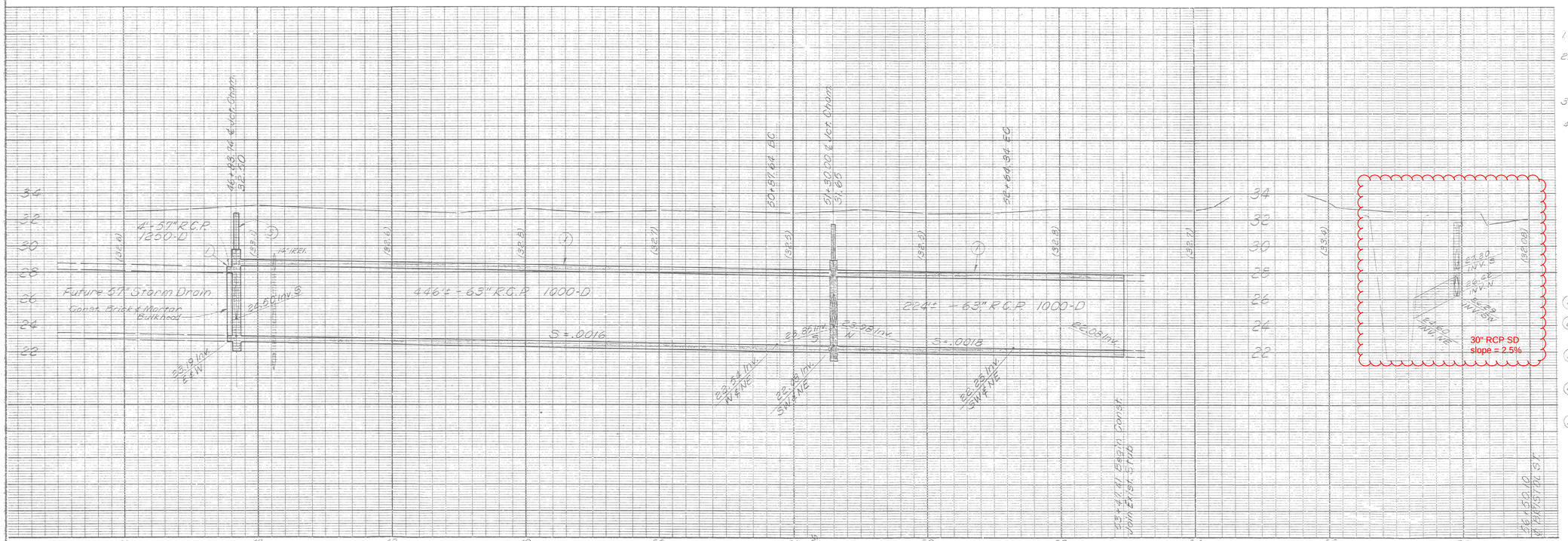
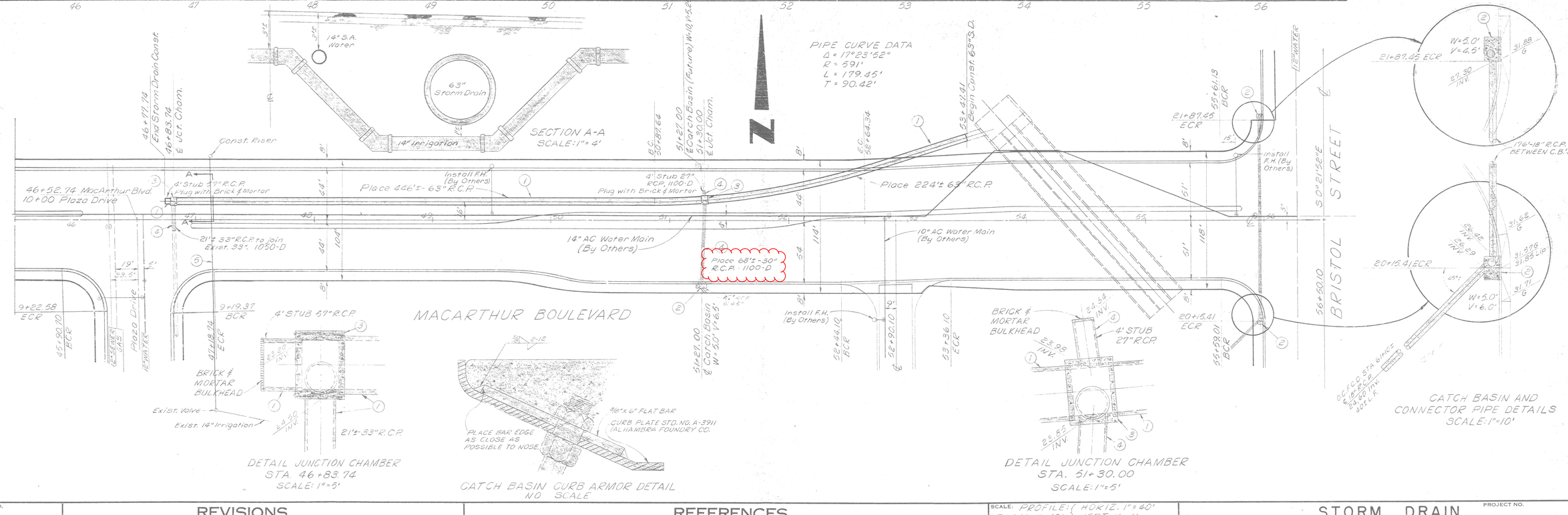
GENERAL NOTES

1. CONSTRUCT SHADED PORTION ONLY.
2. ALL WORK SHALL BE DONE IN ACCORDANCE WITH CITY OF SANTA ANA STANDARDS & SPECIFICATIONS.
3. STATIONING IS ALONG SURVEY CENTERLINE.
4. UTILITIES SHOWN ON THESE PLANS ARE CORRECT AND ACCURATE TO THE EXTENT OF AVAILABLE RECORDS AND KNOWLEDGE. THE CONTRACTOR, HOWEVER, IS REQUIRED TO TAKE STEPS TO ASCERTAIN THE EXACT LOCATION OF ALL UNDERGROUND FACILITIES PRIOR TO DOING WORK THAT MAY DAMAGE SUCH FACILITIES OR INTERFERE WITH THEIR SERVICE.

CONSTRUCTION NOTES

1. CONSTRUCT STORM DRAIN, SIZE & "D" AS SHOWN.
2. CONSTRUCT TYPE "C" CATCH BASIN PER STANDARD PLANS NOS. 303A, 305A & 305B, MODIFIED AS SHOWN PER DETAIL THIS SHEET.
3. CONSTRUCT TYPE "B" JUNCTION CHAMBER PER STANDARD PLANS NOS. 307 & 309.
4. PLACE CONNECTOR PIPE, SIZE & "D" AS SHOWN.
5. CONSTRUCT 219± L.F. 14" ACP. (JOHNS-MANVILLE CLASS 2400 NON-PRESSURE OR APPROVED EQUAL) IRRIGATION LINE.





FILE NO.	REVISIONS				REFERENCES		SCALE: PROFILE: (HOR. 1" = 40' PLAN: 1" = 40' VERT. 1" = 4'		
	NUMBER	DATE	INITIALS	DESCRIPTION	APP'V'D.	Topo.: Book LL-12, Pg. 133-138	Bench Mark: OCS Tag So. End East Hdwl. Drain. Chnl.		DATE
	1	9-15-72	MJ	AS BUILT		Levels: Book LL-12, Pg. 139-144	Crossing Bristol Elev. 33.01	DESIGNED	B.S. MJ 10-71
						Book LL-13, Pg. 59-62	T.B.M.: Mon. & Int. Bristol & MacArthur Elev. 31.37	DRAWN	M.J. 10-71
						Dray File: 1-13A-8		CHECKED	R.S.
								R/W APPROVED	9-7-72
								RECOMMENDED	J.G. Stevens 9-72
								APPROVED R.C.E. NO. 9879	Ronald L. Worland 9/10/72

PROJECT NO.

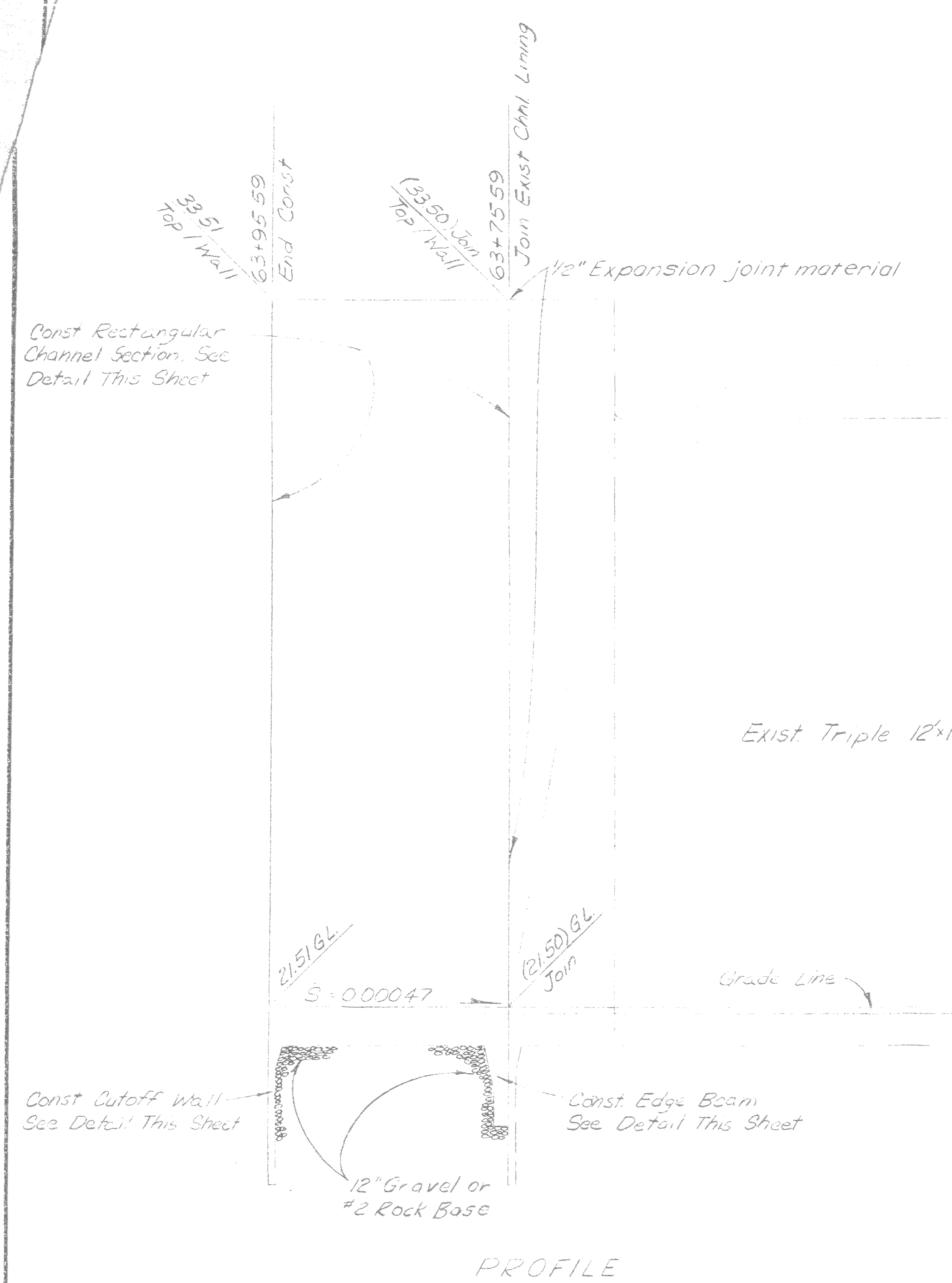
STORM DRAIN
MACARTHUR BLVD.
PLAZA DRIVE TO BRISTOL STREET
DEPARTMENT OF PUBLIC WORKS
CITY OF SANTA ANA

SHEET NO. 3 OF 4

W.O. 46435

DIETZGEN 1389-3 AGEPROOF FILM


NATURAL GROUND
FUTURE NORTH GUTTER GRADE
PROPOSED 30" RCP STORM DRAIN LATERAL
63" STORM DRAIN
90° BEND AIMED 45° SOUTH
COUPLING
AIR RELEASE VALVE
90° BEND
14" A.C. PIPE CLASS 150
90° BEND AIMED 45° SOUTH
USE PIPE JOINT DEFLECTION TO MAKE VERTICAL OFFSET
PROPOSED 18" STORM DRAIN LATERAL
EXISTING TEL. CONDUIT
EXIST. 6" GAS
EXIST. 12" WATER
EXISTING 14" CROSS
EXISTING TELEPHONE CONDUIT
VERTICAL SCALE: 1" = 2'
56+50.10 BRISTOL STREET
SEE STREET IMPROVEMENT PLAN MACARTHUR BLVD., GREENVILLE TO BRISTOL FOR A CONTINUATION OF THESE IMPROVEMENTS TO THE WEST.
MACARTHUR BOULEVARD
INSTALL 14" BFV IN MANHOLE. INSTALL MANHOLE SO THAT COVER WILL BE IN FUTURE MEDIAN
LOWER 90° BEND AIMED 45° SOUTH
FUTURE MEDIAN
S. 81°03'53" E.
45° BEND
10" A.C. WATER MAIN INSTALL TO STA. 12 IF NOT EXISTING PRIOR TO PAVING
NOTE:
DUCTILE IRON PIPE WITH RESTRAINED JOINTS IS AN ACCEPTABLE ALTERNATE FOR THE C.M.L.C. STEEL WATER MAIN SHOWN HEREON.
FIELD OR SHOP WELD ALL JOINTS BETWEEN COUPLINGS
½ EXTRA HEAVY COUPLING TO ACCEPT 1" CORP. STOP FOR AIR RELEASE VALVE PER STANDARD #12
LOWER 90° BEND AIMED 22½° SOUTH
CONNECT CLMC STEEL PIPE TO A.C. PIPE WITH SMITH-BLAIR #415 REDUCING COUPLING (16.22" X 15¼") COATED INSIDE AND OUT WITH EPOXY. ALL BOLTS AND NUTS SHALL BE STAINLESS STEEL. FIELD WRAP WITH 10 MIL POLYETHYLENE. (TYP. FOR 2 COUPLINGS)
ALLOWABLE DRIVEWAY ENCROACHMENT
FUTURE SIGNAL
INSTALL FIRE HYDRANT-7" ON 8" LATERAL
INSTALL 14" BFV IN MANHOLE
REMOVE EXISTING 12" STUB AND 14"X12" REDUCER. INSTALL 14" A.C. WATER MAIN
EXIST 14" CROSS
EXIST 12" STUB
EXIST 35" MVD MAIN
FUTURE CONSTRUCTION BY DEVELOPER
FUTURE BOX CULVERT
MACARTHUR BLVD.
BRISTOL STREET
SCALE: 1" = 20'
DESIGNED OB 12-71
DRAWN OB 12-71
R/W & CHECKED WDS 2-72
RECOMMENDED J.E. Stevens 2-72
APPROVED, RCE 9879 Ronald E. Wolford 2/8/72
WATER MAIN CROSSING O.C.F.C.D CHANNEL
MACARTHUR BOULEVARD
240' W/O ℄ BRISTOL STREET
DEPT. OF PUBLIC WORKS
CITY OF SANTA ANA
No. 1 OF 1
PM-711
W-68



PROFILE
SCALE: HORIZ. 1"=10'; VERT. 1"=2'

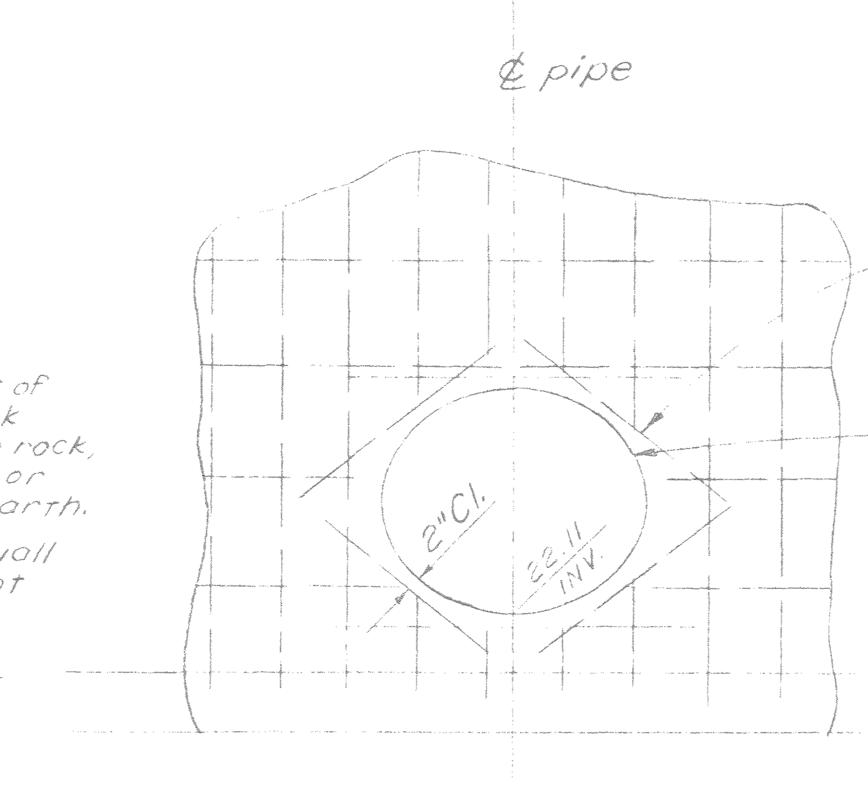
ORANGE COUNTY FLOOD CONTROL DISTRICT

All work and materials used within the flood control district right of way shall be in accordance with district's standards and specifications and with the provisions of the construction permit granted by district. Contractor shall maintain a copy of said permit and stamped plans on the job site. All work and use of district property shall be subject to control and inspection by district inspector.

ORANGE COUNTY FLOOD CONTROL DISTRICT
APPROVED FOR CONSTRUCTION IN DISTRICT RIGHT OF WAY
PERMIT NO. AUG 31 1971 ISSUED 22871

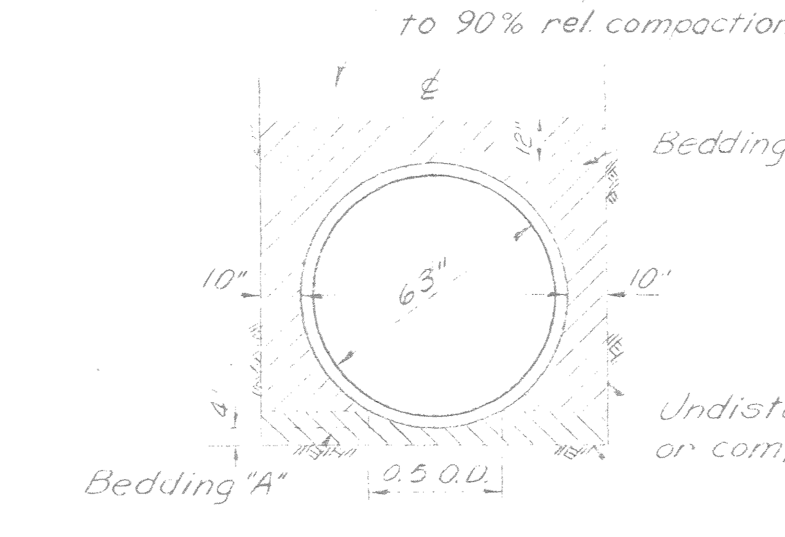
REVISED PLAN APPROVED OCT 26 1971

NOTES
1. Bed first joint of pipe in 1½ sack slurry conc. on rock, compacted fill or undisturbed earth.
2. Cut or bend wall reinforcement to clear inlet pipe by 2"
3. Channel invert reinforcement not shown.

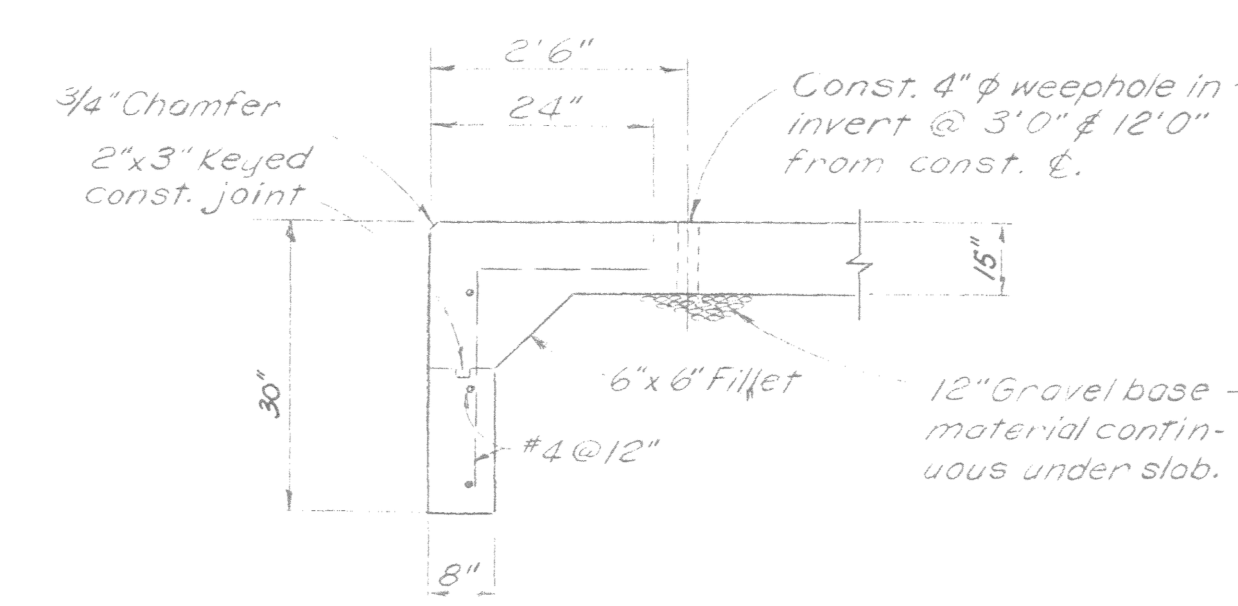


TYPICAL INLET DETAIL
INTO CONCRETE WALL
NO SCALE

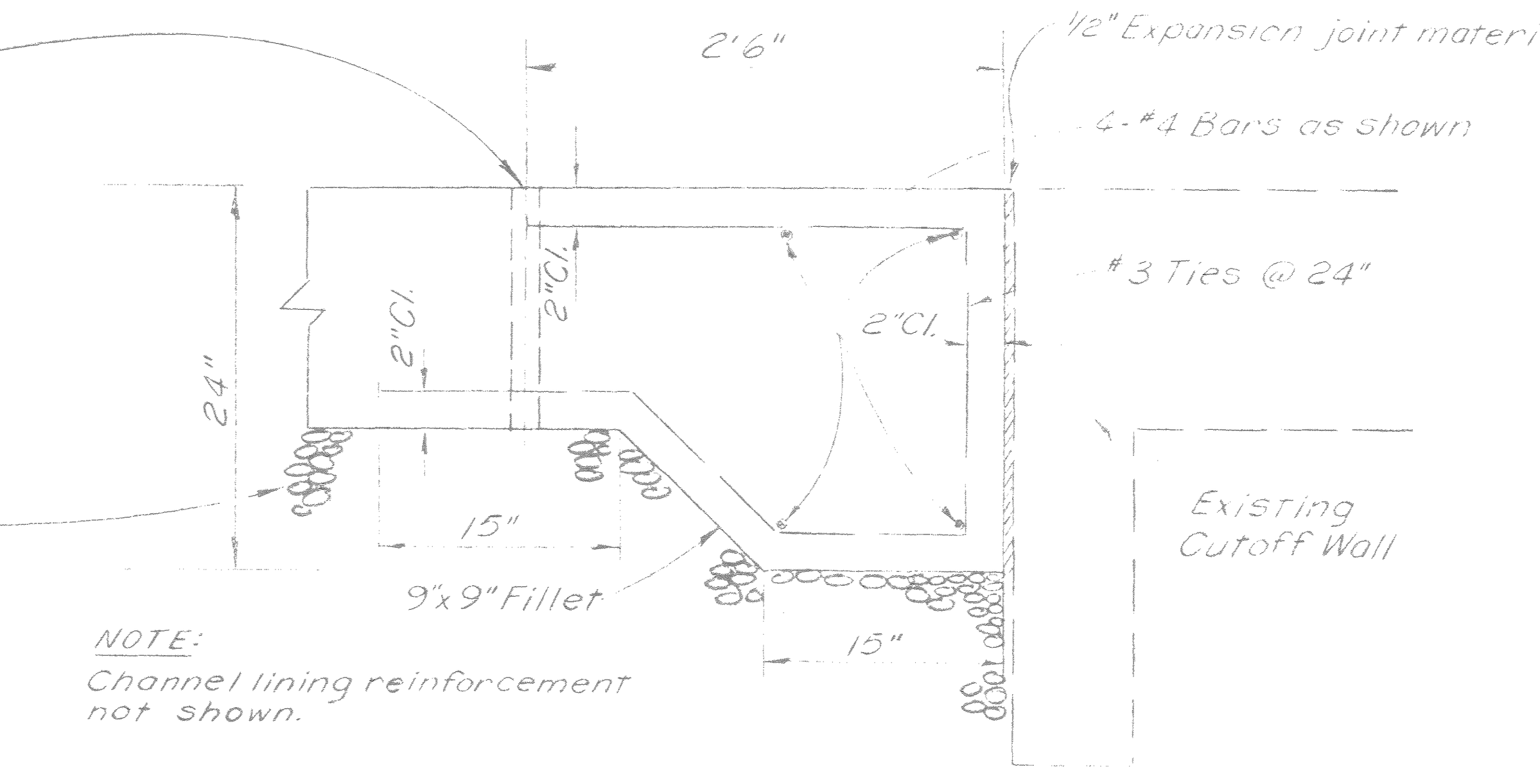
NOTE:
Bedding "A" shall be composed of sand, #3 crushed rock or gravel or other granular material approved by the engineer w/min. sand equivalent of 60 & compacted to 90% relative compaction.
Bedding "B" shall be composed of sand or other granular material approved by the engineer w/min. sand equivalent of 30 & compacted to 90% relative compaction.



R.C.P. BEDDING DETAIL
NO SCALE

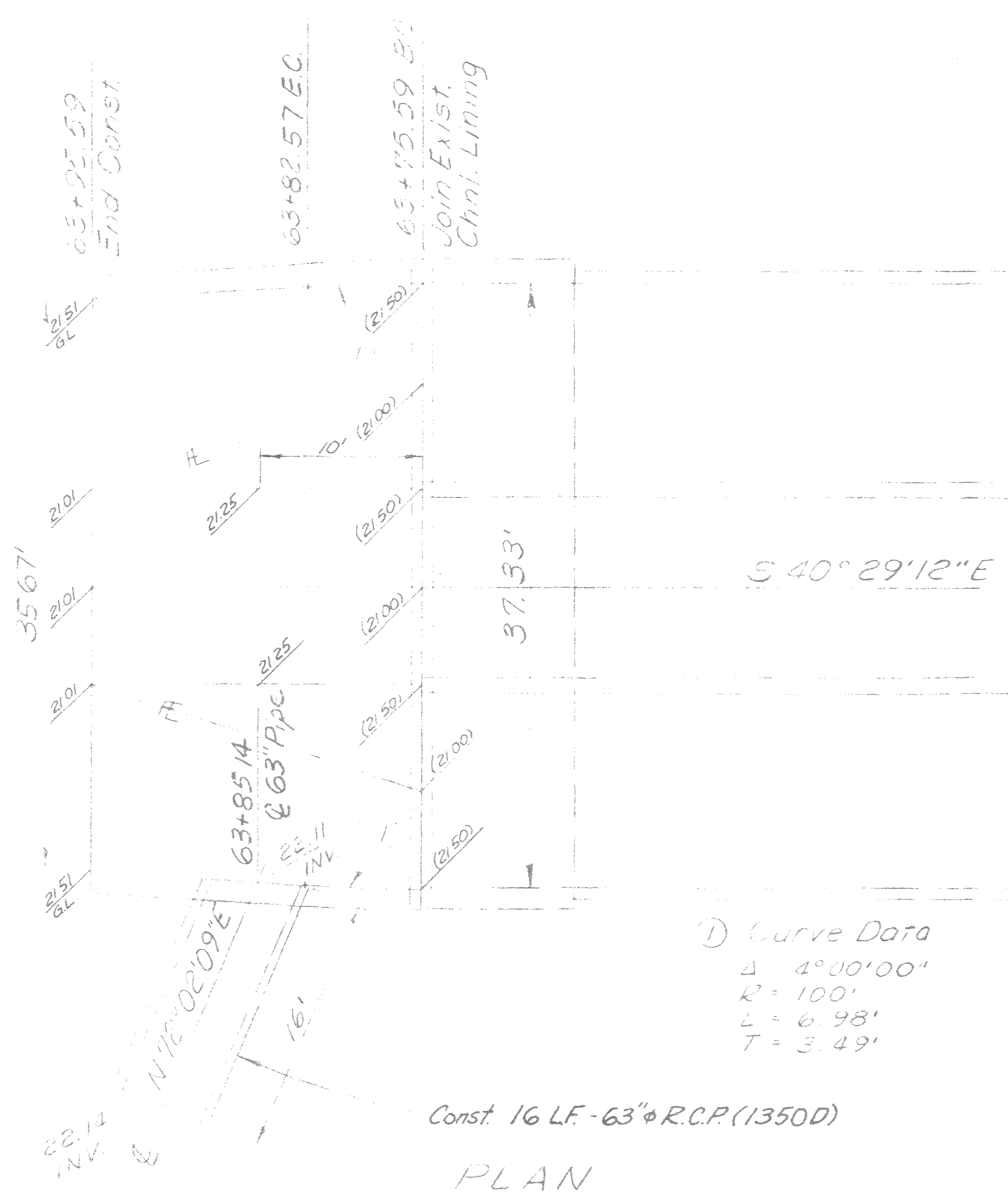


CUTOFF WALL DETAIL
NO SCALE

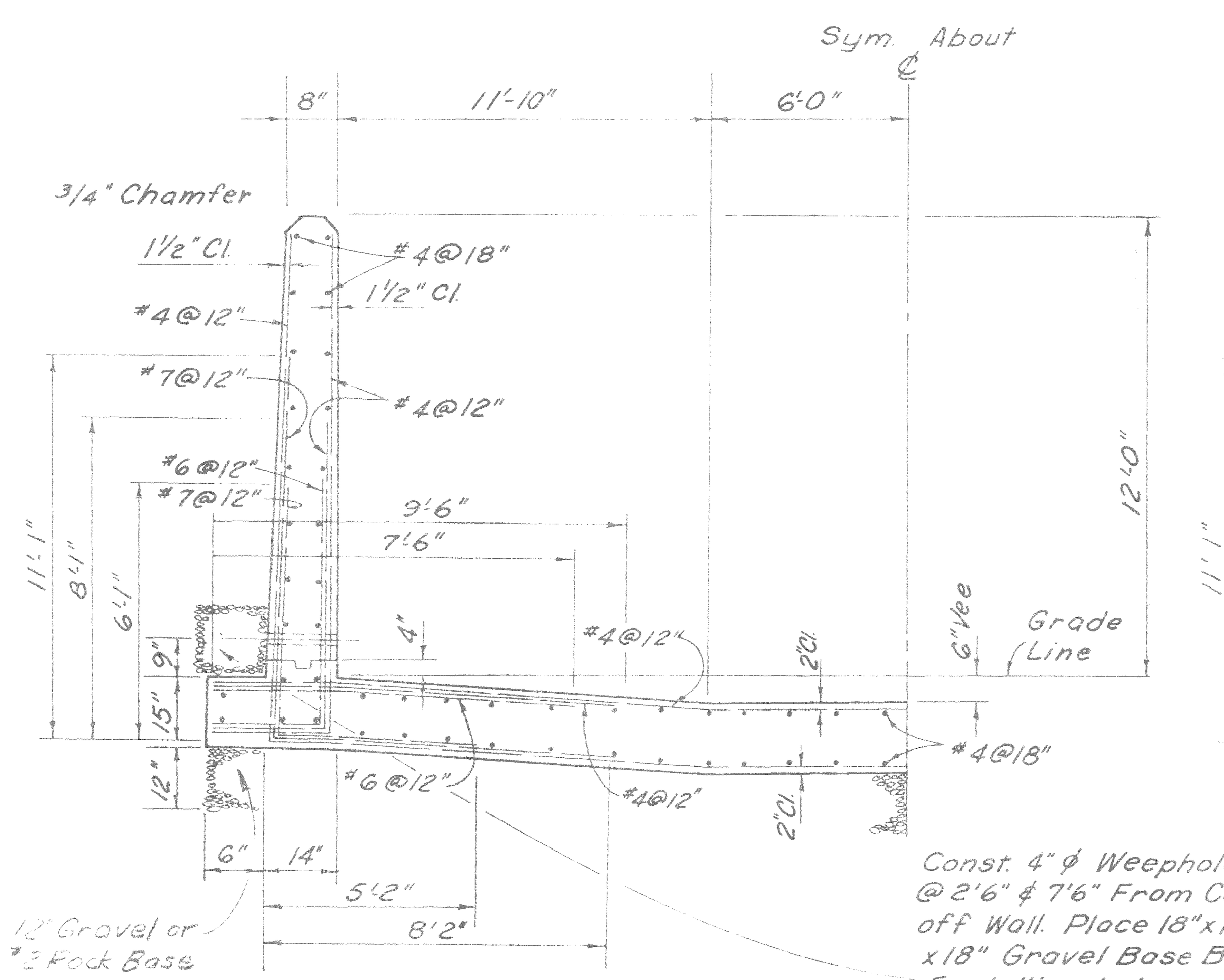


NOTE:
Channel lining reinforcement not shown.

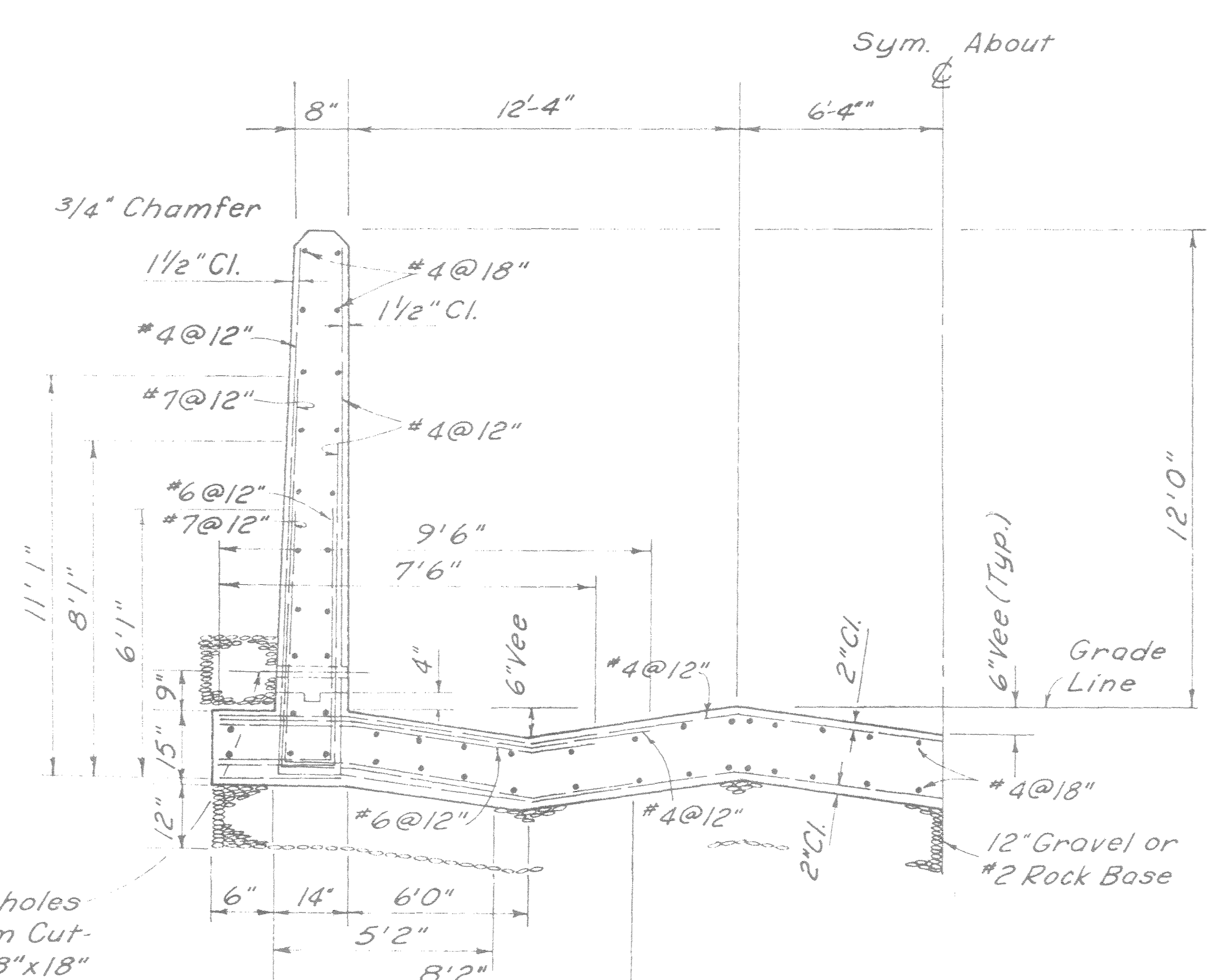
BEAM DETAIL
NO SCALE



PLAN
SCALE: 1"=10'



TYPICAL HALF SECTION STA 63+90.59
R.C. RECTANGULAR SECTION



TYPICAL HALF SECTION STA 63+75.59
R.C. RECTANGULAR SECTION

CONSTRUCTION NOTES

1. [illegible] REINFORCING [illegible] SHALL BE 30 BAR [illegible] UNLESS OTHERWISE SHOWN.
2. ALL EXPOSED EDGES SHALL [illegible] CHAMFER.
3. MINIMUM WAITING PERIOD [illegible] ADJACENT R.C. [illegible] POURS SHALL BE [illegible] HOURS.
4. TRANSVERSE CONSTRUCTION [illegible] SHALL BE IN THE [illegible] PLANE ACROSS ENTIRE STRUCTURE.
5. [illegible] REINF. BARS TO CLEAR [illegible] BY 1 1/2".
6. ALL CONCRETE SHALL BE [illegible].
7. ALL REINFORCING BARS SHALL BE PLACED SYMMETRICAL ABOUT CENTER LINE OF CULVERT.
8. REINFORCEMENT EMBEDMENT TO 2" CLEAR, EXCEPT AS NOTED.
9. PLACE #2 ROCK OR OTHER [illegible] APPROVED AGGREGATE UNDER CULVERT AS DIRECTED BY ENGINEER.

FILE NO.

REVISIONS

NUMBER	DATE	INITIALS	DESCRIPTION	APP'V'D.

REFERENCES

S.P.S.A.-40, DWG. NO. 1-17-9
O.C.F.C.D. DWG. NO. F02-101-2-A

Bench Mark: B.M. No. SA-206.70
O.C.S. Disc No. End West Hdwall. O.C.F.C.D Channel At Bristol, Approx. 250' So. Of MacArthur & Bristol Intersection
1970 Adjusted Elev.=33.328

SCALE: NO SCALE UNLESS OTHERWISE SPECIFIED

		DATE
DESIGNED	B. STEAFFENS	10-71
DRAWN	M.I.	10-71
CHECKED	RS	10-21-71
R/W APPROVED		
RECOMMENDED	J.E. Stevens	10-21-71
APPROVED R.C.E. NO. 9879	Ronald E. Wolford	10/21/71

PROJECT NO. 1326-A

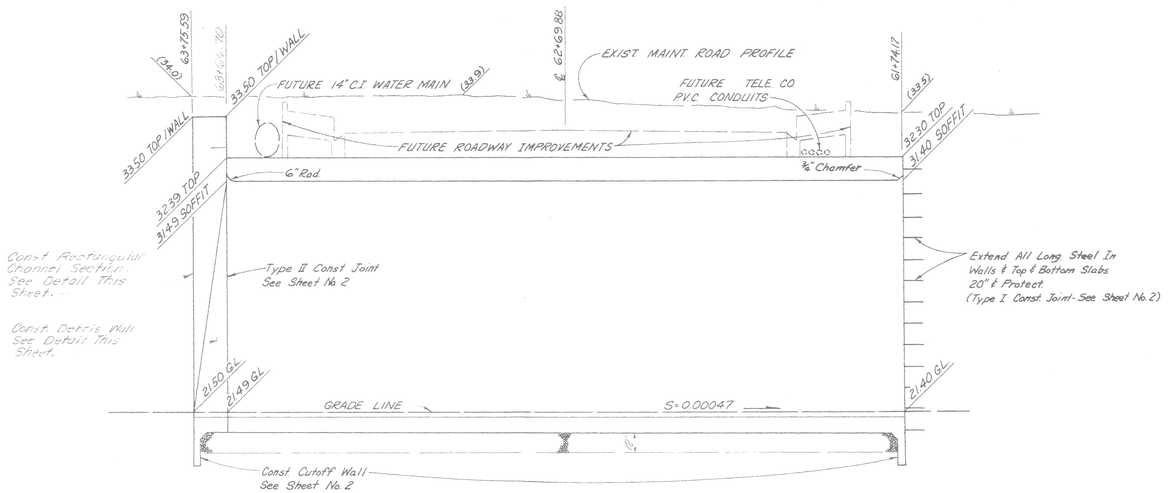
SANTA ANA GARDENS CHANNEL CROSSING
MACARTHUR BLVD.
CHANNEL LINING DETAILS

DEPARTMENT OF PUBLIC WORKS
CITY OF SANTA ANA

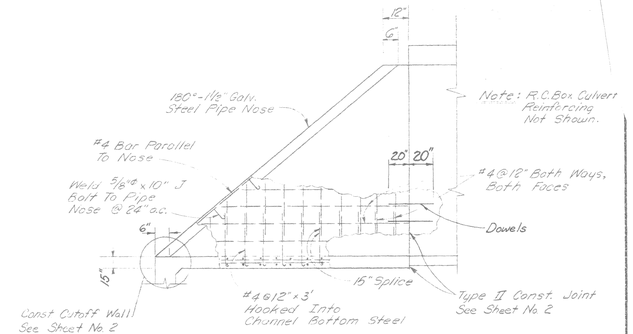
SHEET NO. 1 OF 1

W.O. 48435

DIETZGEN 138W-3 AGEPROOF FILM



℄ PROFILE



DEBRIS WALL DETAIL

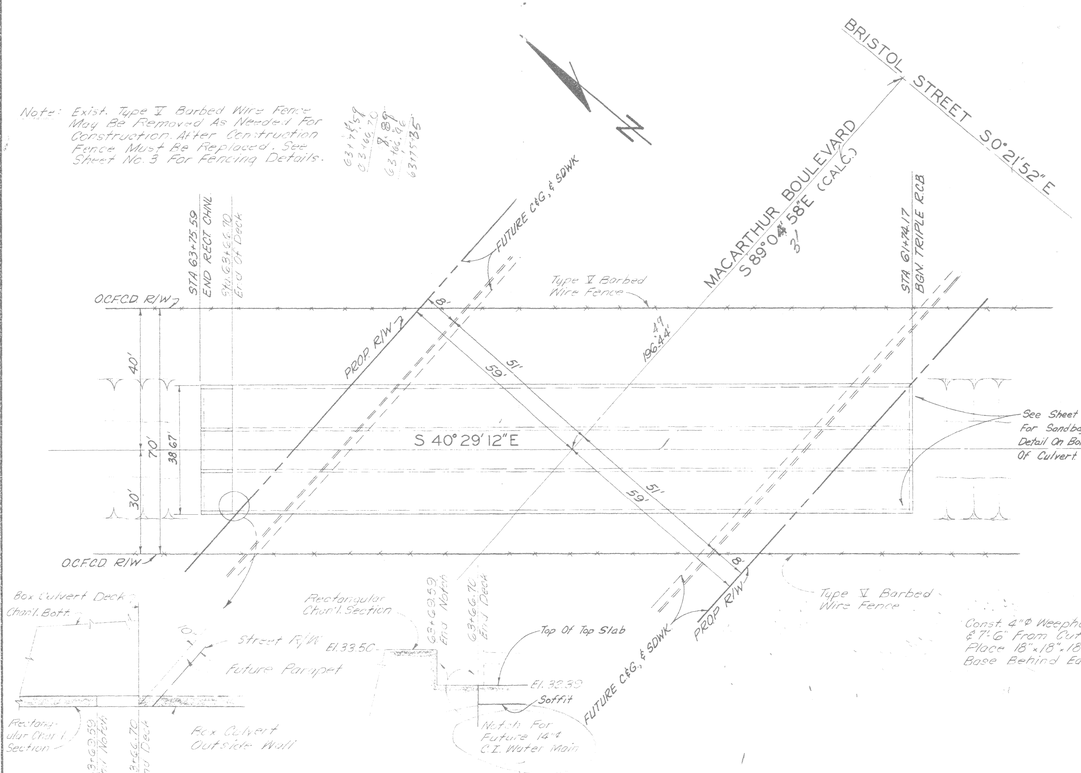
ORANGE COUNTY FLOOD CONTROL DISTRICT

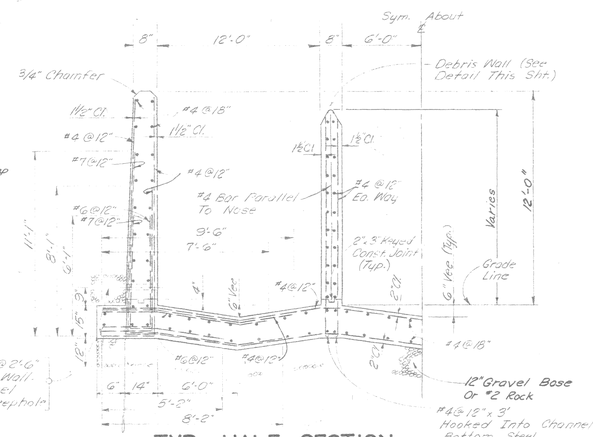
ALL WORK AND MATERIALS USED WITHIN THE FLOOD CONTROL DISTRICT RIGHT OF WAY SHALL BE IN ACCORDANCE WITH DISTRICT'S STANDARDS AND SPECIFICATIONS AND WITH THE PROVISIONS OF THE CONSTRUCTION PERMIT GRANTED BY DISTRICT. CONTRACTOR SHALL MAINTAIN A COPY OF SAID PERMIT AND STAMPED PLANS ON THE JOB SITE. ALL WORK AND USE OF DISTRICT PROPERTY SHALL BE SUBJECT TO CONTROL AND INSPECTION BY DISTRICT INSPECTOR.

ORANGE COUNTY FLOOD CONT...
...FOR CONS...
...DISTRICT RIGHT OF WAY
PERMIT NO. 22871 ISSUED SEP 14 19...

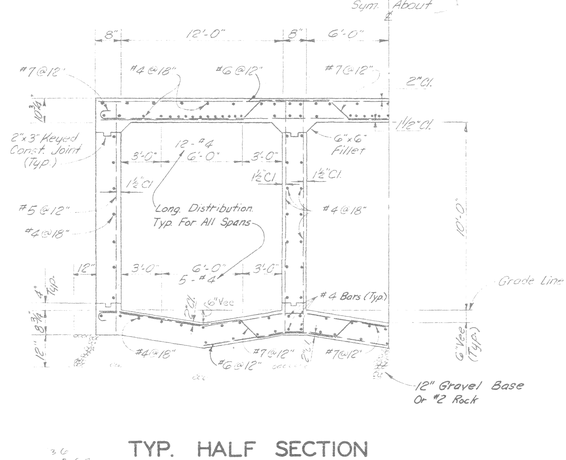
CONSTRUCTION NOTES

1. SPLICES IN REINFORCING STEEL SHALL BE 30 BAR DIAMETERS UNLESS OTHERWISE SHOWN.
2. ALL EXPOSED EDGES SHALL HAVE A ¾" CHAMFER.
3. MINIMUM WAITING PERIOD BETWEEN ADJACENT R.C. INVERT POURS SHALL BE 4 HOURS.
4. TRANSVERSE CONSTRUCTION JOINTS SHALL BE IN THE SAME PLANE ACROSS ENTIRE STRUCTURE.
5. HUNCH REINF. BARS TO CLEAR WEEPHOLES BY 1 ½".
6. ALL CONCRETE SHALL BE 3,000 PSI.
7. ALL REINFORCING BARS SHALL BE PLACED SYMMETRICAL ABOUT CENTER LINE OF CULVERT.
8. REINFORCEMENT EMBEDMENT IS 2" CLEAR, EXCEPT AS NOTED.
9. PLACE #2 ROCK OR OTHER ENGINEER APPROVED AGGREGATE UNDER CULVERT AS DIRECTED BY ENGINEER.
10. WHEN THE SIDEWALLS AND DECK ARE POURED MONOLITHICALLY, THE SIDEWALLS SHALL BE POURED COMPLETELY FIRST AFTER A SUITABLE TIME TO BE DETERMINED BY THE ENGINEER (30 MINUTES MINIMUM), THE DECK MAY BE POURED.





TYP. HALF SECTION
R.C. RECTANGULAR SECTION



TYP. HALF SECTION
R.C. BOX CULVERT

FILE NO.	REVISIONS					REFERENCES		SCALE: NO SCALE UNLESS OTHERWISE SPECIFIED		DATE
	NUMBER	DATE	INITIALS	DESCRIPTION	APP'V'D.	S.P.S.A.-40, DWG. NO. 1-17-9	Bench Mark: B.M. No. SA-206.70	DESIGNED	W.M.M., B. STEAFFENS	8-71
						O.C.F.C.D. DWG. NO. F02-101-2-A	O.C.S. Disc So. End East Hdwall, O.C.F.C.D.	DRAWN	W.M.M., B. STEAFFENS	8-71
							Channel At Bristol. Approx. 250' So. Of MacArthur & Bristol Intersection.	CHECKED		
							1970 Adjusted Elev = 33.328	R/W APPROVED		
								RECOMMENDED		
								APPROVED R.C.E. NO. 11026		8-15-71

PROJECT NO. 1326-4

SANTA ANA GARDENS CHANNEL CROSSING
MACARTHUR BLVD.
R.C. BOX CULVERT DETAILS
DEPARTMENT OF PUBLIC WORKS
CITY OF SANTA ANA

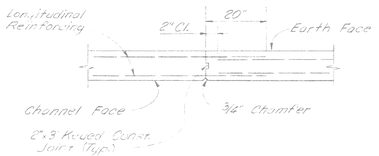
SHEET NO. 1 OF 3

W.O. 48435

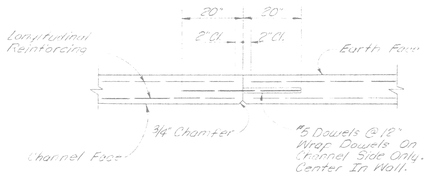
DIETZGEN 138W-3 AGEPROOF FILM

Construction Joint Notes:

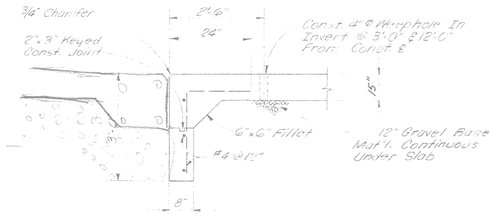
1. Construction Joint For R.C.B. To Be At Intervals Not Less Than 10' Or More Than 50'.
2. Minimum Waiting Period Between Adjacent R.C.B. Pours: 4 Hours.
3. All Construction Joints To Be In The Same Plane For Entire Structure.
4. When The Sidewalls And Deck Are Poured Monolithically, The Sidewalls Shall Be Poured Completely First. After A Suitable Time Determined By The Engineer (30 Mins Minimum) The Deck May Be Poured.



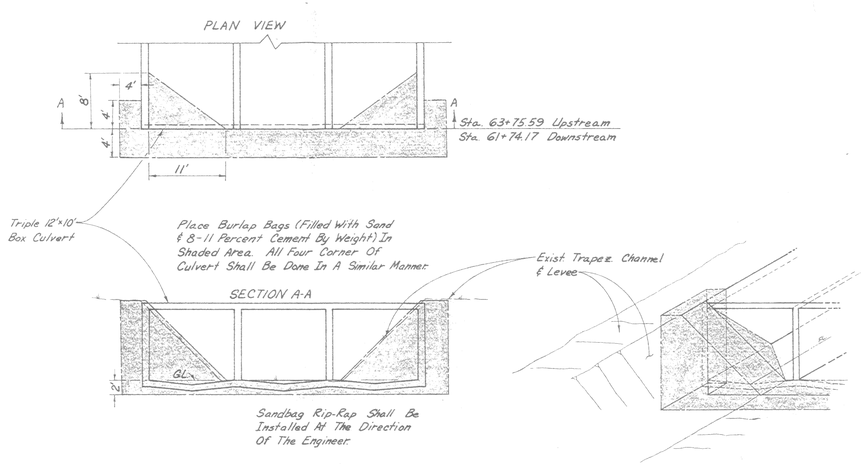
TYPE I
CONSTRUCTION JOINT
DETAIL



TYPE II
CONSTRUCTION JOINT
DETAIL



CUTOFF WALL DETAIL



SANDBAG RIP-RAP DETAIL

CONSTRUCTION NOTES

1. SPLICES IN REINFORCING STEEL SHALL BE 30 BAR DIAMETERS UNLESS OTHERWISE SHOWN.
2. ALL EXPOSED EDGES SHALL HAVE A 3/4" CHAMFER.
3. MINIMUM WAITING PERIOD BETWEEN ADJACENT R.C. INVERT POURS SHALL BE 4 HOURS.
4. TRANSVERSE CONSTRUCTION JOINTS SHALL BE IN THE SAME PLANE ACROSS ENTIRE STRUCTURE.
5. BUNDLE REINF. BARS TO CLEAN WEEPHOLES BY 1 1/2".
6. ALL CONCRETE SHALL BE 3,000 PSI.
7. ALL REINFORCING BARS SHALL BE PLACED SYMMETRICAL ABOUT CENTER LINE OF CULVERT.
8. REINFORCEMENT EASEMENT IS 2" CLEAR, EXCEPT AS NOTED.
9. PLACE #2 ROCK OR OTHER ENGINEER APPROVED AGGREGATE UNDER CULVERT AS DIRECTED BY ENGINEER.
10. WHEN CBE SIDEWALLS AND DECK ARE POURED MONOLITHICALLY, THE SIDEWALLS SHALL BE POURED COMPLETELY FIRST. AFTER A SUITABLE TIME TO BE DETERMINED BY THE ENGINEER (30 MINUTES MINIMUM), THE DECK MAY BE POURED.

FILE NO.

REVISIONS

NUMBER	DATE	INITIALS	DESCRIPTION	APP'V'D.

REFERENCES

S.P.S.A. 40, Dwg. No. 1-17-9	Bench Mark: B.M. No. SA-206-70
	O.C.S. Disc. So. End East Headwall. O.C.F.C.
O.C.F.C.D. Dwg. No. FDB-101-2.A	Channel At Bristol - Approx. 250' So.
	Of MacArthur & Bristol Intersection
	1970 Adjusted Elev. = 35.328

SCALE: NO SCALE UNLESS OTHERWISE SPECIFIED		DATE
DESIGNED	W.M.M., B. Stouffer	8-71
DRAWN	W.M.M., B. Stouffer	8-71
CHECKED	T.J.A.	
R/W APPROVED		
RECOMMENDED		
APPROVED R.C.E. NO. 11926		8-13-71

PROJECT NO. 1326-A

SANTA ANA GARDENS CHANNEL CROSSING
MACARTHUR BLVD.
R.C. BOX CULVERT DETAILS
DEPARTMENT OF PUBLIC WORKS
CITY OF SANTA ANA

SHEET NO. 2 OF 3

DIETZGEN 138W-3 AGEPROOF FILM

W.O. 48435

GENERAL NOTES

1. — All metal parts of all type fences and gates, including fence fabrics and barbed wire shall be new galv. material.
2. — Std. stl. pipe shall be of following min. weights before galv'g.

No. Dia	Wt/ft	No. Dia.	Wt/ft.
1"	1.68#	2 1/2"	5.79#
1 1/4"	2.27#	4"	10.79#
1 1/2"	2.72#	6"	18.97#
2"	3.65#		

3. — Light weight metal inserts shall be sheet metal tube with I.D. 3/4" greater than O.D. of pipe used. Posts shall be grouted into inserts using neat grout of 1 part of cement and 2 parts of water. Post may be set in sulphur in lieu of grout if approved by the Engineer.
4. — All gate hinges shall be heavy duty malleable iron or steel, industrial service type, 180 degree swing, of approved quality and design.
5. — Ground shall be graded before fence construction begins. Bottom of fence shall be located one inch above ground surface. Localized ground depressions in excess of 3 inches shall be eliminated by properly placed compacted fill, by placing additional fabric or by installation of additional posts as directed by the Engineer.
6. — Unless otherwise shown on the plans, District Contractors shall construct fence with fabric 0.2' inside of R/W Line.

PRELIMINARY REVISION CODE
Disregard Prints Bearing Earlier Codes

REVISIONS

MARK	DATE	DESCRIPTION
1	5-66	Rev. pipe lengths.
2	11-66	Rev. line posts

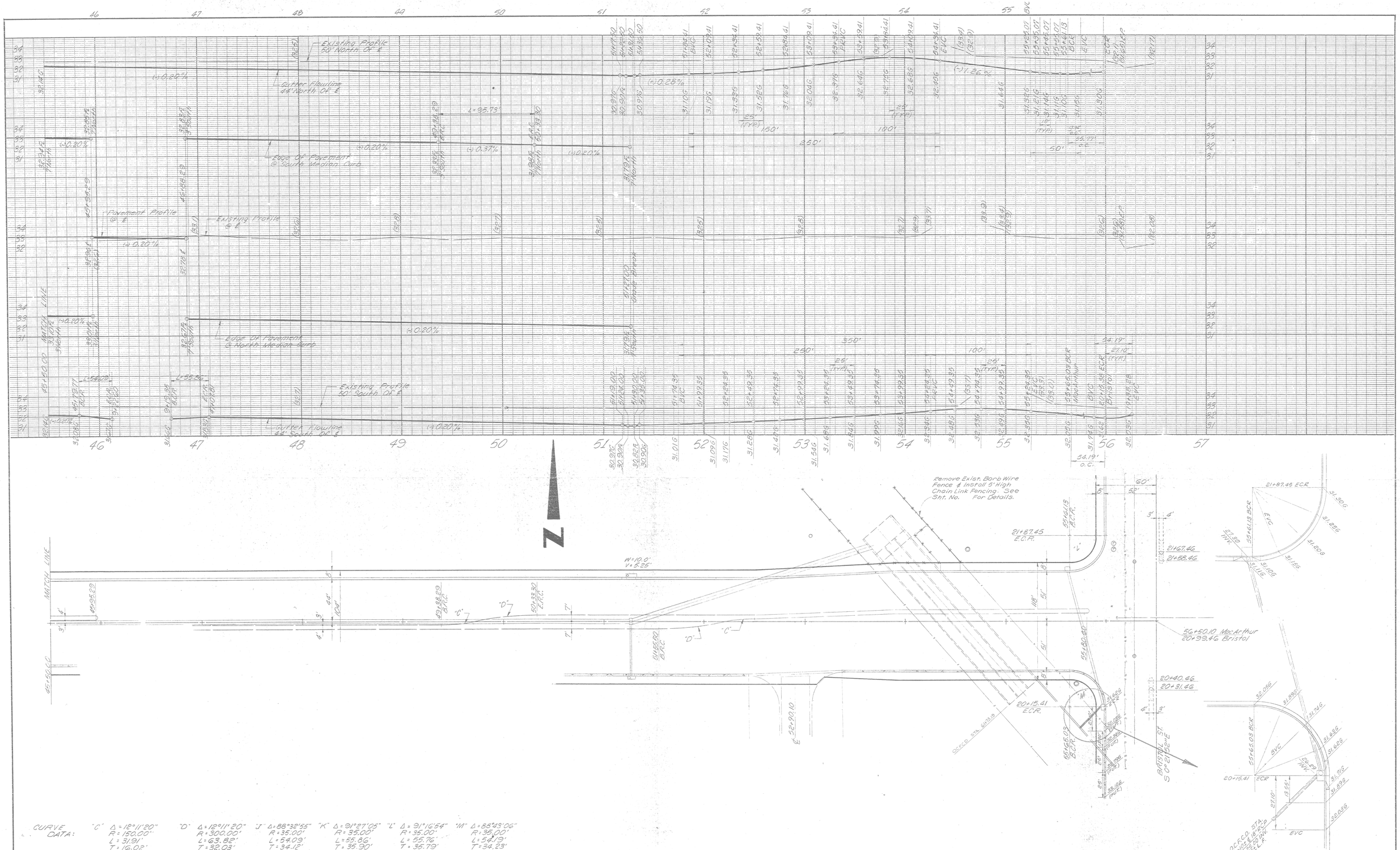
ORANGE COUNTY FLOOD CONTROL DISTRICT

SANTA ANA GARDENS
F-02 CHANNEL
TYPICAL FENCE
AND GATE DETAILS

DESIGNED J.W.H.
DRAWN A.P. CHECKED J.W.H.
SUBMITTED ____ DESIGN ENGINEER
RECOMMENDED ____ DESIGN DIVISION ENGINEER
SCALE AS SHOWN
DATE APR. 1965
DWG. NO.

SHEET 3 OF 3

S-104-DIS



FILE NO.	REVISIONS					REFERENCES		SCALE: Plan: 1" = 40' Profile: Horiz.: 1" = 40' Vert.: 1" = 4'		DATE
	NUMBER	DATE	INITIALS	DESCRIPTION	APP'V'D.	Topo.: Book LL-12, Pg. 133-138	Bench Mark: OCS Tag So. End East Holwl. Drain. Chan'l. Crossing Bristol Elev. 33.01	DESIGNED	W.M.M.	'71
						Levels: Book LL-12, Pg. 139-144 Book LL-13, Pg. 59-62	T.B.M.: Mon. @ Bristol & MacArthur Elev. 31.37	DRAWN	W.M.M.	'71
						Dray File: 1-13A-8		CHECKED		
								R/W APPROVED		
								RECOMMENDED		
								APPROVED R.C.E. NO.		

STREET IMPROVEMENT PROJECT NO.

MACARTHUR BLVD.

GREENVILLE ST. TO BRISTOL ST.

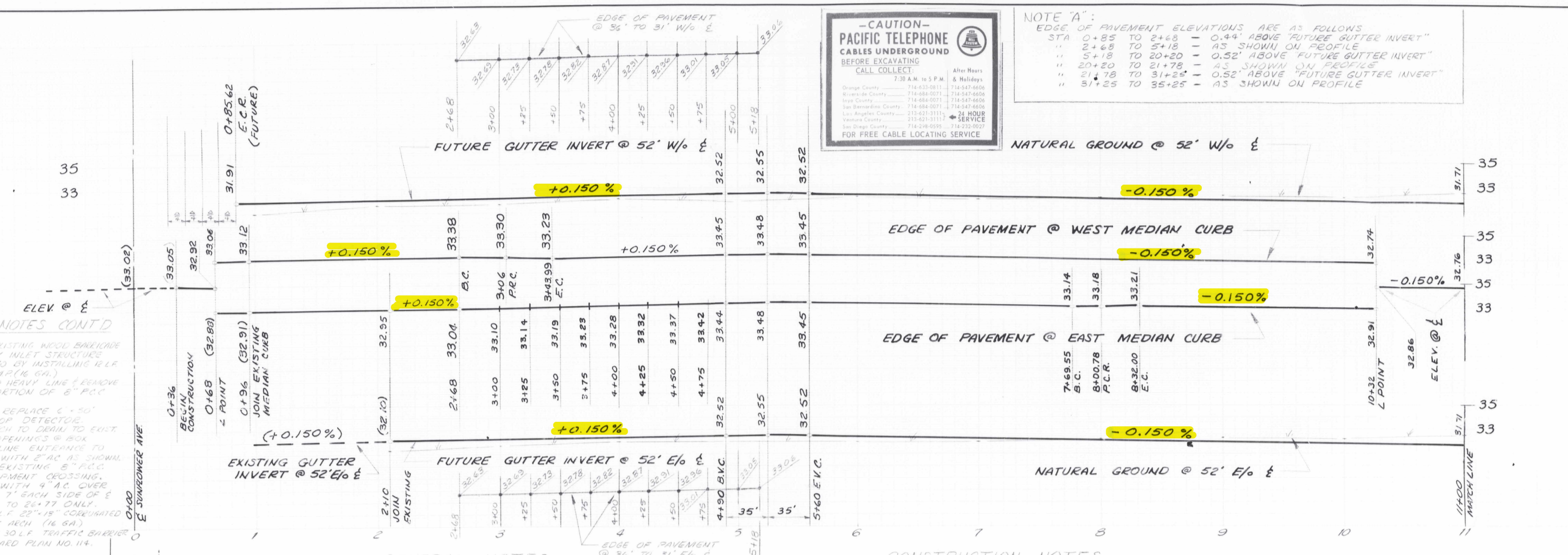
DEPARTMENT OF PUBLIC WORKS
CITY OF SANTA ANA

SHEET NO. 5 OF

DIETZGEN 138W-3 AGEPROOF FILM

W.O. # 88435

Bristol St: Sunflower to Alton
PR: 306
1 of 4
1-13-8



NOTE "A":
EDGE OF PAVEMENT ELEVATIONS ARE AS FOLLOWS

STA	0+85	TO 2+68	–	0.44' ABOVE "FUTURE GUTTER INVERT"
"	2+68	TO 5+18	–	AS SHOWN ON PROFILE
"	5+18	TO 20+20	–	0.52' ABOVE "FUTURE GUTTER INVERT"
"	20+20	TO 21+78	–	AS SHOWN ON PROFILE
"	21+78	TO 31+25	–	0.52' ABOVE "FUTURE GUTTER INVERT"
"	31+25	TO 35+25	–	AS SHOWN ON PROFILE

CONST NOTES CONT'D

(11) RELOCATE EXISTING WOOD BARRICADE & TEMPORARY INLET STRUCTURE TO STA 0+50 BY INSTALLING 12 L.F. OF 18" ⌀ C.M.P. (16 GA.)
(12) SAW CUT @ HEAVY LINE & REMOVE SHADED PORTION OF 8" P.C.C. PAVEMENT.
(13) REMOVE & REPLACE 6' × 50' TRAFFIC LOOP DETECTOR.
(14) GRADE DITCH TO DRAIN TO EXIST. PARAPET OPENINGS @ BOX CULVERT. LINE ENTRANCE TO OPENINGS WITH 2" A.C. AS SHOWN.
(15) REMOVE EXISTING 8" P.C.C. SLAB EQUIPMENT CROSSING.
(16) SURFACE WITH 4" A.C. OVER 8" A.B. TO 7' EACH SIDE OF ℄ STA 26+37 TO 26+77 ONLY.
(17) PLACE 18 L.F. 22" × 13" CORRUGATED METAL PIPE ARCH (16 GA.)
(18) CONSTRUCT 30 L.F. TRAFFIC BARRIER PER STANDARD PLAN NO. 114.

GENERAL NOTES

1. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE PROVISIONS OF THE STANDARD SPECIFICATIONS OF CITY OF SANTA ANA.
2. UTILITIES AND SIGNS ARE TO BE RELOCATED AS REQUIRED, BY OTHERS, PRIOR TO CONSTRUCTION.
3. CONSTRUCT SHADED PORTION ONLY.
4. WITHIN 72 HOURS AFTER FINAL SURFACING IS PLACED, ALL MANHOLE AND VALVE BOX FRAMES AND COVERS SHALL BE ADJUSTED TO FINISHED GRADE. ADJUSTMENT SHALL BE MADE PRIOR TO PLACING THE SEAL COAT.
5. THE CITY WATER DIVISION WILL PLACE A WATER LINE IN BRISTOL STREET AFTER THE EXCAVATION HAS BEEN COMPLETED & PRIOR TO BASE PREPARATION. THE CONTRACTOR SHALL COORDINATE HIS ACTIVITIES WITH THE WATER DIVISION, DEPARTMENT OF PUBLIC WORKS.

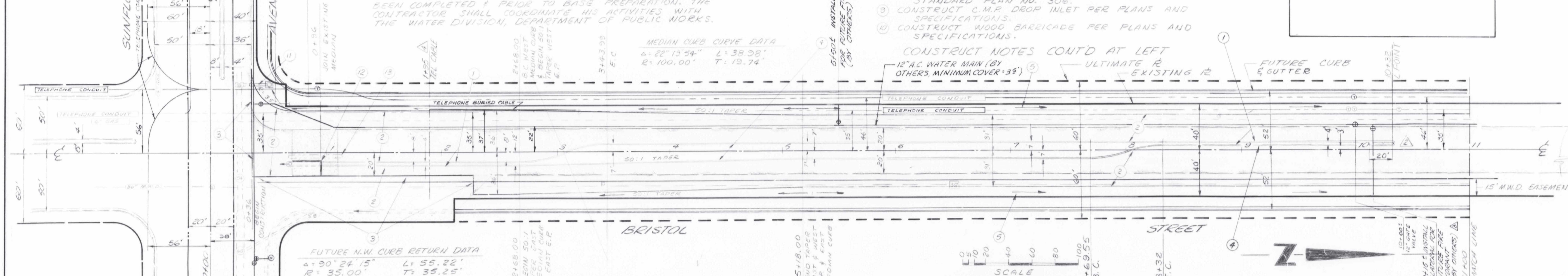
CONSTRUCTION NOTES

(1) CONSTRUCT TYPE B-1 CURB PER STANDARD PLAN NO. 101.
(2) CONSTRUCT 4" A.C. WITH FOG SEAL COAT, OVER 7" C.T.B., OVER 7" L.T.S. (or 4" AC over 19" AB)
(3) JOIN & FEATHER AS DIRECTED BY THE ENGINEER.
(4) CONSTRUCT MEDIAN PER STANDARD PLAN NO. 118.
(5) GRADE DITCH TO 4" BELOW EDGE OF PAVEMENT ELEVATION.
(6) REPLACE EXISTING IRRIGATION PIPE WITH CLASS 150 A.C. PIPE THROUGH R/W AREA. SIZE AS SHOWN ON PLAN.
(7) CONSTRUCT R.C.P. STORM DRAIN PER STANDARD PLAN NO. 206. SIZE AS SHOWN ON PLAN.
(8) CONSTRUCT TYPE "A" JUNCTION CHAMBER PER STANDARD PLAN NO. 306.
(9) CONSTRUCT C.M.P. DROP INLET PER PLANS AND SPECIFICATIONS.
(10) CONSTRUCT WOOD BARRICADE PER PLANS AND SPECIFICATIONS.

CONSTRUCT NOTES CONT'D AT LEFT

NOTE:
ALL WORK WITHIN THE FLOOD CONTROL DISTRICT RIGHT OF WAY SHALL BE PERFORMED IN ACCORDANCE WITH THE PROVISIONS OF THE CONSTRUCTION PERMIT GRANTED BY ORANGE COUNTY FLOOD CONTROL DISTRICT AND THE PLANS STAMPED WITH THE APPROVAL OF ORANGE COUNTY FLOOD CONTROL DISTRICT. CONTRACTOR SHALL HAVE A COPY OF SAID PERMIT AND STAMPED PLANS ON THE JOB SITE.

O.C.F.C.D. PERMIT NO. 22567



1-13-8 REVISIONS

NUMBER	DATE	INITIALS	DESCRIPTION	APP'V'D.
	10-10-67	dwb	Add Drainage Details & Channel & Traffic Barrier & P.C.C.	
3	11-4-67		ADDITION OF FIRE HYDRANT LATERALS	WDS
2	11-15-67	H.D.K.	ADD MEDIAN OPENINGS	
4	8-7-68	W.A.N.	ADD TEL CABLE STA AS BUILT	
5			Add alternate section 8-18-70	J.M.

REFERENCES

TOPO - BK LL-6 Pgs 24-28
LEVELS - BK LL-6 Pgs 29-34
1-107-1 41-39
1-73-1; SUNFLOWER 1-31-5; BRISTOL

B.M. ℄ INTERSECTION SUNFLOWER & BRISTOL. ELEV. = 33.02 (BOLT FLUSH WITH PAVEMENT)

SCALE:	PLAN 1" = 40'; PROFILE HORIZ 1" = 40', VERT 1" = 4' ON ORIGINAL	DATE
DESIGNED	dwb VJS	10-66
DRAWN	dwb	8-66
CHECKED	NKS	8-66
R/W APPROVED		8-28-67
RECOMMENDED		8-31-67
APPROVED R.E. NO. 9879	R.E. Wolford	8/31/67

BRISTOL STREET
SUNFLOWER AVENUE TO ALTON AVENUE
PROJ. #306
DEPARTMENT OF PUBLIC WORKS
CITY OF SANTA ANA
SHEET NO. 1 OF 4
1-13-8

2 oF 4

BRISTOL ST: SUNFLOWER - ALTON AVE
PR: 306

1-13-8

M/7 2192-10194

METROPOLITAN WATER DISTRICT FACILITIES

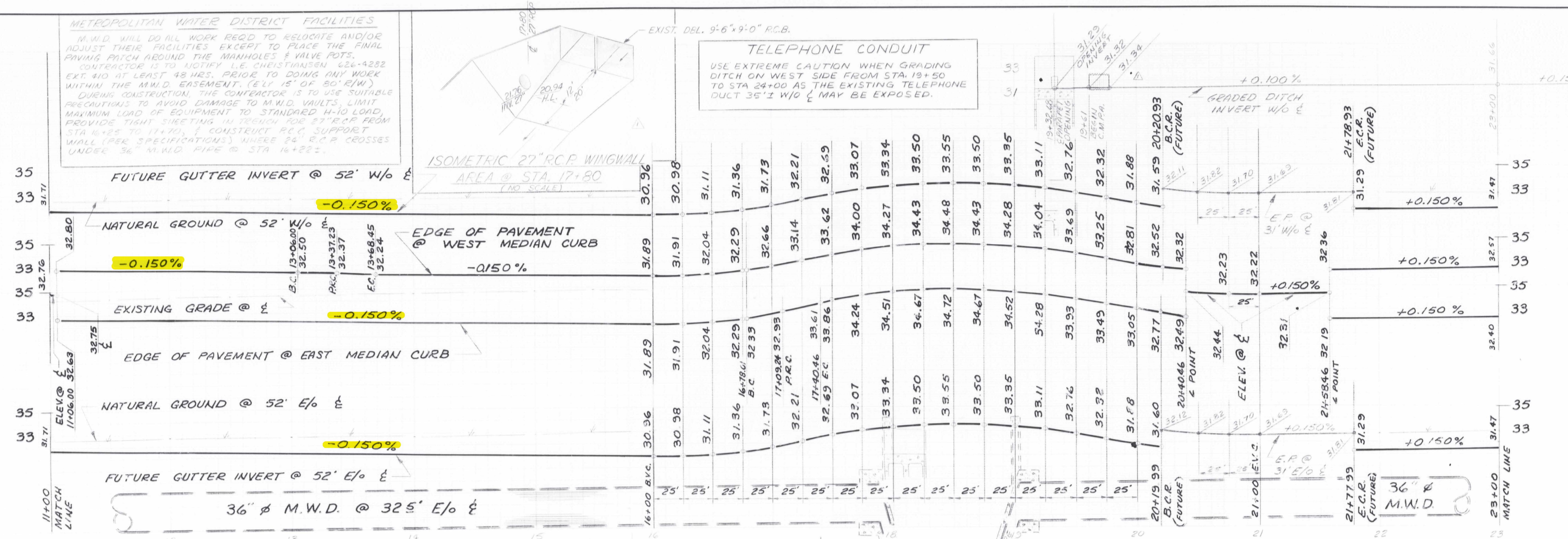
M.W.D. WILL DO ALL WORK REQ'D TO RELOCATE AND/OR ADJUST THEIR FACILITIES EXCEPT TO PLACE THE FINAL PAVING PATCH AROUND THE MANHOLES & VALVE POTS.

CONTRACTOR IS TO NOTIFY L.E. CHRISTIANSEN 626-4282 EXT. 410 AT LEAST 48 HRS. PRIOR TO DOING ANY WORK WITHIN THE M.W.D. EASEMENT. (E'LY 15' OF 80' R/W)

DURING CONSTRUCTION, THE CONTRACTOR IS TO USE SUITABLE PRECAUTIONS TO AVOID DAMAGE TO M.W.D. VAULTS, LIMIT MAXIMUM LOAD OF EQUIPMENT TO STANDARD H-10 LOAD, PROVIDE TIGHT SHEETING IN TRENCH FOR 27" R.C.P. FROM STA 16+25 TO 17+70, & CONSTRUCT P.C.C. SUPPORT WALL (PER SPECIFICATIONS) WHERE 24" R.C.P. CROSSES UNDER 36" M.W.D. PIPE @ STA 16+22±.

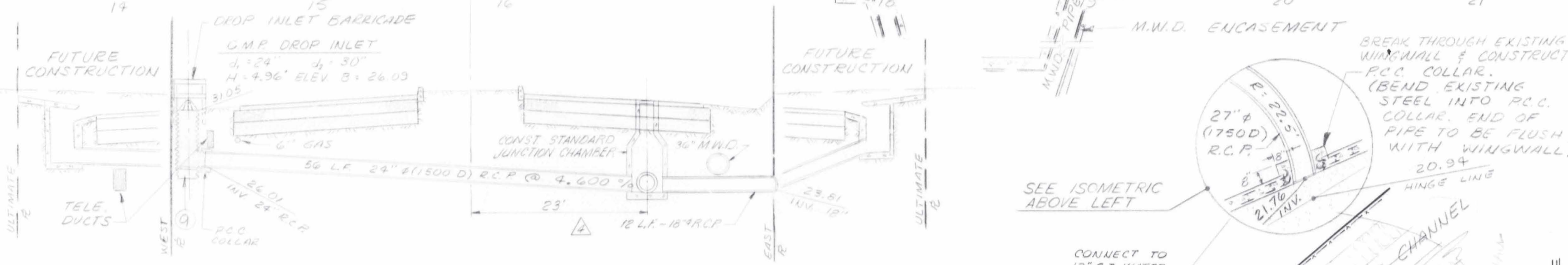
TELEPHONE CONDUIT

USE EXTREME CAUTION WHEN GRADING DITCH ON WEST SIDE FROM STA. 19+50 TO STA 24+00 AS THE EXISTING TELEPHONE DUCT 35'± W/O ℄ MAY BE EXPOSED.



CONSTRUCTION NOTES

1. CONSTRUCT TYPE B-1 CURB PER STANDARD PLAN NO. 101.
2. CONSTRUCT 4" A.C. WITH FOG SEAL COAT, OVER 7" C.T.B., OVER 7" L.T.S.
3. JOIN AND FEATHER AS DIRECTED BY THE ENGINEER.
4. CONSTRUCT MEDIAN PER STANDARD PLAN NO. 118.
5. GRADE DITCH TO 4" BELOW EDGE OF PAVEMENT ELEVATION.
6. REPLACE EXISTING IRRIGATION PIPE WITH CLASS 150 AC PIPE THROUGH R/W AREA. SIZE AS SHOWN ON PLAN.
7. CONSTRUCT R.C.P. STORM DRAIN PER STANDARD PLAN NO. 206. SIZE AS SHOWN ON PLAN.
8. CONSTRUCT TYPE "A" JUNCTION CHAMBER PER STANDARD PLAN NO. 306. (OMIT FRAME & COVER)
9. CONSTRUCT C.M.P. DROP INLET PER PLANS AND SPECIFICATIONS.
10. CONSTRUCT WOOD BARRICADE PER PLANS AND SPECIFICATIONS.
14. GRADE DITCH TO DRAIN TO EXISTING PARAPET OPENINGS AT BOX CULVERT. LINE ENTRANCE TO OPENINGS WITH 2" A.C. AS SHOWN.
17. PLACE 18 L.F. 22"x13" C.M.P.A. (16 GA)



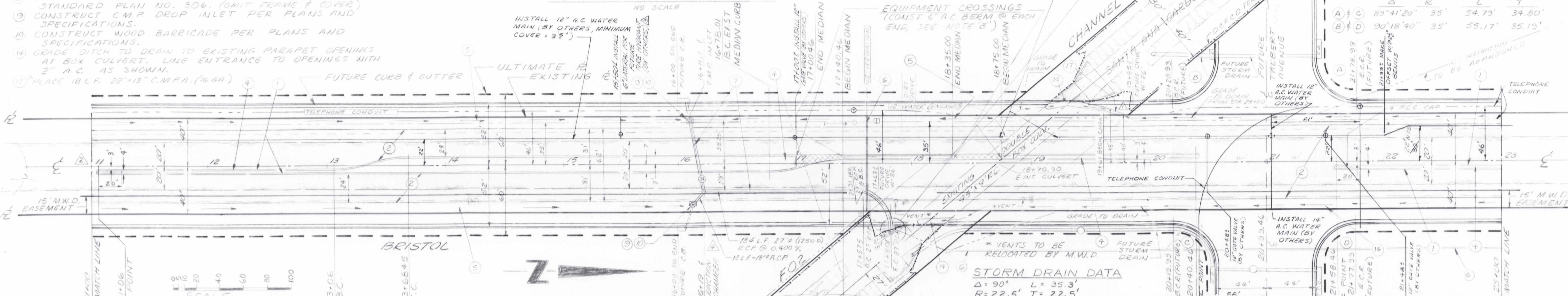
STORM DRAIN DETAILS
NO SCALE

NOTE "B"

TO PROVIDE ACCESS FOR AGRICULTURAL EQUIPMENT TO ADJACENT FIELDS, THE MEDIAN IS TO BE OMITTED FROM STA. 17+00.46 TO 17+40.46 & FROM STA 18+35 TO 18+75. CONSTRUCT 4" AC. ON 8" A.B. TEMPORARY SECTION (ONLY IN THE CROSS-HATCHED AREAS, FULL 4" AC OVER 7" C.T.B. OVER 7" L.T.S. ALL OTHER AREAS) WITH CROWN @ "EDGE OF PAVEMENT @ EAST MEDIAN CURB" ELEVATIONS SHOWN ON PROFILE. THESE EQUIPMENT CROSSINGS ARE TEMPORARY & WILL BE CLOSED WHEN THE ADJACENT PROPERTIES ARE DEVELOPED.

FUTURE CURB RETURN DATA

	"Δ"	"R"	"L"	"T"
A & C	89°41'20"	35'	54.79'	34.80'
B & D	90°18'40"	35'	55.17'	35.19'



STORM DRAIN DATA
Δ = 90°   L = 35.3'
R = 22.5'   T = 22.5'

1-13-8 REVISIONS

NUMBER	DATE	INITIALS	DESCRIPTION	APP'V'D.
1	10-10-67	dwb	ADD DRAINAGE DETAILS @ CHANNEL & TRAFFIC BARRIER @ P.E.R.R.	
2	11-3-67	dwb	ADD M.W.D. REQUIREMENTS, ADD MEDIAN OPENINGS	
3	11-9-67	CS	ADDITION OF FIRE HYDRANT LATERALS	
4	8-8-68	WMM	CHNG'D LOCATION & CONST OF PORTION OF STORM DRAIN - AS BUILT	
5	8-18-70	HS	Add alternate section 8-18-70	2M

REFERENCES

TOPO - BK LL-6 Pgs 24-28
LEVELS - BK LL-6 Pgs 29-34
1-31-5; BRISTOL ST.
F-2-CHANNEL; BIN "Q" & "R"

B.M.
E. SIDE: 17+65 29.3' E EL. 30.30
19+38 33' E/℄ T.P. EL. 29.78
W. SIDE: 21+18 @ E.P. EL. 31.75, TOP OF 10" IRRIG. EL. 29.67
TOP OF DUCT EL. 31.62
17+67 TOP OF PIPE, 14" O.D., EL. 30.31

SCALE: PLAN: 1" = 40'; PROFILE HORIZ.: 1" = 40', VERT.: 1" = 4' ON ORIGINAL

		DATE
DESIGNED	dwb VJS	10-66
DRAWN	dwb	8-66
CHECKED	NKS	
R/W APPROVED		8-28-67
RECOMMENDED		8-31-67
APPROVED	R.E. Wolford	8/31/67
R. E. NO. 9879		

BRISTOL STREET
SUNFLOWER AVENUE TO ALTON AVENUE

PROJ. # 306

DEPARTMENT OF PUBLIC WORKS
CITY OF SANTA ANA

SHEET NO. 2 OF 4

1-13-8

2 OF 4

N/F 10/10/74

MacArthur BLVD. Plaza Dr. to Bristol ST. P-1327 & 1326

1-36-9

N/F 11/11/74

GENERAL NOTES

1. CONSTRUCT SHADED PORTION ONLY.
2. ALL WORK TO BE DONE IN ACCORDANCE WITH CITY OF SANTA ANA STANDARDS & SPECIFICATIONS.
3. STATIONING IS ALONG SURVEY CENTERLINE.
4. UTILITIES SHOWN ON THESE PLANS ARE CORRECT AND ACCURATE TO THE EXTENT OF AVAILABLE RECORDS AND KNOWLEDGE. THE CONTRACTOR, HOWEVER, IS REQUIRED TO TAKE STEPS TO ASCERTAIN THE EXACT LOCATION OF ALL UNDERGROUND FACILITIES PRIOR TO DOING WORK THAT MAY DAMAGE SUCH FACILITIES OR INTERFERE WITH THEIR SERVICE.
5. ALL WATER VALVE BOXES & MANHOLE RIMS SHALL BE BROUGHT TO GRADE.

CONSTRUCTION NOTES

1. CONSTRUCT 4" AC, WITH FOG SEAL COAT, OVER 7" CTB OVER 6" LTS.
2. CONSTRUCT TYPE A-2 PCC CURB AND GUTTER PER STANDARD PLAN #101.
3. CONSTRUCT AC BERM PER DETAIL, THIS SHEET.
4. CAP EXISTING PAVEMENT WITH 2" AC. JOIN & FEATHER AS DIRECTED BY ENGINEER.
5. INSTALL CHAIN LINK FENCE AS SHOWN ON PLAN.
6. INSTALL GATE, "W"=16', SEE SHEET NO. 4.
7. CONSTRUCT PCC DRIVE APPROACH PER STANDARD PLAN NO. 112, "W" AS SHOWN.
8. CONSTRUCT CITY OF SANTA ANA SURVEY MONUMENT PER STANDARD PLAN NO. 117.
9. PLACE 3-W21R CONSTRUCTION SIGNS, EVENLY SPACED, AT WEST END OF PAVING ON MACARTHUR BLVD. & 6' AT NORTH END OF PAVING AT PLAZA DR.

Existing Profile 50' North Of ℄ (Future)
Gutter Flowline 44' North Of ℄ (Future)
Edge Of Pavement @ North Median Curb (Future)
Pavement Profile @ ℄
Existing Profile @ ℄
Future S. Med. Curb
Edge Of Pavement @ South Median Curb
Future C&G
Existing Profile 50' South Of ℄
Gutter Flowline 44' South Of ℄
Proposed Crown Line 7' N/℄
Remove Exist. Barb Wire Fence & Install 5' High Chain Link Fencing. See Sht. No. 4 For Details. 1131 L.F.
Future Median
Proposed Crown Line
Future Curb & Gutter
Install F.H. (By Others)
Const. 14" AC Water Main (By Others)
Remove Exist. Ch. Link Fence
Install 5' High Chain Link Fencing. See Sht. No. 4 For Details. 1651 L.F.
Const. 5' High Ch. Link Fence See Sht. No. 4
Exist. Ch. Link Fence
MACARTHUR BOULEVARD
CURB DATA
NOTE: For Storm Drain Details See Sheet No. 3.
See Sheet #3 for Drain Details

TYPICAL SECTION
STA. 53+65.14 TO 55+59.01
SCALE: HOR. 1"=20' VERT. 1"=2'

TYPICAL SECTION
STA 45+90.70 to 53+65.14
SCALE: HORIZ. 1"=20', VERT. 1"=2'

A.C. BERM SCALE: 1"=10'
SOUTH SIDE: STA. 52+44.10 to 53+36.10

SIDEWALK SECTION
NORTH SIDE: STA. 53+82.83 to 54+54.39
SOUTH SIDE: STA. 54+74.73 to 55+31.45
UTILITIES UNDER SOUTH SIDE ONLY

NORTHWEST CORNER
INTERSECTION DETAILS
SCALE: 1"=20'
SOUTHWEST CORNER
SOUTHEAST CORNER

CURVE DATA

	Δ	R	L	T
C	10°56'35"	150'	27.77'	13.98'
D	12°11'20"	300'	63.81'	32.03'
J	88°33'45"	35'	54.10'	34.13'
K	91°26'15"	35'	55.86'	35.89'
L	91°17'54"	35'	55.77'	35.80'
M	88°42'06"	35'	54.18'	34.22'
O	12°06'05"	300'	63.36'	31.79'
P	12°06'05"	150'	31.68'	15.90'
R	12°06'05"	158'	33.37'	16.74'
S	12°06'05"	292'	61.67'	30.95'

FILE NO.	REVISIONS				
	NUMBER	DATE	INITIALS	DESCRIPTION	APP'V'D.
1-369	1	9-15-72	RJ	AS BUILT	

REFERENCES	
Topo.: Book LL-12, Pg. 133-138	Bench Mark: OCS Tag Sta. End East Hfld. Drain. Chan'l. Crossing Bristol Elev. 33.01
Levels: Book LL-12, Pg. 139-144	
Book LL-13, Pg. 59-62	T.B.M.: Mon. ℄ Bristol ℄ MacArthur Elev. 31.37
Dray File: 1-19A-8	

SCALE: Plan: 1"=40' Profile: Hor.: 1"=40' Vert.: 1"=4'			DATE
DESIGNED	BS	MI	1-75
DRAWN			1-75
CHECKED		RS	
R/W APPROVED			2-2-72
RECOMMENDED	J.E. Stevens		2-76
APPROVED R.C.E. NO. 9879			

STREET IMPROVEMENT PROJECT NO. 1327 & 1326
MACARTHUR BLVD.
PLAZA DRIVE TO BRISTOL ST.
DEPARTMENT OF PUBLIC WORKS
CITY OF SANTA ANA
SHEET NO. 2 OF 4

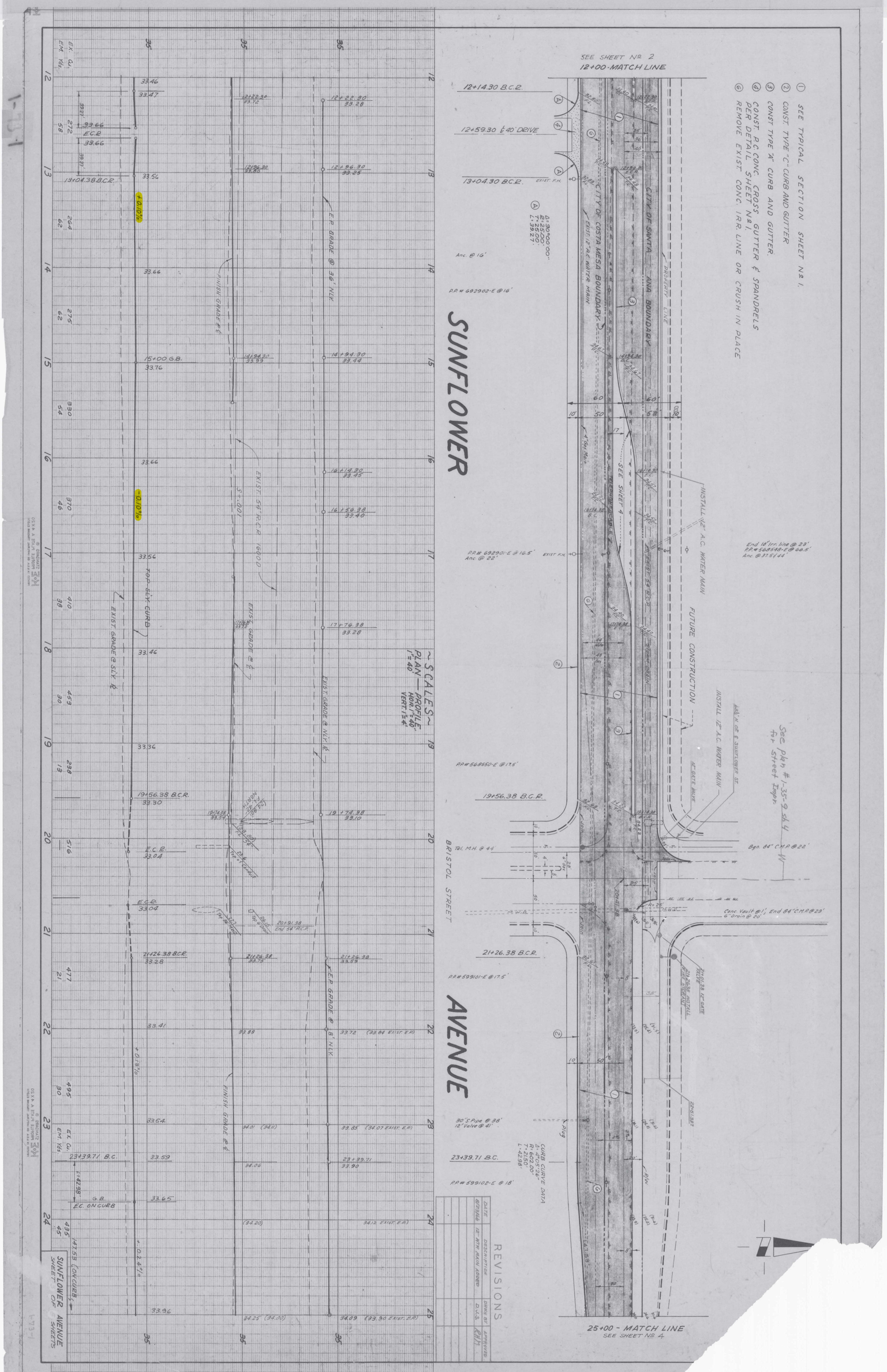
W.O. # 28475

DIETZGEN 139W-3 AGEPROOF FILM

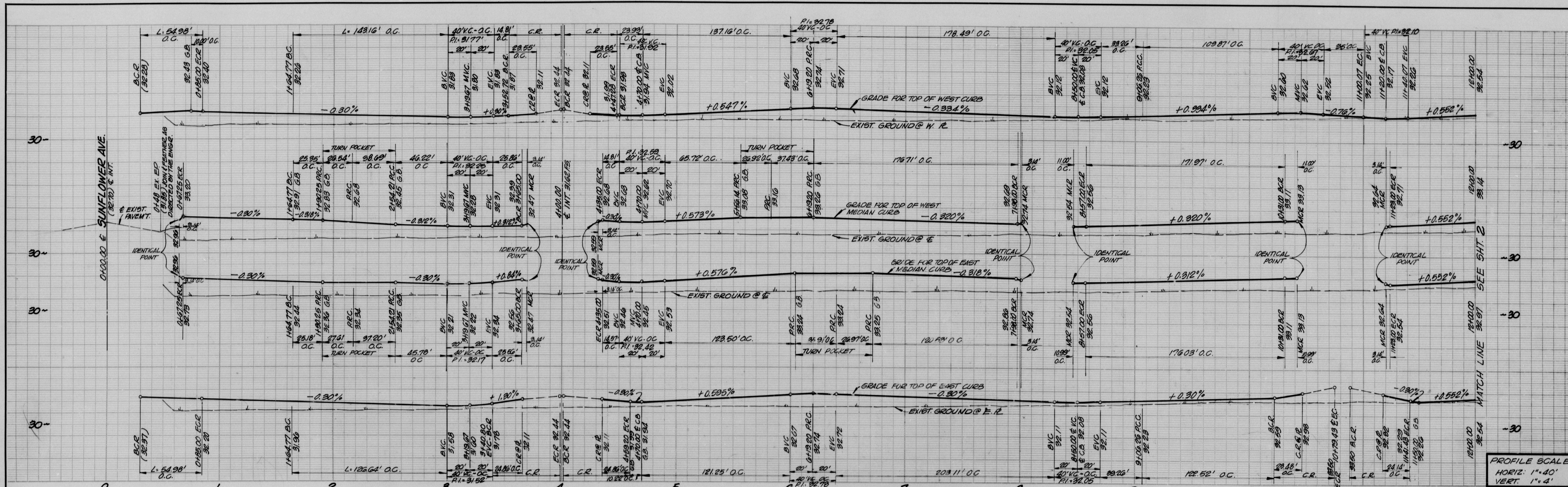
ST. IMP. SUNFLOWER AVENUE : BEAR STREET - SANTA ANA DELHI CHANNEL

1-73-1

3 of 5



Plaza Drive: Sunflower Ave - MacArthur Blvd. 1 of 4
St. Imp.
VA: 71-54
8/71
HF: 47-12



PROFILE SCALE
HORIZ: 1" = 40'
VERT. 1" = 4'

CONSTRUCTION NOTES

1. CONST. PER TYP. SECTION THIS SHEET (4" A.C. OVER 19" A.B.)
2. CONST. TYPE A-2 CURB & GUTTER PER STD. PLAN 101.
3. CONST. TYPE B-1A MODIFIED CURB & GUTTER PER DET. ON SHT. 2.
4. CONST. CONC. SIDEWALK PER STD. PLAN 104
5. ADJUST MANHOLE TO GRADE
6. FUTURE CONC. SIDEWALK

NOTE: △2

1. TELE - (2) 4" PVC 1'± OFF ℞ WEST SIDE 42"± dn FROM FINISH PCC S/W STA. TO STA.
2. EDISON (2) 5" PVC 2'6" OFF ℞ W/S 48"± dn. STA. 0 N/END WEST SIDE 9+06
3. IRRIGATION CONTROLLER (1) 2" P.V.C. 2' OFF ℞ W/S 24"± dn. STA. 3+50 TO STA 9+06±.
4. FIRE ALARM SYSTEM W/S PLAZA BACK OF CURB.

△2
5. GAS 3" PLASTIC ... WEST CURB
6. EDISON ST. LIGHTS ON PLAZA DRIVE 48"± OFF CURB & 36"± dn. & PCC ENCASED, BOTH SIDES PLAZA FROM SUNFLOWER TO STA. ALSO TREEWELLS SPRINKLER SYSTEM TRENCH 15"± dn.
7. EDISON ST. LIGHTS ON SUNFLOWER ARE 76"± OFF CURB & 36"± dn. PCC ENCASED NORTH SIDE ONLY (NO SPRINKLER LINE).

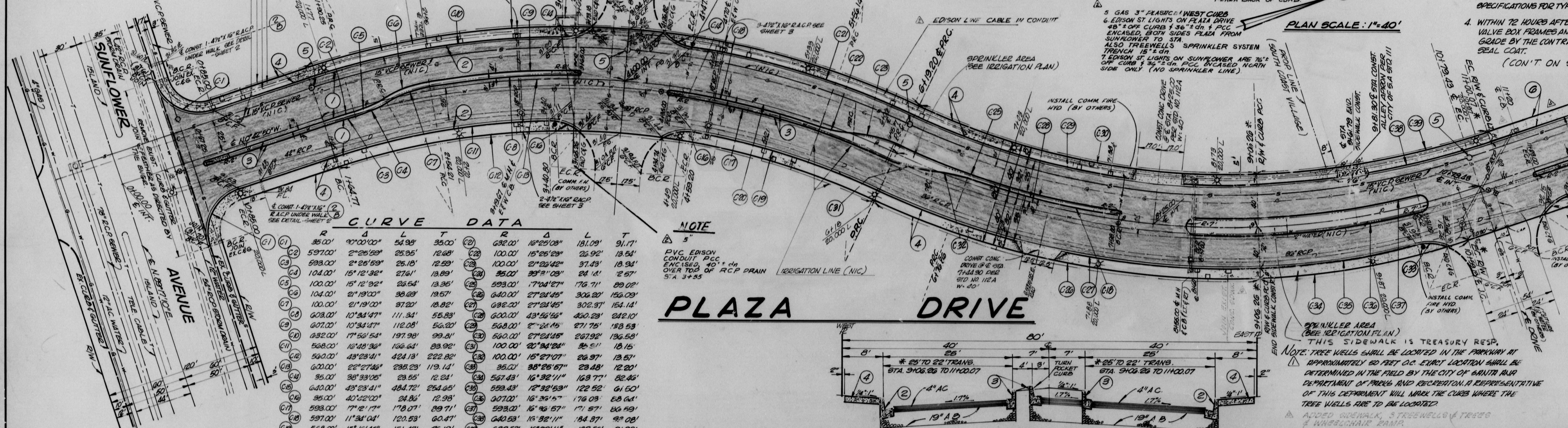
PLAN SCALE: 1" = 40'

GENERAL NOTES

1. ALL WORK SHOWN HEREON SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE PROVISIONS OF THE STD. SPECIFICATIONS OF THE CITY OF SANTA ANA.
2. AGGREGATE BASE SHALL CONFORM TO SECTION 26 OF THE STATE STD. SPECIFICATIONS FOR CLASS 1 OR 2. SPREADING SHALL CONFORM TO CLASS 2.
3. ASPHALT CONCRETE SHALL CONFORM TO SECTION 39 OF THE STATE STD. SPECIFICATIONS FOR TYPE "B", 3/4" MAX., (MEDIUM) WITH 85-100 PAVING ASPHALT.
4. WITHIN 72 HOURS AFTER FINAL SURFACING IS PLACED, ALL MANHOLE AND VALVE BOX FRAMES AND COVERS SHALL BE ADJUSTED TO FINISHED GRADE BY THE CONTRACTOR. THIS IS TO BE DONE PRIOR TO PLACING SEAL COAT.

(CON'T ON SHEET 2)

NOTE: FOR TYPICAL LAYOUT OF TREEWELLS SEE PLAZA DRIVE PLANTING PLAN SHEET 1 OF 2



NOTE: PVC EDISON CONDUIT P.C.C. ENCASED 40' dn OVER TOP OF RCP DRAIN STA. 3+35

CURVE DATA

	R	Δ	L	T
C1	35.00'	90°00'00"	54.98'	35.00'
C2	597.00'	2°25'59"	25.35'	12.68'
C3	593.00'	2°25'59"	25.18'	12.59'
C4	104.00'	15°12'32"	27.61'	13.89'
C5	100.00'	15°12'32"	26.54'	13.35'
C6	104.00'	21°19'00"	38.69'	19.57'
C7	100.00'	21°19'00"	37.20'	18.82'
C8	603.00'	10°34'47"	111.34'	55.83'
C9	607.00'	10°34'47"	112.08'	56.20'
C10	632.00'	17°56'54"	197.98'	99.81'
C11	568.00'	16°48'36"	166.64'	83.92'
C12	560.00'	43°23'41"	424.13'	222.82'
C13	600.00'	22°27'46"	235.23'	119.14'
C14	35.00'	38°33'05"	23.55'	12.24'
C15	640.00'	43°23'41"	484.72'	254.65'
C16	35.00'	40°42'00"	24.86'	12.98'
C17	593.00'	17°12'17"	178.07'	89.71'
C18	597.00'	11°34'04"	120.53'	60.47'
C19	568.00'	15°16'45"	151.47'	76.19'
C20	600.00'	20°55'55"	219.20'	110.84'
C21	632.00'	16°25'03"	181.09'	91.17'
C22	100.00'	15°25'23"	26.92'	13.54'
C23	100.00'	21°26'42"	37.43'	18.94'
C24	35.00'	39°3"03"	24.14'	12.57'
C25	593.00'	17°04'27"	176.71'	89.02'
C26	640.00'	27°24'45"	306.20'	156.09'
C27	632.00'	27°24'45"	302.37'	154.14'
C28	600.00'	43°56'56"	460.23'	242.10'
C29	568.00'	27°24'45"	271.75'	138.53'
C30	560.00'	27°24'45"	267.92'	136.58'
C31	100.00'	20°34'24"	35.91'	18.15'
C32	100.00'	15°27'07"	26.97'	13.57'
C33	35.00'	38°25'57"	23.48'	12.20'
C34	567.43'	16°32'11"	163.77'	82.46'
C35	559.43'	12°32'53"	122.52'	61.50'
C36	607.00'	16°36'57"	176.03'	88.64'
C37	593.00'	16°36'57"	171.97'	86.59'
C38	640.53'	16°32'11"	184.87'	93.08'
C39	632.53'	16°32'11"	182.56'	91.92'

NOTE: TREE WELLS SHALL BE LOCATED IN THE PARKWAY AT △1 APPROXIMATELY 50 FEET O.C. EXACT LOCATION SHALL BE DETERMINED IN THE FIELD BY THE CITY OF SANTA ANA DEPARTMENT OF PARKS AND RECREATON. A REPRESENTATIVE OF THIS DEPARMENT WILL MARK THE CURB WHERE THE TREE WELLS ARE TO BE LOCATED.

△ ADDED SIDEWALK, 3 TREEWELLS & TREES & WHEELCHAIR RAMP.

LEGEND

- TC = TOP OF CURB
- FL = FLOW LINE
- CF = CURB FACE
- CB = CATCH BASIN
- —D— STORM DRAIN
- —S— SEWER LINE
- —W— WATER LINE
- IRRIGATION LINE (ON PRIVATE PROPERTY)
- —G— GAS LINE
- TELE. LINE
- ☼ STREET LIGHT

M/F
19 MAY 1972

71-54
VA 71-54

FILE NO. 47-12

REVISIONS

NUMBER	DATE	INITIALS	DESCRIPTION	APP'V'D.
△1	3/17/72		ADDED SIDEWALK TO EAST SIDE OF PLAZA DR., STA 11+00 TO MAC ARTHUR BLVD. BY JENNINGS-HALDERMAN-HOOD	J.M.
△2	6/30/72	LBF	AS BUILT	J.M.
4	5/11/73	TACK	ADDED SIDEWALK TO WEST SIDE STA 9+61.79 TO MACARTHUR BY TOUPS	J.M.
5	4-18-74	D.M.	ADDED ALLEY APRON @ STA 9+81.30, WEST SIDE	J.M.
△			AS BUILT	D.K. 8-77

REFERENCES

BENCH MARK: ELEV. 35.91
58-SA 29-6 MON. ON ℄-℄ ALTON & BRISTOL
(BELOW SURFACE IN CAPPED WELL)

PREPARED UNDER THE SUPERVISION OF		
Paul N. Byrnes — PAUL N. BYRNES		6-28-71 RCE 20578
DESIGNED	P.N.B.	
DRAWN	D.M.	5-3-71
CHECKED	C.D.	
R/W APPROVED		
RECOMMENDED	G.M.	8-2-71
APPROVED (signature) — ASSISTANT DIRECTOR OF PUBLIC WORKS R.C.E. 11026		8-3-71

TOUPS ENGINEERING, INC.
CONSULTING CIVIL ENGINEERS - 1801 N. COLLEGE AVE., SANTA ANA CALIF. 714-541-4431

PROJECT NO.

PLAZA DRIVE

SUNFLOWER AVENUE TO MacARTHUR BLVD.

DEPARTMENT OF PUBLIC WORKS
CITY OF SANTA ANA
SHEET NO. 1 OF 3 4

M/F 10/1/74
47-12

DIETZGEN 138W-3 AGEPROOF FILM

UTILITY PLAN
FOR
BRISTOL TOWN AND COUNTRY SHOPPING CENTER

· GENERAL NOTES ·

1. — THE ENTIRE PUBLIC WATER SYSTEM INSTALLATION SHOWN HEREON SHALL BE INSTALLED IN STRICT ACCORDANCE WITH THE CITY OF SANTA ANA STANDARD PLANS AND SPECIFICATIONS AND WATER DIVISION SPECIAL PROVISIONS. THE PUBLIC WATER SYSTEM ENDS WITH THE WATER METER, OR DETECTOR CHECK VALVE.

2. — CONTRACTOR INSTALLING PUBLIC WATER SYSTEM SHALL BE LICENSED AS PROVIDED IN THE SPECIFICATIONS AND SHALL OBTAIN, FROM THE DEPARTMENT OF PUBLIC WORKS, A PERMIT FOR, AND INSPECTION OF THIS INSTALLATION. PERMIT WILL NOT BE ISSUED UNTIL ALL APPLICABLE WATER MAIN AND SERVICE CONNECTION CHARGES ARE PAID AND EASEMENT DEEDS ARE EXECUTED AND IN HAND.

3. — ALL PRESSURE, LEAKAGE AND BACTERIOLOGICAL TESTING SHALL BE DONE IN ACCORDANCE WITH THE SPECIAL PROVISIONS. TESTING SHALL BE PROVIDED BY THE DEVELOPER AND SHALL BE UNDER THE SUPERVISION OF THE CITY INSPECTOR. DELIVER ALL TEST DOCUMENTS TO INSPECTOR. NO METERS WILL BE INSTALLED OR WATER DELIVERED UNTIL ALL TESTS ARE SATISFACTORILY COMPLETED. ANY METER INSTALLATION OR DELIVERY OF WATER IN THE INTERVAL BETWEEN COMPLETION OF TESTS AND FINAL CITY ACCEPTANCE OF THIS WORK SHALL BE TEMPORARY ONLY AND SUCH INSTALLATION OR DELIVERY MAY BE DISCONTINUED FOR CAUSE UPON 48 HOURS NOTICE.

4. — EXCAVATION AND PIPE BEDDING SHALL BE PER SPECIFICATIONS. AFTER INSPECTION AND TESTING OF PIPELINE, BACKFILL TRENCH EVENLY IN A MANNER AND WITH MATERIAL ACCEPTABLE TO THE INSPECTOR. COMPACT BACKFILL TO 90% OF MAXIMUM DENSITY AS DIRECTED BY INSPECTOR.

5 — PUBLIC WATER MAIN SHALL HAVE A MINIMUM COVER OF 36" FROM FINISHED SURFACE.

6 — ANY SURVEY WORK NECESSARY TO INSURE CORRECT HORIZONTAL AND VERTICAL ALIGNMENT SHALL BE PROVIDED BY THE DEVELOPER.

7 — DEVELOPER SHALL PROVIDE CURBED 8" C.F. ISLANDS AT FIRE HYDRANTS AND WATER METERS (OR 4" DIAMETER GUARD POSTS IF APPROVED BY WATER SUPERVISOR).

8 — ALL PAVEMENT WITHIN 5 FEET OF PUBLIC WATER MAIN SHALL BE 2 1/2" A.C. OVER 6" A.B. MINIMUM.

9 — ALL VALVE BOX AND WATER SERVICE VAULT OR MANHOLE FRAMES AND COVERS SHALL BE ADJUSTED TO FINISHED PAVEMENT GRADE BY THE DEVELOPER.

10 — UPON FINAL ACCEPTANCE OF THE COMPLETED PUBLIC WATER SYSTEM INSTALLATION SHOWN HEREON, SAID INSTALLATION SHALL BECOME THE PROPERTY OF THE CITY OF SANTA ANA.

11 — ALL ON-SITE PUBLIC WATER MAINS AND FIRE HYDRANTS AND THE CONNECTIONS TO EXISTING PUBLIC WATER MAINS SHALL BE INSTALLED BY THE DEVELOPER AT HIS EXPENSE. ON-SITE FIRE HYDRANTS AND LATERALS WILL NOT BE SUPPLIED AT CITY EXPENSE.

12 — WATER MAINS ARE TO BE INSTALLED AFTER SEWER MAINS AND LATERALS UNDER NORMAL CONDITIONS.

PREPARED BY:
JENNINGS · HALDERMAN · HOOD
REGISTERED CIVIL ENGINEERS
2001 EAST FOURTH STREET
SANTA ANA, CALIFORNIA (714) 835-3611
PREPARED UNDER THE SUPERVISION OF:
Lawrence R. Wlezien DATE: 3/31/72
LAWRENCE R. WLEZIEN R.C.E. 19355

PREPARED FOR:
WINMAR COMPANY INC.
1901 AVENUE OF THE STARS
LOS ANGELES, CALIFORNIA

The stamping of this set of plans SHALL NOT be held to permit or to approve the violation of any law, or structural stability of any building.
APPROVED APR 2 7 1972
SANTA ANA FIRE DEPT.

RECOMMENDED: Walter D. Schwank — WATER
SEWER
APPROVED: John E. Stevens 5/9/72 — ASS'T DIRECTOR R.C.E. 11026

GENERAL NOTES (CONT.)

13 — WATER MAINS, FIRE HYDRANTS, AND WATER SERVICES SHALL BE INSTALLED UNDER PERMIT AND WILL BE INSPECTED BY PUBLIC WORKS INSPECTORS WHO WILL HAVE ACCESS TO THE CONSTRUCTION SITE AT ALL REASONABLE TIMES. THE INSPECTOR WILL HAVE AUTHORITY TO ORDER CORRECTION OF INSTALLATIONS TO MEET CITY STANDARDS AND SPECIFICATIONS AND WILL HAVE AUTHORITY TO STOP THE WORK FOR NONCOMPLIANCE.

14 — WATER METERS WILL BE INSTALLED BY THE CITY. METERS WILL NOT BE INSTALLED UNLESS BOXES, CURB STOPS, AND PIPING MEET CITY STANDARDS.

15. — AT THE INTERSECTION OF TELEPHONE OR EDISON LINES WITH WATER LINES THE THE TELEPHONE OR EDISON LINES SHALL GO UNDER THE WATER LINE.

16 — ALL EDISON UNDERGROUND PLACED WITHIN UTILITY EASEMENTS TO CITY SHALL HAVE 30" MINIMUM COVER AND BE FULLY ENCASED IN ACCORDANCE WITH CITY LETTER OF MARCH 31, 1972 TO EDISON CO.

NOTE: THE CONTRACTOR SHALL COORDINATE THE ON-SITE CONSTRUCTION WITH THE GENERAL CONTRACTOR DOING OFF-SITE CONSTRUCTION.

CONSTUCTION NOTES & QUANTITY ESTIMATE

No.	Item	Quantity
(1)	INSTALL FIRE HYDRANTS PER STD. PLAN № 403 (INC. VALVE, RUN & BURY)	10 EA.
(2)	INSTALL 2" COPPER WATER SERVICE PER STD. PLAN № 401 & 417	115 L.F.
(3)	CONST. P.C.C. THRUST BLOCKS PER STD. PLAN № 408 (TYP).	11 EA.
(4)	PLACE A.C. WATER MAIN: 8" A.C.P.	2208 L.F.
	10" A.C.P.	428 L.F.
(5)	PLACE GATE VALVES: 8"	4 EA.
(6)	INSTALL 2" WATER METER PER STD. PLANS № 401 & 417 (BY CITY)	5 EA.
(7)	8" CURB FACE, SEE ARCHITECTS PLAN	471 L.F.
△5 (8)	PLACE 8" V.C.P. SEWER MAIN	1135 L.F.
△5 (9)	PLACE 6" V.C.P. SEWER LATERALS	7 L.F.
△5 (10)	PLACE 4" V.C.P. LATERALS	229 L.F.
(11)	PLACE 8" V.C.P. STUB	2 EA.
△5 (12)	CONST. STD. MANHOLE PER CITY STD № 201	9 EA.
(13)	CABLE TRENCH (TO GO UNDER WATER LINES)	4040 L.F.
(14)	REMOVE, TURN & REINSTALL EXIST. TEE TO PROVIDE OUTLET NORTH	1 EA.
(15)	REMOVE EXIST. GATE VALVE & PLUG EXIST. TEE.	1 EA.
(16)	CUT IN NEW 8" CROSS	1 EA.
(17)	RELOCATE EXIST. FIRE HYDRANT #2988 TO NEW LOCATION AS SHOWN.	1 EA.
(18)	ABANDON EXIST. SEWER MAIN.	203 L.F.
(19)	ABANDON EXIST. WATER MAIN.	195 L.F.

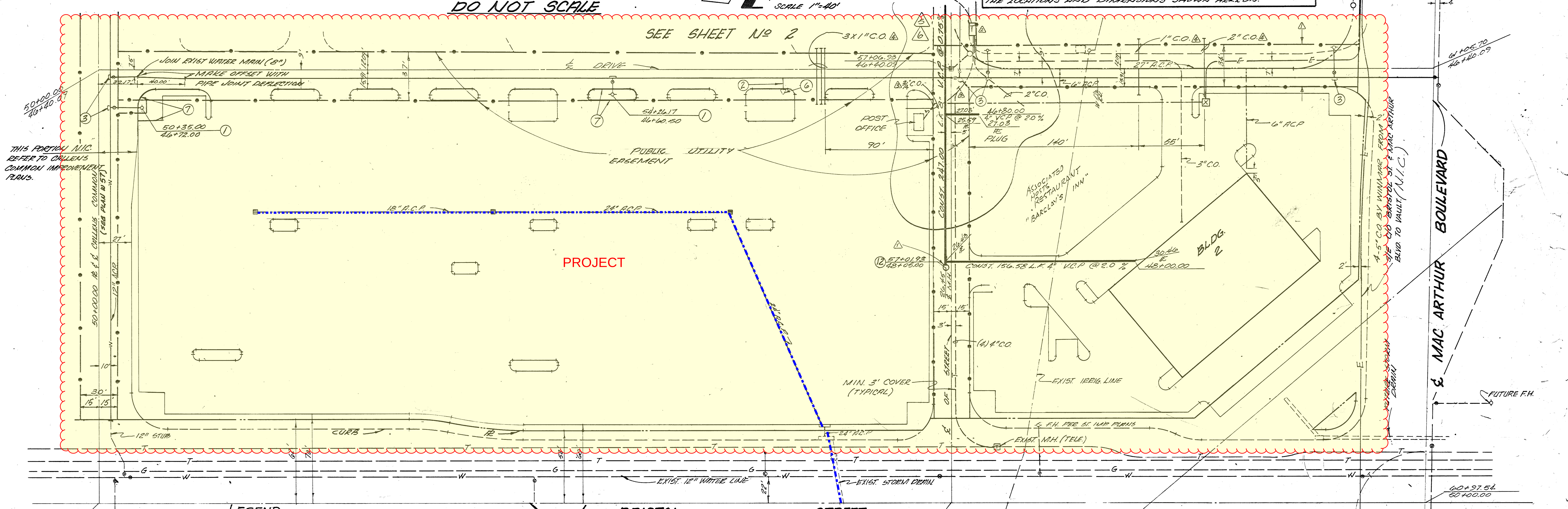
NOTE: REFER TO STAKING PLAN FOR CORRELATION OF GRID COORDINATES AND BEARINGS.

△3 NOTE: MINIMUM RADIUS 12.5' FOR ALL TELEPHONE

NOTE: THIS PLAN SHALL DETERMINE ALL UTILITY LOCATIONS WITHIN THE EASEMENT BOUNDARIES. DETAILED PLANS FOR EACH INDIVIDUAL UTILITY INSTALLATION MAY BE PREPARED USING THE LOCATIONS AND DIMENSIONS SHOWN HEREON.

NOTE: THESE PLANS DO NOT SCALE

SCALE 1" = 40'



LEGEND

- —E— POWER DUCT, NUMBER & SIZE AS NOTED.
- — — — TELEPHONE CONDUIT, NUMBER & SIZE AS NOTED.
- —·—·— SECONDARY CONDUIT.
- c/c CABLE IN CONDUIT, FURNISHED & INSTALLED BY SO. CALIF. EDISON.
- ☒ CST ENCL. 4'X7'X7'.
- Ⓣ TELEPHONE MANHOLE, 4'-6"X 8'-6" (QUICKSET TV-301)
- —●— EXCLUSIVE UTILITY EASEMENT.

APP.	№	INITIAL	REVISION	DATE
D.K. 8-77	8	J.R.	AS BUILT ELECTRICAL CONSTRUCTION	12-76
	7	W.J.G.	AS BUILT WATER LINE SHT. #2	9-5-74
J.E.S.	6		LENGTHEN BLDG. 6B BY WINMAR	6-19-74

APP.	№	INITIAL	REVISION	DATE
J.E.S.	5	LRW	RELOCATE SEWER & WATER @ BLDG. 6B	5-9-74
G.M.	4	LRW	ADD. LIE. STD. C.O. FOR ESM'T CROSSING	8-21-72
J.E.S.	3	LRW	RELOC. TELE. CONDUIT & ADDED NOTE	6-26-72
J.E.S.	2	LRW	RELOC. TELE. & ELEC. VAULTS & STUB-OUT	6-16-72
J.E.S.	1	LRW	RELOC. TELE., ELEC., STORM DRAIN, SEWER & WTR. LINES	4-27-72
			FIRST SUBMITTAL	3-31-72

PLAN-W-56

J.H.H. Job № 1481
SHEET 1 OF 2

W-56

NOTE: REFER TO STAKING PLAN FOR CORRELATION OF GRID COORDINATES AND BEARINGS.

NOTE: THESE PLANS DO NOT SCALE

PROJECT

PLAZA DRIVE

BOULEVARD

MAC ARTHUR

CALLEUS

COMMON

BLDG 6A

BLDG 6B

BLDG 6C

EXCLUSIVE UTILITY EASEMENT

EXCLUSIVE PUBLIC UTILITY EASEMENT.

THIS PORTION N.I.C. REFER TO CALLEN'S COMMON IMPROVEMENT PLANS

TYP. LIGHT STANDARD CONDUIT TO EXTEND INTO EASEMENT MAXIMUM OF 6.0', FOR CONNECTION & CROSSING OF EASEMENT. ALL CONDUIT TO BE P.V.C. SCH. 40. BURY MINIMUM OF 24" PER N.E.C. NO CONCRETE ENCASEMENT.

ELECTRICAL TRENCHING DETAIL
NO SCALE
(N.I.C.)

SECTION A-A
NO SCALE

SECTION B-B
NO SCALE

SECTION C-C
NO SCALE

SECTION D-D
NO SCALE

SCALE: 1" = 40'

SEE SHEET No 1

PLAN W-56
J.H.H. Job No 1481
SHEET 2 OF 2

W-56

Appendix 4

Hydrologic Soil Group Evaluation

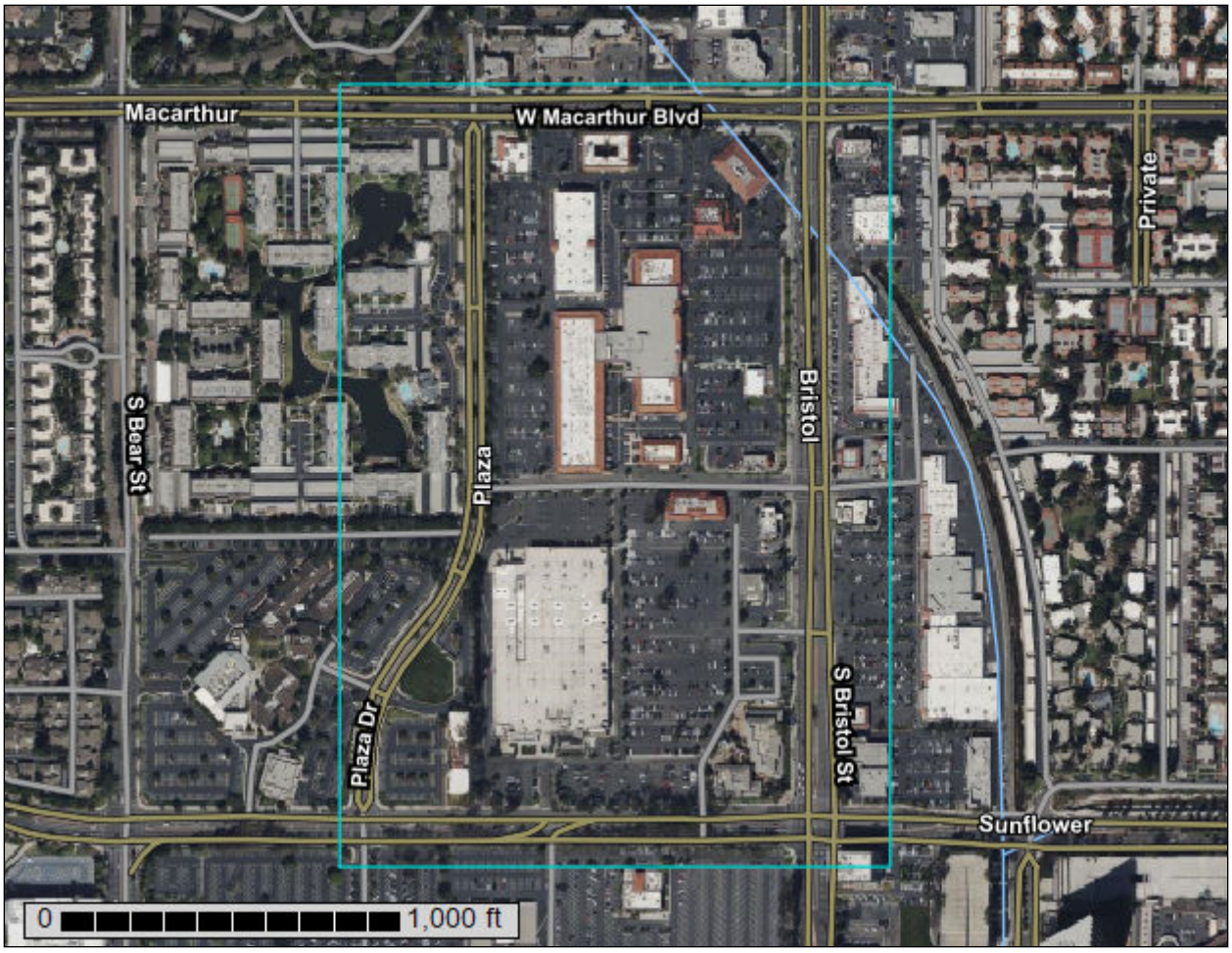
United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Related Bristol Orange County and Part of Riverside County, California



September 27, 2022

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map

Map Scale: 1:4,100 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 150 300 600 900

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Orange County and Part of Riverside County, California
Survey Area Data: Version 15, Sep 13, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 14, 2022—Mar 17, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND

MAP INFORMATION

imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
182	Omni silt loam, drained	64.4	75.3%
184	Omni clay, drained	21.2	24.7%
Totals for Area of Interest		**85.6**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however,

onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Orange County and Part of Riverside County, California

182—Omni silt loam, drained

Map Unit Setting

National map unit symbol: hcnw
Elevation: 20 feet
Mean annual precipitation: 14 to 17 inches
Mean annual air temperature: 57 to 63 degrees F
Frost-free period: 365 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Omni and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Omni

Setting

Landform: Depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Mixed alluvium

Typical profile

H1 - 0 to 12 inches: silt loam
H2 - 12 to 60 inches: silty clay

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 10.2 inches)

Interpretive groups

Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: R019XG907CA - Loamy Bottom
Hydric soil rating: Yes

Minor Components

Chino, silty clay loam

Percent of map unit: 10 percent
Hydric soil rating: No

Bolsa, silt loam

Percent of map unit: 5 percent
Hydric soil rating: No

184—Omni clay, drained

Map Unit Setting

National map unit symbol: hcny
Elevation: 20 feet
Mean annual precipitation: 14 to 17 inches
Mean annual air temperature: 57 to 63 degrees F
Frost-free period: 365 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Omni and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Omni

Setting

Landform: Depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Mixed alluvium

Typical profile

H1 - 0 to 17 inches: clay
H2 - 17 to 60 inches: silty clay

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 10.2 inches)

Interpretive groups

Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: C

Ecological site: R019XG906CA - Clayey Bottom
Hydric soil rating: Yes

Minor Components

Chino, silty clay loam, drained
Percent of map unit: 10 percent
Hydric soil rating: No

Bolsa, silty clay loam, drained
Percent of map unit: 5 percent
Hydric soil rating: No

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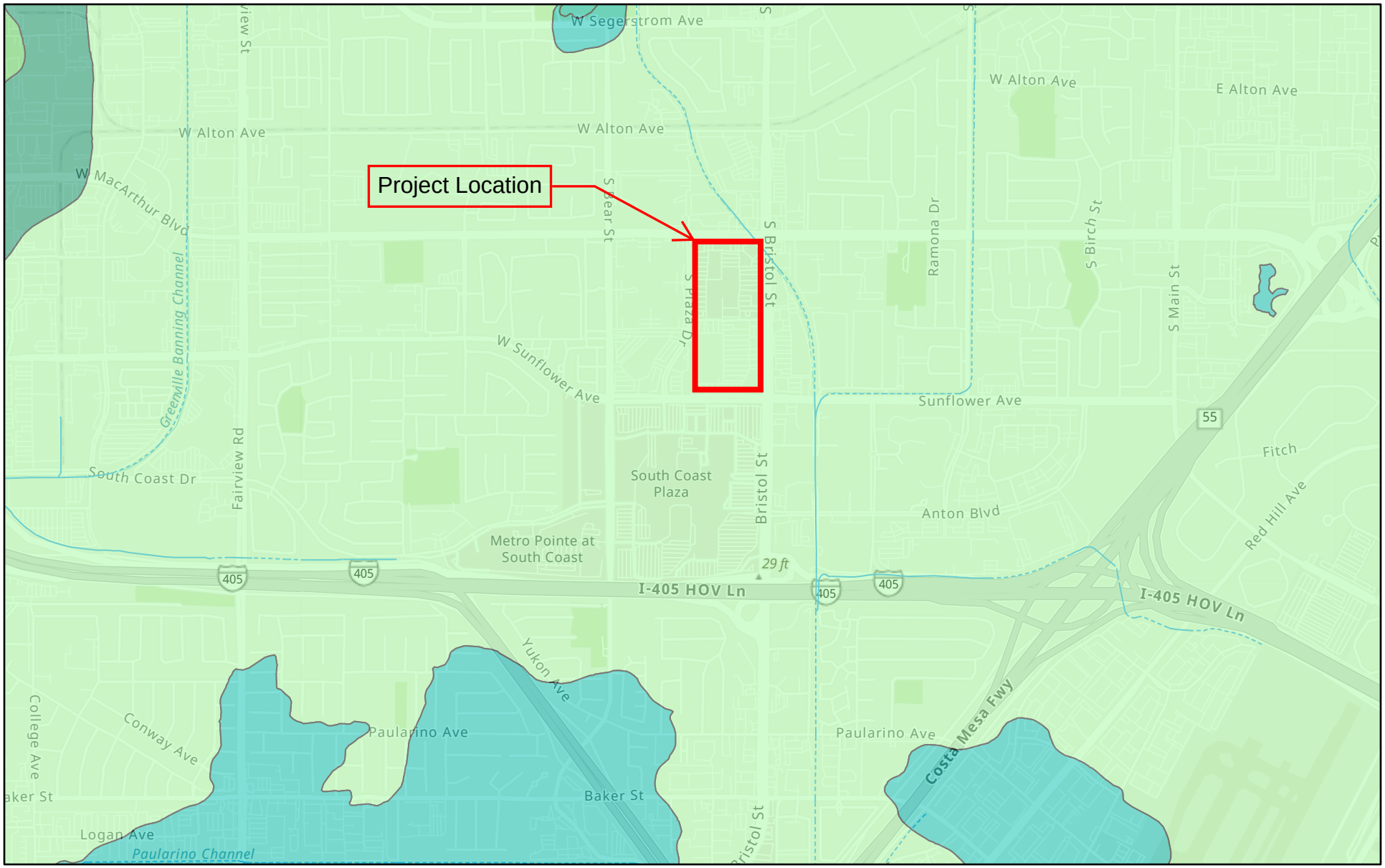
OC Stormwater Program Land Development Tool



3/30/2023

Soil

A

B

C Regional Channels

D

Open Conveyance

Closed Conveyance

1:25,609

0 0.17 0.35 0.7 mi

0 0.28 0.55 1.1 km

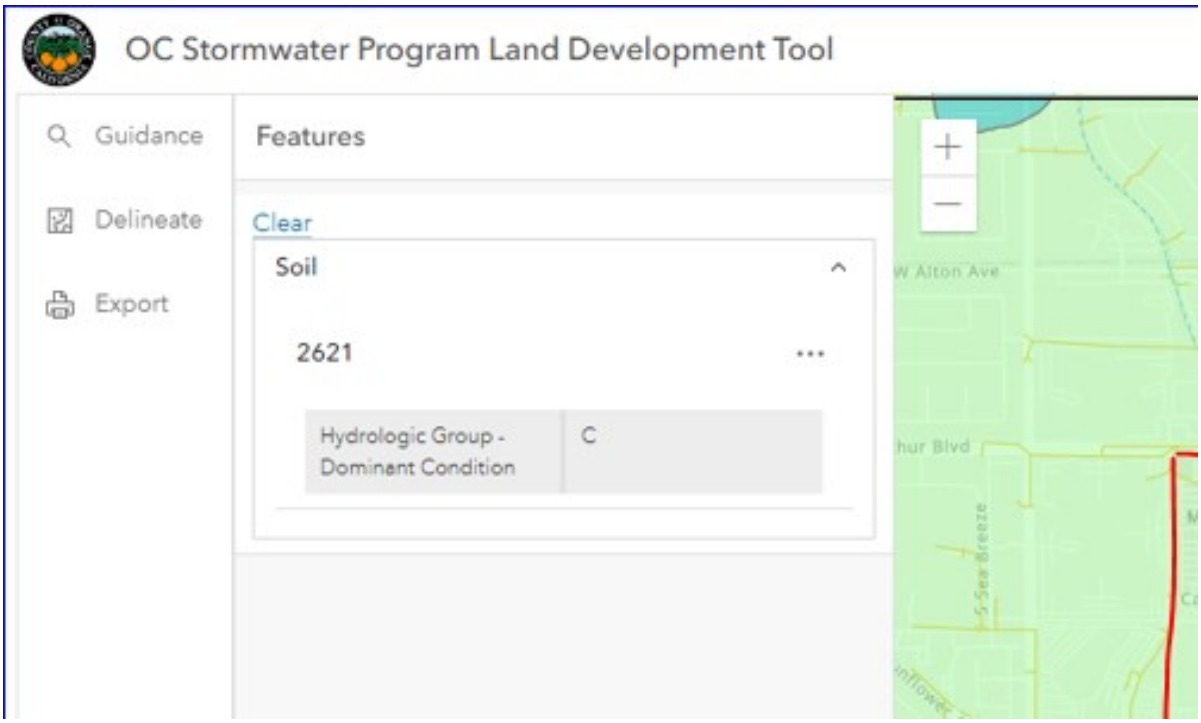
Serena Ausili

From: Michael Givens <michaelg@groupdelta.com>
Sent: Wednesday, March 29, 2023 5:27 PM
To: Sue Williams
Cc: Oriana Slasor; Serena Ausili; 622-015@fuscoe.tonicdm.com
Subject: RE: Related Bristol - Hydrologic Soil Type

Sue,

The NRSC classifications and hydraulic group descriptions are different than the USCS classification that we use, which makes it difficult to directly identify the difference between hydraulic type C and D soils. The hydraulic soil groups C&D are fairly similar. However, below is a snippet from the OCPW website that classifies the project site as a hydraulic group type C that should be acceptable for the project.

https://ocerws.ocpublicworks.com/service-areas/oc-environmental-resources/oc-watersheds/regional-stormwater-program/water-quality



Regards,

Michael Givens, PhD, PE, GE, PG
Group Delta Consultants, Inc.
Associate Engineer / Office Manager
Mobile: (949) 295-2348
michaelg@groupdelta.com

From: Sue Williams <SWilliams@fuscoe.com>
Sent: Wednesday, March 29, 2023 4:39 PM
To: Michael Givens <michaelg@groupdelta.com>

Cc: Oriana Slasor <oslasor@fuscoe.com>; Serena Ausili <SAusili@fuscoe.com>; 622-015@fuscoe.tonicdm.com
Subject: Related Bristol - Hydrologic Soil Type

Hi Michael,
It was nice talking to you. As a follow-up to our conversation, we are currently preparing a hydrology study for the project site, and would like your review and concurrence that the hydrologic soil type to be used at the site is soil group "C". As I mentioned, we are using U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS) soil survey to provide the hydrologic soil type. Please see attached soil report, stating that the site is entirely within soil type "C". Here is the link to the NRCS soil survey website: Web Soil Survey (usda.gov)

The city's plan checker is referencing the 1986 O.C. Hydrology Manual soil map and TGD , which show this area as soil type "D". However, they advised that they would defer to you to provide guidance on the soil type that would be acceptable to be used for the hydrologic analysis. Would you please review and provide concurrence, as you deem accurate, that the project site is within soil type "C" as shown on the attached soil survey report?

Please let me know if you have questions or need additional information.

Thank you,
Sue

SUSAN WILLIAMS, PE, MS, QSD/P
Associate Project Manager
SWilliams@fuscoe.com

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Heads up! Effective April 3, 2023 our new Irvine office address will be:
15535 Sand Canyon, Suite 100, Irvine, CA 92618

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Appendix 5

Rational Method Calculations
Existing Condition

BRIS2EX.RES

```
**************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
         (c) Copyright 1983-2014 Advanced Engineering Software (aes)
            Ver. 21.0  Release Date: 06/01/2014  License ID 1355

                        Analysis prepared by:

                          Fuscoe Engineering
                           16795 Von Karman
                              Suite 100
                           Irvine, CA 92606

 ************************ DESCRIPTION OF STUDY ************************
* RELATED BRISTOL                                                        *
* 2-YEAR STORM EVENT                                                     *
* EXISTING CONDITION                                                     *
 **************************************************************************

  FILE NAME: BRIS2EX.DAT
  TIME/DATE OF STUDY: 09:39 02/02/2023
==========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==========================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   8.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

+--------------------------------------------------------------------------+
| AREA 'A'                                                                 |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+

**************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   186.00
  ELEVATION DATA: UPSTREAM(FEET) =     36.00  DOWNSTREAM(FEET) =     33.40
```

BRIS2EX.RES

```
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.775
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  2.084
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 C        1.12      0.25     0.100    50    5.78
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      2.08
  TOTAL AREA(ACRES) =      1.12   PEAK FLOW RATE(CFS) =      2.08

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    31.40  DOWNSTREAM(FEET) =    30.60
  FLOW LENGTH(FEET) =   157.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   8.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.45
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.08
  PIPE TRAVEL TIME(MIN.) =   0.76    Tc(MIN.) =    6.53
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     12.00 =     343.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    6.53
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.941
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 C        0.41      0.25     0.100    50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.41      SUBAREA RUNOFF(CFS) =    0.71
  EFFECTIVE AREA(ACRES) =      1.53   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        1.5       PEAK FLOW RATE(CFS) =       2.64

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    30.60  DOWNSTREAM(FEET) =    29.70
  FLOW LENGTH(FEET) =   176.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.36
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.64
  PIPE TRAVEL TIME(MIN.) =   0.87    Tc(MIN.) =    7.41
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     13.00 =     519.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.41
  RAINFALL INTENSITY(INCH/HR) =   1.81
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       1.53
  TOTAL STREAM AREA(ACRES) =       1.53
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.64

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   309.00
  ELEVATION DATA: UPSTREAM(FEET) =     34.80  DOWNSTREAM(FEET) =     34.60

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   13.081
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.303
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
        LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                C        0.39      0.25     0.100    50   13.08
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.45
  TOTAL AREA(ACRES) =      0.39   PEAK FLOW RATE(CFS) =      0.45

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     13.00 IS CODE =  91
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  UPSTREAM NODE ELEVATION(FEET) =     34.60
  DOWNSTREAM NODE ELEVATION(FEET) =     33.60
  CHANNEL LENGTH THRU SUBAREA(FEET) =   207.00
  "V" GUTTER WIDTH(FEET) =   5.00   GUTTER HIKE(FEET) =  0.050
  PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0150
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
  MAXIMUM DEPTH(FEET) =  10.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.157
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
        LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                C        0.33      0.25     0.100    50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      0.62
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.14
  AVERAGE FLOW DEPTH(FEET) =   0.11   FLOOD WIDTH(FEET) =    9.91
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   3.03   Tc(MIN.) =   16.11
  SUBAREA AREA(ACRES) =    0.33       SUBAREA RUNOFF(CFS) =    0.34
  EFFECTIVE AREA(ACRES) =    0.72     AREA-AVERAGED Fm(INCH/HR) =   0.03
```

```
 AREA-AVERAGED Fp(INCH/HR) =   0.25  AREA-AVERAGED Ap =   0.10
 TOTAL AREA(ACRES) =        0.7         PEAK FLOW RATE(CFS) =       0.73

 END OF SUBAREA "V" GUTTER HYDRAULICS:
 DEPTH(FEET) =  0.12   FLOOD WIDTH(FEET) =   10.64
 FLOW VELOCITY(FEET/SEC.) =   1.19   DEPTH*VELOCITY(FT*FT/SEC) =   0.14
 LONGEST FLOWPATH FROM NODE     14.00 TO NODE     13.00 =     516.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   16.11
 RAINFALL INTENSITY(INCH/HR) =   1.16
 AREA-AVERAGED Fm(INCH/HR) =  0.03
 AREA-AVERAGED Fp(INCH/HR) =  0.25
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.72
 TOTAL STREAM AREA(ACRES) =       0.72
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.73

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1        2.64    7.41    1.807  0.25( 0.03) 0.10       1.5      10.00
     2        0.73   16.11    1.157  0.25( 0.03) 0.10       0.7      14.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1        3.17    7.41    1.807  0.25( 0.03) 0.10       1.9      10.00
     2        2.41   16.11    1.157  0.25( 0.03) 0.10       2.2      14.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       3.17    Tc(MIN.) =     7.41
 EFFECTIVE AREA(ACRES) =       1.86   AREA-AVERAGED Fm(INCH/HR) =  0.03
 AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =        2.2
 LONGEST FLOWPATH FROM NODE     10.00 TO NODE     13.00 =     519.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    7.41
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.807
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 C        1.25      0.25      0.100    50
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    1.25      SUBAREA RUNOFF(CFS) =    2.00
 EFFECTIVE AREA(ACRES) =      3.11   AREA-AVERAGED Fm(INCH/HR) =  0.03
```

```
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        3.5       PEAK FLOW RATE(CFS) =       4.99

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     16.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    29.70  DOWNSTREAM(FEET) =    28.50
  FLOW LENGTH(FEET) =   252.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.35
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.99
  PIPE TRAVEL TIME(MIN.) =   0.66    Tc(MIN.) =    8.07
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     16.00 =     771.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     16.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.07
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.720
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 C        0.37      0.25     0.100    50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.37      SUBAREA RUNOFF(CFS) =    0.56
  EFFECTIVE AREA(ACRES) =      3.48   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        3.9       PEAK FLOW RATE(CFS) =       5.31

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     17.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    28.50  DOWNSTREAM(FEET) =    28.20
  FLOW LENGTH(FEET) =    49.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.76
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.31
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =    8.19
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     17.00 =     820.00 FEET.

+--------------------------------------------------------------------------+
| AREA 'B'                                                                 |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  21
----------------------------------------------------------------------------
```

```
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
================================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =     35.30  DOWNSTREAM(FEET) =     33.70

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.978
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.618
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 C        0.94      0.25     0.100    50    8.98
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.35
  TOTAL AREA(ACRES) =      0.94   PEAK FLOW RATE(CFS) =      1.35

********************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  41
--------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    31.80  DOWNSTREAM(FEET) =    31.70
  FLOW LENGTH(FEET) =    63.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   1.72
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.35
  PIPE TRAVEL TIME(MIN.) =   0.61    Tc(MIN.) =    9.59
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     22.00 =     393.00 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =  81
--------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =    9.59
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.558
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 C        0.29      0.25     0.100    50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.29      SUBAREA RUNOFF(CFS) =    0.40
  EFFECTIVE AREA(ACRES) =      1.23   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        1.2       PEAK FLOW RATE(CFS) =       1.70

********************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  41
--------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    31.70  DOWNSTREAM(FEET) =    31.60
  FLOW LENGTH(FEET) =    47.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   2.16
```

```
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.70
  PIPE TRAVEL TIME(MIN.) =   0.36    Tc(MIN.) =    9.95
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     23.00 =     440.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.95
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.525
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 C        2.17      0.25     0.100    50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    2.17      SUBAREA RUNOFF(CFS) =    2.93
  EFFECTIVE AREA(ACRES) =      3.40   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        3.4       PEAK FLOW RATE(CFS) =       4.59

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     24.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    31.60  DOWNSTREAM(FEET) =    31.00
  FLOW LENGTH(FEET) =   136.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.84
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.59
  PIPE TRAVEL TIME(MIN.) =   0.39    Tc(MIN.) =   10.34
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     24.00 =     576.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     24.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.34
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.492
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 C        0.35      0.25     0.100    50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.35      SUBAREA RUNOFF(CFS) =    0.46
  EFFECTIVE AREA(ACRES) =      3.75   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        3.8       PEAK FLOW RATE(CFS) =       4.95

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     25.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    31.00  DOWNSTREAM(FEET) =    30.80
  FLOW LENGTH(FEET) =    54.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.30
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.95
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =   10.48
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     25.00 =     630.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     25.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.48
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.480
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL               C        0.50      0.25     0.100    50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.50      SUBAREA RUNOFF(CFS) =    0.65
  EFFECTIVE AREA(ACRES) =      4.25   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        4.2       PEAK FLOW RATE(CFS) =       5.57

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     26.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    30.80  DOWNSTREAM(FEET) =    30.60
  FLOW LENGTH(FEET) =    51.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.09
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.57
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =   10.60
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     26.00 =     681.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     26.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.60
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.470
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL               C        0.50      0.25     0.100    50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.50      SUBAREA RUNOFF(CFS) =    0.65
  EFFECTIVE AREA(ACRES) =      4.75   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.10
```

```
  TOTAL AREA(ACRES) =        4.8       PEAK FLOW RATE(CFS) =       6.18

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     27.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    30.60  DOWNSTREAM(FEET) =    30.40
  FLOW LENGTH(FEET) =    44.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.87
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.18
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =   10.70
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     27.00 =     725.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     27.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.70
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.463
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 C        2.15      0.25     0.100    50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    2.15      SUBAREA RUNOFF(CFS) =    2.78
  EFFECTIVE AREA(ACRES) =      6.90   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        6.9       PEAK FLOW RATE(CFS) =       8.93

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     28.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    30.40  DOWNSTREAM(FEET) =    29.30
  FLOW LENGTH(FEET) =   258.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.37
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.93
  PIPE TRAVEL TIME(MIN.) =   0.38    Tc(MIN.) =   11.07
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     28.00 =     983.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.07
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.434
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
```

```
  COMMERCIAL                 C        1.17      0.25     0.100    50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.17      SUBAREA RUNOFF(CFS) =    1.48
  EFFECTIVE AREA(ACRES) =      8.07   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        8.1       PEAK FLOW RATE(CFS) =      10.23

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     29.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    29.30  DOWNSTREAM(FEET) =    28.50
  FLOW LENGTH(FEET) =   186.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.03
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.23
  PIPE TRAVEL TIME(MIN.) =   0.24    Tc(MIN.) =   11.31
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     29.00 =    1169.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     29.00 TO NODE     29.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.31
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.417
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 C        0.78      0.25     0.100    50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.78      SUBAREA RUNOFF(CFS) =    0.98
  EFFECTIVE AREA(ACRES) =      8.85   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        8.8       PEAK FLOW RATE(CFS) =      11.09

****************************************************************************
  FLOW PROCESS FROM NODE     29.00 TO NODE     29.10 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    28.50  DOWNSTREAM(FEET) =    27.90
  FLOW LENGTH(FEET) =   157.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.11
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.09
  PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =   11.50
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     29.10 =    1326.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     29.10 TO NODE     29.10 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```

```
==========================================================================
  MAINLINE Tc(MIN.) =   11.50
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.404
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 C        0.62      0.25     0.100    50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.62      SUBAREA RUNOFF(CFS) =    0.77
  EFFECTIVE AREA(ACRES) =      9.47   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        9.5       PEAK FLOW RATE(CFS) =      11.75

**************************************************************************
  FLOW PROCESS FROM NODE     29.10 TO NODE     29.20 IS CODE =  41
--------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    27.90  DOWNSTREAM(FEET) =    27.50
  FLOW LENGTH(FEET) =   107.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.96
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.75
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =   11.62
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     29.20 =    1433.00 FEET.

+--------------------------------------------------------------------------+
| AREA 'E'                                                                 |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+

**************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     31.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   179.00
  ELEVATION DATA: UPSTREAM(FEET) =     35.00  DOWNSTREAM(FEET) =     33.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.220
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.997
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 C        1.54      0.25     0.100    50    6.22
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      2.73
  TOTAL AREA(ACRES) =      1.54   PEAK FLOW RATE(CFS) =      2.73

**************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  41
--------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
```

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```
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    31.40  DOWNSTREAM(FEET) =    30.40
  FLOW LENGTH(FEET) =   193.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.48
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.73
  PIPE TRAVEL TIME(MIN.) =   0.92    Tc(MIN.) =    7.14
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     32.00 =     372.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     32.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.14
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.844
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 C        1.35      0.25     0.100    50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.35      SUBAREA RUNOFF(CFS) =    2.21
  EFFECTIVE AREA(ACRES) =      2.89   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        2.9       PEAK FLOW RATE(CFS) =       4.73

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     33.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    30.40  DOWNSTREAM(FEET) =    29.40
  FLOW LENGTH(FEET) =   192.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.03
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.73
  PIPE TRAVEL TIME(MIN.) =   0.53    Tc(MIN.) =    7.67
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     33.00 =     564.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     33.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.67
  RAINFALL INTENSITY(INCH/HR) =   1.77
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       2.89
  TOTAL STREAM AREA(ACRES) =       2.89
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.73

****************************************************************************
```

```
                                                    BRIS2EX.RES
  FLOW PROCESS FROM NODE     34.00 TO NODE     33.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   266.00
  ELEVATION DATA: UPSTREAM(FEET) =     35.00  DOWNSTREAM(FEET) =     33.30

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.793
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.755
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
        LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 C        1.85      0.25     0.100    50    7.79
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      2.88
  TOTAL AREA(ACRES) =      1.85   PEAK FLOW RATE(CFS) =      2.88

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     33.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.79
  RAINFALL INTENSITY(INCH/HR) =   1.75
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       1.85
  TOTAL STREAM AREA(ACRES) =       1.85
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.88

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        4.73    7.67    1.770  0.25( 0.03) 0.10       2.9      30.00
      2        2.88    7.79    1.755  0.25( 0.03) 0.10       1.9      34.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        7.59    7.67    1.770  0.25( 0.03) 0.10       4.7      30.00
      2        7.57    7.79    1.755  0.25( 0.03) 0.10       4.7      34.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       7.59    Tc(MIN.) =     7.67
  EFFECTIVE AREA(ACRES) =       4.71   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        4.7
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     33.00 =     564.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     35.00 IS CODE =  41
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    29.40  DOWNSTREAM(FEET) =    28.40
  FLOW LENGTH(FEET) =   197.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.67
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.59
  PIPE TRAVEL TIME(MIN.) =   0.34    Tc(MIN.) =    8.01
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     35.00 =     761.00 FEET.

+--------------------------------------------------------------------------+
| AREA 'F'                                                                 |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     41.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =     35.70  DOWNSTREAM(FEET) =     35.20

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   11.329
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.416
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 C        0.36      0.25     0.100    50   11.33
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.45
  TOTAL AREA(ACRES) =      0.36   PEAK FLOW RATE(CFS) =      0.45

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     42.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   35.20  DOWNSTREAM ELEVATION(FEET) =   34.60
  STREET LENGTH(FEET) =   183.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.58
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.21
```

```
    HALFSTREET FLOOD WIDTH(FEET) =    2.59
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.14
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.24
  STREET FLOW TRAVEL TIME(MIN.) =   2.68   Tc(MIN.) =   14.01
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.253
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                C        0.23      0.25     0.100    50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.23      SUBAREA RUNOFF(CFS) =    0.25
  EFFECTIVE AREA(ACRES) =      0.59    AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.6        PEAK FLOW RATE(CFS) =       0.65

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.23   HALFSTREET FLOOD WIDTH(FEET) =   3.59
  FLOW VELOCITY(FEET/SEC.) =  1.05   DEPTH*VELOCITY(FT*FT/SEC.) =   0.24
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     42.00 =     513.00 FEET.

+----------------------------------------------------------------------------+
| AREA 'H'                                                                   |
|                                                                            |
|                                                                            |
+----------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     51.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =     35.40  DOWNSTREAM(FEET) =     34.80

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.923
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.445
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                C        0.56      0.25     0.100    50   10.92
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.72
  TOTAL AREA(ACRES) =      0.56   PEAK FLOW RATE(CFS) =      0.72

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     52.00 IS CODE =  91
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  UPSTREAM NODE ELEVATION(FEET) =     34.80
  DOWNSTREAM NODE ELEVATION(FEET) =     32.80
  CHANNEL LENGTH THRU SUBAREA(FEET) =   224.00
  "V" GUTTER WIDTH(FEET) =   5.00   GUTTER HIKE(FEET) =  0.050
  PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0150
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
  MAXIMUM DEPTH(FEET) =  10.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.309
  SUBAREA LOSS RATE DATA(AMC  I ):
```

```
                                                    BRIS2EX.RES
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 C        1.65      0.25      0.100    50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      1.66
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.80
  AVERAGE FLOW DEPTH(FEET) =   0.14   FLOOD WIDTH(FEET) =   13.19
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   2.07   Tc(MIN.) =   12.99
  SUBAREA AREA(ACRES) =    1.65       SUBAREA RUNOFF(CFS) =    1.91
  EFFECTIVE AREA(ACRES) =    2.21     AREA-AVERAGED Fm(INCH/HR) =   0.03
  AREA-AVERAGED Fp(INCH/HR) =   0.25  AREA-AVERAGED Ap =   0.10
  TOTAL AREA(ACRES) =        2.2         PEAK FLOW RATE(CFS) =       2.55

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  0.17   FLOOD WIDTH(FEET) =   15.62
  FLOW VELOCITY(FEET/SEC.) =   2.01   DEPTH*VELOCITY(FT*FT/SEC) =   0.33
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     52.00 =     554.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     53.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    32.20  DOWNSTREAM(FEET) =    30.40
  FLOW LENGTH(FEET) =   497.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.25
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.55
  PIPE TRAVEL TIME(MIN.) =   2.55    Tc(MIN.) =   15.54
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     53.00 =    1051.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     53.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   15.54
  RAINFALL INTENSITY(INCH/HR) =   1.18
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       2.21
  TOTAL STREAM AREA(ACRES) =       2.21
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.55

****************************************************************************
  FLOW PROCESS FROM NODE     53.10 TO NODE     53.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   230.00
  ELEVATION DATA: UPSTREAM(FEET) =     36.30  DOWNSTREAM(FEET) =     33.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.464
```

```
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.953
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
        LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 C        0.66      0.25     0.100    50    6.46
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.15
  TOTAL AREA(ACRES) =      0.66   PEAK FLOW RATE(CFS) =      1.15

****************************************************************************
  FLOW PROCESS FROM NODE     53.20 TO NODE     53.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    30.60  DOWNSTREAM(FEET) =    30.40
  FLOW LENGTH(FEET) =   118.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   8.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   1.98
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.15
  PIPE TRAVEL TIME(MIN.) =   0.99    Tc(MIN.) =    7.46
  LONGEST FLOWPATH FROM NODE     53.10 TO NODE     53.00 =     348.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     53.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.46
  RAINFALL INTENSITY(INCH/HR) =   1.80
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.66
  TOTAL STREAM AREA(ACRES) =       0.66
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.15

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        2.55   15.54    1.181  0.25( 0.03) 0.10       2.2      50.00
      2        1.15    7.46    1.799  0.25( 0.03) 0.10       0.7      53.10

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        3.03    7.46    1.799  0.25( 0.03) 0.10       1.7      53.10
      2        3.30   15.54    1.181  0.25( 0.03) 0.10       2.9      50.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       3.30    Tc(MIN.) =    15.54
  EFFECTIVE AREA(ACRES) =       2.87   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        2.9
```

```
 LONGEST FLOWPATH FROM NODE     50.00 TO NODE     53.00 =    1051.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     53.00 TO NODE     53.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   15.54
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.181
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                C        3.00      0.25     0.100    50
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    3.00      SUBAREA RUNOFF(CFS) =    3.12
 EFFECTIVE AREA(ACRES) =      5.87   AREA-AVERAGED Fm(INCH/HR) =  0.03
 AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =        5.9       PEAK FLOW RATE(CFS) =       6.11

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1        7.54    7.46    1.799  0.25( 0.03) 0.10       4.7      53.10
     2        6.11   15.54    1.181  0.25( 0.03) 0.10       5.9      50.00
 NEW PEAK FLOW DATA ARE:
 PEAK FLOW RATE(CFS) =       7.54  Tc(MIN.) =    7.46
 AREA-AVERAGED Fm(INCH/HR) =  0.03  AREA-AVERAGED Fp(INCH/HR) =  0.25
 AREA-AVERAGED Ap =  0.10  EFFECTIVE AREA(ACRES) =       4.72

****************************************************************************
 FLOW PROCESS FROM NODE     53.00 TO NODE     53.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    7.46
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.799
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                C        4.24      0.25     0.100    50
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    4.24      SUBAREA RUNOFF(CFS) =    6.77
 EFFECTIVE AREA(ACRES) =      8.96   AREA-AVERAGED Fm(INCH/HR) =  0.03
 AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =       10.1       PEAK FLOW RATE(CFS) =      14.31

****************************************************************************
 FLOW PROCESS FROM NODE     53.00 TO NODE     54.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    30.40  DOWNSTREAM(FEET) =    29.00
 FLOW LENGTH(FEET) =   255.00   MANNING'S N =  0.013
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =  18.22
 PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
 GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      14.31
 PIPE TRAVEL TIME(MIN.) =   0.23    Tc(MIN.) =    7.69
```

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```
 LONGEST FLOWPATH FROM NODE     50.00 TO NODE     54.00 =    1306.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     54.00 TO NODE     54.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    7.69
 RAINFALL INTENSITY(INCH/HR) =   1.77
 AREA-AVERAGED Fm(INCH/HR) =  0.03
 AREA-AVERAGED Fp(INCH/HR) =  0.25
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       8.96
 TOTAL STREAM AREA(ACRES) =      10.11
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      14.31

****************************************************************************
 FLOW PROCESS FROM NODE     54.10 TO NODE     54.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   303.00
 ELEVATION DATA: UPSTREAM(FEET) =     36.40  DOWNSTREAM(FEET) =     32.40

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.101
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.851
 SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 C        2.57      0.25     0.100    50    7.10
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA RUNOFF(CFS) =      4.22
 TOTAL AREA(ACRES) =      2.57   PEAK FLOW RATE(CFS) =      4.22

****************************************************************************
 FLOW PROCESS FROM NODE     54.00 TO NODE     54.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    7.10
 RAINFALL INTENSITY(INCH/HR) =   1.85
 AREA-AVERAGED Fm(INCH/HR) =  0.03
 AREA-AVERAGED Fp(INCH/HR) =  0.25
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       2.57
 TOTAL STREAM AREA(ACRES) =       2.57
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.22

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       14.31    7.69    1.768  0.25( 0.03) 0.10       9.0      53.10
     1       10.52   15.86    1.167  0.25( 0.03) 0.10      10.1      50.00
     2        4.22    7.10    1.851  0.25( 0.03) 0.10       2.6      54.10
```

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```
  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       18.06    7.10    1.851  0.25( 0.03) 0.10      10.8      54.10
      2       18.34    7.69    1.768  0.25( 0.03) 0.10      11.5      53.10
      3       13.16   15.86    1.167  0.25( 0.03) 0.10      12.7      50.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      18.34    Tc(MIN.) =     7.69
  EFFECTIVE AREA(ACRES) =      11.53   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =       12.7
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     54.00 =    1306.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     55.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    29.00  DOWNSTREAM(FEET) =    28.00
  FLOW LENGTH(FEET) =   254.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  23.35
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      18.34
  PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =    7.87
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     55.00 =    1560.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.87
  RAINFALL INTENSITY(INCH/HR) =   1.74
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =      11.53
  TOTAL STREAM AREA(ACRES) =      12.68
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      18.34

****************************************************************************
  FLOW PROCESS FROM NODE     55.10 TO NODE     55.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   326.00
  ELEVATION DATA: UPSTREAM(FEET) =     35.70  DOWNSTREAM(FEET) =     33.10

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.087
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.718
```

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```
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 C        2.01      0.25     0.100    50    8.09
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      3.06
  TOTAL AREA(ACRES) =      2.01   PEAK FLOW RATE(CFS) =      3.06

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.09
  RAINFALL INTENSITY(INCH/HR) =   1.72
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       2.01
  TOTAL STREAM AREA(ACRES) =       2.01
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.06

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       18.06    7.29    1.824  0.25( 0.03) 0.10      10.8      54.10
      1       18.34    7.87    1.744  0.25( 0.03) 0.10      11.5      53.10
      1       13.16   16.11    1.156  0.25( 0.03) 0.10      12.7      50.00
      2        3.06    8.09    1.718  0.25( 0.03) 0.10       2.0      55.10

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       20.99    7.29    1.824  0.25( 0.03) 0.10      12.7      54.10
      2       21.37    7.87    1.744  0.25( 0.03) 0.10      13.5      53.10
      3       21.27    8.09    1.718  0.25( 0.03) 0.10      13.6      55.10
      4       15.20   16.11    1.156  0.25( 0.03) 0.10      14.7      50.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      21.37    Tc(MIN.) =     7.87
  EFFECTIVE AREA(ACRES) =      13.49   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =       14.7
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     55.00 =    1560.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.87
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.744
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
```

```
  COMMERCIAL                 C        0.91      0.25     0.100    50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.91      SUBAREA RUNOFF(CFS) =    1.41
  EFFECTIVE AREA(ACRES) =     14.40   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =       15.6       PEAK FLOW RATE(CFS) =      22.28

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     56.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    28.00  DOWNSTREAM(FEET) =    27.40
  FLOW LENGTH(FEET) =   145.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  28.37
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      22.28
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    7.96
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     56.00 =    1705.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     56.00 TO NODE     56.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.96
  RAINFALL INTENSITY(INCH/HR) =   1.73
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =      14.40
  TOTAL STREAM AREA(ACRES) =      15.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      22.28

****************************************************************************
  FLOW PROCESS FROM NODE     57.00 TO NODE     58.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   323.00
  ELEVATION DATA: UPSTREAM(FEET) =     36.20  DOWNSTREAM(FEET) =     33.70

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.106
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.715
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
        LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 C        0.91      0.25     0.100    50    8.11
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.38
  TOTAL AREA(ACRES) =      0.91   PEAK FLOW RATE(CFS) =      1.38

****************************************************************************
```

```
  FLOW PROCESS FROM NODE     58.00 TO NODE     59.00 IS CODE =  91
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  UPSTREAM NODE ELEVATION(FEET) =     33.70
  DOWNSTREAM NODE ELEVATION(FEET) =     32.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   255.00
  "V" GUTTER WIDTH(FEET) =   5.00   GUTTER HIKE(FEET) =  0.050
  PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0150
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
  MAXIMUM DEPTH(FEET) =  10.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.447
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 C        1.52      0.25     0.100    50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      2.35
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.52
  AVERAGE FLOW DEPTH(FEET) =   0.18   FLOOD WIDTH(FEET) =   17.32
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   2.80   Tc(MIN.) =   10.90
  SUBAREA AREA(ACRES) =    1.52       SUBAREA RUNOFF(CFS) =    1.95
  EFFECTIVE AREA(ACRES) =    2.43     AREA-AVERAGED Fm(INCH/HR) =   0.02
  AREA-AVERAGED Fp(INCH/HR) =   0.25  AREA-AVERAGED Ap =   0.10
  TOTAL AREA(ACRES) =        2.4         PEAK FLOW RATE(CFS) =       3.11

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  0.20   FLOOD WIDTH(FEET) =   19.26
  FLOW VELOCITY(FEET/SEC.) =   1.63   DEPTH*VELOCITY(FT*FT/SEC) =   0.33
  LONGEST FLOWPATH FROM NODE     57.00 TO NODE     59.00 =     578.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     59.00 TO NODE     59.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.90
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.447
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 C        0.99      0.25     0.100    50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.99       SUBAREA RUNOFF(CFS) =    1.27
  EFFECTIVE AREA(ACRES) =      3.42   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        3.4       PEAK FLOW RATE(CFS) =       4.38

****************************************************************************
  FLOW PROCESS FROM NODE     59.00 TO NODE     56.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    28.00  DOWNSTREAM(FEET) =    27.40
  FLOW LENGTH(FEET) =    76.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.57
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
```

```
  PIPE-FLOW(CFS) =       4.38
  PIPE TRAVEL TIME(MIN.) =   0.23    Tc(MIN.) =   11.13
  LONGEST FLOWPATH FROM NODE     57.00 TO NODE     56.00 =     654.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     56.00 TO NODE     56.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.13
  RAINFALL INTENSITY(INCH/HR) =   1.43
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       3.42
  TOTAL STREAM AREA(ACRES) =       3.42
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.38

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       21.96    7.37    1.812  0.25( 0.03) 0.10      13.6      54.10
      1       22.28    7.96    1.734  0.25( 0.03) 0.10      14.4      53.10
      1       22.06    8.17    1.707  0.25( 0.03) 0.10      14.5      55.10
      1       15.89   16.23    1.152  0.25( 0.03) 0.10      15.6      50.00
      2        4.38   11.13    1.430  0.25( 0.03) 0.10       3.4      57.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       25.64    7.37    1.812  0.25( 0.03) 0.10      15.8      54.10
      2       26.08    7.96    1.734  0.25( 0.03) 0.10      16.8      53.10
      3       25.91    8.17    1.707  0.25( 0.03) 0.10      17.0      55.10
      4       24.17   11.13    1.430  0.25( 0.02) 0.10      18.3      57.00
      5       19.40   16.23    1.152  0.25( 0.03) 0.10      19.0      50.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      26.08    Tc(MIN.) =     7.96
  EFFECTIVE AREA(ACRES) =      16.84   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =       19.0
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     56.00 =    1705.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     56.00 TO NODE     60.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    27.40  DOWNSTREAM(FEET) =    27.00
  FLOW LENGTH(FEET) =    86.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  33.21
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      26.08
```

```
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    8.00
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     60.00 =    1791.00 FEET.

+---------------------------------------------------------------------------+
| AREA 'G'                                                                  |
|                                                                           |
|                                                                           |
+---------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE     80.00 TO NODE     81.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   187.00
  ELEVATION DATA: UPSTREAM(FEET) =     36.00  DOWNSTREAM(FEET) =     32.90

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.594
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  2.122
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
        LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  C        1.16      0.25     0.100    50    5.59
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      2.19
  TOTAL AREA(ACRES) =      1.16   PEAK FLOW RATE(CFS) =      2.19

****************************************************************************
  FLOW PROCESS FROM NODE     81.00 TO NODE     82.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    31.90  DOWNSTREAM(FEET) =    31.50
  FLOW LENGTH(FEET) =    93.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   9.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.22
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.19
  PIPE TRAVEL TIME(MIN.) =   0.48    Tc(MIN.) =    6.08
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     82.00 =     280.00 FEET.

+---------------------------------------------------------------------------+
| AREA 'C'                                                                  |
|                                                                           |
|                                                                           |
+---------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE     90.00 TO NODE     91.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =     38.30  DOWNSTREAM(FEET) =     34.10

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.402
```

```
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.807
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
        LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 C        0.77      0.25     0.100    50    7.40
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.24
  TOTAL AREA(ACRES) =      0.77   PEAK FLOW RATE(CFS) =      1.24

+---------------------------------------------------------------------------+
| AREA 'D'                                                                  |
|                                                                           |
|                                                                           |
+---------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   290.00
  ELEVATION DATA: UPSTREAM(FEET) =     36.50  DOWNSTREAM(FEET) =     34.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.945
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.735
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
        LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 C        0.77      0.25     0.100    50    7.95
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.19
  TOTAL AREA(ACRES) =      0.77   PEAK FLOW RATE(CFS) =      1.19

+---------------------------------------------------------------------------+
| AREA 'I'                                                                  |
|                                                                           |
|                                                                           |
+---------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE    110.00 TO NODE    111.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   299.00
  ELEVATION DATA: UPSTREAM(FEET) =     39.00  DOWNSTREAM(FEET) =     35.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.045
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.859
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
        LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 C        0.76      0.25     0.100    50    7.04
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.25
```

```
                                                    BRIS2EX.RES
  TOTAL AREA(ACRES) =      0.76   PEAK FLOW RATE(CFS) =      1.25
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        0.8  TC(MIN.) =      7.04
  EFFECTIVE AREA(ACRES) =      0.76  AREA-AVERAGED Fm(INCH/HR)=  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap = 0.100
  PEAK FLOW RATE(CFS)   =       1.25
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

BRIS10EX.RES

```
**************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
         (c) Copyright 1983-2014 Advanced Engineering Software (aes)
            Ver. 21.0  Release Date: 06/01/2014  License ID 1355

                        Analysis prepared by:

                          Fuscoe Engineering
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                           Irvine, CA 92606

 ************************ DESCRIPTION OF STUDY ************************
* RELATED BRISTOL                                                        *
* 10-YEAR STORM EVENT                                                    *
* EXISTING CONDITION                                                     *
 **************************************************************************

  FILE NAME: BRIS2EX.DAT
  TIME/DATE OF STUDY: 09:41 02/02/2023
==========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==========================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   8.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

+--------------------------------------------------------------------------+
| AREA 'A'                                                                 |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+

**************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   186.00
  ELEVATION DATA: UPSTREAM(FEET) =     36.00  DOWNSTREAM(FEET) =     33.40
```

```
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.775
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.738
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 C        1.12      0.25     0.100    69    5.78
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      3.74
  TOTAL AREA(ACRES) =      1.12   PEAK FLOW RATE(CFS) =      3.74

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    31.40  DOWNSTREAM(FEET) =    30.60
  FLOW LENGTH(FEET) =   157.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.76
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.74
  PIPE TRAVEL TIME(MIN.) =   0.55    Tc(MIN.) =    6.32
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     12.00 =     343.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    6.32
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.548
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 C        0.41      0.25     0.100    69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.41      SUBAREA RUNOFF(CFS) =    1.30
  EFFECTIVE AREA(ACRES) =      1.53   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        1.5       PEAK FLOW RATE(CFS) =       4.85

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    30.60  DOWNSTREAM(FEET) =    29.70
  FLOW LENGTH(FEET) =   176.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.18
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.85
  PIPE TRAVEL TIME(MIN.) =   0.47    Tc(MIN.) =    6.80
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     13.00 =     519.00 FEET.
```

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```
****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.80
  RAINFALL INTENSITY(INCH/HR) =   3.40
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       1.53
  TOTAL STREAM AREA(ACRES) =       1.53
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.85

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   309.00
  ELEVATION DATA: UPSTREAM(FEET) =     34.80  DOWNSTREAM(FEET) =     34.60

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   13.081
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.340
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
        LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 C        0.39      0.25     0.100    69   13.08
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.81
  TOTAL AREA(ACRES) =      0.39   PEAK FLOW RATE(CFS) =      0.81

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     13.00 IS CODE =  91
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  UPSTREAM NODE ELEVATION(FEET) =     34.60
  DOWNSTREAM NODE ELEVATION(FEET) =     33.60
  CHANNEL LENGTH THRU SUBAREA(FEET) =   207.00
  "V" GUTTER WIDTH(FEET) =   5.00   GUTTER HIKE(FEET) =  0.050
  PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0150
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
  MAXIMUM DEPTH(FEET) =  10.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.106
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
        LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 C        0.33      0.25     0.100    69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      1.12
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.31
  AVERAGE FLOW DEPTH(FEET) =   0.14   FLOOD WIDTH(FEET) =   12.70
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   2.63   Tc(MIN.) =   15.72
  SUBAREA AREA(ACRES) =    0.33       SUBAREA RUNOFF(CFS) =    0.62
```

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```
  EFFECTIVE AREA(ACRES) =    0.72     AREA-AVERAGED Fm(INCH/HR) =   0.03
  AREA-AVERAGED Fp(INCH/HR) =   0.25  AREA-AVERAGED Ap =   0.10
  TOTAL AREA(ACRES) =        0.7         PEAK FLOW RATE(CFS) =       1.35

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  0.15   FLOOD WIDTH(FEET) =   13.68
  FLOW VELOCITY(FEET/SEC.) =   1.37   DEPTH*VELOCITY(FT*FT/SEC) =   0.20
  LONGEST FLOWPATH FROM NODE     14.00 TO NODE     13.00 =     516.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   15.72
  RAINFALL INTENSITY(INCH/HR) =   2.11
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.72
  TOTAL STREAM AREA(ACRES) =       0.72
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.35

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        4.85    6.80    3.404  0.25( 0.03) 0.10       1.5      10.00
      2        1.35   15.72    2.106  0.25( 0.03) 0.10       0.7      14.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        5.80    6.80    3.404  0.25( 0.03) 0.10       1.8      10.00
      2        4.34   15.72    2.106  0.25( 0.03) 0.10       2.2      14.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       5.80    Tc(MIN.) =     6.80
  EFFECTIVE AREA(ACRES) =       1.84   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        2.2
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     13.00 =     519.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    6.80
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.404
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 C        1.25      0.25     0.100    69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.25      SUBAREA RUNOFF(CFS) =    3.80
```

```
  EFFECTIVE AREA(ACRES) =      3.09   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        3.5       PEAK FLOW RATE(CFS) =       9.40

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     16.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    29.70  DOWNSTREAM(FEET) =    28.50
  FLOW LENGTH(FEET) =   252.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.97
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.40
  PIPE TRAVEL TIME(MIN.) =   0.35    Tc(MIN.) =    7.15
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     16.00 =     771.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     16.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.15
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.307
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 C        0.37      0.25     0.100    69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.37      SUBAREA RUNOFF(CFS) =    1.09
  EFFECTIVE AREA(ACRES) =      3.46   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        3.9       PEAK FLOW RATE(CFS) =      10.23

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     17.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    28.50  DOWNSTREAM(FEET) =    28.20
  FLOW LENGTH(FEET) =    49.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.02
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.23
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    7.21
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     17.00 =     820.00 FEET.

+----------------------------------------------------------------------------+
| AREA 'B'                                                                   |
|                                                                            |
|                                                                            |
+----------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  21
```

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```
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =     35.30  DOWNSTREAM(FEET) =     33.70

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.978
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.903
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
        LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                C        0.94      0.25     0.100    69    8.98
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      2.43
  TOTAL AREA(ACRES) =      0.94   PEAK FLOW RATE(CFS) =      2.43

************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  41
------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    31.80  DOWNSTREAM(FEET) =    31.70
  FLOW LENGTH(FEET) =    63.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.10
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.43
  PIPE TRAVEL TIME(MIN.) =   0.34    Tc(MIN.) =    9.32
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     22.00 =     393.00 FEET.

************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =  81
------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
========================================================================
  MAINLINE Tc(MIN.) =    9.32
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.842
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
        LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                C        0.29      0.25     0.100    69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.29      SUBAREA RUNOFF(CFS) =    0.74
  EFFECTIVE AREA(ACRES) =      1.23   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        1.2       PEAK FLOW RATE(CFS) =       3.12

************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  41
------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    31.70  DOWNSTREAM(FEET) =    31.60
  FLOW LENGTH(FEET) =    47.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
```

```
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.97
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.12
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =    9.51
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     23.00 =     440.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.51
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.808
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                C        2.17      0.25     0.100    69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    2.17      SUBAREA RUNOFF(CFS) =    5.44
  EFFECTIVE AREA(ACRES) =      3.40   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        3.4       PEAK FLOW RATE(CFS) =       8.52

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     24.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    31.60  DOWNSTREAM(FEET) =    31.00
  FLOW LENGTH(FEET) =   136.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.84
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.52
  PIPE TRAVEL TIME(MIN.) =   0.21    Tc(MIN.) =    9.72
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     24.00 =     576.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     24.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.72
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.773
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                C        0.35      0.25     0.100    69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.35      SUBAREA RUNOFF(CFS) =    0.87
  EFFECTIVE AREA(ACRES) =      3.75   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        3.8       PEAK FLOW RATE(CFS) =       9.28

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     25.00 IS CODE =  41
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    31.00  DOWNSTREAM(FEET) =    30.80
  FLOW LENGTH(FEET) =    54.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.81
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.28
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    9.80
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     25.00 =     630.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     25.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.80
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.761
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 C        0.50      0.25     0.100    69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.50      SUBAREA RUNOFF(CFS) =    1.23
  EFFECTIVE AREA(ACRES) =      4.25   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        4.2       PEAK FLOW RATE(CFS) =      10.46

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     26.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    30.80  DOWNSTREAM(FEET) =    30.60
  FLOW LENGTH(FEET) =    51.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.32
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.46
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    9.86
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     26.00 =     681.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     26.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.86
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.751
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 C        0.50      0.25     0.100    69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.50      SUBAREA RUNOFF(CFS) =    1.23
  EFFECTIVE AREA(ACRES) =      4.75   AREA-AVERAGED Fm(INCH/HR) =  0.03
```

```
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        4.8       PEAK FLOW RATE(CFS) =      11.65

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     27.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    30.60  DOWNSTREAM(FEET) =    30.40
  FLOW LENGTH(FEET) =    44.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.84
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.65
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    9.91
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     27.00 =     725.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     27.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.91
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.743
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 C        2.15      0.25      0.100    69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    2.15      SUBAREA RUNOFF(CFS) =    5.26
  EFFECTIVE AREA(ACRES) =      6.90   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        6.9       PEAK FLOW RATE(CFS) =      16.88

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     28.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    30.40  DOWNSTREAM(FEET) =    29.30
  FLOW LENGTH(FEET) =   258.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  21.49
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      16.88
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =   10.11
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     28.00 =     983.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.11
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.711
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
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      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                C        1.17      0.25     0.100    69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.17      SUBAREA RUNOFF(CFS) =    2.83
  EFFECTIVE AREA(ACRES) =      8.07   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        8.1       PEAK FLOW RATE(CFS) =      19.51

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     29.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    29.30  DOWNSTREAM(FEET) =    28.50
  FLOW LENGTH(FEET) =   186.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  24.84
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      19.51
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =   10.24
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     29.00 =    1169.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     29.00 TO NODE     29.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.24
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.692
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                C        0.78      0.25     0.100    69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.78      SUBAREA RUNOFF(CFS) =    1.87
  EFFECTIVE AREA(ACRES) =      8.85   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        8.8       PEAK FLOW RATE(CFS) =      21.25

****************************************************************************
  FLOW PROCESS FROM NODE     29.00 TO NODE     29.10 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    28.50  DOWNSTREAM(FEET) =    27.90
  FLOW LENGTH(FEET) =   157.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  27.05
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      21.25
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =   10.33
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     29.10 =    1326.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     29.10 TO NODE     29.10 IS CODE =  81
----------------------------------------------------------------------------
```

```
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   10.33
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.678
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 C        0.62      0.25     0.100    69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.62      SUBAREA RUNOFF(CFS) =    1.48
  EFFECTIVE AREA(ACRES) =      9.47   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        9.5       PEAK FLOW RATE(CFS) =      22.61

********************************************************************************
  FLOW PROCESS FROM NODE     29.10 TO NODE     29.20 IS CODE =  41
--------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    27.90  DOWNSTREAM(FEET) =    27.50
  FLOW LENGTH(FEET) =   107.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  28.79
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      22.61
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =   10.40
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     29.20 =    1433.00 FEET.

+------------------------------------------------------------------------------+
| AREA 'E'                                                                     |
|                                                                              |
|                                                                              |
+------------------------------------------------------------------------------+

********************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     31.00 IS CODE =  21
--------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
================================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   179.00
  ELEVATION DATA: UPSTREAM(FEET) =     35.00  DOWNSTREAM(FEET) =     33.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.220
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.582
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 C        1.54      0.25     0.100    69    6.22
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      4.93
  TOTAL AREA(ACRES) =      1.54   PEAK FLOW RATE(CFS) =      4.93

********************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  41
--------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
                                                    BRIS10EX.RES
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    31.40  DOWNSTREAM(FEET) =    30.40
  FLOW LENGTH(FEET) =   193.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.28
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.93
  PIPE TRAVEL TIME(MIN.) =   0.51    Tc(MIN.) =    6.73
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     32.00 =     372.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     32.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    6.73
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.423
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 C        1.35      0.25     0.100    69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.35      SUBAREA RUNOFF(CFS) =    4.13
  EFFECTIVE AREA(ACRES) =      2.89   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        2.9       PEAK FLOW RATE(CFS) =       8.84

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     33.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    30.40  DOWNSTREAM(FEET) =    29.40
  FLOW LENGTH(FEET) =   192.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.25
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.84
  PIPE TRAVEL TIME(MIN.) =   0.28    Tc(MIN.) =    7.02
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     33.00 =     564.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     33.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.02
  RAINFALL INTENSITY(INCH/HR) =   3.34
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       2.89
  TOTAL STREAM AREA(ACRES) =       2.89
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.84
```

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```
****************************************************************************
  FLOW PROCESS FROM NODE     34.00 TO NODE     33.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   266.00
  ELEVATION DATA: UPSTREAM(FEET) =     35.00  DOWNSTREAM(FEET) =     33.30

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.793
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.148
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
        LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  C        1.85      0.25     0.100    69    7.79
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      5.20
  TOTAL AREA(ACRES) =      1.85   PEAK FLOW RATE(CFS) =      5.20

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     33.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.79
  RAINFALL INTENSITY(INCH/HR) =   3.15
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       1.85
  TOTAL STREAM AREA(ACRES) =       1.85
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.20

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        8.84    7.02    3.343  0.25( 0.03) 0.10       2.9      30.00
      2        5.20    7.79    3.148  0.25( 0.03) 0.10       1.9      34.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       13.81    7.02    3.343  0.25( 0.03) 0.10       4.6      30.00
      2       13.52    7.79    3.148  0.25( 0.03) 0.10       4.7      34.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      13.81    Tc(MIN.) =     7.02
  EFFECTIVE AREA(ACRES) =       4.56   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        4.7
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     33.00 =     564.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     35.00 IS CODE =  41
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    29.40  DOWNSTREAM(FEET) =    28.40
  FLOW LENGTH(FEET) =   197.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.59
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.81
  PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =    7.20
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     35.00 =     761.00 FEET.

+--------------------------------------------------------------------------+
| AREA 'F'                                                                 |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     41.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =     35.70  DOWNSTREAM(FEET) =     35.20

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   11.329
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.541
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 C        0.36      0.25     0.100    69   11.33
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.82
  TOTAL AREA(ACRES) =      0.36   PEAK FLOW RATE(CFS) =      0.82

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     42.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   35.20  DOWNSTREAM ELEVATION(FEET) =   34.60
  STREET LENGTH(FEET) =   183.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.04
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
```

```
    STREET FLOW DEPTH(FEET) =  0.27
    HALFSTREET FLOOD WIDTH(FEET) =    5.78
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.06
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.28
  STREET FLOW TRAVEL TIME(MIN.) =   2.89   Tc(MIN.) =   14.22
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.231
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 C        0.23      0.25     0.100    69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.23      SUBAREA RUNOFF(CFS) =    0.46
  EFFECTIVE AREA(ACRES) =      0.59    AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.6        PEAK FLOW RATE(CFS) =       1.17

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   6.22
  FLOW VELOCITY(FEET/SEC.) =  1.08   DEPTH*VELOCITY(FT*FT/SEC.) =   0.30
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     42.00 =     513.00 FEET.

+-------------------------------------------------------------------------+
| AREA 'H'                                                                |
|                                                                         |
|                                                                         |
+-------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     51.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =     35.40  DOWNSTREAM(FEET) =     34.80

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.923
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.594
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 C        0.56      0.25     0.100    69   10.92
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.29
  TOTAL AREA(ACRES) =      0.56   PEAK FLOW RATE(CFS) =      1.29

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     52.00 IS CODE =  91
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  UPSTREAM NODE ELEVATION(FEET) =     34.80
  DOWNSTREAM NODE ELEVATION(FEET) =     32.80
  CHANNEL LENGTH THRU SUBAREA(FEET) =   224.00
  "V" GUTTER WIDTH(FEET) =   5.00   GUTTER HIKE(FEET) =  0.050
  PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0150
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
  MAXIMUM DEPTH(FEET) =  10.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.376
```

```
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 C        1.65      0.25     0.100    69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      3.03
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.06
  AVERAGE FLOW DEPTH(FEET) =   0.18   FLOOD WIDTH(FEET) =   16.83
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   1.81   Tc(MIN.) =   12.73
  SUBAREA AREA(ACRES) =    1.65       SUBAREA RUNOFF(CFS) =    3.49
  EFFECTIVE AREA(ACRES) =    2.21     AREA-AVERAGED Fm(INCH/HR) =   0.03
  AREA-AVERAGED Fp(INCH/HR) =   0.25  AREA-AVERAGED Ap =   0.10
  TOTAL AREA(ACRES) =        2.2         PEAK FLOW RATE(CFS) =       4.68

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  0.21   FLOOD WIDTH(FEET) =   19.99
  FLOW VELOCITY(FEET/SEC.) =   2.28   DEPTH*VELOCITY(FT*FT/SEC) =   0.48
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     52.00 =     554.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     53.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    32.20  DOWNSTREAM(FEET) =    30.40
  FLOW LENGTH(FEET) =   497.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.95
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.68
  PIPE TRAVEL TIME(MIN.) =   1.39    Tc(MIN.) =   14.12
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     53.00 =    1051.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     53.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   14.12
  RAINFALL INTENSITY(INCH/HR) =   2.24
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       2.21
  TOTAL STREAM AREA(ACRES) =       2.21
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.68

****************************************************************************
  FLOW PROCESS FROM NODE     53.10 TO NODE     53.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   230.00
  ELEVATION DATA: UPSTREAM(FEET) =     36.30  DOWNSTREAM(FEET) =     33.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
```

```
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.464
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.504
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 C        0.66      0.25     0.100    69    6.46
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      2.07
  TOTAL AREA(ACRES) =      0.66   PEAK FLOW RATE(CFS) =      2.07

****************************************************************************
  FLOW PROCESS FROM NODE     53.20 TO NODE     53.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    30.60  DOWNSTREAM(FEET) =    30.40
  FLOW LENGTH(FEET) =   118.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   2.63
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.07
  PIPE TRAVEL TIME(MIN.) =   0.75    Tc(MIN.) =    7.21
  LONGEST FLOWPATH FROM NODE     53.10 TO NODE     53.00 =     348.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     53.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.21
  RAINFALL INTENSITY(INCH/HR) =   3.29
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.66
  TOTAL STREAM AREA(ACRES) =       0.66
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.07

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        4.68   14.12    2.239  0.25( 0.03) 0.10       2.2      50.00
      2        2.07    7.21    3.291  0.25( 0.03) 0.10       0.7      53.10

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        5.59    7.21    3.291  0.25( 0.03) 0.10       1.8      53.10
      2        6.08   14.12    2.239  0.25( 0.03) 0.10       2.9      50.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       6.08    Tc(MIN.) =    14.12
  EFFECTIVE AREA(ACRES) =       2.87   AREA-AVERAGED Fm(INCH/HR) =  0.03
```

```
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        2.9
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     53.00 =    1051.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     53.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.12
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.239
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 C        3.00      0.25     0.100    69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    3.00      SUBAREA RUNOFF(CFS) =    5.98
  EFFECTIVE AREA(ACRES) =      5.87   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        5.9       PEAK FLOW RATE(CFS) =      11.70

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       14.08    7.21    3.291  0.25( 0.03) 0.10       4.8      53.10
      2       11.70   14.12    2.239  0.25( 0.03) 0.10       5.9      50.00
  NEW PEAK FLOW DATA ARE:
  PEAK FLOW RATE(CFS) =      14.08  Tc(MIN.) =    7.21
  AREA-AVERAGED Fm(INCH/HR) =  0.03  AREA-AVERAGED Fp(INCH/HR) =  0.25
  AREA-AVERAGED Ap =  0.10  EFFECTIVE AREA(ACRES) =       4.79

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     53.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.21
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.291
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 C        4.24      0.25     0.100    69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    4.24      SUBAREA RUNOFF(CFS) =   12.46
  EFFECTIVE AREA(ACRES) =      9.03   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =       10.1       PEAK FLOW RATE(CFS) =      26.54

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     54.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    30.40  DOWNSTREAM(FEET) =    29.00
  FLOW LENGTH(FEET) =   255.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  33.79
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
```

```
  PIPE-FLOW(CFS) =      26.54
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =    7.34
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     54.00 =    1306.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     54.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.34
  RAINFALL INTENSITY(INCH/HR) =   3.26
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       9.03
  TOTAL STREAM AREA(ACRES) =      10.11
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      26.54

****************************************************************************
  FLOW PROCESS FROM NODE     54.10 TO NODE     54.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   303.00
  ELEVATION DATA: UPSTREAM(FEET) =     36.40  DOWNSTREAM(FEET) =     32.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.101
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.320
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 C        2.57      0.25     0.100    69    7.10
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      7.62
  TOTAL AREA(ACRES) =      2.57   PEAK FLOW RATE(CFS) =      7.62

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     54.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.10
  RAINFALL INTENSITY(INCH/HR) =   3.32
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       2.57
  TOTAL STREAM AREA(ACRES) =       2.57
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       7.62

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       26.54    7.34    3.259  0.25( 0.03) 0.10       9.0      53.10
```

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1	20.15	14.29	2.224	0.25(0.03)	0.10	10.1	50.00
2	7.62	7.10	3.320	0.25(0.03)	0.10	2.6	54.10

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	33.80	7.10	3.320	0.25(0.03)	0.10	11.3	54.10
2	34.02	7.34	3.259	0.25(0.03)	0.10	11.6	53.10
3	25.23	14.29	2.224	0.25(0.03)	0.10	12.7	50.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 34.02 Tc(MIN.) = 7.34
EFFECTIVE AREA(ACRES) = 11.60 AREA-AVERAGED Fm(INCH/HR) = 0.03
AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 12.7
LONGEST FLOWPATH FROM NODE 50.00 TO NODE 54.00 = 1306.00 FEET.

****
FLOW PROCESS FROM NODE 54.00 TO NODE 55.00 IS CODE = 41

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
==========
ELEVATION DATA: UPSTREAM(FEET) = 29.00 DOWNSTREAM(FEET) = 28.00
FLOW LENGTH(FEET) = 254.00 MANNING'S N = 0.013
ASSUME FULL-FLOWING PIPELINE
PIPE-FLOW VELOCITY(FEET/SEC.) = 43.31
PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
GIVEN PIPE DIAMETER(INCH) = 12.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 34.02
PIPE TRAVEL TIME(MIN.) = 0.10 Tc(MIN.) = 7.43
LONGEST FLOWPATH FROM NODE 50.00 TO NODE 55.00 = 1560.00 FEET.

****
FLOW PROCESS FROM NODE 55.00 TO NODE 55.00 IS CODE = 1

>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==========
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 7.43
RAINFALL INTENSITY(INCH/HR) = 3.23
AREA-AVERAGED Fm(INCH/HR) = 0.03
AREA-AVERAGED Fp(INCH/HR) = 0.25
AREA-AVERAGED Ap = 0.10
EFFECTIVE STREAM AREA(ACRES) = 11.60
TOTAL STREAM AREA(ACRES) = 12.68
PEAK FLOW RATE(CFS) AT CONFLUENCE = 34.02

****
FLOW PROCESS FROM NODE 55.10 TO NODE 55.00 IS CODE = 21

>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==========
INITIAL SUBAREA FLOW-LENGTH(FEET) = 326.00
ELEVATION DATA: UPSTREAM(FEET) = 35.70 DOWNSTREAM(FEET) = 33.10

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20

```
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.087
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.082
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 C        2.01      0.25     0.100    69    8.09
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA RUNOFF(CFS) =      5.53
 TOTAL AREA(ACRES) =      2.01   PEAK FLOW RATE(CFS) =      5.53

****************************************************************************
 FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    8.09
 RAINFALL INTENSITY(INCH/HR) =   3.08
 AREA-AVERAGED Fm(INCH/HR) =  0.03
 AREA-AVERAGED Fp(INCH/HR) =  0.25
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       2.01
 TOTAL STREAM AREA(ACRES) =       2.01
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.53

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       33.80    7.20    3.294  0.25( 0.03) 0.10      11.3      54.10
     1       34.02    7.43    3.234  0.25( 0.03) 0.10      11.6      53.10
     1       25.23   14.42    2.213  0.25( 0.03) 0.10      12.7      50.00
     2        5.53    8.09    3.082  0.25( 0.03) 0.10       2.0      55.10

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       39.06    7.20    3.294  0.25( 0.03) 0.10      13.1      54.10
     2       39.36    7.43    3.234  0.25( 0.03) 0.10      13.4      53.10
     3       38.73    8.09    3.082  0.25( 0.02) 0.10      13.7      55.10
     4       29.19   14.42    2.213  0.25( 0.03) 0.10      14.7      50.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      39.36    Tc(MIN.) =     7.43
 EFFECTIVE AREA(ACRES) =      13.45   AREA-AVERAGED Fm(INCH/HR) =  0.03
 AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =       14.7
 LONGEST FLOWPATH FROM NODE     50.00 TO NODE     55.00 =    1560.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    7.43
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.234
 SUBAREA LOSS RATE DATA(AMC  II):
```

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```
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 C        0.91      0.25      0.100    69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.91      SUBAREA RUNOFF(CFS) =    2.63
  EFFECTIVE AREA(ACRES) =     14.36   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =       15.6       PEAK FLOW RATE(CFS) =      41.46

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     56.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    28.00  DOWNSTREAM(FEET) =    27.40
  FLOW LENGTH(FEET) =   145.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  52.79
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      41.46
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    7.48
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     56.00 =    1705.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     56.00 TO NODE     56.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.48
  RAINFALL INTENSITY(INCH/HR) =   3.22
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =      14.36
  TOTAL STREAM AREA(ACRES) =      15.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      41.46

****************************************************************************
  FLOW PROCESS FROM NODE     57.00 TO NODE     58.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   323.00
  ELEVATION DATA: UPSTREAM(FEET) =     36.20  DOWNSTREAM(FEET) =     33.70

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.106
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.078
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 C        0.91      0.25      0.100    69    8.11
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      2.50
  TOTAL AREA(ACRES) =      0.91   PEAK FLOW RATE(CFS) =      2.50
```

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```
****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     59.00 IS CODE =  91
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  UPSTREAM NODE ELEVATION(FEET) =     33.70
  DOWNSTREAM NODE ELEVATION(FEET) =     32.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   255.00
  "V" GUTTER WIDTH(FEET) =   5.00   GUTTER HIKE(FEET) =  0.050
  PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0150
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
  MAXIMUM DEPTH(FEET) =  10.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.648
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                C        1.52      0.25     0.100    69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      4.29
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.75
  AVERAGE FLOW DEPTH(FEET) =   0.23   FLOOD WIDTH(FEET) =   21.93
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   2.43   Tc(MIN.) =   10.54
  SUBAREA AREA(ACRES) =    1.52       SUBAREA RUNOFF(CFS) =    3.59
  EFFECTIVE AREA(ACRES) =    2.43     AREA-AVERAGED Fm(INCH/HR) =   0.02
  AREA-AVERAGED Fp(INCH/HR) =   0.25  AREA-AVERAGED Ap =   0.10
  TOTAL AREA(ACRES) =        2.4         PEAK FLOW RATE(CFS) =       5.74

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  0.26   FLOOD WIDTH(FEET) =   24.60
  FLOW VELOCITY(FEET/SEC.) =   1.87   DEPTH*VELOCITY(FT*FT/SEC) =   0.48
  LONGEST FLOWPATH FROM NODE     57.00 TO NODE     59.00 =     578.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     59.00 TO NODE     59.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.54
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.648
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                C        0.99      0.25     0.100    69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.99      SUBAREA RUNOFF(CFS) =    2.34
  EFFECTIVE AREA(ACRES) =      3.42   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        3.4       PEAK FLOW RATE(CFS) =       8.07

****************************************************************************
  FLOW PROCESS FROM NODE     59.00 TO NODE     56.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    28.00  DOWNSTREAM(FEET) =    27.40
  FLOW LENGTH(FEET) =    76.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.28
```

```
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.07
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =   10.66
  LONGEST FLOWPATH FROM NODE     57.00 TO NODE     56.00 =     654.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     56.00 TO NODE     56.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.66
  RAINFALL INTENSITY(INCH/HR) =   2.63
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       3.42
  TOTAL STREAM AREA(ACRES) =       3.42
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.07

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       41.21    7.25    3.282  0.25( 0.03) 0.10      14.0      54.10
      1       41.46    7.48    3.223  0.25( 0.03) 0.10      14.4      53.10
      1       40.22    8.13    3.072  0.25( 0.02) 0.10      14.6      55.10
      1       30.71   14.48    2.207  0.25( 0.03) 0.10      15.6      50.00
      2        8.07   10.66    2.630  0.25( 0.03) 0.10       3.4      57.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       48.07    7.25    3.282  0.25( 0.03) 0.10      16.3      54.10
      2       48.42    7.48    3.223  0.25( 0.03) 0.10      16.8      53.10
      3       47.42    8.13    3.072  0.25( 0.02) 0.10      17.2      55.10
      4       44.51   10.66    2.630  0.25( 0.03) 0.10      18.4      57.00
      5       37.47   14.48    2.207  0.25( 0.03) 0.10      19.0      50.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      48.42    Tc(MIN.) =     7.48
  EFFECTIVE AREA(ACRES) =      16.76   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =       19.0
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     56.00 =    1705.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     56.00 TO NODE     60.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    27.40  DOWNSTREAM(FEET) =    27.00
  FLOW LENGTH(FEET) =    86.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  61.64
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
```

```
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      48.42
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    7.50
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     60.00 =    1791.00 FEET.

+-------------------------------------------------------------------------+
| AREA 'G'                                                                |
|                                                                         |
|                                                                         |
+-------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE     80.00 TO NODE     81.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   187.00
  ELEVATION DATA: UPSTREAM(FEET) =     36.00  DOWNSTREAM(FEET) =     32.90

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.594
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.807
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                C        1.16      0.25     0.100    69    5.59
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      3.95
  TOTAL AREA(ACRES) =      1.16   PEAK FLOW RATE(CFS) =      3.95

****************************************************************************
  FLOW PROCESS FROM NODE     81.00 TO NODE     82.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    31.90  DOWNSTREAM(FEET) =    31.50
  FLOW LENGTH(FEET) =    93.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.03
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.95
  PIPE TRAVEL TIME(MIN.) =   0.31    Tc(MIN.) =    5.90
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     82.00 =     280.00 FEET.

+-------------------------------------------------------------------------+
| AREA 'C'                                                                |
|                                                                         |
|                                                                         |
+-------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE     90.00 TO NODE     91.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =     38.30  DOWNSTREAM(FEET) =     34.10
```

```
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.402
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.242
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 C        0.77      0.25     0.100    69    7.40
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      2.23
  TOTAL AREA(ACRES) =      0.77   PEAK FLOW RATE(CFS) =      2.23

+---------------------------------------------------------------------------+
| AREA 'D'                                                                  |
|                                                                           |
|                                                                           |
+---------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   290.00
  ELEVATION DATA: UPSTREAM(FEET) =     36.50  DOWNSTREAM(FEET) =     34.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.945
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.113
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 C        0.77      0.25     0.100    69    7.95
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      2.14
  TOTAL AREA(ACRES) =      0.77   PEAK FLOW RATE(CFS) =      2.14

+---------------------------------------------------------------------------+
| AREA 'I'                                                                  |
|                                                                           |
|                                                                           |
+---------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE    110.00 TO NODE    111.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   299.00
  ELEVATION DATA: UPSTREAM(FEET) =     39.00  DOWNSTREAM(FEET) =     35.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.045
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.335
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 C        0.76      0.25     0.100    69    7.04
```

```
                                                BRIS10EX.RES
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      2.26
  TOTAL AREA(ACRES) =      0.76   PEAK FLOW RATE(CFS) =      2.26
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        0.8  TC(MIN.) =      7.04
  EFFECTIVE AREA(ACRES) =      0.76  AREA-AVERAGED Fm(INCH/HR)=  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap = 0.100
  PEAK FLOW RATE(CFS)   =       2.26
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

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```
**************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
         (c) Copyright 1983-2014 Advanced Engineering Software (aes)
             Ver. 21.0  Release Date: 06/01/2014  License ID 1355

                          Analysis prepared by:

                            Fuscoe Engineering
                             16795 Von Karman
                                Suite 100
                             Irvine, CA 92606

 ************************ DESCRIPTION OF STUDY ************************
* RELATED BRISTOL                                                        *
* 100-YEAR STORM EVENT                                                   *
* EXISTING CONDITION                                                     *
 **************************************************************************

  FILE NAME: BRIS2EX.DAT
  TIME/DATE OF STUDY: 09:42 02/02/2023
==========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==========================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   8.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

+--------------------------------------------------------------------------+
| AREA 'A'                                                                 |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+

**************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   186.00
  ELEVATION DATA: UPSTREAM(FEET) =     36.00  DOWNSTREAM(FEET) =     33.40
```

```
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.775
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.697
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 C        1.12      0.25     0.100    86    5.78
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      5.72
  TOTAL AREA(ACRES) =      1.12   PEAK FLOW RATE(CFS) =      5.72

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    31.40  DOWNSTREAM(FEET) =    30.60
  FLOW LENGTH(FEET) =   157.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.28
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.72
  PIPE TRAVEL TIME(MIN.) =   0.36    Tc(MIN.) =    6.13
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     12.00 =     343.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    6.13
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.503
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 C        0.41      0.25     0.100    86
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.41      SUBAREA RUNOFF(CFS) =    2.02
  EFFECTIVE AREA(ACRES) =      1.53   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        1.5       PEAK FLOW RATE(CFS) =       7.54

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    30.60  DOWNSTREAM(FEET) =    29.70
  FLOW LENGTH(FEET) =   176.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.60
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.54
  PIPE TRAVEL TIME(MIN.) =   0.31    Tc(MIN.) =    6.44
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     13.00 =     519.00 FEET.
```

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```
****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.44
  RAINFALL INTENSITY(INCH/HR) =   5.35
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       1.53
  TOTAL STREAM AREA(ACRES) =       1.53
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       7.54

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   309.00
  ELEVATION DATA: UPSTREAM(FEET) =     34.80  DOWNSTREAM(FEET) =     34.60

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   13.081
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.566
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
        LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 C        0.39      0.25     0.100    86   13.08
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.24
  TOTAL AREA(ACRES) =      0.39   PEAK FLOW RATE(CFS) =      1.24

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     13.00 IS CODE =  91
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  UPSTREAM NODE ELEVATION(FEET) =     34.60
  DOWNSTREAM NODE ELEVATION(FEET) =     33.60
  CHANNEL LENGTH THRU SUBAREA(FEET) =   207.00
  "V" GUTTER WIDTH(FEET) =   5.00   GUTTER HIKE(FEET) =  0.050
  PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0150
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
  MAXIMUM DEPTH(FEET) =  10.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.238
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
        LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 C        0.33      0.25     0.100    86
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      1.72
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.44
  AVERAGE FLOW DEPTH(FEET) =   0.16   FLOOD WIDTH(FEET) =   15.13
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   2.40   Tc(MIN.) =   15.48
  SUBAREA AREA(ACRES) =    0.33       SUBAREA RUNOFF(CFS) =    0.95
```

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```
  EFFECTIVE AREA(ACRES) =    0.72     AREA-AVERAGED Fm(INCH/HR) =   0.03
  AREA-AVERAGED Fp(INCH/HR) =   0.25  AREA-AVERAGED Ap =   0.10
  TOTAL AREA(ACRES) =        0.7         PEAK FLOW RATE(CFS) =       2.08

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  0.17   FLOOD WIDTH(FEET) =   16.35
  FLOW VELOCITY(FEET/SEC.) =   1.50   DEPTH*VELOCITY(FT*FT/SEC) =   0.26
  LONGEST FLOWPATH FROM NODE     14.00 TO NODE     13.00 =     516.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   15.48
  RAINFALL INTENSITY(INCH/HR) =   3.24
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.72
  TOTAL STREAM AREA(ACRES) =       0.72
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.08

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        7.54    6.44    5.352  0.25( 0.03) 0.10       1.5      10.00
      2        2.08   15.48    3.238  0.25( 0.03) 0.10       0.7      14.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        8.98    6.44    5.352  0.25( 0.03) 0.10       1.8      10.00
      2        6.63   15.48    3.238  0.25( 0.03) 0.10       2.2      14.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       8.98    Tc(MIN.) =     6.44
  EFFECTIVE AREA(ACRES) =       1.83   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        2.2
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     13.00 =     519.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    6.44
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.352
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 C        1.25      0.25     0.100    86
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.25      SUBAREA RUNOFF(CFS) =    5.99
```

```
  EFFECTIVE AREA(ACRES) =      3.08   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        3.5       PEAK FLOW RATE(CFS) =      14.76

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     16.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    29.70  DOWNSTREAM(FEET) =    28.50
  FLOW LENGTH(FEET) =   252.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.80
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.76
  PIPE TRAVEL TIME(MIN.) =   0.22    Tc(MIN.) =    6.66
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     16.00 =     771.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     16.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    6.66
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.248
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 C        0.37      0.25     0.100    86
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.37      SUBAREA RUNOFF(CFS) =    1.74
  EFFECTIVE AREA(ACRES) =      3.45   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        3.9       PEAK FLOW RATE(CFS) =      16.22

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     17.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    28.50  DOWNSTREAM(FEET) =    28.20
  FLOW LENGTH(FEET) =    49.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  20.65
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      16.22
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    6.70
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     17.00 =     820.00 FEET.

+--------------------------------------------------------------------------+
| AREA 'B'                                                                 |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  21
```

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```
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =     35.30  DOWNSTREAM(FEET) =     33.70

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.978
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.424
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 C        0.94      0.25     0.100    86    8.98
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      3.72
  TOTAL AREA(ACRES) =      0.94   PEAK FLOW RATE(CFS) =      3.72

************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  41
------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    31.80  DOWNSTREAM(FEET) =    31.70
  FLOW LENGTH(FEET) =    63.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.74
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.72
  PIPE TRAVEL TIME(MIN.) =   0.22    Tc(MIN.) =    9.20
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     22.00 =     393.00 FEET.

************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =  81
------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
========================================================================
  MAINLINE Tc(MIN.) =    9.20
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.363
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 C        0.29      0.25     0.100    86
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.29      SUBAREA RUNOFF(CFS) =    1.13
  EFFECTIVE AREA(ACRES) =      1.23   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        1.2       PEAK FLOW RATE(CFS) =       4.80

************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  41
------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    31.70  DOWNSTREAM(FEET) =    31.60
  FLOW LENGTH(FEET) =    47.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
```

```
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.11
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.80
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =    9.33
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     23.00 =     440.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.33
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.329
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                C        2.17      0.25     0.100    86
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    2.17      SUBAREA RUNOFF(CFS) =    8.40
  EFFECTIVE AREA(ACRES) =      3.40   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        3.4       PEAK FLOW RATE(CFS) =      13.17

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     24.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    31.60  DOWNSTREAM(FEET) =    31.00
  FLOW LENGTH(FEET) =   136.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.77
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.17
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =    9.46
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     24.00 =     576.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     24.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.46
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.293
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                C        0.35      0.25     0.100    86
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.35      SUBAREA RUNOFF(CFS) =    1.34
  EFFECTIVE AREA(ACRES) =      3.75   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        3.8       PEAK FLOW RATE(CFS) =      14.40

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     25.00 IS CODE =  41
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    31.00  DOWNSTREAM(FEET) =    30.80
  FLOW LENGTH(FEET) =    54.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.34
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.40
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    9.51
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     25.00 =     630.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     25.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.51
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.280
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 C        0.50      0.25     0.100    86
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.50      SUBAREA RUNOFF(CFS) =    1.91
  EFFECTIVE AREA(ACRES) =      4.25   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        4.2       PEAK FLOW RATE(CFS) =      16.28

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     26.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    30.80  DOWNSTREAM(FEET) =    30.60
  FLOW LENGTH(FEET) =    51.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  20.72
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      16.28
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    9.55
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     26.00 =     681.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     26.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.55
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.270
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 C        0.50      0.25     0.100    86
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.50      SUBAREA RUNOFF(CFS) =    1.91
  EFFECTIVE AREA(ACRES) =      4.75   AREA-AVERAGED Fm(INCH/HR) =  0.03
```

```
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        4.8       PEAK FLOW RATE(CFS) =      18.15

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     27.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    30.60  DOWNSTREAM(FEET) =    30.40
  FLOW LENGTH(FEET) =    44.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  23.10
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      18.15
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =    9.58
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     27.00 =     725.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     27.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.58
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.262
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 C        2.15      0.25      0.100    86
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    2.15      SUBAREA RUNOFF(CFS) =    8.20
  EFFECTIVE AREA(ACRES) =      6.90   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        6.9       PEAK FLOW RATE(CFS) =      26.31

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     28.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    30.40  DOWNSTREAM(FEET) =    29.30
  FLOW LENGTH(FEET) =   258.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  33.50
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      26.31
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =    9.71
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     28.00 =     983.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.71
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.229
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
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      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                C        1.17      0.25     0.100    86
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.17      SUBAREA RUNOFF(CFS) =    4.43
  EFFECTIVE AREA(ACRES) =      8.07   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        8.1       PEAK FLOW RATE(CFS) =      30.54

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     29.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    29.30  DOWNSTREAM(FEET) =    28.50
  FLOW LENGTH(FEET) =   186.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  38.88
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      30.54
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    9.79
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     29.00 =    1169.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     29.00 TO NODE     29.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.79
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.210
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                C        0.78      0.25     0.100    86
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.78      SUBAREA RUNOFF(CFS) =    2.94
  EFFECTIVE AREA(ACRES) =      8.85   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        8.8       PEAK FLOW RATE(CFS) =      33.33

****************************************************************************
  FLOW PROCESS FROM NODE     29.00 TO NODE     29.10 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    28.50  DOWNSTREAM(FEET) =    27.90
  FLOW LENGTH(FEET) =   157.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  42.44
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      33.33
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    9.85
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     29.10 =    1326.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     29.10 TO NODE     29.10 IS CODE =  81
----------------------------------------------------------------------------
```

```
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =    9.85
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.194
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 C        0.62      0.25     0.100    86
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.62      SUBAREA RUNOFF(CFS) =    2.33
  EFFECTIVE AREA(ACRES) =      9.47   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        9.5       PEAK FLOW RATE(CFS) =      35.54

********************************************************************************
  FLOW PROCESS FROM NODE     29.10 TO NODE     29.20 IS CODE =  41
--------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    27.90  DOWNSTREAM(FEET) =    27.50
  FLOW LENGTH(FEET) =   107.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  45.25
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      35.54
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    9.89
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     29.20 =    1433.00 FEET.

+------------------------------------------------------------------------------+
| AREA 'E'                                                                     |
|                                                                              |
|                                                                              |
+------------------------------------------------------------------------------+

********************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     31.00 IS CODE =  21
--------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
================================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   179.00
  ELEVATION DATA: UPSTREAM(FEET) =     35.00  DOWNSTREAM(FEET) =     33.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.220
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.460
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 C        1.54      0.25     0.100    86    6.22
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      7.53
  TOTAL AREA(ACRES) =      1.54   PEAK FLOW RATE(CFS) =      7.53

********************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  41
--------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
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  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    31.40  DOWNSTREAM(FEET) =    30.40
  FLOW LENGTH(FEET) =   193.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.59
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.53
  PIPE TRAVEL TIME(MIN.) =   0.34    Tc(MIN.) =    6.55
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     32.00 =     372.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     32.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    6.55
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.298
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 C        1.35      0.25     0.100    86
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.35      SUBAREA RUNOFF(CFS) =    6.41
  EFFECTIVE AREA(ACRES) =      2.89   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        2.9       PEAK FLOW RATE(CFS) =      13.72

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     33.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    30.40  DOWNSTREAM(FEET) =    29.40
  FLOW LENGTH(FEET) =   192.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.46
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.72
  PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =    6.74
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     33.00 =     564.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     33.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.74
  RAINFALL INTENSITY(INCH/HR) =   5.21
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       2.89
  TOTAL STREAM AREA(ACRES) =       2.89
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      13.72
```

```
                                                    BRIS100E.RES
****************************************************************************
  FLOW PROCESS FROM NODE     34.00 TO NODE     33.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   266.00
  ELEVATION DATA: UPSTREAM(FEET) =     35.00  DOWNSTREAM(FEET) =     33.30

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.793
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.798
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 C        1.85      0.25     0.100    86    7.79
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      7.95
  TOTAL AREA(ACRES) =      1.85   PEAK FLOW RATE(CFS) =      7.95

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     33.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.79
  RAINFALL INTENSITY(INCH/HR) =   4.80
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       1.85
  TOTAL STREAM AREA(ACRES) =       1.85
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       7.95

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       13.72    6.74    5.215  0.25( 0.03) 0.10       2.9      30.00
      2        7.95    7.79    4.798  0.25( 0.03) 0.10       1.9      34.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       21.19    6.74    5.215  0.25( 0.03) 0.10       4.5      30.00
      2       20.56    7.79    4.798  0.25( 0.03) 0.10       4.7      34.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      21.19    Tc(MIN.) =     6.74
  EFFECTIVE AREA(ACRES) =       4.49   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        4.7
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     33.00 =     564.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     35.00 IS CODE =  41
```

```
------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    29.40  DOWNSTREAM(FEET) =    28.40
  FLOW LENGTH(FEET) =   197.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  26.98
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      21.19
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =    6.86
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     35.00 =     761.00 FEET.

+------------------------------------------------------------------------+
| AREA 'F'                                                               |
|                                                                        |
|                                                                        |
+------------------------------------------------------------------------+

************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     41.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =     35.70  DOWNSTREAM(FEET) =     35.20

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   11.329
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.872
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 C        0.36      0.25     0.100    86   11.33
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.25
  TOTAL AREA(ACRES) =      0.36   PEAK FLOW RATE(CFS) =      1.25

************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     42.00 IS CODE =  61
------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
========================================================================
  UPSTREAM ELEVATION(FEET) =   35.20  DOWNSTREAM ELEVATION(FEET) =   34.60
  STREET LENGTH(FEET) =   183.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.60
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
```

```
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    7.53
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.14
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.34
  STREET FLOW TRAVEL TIME(MIN.) =   2.69   Tc(MIN.) =   14.01
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.428
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 C        0.23      0.25     0.100    86
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.23      SUBAREA RUNOFF(CFS) =    0.70
  EFFECTIVE AREA(ACRES) =      0.59    AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.6        PEAK FLOW RATE(CFS) =       1.81

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =   8.03
  FLOW VELOCITY(FEET/SEC.) =  1.17   DEPTH*VELOCITY(FT*FT/SEC.) =   0.36
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     42.00 =     513.00 FEET.

+----------------------------------------------------------------------------+
| AREA 'H'                                                                   |
|                                                                            |
|                                                                            |
+----------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     51.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =     35.40  DOWNSTREAM(FEET) =     34.80

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.923
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.954
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 C        0.56      0.25     0.100    86   10.92
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.98
  TOTAL AREA(ACRES) =      0.56   PEAK FLOW RATE(CFS) =      1.98

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     52.00 IS CODE =  91
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  UPSTREAM NODE ELEVATION(FEET) =     34.80
  DOWNSTREAM NODE ELEVATION(FEET) =     32.80
  CHANNEL LENGTH THRU SUBAREA(FEET) =   224.00
  "V" GUTTER WIDTH(FEET) =   5.00   GUTTER HIKE(FEET) =  0.050
  PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0150
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
  MAXIMUM DEPTH(FEET) =  10.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.649
```

```
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 C        1.65      0.25     0.100    86
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      4.65
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.27
  AVERAGE FLOW DEPTH(FEET) =   0.21   FLOOD WIDTH(FEET) =   19.99
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   1.64   Tc(MIN.) =   12.57
  SUBAREA AREA(ACRES) =    1.65       SUBAREA RUNOFF(CFS) =    5.38
  EFFECTIVE AREA(ACRES) =    2.21     AREA-AVERAGED Fm(INCH/HR) =   0.03
  AREA-AVERAGED Fp(INCH/HR) =   0.25  AREA-AVERAGED Ap =   0.10
  TOTAL AREA(ACRES) =        2.2         PEAK FLOW RATE(CFS) =       7.21

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  0.25   FLOOD WIDTH(FEET) =   23.75
  FLOW VELOCITY(FEET/SEC.) =   2.51   DEPTH*VELOCITY(FT*FT/SEC) =   0.62
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     52.00 =     554.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     53.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    32.20  DOWNSTREAM(FEET) =    30.40
  FLOW LENGTH(FEET) =   497.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.18
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.21
  PIPE TRAVEL TIME(MIN.) =   0.90    Tc(MIN.) =   13.47
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     53.00 =    1051.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     53.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.47
  RAINFALL INTENSITY(INCH/HR) =   3.51
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       2.21
  TOTAL STREAM AREA(ACRES) =       2.21
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       7.21

****************************************************************************
  FLOW PROCESS FROM NODE     53.10 TO NODE     53.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   230.00
  ELEVATION DATA: UPSTREAM(FEET) =     36.30  DOWNSTREAM(FEET) =     33.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
```

```
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.464
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.341
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 C        0.66      0.25     0.100    86    6.46
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      3.16
  TOTAL AREA(ACRES) =      0.66   PEAK FLOW RATE(CFS) =      3.16

****************************************************************************
  FLOW PROCESS FROM NODE     53.20 TO NODE     53.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    30.60  DOWNSTREAM(FEET) =    30.40
  FLOW LENGTH(FEET) =   118.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.02
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.16
  PIPE TRAVEL TIME(MIN.) =   0.49    Tc(MIN.) =    6.95
  LONGEST FLOWPATH FROM NODE     53.10 TO NODE     53.00 =     348.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     53.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.95
  RAINFALL INTENSITY(INCH/HR) =   5.12
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.66
  TOTAL STREAM AREA(ACRES) =       0.66
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.16

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        7.21   13.47    3.507  0.25( 0.03) 0.10       2.2      50.00
      2        3.16    6.95    5.122  0.25( 0.03) 0.10       0.7      53.10

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        8.60    6.95    5.122  0.25( 0.03) 0.10       1.8      53.10
      2        9.36   13.47    3.507  0.25( 0.03) 0.10       2.9      50.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       9.36    Tc(MIN.) =    13.47
  EFFECTIVE AREA(ACRES) =       2.87   AREA-AVERAGED Fm(INCH/HR) =  0.03
```

```
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        2.9
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     53.00 =    1051.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     53.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.47
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.507
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 C        3.00      0.25     0.100    86
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    3.00      SUBAREA RUNOFF(CFS) =    9.40
  EFFECTIVE AREA(ACRES) =      5.87   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        5.9       PEAK FLOW RATE(CFS) =      18.39

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       22.02    6.95    5.122  0.25( 0.03) 0.10       4.8      53.10
      2       18.39   13.47    3.507  0.25( 0.03) 0.10       5.9      50.00
  NEW PEAK FLOW DATA ARE:
  PEAK FLOW RATE(CFS) =      22.02  Tc(MIN.) =    6.95
  AREA-AVERAGED Fm(INCH/HR) =  0.03  AREA-AVERAGED Fp(INCH/HR) =  0.25
  AREA-AVERAGED Ap =  0.10  EFFECTIVE AREA(ACRES) =       4.80

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     53.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    6.95
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.122
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 C        4.24      0.25     0.100    86
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    4.24      SUBAREA RUNOFF(CFS) =   19.45
  EFFECTIVE AREA(ACRES) =      9.04   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =       10.1       PEAK FLOW RATE(CFS) =      41.47

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     54.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    30.40  DOWNSTREAM(FEET) =    29.00
  FLOW LENGTH(FEET) =   255.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  52.81
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
```

```
  PIPE-FLOW(CFS) =      41.47
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    7.03
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     54.00 =    1306.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     54.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.03
  RAINFALL INTENSITY(INCH/HR) =   5.09
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       9.04
  TOTAL STREAM AREA(ACRES) =      10.11
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      41.47

****************************************************************************
  FLOW PROCESS FROM NODE     54.10 TO NODE     54.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   303.00
  ELEVATION DATA: UPSTREAM(FEET) =     36.40  DOWNSTREAM(FEET) =     32.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.101
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.061
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 C        2.57      0.25     0.100    86    7.10
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =     11.65
  TOTAL AREA(ACRES) =      2.57   PEAK FLOW RATE(CFS) =     11.65

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     54.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.10
  RAINFALL INTENSITY(INCH/HR) =   5.06
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       2.57
  TOTAL STREAM AREA(ACRES) =       2.57
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      11.65

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       41.47    7.03    5.088  0.25( 0.03) 0.10       9.0      53.10
```

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1	31.68	13.57	3.491	0.25(0.03)	0.10	10.1	50.00
2	11.65	7.10	5.061	0.25(0.03)	0.10	2.6	54.10

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	53.07	7.03	5.088	0.25(0.02)	0.10	11.6	53.10
2	53.02	7.10	5.061	0.25(0.03)	0.10	11.6	54.10
3	39.70	13.57	3.491	0.25(0.03)	0.10	12.7	50.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 53.07 Tc(MIN.) = 7.03
EFFECTIVE AREA(ACRES) = 11.59 AREA-AVERAGED Fm(INCH/HR) = 0.02
AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 12.7
LONGEST FLOWPATH FROM NODE 50.00 TO NODE 54.00 = 1306.00 FEET.

****
FLOW PROCESS FROM NODE 54.00 TO NODE 55.00 IS CODE = 41

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
==========
ELEVATION DATA: UPSTREAM(FEET) = 29.00 DOWNSTREAM(FEET) = 28.00
FLOW LENGTH(FEET) = 254.00 MANNING'S N = 0.013
ASSUME FULL-FLOWING PIPELINE
PIPE-FLOW VELOCITY(FEET/SEC.) = 67.58
PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
GIVEN PIPE DIAMETER(INCH) = 12.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 53.07
PIPE TRAVEL TIME(MIN.) = 0.06 Tc(MIN.) = 7.10
LONGEST FLOWPATH FROM NODE 50.00 TO NODE 55.00 = 1560.00 FEET.

****
FLOW PROCESS FROM NODE 55.00 TO NODE 55.00 IS CODE = 1

>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==========
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 7.10
RAINFALL INTENSITY(INCH/HR) = 5.06
AREA-AVERAGED Fm(INCH/HR) = 0.02
AREA-AVERAGED Fp(INCH/HR) = 0.25
AREA-AVERAGED Ap = 0.10
EFFECTIVE STREAM AREA(ACRES) = 11.59
TOTAL STREAM AREA(ACRES) = 12.68
PEAK FLOW RATE(CFS) AT CONFLUENCE = 53.07

****
FLOW PROCESS FROM NODE 55.10 TO NODE 55.00 IS CODE = 21

>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==========
INITIAL SUBAREA FLOW-LENGTH(FEET) = 326.00
ELEVATION DATA: UPSTREAM(FEET) = 35.70 DOWNSTREAM(FEET) = 33.10

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20

```
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.087
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.697
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 C        2.01      0.25     0.100    86    8.09
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA RUNOFF(CFS) =      8.45
 TOTAL AREA(ACRES) =      2.01   PEAK FLOW RATE(CFS) =      8.45

****************************************************************************
 FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    8.09
 RAINFALL INTENSITY(INCH/HR) =   4.70
 AREA-AVERAGED Fm(INCH/HR) =  0.03
 AREA-AVERAGED Fp(INCH/HR) =  0.25
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       2.01
 TOTAL STREAM AREA(ACRES) =       2.01
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.45

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       53.07    7.10    5.063  0.25( 0.02) 0.10      11.6      53.10
     1       53.02    7.16    5.035  0.25( 0.03) 0.10      11.6      54.10
     1       39.70   13.66    3.479  0.25( 0.03) 0.10      12.7      50.00
     2        8.45    8.09    4.697  0.25( 0.03) 0.10       2.0      55.10

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       61.07    7.10    5.063  0.25( 0.02) 0.10      13.3      53.10
     2       61.05    7.16    5.035  0.25( 0.03) 0.10      13.4      54.10
     3       59.58    8.09    4.697  0.25( 0.02) 0.10      13.8      55.10
     4       45.94   13.66    3.479  0.25( 0.03) 0.10      14.7      50.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      61.07    Tc(MIN.) =     7.10
 EFFECTIVE AREA(ACRES) =      13.35   AREA-AVERAGED Fm(INCH/HR) =  0.03
 AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =       14.7
 LONGEST FLOWPATH FROM NODE     50.00 TO NODE     55.00 =    1560.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    7.10
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.063
 SUBAREA LOSS RATE DATA(AMC III):
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```
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 C        0.91      0.25      0.100    86
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.91      SUBAREA RUNOFF(CFS) =    4.13
  EFFECTIVE AREA(ACRES) =     14.26   AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =       15.6       PEAK FLOW RATE(CFS) =      64.65

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     56.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    28.00  DOWNSTREAM(FEET) =    27.40
  FLOW LENGTH(FEET) =   145.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  82.32
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      64.65
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =    7.13
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     56.00 =    1705.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     56.00 TO NODE     56.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.13
  RAINFALL INTENSITY(INCH/HR) =   5.05
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.25
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =      14.26
  TOTAL STREAM AREA(ACRES) =      15.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      64.65

****************************************************************************
  FLOW PROCESS FROM NODE     57.00 TO NODE     58.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   323.00
  ELEVATION DATA: UPSTREAM(FEET) =     36.20  DOWNSTREAM(FEET) =     33.70

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.106
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.691
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 C        0.91      0.25      0.100    86    8.11
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      3.82
  TOTAL AREA(ACRES) =      0.91   PEAK FLOW RATE(CFS) =      3.82
```

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```
****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     59.00 IS CODE =  91
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  UPSTREAM NODE ELEVATION(FEET) =     33.70
  DOWNSTREAM NODE ELEVATION(FEET) =     32.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   255.00
  "V" GUTTER WIDTH(FEET) =   5.00   GUTTER HIKE(FEET) =  0.050
  PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0150
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
  MAXIMUM DEPTH(FEET) =  10.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.083
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                C        1.52      0.25     0.100    86
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      6.59
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.91
  AVERAGE FLOW DEPTH(FEET) =   0.27   FLOOD WIDTH(FEET) =   26.05
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   2.22   Tc(MIN.) =   10.33
  SUBAREA AREA(ACRES) =    1.52       SUBAREA RUNOFF(CFS) =    5.55
  EFFECTIVE AREA(ACRES) =    2.43     AREA-AVERAGED Fm(INCH/HR) =   0.02
  AREA-AVERAGED Fp(INCH/HR) =   0.25  AREA-AVERAGED Ap =   0.10
  TOTAL AREA(ACRES) =        2.4         PEAK FLOW RATE(CFS) =       8.88

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  0.30   FLOOD WIDTH(FEET) =   29.21
  FLOW VELOCITY(FEET/SEC.) =   2.06   DEPTH*VELOCITY(FT*FT/SEC) =   0.62
  LONGEST FLOWPATH FROM NODE     57.00 TO NODE     59.00 =     578.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     59.00 TO NODE     59.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.33
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.083
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                C        0.99      0.25     0.100    86
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.99       SUBAREA RUNOFF(CFS) =    3.62
  EFFECTIVE AREA(ACRES) =      3.42   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        3.4        PEAK FLOW RATE(CFS) =      12.49

****************************************************************************
  FLOW PROCESS FROM NODE     59.00 TO NODE     56.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    28.00  DOWNSTREAM(FEET) =    27.40
  FLOW LENGTH(FEET) =    76.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.90
```

```
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.49
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   10.41
  LONGEST FLOWPATH FROM NODE     57.00 TO NODE     56.00 =     654.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     56.00 TO NODE     56.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.41
  RAINFALL INTENSITY(INCH/HR) =   4.07
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       3.42
  TOTAL STREAM AREA(ACRES) =       3.42
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      12.49

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       64.65    7.13    5.051  0.25( 0.02) 0.10      14.3      53.10
      1       64.54    7.19    5.023  0.25( 0.02) 0.10      14.3      54.10
      1       61.78    8.12    4.687  0.25( 0.02) 0.10      14.7      55.10
      1       48.49   13.70    3.473  0.25( 0.03) 0.10      15.6      50.00
      2       12.49   10.41    4.065  0.25( 0.03) 0.10       3.4      57.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       75.29    7.13    5.051  0.25( 0.02) 0.10      16.6      53.10
      2       75.22    7.19    5.023  0.25( 0.02) 0.10      16.7      54.10
      3       73.02    8.12    4.687  0.25( 0.02) 0.10      17.4      55.10
      4       68.82   10.41    4.065  0.25( 0.03) 0.10      18.5      57.00
      5       59.15   13.70    3.473  0.25( 0.03) 0.10      19.0      50.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      75.29    Tc(MIN.) =     7.13
  EFFECTIVE AREA(ACRES) =      16.60   AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =       19.0
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     56.00 =    1705.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     56.00 TO NODE     60.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    27.40  DOWNSTREAM(FEET) =    27.00
  FLOW LENGTH(FEET) =    86.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  95.86
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
```

```
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      75.29
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    7.14
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     60.00 =    1791.00 FEET.

+-------------------------------------------------------------------------+
| AREA 'G'                                                                |
|                                                                         |
|                                                                         |
+-------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE     80.00 TO NODE     81.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   187.00
  ELEVATION DATA: UPSTREAM(FEET) =     36.00  DOWNSTREAM(FEET) =     32.90

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.594
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.802
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 C        1.16      0.25     0.100    86    5.59
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      6.03
  TOTAL AREA(ACRES) =      1.16   PEAK FLOW RATE(CFS) =      6.03

****************************************************************************
  FLOW PROCESS FROM NODE     81.00 TO NODE     82.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    31.90  DOWNSTREAM(FEET) =    31.50
  FLOW LENGTH(FEET) =    93.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.68
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.03
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =    5.80
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     82.00 =     280.00 FEET.

+-------------------------------------------------------------------------+
| AREA 'C'                                                                |
|                                                                         |
|                                                                         |
+-------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE     90.00 TO NODE     91.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =     38.30  DOWNSTREAM(FEET) =     34.10
```

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```
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.402
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.942
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 C        0.77      0.25     0.100    86    7.40
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      3.41
  TOTAL AREA(ACRES) =      0.77   PEAK FLOW RATE(CFS) =      3.41

+---------------------------------------------------------------------------+
| AREA 'D'                                                                  |
|                                                                           |
|                                                                           |
+---------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   290.00
  ELEVATION DATA: UPSTREAM(FEET) =     36.50  DOWNSTREAM(FEET) =     34.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.945
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.745
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 C        0.77      0.25     0.100    86    7.95
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      3.27
  TOTAL AREA(ACRES) =      0.77   PEAK FLOW RATE(CFS) =      3.27

+---------------------------------------------------------------------------+
| AREA 'I'                                                                  |
|                                                                           |
|                                                                           |
+---------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE    110.00 TO NODE    111.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   299.00
  ELEVATION DATA: UPSTREAM(FEET) =     39.00  DOWNSTREAM(FEET) =     35.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.045
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.084
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 C        0.76      0.25     0.100    86    7.04
```

```
                                                BRIS100E.RES
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      3.46
  TOTAL AREA(ACRES) =      0.76   PEAK FLOW RATE(CFS) =      3.46
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        0.8  TC(MIN.) =      7.04
  EFFECTIVE AREA(ACRES) =      0.76  AREA-AVERAGED Fm(INCH/HR)=  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap = 0.100
  PEAK FLOW RATE(CFS)   =       3.46
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

Appendix 6

Hydrology Map - Existing Condition