood insurance rates should be reduced.*

*Loss of life/disruption of life – very important consideration.*

## **Miscellaneous Comments**

*Political climate nationally due to financial crisis will bode well for infrastructure improvements. This federal funding for state projects should be to Reno's advantage for the entire flood project.*

*Get it done. You'll get the most "bang for the buck" with construction industry hungry for work (if you do it soon).*

*Flood protection should take priority over attractiveness of bridge design.*

*We must improve bridges for water flow [during storm events]*

*This was not a "workshop," it was a presentation. Hardly no input.*

*Create new "history" do not try to sustain the old.*

*Keep the dollar amount in consideration compared to what the cost of clean-up would be.*

*The bridges being of historical value is definitely something this community should work hard to retain.*

*Keep current bridges and build spillways to the sides.*

*Do the worst bridge(s) first then move on.*

*Bridge design should be put out as a contest. Local artists and engineers could put forth concepts at each street for new ideas. All bridges should be different, suite the site at each street, and final designs could be voted on. Building the same bridge would make the bridges bland and boring. Look at cities such as Portland, OR who embrace their river and make the bridges icons, not eyesores.*

*Maintaining current conditions would still generate high costs with no flood impact improvements/reductions. Therefore there would be a low cost/benefit ratio.*

*Prioritize, Virginia Street first due to condition, Lake Street second due to flood impact, etc.*

*I am still not convinced that dredging/widening the channel would not allow us to have bridges at [current] street level. If we have to pay a little more to maintain views, eliminate ramps, and not impact access to the river, it is fine. We are building these bridges for the next 75-100 years and therefore should do the best job possible.*

*We need to take advantage of the river for redevelopment. Pedestrian/bike paths are ways to help do that and help with flood control.*

*The presentation was well done. Thank you for your efforts!*

*I like as much freeboard as practical. While aesthetically pleasing is nice, flood abatement is the goal.*

*Replacing bridges as currently built is highly unfavorable.*

*I attended the second meeting as well and CH2M HILL has done an excellent job presenting this information. It can be a confusing topic and I appreciate the way the information was delivered.*

*The negative impacts of dredging the river are disadvantages. Dredging is temporary, sediment fills it in, and fish/wildlife habitat is reduced. Dredging the kayaking and swimming area would degrade the recreational and aesthetic benefits (and their economic benefits). It would put the area back in the dark-ages before the arts district and public recreation were supported to improve quality of life.*

*The existing bridges are crumbling in places-flood damage, nicks, chunks broken, exposed rebar.*

*Comparing the alternatives of dredging, upstream detention, and widening the river, the disadvantages are contrary to maintaining the advantages that currently exist.*

*If possible, an overflow canal should be built to circumvent the downtown area or maybe circumvent both Reno and Sparks.*

*Widening the river would take out some of the features we've saved and which improved the general demeanor of the city (i.e., the Artists' Lofts).*

*Maybe a floodplain could be set aside through part of town for overflow; certain streets with buildings rebuilt to withstand floodwater with few or no impacts and berms or raised areas to direct flood water could serve as a type of floodplain or overflow canal?*

*I cannot comment on the 74-year versus the 100-year design because I cannot visualize what will happen with the building access to those buildings affected sidewalk ramping. The visual impact of the ramping to those buildings.*

*Final design/architectural design is critical to acceptance of the needed engineering solution.*

*I think we need to consider four different designs for the bridges.*

*I am significantly concerned with the historical structures affected by the two different designs. What you have designed clearly has not researched the affect on the existing buildings and access (ADA and otherwise). It appears it will be considered after the streets/bridges are designed. I am not convinced, I think this needs to be looked at more carefully.*

*I think property owners should bear more responsibility for self-protection.*

*Please make sure new bridges accommodate bike travel both east-west and north-south. Also provide connectivity between the two.*

*Make these bridges the best and most beautiful possible. Think long-term and quality. Look at what Redding, CA did with their pedestrian bridge.*

*I think there are other ways besides building new bridges or widening the river. One idea would be to direct the water around the bridges during a flood.*

*Graphics are accurate, however, extremely difficult to understand.*

*I enjoy downtown as it is.*

*I feel if there are different, inexpensive forms of averting flooding, why not do that before destroying bridges that have nothing else wrong with them?*

*The only advantage to maintaining current conditions is spreading out the cost over several years, although this could be negated by inflation.*

*I think weather conditions and patterns need to be considered when deciding whether or not to permanently change bridges.*

*What about the Booth Street bridge? This bridge catches debris and backs water up and causes Idlewild to flood.*

*How about requiring permeable pavement for parking lots and dry wells for downspouts to reduce run-off and enhance ground water recharge? Perhaps builders/developers could receive credits for installing these measures. Bridges are just part of the problem.*

*Reno is an eclectic community with the downtown district really evolving into an active place. We now have the Whitewater Park and art events and the new bridges should reflect this new character. They should be eclectically designed and really capture the mixed character in the river district. Maybe a mix of above and below type bridges would be good, but Reno should not be afraid to make a strong design statement with these bridge replacements.*

*I would enjoy seeing the final compilation of comments, etc. I still feel strongly that there needs to be some type of design guideline for the bridge replacements to avoid a piecemeal approach.*

*The wood type of debris that ends up in the river during both normal and flood stage flows is tumbled/smooth and really good for making furniture. Furniture builders might be asked to collect this wood for the City.*

## 5. Q & A

**Q:** How are existing building finished floor elevations affected by the raising of roadways and pedestrian paths? Does replacing the bridges lower the water surface elevation to below existing buildings?

**A:** Yes. Changes would lower water surface to below finished floors.

**Q:** What amount of freeboard do the simulations used in this presentation represent?

**A:** An assumption of 2 foot of freeboard was used in the development of the simulations presented.

**Q:** Should new bridge piers be angled to better deflect debris?

**A:** This is a design consideration appropriate to evaluate during the design phase of the project.

**Q:** Would the above supported structures potentially create a problem with regard to debris collection if the bridges were overtopped by an event larger than they were designed for?

**A:** Yes. If the bridges were overtopped by a significantly large flood event, debris could become a problem for the above supported structures.

**Q:** If debris clearing were to become necessary during a large flood event, wouldn't the above supported structures make it difficult to perform?

**A:** Yes, the structural elements could interfere with equipment operation and debris removal.

**Q:** How would business access be perpetuated?

**A:** For each location, access consideration will be taken as a high priority and a resolution at each location will need to be considered once the design phase is underway.

## 6. Meeting Notification

Public notice was distributed to the following locations/individuals:

10/2/08: Reno Gazette Journal notification sent to City of Reno for distribution

10/2/08: Mailers delivered to City of Reno for postage and delivery via USPS

10/3/08: City of Reno and Truckee River Flood Management Project Website Postings

10/14/08: Fliers hand delivered to Riverfront businesses

10/21/08: Email Blast



**City of Reno and Truckee Flood Management Project  
 City of Reno TRAction Project – Workshop #3  
 Date: October 21, 2008 – McKinley Arts Building**

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Edwin A. Junger	1935 Conroy Hollow Reno	673-7265	EdJunger@junki.com
Paul Urban	9390 Gateway Dr #230	850-7421	urbane.washcount.wi.
Jack Hawkins	520 Cherokee St	786-8380	Jacke.Hawkins.Architect@comcast.com

## Notice of Public Workshop

### City of Reno Truckee River Bridges Visioning Project

#### Notice of Public Workshop

### The City of Reno Wants Your Input!

The City of Reno and the Truckee River Flood Management Project are in the planning process to define a safe and functional vision for the Truckee River Corridor and the transportation infrastructure between Booth Street to the west and Lake Street to the east.

This is the third in a series of public workshops being conducted to establish design guidelines for future engineers and planners to follow when considering replacement of the bridge structures across the Truckee River in Reno.

Workshop # 3 will be held at the McKinley Arts & Culture Center on Tuesday, October 21, 2008. The goal of this third workshop is to present refined concepts for replacing the downtown bridge structures and to obtain public input regarding structure types and desired level of flood protection. This workshop will be held in an open-house format with project team representatives on-hand beginning at 5:30 p.m. to answer questions. There will be a formal presentation regarding structure types beginning at 6:00 p.m., with a question and answer period to follow.

***We hope that you will be able to join us, and we look forward to involving you in this important on-going community-based process.***



**Tuesday, October 21, 2008**  
5:30 p.m. to 7:30 p.m.  
McKinley Arts & Culture Center  
925 Riverside Drive  
Reno, NV 89503

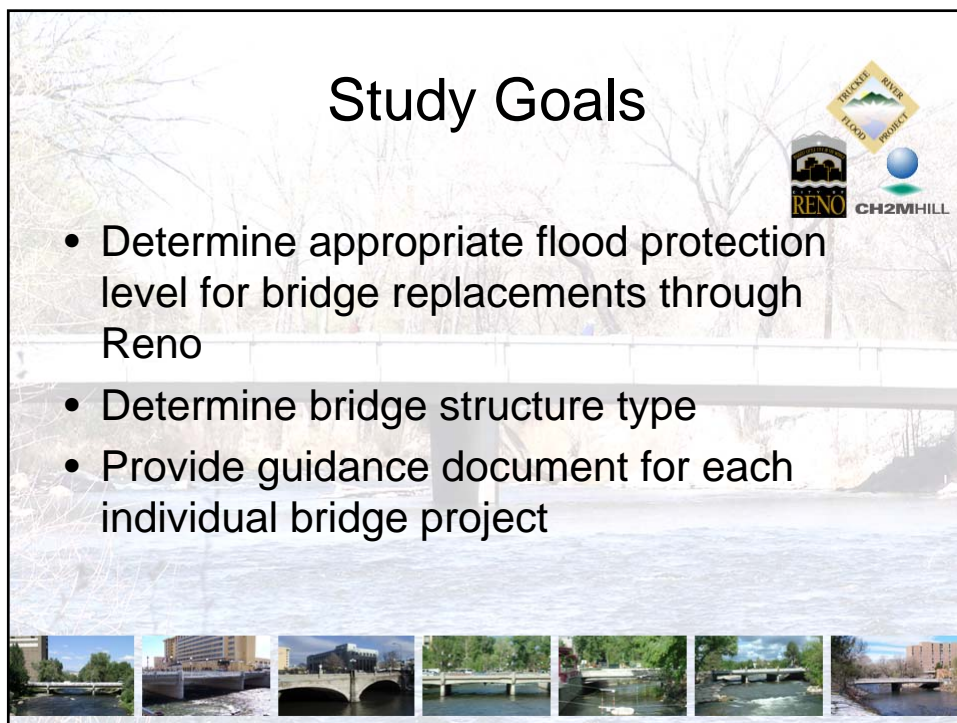


For more information on these workshops, please contact:  
Kerri Lanza, P.E., Senior Civil Engineer, City of Reno, at 775-334-2683





**City of Reno TRAction  
Project  
Downtown Bridges**

**Public Workshop #3  
October 21, 2008**




**Study Goals**

- Determine appropriate flood protection level for bridge replacements through Reno
- Determine bridge structure type
- Provide guidance document for each individual bridge project






## Project Process Overview




- 2 Previous Community Workshops
- City Council Briefing - September 2008
- Seeking Your Feedback Today
- Final Report to Council – Fall 2008
- Future discussion on aesthetics/architectural style for each bridge

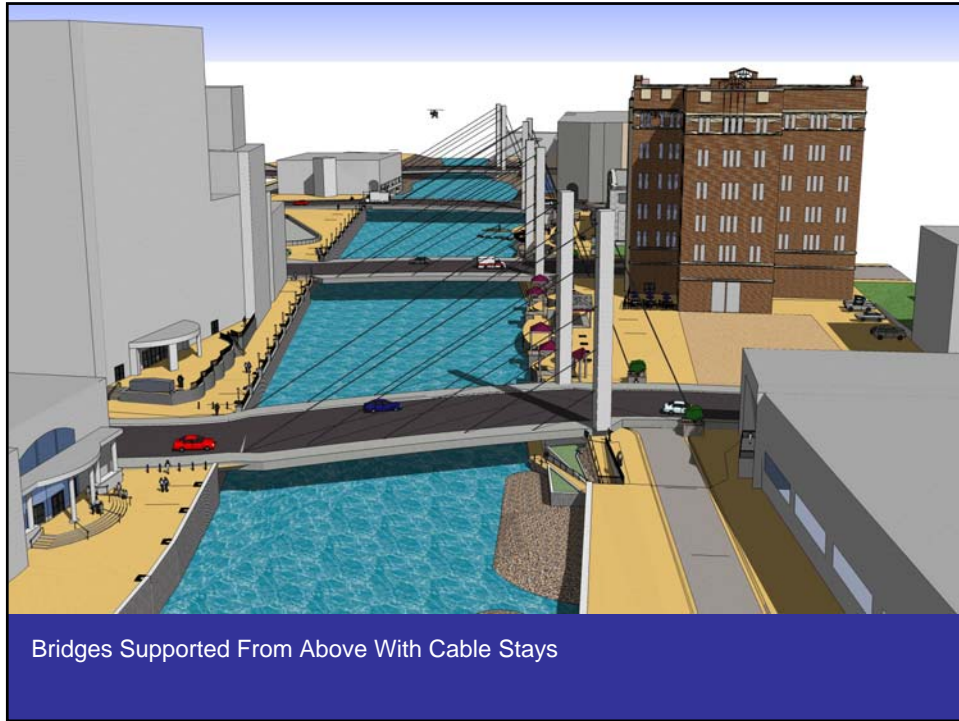


## Topics for Discussion

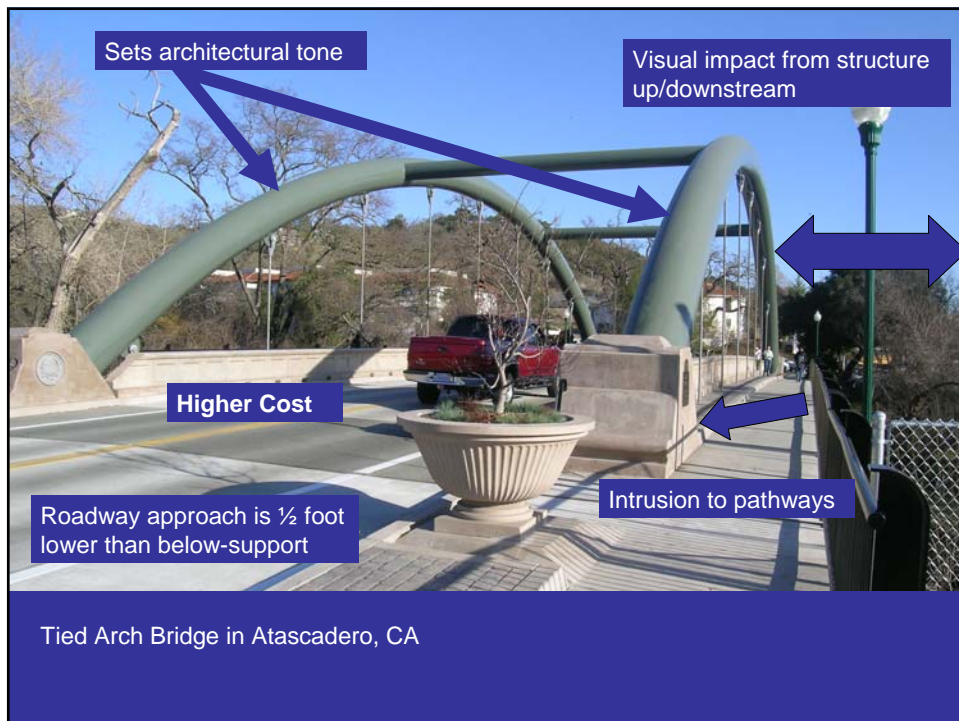
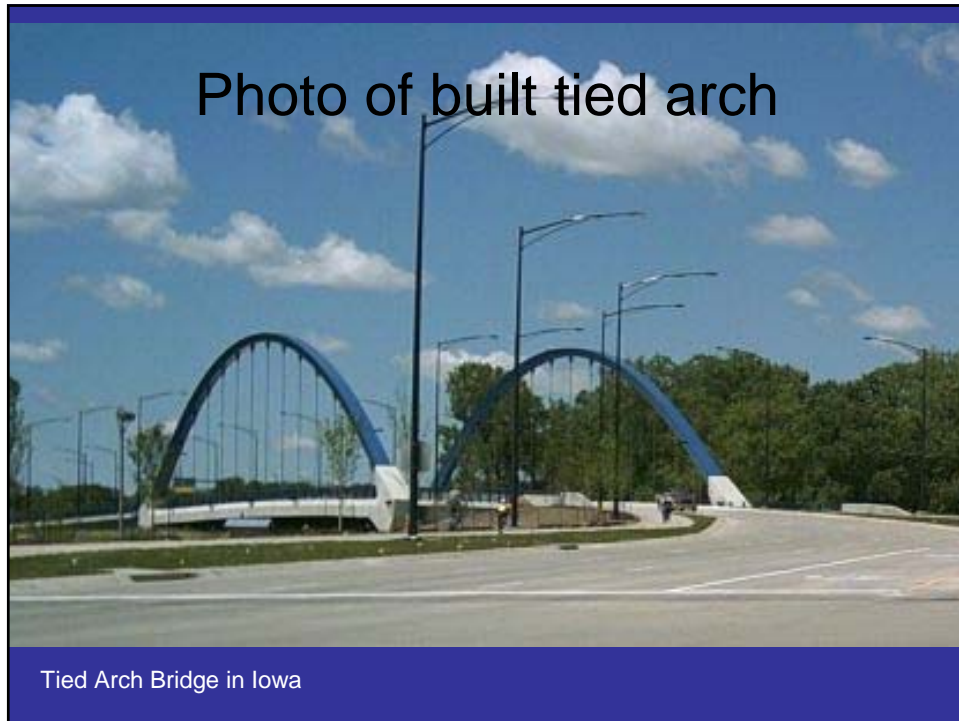


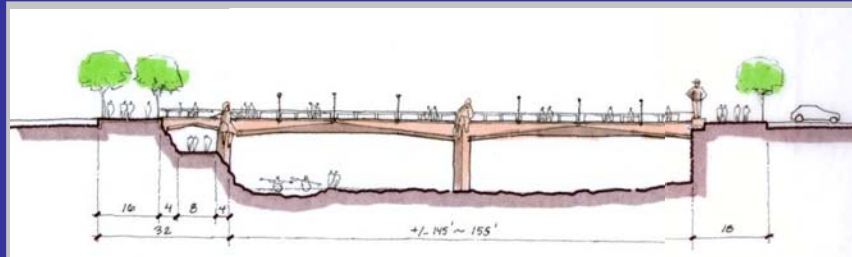
- Bridge Types - Above or Below Support
- Level of Flood Protection for *4 Downtown Bridges*
  - 74-yr vs. 100-yr
- Cost Comparisons
- Freeboard Comparisons
- Responding to Other Flood Protection Strategies & Concepts







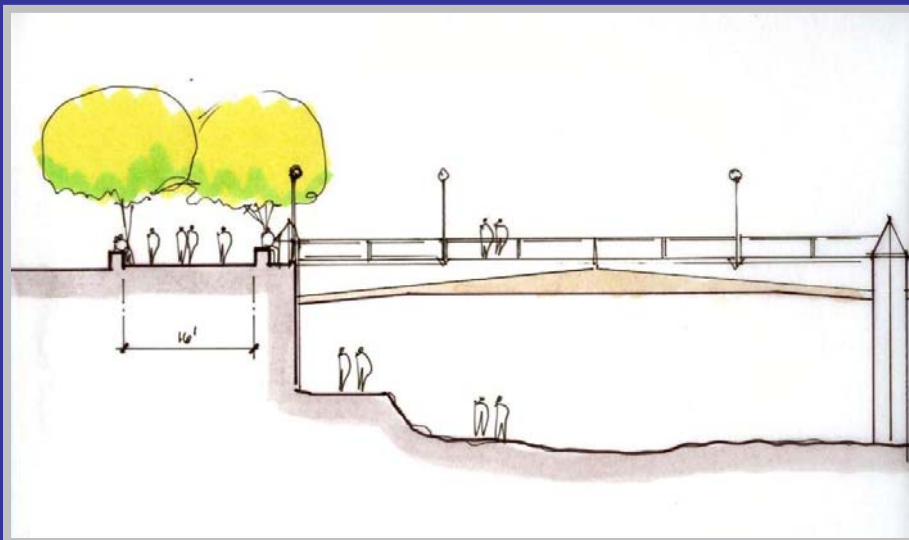




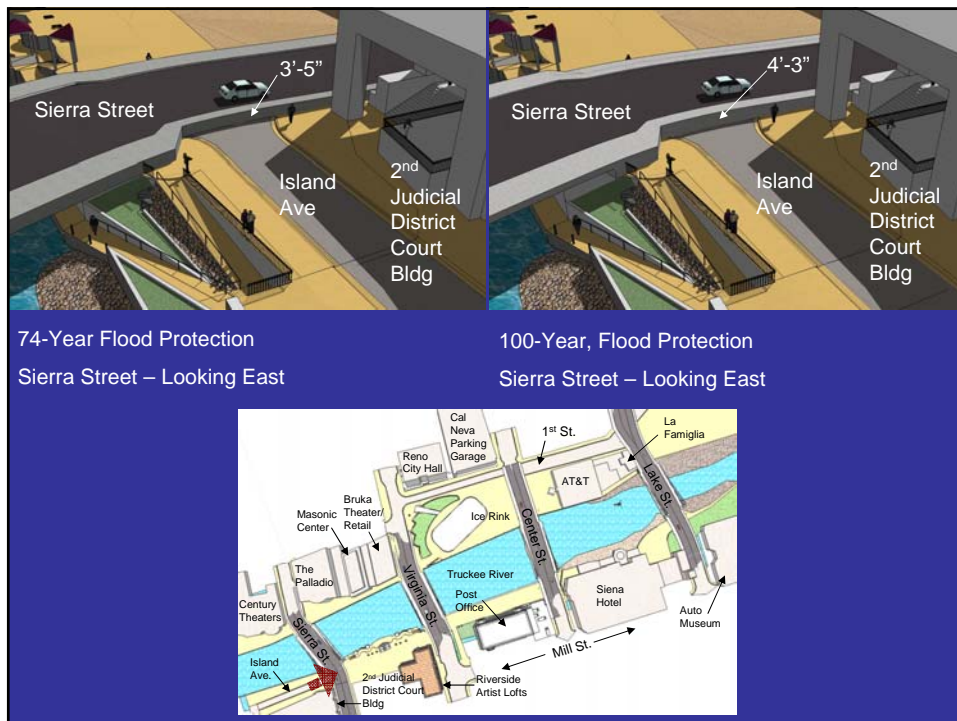
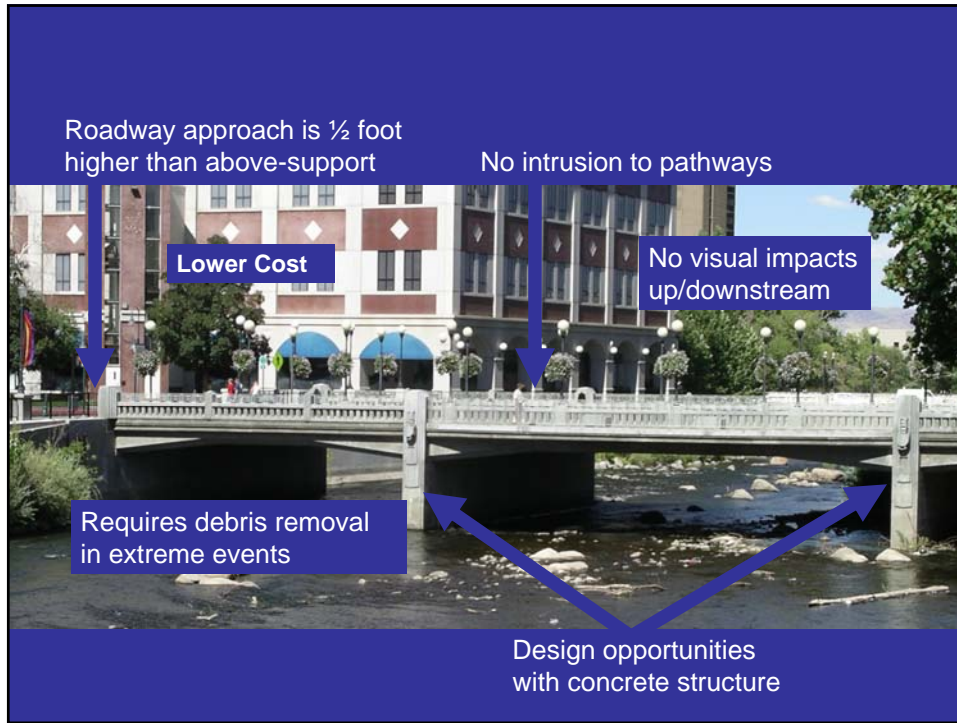
Bridge Structure Supported from Below

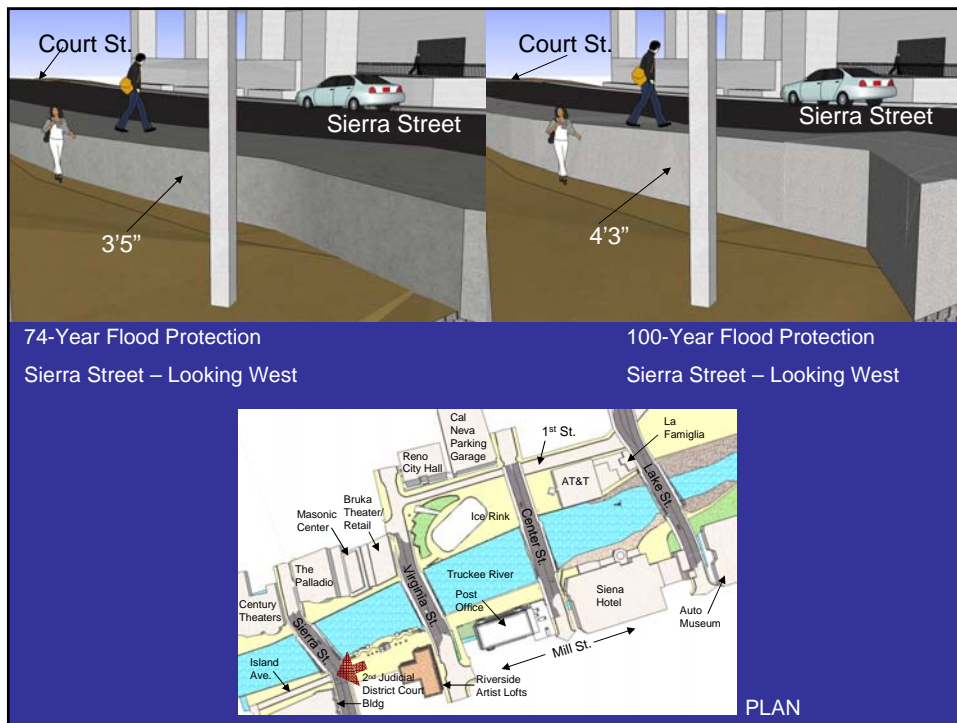
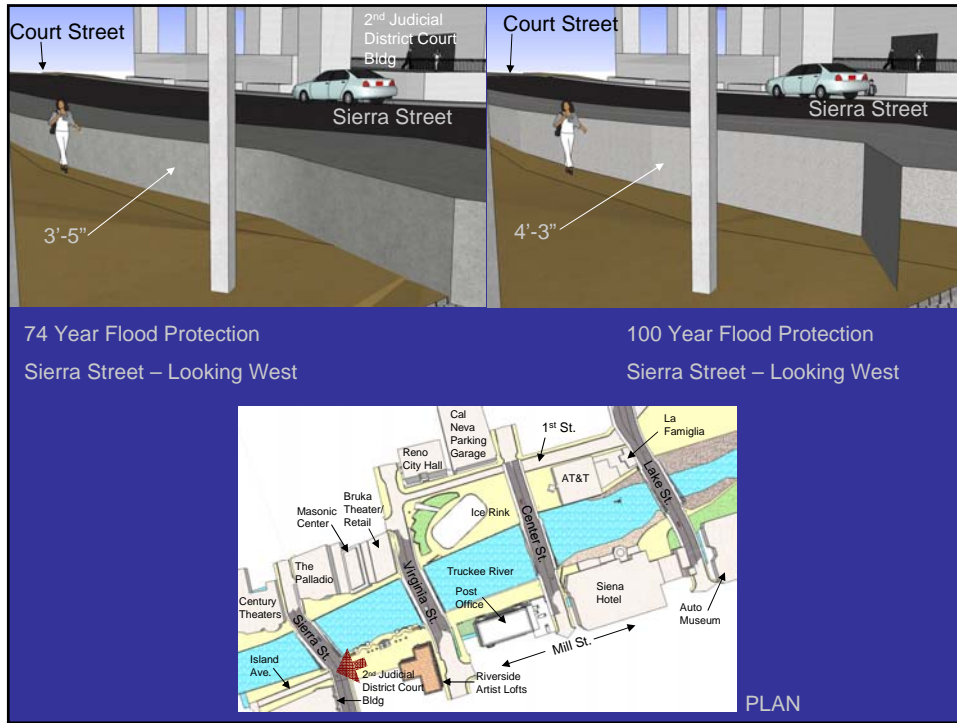


Bridge Structure Integrating Art / Sculpture

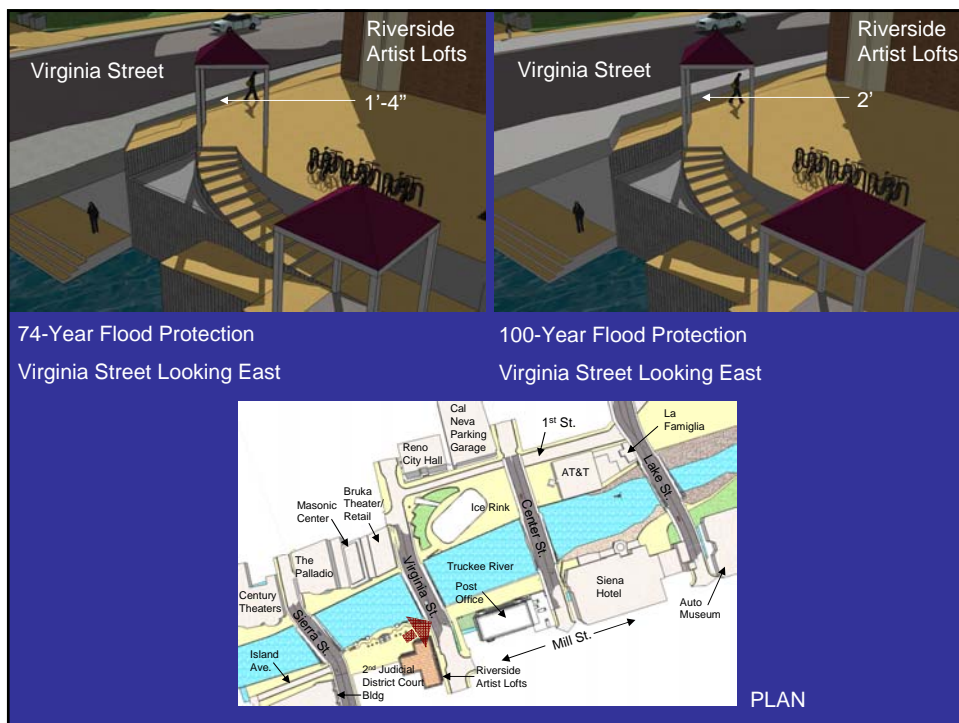
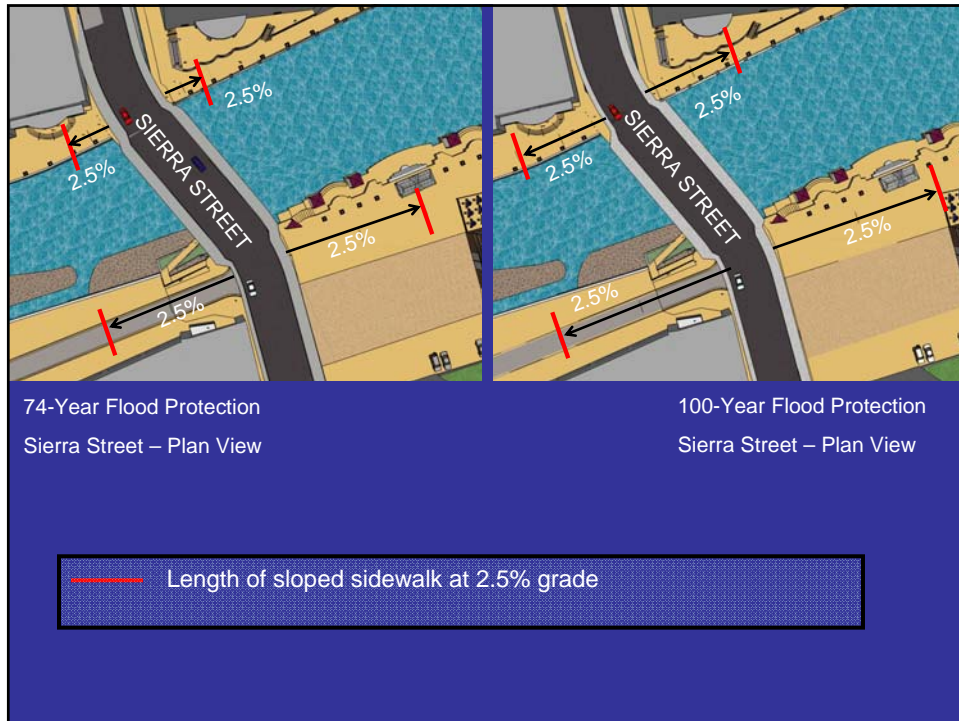


Promenade and Bridge









74-Year Flood Protection  
Virginia Street Looking South

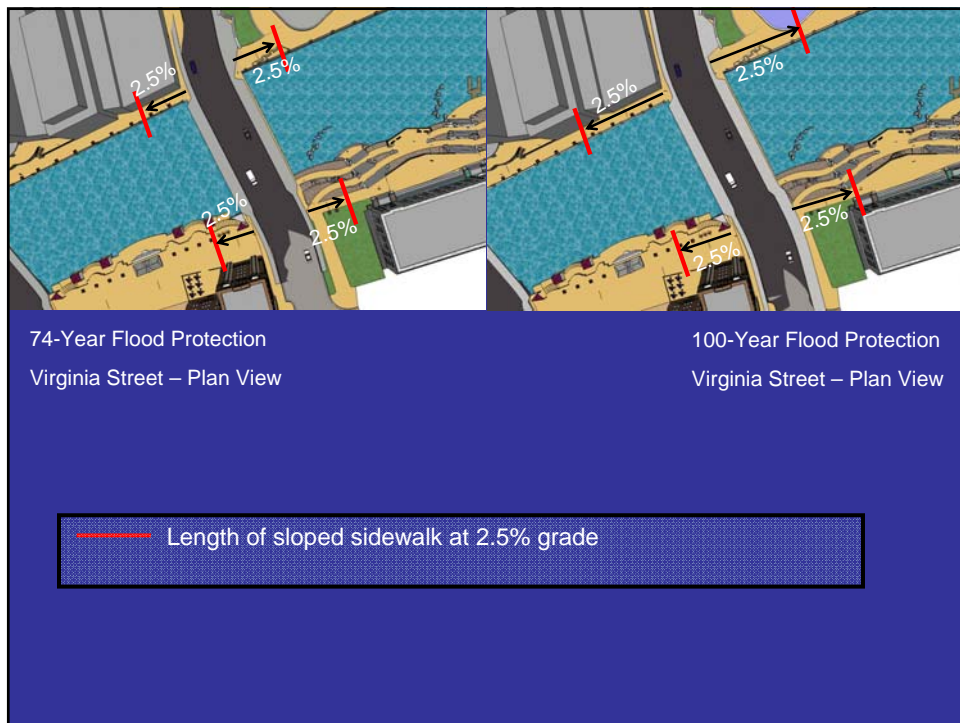
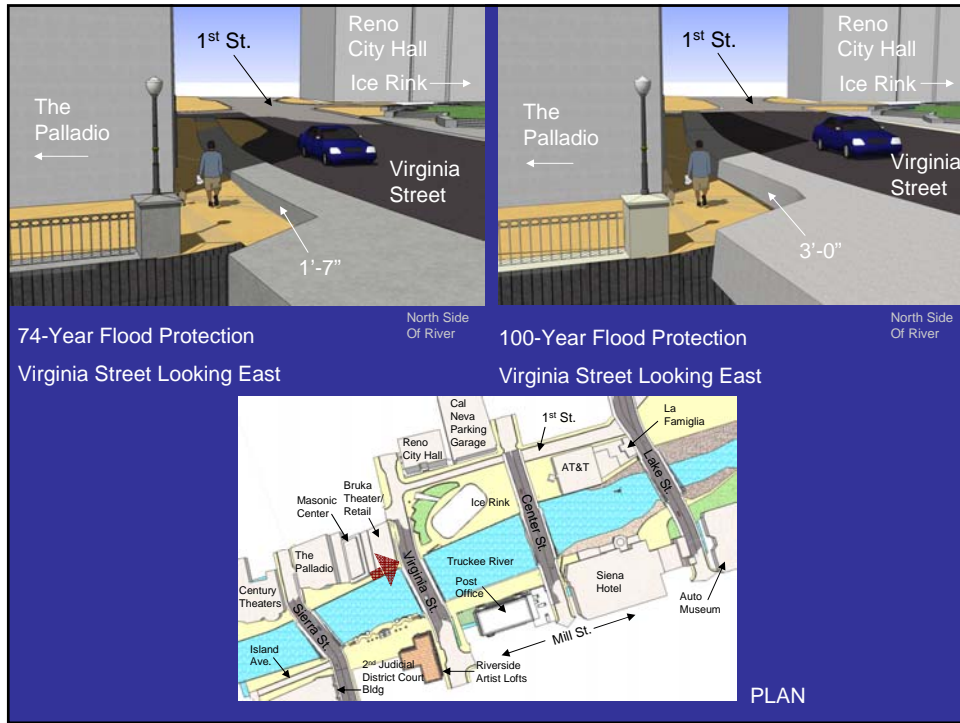
100-Year Flood Protection  
Virginia Street Looking South

PLAN

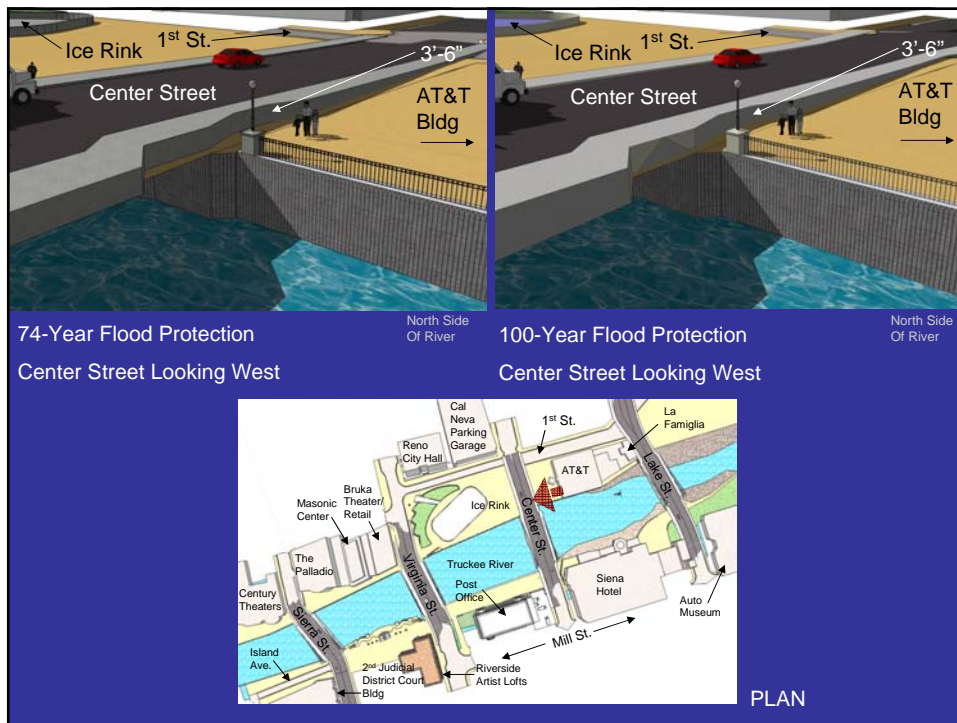
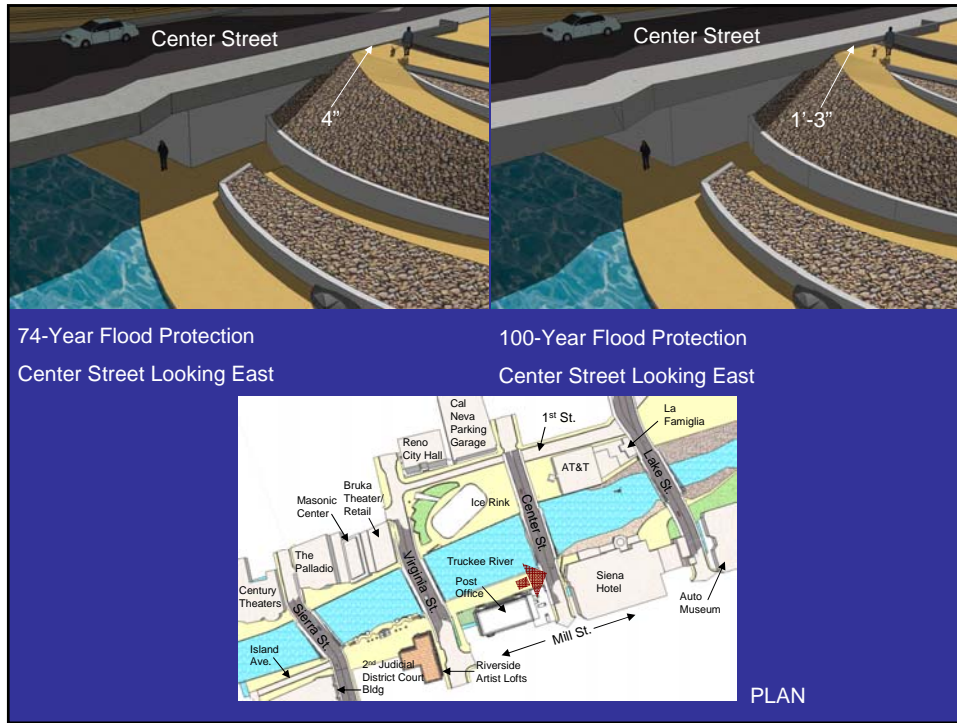
74-Year Flood Protection  
Virginia Street Looking West

100-Year Flood Protection  
Virginia Street Looking West

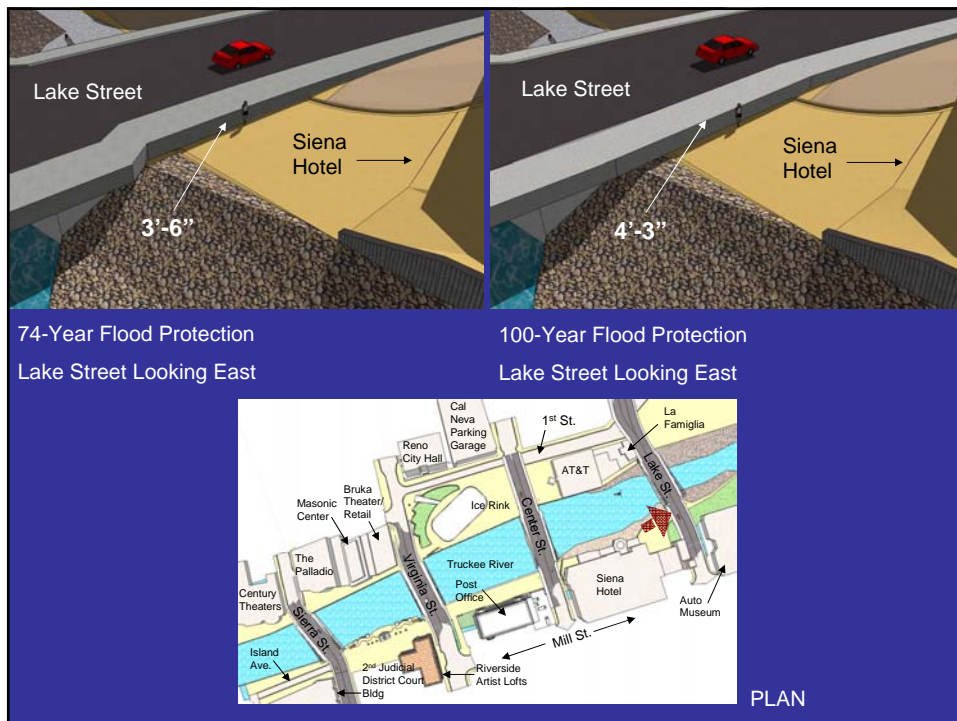
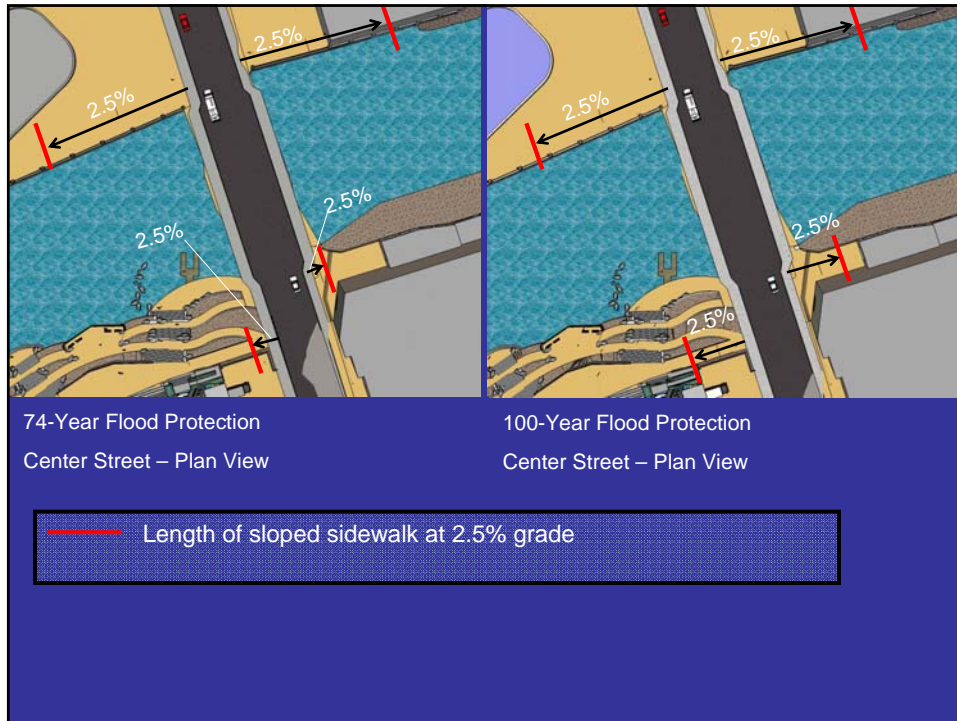
PLAN

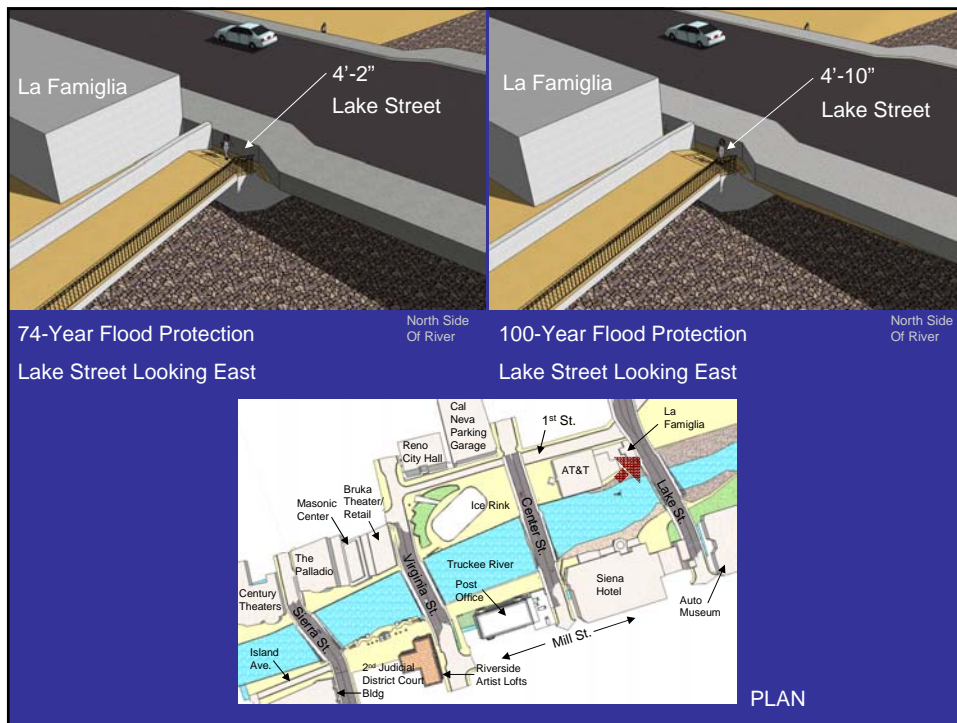
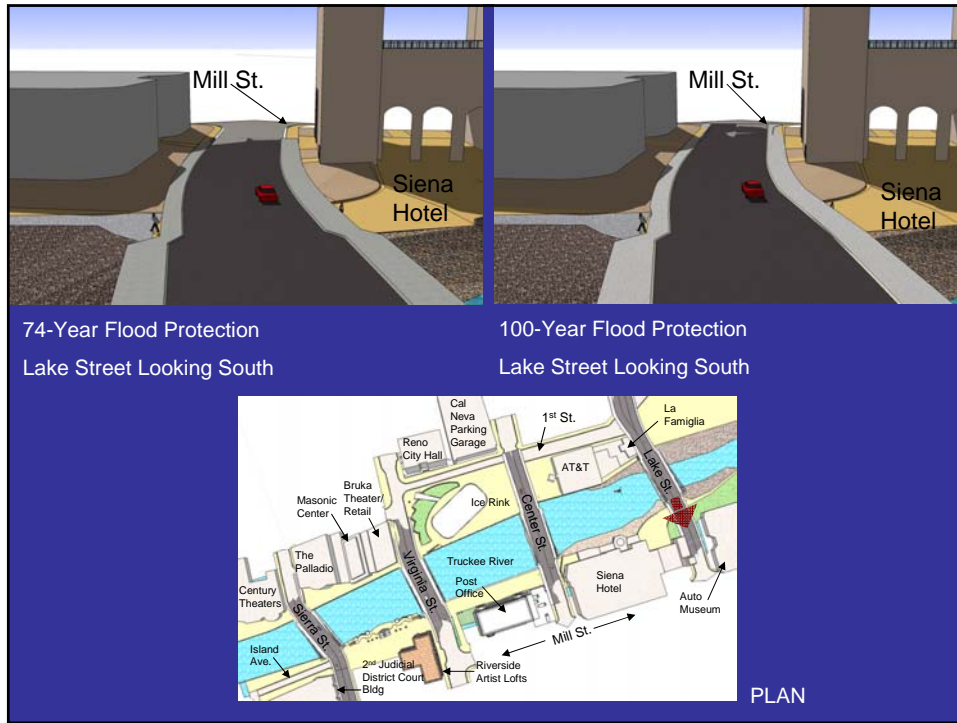


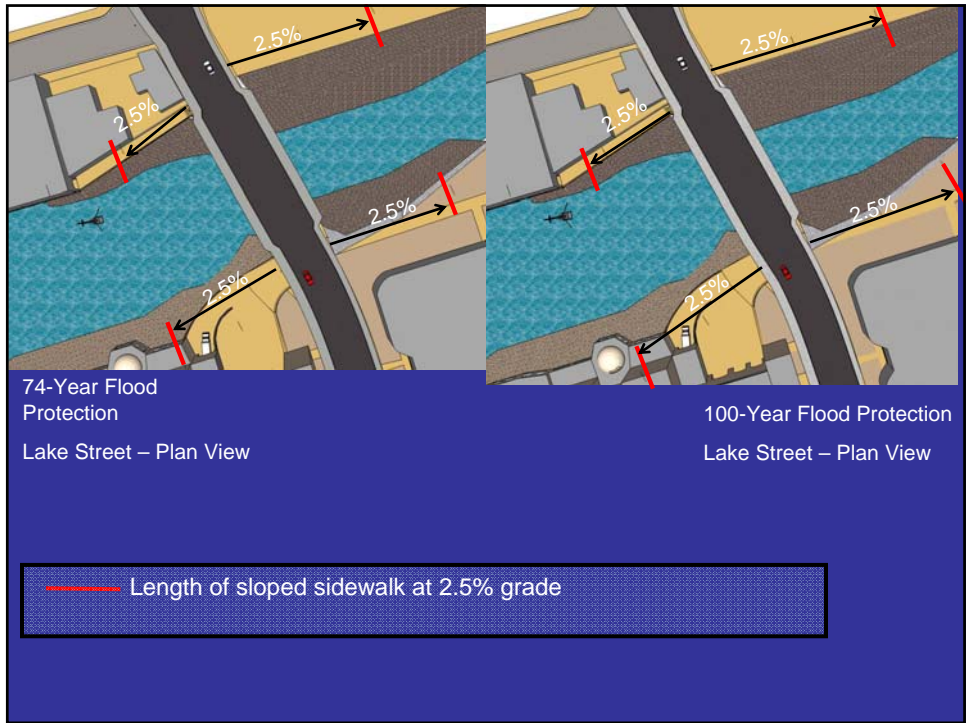



















All Bridges Planning Estimates				
Below (2-Span Conventional Highway Bridge); Above (Single Span Signature Bridge)				
Crossing	74-Year Flood Protection		100-Year Flood Protection	
	Below	Above	Below	Above
<b>Booth</b>	\$6,580,000	N/A	\$8,420,000	N/A
<b>Arlington</b>	\$19,000,000	N/A	\$21,250,000	N/A
<b>Sierra</b>	\$13,080,000	\$15,070,000	\$13,660,000	\$15,560,000
<b>Virginia</b>	\$13,020,000	\$15,370,000	\$13,670,000	\$16,000,000
<b>Center</b>	\$12,510,000	\$14,850,000	\$13,210,000	\$15,400,000
<b>Lake</b>	\$15,640,000	\$17,820,000	\$17,240,000	\$19,380,000
<b>TOTAL for 4</b>	<b>\$54,250,000</b>	<b>\$63,110,000</b>	<b>\$57,780,000</b>	<b>\$66,340,000</b>
<b>Assumptions:</b>				
All Estimates in 2008 Dollars.				
River-level pathway construction not included. Property costs included.				

## Freeboard Allowance




Freeboard Criteria	Cost Implications
<b>2 feet (highway bridge)</b>	Baseline
3 feet	+ ~ \$2M
4 feet (Corps)	+ ~ \$4M

## Cost Conclusions



- Above-Supported bridges ~\$10M more than Below
- 100-yr design ~\$3M more than 74-yr
- Either design may meet FEMA criteria
  - 74-yr reduces FEMA flood plain on some structures
  - 100-yr reduces FEMA flood plain on most structures








Q&A on Bridge Types/Flood Level Protection

TRUCKEE RIVER FLOOD PROJECT  
RENO CH2MHILL




**You wanted to know.....**

Other Flood Protection Strategies & Concepts Considered:

- ❖ Maintain existing conditions
- ❖ Upstream detention
- ❖ Dredging/channel widening
- ❖ Lift/moveable bridges

TRUCKEE RIVER FLOOD PROJECT  
RENO CH2MHILL



## Maintain Existing Conditions

- ❖ Risk of flooding impacts
  - ✓ Bridges closed, no access
  - ✓ Debris builds and adds to more water breaching structures, damage to structure
  - ✓ Building not flood-protected would be affected
- ❖ No change to downtown circulation for parking, bicycle or pedestrian access
- ❖ Replace bridges while keeping existing roadway elevation

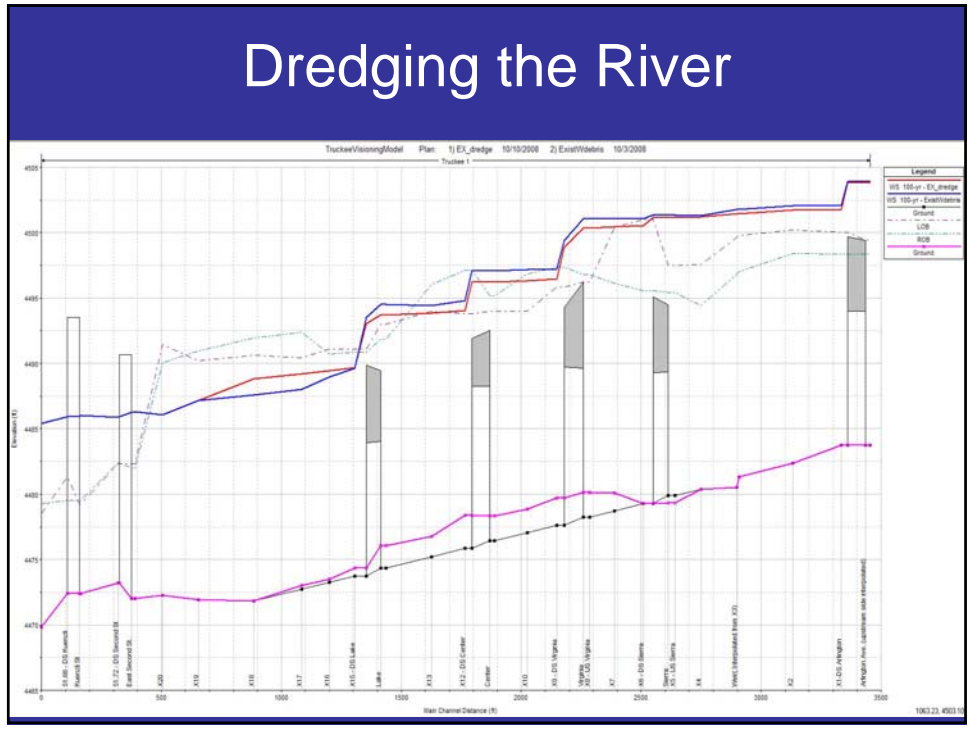


## Upstream Detention

- ❖ Increasing existing capacity in reservoirs only benefits in extreme events (400 –year flood event)
- ❖ Ability to change California/Lake Tahoe operating rules is institutionally complex and change is not guaranteed
- ❖ Fails cost/benefit analysis
- ❖ Evaluated in US Army Corps study and was eliminated








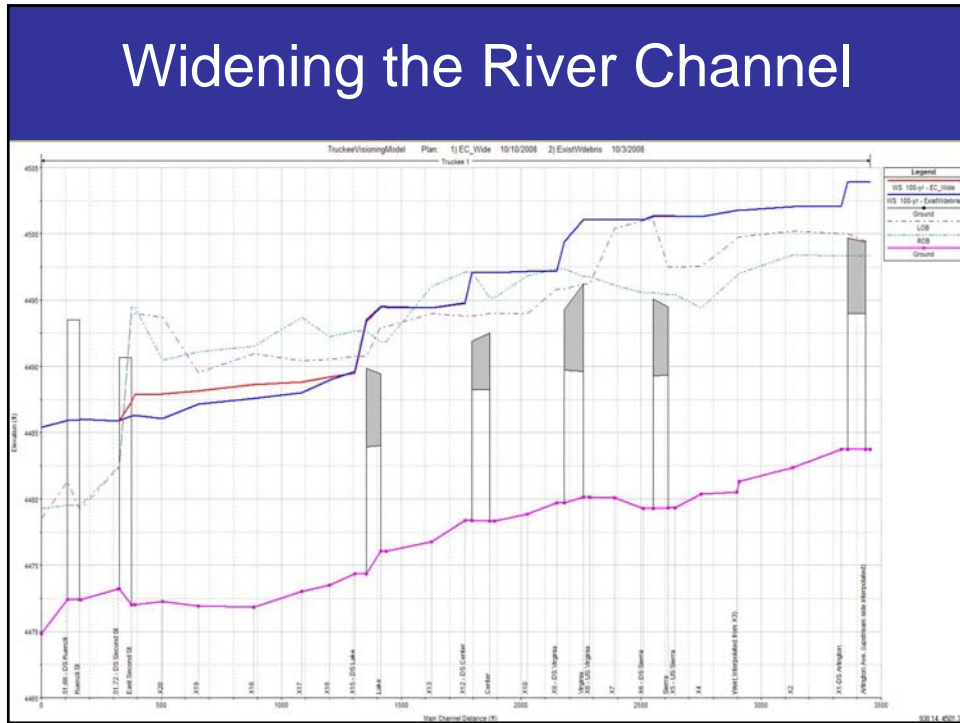
# Dredging the River

Other characteristics and outcomes:

- ❖ Stream fills back in following a storm event
- ❖ Long-term maintenance and environmental mitigation costs
- ❖ Adverse impacts to habitats
- ❖ Doesn't eliminate need to replace and rehabilitate deficient bridge and flood wall structures
- ❖ Existing bridge supports would be impacted









## Widening the Channel

Other characteristics and outcomes:

- ❖ Channel must be at least 50 ft on each side
- ❖ Property impacts on either side of river
- ❖ Requires reconstruction of bridge abutments, roadway approach, pathways
- ❖ Reduces velocity of the river flows
- ❖ Increases sediment deposit and build-up





# Lift/Moveable Bridges

- Usually used where there is ship traffic
- Noisy when vehicles travel across
- Construction is ~5 times more expensive
- Maintenance costs are higher
- May still require raising grades of roadway approaches

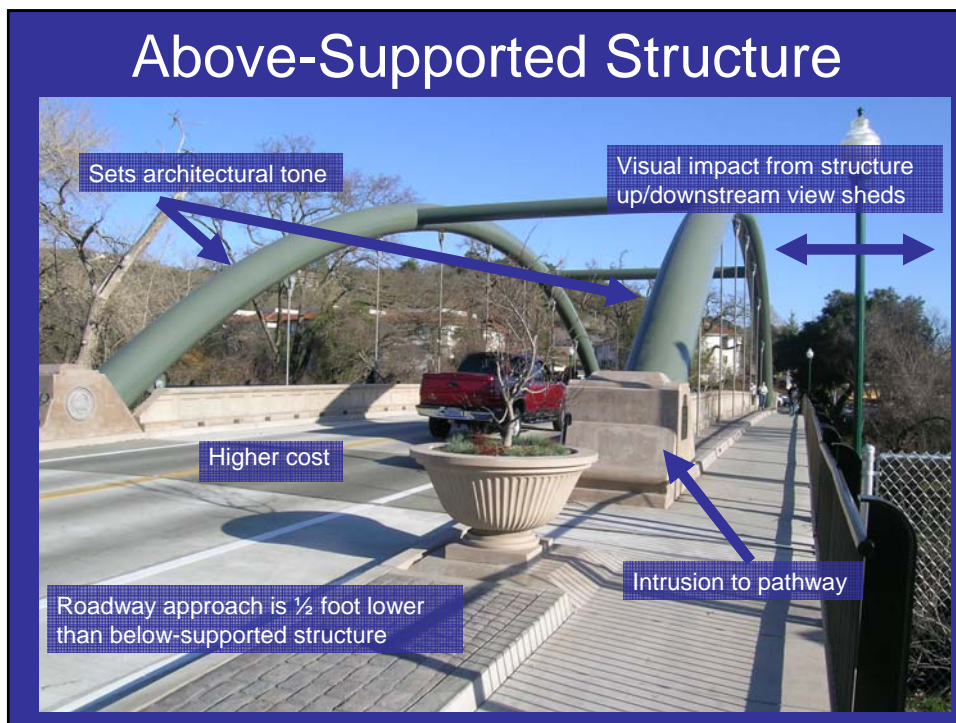
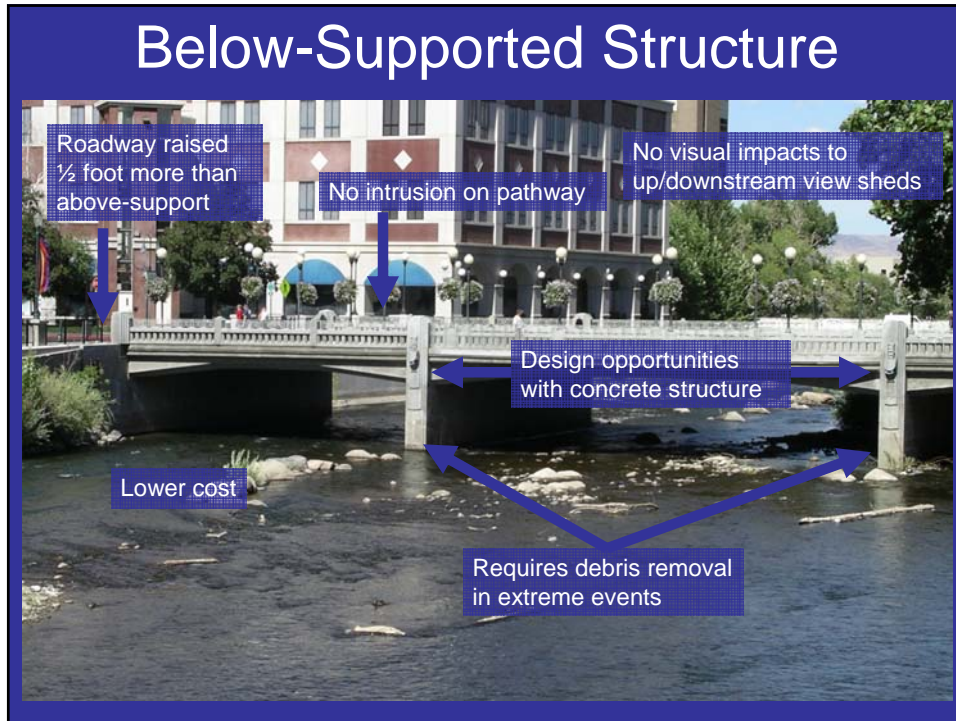


PRICKLE RIVER FLOOD PROJECT

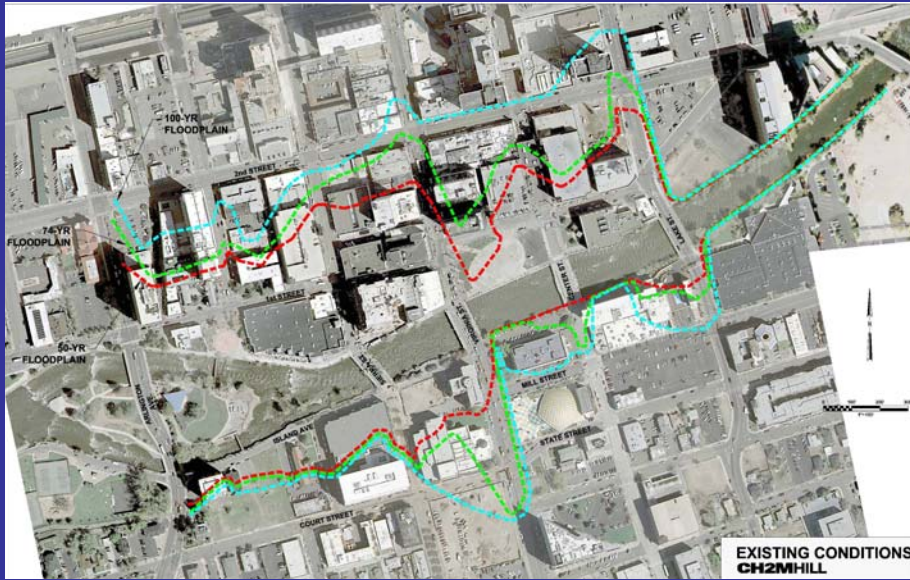
We now invite you to the remainder of the Open House for questions to staff.

A row of seven small images showing different views of bridges and river infrastructure. The images include various types of bridges, from simple spans to more complex structures, and views of the river and surrounding landscape.

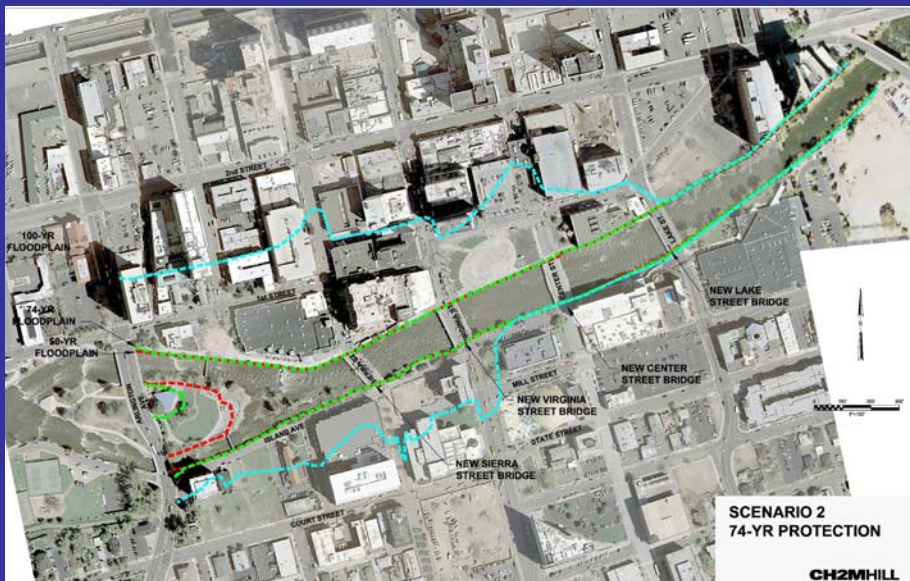




# What Floods with Today's Conditions

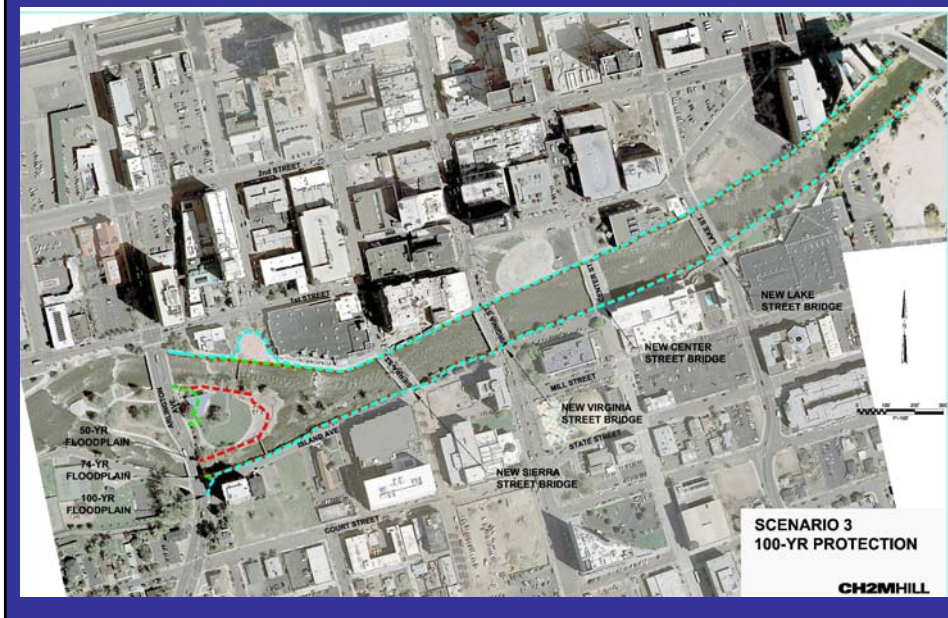


# 74-yr Flood Design Impacts





# 100-yr Flood Design Impacts



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Stampede Reservoir



Boca Reservoir



Tahoe Dam

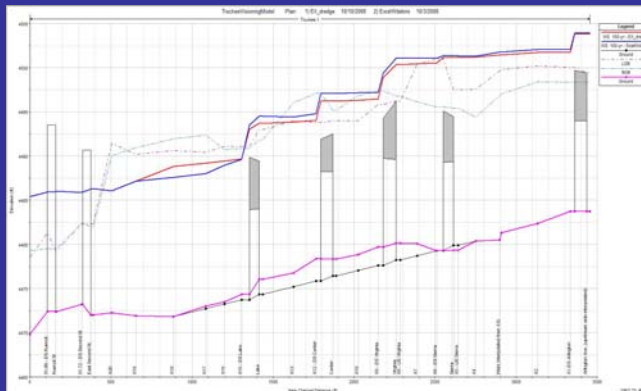
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