HYDROLOGY K16/D5 3 PLANS

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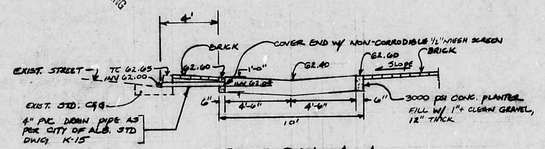
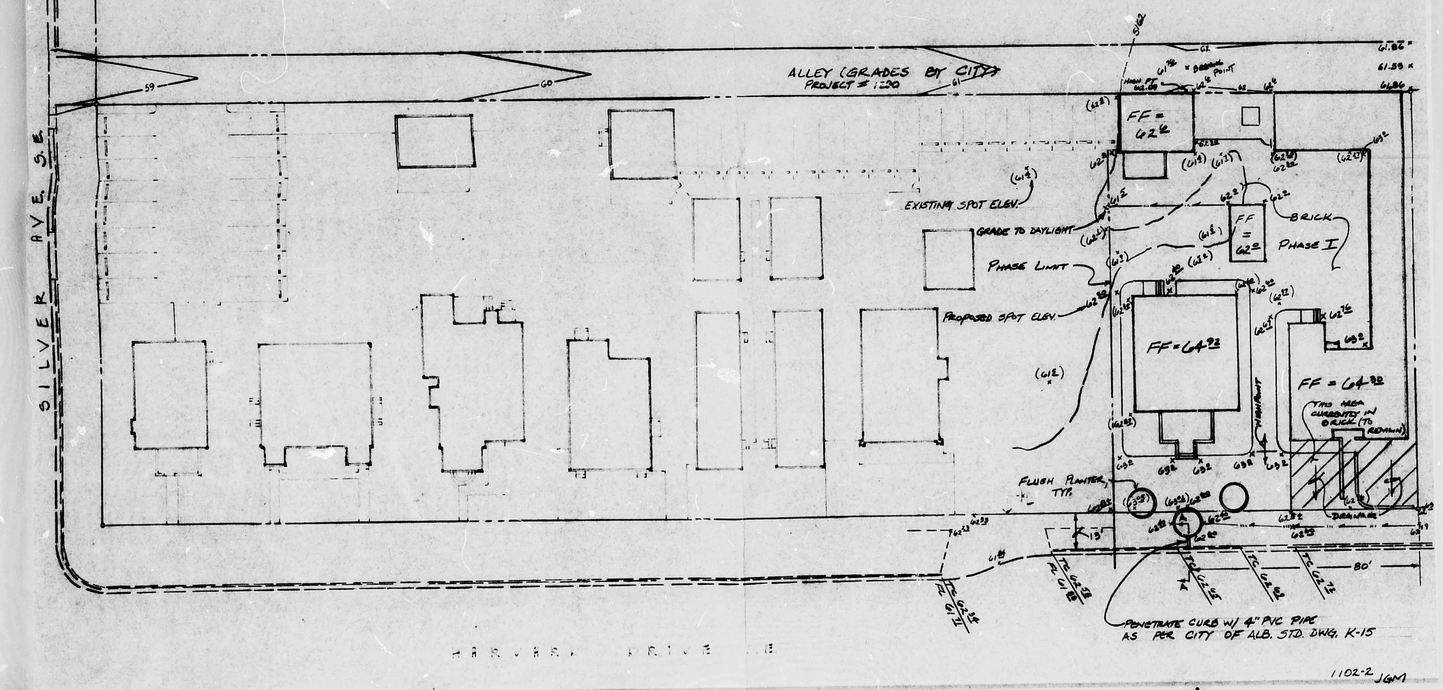


SECTION A-A
1" = 4'-0"



1102-2 JGM

K16/D5

3 Plans

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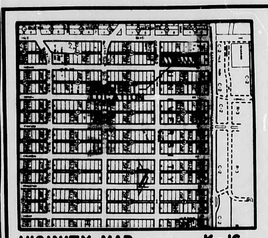

VICINITY MAP **K·16**

SCALE 1" = 800'

SCALE 1" = 20'

LEGEND

- EXISTING SPOT ELEVATION
- PROPOSED SPOT ELEVATION
- FLOW LINE
- SWALE
- EXISTING SIDEWALK

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10 07 1984
HYDROLOGY SECTION

DRAINAGE PLAN

The following items concerning the Harvard Mall Phase III Drainage Plan are contained hereon:

1. Vicinity Map
2. Grading Plan
3. Calculations

The proposed improvements, as shown by the Vicinity May, are located in the University Heights Addition. At present, the site is fully developed. The proposed improvements, however, involve the modification of a portion of the existing site. As part of the beautification of the site, new landscaping, which will include planters and brick paving, will be added.

The site does not lie in a designated flood hazard zone as shown on the plat of the Albuquerque Master Drainage Study. Offsite flows do not enter the site as determined by the previously approved drainage plan.

The Grading Plan shows 1) existing grades indicated by spot elevations, 2) proposed grades indicated by spot elevations and contours at 0' 6" intervals, 3) swales, 4) proposed alley grades as established by the City of Albuquerque Engineering Division, Design Section, 5) continuity between proposed and existing elevations, and 6) the limits and character of the proposed improvements.

The Calculations which appear below were performed using the Rational Method, along with data from the previous report to maintain consistency. The runoff calculations demonstrate that the proposed improvements do not significantly affect the rate of runoff discharged from the site when compared to the previous report. The proposed drainage has been maintained as close as possible to the patterns established by the previously approved drainage plan. A combined total runoff of 0.90 cfs will be generated by the adjacent phase immediately north and the proposed development of this phase, and will be routed onsite. A combined total runoff of 1.0 cfs will be generated by the adjacent phase immediately north and the proposed development of this phase, and will be discharged directly to the alley along the west property line of the site.

CALCULATIONS

Ground Cover Information

From SCS Bernalillo County Soil Survey, Plate 31:
Cu Cut and Fill Land
Hydrologic Soil Group A

Rational Method

Discharge: $Q = CiA$
where C varies
$i = P_6 (6.84) T_c^{-0.51} = 4.86$ in/hr
$P_6 = 2.35$ in (DPM Plate 22.2D-1)
$T_c = 10$ min (minimum)
A = area, acres
Volume: $V = CP_6A(1/12)$
where C varies
$P_6 = 2.35$ in (DPM Plate 22.2D-1)
A = area, sf

Existing Condition

$A_{total} = 16{,}000$ sf $= 0.37$ Ac
$A_{imp} = 3200$ sf; % impervious = 20%
$C_{imp} = 0.26$ (from previous report)
$Q_{100} = CiA = .26\ (4.86)\ (.37) = 0.50$ cfs
$V_{100} = CP_6A = 0.26\ (2.35/12)\ (16{,}000) = 814$ cf

Developed Condition

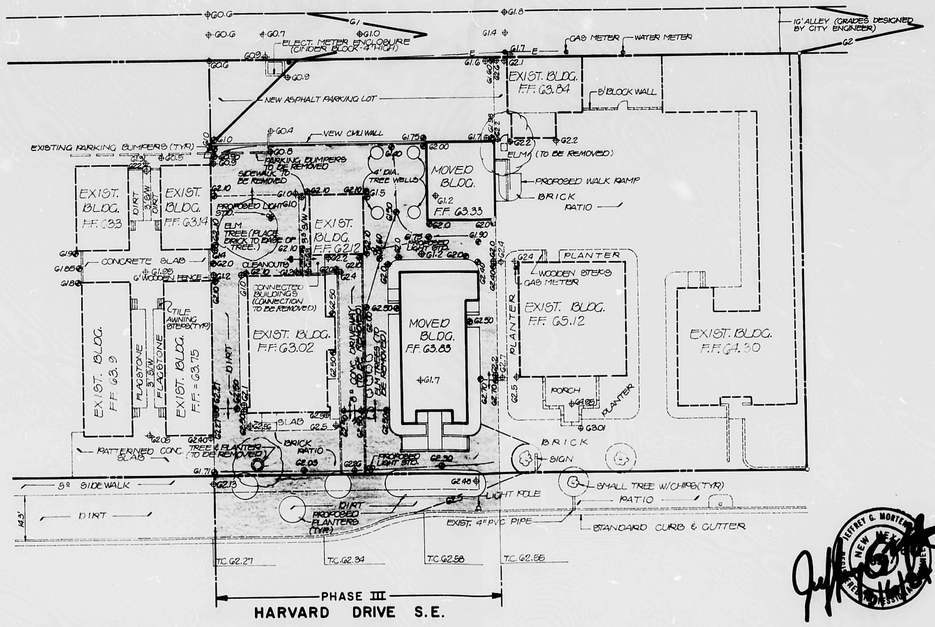
1. Discharge to Alley
   $A_{total} = 8712$ sf $= 0.20$ Ac
   $A_{imp} = 1840$ sf; % impervious = 90%
   $C_{imp} = 0.86$ (from previous report)
   $Q_{100} = CiA = 0.86\ (4.86)\ (0.20) = 0.84$ cfs
   $V_{100} = CP_6A = 0.86\ (2.35/12)\ (8712) = 1468$ cf

2. Discharge to South (Onsite)
   $A_{total} = 7288$ sf $= 0.17$ Ac
   $A_{imp} = 6852$ sf; % impervious = 094%
   $C_{imp} = 0.87$ (from previous report)
   $Q_{100} = 0.87\ (4.86)\ (0.17) = .72$ cfs
   $V_{100} = 0.87\ (2.35/12)\ (7288) = 1242$ cf

3. Discharge from North (Onsite from previous report)
   A. Discharge to Alley
      $Q_{100} = 0.94\ (4.86)\ (0.05) = 0.22$ cfs
      $V_{100} = 0.94\ (2.35/12)\ (2178) = 400$ cf
   B. Discharge to South (Onsite)
      $Q_{100} = 0.69\ (4.86)\ (0.04) = 0.13$ cfs
      $V_{100} = 0.69\ (2.35/12)\ (1745) = 236$ cf

4. Total Discharge to Alley
   $Q_{100} = 0.84 + 0.22 = 1.06$ cfs
   $V_{100} = 1468 + 400 = 1869$ cf

Total Discharge to South (Onsite)
$Q_{100} = 0.72 + 0.13 = .85$ cfs
$V_{100} = 1242 + 236 = 1478$ cf



BOHNHOFF & ASSOCIATES, INC. ENGINEERS, 811 DALLAS N.E. · ALBUQUERQUE · NEW MEXICO · 87110	NO. / DATE / BY / REVISIONS	DESIGNED BY J.G.M. / DRAWN BY C.G.C. / APPROVED T.T.M.	JOB NO. 11024 / DATE 2·84	GRADING & DRAINAGE PLAN HARVARD MALL PHASE III	FILE NO. / SHEET 1 OF 1

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DRAINAGE PLAN

The following items concerning the Harvard Square Drainage Plan are contained hereon:

1. Vicinity Map
2. Flood Hazard Map
3. Grading Plan
4. Calculations

The proposed improvements, as shown by the Vicinity Map, are located in University Heights Addition, Block 1, Lots 15-21. At present, the site is fully developed. The proposed improvements, however, involve the demolition of several existing buildings and the construction of new buildings. Many of the existing buildings, however, will remain. As part of the beautification of the site, new landscaping, which will include planters and brick paving, will be added.

The site does not lie in a designated flood hazard zone as shown by the Flood Hazard Map. The Flood Hazard Map was taken from the "City of Albuquerque, New Mexico, Bernalillo County Flood Hazard Boundary Map" prepared by the U. S. Department of H.U.D., Federal Insurance Program. Offsite flows do not enter the site as evidenced by field inspection and study of the Albuquerque Master Drainage Study.

The Grading Plan shows (1) existing contours at 1'-0" intervals, (2) proposed grades indicated by spot elevations and contours at 0'-6" intervals, (3) swales, (4) proposed alley grades as established by the City of Albuquerque Engineering Division, Design Section, (5) proposed storm drains to control runoff within the site, (6) continuity between proposed and existing elevations and (7) the limits and character of the proposed improvements.

The calculations which appear below were performed using the Rational Formula. Runoff coefficients were determined from a watershed characteristics table prepared by the U. S. Soil Conservation Service. Rainfall intensity was obtained from the PDIP curves developed by Herkenhoff (1961). The runoff calculations demonstrate that the proposed improvements do not significantly affect the rate of runoff discharged from the site. In fact, more than one-half of the runoff generated by a 100-year frequency storm falling on the site will be directed offsite via a storm drain system. This runoff, as shown by the grading plan, will enter an existing 24-inch storm drain located in Silver Avenue S.E. The connection to the existing storm drain has been coordinated with Mr. Robert Kielich, Assistant City Engineer/Design.

CALCULATIONS

EXISTING CONDITION:

Dirt & gravel = 0.60 Ac± (C = 0.70)
Impervious areas = 0.87 Ac± (C = 0.95)
Total area = 1.47 Ac±

By Kirpich equation,

$$t_c = 0.00013 \frac{L^{0.77}}{s^{0.385}} = 0.10 \text{ hr} = 6 \text{ min}$$

where L = 500'
Δ elev = 4'
$s = \frac{\Delta \text{ elev}}{L} = 0.0080$

Let t_c = 10 min

$$\text{Composite "C"} = \frac{0.87}{1.47}(0.95) + \frac{0.60}{1.47}(0.70) = \underline{0.85}$$

Q = CiA (Rational equation)

$Q_{100, \text{ exist}}$ = 0.85(5.4)(1.47) = 6.75 cfs

DEVELOPED CONDITION:

1. Discharge to Alley

Impervious areas = 0.32 Ac± (C = 0.95)
Brick = 0.14 Ac± (C = 0.85)
Planters = 0.02 Ac± (C = 0.40)
Total area = 0.48 Ac±

$$\text{Composite "C"} = \frac{0.32}{0.48}(0.95) + \frac{0.14}{0.48}(0.85) + \frac{0.02}{0.48}(0.40)$$

"C" = 0.90

Q_{100} = 0.90(5.4)(0.48) = 2.33 cfs

2. Discharge to Storm Drain System

Impervious areas = 0.26 Ac± (C = 0.95)
Brick = 0.63 Ac± (C = 0.85)
Plantors = 0.10 Ac± (C = 0.40)
Total area = 0.99 Ac±

$$\text{Composite "C"} = \frac{0.26}{0.99}(0.95) + \frac{0.63}{0.99}(0.85) + \frac{0.10}{0.99}(0.40)$$

"C" = 0.83

Q_{100} = 0.83(5.4)(0.99) = 4.44 cfs

3. Total Discharge From Site

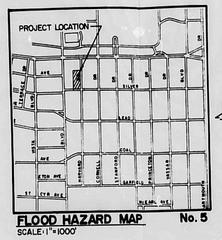
ΣQ_{100} = 2.33 + 4.44 = 6.77 cfs

$\therefore Q_{100, \text{ dev}} = Q_{100, \text{ exist}}$

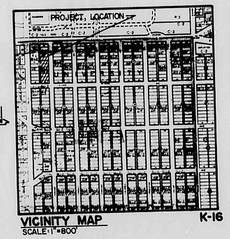
NOTES:

1. CATCH BASINS SHALL BE CONSTRUCTED IN ACCORDANCE WITH CITY OF ALBUQUERQUE STANDARD DRAWING K-6-1.
2. ALL CURB SPECIFIED FOR PLANTER AREAS SHALL BE 6 INCHES THICK AND 12 INCHES DEEP. CURB HEIGHT SHALL BE 6 INCHES UNLESS INDICATED OTHERWISE.
3. ALLEY GRADES HAVE BEEN ESTABLISHED BY THE CITY OF ALBUQUERQUE ENGINEERING DIVISION DESIGN SECTION.

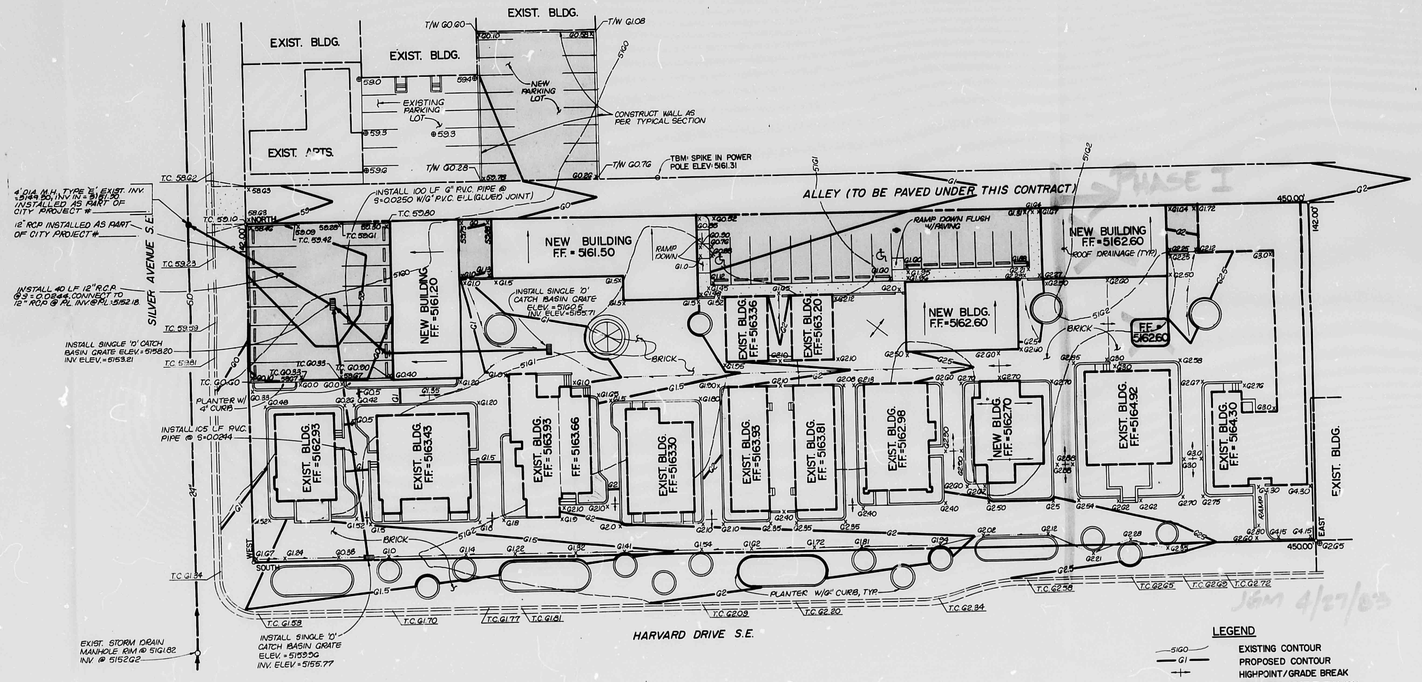
SCALE: 1" = 20'

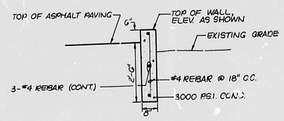


FLOOD HAZARD MAP No. 5
SCALE: 1" = 1000'



VICINITY MAP K-16
SCALE: 1" = 800'





TYPICAL WALL SECTION
SCALE: 1" = 2'

LEGEND

- 5160 — EXISTING CONTOUR
- G1 — PROPOSED CONTOUR
- HIGHPOINT/GRADE BREAK
- PROPOSED SPOT ELEVATION
- EXISTING SPOT ELEVATION
- PROPOSED CONCRETE
- CATCH BASIN
- SWALE FLOWLINE
- PROPOSED ASPHALT PAVING
- PROPOSED PLANTING AREA
- PROPERTY LINE

REGISTERED PROFESSIONAL ENGINEER — STATE OF NEW MEXICO — THOMAS T. MARTINEZ — 3781 — ENGINEER AND LAND SURVEYOR
2/11/82

Harvey Hoshour / Architect / Ltd.
201 Coal Avenue, S.W. / Albuquerque, New Mexico 87102 / Telephone (505) 842-0500

THE HARVARD MALL
115-147 HARVARD DRIVE, S.E.
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