



Memorandum

To: Santa Ana Stormwater Quality Standards Task Force

From: CDM Smith

Date: October 3, 2013

Subject: Dry Weather Flow Analysis for Greenville-Banning Channel

This technical memorandum summarizes an assessment of flow conditions that would exist within the Greenville-Banning Channel if the existing rubber dam diversion structure was not in place. This analysis was performed to support the UAA process for the channel.

The rubber dam within the channel is part of a dry weather diversion system used to capture flows from the upstream drainage area and divert them to a sanitary sewer for treatment. A pipeline connected to an orifice in the side of the channel, just upstream of the rubber dam, collects captured flows for screening and pumping to the sanitary sewer. Orange County Sanitation District (OCSD) maintains a record of dry weather flow that is diverted. These data were used to characterize dry weather flow rates in the channel. Summary statistics of these data are provided below:

- The average flow diversion was 429,116 gallons per day (0.664 cfs)
- The median flow diversion was 358,664 gallons per day (0.555 cfs)
- The 90th percentile flow diversion was 892,014 gallons per day (1.38 cfs)
- The maximum flow diversion was 1,111,519 gallons per day (1.72 cfs)

The SWMM hydraulic model, employing the Manning's Equation to compute water surface profiles, was used to determine the depth (ft) and velocity (ft/sec) within the channel associated with typical dry weather flow rates (cfs). Key channel characteristics used for input parameters to the model include:

- Concrete lined rectangular shaped channel type
- Bottom width of 60 feet
- Longitudinal slope of 0.005
- Roughness coefficient of 0.01

The model was run for a series of flow rates to generate a relationship between flow rate and flow depth in the channel. The flow rates used provide sufficient resolution to capture minor differences that are associated with the temporal variability of dry weather flow. Figure 1 shows the rating curve over a range of flow that would include both dry and wet weather. Figure 2 represents the lower portion the curve (<2 cfs) and shows how depths vary for minor changes to dry weather flows that are likely occur.

The estimated depth of water in Greenville-Banning Channel during dry weather is very low (<1 inch), assuming flow is spread uniformly across the channel bottom. Based on field observations of similar flow rates in similar Santa Ana River watershed channels, it is likely that the dry weather flow will not spread uniformly across the channel bottom, but will instead flow against one of the vertical side walls, being normally 1 inch deep.

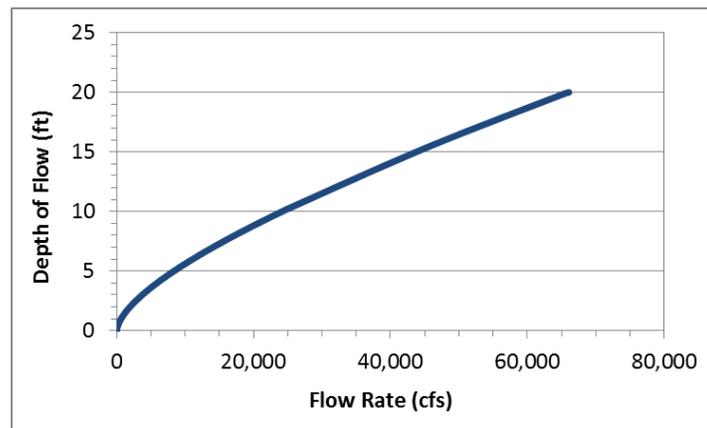


Figure 1
Rating Curve for Flow Depth and Discharge in Greenville-Banning Channel

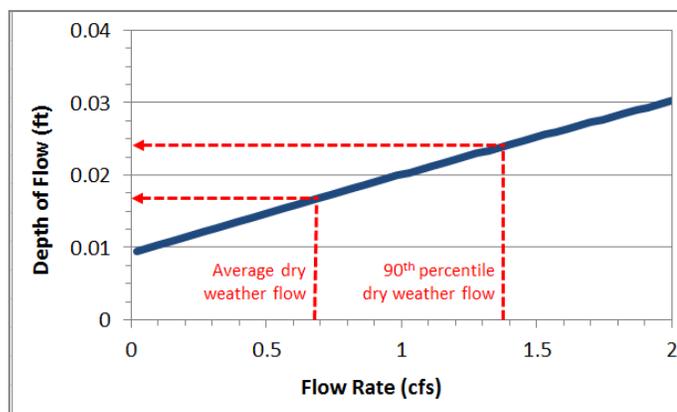


Figure 2
Rating Curve for Flow Depth and Discharge in Greenville-Banning Channel for Low Flow Conditions