CALCULATIONS

DRAINAGE PLAN

The following items concerning the Covenant United Methodist Church Grading and Drainage Plan are contained hereon:

    1. Vicinity Map   2. Grading Plan   3. Calculations

As shown by the Vicinity Map, the site is located at the southeast corner of the intersection of Wyoming Boulevard N.E. and Wilshire Avenue N.E. At present, the site is developed as a church. Under the proposed scheme of development, building additions, additional paved parking and landscaping will be constructed.

As shown by Panel 10 of 50 of the National Flood Insurance Program Flood Insurance Rate Maps (FIRM) for the City of Albuquerque, New Mexico, dated 10/14/83, a designated flood hazard zone lies within the site. The only improvements which lie within that flood zone are existing paving and landscaping. No building improvements are proposed within that flood zone. The approximate limits of the flood zone have been superimposed on the grading plan as scaled from the FIRM panel.

The Grading Plan shows 1) existing and proposed grades indicated by spot elevations and contours at one foot intervals, 2) the limit and character of the existing improvements, 3) the limit and character of the proposed improvements, and 4) the limit and character of Wilshire Avenue infrastructure improvements, 5) the limit and character of future improvements to Wyoming Boulevard N.E. and 6) continuity between existing and proposed grades. As shown by this plan, the proposed improvements consist of the construction of building additions and site improvements which will be accomplished in a phased manner. At this time, that portion of Wilshire Avenue N.E. which lies adjacent to the site will be paved. As an interim improvement, an asphalt rundown will channel the runoff to an interim retention pond. No 100-year emergency spillway has been designated for the right-of-way pond since this would result in channelization of runoff and damage to downstream properties. The interim retention pond will contain public runoff and will lie within public right-of-way. At such time as the Wyoming Boulevard N.E. improvements can be constructed, the interim pond will be eliminated and public storm drain improvements will be constructed. The retention ponds cannot be eliminated until the Wyoming Boulevard N.E. improvements are in place. The ability to construct these improvements is directly dependent upon the construction of the AMAFCA/Louisiana Dam and the extension of public storm drain improvements from the Dam within the North Arroyo de Domingo Baca Corridor to the crossing at Wyoming Boulevard N.E. Consequently, the public improvements will be constructed in two phases. The first phase will consist of the construction of the Wilshire Avenue N.E. paving along the property frontage. The second phase, which is deferred construction, will include the Wyoming Boulevard N.E. improvements, the removal of the asphalt channel, and the addition of storm drain which will connect to the Wyoming Boulevard construction. In addition, retention ponding will be provided onsite to accommodate twice the increase in 100-year developed runoff generated by all phases of this project. The existing runoff will be allowed to flow historically, hence only the increase in developed runoff will be ponded. This will be implemented so as not to create an adverse impact on downstream properties. The emergency spillway for the onsite ponds is the driveway located on the west side of the site. It is designated "point of overflow" on the grading and drainage plan.

The Calculations which appear hereon analyze the existing and developed conditions for the 100-year, 6-hour rainfall event. Calculations have been performed in accordance with the Procedure for 40-acre and Smaller Basins set forth in the Revision of Section 22.2, Hydrology of the Development Process Manual, Volume II, Design Criteria, dated August, 1991. As shown by these calculations, the proposed project will result in an increase in developed runoff from this site. The increase in runoff will be offset, however, by the use of interim retention ponding. Retention ponds can be eliminated at such time as the Louisiana Dam and North Arroyo de Domingo Baca improvements, downstream from this site, are in place.

The residential area to the east is separated from this site by a wall and hence will not contribute offsite flows. The flood zone which runs through the site does introduce offsite flows. These offsite flows will be accepted and conveyed through the site.

Site Characteristics

1. Precipitation Zone 3
2. $P_{6,100} = P_{360} = 2.60$
3. Total Area (A_T) 4.01 Acres
4. Existing Land Treatment

Treatment	Area (sf/ac)	%
a. Basin A		
A	102,940/2.36	100
A	102,940/2.36	100
b. Basin B	71,810/1.65	100
A	38,780/0.89	54
D	33,030/0.76	46

5. Developed Land Treatment

Treatment	Area (sf/ac)	%
a. Basin A		
A	102,940/2.36	100
A	102,940/2.36	100
b. Basin B	71,810/1.65	100
A	22,400/0.52	31
D	49,410/1.13	69

Existing Condition

a. Basin A
1. Volume
$$E_W = (E_A A_A + E_B A_B + E_C A_C + E_D A_D)/A_T$$
$$E_W = (0.66)(2.36)/2.36 = 0.66 \text{ in.}$$
$$V_{100} = (E_W/12)A_T$$
$$V_{100} = (0.66/12)(2.36) = 0.1298 \text{ ac.ft.; } 5650 \text{ cf}$$
2. Peak Discharge
$$Q_P = Q_{PA} A_A + Q_{PB} A_B + Q_{PC} A_C + Q_{PD} A_D$$
$$Q_P = Q_{100} = (1.87)(2.36) = 4.41 \text{ cfs}$$

b. Basin B
1. Volume
$$E_W = (E_A A_A + E_B A_B + E_C A_C + E_D A_D)/A_T$$
$$E_W = [(0.66)(0.89) + (2.36)(0.76)]/(1.65) = 1.44 \text{ in.}$$
$$V_{100} = (E_W/12)A_T$$
$$V_{100} = (1.44/12)(1.65) = 0.1984 \text{ ac.ft.; } 8,640 \text{ cf}$$
$$V_{10 \text{ day}} = V_{100} + A_d (P_{10 \text{ day}} - P_{360})/12 \text{ in/ft.}$$
$$V_{10 \text{ Day}} = 0.1984 + 0.1457 = 0.3441 \text{ ac.ft.; } 14,990 \text{ cf}$$
2. Peak Discharge
$$Q_P = Q_{PA} A_A + Q_{PB} A_B + Q_{PC} A_C + Q_{PD} A_D$$
$$Q_P = Q_{100} = (1.87)(0.89) + (5.02)(0.76) = 5.5 \text{ cfs}$$

Developed Condition

a. Basin A
1. Volume
   No Change
2. Peak Discharge
   No Change

b. Basin B
1. Volume
$$E_W = (E_A A_A + E_B A_B + E_C A_C + E_D A_D)/A_T$$
$$E_W = [(0.92)(0.52) + (2.36)(1.13)]/(1.65) = 1.91 \text{ in.}$$
$$V_{100} = (E_W/12)A_T$$
$$V_{100} = (1.91/12)(1.65) = 0.2627 \text{ ac.ft.; } 11,440 \text{ cf}$$
$$V_{10 \text{ day}} = V_{100} + A_d (P_{10 \text{ Day}} - P_{360})/12 \text{ in/ft}$$
$$V_{10 \text{ Day}} = 0.2627 + 0.2166 = 0.4793 \text{ ac.ft.; } 20,880 \text{ cf}$$
2. Peak Discharge
$$Q_P = Q_{PA} A_A + Q_{PB} A_B + Q_{PC} A_C + Q_{PD} A_D$$
$$Q_P = Q_{100} = (2.60)(0.52) + (5.02)(1.13) = 7.0 \text{ cfs}$$

Comparison
a. Basin A
   No Change
b. Basin B
   1. $\Delta V_{100} = 11,440 - 8,640 = 2,800 \text{ cf (increase)}$
   2. $\Delta Q_{100} = 7.0 - 5.5 = 1.5 \text{ cfs (increase)}$
c. Wilshire Avenue
   1. $\Delta V_{100} = 1100 \text{ cf}$
   2. $\Delta Q_{100} = 0.5 \text{ cfs}$
   (From Watershed Design & Analysis)

Pond Volume Calculations

⚠ A. Onsite Ponds (North Pond)

Elev (ft)	Area (sf)	Vol (cf)	Σ Vol (cf)
91.5	1660		
		892.5	892.5
92.0	1910		
		2255.0	3147.5
93.0	2600		

⚠ B. (South Pond)

Elev (ft)	Area (sf)	Vol (cf)	Σ Vol (cf)
91.5	1635		
		928.75	928.75
92.0	2080		
		2425.0	3353.75
93.0	2770		

Total Volume Both Ponds @ WSL 5,393 = 6501.25 cf
$$2 \times \Delta V_{100} = 2(2260) = 4520 \text{ cf}$$
$$V_{pond} > 2 \times \Delta V_{100}$$

⚠ B. Right-of-Way Ponding

Elevation	Area	V	ΣV
90.5	840		
		550	550
91.0	1360		
		1730	2280
92.0	2100		

$$2 \times \Delta V_{100} = 2(1100) = 2200 \text{ cf}$$
$$V_{pond} > 2 \times \Delta V_{100}$$

Future Condition (Basin A)
(Assume same style development as for Basin B)

⚠ 1. Volume
$$E_W = (E_A A_A + E_B A_B + E_C A_C + E_D A_D)/A_T$$
$$E_W = [(0.92)(0.73)+(2.36)(1.63)]/2.36 = 1.91 \text{ in}$$
$$V_{100} = (E_W/12)A_T$$
$$V_{100} = (1.91/12)(2.36) = 0.3765 \text{ ac.ft.; } 16,402 \text{ cf}$$
$$V_{10 \text{ day}} = V_{100} + A_d (P_{10 \text{ day}} - P_{360})/12 \text{ in/ft.}$$
$$V_{10 \text{ Day}} = 0.3765 + 1.63 (4.90 - 2.60)/12$$
$$V_{10 \text{ Day}} = 0.6889 \text{ ac.ft.; } 30,010 \text{ cf}$$
2. Peak Discharge
$$Q_P = Q_{PA} A_A + Q_{PB} A_B + Q_{PC} A_C + Q_{PD} A_D$$
$$Q_P = Q_{100} = (2.60)(0.73) + (5.02)(1.63) = 10.1 \text{ cfs}$$

VICINITY MAP
SCALE: 1" = 750' (APPROX.)

C - 19

PROJECT BENCHMARK
CITY OF ALBUQUERQUE BENCHMARK "HEAVEN" A STAMPED USC AND GS BRASS TABLET STAMPED "HEAVEN 1969", SET IN TOP OF A CONCRETE POST FLUSH WITH THE GROUND LOCATED AT THE ENTRANCE WAY TO THE "GATE OF HEAVEN" CEMETARY BUS MULT WEST OF THE INTERSECTION OF PASEO DEL NORTE, N.E. AND WYOMING BOULEVARD N.E. ON THE SOUTH SIDE OF PASEO DEL NORTE.
ELEVATION = 5378.78 FEET (M.S.L.D.)

T.B.M.
SANITARY SEWER MANHOLE RIM AT THE INTERSECTION OF VILSHIRE AVE. N.E. AND WYOMING BOULEVARD N.E. AS SHOWN ON THE DRAWING BELOW.
ELEVATION = 5390.48 FEET (M.S.L.D.)

LEGEND

—— 5390.0 ——	EXISTING CONTOUR
——— 02 ———	PROPOSED CONTOUR
⊕ 91.5	PROPOSED SPOT ELEVATION
→	PROPOSED DIRECTION OF FLOW
———	PROPOSED BASIN BOUNDARY LINE
— — —	EXISTING 100-YEAR FLOODPLAIN LINE

LEGAL DESCRIPTION
LOT 5A , BLOCK 16, TRACT 2, UNIT 3, NORTH ALBUQUERQUE ACRES.

ALL SURVEY INFORMATION SHOWN HEREON OBTAINED FROM A SURVEY PERFORMED BY TOM WAGNER, N.M.P.S. 3517 ON 04/14/1993. THIS IS NOT A BOUNDARY SURVEY. APPARENT PROPERTY CORNERS ARE SHOWN FOR ORIENTATION ONLY. BOUNDARY DATA SHOWN IS FROM PREVIOUS SURVEY REFERENCED ABOVE.

SCALE: 1" = 30'

CONSTRUCTION NOTES:

1. Two (2) working days prior to any excavation, contractor must contact New Mexico One Call Service 266-1990, 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 in writing 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.

5. If any utility lines, pipelines, or underground utility lines are shown on these drawings, they are shown in an approximate manner only, and such lines may exist where none are shown. If any such existing lines are shown, the location is based upon information provided by the owner of said utility, and the information may be incomplete, or may be obsolete by the time construction commences. The engineer has conducted only preliminary investigation of the location, depth, size or type of existing utility lines, pipelines, or underground utility lines. This investigation is not conclusive, and may not be complete, therefore, makes no representation pertaining thereto, and assumes no responsibility or liability therefor. The contractor shall inform itself of the location of any utility line, pipeline, or underground utility line in or near the area of the work in advance of and during excavation work. The contractor is fully responsible for any and all damage caused by its failure to locate, identify and preserve any and all existing utilities, pipelines, and underground utility lines. In planning and conducting excavation, the contractor shall comply with state statutes, municipal and local ordinances, rules and regulations, if any, pertaining to the location of these lines and facilities.

6. The design of planters and landscaped areas is not part of this plan. All planters and landscaped areas adjacent to the building(s) shall be provided with positive drainage to avoid any ponding adjacent to the structure. For construction details, refer to landscaping plan.

EROSION CONTROL MEASURES

1. The contractor shall ensure that no soil erodes from the site into public right-of-way or onto private property. This can be achieved by constructing temporary berms at the property lines and wetting the soil to keep it from blowing.

2. The contractor shall promptly clean up any material excavated within the public right-of-way so that the excavated material is not susceptible to being washed onto the street.

3. The contractor shall secure "Topsoil Disturbance Permit" prior to beginning construction.

⚠ FOR EXPANSION OF POND WITHIN R.O.W., REFER TO DETAIL ②

BASIN B

BASIN A

CHURCH

PHASE 1A
FF-5399.62

PHASE 1B   PHASE II

POINT OF OVERFLOW

STREET GRADES PER C.O.A. PROJECT #4769.90

100-YEAR FLOOD PLAIN LIMITS AS SHOWN ON PANEL 10 OF 50 OF THE FEMA FLOOD BOUNDARY MAPS.

DRAINAGE BASIN BOUNDARY

WYOMING   BLVD   N.E.

INSTALL 2 - 8" PVC CULVERTS @ 91.5

DEC 1 2 1994

GRADING AND DRAINAGE PLAN

COVENANT UNITED METHODIST CHURCH

JEFF MORTENSEN & ASSOCIATES INC
6600-B MIDWAY PARK BLVD. N.E.
ALBUQUERQUE NEW MEXICO 87109
ENGINEERS • SURVEYORS (505) 345-4250

DESIGNED BY	M.F.D.
DRAWN BY	ACAD
APPROVED BY	J.G.M.

NO.	DATE	BY	REVISIONS
⚠	4/94	M.F.D.	DRAINAGE PLAN PHASING, REVISE CALCS.
⚠	5/94	JGM	BERM ELEVATION
⚠	11/94	JGM	DETAIL ④

JOB NO. 930682
DATE 03-1994
SHEET 1 OF 2

159098

PROJECT BENCHMARK

CITY OF ALBUQUERQUE BENCHMARK "HEAVEN" A STAMPED
USC and GS BRASS TABLET STAMPED "HEAVEN 1969",
SET IN TOP OF A CONCRETE POST FLUSH WITH THE
GROUND LOCATED AT THE ENTRANCE WAY TO THE "GATE
OF HEAVEN" CEMETARY 0.15 MILE WEST OF THE
INTERSECTION OF PASEO DEL NORTE N.E. AND WYOMING
BOULEVARD N.E. ON THE SOUTH SIDE OF PASEO DEL NORTE.
ELEVATION = 5378.78 FEET (M.S.L.D.)

T.B.M.

SANITARY SEWER MANHOLE RIM AT THE INTERSECTION OF
WILSHIRE AVE. N.E. AND WYOMING BOULEVARD N.E. AS
SHOWN ON THE DRAWING BELOW.
ELEVATION = 5390.48 FEET (M.S.L.D.)

LEGAL DESCRIPTION

LOT 5A , BLOCK 16, TRACT 2, UNIT 3,
NORTH ALBUQUERQUE ACRES

SCALE: 1" = 30'

LEGEND

- — 5390.0 — EXISTING CONTOUR
- — 02 — PROPOSED CONTOUR
- ⊕ 91.5 PROPOSED SPOT ELEVATION
- → PROPOSED DIRECTION OF FLOW
- ——— PROPOSED BASIN BOUNDARY LINE
- — · · — EXISTING 100-YEAR FLOODPLAIN LINE
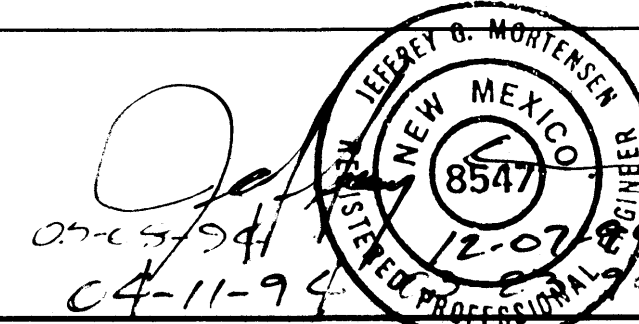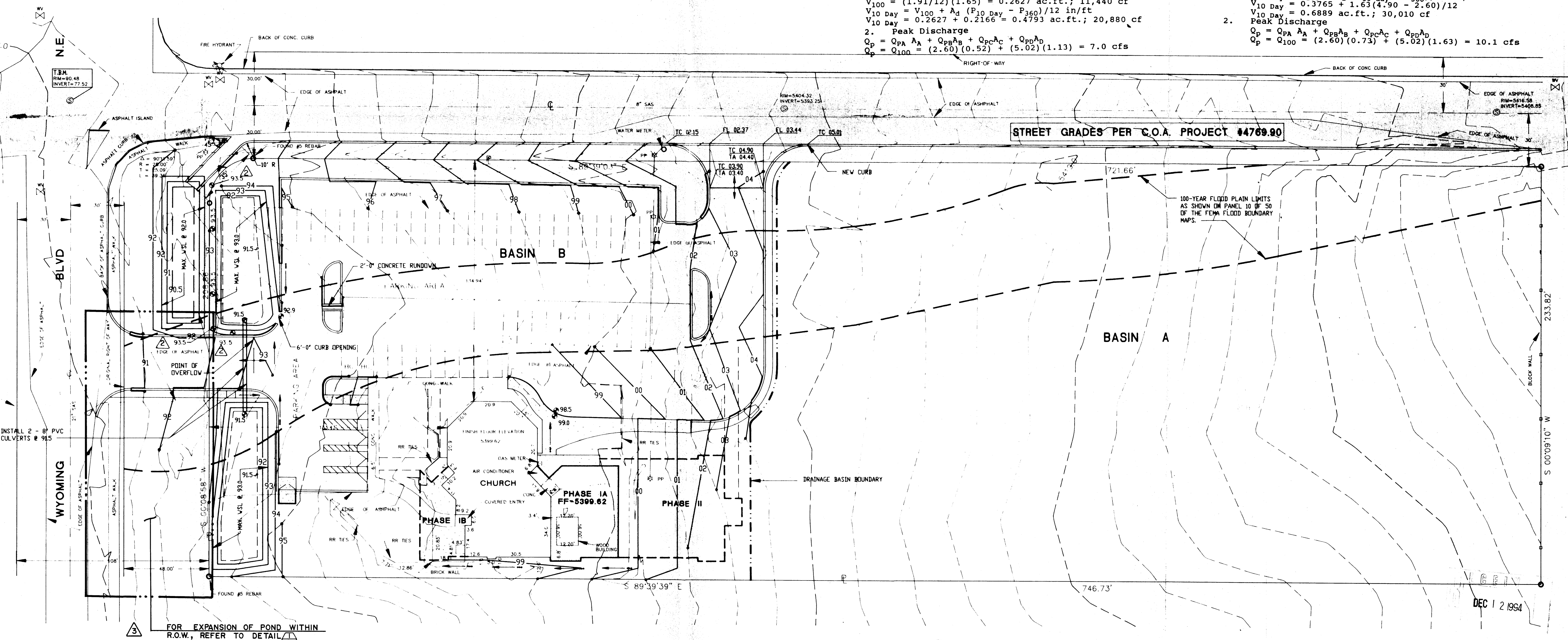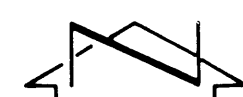- ▭ NEW/ADDITIONAL PONDING
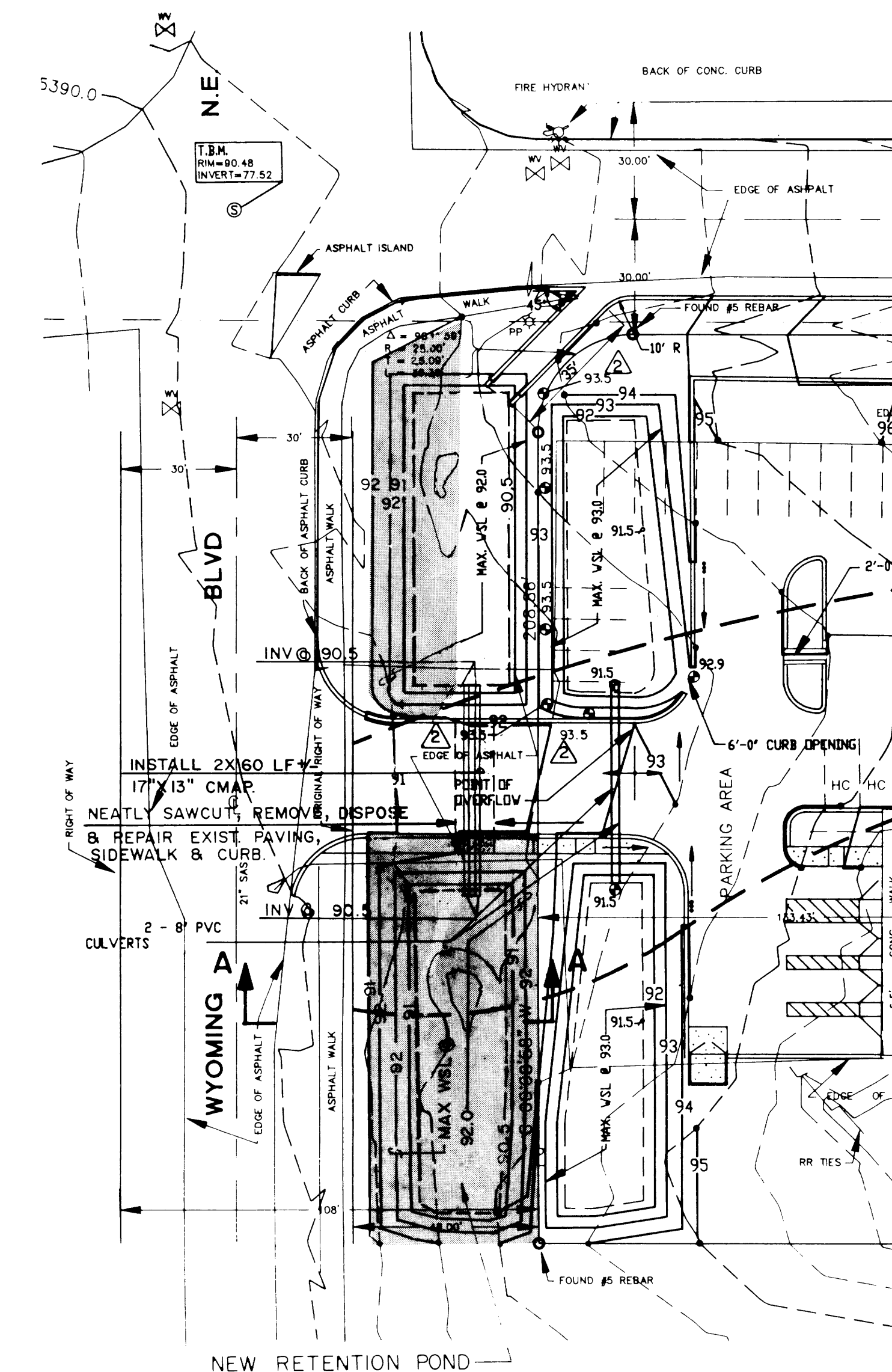 PROPOSED BY THIS PLAN

CONSTRUCTION NOTES:

1. Two (2) working days prior to any excavation, contractor must contact New Mexico One Call Service 266-1990, 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 in writing 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.

5. If any utility lines, pipelines, or underground utility lines are shown on these drawings, they are shown in an approximate manner only, and such lines may exist where none are shown. If any such existing lines are shown, the location is based upon information provided by the owner of said utility, and the information may be incomplete, or may be obsolete by the time construction commences. The engineer action is conducted only preliminary investigation of the location, depth, size, or type of existing utility lines, pipelines, or underground utility lines. This investigation is not conclusive, and may not be complete, therefore, makes no representation pertaining thereto, and assumes no responsibility or liability therefor. The contractor shall inform itself of the location of any utility line, pipeline, or underground utility line in or near the Wilshire in advance of and during excavation work. The contractor is fully responsible for any and all damage caused by its failure to locate, identify and preserve any and all existing utilities, pipelines, and underground utility lines. In planning and conducting its work, the contractor shall comply with state statutes, municipal and local ordinances, rules and regulations, if any, pertaining to the location of these lines and facilities.

6. The design of planters and landscaped areas is not part of this plan. All planters and landscaped areas adjacent to the building(s) shall be provided with positive drainage to avoid any ponding adjacent to the structure. For construction details, refer to landscaping plan.

EROSION CONTROL MEASURES

1. The contractor shall ensure that no soil erodes from the site into the public right-of-way or onto private property.

2. The contractor shall promptly clean up any material excavated within the public right-of-way so that the excavated material is not susceptible to being washed down the street.

3. The contractor shall secure 'Topsoil Disturbance Permit' prior to beginning construction.

4. Any areas of excess disturbance (traffic access, storage, yard excavated material, etc.) shall be re-seeded (according to C.O.A. Specifications K-12 "Native Grass Seeding". This will be considered incidental to construction, therefore, no separate payment will be made.
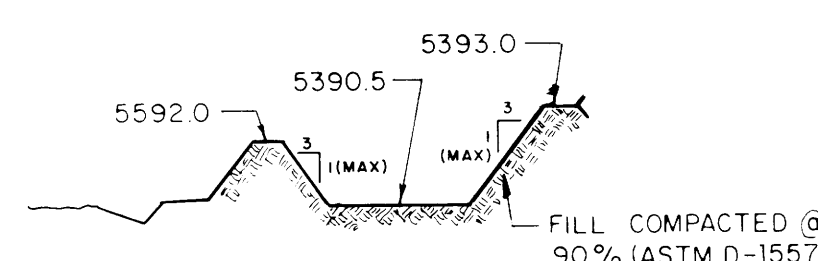
CALCULATIONS (6 Hour-2 Year Storm)

Site Characteristics (TIERRA LA CUEVA II)

1. Precipitation Zone = 3
2. $P_{6,2} = P_{360} =$ 1.13
3. Total Area (A_T) = 5.88
4. Existing Land Treatment

Treatment	Area (sf/ac)	%
A	256,020/5.88	100%

5. Developed Land Treatment

a. Basin A

$N = 2 \text{ Lots}/0.29 \text{ Ac} = 6.9 \text{ du/Ac}$
$\% D = 7(N^2 + 5N)^{\frac{1}{2}} = 63\% = 0.18 \text{ Ac}$
$\% B = 100 - \% D = 37\% = 0.11 \text{ Ac}$

b. Basin B

$N = 23 \text{ Lots}/5.09 \text{ Ac} = 4.5 \text{ du/Ac}$
$\% D = 7(N^2 + 5N)^{\frac{1}{2}} = 46\% = 2.34 \text{ Ac}$
$\% B = 100 - \% D = 54\% = 2.75 \text{ Ac}$

c. Basin C

$N = 2 \text{ Lots}/0.49 \text{ Ac} = 4.1 \text{ du/Ac}$
$\% D = 7(N^2 + 5N)^{\frac{1}{2}} = 43\% = 0.21 \text{ Ac}$
$\% B = 100 - \% D = 57\% = 0.28 \text{ Ac}$

Existing Condition

1. Volume

$E_W = (E_AA_A + E_BA_B + E_CA_C + E_DA_D)/A_T$
$E_W = (0.00) (5.88)/5.88 = 0.00 \text{ in.}$
$V_2 = (E_W/12)A_T = \underline{0 \text{ cf}}$

2. Peak Discharge

$Q_P = Q_{PA} A_A + Q_{PB}A_B + Q_{PC}A_C + Q_{PD}A_D$
$Q_P = Q_2 = (0.00) (5.88) = \underline{0 \text{ cfs}}$

Developed Condition

a. Basin A

1. Volume

$E_W = (E_AA_A + E_BA_B + E_CA_C + E_DA_D)/A_T$
$E_W = [(0.06)(0.11) + (0.89)(0.18)]/0.29 = 0.58 \text{ in}$
$V_2 = (E_W/12)A_T$
$V_2 = (0.58/12)0.29 = 0.014 \text{ ac. ft.} = \underline{610 \text{ cf}}$

2. Peak Discharge

$Q_P = Q_{PA} A_A + Q_{PB}A_B + Q_{PC}A_C + Q_{PD}A_D$
$Q_P = Q_2 = (0.21) (0.11) + (2.04) (0.18)$
$Q_2 = \underline{0.4 \text{ cfs}}$

b. Basin B

1. Volume

$E_W = (E_AA_A + E_BA_B + E_CA_C + E_DA_D)/A_T$
$E_W = (0.06) (2.75) + (0.89) (2.34)/5.09 = 0.44 \text{ in.}$
$V_2 = (E_W/12)A_T$
$V_2 = (0.44/12)5.09 = 0.19 \text{ ac. ft} = \underline{8,280 \text{ cf}}$

2. Peak Discharge

$Q_P = Q_{PA} A_A + Q_{PB}A_B + Q_{PC}A_C + Q_{PD}A_D$
$Q_P = Q_2 = (0.21) (2.75) + (2.04) (2.34)$
$Q_2 = \underline{5.4 \text{ cfs}}$

c. Basin C

1. Volume

$E_W = (E_AA_A + E_BA_B + E_CA_C + E_DA_D)/A_T$
$E_W = (0.06) (0.28) + (0.89) (0.21)/0.49 = 0.42 \text{ in.}$
$V_2 = (E_W/12)A_T$
$V_2 = (0.42/12)(0.49) = 0.017 \text{ ac. ft} = \underline{740 \text{ cf}}$

2. Peak Discharge

$Q_P = Q_{PA} A_A + Q_{PB}A_B + Q_{PC}A_C + Q_{PD}A_D$
$Q_P = Q_2 = (0.21)(0.28) + (2.04)(0.21) = \underline{0.5 \text{ cfs}}$

d. Total Developed Basins

1. Volume $= V_{100A} + V_{100B} + V_{100C}$
$V_{100T} = 610 + 8,280 + 740 = \underline{9,630 \text{ cf}}$

2. Peak Discharge $= Q_{2A} + Q_{2B} + Q_{2C}$
$Q_{2T} = 0.4 + 5.4 + 0.5 = \underline{6.3 \text{ cfs}}$

Comparison

1. $\Delta V_2 = 9,630 - 0 = 9,630 \text{ cf (increase)}$
2. $\Delta Q_2 = 6.3 - 0 = 6.3 \text{ cfs (increase)}$

ΔV_2 Calculations (T.L.C. 2 and Barstow Street Storm Drain)

$V_{2 (offsite)} = 0.01260 \text{ in. (From C.L.O.M.R. for Tierra La Cueva 2)}$
$A_{(offsite)} = 0.0938 \text{ mi}^2 = 60 \text{ acres}$
$V_{2 (offsite)} = (0.01260 \text{ in/acre})(60 \text{ acres})(1 \text{ ft/12 in})(43,560 \text{ ft}^2/\text{Ac})$
$= \underline{2,744 \text{ cf}}$
$(2,744)(1.15) = 3.156 \text{ cf (15\% Bulking Factor)}$
All 2 year offsite flows intercepted by Barstow St. Storm Drain
$\Delta V_{2 (net)} = \Delta V_{2 (onsite)} - V_{2 (offsite)} = 9,630 - 3,156 = 6,474 \text{ cf (increase)}$
∴ Additional Required Volume = 6,474 cf

Pond Volume Calculations

A. North Pond

$A_{90.5} = 1,924 \text{ sf}$
$A_{91} = 2,259 \text{ sf}$
$A_{92} = 2,962 \text{ sf}$

$V_{91} = (1/2)(1,924 + 2,259)(0.5) + (1/2)(2,259 + 2,962)(1.0)$
$V_{91} = \underline{3,656 \text{ cf}}$

B. South Pond

$A_{90.5} = 1,728 \text{ sf}$
$A_{91} = 2,125 \text{ sf}$
$A_{92} = 2,867 \text{ sf}$

$V_{91} = (1/2)(1,728 + 2,125)(0.5) + (1/2)(2,125 + 2,867)(1.0)$
$V_{91} = \underline{3,459 \text{ cf}}$

C. Total Volume = 3,650 cf + 3,459 = 7,115 cf

Calculations (6 Hour - 2 Year Storm)

Site Characteristics (WILSHIRE AVENUE MODIFICATIONS BY COVENANT UMC)

1. Precipitation Zone = 3
2. $P_{6,2} = P_{360} =$ 1.13
3. Total Area (A_T) = 3.44 ac
4. Existing Land Treatment (Areas taken from Hydrology File C19/D10) *Drainage Analysis (2of 6)*

Treatment	Area (sf/ac)
C	0.74 AC
D	2.70 AC

5. Developed Land Treatment

Treatment	Area (sf/ac)
C	0.46 AC
D	2.98 AC

Existing Condition

Volume

$E_W = (E_AA_A + E_BA_B + E_CA_C + E_DA_D)/A_T$
$E_W = [(0.20)(0.74) + (0.89)(2.70)]/(3.44) = 0.74 \text{ in.}$
$V_2 = (E_W/12)A_T$
$V_2 = (0.74/12)(3.44) = 0.212 \text{ ac-ft} = \underline{9,235 \text{ cf}}$

Developed Condition

Volume

$E_W = (E_AA_A + E_BA_B + E_CA_C + E_DA_D)/A_T$
$E_W = [(0.20)(0.46) + (0.89)(2.98)]/(3.44) = 0.80 \text{ in}$
$V_2 = (E_W/12)A_T$
$V_2 = (0.80/12)(3.44) = 0.229 \text{ ac-ft} = \underline{9,975 \text{ cf}}$

Comparison

$\Delta V_2 = 9,975 - 9,235 = \underline{740 \text{ cf}} \text{ (increase)}$

Pond Volume required for Wilshire Modifications = 740 cf

Pond Volume provided = 7,115 cf
Excess storage = 7,115 cf - 740 cf = 6,375 cf
Volume of 17"x13" CMAP = (120 ft)(1.1 sf) = 132 cf
Total storage = 6,375 + 132 cf = 6,507 cf
6,507 cf > 6,474 cf

DRAINAGE PLAN

The following items concerning Tierra La Cueva, Unit 2/Wyoming-Wilshire Improvements Drainage Plan are contained hereon:

1. Updated Grading Plan
2. Grading Detail
3. Calculations
4. Pond Section

Sheet one of this set shows the previously approved plan for the Covenant United Methodist Church (Hydrology file C19/D10). The purpose of the Tierra La Cueva Unit 2/Wyoming-Wilshire Improvements Plan is to expand the public temporary ponding area which was constructed in association with the Covenant United Methodist Church. This additional ponding volume is intended to contain the increase in volume generated by the construction of Tierra La Cueva Unit 2 Subdivision due to the 2-year, 6-hour rainfall event.

The updated Grading Plan cross-references the Grading Detail. The Grading Detail shows 1) existing and proposed grades indicated by spot elevations and contours at 1'0" intervals, 2) the limit and character of the existing improvements, 3) the limit and character of the proposed improvements, and 4) continuity between existing and proposed grades. The work specified by this Detail lies entirely in public right-of-way and will not require work on private property.

The Tierra La Cueva Unit 2 Drainage Plan (C19-D9) demonstrates that the construction of the subdivision, combined with the paving and storm drain improvements in Barstow Street (City of Albuquerque Project No. 4685.90), results in a decrease in storm water runoff during the 10 and 100-year, 6-hour rainfall events while producing an increase for the 2-year event. The calculations shown hereon demonstrate that the proposed grading improvement will eliminate any increase in stormwater volume observed below the intersection of Wyoming Blvd and Wilshire Avenue resulting from the 2-year, 6-hour event.

The need for this additional pond volume will be eliminated upon completion of storm drain and paving improvements within Wyoming Blvd. These improvements are driven by AMAFCA and are currently in the planning phase. Construction is to begin upon completion of the Louisiana Dam Project which is currently under construction. The proposed permanent improvements will construct a crown in Wyoming which it lacks currently. The lack of crown allows flow within Wilshire to cross Wyoming instead of flowing down Wyoming to the outfall at the North Domingo Baca Arroyo. Storm Drain construction is also planned to pick up flows from Wilshire and carry them to the Domingo Baca.

Suncor Development, the Developer of Tierra La Cueva Unit 2, had originally planned, by prior submittal, to reconstruct a portion of Wilshire Blvd in order to convey the more frequent flows within Wilshire to the Domingo Baca (see Hydrology file C-19/D9). In light of the proposed AMAFCA improvements, this reconstruction of temporary improvements would be wasteful as a permanent solution is in the near future. The Financial Guarantee that the City of Albuquerque is holding from Suncor Development for the temporary paving improvements would instead be used to accomplish the grading proposed hereon.

The required additional right-of-way ponding volume has been determined in the following manner; The 2-year offsite volume which originally crossed Barstow Street and flowed down Wilshire is now intercepted by Barstow Street and its storm drain. The bulked runoff was calculated by the AHYMO Program for the Tierra La Cueva Unit 2 CLOMR to be 3,156 cf. As shown by the 2-year calculations for the Tierra La Cueva Subdivision, there is an increase in volume of 9,630 cf. The net result of the recent construction is therefore a 9,630-3,156 = 6,474 cubic foot increase in volume. This 6,474 cubic feet is the additional volume which is to be ponded before it reaches Wyoming Blvd.

As shown on Sheet 1 of 2 of this Plan, a temporary pond was constructed by the Covenant United Methodist Church to pond the additional public storm runoff generated by their paving within Wilshire Avenue. The 2-year volume calculations shown on this Plan for the Wilshire Paving shows that the required pond volume is 740 cf. The total capacity within the two right-of-way ponds is 7,115 cf. the excess capacity of 7,115-740 = 6,375 cf is added to the storage volume of the CMAP culverts to produce a total volume of 6,507 cf which is slightly greater than the 6,474 cf net increase in 2-year volume.

The lack of a distinguished crown within Wilshire allows flows in Wilshire to cross over to the south side of the street and into the rundown which outfalls to the proposed ponds. As shown by the Calculations, the increase in runoff during 2-year, 6-hour event caused by the construction of Tierra La Cueva Unit 2 will be neutralized by the proposed ponding.

The Calculations which appear hereon analyze both the existing and developed conditions for the 2-year, 6-hour rainfall event. The Procedure for 40-acre and smaller basins, as set forth in the Revision of Section 22.2, Hydrology of the Development Process Manual, Volume 2, Design Criteria, dated January, 1993, has been used to quantify the peak rate of discharge and volume of runoff generated.

NEW RETENTION POND

DETAIL
SCALE: 1"=30'

SECTION A-A
SCALE: 1"=30' HORIZ.
1"=50' VERT.

FILL COMPACTED @ 90% (ASTM D-1557)

DEC 1 2 1994

JEFFREY B. MORTENSEN
No. 8547
NEW MEXICO
REGISTERED PROFESSIONAL ENGINEER

DRAINAGE PLAN, CALCULATIONS, DETAILS & SECTIONS

TIERRA LA CUEVA, UNIT II / WYOMING – WILSHIRE IMPROVEMENTS

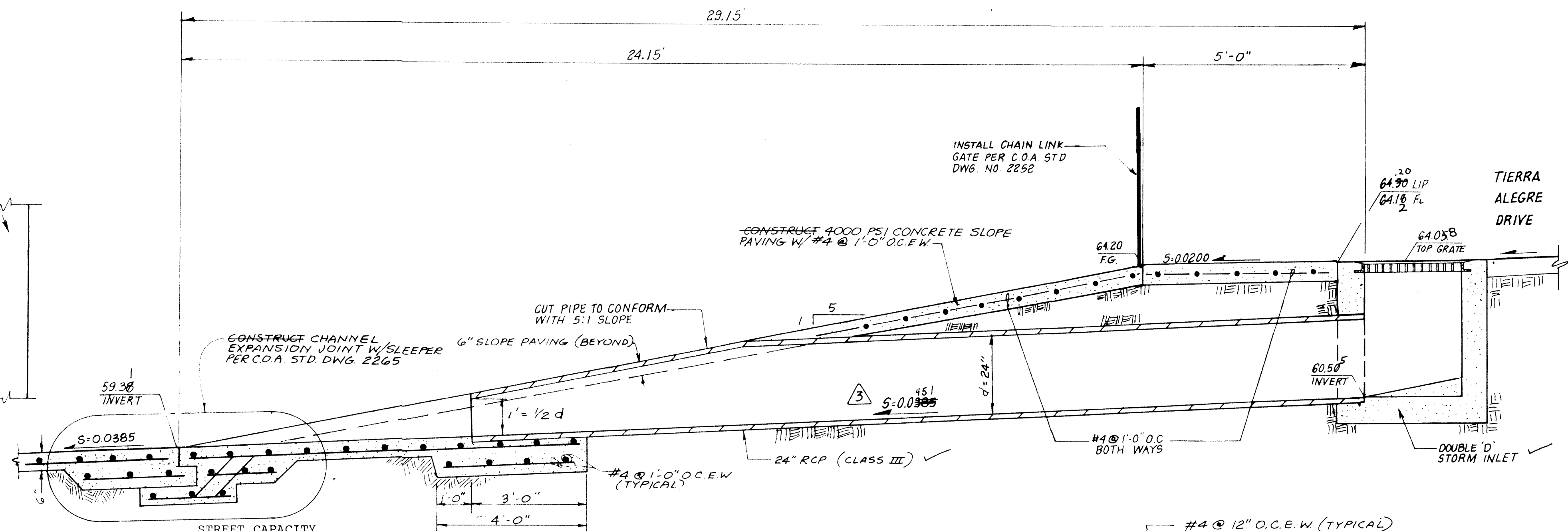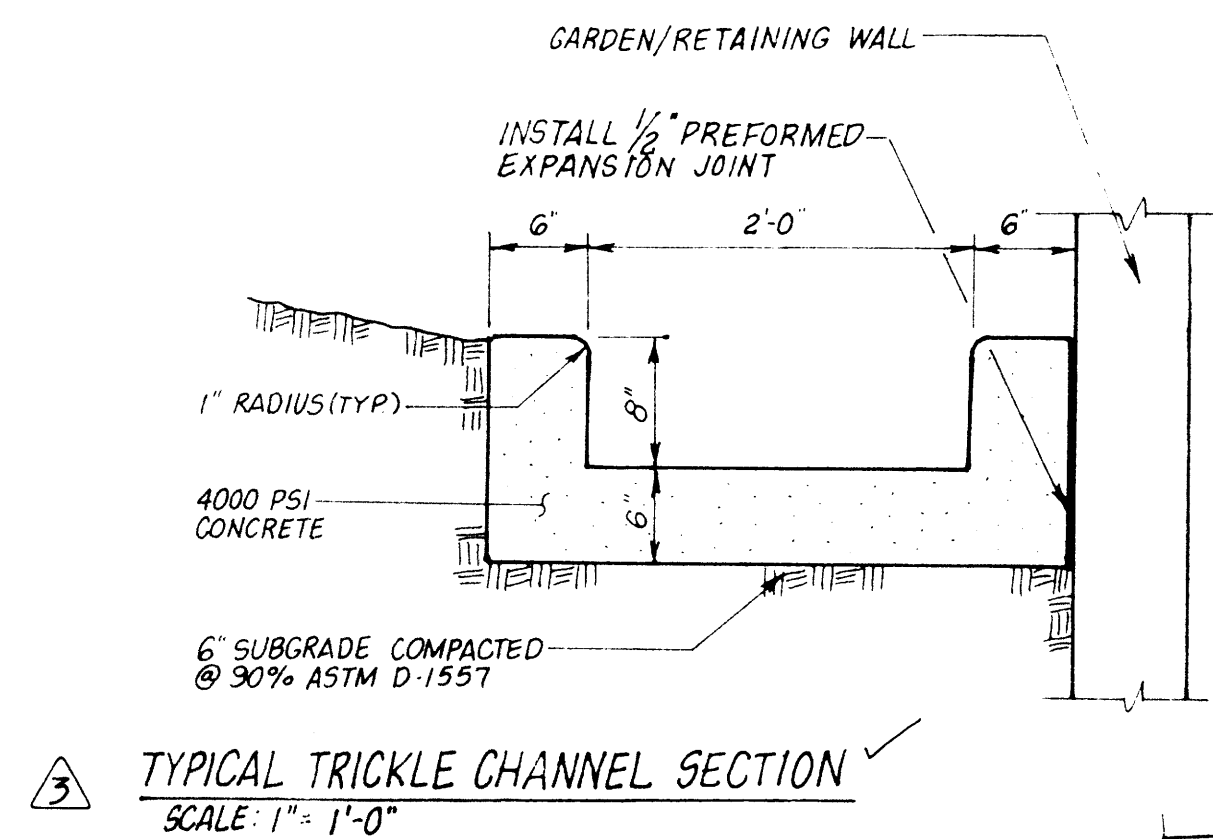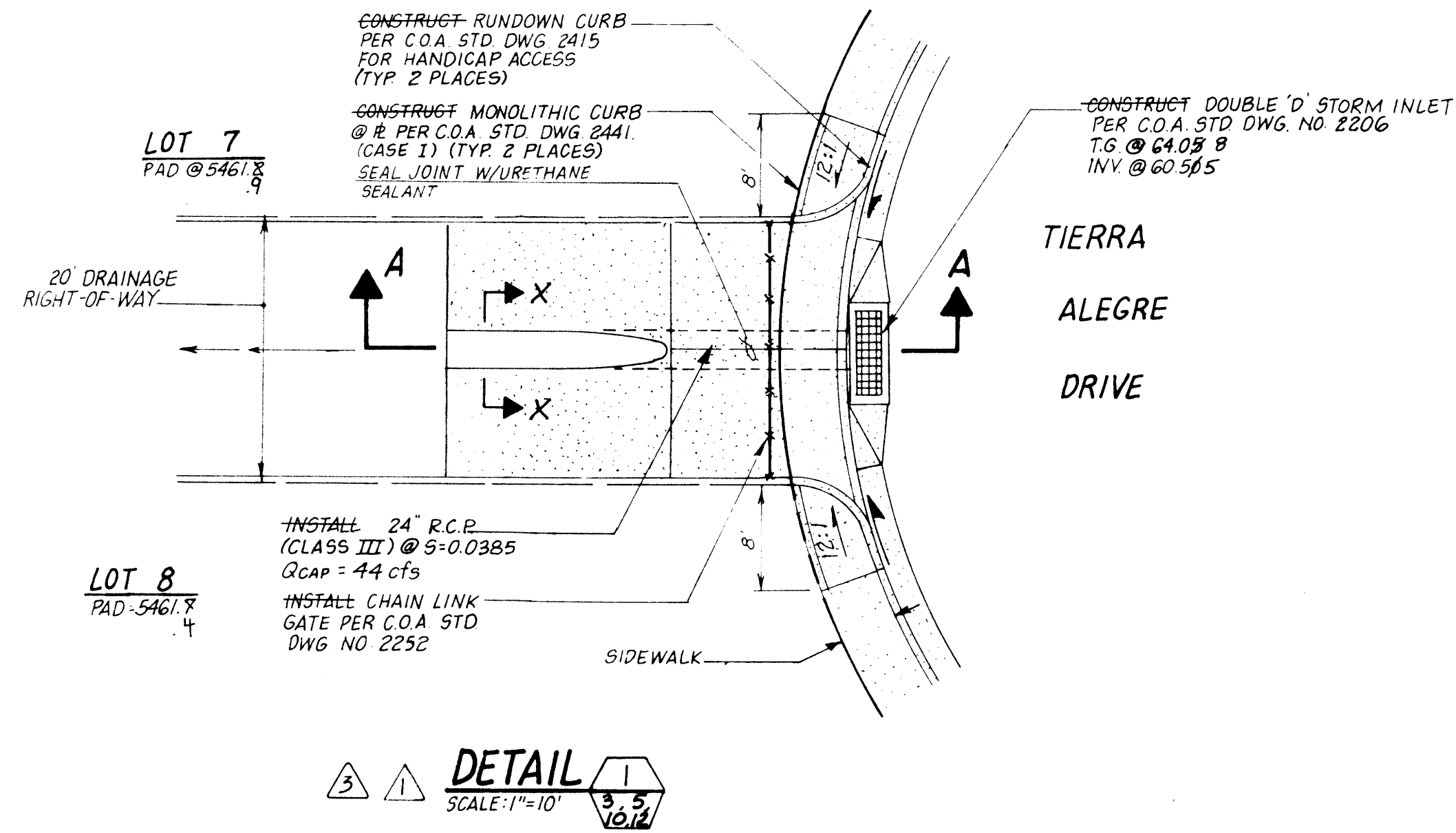|	NO.	DATE	BY	REVISIONS		JOB NO. 930682
DESIGNED BY J.G.M.						DATE 11/94
DRAWN BY J.M.A.						
APPROVED BY J.G.M.						SHEET 2 OF 2

PROJECT BENCHMARK

CITY OF ALBUQUERQUE BENCHMARK "HEAVEN", A STANDARD USC & GS BRASS TABLET STAMPED, "HEAVEN 1969", SET IN TOP OF A CONCRETE POST FLUSH WITH THE GROUND. LOCATED AT THE ENTRANCE WAY TO THE "GATE OF HEAVEN" CEMETARY 0.15 MILE WEST OF THE INTERSECTION OF PASEO DEL NORTE N.E. AND WYOMING BLVD. N.E. STATION IS LOCATED ON THE SOUTH SIDE OF PASEO DEL NORTE.
ELEVATION = 5378.78' (M.S.L.D.)

T.B.M.

A CHISELED "□", ON TOP OF EXISTING WALL @ SE CORNER OF LA CUEVA HIGH SCHOOL SITE AS SHOWN BELOW.
ELEVATION = 5465.72' (M.S.L.D.)

SCALE: 1" = 50'

LEGEND

TC51.50	TOP CURB
FL51.00	FLOW LINE
TW50.00	TOP OF WALL
TSW@51.00	TOP STEP AT WALL
NG50.50	NATURAL GROUND
⊕ 67.0	PROPOSED SPOT ELEVATION
→	PROPOSED DIRECTION OF FLOW
-----	PROPOSED BASIN BOUNDARY LINE
═══	PROPOSED RETAINING WALL

③ (H) HOUSE COMPLETE OR UNDER CONSTRUCTION

CONSTRUCTION NOTES:

1. Two (2) working days prior to any excavation, contractor must contact New Mexico One Call Service 266-1990, 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 in writing 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.

5. If any utility lines, pipelines, or underground utility lines are shown on these drawings, they are shown in an approximate manner only, and such lines may exist where none are shown. If any such existing lines are shown, the location is based upon information provided by the owner of said utility, and the information may be incomplete, or may be obsolete by the time construction commences. The engineer has conducted only preliminary investigation of the location, depth, size, or type of existing utility lines, pipelines, or underground utility lines. This investigation is not conclusive, and may not be complete, therefore, makes no representation pertaining thereto, and assumes no responsibility or liability therefor. The contractor shall inform itself of the location of any utility line, pipeline, or underground utility line in or near the area of the work in advance of and during excavation work. The contractor is fully responsible for any and all damage caused by its failure to locate, identify and preserve any and all existing utilities, pipelines, and underground utility lines. In planning and conducting excavation, the contractor shall comply with state statutes, municipal and local ordinances, rules and regulations, if any, pertaining to the location of these lines and facilities.

6. The design of planters and landscaped areas is not part of this plan. All planters and landscaped areas adjacent to the building(s) shall be provided with positive drainage to avoid any ponding adjacent to the structure. For construction details, refer to landscaping plan.

EROSION CONTROL MEASURES

1. The contractor shall ensure that no soil erodes from the site into public right-of-way or onto private property. This can be achieved by constructing temporary berms at the property lines and wetting the soil to keep it from blowing.

2. The contractor shall promptly clean up any material excavated within the public right-of-way so that the excavated material is not susceptible to being washed down the street.

3. The contractor shall secure 'Topsoil Disturbance Permit' prior to beginning construction.

DRAINAGE PLAN

The following items concerning the Tierra La Cueva Unit 2 Drainage Plan are contained hereon:

1. Vicinity Map
2. Grading Plan
3. Calculations
4. Grading Notes
5. Sections & Details

As shown by the Vicinity Map, the site is located at the northwest corner of the intersection of Wilshire Avenue N.E. and Barstow Street N.E. The site is bounded on the north by Tierra La Cueva Unit 1, and on the west by La Cueva High School. This plan is a revision to the previously approved plan. The significant change is that Lots 13 and 20, Block 15, North Albuquerque Acres, Tract 2, Unit 3, have been combined with the previously platted Lot 40, Tierra La Cueva - Unit 1. In response, the internal lot grading and street configuration have been modified. All offsite improvements, which consist of Barstow Street N.E. and Wilshire Avenue N.E., are unchanged by this plan. This plan is an update to the internal grading and drainage of the subdivision.

As shown by Panel 10 of 50 of the National Flood Insurance Program, Flood Insurance Rate Maps for the City of Albuquerque, dated October 14, 1983, a portion of this site lies within a designated flood hazard zone. That zone is designated "AO" (DEPTH 1). A Conditional Letter of Map Revision (CLOMR) is in progress. That CLOMR addresses the removal of the above referenced floodplain. In addition, the Carrington Subdivision, which is in the design and development stage, lies upstream from this site. The development of that property will eliminate the offsite flows currently impacting this property. In the event that the Carrington Subdivision does not proceed, the previous plans for diverting the offsite flows will be effected. The floodplain continues onto the La Cueva High School site. At the time that the La Cueva High School site was platted, a floodplain easement, dedicated to AMAFCA, was created. Structural improvements have been constructed within that easement to receive the existing, undeveloped flows which cross this property and enter the high school site. The improvements on the high school site were designed for an offsite flow of 120 cfs. The developed runoff to be discharged to this facility by the proposed subdivision will be considerably less than that for which the improvement was designed. The developed runoff to be discharged at this point has been calculated at 18.9 cfs, which is the developed runoff from Basin B. The downstream drainage structure was designed by this office and certified as to compliance with the approved design on November 18, 1988. In closing, the downstream structure has more than adequate capacity to receive the developed runoff from this site.

The Grading Plan shows 1) existing grades indicated by spot elevations and contours at 1'0" intervals, 2) proposed grades indicated by spot elevations, top-of curb elevations, and pad elevations, 3) the limit and character of the existing improvements, 4) the limit and character of the proposed improvements, and 5) continuity between the existing and proposed grades. As shown by this plan, the proposed construction consists of public streets and lot grading. Public and private drainage facilities are required to effect the grading and drainage of the site. Those facilities are depicted on the plan. The design of the public storm drainage improvements will be addressed in more detail with the Work Order plans. Further project specifications are enumerated in the grading notes which accompany this submittal. The site consists of three drainage basins. Basin A is a relatively small area which discharges via Tierra Alegre N.E. to Alameda Boulevard N.E. This small basin drains into the La Cueva Arroyo watershed. Based upon the previous submittal for Tierra La Cueva Unit 1, this area is allowed free drainage. Basin B consists of the majority of the site. Basin B drains internally to the existing drainage structure which is constructed on the La Cueva High School site. The capacity of that facility is addressed above. The third basin is Basin C, which is also a relatively small area. That basin discharges directly into Wilshire Avenue N.E. Wilshire Avenue N.E. drains in a westerly direction to Wyoming Boulevard N.E. The downstream capacity has been addressed by the previous submittal for this project.

The calculations which appear hereon analyze the existing and developed conditions for the 6-hour, 100-year rainfall event. The calculations have been performed in accordance with the procedure for '40 Acres and Smaller Basins" as set forth in Section 22.2, Hydrology of the Development Process manual, Volume 2, Design Criteria, dated August 1991. As shown by these calculations, an increase in runoff is anticipated due to the proposed development. Downstream development will experience a decrease, however, due to the upstream diversion of runoff in accordance with the Carrington Subdivision and/or the Barstow Street Storm Drain as more fully described in the previous submittal which was approved on September 22, 1992, C19/09A, for Preliminary Plat and Conditional Letter of Map Revision. Hydraulic computations also accompany this submittal for street capacities and public and private drainage facility capacities. As shown by these calculations, the improvements as designed have adequate capacity to handle the developed runoff from this site.

③ DRAINAGE CERTIFICATION

As indicated by the as-built information shown hereon, Tierra La Cueva-Unit 2 has been graded in substantial conformance with the approved Plan. The streets are constructed and have been accepted by the City. Private drainage improvements and retaining walls have also been constructed. The concrete trickle channels, within private drainage easements, have been constructed in close tolerance to the approved grades. Pad elevations have been verified upon completion of the pad construction. As indicated, more than half of the lots have been developed or have houses under construction. Lots 14, 17, 18, and 19 have been completed. All other lots are still under construction with final lot grading pending completion of construction and yard landscaping. From review of the as-built information, the project has been constructed within construction tolerance with the exception of the finished grading which must be completed in conjunction with the finished landscaping of each lot. In addition, the existing paving along the south side of Wilshire Avenue N.E. was overlaid in order to raise the waterblock as required by previous submittal. Preliminary evaluations revealed that the as-constructed waterblock did not meet DPM criteria. In conjunction with the diversion of stormwaters by Barstow Street N.E., raising the waterblock was required.

The as-built information shown hereon was obtained by me or under my supervision and is true and correct to the best of my knowledge and belief.

Jeffrey G. Mortensen
NMPE 8547

CALCULATIONS

Site Characteristics

1. Precipitation Zone   3
2. $P_{6,100}$ 2.60
3. P_{360} =   2.60
4. Total Area (A_T)   5.88

Existing Land Treatment

Treatment	Area (sf/ac)	%
A	256,020/5.88	100%

5. Developed Land Treatment

a. Basin A

$N = 2$ Lots/0.29 Ac = 6.9 du/Ac
% $D = 7(N^2 + 5N)^{1/2} = 63\% = 0.18$ Ac
% $B = 100 - $%$D = 37\% = 0.11$ Ac

b. Basin B

$N = 23$ Lots/5.09 Ac = 4.5 du/Ac
% $D = 7(N^2 + 5N)^{1/2} = 46\% = 2.34$ Ac
% $B = 100 - $%$D = 54\% = 2.75$ Ac

c. Basin C

$N = 2$ Lots/0.49 Ac = 4.1 du/Ac
% $D = 7(N^2 + 5N)^{1/2} = 43\% = 0.21$ Ac
% $B = 100 - $%$D = 57\% = 0.28$ Ac

Existing Condition

1. Volume

$E_W = (E_A A_A + E_B A_B + E_C A_C + E_D A_D)/A_T$
$E_W = [(0.66)(5.88)]/5.88 = 0.66$ in
$V_{100} = (E_W/12)A_T = [(0.66)/12]5.88 = 0.323$ ac. ft. = 14,090 cf

2. Peak Discharge

$Q_P = Q_{PA}A_A + Q_{PB}A_B + Q_{PC}A_C + Q_{PD}A_D$
$Q_P = Q_{100} = (1.87)(5.88) = 11.0$ cfs

Developed Condition

a. Basin A

1. Volume

$E_W = (E_A A_A + E_B A_B + E_C A_C + E_D A_D)/A_T$
$E_W = [(0.92)(0.11) + (2.36)(0.18)]/0.29 = 1.81$ in.
$V_{100} = (E_W/12)A_T$
$V_{100} = (1.81/12)0.29 = 0.044$ ac. ft. = 1,920 cf

2. Peak Discharge

$Q_P = Q_{PA}A_A + Q_{PB}A_B + Q_{PC}A_C + Q_{PD}A_D$
$Q_P = Q_{100} = (2.60)(0.11) + (5.02)(0.18)$
$Q_{100} = 1.2$ cfs

b. Basin B

1. Volume

$E_W = (E_A A_A + E_B A_B + E_C A_C + E_D A_D)/A_T$
$E_W = [(0.92)(2.75) + (2.36)(2.34)]/5.09 = 1.58$ in.
$V_{100} = (E_W/12)A_T$
$V_{100} = (1.58/12)5.09 = 0.66$ ac. ft. = 28,640 cf

2. Peak Discharge

$Q_P = Q_{PA}A_A + Q_{PB}A_B + Q_{PC}A_C + Q_{PD}A_D$
$Q_P = Q_{100} = (2.60)(2.75) + (5.02)(2.34)$
$Q_{100} = 18.9$ cfs

c. Basin C

1. Volume

$E_W = (E_A A_A + E_B A_B + E_C A_C + E_D A_D)/A_T$
$E_W = [(0.92)(0.28) + (2.36)(0.21)]/0.49 = 1.54$ in.
$V_{100} = (E_W/12)A_T$
$V_{100} = (1.54/12)(0.49) = 0.063$ ac. ft. = 2,740 cf

2. Peak Discharge

$Q_P = Q_{PA}A_A + Q_{PB}A_B + Q_{PC}A_C + Q_{PD}A_D$
$Q_P = Q_{100} = (2.60)(0.28) + (5.02)(0.21) = 1.8$ cfs

d. Total Developed Basins

1. Volume = $V_{100A} + V_{100B} + V_{100C}$
$V_{100T} = 1,920 + 28,640 + 2,740 = 33,300$ cf

2. Peak Discharge = $Q_{100A} + Q_{100B} + Q_{100C}$
$Q_{100T} = 1.2 + 18.9 + 1.8 = 21.9$ cfs

Comparison

1. $\Delta V_{100} = 28,640 - 14,090 = 14,550$ cf (increase)
2. $\Delta Q_{100} = 21.9 - 11.0 = 10.9$ cfs (increase)

NOTE: HOMEBUILDER IS RESPONSIBLE FOR CONSTRUCTING ALL RETAINING WALLS INTEGRAL TO HOUSE CONSTRUCTION.

SECTION B-B

SCALE: HORIZ 1" = 20'
VERT 1" = 5'

Grading Plan labels

BASIN A

SIGNAL AVENUE N.E.

BASIN B

BASIN C

TIERRA SERENA PLACE N.E.

WILSHIRE AVENUE N.E.

BARSTOW STREET N.E.

③ OVERLAY EXISTING PAVING TO RAISE WATERBLOCK

T.B.M.
TOP OF WALL
ELEVATION = 5465.72

CONSTRUCT 2'-0" CONCRETE TRICKLE CHANNEL WITHIN 5' PRIVATE DRAINAGE EASEMENT (TYPICAL)

PROJECT NO. 4368.91

GRADING AND DRAINAGE PLAN
TIERRA LA CUEVA - UNIT 2

APPROVED FOR ROUGH GRADING
5-21-93

NO.	DATE	BY	REVISIONS
①	04/93	JGM	CLARIFY RETAINING WALLS; SECTION B-B; ADD WILSHIRE T.C.s; LABEL FLOODPLAIN.
②	04/93	JGM	REVISE SECTION B-B
③	06/94	JGM	AS-BUILT & CERTIFY

DESIGNED BY	J.G.M.
DRAWN BY	ACAD
APPROVED BY	J.G.M.

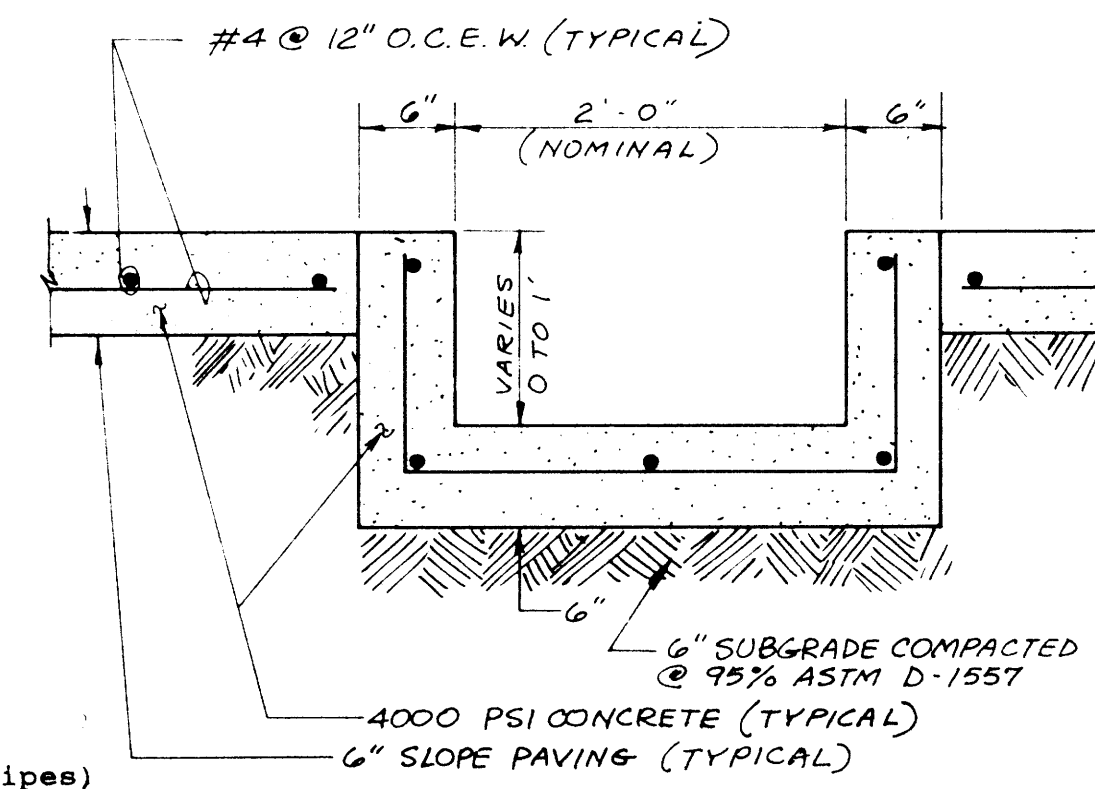JOB NO. 940101
DATE 02-1993
SHEET 3 OF 14

GRADING NOTES:

1. ALL FILL SHALL BE COMPACTED TO A MINIMUM OF 90% ASTM D-1557; HOUSE PADS SHALL BE COMPACTED AT 95% ASTM D-1557.

2. THE PAD ELEVATIONS SHOWN HEREON ARE FOR ROUGH GRADING PURPOSES.

3. FINISHED FLOOR ELEVATIONS MAY VARY FROM THE PAD ELEVATIONS AND WILL BE DETERMINED AS A FUNCTION OF INDIVIDUAL HOUSE DESIGN.

4. FINISHED FLOOR ELEVATIONS SHOULD BE ESTABLISHED AT A MINIMUM OF 6 INCHES ABOVE PAD ELEVATIONS; DEVIATIONS FROM THESE GUIDELINES MUST BE BASED ON THE RECOMMENDATIONS AND/OR DESIGN OF A COMPETENT DESIGN PROFESSIONAL.

5. NO CROSS-LOT DRAINAGE WILL BE ALLOWED UNLESS PROVIDED FOR BY PRIVATE DRAINAGE EASEMENT.

6. RETAINING WALLS SHALL BE CONSTRUCTED BY THE DEVELOPER.

7. YARD (GARDEN) WALLS SHALL BE CONSTRUCTED BY THE LOT OWNER OR ITS BUILDER.

8. THE FINISHED GRADING OF EACH LOT SHALL BE ACCOMPLISHED BY THE LOT OWNER OR ITS BUILDER. ALL RUNOFF MUST BE DIRECTED TO THE STREETS OR DRAINAGE EASEMENT (IF APPLICABLE).

9. LOTS 1 THROUGH 8 INCLUSIVE AND LOTS 15 AND 16 WILL BE CONSTRUCTED WITH LOWER LEVELS WHICH WILL LIE BELOW THE ADJACENT STREET GRADE. THE UPPER LEVEL WILL BE ESTABLISHED ABOVE THE FINISHED STREET GRADE.

10. ALL DEVELOPED ROOF AND SIDE YARD RUNOFF MUST BE DRAINED TO THE STREET.

11. MAXIMUM SLOPES SHALL BE 3:1; MINIMUM SLOPES SHALL BE 1%.

12. TWO (2) WORKING DAYS PRIOR TO ANY EXCAVATION, CONTRACTOR MUST CONTACT NEW MEXICO ONE CALL SYSTEM, 260-1990, FOR LOCATION OF EXISTING UTILITIES.

13. IF ANY UTILITY LINES, PIPELINES, OR UNDERGROUND UTILITY LINES ARE SHOWN ON THESE DRAWINGS, THEY ARE SHOWN IN AN APPROXIMATE MANNER ONLY, AND SUCH LINES MAY EXIST WHERE NONE ARE SHOWN. IF ANY SUCH EXISTING LINES ARE SHOWN, THE LOCATION IS BASED UPON INFORMATION PROVIDED BY THE OWNER OF SAID UTILITY, AND THE INFORMATION MAY BE INCOMPLETE, OR MAY BE OBSOLETE BY THE TIME CONSTRUCTION COMMENCES. THE ENGINEER HAS CONDUCTED ONLY PRELIMINARY INVESTIGATION OF THE LOCATION, DEPTH, SIZE, OR TYPE OF EXISTING UTILITY LINES, PIPELINES, OR UNDERGROUND UTILITY LINES. THIS INVESTIGATION IS NOT CONCLUSIVE, AND MAY NOT BE COMPLETE, THEREFORE, MAKES NO REPRESENTATION PERTAINING THERETO, AND ASSUMES NO RESPONSIBILITY OR LIABILITY THEREFOR. THE CONTRACTOR SHALL INFORM ITSELF OF THE LOCATION OF ANY UTILITY LINE, PIPELINE, OR UNDERGROUND UTILITY LINE IN OR NEAR THE AREA OF THE WORK IN ADVANCE OF AND DURING EXCAVATION WORK. THE CONTRACTOR IS FULLY RESPONSIBLE FOR ANY AND ALL DAMAGE CAUSED BY ITS FAILURE TO LOCATE, IDENTIFY AND PRESERVE ANY AND ALL EXISTING UTILITIES, PIPELINES, AND UNDERGROUND UTILITY LINES. IN PLANNING AND CONDUCTING EXCAVATION, THE CONTRACTOR SHALL COMPLY WITH STATE STATUTES, MUNICIPAL AND LOCAL ORDINANCES, RULES AND REGULATIONS, IF ANY, PERTAINING TO THE LOCATION OF THESE LINES AND FACILITIES.

14. THE CONTRACTOR SHALL ENSURE THAT NO SOIL ERODES FROM THE SITE INTO PUBLIC RIGHT-OF-WAY OR ONTO PRIVATE PROPERTY. THIS CAN BE ACHIEVED BY CONSTRUCTING TEMPORARY BERMS AT THE PROPERTY LINES AND WETTING THE SOIL TO KEEP IT FROM BLOWING.

15. THE CONTRACTOR SHALL PROMPTLY CLEAN UP ANY MATERIAL EXCAVATED WITHIN THE PUBLIC RIGHT-OF-WAY SO THAT THE EXCAVATED MATERIAL IS NOT SUSCEPTIBLE TO BEING WASHED DOWN THE STREET.

16. THE CONTRACTOR SHALL SECURE "TOPSOIL DISTURBANCE PERMIT" PRIOR TO BEGINNING CONSTRUCTION. AN EXCAVATION PERMIT IS REQUIRED FOR ALL WORK WITHIN PUBLIC RIGHT-OF-WAY.

DRAINAGE CERTIFICATION

As indicated by the as-built information shown hereon, Tierra La Cueva-Unit 2 has been graded in substantial conformance with the approved Plan. The streets are constructed and have been accepted by the City. Private drainage improvements and retaining walls have also been constructed. The concrete trickle channels, within private drainage easements, have been constructed in close tolerance to the approved grades. Pad elevations were verified upon completion of the pad construction. As indicated, more than half of the lots have been developed or have houses under construction. Lots 14, 17, 18, and 19 have been completed. All other lots are still under construction with final lot grading pending completion of construction and yard landscaping. From review of the as-built information, the project has been constructed within construction tolerance with the exception of the finished grading which must be completed in conjunction with the finished landscaping of each lot. In addition, the existing paving along the south side of Wilshire Avenue N.E. was overlaid in order to raise the waterblock as required by previous submittal. Preliminary evaluations revealed that the as-constructed waterblock did not meet DPM criteria. In conjunction with the diversion of stormwaters by Barstow Street N.E., raising the waterblock was required.

The as-built information shown hereon was obtained by me or under my supervision and is true and correct to the best of my knowledge and belief.

Jeffrey G. Mortensen
NMPE 8547

DETAIL 1
SCALE: 1"=10'

LOT 7
PAD @ 5461.8

LOT 8
PAD 5461.4

20' DRAINAGE RIGHT-OF-WAY

CONSTRUCT RUNDOWN CURB PER COA STD DWG 2415 FOR HANDICAP ACCESS (TYP 2 PLACES)

CONSTRUCT MONOLITHIC CURB @ ℄ PER COA STD DWG 2441 (CASE 1) (TYP 2 PLACES) SEAL JOINT W/URETHANE SEALANT

CONSTRUCT DOUBLE 'D' STORM INLET PER C.O.A. STD. DWG. NO. 2206 T.G. @ 6405.8 INV @ 6058.5

INSTALL 24" R.C.P. (CLASS III) @ 5-0.0385
Qcap = 44 cfs

INSTALL CHAIN LINK GATE PER COA STD DWG NO 2252

SIDEWALK

TIERRA ALEGRE DRIVE

TYPICAL TRICKLE CHANNEL SECTION
SCALE: 1"= 1'-0"

GARDEN/RETAINING WALL
INSTALL ½" PREFORMED EXPANSION JOINT
1" RADIUS (TYP)
4000 PSI CONCRETE
6" SUBGRADE COMPACTED @ 90% ASTM D-1557

SECTION A-A
SCALE: 1"=2'

INSTALL CHAIN LINK GATE PER C.O.A. STD DWG NO 2252

CONSTRUCT 4000 PSI CONCRETE SLOPE PAVING W/ #4 @ 1'-0" O.C.E.W.

CUT PIPE TO CONFORM WITH 5:1 SLOPE
6" SLOPE PAVING (BEYOND)

CONSTRUCT CHANNEL EXPANSION JOINT W/SLEEPER PER COA STD DWG 2265

24" RCP (CLASS III)
#4 @ 1'-0" O.C.E.W. (TYPICAL)

#4 @ 1'-0" O.C BOTH WAYS

DOUBLE 'D' STORM INLET

TIERRA ALEGRE DRIVE

SECTION X-X
SCALE: 1"=1'-0"

#4 @ 12" O.C.E.W. (TYPICAL)
4000 PSI CONCRETE (TYPICAL)
6" SUBGRADE COMPACTED @ 95% ASTM D-1557
6" SLOPE PAVING (TYPICAL)

HYDRAULIC CAPACITY

a. Concrete Trickle Channel

$Q = (1.49/n)AR^{2/3}S^{1/2}$

Where
$n = 0.013$
$A = 2(0.50) = 1.00$ sf
$P = 0.50 + 2.0 + 0.50 = 3.00$ ft
$R = A/P = 1.00/3.00 = 0.33; R^{2/3} = 0.48$
$S = 0.01$ (minimum); $S^{1/2} = 0.10$

$Q_{cap} = 5.5$ cfs

b. Public Drainage Channel

$Q_{8 inch} = (1.49/n)AR^{2/3}S^{1/2}$

Where
$n = 0.013$
$A = (2/3)(18.67) = 12.45$ sf
$P = 2/3 + 18.67 + 2/3 = 20$ ft
$R = A/P = 12.45/20.00 = 0.623; R^{2/3} = 0.729$
$S = 0.0513; S^{1/2} = 0.23$

$Q_{8 inch} = 239$ cfs

@ $Q_{design} = 18.9$ cfs (Drainage Basin 'B')
$D = 0.14$ ft; $A = 2.69$ ft²
$V = Q/A = 18.9/2.69 = 7.0$ fps

STREET CAPACITY

a. Minimum Slope (0.0050)
DPM Plate 22.3 D-1 for S = 0.0050, D = 0.67
$Q_{1/2} = 22.5$ cfs
$V = 3.4$ fps
$Q_{cap} = 2 \times Q_{1/2} = 45$ cfs

@ $Q_{design} = 18.9$ cfs
Then $Q_{1/2} = 9.5$ cfs
$D = 0.49$ ft
$V = 2.38$ fps

b. Maximum Slope (0.0080)
DPM Plate 22.3 D-1 for S = 0.0080, D = 0.67
$Q_{1/2} = 28.5$ cfs
@ $Q_{design} = 18.9$ cfs
Then $Q_{1/2} = 9.5$ cfs
$D = 0.46$ ft
$V = 2.72$ fps

SUMP CONDITION @ CUL-DE-SAC

Required Capacity $Q_{req} ≈ 18.9$ cfs
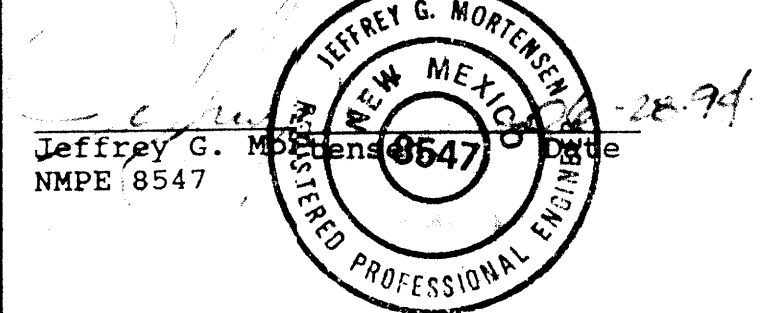
a. Double "D" Inlet:

$Q_D = CA_{eff}(2g\Delta h)^{0.5}$
$= 37.4$ cfs

Where C = 0.7
$A_{eff} = 0.5(6.5 \times 2.5) = 8.125$ sf (effective)
$g = 32.2$ ft/s²
$\Delta h = 0.67$

b. Pipe Capacity
(By Field's Hydraulics Calculator for Gravity Flow in Pipes)

24" RCP
$n = 0.013$
$S = 0.0385$

$Q_{cap} = 44$ cfs

CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT
ENGINEERING GROUP

TITLE: TIERRA LA CUEVA UNIT 2
GRADING NOTES
DRAINAGE DETAILS AND SECTIONS

APPROVALS	ENGINEER	DATE	APPROVALS	ENGINEER	DATE
DRC CHAIRMAN		8-04-93	WATER		7-1-93
TRANSPORTATION		7-1-93	WASTE WATER		7-1-93
HYDROLOGY		07-01-93			

PROJECT NO. 4368.91
MAP NO. C-19
SHEET 4 OF 14

940101

JUN 2 9 1994