CONCEPTUAL HYDRAULIC DESIGN OF FLOOD DAMAGE REDUCTION ALTERNATIVE

Rio Hondo below the Two Rivers Flood Control Project Chaves County, New Mexico

Final Summary Report

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Prepared For:

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EXECUTIVE SUMMARY

The Two Rivers Dam Project, located about 14 miles west of Roswell in Chaves County NM, provides flood risk management benefits to the City of Roswell. Flood releases from the project are routed towards the City in two water courses, Rocky Arroyo and the Rio Hondo. These outfall channels converge approximately 4 miles west of Roswell with the combined flow then traversing another 12 miles through the City, ultimately reaching the Pecos River. Recent engineering studies have identified that the Rio Hondo channel, in the vicinity of the confluence and extending downstream for about a mile and a half, does not have the capacity to convey the potential flood releases in a controlled manner. Out of channel (overbank and overland) flooding is expected in this reach during high releases. This overland flow is expected to traverse unconfined east, towards Roswell and the Industrial Airpark (formerly Walker AFB).

In 2010, the Corps of Engineers (Albuquerque District) along with a consultant team completed a hydraulic study in which a two-dimensional hydrologic flood routing computer model was used to quantify inundation extents, flow depths, and flow velocities for high, long duration flood water releases from the project.

The Albuquerque District coordinates with the Chaves County Flood Commission (CCFC) to minimize adverse impacts to the project outfall channels and surrounding areas during flood releases from the project. In this capacity, and recognizing that overland flows occur in the study area, the Commission has constructed two earthen containment/diversion berms in the area of interest. The 2010 study identified one of these berms as not capable of containing the high release.

The primary objective of this study is to develop the hydraulic criteria that can be used for a conceptual design of a levee to replace the deficient berm. To achieve this objective, additional two-dimensional modeling has been completed in which alternate levee heights and lengths have been integrated into model parameters. Results from these simulations show that a viable alternative exists, largely using the existing footprint of the current berm for the horizontal alignment that will prevent the unconfined overbank flow on the Rio Hondo from reaching developed areas of Roswell.

The recommended "replacement" levee has a maximum crest height of almost seven feet and extends for about 8,860 linear feet. Integrating this levee configuration into the 2-D model results in a 70 to 75 percent reduction in overbank areas that are susceptible to flooding from high, prolonged project releases. There is a corresponding increase in flow that travels north in and adjacent to the current Rio Hondo Channel. Under this scenario the flow rate in the channel is predicted to be

approximately 700 cubic feet per second (cfs) at the U.S. 285 intersection for nearly the entire duration of the prescribed release investigated here in. The increased flow in the left overbank (looking downstream) in this reach is intercepted and diverted back into the Rio Hondo by the second CCFC Berm. However, this feature will need to be raised approximately 1 foot for a portion of its length to ensure it is not overtopped by the increased flow it will now be subjected to during the prescribed release. Additionally, the recommended alternative includes the reconstruction of the Diversion # 3 structure which is located on the Rio Hondo approximately at the midpoint of the current study area. This feature, currently in a distressed condition, provides grade control for the Rio Hondo and has been assumed operable for the modeling completed in support of this study.

The map on the following page depicts a probable outcome for a long duration flood release from the project with the *Recommended Alternative* in place.