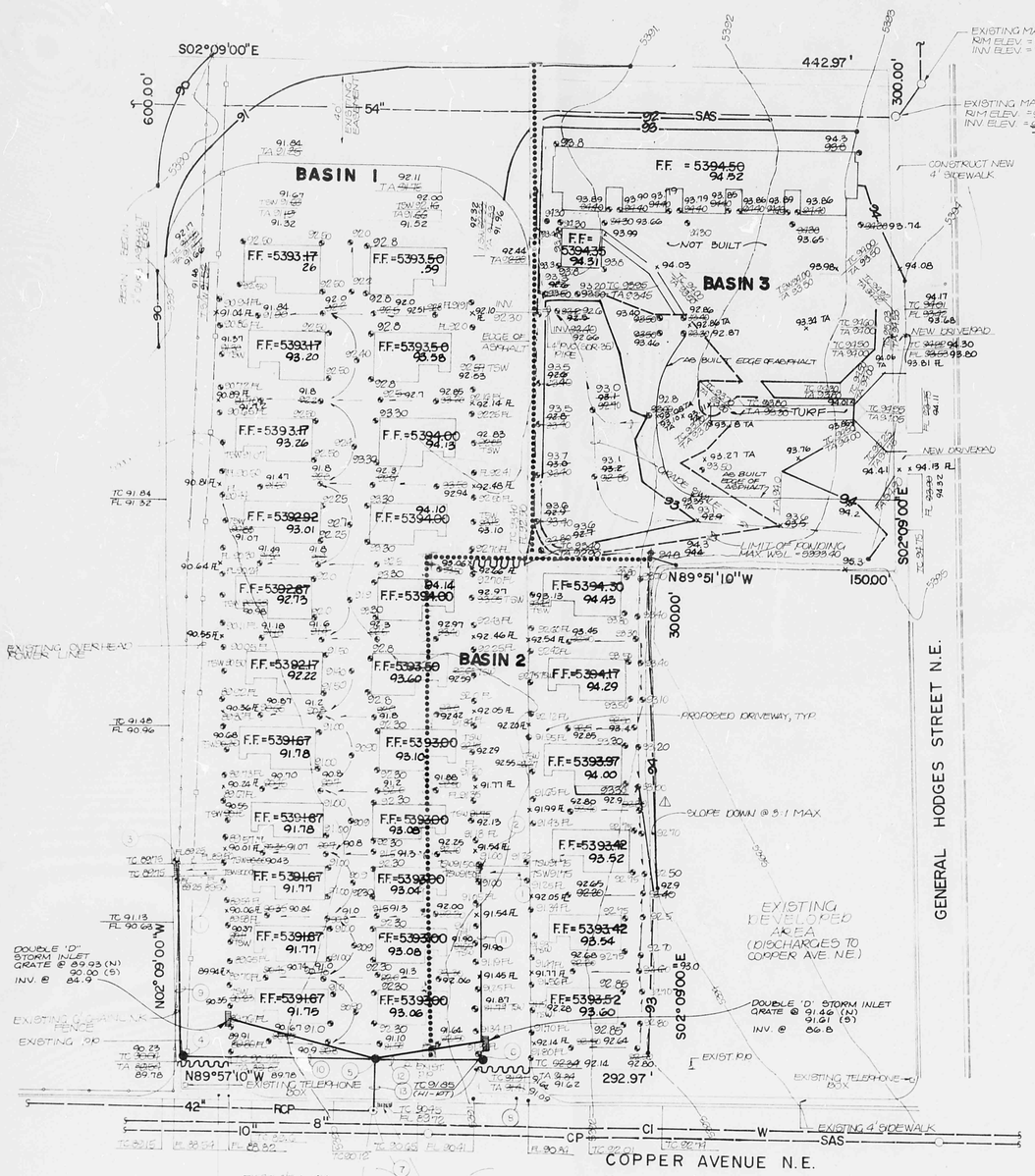
HYDROLOGY

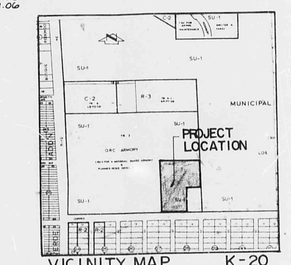
K20/D2
ONE PLAN

K20-D2

1 PLAN



GRADING & DRAINAGE PLAN



VICINITY MAP K-20

SCALE 1" = 800'

LEGEND

⊕	PROPOSED SPOT ELEV.
⊕	EXISTING SPOT ELEV.
T.C. 66.56	TOP OF CURB
TSW 66.06	TOP OF SIDEWALK
FL 65.56	FLOW LINE
	PROPERTY LINE
	EXISTING FENCE
	SWALE
96	PROPOSED CONTOUR
95.56	EXISTING CONTOUR
	DRAINAGE BASIN BOUNDARY
	PROPOSED CONCRETE
	EXISTING CONCRETE
	WATER BLOCK
× 92.34	AS BUILT SPOT ELEVATIONS
~~92.90~~ 93.4	AS BUILT SPOT ELEVATIONS

KEYED NOTES

1. ~~Construct 6' concrete valley gutter per City of Albuquerque Standard Drawing P-10-1.~~ NOT BUILT
2. ~~Construct single 'C' catch basin per City of Albuquerque Standard Drawing K-4-3. Grate elev. = 5391.00 Inv. elev. = 5387.90~~ NOT BUILT @ THIS LOCATION
3. ~~Construct single 'C' catch basin per City of Albuquerque Standard Drawing K-4-3. Grate elev. = 5389.25 Inv. elev. = 5385.25~~ NOT BUILT @ THIS LOCATION
4. ~~Construct 4' diameter manhole Rim elev. = 5389.5 Inv. elev. = 5383.16~~ NOT BUILT
5. Construct 4' diameter manhole Rim elev. = 5392.0 Inv. elev. = 5381.04 NOT BUILT
6. ~~Construct 4' diameter manhole Rim elev. = 5391.4 Inv. elev. = 5382.18~~ NOT BUILT
7. Connect to existing storm drain manhole Exist inv. = 5378.34 Inv. in. = 5380.50 REFER TO S.O. #19 INSPECTED BY CITY ENGINEERING
8. Construct concrete valley gutter per City of Albuquerque Standard Drawing P-9-3. (INSPECTED BY CITY ENGINEERING)
9. ~~Install 18" PVC storm drain @ S = 0.018; $Q_{capacity}$ = 20.5 cfs~~ NOT BUILT
10. Install 18" PVC storm drain @ S = 0.018; $Q_{capacity}$ = 20.5 cfs
11. ~~Install 12" PVC storm drain @ S = 0.034; $Q_{capacity}$ = 9.4 cfs~~ NOT BUILT
12. Install 12" PVC storm drain @ S = 0.034; $Q_{capacity}$ = 9.4 cfs
13. Install 18" PVC storm drain @ S = 0.018; $Q_{capacity}$ = 20.5 cfs REFER TO S.O. #19 INSPECTED BY CITY ENGINEERING

NOTE: Storm drain capacity determined by Feild's Hydraulics Calculation for Gravity Flow in Pipes.

DRAINAGE PLAN

The following items concerning the Los Altos Family and Elderly Housing 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 north side of Copper Avenue just west of the northerly extension of General Hodges N.E. which is a private service drive to the Los Altos Towers. At present, the site is undeveloped. The surrounding area, however, is largely developed.

As shown by Plate K-20, of the Albuquerque Master Drainage Study, this site does not lie within a designated Flood Hazard Zone. The site, does however lie adjacent to an AO Zone. This AO Zone is characterized by flooding in the street to a depth of 1' above gutter flow line. Because of this, the finished floor elevations of the proposed houses which are stituated adjacent to the street have been established at least 2' above the corresponding flow line of Copper Avenue N.E. Furthermore, offsite flows do not impact this site. The site to the north drains parallel to this site. The site located at the southeast corner of this site discharges its runoff to the adjacent streets. The site situated to the west of this site is topographically lower, therefore, does not contribute any runoff to the project site.

The Grading Plan shows 1) existing grades indicated by spot elevations and contours at 1' 0" intervals, 2) proposed grades indicated by contours and spot elevations in the unpaved areas and spot elevations in the paved and yard areas, 3) the limit and character of the proposed improvements, and 4) continuity between existing and proposed grades. As shown by this plan, the proposed improvements consist of the construction of many single family dwelling units and an elderly housing complex. Adjacent paving and landscaping will also be provided. These improvements will take place on a single tract of land and there will be no subsequent platting of this parcel into individual lots.

At present, the runoff generated by this site flows from east to west onto the site of the National Guard Armory. In the developed condition, the site has been analyzed in three distinct basins. The flows generated by Basin 1 will drain from the yard areas to the private street. This street will drain to a proposed catch basin which will outlet to the existing public storm drain in Copper Avenue. Basin 2 will also drain its yards to the private street which will drain to another catch basin which will outlet to the aformentioned public system. The runoff from Basin 3, which is largely the area utilized for the elderly housing, will be routed through a positive discharge pond. The discharge from this pond will outlet onto the aforementioned private street within Basin 1. From this point, the controlled flows will flow within the private street to the aformentioned catch basin. The storm drain constructed within this project will be a private storm drain which will connect to the public storm drain system which exists in Copper Avenue N.E.

The Calculations which appear hereon 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. As shown by these calculations, the development of this parcel will result in an increase in runoff from the site. This discharge of runoff will largely be directed to the existing storm drain system which exists in Copper Avenue. Because of the close proximity of this site to the existing 42-inch RCP storm drain in relation to overall watershed contributing to the existing inlet adjacent to the site, Basin 1 and 2 will freely discharge to the existing storm drain system. Basin 3, on the otherhand, will experience a controlled discharge because it is located further away from the street and its flow may reach this system by the time that flooding may begin to occur in the street. It should be noted, however, that this site will discharge its runoff directly to the underground system and will not rely upon the discharge of this runoff to the street where it may or may not be intercepted by the existing catch basin.

DRAINAGE CERTIFICATION

The "As-Built" spot elevations shown hereon indicate that this project has been constructed in substantial compliance with the approved drainage plan in most areas of the site. Minor revisions appear to have been made to the parking lot layout for the Elderly Housing, however, these revisions do not appear to adversely impact the drainage of the site. Some of the private street grades differ from the approved design. However, the streets do appear to drain as observed during a rainfall on September 23, 1986. All of the building finished floor elevations have been constructed at or slightly above the design elevations on the approved plan. The greatest single departure from the approved plan is the private storm drain system. The said contractor responsible for this work claims that he encountered conflicts with other utilities and therefore had to relocate the storm drain inlets within the private road. Based upon the rainfall and runoff of September 23, 1986, these relocated facilities appear to function adequately. The connection of this private storm drain system to the public storm drain system within Copper Avenue N.E. was observed and inspected by the City of Albuquerque and is not part of this certification. Lastly, the pond by the Elderly Housing portion of this site was originally not constructed in accordance with the approved drainage plan. The contractor was notified of this and he had this pond regraded to comply with the approved drainage plan. It is because of this that there are two sets of "as-built" spot elevations presented on this portion of the drawing.

These drawings represent the "as-built" conditions of the grading and drainage portion of this project to the best of my knowledge and belief. All vertical and horizontal dimensions should be field verified prior to use or future projects. This drawing cannot be used in conjunction with any further work without the express written consent of Krueger & Associates.

Jeffrey G. Mortensen, P.E. 10-13-86
Date

JEFFREY G. MORTENSEN NEW MEXICO 8547 REGISTERED PROFESSIONAL ENGINEER

CALCULATIONS

Ground Cover Information

From SCS Bernalillo County Soil Survey, Plate 31
TgB Tijeras Gravelly Fine Sandy Loam
Hydrologic Soil Group B

Rational Method

Discharge: $Q = CiA$
where C varies
$i = P_6 (6.84) T_c^{-0.51} = 5.0$ in/hr
$P_6 = 2.35$ in (DPM Plate 22.2D-1)
$T_c = 10$ min (minimum)
A = area, acres

Volume: $V = CP_6A(1/2)$
where C varies
$P_6 = 2.35$ in (DPM Plate 22.2D-1)
A = area, sf

Existing Condition

A_{total} = 220,780 sf = 5.07 Ac
A_{imp} = 0 sf; % impervious = 0%
$'C'$ = 0.34 (DPM Plate 22.2C-1)
$Q_{100} = CiA = (0.34)(5.0)(5.07) = 8.6$ cfs
$V_{100} = CP_6A = (0.34)(2.35/12)(220,780) = 14,700$ cfs

Developed Condition

Basin 1
A_{total} = 136,780 sf = 3.14 Ac
A_{imp} = 62,870 = % impervious = 46%
$'C'$ = 0.56 (DPM Plate 22.2D-1)
$Q_{100} = CiA = (0.56)(5.0)(3.14) = 8.8$ cfs
$V_{100} = CP_6A = (0.56)(2.35/12)(136,780) = 15,000$ cf

Basin 2
A_{total} = 39,000 sf = 0.90 Ac
A_{imp} = 24,736 sf % impervious = 63%
$'C'$ = 0.65 (DPM Plate 22.2D-1)
$Q_{100} = CiA = (0.65)(5.0)(0.90) = 2.9$ cfs
$V_{100} = CP_6A = (0.65)(2.35/12)(39,000) = 4580$ cf

Basin 3
A_{total} = 45,000 sf = 1.03 Ac
A_{imp} = 24,930 sf = % impervious = 55%
$'C'$ = 0.60 (DPM Plate 22.2D-1)
$Q_{100} = CiA = (0.60)(5.0)(1.03) = 3.1$ cfs
$V_{100} = CP_6A = (0.60)(2.35/12)(45,000) = 5290$ cf

$V_{required}$ = 3744 cf (based upon Hydrograph Analysis)
$V_{pond} = 1/2[(A_{92.15} + A_{93.0})(93.0 - 92.15) + (A_{93.4} + A_{93.0})(93.4 - 93.0)]$
$V_{pond} = 1/2[(0 + 7490)(0.85) + (7470 + 10,900)(0.40)]$
= 6850 cf

$Q_{release} = CA\sqrt{2gh} = 0.5$ cfs (discharged to Basin 1)
C = 0.75
A = 0.0873 sf (4" dia pipe)
g = 32.2 ft/sec²
h = 0.9 ft

Comparison

$\Delta Q_{100} = (8.8 + 2.9 + 0.5) - 8.6 = 3.6$ cfs (increase)
$\Delta V_{100} = (15,000 + 4580 + 5290) - 14,700 = 10,170$ (increase)

RECEIVED OCT 13 1986 HYDROLOGY SECTION

OWNERSHIP AND USE OF THESE DRAWINGS IS LIMITED AND WILL BE ENFORCED AS PER ARTICLE 1.3.1. OF A.I.A. DOCUMENT A201

126 GENERAL CHENNAULT NORTHEAST
ALBUQUERQUE, N.M. 87123 505-293-7888

LOS ALTOS FAMILY & ELDERLY HOUSING
ALBUQUERQUE, N.M. 87123

STATE OF NEW MEXICO DONALD A. KRUEGER No. 444 REGISTERED ARCHITECT

PROJECT: 258-1281

GRADING & DRAINAGE PLAN

SHEET 3 OF 24

DATE: 8/1/84
DRAWN BY:
REVISIONS: 1 ADD CONTOURS @ EAST PL 10/26/84

DONALD A. KRUEGER & ASSOCIATES INC
ARCHITECTURE PLANNING

K20/D2