MASTER DEVELOPMENT DRAINAGE PLAN
FOR
SPRING CREEK DEVELOPMENT
Spring Creek and Miscellaneous Drainage Basins)

J R ENGINEERING

J·R ENGINEERING
A Subsidiary of Westrian

MASTER DEVELOPMENT DRAINAGE PLAN
FOR
SPRING CREEK DEVELOPMENT
(Spring Creek and Miscellaneous Drainage Basins)

August 2001
Revised September 2001
Revised January 2002
Revised March 2002
Revised May 2002
Revised June 2002

Prepared For:

S.C. COLORADO HOLDINGS, LLC
6 S. Tejon, Suite 400
Colorado Springs, CO 80903
(719) 447-1003

Prepared By:

JR ENGINEERING
4310 ArrowsWest Drive
Colorado Springs, CO 80907
(719) 593-2593

Job No. 9840.00

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FOR
SPRING CREEK DEVELOPMENT
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DRAINAGE REPORT STATEMENT

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 any negligent acts, errors, or omissions on my part in preparing this report.

COLORADO REGISTERED MIKE A. BRAMLETT

Mike A. Bramlett, Colorado P.E. #32314
For and On Behalf of JR Engineering

6/18/02
Date

DEVELOPER'S STATEMENT:
I, the developer, have read and will comply with all of the requirements specified in this drainage report and plan.

Business Name:	S.C. Colorado Holdings, LLC
By:	
Title:	Manager
Address:	6 S. Tejon Street, Suite 400
	Colorado Springs, CO 80903

CITY OF COLORADO SPRINGS ONLY:
Filed in accordance with Section 15-3-906 of the Code of the City of Colorado Springs, 1980, as amended.

City Engineer

7/2/02
Date

Conditions:

Colorado Department of Transportation Approval:

See Approval Letter Next Page
State Engineer

Date

4310 ArrowsWest Drive, Colorado Springs, CO 80907
719-593-2593 • Fax: 719-528-6613 • www.jrengineering.com

Post-it® Fax Note 7671	Date 2/5	# of pages ▶ 1
To Paul Poppert	From R. O'Connor	
Co./Dept	Co.	
Phone #	Phone #	
Fax # 578-8524	Fax #	

DEPARTMENT OF TRANSPORTATION

Region 2 – Access
P.O. Box 536
Pueblo Colorado 81002
Phone (719) 546-5403
Fax (719) 546-5414

February 4, 2002

SH 29
City of CS

Rick O'Connor, Senior Planner
City of Colorado Springs Development Services
30 S Nevada, Suite 301/305
Colorado Springs, CO 80903

RE: CPC CP 01-00179 – Spring Creek Concept Plan

Dear Mr. O'Connor

The Colorado Department of Transportation has reviewed both the drainage study and the traffic impact analysis submitted with the abovementioned development. The comments are as follows:

- On the drainage report. The Master Development Drainage Plan for Spring Creek Development does not anticipate adverse effects on the CDOT infrastructure at SH 24 or Circle Drive. The MDDP will be followed by a series of drainage reports as the land is developed. This approach is acceptable to the CDOT Hydraulics Unit.

- Regarding the TIA: The State Highway Access Category Assignment Schedule lists this portion of State Highway 29 through the site area as Category E-X or Expressway, Major Bypass. The State Highway Access Code does not allow for any of the proposed signalization of the existing full-movement intersection at SH 29 and Server, nor proposed right-in/right-out access points, existing or not. Paragraph 3.7(7) states, *All access provided to a category E-X highway shall be done so with the understanding that if the highway is reconstructed, the direct access location may be closed and alternative access may be required to frontage road or by other available means.* A very large portion of land at this site is currently undeveloped. Assuming that the Category Assignment does not change and existing access points to SH 29 are closed, additional information is needed in order to fairly assess the developer's fair portion of installation cost for signals at SH 24 and Union Boulevard.

If you have any questions regarding the reviews of the drainage or traffic studies, please contact Mr. Paul Reinsma in Colorado Springs at (719) 634-2323 or Mr. John Cordova in Pueblo at (719) 546-5405 respectively. All other questions should be directed to me in Pueblo at (719) 546-5407

Sincerely,

Valerie Watkins
Access Manager

Xc: Mike DeGrant, SC Colorado Holdings LLC
Poling
Breeséowitz
Hall/file

MASTER DEVELOPMENT DRAINAGE PLAN
FOR
SPRING CREEK DEVELOPMENT
(Spring Creek and Miscellaneous Drainage Basins)

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APPENDIX

MASTER DEVELOPMENT DRAINAGE PLAN FOR SPRING CREEK DEVELOPMENT (Spring Creek and Miscellaneous Drainage Basins)

PURPOSE

This document is the Master Development Drainage Plan (M.D.D.P.) for Spring Creek Development. The purpose of this report is to identify major drainageways, culvert, storm sewer, inlet locations, and areas tributary to this site. This report will analyze overall routing for developed flows based upon the previously approved drainage studies and recommend outfall locations to transfer these flows to their respective discharge points. This report attempts to size and locate the minor storm facility system. Due to the fact that this land plan is subject to minor grading and site plan changes, the minor storm facility system may change slightly and should be verified at the time of final drainage reports.

GENERAL DESCRIPTION

The Spring Creek Development is located in portions of sections 21, 28, and 29, Township 14 South, Range 66 West of the Sixth Principal Meridian in the City of Colorado Springs, El Paso County. The site is bounded to the north by the existing U.S. Highway 24 Bypass, to the west by existing Hancock Expressway and right-of-way for the Atchison, Topeka, and Santa Fe railroad, to the south by South Circle Drive, and to the east by South Circle Drive and Spring Creek Filings No. 1, 2, and 6. This site consists of approximately 222 acres.

A large portion of the site is located within the Spring Creek Drainage Basin. The remainder of the site is located within a miscellaneous drainage basin that is small in relation to major basins and drains directly to Fountain Creek. The Spring Creek basin is bounded to the north by the Shook's Run Drainage Basin, to the south and east by the miscellaneous basin and the Sand Creek Drainage Basin, and to the west by Fountain Creek. This area has been previously studied in the following reports: "Spring Creek Drainage Study," by the Lincoln DeVore Testing Laboratory, dated March 1968; "Drainage Report and Plan for Spring Creek Development Phase 1," by URS/NES, dated

January 1985; "Drainage Report for Spring Creek Filing No. 2," by KLH Engineering Consultants, Inc., dated December 1985; "Master Drainage Study for Spring Creek Development Phase II and Final Drainage Report for Spring Creek Filing No. 4," by KLH Engineering Consultants, Inc., dated February 1986; "Amendment to Master Drainage Study for Spring Creek Development Phase II and Final Drainage Report for Spring Creek Filing No. 4," by KLH Engineering Consultants, Inc., dated August 8, 1988 (revised October 4, 1988); "Master Drainage Study for Spring Creek Shopping Center and Preliminary & Final Drainage Report for Spring Creek Filing No. 5," by KLH Engineering Consultants, Inc., dated August 1988; "Spring Creek Shopping Center Phase II and Spring Creek Filing No. 6 and Adjacent Area Final Drainage Report," by KLH Engineering Consultants, Inc., dated June 1990; "Spring Creek Drainage Basin Planning Study," by URS Consultants, dated October 1993.

The average soil condition reflects Hydrologic Group "B" and "D" (Nelson-Tassel), as determined by the "Soil Survey of El Paso County Area," prepared by S.C.S. (see map in appendix). The majority of the site (approximately 95%) is classified as the Nelson-Tassel. Therefore, Hydrologic Group "D" was assumed for the calculations in this report.

EXISTING DRAINAGE CHARACTERISTICS

Currently, Union Boulevard, Hancock Expressway, Highway 24, Circle Drive, and Monterey Drive have been built. Storm sewer, water main, sanitary sewer, fiber optics, and curb and gutter have been installed within the right-of-way as of the writing of this report. With the exception of these roads, most of the site is currently vacant land. Existing off-site improvements include the existing Cub Foods retail site and an apartment site along the east side of the property.

The existing site can be divided into five sections. The northwest quadrant, northeast quadrant, southwest quadrant, southeast quadrant and Spring Creek Filing No. 10. For clarity, the existing drainage conditions explanation will be divided into these sections.

Northwest Quadrant

The northwest quadrant consists of 38.64 acres of undeveloped land bounded to the north by Highway 24, to the east by Union Boulevard and to the west and south by Hancock Expressway.

There is an existing ridge which runs to the northwest across this quadrant and splits drainage into two basins.

Basin ENW-1's 11.65 acres produce flows of Q_5 = 7.90 cfs and Q_{100} = 15.63 cfs which flow northwest to Design Point E-1.

Basin ENW-1A's 11.05 acres combine with Basin EOS-21's 2.39 acres at the existing 8' sump inlet in Hancock Expressway. These flows are piped to the southwest in a 30" R.C.P. where they combine with flows from EOS-20's 0.69 acres at Design Point 21. Existing flows of Q_5 = 13.15 cfs and Q_{100} = 24.85 cfs flow to an existing ditch.

Basin ENW-2's 15.95 acres produce existing flows of Q_5 = 9.65 cfs and Q_{100} = 18.86 cfs at Design Point E-2.

At Design Point E-3, flows from Basin EOS-23's 4.05 acres combine with flows from Design Point E-2 to produce overland swaled flows of Q_5 = 15.04 cfs and Q_{100} = 28.11 cfs.

At Design Point E-4, flows from Basin EOS-21A's 3.00 acres combine with flows from Design Point E-3 and E-1 to produce total flows of Q_5 = 26.00 cfs and Q_{100} = 48.51 cfs. These flows currently discharge overland directly to the north to the existing Spring Creek (east of Hancock Expressway). Flow travels over a gabion wall to discharge upstream of Hancock Expressway bridge. In its present condition, this outfall point is characterized by dense vegetation and grasses with no sign of erosive velocities. The gabions placed on Spring Creek are also in proper order and show no signs of damage due to historic flow rates.

Northeast Quadrant

The northeast quadrant consists of 93.95 acres of undeveloped land bounded to the north by Highway 24 and Prospect Park Subdivisions No. 3 and 5, to the east by Circle Drive and Spring Creek Filings No. 5 and 6 (existing retail shopping and office complex), to the west by Highway 24 and Union Boulevard and to the south by Monterey Drive.

There are two existing ridges in this quadrant. Basin ENE-1's 6.31 acres is split off from the rest of the site by an existing ridge which parallels Monterey Drive and Union Boulevard. Flows of Q_5 = 4.90 cfs and Q_{100} = 9.84 cfs sheet flow from this area into Monterey Drive and Union Boulevard. These flows are carried to the west along the existing Monterey Drive curb line and then to the north in the existing Union Boulevard curb line to a series of existing at-grade inlets along the east side of Union Boulevard.

Basin ENE-3's 27.95 acres is split from the rest of the site by an existing east-west ridge. Existing flows of Q_5 = 16.42 cfs and Q_{100} = 32.02 cfs flow overland to the northwest and exit the site at Design Point E-7.

Design Point E-8 is the point at which flows from Basin EOS-2's 29.44 acres combines with flows from Basin ENE-3 and flows north under Highway 24 in a ±24" CMP culvert. Existing combined flows of Q_5 = 55.87 cfs and Q_{100} = 99.47 cfs are calculated at this point.

Design Point E-10 is the point to which flows from EOS-3's 16.21 acres and EOS-4's 4.93 acres is carried in existing storm sewer from the existing retail center and Circle Drive's right-of-way to our site. These combined flows of Q_5 = 61.53 cfs and Q_{100} = 112.11 cfs flow overland to the northwest.

Design Point E-11 is the point to which flows from EOS-5's 1.10 acres, ESE-2's 2.45 acres, ESE-3's 0.30 acres, EOS-7's 0.12 acres, and EOS-6's 1.18 acres are directed in existing storm sewer from the sump inlets in Monterey Drive. These combined flows of Q_5 = 7.65 cfs and Q_{100} = 13.77 cfs flow overland to the existing pond in the center of Basin ENE-2.

The existing pond in the center of Basin ENE-2 appears to have had its overflow breached intentionally. This may have been done when Highway 24 was complete to avoid the possible natural breach of this dam during a large storm event. For the purpose of this study, these ponds are not considered.

Flows from Design Points E-11 and E-10 combine with runoff from ENE-2's 59.69 acres at Design Point E-6. Flows of Q_5 = 77.93 cfs and Q_{100} = 141.95 cfs are channeled at this point and exit the site at an existing low point.

Flows from Design Point E-6 combine with flows from Basin EOS-1's 3.06 acres at Design Point E-9. Existing flows of Q_5 = 79.82 cfs and Q_{100} = 145.67 cfs empty into the existing 10' by 10' concrete box culvert/78" R.C.P. under Highway 24 and travel north to Spring Creek. The capacity of this box/pipe combination is 522.41 cfs assuming that the 78" R.C.P. is the limiting factor when compared to the larger box culvert portion. Therefore, the pipe is adequate for existing conditions.

Southwest Quadrant

The Southwest Quadrant consists of 31.43 acres of undeveloped land bounded to the north by Hancock Expressway, to the east by Union Boulevard, and to the south and west by the Atchison, Topeka, and Santa Fe Railroad.

Existing Basin ESW-1's 19.97 acres combine with flows from Basin EOS-19 and sheet flow to the southwest to the existing ditch on the Atchison, Topeka, and Santa Fe Railroad property. Existing flows of Q_5 = 14.39 cfs and Q_{100} = 27.80 cfs exist at Design Point E-12. The flows off the site are not concentrated at this point. Design Point E-12 is intended to indicate sheet flow from Basin ESW-1 to the west.

Existing Basin EOS-18's 12.46 acres combine with flows from Design Point E-12 to produce existing flows of Q_5 = 22.37 cfs and Q_{100} = 43.49 cfs at Design Point E-13. At this point, flows are channeled and continue to flow south in the existing ditch.

Existing Basin ESW-2's 8.77 acres sheet flow to Design Point E-14, producing existing flows of Q_5 = 4.18 cfs and Q_{100} = 8.01 cfs. These flows are collected at a low point at Design Point E-14. These flows currently overtop this low point and flow overland to the west where they combine with flows from Basin EOS-17's 3.88 acres and Design Point E-13 to produce a combined flow of Q_5 = 22.68 cfs and Q_{100} = 43.11 cfs at Design Point E-15.

Flows from ESW-4's 2.36 acres flow overland and combine with Basin EOS-16's 3.40 acres (west side of Union). These total flows are Q_5 = 10.25 cfs and Q_{100} = 17.98 cfs at Design Point E-16 where they are collected in an existing 6' sump inlet. The existing R.C.P. storm sewer system in Union Boulevard conveys these flows to Fountain Creek.

Southeast Quadrant

The Southeast Quadrant consists of 41.07 acres of undeveloped land bounded to the north by Monterey Drive, to the east by Spring Creek Filing No. 1 (existing apartments), to the west by Union Boulevard, and to the south by Spring Creek Filing No. 10 (currently vacant land).

Basin EOS-8A's 6.56 acres combine with Basin ESE-1's 38.31 acres and flows overland to Union Boulevard's easterly curb line at Design Point E-17. Existing flows of Q_5 = 24.82 cfs and Q_{100} = 48.13 cfs occur at this location. These flows are picked up in the existing at-grade inlets along the easterly curb line of Union Boulevard.

Flows from Basin ESE-5's 1.34 acres also flow overland to the west and into Union Boulevard and combine with flows from E-17 at Design Point E-18. Existing flows of Q_5 = 25.56 cfs and Q_{100} = 49.56 cfs flow from this point, Design Point E-18, to the 15' sump grade inlets at Union Boulevard north of Circle Drive and then to Fountain Creek in the existing 72" diameter R.C.P. storm sewer.

Spring Creek Filing No. 10

Spring Creek Filing No. 10 consists of 16.712 acres of undeveloped land bounded to the north by Spring Creek Filing No. 1 (existing apartments) and the Southeast Quadrant, to the south and east by Circle Drive, and to the west by Union Boulevard.

Basin ESE-4's 15.37 acres combines with flows from Basin EOS-8B's 1.77 acres, EOS-10's 5.16 acres, EOS-11's 7.04 acres, and Design Point E-18 to produce existing overland flows of $Q_5 = 52.66$ cfs and $Q_{100} = 97.22$ cfs at Design Point E-20. From here, existing flows are combined with flows from Design Point E-16 and flow west to Fountain Creek via an existing 72" diameter R.C.P. storm sewer system under Union Boulevard. Existing combined flows are $Q_5 = 59.91$ cfs and $Q_{100} = 109.48$ cfs at Design Point E-22.

Total combined flows entering the 72" R.C.P. are $Q_5 = 74.32$ cfs and $Q_{100} = 136.37$ cfs at Design Point E-23. This existing system was designed and constructed in anticipation of future development and is adequate for existing flows.

PROPOSED DRAINAGE CHARACTERISTICS

This site is proposed to be a commercial, retail, multi-family, and single-family development using the traditional neighborhood design.

In the developed condition, the proposed internal drainage facilities are detailed on the enclosed proposed conditions drainage map. Inlet and pipe sizes have been determined based upon the current site layout. At the time of final drainage reports, the layout and sizes of the storm system will need to be verified. The proposed Master Development Drainage Facilities were determined using the following criteria:

TND Drainage Standards:

The following drainage standards are required of a TND development (except as indicated in the TND ordinance, the Drainage Criteria Manual shall apply):

1. Vertical curbs shall be used on all TND streets, excepting alleys. The design engineer shall compute the allowable flow capacities and flow depths for TND streets using equivalent values in the Drainage Criteria Manual and the following criteria:

For local streets, the Initial Storm (5 year) Flow must not cross the street crown from one side to the other. There must be at least two (2) inches of freeboard at the curb. The Major Storm (100 year) Flow must not exceed twelve (12) inch depth at the gutter and must not flood adjacent buildings.

For Avenues and Parkways, Initial Storm Flow spread must not encroach beyond the outside land and Major Storm Flows must be confined in the street section.

Allowable alley storm flows shall be limited to the flows generated from the rear of the lots along the alley.

Alley flows shall not cross the intersecting streets into another alley but shall be captured or diverted at the intersecting street.

Flow spread shall be confined to the right of way at reasonable and safe depths.

2. Alternate inlet types such as combination castings shall be allowed to provide a more traditional appearance. Slotted drains are prohibited for public facilities.

Per the Plat, the tracts containing the alleyways are for ingress, egress, public utilities and public drainage purposes and shall be owned and maintained by the Spring Creek Traditional Neighborhood Homeowners Association.

This report will discuss the major facilities required for development. For ease of review, this information is broken down in a section-by-section format.

Northwest Quadrant

Developed flows from basins PNW-4, PNW-5, and PNW-15 will be collected via a proposed inlet and storm sewer system. Basin PNW-15's developed flows of $Q_5 = 11.53$ cfs and $Q_{100} = 20.88$ cfs are conveyed to Design Point SD37 using a proposed 24" R.C.P. Flows from basins PNW-4 and PNW-5 combine with PNW-15 flows for a total combined flow of $Q_5 = 33.82$ cfs and $Q_{100} = 61.25$ cfs at Design Point SD38. These flows are conveyed to Design Point B using a proposed 30" R.C.P.

Basin PNW-1, PNW-2, PNW-3, PNW-6, PNW-7, PNW-8, and PNW-14 combine with flows from Design Point SD 33 and Hancock Expressway and outfall at Design Point B. These flows will combine with those from Basins PNW-4, PNW-5, and PNW-15 for a total combined flow of Q_5 = 99.82 cfs and Q_{100} = 169.06 cfs at Design Point B. It was determined that unrestricted flows would cause mildly erosive velocities in the existing channel to Spring Creek. Therefore, a detention pond is proposed to restrict flows to historic conditions at Design Point B. At the time of final engineering, an appropriate outlet structure shall be designed and the required detention volume calculated to restrict outflows to historic levels. Since the existing channel between Design Point B and Spring Creek is well vegetated and shows no signs of erosion (as discussed in the "Existing Conditions" section of this report), flows reduced to historic levels are not expected to cause any adverse effects.

Flows from Basins PNW-9 and PNW-13 will combine with existing Hancock flows from Basins EOS-20 and EOS-21. These flows are collected by an existing storm sewer and inlet system in Hancock Expressway and conveyed west onto adjacent property. The additional flows from the two proposed basins are similar to the historic flows tributary to the Hancock inlets and no adverse effects are anticipated with this existing system.

Flows from Basins PNW-10, PNW-11 and PNW-12 will combine at Design Point SD-33 for a total combined flow of Q_5 = 29.45 cfs and Q_{100} = 53.34 cfs. These flows will be conveyed to Design Point SD-32 in a proposed 30" R.C.P. At Design Point SD-32, flows from Design Point SD-31 and SD-33 combine and are routed to Design Point B as previously discussed.

Northeast Quadrant

Flows from the Northeast Quadrant's development will be conveyed via a proposed storm sewer system to the proposed outfall channel located at Design Points SD-4, SD-13, and SD-12. A community park and wetland enhancement area is proposed along the existing channel. Currently, the application for an individual Department of Army 404 Permit is in progress. Water quality enhancement features are also anticipated. This area will be publicly owned and maintained with a homeowner's association providing additional maintenance to the wetlands mitigation area.

Developed flows of $Q_5 = 207.16$ cfs and $Q_{100} = 371.91$ cfs will discharge to the existing concrete box culvert under Highway 24 at Design Point A. This box culvert is adequate for these proposed flows. The existing box culvert is a 10' X 10' concrete box with headwall, which empties into a 78" diameter concrete pipe. The calculated capacity for this structure was 522.41 cfs.

Flows from the future park site will follow existing drainage patterns to the north. No increase in developed flows is anticipated at this location.

Southwest Quadrant

Flows from this developed site will flow via a proposed storm system from north to south along the westerly edge of the property. This flow will be discharged into Fountain Creek in the existing 72" concrete pipe under the FMIC ditch and the railroad. From this site, proposed flows of $Q_5 = 240.67$ cfs and $Q_{100} = 427.34$ cfs are anticipated at Design Point SD-36. The existing 72" was designed in anticipation of these proposed flows and is adequate to carry them to the outfall at Fountain Creek.

Southeast Quadrant

The majority of the developed flows from the southeast quadrant will be directed into a storm sewer system, which will tie into the existing system in Union Boulevard at the existing 15' double-sided inlet. The existing 18" and 36" system in Union Boulevard was sized per the "Master Drainage Study for Spring Creek Development Phase II" dated February 1986 for 5-year flows with the reminder of 100-year flows carried in the street section. Per this report, accumulated surface flows of 211 cfs were assumed to be flowing down Union Boulevard with 98.9 cfs of this flow being collected by the existing storm sewer. The excess runoff in the 100-year storm would fill the eastern cross section of Union Boulevard with an approximate 5' clear lane remaining. Per current City criteria, this is unacceptable and a solution is presented in the following paragraph. From the existing 60" storm and downstream, the system has been sized for 100-year flows and will adequately convey developed flows per the previous report and for this proposed development. The calculated 100-year flow at Design Point SD 35 ($Q_{100} = 273.91$ cfs) is similar to anticipated flow of 310 cfs at this point in the previous report.

Developed flows of Q_5 = 78.37 cfs, Q_{100} = 148.59 cfs will be conveyed in a proposed 36" storm sewer to the existing 15' double-sided inlet in Union Boulevard. Proper easements through Spring Creek Filing No. 10 must be secured prior to implementation of this facility. If an easement is not available at the time of construction, the existing facilities in Union Boulevard must be upsized to accommodate the 100-year flows resulting from this development. Although the existing 36" R.C.P. in Union Boulevard is not adequate to accept 100 year proposed flows at Design Point SD 20 (Q_5 = 78.37 cfs, Q_{100} = 148.59) it would still maintain enough capacity to accept the 5 year flows from the southeast quadrant. However, for the purposes of this report, all 5 year and 100 year flows will be assumed to contribute to the proposed 36" R.C.P. Some flows will be directed into Monterey Drive, collected by the existing inlet and conveyed to the northeast quadrant following existing drainage patterns by an existing 36" storm. In the developed condition, Basin PSE-1A will contribute an additional 10 cfs of flow in the 100-year storm than the existing Basin ESE-2. Combined with existing Design Point E1, developed 100-year flows of 23.77 cfs will be conveyed adequately by the 24" and 36" storm sewer.

Spring Creek Filing No. 10

The existing 24" R.C.P. will be replaced to handle developed flows. Developed flows of Q_5 = 36.66 cfs and Q_{100} = 66.10 cfs from this site will be collected in a proposed 30" storm sewer system at Design Point P36 and directed to the existing storm sewer in Union Boulevard. These flows combine with flows from Circle Drive, Union Boulevard, the Southeast Quadrant, and the Southwest Quadrant and are conveyed via the existing 72" diameter storm sewer to Fountain Creek. This outfall is sized to handle the 100-year storm.

HYDROLOGIC CALCULATIONS

Hydrologic calculations were performed using the Rational Method for the 5-year and 100-year recurrence intervals. All facilities calculated in this report are designed to accept the 100-year flows. Hydrologic calculations were performed using the City of Colorado Springs/El Paso County Drainage Criteria Manual, as revised in November 1991 and October 1994.

HYDRAULIC CALCULATIONS

Hydraulic calculations were performed using the City of Colorado Springs/El Paso County Drainage Criteria Manual, as revised in November 1991 and October 1994. These calculations were performed with Haestad Methods, Inc. Flowmaster V.5.10 software using the Manning's formula (See Appendix).

FLOODPLAIN STATEMENT

No portion of this site is within a designated F.E.M.A. floodplain as determined by Flood Insurance Rate Map Community Panel Numbers 08041C0733F, 08041C0741F, 08041C0742F, and 08041C0734F, effective March 17, 1997. See the appendix for a Floodplain Information Map, which shows the location of the site.

CONSTRUCTION COST OPINION

Northeast Quadrant

Item	Description	Quantity	Unit Cost	Cost
1.	18" R.C.P. Pipe	302 L.F.	$23/L.F.	$ 6,946.00
2.	24" R.C.P. Pipe	1,537 L.F.	$30/L.F.	$ 46,110.00
3.	30" R.C.P. Pipe	926 L.F.	$42/L.F.	$ 38,892.00
4.	36" R.C.P. Pipe	1,859 L.F.	$50/L.F.	$ 92,950.00
5.	42" R.C.P. Pipe	311 L.F.	$62/L.F.	$ 19,282.00
6.	48" R.C.P. Pipe	524 L.F.	$68/L.F.	$ 35,632.00
7.	4' D-10 Inlet	10 EACH	$2,970/EA	$ 29,700.00
8.	6' D-10 Inlet	6 EACH	$3,210/EA	$ 19,260.00
9.	8' D-10 Inlet	4 EACH	$3,445/EA	$ 13,780.00
10.	12' D-10 Inlet	2 EACH	$4,345/EA	$ 8,690.00
11.	14' D-10 Inlet	2 EACH	$4,750/EA	$ 9,500.00
12.	16' D-10 Inlet	4 EACH	$5,440/EA	$ 21,760.00
13.	24' D-10 Inlet	1 EACH	$8,160/EA	$ 8,160.00
14.	24" F.E.S.	1 EACH	$655/EA	$ 655.00
15.	30" F.E.S.	1 EACH	$715/EA	$ 715.00
16.	36" F.E.S.	1 EACH	$770/EA	$ 770.00
17.	42" F.E.S.	1 EACH	$950/EA	$ 950.00
18.	48" F.E.S.	1 EACH	$1,055/EA	$ 1,055.00
		Sub-Total		$ 354,807.00
		15% Engineering and Contingencies		$ 53,221.00
		TOTAL		**$ 408,028.00**

Southeast Quadrant

Item	Description	Quantity	Unit Cost	Cost
1.	18" R.C.P. Pipe	879 L.F.	$23/L.F.	$ 20,217.00
2.	24" R.C.P. Pipe	623 L.F.	$30/L.F.	$ 18,690.00
3.	36" R.C.P. Pipe	2,386 L.F.	$50/L.F.	$ 119,300.00
4.	4' D-10 Inlet	4 EACH	$2,970/EA	$ 11,880.00
5.	8' D-10 Inlet	1 EACH	$3,445/EA	$ 3,445.00
6.	14' D-10 Inlet	4 EACH	$4,750/EA	$ 19,000.00
7.	24' D-10 Inlet	2 EACH	$8,160/EA	$ 16,320.00
8.	26' D-10 Inlet	1 EACH	$8,840/EA	$ 8,840.00
		Sub-Total		$ 217,692.00
		15% Engineering and Contingencies		$ 32,654.00
		TOTAL		**$ 250,346.00**

Southwest Quadrant

Item	Description	Quantity	Unit Cost	Cost
1.	18" R.C.P. Pipe	1,862 L.F.	$23/L.F.	$ 42,826.00
2.	24" R.C.P. Pipe	1,228 L.F.	$30/L.F.	$ 36,840.00
3.	30" R.C.P. Pipe	931 L.F.	$42/L.F.	$ 39,102.00
4.	36" R.C.P. Pipe	437 L.F.	$50/L.F.	$ 21,850.00
5.	42" R.C.P. Pipe	161 L.F.	$62/L.F.	$ 9,982.00
6.	48" R.C.P. Pipe	782 L.F.	$68/L.F.	$ 53,176.00
7.	4' D-10 Inlet	5 EACH	$2,970/EA	$ 14,850.00
8.	6' D-10 Inlet	2 EACH	$3,210/EA	$ 6,420.00
9.	8' D-10 Inlet	1 EACH	$3,445/EA	$ 3,445.00
10.	12' D-10 Inlet	4 EACH	$4,345/EA	$ 17,380.00
11.	16' D-10 Inlet	1 EACH	$5,440/EA	$ 5,440.00
12.	30' D-10 Inlet	1 EACH	$10,200/EA	$ 10,200.00
		Sub-Total		$ 261,511.00
		15% Engineering and Contingencies		$ 39,227.00
		TOTAL		**$ 300,738.00**

Northwest Quadrant

Item	Description	Quantity	Unit Cost	Cost
1.	18" R.C.P. Pipe	447 L.F.	$23/L.F.	$ 10,281.00
2.	24" R.C.P. Pipe	1,714 L.F.	$30/L.F.	$ 51,420.00
3.	30" R.C.P. Pipe	2,103 L.F.	$42/L.F.	$ 88,326.00
4.	36" R.C.P. Pipe	309 L.F.	$50/L.F.	$ 15,450.00
5.	42" R.C.P. Pipe	454 L.F.	$62/L.F.	$ 28,148.00
6.	4' D-10 Inlet	8 EACH	$2,970/EA	$ 23,760.00
7.	8' D-10 Inlet	3 EACH	$3,445/EA	$ 10,335.00
8.	10' D-10 Inlet	2 EACH	$3,935/EA	$ 7,870.00
9.	12' D-10 Inlet	1 EACH	$4,345/EA	$ 4,345.00
10.	14' D-10 Inlet	1 EACH	$4,750/EA	$ 4,750.00
11.	24" F.E.S.	1 EACH	$655/EA	$ 655.00
12.	30" F.E.S.	1 EACH	$715/EA	$ 715.00
13.	42" F.E.S.	1 EACH	$950/EA	$ 950.00
14.	Detention Grading Allowance	LUMP SUM	$10,000/L.S.	$ 10,000.00
15.	Detention Outlet Structure	LUMP SUM	$5,000/L.S.	$ 5,000.00
		Sub-Total		$ 262,005.00
		15% Engineering and Contingencies		$ 39,300.75
		TOTAL		**$ 301,305.75**

DRAINAGE FEES

Drainage fees shall be calculated at the time of final drainage reports. For this report, it was determined that 134.25 acres were located in the Spring Creek Drainage Basin and 70.84 acres lie in the miscellaneous Drainage Basin. It should be noted that changes to the grading of the site would possibly affect basin boundaries. Spring Creek Filing No. 10 was included in drainage calculations to properly size future storm sewer. However, it was not included in basin acreage calculations, as it is owned by a separate party.

SUMMARY

This M.D.D.P. lays the basic groundwork for the future final drainage reports for the Spring Creek Development. Drainage facilities, as outlined in this report, will be publicly owned and maintained. Phasing of proposed improvements will be required once the project is underway. Final drainage reports for each phase will need to re-examine recommendations made in this report to verify assumptions. Overall, this project may be completed with minimal off-site improvements. Based upon development flows being reduced by the town home development versus the originally planned regional shopping center, our calculations show that the existing off-site facilities and crossings will adequately convey the proposed development flows. These proposed improvements are in compliance with the 1993 Spring Creek D.B.P.S., which called for improvements, in general, to the north and east of the proposed development. As the miscellaneous basin has not been studied, no previous recommendations were available for this area.

PREPARED BY:

JR Engineering

Aaron C. Seal, E.I.
Design Engineer II

/kd/984000/MDDP 08-01 REV jun 02.doc

REFERENCES

1. City of Colorado Springs/County of El Paso Drainage Criteria Manual, dated November 1991.

2. Soils Survey of El Paso County Area, Colorado Soil Conservation Service.

3. "Spring Creek Drainage Study," Lincoln DeVore Testing Laboratory, March 1968.

4. "Drainage Report and Plan for Spring Creek Development Phase 1," URS/NES, January 1985.

5. "Drainage Report for Spring Creek Filing No. 2," KLH Engineering Consultants, Inc., December 1985.

6. "Master Drainage Study for Spring Creek Development Phase II and Final Drainage Report for Spring Creek Filing No. 4," KLH Engineering Consultants, Inc., February 1986.

7. "Amendment to Master Drainage Study for Spring Creek Development Phase II and Final Drainage Report for Spring Creek Filing No. 4," KLH Engineering Consultants, Inc., August 8, 1988 (revised October 4, 1988).

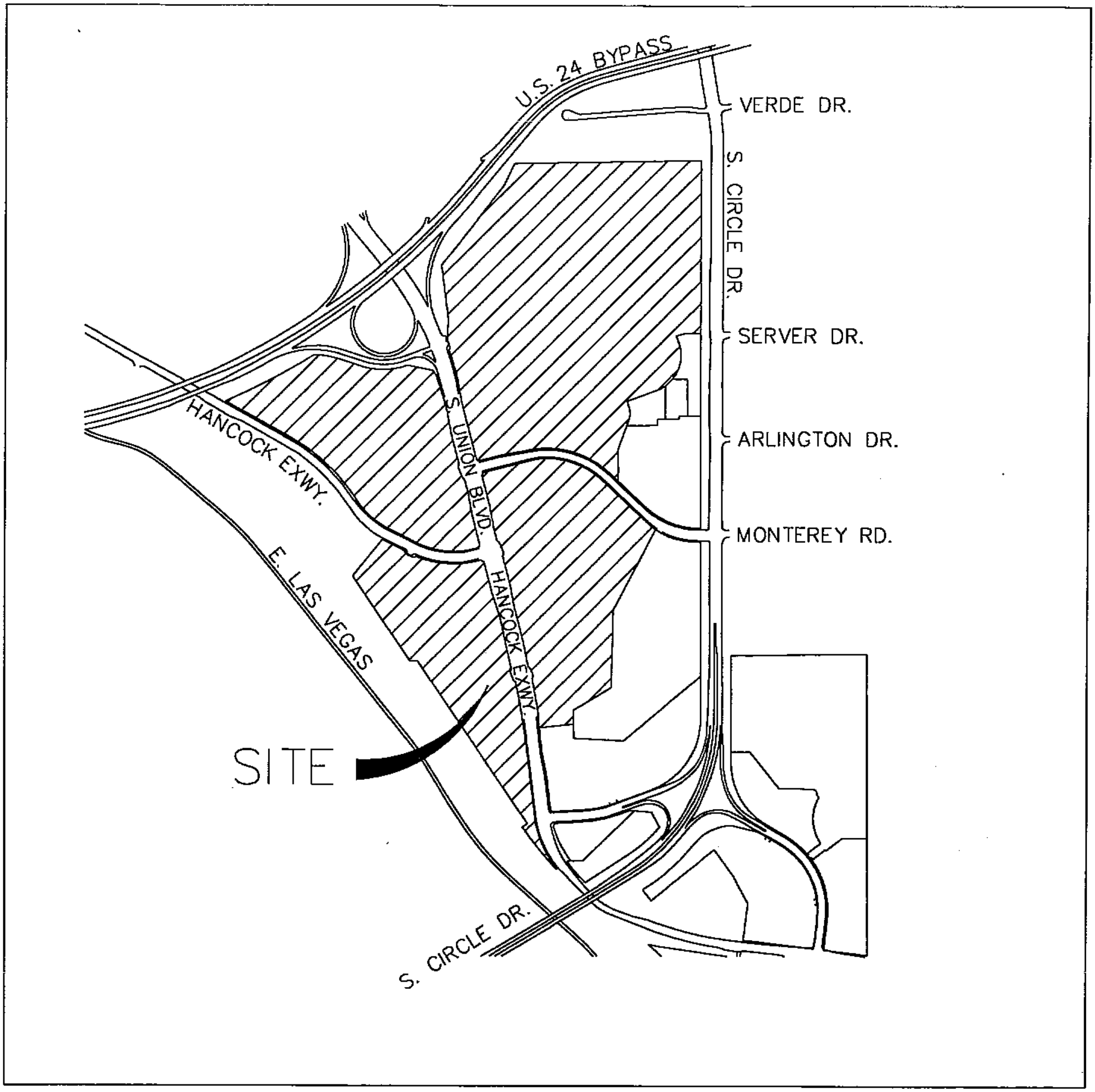
8. "Master Drainage Study for Spring Creek Shopping Center and Preliminary & Final Drainage Report for Spring Creek Filing No. 5," KLH Engineering Consultants, Inc., August 1988.

9. "Spring Creek Shopping Center Phase II and Spring Creek Filing No. 6 and Adjacent Area Final Drainage Report," KLH Engineering Consultants, Inc., June 1990.

10. "Spring Creek Drainage Basin Planning Study," URS Consultants, October 1993.

APPENDIX

VICINITY MAP



VICINITY MAP

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719-593-2593 • Fax 719-528-6613
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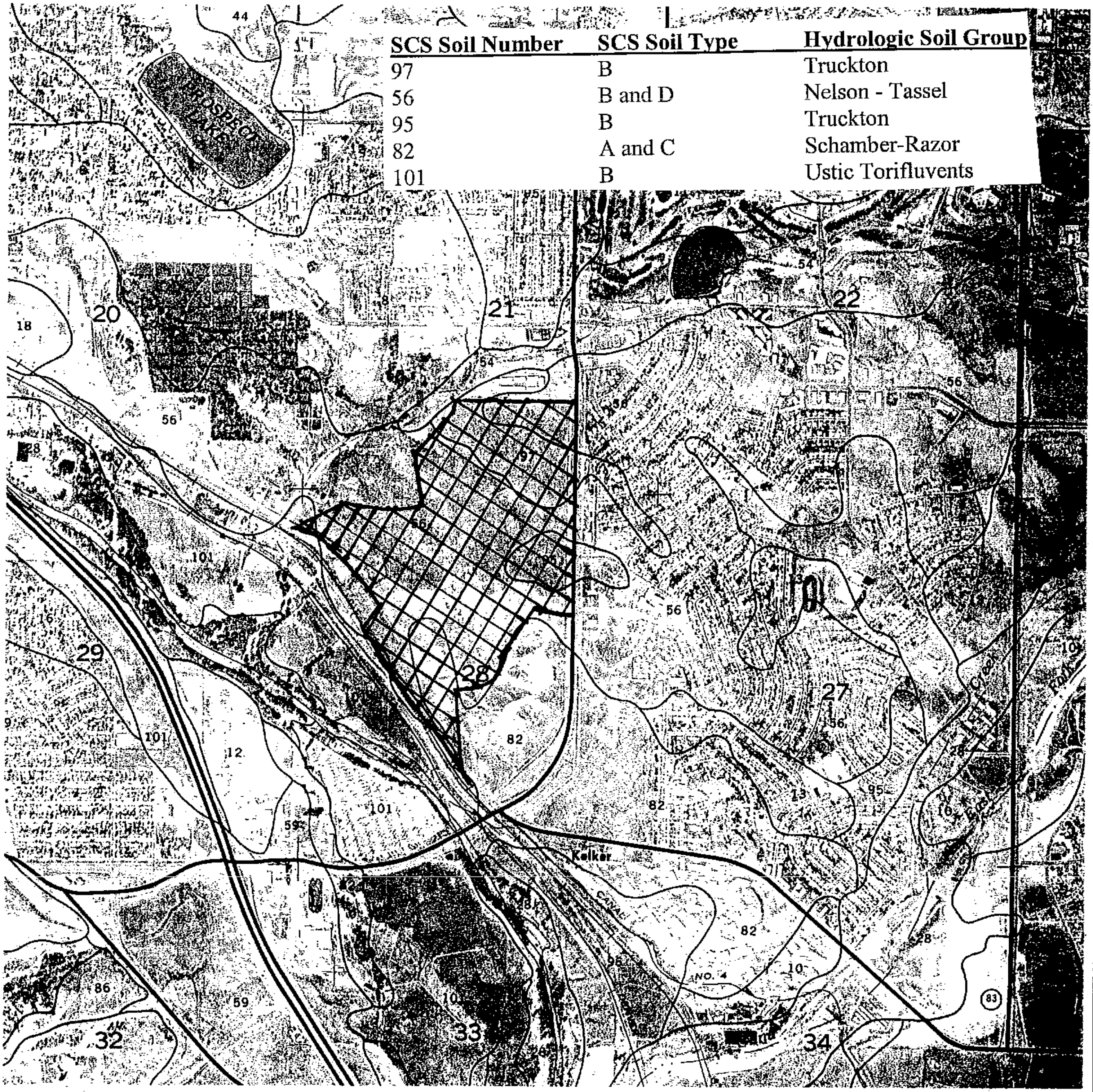
SOIL MAP (S.C.S. SURVEY)



SCS Soil Number	SCS Soil Type	Hydrologic Soil Group
97	B	Truckton
56	B and D	Nelson - Tassel
95	B	Truckton
82	A and C	Schamber-Razor
101	B	Ustic Torifluvents

SCS SOIL SURVEY

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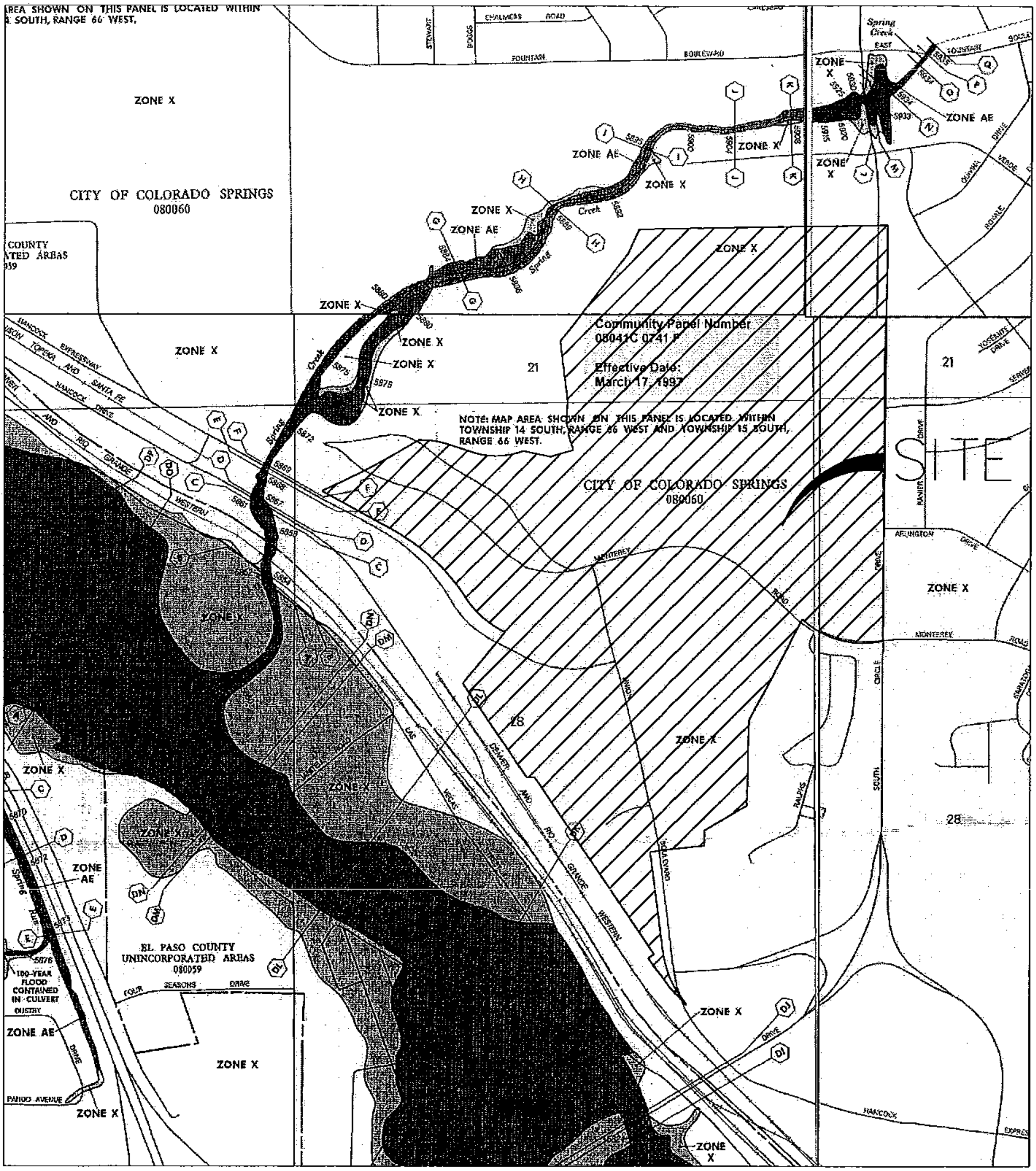
F.E.M.A. MAP



FEMA FIRM

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NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

EL PASO COUNTY, COLORADO AND INCORPORATED AREAS

PANEL 733 OF 1300
(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
COLORADO SPRINGS, CITY OF	080060	0733	F
EL PASO COUNTY, UNINCORPORATED AREAS	080059	0733	F

MAP NUMBER
08041C0733 F

EFFECTIVE DATE:
MARCH 17, 1997

Federal Emergency Management Agency

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

EL PASO COUNTY, COLORADO AND INCORPORATED AREAS

PANEL 734 OF 1300
(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
COLORADO SPRINGS, CITY OF	080060	0734	F

MAP NUMBER
08041C0734 F

EFFECTIVE DATE:
MARCH 17, 1997

Federal Emergency Management Agency

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

EL PASO COUNTY, COLORADO AND INCORPORATED AREAS

PANEL 741 OF 1300
(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
COLORADO SPRINGS, CITY OF	080060	0741	F
EL PASO COUNTY, UNINCORPORATED AREAS	080059	0741	F

MAP NUMBER
08041C0741 F

EFFECTIVE DATE:
MARCH 17, 1997

Federal Emergency Management Agency

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

EL PASO COUNTY, COLORADO AND INCORPORATED AREAS

PANEL 742 OF 1300
(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
COLORADO SPRINGS, CITY OF	080060	0742	F
EL PASO COUNTY, UNINCORPORATED AREAS	080059	0742	F

REVISED TO REFLECT LOMR DATED AUG 27 1998

MAP NUMBER
08041C0742 F

EFFECTIVE DATE:
MARCH 17, 1997

Federal Emergency Management Agency

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HYDROLOGIC CALCULATIONS

SPRING CREEK DEVELOPMENT MDDP
(Area Runoff Coefficient Summary)

		STREETS / DEVELOPED			OVERLAND / UNDEVELOPED			WEIGHTED	
BASIN	**TOTAL AREA**	**AREA**	C_5	C_{100}	**AREA**	C_5	C_{100}	C_5	C_{100}
	(Acres)	*(Acres)*			*(Acres)*				
ENW-1	11.65	0.00	0.90	0.95	11.65	0.25	0.30	*0.25*	*0.30*
ENW-1A	11.05							*0.25*	*0.30*
ENW-2	15.95	0.00	0.90	0.95	15.95	0.25	0.30	*0.25*	*0.30*
ENE-1	6.31	0.00	0.90	0.95	6.31	0.25	0.30	*0.25*	*0.30*
ENE-2	59.69	0.00	0.90	0.95	59.69	0.25	0.30	*0.25*	*0.30*
ENE-3	27.95	0.00	0.90	0.95	27.95	0.25	0.30	*0.25*	*0.30*
ESE-1	38.31	0.00	0.90	0.95	38.31	0.25	0.30	*0.25*	*0.30*
ESE-2	2.45	0.00	0.90	0.95	2.45	0.25	0.30	*0.25*	*0.30*
ESE-3	0.30	0.00	0.90	0.95	0.30	0.25	0.30	*0.25*	*0.30*
ESE-4	15.37							*0.25*	*0.30*
ESE-5	1.34							*0.25*	*0.30*
ESW-1	19.97	0.00	0.90	0.95	19.97	0.25	0.30	*0.25*	*0.30*
ESW-2	8.77	0.00	0.90	0.95	8.77	0.25	0.30	*0.25*	*0.30*
ESW-3	0.34	0.00	0.90	0.95	0.34	0.25	0.30	*0.25*	*0.30*
ESW-4	2.36							*0.25*	*0.30*
EOS-1	3.06	0.00	0.90	0.95	3.06	0.25	0.30	*0.25*	*0.30*
EOS-2	29.44							*0.57*	*0.60*
EOS-3	16.21							*0.71*	*0.73*
EOS-4	4.93							*0.52*	*0.55*
EOS-5	1.10							*0.72*	*0.73*
EOS-6	1.18							*0.75*	*0.77*
EOS-7	0.12							*0.47*	*0.50*
EOS-8	14.66							*0.55*	*0.65*
EOS-8A	6.56							*0.25*	*0.30*
EOS-8B	1.77							*0.25*	*0.30*
EOS-10	5.16							*0.52*	*0.55*
EOS-11	7.04							*0.75*	*0.76*
EOS-12	2.76							*0.60*	*0.62*

SPRING CREEK DEVELOPMENT MDDP
(Area Runoff Coefficient Summary)

EOS-13	1.51							***0.40***	***0.44***
EOS-14	11.22							***0.36***	***0.40***
EOS-15	3.41							***0.38***	***0.42***
EOS-16	3.40							***0.79***	***0.80***
EOS-17	3.88							***0.25***	***0.30***
EOS-18	12.46							***0.25***	***0.30***
EOS-19	0.83							***0.75***	***0.76***
EOS-20	0.69							***0.66***	***0.69***
EOS-21	2.39							***0.54***	***0.56***
EOS-21A	3.00							***0.54***	***0.56***
EOS-22	5.11							***0.25***	***0.30***
EOS-23	4.05							***0.55***	***0.58***
PNE-1	4.36							***0.25***	***0.30***
PNE-2	5.01							***0.70***	***0.80***
PNE-3	8.92							***0.70***	***0.80***
PNE-4	5.39							***0.70***	***0.80***
PNE-5	9.85							***0.70***	***0.80***
PNE-6	3.83							***0.70***	***0.80***
PNE-7	4.72							***0.70***	***0.80***
PNE-8	5.40							***0.70***	***0.80***
PNE-9	8.68							***0.25***	***0.30***
PNE-10	8.15							***0.70***	***0.80***
PNE-11	2.42							***0.70***	***0.80***
PNE-12	1.52							***0.70***	***0.80***
PNE-13	1.15							***0.70***	***0.80***
PNE-14	3.09							***0.80***	***0.85***
PNE-15	0.68							***0.90***	***0.90***
PNE-16	8.50							***0.80***	***0.85***
PNE-17	3.56							***0.75***	***0.83***
PNE-18	6.20							***0.90***	***0.90***
PNE-19	3.88							***0.90***	***0.90***

SPRING CREEK DEVELOPMENT MDDP
(Area Runoff Coefficient Summary)

PSE-1	2.39							*0.90*	*0.90*
PSE-1A	1.66							*0.90*	*0.90*
PSE-2	3.41							*0.90*	*0.90*
PSE-3	3.45							*0.70*	*0.80*
PSE-4	4.02							*0.70*	*0.80*
PSE-5	0.40							*0.90*	*0.90*
PSE-6	2.86							*0.25*	*0.30*
PSE-7	0.37							*0.75*	*0.83*
PSE-8	1.62							*0.25*	*0.30*
PSE-9	2.35							*0.75*	*0.83*
PSE-10	3.74							*0.70*	*0.80*
PSE-11	2.19							*0.75*	*0.83*
PSE-12	2.22							*0.75*	*0.83*
PSE-13	8.20							*0.48*	*0.55*
PSE-14	2.19							*0.55*	*0.60*
PSE-15	15.37							*0.58*	*0.60*
PSE-15A	1.34							*0.25*	*0.30*
PSW-1	1.32							*0.90*	*0.90*
PSW-2	3.09							*0.90*	*0.90*
PSW-3	2.34							*0.90*	*0.90*
PSW-4	1.95							*0.90*	*0.90*
PSW-5	6.49							*0.90*	*0.90*
PSW-6	2.54							*0.90*	*0.90*
PSW-6A	1.49							*0.90*	*0.90*
PSW-7	1.83							*0.90*	*0.90*
PSW-8	1.09							*0.90*	*0.90*
PSW-9	3.26							*0.90*	*0.90*
PSW-10	5.69							*0.90*	*0.90*
PSW-11	0.48							*0.25*	*0.30*
PNW-1	1.82							*0.25*	*0.30*
PNW-2	3.97							*0.90*	*0.90*

SPRING CREEK DEVELOPMENT MDDP

(Area Runoff Coefficient Summary)

PNW-3	2.12							*0.90*	*0.90*
PNW-4	1.68							*0.90*	*0.90*
PNW-5	3.27							*0.90*	*0.90*
PNW-6	2.44							*0.90*	*0.90*
PNW-7	3.34							*0.90*	*0.90*
PNW-8	2.33							*0.90*	*0.90*
PNW-9	2.37							*0.90*	*0.90*
PNW-10	2.76							*0.90*	*0.90*
PNW-11	0.89							*0.90*	*0.90*
PNW-12	2.89							*0.90*	*0.90*
PNW-13	1.63							*0.90*	*0.90*
PNW-14	4.58							*0.90*	*0.90*
PNW-15	2.56							*0.90*	*0.90*
POS-1	4.03							*0.90*	*0.90*
POS-2	1.88							*0.90*	*0.90*
POS-3	1.16							*0.90*	*0.90*
POS-4	0.46							*0.25*	*0.30*
POS-5	2.62							*0.25*	*0.30*
POS-6	2.80							*0.25*	*0.30*
POS-6A	0.54							*0.25*	*0.30*
POS-6B	0.17							*0.25*	*0.30*
POS-7	1.77							*0.25*	*0.30*

Calculated by: ACS
Date: 1/22/2002
Checked by: ______

SPRING CREEK DEVELOPMENT MDDP
(Area Drainage Summary)

		WEIGHTED		*OVERLAND*				*STREET / CHANNEL FLOW*				T_t	*INTENSITY*		*TOTAL FLOWS*	
BASIN	AREA TOTAL *(Acres)*	C_5	C_{100}	C_5	Length *(ft)*	Height *(ft)*	T_C *(min)*	Length *(ft)*	Slope *(%)*	Velocity *(fps)*	T_t *(min)*	TOTAL *(min)*	I_5 *(in/hr)*	I_{100} *(in/hr)*	Q_5 *(c.f.s.)*	Q_{100} *(c.f.s.)*
		* For Calcs See Runoff Summary														
ENW-1	11.65	0.25	0.30	0.25	1000	80	25.31	0	0.0%	0.0	0.00	25.31	2.7	4.5	***7.90***	***15.63***
ENW-1A	11.05	0.25	0.30	0.25	750	60	21.92	0	0.0%	0	0.00	21.92	2.9	4.8	***8.06***	***16.06***
ENW-2	15.95	0.25	0.30	0.25	1000	47	30.16	656	6.3%	8.8	1.25	31.41	2.4	3.9	***9.65***	***18.86***
ENE-1	6.31	0.25	0.30	0.25 0.25	390 65	35 22	15.22 4.01	0	0.0%	0.0	0.00	19.22	3.1	5.2	***4.90***	***9.84***
ENE-2	59.69	0.25	0.30	0.25	1000	65	27.10	1000	3.7%	6.7	2.48	29.58	2.5	4.1	***37.30***	***73.14***
ENE-3	27.95	0.25	0.30	0.25	1000	42	31.30	791	4.4%	7.4	1.79	33.09	2.4	3.8	***16.42***	***32.02***
ESE-1	38.31	0.25	0.30	0.25 0.25	300 700	66 34	9.93 24.96	876	4.6%	7.5	1.95	36.84	2.2	3.6	***21.19***	***41.09***
ESE-2	2.45	0.25	0.30	0.25 0.25	344 40	26 11	15.12 3.37	0	0.0%	0.0	0.00	18.49	3.2	5.3	***1.94***	***3.90***
ESE-3	0.30	0.25	0.30	0.25	110	3	11.97	0	0.0%	0.0	0.00	11.97	3.8	6.5	***0.29***	***0.59***
ESW-1	19.97	0.25	0.30	0.25 0.25	324 388	86 19	9.70 18.54	0	0.0%	0.0	0.00	28.23	2.6	4.2	***12.79***	***25.15***

SPRING CREEK DEVELOPMENT MDDP
(Area Drainage Summary)

		WEIGHTED		OVERLAND				STREET / CHANNEL FLOW				T_t	INTENSITY		TOTAL FLOWS	
BASIN	AREA TOTAL (Acres)	C_5	C_{100}	C_5	Length (ft)	Height (ft)	T_C (min)	Length (ft)	Slope (%)	Velocity (fps)	T_t (min)	TOTAL (min)	I_5 (in/hr)	I_{100} (in/hr)	Q_5 (c.f.s.)	Q_{100} (c.f.s.)
		* For Calcs See Runoff Summary														
ESW-2	8.77	0.25	0.30	0.25 0.25	168 832	24 14	8.57 38.61	73	2.7%	5.8	0.21	47.39	1.9	3.0	4.18	8.01
ESW-3	0.34	0.25	0.30	0.25	98	11	7.08	0	0.0%	0.0	0.00	7.08	4.6	8.1	0.39	0.82
ESW-4	2.36	0.25	0.30	0.25	371	16	18.90	0	0.0%	0	0	18.90	3.1	5.2	1.85	3.71
EOS-1	3.06	0.25	0.30	0.25 0.25	101 94	5 29	9.42 4.97	437	2.5%	5.5	1.32	15.71	3.4	5.8	2.60	5.29
EOS-2	29.44	0.57	0.60	0.57 0.57	284 30	8 13	11.87 1.57	2903	2.0%	4.9	9.80	23.23	2.8	4.7	47.55	82.86
EOS-3	16.21	0.71	0.73	0.71	66	4	3.27	1174	1.4%	4.1	4.79	8.06	4.4	7.7	50.31	91.20
EOS-4	4.93	0.52	0.55	0.52	0	0	0.00	1234	0.8%	3.1	6.57	6.57	4.7	8.3	11.93	22.50
EOS-5	1.10	0.72	0.73	0.72	75	1	5.60	757	0.9%	3.3	3.80	9.40	4.2	7.3	3.29	5.83
EOS-6	1.18	0.75	0.77	0.75	100	1	6.55	743	0.9%	3.3	3.73	10.27	4.0	7.0	3.56	6.36
EOS-7	0.12	0.47	0.50	0.47	30	2	3.45	0	0.0%	0.0	0.00	5.00	5.0	9.1	0.28	0.54

SPRING CREEK DEVELOPMENT MDDP
(Area Drainage Summary)

		WEIGHTED		OVERLAND				STREET / CHANNEL FLOW				T_t	INTENSITY		TOTAL FLOWS	
BASIN	AREA TOTAL (Acres)	C_5	C_{100}	C_5	Length (ft)	Height (ft)	T_C (min)	Length (ft)	Slope (%)	Velocity (fps)	T_t (min)	TOTAL (min)	I_5 (in/hr)	I_{100} (in/hr)	Q_5 (c.f.s.)	Q_{100} (c.f.s.)
		* For Calcs See Runoff Summary														
EOS-8	14.66	0.55	0.65	0.55	243	8	10.82	488	5.3%	8.1	1.01	11.83	3.8	6.6	30.80	62.71
EOS-8A	6.56	0.25	0.30	0.25 0.25 0.25	44 75 184	3 30 29	5.60 4.07 8.68	0	0.0%	0.0	0.00	18.35	3.2	5.3	5.20	10.48
EOS-8B	1.77	0.25	0.30	0.25	155	50	6.29	0	0.0%	0.0	0.0	6.29	4.7	8.4	2.08	4.47
ESE-4	15.37	0.25	0.30	0.25	1000	62	27.53	345	6.1%	8.6	0.67	28.19	2.6	4.2	9.85	19.37
ESE-5	1.34	0.25	0.30	0.25	343	94	9.87	0	0.0%	0.0	0.00	9.87	4.1	7.1	1.37	2.86
EOS-10	5.16	0.52	0.55	0.52	284	3	17.95	1810	4.0%	7.0	4.33	22.28	2.9	4.8	7.76	13.63
EOS-11	7.04	0.75	0.76	0.75	124	2	6.22	3282	3.7%	6.7	8.18	14.40	3.5	6.0	18.63	32.15
EOS-12	2.76	0.60	0.62	0.60	185	8	7.84	2198	3.7%	6.7	5.44	13.29	3.6	6.2	6.04	10.68
EOS-13	1.51	0.40	0.44	0.40	112	10	6.73	470	5.5%	8.2	0.95	7.68	4.4	7.8	2.68	5.21
EOS-14	11.22	0.36	0.40	0.36	768	32	23.95	335	4.2%	7.1	0.78	24.73	2.7	4.5	11.09	20.33

SPRING CREEK DEVELOPMENT MDDP
(Area Drainage Summary)

		WEIGHTED		OVERLAND				STREET / CHANNEL FLOW				T_t	INTENSITY		TOTAL FLOWS	
BASIN	AREA TOTAL (Acres)	C_5	C_{100}	C_5	Length (ft)	Height (ft)	T_C (min)	Length (ft)	Slope (%)	Velocity (fps)	T_t (min)	TOTAL (min)	I_5 (in/hr)	I_{100} (in/hr)	Q_5 (c.f.s.)	Q_{100} (c.f.s.)
		* For Calcs See Runoff Summary														
EOS-15	3.41	0.38	0.42	0.38	295	11	14.98	0	0.0%	0.0	0.00	14.98	3.5	5.9	4.50	8.44
EOS-16	3.40	0.79	0.80	0.79	96	3	3.90	1764	4.5%	7.4	3.97	7.87	4.4	7.8	11.83	21.15
EOS-17	3.88	0.25	0.30	0.25	677	21	28.47	0	0.0%	0.0	0.00	28.47	2.6	4.2	2.47	4.86
EOS-18	12.46	0.25	0.30	0.25	654	63	19.25	0	0.0%	0.0	0.00	19.25	3.1	5.2	9.67	19.41
EOS-19	0.83	0.75	0.76	0.75	0	0	0.00	637	4.2%	7.2	1.47	5.00	5.0	9.1	3.11	5.72
EOS-20	0.69	0.66	0.69	0.66	240	11	7.71	372	3.0%	6.0	1.03	8.74	4.3	7.5	1.94	3.56
EOS-21	2.39	0.54	0.56	0.54	0	0	0.00	1418	4.0%	7.0	3.38	5.00	5.0	9.1	6.46	12.13
EOS-21A	3.00	0.54	0.56	0.54	675	28	17.01	0	0.0%	0.0	0.0	17.01	3.3	5.5	5.32	9.30
EOS-22	5.11	0.25	0.30	0.25	243	25	11.48	245	4.5%	7.4	0.55	12.03	3.8	6.5	4.85	10.01
EOS-23	4.05	0.55	0.58	0.55	0	0	0.00	2188	4.4%	7.4	4.95	4.95	5.0	9.1	11.17	21.35

SPRING CREEK DEVELOPMENT MDDP
(Area Drainage Summary)

		WEIGHTED		*OVERLAND*				*STREET / CHANNEL FLOW*				T_t	*INTENSITY*		*TOTAL FLOWS*	
BASIN	**AREA TOTAL** *(Acres)*	C_5	C_{100}	C_5	**Length** *(ft)*	**Height** *(ft)*	T_C *(min)*	**Length** *(ft)*	**Slope** *(%)*	**Velocity** *(fps)*	T_t *(min)*	**TOTAL** *(min)*	I_5 *(in/hr)*	I_{100} *(in/hr)*	Q_5 *(c.f.s.)*	Q_{100} *(c.f.s.)*
		* For Calcs See Runoff Summary														
PNE-1	4.36	0.25	0.30	0.25	435 30	22 10	19.42 3.54	0	0.0%	0.0	0.00	22.96	2.9	4.7	*3.11*	*6.18*
PNE-2	5.01	0.70	0.80	0.70	50	1	4.21	760	3.2%	6.3	2.02	6.23	4.7	8.5	*16.56*	*33.87*
PNE-3	8.92	0.70	0.80	0.70	60	1	4.90	700	2.5%	5.5	2.11	7.00	4.6	8.1	*28.51*	*57.92*
PNE-4	5.39	0.70	0.80	0.70	56	1	4.62	608	3.5%	6.5	1.55	6.17	4.7	8.5	*17.87*	*36.56*
PNE-5	9.85	0.70	0.80	0.70	60	1	4.90	1000	3.0%	6.1	2.75	7.64	4.4	7.9	*30.65*	*61.96*
PNE-6	3.83	0.70	0.80	0.70	50	1	4.21	600	3.0%	6.1	1.65	5.86	4.8	8.6	*12.88*	*26.43*
PNE-7	4.72	0.70	0.80	0.70	26	1	2.45	505	3.5%	6.5	1.29	5.00	5.0	9.1	*16.53*	*34.22*
PNE-8	5.40	0.70	0.80	0.70	50	1	4.21	860	3.5%	6.5	2.19	6.40	4.7	8.4	*17.72*	*36.18*
PNE-9	8.68	0.25	0.30	0.25	1000	27	36.22	175	2.3%	5.3	0.55	36.77	2.2	3.6	*4.81*	*9.32*

SPRING CREEK DEVELOPMENT MDDP
(Area Drainage Summary)

		WEIGHTED		*OVERLAND*				*STREET / CHANNEL FLOW*				T_t	*INTENSITY*		*TOTAL FLOWS*	
BASIN	AREA TOTAL *(Acres)*	C_5	C_{100}	C_5	Length *(ft)*	Height *(ft)*	T_C *(min)*	Length *(ft)*	Slope *(%)*	Velocity *(fps)*	T_t *(min)*	TOTAL *(min)*	I_5 *(in/hr)*	I_{100} *(in/hr)*	Q_5 *(c.f.s.)*	Q_{100} *(c.f.s.)*
		* For Calcs See Runoff Summary														
PNE-10	8.15	0.70	0.80	0.70	143	10	4.71	1073	4.0%	7.0	2.55	7.26	4.5	8.0	*25.77*	*52.23*
PNE-11	2.42	0.70	0.80	0.70	135	5	5.64	211	6.0%	8.6	0.41	6.05	4.8	8.5	*8.06*	*16.52*
PNE-12	1.52	0.70	0.80	0.70	150	10	4.90	179	3.9%	6.9	0.43	5.33	4.9	8.9	*5.24*	*10.81*
PNE-13	1.15	0.70	0.80	0.70	315	8	9.76	0	0.0%	0.0	0.00	9.76	4.1	7.1	*3.30*	*6.57*
PNE-14	3.09	0.80	0.85	0.80	222	5	6.39	312	4.5%	7.4	0.70	7.09	4.5	8.1	*11.24*	*21.22*
PNE-15	0.68	0.90	0.90	0.90	94	2	2.83	138	2.0%	4.9	0.46	5.00	5.0	9.1	*3.06*	*5.55*
PNE-16	8.50	0.80	0.85	0.80	302	12	6.18	297	3.0%	6.1	0.82	7.00	4.6	8.1	*31.05*	*58.65*
PNE-17	3.56	0.75	0.83	0.75	166	10	4.66	564	6.0%	8.6	1.10	5.76	4.8	8.7	*12.88*	*25.63*
PNE-18	6.20	0.90	0.90	0.90	308	21	3.48	252	4.0%	7.0	0.60	5.00	5.0	9.1	*27.92*	*50.57*
PNE-19	3.88	0.90	0.90	0.90	100	6	2.07	456	2.6%	5.6	1.35	5.00	5.0	9.1	*17.47*	*31.65*

SPRING CREEK DEVELOPMENT MDDP
(Area Drainage Summary)

		WEIGHTED		OVERLAND				STREET / CHANNEL FLOW				T_t	INTENSITY		TOTAL FLOWS	
BASIN	AREA TOTAL (Acres)	C_5	C_{100}	C_5	Length (ft)	Height (ft)	T_C (min)	Length (ft)	Slope (%)	Velocity (fps)	T_t (min)	TOTAL (min)	I_5 (in/hr)	I_{100} (in/hr)	Q_5 (c.f.s.)	Q_{100} (c.f.s.)
		* For Calcs See Runoff Summary														
PSE-1	2.39	0.90	0.90	0.90	302	13	4.01	0	0.0%	0.0	0.00	5.00	5.0	9.1	*10.76*	*19.49*
PSE-1A	1.66	0.90	0.90	0.90	186	4	3.96	0	0.0%	0.0	0.00	5.00	5.0	9.1	*7.48*	*13.54*
PSE-2	3.41	0.90	0.90	0.90 0.90	148 232	36 15	1.59 3.08	0	0.0%	0.0	0.00	5.00	5.0	9.1	*15.36*	*27.81*
PSE-3	3.45	0.70	0.80	0.70	225	4	9.28	86	4.0%	7.0	0.20	9.48	4.1	7.2	*10.00*	*19.96*
PSE-4	4.02	0.70	0.80	0.70	249	18	6.14	189	3.0%	6.1	0.52	6.66	4.6	8.3	*13.04*	*26.56*
PSE-5	0.40	0.90	0.90	0.90	0	0	0.00	517	3.0%	6.1	1.42	5.00	5.0	9.1	*1.80*	*3.26*
PSE-6	2.86	0.25	0.30	0.25	202	40	8.43	0	0.0%	0.0	0.00	8.43	4.3	7.6	*3.08*	*6.50*
PSE-7	0.37	0.75	0.83	0.75	0	0	0.00	283	4.0%	7.0	0.67	5.00	5.0	9.1	*1.39*	*2.78*
PSE-8	1.62	0.25	0.30	0.25	268	16	14.43	746	6.0%	8.6	1.45	15.88	3.4	5.7	*1.37*	*2.78*

SPRING CREEK DEVELOPMENT MDDP

(Area Drainage Summary)

		WEIGHTED		*OVERLAND*				*STREET / CHANNEL FLOW*				T_t	*INTENSITY*		*TOTAL FLOWS*	
BASIN	**AREA TOTAL** *(Acres)*	C_5	C_{100}	C_5	**Length** *(ft)*	**Height** *(ft)*	T_C *(min)*	**Length** *(ft)*	**Slope** *(%)*	**Velocity** *(fps)*	T_t *(min)*	**TOTAL** *(min)*	I_5 *(in/hr)*	I_{100} *(in/hr)*	Q_5 *(c.f.s.)*	Q_{100} *(c.f.s.)*
		* For Calcs See Runoff Summary														
PSE-9	2.35	0.75	0.83	0.75	151	10	4.31	372	4.0%	7.0	0.89	5.20	5.0	9.0	***8.74***	***17.47***
PSE-10	3.74	0.70	0.80	0.70	269	14	7.12	202	1.0%	3.5	0.96	8.08	4.4	7.7	***11.44***	***23.04***
PSE-11	2.19	0.75	0.83	0.75	198	6	6.39	289	3.5%	6.5	0.74	7.12	4.5	8.1	***7.46***	***14.66***
PSE-12	2.22	0.75	0.83	0.75	311	12	7.39	151	2.7%	5.8	0.44	7.83	4.4	7.8	***7.35***	***14.36***
PSE-13	8.20	0.48	0.55	0.48	356	21	12.18	274	2.7%	5.8	0.79	12.97	3.7	6.3	***14.50***	***28.46***
PSE-14	2.19	0.55	0.60	0.55 0.55	197 250	68 14	4.49 9.21	0	0.0%	0.0	0.00	13.70	3.6	6.2	***4.34***	***8.09***
PSE-15	15.37	0.58	0.60	0.58	216	10	8.62	1026	4.0%	7.0	2.44	11.06	3.9	6.8	***34.93***	***62.50***
PSE-15A	1.34	0.25	0.30	0.25	343	94	9.87	0	0.0%	0.0	0.00	9.87	4.1	7.1	***1.37***	***2.86***
PSW-1	1.32	0.90	0.90	0.90	159	8	2.77	223	1.6%	4.4	0.84	5.00	5.0	9.1	***5.94***	***10.77***

SPRING CREEK DEVELOPMENT MDDP
(Area Drainage Summary)

		WEIGHTED		OVERLAND				STREET / CHANNEL FLOW				T_t	INTENSITY		TOTAL FLOWS	
BASIN	AREA TOTAL (Acres)	C_5	C_{100}	C_5	Length (ft)	Height (ft)	T_C (min)	Length (ft)	Slope (%)	Velocity (fps)	T_t (min)	TOTAL (min)	I_5 (in/hr)	I_{100} (in/hr)	Q_5 (c.f.s.)	Q_{100} (c.f.s.)
		* For Calcs See Runoff Summary														
PSW-2	3.09	0.90	0.90	0.90	0	0	0.00	0	0.0%	0.0	0.00	5.00	5.0	9.1	13.92	25.20
PSW-3	2.34	0.90	0.90	0.90	0	0	0.00	0	0.0%	0.0	0.00	5.00	5.0	9.1	10.54	19.09
PSW-4	1.95	0.90	0.90	0.90	0	0	0.00	0	0.0%	0.0	0.00	5.00	5.0	9.1	8.78	15.90
PSW-5	6.49	0.90	0.90	0.90	133	7	2.49	1380	3.5%	6.5	3.51	6.01	4.8	8.6	27.87	49.97
PSW-6	2.54	0.90	0.90	0.90	123	10	2.08	661	3.0%	6.1	1.82	5.00	5.0	9.1	11.44	20.72
PSW-6A	1.49	0.90	0.90	0.90	114	12	1.84	167	1.0%	3.5	0.80	5.00	5.0	9.1	6.71	12.15
PSW-7	1.83	0.90	0.90	0.90	244	7	4.13	38	4.0%	7.0	0.09	5.00	5.0	9.1	8.24	14.93
PSW-8	1.09	0.90	0.90	0.90	161	6	3.07	43	2.0%	4.9	0.14	5.00	5.0	9.1	4.91	8.89
PSW-9	3.26	0.90	0.90	0.90	196	7	3.44	752	4.5%	7.4	1.69	5.13	5.0	9.0	14.59	26.39
PSW-10	5.69	0.90	0.90	0.90	0	0	0.00	1284	2.8%	5.9	3.65	5.00	5.0	9.1	25.62	46.41

SPRING CREEK DEVELOPMENT MDDP
(Area Drainage Summary)

		WEIGHTED		OVERLAND				STREET / CHANNEL FLOW				T_t	INTENSITY		TOTAL FLOWS	
BASIN	AREA TOTAL (Acres)	C_5	C_{100}	C_5	Length (ft)	Height (ft)	T_C (min)	Length (ft)	Slope (%)	Velocity (fps)	T_t (min)	TOTAL (min)	I_5 (in/hr)	I_{100} (in/hr)	Q_5 (c.f.s.)	Q_{100} (c.f.s.)
		* For Calcs See Runoff Summary														
PSW-11	0.48	0.25	0.30	0.25	89	6	7.99	0	0.0%	0.0	0.00	7.99	4.4	7.7	**0.53**	**1.11**
PNW-1	1.82	0.25	0.30	0.25 0.25	69 176	22 9	4.21 12.31	0	0.0%	0.0	0.00	16.52	3.3	5.6	**1.51**	**3.07**
PNW-2	3.97	0.90	0.90	0.90	0	0	0.00	520	3.0%	6.1	1.43	5.00	5.0	9.1	**17.88**	**32.38**
PNW-3	2.12	0.90	0.90	0.90	163	4	3.55	73	4.0%	7.0	0.17	5.00	5.0	9.1	**9.55**	**17.29**
PNW-4	1.68	0.90	0.90	0.90	184	14	2.60	276	3.5%	6.5	0.70	5.00	5.0	9.1	**7.57**	**13.70**
PNW-5	3.27	0.90	0.90	0.90	201	6	3.70	286	4.0%	7.0	0.68	5.00	5.0	9.1	**14.73**	**26.67**
PNW-6	2.44	0.90	0.90	0.90	0	0	0.00	738	4.0%	7.0	1.76	5.00	5.0	9.1	**10.99**	**19.90**
PNW-7	3.34	0.90	0.90	0.90	0	0	0.00	882	3.0%	6.1	2.42	5.00	5.0	9.1	**15.04**	**27.24**
PNW-8	2.33	0.90	0.90	0.90	66	3	1.84	410	4.0%	7.0	0.98	5.00	5.0	9.1	**10.49**	**19.00**

SPRING CREEK DEVELOPMENT MDDP
(Area Drainage Summary)

		WEIGHTED		OVERLAND				STREET / CHANNEL FLOW				T_t	INTENSITY		TOTAL FLOWS	
BASIN	AREA TOTAL (Acres)	C_5	C_{100}	C_5	Length (ft)	Height (ft)	T_C (min)	Length (ft)	Slope (%)	Velocity (fps)	T_t (min)	TOTAL (min)	I_5 (in/hr)	I_{100} (in/hr)	Q_5 (c.f.s.)	Q_{100} (c.f.s.)
		* For Calcs See Runoff Summary														
PNW-9	2.37	0.90	0.90	0.90	108	16	1.60	0	0.0%	0.0	0.00	5.00	5.0	9.1	10.67	19.33
PNW-10	2.76	0.90	0.90	0.90	0	0	0.00	0	0.0%	0.0	0.00	5.00	5.0	9.1	12.43	22.51
PNW-11	0.89	0.90	0.90	0.90	0	0	0.00	0	0.0%	0.0	0.00	5.00	5.0	9.1	4.01	7.26
PNW-12	2.89	0.90	0.90	0.90	0	0	0.00	0	0.0%	0.0	0.00	5.00	5.0	9.1	13.01	23.57
PNW-13	1.63	0.90	0.90	0.90	0	0	0.00	0	0.0%	0.0	0.00	5.00	5.0	9.1	7.34	13.29
PNW-14	4.58	0.90	0.90	0.00	0	0	0.00	0	0.0%	0.0	0.00	5.00	5.0	9.1	20.63	37.36
PNW-15	2.56	0.90	0.90	0.00	0	0	0.00	0	0.0%	0.0	0.00	5.00	5.0	9.1	11.53	20.88
POS-1	4.03	0.90	0.90	0.90	312	8	4.84	128	2.0%	4.9	0.43	5.27	4.9	8.9	17.91	32.34
POS-2	1.88	0.90	0.90	0.90	232	3	5.23	91	2.0%	4.9	0.31	5.54	4.9	8.8	8.25	14.86

SPRING CREEK DEVELOPMENT MDDP

(Area Drainage Summary)

		WEIGHTED		OVERLAND				STREET / CHANNEL FLOW				T_t	INTENSITY		TOTAL FLOWS	
BASIN	AREA TOTAL (Acres)	C_5	C_{100}	C_5	Length (ft)	Height (ft)	T_C (min)	Length (ft)	Slope (%)	Velocity (fps)	T_t (min)	TOTAL (min)	I_5 (in/hr)	I_{100} (in/hr)	Q_5 (c.f.s.)	Q_{100} (c.f.s.)
		* For Calcs See Runoff Summary														
POS-3	1.16	0.90	0.90	0.90	0	0	0.00	0	0.0%	0.0	0.00	5.00	5.0	9.1	**5.22**	**9.46**
POS-4	0.46	0.25	0.30	0.25	194	27	9.29	0	0.0%	0.0	0.00	9.29	4.2	7.3	**0.48**	**1.01**
POS-5	2.62	0.25	0.30	0.25	314	63	10.47	0	0.0%	0.0	0.00	10.47	4.0	6.9	**2.62**	**5.45**
POS-6	2.80	0.25	0.30	0.25	229	47	8.87	0	0.0%	0.0	0.00	8.87	4.2	7.4	**2.97**	**6.24**
POS-6A	0.54	0.25	0.30	0.25	177	63	6.51	0	0.0%	0.0	0.00	6.51	4.7	8.3	**0.63**	**1.35**
POS-6B	0.17	0.25	0.30	0.25	132	56	5.30	0	0.0%	0.0	0.00	5.30	4.9	8.9	**0.21**	**0.45**
POS-7	1.77	0.25	0.30	0.25	155	50	6.29	0	0.0%	0.0	0.00	6.29	4.7	8.4	**2.08**	**4.47**

Calculated by: ACS
Date: 1/22/2002
Checked by:

SPRING CREEK DEVELOPMENT MDDP
(Surface Routing Summary)

Design Point(s)	Contributing Basins	Equivalent CA_5	Equivalent CA_{100}	Maximum T_C	Intensity		Flow	
					I_5	I_{100}	Q_5	Q_{100}
E1A	ENW-1 + ENW-2	6.90	8.28	31.41	2.4	3.9	*16.69*	*32.63*
E3	ENW-2 + EOS-23	6.22	7.13	31.41	2.4	3.9	*15.04*	*28.11*
E4	E3 + ENW-1 + EOS-21A	10.75	12.31	31.41	2.4	3.9	*26.00*	*48.51*
E6	E10 + E11 + ENE-2	31.42	35.05	30.00	2.5	4.1	*77.93*	*141.95*
E8	ENE-3 + EOS-2	23.77	26.05	33.09	2.4	3.8	*55.87*	*99.47*
E9	E6 + EOS-1	32.18	35.97	30.00	2.5	4.1	*79.82*	*145.67*
E10	EOS-3 + EOS-4	14.07	14.54	8.06	4.4	7.7	*61.53*	*112.11*
E11	ESE-2 + ESE-3 + EOS-5 + EOS-6 + EOS-7	2.42	2.60	18.49	3.2	5.3	*7.65*	*13.77*
E12	ESW-1 + EOS-19	5.62	6.62	28.23	2.6	4.2	*14.39*	*27.80*
E13	E12 + EOS-18	8.73	10.36	28.23	2.6	4.2	*22.37*	*43.49*
E15	E13 + ESW-2 + EOS-17	11.89	14.15	47.39	1.9	3.0	*22.68*	*43.11*
E16	ESW-4 + EOS-16	3.28	3.43	18.9	3.1	5.2	*10.25*	*17.98*

SPRING CREEK DEVELOPMENT MDDP

(Surface Routing Summary)

E17	ESE-1 + EOS-8A	11.22	13.46	36.84	2.2	3.6	*24.82*	*48.13*
E18	E17 + ESE-5	11.55	13.86	36.84	2.2	3.6	*25.56*	*49.56*
E20	E18 + ESE-4 + EOS-8B + EOS-10 + EOS-11	23.80	27.19	36.84	2.2	3.6	*52.66*	*97.22*
E21	ENW-1A + EOS-20 + EOS-21	4.51	5.13	21.92	2.9	4.8	*13.15*	*24.85*
E22	E16 + E20	27.08	30.62	36.84	2.2	3.6	*59.91*	*109.48*
E23	E15 + E22	38.97	44.78	47.39	1.9	3.0	*74.32*	*136.37*
P13	PNE-12 + PNE-13	1.87	2.14	9.8	4.1	7.1	*7.66*	*15.26*
P19	PNE-19 + POS-3	4.54	4.54	5.0	5.0	9.1	*22.70*	*41.11*
P25	PSE-5 + POS-4	0.48	0.50	9.3	4.2	7.3	*1.98*	*3.63*
P27	PSE-6 + POS-5	1.37	1.64	10.5	4.0	6.9	*5.48*	*11.41*
P32	DP-P31 + PSE-10 (FLOW-BY)	3.07	3.69	8.1	4.4	7.7	*13.40*	*28.43*
P33	DP-P32 + PSE-11 (FLOW-BY)	2.63	3.47	8.1	4.4	7.7	*11.50*	*26.70*
P30	DP-P33 + PSE-8 + PSE-12 (FLOW-BY)	2.80	3.69	15.9	3.4	5.7	*9.48*	*21.13*
P35	PSE-13 + POS-6 + DP-P30	7.44	9.04	15.9	3.4	5.7	*25.17*	*51.79*

SPRING CREEK DEVELOPMENT MDDP
(Surface Routing Summary)

P36	**PSE-15 + POS-7**	9.36	9.75	11.1	3.9	6.8	***36.66***	***66.10***
P37	**PSE-15A + POS-6B**	0.38	0.45	9.9	4.1	7.1	***1.54***	***3.22***
PO1	**PNE-15 + POS-1**	4.24	4.24	5.3	4.9	8.9	***20.93***	***37.81***
SD1	**PNE-6 + PNE-7**	5.99	6.84	5.9	4.8	8.6	***28.75***	***59.00***
SD2	**PNE-2 + PNE-3**	9.75	11.14	7.0	4.6	8.1	***44.52***	***90.45***
SD3	**SD2 + PNE-4**	13.52	15.46	7.0	4.6	8.1	***61.75***	***125.44***
SD4	**SD3 + PNE-5**	20.42	23.34	7.6	4.4	7.9	***90.78***	***183.48***
SD5	**POS-1 + EXIST. 24"**	7.45	7.91	30.3	2.5	4.0	***18.38***	***31.85***
SD6	**SD5 + POS-2 + EXIST. 24"**	13.72	14.31	30.3	2.5	4.0	***33.85***	***57.61***
SD7	**SD6 + PNE-14**	16.19	16.94	30.3	2.5	4.0	***39.95***	***68.19***
SD8	**DP-P19 + PNE-17**	7.21	7.49	5.8	4.8	8.7	***34.77***	***64.96***
SD9	**SD8 + PNE-18 + EXIST. 36"**	19.35	20.52	8.0	4.4	7.7	***84.81***	***158.61***
SD10	**SD9 + SD7 + PNE-16**	42.35	44.68	30.3	2.5	4.0	***104.47***	***179.89***

SPRING CREEK DEVELOPMENT MDDP
(Surface Routing Summary)

SD11	SD10 + DP13	44.22	46.82	30.3	2.5	4.0	*109.09*	*188.49*
SD12	SD11 + SD1 + PNE-8	53.98	57.98	30.3	2.5	4.0	*133.18*	*233.42*
SD13	PNE-10 + PNE-11	7.40	8.46	7.3	4.5	8.0	*33.42*	*67.75*
SD14	DP-P25 + PSE-4	3.29	3.71	9.3	4.2	7.3	*13.72*	*27.08*
SD15	SD14 + PSE-3	5.70	6.47	9.5	4.1	7.2	*23.62*	*46.82*
SD16	SD15 + PSE-2 + PSE-7	9.05	9.85	9.5	4.1	7.2	*37.49*	*71.23*
SD17	SD16 + PSE-9	10.81	11.80	9.5	4.1	7.2	*44.79*	*85.34*
SD18	SD17 + PSE-10	13.43	14.79	9.5	4.1	7.2	*55.63*	*106.97*
SD19	SD18 + DP27 + PSE-11	16.44	18.25	10.5	4.0	6.9	*65.67*	*126.52*
SD20	SD19 + PSE-8 + PSE-12 + PSE-13 + POS-6	23.15	25.93	15.9	3.4	5.7	*78.37*	*148.59*
SD21	PSW-2 + PSW-3	4.89	4.89	5.0	5.0	9.1	*24.45*	*44.29*
SD22	SD21 + PSW-4	6.64	6.64	5.0	5.0	9.1	*33.23*	*60.19*
SD23	PSW-7 + PSW-8	2.63	2.63	5.0	5.0	9.1	*13.15*	*23.82*

SPRING CREEK DEVELOPMENT MDDP
(Surface Routing Summary)

SD24	SD23 + PSW-9	5.56	5.56	5.1	5.0	9.0	*27.65*	*50.02*
SD25	SD24 + PSW-6 + PSW-6A	9.19	9.19	5.1	5.0	9.0	*45.69*	*82.63*
SD26	SD25 + PSW-5	15.03	15.03	5.1	5.0	9.0	*74.73*	*135.16*
SD27	SD26 + SD22	21.67	21.67	5.1	5.0	9.0	*107.75*	*194.89*
SD28	SD27 + PSW-10	26.79	26.79	5.1	5.0	9.0	*133.21*	*240.94*
SD29	PNW-14 + PNW-6	6.32	6.32	5.0	5.0	9.1	*31.61*	*57.26*
SD30	SD29 + PNW-7	9.32	9.32	5.0	5.0	9.1	*46.66*	*84.50*
SD31	SD30 + PNW-8	11.42	11.42	5.0	5.0	9.1	*57.15*	*103.50*
SD32	SD31 + PNW-3 + SD33	19.22	19.22	5.0	5.0	9.1	*96.15*	*174.14*
SD33	PNW-10 + PNW-11 + PNW-12	5.89	5.89	5.0	5.0	9.1	*29.45*	*53.34*
SD34	PSE-14 + POS-6A	1.34	1.48	13.7	3.6	6.2	*4.83*	*9.08*
SD35	SD20 + SD34 + DP-P36 + DP-P37 + PSE-1 + EOS-11 + EOS-16	44.34	47.84	15.9	3.4	5.7	*150.02*	*273.92*
SD36	SD28 + SD35	71.13	74.63	15.9	3.4	5.7	*240.67*	*427.34*
SD37	PNW-5 + PNW-15	5.25	5.25	5.0	5.0	9.1	*26.25*	*47.55*

SPRING CREEK DEVELOPMENT MDDP

(Surface Routing Summary)

SD38	**SD37 + PNW-4**	6.76	6.76	5.0	5.0	9.1	***33.82***	***61.25***
A	**SD4 + SD12 + SD13 + PNE-9**	83.97	92.37	30.3	2.5	4.0	***207.16***	***371.91***
B	**PNW-1 + PNW-2 + SD38 + SD32**	30.00	30.09	16.5	3.3	5.6	***99.82***	***169.06***
C	**SD20 + SD34**	24.49	27.41	15.9	3.4	5.7	***82.86***	***156.95***

DP - Design Point

Calculated by: ACS MSD
Date: 1/22/2002 3/12/2002
Checked by: ______

HYDRAULIC CALCULATIONS

SPRING CREEK DEVELOPMENT MDDP
(Inlet Calculations - Sump Condition)

Design Point P2

Total Flow:	Q_5	=	**8.3** cfs	Half of flow from basin
	Q_{100}	=	**16.9** cfs	PNE2 is considered to contribute to two equal sized inlets

Maximum allowable ponding depth at sump:

D_5 = 0.50
D_{100} = 0.67 (dmax)

Qi = = 1.7(Li+1.8(W))(dmax + w/12)^1.85

Clogging Factor = 1.25
Li (1.25) = Length of inlet opening

5-Year Event: **4** foot inlet required

100-Year Event: **6** foot inlet required

(Install 2 public 6' D-10-R inlets to accept both 5 yr. & 100 yr. developed flows at this design point.)

Calculated by: MSD
Date: 3/6/2002
Checked by:

SPRING CREEK DEVELOPMENT MDDP
(Inlet Calculations - Sump Condition)

Design Point P4

Total Flow:	Q_5	=	**8.9** cfs	Half of flow from basin
	Q_{100}	=	**18.3** cfs	PNE4 is considered to contribute to two equal
Maximum allowable ponding depth at sump:				sized inlets
	D_5	=	0.50	
	D_{100}	=	0.67 (dmax)	
	Qi	=	= 1.7(Li+1.8(W))(dmax + w/12)^1.85	
	Clogging Factor	=	1.25	
	Li (1.25)	=	Length of inlet opening	
5-Year Event:	**4**		foot inlet required	
100-Year Event:	**8**		foot inlet required	

(Install 2 public 8' D-10-R inlets to accept both 5 yr. & 100 yr. developed flows at this design point.)

Calculated by: MSD
Date: 3/6/2002
Checked by:

SPRING CREEK DEVELOPMENT MDDP
(Inlet Calculations - Sump Condition)

Design Point P5

Total Flow: Q_5 = **15.3** cfs

Q_{100} = **31.0** cfs

Half of flow from basin PNE5 is considered to contribute to two equal sized inlets

Maximum allowable ponding depth at sump:

D_5 = 0.50

D_{100} = 0.67 (dmax)

Qi = = 1.7(Li+1.8(W))(dmax + w/12)^1.85

Clogging Factor = 1.25

Li (1.25) = Length of inlet opening

5-Year Event: **10** foot inlet required

100-Year Event: **16** foot inlet required

(Install 2 public 16' D-10-R inlets to accept both 5 yr. & 100 yr. developed flows at this design point.)

Calculated by: MSD

Date: 3/6/2002

Checked by:

SPRING CREEK DEVELOPMENT MDDP
(Inlet Calculations - Sump Condition)

Design Point P7

Total Flow:

Q_5 = **8.3** cfs

Q_{100} = **17.1** cfs

Half of flow from basin PNE7 is considered to contribute to two equal sized inlets

Maximum allowable ponding depth at sump:

D_5 = 0.50

D_{100} = 0.67 (dmax)

Qi = = 1.7(Li+1.8(W))(dmax + w/12)^1.85

Clogging Factor = 1.25

Li (1.25) = Length of inlet opening

5-Year Event: **4** foot inlet required

100-Year Event: **6** foot inlet required

(Install 2 public 6' D-10-R inlets to accept both 5 yr. & 100 yr. developed flows at this design point.)

Calculated by: MSD

Date: 3/6/2002

Checked by:

SPRING CREEK DEVELOPMENT MDDP
(Inlet Calculations - Sump Condition)

Design Point P8

Total Flow: Q_5 = **8.9** cfs

Q_{100} = **18.1** cfs

Half of flow from basin PNE8 is considered to contribute to two equal sized inlets

Maximum allowable ponding depth at sump:

D_5 = 0.50

D_{100} = 0.67 (dmax)

Qi = = 1.7(Li+1.8(W))(dmax + w/12)^1.85

Clogging Factor = 1.25

Li (1.25) = Length of inlet opening

5-Year Event: **4** foot inlet required

100-Year Event: **8** foot inlet required

(Install 2 public 8' D-10-R inlets to accept both 5 yr. & 100 yr. developed flows at this design point.)

Calculated by: MSD

Date: 3/6/2002

Checked by:

SPRING CREEK DEVELOPMENT MDDP
(Inlet Calculations - Sump Condition)

Design Point P10

Total Flow:

Q_5 = **13** cfs

Q_{100} = **26.3** cfs

Half of flow from basin PNE10 is considered to contribute to two equal sized inlets

Maximum allowable ponding depth at sump:

D_5 = 0.50

D_{100} = 0.67 (dmax)

Qi = = 1.7(Li+1.8(W))(dmax + w/12)^1.85

Clogging Factor = 1.25

Li (1.25) = Length of inlet opening

5-Year Event: **8** foot inlet required

100-Year Event: **14** foot inlet required

(Install 2 public 14' D-10-R inlets to accept both 5 yr. & 100 yr. developed flows at this design point.)

Calculated by: ACS

Date: 8/30/2001

Checked by:

SPRING CREEK DEVELOPMENT MDDP
(Inlet Calculations - Sump Condition)

Design Point P11

Total Flow:

Q_5 = **4.25** cfs

Q_{100} = **8.5** cfs

Half of flow from basin PNE11 is considered to contribute to two equal sized inlets

Maximum allowable ponding depth at sump:

D_5 = 0.50

D_{100} = 0.67 (dmax)

Qi = = 1.7(Li+1.8(W))(dmax + w/12)^1.85

Clogging Factor = 1.25

Li (1.25) = Length of inlet opening

5-Year Event: **4** foot inlet required

100-Year Event: **4** foot inlet required

(Install 2 public 4' D-10-R inlets to accept both 5 yr. & 100 yr. developed flows at this design point.)

Calculated by: ACS

Date: 8/30/2001

Checked by:

SPRING CREEK DEVELOPMENT MDDP
(Inlet Calculations - Sump Condition)

Design Point P13

Total Flow:

Q_5 = 4 cfs

Q_{100} = 7.75 cfs

Half of flows from basins PNE12 and PNE13 are considered to contribute to two equal sized inlets

Maximum allowable ponding depth at sump:

D_5 = 0.50

D_{100} = 0.67 (dmax)

Qi = = 1.7(Li+1.8(W))(dmax + w/12)^1.85

Clogging Factor = 1.25

Li (1.25) = Length of inlet opening

5-Year Event: 4 foot inlet required

100-Year Event: 4 foot inlet required

(Install 2 public 4' D-10-R inlets to accept both 5 yr. & 100 yr. developed flows at this design point.)

Calculated by: ACS

Date: 8/30/2001

Checked by:

SPRING CREEK DEVELOPMENT MDDP
(Inlet Calculations - Sump Condition)

Design Point P14

Total Flow:

Q_5 = **5.75** cfs

Q_{100} = **10.8** cfs

Half of flow from basin PNE14 is considered to contribute to two equal sized inlets

Maximum allowable ponding depth at sump:

D_5 = 0.50

D_{100} = 0.67 (dmax)

Qi = = 1.7(Li+1.8(W))(dmax + w/12)^1.85

Clogging Factor = 1.25

Li (1.25) = Length of inlet opening

5-Year Event: 4 foot inlet required

100-Year Event: 4 foot inlet required

(Install 2 public 4' D-10-R inlets to accept both 5 yr. & 100 yr. developed flows at this design point.)

Calculated by: ACS

Date: 8/30/2001

Checked by:

SPRING CREEK DEVELOPMENT MDDP
(Inlet Calculations - Sump Condition)

Design Point P16

Total Flow:	Q_5	=	**15.8** cfs	Half of flow from basin
	Q_{100}	=	**29.5** cfs	PNE16 is considered to contribute to two equal sized inlets

Maximum allowable ponding depth at sump:

D_5 = 0.50

D_{100} = 0.67 (dmax)

Qi = = 1.7(Li+1.8(W))(dmax + w/12)^1.85

Clogging Factor = 1.25

Li (1.25) = Length of inlet opening

5-Year Event: **10** foot inlet required

100-Year Event: 16 foot inlet required

(Install 2 public 16' D-10-R inlets to accept both 5 yr. & 100 yr. developed flows at this design point.)

Calculated by: ACS

Date: 8/30/2001

Checked by: ______

SPRING CREEK DEVELOPMENT MDDP
(Inlet Calculations - Sump Condition)

Design Point P17

Total Flow:

Q_5 = **6.5** cfs

Q_{100} = **13** cfs

Half of flow from basin PNE17 is considered to contribute to two equal sized inlets

Maximum allowable ponding depth at sump:

D_5 = 0.50

D_{100} = 0.67 (dmax)

Qi = = 1.7(Li+1.8(W))(dmax + w/12)^1.85

Clogging Factor = 1.25

Li (1.25) = Length of inlet opening

5-Year Event: **4** foot inlet required

100-Year Event: **4** foot inlet required

(Install 2 public 4' D-10-R inlets to accept both 5 yr. & 100 yr. developed flows at this design point.)

Calculated by: ACS

Date: 8/30/2001

Checked by: ____________

SPRING CREEK DEVELOPMENT MDDP
(Inlet Calculations - Sump Condition)

Design Point P18

Total Flow:

Q_5 = **14** cfs
Q_{100} = **25.5** cfs

Half of flow from basin PNE18 is considered to contribute to two equal sized inlets

Maximum allowable ponding depth at sump:

D_5 = 0.50
D_{100} = 0.67 (dmax)

Qi = = 1.7(Li+1.8(W))(dmax + w/12)^1.85

Clogging Factor = 1.25
Li (1.25) = Length of inlet opening

5-Year Event: **8** foot inlet required

100-Year Event: **12** foot inlet required

(Install 2 public 12' D-10-R inlets to accept both 5 yr. & 100 yr. developed flows at this design point.)

Calculated by: ACS
Date: 8/30/2001
Checked by:

SPRING CREEK DEVELOPMENT MDDP
(Inlet Calculations - Sump Condition)

Design Point P19

Total Flow:	Q_5	=	**22.7** cfs	Basin PNE-19 and Basin
	Q_{100}	=	**41.1** cfs	POS-3

Maximum allowable ponding depth at sump:

D_5 = 0.50

D_{100} = 0.67 (dmax)

Qi = = 1.7(Li+1.8(W))(dmax + w/12)^1.85

Clogging Factor = 1.25

Li (1.25) = Length of inlet opening

5-Year Event: **18** foot inlet required

100-Year Event: **24** foot inlet required

(Install a public 24' D-10-R inlet to accept both 5 yr. & 100 yr. developed flows at this design point.)

Calculated by: ACS

Date: 8/30/2001

Checked by: ______

SPRING CREEK DEVELOPMENT MDDP
(Inlet Calculations - Sump Condition)

Design Point P22

Total Flow:	Q_5	=	**15.4** cfs
	Q_{100}	=	**27.8** cfs

Maximum allowable ponding depth at sump:

D_5 = 0.50

D_{100} = 0.67 (dmax)

Qi = = 1.7(Li+1.8(W))(dmax + w/12)^1.85

Clogging Factor = 1.25

Li (1.25) = Length of inlet opening

5-Year Event:	**10**	foot inlet required
100-Year Event:	**14**	foot inlet required

(Install a public 14' D-10-R inlet to accept both 5 yr. & 100 yr. developed flows at this design point.)

Calculated by: ACS

Date: 8/30/2001

Checked by:

SPRING CREEK DEVELOPMENT MDDP
(Inlet Calculations - Sump Condition)

Design Point P23

Total Flow: Q_5 = **10** cfs

Q_{100} = **20** cfs

Maximum allowable ponding depth at sump:

D_5 = 0.50

D_{100} = 0.67 (dmax)

Qi = = 1.7(Li+1.8(W))(dmax + w/12)^1.85

Clogging Factor = 1.25

Li (1.25) = Length of inlet opening

5-Year Event: **4** foot inlet required

100-Year Event: **8** foot inlet required

(Install a public 8' D-10-R inlet to accept both 5 yr. & 100 yr. developed flows at this design point.)

Calculated by: ACS

Date: 8/30/2001

Checked by:

SPRING CREEK DEVELOPMENT MDDP
(Inlet Calculations - Sump Condition)

Design Point P24

Total Flow:

Q_5 = **13** cfs
Q_{100} = **26.6** cfs

Maximum allowable ponding depth at sump:

D_5 = 0.50
D_{100} = 0.67 (dmax)

Qi = = 1.7(Li+1.8(W))(dmax + w/12)^1.85

Clogging Factor = 1.25
Li (1.25) = Length of inlet opening

5-Year Event: **8** foot inlet required

100-Year Event: **14** foot inlet required

(Install a public 14' D-10-R inlet to accept both 5 yr. & 100 yr. developed flows at this design point.)

Calculated by: ACS
Date: 8/30/2001
Checked by: ______

SPRING CREEK DEVELOPMENT MDDP
(Inlet Calculations - Sump Condition)

Design Point P25

Total Flow:

Q_5 = **1.98** cfs — Basin PSE-5 and Basin POS-4
Q_{100} = **3.63** cfs

Maximum allowable ponding depth at sump:

D_5 = 0.50
D_{100} = 0.67 (dmax)

Qi = = 1.7(Li+1.8(W))(dmax + w/12)^1.85

Clogging Factor = 1.25
Li (1.25) = Length of inlet opening

5-Year Event: **4** foot inlet required

100-Year Event: **4** foot inlet required

(Install a public 4' D-10-R inlet to accept both 5 yr. & 100 yr. developed flows at this design point.)

Calculated by: ACS
Date: 8/30/2001
Checked by:

SPRING CREEK DEVELOPMENT MDDP
(Inlet Calculations - Sump Condition)

Design Point P27

Total Flow:	Q_5	=	**5.5** cfs	Basin PSE-6 and Basin
	Q_{100}	=	**11.4** cfs	POS-5

Maximum allowable ponding depth at sump:

D_5 = 0.50

D_{100} = 0.67 (dmax)

Qi = = 1.7(Li+1.8(W))(dmax + w/12)^1.85

Clogging Factor = 1.25

Li (1.25) = Length of inlet opening

5-Year Event:	**4**	foot inlet required
100-Year Event:	**4**	foot inlet required

(Install a public 4' D-10-R inlet to accept both 5 yr. & 100 yr. developed flows at this design point.)

Calculated by: MSD

Date: 3/6/2002

Checked by: ____________

SPRING CREEK DEVELOPMENT MDDP
(Inlet Calculations - Sump Condition)

Design Point P29

Total Flow:	Q_5	=	**1.39** cfs
	Q_{100}	=	**2.78** cfs

Maximum allowable ponding depth at sump:

D_5 = 0.50

D_{100} = 0.67 (dmax)

Qi = = 1.7(Li+1.8(W))(dmax + w/12)^1.85

Clogging Factor = 1.25

Li (1.25) = Length of inlet opening

5-Year Event:	**4**	foot inlet required
100-Year Event:	**4**	foot inlet required

(Install a public 4' D-10-R inlet to accept both 5 yr. & 100 yr. developed flows at this design point.)

Calculated by: ACS

Date: 8/30/2001

Checked by: ____________

SPRING CREEK DEVELOPMENT MDDP
(Inlet Calculations - At-Grade)

Proposed 24' Inlet at Design Point P31

5-YR FLOW

Q(5)	8.7	I(5)	5.0		
DEPTH	0.29	Fr	2.97	Inlet size ? L(i) =	24
SPREAD	10.3	L(1)	23.4	If Li < L(2) then Qi =	9
CROSS SLOPE	2.0%	L(2)	14.1	If Li > L(2) then Qi =	7
STREET SLOPE	6.0%	L(3)	50.2	FB =	2
				CA(eqv.)=	0.45

100-YR FLOW

Q(100)	17.5	I(100)	9.0		
DEPTH	0.37	Fr	3.16	Inlet size ? L(i) =	24
SPREAD	14.0	L(1)	34.1	If Li < L(2) then Qi =	12
CROSS SLOPE	2.0%	L(2)	20.5	If Li > L(2) then Qi =	11
STREET SLOPE	6.0%	L(3)	73.0	FB =	6
				CA(eqv.)=	0.70

SPRING CREEK DEVELOPMENT MDDP
(Inlet Calculations - At-Grade)

Proposed 24' Inlet at Design Point P32

5-YR FLOW

Q(5)	13.4	I(5)	4.4		
DEPTH	0.34	Fr	3.09	Inlet size ? L(i) =	24
SPREAD	12.5	L(1)	29.8	If Li < L(2) then Qi =	11
CROSS SLOPE	2.0%	L(2)	17.9	If Li > L(2) then Qi =	9
STREET SLOPE	6.0%	L(3)	63.8	FB =	4
				CA(eqv.)=	0.99

100-YR FLOW

Q(100)	28.4	I(100)	7.7		
DEPTH	0.43	Fr	3.29	Inlet size ? L(i) =	24
SPREAD	17.2	L(1)	43.4	If Li < L(2) then Qi =	16
CROSS SLOPE	2.0%	L(2)	26.1	If Li > L(2) then Qi =	17
STREET SLOPE	6.0%	L(3)	93.0	FB =	13
				CA(eqv.)=	1.65

SPRING CREEK DEVELOPMENT MDDP
(Inlet Calculations - At-Grade)

Proposed 26' Inlet at Design Point P33

5-YR FLOW

Q(5)	11.5	I(5)	4.4		
DEPTH	0.32	Fr	3.05	Inlet size ? L(i) =	26
SPREAD	11.8	L(1)	27.6	If Li < L(2) then Qi =	11
CROSS SLOPE	2.0%	L(2)	16.6	If Li > L(2) then Qi =	8
STREET SLOPE	6.0%	L(3)	59.2	FB =	3
				CA(eqv.)=	0.73

100-YR FLOW

Q(100)	26.7	I(100)	7.7		
DEPTH	0.42	Fr	3.27	Inlet size ? L(i) =	26
SPREAD	16.7	L(1)	42.1	If Li < L(2) then Qi =	17
CROSS SLOPE	2.0%	L(2)	25.3	If Li > L(2) then Qi =	16
STREET SLOPE	6.0%	L(3)	90.1	FB =	10
				CA(eqv.)=	1.36

SPRING CREEK DEVELOPMENT MDDP
(Inlet Calculations - Sump Condition)

Design Point P35

Total Flow:

Q_5 = **12.6** cfs
Q_{100} = **25.9** cfs

Half of flow from DP-P35 is considered to contribute to two equal sized inlets

Maximum allowable ponding depth at sump:

D_5 = 0.50
D_{100} = 0.67 (dmax)

Qi = = 1.7(Li+1.8(W))(dmax + w/12)^1.85

Clogging Factor = 1.25
Li (1.25) = Length of inlet opening

5-Year Event: **8** foot inlet required

100-Year Event: **14** foot inlet required

(Install 2 public 14' D-10-R inlets to accept both 5 yr. & 100 yr. developed flows at this design point.)

Calculated by: MSD
Date: 3/12/2002
Checked by: ______

SPRING CREEK DEVELOPMENT MDDP
(Inlet Calculations - Sump Condition)

Design Point SD34

Total Flow:	Q_5	=	**4.8** cfs
	Q_{100}	=	**9.1** cfs

Maximum allowable ponding depth at sump:

D_5 = 0.50

D_{100} = 0.67 (dmax)

Qi = = 1.7(Li+1.8(W))(dmax + w/12)^1.85

Clogging Factor = 1.25

Li (1.25) = Length of inlet opening

5-Year Event:	4	foot inlet required
100-Year Event:	4	foot inlet required

(Install A public 4' D-10-R inlets to accept both 5 yr. & 100 yr. developed flows at this design point.)

Calculated by: MSD

Date: 3/8/2002

Checked by:

SPRING CREEK DEVELOPMENT MDDP
(Inlet Calculations - Sump Condition)

Design Point P36

Total Flow:

Q_5 = **18.5** cfs

Q_{100} = **33.1** cfs

Half of flow from Basins PSE-15 and POS-7 is considered to contribute to two equal sized inlets

Maximum allowable ponding depth at sump:

D_5 = 0.50

D_{100} = 0.67 (dmax)

Qi = = 1.7(Li+1.8(W))(dmax + w/12)^1.85

Clogging Factor = 1.25

Li (1.25) = Length of inlet opening

5-Year Event: **14** foot inlet required

100-Year Event: **18** foot inlet required

(Install 2 public 18' D-10-R inlets to accept both 5 yr. & 100 yr. developed flows at this design point.)

Calculated by: LDR

Date: 8/31/2001

Checked by:

SPRING CREEK DEVELOPMENT MDDP
(Inlet Calculations - Sump Condition)

Design Point P37

Total Flow: Q_5 = **1.54** cfs
Q_{100} = **3.22** cfs

Maximum allowable ponding depth at sump:

D_5 = 0.50
D_{100} = 0.67 (dmax)

Qi = = 1.7(Li+1.8(W))(dmax + w/12)^1.85

Clogging Factor = 1.25
Li (1.25) = Length of inlet opening

5-Year Event: **4** foot inlet required

100-Year Event: **4** foot inlet required

(Existing public 6' D-10-R inlet is adequate to accept both 5 yr. & 100 yr. developed flows at this design point.)

Calculated by: LDR
Date: 8/31/2001
Checked by: ____________

SPRING CREEK DEVELOPMENT MDDP
(Inlet Calculations - Sump Condition)

Design Point P39

Total Flow:

Q_5 = **13.9** cfs

Q_{100} = **25.2** cfs

Maximum allowable ponding depth at sump:

D_5 = 0.50

D_{100} = 0.67 (dmax)

Qi = = 1.7(Li+1.8(W))(dmax + w/12)^1.85

Clogging Factor = 1.25

Li (1.25) = Length of inlet opening

5-Year Event: **8** foot inlet required

100-Year Event: **12** foot inlet required

(Install a public 12' D-10-R inlet to accept both 5 yr. & 100 yr. developed flows at this design point.)

Calculated by: LDR

Date: 8/31/2001

Checked by: ____________

SPRING CREEK DEVELOPMENT MDDP
(Inlet Calculations - Sump Condition)

Design Point P40

Total Flow:

Q_5 = **10.5** cfs
Q_{100} = **19.1** cfs

Maximum allowable ponding depth at sump:

D_5 = 0.50
D_{100} = 0.67 (dmax)

Qi = = 1.7(Li+1.8(W))(dmax + w/12)^1.85

Clogging Factor = 1.25
Li (1.25) = Length of inlet opening

5-Year Event: **6** foot inlet required

100-Year Event: **8** foot inlet required

(Install a public 8' D-10-R inlet to accept both 5 yr. & 100 yr. developed flows at this design point.)

Calculated by: LDR
Date: 8/31/2001
Checked by:

SPRING CREEK DEVELOPMENT MDDP
(Inlet Calculations - Sump Condition)

Design Point P41

Total Flow:

Q_5 = **8.78** cfs
Q_{100} = **15.9** cfs

Maximum allowable ponding depth at sump:

D_5 = 0.50
D_{100} = 0.67 (dmax)

Qi = = 1.7(Li+1.8(W))(dmax + w/12)^1.85

Clogging Factor = 1.25
Li (1.25) = Length of inlet opening

5-Year Event: **4** foot inlet required

100-Year Event: **6** foot inlet required

(Install a public 6' D-10-R inlet to accept both 5 yr. & 100 yr. developed flows at this design point.)

Calculated by: LDR
Date: 8/31/2001
Checked by:

SPRING CREEK DEVELOPMENT MDDP
(Inlet Calculations - Sump Condition)

Design Point P42

Total Flow:	Q_5	=	**14** cfs	Half of flow from basin
	Q_{100}	=	**31** cfs	PSW5 is considered to contribute to each inlet
Maximum allowable ponding depth at sump:				and 6 cfs flowby is included here from PSW6
	D_5	=	0.50	
	D_{100}	=	0.67 (dmax)	

Qi = = 1.7(Li+1.8(W))(dmax + w/12)^1.85

Clogging Factor = 1.25
Li (1.25) = Length of inlet opening

5-Year Event:	**8**	foot inlet required
100-Year Event:	**16**	foot inlet required

(Install a public 16' D-10-R inlet to accept both 5 yr. & 100 yr. developed flows at this design point.)

Calculated by: LDR
Date: 8/31/2001
Checked by:

SPRING CREEK DEVELOPMENT MDDP
(Inlet Calculations - Sump Condition)

Design Point P43

Total Flow:	Q_5	=	**14** cfs	Half of flow from basin
	Q_{100}	=	**25** cfs	PSW5 is considered to contribute to each inlet

Maximum allowable ponding depth at sump:

D_5 = 0.50

D_{100} = 0.67 (dmax)

Qi = = 1.7(Li+1.8(W))(dmax + w/12)^1.85

Clogging Factor = 1.25

Li (1.25) = Length of inlet opening

5-Year Event:	**8**	foot inlet required
100-Year Event:	**12**	foot inlet required

(Install a public 12' D-10-R inlet to accept both 5 yr. & 100 yr. developed flows at this design point.)

Calculated by: LDR

Date: 8/31/2001

Checked by:

SPRING CREEK DEVELOPMENT MDDP
(Inlet Calculations - At-Grade)

Proposed 30' Inlet at Design Point P44

5-YR FLOW

Q(5)	11	I(5)	5.0		
DEPTH	0.34	Fr	2.53	Inlet size ? L(i) =	30
SPREAD	12.8	L(1)	24.9	If Li < L(2) then Qi =	14
CROSS SLOPE	2.0%	L(2)	14.9	If Li > L(2) then Qi =	9
STREET SLOPE	4.0%	L(3)	53.3	FB =	2
				CA(eqv.)=	0.47

100-YR FLOW

Q(100)	21	I(100)	9.1		
DEPTH	0.41	Fr	2.66	Inlet size ? L(i) =	30
SPREAD	16.4	L(1)	33.6	If Li < L(2) then Qi =	18
CROSS SLOPE	2.0%	L(2)	20.2	If Li > L(2) then Qi =	15
STREET SLOPE	4.0%	L(3)	72.0	FB =	6
				CA(eqv.)=	0.67

SPRING CREEK DEVELOPMENT MDDP
(Inlet Calculations - Sump Condition)

Design Point P45

Total Flow:

Q_5 = **3.5** cfs
Q_{100} = **6.5** cfs

Half of flow from basin PSW6A is considered to contribute to two equal sized inlets

Maximum allowable ponding depth at sump:

D_5 = 0.50
D_{100} = 0.67 (dmax)

Qi = = 1.7(Li+1.8(W))(dmax + w/12)^1.85

Clogging Factor = 1.25
Li (1.25) = Length of inlet opening

5-Year Event: 4 foot inlet required

100-Year Event: 4 foot inlet required

(Install 2 public 4' D-10-R inlets to accept both 5 yr. & 100 yr. developed flows at this design point.)

Calculated by: LDR
Date: 8/31/2001
Checked by: ______

SPRING CREEK DEVELOPMENT MDDP
(Inlet Calculations - Sump Condition)

Design Point P47

Total Flow: Q_5 = **8.24** cfs

Q_{100} = **14.9** cfs

Maximum allowable ponding depth at sump:

D_5 = 0.50

D_{100} = 0.67 (dmax)

Qi = = 1.7(Li+1.8(W))(dmax + w/12)^1.85

Clogging Factor = 1.25

Li (1.25) = Length of inlet opening

5-Year Event: **4** foot inlet required

100-Year Event: **6** foot inlet required

(Install a public 6' D-10-R inlet to accept both 5 yr. & 100 yr. developed flows at this design point.)

Calculated by: LDR

Date: 8/31/2001

Checked by: ________

SPRING CREEK DEVELOPMENT MDDP
(Inlet Calculations - Sump Condition)

Design Point P48

Total Flow:

Q_5 = **4.91** cfs

Q_{100} = **8.89** cfs

Maximum allowable ponding depth at sump:

D_5 = 0.50

D_{100} = 0.67 (dmax)

Qi = = 1.7(Li+1.8(W))(dmax + w/12)^1.85

Clogging Factor = 1.25

Li (1.25) = Length of inlet opening

5-Year Event: **4** foot inlet required

100-Year Event: **4** foot inlet required

(Install a public 4' D-10-R inlet to accept both 5 yr. & 100 yr. developed flows at this design point.)

Calculated by: LDR

Date: 8/31/2001

Checked by:

SPRING CREEK DEVELOPMENT MDDP
(Inlet Calculations - Sump Condition)

Design Point P49

Total Flow:

Q_5 = **7.5** cfs

Q_{100} = **13.3** cfs

Half of flow from basin PSW9 is considered to contribute to two equal sized inlets

Maximum allowable ponding depth at sump:

D_5 = 0.50

D_{100} = 0.67 (dmax)

Qi = = 1.7(Li+1.8(W))(dmax + w/12)^1.85

Clogging Factor = 1.25

Li (1.25) = Length of inlet opening

5-Year Event: **4** foot inlet required

100-Year Event: **4** foot inlet required

(Install 2 public 4' D-10-R inlets to accept both 5 yr. & 100 yr. developed flows at this design point.)

Calculated by: LDR

Date: 8/31/2001

Checked by: ____________

SPRING CREEK DEVELOPMENT MDDP
(Inlet Calculations - Sump Condition)

Design Point P50

Total Flow:

Q_5 = **13** cfs
Q_{100} = **23.3** cfs

Half of flow from basin PSW10 is considered to contribute to each inlet

Maximum allowable ponding depth at sump:

D_5 = 0.50
D_{100} = 0.67 (dmax)

Qi = = 1.7(Li+1.8(W))(dmax + w/12)^1.85

Clogging Factor = 1.25
Li (1.25) = Length of inlet opening

5-Year Event: **8** foot inlet required

100-Year Event: **12** foot inlet required

(Install 2 public 12' D-10-R inlets to accept both 5 yr. & 100 yr. developed flows at this design point.)

Calculated by: LDR
Date: 8/31/2001
Checked by: ______

SPRING CREEK DEVELOPMENT MDDP
(Inlet Calculations - Sump Condition)

Design Point P54

Total Flow:

Q_5 = **17.9** cfs
Q_{100} = **32.4** cfs

Maximum allowable ponding depth at sump:

D_5 = 0.50
D_{100} = 0.67 (dmax)

Qi = = 1.7(Li+1.8(W))(dmax + w/12)^1.85

Clogging Factor = 1.25
Li (1.25) = Length of inlet opening

5-Year Event: **12** foot inlet required

100-Year Event: **18** foot inlet required

(Install a public 18' D-10-R inlet to accept both 5 yr. & 100 yr. developed flows at this design point.)

Calculated by: ACS
Date: 9/4/2001
Checked by:

SPRING CREEK DEVELOPMENT MDDP
(Inlet Calculations - Sump Condition)

Design Point P55

Total Flow:

Q_5 = 5 cfs

Q_{100} = **8.75** cfs

Half of flow from basin PNW3 is considered to contribute to two equal sized inlets

Maximum allowable ponding depth at sump:

D_5 = 0.50

D_{100} = 0.67 (dmax)

Qi = = 1.7(Li+1.8(W))(dmax + w/12)^1.85

Clogging Factor = 1.25

Li (1.25) = Length of inlet opening

5-Year Event: 4 foot inlet required

100-Year Event: 4 foot inlet required

(Install 2 public 4' D-10-R inlets to accept both 5 yr. & 100 yr. developed flows at this design point.)

Calculated by: LDR

Date: 8/31/2001

Checked by: ____________

SPRING CREEK DEVELOPMENT MDDP
(Inlet Calculations - Sump Condition)

Design Point P57

Total Flow: Q_5 = 7.57 cfs
Q_{100} = 13.7 cfs

Maximum allowable ponding depth at sump:

D_5 = 0.50
D_{100} = 0.67 (dmax)

Qi = = 1.7(Li+1.8(W))(dmax + w/12)^1.85

Clogging Factor = 1.25
Li (1.25) = Length of inlet opening

5-Year Event: **4** foot inlet required

100-Year Event: **4** foot inlet required

(Install a public 4' D-10-R inlet to accept both 5 yr. & 100 yr. developed flows at this design point.)

Calculated by: ACS
Date: 9/4/2001
Checked by:

SPRING CREEK DEVELOPMENT MDDP
(Inlet Calculations - Sump Condition)

Design Point P58

Total Flow:

Q_5 = **14.7** cfs

Q_{100} = **26.7** cfs

Maximum allowable ponding depth at sump:

D_5 = 0.50

D_{100} = 0.67 (dmax)

Qi = = 1.7(Li+1.8(W))(dmax + w/12)^1.85

Clogging Factor = 1.25

Li (1.25) = Length of inlet opening

5-Year Event: **10** foot inlet required

100-Year Event: **14** foot inlet required

(Install a public 14' D-10-R inlet to accept both 5 yr. & 100 yr. developed flows at this design point.)

Calculated by: ACS

Date: 9/4/2001

Checked by:

SPRING CREEK DEVELOPMENT MDDP
(Inlet Calculations - Sump Condition)

Design Point P59

Total Flow: Q_5 = **5.5** cfs
Q_{100} = **10** cfs

Half of flow from basin PNW6 is considered to contribute to two equal sized inlets

Maximum allowable ponding depth at sump:

D_5 = 0.50
D_{100} = 0.67 (dmax)

Qi = = 1.7(Li+1.8(W))(dmax + w/12)^1.85

Clogging Factor = 1.25
Li (1.25) = Length of inlet opening

5-Year Event: **4** foot inlet required

100-Year Event: **4** foot inlet required

(Install 2 public 4' D-10-R inlets to accept both 5 yr. & 100 yr. developed flows at this design point.)

Calculated by: ACS
Date: 9/4/2001
Checked by: ______

SPRING CREEK DEVELOPMENT MDDP
(Inlet Calculations - Sump Condition)

Design Point P61

Total Flow:

Q_5 = **7.75** cfs

Q_{100} = **13.8** cfs

Half of flow from basin PNW7 is considered to contribute to two equal sized inlets

Maximum allowable ponding depth at sump:

D_5 = 0.50

D_{100} = 0.67 (dmax)

Qi = = 1.7(Li+1.8(W))(dmax + w/12)^1.85

Clogging Factor = 1.25

Li (1.25) = Length of inlet opening

5-Year Event: **4** foot inlet required

100-Year Event: 4 foot inlet required

(Install 2 public 4' D-10-R inlets to accept both 5 yr. & 100 yr. developed flows at this design point.)

Calculated by: ACS

Date: 9/4/2001

Checked by:

SPRING CREEK DEVELOPMENT MDDP
(Inlet Calculations - Sump Condition)

Design Point P63

Total Flow: Q_5 = **10.5** cfs

Q_{100} = **19** cfs

Maximum allowable ponding depth at sump:

D_5 = 0.50

D_{100} = 0.67 (dmax)

Qi = = 1.7(Li+1.8(W))(dmax + w/12)^1.85

Clogging Factor = 1.25

Li (1.25) = Length of inlet opening

5-Year Event: **6** foot inlet required

100-Year Event: **8** foot inlet required

(Install a public 8' D-10-R inlet to accept both 5 yr. & 100 yr. developed flows at this design point.)

Calculated by: ACS

Date: 9/4/2001

Checked by: ______

SPRING CREEK DEVELOPMENT MDDP
(Inlet Calculations - Sump Condition)

Design Point P65

Total Flow:

Q_5 = **12.4** cfs
Q_{100} = **22.5** cfs

Maximum allowable ponding depth at sump:

D_5 = 0.50
D_{100} = 0.67 (dmax)

Qi = = 1.7(Li+1.8(W))(dmax + w/12)^1.85

Clogging Factor = 1.25
Li (1.25) = Length of inlet opening

5-Year Event: **8** foot inlet required

100-Year Event: **10** foot inlet required

(Install a private 10' D-10-R inlet to accept both 5 yr. & 100 yr. developed flows at this design point.)

Calculated by: ACS
Date: 9/4/2001
Checked by:

SPRING CREEK DEVELOPMENT MDDP
(Inlet Calculations - Sump Condition)

Design Point P66

Total Flow:

Q_5 = **4.01** cfs
Q_{100} = **7.26** cfs

Maximum allowable ponding depth at sump:

D_5 = 0.50
D_{100} = 0.67 (dmax)

Qi = = 1.7(Li+1.8(W))(dmax + w/12)^1.85

Clogging Factor = 1.25
Li (1.25) = Length of inlet opening

5-Year Event: **4** foot inlet required

100-Year Event: **4** foot inlet required

(Install a public 4' D-10-R inlet to accept both 5 yr. & 100 yr. developed flows at this design point.)

Calculated by: ACS
Date: 9/4/2001
Checked by:

SPRING CREEK DEVELOPMENT MDDP
(Inlet Calculations - Sump Condition)

Design Point P67

Total Flow:

Q_5 = **13** cfs
Q_{100} = **23.6** cfs

Maximum allowable ponding depth at sump:

D_5 = 0.50
D_{100} = 0.67 (dmax)

Qi = = 1.7(Li+1.8(W))(dmax + w/12)^1.85

Clogging Factor = 1.25
Li (1.25) = Length of inlet opening

5-Year Event: **8** foot inlet required

100-Year Event: **12** foot inlet required

(Install a private 12' D-10-R inlet to accept both 5 yr. & 100 yr. developed flows at this design point.)

Calculated by: ACS
Date: 9/4/2001
Checked by: ____________

SPRING CREEK DEVELOPMENT MDDP
(Inlet Calculations - Sump Condition)

Design Point P70

Total Flow:

Q_5 = **10.5** cfs
Q_{100} = **18.8** cfs

Half of flow from basin PNW14 is considered to contribute to two equal sized inlets

Maximum allowable ponding depth at sump:

D_5 = 0.50
D_{100} = 0.67 (dmax)

Qi = = 1.7(Li+1.8(W))(dmax + w/12)^1.85

Clogging Factor = 1.25
Li (1.25) = Length of inlet opening

5-Year Event: **6** foot inlet required

100-Year Event: **8** foot inlet required

(Install 2 public 8' D-10-R inlets to accept both 5 yr. & 100 yr. developed flows at this design point.)

Calculated by: ACS
Date: 9/4/2001
Checked by:

SPRING CREEK DEVELOPMENT MDDP
(Inlet Calculations - Sump Condition)

Design Point P72

Total Flow:

Q_5 = **11.5** cfs

Q_{100} = **20.9** cfs

Maximum allowable ponding depth at sump:

D_5 = 0.50

D_{100} = 0.67 (dmax)

Qi = = 1.7(Li+1.8(W))(dmax + w/12)^1.85

Clogging Factor = 1.25

Li (1.25) = Length of inlet opening

5-Year Event: **6** foot inlet required

100-Year Event: **10** foot inlet required

(Install a public 10' D-10-R inlet to accept both 5 yr. & 100 yr. developed flows at this design point.)

Calculated by: ACS

Date: 9/4/2001

Checked by:

SPRING CREEK DEVELOPMENT MDDP
(Inlet Calculations - Sump Condition)

Design Point PO1

Total Flow: Q_5 = **10.5** cfs
Q_{100} = **19** cfs

Half of flow from basins PNE15 and POS1 are considered to contribute to two equal sized inlets

Maximum allowable ponding depth at sump:

D_5 = 0.50
D_{100} = 0.67 (dmax)

Qi = = 1.7(Li+1.8(W))(dmax + w/12)^1.85

Clogging Factor = 1.25
Li (1.25) = Length of inlet opening

5-Year Event: **6** foot inlet required

100-Year Event: **8** foot inlet required

(Install 2 public 8' D-10-R inlets to accept both 5 yr. & 100 yr. developed flows at this design point.)

Calculated by: ACS
Date: 9/4/2001
Checked by:

SPRING CREEK DEVELOPMENT MDDP
(Inlet Calculations - Sump Condition)

Design Point PO2

Total Flow: Q_5 = **4.25** cfs

Q_{100} = **7.5** cfs

Half of flow from basin POS2 is considered to contribute to two equal sized inlets

Maximum allowable ponding depth at sump:

D_5 = 0.50

D_{100} = 0.67 (dmax)

Qi = = 1.7(Li+1.8(W))(dmax + w/12)^1.85

Clogging Factor = 1.25

Li (1.25) = Length of inlet opening

5-Year Event: 4 foot inlet required

100-Year Event: **4** foot inlet required

(Install 2 public 4' D-10-R inlets to accept both 5 yr. & 100 yr. developed flows at this design point.)

Calculated by: ACS

Date: 9/4/2001

Checked by:

Basin PNE-3 Storm
Worksheet for Circular Channel

Project Description	
Project File	x:\2980000.all\2984000\flowmaster\springcr.fm2
Worksheet	Basin PNE-3
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.015000	ft/ft
Diameter	36.00	in
Discharge	57.92	cfs

Results		
Depth	1.87	ft
Flow Area	4.62	ft^2
Wetted Perimeter	5.45	ft
Top Width	2.91	ft
Critical Depth	2.46	ft
Percent Full	62.18	
Critical Slope	0.007515	ft/ft
Velocity	12.54	ft/s
Velocity Head	2.44	ft
Specific Energy	4.31	ft
Froude Number	1.75	
Maximum Discharge	87.87	cfs
Full Flow Capacity	81.68	cfs
Full Flow Slope	0.007542	ft/ft
Flow is supercritical.		

DP SD-2 Storm
Worksheet for Circular Channel

Project Description	
Project File	x:\2980000.all\2984000\flowmaster\springcr.fm2
Worksheet	Design Point SD-2
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.020000	ft/ft
Diameter	36.00	in
Discharge	90.45	cfs

Results		
Depth	2.36	ft
Flow Area	5.95	ft^2
Wetted Perimeter	6.53	ft
Top Width	2.46	ft
Critical Depth	2.85	ft
Percent Full	78.50	
Critical Slope	0.015928	ft/ft
Velocity	15.19	ft/s
Velocity Head	3.59	ft
Specific Energy	5.94	ft
Froude Number	1.72	
Maximum Discharge	101.46	cfs
Full Flow Capacity	94.32	cfs
Full Flow Slope	0.018392	ft/ft
Flow is supercritical.		

DP SD-3 Storm
Worksheet for Circular Channel

Project Description	
Project File	x:\2980000.all\2984000\flowmaster\springcr.fm2
Worksheet	Design Point SD-3
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.015000	ft/ft
Diameter	42.00	in
Discharge	125.44	cfs

Results		
Depth	2.93	ft
Flow Area	8.60	ft^2
Wetted Perimeter	8.09	ft
Top Width	2.59	ft
Critical Depth	3.28	ft
Percent Full	83.69	
Critical Slope	0.013435	ft/ft
Velocity	14.59	ft/s
Velocity Head	3.31	ft
Specific Energy	6.24	ft
Froude Number	1.41	
Maximum Discharge	132.54	cfs
Full Flow Capacity	123.21	cfs
Full Flow Slope	0.015547	ft/ft
Flow is supercritical.		

DP SD-4 Storm Outfall
Worksheet for Circular Channel

Project Description	
Project File	x:\2980000.all\2984000\flowmaster\springcr.fm2
Worksheet	Design Point SD-4
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.030000	ft/ft
Diameter	42.00	in
Discharge	183.48	cfs

Results		
Depth	3.07	ft
Flow Area	8.95	ft^2
Wetted Perimeter	8.50	ft
Top Width	2.29	ft
Critical Depth	3.45	ft
Percent Full	87.82	
Critical Slope	0.030174	ft/ft
Velocity	20.49	ft/s
Velocity Head	6.53	ft
Specific Energy	9.60	ft
Froude Number	1.83	
Maximum Discharge	187.44	cfs
Full Flow Capacity	174.25	cfs
Full Flow Slope	0.033262	ft/ft
Flow is supercritical.		

DP SD-5 Storm
Worksheet for Circular Channel

Project Description	
Project File	x:\2980000.all\2984000\flowmaster\springcr.fm2
Worksheet	Design Point SD-5
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.020000	ft/ft
Diameter	24.00	in
Discharge	31.85	cfs

Results		
Depth	1.63	ft
Flow Area	2.74	ft^2
Wetted Perimeter	4.51	ft
Top Width	1.55	ft
Critical Depth	1.89	ft
Percent Full	81.56	
Critical Slope	0.017141	ft/ft
Velocity	11.61	ft/s
Velocity Head	2.09	ft
Specific Energy	3.73	ft
Froude Number	1.54	
Maximum Discharge	34.41	cfs
Full Flow Capacity	31.99	cfs
Full Flow Slope	0.019824	ft/ft
Flow is supercritical.		

DP SD-6 Storm
Worksheet for Circular Channel

Project Description	
Project File	x:\2980000.all\2984000\flowmaster\springcr.fm2
Worksheet	Design Point SD-6
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.020000	ft/ft
Diameter	30.00	in
Discharge	57.61	cfs

Results		
Depth	2.03	ft
Flow Area	4.28	ft^2
Wetted Perimeter	5.62	ft
Top Width	1.95	ft
Critical Depth	2.38	ft
Percent Full	81.35	
Critical Slope	0.017091	ft/ft
Velocity	13.47	ft/s
Velocity Head	2.82	ft
Specific Energy	4.85	ft
Froude Number	1.60	
Maximum Discharge	62.40	cfs
Full Flow Capacity	58.00	cfs
Full Flow Slope	0.019729	ft/ft
Flow is supercritical.		

DP SD-7 Storm
Worksheet for Circular Channel

Project Description	
Project File	x:\2980000.all\2984000\flowmaster\springcr.fm2
Worksheet	Design Point SD-7
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.025000	ft/ft
Diameter	30.00	in
Discharge	68.19	cfs

Results		
Depth	2.19	ft
Flow Area	4.56	ft²
Wetted Perimeter	6.06	ft
Top Width	1.65	ft
Critical Depth	2.43	ft
Percent Full	87.61	
Critical Slope	0.024466	ft/ft
Velocity	14.96	ft/s
Velocity Head	3.48	ft
Specific Energy	5.67	ft
Froude Number	1.59	
Maximum Discharge	69.76	cfs
Full Flow Capacity	64.85	cfs
Full Flow Slope	0.027641	ft/ft
Flow is supercritical.		

Basin PNE-17 Storm
Worksheet for Circular Channel

Project Description	
Project File	x:\2980000.all\2984000\flowmaster\springcr.fm2
Worksheet	Basin PNE-17
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.015000	ft/ft
Diameter	24.00	in
Discharge	25.63	cfs

Results		
Depth	1.52	ft
Flow Area	2.56	ft^2
Wetted Perimeter	4.23	ft
Top Width	1.71	ft
Critical Depth	1.78	ft
Percent Full	75.95	
Critical Slope	0.011431	ft/ft
Velocity	10.01	ft/s
Velocity Head	1.56	ft
Specific Energy	3.08	ft
Froude Number	1.44	
Maximum Discharge	29.80	cfs
Full Flow Capacity	27.71	cfs
Full Flow Slope	0.012837	ft/ft
Flow is supercritical.		

Basin PNE-19 and POS-3 Storm
Worksheet for Circular Channel

Project Description	
Project File	x:\2980000.all\2984000\flowmaster\springcr.fm2
Worksheet	Basin PNE-19
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.010000	ft/ft
Diameter	30.00	in
Discharge	41.11	cfs

Results		
Depth	2.05	ft
Flow Area	4.32	ft^2
Wetted Perimeter	5.67	ft
Top Width	1.91	ft
Critical Depth	2.15	ft
Percent Full	82.18	
Critical Slope	0.009289	ft/ft
Velocity	9.52	ft/s
Velocity Head	1.41	ft
Specific Energy	3.46	ft
Froude Number	1.12	
Maximum Discharge	44.12	cfs
Full Flow Capacity	41.01	cfs
Full Flow Slope	0.010046	ft/ft
Flow is supercritical.		

DP SD-8 Storm
Worksheet for Circular Channel

Project Description	
Project File	x:\2980000.all\2984000\flowmaster\springcr.fm2
Worksheet	Design Point SD-8
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.025000	ft/ft
Diameter	30.00	in
Discharge	64.96	cfs

Results		
Depth	2.05	ft
Flow Area	4.31	ft^2
Wetted Perimeter	5.67	ft
Top Width	1.92	ft
Critical Depth	2.42	ft
Percent Full	82.12	
Critical Slope	0.022036	ft/ft
Velocity	15.06	ft/s
Velocity Head	3.52	ft
Specific Energy	5.58	ft
Froude Number	1.77	
Maximum Discharge	69.76	cfs
Full Flow Capacity	64.85	cfs
Full Flow Slope	0.025085	ft/ft
Flow is supercritical.		

DP SD-9 Storm
Worksheet for Circular Channel

Project Description	
Project File	x:\2980000.all\2984000\flowmaster\springcr.fm2
Worksheet	Design Point SD-9
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.025000	ft/ft
Diameter	42.00	in
Discharge	158.61	cfs

Results		
Depth	2.86	ft
Flow Area	8.42	ft^2
Wetted Perimeter	7.90	ft
Top Width	2.71	ft
Critical Depth	3.41	ft
Percent Full	81.70	
Critical Slope	0.022011	ft/ft
Velocity	18.85	ft/s
Velocity Head	5.52	ft
Specific Energy	8.38	ft
Froude Number	1.88	
Maximum Discharge	171.11	cfs
Full Flow Capacity	159.07	cfs
Full Flow Slope	0.024856	ft/ft
Flow is supercritical.		

DP SD-10 Storm
Worksheet for Circular Channel

Project Description	
Project File	x:\2980000.all\2984000\flowmaster\springcr.fm2
Worksheet	Design Point SD-10
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.015000	ft/ft
Diameter	48.00	in
Discharge	179.89	cfs

Results		
Depth	3.37	ft
Flow Area	11.29	ft^2
Wetted Perimeter	9.29	ft
Top Width	2.92	ft
Critical Depth	3.77	ft
Percent Full	84.16	
Critical Slope	0.013561	ft/ft
Velocity	15.94	ft/s
Velocity Head	3.95	ft
Specific Energy	7.31	ft
Froude Number	1.43	
Maximum Discharge	189.23	cfs
Full Flow Capacity	175.92	cfs
Full Flow Slope	0.015685	ft/ft
Flow is supercritical.		

DP SD-11 Storm
Worksheet for Circular Channel

Project Description	
Project File	x:\2980000.all\2984000\flowmaster\springcr.fm2
Worksheet	Design Point SD-11
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.015000	ft/ft
Diameter	48.00	in
Discharge	188.49	cfs

Results		
Depth	3.66	ft
Flow Area	12.04	ft^2
Wetted Perimeter	10.18	ft
Top Width	2.24	ft
Critical Depth	3.81	ft
Percent Full	91.39	
Critical Slope	0.014930	ft/ft
Velocity	15.65	ft/s
Velocity Head	3.81	ft
Specific Energy	7.46	ft
Froude Number	1.19	
Maximum Discharge	189.23	cfs
Full Flow Capacity	175.92	cfs
Full Flow Slope	0.017221	ft/ft
Flow is supercritical.		

Basin PNE-6 Storm
Worksheet for Circular Channel

Project Description	
Project File	x:\2980000.all\2984000\flowmaster\springcr.fm2
Worksheet	Basin PNE-6
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.015000	ft/ft
Diameter	24.00	in
Discharge	26.43	cfs

Results		
Depth	1.56	ft
Flow Area	2.63	ft^2
Wetted Perimeter	4.34	ft
Top Width	1.65	ft
Critical Depth	1.80	ft
Percent Full	78.11	
Critical Slope	0.012040	ft/ft
Velocity	10.04	ft/s
Velocity Head	1.57	ft
Specific Energy	3.13	ft
Froude Number	1.40	
Maximum Discharge	29.80	cfs
Full Flow Capacity	27.71	cfs
Full Flow Slope	0.013651	ft/ft
Flow is supercritical.		

Basin PNE-7 Storm
Worksheet for Circular Channel

Project Description	
Project File	x:\2980000.all\2984000\flowmaster\springcr.fm2
Worksheet	Basin PNE-7
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.025000	ft/ft
Diameter	24.00	in
Discharge	34.22	cfs

Results		
Depth	1.57	ft
Flow Area	2.64	ft^2
Wetted Perimeter	4.35	ft
Top Width	1.65	ft
Critical Depth	1.91	ft
Percent Full	78.33	
Critical Slope	0.019889	ft/ft
Velocity	12.96	ft/s
Velocity Head	2.61	ft
Specific Energy	4.18	ft
Froude Number	1.81	
Maximum Discharge	38.47	cfs
Full Flow Capacity	35.77	cfs
Full Flow Slope	0.022884	ft/ft
Flow is supercritical.		

DP SD-1 Storm
Worksheet for Circular Channel

Project Description	
Project File	x:\2980000.all\2984000\flowmaster\springcr.fm2
Worksheet	Design Point SD-1
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.020000	ft/ft
Diameter	30.00	in
Discharge	59.00	cfs

Results		
Depth	2.09	ft
Flow Area	4.38	ft^2
Wetted Perimeter	5.77	ft
Top Width	1.85	ft
Critical Depth	2.39	ft
Percent Full	83.60	
Critical Slope	0.017962	ft/ft
Velocity	13.46	ft/s
Velocity Head	2.82	ft
Specific Energy	4.91	ft
Froude Number	1.54	
Maximum Discharge	62.40	cfs
Full Flow Capacity	58.00	cfs
Full Flow Slope	0.020693	ft/ft
Flow is supercritical.		

DP SD-12 Storm Outfall
Worksheet for Circular Channel

Project Description	
Project File	x:\2980000.all\2984000\flowmaster\springcr.fm2
Worksheet	Design Point SD-12
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.025000	ft/ft
Diameter	48.00	in
Discharge	233.42	cfs

Results		
Depth	3.39	ft
Flow Area	11.35	ft^2
Wetted Perimeter	9.35	ft
Top Width	2.88	ft
Critical Depth	3.92	ft
Percent Full	84.71	
Critical Slope	0.023590	ft/ft
Velocity	20.56	ft/s
Velocity Head	6.57	ft
Specific Energy	9.96	ft
Froude Number	1.83	
Maximum Discharge	244.30	cfs
Full Flow Capacity	227.11	cfs
Full Flow Slope	0.026409	ft/ft
Flow is supercritical.		

Basin PNE-11 Storm
Worksheet for Circular Channel

Project Description	
Project File	x:\2980000.all\2984000\flowmaster\springcr.fm2
Worksheet	Basin PNE-11
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.025000	ft/ft
Diameter	18.00	in
Discharge	16.52	cfs

Results		
Depth	1.22	ft
Flow Area	1.54	ft^2
Wetted Perimeter	3.38	ft
Top Width	1.17	ft
Critical Depth	1.43	ft
Percent Full	81.49	
Critical Slope	0.021479	ft/ft
Velocity	10.71	ft/s
Velocity Head	1.78	ft
Specific Energy	3.01	ft
Froude Number	1.64	
Maximum Discharge	17.87	cfs
Full Flow Capacity	16.61	cfs
Full Flow Slope	0.024736	ft/ft
Flow is supercritical.		

DP SD-13 Storm Outfall
Worksheet for Circular Channel

Project Description	
Project File	x:\2980000.all\2984000\flowmaster\springcr.fm2
Worksheet	Design Point SD-13
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.025000	ft/ft
Diameter	30.00	in
Discharge	67.75	cfs

Results		
Depth	2.17	ft
Flow Area	4.52	ft²
Wetted Perimeter	5.99	ft
Top Width	1.70	ft
Critical Depth	2.43	ft
Percent Full	86.69	
Critical Slope	0.024126	ft/ft
Velocity	14.99	ft/s
Velocity Head	3.49	ft
Specific Energy	5.66	ft
Froude Number	1.62	
Maximum Discharge	69.76	cfs
Full Flow Capacity	64.85	cfs
Full Flow Slope	0.027286	ft/ft
Flow is supercritical.		

DP SD-14 Storm
Worksheet for Circular Channel

Project Description	
Project File	x:\2980000.all\2984000\flowmaster\springcr.fm2
Worksheet	Design Point SD-14
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.015000	ft/ft
Diameter	24.00	in
Discharge	27.08	cfs

Results		
Depth	1.60	ft
Flow Area	2.69	ft^2
Wetted Perimeter	4.43	ft
Top Width	1.60	ft
Critical Depth	1.81	ft
Percent Full	80.00	
Critical Slope	0.012562	ft/ft
Velocity	10.05	ft/s
Velocity Head	1.57	ft
Specific Energy	3.17	ft
Froude Number	1.37	
Maximum Discharge	29.80	cfs
Full Flow Capacity	27.71	cfs
Full Flow Slope	0.014331	ft/ft
Flow is supercritical.		

DP SD-15 Storm
Worksheet for Circular Channel

Project Description	
Project File	x:\2980000.all\2984000\flowmaster\springcr.fm2
Worksheet	Design Point SD-15
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.010000	ft/ft
Diameter	36.00	in
Discharge	46.82	cfs

Results		
Depth	1.85	ft
Flow Area	4.58	ft^2
Wetted Perimeter	5.43	ft
Top Width	2.92	ft
Critical Depth	2.23	ft
Percent Full	61.77	
Critical Slope	0.006058	ft/ft
Velocity	10.22	ft/s
Velocity Head	1.62	ft
Specific Energy	3.47	ft
Froude Number	1.44	
Maximum Discharge	71.74	cfs
Full Flow Capacity	66.69	cfs
Full Flow Slope	0.004928	ft/ft
Flow is supercritical.		

DP SD-16 Storm
Worksheet for Circular Channel

Project Description	
Project File	x:\2980000.all\2984000\flowmaster\springcr.fm2
Worksheet	Design Point SD-16
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.010000	ft/ft
Diameter	36.00	in
Discharge	71.23	cfs

Results		
Depth	2.71	ft
Flow Area	6.73	ft^2
Wetted Perimeter	7.54	ft
Top Width	1.76	ft
Critical Depth	2.67	ft
Percent Full	90.48	
Critical Slope	0.010128	ft/ft
Velocity	10.59	ft/s
Velocity Head	1.74	ft
Specific Energy	4.46	ft
Froude Number	0.96	
Maximum Discharge	71.74	cfs
Full Flow Capacity	66.69	cfs
Full Flow Slope	0.011406	ft/ft
Flow is subcritical.		

DP SD-17 Storm
Worksheet for Circular Channel

Project Description	
Project File	x:\2980000.all\2984000\flowmaster\springcr.fm2
Worksheet	Design Point SD-17
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.015000	ft/ft
Diameter	36.00	in
Discharge	85.34	cfs

Results		
Depth	2.60	ft
Flow Area	6.51	ft^2
Wetted Perimeter	7.18	ft
Top Width	2.04	ft
Critical Depth	2.81	ft
Percent Full	86.70	
Critical Slope	0.014149	ft/ft
Velocity	13.11	ft/s
Velocity Head	2.67	ft
Specific Energy	5.27	ft
Froude Number	1.29	
Maximum Discharge	87.87	cfs
Full Flow Capacity	81.68	cfs
Full Flow Slope	0.016373	ft/ft
Flow is supercritical.		

DP SD-18 Storm
Worksheet for Circular Channel

Project Description	
Project File	x:\2980000.all\2984000\flowmaster\springcr.fm2
Worksheet	Design Point SD-18
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.025000	ft/ft
Diameter	36.00	in
Discharge	106.97	cfs

Results		
Depth	2.50	ft
Flow Area	6.29	ft^2
Wetted Perimeter	6.90	ft
Top Width	2.24	ft
Critical Depth	2.92	ft
Percent Full	83.33	
Critical Slope	0.022749	ft/ft
Velocity	17.00	ft/s
Velocity Head	4.49	ft
Specific Energy	6.99	ft
Froude Number	1.79	
Maximum Discharge	113.44	cfs
Full Flow Capacity	105.45	cfs
Full Flow Slope	0.025724	ft/ft
Flow is supercritical.		

Basin PSE-6 and POS-5 Storm
Worksheet for Circular Channel

Project Description	
Project File	x:\2980000.all\2984000\flowmaster\springcr.fm2
Worksheet	Basin PSE-6
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.015000	ft/ft
Diameter	18.00	in
Discharge	11.41	cfs

Results		
Depth	1.10	ft
Flow Area	1.39	ft^2
Wetted Perimeter	3.08	ft
Top Width	1.33	ft
Critical Depth	1.29	ft
Percent Full	73.27	
Critical Slope	0.010938	ft/ft
Velocity	8.22	ft/s
Velocity Head	1.05	ft
Specific Energy	2.15	ft
Froude Number	1.42	
Maximum Discharge	13.84	cfs
Full Flow Capacity	12.86	cfs
Full Flow Slope	0.011800	ft/ft
Flow is supercritical.		

DP SD-19 Storm
Worksheet for Circular Channel

Project Description	
Project File	x:\2980000.all\2984000\flowmaster\springcr.fm2
Worksheet	Design Point SD-19
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.035000	ft/ft
Diameter	36.00	in
Discharge	126.52	cfs

Results		
Depth	2.50	ft
Flow Area	6.29	ft^2
Wetted Perimeter	6.90	ft
Top Width	2.24	ft
Critical Depth	2.96	ft
Percent Full	83.29	
Critical Slope	0.032718	ft/ft
Velocity	20.11	ft/s
Velocity Head	6.29	ft
Specific Energy	8.78	ft
Froude Number	2.11	
Maximum Discharge	134.22	cfs
Full Flow Capacity	124.77	cfs
Full Flow Slope	0.035986	ft/ft
Flow is supercritical.		

DP SD-20 Storm
Worksheet for Circular Channel

Project Description	
Project File	x:\2980000.all\2984000\flowmaster\springcr.fm2
Worksheet	Design Point SD-20
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.050000	ft/ft
Diameter	36.00	in
Discharge	148.59	cfs

Results		
Depth	2.45	ft
Flow Area	6.18	ft²
Wetted Perimeter	6.77	ft
Top Width	2.32	ft
Critical Depth	2.98	ft
Percent Full	81.63	
Critical Slope	0.046214	ft/ft
Velocity	24.05	ft/s
Velocity Head	8.99	ft
Specific Energy	11.44	ft
Froude Number	2.60	
Maximum Discharge	160.42	cfs
Full Flow Capacity	149.13	cfs
Full Flow Slope	0.049636	ft/ft
Flow is supercritical.		

DP B Storm
Worksheet for Circular Channel

Project Description	
Project File	x:\2980000.all\2984000\flowmaster\springcr.fm2
Worksheet	DP C
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.060000	ft/ft
Diameter	36.00	in
Discharge	156.95	cfs

Results		
Depth	2.36	ft
Flow Area	5.96	ft^2
Wetted Perimeter	6.54	ft
Top Width	2.46	ft
Critical Depth	2.98	ft
Percent Full	78.64	
Critical Slope	0.051922	ft/ft
Velocity	26.32	ft/s
Velocity Head	10.77	ft
Specific Energy	13.13	ft
Froude Number	2.98	
Maximum Discharge	175.74	cfs
Full Flow Capacity	163.37	cfs
Full Flow Slope	0.055378	ft/ft
Flow is supercritical.		

Basin PSW-2 Storm
Worksheet for Circular Channel

Project Description	
Project File	x:\2980000.all\2984000\flowmaster\springcr.fm2
Worksheet	Basin PSW-2
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.015000	ft/ft
Diameter	24.00	in
Discharge	25.20	cfs

Results		
Depth	1.50	ft
Flow Area	2.52	ft^2
Wetted Perimeter	4.18	ft
Top Width	1.74	ft
Critical Depth	1.77	ft
Percent Full	74.84	
Critical Slope	0.011119	ft/ft
Velocity	9.99	ft/s
Velocity Head	1.55	ft
Specific Energy	3.05	ft
Froude Number	1.46	
Maximum Discharge	29.80	cfs
Full Flow Capacity	27.71	cfs
Full Flow Slope	0.012410	ft/ft
Flow is supercritical.		

DP SD-21 Storm
Worksheet for Circular Channel

Project Description	
Project File	x:\2980000.all\2984000\flowmaster\springcr.fm2
Worksheet	Design Point SD-21
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.015000	ft/ft
Diameter	30.00	in
Discharge	44.29	cfs

Results		
Depth	1.82	ft
Flow Area	3.83	ft^2
Wetted Perimeter	5.12	ft
Top Width	2.22	ft
Critical Depth	2.21	ft
Percent Full	72.92	
Critical Slope	0.010424	ft/ft
Velocity	11.55	ft/s
Velocity Head	2.07	ft
Specific Energy	3.90	ft
Froude Number	1.55	
Maximum Discharge	54.04	cfs
Full Flow Capacity	50.23	cfs
Full Flow Slope	0.011661	ft/ft
Flow is supercritical.		

DP SD-22 Storm
Worksheet for Circular Channel

Project Description	
Project File	x:\2980000.all\2984000\flowmaster\springcr.fm2
Worksheet	Design Point SD-22
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.020000	ft/ft
Diameter	30.00	in
Discharge	60.19	cfs

Results		
Depth	2.15	ft
Flow Area	4.48	ft^2
Wetted Perimeter	5.92	ft
Top Width	1.74	ft
Critical Depth	2.39	ft
Percent Full	85.83	
Critical Slope	0.018731	ft/ft
Velocity	13.42	ft/s
Velocity Head	2.80	ft
Specific Energy	4.95	ft
Froude Number	1.48	
Maximum Discharge	62.40	cfs
Full Flow Capacity	58.00	cfs
Full Flow Slope	0.021536	ft/ft
Flow is supercritical.		

Basin PSW-7 Storm
Worksheet for Circular Channel

Project Description	
Project File	x:\2980000.all\2984000\flowmaster\springcr.fm2
Worksheet	Basin PSW-7
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.020000	ft/ft
Diameter	18.00	in
Discharge	14.93	cfs

Results		
Depth	1.24	ft
Flow Area	1.56	ft^2
Wetted Perimeter	3.41	ft
Top Width	1.14	ft
Critical Depth	1.40	ft
Percent Full	82.43	
Critical Slope	0.017461	ft/ft
Velocity	9.58	ft/s
Velocity Head	1.43	ft
Specific Energy	2.66	ft
Froude Number	1.45	
Maximum Discharge	15.98	cfs
Full Flow Capacity	14.85	cfs
Full Flow Slope	0.020204	ft/ft
Flow is supercritical.		

Basin PSW-8 Storm
Worksheet for Circular Channel

Project Description	
Project File	x:\2980000.all\2984000\flowmaster\springcr.fm2
Worksheet	Basin PSW-8
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.010000	ft/ft
Diameter	18.00	in
Discharge	8.89	cfs

Results		
Depth	1.06	ft
Flow Area	1.33	ft^2
Wetted Perimeter	2.99	ft
Top Width	1.37	ft
Critical Depth	1.15	ft
Percent Full	70.59	
Critical Slope	0.008134	ft/ft
Velocity	6.67	ft/s
Velocity Head	0.69	ft
Specific Energy	1.75	ft
Froude Number	1.19	
Maximum Discharge	11.30	cfs
Full Flow Capacity	10.50	cfs
Full Flow Slope	0.007163	ft/ft
Flow is supercritical.		

DP SD-23 Storm
Worksheet for Circular Channel

Project Description	
Project File	x:\2980000.all\2984000\flowmaster\springcr.fm2
Worksheet	Design Point SD-23
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.010000	ft/ft
Diameter	24.00	in
Discharge	23.82	cfs

Results		
Depth	1.76	ft
Flow Area	2.92	ft^2
Wetted Perimeter	4.86	ft
Top Width	1.31	ft
Critical Depth	1.73	ft
Percent Full	87.82	
Critical Slope	0.010187	ft/ft
Velocity	8.15	ft/s
Velocity Head	1.03	ft
Specific Energy	2.79	ft
Froude Number	0.96	
Maximum Discharge	24.33	cfs
Full Flow Capacity	22.62	cfs
Full Flow Slope	0.011088	ft/ft
Flow is subcritical.		

DP SD-24 Storm
Worksheet for Circular Channel

Project Description	
Project File	x:\2980000.all\2984000\flowmaster\springcr.fm2
Worksheet	Design Point SD-24
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.015000	ft/ft
Diameter	30.00	in
Discharge	50.02	cfs

Results		
Depth	2.04	ft
Flow Area	4.29	ft²
Wetted Perimeter	5.64	ft
Top Width	1.94	ft
Critical Depth	2.30	ft
Percent Full	81.58	
Critical Slope	0.012911	ft/ft
Velocity	11.67	ft/s
Velocity Head	2.12	ft
Specific Energy	4.15	ft
Froude Number	1.38	
Maximum Discharge	54.04	cfs
Full Flow Capacity	50.23	cfs
Full Flow Slope	0.014873	ft/ft
Flow is supercritical.		

Basin PSW-6A Storm
Worksheet for Circular Channel

Project Description	
Project File	x:\2980000.all\2984000\flowmaster\springcr.fm2
Worksheet	Basin PSW-6A
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.015000	ft/ft
Diameter	18.00	in
Discharge	12.15	cfs

Results		
Depth	1.16	ft
Flow Area	1.47	ft^2
Wetted Perimeter	3.23	ft
Top Width	1.26	ft
Critical Depth	1.32	ft
Percent Full	77.38	
Critical Slope	0.012037	ft/ft
Velocity	8.28	ft/s
Velocity Head	1.07	ft
Specific Energy	2.23	ft
Froude Number	1.35	
Maximum Discharge	13.84	cfs
Full Flow Capacity	12.86	cfs
Full Flow Slope	0.013380	ft/ft
Flow is supercritical.		

DP SD-25 Storm
Worksheet for Circular Channel

Project Description	
Project File	x:\2980000.all\2984000\flowmaster\springcr.fm2
Worksheet	Design Point SD-25
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.015000	ft/ft
Diameter	36.00	in
Discharge	82.63	cfs

Results		
Depth	2.49	ft
Flow Area	6.28	ft²
Wetted Perimeter	6.88	ft
Top Width	2.25	ft
Critical Depth	2.79	ft
Percent Full	83.05	
Critical Slope	0.013274	ft/ft
Velocity	13.17	ft/s
Velocity Head	2.69	ft
Specific Energy	5.19	ft
Froude Number	1.39	
Maximum Discharge	87.87	cfs
Full Flow Capacity	81.68	cfs
Full Flow Slope	0.015349	ft/ft
Flow is supercritical.		

DP SD-26 Storm
Worksheet for Circular Channel

Project Description	
Project File	x:\2980000.all\2984000\flowmaster\springcr.fm2
Worksheet	Design Point SD-26
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.020000	ft/ft
Diameter	42.00	in
Discharge	135.16	cfs

Results		
Depth	2.72	ft
Flow Area	8.03	ft²
Wetted Perimeter	7.56	ft
Top Width	2.91	ft
Critical Depth	3.33	ft
Percent Full	77.80	
Critical Slope	0.015650	ft/ft
Velocity	16.83	ft/s
Velocity Head	4.40	ft
Specific Energy	7.12	ft
Froude Number	1.79	
Maximum Discharge	153.05	cfs
Full Flow Capacity	142.28	cfs
Full Flow Slope	0.018049	ft/ft
Flow is supercritical.		

DP SD-27 Storm
Worksheet for Circular Channel

Project Description	
Project File	x:\2980000.all\2984000\flowmaster\springcr.fm2
Worksheet	Design Point SD-27
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.020000	ft/ft
Diameter	48.00	in
Discharge	194.89	cfs

Results		
Depth	3.14	ft
Flow Area	10.59	ft^2
Wetted Perimeter	8.71	ft
Top Width	3.28	ft
Critical Depth	3.83	ft
Percent Full	78.54	
Critical Slope	0.016012	ft/ft
Velocity	18.41	ft/s
Velocity Head	5.27	ft
Specific Energy	8.41	ft
Froude Number	1.81	
Maximum Discharge	218.51	cfs
Full Flow Capacity	203.13	cfs
Full Flow Slope	0.018410	ft/ft
Flow is supercritical.		

DP SD-28 Storm
Worksheet for Circular Channel

Project Description	
Project File	x:\2980000.all\2984000\flowmaster\springcr.fm2
Worksheet	Design Point SD-28
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.025000	ft/ft
Diameter	48.00	in
Discharge	240.94	cfs

Results		
Depth	3.56	ft
Flow Area	11.82	ft^2
Wetted Perimeter	9.87	ft
Top Width	2.50	ft
Critical Depth	3.92	ft
Percent Full	89.08	
Critical Slope	0.025268	ft/ft
Velocity	20.38	ft/s
Velocity Head	6.46	ft
Specific Energy	10.02	ft
Froude Number	1.65	
Maximum Discharge	244.30	cfs
Full Flow Capacity	227.11	cfs
Full Flow Slope	0.028138	ft/ft
Flow is supercritical.		

Basin PNW-14 Storm
Worksheet for Circular Channel

Project Description	
Project File	x:\2980000.all\2984000\flowmaster\springcr.fm2
Worksheet	Basin PNW-14
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.025000	ft/ft
Diameter	24.00	in
Discharge	37.36	cfs

Results		
Depth	1.73	ft
Flow Area	2.89	ft^2
Wetted Perimeter	4.79	ft
Top Width	1.36	ft
Critical Depth	1.94	ft
Percent Full	86.67	
Critical Slope	0.023978	ft/ft
Velocity	12.92	ft/s
Velocity Head	2.59	ft
Specific Energy	4.33	ft
Froude Number	1.56	
Maximum Discharge	38.47	cfs
Full Flow Capacity	35.77	cfs
Full Flow Slope	0.027276	ft/ft
Flow is supercritical.		

DP SD-29 Storm
Worksheet for Circular Channel

Project Description	
Project File	x:\2980000.all\2984000\flowmaster\springcr.fm2
Worksheet	Design Point SD-29
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.020000	ft/ft
Diameter	30.00	in
Discharge	57.26	cfs

Results		
Depth	2.02	ft
Flow Area	4.25	ft^2
Wetted Perimeter	5.59	ft
Top Width	1.97	ft
Critical Depth	2.37	ft
Percent Full	80.82	
Critical Slope	0.016877	ft/ft
Velocity	13.47	ft/s
Velocity Head	2.82	ft
Specific Energy	4.84	ft
Froude Number	1.62	
Maximum Discharge	62.40	cfs
Full Flow Capacity	58.00	cfs
Full Flow Slope	0.019490	ft/ft
Flow is supercritical.		

DP SD-30 Storm
Worksheet for Circular Channel

Project Description	
Project File	x:\2980000.all\2984000\flowmaster\springcr.fm2
Worksheet	Design Point SD-30
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.015000	ft/ft
Diameter	36.00	in
Discharge	84.50	cfs

Results		
Depth	2.56	ft
Flow Area	6.43	ft²
Wetted Perimeter	7.08	ft
Top Width	2.12	ft
Critical Depth	2.81	ft
Percent Full	85.45	
Critical Slope	0.013873	ft/ft
Velocity	13.14	ft/s
Velocity Head	2.68	ft
Specific Energy	5.25	ft
Froude Number	1.33	
Maximum Discharge	87.87	cfs
Full Flow Capacity	81.68	cfs
Full Flow Slope	0.016052	ft/ft
Flow is supercritical.		

Basin PNW-8 Storm
Worksheet for Circular Channel

Project Description	
Project File	x:\2980000.all\2984000\flowmaster\springcr.fm2
Worksheet	Basin PNW-8
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.030000	ft/ft
Diameter	18.00	in
Discharge	19.00	cfs

Results		
Depth	1.30	ft
Flow Area	1.63	ft²
Wetted Perimeter	3.59	ft
Top Width	1.02	ft
Critical Depth	1.46	ft
Percent Full	86.65	
Critical Slope	0.028958	ft/ft
Velocity	11.68	ft/s
Velocity Head	2.12	ft
Specific Energy	3.42	ft
Froude Number	1.63	
Maximum Discharge	19.57	cfs
Full Flow Capacity	18.19	cfs
Full Flow Slope	0.032720	ft/ft
Flow is supercritical.		

DP SD-31 Storm
Worksheet for Circular Channel

Project Description	
Project File	x:\2980000.all\2984000\flowmaster\springcr.fm2
Worksheet	Design Point SD-31
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.025000	ft/ft
Diameter	36.00	in
Discharge	103.50	cfs

Results		
Depth	2.41	ft
Flow Area	6.09	ft^2
Wetted Perimeter	6.67	ft
Top Width	2.38	ft
Critical Depth	2.91	ft
Percent Full	80.34	
Critical Slope	0.021188	ft/ft
Velocity	17.01	ft/s
Velocity Head	4.49	ft
Specific Energy	6.90	ft
Froude Number	1.88	
Maximum Discharge	113.44	cfs
Full Flow Capacity	105.45	cfs
Full Flow Slope	0.024082	ft/ft
Flow is supercritical.		

DP SD-32 Storm
Worksheet for Circular Channel

Project Description	
Project File	x:\2980000.all\2984000\flowmaster\springcr.fm2
Worksheet	Design Point SD-32
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.025000	ft/ft
Diameter	42.00	in
Discharge	169.06	cfs

Results		
Depth	3.13	ft
Flow Area	9.08	ft²
Wetted Perimeter	8.68	ft
Top Width	2.15	ft
Critical Depth	3.43	ft
Percent Full	89.42	
Critical Slope	0.025272	ft/ft
Velocity	18.63	ft/s
Velocity Head	5.39	ft
Specific Energy	8.52	ft
Froude Number	1.60	
Maximum Discharge	171.11	cfs
Full Flow Capacity	159.07	cfs
Full Flow Slope	0.028239	ft/ft
Flow is supercritical.		

Basin PNW-11 Storm
Worksheet for Circular Channel

Project Description	
Project File	x:\2980000.all\2984000\flowmaster\springcr.fm2
Worksheet	Basin PNW-11
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.010000	ft/ft
Diameter	18.00	in
Discharge	7.26	cfs

Results		
Depth	0.92	ft
Flow Area	1.13	ft^2
Wetted Perimeter	2.69	ft
Top Width	1.46	ft
Critical Depth	1.04	ft
Percent Full	61.13	
Critical Slope	0.006925	ft/ft
Velocity	6.41	ft/s
Velocity Head	0.64	ft
Specific Energy	1.56	ft
Froude Number	1.29	
Maximum Discharge	11.30	cfs
Full Flow Capacity	10.50	cfs
Full Flow Slope	0.004777	ft/ft
Flow is supercritical.		

Basin PNW-12 Storm
Worksheet for Circular Channel

Project Description	
Project File	x:\2980000.all\2984000\flowmaster\springcr.fm2
Worksheet	Basin PNW-12
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.045000	ft/ft
Diameter	18.00	in
Discharge	23.57	cfs

Results		
Depth	1.33	ft
Flow Area	1.66	ft²
Wetted Perimeter	3.68	ft
Top Width	0.95	ft
Critical Depth	1.48	ft
Percent Full	88.56	
Critical Slope	0.046160	ft/ft
Velocity	14.24	ft/s
Velocity Head	3.15	ft
Specific Energy	4.48	ft
Froude Number	1.91	
Maximum Discharge	23.97	cfs
Full Flow Capacity	22.28	cfs
Full Flow Slope	0.050353	ft/ft
Flow is supercritical.		

DP SD-33 Storm
Worksheet for Circular Channel

Project Description	
Project File	x:\2980000.all\2984000\flowmaster\springcr.fm2
Worksheet	Design Point SD-33
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.015000	ft/ft
Diameter	30.00	in
Discharge	53.34	cfs

Results		
Depth	2.23	ft
Flow Area	4.62	ft^2
Wetted Perimeter	6.18	ft
Top Width	1.55	ft
Critical Depth	2.34	ft
Percent Full	89.24	
Critical Slope	0.014618	ft/ft
Velocity	11.53	ft/s
Velocity Head	2.07	ft
Specific Energy	4.30	ft
Froude Number	1.18	
Maximum Discharge	54.04	cfs
Full Flow Capacity	50.23	cfs
Full Flow Slope	0.016913	ft/ft
Flow is supercritical.		

Basin PNW-2 Storm
Worksheet for Circular Channel

Project Description	
Project File	x:\2980000.all\2984000\flowmaster\springcr.fm2
Worksheet	Basin PNW-2
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.020000	ft/ft
Diameter	24.00	in
Discharge	32.38	cfs

Results		
Depth	1.66	ft
Flow Area	2.79	ft^2
Wetted Perimeter	4.59	ft
Top Width	1.50	ft
Critical Depth	1.89	ft
Percent Full	83.11	
Critical Slope	0.017729	ft/ft
Velocity	11.60	ft/s
Velocity Head	2.09	ft
Specific Energy	3.75	ft
Froude Number	1.50	
Maximum Discharge	34.41	cfs
Full Flow Capacity	31.99	cfs
Full Flow Slope	0.020489	ft/ft
Flow is supercritical.		

Basin PNW-4 Storm
Worksheet for Circular Channel

Project Description	
Project File	x:\2980000.all\2984000\flowmaster\springcr.fm2
Worksheet	Basin PNW-4
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.015000	ft/ft
Diameter	18.00	in
Discharge	13.70	cfs

Results		
Depth	1.35	ft
Flow Area	1.67	ft^2
Wetted Perimeter	3.74	ft
Top Width	0.91	ft
Critical Depth	1.37	ft
Percent Full	89.83	
Critical Slope	0.014805	ft/ft
Velocity	8.19	ft/s
Velocity Head	1.04	ft
Specific Energy	2.39	ft
Froude Number	1.06	
Maximum Discharge	13.84	cfs
Full Flow Capacity	12.86	cfs
Full Flow Slope	0.017012	ft/ft
Flow is supercritical.		

Basin PNW-5 Storm
Worksheet for Circular Channel

Project Description	
Project File	x:\2980000.all\2984000\flowmaster\springcr.fm2
Worksheet	Basin PNW-5
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.015000	ft/ft
Diameter	24.00	in
Discharge	26.67	cfs

Results		
Depth	1.58	ft
Flow Area	2.66	ft^2
Wetted Perimeter	4.37	ft
Top Width	1.64	ft
Critical Depth	1.80	ft
Percent Full	78.79	
Critical Slope	0.012230	ft/ft
Velocity	10.04	ft/s
Velocity Head	1.57	ft
Specific Energy	3.14	ft
Froude Number	1.39	
Maximum Discharge	29.80	cfs
Full Flow Capacity	27.71	cfs
Full Flow Slope	0.013900	ft/ft
Flow is supercritical.		

Basin PNW-15 Storm
Worksheet for Circular Channel

Project Description	
Project File	x:\2980000.all\2984000\flowmaster\springcr.fm2
Worksheet	Basin PNW-15
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.010000	ft/ft
Diameter	24.00	in
Discharge	20.88	cfs

Results		
Depth	1.52	ft
Flow Area	2.55	ft^2
Wetted Perimeter	4.23	ft
Top Width	1.71	ft
Critical Depth	1.64	ft
Percent Full	75.80	
Critical Slope	0.008535	ft/ft
Velocity	8.17	ft/s
Velocity Head	1.04	ft
Specific Energy	2.55	ft
Froude Number	1.18	
Maximum Discharge	24.33	cfs
Full Flow Capacity	22.62	cfs
Full Flow Slope	0.008520	ft/ft
Flow is supercritical.		

DP SD-34 Storm
Worksheet for Circular Channel

Project Description	
Project File	x:\2980000.all\2984000\flowmaster\springcr.fm2
Worksheet	Design Point SD-34
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.010000	ft/ft
Diameter	18.00	in
Discharge	9.08	cfs

Results		
Depth	1.08	ft
Flow Area	1.36	ft^2
Wetted Perimeter	3.03	ft
Top Width	1.35	ft
Critical Depth	1.17	ft
Percent Full	71.77	
Critical Slope	0.008301	ft/ft
Velocity	6.69	ft/s
Velocity Head	0.70	ft
Specific Energy	1.77	ft
Froude Number	1.18	
Maximum Discharge	11.30	cfs
Full Flow Capacity	10.50	cfs
Full Flow Slope	0.007473	ft/ft
Flow is supercritical.		

DP SD-35 Storm
Worksheet for Circular Channel

Project Description	
Project File	x:\2980000.all\2984000\flowmaster\springcr.fm2
Worksheet	Design Point SD-35
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.010000	ft/ft
Diameter	72.00	in
Discharge	273.91	cfs

Results		
Depth	3.51	ft
Flow Area	17.20	ft^2
Wetted Perimeter	10.45	ft
Top Width	5.91	ft
Critical Depth	4.53	ft
Percent Full	58.54	
Critical Slope	0.004949	ft/ft
Velocity	15.93	ft/s
Velocity Head	3.94	ft
Specific Energy	7.45	ft
Froude Number	1.65	
Maximum Discharge	455.55	cfs
Full Flow Capacity	423.49	cfs
Full Flow Slope	0.004183	ft/ft
Flow is supercritical.		

DP SD-36 Storm
Worksheet for Circular Channel

Project Description	
Project File	x:\2980000.all\2984000\flowmaster\springcr.fm2
Worksheet	Design Point SD-36
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.010000	ft/ft
Diameter	72.00	in
Discharge	427.33	cfs

Results		
Depth	4.97	ft
Flow Area	25.04	ft²
Wetted Perimeter	13.72	ft
Top Width	4.53	ft
Critical Depth	5.45	ft
Percent Full	82.81	
Critical Slope	0.008902	ft/ft
Velocity	17.07	ft/s
Velocity Head	4.53	ft
Specific Energy	9.50	ft
Froude Number	1.28	
Maximum Discharge	455.55	cfs
Full Flow Capacity	423.49	cfs
Full Flow Slope	0.010182	ft/ft
Flow is supercritical.		

DP SD-37 Storm
Worksheet for Circular Channel

Project Description	
Project File	x:\2980000.all\2984000\flowmaster\springcr.fm2
Worksheet	Design Point SD-37
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.015000	ft/ft
Diameter	30.00	in
Discharge	47.55	cfs

Results		
Depth	1.94	ft
Flow Area	4.08	ft²
Wetted Perimeter	5.39	ft
Top Width	2.09	ft
Critical Depth	2.27	ft
Percent Full	77.54	
Critical Slope	0.011768	ft/ft
Velocity	11.64	ft/s
Velocity Head	2.11	ft
Specific Energy	4.04	ft
Froude Number	1.47	
Maximum Discharge	54.04	cfs
Full Flow Capacity	50.23	cfs
Full Flow Slope	0.013441	ft/ft
Flow is supercritical.		

Project: 2909410 Tue Jan 22 11:05:54 2002

Point statistics:

Starting point number: 1

Current point number: 1959 ('L' indicates locked point)

Current Coordinate Listing by Point Range

Point	Northing	Easting	Elevation	Description
1950	15793.4959	18312.5060	.	5'X5'
1951	15798.1840	18320.1885	.	5'X5'
1952	15796.4768	18321.2304	.	5'X5'
1953	15815.2296	18351.9604	.	5'X5'
1954	15860.1808	18324.5293	.	5'X5'
1955	15864.3037	18322.0133	.	5'X5'
1956	15851.1924	18300.5279	.	5'X5'
1957	15847.0695	18303.0439	.	5'X5'
1958	15824.3122	18316.9313	.	5'X5'

DP SD-38 Storm
Worksheet for Circular Channel

Project Description	
Project File	x:\2980000.all\2984000\flowmaster\springcr.fm2
Worksheet	Design Point SD-38
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.020000	ft/ft
Diameter	30.00	in
Discharge	61.25	cfs

Results		
Depth	2.21	ft
Flow Area	4.59	ft^2
Wetted Perimeter	6.11	ft
Top Width	1.61	ft
Critical Depth	2.40	ft
Percent Full	88.27	
Critical Slope	0.019436	ft/ft
Velocity	13.36	ft/s
Velocity Head	2.77	ft
Specific Energy	4.98	ft
Froude Number	1.39	
Maximum Discharge	62.40	cfs
Full Flow Capacity	58.00	cfs
Full Flow Slope	0.022301	ft/ft
Flow is supercritical.		

Culvert Calculator Report
Spring Creek 78" culvert

Solve For: Discharge

Culvert Summary			
Allowable HW Elevation	5,930.00 ft	Headwater Depth/ Height	2.15
Computed Headwater Elevation	5,930.00 ft	Discharge	522.41 cfs
Inlet Control HW Elev	5,930.00 ft	Tailwater Elevation	0.00 ft
Outlet Control HW Elev	5,928.25 ft	Control Type	Inlet Control

Grades			
Upstream Invert	5,916.00 ft	Downstream Invert	5,888.00 ft
Length	415.00 ft	Constructed Slope	0.067470 ft/ft

Hydraulic Profile			
Profile	S2	Depth, Downstream	2.94 ft
Slope Type	Steep	Normal Depth	2.79 ft
Flow Regime	Supercritical	Critical Depth	5.91 ft
Velocity Downstream	35.86 ft/s	Critical Slope	0.008680 ft/ft

Section			
Section Shape	Circular	Mannings Coefficient	0.013
Section Material	Concrete	Span	6.50 ft
Section Size	78 inch	Rise	6.50 ft
Number Sections	1		

Outlet Control Properties			
Outlet Control HW Elev	5,928.25 ft	Upstream Velocity Head	4.23 ft
Ke	0.50	Entrance Loss	2.11 ft

Inlet Control Properties			
Inlet Control HW Elev	5,930.00 ft	Flow Control	Submerged
Inlet Type	Square edge w/headwall	Area Full	33.2 ft²
K	0.00980	HDS 5 Chart	1
M	2.00000	HDS 5 Scale	1
C	0.03980	Equation Form	1
Y	0.67000		

DRAINAGE MAPS