

Arroyo Santa Rosa Tributary

Arroyo Santa Rosa Tributary composes of approximately 3,300 feet long RC open channel downstream of Santa Rosa Road and about 7,400 feet long natural channel before the confluence with Arroyo Santa Rosa. The 1998 LOMR covers all the natural channel and a portion of the RC open channel. For the section of the improved channel, the 1998 LOMR shows that the floodplain is contained in channel. However, the 2005 Nolte FIS shows a wide floodplain as well as a floodway outside the concrete channel (see attachment 3). It is evident that the 2005 Nolte FIS needs to be revised for the following reasons:

1. Incorrect coding the channel geometry:
The 3,300 feet long channel downstream of Santa Rosa Road is an improved RC open channel (12'x 6') constructed in early 1970's (see attachment 2). The channel has a uniform longitudinal slope from 2.04 % to 2.72 %. However, Nolte 2005 FIS did not code the cross section correctly resulting in an uneven slope (Conejo_SRtrib.prj). In addition, before joining Arroyo Santa Rosa, there is a section of concrete chute. The geometry of the chute was not coded correctly. A comparison of HEC-RAS profiles based on Nolte FIS and as-built drawings is shown in Figure 3.
2. Incorrect selection of channel roughness coefficients:
Nolte FIS used a roughness coefficient of 0.025 to 0.035 for the concrete open channel, which greatly underestimated the channel capacity.
3. Incorrect modeling of flow regime - super-critical vs. sub-critical flows.
The improved channel has a supercritical slope from 2.04 % to 2.72 %. However, the Nolte FIS choose to run the HEC-RAS model in a subcritical flow regime. As such, the model was forced to run subcritical even though there can only exist supercritical flows. The same is true at the confluence with Arroyo Santa Rosa where critical flows should occur because of the existing chute and elevation drop which have a physical evidence to support such flow regime. The artificial subcritical flow has resulted in a large area of flooding.

For the natural channel section, Nolte FIS study also resulted in wider floodplains at some places. This was caused mainly because of the incorrect selection of channel roughness factors (0.05 instead of 0.03 for natural earth channels). Please refer to approved 1998 LOMR for reference.

A print-out of Nolte FIS HEC-RAS cross sections is attached in attachment 4. Parameters in question are highlighted.

Duplicate Effective Models

A duplicate effective model is included which better represents actual physical conditions of the study reach. The duplicate effective models are created based on Nolte HEC-RAS models with

corrections on channel geometry and roughness coefficients. A print-out of the duplicate effective models is attached in Attachment 5.

Arroyo Santa Rosa Tributary floodway data table 6 in FEMA 2005 flood insurance study report has been modified as shown in Table 2.

Flood profiles for Arroyo Santa Rosa Tributary (page 05P and 06P in FEMA 2005 FIS) have been modified as shown in Figure 4.

Revised floodplain/floodway maps are shown in Attachment 6.

Digital files of the duplicate effective models (SRT_Revised.prj; SRT_Floodway_Revised.prj) are attached in Attachment 7.

