Piedmont Development Company

April 15, 1987

Mr. Hank Van Dyke
CITY OF AGOURA HILLS
30101 Agoura Road, Suite 102
Agoura Hills, CA 91301

RE: Final Soils Report: Off-Site Sewer
Final Soils Report: Off-Site Fill

Dear Mr. Van Dyke:

Enclosed with this letter are two copies each of the Final Soils Reports for the above referenced areas.

These are for your review, comments and files.

As always, if you have any questions, please do not hesitate to contact me.

Sincerely,

RANDY P. McGRANE
Project Director

Enclosures

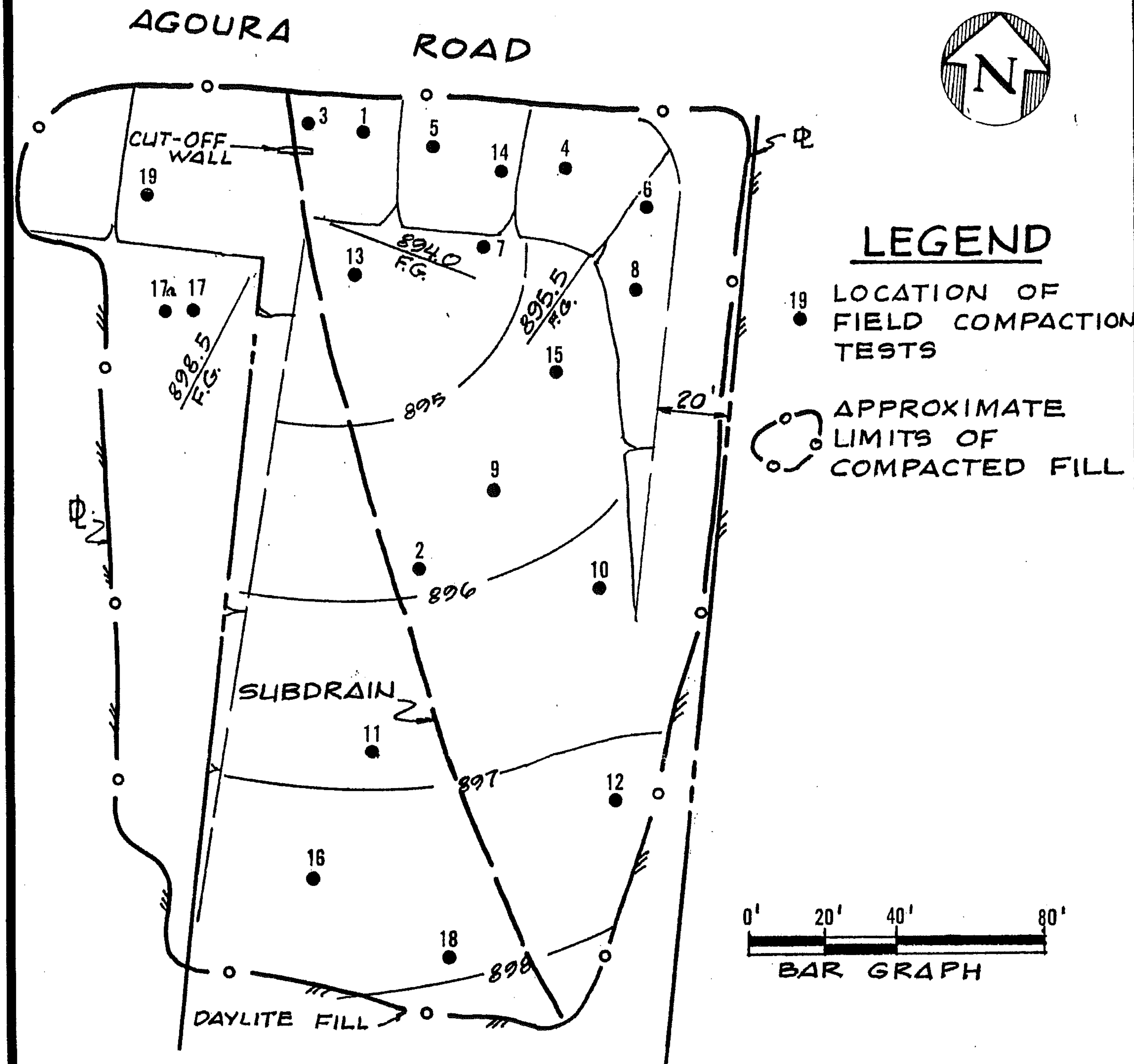
cc: Behrouz Soroudi
Rene Folse/Miller & Folse

RMG:sem

1336 5Th Street, Santa Monica, CA 90401, (213) 451-1655

LOCATION MAP
FOR
OFFSITE FILL TRACT 40477

CITY OF AGOURA HILLS
CALIF.



SOIL AND FOUNDATION ENGINEERS — GORIAN AND ASSOCIATES, Inc. — APPLIED EARTH SCIENCES

JOB NUMBER: 1069-1-21		DATE: 3-28-87	
SCALE:	APPROVED BY:	DRAWN BY: MAF	LOG NO:

COUNTY OF LOS ANGELES
DEPARTMENT OF PUBLIC WORKS
BUILDING AND SAFETY DIVISION

ENGINEERED GRADING
CONSULTANT STATEMENT

Job Address or Tract No. Tract 40477 Locality Agoura Hills Permit No. ______

Owner Piedmont Development Contractor ______

☐ ROUGH GRADING

☐ BY FIELD ENGINEER

Based upon observations, rough grading of the lots listed below has been completed in conformance with plans therefor marked "APPROVED" by the County, and Building Code Chapter 70. The Work includes but is not limited to the following: grading to approximate final elevations; staking of property lines; location and gradient of cut and fill slopes; location, cross-sectional configuration and flow-line gradient of drainage swales and terraces (graded ready for paving); berms installed where indicated; and required drainage slopes provided on building pads.

LOT NOS. ______

As-built plans have been prepared
Latest Plan revision date ______.

Remarks: ______

Engineer ______ (Signature) Reg. No. ______ Date ______

XX BY SOIL ENGINEER

Based upon tests and observations, the earth fills placed on the following lots were installed upon properly prepared base material and compacted in compliance with requirements of Building Code Section 7016. Fill slope surfaces have been compacted and buttress fills or similar stabilization measures have been installed in accordance with my recommendations as approved by the Building Official. Sub-drains have been provided where required and locations of said sub-drains are shown on plans dated ______.

LOT NOS. ______

See report dated 3-28-87 for compaction test data and procedure, recommended allowable soil bearing values and other special recommendations.

EXPANSIVE SOILS (YES) (XX) LOT NOS. Off-Site Fill

BUTTRESS FILLS (XXS) (NO) LOT NOS. Off-Site Fill

Remarks: ______

Engineer [signature] (Signature) Reg. No. RCE 31472 Date 3-30-87

No. 31472

TABLE I

RESULTS OF COMPACTION TESTS

W.O. 1069-1-21 .... NAME PIEDMONT-OFFSITE GRADING-TRACT 40477 ...... REPORT DATE..........

TEST NO.	DATE	ELEVATION	MOISTURE CONTENT (%)	UNIT DRY DENSITY (LBS./CU.FT.)	RELATIVE COMPACTION (%)	SOIL TYPE	
1	3-4-86	875.0	28.0	96.7	91	I	
2	3-4-86	891.0	27.7	97.4	91	I	
3	4-1-86	877.0	24.0	98.5	90	II	
4	4-2-86	878.0	30.1	94.5	90	III	
5	4-3-86	880.0	29.0	94.9	90	III	
6	4-4-86	882.0	27.8	96.8	92	III	
7	4-10-86	884.0	14.2	115.3	95	IV	
8	4-10-86	886.0	16.5	109.8	91	IV	
9	4-10-86	888.0	16.2	111.7	92	IV	
10	4-11-86	890.0	26.5	98.5	93	III	
11	4-11-86	893.0	16.1	110.2	91	IV	
12	4-11-86	894.0	15.8	111.1	92	IV	
13	4-14-86	891.0	30.1	90.3	90	V	
14	4-15-86	887.0	25.5	97.1	91	I	
15	4-16-86	895.0	16.1	110.7	91	IV	
16	4-16-86	893.0	16.1	107.2	91	VI	
17	4-16-86	897.5	22.1	103.2	87*	VI	
17A	4-16-86	897.5	19.0	106.7	90	VI	
18	4-16-86	897.0	22.5	91.0	91	V	
19	4-22-86	894.0	21.0	101.0	95	I	

* INDICATES COMPACTION TEST RESULT BELOW THE MINIMUM COMPACTION REQUIREMENTS.
A INDICATES RETEST OF FAILING AREA AFTER BEING REWORKED.

GORIAN AND ASSOCIATES, Inc.

GORIAN AND ASSOCIATES, Inc.
Soil and Foundation Engineers
Applied Earth Sciences

March 28, 1987

Piedmont Development Company
1336 Fifth Street
Santa Monica, California 90401

Work Order: 1069-1-21
Log Number: 11447

Attention: Mr. Randy McGrane

Subject: Rough Grading Compaction Test Report for Off-Site Fill Adjacent to Northeast Corner of Tract 40477, City of Agoura Hills, California.

Gentlemen:

This report summarizes the results of compaction tests and inspections conducted during the grading operations for the referenced subject. Compaction test locations are shown on the attached Location Map with test results summarized on the enclosed Table I.

SITE PREPARATION

Prior to construction of the fill slope along Agoura Road, an equipment width keyway was established at the proposed toe and founded in firm native ground. The upper 12" of native ground in the keyway and other areas to receive fill was scarified, watered to near the optimum moisture content and recompacted to a minimum of 90% relative compaction.

Subdrains

A subdrain was installed in the natural drainage course as previously recommended. The location of the subdrain is shown on the attached

766 Lakefield Road, Suite A, Westlake Village, Calif. 91361
(805) 497-9363 (805) 987-0821 (818) 889-2137

Location Map. The subdrain consists of 9 cubic feet of gravel per lineal foot of drain wrapped in filter cloth. A concrete cut off wall was constructed adjacent to the unperforated outlet pipe near the toe of slope. Discharge of subdrain will be into a storm drain that will be constructed at a future date.

Grading Operations

Based on our compaction tests and inspections fill soils were cleansed of any debris or significant vegetation, watered to near the optimum moisture content, placed in 4 to 6 inch thick lifts and compacted to a minimum of 90% relative compaction. All fills were benched as necessary into bedrock of firm native ground as the fills progressed. The resulting fill slope face was sheepsfooted and grid rolled.

COMPACTION TESTING

Compaction tests and inspections were conducted during the grading operations in accordance with the County of Los Angeles requirements. Density determinations were accomplished by conducting at least one sand cone test in accordance with the ASTM D 1556 for every five nuclear gauge tests in accordance with the ASTM D 2922. Locations of compaction tests are shown on the attached Location Map with the results summarized on the attached Table I.

LABORATORY TESTING

Maximum Density-Optimum Moisture Curves

A maximum density-optimum moisture curve was established for each significant soil type encountered in accordance with the ASTM D 1557 (the five layer method). The results of our tests are as follows:

Soil Type	Visual Soil Classification	Maximum Dry Density-pcf	Optimum Moisture Content-%
I	Brown clayey silt and sand with rock fragments	106.0	20.5
II	Dark brown very clayey sand with rock fragments	109.5	18.0
III	Dark brown silty clay	105.0	22.5
IV	Grey clayey sand with rock fragments	121.0	13.0
V	Light brown clayey fine to medium sand with rock fragments	100.0	24.5
VI	Yellow brown clayey sand with rock fragments	118.0	15.0

CONCLUSIONS AND RECOMMENDATIONS

1. Based on the results of our tests and inspections, fills placed within the limits and elevations shown on the attached Location Map were compacted to at least 90% relative compaction.

2. Drainage

   Positive drainage should be provided away from the top of slope and towards the street. Also, water should not be allowed to pond on the pad area.

3. Slope Maintenance

   The fill slope should be planted with a dense, deep rooting groundcover and possibly shrubs or trees. A reliable irrigation system should be installed, adjusted so that overwatering does not occur. Overwatering of the slope can cause erosion and must be avoided. The future integrity of the slope face will depend on proper drainage and slope maintenance as discussed above.

Work Order: 1069-1-21
Log Number: 11447

Please call if you have any questions.

Respectfully,

Gorian and Associates, Inc.

By: Lynn McKnerney

By: Jerome J. Blunck
RCE 31472

REGISTERED PROFESSIONAL ENGINEER
JEROME JON BLUNCK
No. 31472
Exp. 12/31/88
CIVIL
STATE OF CALIFORNIA

Attachments: Table I
Location Map
Certification

Distribution: Addressee (4)

LM/JJB/ dw

GORIAN AND ASSOCIATES, Inc.

Appendix G

Hydrology and Drainage Study

07-CUP-009
07-OTP-012
(GUPTA)

Hydrology and Drainage Study
for
Dr. Vinod K. Gupta
31225 La Baya Drive
Westlake Village, CA 91362
Project No. 07 CUP-009

October 16, 2007

The existing site is in the City of Agoura Hills, Los Angeles County, CA on approximately 1.6 Acres bordering Agoura Road, where a two story office building is planned. It is known as APN No. 2061-033-015.

The watershed area to and through this existing property consists of soil that is mostly broken rock outcroppings and mountain chaparral in weathered decomposed rock, with low sparse vegetation except for some areas of dense scrub oak and other larger trees.

This site, therefore, is being designed for the Urban Flood level of Protection, which is the runoff from a 25-year frequency design storm falling on a saturated watershed as it affects the City.

In the Los Angeles County 1991 Hydrology Manual, the site is located on Hydrologic Map 1-H1-24, the soil classification area at the site is 028, Debris Potential Area Zone DPA-7, Zone "L", and the 50 yr. isohyet is in the 8" max. 24 hour amount.

The high point of the undeveloped watershed above this site is at Elevation 1220.
The low point of the undeveloped watershed is at Elevation 876 at Agoura Road.
The longest drainage path for this watershed is 1230 feet.
The average slope for this watershed = 1220 – 876 = 0.28 ft. per ft.

The time of concentration for the undeveloped and developed site for a 50 year. or 10 year storm is assumed as, T_c = 4.0 min. approx. per the following analysis:
Sub Area 1A (blue) per attached map = 3.4 acres; L = 630 ft.; slope = (1220 – 960) / 630 = 0.41 ft./ft.
Assume the undeveloped runoff coeff. = C_u = 0.670, and the imperviousness, Imp = 0.60
Assume also that the time of concentration = T_c = 4 minutes.
Then, C_d = (0.9)(Imp) + (1.0 -- Imp)(C_u) = Developed runoff coefficient, where
C_u = Undeveloped runoff coefficient, for Soil Type No. 028. (See chart D-47, dated Dec.1990)

Considering the Undeveloped Site and its Watershed: (See the Hydrology colored Area Plan)
Assume a T_c for the Area, and Calculate the T_c within ½ minute. from the following information and formula for the sub-Area involved:

$$C_d = (0.9)(0.60) + (1.0 - 0.60)(0.67) = 0.54 + 0.208 = 0.808 = C_d$$
$$I_t = (I_{1440})(1440 / T_c)^{0.47} = I_t = (8/24)(1440 / T_c)^{0.47} = \text{xxxx in./hr.}$$
$$\text{Assume } T_c = 4 \text{ min.: } I_t = (8/24)(1440 / 4)^{0.47} = 5.29 \text{ in./hr.}$$
$$T_c = (0.31)(L^{0.483}) / [(C_d)(I_t)]^{0.519}](\text{slope})^{0.135} = (6.97) / [(0.808)(5.29)]^{0.519} (0.887) = 3.70 =< 4.0$$

Therefore, for Sub Area 1A (blue), the following is determined:
A = 3.4 Ac. ; Imp. = 0.60 ; L = 630 ft. ; s = 0.41 ft./ft. ; C_u = 0.67 ; C_d = 0.808
Assume T_c = 4 min. ; I_t = 5.29 in./hr. ; T_c calc'd = 3.70 min. =< 4.0 min. OK

Considering the Undeveloped Site and Its Watershed: (continued)

Sub Area 2A (pink) : A = 1.4 acres; Imp. = 0.60 ; L = 700 ft. ; s = 267/700 = 0.37 ft./ft.
T_c = 4 min. ; I_t = 5.29 in./hr. ; C_d = 0.808 ; C_u = 0.67 ; T_c calc'd = 3.90 min =< 4.0 min.

Sub Area 6B (green) : A = 2.89 acre; Imp. = 0.60 ; L = 650 ft. ; s = 260/650 = 0.31 ft./ft.
T_c = 4 min.; I_t = 5.29 in./hr. ; C_d = 0.808 ; C_u = 0.67 ; T_c calc'd = 3.90 min. =< 4.0 min.

Sub Area 9C (orange) : A = 1.51 acres; Imp. = 0.60; L = 350 ft.; s = 100/350 = 0.28 ft./ft.
T_c = 2.5 min.; I_t = 6.61 in./hr.; C_d = 0.808; C_u = 0.67; T_c calc'd = 2.61 min.=> 2.5 min.

Sub Area 4A (yellow) : A = 1.6 acres ; Imp. = 0.60 ; L = 520 ft. ; s = 80/520 = 0.15 ft./ft/
T_c = 4 min. ; I_t = 5.29 in/hr.; C_d = 0.808 ; C_u = 0.67 ; T_c calc'd = 3.84 min. = < 4.0 min.

Summary:

The peak Intensity for a 10 yr. frequency = (0.714)(50 yr. frequency) = (0.714)(Q_{50})
" " " " " 25 yr. " = (0.878)(50 yr. frequency) = (0.878)(Q_{50})
" " " " " 50 yr. " = (1.000)(50 yr. frequency) = (1.00) (Q_{50})
" " " " " 100 yr. " = (1.122)(50 yr. frequency) = (1.122)(Q_{50})

Area 1A (blue) : Q_{50} = CiA = (C_d)(I_t)(A) = (0.808)(5.29)(3.4) = **14.53 cfs. @ Point 3A**

Area 2A (pink) : Q_{50} = (0.808)(5.29)(1.4) = **5.98 cfs. @ Point 3A**

Area 6B (green) : Q_{50} = (0.808)(5.29)(2.89) = **12.35 cfs. @ Point 8B**

Area 9C (orange) : Q_{50} = (0.808)(6.61)(1.51) = **8.06 cfs. @ Point 10BC and Point 11BC**

Area 4A (yellow) : Q_{50} = (0.808)(5.29)(1.6) = **6.84 cfs. @ Point 5A**

In summary:

Q_{50} @ Point 3A = 14.53 + 5.98 = 20.51 cfs.
Q_{10} @ Point 3A = (0.714)(20.51 = 14.64 cfs. Use for culvert entrance design.

Q_{50} @ Point 8B = 12.35 cfs
Q_{10} @ Point 8B = (0.714)(12.35) = 8.82 cfs. Use for roadway design.

Q_{50} @ Point 10BC = 8.06 + 12.35 = 20.41 cfs.
Q_{10} @ Point 10BC = (0.714)(20.41) = 14.57 cfs. Use for roadway design.

Q_{50} @ Point 5A = 20.51 + 6.84 = 27.35 cfs.
Q_{10} @ Point 5A = (0.714)(27.35) = 19.53 cfs. Use for road catch basin design.

Q_{50} @ Point 11BC = 20.41 cfs.
Q_{10} @ Point 11BC = (0.714)(20.41) = 14.57 cfs. Use for road catch basin design.

Considering the Improved Developed Site:

For the improved developed Area 4A (yellow) : Acres = 1.6 Ac. Total
Of the 1.6 acres, approx. 0.714 Acres are hard surfaces.
" " 1.6 " " 1.6 – 0.714 Acres = 0.886 acres are green or planted surfaces.

The amount of offsite runoff + onsite runoff of unimproved area reaching Point 3A is as follows: Area 1A (blue) = 14.53 cfs. + Area 3A (pink) = 5.98 cfs. + unimproved area of Area 4A (yellow) = 1.97cfs. = Q_{50} = **22.48 cfs., Total Q_{10} = (0.714)(22.48) = 16.05 cfs. = Q_{10} Total** Calculation for runoff to Point 3A from unimproved (yellow) Area 4A = (160 +90)(160)/2 = 20000/43560 = 0.46 acres. Q_{50} = (0.808)(5.29)(0.46) = 1.97 cfs.

This runoff to Point 3A will be carried through velocity reducing rip rap to the inlet of a 24" dia. PVC pipe that will carry it to a storm sewer in Agoura Road. See attached plan, and details..

The inlet size of this pipe is determined as follows: Q_{10} = **16.05 cfs. Capacity of the 24" Dia. pipe is approx. 18.0 cfs. per the attached chart with a 36 " high headwall at the inlet. Use wing walls on either side of the inlet and over the top of the pipe to allow for a 3 " head on the pipe flowing full with a basin at the inlet. The slope of this pipe = (913 – 870) / 400 = 10.75% . The velocity is approx. 7.0 fps, and the pipe will not be flowing full.**

The outlet size of this pipe is determined as follows:
At Point 5A the accumulated runoff, Q_{10} = (14.53 + 5.98 + 6.84)(0.714) = 19.53 cfs.
The slope of this proposed pipe = (913 – 870)/400 = 10.75 % = 0.1075 ft./ft.
Assume a 24 in. dia. ADS Corrugated Polythene Pipe: n = 0.020
Use: 24" dia. VCP, At the point of discharge at Agoura Road, it will have a 0.6 ft. of head, flowing full, and it will have a capacity of approx. 22 cfs. (See the attached Chart).
Q_{10} capacity, flowing full, with 0.6 ft. head = 22.0 cfs. => 19.53 cfs required. OK

Consider the Onsite Developed Drainage System:

At Point 1D: Catch Basin:
Contributing Area = 0.26 Ac.; C_d = 0.90 for mostly hard surfaces ; I_t = 5.29 in/hr
Q_{50} = C I A = (0.90)(5.29)(0.26) = 1.24 cfs. to the Catch Basin ;
Q_{10} = (0.714)(1.24) = 0.88 cfs. With 3" of head over top of pipe in a Catch Basin,
$Q_{capacity}$ = 1.5 cfs. => 0.88 cfs. required.
Use: 8" dia. pipe @ 2% slope to 18" Storm Drain See attached chart. OK

At Point 2D: Catch Basin:
Contributing area = 0.12 Ac.; C_d = 0.90 ; I_t = 5.29 in./hr.
Q_{50} = CIA = (0.90)(5.29)(0.12) = 0.57 cfs. runoff to a Catch Basin.
Q_{10} = (0.714)(0.57) = 0.41 cfs. With 3" of head over top of pipe in a Catch Basin,
$Q_{capacity}$ = 1.5 cfs. => 0.41 cfs. required
Use: 8" dia. pipe @ 2% slope to an 8" dia. pipe directed to be discharged into the 8" dia. PVC drain pipe from Point 1D after combining with runoff from Point 2D
Runoff from Point 1D = 0.88 cfs in an 8" dia. PVC pipe
Runoff from Point 2D = 0.41 cfs in an 8" dia. PVC pipe.
Total runoff from Point 1D + Point 2D = 0.88 + 0.41 = 1.29 cfs combined =< 1.5 cfs. capacity in the 8" dia. pipe from Point 1D to the 24" dia. Storm Sewer. OK

At Point 3D: Catch Basin:
Contributing Area = 0.04 Acres; C_d = 0.90; I_t = 5.29 in./hr.; Use: 8" dia. to a 8" dia. PVC
Q_{50} = CIA = (0.90)(5.29)(0.04) = 0.19 cfs. runoff
Q_{10} = (0.714)(0.19) = 0.14 cfs.
Use: 8" dia. PVC pipe @ 2% : Very oversized by inspection from previous analysis. OK

Summary of Runoff from Points 1D, 2D, & 3D = 0.88 + 0.41 + 0.14 cfs = 1.43 cfs.

At Point 4D: Catch Basin from grass area:
Contributing Area = 0.05 Acres; C_d = 0.40; I_t =5.29 in./hr. Q_{50} = $C_d I_t A$
Q_{50} = CIA = (0.40)(5.29)(0.05) = 0.11 cfs runoff.
Q_{10} = (0.714)(0.11) = 0.08 cfs.
Use: 8" dia. PVC to 8" dia. PVC from Catch Basin at Point 1D to 24" dia. Storm Drain

Check capacity of 8" dia. drain from CB at Point 1D to the 24" dia. PVC Storm Drain:
Summary of Runoff: Point 1D + 2D +3D +4D = 0.88 + 0.41 + 0.14 + 0.08 = 1.51 cfs. total
Intercept this drainage in a 24" x 24" Catch Basin #1 which will have a filter insert as analyzed later herewith, under the title "Filter Requirement of Storm Water Runoff."

Connect this Catch Basin #1 with a 10" dia. PVC drain to an underground system of detention chambers. Provide a 10" dia. PVC overflow above the level of the chambers from Catch Basin #1 to the 24" dia. PVC Storm Drain.

Determine the amount of Detention Capacity Required on Site:
The amount of storm water runoff to be detained on the site is the difference between the amount of runoff from a 100 yr. storm event and a 10 yr. storm event. C_d = 0.808 for the developed site.
The Q_{100} storm intensity is 1.122 times as much as a Q_{50} storm = (1.122)(5.29) = 5.92 in./hr.
The Q_{10} storm intensity is 0.714 times as much as a Q_{50} storm = (0.714)(5.29) = 3.78 in./hr.

The Q_{100} for the developed Area 1A = Q_{100} = C I A = (0.808)(5.92)(1.6) = 7.65 cfs.
The Q_{10} for the developed Area 1A = Q_{10} = C I A = (0.808)(3.78)(1.6) = 4.75 cfs
The difference between Q 100 and Q_{10} = (7.65 -- 4.75) = 2.9 cfs.
For a 4 minute storm, this amounts to (4)(60)(2.9) = 696 cf. to be detained during the storm.

Using Infiltrator Systems, Inc., or equal, chambers (see attached brochures). One chamber has 16.3 cu. ft. of storage capacity. 696 / 16.3 = 43 chambers required. These would take up (6.25)(43) = 269 lin. ft. of underground space approx. 4 ft. wide. The runoff from catch basin Points 1D, 2D, 3D, and 4D, will be intercepted at **Catch Basin #1, and directed to the Underground Detention Chamber System by a 10 " dia. PVC pipe. The overflow from this Catch Basin #1, will be a 10 " dia. PVC pipe at a 2% slope to the 24" dia. PVC Storm Drain Pipe to Agoura Road.**

Filter Requirement of Storm Water Runoff:
The amount of storm water runoff to be filtered before being discharged = 10% of the runoff from a Q_{50} storm event = (0.10) C_d I A = (0.10)(0.808)(5.29)(1.6) = 0.684 cfs.
For a 4 minute storm, this amounts to filtering: (4)(60)(0.684) = 164 cu. ft. of runoff.
This will be accomplished at **Catch Basin #1,** a filtering 24" x 24" catch basin, before being discharged through a 10"dia. PVC pipe to the 24 " dia. storm drain to Agoura Road.

Catch Basin #1 will receive runoff from Points 1D, 2D, 3D, and 4D = 1.51 cfs. => 0.684 cfs., or approx. 164 cu. ft. of runoff. Actually most of the runoff for any storm will be filtered in this Catch Basin #1.

To filter the runoff use: DrainPac Storm Drain Filter Insert, or equal, in Catch Basin #1
or Storm-PURE, Catch Basin Filter Insert, or equal. (see attached brochures)

Down Spouts from roof drains can be connected to the underground drainage system, at any place, since all of the underground drainage pipes have more than adequate capacity to handle the roof drain runoff in addition to the surface area runoff, as determined.

REGISTERED PROFESSIONAL ENGINEER
JOHN E. TRACY
No. 15566
Exp. 6-30-09
CIVIL
STATE OF CALIFORNIA

This study is prepared and submitted by:

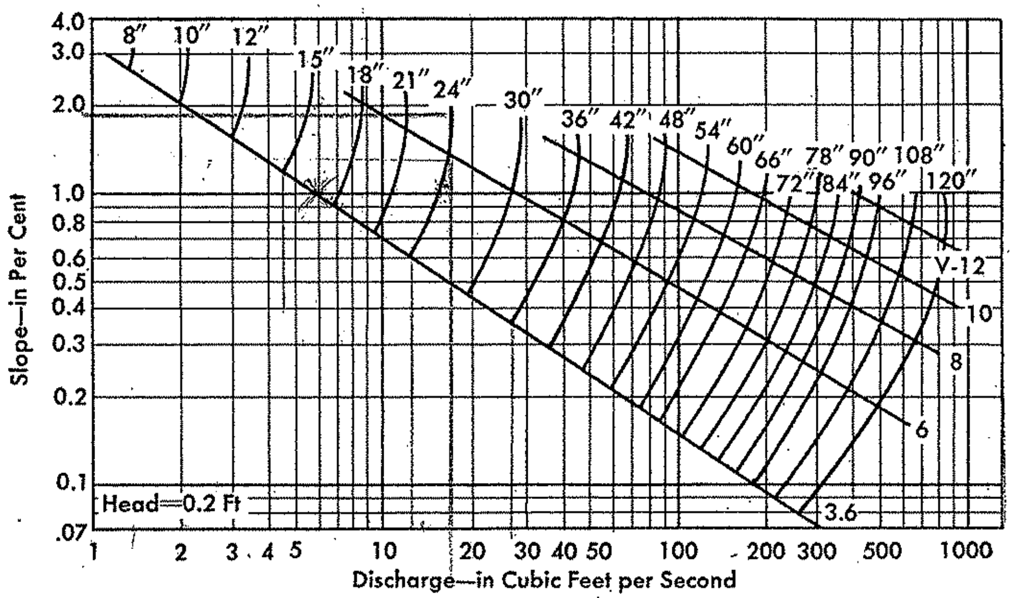
CVE Engineering, Inc.
P.O. Box 7208
Thousand Oaks, CA. 91360
Phone : 805-496-2282

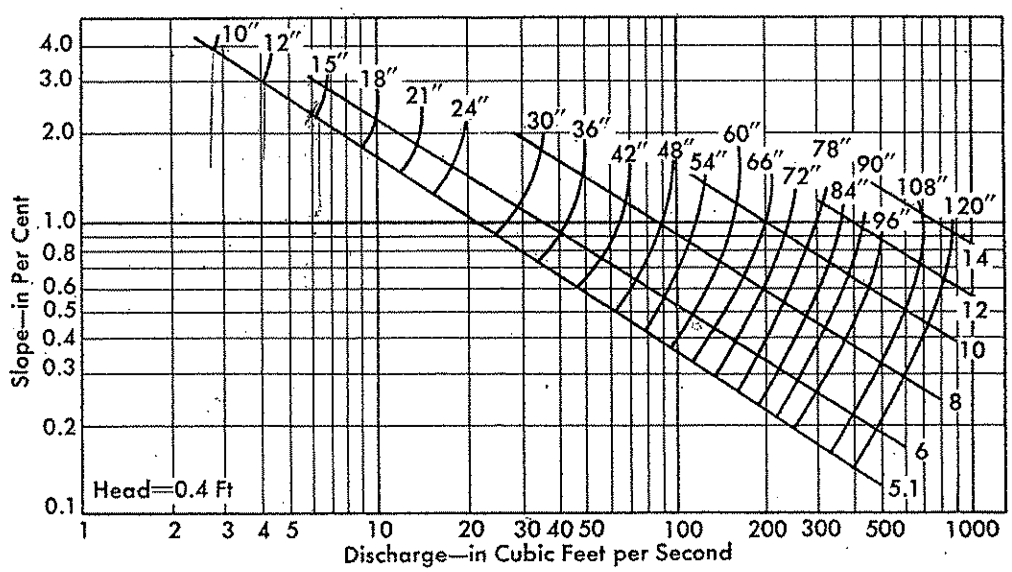
Prepared by:
John E. Tracy, RCE # 15566

Signature — Date: Oct. 16, 2007

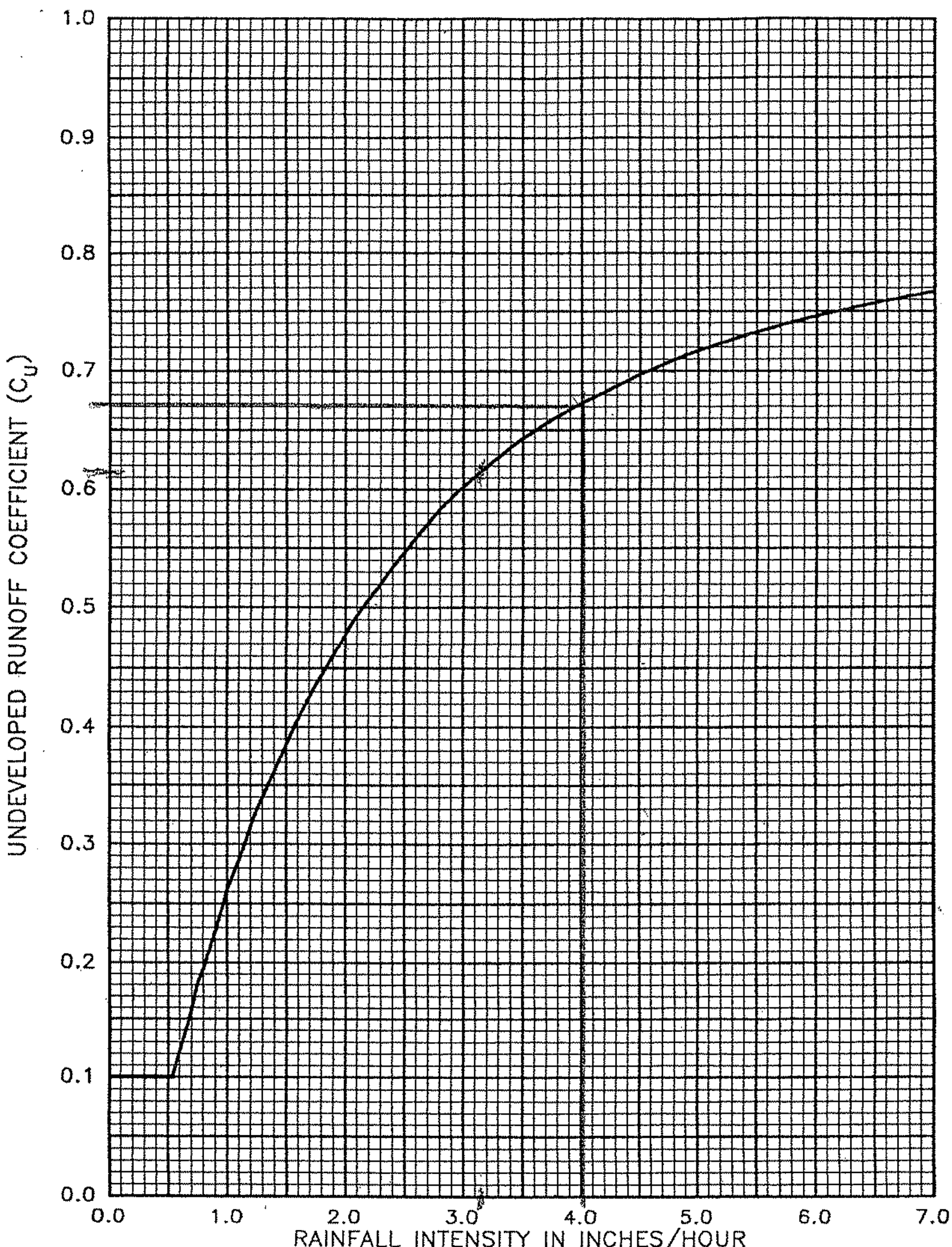
CAPACITY-VELOCITY CURVES
For Pipe on Various Slopes—Outlets Unsubmerged
Computed by Manning's Formula for $n=.021$

Note: Upper limit of curves is critical slope, beyond which discharge is constant.
Lower limit of curves is slope below which pipe flows full.
Number at top of each curve represents diameter in inches.
Numbers on straight lines represent approximate velocities in feet per second.





Figs. 132–133. Curves showing capacity and velocity for various slopes—outlets unsubmerged. For heads of 0.2 and 0.4 ft.



Equation:

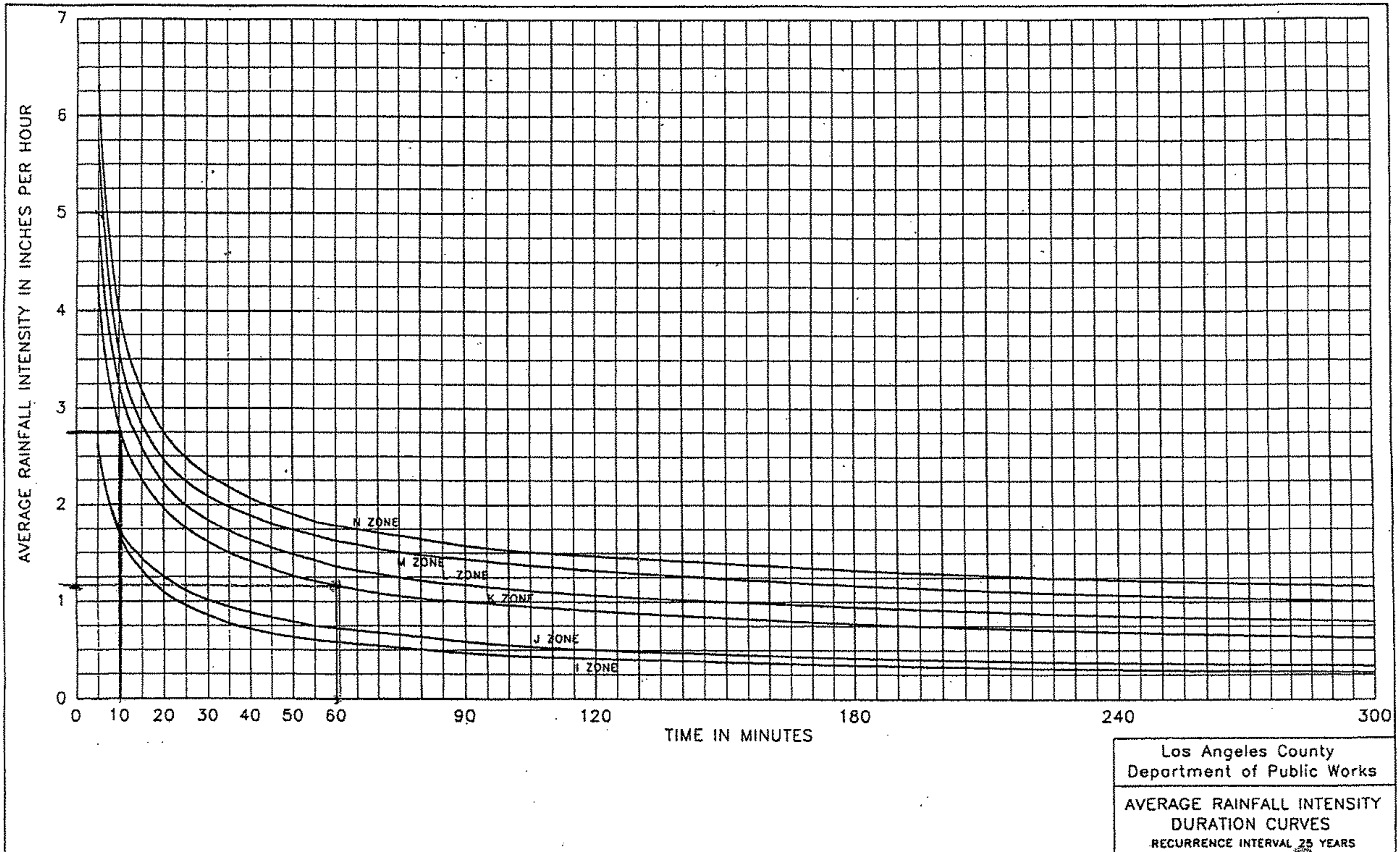
$$C_D = (0.9 * IMP) + (1.0 - IMP)\ C_U$$

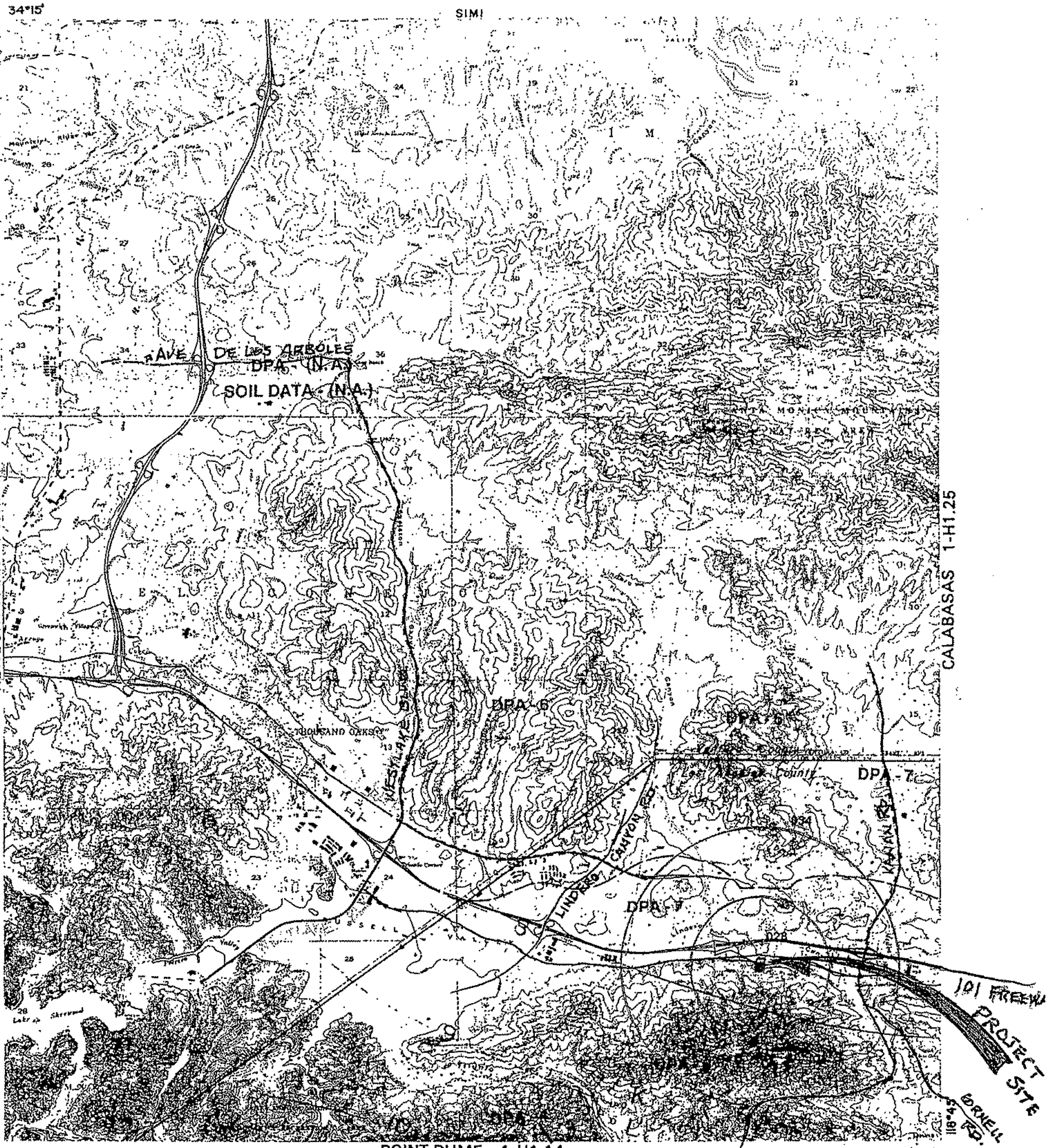
Where:
C_D = Developed runoff coefficient.
IMP = Proportion impervious.
C_U = Undeveloped runoff coefficient.

Los Angeles County
Department of Public Works

RUNOFF COEFFICIENT CURVE

SOIL TYPE NO. 028


7
6
5
4
3
2
1
0
AVERAGE RAINFALL INTENSITY IN INCHES PER HOUR
0
10
20
30
40
50
60
90
120
180
240
300
TIME IN MINUTES
N ZONE
M ZONE
L ZONE
K ZONE
J ZONE
I ZONE
Los Angeles County
Department of Public Works
AVERAGE RAINFALL INTENSITY
DURATION CURVES
RECURRENCE INTERVAL 25 YEARS



LEGEND

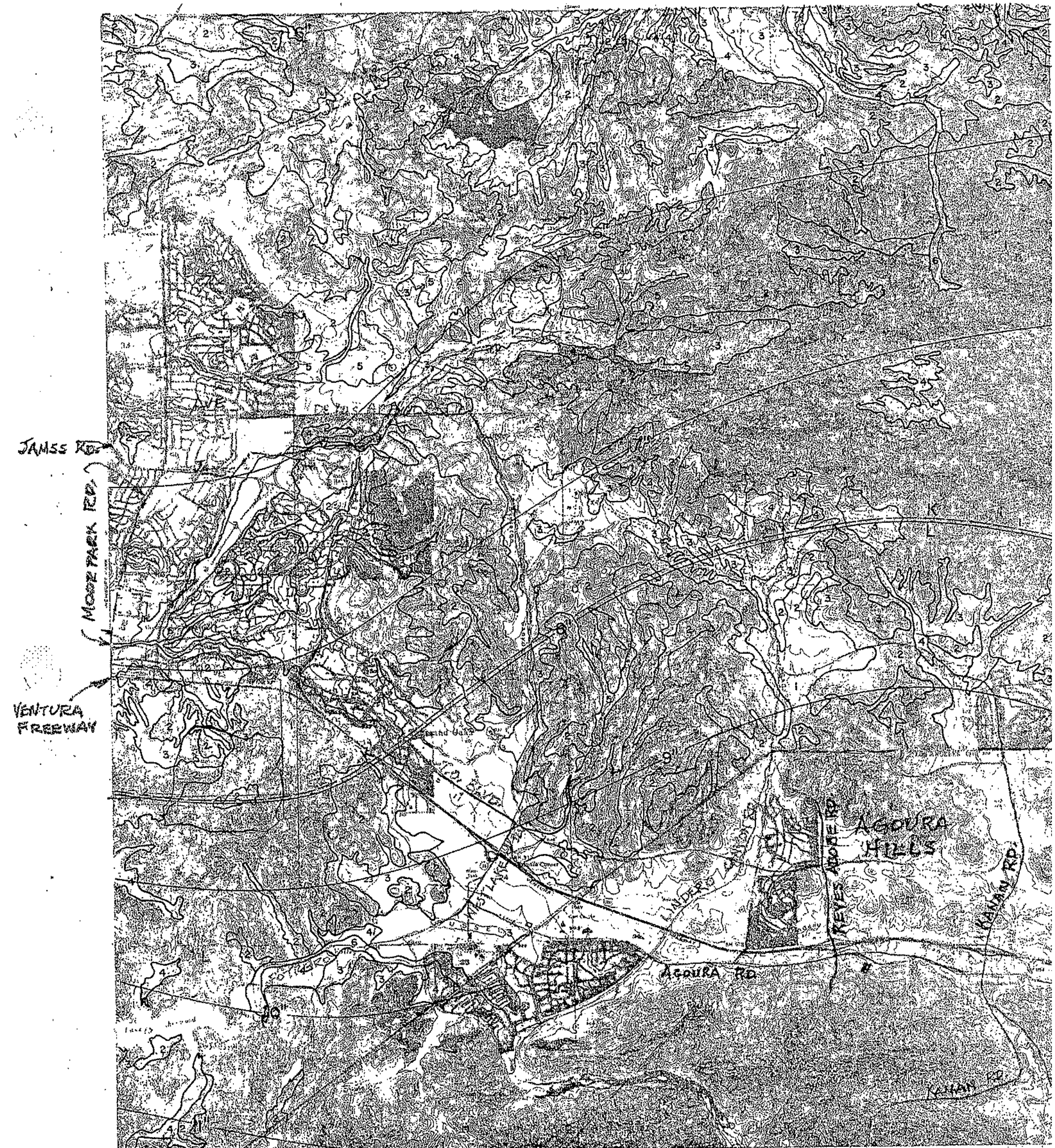
— — — SOIL CLASSIFICATION AREA
·········· DEBRIS POTENTIAL AREA
RAINFALL ZONE
—12— 50YR. ISOHYET

LACDPW

THOUSAND OAKS 1981

hydrologic map

0 FEET 5000



LEGEND

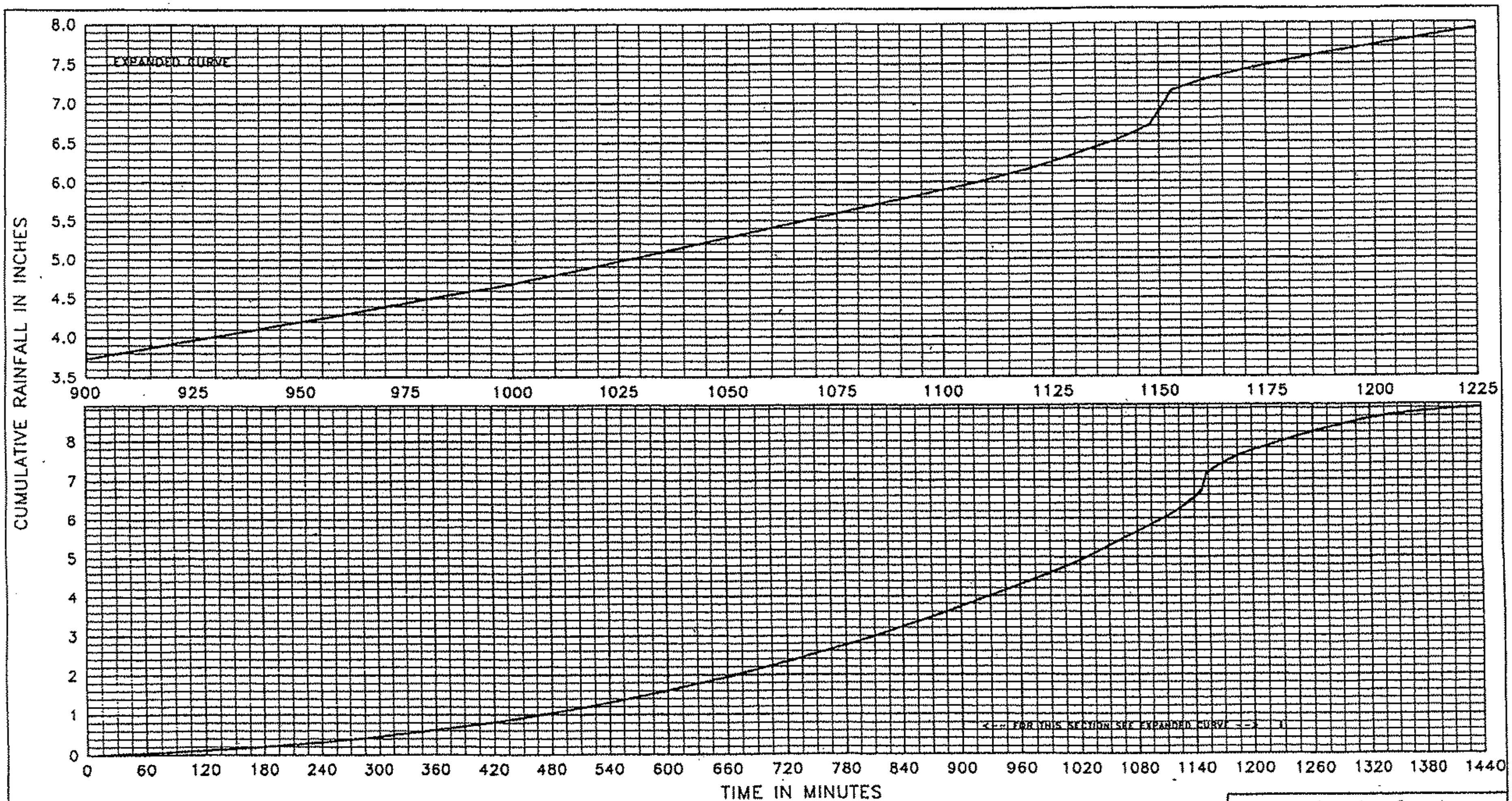
1000 0 1000 2000
SCALE IN FEET

5 SOIL NUMBER
—— SOIL TYPE BOUNDARY
------ RAINFALL ZONE
—— 50-YEAR, 24-HOUR ISOHYET

HYDROLOGIC MAP THOUSAND OAKS

1967

B



Los Angeles County
Department of Public Works

RAINFALL MASS CURVE
L ZONE–25 YEAR FREQUENCY

TABLE 26-2 CAPACITY OF CULVERTS WITH *FREE* OUTLET WITH WATER SURFACE AT INLET SAME ELEVATION AS TOP OF PIPE, AND OUTLET UNSUBMERGED

Values are in cubic feet per second. $n=.021$*

Slope in Per Cent	*Diameter of Pipe, in Inches*																				
	8	*10*	*12*	*15*	*18*	*21*	*24*	*30*	*36*	*42*	*48*	*54*	*60*	*66*	*72*	*78*	*84*	*90*	*96*	*108*	*120*
.1	0.2	0.4	0.6	1.3	2.1	3.3	4.7	8	12	20	25	36	47	67	85	110	130	160	190	270	330
.2	0.3	0.6	1.0	2.0	3.1	4.7	6.8	12	19	30	42	57	77	100	130	160	190	230	270	380	500
.3	0.4	0.8	1.3	2.4	3.9	5.9	8.3	15	25	37	53	72	97	120	150	190	230	280	330	450	600
.4	0.5	0.9	1.5	2.8	4.4	6.8	9.5	17	28	42	62	83	110	140	180	220	270	320	380	510	670
.5	0.6	1.0	1.7	3.0	4.9	7.5	10.	19	31	46	68	90	120	150	190	240	290	340	410	560	730
.6	0.6	1.1	1.9	3.3	5.4	8.1	11.	21	33	50	72	97	130	160	210	250	300	360	430	580	770
.8	0.8	1.2	2.1	3.7	6.1	9.0	13	23	37	55	77	100	140	180	220	270	320	390	460	620	**810**
1.0	0.8	1.4	2.3	4.0	6.5	9.6	14	24	39	57	80	**110**	140	180	**230**	**280**	**330**	**400**	**470**	**630**	810
1.2	0.8	1.5	2.4	4.3	6.8	10.	14	25	**40**	**59**	82	110	**150**	**190**	230	280	330	400	470	630	810
1.4	**0.9**	**1.6**	2.5	4.4	7.0	10	**15**	25	40	59	**83**	110	150	190	230	280	330	400	470	630	810
1.6	0.9	1.6	**2.6**	4.5	**7.1**	10	15	**26**	40	59	83	110	150	190	230	280	330	400	470	630	810
1.8	0.9	1.6	2.6	**4.6**	7.1	**11**	15	26	40	59	83	110	150	190	230	280	330	400	470	630	810
2.0	0.9	1.6	2.6	4.6	7.1	11	15	26	40	59	83	110	150	190	230	280	330	400	470	630	810
2.2	0.9	1.6	2.6	4.6	7.1	11	15	26	40	59	83	110	150	190	230	280	330	400	470	630	810
2.4	0.9	1.6	2.6	4.6	7.1	11	15	26	40	59	83	110	150	190	230	280	330	400	470	630	810

Note: The values in bold face type indicate discharge at the approximate "critical slope," when $n=.021$. Steeper slopes than "critical" do not result in increased discharge.

The "stairs" of heavy horizontal lines indicate approximate velocities of 2, 4, 6, 8 and 10 feet per second.

*For $n=.015$, see Table 33-2, Page 278.

Infiltration Rates in Inches per Hour

Soil Number	Soil Designation	Rainfall Intensity in Inches per Hour 0	0.5	1.0	1.5	2.0	2.5	3.0
021	S.M.M.- 1	0	0.490	0.830	1.100	1.260	1.375	1.440
022	S.M.M.- 2	0	0.405	0.550	0.660	0.760	0.825	0.900
023	S.M.M.- 3	0	0.405	0.600	0.705	0.780	0.825	0.840
024	S.M.M.- 4	0	0.500	0.960	1.245	1.480	1.650	1.770
025	S.M.M.- 5	0	0.200	0.330	0.435	0.520	0.600	0.660
026	S.M.M.- 6	0	0.500	1.000	1.500	2.000	2.500	3.000
027	S.M.M.- 7	0	0.500	0.830	1.035	1.200	1.325	1.410
028	S.M.M.- 8	0	0.460	0.740	0.930	1.040	1.125	1.200
029	S.M.M.- 9	0	0.220	0.290	0.300	0.280	0.250	0.270
030	S.M.M.-10	0	0.500	0.800	0.975	1.140	1.275	1.410
031	S.M.M.-11	0	0.500	1.000	0.960	1.040	1.100	1.170
032	S.M.M.-12	0	0.350	0.480	0.555	0.580	0.625	0.630
033	S.M.M.-13	0	0.485	0.650	0.780	0.880	0.975	1.050
034	S.M.M.-14	0	0.285	0.350	0.405	0.470	0.450	0.480
035	S.M.M.-15	0	0.500	1.000	1.500	1.400	1.400	1.470
036	S.M.M.-16	0	0.260	0.350	0.390	0.420	0.425	0.420
037	S.M.M.-17	0	0.500	0.730	0.870	1.000	1.100	1.230
038	S.M.M.-18	0	0.485	0.600	0.690	0.780	0.825	0.870
039	S.M.M.-19	0	0.290	0.340	0.360	0.360	0.350	0.360
040	S.M.M.-20	0	0.285	0.350	0.325	0.400	0.425	0.450
041	S.M.M.-21	0	0.500	1.000	1.500	2.000	2.300	2.280
042	S.M.M.-22	0	0.325	0.470	0.555	0.620	0.650	0.690
043	S.M.M.-23	0	0.495	0.820	1.020	1.200	1.325	1.440
044	S.M.M.-24	0	0.215	0.240	0.225	0.200	0.200	0.180
045	S.M.M.-25	0	0.500	1.000	1.500	1.800	1.825	1.920
046	U.L.A.R.- 1	0	0.500	0.960	1.365	1.720	2.050	2.340
047	U.L.A.R.- 3	0	0.385	0.540	0.675	0.660	0.650	0.660
048	U.L.A.R.- 5	0	0.500	0.720	0.870	0.980	1.050	1.050
049	U.L.A.R.- 6AB	0	0.345	0.450	0.525	0.580	0.600	0.600
050	U.L.A.R.- 6CD	0	0.255	0.320	0.360	0.360	0.350	0.330
051	U.L.A.R.- 6EF	0	0.440	0.610	0.705	0.760	0.775	0.810
052	U.L.A.R.- 7A	0	0.500	1.000	1.500	2.000	2.500	3.000
053	U.L.A.R.- 7B	0	0.500	0.720	0.945	1.160	1.325	1.470
054	U.L.A.R.- 7CD	0	0.435	0.540	0.675	0.720	0.725	0.720
055	U.L.A.R.- 8	0	0.430	0.640	0.762	0.840	0.900	0.930
056	U.L.A.R.- 9A	0	0.345	0.420	0.450	0.480	0.500	0.510
057	U.L.A.R.- 9B	0	0.500	0.980	1.245	1.425	1.520	1.590
058	U.L.A.R.- 9C	0	0.460	0.610	0.750	0.860	0.950	1.020
059	U.L.A.R.- 9D	0	0.350	0.420	0.450	0.460	0.450	0.450
060	U.L.A.R.- 9E	0	0.500	0.910	1.125	1.320	1.500	1.680
061	U.L.A.R.-10A	0	0.500	1.000	1.500	2.000	2.500	3.000
062	U.L.A.R.-10B	0	0.500	0.730	0.855	0.960	1.025	0.050
063	U.L.A.R.-11	0	0.445	0.620	0.720	0.780	0.825	0.870
064	U.L.A.R.-12	0	0.320	0.420	0.495	0.540	0.575	0.600

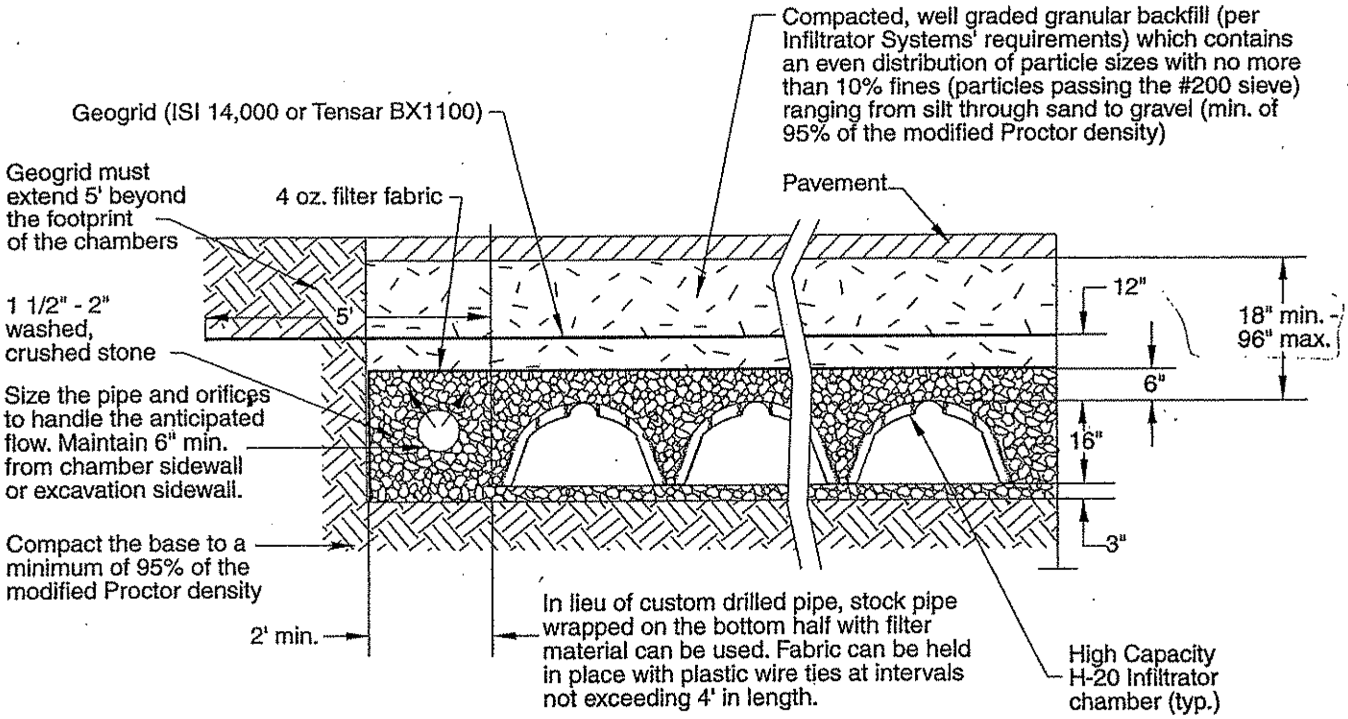
LACFCD

hydrology manual

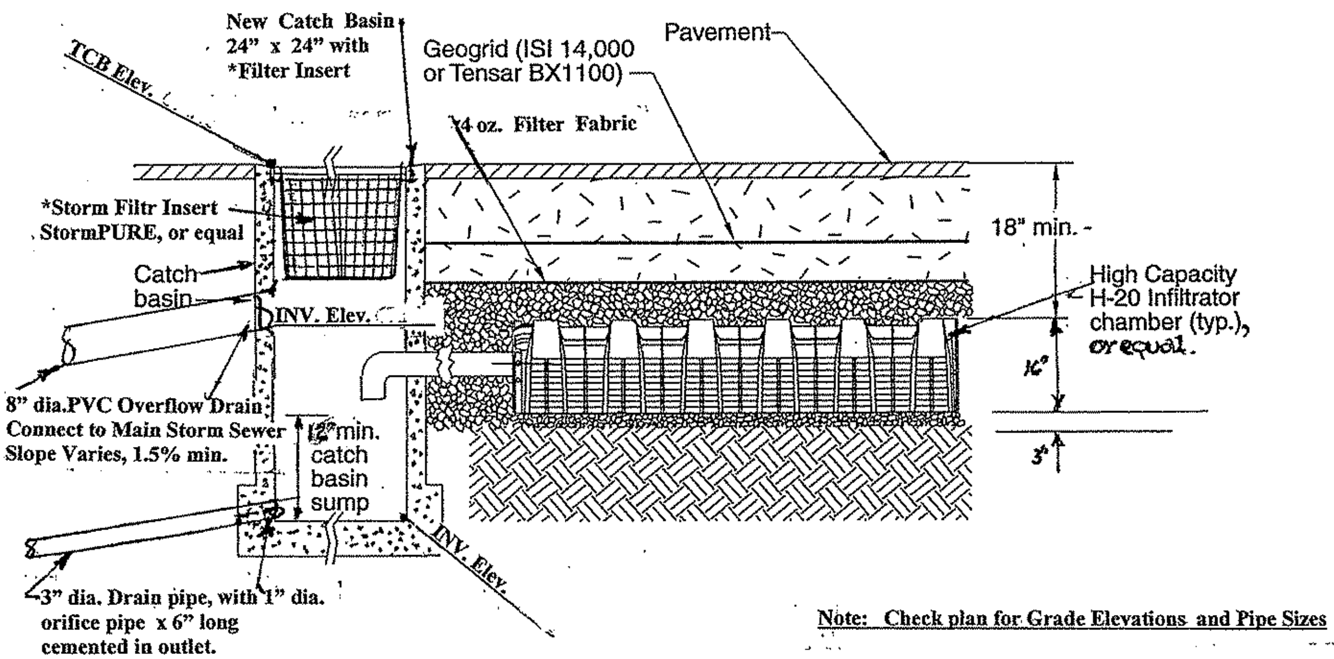
INFILTRATION RATE TABLE

MOUNTAIN-DESERT SOILS

TYPICAL CROSS SECTION OF THE PERFORATED PIPE DISTRIBUTION METHOD



TYPICAL CROSS SECTION OF A CATCH BASIN SUMP TO A RETENTION SYSTEM



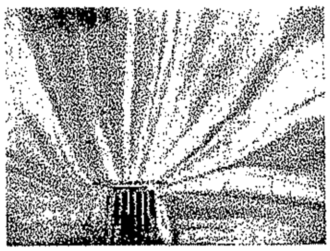
TYPICAL DETENTION CHAMBER &

CATCH BASIN
No Scale

(706)348-8201 Fax: (706)348-8346

SEND US A REQUEST FOR A QUOTE

REQ



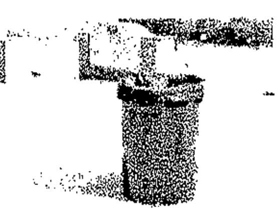
Click To Enlarge

Storm-PURE™ Catch Basin Inserts

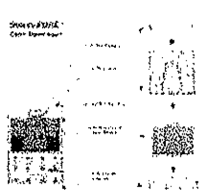
Phase II of EPA's National Pollution Discharge Elimination System (NPDES) requires all but the smallest municipal and industrial storm sewer systems to treat stormwater discharge to the "maximum extent practicable". The Storm--PURE™ catch basin insert, a two-stage unit that will fit into new or existing catch basins, stands apart from competitive units in its ability to remove suspended solids, hydrocarbons and other pollutants.

The upper section consists of a perforated metal catch basket covered by a geotextile filter bag. This assembly captures sediment and debris while allowing filtered water to pass freely down through the center cone. The lower stage contains a patented Mycelx® filter insert that attracts and holds tiny particles of hydrocarbons and oil-bound pollutants. The specially treated absorbent material instantly bonds to contaminated particles, resulting in a 99% removal rate of total petroleum hydrocarbons.

Both stages are housed in a corrosion-resistant high density polyethylene body with overflow slots at the top to act as a bypass in unusually high flow conditions. The complete assembly will pass 230 gpm without bypassing the flow. ≈ 0.51 cfs.

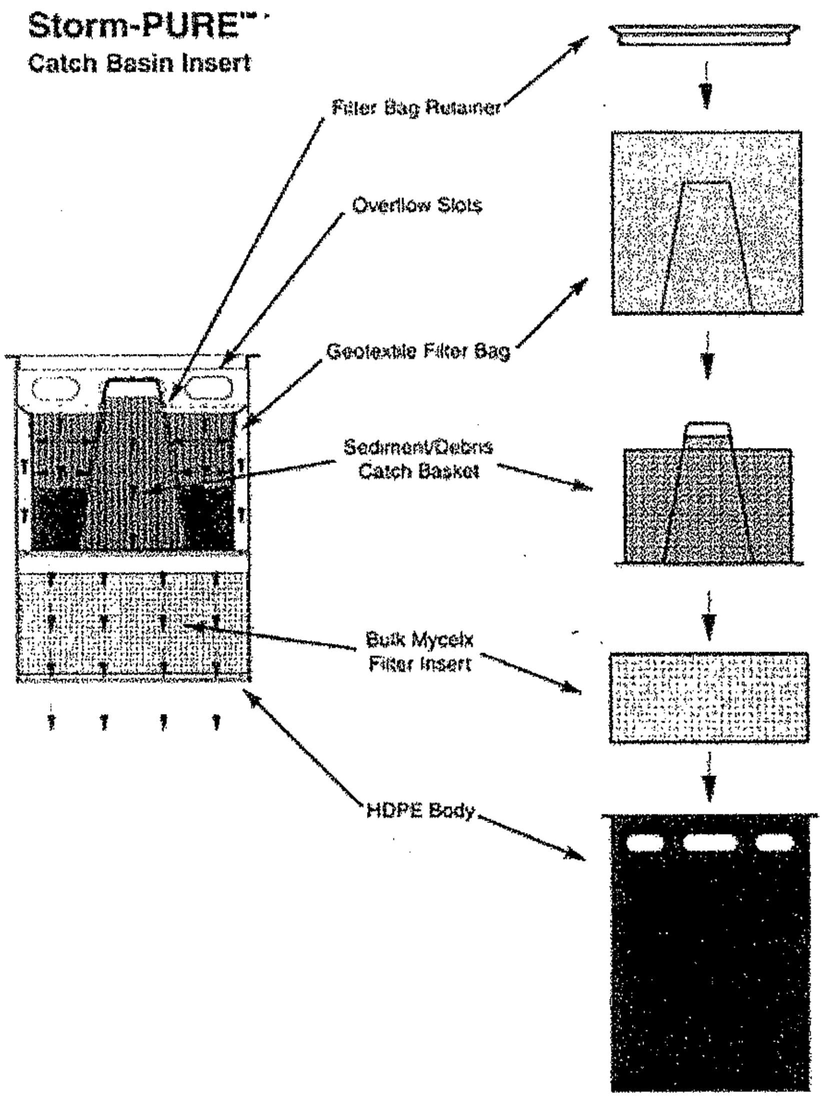


Storm-PURE™ Component View



Storm-PURE™ Exploded View

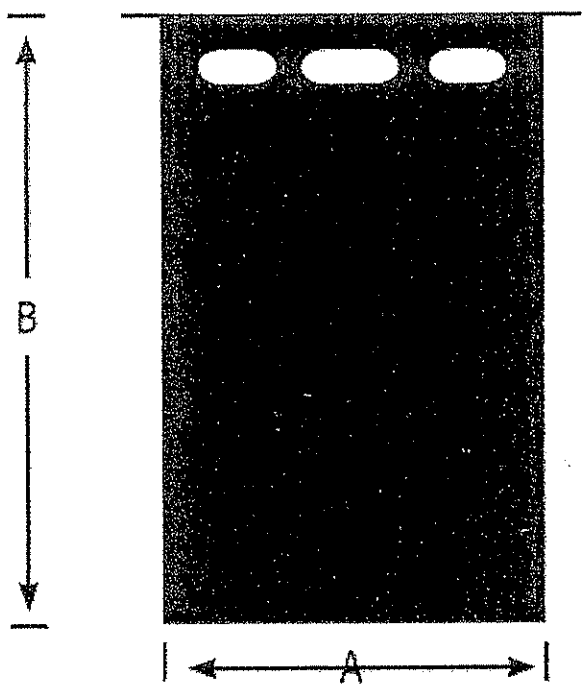
Storm–PURE™ Exploded View



Click to close

Storm–PURE™ Dimensions

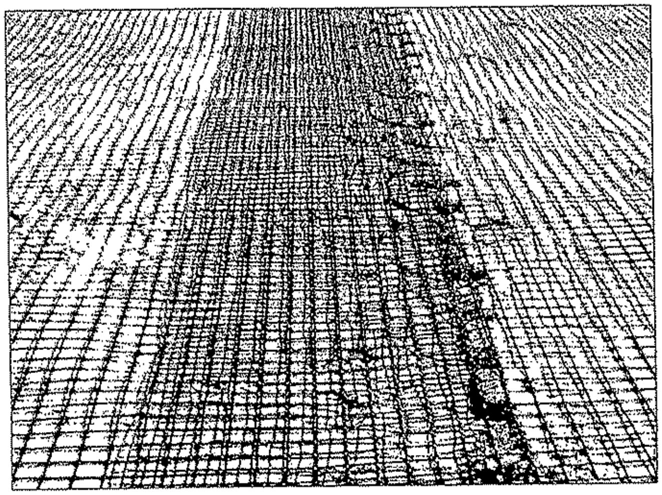
Dimensions*



Nom. Diameter	A	B
18"	15.38"	18.00"
24"	21.38"	18.00"
24"	21.38"	30.00"

Click to close

Requirements for Covering the System.



Lay geogrid over the stone and compacted backfill, 12" above the top of the chambers.

6 Lay ISI 14,000 or Tensar BX1100 geogrid over the 6" of compacted backfill. If two rolls are to be placed side by side, or end to end, overlap them a minimum of two feet.

NOTE: Geogrid must extend at least 5' beyond the footprint of the chambers. Refer to manufacturer's specifications for other installation guidelines.

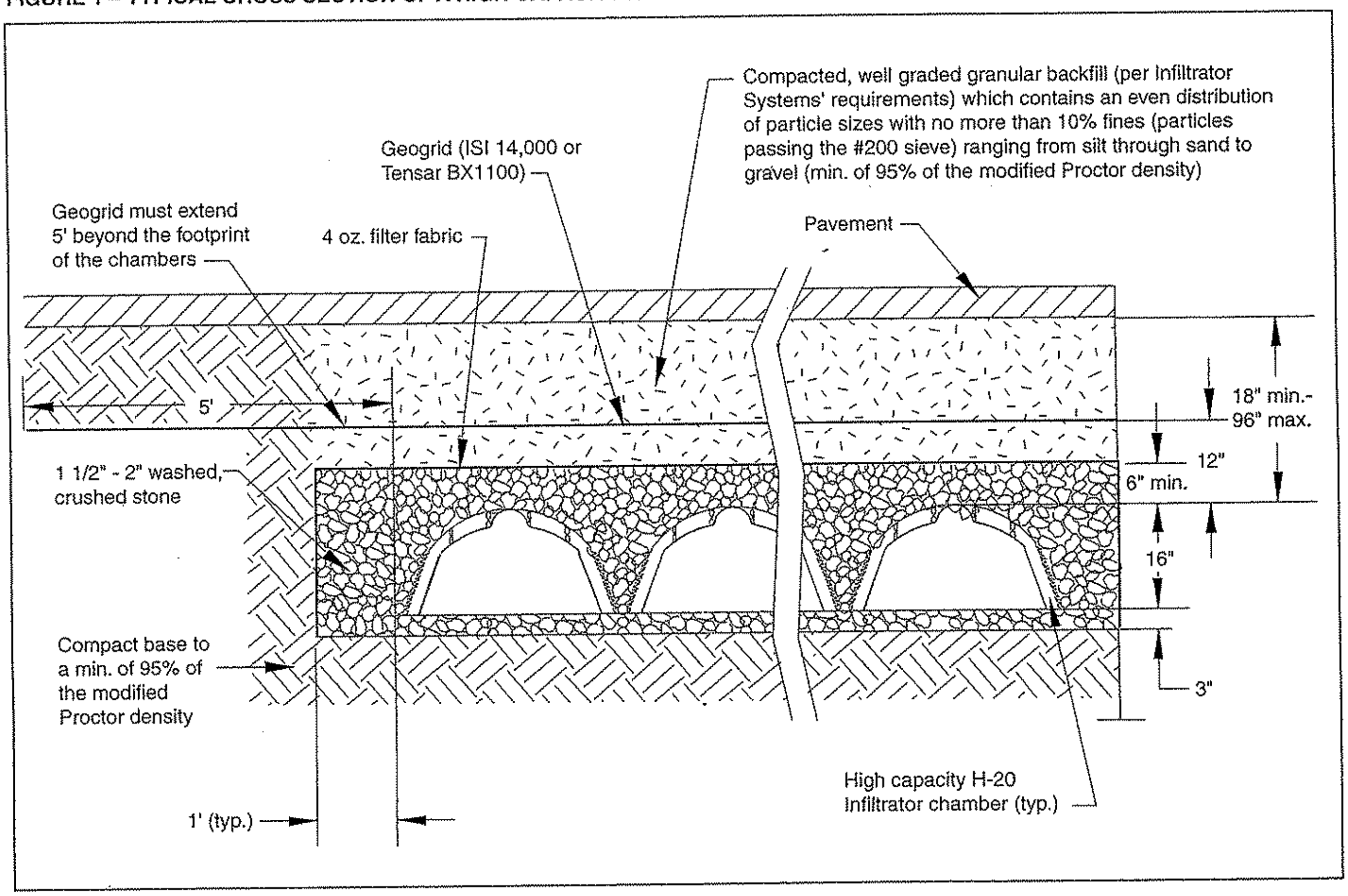
7 Continue to backfill in 12" lifts until the specified height of the system is achieved. Compact the soil after each lift.

NOTE: Place the backfill in 6" lifts in sandy soil, compacting after each lift. Refer to special installation requirements for sandy soil.

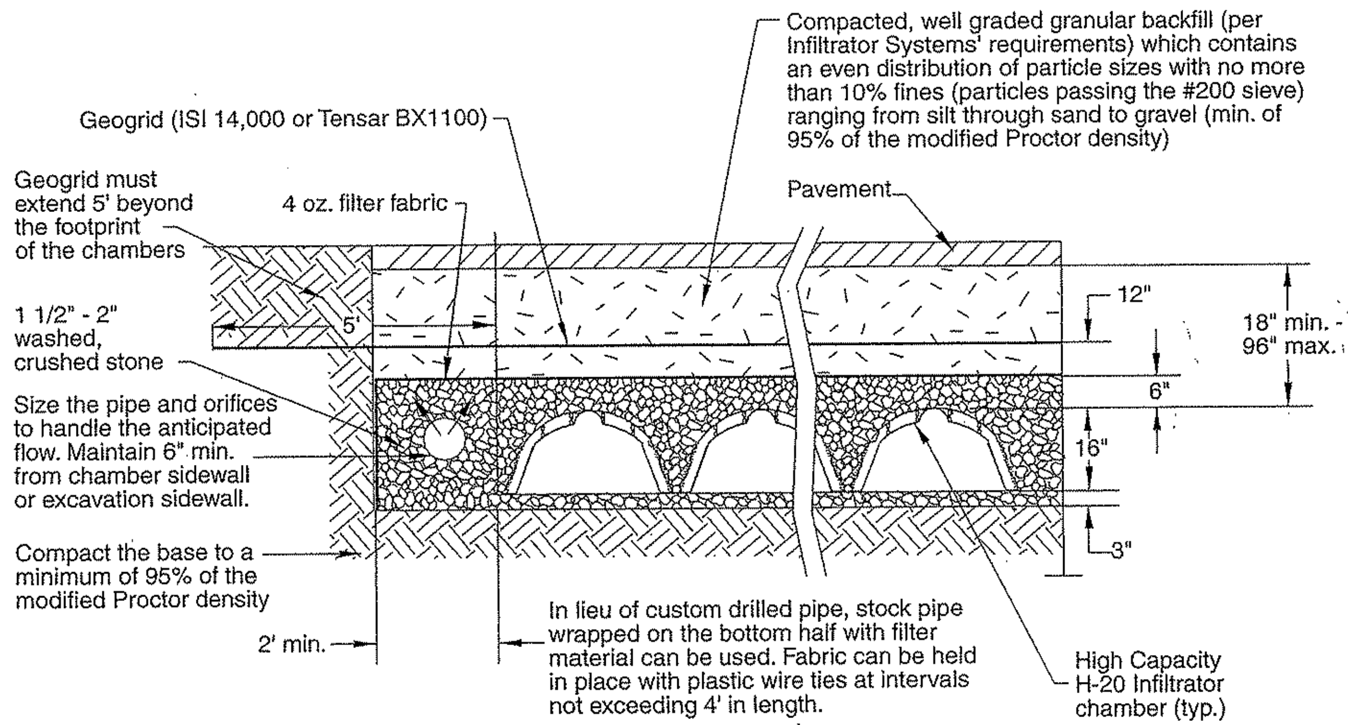
8 Begin laying the pavement base.

NOTE: The bed must be cordoned off using warning tape and signs to keep traffic off until it's paved.

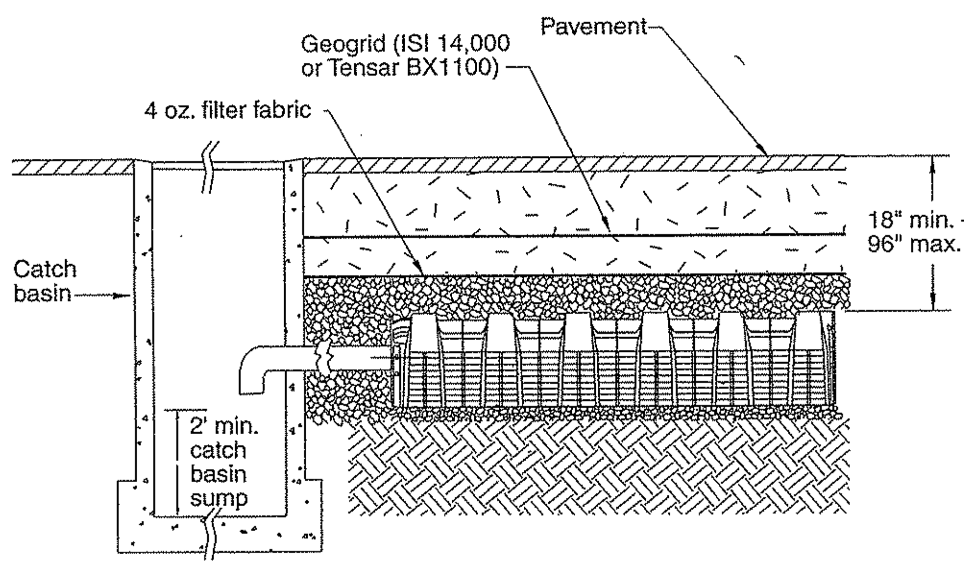
FIGURE 1 – TYPICAL CROSS SECTION OF A HIGH CAPACITY H-20 INFILTRATOR CHAMBER SYSTEM



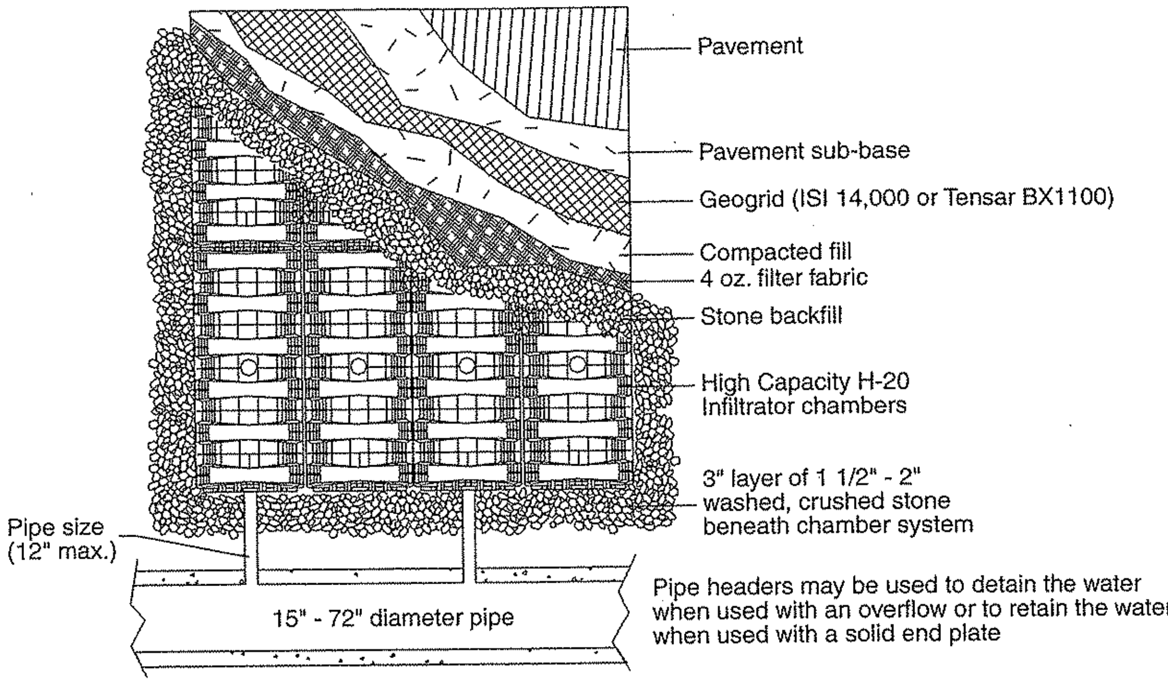
TYPICAL CROSS SECTION OF THE PERFORATED PIPE DISTRIBUTION METHOD



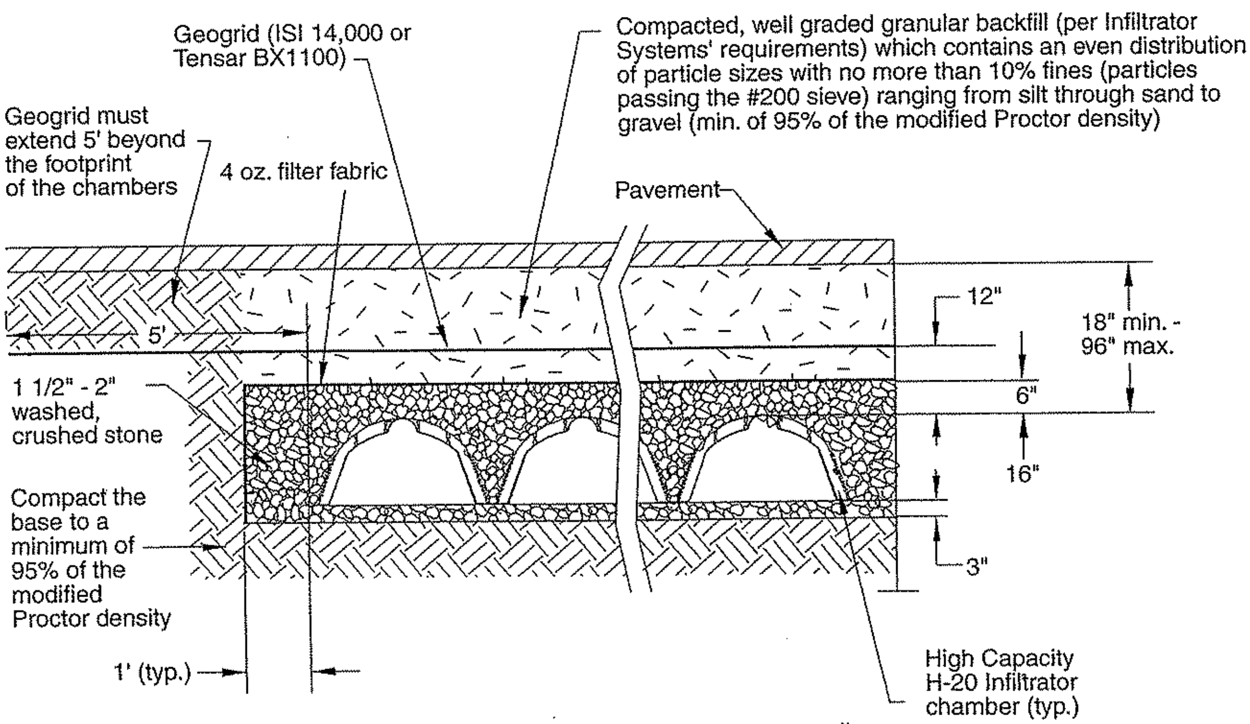
TYPICAL CROSS SECTION OF A CATCH BASIN SUMP TO A RETENTION SYSTEM



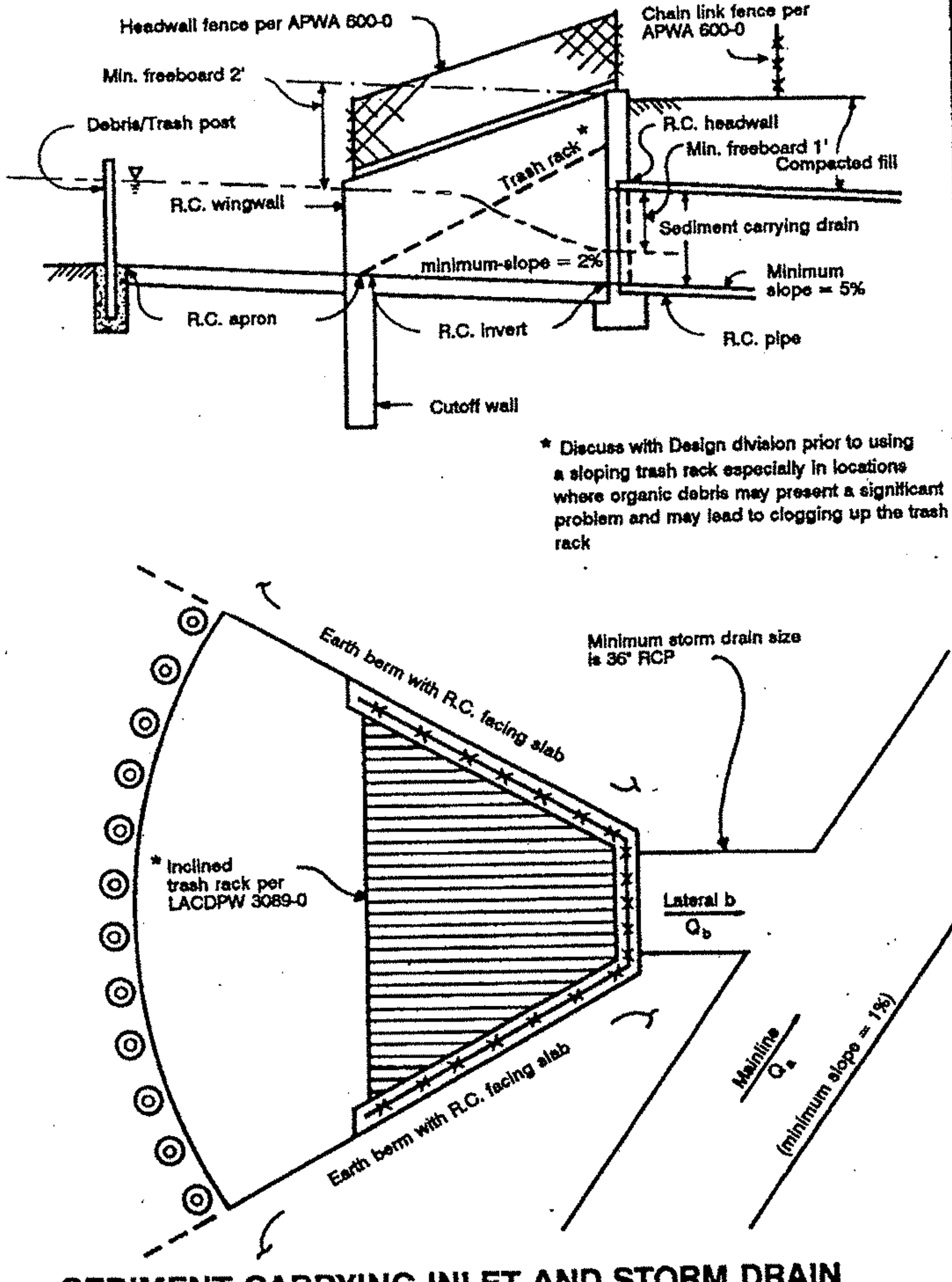
PLAN VIEW OF HIGH CAPACITY H-20 INFILTRATOR CHAMBER SYSTEM



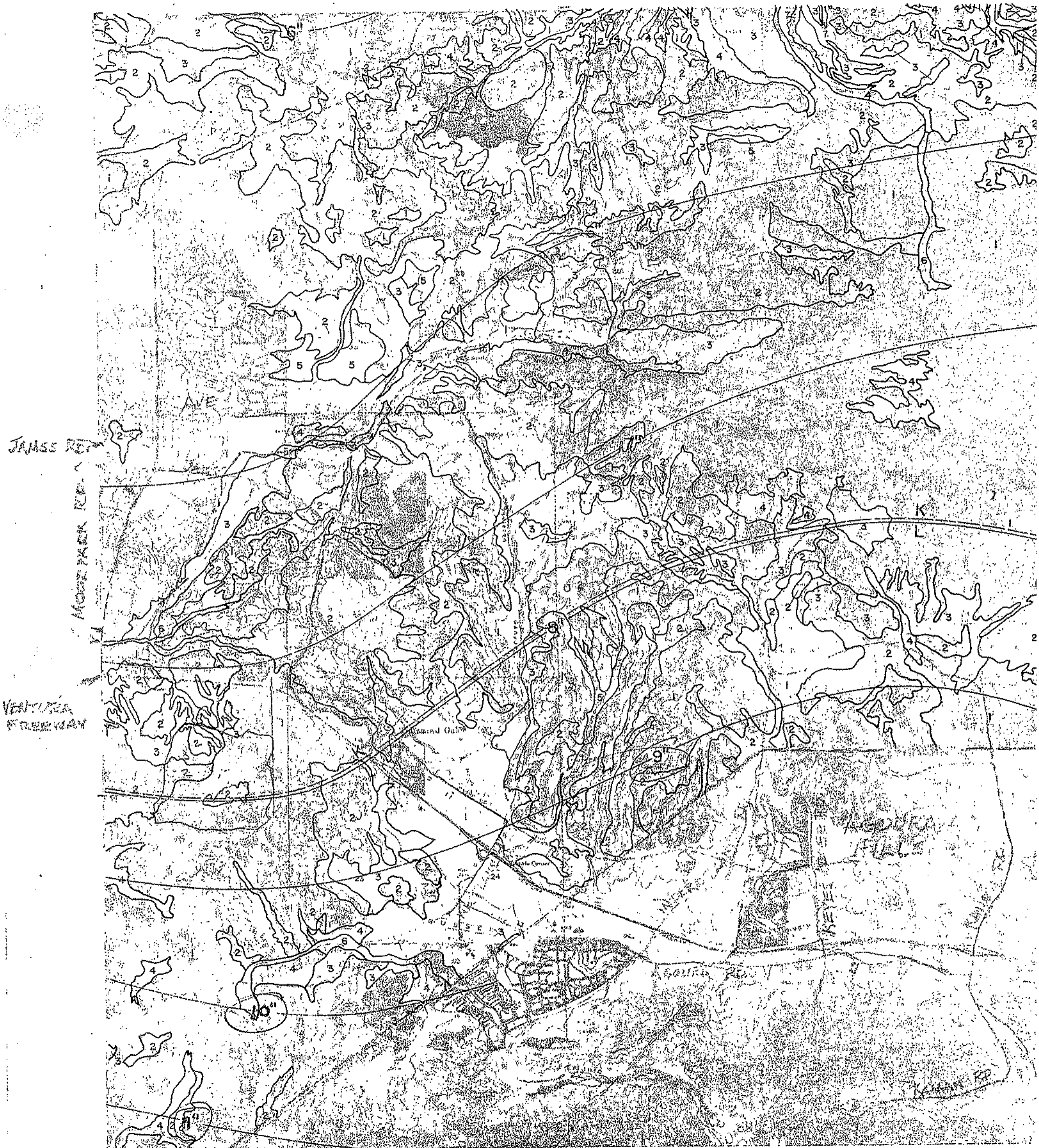
TYPICAL CROSS SECTION HIGH CAPACITY H-20 INFILTRATOR CHAMBER SYSTEM



NOTE: Geogrid must overlap on itself at least 2' when using more than one roll.



SEDIMENT CARRYING INLET AND STORM DRAIN
FIGURE 5.3



LEGEND

1000 0 1000 2000
SCALE IN FEET

5 SOIL NUMBER

——— SOIL TYPE BOUNDARY

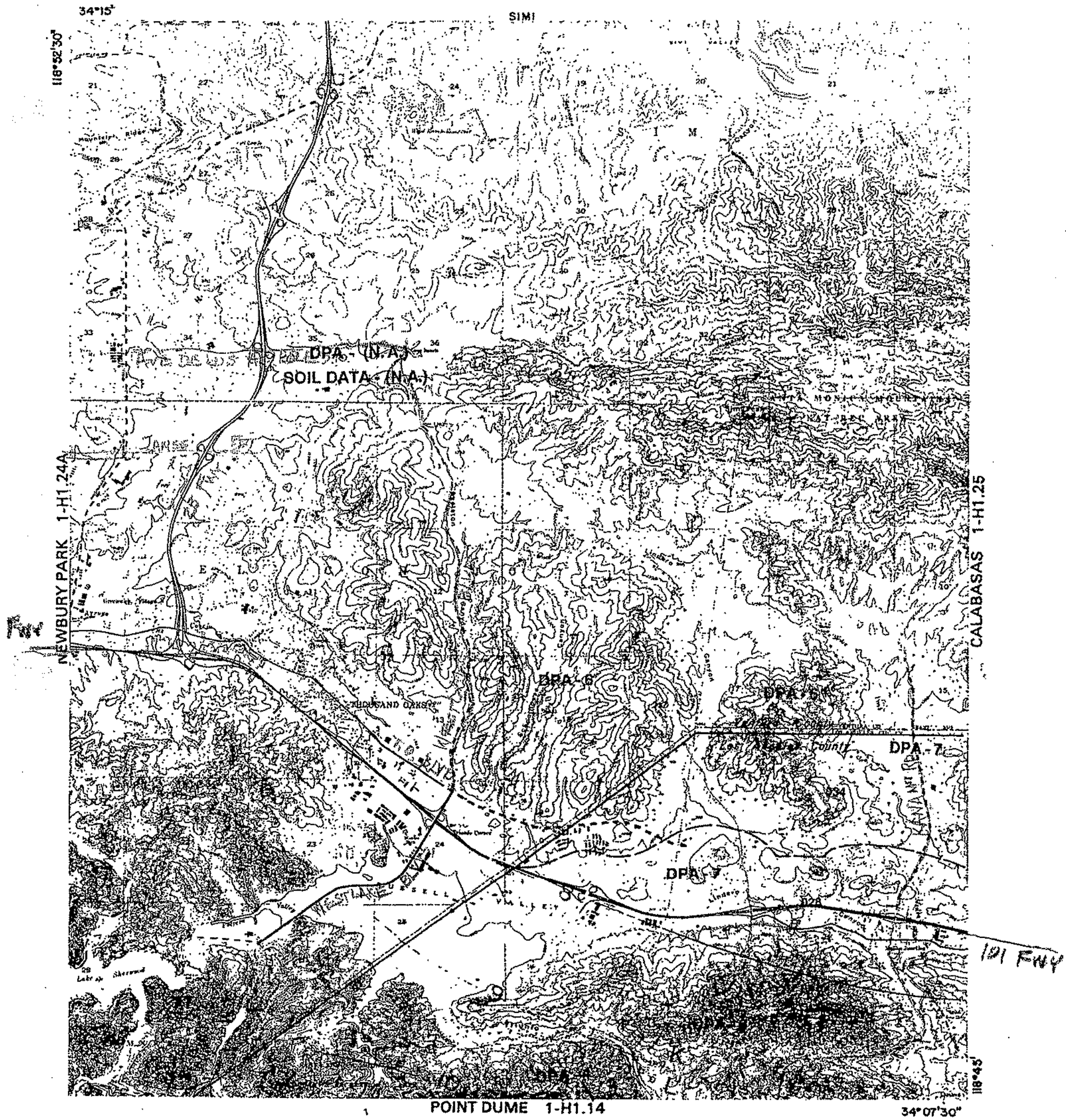
– – —— RAINFALL ZONE

——— 50-YEAR, 24-HOUR ISOHYET

HYDROLOGIC MAP THOUSAND OAKS

1967

B



LEGEND

——— SOIL CLASSIFICATION AREA

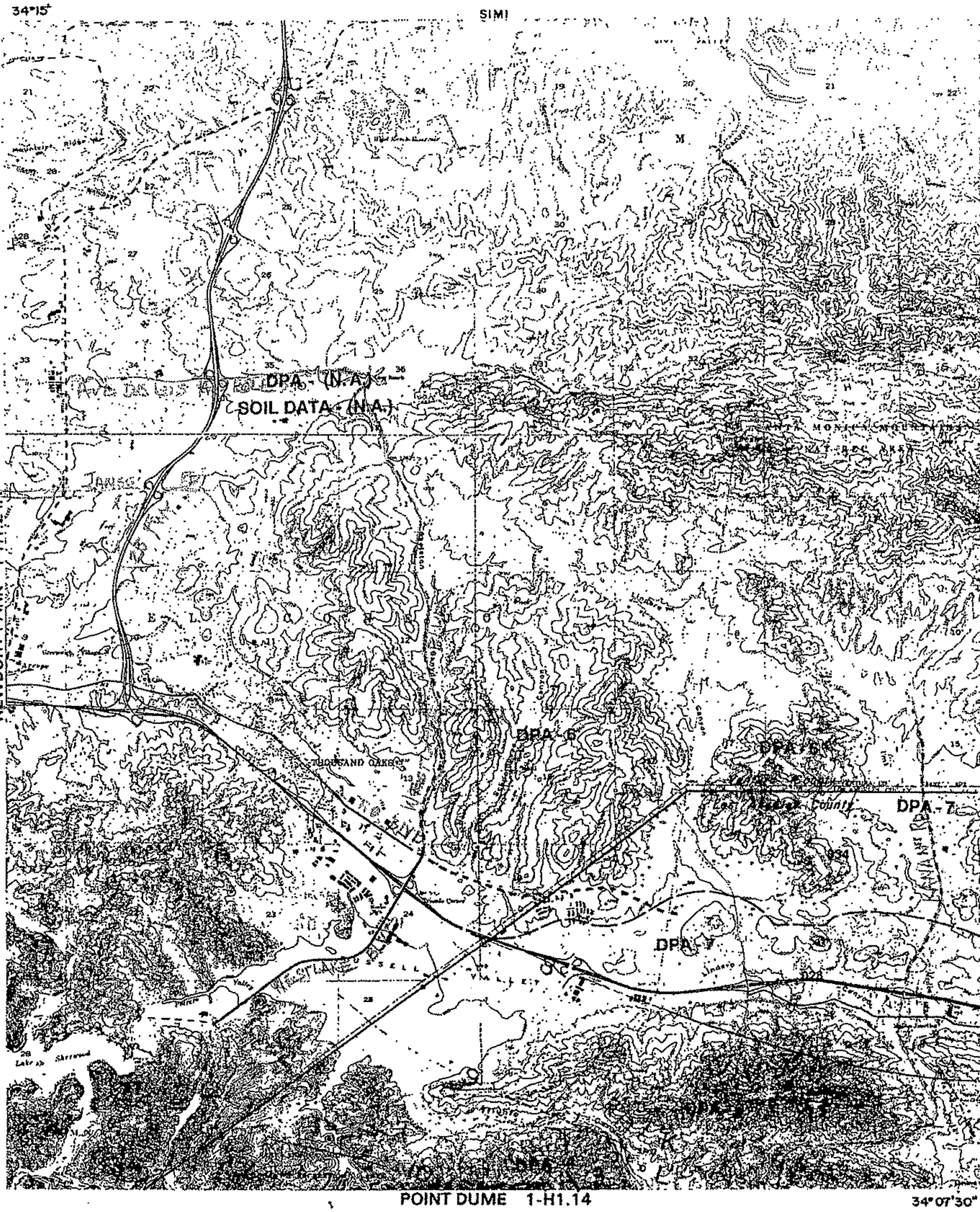
·········· DEBRIS POTENTIAL AREA

LACDPW

THOUSAND OAKS **1981**

hydrologic map

0 FEET 5000



LEGEND

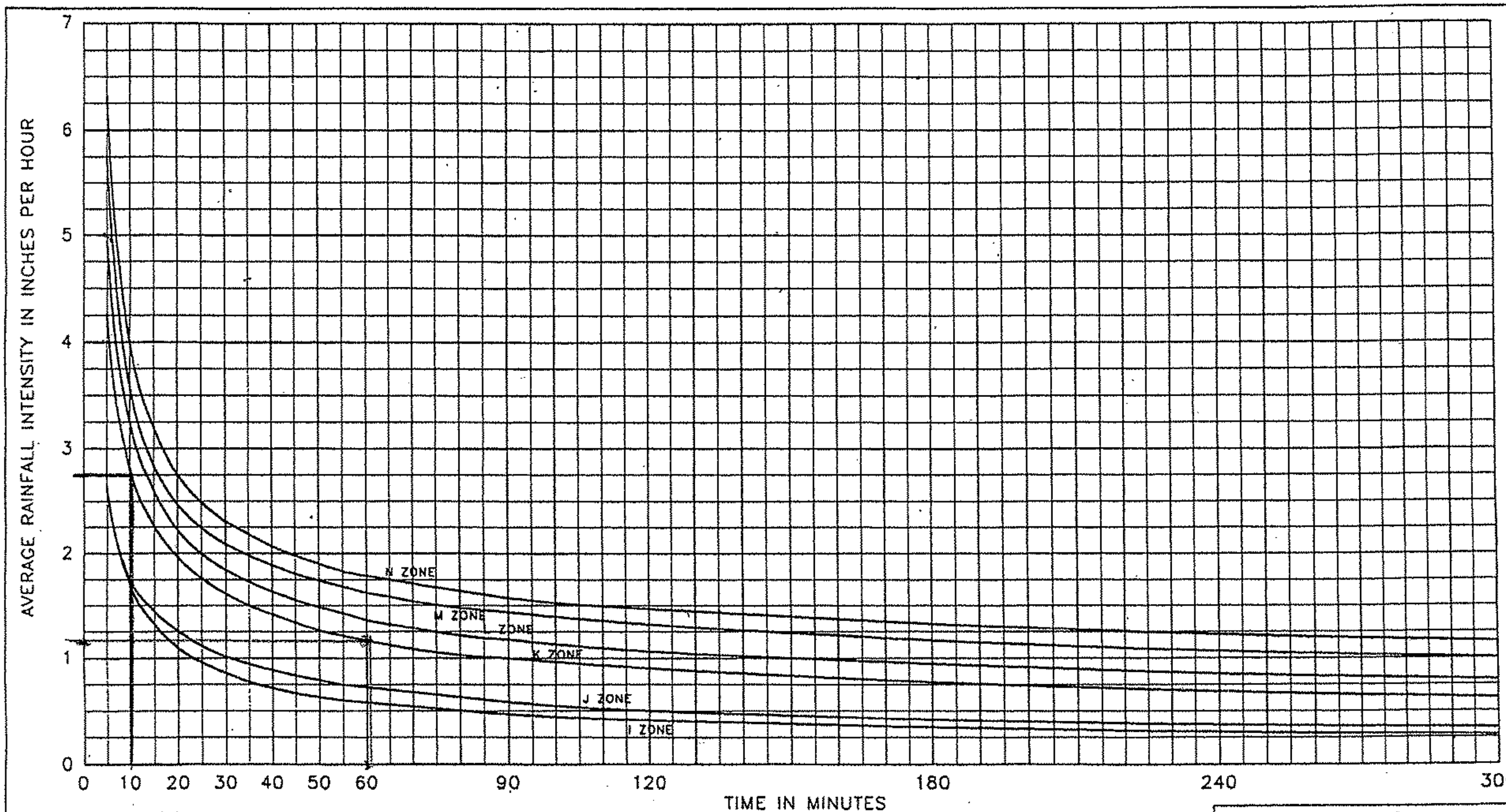
- — — — SOIL CLASSIFICATION AREA
- ·········· DEBRIS POTENTIAL AREA

LACDPW

FEET 0 5000

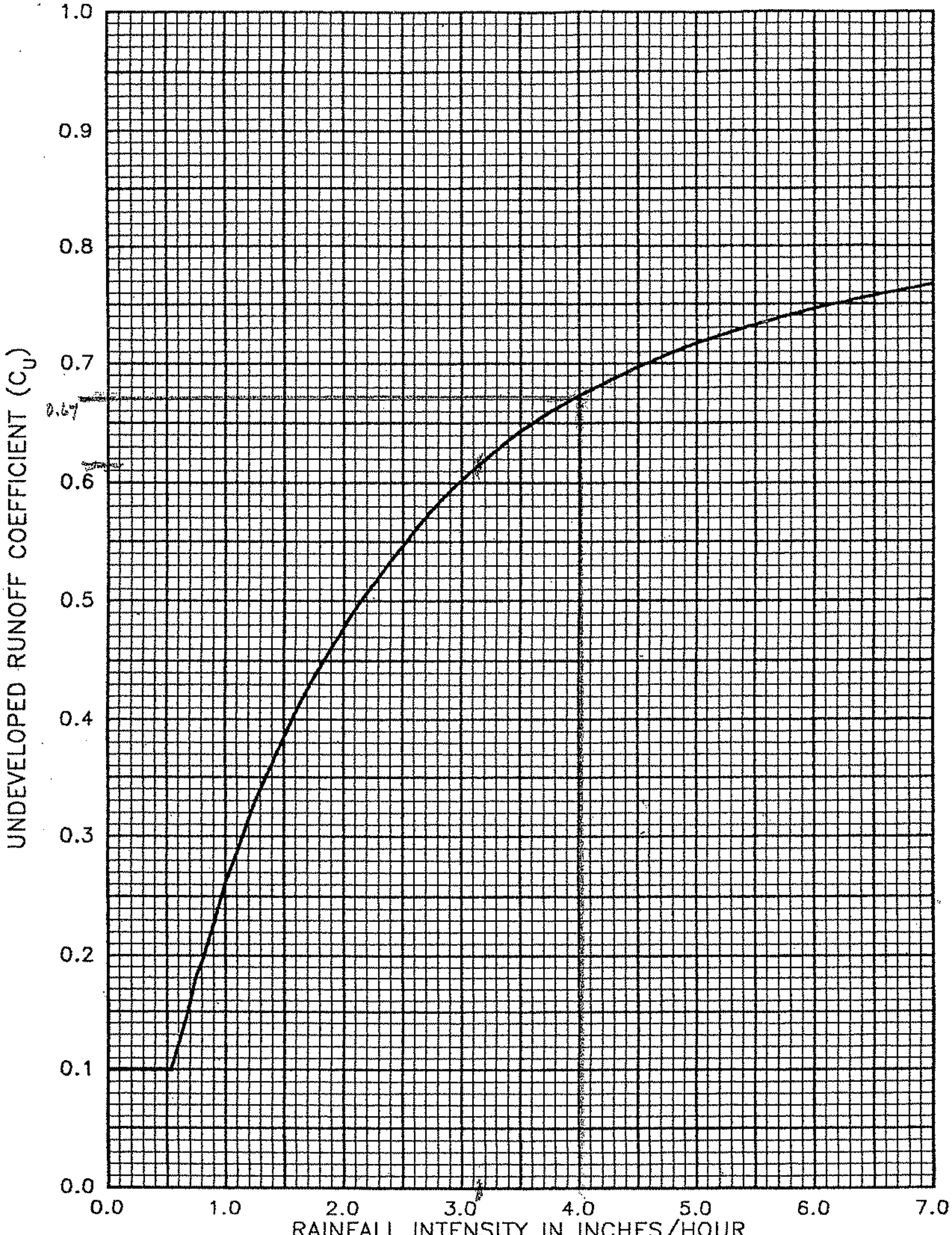
THOUSAND OAKS **1981**

hydrologic map



Los Angeles County
Department of Public Works

AVERAGE RAINFALL INTENSITY
DURATION CURVES
RECURRENCE INTERVAL 25 YEARS



Equation:	
$C_D = (0.9 * IMP) + (1.0 - IMP)\ C_U$	
Where:	C_D = Developed runoff coefficient. IMP = Proportion impervious. C_U = Undeveloped runoff coefficient.

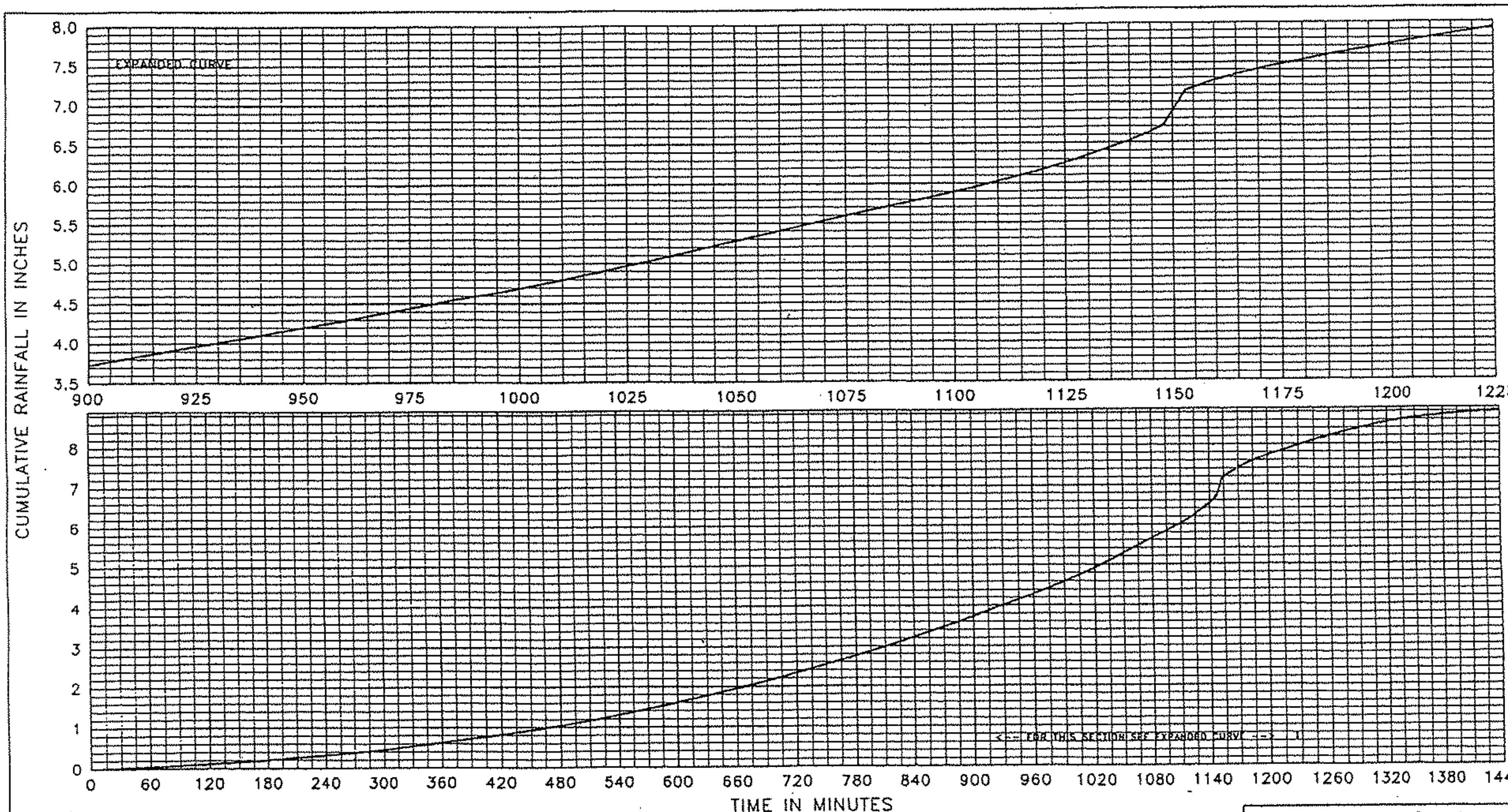
Los Angeles County
Department of Public Works

RUNOFF COEFFICIENT CURVE

SOIL TYPE NO. 028

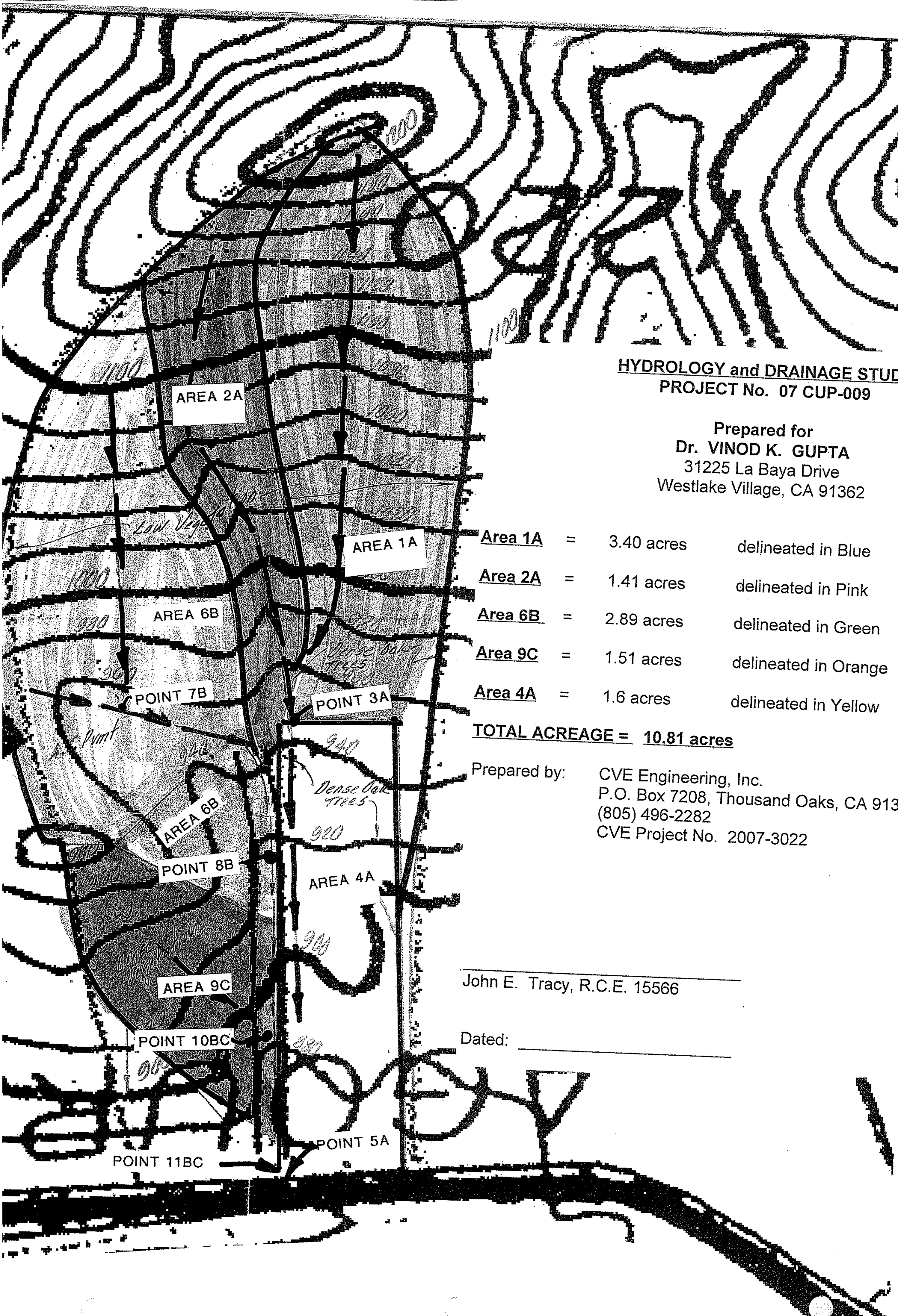
SPG

Nº



Los Angeles County
Department of Public Works

RAINFALL MASS CURVE
L ZONE-25 YEAR
FREQUENCY



HYDROLOGY and DRAINAGE STUD
PROJECT No. 07 CUP-009

Prepared for
Dr. VINOD K. GUPTA
31225 La Baya Drive
Westlake Village, CA 91362

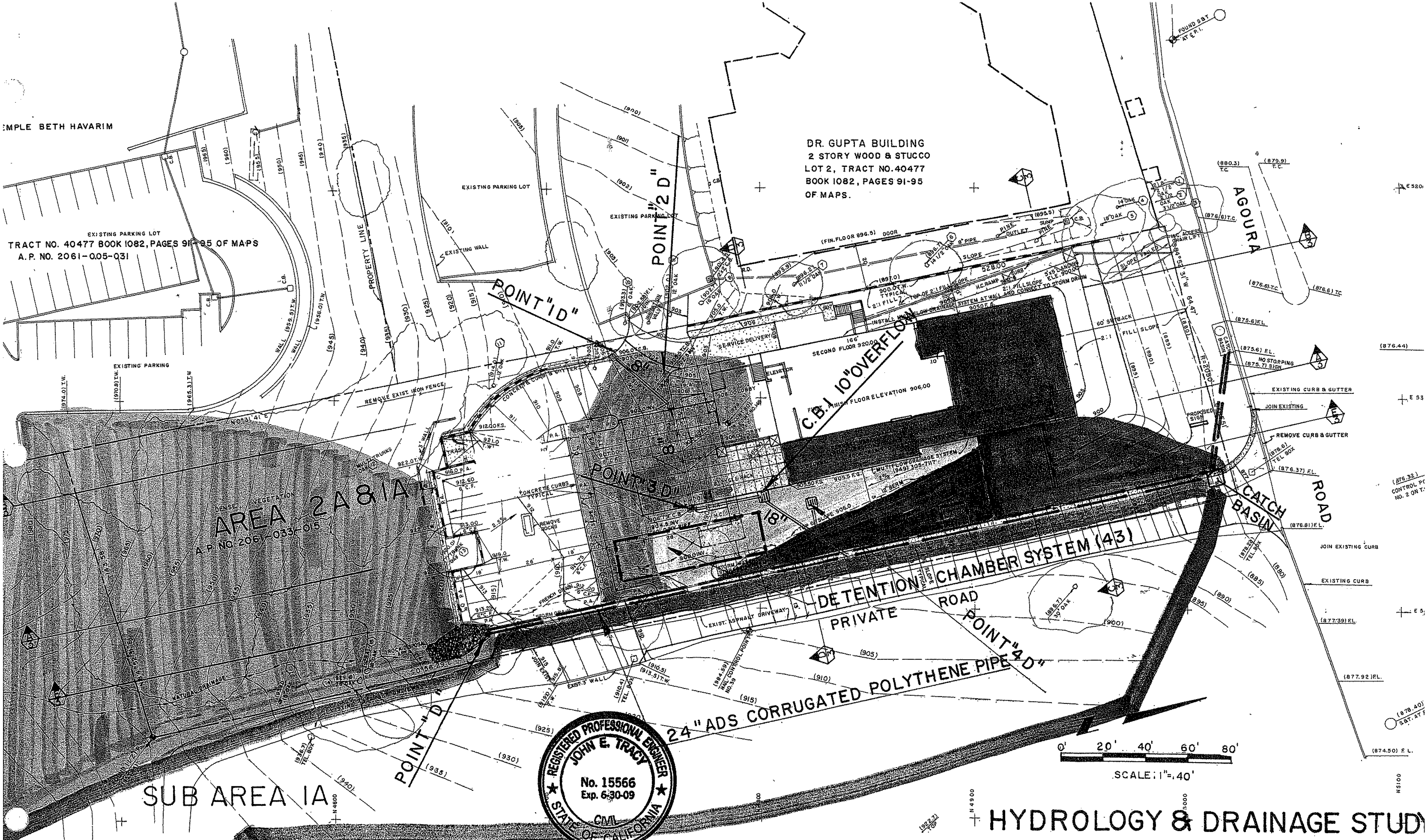
Area 1A	=	3.40 acres	delineated in Blue
Area 2A	=	1.41 acres	delineated in Pink
Area 6B	=	2.89 acres	delineated in Green
Area 9C	=	1.51 acres	delineated in Orange
Area 4A	=	1.6 acres	delineated in Yellow

TOTAL ACREAGE = 10.81 acres

Prepared by: CVE Engineering, Inc.
P.O. Box 7208, Thousand Oaks, CA 9136
(805) 496-2282
CVE Project No. 2007-3022

John E. Tracy, R.C.E. 15566

Dated: ____________



HYDROLOGY & DRAINAGE STUDY

REV	SYMBOL	DESCRIPTION OF CHANGE	RCE	DATE

PREPARED BY:
CVE ENGINEERING INC. W.O. 3128
P.O. BOX 7208 THOUSAND OAKS CA 91360
W.O. 3128
PROJECT ENGINEER 10/5/07 DATE
JOHN E. TRACY RCE 15566

CITY OF AGOURA HILLS APPROVAL
REVIEWED BY DATE
CITY ENGINEER DATE RCE NO. EXP DATE

CITY OF AGOURA HILLS

FOR A TWO STORY OFFICE BUILDING ON APN NO. 2061-033-015
A PROFESSIONAL BUILDING FOR DR. GUPTA
AGOURA HILLS, CALIFORNIA
PROJECT NO. 07 CUP-009
SHEET OF

Appendix H

Noise Measurement Results

C:\LARDAV\SLMUTIL\AGOURARD.bin Interval Data

Site	Location	Meas Number	Date	Time	Duration	Leq	SEL	Lmax
0		0	11Jun 09	11:21:27	1200	58.7	89.5	75.1
0		0	11Jun 09	11:47:44	1200	52.2	83	74.8
0		0	11Jun 09	12:11:16	1200	54	84.8	68.8

Lmin	Peak	Uwpk
49.1	97.4	100.5
46.6	98.7	100.5
47.2	79	0

ExistingbtwLady&Kanan

* * * * CASE INFORMATION * * * *

* * * * Results calculated with TNM Version 2.5 * * * *

ExistingbtwLady&Kanan

* * * * TRAFFIC VOLUME/SPEED INFORMATION * * * *

Automobile volume (v/h):	817.9
Average automobile speed (mph):	35.0
Medium truck volume (v/h):	17.0
Average medium truck speed (mph):	30.0
Heavy truck volume (v/h):	32.1
Average heavy truck speed (mph):	30.0
Bus volume (v/h):	0.0
Average bus speed (mph):	0.0
Motorcycle volume (v/h):	0.0
Average Motorcycle speed (mph):	0.0

* * * * TERRAIN SURFACE INFORMATION * * * *

Terrain surface:	hard

* * * * RECEIVER INFORMATION * * * *

DESCRIPTION OF RECEIVER # 1

ExistingbtwLady&Kanan

Distance from center of 12-ft wide, single lane roadway (ft):	50.0
A-weighted Hourly Equivalent Sound Level without Barrier (dBA):	65.5

CumbtwLady&Kanan

* * * * CASE INFORMATION * * * *

* * * * Results calculated with TNM Version 2.5 * * * *

CumbtwLady&Kanan

* * * * TRAFFIC VOLUME/SPEED INFORMATION * * * *

Automobile volume (v/h):	1381.4
Average automobile speed (mph):	35.0
Medium truck volume (v/h):	28.8
Average medium truck speed (mph):	30.0
Heavy truck volume (v/h):	28.8
Average heavy truck speed (mph):	30.0
Bus volume (v/h):	0.0
Average bus speed (mph):	0.0
Motorcycle volume (v/h):	0.0
Average Motorcycle speed (mph):	0.0

* * * * TERRAIN SURFACE INFORMATION * * * *

Terrain surface: hard

* * * * RECEIVER INFORMATION * * * *

DESCRIPTION OF RECEIVER # 1

CumbtwLady&Kanan

Distance from center of 12-ft wide, single lane roadway (ft):	50.0
A-weighted Hourly Equivalent Sound Level without Barrier (dBA):	67.0

Cum+ProjbtwLady&Kanan

* * * * CASE INFORMATION * * * *

* * * * Results calculated with TNM Version 2.5 * * * *

Cum+ProjbtwLady&Kanan

* * * * TRAFFIC VOLUME/SPEED INFORMATION * * * *

Automobile volume (v/h):	1395.8
Average automobile speed (mph):	35.0
Medium truck volume (v/h):	29.0
Average medium truck speed (mph):	30.0
Heavy truck volume (v/h):	29.0
Average heavy truck speed (mph):	30.0
Bus volume (v/h):	0.0
Average bus speed (mph):	0.0
Motorcycle volume (v/h):	0.0
Average Motorcycle speed (mph):	0.0

* * * * TERRAIN SURFACE INFORMATION * * * *

Terrain surface: hard

* * * * RECEIVER INFORMATION * * * *

DESCRIPTION OF RECEIVER # 1

Cum+ProjbtwLady&Kanan

Distance from center of 12-ft wide, single lane roadway (ft):	50.0
A-weighted Hourly Equivalent Sound Level without Barrier (dBA):	67.0

ExistingbtwReyes&Lady

* * * * CASE INFORMATION * * * *

* * * * Results calculated with TNM Version 2.5 * * * *

ExistingbtwReyes&Lady

* * * * TRAFFIC VOLUME/SPEED INFORMATION * * * *

Automobile volume (v/h):	1048.8
Average automobile speed (mph):	35.0
Medium truck volume (v/h):	21.9
Average medium truck speed (mph):	30.0
Heavy truck volume (v/h):	21.9
Average heavy truck speed (mph):	30.0
Bus volume (v/h):	0.0
Average bus speed (mph):	0.0
Motorcycle volume (v/h):	0.0
Average Motorcycle speed (mph):	0.0

* * * * TERRAIN SURFACE INFORMATION * * * *

Terrain surface:	hard

* * * * RECEIVER INFORMATION * * * *

DESCRIPTION OF RECEIVER # 1

ExistingbtwReyes&Lady

Distance from center of 12-ft wide, single lane roadway (ft):	50.0
A-weighted Hourly Equivalent Sound Level without Barrier (dBA):	65.8

CumbtwReyes&Lady

* * * * CASE INFORMATION * * * *

* * * * Results calculated with TNM Version 2.5 * * * *

CumbtwReyes&Lady

* * * * TRAFFIC VOLUME/SPEED INFORMATION * * * *

Automobile volume (v/h):	1517.8
Average automobile speed (mph):	35.0
Medium truck volume (v/h):	31.6
Average medium truck speed (mph):	30.0
Heavy truck volume (v/h):	31.6
Average heavy truck speed (mph):	30.0
Bus volume (v/h):	0.0
Average bus speed (mph):	0.0
Motorcycle volume (v/h):	0.0
Average Motorcycle speed (mph):	0.0

* * * * TERRAIN SURFACE INFORMATION * * * *

Terrain surface:	hard

* * * * RECEIVER INFORMATION * * * *

DESCRIPTION OF RECEIVER # 1

CumbtwReyes&Lady

Distance from center of 12-ft wide, single lane roadway (ft):	50.0
A-weighted Hourly Equivalent Sound Level without Barrier (dBA):	67.4

Cum+ProjbtwReyes&Lady

* * * * CASE INFORMATION * * * *

* * * * Results calculated with TNM Version 2.5 * * * *

Cum+ProjbtwReyes&Lady

* * * * TRAFFIC VOLUME/SPEED INFORMATION * * * *

Automobile volume (v/h):	1540.8
Average automobile speed (mph):	35.0
Medium truck volume (v/h):	32.1
Average medium truck speed (mph):	30.0
Heavy truck volume (v/h):	32.1
Average heavy truck speed (mph):	30.0
Bus volume (v/h):	0.0
Average bus speed (mph):	0.0
Motorcycle volume (v/h):	0.0
Average Motorcycle speed (mph):	0.0

* * * * TERRAIN SURFACE INFORMATION * * * *

Terrain surface: hard

* * * * RECEIVER INFORMATION * * * *

DESCRIPTION OF RECEIVER # 1

Cum+ProjbtwReyes&Lady

Distance from center of 12-ft wide, single lane roadway (ft):	50.0
A-weighted Hourly Equivalent Sound Level without Barrier (dBA):	67.5