Appendix B – Software Version History

History of the Pima County Hydrology Procedures and the PC-HYDRO Computer Program

The Pima County Hydrology Procedures
The original computational procedure for the Pima County Hydrology Method was developed by Michael E. Zeller, PE, PH while employed by the District. The procedure was presented with examples, in the Hydrology Manual for Engineering Design and Floodplain Management within Pima County, Arizona (Pima County Department of Transportation and Flood Control District, Tucson, Arizona). The method takes the form of the Rational Formula where peak runoff rate is the product of the watershed area, a runoff coefficient and rainfall intensity at the time of concentration.

The manual was first published in 1977 and later republished in 1979 with minor corrections and additions. Mr. Zeller developed and authored this semi-empirical rainfall-runoff model and validated it with available local data. The Pima County Hydrology Procedures were widely used and accepted in Pima County for predicting flood peaks from ungaged watersheds under natural and developed hydrologic conditions. In addition, the method has been used and accepted in remapping FEMA regulatory flood peaks for use in unincorporated Pima County.

The PC-HYDRO Program
Because the Pima County Hydrology Procedures required an interactive solution, the calculation was not a trivial task to perform. Practitioners used graphs in the manual or used a programmable calculator to address this issue. In order to overcome the need for by-hand calculations, the PC-HYDRO (1.0) computer program was written in 1992 by Robert J. Smolinsky, PE for use as a computational tool by Arroyo Engineering. This original version of the software was freely distributed and widely used throughout the local engineering community operating on the MS DOS platform.

In 2006, Arroyo Engineering was contracted by the Pima County Regional Flood Control District to improve the computational capabilities of this software, as well as to expand its availability and develop it on the Windows platform. This effort resulted in PC-HYDRO 5, released in March, 2007 – the first version distributed by the Pima County Regional Flood Control District for use by the engineering community. In practice, PC-HYDRO 5 performed the same calculations as the original procedures released in 1977, the difference being the adoption of newer rainfall intensity-duration-frequency data from NOAA Atlas 14, which superseded NOAA Atlas 2.

PC-HYDRO 6 was developed in 2016 as an internet-based user-interface, rather than a stand-alone computer software program, which performed the same Pima County Hydrology Procedures from 1977. It continued to use the NOAA Atlas 14 rainfall data by obtaining the most-recent data values directly from the NOAA website for each calculation.

In 2018, Pima County Regional Flood Control District contracted with WEST Consultants to perform a comprehensive evaluation of the Pima County Hydrology Procedures and the PC-HYDRO program (Appendix G). Following the recommendations generated by the evaluation, PC-HYDRO 7.1, released in March 2019, has removed the Adjusted Curve Number Correction from the calculation procedures.