



# Reata Wash Flood Control Study

Newsletter May 2016

## STUDY PURPOSE

The purpose of the study is to identify and recommend flood control measures that will reduce flood risks to residents, property and public infrastructure in the Reata Wash floodplain. There are more than 4,600 residential, commercial and public buildings located within the floodplain that are at potential risk of flooding in accordance with the Federal Emergency Management Agency's (FEMA) National Flood Insurance Program (NFIP).

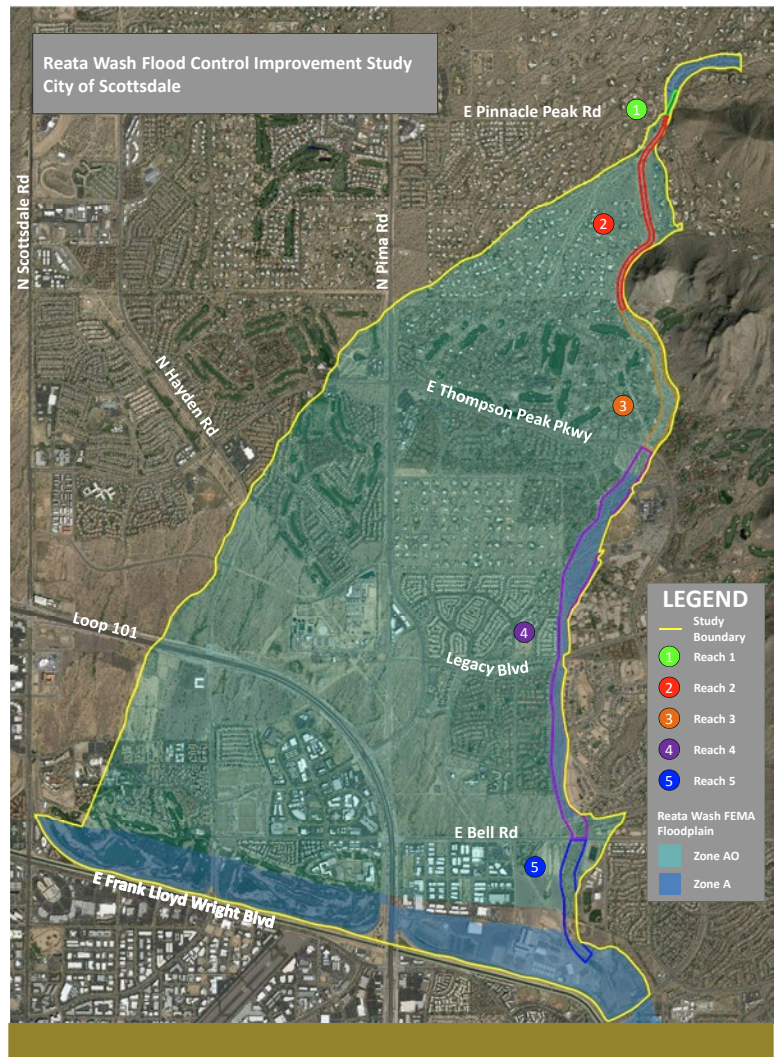
A secondary goal is to remove or reduce the size of the existing FEMA-designated floodplain. This would proportionately reduce the requirement for many property owners to purchase flood insurance. Within the Reata Wash designated floodplain, existing property owners are currently paying more than \$1.8 million annually in flood insurance premiums.

## WHY A COMPREHENSIVE SOLUTION IS NEEDED

Reata Wash is an active alluvial fan. Within an alluvial fan, stormwater runoff during a large storm event spreads out and flows down unpredictably along an interconnected series of smaller washes. These washes do not have the capacity to convey stormwater flows from a large, 100-year storm event. This level of storm represents a 1 percent chance of occurring in any given year. In Reata Wash, the 100-year flood is predicted to result in approximately 13,000 cubic feet per second (cfs) of stormwater runoff at the Pinnacle Peak Road crossing at the apex (or starting point) of the alluvial fan. This is the equivalent to 100,000 gallons of stormwater passing through every second. As a result, the stormwater can spread out unpredictably – putting people and properties at risk.

In response to this level of risk, flood control improvements were constructed along some portions of the Reata Wash corridor in conjunction with master-planned developments. However, some gaps remain in areas that were developed prior to any overall flood control improvement plan being considered. These gaps are located primarily within the upper and lower portions of Reata Wash.

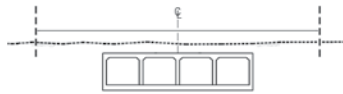
A comprehensive flood control solution is needed to close these gaps and properly convey stormwater within the entire wash corridor. A comprehensive solution will protect the thousands of properties currently at risk. It will also allow for the re-delineation of the FEMA regulatory floodplain by demonstrating that the flood risk has been mitigated.



## FLOOD CONTROL CONVEYANCE OPTIONS EVALUATED

The study team evaluated several different types of flood control improvements to convey stormwater along the wash. These options vary in width and the type of material lining the drainage channel. The options evaluated include:

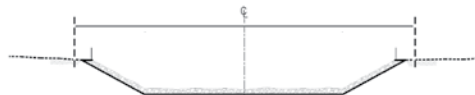
- A covered box culvert (100-foot-wide corridor). Stormwater is carried in a box culvert buried below ground. This is the most expensive option to construct.
- A concrete U-channel (100-foot-wide corridor). Stormwater is carried in an open, concrete channel. A handrail or fence would be required along the channel for safety reasons. This is the second most expensive option to construct.
- A grouted rock channel (120 to 180-foot-wide corridor). This is an open channel lined with large rocks that are grouted in place. This option also requires a handrail or fence along the channel, due to the grade of the slope. This option is about two-thirds the cost of the concrete U-channel to construct and less than half the cost of the box culvert.
- An earthen channel (330 to 380-foot-wide corridor). An earthen channel may include buried bank protection. This channel type exists along some portions of the wash today. It is the least expensive option, but requires a larger channel width and additional land rights, which adds to overall costs and potential impacts.
- An earthen channel with levees (460-foot-wide corridor). This is an earthen channel with the addition of low berms on one or both sides to contain stormwater. This is the widest channel option which requires the most land, and adds to potential costs and impacts.



100' Covered Box Culvert Corridor



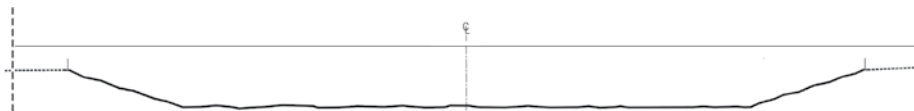
100' U-Channel Corridor



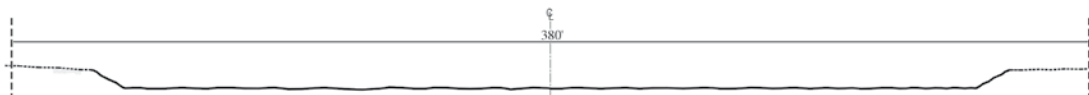
120' Grouted Rock Channel Corridor



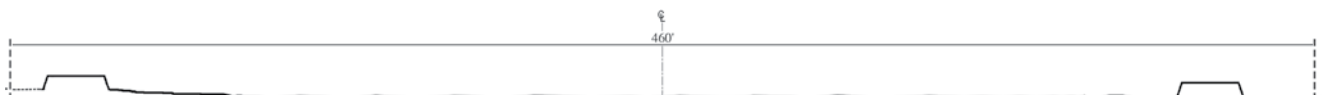
180' Grouted Rock Channel Corridor



320' Earthen Channel Corridor



380' Earthen Channel Corridor



460' Earthen Channel Corridor with Levees

The Reata Wash has been divided into five segments – or reaches. The conveyance options were evaluated for technical feasibility within each reach. A major consideration for each option is the available City land rights along the wash, because this affects both the cost of a project and the impacts to adjacent properties. The current City rights along the wash vary between 100 and 450 feet, with the narrowest segment within Reach 2 in the upper wash. Along some portions of the upper wash, the City does not have any existing land rights. The City would need to acquire additional land rights from adjacent properties to make drainage conveyance improvements.

## OPTIONS ELIMINATED

The two widest channel options were eliminated from consideration based on the initial analysis: the 380-foot earthen channel and the 460-foot earthen channel with levees. The remaining channel options were further evaluated by reach based on the available City land rights. These options are listed below.

## POTENTIAL IMPROVEMENT OPTIONS BY REACH

The following options are being considered along each reach of Reata Wash. Please note these are the options that are technically feasible but may not represent the most cost-effective or publicly-acceptable solution. These options will be further refined and a preferred flood control alternative will be recommended to Council for consideration. The recommendation will be based on an analysis of the cost, technical and environmental considerations and the community's input.

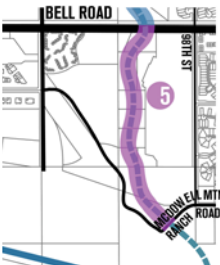
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## REACH 5 (CENTRAL ARIZONA PROJECT TO BELL ROAD)

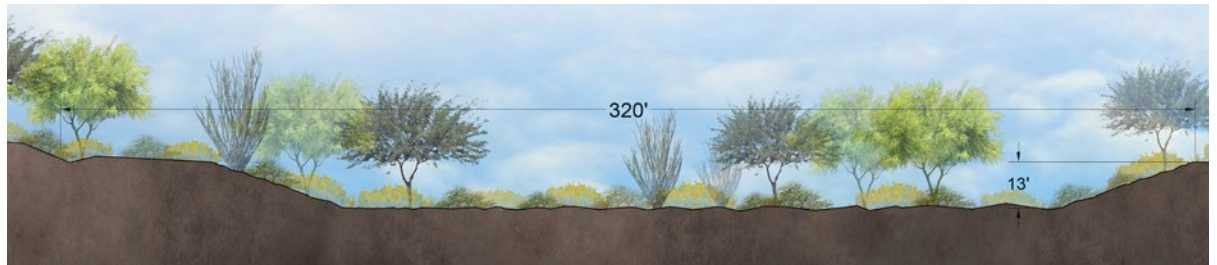
Improvements are needed along the entire reach and include:

- Channel improvements: New earthen channel with buried bank protection.
- A new concrete drop structure, which helps reduce erosion.
- A new sediment basin to collect the sediment from the drainage corridor.

### KEY MAP



### EARTHEN CHANNEL



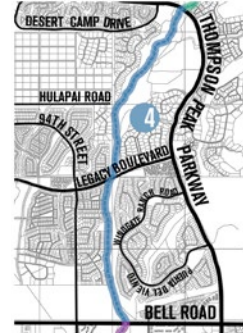


## REACH 4 (BELL ROAD TO THOMPSON PEAK PARKWAY)

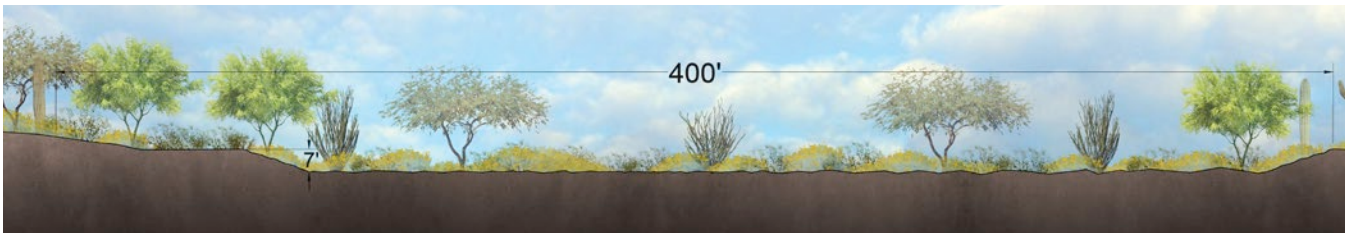
The majority of this reach has an existing earthen channel. Additional field investigations are needed along some locations of the existing channel to determine if it meets FEMA guidelines for flood protection. Minor updates to some existing flood control structures along the drainage corridor will be needed to meet FEMA guidelines. These include:

- Increasing the height of the existing Bell Road levee by approximately 1 foot.
- An increase in levee height or new floodwalls in other locations.
- Additional buried bank protection along some sections of the wash to create stable side banks.

### KEY MAP



### EXISTING EARTHEN CHANNEL

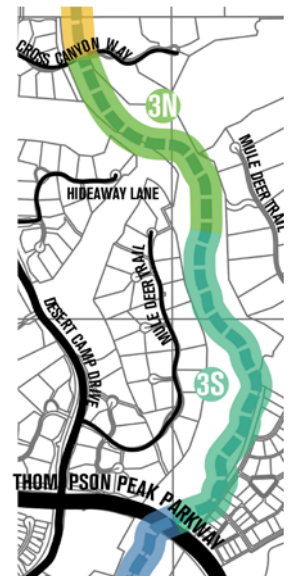


## REACH 3 (THOMPSON PEAK PARKWAY TO CROSS CANYON WAY)

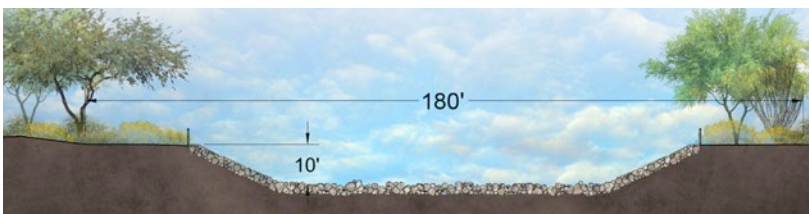
The southern part of this reach has an existing earthen channel. Minor improvements will be needed along the channel to meet FEMA guidelines, including new buried bank protection along the west bank, and updates to the existing buried bank protection on the east bank. The wash channel along the northern part of this reach needs to be improved and connected with improvements in Reach 2 to the north. The following channel options are being considered in the northern section of Reach 3:

- A new Covered Box Culvert.
- A new Concrete U-Channel.
- A new Grouted Rock Channel.

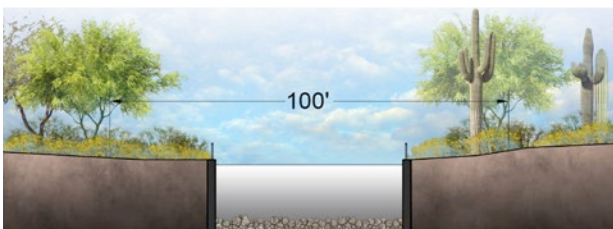
### KEY MAP



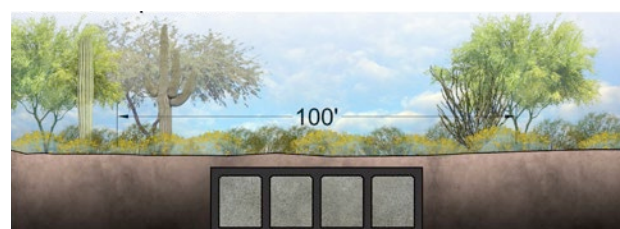
### OPTION A: GROUTED ROCK CHANNEL (NORTH) LOWEST COST



### OPTION B: U-CHANNEL (NORTH) 1.6 X MORE \$ THAN A



### OPTION C: BOX CULVERT (NORTH) 2.3 X MORE \$ THAN A

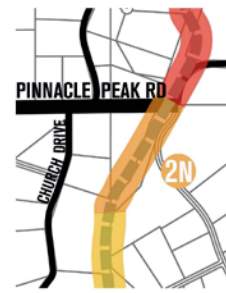


## REACH 2 (CROSS CANYON WAY TO PINNACLE PEAK ROAD)

No flood control structures currently exist in Reach 2, and improvements are needed along the entire reach. Different options are being considered in the southern and northern sections of Reach 2, based on the existing City land rights. In the northern section, the City has 100 feet (width) of land rights. In the southern section, additional land rights would need to be acquired for the potential improvements. The following options are being considered in Reach 2:

- A new Covered Box Culvert – Option for Reach 2 north and south.
- A new Concrete U-Channel – Option for Reach 2 north and south.
- A new Grouted Rock Channel – Option for Reach 2 south only.

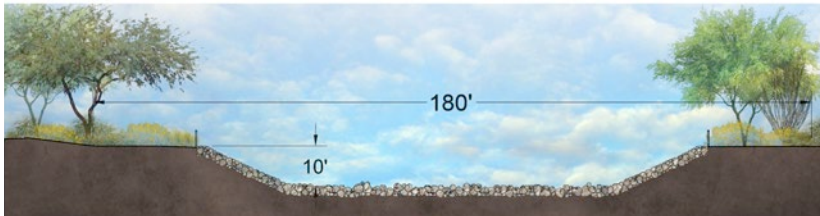
KEY MAP: NORTH



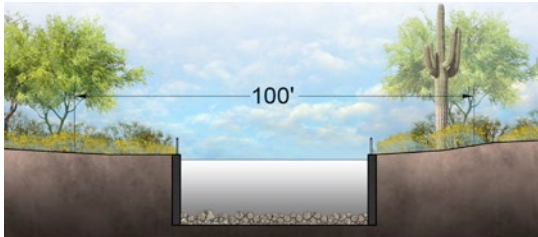
KEY MAP: SOUTH



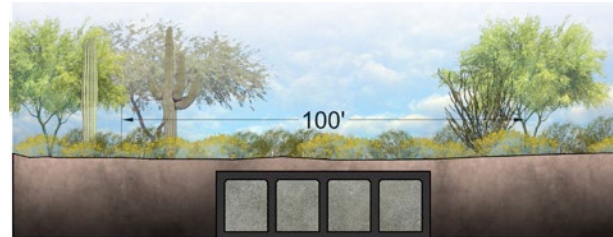
### OPTION A: GROUTED ROCK CHANNEL (SOUTH) LOWEST COST



### OPTION B: U-CHANNEL (NORTH & SOUTH) 1.6 X MORE \$ THAN A



### OPTION C: BOX CULVERT (NORTH & SOUTH) 2.3 X MORE \$ THAN A



This area also includes the Dobson Wash. An outlet structure is proposed to maintain stormwater flows in Dobson Wash to meet federal environmental regulations.

## REACH 1 (NORTH OF PINNACLE PEAK ROAD)

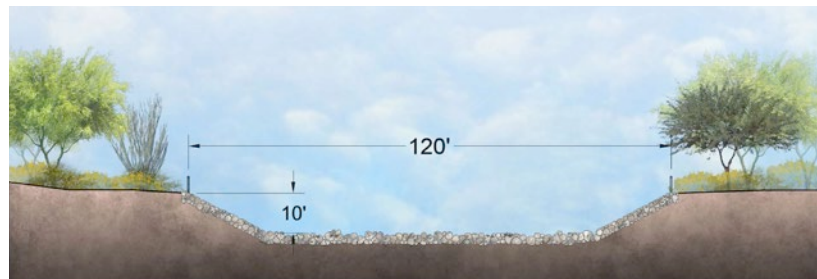
Some flood control structures exist in Reach 1, which is upstream of the Pinnacle Peak Road Bridge. Proposed improvements being considered include:

- A new Grouted Rock Channel.
- A new floodwall to direct stormwater into the channel.

KEY MAP



GROUTED ROCK CHANNEL





**Reata Wash Flood Control Improvement Study**  
**City of Scottsdale**  
**Proposed Flood Control Improvements with Existing**  
**and Proposed FEMA Floodplains**

**LEGEND**

- New Conveyance Corridor
- Existing Conveyance Corridor Alignment
- New Box Culvert at Dobson Wash
- Existing Reata Wash FEMA Floodplain/Study Boundary
- Existing FEMA Floodplain – Outside Study Boundary
- Proposed New FEMA Floodplain
- Existing Environmental Diversion Culverts

N Scottsdale Rd

E Pinnacle Peak Rd  
 2 Options  
 Box Culvert  
 Concrete 'U' Channel

Additional Rights-of-Way Required

3 Options  
 Box Culvert  
 Concrete 'U' Channel  
 Grouted Rock Channel

Local Minor Improvements are Required

Beardsley Wash Floodplains

Proposed Reata Wash FEMA Floodplain

Rawhide Wash Floodplain

E Bell Rd

E Frank Lloyd Wright Blvd

Loop 101

Legacy Blvd

E Thompson Peak Pkwy

N Hayden Rd

N Pima Rd



## ESTIMATED COST OF FLOOD CONTROL IMPROVEMENTS

A comprehensive flood control solution for Reata Wash is estimated to cost approximately \$47-69 million to design and construct. This cost does not include acquisition of land rights. The study team will prepare cost estimates for the flood control options, as well as a cost-benefit analysis of the recommended alternative.

There is no funding currently identified for any flood control improvements. If the Council recommends the study be moved forward as a project, funding would need to be identified and the Council would need to allocate any funds. The City would seek County, State and Federal funding partners for a project.

## COMMUNITY BENEFITS OF FLOOD CONTROL IMPROVEMENTS

The overall benefits to the community will be evaluated along with the cost of a potential project.

Major benefits include:

- Reduction in flood risk to thousands of homes and businesses, as well as public buildings and public infrastructure. There are more than 4,600 public and private buildings and public infrastructure in the floodplain.
- Anticipated re-mapping of nearly all properties out of the existing Reata Wash FEMA regulatory floodplain. Approximately 80 structures would likely remain in the floodplain. This would eliminate the federal requirement for property owners with a federally-backed mortgage to purchase flood insurance. This would save property owners in the Reata Wash floodplain \$1.8 million annually in flood insurance premiums based on current rates.

- Increased public safety and improved access on roadways during storms.
- Reduced costs to the City to repair public infrastructure and clean up debris and sediment after major storms.

## CRITERIA FOR FLOOD CONTROL IMPROVEMENTS

The following criteria will be used to determine a recommended flood control solution to Scottsdale City Council:

- A FEMA-compliant solution to reduce flood risk throughout the current FEMA floodplain.
- Maximize the acres and properties removed from the FEMA floodplain based on the reduced risk.
- Minimize adverse impacts to private properties.
- Compliant with environmental requirements.
- Context-sensitive and compatible with the character of the desert environment.
- Meet Flood Control District of Maricopa County (FCDMC) guidelines, as they will be a potential source of funding.
- Cost-effective design that maximizes the use of taxpayer funds.
- Acceptable to the community.

*A comprehensive flood control solution will contain stormwater within Reata Wash and protect properties in the floodplain.*



## NEXT STEPS

The study team is seeking input from the community about these potential flood control options. Once that input is received, the team will complete additional technical and environmental evaluation of the options. Based on the technical analysis and community's input, the team will identify the recommended alternative for the Reata Wash corridor and prepare a design concept and cost analysis. Staff anticipates presenting the recommended alternative to City Council in late 2016 for its consideration and action.

## COMMUNITY INVOLVEMENT AND OPPORTUNITIES FOR INPUT

The City held a public meeting in March 2016 to determine the importance of addressing flood risk in Reata Wash. The team has also been meeting with homeowners associations and other stakeholders to discuss the study and the flood control options being considered in their community. The majority of attendees said it is important to reduce flood risk and to reduce or eliminate the FEMA floodplain to eliminate the requirement for flood insurance. The City is holding a public meeting May 18, 2016 to seek the community's input on the flood control options currently being considered. All property owners in the Reata Wash floodplain were mailed a notice of the meeting.

If you were unable to participate in these meetings, you can visit the study web page or contact the study team for more information and to provide your input.



## GET INVOLVED

For more information or to sign up for the study e-mail list to receive updates and notices of community meetings visit:  
[www.scottsdaleaz.gov](http://www.scottsdaleaz.gov), Search (Reata)

## QUESTIONS OR COMMENTS

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