# Hydrology Overview
# North Portion of DC Ranch

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COPPER STATE ENGINEERING, INC.

DC Ranch Community Council
December 7, 2020

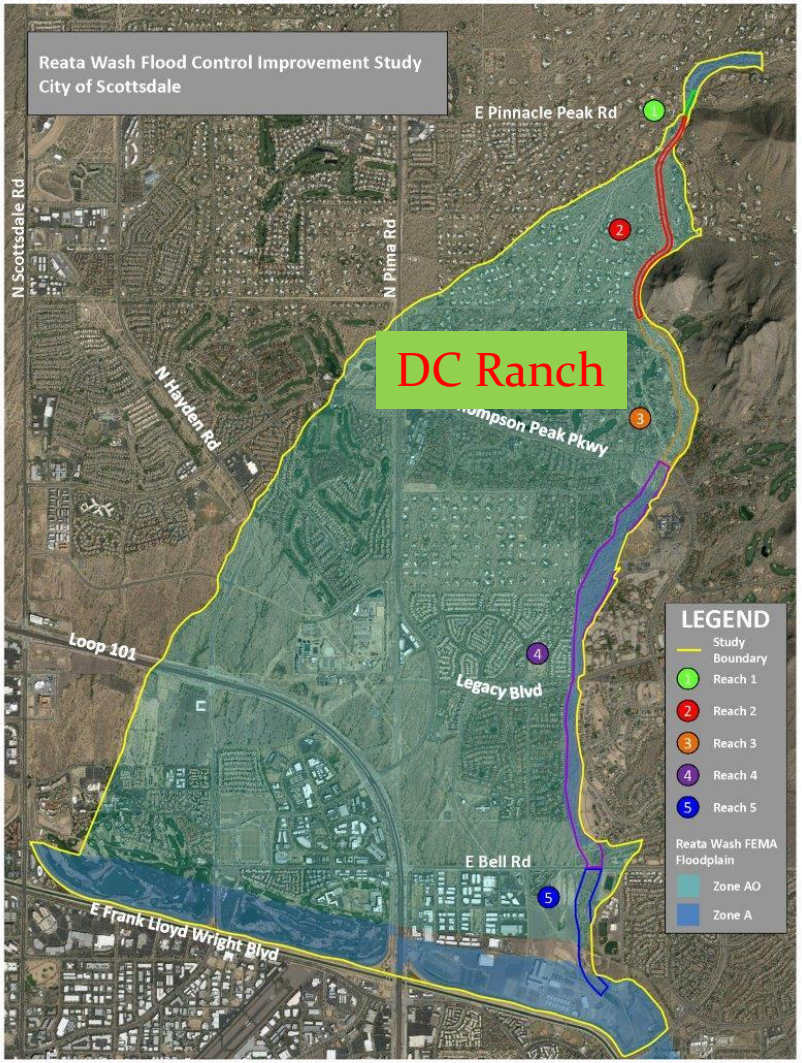
# City of Scottsdale

## Flooding Risks Identified

The Reata Wash floodplain poses significant flood risks to people, properties and infrastructure in north Scottsdale. The Reata Wash floodplain is a geologic alluvial fan feature where stormwater and sediment travel down irregular terrain and spread out unpredictably in a fan shape.

Properties and structures within the floodplain are at some risk of flooding from a major storm event. Flooding will vary depending on where the water spreads across the fan floodplain. In addition, several major transportation arterials – including Pima Road, Thompson Peak Parkway and Pinnacle Peak Road – are likely to be impassible and potentially damaged following a major storm.

# Reata Wash Flood Control Improvement Study



# Area of interest between Pinnacle Peak Vistas and north side of DC Ranch

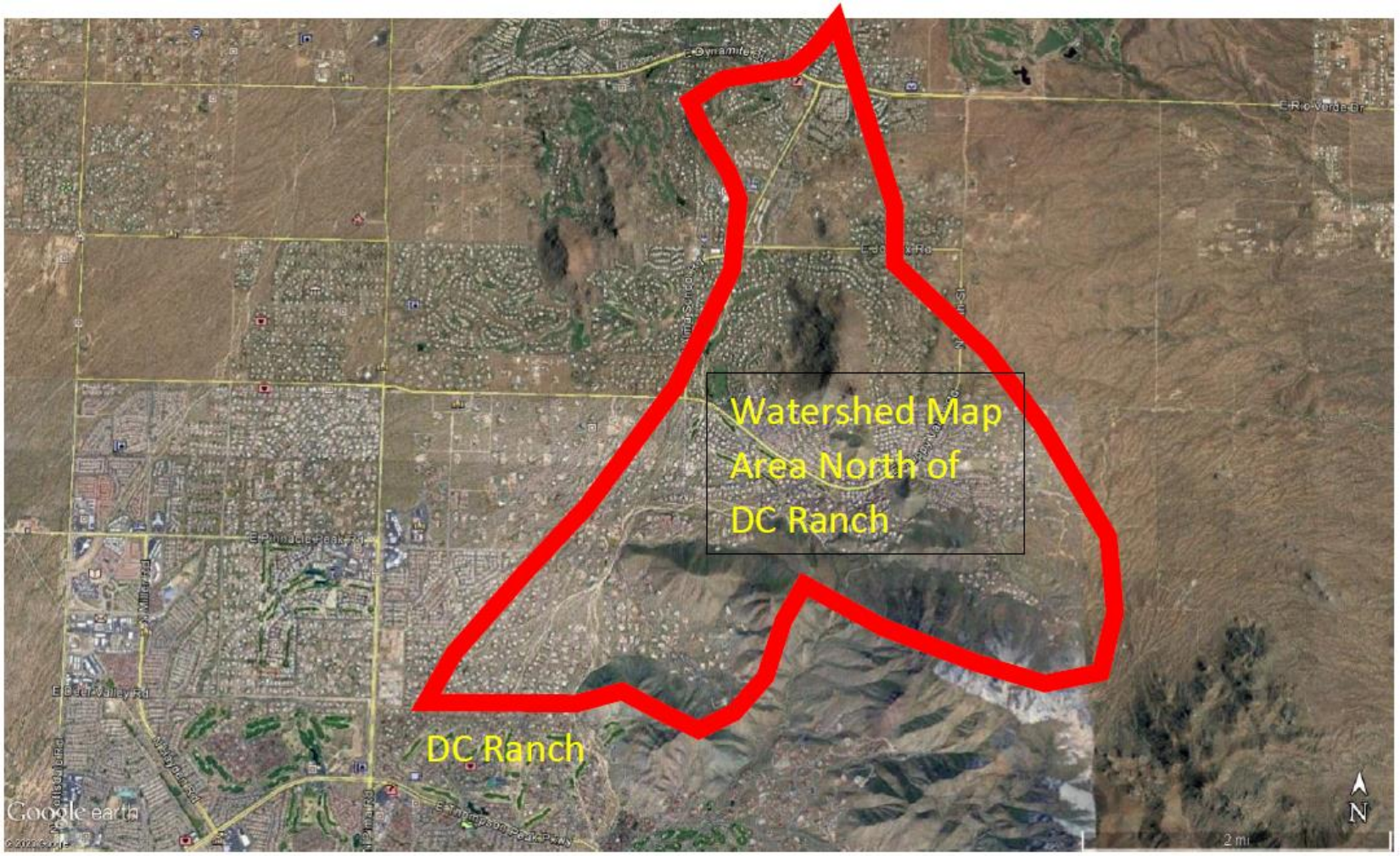
# 9-23-2019 Pinnacle Peak Vistas storm damage along E. Adobe Drive. Two-year storm?

# 9-23-2019 Pinnacle Peak Vistas storm damage along E. Adobe Drive

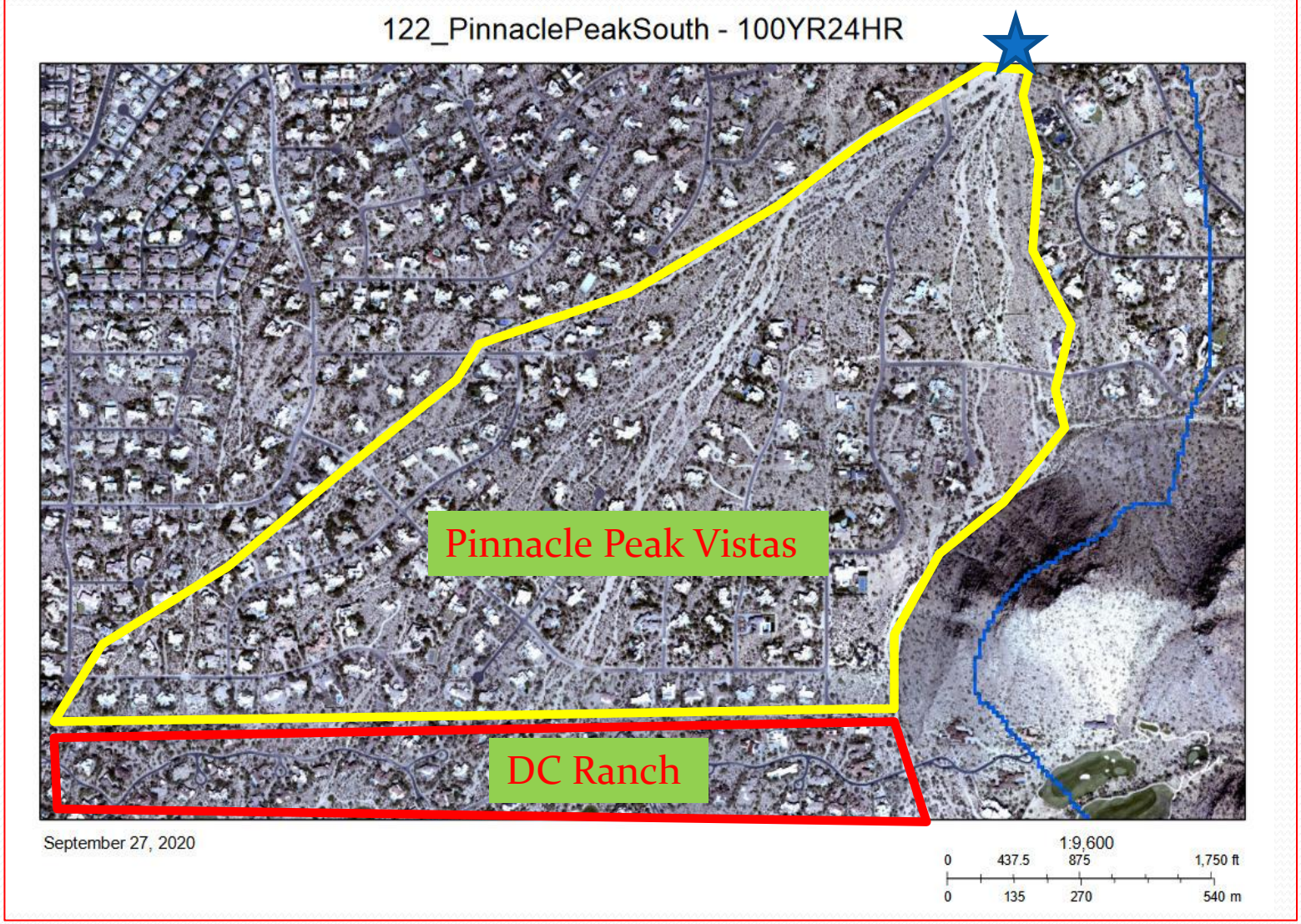
# 9-23-2019 DC Ranch storm damage north of Desert Camp Drive

# 9-23-2019 DC Ranch storm cleanup

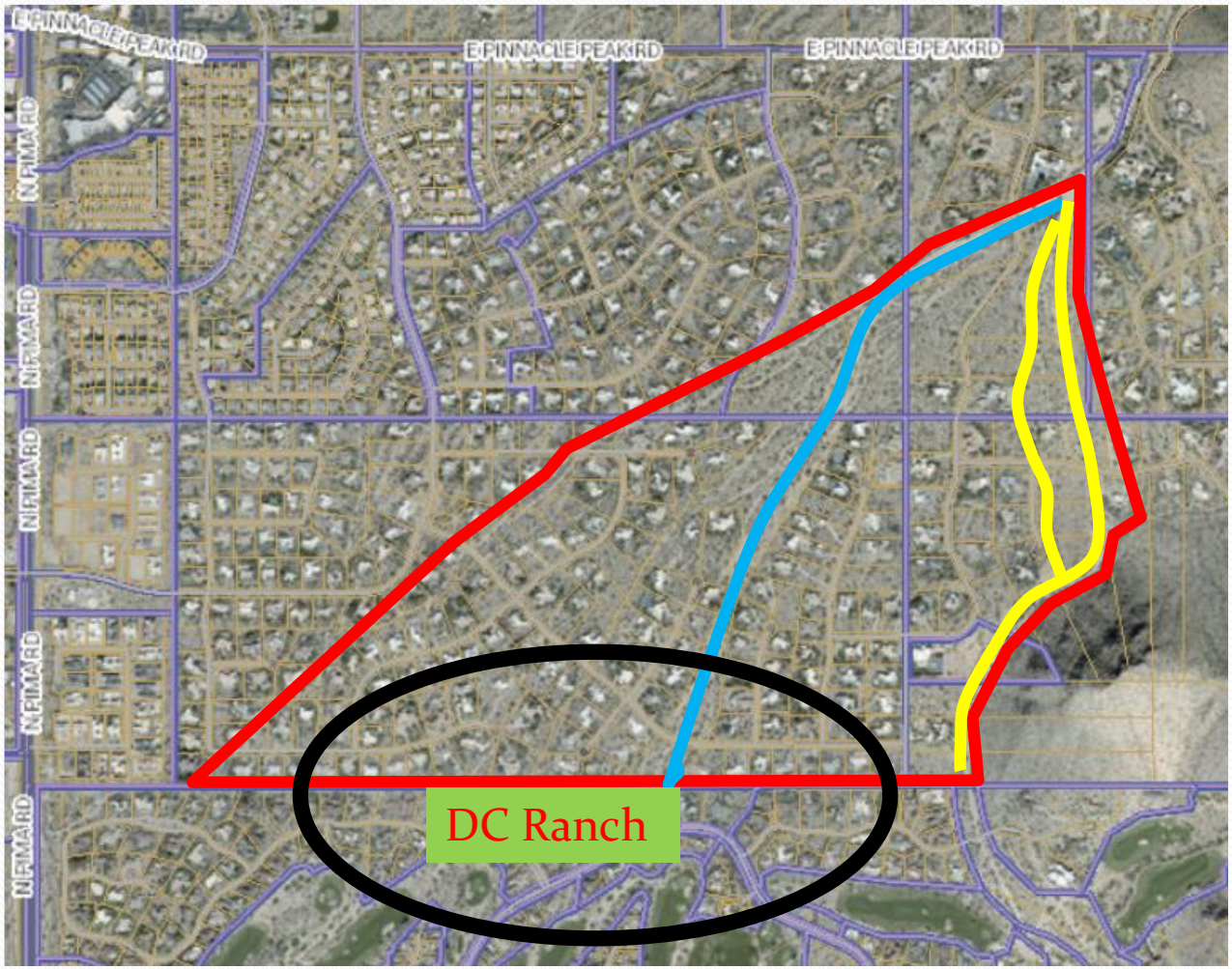
# 8.5 square mile watershed above north portion of DC Ranch



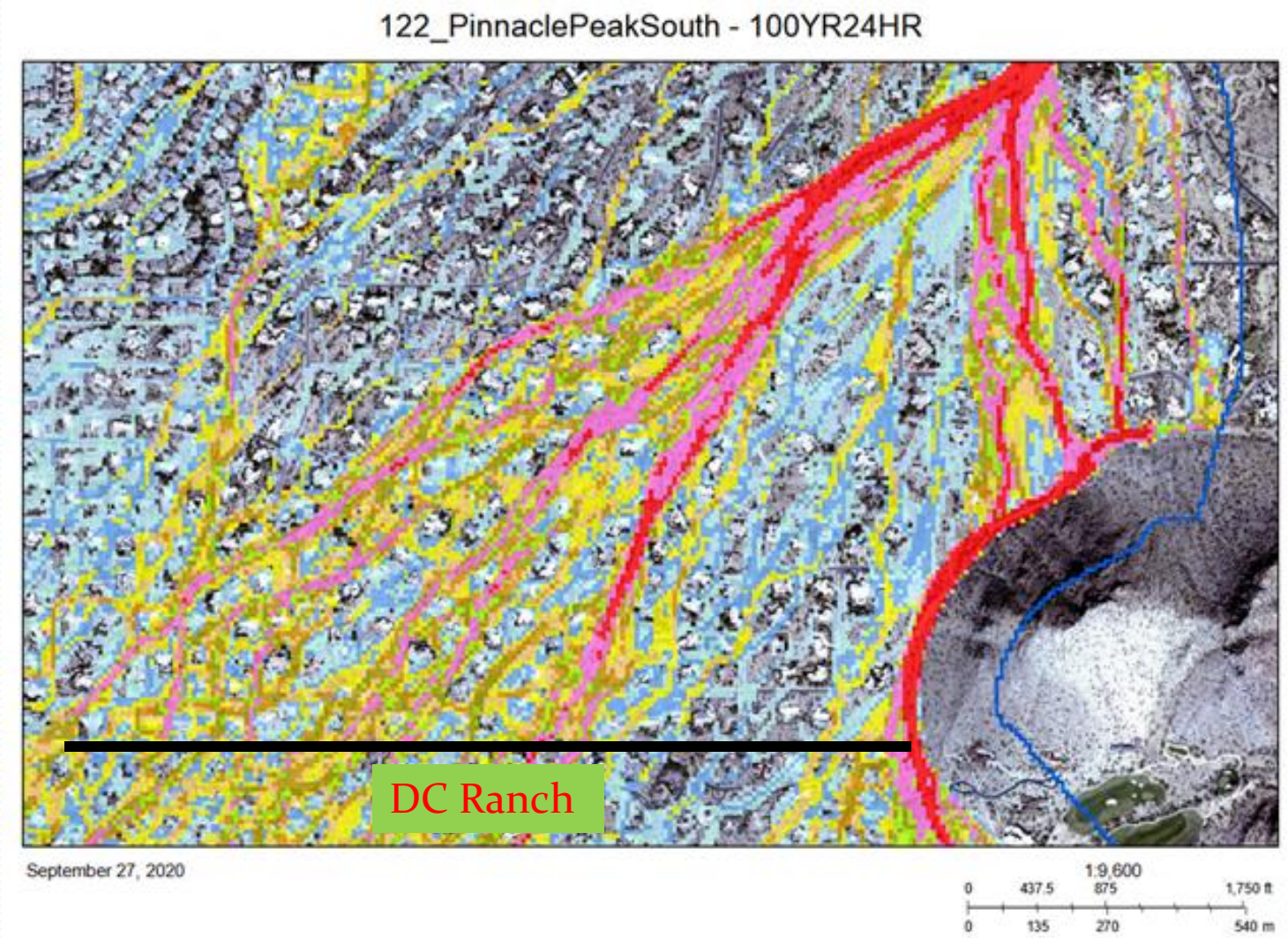
# Reata Alluvial Fan upstream from DC Ranch
# 6.7 square mile watershed upstream of blue star



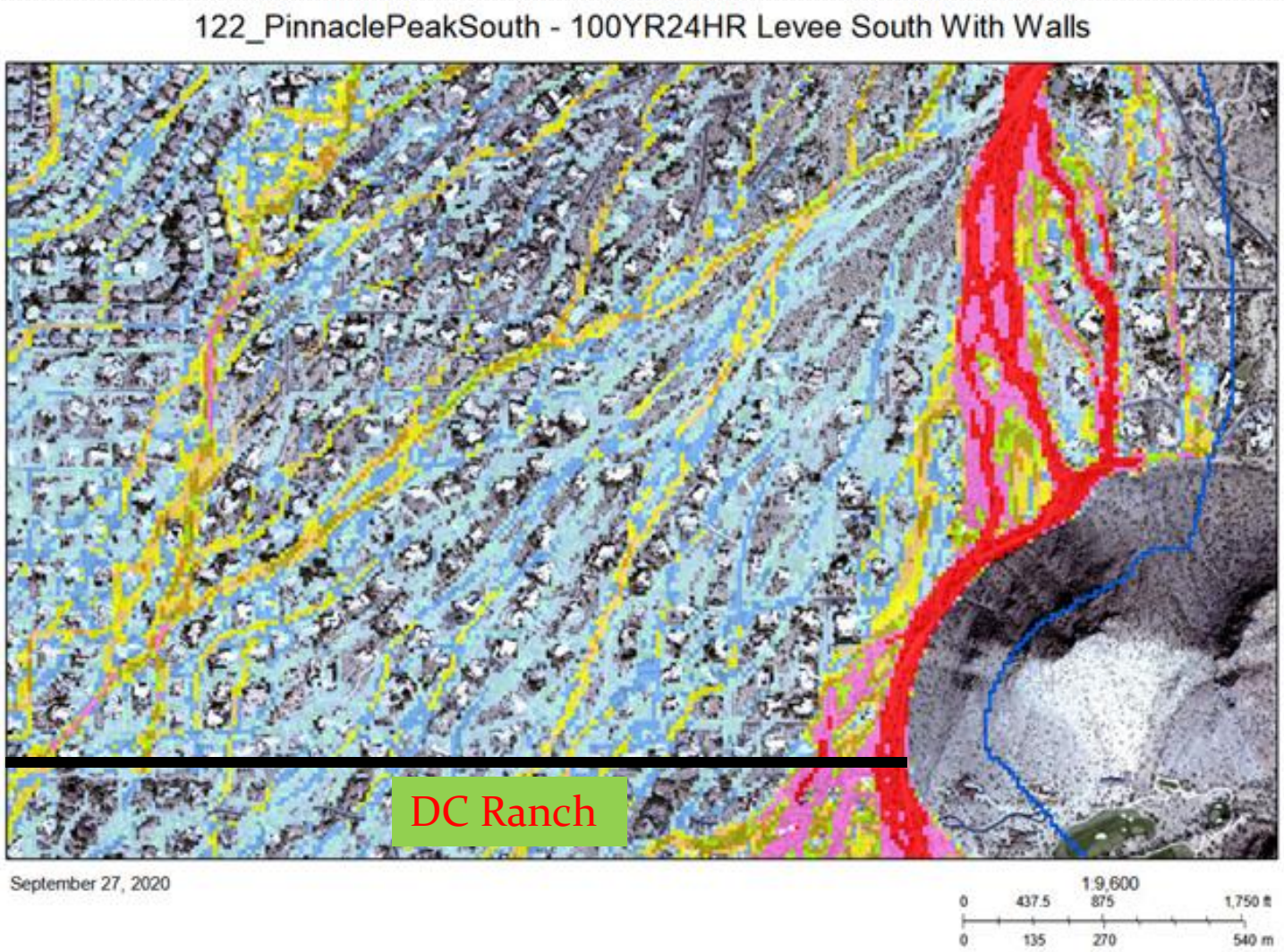
# Reata Alluvial Fan
# Dobson Wash (blue) and Reata Wash (yellow)



# Current Conditions – Pinnacle Peak South (PPS)

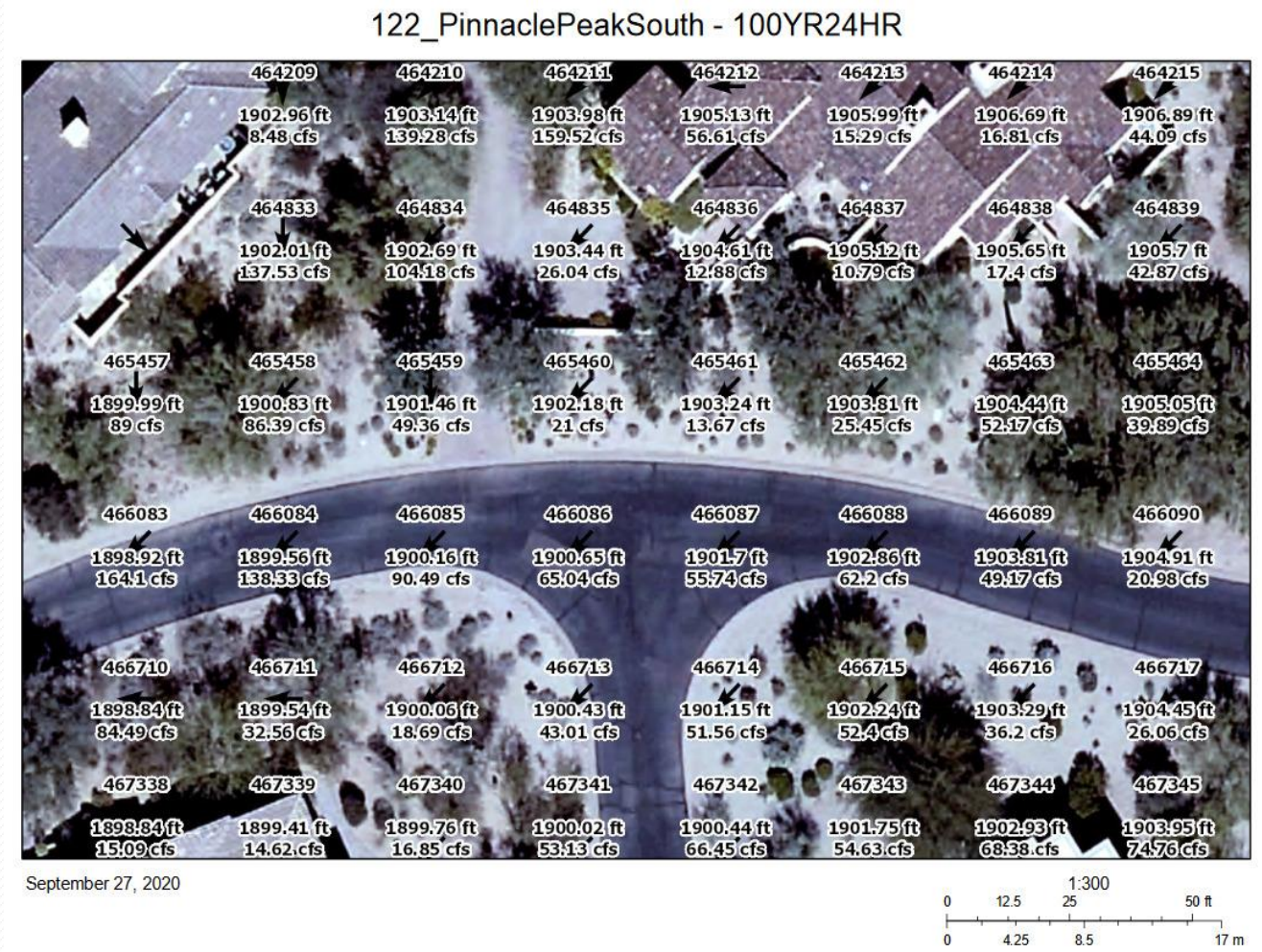


# Future Levee South With Walls (PPS S Levee)

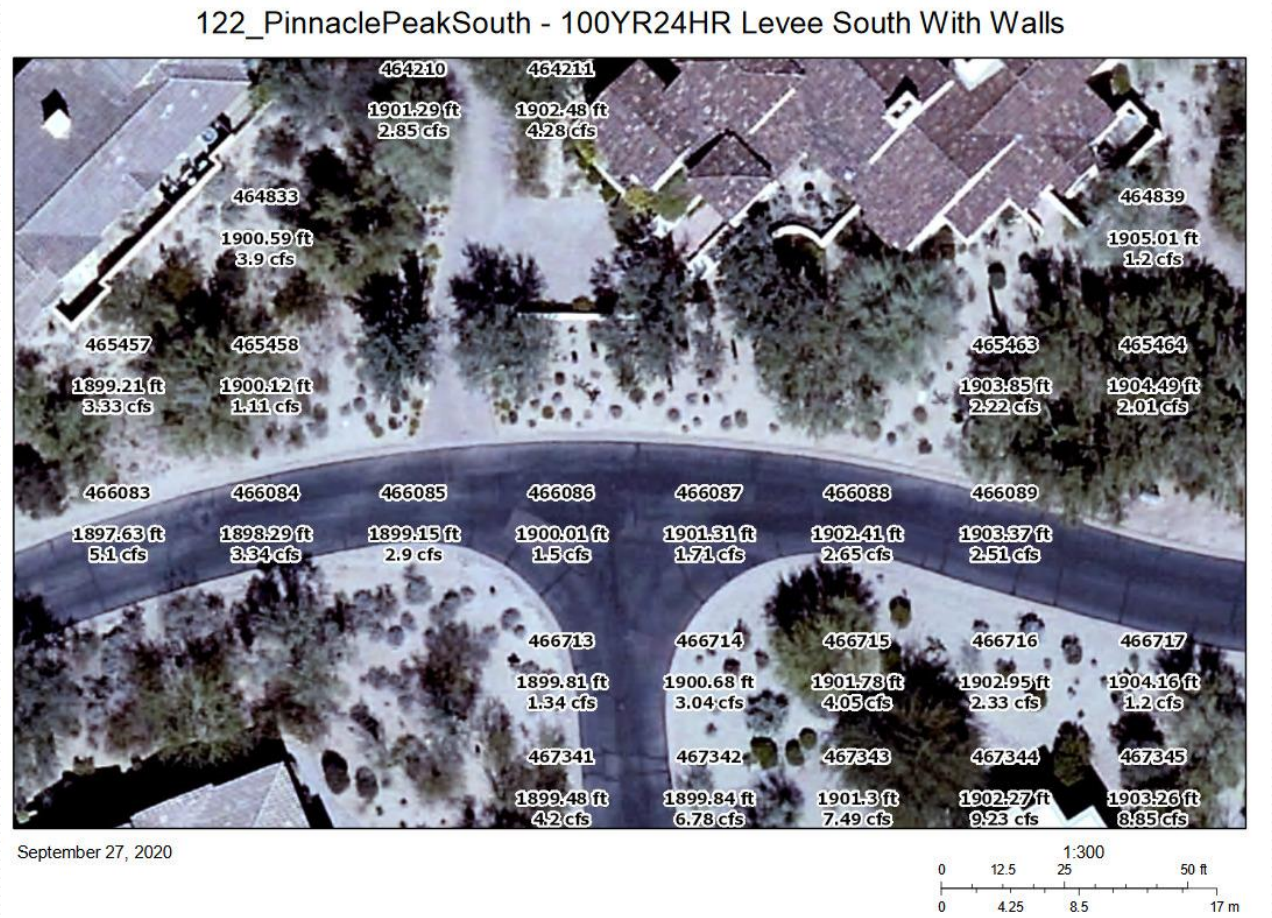


# Current Conditions along Cattle Whip Drive (PPS model-flow depth and velocity)

# Current Conditions along Cattle Whip Drive (PPS model-flow quantity)



# Future Levee South With Walls along Cattle Whip Drive (PPS S Levee - flow quantity)



# Reata Wash
# Flood Control Improvement Study

Contract No. 2014-168-COS

## Design Concept Report
## Volume I - Report
**November 2, 2016**

Prepared for:

Capital Project Management
7447 East Indian School Road, Suite 205
Scottsdale, AZ. 85251

Prepared By:

WOOD/PATEL
MISSION: CLIENT SERVICE™

Wood, Patel & Associates, Inc.
2051 West Northern Avenue, Suite 100
Phoenix, Arizona 85021


EXPIRES 12-31-16

## Project Information

**Budget:** $2,256,000

**Sponsoring Division:** Stormwater & Floodplain Management

**Funding Source:** General Fund

## Contact Information

**City of Scottsdale - Capital Project Management**

7447 E. Indian School Road

Scottsdale, AZ 85251

P: 480-312-7250

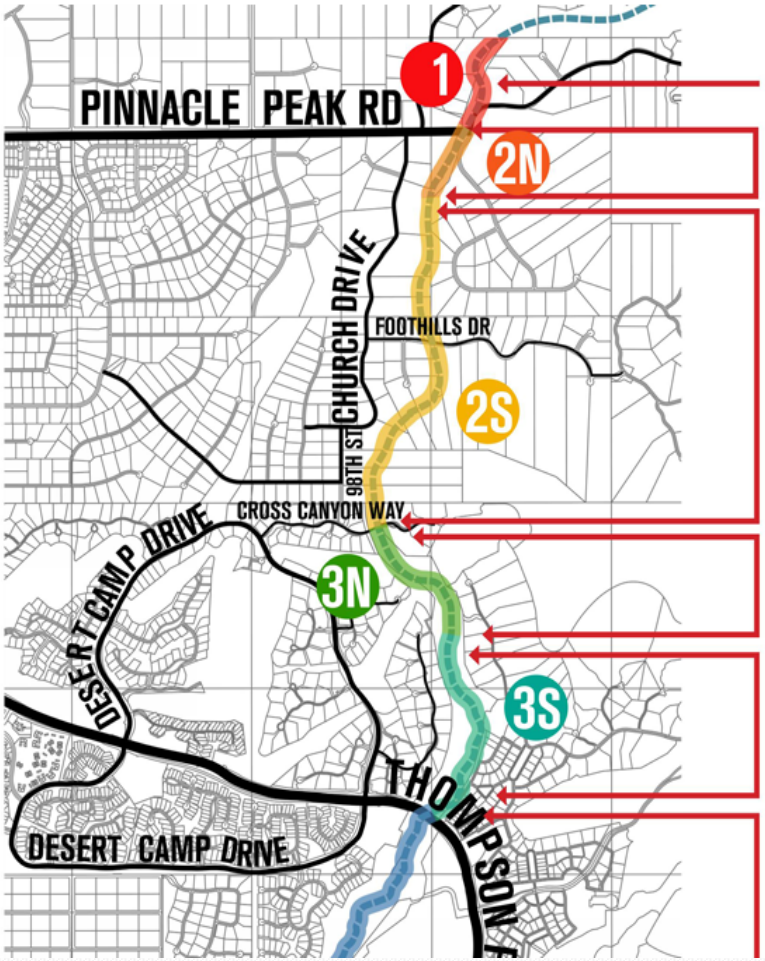
Reata Wash Flood Control Improvement Study

# *Recommended Solution*

*The Reata Wash Flood Control Improvement Study recommends an alignment which is 27,800 feet in length. Various channel section improvements were selected as recommended options for satisfying technical drainage conveyance criteria.*
*The Recommended Solution includes the following:*

*Reach 1 - 'U' Channel with concrete retaining walls and Grouted Rock invert from Station 300+00 to Pinnacle Peak Road*
*Reach 2 - Concrete 'U' Channel from Pinnacle Peak Road to Station 278+00 and Grouted Rock Channel from Station 278+00 to Reach 3*
*Reach 3 - Grouted Rock Channel from Reach 2 to Station 209+00, Bank Protection Enhancements from Station 209+00 to Thompson Peak Parkway*
*Reach 4 - Levee and Bank Protection Enhancements from Thompson Peak Parkway to Bell Road*
*Reach 5 - Earthen Trapezoidal Channel from Thompson Peak Parkway to McDowell Mountain Ranch Road*

## Overall Plan




New floodwall to prevent water from breaking out to the southwest.

New 1,000-foot hard lined U-channel with a grouted rock bottom.

New 1,350-foot concrete U-channel and a concrete channel transition structure.

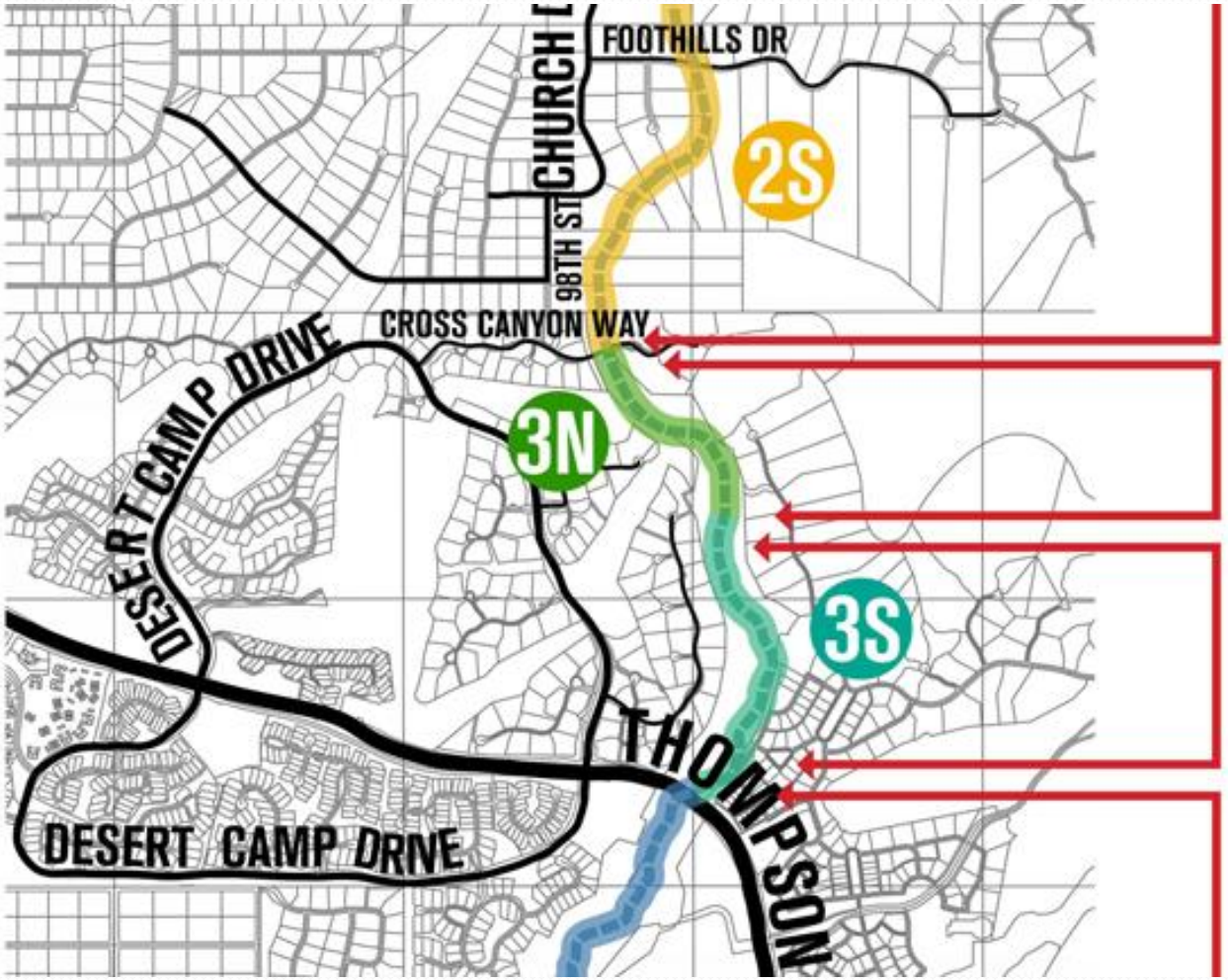
New diversion wall to direct a portion of the stormwater from the Reata Wash corridor to Dobson Wash.

New grouted rock trapezoidal channel. New culvert at Foothills Drive.

New grouted rock trapezoidal channel. New culvert at Cross Canyon Way.

Enhanced buried bank protection on the east bank.

New buried bank protection and surface bank protection along portions of the west bank.



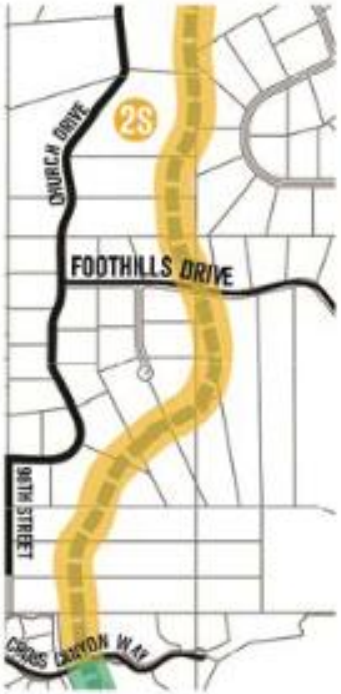

New grouted rock trapezoidal channel.
New culvert at Foothills Drive.

New grouted rock trapezoidal channel.
New culvert at Cross Canyon Way.

Enhanced buried bank protection on the east bank.

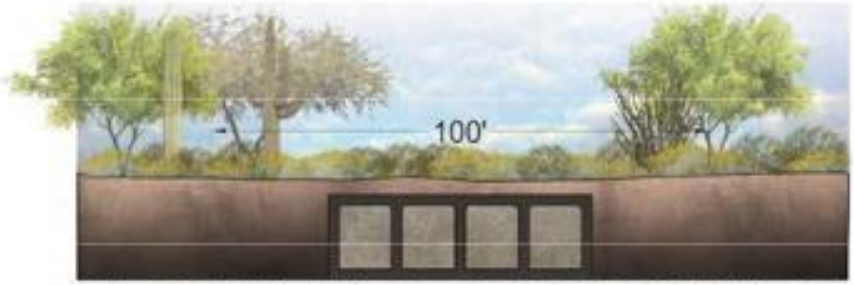
New buried bank protection and surface bank protection along portions of the west bank.

# REACH 2 SOUTH




KEY MAP


RECOMMENDED SOLUTION &
ALTERNATIVE B: GROUTED ROCK CHANNEL



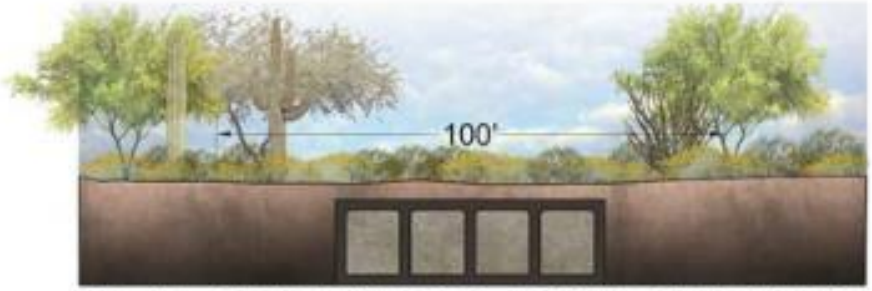

ALTERNATIVES C: BOX CULVERT

*Figure 8.3 Reach 2 South Landscape*

# REACH 3 NORTH


RECOMMENDED SOLUTION &
ALTERNATIVE B: GROUTED ROCK CHANNEL

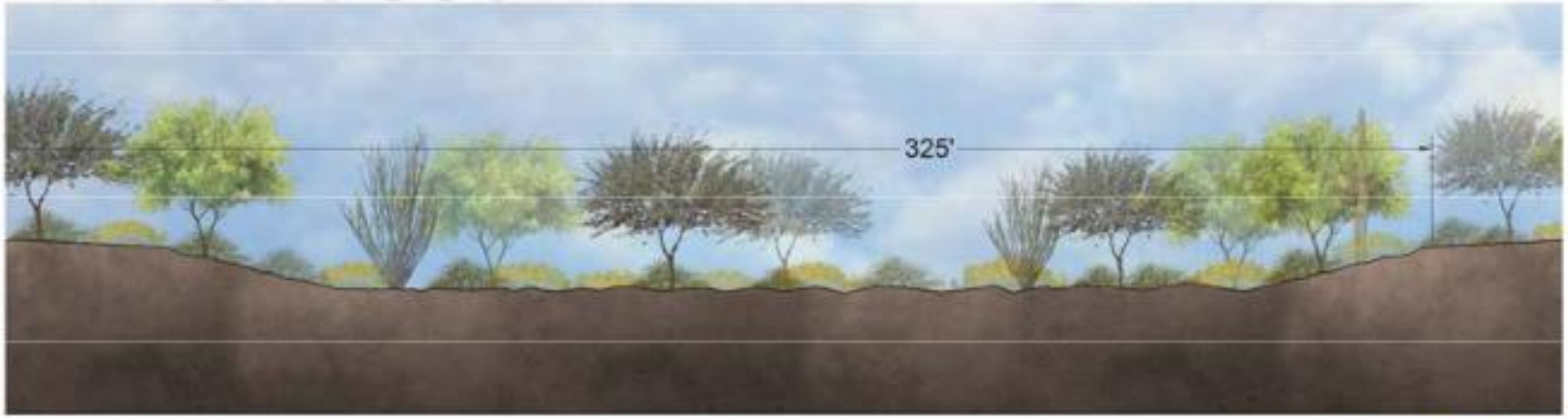

KEY MAP




ALTERNATIVES C: BOX CULVERT

*Figure 8.4 Reach 3 North Landscape*

# REACH 3 SOUTH




EXISTING EARTHEN CHANNEL TO REMAIN


*Figure 8.5 Reach 3 South Landscape*


*Figure 16.2 Dobson Wash Release (Reach 2)*

**Preliminary Opinion of Probable Construction Cost ( 15% Design Level)**

| Study Reach | Amount |
|---|---|
| Reach 1 | $2,319,627 |
| Reach 2 North Segment | $6,251,201 |
| Reach 2 Middle Segment | $5,393,183 |
| Reach 2 South & Reach 3 North Segments | $13,826,003 |
| Reach 3 South Segment | $2,103,788 |
| Reach 4 | $3,264,249 |
| Reach 5 | $9,823,685 |
| **Grand Total** | **$42,981,734** |

*Land Right Acquisition costs not included*

***Table 19.1 Recommend Solution***

# CSE Conclusions

Based on the recent geometry of the flow split in the two washes as evidenced by the PSS Flo-2D modelling, the flows into the Parcel 4.1 portion of DC Ranch cannot be accommodated by the existing hydraulic infrastructure including pipes and culverts. This is true even if the pipes and culverts are maintained free of debris and sediment, and the spit in west wash and south wash flows at the apex of the alluvial fan remain similar to the PSS Flo-2D conditions.

# CSE Conclusions

Because of the as of yet unrealized original upstream mitigation assumptions made in the hydrologic and hydraulic designs for DC Ranch, portions of the development are at risk of flooding damage in the event of a significant storm. Hopefully the City of Scottsdale's Reata Wash Flood Control Project will provide mitigation after it is designed, funded and constructed.

# CSE Conclusions

In CSE's opinion, the N. Church Road crossing of the west wash in the alluvial fan upstream of DC Ranch is critical to managing flooding problems in the north Parcel 4.1 portion of DC Ranch until the future Reata Wash Flood Control Project is completed. From our aerial photo review it appears that after significant flow events there is erosion on the downstream slope of the N. Church Road crossing of the west wash, and it appears that this erosion is then repaired with new imported fill to protect the paved road wash crossing.

# CSE Conclusions

CSE recommends that DC Ranch monitor the N. Church Road crossing of the west wash to confirm that the head cutting in the west wash does not capture more flow from the south wash. This can be done by reviewing MCAS yearly aerial photos or by driving by the site. Perhaps a line of communication can be established between the two developments to discuss storm activities if one does not already exist.

# CSE Conclusions

CSE also recommends that DC Ranch monitor City of Scottsdale progress on the design, funding and construction of the PPS S Levee future mitigation (Reata Wash Flood Control Project) and communicate this to the home owners that are currently impacted by the lack of originally anticipated flood control measures.

# UPDATE

- **May 2, 2019**
- The Reata Wash flood control project will not be part of the city of Scottsdale's November 2019 bond package. While the DC Ranch Community Council and many residents lobbied for its inclusion, two Scottsdale citizen groups threatened to boycott the bond if the Reata Wash project was included.
- Scottsdale's mayor, several city council members and the city manager have stated their commitment to finding a way to get the Reata Wash improvements completed. The city has issued a contract that will result in preliminary design, a firm cost estimate and allow the city to seek approval from the Federal Emergency Management Agency. This work is expected to take 12 months to complete.
- Once complete, funding options to build this important regional flood control project will be brought back for consideration by the community and the City Council.