HYDROLOGY

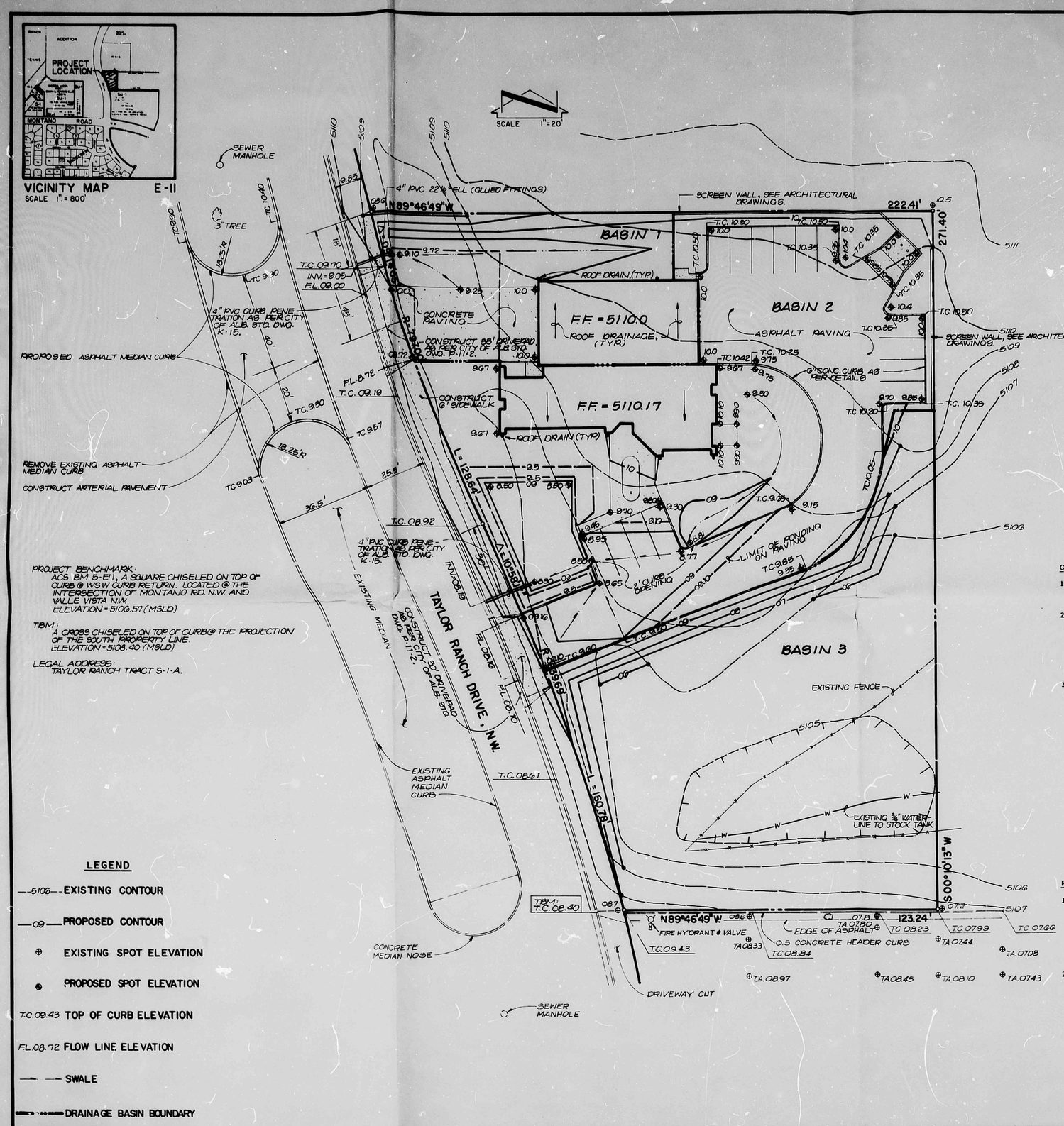
E11/D19

ONE PLAN

1 PLAN FOR

TAYLOR RANCH
FIRE STATION #18

E 11 — D 19



PROJECT BENCHMARK:
ACS BM 5-E11, A SQUARE CHISELED ON TOP OF CURB @ W.S.W. CURB RETURN. LOCATED @ THE INTERSECTION OF MONTANO RD. N.W. AND VALLE VISTA N.W.
ELEVATION = 5100.57 (MSLD)

TBM:
A CROSS CHISELED ON TOP OF CURB @ THE PROJECTION OF THE SOUTH PROPERTY LINE.
ELEVATION = 5108.40 (MSLD)

LEGAL ADDRESS:
TAYLOR RANCH TRACT S-1-A.

LEGEND

- 5106 EXISTING CONTOUR
- 09 PROPOSED CONTOUR
- ⊕ EXISTING SPOT ELEVATION
- ⊕ PROPOSED SPOT ELEVATION
- T.C. 09.43 TOP OF CURB ELEVATION
- FL. 08.72 FLOW LINE ELEVATION
- SWALE
- DRAINAGE BASIN BOUNDARY

DRAINAGE PLAN

The following items concerning the Taylor Ranch Fire Station No. 18, 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 east side of Taylor Ranch Drive, N.W. just north of Montano Road, N.W. The site is more particularly described as Taylor Ranch Tract S-1-A. At present, the site is undeveloped.

Research has revealed that the site does not lie within a designated Flood Hazard Zone. Downstream flooding conditionsdo, however, exist. Because of this, the runoff generated by the developed portions of the site will be routed through positive discharge ponds and discharged onto Taylor Ranch Drive. At this point, Taylor Ranch Drive drains to the south.

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 fire station, along with paving and landscaping. At present, runoff flows from north to south to a depressed area which lies on the south end of the site. Once this depression fills with water, runoff flows to the east. The runoff generated within Basin 3 will continue to follow this trend. The runoff generated by Basins 1 and 2 however, will be routed through positive discharge ponds and will ultimately drain onto Taylor Ranch Drive. Taylor Ranch Drive drains to the south as mentioned above.

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 II. The evaluation of pond release rates is based upon the Orifice Equation.

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Calculations

Ground Cover Information

1. From SCS Bernalillo County Soil Survey, Plate 20:
   NWA Madurez Wink-Association
   Hydrologic Soil Group B

2. **Existing Condition**

   $A_{total} = 1$ Ac ±
   $A_{imp} = 0$
   % impervious = 0%
   C = 0.34 (DPM Plate 22.2C-1)

3. **Developed Condition**

   a. Basin 1
   A = 7230 sf = 0.17 Ac ±
   $A_{imp} = 3530$ sf
   % impervious = 49%
   C = 0.57 (DPM Plate 22.2 C-1)

   b. Basin 2
   A = 20,680 sf = 0.47 Ac ±
   $A_{imp} = 12,320$ sf
   % impervious = 60%
   C = 0.63 (DPM Plate 22.2 C-1)

   c. Basin 3
   A = 15,680 sf = 0.36 Ac ±
   $A_{imp} = 0$
   % impervious = 0%
   C = 0.34 (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 22.2D-1)
   $T_c = 10$ min (minimum)
   A = area, Ac

2. Volume: $V = CP_6A(1/12)$
   where C varies
   $P_6 = 2.2$ in (DPM Plate 22.2D-1)
   A = area, sf

Hydrology

1. Existing Condition
   $Q_{100} = 0.34(4.65)(1) = 1.6$ cfs (to east)
   $V_{100} = 0.34\ (2.2/12)(43,560) = 2715$ cf

2. **Developed Condition**

   a. Basin 1
   $Q_{100} = 0.57(4.65)(0.17) = 0.45$ cfs (to street)
   $V_{100} = 0.57(2.2/12)(7230) = 756$ cf
   $V_{pond} = 538$ cf
   $V_{pond} = 1/2(A_{9.1}+A_{9.25})(9.25-9.1)+1/2\ (A_{9.25}+A_{9.72})(9.72-9.25)$
   $= 1/2(0+600)(0.15)+1/2(600+1500)(0.47)$
   $Q_{release} = C\sqrt{2gh}\ A = 0.8\sqrt{2(32.2)(0.45)}(0.0873)$
   $= 0.38$ cfs $\approx Q_{100}$ ^ pond volume ok

   b. Basin 2
   $Q_{100} = 0.63(4.65)(0.47) = 1.4$ cfs (to street)
   $V_{100} = 0.63\ (2.2/12)(20,680) = 2389$ cf
   $V_{pond} = 1211$ cf $> V_{required}$
   $V_{pond} = 1/2\ (A_{8.3}+A_{8.5})(8.5-8.3)+1/2\ (A_{8.5}+A_9)(9-8.5)$
   $+ 1/2(A_9+A_{9.1})(9.1-9)$
   $= 1/2(0+940)(0.2)+1/2(940+2440)(0.5)$
   $+ 1/2(2440+3000)(0.1)$
   $Q_{release} = 0.8\sqrt{2(32.2)(0.63)}\ (0.0873)$
   $= 0.44$ cfs

   By hydrograph analysis, $V_{required} = 1181$ cf

   c. Basin 3
   $Q_{100} = 0.34(4.65)(0.36) = 0.6$ cfs (to east)
   $V_{100} = 0.34\ (2.2/12)(15,680) = 977$ cf

   This area not intended for development.
   No ponding proposed.

3. Comparison
   a. Discharge to east
   $\Delta Q_{100} = 1.6-0.6 = 1$ cfs decrease
   $\Delta V_{100} = 2715-977 = 1738$ cf decrease

   b. Discharge to Taylor Ranch Drive
   $\Delta Q_{100} = 0-(0.38+0.44) = (0.8)$ cfs increase
   $\Delta V_{100} = 0-(756+2389) = 3145$ cf increase

SEE PLAN
EUISEC 4/13/84

REGISTERED PROFESSIONAL ENGINEER
STATE OF NEW MEXICO
3782
NEW MEXICO LAND SURVEYOR

NO.	DATE	BY	REVISIONS

John Mann Associates, Inc.
811 DALLAS N.E. · ALBUQUERQUE · NEW MEXICO · 87110
ENGINEERS

DESIGNED BY J.G.M.
DRAWN BY B.S.
APPROVED T.T.M.
JOB NO. 2131-2
DATE 3-83

GRADING & DRAINAGE PLAN
TAYLOR RANCH FIRE STATION NO. 18

E11/D19

FILE NO.
SHEET 1 OF 1