PRELIMINARY HYDROLOGY CALCULATIONS

FOR

BRIDGE UPLAND
NORTHEAST CORNER OF FOOTHILL BLVD.
AND CENTRAL AVENUE
UPLAND, CALIFORNIA

PREPARED FOR

BRIDGE DEVELOPMENT PARTNERS
1334 PARKWAY AVENUE, SUITE 310
MANHATTAN BEACH, CALIFORNIA 90266
P. (213) 805-6350
FAX (310) 853-8423

MAY 7, 2018
REVISED APRIL 3, 2019
REVISED JULY 22, 2019
REVISED SEPTEMBER 27, 2019
REVISED NOVEMBER 13, 2019
REVISED NOVEMBER 22, 2019

JOB NO. 3651

PREPARED BY

THIENES ENGINEERING
14349 FIRESTONE BLVD.
LA MIRADA, CALIFORNIA 90638
P. (714) 521-4811
FAX (714) 521-4173

PRELIMINARY HYDROLOGY CALCULATIONS

FOR

BRIDGE UPLAND

PREPARED UNDER
THE SUPERVISION OF

11 / 22 / 19

REINHARD STENZEL DATE:
R.C.E. 56155
EXP. 12/31/20

INTRODUCTION

A: PROJECT LOCATION

The project site is located north of Foothill Boulevard between the prolongation of Central Avenue at the west and Benson Avenue to the east in the City of Upland. Cable Airport is adjacent to the site to the north. See following page for vicinity map.

B: STUDY PURPOSE

The purpose of this study is to determine the existing and proposed condition 100-year peak flow rate from the site that ultimately drains to an existing storm drain system in Foothill Boulevard.

C: PROJECT STAFF:

Thienes Engineering staff involved in this study include:

Reinhard Stenzel, PE
James Wickenhaeuser

Last Update: 11/21/19
O:\3600-3699\3651\3651VicMap.dwg

Thienes Engineering, inc.
CIVIL ENGINEERING • LAND SURVEYING
14349 FIRESTONE BOULEVARD
LA MIRADA, CALIFORNIA 90638
PH.(714)521-4811 FAX(714)521-4173

VICINITY MAP
FOR
BRIDGE UPLAND

DISCUSSION

The proposed commercial site encompasses approximately 50.0 acres. Improvements to the site include one warehouse type building. The building is approximately 200,300 square feet. The building has two truck yard areas as well as vehicle parking. Landscaping is located throughout the project site.

County/City Hydrology

San Bernardino County Flood Control District's Comprehensive Storm Drain Plan Project No. 1-7, dated July 1966, appears to have tabled the easterly half of the project site (Area B9) to a storm drain system in Benson Avenue. The westerly half of the project site (southerly portion of Area 7A) appears to be tabled to a future storm drain system in Central Avenue. This study also shows a portion of the airport to the north (northerly portion of Area 7A) draining to the project site. The provided drainage maps to not indicate peak flow rates.

The West Upland Master Storm Drain Plan appears to have updated the older Comprehensive Storm Drain Plan. Exhibit "A" – Hydrology Map, dated June 2001, provided by the City shows the majority of the project site (Areas B6, B7, B10, B11 and B12) tabled westerly in Foothill Boulevard to detention areas located south of Foothill Boulevard and east of San Antonio Channel. This exhibit does not indicate peak flow rates.

See Appendix "A" for reference County and City hydrology plans.

Existing Storm Drain Facilities

There is an existing storm drain system in Benson Avenue. The upstream portion of this storm drain is at the intersection of Benson Avenue and 13th Street (east) and Cable Airport Drive (west). The drain continues southerly in Benson Avenue to Arrow Highway. Here, the drain continues westerly in Arrow Highway ultimately to existing detention basins. Hydrology for this storm drain system was not available from the City. It does not appear that a significant portion of the project site is tabled to the Benson Avenue storm drain system.

There is a 42" lateral to the Benson Avenue storm drain at the northerly side of Foothill Boulevard. However, this drain appears to serve the existing Lowe's site and other commercial sites located to the east of the project site.

There is an existing storm drain in 11th Street located south of Foothill Boulevard. This drain intercepts runoff from the upstream portion of the Benson Avenue storm drain, thus providing relief to downstream portions. The storm drain continues westerly to Dewey Way. While this storm drain shows an increase in peak flow rate at Central Avenue, it

does not appear that this drain was intended for flows tabled to Central Avenue from Comprehensive Storm Drain Plan Project No. 1-7.

There is an existing storm drain system in Dewey Way. This storm drain traverses southerly from Foothill Boulevard to an existing detention basin located south of Arrow Highway. Dewey Way is approximately 1250' west of the project site. The plans show a 72" lateral in Foothill Boulevard that extends about 400' easterly. The hydrology study or drainage maps to this storm drain were not available from the City. However, based on the Master Plan and peak flow rates shown on the plan it appears that the project site is tabled to the 72" Foothill lateral.

Finally, the Cable Airport to the north appears to have an onsite drainage system. The majority of runoff from the airport is conveyed westerly to a storm drain system that continues southerly and connected to the previously mentioned Dewey Way storm drain system. It does not appear that the Airport drains directly to the project site.

See Appendix "A" for reference storm drain facilities.

Existing Condition Hydrology

The project site is currently an undeveloped dirt lot with native vegetation. There are several stockpiles of dirt/rocks on the westerly portion of the project site. There are several existing commercial developments and open areas south of the project site.

Foothill Boulevard has a high point roughly midway between the east and west boundaries of the site. Runoff from approximately half of the site ultimately drains easterly towards Benson Avenue with the other half draining westerly towards Central Avenue.

Runoff from the site generally drains from north to south towards Foothill Boulevard. While there are several large stockpiles of dirt on the site. It is assumed that runoff generally goes around these stockpiles and therefore elevations in the rational method model assume the stockpiles are just part of the overall area that is considered as barren.

The easterly portion of the site (nodes 100-102 and 200-202 on the existing condition hydrology map) ultimately drains to Foothill Boulevard through the adjacent properties and open spaces to the south. These areas then appear to drain easterly in Foothill Boulevard. The 100-year peak flow rate for these area is approximately 21.2 cfs and 22.8 cfs, respectively.

The stockpiles and areas adjacent (nodes 300-303 and 400-402) drain from north to south ultimately to Foothill Boulevard. It appears these flows continue westerly in the street. The respective 100-year peak flow rates are approximately 53.6 cfs and 47.5 cfs. Adding up the individual existing condition peak flow rates yields a total 100-year peak flow rate of 145.1 cfs.

See Appendix "B" for existing condition hydrology calculations.

Proposed Condition

Runoff from the easterly parking lot (nodes 100-104 on proposed condition hydrology map) will generally drain from north to south to catch basins located in the parking areas. A proposed storm drain, Line "B", will convey runoff southerly through the drive aisle. This flow will combine with the runoff from the southeasterly parking area (nodes 110-112) at node 113. These flows continue westerly in Line "A" through the southerly parking lot.

Flow from the southerly half of the proposed building and the southerly truck yard area (nodes 120-121) will be intercepted in catch basin located in the truck yard area. A storm drain conveys runoff southerly to confluence with Line "A" (at node 122). Continuing westerly, a portion of the southerly parking area is then added to the Line "A" storm drain system (at node 123). Line "A" continues westerly, ultimately connecting to Line "C" (at node 303).

Runoff from the northerly parking area, the northerly half of the proposed building and the northerly truck yard area (nodes 200-202) drain to catch basins located in the truck yard area. A proposed storm drain, Line "C", conveys runoff westerly around the proposed building. Parking areas immediately west of the building (nodes 203-204) are also tributary to Line "C". Line "C" continues westerly then southerly at the westerly drive aisle. The northwesterly parking area (nodes 300-301) is conveyed to Line "C" at this location (at node 302).

Line "C" continues southerly and confluences with Line "A" in the westerly drive aisle. The westerly drive aisle, the southwesterly parking area and a portion of the southerly landscaped area is added to this storm drain system (at nodes 304 and 305). The total 100-year peak flow rate for this portion of the project site is approximately 172.3 cfs.

The private storm drain system will connect to the proposed extension of the Foothill storm drain system at the Central Avenue cul-de-sac. This storm drain continues westerly in Foothill Boulevard, ultimately connecting to the existing 72" existing storm drain approximately 250' west of the project site.

The existing downstream storm drain plan indicates a 100-year peak flow rate of 288.4 cfs. The existing commercial development at the northeast corner of Dewey Way and Foothill Boulevard does not use this drain. It appears that the 72" storm drain has the capacity of the proposed development along with remaining areas on Foothill Boulevard.

Flow from the proposed easterly driveways (nodes 400-401 and 500-501) will sheet flow to Foothill Boulevard. The 100-year peak flow rates for these areas are 1.5 cfs and 4.2 cfs, respectively.

The remaining landscaped areas at the southerly portion of the project site will continue to flow southerly to the existing commercial developments as under existing conditions.

See Appendix "B" for proposed condition hydrology calculations.

Methodology

San Bernardino County Rational Method program (by AES Software) was used for the hydrology calculations. The 1-hour rainfall value is 1.55 per the San Bernardino County Hydrology Manual. The soil type is "A". See Appendix "A" for reference material from the Hydrology Manual.

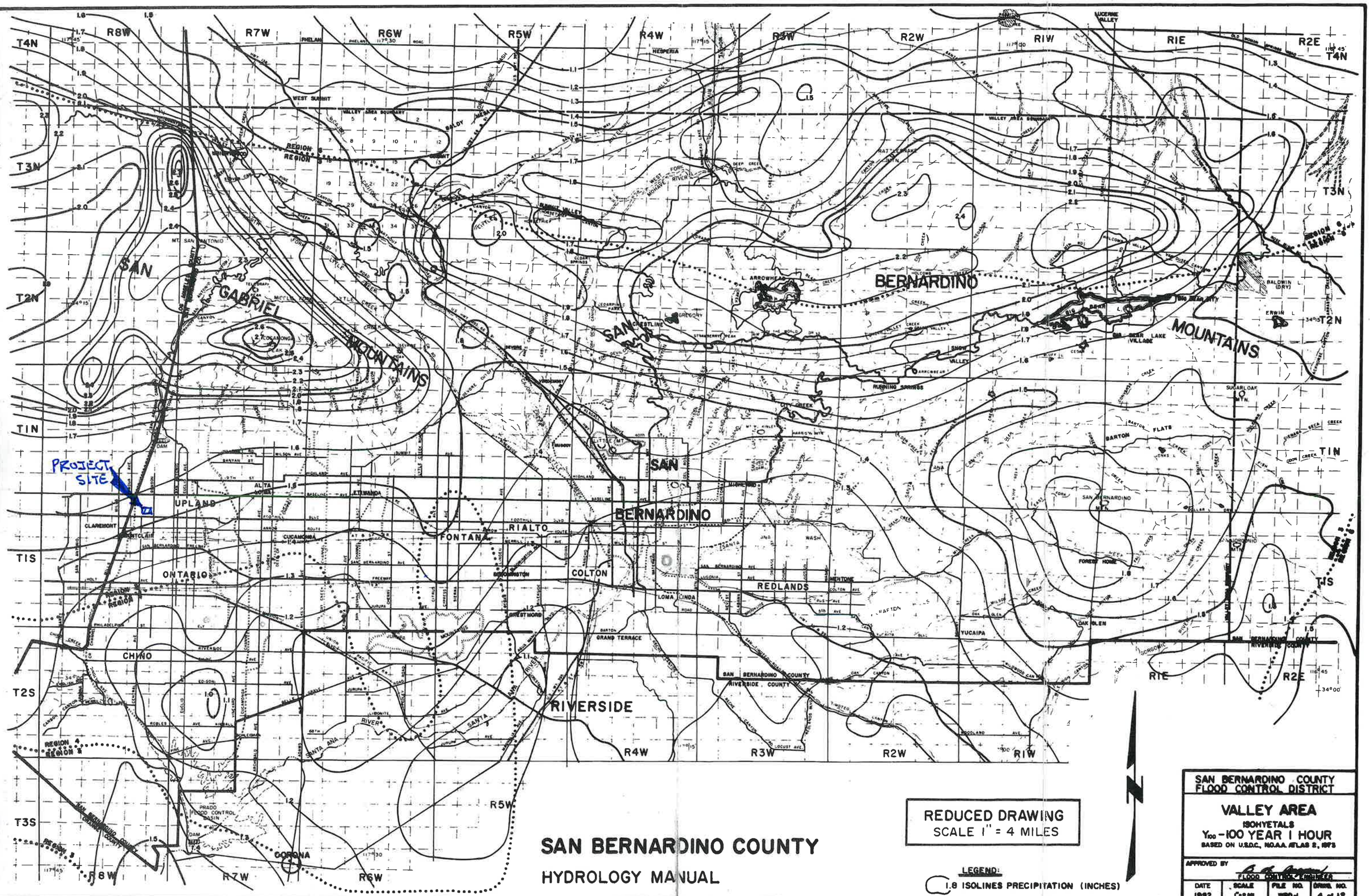
Summary

The total proposed 100-year peak flow from the project site is approximately 178.0 cfs (172.3 cfs at the westerly storm drain system + 5.7 cfs at the easterly driveways). The existing public storm drain in Foothill Boulevard is designed for a 100-year storm event and indicates a peak flow rate of 288.4 cfs. This leaves approximately 100 cfs for the smaller remaining developments at Foothill Boulevard. Therefore, the proposed project site does not have an adverse effect on existing downstream facilities.

APPENDIX	DESCRIPTION
A	REFERENCE MATERIALS
B	HYDROLOGY CALCULATIONS
C	HYDROLOGY MAP

APPENDIX A

REFERENCE MATERIALS



REDUCED DRAWING
SCALE 1" = 4 MILES

LEGEND:
1.8 ISOLINES PRECIPITATION (INCHES)

SAN BERNARDINO COUNTY
HYDROLOGY MANUAL

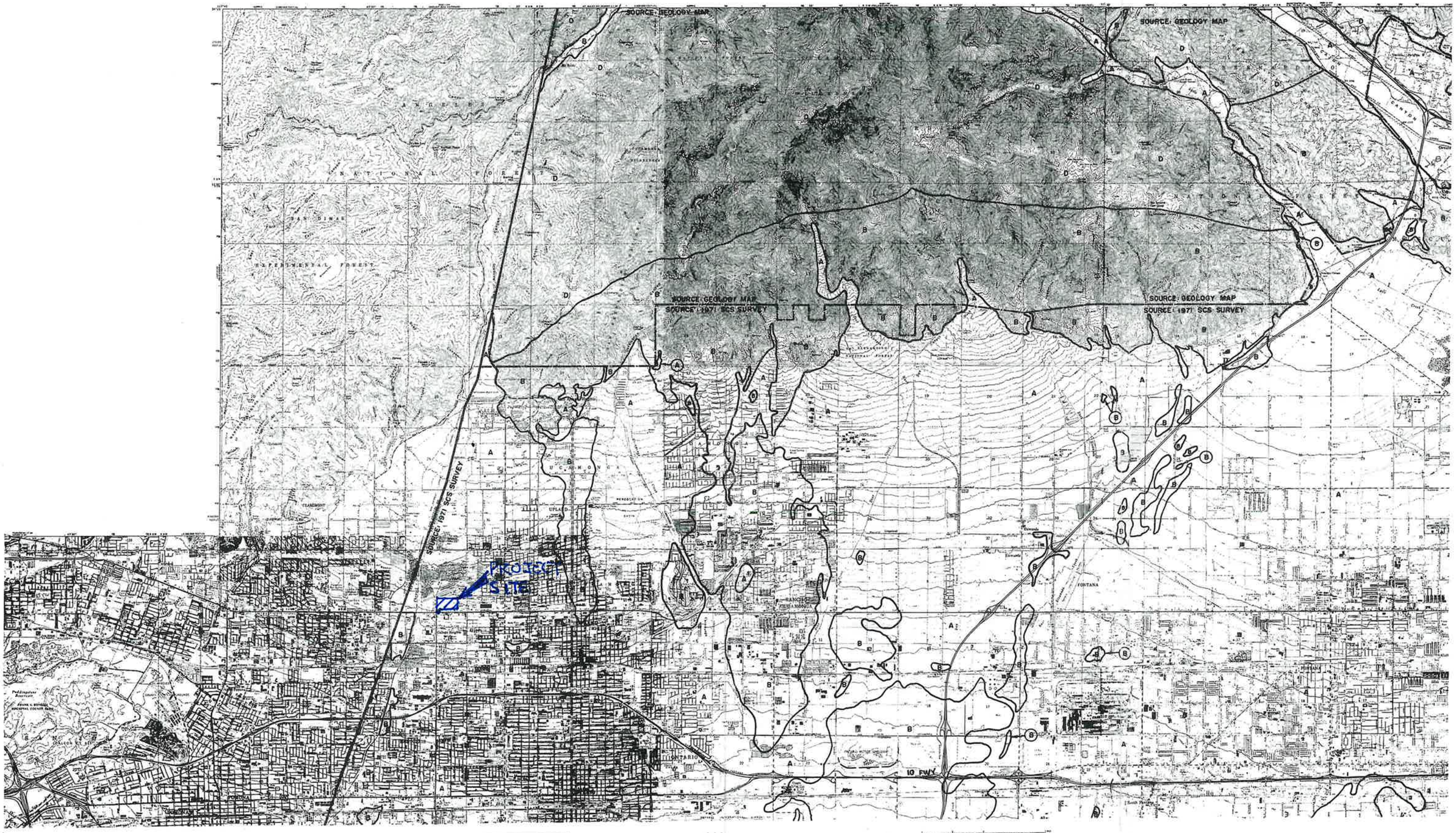
SAN BERNARDINO COUNTY
FLOOD CONTROL DISTRICT

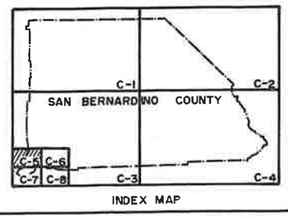
VALLEY AREA
ISOHYETALS
Y_{100} - 100 YEAR 1 HOUR
BASED ON U.S.D.C., N.O.A.A. ATLAS 2, 1973

APPROVED BY _____ FLOOD CONTROL ENGINEER

DATE	SCALE	FILE NO.	DRWG. NO.
1982	1"=2 MI.	WRD-1	4 of 12

FIGURE B-4





INDEX MAP

LEGEND
- SOIL GROUP BOUNDARY
- A — SOIL GROUP DESIGNATION
- BOUNDARY OF INDICATED SOURCE

SCALE 1: 48,000

SCALE REDUCED BY 1/2

SAN BERNARDINO COUNTY
HYDROLOGY MANUAL

HYDROLOGIC SOILS GROUP MAP
FOR
SOUTHWEST-A AREA

FIGURE C-13

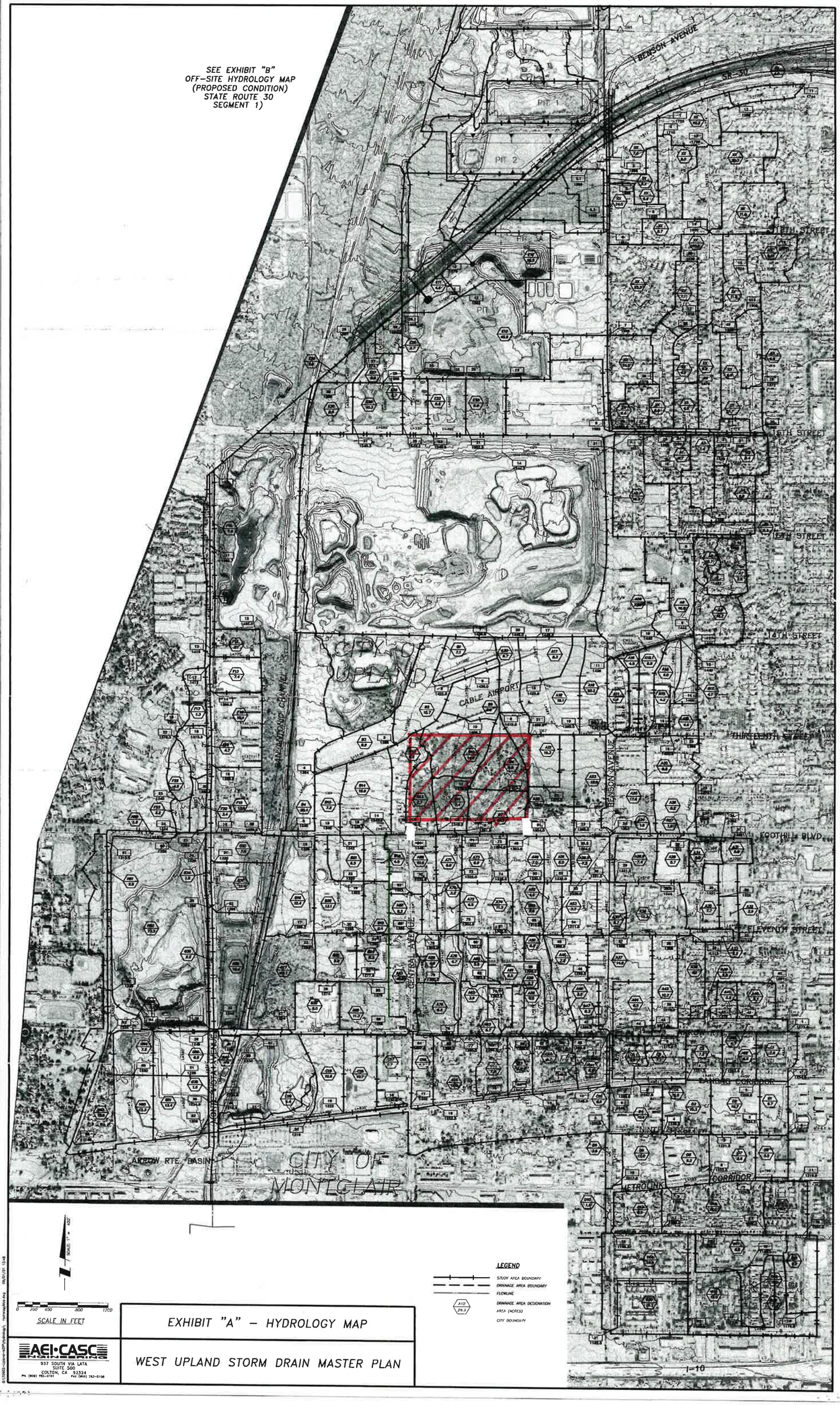
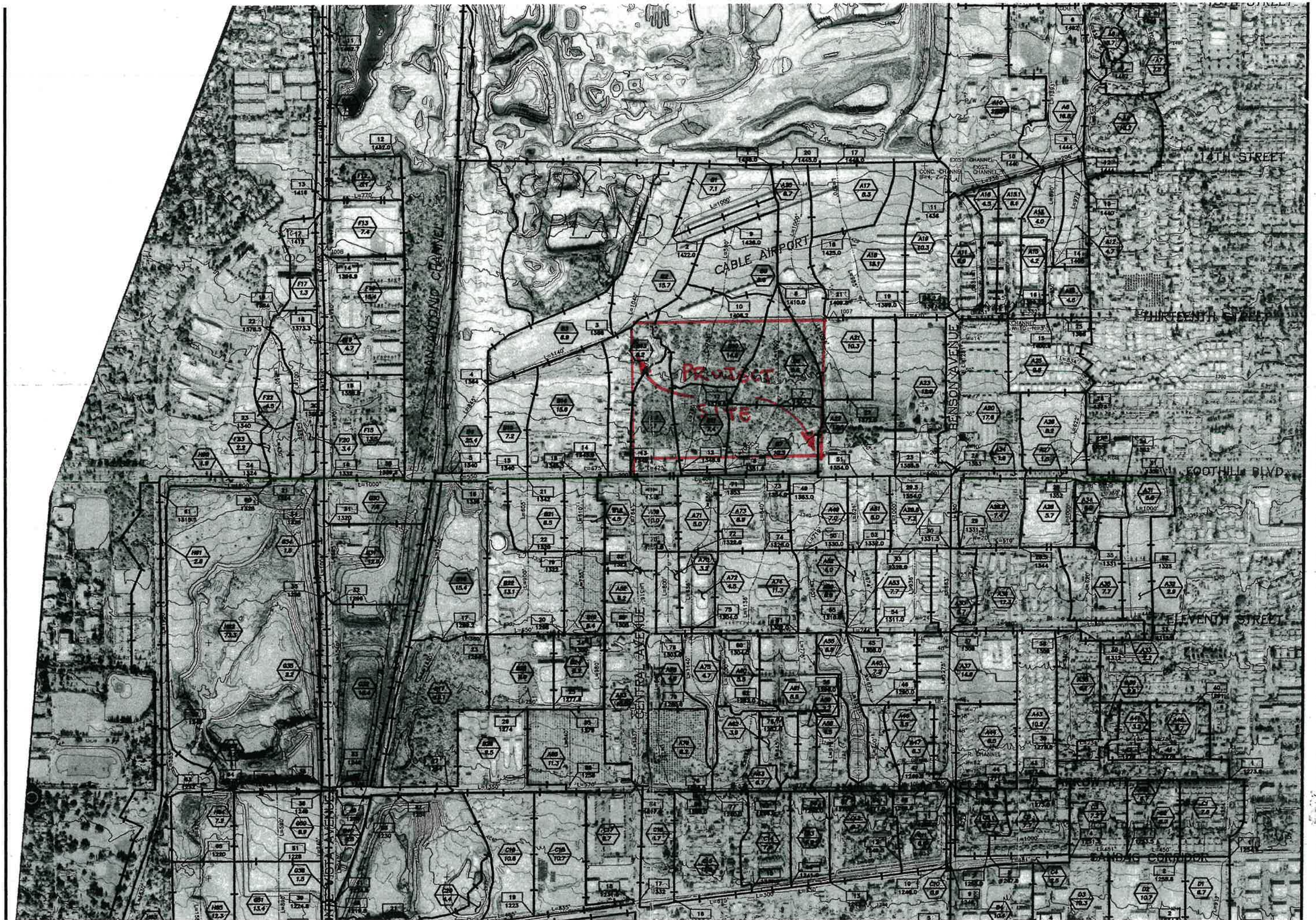


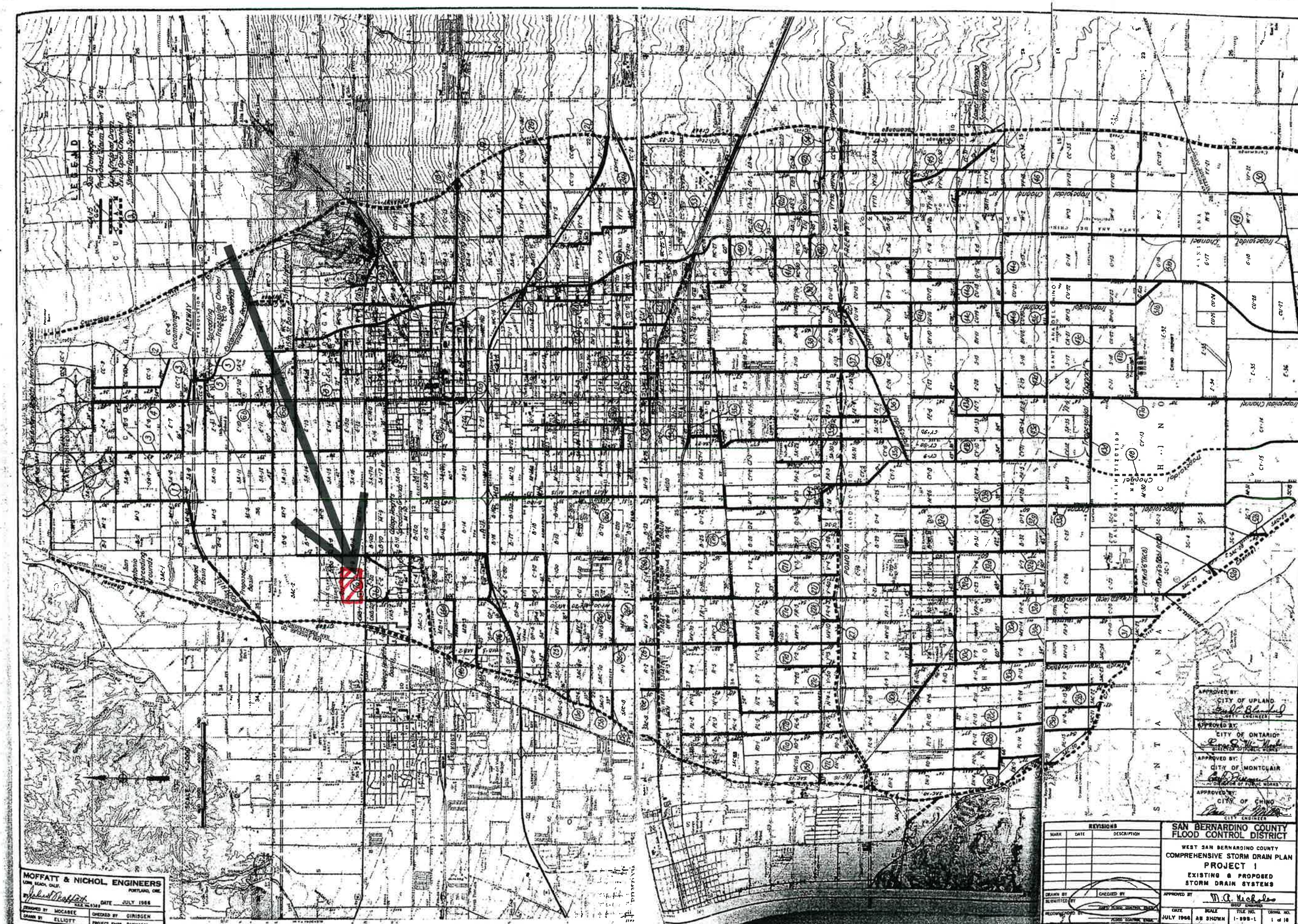
EXHIBIT "A" – HYDROLOGY MAP

WEST UPLAND STORM DRAIN MASTER PLAN

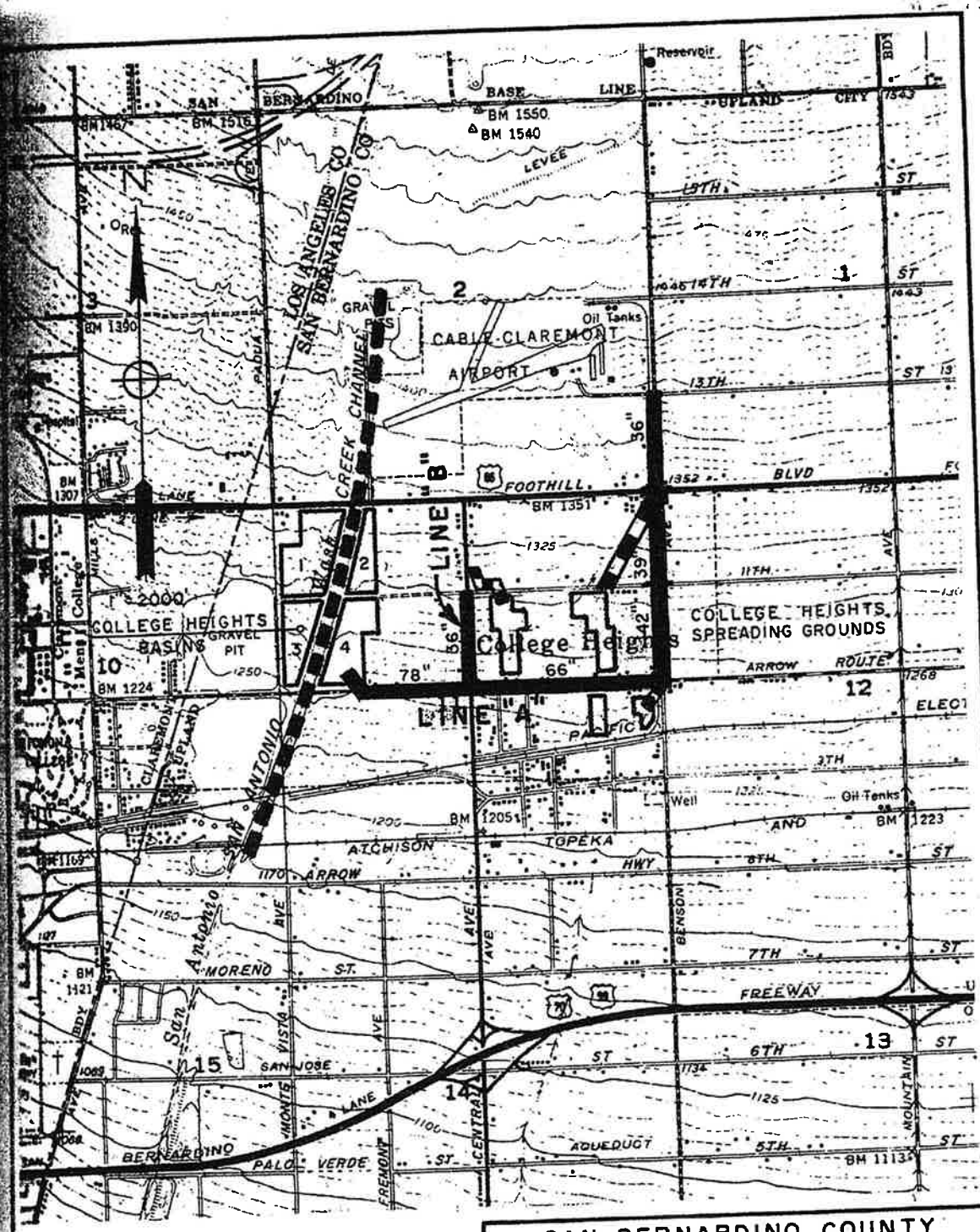
AEI•CASC ENGINEERING
937 SOUTH VIA LATA
SUITE 500
COLTON, CA 92324
PH. (909) 783-0101
FAX (909) 783-0108


CITY OF UPLAND
CABLE AIRPORT
ANDREWS CHANNEL
BENSON AVENUE
CENTRAL AVENUE
14TH STREET
THIRTEENTH STREET
FOOTHILL BLVD
ELEVENTH STREET
SANDAG CORRIDOR
Project Site

#2731



LEGEND
FREEWAY
CHINO
SANTA ANA
APPROVED BY:
CITY OF UPLAND
CITY ENGINEER
APPROVED BY:
CITY OF ONTARIO
DIRECTOR OF PUBLIC WORKS
APPROVED BY:
CITY OF MONTCLAIR
DIRECTOR OF PUBLIC WORKS
APPROVED BY:
CITY OF CHINO
CITY ENGINEER
REVISIONS
MARK
DATE
DESCRIPTION
DRAWN BY
CHECKED BY
SUBMITTED BY
RECOMMENDED BY
SAN BERNARDINO COUNTY
FLOOD CONTROL DISTRICT
WEST SAN BERNARDINO COUNTY
COMPREHENSIVE STORM DRAIN PLAN
PROJECT 1
EXISTING & PROPOSED
STORM DRAIN SYSTEMS
APPROVED BY
CHIEF ENGINEER
DATE
JULY 1966
SCALE
AS SHOWN
FILE NO.
1-898-1
DWG. NO.
1 of 16
MOFFATT & NICHOL, ENGINEERS
LONG BEACH, CALIF.
PORTLAND, ORE.
DATE JULY 1966
DESIGNED BY MOCABEE
CHECKED BY GIRISGEN
DRAWN BY ELLIOTT
PROJECT ENGR. DUNHAM



LEGEND

- STORM DRAINS TO BE CONSTRUCTED
- EXISTING OPEN CHANNEL
- EXISTING ENCLOSED DRAIN

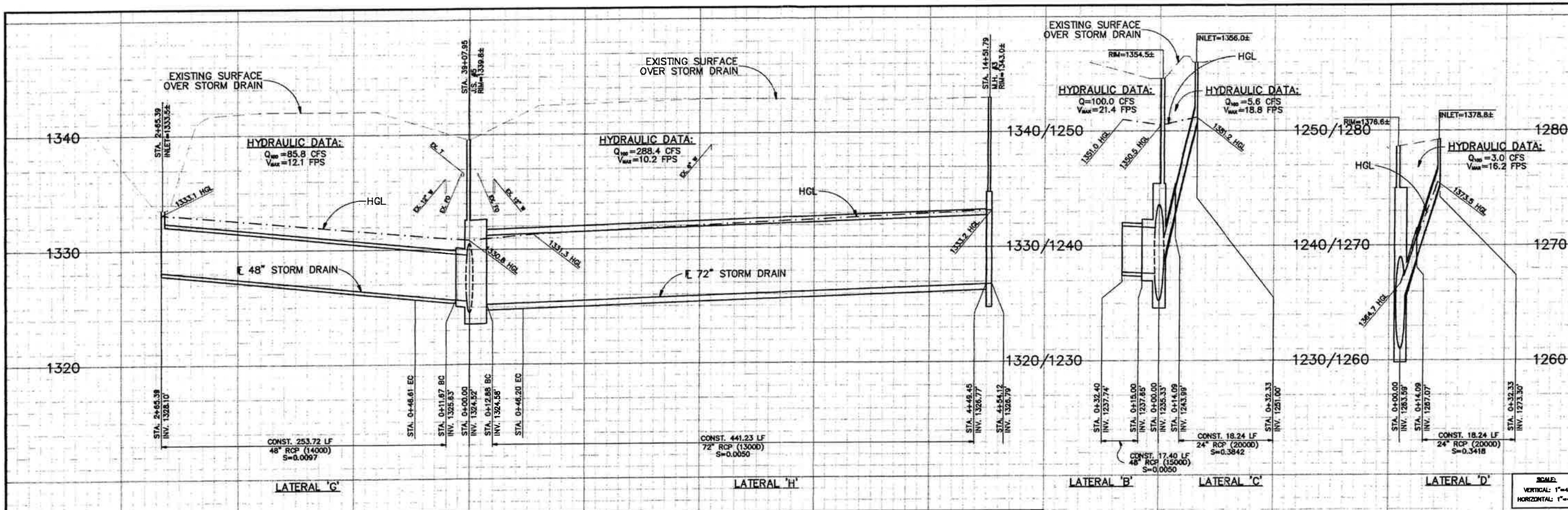
SAN BERNARDINO COUNTY
FLOOD CONTROL DISTRICT

COMPREHENSIVE STORM DRAIN PLAN
PROJECT NO. 1-7

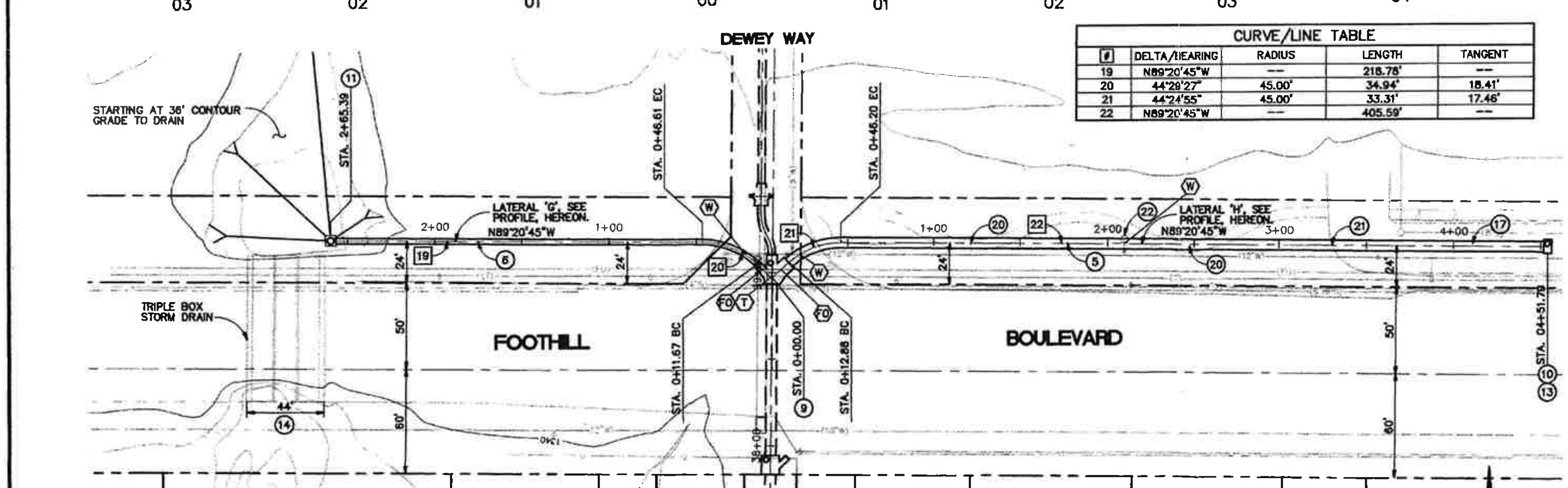
PREPARED BY
MOFFATT & NICHOL, ENGINEERS
122 W. FIFTH ST. – LONG BEACH, CALIFORNIA

JULY 1966

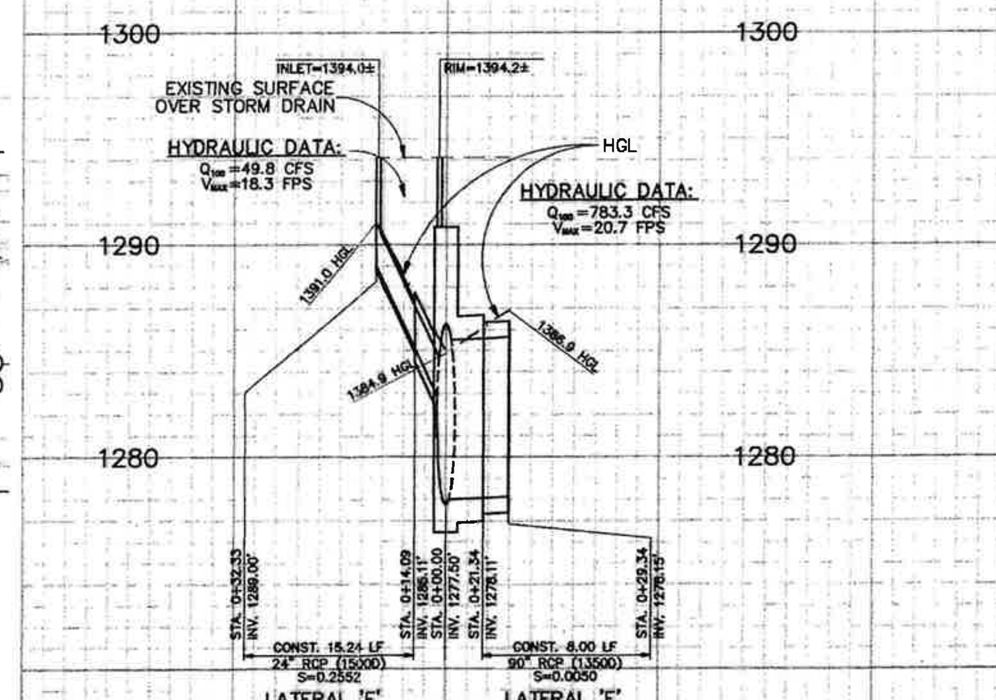
DRAWING 1 OF 4

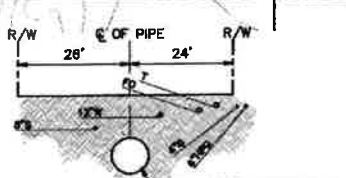


EXISTING SURFACE OVER STORM DRAIN
HYDRAULIC DATA:
Q100 =85.8 CFS
VMAX =12.1 FPS
HYDRAULIC DATA:
Q100 =288.4 CFS
VMAX =10.2 FPS
HGL
48" STORM DRAIN
72" STORM DRAIN
CONST. 253.72 LF
48" RCP (1400D)
S=0.0097
CONST. 441.23 LF
72" RCP (1300D)
S=0.0050
LATERAL 'G'
LATERAL 'H'
HYDRAULIC DATA:
Q=100.0 CFS
VMAX=21.4 FPS
HYDRAULIC DATA:
Q100 =5.6 CFS
VMAX=18.8 FPS
INLET=1356.0±
RIM=1354.5±
CONST. 17.40 LF
48" RCP (1500D)
S=0.0050
CONST. 18.24 LF
24" RCP (2000D)
S=0.3842
LATERAL 'B'
LATERAL 'C'
HYDRAULIC DATA:
Q100 =3.0 CFS
VMAX=16.2 FPS
RIM=1376.6±
INLET=1378.8±
CONST. 18.24 LF
24" RCP (2000D)
S=0.3418
LATERAL 'D'
SCALE:
VERTICAL: 1"=4'
HORIZONTAL: 1"=40'



CURVE/LINE TABLE				
#	DELTA/BEARING	RADIUS	LENGTH	TANGENT
19	N89°20'45"W	---	218.78'	---
20	44°28'27"	45.00'	34.94'	18.41'
21	44°24'55"	45.00'	33.31'	17.46'
22	N89°20'45"W	---	405.59'	---





SECTION
STA. 4+00

Underground Service Alert
Call: TOLL FREE
1-800
227-2600
TWO WORKING DAYS BEFORE YOU DIG

CONSTRUCTION NOTES:

(5) CONSTRUCT 72" RCP (SEE PROFILE FOR D-LOAD).
(6) CONSTRUCT 48" RCP (SEE PROFILE FOR D-LOAD).
(9) CONSTRUCT JUNCTION STRUCTURE PER AMERICAN PUBLIC WORKS ASSOCIATION STANDARD DETAIL NO. 322-1.
(10) CONSTRUCT MANHOLE PER AMERICAN PUBLIC WORKS ASSOCIATION STANDARD DETAIL NO. 320-1 WITH 5' RADIUS OF ASPHALT CONCRETE PAVEMENT AROUND INLET.
(11) CONSTRUCT DROP INLET PER CALTRANS STANDARD DETAIL NO. D75A TYPE OMP. GRADE TO DRAIN TO STRUCTURE.

CONSTRUCTION NOTES CONT.:

(13) CONSTRUCT BULKHEAD PER RIVERSIDE COUNTY FLOOD CONTROL STANDARD DET. NOS. M804 & M816.
(14) REMOVE AND RECONSTRUCT OR CONSTRUCT CHAINLINK FENCE AS REQUIRED.
(17) CONSTRUCT 12" ASPHALT CONCRETE PAVEMENT.
(20) CONSTRUCT PCC SIDEWALK PER STANDARD DRAWING CU-P-3.
(21) CONSTRUCT ASPHALT CONCRETE CURB.
(22) REMOVE AND REPLACE FIRE HYDRANT AS REQUIRED.

SCALE: 1"=40'

BENCH MARK NO. 14G-86
LOCATION
FOUND 2" CITY OF UPLAND BRASS DISK MKD. "14G-86" IN NW HEADWALL FOR WASH BRIDGE, 28' N. OF C/L ARROW HWY & 1653' W. OF CENTRAL PER CITY OF UPLAND RECORDS
ELEV. 1256.198'

REVISIONS					
MARK	DATE	INITIAL	DESCRIPTION	DATE	APP'VD

REGISTERED PROFESSIONAL ENGINEER MICHAEL PATRICK THORNTON No. 44226 Exp. 6-30-05 CIVIL STATE OF CALIFORNIA

TKE ENGINEERING, INC.
4446 CENTRAL AVENUE
RIVERSIDE, CA 92506
(909) 680-0440
FAX: (909) 680-0490

8/18/03
MICHAEL PATRICK THORNTON R.C.E. No. 44226
EXPIRES: 6-30-05

DRAWN BY: MLS
DESIGNED BY: TMR
CHECKED BY: MPT
RECOMMENDED BY: RH

REVIEWED BY CITY STAFF		
DEPARTMENT	INITIAL	DATE
PUBLIC WORKS (OPER.)	N/A	
PUBLIC WORKS (ENV.)		
PUBLIC WORKS (WATER)		
PUBLIC WORKS (TRAF.)	AQ	
FIRE DEPT.	N/A	

APPROVED BY:
PUBLIC WORKS DIRECTOR / CITY ENGINEER
R.C.E. 54786 EXP. DATE 12/31/06
DATE

RECOMMENDED BY:
DEPUTY CITY ENGINEER

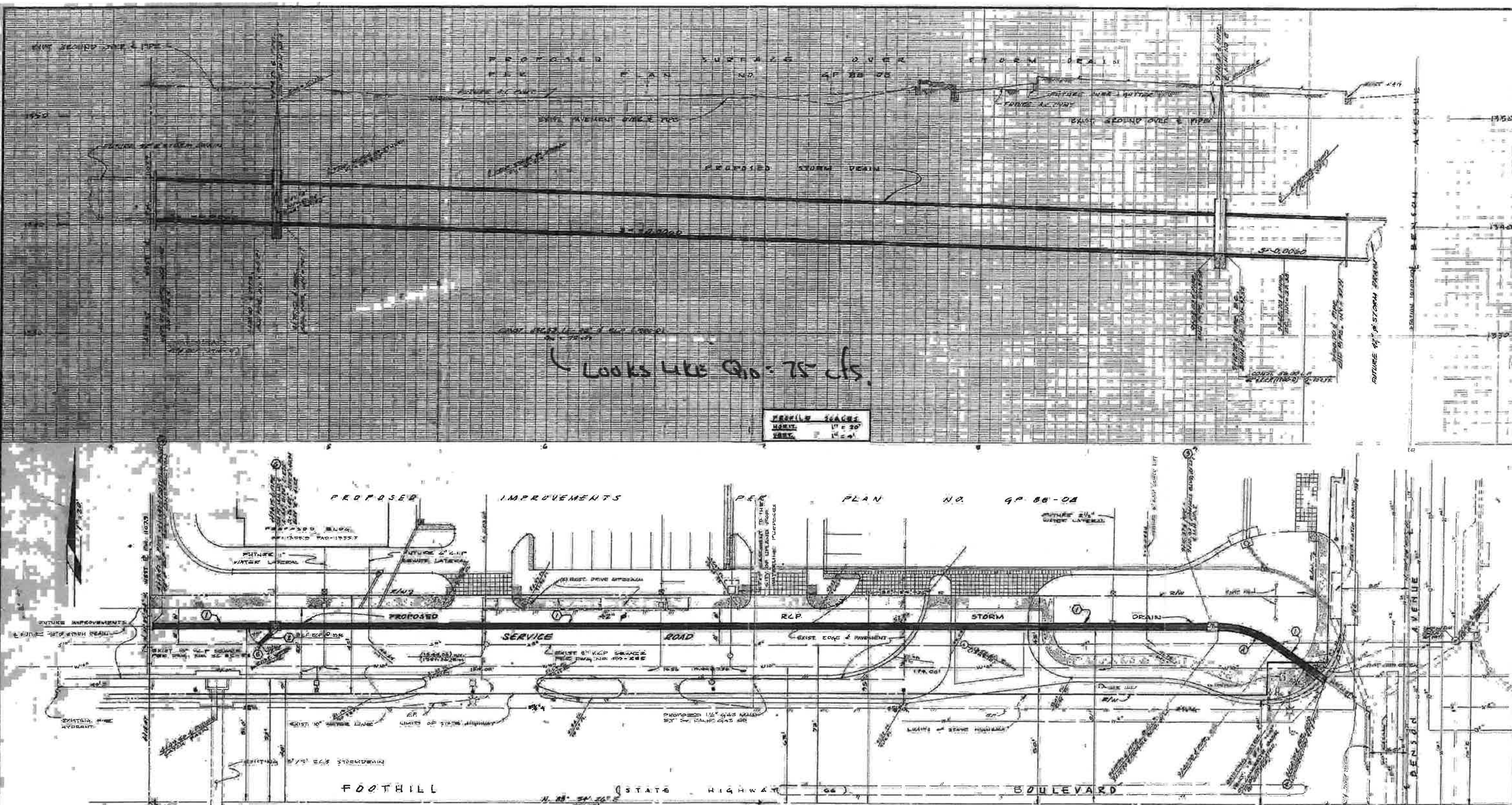
RECOMMENDED BY:
DEVELOPMENT SERVICES

CITY OF UPLAND

FOOTHILL BOULEVARD STORM DRAIN

LATERAL PLAN/PROFILE SHEET

WATER DRAWING NO.
SHEET 5 OF 8 SHEETS
DRAWING NO. SD6689



CONSTRUCTION NOTES

1. CONSTRUCT 48" RCP (1500-D)
2. CONSTRUCT 24" RCP (1500-D)
3. CONSTRUCT M.H. NO. 2 PER L.A.C.F.C.D. STD. DWG. 2-D184
4. CONSTRUCT PRECAST PIPE COLLARS - TYPE "A" PER S.B.C.F.C.D. STD. PLAT NO. 3-B 174.
5. CONSTRUCT BRICK & MORTAR PLUG PER S.B.C.F.C.D. STD. PLAT NO. SP 176-A.
6. CONSTRUCT M.H. NO. 4 PER L.A.C.F.C.D. STD. DWG. 2-D115

℄ PIPE CURVE DATA

(A) RADIUS = 45.00'
Δ = 35° 41' 31"
LENGTH = 28.03'
TANGENT = 14.49'

BENCH MARK NO. 304-20
LOCATION: NW CORNER FOOTHILL & BENSON
ELEV. 1352.77

MARK	DATE	INITIAL	REVISIONS DESCRIPTION	APP'VD
			FOR RECORD DRAWING SEE S.D. 9813 SHEET 2	

PLANS PREPARED BY
DERBISH, GUERRA & ASSOCIATES, Inc.
CIVIL ENGINEERS

DRAWN BY: J. CARUSO
DESIGN BY: DAN G.
CHECKED BY:

REVIEW BY CITY STAFF	INITIAL	DATE
DEPARTMENT		
WATER DEP'T.		
FIRE DEP'T.		
TRAFFIC		
SEWER		
DRAINAGE		

APPROVED BY:
CITY ENGINEER R.C.E. 15033 DATE

CITY OF UPLAND

FOOTHILL BOULEVARD STORM DRAIN

FROM BENSON AVENUE TO 380'± WEST.
SCHEDULE 4

SHEET

PROJECT NO. 9813 PLAN NO. SD 9813

CONTRACT NO. SHEET OF S.T. 9813

GENERAL NOTES

1. ALL WORK CALLED FOR ON THE PLANS SHALL BE IN COMPLIANCE WITH CURRENT CITY OF UPLAND STANDARD SPECIFICATIONS, ADOPTED BY CITY COUNCIL UNLESS OTHERWISE NOTED ON THE PLANS OR IN THE SPECIAL PROVISIONS FOR THIS PROJECT.
2. THE CONTRACTOR, BEFORE UNDERTAKING ANY GRADING OR CONSTRUCTION WORK OF ANY TYPE WITHIN THE PUBLIC RIGHT OF WAY, MUST FIRST OBTAIN A CONSTRUCTION PERMIT FROM THE PUBLIC WORKS DEPARTMENT.
3. A TEMPORARY STREET CLOSURE PERMIT IS REQUIRED IN ALL CASES WHERE WORK WILL IN ANY WAY INTERFERE WITH VEHICULAR OR PEDESTRIAN TRAFFIC. THE CONTRACTOR IS ADVISED THAT CITY COUNCIL RESOLUTION NO. 1656, DEALING WITH PROMPT RESTORATION OF CITY STREETS TORN UP DURING CONSTRUCTION, WILL BE ENFORCED IN ALL CASES WHERE THE PROVISIONS THEREOF ARE APPLICABLE.
4. INSPECTION BY THE CITY OF THE WORK CALLED FOR ON THE PLANS SHALL NOT, IN ANY WAY, RELIEVE THE CONTRACTOR AND/OR DEVELOPER OF THEIR OBLIGATION TO PERFORM WORK IN COMPLIANCE WITH THE PLANS AND SPECIFICATIONS.
5. ANY ALTERATIONS OR VARIANCES FROM THE PLANS, EXCEPT MINOR ADJUSTMENTS IN THE FIELD TO MEET EXISTING CONDITIONS, SHALL BE REQUESTED IN WRITING AND MAY NOT BE INSTITUTED UNTIL APPROVED BY THE PUBLIC WORKS DIRECTOR OR HIS REPRESENTATIVES ACTING SPECIFICALLY UPON HIS INSTRUCTIONS.
6. ALL ELEVATIONS SHOWN ON THE PLANS ARE ESTABLISHED FROM CITY OF UPLAND DATUM PLANE.
7. QUANTITIES, AS SHOWN ON THE PLANS, ARE ESTIMATED, AND THE CONTRACTOR IS ADVISED THAT FINAL QUANTITIES OF MATERIAL AND WORK IN PLACE MAY BE SOMEWHAT GREATER OR LESS THAN THOSE INDICATED ON THE PLANS.
8. CONCRETE ITEMS WHICH WILL BE SUBJECT TO VEHICULAR TRAFFIC SHALL BE BARRICADED, AND NO VEHICULAR TRAFFIC SHALL BE SOONER THAN SEVEN DAYS AFTER PLACING, OR WHEN THE CONTRACTOR FOR CONVENIENCE OF OPERATION SO DESIRES, CONCRETE CONTAINING EIGHT SACKS OF CEMENT PER CUBIC YARD MAY, AND SHALL IF SO DIRECTED BY THE ENGINEER, BE USED, AND TRAFFIC WILL BE PERMITTED THEREON SEVENTY-TWO HOURS AFTER PLACING OF SAID EIGHT SACK CONCRETE.
9. THE CONTRACTOR SHALL OPERATE IN A MANNER COMPLIANT WITH ALL APPLICABLE SECTIONS OF THE MUNICIPAL CODE AND COMPLIANT WITH ALL APPLICABLE CITY COUNCIL RESOLUTIONS.
10. ALL STATIONING REFERS TO CENTERLINE OF CONSTRUCTION UNLESS OTHERWISE NOTED. CATCH BASIN STATIONING IS BASED ON STREET CENTERLINE STATIONING.
11. STATIONING FOR LATERALS AND CONNECTOR PIPES REFERS TO THE CENTERLINE CENTERLINE INTERSECTION AND IS BASED ON STORM DRAIN STATIONING. STREET CENTERLINE STATIONING AND STORM DRAIN STATIONING ARE SEPARATE AND DIFFERENT FROM EACH OTHER.
12. PROTECT ALL UTILITIES, POLES, SIGNS, AND EXISTING IMPROVEMENTS IN PLACE UNLESS OTHERWISE DIRECTED BY THE ENGINEER OR NOTED ON THE PLANS. WHERE RELOCATION OF THESE UTILITIES ARE REQUIRED, THE CONTRACTOR SHALL COORDINATE CONSTRUCTION AS NECESSARY AND AS APPROVED BY THE ENGINEER.
13. OPENINGS RESULTING FROM THE CUTTING OR PARTIAL REMOVAL OF EXISTING CULVERTS PIPES, OR SIMILAR STRUCTURES TO BE ABANDONED SHALL BE SEALED WITH 6"OF CLASS "B" CONCRETE.
14. "V" IS THE DEPTH OF INLET OF CATCH BASINS MEASURED FROM THE TOP OF CURB TO INVERT OF THE OUTLET CONNECTOR PIPE.
15. CATCH BASINS SHALL BE LOCATED SO THAT THE LOCAL DEPRESSION SHALL BEGIN AT CURB RETURN JOINTS, UNLESS OTHERWISE NOTED ON PLANS.
16. IRRIGATION LINES WITHIN ANY CITY RIGHT-OF-WAY SHALL HAVE A TWENTY-FOUR INCH MINIMUM COVER FROM FINISH SURFACE, UNLESS SAID IRRIGATION LINE IS ENCASED IN CONCRETE OR BEDDED IN A SPECIAL CONCRETE CRADLE.
17. THE LOCATION OF UNDERGROUND UTILITY OR IRRIGATION LINES AS SHOWN ON THE PLANS, IS APPROXIMATE, AND SINCE THE ACTUAL LOCATION MAY BE SOMEWHAT DIFFERENT FROM THAT SHOWN, THE CONTRACTOR IS REQUIRED TO CONTACT THE INTERESTED UTILITY OR WATER COMPANY BEFORE EXCAVATING IN THE VICINITY OF ANY SUCH LINES.
18. THE FOLLOWING CITY OF UPLAND STD. DWGS. APPLY TO THIS PROJECT AND SHALL BE CONSIDERED AS PART OF THESE PLANS: CU-G-1, CU-D-2, CU-P-3, CU-P-4, CU-P-8, CU-R-2, CU-R-3, CU-S-1, CU-S-6 AND W6-23
19. INSTALL PLYWOOD FALSE BOTTOMS IN ALL SEWER MANHOLES WITHIN THE CONSTRUCTION AREA. CHECK DAILY BY INSPECTOR
20. THE CONTRACTOR, BEFORE UNDERTAKING ANY GRADING OR CONSTRUCTION WORK OF ANY TYPE WITHIN THE SAN BERNARDINO COUNTY FLOOD CONTROL DISTRICT RIGHT-OF-WAY, MUST FIRST OBTAIN A CONSTRUCTION PERMIT FROM THE SAN BERNARDINO COUNTY FLOOD CONTROL DISTRICT.
21. THE DEVELOPER SHALL BE RESPONSIBLE FOR SUBMITTING TO THE CITY, PROOF THAT A NOTICE OF INTENT (NOI) FOR THE GENERAL PERMIT FOR STORM WATER DISCHARGES ASSOCIATED WITH CONSTRUCTION ACTIVITY HAS BEEN FILED WITH AND APPROVED BY THE STATE WATER RESOURCES CONTROL BOARD. CONSTRUCTION SHALL NOT COMMENCE WITHOUT THIS APPROVAL. THE DEVELOPER SHALL BE RESPONSIBLE TO COMPLY WITH THE GENERAL CONSTRUCTION ACTIVITY STORM WATER PERMIT BY IMPLEMENTING THEIR STORM WATER POLLUTION PREVENTION PLAN FOR THE DURATION OF THE PROJECT.
22. ALL CATCH BASINS AND STORM DRAIN INLET FACILITIES SHALL BE STENCILED WITH THE APPROPRIATE "NO DUMPING" MESSAGE AS SUPPLIED BY THE PUBLIC WORKS DEPARTMENT, ENVIRONMENTAL DIVISION.

SURVEY MONUMENT NOTE:

SURVEY MONUMENTS THAT EXIST AS SHOWN ON RECORDED MAPS, HIGHWAY MAPS OR POINTS THAT PROVIDE SURVEY CONTROL WITHIN THE CONSTRUCTION AREA, SHALL BE LOCATED AND REFERENCED OUT BY A LICENSED LAND SURVEYOR OR REGISTERED CIVIL ENGINEER (AUTHORIZED TO PRACTICE LAND SURVEYING), AND CORNER RECORDS SHALL BE FILED WITH THE COUNTY SURVEYOR PRIOR TO THE START OF CONSTRUCTION. THESE CORNER RECORDS SHALL DESCRIBE THE MONUMENTS FOUND WITH TIE DISTANCES TO REFERENCE POINTS FOR RESETTING OF THE SURVEY MONUMENT. WHEN CONSTRUCTION IS COMPLETED, MONUMENTS SHALL BE SET AND CORNER RECORDS SHALL BE FILED WITH THE COUNTY SURVEYOR SHOWING THE NEW MONUMENTS.

ENGINEERS NOTICE TO CONTRACTOR

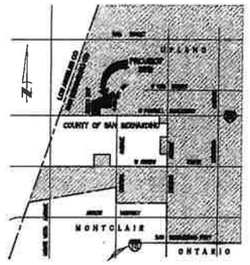
THE EXISTENCE AND APPROXIMATE LOCATION OF ANY UNDERGROUND UTILITIES PIPES OR STRUCTURES SHOWN ON THESE PLANS ARE OBTAINED BY A SEARCH OF AVAILABLE RECORDS. TO THE BEST OF OUR KNOWLEDGE, THERE ARE NO EXISTING UTILITIES OR STRUCTURES EXCEPT AS SHOWN ON THESE PLANS. THE ENGINEER ASSUMES NO LIABILITY AS TO THE EXACT LOCATION NEITHER OF SAID LINES NOR FOR UTILITIES OR IRRIGATION LINES WHOSE LOCATIONS ARE NOT SHOWN. THE CONTRACTOR SHALL BE RESPONSIBLE FOR NOTIFYING ALL UTILITY AND IRRIGATION COMPANIES PRIOR TO WORK ON EXCAVATION TO DETERMINE EXACT LOCATION OF ALL LINE AFFECTING THIS WORK, WHETHER OR NOT SHOWN HEREON, AND FOR ANY DAMAGE OR PROTECTION OF THESE LINES.

THE CONTRACTOR SHALL CALL IN A LOCATION REQUEST TO UNDERGROUND SERVICE ALERT (U.S.A.) PHONE 1-800-227-2600 TWO WORKING DAYS PRIOR TO DIGGING. NO CONSTRUCTION PERMIT ISSUED BY PUBLIC WORKS DEPARTMENT SHALL BE VALID INVOLVING UNDERGROUND FACILITIES UNLESS THE APPLICANT HAS AN INQUIRY IDENTIFICATION NUMBER ISSUED BY U.S.A.

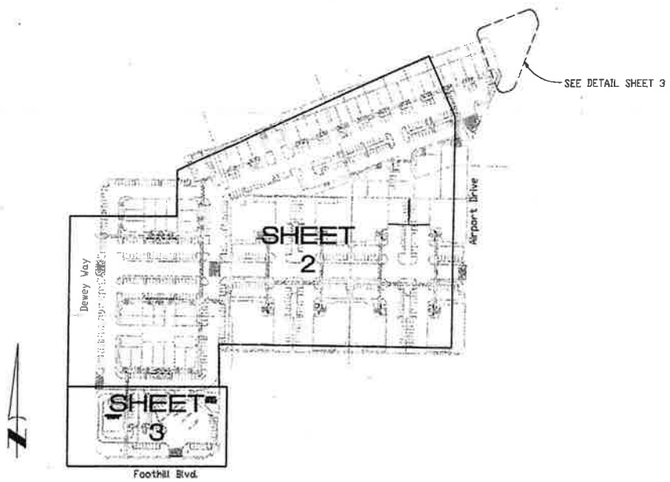
REGISTERED PROFESSIONAL ENGINEER — C. CURT INGRAHAM — No. 44780 — Exp. 03-31-04 — CIVIL — STATE OF CALIFORNIA

Underground Service Alert — Call: TOLL FREE 1-800 227-2600 — TWO WORKING DAYS BEFORE YOU DIG

SITE IMPROVEMENT PLANS
FOR
CABLE BUSINESS PARK



LOCATION MAP
NTS



INDEX MAP
N.T.S.

OWNER / DEVELOPER

CABLE DEVELOPMENT, L.L.C.
428 EAST 25TH STREET
UPLAND, CA 91784-1106

PH: (909) 931-1020
FAX (909) 982-4410

CONTACT: MR. GEORGE D VOIGT

SOILS ENGINEER

RMA GROUP
10851 EDISON CT.
RANCHO CUCAMONGA, CA 91730

PH: (909) 989-1751
FAX (909) 989-4287

CONTACT: MR. ED LYON

CONTRACTOR'S RESPONSIBILITY FOR SAFETY

IN SUBMITTING A BID FOR THIS WORK THE CONTRACTOR AGREES THAT HE SHALL ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THIS PROJECT; INCLUDING SAFETY OF ALL PERSONS AND PROPERTY; THAT THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS, AND THAT THE CONTRACTOR SHALL DEFEND, INDEMNIFY AND HOLD THE OWNER, THE ENGINEER AND THE CITY OF UPLAND HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT, EXCEPTING FOR LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF THE OWNER, THE ENGINEER, OR THE CITY OF UPLAND.

ALL CONTRACTORS AND SUBCONTRACTORS PERFORMING WORK SHOWN ON OR RELATED TO THESE PLANS SHALL CONDUCT THEIR OPERATIONS SO THAT EMPLOYEES ARE PROVIDED A SAFE PLACE TO WORK AND THE PUBLIC IS PROTECTED. ALL CONTRACTORS AND SUBCONTRACTORS SHALL COMPLY WITH THE "OCCUPATIONAL SAFETY AND HEALTH REGULATIONS" OF THE U.S. DEPARTMENT OF LABOR AND WITH "CONSTRUCTION SAFETY ORDERS". THE CIVIL ENGINEER SHALL NOT BE RESPONSIBLE IN ANY WAY FOR THE CONTRACTOR OR SUBCONTRACTORS COMPLIANCE WITH SAID REGULATIONS AND ORDERS.

CONSTRUCTION NOTES

1. NOT USED
2. NOT USED
3. INSTALL 30" INLINE DRAIN WITH CAST IRON GRATE (H-20 RATED), N-12 DOWN DRAIN (Part No. 2730AG12) and 12" N-12 FABRICATED 90° BEND (Part No. 1299-AN) PER ADVANCED DRAINAGE SYSTEMS, Inc. — 3 EA
4. CONSTRUCT 30"ø N-12 PROLINK ULTRA HDPE DRAIN PIPE BY ADVANCED DRAINAGE SYSTEMS, Inc. — 388 LF
5. CONSTRUCT 24"ø N-12 PROLINK ULTRA HDPE DRAIN PIPE BY ADVANCED DRAINAGE SYSTEMS, Inc. — 352 LF
6. CONSTRUCT 18"ø N-12 PROLINK ULTRA HDPE DRAIN PIPE BY ADVANCED DRAINAGE SYSTEMS, Inc. — 1170 LF
7. CONSTRUCT 15"ø N-12 PROLINK ULTRA HDPE DRAIN PIPE BY ADVANCED DRAINAGE SYSTEMS, Inc. — 408 LF
8. CONSTRUCT 12"ø N-12 PROLINK ULTRA HDPE DRAIN PIPE BY ADVANCED DRAINAGE SYSTEMS, Inc. — 273 LF
9. INSTALL 24"x24" N-12 FABRICATED TEE PER ADVANCED DRAINAGE SYSTEMS, Inc. - Part No. 2467-AN — 2 EA
10. INSTALL 24"x12" N-12 FABRICATED REDUCING WYE PER ADVANCED DRAINAGE SYSTEMS, Inc. - Part No. 2484-AN — 1 EA
11. NOT USED
12. INSTALL 30" INLINE DRAIN WITH CAST IRON GRATE (H-20 RATED), N-12 DOWN DRAIN (Part No. 2730AG24) PER ADVANCED DRAINAGE SYSTEMS, Inc. — 2 EA
13. INSTALL 24"x18" N-12 FABRICATED REDUCER PER ADVANCED DRAINAGE SYSTEMS, Inc. - PART No. 2476-AN85 — 2 EA
14. CONSTRUCT CURB INLET TYPE B-1 PER CITY OF UPLAND STD. DWG CU-S-2 — 1 EA
15. CONSTRUCT TRANSVERSE CATCH BASIN PER APWA STD. PLAN No. 305-2, 2 GRATES — 7 EA
16. NOT USED
17. CONSTRUCT GRATING CATCH BASIN, LONGITUDINAL, 3 GRATES, PER APWA STD. PLAN No. 304-2 — 1 EA
18. CONSTRUCT 36" RCP STORM DRAIN PIPE (D-2500) — 180 LF
19. CONSTRUCT CURB INLET TYPE B-2 PER CITY OF UPLAND STD. DWG CU-S-2 — 1 EA
20. INSTALL 15" INLINE DRAIN WITH LOCKING H-20 RATED GRATE, N-12 DOWN DRAIN (PART 2715AGN) PER ADVANCED DRAINAGE SYSTEMS INC. — 1 EA
21. INSTALL 6"ø N-12 HDPE DRAIN PIPE BY ADVANCED DRAINAGE SYSTEMS — 145 LF
22. INSTALL 15" INLINE DRAIN WITH PEDESTRIAN GRATE (H-10 RATED), N-12 DOWN DRAIN (PART No. 2715AGN) PER ADVANCED DRAINAGE SYSTEMS, Inc. — 5 EA
23. INSTALL 6"øN-12 FABRICATED 90° BEND (PART NO. 0699AN) ADVANCED DRAINAGE SYSTEMS, Inc — 2 EA
24. INSTALL 6"ø N-12 FABRICATED TEE (PART No. 0661AN) ADVANCED DRAINAGE SYSTEMS, Inc. — 3 LF
25. CONSTRUCT GRATING CATCH BASIN, LONGITUDINAL, 1 GRATE, PER APWA STD. PLAN No. 304-2 — 2 EA
26. CONSTRUCT GRATING CATCH BASIN, LONGITUDINAL, 2 GRATES, PER APWA STD. PLAN No. 304-2 — 7 EA
27. CONSTRUCT INLET TYPE "V" PER ORANGE COUNTY EMA STANDARD PLAN 1305 — 1 EA
28. CONSTRUCT JUNCTION STRUCTURE PER APWA STD. PLAN No. 332-0 — 1 EA
29. CONSTRUCT PARKWAY DRAIN PER APWA STD. PLAN No. 151-1, TYPE 1 INLET. — 2 EA

(#) ITEM NOT USED ON THIS SHEET

ABBREVIATIONS

APWA	AMERICAN PUBLIC WORKS ASSOCIATION
BF	BOTTOM OF FOOTING
BOP	BOTTOM OF PIPE
FL	FLOW LINE
HDPE	HIGH DENSITY POLYETHYLENE PIPE
INV	INVERT
RCP	REINFORCED CONCRETE PIPE
SD	STORM DRAIN
TC	TOP OF CURB
TG	TOP OF GRATE
TOP	TOP OF PIPE
USA	UNDEGROUND SERVICE ALERT

AGENCY/UTILITY CONTACT LIST

SOUTHERN CALIFORNIA EDISON
216 NORTH EUCLID AVENUE
ONTARIO, CALIFORNIA 91761
(800) 684-8123

SAN ANTONIO WATER CO.
139 NORTH EUCLID AVENUE
UPLAND, CALIFORNIA 91786
(909) 982-4107

CITY OF UPLAND
WATER DIVISION
1370 NORTH BENSON AVENUE
UPLAND, CALIFORNIA 91786
(909) 931-4230

VERIZON
1400 EAST PHILLIPS BOULEVARD
POMONA, CALIFORNIA 91766-5432
(909) 469-6336

THE GAS CO.
P.O. BOX 3003
REDLANDS, CALIFORNIA 92373
(800) 427-2200

CITY OF UPLAND
DEVELOPMENT SERVICES
460 NORTH EUCLID AVENUE
UPLANDS, CALIFORNIA 91786
(909) 931-4133 OR (909) 931-4145

BENCH MARK No. 29A-86
LOCATION FOOTHILL BOULEVARD AND BENSON AVENUE

2" CITY OF UPLAND BRASS CAP IN P.C.C. BASE OF TRAFFIC SIGNAL 34 FEET EAST OF ℄ BENSON AVENUE; 38 FEET NORTH OF SOUTH DRIVEWAY FOR UPLAND FIRE.

ELEV 1425.07'

REVISIONS

MARK	DATE	BY	DESCRIPTION	DATE	APP'VD

Associated Engineers, Inc
3311 E. SHELBY STREET · ONTARIO, CA 91764
TEL: (909) 980-1962 · FAX: (909) 941-0893
C. CURT INGRAHAM R.C.E. 44780 — DATE

DRAWN BY: VAD AUGUST 2001
DESIGNED BY: VAD AUGUST 2001
CHECKED BY: BWL AUGUST 2001
RECOMMENDED BY:

REVIEWED BY CITY STAFF

DEPARTMENT	INITIAL	DATE
PUBLIC WORKS (OPER.)		11/07
PUBLIC WORKS (ENV.)		11/07
PUBLIC WORKS (WATER)		11/07
PUBLIC WORKS (TRAF.)		11/07
FIRE DEPT.		

APPROVED BY:
PUBLIC WORKS DIRECTOR / CITY ENGINEER RCE 54786 Exp. DATE 12-31-03 — DATE 12/18/02
RECOMMENDED BY: DEPUTY CITY ENGINEER — DATE 12/17/02
RECOMMENDED BY: DEVELOPMENT SERVICES — DATE 11/11/02

CITY OF UPLAND
CABLE BUSINESS PARK
ON-SITE PRIVATE STORM DRAIN IMPROVEMENTS

WATER DRAWING NO. 1 OF 3 SHEETS
DRAWING No. SD 01-07

PROJECT NO. SP 00-04 PLAN NO. SD 01-07

M:\2000\000331\DWG\DRAINAGE\Sht-cover.DWG

LINE TABLE		
LINE	LENGTH	BEARING
L1	54.27'	N44°32'38"W

SCALE: 1"=40'
0 20 40 80
SCALE FEET

PROPERTY LINE N69°11'07"E 1261.91'

C/L DEWEY WAY

P/L N00°00'33"W 769.54'

DEWEY WAY

SEE SHEET 3 OF 3

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- ITEM NOT USED ON THIS SHEET

PLAN NO. SD 01-07
PROJECT NO. SP 00-04

Underground Service Alert
Call: TOLL FREE 1-800 227-2600
TWO WORKING DAYS BEFORE YOU DIG

BENCH MARK No. 29A-86
LOCATION FOOTHILL BOULEVARD AND BENSON AVENUE

2" CITY OF UPLAND BRASS CAP IN P.C.C. BASE OF TRAFFIC SIGNAL 34 FEET EAST OF ℄ BENSON AVENUE; 38 FEET NORTH OF SOUTH DRIVEWAY FOR UPLAND FIRE.

ELEV 1425.07'

REVISIONS					
MARK	DATE	BY	DESCRIPTION	DATE	APP'VD

Associated Engineers
3311 EAST SHELBY STREET • ONTARIO, CA 91764
TEL: (909) 987-1982 • FAX: (909) 941-0891

DRAWN BY:	VAD AUGUST 2001
DESIGNED BY:	VAD AUGUST 2001
CHECKED BY:	CCI AUGUST 2001
RECOMMENDED BY:	

REVIEWED BY CITY STAFF

DEPARTMENT	INITIAL	DATE
PUBLIC WORKS (OPER.)		11/27/02
PUBLIC WORKS (ENV.)		11/27/02
PUBLIC WORKS (WATER)		11/26/02
PUBLIC WORKS (TRAF.)		11/27/02
FIRE DEPT.		

APPROVED BY:
PUBLIC WORKS DIRECTOR / CITY ENGINEER RCE 54786 Exp. DATE 12-31-03 — DATE 12/10/02

RECOMMENDED BY: DEPUTY CITY ENGINEER — DATE 11/26/02
RECOMMENDED BY: DEVELOPMENT SERVICES — DATE 11/26/02

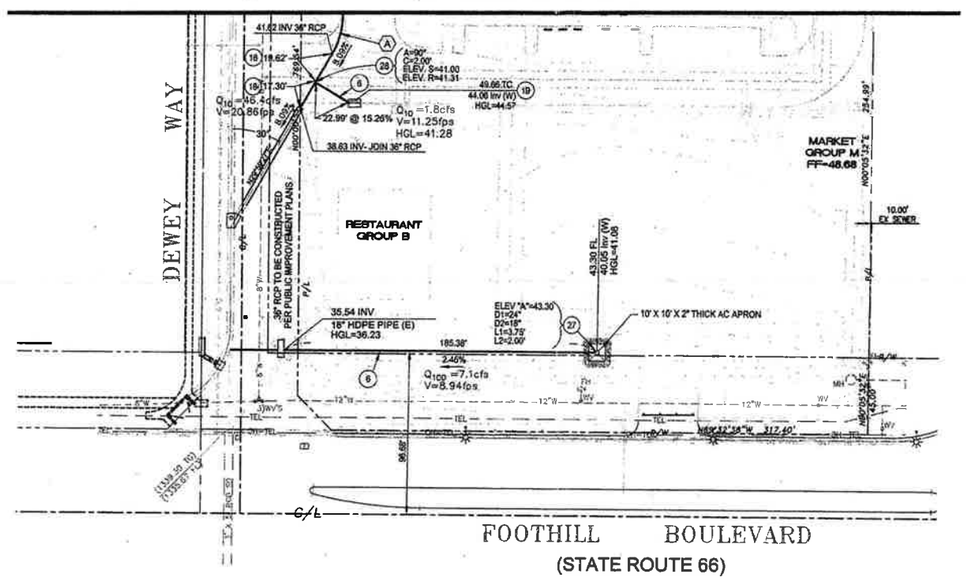
CITY OF UPLAND
CABLE BUSINESS PARK
ON-SITE PRIVATE STORM DRAIN IMPROVEMENTS

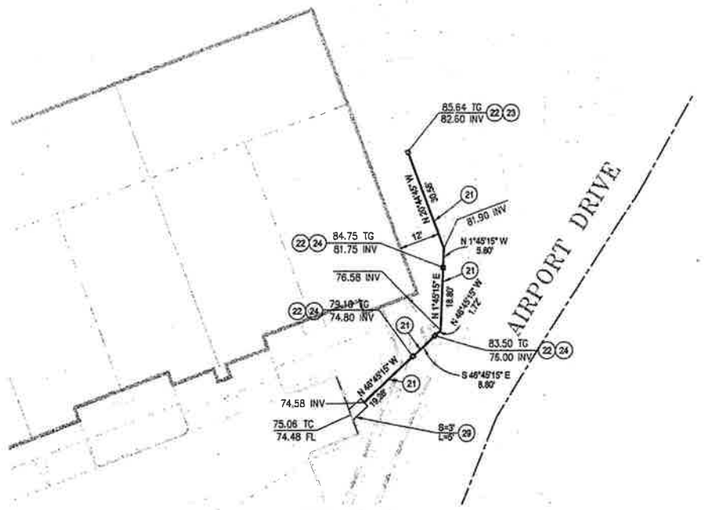
WATER DRAWING NO.
2 OF 3 SHEETS
DRAWING No. SD 01-07

M:\2000\00033\DWG\DRAINAGE\onsite\sht2.dwg

SEE SHEET 2 OF 3

SCALE: 1"=40'
0 20 40 80
SCALE FEET





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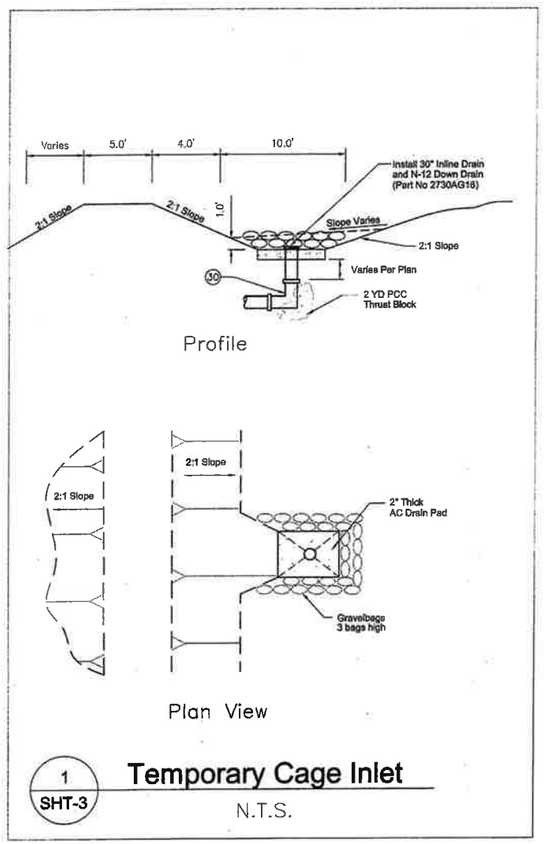

1 SHT-3 **Temporary Cage Inlet**

N.T.S.

CURVE TABLE				
	△	R	L	T
A	33°56'48"	45.00'	26.66'	13.73'

CONSTRUCTION NOTES

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ELEV 1425.07'

REVISIONS

MARK	DATE	BY	DESCRIPTION	DATE	APP'VD

REGISTERED PROFESSIONAL ENGINEER — C. CURT MCMASKIN — No. 44760 — Exp. 3-31-04 — CIVIL — STATE OF CALIFORNIA

Associated Engineers
5311 EAST SHELBY STREET • ONTARIO, CA. 91764
TEL: (909) 980-2982 • FAX: (909) 941-0891
11/30/02

DRAWN BY:	VAD AUGUST 2001
DESIGNED BY:	VAD AUGUST 2001
CHECKED BY:	CCI AUGUST 2001
RECOMMENDED BY:	

REVIEWED BY CITY STAFF

DEPARTMENT	INITIAL	DATE
PUBLIC WORKS (OPER.)		11/27/02
PUBLIC WORKS (ENV.)		11/27/02
PUBLIC WORKS (WATER)		11/27/02
PUBLIC WORKS (TRAF.)	AG	11/27/02
FIRE DEPT.		11/27/02

APPROVED BY:
PUBLIC WORKS DIRECTOR/CITY ENGINEER — DATE 12/16/02
RCE 54706 Exp. DATE 12-31-03

RECOMMENDED BY:
DEPUTY CITY ENGINEER

RECOMMENDED BY:
DEVELOPMENT SERVICES — 12/9/02

CITY OF UPLAND

CABLE BUSINESS PARK

ON-SITE PRIVATE STORM DRAIN IMPROVEMENTS

WATER DRAWING NO.

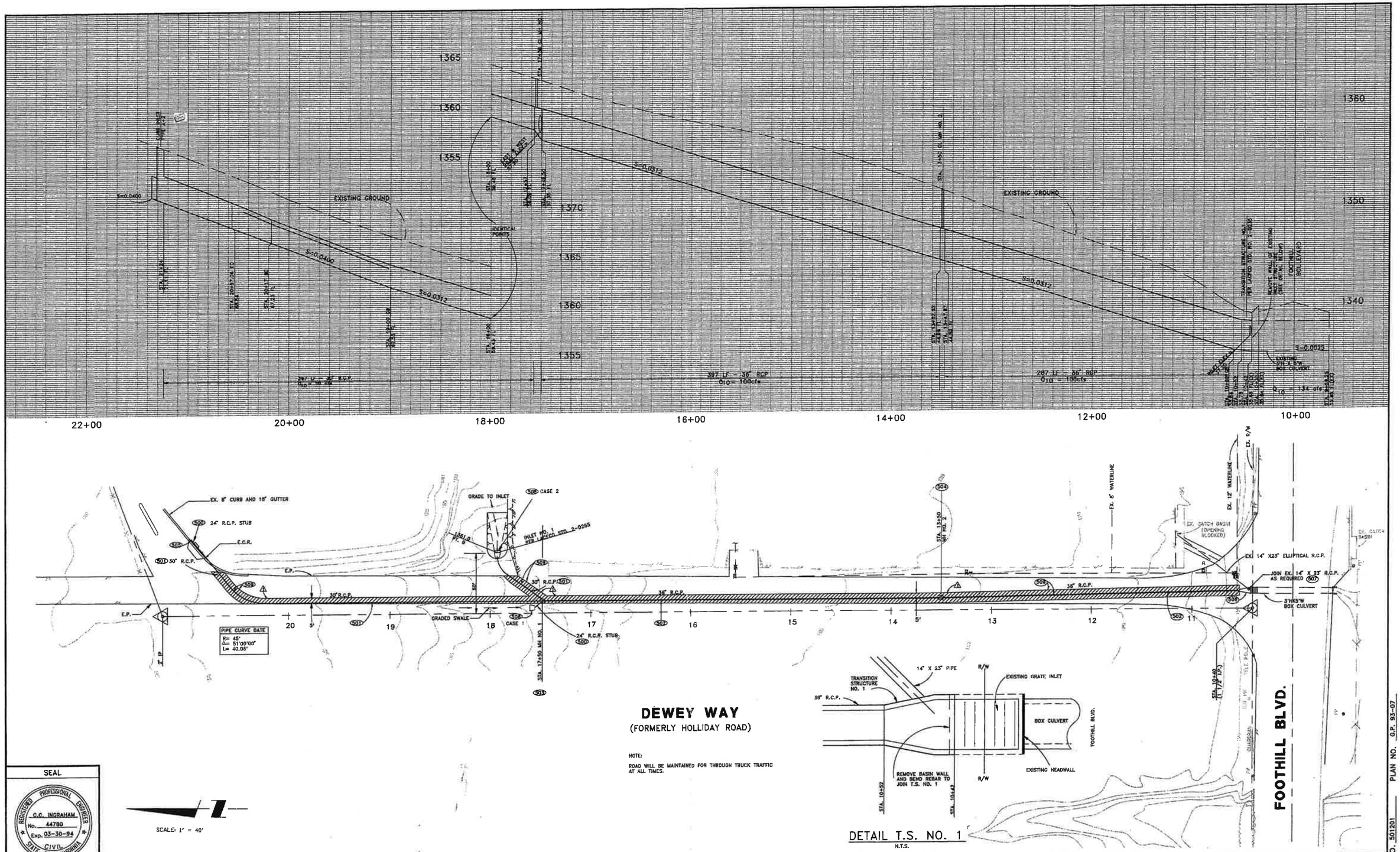
3
OF 3 SHEETS

DRAWING No.
SD 01-07

PROJECT NO

PLAN NO.

M:\2000\00033\DWG\DRAINAGE\onsite\sht3.dwg



DEWEY WAY
(FORMERLY HOLLIDAY ROAD)

NOTE:

ROAD WILL BE MAINTAINED FOR THROUGH TRUCK TRAFFIC AT ALL TIMES.

SCALE: 1" = 40'

SEAL

REGISTERED PROFESSIONAL ENGINEER
C.C. INGRAHAM
No. 44780
Exp. 03-30-94
CIVIL
STATE OF CALIFORNIA

BENCH MARK NO. 29A-86
LOCATION:

2" CITY OF UPLAND BRASS CAP IN P.C.C. BASE OF TRAFFIC SIGNAL 34' EAST OF C BENSON AVENUE 38' NORTH OF SOUTH DRIVEWAY FOR UPLAND FIRE.

ELEV. 1425.07'

REVISIONS					
MARK	DATE	INITIAL	DESCRIPTION	DATE	APP'VD.
1	10/01/93	LKH	STORM DRAIN ALIGNMENT AND TRENCH REPAIR		

PLANS PREPARED BY
ASSOCIATED ENGINEERS
3311 EAST SHELBY AVENUE
ONTARIO, CALIFORNIA 91764
TEL. (909) 980-1982
FAX: (909) 941-0891

R.C.E. NO. 44780 (EXPIRES: 03-30-94) 10/1/93 DATE

DRAWN BY: L.H.
DESIGN BY: S.B./C.C.I.
CHECKED BY: C.C.I.

REVIEW BY CITY STAFF

DEPARTMENT	INITIAL	DATE
PUBLIC WORKS (OPER)		
PUBLIC WORKS (ENV)		10/26/93
PUBLIC WORKS (WATER)		10/26/93
PUBLIC WORKS (TRAFFIC)		10/26/93
FIRE DEPT		

APPROVED BY:
PUBLIC WORKS DIRECTOR/CITY ENGINEER
R.C.E. 39880 EXP. DATE 12-31-93
10-28-93 DATE

RECOMMENDED BY:
DEPUTY CITY ENGINEER

RECOMMENDED BY:
DEVELOP. SVCS. COORD. 10/26/93

CITY OF UPLAND
CABLE AIRPORT
A.I.P. 05
STORM DRAIN PLAN DEWEY WAY

WATER DRAWING NO.

SHEET 14 OF 14 SHEETS

DRAWING NO. G.P. 93-07

PROJECT NO. 501201 PLAN NO. G.P. 93-07

FILE: 9336SH1.DWG
DATE: 08-25-93

APPENDIX B

HYDROLOGY CALCULATIONS

EXISTING CONDITION

```
**************************************************************************
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                        Analysis prepared by:



 ************************** DESCRIPTION OF STUDY **************************
* TEI 3651                                                                *
* EXISTING CONDITION                                                      *
* 100-YEAR EVENT (NODES 100-102)                                          *
 **************************************************************************

  FILE NAME: W:\3651\EX100.DAT
  TIME/DATE OF STUDY: 08:51 05/08/2018
==========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==========================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.6000
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.5500

  *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

**************************************************************************
  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) =   563.00
  ELEVATION DATA: UPSTREAM(FEET) =   1394.60  DOWNSTREAM(FEET) =   1376.30

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   13.121
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.859
  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.)
  NATURAL POOR COVER
  "OPEN BRUSH"                 A        2.90      0.35      1.000    81   13.12
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.35
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      9.15
  TOTAL AREA(ACRES) =      2.90   PEAK FLOW RATE(CFS) =      9.15

**************************************************************************
  FLOW PROCESS FROM NODE     101.00 TO NODE     102.00 IS CODE =  52
--------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1376.30  DOWNSTREAM(FEET) =   1358.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   560.00   CHANNEL SLOPE =  0.0327
  CHANNEL FLOW THRU SUBAREA(CFS) =      9.15
  FLOW VELOCITY(FEET/SEC) =   4.42 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   2.11   Tc(MIN.) =   15.23
  LONGEST FLOWPATH FROM NODE     100.00 TO NODE     102.00 =    1123.00 FEET.
```

```
**************************************************************************
 FLOW PROCESS FROM NODE    102.00 TO NODE    102.00 IS CODE =  81
--------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========================================================================
 MAINLINE Tc(MIN.) =   15.23
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.528
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL POOR COVER
 "OPEN BRUSH"                 A        4.50      0.35      1.000    81
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.35
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 SUBAREA AREA(ACRES) =     4.50      SUBAREA RUNOFF(CFS) =   12.86
 EFFECTIVE AREA(ACRES) =      7.40   AREA-AVERAGED Fm(INCH/HR) =  0.35
 AREA-AVERAGED Fp(INCH/HR) =  0.35  AREA-AVERAGED Ap =  1.00
 TOTAL AREA(ACRES) =         7.4      PEAK FLOW RATE(CFS) =      21.15
==========================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)      =        7.4  TC(MIN.) =     15.23
 EFFECTIVE AREA(ACRES) =      7.40  AREA-AVERAGED Fm(INCH/HR)=  0.35
 AREA-AVERAGED Fp(INCH/HR) =  0.35  AREA-AVERAGED Ap = 1.000
 PEAK FLOW RATE(CFS)    =     21.15
==========================================================================
==========================================================================
 END OF RATIONAL METHOD ANALYSIS
```

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```
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                      Analysis prepared by:



 ************************** DESCRIPTION OF STUDY **************************
* TEI 3651                                                                *
* EXISTING CONDITION                                                      *
* 100-YEAR EVENT (NODES 200-202)                                          *
 **************************************************************************

  FILE NAME: W:\3651\EX200.DAT
  TIME/DATE OF STUDY: 08:51 05/08/2018
==========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==========================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.6000
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.5500

  *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 0.0312 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

**************************************************************************
  FLOW PROCESS FROM NODE     200.00 TO NODE     201.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   803.00
  ELEVATION DATA: UPSTREAM(FEET) =   1403.00  DOWNSTREAM(FEET) =   1369.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   14.387
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.651
  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.)
  NATURAL POOR COVER
  "OPEN BRUSH"                 A        5.70      0.35      1.000    81   14.39
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.35
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =     16.92
  TOTAL AREA(ACRES) =      5.70   PEAK FLOW RATE(CFS) =     16.92

**************************************************************************
  FLOW PROCESS FROM NODE     201.00 TO NODE     202.00 IS CODE =  52
--------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1369.50  DOWNSTREAM(FEET) =   1351.90
  CHANNEL LENGTH THRU SUBAREA(FEET) =   691.00   CHANNEL SLOPE =  0.0255
  CHANNEL FLOW THRU SUBAREA(CFS) =      16.92
  FLOW VELOCITY(FEET/SEC) =   4.57 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   2.52   Tc(MIN.) =   16.91
  LONGEST FLOWPATH FROM NODE     200.00 TO NODE     202.00 =    1494.00 FEET.
```

```
****************************************************************************
 FLOW PROCESS FROM NODE     202.00 TO NODE     202.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   16.91
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.314
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL POOR COVER
 "OPEN BRUSH"                A        2.85      0.35      1.000    81
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.35
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 SUBAREA AREA(ACRES) =    2.85      SUBAREA RUNOFF(CFS) =    7.60
 EFFECTIVE AREA(ACRES) =      8.55   AREA-AVERAGED Fm(INCH/HR) =  0.35
 AREA-AVERAGED Fp(INCH/HR) =  0.35  AREA-AVERAGED Ap =  1.00
 TOTAL AREA(ACRES) =       8.5       PEAK FLOW RATE(CFS) =      22.79
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)      =        8.5  TC(MIN.) =     16.91
 EFFECTIVE AREA(ACRES) =       8.55  AREA-AVERAGED Fm(INCH/HR)=  0.35
 AREA-AVERAGED Fp(INCH/HR) =  0.35  AREA-AVERAGED Ap = 1.000
 PEAK FLOW RATE(CFS)   =      22.79
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

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************************************************************************
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                      Analysis prepared by:



 ************************** DESCRIPTION OF STUDY **************************
* TEI 3651                                                                *
* EXISTING CONDITION                                                      *
* 100-YEAR EVENT (NODES 300-303)                                          *
 ************************************************************************

  FILE NAME: W:\3651\EX300.DAT
  TIME/DATE OF STUDY: 08:51 05/07/2018
========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
========================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.6000
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.5500

  *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 0.0312 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

************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    301.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   585.00
  ELEVATION DATA: UPSTREAM(FEET) =   1399.00  DOWNSTREAM(FEET) =   1383.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =  13.792
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.745
  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.)
  NATURAL POOR COVER
  "BARREN"                    A        5.85      0.18      1.000    93   13.79
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.18
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      18.77
  TOTAL AREA(ACRES) =      5.85   PEAK FLOW RATE(CFS) =     18.77

************************************************************************
  FLOW PROCESS FROM NODE    301.00 TO NODE    302.00 IS CODE =  52
------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1383.00  DOWNSTREAM(FEET) =   1367.90
  CHANNEL LENGTH THRU SUBAREA(FEET) =   341.00   CHANNEL SLOPE =  0.0443
  CHANNEL FLOW THRU SUBAREA(CFS) =      18.77
  FLOW VELOCITY(FEET/SEC) =   6.20 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.92   Tc(MIN.) =   14.71
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    302.00 =     926.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     302.00 TO NODE     302.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.71
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.603
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                    A        5.35      0.18      1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.18
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =     5.35      SUBAREA RUNOFF(CFS) =   16.48
  EFFECTIVE AREA(ACRES) =    11.20   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.18  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       11.2       PEAK FLOW RATE(CFS) =      34.50

****************************************************************************
  FLOW PROCESS FROM NODE     302.00 TO NODE     303.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1367.90  DOWNSTREAM(FEET) =   1351.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   449.00   CHANNEL SLOPE =  0.0376
  CHANNEL FLOW THRU SUBAREA(CFS) =      34.50
  FLOW VELOCITY(FEET/SEC) =   6.76 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.11   Tc(MIN.) =   15.82
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    303.00 =    1375.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     303.00 TO NODE     303.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.82
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.449
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                    A        7.00      0.18      1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.18
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =     7.00      SUBAREA RUNOFF(CFS) =   20.60
  EFFECTIVE AREA(ACRES) =    18.20   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.18  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       18.2       PEAK FLOW RATE(CFS) =      53.55
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =       18.2  TC(MIN.) =     15.82
  EFFECTIVE AREA(ACRES) =     18.20  AREA-AVERAGED Fm(INCH/HR)=  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.18  AREA-AVERAGED Ap = 1.000
  PEAK FLOW RATE(CFS)    =      53.55
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
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                        Analysis prepared by:



 ************************** DESCRIPTION OF STUDY **************************
* TEI 3651                                                                *
* EXISTING CONDITION                                                      *
* 100-YEAR EVENT (NODES 400-402)                                          *
 **************************************************************************

  FILE NAME: W:\3651\EX400.DAT
  TIME/DATE OF STUDY: 08:53 05/07/2018
==========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==========================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.6000
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.5500

  *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 0.0312 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

**************************************************************************
  FLOW PROCESS FROM NODE    400.00 TO NODE    401.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   598.00
  ELEVATION DATA: UPSTREAM(FEET) =   1399.70  DOWNSTREAM(FEET) =   1377.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =  13.089
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.864
  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.)
  NATURAL POOR COVER
  "BARREN"                   A        8.55      0.18      1.000    93   13.09
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.18
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =     28.35
  TOTAL AREA(ACRES) =      8.55   PEAK FLOW RATE(CFS) =     28.35

**************************************************************************
  FLOW PROCESS FROM NODE    401.00 TO NODE    402.00 IS CODE =  52
--------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1377.50  DOWNSTREAM(FEET) =   1348.40
  CHANNEL LENGTH THRU SUBAREA(FEET) =   804.00   CHANNEL SLOPE =  0.0362
  CHANNEL FLOW THRU SUBAREA(CFS) =      28.35
  FLOW VELOCITY(FEET/SEC) =   6.27 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   2.14   Tc(MIN.) =   15.23
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    402.00 =    1402.00 FEET.
```

```
****************************************************************************
 FLOW PROCESS FROM NODE    402.00 TO NODE    402.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   15.23
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.529
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL POOR COVER
 "BARREN"                   A        7.20      0.18      1.000    93
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.18
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 SUBAREA AREA(ACRES) =    7.20      SUBAREA RUNOFF(CFS) =   21.70
 EFFECTIVE AREA(ACRES) =    15.75   AREA-AVERAGED Fm(INCH/HR) =  0.18
 AREA-AVERAGED Fp(INCH/HR) =  0.18  AREA-AVERAGED Ap =  1.00
 TOTAL AREA(ACRES) =       15.8      PEAK FLOW RATE(CFS) =      47.47
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)      =       15.8  TC(MIN.) =     15.23
 EFFECTIVE AREA(ACRES) =     15.75  AREA-AVERAGED Fm(INCH/HR)=  0.18
 AREA-AVERAGED Fp(INCH/HR) =  0.18  AREA-AVERAGED Ap = 1.000
 PEAK FLOW RATE(CFS)    =     47.47
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

♀

PROPOSED CONDITION

```
**************************************************************************
          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
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 ************************** DESCRIPTION OF STUDY **************************
* TEI JOB 3651                                                            *
* 100-YEAR STORM EVENT                                                    *
* PROPOSED CONDITION (NODES 100-304)                                      *
 **************************************************************************

  FILE NAME: C:\XDRIVE\3651\100P.DAT
  TIME/DATE OF STUDY: 13:47 11/13/2019
==========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==========================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.6000
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.5500

  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*


**************************************************************************
  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) =   381.00
  ELEVATION DATA: UPSTREAM(FEET) =   1397.20  DOWNSTREAM(FEET) =   1386.94

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.748
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.750
  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                  A        1.25      0.80        0.10    52    6.75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
  SUBAREA RUNOFF(CFS) =      6.38
  TOTAL AREA(ACRES) =      1.25   PEAK FLOW RATE(CFS) =      6.38

**************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  31
--------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1382.94  DOWNSTREAM(FEET) =  1376.94
  FLOW LENGTH(FEET) =   200.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   9.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.46
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      6.38
  PIPE TRAVEL TIME(MIN.) =   0.35    Tc(MIN.) =   7.10
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    102.00 =   581.00 FEET.

**************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    102.00 IS CODE =  81
--------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========================================================================
  MAINLINE Tc(MIN) =   7.10
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.577
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  A        1.40      0.80        0.10    52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
  SUBAREA AREA(ACRES) =     1.40      SUBAREA RUNOFF(CFS) =     6.93
  EFFECTIVE AREA(ACRES) =     2.65    AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =     2.65       PEAK FLOW RATE(CFS) =     13.11

**************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    103.00 IS CODE =  31
--------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1376.94  DOWNSTREAM(FEET) =  1371.54
```

```
 FLOW LENGTH(FEET) =   180.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  11.70
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     13.11
 PIPE TRAVEL TIME(MIN.) =   0.26    Tc(MIN.) =   7.36
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    103.00 =   761.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    103.00 TO NODE    103.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN) =   7.36
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.460
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  A        1.55      0.80       0.10    52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =     1.55      SUBAREA RUNOFF(CFS) =     7.51
 EFFECTIVE AREA(ACRES) =     4.20    AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =     4.20       PEAK FLOW RATE(CFS) =      20.34

****************************************************************************
 FLOW PROCESS FROM NODE    103.00 TO NODE    104.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1371.54  DOWNSTREAM(FEET) =  1370.76
 FLOW LENGTH(FEET) =    26.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  13.04
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     20.34
 PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =   7.39
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    104.00 =   787.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    104.00 TO NODE    104.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN) =   7.39
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.445
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  A        1.05      0.80       0.10    52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =     1.05      SUBAREA RUNOFF(CFS) =     5.07
 EFFECTIVE AREA(ACRES) =     5.25    AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =     5.25       PEAK FLOW RATE(CFS) =      25.35

****************************************************************************
 FLOW PROCESS FROM NODE    104.00 TO NODE    113.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1370.76  DOWNSTREAM(FEET) =  1363.35
 FLOW LENGTH(FEET) =   247.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  13.58
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     25.35
 PIPE TRAVEL TIME(MIN.) =   0.30    Tc(MIN.) =   7.69
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    113.00 =  1034.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    113.00 TO NODE    113.00 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) =   5.32
 AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =    5.25
 TOTAL STREAM AREA(ACRES) =    5.25
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     25.35

****************************************************************************
 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) =   495.00
 ELEVATION DATA: UPSTREAM(FEET) =   1381.19  DOWNSTREAM(FEET) =   1368.38
```

```
Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.553
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.375
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                 A        3.00      0.80       0.10     52    7.55
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
SUBAREA RUNOFF(CFS) =     14.30
TOTAL AREA(ACRES) =      3.00   PEAK FLOW RATE(CFS) =     14.30

****************************************************************************
FLOW PROCESS FROM NODE    111.00 TO NODE    112.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =  1364.38  DOWNSTREAM(FEET) =  1364.12
FLOW LENGTH(FEET) =    33.00   MANNING'S N =  0.012
DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   7.03
ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =     14.30
PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   7.63
LONGEST FLOWPATH FROM NODE    110.00 TO NODE    112.00 =   528.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    112.00 TO NODE    112.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN) =   7.63
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.341
SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
COMMERCIAL                 A        1.10      0.80       0.10     52
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
SUBAREA AREA(ACRES) =     1.10      SUBAREA RUNOFF(CFS) =     5.21
EFFECTIVE AREA(ACRES) =     4.10   AREA-AVERAGED Fm(INCH/HR) =  0.08
AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
TOTAL AREA(ACRES) =     4.10      PEAK FLOW RATE(CFS) =     19.42

****************************************************************************
FLOW PROCESS FROM NODE    112.00 TO NODE    113.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =  1364.12  DOWNSTREAM(FEET) =  1361.59
FLOW LENGTH(FEET) =   316.00   MANNING'S N =  0.012
DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   7.71
ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =     19.42
PIPE TRAVEL TIME(MIN.) =   0.68    Tc(MIN.) =   8.31
LONGEST FLOWPATH FROM NODE    110.00 TO NODE    113.00 =   844.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    113.00 TO NODE    113.00 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.) =   8.31
RAINFALL INTENSITY(INCH/HR) =   5.07
AREA-AVERAGED Fm(INCH/HR) =  0.08
AREA-AVERAGED Fp(INCH/HR) =  0.80
AREA-AVERAGED Ap =  0.10
EFFECTIVE STREAM AREA(ACRES) =    4.10
TOTAL STREAM AREA(ACRES) =    4.10
PEAK FLOW RATE(CFS) AT CONFLUENCE =     19.42

** CONFLUENCE DATA **
 STREAM     Q     Tc   Intensity   Fp(Fm)      Ap   Ae      HEADWATER
 NUMBER   (CFS) (MIN.) (INCH/HR) (INCH/HR)        (ACRES)     NODE
    1     25.35   7.69    5.315  0.80( 0.08) 0.10     5.3      100.00
    2     19.42   8.31    5.074  0.80( 0.08) 0.10     4.1      110.00

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     44.19   7.69    5.315  0.80( 0.08) 0.10     9.0      100.00
    2     43.60   8.31    5.074  0.80( 0.08) 0.10     9.4      110.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =     44.19    Tc(MIN.) =     7.69
EFFECTIVE AREA(ACRES) =     9.04   AREA-AVERAGED Fm(INCH/HR) =  0.08
AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
TOTAL AREA(ACRES) =      9.35
LONGEST FLOWPATH FROM NODE    100.00 TO NODE    113.00 =  1034.00 FEET.
```

```
****************************************************************************
 FLOW PROCESS FROM NODE    113.00 TO NODE    114.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1361.59  DOWNSTREAM(FEET) =  1360.34
 FLOW LENGTH(FEET) =   156.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  33.0 INCH PIPE IS  24.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.50
 ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     44.19
 PIPE TRAVEL TIME(MIN.) =   0.27    Tc(MIN.) =   7.97
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    114.00 =  1190.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    114.00 TO NODE    114.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN) =   7.97
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.205
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  A        1.65      0.80        0.10    52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =    1.65      SUBAREA RUNOFF(CFS) =    7.61
 EFFECTIVE AREA(ACRES) =    10.69   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =    11.00      PEAK FLOW RATE(CFS) =      49.33

****************************************************************************
 FLOW PROCESS FROM NODE    114.00 TO NODE    115.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1360.34  DOWNSTREAM(FEET) =  1359.37
 FLOW LENGTH(FEET) =   324.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  42.0 INCH PIPE IS  29.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.78
 ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     49.33
 PIPE TRAVEL TIME(MIN.) =   0.80    Tc(MIN.) =   8.76
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    115.00 =  1514.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    115.00 TO NODE    115.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN) =   8.76
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.916
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  A        0.35      0.80        0.10    52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =    0.35      SUBAREA RUNOFF(CFS) =    1.52
 EFFECTIVE AREA(ACRES) =    11.04   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =    11.35      PEAK FLOW RATE(CFS) =      49.33
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
 FLOW PROCESS FROM NODE    115.00 TO NODE    122.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1359.37  DOWNSTREAM(FEET) =  1359.16
 FLOW LENGTH(FEET) =    68.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  42.0 INCH PIPE IS  29.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.87
 ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     49.33
 PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =   8.93
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    122.00 =  1582.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    122.00 TO NODE    122.00 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.) =   8.93
 RAINFALL INTENSITY(INCH/HR) =   4.86
 AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =   11.04
 TOTAL STREAM AREA(ACRES) =   11.35
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     49.33

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

```
 FLOW PROCESS FROM NODE     120.00 TO NODE     121.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   556.00
 ELEVATION DATA: UPSTREAM(FEET) =   1382.69  DOWNSTREAM(FEET) =   1375.18

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.011
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.834
 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                 A        6.10      0.80       0.10     52    9.01
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA RUNOFF(CFS) =     26.10
 TOTAL AREA(ACRES) =      6.10   PEAK FLOW RATE(CFS) =     26.10

****************************************************************************
 FLOW PROCESS FROM NODE     121.00 TO NODE     122.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1371.18  DOWNSTREAM(FEET) =  1359.16
 FLOW LENGTH(FEET) =   117.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  21.98
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     26.10
 PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =   9.10
 LONGEST FLOWPATH FROM NODE     120.00 TO NODE     122.00 =   673.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     122.00 TO NODE     122.00 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.) =   9.10
 RAINFALL INTENSITY(INCH/HR) =   4.81
 AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =    6.10
 TOTAL STREAM AREA(ACRES) =    6.10
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     26.10

 ** CONFLUENCE DATA **
  STREAM     Q      Tc   Intensity   Fp(Fm)      Ap   Ae      HEADWATER
  NUMBER   (CFS) (MIN.) (INCH/HR) (INCH/HR)        (ACRES)     NODE
     1     49.33   8.93    4.861  0.80( 0.08) 0.10    11.0      100.00
     1     48.47   9.55    4.668  0.80( 0.08) 0.10    11.4      110.00
     2     26.10   9.10    4.806  0.80( 0.08) 0.10     6.1      120.00

 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     75.24   8.93    4.861  0.80( 0.08) 0.10    17.0      100.00
     2     73.81   9.55    4.668  0.80( 0.08) 0.10    17.5      110.00
     3     75.20   9.10    4.806  0.80( 0.08) 0.10    17.2      120.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     75.24    Tc(MIN.) =     8.93
 EFFECTIVE AREA(ACRES) =    17.03   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =     17.45
 LONGEST FLOWPATH FROM NODE     100.00 TO NODE     122.00 =  1582.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     122.00 TO NODE     123.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1359.16  DOWNSTREAM(FEET) =  1358.01
 FLOW LENGTH(FEET) =   454.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  48.0 INCH PIPE IS  38.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.92
 ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     75.24
 PIPE TRAVEL TIME(MIN.) =   1.09    Tc(MIN.) =  10.02
 LONGEST FLOWPATH FROM NODE     100.00 TO NODE     123.00 =  2036.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     123.00 TO NODE     123.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN) =  10.02
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.536
 SUBAREA LOSS RATE DATA(AMC III):
```

```
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 A        2.50      0.80       0.10    52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =     2.50     SUBAREA RUNOFF(CFS) =   10.03
 EFFECTIVE AREA(ACRES) =    19.53   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =    19.95      PEAK FLOW RATE(CFS) =      78.32

****************************************************************************
 FLOW PROCESS FROM NODE    123.00 TO NODE    303.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1358.01  DOWNSTREAM(FEET) =  1343.50
 FLOW LENGTH(FEET) =   590.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  33.0 INCH PIPE IS  24.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  16.67
 ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     78.32
 PIPE TRAVEL TIME(MIN.) =   0.59    Tc(MIN.) =  10.61
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    303.00 =  2626.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    303.00 TO NODE    303.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    200.00 TO NODE    201.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   635.00
 ELEVATION DATA: UPSTREAM(FEET) =   1390.64  DOWNSTREAM(FEET) =   1378.81

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.911
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.867
 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                 A        7.30      0.80       0.10    52    8.91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA RUNOFF(CFS) =     31.45
 TOTAL AREA(ACRES) =      7.30   PEAK FLOW RATE(CFS) =     31.45

****************************************************************************
 FLOW PROCESS FROM NODE    201.00 TO NODE    202.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1374.81  DOWNSTREAM(FEET) =  1373.60
 FLOW LENGTH(FEET) =   242.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  33.0 INCH PIPE IS  22.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.38
 ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     31.45
 PIPE TRAVEL TIME(MIN.) =   0.55    Tc(MIN.) =   9.46
 LONGEST FLOWPATH FROM NODE    200.00 TO NODE    202.00 =   877.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    202.00 TO NODE    202.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN) =   9.46
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.696
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 A        2.85      0.80       0.10    52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =     2.85     SUBAREA RUNOFF(CFS) =   11.84
 EFFECTIVE AREA(ACRES) =    10.15   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =    10.15      PEAK FLOW RATE(CFS) =      42.17

****************************************************************************
 FLOW PROCESS FROM NODE    202.00 TO NODE    203.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1373.60  DOWNSTREAM(FEET) =  1372.70
 FLOW LENGTH(FEET) =   180.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  36.0 INCH PIPE IS  25.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.90
 ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     42.17
 PIPE TRAVEL TIME(MIN.) =   0.38    Tc(MIN.) =   9.84
 LONGEST FLOWPATH FROM NODE    200.00 TO NODE    203.00 =  1057.00 FEET.
```

```
****************************************************************************
 FLOW PROCESS FROM NODE     203.00 TO NODE     203.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN) =   9.84
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.587
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  A        1.60      0.80        0.10    52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =     1.60      SUBAREA RUNOFF(CFS) =     6.49
 EFFECTIVE AREA(ACRES) =    11.75    AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80   AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =     11.75       PEAK FLOW RATE(CFS) =      47.66

****************************************************************************
 FLOW PROCESS FROM NODE     203.00 TO NODE     204.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1372.70  DOWNSTREAM(FEET) =  1370.73
 FLOW LENGTH(FEET) =   394.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  36.0 INCH PIPE IS  28.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.02
 ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     47.66
 PIPE TRAVEL TIME(MIN.) =   0.82    Tc(MIN.) =  10.66
 LONGEST FLOWPATH FROM NODE     200.00 TO NODE     204.00 =  1451.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     204.00 TO NODE     204.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN) =  10.66
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.372
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  A        1.85      0.80        0.10    52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =     1.85      SUBAREA RUNOFF(CFS) =     7.15
 EFFECTIVE AREA(ACRES) =    13.60    AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80   AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =     13.60       PEAK FLOW RATE(CFS) =      52.54

****************************************************************************
 FLOW PROCESS FROM NODE     204.00 TO NODE     302.00 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.) =  10.66
 RAINFALL INTENSITY(INCH/HR) =   4.37
 AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =   13.60
 TOTAL STREAM AREA(ACRES) =   13.60
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     52.54

****************************************************************************
 FLOW PROCESS FROM NODE     300.00 TO NODE     301.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   908.00
 ELEVATION DATA: UPSTREAM(FEET) =   1368.06  DOWNSTREAM(FEET) =   1363.52

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =  13.376
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.814
 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                  A        7.45      0.80        0.10    52   13.38
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA RUNOFF(CFS) =     25.04
 TOTAL AREA(ACRES) =      7.45   PEAK FLOW RATE(CFS) =     25.04

****************************************************************************
 FLOW PROCESS FROM NODE     301.00 TO NODE     302.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1359.52  DOWNSTREAM(FEET) =  1358.98
 FLOW LENGTH(FEET) =   107.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.98
```

```
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     25.04
 PIPE TRAVEL TIME(MIN.) =   0.26    Tc(MIN.) =  13.63
 LONGEST FLOWPATH FROM NODE    300.00 TO NODE    302.00 =  1015.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    302.00 TO NODE    302.00 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.) =  13.63
 RAINFALL INTENSITY(INCH/HR) =   3.77
 AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =    7.45
 TOTAL STREAM AREA(ACRES) =    7.45
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     25.04

 ** CONFLUENCE DATA **
  STREAM     Q     Tc   Intensity   Fp(Fm)      Ap   Ae      HEADWATER
  NUMBER   (CFS) (MIN.) (INCH/HR) (INCH/HR)        (ACRES)    NODE
     1     52.54  10.66    4.372  0.80( 0.08) 0.10    13.6     200.00
     2     25.04  13.63    3.771  0.80( 0.08) 0.10     7.4     300.00

 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     75.30  10.66    4.372  0.80( 0.08) 0.10    19.4     200.00
     2     70.23  13.63    3.771  0.80( 0.08) 0.10    21.0     300.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     75.30    Tc(MIN.) =    10.66
 EFFECTIVE AREA(ACRES) =    19.42   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =     21.05
 LONGEST FLOWPATH FROM NODE    200.00 TO NODE    302.00 =  1451.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    302.00 TO NODE    303.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1358.98  DOWNSTREAM(FEET) =  1343.50
 FLOW LENGTH(FEET) =   247.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  27.0 INCH PIPE IS  20.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  23.36
 ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     75.30
 PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =  10.83
 LONGEST FLOWPATH FROM NODE    200.00 TO NODE    303.00 =  1698.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    303.00 TO NODE    303.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
  STREAM     Q     Tc   Intensity   Fp(Fm)      Ap   Ae      HEADWATER
  NUMBER   (CFS) (MIN.) (INCH/HR) (INCH/HR)        (ACRES)    NODE
     1     75.30  10.83    4.329  0.80( 0.08) 0.10    19.4     200.00
     2     70.23  13.81    3.742  0.80( 0.08) 0.10    21.0     300.00
 LONGEST FLOWPATH FROM NODE    200.00 TO NODE    303.00 =  1698.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     Q     Tc   Intensity   Fp(Fm)      Ap   Ae      HEADWATER
  NUMBER   (CFS) (MIN.) (INCH/HR) (INCH/HR)        (ACRES)    NODE
     1     78.32  10.61    4.383  0.80( 0.08) 0.10    19.5     100.00
     2     78.31  10.78    4.341  0.80( 0.08) 0.10    19.7     120.00
     3     77.11  11.24    4.235  0.80( 0.08) 0.10    20.0     110.00
 LONGEST FLOWPATH FROM NODE      0.00 TO NODE    303.00 =     0.00 FEET.

 ** PEAK FLOW RATE TABLE **
  STREAM     Q     Tc   Intensity   Fp(Fm)      Ap   Ae      HEADWATER
  NUMBER   (CFS) (MIN.) (INCH/HR) (INCH/HR)        (ACRES)    NODE
     1    153.47  10.83    4.329  0.80( 0.08) 0.10    39.2     200.00
     2    138.20  13.81    3.742  0.80( 0.08) 0.10    41.0     300.00
     3    153.02  10.61    4.383  0.80( 0.08) 0.10    38.6     100.00
     4    153.47  10.78    4.341  0.80( 0.08) 0.10    39.1     120.00
     5    151.72  11.24    4.235  0.80( 0.08) 0.10    39.6     110.00
   TOTAL AREA(ACRES) =     41.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     153.47  Tc(MIN.) =   10.832
 EFFECTIVE AREA(ACRES) =    39.18  AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =    41.00
 LONGEST FLOWPATH FROM NODE    200.00 TO NODE    303.00 =  1698.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    303.00 TO NODE    303.00 IS CODE =  12
```

```
------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 1 <<<<<
========================================================================

************************************************************************
 FLOW PROCESS FROM NODE    303.00 TO NODE    304.00 IS CODE =  31
------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
========================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1343.50  DOWNSTREAM(FEET) =  1342.25
 FLOW LENGTH(FEET) =    98.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  48.0 INCH PIPE IS  35.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  15.42
 ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =    153.47
 PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =  10.94
 LONGEST FLOWPATH FROM NODE    200.00 TO NODE    304.00 =  1796.00 FEET.

************************************************************************
 FLOW PROCESS FROM NODE    304.00 TO NODE    304.00 IS CODE =  81
------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
========================================================================
 MAINLINE Tc(MIN) =  10.94
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.304
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  A        0.70      0.80       0.10    52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =    0.70      SUBAREA RUNOFF(CFS) =    2.66
 EFFECTIVE AREA(ACRES) =    39.88   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =    41.70      PEAK FLOW RATE(CFS) =     153.47
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

************************************************************************
 FLOW PROCESS FROM NODE    304.00 TO NODE    305.00 IS CODE =  31
------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
========================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1342.25  DOWNSTREAM(FEET) =  1341.84
 FLOW LENGTH(FEET) =    22.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  45.0 INCH PIPE IS  32.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  17.81
 ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =    153.47
 PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =  10.96
 LONGEST FLOWPATH FROM NODE    200.00 TO NODE    305.00 =  1818.00 FEET.

************************************************************************
 FLOW PROCESS FROM NODE    305.00 TO NODE    305.00 IS CODE =  81
------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
========================================================================
 MAINLINE Tc(MIN) =  10.96
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.299
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL FAIR COVER
 "OPEN BRUSH"                A        0.55      0.61       1.00    66
 COMMERCIAL                  A        5.00      0.80       0.10    52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.70
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.19
 SUBAREA AREA(ACRES) =    5.55      SUBAREA RUNOFF(CFS) =   20.81
 EFFECTIVE AREA(ACRES) =    45.43   AREA-AVERAGED Fm(INCH/HR) =  0.09
 AREA-AVERAGED Fp(INCH/HR) =  0.78  AREA-AVERAGED Ap =  0.11
 TOTAL AREA(ACRES) =    47.25      PEAK FLOW RATE(CFS) =     172.24

 ** PEAK FLOW RATE TABLE **
  STREAM     Q      Tc   Intensity   Fp(Fm)      Ap   Ae      HEADWATER
  NUMBER    (CFS)  (MIN.) (INCH/HR) (INCH/HR)        (ACRES)    NODE
     1    172.24  10.96    4.299  0.78( 0.09) 0.11    45.4      200.00
     2    154.59  13.94    3.721  0.78( 0.09) 0.11    47.3      300.00
     3    172.02  10.74    4.352  0.78( 0.09) 0.11    44.8      100.00
     4    172.29  10.91    4.311  0.78( 0.09) 0.11    45.3      120.00
     5    170.01  11.36    4.206  0.78( 0.09) 0.11    45.8      110.00
 NEW PEAK FLOW DATA ARE:
 PEAK FLOW RATE(CFS) =    172.29  Tc(MIN.) =  10.91
 AREA-AVERAGED Fm(INCH/HR) =  0.09  AREA-AVERAGED Fp(INCH/HR) =  0.78
 AREA-AVERAGED Ap =  0.11  EFFECTIVE AREA(ACRES) =     45.31
========================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)      =     47.25  TC(MIN.) =     10.91
 EFFECTIVE AREA(ACRES) =     45.31  AREA-AVERAGED Fm(INCH/HR)=  0.09
 AREA-AVERAGED Fp(INCH/HR) =  0.78  AREA-AVERAGED Ap =  0.11
 PEAK FLOW RATE(CFS)    =    172.29

 ** PEAK FLOW RATE TABLE **
  STREAM     Q      Tc   Intensity   Fp(Fm)      Ap   Ae      HEADWATER
  NUMBER    (CFS)  (MIN.) (INCH/HR) (INCH/HR)        (ACRES)    NODE
     1    172.02  10.74    4.352  0.78( 0.09) 0.11    44.8      100.00
     2    172.29  10.91    4.311  0.78( 0.09) 0.11    45.3      120.00
     3    172.24  10.96    4.299  0.78( 0.09) 0.11    45.4      200.00
     4    170.01  11.36    4.206  0.78( 0.09) 0.11    45.8      110.00
```

```
      5    154.59  13.94     3.721  0.78( 0.09) 0.11     47.3      300.00
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS

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**************************************************************************
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            Ver. 8.0  Release Date: 01/01/99  License ID 1435

                          Analysis prepared by:

                            THIENES ENGINEERING
                          16800 VALLEY VIEW AVENUE
                            LA MIRADA CA 90638
                     PH: (714) 521-4811 FAX: (714) 521-4173

 ************************** DESCRIPTION OF STUDY **************************
* TEI JOB 3651                                                            *
* 100-YEAR STORM EVENT                                                    *
* PROPOSED CONDITION (NODES 400-401)                                      *
 **************************************************************************

  FILE NAME: C:\XDRIVE\3651\400P.DAT
  TIME/DATE OF STUDY: 15:01 11/13/2019
==========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==========================================================================
                     --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.6000
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.5500

  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*


**************************************************************************
  FLOW PROCESS FROM NODE    400.00 TO NODE    401.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   169.00
  ELEVATION DATA: UPSTREAM(FEET) =   1372.14  DOWNSTREAM(FEET) =   1351.71

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.884
  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                 A        0.25      0.80       0.10    52    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
  SUBAREA RUNOFF(CFS) =      1.53
  TOTAL AREA(ACRES) =      0.25   PEAK FLOW RATE(CFS) =      1.53
==========================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =      0.25  TC(MIN.) =      5.00
  EFFECTIVE AREA(ACRES) =      0.25  AREA-AVERAGED Fm(INCH/HR)=  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
  PEAK FLOW RATE(CFS)    =      1.53
==========================================================================
==========================================================================
  END OF RATIONAL METHOD ANALYSIS

1
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**************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
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            Ver. 8.0  Release Date: 01/01/99  License ID 1435

                          Analysis prepared by:

                            THIENES ENGINEERING
                          16800 VALLEY VIEW AVENUE
                            LA MIRADA CA 90638
                     PH: (714) 521-4811 FAX: (714) 521-4173

 ************************** DESCRIPTION OF STUDY **************************
* TEI JOB 3651                                                            *
* 100-YEAR STORM EVENT                                                    *
* PROPOSED CONDITION (NODES 500-501)                                      *
 **************************************************************************

  FILE NAME: C:\XDRIVE\3651\500P.DAT
  TIME/DATE OF STUDY: 15:03 11/13/2019
==========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==========================================================================
                     --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.6000
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.5500

  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*


**************************************************************************
  FLOW PROCESS FROM NODE    500.00 TO NODE    501.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   269.00
  ELEVATION DATA: UPSTREAM(FEET) =   1365.27  DOWNSTREAM(FEET) =   1352.38

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.232
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.699
  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                  A        0.70      0.80       0.10     52    5.23
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
  SUBAREA RUNOFF(CFS) =      4.17
  TOTAL AREA(ACRES) =      0.70   PEAK FLOW RATE(CFS) =      4.17
==========================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =      0.70  TC(MIN.) =      5.23
  EFFECTIVE AREA(ACRES) =      0.70  AREA-AVERAGED Fm(INCH/HR)=  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
  PEAK FLOW RATE(CFS)    =      4.17
==========================================================================
==========================================================================
  END OF RATIONAL METHOD ANALYSIS

1
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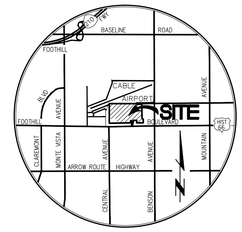
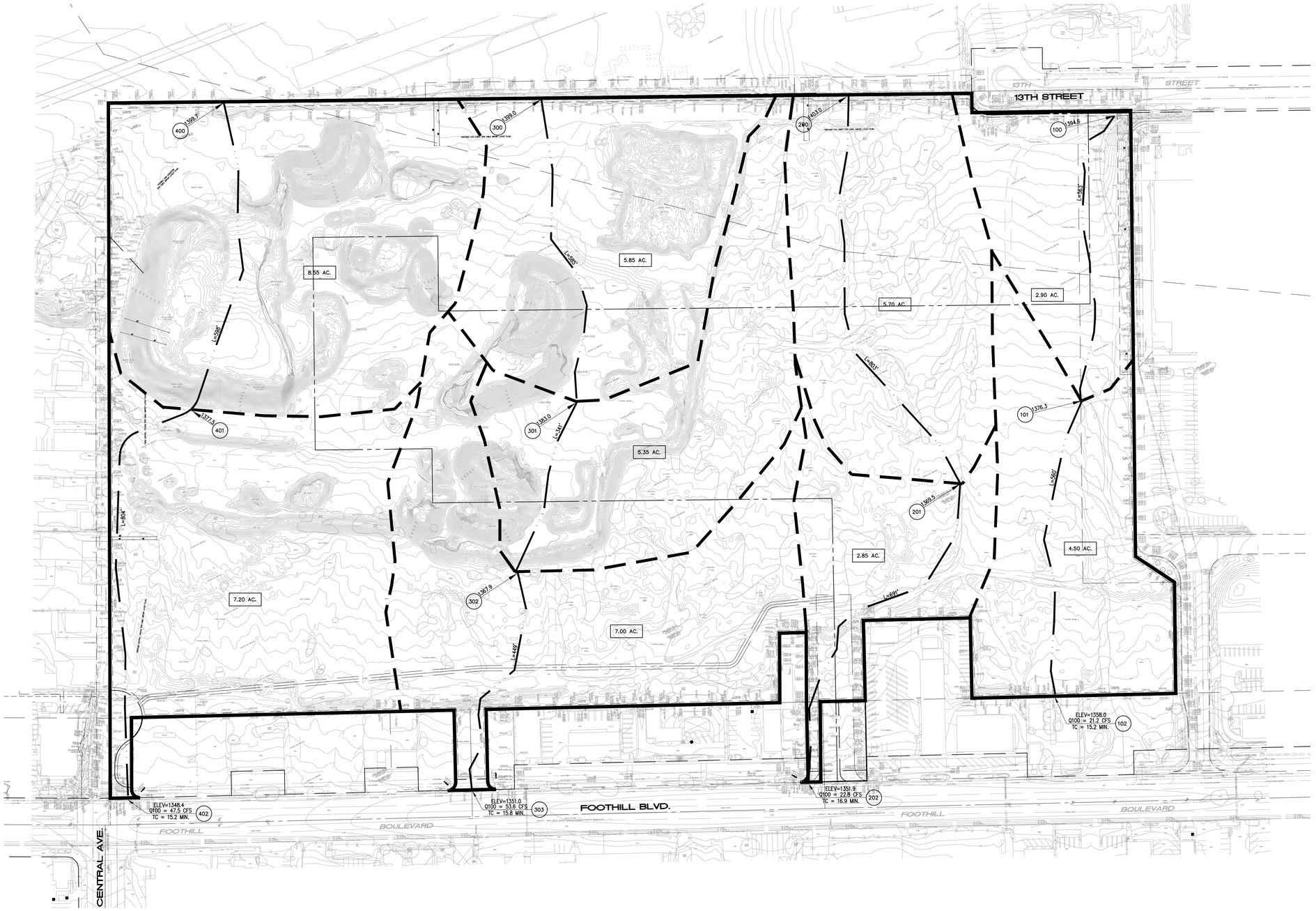
APPENDIX C

HYDROLOGY MAPS



VICINITY MAP
N.T.S.



LEGEND	
	PROJECT BOUNDARY
	SUBAREA BOUNDARY
	FLOWLINE
1.00 AC.	SUBAREA AREA
100	NODE NUMBER

0 40 80 160 240

SCALE: 1"=80'

Last Update: 5/8/18
O:\3600-3699\3651\3651HYD-EX.dwg

CITY OF UPLAND
PUBLIC WORKS DEPARTMENT

EXISTING CONDITION HYDROLOGY MAP
BRIDGE UPLAND
NE FOOTHILL BLVD AND CENTRAL AVE

3561/1 OF 1 SHEET

PREPARED FOR:
BRIDGE DEVELOPMENT PARTNERS
1334 PARKVIEW AVENUE, SUITE 310
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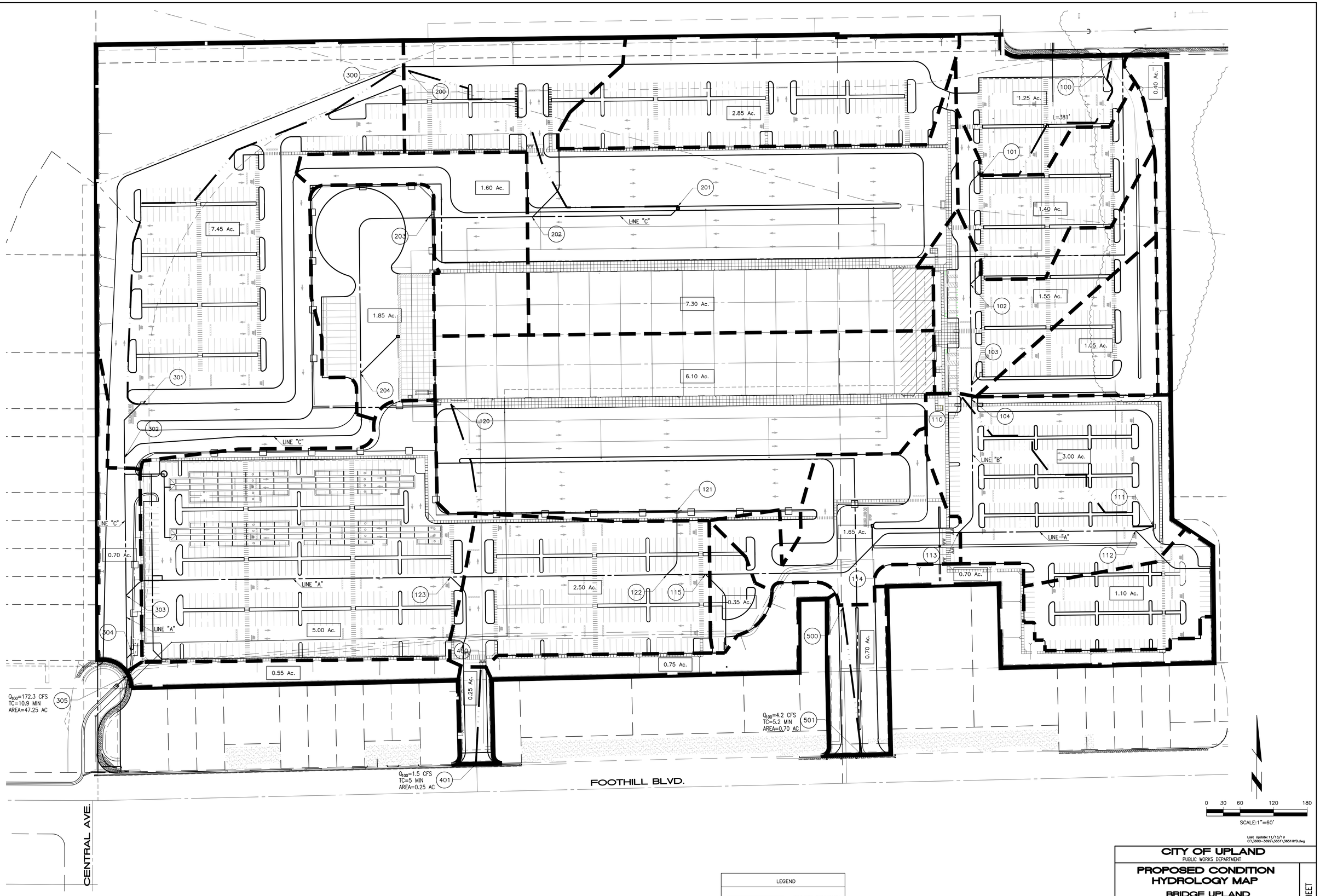
Designed by _____ Date _____
Checked by _____ Date _____
Designed by _____ Date _____
Checked by _____ Date _____

Approved by _____ Date _____
Public Works Director _____ R.C.E. XXXXX

Sheet 1 of 1 Sheets



Last Update: 11/13/19
O:\3600-3699\3651\3651HYD.dwg

LEGEND

- PROJECT BOUNDARY
- SUBAREA BOUNDARY
- FLOWLINE
- 1.00 AC. — SUBAREA AREA
- (100) — NODE NUMBER

PREPARED FOR:

BRIDGE DEVELOPMENT PARTNERS
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CITY OF UPLAND
PUBLIC WORKS DEPARTMENT

PROPOSED CONDITION HYDROLOGY MAP

BRIDGE UPLAND

NE FOOTHILL BLVD AND CENTRAL AVE

Designed by _____ Date _____
Checked by _____ Date _____
Designed by _____ Date _____
Checked by _____ Date _____

Approved by _____ Date _____
Public Works Director _____ R.C.E. XXXXX

Sheet 1 of 1 Sheets

3561/1 OF 1 SHEET