CITY OF ALBUQUERQUE

NORTH I-25 NONPOTABLE WATER PROJECT

DRAINAGE REPORT
FOR HONEYWELL RESERVOIR AND PUMP STATION SITE

The following items concerning the Honeywell Reservoir and Pump Station site grading and drainage improvements are contained herein:

- Vicinity Map
- Updated/Amended Drainage Plan for Honeywell D.A.S Site (Sperry Site Tract 1-A-1)
- Site Grading and Drainage Plan for Proposed Subdivision for the Nonpotable Reservoir and Pump Station Site
- Calculations
- Storm Sewer Construction—Plan and Profile

The site of the proposed improvements, as shown on the Site Vicinity Map (Attachment A), is located at the west side of the existing Honeywell D.A.S. site (Sperry Site Tract 1-A-1) between San Diego Ave. and Jefferson St., N.E. (Zone Atlas B-17). The existing site is currently occupied by the Honeywell D.A.S manufacturing and research facilities.

The proposed subdivision and improvements will consist of the construction of a 1.0 million gallon storage reservoir and pumping facility with associated site piping and appurtenances for the North I-25 Nonpotable water recycling facilities for the City of Albuquerque.

As shown by Panel 129 of the Federal Emergency Management Agency, Flood Insurance Rate Map, dated September 20, 1996, this site does not lie within a designated flood hazard area (see Attachment C). Due to the fact that this is an existing developed site, it would be classified as an infill site, and it would not be expected to contribute runoff to an existing flooding problem. One hundred (100) percent of the total runoff from the proposed subdivision will be intercepted and diverted to the North La Cueva Arroyo. The proposed improvements represent a "no change" condition from what currently exists.

The runoff calculations (see Attachment D) analyze the existing and fully developed conditions for the 100-year, 6-hour rainfall event for both the entire Honeywell site and the proposed subdivision. The Rational Method was used to quantify the peak rate of discharge and the Soil Conservation Service (SCS) method was used to quantify the volume of runoff. Both methods were used in accordance with the City of Albuquerque *Development Process Manual* (DPM), Section 22.2. In the following discussion of the existing and proposed conditions, the basin designations (shown on Attachment B and described below) are referenced:

- Basin A—This area represents the northern portion of the site, including the north section of the existing manufacturing building, northern section of the paved employee parking area and the northeastern portion of the site adjacent to the North La Cueva Arroyo. Runoff contributions from this portion of the site are currently and will continue to be directed to the North La Cueva Arroyo.

- Basin B—This area represents the north central section of the paved employee parking area along the West Side of the manufacturing facility that currently and will continue to contribute runoff contributions to the North La Cueva Arroyo.

- Basin C—This area represents the south central section of the paved employee parking area along the West Side of the manufacturing facility that currently and will continue to contribute runoff contributions to the South La Cueva Arroyo.
- Basin D— This area represents the south section of the existing manufacturing building and the southeastern portion of the site adjacent to San Mateo Blvd. Runoff contributions from this portion of the site are currently and will continue to be directed to the South La Cueva Arroyo by way of an existing on-site storm sewer system.
- Basin E— This area represents the south section of the paved employee parking area along the South and West Side of the manufacturing facility. Runoff contributions from this portion of the site are currently and will continue to be directed to the South La Cueva Arroyo by way of an existing on-site storm sewer system.
- Basin F— This area represents the southern portion of the site adjacent to the South La Cueva Arroyo. Runoff contributions from this portion of the site are currently and will continue to be directed to the South La Cueva Arroyo.
- Basin G— This area represents the new site proposed for siting of the Nonpotable Water storage reservoir and pump station at the western edge of the property between San Diego Ave. and Jefferson St. Runoff contributions from this portion of the site are currently and will continue to be directed to the North La Cueva Arroyo.

Existing Conditions

Runoff flows from east to west across the site to either the North or South La Cueva Arroyos. Runoff from Basin A (Q_{100}=58.7 cubic feet per second [cfs]), flows northwesterly to a concrete inlet to the North La Cueva Arroyo near the northwest corner of the property. Runoff from Basin B (Q_{100}=27.1 cfs), flows westerly to an existing drop inlet near the northwest corner of the property. This flow is collected at the existing drop inlet and diverted through an existing 24-inch/42-inch storm sewer to the North La Cueva Arroyo. Runoff from Basin C (Q_{100}=33.9 cfs), flows westerly across the site, then south to an existing concrete inlet into Basin F and then into the South La Cueva Arroyo. Runoff from Basin D (Q_{100}=54.8 cfs), is collected in an existing on-site storm sewer system and discharged into the South La Cueva Arroyo. Runoff from Basin E (Q_{100}=53.7 cfs), flows westerly across the site to an existing drop inlet where it is collected and discharged into the South La Cueva

Arroyo. . Runoff from Basin F (Q_{100}=15.9 cfs), flows westerly along the north edge of the site to an existing concrete inlet into the South La Cueva Arroyo. (see Attachment B for a breakdown of the site drainage basins).

Proposed Improvements

Proposed improvements will consist of subdivision of the existing Honeywell site to create and convey ownership of a 0.985 acre tract, to the City of Albuquerque for siting of a 1.0 million gallon storage reservoir and pumping facility for the North I-25 Nonpotable water recycling project. The proposed improvements include: 1) demolition and removal of approximately 42,00 S.F. of asphalt pavement, 2) construction of approximately 360 L.F. of concrete curb and gutter, 3) excavation and finish grading of approximately 0.985 acres, 4) construction of a 1.0 M.G. Nonpotable water storage reservoir, 5) construction of a 9.21 MGD Nonpotable water pump station, 6) construction of approximately 380 L.F. of 30-inch and 110 L.F. of 36-inch storm sewer, and 7) landscaping improvements to 0.985 acres. Runoff from the newly created 0.985 acre parcel, Basin G (Q_{100}=4.3 cfs), will be collected at the new drop inlet structure near the center of the site and be directed to the North La Cueva Arroyo through a new 30/36-inch storm sewer. Site grading improvements and runoff flow routing is shown on the Site Grading and Drainage Plan for Proposed Subdivision for the Nonpotable Reservoir and Pump Station Site (Attachment E). The Grading and Drainage Plan also shows the following:

- Existing and proposed grades and contours at 1-foot intervals
- Continuity between existing and proposed grades
- Location and character of proposed improvements

Storm Sewer Construction

The proposed improvements will <u>not</u> add any additional flows to the storm sewer system; in fact, the flows will actually be decreased by 1.0 cfs (see Attachment D). The existing runoff currently collected at the existing drop inlet, at the northwest corner of the site, will be reduced by 8.4 cfs. The reduction in runoff, to the existing catch basin, is a result of the

following: 1) 1.0 cfs reduction in total site runoff, 2) diversion of 3.1 cfs to the South La Cueva Arroyo, and 3) the interception of 4.3 cfs by the new drop inlet structure located near the center of the new site. Runoff from the new site will be collected at the new drop inlet, near the center of the site, and diverted into the existing storm sewer at the location where the existing drop inlet piping connects to the North La Cueva Arroyo. The emergency overflow piping for the new 1.0 MG Nonpotable storage Reservoir will connect to the system at this same location. The existing 24-inch storm sewer from approximately 50 west of the existing drop inlet, will be reconstructed in order to accommodate the new Reservoir overflow and site drain piping (see Attachment F). Preliminary design details for the new drop inlet structure are shown on Attachment G.

Also attached for informational purposes are Attachment H— Proposed Landscaping Plan for the Nonpotable Reservoir and Pump Station Site.

Attachments

A. Site Vicinity Map

B. Site Drainage Basins, flow summary, and runoff calculations for entire Honeywell Site

C. Portion of Panel 129 of the Federal Emergency Agency, Flood Insurance Rate Map, showing location of proposed development site

D. Calculations on existing and proposed runoff flow and volume

E. Site Grading and Drainage Plan for Proposed Subdivision for the Nonpotable Reservoir and Pump Station Site

F. Storm Sewer Construction—Plan and Profile

G. New Drop Inlet Details

H. Proposed Landscaping Plan for the Nonpotable Reservoir and Pump Station Site

ATTACHMENT D

The following calculations quantify the change in runoff flow and volumes due to the proposed site improvements.

Ground Cover Information

From SCS Bernalillo County Soil Survey
Sheet 11 Soil Type for This Site is: **EtC - Embudo Tijeras Complex gravelly fine sandy loam**

Hydrologic Soil Group: **B**

From DPM Section 22.2 Table A-1: Precipitation Zone for this site is **Zone 2** (between the Rio Grande and San Mateo.)

Land Treatments Present:

A—Soil uncompacted by human activity with 0-10% slopes. Native grasses, weeds and shrubs in typical densities with minimal disturbance to grading, ground cover and infiltration capacity.

B—Irrigated lawns (slope < 10%), native grasses, weeds and shrubs, and soil uncompacted by human activity (slope 10%<20%)

C—Soil compacted by human activity. Minimal vegetation, vacant lots, unpaved parking/roads, gravel or rock on plastic.

D—Impervious areas, pavement and roofs.

Time of Concentration

T_C (Inches/Hour) per DPM Section 22.2 = **0.2 hours = 12 minutes**

100 Year 6-Hour Depth (R)

"**R**" Depth (Inches) per DPM Section 22.2 Table A-2 = **2.35 inches**

Rational Method

Discharge (cfs): $Q = CiA$

Where: C = **Runoff Coefficient** (from DPM Section 22.2 Table A-11)

i = From DPM Section 22.2 Table A-10 = **5.05 in/hr**

A = **Area** (acres)

SCS Method

Volume (cf): $V = 3630 \times \Sigma(E \times A)$

Where E = Excess Precipitation "E", from DPM Section 22.2, Table A-8.

A = Area (acres)

3630 = conversion factor (acre-feet to cubic feet)

Existing Conditions Entire Honeywell D.A.S Site (Sperry Site Tract 1-A-1)

Total Site Area (A+B+C+D+E+F+G) = 61.45 ac. (Reference Attachment A)

	Area (acres)	Runoff Coefficient (C)	Excess Precipitation (E)
Treatment A	04.36	0. 31	0.53
Treatment B	00.18	0.45	0.78
Treatment C	16.04	0.62	1.13
Treatment D	40.87	0.93	2.12

$Q_{100} = \Sigma(CiA) = (.31)(5.05)(4.36) + (.45)(5.05)(.18) + (.62)(5.05)(16.04) + (.93)(5.05)(40.87)$

Q_{100} = 249.4 cfs Area Impervious = 40.87 ac.: % impervious = 66.5%

$V_{100} = 3630 \times \Sigma(E \times A) = 3630 [(0.53)(4.36) + (0.78)(0.18) + (1.13)(16.04) + (2.12)(40.87)]$

V_{100} = 389,212 cf

Fully Developed Conditions Entire Honeywell D.A.S Site (Sperry Site Tract 1-A-1)

Total Site Area (A+B+C+D+E+F+G) = 61.45 ac. (Reference Attachment A)

	Area (acres)	Runoff Coefficient (C)	Excess Precipitation (E)
Treatment A	04.36	0. 31	0.53
Treatment B	00.57	0.45	0.78
Treatment C	16.11	0.62	1.13
Treatment D	40.41	0.93	2.12

$Q_{100} = \Sigma(CiA) = (.31)(5.05)(4.36) + (.45)(5.05)(.57) + (.62)(5.05)(16.11) + (.93)(5.05)(40.41)$

Q_{100} = 248.4 cfs Area Impervious = 40.18 ac.: % impervious = 65.4%

$V_{100} = 3630 \times \Sigma(E \times A) = 3630 [(0.53)(4.36) + (0.78)(0.57) + (1.13)(16.11) + (2.12)(40.41)]$

V_{100} = 387,063 cf

Comparison

Change in Q_{100} = 248.4 cfs – 249.4 cfs = -1.0 cfs (**decrease**)

Change in V_{100} = 387,063 cf - 389,212 cf = -2,149 cf (**decrease**)

Existing Conditions New Basin G
(created from subdivision of Sperry Site Tract 1-A-1)

Site Data

Area = 1.28 ac.

	Area (acres)	Runoff Coefficient (C)	Excess Precipitation (E)
Landscaped Area (Treatment B)	0.00	0.45	0.78
Undeveloped Area (Treatment C)	0.38	0.62	1.13
Roof Area (Treatment D)	0.00	0.93	2.12
Paved Area (Treatment D)	0.90	0.93	2.12

$Q_{100} = \Sigma(CiA) = (.45)(5.05)(.00) + (.62)(5.05)(.38) + (.93)(5.05)(.00) + (.93)(5.05)(.90)$

$Q_{100} = 5.4$ cfs

Area impervious = 0.90 ac.: % impervious = 70.3%

$V_{100} = 3630 \times \Sigma(E \times A) = 3630\ [(.78)(.00) + (1.13)(.38) + (2.12)(.90)] = 8{,}485$ cf

Fully Developed Conditions New Basin G
(created from subdivision of Sperry Site Tract 1-A-1)

Site Data

Area = 1.28 ac.

	Area (acres)	Runoff Coefficient (C)	Excess Precipitation (E)
Landscaped Area (Treatment B)	0.39	0.45	0.78
Undeveloped Area (Treatment C)	0.50	0.62	1.13
Roof Area (Treatment D)	0.25	0.93	2.12
Paved Area (Treatment D)	0.14	0.93	2.12

$Q_{100} = \Sigma(CiA) = (.45)(5.05)(.39) + (.62)(5.05)(.50) + (.93)(5.05)(.25) + (.93)(5.05)(.14)$

$Q_{100} = 4.3$ cfs

Area impervious = 0.39 ac.: % impervious = 30.5%

$V_{100} = 3630 \times \Sigma(E \times A) = 3630\ [(.78)(.39) + (1.13)(.5) + (2.12)(.39)] = 6{,}156$ cf

Comparison

Change in Q_{100} = 4.3 cfs – 5.4 cfs = -1.1 cfs (**decrease**)

Change in V_{100} = 6,156 cf - 8,485 cf = -2,329 cf (**decrease**)

APPENDIX A

BASIN TIME OF CONCENRATION (Tc) CALCULATIONS

info

Calculation of Time to Peak
Revised DPM procedure
03/19/96

EXISTING UNDEVELOPED BASINS

Description	Var.	Unit							
Basin			#1	#2	#3	#4	#5	#6	#7	#8
Basin Area		Acres	19.50	49.72	32.93	21.82	39.97	15.08	16.50	9.91
Total Reach	L	Feet	1000.0	2350.0	3100.0	2000.0	2650.0	1300.0	1350.0	1450.0
Overland Reach	L1	Feet	400.0	400.0	400.0	400.0	400.0	400.0	400.0	400.0
Overland K	K1		0.7	0.7	0.7	0.7	0.7	1	0.7	0.7
Overland Slope	S1	Percent	3.00	3.50	2.80	3.50	1.75	1.50	3.50	2.50
Adj. Overland Slope	S1'	Percent	3.000	3.500	2.800	3.500	1.750	1.500	3.500	2.500
Gully Reach	L2	Feet	600.0	1600.0	1600.0	1600.0	1600.0	900.0	950.0	1050.0
Gully K	K2		2.000	2.000	2.000	2.000	2.000	3.000	2.000	2.000
Gully Slope	S2	Percent	2.000	3.000	2.800	2.000	1.500	1.500	2.500	3.200
Adj. Gully Slope	S2'	Percent	2.000	3.000	2.800	2.000	1.500	1.500	2.500	3.200
Arroyo Reach	L3	Feet	0.0	350.0	1100.0	0.0	650.0	0.0	0.0	0.0
Arroyo K	K3		3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
Arroyo Slope	S3	Percent	3.000	3.600	2.900	3.000	3.500	1.500	3.630	2.500
Adj. Arroyo Slope	S3'	Percent	3.000	3.600	2.900	3.000	3.500	1.500	3.630	2.500
Lca	Lca	Feet	500.0	1250.0	1250.0	1350.0	1350.0	750.0	500.0	600.0
Base Discharge	Qb	cfs	76.9	67.5	38.9	30.9	41.9	54.5	26.5	16.0
Ground Slope S	S	Percent	2.400	3.174	2.835	2.300	2.028	1.500	2.796	3.007
Adjusted Slope S'	S'	Percent	2.400	3.174	2.835	2.300	2.028	1.500	2.796	3.007
K	K		1.191	1.591	1.779	1.514	1.549	1.857	1.333	1.277
K'	K'		1.191	1.591	1.779	1.514	1.549	1.857	1.333	1.277
K"	K"		4.259	3.618	3.466	3.693	4.154	5.064	3.258	2.867
K"'	K"'		2.920	2.480	2.376	2.532	2.847	3.471	2.233	1.965
Kn	Kn		0.033	0.033	0.033	0.033	0.033	0.021	0.033	0.033
Orig. TC	TC	Hrs.	0.151	0.230	0.287	0.242	0.334	0.159	0.168	0.182
Adjusted TC	TC'	Hrs.	0.151	0.230	0.287	0.242	0.334	0.159	0.168	0.182
Time Lag	Lg	Hrs.	-	-	-	-	-	-	-	-
Time to Peak	TP	Hrs.	0.133	0.153	0.192	0.161	0.222	0.133	0.133	0.133

Calculation of Time to Peak
Revised DPM procedure
03/19/96

DEVELOPED SITE AND STREETS WITH UNDEVELOPED UPSTREAM BASINS

Description	Var.	Unit	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	#14	#15
Basin																	
Basin Area		Acres	19.50	45.53	17.75	12.02	20.94	3.04	4.06	2.37	0.87	0.91		2.93	5.87	4.64	1.97
Total Reach	L	Feet	1000.0	2250.0	2100.0	1000.0	2000.0	1950.0	2600.0	1200.0	440.0	460.0		870.0	660.0	2390.0	1000.0
Overland Reach	L1	Feet	400.0	400.0	400.0	400.0	400.0	400.0	400.0	400.0	400.0	400.0		400.0	400.0	400.0	400.0
Overland K	K1		0.7	0.7	0.7	0.7	0.7	3	3	3	3	3		0.7	0.7	3	3
Overland Slope	S1	Percent	3.00	4.00	3.50	2.00	4.50	0.50	0.50	0.50	0.50	0.50		3.50	2.50	2.00	2.00
Adj. Overland Slope	S1'	Percent	3.000	4.000	3.500	2.000	4.434	0.500	0.500	0.500	0.500	0.500		3.500	2.500	2.000	2.000
Gully Reach	L2	Feet	600.0	1600.0	1600.0	600.0	1600.0	1550.0	1600.0	800.0	40.0	60.0		470.0	260.0	1600.0	600.0
Gully K	K2		2.000	2.000	2.000	2.000	2.000	3.000	3.000	3.000	3.000	3.000		3.000	3.000	3.000	3.000
Gully Slope	S2	Percent	2.000	2.500	4.000	2.000	1.900	0.500	0.500	0.500	0.500	0.500		3.000	4.250	2.000	2.000
Adj. Gully Slope	S2'	Percent	2.000	2.500	4.000	2.000	1.900	0.500	0.500	0.500	0.500	0.500		3.000	4.233	2.000	2.000
Arroyo Reach	L3	Feet	0.0	250.0	100.0	0.0	0.0	0.0	600.0	0.0	0.0	0.0		0.0	0.0	390.0	0.0
Arroyo K	K3		3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000		3.000	3.000	3.000	3.000
Arroyo Slope	S3	Percent	3.500	5.500	5.000	3.300	5.000	3.300	0.500	3.700	2.900	1.500		2.000	2.000	2.000	2.000
Adj. Arroyo Slope	S3'	Percent	3.500	5.008	4.760	3.300	4.760	3.300	0.500	3.700	2.900	1.500		2.800	2.800	2.800	2.800
Lca	Lca	Feet	500.0	1500.0	1000.0	550.0	1000.0	950.0	1300.0	600.0	220.0	230.0		435.0	330.0	1200.0	500.0
Base Discharge	Qb	cfs	76.9	73.7	31.5	19.3	30.2	11.7	13.3	9.8	3.7	3.7		4.4	9.5	19.3	8.2
Ground Slope S	S	Percent	2.400	3.100	3.952	2.000	2.420	0.500	0.500	0.500	0.500	0.500		3.230	3.189	2.000	2.000
Adjusted Slope S'	S'	Percent	2.400	3.100	3.952	2.000	2.420	0.500	0.500	0.500	0.500	0.500		3.230	3.189	2.000	2.000
K	K		1.191	1.545	1.466	1.148	1.513	3.000	3.000	3.000	3.000	3.000		1.223	0.916	3.000	3.000
K'	K'		1.191	1.542	1.466	1.148	1.509	3.000	3.000	3.000	3.000	3.000		1.223	0.916	3.078	3.000
K''	K''		4.259	3.719	2.826	3.640	3.586	6.647	6.808	6.440	5.408	5.408		2.197	2.535	3.638	3.119
K'''	K'''		2.920	2.549	1.937	2.495	2.458	4.556	4.666	4.414	3.707	3.707		1.506	1.737	2.494	2.138
Kn	Kn		0.033	0.033	0.033	0.033	0.033	0.021	0.021	0.021	0.021	0.021		0.033	0.033	0.021	0.021
Orig. TC	TC	Hrs.	0.151	0.230	0.200	0.171	0.236	0.255	0.340	0.157	0.058	0.060		0.110	0.112	0.156	0.065
Adjusted TC	TC'	Hrs.	0.151	0.230	0.200	0.171	0.236	0.255	0.340	0.157	0.058	0.060		0.110	0.112	0.156	0.065
Time Lag	Lg	Hrs.	-	-	-	-	-	-	-	-	-	-		-	-	-	-
Time to Peak	TP	Hrs.	0.133	0.153	0.133	0.133	0.157	0.170	0.227	0.133	0.133	0.133		0.133	0.133	0.133	0.133

Calculation of Time to Peak
Revised DPM procedure
03/19/95

Developed Citicorp Site and Streets with Developed Upstream Basins

Description	Var.	Unit								
Basin			#2	#3	#4	#4A	#5	#5A	#12	#13
Basin Area		Acres	40.00	21.61	16.26	13.05	6.08	3.61	2.93	5.87
Total Reach	L	Feet	2650.0	2200.0	1275.0	1000.0	1125.0	750.0	870.0	660.0
Overland Reach	L1	Feet	400.0	400.0	400.0	400.0	400.0	400.0	400.0	400.0
Overland K	K1		3	3	3	3	0.7	0.7	3	3
Overland Slope	S1	Percent	2.00	2.00	2.00	2.00	4.50	4.50	2.00	2.00
Adj. Overland Slope	S1'	Percent	2.000	2.000	2.000	2.000	4.434	4.434	2.000	2.000
Gully Reach	L2	Feet	1600.0	1600.0	875.0	600.0	725.0	350.0	470.0	260.0
Gully K	K2		3.000	3.000	3.000	3.000	2.000	2.000	3.000	3.000
Gully Slope	S2	Percent	2.000	2.000	2.000	2.000	1.900	1.900	2.000	2.000
Adj. Gully Slope	S2'	Percent	2.000	2.000	2.000	2.000	1.900	1.900	2.000	2.000
Arroyo Reach	L3	Feet	650.0	200.0	0.0	0.0	0.0	0.0	0.0	0.0
Arroyo K	K3		3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
Arroyo Slope	S3	Percent	2.000	2.000	2.000	2.000	1.500	1.500	2.000	2.000
Adj. Arroyo Slope	S3'	Percent	2.000	5.000	2.000	2.000	1.500	1.500	2.800	2.800
Lca	Lca	Feet	1325.0	1300.0	635.0	500.0	570.0	340.0	435.0	330.0
Base Discharge	Qb	cfs	271.5	86.1	49.2	63.7	18.0	16.5	12.0	24.0
Ground Slope S	S	Percent	2.000	2.000	2.000	2.000	2.824	3.287	2.000	2.000
Adjusted Slope S'	S'	Percent	2.000	2.000	2.000	2.000	2.824	3.287	2.000	2.000
K	K		3.000	3.000	3.000	3.000	1.257	1.044	3.000	3.000
K'	K'		3.000	3.104	3.000	3.000	1.253	1.039	3.000	3.000
K"	K"		5.856	4.762	4.306	4.511	3.023	2.760	3.340	3.784
K"'	K"'		4.014	3.264	2.951	3.092	2.072	1.892	2.289	2.594
Kn	Kn		0.021	0.021	0.021	0.021	0.033	0.033	0.021	0.033
1	TC	Hrs.	0.174	0.144	0.083	0.065	0.148	0.110	0.057	0.043
Adjusted TC	TC'	Hrs.	0.174	0.144	0.083	0.065	0.148	0.110	0.057	0.043
Time Lag	Lg	Hrs.	-	-	-	-	-	-	-	-
Time to Peak	TP	Hrs.	0.133	0.133	0.133	0.133	0.133	0.133	0.133	0.133

APPENDIX B

AHYMO MODEL SUMMARY SHEETS

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =03/21/1996
INPUT FILE = EXIST.HYM USER NO.= BOHN_HNM.STE

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION	
*S AHYMO FILE FOR CITICOPR OFFSITE DRAINAGE											
*S FILENAME: EXIST.HYM											
RAINFALL TYPE= 2										RAIN24=	2.800
START										TIME=	.00
*S BASIN 1 (DEVELOPED)											
COMPUTE NM HYD	1.00	-	1	.03050	76.89	3.359	2.06478	1.500	3.939	PER IMP=	75.00
*S ROUTE FLOW FROM BASIN 1 UNDER I-25											
ROUTE MCUNGE	1.10	1	3	.03050	75.31	2.942	1.80857	1.511	3.858	CCODE =	.2
*S ROUTE FLOW FROM BASIN 1 THROUGH BASIN 2											
ROUTE MCUNGE	1.20	3	2	.03050	65.08	2.916	1.79240	1.750	3.334	CCODE =	.1
*S BASIN 2 (UNDEVELOPED)											
COMPUTE NM HYD	2.00	-	3	.07140	67.50	2.203	.57848	1.550	1.477	PER IMP=	1.00
*S COMBINED FLOW FROM BASIN 1 AND 2 AT AP1 (SAN MATEO & PASSADENA)											
*S**********											
S TOTAL FLOW AT AP1 *											
*S**********											
ADD HYD	AP1	3& 2	4	.10190	104.52	5.118	.94181	1.650	1.603		
*S BASIN 3 (UNDEVELOPED)											
*S**********											
S TOTAL FLOW AT AP2 *											
*S**********											
COMPUTE NM HYD	AP2	-	3	.05150	38.86	1.534	.55839	1.600	1.179	PER IMP=	.00
*S BASIN 4 (UNDEVELOPED)											
COMPUTE NM HYD	4.00	-	6	.03410	30.94	1.052	.57847	1.550	1.418	PER IMP=	1.00
*S BASIN 5 (UNDEVELOPED)											
COMPUTE NM HYD	5.00	-	5	.06250	41.90	1.861	.55839	1.600	1.047	PER IMP=	.00
*S ROUTE BASINS 1 AND 2 THROUGH BASIN 5 TO AP4											
ROUTE MCUNGE	1.30	4	2	.10190	104.16	5.135	.94478	1.700	1.597	CCODE =	.2
*S ADD ROUTED FLOW BASINS 1 AND 2 TO BASIN 5 AT AP4											
ADD HYD	5.10	2& 5	9	.16440	141.99	6.996	.79788	1.650	1.349		
*S BASIN 6 (DEVELOPED)											
COMPUTE NM HYD	6.00	-	6	.02360	54.51	2.172	1.72587	1.500	3.609	PER IMP=	51.08
*S ROUTE BASIN 6 THROUGH BASIN 7 TO AP3											
ROUTE MCUNGE	6.10	6	1	.02360	50.46	2.162	1.71763	1.600	3.341	CCODE =	.1
*S BASIN 7 (DEVELOPED)											
COMPUTE NM HYD	7.00	-	7	.02580	26.54	.768	.55839	1.500	1.607	PER IMP=	.00
*S ADD ROUTED FLOW FROM BASIN 6 TO BASIN 7 AT AP3											
*S**********											
S TOTAL FLOW AT AP3 *											
*S**********											
ADD HYD	AP3	7& 1	3	.04940	76.18	2.930	1.11218	1.550	2.410		
*S BASIN 8 (UNDEVELOPED)											
COMPUTE NM HYD	8.00	-	8	.01550	15.95	.462	.55839	1.500	1.607	PER IMP=	.00
*S ADD FLOW FROM BASIN 8 TO FLOW FROM BASINS 1, 2 AND 5 AT AP4											
*S**********											
S TOTAL FLOW AT AP4 *											
*S**********											
ADD HYD	AP4	8& 9	4	.17990	151.90	7.457	.77725	1.650	1.319		
FINISH											

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =03/25/1996
INPUT FILE = EXPLUS.HYM USER NO.= BOHN_HNM.STE

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION	
*S AHYMO FILE FOR CITICOPR OFFSITE DRAINAGE											
*S FILENAME: EXPLUS.HYM											
RAINFALL TYPE= 2										RAIN24=	2.800
START										TIME=	.00
*S BASIN 1											
*S EAST OF I-25 (DEVELOPED)											
COMPUTE NM HYD	1.00	-	(1)	.03050	76.89	3.359	2.06478	1.500	3.939	PER IMP=	75.00
*S ROUTE FLOW FROM BASIN 1 UNDER I-25											
ROUTE MCUNGE	1.10	1	3	.03050	76.25	3.359	2.06482	1.500	3.906	CCODE =	.2
*S ROUTE FLOW FROM BASIN 1 THROUGH BASIN 2											
ROUTE MCUNGE	1.20	3	2	.03050	76.17	3.380	2.07762	1.650	3.902	CCODE =	.2
*S BASIN 2 (UNDEVELOPED)											
COMPUTE NM HYD	2.00	-	(3)	.07770	73.69	2.397	.57847	1.550	1.482	PER IMP=	1.00
*S COMBINED FLOW FROM BASIN 1 AND 2 AT AP1 (SAN MATEO & PASSADENA)											
*S**********											
S TOTAL FLOW AT AP1 *											
*S**********											
ADD HYD	2.10	3& 2	4	.10820	138.65	5.777	1.00105	1.600	2.002		
*S BASIN 3 (UNDEVELOPED)											
*S**********											
S TOTAL FLOW AT AP2 *											
*S**********											
COMPUTE NM HYD	3.00	-	5	.03060	31.47	.911	.55839	1.500	1.607	PER IMP=	.00
*S ROUTE FLOW FROM AP2 THROUGH BASIN 9 TO AP5											
ROUTE MCUNGE	RAP2	5	3	.03060	31.06	.911	.55828	1.500	1.586	CCODE =	.2
*S BASIN 4 (UNDEVELOPED)											
*S**********											
S TOTAL FLOW AT AP3 *											
*S**********											
COMPUTE NM HYD	4.00	-	6	.01880	19.34	.560	.55839	1.500	1.607	PER IMP=	.00
*S**********											
S NOTE UNDER CITICORP WITH EXISTING UPSTREAM AP 4 IS NOT INCLUDED *											
S BASIN 4 IS DIVERTED BY SAN MATEO EMBANKMENT TO AP3 *											
*S**********											
*S ROUTE FLOW FROM AP3 THROUGH BASIN 8 TO AP5											
ROUTE MCUNGE	4.10	6	20	.01880	19.25	.560	.55830	1.500	1.600	CCODE =	.2
*S BASIN 5 (DEVELOPED)											
*S BASIN IMMEDIATELY NORTH OF SAN DIEGO TO BEEHIVE											
COMPUTE NM HYD	5.00	-	5	.01610	38.29	1.779	2.07180	1.500	3.716	PER IMP=	70.00
*S BASIN 6 (DEVELOPED)											
*S SAN DIEGO - WEST I-25 FRONTAGE ROAD TO SAN MATEO											
COMPUTE NM HYD	6.00	-	6	.00480	11.67	.573	2.23800	1.550	3.798	PER IMP=	81.25
*S BASIN 7 (DEVELOPED)											
*S SAN DIEGO - SAN MATEO TO JEFFERSON											
COMPUTE NM HYD	7.00	-	7	.00630	13.33	.752	2.23800	1.600	3.306	PER IMP=	81.25
*S BASIN 8 (DEVELOPED)											
*S SAN MATEO - SAN DIEGO TO SOUTH CITICORP ENTRANCE (FULL STREET SECTION)											
COMPUTE NM HYD	8.00	-	8	.00370	9.79	.420	2.12836	1.500	4.132	PER IMP=	75.00
*S BASIN 9 (DEVELOPED)											
*S SAN MATEO - SOUTH CITICOROP ENTRANCE TO NORTH CITICORP ENTRANCE											
*S (FULL STREET SECTION)											

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION
COMPUTE NM HYD	9.00	-	9	.00140	3.71	.159	2.12836	1.500	4.143	PER IMP= 75.00
*S ADD FLOW FROM AP1 TO BASIN 9										
ADD HYD	9.10	4& 9	4	.10960	141.20	5.936	1.01545	1.600	2.013	
*S ROUTE FLOW FROM AP1 THROUGH BASIN 9 TO AP5										
ROUTE MCUNGE	9.20	4	1	.10960	140.07	5.933	1.01492	1.600	1.997	CCODE = .2
*S ADD ROUTED FLOW FROM AP1 TO BASIN 8 AT AP5										
ADD HYD	8.10	1& 8	1	.11330	147.32	6.352	1.05127	1.550	2.032	
*S ADD ROUTED FLOW FROM AP3 TO FLOWS AT AP5										
ADD HYD	8.20	1& 3	2	.14390	178.29	7.264	.94643	1.550	1.936	
*S ADD ROUTED FLOW FROM AP3 TO FLOWS AT AP5										
*S**********										
S TOTAL FLOW AT AP5 *										
*S**********										
ADD HYD	AP5	2&20	5	.16270	197.18	7.823	.90158	1.550	1.894	
*S BASIN 10 (DEVELOPED)										
*S SAN MATEO - NORTH CITICORP ENTRANCE TO BALBOA (FULL STREET SECTION)										
COMPUTE NM HYD	10.00	-	10	.00140	3.71	.159	2.12836	1.500	4.143	PER IMP= 75.00
*S BASIN 11 (DEVELOPED)										
*S EXISTING SUMITOMO SITE (DEVELOPED)										
COMPUTE NM HYD	11.00	-	11	.01940	44.82	1.786	1.72587	1.500	3.610	PER IMP= 51.08
*S BASIN 12										
*S PROPOSED SUMITOMO EXPANSION SITE (UNDEVELOPED)										
COMPUTE NM HYD	12.00	-	12	.00430	4.43	.128	.55839	1.500	1.609	PER IMP= .00
*S ADD FLOWS FROM BASINS 11 AND 12 AT AP7										
*S**********										
S TOTAL FLOW AT AP7 *										
*S**********										
ADD HYD	AP7	11&12	7	.02370	49.24	1.914	1.51403	1.500	3.247	
*S BASIN 13										
*S SITE WEST OF SUMITOMO (UNDEVELOPED)										
*S**********										
S TOTAL FLOW AT AP8 *										
*S**********										
COMPUTE NM HYD	AP8	-	8	.00920	9.47	.274	.55839	1.500	1.608	PER IMP= .00
*S BASIN 14 (DEVELOPED)										
*S BALBOA - WEST I-25 FRONTAGE ROAD TO SAN MATEO (FULL STREET SECTION)										
COMPUTE NM HYD	14.00	-	14	.00730	19.29	.829	2.12836	1.500	4.129	PER IMP= 75.00
*S ADD FLOWS FROM BASIN 10 AND 14 AT AP6										
*S**********										
S TOTAL FLOW AT AP6 *										
*S**********										
ADD HYD	AP6	10&14	6	.00870	23.00	.988	2.12830	1.500	4.131	
*S**********										
*S SOUTH STORM DRAIN THROUGH SITE *										
*S**********										
COMPUTE NM HYD	16.00	-	16	.02020	55.16	2.370	2.20033	1.500	4.267	PER IMP= 77.00
*S ADD FROM BASIN 16 TO FLOWS FROM AP5 AT AP5										
ADD HYD	AP5.1	16& 5	17	.18290	245.68	10.194	1.04501	1.550	2.099	
*S ROUTE FLOWS THRU MAIN STORM DRAIN IN SOUTH HALF OF SITE										
*S ROUTE FLOWS FROM AP5 TO AP10										
ROUTE MCUNGE	RAP5	17	18	.18290	244.65	10.191	1.04470	1.550	2.090	CCODE = .2
*S ROUTE FLOWS FROM AP7 TO AP10										

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION
ROUTE MCUNGE	RAP7	7	19	.02370	49.00	1.913	1.51345	1.500	3.231	CCODE = .2
*S ADD FLOWS FROM AP7 TO FLOW AT AP10										
ADD HYD	AP10.1	18&19	20	.20660	289.91	12.104	1.09847	1.550	2.193	
*S ROUTE FLOWS FROM AP8 TO AP10										
ROUTE MCUNGE	RAP8	8	21	.00920	9.37	.273	.55555	1.550	1.592	CCODE = .1
*S ADD FLOWS FROM AP8 TO FLOW AT AP10										
*S**********										
S TOTAL FLOW AT AP10 *										
*S**********										
ADD HYD	AP10	20&21	10	.21580	299.28	12.376	1.07532	1.550	2.167	
*S**********										
*S NORTH STORM DRAIN THROUGH SITE *										
*S**********										
COMPUTE NM HYD	17.00	-	17	.02960	82.53	3.588	2.27291	1.500	4.356	PER IMP= 81.50
*S ADD FLOWS FROM BASIN 17 TO AP6 TO FLOW AT AP6										
ADD HYD	AP6.1	17& 6	22	.03830	105.53	4.576	2.24005	1.500	4.305	
*S ROUTE FLOWS THRU MAIN STORM DRAIN IN NORTH HALF OF SITE										
*S ROUTE FLOWS FROM AP6 TO AP11										
ROUTE MCUNGE	RAP6	22	23	.03830	103.30	4.581	2.24254	1.500	4.214	CCODE = .2
*S BASIN 15 (DEVELOPED)										
*S OLD BASIN 12										
*S BALBOA - SAN MATEO TO WEST SITE BOUNDARY (FULL STREET SECTION)										
*S**********										
S TOTAL FLOW AT AP9 *										
*S**********										
COMPUTE NM HYD	15.00	-	15	.00310	8.20	.352	2.12836	1.500	4.134	PER IMP= 75.00
*S ADD FLOWS FROM BASIN 15 TO FLOWS FROM AP6 TO FLOW AT AP9										
*S**********										
S TOTAL FLOW AT AP11 *										
*S**********										
ADD HYD	AP11	15&23	11	.04140	111.50	4.933	2.23397	1.500	4.208	
*S ROUTE FLOWS FROM AP11 TO AP12										
ROUTE MCUNGE	RAP11	11	24	.04140	110.89	4.932	2.23352	1.550	4.185	CCODE = .2
*S**********										
S TOTAL FLOW AT AP12 *										
*S**********										
ADD HYD	AP12	10&24	12	.25720	410.18	17.308	1.26175	1.550	2.492	
*S ROUTE FLOWS FROM AP12 TO AP13										
*S**********										
S TOTAL FLOW AT AP13 *										
*S**********										
ROUTE MCUNGE	AP13	12	13	.25720	409.57	17.306	1.26164	1.550	2.488	CCODE = .2
FINISH										

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =04/30/1996
INPUT FILE = DEVLP.HYM USER NO.= BOHN_HNM.STE

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION	
*S AHYMO FILE FOR CITICOPR OFFSITE DRAINAGE											
*S FILENAME: DEVLP.HYM											
RAINFALL TYPE= 2										RAIN24=	2.800
START										TIME=	.00
*S BASIN 1											
*S EAST OF I-25 (DEVELOPED)											
COMPUTE NM HYD	1.00	-	1	.03050	76.89	3.359	2.06478	1.500	3.939	PER IMP=	75.00
*S ROUTE FLOW FROM BASIN 1 UNDER I-25											
ROUTE MCUNGE	1.10	1	3	.03050	76.25	3.359	2.06482	1.500	3.906	CCODE =	.2
*S ROUTE FLOW FROM BASIN 1 THROUGH BASIN 2											
ROUTE MCUNGE	1.20	3	2	.03050	76.17	3.380	2.07762	1.650	3.902	CCODE =	.2
*S BASIN 2 (DEVELOPED)											
COMPUTE NM HYD	2.00	-	3	.06250	163.70	6.906	2.07181	1.500	4.093	PER IMP=	70.00
*S COMBINED FLOW FROM BASIN 1 AND 2 AT AP1 (SAN MATEO & PASSADENA)											
*S**********											
S TOTAL FLOW AT AP1 *											
*S**********											
ADD HYD	AP1	3& 2	4	.09300	205.39	10.286	2.07370	1.550	3.451		
*S BASIN 9 (DEVELOPED)											
*S SAN MATEO - SOUTH CITICOROP ENTRANCE TO NORTH CITICORP ENTRANCE											
*S (FULL STREET SECTION)											
COMPUTE NM HYD	9.00	-	9	.00140	3.71	.159	2.12836	1.500	4.143	PER IMP=	75.00
*S ADD FLOW FROM AP1 TO BASIN 9											
ADD HYD	9.10	4& 9	4	.09440	208.66	10.444	2.07451	1.550	3.454		
*S ROUTE FLOW FROM AP1 THROUGH BASIN 9 TO AP5											
ROUTE MCUNGE	9.20	4	1	.09440	204.89	10.442	2.07406	1.550	3.391	CCODE =	.1
*S BASIN 3 (DEVELOPED)											
*S**********											
S TOTAL FLOW AT AP2 *											
*S**********											
COMPUTE NM HYD	AP2	-	5	.03290	86.10	3.635	2.07181	1.500	4.089	PER IMP=	70.00
*S ROUTE FLOW FROM AP2 THROUGH BASIN 9 TO AP5											
ROUTE MCUNGE	RAP2	5	3	.03290	85.98	3.635	2.07175	1.500	4.083	CCODE =	.2
*S BASIN 4 (DEVELOPED)											
COMPUTE NM HYD	4.00	-	6	.02570	67.26	2.840	2.07180	1.500	4.089	PER IMP=	70.00
*S ROUTE FLOW FROM BASIN 4 THROUGH BASIN 4A											
*S SHEET FLOW ACROSS A PARKING LOT											
ROUTE MCUNGE	4.10	6	7	.02570	66.52	2.850	2.07914	1.550	4.044	CCODE =	.2
*S BASIN 4A (DEVELOPED)											
COMPUTE NM HYD	4A	-	8	.02260	63.69	2.796	2.31936	1.500	4.403	PER IMP=	85.00
ADD HYD	4.20	7& 8	11	.04830	126.23	5.645	2.19152	1.500	4.083		
*S**********											
S TOTAL FLOW AT AP3 *											
*S**********											
*S BASIN 8 (DEVELOPED)											
*S SAN MATEO - SAN DIEGO TO SOUTH CITICORP ENTRANCE (FULL STREET SECTION)											
COMPUTE NM HYD	8.00	-	12	.00370	9.79	.420	2.12836	1.500	4.132	PER IMP=	75.00
ADD HYD	4.40	12&11	13	.05200	136.01	6.065	2.18702	1.500	4.087		
*S ROUTE FLOW FROM AP3 THROUGH BASIN 8 TO AP5											

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION
ROUTE MCUNGE	RAP13	13	20	.05200	133.52	6.063	2.18621	1.550	4.012	CCODE = .1
*S BASIN 5 (DEVELOPED)										
*S BASIN IMMEDIATELY NORTH OF SAN DIEGO TO BASIN 5A										
COMPUTE NM HYD	5.00	-	5	.00970	23.08	1.072	2.07180	1.500	3.717	PER IMP= 70.00
*S ROUTE FLOW FROM BASIN 5 THROUGH BASIN 5A										
*S SHEET FLOW ACROSS A PARKING LOT										
ROUTE MCUNGE	R5	5	6	.00970	22.49	1.067	2.06211	1.600	3.622	CCODE = .1
*S BASIN 5A (DEVELOPED)										
*S BASIN IMMEDIATELY NORTH OF SAN DIEGO TO BEEHIVE										
COMPUTE NM HYD	5A	-	5	.00640	16.52	.792	2.31936	1.500	4.033	PER IMP= 85.00
ADD HYD	EEE	5& 6	5	.01610	37.12	1.858	2.16431	1.550	3.602	
*S BASIN 6 (DEVELOPED)										
*S SAN DIEGO - WEST I-25 FRONTAGE ROAD TO SAN MATEO										
COMPUTE NM HYD	6.00	-	6	.00480	11.67	.573	2.23800	1.550	3.798	PER IMP= 81.25
*S BASIN 7 (DEVELOPED)										
*S SAN DIEGO - SAN MATEO TO JEFFERSON										
COMPUTE NM HYD	7.00	-	7	.00630	13.33	.752	2.23800	1.600	3.306	PER IMP= 81.25
*S ADD ROUTED FLOW FROM AP3 TO FLOWS AT AP5										
ADD HYD	8.20	1& 3	2	.12730	282.01	14.077	2.07345	1.550	3.461	
*S ADD ROUTED FLOW FROM AP4 TO FLOWS AT AP5										
*S**********										
S TOTAL FLOW AT AP5 *										
*S**********										
ADD HYD	AP5	2&20	5	.17930	415.53	20.140	2.10615	1.550	3.621	
*S BASIN 10 (DEVELOPED)										
*S SAN MATEO - NORTH CITICORP ENTRANCE TO BALBOA (FULL STREET SECTION)										
COMPUTE NM HYD	10.00	-	10	.00140	3.71	.159	2.12836	1.500	4.143	PER IMP= 75.00
*S BASIN 11 (DEVELOPED)										
*S EXISTING SUMITOMO SITE (DEVELOPED)										
COMPUTE NM HYD	11.00	-	11	.01940	47.08	1.902	1.83861	1.500	3.792	PER IMP= 56.00
*S BASIN 12										
*S PROPOSED SUMITOMO EXPANSION SITE (DEVELOPED)										
COMPUTE NM HYD	12.00	-	12	.00430	11.27	.475	2.07180	1.500	4.094	PER IMP= 70.00
*S ADD FLOWS FROM BASINS 11 AND 12 AT AP7										
*S**********										
S TOTAL FLOW AT AP7 *										
*S**********										
ADD HYD	AP7	11&12	7	.02370	58.34	2.377	1.88090	1.500	3.847	
*S BASIN 13										
*S SITE WEST OF SUMITOMO (DEVELOPED)										
*S**********										
S TOTAL FLOW AT AP8 *										
*S**********										
COMPUTE NM HYD	AP8	-	8	.00820 (should be 0.0092)	21.47	.906	2.07181	1.500	4.092	PER IMP= 70.00
*S BASIN 14 (DEVELOPED)										
*S BALBOA - WEST I-25 FRONTAGE ROAD TO SAN MATEO (FULL STREET SECTION)										
COMPUTE NM HYD	14.00	-	14	.00730	19.29	.829	2.12836	1.500	4.129	PER IMP= 75.00
*S ADD FLOWS FROM BASIN 10 AND 14 AT AP6										
*S**********										
S TOTAL FLOW AT AP6 *										
*S**********										
ADD HYD	AP6	10&14	6	.00870	23.00	.988	2.12830	1.500	4.131	
*S**********										
*S SOUTH STORM DRAIN THROUGH SITE *										
*S**********										

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION
COMPUTE NM HYD	16.00	-	16	.02020	55.16	2.370	2.20033	1.500	4.267	PER IMP= 77.00
*S ADD FROM BASIN 16 TO FLOWS FROM AP5 AT AP5										
ADD HYD	AP5.1 16& 5	17		.19950	464.03	22.511	2.11568	1.550	3.634	
*S ROUTE FLOWS THRU MAIN STORM DRAIN IN SOUTH HALF OF SITE										
*S ROUTE FLOWS FROM AP5 TO AP10										
ROUTE MCUNGE	RAP5	17	18	.19950	448.60	22.497	2.11441	1.550	3.513	CCODE = .1
*S ROUTE FLOWS FROM AP7 TO AP10										
ROUTE MCUNGE	RAP7	7	19	.02370	58.33	2.377	1.88072	1.500	3.846	CCODE = .2
*S ADD FLOWS FROM AP7 TO FLOW AT AP10										
ADD HYD	AP10.1 18&19		20	.22320	501.40	24.874	2.08959	1.550	3.510	
*S ROUTE FLOWS FROM AP8 TO AP10										
ROUTE MCUNGE	RAP8	8	21	.00820	21.27	.905	2.07041	1.500	4.054	CCODE = .2
*S ADD FLOWS FROM AP8 TO FLOW AT AP10										
*S**********										
S TOTAL FLOW AT AP10 *										
*S**********										
ADD HYD	AP10 20&21		10	.23140	521.58	25.780	2.08891	1.550	3.522	
*S**********										
*S NORTH STORM DRAIN THROUGH SITE *										
*S**********										
COMPUTE NM HYD	17.00	-	17	.02960	82.53	3.588	2.27291	1.500	4.356	PER IMP= 81.50
*S ADD FLOWS FROM BASIN 17 TO AP6 TO FLOW AT AP6										
ADD HYD	AP6.1 17& 6		22	.03830	105.53	4.576	2.24005	1.500	4.305	
*S ROUTE FLOWS THRU MAIN STORM DRAIN IN NORTH HALF OF SITE										
*S ROUTE FLOWS FROM AP6 TO AP11										
ROUTE MCUNGE	RAP6	22	23	.03830	103.30	4.581	2.24254	1.500	4.214	CCODE = .2
*S BASIN 15 (DEVELOPED)										
*S OLD BASIN 12										
*S BALBOA - SAN MATEO TO WEST SITE BOUNDARY (FULL STREET SECTION)										
*S**********										
S TOTAL FLOW AT AP9 *										
*S**********										
COMPUTE NM HYD	15.00	-	15	.00310	8.20	.352	2.12836	1.500	4.134	PER IMP= 75.00
*S ADD FLOWS FROM BASIN 15 TO FLOWS FROM AP6 TO FLOW AT AP9										
*S**********										
S TOTAL FLOW AT AP11 *										
*S**********										
ADD HYD	AP11 15&23		11	.04140	111.50	4.933	2.23397	1.500	4.208	
*S ROUTE FLOWS FROM AP11 TO AP12										
ROUTE MCUNGE	RAP11	11	24	.04140	110.89	4.932	2.23352	1.550	4.185	CCODE = .2
*S**********										
S TOTAL FLOW AT AP12 *										
*S**********										
ADD HYD	AP12 10&24		12	.27280	632.47	30.711	2.11085	1.550	3.623	
*S ROUTE FLOWS FROM AP12 TO AP13										
*S**********										
S TOTAL FLOW AT AP13 *										
*S**********										
ROUTE MCUNGE	AP13	12	13	.27280	609.57	30.711	2.11079	1.600	3.491	CCODE = .1
FINISH										

APPENDIX C

BASIN LAND USE TREATMENT FACTORS

CITICORP OFFSITE DRAINAGE BASIN SUMMARY

DEVLOPMENT SCENARIO #1
EXISTING CONDITIONS

BASIN	AREA	AREA	LAND USE TREATMENTS PERCENTAGES			
	(ac)	(sq mi)	A	B	C	D
1	19.50	0.0305	25	0	0	75
2	45.72	0.0714	99	0	0	1
3	32.93	0.0515	100	0	0	0
4	21.82	0.0341	99	0	0	1
5	39.97	0.0625	100	0	0	0
6	15.08	0.0236	0	43.3	5.62	51.08
7	16.50	0.0258	100	0	0	0
8	9.91	0.0155	100	0	0	0

DEVLOPMENT SCENARIO #2
DEVELOPED SITE AND STREETS WITH UNDEVELOPED UPSTREAM BASINS

BASIN	AREA	AREA	LAND USE TREATMENTS PERCENTAGES			
	(ac)	(sq mi)	A	B	C	D
1	19.50	0.0305	25	0	0	75
2	66.32	0.1036	99	0	0	1
3	2.99	0.0047	100	0	0	0
4	12.02	0.0188	100	0	0	0
5	20.94	0.0327	99	0	0	1
6	3.05	0.0048	0	18.75	0	81.25
7	4.06	0.0063	0	18.75	0	81.25
8	2.37	0.0037	0	25	0	75
9	0.87	0.0014	0	25	0	75
10	0.91	0.0014	0	25	0	75
11	4.64	0.0073	0	25	0	75
12	1.97	0.0031	0	25	0	75
13	12.40	0.0194	0	43.3	5.62	51.08
14	2.75	0.0043	100	0	0	0
15	5.87	0.0092	100	0	0	0

DEVLOPMENT SCENARIO #3
DEVELOPED SITE AND STREETS WITH DEVELOPED UPSTREAM BASINS

BASIN	AREA	AREA	LAND USE TREATMENTS PERCENTAGES			
	(ac)	(sq mi)	A	B	C	D
1	19.50	0.0305	25	0	0	75
2	39.99	0.0625	0	20	10	70
3	21.06	0.0329	0	20	10	70
4	16.45	0.0257	0	20	10	70
4A	14.46	0.0226	0	10	5	85
5	6.21	0.0097	0	20	10	70
5A	4.10	0.0064	0	10	5	85
6	3.05	0.0048	0	18.75	0	81.25
7	4.06	0.0063	0	18.75	0	81.25
8	2.37	0.0037	0	25	0	75
9	0.87	0.0014	0	25	0	75
10	0.91	0.0014	0	25	0	75
11	4.64	0.0073	0	25	0	75
12	1.97	0.0031	0	25	0	75
13	12.40	0.0194	0	30	14	56
14	2.75	0.0043	0	20	10	70
15	5.87	0.0092	0	20	10	70

NOTE: SHADED BASINS CHANGE BETWEEN DEVELOPMENT SCENARIOS 2 AND

CITICORP ON-SITE DEVELOPED BASINS
ESTIMATED PEAK DISCHARGE (100-YEAR STORM)

BASIN	AREA (ac)	LAND TREATMENT %				TOTAL PEAK DISCHARGE (cfs)
		A	B	C	D	
A	8.21	0.0%	8.0%	80.0%	84.0%	54.5
B	1.80	0.0%	2.5%	2.5%	95.0%	8.3
C	2.04	0.0%	10.0%	10.0%	80.0%	8.8
D	3.94	0.0%	7.0%	7.0%	86.0%	17.4
E	4.27	0.0%	5.0%	5.0%	90.0%	19.2
F	0.05	0.0%	50.0%	50.0%	0.0%	0.1
G	1.46	0.0%	5.0%	5.0%	90.0%	6.6
H	6.31	0.0%	7.0%	7.0%	86.0%	27.9
I	1.65	0.0%	0.0%	0.0%	100.0%	7.8
J	0.92	0.0%	20.0%	20.0%	60.0%	3.6

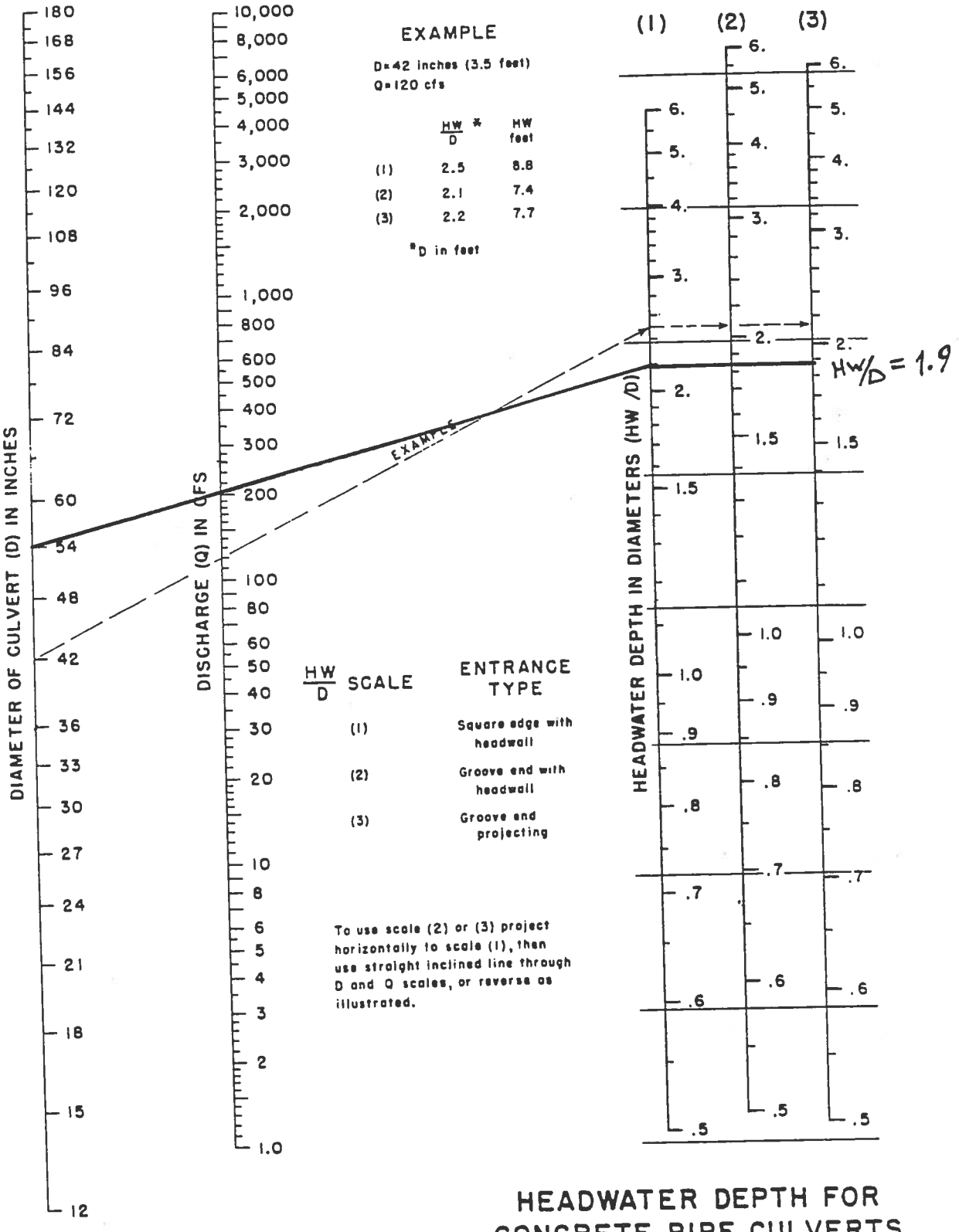
APPENDIX D

RCP PIPE NOMOGRAPHS

RCP STUBOUT AT ANALYSIS POINT "I" (AP1)

205.4 cfs → 54" RCP w/ REDUCER TO 48" RCP

CHART 1



HEADWATER DEPTH FOR CONCRETE PIPE CULVERTS WITH INLET CONTROL

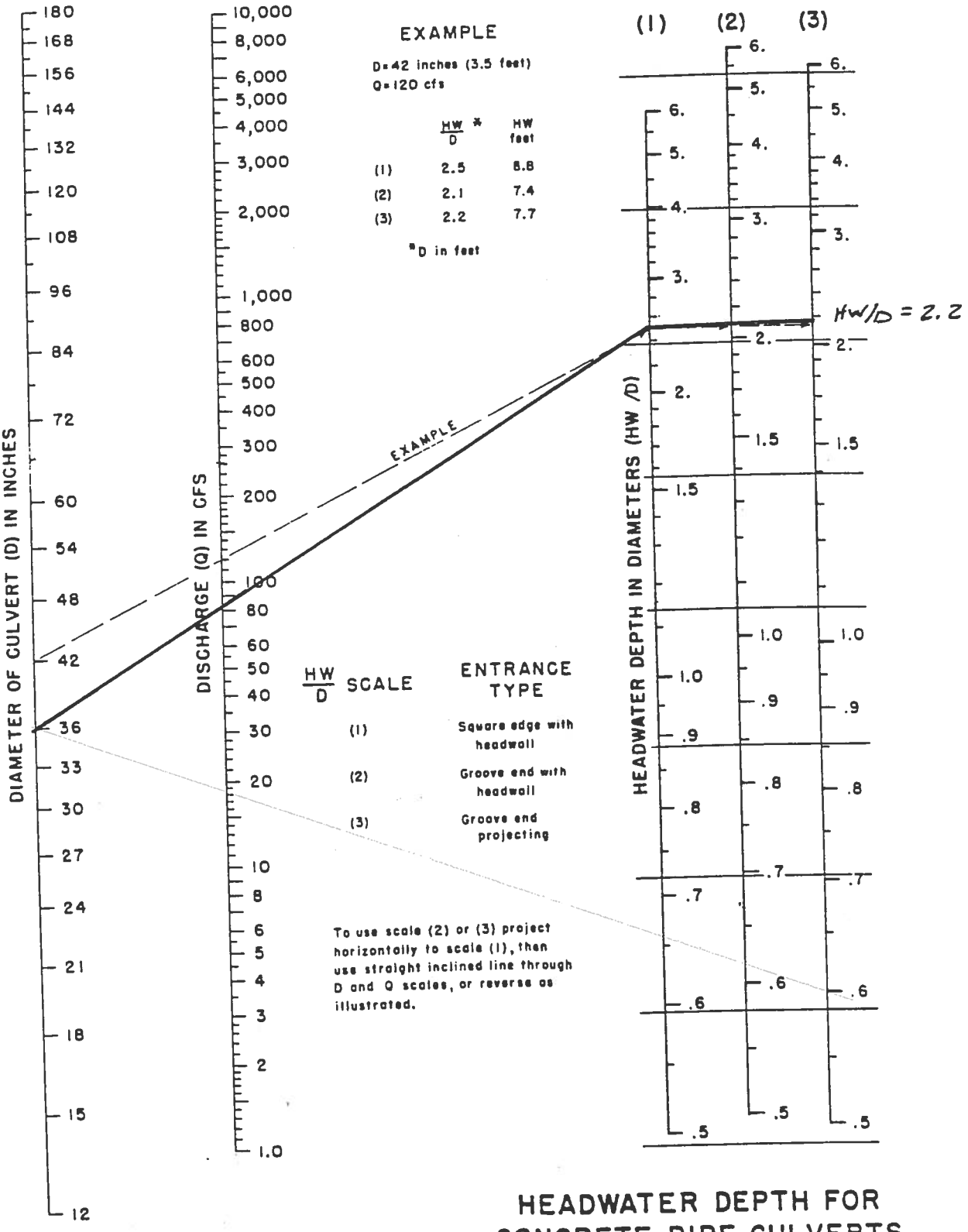
HEADWATER SCALES 283
REVISED MAY 1964

BUREAU OF PUBLIC ROADS JAN. 1963

RCP STUBOUT AT ANALYSIS POINT #2 (AP2)

86.1 cfs → 36" RCP → HW/D = 2.2'

CHART 1



HEADWATER DEPTH FOR CONCRETE PIPE CULVERTS WITH INLET CONTROL

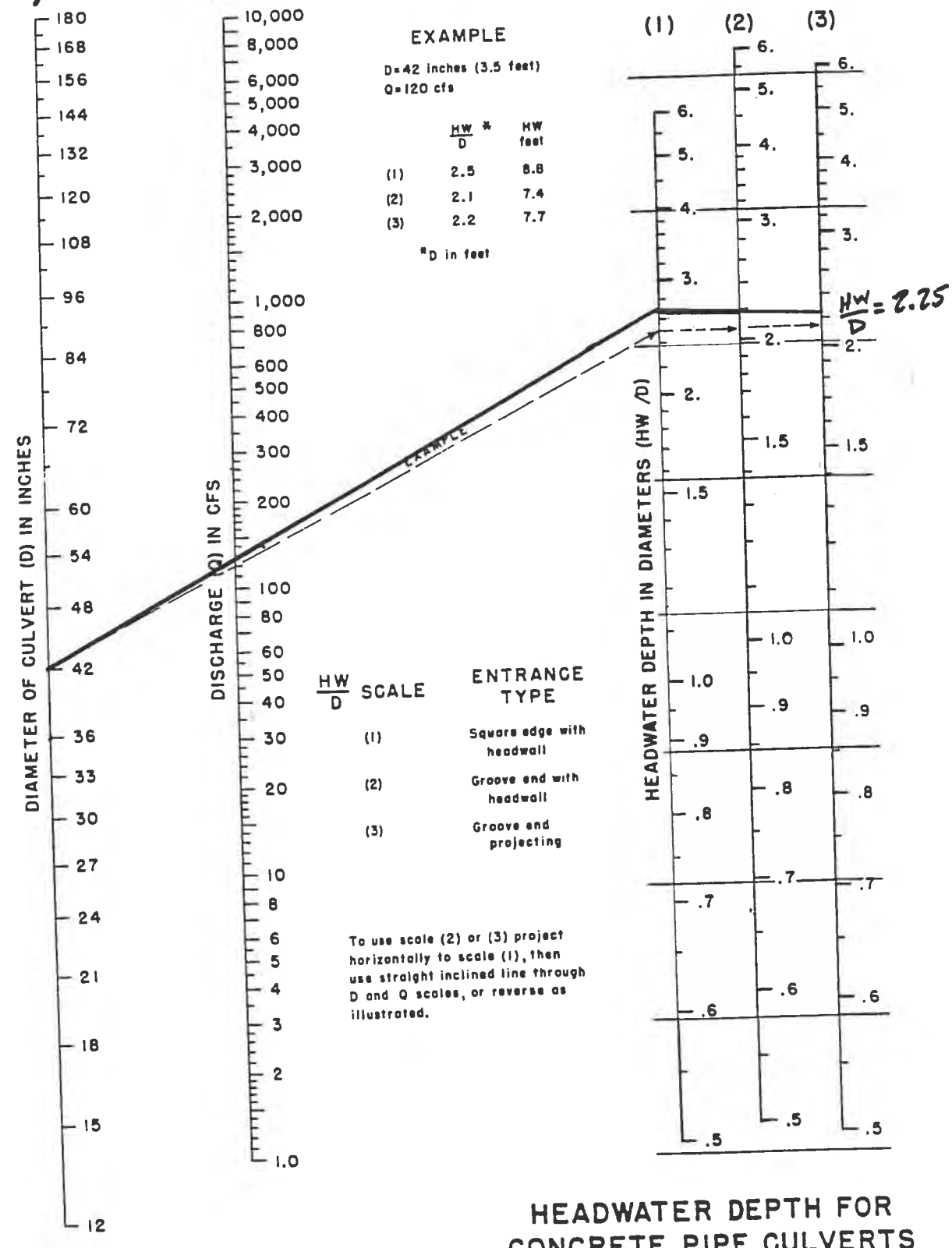
HEADWATER SCALES 2&3
REVISED MAY 1964

BUREAU OF PUBLIC ROADS JAN. 1963

RCP STUBOUT AT ANALYSIS POINT #3 (AP3)

126.2 cfs → 42" RCP → $\frac{HW}{D}$ = 2.25

CHART 1



HEADWATER SCALES 2&3
REVISED MAY 1964

BUREAU OF PUBLIC ROADS JAN. 1963

HEADWATER DEPTH FOR CONCRETE PIPE CULVERTS WITH INLET CONTROL

APPENDIX E

STREET FLOW & GRATE INLET CALCUATIONS

CITICORP OFFSITE DRAINAGE
Street Flow Calculations

BASIN #	REACH LENGTH (feet)	ROAD SLOPE (percent)	Q max (cfs)	FLOW DEPTH (feet)	FLOW VEL. (fps)	VEL. HEAD (feet)	EGL (feet)	ALLOWABLE EGL (feet)
8	1200	0.50	9.8	0.48	2.3	0.082	0.56	0.87
9	440	0.50	3.7	0.36	1.75	0.048	0.41	0.87
10	460	0.50	3.7	0.36	1.75	0.048	0.41	0.87
14	2350	2.00	19.3	0.48	4.7	0.34	0.82	0.87
15	1000	3.00	8.2	0.34	4.5	0.31	0.65	0.87

Drop Inlet Capacity Calculations

BASIN #	Q max to Inlet (cfs)	Flow Depth at Inlet (feet)	Inlet Slope (%)	# of Inlets Needed	Residual Flow (CFS)
8	4.9	0.39	0.50	2	0
9	1.9	0.35	0.50	1	0
10	1.9	0.35	0.50	1	0
14	9.65	0.38	2.00	3	0
15	4.1	0.29	3.00	2	0

APPENDIX F

HYRDAULIC GRADE LINE SPREADSHEETS

y-96 MAF HYD LIC (ULA S

08:02 AM CITICORP SITE PLAN HYDRAULIC GRADE LINES n =

Station	Structure	Diam.	Q	Area	Vel.	K	Sf	Length	Dia	Angle	Hf	Hb	Hj	Hmh	Ht	Total Losses	HGL(dn)	HGL(up)	Low Point	HV	EGL(dn)	EGL(up)
+00	MH #1								8	0		0.00	7.37	0.09	0.00	7.46		5097.50	5113	7.37	5104.87	5104.87
		72	615.8	28.27	21.78	4235	0.0211	38.00			0.80					0.80						
+38	MH #2								8	65		0.24	3.56	0.07	0.00	3.87	5098.30	5103.88	5114	5.66	5105.67	5109.54
		72	539.8	28.27	19.09	4235	0.0162	423.00			6.87					6.87						
+61	MH #3								8	0		0.00	0.75	0.31	0.00	1.06	5110.75	5112.18	5118	5.3	5116.41	5117.48
		72	522.4	28.27	18.48	4235	0.0152	100.00			1.52					1.52						
+61	MH #4								8	45		0.76	1.71	0.27	0.00	2.74	5113.70	5116.29	5119	5.45	5119.00	5121.74
		66	444.9	23.76	18.73	3358	0.0176	570.00			10.00					10.00						
12+31	MH #5								8	0		0.00	0.52	0.27	0.00	0.78	5126.30	5127.27	5128	5.26	5131.74	5132.52
		66	437.1	23.76	18.40	3358	0.0169	157.00			2.66					2.66						
13+88	MH #6								8	0		0.00	2.31	0.32	0.04	2.67	5129.93	5130.29	5134	7.57	5135.18	5137.86
		60	433.5	19.63	22.08	2604	0.0277	100.00			2.77					2.77						
14+88	MH #7								8	0												
OFFSITE TO SAN MATEO SOUTH DRAIN SYSTEM																						

01-May-96	SUMMARY OF HYDRAULIC CALCULATIONS							File: CITI_HGL.WK4														
08:02 AM	CITICORP SITE PLAN HYDRAULIC GRADE LIN							n =														
	NORTH TRUNK LINE															Total			Low			
Station	Structure	Diam.	Q	Area	Vel.	K	Sf	Length	Dia.	Angle	Hf	Hb	Hj	Hmh	Ht	Losses	HGL(dn)	HGL(up)	Point	HV	EGL(dn)	EGL(up)
+00	MH#1								8	85		0.00	1.15	0.01	0.00	1.16		5108.00	5113.5	1.2	5109.15	5109.15
		42	82.8	9.62	8.61	1006	0.0068	355.00			2.40					2.40						
1+55	MH#2								6	60		0.04	0.00	0.01	0.00	0.05	5110.40	5110.67	5111	0.9	5111.55	5111.60
		42	74.5	9.62	7.74	1006	0.0055	235.00			1.29					1.29						
3+90	MH #3								4	10		0.06	0.00	0.05	0.00	0.11	5111.96	5112.20	5114.8	0.8	5112.89	5113.01
		36	50.9	7.07	7.20	667	0.0058	545.00			3.17					3.17						
12+35	MH #4								4	0		0.00	0.00	0.04	0.00	0.04	5115.38	5115.39	5128.5	0.8	5116.18	5116.22
		24	23	3.14	7.32	226	0.0103	190.00			1.96					1.96						
14+25	MH #5								4	35		0.10	0.00	0.04	0.00	0.15	5117.35	5117.50	5131.5	0.8	5118.19	5118.33
		24	23	3.14	7.32	226	0.0103	97.00			1.00					1.00						
15+22	MH #6								4	0		0.00	0.00	0.01	0.17	0.18	5118.50	5119.51	5134.5	0	5119.33	5119.51
OFFSITE TO BALBOA/SAN MATEO INTERSECTION																						