

**BLACK RANCH TRACT 3**  
**GRADING, DRAINAGE, AND TERRAIN**  
**MANAGEMENT PLAN**

**JULY 1990**  
**Amended July 27, 1990**

**PREPARED FOR:**

**SEVEN BAR LAND & CATTLE COMPANY**  
**3615 RIO RANCHO BOULEVARD, NW**  
**SUITE 203**  
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**PREPARED BY:**

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I, Ronald P. Bohannon, hereby certify that I am a Registered Professional Engineer, qualified in Civil Engineering, that the accompanying documents and drawings were prepared by me or under my direction.



*Ronald P. Bohannon 7/27/90*  
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Ronald P. Bohannon, P.E.  
NMPE No. 9814

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**PURPOSE AND SCOPE**

The purpose of this Grading, Drainage, and Terrain Management Plan, for Black Ranch Tract 3, is two-fold. First, the plan is to present the drainage analysis of Tract 3 and off-site drainage areas that may impact the site, and a workable plan for managing site drainage. Second, the plan is to provide general recommendations for on-site grading, drainage, and terrain management to guide in the development of the site. The drainage analysis covers existing, proposed initial development, and anticipated ultimate development drainage conditions.

**SITE LOCATION AND DESCRIPTION**

Black Ranch Tract 3 is a 12.7 acre site located in the northwest portion of Albuquerque at the intersection of Coors Boulevard and Irving Boulevard, refer to the Location Map. The site is bounded by Coors Boulevard on the west, Tract 4 on the north, the Corrales Main Canal on the east, and Tract 2 on the south. The site is located in Bernalillo County outside the Albuquerque city limits, but within the City of Albuquerque's extra terrestrial jurisdiction (ETJ) area. The site is also within the North Coors Drainage Management Plan (NCDMP) area, included as a portion of Drainage Basin 10.2E.

The existing site slopes generally from north to south at slopes ranging from three to eight percent. The eastern portion of the site falls off abruptly to the Corrales Main Canal and Tract 12, approximately 30 to 35 feet lower in elevation. Slopes along the east portion of the site range from 20 to over 50 percent. Site soils consist of Bluepoint Loamy Fine Sand

and are characterized by potential blow hazard and high permeability to water. Existing site vegetation consists primarily of sagebrush and sparse native grasses.

## ANALYSIS METHODS

Off-site drainage basins were delineated by reviewing 1"=200' scale, two-foot contour interval orthophoto topographic maps (Limbaugh Engineers, 1972), the North Coors Drainage Management Plan (Scanlon & Associates, Inc., 1985), the drainage report for Market Center West (Bohannon-Huston, Inc., 1989), the Eagle Ranch Storm Drain as-built plans (Easterling & Associates, Inc., 1988), the drainage plan for Rowland Nursery (DTS Engineers, Inc., 1984), the Paseo del Norte and Coors Boulevard Drainage Plan (Leedshill-Herkenhoff, Inc.), and by field review of existing drainage conditions. On-site drainage basins were delineated from a 1"=50' scale, two-foot contour interval topographic map (Bohannon-Huston, Inc., 1989), field review of existing drainage conditions, and by analysis of the proposed development grading plan.

Runoff peak flow rates and volumes were determined using the procedures outlined in Interim Drainage Design Criteria for Bernalillo County, adopted April 1990. Peak flow rates and runoff volumes were determined for storms with return frequencies of two, ten, and 100 years. The NCDMP established an allowable release rate of 2.13 cfs per gross acre for the Tract 3 drainage area. The allowable runoff release rates for Tracts 3A through 3K were calculated by determining the total allowable release rate from Tract 3 based on the NCDMP, subtracting the peak flow rate from fully developed street corridors (including the east half of Coors Boulevard abutting Tract 3), and allocating the remaining allowable release rate to Tracts 3A through 3K based on net acreage. The total allowable Q100 discharge from Tract 3 and the east half of Coors Boulevard abutting the site is 31.7 cfs.

Approximate on-site detention pond volumes were determined for each tract based on anticipated developed drainage conditions, the allowable release rates, and the runoff volume generated by a six-hour/100-year storm (2.2 inch precipitation). The additional pond volumes required to provide sediment storage, in accordance with NCDMP, were also determined. The NCDMP sediment ponding design requirements are outlined as follows:

1. Minimum sediment storage =  
.0023 AC FT/AC (= 102 CU FT/AC) of upstream basin
2. Velocity of sediment fill =  
.002 FT/SEC at 50% of Q100
3. Maximum horizontal velocity through sediment pond =  
0.5 FT/SEC at 50% of Q100
4. Minimum detention time in pond =  
depth of pond (FT)/.002 FT/SEC

Interim runoff volumes discharged to Tract 12 were determined based on a six-hour/100-year storm (2.2 inch precipitation).

#### **EXISTING AND OFF-SITE DRAINAGE**

Existing and off-site drainage conditions are shown on the Existing and Off-Site Drainage Plan, Plate 1.

Existing off-site drainage originates west of Coors Boulevard and along Coors Boulevard north of the site. Existing off-site drainage is contained within the Coors Boulevard right-of-way and does not enter Tract 3. A total Q100 of 109.0 cfs is estimated on the west side of Coors Boulevard at Irving Boulevard. Of this, approximately 32 cfs is discharged to the east side of Coors Boulevard through the existing 24-inch RCP storm drain immediately south of Irving Boulevard. This recently installed storm drain discharges runoff historically contained along the west side of Coors Boulevard to the east side of Coors Boulevard. The remaining 77 cfs continues south along the west side of Coors Boulevard as street flow. Hydraulic calculations for the existing storm drain discharge, and the surface flow depth on the east side of Coors Boulevard at Irving Boulevard, are included in Appendix 1. Approximately 8.5 cfs is generated along the east side of Coors Boulevard north of Tract 3.

The runoff along the east side of Coors Boulevard flows south in the existing roadside swale. A total off-site Q100 of 49.5 cfs is estimated at the east side of Coors Boulevard at the southwest corner of Tract 3. Existing on-site drainage is divided into two drainage basins; 3 and 4. Basin 3 includes most of the site and drains south to Tract 2. This runoff flows through Tract 2 and eventually enters the Corrales Main Canal. Basin 4 includes the eastern portion of Tract 3 which sheet flows directly to the Corrales Main Canal along the east boundary of Tract 3. The Q100 peak flow rates for Basins 3 and 4 are 13.56 cfs and 6.87 cfs, respectively. The total existing condition Q100 discharge from Tract 3 and the east half of Coors Boulevard abutting the site is 29.4 cfs.

### **INITIAL DEVELOPMENT DRAINAGE**

Initial development drainage conditions are shown on the Initial Development Drainage Plan, Plate 2.

"Initial development drainage" refers to drainage conditions that will exist upon full development of Tract 3 and completion of site-related initial improvements to Coors Boulevard and Irving Boulevard. It does not include the ultimate widening of Coors Boulevard or Irving Boulevard. The key elements of the Initial Development Drainage Plan include the following:

1. Grading and culvert improvements to the existing ditch along the east side of Coors Boulevard.
2. On-tract sediment storage and runoff detention ponding with controlled discharge.
3. Storm drain outfalls to Tract 12.
4. Interim outlet ponds on Tract 12.

Grading and culvert improvements along the east side of Coors Boulevard are needed to control existing roadside drainage, provide an outfall for the 32.0 cfs discharge from the existing 24-inch RCP storm drain at Irving Boulevard, and to allow for culverts at proposed

street connections to Coors Boulevard. The initial development drainage plan is expected to slightly decrease the runoff on the east side of Coors Boulevard at the southwest corner of Tract 3; this is so for two reasons. First, the required right-turn/deceleration lanes on Coors Boulevard will be located primarily on existing paving so there is minimal increase in the impervious pavement area. Second, the vertical alignment constraints on connecting streets preclude waterblocks at both intersections; therefore, Irving Boulevard and Street B will intercept a small portion of the sheet flow on existing Coors Boulevard. As in the existing drainage analysis, approximately 49.5 cfs will continue south along the east side of Coors Boulevard. Typical ditch sections and culvert hydraulic analyses are included in Appendix 2.

On-tract sediment storage and detention ponding, with controlled discharge, will be required on all tracts, in accordance with NCDMP. Interim earth swales and retention ponds will be graded on each tract during site mass grading to intercept most of the runoff and sediment originating on the tracts. The ponds are expected to drain in less than 24 hours by infiltration. Each pond will remain until modified, as needed for tract development. Upon development, Tracts 3B through 3E will drain to Street A. The drainage on Tract 3A and Tracts 3G to 3K, however, will be split. A portion of each of these tracts will drain to the Corrales Main Canal, as in the existing conditions. The total flow rate draining to the Canal will be about 2.96 cfs - approximately 4 cfs less than in the existing conditions. The total allowable discharge for these tracts includes the uncontrolled existing condition discharge to the canal and the controlled discharge to the street. Upon tract development, the controlled discharge to the street may be increased to the extent the uncontrolled discharge to the canal is decreased.

Proposed storm drain outfalls are located at the south end of Street A and the east end of Irving Boulevard. Extra depth will be provided in the inlet at the east end of Irving Boulevard to provide a limited amount of sediment storage and oil trap for street runoff from Irving Boulevard. The sediment storage pond located within Tract F, at the south end of Street A, will pond runoff from Streets A and B. The outfall inlet grate will be elevated about 1.5 feet above the pond bottom to provide for sediment storage. This pond may be eliminated in the future, if Street A is extended south to Tract 2. If this occurs, a limited

amount of sediment storage and oil trap could be provided with extra depth in inlets, as proposed for the inlet at Irving Boulevard.

As indicated in the NCDMP, it is anticipated that the Corrales Main Canal will eventually be improved to serve as a joint-use irrigation/drainage facility. The capacity of the existing canal is inadequate to accept runoff from the site. In the interim, storm drain outfalls will cross below the canal and discharge to submerged pipe outlet ponds on Tract 12. The outlet ponds will discharge to border-irrigated fields. The 100-year storm ( 6 hour) runoff volumes to be discharged to Tract 12 are 10,167 cubic feet and 46,321 cubic feet for the north and south fields, respectively. These volumes are equivalent to 1/4 inch over the entire north field, and 3/4 inch over the entire south field, and are insignificant in comparison to normal irrigation volumes. The runoff will dissipate by infiltration and evaporation. Required easements will be obtained from the owners of Tract 12.

Discussions have been initiated between Seven Bar Land and Cattle Company and AMAFCA regarding possible right-of-way and/or easement requirements and future canal improvements. Any dedication would be subject to any existing MRGCD prescriptive rights. When the Corrales Main Canal improvements are completed, the proposed storm drain outfalls to Tract 12 can be reconstructed to drain directly to the canal, and interim outfall ponds can be eliminated.

The total initial development Q100 discharge from Tract 3 and the east half of Coors Boulevard abutting the site is 29.8 cfs. Allowable discharge release rates, and required sediment storage pond volumes for each tract, are included on Plate 2. A summary of hydrology calculations is included in Plate 4.

#### **ULTIMATE DEVELOPMENT DRAINAGE**

Ultimate development drainage conditions are shown on the Ultimate Development Drainage Plan, Plate 3. "Ultimate development drainage" refers to conditions that will exist upon full development of Tract 3 and completion of anticipated "ultimate" improvements to Coors Boulevard and Irving Boulevard. Coors Boulevard is expected to be widened to provide



four through lanes in each direction. The drainage impact of the widening will be mitigated somewhat by a proposed 28-foot wide landscaped median. A rural road section (no curb and gutter) is proposed for Coors Boulevard through Coors Corridor Plan, Segments 3 and 4. The typical section allows a narrow eight-foot wide swale for drainage on each side of the road. The swale, as shown, will have minimal hydraulic capacity and, given the relatively high existing drainage flow rates in the area, it is anticipated that a storm drain system will be constructed in Coors Boulevard in the future. The storm drain would replace the roadside ditch improvements proposed in the initial development drainage plan and could intercept the flow in the existing 24-inch RCP storm drain at Irving Boulevard. The storm drain could also alleviate drainage ponding problems on Coors Boulevard immediately north of the Paseo del Norte overpass.

Irving Boulevard is expected to have two lanes in each direction with a double left to southbound Coors Boulevard. Ultimately, Irving Boulevard will be extended east down the escarpment and over the Corrales Main Canal to the lower Black Ranch area. It is anticipated that canal improvements will precede the extension of Irving Boulevard, and that drainage inlets would be constructed to drain roadway improvements directly to the improved canal. The Tract 3 interim outfall ponds would be eliminated.

The anticipated major street widening and storm drain improvements represent the only changes in the drainage conditions. The total ultimate development discharge from Tract 3 and the east half of Coors Boulevard abutting the site is 31.5 cfs. The drainage runoff parameters for all basins are summarized in the hydrology calculations on Plate 4.

## **GENERAL GRADING, DRAINAGE, AND TERRAIN MANAGEMENT RECOMMENDATIONS**

It is recommended that developers of individual tracts engage a registered professional engineer to perform a site specific geotechnical investigation of the tract(s) to make appropriate recommendations regarding foundation design and construction and site development. In general, permanent cut and/or fill slopes should be no steeper than 3:1 (horizontal to vertical). Fill and backfill material should be moisture processed to optimum moisture content ( $\pm 3\%$ ) and compacted to a minimum of 95 percent maximum density, as determined by ASTM

D-1557. No organic material, debris, or other unsuitable material should be placed in fills or backfill.

Adequate provisions should be made to minimize and control wind and storm runoff erosion, and to provide for safe passage of storm runoff during site construction. Interim detention ponds, swales, contour grading, native seeding ground cover, slope protection, and/or drift fencing may be necessary to mitigate erosion hazards.

A registered professional engineer should be engaged to prepare a site specific drainage plan for each tract to assure compliance with this plan, the North Coors Drainage Management Plan, and applicable drainage ordinances and policies.

Ponds should be located as far away as possible from structures and steep slopes. Grading, adjacent to structures and slopes, should provide for positive drainage away from the structures and slopes. Significant amounts of water should not be discharged onto steep slopes; erosion may result. Drainage improvements should be maintained regularly and after wind and/or rain storm events to assure proper operation of the storm drainage system.