

DRAINAGE REPORT
FOR
DUBLIN BOULEVARD
(From Austin Bluffs Parkway, East 3960 Feet)

PREPARED BY:

K L H Engineering Consultants, Inc.
206-208 Sutton Lane
Colorado Springs, CO 80907

J.N. 83 559 00

March 1987

GENERAL

This Drainage Report is written for the 3960 foot portion of Dublin Boulevard from Austin Bluffs Parkway to the East line of the existing Norwood Master Plan area, also being the East line of the W 1/2 of Section 12, Township 13 South, Range 66 West of the 6th P.M. (see Figure 1). This report is written in conjunction with the extension of Dublin Boulevard from Rangewood Drive to Austin Bluffs Parkway.

This portion of Dublin Boulevard consists of 11.27 acres of right-of-way, and is presently surrounded by unplatted lands. The street is considered as an arterial street and shall have vertical curb throughout.

The street is located on terrain which slopes moderately, from North to South. Soils located in the tributary drainage area are classified as: Blakeland Sandy Loam, Truckton Loamy Sand, and Truckton-Blakeland Complex, Hydrologic Soils Group A. S.C.S. Soils Map numbers are shown on the Drainage Plan following this report.

This portion of Dublin Boulevard is in the Cottonwood Creek Drainage Basin and does not lie within the 100-year floodplain of Cottonwood Creek.

The West intersection with Austin Bluffs Parkway is addressed in the "Drainage Report for Austin Bluffs Parkway (From Dublin Boulevard to Woodmen)", by KLH Engineering Consultants, Inc., July 1985, revised November 1986.

METHOD OF COMPUTATIONS

Runoff quantities were calculated using the Modified S.C.S. Methodology as approved by the City of Colorado Springs Engineering Division. Peak runoff flows for both 5-year and 100-year storms were computed. A weighted curve number was utilized using respective percentages of area in the streets and on the lots, in calculating flows.

Per City of Colorado Springs Criteria, all drainage structures have been sized for the 5-year storm when the peak 100-year flow is less than 500 c.f.s., and for the 100-year storm when peak 100-year flows exceed 500 c.f.s.

INTERIOR DRAINAGE

The amount of runoff generated in the right-of-way for this street is small compared to flows tributary to the right-of-way. Therefore, interior drainage area has been included as part of the exterior drainage discussion.

EXTERIOR DRAINAGE AND DRAINAGE IMPROVEMENTS

Drainage basin delineations for areas tributary to this portion of Dublin Boulevard are based on preliminary street layouts (from the Amended Norwood Master Plan area and in-house residential street patterns) and existing topography. See Figure 2 for tributary drainage areas. Land uses for tributary drainage areas are based on the Amended Nor'wood Master Plan with reasonable assumptions for lands further East. Land uses for each basin are summarized in the drainage computations in the back of this report.

Runoff from lands adjacent to Dublin Boulevard will flow overland to streets, and down streets as gutter flow to catch basins in Dublin Boulevard. Basins 1 thru 4, and Basin 7 drain to storm sewer facilities on the North side of Dublin Boulevard and then outfall South in the future street and discharge into the Nor'wood East Drainageway. Runoff from Basins 5, 6, and 8 will flow in the gutter on the South side of Dublin Boulevard to the future street located at the low point in Dublin Boulevard and then drain into catch basins in the future street. The flow in the outfall facilities will then discharge into the Nor'wood East Drainageway. Storm drain facilities for this plat will include all facilities to the point of outfall at the Nor'wood East Drainageway. All storm drain facilities not located within the Dublin Boulevard Right-of-Way will be located in a public easement.

Runoff from basins 11, 12 and 13 will flow overland to streets, and down streets as gutter flow to catch basins in proposed streets, and into the storm sewer facilities located in the future street. The flow will then discharge into the Nor'wood East Drainageway. The facilities in basins 11, 12 and 13 are approximate only and may change depending on the final street design.

Runoff from Basins 9 and 10 will flow into the storm sewer facilities as described in the "Drainage Report for Austin Bluffs Parkway (From Rangewood to Dublin)" and the "Drainage Report for Austin Bluffs Parkway (From Dublin to Woodmen)", both by KLH Engineering Consultants, Inc. These two reports are presently on file with the City of Colorado Springs Engineering Department.

All runoff flows exiting this portion of Dublin Boulevard flow onto and across lands owned by Nor'wood Development Corporation. Nor'wood Development Corporation agrees to accept the increased developed flows.

DRAINAGE FACILITIES COST ESTIMATE

Public and Reimbursable
Dublin Facilities

6' D-10R	3 Each @ \$2,000/Ea.	=	\$ 6,000.00
10' D-10R	1 Each @ \$2,700/Ea.	=	\$ 2,700.00
Manholes	4 Each @ \$1,300/Ea.	=	\$ 5,200.00
18" R.C.P.	200 L.F. @ \$ 26/L.F.	=	\$ 5,200.00
21" R.C.P.	130 L.F. @ \$ 31/L.F.	=	\$ 4,030.00
24" R.C.P.	1000 L.F. @ \$ 37/L.F.	=	\$ 37,000.00
30" R.C.P.	195 L.F. @ \$ 42/L.F.	=	\$ 8,190.00

Outfall Facilities

6' D-10R	3 Each @ \$2,000/Ea	=	\$ 6,000.00
Manholes	3 Each @ \$1,300/Ea	=	\$ 3,900.00
18" R.C.P.	100 L.F. @ \$ 26/L.F.	=	\$ 2,600.00
30" R.C.P.	1045 L.F. @ \$ 42/L.F.	=	\$ 43,890.00
36" R.C.P.	350 L.F. @ \$ 51/L.F.	=	\$ 17,850.00
18" Rip Rap	90 C.Y. @ \$ 35/C.Y.	=	\$ 3,150.00

\$145,710.00

Plus 15% Engineering & Contingency 21,856.50

TOTAL \$167,566.50

DRAINAGE AND BRIDGE FEES

1987 Drainage Fee:	11.27 Ac. @ \$3,458/Ac.	=	\$ 38,971.66
1987 Bridge Fee:	11.27 Ac. @ \$ 158/Ac.	=	\$ 1,780.66

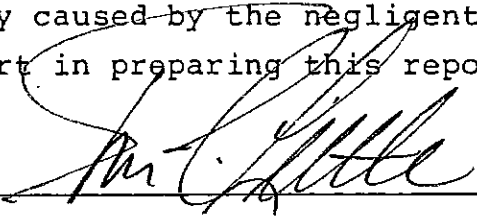
The Developer will provide a letter of credit upon platting for the amount of the storm drain cost estimate, to insure the construction of the facilities. The Developer will pay the Bridge Fees upon platting.

DRAINAGE REPORT STATEMENTS

Engineer's Statement:

The attached drainage plan and report were prepared under my direction and supervision and are correct to the best of my knowledge and belief. Said drainage report has been prepared according to the criteria established by the City for drainage reports and said report is in conformity with the master plan of the drainage basin. I accept responsibility for any liability caused by the negligent acts, errors or omissions on my part in preparing this report.

Name



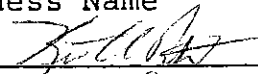
Developer's Statement:

The developer has read and will comply with all of the requirements specified in this drainage report.

NORWOOD DEVELOPMENT CORPORATION

Business Name

By:



Title:

Pras

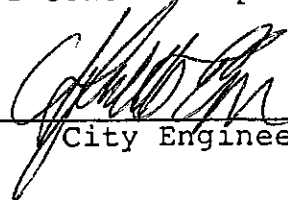
Address:

P.O. Box 792

Manitou Springs, CO 80829

City of Colorado Springs:

Filed in accordance with Section 15-3-906 of the Code of the City of Colorado Springs, 1980, as amended.



City Engineer

5/21/87

Date

Conditions:

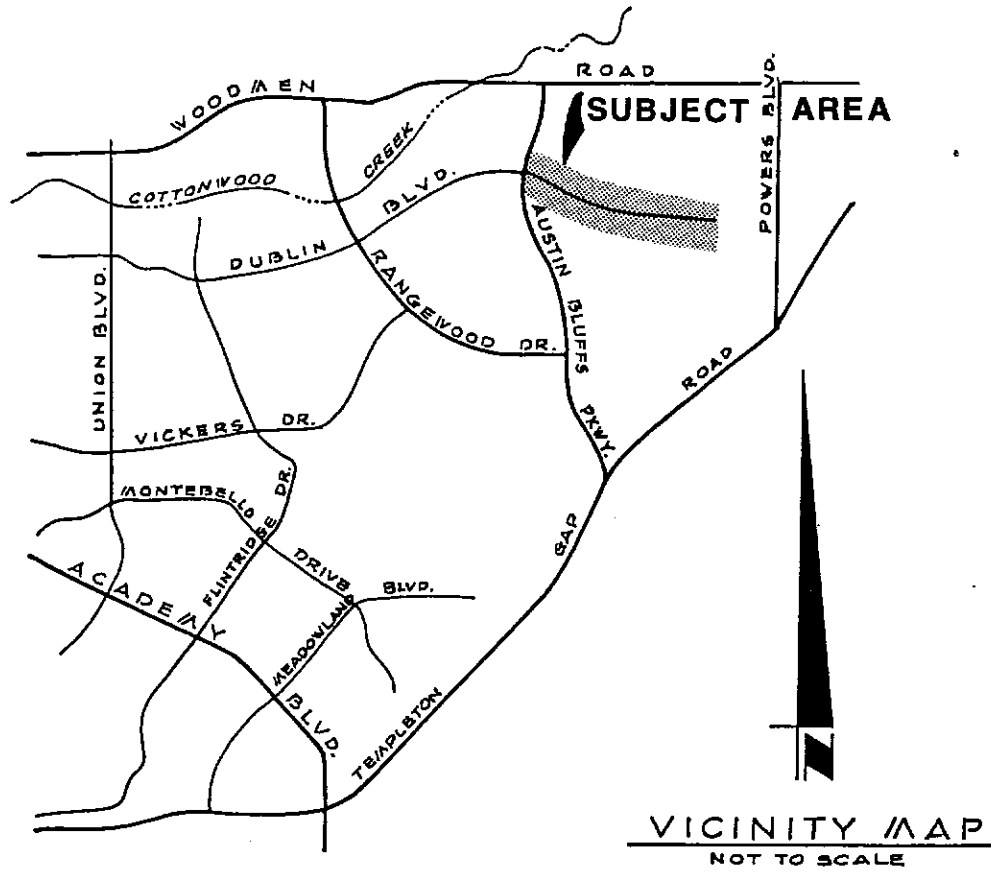
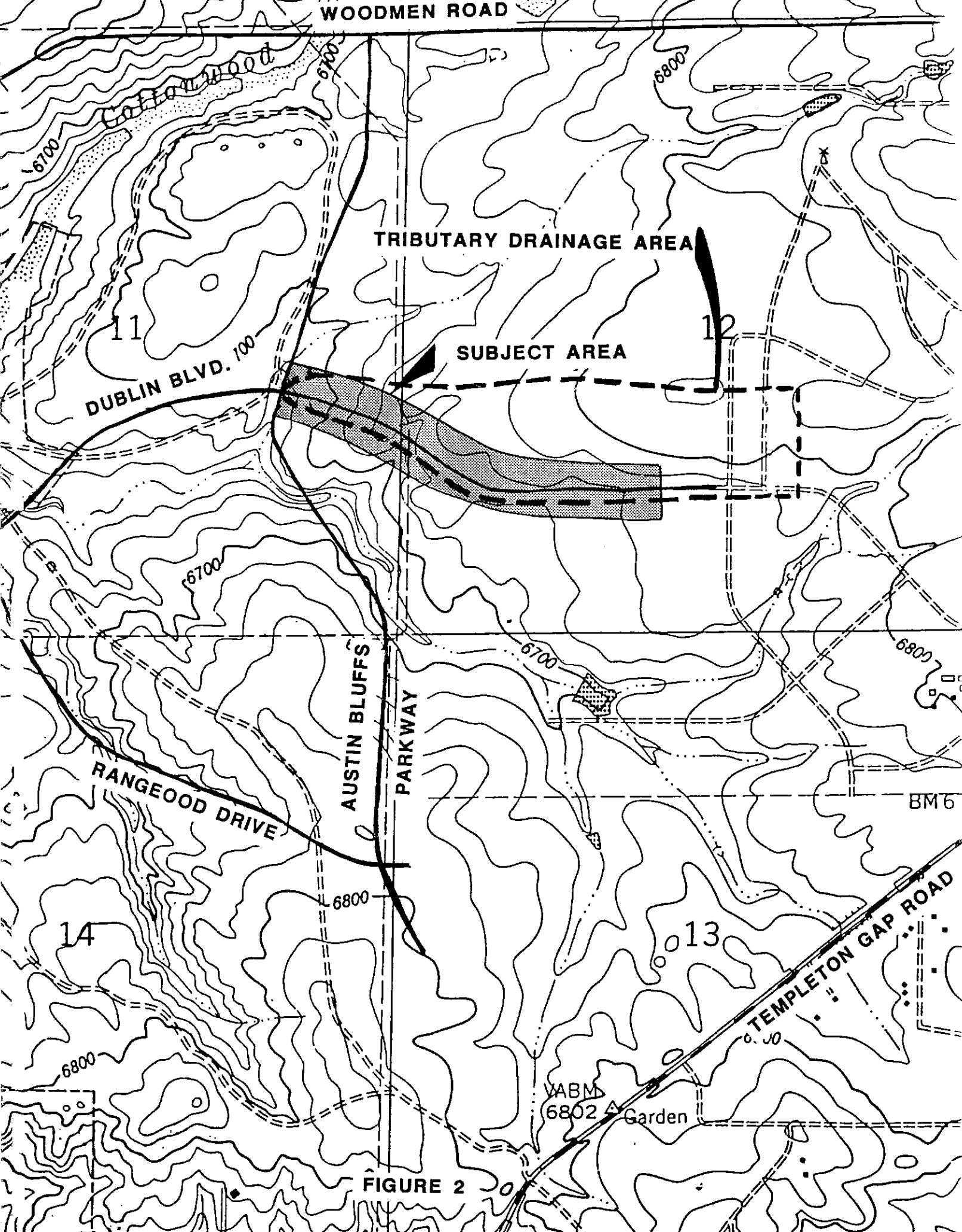


FIGURE 1

WOODMEN ROAD



TRIBUTARY DRAINAGE AREA

SUBJECT AREA

DUBLIN BLVD. 100

AUSTIN BLUFFS PARKWAY

RANGEODD DRIVE

TEMPLETON GAP ROAD

FIGURE 2

BASIN

DUBLIN- 1

ACREAGE	SQ. MI.	LAND USE	SOIL	CN	Z	Z x CN
11.6		RESIDENTIAL 1/5Ac	A	77	85.3	6567.6
2.0		STREETS & WALKS	A	98	14.7	1441.2
13.6	.021				100.0	8008.8
WEIGHTED CN = 80.1						

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)
SHEET	200	2	.028			
STREET	1950	68	.090			
	2150	70	.118	.63	1220	16.3 (5yr FLOW)
				1.64		42.6 (100yr FLOW)

BASIN

DUBLIN- 2

ACREAGE	SQ. MI.	LAND USE	SOIL	CN	Z	Z x CN
9.9		RESIDENTIAL 1/5Ac	A	77	85.3	6571.6
1.7		STREETS & WALKS	A	98	14.7	1436.2
11.6	.018				100.0	6007.8
WEIGHTED CN = 80.1						

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)
SHEET	100	1	.014			
STREET	1380	74	.044			
	1480	75	.058	.63	1300	14.8 (5yr FLOW)
				1.64		38.7 (100yr FLOW)

BASIN

DUBLIN- 3

ACREAGE	SQ. MI.	LAND USE	SOIL	CN	Z	Z x CN
3.6		RESIDENTIAL 1/5Ac	A	77	85.7	6600.0
.6		STREETS & WALKS	A	98	14.3	1400.0
4.2	.007				100.0	8000.0
WEIGHTED CN = 80.0						

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)
STREET	100	4	.007			
PIPE	1050	22	.024			
	1150	26	.031	.62	1300	5.3 (5yr FLOW)
				1.64		14.0 (100yr FLOW)

BASIN

DUBLIN- 4

ACREAGE	SQ. MI.	LAND USE	SOIL	CN	Z	Z x CN
9.2		RESIDENTIAL 1/5Ac	A	77	71.3	5491.5
1.6		STREETS & WALKS	A	98	12.4	1215.5
2.1		PARK / OPEN SPACE	A	39	16.3	634.9
12.9	.020				100.0	7341.9
WEIGHTED CN = 73.4						

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)
SHEET	100	4	.007			
STREET	1420	76	.045			
	1520	80	.052	.38	1300	9.9 (5yr FLOW)
				1.20		31.6 (100yr FLOW)

BASIN

DUBLIN- 5

ACREAGE	SQ. MI.	LAND USE	SOIL	CN	Z	Z x CN
1.2		RESIDENTIAL 1/5Ac	A	77	50.0	3850.0
1.2		STREETS & WALKS	A	98	50.0	4900.0
2.4	.004				100.0	8750.0
WEIGHTED CN = 87.5						

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)
STREET	1350	26	.120			
	1350	26	.120	1.02	1220	4.6 (5yr FLOW)
				2.23		10.2 (100yr FLOW)

BASIN

DUBLIN- 6

ACREAGE	SQ. MI.	LAND USE	SOIL	CN	Z	Z x CN
1.5		RESIDENTIAL 1/5Ac	A	77	51.7	3982.8
1.4		STREETS & WALKS	A	98	48.3	4731.0
2.9	.005				100.0	8713.8
WEIGHTED CN = 87.1						

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)
STREET	1150	22	.120			
	1150	22	.120	.99	1220	5.5 (5yr FLOW)
				2.19		12.1 (100yr FLOW)

BASIN

DUBLIN-7

ACREAGE	SQ. MI.	LAND USE	SOIL	CN	Z	Z x CN
7.0		RESIDENTIAL 1/5Ac	A	77	82.4	6341.2
.3		PARK / OPEN SPACE	A	39	3.5	137.6
1.2		STREETS & WALKS	A	98	14.1	1383.5
9.5	.013				100.0	7862.4
WEIGHTED CN = 78.6						

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)
SHEET	100	1	.014			
STREET	940	40	.033			
	1040	41	.047	.57	1300	9.8 (5yr FLOW)
				1.54		26.6 (100yr FLOW)

BASIN

DUBLIN-10

ACREAGE	SQ. MI.	LAND USE	SOIL	CN	Z	Z x CN
29.2		P.U.D.	A	77	89.3	6875.8
3.5		STREETS & WALKS	A	98	10.7	1048.9
32.7	.051				100.0	7924.8
WEIGHTED CN = 79.2						

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)
SHEET	640	20	.051			
STREET	1040	11	.072			
	1680	31	.123	.59	1210	36.6 (5yr FLOW)
				1.58		97.9 (100yr FLOW)

BASIN

DUBLIN-8

ACREAGE	SQ. MI.	LAND USE	SOIL	CN	Z	Z x CN
.8		RESIDENTIAL 1/5Ac	A	77	48.5	3733.3
.9		STREETS & WALKS	A	98	51.5	5048.5
1.7	.003				100.0	8781.8
WEIGHTED CN = 87.8						

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)
STREET	730	8	.100			
	730	8	.100	1.03	1270	3.4 (5yr FLOW)
				2.25		7.4 (100yr FLOW)

BASIN

DUBLIN-11

ACREAGE	SQ. MI.	LAND USE	SOIL	CN	Z	Z x CN
11.6		RESIDENTIAL 1/5Ac	A	77	85.3	6567.6
2.0		STREETS & WALKS	A	98	14.7	1441.2
13.6	.021				100.0	8008.8
WEIGHTED CN = 80.1						

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)
SHEET	200	2	.079			
STREET	1500	10	.149			
	1700	12	.228	.63	1020	13.6 (5yr FLOW)
				1.64		35.6 (100yr FLOW)

BASIN

DUBLIN-9

ACREAGE	SQ. MI.	LAND USE	SOIL	CN	Z	Z x CN
1.5		RESIDENTIAL 1/5Ac	A	77	50.0	3850.0
1.5		STREETS & WALKS	A	98	50.0	4900.0
3.0	.005				100.0	8750.0
WEIGHTED CN = 87.5						

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)
STREET	1250	55	.080			
	1250	55	.080	1.02	1300	6.2 (5yr FLOW)
				2.23		13.6 (100yr FLOW)

BASIN

DUBLIN-12

ACREAGE	SQ. MI.	LAND USE	SOIL	CN	Z	Z x CN
17.0		RESIDENTIAL 1/5Ac	A	77	85.0	6545.0
3.0		STREETS & WALKS	A	98	15.0	1470.0
20.0	.031				100.0	8015.0
WEIGHTED CN = 80.2						

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)
SHEET	70	1	.024			
STREET	1900	40	.096			
	1970	41	.120	.63	1220	24.1 (5yr FLOW)
				1.65		62.8 (100yr FLOW)

DUBLIN BOULEVARD EAST OF AUSTIN BLUFFS PARKWAY

DUBLIN BOULEVARD EAST OF AUSTIN BLUFFS PARKWAY

BASIN

DUBLIN-13

ACREAGE	SQ. MI.	LAND USE	SOIL	CN	%	% x CN
11.7		RESIDENTIAL 1/5Ac	A	77	85.0	6545.0
2.1		STREETS & WALKS	A	98	15.0	1470.0
14.0	.022				100.0	8015.0

WEIGHTED CN = 80.2

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)
SHEET	200	8	.046			
STREET	1990	66	.077			
	2190	68	.117	.63	1220	16.8 (5yr FLOW)
				1.85		44.0 (100yr FLOW)

BASIN

DUBLIN-14

ACREAGE	SQ. MI.	LAND USE	SOIL	CN	%	% x CN
7.5		RESIDENTIAL 1/5Ac	A	77	85.2	6582.5
1.3		STREETS & WALKS	A	98	14.8	1447.7
8.8	.014				100.0	8030.2

WEIGHTED CN = 80.1

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)
SHEET	79	1	.024			
STREET	1850	45	.070			
PIPE	1050	20	.024			
	2770	67	.118	.63	1220	10.5 (5yr FLOW)
				1.64		27.6 (100yr FLOW)

BASINS

DUBLIN- 1 ,2

ACREAGE	SQ. MI.	LAND USE	SOIL	CN	%	% x CN
21.5		RESIDENTIAL 1/5Ac	A	77	85.3	6569.4
3.7		STREETS & WALKS	A	98	14.7	1438.9
25.2	.039				100.0	8008.3

WEIGHTED CN = 80.1

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)
SHEET	200	2	.028			
STREET	1950	68	.090			
	2150	70	.118	.63	1220	30.2 (5yr FLOW)
				1.64		78.9 (100yr FLOW)

BASINS

DUBLIN- 1 ,2 ,3

ACREAGE	SQ. MI.	LAND USE	SOIL	CN	%	% x CN
25.1		RESIDENTIAL 1/5Ac	A	77	85.4	6573.8
4.3		STREETS & WALKS	A	98	14.6	1433.3
29.4	.046				100.0	8007.1

WEIGHTED CN = 80.1

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)
SHEET	200	2	.028			
STREET	1950	68	.090			
PIPE	1050	22	.024			
	3200	92	.142	.63	1170	33.7 (5yr FLOW)
				1.64		88.2 (100yr FLOW)

BASINS

DUBLIN- 1,2,3,4

ACREAGE	SQ. MI.	LAND USE	SOIL	CN	Z	Z x CN
34.3		RESIDENTIAL 1/5ac	A	77	81.1	6243.7
2.1		PARK / OPEN SPACE	A	39	5.0	193.6
5.9		STREETS & WALKS	-A	98	13.9	1366.9
42.3	.066				100.0	7804.3

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)
SHEET	200	2	.028			
STREET	1950	68	.090			
PIPE	1050	22	.024			
	3200	92	.142	.54	1170	42.0 (5yr FLOW)
				1.50		116.0 (100yr FLOW)

BASINS

DUBLIN- 1,2,3,4,7

ACREAGE	SQ. MI.	LAND USE	SOIL	CN	Z	Z x CN
41.3		RESIDENTIAL 1/5ac	A	77	81.3	6260.0
2.4		PARK / OPEN SPACE	A	39	4.7	184.3
7.1		STREETS & WALKS	A	98	14.0	1369.7
50.8	.079				100.0	7814.0

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)
SHEET	200	2	.028			
STREET	1950	68	.090			
PIPE	1050	22	.024			
	3200	92	.142	.55	1170	50.8 (5yr FLOW)
				1.51		139.9 (100yr FLOW)

BASINS

DUBLIN- 5,6

ACREAGE	SQ. MI.	LAND USE	SOIL	CN	Z	Z x CN
2.7		RESIDENTIAL 1/5ac	A	77	50.9	3922.6
2.6		STREETS & WALKS	A	98	49.1	4807.5
5.3	.008				100.0	8730.2

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)
STREET	2500	48	.130			
	2500	48	.130	1.00	1190	9.9 (5yr FLOW)
				2.21		21.8 (100yr FLOW)

BASINS

DUBLIN- 1,2,3,4,5,6,7,8

ACREAGE	SQ. MI.	LAND USE	SOIL	CN	Z	Z x CN
44.8		RESIDENTIAL 1/5ac	A	77	77.6	5973.3
2.4		PARK / OPEN SPACE	A	39	4.2	162.1
10.6		STREETS & WALKS	A	98	18.3	1790.3
57.8	.090				100.0	7925.7

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)
SHEET	200	2	.028			
STREET	1950	68	.090			
PIPE	1050	22	.024			
	3200	92	.142	.59	1170	62.6 (5yr FLOW)
				1.58		167.2 (100yr FLOW)

BASINS

DUBLIN- 1 ,2 ,3 ,4 ,5 ,6 ,7 ,8 ,14

ACREAGE	SQ. MI.	LAND USE	SOIL	CN	Z	Z x CN
52.3		RESIDENTIAL 1/5Ac	A	77	78.6	6051.2
2.4		PARK / OPEN SPACE	A	39	3.6	140.6
11.9		STREETS & WALKS	A	98	17.8	1745.0
66.6	.104				100.0	7936.9

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)
SHEET	200	2	.028			
STREET	1950	68	.090			
PIPE	2100	42	.049			
	4250	112	.167	.60	1120	69.6 (5yr FLOW)
				1.59		185.4 (100yr FLOW)

WEIGHTED CN = 79.4

BASINS

DUBLIN- 11,12,13

ACREAGE	SQ. MI.	LAND USE	SOIL	CN	Z	Z x CN
40.5		RESIDENTIAL 1/5Ac	A	77	85.1	6551.5
7.1		STREETS & WALKS	A	98	14.9	1461.8
47.6	.074				100.0	8013.2

WEIGHTED CN = 80.1

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)
SHEET	200	2	.079			
STREET	3490	70	.176			
	3690	72	.255	.63	980	45.9 (5yr FLOW)
				1.65		120.0 (100yr FLOW)

BASINS

DUBLIN- 1 ,2 ,3 ,4 ,5 ,6 ,7 ,8 ,11,12,13,14

ACREAGE	SQ. MI.	LAND USE	SOIL	CN	Z	Z x CN
92.8		RESIDENTIAL 1/5Ac	A	77	81.3	6259.8
2.4		PARK / OPEN SPACE	A	39	2.1	82.0
19.0		STREETS & WALKS	A	98	16.6	1626.9
114.2	.178				100.0	7968.7

WEIGHTED CN = 79.7

FLOW TYPE	L(ft)	H(ft)	Tc(hrs)	RUNOFF(in)	qp(CSM/in)	Q (cfs)
SHEET	200	2	.028			
STREET	1950	68	.090			
PIPE	2100	42	.049			
	4250	112	.167	.61	1120	122.0 (5yr FLOW)
				1.61		322.4 (100yr FLOW)