Meeting 10:00 a.m. 1/27/94
Review Copy

DRAINAGE REPORT FOR THE EAST COUPLET STREET AND DRAINAGE IMPROVEMENTS

Earll Drive to Second Street

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Greiner, Inc.
7310 N. 16th Street, Suite 160
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October 1993
Revised December 1993

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DRAINAGE.ECO

DRAINAGE REPORT FOR THE EAST COUPLET STREET AND DRAINAGE IMPROVEMENTS
Earll Drive to Second Street

I. INTRODUCTION

The City of Scottsdale plans to construct the East Couplet street and drainage improvements from Earll Drive to Second Street. The drainage system for the new roadway will consist of a storm drain system along the new roadway alignment with associated catch basins that will drain to the Osborn Road outfall storm drain on the north and to the existing Scottsdale Road storm drain on the south. The Osborn Road storm drain is expected to be completed in early 1994. The East Couplet roadway improvements are expected to be constructed in the summer of 1994.

II. SCOPE

The purpose of this report is to: document the hydrologic conditions of the drainage areas contributing flow to the new roadway and drainage system, size the catch basins along the East Couplet to capture the flow, and design the main storm drain line along the East Couplet to carry flows to the Osborn Road storm drain and the existing Scottsdale Road storm drain. A detailed hydrologic study for the area generally bounded by Scottsdale Road on the west, Civic Center Plaza on the east, Osborn Road on the north and Earll Drive on the south has been performed. The study area is shown on Exhibit 1.

Catch basins have been sized and located to intercept the drainage in the East Couplet roadway and connecting side streets for the 100-year storm event. Catch basins to intercept off-site flows from the properties abutting the East Couplet on the north have been provided. A summary of the catch basin design, including sizes and locations, is included in Table 3.

The proposed storm drain in the East Couplet roadway has been analyzed for capacity based on the 100-year discharges obtained in the hydrologic investigation. The storm drain system in Civic Center Plaza north of Osborn Road that extends north to Fourth Street was analyzed and designed as part of the Osborn Road storm drain; however, it is being constructed as part of the East Couplet project. Similarly, the portion of the Osborn Road storm drain between Brown Road and Civic Center Plaza was analyzed and designed as part of the Osborn Road storm drain project, but is being constructed as part of the East Couplet project. The hydrologic and hydraulic analysis of the storm drain and catch basins can be found in the Final Drainage Report for the Osborn Road Storm Drain.

EXHIBIT 1

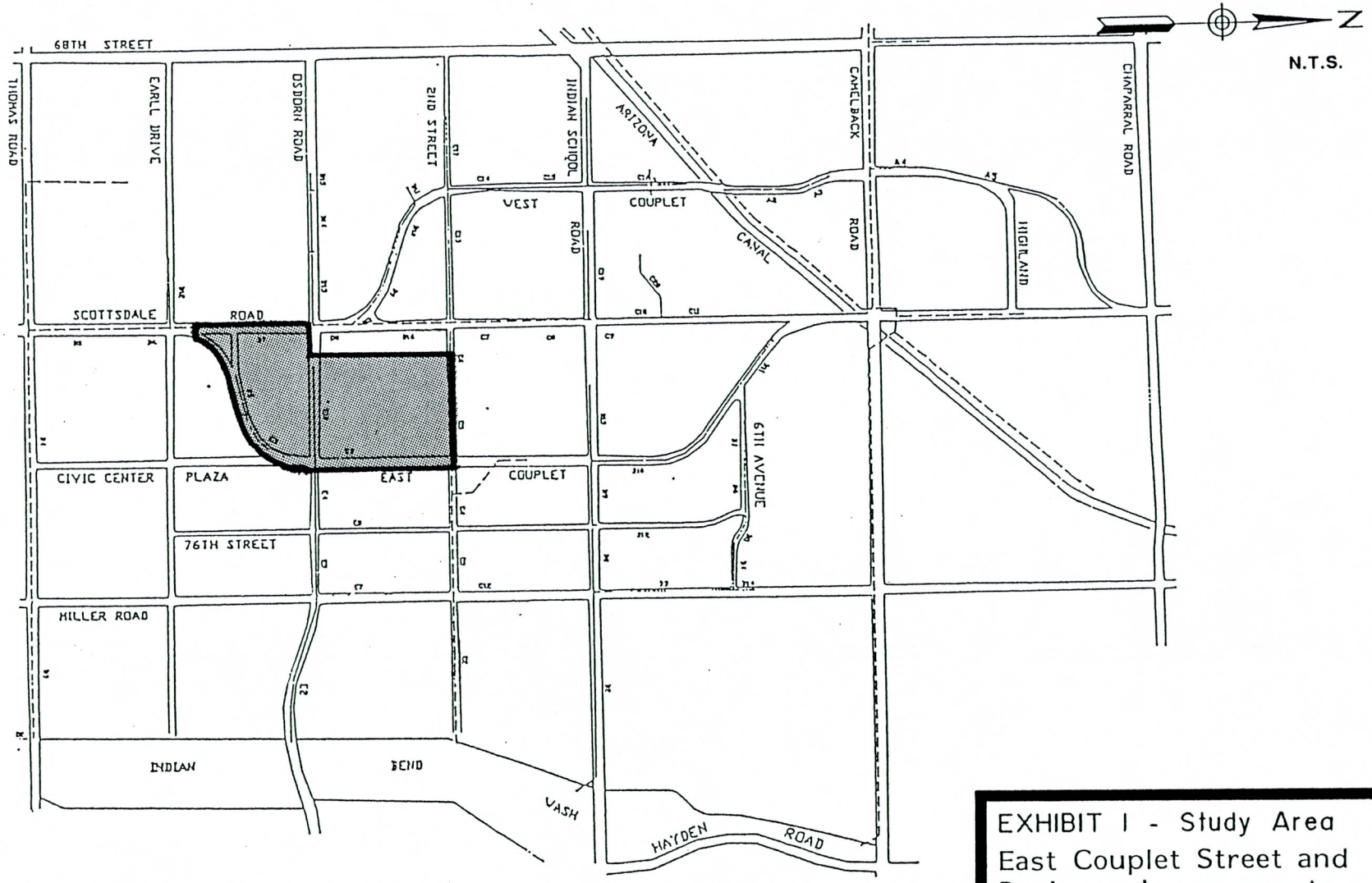


EXHIBIT I - Study Area
East Couplet Street and
Drainage Improvements
Earll Drive to 2nd Street

Greiner, Inc.

DRAWN: J.P.W.	CHECKED: R.D.B.

Ref: Boyle Report

III. BASIS OF DESIGN

Previous Investigations

The off-site drainage areas associated with the East Couplet were analyzed in the HEC-1 runs for the Osborn Road storm drain. This information was used as input for the hydraulic analysis of the 40"x65" stub-out that is the tie-in for the East Couplet storm drain at Osborn Road. The HEC-1 analysis for the 100-year storm event is included in Appendix A as reference to this report.

The hydrologic and hydraulic analysis for the segments of storm drain in Civic Center Plaza north of Osborn Road and in Osborn Road west of Civic Center Plaza, was also a part of the analysis associated with the Osborn Road storm drain. This information is included in the Final Drainage Report for the Osborn Road Storm Drain.

Design Criteria

The City of Scottsdale procedures outlined in Section 2.2 of the Hydrology Design Standards and Procedures (Revised September 1992) were used for this report. As previously mentioned, a HEC-1 analysis was performed for the East Couplet drainage area as part of the Osborn Road storm drain.

The rational method was used for all of the drainage areas associated with the roadway. All drainage areas are less than 40 acres. The largest drainage area in this analysis is 1.3 acres. The design storm for this project is the 6-hour, 100-year event.

The East Couplet roadway is considered a minor arterial according to the City's street classification system. The Scottsdale drainage ordinance requires one dry lane in each direction and a maximum depth of flow in the street of eight inches for the 100-year event, provided the flow width does not exceed the width of the right-of-way.

IV. WATERSHED CONDITIONS

The adjacent drainage areas for the East Couplet roadway are a mix of urbanized and undeveloped property. The undeveloped property was assumed to be built-out according to the zoning classification for those parcels in this analysis. Land use in this area is typically medical office, retirement homes and nursing homes. The Scottsdale Memorial Hospital parking lot is a significant parcel that drains to the East Couplet roadway. The drainage pattern is generally northwest to south-southeast. Exhibit 2 shows the watershed area taken from the U.S.G.S. map of the area. Table 1 summarizes the drainage area characteristics of each of the drainage areas encompasing the project.

There are no known areas of bypass flow from other downtown areas that impact this project. All flows to the north are intercepted by the Osborn Road storm drain.

TABLE 1 – DRAINAGE AREA CHARACTERISTICS

Drainage Area No.	Length	Long. Slope	Cross Slope	Area
1	735'	0.40%	3.0%	1.10 ac.
2	160'	0.68%	2.0%	.19 ac.
3	665'	0.43%	2.0%	.74 ac.
4 & 5	Combined 4.98 ac. Q=35 cfs → 17.5 cfs each area		See HEC-1 Appendix A	
6	2.14 ac.	Q=23 cfs	See HEC-1 Appendix A	
7	2.34 ac.	Q=16 cfs	See HEC-1 Appendix A	
8	310'	0.40%	2.0%	0.27 ac.
9	210'	0.50%	4.0%	0.58 ac.
10	275'	0.50%	4.0%	0.56 ac.
11	240'	0.50%	N/A	0.64 ac.
12	500'	0.5%	4.0%	1.31 ac.
13	400'	0.5%	4.0%	0.51 ac.
14	300'	0.5%	4.0%	0.34 ac.
15	280'	0.5%	2.0%	0.44 ac.
16 & 17	Combined 4.00 ac. Q=33 cfs → 16.5 cfs each area		See HEC-1 Appendix A	
18	305'	0.50%	N/A	0.29 ac.
19	200'	0.50%	N/A	0.48 ac.
20	Area=0.57 ac. Q=5 cfs		See HEC-1 Appendix A	

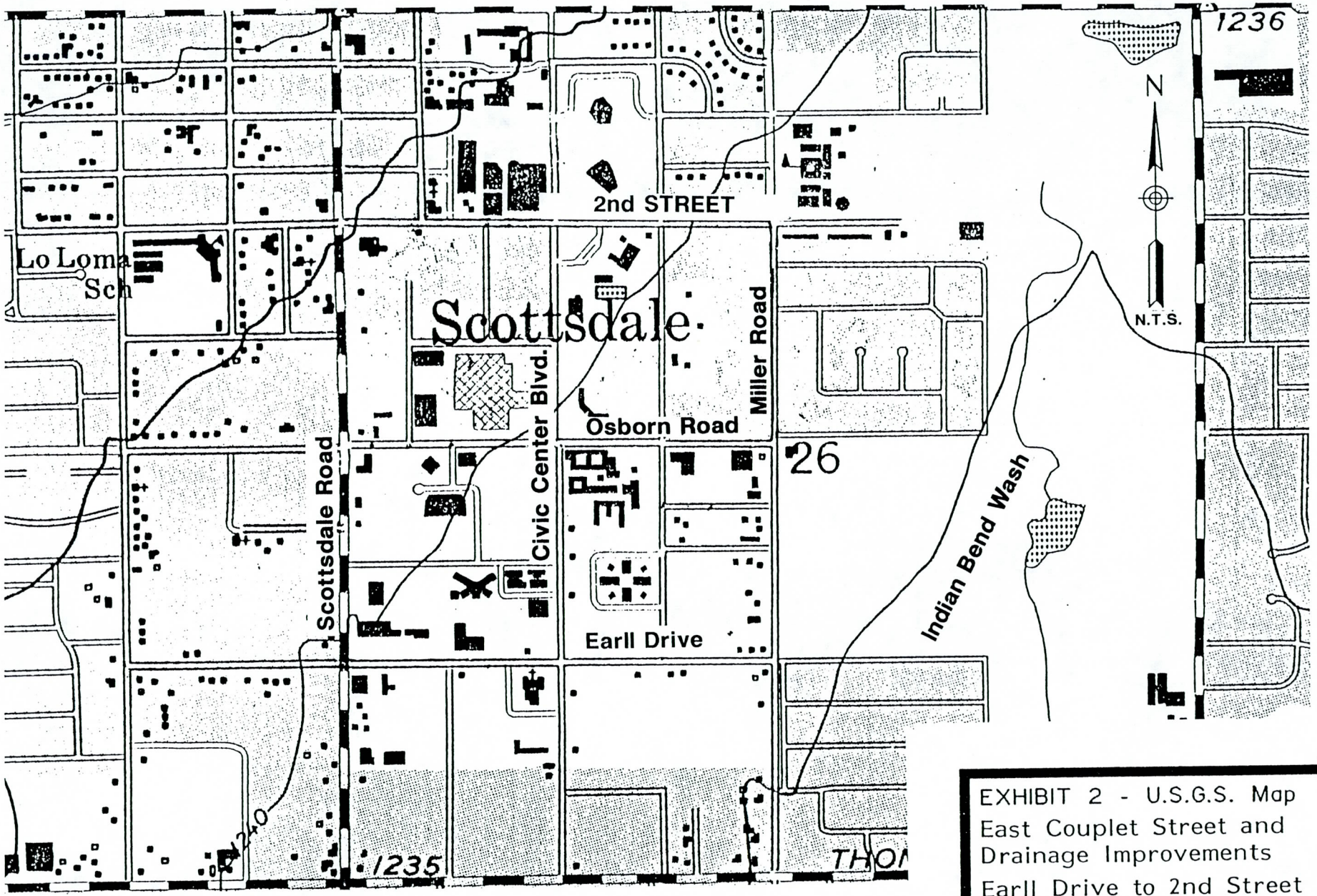


EXHIBIT 2 - U.S.G.S. Map
East Couplet Street and
Drainage Improvements
Earll Drive to 2nd Street

Greiner, Inc.

DRAWN: J.P.W. | CHECKED: R.D.B.

V. EXISTING DRAINAGE FACILITIES

Scottsdale Road Storm Drain

The Scottsdale Road storm drain is located along the western boundary of the watershed area. The drain is 72 inches in diameter south of Osborn Road. This drain was connected to the Second Street storm drain at Second Street and plugged to the south. The drainage area north of Second Street has, therefore, been diverted to the east and no longer drains into the Scottsdale Road drain. Available capacity in the drain is provided by cutting off the watershed to the north that will be used to drain the western end of the Osborn Road storm drain between Scottsdale Road and Brown Road and a portion of the West Couplet at Osborn Road. The 100-year discharge from these two projects is 60 cfs and 65 cfs, respectively.

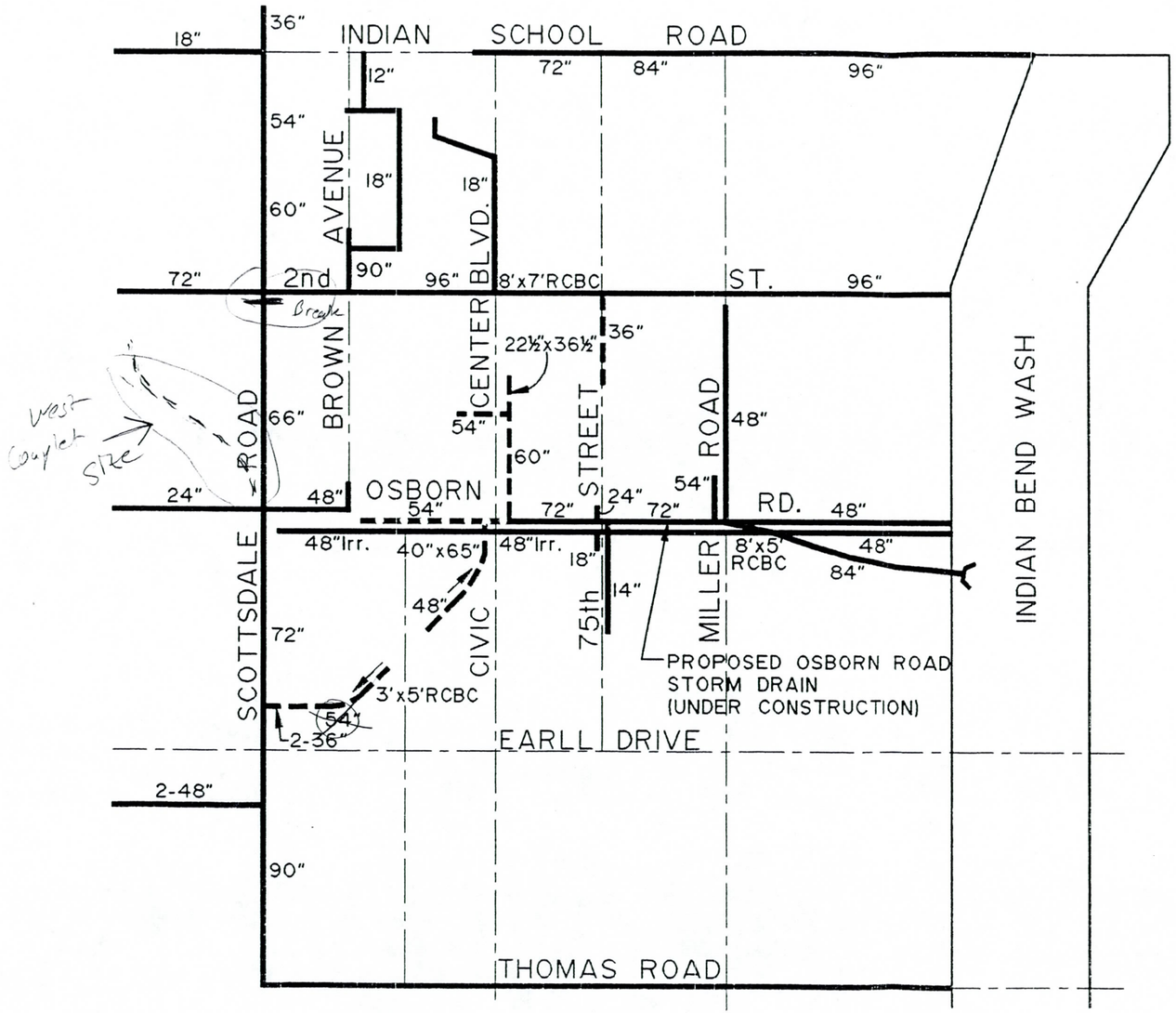
The Scottsdale Road storm drain has additional capacity that is available to use for the East Couplet project. The capacity of this drain is estimated to be approximately 253 cfs. An estimated 128-cfs capacity is available in this drain.

Osborn Road Storm Drain

The Osborn Road storm drain will serve as the outfall for the north end of the East Couplet. The estimated discharge at the connection from the south is approximately 48 cfs. The discharge from Osborn Road west of Civic Center Plaza is 66 cfs and from Civic Center Plaza north of Osborn is 122 cfs (Final Drainage Report for Osborn Road Storm Drain, Greiner, 1993). Existing storm drain facilities in the project vicinity are shown on Exhibit 3.

VI. RESULTS OF THE HYDROLOGIC INVESTIGATION

The results of the hydrologic investigation are summarized in Table 2. The Drainage Area Map (Exhibit 4) shows the various drainage area delineations used in the hydrologic analysis. The total runoff estimated for the East Couplet is reasonably close to the runoff estimated as part of the Osborn Road study.



N

0 200 400 800

Scale: 1" = 400'

EXISTING STORM DRAIN

PROPOSED STORM DRAIN

CITY OF SCOTTSDALE

EAST COUPLET STREET & DRAINAGE IMPROVEMENTS
Earll Drive to 2nd Street

EXISTING STORM DRAIN FACILITIES

EXHIBIT 3

Greiner

TABLE 2 – RUNOFF SUMMARY

Drainage Area No.	Area	Time of Concentration	Rainfall Intensity	Runoff Coefficient	Discharge Q (100-Year)
East Couplet – 3' x 5' Box in Monterey Way to Scottsdale Road Drain					
1	1.10 ac.	5 min.	9.0 in/hr.	0.91	9.0 cfs
2	0.19 ac.	5 min.	9.0 in./hr.	0.91	1.6 cfs
3	0.74 ac.	5 min.	9.0 in./hr.	0.91	6.1 cfs
4	See HEC-1 Appendix A				17.5
5	See HEC-1 Appendix A				17.5
6	See HEC-1 Appendix A				23
7	See HEC-1 Appendix A				16
10	0.56 ac.	5 min.	9.0 in./hr.	0.91	4.6 cfs
15	0.44 ac.	5 min.	9.0 in./hr.	0.91	3.6 cfs
17	2.00 ac.	See HEC-1 Appendix A			16.5 cfs
20	0.57 ac.	N/A	N/A	N/A	5.0 cfs
Note: Q for 36" lateral in Wells Fargo is 34 cfs which is an upstream lateral to the 3' x 5' box.					Summation Q = 120 cfs
East Couplet – 48" Drain to Osborn Road Drain					
12	1.31 ac.	5 min.	9.0 in./hr.	0.91	10.7 cfs
13	0.51 ac.	5 min.	9.0 in./hr.	0.91	4.2 cfs
14	0.34 ac.	5 min.	9.0 in./hr.	0.91	2.8 cfs
16	2.00 ac.	See HEC-1 Appendix A			16.5 cfs
18	0.29 ac.	5 min.	9.0 in./hr.	0.91	2.4 cfs
19	0.48 ac.	5 min.	9.0 in./hr.	0.91	3.9 cfs
					Summation Q = 41 cfs
East Couplet – 18" Lateral to Scottsdale Road Drain					
8	0.27 ac.	5 min.	9.0 in./hr.	0.91	2.2 cfs
9	0.58 ac.	5 min.	9.0 in./hr.	0.91	4.8 cfs
					Summation Q = 7.0 cfs
Gateway Parcel – On-Site Retention					
11	0.64 ac.	5 min.	9.0 in./hr.	0.65	3.3 cfs

VII. PROPOSED CATCH BASIN LOCATIONS

The catch basins proposed for this project are typically City of Phoenix standard catch basins. The only exceptions are the area drains that are proposed for the off-site areas north of the roadway. The area drains are standard ADOT area drains. A complete summary of proposed catch basin locations and interception rates is located in Table 3.

The City's criteria for locating catch basins on the East Couplet roadway (minor arterial) are to provide one dry lane in each direction and to limit the depth of flow in the street to eight inches for the 100-year event. In addition, this flow must be kept in the right-of-way.

Off-site runoff concentration points were identified and catch basins located to intercept these flows. These off-site locations include the Pegler property, Scottsdale Medical Pavilion parking lot and Scottsdale Memorial Hospital parking lot. Off-site flows are also intercepted from Wells Fargo Avenue.

TABLE 3 – CATCH BASIN SUMMARY

Station	DA No / CB No.	Inlet Type	Q	Q_c	Q_T	S_o	S_x	Z/n	D	T	a	Inlet Length Act.	Inlet Length Corr	Q_i/Q	Q_i	Q_c
Catch Basins for East Couplet – Earll Drive to Civic Center Boulevard																
14+23.80 Lt. Monterey Way	1	M-1, L=17	9.0	0	9.0	0.4	3.0	33.33	0.42	14.0	2	20	16	N/A	9.0	0
14+11.90 Rt. Monterey Way	2	M-1, L=6	1.6	0	1.6	0.68	2.0	50.00	0.11	5.5	2	9	7.2	N/A	1.6	0
21+45.87 Civic Center Plaza	3	M2, L=17	6.1	5.6	11.7	0.43	2.0	50.00	0.31	15.5	2	37	29.6	N/A	11.7	0
10+72.00 Lt. Wells Fargo Ave.	4	M2, L=17	17.5	0	17.5	0.40	2.0	50.00	0.46		2	37	29.6	0.68	11.9	5.6
10+95.00 Rt. Wells Fargo Ave.	5	M-2, L=17	17.5	0	17.5	0.40	2.0	50.00	0.46		2	37	29.6	0.68	11.9	5.6
21+28.00 Lt. Civic Center Plaza	6	C-15.30 TYPE 4	23.0	0	23.0	N/A	N/A	N/A	0.80	N/A	N/A	N/A	N/A	N/A	21.4	1.6
18+31.00 Lt. Civic Center Plaza	7	C-15.30 TYPE 4	16.0	0	16.0	N/A	N/A	N/A	0.80	N/A	N/A	N/A	N/A	N/A	16.0	0
12+24.95 Rt. Scottsdale Rd.	8	M-1, L=10	2.2	0	2.2	0.4	2.0	50.00	0.21	10.5	2	13	10.4	0.92	1.5	0.7
12+36.00 Rt. Civic Center Plaza	9	M-1, L=17	4.8	0.7	5.5	0.5	4.0	25.00	0.35	8.8	2	20	16	N/A	5.5	0
17+57.50 Rt. Civic Center Plaza	10	M-1, L=10	4.6	0	4.6	0.5	4.0	50.00	0.27	6.7	2	13	10.4	N/A	4.6	0
Gateway Parcel	11	On-Site Retention														
25+85.50 Lt. Civic Center Plaza	12	M-2, L=17	10.7	5.6	17.5	0.5	4.0	25.00	0.48	12.0	2	37	29.6	N/A	17.5	0
26+66.00 Rt. Civic Center Plaza	13	M-1 ,L=17	4.2	0	4.2	0.5	4.0	25.00	.34	8.4	2	20	16	0.96	3.0	1.2
25+14.00 Rt. Civic Center Plaza	14	M-1, L=10	2.8	0	2.8	0.5	4.0	25.00	.29	7.1	2	13	10.4	0.97	2.0	0.8
20_97.09 Rt. Civic Center Plaza	15	M-1, L=10	3.6	0	3.6	0.5	2.0	25.00	.32	8.0	2	13	10.4	N/A	3.6	0
26+09.00 Lt. Civic Center Plaza	16	C-15.30 TYPE 4	16.5	0	16.5	N/A	N/A	N/A	0.80	N/A	N/A	N/A	N/A	N/A	16.5	0
22+42.00 Lt. Civic Center Plaza	17	C-15.30 TYPE 4	16.5	0	16.5	N/A	N/A	N/A	0.80	N/A	N/A	N/A	N/A	N/A	16.5	0
Remnant Parcel	18	On-Site Retention														
Bird Sanctuary	19	On-Site Retention														
Mont. Nursing Home	20	C-15.30 TYPE 4	5.0	0	5.0	N/A	N/A	N/A		N/A	N/A	N/A	N/A	N/A	5.0	0
Catch Basins for Osborn Road from Brown Road to Civic Center Boulevard																
16+30.25 Lt.	O2N	M-1, L-10	1.0	2.5	3.5	0.27	1.70	3676.5	0.35	15.7	2	16	12.0	0.86	3.0	0.5
16+30.25 Rt.	O1S	M-1, L-17	6	0	6	0.27	2.52	2481.2	0.471	15.4	2	20	16.0	0.9750	5.9	0.1
17+70 Lt.	N2	MAG TYPE E	32	---	32	0.3	2.5	2500.	0.80	32	2	---	N/A	0.69	223	9.8

Include CB # Cas shown on Figure

TABLE 3 – CATCH BASIN SUMMARY

Station	DA No.	Inlet Type	Q	Q_c	Q_T	S_o	S_x	Z/n	D	T	a	Inlet Length		Q/Q	Q_i	Q_e
												Act.	Corr			
17+94.25 Lt.	N3	MAG TYPE E	9.8	---	9.8	0.3	2.5	2500	0.33	11	2	---	N/A	1.00	9.8	0
22+03.00 Lt.	N4	MAG TYPE L	14	---	14.0	----	----	------	----	----	-	6	----	1.00	14.0	---
22+40.00 Lt.	O3N, 04N	M-1, L-17	5	0.5	5.5	0.29	1.70	3676.5	0.402	18.7	2	20	16.0	0.93	5.1	0.4
22+31.00 Rt.	O2S	M-1, L-17	6	0.1	6.1	0.29	2.66	2349.6	0.476	14.8	2	20	16.0	0.9739	5.9	0.2
Catch Basins for Civic Center Boulevard from Osborn Road to 4th Street (including 4th Street)																
36+57.40 (123.39' Rt.)	4N	M-2, L-17	41	---	41	0.33	0.73	8562.0	.95	30	2	37	29.6	0.80	33.2	8.3
36+21.40 (123.39' Lt.)	4S	M-2, L-17	41	---	41	0.33	0.73	8562.0	.95	30	2	37	29.6	0.80	33.2	8.3
37+21.40 (69.39' Lt.)	------	M-1, L-17	--	8.3	8.3	0.33	0.73	8562.0	0.35	30	2	20	16.0	0.92	7.6	0.7
36+57.40 (59.39' Lt.)	------	M-1, L-17	--	8.3	8.3	0.33	2.07	3019.0	0.48	19.2	2	20	16.0	0.92	7.6	0.7
38+63 Lt.	CC1W	M-2, L-17	15	---	15	0.44	0.57	10,964.0	0.337	21.0	2	37	29.4	0.64	9.7	5.3
37+82.50 Lt.	------	M-2, L-17	--	5.3	5.3	0.44	0.57	10,964.0	0.21	21.0	2	37	29.4	0.88	4.7	0.6
35+95.25 Lt.	------	M-1, L-10	--	2.2	2.2	0.39	1.43	4371.0	0.28	13.8	2	13	10.4	0.96	2.1	0.1
32+93.00 Lt.	N5W	M-2, L-17	14	0.1	14.1	0.30	1.43	4371.0	0.45	21.0	2	37	29.4	0.86	12.1	2.0
31+70.00 Lt.	------	M-1, L-10	--	2.0	2.0	0.30	0.95	6579.0	0.19	20.0	2	13	10.4	0.78	1.6	0.4
33+26.25 Rt.	N5E	M-1, L-17	8.0	---	8.0	0.38	2.20	2841.0	0.468	17.5	2	20	16.0	0.86	6.9	1.1
31+72 Rt.	------	M-1, L-3	--	1.1	1.1	0.38	1.40	4464.0	0.23	10.5	2	6	4.8	0.80	0.9	0.2

Note: **All catch basins shall be bicycle-safe.**

TABLE3DR.ECO

VIII. STORM DRAIN SIZES

Based on the results of the hydrologic and hydraulic analysis, storm drain sizes have been established for the various reaches of the East Couplet storm drain.

The storm drain layout for the East Couplet consists of one system that drains to the Osborn Road storm drain and one system that drains to the existing storm drain in Scottsdale Road. The Scottsdale Road storm drain was utilized to reduce some of the flow contributing to the Osborn Road system. This was found to be necessary to drain the low point in the southbound lanes at Station 25+85 in compliance with the drainage criteria set forth for the project.

A flap gate is proposed to control potential backwater effects from the Scottsdale Road drain. The flap gate will be located in the junction structure at 14+00.48 (Monterey Way). The junction structure shall be designed to accommodate the operation of the flap gate. The flap gate is a 3' x 5' model that will be placed at the outlet of the 3' x 5' box culvert.

The flow from the East Couplet roadway system has been split as follows: Flow to Osborn Road = 48 cfs. Flow to Scottsdale Road = 110 cfs. The hydraulic analysis for the Osborn Road drain has been revised to reflect the reduced flow from the East Couplet. Presented in this report

Portions of the previously designed Osborn Road storm drain will be constructed as part of this project. This is a result of the need to coordinate the relocation of electrical facilities serving the hospital so that the relocation had to occur only once. A storm drain is proposed in Osborn Road between Brown Road and Civic Center Plaza. A storm drain is also proposed in Civic Center Plaza from Fourth Street to Osborn Road.

A summary of the hydraulics for the East Couplet storm drain is included in Table 4.

DRAINAGE.ECO

TABLE 4 – Summary of Hydraulic Calculations
Pressure Flow Design

Beginning Station	Ending Station	SD Size	Q	A	V	S_F	L	Losses						E.G.	h,	H.G. Dn Str. Up Str.
								H_F	H_B	H_J	H_{AP}	H_{MH}	ΣH_L			
East Couplet Storm Drain – Wells Fargo Avenue to Outfall Located at Scottsdale Road																
13+48.48 Monterey Way	14+00.48 Monterey Way	2-36"	120	14.14	8.5	.0069	52	0.36		2.85			3.21	36.61 39.82	1.12	38.34* 33.70
14+00.48 Monterey Way	18+31.00 Civic Ctr. Blvd.	3'x5' RCB	94.8	15.00	6.3	0.0038	431	1.64			0.10	0.06	1.80	36.51 38.31	1.12 0.62	35.39** 37.69
18+31.00 Civic Ctr. Blvd.	20+97.09 Civic Ctr. Blvd.	3'x5' RCB	78.8	15.00	5.3	0.0020	267	0.52			0.10		0.62	38.31 38.93	0.62 0.44	37.69 38.49
East Couplet Storm Drain – Intersection of Civic Center Boulevard and 74th Street to Outfall at Osborn Road																
30+17.64 Civic Ctr. Blvd.	25+14 Civic Ctr. Blvd.	48"	41	12.57	3.3	0.0007	504	0.35					0.35	34.15 34.50	0.17 0.17	33.98**** 34.33
Osborn Road Storm Drain – Civic Center Boulevard to Osborn Road at 4th Street																
31+86.25 Civic Ctr. Blvd.	34+70.00 Civic Ctr. Blvd	60"	122	19.63	6.2	0.0019	284	0.54				0.03	0.57	40.85 41.42	0.60 0.60	40.25 40.82
34+70.00 Civic Ctr. Blvd.	37+07.50 Civic Ctr. Blvd.	60"	122	19.63	6.2	0.0019	238	0.45				0.03	0.48	41.42 41.90	0.60 0.60	40.82 41.30
37+07.50 Civic Ctr. Blvd.	38+63 Civic Ctr. Blvd.	22.5"x36.5"	15	4.4	3.4	0.0010	125	0.13				0.03	0.16	41.90 42.06	0.60 0.18	41.30 41.88
37+07.50 Civic Ctr. Blvd.	4th Street Lateral	54"	83	15.9	5.2	0.0015	99	0.15		1.32			1.47	41.90 43.37	0.42	40.82 42.95
Osborn Road Storm Drain – Brown Road to Civic Center Boulevard																
22+89.00 Osborn Road	22+26.50 Osborn Road	54"	66	15.9	4.2	.001	63	.06				.02	0.08	32.75 32.83	0.27	32.48 32.56
22+26.50 Osborn Road	22+02.50 Osborn Road	54"	66	15.9	4.2	.001	30	0.03					0.03	32.83 32.86	0.27 0.27	32.56 32.59
22+02.50 Osborn Road	21+44.42 Osborn Road	54"	66	15.9	4.2	.001	60	0.06				.02	.08	32.86 32.94	0.27 0.27	32.59 32.67
21+44.42 Osborn Road	16+22.75 Osborn Road	54"	66	15.9	4.2	.001	523	0.52					0.52	32.94 33.46	0.27 0.27	32.67 33.19

* Starting HGL in Scottsdale Road drain set at top of pipe.
** HGL at downstream end of 3' x 5' box controlled by flapgate located in manhole at Station 14+00.48 (Monterey Way).
*** Starting HGL at Osborn Road based on a reduced Q from East Couplet of 48 cfs.
**** Starting HGL set at top of pipe.

why was taken @ top of pipe when reanalysis was performed

#'s not making any sense

TABLE4DR.ECO

APPENDIX A

HEC-1
100-YEAR

```
*****************************************
*                                       *
*  FLOOD HYDROGRAPH PACKAGE  (HEC-1)    *
*        FEBRUARY 1981                  *
*        REVISED 02 AUG 88              *
*                                       *
*  RUN DATE  01/17/1993  TIME  09:27:31 *
*                                       *
*****************************************
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*  THE HYDROLOGIC ENGINEERING CENTER    *
*         609 SECOND STREET             *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 551-1748              *
*                                       *
*****************************************
```

```
X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X              X
XXXXXXX  XXXX     X       XXXXX  X
X     X  X        X              X
X     X  X        X     X        X
X     X  XXXXXXX   XXXXX         XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

HEC-1 INPUT PAGE 1

```
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  1           ID   HEC-1 FOR EAST COUPLET, JOB NUMBER E019600
  2           ID   CITY OF SCOTTSDALE PROJECT NUMBERS: S2703 AND F2703
  3           ID   100-YEAR, 6-HOUR HYPOTHETICAL STORM ** DEVELOPED CONDITIONS **
  4           ID
  5           ID   DISCHARGE COMPUTATIONS FOR OFFSITE EXISTING DRAINAGE AREAS,
  6           ID   BOTH NORTH AND SOUTH OF OSBORN ROAD, AND ON-SITE
  7           ID   AREAS FROM SCOTTSDALE ROAD IN THE WEST TO THE WEST SIDE MILLER
  8           ID   ROAD IN THE EAST.
  9           ID
 10           ID   INPUT FILE NAME: EAST-100.DAT
 11           ID
 12           IT      2       0       0     300       0       0       0       0
 13           IO      5       0       0       0       0       0       0       0
              *DIAGRAM

 14           KK     O1N
 15           KM
 16           KM   *********************************************
 17           KM   * DRAINAGE AREA O1N DISCHARGE COMPUTATION.  *
 18           KM   * ON-SITE AREA 1 NORTH SIDE OF OSBORN ROAD. *
 19           KM   *********************************************
 20           KM
 21           PH      0       0    0.89    1.62    2.61    2.86    3.03    3.35
 22           BA   .0007
 23           LS      0    84.4    60.7
 24           UD  0.060       0       0

 25           KK     N1W
```

```
26          KM
27          KM   ********************************************
28          KM   * DRAINAGE AREA N1W DISCHARGE COMPUTATION *
29          KM   * OFFSITE NORTH SIDE AREA 1 WEST SIDE OF  *
30          KM   * CONTRIBUTING STREET                     *
31          KM   ********************************************
32          KM
33          BA   .0097      0       0       0       0       0       0       0
34          LS      0    81.7    72.9       0       0       0       0       0
35          UD   0.096

36          KK     N1E
37          KM
38          KM   ********************************************
39          KM   * DRAINAGE AREA N1E DISCHARGE COMPUTATION.  *
40          KM   * OFF-SITE AREA NORTH OF OSBORN ROAD FOR    *
41          KM   * BROWN AVE. ON THE EAST SIDE.              *
42          KM   ********************************************
43          KM
44          BA   .0040
45          LS      0    79.0    85.0
46          UD   0.119      0       0
```



```
LINE        ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

47          KK     CH1
48          KM
49          KM   ************************************************
50          KM   * COMBINE THE HYDROGRAPHS FROM D.A. N1W WITH D.A. *
51          KM   * N1E                                            *
52          KM   ************************************************
53          KM
54          HC       2

55          KK     CH2
56          KM
57          KM   ***********************************************
58          KM   * COMBINE THE COMBINED HYDROGRAPH OF D.A. N1W *
59          KM   * AND N1E WITH THE HYDROGRAPH FROM D.A. O1N   *
60          KM   * THIS FLOW WILL BE TAKEN TO THE EXISTING     *
61          KM   * SCOTTSDALE ROAD DRAIN.                      *
62          KM   ***********************************************
63          KM
64          HC       2

65          KK     O2N
66          KM
67          KM   ********************************************
68          KM   * DRAINAGE AREA O2N DISCHARGE COMPUTATION *
69          KM   ********************************************
70          KM
71          BA   .0002
72          LS      0    98.0
73          UD   0.060      0       0

74          KK      N2
75          KM
76          KM   ********************************************
77          KM   * DRAINAGE AREA N2 DISCHARGE COMPUTATION *
78          KM   ********************************************
79          KM
80          BA   .0029
81          LS      0    79.0    85.0
82          UD    .070      0       0
```

```
83          KK     N3
84          KM
85          KM   ******************************************
86          KM   * DRAINAGE AREA N3 DISCHARGE COMPUTATION *
87          KM   ******************************************
88          KM
89          BA   .0041
90          LS      0    79.0    85.0
91          UD  0.090       0       0
```



```
LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

92          KK     CH4
93          KM
94          KM   ******************************************
95          KM   * COMBINE HYDROGRAPH FOR D.A. N2 WITH THE *
96          KM   * HYDROGRAPH FROM D.A. N3                 *
97          KM   ******************************************
98          HC      3

99          KK     O3N
100         KM
101         KM   ******************************************
102         KM   * DRAINAGE AREA O3N DISCHARGE COMPUTATION *
103         KM   ******************************************
104         KM
105         BA   .0001
106         LS      0    98.0
107         UD  0.060       0       0

108         KK     O1S
109         KM
110         KM   ******************************************
111         KM   * DRAINAGE AREA O1S DISCHARGE COMPUTATION  *
112         KM   * ON-SITE AREA 1 SOUTH                     *
113         KM   ******************************************
114         KM
115         BA   .0014
116         LS      0    79.0    65.0
117         UD  0.062       0       0

118         KK     CH5
119         KM
120         KM   ******************************************
121         KM   * COMBINE HYDROGRAPH FROM THE COMBINED CH4  *
122         KM   * WITH THE HYDROGRAPHS FROM COMBINED        *
123         KM   * O3N, AND O1S.  THIS CONCENTRATION POINT   *
124         KM   * IS ABOUT MID WAY BETWEEN BROWN AVE. AND   *
125         KM   * CIVIC CENTER AND IS FOR THE COMBINED      *
126         KM   * FOR BOTH NORTH, SOUTH AND ON-SITE OSBORN  *
127         KM   ******************************************
128         HC      3

129         KK     R2
130         KM
131         KM   ******************************************
132         KM   * ROUTE THE COMBINED HYDROGRAPH CH5 TO THE *
133         KM   * WEST SIDE OF CIVIC CENTER AVE.           *
134         KM   ******************************************
135         RC  0.013   0.016   0.013   525.0  0.0029   10.00
136         RX    100     105   105.5  105.51  169.35  169.36  169.86  174.86
137         RY  10.00    9.92    9.92    9.79    9.79    9.92    9.92   10.00
```

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

138       KK     N4
139       KM
140       KM   ****************************************
141       KM   * DRAINAGE AREA N4 DISCHARGE COMPUTATION *
142       KM   ****************************************
143       KM
144       BA   .0029
145       LS      0    79.0    85.0
146       UD  0.060       0       0

147       KK     O4N
148       KM
149       KM   ****************************************
150       KM   * DRAINAGE AREA O4N DISCHARGE COMPUTATION *
151       KM   ****************************************
152       KM
153       BA   .0008
154       LS      0    98.0
155       UD  0.060       0       0

156       KK     O2S
157       KM
158       KM   ****************************************
159       KM   * DRAINAGE AREA O2S DISCHARGE COMPUTATION *
160       KM   ****************************************
161       KM
162       BA   .0012
163       LS      0    98.0
164       UD  0.060       0       0

165       KK     CH6
166       KM
167       KM   ********************************************
168       KM   * COMBINE HYDROGRAPH FROM THE COMBINED CH5  *
169       KM   * WITH THE HYDROGRAPHS FROM COMBINED N4,    *
170       KM   * ON4, AND O2S.  THIS CONCENTRATION POINT   *
171       KM   * IS WEST OF CIVIC CENTER AVE AND COMBINES  *
172       KM   * THE FLOWS FROM NORTH, SOUTH AND ON-SITE   *
173       KM   * FOR OSBORN ROAD.                          *
174       KM   ********************************************
175       HC      4

176       KK     EC1   DA 4 and 5
177       KM
178       KM   ********************************************
179       KM   * DRAINAGE AREA CONSISTING OF MEDICAL       *
180       KM   * OFFICES DRAINING TO WELLS FARGO AND       *
181       KM   * MONTEREY.                                 *
182       KM   ********************************************
183       BA   .0078
184       LS      0    82.0    71.0
185       UD   .0835
```



```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

186       KK     EC2   DA7
187       KM
188       KM   ********************************************
189       KM   * DRAINAGE AREA AT NE CORNER OF SCOTTSDALE  *
190       KM   * ROAD AND MONTEREY.                        *
```

```
191        KM   ********************************************
192        BA   .0037
193        LS      0    79.0    85.0
194        UD   .0971

195        KK    CH01
196        KM
197        KM   ********************************************
198        KM   * COMBINE HYDROGRAPHS EC1 & EC2.          *
199        KM   ********************************************
200        HC      2

201        KK    EC3          DA 6
202        KM
203        KM   ********************************************
204        KM   * DRAINAGE AREA CONSISTING OF SCOTTSDALE   *
205        KM   * MEDICAL PAVILION.                        *
206        KM   ********************************************
207        BA   .0038
208        LS      0    79.0    85.0
209        UD   .0222

210        KK    EC4          DA 16 and 17
211        KM
212        KM   ********************************************
213        KM   * DRAINAGE AREA CONSISTING OF HOSPITAL     *
214        KM   * PARKING LOT.                             *
215        KM   ********************************************
216        BA   .0062
217        LS      0    98.0
218        UD   .0644

219        KK    CH02
220        KM
221        KM   ********************************************
222        KM   * COMBINE HYDROGRAPHS CH01, EC3 AND EC4    *
223        KM   ********************************************
224        HC      3

225        KK    EC5
226        KM
227        KM   ********************************************
228        KM   * DRAINAGE AREA CONSISTING OF THE COUPLET  *
229        KM   * ROADWAY.                                 *
230        KM   ********************************************
231        BA   .0061
232        LS      0    98.0
233        UD   0.075
```



```
LINE       ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

234        KK    EC6          DA 20
235        KM
236        KM   ********************************************
237        KM   * DRAINAGE AREA CONSISTING OF NURSING HOME *
238        KM   ********************************************
239        BA   .0009
240        LS      0    69.0    85.0
241        UD   .0122

242        KK    CH03
243        KM
244        KM   ********************************************
245        KM   * COMBINED CH02, EC5 AND EC6               *
```

```
246          KM   ********************************************
247          HC      3

248          KK    R04
249          KM
250          KM   ********************************************
251          KM   * ROUTE ALL E. COUPLET HYDROGRAPHS TO       *
252          KM   * INTERSECTION CIVIC CENTER/OSBORN          *
253          KM   ********************************************
254          RC  0.013   0.016   0.013   850.0  .0045   102
255          RX    100     110     110   128.5    147   147  157  160
256          RY    101   100.5   100.0  100.57  100.0 100.5  101  101

257          KK   CH04
258          KM
259          KM   ********************************************
260          KM   * COMBINE COUPLET HYDROGRAPH WITH CH6       *
261          KM   ********************************************
262          HC      2

263          KK     4N
264          KM
265          KM   *******************************************
266          KM   * DRAINAGE AREA 4N DISCHARGE COMPUTATION  *
267          KM   * OFFSITE NORTH SIDE FOR THE AREA NORTH   *
268          KM   * OF 4TH STREET FORM BROWN EAST TO CCB    *
269          KM   *******************************************
270          KM
271          BA   .0128       0       0
272          LS      0    79.0    85.0
273          UD  0.080       0       0

274          KK     4S
275          KM
276          KM   *******************************************
277          KM   * DRAINAGE AREA 4S DISCHARGE COMPUTATION  *
278          KM   * FOR 4TH STREET SOUTH FROM BROWN AVE.    *
279          KM   * TO CIVIC CENTER BOULEVARD. ON THE WEST. *
280          KM   *******************************************
281          KM
282          BA   .0043
```



```
LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

283          LS      0    79.0    85.0
284          UD  0.060       0       0

285          KK     CH4
286          KM
287          KM   *******************************************
288          KM   * THIS IS THE COMBINED HYDROGRAPH FOR 4TH *
289          KM   * STREET AT CIVIC CENTER BOULEVARD.       *
290          KM   *******************************************
291          HC      2

292          KK    CC1W
293          KM
294          KM   ************************************************
295          KM   * DRAINAGE AREA CC1W DISCHARGE COMPUTATION      *
296          KM   * FOR THE AREA NORTH OF 4TH STREET CONCENTRATING *
297          KM   * IN CIVIC CENTER BOULEVARD ON THE WEST SIDE     *
298          KM   ************************************************
299          KM
300          BA   .0032
301          LS      0    79.0    85.0
```

```
302          UD   0.061       0       0

303          KK   CHCCN
304          KM
305          KM   ************************************************
306          KM   * COMBINE THE COMBINED HYDROGRAPH, CH4 WITH    *
307          KM   * CC1W.  THIS IS THE COMBINED FLOW FOR 4TH ST. *
308          KM   * AND CIVIC CENTER BOULEVARD AT 4TH STREET.    *
309          KM   ************************************************
310          HC      2

311          KK    RCC
312          KM
313          KM   ************************************************************
314          KM   * ROUTE THE COMBINED HYDROGRAPH CHCCN TO THE INTERSECTION *
315          KM   * OSBORN ROAD AND CIVIC CENTER BOULEVARD.                  *
316          KM   ************************************************************
317          RC   0.013   0.016   0.013   545.0  0.0030  241.88
318          RX   100.0   105.0  105.42   105.5   107.0  127.98  127.99   128.0
319          RY  241.88  241.80  241.80  241.30  241.38  241.68  241.80  241.88

320          KK    N5W
321          KM
322          KM   *******************************************
323          KM   * DRAINAGE AREA N5W DISCHARGE COMPUTATION *
324          KM   * FOR CIVIC CENTER BOULEVARD FROM 4TH ST. *
325          KM   * TO CIVIC CENTER BOULEVARD. ON THE WEST. *
326          KM   *******************************************
327          KM
328          BA   .0029
329          LS      0    79.0    85.0
330          UD   0.060       0       0
```



```
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.......10

331          KK    N5E
332          KM
333          KM   *******************************************
334          KM   * DRAINAGE AREA N5E DISCHARGE COMPUTATION *
335          KM   *******************************************
336          KM
337          BA   .0019
338          LS      0    98.0
339          UD   0.085       0

340          KK  CHCCNT
341          KM
342          KM   ************************************************
343          KM   * THIS WILL PRODUCE THE COMBINED HYDROGRAPH FOR *
344          KM   * CIVIC CENTER AT OSBORN ROAD FROM THE NORTH.   *
345          KM   * COMBINE THE COMBINED HYDROGRAPH FOR CHCCN     *
346          KM   * WITH D.A. N5W AND N5E.                       *
347          KM   ************************************************
348          HC      3

349          KK    CH7
350          KM
351          KM   *********************************************
352          KM   * COMBINE HYDROGRAPH FROM THE COMBINED CH6   *
353          KM   * AND CHCCNT WITH THE HYDROGRAPH FROM EC1.   *
354          KM   * THIS CONCENTRATION POINT IS EAST OF CIVIC  *
355          KM   * CENTER AVE AND COMBINES THE FLOWS FROM     *
356          KM   * NORTH, SOUTH AND ON-SITE FOR OSBORN ROAD.  *
357          KM   *********************************************
```

```
414          UD   0.060       0

415          KK    CH8A
416          KM
417          KM   *********************************************
418          KM   * COMBINE HYDROGRAPHS FOR D.A. N6W AND N6E *
419          KM   * THIS IS THE FLOW COMING FROM THE NORTH   *
420          KM   * ALONG 75TH STREET TO OSBORN.             *
421          KM   *********************************************
422          KM
423          HC      2
```



```
LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

424          KK    BOYS
425          KM
426          KM   *********************************************
427          KM   * DRAINAGE AREA BOYS DISCHARGE COMPUTATION *
428          KM   *********************************************
429          KM
430          BA   .0013
431          LS      0    79.0    85.0
432          UD   0.060       0       0

433          KK   PRKNG
434          KM
435          KM   *********************************************
436          KM   * DRAINAGE AREA PRKNG DISCHARGE COMPUTATION *
437          KM   *********************************************
438          KM
439          BA   .0107
440          LS      0    87.9    43.7
441          UD   0.060       0       0

442          KK     S1W
443          KM
444          KM   *******************************************
445          KM   * DRAINAGE AREA S1W DISCHARGE COMPUTATION *
446          KM   * AREA SOUTH 1 WEST SIDE OF CONTRIBUTING  *
447          KM   * SIDE STREET.                            *
448          KM   *******************************************
449          KM
450          BA   .0012
451          LS      0    83.8    63.8
452          UD   0.060       0       0

453          KK     S1E
454          KM
455          KM   *******************************************
456          KM   * DRAINAGE AREA S1E DISCHARGE COMPUTATION *
457          KM   *******************************************
458          KM
459          BA   .0012
460          LS      0    82.2    70.8
461          UD   0.060       0       0

462          KK     CH9
463          KM
464          KM   ************************************************
465          KM   * COMBINE HYDROGRAPH FROM THE COMBINED CH8      *
466          KM   * WITH THE COMBINED HYDROGRAPH CH8A WITH THE    *
467          KM   * HYDROGRAPHS FROM S1W, S1E, BOYS AND PRKNG.    *
468          KM   * THIS CONCENTRATION POINT IS EAST OF 75TH ROAD *
469          KM   * AND COMBINES THE FLOWS FROM NORTH, SOUTH AND  *
```

```
470          KM   * ON-SITE FOR OSBORN ROAD.                    *
471          KM   ************************************************
472          HC       6
```



```
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

473          KK      R4
474          KM
475          KM   *********************************************
476          KM   * ROUTE THE COMBINED HYDROGRAPH CH9 TO STA  *
477          KM   * 22+85.00 APPROXIMATELY HALF WAY TO MILLER *
478          KM   *********************************************
479          KM
480          RC   0.013   0.016   0.013  365.00  0.0044   10.00
481          RX     100     105   105.5  105.51  169.35  169.36  169.86  174.86
482          RY   10.00    9.92    9.92    9.79    9.79    9.92    9.92   10.00

483          KK    O6N1
484          KM
485          KM   *********************************************
486          KM   * DRAINAGE AREA O6N1 DISCHARGE COMPUTATION *
487          KM   *********************************************
488          KM
489          BA   .0048
490          LS       0    88.4    19.0
491          UD   0.126       0       0

492          KK    O4S1
493          KM
494          KM   *********************************************
495          KM   * DRAINAGE AREA O4S1 DISCHARGE COMPUTATION *
496          KM   *********************************************
497          KM
498          BA   .0012
499          LS       0    79.0    85.0
500          UD   0.060       0       0

501          KK    CH10
502          KM
503          KM   ************************************************
504          KM   * COMBINE HYDROGRAPH FROM THE COMBINED CH9     *
505          KM   * WITH THE HYDROGRAPHS FROM O6N1 AND O4S1      *
506          KM   * THIS CONCENTRATION POINT IS AT STA. 22+85.00 *
507          KM   ************************************************
508          KM
509          HC       3

510          KK      R5
511          KM
512          KM   *********************************************
513          KM   * ROUTE THE COMBINED HYDROGRAPH CH10 TO THE *
514          KM   * WEST SIDE OF MILLER ROAD                   *
515          KM   *********************************************
516          KM
517          RC   0.013   0.016   0.013  290.00  0.0044   10.00
518          RX     100     105   105.5  105.51  169.35  169.36  169.86  174.86
519          RY   10.00    9.92    9.92    9.79    9.79    9.92    9.92   10.00
```



```
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

520          KK    O6N2
521          KM
```

```
578          KM   * COMBINE THE COMBINED HYDROGRAPH FOR CH10 *
579          KM   * WITH CH11 TO COMPUTE THE TOTAL FLOW FOR  *
580          KM   * OSBORN ROAD JUST EAST OF MILLER RD.      *
581          KM   *********************************************
582          HC     2

583          KK     R6
584          KM
585          KM   *********************************************
586          KM   * ROUTE THE COMBINED HYDROGRAPH CH12 TO THE *
587          KM   * WEST SIDE OF THE 1ST ENTRANCE TO THE      *
588          KM   * APARTMENT COMPLEX.                        *
589          KM   *********************************************
590          KM
591          RC  0.013   0.016   0.013   470.0  0.0042   100.0       0       0
592          RX 1000.0 1000.25 1000.50 1000.58 1055.58 1056.00 1056.25 1056.50
593          RY  100.00  100.00  100.00   99.82   99.82  100.00  100.00  100.00

594          KK     07N
595          KM
596          KM   ************************************************
597          KM   * COMPUTE THE HYDROGRAPH FOR D.A. 07N JUST      *
598          KM   * WEST OF THE WESTERN MOST ENTRANCE TO THE      *
599          KM   * APARTMENT COMPLEX BETWEEN MILLER AND THE     *
600          KM   * INDIAN BEND WASH ON THE NORTH SIDE OF OSBORN. *
601          KM   ************************************************
602          KM
603          BA   .0009
604          LS      0    98.0       0
605          UD  0.060       0       0

606          KK     05S
607          KM
608          KM   ************************************************
609          KM   * COMPUTE THE HYDROGRAPH FOR D.A. 05S JUST      *
610          KM   * WEST OF THE WESTERN MOST ENTRANCE TO THE      *
611          KM   * APARTMENT COMPLEX BETWEEN MILLER AND THE     *
612          KM   * INDIAN BEND WASH ON THE SOUTH SIDE OF OSBORN. *
613          KM   ************************************************
614          KM
615          BA   .0006
616          LS      0    96.6
```



```
LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

617          UD  0.060       0       0

618          KK     CH13
619          KM
620          KM   ***************************************************
621          KM   * COMBINE THE COMBINED HYDROGRAPH FOR CH12        *
622          KM   * WITH D.A. 07N AND 05S LOCATED JUST WEST OF      *
623          KM   * THE WESTERN MOST ENTRANCE TO THE APARTMENT      *
624          KM   * COMPLEX BETWEEN MILLER AND THE INDIAN BEND WASH. *
625          KM   ***************************************************
626          HC     3

627          KK     R6
628          KM
629          KM   *********************************************
630          KM   * ROUTE THE COMBINED HYDROGRAPH CH12 TO THE *
631          KM   * WEST SIDE OF THE WESTER ENTRANCE TO THE   *
632          KM   * APARTMENT COMPLEX.                        *
633          KM   *********************************************
634          RC  0.013   0.016   0.013   470.0  0.0042   100.0       0       0
```

```
635          RX  1000.0 1000.25 1000.50 1000.58 1055.58 1056.00 1056.25 1056.50
636          RY  100.00  100.00  100.00   99.82   99.82  100.00  100.00  100.00

637          KK    08N
638          KM
639          KM   ************************************************
640          KM   * COMPUTE THE HYDROGRAPH FOR D.A. 08N JUST      *
641          KM   * WEST OF THE EASTERN MOST ENTRANCE TO THE      *
642          KM   * APARTMENT COMPLEX BETWEEN MILLER AND THE      *
643          KM   * INDIAN BEND WASH ON THE NORTH SIDE OF OSBORN. *
644          KM   ************************************************
645          KM
646          BA   .0008
647          LS      0    98.0       0
648          UD  0.060       0       0

649          KK    06S
650          KM
651          KM   ************************************************
652          KM   * COMPUTE THE HYDROGRAPH FOR D.A. 06S JUST      *
653          KM   * WEST OF THE EASTERN MOST ENTRANCE TO THE      *
654          KM   * APARTMENT COMPLEX BETWEEN MILLER AND THE      *
655          KM   * INDIAN BEND WASH ON THE SOUTH SIDE OF OSBORN. *
656          KM   ************************************************
657          KM
658          BA   .0010
659          LS      0    95.9
660          UD  0.060       0       0

661          KK    CH14
662          KM
663          KM   ************************************************
664          KM   * COMBINE THE COMBINED HYDROGRAPH FOR CH13      *
665          KM   * WITH D.A. 08N AND 06S LOCATED JUST WEST OF    *
666          KM   * THE EASTERN MOST ENTRANCE TO THE APARTMENT    *
```



```
LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

667          KM   * COMPLEX BETWEEN MILLER AND THE INDIAN BEND WASH. *
668          KM   ************************************************
669          HC      3

670          KK    09N
671          KM
672          KM   ************************************************
673          KM   * COMPUTE THE HYDROGRAPH FOR D.A. 09N LOCATED AT THE *
674          KM   * END OF THE PROJECT AT THE INDIAN BEND WASH.    *
675          KM   ************************************************
676          BA   .0017
677          LS      0    93.9
678          UD  0.060       0

679          KK    07S
680          KM
681          KM   ************************************************
682          KM   * COMPUTE THE HYDROGRAPH FOR D.A. 07S LOCATED AT THE *
683          KM   * END OF THE PROJECT AT THE INDIAN BEND WASH.    *
684          KM   ************************************************
685          BA   .0019
686          LS      0    95.1
687          UD  0.060       0

688          KK    N8E
689          KM
690          BA   .0017
```

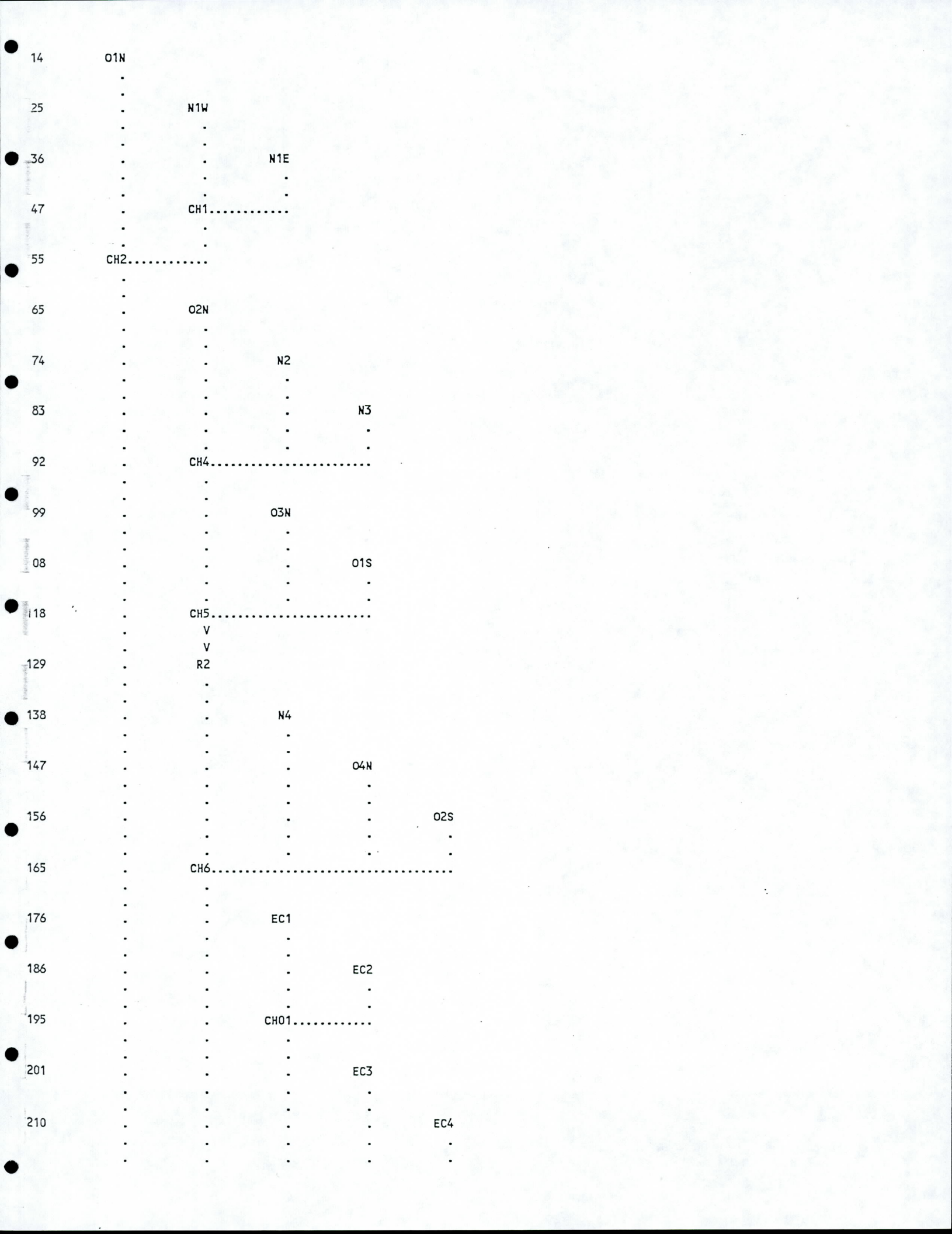
```
691          LS      0      79
692          UD   .319       0

693          KK    N10
694          KM
695          BA   .0017
696          LS      0      79
697          UD   .310       0

698          KK    N11
699          KM
700          BA   .0011
701          LS      0    91.1
702          UD   .280       0

703          KK     N9
704          KM
705          BA   .0182
706          LS      0      79
707          UD   .122       0

708          KK    CH15
709          KM
710          HC       4
```

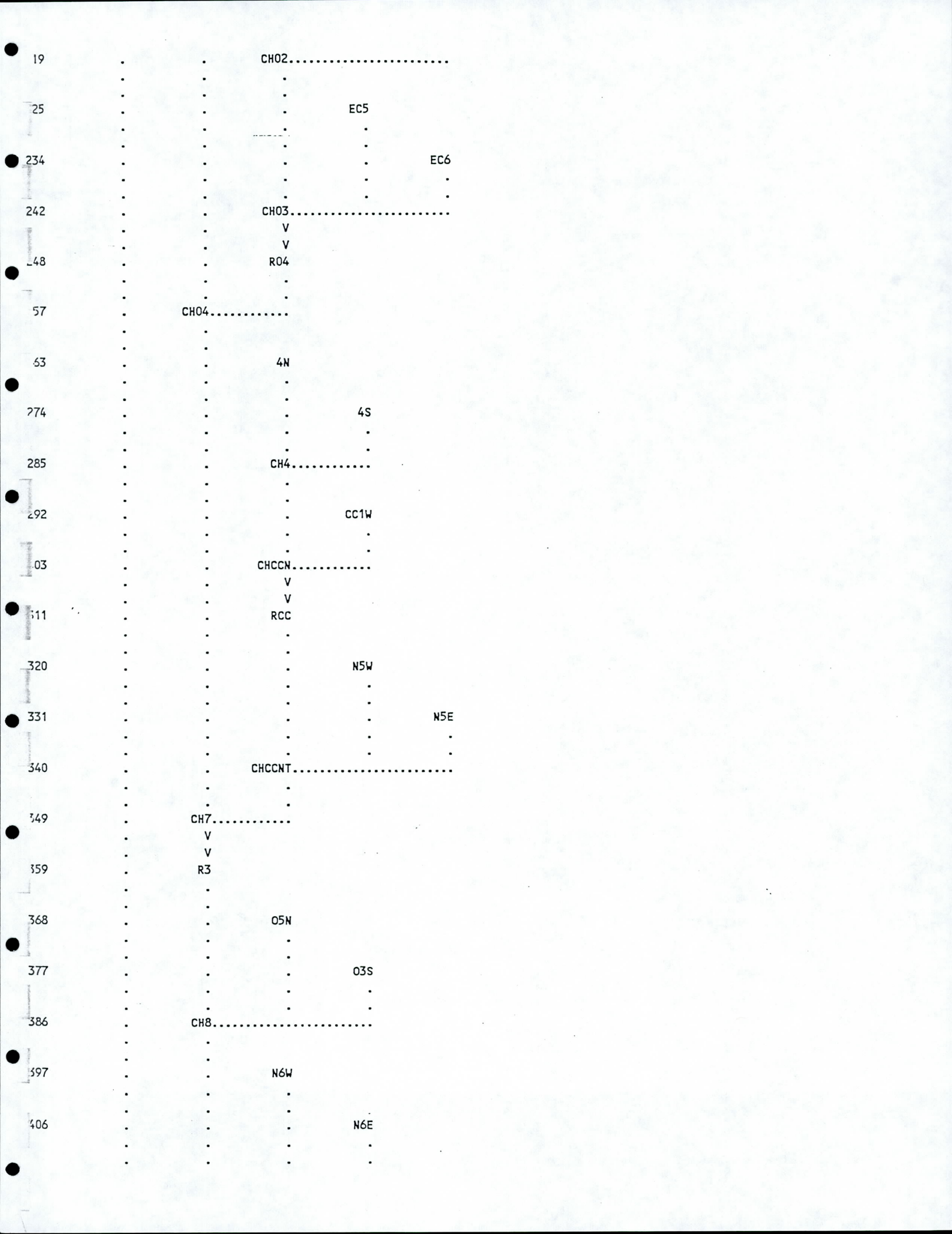


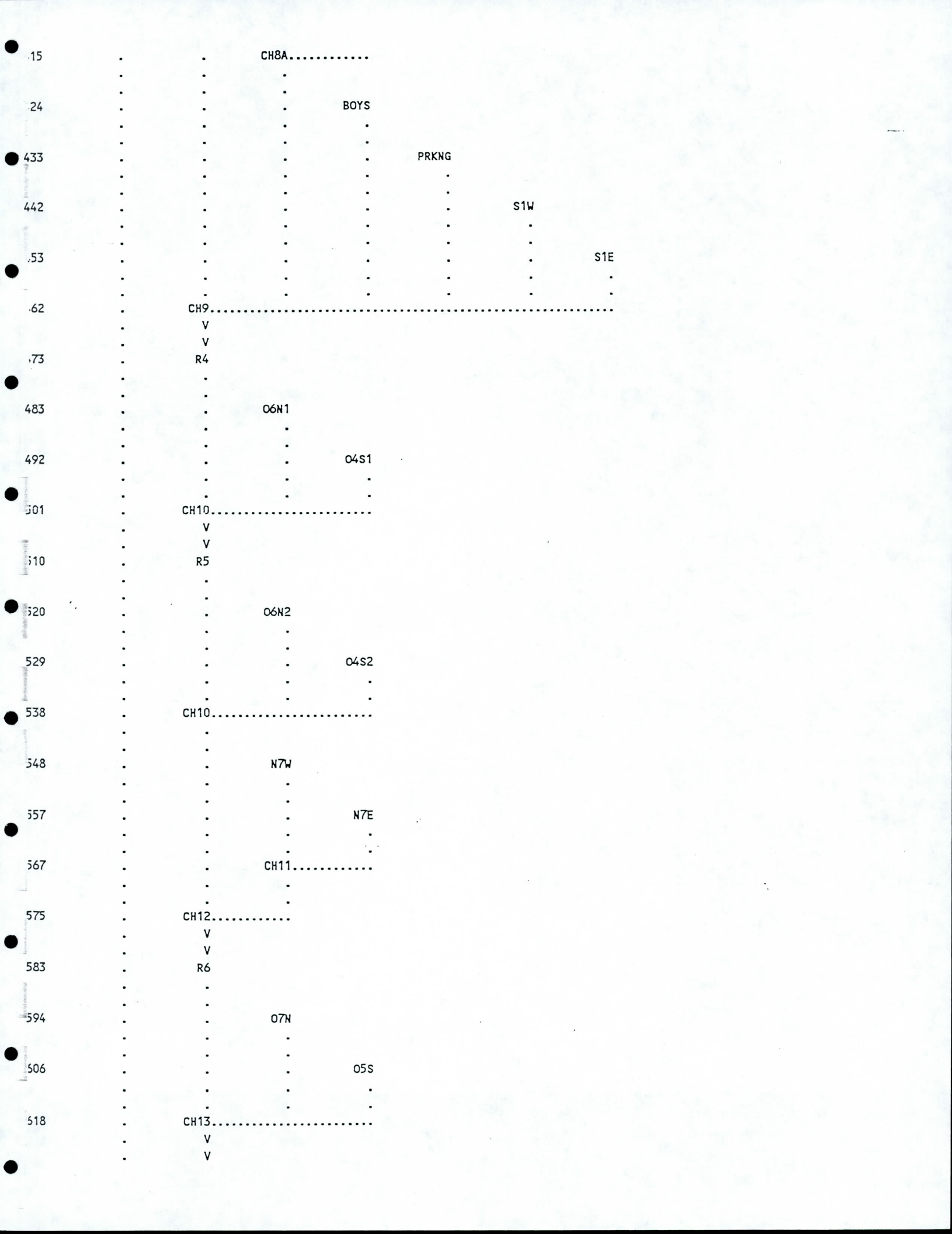
```
LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

711          KK    N12
712          KM
713          BA   .0006
714          LS      0      79
715          UD   .261       0

716          KK    N13
717          KM
718          BA   .0043
719          LS      0      91
720          UD   .248       0

721          KK    N8W
722          KM
723          BA   .0312
724          LS      0      79
725          UD   .248       0

726          KK     CP
727          KM
728          BA   .0043
729          LS      0      91
730          UD   .027       0

731          KK    CH16
732          KM   ****************************************************
733          KM    COMBINE N8E, N10, N11, N9, N12, N13, N8W, CP.
734          KM   ****************************************************
735          HC       5
736          ZZ
```

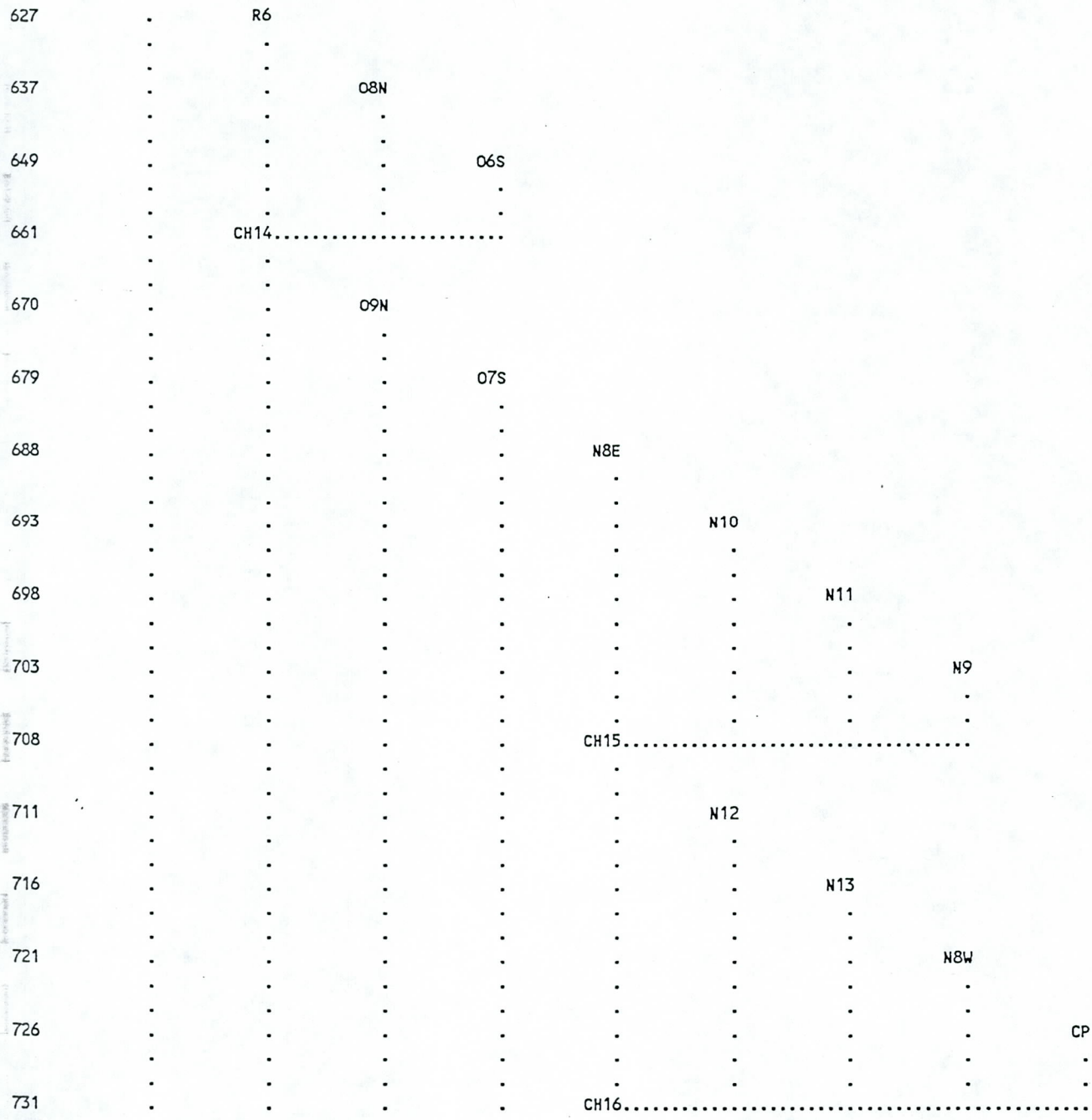
SCHEMATIC DIAGRAM OF STREAM NETWORK

```
INPUT
 LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

  NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW
```


14
O1N
25
N1W
36
N1E
47
CH1
55
CH2
65
O2N
74
N2
83
N3
92
CH4
99
O3N
08
O1S
118
CH5
129
R2
138
N4
147
O4N
156
O2S
165
CH6
176
EC1
186
EC2
195
CH01
201
EC3
210
EC4


19
CH02
25
EC5
234
EC6
242
CH03
V
V
248
R04
257
CH04
263
4N
274
4S
285
CH4
292
CC1W
303
CHCCN
V
V
311
RCC
320
N5W
331
N5E
340
CHCCNT
349
CH7
V
V
359
R3
368
O5N
377
O3S
386
CH8
397
N6W
406
N6E


15
CH8A
24
BOYS
433
PRKNG
442
S1W
53
S1E
62
CH9
73
R4
483
O6N1
492
O4S1
501
CH10
510
R5
520
O6N2
529
O4S2
538
CH10
548
N7W
557
N7E
567
CH11
575
CH12
583
R6
594
O7N
506
O5S
618
CH13



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*            FEBRUARY 1981              *
*          REVISED 02 AUG 88            *
*                                       *
*  RUN DATE  01/17/1993  TIME  09:27:31 *
*                                       *
*****************************************
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*  THE HYDROLOGIC ENGINEERING CENTER    *
*         609 SECOND STREET             *
*       DAVIS, CALIFORNIA 95616         *
*          (916) 551-1748               *
*                                       *
*****************************************
```

HEC-1 FOR EAST COUPLET, JOB NUMBER E019600
CITY OF SCOTTSDALE PROJECT NUMBERS: S2703 AND F2703
100-YEAR, 6-HOUR HYPOTHETICAL STORM ** DEVELOPED CONDITIONS **

DISCHARGE COMPUTATIONS FOR OFFSITE EXISTING DRAINAGE AREAS,
BOTH NORTH AND SOUTH OF OSBORN ROAD, AND ON-SITE
AREAS FROM SCOTTSDALE ROAD IN THE WEST TO THE WEST SIDE MILLER
ROAD IN THE EAST.

INPUT FILE NAME: EAST-100.DAT

13 IO OUTPUT CONTROL VARIABLES

IPRNT	5	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

IT HYDROGRAPH TIME DATA

NMIN	2	MINUTES IN COMPUTATION INTERVAL
IDATE	1 0	STARTING DATE
ITIME	0000	STARTING TIME
NQ	300	NUMBER OF HYDROGRAPH ORDINATES
NDDATE	1 0	ENDING DATE
NDTIME	0958	ENDING TIME
ICENT	19	CENTURY MARK

COMPUTATION INTERVAL .03 HOURS
TOTAL TIME BASE 9.97 HOURS

ENGLISH UNITS

DRAINAGE AREA	SQUARE MILES
PRECIPITATION DEPTH	INCHES
LENGTH, ELEVATION	FEET
FLOW	CUBIC FEET PER SECOND
STORAGE VOLUME	ACRE-FEET
SURFACE AREA	ACRES
TEMPERATURE	DEGREES FAHRENHEIT

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
HYDROGRAPH AT	O1N	3.	3.07	0.	0.	0.	.00		
HYDROGRAPH AT	N1W	41.	3.13	3.	2.	2.	.01		
HYDROGRAPH AT	N1E	16.	3.13	1.	1.	1.	.00		
2 COMBINED AT	CH1	57.	3.13	4.	3.	3.	.01		
2 COMBINED AT	CH2	60.	3.13	5.	3.	3.	.01		
HYDROGRAPH AT	O2N	1.	3.07	0.	0.	0.	.00		
HYDROGRAPH AT	N2	14.	3.10	1.	1.	1.	.00		
HYDROGRAPH AT	N3	19.	3.10	1.	1.	1.	.00		

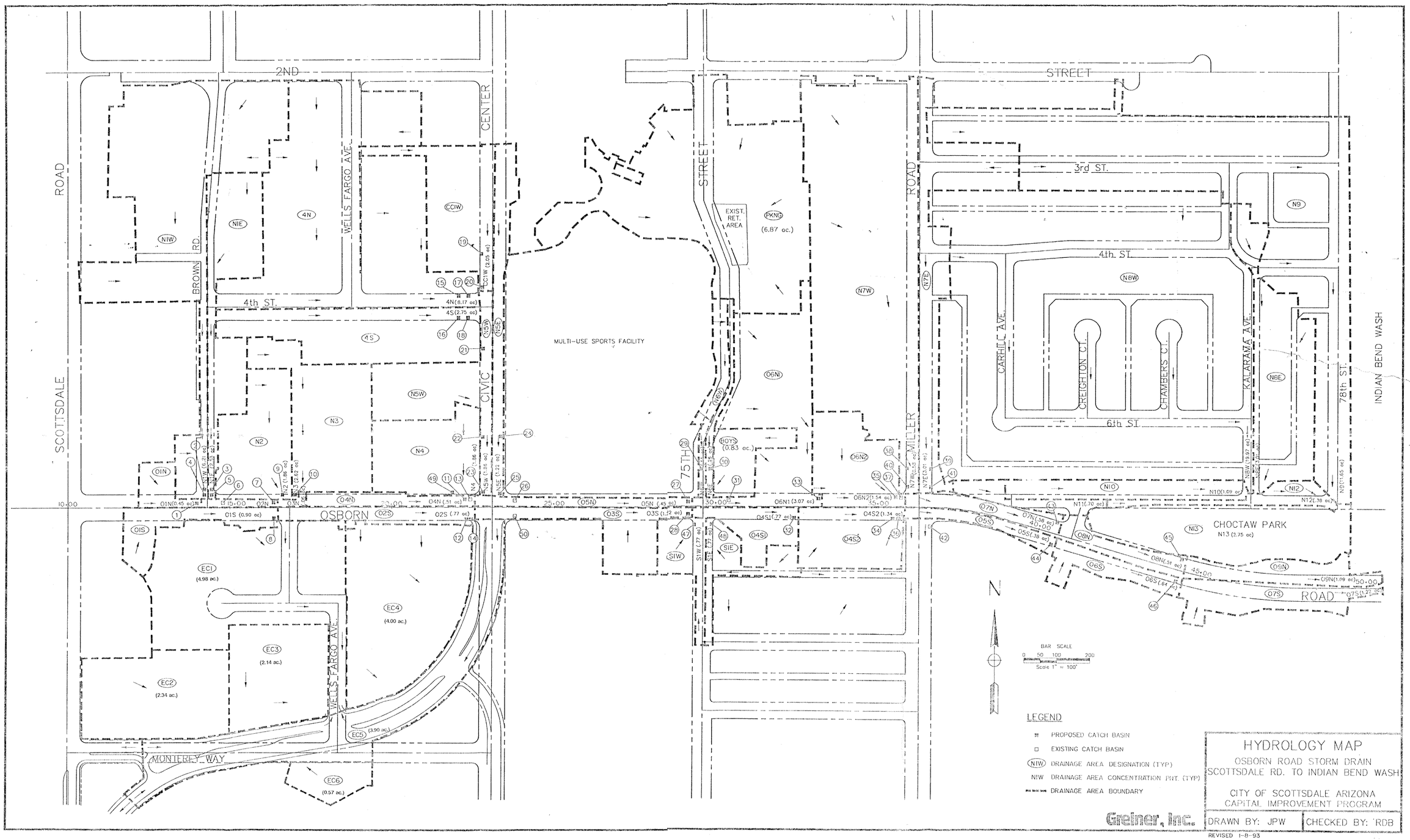
3 COMBINED AT	CH4	34.	3.10	2.	1.	1.	.01
HYDROGRAPH AT	O3N	1.	3.07	0.	0.	0.	.00
HYDROGRAPH AT	O1S	6.	3.10	0.	0.	0.	.00
3 COMBINED AT	CH5	41.	3.10	3.	2.	2.	.01
ROUTED TO	R2	41.	3.10	3.	2.	2.	.01
HYDROGRAPH AT	N4	15.	3.07	1.	1.	1.	.00
HYDROGRAPH AT	O4N	4.	3.07	0.	0.	0.	.00
HYDROGRAPH AT	O2S	7.	3.07	0.	0.	0.	.00
4 COMBINED AT	CH6	66.	3.10	4.	3.	3.	.01
HYDROGRAPH AT	EC1	35.	3.10	2.	1.	1.	.01
HYDROGRAPH AT	EC2	16.	3.13	1.	1.	1.	.00
2 COMBINED AT	CH01	51.	3.10	4.	2.	2.	.01
HYDROGRAPH AT	EC3	23.	3.03	1.	1.	1.	.00
HYDROGRAPH AT	EC4	33.	3.10	2.	1.	1.	.01
3 COMBINED AT	CH02	98.	3.07	7.	4.	4.	.02
HYDROGRAPH AT	EC5	32.	3.10	2.	1.	1.	.01
HYDROGRAPH AT	EC6	5.	3.03	0.	0.	0.	.00
3 COMBINED AT	CH03	133.	3.10	9.	6.	6.	.03
ROUTED TO	R04	133.	3.10	9.	6.	6.	.03
2 COMBINED AT	CH04	199.	3.10	14.	8.	8.	.04
HYDROGRAPH AT	4N	61.	3.10	4.	3.	3.	.01
HYDROGRAPH AT	4S	22.	3.07	1.	1.	1.	.00

2 COMBINED AT						
CH4	83.	3.10	6.	3.	3.	.02
HYDROGRAPH AT						
CC1W	16.	3.07	1.	1.	1.	.00
2 COMBINED AT						
CHCCN	98.	3.10	7.	4.	4.	.02
ROUTED TO						
RCC	98.	3.10	7.	4.	4.	.02
HYDROGRAPH AT						
N5W	15.	3.07	1.	1.	1.	.00
HYDROGRAPH AT						
N5E	9.	3.10	1.	0.	0.	.00
3 COMBINED AT						
CHCCNT	122.	3.10	8.	5.	5.	.03
2 COMBINED AT						
CH7	321.	3.10	22.	13.	13.	.07
ROUTED TO						
R3	321.	3.10	22.	13.	13.	.07
HYDROGRAPH AT						
O5N	4.	3.07	0.	0.	0.	.00
HYDROGRAPH AT						
O3S	9.	3.07	1.	0.	0.	.00
3 COMBINED AT						
CH8	333.	3.10	23.	14.	14.	.07
HYDROGRAPH AT						
N6W	4.	3.10	0.	0.	0.	.00
HYDROGRAPH AT						
N6E	2.	3.07	0.	0.	0.	.00
2 COMBINED AT						
CH8A	6.	3.10	0.	0.	0.	.00
HYDROGRAPH AT						
BOYS	7.	3.07	0.	0.	0.	.00
HYDROGRAPH AT						
PRKNG	50.	3.07	3.	2.	2.	.01
HYDROGRAPH AT						
S1W	6.	3.07	0.	0.	0.	.00
HYDROGRAPH AT						
S1E	6.	3.07	0.	0.	0.	.00
6 COMBINED AT						
CH9	406.	3.10	27.	16.	16.	.09
ROUTED TO						
R4	406.	3.10	27.	16.	16.	.09
HYDROGRAPH AT						
O6N1	16.	3.17	1.	1.	1.	.00

HYDROGRAPH AT						
	O4S1	6.	3.07	0.	0.	0.	.00
3 COMBINED AT						
	CH10	427.	3.10	29.	17.	17.	.09
ROUTED TO						
	R5	427.	3.10	29.	17.	17.	.09
HYDROGRAPH AT						
	O6N2	11.	3.10	1.	0.	0.	.00
HYDROGRAPH AT						
	O4S2	11.	3.07	1.	0.	0.	.00
3 COMBINED AT						
	CH10	448.	3.10	30.	18.	18.	.10
HYDROGRAPH AT						
	N7W	53.	3.13	4.	2.	2.	.01
HYDROGRAPH AT						
	N7E	10.	3.30	1.	1.	1.	.00
2 COMBINED AT						
	CH11	59.	3.13	5.	3.	3.	.02
2 COMBINED AT						
	CH12	503.	3.10	36.	21.	21.	.11
ROUTED TO						
	R6	503.	3.10	36.	21.	21.	.11
HYDROGRAPH AT						
	O7N	5.	3.07	0.	0.	0.	.00
HYDROGRAPH AT						
	O5S	3.	3.07	0.	0.	0.	.00
3 COMBINED AT						
	CH13	511.	3.10	36.	22.	22.	.12
ROUTED TO						
	R6	511.	3.10	36.	22.	22.	.12
HYDROGRAPH AT						
	O8N	4.	3.07	0.	0.	0.	.00
HYDROGRAPH AT						
	O6S	5.	3.07	0.	0.	0.	.00
3 COMBINED AT						
	CH14	520.	3.10	37.	22.	22.	.12
HYDROGRAPH AT						
	O9N	8.	3.07	0.	0.	0.	.00
HYDROGRAPH AT						
	O7S	10.	3.07	1.	0.	0.	.00
HYDROGRAPH AT						
	N8E	2.	3.40	0.	0.	0.	.00
HYDROGRAPH AT						
	N10	2.	3.37	0.	0.	0.	.00

HYDROGRAPH AT	N11	3.	3.33	0.	0.	0.	.00
HYDROGRAPH AT	N9	40.	3.17	3.	2.	2.	.02
4 COMBINED AT	CH15	43.	3.17	4.	2.	2.	.02
HYDROGRAPH AT	N12	1.	3.33	0.	0.	0.	.00
HYDROGRAPH AT	N13	11.	3.30	1.	1.	1.	.00
HYDROGRAPH AT	N8W	47.	3.30	5.	3.	3.	.03
HYDROGRAPH AT	CP	22.	3.03	1.	1.	1.	.00
5 COMBINED AT	CH16	97.	3.23	11.	7.	7.	.06

NORMAL END OF HEC-1 ***



HYDROLOGY MAP

OSBORN ROAD STORM DRAIN
SCOTTSDALE RD. TO INDIAN BEND WASH

CITY OF SCOTTSDALE ARIZONA
CAPITAL IMPROVEMENT PROGRAM

DRAWN BY: JPW | CHECKED BY: 'RDB

REVISED 1-8-93