City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

DESIGN HYDROLOGY SECTION
123 Central NW, Albuquerque, NM 87102
(505) 766-7644

August 10, 1984

Chuck Easterling
Leverton-Easterling, Inc.
Consulting Engineers
5629 Paradise Boulevard NW
Albuquerque, NM 87110

REF: GRADING PLAN AMENDMENT FOR PIONEER ESTATES (D11-D1) DATED 8-7-84

Dear Chuck:

The proposed grading plan (referenced above) eliminating backyard ponds is approved.

Please advise your client that separate wall permits, in accordance with the Building Code, will be required for retaining walls proposed on the subject site.

If you have any questions, please feel free to contact me at 766-7644.

Sincerely yours,

Fred J. Aguirre
Design Hydrologist

FJA:mrk

Albuquerque
Metropolitan
Arroyo
Flood
Control
Authority

P. O. BOX 25851 - ALBUQUERQUE, N. M. 87125
TELEPHONE 884-2215

Please file
D11/D?

October 20, 1986

Billy J. Goolsby, P.E.
C.E./Hydrology Section
123 Central NW
Albuquerque, New Mexico 87102

Re: PIONEER ESTATES CHANNEL RECONSTRUCTION AND OUTFALL INTO THE NORTH MARIPOSA CHANNEL

Dear Billy:

We have no objection to the concept of adding an additional outlet pipe through the enbankment of Mariposa Detention Basin, assuming that it is the only feasible solution.

Some comments follow.

1. State Highway Specs were used (as supplemented) to build the project, and have been reproduced, in part, on Sheet 16A.

However, be advised that:

a. Section 603 - RIPRAP (Shown on Sheet 16A) was supplemented (See attached copy.

b. Section 304 - BASE COURSE AND SUBBASE (Shown on Sheet 16A) is OK - it was not supplemented.

c. Section 203 - EXCAVATION, BORROW AND EMBANKMENT was completely replaced with a new section (copy attached).

d. Section 206 - EXCAVATION AND BACKFILL FOR CULVERTS AND MINOR STRUCTURES was supplemented (copy attached).

2. The pipe installation and embankment replacement must be installed in accordance with appropriate portions of the above specifications. AMAFCA requires that one set of applicable "as built" drawings, and specifications be provided, with a certification by a Registered Professional Engineer, that work done on the pipe installation and embankment replacement was done in substantial compliance with the plans and specifications.

3. I am concerned about the proximity of the new pipe to the existing, in that embankment support around the existing pipe could be lost as excavation occurs. Suggest that the excavation be widened to expose a portion of the top of the existing pipe, and that slopes no steeper than 1.5H to 1.0V be specified. A sketch on Sheet 16 might be helpful. I will be glad to discuss.

Sincerely,

Larry A. Blair
Field Engineer

cc: Easterling & Associates - Doug Copeland
Bellamah - Bob Ryals
CCM - Porf Lucero

DRAINAGE REPORT for the PIONEER ESTATES

Goldberg - Mann & Associates, Inc.

Engineers - Planners

811 Dallas St., N.E. Albuquerque, New Mexico 87110

PURPOSE AND SCOPE

The purpose of this drainage plan is to establish the criteria for controlling surface runoff from the particular development in a manner that is acceptable to the City of Albuquerque and to the Albuquerque Metropolitan Arroyo Flood Control Authority.

This plan determines the runoff resulting from a 100-year frequency storm falling on the site under existing and developed conditions.

The scope of this plan is to ensure that the proposed project will be protected from storm runoff and that the construction of this project will not increase the flooding potential of the adjacent properties.

LOCATION AND DESCRIPTION

The Pioneer Estates Subdivision, being a portion of Tract X of Taylor Ranch, is located within the corporate limits of the City of Albuquerque in the West Mesa area. The parcel is located along the south side of Homestead Circle, N.W. between Mojave Street, N.W. and Conestoga Drive, N.W. within Section 23, Township 11 North, Range 2 East, N.M.P.M. Figure 1 graphically depicts the location of the site.

The parcel is 16.34 acres in size and will be developed as a 124-unit townhouse complex. The natural topography of the site slopes from west to east at approximately one (1) percent.

DESIGN CRITERIA

In analyzing the storm runoff, the Rational Formula, Q = CIA is used.

Where:

Q = Runoff quantity in cubic feet/second.

A = Contributing area in acres.

I = Intensity in inches/hour for a duration equal in minutes and obtained from Figure 2, Intensity Duration Frequency Curves, Albuquerque Area 1961. (Note: Where a Time of Concentration [Tc] is less than ten minutes, the intensity value derived from a Tc of ten (10) minutes is employed.)

C = Runoff coefficient (No Units). This coefficient represents the integrated effects of infiltration, detention storage, evaporation, retention, flow routing, and interception which all affect the time distribution and peak rate of runoff.

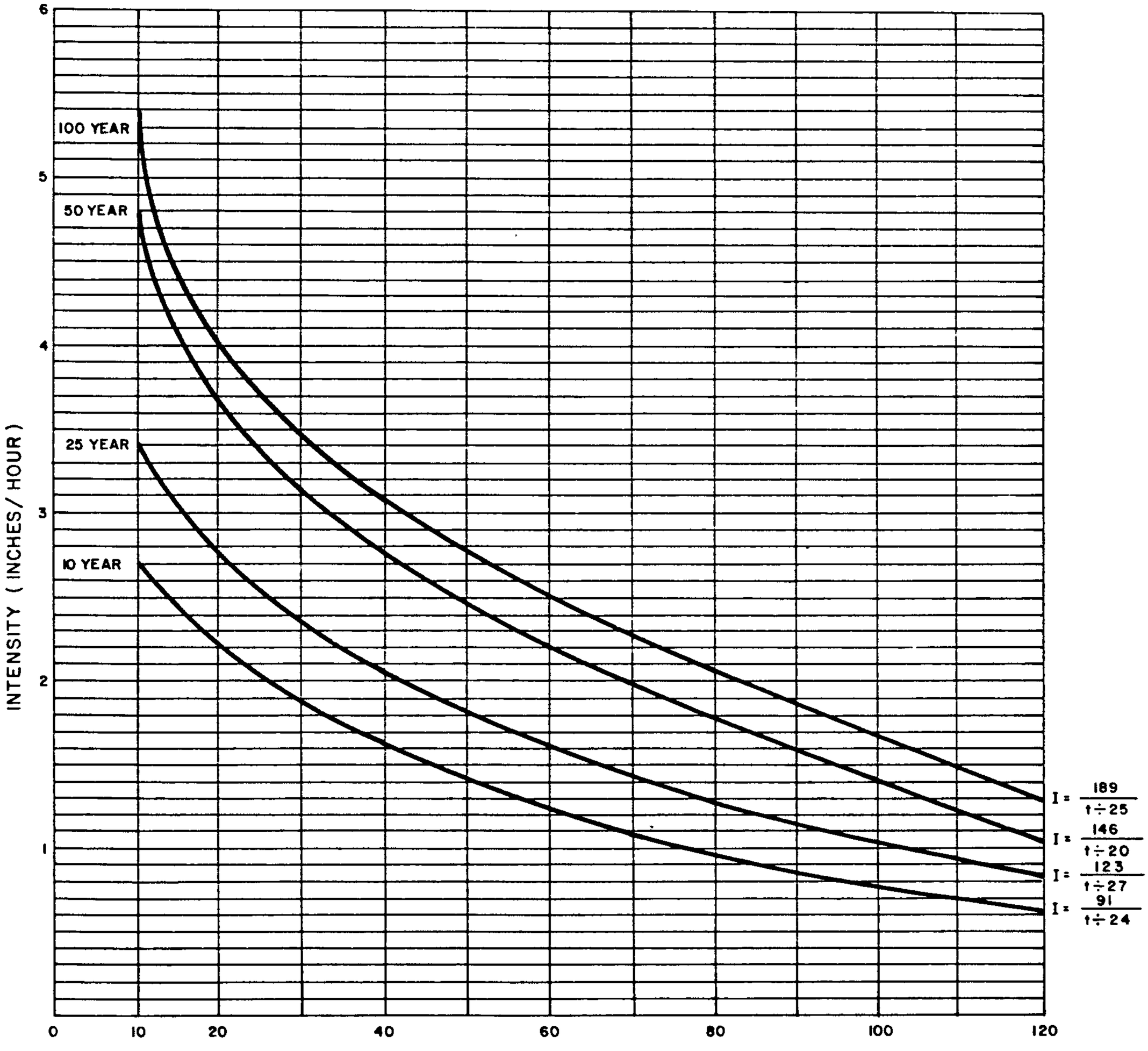


FIGURE 2

INTENSITY DURATION FREQUENCY CURVES

EXISTING DRAINAGE CONDITIONS

The Flood Hazard Map is shown in Figure 3. It can be seen from this figure that the project site does not lie within a flood hazard zone or a flood plain. In addition, there are no existing drainge easements on the property.

The parcel is bounded on the north by Homestead Circle, on the west by Mojave Street and on the south by a future drainage right-of-way. Both streets are paved and have standard curb and gutter. Because of the existence of curb and gutter, offsite flows do not enter the site but are diverted around the site through the existing streets. As shown by the existing contours on Figure 5, onsite flows travel in a southeasterly direction across the site into the future drainage right-of-way. The site to the east is, at this time, undeveloped and does not contribute any runoff to the project site.

PROPOSED DRAINAGE CONDITIONS

The proposed drainage plan is shown in Figure 5. Runoff from front yards and, in most cases, two-thirds of the roof areas will drain into the streets. This runoff will be conveyed through the streets and discharged through drainage channels A and B. This is shown conceptually in Figure 5. Figure 4 illustrates typical lot drainage for a typical lot.

Runoff generated in the rear and side yards and from one-third the roof area will be retained by ponding in the rear yards. Rear yard ponds are designed to retain at least 100 percent of the runoff from a 100 year frequency storm. Required rear yard pond volumes range from 175 cf for a typical lot to 750 cf for the largest lot (56, Block 3).

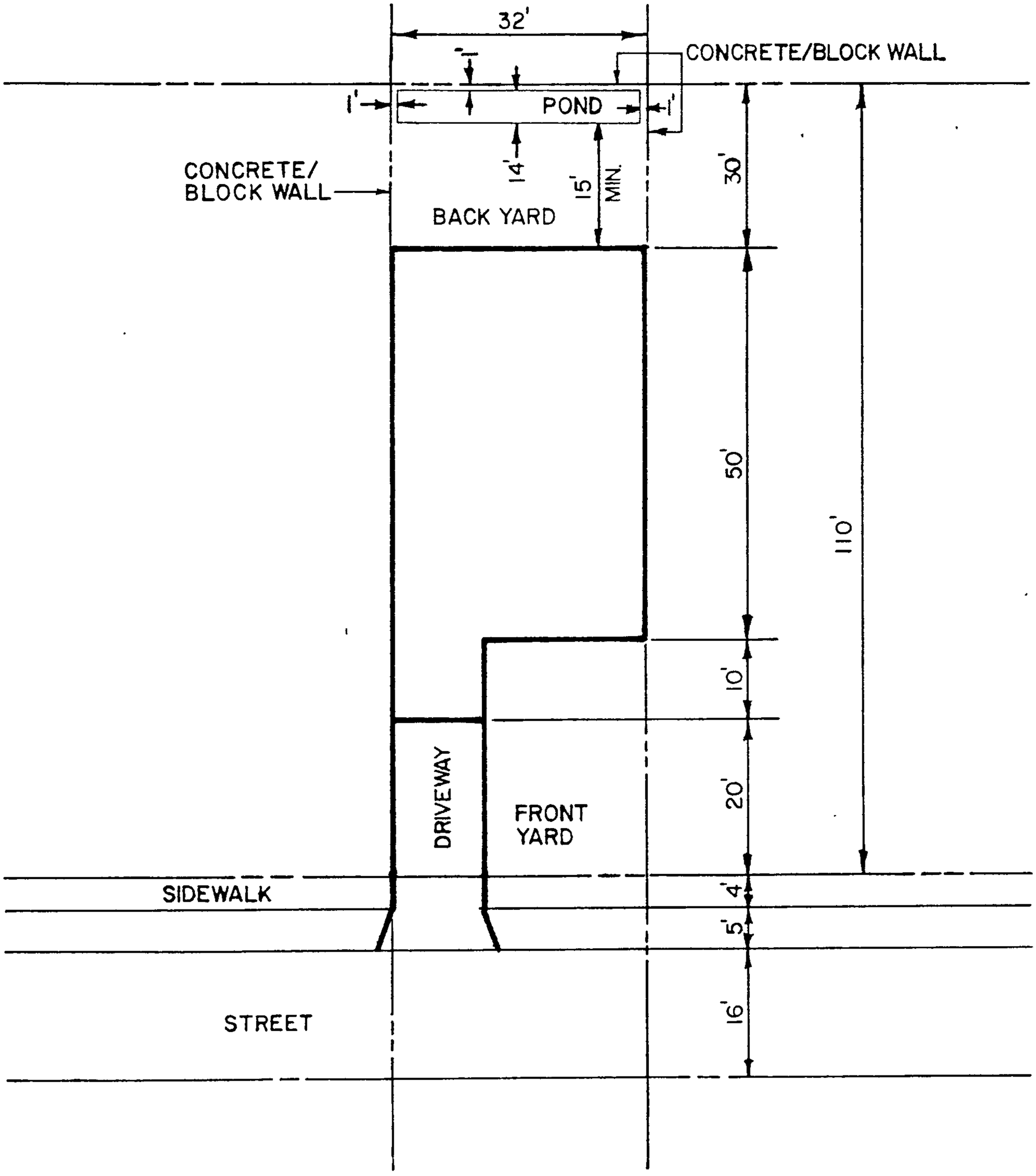
The following requirements will be followed for the construction of rear yard ponds. Rear yard ponds will be:

1. A minimum distance of 15 feet from the house.
2. A maximum depth of 6 inches.
3. A minimum distance of 1 foot from side and rear lot lines.

Maximum pond slopes will be 3:1. A typical pond is shown in Figure 6.

Due to the ponding requirements established above, adequate ponding could not be provided for several lots. Because of this, drainage modifications were necessary. Lot 11, Block 2, lots 16, 21, 22 and 27, Block 3, and lots 1, 4, 5, 8, 9, 14, 15, 20, 21, 26, 27 and 28, Block 4, will drain entirely

to the streets. Lots 1 through 13, Block 3, and 30 through 53, Block 3, will drain runoff generated from the rear yard area and one-third the roof area to the back of the lot where it will discharge through the weepholes in the perimeter block wall into the future drainage right-of-way.



LEGEND

——— PROPERTY LINE

———— STREET CENTERLINE

FIGURE 4

TYPICAL LOT DRAINAGE

CONCLUSIONS

The following conclusions and recommendations are presented for the development of the Pioneer Estates Subdivision:

1. Drain all front yards and two-thirds of the roof area into the streets.

2. Discharge the runoff in the streets into the future drainage right-of-way via two (2) concrete drainage channels.

3. Construct two (2) concrete drainage channels as per item 2.

4. Construct rear yard ponds to retain the runoff from a 100-year frequency storm except as previously noted in the text.

5. Construct rear yard ponds in accordance with the requirements outlined in the text.

CALCULATIONS

Undeveloped Flow

Area of site = 16.5 AC±
C = 0.40
i = 5.4 in/hr

By Rational Formula,
Q = CiA
Q = (0.40) (5.4)(16.5) = 36 cfs

Developed Flows

Area Draining to Street:

1. Drainage Area A (40 units)

Street, Driveways, Sidewalks	62,200 sf
Roofs	45,500 sf
Yard Area	36,000 sf
Total impervious area	107,700 sf
Total pervious area	36,000 sf
Total area draining to street	143,700 sf

2. Drainage Area B (84 units)

Streets, Driveways, Sidewalk	106,100 sf
Roofs	76,500 sf
Yard Area	83,700 sf
Total impervious area	182,600 sf
Total pervious area	83,700 sf
Total area draining to street	266,300 sf

Composite 'C' Factor:

$$\frac{(107,700 + 182,600)}{(143,700 + 266,300)}(0.95) + \frac{36,000 + 83,700}{(143,700 + 266,300)}(0.40) = 0.79$$

$$Q_{A_{100}} = 0.79\ (5.4)\ \left(\frac{143,700}{43,560}\right)$$

$$Q_{A_{100}} = 14 \text{ cfs}$$

$$Q_{B_{100}} = 0.81\ (5.4)\left(\frac{266,300}{43,560}\right)$$

$$Q_{B_{100}} = 26 \text{ cfs}$$

Rear Yard Ponding:

For typical lot (Lot 9, Block 2),
rear yard area = 32 (30) 960 sf
1/2 roof area = 1/3 (1720) 600 sf

1,560 sf

Volume to pond for 100-year storm,

$$Vol_{100}(pond) = \frac{2.2}{12} 600\ (0.95) + 960\ (0.40) = \underline{175\ cf}$$

Pond Volume,

$$Vol_{pond} = 0.5\ \boxed{1/2(30 + 27)}\ \boxed{1/2(14 + 11)} = \underline{178\ cf}$$

Pond volume exceeds volume required for a 100-year frequency storm. Refer to Figure 4 for Typical Lot Drainage and Figure 6 for Typical Pond Section.

Drainage Channel Design
By Chezy-Manning Formula,

$$Q = \frac{1.49}{n} AR^{2/3} S^{1/2}$$

Let n = 0.013
A = 11(1) = 11 sf
P = 1 + 11 + 1 = 13 ft
$R = \frac{A}{P} = \frac{11}{13} = 0.85$ ft
S = 0.005

$$Q = \frac{1.49}{0.013}(11)(0.85)^{2/3}\sqrt{0.005}$$

Q = 80 cfs

Capacity of channel exceeds $Q_{A_{100}}$ and $Q_{B_{100}}$.

Refer to Figure 5 for typical channel section.