

**DRAINAGE REPORT**  
**FOR**  
**RIVERVIEW PROPERTIES, TRACT H-17A-1B1**  
**NOW COMPRISING RIVERVIEW ESTATES SUBDIVISION**  
**AND**  
**THE SOUTH BRANCH OF THE PIEDRAS MARCADAS ARROYO**

**JUNE 26, 1992**


**PREPARED FOR:**  
**PASEO DEL NORTE JOINT VENTURE**  
**NO.10 TRAMWAY LOOP NE**  
**ALBUQUERQUE, NM 87122**

**PREPARED BY:**  
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**JOB NO. 92136.02**  
**COA PROJECT NO. 4460.90**

**I CERTIFY THAT I AM A REGISTERED PROFESSIONAL ENGINEER  
IN THE STATE OF NEW MEXICO AND THAT THIS REPORT WAS  
PREPARED BY ME OR UNDER MY SUPERVISION.**

*Joe Kelley*  
JOE P. KELLEY, P.E. *June 26, 1992*



The seal is circular with a double border. The outer ring contains the text "REGISTERED PROFESSIONAL ENGINEER" at the bottom and "JOE P. KELLEY" at the top. The inner circle contains "NEW MEXICO" at the top and the license number "9996" in the center. A date stamp "JUN 26 1992" is visible over the seal.

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## **PURPOSE**

The purpose of this report is to present the Drainage Management Plan for the future development of the south branch of the Piedras Marcadas Arroyo, as well as for the present development of Tract H-17A-1B1, Riverview Properties within the south branch basin. The plan is prepared in accordance with prior drainage reports approved by the City of Albuquerque, and in accordance with the Development Process Manual (DPM) of the City of Albuquerque, including recently proposed revisions dated August, 1991 (DPM Update). Tract H-17A-1B1 is being subdivided into a single-family, detached residential subdivision called Riverview Estates.

## **LEGAL DESCRIPTION**

Riverview Subdivision, Tract H-17A-1B1.

## **LOCATION**

The subject tract is located at the northeast corner of Golf Course Road, NW and Butterfield Trail NW, within the Piedras Marcadas south branch watershed. It lies within the Riverview Sector Development Plan Area of Taylor Ranch on the west mesa and is bounded by Golf Course Road on the west, the proposed extension of Butterfield Trail on the south and east, and the proposed extension of Calle Nortena on the north.

## **FLOOD HAZARD ZONES**

As shown by Panel 3500020008 of the National Flood Insurance Program Flood Boundary and Floodway Maps for the City of Albuquerque, dated September 15, 1983, none of the new residential lots lie within a designated Flood Hazard Zone. A portion of Panel 3500020008 has been reproduced as the Drainage Basin Map (Plate 1) and overlaid with the proposed parcel boundaries. It can be seen from this map that a designated 100-year Flood Hazard Zone encroaches into the Butterfield Trail Right-of-Way along the southern boundary of this site.

The Piedras Marcadas South Branch storm drain was constructed within Butterfield Trail after the flood plain maps of 1983 were prepared. When this storm drain was constructed, the flood plain was effectively removed. At the time of its construction, application for a Letter of Map Revision (LOMR) had been made to the Federal Emergency Management Agency (FEMA), which was granted as a Conditional LOMR (Case No. 88-06-28R) in a letter to Mayor Ken Schultz dated June 17, 1988. The Conditional LOMR would have become an unconditional LOMR and would have resulted in a map revision upon the routine submission of as-built plans to FEMA. As-built plans were not submitted to FEMA until July 31, 1991. During the interim period, the hydrologic criteria used for analyzing potential map revisions was changed. Therefore after the as-built plans were finally submitted, FEMA responded that the analysis which had previously been performed in support of the LOMR request would need to be redone in accordance with the new hydrologic methods identified in the DPM Update. Please refer to the correspondence included in Appendix 4.

The present report is being done in conjunction with another study by this office which will request FEMA's approval of a LOMR for the south branch once the present proposed improvements have been constructed. The analyses contained herein are for the ultimate developed conditions within the watershed. The offsite park improvements, which include a detention pond, are being made at this time in order to limit the downstream flood plain to the proposed paved surfaces.

## **PRESENT LAND USE**

The subject tract is presently undeveloped, as are the tracts to the north, east, and south. Golf Course Road, NW, which lies along the west boundary of the subject tracts, is a fully developed arterial street with paving, drainage, and utility improvements. Residential subdivisions are in the process of being constructed

west of Golf Course Road in Drainage Basin 403.02 (see Plate 1). The offsite park is located west of Golf Course Road, and is presently vacant (Drainage Basins 403.03 and 403.04). The subject tract lies within an area that was rezoned from IP to SU-1 for Planned Residential Development, which was approved by the EPC in June, 1991 as an amendment to the Riverview Sector Development Plan.

The tract to the northwest, Tract H-17A-1A, is of archaeological value and was purchased by the City of Albuquerque in March, 1992 as a designated Open Space tract. No development will occur on this tract.

## **PRESENT DRAINAGE PATTERN**

The site slopes down from west to east and discharges into the south branch of the Piedras Marcadas arroyo on the east and south via sheet flow. The south branch then discharges into AMAFCA's Piedras Marcadas Dam Basin some 300 feet downstream.

Pavement on Golf Course Road intercepts the majority of runoff from the west and discharges the runoff into the Piedras Marcadas South Branch storm drain, which then conveys offsite runoff into the arroyo east of the site. No offsite runoff is conveyed through the site, but a portion of the 100-year overflow across Golf Course Road does travel overland south of the site as it goes to the arroyo.

The park site generally slopes from north to south, and discharges into an earthen drainage channel on its southern boundary. This runoff is then conveyed to Golf Course Road by the channel.

The remainder of the south branch of the Piedras Marcadas is largely developed. Only a few areas have not yet been developed. In its present state, the Piedras Marcadas South Branch discharges overland across Golf Course Road during both the 100-year and the 10-year storm event.

## **RELATED REPORTS**

This tract lies within the area addressed by the Riverview Master Drainage Plan prepared by Community Sciences in 1985. Because runoff calculations in this prior report were made using the old SCS method, and not the initial abstraction-infiltration method identified within the proposed DPM Update, FEMA has indicated that the runoff quantities calculated in that report are not acceptable for issuance of a LOMR for the South Branch. In addition, the land development has followed a different pattern from that which had been established in 1985. Therefore, the previously approved 1985 report has not been used to establish drainage criteria for the present submittal.

Molzen-Corbin is presently preparing a report for AMAFCA which will analyze the entire Piedras Marcadas watershed in order to determine the effects of upstream development on the existing dam. They are using the updated computerized Hymo model to determine runoff rates. The drainage basins identified within that study have been modified to model the existing storm drain inlet conditions in greater detail.

As was stated previously, the Piedras Marcadas South Branch storm drain is presently being analyzed by this office for the ultimate developed conditions within the entire basin. The improvements proposed by that report are proposed to be constructed under the present plan.

A drainage report is also currently being prepared by Community Sciences for Tract H-24A, which is being developed by Sivage Thomas homes. That drainage report will identify the proposed drainage plan for Tract H-24A, and will identify the drainage improvements that will be necessary for development of that property. It has been proposed by the Community Sciences report that a storm drain connection be made to the Piedras Marcadas storm drain to convey developed runoff from Tract H-24A to Butterfield Trail. With this in mind, the present plan has made allowances for the discharge of Tract H-24A runoff into a new manhole within Butterfield Trail.

## **ANALYSIS METHODS**

The hydrologic calculations which appear herein analyze both the existing and developed discharge for the 100-year, 6-hour rainfall event. The peak discharge of runoff has been calculated using the modified computerized hydrologic model HYMO, which utilizes the initial abstraction/uniform infiltration method as identified within the proposed DPM Update.

The hydraulic calculations which appear herein were computed as follows: Street and channel capacities were computed using Manning's equation with Manning's N values as identified within the latest edition of the DPM. The capacities of streets were computed with the maximum water elevation at top of curb. The computed capacities of street and channel sections have been noted on the drainage plan, and the Manning's analyses of these sections are included within the Hymo computer output. Hydraulic grade line calculations were made in accordance with DPM guidelines. Computations of inlet capacities in sumps were made using the orifice equation and the weir equation. Rating curves for inlets in sumps have been included in the appendix. Where an inlet in a sump was acting in tandem with an overflow weir, a rating curve was made for the combined system. Capacities of inlets on grade were computed using the appropriate DPM Plates.

## **EXPLANATION OF POND HYDROLOGY**

The following is an explanation of how the pond, pipe, and diversion manhole were modeled in Hymo:

1. The initial rising limb of the hydrograph entering the orifice manhole via the pipe, up to a flow of 200 cfs, continues straight through the manhole without entering the detention pond.
2. The rest of the hydrograph (beginning where inflow into the diversion manhole exceeds 200 cfs) is routed into the pond.
3. The outflow from the pond is described and controlled by the orifices on the downstream side of the manhole. Orifice flows were computed on the downstream side of the manhole. Orifice flows were computed based on a rating curve of pond depth vs. orifice flow.
4. The initial flows described in 1. (above) are then added back to the outflow hydrograph from the pond by means of a recall hyd. This composite hydrograph is then routed downstream of the diversion manhole through the rest of the Hymo run.

## **DRAINAGE AND GRADING PLAN**

For the purposes of this analysis, the entire Piedras Marcadas south branch watershed is assumed to be developed. Upstream runoff from undeveloped natural areas has been increased 12% for sediment bulking.

In its current condition, the South Branch storm drain does not have the capacity to discharge all of the runoff from the developed South Branch watershed. Therefore, a detention pond has been designed in the only "upstream" location available, an undeveloped park tract west of Golf Course Road. The detention pond will be located in a park space which is presently owned by the Developer, but which will be deeded to the City upon the completion of this project. The City Parks and Recreation Division has previously approved this particular tract for park use.

A manhole with a restricting plate will be built on the existing 60" storm drain adjacent to the park. The bottom of the plate has been located so that the 10-year pipe flows will continue unimpeded through the

pipe, without touching the plate. Whenever flows appreciably greater than the 10-year runoff enter the pipe, the water surface will hit the plate, and a hydraulic jump will occur. The rate of runoff conveyed downstream past the plate will decrease as the flow goes from supercritical to subcritical, and storm water will begin to back up into the pond. A 1.1 acre ponding area has been provided in the park, compatible with the development of the park site. Ponding will occur in this area for a short duration only during storm events greater than the 10-year event.

Developed runoff from the subdivision and undeveloped runoff from Tract H-17A-1A, the open space parcel, will be collected on the proposed street sections, which will be conveyed from west to east through the development. The subdivision's runoff will discharge to the intersection of Calle Nortena and Butterfield at the subdivision's southeast corner. From that point, the overland runoff will be conveyed to the dam basin via the proposed extension of Butterfield Trail. A proposed concrete rundown will deliver runoff collected at the end of the Butterfield Trail cul-de-sac into the dam basin. Four new storm inlets will discharge a portion of Tract H-17A-1B1 runoff into the storm drain.

The Drainage and Grading Plan shows: 1) existing grades indicated by spot elevations and contours at 1'0" intervals; 2) proposed grades indicated by spot elevations and slopes; 3) the limit and character of existing improvements; 4) the limit and character of proposed improvements; and 5) continuity between existing and proposed grades. As shown by this Plan, the proposed improvements consist of a 67-lot detached residential subdivision of Tract H-17A-1B1, complete with paving, drainage, and utility improvements. Offsite paving and a channel within the Butterfield Trail alignment will also be constructed. Tract H-17A-1A will remain undisturbed as open space. In addition, the park site will be graded, a detention pond will be added, and storm drain modifications will be built for control of runoff through the park.

## **CONCLUSIONS**

As shown by these calculations, the proposed development will result in an increase in runoff generated by the site. Provision has been made to safely convey the increased on-site runoff to the Piedras Marcadas Dam via paved surfaces, new storm inlets, and a new channel. The new construction will also result in a decrease in the 100-year discharge of the storm drain due to the construction of the detention pond. The construction of these facilities will limit the 100-year flood plain to the pond and to the paved Butterfield and Golf Course Road right-of-ways downstream of the site, and will meet the hydrologic criteria necessary to implement a Flood Hazard Map amendment. The construction of these facilities does not have any effect on possible flood areas upstream of the pond. The proposed development will in effect decrease sediment load due to construction of impervious areas (roads, driveways, roofs, etc.) and general anticipated formal landscaping by future owners. Although the flowrates from the development are higher than existing, the net flows to the Piedras Marcadas Dam will be lower due to proposed upstream ponding.



# City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

*CC: Cleve Mattheis  
file 9/128.02*

July 31, 1991

Diane Leatherwood  
Emergency Management Specialist  
Region VI, Federal Center  
800 North Loop 288  
Denton, Texas 76201-3698

RE: REQUEST FOR LETTER OF MAP REVISION FOR THE SOUTH BRANCH OF THE  
PIEDRAS MARCADAS ARROYO

Dear Ms. Leatherwood:

This submittal is in response to the letter from the Federal Emergency Management Agency (FEMA) to the City of Albuquerque dated June 17, 1988 regarding a Conditional Letter of Map Revision (LOMR) along the Piedras Marcadas Arroyo. A copy of that letter is attached for reference, which states that the Conditional LOMR is approved by FEMA and that the Final LOMR will be issued pending receipt of the "as-built" plans for the channel modification projects. The other two items that were required by FEMA, which includes the hydrologic calculations and the topographic mapping representing as-built conditions are indicated to have already been received and approved.

As required, enclosed are the revised "as-built" plans of the completed channel modifications, consisting of two storm sewer projects through this reach of the arroyo. The reason that this information had not been submitted previously was that a change in the land ownership had occurred. Could you please proceed to issue the Letter of Map Revision.

If you should have any questions concerning this submittal, please do not hesitate to call me at (505) 768-2650.

Cordially,

Gilbert Aldaz, P.E. & L.S.  
City/County Floodplain Administrator

xc: Kerry L. Davis, P.E. ✓

GA

PUBLIC WORKS DEPARTMENT

(WP-1596)

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