HYDROLOGY

K22/D23

ONE PLAN

1 PLAN FOR

ALBUQ. RETIREMENT CNTR.

K22-D23

VICINITY MAP K·22

## Drainage Plan

The following items concerning the Albuquerque Retirement Center Drainage Plan are contained hereon:

1. Vicinity Map 2. Grading Plan 3. Calculation

The proposed improvements, as shown by the Vicinity Map, are located at the northeast corner of the intersection of Paisano Road N.E. and Skyline Road N.E. The Retirement Center is more particularly described as Tract B-2 of the KOA Subdivision, Unit 2. Directly north of the site lies a future hotel site. Directly east of the site is the site of the proposed Sandia Ridge Apartments currently being designed by Andrews, Asbury and Robert. It is believed through conversations with Mr. John Robert and Mr. Bob Poglesong, both of Andrews, Asbury and Robert, that the development of Tract B-1 will divert all offsite flows to Skyline Road N.E., thereby eliminating the impact of those flows on the subject site. At present, all three sites are undeveloped.

As shown by Plate K-22 of the Albuquerque Master Drainage Study, the site does not lie within a designated flood-hazard zone. The potential for downstream flooding may exist, therefore, the runoff generated by the proposed improvements will be routed through a positive discharge pond in accordance with the approved conceptual drainage plan. The existing drainage pattern of the area is one in which runoff flows from northeast to southwest. Offsite flows, in the form of sheetflow, impact the site from the east, however, the magnitude of this flow, which is calculated below, does not present a problem to the development of this site. Also, as stated above, the development of the Sandia Ridge Apartments will divert all of these offsite flows to Skyline Road N.E.

The Grading Plan shows 1) existing and proposed grades indicated by contours at 1'0" intervals, 2) the limit and character of the proposed improvements within the site and, 3) the limit and character of the proposed street improvements which are also being designed by this office. As shown by this plan, the proposed improvements include the construction of a retirement facility, asphalt paving for access and parking, and landscaping. All runoff generated by this site will be routed through a positive discharge pond located at the southwest corner of the project. Also shown by the Grading Plan is that some offsite grading is proposed. That area which is disturbed by the offsite grading will be seeded in accordance with the attached seeding specification in order to control soil erosion.

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 the pond release rate is based upon the Orifice equation. The pond volume has been determined based upon the average end-area method. These calculations demonstrate that a decrease in the peak discharge of runoff from the site will be realized due to the proposed construction. The total volume of runoff is expected to increase, however, adequate ponding has been provided based upon hydrograph analysis.

## Calculations

**Ground Cover Information**

1. From SCS Bernalillo County Soil Survey, Plate 3:
   TgB Tijeras Gravelly Fine Sandy Loam
   Hydrologic SoilGroup B

2. **Existing Condition**

   a. Site

   $A = 4.50$ Ac ±

   % impervious = 0%

   $C = 0.34$ (DPM Plate 22.2 C-1)

   b. Offsite

   $A = 3.4$ Ac±

   % impervious = 0%

   $C = 0.34$ (DPM Plate 22.2 C-1)

3. **Developed Condition**

   a. Retirement Center

   $A = 4.50$ Ac ±

   $A_{imp} = 97{,}000$ sf $= 2.23$ Ac ±

   % impervious $= 2.23/4.50 = 49\%$

   $C = 0.57$ (DPM Plate 22.2 C-1)

   b. Offsite

   Same as above.

**Rational Method**

1. Discharge: $Q = CiA$

   where C varies

   $i = P_6\,(6.84)\,T_c^{-0.51} = 5.10$ in/hr

   $P_6 = 2.45$ in (DPM Plate 22.2D-1)

   $T_c = 10$ min. (minimum)

   A = area, Ac

2. Volume: $V = CP_6A(1/12)$

   where C varies

   $P_6 = 2.45$ in (DPM Plate 22.2D-1)

   A = area, sf

**Hydrology**

1. **Existing Condition**

   a. Site

   $Q_{100} = 0.34(5.18)(4.50) = 7.9$ cfs

   $V_{100} = 0.34(2.45/12)(4.50)(43{,}560) = 13{,}607$ cf

   b. Offsite

   $Q_{100} = 0.34(5.18)(3.4) = 6.0$ cfs (sheetflow)

   $V_{100} = 0.34(2.45/12)(3.4)(43{,}560) = 10{,}280$ cf

2. **Developed Condition**

   a. Retirement Center

   $Q_{100} = 0.57(5.18)(4.50) = 13.3$ cfs

   $V_{100} = 0.57(2.45/12)(4.50)(43{,}560) = 22{,}812$ cf

   $= 3 \times Q_6$

   $Q_{release} = 3\,CA\sqrt{2gh} = 3(1.2) = 3.5$ cfs

   where $C = 0.75$

   $A = d^2/4 = 0.1963$ sf

   $g = 32.2$ ft/sa$^2$

   $h = 37.23 - 36.0 - 1/2(0.5) = 1'$.

   By hydrograph analysis, $V_{required} = 12{,}500$ cf

   By average end-area method, $V_{pond} = 15{,}086$ cf

   $$V_{pond} = 1/2\,[A_{35.85}+A_{36})(36-35.85) + (A_{36}+A_{37})(37-36) + (A_{37}+A_{37.23}(37.23-37)]$$
   $$= 1/2[(0+9120)(0.15)+(9120+13{,}140)(1) + (13{,}140+15{,}310)(0.23)]$$
   $$= 1/2(1368 + 22{,}260 + 6544) = 15{,}086 \text{ cf}$$

   $V_{pond} > V_{required}$

   b. Offsite

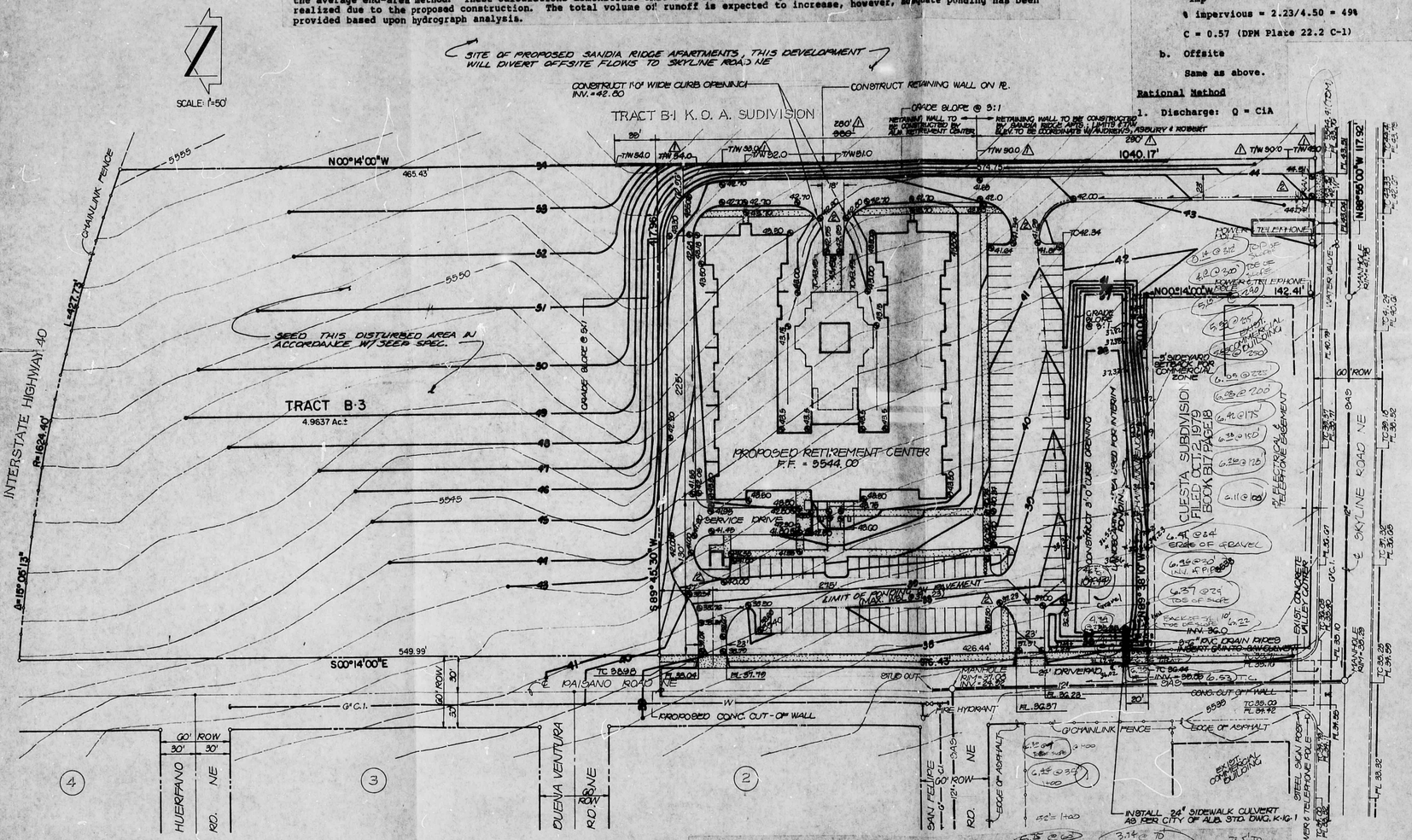
   $Q_{100} = 6.0$ cfs (sheetflow)

   $V_{100} = 10{,}280$ cf

3. **Comparison**

   $\Delta Q_{100} = 7.9 - 3.5 = 4.4$ cfs (decrease)

   $\Delta V_{100} = 13{,}607 - 22{,}812 = 9205$ cf (increase)




**PROJECT BENCHMARK:**

ACS "1-L21 RESET"
ELEV = 5534.54 FEET (MSLD)

**TBM:**

Top of curb elevation at projection of SE property corner as shown on plan
Elevation = 5544.14 feet (MSLD)

**CONSTRUCTION NOTES:**

1. TWO (2) WORKING DAYS PRIOR TO ANY EXCAVATION, CONTRACTOR MUST CONTACT LINE LOCATING SERVICE 765-1234, FOR LOCATION OF EXISTING UTILITIES.
2. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL EXCAVATE AND VERIFY THE HORIZONTAL AND VERTICAL LOCATION OF ALL POTENTIAL OBSTRUCTIONS. SHOULD A CONFLICT EXIST, THE CONTRACTOR SHALL NOTIFY THE ENGINEER SO THAT THE CONFLICT CAN BE RESOLVED WITH A MINIMUM AMOUNT OF DELAY.
3. ALL WORK ON THIS PROJECT SHALL BE PERFORMED IN ACCORDANCE WITH APPLICABLE FEDERAL, STATE AND LOCAL LAWS, RULES AND REGULATIONS CONCERNING CONSTRUCTION SAFETY AND HEALTH.
4. ALL CONSTRUCTION WITHIN PUBLIC RIGHT-OF-WAY SHALL BE PERFORMED IN ACCORDANCE WITH APPLICABLE CITY OF ALBUQUERQUE STANDARDS AND PROCEDURES.

**VEGETATION FOR EROSION CONTROL**

1. SEED RATE:

| Species | Pure Live Seed (lbs/acre)* |
|---|---|
| Annual Rye Grass | 8.0 |
| Giant Dropseed | 2.0 |
| Sand Dropseed | 1.0 |
| Indian Ricegrass | 4.0 |
| Sideoats Grama | 6.0 |
| Total: | 21.0 |

*Rates apply to drilled seed. Double rates listed if seed is broadcast.

2. SEED APPLICATION:

a. Flat areas - cultivate area to produce an acceptable, friable seed bed, then drill seed to a depth of 1/4 to 1/2 inches.

b. Slopes 3:1 or greater - hand broadcast and cultivate into top 1/4 to 1/2 inch of soil.

c. Hydro-mulching is acceptable in either application.

3. FERTILIZER

16-20-0 @ 200 lbs. per acre applied simultaneously with seed.

4. MULCH

5,000 lbs. hay or straw per acre. Mulch shall be crimped into the soil so as not to exceed 2 inches in depth.

5. WATERING SCHEDULE

CONTRACTOR shall maintain a wet seed bed for a period of at least 6 weeks following seeding.

| No. | Date | REVISIONS | Accept. Date | Const. Stat. | Sht. No. |
|---|---|---|---|---|---|
| 3 | 11/84 | Revised grades due to site plan revisions. | | | |
| 2 | 4/84 | REVISE RETAINING WALL LIMITS | | | |

RECEIVED NOV 19 1984 HYDROLOGY SECTION

Sheet Title: GRADING & DRAINAGE PLAN

Proj. No.: 30247
Date: 10/83
Drawn: JVT
Checked: JGM
Approved: TTN
sheet 1 number
of 1 sh. 1

K22/D23