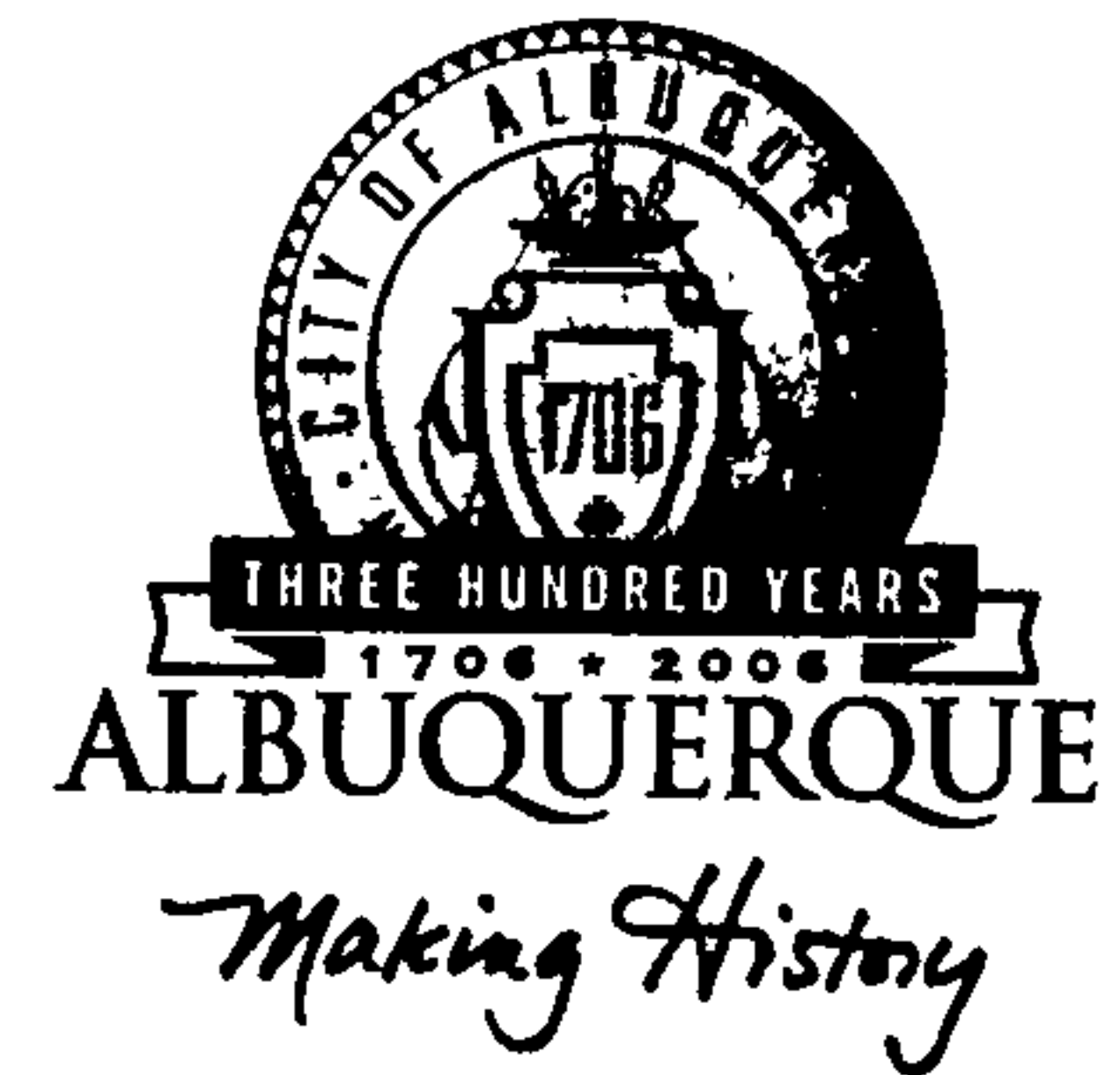


CITY OF ALBUQUERQUE



May 6, 2005

John Andrews, PE
The Larkin Group, Inc
8500 Menaul Blvd NE, Suite A-440
Albuquerque, NM 87112

**Re: Fed-Ex Freight Site Revisions Grading and Drainage Plan,
Engineer's Stamp dated 4-29-05 (H11/D3B)**

Dear Mr. Andrews,

Based upon the information provided in your submittal dated 5-2-05, the above referenced plan is approved for Grading Permit and Paving Permit. Upon completion of the project, please submit an Engineer's Certification for my records.

P.O. Box 1293

If you have any questions, you can contact me at 924-3986.

Albuquerque

New Mexico 87103

www.cabq.gov

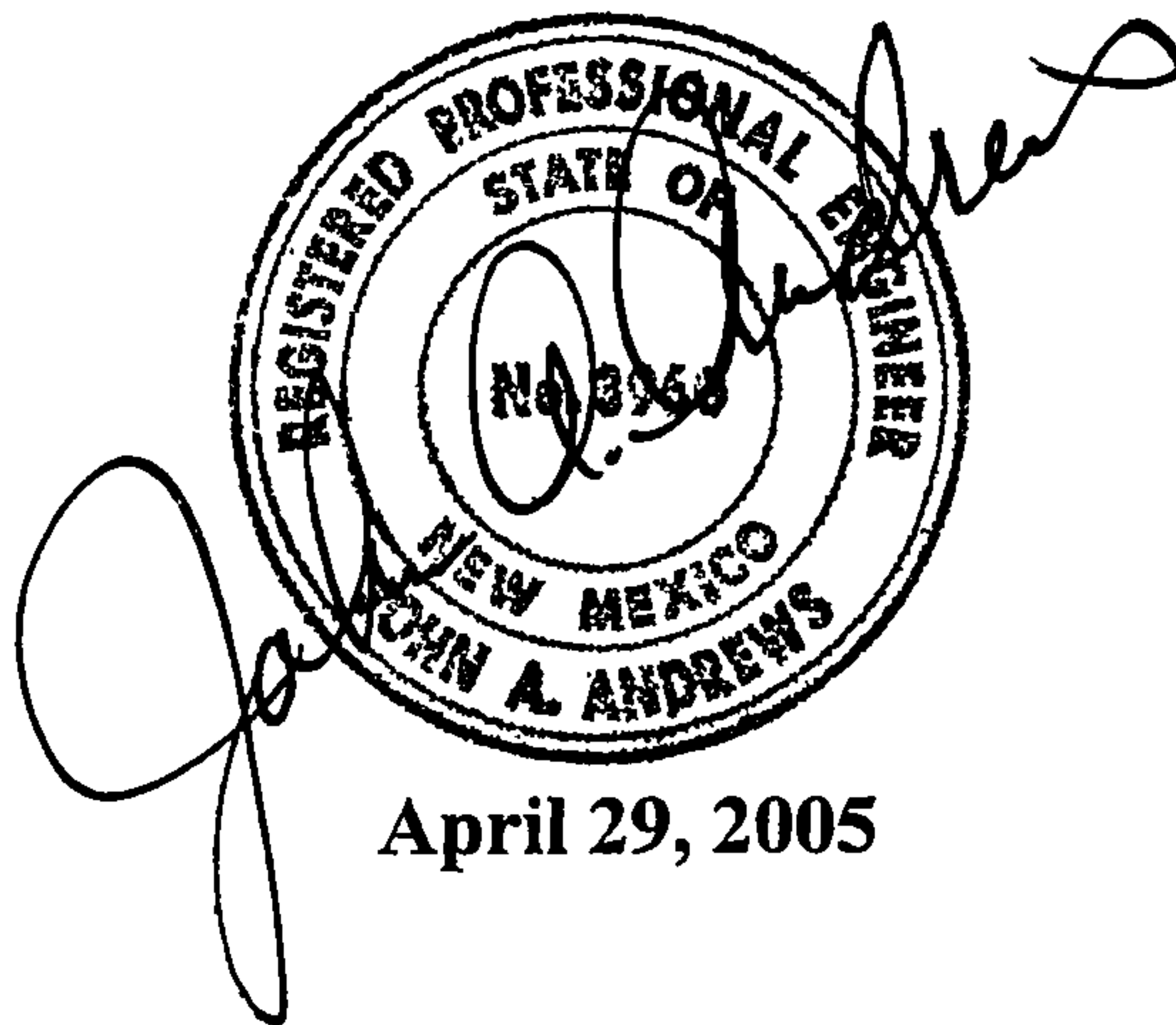
C: Roland Pentilla, DMD
file

Sincerely,

Bradley L. Bingham, PE
Principal Engineer, Planning Dept.
Building and Development Services

**FEDEX FREIGHT
ALBUQUERQUE SERVICE CENTER
SITE REVISIONS**

DRAINAGE ANALYSIS



Prepared By:

**Larkin Group NM, Inc.
8500 Menaul Blvd. NE, Suite A-440
Albuquerque, NM 87112
Phone: (505) 275-7500
Fax: (505) 275-0748**

**FEDEX FREIGHT
ALBUQUERQUE SERVICE CENTER
SITE REVISIONS**

**DRAINAGE ANALYSIS
APRIL 29, 2005**

SITE DESCRIPTION:

Lot 263-C, Town of Atrisco Grant, Unit 8. Zone Atlas Page H-11 & J-11.

PROJECT DESCRIPTION:

City of Albuquerque and NMDOT are taking the easterly 30 feet of the parcel of land on which FEDEX Freight facilities are located to construct a new roadway to be known as Estancia Street. This requires FEDEX to make site revisions. The taking of the easterly 30 feet of the site takes away a row of on site truck parking and also takes away a portion of an existing stormwater detention pond located at the southeast corner of the site.

Reduction of stormwater flow from the site needs to be maintained due to limited down stream capacity. Site revisions will include extending the existing detention pond to help make up for the portion lost by the City's taking.

Site revisions also include the filling, regrading and paving of the northerly portion of the tract that is not currently being utilized. A detention pond will be constructed at the east end of the new paved area with a controlled outlet to a storm drain to be constructed by NMDOT along with the roadway adjacent to the easterly side of the tract.

DRAINAGE COMPUTATIONS:

Drainage Area computations are attached hereto.



LARKIN GROUP NM INC.

CONSULTING ENGINEERS AND SURVEYORS

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e-mail: albmail@larkin-grp.com

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Client	FEDEX		
Job No.	2005-0001		
Job Title	Site Revisions		
Made By	JA		
Chkd. By			

FEDEX FREIGHT SITE REVISIONS

DRAINAGE COMPUTATIONS

DRAINAGE AREA No. 1 - ZONE 1

$$\text{Total Area} = 385' \times 440' = 169,400 \text{ ft}^2 = 3.89 \text{ Ae.}$$

$$\text{Surface Treatment C (Det. Pond)} = 160 \times 135 = 5600 = 0.13 \text{ Ae.}$$

$$\text{Surface Treatment D} = 169,400 - 5600 = 3.76 \text{ Ae}$$

$$\text{Runoff Rate (to pond)} = 4.37 \text{ cfs/Ae} \times 3.76 = 16.4 \text{ cfs}$$

Size Runoff to Pond

West Runoff is Existing -

North Runoff - Size for 65% of Area -

$$\text{Flow} = 65\% \times 16.4 \text{ cfs} = 10.6 \text{ cfs} \quad \text{Try 10' wide -}$$

$$\text{Weir Formula} = Q = CLH^{3/2} \quad C = 3.03, \underline{L = 10'} \quad H = 0.5'$$

$$Q = 3.03 \times 10.0' \times 0.5^{3/2} = 10.7 \text{ cfs} - \text{OK}$$

Runoff Volume - zone 1 - 6 Hour Storm

$$\text{Volume} = [0.99" \times 0.13 \text{ Ae} + 1.97" \times 3.76 \text{ Ae}] / 12 = 0.628 \text{ AF}$$

Pond Volume

$$\text{Btm. Area} = 21.5' \times 146.5' = 3150 \text{ ft}^2$$

$$\text{Top Area} = 31' \times 158' = 4898 \text{ ft}^2$$

$$\text{minus Carb return fillet} = \frac{21.5^2}{2} (21.5^2 \pi) 4 = 99.2 \times 4 = -397 \text{ ft}^2$$

$$\text{Fill to Carb Height} = 31 \times 158 \times 0.5' \text{ depth} = \frac{2449 \text{ ft}^3}{\text{Total}} = \frac{18,128}{= 0.416 \text{ AF}}$$



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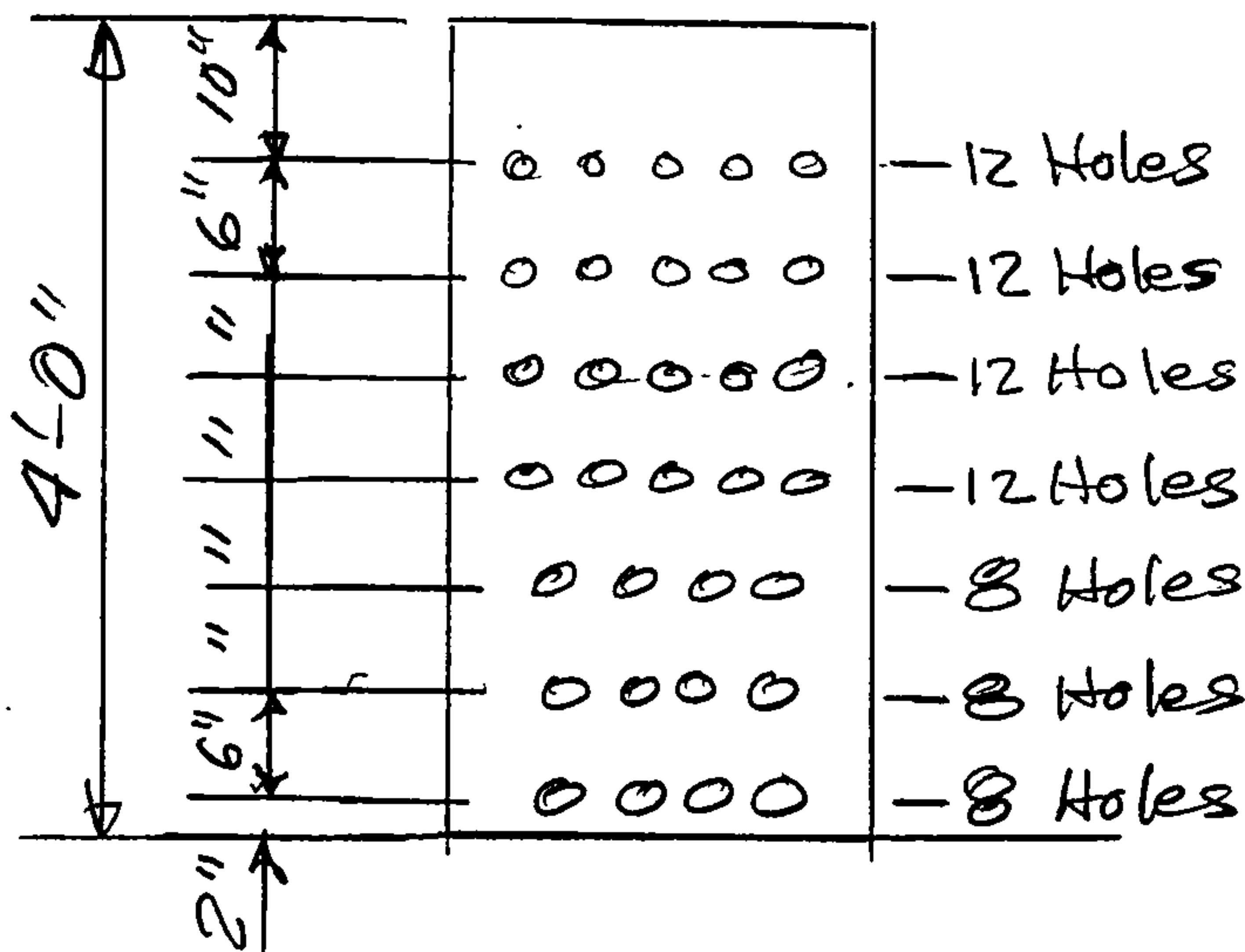
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Chkd. By			

Determine Volume of Outflow from pond during storm while pond is filling.

This outflow will reduce volume of storage required.

POND OUTFLOW

Use 18" Dia CMP riser w/ 1" Dia. drilled holes.



using Orifice Formula

$Q = CA\sqrt{2gh}$ determine flow @ water depth = 4.0'

<u>h</u>	<u>Area</u>	<u>Q-cfs</u>	
3.83	0.0436	0.4106	8 holes
3.33	0.0436	0.3829	
2.83	0.0436	0.3529	
2.33	0.06545	0.3203	12 holes
1.83	0.06545	0.4261	
1.33	0.06545	0.3632	
0.83	0.06545	0.2869	
Total -		2.5429	

Assume outflow is $\frac{1}{2}$ of above flow = 1.271 cfs for 2 hours while pond is filling.

$$1.271 \text{ cfs} \times 2 \text{ hrs} \times 3600 \text{ sec/hr} = 9151 \text{ ft}^3 = 0.210 \text{ AF}$$

there-for Pond Volume req'd = $0.628 - 0.210 = 0.418 \text{ AF}$
 Volume Provided = 0.416 AF
 $\approx \text{OK}$

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DRAINAGE AREA NO. 2

$$\text{Total Area} = 113 \times 390 = 44070 = 1.01 \text{ Ac.}$$

$$\text{Surface Treatment C} = 10 \times 101' + 10 \times 345 + 102 \times 45 = 0.208 \text{ Ac.}$$

$$\text{Surface Treatment D} = 103 \times 335 + 11 \times 440 = 0.802 \text{ Ac}$$

$$\text{Runoff Rate (to Pond)} = 4.37 \text{ cfs/Ac} \times 0.792 = 3.46 \text{ cfs}$$

Size Runoff to Pond - Try 4' wide -

$$\text{Weir formula } Q = CLH^{3/2} \quad C = 3.03, L = 4.0' \quad H = 0.50'$$

$$Q = (3.03)(4.0)(0.50)^{3/2} = 4.28 \text{ cfs} > 3.46 \text{ OK}$$

Runoff Volume. zone 1 6 Hour Storm

$$\text{Volume} = [0.99" \times 0.208 \text{ Ac} + 1.97" \times 0.802 \text{ Ac}] / 12 = 0.149 \text{ AF}$$

Pond Volume

$$\text{Btm. Area} = 25 \times 81 = 2025 \text{ ft}^2$$

$$\text{Top Area} = 37 \times 93 = 3441 \text{ ft}^2 \quad \text{Avg: } 2733 \times 2.0' \text{ deep} = 5466 \text{ ft}^3$$

Back up on paving to elev. 96.0

$$110' \times 62' / 2 \times 0.50' \text{ deep} / 2 = \frac{852}{\text{Total}} = 6318 \text{ ft}^3$$

$$= 0.145 \text{ AF}$$

$$0.149 \text{ AF} \approx 0.145 \text{ AF} - \text{OK}$$



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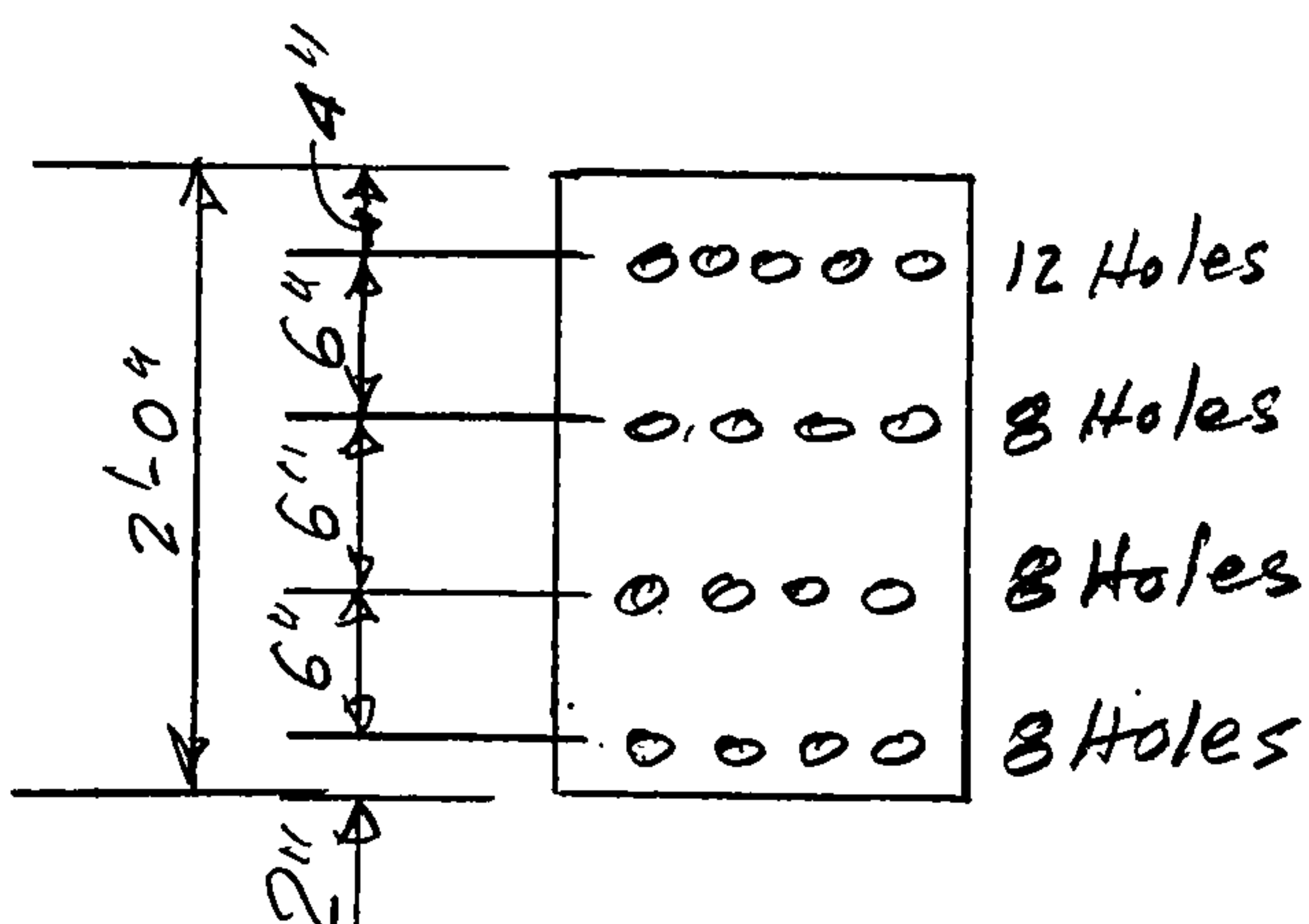
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POND OUTFLOW

Use 18" Dia CMP riser w/ 1" Dia drilled holes



Orifice Formula - $Q = CA\sqrt{2gh}$
 flow @ water depth - 2.0 ft'

<u>h</u>	<u>Area</u>	<u>Q-cfs</u>
1.83	0.0436	0.2838
1.33	0.0436	0.2420
0.83	0.0436	0.1915
0.33	0.06545	0.1890

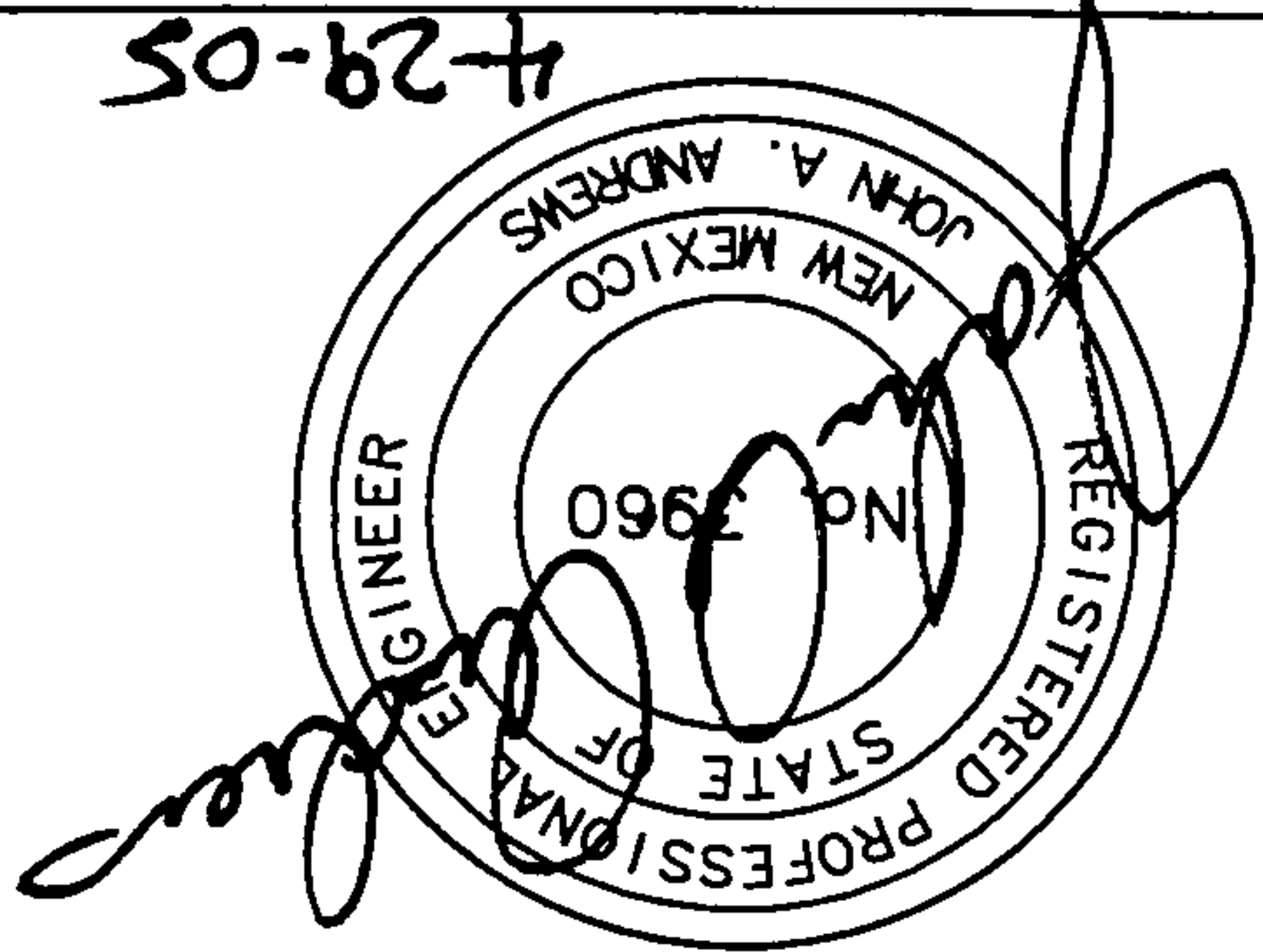
Total 0.8982 cfs.

Discharge from detention pond-

Peak rate = 0.8982 ≈ 0.90 cfs. OK

Peak rate allowed- Per NMDOT = 1.4 cfs.

DRAINAGE PLAN
 ALBUQUERQUE SERVICE CENTER
 SITE REVISIONS
 FEDEX FREIGHT



LEGAL DESCRIPTION
 LOT 263-C, PLAT OF LOTS 263-A, 263-B, &
 63-C, TOWN OF ATRISCO GRANT, UNIT 8,
 FILED MAY 17, 1995, VOL. 95C, FOLIO 180

NOTE
 SEE GRADING PLAN FOR ADDITIONAL DETAILS

SCALE: 1"=1000'±
 ZONE ATLAS MAP H-11 & J-11

VICINITY MAP

