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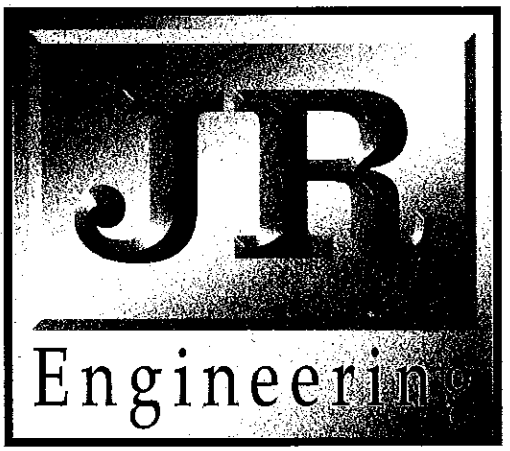
MASTER DEVELOPMENT DRAINAGE PLAN AMENDMENT FOR THE EASTERLY PORTION OF RIDGEVIEW SUBDIVISION AND PRELIMINARY DRAINAGE REPORT FOR RIDGEVIEW ASSISTED LIVING DEVELOPMENT



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May 26, 1999
Revised November 1999

Prepared For:

RIDGEVIEW 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 KYLE CAMPBELL 29794 PROFESSIONAL ENGINEER

Kyle R. Campbell, Colorado P.E. #29794
For and On Behalf of JR Engineering, Ltd.

12-14-99
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: Ridgeview Development

By: Peter R. Matt

Title: DEV. MNGR.

Address: 616 West Monument Street

Colorado Springs. CO 80905

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.

for City Engineer

12/27/99
Date

Conditions:

MASTER DEVELOPMENT DRAINAGE PLAN FOR THE EASTERLY PORTION OF RIDGEVIEW SUBDIVISION AND PRELIMINARY DRAINAGE REPORT FOR RIDGEVIEW ASSISTED LIVING DEVELOPMENT

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APPENDIX

BRIAN G. KELLEY
NOTARY PUBLIC
STATE OF COLORADO
My Commission Expires

MASTER DEVELOPMENT DRAINAGE PLAN FOR THE EASTERLY PORTION OF RIDGEVIEW SUBDIVISION AND PRELIMINARY DRAINAGE REPORT FOR RIDGEVIEW ASSISTED LIVING DEVELOPMENT

PURPOSE

The purpose of this Master Development Drainage Plan (M.D.D.P.) and Preliminary Drainage Report is to identify major drainage features and facilities, estimate peak rates of stormwater runoff from on-site and off-site sources, and outline in concept the necessary drainage improvements to safely convey stormwater runoff to adequate outfall facilities. The concepts presented herein are intended to build on hydrology of the previous reports titled:

1) "Sand Creek Drainage Basin Planning Study, Preliminary Design Report, City of Colorado Springs, El Paso County," prepared by Kiowa Engineering Corporation, date of last revision March 1996.

2) "Master Development Drainage Plan for Ridgeview Subdivision," prepared by URS Greiner, Inc., October 23, 1998

while revising the drainage concepts to meet current development plans and environmental considerations.

GENERAL DESCRIPTION

The easterly portion of Ridgeview Subdivision lies along Sand Creek Reach SC-6 as defined in the above-referenced D.B.P.S., north of planned Stetson Hills Boulevard, east of Powers Boulevard.

The Ridgeview development site is located in eastern Colorado Springs, within Range 65 West, Township 13 South, Sections 17 and 18, and Range 66 West, Township 13 South, Section 13.

Soils in the study area as mapped by S.C.S. in "Soil Survey of El Paso County Area" are Trucktun Soil (97), Blakeland Soil (8), and Blendon Soil (10) a copy of the soils map prepared by URS

Greiner for the referenced M.D.D.P. is included in the appendix of this report. These soils are Hydrologic Groups A and B, thus Hydrologic Group B soil was assumed in determination of stormwater runoff factors. The study area is presently vegetated with native grasses. Willows and cottonwoods are present in the southerly portions of Sand Creek channel, see wetlands delineation for additional information.

EXISTING DRAINAGE CONDITIONS

Sand Creek flows through the study area from north to south. The northerly one-third of Sand Creek in the study area has a relatively narrow sinuous channel path. A narrow channel has incised 2' – 4' deep in the historic wider bed of this reach. The incision gives the channel a triangular cross section at the more narrow locations. This portion of the channel has very little vegetation.

The southerly two-thirds of the Sand Creek channel on-site is less sinuous than the northerly portion and in general has a relatively flat wide trapezoidal section. The southerly one-third of the channel has considerable willow growth. Preliminary grading for Stetson Hills Boulevard has created a pond and wetland area upstream of the Stetson Hills Boulevard crossing of Sand Creek.

A tributary finger projects northwest from the pond to the confluence of two tributaries, one flowing from off-site through the northwest corner of the site, the second paralleling the main Sand Creek channel on the west. This finger area contains wetlands. Two significant drainages cross the study area from the east, Basins 139 and 140.

A portion of the Sand Creek channel and the above described tributary finger have been delineated as wetlands by a wetland biologist. Other portions of the Sand Creek channel have been identified as "waters of the U.S.". Waters of the U.S. including wetland come under the jurisdiction of the U.S. Army Corps of Engineers (U.S. C.O.E.). A field verification of these U.S. Army Corps of Engineers jurisdictional areas has been done by Van Truan of the U.S. Army Corps of Engineers. Permit applications for development in the jurisdictional areas will be submitted to the U.S. Army Corps of Engineers by the developer.

PROPOSED DRAINAGE CHARACTERISTICS

As previously noted, Sand Creek has two distinct channel types in the study area. The north portion has little vegetation is narrow and sinuous. The south portion is a wide flat channel, with vegetation density increasing from the north transition to the southerly pond location.

The different types of channel require different methods of treatment. The proposed treatment measures for the northerly portion include:

1) Regrading and stabilizing the existing channel with 4' high drop structures. The intent being to approximate the channel section prior to the incision of the historic bed with drop structures to reduce the channel gradient to between 0.5% and 1.0%. Selective bank treatment is also proposed.
2) New alignment and excavation of a new segment of channel to eliminate a segment containing two 90 degrees ± bends to standards outlined in (1) above.

The proposed treatment measures for the southerly portion of Sand Creek channel in the study area are check structures, selective bank treatment, redirection of the existing low flow channel in critical areas, minimal channel regrading in critical areas, and selective bank treatment. The corrective measures for the southerly portion are consistent with recommendations of the above-referenced D.B.P.S. The intent is to minimize impact on existing vegetation. It is desirable to preserve the vegetation for aesthetics and channel stability.

The current M.D.D.P. varies from the referenced M.D.D.P. and D.B.P.S. in the manner that flows from the tributary reach segments 142 and 143 are treated. The current M.D.D.P. is consistent with the previous M.D.D.P. with the proposed diversion of reach 143 at tributary Design Point 147 to Design Point 148 of the main channel. The D.B.P.S. proposes construction of new channels for tributary reach segments 142 and 143 at their existing locations. The previous M.D.D.P. proposes new channel sections for reach 142.

Note that the location of the westerly Basin boundary of this M.D.D.P. has been adjusted from its location shown in the previous M.D.D.P. Approximately 27 acres (labeled as Basin 35, 20 acres on Figure 4 of the previous M.D.D.P.) which was previously planned to drain to the west is now

planned to drain to the east as a portion of Basin 127 in this M.D.D.P. This change is delineated on the drainage plan included in the appendix of this report.

Both the previous M.D.D.P. and D.B.P.S. directed flow from constructed channels through the tributary finger reach segment 136. However, with the increased significance of the wetlands contained in reach 136 and the desire to maintain the wetlands area in present condition it was determined that Q_{100} flows to the existing tributary channel should be limited to 300 cfs.

The differences in drainage concepts between this M.D.D.P. and previous D.B.P.S. can be summarized as follows:

1) Open channel diversion of tributary Design Point 147 to main Sand Creek channel Design Point 148 (consistent with referenced M.D.D.P.).
2) Diversion of off-site flows from Basin 142 to main channel Design Point 148.
3) Basin 146 divided, west portion flowing Basin 145 to Design Point 145, east portion added to Basin 142.
4) Collection of flows from Basin 145, Basin 146, and Basin 121 at Design Point 145 and conveyance to Design Point 142 main channel via reinforced concrete box culvert and open channel.
5) Basin 123 diverted to same channel noted in (4) above.
6) Basin 143 diverted to main channel by pipe storm drain through the proposed subdivision.
7) Basin 127 conveyed to the main channel pond by pipe storm drain through the proposed subdivision.
8) Basin 140 off-site from the east conveyed through the proposed subdivision by pipe storm drain to the main channel.
9) Basin 139 off-site, from the east conveyed through the proposed subdivision by pipe storm drain to the main channel. This drainage was omitted in the D.B.P.S.
10) Elimination of tributary channel reach segments 142 and 143 and related improvements, to be replaced with pipe storm drains and open channel diversions.

More specifically, for the purpose of estimating the required facilities to implement the above concepts, the drainage basins were divided into Sub-Basins and the means required to convey runoff from the Sub-Basins to the appropriate outfalls were outlined.

The proposed new alignment and excavation of a new segment of channel to eliminate a segment containing two 90°± bends will create an oxbow. The oxbow channel is to remain in the natural/present condition. Some frequent flow runoff shall be directed to the oxbow to maintain/promote vegetative growth in the channel bottom.

DRAINAGE BASIN 127

Drainage Basin 127 lying on the west side of Sand Creek within the proposed subdivision was divided into Sub-Basins 127-A through 127-E. It is proposed that Basin 127 flows be conveyed in large diameter pipes to outfall in the Sand Creek channel-pond. In the proposed condition runoff from Sub-Basin 127-A, 16.8 acres, $Q_5 = 33$ cfs, $Q_{100} = 66$ cfs is collected and conveyed to 42' long sump inlet at Design Point 27-1 (DP-27-1). Flows from Design Point 27-1 are conveyed in a proposed 42" diameter R.C.P. to Design Point 27-3. At Design Point 27-3, flows from Design Point 27-1 are combined with runoff conveyed and collected at a 14' long sump inlet, Design Point 27-2, Sub-Basin 27-B, 6.7 acres $Q_5 = 14$ cfs, $Q_{100} = 28$ cfs. From Design Point 27-3, combined flows are to be conveyed to Design Point 27-5 in a proposed 42" diameter R.C.P. where flows from two (2) proposed at-grade inlets, 1-8' long, 1-6' long at Design Point 27-4 intercepts a portion of runoff $Q_5 = 9$ cfs, $Q_{100} = 13$ cfs from Sub-Basin 27-C, 7.7 acres, $Q_5 = 15$ cfs, $Q_{100} = 30$ cfs.

Combined flows at Design Point 27-5, are to be conveyed to Design Point 27-6 in a proposed 48" diameter R.C.P. where runoff from Sub-Basin 127-D, 3.0 acres, $Q_5 = 6$ cfs, $Q_{100} = 13$ cfs is added. A 6' long sump inlet at Design Point 27-6 is proposed to intercept runoff from Sub-Basin 27-D. From Design Poing 27-6, combined flows, $Q_5 = 55$ cfs, $Q_{100} = 105$ cfs, are to be conveyed in a proposed 48" diameter R.C.P. outfall to the Sand Creek channel-pond.

It is proposed that Sub-Basin 127-E, 12.6 acres, $Q_5 = 24$ cfs, $Q_{100} = 48$ cfs have an independent outfall at Design Point E3. In Sub-Basin, 127-E at Design Point E1, a 4' long sump inlet is proposed to intercept $Q_5 = 3$ cfs, $Q_{100} = 6$ cfs. At Design Point E2, flow from Design Point E1 is combined

with Q_5 = 7 cfs, Q_{100} = 16 cfs intercepted by a proposed 12' long at-grade inlet. The combined flows are then conveyed to Design Point E3 in a proposed 24" diameter R.C.P. where the remaining flows Q_5 = 14 cfs, Q_{100} = 26 cfs from Sub-Basin 127-E are collected in a proposed 14' long sump inlet and conveyed to Sand Creek channel-pond in a proposed 36" diameter R.C.P. outfall.

DRAINAGE BASIN 126

Drainage Basin 126 lies on the west side of Sand Creek and is proposed to outfall to the west tributary finger of Sand Creek previously discussed. Flow-by from Sub-Basin 127-C is also included in the outfall.

Drainage Basin 126 was divided into Sub-Basins 126-A through 126-C for analysis. Sub-basin 126-A, 14.4 acres, Q_5 = 29 cfs, Q_{100} = 57 cfs is proposed to be conveyed by street gutter to two (2) sump inlets and a 36" RCP outfall to north end of the Sand Creek west tributary finger and wetland area previously discussed.

Sub-basin 126-D, 3.8 acres, Q_5 = 3 cfs, Q_{100} = 8 cfs consists of the north end of the west tributary finger drainage way and rear portion of the proposed adjacent lots conveyed by sheet flow to the west tributary.

Sub-Basins 126-B, 126-C, and flow-by from 127-C are also proposed to have a common outfall in the Sand Creek west tributary finger. Runoff from Sub-Basin 126-B, 11.9 acres, Q_5 = 20 cfs, Q_{100} = 39 cfs is conveyed by street gutter flow to two (2) sump inlets at Design Point 26-1. Flow from Design Point 26-1 is proposed to be conveyed to Design Point 26-2 via a proposed 30" diameter R.C.P. At Design Point 26-2, flows from Design Point 26-1 are combined with flows collected in two (2) sump inlets from Sub-Basin 126-C, 9.3 acres, Q_5 = 19 cfs, Q_{100} = 38 cfs and flow-by from Sub-Basin 127-C, Q_5 = 7 cfs, Q_{100} = 17 cfs. Routed flows at Design Point 26-2, Q_5 = 45 cfs, Q_{100} = 90 cfs are conveyed in a proposed 42" diameter R.C.P. outfall to the Sand Creek west tributary finger.

The combined proposed outfalls to the Sand Creek west tributary finger are Q_5 = 29 + 3 + 45 = 77 cfs, Q_{100} = 57 + 8 + 90 = 155 cfs; less than the 300 cfs previously discussed to minimize impacts on

the channel and wetlands.

DRAINAGE BASIN 128

Sub-Basin 128-A, the portion of Basin 128 proposed for development, lies along the west side of Sand Creek channel. It is proposed that the runoff from Sub-Basin 128-A, 6.8 acres, $Q_5 = 14$ cfs, $Q_{100} = 28$ cfs be conveyed by street gutter to a sump inlet and 30" diameter R.C.P. outfall to the Sand Creek main channel.

DRAINAGE BASIN 143

Basin 143 lies on the west side of Sand Creek. It is proposed that Basin 143 flows be conveyed by large diameter pipe through the proposed subdivision to outfall in the Sand Creek main channel. Basin 143 was divided into Sub-Basins 143-A through 143-F. Runoff from Sub-Basin 143-A, 65.2 acres, $Q_5 = 120$ cfs, $Q_{100} = 234$ cfs is to be collected and conveyed to Design Point 43-1, the conveyance a subject of future drainage report(s). The flow from Design Point 43-1 is proposed to be conveyed to Design Point 43-2 by a 66" diameter R.C.P. Runoff from Sub-Basin 143-B, 11.5 acres, $Q_5 = 23$ cfs, $Q_{100} = 44$ cfs is proposed to be conveyed to two (2) sump inlets at Design Point 43-2. The combined flows at Design Point 43-2 are proposed to be conveyed to Design Point 43-7 via a 66" diameter R.C.P.

Runoff from Sub-Basin 143-C, 57.4 acres, $Q_5 = 98$ cfs, $Q_{100} = 203$ cfs is proposed to be collected and conveyed to Design Point 43-3, the conveyance to be the subject of a future drainage report. Flow from Design Point 43-3 is proposed to be conveyed to Design Point 43-6 in a 60" diameter R.C.P.

Runoff from Sub-Basin 143-D, 5.2 acres, $Q_5 = 11$ cfs, $Q_{100} = 21$ cfs is proposed to be conveyed and collected at a sump inlet at Design Point 43-4. Flow from Design Point 43-4 is proposed to be conveyed to Design Point 43-5 in a 24" R.C.P. At Design Point 43-5, it is proposed that two (2) sump inlets intercept runoff from Sub-Basin 143-E, 7.2 acres, $Q_5 = 15$ cfs, $Q_{100} = 30$ cfs. It is proposed that the combined flow from Sub-Basins 143-D and 143-E be conveyed to Design Point 43-6 in a proposed 36" diameter R.C.P. and combined with flow from Design Point 43-3. Combined flows at Design Point 43-6 are proposed to be conveyed to Design Point 43-7 in a 66" diameter

R.C.P. and combined with flows from Design Point 43-2, Basins 143-A and 143-B. Combined flows at Design Point 43-7 are proposed to be conveyed in a 78" diameter R.C.P. to Design Point 43-8. At Design Point 43-7, it is proposed that two (2) sump inlets intercept flow from Sub-Basin 143-F, 13.8 acres, $Q_5 = 23$ cfs, $Q_{100} = 44$ cfs. The combined flows at Design Point 43-7 are proposed to be conveyed to the Sand Creek main channel via an 84" diameter R.C.P. outfall.

DRAINAGE BASIN 124

Basin 124 lies on the west bank of Sand Creek. Sub-Basin 124-A, 15.2 acres, $Q_5 = 31$ cfs, $Q_{100} = 60$ cfs includes the entire Basin 124. It is proposed that runoff from Sub-Basin 124-A be collected and conveyed by street gutter to two (2) sump inlets with a 36" diameter R.C.P. outfall to Sand Creek channel.

DRAINAGE BASIN 125

Drainage Basin 125 includes a portion of Sand Creek channel and land lying along the west bank. Sub-Basin 125-A, 20.3 acres, $Q_5 = 40$ cfs, $Q_{100} = 79$ cfs is the portion of Drainage Basin 127 intended to be developed. It is proposed that runoff from Sub-Basin be collected and conveyed by street gutter to two (2) sump inlets and a 42" diameter outfall to Sand Creek channel.

DRAINAGE BASINS 145 AND 146

It is proposed that on and off-site runoff from Drainage Basin 145 and 146, located in the northwest corner of the study area, be collected and conveyed to the proposed 6' high x 10' wide RCB at TR20 Design Point 145, $Q_{10} = 443$ cfs, $Q_{100} = 853$ cfs (TR20 Analysis). Then to Sand Creek channel, via the proposed 6' high x 10' wide RCB and open channel. The collection and conveyance of runoff from Drainage Basins 145 and 146 shall be studied in future drainage report(s).

DRAINAGE BASIN 142

It is proposed that runoff from off-site Drainage Basin 142, 38 acres, $Q_{10} = 47$ cfs, $Q_{100} = 93$ cfs (TR20 Analysis) be intercepted and conveyed to Sand Creek channel via a proposed open channel. The channel shall be constructed prior to or with the development of either Drainage Basins 121 or 122. A future drainage report for the development of Basins 121 and 122 shall address the design of the open channel.

DRAINAGE BASIN 121

It is proposed that runoff from developed Drainage Basin 121, 32 acres, Q_{10} = 34 cfs, Q_{100} = 73 cfs (TR20 Analysis) be collected and conveyed to the proposed 6' high x 10' wide RCB and open channel outfall. Basin 121 shall be a subject of a future drainage report.

DRAINAGE BASIN 122

It is proposed that runoff from developed Drainage Basin 122, 19 acres, Q_{10} = 22 cfs, Q_{100} = 46 cfs (TR20 Analysis) be collected and conveyed to Sand Creek channel. Basin 122 shall be a subject of a future drainage report.

OFF-SITE DRAINAGE BASINS 47 AND 48

The proposed conveyance of runoff from off-site existing Drainage Basins 47 and 48 to the Sand Creek channel shall be addressed in the Sand Creek Channel Improvements Design Report.

DRAINAGE BASIN 123

It is proposed that runoff from developed Drainage Basin 123, 26 acres, Q_{10} = 39 cfs, Q_{100} = 76 cfs (TR20 Analysis) be collected and conveyed to the proposed open channel along the southerly boundary of the Basin. Basin 123 shall be a subject of a future drainage report.

DRAINAGE BASIN 141

It is proposed that runoff from developed Drainage Basin 141, 32 acres, Q_{10} = 16 cfs, Q_{100} = 45 cfs (TR20 Analysis) be collected and conveyed to Sand Creek channel. Basin 141 shall be a subject of a future drainage report.

DRAINAGE BASIN 137

Drainage Basin 137 lies in the southeast corner of the study area on the east side of Sand Creek channel. Basin 137 was divided into Sub-Basins 137-A through 137-D. It is proposed that Basin 137-A, 15.6 acres, Q_5 = 30 cfs, Q_{100} = 58 cfs, runoff be collected and conveyed to two (2) 16' long sump inlets and 36" diameter R.C.P. outfall to the Sand Creek channel.

It is proposed that Sub-Basin 137-D, Peterson right-of-way, and Sub-Basin 137-B have a common outfall. It is proposed that runoff from Sub-Basin 137-D, 5.3 acres, $Q_5 = 23$ cfs, $Q_{100} = 41$ cfs, is conveyed in Peterson Road gutters to two (2) 10' long sump inlets at Design Point 16. Flow from Design Point 37-1 to Design Point 37-2 is conveyed in a proposed 30" diameter R.C.P. Runoff from Sub-Basin 137-B, 15.7 acres, $Q_5 = 30$ cfs, $Q_{100} = 59$ cfs, is collected and conveyed to two (2) 16' long sump inlets at Design Point 37-2. The combined flows at Design Point 37-2 are conveyed in a proposed 48" diameter outfall to Sand Creek channel.

Runoff from Sub-Basin 137-C, 12.1 acres, $Q_5 = 24$ cfs, $Q_{100} = 47$ cfs, is proposed to be collected and conveyed to two (2) 12' long sump inlets and 36" diameter R.C.P. outfall to Sand Creek channel.

DRAINAGE BASIN 139

Drainage Basin 139 lies east of Sand Creek, with a portion easterly of proposed Peterson Road. Drainage Basin 139 was divided into Sub-Basins 139-A through 139-E. Sub-Basin 139-A, 57.6 acres, $Q_5 = 96$ cfs, $Q_{100} = 184$ cfs lies east of proposed Peterson Road, a subject of a future drainage report. It is proposed that runoff from off-site Sub-Basin 139-A be collected and conveyed to Design Point 39-1. It is proposed that flow from Design Point 39-1 to Design Point 39-2 be conveyed in a 60" diameter R.C.P. Runoff from Sub-Basin 139-B, 5.4 acres, $Q_5 = 24$ cfs, $Q_{100} = 43$ cfs is conveyed in Peterson Road gutters to two (2) 10' long sump inlets at Design Point 39-2. Flow is conveyed from Design Point 39-2 to Design Point 39-3 in a proposed 60" diameter R.C.P. Runoff from Sub-Basin 139-C, 15.8 acres, $Q_5 = 37$ cfs, $Q_{100} = 73$ cfs is collected and conveyed to Design Point 39-3. Combined flows at Design Point 39-3 are conveyed to Design Point 39-4 in a proposed 60" diameter R.C.P. Sub-Basin 139-D, 4.6 acres, $Q_5 = 18$ cfs, $Q_{100} = 37$ cfs, runoff is proposed to be conveyed to a sump inlet and conveyed to Design Point 39-4. Combined flows at Design Point 39-4 are proposed to be conveyed to Sand Creek channel in a 66" diameter outfall. A final drainage report shall determine the number and location of drainage inlets in Sub-Basins 139-C and 139-D.

DRAINAGE BASIN 140

Drainage Basin 140 lies east of Sand Creek with a portion easterly of proposed Peterson Road. Drainage Basin 140 was divided into Sub-Basins 140-A through 140-D. It is proposed the off-site Sub-Basin 140-A, 170.6 acres, $Q_5 = 211$ cfs, $Q_{100} = 414$ cfs be collected and conveyed to Design

Point 40-1, a subject of a future drainage report. It is proposed that flow be conveyed from Design Point 40-1 to Design Point 40-2 in a 78" diameter R.C.P. Runoff from Sub-Basin 140-B, 5.5 acres, Q_5 = 22 cfs, Q_{100} = 39 cfs are proposed to be collected at two (2) sump inlets in Peterson Road Design Point 40-2. Combined flows at Design Point 40-2 are proposed to be conveyed in a 78" diameter R.C.P. to Design Point 40-3. It is proposed that runoff from Sub-Basin 140-C, 19.3 acres, Q_{10} = 37 cfs, Q_{100} = 72 cfs be conveyed to a sump inlet at Design Point 40-3 and that the combined flows at Design Point 40-3 be conveyed in a proposed 84" diameter R.C.P. outfall to Sand Creek channel.

It is proposed that runoff from Sub-Basin 140-D, 10.3 acres be conveyed to Sand Creek channel by a diversion swale along the southerly boundary and as determined by future drainage analysis/report(s).

DRAINAGE BASIN S

Drainage Basin S was created to estimate the size of the stormwater facilities in proposed Stetson Hills Boulevard along the southerly boundary of the proposed subdivision. For the purpose of estimating pipe diameters and inlet lengths, Basin S was divided into Sub-Basins S-1 through S-4. It is proposed a portion of the runoff from Sub-Basin S-1, 3.2 acres, Q_5 = 11 cfs, Q_{100} = 21 cfs be intercepted at an 8' long at-grade inlet Q_5 = 7 cfs, Q_{100} = 11 cfs at Design Point S1. The intercepted flow is proposed to be conveyed to Design Point S2 via an 18" diameter R.C.P. The flow-by past Design Point S1, Q_5 = 4 cfs, Q_{100} = 10 cfs is conveyed by street gutter do Design Point S3. At Design Point S2, a proposed 8' long at-grade inlet intercepts a portion of runoff from Sub-Basin S-2, Q_5 = 11 cfs, Q_{100} = 21 cfs. The intercepted flow Q_5 = 7 cfs, Q_{100} = 11 cfs is combined with flow from Design Point S1 and conveyed to Design Point S4 in a 24" diameter R.C.P. The flow-by past Design Point S2 is conveyed by street gutter to Design Point S4. At Design Point S3, it is proposed that an 18' long sump inlet intercept runoff from Sub-Basin S-3, 3.8 acres, Q_5 = 13 cfs, Q_{100} = 25 cfs and flow-by from Design Point S1. Flow at Design Point S3 is proposed to be conveyed to Design Point S4 via a 30" diameter R.C.P. At Design Point S4, it is proposed that an 18' long sump inlet intercept runoff from Sub-Basin S-4. 3.5 acres, Q_5 = 12 cfs, Q_{100} = 23 cfs and flow-by from Design Point S2. It is proposed that the combined flow at Design Point S4 be conveyed via a 36" diameter R.C.P. to Sand Creek channel south of Stetson Hills Boulevard.

At the Stetson Hills Boulevard crossing of Sand Creek, the referenced D.B.P.S. recommended triple cell 8'H x 10'W RCB, the referenced M.D.D.P. recommended a 4 cell – 10' x 10' RCB. It is noted that a trail underpass must be incorporated in the crossing structure. A minimum sixty-foot clear span bridge structure with pedestrian underpass is presently under consideration for this location, future final drainage reports will examine this area in more detail.

A drop structure is recommended between the existing pond and the proposed bridge to maintain the existing pond water level and provide an elevation drop to match the downstream channel.

Both referenced reports recommend an 80' clear span bridge for the Dublin crossing of Sand Creek, which is consistent with the choice of a clear span bridge for the Stetson Hills crossing.

Note that the location of 80' clear span bridge at Peterson Road crossing of Sand Creek channel shown in the D.B.P.S. has been changed to the northeast corner of the study area.

HYDROLOGIC CALCULATIONS

TR-20 SAND CREEK BASIN ANALYSIS

In order to analyze the effects that the proposed drainage concept will have on the peak flow rates in Sand Creek, a copy of the TR-20 models that were prepared for the 1996 Revision of Sand Creek D.B.P.S. were obtained and revised to reflect the current proposed conditions. The models for the "fully developed" and "existing" conditions were obtained through the City of Colorado Springs Engineering Division. The computer file for the existing condition model was found to be missing some data when obtained. This data was recreated for the upstream watershed, to the extent possible, using a hard copy of the model as revised and published in the M.D.D.P. for Ridgeview Subdivision, by URS Greiner. The Sand Creek D.B.P.S. Technical Addendum does not contain a copy of the existing condition model.

The above-described "existing" condition model was revised to model the on-site area of this plan in the proposed "fully developed" condition. All other areas in the model were left in the "existing

condition" as modeled for the D.B.P.S. The model was cut off at proposed Stetson Hills Boulevard as development has occurred downstream, thus the existing condition model does not reflect the current conditions there. Very little has changed in the watershed upstream of Stetson Hills Boulevard since the D.B.P.S. model was prepared. The purpose of including this model was to demonstrate the minimal effect that development of the on-site area will have on the peak flow rates in Sand Creek.

The D.B.P.S. developed condition model was also revised to model the on-site area of this plan in the proposed fully developed condition. As described earlier in this report, the most significant difference between the current on-site drainage plan and the plan for the on-site area as proposed in the D.B.P.S. is the location of runoff routing to Sand Creek.

Runoff curve numbers (R.C.N.). basin areas, time of concentration, and conveyance factors were adjusted to reflect the current proposed plan for the on-site area. Due to the importance of keeping all calculations in the model on the same time basis, the method used to compute times of concentration (T.C.s) for the revised areas was chosen based on it's ability to produce times of concentration similar to those used in the D.B.P.S. model.

The proposed plan calls for the existing pond located north of proposed Stetson Hills Boulevard to remain. The routing effects of this pond were included in the models prepared for this report.

The modified existing and developed condition models were run to simulate both the 10-year and 100-year 24 hour rainfall events consistent with the D.B.P.S. modeling. Rainfall depths of 3.0" and 4.4" respectively were utilized for the 10-year and 100-year events.

A copy of the model input data files and summary tables generated by the models are included in the appendix of this report. Also included in the appendix are copies of spreadsheets used to calculate times of concentration, and runoff curve numbers, along with summary tables containing sub-basin data and data pertaining to the major analysis points of interest. Some hydrographs pertaining to major analysis points of interest along Sand Creek are also contained in the appendix.

The above-mentioned summary tables and hydrographs contain flow data generated by both the original D.B.P.S. model and the current modified model for the developed condition. As one might expect the predicted peak flow rates in Sand Creek through the on-site area for the proposed developed condition are up to 25 percent higher than the flow rate predicted by the D.B.P.S. for the same condition. This is due to the elimination of the parallel channel located west of Sand Creek, and the addition of the flow from that channel further upstream than was previously proposed. The tables and graphs will demonstrate that the current predicted developed condition peak flow rate is only slightly (3.5%) above the D.B.P.S. predicted peak rate at Stetson Hills Boulevard. Downstream of this point the current predicted developed condition peak flow rate is less than the D.B.P.S. predicted peak rates due to changes in the timing of the peak brought about by the onsite changes and the modeling of the small Stetson Hills Pond as a detention Basin.

The lack of data for the "existing condition" D.B.P.S. model throughout the on-site area prohibits comparison with the revised model. The predicted 100-year peak rate in Sand Creek at Stetson Hills Boulevard in the existing condition was reported in the D.B.P.S. as 3,230cfs. The revised model predicts 100-year flow rate at this location of 3,380cfs. The revised model condition is fully developed onsite, and the D.B.P.S. "existing condition" upstream. This increase is insignificant in a channel of this size.

It should be noted that the D.B.P.S. requires four (4) detention basins to be constructed in the upstream watershed near Woodmen Road to regulate flows as future development occurs.

RATIONAL METHOD BASIN ANALYSIS

The individual basins were divided into sub-basins and analyzed using the rational method.

Composite C values were estimated for each sub-basin based on land use, density, and the City of Colorado Springs Drainage Criteria Manual.

Stormwater routings were done by the Rational Method using weighted "CA" coefficients of the sub-basins identified above and on the enclosed drainage map. Analysis spreadsheets and a summary of the stormwater routing flows are tabulated in the appendix of this report.

HYDRAULIC CALCULATIONS

Pipe diameters, reinforce concrete box culvert dimensions, and channel sections were estimated with Heastad Methods, Inc. FlowMaster v5.10 software using the Manning's Formula, pertinent data sheets are included in the appendix of this report.

Street capacities were estimated using the City of Colorado Drainage Criteria manual graph of Discharge vs. Street Slope for residential ramp curb (34' flowline to flowline), and Flow Master v5.10 for irregular sections. The graph and data sheets are included in the appendix of this report.

It should be noted that the information in this report is preliminary in nature and shall be analyzed thoroughly in future drainage reports, based on final grading and street plans, etc.

FLOODPLAIN STATEMENT

A portion of this site is within a designated F.E.M.A. floodplain, as determined by Flood Insurance Rate Map Community Panel Number 80841C0537, effective March 17, 1997. Additional analysis of Sand Creek channel is proposed to further define the channel improvements previously discussed. It is intended that the study also address F.E.M.A. Floodplain issues and required permits.

CONSTRUCTION COST OPINION – Reimbursable Costs

The following are total reimbursable costs defined in the referenced Sand Creek D.B.P.S.

From D.B.P.S. Table XIII-2, "Drainage Conveyance Cost Estimate with Selected Alternatives," page 63.

MAIN CHANNEL SEGMENT NO.	TOTAL REIMBURSABLE COST
137	$ 638,250
185	$ 87,650
141	$ 436,800
Partial 148-1	$ 30,700
	$1,193,400

From D.B.P.S. Table VIII-3, "Tributary Drainage Conveyance Cost Estimate Sand Creek, Center Tributary and West Fork Sand Creek," page 72.

UPPER SAND CREEK TRIBUTARY SEGMENT NO.	TOTAL REIMBURSABLE COST
136 West Tributary	$ 436,500
142 West Tributary	$1,123,200
143 West Tributary	$ 682,000
145 West Tributary	$ 265,200
140 East Tributary	$ 85,400
	$2,592,300

From D.B.P.S. Table VIII-4, "Roadway Culvert Crossing Cost Estimate Sand Creek Basins," page 76.

ROADWAY	REACH NUMBER	DRAINAGEWAY SEGMENT	CROSSING TYPE	TOTAL REIMBURSABLE COST
Jedediah Smith Rd.	SC-6	136	2-8'Hx10'W CBC	$ 90,000
Peterson Road	SC-6	140	6'Hx7'W CBC	$ 27,000
Dublin Boulevard	SC-6	142	6'Hx9'W CBC	$ 36,000
Jedediah Smith Rd	SC-6	143	6'Hx10'W CBC	$ 31,200
Dublin Boulevard	SC-6	145	6'Hx10'W CBC	$ 46,800
				$231,000

From D.B.P.S. Table VIII-9, "Sand Creek Drainage Basin Planning Study, City Bridge Fee Calculation".

ROADWAY	CROSSING TYPE	TOTAL COST	TOTAL CITY COST (1)	TOTAL REIMBURSABLE COST
Stetson Hills	3-8'HX10'W CBC	$ 222,000	$ 84,360	$137,640
Jedediah Smith Rd.	3-8'Hx10'W CBC	$ 66,600	$ 9,990	$ 56,610
Peterson Road	80' Clear Span Bridge	$ 512,000	$194,560	$ 317,440
Dublin Boulevard	80' Clear Span Bridge	$ 512,000	$194,560	$ 317,440
		$1,312,600	**$483,470**	**$829,130**

As previously discussed in the section "Proposed Drainage Characteristics." of this M.D.D.P., conceptual changes of drainage patterns from the previous D.B.P.S. are proposed. In addition, there are changes in the routing of both Jedediah Smith Road and Peterson Road which will require adjustments in fee calculations. The following estimates of probable construction costs have been prepared for the reimbursable improvements outlined in this M.D.D.P.

PROPOSED REIMBURSABLE IMPROVEMENTS AND ESTIMATED PROBABLE CONSTRUCTION COST

Sand Creek Main Channel Improvements

The proposed improvements include:

1) South portion of channel, construction of grade control structures, selective bank treatment, low flow channel redirection, minor regrading, and a combination level control drop structure at the existing pond outlet. (See estimate of Probable Construction Cost in Appendix)

   Total Estimated Probable Construction Cost: $ 780,000

2) North end of channel, construction of drop structures, widening of the channel bottom, placing of selective bank treatments, excavation of channel realignment, and lowering of the channel slope to between 0.5% and 1%. (See estimate of Probable Construction Cost in Appendix)

   Total Estimated Probable Construction Cost: $1,051,000

   Main Channel Total Estimated Probable Construction Cost $1,831.000

Note that the previous D.B.P.S. allotted $1,193,400 for this section of channel. The increase can be attributed to more extensive treatment proposed for the northerly section of the channel which is sparsely vegetated and in need of drop structures and grade stabilization, and the required level control/drop structure at the existing channel pond outlet.

Sand Creek Tributary Channel Improvements

1) Proposed open lined channel diversion from TR20 Design Point 147 to main channel TR20 Design Point 148. Proposed channel bottom width is 18', with 3:1 side slopes. Approximately 550 linear feet of channel, drop structure(s) and transition to the main channel.

   This concept is not included in the D.B.P.S. However, this improvement eliminates the need for channel improvements for tributary channel segment 142 indicated in the D.B.P.S.

   Total Estimated Probable Construction Cost: $ 156,000

2) Drainage Basin 142 proposed open lined channel diversion to collect and convey runoff from off-site Basin 142 to the Sand Creek Main channel via the proposed diversion channel in 1) above. Proposed channel includes approximately 1,500 L.F. of channel, 4' bottom width with 3:1 slopes, transition to receiving channel, up-gradient swales, and drops to collect and deliver runoff to the channel minimizing erosion.

✓ This concept is not included in the D.B.P.S. However, as with Item 1 above this improvement helps eliminate the need for channel improvements to poorly defined tributary channel segments 142 and 143 outlined indicated in the D.B.P.S.

   Total Estimated Probable Construction Cost: $ 99,000

3) Construction of facilities to divert flow from TR20 Design Point 145 to the Sand Creek main channel estimated as follows:

ITEM	QUANTITY	UNIT COST	COST
INLETS	4 EA	$5800/EA	$ 23,200
42" R.C.P.	220 L.F.	$70/L.F.	$ 15,400
36" R.C.P.	60 L.F.	$40/L.F.	$ 2,400
WYE	1 EA	$1500/EA	$ 1,500
BENDS	2 EA	$1200/EA	$ 2,400
6 ' X 10' RCB	770 L.F.	$420/L.F.	$323,100
OPEN CHANNEL	1250 L.F.	$228/L.F.	$285,000
			$653,300

This concept is not included in the D.B.P.S. However, as with Item 1 and 2 above, this improvement also diverts flow from the lower reaches of channel segments 142 and 143 outlined in the D.B.P.S.

Total Estimated Probable Construction Cost: $ 653,300

4) Drainage Basin 137. this facility includes proposed sump inlets in Peterson Road and pipe outfall to Sand Creek channel, estimated as follows:

ITEM	QUANTITY	UNIT COST	COST
SUMP INLETS	2 EA	$4600/EA	$ 9,200
30" DIA. R.C.P.	800 L.F.	$40/L.F.	$ 32,000
48" DIA. R.C.P.	280 L.F.	$90/L.F.	$ 25,200
BENDS	3 EA	$1200/EA	$ 3,600
MANHOLES	1 EA	$6500/EA.	$ 6,500
WYES	2 EA	$1500/EA	$ 3,000
OUTFALL	1 EA	$8000/EA	$ 8,000
			$ 87,500

✓ This improvement was not included in the D.B.P.S. as this detail would be beyond the scope of a D.B.P.S.

Total Estimated Probable Construction Cost: $ 87,500

5) Drainage Basin 139 to include provision for offsite flows from Sub-Basin 139-A, sump inlets in Peterson Road and pipe conveyance to the Sand Creek outfall, estimated as follows:

ITEM	QUANTITY	UNIT COST	COST
SUMP INLETS	2 EA	$4600/EA	$ 9,200
60" DIA. R.C.P.	1100 L.F.	$120/L.F.	$132,000
66" DIA. R.C.P.	100 L.F.	$145/L.F.	$ 14,500
BENDS	3 EA	$1200/EA	$ 3,600
MANHOLES	3 EA	$3000/EA	$ 9,000
WYES	3 EA	$1500/EA	$ 4,500
OUTFALL	1 EA	$22,000/EA	$ 22,000
			$194,800

✓ These facilities are not included in the D.B.P.S.

Total Estimated Probable Construction Cost: $ 194,800

6) Facilities in Basin 140 to include provision for offsite flows from Sub-Basin 140-A, sump inlets in Peterson Road and pipe conveyance to the Sand Creek outfall estimated as follows:

ITEM	QUANTITY	UNIT COST	COST
SUMP INLETS	2 EA	$4600/EA	$ 9,200
78" DIA. R.C.P.	1050 L.F.	$205/L.F.	$215,250
84" DIA. R.C.P.	250 L.F.	$230/L.F.	$ 57,500
BENDS	3 EA	$1200/EA.	$ 3,600
MANHOLES	3 EA	$3000/EA	$ 9,000
WYES	3 EA	$1500/EA	$ 4,500
OUTFALL	1 EA	$28,000/EA	$ 28,000
			$327,050

The D.B.P.S. outlined a 6' H x 7' W RCB and improved riprap channel for this Basin.

Total Estimated Probable Construction Cost: $ 327,050

7) Facilities in Basin 143 to include provision to intercept runoff from Sub-Basins 143-A and 143-C, collector streets inlets, and large diameter R.C.P. outfall through the proposed subdivision to outfall in the Sand Creek channel, estimated as follows:

ITEM	QUANTITY	UNIT COST	COST
INLETS	4 EA	$5200/EA	$ 20,800
60" DIA. R.C.P.	550 L.F.	$120/L.F.	$ 66,000
66" DIA. R.C.P.	1380 L.F.	$145/L.F.	$200,100
78" DIA. R.C.P.	850 L.F.	$205/L.F.	$ 17,250
84" DIA. R.C.P.	230 L.F.	$230/L.F.	$ 52,900
BENDS	8 EA	$1200/EA	$ 9,600
MANHOLES	3 EA	$3000/EA	$ 9,000
WYES	8 EA	$1500/EA	$ 12,000
OUTFALL	1 EA	$28,000/EA	$ 28,000
			$415,650

These facilities are not included in the D.B.P.S. They negate the needed for channel improvements to tributary channel segments 142 and 143.

Total Estimated Probable Construction Cost: $ 415,650

8) Facilities in Basin S to include inlets and pipe conveyance to intercept runoff in Stetson Hills Boulevard and outfall to Sand Creek channel, estimated as follows:

ITEM	QUANTITY	UNIT COST	COST
INLETS	4 EA	$5500/EA	$ 22,000
18" DIA. R.C.P.	100 L.F.	$25/L.F.	$ 2,500
24" DIA. R.C.P.	380 L.F.	$35/L.F.	$ 13,300
30" DIA. R.C.P.	100 L.F.	$40/L.F.	$ 4,000
36" DIA. R.C.P.	120 L.F.	$50/L.F.	$ 6,000
BENDS	1 EA	$1200/EA	$ 1,200
			$49,000

These facilities were beyond the scope of the D.B.P.S.

Total Estimated Probable Construction Cost:	$ 49,000
Tributary Channel Improvements:	
Total Estimated Probable Construction Cost: Not included in D.B.P.S	$1,982,300

In summary, the total reimbursable construction costs for the study area outlined in the D.B.P.S. are:

Sand Creek Main Channel:	$1,193,400
Tributary Improvements:	$2,592,300
Total Estimated Reimbursable Construction Cost:	**$3,785,700**

Those facilities not included in the D.B.P.S. must be brought before the Drainage Board for consideration in cost reimbursement. For all practical purposes, the total estimated reimbursable costs outlined in the D.B.P.S. ($3,785,700) and this M.D.D.P. ($1,831,000, Main Channel + $1,982,300, Tributary = $3,813,300) are equal considering the level of detail available for estimating. It should be noted that two (2) culvert crossings of Jedediah Smith Road and one (1) culvert crossing of Dublin Boulevard have been eliminated.

JR Engineering, Ltd. cannot and does not guarantee that the construction cost will not vary from these opinions of probable construction costs. These opinions represent our best judgement as design professionals familiar with the construction industry and this development in particular.

Sand Creek Bridge Reimbursable Construction Costs

No new construction cost data for bridge crossings has been generated for this report. Bridge crossings shall be addressed in final drainage report(s). It should be noted that the Jedediah Smith Road crossing of Sand Creek has been eliminated and the location of the Peterson Road bridge crossing of Sand Creek has been changed from the D.B.P.S. location.

The above differences in drainage facilities and associated construction costs should be bought before the Drainage Board for consideration in cost reimbursement and adjustment of basin fees when construction costs are known.

NON-REIMBURSABLE ESTIMATED PROBABLE CONSTRUCTION COSTS

1. Sub-Basin 124-A

ITEM	QUANTITY	UNIT COST	COST
INLETS	2 EA	$6400/EA	$ 12,800
36" DIA. R.C.P.	330 L.F.	$50/L.F.	$ 16,500
BENDS	1 EA	$1200/EA	$ 1,200
OUTFALL	1 EA	$800/EA	$ 8,000
Total Estimated Probable Construction Cost:			**$ 38,500**

2. Sub-Basin 125-A

ITEM	QUANTITY	UNIT COST	COST
INLETS	2 EA	$8800/EA	$ 17,600
42" DIA. R.C.P.	240 L.F.	$70/L.F.	$ 16,800
BENDS	1 EA	$1200/EA	$ 1,200
OUTFALL	1 EA	$1100/EA	$ 11,000
Total Estimated Probable Construction Cost:			**$ 46,600**

3. Sub-Basins 126-A

ITEM	QUANTITY	UNIT COST	COST
INLETS	2 EA	$8800/EA	$ 17,600
36" DIA. R.C.P.	350 L.F.	$50/L.F.	$ 17,500
OUTFALL	1 EA	$11,000/EA	$ 11,000
Total Estimated Probable Construction Cost:			**$46,100**

4. Sub-Basins 126-B and 126-C

ITEM	QUANTITY	UNIT COST	COST
INLETS	4 EA	$4300/EA	$ 17,200
18" DIA. R.C.P.	80 L.F.	$25/L.F.	$ 2,000
36" DIA. R.C.P.	300 L.F.	$50/L.F.	$ 15,000
42" DIA. R.C.P.	200 L.F.	$70/L.F.	$ 14,000
BENDS	1 EA	$1200/EA	$ 1,200
OUTFALL	1 EA	$11,000/EA	$ 11,000
Total Estimated Probable Construction Cost:			**$ 60,400**

5. Sub-Basins 127-A through 127-D

ITEM	QUANTITY	UNIT COST	COST
INLETS	5 EA	$VARIES	$ 32,600
24" DIA. R.C.P.	75 L.F.	$35/L.F.	$ 2,625
30" DIA. R.C.P.	130 L.F.	$40/L.F.	$ 5,200
42" DIA. R.C.P.	980 L.F.	$70/L.F.	$ 68,600
48" DIA. R.C.P.	630 L.F.	$90/L.F.	$ 56,700
BENDS	7 EA	$1200/EA	$ 8,400
WYES	3 EA	$1500/EA	$ 4,500
MANHOLES	2 EA	$3000/EA	$ 6,000
OUTFALL	1 EA	$14,000/EA	$ 14,000
Total Estimated Probable Construction Cost:			**$198,625**

6. Sub-Basin 127-E

ITEM	QUANTITY	UNIT COST	COST
INLETS	3 EA	$VARIES	$ 13,800
18" DIA. R.C.P.	60 L.F.	$25/L.F.	$ 1,500
24" DIA. R.C.P.	440 L.F.	$35/L.F.	$ 15,400
36" DIA. R.C.P.	100 L.F.	$50/L.F.	$ 5,000
BENDS	2 EA	$1200/EA	$ 2,400
WYES	3 EA	$1500/EA	$ 4,500
OUTFALL	1 EA	$8000/EA	$ 8,000
Total Estimated Probable Construction Cost:			**$ 50,600**

7. Sub-Basin 128-A

ITEM	QUANTITY	UNIT COST	COST
INLETS	1 EA	$5800/EA	$ 5,800
30" DIA. R.C.P.	200 L.F.	$40/L.F.	$ 8,000
BENDS	1 EA	$1200/EA	$ 1,200
OUTFALL	1 EA	$8000/EA	$ 8,000
Total Estimated Probable Construction Cost:			**$ 23,000**

8. Sub-Basin 137-A

ITEM	QUANTITY	UNIT COST	COST
INLETS	2 EA	$6400/EA	$ 12,800
36" DIA. R.C.P.	290 L.F.	$50/L.F.	$ 14,500
BENDS	1 EA	$1200/EA	$ 1,200
OUTFALL	1 EA	$8000/EA	$ 8,000
Total Estimated Probable Construction Cost:			**$ 36,500**

9. Sub-Basin 137-B (Connection to Reimbursable Outfall)

ITEM	QUANTITY	UNIT COST	COST
INLETS	2 EA	$6400/EA	$ 12,800
24" DIA. R.C.P.	60 L.F.	$35/L.F.	$ 2,100
Total Estimated Probable Construction Cost:			**$ 14,900**

10. Sub-Basin 137-C

ITEM	QUANTITY	UNIT COST	COST
INLETS	2 EA	$5200/EA	$ 10,400
36" DIA. R.C.P.	1590 L.F.	$50/L.F.	$ 7,500
OUTFALL	1 EA	$8000/EA	$ 8,000
Total Estimated Probable Construction Cost:			**$ 25,900**

11. Sub-Basins 139-C and 139-D (Connection to Reimbursable Outfall)

ITEM	QUANTITY	UNIT COST	COST
INLETS	2 EA	$12,300/EA	$ 24,600
30" DIA. R.C.P.	50 L.F.	$40/L.F.	$ 2,000
42" DIA. R.C.P.	80 L.F.	$70/L.F.	$ 5,600
Total Estimated Probable Construction Cost:			**$ 32,200**

12. Sub-Basin 139-E

ITEM	QUANTITY	UNIT COST	COST
INLET	1 EA	$8800/EA	$ 8,800
36" DIA. R.C.P.	150 L.F.	$50/L.F.	$ 7,500
OUTFALL	1 EA	$8000/EA	$ 8,000
Total Estimated Probable Construction Cost:			**$ 24,300**

13. Sub-Basins 140-C (Connection to Reimbursable Outfall)

ITEM	QUANTITY	UNIT COST	COST
INLET	1 EA	$17,600/EA	$ 17,600
Total Estimated Probable Construction Cost:			**$ 17,600**

Total Estimated Probable Non-Reimbursable Construction Costs: **$615,225**

All non-reimbursable construction costs are the responsibility of the developer.

JR Engineering cannot and does not guarantee that the construction cost will not vary from these opinions of probable construction costs. These opinions represent our best judgement as design professionals familiar with the construction industry and this development in particular.

The division between public and private non-reimbursable systems and maintenance issues shall be addressed in final drainage reports.

DRAINAGE, BRIDGE, AND POND FEES

The area within Sand Creek Basin is subject to the drainage, bridge, and pond fees. The following is an estimate of the fees based on approximate parcel areas.

Presently Planned Development: 340 Acres ±

Drainage Fees:			
	340 acres x $5,959/ac	=	$2,026,060±
Bridge Fees:			
	340 acres x $370/ac	=	$ 125,800±
Pond Fees:			
	Land - 340 acres x $352/ac	=	$ 119,680±
	Facilities - 340 acres x $1,384/ac	=	$ 470,560±
	Surcharge – 340 acres x $693/ac	=	$ 235,620±

Remainder of Parcel: 226 Acres ±

Drainage Fees:

226 acres x $5,959/ac	=	$1,346,734±

Bridge Fees:

226 acres x $370/ac	=	$ 83,620±

Pond Fees:

Land - 226 acres x $352/ac	=	$ 79,552±
Facilities - 226 acres x $1,384/ac	=	$ 312,784±
Surcharge – 226 acres x $693/ac	=	$ 156,618±

Fees shall be posted prior to plat recordation.

SUMMARY

Proper implementation of the concepts presented in this M.D.D.P. will provide for the development of the proposed site without undue impacts to the receiving water course and surrounding developments.

The final location/routing of all stormwater conveyances shall result from final drainage reports. At that time, the necessary drainage easements shall be defined.

The TR-20 analysis of Sand Creek modeling of the proposed drainage concepts presented in this M.D.D.P. predicted only a 3.5% increase over the D.B.P.S. model for the peak flow rate developed condition at Stetson Boulevard. Sand Creek flow rates through the site will be increased due to diversion of the westerly tributaries upstream of their present confluence. The increased rates will be used for the final design report for the proposed Sand Creek Channel improvements.

It is understood, that the pond in Sand Creek channel on the north side of Stetson Hills Boulevard shall be privately maintained.

The division between public and private non-reimbursable systems and maintenance issues shall be addressed in final drainage reports.

Included in the appendix of this report is a plan titled "Phasing of Proposed Master Development Improvements". The purpose of the plan is to indicate areas of development which will trigger the necessity to construct the various improvements outlined in this report.

PREPARED BY:

JR Engineering

John R. Bessette, P.E.
Senior Project Engineer

/jl-le/910401/reports/MDDPmay99

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.

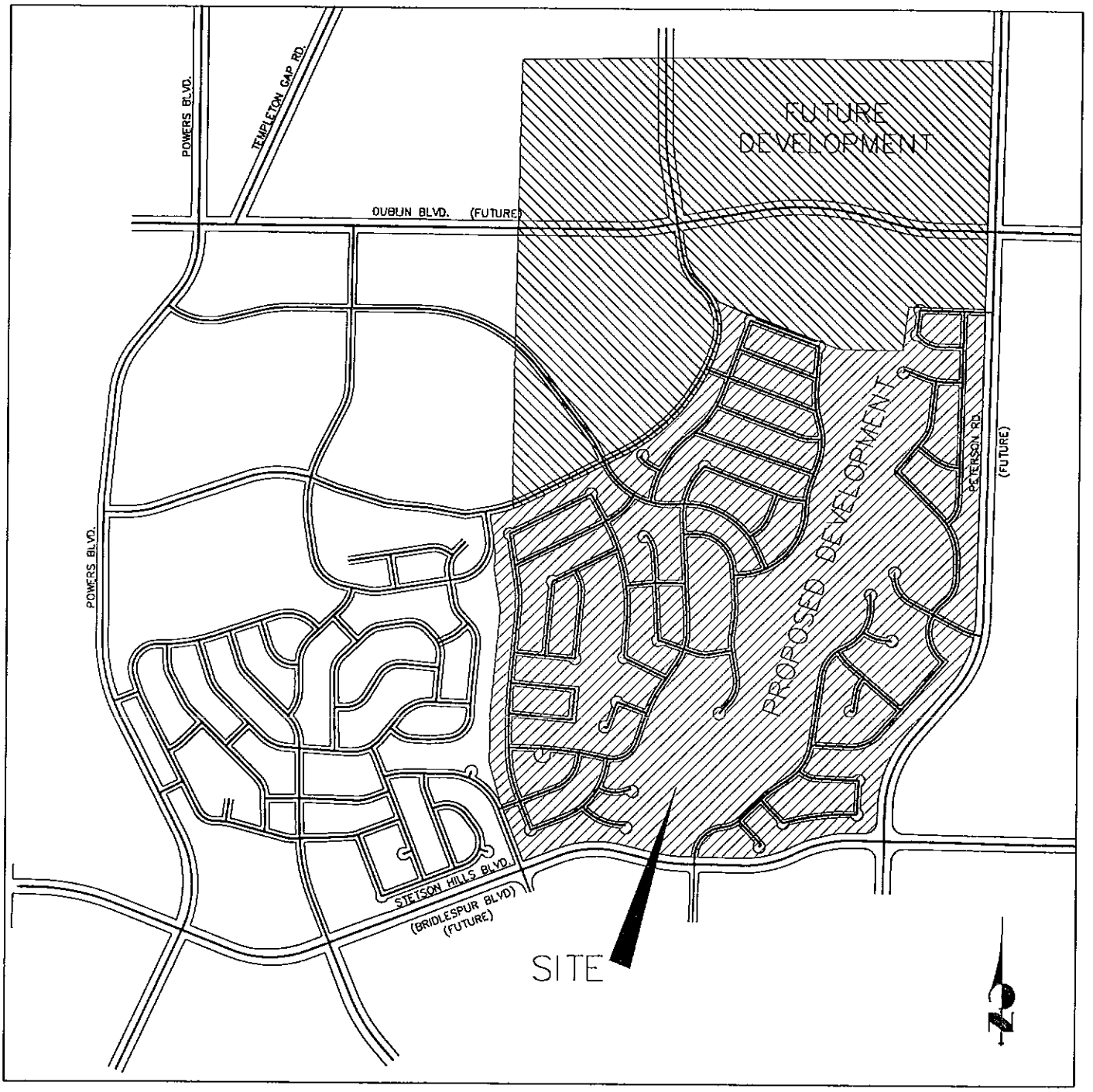
3. "Sand Creek Drainage Basin Planning Study Preliminary Design Report," KIOWA Engineering Corporation, dated March 1996.

4. "Master Development Drainage Plan For Ridgeveiw Subdivision," URS Greiner, Inc., dated October 23, 1998.

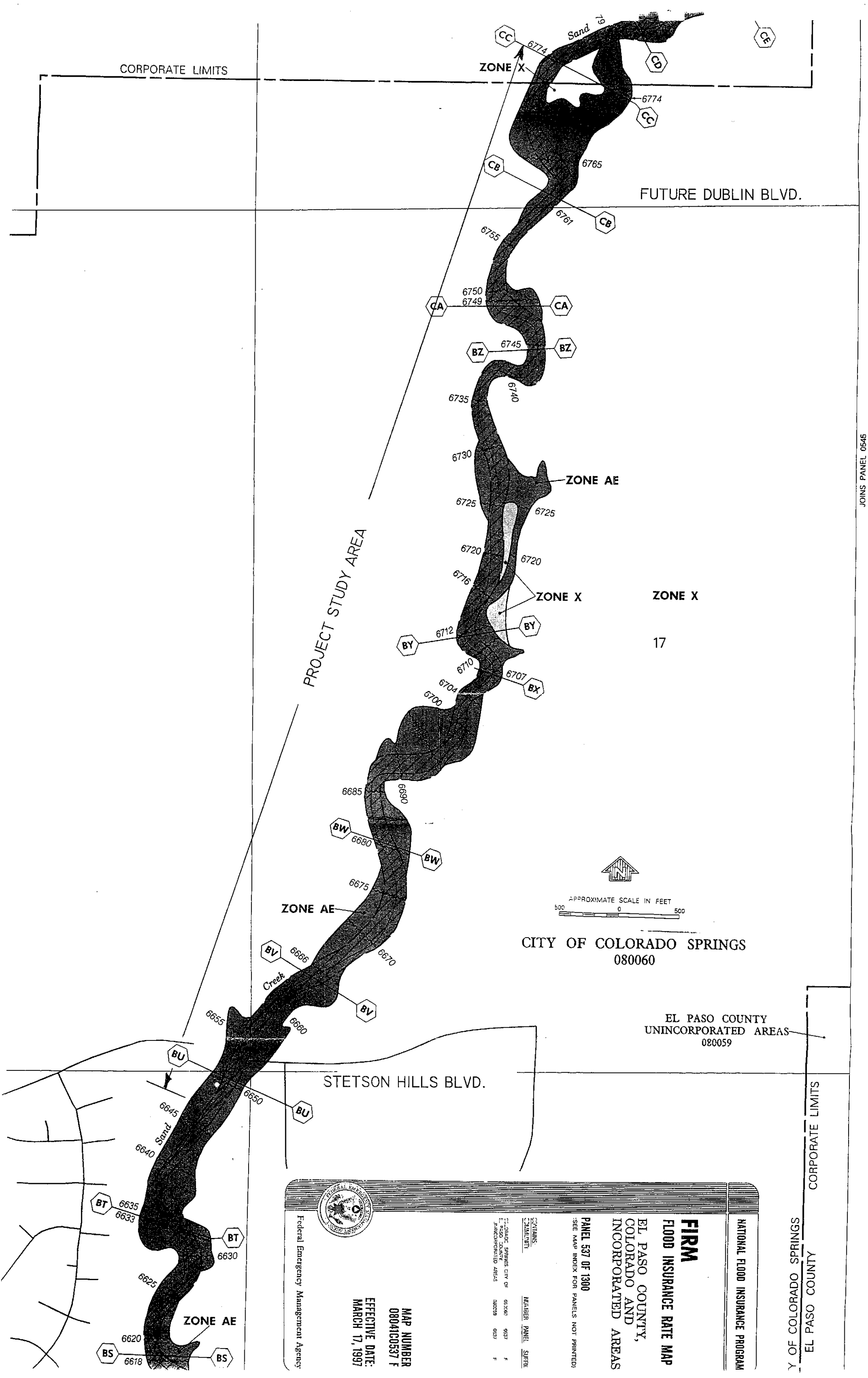
APPENDIX

VICINITY MAP

RIDGEVIEW SUBDIVISION



F. E. M. A. FLOODPLAIN MAP


CORPORATE LIMITS
FUTURE DUBLIN BLVD.
PROJECT STUDY AREA
STETSON HILLS BLVD.
ZONE X
ZONE AE
ZONE X
ZONE X
ZONE AE
ZONE AE
Sand Creek
Sand Creek
CC
CD
CE
CB
CA
BZ
BY
BX
BW
BV
BU
BT
BS
6774
6765
6761
6755
6750
6749
6745
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APPROXIMATE SCALE IN FEET
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CITY OF COLORADO SPRINGS
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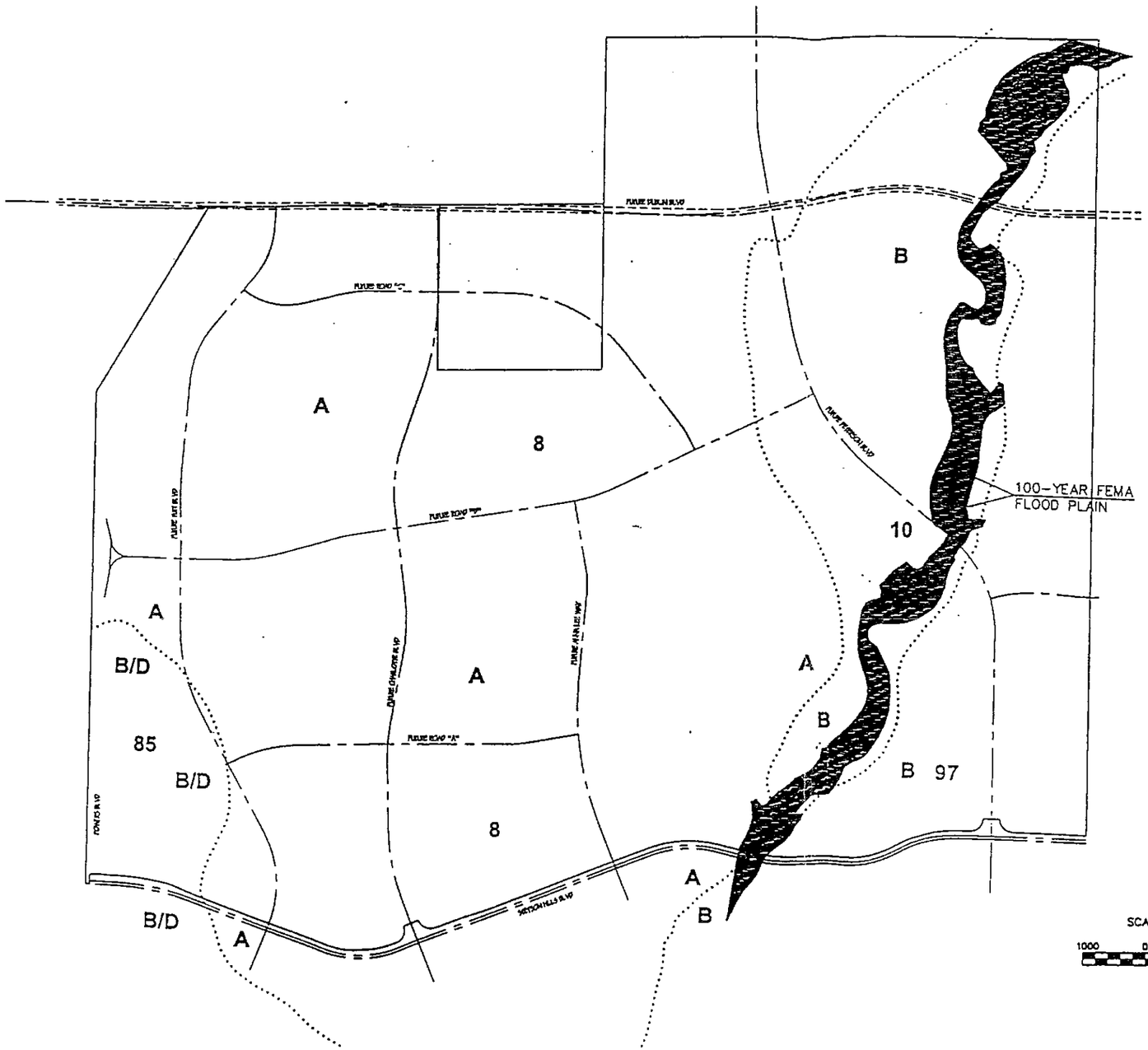
EL PASO COUNTY
UNINCORPORATED AREAS
080059
JOINS PANEL 0545
NATIONAL FLOOD INSURANCE PROGRAM
FIRM
FLOOD INSURANCE RATE MAP
EL PASO COUNTY,
COLORADO AND
INCORPORATED AREAS
PANEL 537 OF 1300
(SEE MAP INDEX FOR PANELS NOT PRINTED)
CONTAINS:
COMMUNITY
NUMBER
PANEL
SUFFIX
COLORADO SPRINGS, CITY OF
EL PASO COUNTY
UNINCORPORATED AREAS
080060
080059
0537
0537
F
F
MAP NUMBER
08041C0537 F
EFFECTIVE DATE:
MARCH 17, 1997
Federal Emergency Management Agency
CORPORATE LIMITS
EL PASO COUNTY
Y OF COLORADO SPRINGS

17

SOIL MAP

RIDGEVIEW MDDP
SOILS TYPES



URS Greiner
8415 EXPLORER DR, SUITE 110
COLORADO SPRINGS, CO 80920
(719) 531-0001

674271/CAD/SOILSTYPE.DWG PLOT DATE: 3/30/98

FIGURE 2

HYDROLOGIC CALCULATIONS

RATIONAL METHOD

RIDGEVIEW
MASTER DEVELOPMENT DRAINAGE PLAN
(Area Drainage Summary)

(SAND CREEK BASINS 124, 125, 126, & 128 DEVELOPED CONDITION)

SUB-BASIN	AREA TOTAL (Ac)	WEIGHTED C(5) * For Calcs See Runoff Summary	WEIGHTED C(100)	OVERLAND C(5)	OVERLAND Length (ft)	OVERLAND Height (ft)	OVERLAND Tc (min)	STREET / CHANNEL Length (ft)	STREET / CHANNEL Slope (%)	STREET / CHANNEL Velocity (fps)	STREET / CHANNEL Tc (min)	Tc TOTAL (min)	INTENSITY I(5) (in/hr)	INTENSITY I(100) (in/hr)	TOTAL FLOWS Q(5) (c.f.s.)	TOTAL FLOWS Q(100) (c.f.s.)
124-A	15.20	0.60	0.70	0.25	100	2.00	12.65	450 450	1.00% 2.50%	3.50 5.53	2.14 1.36	16.14	3.36	5.68 CA(equiv.)	**31** **9.12**	**60** **10.64**
125-A	20.30	0.60	0.70	0.25	100	2.00	12.65	900 500	1.00% 1.50%	3.50	4.29	16.93	3.29	5.55 CA(equiv.)	**40** **12.18**	**79** **14.21**
126-A	14.40	0.60	0.70	0.25	100	2.00	12.65	850 400	2.50% 3.00%	5.53 6.06	2.56 1.10	16.30	3.35	5.66 CA(equiv.)	**29** **8.64**	**57** **10.08**
126-B	11.90	0.53	0.62	0.25	200	8.00	14.23	1400 400	3.30% 4.00%	6.36 7.00	3.67 0.95	18.85	3.13	5.25 CA(equiv.)	**20** **6.31**	**39** **7.38**
126-C	9.30	0.53	0.62	0.25	150	10.00	10.41	450	2.00%	4.95	1.52	11.92	3.81	6.56 CA(equiv.)	**19** **4.93**	**38** **5.77**
126-D	3.80	0.25	0.35	0.25	100	3.00	11.06	800	2.20%	5.19	2.57	13.63	3.61	6.17 CA(equiv.)	**3** **0.95**	**8** **1.33**
128-A	6.80	0.60	0.70	0.25	80	1.60	11.31	1100	2.30%	5.31	3.45	14.76	3.49	5.94 CA(equiv.)	**14** **4.08**	**28** **4.76**

RIDGEVIEW
MASTER DEVELOPMENT DRAINAGE PLAN

COMPOSITE "CA" CALCULATION

SAND CREEK SUBBASINS 126-B & C, AND 127-C FLOW-BY, DEVELOPED CONDITION)

ANALYSIS POINT	SUB-BASIN I.D.	SUB-BASIN AREA (ac)	SUB-BASIN CA(5)	SUB-BASIN CA(100)	COMPOSITE CA(5)	COMPOSITE CA(100)
DP-26-1	126-B	11.9	6.31	7.38		
	TOTAL	11.9			6.31	7.38
DP-26-2	126-B	11.9	6.31	7.38		
	126-C	9.3	4.93	5.77		
	127-C FLOW-BY	7.7	2.17	2.90		
	TOTAL	28.9			13.41	16.05

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RIDGEVIEW
MASTER DEVELOPMENT DRAINAGE PLAN

(SAND CREEK SUBBASINS 126-B & C, AND 127-C FLOW-BY, DEVELOPED CONDITION ROUTING)

DESIGN POINT	AREA TOTAL (Ac)	WEIGHTED CA(5)	WEIGHTED CA(100)	OVERLAND/POND OUTFLOW C(5)	OVERLAND/POND OUTFLOW Length (ft)	OVERLAND/POND OUTFLOW Height (ft)	OVERLAND/POND OUTFLOW Tc (min)	STREET / CHANNEL/PIPE Length (ft)	STREET / CHANNEL/PIPE Slope (%)	STREET / CHANNEL/PIPE Velocity (fps)	STREET / CHANNEL/PIPE Tc (min)	Tc TOTAL (min)	INTENSITY I(5) (in/hr)	INTENSITY I(100) (in/hr)	TOTAL FLOWS Q(5) (c.f.s.)	TOTAL FLOWS Q(100) (c.f.s.)
		* For Calcs See Runoff Summary														
DP-26-1 126-B	11.90	6.31	7.38	0.25	200	8	14.23	1400 400	3.30% 4.00%	6.36 7.00	3.67 0.95	18.85	3.13	5.25	**20**	**39**
DP-26-2	28.90	13.41	16.05	0.25	100	2	12.65	600 400 300	3.30% 4.00% 1.00%	6.36 7.00 3.50	1.57 0.95 1.43	16.60	3.32	5.60	**45**	**90**

RATROUTD 5/12/99

RIDGEVIEW
MASTER DEVELOPMENT DRAINAGE PLAN
(Area Drainage Summary)

(SAND CREEK BASINS 137 & 140, DEVELOPED CONDITION)

SUB-BASIN	AREA TOTAL (Ac)	WEIGHTED C(5) * For Calcs See Runoff Summary	WEIGHTED C(100)	OVERLAND C(5)	OVERLAND Length (ft)	OVERLAND Height (ft)	OVERLAND Tc (min)	STREET / CHANNEL Length (ft)	STREET / CHANNEL Slope (%)	STREET / CHANNEL Velocity (fps)	STREET / CHANNEL Tc (min)	Tc TOTAL (min)	INTENSITY I(5) (in/hr)	INTENSITY I(100) (in/hr)	TOTAL FLOWS Q(5) (c.f.s.)	TOTAL FLOWS Q(100) (c.f.s.)
137-A	15.60	0.60	0.70	0.25	130	2.60	14.42	1150	2.00%	4.95	3.87	18.29	3.18	5.33	30	58
														CA(equiv.)	9.36	10.92
137-B	15.70	0.60	0.70	0.25	130	2.60	14.42	1600	4.00%	7.00	3.81	18.23	3.18	5.34	30	59
														CA(equiv.)	9.42	10.99
137-C	12.10	0.60	0.70	0.25	140	4.00	13.30	1500	3.30%	6.36	3.93	17.23	3.27	5.50	24	47
														CA(equiv.)	7.26	8.47
137-D	5.30	0.90	0.90	0.25	30	10.00	2.74	1000	2.50%	5.53	3.01	5.75	4.83	8.68	23	41
														CA(equiv.)	4.77	4.77
140-A	170.60	0.50	0.60	0.25	150	2.00	17.70	2600	1.00%	3.50	12.38	30.09	2.48	4.04	211	414
														CA(equiv.)	85.30	102.36
140-B	5.50	0.90	0.90	0.25	20	2.00	3.32	1200	2.00%	4.95	4.04	7.37	4.50	7.97	22	39
														CA(equiv.)	4.95	4.95
140-C	19.30	0.60	0.70	0.25	100	2.00	12.65	1200	1.00%	3.50	5.71	18.36	3.17	5.32	37	72
														CA(equiv.)	11.58	13.51

RIDGEVIEW
MASTER DEVELOPMENT DRAINAGE PLAN

COMPOSITE "CA" CALCULATION

SAND CREEK BASIN 137 (SUBBASINS B AND D, DEVELOPED CONDITION)

ANALYSIS POINT	SUB-BASIN I.D.	SUB-BASIN AREA (ac)	SUB-BASIN CA(5)	SUB-BASIN CA(100)	COMPOSITE CA(5)	COMPOSITE CA(100)
DP-37-1	137-D	5.3	4.77	4.77		
	TOTAL	5.3			4.77	4.77
DP-37-2	137-D	5.3	4.77	4.77		
	137-B	15.7	9.42	10.99		
	TOTAL	21			14.19	15.76

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COMPOSITE "CA" CALCULATION

SAND CREEK BASIN 140(SUBBASINS A TO C, DEVELOPED CONDITION)

ANALYSIS POINT	SUB-BASIN I.D.	SUB-BASIN AREA (ac)	SUB-BASIN CA(5)	SUB-BASIN CA(100)	COMPOSITE CA(5)	COMPOSITE CA(100)
DP-40-1	140-A	170.6	85.30	102.36		
	TOTAL	170.6			85.30	102.36
DP-40-2	140-A	170.6	85.30	102.36		
	140-B	5.4	4.95	4.95		
	TOTAL	176			90.25	107.31
DP-40-3	140-A	170.6	85.30	102.36		
	140-B	5.4	4.95	4.95		
	140-C	19.3	11.85	13.51		
	TOTAL	195.3			102.10	120.82

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RIDGEVIEW
MASTER DEVELOPMENT DRAINAGE PLAN

(SAND CREEK BASIN 140, SUBBASINS A TO C, DEVELOPED CONDITION ROUTING)

DESIGN POINT	AREA TOTAL (Ac)	WEIGHTED CA(5) * For Calcs See Runoff Summary	WEIGHTED CA(100) * For Calcs See Runoff Summary	OVERLAND/POND OUTFLOW C(5)	OVERLAND/POND OUTFLOW Length (ft)	OVERLAND/POND OUTFLOW Height (ft)	OVERLAND/POND OUTFLOW Tc (min)	STREET / CHANNEL/PIPE Length (ft)	STREET / CHANNEL/PIPE Slope (%)	STREET / CHANNEL/PIPE Velocity (fps)	STREET / CHANNEL/PIPE Tc (min)	Tc TOTAL (min)	INTENSITY I(5) (in/hr)	INTENSITY I(100) (in/hr)	TOTAL FLOWS Q(5) (c.f.s.)	TOTAL FLOWS Q(100) (c.f.s.)
DP-40-1 140-A	170.60	85.30	102.36	0.25	150	2	17.70	2600	1.00%	3.50	12.38	30.09	2.48	4.04	**211**	**414**
DP-40-2 DP-40-1 +B	176.00	90.25	107.31	0.25	100	2	12.65	2600 200	1.00% 1.00%	3.50 3.50	12.38 0.95	25.98	2.68	4.40	**242**	**473**
DP-40-3 DP-40-2 +C	195.30	102.10	120.82	0.25	100	2	12.65	2600 200 850	1.00% 1.00% 2.00%	3.50 3.50 4.95	12.38 0.95 2.86	28.84	2.53	4.15	**259**	**501**

RATROUTD 5/12/99

(SAND CREEK BASIN 137, SUBBASINS B & D, DEVELOPED CONDITION ROUTING)

DESIGN POINT	AREA TOTAL (Ac)	WEIGHTED CA(5) * For Calcs See Runoff Summary	WEIGHTED CA(100) * For Calcs See Runoff Summary	OVERLAND/POND OUTFLOW C(5)	OVERLAND/POND OUTFLOW Length (ft)	OVERLAND/POND OUTFLOW Height (ft)	OVERLAND/POND OUTFLOW Tc (min)	STREET / CHANNEL/PIPE Length (ft)	STREET / CHANNEL/PIPE Slope (%)	STREET / CHANNEL/PIPE Velocity (fps)	STREET / CHANNEL/PIPE Tc (min)	Tc TOTAL (min)	INTENSITY I(5) (in/hr)	INTENSITY I(100) (in/hr)	TOTAL FLOWS Q(5) (c.f.s.)	TOTAL FLOWS Q(100) (c.f.s.)
DP-37-1 137-D	5.30	4.77	4.77	0.25	30	10	2.74	1000	2.50%	5.53	3.01	5.75	4.83	8.68	**23**	**41**
DP-37-2 DP-37-1 +137-B	21.00	14.19	15.76	0.25	30	10	2.74	1000 750	2.50% 3.30%	5.53 6.36	3.01 1.97	7.71	4.43	7.84	**63**	**123**

RATROUTD 5/12/99

RIDGEVIEW
MASTER DEVELOPMENT DRAINAGE PLAN
(Area Drainage Summary)

(SAND CREEK BASIN 127, DEVELOPED)

SUB-BASIN/ OUTFALL	AREA TOTAL (Ac)	WEIGHTED C(5) * For Calcs See Runoff Summary	WEIGHTED C(100)	OVERLAND C(5)	OVERLAND Length (ft)	OVERLAND Height (ft)	OVERLAND Tc (min)	STREET / CHANNEL Length (ft)	STREET / CHANNEL Slope (%)	STREET / CHANNEL Velocity (fps)	STREET / CHANNEL Tc (min)	Tc TOTAL (min)	INTENSITY I(5) (in/hr)	INTENSITY I(100) (in/hr)	TOTAL FLOWS Q(5) (c.f.s.)	TOTAL FLOWS Q(100) (c.f.s.)
127-A	16.80	0.60	0.70	0.25	100	2.00	12.65	1000	3.00%	6.06	2.75	16.58	3.32	5.61	**33**	**66**
(DP-27-1)								500	4.00%	7.00	1.19					
														CA(equiv.)	**10.08**	**11.76**
127-B	6.70	0.60	0.70	0.25	100	2.00	12.65	500	5.00%	7.83	1.06	14.31	3.54	6.03	**14**	**28**
(DP-27-2)								250	4.00%	7.00	0.60					
														CA(equiv.)	**4.02**	**4.69**
127-C	7.70	0.60	0.70	0.25	130	2.60	14.42	250	4.00%	7.00	0.60	16.53	3.33	5.62	**15**	**30**
(DP-27-4)								450	2.00%	4.95	1.52					
														CA(equiv.)	**4.62**	**5.39**
127-D	3.00	0.60	0.70	0.25	100	2.00	12.65	500	2.00%	4.95	1.68	14.33	3.54	6.02	**6**	**13**
(DP-27-6)																
														CA(equiv.)	**1.80**	**2.10**
127-E	12.60	0.60	0.70	0.25	100	2.00	12.65	750	3.30%	6.36	1.97	17.84	3.21	5.40	**24**	**48**
(DP-E1 to E3)								700	6.00%	8.57	1.36					
								850	4.70%	7.59	1.87			CA(equiv.)	**7.56**	**8.82**

RIDGEVIEW
MASTER DEVELOPMENT DRAINAGE PLAN

COMPOSITE "CA" CALCULATION

SAND CREEK BASIN 127(SUBBASINS A TO D, DEVELOPED CONDITION)

ANALYSIS POINT	SUB-BASIN I.D.	SUB-BASIN AREA (ac)	SUB-BASIN CA(5)	SUB-BASIN CA(100)	COMPOSITE CA(5)	COMPOSITE CA(100)
DP-27-1	127-A	16.8	10.08	11.76		
	TOTAL	16.8			10.08	11.76
DP-27-2	127-B	6.7	4.02	4.69		
	TOTAL	6.7			4.02	4.69
DP-27-3	127-A	16.8	10.08	11.76		
	127-B	6.7	4.02	4.69		
	TOTAL	23.5			14.10	16.45
DP-27-4	127-C INLET	7.7	2.63	2.44		
	TOTAL	7.7			2.63	2.44
DP-27-5	127-A	16.8	10.08	11.76		
	127-B	6.7	4.02	4.69		
	127-C INLET	7.7	2.63	2.44		
	TOTAL	31.2			16.73	18.89
DP-27-6	127-A	16.8	10.08	11.76		
	127-B	6.7	4.02	4.69		
	127-C INLET	7.7	2.63	2.44		
	127-D	3	1.80	2.10		
	TOTAL	34.2			18.53	20.99

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RIDGEVIEW
MASTER DEVELOPMENT DRAINAGE PLAN

(SAND CREEK BASIN 127 DEVELOPED CONDITION ROUTING)

DESIGN POINT	AREA TOTAL (Ac)	WEIGHTED CA(5) * For Calcs See Runoff Summary	WEIGHTED CA(100) * For Calcs See Runoff Summary	OVERLAND/POND OUTFLOW C(5)	Length (ft)	Height (ft)	Tc (min)	STREET / CHANNEL/PIPE Length (ft)	Slope (%)	Velocity (fps)	Tc (min)	Tc TOTAL (min)	INTENSITY I(5) (in/hr)	INTENSITY I(100) (in/hr)	TOTAL FLOWS Q(5) (c.f.s.)	TOTAL FLOWS Q(100) (c.f.s.)
DP-27-1 A	16.80	10.08	11.76	0.25	100	2	12.65	1000 500	3.00% 4.00%	6.06 7.00	2.75 1.19	16.58	3.32	5.61	**33**	**66**
DP-27-2 B	6.70	4.02	4.69	0.25	100	2	12.65	500 250	5.00% 4.00%	7.83 7.00	1.06 0.60	14.31	3.54	6.03	**14**	**28**
DP-27-3 DP-27-1 + DP-27-2	23.50	14.10	16.45	0.25	100	2	12.65	1000 500 170 450	3.00% 4.00% 5.00% 2.00%	6.06 7.00 7.83 4.95	2.75 1.19 0.36 1.52	18.46	3.16	5.31	**45**	**87**
DP-27-4 INTERCEPT C	7.70	2.63	2.44	0.25	130	2.60	14.42	250 450	4.00% 2.00%	7.00 4.95	0.60 1.52	16.53	3.33	5.62	**9**	**14**
DP-27-5 DP-27-3 + DP-27-4	31.20	16.73	18.89	0.25	100	2.00	12.65	1000 500 170 450 350	3.00% 4.00% 5.00% 2.00% 4.00%	6.06 7.00 7.83 4.95 7.00	2.75 1.19 0.36 1.52 0.83	19.30	3.10	5.19	**52**	**98**
DP-27-6 DP-27-5 D	34.20	18.53	20.99	0.25	100	2.00	12.65	1000 500 170 450 350 200 290	3.00% 4.00% 5.00% 2.00% 4.00% 1.50% 4.00%	6.06 7.00 7.83 4.95 7.00 4.29 7.00	2.75 1.19 0.36 1.52 0.83 0.78 0.69	20.76	2.99	4.99	**55**	**105**

RIDGEVIEW
MASTER DEVELOPMENT DRAINAGE PLAN
(Area Drainage Summary)

(SAND CREEK BASIN 139, DEVELOPED)

SUB-BASIN	AREA TOTAL (Ac)	WEIGHTED C(5) * For Calcs See Runoff Summary	WEIGHTED C(100)	OVERLAND C(5)	OVERLAND Length (ft)	OVERLAND Height (ft)	OVERLAND Tc (min)	STREET / CHANNEL Length (ft)	STREET / CHANNEL Slope (%)	STREET / CHANNEL Velocity (fps)	STREET / CHANNEL Tc (min)	Tc TOTAL (min)	INTENSITY I(5) (in/hr)	INTENSITY I(100) (in/hr)	TOTAL FLOWS Q(5) (c.f.s.)	TOTAL FLOWS Q(100) (c.f.s.)
139-A OS	57.60	0.60	0.70	0.25	120	2.40	13.85	2200	1.00%	3.50	10.48	24.33	2.77	4.57	**96**	**184**
														CA(equiv.)	**34.56**	**40.32**
139-B	5.40	0.90	0.90	0.25	20	5.00	2.46	1000	2.50%	5.53	3.01	5.47	4.89	8.82	**24**	**43**
														CA(equiv.)	**4.86**	**4.86**
139-C	15.80	0.65	0.75	0.25	50	1.00	8.94	1000 300 500	1.00% 3.00% 3.50%	3.50	4.76	13.70	3.60	6.15	**37**	**73**
														CA(equiv.)	**10.27**	**11.85**
139-D	4.60	0.75	0.85	0.25	30	6.00	3.24	350	2.00%	4.95	1.18	4.42	5.15	9.39	**18**	**37**
														CA(equiv.)	**3.45**	**3.91**
139-E	9.40	0.60	0.70	0.25	150	10.00	10.41	600	4.00%	7.00	1.43	11.84	3.82	6.58	**22**	**43**
														CA(equiv.)	**5.64**	**6.58**

BASINS 5/12/99

RIDGEVIEW
MASTER DEVELOPMENT DRAINAGE PLAN

COMPOSITE "CA" CALCULATION

SAND CREEK BASIN 139(SUBBASINS A TO D, DEVELOPED CONDITION)

ANALYSIS POINT	SUB-BASIN I.D.	SUB-BASIN AREA (ac)	SUB-BASIN CA(5)	SUB-BASIN CA(100)	COMPOSITE CA(5)	COMPOSITE CA(100)
DP-39-1	139-A	57.6	34.56	40.32		
	TOTAL	57.6			34.56	40.32
DP-39-2	139-A	57.6	34.56	40.32		
	139-B	5.4	4.86	4.86		
	TOTAL	63			39.42	45.18
DP-39-3	139-A	57.6	34.56	40.32		
	139-B	5.4	4.86	4.86		
	139-C	15.8	10.27	11.85		
	TOTAL	78.8			49.69	57.03
DP-39-4	139-A	57.6	34.56	40.32		
	139-B	5.4	4.86	4.86		
	139-C	15.8	10.27	11.85		
	139-D	4.6	3.45	3.91		
	TOTAL	83.4			53.14	60.94

Comc 5/12/99

RIDGEVIEW
MASTER DEVELOPMENT DRAINAGE PLAN
(SAND CREEK BASIN 139 DEVELOPED CONDITION ROUTING)

DESIGN POINT	AREA TOTAL (Ac)	WEIGHTED CA(5) * For Cales See Runoff Summary	WEIGHTED CA(100) * For Cales See Runoff Summary	OVERLAND/POND OUTFLOW C(5)	OVERLAND/POND OUTFLOW Length (ft)	OVERLAND/POND OUTFLOW Height (ft)	OVERLAND/POND OUTFLOW Tc (min)	STREET / CHANNEL/PIPE Length (ft)	STREET / CHANNEL/PIPE Slope (%)	STREET / CHANNEL/PIPE Velocity (fps)	STREET / CHANNEL/PIPE Tc (min)	Tc TOTAL (min)	INTENSITY I(5) (in/hr)	INTENSITY I(100) (in/hr)	TOTAL FLOWS Q(5) (c.f.s.)	TOTAL FLOWS Q(100) (c.f.s.)
DP-39-1 139-A	57.60	34.56	40.32	0.25	120	2.4	13.85	2200	1.00%	3.50	10.48	24.33	2.77	4.57	**96**	**184**
DP-39-2 DP-39-1 +B	63.00	39.42	45.18	0.25	100	2	12.65	2200 200	1.00% 1.00%	3.50 3.50	10.48 0.95	24.07	2.78	4.60	**110**	**208**
DP-39-3 DP-39-2 +C	78.80	49.69	57.03	0.25	100	2	12.65	2200 200 650	1.00% 1.00% 1.00%	3.50 3.50 3.50	10.48 0.95 3.10	27.17	2.62	4.29	**130**	**245**
DP-39-4 DP-39-3 +D	83.40	53.14	60.94	0.25	100	2.00	12.65	2200 200 650 300	1.00% 1.00% 1.00% 1.00%	3.50 3.50 3.50 3.50	10.48 0.95 3.10 1.43	28.60	2.55	4.17	**135**	**254**

RATROUTD 5/12/99

RIDGEVIEW
MASTER DEVELOPMENT DRAINAGE PLAN
(Area Drainage Summary)

(SAND CREEK BASIN 143, DEVELOPED CONDITION)

SUB-BASIN	AREA TOTAL (Ac)	WEIGHTED C(5) * For Calcs See Runoff Summary	WEIGHTED C(100)	OVERLAND C(5)	OVERLAND Length (ft)	OVERLAND Height (ft)	OVERLAND Tc (min)	STREET / CHANNEL Length (ft)	STREET / CHANNEL Slope (%)	STREET / CHANNEL Velocity (fps)	STREET / CHANNEL Tc (min)	Tc TOTAL (min)	INTENSITY I(5) (in/hr)	INTENSITY I(100) (in/hr)	TOTAL FLOWS Q(5) (c.f.s.)	TOTAL FLOWS Q(100) (c.f.s.)
143-A	65.20	0.60	0.70	0.25	100	2.00	12.65	500 700 1400	2.00% 2.50% 4.00%	4.95 5.53 7.00	1.68 2.11 3.33	19.77	3.06	5.12 CA(equiv.)	**120** **39.12**	**234** **45.64**
143-B	11.50	0.60	0.70	0.25	120	2.40	13.85	1000	2.00%	4.95	3.37	17.22	3.27	5.50 CA(equiv.)	**23** **6.90**	**44** **8.05**
143-C	57.40	0.56	0.69	0.25	100	2.00	12.65	700 1400	1.00% 3.00%	3.50 6.06	3.33 3.85	19.83	3.06	5.11 CA(equiv.)	**98** **32.14**	**203** **39.61**
143-D	5.20	0.60	0.70	0.25	120	2.40	13.85	750	3.30%	6.36	1.97	15.82	3.39	5.74 CA(equiv.)	**11** **3.12**	**21** **3.64**
143-E	7.20	0.60	0.70	0.25	100	2.00	12.65	650	4.00%	7.00	1.55	14.19	3.55	6.05 CA(equiv.)	**15** **4.32**	**30** **5.04**
143-F	13.80	0.60	0.70	0.25	200	3.00	19.66	1400	2.00%	4.95	4.71	24.38	2.77	4.57 CA(equiv.)	**23** **8.28**	**44** **9.66**

RIDGEVIEW
MASTER DEVELOPMENT DRAINAGE PLAN

COMPOSITE "CA" CALCULATION

SAND CREEK BASIN 143 (SUBBASINS A THRU F, DEVELOPED CONDITION)

ANALYSIS POINT	SUB-BASIN I.D.	SUB-BASIN AREA (ac)	SUB-BASIN CA(5)	SUB-BASIN CA(100)	COMPOSITE CA(5)	COMPOSITE CA(100)
DP-43-1	143-A	65.2	39.12	45.64		
	TOTAL	65.2			39.12	45.64
DP-43-2	143-A	65.2	39.12	45.64		
	143-B	11.5	6.90	8.05		
	TOTAL	76.7			46.02	53.69
DP-43-3	143-C	57.4	32.14	39.61		
	TOTAL	57.4			32.14	39.61
DP-43-4	143-D	5.2	3.12	3.64		
	TOTAL	5.2			3.12	3.64
DP-43-5	143-D	5.2	3.12	3.64		
	143-E	7.2	4.32	5.04		
	TOTAL	12.4			7.44	8.68
DP-43-6	143-C	57.4	32.14	39.61		
	143-D	5.2	3.12	3.64		
	143-E	7.2	4.32	5.04		
	TOTAL	69.8			39.58	48.29
DP-43-7	143-A	65.2	39.12	45.64		
	143-B	11.5	6.90	8.05		
	143-C	57.4	32.14	39.61		
	143-D	5.2	3.12	3.64		
	143-E	7.2	4.32	5.04		
	TOTAL	146.5			85.60	101.98
DP-43-8	143-A	65.2	39.12	45.64		
	143-B	11.5	6.90	8.05		
	143-C	57.4	32.14	39.61		
	143-D	5.2	3.12	3.64		
	143-E	7.2	4.32	5.04		
	143-F	13.8	8.28	9.66		
	TOTAL	160.3			93.88	111.64

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RIDGEVIEW
MASTER DEVELOPMENT DRAINAGE PLAN

(SAND CREEK BASIN 143 DEVELOPED CONDITION ROUTING)

DESIGN POINT	AREA TOTAL (Ac)	WEIGHTED CA(5) * For Cales See Runoff Summary	WEIGHTED CA(100)	OVERLAND/POND OUTFLOW C(5)	Length (ft)	Height (ft)	Tc (min)	STREET / CHANNEL/PIPE Length (ft)	Slope (%)	Velocity (fps)	Tc (min)	Tc TOTAL (min)	INTENSITY I(5) (in/hr)	INTENSITY I(100) (in/hr)	TOTAL FLOWS Q(5) (c.f.s.)	TOTAL FLOWS Q(100) (c.f.s.)
DP-43-1 143-A	65.20	39.12	45.64	0.25	100	2	12.65	500 700 1400	2.00% 2.50% 4.00%	4.95 5.53 7.00	1.68 2.11 3.33	19.77	3.06	5.12	**120**	**234**
DP-43-2 143-A & B	76.70	46.02	53.69	0.25	100	2	12.65	500 700 1400 300	2.00% 2.50% 4.00% 2.00%	4.95 5.53 7.00 4.95	1.68 2.11 3.33 1.01	20.78	2.99	4.99	**138**	**268**
DP-43-3 143-C	57.40	32.14	39.61	0.25	100	2	12.65	700 1400	1.00% 3.00%	3.50 6.06	3.33 3.85	19.83	3.06	5.11	**98**	**203**
DP-43-4 143-D	5.20	3.12	3.64	0.25	120	2.40	13.85	750	3.30%	6.36	1.97	15.82	3.39	5.74	**11**	**21**
DP-43-5 143-D & E	12.40	7.44	8.68	0.25	100	2.00	12.65	750 440	3.30% 3.00%	6.36 6.06	1.97 1.21	15.82	3.39	5.74	**25**	**50**
DP-43-6 143-C, D & E	69.80	39.58	48.29	0.25	100	2.00	12.65	700 1400 550	1.00% 3.00% 3.00%	3.50 6.06 6.06	3.33 3.85 1.51	21.34	2.95	4.92	**117**	**237**
DP-43-7 143-A THRU E	146.50	85.60	101.98	0.25	100	2.00	12.65	500 700 1400 300 600	2.00% 2.50% 4.00% 2.20% 2.20%	4.95 5.53 7.00 5.19 5.19	1.68 2.11 3.33 0.96 1.93	22.66	2.87	4.76	**246**	**485**
DP-43-8 143-A THRU F	160.30	93.88	111.64	0.25	100	2.00	12.65	500 700 1400 900 850	2.00% 2.50% 4.00% 2.20% 2.20%	4.95 5.53 7.00 5.19 5.19	1.68 2.11 3.33 2.89 2.73	25.39	2.71	4.46	**254**	**498**

RIDGEVIEW
MASTER DEVELOPMENT DRAINAGE PLAN
(Area Drainage Summary)

(SAND CREEK STETSON HILLS BLVD BASINS, DEVELOPED)

SUB-BASIN	AREA TOTAL (Ac)	WEIGHTED C(5)	WEIGHTED C(100)	OVERLAND C(5)	OVERLAND Length (ft)	OVERLAND Height (ft)	OVERLAND Tc (min)	STREET / CHANNEL Length (ft)	STREET / CHANNEL Slope (%)	STREET / CHANNEL Velocity (fps)	STREET / CHANNEL Tc (min)	Tc TOTAL (min)	INTENSITY I(5) (in/hr)	INTENSITY I(100) (in/hr)	TOTAL FLOWS Q(5) (c.f.s.)	TOTAL FLOWS Q(100) (c.f.s.)
		* For Calcs See Runoff Summary														
S-1	3.20	0.78	0.84	0.25	20	0.80	4.50	1320	4.00%	7.00	3.14	7.64	4.45	7.86	11	21
														CA(equiv.)	2.50	2.69
S-2	3.20	0.78	0.84	0.25	20	0.80	4.50	1300	4.00%	7.00	3.10	7.59	4.46	7.88	11	21
														CA(equiv.)	2.50	2.69
S-3	3.80	0.78	0.84	0.25	20	0.80	4.50	1100	2.20%	5.19	3.53	8.03	4.38	7.72	13	25
														CA(equiv.)	2.96	3.19
S-4	3.50	0.78	0.84	0.25	20	0.80	4.50	1050	2.20%	5.19	3.37	7.87	4.41	7.78	12	23
														CA(equiv.)	2.73	2.94

RIDGEVIEW
MASTER DEVELOPMENT DRAINAGE PLAN

COMPOSITE "CA" CALCULATION

SAND CREEK STETSON HILLS BLVD BASINS PIPE ROUTING, DEVELOPED CONDITION

ANALYSIS POINT	SUB-BASIN I.D.	SUB-BASIN AREA (ac)	SUB-BASIN CA(5)	SUB-BASIN CA(100)	COMPOSITE CA(5)	COMPOSITE CA(100)
DP-S1 INTERCEPTED S-1	S-1	3.2	1.49	1.38		
	TOTAL	3.2			1.49	1.38
DP-S2 INTERCEPTED (S-1+S-2)	DP-S1	3.2	1.49	1.38		
	S-2	3.2	1.49	1.38		
	TOTAL	6.4			2.98	2.76
DP-S3 SUBBASIN S-3 + FLOWBY S-1	S-3	3.8	2.96	3.19		
	DP-1	3.2	0.99	1.29		
	TOTAL	7			3.95	4.48
DP-S4 DP-S2 + DP-S3 + BASIN S-4 + FLOWBY S-2	DP-S2		2.98	2.76		
	DP-S3		3.95	4.48		
	S-4		2.73	2.94		
	S-2		0.99	1.29		
	TOTAL	13.7			10.65	11.47

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RIDGEVIEW
MASTER DEVELOPMENT DRAINAGE PLAN

COMPOSITE "CA" CALCULATION

SAND CREEK STETSON HILLS BLVD BASINS SURFACE ROUTING, DEVELOPED CONDITION

ANALYSIS POINT	SUB-BASIN I.D.	SUB-BASIN AREA (ac)	SUB-BASIN CA(5)	SUB-BASIN CA(100)	COMPOSITE CA(5)	COMPOSITE CA(100)
DP-S3 SUBBASIN S-3+ FLOWBY S-1	S-3	3.8	2.96	3.19		
	S-1	3.2	0.99	1.29		
	TOTAL	7			3.95	4.48
DP-S4 SUBBASIN S-4 + FLOWBY S-2	S-4	3.5	2.73	2.94		
	S-2	3.2	0.99	1.29		
	TOTAL	6.7			3.72	4.23

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RIDGEVIEW
MASTER DEVELOPMENT DRAINAGE PLAN

SAND CREEK STETSON HILLS BLVD BASINS SURFACE ROUTING, DEVELOPED CONDITION

DESIGN POINT	AREA TOTAL (Ac)	WEIGHTED CA(5) * For Calcs See Runoff Summary	WEIGHTED CA(100) * For Calcs See Runoff Summary	OVERLAND/POND OUTFLOW C(5)	OVERLAND/POND OUTFLOW Length (ft)	OVERLAND/POND OUTFLOW Height (ft)	OVERLAND/POND OUTFLOW Tc (min)	STREET / CHANNEL/PIPE Length (ft)	STREET / CHANNEL/PIPE Slope (%)	STREET / CHANNEL/PIPE Velocity (fps)	STREET / CHANNEL/PIPE Tc (min)	Tc TOTAL (min)	INTENSITY I(5) (in/hr)	INTENSITY I(100) (in/hr)	TOTAL FLOWS Q(5) (c.f.s.)	TOTAL FLOWS Q(100) (c.f.s.)
DP-S3 S-3 + FLOW-BY S-1	7.00	3.95	4.48	0.25	20	0.80	4.50	1320 400	4.00% 1.00%	7.00 3.50	3.14 1.90	9.55	4.13	7.21	**16**	**32**
DP-S4 S-4 + FLOW-BY S-2	6.70	3.72	4.23	0.25	20	0.80	4.50	1300 400	4.00% 1.00%	7.00 3.50	3.10 1.90	9.50	4.14	7.23	**15**	**31**

RATROUTD 5/10/99

RIDGEVIEW
MASTER DEVELOPMENT DRAINAGE PLAN

SAND CREEK STETSON HILLS BLVD BASINS PIPE ROUTING, DEVELOPED CONDITION

DESIGN POINT	AREA TOTAL (Ac)	WEIGHTED CA(5) * For Calcs See Runoff Summary	WEIGHTED CA(100) * For Calcs See Runoff Summary	OVERLAND/POND OUTFLOW C(5)	OVERLAND/POND OUTFLOW Length (ft)	OVERLAND/POND OUTFLOW Height (ft)	OVERLAND/POND OUTFLOW Tc (min)	STREET / CHANNEL/PIPE Length (ft)	STREET / CHANNEL/PIPE Slope (%)	STREET / CHANNEL/PIPE Velocity (fps)	STREET / CHANNEL/PIPE Tc (min)	Tc TOTAL (min)	INTENSITY I(5) (in/hr)	INTENSITY I(100) (in/hr)	TOTAL FLOWS Q(5) (c.f.s.)	TOTAL FLOWS Q(100) (c.f.s.)
DP-S1 INTERCEPT S-1	3.20	1.49	1.38	0.25	20	0.80	4.50	1320	4.00%	7.00	3.14	7.64	4.45	7.86	**7**	**11**
DP-S2 INTERCEPT (S-1+S-2)	6.40	2.98	2.76	0.25	20	0.80	4.50	1320 100	2.50% 2.00%	5.53 4.95	3.98 0.34	8.81	4.25	7.45	**13**	**21**
DP-S3 SUBBASIN S-3 + FLOWBY S-1	7.00	3.95	4.48	0.25	20	0.80	4.50	1320 400	4.00% 2.00%	7.00 4.95	3.14 1.35	8.99	4.22	7.39	**17**	**33**
DP-S4 DP-S2 + DP-S3 + BASIN S-3 + FLOWBY DP-S2	13.70	10.65	11.47	0.25	100	2.00	12.65	1320 100 370	2.50% 2.00% 2.00%	5.53 4.95 4.95	3.98 0.34 1.25	18.20	3.18	5.35	**34**	**61**

HYDRAULIC CALCULATIONS

TRAPEZOIDAL CHANNEL ANALYSIS OF NORTH PORTION MAIN SAND CREEK CHANNEL

STREET CAPACITY GRAPH AND TABLES

REINFORCED CONCRETE BOX CULVERT ANALYSIS D.P.-145 OUTFALL

DIVERSION CHANNEL BASIN 123

DIVERSION CHANNEL D.P.-147 TO D.P.-148

DIVERSION CHANNEL BASIN 142

CIRCULAR PIPE CAPACITY

PRELIMINARY INLET CALCULATIONS

RIDGEVIEW SUBDIVISION
Worksheet for Trapezoidal Channel

Project Description	
Project File	untitled.fm2
Worksheet	NORTH PORTION MAIN CHANNEL
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.030	
Channel Slope	0.005000	ft/ft
Left Side Slope	3.000000	H : V
Right Side Slope	3.000000	H : V
Bottom Width	50.00	ft
Discharge	500.00	cfs

Results		
Depth	1.84	ft
Flow Area	102.01	ft²
Wetted Perimeter	61.62	ft
Top Width	61.03	ft
Critical Depth	1.42	ft
Critical Slope	0.012098	ft/ft
Velocity	4.90	ft/s
Velocity Head	0.37	ft
Specific Energy	2.21	ft
Froude Number	0.67	
Flow is subcritical.		

Table
Rating Table for Trapezoidal Channel

Project Description	
Project File	untitled.fm2
Worksheet	NORTH PORTION MAIN CHANNEL
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Constant Data		
Mannings Coefficient	0.030	
Left Side Slope	3.000000	H : V
Right Side Slope	3.000000	H : V
Bottom Width	50.00	ft

Input Data				
	Minimum	Maximum	Increment	
Channel Slope	0.005000	0.010000	0.002500	ft/ft
Discharge	500.00	4,000.00	500.00	cfs

Rating Table

Discharge (cfs)	Channel Slope (ft/ft)	Depth (ft)	Velocity (ft/s)
500.00	0.005000	1.84	4.90
500.00	0.007500	1.63	5.58
500.00	0.010000	1.50	6.12
1,000.00	0.005000	2.75	6.24
1,000.00	0.007500	2.45	7.13
1,000.00	0.010000	2.25	7.83
1,500.00	0.005000	3.47	7.15
1,500.00	0.007500	3.09	8.18
1,500.00	0.010000	2.85	9.00
2,000.00	0.005000	4.09	7.85
2,000.00	0.007500	3.65	9.00
2,000.00	0.010000	3.36	9.91
2,500.00	0.005000	4.64	8.43
2,500.00	0.007500	4.14	9.68
2,500.00	0.010000	3.81	10.67
3,000.00	0.005000	5.14	8.93
3,000.00	0.007500	4.59	10.26
3,000.00	0.010000	4.23	11.32
3,500.00	0.005000	5.59	9.37
3,500.00	0.007500	5.00	10.77
3,500.00	0.010000	4.61	11.89
4,000.00	0.005000	6.02	9.76
4,000.00	0.007500	5.38	11.23

Table
Rating Table for Trapezoidal Channel

Rating Table			
Discharge (cfs)	Channel Slope (ft/ft)	Depth (ft)	Velocity (ft/s)
4,000.00	0.010000	4.97	12.40

RIDGEVIEW
Worksheet for Rectangular Channel

Project Description	
Project File	untitled.fm2
Worksheet	RCB DP75
Flow Element	Rectangular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.005000	ft/ft
Bottom Width	10.00	ft
Discharge	1,000.00	cfs

Results		
Depth	6.26	ft
Flow Area	62.59	ft^2
Wetted Perimeter	22.52	ft
Top Width	10.00	ft
Critical Depth	6.77	ft
Critical Slope	0.004077	ft/ft
Velocity	15.98	ft/s
Velocity Head	3.97	ft
Specific Energy	10.23	ft
Froude Number	0.00	

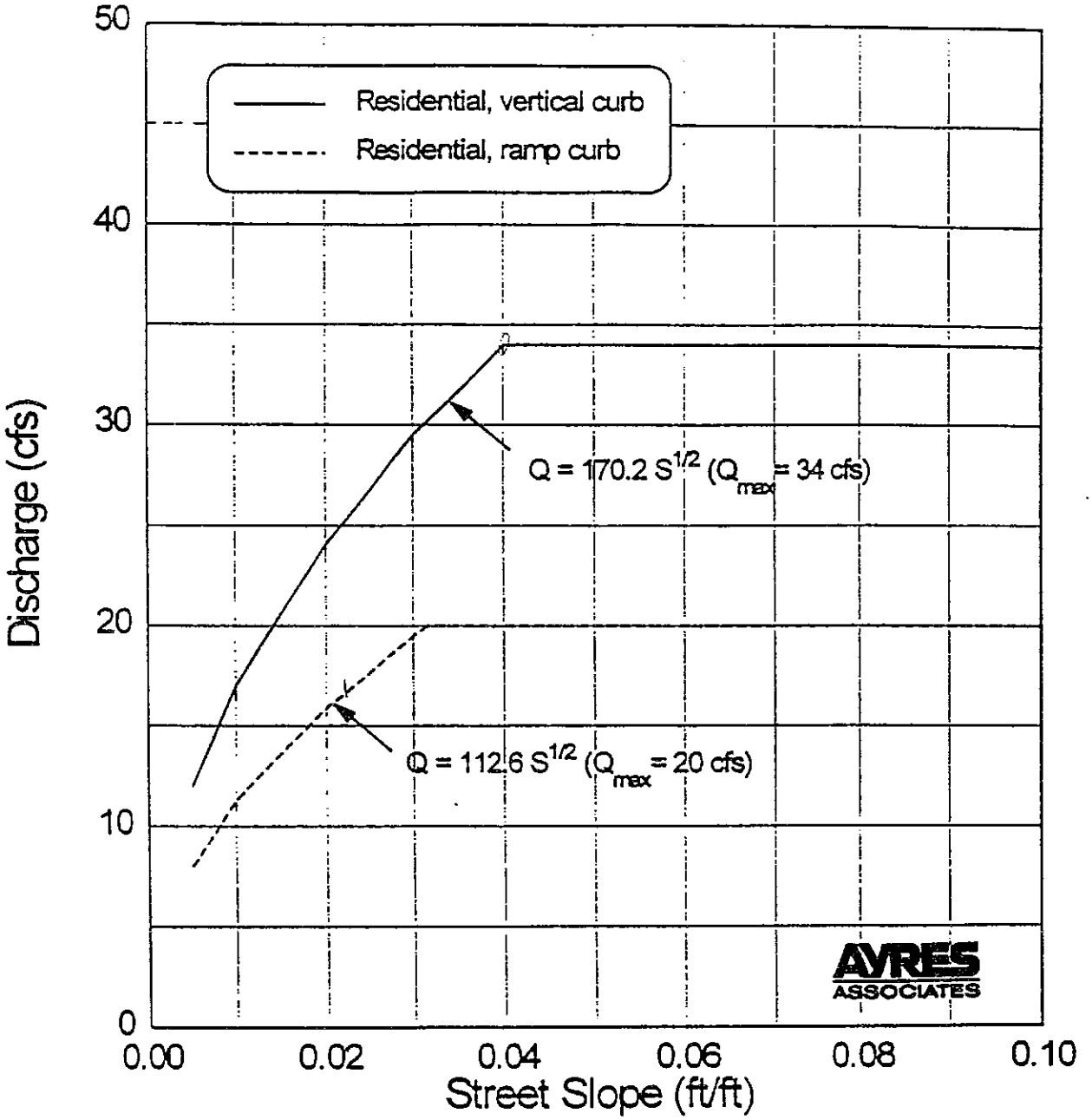
RIDGEVIEW
Worksheet for Trapezoidal Channel

Project Description	
Project File	untitled.fm2
Worksheet	CHANNEL BASIN 123
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.030	
Channel Slope	0.007500	ft/ft
Left Side Slope	3.000000	H : V
Right Side Slope	3.000000	H : V
Bottom Width	10.00	ft
Discharge	1,100.00	cfs

Results		
Depth	4.97	ft
Flow Area	123.66	ft²
Wetted Perimeter	41.41	ft
Top Width	39.80	ft
Critical Depth	4.69	ft
Critical Slope	0.009625	ft/ft
Velocity	8.90	ft/s
Velocity Head	1.23	ft
Specific Energy	6.20	ft
Froude Number	0.89	
Flow is subcritical.		

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.

RIDGEVIEW
Worksheet for Irregular Channel

Project Description	
Project File	x:\910000.all\910401\streetca.fm2
Worksheet	RIDGEVIEW SREET CAPACITY RAMP CURB
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Discharge

Input Data		
Channel Slope	0.010000	ft/ft
Water Surface Elevation	100.44	ft

Elevation range: 100.00 ft to 100.62 ft.

Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	100.62	0.00	1.67	0.030
1.67	100.59	1.67	48.34	0.012
6.67	100.49	48.34	50.00	0.030
8.00	100.12			
8.01	100.00			
9.18	100.12			
25.00	100.44			
40.83	100.12			
42.00	100.00			
42.01	100.12			
43.34	100.49			
48.34	100.59			
50.00	100.62			

Results		
Wtd. Mannings Coefficient	0.012	
Discharge	24.31	cfs
Flow Area	6.33	ft²
Wetted Perimeter	36.64	ft
Top Width	36.31	ft
Height	0.44	ft
Critical Depth	100.51	ft
Critical Slope	0.003463	ft/ft
Velocity	3.84	ft/s
Velocity Head	0.23	ft
Specific Energy	100.67	ft
Froude Number	1.62	
Flow is supercritical.		
Flow is divided.		

Vs 22.5 cfs by $Q = 112.6\ S^{1/2}$/SIDE

STREET SECTION
Cross Section for Irregular Channel

Project Description	
Project File	x:\910000.all\910401\streetca.fm2
Worksheet	RIDGEVIEW SREET CAPACITY RAMP CURB
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Discharge

Section Data		
Wtd. Mannings Coefficient	0.012	
Channel Slope	0.010000	ft/ft
Water Surface Elevation	100.44	ft
Discharge	24.31	cfs

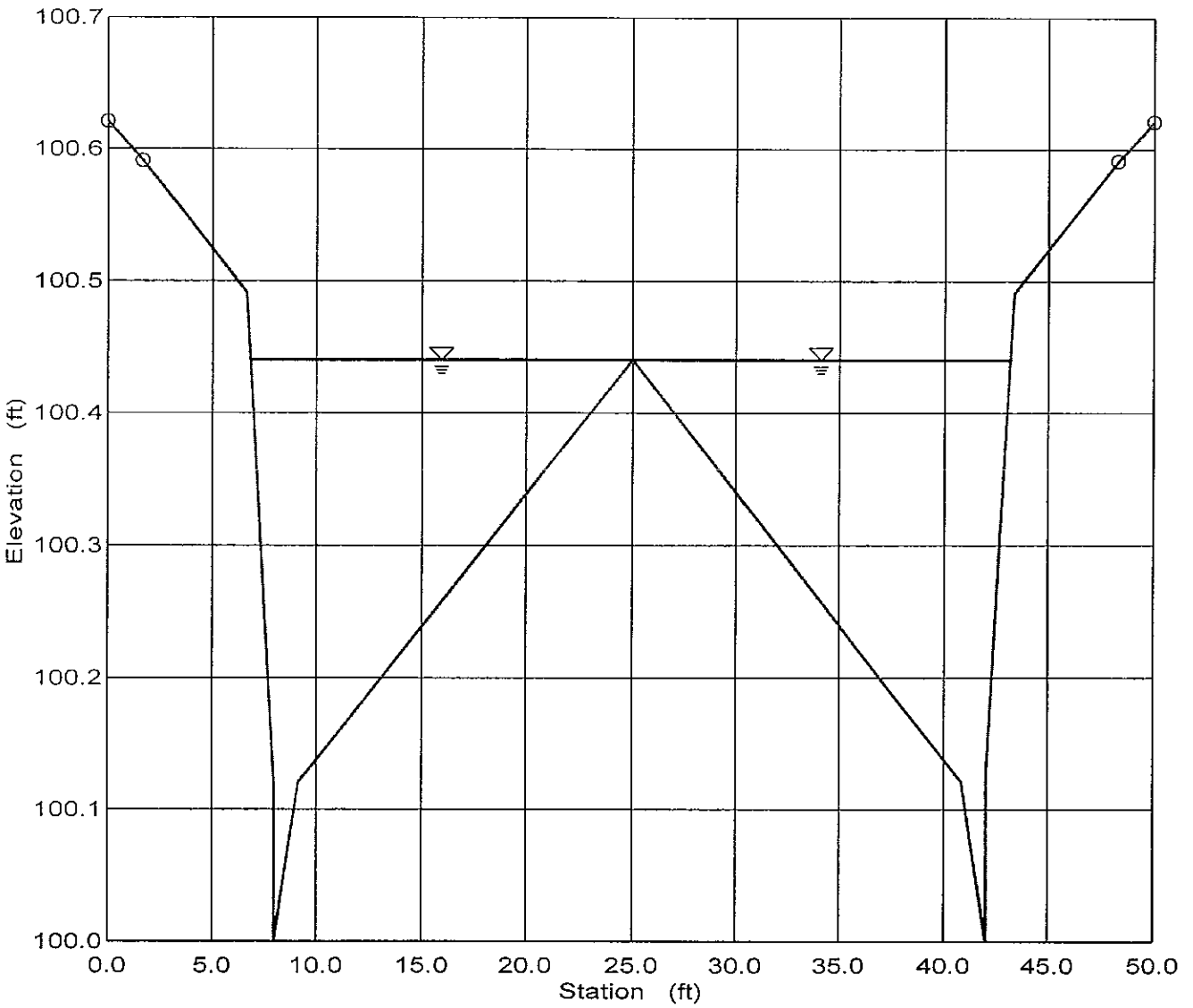


TABLE STREET CAPACITY
Rating Table for Irregular Channel

Project Description	
Project File	x:\910000.all\910401\streetca.fm2
Worksheet	RIDGEVIEW SREET CAPACITY RAMP CURB
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Discharge

Constant Data

Input Data	Minimum	Maximum	Increment	
Channel Slope	0.005000	0.070000	0.002500	ft/ft
Water Surface Elevation	100.12	100.62	0.10	ft

Rating Table

Water Surface Elevation (ft)	Channel Slope (ft/ft)	Wtd. Mannings Coefficient	Discharge (cfs)	Velocity (ft/s)
100.12	0.005000	0.012	0.18	1.26
100.12	0.007500	0.012	0.22	1.54
100.12	0.010000	0.012	0.25	1.78
100.12	0.012500	0.012	0.28	1.99
100.12	0.015000	0.012	0.31	2.18
100.12	0.017500	0.012	0.33	2.36
100.12	0.020000	0.012	0.36	2.52
100.12	0.022500	0.012	0.38	2.67
100.12	0.025000	0.012	0.40	2.82
100.12	0.027500	0.012	0.42	2.96
100.12	0.030000	0.012	0.44	3.09
100.12	0.032500	0.012	0.45	3.21
100.12	0.035000	0.012	0.47	3.33
100.12	0.037500	0.012	0.49	3.45
100.12	0.040000	0.012	0.50	3.56
100.12	0.042500	0.012	0.52	3.67
100.12	0.045000	0.012	0.54	3.78
100.12	0.047500	0.012	0.55	3.88
100.12	0.050000	0.012	0.56	3.99
100.12	0.052500	0.012	0.58	4.08
100.12	0.055000	0.012	0.59	4.18
100.12	0.057500	0.012	0.61	4.27
100.12	0.060000	0.012	0.62	4.37
100.12	0.062500	0.012	0.63	4.46
100.12	0.065000	0.012	0.64	4.54
100.12	0.067500	0.012	0.66	4.63
100.12	0.070000	0.012	0.67	4.72

TABLE STREET CAPACITY
Rating Table for Irregular Channel

Rating Table

Water Surface Elevation (ft)	Channel Slope (ft/ft)	Wtd. Mannings Coefficient	Discharge (cfs)	Velocity (ft/s)
100.22	0.005000	0.012	1.33	1.47
100.22	0.007500	0.012	1.63	1.80
100.22	0.010000	0.012	1.88	2.08
100.22	0.012500	0.012	2.11	2.32
100.22	0.015000	0.012	2.31	2.54
100.22	0.017500	0.012	2.49	2.75
100.22	0.020000	0.012	2.67	2.94
100.22	0.022500	0.012	2.83	3.11
100.22	0.025000	0.012	2.98	3.28
100.22	0.027500	0.012	3.13	3.44
100.22	0.030000	0.012	3.26	3.60
100.22	0.032500	0.012	3.40	3.74
100.22	0.035000	0.012	3.53	3.88
100.22	0.037500	0.012	3.65	4.02
100.22	0.040000	0.012	3.77	4.15
100.22	0.042500	0.012	3.89	4.28
100.22	0.045000	0.012	4.00	4.40
100.22	0.047500	0.012	4.11	4.52
100.22	0.050000	0.012	4.21	4.64
100.22	0.052500	0.012	4.32	4.76
100.22	0.055000	0.012	4.42	4.87
100.22	0.057500	0.012	4.52	4.98
100.22	0.060000	0.012	4.62	5.08
100.22	0.062500	0.012	4.71	5.19
100.22	0.065000	0.012	4.81	5.29
100.22	0.067500	0.012	4.90	5.39
100.22	0.070000	0.012	4.99	5.49
100.32	0.005000	0.012	5.65	2.07
100.32	0.007500	0.012	6.92	2.53
100.32	0.010000	0.012	7.99	2.92
100.32	0.012500	0.012	8.93	3.27
100.32	0.015000	0.012	9.79	3.58
100.32	0.017500	0.012	10.57	3.86
100.32	0.020000	0.012	11.30	4.13
100.32	0.022500	0.012	11.99	4.38
100.32	0.025000	0.012	12.64	4.62
100.32	0.027500	0.012	13.25	4.84
100.32	0.030000	0.012	13.84	5.06
100.32	0.032500	0.012	14.41	5.27
100.32	0.035000	0.012	14.95	5.47
100.32	0.037500	0.012	15.48	5.66
100.32	0.040000	0.012	15.98	5.84
100.32	0.042500	0.012	16.48	6.02
100.32	0.045000	0.012	16.95	6.20
100.32	0.047500	0.012	17.42	6.37

TABLE STREET CAPACITY
Rating Table for Irregular Channel

Rating Table				
Water Surface Elevation (ft)	Channel Slope (ft/ft)	Wtd. Mannings Coefficient	Discharge (cfs)	Velocity (ft/s)
100.32	0.050000	0.012	17.87	6.53
100.32	0.052500	0.012	18.31	6.69
100.32	0.055000	0.012	18.74	6.85
100.32	0.057500	0.012	19.16	7.01
100.32	0.060000	0.012	19.58	7.16
100.32	0.062500	0.012	19.98	7.30
100.32	0.065000	0.012	20.37	7.45
100.32	0.067500	0.012	20.76	7.59
100.32	0.070000	0.012	21.14	7.73
100.42	0.005000	0.012	14.69	2.61
100.42	0.007500	0.012	17.99	3.20
100.42	0.010000	0.012	20.78	3.69
100.42	0.012500	0.012	23.23	4.13
100.42	0.015000	0.012	25.45	4.52
100.42	0.017500	0.012	27.49	4.89
100.42	0.020000	0.012	29.38	5.22
100.42	0.022500	0.012	31.17	5.54
100.42	0.025000	0.012	32.85	5.84
100.42	0.027500	0.012	34.45	6.13
100.42	0.030000	0.012	35.99	6.40
100.42	0.032500	0.012	37.46	6.66
100.42	0.035000	0.012	38.87	6.91
100.42	0.037500	0.012	40.23	7.15
100.42	0.040000	0.012	41.55	7.39
100.42	0.042500	0.012	42.83	7.62
100.42	0.045000	0.012	44.07	7.84
100.42	0.047500	0.012	45.28	8.05
100.42	0.050000	0.012	46.46	8.26
100.42	0.052500	0.012	47.61	8.46
100.42	0.055000	0.012	48.73	8.66
100.42	0.057500	0.012	49.82	8.86
100.42	0.060000	0.012	50.89	9.05
100.42	0.062500	0.012	51.94	9.24
100.42	0.065000	0.012	52.97	9.42
100.42	0.067500	0.012	53.98	9.60
100.42	0.070000	0.012	54.97	9.77
100.52	0.005000	0.012	30.78	3.31
100.52	0.007500	0.012	37.69	4.05
100.52	0.010000	0.012	43.52	4.68
100.52	0.012500	0.012	48.66	5.23
100.52	0.015000	0.012	53.30	5.73
100.52	0.017500	0.012	57.57	6.19
100.52	0.020000	0.012	61.55	6.62
100.52	0.022500	0.012	65.28	7.02
100.52	0.025000	0.012	68.82	7.40

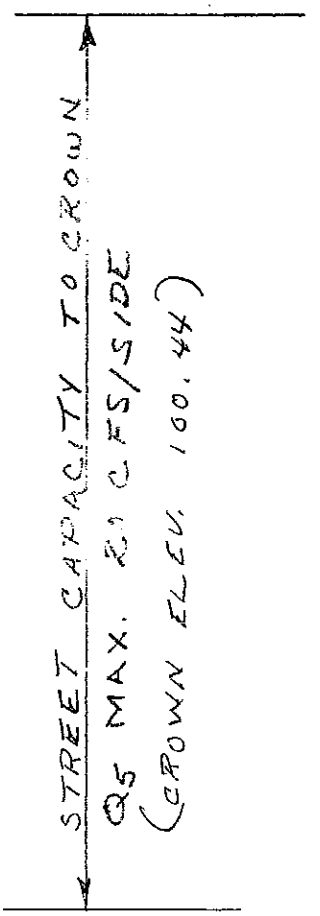
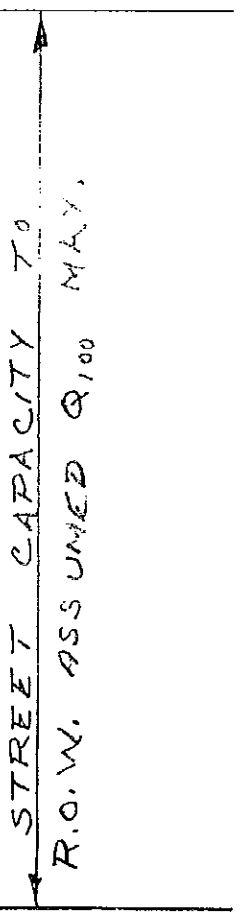


TABLE STREET CAPACITY
Rating Table for Irregular Channel

Rating Table

Water Surface Elevation (ft)	Channel Slope (ft/ft)	Wtd. Mannings Coefficient	Discharge (cfs)	Velocity (ft/s)
100.52	0.027500	0.012	72.17	7.76
100.52	0.030000	0.012	75.38	8.11
100.52	0.032500	0.012	78.46	8.44
100.52	0.035000	0.012	81.42	8.76
100.52	0.037500	0.012	84.28	9.06
100.52	0.040000	0.012	87.05	9.36
100.52	0.042500	0.012	89.72	9.65
100.52	0.045000	0.012	92.33	9.93
100.52	0.047500	0.012	94.86	10.20
100.52	0.050000	0.012	97.32	10.47
100.52	0.052500	0.012	99.72	10.72
100.52	0.055000	0.012	102.07	10.98
100.52	0.057500	0.012	104.36	11.22
100.52	0.060000	0.012	106.61	11.47
100.52	0.062500	0.012	108.81	11.70
100.52	0.065000	0.012	110.96	11.93
100.52	0.067500	0.012	113.07	12.16
100.52	0.070000	0.012	115.15	12.38
100.62	0.005000	0.014	45.11	3.28
100.62	0.007500	0.014	55.25	4.01
100.62	0.010000	0.014	63.79	4.63
100.62	0.012500	0.014	71.32	5.18
100.62	0.015000	0.014	78.13	5.67
100.62	0.017500	0.014	84.39	6.13
100.62	0.020000	0.014	90.22	6.55
100.62	0.022500	0.014	95.69	6.95
100.62	0.025000	0.014	100.86	7.32
100.62	0.027500	0.014	105.79	7.68
100.62	0.030000	0.014	110.49	8.02
100.62	0.032500	0.014	115.00	8.35
100.62	0.035000	0.014	119.35	8.67
100.62	0.037500	0.014	123.53	8.97
100.62	0.040000	0.014	127.59	9.27
100.62	0.042500	0.014	131.51	9.55
100.62	0.045000	0.014	135.32	9.83
100.62	0.047500	0.014	139.03	10.10
100.62	0.050000	0.014	142.64	10.36
100.62	0.052500	0.014	146.17	10.61
100.62	0.055000	0.014	149.61	10.86
100.62	0.057500	0.014	152.97	11.11
100.62	0.060000	0.014	156.26	11.35
100.62	0.062500	0.014	159.48	11.58
100.62	0.065000	0.014	162.64	11.81
100.62	0.067500	0.014	165.74	12.04
100.62	0.070000	0.014	168.78	12.26



RIDGEVIEW MDDP
Worksheet for Rectangular Channel

Project Description	
Project File	untitled.fm2
Worksheet	DESIGN POINT 145 OUTFALL, RCB
Flow Element	Rectangular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.007500	ft/ft
Bottom Width	10.00	ft
Discharge	853.00	cfs

Results		
Depth	4.76	ft
Flow Area	47.57	ft^2
Wetted Perimeter	19.51	ft
Top Width	10.00	ft
Critical Depth	6.09	ft
Critical Slope	0.003901	ft/ft
Velocity	17.93	ft/s
Velocity Head	5.00	ft
Specific Energy	9.75	ft
Froude Number	0.00	

RIDGEVIEW MDDP
Worksheet for Trapezoidal Channel

Project Description	
Project File	untitled.fm2
Worksheet	DIVERSION CHANNEL BASIN 123
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

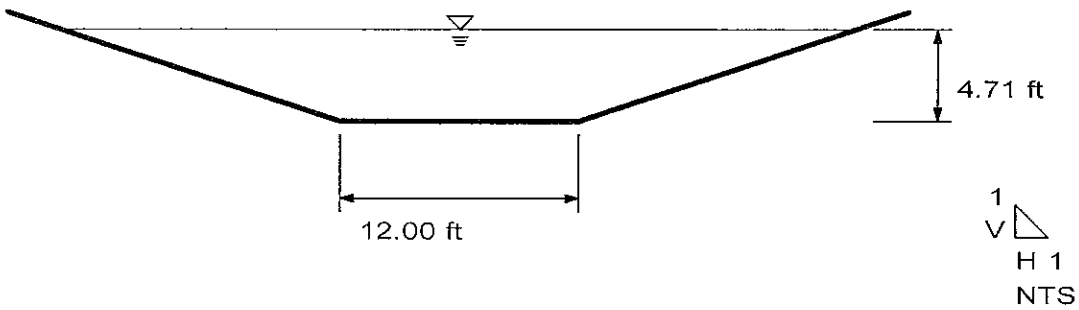
Input Data		
Mannings Coefficient	0.035	
Channel Slope	0.007500	ft/ft
Left Side Slope	3.000000	H : V
Right Side Slope	3.000000	H : V
Bottom Width	12.00	ft
Discharge	929.00	cfs

Results		
Depth	4.71	ft
Flow Area	123.00	ft²
Wetted Perimeter	41.78	ft
Top Width	40.25	ft
Critical Depth	4.09	ft
Critical Slope	0.013414	ft/ft
Velocity	7.55	ft/s
Velocity Head	0.89	ft
Specific Energy	5.59	ft
Froude Number	0.76	
Flow is subcritical.		

Cross Section
Cross Section for Trapezoidal Channel

Project Description	
Project File	untitled.fm2
Worksheet	DIVERSION CHANNEL BASIN 123
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.035	
Channel Slope	0.007500	ft/ft
Depth	4.71	ft
Left Side Slope	3.000000	H : V
Right Side Slope	3.000000	H : V
Bottom Width	12.00	ft
Discharge	929.00	cfs



RIDGEVIEW MDDP
Worksheet for Trapezoidal Channel

Project Description	
Project File	untitled.fm2
Worksheet	DIVERSION CHANNEL BASIN 123
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

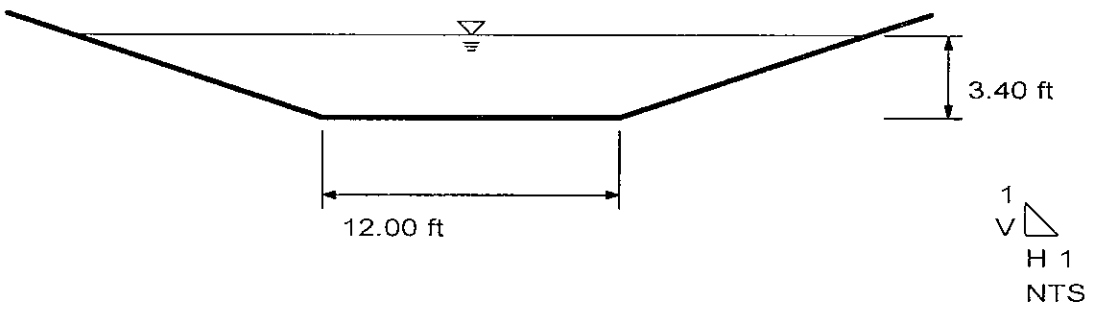
Input Data		
Mannings Coefficient	0.035	
Channel Slope	0.007500	ft/ft
Left Side Slope	3.000000	H : V
Right Side Slope	3.000000	H : V
Bottom Width	12.00	ft
Discharge	478.00	cfs

Results		
Depth	3.40	ft
Flow Area	75.60	ft^2
Wetted Perimeter	33.53	ft
Top Width	32.42	ft
Critical Depth	2.87	ft
Critical Slope	0.014711	ft/ft
Velocity	6.32	ft/s
Velocity Head	0.62	ft
Specific Energy	4.03	ft
Froude Number	0.73	
Flow is subcritical.		

Cross Section
Cross Section for Trapezoidal Channel

Project Description	
Project File	untitled.fm2
Worksheet	DIVERSION CHANNEL BASIN 123
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.035	
Channel Slope	0.007500	ft/ft
Depth	3.40	ft
Left Side Slope	3.000000	H : V
Right Side Slope	3.000000	H : V
Bottom Width	12.00	ft
Discharge	478.00	cfs



Worksheet
Worksheet for Trapezoidal Channel

Project Description	
Project File	untitled.fm2
Worksheet	DIVERSION CHANNEL DP-147 TO DP-148
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.030	
Channel Slope	0.004000	ft/ft
Left Side Slope	3.000000	H : V
Right Side Slope	3.000000	H : V
Bottom Width	18.00	ft
Discharge	283.00	cfs

Results		
Depth	2.40	ft
Flow Area	60.52	ft^2
Wetted Perimeter	33.19	ft
Top Width	32.41	ft
Critical Depth	1.78	ft
Critical Slope	0.011907	ft/ft
Velocity	4.68	ft/s
Velocity Head	0.34	ft
Specific Energy	2.74	ft
Froude Number	0.60	
Flow is subcritical.		

Worksheet
Worksheet for Trapezoidal Channel

Project Description	
Project File	untitled.fm2
Worksheet	DIVERSION CHANNEL DP-147 TO DP-148
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.030	
Channel Slope	0.004000	ft/ft
Left Side Slope	3.000000	H : V
Right Side Slope	3.000000	H : V
Bottom Width	18.00	ft
Discharge	644.00	cfs

Results		
Depth	3.72	ft
Flow Area	108.41	ft²
Wetted Perimeter	41.52	ft
Top Width	40.31	ft
Critical Depth	2.89	ft
Critical Slope	0.010476	ft/ft
Velocity	5.94	ft/s
Velocity Head	0.55	ft
Specific Energy	4.27	ft
Froude Number	0.64	
Flow is subcritical.		

RIDGEVIEW BASIN 142 CHANNEL
Worksheet for Trapezoidal Channel

Project Description	
Project File	untitled.fm2
Worksheet	DRAINAGE BASIN 142 DIVERSION CHANNEL
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.035	
Channel Slope	0.010000	ft/ft
Left Side Slope	3.000000	H : V
Right Side Slope	3.000000	H : V
Bottom Width	4.00	ft
Discharge	93.00	cfs

Results		
Depth	1.97	ft
Flow Area	19.54	ft^2
Wetted Perimeter	16.47	ft
Top Width	15.83	ft
Critical Depth	1.71	ft
Critical Slope	0.018215	ft/ft
Velocity	4.76	ft/s
Velocity Head	0.35	ft
Specific Energy	2.32	ft
Froude Number	0.76	
Flow is subcritical.		

RIDGEVIEW BASIN 142 CHANNEL
Worksheet for Trapezoidal Channel

Project Description	
Project File	untitled.fm2
Worksheet	DRAINAGE BASIN 142 DIVERSION CHANNEL
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.035	
Channel Slope	0.010000	ft/ft
Left Side Slope	3.000000	H : V
Right Side Slope	3.000000	H : V
Bottom Width	4.00	ft
Discharge	47.00	cfs

Results		
Depth	1.43	ft
Flow Area	11.81	ft^2
Wetted Perimeter	13.02	ft
Top Width	12.56	ft
Critical Depth	1.20	ft
Critical Slope	0.019988	ft/ft
Velocity	3.98	ft/s
Velocity Head	0.25	ft
Specific Energy	1.67	ft
Froude Number	0.72	
Flow is subcritical.		

Table
Rating Table for Circular Channel

Project Description	
Project File	untitled.fm2
Worksheet	PIPE CAPACITY
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

Constant Data	
Mannings Coefficient	0.013

Input Data				
	Minimum	Maximum	Increment	
Channel Slope	0.005000	0.010000	0.005000	ft/ft
Diameter	18.00	90.00	6.00	in

Rating Table

Diameter (in)	Channel Slope (ft/ft)	Depth (ft)	Discharge (cfs)	Velocity (ft/s)
18.00	0.005000	1.50	7.43	4.20
18.00	0.010000	1.50	10.50	5.94
24.00	0.005000	2.00	16.00	5.09
24.00	0.010000	2.00	22.62	7.20
30.00	0.005000	2.50	29.00	5.91
30.00	0.010000	2.50	41.01	8.36
36.00	0.005000	3.00	47.16	6.67
36.00	0.010000	3.00	66.69	9.44
42.00	0.005000	3.50	71.14	7.39
42.00	0.010000	3.50	100.60	10.46
48.00	0.005000	4.00	101.57	8.08
48.00	0.010000	4.00	143.64	11.43
54.00	0.005000	4.50	139.04	8.74
54.00	0.010000	4.50	196.64	12.36
60.00	0.005000	5.00	184.15	9.38
60.00	0.010000	5.00	260.43	13.26
66.00	0.005000	5.50	237.44	9.99
66.00	0.010000	5.50	335.79	14.13
72.00	0.005000	6.00	299.45	10.59
72.00	0.010000	6.00	423.49	14.98
78.00	0.005000	6.50	370.70	11.17
78.00	0.010000	6.50	524.25	15.80
84.00	0.005000	7.00	451.70	11.74
84.00	0.010000	7.00	638.80	16.60
90.00	0.005000	7.50	542.94	12.29
90.00	0.010000	7.50	767.83	17.38

PRELIMINARY INLET

CALCULATIONS

RIDGEVIEW
MASTER DEVELOPMENT DRAINAGE PLAN
(Inlet Calculations - Sump Condition)

Design Point DP-27-1 SUBBASIN 127-A

Total Flow:

Q_5 = **33** cfs

Q_{100} = **66** 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: **28** foot inlet required

100-Year Event: **42** foot inlet required

(Install 1-42' D-10-R inlet to accept both 5 yr. & 100 yr. developed flows at this design point.)

Calculated by: _____

Date: _____

Checked by: _____

RIDGEVIEW
MASTER DEVELOPMENT DRAINAGE PLAN
(Inlet Calculations - Sump Condition)

Design Point DP-27-2 SUBBASIN 127-B

Total Flow: Q_5 = **14** cfs
Q_{100} = **28** 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 1-14' D-10-R inlet to accept both 5 yr. & 100 yr. developed flows at this design point.)

Calculated by: _____
Date: _____
Checked by: _____

RIDGEVIEW
ATGRADE INLET CALCULATIONS SAND CREEK BASIN 127-C

TOTAL Q100 IN STREET = 30 CFS
ASSUME 70% ON SOUTH SIDE 30%
ON NORTH SIDE OF STREET

DP-27-4, SOUTH FL
100-YR. FLOW

Q(100)	21	I(100)	5.6	Inlet size ? L(i) =	8
DEPTH	0.32	Fr	3.20	If Li < L(2) then Qi =	
				CA(eqv.)=	
SPREAD	11.7	L(1)	29.0		
				If Li > L(2) then Qi =	9
CROSS SLOPE	2.0%	L(2)	17.4	CA(eqv.)=	1.65
STREET SLOPE	6.6%	L(3)	62.1	FB =	12
				CA(eqv.)=	2.09

5-YR. FLOW

Q(5)	11	I(10)	3.3	Inlet size ? L(i) =	8
DEPTH	0.25	Fr	2.96	If Li < L(2) then Qi =	
				CA(eqv.)=	
SPREAD	8.2	L(1)	18.7		
				If Li > L(2) then Qi =	6
CROSS SLOPE	2.0%	L(2)	11.2	CA(eqv.)=	1.73
STREET SLOPE	6.6%	L(3)	40.1	FB =	5
				CA(eqv.)=	1.57

RIDGEVIEW

ATGRADE INLET CALCULATIONS SAND CREEK BASIN 127-C

TOTAL Q100 IN STREET = 30 CFS
ASSUME 70% ON SOUTH SIDE 30%
ON NORTH SIDE OF STREET

DP-27-4 NORTH FL
100-YR. FLOW

Q(100)	9	I(100)	5.6	Inlet size ? L(i) =	6
DEPTH	0.23	Fr	2.90	If Li < L(2) then Qi =	
				CA(eqv.)=	
SPREAD	7.4	L(1)	16.4		
				If Li > L(2) then Qi =	4
CROSS SLOPE	2.0%	L(2)	9.9	CA(eqv.)=	0.79
STREET SLOPE	6.6%	L(3)	35.2	FB =	5
				CA(eqv.)=	0.81

5-YR. FLOW

Q(5)	5	I(10)	3.3	Inlet size ? L(i) =	6
DEPTH	0.18	Fr	2.62	If Li < L(2) then Qi =	
				CA(eqv.)=	
SPREAD	5.0	L(1)	10.1		
				If Li > L(2) then Qi =	3
CROSS SLOPE	2.0%	L(2)	6.0	CA(eqv.)=	0.9
STREET SLOPE	6.6%	L(3)	21.6	FB =	2
				CA(eqv.)=	0.60

RIDGEVIEW
MASTER DEVELOPMENT DRAINAGE PLAN
(Inlet Calculations - Sump Condition)

Design Point _27-6__ Subbasin 127-D

Total Flow:	Q_5	=	6 cfs
	Q_{100}	=	13 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 6' D-10-R inlet to accept both 5 yr. & 100 yr. developed flows at this design point.)

Calculated by: _____
Date: _____
Checked by: _____

RIDGEVIEW
MASTER DEVELOPMENT DRAINAGE PLAN
(Inlet Calculations - Sump Condition)

Design Point E1 Subbasin 127-E

Total Flow: Q_5 = 3 cfs
Q_{100} = 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: 4 foot inlet required

100-Year Event: 4 foot inlet required

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

Calculated by: _____
Date: _____
Checked by: _____

RIDGEVIEW
ATGRADE INLET CALCULATIONS SAND CREEK BASIN 127-E

TOTAL Q100 IN SOUTH FLOWLINE 33 CFS

INLET DP-E2
SOUTH FLOW LINE
100-YR. FLOW

Q(100)	33	I(100)	5.4	Inlet size ? L(i) =	12
DEPTH	0.40	Fr	2.95	If Li < L(2) then Qi =	
				CA(eqv.)=	
SPREAD	15.7	L(1)	35.8		
				If Li > L(2) then Qi =	16
CROSS SLOPE	2.0%	L(2)	21.5	CA(eqv.)=	2.91
STREET SLOPE	5.0%	L(3)	76.7	FB =	17
				CA(eqv.)=	3.20

5-YR. FLOW

Q(5)	17	I(10)	3.2	Inlet size ? L(i) =	12
DEPTH	0.43	Fr	3.52	If Li < L(2) then Qi =	
				CA(eqv.)=	
SPREAD	17.7	L(1)	63.2		
				If Li > L(2) then Qi =	7
CROSS SLOPE	5.0%	L(2)	45.6	CA(eqv.)=	2.24
STREET SLOPE	5.0%	L(3)	102.9	FB =	10
				CA(eqv.)=	3.05

RIDGEVIEW
MASTER DEVELOPMENT DRAINAGE PLAN
(Inlet Calculations - Sump Condition)

Design Point _E3__ Subbasin 127-E

Total Flow:	Q_5	=	**14** cfs
	Q_{100}	=	**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:	8	foot inlet required
100-Year Event:	14	foot inlet required

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

Calculated by: _____
Date: _____
Checked by: _____

RIDGEVIEW
ATGRADE INLET CALCULATIONS SAND CREEK BASINS S-1, S-2

100-YR. FLOW

Q(100)	21	I(100)	7.9	Inlet size ? L(i) =	8
DEPTH	0.45	Fr	1.36	If Li < L(2) then Qi =	
				CA(eqv.)=	
SPREAD	18.6	L(1)	19.5		
				If Li > L(2) then Qi =	11
CROSS SLOPE	2.0%	L(2)	11.7	CA(eqv.)=	1.38
STREET SLOPE	1.0%	L(3)	41.8	FB =	10
				CA(eqv.)=	1.29

5-YR. FLOW

Q(5)	11	I(10)	4.5	Inlet size ? L(i) =	8
DEPTH	0.35	Fr	1.28	If Li < L(2) then Qi =	
				CA(eqv.)=	
SPREAD	13.5	L(1)	13.3		
				If Li > L(2) then Qi =	7
CROSS SLOPE	2.0%	L(2)	7.9	CA(eqv.)=	1.49
STREET SLOPE	1.0%	L(3)	28.6	FB =	4
				CA(eqv.)=	0.99

RIDGEVIEW
MASTER DEVELOPMENT DRAINAGE PLAN
(Inlet Calculations - Sump Condition)

Design Point DP-S4

Total Flow:	Q_5	=	**15** cfs
	Q_{100}	=	**31** 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:	16	foot inlet required

(Install 1-18' D-10-R inlet to accept both 5 yr. & 100 yr. developed flows at this design point.)

Calculated by: _____
Date: _____
Checked by: _____

RIDGEVIEW
MASTER DEVELOPMENT DRAINAGE PLAN
(Inlet Calculations - Sump Condition)

Design Point DP-S3

Total Flow:	Q_5	=	**16** cfs
	Q_{100}	=	**32** 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:	18	foot inlet required

(Install 1-18' D-10-R inlet to accept both 5 yr. & 100 yr. developed flows at this design point.)

Calculated by: _____

Date: _____

Checked by: _____

HYDROLOGIC CALCULATIONS

TR-20 SAND CREEK BASIN ANALYSIS

TABLE – MAJOR DESIGN POINT DATA SUMMARY
DEVELOPED CONDITION D.B.P.S. MODEL
ON-SITE DEVELOPED CONDITION

TABLE – MAJOR DESIGN POINT DATA SUMMARY
EXISTING CONDITION D.B.P.S. MODEL
ON-SITE DEVELOPED CONDITION

TABLE – SUB-BASIN DATA SUMMARY
DEVELOPED CONDITION D.B.P.S. MODEL
ON-SITE DEVELOPED CONDITION

TABLE – SUB-BASIN DATA SUMMARY
EXISTING CONDITION D.B.P.S. MODEL
ON-SITE DEVELOPED CONDITION

TABLE – TR-20 TIME OF CONCENTRATION ESTIMATE

HYDROGRAPH – D.B.P.S. SECTION 37

HYDROGRAPH – D.B.P.S. SECTION 48

HYDROGRAPH – D.B.P.S. SECTION 20

TR-20 ROUTING SECTION 143

TR-20 ROUTING SECTION 141

TR-20 ROUTING SECTION 137, 185, 186

TR-20 INPUT & OUTPUT DATA FILES

EAST PORTION OF RIDGEVIEW

TR-20 ANALYSIS

UPPER SAND CREEK DEVELOPED CONDITION DBPS MODEL
REVISED TO REFLECT PROPOSED ONSITE CONDITION

MAJOR DESIGN POINT DATA SUMMARY

5/25/99

DESIGN POINT		DRAINAGE AREA (mi^2)		100 YEAR TIME OF PEAK (hrs)		100 YEAR PEAK FLOW (cfs)	
DBPS	CURRENT	DBPS	CURRENT	DBPS	CURRENT	DBPS	CURRENT
45	145	0.47	0.47	6.09	6.08	841	853****
47	147	1.55	1.62	6.2	6.19	539	644
48	148	6.75	8.37	7.18	7.17	2477	2633
	142		8.96		7.24		2698
41	141	7.13	9.31	7.27	7.23	2524	2759
85	185	7.33	9.74	7.26	6.18	2545	3381
37	137	9.98	10.04	6.2	6.27	3268	3600
	91*		10.04		6.37		3384
29	29**	10.86	10.89	6.29	6.5	3710	3690
30	30**	12.19	12.16	6.22	6.37	6105	5251
25	25**	12.61	12.58	6.16	6.17	6654	5439
20	20**	13.51	13.48	6.09	6.08	8536	7367
98	98**	13.51	13.48	6.53	6.64	4883	4577
13	13**	14.5	14.47	6.63	6.75	5070	4722
99	99** ***	16.04	16.01	6.24	6.24	3666	3580

* This point represents the outflow from the small pond @ Stetson Hills Boulevard/ flow under Stetson Hills in the current model. It is equivalent in location to point 37 in the DBPS model.

** This analysis point is downstream of the site

*** Downstream limit of DBPS model for Upper Sand Creek

****This flow rate was calculated in the context of the overall Upper sand Creek Drainage Basin An independent runoff analysis of the watershed contributing to this point should be performed prior to the design of downstream conveyance facilities.

EAST PORTION OF RIDGEVIEW

TR-20 ANALYSIS

UPPER SAND CREEK EXISTING CONDITION DBPS MODEL
REVISED TO REFLECT DEVELOPED ONSITE CONDITION

MAJOR DESIGN POINT DATA SUMMARY

5/25/99

DESIGN POINT		DRAINAGE AREA (mi^2)		100 YR TIME OF PEAK (hrs)		100 YR PEAK FLOW (cfs)	
DBPS	CURRENT	DBPS	CURRENT	DBPS	CURRENT	DBPS	CURRENT
45	145	**	0.47	**	6.17	**	430
47	147	**	1.62	**	6.31	**	661
48	148	**	8.37	**	6.90	**	3134
42	142	**	8.96	**	6.89	**	3239
41	141	**	9.31	**	6.88	**	3303
85	185	**	9.74	**	6.87	**	3406
37	137	**	10.04	**	6.97	**	3430
	91*	10***	10.04	**	7.05	3230***	3380

* This point represents the outflow from the small pond @ Stetson Hills Boulevard/ flow under Stetson Hills in the current model. It is equivalent in location to point 37 in the DBPS model.

** Data not found. The existing condition model output is not included in the Sand Creek DBPS Technical Addendum. A copy of the computer model on disk was received but a portion of the data was corrupt.

*** Data taken from Sand Creek DBPS Table III-2

NOTE: The flow rates listed as "current" reflect a condition in which the offsite watershed is in the "existing condition" as analyzed for the Sand Creek DBPS and the on-site area is fully developed per the current plan.

EAST PORTION OF RIDGEVIEW

PRELIMINARY TR-20 ANALYSIS

UPPER SAND CREEK DEVELOPED CONDITION DBPS MODEL REVISED TO REFLECT PROPOSED ONSITE CONDITION

SUB-BASIN DATA SUMMARY

5/25/99

BASIN I.D.	AREA		TC * (hrs)	RCN	PEAK RUNOFF (cfs)	
	(acres)	(sq-miles)			Q_{10}	Q_{100}
121	32	0.05	0.4	76	34	73
122	19	0.03	0.36	76	22	46
123	26	0.04	0.35	81	39	76
124	13	0.02	0.41	81	18	35
125	19	0.03	0.46	80	24	48
126	51	0.08	0.45	79	62	125
127	47	0.07	0.39	82	69	132
128	26	0.04	0.39	75	26	56
137	70	0.11	0.44	80	91	180
139	96	0.15	0.63	84	124	233
140	211	0.33	0.65	79	196	406
141	32	0.05	0.42	67	16	45
142	38	0.06	0.53	81	47	93
143	160	0.25	0.43	82	235	450
145	154	0.24	0.32	86	321	567
146	115	0.18	0.45	75	107	235

* The methodology used to calculate times of concentration (TC) for this analysis was utilized in order to produce TCs similar to those utilized in the Upper Sand Creek Drainage Basin Planning Study Model.

EAST PORTION OF RIDGEVIEW

PRELIMINARY TR-20 ANALYSIS

UPPER SAND CREEK EXISTING CONDITION DBPS MODEL REVISED TO REFLECT DEVELOPED ONSITE CONDITION

SUB-BASIN DATA SUMMARY

5/25/99

BASIN I.D.	AREA		TC *	RCN	PEAK RUNOFF (cfs)	
	(acres)	(sq-miles)	(hrs)		Q_{10}	Q_{100}
121	32	0.05	0.40	76	34	73
122	19	0.03	0.36	76	22	46
123	26	0.04	0.35	81	39	76
124	13	0.02	0.41	81	18	35
125	19	0.03	0.46	80	24	48
126	51	0.08	0.45	79	62	125
127	45	0.07	0.39	82	69	132
128	26	0.04	0.39	75	26	56
137	70	0.11	0.44	80	91	180
139**	96	0.15	0.63	76**	75	165
140**	211	0.33	0.65	64**	55	178
141	32	0.05	0.42	67	16	45
142**	38	0.06	0.53	60**	7	29
143	160	0.25	0.43	82	235	450
145**	154	0.24	0.50	72**	106	255
146**	115	0.18	0.48	62**	30	106

* The methodology used to calculate times of concentration (TC) for this analysis was utilized in order to produce TCs similar to those utilized in the Upper Sand Creek Drainage Basin Planning Study Model.

** Sub-basin is all or partially outside of the on-site area. RCN is based on a weighted average of the on-site developed area and the off-site undeveloped propoerty.

RIDGEVIEW
MASTER DEVELOPMENT DRAINAGE PLAN

FULLY DEVELOPED CONDITION TIME OF CONCENTRATION ESTIMATE

5/18/99

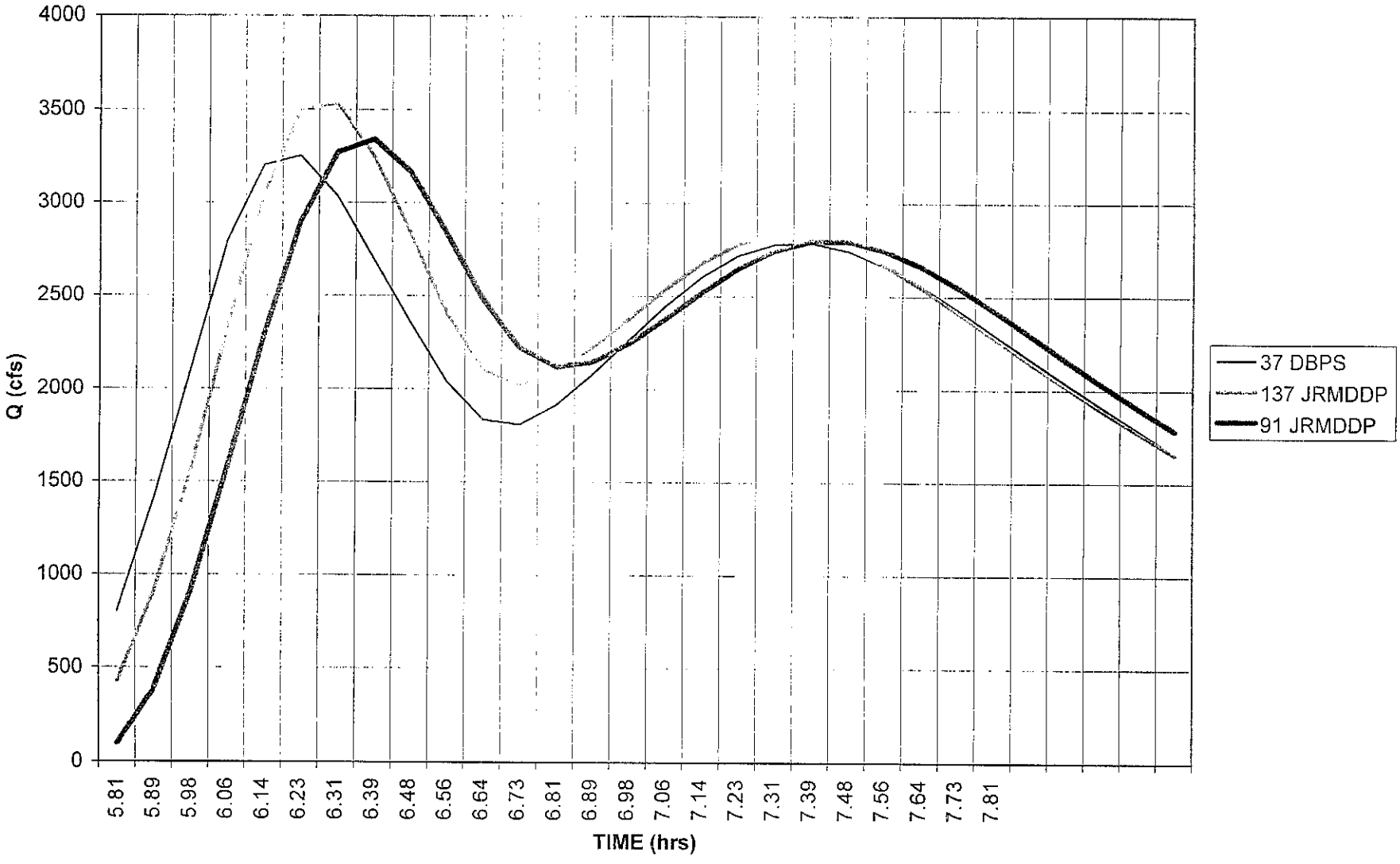
BASIN	OVERLAND FLOW					SWALE OR STREET FLOW					CHANNEL OR S.D. FLOW					TOTAL	TOTAL
ID.	L (ft)	P_2	n	S (ft/ft)	TC(min)	TYPE	L (ft)	S (%)	V (fps)	TC(min)	TYPE	L (ft)	S(%)	V (fps)	TC(min)	TC(min)	TC(hrs.)
121	90	2	0.24	0.02	16.59	ST	1300	2	2.9	7.47					0.00	24.06	0.40
122	90	2	0.24	0.02	16.59	ST	1000	2.5	3.2	5.21					0.00	21.80	0.36
123	90	2	0.24	0.02	16.59	ST	300	3	3.5	1.43	CH	1700	1	10	2.83	20.85	0.35
124	90	2	0.24	0.02	16.59	ST	950	1	2.1	7.54	SD	350	1	10	0.58	24.71	0.41
125	90	2	0.24	0.02	16.59	ST	1300	1	2.1	10.32	SD	300	1	10	0.50	27.41	0.46
126	90	2	0.24	0.02	16.59	ST	1850	2.2	3.0	10.28	SD	200	2	12	0.28	27.15	0.45
127	90	2	0.24	0.02	16.59	ST	1100	4.0	4.1	4.47	SD	1490	1	11.0	2.26	23.32	0.39
128	90	2	0.24	0.02	16.59	ST	1750	1.8	4.4	6.63	SD	250	1	11	0.38	23.60	0.39
137	90	2	0.24	0.02	16.59	ST	1200	1	2.1	9.52	SD	300	1	11	0.45	26.57	0.44
139	90	2	0.24	0.02	16.59	ST	2800	1.3	2.4	19.44	SD	1250	1	11	1.89	37.93	0.63
140	90	2	0.24	0.02	16.59	ST	2600	1	2.1	20.63	SD	1300	1	11	1.97	39.20	0.65
141	90	2	0.24	0.02	16.59	ST	1500	2	2.9	8.62					0.00	25.21	0.42
142	90	2	0.24	0.02	16.59	ST	3500	4	4.1	14.23	CH	700	1	10	1.17	31.99	0.53
143	90	2	0.24	0.02	16.59	ST	1600	4	4.1	6.50	SD	1800	1	10	3.00	26.10	0.43
145	50	2	0.24	0.02	10.37	ST	1400	4	4.1	5.69	SD	3300	4	18	3.06	19.11	0.32
146	90	2	0.24	0.02	16.59	ST	1500	3	3.5	7.14	SD	3500	4	18	3.24	26.98	0.45

SHEET FLOW $Tt=0.007(NL)^{0.8}/(P2)^{0.5}S^{0.4}$

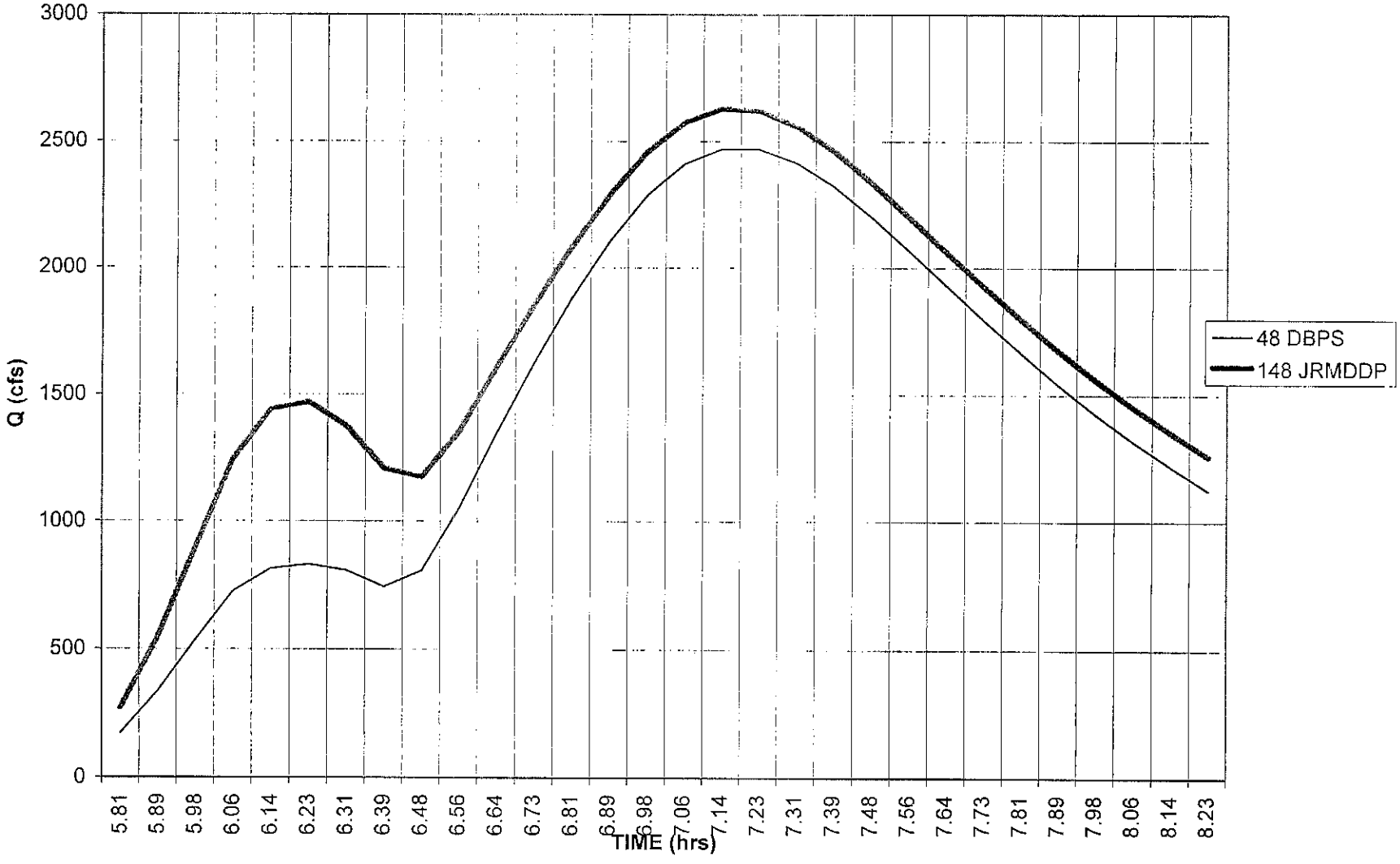
STREET AND SWALE VELOCITY PER TR-55, Figure 3-1 BASED ON A ESTIMATED AVERAGE SLOPE AND FLOW PATH

CHANNEL VELOCITY PER MANNINGS BASED ON APPROXMATE SECTION AND FLOW RATE
STORM DRAIN VELOCITY PER MANNINGS BASED ON AN ESTIMATED STORM DRAIN SIZE

DBPS SECTION 37



DBPS SECTION 48



DBPS SECTION 20

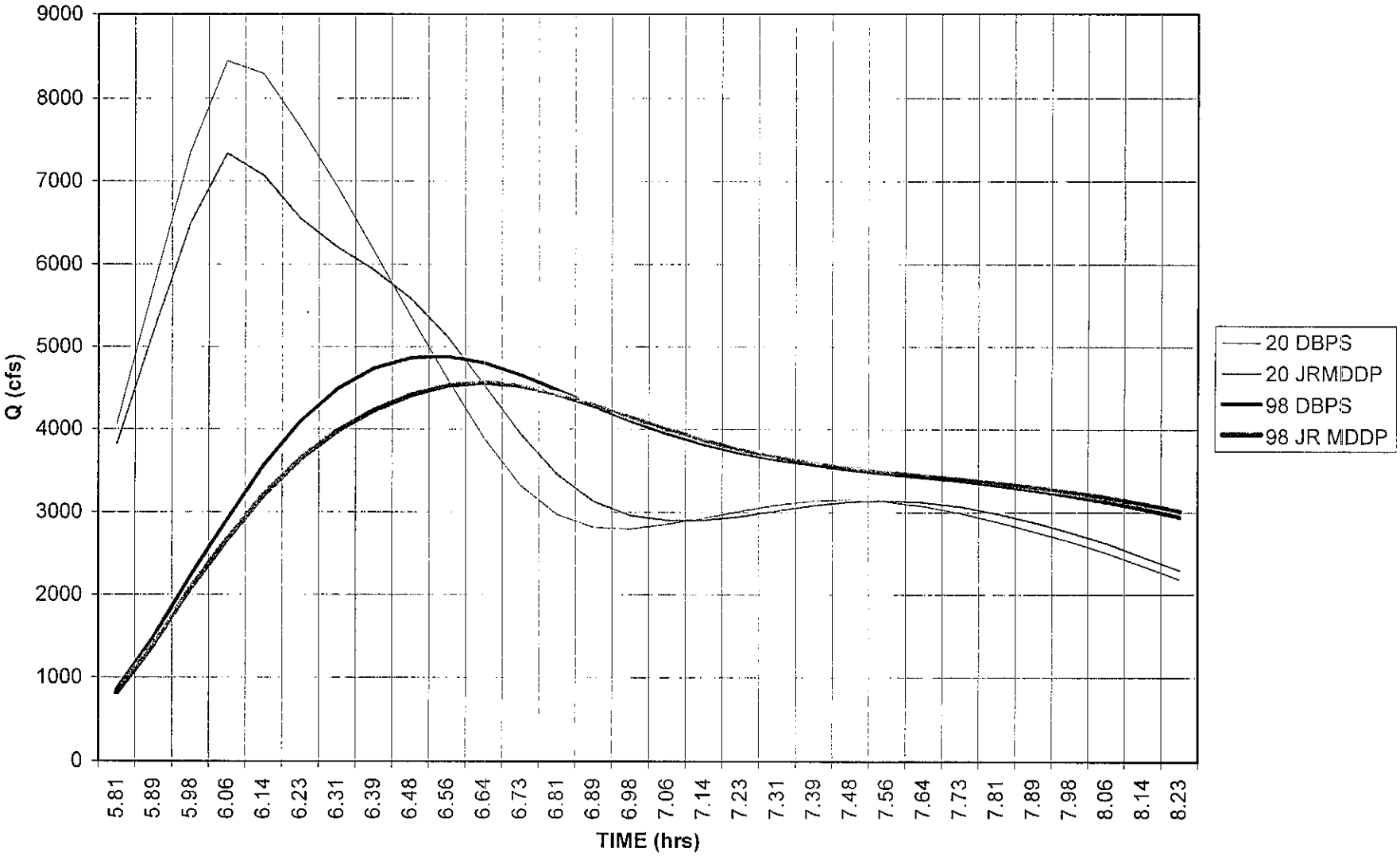


Table
Rating Table for Trapezoidal Channel

Project Description	
Project File	untitled.fm2
Worksheet	CHANNEL, 12' BOTTOM WIDTH
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Discharge

Constant Data	
Mannings Coefficient	0.030
Channel Slope	0.010000 ft/ft
Left Side Slope	3.000000 H : V
Right Side Slope	3.000000 H : V
Bottom Width	12.00 ft

Input Data			
	Minimum	Maximum	Increment
Depth	1.00	5.00	0.50 ft

Rating Table

Depth (ft)	Discharge (cfs)	Velocity (ft/s)	Flow Area (ft^2)
1.00	65.01	4.33	15
1.50	134.71	5.44	25
2.00	229.53	6.38	36
2.50	351.03	7.20	49
3.00	500.93	7.95	63
3.50	681.00	8.65	79
4.00	893.03	9.30	96
4.50	1,138.78	9.92	115
5.00	1,420.00	10.52	135

TR-20 ROUTING SECTION 141

Table
Rating Table for Trapezoidal Channel

Project Description	
Project File	untitled.fm2
Worksheet	SAND CREEK UPPER REACH
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Discharge

Constant Data	
Mannings Coefficient	0.035
Channel Slope	0.007500 ft/ft
Left Side Slope	3.000000 H : V
Right Side Slope	3.000000 H : V
Bottom Width	50.00 ft

Input Data			
	Minimum	Maximum	Increment
Depth	0.50	6.50	0.50 ft

Rating Table

Depth (ft)	Discharge (cfs)	Velocity (ft/s)	Flow Area (ft^2)
0.50	58.39	2.27	26
1.00	187.12	3.53	53
1.50	371.53	4.54	82
2.00	606.57	5.42	112
2.50	889.75	6.19	144
3.00	1,219.81	6.89	177
3.50	1,596.11	7.54	211
4.00	2,018.46	8.14	248
4.50	2,486.95	8.70	285
5.00	3,001.85	9.24	325
5.50	3,563.57	9.74	366
6.00	4,172.63	10.23	408
6.50	4,829.61	10.69	

Table
Rating Table for Trapezoidal Channel

Project Description	
Project File	untitled.fm2
Worksheet	SAND CREEK LOWER REACH
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Discharge

Constant Data	
Mannings Coefficient	0.060
Channel Slope	0.017000 ft/ft
Left Side Slope	1.000000 H : V
Right Side Slope	1.000000 H : V
Bottom Width	120.00 ft

Input Data

	Minimum	Maximum	Increment
Depth	0.50	5.00	0.50 ft

Rating Table

Depth (ft)	Discharge (cfs)	Velocity (ft/s)	FLOW AREA (ft^2)
0.50	121.94	2.02	60
1.00	386.82	3.20	120
1.50	759.74	4.17	182
2.00	1,226.29	5.03	244
2.50	1,777.59	5.80	306
3.00	2,407.37	6.52	369
3.50	3,110.92	7.20	432
4.00	3,884.46	7.83	496
4.50	4,724.94	8.43	560
5.00	5,629.78	9.01	624

TR-20 ANALYSIS

SAND CREEK D.B.P.S. EXISTING CONDITION MODEL MODIFIED TO REFLECT FULLY DEVELOPED CONDITION IN ON-SITE AREA

INPUT DATA FILE

```
JOB TR-20                                          SUMMARY   NOPLOTS
TLE 001 UPPER SAND CREEK -DBPS U24EX.DAT MODEL CHANGED TO RELECT ONSITE AREA
TLE     IN DEVELOPED COND 24 HR TYPE IIA STRM (100&10-YR,AMC=2)FN:EXJRMDDP.DAT
 RAINFL 1                .50
                 0.000       .0025       0.005       .0075       0.010
                 0.015       0.020       0.025       0.030       0.050
                 0.060       0.100       0.700       0.750       0.780
                 0.798       0.820       0.830       0.840       0.850
                 0.860       0.865       0.870       0.885       0.890
                 0.900       0.905       0.910       0.915       0.921
                 0.927       0.933       0.940       0.945       0.950
                 0.955       0.960       0.965       0.970       0.975
                 0.980       0.983       0.985       0.988       0.990
                 0.993       0.995       0.998       1.000       1.000
 ENDTBL
 XSECTN   137        1.0
                     0.0           0.0         0.0
                     1.0         386.0       120.0
                     1.5         760.0       182.0
                     2.0        1226.0       244.0
                     2.5        1777.0       306.0
                     3.0        2407.0       369.0
                     3.5        3110.0       432.0
                     4.0        3884.0       496.0
                     4.5        4725.0       560.0
                     5.0        5630.0       624.0
 ENDTBL
 XSECTN   141        1.0
                     0.0           0.0         0.0
                     1.0         187.0        53.0
                     1.5         372.0        82.0
                     2.0         606.0       112.0
                     2.5         890.0       144.0
                     3.0        1220.0       177.0
                     3.5        1596.0       211.0
                     4.0        2018.0       248.0
                     4.5        2487.0       285.0
                     5.0        3001.0       325.0
                     5.5        3563.0       366.0
                     6.0        4173.0       408.0
 ENDTBL
 XSECTN   143        1.0
                     0.0           0.0         0.0
                     1.0          65.0        15.0
                     1.5         135.7        24.8
                     2.0         229.5        36.0
                     2.5         351.0        48.8
                     3.0         500.9        63.0
                     3.5         681.0        78.7
                     4.0         893.0        96.0
                     4.5        1138.8       114.8
                     5.0        1420.0       135.0
 ENDTBL
 XSECTN   185        1.0
                     0.0           0.0         0.0
                     1.0         386.0       120.0
                     1.5         760.0       182.0
                     2.0        1226.0       244.0
                     2.5        1777.0       306.0
                     3.0        2407.0       369.0
```

```
8                       3.5         3110.0      432.0
8                       4.0         3884.0      496.0
8                       4.5         4725.0      560.0
8                       5.0         5630.0      624.0
9 ENDTBL
2 XSECTN   186          1.0
8                       0.0            0.0        0.0
8                       1.0          386.0      120.0
8                       1.5          760.0      182.0
8                       2.0         1226.0      244.0
8                       2.5         1777.0      306.0
8                       3.0         2407.0      369.0
8                       3.5         3110.0      432.0
8                       4.0         3884.0      496.0
8                       4.5         4725.0      560.0
8                       5.0         5630.0      624.0
9 ENDTBL
3 STRUCT       91
8                         57.           0.         0.
8                         58.         120.         2.6
8                         59.         460.         5.8
8                         60.         964.         9.6
8                         61.        1584.        14.1
8                         62.        2304.        19.4
8                         63.        3108.        25.6
8                         64.        3986.        32.8
9 ENDTBL
6 RUNOFF 1  82        1          0.19        67.0        0.19
6 REACH  3 174   1    2       2300.0         0.9        1.53
6 RUNOFF 1  74        1          0.18        67.0        0.48
6 ADDHYD 4    74 1 2 3
6 REACH  3 173   3    1       2800.0         0.7        1.53
6 RUNOFF 1  75        2          0.12        67.0         .70
6 ADDHYD 4    75 1 2 3
6 RUNOFF 1  73        1          0.12        67.0         .53
6 ADDHYD 4    75 1 3 2
6 RUNOFF 1  81        1          0.39        67.0        0.51
6 REACH  3 175   1    3       3850.0         0.6        1.56
6 ADDHYD 4    75 2 3 1
6 RUNOFF 1  80        2          0.22        67.0        0.39
6 REACH  3 176   2    3       4100.0         0.6        1.56
6 ADDHYD 4    75 3 1 2
6 RUNOFF 1  76        1          0.17        67.0        0.68
6 ADDHYD 4    75 1 2 3
6 REACH  3 172   3    2       1700.0         0.8        1.53
6 RUNOFF 1  88        1          0.10        67.0         .34
6 ADDHYD 4    77 1 2 3
6 RUNOFF 1  77        2          0.25        67.0         .56
6 ADDHYD 4    77 3 2 1
6 RUNOFF 1  79        2           .29         67.         .29
6 REACH  3 178   2    3       3000.           .6        1.56
6 RUNOFF 1  78        2           .88        67.0        0.44
6 ADDHYD 4    78 2 3 4
6 REACH  3 177   4    2       3350.           .6        1.56
6 ADDHYD 4    77 2 1 3
6 REACH  3 171   3    2       3850.           .2        1.63
6 RUNOFF 1  71        1           .36         70.         .30
6 ADDHYD 4    71 1 2 3
6 REACH  3 170   3    2       2500.           .3        1.63
6 RUNOFF 1  70        1           .31         70.         .35
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6 ADDHYD 4   70    1 2 3
6 REACH  3 187    3   2        1200.          .2        1.64
6 RUNOFF 1  87         3         .04         70.         .14
6 ADDHYD 4     87 3 2 4
5 RUNOFF 1  72         2         .25         70.         .23
6 REACH  3 169    2   3        3000.          .8        1.55
6 RUNOFF 1  69         1         .25         70.         .80
6 ADDHYD 4     69 3 1 2
6 REACH  3 186    2   1        1400.          .7        1.51
6 RUNOFF 1 086         2         .05         70.         .37
6 ADDHYD 4     87 1 2 3
6 ADDHYD 4     87 4 3 1
6 REACH  3 163    1   2        4400.          .2        1.64
5 RUNOFF 1  63         3         .16         66.         .43
6 ADDHYD 4     63 2 3 4
6 REACH  3 160    4   1        4400.          .2        1.65
6 RUNOFF 1  60         3         .15         66.         .41
5 ADDHYD 4     60 1 3 4
6 RUNOFF 1  59         3         .16         65.         .33
5 ADDHYD 4     60 4 3 5
6 RUNOFF 1  68         1         .22         60.         .65
6 REACH  3 167    1   3        3300.          .7        1.51
6 RUNOFF 1  67         1         .27        60.0        1.52
6 ADDHYD 4     67 3 1 2
6 REACH  3 164    2   3        2500.          .8        1.51
5 RUNOFF 1  64         2         .25         59.        1.12
6 ADDHYD 4     64 3 2 1
6 REACH  3 159    1   3        3300.          .5        1.62
5 ADDHYD 4  60    5 3 2
6 REACH  3 151    2   1        4000.          .1        1.65
6 RUNOFF 1  51         5         .15         59.         .39
6 ADDHYD 4     51 1 5 2
6 RUNOFF 1  49         1         .10         55.         .34
6 ADDHYD 4     51 1 2 5
6 RUNOFF 1  52         1         .19         55.         .60
5 ADDHYD 4     51 1 5 3
5 RUNOFF 1  65         1         .10         65.         .75
6 REACH  3 158    1   2        3600.          .4        1.63
5 RUNOFF 1  58         1         .17         84.         .43
5 ADDHYD 4     58 1 2 5
6 REACH  3 152    5   1        3500.          .3        1.63
5 ADDHYD 4  51    3 1 4
5 RUNOFF 1  62         3         .25         55.         .70
6 REACH  3 161    3   2        3400.          .7        1.51
6 RUNOFF 1  61         1         .13         66.         .62
5 ADDHYD 4     61 1 2 3
5 REACH  3 150    3   2        3950.          .6        1.53
5 RUNOFF 1  50         3         .13         54.         .63
5 ADDHYD 4     50 2 3 1
5 REACH  3 149    1   2        2400.          .3        1.63
6 ADDHYD 4     51 4 2 3
6 REACH  3 148    3   1        3300.          .3        1.62
5 RUNOFF 1  48         2         .15         55.         .23
6 ADDHYD 4 148    1 2 4
6 RUNOFF 1  66         3        0.31        57.0         .80
5 REACH  3 157    3   2      2300.0         0.8        1.53
5 RUNOFF 1  57         3        0.16        60.0        0.53
6 ADDHYD 4     57 2 3 1
6 REACH  3 154    1   2      3500.0         0.5        1.61
6 RUNOFF 1  55         3        0.25        60.0         .58
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6 ADDHYD 4    54 2 3 1
6 RUNOFF 1  56       3        0.15       60.0       0.23
6 REACH  3 155   3   2      3450.0        0.6       1.53
6 ADDHYD 4    54 2 1 5
6 RUNOFF 1  54       7        0.25       60.0       0.33
6 ADDHYD 4    54 7 5 3
6 REACH  3 153   3   6      2050.0        0.5       1.61
6 RUNOFF 1  53       5        0.17       74.0       0.41
6 ADDHYD 4    53 6 5 1
6 REACH  3 147   1   3      2300.0        0.4       1.62
6 RUNOFF 1  47       2        0.27       60.0       0.45
6 ADDHYD 4 147   3 2 6
6 RUNOFF 1 142       1        0.06       60.0        .53
6 ADDHYD 4 147   1 6 2
6 ADDHYD 4 148   2 4 1
6 REACH  3 141   1   2      2100.0
6 RUNOFF 1 122       3        0.03       76.0        .36
6 ADDHYD 4 143   2 3 1
6 RUNOFF 1 141       3        0.05       67.0       0.42
6 ADDHYD 4 143   3 1 2
6 RUNOFF 1 145       1        0.24       72.0        .50
6 RUNOFF 1 146       3        0.18       62.0       0.48
6 ADDHYD 4 145   1 3 4
6 RUNOFF 1 121       1        0.05       76.0        .40
6 ADDHYD 4 145   1 4 3
6 REACH  3 143   3   1      1900.0
6 RUNOFF 1 123       3        0.04       81.0        .35
6 ADDHYD 4 142   3 1 5
6 ADDHYD 4 142   2 5 1
6 REACH  3 186   1   2       700.0
6 RUNOFF 1 124       1        0.02       81.0        .41
6 ADDHYD 4 141   2 1 3
6 RUNOFF 1 140       1        0.33       64.0        .65
6 ADDHYD 4 141   1 3 2
6 REACH  3 185   2   1      1100.0
6 RUNOFF 1 125       2        0.03       80.0       0.46
6 ADDHYD 4 185   1 2 3
6 RUNOFF 1 139       1        0.15       76.0       0.63
6 ADDHYD 4 185   3 1 4
6 RUNOFF 1 143       1        0.25       82.0        .43
6 ADDHYD 4 185   4 1 2
6 REACH  3 137   2   1      3300.0
6 RUNOFF 1 128       2        0.04       75.0        .39
6 ADDHYD 4 137   1 2 3
6 RUNOFF 1 137       2        0.11       80.0        .44
6 ADDHYD 4 137   3 2 1
6 RUNOFF 1 126       2        0.08       79.0        .45
6 RUNOFF 1 127       3        0.07       82.0       0.39
6 ADDHYD 4 137   2 3 4
6 ADDHYD 4 137   1 4 2
6 RESVOR 2    91 2   3                              1 1 1      1
  ENDATA
7 INCREM 6                .083
7 COMPUT 7  82      91        0.0        4.4        1.01 2  01   01 100-YR
  ENDCMP 1
7 COMPUT 7  82      91        0.0        3.0        1.01 2  01   02 10-YR
  ENDCMP 1
  ENDJOB 2
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TR-20 ANALYSIS

SAND CREEK D.B.P.S. EXISTING CONDITION MODEL MODIFIED TO REFLECT FULLY DEVELOPED CONDITION IN ON-SITE AREA

MODEL OUTPUT

FILE NO. 1

COMPUTER PROGRAM FOR PROJECT FORMULATION - HYDROLOGY USER NOTES

THE USERS MANUAL FOR THIS PROGRAM IS THE MAY 1983 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)

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

EXECUTIVE CONTROL OPERATION INCREM RECORD ID
+ MAIN TIME INCREMENT = .08 HOURS

EXECUTIVE CONTROL OPERATION COMPUT RECORD ID 100-YR
+ FROM XSECTION 82
+ TO STRUCTURE 91
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 = .08 HOURS

*** WARNING REACH 174 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

*** WARNING REACH 173 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

*** WARNING REACH 172 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

*** WARNING REACH 177 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

*** WARNING REACH 170 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

*** WARNING REACH 187 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

*** WARNING REACH 169 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

*** WARNING REACH 186 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

*** WARNING REACH 148 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

*** WARNING REACH 153 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

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

*** WARNING REACH 141 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

*** WARNING REACH 143 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

*** WARNING REACH 186 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

*** WARNING REACH 185 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

*** WARNING REACH 137 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

OPERATION RESVOR STRUCTURE 91
1

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
7.05	3380.08	63.31
12.63	304.05	58.54
16.36	214.47	58.28
20.07	175.87	58.16
22.76	91.19	57.76
23.82	90.52	57.75

TIME(HRS)		FIRST HYDROGRAPH POINT = .00 HOURS				TIME INCREMENT = .08 HOURS			DRAINAGE AREA =		10.04 SQ.MI.
4.98	DISCHG	.00	.00	.00	.00	.00	.00	.00	.21	2.78	15.77
4.98	ELEV	57.00	57.00	57.00	57.00	57.00	57.00	57.00	57.00	57.02	57.13
5.81	DISCHG	54.59	157.88	445.26	889.26	1419.89	1963.01	2428.90	2753.23	2935.83	3009.81
5.81	ELEV	57.45	58.11	58.96	59.85	60.74	61.53	62.16	62.56	62.79	62.88
6.64	DISCHG	3040.59	3083.92	3158.62	3255.27	3342.86	3379.98	3334.73	3196.65	2972.19	2691.37
6.64	ELEV	62.92	62.97	63.06	63.17	63.27	63.31	63.26	63.10	62.83	62.48
7.47	DISCHG	2392.21	2093.53	1821.98	1589.17	1393.90	1236.66	1111.45	1011.91	932.66	867.39
7.47	ELEV	62.11	61.71	61.33	61.01	60.69	60.44	60.24	60.08	59.94	59.81
8.30	DISCHG	809.93	757.90	710.34	667.51	630.09	598.19	570.94	546.85	524.38	502.26
8.30	ELEV	59.69	59.59	59.50	59.41	59.34	59.27	59.22	59.17	59.13	59.08
9.13	DISCHG	479.86	457.67	438.61	419.15	400.91	384.80	371.19	360.10	351.29	344.46
9.13	ELEV	59.04	58.99	58.94	58.88	58.83	58.78	58.74	58.71	58.68	58.66
9.96	DISCHG	339.25	335.30	332.14	329.00	324.95	319.32	311.96	303.24	293.84	284.34
9.96	ELEV	58.64	58.63	58.62	58.61	58.60	58.59	58.56	58.54	58.51	58.48
10.79	DISCHG	275.02	265.87	256.71	247.38	238.14	230.15	225.25	224.90	229.60	238.70
10.79	ELEV	58.46	58.43	58.40	58.37	58.35	58.32	58.31	58.31	58.32	58.35
11.62	DISCHG	250.49	262.51	272.45	279.03	282.24	283.19	283.58	284.92	288.00	292.60
11.62	ELEV	58.38	58.42	58.45	58.47	58.48	58.48	58.48	58.49	58.49	58.51
12.45	DISCHG	297.70	301.95	304.01	302.93	298.38	290.83	281.40	271.49	262.40	254.89
12.45	ELEV	58.52	58.54	58.54	58.54	58.52	58.50	58.47	58.45	58.42	58.40
13.28	DISCHG	248.97	244.12	239.60	234.71	229.03	222.50	215.38	208.12	201.18	194.90
13.28	ELEV	58.38	58.37	58.35	58.34	58.32	58.30	58.28	58.26	58.24	58.22
14.11	DISCHG	189.52	185.19	182.03	180.06	179.17	179.18	179.81	180.84	182.11	183.54
14.11	ELEV	58.20	58.19	58.18	58.18	58.17	58.17	58.18	58.18	58.18	58.19
14.94	DISCHG	185.12	186.85	188.73	190.72	192.75	194.73	196.58	198.23	199.68	201.03
14.94	ELEV	58.19	58.20	58.20	58.21	58.21	58.22	58.23	58.23	58.23	58.24
15.77	DISCHG	202.44	204.08	206.01	208.19	210.45	212.48	213.91	214.47	214.10	213.00
15.77	ELEV	58.24	58.25	58.25	58.26	58.27	58.27	58.28	58.28	58.28	58.27
16.60	DISCHG	211.49	209.85	208.22	206.54	204.68	202.52	199.96	197.03	193.87	190.66
16.60	ELEV	58.27	58.26	58.26	58.25	58.25	58.24	58.24	58.23	58.22	58.21
17.43	DISCHG	187.61	184.85	182.48	180.53	178.96	177.75	176.83	176.14	175.64	175.28
17.43	ELEV	58.20	58.19	58.18	58.18	58.17	58.17	58.17	58.17	58.16	58.16
18.26	DISCHG	175.03	174.87	174.76	174.71	174.68	174.69	174.71	174.75	174.80	174.85
18.26	ELEV	58.16	58.16	58.16	58.16	58.16	58.16	58.16	58.16	58.16	58.16
19.09	DISCHG	174.92	174.99	175.06	175.14	175.22	175.30	175.38	175.47	175.55	175.64
19.09	ELEV	58.16	58.16	58.16	58.16	58.16	58.16	58.16	58.16	58.16	58.16
19.92	DISCHG	175.73	175.81	175.86	175.72	175.09	173.66	171.33	168.16	164.44	160.40
19.92	ELEV	58.16	58.16	58.16	58.16	58.16	58.16	58.15	58.14	58.13	58.12
20.75	DISCHG	156.10	151.46	146.36	140.78	134.79	128.62	122.66	118.58	115.83	112.96

20.75	ELEV	58.11	58.09	58.08	58.06	58.04	58.03	58.01	57.99	57.97	57.94
21.58	DISCHG	110.18	107.53	105.00	102.52	100.07	97.71	95.52	93.61	92.13	91.13

21.58	ELEV	57.92	57.90	57.87	57.85	57.83	57.81	57.80	57.78	57.77	57.76
22.41	DISCHG	90.64	90.55	90.74	91.01	91.18	91.13	90.79	90.21	89.51	88.82
22.41	ELEV	57.76	57.75	57.76	57.76	57.76	57.76	57.76	57.75	57.75	57.74
23.24	DISCHG	88.33	88.13	88.27	88.70	89.29	89.90	90.35	90.52	90.37	89.94
23.24	ELEV	57.74	57.73	57.74	57.74	57.74	57.75	57.75	57.75	57.75	57.75
24.07	DISCHG	89.32	88.58	87.63	86.28	84.33	81.64	78.23	74.22	69.77	65.02
24.07	ELEV	57.74	57.74	57.73	57.72	57.70	57.68	57.65	57.62	57.58	57.54

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

EXECUTIVE CONTROL OPERATION COMPUT RECORD ID 10-YR
+ FROM XSECTION 82
+ TO STRUCTURE 91
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 = .08 HOURS

*** WARNING REACH 172 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

*** WARNING REACH 170 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

*** WARNING REACH 187 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

*** WARNING-MAIN TIME INCREMENT MAY BE TOO LARGE.
COMPUTED PEAK(27.75) AT EXCEEDS MAX. ADJACENT HYDROGRAPH COORDINATE BY 6 %.
+ XSECTION 87

TIME(HRS) FIRST HYDROGRAPH POINT = .00 HOURS TIME INCREMENT = .08 HOURS DRAINAGE AREA = .04 SQ.MI.

4.98	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	.00	1.00
5.81	DISCHG	7.71	16.89	25.40	26.00	10.28	4.83	3.56	3.29	3.27	3.07
6.64	DISCHG	2.34	2.09	2.05	2.05	2.06	1.94	1.47	1.30	1.27	1.27
7.47	DISCHG	1.27	1.32	1.49	1.55	1.57	1.58	1.59	1.47	.97	.79
8.30	DISCHG	.74	.73	.73	.74	.74	.74	.74	.74	.74	.74
9.13	DISCHG	.74	.75	.75	.75	.75	.75	.75	.75	.76	.76
9.96	DISCHG	.76	.72	.50	.41	.39	.38	.38	.38	.38	.38
10.79	DISCHG	.38	.38	.38	.45	.88	1.09	1.14	1.16	1.16	1.12
11.62	DISCHG	.67	.45	.40	.39	.39	.42	.64	.75	.78	.79
12.45	DISCHG	.79	.77	.55	.43	.40	.40	.40	.40	.40	.40
13.28	DISCHG	.40	.40	.40	.40	.40	.40	.40	.40	.40	.40
14.11	DISCHG	.45	.47	.48	.48	.48	.48	.48	.48	.48	.48
14.94	DISCHG	.49	.49	.49	.49	.49	.49	.49	.49	.53	.56
15.77	DISCHG	.57	.57	.57	.57	.49	.43	.41	.41	.41	.41
16.60	DISCHG	.41	.41	.41	.41	.41	.41	.41	.41	.41	.41
17.43	DISCHG	.41	.41	.41	.42	.42	.42	.42	.42	.42	.42
18.26	DISCHG	.42	.42	.42	.42	.42	.42	.42	.42	.42	.42
19.09	DISCHG	.42	.42	.42	.42	.42	.42	.42	.42	.42	.42
19.92	DISCHG	.42	.42	.36	.28	.26	.26	.25	.25	.22	.18

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20.75	DISCHG	.17	.17	.17	.17	.20	.24	.25	.25	.26	.26

21.58	DISCHG	.23	.18	.17	.17	.17	.17	.20	.24	.25	.26
22.41	DISCHG	.26	.26	.23	.19	.17	.17	.17	.17	.20	.24
23.24	DISCHG	.25	.26	.26	.26	.23	.19	.18	.17	.17	.17
24.07	DISCHG	.13	.03	.01	.00						

***WARNING - LACK OF LOW FLOW DEFINITION FOR XSECT TABLE186. MAX.FLOW LESS THAN 2ND TABLE VALUE.

*** WARNING REACH 186 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

*** WARNING REACH 141 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

*** WARNING REACH 143 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

*** WARNING REACH 186 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

*** WARNING REACH 185 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

OPERATION RESVOR STRUCTURE 91

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
6.67	774.58	59.62
7.75	865.48	59.80
11.87	138.82	58.06
13.05	140.19	58.06
16.66	103.54	57.86
20.13	89.40	57.74
23.99	46.37	57.39

TIME(HRS) FIRST HYDROGRAPH POINT = .00 HOURS TIME INCREMENT = .08 HOURS DRAINAGE AREA = 10.04 SQ.MI.

4.98	DISCHG	.00	.00	.00	.00	.00	.00	.00	.01	.42	3.25
4.98	ELEV	57.00	57.00	57.00	57.00	57.00	57.00	57.00	57.00	57.00	57.03
5.81	DISCHG	13.33	37.75	82.94	180.89	334.30	468.04	590.97	672.04	725.78	758.97
5.81	ELEV	57.11	57.31	57.69	58.18	58.63	59.02	59.26	59.42	59.53	59.59
6.64	DISCHG	773.54	770.94	756.53	739.03	725.76	720.71	724.91	737.70	757.73	782.93
6.64	ELEV	59.62	59.62	59.59	59.55	59.53	59.52	59.53	59.55	59.59	59.64
7.47	DISCHG	810.17	835.48	854.74	864.65	863.37	850.58	827.25	795.20	756.49	713.12
7.47	ELEV	59.69	59.75	59.78	59.80	59.80	59.77	59.73	59.67	59.59	59.50
8.30	DISCHG	666.99	619.85	573.23	528.35	486.08	448.94	417.75	387.73	360.40	336.30
8.30	ELEV	59.41	59.32	59.22	59.14	59.05	58.97	58.88	58.79	58.71	58.64
9.13	DISCHG	315.42	297.49	282.12	268.84	257.21	246.83	237.35	228.54	220.27	212.47
9.13	ELEV	58.57	58.52	58.48	58.44	58.40	58.37	58.35	58.32	58.29	58.27
9.96	DISCHG	205.16	198.36	192.03	186.05	180.28	174.66	169.14	163.76	158.53	153.50
9.96	ELEV	58.25	58.23	58.21	58.19	58.18	58.16	58.14	58.13	58.11	58.10
10.79	DISCHG	148.74	144.33	140.30	136.67	133.55	131.19	129.83	129.59	130.39	132.07
10.79	ELEV	58.08	58.07	58.06	58.05	58.04	58.03	58.03	58.03	58.03	58.04
11.62	DISCHG	134.30	136.52	138.16	138.82	138.33	136.76	134.43	131.82	129.50	127.96
11.62	ELEV	58.04	58.05	58.05	58.06	58.05	58.05	58.04	58.03	58.03	58.02

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12.45	DISCHG	127.53	128.31	130.15	132.66	135.35	137.74	139.42	140.17	139.88	138.60
12.45	ELEV	58.02	58.02	58.03	58.04	58.05	58.05	58.06	58.06	58.06	58.05
13.28	DISCHG	136.49	133.80	130.83	127.80	124.90	122.22	119.90	118.75	117.39	115.90
13.28	ELEV	58.05	58.04	58.03	58.02	58.01	58.01	58.00	57.99	57.98	57.97

14.11	DISCHG	114.28	112.58	110.81	109.01	107.22	105.48	103.82	102.28	100.88	99.64
14.11	ELEV	57.95	57.94	57.92	57.91	57.89	57.88	57.87	57.85	57.84	57.83
14.94	DISCHG	98.57	97.65	96.90	96.32	95.89	95.61	95.47	95.48	95.62	95.90
14.94	ELEV	57.82	57.81	57.81	57.80	57.80	57.80	57.80	57.80	57.80	57.80
15.77	DISCHG	96.33	96.91	97.64	98.50	99.45	100.44	101.37	102.19	102.84	103.27
15.77	ELEV	57.80	57.81	57.81	57.82	57.83	57.84	57.84	57.85	57.86	57.86
16.60	DISCHG	103.50	103.53	103.40	103.15	102.83	102.48	102.13	101.80	101.47	101.14
16.60	ELEV	57.86	57.86	57.86	57.86	57.86	57.85	57.85	57.85	57.85	57.84
17.43	DISCHG	100.79	100.39	99.94	99.40	98.79	98.10	97.35	96.56	95.74	94.93
17.43	ELEV	57.84	57.84	57.83	57.83	57.82	57.82	57.81	57.80	57.80	57.79
18.26	DISCHG	94.14	93.40	92.71	92.08	91.53	91.04	90.63	90.28	90.00	89.77
18.26	ELEV	57.78	57.78	57.77	57.77	57.76	57.76	57.76	57.75	57.75	57.75
19.09	DISCHG	89.58	89.45	89.34	89.27	89.23	89.20	89.20	89.21	89.23	89.26
19.09	ELEV	57.75	57.75	57.74	57.74	57.74	57.74	57.74	57.74	57.74	57.74
19.92	DISCHG	89.30	89.34	89.38	89.39	89.30	89.09	88.70	88.14	87.40	86.47
19.92	ELEV	57.74	57.74	57.74	57.74	57.74	57.74	57.74	57.73	57.73	57.72
20.75	DISCHG	85.36	84.09	82.69	81.18	79.59	77.95	76.29	74.66	73.07	71.54
20.75	ELEV	57.71	57.70	57.69	57.68	57.66	57.65	57.64	57.62	57.61	57.60
21.58	DISCHG	70.07	68.62	67.16	65.66	64.07	62.41	60.66	58.87	57.11	55.43
21.58	ELEV	57.58	57.57	57.56	57.55	57.53	57.52	57.51	57.49	57.48	57.46
22.41	DISCHG	53.91	52.58	51.48	50.60	49.92	49.36	48.89	48.45	48.00	47.54
22.41	ELEV	57.45	57.44	57.43	57.42	57.42	57.41	57.41	57.40	57.40	57.40
23.24	DISCHG	47.09	46.68	46.34	46.11	46.00	46.00	46.09	46.21	46.32	46.37
23.24	ELEV	57.39	57.39	57.39	57.38	57.38	57.38	57.38	57.39	57.39	57.39
24.07	DISCHG	46.33	46.16	45.81	45.25	44.48	43.50	42.35	41.05	39.63	38.14
24.07	ELEV	57.39	57.38	57.38	57.38	57.37	57.36	57.35	57.34	57.33	57.32

EXECUTIVE CONTROL OPERATION ENDCMP RECORD ID

\+ COMPUTATIONS COMPLETED FOR PASS 2

EXECUTIVE CONTROL OPERATION ENDJOB RECORD ID

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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 1													
XSECTION 82	RUNOFF	.19	1	2	.08	.0	4.40	24.00	1.40	---	6.03	249.72	1314.3
XSECTION 174	REACH	.19	1	2	.08	.0	4.40	24.00	1.40	---	6.13	235.29	1238.4
XSECTION 74	RUNOFF	.18	1	2	.08	.0	4.40	24.00	1.40	---	6.18	148.53	825.2
STRUCTURE 74	ADDHYD	.37	1	2	.08	.0	4.40	24.00	1.40	---	6.14	379.44	1025.5

XSECTION 173	REACH	.37	1	2	.08	.0	4.40	24.00	1.40	---	6.25	346.58	936.7
XSECTION 75	RUNOFF	.12	1	2	.08	.0	4.40	24.00	1.40	---	6.33	75.13	626.1
STRUCTURE 75	ADDHYD	.49	1	2	.08	.0	4.40	24.00	1.40	---	6.25	418.87	854.8
XSECTION 73	RUNOFF	.12	1	2	.08	.0	4.40	24.00	1.40	---	6.21	92.61	771.7
STRUCTURE 75	ADDHYD	.61	1	2	.08	.0	4.40	24.00	1.40	---	6.25	510.06	836.2
XSECTION 81	RUNOFF	.39	1	2	.08	.0	4.40	24.00	1.40	---	6.20	304.01	779.5
XSECTION 175	REACH	.39	1	2	.08	.0	4.40	24.00	1.40	---	6.36	271.28	695.6
STRUCTURE 75	ADDHYD	1.00	1	2	.08	.0	4.40	24.00	1.40	---	6.28	754.36	754.4
XSECTION 80	RUNOFF	.22	1	2	.08	.0	4.40	24.00	1.40	---	6.14	206.24	937.4
XSECTION 176	REACH	.22	1	2	.08	.0	4.40	24.00	1.40	---	6.29	168.33	765.2
STRUCTURE 75	ADDHYD	1.22	1	2	.08	.0	4.40	24.00	1.40	---	6.28	922.26	756.0
XSECTION 76	RUNOFF	.17	1	2	.08	.0	4.40	24.00	1.39	---	6.31	107.47	632.2
STRUCTURE 75	ADDHYD	1.39	1	2	.08	.0	4.40	24.00	1.40	---	6.28	1029.19	740.4
XSECTION 172	REACH	1.39	1	2	.08	.0	4.40	24.00	1.40	---	6.28	1029.19	740.4
XSECTION 88	RUNOFF	.10	1	2	.08	.0	4.40	24.00	1.40	---	6.11	100.20	1002.0
STRUCTURE 77	ADDHYD	1.49	1	2	.08	.0	4.40	24.00	1.40	---	6.27	1097.78	736.8
XSECTION 77	RUNOFF	.25	1	2	.08	.0	4.40	24.00	1.40	---	6.23	182.71	730.9
STRUCTURE 77	ADDHYD	1.74	1	2	.08	.0	4.40	24.00	1.40	---	6.26	1278.88	735.0
XSECTION 79	RUNOFF	.29	1	2	.08	.0	4.40	24.00	1.40	---	6.08	318.12	1097.0
XSECTION 178	REACH	.29	1	2	.08	.0	4.40	24.00	1.40	---	6.20	284.15	979.8
XSECTION 78	RUNOFF	.88	1	2	.08	.0	4.40	24.00	1.40	---	6.16	762.75	866.8
STRUCTURE 78	ADDHYD	1.17	1	2	.08	.0	4.40	24.00	1.40	---	6.17	1041.83	890.4
XSECTION 177	REACH	1.17	1	2	.08	.0	4.40	24.00	1.40	---	6.28	998.05	853.0
STRUCTURE 77	ADDHYD	2.91	1	2	.08	.0	4.40	24.00	1.40	---	6.27	2264.92	778.3
XSECTION 171	REACH	2.91	1	2	.08	.0	4.40	24.00	1.40	---	6.40	2132.94	733.0
XSECTION 71	RUNOFF	.36	1	2	.08	.0	4.40	24.00	1.60	---	6.08	455.82	1266.2
STRUCTURE 71	ADDHYD	3.27	1	2	.08	.0	4.40	24.00	1.42	---	6.39	2249.04	687.8
XSECTION 170	REACH	3.27	1	2	.08	.0	4.40	24.00	1.42	---	6.47	2242.92	685.9

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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 1													
XSECTION 70	RUNOFF	.31	1	2	.08	.0	4.40	24.00	1.60	---	6.11	360.53	1163.0
XSECTION 70	ADDHYD	3.58	1	2	.08	.0	4.40	24.00	1.43	---	6.47	2338.19	653.1
XSECTION 187	REACH	3.58	1	2	.08	.0	4.40	24.00	1.43	---	6.47	2338.19	653.1
XSECTION 87	RUNOFF	.04	1	2	.08	.0	4.40	24.00	1.61	---	6.00	61.57	1539.2
STRUCTURE 87	ADDHYD	3.62	1	2	.08	.0	4.40	24.00	1.44	---	6.47	2344.87	647.8

XSECTION 72	RUNOFF	.25	1	2	.08	.0	4.40	24.00	1.60	---	6.04	354.53	1418.1
XSECTION 169	REACH	.25	1	2	.08	.0	4.40	24.00	1.60	---	6.15	327.64	1310.6
XSECTION 69	RUNOFF	.25	1	2	.08	.0	4.40	24.00	1.60	---	6.38	168.01	672.0
STRUCTURE 69	ADDHYD	.50	1	2	.08	.0	4.40	24.00	1.60	---	6.17	448.49	897.0
XSECTION 186	REACH	.50	1	2	.08	.0	4.40	24.00	1.60	1.08	6.26	448.35	896.7
XSECTION 86	RUNOFF	.05	1	2	.08	.0	4.40	24.00	1.60	---	6.12	56.52	1130.3
STRUCTURE 87	ADDHYD	.55	1	2	.08	.0	4.40	24.00	1.60	---	6.25	491.03	892.8
STRUCTURE 87	ADDHYD	4.17	1	2	.08	.0	4.40	24.00	1.46	---	6.44	2655.49	636.8
XSECTION 163	REACH	4.17	1	2	.08	.0	4.40	24.00	1.46	---	6.56	2570.67	616.5
XSECTION 63	RUNOFF	.16	1	2	.08	.0	4.40	24.00	1.33	---	6.16	133.14	832.2
STRUCTURE 63	ADDHYD	4.33	1	2	.08	.0	4.40	24.00	1.45	---	6.56	2611.75	603.2
XSECTION 160	REACH	4.33	1	2	.08	.0	4.40	24.00	1.45	---	6.68	2539.50	586.5
XSECTION 60	RUNOFF	.15	1	2	.08	.0	4.40	24.00	1.33	---	6.15	128.14	854.2
STRUCTURE 60	ADDHYD	4.48	1	2	.08	.0	4.40	24.00	1.45	---	6.68	2566.56	572.9
XSECTION 59	RUNOFF	.16	1	2	.08	.0	4.40	24.00	1.27	---	6.11	144.66	904.1
STRUCTURE 60	ADDHYD	4.64	1	2	.08	.0	4.40	24.00	1.44	---	6.68	2589.30	558.0
XSECTION 68	RUNOFF	.22	1	2	.08	.0	4.40	24.00	.96	---	6.32	87.71	398.7
XSECTION 167	REACH	.22	1	2	.08	.0	4.40	24.00	.96	---	6.51	75.67	344.0
XSECTION 67	RUNOFF	.27	1	2	.08	.0	4.40	24.00	.96	---	6.98	55.40	205.2
STRUCTURE 67	ADDHYD	.49	1	2	.08	.0	4.40	24.00	.96	---	6.62	116.49	237.7
XSECTION 164	REACH	.49	1	2	.08	.0	4.40	24.00	.96	---	6.78	113.08	230.8
XSECTION 64	RUNOFF	.25	1	2	.08	.0	4.40	24.00	.91	---	6.68	60.27	241.1
STRUCTURE 64	ADDHYD	.74	1	2	.08	.0	4.40	24.00	.94	---	6.75	172.56	233.2
XSECTION 159	REACH	.74	1	2	.08	.0	4.40	24.00	.94	---	6.92	166.83	225.4
XSECTION 60	ADDHYD	5.38	1	2	.08	.0	4.40	24.00	1.37	---	6.69	2732.22	507.8
XSECTION 151	REACH	5.38	1	2	.08	.0	4.40	24.00	1.37	---	6.84	2606.44	484.5
XSECTION 51	RUNOFF	.15	1	2	.08	.0	4.40	24.00	.91	---	6.16	81.05	540.3
STRUCTURE 51	ADDHYD	5.53	1	2	.08	.0	4.40	24.00	1.36	---	6.84	2620.02	473.8
XSECTION 49	RUNOFF	.10	1	2	.08	.0	4.40	24.00	.70	---	6.14	40.52	405.2
STRUCTURE 51	ADDHYD	5.63	1	2	.08	.0	4.40	24.00	1.35	---	6.84	2626.55	466.5
XSECTION 52	RUNOFF	.19	1	2	.08	.0	4.40	24.00	.70	---	6.30	50.73	267.0

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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 1													
STRUCTURE 51	ADDHYD	5.82	1	2	.08	.0	4.40	24.00	1.33	---	6.83	2646.38	454.7

XSECTION 65	RUNOFF	.10	1	2	.08	.0	4.40	24.00	1.27	---	6.37	51.91	519.1
XSECTION 158	REACH	.10	1	2	.08	.0	4.40	24.00	1.26	---	6.61	42.65	426.5
XSECTION 58	RUNOFF	.17	1	2	.08	.0	4.40	24.00	2.72	---	6.12	329.73	1939.6
STRUCTURE 58	ADDHYD	.27	1	2	.08	.0	4.40	24.00	2.18	---	6.13	339.51	1257.5
XSECTION 152	REACH	.27	1	2	.08	.0	4.40	24.00	2.18	---	6.28	301.38	1116.2
XSECTION 51	ADDHYD	6.09	1	2	.08	.0	4.40	24.00	1.36	---	6.82	2757.03	452.7
XSECTION 62	RUNOFF	.25	1	2	.08	.0	4.40	24.00	.70	---	6.38	58.97	235.9
XSECTION 161	REACH	.25	1	2	.08	.0	4.40	24.00	.70	---	6.61	49.77	199.1
XSECTION 61	RUNOFF	.13	1	2	.08	.0	4.40	24.00	1.33	---	6.28	82.67	636.0
STRUCTURE 61	ADDHYD	.38	1	2	.08	.0	4.40	24.00	.91	---	6.38	113.58	298.9
XSECTION 150	REACH	.38	1	2	.08	.0	4.40	24.00	.91	---	6.62	99.62	262.2
XSECTION 50	RUNOFF	.13	1	2	.08	.0	4.40	24.00	.65	---	6.34	29.80	229.2
STRUCTURE 50	ADDHYD	.51	1	2	.08	.0	4.40	24.00	.84	---	6.55	120.88	237.0
XSECTION 149	REACH	.51	1	2	.08	.0	4.40	24.00	.84	---	6.74	114.97	225.4
STRUCTURE 51	ADDHYD	6.60	1	2	.08	.0	4.40	24.00	1.32	---	6.82	2870.24	434.9
XSECTION 148	REACH	6.60	1	2	.08	.0	4.40	24.00	1.32	---	6.92	2855.21	432.6
XSECTION 48	RUNOFF	.15	1	2	.08	.0	4.40	24.00	.70	---	6.07	77.77	518.5
XSECTION 148	ADDHYD	6.75	1	2	.08	.0	4.40	24.00	1.31	---	6.92	2863.49	424.2
XSECTION 66	RUNOFF	.31	1	2	.08	.0	4.40	24.00	.80	---	6.44	80.57	259.9
XSECTION 157	REACH	.31	1	2	.08	.0	4.40	24.00	.80	---	6.59	77.13	248.8
XSECTION 57	RUNOFF	.16	1	2	.08	.0	4.40	24.00	.97	---	6.24	75.73	473.3
STRUCTURE 57	ADDHYD	.47	1	2	.08	.0	4.40	24.00	.86	---	6.40	121.79	259.1
XSECTION 154	REACH	.47	1	2	.08	.0	4.40	24.00	.86	---	6.62	113.11	240.7
XSECTION 55	RUNOFF	.25	1	2	.08	.0	4.40	24.00	.96	---	6.27	108.08	432.3
STRUCTURE 54	ADDHYD	.72	1	2	.08	.0	4.40	24.00	.89	---	6.40	191.73	266.3
XSECTION 56	RUNOFF	.15	1	2	.08	.0	4.40	24.00	.97	---	6.06	118.68	791.2
XSECTION 155	REACH	.15	1	2	.08	.0	4.40	24.00	.96	---	6.21	83.54	556.9
STRUCTURE 54	ADDHYD	.87	1	2	.08	.0	4.40	24.00	.91	---	6.31	255.44	293.6
XSECTION 54	RUNOFF	.25	1	2	.08	.0	4.40	24.00	.96	---	6.12	160.64	642.6
STRUCTURE 54	ADDHYD	1.12	1	2	.08	.0	4.40	24.00	.92	---	6.21	371.96	332.1
XSECTION 153	REACH	1.12	1	2	.08	.0	4.40	24.00	.92	---	6.31	366.04	326.8
XSECTION 53	RUNOFF	.17	1	2	.08	.0	4.40	24.00	1.89	---	6.13	222.27	1307.5
STRUCTURE 53	ADDHYD	1.29	1	2	.08	.0	4.40	24.00	1.05	---	6.24	538.08	417.1
XSECTION 147	REACH	1.29	1	2	.08	.0	4.40	24.00	1.05	---	6.35	525.07	407.0
XSECTION 47	RUNOFF	.27	1	2	.08	.0	4.40	24.00	.97	---	6.19	142.13	526.4

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

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XSECTION	147	ADDHYD	1.56	1	2	.08	.0	4.40	24.00	1.03	---	6.32	634.92	407.0
XSECTION	142	RUNOFF	.06	1	2	.08	.0	4.40	24.00	.97	---	6.24	28.40	473.3
XSECTION	147	ADDHYD	1.62	1	2	.08	.0	4.40	24.00	1.03	---	6.31	661.17	408.1
XSECTION	148	ADDHYD	8.37	1	2	.08	.0	4.40	24.00	1.26	---	6.90	3134.85	374.5
XSECTION	141	REACH	8.37	1	2	.08	.0	4.40	24.00	1.26	5.12	6.90	3134.85	374.5
XSECTION	122	RUNOFF	.03	1	2	.08	.0	4.40	24.00	2.05	---	6.10	46.28	1542.8
XSECTION	143	ADDHYD	8.40	1	2	.08	.0	4.40	24.00	1.26	8.06	6.90	3139.22	373.7
XSECTION	141	RUNOFF	.05	1	2	.08	.0	4.40	24.00	1.40	---	6.15	44.75	895.0
XSECTION	143	ADDHYD	8.45	1	2	.08	.0	4.40	24.00	1.26	8.07	6.90	3145.45	372.2
XSECTION	145	RUNOFF	.24	1	2	.08	.0	4.40	24.00	1.75	---	6.18	254.81	1061.7
XSECTION	146	RUNOFF	.18	1	2	.08	.0	4.40	24.00	1.08	---	6.20	105.65	587.0
XSECTION	145	ADDHYD	.42	1	2	.08	.0	4.40	24.00	1.46	---	6.18	360.88	859.2
XSECTION	121	RUNOFF	.05	1	2	.08	.0	4.40	24.00	2.05	---	6.12	72.62	1452.3
XSECTION	145	ADDHYD	.47	1	2	.08	.0	4.40	24.00	1.52	---	6.17	430.25	915.4
XSECTION	143	REACH	.47	1	2	.08	.0	4.40	24.00	1.52	2.75	6.26	426.06	906.5
XSECTION	123	RUNOFF	.04	1	2	.08	.0	4.40	24.00	2.46	---	6.08	75.90	1897.6
XSECTION	142	ADDHYD	.51	1	2	.08	.0	4.40	24.00	1.60	---	6.24	475.26	931.9
XSECTION	142	ADDHYD	8.96	1	2	.08	.0	4.40	24.00	1.28	---	6.89	3239.03	361.5
XSECTION	186	REACH	8.96	1	2	.08	.0	4.40	24.00	1.28	3.58	6.89	3239.03	361.5
XSECTION	124	RUNOFF	.02	1	2	.08	.0	4.40	24.00	2.46	---	6.11	35.31	1765.7
XSECTION	141	ADDHYD	8.98	1	2	.08	.0	4.40	24.00	1.28	5.22	6.89	3242.80	361.1
XSECTION	140	RUNOFF	.33	1	2	.08	.0	4.40	24.00	1.20	---	6.30	177.85	539.0
XSECTION	141	ADDHYD	9.31	1	2	.08	.0	4.40	24.00	1.28	5.27	6.88	3303.28	354.8
XSECTION	185	REACH	9.31	1	2	.08	.0	4.40	24.00	1.28	3.62	6.88	3303.28	354.8
XSECTION	125	RUNOFF	.03	1	2	.08	.0	4.40	24.00	2.37	---	6.14	48.22	1607.2
XSECTION	185	ADDHYD	9.34	1	2	.08	.0	4.40	24.00	1.28	3.63	6.88	3309.69	354.4
XSECTION	139	RUNOFF	.15	1	2	.08	.0	4.40	24.00	2.05	---	6.25	164.70	1098.0
XSECTION	185	ADDHYD	9.49	1	2	.08	.0	4.40	24.00	1.29	3.66	6.88	3353.72	353.4
XSECTION	143	RUNOFF	.25	1	2	.08	.0	4.40	24.00	2.55	---	6.12	449.59	1798.4
XSECTION	185	ADDHYD	9.74	1	2	.08	.0	4.40	24.00	1.33	3.69	6.87	3406.36	349.7
XSECTION	137	REACH	9.74	1	2	.08	.0	4.40	24.00	1.32	3.67	6.98	3379.66	347.0
XSECTION	128	RUNOFF	.04	1	2	.08	.0	4.40	24.00	1.97	---	6.12	56.35	1408.7
XSECTION	137	ADDHYD	9.78	1	2	.08	.0	4.40	24.00	1.33	3.68	6.98	3385.18	346.1
XSECTION	137	RUNOFF	.11	1	2	.08	.0	4.40	24.00	2.37	---	6.13	179.79	1634.5
XSECTION	137	ADDHYD	9.89	1	2	.08	.0	4.40	24.00	1.34	3.69	6.98	3404.31	344.2
XSECTION	126	RUNOFF	.08	1	2	.08	.0	4.40	24.00	2.29	---	6.14	124.80	1560.0

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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/	STANDARD	RAIN	ANTEC	MAIN	PRECIPITATION	PEAK DISCHARGE

STRUCTURE ID	CONTROL OPERATION	DRAINAGE AREA (SQ MI)	TABLE #	MOIST COND	TIME INCREM (HR)	BEGIN (HR)	AMOUNT (IN)	DURATION (HR)	RUNOFF AMOUNT (IN)	ELEVATION (FT)	TIME (HR)	RATE (CFS)	RATE (CSM)
ALTERNATE 1 STORM 1													
XSECTION 127	RUNOFF	.07	1	2	.08	.0	4.40	24.00	2.55	---	6.10	131.62	1880.3
XSECTION 137	ADDHYD	.15	1	2	.08	.0	4.40	24.00	2.41	.66	6.12	255.51	1703.4
XSECTION 137	ADDHYD	10.04	1	2	.08	.0	4.40	24.00	1.36	3.71	6.97	3429.68	341.6
STRUCTURE 91	RESVOR	10.04	1	2	.08	.0	4.40	24.00	1.35	63.31	7.05	3380.08	336.7
ALTERNATE 1 STORM 2													
XSECTION 82	RUNOFF	.19	1	2	.08	.0	3.00	24.00	.59	---	6.05	97.75	514.5
XSECTION 174	REACH	.19	1	2	.08	.0	3.00	24.00	.58	---	6.16	82.70	435.2
XSECTION 74	RUNOFF	.18	1	2	.08	.0	3.00	24.00	.58	---	6.21	52.40	291.1
STRUCTURE 74	ADDHYD	.37	1	2	.08	.0	3.00	24.00	.58	---	6.17	133.56	361.0
XSECTION 173	REACH	.37	1	2	.08	.0	3.00	24.00	.58	---	6.31	109.98	297.2
XSECTION 75	RUNOFF	.12	1	2	.08	.0	3.00	24.00	.58	---	6.36	26.14	217.8
STRUCTURE 75	ADDHYD	.49	1	2	.08	.0	3.00	24.00	.58	---	6.32	135.83	277.2
XSECTION 73	RUNOFF	.12	1	2	.08	.0	3.00	24.00	.59	---	6.24	32.80	273.4
STRUCTURE 75	ADDHYD	.61	1	2	.08	.0	3.00	24.00	.58	---	6.31	166.64	273.2
XSECTION 81	RUNOFF	.39	1	2	.08	.0	3.00	24.00	.58	---	6.24	107.97	276.8
XSECTION 175	REACH	.39	1	2	.08	.0	3.00	24.00	.58	---	6.43	87.43	224.2
STRUCTURE 75	ADDHYD	1.00	1	2	.08	.0	3.00	24.00	.58	---	6.34	246.80	246.8
XSECTION 80	RUNOFF	.22	1	2	.08	.0	3.00	24.00	.58	---	6.16	74.81	340.0
XSECTION 176	REACH	.22	1	2	.08	.0	3.00	24.00	.58	---	6.35	52.18	237.2
STRUCTURE 75	ADDHYD	1.22	1	2	.08	.0	3.00	24.00	.58	---	6.34	299.22	245.3
XSECTION 76	RUNOFF	.17	1	2	.08	.0	3.00	24.00	.58	---	6.34	37.62	221.3
STRUCTURE 75	ADDHYD	1.39	1	2	.08	.0	3.00	24.00	.58	---	6.34	336.84	242.3
XSECTION 172	REACH	1.39	1	2	.08	.0	3.00	24.00	.58	---	6.43	334.83	240.9
XSECTION 88	RUNOFF	.10	1	2	.08	.0	3.00	24.00	.58	---	6.13	36.82	368.2
STRUCTURE 77	ADDHYD	1.49	1	2	.08	.0	3.00	24.00	.58	---	6.42	347.28	233.1
XSECTION 77	RUNOFF	.25	1	2	.08	.0	3.00	24.00	.58	---	6.27	64.37	257.5
STRUCTURE 77	ADDHYD	1.74	1	2	.08	.0	3.00	24.00	.58	---	6.41	400.73	230.3
XSECTION 79	RUNOFF	.29	1	2	.08	.0	3.00	24.00	.58	---	6.10	117.87	406.5
XSECTION 178	REACH	.29	1	2	.08	.0	3.00	24.00	.58	---	6.24	93.39	322.0
XSECTION 78	RUNOFF	.88	1	2	.08	.0	3.00	24.00	.58	---	6.19	271.55	308.6
STRUCTURE 78	ADDHYD	1.17	1	2	.08	.0	3.00	24.00	.58	---	6.21	361.72	309.2
XSECTION 177	REACH	1.17	1	2	.08	.0	3.00	24.00	.58	---	6.34	327.48	279.9
STRUCTURE 77	ADDHYD	2.91	1	2	.08	.0	3.00	24.00	.58	---	6.37	716.91	246.4
XSECTION 171	REACH	2.91	1	2	.08	.0	3.00	24.00	.58	---	6.55	631.49	217.0
XSECTION 71	RUNOFF	.36	1	2	.08	.0	3.00	24.00	.71	---	6.10	186.14	517.0
STRUCTURE 71	ADDHYD	3.27	1	2	.08	.0	3.00	24.00	.60	---	6.54	667.80	204.2

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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.)

ALTERNATE 1 STORM 2

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)
XSECTION 170	REACH	3.27	1	2	.08	.0	3.00	24.00	.60	---	6.65	654.58	200.2
XSECTION 70	RUNOFF	.31	1	2	.08	.0	3.00	24.00	.71	---	6.13	145.97	470.9
XSECTION 70	ADDHYD	3.58	1	2	.08	.0	3.00	24.00	.61	---	6.64	683.38	190.9
XSECTION 187	REACH	3.58	1	2	.08	.0	3.00	24.00	.61	---	6.73	683.08	190.8
XSECTION 87	RUNOFF	.04	1	2	.08	.0	3.00	24.00	.72	---	6.02	27.75	693.8
STRUCTURE 87	ADDHYD	3.62	1	2	.08	.0	3.00	24.00	.61	---	6.73	685.16	189.3
XSECTION 72	RUNOFF	.25	1	2	.08	.0	3.00	24.00	.71	---	6.06	148.80	595.2
XSECTION 169	REACH	.25	1	2	.08	.0	3.00	24.00	.71	---	6.18	124.18	496.7
XSECTION 69	RUNOFF	.25	1	2	.08	.0	3.00	24.00	.71	---	6.42	64.92	259.7
STRUCTURE 69	ADDHYD	.50	1	2	.08	.0	3.00	24.00	.71	---	6.21	169.68	339.4
XSECTION 186	REACH	.50	1	2	.08	.0	3.00	24.00	.71	.43	6.31	165.87	331.7
XSECTION 86	RUNOFF	.05	1	2	.08	.0	3.00	24.00	.71	---	6.14	22.79	455.7
STRUCTURE 87	ADDHYD	.55	1	2	.08	.0	3.00	24.00	.71	---	6.30	180.29	327.8
STRUCTURE 87	ADDHYD	4.17	1	2	.08	.0	3.00	24.00	.62	---	6.71	771.34	185.0
XSECTION 163	REACH	4.17	1	2	.08	.0	3.00	24.00	.62	---	6.87	726.28	174.2
XSECTION 63	RUNOFF	.16	1	2	.08	.0	3.00	24.00	.54	---	6.18	45.76	286.0
STRUCTURE 63	ADDHYD	4.33	1	2	.08	.0	3.00	24.00	.62	---	6.86	735.41	169.8
XSECTION 160	REACH	4.33	1	2	.08	.0	3.00	24.00	.62	---	7.03	701.69	162.1
XSECTION 60	RUNOFF	.15	1	2	.08	.0	3.00	24.00	.54	---	6.17	44.37	295.8
STRUCTURE 60	ADDHYD	4.48	1	2	.08	.0	3.00	24.00	.62	---	7.03	708.64	158.2
XSECTION 59	RUNOFF	.16	1	2	.08	.0	3.00	24.00	.51	---	6.13	49.15	307.2
STRUCTURE 60	ADDHYD	4.64	1	2	.08	.0	3.00	24.00	.61	---	7.03	715.09	154.1
XSECTION 68	RUNOFF	.22	1	2	.08	.0	3.00	24.00	.33	---	6.37	21.13	96.0
XSECTION 167	REACH	.22	1	2	.08	.0	3.00	24.00	.33	---	6.66	16.17	73.5
XSECTION 67	RUNOFF	.27	1	2	.08	.0	3.00	24.00	.33	---	7.09	14.12	52.3
STRUCTURE 67	ADDHYD	.49	1	2	.08	.0	3.00	24.00	.33	---	6.82	27.89	56.9
XSECTION 164	REACH	.49	1	2	.08	.0	3.00	24.00	.33	---	7.07	26.67	54.4
XSECTION 64	RUNOFF	.25	1	2	.08	.0	3.00	24.00	.30	---	6.78	13.94	55.8
STRUCTURE 64	ADDHYD	.74	1	2	.08	.0	3.00	24.00	.32	---	6.96	39.44	53.3
XSECTION 159	REACH	.74	1	2	.08	.0	3.00	24.00	.32	---	7.24	36.93	49.9
XSECTION 60	ADDHYD	5.38	1	2	.08	.0	3.00	24.00	.57	---	7.04	749.94	139.4
XSECTION 151	REACH	5.38	1	2	.08	.0	3.00	24.00	.57	---	7.25	700.57	130.2
XSECTION 51	RUNOFF	.15	1	2	.08	.0	3.00	24.00	.30	---	6.20	18.06	120.4
STRUCTURE 51	ADDHYD	5.53	1	2	.08	.0	3.00	24.00	.56	---	7.25	703.84	127.3
XSECTION 49	RUNOFF	.10	1	2	.08	.0	3.00	24.00	.19	---	6.19	5.53	55.3
STRUCTURE 51	ADDHYD	5.63	1	2	.08	.0	3.00	24.00	.56	---	7.25	705.23	125.3

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													
XSECTION 52	RUNOFF	.19	1	2	.08	.0	3.00	24.00	.19	---	6.39	7.03	37.0
STRUCTURE 51	ADDHYD	5.82	1	2	.08	.0	3.00	24.00	.54	---	7.25	708.50	121.7
XSECTION 65	RUNOFF	.10	1	2	.08	.0	3.00	24.00	.51	---	6.41	16.71	167.1
XSECTION 158	REACH	.10	1	2	.08	.0	3.00	24.00	.50	---	6.82	12.01	120.1
XSECTION 58	RUNOFF	.17	1	2	.08	.0	3.00	24.00	1.51	---	6.13	178.46	1049.8
STRUCTURE 58	ADDHYD	.27	1	2	.08	.0	3.00	24.00	1.14	---	6.13	179.09	663.3
XSECTION 152	REACH	.27	1	2	.08	.0	3.00	24.00	1.14	---	6.30	147.86	547.6
XSECTION 51	ADDHYD	6.09	1	2	.08	.0	3.00	24.00	.57	---	7.24	738.68	121.3
XSECTION 62	RUNOFF	.25	1	2	.08	.0	3.00	24.00	.19	---	6.50	8.41	33.6
XSECTION 161	REACH	.25	1	2	.08	.0	3.00	24.00	.19	---	6.92	6.21	24.9
XSECTION 61	RUNOFF	.13	1	2	.08	.0	3.00	24.00	.54	---	6.31	27.96	215.0
STRUCTURE 61	ADDHYD	.38	1	2	.08	.0	3.00	24.00	.31	---	6.34	29.91	78.7
XSECTION 150	REACH	.38	1	2	.08	.0	3.00	24.00	.31	---	6.66	22.24	58.5
XSECTION 50	RUNOFF	.13	1	2	.08	.0	3.00	24.00	.17	---	6.46	3.55	27.3
STRUCTURE 50	ADDHYD	.51	1	2	.08	.0	3.00	24.00	.28	---	6.64	25.37	49.7
XSECTION 149	REACH	.51	1	2	.08	.0	3.00	24.00	.28	---	6.98	22.55	44.2
STRUCTURE 51	ADDHYD	6.60	1	2	.08	.0	3.00	24.00	.55	---	7.23	759.80	115.1
XSECTION 148	REACH	6.60	1	2	.08	.0	3.00	24.00	.55	---	7.37	750.83	113.8
XSECTION 48	RUNOFF	.15	1	2	.08	.0	3.00	24.00	.19	---	6.12	11.00	73.3
XSECTION 148	ADDHYD	6.75	1	2	.08	.0	3.00	24.00	.54	---	7.37	752.52	111.5
XSECTION 66	RUNOFF	.31	1	2	.08	.0	3.00	24.00	.25	---	6.54	15.12	48.8
XSECTION 157	REACH	.31	1	2	.08	.0	3.00	24.00	.25	---	6.78	13.57	43.8
SECTION 57	RUNOFF	.16	1	2	.08	.0	3.00	24.00	.33	---	6.28	18.11	113.2
TRUCTURE 57	ADDHYD	.47	1	2	.08	.0	3.00	24.00	.28	---	6.41	23.39	49.8
XSECTION 154	REACH	.47	1	2	.08	.0	3.00	24.00	.27	---	6.88	20.44	43.5
SECTION 55	RUNOFF	.25	1	2	.08	.0	3.00	24.00	.33	---	6.33	26.27	105.1
STRUCTURE 54	ADDHYD	.72	1	2	.08	.0	3.00	24.00	.29	---	6.42	38.48	53.4
XSECTION 56	RUNOFF	.15	1	2	.08	.0	3.00	24.00	.33	---	6.09	31.18	207.8
SECTION 155	REACH	.15	1	2	.08	.0	3.00	24.00	.33	---	6.35	15.83	105.5
TRUCTURE 54	ADDHYD	.87	1	2	.08	.0	3.00	24.00	.30	---	6.40	53.92	62.0
SECTION 54	RUNOFF	.25	1	2	.08	.0	3.00	24.00	.33	---	6.15	40.73	162.9
TRUCTURE 54	ADDHYD	1.12	1	2	.08	.0	3.00	24.00	.31	---	6.27	77.70	69.4
XSECTION 153	REACH	1.12	1	2	.08	.0	3.00	24.00	.31	---	6.44	71.85	64.2
SECTION 53	RUNOFF	.17	1	2	.08	.0	3.00	24.00	.91	---	6.15	98.97	582.2
TRUCTURE 53	ADDHYD	1.29	1	2	.08	.0	3.00	24.00	.39	---	6.24	139.71	108.3
XSECTION 147	REACH	1.29	1	2	.08	.0	3.00	24.00	.39	---	6.39	129.61	100.5

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													
XSECTION 47	RUNOFF	.27	1	2	.08	.0	3.00	24.00	.33	---	6.23	34.86	129.1
XSECTION 147	ADDHYD	1.56	1	2	.08	.0	3.00	24.00	.38	---	6.35	157.60	101.0
XSECTION 142	RUNOFF	.06	1	2	.08	.0	3.00	24.00	.33	---	6.28	6.79	113.2
XSECTION 147	ADDHYD	1.62	1	2	.08	.0	3.00	24.00	.38	---	6.34	164.15	101.3
XSECTION 148	ADDHYD	8.37	1	2	.08	.0	3.00	24.00	.51	---	7.35	811.32	96.9
XSECTION 141	REACH	8.37	1	2	.08	.0	3.00	24.00	.51	2.36	7.45	808.68	96.6
XSECTION 122	RUNOFF	.03	1	2	.08	.0	3.00	24.00	1.01	---	6.12	21.82	727.4
XSECTION 143	ADDHYD	8.40	1	2	.08	.0	3.00	24.00	.51	3.80	7.45	810.01	96.4
XSECTION 141	RUNOFF	.05	1	2	.08	.0	3.00	24.00	.58	---	6.18	16.09	321.9
XSECTION 143	ADDHYD	8.45	1	2	.08	.0	3.00	24.00	.51	3.81	7.45	811.56	96.0
XSECTION 145	RUNOFF	.24	1	2	.08	.0	3.00	24.00	.81	---	6.20	105.50	439.6
XSECTION 146	RUNOFF	.18	1	2	.08	.0	3.00	24.00	.40	---	6.24	29.55	164.1
XSECTION 145	ADDHYD	.42	1	2	.08	.0	3.00	24.00	.63	---	6.21	134.70	320.7
XSECTION 121	RUNOFF	.05	1	2	.08	.0	3.00	24.00	1.01	---	6.14	33.93	678.6
XSECTION 145	ADDHYD	.47	1	2	.08	.0	3.00	24.00	.67	---	6.19	165.85	352.9
XSECTION 143	REACH	.47	1	2	.08	.0	3.00	24.00	.67	1.64	6.30	161.65	343.9
XSECTION 123	RUNOFF	.04	1	2	.08	.0	3.00	24.00	1.31	---	6.09	39.29	982.2
XSECTION 142	ADDHYD	.51	1	2	.08	.0	3.00	24.00	.72	---	6.27	183.90	360.6
XSECTION 142	ADDHYD	8.96	1	2	.08	.0	3.00	24.00	.52	---	7.44	833.20	93.0
XSECTION 186	REACH	8.96	1	2	.08	.0	3.00	24.00	.52	1.58	7.44	833.20	93.0
XSECTION 124	RUNOFF	.02	1	2	.08	.0	3.00	24.00	1.31	---	6.13	18.17	908.4
XSECTION 141	ADDHYD	8.98	1	2	.08	.0	3.00	24.00	.52	2.40	7.44	834.31	92.9
XSECTION 140	RUNOFF	.33	1	2	.08	.0	3.00	24.00	.47	---	6.34	54.72	165.8
XSECTION 141	ADDHYD	9.31	1	2	.08	.0	3.00	24.00	.52	2.42	7.43	845.82	90.9
XSECTION 185	REACH	9.31	1	2	.08	.0	3.00	24.00	.52	1.59	7.52	845.67	90.8
XSECTION 125	RUNOFF	.03	1	2	.08	.0	3.00	24.00	1.25	---	6.16	24.20	806.6
XSECTION 185	ADDHYD	9.34	1	2	.08	.0	3.00	24.00	.52	1.59	7.52	847.26	90.7
XSECTION 139	RUNOFF	.15	1	2	.08	.0	3.00	24.00	1.01	---	6.27	74.68	497.8
XSECTION 185	ADDHYD	9.49	1	2	.08	.0	3.00	24.00	.53	1.60	7.51	856.01	90.2
XSECTION 143	RUNOFF	.25	1	2	.08	.0	3.00	24.00	1.38	---	6.14	235.07	940.3
XSECTION 185	ADDHYD	9.74	1	2	.08	.0	3.00	24.00	.55	1.62	7.51	869.89	89.3
XSECTION 137	REACH	9.74	1	2	.08	.0	3.00	24.00	.55	1.60	7.66	857.31	88.0
XSECTION 128	RUNOFF	.04	1	2	.08	.0	3.00	24.00	.96	---	6.14	25.81	645.3
XSECTION 137	ADDHYD	9.78	1	2	.08	.0	3.00	24.00	.55	1.61	7.66	858.99	87.8

XSECTION 137	RUNOFF	.11	1	2	.08	.0	3.00	24.00	1.25	---	6.15	90.47	822.5
XSECTION 137	ADDHYD	9.89	1	2	.08	.0	3.00	24.00	.56	1.61	7.66	864.57	87.4

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SUMMARY TABLE 1 - SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL INSTRUCTIONS IN THE ORDER PERFORMED
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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													
XSECTION 126	RUNOFF	.08	1	2	.08	.0	3.00	24.00	1.19	---	6.15	61.50	768.7
XSECTION 127	RUNOFF	.07	1	2	.08	.0	3.00	24.00	1.38	---	6.12	69.20	988.6
XSECTION 137	ADDHYD	.15	1	2	.08	.0	3.00	24.00	1.28	.34	6.13	130.11	867.4
XSECTION 137	ADDHYD	10.04	1	2	.08	.0	3.00	24.00	.57	1.62	7.67	872.25	86.9
STRUCTURE 91	RESVOR	10.04	1	2	.08	.0	3.00	24.00	.57	59.80	7.75	865.48	86.2

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)

		HYDROGRAPH INFORMATION							ROUTING PARAMETERS										PEAK TRAVEL TIME	
						OUTFLOW+			VOLUME	MAIN	ITER-	Q AND A			PEAK	S/Q	ATT-		
SEC ID	REACH LENGTH (FT)	INFLOW PEAK (CFS)	INFLOW TIME (HR)	OUTFLOW PEAK (CFS)	OUTFLOW TIME (HR)	INTERV.AREA PEAK (CFS)	INTERV.AREA TIME (HR)	BASE-FLOW (CFS)	ABOVE BASE (IN)	TIME INCR (HR)	ATION #	EQUATION COEFF (X)	EQUATION POWER (M)	LENGTH FACTOR (K*)	RATIO O/I (Q*)	@PEAK (K) (SEC)	KIN COEFF (C)	STOR- AGE (HR)	KINE- MATIC (HR)
ALTERNATE 1 STORM 1																			
+174	2300	244	6.1	234	6.1	---	---	0	1.40	.08	1	.900	1.53	.052	.957	240	.77?	.08	.07
+173	2800	379	6.1	343	6.2	---	---	0	1.40	.08	1	.700	1.53	.051	.903	295	.67?	.08	.08

+175	3850	303	6.2	269	6.4			0	1.40	.08	1	.600	1.56	.060	.888	441	.51	.17	.12
+						---	---												
+176	4100	206	6.1	168	6.3			0	1.40	.08	1	.600	1.56	.110	.815	538	.43	.17	.16
+						---	---												
+172	1700	1023	6.3	1023	6.3			0	1.40	.08	0	.800	1.53	.007	1.000	117	1.00?	.00	.00
+						---	---												
+178	3000	316	6.1	281	6.2			0	1.40	.08	1	.600	1.56	.067	.891	338	.61	.17	.10
+						---	---												
+177	3350	1026	6.1	990	6.3			0	1.40	.08	1	.600	1.56	.029	.965	247	.75?	.17	.07
+						---	---												
+171	3850	2237	6.3	2131	6.4			0	1.40	.08	1	.200	1.63	.033	.952	322	.63	.08	.09
+						---	---												
+170	2500	2249	6.4	2243	6.5			0	1.42	.08	1	.300	1.63	.009	.997	163	.96?	.08	.0!
+						---	---												
+187	1200	2337	6.5	2337	6.5			0	1.43	.08	0	.200	1.64	.003	1.000	95	1.00?	.00	.0(
+						---	---												
+169	3000	353	6.1	327	6.1			0	1.60	.08	1	.800	1.55	.061	.929	279	.70?	.08	.08
+						---	---												
+186	1400	442	6.1	441	6.2			0	1.60	.08	1	.700	1.51	.012	1.000	150	1.00?	.08	.0(
+						---	---												
+163	4400	2641	6.5	2570	6.6			0	1.46	.08	1	.200	1.64	.023	.973	331	.62	.08	.09
+						---	---												
+160	4400	2612	6.6	2521	6.7			0	1.45	.08	1	.200	1.65	.020	.965	319	.64	.17	.09
+						---	---												
+167	3300	88	6.3	75	6.5			0	.96	.08	1	.700	1.51	.065	.855	611	.39	.17	.17
+						---	---												
+164	2500	116	6.6	113	6.8			0	.96	.08	1	.800	1.51	.015	.971	385	.56	.17	.1(
+						---	---												
+159	3300	172	6.7	166	6.9			0	.94	.08	1	.500	1.62	.015	.966	435	.51	.17	.12
+						---	---												
+151	4000	2717	6.7	2596	6.8			0	1.37	.08	1	.100	1.65	.028	.955	434	.51	.08	.12
+						---	---												
+158	3600	52	6.4	43	6.6			0	1.27	.08	1	.400	1.63	.099	.823	843	.30	.25	.24
+						---	---												
+152	3500	339	6.1	299	6.3			0	2.18	.08	1	.300	1.63	.067	.883	473	.48	.17	.13
+						---	---												
+161	3400	59	6.4	50	6.6			0	.70	.08	1	.700	1.51	.062	.842	720	.34	.25	.21

+						---	---												
												.600							
150	3950	114	6.4	99	6.6			0	.91	.08	1		1.53	.055	.876	700	.35	.25	.20
+						---	---												
												.300							
149	2400	121	6.6	115	6.7			0	.84	.08	1		1.63	.022	.950	483	.47	.17	.14
						---	---												
												.300							
148	3300	2868	6.8	2846	6.9			0	1.32	.08	1		1.62	.007	.993	203	.85?	.08	.06
						2854	6.9												
												.800							
157	2300	80	6.5	77	6.6			0	.80	.08	1		1.53	.021	.955	381	.56	.08	.11
						---	---												
												.500							
154	3500	122	6.4	113	6.6			0	.86	.08	1		1.61	.030	.928	542	.43	.25	.15
						---	---												
												.600							
155	3450	119	6.1	83	6.2			0	.97	.08	1		1.53	.179	.702	602	.40	.17	.18
						---	---												
												.500							
+153	2050	371	6.2	366	6.3			0	.92	.08	1		1.61	.009	.987	208	.84?	.08	.06
						---	---												
												.400							
+147	2300	536	6.2	517	6.3			0	1.05	.08	1		1.62	.011	.965	226	.80?	.08	.06
						634	6.3												
												.501							
141	2100	3134	6.9	3134	6.9			0	1.26	.08	0		1.50	.005	1.000	149	1.00?	.00	.00
						---	---												
												1.40							
+143	1900	425	6.1	418	6.2			0	1.52	.08	1		1.42	.020	.985	176	.92?	.08	.05
						---	---												
												.160							
+186	700	3239	6.9	3239	6.9			0	1.28	.08	0		1.63	.001	1.000	59	1.00?	.00	.00
						---	---												

UMMARY 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)

		HYDROGRAPH INFORMATION							ROUTING PARAMETERS									PEAK	
						OUTFLOW+			VOLUME	MAIN	ITER-	Q AND A			PEAK	S/Q	ATT-	TRAVEL TIME	
SEC	REACH	INFLOW		OUTFLOW		INTERV.AREA		BASE-	ABOVE	TIME	ATION	EQUATION		LENGTH	RATIO	@PEAK	KIN	STOR-	KINE-
+																			
ID	LENGTH	PEAK	TIME	PEAK	TIME	PEAK	TIME	FLOW	BASE	INCR	#	COEFF	POWER	FACTOR	O/I	(K)	COEFF	AGE	MATIC
	(FT)	(CFS)	(HR)	(CFS)	(HR)	(CFS)	(HR)	(CFS)	(IN)	(HR)		(X)	(M)	(K*)	(Q*)	(SEC)	(C)	(HR)	(HR)

ALTERNATE 1 STORM 1

+																			
+185	1100	3303	6.9	3303	6.9			0	1.28	.08	0	.160	1.63	.001	1.000	92	1.00?	.00	.0
+						3309	6.9												
+137	3300	3403	6.9	3379	7.0			0	1.33	.08	1	.161	1.63	.008	.993	272	.71?	.08	.0
+						3385	7.0												
	ALTERNATE	1	STORM	2															
+																			
+174	2300	97	6.1	82	6.1			0	.59	.08	1	.900	1.53	.079	.845	330	.62	.08	.09
+						---	---												
+173	2800	131	6.1	110	6.3			0	.58	.08	1	.700	1.53	.067	.837	426	.52	.17	.12
+						---	---												
+175	3850	108	6.2	87	6.4			0	.58	.08	1	.600	1.56	.083	.803	638	.38	.17	.18
+						---	---												
+176	4100	74	6.1	52	6.4			0	.58	.08	1	.600	1.56	.154	.695	776	.32	.25	.2
+						---	---												
+172	1700	333	6.3	330	6.4			0	.58	.08	1	.800	1.53	.009	.989	172	.93?	.08	.0
+						---	---												
+178	3000	113	6.1	93	6.2			0	.58	.08	1	.600	1.56	.093	.822	489	.47	.17	.14
+						---	---												
+177	3350	360	6.2	323	6.3			0	.58	.08	1	.600	1.56	.040	.898	360	.59	.08	.1(
+						---	---												
+171	3850	715	6.4	631	6.6			0	.58	.08	1	.200	1.63	.044	.883	500	.46	.17	.14
+						---	---												
+170	2500	666	6.6	654	6.6			0	.60	.08	1	.300	1.63	.011	.981	260	.73?	.08	.07
+						---	---												
+187	1200	683	6.6	683	6.7			0	.61	.08	1	.200	1.64	.004	1.000	153	.99?	.08	.04
+						---	---												
+169	3000	149	6.1	120	6.1			0	.71	.08	1	.800	1.55	.089	.809	379	.57	.08	.11
+						---	---												
+186	1400	169	6.2	166	6.3			0	.71	.08	1	.700	1.51	.016	.980	208	.84?	.08	.06
+						---	---												
+163	4400	770	6.7	725	6.9			0	.62	.08	1	.200	1.64	.028	.941	535	.44	.17	.15
+						---	---												
+160	4400	734	6.9	701	7.1			0	.62	.08	1	.200	1.65	.023	.955	526	.44	.17	.15
+						---	---												
+167	3300	21	6.4	16	6.6			0	.33	.08	1	.700	1.51	.078	.766	988	.26	.25	.29
+						---	---												
+164	2500	28	6.8	27	7.1			0	.33	.08	1	.800	1.51	.018	.956	624	.39	.25	.17

SEC	REACH	INFLOW		OUTFLOW		OUTFLOW+ INTERV.	AREA	BASE-	VOLUME ABOVE BASE(IN)	MAIN TIME	ITER- ATION	Q AND A EQUATION	LENGTH	PEAK RATIO	S/Q @PEAK	ATT- KIN	PEAK TRAVEL TIME STOR-	KINE-
+						---	---					.500						
	159	3300	39	7.0	37	7.2		0	.32	.08	1		1.62	.020	.936	766	.33	.25	.22
						---	---					.100						
	151	4000	749	7.1	699	7.2		0	.57	.08	1		1.65	.032	.933	721	.34	.17	.20
						---	---					.400						
	158	3600	17	6.4	12	6.8		0	.51	.08	1		1.63	.142	.720	1306	.21	.33	.39
						---	---					.300						
+	152	3500	179	6.1	148	6.3		0	1.14	.08	1		1.63	.102	.826	605	.40	.17	.17
						---	---					.700						
	161	3400	8	6.5	6	6.9		0	.19	.08	1		1.51	.060	.739	1390	.19	.41	.41
						---	---					.600						
	150	3950	30	6.3	22	6.6		0	.31	.08	1		1.53	.074	.748	1114	.24	.33	.32
						---	---					.300						
	149	2400	25	6.6	23	7.0		0	.28	.08	1		1.63	.028	.889	883	.29	.33	.25
						---	---					.300						
	48	3300	760	7.2	750	7.4		0	.55	.08	1		1.62	.008	.988	338	.61	.17	.09
						752	7.4												
						---	---					.800						
	57	2300	15	6.6	14	6.8		0	.25	.08	1		1.53	.025	.896	679	.36	.25	.19
						---	---					.500						
+	154	3500	23	6.4	20	6.9		0	.28	.08	1		1.61	.036	.875	1013	.26	.50	.29
						---	---					.600						
	55	3450	30	6.1	16	6.4		0	.33	.08	1		1.53	.231	.520	968	.27	.25	.30
						---	---					.500						
+	153	2050	76	6.2	72	6.5		0	.31	.08	1		1.61	.010	.937	379	.57	.25	.11
+						---	---					.400						
	47	2300	139	6.2	130	6.4		0	.39	.08	1		1.62	.015	.930	378	.57	.17	.11
+						156	6.3												

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)

ID	LENGTH (FT)	PEAK (CFS)	TIME (HR)	PEAK (CFS)	TIME (HR)	PEAK (CFS)	TIME (HR)	FLOW (CFS)	BASE (IN)	INCR (HR)	#	COEFF (X)	POWER (M)	FACTOR (K*)	O/I (Q*)	(K) (SEC)	COEFF (C)	AGE (HR)	MATIC (HR
ALTERNATE 1 STORM 2																			
+141	2100	809	7.3	808	7.5	---	---	0	.51	.08	1	.380	1.56	.004	.999	225	.80?	.17	.0
+143	1900	164	6.2	162	6.3	---	---	0	.67	.08	1	1.26	1.46	.022	.984	226	.80?	.08	.06
+186	700	832	7.5	832	7.5	---	---	0	.52	.08	0	.160	1.63	.001	1.000	99	1.00?	.00	.00
+185	1100	844	7.5	844	7.6	846	7.6	0	.52	.08	1	.160	1.63	.002	1.000	155	.98?	.08	.04
+137	3300	868	7.5	857	7.6	858	7.6	0	.55	.08	1	.160	1.63	.008	.986	461	.49	.17	.1

1END OF 1 JOBS IN THIS RUN

TR-20 ANALYSIS

SAND CREEK D.B.P.S. FULLY DEVELOPED CONDITION MODEL MODIFIED TO REFLECT CURRENT PROPOSED FULLY DEVELOPED CONDITION IN ON-SITE AREA

INPUT DATA FILE

```
JOB TR-20                                          SUMMARY   NOPLOTS
TITLE 001 UPPER SAND CREEK --DBPS FUALTC.DAT MOD. TO JR ENG. RIDGEVIEW MDDP
TITLE     24 HR TYPE IIA STORM (100- AND 10-YR, AMC=2) FILE NAME: FUJRMDDP.DAT
 5 RAINFL 1                .50
 8               0.000      .0025      0.005      .0075      0.010
 8               0.015      0.020      0.025      0.030      0.050
 8               0.060      0.100      0.700      0.750      0.780
 8               0.798      0.820      0.830      0.840      0.850
 8               0.860      0.865      0.870      0.885      0.890
 8               0.900      0.905      0.910      0.915      0.921
 8               0.927      0.933      0.940      0.945      0.950
 8               0.955      0.960      0.965      0.970      0.975
 8               0.980      0.983      0.985      0.988      0.990
 8               0.993      0.995      0.998      1.000      1.000
 9 ENDTBL
 2 XSECTN   137        1.0
 8                     0.0          0.0        0.0
 8                     1.0        386.0      120.0
 8                     1.5        760.0      182.0
 8                     2.0       1226.0      244.0
 8                     2.5       1777.0      306.0
 8                     3.0       2407.0      369.0
 8                     3.5       3110.0      432.0
 8                     4.0       3884.0      496.0
 8                     4.5       4725.0      560.0
 8                     5.0       5630.0      624.0
 9 ENDTBL
 2 XSECTN   141        1.0
 8                     0.0          0.0        0.0
 8                     1.0        187.0       53.0
 8                     1.5        372.0       82.0
 8                     2.0        606.0      112.0
 8                     2.5        890.0      144.0
 8                     3.0       1220.0      177.0
 8                     3.5       1596.0      211.0
 8                     4.0       2018.0      248.0
 8                     4.5       2487.0      285.0
 8                     5.0       3001.0      325.0
 8                     5.5       3563.0      366.0
 8                     6.0       4173.0      408.0
 9 ENDTBL
 2 XSECTN   143        1.0
 8                     0.0          0.0        0.0
 8                     1.0         65.0       15.0
 8                     1.5        135.7       24.8
 8                     2.0        229.5       36.0
 8                     2.5        351.0       48.8
 8                     3.0        500.9       63.0
 8                     3.5        681.0       78.7
 8                     4.0        893.0       96.0
 8                     4.5       1138.8      114.8
 8                     5.0       1420.0      135.0
 9 ENDTBL
 2 XSECTN   185        1.0
 8                     0.0          0.0        0.0
 8                     1.0        386.0      120.0
 8                     1.5        760.0      182.0
 8                     2.0       1226.0      244.0
 8                     2.5       1777.0      306.0
 8                     3.0       2407.0      369.0
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8                    3.5         3110.0      432.0
8                    4.0         3884.0      496.0
8                    4.5         4725.0      560.0
8                    5.0         5630.0      624.0
9 ENDTBL
2 XSECTN   186       1.0
8                    0.0            0.0        0.0
8                    1.0          386.0      120.0
8                    1.5          760.0      182.0
8                    2.0         1226.0      244.0
8                    2.5         1777.0      306.0
8                    3.0         2407.0      369.0
8                    3.5         3110.0      432.0
8                    4.0         3884.0      496.0
8                    4.5         4725.0      560.0
8                    5.0         5630.0      624.0
9 ENDTBL
3 STRUCT     91
8                   57.            0.         0.
8                   58.          120.         2.6
8                   59.          460.         5.8
8                   60.          964.         9.6
8                   61.         1584.        14.1
8                   62.         2304.        19.4
8                   63.         3108.        25.6
8                   64.         3986.        32.8
9 ENDTBL
3 STRUCT     92
8                    0.            0.         0.
8                    4.           40.        40.
8                    5.           60.        60.
8                    6.           82.        90.
8                    8.           90.       110.
8                    9.           91.       120.
8                   10.           95.       130.
9 ENDTBL
3 STRUCT     93
8                    0.            0.         0.
8                    4.           20.        10.
8                    6.          100.        20.
8                    8.          290.        30.
9 ENDTBL
3 STRUCT     94
8                    0.            0.         0.
8                    4.           80.        30.
8                    5.           90.        40.
8                    7.          300.        60.
8                    8.          800.        80.
8                    9.         1750.       120.
8                   10.         2000.       130.
9 ENDTBL
3 STRUCT     95
8                    0.            0.         0.
8                    4.           10.        20.
8                    7.           20.        34.
8                    8.           30.        39.
8                    9.           40.        42.
8                   10.           43.        50.
9 ENDTBL
3 STRUCT     98
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8                          0.            0.        0.
8                          4.         2000.       80.
8                         10.         3500.      160.
9 ENDTBL
3 STRUCT      97
8                          0.            0.        0.
8                          4.          400.      75.0
8                          5.          800.      100.
8                          6.         2000.      137.5
8                          7.         2700.      162.5
8                          8.         2900.      187.5
8                          9.         3000.      237.5
8                         10.         3150.      250.
8                         13.         3200.      375.
9 ENDTBL
5 RUNOFF 1  82        1        0.19       67.0       0.19
6 REACH  3 174   1    2     2300.0        0.9       1.53
6 RUNOFF 1  74        1        0.18       67.0       0.48
6 ADDHYD 4    74 1 2 3
5 REACH  3 173   3    1     2800.0        0.7       1.53
6 RUNOFF 1  75        2        0.12       67.0        .70
5 ADDHYD 4    75 1 2 3
5 RUNOFF 1  73        1        0.12       67.0        .53
5 ADDHYD 4    75 1 3 2
6 RUNOFF 1  81        1        0.39       67.0       0.51
5 REACH  3 175   1    3     3850.0        0.6       1.56
6 ADDHYD 4    75 2 3 1
6 RUNOFF 1  80        2        0.22       67.0       0.40
6 REACH  3 176   2    3     4100.0        0.6       1.56
5 ADDHYD 4    75 3 1 2
6 RUNOFF 1  76        1        0.17       67.0       0.68
5 ADDHYD 4    75 1 2 3
5 REACH  3 172   3    2     1700.0        0.8       1.53
5 RUNOFF 1  88        1        0.10       67.0        .34
6 ADDHYD 4    77 1 2 3
5 RUNOFF 1  77        2        0.25       67.0        .56
5 ADDHYD 4    77 3 2 1
6 RUNOFF 1  79        2        0.29       67.0       0.29
5 REACH  3 178   2    3     3000.0        0.6       1.56
5 RUNOFF 1  78        2        0.88       67.0       0.44
6 ADDHYD 4    78 2 3 4
5 REACH  3 177   4    2     3350.0        0.6       1.56
5 ADDHYD 4    77 2 1 3
6 REACH  3 171   3    2     3850.0        0.2       1.63
6 RUNOFF 1  71        1        0.36       75.0        .30
5 ADDHYD 4    71 1 2 3
5 REACH  3 170   3    2     2500.0        0.3       1.63
6 RUNOFF 1  70        1        0.31       75.0       0.35
5 ADDHYD 4    70 1 2 3
5 REACH  3 187   3    2     1200.0        0.2       1.64
5 RUNOFF 1  87        3        0.04       71.0       0.14
5 ADDHYD 4    87 3 2 4
5 RUNOFF 1  72        2        0.25       70.0       0.23
6 REACH  3 169   2    3     3000.0         .8       1.55
6 RUNOFF 1  69        1        0.25       75.0       0.80
5 ADDHYD 4    69 3 1 2
5 REACH  3 186   2    1     1400.0        0.7       1.51
6 RUNOFF 1  86        2        0.05       75.0       0.37
5 ADDHYD 4    87 1 2 3
5 ADDHYD 4    87 4 3 1
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6 REACH  3 163   1   2      4400.0       0.2      1.64
6 RUNOFF 1  63       3        0.16      73.0      0.43
6 ADDHYD 4    63 2 3 4
6 REACH  3 160   4   1      4400.0       0.2      1.65
6 RUNOFF 1  60       3        0.15      72.0      0.41
6 ADDHYD 4    60 1 3 4
6 RUNOFF 1  59       3        0.16      86.0       .33
6 ADDHYD 4    60 4 3 5
6 RUNOFF 1  68       1        0.22      75.0       .65
6 REACH  3 167   1   3      3300.0       0.7      1.51
6 RUNOFF 1  67       1        0.27      85.0       .54
6 ADDHYD 4    67 3 1 2
6 REACH  3 164   2   3      2500.0       0.8      1.51
6 RUNOFF 1  64       2        0.25      85.0       .30
6 ADDHYD 4    64 3 2 1
6 REACH  3 159   1   3      3300.0       0.5      1.62
6 ADDHYD 4    60 5 3 2
6 REACH  3 151   2   1      4000.0       0.1      1.65
6 RESVOR 2    94 1   4
6 RUNOFF 1  51       5        0.15      75.0       .39
6 ADDHYD 4    51 4 5 2
6 RUNOFF 1  49       1        0.10      78.0      0.34
6 ADDHYD 4    51 1 2 5
6 RUNOFF 1  52       1        0.19      85.0      0.61
6 ADDHYD 4    51 1 5 3
6 RUNOFF 1  65       1        0.10      85.0      0.26
6 REACH  3 158   1   2      3600.0        .4      1.63
6 RUNOFF 1  58       1        0.17      93.0      0.26
6 ADDHYD 4    58 1 2 5
6 REACH  3 152   5   1      3500.0       0.3      1.63
6 RESVOR 2    93 1   2
6 ADDHYD 4    51 3 2 4
6 RUNOFF 1  62       3        0.25      86.0       .70
6 REACH  3 161   3   2      3400.0        .7      1.51
6 RUNOFF 1  61       1        0.13      73.0      0.62
6 ADDHYD 4    61 1 2 3
6 REACH  3 150   3   2      2950.0       0.6      1.53
6 RUNOFF 1  50       3        0.13      85.0      0.64
6 ADDHYD 4    50 2 3 1
6 RESVOR 2    95 1   5
6 REACH  3 149   5   2      2400.0       0.3      1.63
6 ADDHYD 4    51 4 2 3
6 REACH  3 148   3   1      3300.0       0.3      1.62
6 RUNOFF 1  48       2        0.15      73.0      0.23
6 ADDHYD 4 148   1 2 4
6 RUNOFF 1  66       3        0.31      87.0       .43
6 REACH  3 157   3   2      2300.0       0.8      1.53
6 RUNOFF 1  57       3        0.16      93.0      0.34
6 ADDHYD 4    57 2 3 1
6 REACH  3 154   1   2      3500.0       0.5      1.61
6 RUNOFF 1  55       3        0.25      86.0       .46
6 ADDHYD 4    54 2 3 1
6 RUNOFF 1  56       3        0.15      83.0      0.23
6 REACH  3 155   3   2      3450.0       0.6      1.53
6 ADDHYD 4    54 2 1 5
6 RUNOFF 1  54       7        0.25      93.0      0.33
6 ADDHYD 4    54 7 5 2
6 RESVOR 2    92 2   3
6 REACH  3 153   3   6      2050.0       0.5      1.61
6 RUNOFF 1  53       5        0.17      74.0      0.41
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```
6 ADDHYD 4     53 6 5 1
6 REACH  3 147   1   3       2300.0          0.4         1.62
6 RUNOFF 1  47       2         0.27         74.0         0.45
6 ADDHYD 4 147   3 2 6
6 RUNOFF 1 142       1         0.06         81.0          .53
6 ADDHYD 4 147   1 6 2
6 ADDHYD 4 148   2 4 1
6 REACH  3 141   1   2       2100.0
6 RUNOFF 1 122       3         0.03         76.0          .36
5 ADDHYD 4 143   2 3 1
6 RUNOFF 1 141       3         0.05         67.0         0.42
6 ADDHYD 4 143   3 1 2
5 RUNOFF 1 145       1         0.24         86.0          .32
6 RUNOFF 1 146       3         0.18         75.0         0.45
6 ADDHYD 4 145   1 3 4
5 RUNOFF 1 121       1         0.05         76.0          .40
5 ADDHYD 4 145   1 4 3
6 REACH  3 143   3   1       1900.0
5 RUNOFF 1 123       3         0.04         81.0          .35
5 ADDHYD 4 142   3 1 5
6 ADDHYD 4 142   2 5 1
6 REACH  3 186   1   2        700.0
  RUNOFF 1 124       1         0.02         81.0          .41
  ADDHYD 4 141   2 1 3
6 RUNOFF 1 140       1         0.33         79.0          .65
  ADDHYD 4 141   1 3 2
  REACH  3 185   2   1       1100.0
6 RUNOFF 1 125       2         0.03         80.0         0.46
  ADDHYD 4 185   1 2 3
  RUNOFF 1 139       1         0.15         84.0         0.63
6 ADDHYD 4 185   3 1 4
6 RUNOFF 1 143       1         0.25         82.0          .43
  ADDHYD 4 185   4 1 2
  REACH  3 137   2   1       3300.0
6 RUNOFF 1 128       2         0.04         75.0          .39
  ADDHYD 4 137   1 2 3
  RUNOFF 1 137       2         0.11         80.0          .44
6 ADDHYD 4 137   3 2 1
  RUNOFF 1 126       2         0.08         79.0          .45
  RUNOFF 1 127       3         0.07         82.0         0.39
  ADDHYD 4 137   2 3 4
6 ADDHYD 4 137   1 4 2
  RESVOR 2     91 2   3
  REACH  3 129   3   2       3800.0          0.1         1.65
6 RUNOFF 1  27       3         0.16         85.0         0.23
  ADDHYD 4     29 2 3 1
  RUNOFF 1  38         3       0.32         76.0         0.58
  REACH  3 128   3   2       1700.0          1.2         1.47
  RUNOFF 1  28         4       0.17         86.0         0.18
  ADDHYD 4     28 2 4 5
  REACH  3 127   5   3       2300.0          1.0         1.47
6 ADDHYD 4     29 1 3 5
  RUNOFF 1  29         1        .20         80.0          .24
  ADDHYD 4  29   1 5 4
6 REACH  3 184   4   2       1350.0           .2         1.63
  RUNOFF 1  84         3       0.04         86.0          .08
  ADDHYD 4     30 2 3 1
6 RUNOFF 1  30         3       0.10         82.0         0.57
  ADDHYD 4     30 3 1 2
  RUNOFF 1  31         3       0.21         92.0          .70
```

```
8                    3.5         3110.0      432.0
8                    4.0         3884.0      496.0
8                    4.5         4725.0      560.0
8                    5.0         5630.0      624.0
9 ENDTBL
2 XSECTN   186       1.0
8                    0.0            0.0        0.0
8                    1.0          386.0      120.0
8                    1.5          760.0      182.0
8                    2.0         1226.0      244.0
8                    2.5         1777.0      306.0
8                    3.0         2407.0      369.0
8                    3.5         3110.0      432.0
8                    4.0         3884.0      496.0
8                    4.5         4725.0      560.0
8                    5.0         5630.0      624.0
9 ENDTBL
3 STRUCT     91
8                   57.            0.         0.
8                   58.          120.         2.6
8                   59.          460.         5.8
8                   60.          964.         9.6
8                   61.         1584.        14.1
8                   62.         2304.        19.4
8                   63.         3108.        25.6
8                   64.         3986.        32.8
9 ENDTBL
3 STRUCT     92
8                    0.            0.         0.
8                    4.           40.        40.
8                    5.           60.        60.
8                    6.           82.        90.
8                    8.           90.       110.
8                    9.           91.       120.
8                   10.           95.       130.
9 ENDTBL
3 STRUCT     93
8                    0.            0.         0.
8                    4.           20.        10.
8                    6.          100.        20.
8                    8.          290.        30.
9 ENDTBL
3 STRUCT     94
8                    0.            0.         0.
8                    4.           80.        30.
8                    5.           90.        40.
8                    7.          300.        60.
8                    8.          800.        80.
8                    9.         1750.       120.
8                   10.         2000.       130.
9 ENDTBL
3 STRUCT     95
8                    0.            0.         0.
8                    4.           10.        20.
8                    7.           20.        34.
8                    8.           30.        39.
8                    9.           40.        42.
8                   10.           43.        50.
9 ENDTBL
3 STRUCT     98
```

```
6 ADDHYD 4     11 3 1 5
6 REACH  3 107   5   1        2650.0         1.0        1.45
6 ADDHYD 4      6 1 2 3
6 RESVOR 2     97 3   4
6 REACH  3 104   4   1        1950.0         0.2        1.65
6 RUNOFF 1   4       2          0.19        86.0        0.24
6 ADDHYD 4      4 1 2 3
6 RUNOFF 1   8       2          0.20        91.0         .39
6 ADDHYD 4      8 3 2 1
6 RUNOFF 1  10       2          0.14        85.0        0.17
6 REACH  3 109   2   3        2350.0         1.8        1.41
6 RUNOFF 1   9       2          0.25        87.0        0.15
6 ADDHYD 4      9 3 2 4
6 REACH  3 108   4   2        2500.0         0.9        1.47
6 ADDHYD 4     99 1 2 4
  ENDATA
7 INCREM 6                   .083
7 COMPUT 7  82      99          0.0         4.4        1.01 2  01  01 100-YR
  ENDCMP 1
7 COMPUT 7  82      99          0.0         3.0        1.01 2  01  02 10-YR
  ENDCMP 1
  ENDJOB 2
```

TR-20 ANALYSIS

SAND CREEK D.B.P.S. FULLY DEVELOPED CONDITION MODEL MODIFIED TO REFLECT CURRENT PROPOSED FULLY DEVELOPED CONDITION IN ON-SITE AREA

MODEL OUTPUT

FILE NO. 1

COMPUTER PROGRAM FOR PROJECT FORMULATION - HYDROLOGY USER NOTES

THE USERS MANUAL FOR THIS PROGRAM IS THE MAY 1983 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)

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

EXECUTIVE CONTROL OPERATION INCREM RECORD ID
\+ MAIN TIME INCREMENT = .08 HOURS

EXECUTIVE CONTROL OPERATION COMPUT RECORD ID 100-YR
\+ FROM XSECTION 82
\+ 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 = .08 HOURS

*** WARNING REACH 174 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

*** WARNING REACH 173 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

*** WARNING REACH 172 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

*** WARNING REACH 177 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

*** WARNING REACH 170 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

*** WARNING REACH 187 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

*** WARNING REACH 169 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

*** WARNING REACH 186 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

*** WARNING REACH 164 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

*** WARNING REACH 159 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***
0 *** WARNING - REACH 149 INFLOW HYDROGRAPH VOLUME TRUNCATED ABOVE BASEFLOW AT 16.49 CFS, 39.87 % OF PEAK.

*** WARNING REACH 148 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

*** WARNING REACH 157 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

*** WARNING REACH 154 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***
0 *** WARNING - REACH 153 INFLOW HYDROGRAPH VOLUME TRUNCATED ABOVE BASEFLOW AT 60.20 CFS, 64.33 % OF PEAK.
0 *** WARNING - REACH 147 INFLOW HYDROGRAPH VOLUME TRUNCATED ABOVE BASEFLOW AT 60.73 CFS, 23.77 % OF PEAK.

*** WARNING REACH 141 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

*** WARNING REACH 143 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

*** WARNING REACH 186 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

*** WARNING REACH 185 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***
1

*** WARNING REACH 137 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

*** WARNING REACH 128 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

*** WARNING REACH 127 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

*** WARNING REACH 184 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

*** WARNING REACH 130 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

*** WARNING REACH 125 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

*** WARNING REACH 120 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

*** WARNING REACH 183 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

*** WARNING REACH 115 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

*** WARNING REACH 114 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

*** WARNING REACH 106 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

*** WARNING REACH 107 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

*** WARNING REACH 104 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

*** WARNING REACH 109 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

*** WARNING REACH 108 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

(ECUTIVE CONTROL OPERATION ENDCMP RECORD ID

COMPUTATIONS COMPLETED FOR PASS 1

EXECUTIVE CONTROL OPERATION COMPUT RECORD ID 10-YR

FROM XSECTION 82

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 = .08 HOURS

*** WARNING REACH 172 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

*** WARNING REACH 170 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

*** WARNING REACH 187 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

** WARNING-MAIN TIME INCREMENT MAY BE TOO LARGE.

COMPUTED PEAK(29.70) AT EXCEEDS MAX. ADJACENT HYDROGRAPH COORDINATE BY 7 %.

XSECTION 87

XSECTION 74	RUNOFF	.18	1	2	.08	.0	4.40	24.00	1.40	---	6.18	148.53	825.2
STRUCTURE 74	ADDHYD	.37	1	2	.08	.0	4.40	24.00	1.40	---	6.14	379.44	1025.5
XSECTION 173	REACH	.37	1	2	.08	.0	4.40	24.00	1.40	---	6.25	346.58	936.
XSECTION 75	RUNOFF	.12	1	2	.08	.0	4.40	24.00	1.40	---	6.33	75.13	626.1
STRUCTURE 75	ADDHYD	.49	1	2	.08	.0	4.40	24.00	1.40	---	6.25	418.87	854.9
XSECTION 73	RUNOFF	.12	1	2	.08	.0	4.40	24.00	1.40	---	6.21	92.61	771.
STRUCTURE 75	ADDHYD	.61	1	2	.08	.0	4.40	24.00	1.40	---	6.25	510.06	836.2
XSECTION 81	RUNOFF	.39	1	2	.08	.0	4.40	24.00	1.40	---	6.20	304.01	779.5
XSECTION 175	REACH	.39	1	2	.08	.0	4.40	24.00	1.40	---	6.36	271.28	695.4
STRUCTURE 75	ADDHYD	1.00	1	2	.08	.0	4.40	24.00	1.40	---	6.28	754.36	754.4
XSECTION 80	RUNOFF	.22	1	2	.08	.0	4.40	24.00	1.40	---	6.14	202.83	922.0
XSECTION 176	REACH	.22	1	2	.08	.0	4.40	24.00	1.40	---	6.30	166.10	755.1
STRUCTURE 75	ADDHYD	1.22	1	2	.08	.0	4.40	24.00	1.40	---	6.28	919.57	753.7
XSECTION 76	RUNOFF	.17	1	2	.08	.0	4.40	24.00	1.39	---	6.31	107.47	632.1
STRUCTURE 75	ADDHYD	1.39	1	2	.08	.0	4.40	24.00	1.40	---	6.28	1026.56	738.5
XSECTION 172	REACH	1.39	1	2	.08	.0	4.40	24.00	1.40	---	6.28	1026.56	738.5
XSECTION 88	RUNOFF	.10	1	2	.08	.0	4.40	24.00	1.40	---	6.11	100.20	1002.1
STRUCTURE 77	ADDHYD	1.49	1	2	.08	.0	4.40	24.00	1.40	---	6.27	1086.70	729.3
XSECTION 77	RUNOFF	.25	1	2	.08	.0	4.40	24.00	1.40	---	6.23	182.71	730.9
STRUCTURE 77	ADDHYD	1.74	1	2	.08	.0	4.40	24.00	1.40	---	6.26	1275.55	733.
XSECTION 79	RUNOFF	.29	1	2	.08	.0	4.40	24.00	1.40	---	6.08	318.12	1097.6
XSECTION 178	REACH	.29	1	2	.08	.0	4.40	24.00	1.40	---	6.20	284.15	979.8
XSECTION 78	RUNOFF	.88	1	2	.08	.0	4.40	24.00	1.40	---	6.16	762.75	866.8
STRUCTURE 78	ADDHYD	1.17	1	2	.08	.0	4.40	24.00	1.40	---	6.17	1041.83	890.4
XSECTION 177	REACH	1.17	1	2	.08	.0	4.40	24.00	1.40	---	6.28	998.05	853.0
STRUCTURE 77	ADDHYD	2.91	1	2	.08	.0	4.40	24.00	1.40	---	6.27	2262.04	777.3
XSECTION 171	REACH	2.91	1	2	.08	.0	4.40	24.00	1.40	---	6.40	2130.34	732.1
XSECTION 71	RUNOFF	.36	1	2	.08	.0	4.40	24.00	1.97	---	6.07	575.74	1599.3
STRUCTURE 71	ADDHYD	3.27	1	2	.08	.0	4.40	24.00	1.46	---	6.39	2270.28	694.3
XSECTION 170	REACH	3.27	1	2	.08	.0	4.40	24.00	1.46	---	6.47	2264.65	692.6

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 70	RUNOFF	.31	1	2	.08	.0	4.40	24.00	1.97	---	6.09	458.78	1479.9
STRUCTURE 70	ADDHYD	3.58	1	2	.08	.0	4.40	24.00	1.50	---	6.46	2380.85	665.0
XSECTION 187	REACH	3.58	1	2	.08	.0	4.40	24.00	1.50	---	6.46	2380.85	665.0

TIME(HRS)		FIRST HYDROGRAPH POINT =	.00 HOURS		TIME INCREMENT =	.08 HOURS		DRAINAGE AREA =	.04 SQ.MI.	
4.98	DISCHG	.00	.00	.00	.00	.00	.00	.00	.00	1.61
5.81	DISCHG	9.31	18.83	27.43	27.70	10.91	5.11	3.75	3.46	3.43	3.23
6.64	DISCHG	2.45	2.20	2.15	2.15	2.16	2.03	1.54	1.37	1.33	1.33
7.47	DISCHG	1.33	1.38	1.55	1.62	1.64	1.65	1.66	1.54	1.02	.82
8.30	DISCHG	.78	.77	.77	.77	.77	.77	.77	.77	.77	.78
9.13	DISCHG	.78	.78	.78	.78	.78	.78	.78	.79	.79	.79
9.96	DISCHG	.79	.76	.53	.43	.40	.40	.40	.40	.40	.40
10.79	DISCHG	.40	.40	.40	.46	.92	1.14	1.19	1.21	1.21	1.16
11.62	DISCHG	.70	.47	.42	.41	.41	.43	.66	.78	.81	.82
12.45	DISCHG	.82	.80	.57	.45	.42	.41	.41	.41	.41	.41
13.28	DISCHG	.41	.41	.41	.41	.41	.42	.42	.42	.42	.42
14.11	DISCHG	.46	.49	.50	.50	.50	.50	.50	.50	.50	.50
14.94	DISCHG	.50	.50	.51	.51	.51	.51	.51	.51	.55	.58
15.77	DISCHG	.59	.59	.59	.59	.51	.45	.43	.43	.43	.43
16.60	DISCHG	.43	.43	.43	.43	.43	.43	.43	.43	.43	.43
17.43	DISCHG	.43	.43	.43	.43	.43	.43	.43	.43	.43	.43
18.26	DISCHG	.43	.43	.43	.43	.43	.43	.43	.43	.43	.44
19.09	DISCHG	.44	.44	.44	.44	.44	.44	.44	.44	.44	.44
19.92	DISCHG	.44	.44	.37	.29	.27	.26	.26	.26	.23	.19
20.75	DISCHG	.18	.18	.18	.18	.21	.25	.26	.26	.26	.26
21.58	DISCHG	.23	.19	.18	.18	.18	.18	.21	.25	.26	.26
22.41	DISCHG	.27	.27	.24	.19	.18	.18	.18	.18	.20	.25
23.24	DISCHG	.26	.27	.27	.27	.24	.19	.18	.18	.18	.18
24.07	DISCHG	.13	.04	.01	.00						

***WARNING - LACK OF LOW FLOW DEFINITION FOR XSECT TABLE186. MAX.FLOW LESS THAN 2ND TABLE VALUE.

*** WARNING REACH 186 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

*** WARNING REACH 164 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

*** WARNING REACH 159 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***
0 *** WARNING - REACH 149 INFLOW HYDROGRAPH VOLUME TRUNCATED ABOVE BASEFLOW AT 10.06 CFS, 71.35 % OF PEAK.

*** WARNING REACH 157 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

*** WARNING REACH 154 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***
0 *** WARNING - REACH 153 INFLOW HYDROGRAPH VOLUME TRUNCATED ABOVE BASEFLOW AT 31.46 CFS, 46.24 % OF PEAK.
0 *** WARNING - REACH 147 INFLOW HYDROGRAPH VOLUME TRUNCATED ABOVE BASEFLOW AT 31.86 CFS, 27.80 % OF PEAK.

*** WARNING REACH 141 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***
0 *** WARNING - REACH 141 INFLOW HYDROGRAPH VOLUME TRUNCATED ABOVE BASEFLOW AT 98.98 CFS, 12.04 % OF PEAK.
1

*** WARNING REACH 143 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

*** WARNING REACH 186 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

*** WARNING REACH 185 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

*** WARNING REACH 128 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

*** WARNING REACH 127 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

*** WARNING REACH 184 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

*** WARNING REACH 125 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

*** WARNING REACH 120 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

*** WARNING REACH 183 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

*** WARNING REACH 115 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

*** WARNING REACH 114 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

*** WARNING REACH 106 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

*** WARNING REACH 107 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

*** WARNING REACH 104 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

*** WARNING REACH 109 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

*** WARNING REACH 108 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT ***

EXECUTIVE CONTROL OPERATION ENDCMP RECORD ID

COMPUTATIONS COMPLETED FOR PASS 2

EXECUTIVE CONTROL OPERATION ENDJOB RECORD ID

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 82	RUNOFF	.19	1	2	.08	.0	4.40	24.00	1.40	---	6.03	249.72	1314.3
SECTION 174	REACH	.19	1	2	.08	.0	4.40	24.00	1.40	---	6.13	235.29	1238.4

XSECTION 87	RUNOFF	.04	1	2	.08	.0	4.40	24.00	1.68	---	6.00	64.35	1608.6
STRUCTURE 87	ADDHYD	3.62	1	2	.08	.0	4.40	24.00	1.51	---	6.46	2387.76	659.6
XSECTION 72	RUNOFF	.25	1	2	.08	.0	4.40	24.00	1.60	---	6.04	354.53	1418.1
XSECTION 169	REACH	.25	1	2	.08	.0	4.40	24.00	1.60	---	6.15	327.64	1310.6
XSECTION 69	RUNOFF	.25	1	2	.08	.0	4.40	24.00	1.97	---	6.36	219.07	876.3
STRUCTURE 69	ADDHYD	.50	1	2	.08	.0	4.40	24.00	1.79	---	6.18	495.97	991.9
XSECTION 186	REACH	.50	1	2	.08	.0	4.40	24.00	1.79	1.15	6.18	495.97	991.9
XSECTION 86	RUNOFF	.05	1	2	.08	.0	4.40	24.00	1.97	---	6.10	71.95	1439.0
STRUCTURE 87	ADDHYD	.55	1	2	.08	.0	4.40	24.00	1.80	---	6.17	563.33	1024.2
STRUCTURE 87	ADDHYD	4.17	1	2	.08	.0	4.40	24.00	1.54	---	6.44	2702.46	648.1
XSECTION 163	REACH	4.17	1	2	.08	.0	4.40	24.00	1.54	---	6.56	2632.57	631.3
SECTION 63	RUNOFF	.16	1	2	.08	.0	4.40	24.00	1.82	---	6.14	194.93	1218.3
STRUCTURE 63	ADDHYD	4.33	1	2	.08	.0	4.40	24.00	1.55	---	6.55	2689.28	621.1
SECTION 160	REACH	4.33	1	2	.08	.0	4.40	24.00	1.55	---	6.67	2631.49	607.7
SECTION 60	RUNOFF	.15	1	2	.08	.0	4.40	24.00	1.74	---	6.13	178.07	1187.1
STRUCTURE 60	ADDHYD	4.48	1	2	.08	.0	4.40	24.00	1.56	---	6.66	2667.50	595.4
SECTION 59	RUNOFF	.16	1	2	.08	.0	4.40	24.00	2.91	---	6.06	371.80	2323.7
STRUCTURE 60	ADDHYD	4.64	1	2	.08	.0	4.40	24.00	1.61	---	6.66	2711.61	584.4
SECTION 68	RUNOFF	.22	1	2	.08	.0	4.40	24.00	1.97	---	6.26	224.59	1020.9
SECTION 167	REACH	.22	1	2	.08	.0	4.40	24.00	1.97	---	6.42	206.19	937.2
SECTION 67	RUNOFF	.27	1	2	.08	.0	4.40	24.00	2.81	---	6.17	477.87	1769.9
TRUCTURE 67	ADDHYD	.49	1	2	.08	.0	4.40	24.00	2.44	---	6.23	620.87	1267.1
XSECTION 164	REACH	.49	1	2	.08	.0	4.40	24.00	2.43	---	6.33	612.79	1250.6
XSECTION 64	RUNOFF	.25	1	2	.08	.0	4.40	24.00	2.81	---	6.05	584.18	2336.7
TRUCTURE 64	ADDHYD	.74	1	2	.08	.0	4.40	24.00	2.56	---	6.13	971.26	1312.5
SECTION 159	REACH	.74	1	2	.08	.0	4.40	24.00	2.56	---	6.23	953.85	1289.0
STRUCTURE 60	ADDHYD	5.38	1	2	.08	.0	4.40	24.00	1.74	---	6.60	3295.53	612.6
SECTION 151	REACH	5.38	1	2	.08	.0	4.40	24.00	1.74	---	6.73	3231.01	600.6
TRUCTURE 94	RESVOR	5.38	1	2	.08	.0	4.40	24.00	1.63	10.95	7.10	2237.01	415.8
SECTION 51	RUNOFF	.15	1	2	.08	.0	4.40	24.00	1.97	---	6.12	211.31	1408.7
TRUCTURE 51	ADDHYD	5.53	1	2	.08	.0	4.40	24.00	1.64	---	7.10	2255.57	407.9
XSECTION 49	RUNOFF	.10	1	2	.08	.0	4.40	24.00	2.21	---	6.08	170.40	1704.0
TRUCTURE 51	ADDHYD	5.63	1	2	.08	.0	4.40	24.00	1.65	---	7.10	2269.58	403.1

UMMARY 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.)

ECTION/ 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 52	RUNOFF	.19	1	2	.08	.0	4.40	24.00	2.81	---	6.21	311.88	1641.5
STRUCTURE 51	ADDHYD	5.82	1	2	.08	.0	4.40	24.00	1.69	---	7.09	2315.31	397.
XSECTION 65	RUNOFF	.10	1	2	.08	.0	4.40	24.00	2.82	---	6.03	244.95	2449.
XSECTION 158	REACH	.10	1	2	.08	.0	4.40	24.00	2.82	---	6.24	213.73	2137.3
XSECTION 58	RUNOFF	.17	1	2	.08	.0	4.40	24.00	3.61	---	6.02	517.29	3042.
STRUCTURE 58	ADDHYD	.27	1	2	.08	.0	4.40	24.00	3.32	---	6.05	647.91	2399.7
XSECTION 152	REACH	.27	1	2	.08	.0	4.40	24.00	3.31	---	6.17	600.45	2223.9
STRUCTURE 93	RESVOR	.27	1	2	.08	.0	4.40	24.00	3.08	6.82	6.64	178.27	660.
STRUCTURE 51	ADDHYD	6.09	1	2	.08	.0	4.40	24.00	1.75	---	7.07	2448.96	402.
XSECTION 62	RUNOFF	.25	1	2	.08	.0	4.40	24.00	2.91	---	6.26	394.99	1580.0
XSECTION 161	REACH	.25	1	2	.08	.0	4.40	24.00	2.91	---	6.41	373.47	1493.
XSECTION 61	RUNOFF	.13	1	2	.08	.0	4.40	24.00	1.82	---	6.25	123.70	951.5
STRUCTURE 61	ADDHYD	.38	1	2	.08	.0	4.40	24.00	2.54	---	6.37	481.68	1267.6
XSECTION 150	REACH	.38	1	2	.08	.0	4.40	24.00	2.54	---	6.50	466.70	1228.
XSECTION 50	RUNOFF	.13	1	2	.08	.0	4.40	24.00	2.82	---	6.22	208.78	1606.0
STRUCTURE 50	ADDHYD	.51	1	2	.08	.0	4.40	24.00	2.61	---	6.43	616.00	1207.
STRUCTURE 95	RESVOR	.51	1	2	.08	.0	4.40	24.00	1.54	9.45	8.57	41.35	81.
XSECTION 149	REACH	.51	1	2	.08	.0	4.40	24.00	1.53	---	8.82	41.32	81.0
STRUCTURE 51	ADDHYD	6.60	1	2	.08	.0	4.40	24.00	1.73	---	7.08	2472.38	374.
XSECTION 148	REACH	6.60	1	2	.08	.0	4.40	24.00	1.73	---	7.18	2463.04	373.
XSECTION 48	RUNOFF	.15	1	2	.08	.0	4.40	24.00	1.82	---	6.04	243.72	1624.8
XSECTION 148	ADDHYD	6.75	1	2	.08	.0	4.40	24.00	1.73	---	7.18	2477.43	367.
XSECTION 66	RUNOFF	.31	1	2	.08	.0	4.40	24.00	3.00	---	6.11	668.83	2157.
XSECTION 157	REACH	.31	1	2	.08	.0	4.40	24.00	3.00	---	6.20	663.21	2139.4
XSECTION 57	RUNOFF	.16	1	2	.08	.0	4.40	24.00	3.61	---	6.04	452.40	2827.
STRUCTURE 57	ADDHYD	.47	1	2	.08	.0	4.40	24.00	3.21	---	6.13	1041.60	2216.2
XSECTION 154	REACH	.47	1	2	.08	.0	4.40	24.00	3.21	---	6.23	1017.74	2165.4
XSECTION 55	RUNOFF	.25	1	2	.08	.0	4.40	24.00	2.91	---	6.13	505.86	2023.
STRUCTURE 54	ADDHYD	.72	1	2	.08	.0	4.40	24.00	3.10	---	6.19	1479.29	2054.6
XSECTION 56	RUNOFF	.15	1	2	.08	.0	4.40	24.00	2.63	---	6.03	354.24	2361.6
XSECTION 155	REACH	.15	1	2	.08	.0	4.40	24.00	2.63	---	6.14	315.06	2100.
STRUCTURE 54	ADDHYD	.87	1	2	.08	.0	4.40	24.00	3.02	---	6.18	1784.67	2051.3
XSECTION 54	RUNOFF	.25	1	2	.08	.0	4.40	24.00	3.61	---	6.04	714.19	2856.0
STRUCTURE 54	ADDHYD	1.12	1	2	.08	.0	4.40	24.00	3.15	---	6.13	2385.37	2129.8
STRUCTURE 92	RESVOR	1.12	1	2	.08	.0	4.40	24.00	2.14	9.64	8.35	93.58	83.6
XSECTION 153	REACH	1.12	1	2	.08	.0	4.40	24.00	2.13	---	8.48	93.56	83.5

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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	RAIN TABLE #	ANTEC MOIST COND	MAIN TIME INCREM	PRECIPITATION BEGIN	PRECIPITATION AMOUNT	PRECIPITATION DURATION	RUNOFF AMOUNT	PEAK DISCHARGE ELEVATION	PEAK DISCHARGE TIME	PEAK DISCHARGE RATE	PEAK DISCHARGE RATE

		(SQ MI)			(HR)	(HR)	(IN)	(HR)	(IN)	(FT)	(HR)	(CFS)	(CSM)
ALTERNATE 1 STORM 1													
XSECTION 53	RUNOFF	.17	1	2	.08	.0	4.40	24.00	1.89	---	6.13	222.27	1307.5
STRUCTURE 53	ADDHYD	1.29	1	2	.08	.0	4.40	24.00	2.10	---	6.16	256.09	198.5
XSECTION 147	REACH	1.29	1	2	.08	.0	4.40	24.00	2.09	---	6.28	242.09	187.7
XSECTION 47	RUNOFF	.27	1	2	.08	.0	4.40	24.00	1.89	---	6.15	336.71	1247.1
XSECTION 147	ADDHYD	1.56	1	2	.08	.0	4.40	24.00	2.06	---	6.20	551.92	353.8
XSECTION 142	RUNOFF	.06	1	2	.08	.0	4.40	24.00	2.46	---	6.17	92.93	1548.8
XSECTION 147	ADDHYD	1.62	1	2	.08	.0	4.40	24.00	2.07	---	6.19	644.08	397.6
XSECTION 148	ADDHYD	8.37	1	2	.08	.0	4.40	24.00	1.80	---	7.17	2633.35	314.6
XSECTION 141	REACH	8.37	1	2	.08	.0	4.40	24.00	1.79	4.64	7.25	2632.66	314.5
XSECTION 122	RUNOFF	.03	1	2	.08	.0	4.40	24.00	2.05	---	6.10	46.28	1542.8
XSECTION 143	ADDHYD	8.40	1	2	.08	.0	4.40	24.00	1.79	7.16	7.25	2635.65	313.8
XSECTION 141	RUNOFF	.05	1	2	.08	.0	4.40	24.00	1.40	---	6.15	44.75	895.0
XSECTION 143	ADDHYD	8.45	1	2	.08	.0	4.40	24.00	1.79	7.17	7.25	2639.80	312.4
XSECTION 145	RUNOFF	.24	1	2	.08	.0	4.40	24.00	2.91	---	6.05	566.69	2361.2
XSECTION 146	RUNOFF	.18	1	2	.08	.0	4.40	24.00	1.97	---	6.15	235.30	1307.2
XSECTION 145	ADDHYD	.42	1	2	.08	.0	4.40	24.00	2.51	---	6.08	782.67	1863.5
XSECTION 121	RUNOFF	.05	1	2	.08	.0	4.40	24.00	2.05	---	6.12	72.62	1452.3
XSECTION 145	ADDHYD	.47	1	2	.08	.0	4.40	24.00	2.46	---	6.08	853.15	1815.2
XSECTION 143	REACH	.47	1	2	.08	.0	4.40	24.00	2.46	3.91	6.08	853.15	1815.2
XSECTION 123	RUNOFF	.04	1	2	.08	.0	4.40	24.00	2.46	---	6.08	75.90	1897.6
XSECTION 142	ADDHYD	.51	1	2	.08	.0	4.40	24.00	2.46	---	6.08	929.05	1821.7
XSECTION 142	ADDHYD	8.96	1	2	.08	.0	4.40	24.00	1.83	---	7.24	2697.83	301.1
XSECTION 186	REACH	8.96	1	2	.08	.0	4.40	24.00	1.83	3.21	7.24	2697.83	301.1
XSECTION 124	RUNOFF	.02	1	2	.08	.0	4.40	24.00	2.46	---	6.11	35.31	1765.7
XSECTION 141	ADDHYD	8.98	1	2	.08	.0	4.40	24.00	1.83	4.71	7.24	2700.26	300.7
XSECTION 140	RUNOFF	.33	1	2	.08	.0	4.40	24.00	2.29	---	6.25	406.27	1231.1
XSECTION 141	ADDHYD	9.31	1	2	.08	.0	4.40	24.00	1.85	4.76	7.23	2759.34	296.4
XSECTION 185	REACH	9.31	1	2	.08	.0	4.40	24.00	1.85	3.25	7.23	2759.34	296.4
XSECTION 125	RUNOFF	.03	1	2	.08	.0	4.40	24.00	2.37	---	6.14	48.22	1607.2
XSECTION 185	ADDHYD	9.34	1	2	.08	.0	4.40	24.00	1.85	3.25	7.23	2763.27	295.9
XSECTION 139	RUNOFF	.15	1	2	.08	.0	4.40	24.00	2.72	---	6.22	233.19	1554.6
XSECTION 185	ADDHYD	9.49	1	2	.08	.0	4.40	24.00	1.86	3.38	6.19	2934.87	309.3
XSECTION 143	RUNOFF	.25	1	2	.08	.0	4.40	24.00	2.55	---	6.12	449.59	1798.4
XSECTION 185	ADDHYD	9.74	1	2	.08	.0	4.40	24.00	1.88	3.67	6.18	3380.54	347.1
XSECTION 137	REACH	9.74	1	2	.08	.0	4.40	24.00	1.88	3.59	6.30	3249.53	333.6
XSECTION 128	RUNOFF	.04	1	2	.08	.0	4.40	24.00	1.97	---	6.12	56.35	1408.7

SUMMARY TABLE 1 - SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL INSTRUCTIONS IN THE ORDER PERFORMED
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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 137	ADDHYD	9.78	1	2	.08	.0	4.40	24.00	1.88	3.61	6.30	3285.02	335.9
XSECTION 137	RUNOFF	.11	1	2	.08	.0	4.40	24.00	2.37	---	6.13	179.79	1634.5
XSECTION 137	ADDHYD	9.89	1	2	.08	.0	4.40	24.00	1.88	3.70	6.29	3417.32	345.5
XSECTION 126	RUNOFF	.08	1	2	.08	.0	4.40	24.00	2.29	---	6.14	124.80	1560.0
XSECTION 127	RUNOFF	.07	1	2	.08	.0	4.40	24.00	2.55	---	6.10	131.62	1880.3
XSECTION 137	ADDHYD	.15	1	2	.08	.0	4.40	24.00	2.41	.66	6.12	255.51	1703.4
XSECTION 137	ADDHYD	10.04	1	2	.08	.0	4.40	24.00	1.89	3.82	6.27	3599.69	358.5
STRUCTURE 91	RESVOR	10.04	1	2	.08	.0	4.40	24.00	1.89	63.31	6.37	3383.76	337.0
XSECTION 129	REACH	10.04	1	2	.08	.0	4.40	24.00	1.88	---	6.52	3211.71	319.9
XSECTION 27	RUNOFF	.16	1	2	.08	.0	4.40	24.00	2.82	---	6.02	402.22	2513.9
STRUCTURE 29	ADDHYD	10.20	1	2	.08	.0	4.40	24.00	1.90	---	6.52	3255.04	319.1
XSECTION 38	RUNOFF	.32	1	2	.08	.0	4.40	24.00	2.04	---	6.22	368.55	1151.7
XSECTION 128	REACH	.32	1	2	.08	.0	4.40	24.00	2.04	---	6.31	368.18	1150.6
XSECTION 28	RUNOFF	.17	1	2	.08	.0	4.40	24.00	2.92	---	5.99	446.97	2629.3
STRUCTURE 28	ADDHYD	.49	1	2	.08	.0	4.40	24.00	2.35	---	6.05	627.69	1281.0
XSECTION 127	REACH	.49	1	2	.08	.0	4.40	24.00	2.34	---	6.14	614.64	1254.4
STRUCTURE 29	ADDHYD	10.69	1	2	.08	.0	4.40	24.00	1.92	---	6.50	3639.35	340.4
XSECTION 29	RUNOFF	.20	1	2	.08	.0	4.40	24.00	2.38	---	6.03	421.54	2107.7
XSECTION 29	ADDHYD	10.89	1	2	.08	.0	4.40	24.00	1.93	---	6.50	3690.06	338.8
XSECTION 184	REACH	10.89	1	2	.08	.0	4.40	24.00	1.93	---	6.50	3690.06	338.8
XSECTION 84	RUNOFF	.04	1	2	.08	.0	4.40	24.00	2.89	---	5.94	117.00	2925.0
STRUCTURE 30	ADDHYD	10.93	1	2	.08	.0	4.40	24.00	1.93	---	6.50	3699.61	338.5
XSECTION 30	RUNOFF	.10	1	2	.08	.0	4.40	24.00	2.55	---	6.20	153.79	1537.9
STRUCTURE 30	ADDHYD	11.03	1	2	.08	.0	4.40	24.00	1.93	---	6.49	3784.09	343.1
XSECTION 31	RUNOFF	.21	1	2	.08	.0	4.40	24.00	3.51	---	6.24	411.97	1961.8
STRUCTURE 30	ADDHYD	11.24	1	2	.08	.0	4.40	24.00	1.96	---	6.47	4088.97	363.8
XSECTION 44	RUNOFF	.11	1	2	.08	.0	4.40	24.00	2.46	---	6.12	192.18	1747.1
XSECTION 135	REACH	.11	1	2	.08	.0	4.40	24.00	2.46	---	6.25	177.81	1616.4
XSECTION 35	RUNOFF	.12	1	2	.08	.0	4.40	24.00	2.72	---	6.07	257.11	2142.6
STRUCTURE 35	ADDHYD	.23	1	2	.08	.0	4.40	24.00	2.60	---	6.13	396.46	1723.7
XSECTION 34	RUNOFF	.29	1	2	.08	.0	4.40	24.00	2.72	---	6.17	493.81	1702.8
STRUCTURE 35	ADDHYD	.52	1	2	.08	.0	4.40	24.00	2.67	---	6.15	885.71	1703.3
XSECTION 130	REACH	.52	1	2	.08	.0	4.40	24.00	2.67	---	6.26	859.11	1652.1
STRUCTURE 30	ADDHYD	11.76	1	2	.08	.0	4.40	24.00	1.99	---	6.43	4736.10	402.7
XSECTION 32	RUNOFF	.11	1	2	.08	.0	4.40	24.00	3.82	---	6.15	266.06	2418.7
XSECTION 33	RUNOFF	.29	1	2	.08	.0	4.40	24.00	3.50	---	6.02	870.16	3000.5

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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													
STRUCTURE 33	ADDHYD	.40	1	2	.08	.0	4.40	24.00	3.59	---	6.03	1108.60	2771.5
XSECTION 131	REACH	.40	1	2	.08	.0	4.40	24.00	3.59	---	6.14	1044.35	2610.9
STRUCTURE 30	ADDHYD	12.16	1	2	.08	.0	4.40	24.00	2.05	---	6.37	5251.51	431.9
SECTION 125	REACH	12.16	1	2	.08	.0	4.40	24.00	2.05	---	6.37	5251.51	431.9
SECTION 26	RUNOFF	.19	1	2	.08	.0	4.40	24.00	2.82	---	6.02	482.00	2536.8
STRUCTURE 25	ADDHYD	12.35	1	2	.08	.0	4.40	24.00	2.06	---	6.36	5321.14	430.9
XSECTION 25	RUNOFF	.04	1	2	.08	.0	4.40	24.00	2.50	---	5.94	107.02	2675.6
STRUCTURE 25	ADDHYD	12.39	1	2	.08	.0	4.40	24.00	2.06	---	6.36	5330.28	430.2
SECTION 24	RUNOFF	.19	1	2	.08	.0	4.40	24.00	3.61	---	5.99	576.76	3035.6
TRUCTURE 25	ADDHYD	12.58	1	2	.08	.0	4.40	24.00	2.08	---	6.18	5439.89	432.4
SECTION 120	REACH	12.58	1	2	.08	.0	4.40	24.00	2.08	---	6.18	5439.89	432.4
SECTION 22	RUNOFF	.13	1	2	.08	.0	4.40	24.00	3.30	---	5.95	394.57	3035.2
STRUCTURE 20	ADDHYD	12.71	1	2	.08	.0	4.40	24.00	2.10	---	6.15	5519.00	434.2
XSECTION 20	RUNOFF	.09	1	2	.08	.0	4.40	24.00	2.30	---	6.02	194.86	2165.1
TRUCTURE 20	ADDHYD	12.80	1	2	.08	.0	4.40	24.00	2.10	---	6.11	5636.73	440.4
SECTION 21	RUNOFF	.12	1	2	.08	.0	4.40	24.00	2.92	---	5.96	326.33	2719.4
TRUCTURE 20	ADDHYD	12.92	1	2	.08	.0	4.40	24.00	2.11	---	6.09	5923.97	458.5
SECTION 19	RUNOFF	.17	1	2	.08	.0	4.40	24.00	2.82	---	6.04	405.10	2382.9
TRUCTURE 20	ADDHYD	13.09	1	2	.08	.0	4.40	24.00	2.11	---	6.08	6314.80	482.4
SECTION 83	RUNOFF	.11	1	2	.08	.0	4.40	24.00	3.40	---	6.00	318.60	2896.3
STRUCTURE 20	ADDHYD	13.20	1	2	.08	.0	4.40	24.00	2.13	---	6.08	6611.44	500.9
ECTION 23	RUNOFF	.28	1	2	.08	.0	4.40	24.00	3.61	---	6.04	791.70	2827.5
SECTION 183	REACH	.28	1	2	.08	.0	4.40	24.00	3.61	---	6.13	784.60	2802.1
TRUCTURE 20	ADDHYD	13.48	1	2	.08	.0	4.40	24.00	2.16	---	6.08	7366.95	546.5
TRUCTURE 98	RESVOR	13.48	1	2	.08	.0	4.40	24.00	2.14	14.31	6.64	4577.09	339.5
SECTION 113	REACH	13.48	1	2	.08	.0	4.40	24.00	2.14	---	6.79	4526.91	335.8
SECTION 13	RUNOFF	.24	1	2	.08	.0	4.40	24.00	2.55	---	6.05	505.77	2107.4
TRUCTURE 13	ADDHYD	13.72	1	2	.08	.0	4.40	24.00	2.15	---	6.78	4568.59	333.0
SECTION 14	RUNOFF	.07	1	2	.08	.0	4.40	24.00	2.91	---	6.02	181.29	2589.8
TRUCTURE 13	ADDHYD	13.79	1	2	.08	.0	4.40	24.00	2.15	---	6.78	4580.10	332.1
SECTION 15	RUNOFF	.17	1	2	.08	.0	4.40	24.00	2.73	---	6.05	378.63	2227.3
TRUCTURE 13	ADDHYD	13.96	1	2	.08	.0	4.40	24.00	2.16	---	6.77	4612.25	330.4
ECTION 16	RUNOFF	.21	1	2	.08	.0	4.40	24.00	2.63	---	6.07	434.11	2067.2
SECTION 115	REACH	.21	1	2	.08	.0	4.40	24.00	2.63	---	6.15	433.22	2063.0
TRUCTURE 13	ADDHYD	14.17	1	2	.08	.0	4.40	24.00	2.17	---	6.76	4666.59	329.3
SECTION 18	RUNOFF	.13	1	2	.08	.0	4.40	24.00	3.00	---	6.02	346.50	2665.4

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 17	RUNOFF	.17	1	2	.08	.0	4.40	24.00	2.81	---	6.05	397.24	2336.7
STRUCTURE 18	ADDHYD	.30	1	2	.08	.0	4.40	24.00	2.90	---	6.03	740.96	2469.9
XSECTION 114	REACH	.30	1	2	.08	.0	4.40	24.00	2.90	---	6.03	740.96	2469.9
STRUCTURE 13	ADDHYD	14.47	1	2	.08	.0	4.40	24.00	2.18	---	6.75	4722.20	326.3
XSECTION 106	REACH	14.47	1	2	.08	.0	4.40	24.00	2.18	---	6.75	4722.20	326.3
XSECTION 6	RUNOFF	.13	1	2	.08	.0	4.40	24.00	2.46	---	6.09	240.33	1848.7
STRUCTURE 6	ADDHYD	14.60	1	2	.08	.0	4.40	24.00	2.18	---	6.74	4751.99	325.5
XSECTION 5	RUNOFF	.15	1	2	.08	.0	4.40	24.00	2.73	---	6.03	355.89	2372.6
STRUCTURE 6	ADDHYD	14.75	1	2	.08	.0	4.40	24.00	2.19	---	6.73	4778.84	324.0
XSECTION 7	RUNOFF	.19	1	2	.08	.0	4.40	24.00	3.61	---	6.14	442.41	2328.5
STRUCTURE 6	ADDHYD	14.94	1	2	.08	.0	4.40	24.00	2.21	---	6.15	5083.81	340.3
XSECTION 11	RUNOFF	.16	1	2	.08	.0	4.40	24.00	3.40	---	6.05	425.05	2656.6
XSECTION 12	RUNOFF	.13	1	2	.08	.0	4.40	24.00	3.60	---	6.03	382.51	2942.3
STRUCTURE 11	ADDHYD	.29	1	2	.08	.0	4.40	24.00	3.49	---	6.04	806.16	2779.9
XSECTION 107	REACH	.29	1	2	.08	.0	4.40	24.00	3.49	---	6.14	788.35	2718.5
STRUCTURE 6	ADDHYD	15.23	1	2	.08	.0	4.40	24.00	2.23	---	6.15	5871.13	385.5
STRUCTURE 97	RESVOR	15.23	1	2	.08	.0	4.40	24.00	2.16	12.29	8.31	3188.17	209.3
XSECTION 104	REACH	15.23	1	2	.08	.0	4.40	24.00	2.16	---	8.31	3188.17	209.3
XSECTION 4	RUNOFF	.19	1	2	.08	.0	4.40	24.00	2.91	---	6.02	487.20	2564.2
STRUCTURE 4	ADDHYD	15.42	1	2	.08	.0	4.40	24.00	2.17	---	8.02	3207.58	208.0
XSECTION 8	RUNOFF	.20	1	2	.08	.0	4.40	24.00	3.40	---	6.07	508.36	2541.8
STRUCTURE 8	ADDHYD	15.62	1	2	.08	.0	4.40	24.00	2.19	---	6.84	3242.81	207.6
XSECTION 10	RUNOFF	.14	1	2	.08	.0	4.40	24.00	2.82	---	5.99	360.29	2573.5
XSECTION 109	REACH	.14	1	2	.08	.0	4.40	24.00	2.81	---	6.08	355.09	2536.4
XSECTION 9	RUNOFF	.25	1	2	.08	.0	4.40	24.00	3.01	---	5.97	692.07	2768.3
STRUCTURE 9	ADDHYD	.39	1	2	.08	.0	4.40	24.00	2.94	---	6.00	1011.48	2593.5
XSECTION 108	REACH	.39	1	2	.08	.0	4.40	24.00	2.93	---	6.09	997.37	2557.3
STRUCTURE 99	ADDHYD	16.01	1	2	.08	.0	4.40	24.00	2.20	---	6.24	3579.76	223.6
ALTERNATE 1 STORM 2													
XSECTION 82	RUNOFF	.19	1	2	.08	.0	3.00	24.00	.59	---	6.05	97.75	514.5
XSECTION 174	REACH	.19	1	2	.08	.0	3.00	24.00	.58	---	6.16	82.70	435.2
XSECTION 74	RUNOFF	.18	1	2	.08	.0	3.00	24.00	.58	---	6.21	52.40	291.1
STRUCTURE 74	ADDHYD	.37	1	2	.08	.0	3.00	24.00	.58	---	6.17	133.56	361.0
XSECTION 173	REACH	.37	1	2	.08	.0	3.00	24.00	.58	---	6.31	109.98	297.2
XSECTION 75	RUNOFF	.12	1	2	.08	.0	3.00	24.00	.58	---	6.36	26.14	217.8

STRUCTURE 75	ADDHYD	.49	1	2	.08	.0	3.00	24.00	.58	---	6.32	135.83	277.2

SUMMARY TABLE 1 - SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL INSTRUCTIONS IN THE ORDER PERFORMED
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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													
XSECTION 73	RUNOFF	.12	1	2	.08	.0	3.00	24.00	.59	---	6.24	32.80	273.4
STRUCTURE 75	ADDHYD	.61	1	2	.08	.0	3.00	24.00	.58	---	6.31	166.64	273.2
XSECTION 81	RUNOFF	.39	1	2	.08	.0	3.00	24.00	.58	---	6.24	107.97	276.8
XSECTION 175	REACH	.39	1	2	.08	.0	3.00	24.00	.58	---	6.43	87.43	224.2
STRUCTURE 75	ADDHYD	1.00	1	2	.08	.0	3.00	24.00	.58	---	6.34	246.80	246.8
XSECTION 80	RUNOFF	.22	1	2	.08	.0	3.00	24.00	.58	---	6.16	73.32	333.3
XSECTION 176	REACH	.22	1	2	.08	.0	3.00	24.00	.58	---	6.36	51.48	234.0
STRUCTURE 75	ADDHYD	1.22	1	2	.08	.0	3.00	24.00	.58	---	6.34	298.32	244.5
XSECTION 76	RUNOFF	.17	1	2	.08	.0	3.00	24.00	.58	---	6.34	37.62	221.3
STRUCTURE 75	ADDHYD	1.39	1	2	.08	.0	3.00	24.00	.58	---	6.34	335.94	241.7
XSECTION 172	REACH	1.39	1	2	.08	.0	3.00	24.00	.58	---	6.43	333.92	240.2
XSECTION 88	RUNOFF	.10	1	2	.08	.0	3.00	24.00	.58	---	6.13	36.82	368.2
STRUCTURE 77	ADDHYD	1.49	1	2	.08	.0	3.00	24.00	.58	---	6.42	346.32	232.4
XSECTION 77	RUNOFF	.25	1	2	.08	.0	3.00	24.00	.58	---	6.27	64.37	257.5
STRUCTURE 77	ADDHYD	1.74	1	2	.08	.0	3.00	24.00	.58	---	6.41	399.63	229.7
XSECTION 79	RUNOFF	.29	1	2	.08	.0	3.00	24.00	.58	---	6.10	117.87	406.5
XSECTION 178	REACH	.29	1	2	.08	.0	3.00	24.00	.58	---	6.24	93.39	322.0
XSECTION 78	RUNOFF	.88	1	2	.08	.0	3.00	24.00	.58	---	6.19	271.55	308.6
STRUCTURE 78	ADDHYD	1.17	1	2	.08	.0	3.00	24.00	.58	---	6.21	361.72	309.2
XSECTION 177	REACH	1.17	1	2	.08	.0	3.00	24.00	.58	---	6.34	327.48	279.9
STRUCTURE 77	ADDHYD	2.91	1	2	.08	.0	3.00	24.00	.58	---	6.37	715.59	245.9
XSECTION 171	REACH	2.91	1	2	.08	.0	3.00	24.00	.58	---	6.55	630.48	216.7
XSECTION 71	RUNOFF	.36	1	2	.08	.0	3.00	24.00	.96	---	6.08	267.37	742.7
STRUCTURE 71	ADDHYD	3.27	1	2	.08	.0	3.00	24.00	.63	---	6.53	677.48	207.2
XSECTION 170	REACH	3.27	1	2	.08	.0	3.00	24.00	.62	---	6.65	664.95	203.3
XSECTION 70	RUNOFF	.31	1	2	.08	.0	3.00	24.00	.96	---	6.11	210.83	680.1
STRUCTURE 70	ADDHYD	3.58	1	2	.08	.0	3.00	24.00	.65	---	6.64	702.63	196.3
XSECTION 187	REACH	3.58	1	2	.08	.0	3.00	24.00	.65	---	6.72	702.48	96.2
XSECTION 87	RUNOFF	.04	1	2	.08	.0	3.00	24.00	.76	---	6.02	29.70	742.4
STRUCTURE 87	ADDHYD	3.62	1	2	.08	.0	3.00	24.00	.65	---	6.72	704.68	194.7
XSECTION 72	RUNOFF	.25	1	2	.08	.0	3.00	24.00	.71	---	6.06	148.80	595.2
XSECTION 169	REACH	.25	1	2	.08	.0	3.00	24.00	.71	---	6.18	124.18	496.7

XSECTION 69	RUNOFF	.25	1	2	.08	.0	3.00	24.00	.96	---	6.39	96.75	387.0
STRUCTURE 69	ADDHYD	.50	1	2	.08	.0	3.00	24.00	.84	---	6.22	199.28	398.6
XSECTION 186	REACH	.50	1	2	.08	.0	3.00	24.00	.84	.51	6.32	196.07	392.1
XSECTION 86	RUNOFF	.05	1	2	.08	.0	3.00	24.00	.96	---	6.12	33.01	660.2

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SUMMARY TABLE 1 - SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL INSTRUCTIONS IN THE ORDER PERFORMED
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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 87	ADDHYD	.55	1	2	.08	.0	3.00	24.00	.85	---	6.30	215.54	391.9
STRUCTURE 87	ADDHYD	4.17	1	2	.08	.0	3.00	24.00	.68	---	6.69	817.30	196.0
XSECTION 163	REACH	4.17	1	2	.08	.0	3.00	24.00	.68	---	6.92	782.62	187.7
XSECTION 63	RUNOFF	.16	1	2	.08	.0	3.00	24.00	.86	---	6.16	84.35	527.2
STRUCTURE 63	ADDHYD	4.33	1	2	.08	.0	3.00	24.00	.69	---	6.91	795.11	183.6
XSECTION 160	REACH	4.33	1	2	.08	.0	3.00	24.00	.68	---	7.07	769.25	177.7
XSECTION 60	RUNOFF	.15	1	2	.08	.0	3.00	24.00	.81	---	6.15	75.35	502.4
STRUCTURE 60	ADDHYD	4.48	1	2	.08	.0	3.00	24.00	.69	---	7.07	778.50	173.8
XSECTION 59	RUNOFF	.16	1	2	.08	.0	3.00	24.00	1.66	---	6.07	210.03	1312.7
STRUCTURE 60	ADDHYD	4.64	1	2	.08	.0	3.00	24.00	.72	---	7.06	793.48	171.0
XSECTION 68	RUNOFF	.22	1	2	.08	.0	3.00	24.00	.96	---	6.29	99.36	451.7
XSECTION 167	REACH	.22	1	2	.08	.0	3.00	24.00	.96	---	6.48	86.72	394.2
XSECTION 67	RUNOFF	.27	1	2	.08	.0	3.00	24.00	1.59	---	6.18	259.19	960.0
STRUCTURE 67	ADDHYD	.49	1	2	.08	.0	3.00	24.00	1.30	---	6.23	311.16	635.0
XSECTION 164	REACH	.49	1	2	.08	.0	3.00	24.00	1.30	---	6.35	301.40	615.1
XSECTION 64	RUNOFF	.25	1	2	.08	.0	3.00	24.00	1.59	---	6.06	326.66	1306.6
STRUCTURE 64	ADDHYD	.74	1	2	.08	.0	3.00	24.00	1.40	---	6.13	500.77	676.7
XSECTION 159	REACH	.74	1	2	.08	.0	3.00	24.00	1.40	---	6.25	480.27	649.0
STRUCTURE 60	ADDHYD	5.38	1	2	.08	.0	3.00	24.00	.82	---	6.67	945.72	175.8
XSECTION 151	REACH	5.38	1	2	.08	.0	3.00	24.00	.81	---	7.10	933.78	173.6
STRUCTURE 94	RESVOR	5.38	1	2	.08	.0	3.00	24.00	.75	7.69	7.70	646.77	120.2
XSECTION 51	RUNOFF	.15	1	2	.08	.0	3.00	24.00	.96	---	6.14	96.79	645.3
STRUCTURE 51	ADDHYD	5.53	1	2	.08	.0	3.00	24.00	.75	---	7.70	653.17	118.1
XSECTION 49	RUNOFF	.10	1	2	.08	.0	3.00	24.00	1.13	---	6.10	83.50	835.0
STRUCTURE 51	ADDHYD	5.63	1	2	.08	.0	3.00	24.00	.76	---	7.70	657.97	116.9
XSECTION 52	RUNOFF	.19	1	2	.08	.0	3.00	24.00	1.59	---	6.23	169.12	890.1
STRUCTURE 51	ADDHYD	5.82	1	2	.08	.0	3.00	24.00	.79	---	7.69	670.54	115.2
XSECTION 65	RUNOFF	.10	1	2	.08	.0	3.00	24.00	1.59	---	6.04	138.16	1381.6
XSECTION 158	REACH	.10	1	2	.08	.0	3.00	24.00	1.59	---	6.18	110.85	1108.5

XSECTION 58	RUNOFF	.17	1	2	.08	.0	3.00	24.00	2.25	---	6.02	328.47	1932.2
STRUCTURE 58	ADDHYD	.27	1	2	.08	.0	3.00	24.00	2.01	---	6.05	410.18	1519.2
XSECTION 152	REACH	.27	1	2	.08	.0	3.00	24.00	2.01	---	6.26	366.77	1358.4
STRUCTURE 93	RESVOR	.27	1	2	.08	.0	3.00	24.00	1.83	5.12	6.89	64.80	240.0
STRUCTURE 51	ADDHYD	6.09	1	2	.08	.0	3.00	24.00	.83	---	7.68	721.58	118.5
XSECTION 62	RUNOFF	.25	1	2	.08	.0	3.00	24.00	1.66	---	6.28	216.11	864.4
XSECTION 161	REACH	.25	1	2	.08	.0	3.00	24.00	1.66	---	6.44	198.93	795.7

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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													
XSECTION 61	RUNOFF	.13	1	2	.08	.0	3.00	24.00	.86	---	6.28	52.23	401.7
STRUCTURE 61	ADDHYD	.38	1	2	.08	.0	3.00	24.00	1.39	---	6.41	244.23	642.7
XSECTION 150	REACH	.38	1	2	.08	.0	3.00	24.00	1.39	---	6.56	231.48	609.2
XSECTION 50	RUNOFF	.13	1	2	.08	.0	3.00	24.00	1.59	---	6.24	112.99	869.2
STRUCTURE 50	ADDHYD	.51	1	2	.08	.0	3.00	24.00	1.44	---	6.48	304.02	596.1
STRUCTURE 95	RESVOR	.51	1	2	.08	.0	3.00	24.00	.70	5.23	10.29	14.09	27.6
XSECTION 149	REACH	.51	1	2	.08	.0	3.00	24.00	.69	---	10.62	14.08	27.6
STRUCTURE 51	ADDHYD	6.60	1	2	.08	.0	3.00	24.00	.82	---	7.68	732.55	111.0
XSECTION 148	REACH	6.60	1	2	.08	.0	3.00	24.00	.82	---	7.83	726.58	110.1
XSECTION 48	RUNOFF	.15	1	2	.08	.0	3.00	24.00	.86	---	6.05	110.61	737.4
XSECTION 148	ADDHYD	6.75	1	2	.08	.0	3.00	24.00	.82	---	7.83	733.19	108.6
XSECTION 66	RUNOFF	.31	1	2	.08	.0	3.00	24.00	1.74	---	6.12	380.46	1227.3
XSECTION 157	REACH	.31	1	2	.08	.0	3.00	24.00	1.74	---	6.22	372.02	1200.1
XSECTION 57	RUNOFF	.16	1	2	.08	.0	3.00	24.00	2.25	---	6.05	284.46	1777.9
STRUCTURE 57	ADDHYD	.47	1	2	.08	.0	3.00	24.00	1.91	---	6.14	600.63	1277.9
XSECTION 154	REACH	.47	1	2	.08	.0	3.00	24.00	1.91	---	6.26	575.37	1224.2
XSECTION 55	RUNOFF	.25	1	2	.08	.0	3.00	24.00	1.66	---	6.14	282.19	1128.8
STRUCTURE 54	ADDHYD	.72	1	2	.08	.0	3.00	24.00	1.82	---	6.22	826.97	1148.6
XSECTION 56	RUNOFF	.15	1	2	.08	.0	3.00	24.00	1.45	---	6.03	194.79	1298.6
XSECTION 155	REACH	.15	1	2	.08	.0	3.00	24.00	1.44	---	6.25	160.42	1069.5
STRUCTURE 54	ADDHYD	.87	1	2	.08	.0	3.00	24.00	1.76	---	6.22	985.80	1133.1
XSECTION 54	RUNOFF	.25	1	2	.08	.0	3.00	24.00	2.25	---	6.05	449.47	1797.9
STRUCTURE 54	ADDHYD	1.12	1	2	.08	.0	3.00	24.00	1.87	---	6.16	1322.20	1180.5
STRUCTURE 92	RESVOR	1.12	1	2	.08	.0	3.00	24.00	1.34	5.37	8.27	68.04	60.8
XSECTION 153	REACH	1.12	1	2	.08	.0	3.00	24.00	1.34	---	8.40	68.02	60.7

XSECTION 53	RUNOFF	.17	1	2	.08	.0	3.00	24.00	.91	---	6.15	98.97	582.2
STRUCTURE 53	ADDHYD	1.29	1	2	.08	.0	3.00	24.00	1.28	---	6.18	116.36	90.2
XSECTION 147	REACH	1.29	1	2	.08	.0	3.00	24.00	1.27	---	6.33	105.12	81.5
XSECTION 47	RUNOFF	.27	1	2	.08	.0	3.00	24.00	.91	---	6.17	148.81	551.2
XSECTION 147	ADDHYD	1.56	1	2	.08	.0	3.00	24.00	1.21	---	6.23	236.65	151.7
XSECTION 142	RUNOFF	.06	1	2	.08	.0	3.00	24.00	1.31	---	6.19	47.04	783.9
XSECTION 147	ADDHYD	1.62	1	2	.08	.0	3.00	24.00	1.21	---	6.22	283.25	174.8
XSECTION 148	ADDHYD	8.37	1	2	.08	.0	3.00	24.00	.90	---	7.83	822.84	98.3
XSECTION 141	REACH	8.37	1	2	.08	.0	3.00	24.00	.90	2.38	7.94	821.00	98.1
XSECTION 122	RUNOFF	.03	1	2	.08	.0	3.00	24.00	1.01	---	6.12	21.82	727.4
XSECTION 143	ADDHYD	8.40	1	2	.08	.0	3.00	24.00	.90	3.83	7.94	822.48	97.9

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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													
XSECTION 141	RUNOFF	.05	1	2	.08	.0	3.00	24.00	.58	---	6.18	16.09	321.9
XSECTION 143	ADDHYD	8.45	1	2	.08	.0	3.00	24.00	.89	3.84	7.94	824.11	97.5
XSECTION 145	RUNOFF	.24	1	2	.08	.0	3.00	24.00	1.66	---	6.07	320.91	1337.1
XSECTION 146	RUNOFF	.18	1	2	.08	.0	3.00	24.00	.96	---	6.16	106.50	591.6
XSECTION 145	ADDHYD	.42	1	2	.08	.0	3.00	24.00	1.36	---	6.09	415.05	988.2
XSECTION 121	RUNOFF	.05	1	2	.08	.0	3.00	24.00	1.01	---	6.14	33.93	678.6
XSECTION 145	ADDHYD	.47	1	2	.08	.0	3.00	24.00	1.32	---	6.09	447.42	952.0
XSECTION 143	REACH	.47	1	2	.08	.0	3.00	24.00	1.32	2.81	6.18	443.01	942.6
XSECTION 123	RUNOFF	.04	1	2	.08	.0	3.00	24.00	1.31	---	6.09	39.29	982.2
XSECTION 142	ADDHYD	.51	1	2	.08	.0	3.00	24.00	1.32	---	6.17	478.37	938.0
XSECTION 142	ADDHYD	8.96	1	2	.08	.0	3.00	24.00	.92	---	6.24	1074.03	119.9
XSECTION 186	REACH	8.96	1	2	.08	.0	3.00	24.00	.92	1.84	6.24	1074.03	119.9
XSECTION 124	RUNOFF	.02	1	2	.08	.0	3.00	24.00	1.31	---	6.13	18.17	908.4
XSECTION 141	ADDHYD	8.98	1	2	.08	.0	3.00	24.00	.92	2.80	6.24	1089.27	121.3
XSECTION 140	RUNOFF	.33	1	2	.08	.0	3.00	24.00	1.19	---	6.27	195.80	593.3
XSECTION 141	ADDHYD	9.31	1	2	.08	.0	3.00	24.00	.93	3.09	6.24	1284.61	138.0
XSECTION 185	REACH	9.31	1	2	.08	.0	3.00	24.00	.93	2.05	6.24	1284.61	138.0
XSECTION 125	RUNOFF	.03	1	2	.08	.0	3.00	24.00	1.25	---	6.16	24.20	806.6
XSECTION 185	ADDHYD	9.34	1	2	.08	.0	3.00	24.00	.93	2.07	6.24	1306.58	139.9
XSECTION 139	RUNOFF	.15	1	2	.08	.0	3.00	24.00	1.51	---	6.24	124.14	827.6
XSECTION 185	ADDHYD	9.49	1	2	.08	.0	3.00	24.00	.94	2.19	6.24	1430.73	150.8
XSECTION 143	RUNOFF	.25	1	2	.08	.0	3.00	24.00	1.38	---	6.14	235.07	940.3

XSECTION 185	ADDHYD	9.74	1	2	.08	.0	3.00	24.00	.95	2.37	6.23	1636.27	168.0
XSECTION 137	REACH	9.74	1	2	.08	.0	3.00	24.00	.95	2.27	6.36	1520.40	156.1
XSECTION 128	RUNOFF	.04	1	2	.08	.0	3.00	24.00	.96	---	6.14	25.81	645.3
XSECTION 137	ADDHYD	9.78	1	2	.08	.0	3.00	24.00	.95	2.28	6.36	1533.33	156.8
XSECTION 137	RUNOFF	.11	1	2	.08	.0	3.00	24.00	1.25	---	6.15	90.47	822.5
XSECTION 137	ADDHYD	9.89	1	2	.08	.0	3.00	24.00	.95	2.33	6.35	1588.25	160.6
XSECTION 126	RUNOFF	.08	1	2	.08	.0	3.00	24.00	1.19	---	6.15	61.50	768.7
XSECTION 127	RUNOFF	.07	1	2	.08	.0	3.00	24.00	1.38	---	6.12	69.20	988.6
XSECTION 137	ADDHYD	.15	1	2	.08	.0	3.00	24.00	1.28	.34	6.13	130.11	867.4
XSECTION 137	ADDHYD	10.04	1	2	.08	.0	3.00	24.00	.96	2.40	6.34	1671.96	166.5
STRUCTURE 91	RESVOR	10.04	1	2	.08	.0	3.00	24.00	.95	61.00	6.43	1583.78	157.7
XSECTION 129	REACH	10.04	1	2	.08	.0	3.00	24.00	.95	---	6.62	1436.65	143.1
XSECTION 27	RUNOFF	.16	1	2	.08	.0	3.00	24.00	1.59	---	6.03	228.28	1426.8
STRUCTURE 29	ADDHYD	10.20	1	2	.08	.0	3.00	24.00	.96	---	6.61	1458.34	143.0

SUMMARY TABLE 1 - SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL INSTRUCTIONS IN THE ORDER PERFORMED
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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													
SECTION 38	RUNOFF	.32	1	2	.08	.0	3.00	24.00	1.01	---	6.24	168.41	526.3
SECTION 128	REACH	.32	1	2	.08	.0	3.00	24.00	1.01	---	6.34	166.28	519.6
SECTION 28	RUNOFF	.17	1	2	.08	.0	3.00	24.00	1.67	---	6.01	259.20	1524.7
TRUCTURE 28	ADDHYD	.49	1	2	.08	.0	3.00	24.00	1.24	---	6.04	323.12	659.4
ECTION 127	REACH	.49	1	2	.08	.0	3.00	24.00	1.24	---	6.14	308.77	630.1
TRUCTURE 29	ADDHYD	10.69	1	2	.08	.0	3.00	24.00	.97	---	6.59	1625.52	152.1
SECTION 29	RUNOFF	.20	1	2	.08	.0	3.00	24.00	1.25	---	6.04	219.72	1098.6
ECTION 29	ADDHYD	10.89	1	2	.08	.0	3.00	24.00	.98	---	6.59	1650.58	151.6
SECTION 184	REACH	10.89	1	2	.08	.0	3.00	24.00	.98	---	6.59	1650.58	151.6
SECTION 84	RUNOFF	.04	1	2	.08	.0	3.00	24.00	1.64	---	5.95	68.96	1723.9
RUCTURE 30	ADDHYD	10.93	1	2	.08	.0	3.00	24.00	.98	---	6.59	1655.06	151.4
SECTION 30	RUNOFF	.10	1	2	.08	.0	3.00	24.00	1.38	---	6.21	79.43	794.3
RUCTURE 30	ADDHYD	11.03	1	2	.08	.0	3.00	24.00	.98	---	6.58	1689.88	153.2
SECTION 31	RUNOFF	.21	1	2	.08	.0	3.00	24.00	2.16	---	6.25	250.37	1192.2
STRUCTURE 30	ADDHYD	11.24	1	2	.08	.0	3.00	24.00	1.00	---	6.56	1844.76	164.1
SECTION 44	RUNOFF	.11	1	2	.08	.0	3.00	24.00	1.31	---	6.13	98.77	897.9
XSECTION 135	REACH	.11	1	2	.08	.0	3.00	24.00	1.31	---	6.28	86.44	785.8
XSECTION 35	RUNOFF	.12	1	2	.08	.0	3.00	24.00	1.51	---	6.08	140.36	1169.7
TRUCTURE 35	ADDHYD	.23	1	2	.08	.0	3.00	24.00	1.42	---	6.14	202.32	879.6

XSECTION 34	RUNOFF	.29	1	2	.08	.0	3.00	24.00	1.51	---	6.19	263.30	907.9
STRUCTURE 35	ADDHYD	.52	1	2	.08	.0	3.00	24.00	1.47	---	6.16	463.12	890.6
XSECTION 130	REACH	.52	1	2	.08	.0	3.00	24.00	1.47	---	6.29	437.14	840.6
STRUCTURE 30	ADDHYD	11.76	1	2	.08	.0	3.00	24.00	1.03	---	6.51	2142.99	182.2
XSECTION 32	RUNOFF	.11	1	2	.08	.0	3.00	24.00	2.45	---	6.15	170.51	1550.1
XSECTION 33	RUNOFF	.29	1	2	.08	.0	3.00	24.00	2.16	---	6.02	545.79	1882.0
STRUCTURE 33	ADDHYD	.40	1	2	.08	.0	3.00	24.00	2.24	---	6.04	697.31	1743.3
XSECTION 131	REACH	.40	1	2	.08	.0	3.00	24.00	2.24	---	6.15	636.41	1591.0
STRUCTURE 30	ADDHYD	12.16	1	2	.08	.0	3.00	24.00	1.06	---	6.44	2414.31	198.5
XSECTION 125	REACH	12.16	1	2	.08	.0	3.00	24.00	1.06	---	6.44	2414.31	198.5
XSECTION 26	RUNOFF	.19	1	2	.08	.0	3.00	24.00	1.59	---	6.03	274.23	1443.3
STRUCTURE 25	ADDHYD	12.35	1	2	.08	.0	3.00	24.00	1.07	---	6.43	2448.53	198.3
XSECTION 25	RUNOFF	.04	1	2	.08	.0	3.00	24.00	1.35	---	5.95	59.63	1490.8
STRUCTURE 25	ADDHYD	12.39	1	2	.08	.0	3.00	24.00	1.07	---	6.43	2454.06	198.1
XSECTION 24	RUNOFF	.19	1	2	.08	.0	3.00	24.00	2.25	---	6.01	366.42	1928.5
STRUCTURE 25	ADDHYD	12.58	1	2	.08	.0	3.00	24.00	1.09	---	6.13	2616.57	208.0
XSECTION 120	REACH	12.58	1	2	.08	.0	3.00	24.00	1.09	---	6.21	2616.27	208.0

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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													
XSECTION 22	RUNOFF	.13	1	2	.08	.0	3.00	24.00	1.99	---	5.96	243.28	1871.4
STRUCTURE 20	ADDHYD	12.71	1	2	.08	.0	3.00	24.00	1.10	---	6.19	2654.76	208.9
XSECTION 20	RUNOFF	.09	1	2	.08	.0	3.00	24.00	1.19	---	6.03	101.48	1127.5
STRUCTURE 20	ADDHYD	12.80	1	2	.08	.0	3.00	24.00	1.10	---	6.18	2705.36	211.4
XSECTION 21	RUNOFF	.12	1	2	.08	.0	3.00	24.00	1.67	---	5.98	189.87	1582.2
STRUCTURE 20	ADDHYD	12.92	1	2	.08	.0	3.00	24.00	1.11	---	6.15	2750.86	212.9
XSECTION 19	RUNOFF	.17	1	2	.08	.0	3.00	24.00	1.59	---	6.05	227.31	1337.1
STRUCTURE 20	ADDHYD	13.09	1	2	.08	.0	3.00	24.00	1.11	---	6.13	2942.98	224.8
XSECTION 83	RUNOFF	.11	1	2	.08	.0	3.00	24.00	2.07	---	6.02	201.78	1834.3
STRUCTURE 20	ADDHYD	13.20	1	2	.08	.0	3.00	24.00	1.12	---	6.10	3141.22	238.0
XSECTION 23	RUNOFF	.28	1	2	.08	.0	3.00	24.00	2.25	---	6.05	497.80	1777.9
XSECTION 183	REACH	.28	1	2	.08	.0	3.00	24.00	2.25	---	6.15	488.46	1744.5
STRUCTURE 20	ADDHYD	13.48	1	2	.08	.0	3.00	24.00	1.14	---	6.11	3580.97	265.7
STRUCTURE 98	RESVOR	13.48	1	2	.08	.0	3.00	24.00	1.14	5.41	6.73	2351.87	174.5
XSECTION 113	REACH	13.48	1	2	.08	.0	3.00	24.00	1.13	---	6.90	2319.81	172.1

XSECTION 13	RUNOFF	.24	1	2	.08	.0	3.00	24.00	1.38	---	6.07	269.05	1121.1
STRUCTURE 13	ADDHYD	13.72	1	2	.08	.0	3.00	24.00	1.14	---	6.90	2341.08	170.6
(SECTION 14	RUNOFF	.07	1	2	.08	.0	3.00	24.00	1.66	---	6.03	104.49	1492.7
STRUCTURE 13	ADDHYD	13.79	1	2	.08	.0	3.00	24.00	1.14	---	6.90	2347.71	170.2
XSECTION 15	RUNOFF	.17	1	2	.08	.0	3.00	24.00	1.52	---	6.07	207.82	1222.5
STRUCTURE 13	ADDHYD	13.96	1	2	.08	.0	3.00	24.00	1.14	---	6.89	2364.08	169.3
XSECTION 16	RUNOFF	.21	1	2	.08	.0	3.00	24.00	1.44	---	6.08	233.03	1109.7
XSECTION 115	REACH	.21	1	2	.08	.0	3.00	24.00	1.44	---	6.18	228.82	1089.6
STRUCTURE 13	ADDHYD	14.17	1	2	.08	.0	3.00	24.00	1.15	---	6.88	2388.61	168.6
(SECTION 18	RUNOFF	.13	1	2	.08	.0	3.00	24.00	1.74	---	6.03	202.75	1559.6
(SECTION 17	RUNOFF	.17	1	2	.08	.0	3.00	24.00	1.59	---	6.06	222.13	1306.6
STRUCTURE 18	ADDHYD	.30	1	2	.08	.0	3.00	24.00	1.65	---	6.04	422.71	1409.0
XSECTION 114	REACH	.30	1	2	.08	.0	3.00	24.00	1.65	---	6.13	420.73	1402.4
STRUCTURE 13	ADDHYD	14.47	1	2	.08	.0	3.00	24.00	1.16	---	6.86	2421.19	167.3
(SECTION 106	REACH	14.47	1	2	.08	.0	3.00	24.00	1.16	---	6.95	2419.75	167.2
XSECTION 6	RUNOFF	.13	1	2	.08	.0	3.00	24.00	1.31	---	6.11	124.14	954.9
TRUCTURE 6	ADDHYD	14.60	1	2	.08	.0	3.00	24.00	1.16	---	6.95	2431.71	166.6
SECTION 5	RUNOFF	.15	1	2	.08	.0	3.00	24.00	1.52	---	6.04	197.55	1317.0
STRUCTURE 6	ADDHYD	14.75	1	2	.08	.0	3.00	24.00	1.16	---	6.95	2445.17	165.8
SECTION 7	RUNOFF	.19	1	2	.08	.0	3.00	24.00	2.25	---	6.15	274.84	1446.5
STRUCTURE 6	ADDHYD	14.94	1	2	.08	.0	3.00	24.00	1.18	---	6.92	2483.82	166.3

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A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

SECTION/ TRUCTURE 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													
SECTION 11	RUNOFF	.16	1	2	.08	.0	3.00	24.00	2.07	---	6.06	259.09	1619.3
(SECTION 12	RUNOFF	.13	1	2	.08	.0	3.00	24.00	2.25	---	6.04	241.63	1858.7
STRUCTURE 11	ADDHYD	.29	1	2	.08	.0	3.00	24.00	2.15	---	6.05	499.54	1722.5
SECTION 107	REACH	.29	1	2	.08	.0	3.00	24.00	2.15	---	6.15	480.63	1657.4
TRUCTURE 6	ADDHYD	15.23	1	2	.08	.0	3.00	24.00	1.20	---	6.24	2867.34	188.3
TRUCTURE 97	RESVOR	15.23	1	2	.08	.0	3.00	24.00	1.15	6.38	7.33	2264.90	148.7
SECTION 104	REACH	15.23	1	2	.08	.0	3.00	24.00	1.15	---	7.41	2264.89	148.7
XSECTION 4	RUNOFF	.19	1	2	.08	.0	3.00	24.00	1.66	---	6.03	280.12	1474.3
STRUCTURE 4	ADDHYD	15.42	1	2	.08	.0	3.00	24.00	1.15	---	7.41	2275.81	147.6
SECTION 8	RUNOFF	.20	1	2	.08	.0	3.00	24.00	2.07	---	6.09	308.85	1544.2
STRUCTURE 8	ADDHYD	15.62	1	2	.08	.0	3.00	24.00	1.16	---	7.41	2290.34	146.6
SECTION 10	RUNOFF	.14	1	2	.08	.0	3.00	24.00	1.59	---	6.00	205.93	1470.9

XSECTION 109	REACH	.14	1	2	.08	.0	3.00	24.00	1.58	---	6.10	205.85	1470.4
XSECTION 9	RUNOFF	.25	1	2	.08	.0	3.00	24.00	1.75	---	5.98	408.21	1632.8
STRUCTURE 9	ADDHYD	.39	1	2	.08	.0	3.00	24.00	1.69	---	6.02	581.15	1490.
XSECTION 108	REACH	.39	1	2	.08	.0	3.00	24.00	1.68	---	6.11	576.48	1478.1
STRUCTURE 99	ADDHYD	16.01	1	2	.08	.0	3.00	24.00	1.18	---	7.40	2313.97	144.5

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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)

		HYDROGRAPH INFORMATION							ROUTING PARAMETERS										PEAK
						OUTFLOW+			VOLUME	MAIN	ITER-	Q AND A			PEAK	S/Q	ATT-	TRAVEL TIME	
XSEC	REACH	INFLOW		OUTFLOW		INTERV.AREA		BASE-	ABOVE	TIME	ATION	EQUATION		LENGTH	RATIO	@PEAK	KIN	STOR-	KIN.
ID	LENGTH (FT)	PEAK (CFS)	TIME (HR)	PEAK (CFS)	TIME (HR)	PEAK (CFS)	TIME (HR)	FLOW (CFS)	BASE (IN)	INCR (HR)	#	COEFF (X)	POWER (M)	FACTOR (K*)	O/I (Q*)	(K) (SEC)	COEFF (C)	AGE (HR)	MATIC (HI
ALTERNATE 1 STORM 1																			
												.900							
+174	2300	244	6.1	234	6.1			0	1.40	.08	1		1.53	.052	.957	240	.77?	.08	.07
+						---	---												
												.700							
+173	2800	379	6.1	343	6.2			0	1.40	.08	1		1.53	.051	.903	295	.67?	.08	.08
+						---	---												
												.600							
+175	3850	303	6.2	269	6.4			0	1.40	.08	1		1.56	.060	.888	441	.51	.17	.12
+						---	---												
												.600							
+176	4100	203	6.1	166	6.3			0	1.40	.08	1		1.56	.108	.819	542	.43	.17	.16
+						---	---												
												.800							
+172	1700	1021	6.3	1021	6.3			0	1.40	.08	0		1.53	.007	1.000	117	1.00?	.00	.(
+						---	---												
												.600							
+178	3000	316	6.1	281	6.2			0	1.40	.08	1		1.56	.067	.891	338	.61	.17	.10
+						---	---												
												.600							
+177	3350	1026	6.1	990	6.3			0	1.40	.08	1		1.56	.029	.965	247	.75?	.17	.0
+						---	---												
												.200							
+171	3850	2235	6.3	2128	6.4			0	1.40	.08	1		1.63	.033	.952	322	.63	.08	.0
+						---	---												
												.300							
+170	2500	2270	6.4	2265	6.5			0	1.46	.08	1		1.63	.009	.998	162	.96?	.08	.0
+						---	---												
												.200							

+187	1200	2378	6.5	2378	6.5	---	---	0	1.50	.08	0	.800	1.64	.003	1.000	94	1.00?	.00	.00
169	3000	353	6.1	327	6.1	---	---	0	1.60	.08	1	.700	1.55	.061	.929	279	.70?	.08	.08
+186	1400	486	6.1	486	6.1	---	---	0	1.79	.08	0	.200	1.51	.011	1.000	145	1.00?	.00	.00
+163	4400	2685	6.5	2633	6.6	---	---	0	1.54	.08	1	.200	1.64	.022	.980	329	.63	.08	.09
160	4400	2688	6.6	2625	6.6	---	---	0	1.55	.08	1	.700	1.65	.019	.976	315	.64	.08	.09
67	3300	222	6.2	205	6.4	---	---	0	1.97	.08	1	.800	1.51	.056	.922	446	.50	.17	.13
+164	2500	621	6.2	611	6.3	---	---	0	2.44	.08	1	.500	1.51	.020	.983	219	.81?	.08	.06
+159	3300	970	6.1	953	6.2	---	---	0	2.56	.08	1	.100	1.62	.017	.982	225	.80?	.08	.06
151	4000	3280	6.6	3231	6.7	---	---	0	1.74	.08	1	.400	1.65	.023	.985	403	.54	.08	.11
58	3600	242	6.1	213	6.2	---	---	0	2.82	.08	1	.300	1.63	.125	.881	465	.49	.08	.13
62	3500	647	6.1	597	6.1	---	---	0	3.32	.08	1	.700	1.63	.065	.922	368	.58	.08	.10
61	3400	391	6.2	373	6.4	---	---	0	2.91	.08	1	.600	1.51	.047	.953	380	.56	.17	.11
60	2950	480	6.4	465	6.5	---	---	0	2.54	.08	1	.300	1.53	.031	.969	317	.64	.08	.09
49	2400	41	8.5	41	8.8	---	---	0	1.54*	.08	1	.300	1.63	.003	.999	731	.34	.25	.20
48	3300	2470	7.1	2456	7.2	2471	7.1	0	1.73	.08	1	.300	1.62	.004	.995	215	.82?	.17	.06
57	2300	661	6.1	658	6.2	---	---	0	3.00	.08	1	.800	1.53	.023	.997	183	.90?	.08	.05
54	3500	1040	6.1	1017	6.2	---	---	0	3.21	.08	1	.500	1.61	.031	.978	241	.77?	.08	.07
55	3450	345	6.1	315	6.1	---	---	0	2.63	.08	1	.600	1.53	.112	.913	416	.53	.08	.12
53	2050	94	8.4	94	8.5	---	---	0	2.14*	.08	1	.500	1.61	.001	1.000	351	.60	.08	.10

												.400							
+147	2300	256	6.1	240	6.3			0	2.10*	.08	1		1.62	.002	.941	300	.67	.17	.08
+						548	6.2												
												.469							
+141	2100	2629	7.1	2628	7.2			0	1.80	.08	1		1.52	.002	1.000	156	.98?	.08	.04
+						---	---												
												1.51							
+143	1900	848	6.1	848	6.1			0	2.46	.08	0		1.40	.022	1.000	148	1.00?	.00	.00
+						---	---												
												.159							
+186	700	2696	7.2	2696	7.2			0	1.83	.08	0		1.63	.000	1.000	63	1.00?	.00	.00
+						---	---												
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)

		HYDROGRAPH INFORMATION							ROUTING PARAMETERS										PEAK
						OUTFLOW+			VOLUME	MAIN	ITER-	Q AND A			PEAK	S/Q	ATT-	TRAVEL TIME	
XSEC	REACH	INFLOW		OUTFLOW		INTERV.AREA		BASE-	ABOVE	TIME	ATION	EQUATION		LENGTH	RATIO	@PEAK	KIN	STOR-	KINE
ID	LENGTH (FT)	PEAK (CFS)	TIME (HR)	PEAK (CFS)	TIME (HR)	PEAK (CFS)	TIME (HR)	FLOW (CFS)	BASE (IN)	INCR (HR)	#	COEFF (X)	POWER (M)	FACTOR (K*)	O/I (Q*)	(K) (SEC)	COEFF (C)	AGE (HR)	MATI (HR
ALTERNATE 1 STORM 1																			
+185	1100	2759	7.2	2759	7.2			0	1.85	.08	0	.159	1.63	.001	1.000	98	1.00?	.00	.0
+						2763	7.2												
+137	3300	3336	6.1	3248	6.3			0	1.88	.08	1	.160	1.63	.004	.974	274	.71?	.17	.08
+						3282	6.3												
+129	3800	3378	6.4	3192	6.6			0	1.89	.08	1	.100	1.65	.007	.945	379	.57	.17	.11
+						---	---												
+128	1700	369	6.2	368	6.3			0	2.04	.08	1	1.20	1.47	.014	.999	154	.98?	.08	.04
+						---	---												
+127	2300	626	6.1	614	6.1			0	2.35	.08	1	1.00	1.47	.020	.982	200	.86?	.08	.06
+						---	---												
+184	1350	3680	6.5	3680	6.5			0	1.93	.08	0	.200	1.63	.001	1.000	93	1.00?	.00	.00
+						---	---												
+135	3100	191	6.1	177	6.2			0	2.46	.08	1	.900	1.52	.066	.928	363	.58	.08	.10
						---	---												

130	3700	885	6.1	851	6.2	---	---	0	2.67	.08	1	.900	1.52	.033	.961	256	.74?	.08	.07
+131	4400	1094	6.1	1044	6.1	---	---	0	3.59	.08	1	.700	1.52	.066	.954	334	.62	.08	.09
+125	1200	5246	6.4	5246	6.4	---	---	0	2.05	.08	0	.400	1.63	.000	1.000	47	1.00?	.00	.00
120	2700	5411	6.1	5411	6.1	---	---	0	2.08	.08	0	.400	1.61	.001	1.000	114	1.00?	.00	.00
+183	2700	789	6.1	784	6.1	---	---	0	3.61	.08	1	1.40	1.45	.031	.993	186	.89?	.08	.05
-113	4200	4577	6.6	4525	6.8	---	---	0	2.14	.08	1	.100	1.65	.005	.989	371	.57	.17	.10
+115	1800	433	6.1	432	6.1	---	---	0	2.63	.08	1	.800	1.55	.020	.998	156	.98?	.08	.04
114	1750	731	6.1	731	6.1	---	---	0	2.90	.08	0	.700	1.56	.017	1.000	132	1.00?	.00	.00
+106	3100	4720	6.7	4720	6.7	---	---	0	2.18	.08	0	.300	1.64	.001	1.000	145	1.00?	.00	.00
+107	2650	803	6.1	788	6.1	---	---	0	3.49	.08	1	1.00	1.45	.043	.982	229	.79?	.08	.06
104	1950	3188	8.3	3188	8.3	---	---	0	2.16	.08	0	.200	1.65	.000	1.000	131	1.00?	.00	.00
109	2350	360	6.0	354	6.1	---	---	0	2.82	.08	1	1.80	1.41	.044	.982	198	.86?	.08	.06
108	2500	1007	6.0	987	6.1	---	---	0	2.94	.08	1	.900	1.47	.040	.980	200	.85?	.08	.06

ALTERNATE 1 STORM 2

174	2300	97	6.1	82	6.1	---	---	0	.59	.08	1	.900	1.53	.079	.845	330	.62	.08	.09
-173	2800	131	6.1	110	6.3	---	---	0	.58	.08	1	.700	1.53	.067	.837	426	.52	.17	.12
+175	3850	108	6.2	87	6.4	---	---	0	.58	.08	1	.600	1.56	.083	.803	638	.38	.17	.18
+176	4100	73	6.1	51	6.4	---	---	0	.58	.08	1	.600	1.56	.150	.706	783	.32	.25	.23
+172	1700	332	6.3	328	6.4	---	---	0	.58	.08	1	.800	1.53	.009	.989	172	.93?	.08	.05

												.600							
+178	3000	113	6.1	93	6.2			0	.58	.08	1		1.56	.093	.822	489	.47	.17	.1
+						---	---												
												.600							
+177	3350	360	6.2	323	6.3			0	.58	.08	1		1.56	.040	.898	360	.59	.08	.1(
+						---	---												
												.200							
+171	3850	714	6.4	630	6.6			0	.58	.08	1		1.63	.044	.883	500	.46	.17	.14
+						---	---												
												.300							
+170	2500	676	6.6	665	6.6			0	.63	.08	1		1.63	.010	.984	259	.73?	.08	.0
+						---	---												
												.200							
+187	1200	703	6.6	702	6.7			0	.65	.08	1		1.64	.004	1.000	151	.99?	.08	.(
+						---	---												
												.800							
+169	3000	149	6.1	120	6.1			0	.71	.08	1		1.55	.089	.809	379	.57	.08	.11
+						---	---												
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)

		HYDROGRAPH INFORMATION							ROUTING PARAMETERS									PEAK TRAVEL TIME	
						OUTFLOW+			VOLUME	MAIN	ITER-	Q AND A			PEAK	S/Q	ATT-		
XSEC ID	REACH LENGTH (FT)	INFLOW PEAK (CFS)	INFLOW TIME (HR)	OUTFLOW PEAK (CFS)	OUTFLOW TIME (HR)	INTERV.AREA PEAK (CFS)	INTERV.AREA TIME (HR)	BASE-FLOW (CFS)	ABOVE BASE (IN)	TIME INCR (HR)	ATION #	EQUATION COEFF (X)	EQUATION POWER (M)	LENGTH FACTOR (K*)	RATIO O/I (Q*)	@PEAK (K) (SEC)	KIN COEFF (C)	STOR- AGE (HR)	KINE MATIC (HR
ALTERNATE 1 STORM 2																			
+186	1400	199	6.2	196	6.3			0	.84	.08	1	.700	1.51	.015	.983	196	.86?	.08	.05
+						---	---												
+163	4400	813	6.7	781	6.9			0	.68	.08	1	.200	1.64	.025	.960	524	.44	.08	.15
+						---	---												
+160	4400	794	6.9	769	7.1			0	.69	.08	1	.200	1.65	.021	.969	510	.45	.17	.14
+						---	---												
+167	3300	99	6.3	87	6.5			0	.96	.08	1	.700	1.51	.074	.875	586	.41	.17	.17
+						---	---												
+164	2500	311	6.2	299	6.4			0	1.30	.08	1	.800	1.51	.025	.961	276	.70?	.17	.08
+						---	---												

159	3300	500	6.1	477	6.2	---	---	0	1.40	.08	1	.500	1.62	.023	.953	290	.68?	.08	.08
+151	4000	945	6.6	933	7.1	---	---	0	.82	.08	1	.100	1.65	.023	.987	658	.37	.50	.18
+158	3600	137	6.1	109	6.2	---	---	0	1.59	.08	1	.400	1.63	.181	.791	578	.41	.17	.17
+152	3500	409	6.1	362	6.2	---	---	0	2.01	.08	1	.300	1.63	.093	.884	440	.51	.08	.13
:61	3400	215	6.3	198	6.5	---	---	0	1.66	.08	1	.700	1.51	.061	.921	465	.49	.17	.13
:50	2950	244	6.4	231	6.6	---	---	0	1.39	.08	1	.600	1.53	.040	.949	401	.54	.17	.11
149	2400	14	10.3	14	10.6	---	---	0	.70*	.08	1	.300	1.63	.003	.999	1108	.24	.25	.31
+148	3300	732	7.7	726	7.8	733	7.8	0	.82	.08	1	.300	1.62	.004	.992	343	.61	.08	.10
57	2300	379	6.1	372	6.2	---	---	0	1.74	.08	1	.800	1.53	.031	.982	222	.80?	.08	.06
54	3500	601	6.1	570	6.2	---	---	0	1.91	.08	1	.500	1.61	.041	.948	296	.67?	.08	.08
.55	3450	192	6.1	159	6.2	---	---	0	1.45	.08	1	.600	1.53	.156	.830	510	.45	.08	.15
53	2050	68	8.3	68	8.4	---	---	0	1.34*	.08	1	.500	1.61	.001	1.000	396	.55	.08	.11
47	2300	115	6.1	105	6.3	237	6.2	0	1.28*	.08	1	.400	1.62	.002	.912	407	.54	.17	.12
41	2100	822	7.8	820	8.0	---	---	0	.90*	.08	1	.381	1.56	.002	.998	224	.80?	.17	.06
43	1900	441	6.1	434	6.1	---	---	0	1.32	.08	1	1.40	1.42	.026	.985	175	.92?	.08	.05
86	700	1071	6.2	1071	6.2	---	---	0	.92	.08	0	.159	1.63	.000	1.000	90	1.00?	.00	.00
35	1100	1280	6.2	1280	6.2	1303	6.2	0	.93	.08	0	.159	1.63	.001	1.000	132	1.00?	.00	.00
37	3300	1636	6.2	1514	6.4	1525	6.4	0	.95	.08	1	.157	1.63	.006	.925	360	.59	.17	.10
129	3800	1566	6.4	1434	6.6	---	---	0	.95	.08	1	.100	1.65	.010	.916	513	.45	.25	.14

												1.20							
+128	1700	168	6.2	165	6.3			0	1.01	.08	1		1.47	.018	.981	199	.86?	.08	.06
+						---	---												
												1.00							
+127	2300	321	6.1	309	6.1			0	1.24	.08	1		1.47	.026	.962	247	.75?	.08	.0
+						---	---												
												.200							
+184	1350	1643	6.6	1643	6.6			0	.98	.08	0		1.63	.001	1.000	127	1.00?	.00	.00
+						---	---												
												.900							
+135	3100	99	6.1	86	6.3			0	1.31	.08	1		1.52	.089	.869	454	.49	.17	.13
+						---	---												
												.900							
+130	3700	461	6.1	436	6.3			0	1.47	.08	1		1.52	.043	.947	320	.64	.17	.09
+						---	---												
												.700							
+131	4400	691	6.1	635	6.1			0	2.24	.08	1		1.52	.085	.919	391	.55	.08	.11
+						---	---												
												.400							
+125	1200	2407	6.5	2407	6.5			0	1.06	.08	0		1.63	.000	1.000	64	1.00?	.00	.00
+						---	---												
												.400							
+120	2700	2614	6.1	2614	6.2			0	1.09	.08	1		1.61	.002	1.000	150	1.00?	.08	.04
+						---	---												
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)

		HYDROGRAPH INFORMATION							ROUTING PARAMETERS									PEAK TRAVEL TIME	
						OUTFLOW+			VOLUME	MAIN	ITER-	Q AND A			PEAK	S/Q	ATT-		
XSEC	REACH	INFLOW		OUTFLOW		INTERV.AREA		BASE-	ABOVE	TIME	ATION	EQUATION		LENGTH	RATIO	@PEAK	KIN	STOR-	KINE
ID	LENGTH (FT)	PEAK (CFS)	TIME (HR)	PEAK (CFS)	TIME (HR)	PEAK (CFS)	TIME (HR)	FLOW (CFS)	BASE (IN)	INCR (HR)	#	COEFF (X)	POWER (M)	FACTOR (K*)	O/I (Q*)	(K) (SEC)	COEFF (C)	AGE (HR)	MATIC (HR
ALTERNATE 1 STORM 2																			
												1.40							
+183	2700	497	6.1	488	6.1			0	2.25	.08	1		1.45	.039	.982	215	.82?	.08	.06
+						---	---												
												.100							
+113	4200	2352	6.7	2320	6.9			0	1.14	.08	1		1.65	.008	.986	483	.47	.17	.13
+						---	---												
												.800							
+115	1800	231	6.1	225	6.1			0	1.44	.08	1		1.55	.028	.974	194	.87?	.08	.05
+						---	---												

114	1750	420	6.1	419	6.1	---	---	0	1.65	.08	1	.700	1.56	.024	.997	161	.96?	.08	.0
+106	3100	2420	6.9	2419	7.0	---	---	0	1.16	.08	1	.300	1.64	.002	1.000	188	.88?	.08	.0
107	2650	499	6.1	480	6.1	---	---	0	2.15	.08	1	1.00	1.45	.053	.962	266	.72?	.08	.0
+104	1950	2264	7.3	2264	7.4	---	---	0	1.15	.08	1	.200	1.65	.001	1.000	149	1.00?	.08	.0
+109	2350	204	6.0	197	6.1	---	---	0	1.59	.08	1	1.80	1.41	.056	.966	234	.78?	.17	.0
+108	2500	571	6.0	563	6.1	---	---	0	1.69	.08	1	.900	1.47	.051	.986	240	.77?	.17	.0

SAND CREEK

MAIN CHANNEL

IMPROVEMENTS

ESTIMATED PROBABLE

CONSTRUCTION COST

ESTIMATED PROBABLE CONSTRUCTION COST.

NORTH END CONTINUED:

DROP STRUCTURES:

ESTIMATE DROP W/ SHEET PILING

SHEET PILING

$(\$13/SF)(10'\ DEEP)(102'\ Long) = \$13,260$

RIPRAP

$(45)(6)(90)(1/27)\ \$45/cy = \$40,500$

BEDDING

$(6''/12)(50)(95)(1/27)\ \$6/cy = \$600$

FABRIC

$(100')(50')(1/9)\ \$2/SY = 1,200$

TOTAL $55,560

COMPARE GROUTED BOULDER DROP:

$108/SY FROM BID TABULATION

$(90' \times 60'/9) \times (\$108) = 64,800$

USE: 10 STRUCTURES @ 62,840 = $628,400

TOTAL PREVIOUS PAGE $422,600

NORTH END TOTAL $1,051,000

JR Engineering, Ltd.

CLIENT _____ JOB NO. _____

PROJECT RIDGEVIEW BY JRB CHK. BY _____ DATE 11/15/99

SUBJECT SAND CREEK CHANNEL SHEET NO. 2 OF 3

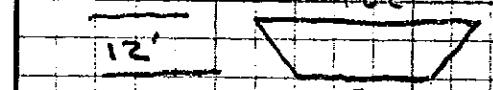
ESTIMATED PROBABLE CONSTRUCTION COST.

ESTIMATE MAIN CHANNEL IMPROVEMENTS

NORTH END:

LENGTH 3050 LF +/-

OX BOW CHANNEL RELOCATION



$VOL/LF = \left(\frac{122+50}{2}\right)(2)\left(\frac{1}{27}\right) = 3.8\ cy/LF$

300 LF @ 3.8 cy/LF = 11,400 cy. EXCAVATION

ESTIMATE

2200 LF @ 20 cy/LF = 44,000 cy

BANK RIPRAP ESTIMATED ON OUTSIDE OF CURVES: 3200 LF, 25' WIDE, 2' DEPTH

$Vol = \left(\frac{25}{27}\right)(3200)(2) = 6,000\ cy$

BEDDING: $25'(2800)\left(\frac{1}{12}\right)\left(\frac{1}{27}\right) = 1300\ cy$

FABRIC: $35'(2800)\ 1/9 = 11,000\ sq\ yd.$

TOTAL COST:

EXCAV. (11,400 + 44,000 + 6,000) cy @ $2/cy = $122,800

RIPRAP (6,000) ($45/cy) = = $270,000

BEDDING (1300 cy) $6/cy = = 7,800

FABRIC (11,000 Sy) $2/Sy = = 22,000

SUBTOTAL $422,600

JR Engineering

CLIENT _____ JOB NO. _____

PROJECT RIDGEVIEW BY JRB CHK. BY _____ DATE 11/15/89

SUBJECT SAND CREEK CHANNEL SHEET NO. 1 OF 3

ESTIMATED PROBABLE CONSTRUCTION COST.
MAIN CHANNEL, SOUTH END.

GRADING ESTIMATE

2,000 cy @ $6/cy = $12,000

CHECK STRUCTURES:

COST PER L.F.

CONC. WALL

1/27 (8' DEEP) (1' THICK) $240.00/cy = $92/LF

DEWATER & EXCAVATION = $15/LF

RIPRAP

10' WIDE (4' DEEP) (1/27) $45/cy = $67/LF

$154/LF

9 STRUCTURES TOTAL 2,400 LF

2400 LF @ $154/LF = $369,600

SELECTIVE RIPRAP 2,345 LF +/-

(2,345 LF) (26' WIDE) (3' DEEP) (1/27) ($45/cy) =

$304,850.00

BEDDING

(2,345 LF) (26) (1) (1/27) $6/cy = $13,550

LEVEL CONTROL/DROP STRUCTURE @ POND OUTLET

ALLOWANCE $89,000

SOUTH END TOTAL: $780,000.00

(12,000 + 369,600 + 304,850 + 13,550 + 89,000)

DRAINAGE MAPS

CURRENT M.D.D.P. OVERLAY

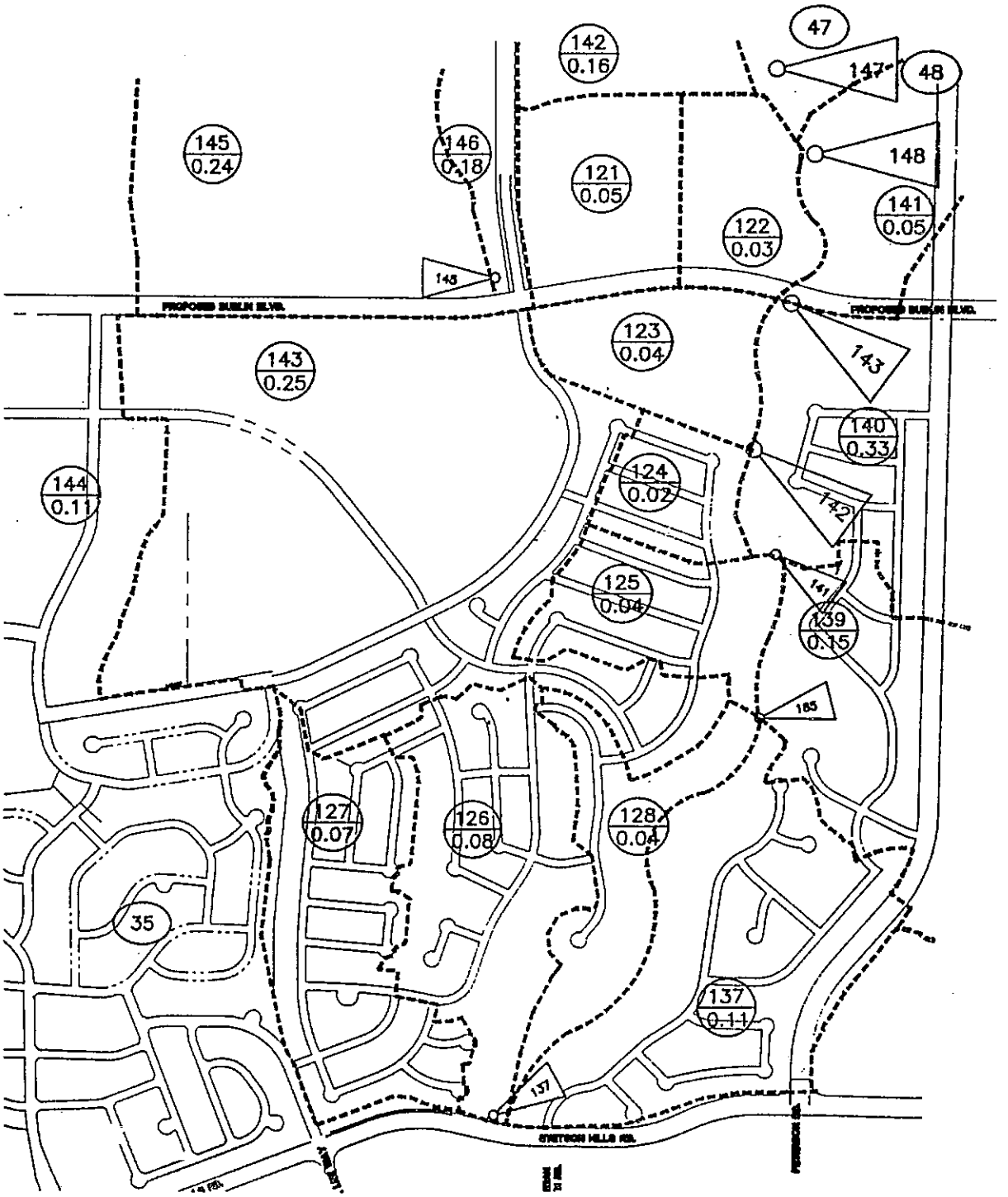
A PORTION OF THE PREVIOUS D.B.P.S. DRAINAGE PLAN

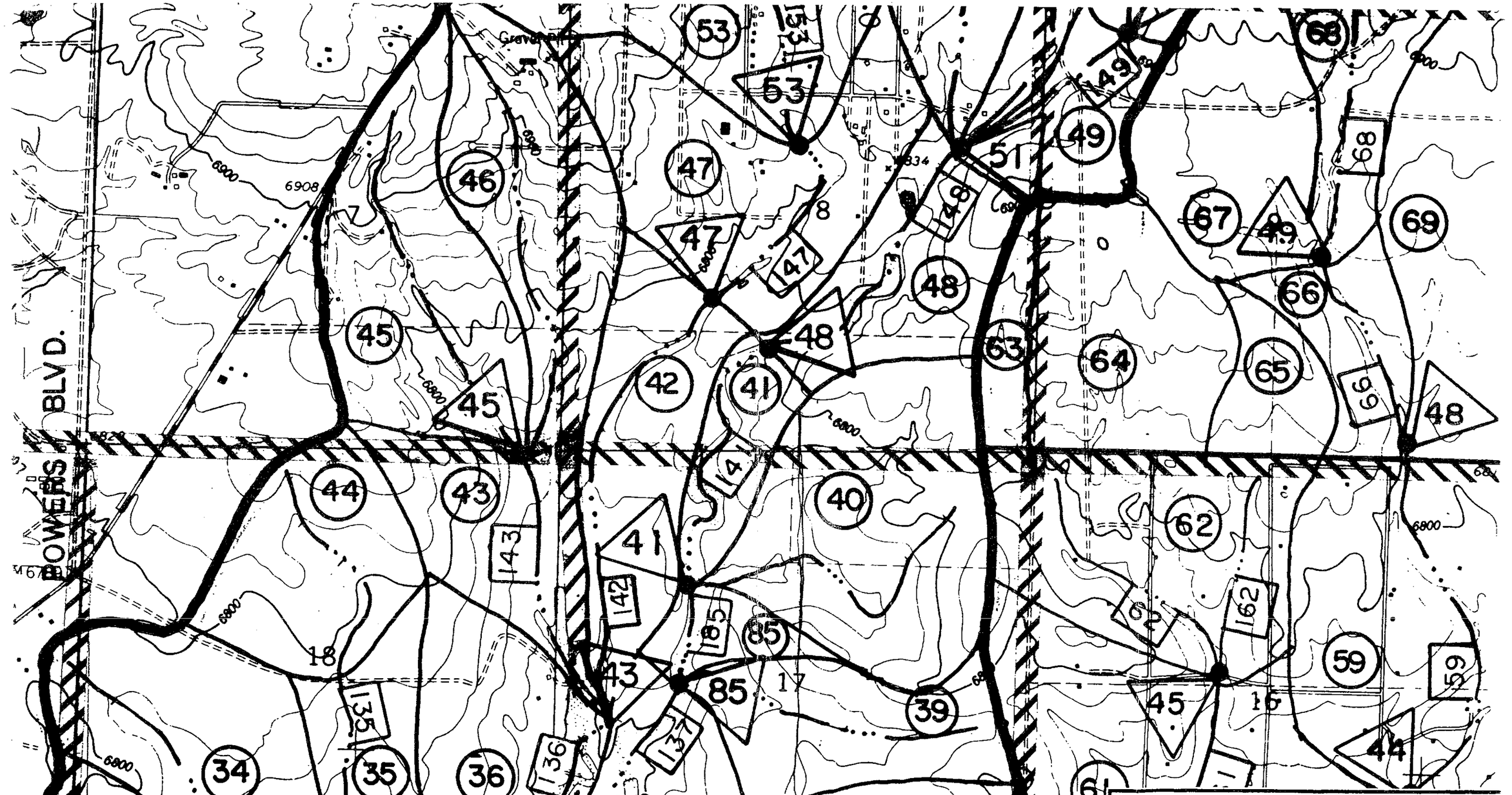
CURRENT M.D.D.P. MAP

PREVIOUS D.B.P.S. DRAINAGE PLAN

PHASING OF PROPOSED MASTER DEVELOPMENT IMPROVEMENTS

CURRENT
MDDP
BOUNDARIES
May 25, 1999





A COPY OF A PORTION OF "EXHIBIT 1 SAND CREEK DRAINAGE PLANNING STUDY" PREPARED BY KIOWA ENGINEERING CORPORATION

SCALE 1" = 1000'