POWERS PROFESSIONAL PARK

MASTER DEVELOPMENT DRAINAGE PLAN

February, 2008

Prepared for:

Powers Professional Park, LLC

Prepared by:

Rockwell Consulting, Inc.
1955 Union Boulevard, Suite 200
Colorado Springs, CO 80909
(719) 475-2575

Project# 04-038

POWERS PROFESSIONAL PARK

PRELIMINARY DRAINAGE REPORT

February, 2008

DRAINAGE PLAN 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 of Colorado Springs for drainage reports, and said drainage report is in conformity with the Master Plan of the drainage basin. I accept responsibility for any liability caused by any negligent acts, errors or omissions on my part in preparing this report.

K.D. Rockwell P.E.

Kent D. Rockwell, P.E.

2/28/08

DEVELOPER'S STATEMENT

I, the developer, have read and will comply with all the requirements specified in this drainage report and plan.

OWNER

BY: _____ 2/22/08
DATE

TITLE: Managing Partner Powers Professional Park LLC

ADDRESS: 19124 Baskerville Way, Monument, Co. 80132

CITY OF COLORADO SPRINGS

Filed in accordance with Section 7.7.906 of the code of the City of Colorado Springs, 2001, as amended.

_____ April 7, 2008
CITY ENGINEER DATE

POWERS PROFESSIONAL PARK

MASTER DEVELOPMENT DRAINAGE PLAN

February, 2008

PURPOSE

The purpose of this report is to identify the existing and proposed runoff patterns and drainage facilities required for the proposed Powers Professional Park located along the east side of Powers Boulevard approximately 2,500 feet south of Woodmen Boulevard.

SUMMARY OF DATA

The sources of information used in the development of this study are listed below:

1. City of Colorado Springs and El Paso County "Drainage Criteria Manual", October 1987, revised November 1991.

2. Soil Survey for El Paso County, Colorado, U.S. Department of Agriculture, Soil Conservation Service, June 1980.

3. "Flood Insurance Studies for Colorado Springs and El Paso County, Colorado", prepared by the Federal Emergency Management Agency (FEMA), 1985.

4. "Cottonwood Creek Drainage Basin Planning Study" by URS Consultants, Inc., August 1995.

5. "Cottonwood Creek Prudent Line Study" by Ayres & Associates, 1996.

6. "Powerwood Subdivision Filing No. 1, Preliminary/Final Drainage Report," prepared by ADP, Inc., June, 2003.

7. "Tutt Boulevard Filing No. 5, Drainage Letter," prepared by Classic Consultants, December, 2005.

GENERAL LOCATION AND DESCRIPTION

The Powers Professional Park development is located within the northeastern portion of the City of Colorado Springs, El Paso County, Colorado. (see Vicinity Map - Figure 1). The site is within the northwest quarter of Section 7, Township 13 South, Range 65 West of the 6th P.M. and is bound on the west by Powers Boulevard, on the north by a closed landfill, on the east by existing Templeton Gap Road and vacant land, and on the south by vacant land and a church parcel.

The proposed Powers Professional Park consists of approximately 40 acres of commercial development. The site is currently located in El Paso County and is proposed to be annexed into the City of Colorado Springs.

Well-established native grasses exist throughout the proposed development. The topography of the northern half of the site generally slopes from east to west toward Powers Boulevard. The southern portion of the site slopes southwesterly onto the adjacent parcel to the south.

SOILS

According to the Soil Survey of El Paso County Area, Colorado, prepared by the U.S. Department of Agriculture Soil Conservation Service, the soils underlying the Powers Professional Park fall under the Blakeland Series (Soil 8). The Blakeland series is classified under Hydrologic Group "A" soils.

CLIMATE

This area of El Paso County can be described as the foothills, with total precipitation amounts typical of a semi-arid region. Winters are generally cold and dry, and summers relatively warm and dry. Precipitation ranges from 12 to 14 inches per year, with the majority of this moisture occurring in the spring and summer in the form of rainfall. Thunderstorms are common during the summer months.

FLOODPLAIN STATEMENT

According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) #08041C0537 F, dated March 17, 1997, no portion of the Powers Professional Park development lies within a designated 100 year floodplain.

DRAINAGE CRITERIA

The current City of Colorado Springs/El Paso County Drainage Criteria was utilized in this report. Peak runoff quantities were determined using the Rational Method for both the 5 year and 100 year storms, as required for drainage basins less than 100 acres.

HISTORIC DRAINAGE BASIN DESCRIPTIONS

A brief description of each historic drainage basin for the site is provided in this section of the report. A summary of peak historic runoff for the basins is depicted on the Historic Drainage Plan (Exhibit 1) provided in the appendix. The site has been divided into 5 historical on-site drainage basins and 4 off-site basins.

The four off-site basins are located directly north of the Powers Professional Park Off-site Basin OS-1 comprises approximately 53 acres directly east of the existing landfill. Historically, flows of $Q_5 = 29.2$ cubic feet per second (cfs) and $Q_{100} = 79.8$ cfs enter the Powers Professional Park along the northerly property line of Powers Professional Park just east of the landfill.

Basin OS-2 comprises a portion of the existing landfill. This 1.10 acre basin generates flows of 1.2 during the 5 year storm and 3.4 cfs during the 100 year storm. These runoff rates sheet flow into the Powers Professional Park site along the northern property line of the development.

Basin OS-3 consists of 12.92 acres of existing landfill and generates flows of $Q_5 = 11.2$ cfs and $Q_{100} = 31.4$. These flows currently sheet flow onto the subject parcel. Once development occurs, these flows will enter developed Basin 21.

Basin OS-4 is located directly east of Basin OS-3. This 6.50 acre basin, consisting of additional landfill land, generates flows of 5.7 cfs during the 5 year storm and 15.8 cfs during the 100 year storm.

Basin OS-5 lies east of Basin OS-1. This 9.18 acre basin comprises the flows along existing Templeton Gap Road northeast of the site. Flow rates of $Q_5 = 6.4$ cfs and $Q_{100} = 18.1$ cfs occur for this basin.

Basically, these same basins were presented in the Powerwood Subdivision Filing No. 1 Preliminary/Final Drainage Report prepared by ADP, Inc. The flows anticipated from these basins are similar in flow rates. Recent grading activities have been performed north of the site within the landfill which may result in lower than historic stormwater runoff flows reaching the proposed Powers Professional Park project. Nevertheless, the more conservative basins are being used in this preliminary study.

A detention pond has been constructed by the developer of Basin OS-1. A single point discharge is currently planned from this detention pond onto the subject property. It is anticipated that a 24" pipe will be utilized to convey historic flow rates from this pond (approximately 85 cfs).

Flows from off-site Basin OS-2, OS-3 and OS-4 enter historic Basin H-1 as sheet flow.

Historic Basin 1 consists of 24.83 acres along the northern portion of the site. Runoff rates of 12.4 cubic feet per second (cfs) generated during the 5 year storm and 34.8 cfs during the 100 year flow toward Powers Boulevard.

Total flows of Q_5 = 62.2cfs and Q_{100} = 175.5 cfs generated from offsite Basins OS-1, OS-2, OS-3 and OS-4 and on-site Basin H-1 reach the western end of the site and pass under Powers Boulevard.

Historic Basin H-2 is located at the extreme southwest corner of the site. Runoff rates of 1.6 cfs and 4.4 cfs are generated from this 2.74 acre basin during the 5 and 100 year storms, respectively. Runoff generated from this basin flows directly to a roadside swale along the eastern edge of Powers Boulevard.

An additional 4.46 acres along the southern property line of the development comprises Basin H-3. This basin generates flows of 2.6 cfs during the 5 year storm and 7.2 cfs during the 100 year storm. These flows exit the site at the extreme southwest corner of the site onto the parcel to the south.

Basin H-4 consists of 5.54 acres directly east of Basin H-3. Flows of Q_5 = 3.5 cfs and Q_{100} = 9.3 cfs generated from Basin H-4 sheet flow onto the parcel to the south.

Basin H-5, located at the extreme southeast corner of the site, generates additional flows of 3.7 cfs and 10.1 cfs during the 5 and 100 year storms, respectively. Flows from off-site Basin OS-5 discharge along the eastern edge of Basin H-5. A shallow swale carries total flows of 10.1 cfs for the 5 year storm and 28.2 cfs for the 100 year storm onto the property to the south.

Historic flows of 15.2 cfs for the 5 year storm and 37.2 cfs for the 100 year storm flow southerly along the east side of Powers Boulevard from the recently completed hospital detention pond. These flows will flow west of the proposed Powers Professional Park detention pond and then cross under Powers Boulevard to the west not entering the Powers Professional Park pond.

DEVELOPED DRAINAGE BASIN DESCRIPTIONS

Approximate developed drainage basins have been calculated based on preliminary concept plans. These basins and the corresponding runoff quantities will vary once more defined development is known. This report provides an approximation of the drainage flows and drainage facilities required to develop this site.

A brief description of each developed drainage basin for the site is provided in this section of the report. A summary of peak developed runoff for the basins is depicted on the Developed Drainage Plan provided in the appendix. All proposed drainage facilities are approximate in size and may vary with actual layout and

design.

Off-site Basin OS-1 consists of approximately 53 acres north of the proposed Powers Professional Park development. Runoff rates of 29.2 cfs during the 5 year storm and 79.8 cfs during the 100 year storm are generated from this basin. It is understood that two detention ponds, one on each side of Tutt Boulevard, are proposed at the south end of this basin to detain flows rates from this area once it is developed. According to the Tutt Boulevard Filing No. 5 Drainage Report and Tutt Boulevard Industrial Park Filing No. 1 Drainage Report prepared by Classic Consultants developed flows of 343.8 cfs will be detained and released at a rate of 85.0 cfs. Historic flows will be released via 24" pipe from these ponds. Street flows from Tutt Boulevard will also be generated by this basin.

Basin 1 is situated toward the northern edge of the property just east of the proposed alignment of Tutt Boulevard. Runoff rates of 9.6 cfs and 18.6 cfs are generated from this 2.54 acre basin. It is anticipated that these flows will be collected within a 4' sump inlet and piped southwesterly within an 18" RCP through the middle of the proposed development.

Proposed Basin 2 consists the east half of future Tutt Boulevard. This 0.90 acre basin generates flows of approximately 3.7 cfs during the 5 year storm and 6.9 cfs during the 100 year storm. Street flows of Q_5 = 7.1 cfs and Q_{100} = 15.8 cfs are produced by Off-site Basin OS-1. It is assumed that half of these flows will be directed along the east side of Tutt Boulevard with the other half on the west. A 15' inlet will be installed at the south end of Basin 2, approximately 70' north of the intersection, to collect flows of 3.5 cfs during the 5 year storm and 5.2 cfs during the 100 year storm. Flows of Q_5 = 3.8 cfs and Q_{100} = 9.6 cfs will bypass this inlet and flow southerly toward the intersection to a 15' inlet in Basin 3.

The north half of the road extending easterly from Tutt Boulevard creates Basin 3. Flow rates of 3.3 cfs and 6.1 cfs are created from this 1.03 acre basin during the 5 and 100 year storms, respectively. Approximately 80% of flows from Basin OS-5 will enter Basin 3 contributing Q_5 = 5.1 cfs and Q_{100} = 14.5 cfs enter this basin from the east. Flows from this basin in addition to the flow by from Basin 2 will reach a 20' sump inlet on the north side of the easterly road.

Basin 4 consists of the south half of the road extending easterly from Tutt Boulevard and is situated on 0.54 acres. This basin will receive the remaining off-site flows of Q_5 = 1.3 cfs and Q_{100} = 3.6 cfs from Basin OS-5 while generating flows of Q_5 = 2.2 cfs and Q_{100} = 4.1 cfs. A 4' sump inlet will collect flows from this basin.

Basin 5 consists of 0.65 acres of future commercial land just east of Tutt. A 4' sump inlet will collect the flows of 2.3 cfs and 4.6 cfs generated from this basin during the 5 and 100 year storms, respectively. These flows will be piped northerly within an 18" pipe to the inlet in Basin 4.

Flow rates of Q_5 = 4.5 cfs and Q_{100} = 8.4 cfs are generated from the 1.10 acre Basin 6 which is located just south of Basin 5. These flows will be collected by a 4' sump inlet and piped southerly to the inlet within Basin 7 within an 18" RCP

Basin 7 consists the east half of future Tutt Boulevard south of Basin 2. This 1.40 acre basin generates flows of approximately 5.8 cfs during the 5 year storm and 10.7 cfs during the 100 year storm. A 15' inlet will be installed at the south end of Basin 7 to collect flows of 4.2 cfs during the 5 year storm and 7.0 cfs during the 100 year storm. Flows of Q_5 = 1.6 cfs and Q_{100} = 3.7 cfs will bypass this inlet and flow southerly onto adjacent property. Flows collected by this basin in addition to the flows from Basin 6 will be piped to the west to the inlet in Basin 9 within a 24" RCP.

Additional flow rates of $Q_5 = 3.0$ cfs and $Q_{100} = 5.5$ cfs will be generated from Basin 8 which is located along the west side of Tutt Boulevard. Like Basin 2, we anticipate off-site street flows of $Q_5 = 3.6$ cfs and $Q_{100} = 7.9$ cfs produced by Off-site Basin OS-1 to enter this basin. A 15' inlet will be placed at the south end of this basin. Flow rates of 4.4 cfs and 7.7 cfs will be collected by this inlet during the 5 and 100 year storms. Flow rates of $Q_5 = 2.2$ cfs and $Q_{100} = 5.7$ cfs will bypass this inlet and enter Basin 15.

Basin 9 lies west of Basin 7 and composes the west half of Tutt Boulevard south of Basin 8. This 0.61 acre basin generates runoff rates of 2.5 cfs during the 5 year storm and 4.7 cfs during the 100 year storm. A 15' on-grade inlet will be installed at the southern end of Basin 9. This inlet will collect flows of $Q_5 = 2.1$ cfs and $Q_{100} = 3.6$ cfs with flows of $Q_5 = 0.4$ cfs and $Q_{100} = 1.1$ cfs will flow by.

Basin 10 consists of 0.63 acres directly west of Tutt Boulevard along the southerly property line. Runoff rates of 2.6 cfs for the 5 year storm and 4.8 cfs for the 100 year storm are created from this basin. A 4' sump inlet will be installed to collect these flows. These flows will be piped westerly within a 24" RCP and combine with the collected flows generated from Basins 6, 7, and 9. Total flow rates of $Q_5 = 10.8$ cfs and $Q_{100} = 19.0$ cfs from Basins 6, 7, 9 and 10 will be conveyed westerly within a 24" RCP.

An additional 2.45 acres along the west side of Tutt Boulevard comprises Basin 11. Runoff rates of 8.0 cfs during the 5 year storm and 15.8 cfs during the 100 year storm are generated from this basin. A proposed 10' on-grade inlet toward the southwest end of this basin will collect flows of $Q_5 = 3.7$ cfs and $Q_{100} = 5.4$ cfs. The remaining flows will enter Basin 21.

Basin 12 is located toward the north end of the site just west of future Tutt Boulevard. This 2.57 acre basin generates flows of $Q_5 = 8.4$ cfs and $Q_{100} = 16.4$ cfs which reach a proposed 10' sump inlet at the southwest end of the basin. This inlet will collect flows from Basin 8 plus bypass flows from Basin 13.

Basin 13 is an additional 1.66 acres west of Basin 12 generating flows of 6.6 cfs and 12.7 cfs during the 5 and 100 year storms. Flows from Basin OS-2 will also enter this basin for total flows of $Q_5 = 7.8$ cfs and $Q_{100} = 15.1$ cfs at the south end of Basin 13. A 10' on-grade inlet will be placed at the south end of this basin to collect a portion of these flows. Flow rates of $Q_5 = 3.6$ cfs and $Q_{100} = 5.2$ cfs will be collected by this inlet. The remaining flows of 4.2 cfs during the 5 year storm and 9.9 cfs during the 100 year storm will bypass this inlet and enter Basin 12 as street flow.

Basin 14 generates additional flows of 3.0 cfs and 6.0 cfs during the 5 and 100 year storms, respectively. A 4' sump inlet in the center of Basin 14 will collect these flows.

Basin 15, consisting of approximately 4.57 acres directly west of Basin 11, generates additional flows of 14.3 cfs and 27.6 cfs during the 5 and 100 year storms, respectively. These flows will be directed westerly to a proposed 15' sump inlet in the center of Basin 15. These flows along with the collected flows from Basins 1, 2, 3, 4, 5, 8, 12, 13, 14 and 16 will be piped westerly through Basin 22 to the proposed detention pond.

Basin 16 is located directly north of Basin 15 and consists of an additional 2.31 acres. Flows of $Q_5 = 7.0$ cfs and $Q_{100} = 13.7$ cfs will be collected by a 4' sump inlet at the south end of Basin 16.

A portion of the proposed warehouse building and the drive aisle behind it comprises Basin 17. Flow rates of 9.0 cfs during the 5 year storm and 17.7 cfs during the 100 year storm are generated from this 4.01 acre basin. These flows will be directed northerly and discharged to the rear of the building toward a 10' sump inlet.

Basin 18, consisting of 1.52 acres, is located west of Basin 17. Runoff rates of $Q_5 = 3.4$ cfs and $Q_{100} = 8.3$ cfs are generated from this basin. Additional off-site flows enter this basin from Basin OS-3. Total flow rates of 12.6 cfs during the 5 year storm and 39.7 cfs during the 100 year storm will reach the north end of this basin. A 15' sump inlet will be installed at this point to collect these flows.

Basin 19 is located west of Basin 14, containing 2.52 acres. Flows of 5.6 cfs and 11.6 cfs are generated from this basin during the 5 and 100 year storms, respectively. Flows rates of $Q_5 = 5.7$ cfs and $Q_{100} = 15.8$ cfs from off-site Basin OS-4 will enter Basin 19 from the north. A 15' sump inlet will collect the total flows of $Q_5 = 11.3$ cfs and $Q_{100} = 27.4$ cfs flows and a 36" RCP will convey these flows westerly into Basin 23.

Basin 20 lies just west of Basin 19. This 0.50 acre basin generates runoff rates of 2.0 cfs and 3.8 cfs during the 5 year and 100 year storms, respectively. These flows will be collected by a 4' sump inlet and be piped westerly directly to the detention pond.

Basin 21 is located just south of Basin 15 and contributes flow rates of $Q_5 = 7.1$ cfs and $Q_{100} = 14.2$ cfs. Flows from this 2.46 acre basin will travel westerly where they will be colleted by a 15' sump inlet

The 4.52 acre Basin 22 lies west of Basins 15 and 21. Flow rates of $Q_5 = 13.7$ cfs and $Q_{100} = 26.9$ cfs will travel southerly where they will be colleted by a 15' sump inlet.

The public detention pond comprises Basin 23 which generates additional flows of $Q_5 = 4.3$ cfs and $Q_{100} = 11.1$ cfs.

Three piping systems will discharge flows into the detention pond. Flows from Basins 6, 7, 9, 10, 11, and 21 will enter the pond at Design Point No. 1. The total routed flows at Design Point #1 are $Q_5 = 26.3$ cfs and $Q_{100} = 51.5$ cfs.

Flows rates of $Q_5 = 99.0$ cfs and $Q_{100} = 245.4$ cfs generated from Basins 1 through 5, 8, 12 through 16, OS-1 and OS-2 will reach Design Point #2. This includes the off-site pond release flows of 80 cfs during the 100 year storm.

Additional flows reach the detention pond at Design Point #3 from Basins 17 through 20 along with flows from off-site Basins OS-3 and OS-4. The routed flows entering the pond at this point are $Q_5 = 23.6$ cfs and $Q_{100} = 60.3$ cfs.

Total flows of $Q_5 = 134.4$ cfs and $Q_{100} = 325.5$ cfs reach the west end of the project (Design Point #4). These flows include the additional 30 cfs during the 5 year storm and 85 cfs during the 100 year storm reaching the outfall point from Basin OS-1. Therefore, the basis for developed flows is 134 cfs during the 5 year storm and 326 during the 100 year storm.

Historic flows from Basins OS-1, OS-2, OS-3, OS-4, and H-1 is the basis of release flows under Powers Boulevard. Total historic flows at this point are $Q_5 = 62.2$ cfs and $Q_{100} = 175.5$ cfs. This results in an approximate detention pond size of 4.7 acre feet without water quality being considered. With water quality considered, an approximate detention pond size of 7.0 acre feet results. The intent is to have the Powers Professional Park pond handle the increase in flows between historic and developed for the Powers Professional Park site only. This will be a public pond.

EROSION CONTROL

Erosion control measures will be installed per the approved grading/erosion control plans

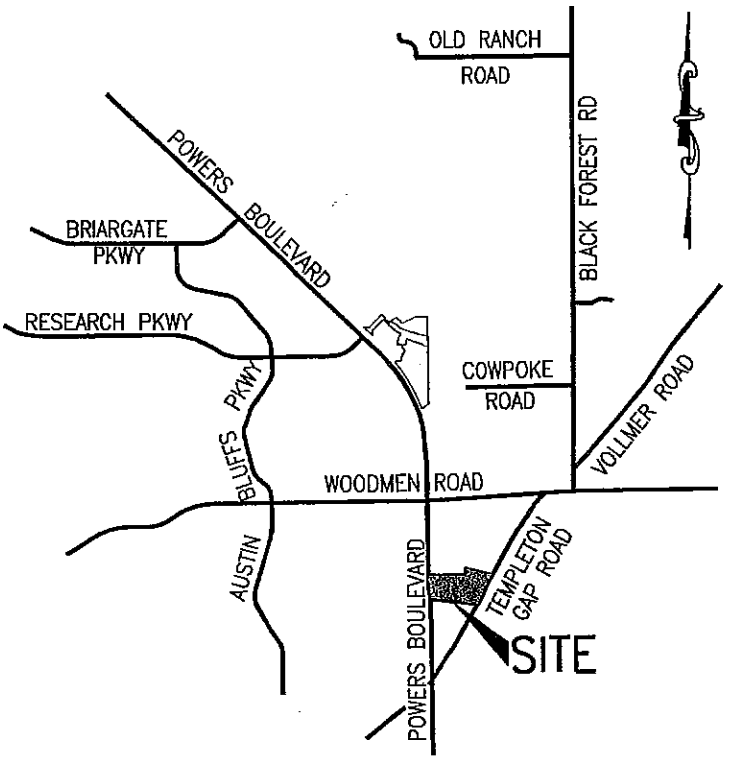
2008 DRAINAGE, BRIDGE AND POND FEES

Drainage fees on a per acre basin for the Cottonwood Creek Basin are depicted below. These fees will be paid based on the platted acreage.

2008 Drainage Fees ($11,043/Acre Total)

	Acres	$/Acre	Total
Capital Improvements Portion	42.48	$ 7,587.00	$ 322,295.76
Land Portion	42.48	$ 2,920.00	$ 124,041.60
Cash Portion	42.48	$ 536.00	$ 22,769.28
BRIDGE FEES	42.48	$ 844.00	$ 35,853.12
			$ 504,959.76

APPENDIX



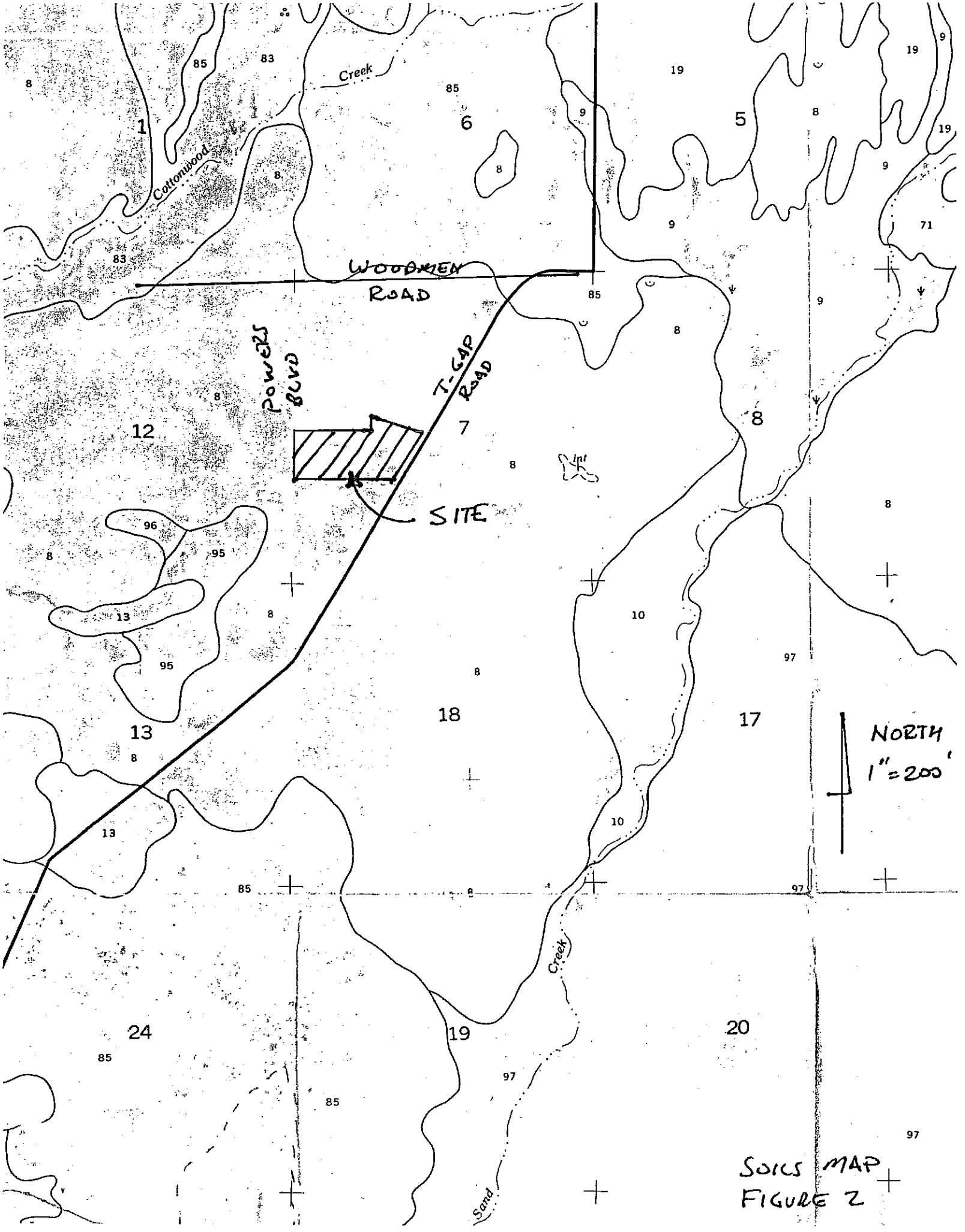
Vicinity Map

NOT TO SCALE

JOB NO. 04-038

FILE: o4038grds.DWG
DATE: 5/19/05

ROCKWELL CONSULTING, Inc.
ENGINEERING • SURVEYING
1955 N. UNION BLVD., SUITE 200
COLORADO SPRINGS, CO 80909
(719) 475-2575 • FAX (719) 475-9223


WOODMEN ROAD
POWERS BLVD
T-GAP ROAD
SITE
Creek
Cottonwood
Creek
Sand
NORTH
1"=200'
SOILS MAP
FIGURE 2

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: POWERS PROFESSIONAL PARK

BASIN: HIST 1
AREA: 24.83
SOIL TYPE: A & B

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
Open Space	24.83	0.25	0.35	100.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	24.83			100%

COMPOSITE: C5= 0.25 C100= 0.35

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	1000	3.2		34.24		30.21
Swale	1280	3	3	7.11	3.2	6.67
Tc Total:				41.35		36.88

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
2.0 in/hr	4.0 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
12.4 cfs	34.8 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: POWERS PROFESSIONAL PARK

BASIN: HIST 2
AREA: 2.74
SOIL TYPE: A & B

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
Open Space	2.74	0.25	0.35	100.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	2.74			100%

COMPOSITE: C5= 0.25 C100= 0.35

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	1000	3.6		32.94		29.06
Tc Total:				32.94		29.06

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
2.3 in/hr	4.6 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
1.6 cfs	4.4 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: POWERS PROFESSIONAL PARK

BASIN: HIST 3
AREA: 4.46
SOIL TYPE: A & B

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
Open Space	4.46	0.25	0.35	100.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	4.46			100%

COMPOSITE: C5= 0.25 C100= 0.35

TIME OF CONCENTRATION: Tc in Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	1000	3.6		32.94		29.06
Tc Total:				32.94		29.06

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
2.3 in/hr	4.6 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
2.6 cfs	7.2 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: POWERS PROFESSIONAL PARK

BASIN: HIST 4
AREA: 5.54
SOIL TYPE: A & B

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
Open Space	5.54	0.25	0.35	100.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	5.54			100%

COMPOSITE: C5= 0.25 C100= 0.35

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	840	3.7		29.92		26.40
Tc Total:				29.92		26.40

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
2.5 in/hr	4.8 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
3.5 cfs	9.3 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: POWERS PROFESSIONAL PARK

BASIN: HIST 5
AREA: 6.13
SOIL TYPE: A & B

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
Open Space	6.13	0.25	0.35	100.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	6.13			100%

COMPOSITE: C5= 0.25 C100= 0.35

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	870	3.3		31.62		27.90
Tc Total:				31.62		27.90

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
2.4 in/hr	4.7 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
3.7 cfs	10.1 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: POWERS PROFESSIONAL PARK

BASIN: OS-1
AREA: 53
SOIL TYPE: A & B

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
Open Space	53	0.25	0.35	100.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	53.00			100%

COMPOSITE: C5= 0.25 C100= 0.35

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	1000	6		27.83		24.55
Swale	700	6	2	5.83	3	3.89
Tc Total:				33.66		28.44

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
2.2 in/hr	4.3 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
29.2 cfs	79.8 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: POWERS PROFESSIONAL PARK

BASIN: OS-2
AREA: 1.1
SOIL TYPE: A & B

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
Open Space	1.1	0.30	0.45	100.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	1.10			100%

COMPOSITE: C5= 0.30 C100= 0.45

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	425	12		13.58		11.04
Tc Total:				13.58		11.04

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
3.6 in/hr	6.8 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
1.2 cfs	3.4 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: POWERS PROFESSIONAL PARK

BASIN: OS-3
AREA: 12.92
SOIL TYPE: A & B

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
Open Space	12.92	0.30	0.45	100.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	12.92			100%

COMPOSITE: C5= 0.30 C100= 0.45

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	1000	10		22.13		17.98
Tc Total:				22.13		17.98

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
2.9 in/hr	5.4 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
11.2 cfs	31.4 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: POWERS PROFESSIONAL PARK

BASIN: OS-4
AREA: 6.5
SOIL TYPE: A & B

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
Open Space	6.5	0.30	0.45	100.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	6.50			100%

COMPOSITE: C5= 0.30 C100= 0.45

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	1000	10		22.13		17.98
Tc Total:				22.13		17.98

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
2.9 in/hr	5.4 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
5.7 cfs	15.8 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: POWERS PROFESSIONAL PARK

BASIN: OS-5
AREA: 6.5
SOIL TYPE: A & B

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
Open Space	9.18	0.30	0.45	100.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	9.18			100%

COMPOSITE: C5= 0.30 C100= 0.45

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	300	8		13.05		10.60
Swale	700	8	4.3	2.71	4.5	2.59
Tc Total:				15.76		13.19

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
3.3 in/hr	6.2 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
6.4 cfs	18.1 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: POWERS PROFESSIONAL PARK

BASIN: 1
AREA: 2.54
SOIL TYPE: A & B

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
Future Commercial	2.54	0.80	0.85	100.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	2.54			100%

COMPOSITE: C5= 0.80 C100= 0.85

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	50	16		4.24		3.44
Street	400	1.5	2.5	2.67	2.7	2.47
Tc Total:				6.90		5.91

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
4.7 in/hr	8.6 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
9.6 cfs	18.6 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: POWERS PROFESSIONAL PARK

BASIN: 2
AREA: 0.9
SOIL TYPE: A & B

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
Future Commercial	0.9	0.80	0.85	100.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0.90			100%

COMPOSITE: C5= 0.80 C100= 0.85

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Street	390	2.8	3.5	1.86	3.7	1.76
Tc Total:				1.86		1.76

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
5.2 in/hr	9.0 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
3.7 cfs	6.9 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: POWERS PROFESSIONAL PARK

BASIN: 3
AREA: 1.03
SOIL TYPE: A & B

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
Future Commercial	1.03	0.80	0.85	100.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	1.03			100%

COMPOSITE: C5= 0.80 C100= 0.85

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	60	2		9.22		7.49
Street	625	5	4.5	2.31	4.7	2.22
Tc Total:				11.53		9.71

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
4.0 in/hr	7.0 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
3.3 cfs	6.1 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: POWERS PROFESSIONAL PARK

BASIN: 4
AREA: 0.54
SOIL TYPE: A & B

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
Future Commercial	0.54	0.80	0.85	100.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0.54			100%

COMPOSITE: C5= 0.80 C100= 0.85

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Street	600	5	4.5	2.22	4.7	2.13
Tc Total:				2.22		2.13

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
5.2 in/hr	9.0 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
2.2 cfs	4.1 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: POWERS PROFESSIONAL PARK

BASIN: 5
AREA: 0.65
SOIL TYPE: A & B

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
Future Commercial	0.65	0.80	0.85	100.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0.65			100%

COMPOSITE: C5= 0.80 C100= 0.85

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	100	8		7.53		6.12
Street	120	3	3.4	0.59	3.6	0.56
Tc Total:				8.12		6.68

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
4.4 in/hr	8.3 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
2.3 cfs	4.6 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: POWERS PROFESSIONAL PARK

BASIN: 6
AREA: 1.1
SOIL TYPE: A & B

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
Future Commercial	1.1	0.80	0.85	100.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	1.10			100%

COMPOSITE: C5= 0.80 C100= 0.85

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	10	2		3.76		3.06
Street	300	3	3.4	1.47	3.6	1.39
Tc Total:				5.23		4.45

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
5.1 in/hr	9.0 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
4.5 cfs	8.4 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: POWERS PROFESSIONAL PARK

BASIN: 7
AREA: 1.4
SOIL TYPE: A & B

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
Future Commercial	1.4	0.80	0.85	100.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	1.40			100%

COMPOSITE: C5= 0.80 C100= 0.85

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Street	650	1.5	2.5	4.33	2.7	4.01
Tc Total:				4.33		4.01

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
5.2 in/hr	9.0 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
5.8 cfs	10.7 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: POWERS PROFESSIONAL PARK

BASIN: 8
AREA: 0.72
SOIL TYPE: A & B

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
Street	0.72	0.80	0.85	100.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0.72			100%

COMPOSITE: C5= 0.80 C100= 0.85

TIME OF CONCENTRATION: Tc in Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Street	440	2.5	3.2	2.29	3.4	2.16
Tc Total:				2.29		2.16

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
5.2 in/hr	9.0 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
3.0 cfs	5.5 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: POWERS PROFESSIONAL PARK

BASIN: 9
AREA: 0.61
SOIL TYPE: A & B

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
Future Commercial	0.61	0.80	0.85	100.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0.61			100%

COMPOSITE: C5= 0.80 C100= 0.85

TIME OF CONCENTRATION: Tc in Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Street	630	1.5	2.5	4.20	2.7	3.89
Tc Total:				4.20		3.89

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
5.2 in/hr	9.0 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
2.5 cfs	4.7 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: POWERS PROFESSIONAL PARK

BASIN: 10
AREA: 0.63
SOIL TYPE: A & B

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
Future Commercial	0.63	0.80	0.85	100.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0.63			100%

COMPOSITE: C5= 0.80 C100= 0.85

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	30	30		2.67		2.17
Street	100	2	2.8	0.60	3	0.56
Tc Total:				3.26		2.72

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
5.2 in/hr	9.0 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
2.6 cfs	4.8 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: POWERS PROFESSIONAL PARK

BASIN:	11
AREA:	2.45
SOIL TYPE:	A & B

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
Future Commercial	2.45	0.80	0.85	100.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	2.45			100%

COMPOSITE: C5= 0.80 C100= 0.85

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	50	9		5.12		4.16
Street	550	1	2	4.58	2.2	4.17
Tc Total:				9.71		8.33

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
4.1 in/hr	7.6 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
8.0 cfs	15.8 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: POWERS PROFESSIONAL PARK

BASIN: 12
AREA: 2.57
SOIL TYPE: A & B

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
Future Commercial	2.57	0.80	0.85	100.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	2.57			100%

COMPOSITE: C5= 0.80 C100= 0.85

TIME OF CONCENTRATION: Tc in Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	50	4		6.69		5.44
Street	650	3	3.4	3.19	3.6	3.01
Tc Total:				9.88		8.45

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
4.1 in/hr	7.5 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
8.4 cfs	16.4 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: POWERS PROFESSIONAL PARK

BASIN: 13
AREA: 1.66
SOIL TYPE: A & B

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
Future Commercial	1.66	0.80	0.85	100.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	1.66			100%

COMPOSITE: C5= 0.80 C100= 0.85

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	50	20		3.94		3.20
Street	360	2.5	3.2	1.88	3.4	1.76
Tc Total:				5.81		4.96

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
5.0 in/hr	9.0 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
6.6 cfs	12.7 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: POWERS PROFESSIONAL PARK

BASIN: 14
AREA: 0.79
SOIL TYPE: A & B

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
Future Commercial	0.79	0.80	0.85	100.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0.79			100%

COMPOSITE: C5= 0.80 C100= 0.85

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	40	6		5.24		4.26
Street	140	1	2	1.17	2.2	1.06
Tc Total:				6.40		5.32

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
4.8 in/hr	9.0 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
3.0 cfs	6.0 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: POWERS PROFESSIONAL PARK

BASIN: 15
AREA: 4.69
SOIL TYPE: A & B

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
Future Commercial	4.69	0.80	0.85	100.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	4.69			100%

COMPOSITE: C5= 0.80 C100= 0.85

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	50	2.5		7.82		6.35
Street	775	3.5	3.8	3.40	4	3.23
Tc Total:				11.22		9.58

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
3.9 in/hr	7.1 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
14.6 cfs	28.3 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: POWERS PROFESSIONAL PARK

BASIN: 16
AREA: 2.31
SOIL TYPE: A & B

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
Future Commercial	2.31	0.80	0.85	100.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	2.31			100%

COMPOSITE: C5= 0.80 C100= 0.85

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	50	2		8.42		6.84
Street	400	1	2	3.33	2.2	3.03
Tc Total:				11.75		9.87

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
3.8 in/hr	7.0 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
7.0 cfs	13.7 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: POWERS PROFESSIONAL PARK

BASIN: 17
AREA: 4.01
SOIL TYPE: A & B

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
Future Commercial	4.01	0.80	0.85	100.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	4.01			100%

COMPOSITE: C5= 0.80 C100= 0.85

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	340	2		21.94		19.20
Tc Total:				21.94		19.20

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
2.8 in/hr	5.2 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
9.0 cfs	17.7 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: POWERS PROFESSIONAL PARK

BASIN: 18
AREA: 1.52
SOIL TYPE: A & B

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
Future Commercial	1.52	0.80	0.85	100.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	1.52			100%

COMPOSITE: C5= 0.80 C100= 0.85

TIME OF CONCENTRATION: Tc in Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	340	2		21.94		17.83
Tc Total:				21.94		17.83

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
2.8 in/hr	6.4 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
3.4 cfs	8.3 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: POWERS PROFESSIONAL PARK

BASIN: 19
AREA: 2.52
SOIL TYPE: A & B

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
Future Commercial	2.52	0.80	0.85	100.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	2.52			100%

COMPOSITE: C5= 0.80 C100= 0.85

TIME OF CONCENTRATION: Tc in Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	340	2		21.94		17.83
Tc Total:				21.94		17.83

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
2.8 in/hr	5.4 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
5.6 cfs	11.6 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: POWERS PROFESSIONAL PARK

BASIN: 20
AREA: 0.5
SOIL TYPE: A & B

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
Future Commercial	0.5	0.80	0.85	100.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0.50			100%

COMPOSITE: C5= 0.80 C100= 0.85

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	25	4		4.73		3.85
Street	150	1	2	1.25	2.2	1.14
Tc Total:				5.98		4.98

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
4.9 in/hr	9.0 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
2.0 cfs	3.8 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: POWERS PROFESSIONAL PARK

BASIN: 21
AREA: 2.46
SOIL TYPE: A & B

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
Future Commercial	2.46	0.80	0.85	100.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	2.46			100%

COMPOSITE: C5= 0.80 C100= 0.85

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	50	2		8.42		6.84
Street	825	2	2.9	4.74	3.1	4.44
Tc Total:				13.16		11.27

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
3.6 in/hr	6.8 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
7.1 cfs	14.2 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: POWERS PROFESSIONAL PARK

BASIN: 22
AREA: 4.52
SOIL TYPE: A & B

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
Future Commercial	4.52	0.80	0.85	100.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	4.52			100%

COMPOSITE: C5= 0.80 C100= 0.85

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	50	2		8.42		6.84
Street	660	2	2.9	3.79	3.1	3.55
Tc Total:				12.21		10.39

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
3.8 in/hr	7.0 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
13.7 cfs	26.9 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: POWERS PROFESSIONAL PARK

BASIN: 23
AREA: 2.75
SOIL TYPE: A & B

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
Detention Pond	2.75	0.30	0.45	100.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	2.75			100%

COMPOSITE: C5= 0.30 C100= 0.45

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	80	22		4.82		3.92
Tc Total:				4.82		3.92

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
5.2 in/hr	9.0 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
4.3 cfs	11.1 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: POWERS PROFESSIONAL PARK

BASIN: DP#1
AREA: 8.65
SOIL TYPE: A & B

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
Basin 6	1.1	0.80	0.85	12.72%
Basin 7	1.4	0.80	0.85	16.18%
Basin 9	0.61	0.80	0.85	7.05%
Basin 10	0.63	0.80	0.85	7.28%
Basin 11	2.45	0.80	0.85	28.32%
Basin 21	2.46	0.80	0.85	28.44%
	8.65			100%

COMPOSITE: C5= 0.80 C100= 0.85

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	50	9		5.12		4.16
Street	550	1	2	4.58	2.2	4.17
Pipe	1330	2	10	2.22	13	1.71
Tc Total:				11.92		10.03

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
3.8 in/hr	7.0 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
26.3 cfs	51.5 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: POWERS PROFESSIONAL PARK

BASIN: DP#2
AREA: 79.3
SOIL TYPE: A & B

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
Basin 1	2.54	0.80	0.85	3.20%
Basin 2	0.9	0.80	0.85	1.13%
Basin 3	1.03	0.80	0.85	1.30%
Basin 4	0.54	0.80	0.85	0.68%
Basin 5	0.65	0.80	0.85	0.82%
Basin 8	0.72	0.80	0.85	0.91%
Basin 12	2.57	0.80	0.85	3.24%
Basin 13	1.66	0.80	0.85	2.09%
Basin 14	0.79	0.80	0.85	1.00%
Basin 15	4.69	0.80	0.85	5.91%
Basin 16	2.31	0.80	0.85	2.91%
OS-1	53.3	0.30	0.45	67.21%
OS-2	1.1	0.30	0.45	1.39%
OS-5	6.5	0.30	0.45	8.20%
	79.30			100%
COMPOSITE:	C5=	0.42	C100=	0.54

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	475	12.4		14.21		11.54
Street	400	1.5	2.5	2.67	2.7	2.47
Pipe	1800	2.5	10	3.00	13	2.31
Tc Total:				19.87		16.32

Intensity, I (inches/hr) from Fig 5-1

I5	I100
3.0 in/hr	5.7 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	Q100
99.0 cfs	245.4 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: POWERS PROFESSIONAL PARK

BASIN: DP#3
AREA: 27.97
SOIL TYPE: A & B

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
Basin 17	4.01	0.80	0.85	14.34%
Basin 18	1.52	0.80	0.85	5.43%
Basin 19	2.52	0.80	0.85	9.01%
Basin 20	0.5	0.80	0.85	1.79%
OS-4	12.92	0.30	0.45	46.19%
OS-5	6.5	0.30	0.45	23.24%
	27.97			100%

COMPOSITE: C5= 0.34 C100= 0.45

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	1050	10		22.67		18.42
Street	400	1	2	3.33	2.2	3.03
Pipe	730	2	12	1.01	14	0.87
Tc Total:				27.02		22.32

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
2.5 in/hr	4.8 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
23.6 cfs	60.3 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: POWERS PROFESSIONAL PARK

BASIN: DP#4
AREA: 120.94
SOIL TYPE: A & B

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
DP#1	8.65	0.80	0.85	7.15%
DP#2	79.3	0.42	0.55	65.57%
DP#3	27.97	0.34	0.45	23.13%
Basin 20	0.5	0.80	0.85	0.41%
Basin 22	4.52	0.80	0.85	3.74%
	120.94			100%

COMPOSITE: C5= 0.44 C100= 0.56

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	1050	10		22.67		18.42
Street	400	1	2	3.33	2.2	3.03
Pipe	730	2	12	1.01	14	0.87
Tc Total:				27.02		22.32

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
2.5 in/hr	4.8 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
134.4 cfs	325.5 cfs

Powers Professional Park

Sump Inlet BASIN 1

		5 YEAR	100 YEAR		
APPROACH FLOWS (worse case)		4.8	9.3	s(x)=	0.02
	d =	0.35	0.45	s(l)=	0.002
				n=	0.016
TOTAL FLOWS		9.6	18.6		
				L=	4
	d(max)=	0.47	0.81		

Powers professional Park

INLET BASIN 2

Q5 =	7.3	Q100 =	14.8
SL =	0.03	SO =	0.02

5 YEAR		100 YEAR	
T	12.36	T	16.12
FW	2.19	FW	2.30
L1	20.8	L1	28.6
L2	12.5	L2	17.1
L3	44.6	L3	61.2

Li =	15.00				
5 YR Q =	7.3		100 YR Q	14.8	
5 YR Qi =	4.7	0.646829	100 YR Qi	7.8	
5 YR Qfb =	2.6		100 YR Qfb	7.0	

Powers Professional Park

Sump Inlet BASIN 3

		5 YEAR	100 YEAR		
APPROACH FLOWS (worse case)		8.4	20.6	s(x)=	0.02
	d =	0.43	0.61	s(l)=	0.002
				n=	0.016
TOTAL FLOWS		13.1	28.4	L=	20
	d(max)=	0.25	0.54		

Powers Professional Park

Sump Inlet BASIN 4

		5 YEAR	100 YEAR		
APPROACH FLOWS (worse case)		3.5	5.8	s(x)=	0.02
	d =	0.31	0.38	s(l)=	0.002
				n=	0.016
TOTAL FLOWS		3.5	5.8		
				L=	4
	d(max)=	0.13	0.28		

Powers Professional Park

Sump Inlet BASIN 5

		5 YEAR	100 YEAR		
APPROACH FLOWS (worse case)		2.3	4.6	s(x)=	0.02
	d =	0.27	0.35	s(l)=	0.002
				n=	0.016
TOTAL FLOWS		2.3	4.6		
				L=	4
	d(max)=	0.04	0.21		

Powers Professional Park

Sump Inlet BASIN 6

		5 YEAR	100 YEAR		
APPROACH FLOWS (worse case)		2.3	4.2	s(x)=	0.02
	d =	0.27	0.33	s(l)=	0.002
				n=	0.016
TOTAL FLOWS		4.5	8.4		
				L=	4
	d(max)=	0.20	0.41		

Powers professional Park

INLET BASIN 7

	Q5 =	5.8		Q100 =	10.7
	SL =	0.015		SO =	0.02

5 YEAR			100 YEAR	
T	12.92		T	16.25
FW	1.56		FW	1.63
L1	15.5		L1	20.4
L2	9.3		L2	12.2
L3	33.2		L3	43.7

	Li =	15.00			
	5 YR Q =	5.8		100 YR Q	10.7
	5 YR Qi =	4.2	0.72761	100 YR Qi	7.0
	5 YR Qfb =	1.6		100 YR Qfb	3.7

Powers professional Park

INLET BASIN 8

Q5 =	6.6	Q100 =	13.4
SL =	0.025	SO =	0.02

5 YEAR		100 YEAR	
T	12.32	T	16.07
FW	1.99	FW	2.10
L1	18.9	L1	26.0
L2	11.4	L2	15.6
L3	40.5	L3	55.6

Li =	15.00				
5 YR Q =	6.6		100 YR Q	13.4
5 YR Qi =	4.4	0.672015	100 YR Qi	7.7
5 YR Qfb =	2.2		100 YR Qfb	5.7

Powers professional Park

INLET BASIN 9

Q5 =	2.5		Q100 =	4.7
SL =	0.015		SO =	0.02

5 YEAR			100 YEAR	
T	9.42		T	11.94
FW	1.46		FW	1.53
L1	10.6		L1	14.1
L2	6.4		L2	8.5
L3	22.7		L3	30.2
Li =	15.00			
5 YR Q =	2.5		100 YR Q	4.7
5 YR Qi =	2.1	0.847031	100 YR Qi	3.6
5 YR Qfb =	0.4		100 YR Qfb	1.1

Powers Professional Park

Sump Inlet BASIN 10

		5 YEAR	100 YEAR		
APPROACH FLOWS (worse case)		2.6	4.8	s(x)=	0.02
	d =	0.28	0.35	s(l)=	0.002
				n=	0.016
TOTAL FLOWS		2.6	4.8		
				L=	4
	d(max)=	0.06	0.22		

Powers professional Park

INLET BASIN 11

Q5 =	8.0		Q100 =	15.8
SL =	0.03		SO =	0.02

5 YEAR		100 YEAR	
T	12.80	T	16.52
FW	2.20	FW	2.31
L1	21.7	L1	29.4
L2	13.0	L2	17.7
L3	46.5	L3	63.0

Li =	10.00			
5 YR Q =	8		100 YR Q	15.8
5 YR Qi =	3.7	0.461306	100 YR Qi	5.4
5 YR Qfb =	4.3		100 YR Qfb	10.4

Powers Professional Park

Sump Inlet BASIN 12

		5 YEAR	100 YEAR		
APPROACH FLOWS (worse case)		12.6	26.3	s(x)=	0.02
	d =	0.50	0.66	s(l)=	0.002
				n=	0.016
TOTAL FLOWS		12.6	26.3		
				L=	10
	d(max)=	0.40	0.75		

Powers professional Park

INLET BASIN 13

Q5 =	7.8	Q100 =	15.1
SL =	0.03	SO =	0.02

5 YEAR		100 YEAR	
T	12.68	T	16.24
FW	2.20	FW	2.30
L1	21.4	L1	28.8
L2	12.9	L2	17.3
L3	45.9	L3	61.7

Li =	10.00				
5 YR Q =	7.8		100 YR Q	15.1	
5 YR Qi =	3.6	0.466582	100 YR Qi	5.2	
5 YR Qfb =	4.2		100 YR Qfb	9.9	

Powers Professional Park

Sump Inlet BASIN 14

		5 YEAR	100 YEAR		
APPROACH FLOWS (worse case)		3	6	s(x)=	0.02
	d =	0.29	0.38	s(l)=	0.002
				n=	0.016
TOTAL FLOWS		3	6	L=	4
	d(max)=	0.10	0.29		

Powers Professional Park

Sump Inlet BASIN 15

		5 YEAR	100 YEAR		
APPROACH FLOWS (worse case)		15.7	30.6	s(x)=	0.02
	d =	0.55	0.70	s(l)=	0.002
				n=	0.016
TOTAL FLOWS		15.7	30.6		
				L=	15
	d(max)=	0.38	0.69		

Powers Professional Park

Sump Inlet BASIN 16

		5 YEAR	100 YEAR		
APPROACH FLOWS (worse case)		7	13.7	s(x)=	0.02
	d =	0.40	0.52	s(l)=	0.002
				n=	0.016
TOTAL FLOWS		7	13.7	L=	4
	d(max)=	0.34	0.64		

Powers Professional Park

Sump Inlet BASIN 17

		5 YEAR	100 YEAR		
APPROACH FLOWS (worse case)		9	17.7	s(x)=	0.02
	d =	0.44	0.57	s(l)=	0.002
				n=	0.016
TOTAL FLOWS		9	17.7	L=	10
	d(max)=	0.28	0.54		

Powers Professional Park

Sump Inlet BASIN 18

		5 YEAR	100 YEAR		
APPROACH FLOWS (worse case)		12.6	39.7	s(x)=	0.02
	d =	0.50	0.78	s(l)=	0.002
				n=	0.016
TOTAL FLOWS		12.6	39.7	L=	15
	d(max)=	0.30	0.84		

Powers Professional Park

Sump Inlet BASIN 19

		5 YEAR	100 YEAR		
APPROACH FLOWS (worse case)		5.6	11.6	s(x)=	0.02
	d =	0.37	0.49	s(l)=	0.002
				n=	0.016
TOTAL FLOWS		11.3	27.4	L=	15
	d(max)=	0.26	0.63		

Powers Professional Park

Sump Inlet BASIN 20

		5 YEAR	100 YEAR		
APPROACH FLOWS (worse case)		1	1.9	s(x)=	0.02
	d =	0.19	0.25	s(l)=	0.002
				n=	0.016
TOTAL FLOWS		2	3.8	L=	4
	d(max)=	0.01	0.15		

Powers Professional Park

Sump Inlet BASIN 21

		5 YEAR	100 YEAR			
APPROACH FLOWS (worse case)		11.4	24.6	s(x)=	0.02	0.02
	d =	0.49	0.65	s(l)=	0.002	0.002
				n=	0.016	0.016
TOTAL FLOWS		11.4	24.6	L=	15	15
	d(max)=	0.27	0.58			

Powers Professional Park

Sump Inlet BASIN 22

		5 YEAR	100 YEAR		
APPROACH FLOWS (worse case)		6.9	13.5	s(x)=	0.02
	d =	0.40	0.52	s(l)=	0.002
				n=	0.016
TOTAL FLOWS		13.7	26.9	L=	15
	d(max)=	0.33	0.62		

RATIONAL METHOD DETENTION POND

Pond #1

DRAINAGE AREA=	121	Acres
5 YR RUNOFF COEFFICIENT	0.45	
100 YR RUNOFF COEFFICIEN	0.56	
5 YR HISTORIC RUNOFF	62.2	
100 YR HISTORIC RUNOFF	175.5	

DURATION (min)	5 YEAR INTENSITY (in/hr)	5 YEAR FLOOD PEAK RUNOFF	100 YEAR INTENSITY (in/hr)	100 YEAR FLOOD PEAK RUNOFF	5 YEAR REQ'D STORAGE VOLUME (C.F.)	100 YEAR REQ'D STORAGE VOLUME (C.F.)	
5	5.2	283.1	9.0	609.8	66282	130302	
8	4.4	239.6	7.6	515.0	85142	162948	
10	4.1	223.2	7.0	474.3	96627	179292	
15	3.4	185.1	5.9	399.8	110637	201856	
20	2.9	157.9	5.1	345.6	114846	204091	
25	2.6	141.6	4.6	311.7	119055	204294	4.69 (100 YR)
30	2.4	130.7	4.1	277.8	123264	184169	2.73 (5 YR)
35	2.1	114.3	3.8	257.5	109505	172175	
40	1.9	103.5	3.5	237.2	99012	147984	
45	1.8	98.0	3.2	216.8	96687	111596	
50	1.7	92.6	3.0	203.3	91095	83340	
55	1.6	87.1	2.8	189.7	82236	46952	
60	1.5	81.7	2.6	176.2	70110	2434	