HYDROLOGY E19/D2 2 PLANS

E19/D2

2 Plans

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STORM DRAINAGE STUDY
FOR
ACADEMY ACRES UNIT NO. 12

JULY 1973

GENERAL

This report presents the calculated probable storm drainage runoff from a 100 year storm of this proposed development of ACADEMY ACRES UNIT NO. 12.

LOCATION

ACADEMY ACRES UNIT NO. 12 is bounded on the East by Academy Acres Unit No. 13; on the North by unplatted land; on the West by Academy Acres Unit No. 11; and on the South by Academy Acres Unit No. 9. It is situated in the Northwest Quarter (N.W./4) of Section 30, Township 11 North, Range 4 East, N.M.P.M.

EXISTING DRAINAGE

The present topography shows a fairly consistant slope to the Southwest of 2% mainly as sheet flow. There are outside contributing areas involved with this site.

Drainage for the East is intercepted by Truchas Drive N.E., to be constructed as part of this unit, and diverted to the natural drainage channel of the Arroyo Del Pino.

PROPOSED DRAINAGE PLANS

In order to reduce runoff, yard ponding will be used. The drainage will be collected at Louisiana Boulevard N.E. and be carried to the Arroyo Del Pino. The streets are designed to carry all runoff without over-topping.

RUNOFF QUANTITIES

The quantities of storm runoff to be expected from each drainage area were determined using the Rational Formula, Q=CIA, where

Q=quantity of storm runoff in cubic feet per second; C=coefficient of runoff dependent upon the type of surface drained; I=intensity of rainfall in inches per hour for a duration equal to the total accumulation time in minutes; and A=area of contributing watershed in acres.

The area (A) of each separate contributing area was determined by outlining the watershed on the contour map and measuring the area (by planimeter) in acres.

Intensity Duration Frequency Curves (Chart 1) for the Albuquerque Area, "Master Plan of Drainage - City of Albuquerque, New Mexico and Environs," 1963, prepared by Gordon Herkenhoff and Associates, Consulting Engineers, together with the expected accumulation of runoff from each of the areas. The total accumulation times are determined by a combination of Yarnell's Method and probable future streets and drainage channel alignments and grades, as shown, assuming overland flows to cross grass surfaces, depending upon the probable type of development in each area and estimating the probable type of grading to be done in each area. The coefficient of runoff (C) was determined by using percentage of area covered by grass, buildings and paving, using respective runoff factors from the Master Plan of Drainage.

STREET DRAINAGE

Street capacities are based on Manning's Equation Q=AV, where $V=\frac{1.486}{n} S^{1/2} R^{2/3}$ when A=cross-sectional area of the channel or structure; R=hydraulic radius of channel or area divided by wetted perimeter; S=slope of channel or facility in feet per foot, and "n"

values of 0.015 for concrete and asphalt surfaces.

CONCLUSIONS

The computations indicate that the proposed design is adequate to satifactorly handle a 100 year storm. The street section and minimum slope will be selected from Exhibit I.

Wm J. McDermott, P.E. & L.S. No. 855

RUNOFF COMPUTATIONS

Sheet No. _____

Job No. _____

Drainage Area No. A

Area = 10.8 acres

Maximum Overland Flow: L = 110 S = 1%

Maximum Channel Flow:

Channel No. 1 L = 1750 S = 2%

Channel No. 2 L _____ S = _____

Channel No. 3 L = _____ S = _____

Accumulation Time

Overland Flow: 5 min.

Channel No. 1 Flow:

Velocity= 5.6 ft/sec; Time= 1750 / 5.6 X 60 = 5 min.

Channel No. 2 Flow:

Velocity= _____ ft/sec; Time= _____ / X 60 = _____ min

Channel No. 3 Flow:

Velocity= _____ ft/sec; Time= _____ / X 60 = _____ min.

Total Accumulation Time: T = 10 min.

$I = \frac{189}{T+25} = \frac{189}{35} = 5.4$

$Q = CIA = (.4)(5.4)(10.8) = 23$ c.f.s.

Date: _____

Comp. by: _____

Checked by: DPC

RUNOFF COMPUTATIONS

Sheet No. _____

Job No. _____

Drainage Area No. 13

Area = 21.8 acres

Maximum Overland Flow: L = 110 S = 1%

Maximum Channel Flow:

Channel No. 1 L = 1750 S = 2%

Channel No. 2 L = _____ S = _____

Channel No. 3 L = _____ S = _____

Accumulation Time

Overland Flow: 5 min.

Channel No. 1 Flow:

Velocity= 5.8 ft/sec; Time= $\frac{1750}{5.8 \times 60}$ = 5 min.

Channel No. 2 Flow:

Velocity= _____ ft/sec; Time= $\frac{\quad}{\quad \times 60}$ = _____ min.

Channel No. 3 Flow:

Velocity= _____ ft/sec; Time= $\frac{\quad}{\quad \times 60}$ = _____ min.

Total Accumulation Time: T = 10 min.

$I = \frac{189}{T+25} = \frac{189}{35} = 5.4$

$Q = CIA = (.4)(5.4)(21.8) = 47$ c.f.s.

Date: _____

Comp. by: _____

Checked by: DPC

EXHIBIT I
STREET CARRYING CAPACITIES
AT VARIOUS GRADES
IN CFS

n(conc)=.015

STREET WIDTH	TYPE CROWN	CURB HT	.0050	.0100	.0150	.0200	.0250	.0300	.0350	.0400
32'	8"	8"	18	25	31	36	40	44	47	50
	6"	8"	35	49	61	70	78	86	92	99
	4"	8"	56	80	98	113	126	138	149	160
	2"	8"	82	115	142	164	183	201	217	232
48'	8"	8"	27	38	47	54	60	66	71	76
	6"	8"	53	75	92	106	118	130	140	150
	4"	8"	85	121	148	171	191	209	226	241
	2"	8"	124	175	215	248	277	304	328	351

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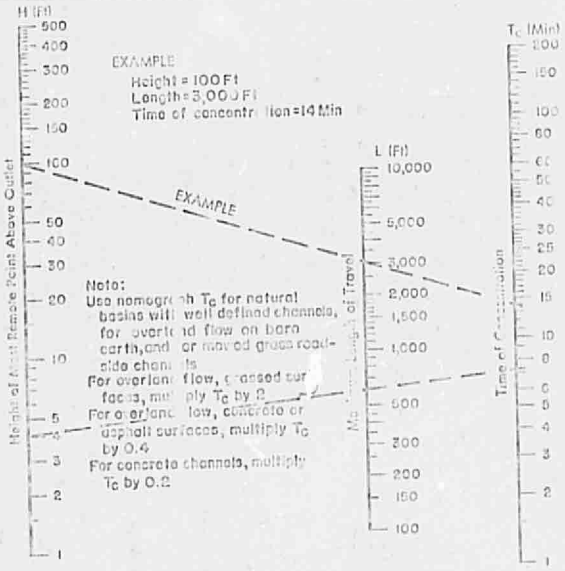

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