

CAVE BUTTES DAM OUTLET CHANNEL

FCD GAGE ID# 19507

STATION DESCRIPTION

LOCATION – The dam is located near what would be the intersection of Happy Valley Road and 16th Street. The gage is located on the east side of the main dam structure across Cave Creek Wash. Latitude 33° 43' 15", Longitude 112° 02' 43". Located in the NW1/4 SW1/4 SW1/4 S03 T4N R3E in the Union Hills 7.5-minute quadrangle.

ESTABLISHMENT – January 25, 1984

DRAINAGE AREA – 195.7 square miles

GAGE – The gage is a pressure transducer and it is located about 5 feet upstream from the footbridge in the outlet channel. The transducer is at 0.83 feet gage height, or 1,558.928 feet NAVD88, levels of December 21, 2017.

There is one staff gage located on the right bank of the outlet channel near the footbridge and the orifice. As of December 21, 2017 it does not read in gage height. It is anticipated that a new staff gage will be established soon and will display directly in gage height from 0 – 7 feet.

There is no usable crest gage at this location.

ZERO GAGE HEIGHT – is based on the low point in a cross section about 8 feet downstream of the footbridge. It is where the point of zero flow occurs. It is equivalent to elevation 1,558.098 feet NAVD88, levels of December 21, 2017.

HISTORY – No previous history at this location. Gage was established on January 25, 1984. Original gage was a pressure transducer. A new bubbler orifice and non-submersible pressure transducer were installed on April 1, 1998. A crest gage was installed on June 14, 2000 near the footbridge. A survey of the pool and outlet of all references and instrumentation was done on November 14, 2017. Gage datum was reestablished based on PZF about eight feet downstream of the footbridge, levels of December 21, 2017. The datum has also been adjusted as of October 1, 2017. The current gage datum is 0.3 feet less than it was prior to October 1, 2017. Also, elevations have been updated to NAVD88. Zero GH in NGVD29 was 1,556.16 feet, and now zero gage height is 1,558.098 feet NAVD88.

REFERENCE MARKS –

RM-1 is a new rebar located on top of the right bank to the right of the footbridge. It is at elevation 10.668 feet gage height and 1,568.766 feet NAVD88, levels of December 21, 2017.

RP-1 is at the center top of the outlet headwall. It is marked point number 2005 in dam safety surveys. It is at elevation 9.070 feet gage height, and 1,567.168 feet NAVD88, levels of December 21, 2017.

RP-2 is a mark on the grouted riprap just on the upstream side of the transducer conduit. It is at elevation 0.787 feet gage height and 1,558.885 feet NAVD88, levels of December 21, 2017.

RP-3 is a mark with a white paint spot located on the left upstream side of the footbridge. It is at elevation 9.004 feet gage height and 1,567.102 feet NAVD88, levels of December 21, 2017.

RP-4 is a chiseled 'X' with a white paint spot on top of left bank outlet wall at the fourth post from downstream end. It is at elevation 9.116 feet gage height and 1,567.214 feet NAVD88, levels of December 21, 2017.

RP-5 is a chiseled 'X' located at the center on the downstream lip of the sediment basin at the outlet. It is at elevation -2.906 feet gage height and 1,555.192 feet NAVD88, levels of December 21, 2017.

CHANNEL AND CONTROL – The channel is a rough concrete lined trapezoidal shaped channel exiting from Cave Buttes Dam. The channel is the control for all levels.

RATING – The current rating is Rating #4. It was developed using 9 surveyed cross sections and an HEC-RAS model for analysis.

The previous rating is rating #3, which is a modification of rating #2. Rating #2 was developed using surveyed cross sections in an HEC-2 model. Rating #3 is a modification of rating #2 using seven direct discharge measurements. Rating #1 was taken from the original design computations for the dam and outlet.

DISCHARGE MEASUREMENTS – Direct measurements can be made at two locations. Wading measurements could be made approximately 2,000 feet below the gage. Higher discharge measurements can be made by bridge crane from the footbridge. The trapezoidal sides do not allow for accurate discharge measurements near the sides.

FLOODS – The discharge from the dam is limited to approximately 550 cfs. Several flows have approached that value. The channel capacity is roughly 1,000 cfs.

POINT OF ZERO FLOW – The PZF is approximately 0.00 feet gage height about 12 feet downstream of the gage, levels of December 21, 2017.

REGULATION – Cave Buttes Dam regulates flow into the outlet channel and limits the flow to approximately 550 cfs.

DIVERSIONS - None

ACCURACY – Good

JUSTIFICATION – Monitor Cave Buttes Dam for Operations and Maintenance and for public safety.

UPDATE – October 25, 2023
 ES Thomas