HYDROLOGY

F17/D31

ONE PLAN

PLAN FOR

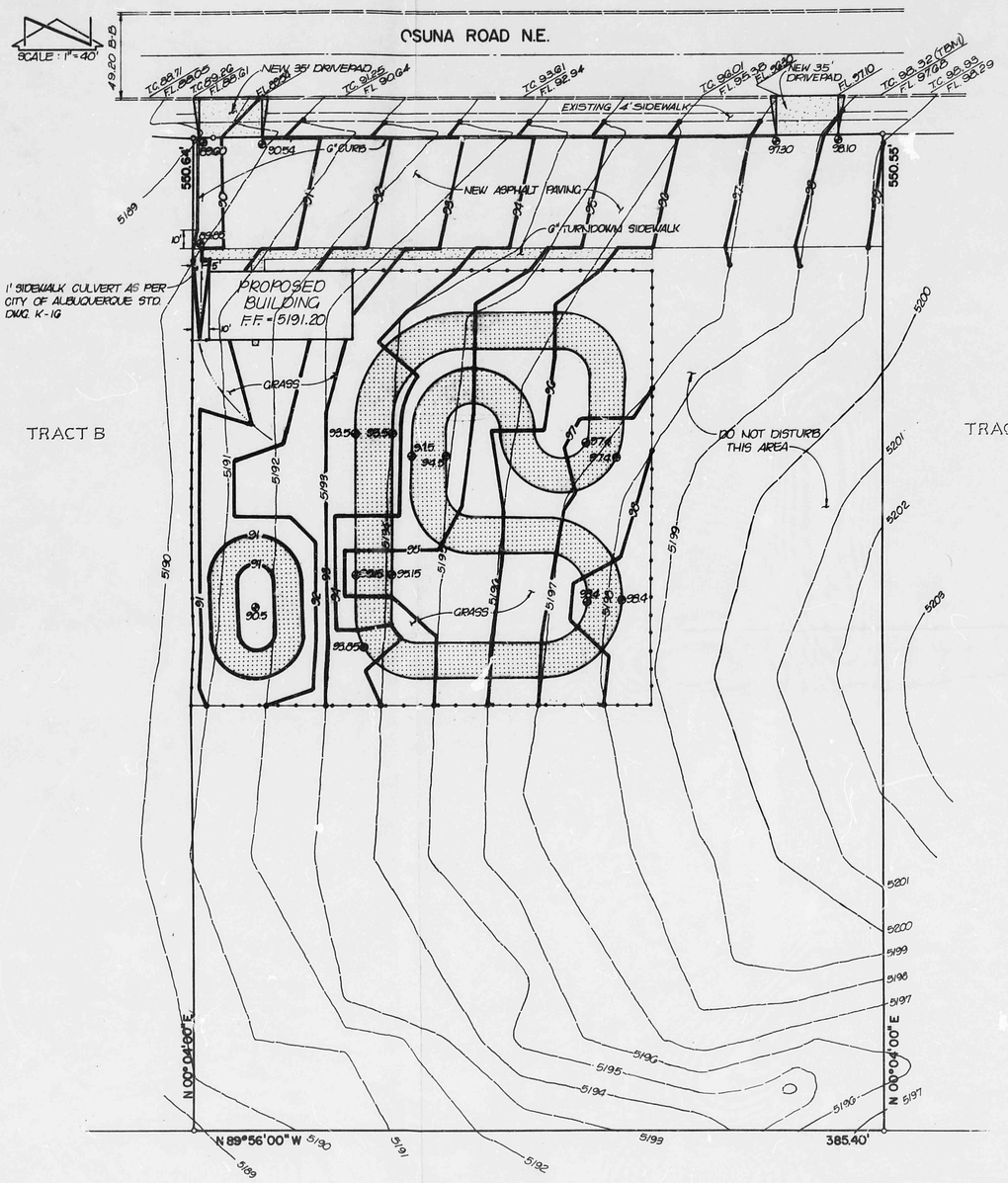
UNCLE CLIFF'S RACEWAY

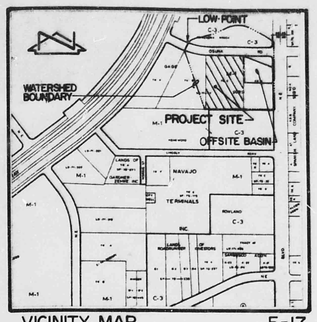
F 17 - D 31

PROJECT BENCHMARK:
A STANDARD N.M.S.H.C. BRASS TABLET, STAMPED "N.M. 307-1" SET ON TOP OF CONC. FOOT SET FLUSH W/GROUND. LOCATED 4.1' FROM THE NOSE OF THE MEDIAN IN SAN MATEO N.E., 55' NORTH OF THE INTERSECTION OF OSUNA RD. N.E. & SAN MATEO N.E.
ELEVATION = 5210.60 FEET (MSLD)

TEMPORARY BENCHMARK:
TOP OF CURB @ N.E. PROPERTY CORNER PROJECTION OF TRACT C.
ELEVATION = 5198.32 FEET (MSLD)

LEGAL DESCRIPTION:
TRACT C, GAGE SUBDIVISION





Calculations

Ground Cover Information

1. From SCS Bernalillo County Soil Survey, Plate 21:
   TgB Tijeras gravelly fine sandy loam
   Hydrologic Soil Group B
2. Existing Condition
   A_{total} = 121,280 sf = 2.78 Ac
   'C' Factor = 0.34 (DPM Plate 22.2 C-1)
3. Developed Condition
   A_{imp} = 48,500 sf
   % impervious = 48,500/121,280 = 40%
   'C' factor = 0.52 (DPM Plate 22.2 C-1)

Rational Method

1. Discharge: Q = CiA
   where C varies
   $i = P_6(6.84)\ T_c^{-0.51} = 4.65$ in/hr
   P_6 = 2.2 in (DPM Plate 22.2 D-1)
   T_c = 10 min (minimum)
   A = area = 2.78 Ac
2. Volume: $V = CP_6A(1/12)$
   where C varies
   P_6 = 2.2 in (DPM Plate 22.2 D-1)
   A = 121,280 sf

Existing Condition

$Q_{100} = CiA = 0.34(4.65)(2.78) = 4.4$ cfs

$V_{100} = CP_6A = 0.34(2.2/12)(121,280) = 7,560$ cf

Developed Condition

$Q_{100} = CiA = 0.52(4.65)(2.78) = 6.7$ cfs

$V_{100} = CP_6A = 0.52\ (2.2/12)(121,280) = 11,562$ cf

Comparison

$\Delta Q_{100} = 6.7 - 4.4 = 2.3$ cfs (increase)

$\Delta V_{100} = 11,562 - 7,560 = 4,002$ cf (increase)

Offsite Flows

A = 1.6 AC ±

C = 0.34 (TgB, 0% impervious)

$Q_{100} = CiA = 0.34(4.65)(1.6) = 2.5$ cfs (sheetflow)

$V_{100} = CP_6A = 0.34(2.2/12)(1.6)(43,560) = 4,344$ cf

Downstream Capacity

1. Watershed
   A = 12 Ac ±
   Let C = 0.80
   i = 4.55 in/hr
   L = 1,500', Δ elev = 26'
   T_c = 10.4 min.
   $Q_{100} = 0.80(4.55)(12) = 44$ cfs
2. Catch Basin Capacity (controlled by 18" dia. pipe)
   $Q_{CB} = CA\sqrt{2gh}$ (orifice eqn.)
   where C = 0.6 - 0.9, use 0.75
   $A = \pi(1.5^2/4) = 1.77$ sf
   $g = 32.2$ ft/sec^2
   h = 0.54 + 1.83 + 0.75 = 3.12'
   (based on Std. Dwg. K-5-2)
   Q_{CB} = 18.8 cfs
3. Downstream Capacity
   $Q_{capacity} = 2xQ_{CB} = 37$ cfs
4. Allowable Discharge
   $q_{allow} = Q_{capacity}/A = 37/12 = 3$ cfs/Ac
   $Q_{allow} = q_{allow} \times A = 2.78(3) = 8.3$ cfs $< Q_{100}$
   Interim ponding not required.

DRAINAGE PLAN

The following items concerning the Uncle Cliff's Raceway Drainage Plan are contained hereon:

1. Vicinity Map
2. Grading Plan
3. Calculations

The proposed improvements, as shown by the Vicinity Map, are located on the south side of Osuna Road N.E. just west of the intersection of Osuna Road N.E. and San Mateo Boulevard N.E. The site is more particularly described as Tract C of the Gage Subdivision. At present, the site is undeveloped. Adjacent sites are also undeveloped with the exception of Uncle Cliff's Amusement Park, which lies to the south of the site.

Telephone communication with Mr. Andre Houle, Civil Engineer, City of Albuquerque Hydrology Section, reveals that the site does not lie within a designated flood-hazard zone. Field investigation, coupled with further communication with Mr. Brian Burnett, Civil Engineer, City of Albuquerque Hydrology Section, revealed that a downstream storm drain facility exists. This facility consists of two (2) Double-C catch basins, which are located at a low point in Osuna Road just east of its intersection with the frontage road. The water collected by these catch basins flows to the west and eventually outfalls into the North Diversion Channel. Further analysis, which appears below in the calculations, substantiates that downstream capacity does exist for the improvements proposed by this plan. Because of this, no interim ponding will be provided.

The Grading Plan shows: 1) existing and proposed grades indicated by spot elevations and contours at 1' 0" intervals, 2) continuity between existing and proposed elevations and 3) the limit and character of the proposed improvements. As shown by this plan, the proposed improvements include the construction of a go-cart track, adjacent landscaping, a small building, and an asphalt parking area. The grading required by these improvements will not significantly alter the existing drainage pattern. At present, runoff flows from east to west with the north half of the site draining eventually into Osuna Road. Runoff from the northerly portion of the site will continue to flow from east to west and drain into Osuna Road. Due to the proposed grading, however, the runoff will enter Osuna Road via a driveway cut, therefore preventing this runoff from flowing onto Tract B, as is presently the pattern.

The calculations which appear below analyze both the existing and developed conditions for the 100-year, 6-hour rainfall event. The Rational Method has been used for this analysis in accordance with the City of Albuquerque Development Process Manual, Volume 2. As shown by these calculations, a minor increase in runoff is anticipated. Further analysis of the downstream capacity of the existing storm drainage improvements reveals that the estimated capacity of the existing system is approximately 37 cfs. For a total watershed area of 12 acres, this correlates to an allowable discharge rate of 3 cfs per acre. The direct discharge in the developed state of the proposed improvements is less than 3 cfs per acre, therefore, no interim ponding has been provided. The evaluation of the downstream improvements is based upon the orifice equation and City of Albuquerque Standard Drawing K-5-2. Drawing K-5-2 enabled the determination of head to be equal to 3.25 feet. This was determined by allowing the water surface at the low point in the street to fill to the top of curb and then referring back to the Standard Drawing for minimum dimensions (e.g. 1'-10", 6 1/2', etc.).

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2/14/83

Tom Mann Associates, Inc.
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ENGINEERS

NO.	DATE	BY	REVISIONS

DESIGNED BY: J.G.M.
DRAWN BY: C.G.C.
APPROVED: T.T.M.

JOB NO. 3007 1
DATE 1/83

GRADING & DRAINAGE PLAN
UNCLE CLIFF'S RACEWAY

F17/D31

FILE NO.
SHEET 1 OF 1

N08294