Master Development Drainage Plan (MDDP) for
High Meadows @ Springs Ranch,
Addendum to MDDP for North Range at Springs Ranch
and Final Drainage Report for
North Range @ Springs Ranch Filing Nos. 3, 4 & 5

November, 2001

Prepared for:

BRE/Springs Ranch LLC
2 N Cascade Avenue, Suite 1100
Colorado Springs, CO 80903

Prepared by:

Rockwell-Minchow Consultants, Inc.
1873 Austin Bluffs Parkway
Colorado Springs, CO 80918
475-2575

Project #01-004

Master Development Drainage Plan (MDDP) for
High Meadows @ Springs Ranch,
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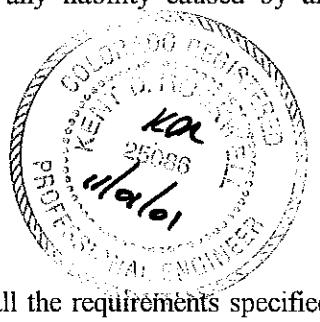
DRAINAGE PLAN STATEMENTS

ENGINEER'S STATEMENT

The attached drainage plan and report were prepared under my direction and supervision and are correct to the best of my knowledge and belief. Said drainage report has been prepared according to the criteria established by the City/County 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.

Kent D. Rockwell, P.E.



DEVELOPER'S STATEMENT

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

BRE/SPRINGS RANCH LLC

BY: _____ DATE 9/27/01
Donald S. Magill

TITLE: Vice President

ADDRESS: 2 N Cascade Ave., Suite 1100
Colorado Springs, CO 80903

CITY OF COLORADO SPRINGS

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

FOR CITY ENGINEER _____ 11/6/01 DATE

Master Development Drainage Plan (MDDP) for
High Meadows @ Springs Ranch,
Addendum to MDDP for North Range at Springs Ranch
and Final Drainage Report for
North Range @ Springs Ranch Filing Nos. 3, 4 & 5

GENERAL LOCATION AND DESCRIPTION

The High Meadows at Springs Ranch is located east of Peterson Road and north of North Carefree Circle and consists of approximately 115 acres. The site lies within Sections 20, 29 & 30, Township 13 South, Range 65 West of the 6th P.M., El Paso County, Colorado (see Figure 1). The site is bound on the south by The Knolls at Springs Ranch and North Range at Springs Ranch, on the west by Peterson Road, on the north by Stetson Hills Subdivision No. 13 and Barnes Road, and on the east by unplatted land in the county.

The entire site lies within the Sand Creek Drainage Basin and will be developed as +1/8 acre single family residential lots. A school site, park site and two multi-family sites also lie adjacent to or within the High Meadows Development. Existing ground cover consists of native grasses.

North Range at Springs Ranch Filing No. 3 contains 15.871 acres, Filing No. 4 contains 7.057 acres and Filing No. 5 contains 8.549 acres.

REFERENCES

1. The Springs Ranch MDDP Update (December, 1996), prepared by Kiowa Engineering, Colorado Springs, CO.

2. Final Drainage Report for North Carefree Circle, Pony Tracks Drive to East City Limit (June, 2000), prepared by Rockwell-Minchow Consultants, Inc., Colorado Springs, CO.

3. MDDP for The Knolls at Springs Ranch and Final Drainage Report for The Knolls at Springs Ranch Filing Nos. 1 & 2 (May, 1999), prepared by Rockwell-Minchow Consultants, Inc., Colorado Springs, CO.

4. The Sand Creek Drainage Basin Planning Study (March, 1996), prepared by Kiowa Engineering, Colorado Springs, CO.

5. MDDP for North Range at Springs Ranch and Final Report for North Range at Springs Ranch Filing Nos. 1 & 2 (January, 2001), prepared by Rockwell-Minchow Consultants, Inc., Colorado Springs, CO.

6. MDDP for Golf Course Heights at Springs Ranch and Final Report for Golf Course Heights at Springs Ranch Filing No. 1 (November, 2000), prepared by Rockwell-Minchow Consultants, Inc., Colorado Springs, CO.

7. Final Drainage Report for The Knolls at Springs Ranch Filing Nos. 3, 4, & 5 (August, 2000), prepared by Rockwell-Minchow Consultants, Inc., Colorado Springs, CO.

SOILS

According to the US Department of Agriculture Soil Conservation Services Soil Survey of El Paso County, The Range at Springs Ranch is underlain by the Truckton Series (Soil 97) which is classified as a Hydrologic Group "B" soil (see Figure 2). Hydrologic Group "B" was used for runoff calculation purposes.

FLOOD PLAIN STATEMENT

According to the Federal Emergency Management Agency (FEMA), as depicted on Flood Insurance Rate Map (FIRM) 08041 CO539 F (March 1997), no portion of this site lies within a designated Flood Plain. See map in Appendix.

DRAINAGE DESIGN CRITERIA

The current City of Colorado Springs and El Paso County Drainage Criteria was used in the preparation of this report. The Rational Method was used to determine the runoff quantities as required for basins containing less than 100 acres. Peak runoff was determined for both the 5 year and 100 year frequency storms.

HISTORIC DRAINAGE ANALYSIS

This portion of the report analyzes the historic runoff quantities and patterns for the site. The area has been depicted on the Historic Drainage Plan by seven (7) basins. Following is a description of each basin and the proposed runoff patterns and drainage improvements.

Basin H-I encompasses 20.7 acres at the northeast corner of the site. Runoff rates of 12.9 cfs (5yr) and 31.1 (100yr) currently sheetflow off-site to the southeast. Release rates will be held to at or below this level for the developed condition.

Basin H-II covers the majority of the site, containing 137.3 acres. Runoff rates of 58.3 cfs (5yr) and 149.0 cfs (100yr) currently sheetflow and shallow swale flow over existing pasture to the south where the runoff exits the site onto land in El Paso County. Runoff release rates from the Springs Ranch Development will be limited to historic runoff rates at the discharge point by way of a Detention Pond (Springs Ranch MDDP Update, Detention Site – DP 46).

Basins H-III, H-IV & H-V consist of the off-site areas to the east of the site that currently sheetflow onto the High Meadows and North Range sites. Runoff entering Springs Ranch will be limited to historic levels from these Basins.

Basin H-VI covers 10.5 acres at the south end of the site that currently sheetflows onto The Knolls at Springs Ranch. Runoff rates of 7.9 cfs (5yr) and 19.1 cfs (100yr) currently enter The Knolls.

Basin H-VII encompasses much of the west end of the site, containing 53.9 acres. Runoff rates of 33.7 cfs (5yr) and 81.1 cfs (100yr) currently sheetflow and shallow swale flow over existing terrain to the west onto Peterson Road.

DEVELOPED DRAINAGE ANALYSIS

This portion of the report analyzes the developed runoff quantities and patterns for the site. The area has been depicted on the Developed Drainage Plan by forty-six (46) basins. Following is a description of the basins and the proposed runoff patterns and drainage improvements.

Basin I consists of a large area of single family lots at the north end of the site near Stetson Hills Filing No. 13, covering 16.5 acres. Runoff rates of 35.6 cfs (5yr) and 71.6 (100yr) cfs will travel as street flow to a proposed 20' sump inlet and 2-6' on–grade inlets proposed in the access street from Barnes Road. A 36" RCP is proposed to exit the sump inlet to the south.

Basins II, III, IV, V & VI all encompass portions of the proposed single-family development near the northeast portion of the site. Most of the developed runoff will be collected by several proposed on-grade inlets as noted on the plan. All of the inlets will discharge to to 36" RCP mentioned above. Inlet calculations are provided in the appendix.

Basin VII covers 8.5 acres of a future multi-family site at the northeast corner of the development. Runoff rates of 19.9 cfs (5yr) and 39.9 cfs (100yr) will be generated by the Basin. A 30" RCP will be stubbed into the south end of the basin to collect the runoff.

Basins VIII & IX encompass portions of the proposed single-family development just south of the proposed multi-family site. Developed runoff will be collected by on-grade inlets connecting to the 30" RCP from Basin VII. The 30" will then join with the 36" RCP mentioned above at a junction (Design Point #1, DP #1) and exit to the south via a 42" RCP. Total runoff rates of 94.5 cfs (5yr) and 185.8 (100yr) cfs will pass through DP #1. Approximately 22 cfs will be in the street and 163.8 cfs in the 42" RCP during the 100 year storm.

Basin X consists of a strip along the easterly boundary of the development covering 2.9 acres. Runoff rates of 9.0 cfs (5yr) and 18.3 (100yr) cfs will sheetflow to the east. These rates are less than the historic rates from Basin H-I of 12.9 cfs (5yr) and 31.1 (100yr).

Basins XI, XII, XIII-A & XIII-B all cover portions of the proposed single-family development near the southeast portion of the site. Most of the developed runoff will be collected by several proposed on-grade inlets as noted on the plan. The junction of Range Creek Drive and Crow Creek Drive is DP #2, where a 48" RCP will exit to the south. Total runoff rates of 133.2 cfs (5yr) and 265.1 (100yr) cfs will pass through DP #2. Approximately 30.2 cfs will be in the street and 234.9 cfs in the 48" RCP during the 100 year storm.

Basins XIV, XV, XVI & XVII all cover portions of the proposed single-family development at the north end of North Range and some off-site area to the east. The developed runoff will be collected by a couple proposed on-grade inlets and a pair of 16' sump inlets at the intersection of Crow Creek Drive and Poplar Brook Drive as noted on the plan. This street junction is DP #3, where a 60" RCP will exit to the south. Total runoff rates of 165.8 cfs (5yr) and 342.9 (100yr) cfs will pass through DP #3. Approximately 6.4 cfs will be in the street and 336.5 cfs in the 60" RCP during the 100 year storm.

Basins XXI, XXII, XIII, XXIV & XXV all encompass portions of the proposed single-family development and future school and park near the south central portion of the site. Much of the developed runoff will be collected by several proposed on-grade inlets as noted on the plan. Most of the flows will be collected by a

pair of proposed 12' sump inlets at DP #4. The junction of Ranch Creek Drive and ?? Drive is DP #4, where a 36" RCP will exit to the south. Total runoff rates of 46.2 cfs (5yr) and 95.5 (100yr) cfs will pass through DP #4. Only minor surface flows will be in the street, the full 95.5 cfs will be in the 36" RCP during the 100 year storm.

Basin XXVI covers 3.5 acres at the northwest end of North Range Filing No. 4. Developed runoff rates of 7.8 cfs (5yr) and 15.7 (100yr) cfs will travel to a proposed 6' radial sump inlet at the intersection of Knollvale Drive and Ranch Creek Drive. The inlet will collect both the 5 yr and 100 yr flows, discharging to a junction via a 24" RCP. The junction will have a 36" RCP entering from upstream (DP #4), and a 42" RCP exiting downstream.

Basin XXVII contains 1.9 acres at the northeast end of North Range Filing No. 4. Developed runoff rates of 4.3 cfs (5yr) and 8.8 (100yr) cfs will travel to a proposed 8' on-grade inlet at the intersection of Pioneer Creek Drive and Ranch Creek Drive. The inlet will collect 4.2 cfs (100yr) cfs and bypass 4.6 cfs (100yr) down Pioneer Creek Drive to the east.

Basin XXVIII covers 10.2 acres on the west side of North Range Filing No. 4. Developed runoff rates of 20.2 cfs (5yr) and 40.7 (100yr) cfs will travel to a proposed 10' sump inlet at the intersection of Pioneer Creek Drive and Happy Jack Drive. The inlet will collect both the 5 yr and 100 yr flows. This intersection is DP #5, where a 42" RCP will exit to the east. Total runoff rates of 70.2 cfs (5yr) and 143.6 (100yr) cfs will pass through DP #5. Only minor surface flows will be in the street, the full 143.6 cfs will be in the 42" RCP during the 100 year storm.

Basin XVIII encompasses 3.6 acres at the north end of North Range Filing No. 5. Developed runoff rates of 8.0 cfs (5yr) and 16.1 (100yr) cfs will travel to a proposed 12' on-grade inlet at the intersection of Poplar Brook Drive and Campstool Drive. The inlet will collect 11.8 cfs (100yr) cfs and bypass 15.3 cfs (100yr) down Poplar Brook Drive to the south (this includes bypass flows from Basin XVII upstream).

Basin XIX contains 6.4 acres encompassing portions of North Range Filing Nos. 3, 4 & 5. Developed runoff rates of 13.4 cfs (5yr) and 26.9 (100yr) cfs will travel to a proposed 16' sump inlet at the intersection of Poplar Brook Drive and Happy Jack Drive. The inlet will collect both the 5 yr and 100 yr flows, including bypass flows from XVIII.

Basin XX covers 15.4 acres on the east side of North Range Filing No. 5 and off-site area to the east. Developed runoff rates of 12.3 cfs (5yr) and 27.2 (100yr) cfs will travel to a proposed 16' sump inlet at the intersection of Poplar Brook Drive and Happy Jack Drive. The inlet will collect both the 5 yr and 100 yr flows. This intersection is DP #6, where a 72" RCP will exit to the south. Total runoff rates of 254.2 cfs (5yr) and 509.1 (100yr) cfs will pass through DP #6. Only minor surface flows will be in the street, the full 509.1 cfs will be in the 72" RCP during the 100 year storm.

Basin XXIX covers 9.3 acres on the west side of North Range Filing No. 3, and a portion of Filing No. 2. Developed runoff rates of 15.6 cfs (5yr) and 31.2 (100yr) cfs will travel to a proposed 12' sump inlet at the low point in Happy Jack Drive. The inlet will collect both the 5 yr and 100 yr flows.

Basin XXX contains 10.1 acres on the east side of North Range Filing No. 3 and off-site area to the east. Developed runoff rates of 8.7 cfs (5yr) and 19.9 (100yr) cfs will travel to a proposed 12' sump inlet at the low point in Happy Jack Drive. The inlet will collect both the 5 yr and 100 yr flows.

Basin XXXI covers 4.6 acres on the southeast end of North Range Filing No. 3 surrounding the Detention Pond Site, and off-site area to the east. Developed runoff rates of 5.2 cfs (5yr) and 11.6 (100yr) cfs will

sheetflow to the Detention Pond (MDDP PT #46). The pond is DP #7, where a staged outlet and 48" RCP will exit to the south. Total runoff rates of 280.4 cfs (5yr) and 576.8 (100yr) cfs will enter the pond. The pond is currently under construction.

The Detention Pond release rates will be held to at or below Historic runoff rates. The pond has been designed by Kiowa Engineering using the TR-20 model that was used in the Springs Ranch MDDP Update to size the pond. Using the TR-20 model, runoff rates of 220 cfs (5yr) and 485 cfs (100yr) were obtained. Runoff rates into and out of the pond will differ from those in this report, as the Rational Method is more conservative and will show higher runoff rates than TR-20 model. Design by the TR-20 model will provide more than adequate storage, freeboard and sufficient hydraulic design to handle the developed flows. The Kiowa design provides for total release rates of 83 cfs (5yr) and 150 cfs (100yr) with storage volumes of 4.9 ac-ft & 11.9 ac-ft, respectively. Calculations by Kiowa Engineering are provided in the appendix. The Detention Pond and flows have not changed from the approved North Range at Springs Ranch MDDP.

Basins XXXII, XXXIII, XXXIV, XXXV & XXXVI all cover portions of the proposed single-family development at the northwest corner of the site. Most of the developed runoff will be collected by several proposed sump and on-grade inlets as noted on the plan. The junction of Peterson Road and Eagle Canyon Drive is DP #8, where a 30" RCP will exit to the southwest down Peterson Road. Total runoff rates of 37.6 cfs (5yr) and 75.2 (100yr) cfs will pass through DP #8. Approximately 14.1 cfs will be in the street and 61.1 cfs in the 30" RCP during the 100 year storm.

Basins XXXVII, XXXVIII & XXXIX all encompass portions of the proposed single-family development at the west central portion of the site. Most of the developed runoff will be collected by several proposed sump and on-grade inlets as noted on the plan. The junction of Peterson Road and Cold Springs Drive is DP #9, where a 36" RCP will exit to the southwest down Peterson Road. Total runoff rates of 56.9 cfs (5yr) and 114.2 (100yr) cfs will pass through DP #9. Only minor surface flows will be in the street, the full 114.2 cfs will be in the 36" RCP during the 100 year storm.

Basins XXXX & XXXXI contain portions of the proposed multi-family development and school at the west end of the site. Most of the developed runoff will be collected by several proposed sump and on-grade inlets as noted on the plan. The junction of Peterson Road and Lyndhurst Drive is DP #10, where a 48" RCP will exit to the south down Peterson Road. Total runoff rates of 86.3 cfs (5yr) and 172.4 (100yr) cfs will pass through DP #10. Only minor surface flows will be in the street, the full 172.4 cfs will be in the 36" RCP during the 100 year storm. A 30" RCP has been stubbed to the northern portion of the multi-family site to collect runoff on-site.

Basins XXXXII & XXXXIII contain portions of the proposed multi-family and single-family development at the west end of the site. All of the developed runoff will be collected by several proposed sump and one on-grade inlet as noted on the plan. The low point in Round Hill Drive is DP #11, where a 36" RCP will exit to the west to an existing 36" RCP stub from Peterson Road. Total runoff rates of 33.5 cfs (5yr) and 67.6 (100yr) cfs will pass through DP #11 in the 36" RCP. A 30" RCP will be stubbed to the southern portion of the multi-family site to collect runoff on-site.

Basin XXXXIV encompasses 3.0 acres at the southwest end of the site consisting of the back of several lots along Peterson Road. Developed runoff rates of 8.1 cfs (5yr) and 16.4 (100yr) cfs will sheetflow to Peterson Road and an existing 20' sump inlet. The inlet will collect all of the runoff as indicated in the Golf Course Heights MDDP.

The drainage facilities in Peterson Road from the existing low point near Golf Club Drive north to Cold Springs Drive have been installed. The Golf Course Heights MDDP and facilities installed have accounted for all of the runoff traveling to Peterson Road described in this report. The ultimate outfall is an existing 54" RCP that discharges just east of Sand Creek near the Hole 12 tee box on the Springs Ranch Golf Course. The minor existing erosion where the drainage discharges into Sand Creek will be mitigated by Springs Ranch prior to the upcoming Spring of 2002. City Engineering Inspections will be notified upon completion of the repairs.

Basin XXXXV covers 4.2 acres on the southerly portion of the site, backing up to The Knolls at Springs Ranch. Developed runoff rates of 11.3 cfs (5yr) and 22.9 (100yr) cfs will sheetflow to the south from the proposed lots. The Knolls at Springs Ranch MDDP and subsequent reports have accounted for this runoff.

Street capacities will not be exceeded within the proposed development under this drainage plan and report. All streets, except Lyndhurst Drive, Cold Springs Drive and Desert Varnish Drive are classified as residential and will be 34' fl-fl with ramp type curb & gutter. The three streets noted above are classified as minor collectors and will be 36' fl-fl with vertical curb and gutter. Street capacity calculations and charts are provided in the appendix.

This report and plan is to serve as a guide for the High Meadows at Springs Ranch Development (and a large portion of North Range at Springs Ranch). Additional Drainage Reports will be required with each additional filing/plat submitted. Storm sewer layout and sizing may vary with actual layout and design.

The Lot Owner/Home Builder/Home Owner will be responsible for individual lot drainage.

PROPOSED FACILITIES (Construction Cost Estimate):

Following is a cost estimate of the proposed drainage facilities required for this development. All proposed drainage facilities will be public and non-reimbursable.

North Range Filing No. 3:

1. 10' D-10-R Inlet	1 Ea. @ $3,750.00/Ea.	$ 3,750.00
2. 12' D-10-R Inlet	2 Ea. @ $4,200.00/Ea.	$ 8,400.00
3. 16' D-10-R Inlet	2 Ea. @ $5,600.00/Ea.	$ 11,200.00
4. 30" RCP	40 L.F. @ $40.00/L.F.	$ 1,600.00
5. 36" RCP	80 L.F. @ $51.00/L.F.	$ 4,080.00
6. 42" RCP	800 L.F. @ $61.00/L.F.	$ 48,800.00
7. 60" RCP	100 L.F. @ $127.00/L.F.	$ 12,700.00
8. 72" RCP	400 L.F. @ $164.00/L.F.	$ 65,600.00
9. Type I MH	2 Ea. @ $5,000.00/Ea.	$ 10,000.00
	Sub-total:	$ 166,130.00
	15% Engineering & Contingency:	$ 24,919.50
	TOTAL:	**$ 191,049.50**

Detention Pond – MDDP Pt. #46 (Public – Non-reimbursable) – North Range #3:

1. Inlet/Dissipator	1 EA @ $10,000/EA	$ 10,000.00
2. Outlet/Dissipator	1 EA @ $15,000/EA	$ 15,000.00
3. Rip-Rap/Conc. Low Flow	1 EA @ $10,000/EA	$ 10,000.00
	Sub-total:	$ 35,000.00
	15% Engineering & Contingency:	$ 5,250.00
	TOTAL:	**$ 40,250.00**

North Range Filing No. 4:

1. 6' D-11 Inlet	1 Ea. @ $4,000.00/Ea.	$ 4,000.00
2. 8' D-10-R Inlet	2 Ea. @ $3,450.00/Ea.	$ 6,900.00
3. 18" RCP	40 L.F. @ $26.00/L.F.	$ 1,040.00
4. 42" RCP	700 L.F. @ $61.00/L.F.	$ 42,700.00
5. Type I MH	2 Ea. @ $5,000.00/Ea.	$ 10,000.00
	Sub-total:	$ 64,640.00
	15% Engineering & Contingency:	$ 9,696.00
	TOTAL:	**$ 74,336.00**

North Range Filing No. 5:

1. 12' D-10-R Inlet	1 Ea. @ $4,200.00/Ea.	$ 4,200.00
2. 18" RCP	200 L.F. @ $26.00/L.F.	$ 5,200.00
3. 60" RCP	500 L.F. @ $127.00/L.F.	$ 63,500.00
4. Type I MH	1 Ea. @ $5,000.00/Ea.	$ 5,000.00
	Sub-total:	$ 77,900.00
	15% Engineering & Contingency:	$ 11,685.00
	TOTAL:	**$ 89,585.00**

Remainder of North Range & all of High Meadows (Public Non-reimbursable):

1. 4' D-10-R Inlet	5 Ea. @ $2,850.00/Ea.	$ 14,250.00
2. 6' D-10-R Inlet	6 Ea. @ $3,100.00/Ea.	$ 18,600.00
3. 10' D-10-R Inlet	3 Ea. @ $3,750.00/Ea.	$ 11,250.00
4. 12' D-10-R Inlet	4 Ea. @ $4,200.00/Ea.	$ 16,800.00
5. 14' D-10-R Inlet	1 Ea. @ $4,800.00/Ea.	$ 4,800.00
6. 16' D-10-R Inlet	5 Ea. @ $5,600.00/Ea.	$ 28,000.00
7. 20' D-10-R Inlet	9 Ea. @ $6,100.00/Ea.	$ 54,900.00
8. 18" RCP	1600 L.F. @ $26.00/L.F.	$ 41,600.00
9. 24" RCP	600 L.F. @ $32.00/L.F.	$ 19,200.00
10. 30" RCP	1200 L.F. @ $40.00/L.F.	$ 48,000.00
11. 36" RCP	1800 L.F. @ $51.00/L.F.	$ 91,800.00
12. 42" RCP	500 L.F. @ $61.00/L.F.	$ 30,500.00
13. 48" RCP	800 L.F. @ $71.00/L.F.	$ 56,800.00
14. 60" RCP	200 L.F. @ $127.00/L.F.	$ 25,400.00
15. Type I MH	9 Ea. @ $5,000.00/Ea.	$ 45,000.00
16. Type II MH	3 Ea. @ $2,000.00/Ea.	$ 6,000.00
	Sub-total:	$ 512,900.00
	15% Engineering & Contingency:	$ 76,935.00
	TOTAL:	**$ 589,835.00**

DRAINAGE FEES

The High Meadows at Springs Ranch Development is located within the Sand Creek Drainage Basin. The total area of the development is approximately 115 acres. The site will be platted with multiple plats as required for build-out. Drainage Reports will be completed for each additional filing at that time, with Fees calculated in individual reports. The 2001 Drainage, Bridge and Pond Fees are as follows:

North Range at Springs Ranch Filing No. 3 contains 15.871 acres, Filing No. 4 contains 7.057 acres and Filing No. 5 contains 8.549 acres.

High Meadows at Springs Ranch:

Drainage Fee:	$ 6,714.00/ac.x115.296ac	=	$ 774,097.34
Bridge Fee:	$ 400.00/ac.x115.296ac	=	$ 46,118.40
Pond Fee (Land):	$ 427.00/ac.x115.296ac	=	$ 49,231.39
Pond Fee (Facilities):	$ 1,498.00/ac.x115.296ac	=	$ 172,713.41
Pond Fee (Assurance):	$ 988.00/ac.x115.296ac	=	$ 113,912.45
	Total:	=	$ 1,156,072.99

North Range Filing No. 3:

Drainage Fee:	$ 6,714.00/ac.x15.871ac	=	$106,557.89
Bridge Fee:	$ 400.00/ac.x15.871ac	=	$ 6,348.40
Pond Fee (Land):	$ 427.00/ac.x15.871ac	=	$ 6,776.92
Pond Fee (Facilities):	$ 1,498.00/ac.x15.871ac	=	$ 23,774.76
Pond Fee (Assurance):	$ 988.00/ac.x15.871ac	=	$ 15,680.55
	Total:	=	$159,138.52

North Range Filing No. 4:

Drainage Fee:	$ 6,714.00/ac.x7.057ac	=	$ 47,380.70
Bridge Fee:	$ 400.00/ac.x7.057ac	=	$ 2,822.80
Pond Fee (Land):	$ 427.00/ac.x7.057ac	=	$ 3,013.34
Pond Fee (Facilities):	$ 1,498.00/ac.x7.057ac	=	$ 10,571.39
Pond Fee (Assurance):	$ 988.00/ac.x7.057ac	=	$ 6,972.32
	Total:	=	$ 70,760.55

North Range Filing No. 5:

Drainage Fee:	$ 6,714.00/ac.x8.549ac	=	$ 57,397.99
Bridge Fee:	$ 400.00/ac.x8.549ac	=	$ 3,419.60
Pond Fee (Land):	$ 427.00/ac.x8.549ac	=	$ 3,650.42
Pond Fee (Facilities):	$ 1,498.00/ac.x8.549ac	=	$ 12,806.40
Pond Fee (Assurance):	$ 988.00/ac.x8.549ac	=	$ 8,446.41
	Total:	=	$ 85,720.82

Remainder of North Range at Springs Ranch:

Drainage Fee:	$ 6,714.00/ac.x20.710ac	=	$139,046.94
Bridge Fee:	$ 400.00/ac.x20.710ac	=	$ 8,284.00
Pond Fee (Land):	$ 427.00/ac.x20.710ac	=	$ 8,843.17
Pond Fee (Facilities):	$ 1,498.00/ac.x20.710ac	=	$ 31,023.58
Pond Fee (Assurance):	$ 988.00/ac.x20.710ac	=	$ 20,461.48
	Total:	=	$207,659.17

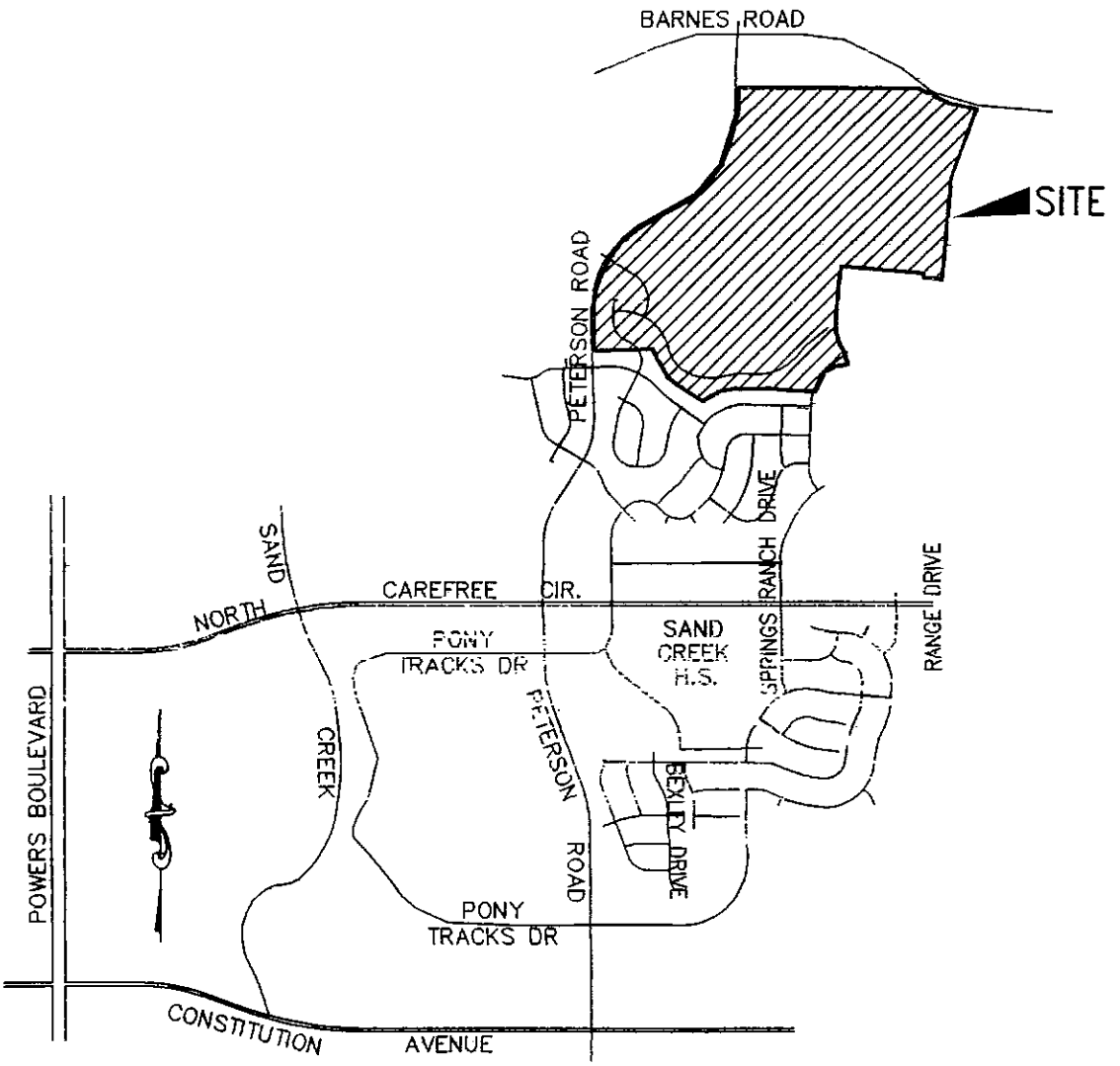
Drainage Credits will be utilized to cover the cost of the Drainage Fees.

Pond (Land) Credits will be utilized to cover the cost of the Pond (Land) Fees.

Bridge Fees will be paid to the City at the time of platting.

Pond (Facilities & Assurance) Fees will be paid to Escrow at the time of platting.

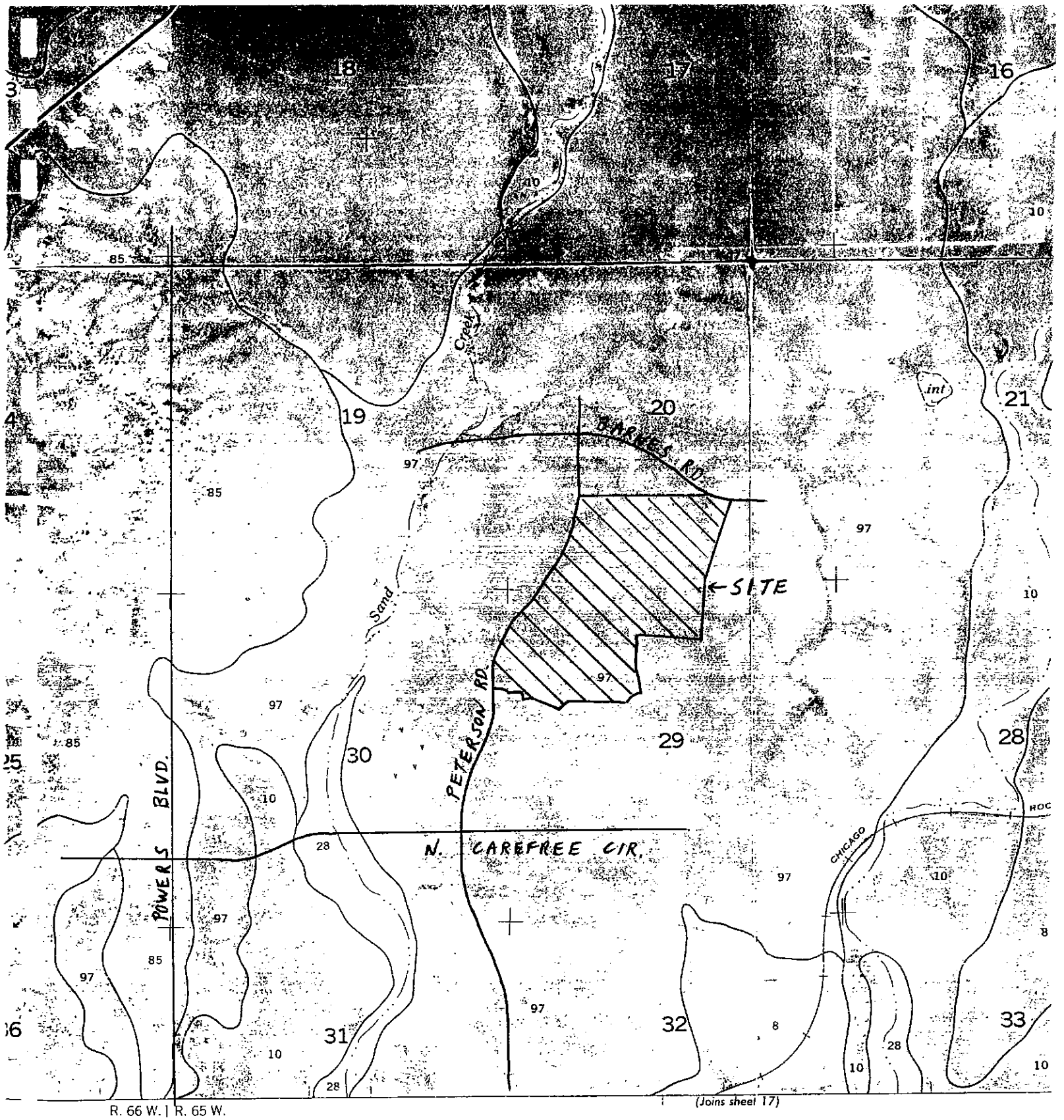
APPENDIX



VICINITY MAP

NOT TO SCALE

FIGURE 1



1" = 2000'

FIGURE 2

1 ½ ⅛ ¼ 0 1

5000 4000 3000 2000 1000 0 5000

Scale 1:24000

EL PASO COUNTY AREA, COLORADO NO. 9

Agriculture.
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NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

EL PASO COUNTY, COLORADO AND INCORPORATED AREAS

PANEL 539 OF 1300

(SEE MAP INDEX FOR PANELS NOT PRINTED)

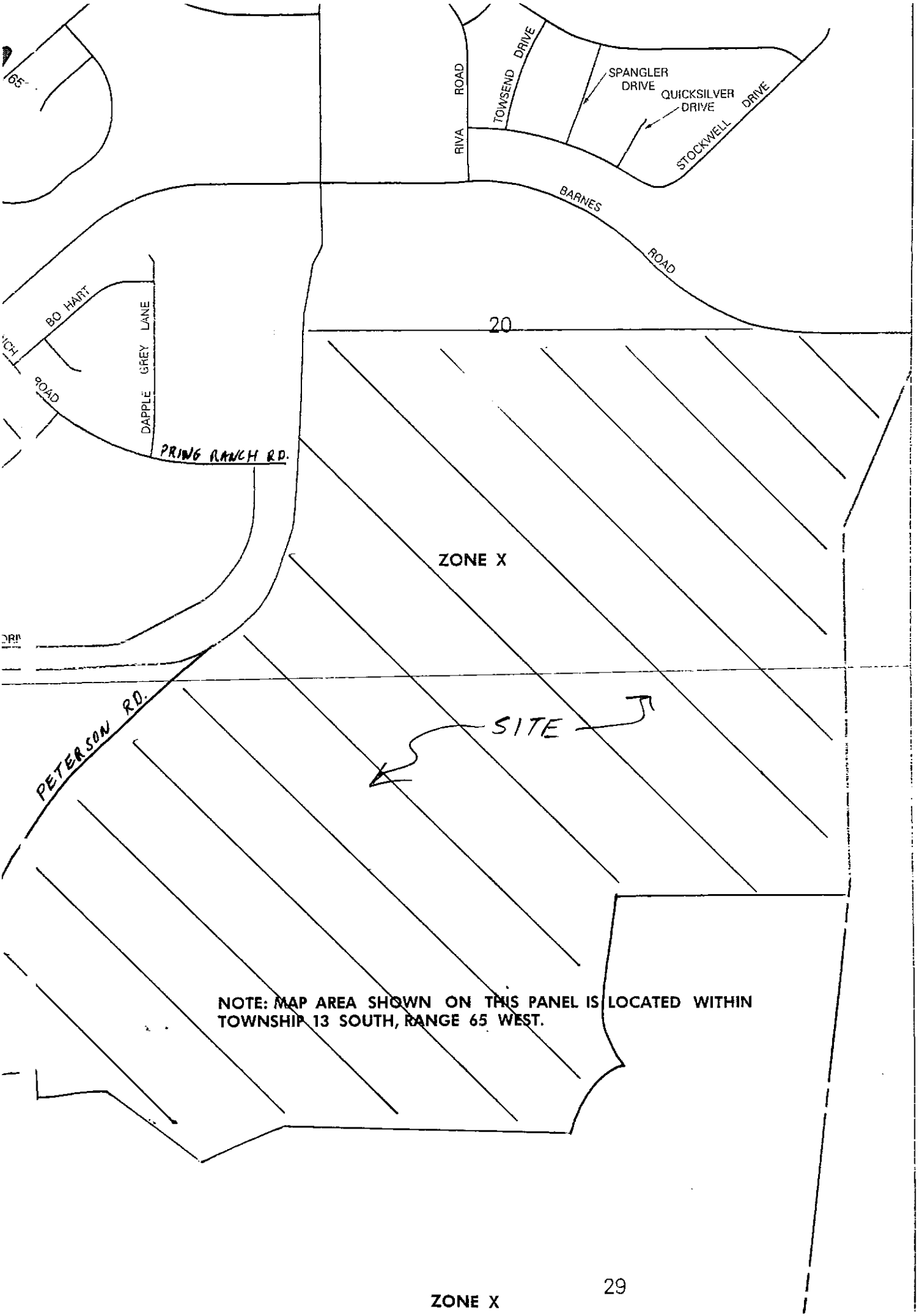
CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
COLORADO SPRINGS, CITY OF	080060	0539	F
EL PASO COUNTY, UNINCORPORATED AREAS	080059	0539	F

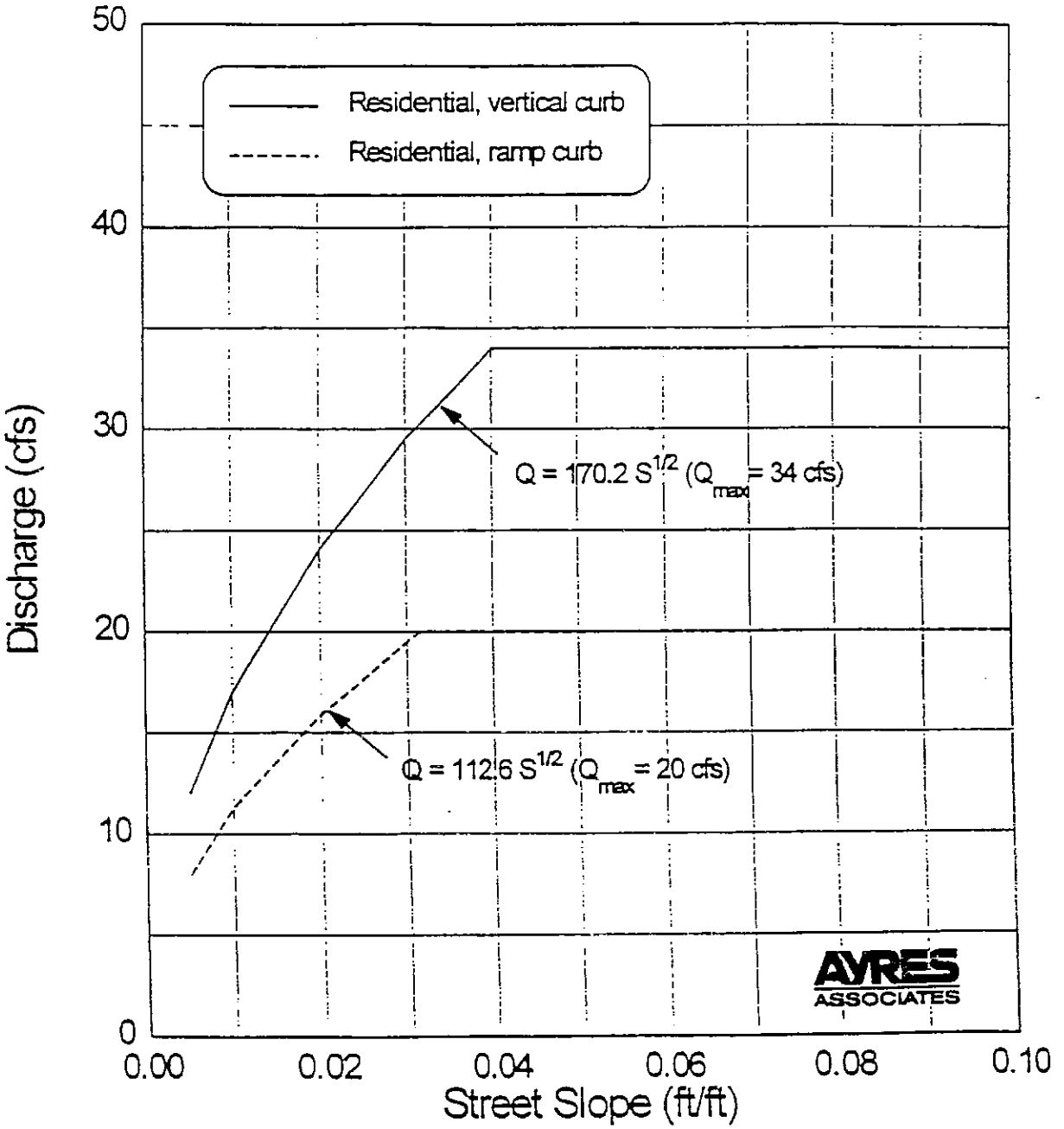
MAP NUMBER
08041C0539 F

EFFECTIVE DATE:
MARCH 17, 1997

Federal Emergency Management Agency


65
RIVA ROAD
TOWNSEND DRIVE
SPANGLER DRIVE
QUICKSILVER DRIVE
STOCKWELL DRIVE
BARNES ROAD
20
BO HART
DAPPLE GREY LANE
PRING RANCH RD.
ZONE X
PETERSON RD.
SITE
NOTE: MAP AREA SHOWN ON THIS PANEL IS LOCATED WITHIN TOWNSHIP 13 SOUTH, RANGE 65 WEST.
ZONE X
JOINS PANEL 0543

RESIDENTIAL STREET (34′ Flowline to flowline)



Interim Release October 12, 1994
City of Colorado Springs

Use this graph to determine the allowable street capacity per side, initial storm, for the typical street section using a 2% crown.

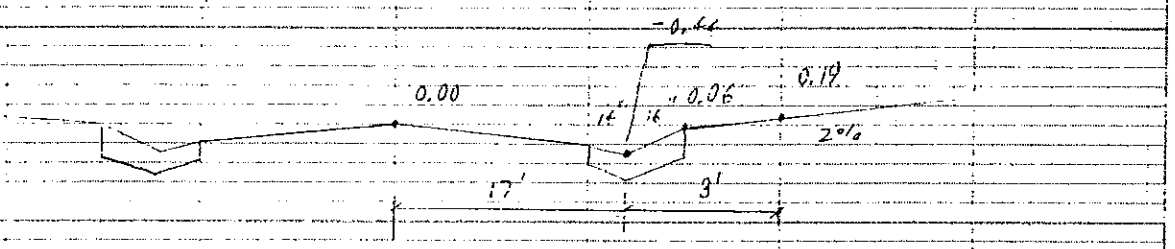
ROCKWELL MINCHOW
CONSULTANTS, INC.

99-044

DATE 8/15/00 PAGE ___ of ___

100 year street capacity -

- Residential Ramp Curb



$Q = \frac{1.486}{n} A R^{2/3} S^{0.5}$

$n = 0.016$

$A = 3.74 + 3.23 + 0.43 + 0.33 + 0.25 = 7.98$ ft²

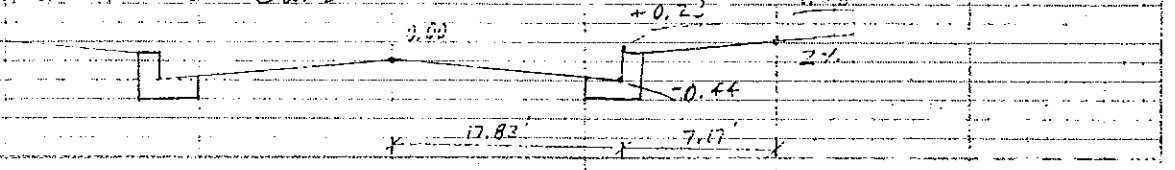
$R = \frac{7.98}{25} = 0.32$

$Q = 346.7\ S^{0.5}$

(1/2 Street)

1% = 34.7 2% = 49.0 3% = 60.0 4% = 69.3

- Residential Vertical Curb



$Q = \frac{1.486}{n} A R^{2/3} S^{0.5}$

$n = 0.016$

$A = 2.37 + 3.17 + 2.32 = 7.86$ ft²

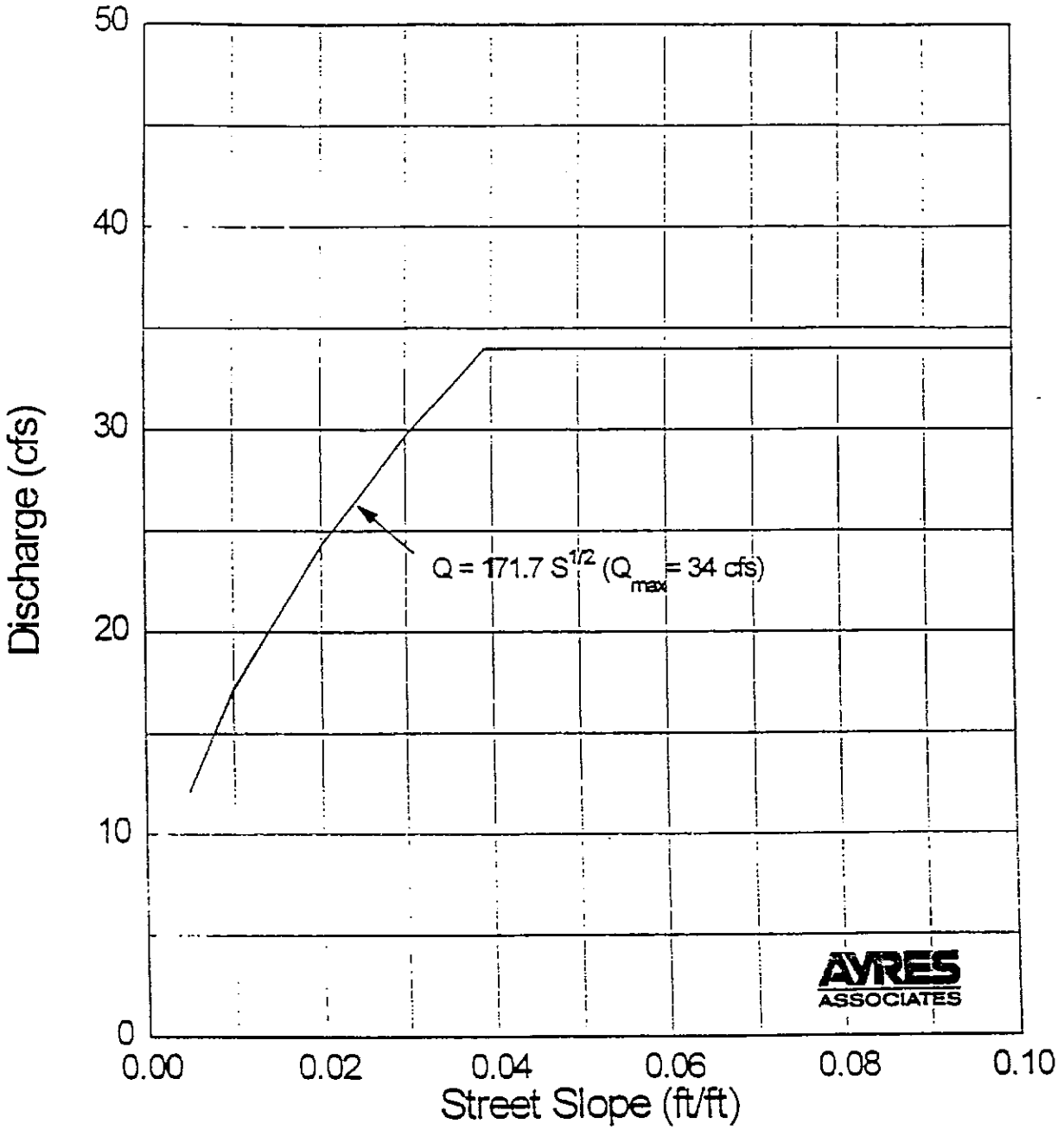
$R = \frac{2.76}{23.6} = 0.34$

$Q = 396.3\ S^{0.5}$

(1/2 Street)

1% = 39.6 2% = 56.0 3% = 68.6 4% = 79.3

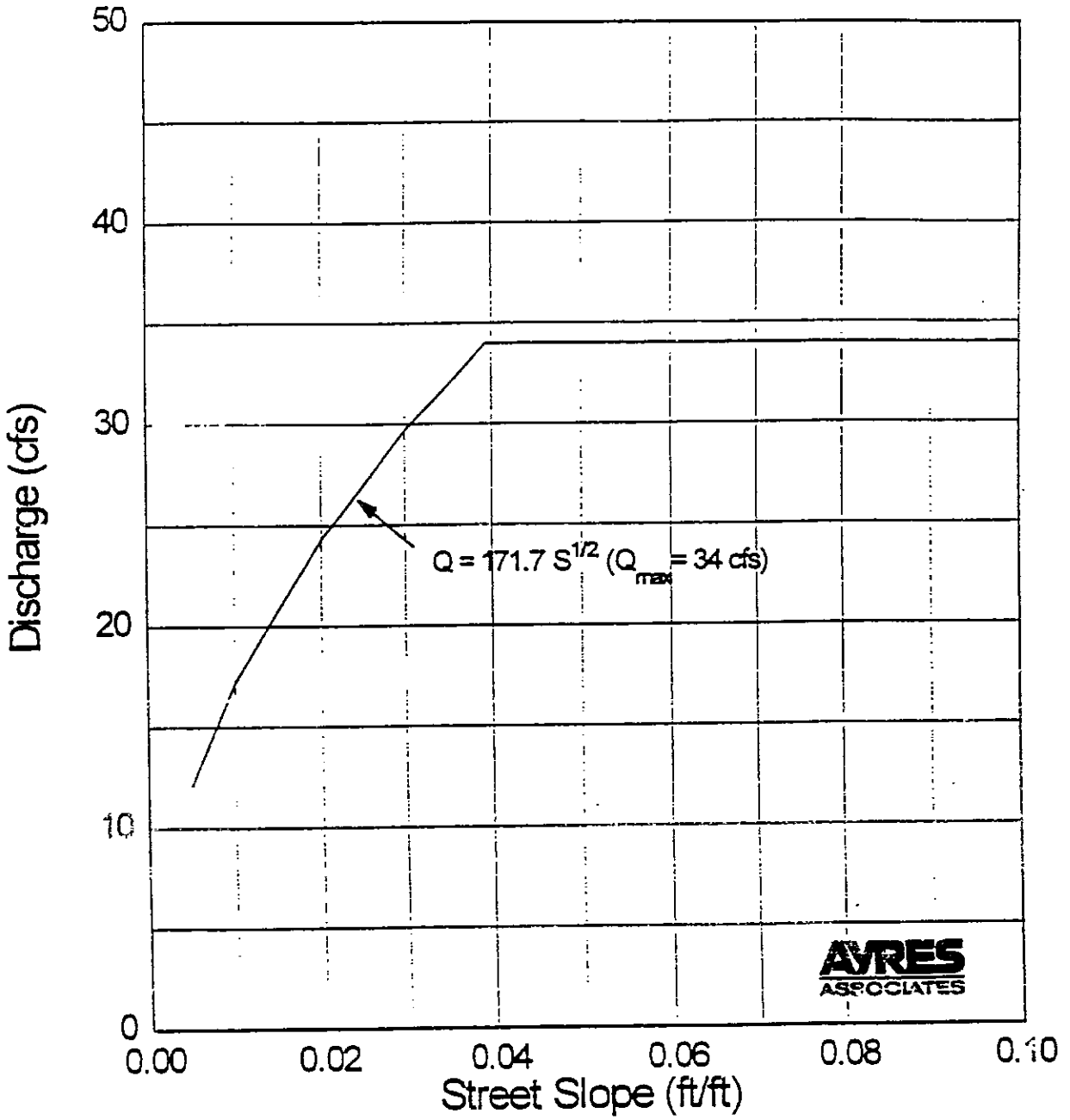
COLLECTOR STREETS (Major and Minor)



Interim Release October 12, 1994
City of Colorado Springs

Use this graph to determine the allowable street capacity per side, initial storm, for the typical street section using a 2% crown. No flow may cross the crown.

ARTERIAL STREETS (Major and Minor)



Interim Release October 12, 1994
City of Colorado Springs

Use this graph to determine the allowable street capacity per side, initial storm, for the typical street section using a 2% crown. The curve corresponds to 6" depth @ flowline, 20 foot flow spread. No flow may cross the crown. Must keep one ten foot lane free of water in each direction.

COMPARISON OF EXISTING AND PROPOSED CRITERIA

INITIAL STORM:

STREET TYPE	OLD	NEW
Hillside Residential ramp curb	flow spread to crown, maximum 25 cfs. per side, whichever is more restrictive	flow spread to crown max. 15 cfs. per side
Hillside Residential vertical curb	flow spread to crown, maximum 25 cfs. per side, whichever is more restrictive	6" allowable depth @ flowline max. 25 cfs. per side
Residential Street ramp curb	flow spread to crown	flow spread to crown max. 20 cfs. per side
Residential Street vertical curb	flow spread to crown	6" allowable depth @ flowline max. 34 cfs. per side
Collector Street	20 foot flow spread	6" allowable depth @ flowline, max. 34 cfs. per side, no overtopping the crown
Arterial Street	flow may encroach onto one outside lane	6" allowable depth @ flowline, max. 34 cfs. per side, one ten foot lane free of water in each direction

MAJOR STORM:

STREET TYPE	OLD	NEW
Hillside Residential Residential Streets Collector Streets	12" max. depth @ flowline no adjacent flooding	NO CHANGE
Arterial Streets	8" max. depth @ flowline (no curb overtopping)	NO CHANGE

CROSS FLOWS: No changes to any street types for the initial storm.
Only change for Major Storm is the Arterial street will now allow 12" max. depth @ flowline and 4" max. depth @ crown whichever is more restrictive. Existing criteria allows no crossflow.

ROCKWELL MINCHOW
CONSULTANTS, INC.

Peterson Rd

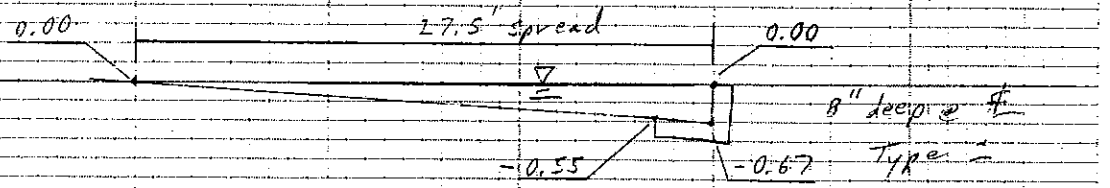
DATE 4/18/00 PAGE ___ of ___

Peterson Rd Street Capacity (1/2 Street)

$Q_5 = 171.7\ S^{1/2}$ ($Q_{max} = 34\ cfs$)

Q_{100} = As follows:

$= \frac{1.486}{n} A R^{2/3} S^{1/2}$ Roadway is 28' wide (1/2)



$n = 0.016$

$A = 8.23$

$R = 8.23/28.17 = 0.292$

$Q_{100} = \frac{1.486}{0.016} (8.23)(0.292)^{2/3} S^{1/2}$

$Q_{100} = 335.6\ S^{1/2}$

$Q_{100} = 33.7\ cfs$ @ 1%

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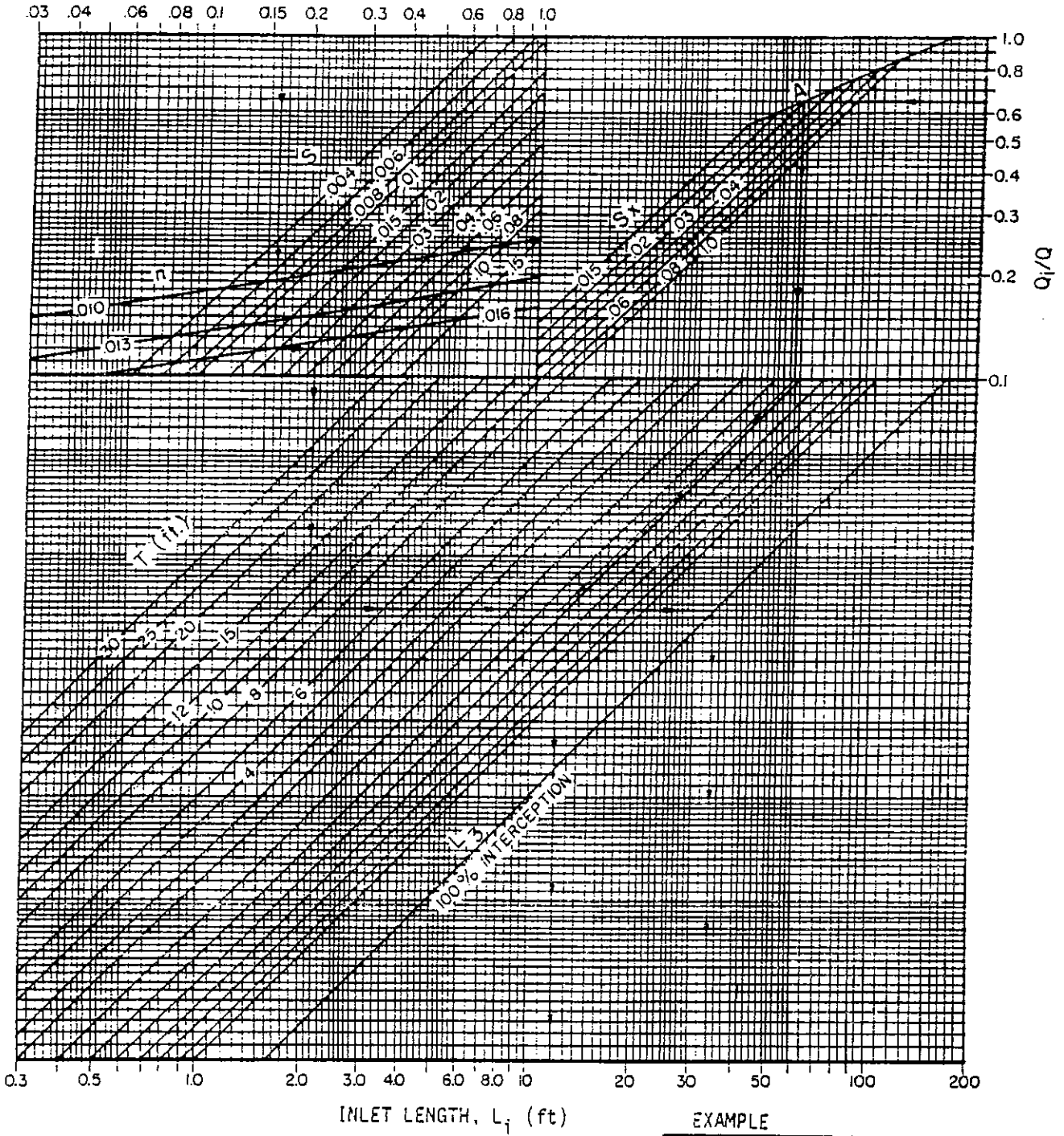
2928 Straus Lane, Suite #100 Colorado Springs, CO 80907 (719) 475-2575 Fax (719) 475-9223



This chart assumes, w=2 ft., a = 2" and h=6in.

REFERENCE :

Izzard, Carl. f., Report presented at the Annual Meeting of the National Transportation Board, January 1977; Simplified Method For Design of Curb-opening Inlets

EXAMPLE

Given — S_x = 0.02 ft/ft
T = 10 ft.
S = 0.03 ft/ft

Find — L_i = 11.8 ft L_i = 34 ft.
Q_i/Q= 0.65 Q_i/Q=1.0

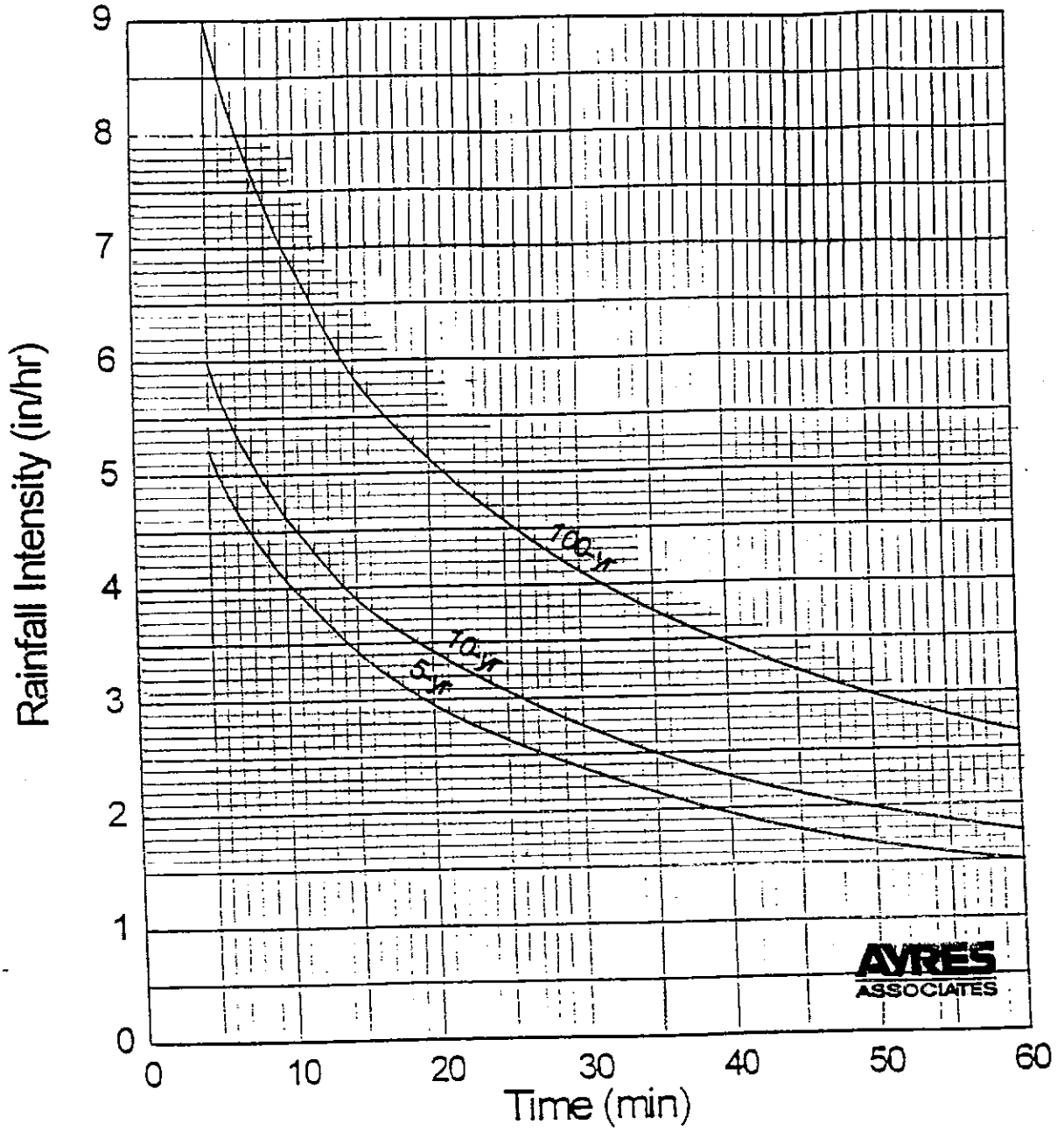
HDR Infrastructure, Inc.
A Centerra Company

The City of Colorado Springs / El Paso County
Drainage Criteria Manual

CONTINUOUS GRADE
Standard Curb-Opening Inlet Chart

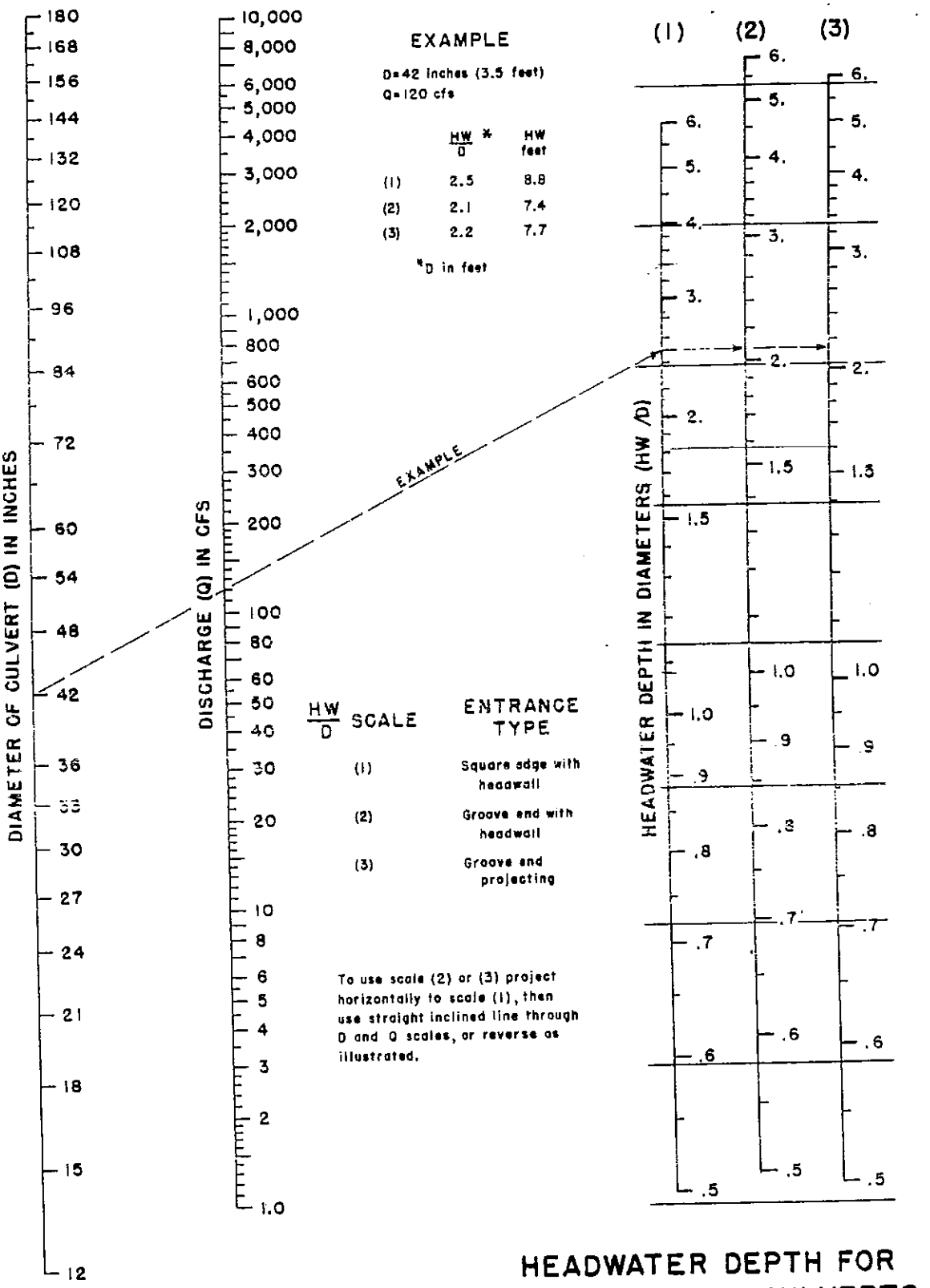
Date
OCT. 1987

Figure
7-9



Interim Release October 12, 1994 , Rainfall Intensity Curves
City Of Colorado Springs Drainage Criteria Manual

CHART 1



HEADWATER DEPTH FOR CONCRETE PIPE CULVERTS WITH INLET CONTROL

HEADWATER SCALES 2&3
REVISED MAY 1964

BUREAU OF PUBLIC ROADS JAN. 1963

CONCRETE PIPE
Capacity (Velocity)

0.5%		1%	2%	3%	4%	5%	6%	7%	8%
5.0	18"	11.3 (6.6)	16.0 (9.3)	19.6 (11.4)	22.6 (13.2)	25.3 (14.7)	27.7 (16.1)	29.9 (17.4)	32.0 (18.6)
17.2	24"	24.3 (8.1)	34.4 (11.2)	42.2 (13.7)	48.7 (15.8)	54.4 (17.6)	59.6 (19.3)	64.4 (20.9)	68.8 (22.3)
31.2	30"	44.1 (9.5)	62.4 (13.4)	76.4 (16.4)	88.2 (19.0)	98.7 (21.2)	108.1 (23.2)	116.8 (25.1)	124.8 (26.8)
50.7	36"	71.8 (10.3)	101.5 (14.6)	124.3 (17.8)	143.5 (20.6)	160.4 (23.0)	175.8 (25.2)	189.8 (27.2)	202.9 (29.1)
76.5	42"	108.2 (10.8)	153.1 (15.3)	187.5 (18.7)	216.5 (21.6)	242.0 (24.2)	265.1 (26.5)	286.3 (28.6)	306.1 (30.6)
109.3	48"	154.5 (11.2)	218.5 (15.8)	267.6 (19.4)	309.0 (22.4)	345.5 (25.0)	378.5 (27.4)	408.8 (29.6)	437.0 (31.6)
149.6	54"	211.5 (11.5)	299.2 (16.2)	366.4 (19.8)	423.1 (22.9)	473.0 (25.6)	518.2 (28.1)	559.7 (30.3)	598.3 (32.4)
198.1	60"	280.2 (11.7)	396.2 (16.5)	485.3 (20.2)	560.3 (23.3)	626.5 (26.1)	686.3 (28.6)	741.2 (30.9)	792.4 (33.0)
255.4	66"	361.2 (11.8)	510.9 (16.7)	625.7 (20.5)	722.5 (23.7)	807.8 (26.5)	884.8 (29.0)	955.7 (31.3)	1021.7 (33.5)
322.1	72"	455.6 (12.0)	644.3 (17.0)	789.1 (20.8)	911.1 (24.0)	1018.7 (26.8)	1115.9 (29.3)	1205.3 (31.7)	1288.6 (33.9)
485.9	84"	687.2	971.4	1190.3	1374.4				

MAJOR BASIN	SUB BASIN	AREA		BASIN		Tc Min.	I	SOIL GROUP	DEV. TYPE	C	BASIN		RETURN PERIOD
		PLANIMETER READING	Ac.	LENGTH	HEIGHT						Q	Q_p	
H-I			20.7	Overland 100' @ 6%		27.8	2.5 / 4.3			0.25 / 0.35	12.9 / 31.1		
H-II			137.3	[illegible] @ 6% = 22.5		47.2	1.7 / 3.1				58.3 / 149.0		
				Swale 3500' @ [illegible]						V			
H-III			12.1	Overland [illegible] @ 7%		22.1	2.8 / 4.9				8.5 / 20.8		
H-IV			12.2	Overland [illegible] @ 7%		23.6	2.7 / 4.7				8.2 / 20.1		
H-V			8.4	Overland [illegible] @ 7%		23.6	2.7 / 4.7				5.7 / 13.8		
H VI			10.5	[illegible] @ 8%		19.6	3.0 / 5.2				7.9 / 19.1		
H-VII			53.9	[illegible] @ 6%		27.8	2.5 / 4.3				33.7 / 81.1		
TOP #1			190.7			47.2	1.7 / 3.1				81.0 / 206.9		

HYDROLOGIC COMPUTATION BASIC DATA
RATIONAL METHOD $Q=CIA$

PAGE ___ OF ___

ROCKWELL MINCHOW CONSULTANTS, INC.

PROJECT: High Meadows, S.R.
BY: TOM DATE: 7/19/01

MAJOR BASIN	SUB BASIN	AREA		BASIN		Tc Min.	I	SOIL GROUP	DEV. TYPE	C	BASIN		RETURN PERIOD
		PLANIMETER READING	Ac.	LENGTH	HEIGHT						Q	Q_p	
I			16.5	[illegible]	[illegible] = 7.4 [illegible] = 5.8	13.2	3.6 6.2	B	Res	0.60 0.70	35.6 71.6		
II			4.1	[illegible]	[illegible] = 9.1 [illegible] = 3.3	12.4	3.7 6.4				9.1 18.4		
III			1.7	[illegible]	[illegible] = 5.3 [illegible] = 6.1	11.4	3.9 6.7				4.0 8.0		
IV			2.5	[illegible]	[illegible] = 7.4 [illegible] = 2.1	9.5	4.1 7.2				6.1 12.6		
V			5.2	[illegible]	[illegible] = 10.5 [illegible] = 4.1	14.9	3.4 5.9				10.8 21.9		
VI			2.6	[illegible]	[illegible] = 9.1 [illegible] = 2.8	11.9	3.8 6.6				5.9 12.0		
VII			8.5	[illegible]	[illegible] = 7.2 [illegible] = 4.2	11.4	3.9 6.7				19.9 39.9		
VIII			1.0	[illegible]	[illegible] = 5.3 [illegible] = 5.0	10.3	4.0 6.9				2.4 4.8		

HYDROLOGIC COMPUTATION BASIC DATA
RATIONAL METHOD Q-CIA

PAGE__ OF__

ROCKWELL MINCHOW
COVINA | TANTE, INC.

PROJECT: High Meadow - S.R.
BY: TAM DATE: 7/19/01

MAJOR BASIN	SUB BASIN	AREA		BASIN		Tc Min.	I	SOIL GROUP	DEV. TYPE	C.	BASIN		RETURN PERIOD
		PLANIMETER READING	Ac.	LENGTH	HEIGHT						Q	Q_p	
IX			2.8	Ova[illegible] 1200' 6% = 7.3 [illegible] 400' 2% = 5.0		12.3	3.7 6.4	B	Res.	0.60 0.70	6.2 12.5		
X			2.9	[illegible] = 4.4		5.0	5.2 9.0				9.0 18.3		
XI			6.0	[illegible] = 9.1 [illegible] = 4.4		13.5	3.6 6.2				13.0 26.0		
XII			8.?	[illegible] = 9.1 [illegible] = 6.2		15.3	3.4 5.8				17.7 35.3		
XIII-1			2.1	Ova[illegible] = 5.5 [illegible] = 10.8		16.3	3.3 5.6				4.2 8.2		
XIII-2			3.5	[illegible] = 7.4 [illegible] = 2.8		10.2	4.0 6.4				8.4 16.9		
XIV			4.5	[illegible] = 9.1 [illegible] = 5.0		14.1	3.5 6.0				9.4 18.9		
XV			5.6	[illegible] = 7.4 [illegible] = 2.8		10.2	4.0 6.9			0.60 0.70	13.4 27.0		
XVI			15.4	[illegible] 700' T/L = 24.2		24.2	2.7 4.6		Rock[illegible]	0.32 0.42	13.3 29.7		

HYDROLOGIC COMPUTATION BASIC DATA
RATIONAL METHOD Q=CIA

PAGE___ OF___

ROCKWELL MINCHOW CONSULTANTS, INC.

PROJECT: High Meadows S.R.
BY: TDA DATE: 7/19/01

MAJOR BASIN	SUB BASIN	AREA: PLANIMETER READING	AREA: Ac.	BASIN: LENGTH	BASIN: HEIGHT	Tc Min.	I	SOIL GROUP	DEV. TYPE	C.	BASIN: Q	BASIN: qp	RETURN PERIOD
XVII			3.4	Overland 100' [illegible] = 9.1 [illegible] 800' @ 3% = 4.4		13.5	3.6 / 6.2		Res	0.60 / 0.70	7.3 / 14.8		
XVIII			3.6	[illegible] 100' [illegible] = 7.4 [illegible] 600' @ 2% = 5.0		12.4	3.7 / 6.4				8.0 / 16.1		
XIV			6.4	[illegible] 100' [illegible] = 7.4 [illegible] 600' @ 2% = 6.7		14.1	3.5 / 6.0		Res.	0.60 / 0.70	13.4 / 26.7		
XX			15.4	overland 200' [illegible] = 22.1 [illegible] 700' @ 2% = 5.8		27.9	2.5 / 4.2		Pasture + Res	0.32 / 0.42	12.3 / 27.2		
XXI			5.7	Overland 100' [illegible] = 9.1 [illegible] 1200' @ 4% = 5.0		14.1	3.5 / 6.0		Res	0.60 / 0.70	12.0 / 23.9		
XXII			8.0	[illegible] = 12.9 [illegible] = 6.9		15.8	3.3 / 5.7				15.8 / 31.9		
XXIII			1.1	[illegible] 100' @ 2% = 7.4		7.4	4.5 / 7.8		RES	0.60 / 0.70	3.0 / 6.0		
XXIV			13.3	Overland 100' [illegible] = 11.1 [illegible] 1800' @ 2% = 10.8		21.9	2.8 / 4.9		[illegible]	0.48 / 0.58	17.9 / 45.6		

HYDROLOGIC COMPUTATION BASIC DATA
RATIONAL METHOD Q=CIA

PAGE___ OF___

ROCKWELL MINCHOW CONSULTANTS, INC.

PROJECT: High Meadow [illegible]
BY: TPM DATE: 7/19/01

MAJOR BASIN	SUB BASIN	AREA		BASIN		Tc Min.	I	SOIL GROUP	DEV. TYPE	C	BASIN		RETURN PERIOD
		PLANIMETER READING	Ac.	LENGTH	HEIGHT						Q	Q_D	
XXV			1.9			16.3	3.3 / 5.6	B	RES.	0.60 / 0.70	3.8 / 7.4		
XXV			2.5			12.6	3.7 / 6.4				7.8 / 15.7		
XXVII			1.7			11.6	3.8 / 6.6				4.3 / 8.6		
XXVIII			10.2			15.8	3.3 / 5.7				20.2 / 40.7		
XXIX			9.3			22.4	2.8 / 4.8			0.60 / 0.70	15.6 / 31.2		
XXX			10.1			23.4	2.7 / 4.7			0.55 / 0.62	8.7 / 19.9		
XXVI			4.6			14.0	3.5 / 6.0			0.55 / 0.62	5.2 / 11.6		
XXXII			8.0			12.9	3.7 / 6.2		Res.	0.60 / 0.70	17.8 / 34.7		

HYDROLOGIC COMPUTATION BASIC DATA
RATIONAL METHOD Q=CIA

PAGE ___ OF ___

ROCKWELL MINCHOW CONSULTANTS, INC.

PROJECT: High Meadows C.R.
BY: TOM DATE: 7/19/01

MAJOR BASIN	SUB BASIN	AREA		BASIN		Tc Min.	I	SOIL GROUP	DEV. TYPE	C	BASIN		RETURN PERIOD
		PLANIMETER READING	Ac.	LENGTH	HEIGHT						Q	Q_p	
XXVII			2.4	Overland 100'	2Y = 7.4	11.3	3.9 / 6.7	B	RES.	0.60 / 0.70	5.6 / 11.3		
				Storm 700'	3Yp = 3.9								
XXVIV			2.7	Overland 200'	1Y = 5.4	8.7	4.3 / 7.4				7.0 / 14.0		
				Gutter 400'	3Yp = 3.3								
XXXV			1.6	Overland 170'	1Y = 9.1	10.8	4.0 / 6.4				3.8 / 7.6		
				Gutter 300'	3Yp = 1.7								
XXVI			3.2	Overland 100'	2Y = 7.4	14.1	3.5 / 6.0				6.7 / 13.4		
				Gutter 700'	3Yp = 6.1								
XXXVII			4.3	Overland 150'	1Y = 4.3	9.8	4.1 / 7.0				10.6 / 21.1		
				Gutter 1000'	3Yp = 5.5								
XXVIII			2.0	Overland 150'	1Y = 5.5	11.3	3.9 / 6.7				7.0 / 14.1		
				Gutter 700'	3Yp = 5.8								
XXXIX			2.7	Overland 100'	2Y = 7.4	10.3	4.0 / 6.9				6.5 / 13.0		
				Gutter 700'	3Yp = 2.9								
XXXX			10.2	Overland 100'	2Y = 11.3	14.6	3.5 / 5.9				21.4 / 42.1		
				Gutter 800'	3Yp = 3.3								

HYDROLOGIC COMPUTATION BASIC DATA
RATIONAL METHOD Q=CIA

PAGE ___ OF ___

ROCKWELL MINCHOW CONSULTANTS, INC.

PROJECT: High Meadow @ S.R.
BY: TDN DATE: 7/19/01

MAJOR BASIN	SUB BASIN	AREA		BASIN		Tc Min.	I	SOIL GROUP	DEV. TYPE	C.	BASIN		RETURN PERIOD
		PLANIMETER READING	Ac.	LENGTH	HEIGHT						Q	Q_p	
XXXXI			5.5	Over [illegible] 1750'	S= 4.8	7.6	4.5 / 7.8	B		0.60 / 0.70	14.8 / 30.0		
				Over [illegible] 500'	S= 2.8								
XXXVII			7.1	Over [illegible] 2300'	S= 9.5	11.6	3.8 / 6.6				16.2 / 32.8		
				[illegible] 500'	S= 2.1								
XXXVIII			8.0	Over [illegible] soil	S= 5.5	11.0	4.0 / 6.8				19.2 / 38.1		
				[illegible] 1000'	S= 5.5								
XXXIV				Over [illegible] 1100'	S= 7.4	7.4	4.5 / 7.8				8.1 / 16.4		
XXXV			4.2	Over [illegible] 1100'	S= 7.4	7.4	4.5 / 7.8				11.3 / 22.9		

HYDROLOGIC COMPUTATION BASIC DATA
RATIONAL METHOD Q=CIA

PAGE___ OF___

ROCKWELL MINCHOW CONSULTANTS, INC.

PROJECT: [illegible]

BY: TLM DATE: 7/19/01

MAJOR BASIN	SUB BASIN	AREA		BASIN		Tc Min.	I	SOIL GROUP	DEV. TYPE	C	BASIN		RETURN PERIOD
		PLANIMETER READING	Ac.	LENGTH	HEIGHT						Q	Q_p	
DP#1	[illegible]		45.0	[illegible]	15.7 + 1.4	14.6	3.5 / 5.9	B		0.60 / 0.70	94.5 / 185.8		
							/	/		/	/		
DP#2	[illegible]		65.3	[illegible]		15.3	3.4 / 5.8	/		0.60 / 0.70	133.2 / 265.1		
							/	/		/	/		
DP#3	[illegible]		94.2	[illegible]	15.2 / 0.9	16.2	3.2 / 5.6	/		0.55 / 0.65	165.8 / 342.9		
							/	/		/	/		
DP#4	[illegible]		30.0	[illegible]		21.9	2.8 / 4.9	/		0.55 / 0.65	46.2 / 95.5		
							/	/		/	/		
DP#5	[illegible]		45.6	[illegible]	21.9 + 1.8	23.7	2.7 / 4.7	/		0.51 / 0.67	70.2 / 143.6		
							/	/		/	/		
DP#6	[illegible]		165.2	[illegible]	[illegible]	24.4	2.7 / 4.6	/		0.51 / 0.67	254.2 / 509.1		
							/	/		/	/		
DP#7	[illegible]		189.2	[illegible]	24.4 + 1.3	25.1	2.6 / 4.55	/		0.51 / 0.67	280.4 / 576.8		
							/	/		/	/		
							/	/		/	/		
							/	/		/	/		

HYDROLOGIC COMPUTATION BASIC DATA
RATIONAL METHOD Q=CIA

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ROCKWELL MINCHOW CONSULTANTS, INC.

PROJECT: [illegible]
BY: [illegible] DATE: 7/19/01

MAJOR BASIN	SUB BASIN	AREA PLANIMETER READING	AREA Ac.	BASIN LENGTH	BASIN HEIGHT	Tc Min.	I	SOIL GROUP	DEV. TYPE	C.	BASIN Q	BASIN q_p	RETURN PERIOD
DP#F	[illegible]		17.9	[illegible]		14.1	3.5 / 6.0	B		0.60 / 0.70	37.6 / 75.2		
[illegible]	DP#A + [illegible]		27.9	DP#... 800 ... 15	14.1 + .9	15.0	3.4 / 5.8				56.9 / 114.2		
[illegible]	DP#4 + [illegible]		43.6	[illegible] 1000 ... 15	15.0 + [illegible]	16.1	3.3 / 5.65				86.3 / 172.4		
[illegible]	[illegible]		15.1	T_c = 11.6 + 400 ... (10fps)	11.6 + [illegible]	12.3	3.7 / 6.4			.60 / .70	[illegible].5 / 67.6		

HYDROLOGIC COMPUTATION BASIC DATA
RATIONAL METHOD Q=CIA

PAGE___ OF___

ROCKWELL MINCHOW CONSULTANTS, INC.

PROJECT: [illegible]
BY: TDM DATE: 7/19/01

INLET AT BASIN I

HIGH MEADOW AT SPRINGS RANCH MDDP
01-004
7/23/01

APPROACH GUTTER DEPTH

Q(cfs)	n	S(X)	S(O)
35.8	0.016	0.02	0.02

d= 0.48 ft

DEPTH AT SUMP INLET

Q	L(I)	W
71.6	20	3

d= 1.06 ft

+ add 2 - 6' on grade inlets each side of sump on north side of street.

INLET AT BASIN II

HIGH MEADOW AT SPRINGS RANCH MDDP
01-004
7/23/01

APPROACH GUTTER DEPTH

Q(cfs)	n	S(X)	S(O)
18.4	0.016	0.02	0.02

d= 0.38 ft

AT GRADE INLET

Q	S(X)	S(O)
18.4	0.02	0.02

T= 18.87

F(w)= 1.93

L1= 28.04

L2= 16.84

L3= 60.09

Try L(I)= 14 ft

Q(I)= 9.2 IF L(I)<L2
FALSE IF L(I)>L2

Q(by)= 9.2 IF L(I)<L2
~~18.4 IF L(I)>L2~~

INLET AT BASIN III

HIGH MEADOW AT SPRINGS RANCH MDDP
01-004
7/23/01

APPROACH GUTTER DEPTH

Q(cfs)	n	S(X)	S(O)
17.2	0.016	0.02	0.03

d= 0.34 ft

AT GRADE INLET

Q	S(X)	S(O)
17.2	0.02	0.03

T= 17.05

F(w)= 2.32

L1= 30.46

L2= 18.29

L3= 65.27

Try L(I)= 16 ft

Q(I)= 9 IF L(I)<L2
FALSE IF L(I)>L2

Q(by)= 8.2 IF L(I)<L2
~~17.2 IF L(I)>L2~~

INLET AT BASIN IV

HIGH MEADOW AT SPRINGS RANCH MDDP
01-004
7/23/01

APPROACH GUTTER DEPTH

Q(cfs)	n	S(X)	S(O)
12.6	0.016	0.02	0.03

d= 0.3 ft

AT GRADE INLET

Q	S(X)	S(O)
12.6	0.02	0.03

T= 15.17

F(w)= 2.27

L1= 26.52

L2= 15.92

L3= 56.82

Try L(I)= 12 ft

Q(I)= 5.7 IF L(I)<L2
FALSE IF L(I)>L2

Q(by)= 6.9 IF L(I)<L2
~~12.6 IF L(I)>L2~~

INLET AT BASIN V

HIGH MEADOW AT SPRINGS RANCH MDDP
01-004
7/23/01

APPROACH GUTTER DEPTH

Q(cfs)	n	S(X)	S(O)
30.1	0.016	0.02	0.02

d= 0.45 ft

AT GRADE INLET

Q	S(X)	S(O)
30.1	0.02	0.02

T= 22.69

F(w)= 2

L1= 34.94

L2= 20.99

L3= 74.88

Try L(I)= 20 ft

Q(I)= 17.2 IF L(I)<L2
FALSE IF L(I)>L2

Q(by)= 12.9 IF L(I)<L2
~~30.1 IF L(I)>L2~~

INLET AT BASIN VI

HIGH MEADOW AT SPRINGS RANCH MDDP
01-004
7/23/01

APPROACH GUTTER DEPTH

Q(cfs)	n	S(X)	S(O)
24.9	0.016	0.02	0.03

d= 0.39 ft

AT GRADE INLET

Q	S(X)	S(O)
24.9	0.02	0.03

T= 19.59

F(w)= 2.39

L1= 36.05

L2= 21.65

L3= 77.25

Try L(I)= 20 ft

Q(I)= 13.8 IF L(I)<L2
FALSE IF L(I)>L2

Q(by)= 11.1 IF L(I)<L2
~~24.9 IF L(I)>L2~~

INLET AT BASIN VIII

HIGH MEADOW AT SPRINGS RANCH MDDP
01-004
7/23/01

APPROACH GUTTER DEPTH

Q(cfs)	n	S(X)	S(O)
4.8	0.016	0.02	0.03

d= 0.21 ft

AT GRADE INLET

Q	S(X)	S(O)
4.8	0.02	0.03

T= 10.57

F(w)= 2.12

L1= 17.26

L2= 10.36

L3= 36.97

Try L(I)= 6 ft

Q(I)= 1.7 IF L(I)<L2
FALSE IF L(I)>L2

Q(by)= 3.1 IF L(I)<L2
~~4.8 IF L(I)>L2~~

INLET AT BASIN IX

HIGH MEADOW AT SPRINGS RANCH MDDP
01-004
7/23/01

APPROACH GUTTER DEPTH

Q(cfs)	n	S(X)	S(O)
12.5	0.016	0.02	0.03

d= 0.3 ft

AT GRADE INLET

Q	S(X)	S(O)
12.5	0.02	0.03

T= 15.13

F(w)= 2.27

L1= 26.45

L2= 15.88

L3= 56.67

Try L(l)= 10 ft

Q(l)= 4.7 IF L(l)<L2
FALSE IF L(l)>L2

Q(by)= 7.8 IF L(l)<L2
~~12.5 IF L(l)>L2~~

INLET AT BASIN XI

HIGH MEADOW AT SPRINGS RANCH MDDP
01-004
7/23/01

APPROACH GUTTER DEPTH

Q(cfs)	n	S(X)	S(O)
26	0.016	0.02	0.03

d= 0.4 ft

AT GRADE INLET

Q	S(X)	S(O)
26	0.02	0.03

T= 19.91

F(w)= 2.39

L1= 36.64

L2= 22.01

L3= 78.52

Try L(I)= 16 ft

Q(I)= 11.4 IF L(I)<L2
FALSE IF L(I)>L2

Q(by)= 14.6 IF L(I)<L2
~~26 IF L(I)>L2~~

INLET AT BASIN XIII-A

HIGH MEADOW AT SPRINGS RANCH MDDP
01-004
7/23/01

APPROACH GUTTER DEPTH

Q(cfs)	n	S(X)	S(O)
22.8	0.016	0.02	0.02

d= 0.41 ft

AT GRADE INLET

Q	S(X)	S(O)
22.8	0.02	0.02

T= 20.45

F(w)= 1.96

L1= 30.86

L2= 18.54

L3= 66.14

Try L(I)= 16 ft

Q(I)= 11.8 IF L(I)<L2
FALSE IF L(I)>L2

Q(by)= 11 IF L(I)<L2
~~22.8 IF L(I)>L2~~

INLET AT BASIN XII

HIGH MEADOW AT SPRINGS RANCH MDDP
01-004
7/23/01

APPROACH GUTTER DEPTH

Q(cfs)	n	S(X)	S(O)
35.3	0.016	0.02	0.03

d= 0.45 ft

AT GRADE INLET

Q	S(X)	S(O)
35.3	0.02	0.03

T= 22.33

F(w)= 2.44

L1= 41.96

L2= 25.2

L3= 89.9

Try L(I)= 20 ft

Q(I)= 16.8 IF L(I)<L2
FALSE IF L(I)>L2

Q(by)= 18.5 IF L(I)<L2
~~35.3 IF L(I)>L2~~

INLET AT BASIN XIII-B

HIGH MEADOW AT SPRINGS RANCH MDDP
01-004
7/23/01

APPROACH GUTTER DEPTH

Q(cfs)	n	S(X)	S(O)
38.9	0.016	0.02	0.03

d= 0.46 ft

AT GRADE INLET

Q	S(X)	S(O)
38.9	0.02	0.03

T= 23.15

F(w)= 2.46

L1= 43.85

L2= 26.34

L3= 93.97

Try L(I)= 20 ft

Q(I)= 17.7 IF L(I)<L2
FALSE IF L(I)>L2

Q(by)= 21.2 IF L(I)<L2
~~38.9 IF L(I)>L2~~

INLET AT BASIN XII

HIGH MEADOW AT SPRINGS RANCH MDDP
01-004
7/23/01

APPROACH GUTTER DEPTH

Q(cfs)	n	S(X)	S(O)
35.3	0.016	0.02	0.03

d= 0.45 ft

AT GRADE INLET

Q	S(X)	S(O)
35.3	0.02	0.03

T= 22.33

F(w)= 2.44

L1= 41.96

L2= 25.2

L3= 89.9

Try L(I)= 20 ft

Q(I)= 16.8 IF L(I)<L2
FALSE IF L(I)>L2

Q(by)= 18.5 IF L(I)<L2
~~35.3 IF L(I)>L2~~

INLET AT DP #2

HIGH MEADOW AT SPRINGS RANCH MDDP
01-004
7/23/01

APPROACH GUTTER DEPTH

Q(cfs)	n	S(X)	S(O)
50.7	0.016	0.02	0.03

d= 0.51 ft

AT GRADE INLET

Q	S(X)	S(O)
50.7	0.02	0.03

T= 25.57

F(w)= 2.51

L1= 49.42

L2= 29.68

L3= 105.9

Try L(I)= 20 ft

Q(I)= 20.5 IF L(I)<L2
FALSE IF L(I)>L2

Q(by)= 30.2 IF L(I)<L2
~~50.7 IF L(I)>L2~~

INLET AT BASIN XIV

HIGH MEADOW AT SPRINGS RANCH MDDP
01-004
7/23/01

APPROACH GUTTER DEPTH

Q(cfs)	n	S(X)	S(O)
18.9	0.016	0.02	0.03

d= 0.35 ft

AT GRADE INLET

Q	S(X)	S(O)
18.9	0.02	0.03

T= 17.66

F(w)= 2.34

L1= 31.82

L2= 19.11

L3= 68.19

Try L(I)= 16 ft

Q(I)= 9.5 IF L(I)<L2
FALSE IF L(I)>L2

Q(by)= 9.4 IF L(I)<L2
18.9 IF L(I)>L2

INLET AT BASIN XV

HIGH MEADOW AT SPRINGS RANCH MDDP
01-004
7/23/01

APPROACH GUTTER DEPTH

Q(cfs)	n	S(X)	S(O)
20	0.016	0.02	0.01

d= 0.44 ft

DEPTH AT SUMP INLET

Q	L(I)	w
36.4	16	3

d= 0.75 ft

Flow will split evenly with 16' sump on opposite side of street (XVI).

INLET AT BASIN XVI

HIGH MEADOW AT SPRINGS RANCH MDDP
01-004
7/23/01

APPROACH GUTTER DEPTH

Q(cfs)	n	S(X)	S(O)
59.9	0.016	0.02	0.01

d= 0.67 ft

DEPTH AT SUMP INLET

Q	L(I)	w
59.9	20	3

d= 0.94 ft

Flow will split evenly with 16' sump on opposite side of street (~~XV~~).

INLET AT BASIN XVII

HIGH MEADOW AT SPRINGS RANCH MDDP
01-004
7/23/01

APPROACH GUTTER DEPTH

Q(cfs)	n	S(X)	S(O)
14.8	0.016	0.02	0.01

d= 0.4 ft

AT GRADE INLET

Q	S(X)	S(O)
14.8	0.02	0.01

T= 19.8

F(w)= 1.38

L1= 21.04

L2= 12.64

L3= 45.08

Try L(I)= 12 ft

Q(I)= 8.4 IF L(I)<L2
FALSE IF L(I)>L2

Q(by)= 6.4 IF L(I)<L2
~~14.8 IF L(I)>L2~~

INLET AT BASIN XVIII

HIGH MEADOW AT SPRINGS RANCH MDDP
01-004
7/23/01

APPROACH GUTTER DEPTH

Q(cfs)	n	S(X)	S(O)
27.1	0.016	0.02	0.01

d= 0.5 ft

AT GRADE INLET

Q	S(X)	S(O)
27.1	0.02	0.01

T= 24.84

F(w)= 1.44

L1= 27.54

L2= 16.54

L3= 59.02

Try L(I)= 12 ft

Q(I)= 11.8 IF L(I)<L2
FALSE IF L(I)>L2

Q(by)= 15.3 IF L(I)<L2
~~27.1 IF L(I)>L2~~

INLET AT BASIN XXI

HIGH MEADOW AT SPRINGS RANCH MDDP
01-004
7/23/01

APPROACH GUTTER DEPTH

Q(cfs)	n	S(X)	S(O)
23.9	0.016	0.02	0.04

d= 0.37 ft

AT GRADE INLET

Q	S(X)	S(O)
23.9	0.02	0.04

T= 18.28

F(w)= 2.72

L1= 38.29

L2= 22.99

L3= 82.04

Try L(I)= 20 ft

Q(I)= 12.5 IF L(I)<L2
FALSE IF L(I)>L2

Q(by)= 11.4 IF L(I)<L2
~~23.9 IF L(I)>L2~~

INLET AT BASIN XXII

HIGH MEADOW AT SPRINGS RANCH MDDP
01-004
7/23/01

APPROACH GUTTER DEPTH

Q(cfs)	n	S(X)	S(O)
31.9	0.016	0.02	0.04

d= 0.41 ft

AT GRADE INLET

Q	S(X)	S(O)
31.9	0.02	0.04

T= 20.37

F(w)= 2.77

L1= 43.45

L2= 26.09

L3= 93.1

Try L(i)= 20 ft

Q(i)= 14.7 IF L(i)<L2
FALSE IF L(i)>L2

Q(by)= 17.2 IF L(i)<L2
~~31.9 IF L(i)≥L2~~

INLET AT BASIN XXIII

HIGH MEADOW AT SPRINGS RANCH MDDP
01-004
7/23/01

APPROACH GUTTER DEPTH

Q(cfs)	n	S(X)	S(O)
34.6	0.016	0.02	0.02

d= 0.48 ft

AT GRADE INLET

Q	S(X)	S(O)
34.6	0.02	0.02

T= 23.91

F(w)= 2.02

L1= 37.19

L2= 22.34

L3= 79.69

Try L(l)= 20 ft

Q(l)= 18.6 IF L(l)<L2
FALSE IF L(l)>L2

Q(by)= 16 IF L(l)<L2
~~34.6 IF L(l)>L2~~

INLET AT BASIN XXIV & XXV

HIGH MEADOW AT SPRINGS RANCH MDDP
01-004
7/23/01

APPROACH GUTTER DEPTH

Q(cfs)	n	S(X)	S(O)
26.5	0.016	0.02	0.02

d= 0.43 ft

DEPTH AT SUMP INLET

Q	L(I)	w
34.5	12	3

d= 0.84 ft

2 INLETS @ 12' - one each side of street

Split flow in sump

INLET AT BASIN XXVI

HIGH MEADOW AT SPRINGS RANCH MDDP
01-004
7/23/01

APPROACH GUTTER DEPTH

Q(cfs)	n	S(X)	S(O)
15.7	0.016	0.02	0.01

d= 0.4 ft

DEPTH AT SUMP INLET

Q	L(I)	w
15.7	6	3

d= 0.64 ft

INLET AT BASIN XXVII

HIGH MEADOW AT SPRINGS RANCH MDDP
01-004
7/23/01

APPROACH GUTTER DEPTH

Q(cfs)	n	S(X)	S(O)
8.8	0.016	0.02	0.01

d= 0.33 ft

AT GRADE INLET

Q	S(X)	S(O)
8.8	0.02	0.01

T= 16.3

F(w)= 1.33

L1= 16.69

L2= 10.03

L3= 35.77

Try L(I)= 8 ft

Q(I)= 4.2 IF L(I)<L2
FALSE IF L(I)>L2

Q(by)= 4.6 IF L(I)<L2
~~8.8 IF L(I)>L2~~

INLET AT BASIN XXVIII

HIGH MEADOW AT SPRINGS RANCH MDDP
01-004
7/23/01

APPROACH GUTTER DEPTH

Q(cfs)	n	S(X)	S(O)
20	0.016	0.02	0.01

d= 0.44 ft

DEPTH AT SUMP INLET

Q	L(l)	w
40.7	10	3

d= 1.02 ft

+ add 8' on-grade inlet @ NW corner of Pioneer Creek Dr. & Ranch Cr. Dr.

INLET AT BASIN XIX

HIGH MEADOW AT SPRINGS RANCH MDDP
01-004
7/23/01

APPROACH GUTTER DEPTH

Q(cfs)	n	S(X)	S(O)
30	0.016	0.02	0.01

d= 0.52 ft

DEPTH AT SUMP INLET

Q	L(l)	w
42.2	16	3

d= 0.83 ft

Flow will split evenly with sump on opposite side of street (XX).

INLET AT BASIN XX

HIGH MEADOW AT SPRINGS RANCH MDDP
01-004
7/23/01

APPROACH GUTTER DEPTH

Q(cfs)	n	S(X)	S(O)
27.2	0.016	0.02	0.01

d= 0.5 ft

DEPTH AT SUMP INLET

Q	L(I)	w
27.2	16	3

d= 0.6 ft

Flow will split evenly with sump on opposite side of street (XIX).

INLET AT BASIN XXIX

HIGH MEADOW AT SPRINGS RANCH MDDP
01-004
7/23/01

APPROACH GUTTER DEPTH

Q(cfs)	n	S(X)	S(O)
20	0.016	0.02	0.01

d= 0.44 ft

DEPTH AT SUMP INLET

Q	L(l)	w
31.2	12	3

d= 0.78 ft

INLET AT BASIN XXX

HIGH MEADOW AT SPRINGS RANCH MDDP
01-004
7/23/01

APPROACH GUTTER DEPTH

Q(cfs)	n	S(X)	S(O)
19.9	0.016	0.02	0.01

d= 0.44 ft

DEPTH AT SUMP INLET

Q	L(l)	w
19.9	12	3

d= 0.56 ft

INLET AT BASIN XXXII

HIGH MEADOW AT SPRINGS RANCH MDDP
01-004
7/23/01

APPROACH GUTTER DEPTH

Q(cfs)	n	S(X)	S(O)
30	0.016	0.02	0.02

d= 0.45 ft

DEPTH AT SUMP INLET

Q	L(l)	w
34.7	12	3

d= 0.84 ft

INLET AT BASIN XXXIII

HIGH MEADOW AT SPRINGS RANCH MDDP
01-004
7/23/01

APPROACH GUTTER DEPTH

Q(cfs)	n	S(X)	S(O)
10	0.016	0.02	0.02

d= 0.3 ft

DEPTH AT SUMP INLET

Q	L(I)	w
11.3	4	3

d= 0.58 ft

INLET AT BASIN XXXV

HIGH MEADOW AT SPRINGS RANCH MDDP
01-004
7/23/01

APPROACH GUTTER DEPTH

Q(cfs)	n	S(X)	S(O)
7.6	0.016	0.02	0.04

d= 0.24 ft

AT GRADE INLET

Q	S(X)	S(O)
7.6	0.02	0.04

T= 11.89

F(w)= 2.5

L1= 22.89

L2= 13.75

L3= 49.05

Try L(I)= 6 ft

Q(I)= 2 IF L(I)<L2
FALSE IF L(I)>L2

Q(by)= 5.6 IF L(I)<L2
~~7.6 IF L(I)>L2~~

INLET AT BASIN XXXVI

HIGH MEADOW AT SPRINGS RANCH MDDP
01-004
7/23/01

APPROACH GUTTER DEPTH

Q(cfs)	n	S(X)	S(O)
13.4	0.016	0.02	0.03

d= 0.31 ft

AT GRADE INLET

Q	S(X)	S(O)
13.4	0.02	0.03

T= 15.53

F(w)= 2.28

L1= 27.27

L2= 16.37

L3= 58.42

Try L(l)= 10 ft

Q(l)= 4.9 IF L(l)<L2
FALSE IF L(l)>L2

Q(by)= 8.5 IF L(l)<L2
~~13.4 IF L(l)>L2~~

INLET AT BASIN XXXVII

HIGH MEADOW AT SPRINGS RANCH MDDP
01-004
7/23/01

APPROACH GUTTER DEPTH

Q(cfs)	n	S(X)	S(O)
35.2	0.016	0.02	0.03

d= 0.45 ft

AT GRADE INLET

Q	S(X)	S(O)
35.2	0.02	0.03

T= 22.3

F(w)= 2.44

L1= 41.9

L2= 25.16

L3= 89.78

Try L(l)= 8 ft

Q(l)= 6.7 IF L(l)<L2
FALSE IF L(l)>L2

Q(by)= 28.5 IF L(l)<L2
~~35.2 IF L(l)>L2~~

INLET AT BASIN XXXVIII

HIGH MEADOW AT SPRINGS RANCH MDDP
01-004
7/23/01

APPROACH GUTTER DEPTH

Q(cfs)	n	S(X)	S(O)
14.1	0.016	0.02	0.01

d= 0.39 ft

DEPTH AT SUMP INLET

Q	L(I)	w
14.1	4	3

d= 0.68 ft

INLET AT BASIN XXXXIII

HIGH MEADOW AT SPRINGS RANCH MDDP
01-004
7/23/01

APPROACH GUTTER DEPTH

Q(cfs)	n	S(X)	S(O)
19	0.016	0.02	0.02

d= 0.38 ft

DEPTH AT SUMP INLET

Q	L(i)	w
38.1	12	3

d= 0.9 ft

SPLIT AMONG 3-4' INLETS + 6' ON-GRADE DUE TO CONFIGURATION

Detention Basin No. 46
North Range at Springs Ranch
Earthwork Calculation

Elevation	Area	Avg. Area	Volume	Basin Depth	Cumulative Basin Volume		Elevation
6566	0 sf						
		19,875 sf	39,750 cf	2.0 ft	**39,750 cf**	**0.91 ac-ft**	**6568**
6568	39,750 sf						
		60,905 sf	121,810 cf	4.0 ft	**161,560 cf**	**3.71 ac-ft**	**6570**
6570	82,060 sf						
		85,793 sf	171,585 cf	6.0 ft	**333,145 cf**	**7.65 ac-ft**	**6572**
6572	89,525 sf						
		93,376 sf	186,751 cf	8.0 ft	**519,896 cf**	**11.94 ac-ft**	**6574**
6574	97,226 sf						
		99,178 sf	99,178 cf	9.0 ft	**619,074 cf**	**14.21 ac-ft**	**6575**
6575	101,130 sf						
		50,565 sf	50,565 cf	10.0 ft	**669,639 cf**	**15.37 ac-ft**	**6576**
6576	105,155 sf						

6570.6	213,036 cf	4.89 ac-ft
6573.99	518,962 cf	11.91 ac-ft

Detention Basin No. 46
North Range at Springs Ranch
Outlet Structure Sizing

Broad Crested Weir Calculation

Weir Coefficient	2.6
Crest Elevation	6566.50
Crest Length	3.5
Top of Weir	6569.50

Water Elevation	Flow Depth	Weir Flow
6567.00	0.50 ft	**3.2 cfs**
6567.50	1.00 ft	**9.1 cfs**
6568.00	1.50 ft	**16.7 cfs**
6568.50	2.00 ft	**25.7 cfs**
6569.00	2.50 ft	**36.0 cfs**
6569.50	3.00 ft	**47.3 cfs**
6570.00	3.50 ft	**59.6 cfs**
6570.50	4.00 ft	**72.8 cfs**

Weir Equation:

$Q = CLH^{1.5}$

C = Weir coefficient (dimensionless)

L = Length of weir, in ft

H = Depth of flow over the crest, in ft

Orifice Calculation associated with Outlet Structure

Orifice Coefficient		0.6
Opening Size	Width	3.5 ft
	Length	3.5 ft
Opening Area		12.25 sf
Opening Area w/Blockage		8.58 sf
Opening Flowline Elevation		6569.50
Opening Centerline Elevation		6570.25
Opening Top Elevation		6571.00

Water Elevation	Head / Flow Depth	Orifice Flow	Weir Flow	Total Flow
6571.00	0.75 ft	35.8 cfs	72.8 cfs	**108.6 cfs**
6571.50	1.25 ft	46.2 cfs	72.8 cfs	**119.0 cfs**
6572.00	1.75 ft	54.6 cfs	72.8 cfs	**127.4 cfs**
6572.50	2.25 ft	61.9 cfs	72.8 cfs	**134.7 cfs**
6573.00	2.75 ft	68.5 cfs	72.8 cfs	**141.3 cfs**
6573.50	3.25 ft	74.4 cfs	72.8 cfs	**147.2 cfs**
6574.00	3.75 ft	80.0 cfs	72.8 cfs	**152.8 cfs**
6574.50	4.25 ft	85.1 cfs	72.8 cfs	**157.9 cfs**
6575.00	4.75 ft	90.0 cfs	72.8 cfs	**162.8 cfs**
6575.50	5.25 ft	94.6 cfs	72.8 cfs	**167.4 cfs**
6576.00	5.75 ft	99.0 cfs	72.8 cfs	**171.8 cfs**

Note: The Orifice Plate controls the flow rate out of the detention basin when the water surface elvation is above 6572. See Orifice Plate Sizing calculation.

Orifice Equation:

$Q = CA(2gH)^{0.5}$

C = Orifice coefficient (dimensionless)

0.6 for a square-edged entrance

1.0 fir a well-rounded entrance

A = Cross-sectional area of opening, in sf

Use a 30% blockage for area

g = Gravitational acceleration constant, 32.2 ft/sec^2

H = Head above the centerline of the pipe, in ft

Detention Basin No. 46
North Range at Springs Ranch
Orifice Plate Sizing

Orifice Plate is located on the 48-inch RCP outfalling from the Outlet Structure.

Orifice Coefficient		0.6
Opening Size	Width	3.1 ft
	Height	4.0 ft
Opening Area		11.01 sf
Opening Flowline Elevation		6564.20
Opening Centerline Elevation		6566.20

Orifice Equation:

$Q = CA(2gH)^{0.5}$

C = Orifice coefficient (dimensionless)

0.6 for a square-edged entrance

1.0 fir a well-rounded entrance

A = Cross-sectional area of opening, in sf

g = Gravitational acceleration constant, 32.2 ft/sec^2

H = Head above the centerline of the pipe, in ft

Water Elevation	Head / Flow Depth	Orifice Flow
6568.00	1.80 ft	71.1 cfs
6568.50	2.30 ft	80.4 cfs
6569.00	2.80 ft	88.7 cfs
6569.50	3.30 ft	96.3 cfs
6570.00	3.80 ft	103.3 cfs
6570.50	4.30 ft	109.9 cfs
6571.00	4.80 ft	116.1 cfs
6571.50	5.30 ft	122.0 cfs
6572.00	5.80 ft	127.7 cfs
6572.50	6.30 ft	133.1 cfs
6573.00	6.80 ft	138.2 cfs
6573.50	7.30 ft	143.2 cfs
6574.00	7.80 ft	148.1 cfs
6574.10	7.90 ft	149.0 cfs
6574.20	8.00 ft	149.9 cfs
6574.50	8.30 ft	152.7 cfs
6575.00	8.80 ft	157.3 cfs

```
  7 COMPUT 7  50       99          0.0          4.4          1.01 2  01   01 100-YR
    ENDCMP 1
  7 COMPUT 7  50       99          0.0          3.0          1.01 2  01   02 10-YR
1


 **********80-80 LIST OF INPUT DATA (CONTINUED)**********

    ENDCMP 1
    ENDJOB 2
0********************************END OF 80-80 LIST*********************************
1


 TR20 XEQ 11/ 8/ 0   11:47      SPRINGS RANCH EAST FORK BASINS -FUTURE CONDITION W/DETENTION                  JOB  1   PASS   1
      REV PC/09/83               24 HR TYPE IIA STORM (100- AND 10-YR, AMC=2)                                    PAGE   1


 FILE NO.  1
0                                  COMPUTER PROGRAM FOR PROJECT FORMULATION - HYDROLOGY   USER NOTES

              THE USERS MANUAL FOR THIS PROGRAM IS THE MAY 1982 DRAFT OF TR-20.  CHANGES FROM THE 2/14/74 VERSION INCLUDE:

              REACH ROUTING - THE MODIFIED ATT-KIN ROUTING PROCEDURE REPLACES THE CONVEX METHOD.  INPUT DATA PREPARED FOR
                 PREVIOUS PROGRAM VERSIONS USING CONVEX ROUTING COEFFICIENTS WILL NOT RUN ON THIS VERSION.

                 THE PREFERRED TYPE OF DATA ENTRY IS CROSS SECTION DATA REPRESENTATIVE OF A REACH.  IT IS RECOMMENDED THAT
                 THE OPTIONAL CROSS SECTION DISCHARGE-AREA PLOTS BE OBTAINED WHENEVER NEW CROSS SECTION DATA IS ENTERED.
                 THE PLOTS SHOULD BE CHECKED FOR REASONABLENESS AND ADEQUACY OF INPUT DATA FOR THE COMPUTATION OF "M"
                 VALUES USED IN THE ROUTING PROCEDURE.

                 GUIDELINES FOR DETERMINING OR ANALYZING REACH LENGTHS AND COEFFICIENTS (X,M) ARE AVAILABLE IN THE USERS
                 MANUAL.  SUMMARY TABLE 2 DISPLAYS REACH ROUTING RESULTS AND ROUTING PARAMETERS FOR COMPARISON AND CHECKING.

              HYDROGRAPH GENERATION - THE PROCEDURE TO CALCULATE THE INTERNAL TIME INCREMENT AND PEAK TIME OF THE UNIT
                 HYDROGRAPH HAVE BEEN IMPROVED.  PEAK DISCHARGES AND TIMES MAY DIFFER FROM THE PREVIOUS VERSION.  OUTPUT
                 HYDROGRAPHS ARE STILL INTERPOLATED, PRINTED, AND ROUTED AT THE USER SELECTED MAIN TIME INCREMENT.

              INTERMEDIATE PEAKS - METHOD ADDED TO PROVIDE DISCHARGES AT INTERMEDIATE POINTS WITHIN REACHES WITHOUT ROUTING.

              OTHER - THIS VERSION CONTAINS SOME ADDITIONS TO THE INPUT AND NUMEROUS MODIFICATIONS TO THE OUTPUT.  USER
                 OPTIONS HAVE BEEN MODIFIED AND AUGMENTED ON THE JOB RECORD, RAINTABLES ADDED, ERROR AND WARNING MESSAGES
                 EXPANDED, AND THE SUMMARY TABLES COMPLETELY REVISED.  THE HOLDOUT OPTION IS NOT OPERATIONAL AT THIS TIME.

              PROGRAM QUESTIONS OR PROBLEMS SHOULD BE DIRECTED TO HYDRAULIC ENGINEERS AT THE SCS NATIONAL TECHNICAL CENTERS:

                   CHESTER, PA (NORTHEAST)  -- 215-499-3933,       FORT WORTH, TX (SOUTH) -- 334-5242 (FTS)
```

LINCOLN, NB (MIDWEST) -- 541-5318 (FTS), PORTLAND, OR (WEST) -- 423-4099 (FTS)
OR HYDROLOGY UNIT, ENGINEERING DIVISION, LANHAM, MD -- 436-7383 (FTS).

PROGRAM CHANGES SINCE MAY 1982:

12/17/82 - CORRECT PEAK RATE FACTOR FOR USER ENTERED DIMHYD
CORRECT REACH ROUTING PEAK TRAVEL TIME PRINTED WITH FULLPRINT OPTION
5/02/83 - CORRECT COMPUTATIONS FOR -
1. DIVISION OF BASEFLOW IN DIVERT OPERATION
2. HYDROGRAPH VOLUME SPLIT BETWEEN BASEFLOW AND ABOVE BASEFLOW
3. CROSS SECTION DATA PLOTTING POSITION
4. INTERMEDIATE PEAK WHEN "FROM" AREA IS LARGER THAN "THRU" AREA
5. STORAGE ROUTED REACH TRAVEL TIME FOR MULTIPEAK HYDROGRAPH
6. ORDERING "FLOW-FREQ" FILE FROM SUMMARY TABLE #3 DATA
7. BASEFLOW ENTERED WITH READHYD
8. LOW FLOW SPLIT DURING DIVERT PROCEDURE #2 WHEN SECTION RATINGS START AT DIFFERENT ELEVATIONS
ENHANCEMENTS ---
1. REPLACE USER MANUAL ERROR CODES (PAGE 4-9 TO 4-11) WITH MESSAGES
2. LABEL OUTPUT HYDROGRAPH FILES WITH CROSS SECTION/STRUCTURE, ALTERNATE AND STORM NO'S
09/01/83 - CORRECT INPUT AND OUTPUT ERRORS FOR INTERMEDIATE PEAKS
CORRECT COMBINATION OF RATING TABLES FOR DIVERT
CHECK REACH ROUTING PARAMETERS FOR ACCEPTABLE LIMITS
ELIMINATE MINIMUM REACH TRAVEL TIME WHEN ATT-KIN COEFFICIENT EQUALS ONE

1

TR20 XEQ 11/ 8/ 0 11:47 SPRINGS RANCH EAST FORK BASINS -FUTURE CONDITION W/DETENTION JOB 1 PASS 1
REV PC/09/83 24 HR TYPE IIA STORM (100- AND 10-YR, AMC-2) PAGE 2

EXECUTIVE CONTROL OPERATION LIST RECORD ID

LISTING OF CURRENT DATA

	STRUCT NO.	ELEVATION	DISCHARGE	STORAGE
3 STRUCT	99			
8		6566.00	.00	.00
8		6568.00	16.70	.90
8		6570.00	59.60	3.70
8		6572.00	127.70	7.70
8		6574.00	148.10	11.90

```
 8                          6575.00       157.30        14 20
 8                          6576.00       496.00        15.40
 9 ENDTBL

                      TIME INCREMENT
 4 DIMHYD                     .0200

 8                  .0000       .0300       .1000       .1900       .3100
 8                  .4700       .6600       .8200       .9300       .9900
 8                 1.0000       .9900       .9300       .8600       .7800
 8                  .6800       .5600       .4600       .3900       .3300
 8                  .2800       .2410       .2070       .1740       .1470
 8                  .1260       .1070       .0910       .0770       .0660
 8                  .0550       .0470       .0400       .0340       .0290
 8                  .0250       .0210       .0180       .0150       .0130
 8                  .0110       .0090       .0080       .0070       .0060
 8                  .0050       .0040       .0030       .0020       .0010
 8                  .0000       .0000       .0000       .0000       .0000
 9 ENDTBL

   COMPUTED PEAK RATE FACTOR =  484.00


      TABLE NO.       TIME INCREMENT
 5 RAINFL 1                   .5000

 8                  .0000       .0015       .0050       .0080       .0120
 8                  .0170       .0210       .0260       .0320       .0460
 8                  .0600       .1000       .7000       .7500       .7800
 8                  .8000       .8200       .8300       .8400       .8500
1


TR20 XEQ 11/ 8/ 0   11:47      SPRINGS RANCH EAST FORK BASINS -FUTURE CONDITION W/DETENTION          JOB  1   PASS   1
     REV PC/09/83              24 HR TYPE IIA STORM (100- AND 10-YR, AMC=2)                                 PAGE   3


 8                  .8600       .8700       .8750       .8830       .8900
 8                  .8980       .9050       .9120       .9180       .9240
 8                  .9300       .9350       .9400       .9450       .9500
 8                  .9550       .9600       .9650       .9700       .9750
 8                  .9800       .9830       .9850       .9880       .9900
 8                  .9930       .9950       .9980      1.0000      1.0000
 9 ENDTBL

      TABLE NO.       TIME INCREMENT
 5 RAINFL 2                   .2500
```

```
 8                .0000       .0020       .0050       .0080       .0110
 8                .0140       .0170       .0200       .0230       .0260
 8                .0290       .0320       .0350       .0380       .0410
 8                .0440       .0480       .0520       .0560       .0600
 8                .0640       .0680       .0720       .0760       .0800
 8                .0850       .0900       .0950       .1000       .1050
 8                .1100       .1150       .1200       .1250       .1330
 8                .1400       .1470       .1550       .1630       .1720
 8                .1810       .1910       .2030       .2160       .2360
 8                .2570       .2830       .3870       .6630       .7070
 8                .7350       .7580       .7760       .7910       .8040
 8                .8150       .8250       .8340       .8430       .8490
 8                .8560       .8630       .8690       .8750       .8810
 8                .8870       .8930       .8980       .9030       .9080
 8                .9130       .9180       .9220       .9260       .9300
 8                .9340       .9380       .9420       .9460       .9500
 8                .9530       .9560       .9590       .9620       .9650
 8                .9680       .9710       .9740       .9770       .9800
 8                .9830       .9860       .9890       .9920       .9950
 8                .9980      1.0000      1.0000      1.0000      1.0000
 9 ENDTBL

      TABLE NO.       TIME INCREMENT
 5 RAINFL 3                   .5000

 8                .0000       .0100       .0220       .0360       .0510
 8                .0670       .0830       .0990       .1160       .1350
 8                .1560       .1790       .2040       .2330       .2680
 8                .3100       .4250       .4800       .5200       .5500
 8                .5770       .6010       .6230       .6440       .6640
 8                .6830       .7010       .7190       .7360       .7530
 8                .7690       .7850       .8000       .8150       .8300
 8                .8440       .8580       .8710       .8840       .8960
 8                .9080       .9200       .9320       .9440       .9560
 8                .9670       .9780       .9890      1.0000      1.0000
 9 ENDTBL
1
```



```
      TABLE NO.       TIME INCREMENT
 5 RAINFL 4                   .5000

 8                .0000       .0040       .0080       .0120       .0160
```

```
 8                .0200       .0250       .0300       .0350       .0400
 8                .0450       .0500       .0550       .0600       .0650
 8                .0700       .0750       .0810       .0870       .0930
 8                .0990       .1050       .1110       .1160       .1250
 8                .1320       .1400       .1480       .1560       .1650
 8                .1740       .1840       .1950       .2070       .2200
 8                .2360       .2550       .2770       .3020       .4090
 8                .5150       .5490       .5830       .6090       .6240
 8                .6400       .6550       .6690       .6820       .6940
 8                .7050       .7160       .7270       .7380       .7480
 8                .7580       .7670       .7760       .7850       .7920
 8                .8000       .8080       .8160       .8230       .8300
 8                .8370       .8440       .8510       .8580       .8640
 8                .8700       .8760       .8820       .8880       .8940
 8                .9000       .9060       .9110       .9160       .9210
 8                .9260       .9310       .9360       .9410       .9460
 8                .9510       .9560       .9610       .9660       .9710
 8                .9760       .9800       .9840       .9880       .9920
 8                .9960      1.0000      1.0000      1.0000      1.0000
 9 ENDTBL

      TABLE NO.       TIME INCREMENT
 5 RAINFL 5                   .5000

 8                .0000       .0020       .0050       .0080       .0110
 8                .0140       .0170       .0200       .0230       .0260
 8                .0290       .0320       .0350       .0380       .0410
 8                .0440       .0470       .0510       .0550       .0590
 8                .0630       .0670       .0710       .0750       .0790
 8                .0840       .0890       .0940       .0990       .1040
 8                .1090       .1140       .1200       .1260       .1330
 8                .1400       .1470       .1540       .1620       .1710
 8                .1810       .1920       .2040       .2170       .2330
 8                .2520       .2770       .3180       .6380       .6980
 8                .7290       .7520       .7700       .7850       .7980
 8                .8090       .8190       .8290       .8380       .8460
 8                .8540       .8610       .8680       .8740       .8800
 8                .8860       .8920       .8970       .9020       .9070
 8                .9120       .9170       .9210       .9250       .9290
 8                .9330       .9370       .9410       .9450       .9490
 8                .9530       .9570       .9600       .9630       .9660
 8                .9690       .9720       .9750       .9780       .9810
1
```

```
 8                .9840       .9870       .9900       .9930       .9960
 8                .9980      1.0000      1.0000      1.0000      1.0000
 9 ENDTBL

      TABLE NO.       TIME INCREMENT
 5 RAINFL 6                    .0200

 8                .0000       .0080       .0161       .0243       .0333
 8                .0425       .0524       .0630       .0744       .0863
 8                .0990       .1124       .1263       .1420       .1595
 8                .1800       .2050       .2550       .3450       .4370
 8                .5300       .6030       .6330       .6600       .6840
 8                .7050       .7240       .7420       .7590       .7750
 8                .7900       .8043       .8180       .8313       .8439
 8                .8561       .8678       .8790       .8898       .9002
 8                .9103       .9201       .9297       .9391       .9483
 8                .9573       .9661       .9747       .9832       .9916
 8               1.0000      1.0000      1.0000      1.0000      1.0000
 9 ENDTBL
1
```



```
0                    STANDARD CONTROL INSTRUCTIONS

 6 RUNOFF 1  50        1        .0830      78.0000       .32000 0 0 0 0 1
 6 REACH  3 150   1    2    1370.0000       1.3000      1.52000 0 0 0 0 1
 6 RUNOFF 1  49        1        .0540      78.0000       .21000 0 0 0 0 1
 6 ADDHYD 4    49 2 1 3                                       0 0 0 0 0 1
 6 REACH  3 149   3    1     830.0000       1.3000      1.52000 0 0 0 0 1
 6 RUNOFF 1  47        2        .0250      78.0000       .25000 0 0 0 0 1
 6 ADDHYD 4    47 1 2 3                                       0 0 0 0 0 1
 6 RUNOFF 1  48        1        .0680      72.0000       .32000 0 0 0 0 1
 6 REACH  3 148   1    2    1205.0000       1.3000      1.52000 0 0 0 0 1
 6 ADDHYD 4    47 3 2 1                                       0 0 0 0 0 1
 6 REACH  3 147   1    2     525.0000       1.3000      1.52000 0 0 0 0 1
 6 RUNOFF 1  46        1        .0340      75.0000       .25000 0 0 0 0 1
 6 ADDHYD 4    46 2 1 3                                       0 0 0 0 0 1
 6 RUNOFF 1  52        1        .0520      69.0000       .32000 0 0 0 0 1
 6 ADDHYD 4    46 3 1 2                                       1 1 0 1 0 1
 6 RESVOR 2    99 2   1        .0000                          0 0 0 0 0 1
   ENDATA
```

END OF LISTING
1

EXECUTIVE CONTROL OPERATION INCREM RECORD ID MIN
+ MAIN TIME INCREMENT = .03 HOURS

EXECUTIVE CONTROL OPERATION COMPUT RECORD ID 100-YR
+ FROM XSECTION 50
+ TO STRUCTURE 99
STARTING TIME = .00 RAIN DEPTH = 4.40 RAIN DURATION= 1 00 RAIN TABLE NO.= 1 ANT. MOIST. COND= 2
ALTERNATE NO.= 1 STORM NO.= 1 MAIN TIME INCREMENT = .03 HOURS

*** WARNING REACH 149 MIT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

*** WARNING REACH 147 MIT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

OPERATION ADDHYD STRUCTURE 40

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.09	486.73	(NULL)
7.98	25.48	(NULL)

TIME(HRS) FIRST HYDROGRAPH POINT = .00 HOURS TIME INCREMENT = .03 HOURS DRAINAGE AREA = .32 SQ.MI.

5.28	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.06	.50
5.61	DISCHG	2.50	8.14	19.70	38.63	65.35	99.34	139.16	183.21	230.05	278.27
5.94	DISCHG	326.52	373.54	418.02	456.09	481.31	485.55	466.49	429.73	382.92	332.80
6.27	DISCHG	285.18	241.97	204.07	172.24	146.67	126.79	111.53	99.85	90.79	83.49
6.60	DISCHG	77.12	71.24	65.75	60.73	56.26	52.44	49.21	46.55	44.38	42.66
6.93	DISCHG	41.33	40.30	39.52	38.89	38.28	37.49	36.41	35.10	33.68	32.26
7.26	DISCHG	30.96	29.82	28.84	28.02	27.37	26.87	26.48	26.20	25.98	25.81
7.59	DISCHG	25.69	25.61	25.54	25.50	25.47	25.45	25.44	25.44	25.44	25.45
7.92	DISCHG	25.46	25.47	25.48	25.46	25.33	24.94	24.19	23.09	21.78	20.39
8.25	DISCHG	19.07	17.87	16.84	15.96	15.26	14.70	14.28	13.95	13.70	13.51
8.58	DISCHG	13.36	13.25	13.16	13.10	13.05	13.01	12.98	12.96	12.95	12.94
8.91	DISCHG	12.93	12.93	12 93	12.93	12.93	12.93	12.93	12.94	12.94	12.95
9.24	DISCHG	12.95	12.96	12.96	12.96	12.97	12.97	12.98	12.98	12.99	12.99
9.57	DISCHG	12.99	13.00	13.00	13.01	13.01	13.02	13.02	13.02	13.03	13.03

RUNOFF VOLUME ABOVE BASEFLOW = 1.48 WATERSHED INCHES, 307.33 CFS-HRS, 24.98 ACRE-FEET; BASEFLOW = .00 CFS

EXECUTIVE CONTROL OPERATION ENDCMP RECORD ID
+ COMPUTATIONS COMPLETED FOR PASS 1

EXECUTIVE CONTROL OPERATION COMPUT RECORD ID 10-YR
+ FROM XSECTION 50
+ TO STRUCTURE 99
STARTING TIME = .00 RAIN DEPTH = 3.00 RAIN DURATION= 1.00 RAIN TABLE NO.= 1 ANT. MOIST. COND= 2
ALTERNATE NO.= 1 STORM NO.= 2 MAIN TIME INCREMENT = .03 HOURS

*** WARNING REACH 149 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***
1

*** WARNING REACH 147 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

OPERATION ADDHYD STRUCTURE 46

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.11	221.00	(NULL)
7.99	13.94	(NULL)

TIME(HRS) FIRST HYDROGRAPH POINT = .00 HOURS TIME INCREMENT = .03 HOURS DRAINAGE AREA = .32 SQ.MI.

5.28	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.01
5.61	DISCHG	.08	.51	1.94	5.41	11.86	21.90	35.66	52.84	72.97	95.48
5.94	DISCHG	119.81	145.30	171.07	194.76	212.82	220.80	217.11	204.14	185.45	164.29
6.27	DISCHG	143.50	124.04	106.39	91.63	78.29	68.04	59.99	53.74	48.86	44.91
6.60	DISCHG	41.50	38.37	35.47	32.84	30.50	28.49	26.79	25.37	24.20	23.25
6.93	DISCHG	22.51	21.93	21.48	21.12	20.78	20.35	19.78	19.09	18.35	17.61
7.26	DISCHG	16.93	16.33	15.80	15.35	14.99	14.70	14.48	14.31	14.18	14.09
7.59	DISCHG	14.02	13.97	13.93	13.91	13.90	13.89	13.89	13.89	13.90	13.91
7.92	DISCHG	13.91	13.93	13.94	13.93	13.87	13.67	13.29	12.72	12.03	11.31
8.25	DISCHG	10.61	9.97	9.41	8.93	8.52	8.20	7.94	7.75	7.59	7.48
8.58	DISCHG	7.39	7.32	7.26	7.22	7.19	7.17	7.16	7.15	7.14	7.13
8.91	DISCHG	7.13	7.13	7.13	7.13	7.13	7.13	7.15	7.14	7.14	7.15
9.24	DISCHG	7.15	7.15	7.16	7.16	7.16	7.17	7.17	7.18	7.18	7.18

9.57	DISCHG	7.19	7.19	7.20	7.20	7.20	7.21	7.21	7.21	7.22	7.22

RUNOFF VOLUME ABOVE BASEFLOW = .69 WATERSHED INCHES, 140.44 CFS-HRS, 11.61 ACRE-FEET; BASEFLOW = .00 CFS

EXECUTIVE CONTROL OPERATION ENDCMP RECORD ID

\+ COMPUTATIONS COMPLETED FOR PASS 2

EXECUTIVE CONTROL OPERATION ENDJOB RECORD ID

1

SUMMARY TABLE 1 - SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL INSTRUCTIONS IN THE ORDER PERFORMED
(A STAR(*) AFTER THE PEAK DISCHARGE TIME AND RATE (CFS) VALUES INDICATES A FLAT TOP HYDROGRAPH
A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

SECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC MOIST COND	MAIN TIME INCREM (HR)	PRECIPITATION BEGIN (HR)	PRECIPITATION AMOUNT (IN)	PRECIPITATION DURATION (HR)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE ELEVATION (FT)	PEAK DISCHARGE TIME (HR)	PEAK DISCHARGE RATE (CFS)	PEAK DISCHARGE RATE (CSM)
ALTERNATE 1 STORM 1													
XSECTION 50	RUNOFF	.08	1	2	.03	.0	4.40	24.00	1.69	---	6.08	146.52	1765.3
XSECTION 150	REACH	.08	1	2	.03	.0	4.40	24.00	1.68	---	6.13	143.84	1733.0
XSECTION 49	RUNOFF	.05	1	2	.03	.0	4.40	24.00	1.69	---	6.03	109.51	2028.0
STRUCTURE 49	ADDHYD	.14	1	2	.03	.0	4.40	24.00	1.69	---	6.07	239.59	1748.9
XSECTION 149	REACH	.14	1	2	.03	.0	4.40	24.00	1.69	---	6.10	239.02	1744.7
XSECTION 47	RUNOFF	.03	1	2	.03	.0	4.40	24.00	1.69	---	6.05	48.45	1937.9
STRUCTURE 47	ADDHYD	.16	1	2	.03	.0	4.40	24.00	1.69	---	6.09	284.14	1753.9
XSECTION 48	RUNOFF	.07	1	2	.03	.0	4.40	24.00	1.29	---	6.09	92.48	1360.0
XSECTION 148	REACH	.07	1	2	.03	.0	4.40	24.00	1.28	---	6.14	90.31	1328.1
STRUCTURE 47	ADDHYD	.23	1	2	.03	.0	4.40	24.00	1.57	---	6.10	370.86	1612.5
XSECTION 147	REACH	.23	1	2	.03	.0	4.40	24.00	1.57	---	6.10	370.86	1612.5
XSECTION 46	RUNOFF	.03	1	2	.03	.0	4.40	24.00	1.48	---	6.05	58.58	1722.9
STRUCTURE 46	ADDHYD	.26	1	2	.03	.0	4.40	24.00	1.56	---	6.09	425.83	1613.0
XSECTION 52	RUNOFF	.05	1	2	.03	.0	4.40	24.00	1.11	---	6.10	60.90	1171.1

STRUCTURE 46	ADDHYD	.32	1	2	.03	.0	4.40	24.00	1.48	---	6.09	486.73	1540.3
STRUCTURE 99	RESVOR	.32	1	2	.03	.0	4.40	24.00	1.43	6573.99	6.40	147.97	468.3

ALTERNATE 1 STORM 2

XSECTION 50	RUNOFF	.08	1	2	.03	.0	3.00	24.00	.82	---	6.09	72.40	872.3
XSECTION 150	REACH	.08	1	2	.03	.0	3.00	24.00	.82	---	6.15	69.70	839.7
XSECTION 49	RUNOFF	.05	1	2	.03	.0	3.00	24.00	.83	---	6.04	55.67	1030.9
STRUCTURE 49	ADDHYD	.14	1	2	.03	.0	3.00	24.00	.82	---	6.08	115.40	842.3
XSECTION 149	REACH	.14	1	2	.03	.0	3.00	24.00	.82	---	6.12	114.30	834.3
XSECTION 47	RUNOFF	.03	1	2	.03	.0	3.00	24.00	.83	---	6.06	24.44	977.6
STRUCTURE 47	ADDHYD	.16	1	2	.03	.0	3.00	24.00	.82	---	6.11	136.34	841.6
XSECTION 48	RUNOFF	.07	1	2	.03	.0	3.00	24.00	.56	---	6.11	39.90	586.8
XSECTION 148	REACH	.07	1	2	.03	.0	3.00	24.00	.56	---	6.17	37.88	557.1
STRUCTURE 47	ADDHYD	.23	1	2	.03	.0	3.00	24.00	.74	---	6.12	171.63	746.2
XSECTION 147	REACH	.23	1	2	.03	.0	3.00	24.00	.74	---	6.12	171.63	746.2
XSECTION 46	RUNOFF	.03	1	2	.03	.0	3.00	24.00	.69	---	6.06	27.83	818.5
STRUCTURE 46	ADDHYD	.26	1	2	.03	.0	3.00	24.00	.74	---	6.11	196.92	745.9
XSECTION 52	RUNOFF	.05	1	2	.03	.0	3.00	24.00	.45	---	6.11	24.08	463.2
STRUCTURE 46	ADDHYD	.32	1	2	.03	.0	3.00	24.00	.69	---	6.11	221.00	699.4

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SUMMARY TABLE 1 - SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL INSTRUCTIONS IN THE ORDER PERFORMED
(A STAR(*) AFTER THE PEAK DISCHARGE TIME AND RATE (CFS) VALUES INDICATES A FLAT TOP HYDROGRAPH
A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

SECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC MOIST COND	MAIN TIME INCREM (HR)	PRECIPITATION BEGIN (HR)	PRECIPITATION AMOUNT (IN)	PRECIPITATION DURATION (HR)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE ELEVATION (FT)	PEAK DISCHARGE TIME (HR)	PEAK DISCHARGE RATE (CFS)	PEAK DISCHARGE RATE (CSM)

ALTERNATE 1 STORM 2

STRUCTURE 99	RESVOR	.32	1	2	.03	.0	3.00	24.00	.66	6570.63	6.40	80.92	256.1

1

SUMMARY TABLE 2 - SELECTED MODIFIED ATT-KIN REACH ROUTINGS IN ORDER OF STANDARD EXECUTIVE CONTROL INSTRUCTIONS
(A STAR(*) AFTER VOLUME ABOVE BASE(IN) INDICATES A HYDROGRAPH TRUNCATED AT A VALUE EXCEEDING BASE + 10% OF PEAK
A QUESTION MARK(?) AFTER COEFF.(C) INDICATES PARAMETERS OUTSIDE ACCEPTABLE LIMITS, SEE PREVIOUS WARNINGS)

XSEC ID	REACH LENGTH (FT)	HYDROGRAPH INFORMATION: INFLOW PEAK (CFS)	INFLOW TIME (HR)	OUTFLOW PEAK (CFS)	OUTFLOW TIME (HR)	OUTFLOW INTERV. AREA PEAK (CFS)	OUTFLOW INTERV. AREA TIME (HR)	BASE-FLOW (CFS)	ROUTING PARAMETERS: VOLUME ABOVE BASE (IN)	MAIN TIME INCR (HR)	ITER-ATION #	Q AND A EQUATION COEFF (X)	Q AND A EQUATION POWER (M)	LENGTH FACTOR (K')	PEAK RATIO O/I (Q*)	S/Q @PEAK (K) (SEC)	ATT-KIN COEFF (C)	TRAVEL TIME STOR-AGE (HR)	TRAVEL TIME KINE-MATIC (HR)
ALTERNATE 1 STORM 1																			
+150	1370	146	6.1	144	6.1	---	---	0	1.69	.03	1	1.30	1.52	.028	.982	138	.60	.07	.04
+149	830	240	6.1	239	6.1	---	---	0	1.69	.03	1	1.30	1.52	.010	.998	71	.91?	.03	.02
+148	1205	92	6.1	91	6.1	---	---	0	1.29	.03	1	1.30	1.52	.029	.980	142	.59	.03	.04
+147	525	371	6.1	371	6.1	---	---	0	1.57	.03	0	1.30	1.52	.004	1.000	38	1.00?	.00	.00
ALTERNATE 1 STORM 2																			
+150	1370	72	6.1	69	6.1	---	---	0	.82	.03	1	1.30	1.52	.040	.962	175	.51	.03	.05
+149	830	115	6.1	111	6.1	---	---	0	.82	.03	1	1.30	1.52	.014	.988	91	.79?	.07	.03
+148	1205	40	6.1	39	6.2	---	---	0	.56	.03	1	1.30	1.52	.045	.950	189	.48	.07	.05
+147	525	171	6.1	171	6.1	---	---	0	.74	.03	0	1.30	1.52	.006	1.000	50	1.00?	.00	.00

1

SUMMARY TABLE 3 - DISCHARGE (CFS) AT XSECTIONS AND STRUCTURES FOR ALL STORMS AND ALTERNATES

XSECTION/ STRUCTURE ID	DRAINAGE AREA (SQ MI)	STORM NUMBERS..... 1	2
0 STRUCTURE 99	.32		
ALTERNATE 1		147.97	80.92
0 STRUCTURE 49	.14		
ALTERNATE 1		239.59	115.40
0 STRUCTURE 47	.23		
ALTERNATE 1		370.86	171.63
0 STRUCTURE 46	.32		
ALTERNATE 1		486.73	221.00
0 XSECTION 46	.03		
ALTERNATE 1		58.58	27.83
0 XSECTION 47	.03		
ALTERNATE 1		48.45	24.44
0 XSECTION 48	.07		
ALTERNATE 1		92.48	39.90
0 XSECTION 49	.05		
ALTERNATE 1		109.51	55.67
0 XSECTION 50	.08		
ALTERNATE 1		146.52	72.40
0 XSECTION 52	.05		
ALTERNATE 1		60.90	24.08
0 XSECTION 147	.23		
ALTERNATE 1		370.86	171.63
0 XSECTION 148	.07		

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    ALTERNATE     1                    90.31      37.89
0 XSECTION  149           .14
+_____________________________ ___
    ALTERNATE     1                   239.02     114.50
0 XSECTION  150           .08
+_____________________________ ___
    ALTERNATE     1                   143.84      69.70
1END OF  1 JOBS IN THIS RUN
```