Thienes Engineering, Inc.
CIVIL ENGINEERING • LAND SURVEYING

PRELIMINARY HYDROLOGY CALCULATIONS

FOR

VALLEY BOULEVARD INDUSTRIAL BUILDING
VALLEY BLVD. BETWEEN WILLOW AVE. AND LILAC AVE.
RIALTO, CALIFORNIA

PREPARED FOR

QR BIRTCHER WILLOW AVE OWNER LLC
450 NEWPORT CENTER DRIVE, SUITE 220
NEWPORT BEACH, CA 92660
PHONE: (949) 440-1052

DECEMBER 23, 2019
REVISED FEBRUARY 05, 2020
REVISED FEBRUARY 20, 2020
REVISED AUGUST 22, 2020
REVISED DECEMBER 22, 2020
REVISED JULY 6, 2021

JOB NO. 3836

PREPARED BY

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

PRELIMINARY HYDROLOGY CALCULATIONS

FOR

VALLEY AND WILLOW

PREPARED BY TONY NUÑEZ
UNDER THE SUPERVISION OF

7 / 6 / 21

REINHARD STENZEL DATE:
R.C.E. 56155
EXP. 12/31/22

INTRODUCTION

A: PROJECT LOCATION

The project site is located on the north side of Valley Boulevard and west of Willow Avenue in the City of Rialto, California. Please see following page for vicinity map.

B: STUDY PURPOSE

The purpose of this study is to determine the 100-year existing condition and proposed condition discharges from the project site that ultimately drains to an existing Caltrans maintained concrete channel adjacent to the Interstate 10 Freeway.

C: PROJECT STAFF:

Thienes Engineering staff involved in this study include:

Reinhard Stenzel
Tony Nuñez

Last Update: 2/20/20
O:\3800-3899\3836\3836VICMAP.dwg

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"VICINITY MAP"

FOR

VALLEY BOULEVARD INDUSTRIAL BUILDING
W. VALLEY BLVD AND S. WILLOW AVE. RIALTO, CA

DISCUSSION

Project Description

The project site encompasses approximately 21.00 acres. Improvements to the site include a warehouse type building that is 494,194 square feet. There will be a truck yard on the east side of the proposed building. Vehicle parking will be on the north, west, and south sides of the project. Proposed landscaping will be street adjacent and throughout the site.

Master Plan of Drainage

The City of Rialto Storm Drain Master Plan dated May 19, 2010, delineates proposed storm drain in Valley Boulevard and Willow Avenue. The proposed storm drain will connect to the existing Caltrans maintained concrete channel adjacent to the interstate 10 Freeway. Please see Appendix "A" for Master Drainage Plan and other pertinent reference materials.

Existing Conditions

The project site consists of undeveloped dirt lots that are used for vehicle, equipment, and miscellaneous storage. The barren land is sufficiently compact. The site generally surface drains to the southeast and discharges into Willow Avenue through a parkway culvert. Stormwater is collected in a catch basin that is located south of the parkway culvert. A box culvert carries drainage to the south, under the intersection of Willow Avenue and Valley Boulevard. The stormwater discharges from a culvert in Willow Avenue, continues south via concrete curb and gutter, and spills into the Caltrans maintained concrete channel adjacent to the Interstate 10 Freeway.

The existing condition 100-year peak flow rate from the project site is approximately 39.4 cfs (Node 103).

See Appendix "B" for existing condition hydrology calculations and Appendix "C" for existing condition hydrology map.

Off Site Run-on

Under existing conditions, the project site is currently accepting offsite flows from an adjacent property in the northwest section of the site. The flows enter the site via spillover from a retention basin. The existing condition 100-year peak flow rate from the neighboring property is approximately 19.4 cfs. These flows will be conveyed by a proposed u-channel and storm drain pipe that runs south along the project's westerly property line and will "burp out" a catch basin and parkway drains into Valley Boulevard. A sump pump will drain residual flow that is stored in the catch basin and pipe.

Proposed Conditions

Drainage is collected in catch basins throughout the site. A proposed storm drain system, Line "A", conveys storm water from the northeastern portion of the building to the north, then westerly around the building collecting runoff from the north drive aisle (nodes 100-110), and then south to the west truck yard. The runoff from the western portion of the building and the truck yard is collected in a series of grates (nodes 200-202). The approximate 100 year peak flow rate at node 202 is approximately 36.4 cfs, undetained. The private storm drain continues easterly in the southerly vehicle parking collecting runoff from southern drive aisle and the southeast portion of the site (nodes 210-213). The private storm drain will discharge into the existing public catch basin at the northwest corner of the intersection of Willow Avenue and Valley Boulevard. The total 100 year peak flow rate from the project site is approximately 52.6 cfs.

See Appendix "B" for proposed condition hydrology calculations, Appendix "C" for proposed condition hydrology map and storm drain plans.

Proposed Public Storm Drain Conditions

The runoff will be directed into a proposed 30" RCP which replaces an existing 18"x24" RCB storm drain that discharges at the southwest corner of Valley and Willow. The proposed 30" RCP will transition to a 42" RCP at the northwest corner of Valley and Willow. It will continue southerly in Willow and connect to the existing Caltrans maintained concrete channel where runoff will discharge.

Methodology

The San Bernardino County Rational Method program (AES Software) was used for hydrology calculations. The site is composed of soil type "A" per the San Bernardino County Hydrology Manual. See Appendix "A" for pertinent reference materials. The Flood Routing Analysis program (also AES Software) for San Bernardino County was used for hydrograph and detention calculations.

APPENDIX	DESCRIPTION
A	REFERENCE MATERIAL
B	HYDROLOGY CALCULATIONS
C	HYDROLOGY MAPS

APPENDIX A

REFERENCE MATERIAL

SOURCE: GEOLOGY MAP

SOURCE: GEOLOGY MAP
SOURCE: 1971 SCS SURVEY

Project Site

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-B AREA

FIGURE C-14

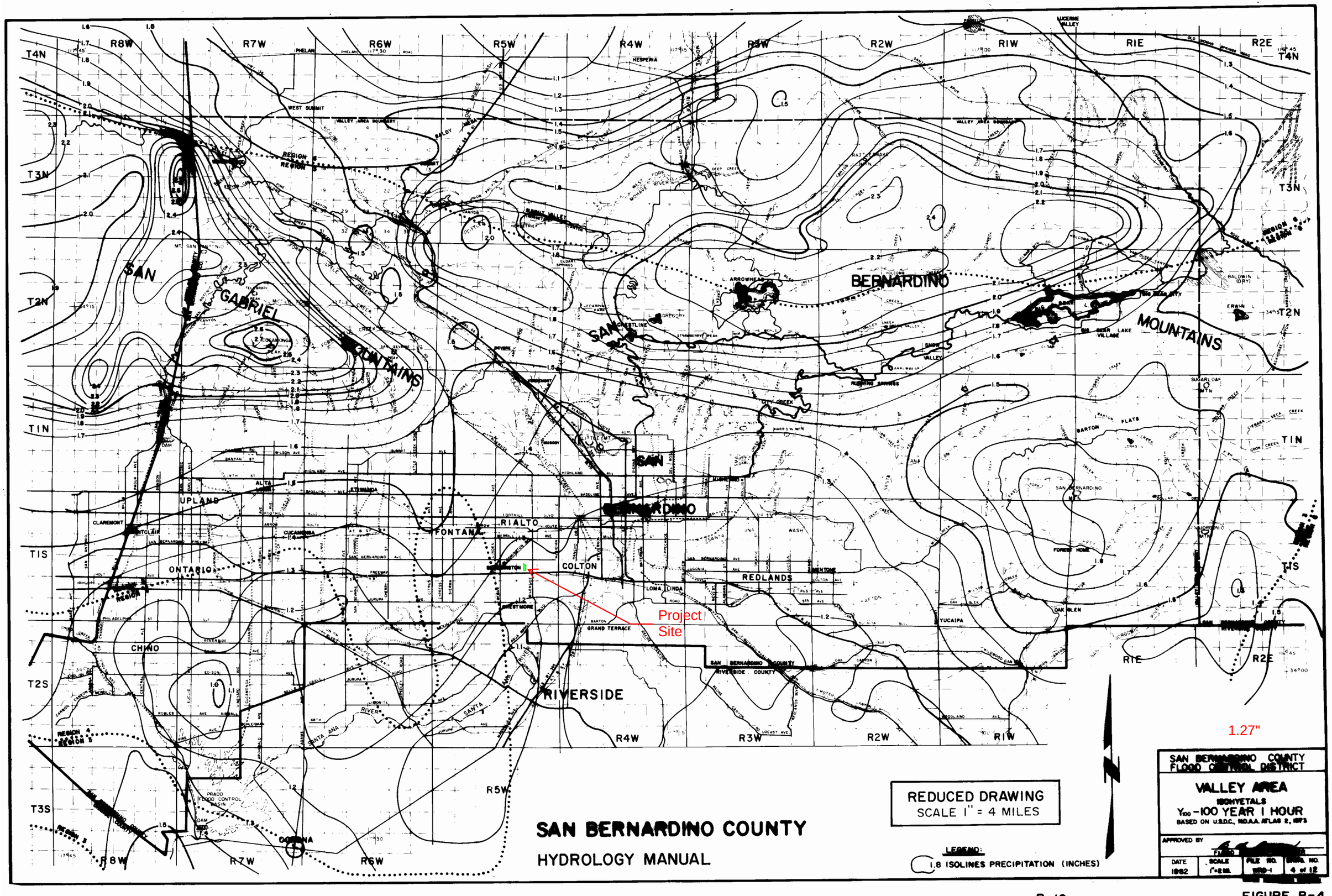
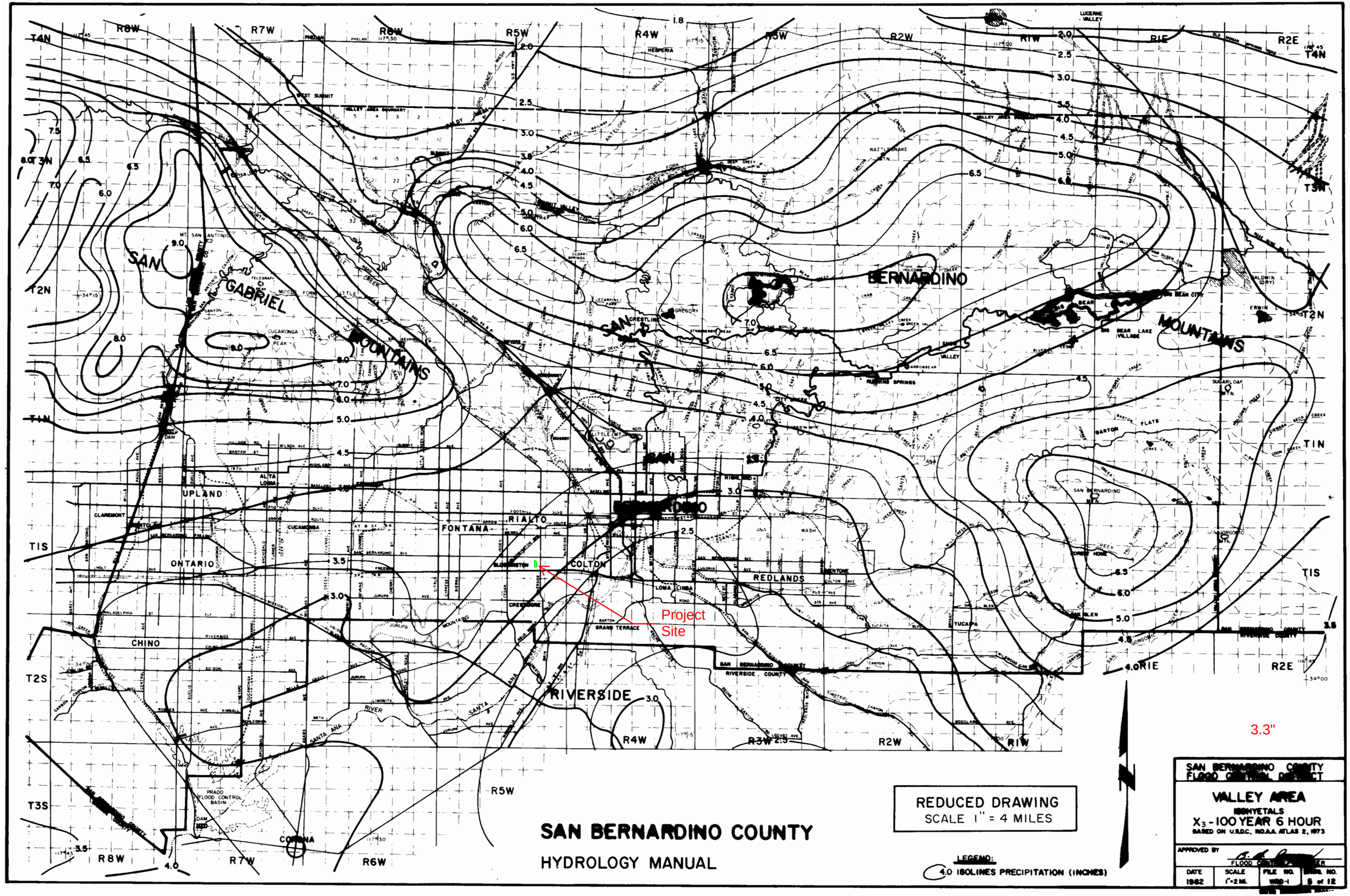

R8W
R7W
R6W
R5W
R4W
R3W
R2W
R1W
R1E
R2E
T4N
T3N
T2N
T1N
T1S
T2S
T3S
SAN GABRIEL MOUNTAINS
SAN BERNARDINO MOUNTAINS
UPLAND
CLAREMONT
ONTARIO
CHINO
RANCHO CUCAMONGA
FONTANA
RIALTO
COLTON
SAN BERNARDINO
REDLANDS
LOMA LINDA
YUCAIPA
RIVERSIDE
GRAND TERRACE
CRESTLINE
LAKE ARROWHEAD
RUNNING SPRINGS
SNOW VALLEY
BIG BEAR LAKE
BIG BEAR CITY
BALDWIN L. (DRY)
ERWIN L.
SUGARLOAF MTN
SAN BERNARDINO MTN
BARTON FLATS
FOREST HOME
OAK GLEN
HESPERIA
PHELAN
WEST SUMMIT
Project Site
1.27"
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
Y100 - 100 YEAR 1 HOUR
BASED ON U.S.D.C., NOAA ATLAS 2, 1973
APPROVED BY
DATE 1982
SCALE 1"=2MI.
FILE NO. SBD-1
DRWG. NO. 4 of 12

FIGURE B-4



B-13

FIGURE B-5

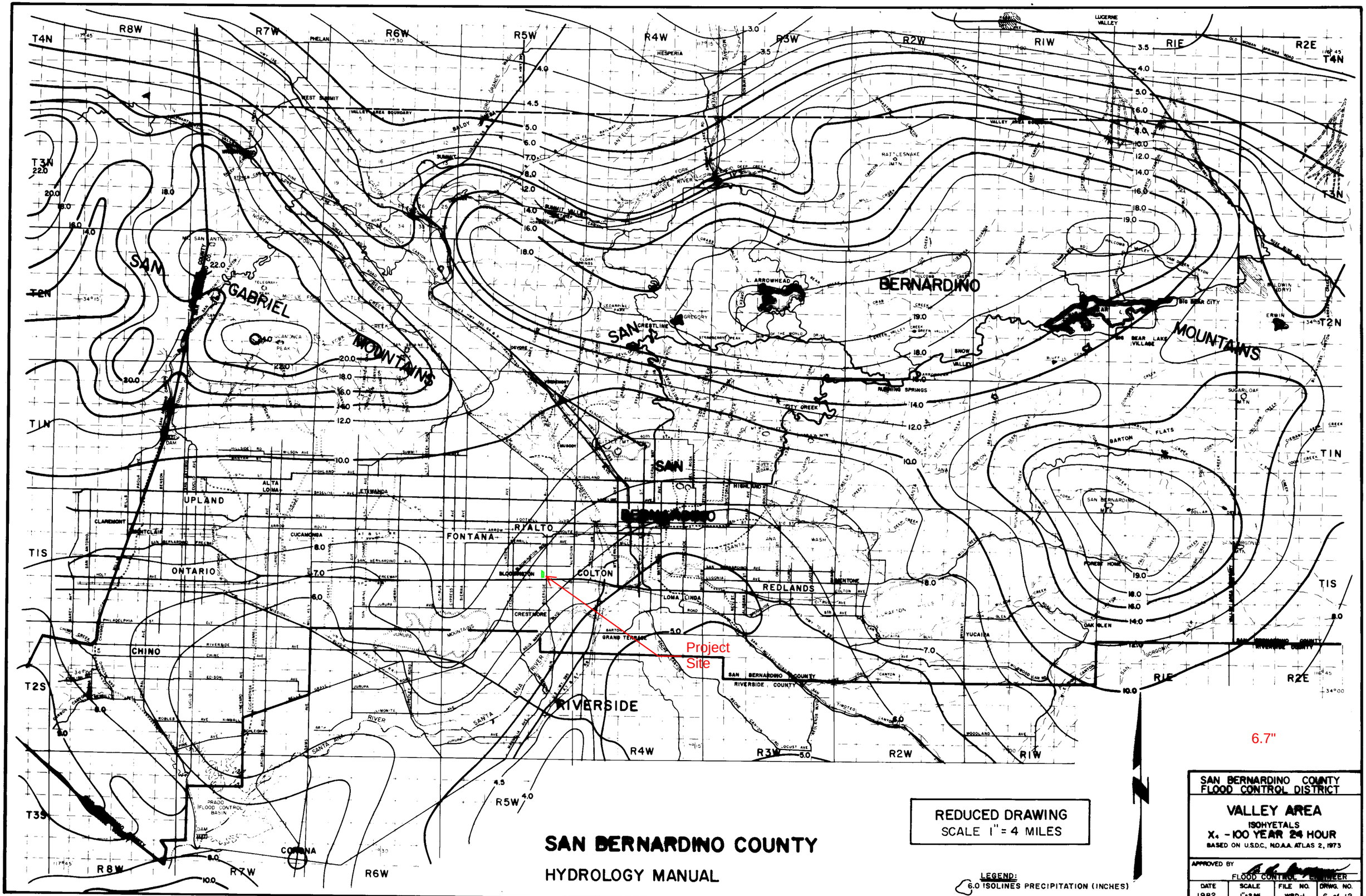

SAN GABRIEL MOUNTAINS
SAN BERNARDINO MOUNTAINS
SAN BERNARDINO
RIVERSIDE
UPLAND
ONTARIO
CHINO
CLAREMONT
ALTA LOMA
ETIWANDA
RANCHO CUCAMONGA
FONTANA
RIALTO
COLTON
REDLANDS
LOMA LINDA
CRESTMORE
BLOOMINGTON
GRAND TERRACE
HIGHLAND
SAN BERNARDINO
RIVERSIDE COUNTY
CRESTLINE
LAKE ARROWHEAD
RUNNING SPRINGS
SNOW VALLEY
BIG BEAR CITY
BEAR LAKE VILLAGE
ERWIN
FAWNSKIN
SUGARLOAF
BARTON FLATS
FOREST HOME
OAK GLEN
YUCAIPA
CITY CREEK
DEVORE
SAN ANDREAS FAULT
SANTA ANA RIVER
MISSION ZANJA CREEK
PRADO FLOOD CONTROL BASIN
CORONA
HESPERIA
LUCERNE VALLEY
T4N
T3N
T2N
T1N
T1S
T2S
T3S
R8W
R7W
R6W
R5W
R4W
R3W
R2W
R1W
R1E
R2E
Project Site
6.7"
REDUCED DRAWING
SCALE 1" = 4 MILES
LEGEND:
6.0 ISOLINES PRECIPITATION (INCHES)
SAN BERNARDINO COUNTY
HYDROLOGY MANUAL
SAN BERNARDINO COUNTY FLOOD CONTROL DISTRICT
VALLEY AREA
ISOHYETALS
X₄ - 100 YEAR 24 HOUR
BASED ON U.S.D.C., N.O.A.A. ATLAS 2, 1973
APPROVED BY
FLOOD CONTROL ENGINEER
DATE 1982
SCALE 1"=2 MI.
FILE NO. WRD-1
DRWG. NO. 6 of 12

FIGURE B-6

344 345 346

360 361 362

376 377 378

W Grovewood Ave

W Pomona St

W Pomona Ave

S Fillmore Ave

S Cactus Ave

S Lilac Ave

W Valley Blvd

San Bernardino Fwy

PROJECT SITE

ID: H3-2 Size:48"
L: 1457' Q100=131 cfs

ID: H2-3 SIZE:36"
L: 1044' Q25= 68 cfs

ID: H2-2 Size:48"
L: 810' Q25=98 cfs

T81

ID: H3-1A SIZE:48"
L: 850' Q25= 53 cfs

746

ID: H2-1A Size:36"
L: 810' Q25=30 cfs

720

744

ID: H1-1A Size:54"
L: 826' Q25=73 cfs

718

ID: XH3-1 SIZE:33"
L: 678' Q100= 65 cfs

ID: XH2-1 SIZE:36"
L: 672' Q25= 82 cfs

ID: H3-1 Size:42"
L: 704' Q100=166 cfs

ID: H2-1 Size:36"
L: 672' Q25=41 cfs

ID: XH4 Ex. Channel
L:1355' Caltrans

745

714

ID: XH3 Ex. Channel
L:1300' Caltrans

743

715

ID: XH2 Ex. Channel
L:1304' Caltrans

CITY OF RIALTO CALIFORNIA

Storm Drain Network

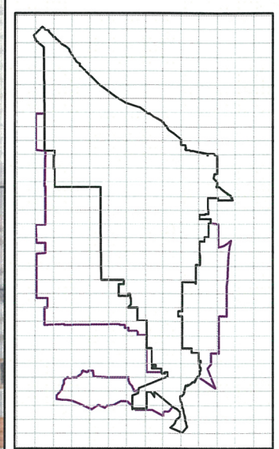
Legend

Storm Drain Master Plan

- Proposed Storm Drain
- Existing Storm Drain
- Proposed Channel
- Existing Channel
- Junction Node
- Transition Node
- Detension Basin
- Master Plan Drainage Area Boundary
- Municipal_Boundary

NORTH

0 100 200 Feet



Mapbook Page: 361
Date: 5/25/2010

CITY OF RIALTO CALIFORNIA

Storm Drain Network

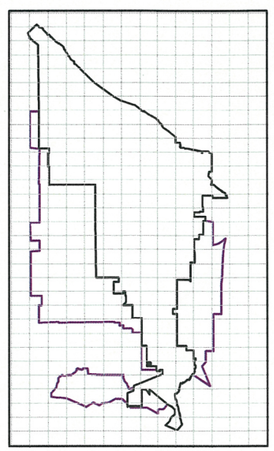
Legend

Storm Drain Master Plan

- Proposed Storm Drain
- Existing Storm Drain
- Proposed Channel
- Existing Channel
- Junction Node
- Transition Node
- Detension Basin
- Master Plan Drainage Area Boundary
- Municipal_Boundary

NORTH

0 100 200 Feet



Mapbook Page: 362
Date: 5/19/2010

345 346 347

361 362 363

377 378 379

PROJECT SITE

S Willow Ave

S Riverside Ave

W Valley Blvd

E Valley Blvd

San Bernardino Fwy

717

742

741

2926

2933

2927

2934

3003716

ID:H1-1A SIZE:54"
L:826' Q25=73 cfs

ID: H1-2 Size:54"
L: 787' Q25=88 cfs

ID: XH1-1 SIZE:33"
L: 637' Q25= 65 cfs

ID: H1-1 Size:36"
L: 635' Q25=60 cfs

ID: XH2 Ex. Channel
L:1304' Caltrans

ID: XH1 Ex. Channel
L:895' Caltrans

Size: 11'x10'
Q:10921 cfs

ID: P1-1 Size:48"
L: 1931' Q100=170 cfs

ID: P1 Size:11'x10'
L: 666' Q100=1129 cfs

ID: XP1 Size:84"
L:650' Q100=239 cfs

Size: (2)14'x10'
Q:12050 cfs

EX SD

ID: XQ1 Size:84"
L:303'

Size: (2) 15'x15'
Q:14180 cfs

ID: XQ1 Size:84"
L:1460'

ID: P2 Size:9'x10'
L: 1339' Q100=977 cfs

ID: XP2 Size:84"
L:1339' Q100=239 cfs

APPENDIX B

HYDROLOGY CALCULATIONS

EXISTING CONDITION

```
**************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
          (Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
         (c) Copyright 1983-2016 Advanced Engineering Software (aes)
             Ver. 23.0  Release Date: 07/01/2016  License ID 1435

                          Analysis prepared by:




 ************************* DESCRIPTION OF STUDY *************************
* VALLEY BOULEVARD INDUSTRIAL BUILDING                                  *
* EXISTING CONDITION 100-YEAR                                           *
* NODES 100-103                                                         *
 *************************************************************************

  FILE NAME: W:\3836\EXIST.DAT
  TIME/DATE OF STUDY: 08:39 02/20/2020
==========================================================================
  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) = 1.2700

  *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    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) =  1000.00
  ELEVATION DATA: UPSTREAM(FEET) =   1087.01  DOWNSTREAM(FEET) =   1073.58

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   19.704
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.477
  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        6.20      0.18      1.000    93   19.70
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.18
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =     12.82
  TOTAL AREA(ACRES) =      6.20   PEAK FLOW RATE(CFS) =     12.82

**************************************************************************
  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) =   1073.58  DOWNSTREAM(FEET) =   1068.39
  CHANNEL LENGTH THRU SUBAREA(FEET) =   325.00   CHANNEL SLOPE =  0.0160
  CHANNEL FLOW THRU SUBAREA(CFS) =      12.82
  FLOW VELOCITY(FEET/SEC) =   3.37 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.61   Tc(MIN.) =   21.31
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    102.00 =    1325.00 FEET.

**************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    102.00 IS CODE =  81
--------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========================================================================
  MAINLINE Tc(MIN.) =   21.31
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.363
  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        6.85      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) =     6.85      SUBAREA RUNOFF(CFS) =   13.46
  EFFECTIVE AREA(ACRES) =     13.05   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.18  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       13.0       PEAK FLOW RATE(CFS) =      25.64

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    103.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1068.39  DOWNSTREAM(FEET) =   1064.22
  CHANNEL LENGTH THRU SUBAREA(FEET) =   364.00   CHANNEL SLOPE =  0.0115
  CHANNEL FLOW THRU SUBAREA(CFS) =      25.64
  FLOW VELOCITY(FEET/SEC) =   3.43 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.77   Tc(MIN.) =   23.08
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    103.00 =    1689.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    103.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   23.08
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.253
  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        8.05      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) =     8.05      SUBAREA RUNOFF(CFS) =   15.02
  EFFECTIVE AREA(ACRES) =     21.10   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.18  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       21.1       PEAK FLOW RATE(CFS) =      39.36
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =       21.1  TC(MIN.) =     23.08
  EFFECTIVE AREA(ACRES) =     21.10  AREA-AVERAGED Fm(INCH/HR)=  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.18  AREA-AVERAGED Ap = 1.000
  PEAK FLOW RATE(CFS)   =      39.36
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
**************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
          (Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
         (c) Copyright 1983-2016 Advanced Engineering Software (aes)
             Ver. 23.0  Release Date: 07/01/2016  License ID 1435

                          Analysis prepared by:
```

```
 ************************* DESCRIPTION OF STUDY *************************
* VALLEY BOULEVARD INDUSTRIAL BUILDING                                  *
* EXISTING CONDITION 100-YEAR                                           *
* NODES 100-101 (NEIGHBORING PROPERTY)                                  *
 *************************************************************************

  FILE NAME: W:\3836\EXOFF.DAT
  TIME/DATE OF STUDY: 09:41 12/11/2019
==========================================================================
  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) = 1.2700

  *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    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) =  1023.00
  ELEVATION DATA: UPSTREAM(FEET) =   1105.22  DOWNSTREAM(FEET) =   1077.06

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.974
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.727
  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        5.90      0.74      0.100    52    9.97
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.74
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =     19.40
  TOTAL AREA(ACRES) =      5.90   PEAK FLOW RATE(CFS) =     19.40
==========================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =         5.9  TC(MIN.) =      9.97
  EFFECTIVE AREA(ACRES) =      5.90  AREA-AVERAGED Fm(INCH/HR)=  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.74  AREA-AVERAGED Ap = 0.100
  PEAK FLOW RATE(CFS)   =      19.40
==========================================================================
==========================================================================
  END OF RATIONAL METHOD ANALYSIS
```

PROPOSED CONDITION

```
**************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
         (Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
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                          Analysis prepared by:

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 ************************* DESCRIPTION OF STUDY *************************
* TEI JOB NO 3836                                                      *
* PROPOSED CONDITION                                                   *
* 100 YEAR STORM EVENT                                                 *
 ************************************************************************

  FILE NAME: W:\3836\P100.DAT
  TIME/DATE OF STUDY: 12:58 07/06/2021
========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
========================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  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) = 1.2700

  *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) =   520.00
  ELEVATION DATA: UPSTREAM(FEET) =  10829.00  DOWNSTREAM(FEET) =   1076.20

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.640
  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        1.00      0.74     0.100    52    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.74
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      5.01
  TOTAL AREA(ACRES) =      1.00   PEAK FLOW RATE(CFS) =      5.01

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

```
 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) =  1074.20  DOWNSTREAM(FEET) =  1073.40
 FLOW LENGTH(FEET) =   150.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.82
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       5.01
 PIPE TRAVEL TIME(MIN.) =   0.52    Tc(MIN.) =    5.52
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    102.00 =     670.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    102.00 TO NODE    102.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    5.52
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.316
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 A        0.80      0.74     0.100    52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.74
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    0.80      SUBAREA RUNOFF(CFS) =    3.77
 EFFECTIVE AREA(ACRES) =      1.80   AREA-AVERAGED Fm(INCH/HR) =  0.07
 AREA-AVERAGED Fp(INCH/HR) =  0.74  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =        1.8       PEAK FLOW RATE(CFS) =       8.49

****************************************************************************
 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) =  1073.40  DOWNSTREAM(FEET) =  1072.90
 FLOW LENGTH(FEET) =   112.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.11
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       8.49
 PIPE TRAVEL TIME(MIN.) =   0.37    Tc(MIN.) =    5.88
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    103.00 =     782.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    103.00 TO NODE    103.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    5.88
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.116
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 A        0.40      0.74     0.100    52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.74
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    0.40      SUBAREA RUNOFF(CFS) =    1.81
 EFFECTIVE AREA(ACRES) =      2.20   AREA-AVERAGED Fm(INCH/HR) =  0.07
 AREA-AVERAGED Fp(INCH/HR) =  0.74  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =        2.2       PEAK FLOW RATE(CFS) =       9.98

****************************************************************************
 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) =  1072.90  DOWNSTREAM(FEET) =  1072.30
 FLOW LENGTH(FEET) =   112.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.4 INCHES
```

```
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.67
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       9.98
 PIPE TRAVEL TIME(MIN.) =   0.33    Tc(MIN.) =    6.21
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    104.00 =     894.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    104.00 TO NODE    104.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    6.21
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.951
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 A        0.40      0.74     0.100    52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.74
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    0.40      SUBAREA RUNOFF(CFS) =    1.76
 EFFECTIVE AREA(ACRES) =      2.60   AREA-AVERAGED Fm(INCH/HR) =  0.07
 AREA-AVERAGED Fp(INCH/HR) =  0.74  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =        2.6       PEAK FLOW RATE(CFS) =      11.41

****************************************************************************
 FLOW PROCESS FROM NODE    104.00 TO NODE    105.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1072.30  DOWNSTREAM(FEET) =  1071.70
 FLOW LENGTH(FEET) =   112.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.78
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      11.41
 PIPE TRAVEL TIME(MIN.) =   0.32    Tc(MIN.) =    6.54
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    105.00 =    1006.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    105.00 TO NODE    105.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    6.54
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.803
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 A        0.40      0.74     0.100    52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.74
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    0.40      SUBAREA RUNOFF(CFS) =    1.70
 EFFECTIVE AREA(ACRES) =      3.00   AREA-AVERAGED Fm(INCH/HR) =  0.07
 AREA-AVERAGED Fp(INCH/HR) =  0.74  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =        3.0       PEAK FLOW RATE(CFS) =      12.77

****************************************************************************
 FLOW PROCESS FROM NODE    105.00 TO NODE    106.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1071.70  DOWNSTREAM(FEET) =  1071.20
 FLOW LENGTH(FEET) =   112.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.64
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      12.77
 PIPE TRAVEL TIME(MIN.) =   0.33    Tc(MIN.) =    6.87
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    106.00 =    1118.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    106.00 TO NODE    106.00 IS CODE =  81
```

```
--------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =    6.87
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.663
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 A        0.40      0.74     0.100    52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.74
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.40      SUBAREA RUNOFF(CFS) =    1.65
  EFFECTIVE AREA(ACRES) =      3.40   AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.74  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        3.4       PEAK FLOW RATE(CFS) =      14.04

********************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    107.00 IS CODE =  31
--------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1071.20  DOWNSTREAM(FEET) =  1070.60
  FLOW LENGTH(FEET) =   112.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.18
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.04
  PIPE TRAVEL TIME(MIN.) =   0.30    Tc(MIN.) =    7.17
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    107.00 =    1230.00 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE    107.00 TO NODE    107.00 IS CODE =  81
--------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =    7.17
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.544
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 A        0.40      0.74     0.100    52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.74
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.40      SUBAREA RUNOFF(CFS) =    1.61
  EFFECTIVE AREA(ACRES) =      3.80   AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.74  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        3.8       PEAK FLOW RATE(CFS) =      15.29

********************************************************************************
  FLOW PROCESS FROM NODE    107.00 TO NODE    108.00 IS CODE =  31
--------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1070.60  DOWNSTREAM(FEET) =  1070.10
  FLOW LENGTH(FEET) =   112.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.78
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      15.29
  PIPE TRAVEL TIME(MIN.) =   0.32    Tc(MIN.) =    7.49
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    108.00 =    1342.00 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =  81
--------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =    7.49
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.425
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
```

```
  COMMERCIAL                  A        0.40      0.74     0.100    52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.74
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.40      SUBAREA RUNOFF(CFS) =    1.57
  EFFECTIVE AREA(ACRES) =      4.20   AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.74  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        4.2       PEAK FLOW RATE(CFS) =      16.45

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    109.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1070.10  DOWNSTREAM(FEET) =  1069.50
  FLOW LENGTH(FEET) =   112.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.33
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      16.45
  PIPE TRAVEL TIME(MIN.) =   0.30    Tc(MIN.) =    7.79
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    109.00 =    1454.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    109.00 TO NODE    109.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.79
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.324
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  A        0.40      0.74     0.100    52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.74
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.40      SUBAREA RUNOFF(CFS) =    1.53
  EFFECTIVE AREA(ACRES) =      4.60   AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.74  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        4.6       PEAK FLOW RATE(CFS) =      17.59

****************************************************************************
  FLOW PROCESS FROM NODE    109.00 TO NODE    110.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1069.50  DOWNSTREAM(FEET) =  1068.90
  FLOW LENGTH(FEET) =   112.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  17.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.57
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      17.59
  PIPE TRAVEL TIME(MIN.) =   0.28    Tc(MIN.) =    8.07
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    110.00 =    1566.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    110.00 TO NODE    110.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.07
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.232
  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      0.74     0.100    52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.74
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.35      SUBAREA RUNOFF(CFS) =    1.31
  EFFECTIVE AREA(ACRES) =      4.95   AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.74  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        5.0       PEAK FLOW RATE(CFS) =      18.52
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    110.00 TO NODE    213.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1068.90  DOWNSTREAM(FEET) =  1063.15
  FLOW LENGTH(FEET) =   136.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.37
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      18.52
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =    8.23
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    213.00 =    1702.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    213.00 TO NODE    213.00 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) =   940.00
  ELEVATION DATA: UPSTREAM(FEET) =   1082.90  DOWNSTREAM(FEET) =   1072.90

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   11.661
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.393
  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        6.65      0.74     0.100    52   11.66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.74
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =     19.87
  TOTAL AREA(ACRES) =      6.65   PEAK FLOW RATE(CFS) =     19.87

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    202.00 IS CODE =  91
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  UPSTREAM NODE ELEVATION(FEET) =   1072.90
  DOWNSTREAM NODE ELEVATION(FEET) =   1070.80
  CHANNEL LENGTH THRU SUBAREA(FEET) =   407.00
  "V" GUTTER WIDTH(FEET) =   3.00   GUTTER HIKE(FEET) =  0.050
  PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0150
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
  MAXIMUM DEPTH(FEET) = 100.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.027
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 A        7.05      0.74     0.100    52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.74
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     29.23
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.77
  AVERAGE FLOW DEPTH(FEET) =   0.49   FLOOD WIDTH(FEET) =   45.78
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   2.44   Tc(MIN.) =   14.11
  SUBAREA AREA(ACRES) =    7.05       SUBAREA RUNOFF(CFS) =   18.74
  EFFECTIVE AREA(ACRES) =   13.70     AREA-AVERAGED Fm(INCH/HR) =   0.07
  AREA-AVERAGED Fp(INCH/HR) =   0.74  AREA-AVERAGED Ap =   0.10
  TOTAL AREA(ACRES) =       13.7         PEAK FLOW RATE(CFS) =      36.41

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  0.53   FLOOD WIDTH(FEET) =   49.89
  FLOW VELOCITY(FEET/SEC.) =   2.91   DEPTH*VELOCITY(FT*FT/SEC) =   1.54
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    202.00 =    1347.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    212.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1066.80  DOWNSTREAM(FEET) =  1065.60
  FLOW LENGTH(FEET) =   239.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  25.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.55
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      36.41
  PIPE TRAVEL TIME(MIN.) =   0.53    Tc(MIN.) =   14.63
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    212.00 =    1586.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    212.00 TO NODE    212.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   14.63
  RAINFALL INTENSITY(INCH/HR) =   2.96
  AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.74
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =      13.70
  TOTAL STREAM AREA(ACRES) =      13.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      36.41

****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    211.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   408.00
  ELEVATION DATA: UPSTREAM(FEET) =   1074.20  DOWNSTREAM(FEET) =   1070.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.622
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.067
  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        1.35      0.74     0.100    52    8.62
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.74
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      4.85
  TOTAL AREA(ACRES) =      1.35   PEAK FLOW RATE(CFS) =      4.85

****************************************************************************
  FLOW PROCESS FROM NODE    211.00 TO NODE    212.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1066.50  DOWNSTREAM(FEET) =  1063.50
  FLOW LENGTH(FEET) =    13.00   MANNING'S N =  0.012
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.76
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.85
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    8.63
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    212.00 =     421.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    212.00 TO NODE    212.00 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.) =    8.63
  RAINFALL INTENSITY(INCH/HR) =   4.06
  AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.74
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       1.35
  TOTAL STREAM AREA(ACRES) =       1.35
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.85

  ** CONFLUENCE DATA **
   STREAM       Q      Tc    Intensity   Fp(Fm)     Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       36.41   14.63    2.961  0.74( 0.07) 0.10      13.7     200.00
      2        4.85    8.63    4.064  0.74( 0.07) 0.10       1.4     210.00

  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       34.54    8.63    4.064  0.74( 0.07) 0.10       9.4     210.00
      2       39.92   14.63    2.961  0.74( 0.07) 0.10      15.1     200.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      39.92    Tc(MIN.) =    14.63
  EFFECTIVE AREA(ACRES) =      15.05   AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.74  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =       15.1
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    212.00 =    1586.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    212.00 TO NODE    213.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1063.50  DOWNSTREAM(FEET) =  1063.15
  FLOW LENGTH(FEET) =   211.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  31.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.10
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      39.92
  PIPE TRAVEL TIME(MIN.) =   0.69    Tc(MIN.) =   15.32
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    213.00 =    1797.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    213.00 TO NODE    213.00 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       34.54    9.36    3.873  0.74( 0.07) 0.10       9.4     210.00
      2       39.92   15.32    2.881  0.74( 0.07) 0.10      15.1     200.00
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    213.00 =    1797.00 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       18.52    8.23    4.183  0.74( 0.07) 0.10       5.0     100.00
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    213.00 =    1702.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc    Intensity   Fp(Fm)     Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       51.38    8.23    4.183  0.74( 0.07) 0.10      13.2     100.00
      2       51.67    9.36    3.873  0.74( 0.07) 0.10      14.4     210.00
      3       52.57   15.32    2.881  0.74( 0.07) 0.10      20.0     200.00
```

```
    TOTAL AREA(ACRES) =        20.0

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       52.57  Tc(MIN.) =   15.323
  EFFECTIVE AREA(ACRES) =     20.00  AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.74  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =       20.0
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    213.00 =    1797.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    213.00 TO NODE    214.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1063.15  DOWNSTREAM(FEET) =  1061.25
  FLOW LENGTH(FEET) =    25.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  23.27
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      52.57
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   15.34
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    214.00 =    1822.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       20.0  TC(MIN.) =     15.34
  EFFECTIVE AREA(ACRES) =     20.00  AREA-AVERAGED Fm(INCH/HR)=  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.74  AREA-AVERAGED Ap = 0.100
  PEAK FLOW RATE(CFS)   =      52.57

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       51.38    8.25    4.178  0.74( 0.07) 0.10      13.2     100.00
      2       51.67    9.37    3.869  0.74( 0.07) 0.10      14.4     210.00
      3       52.57   15.34    2.879  0.74( 0.07) 0.10      20.0     200.00
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

APPENDIX C

DETENTION CALCULATIONS

APPENDIX C

HYDROLOGY MAPS

N.A.P.

N.A.P.

N.A.P.

N.A.P.

N.A.P.

N.A.P.

BOULEVARD

VALLEY

8.05 AC.

6.85 AC.

6.20 AC.

N.A.P.

L = 1,000'

100 1087.01 FS

101 1073.58 FS

102 1068.39 FS

103 1064.22 NG

Q_{100} = 39.4 CFS
T_c = 23.1 MIN.

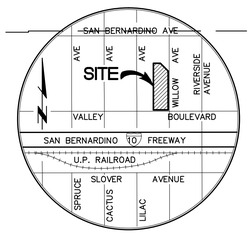
L = 325'

L = 364'

CHANNEL

RIALTO

WILLOW AVENUE



VICINITY MAP
N.T.S.

0 25 50 100 150
SCALE: 1"=50'

LEGEND

	PROJECT BOUNDARY
	SUBAREA BOUNDARY
	FLOW LINE
1.0 AC	SUBAREA AREA
(100)	NODE NUMBER
Tc	TIME OF CONCENTRATION
Q_{100}	DISCHARGE (CUBIC FEET PER SECOND) NUMBER DESIGNATE YEAR OF FREQUENCY

Last Updated:2/20/20
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CITY OF RIALTO
PUBLIC WORKS DEPARTMENT

EXISTING CONDITION HYDROLOGY MAP
VALLEY BOULEVARD INDUSTRIAL BUILDING
WEST VALLEY BLVD. AND S. WILLOW AVENUE

XXXX/1 OF 1 SHEET

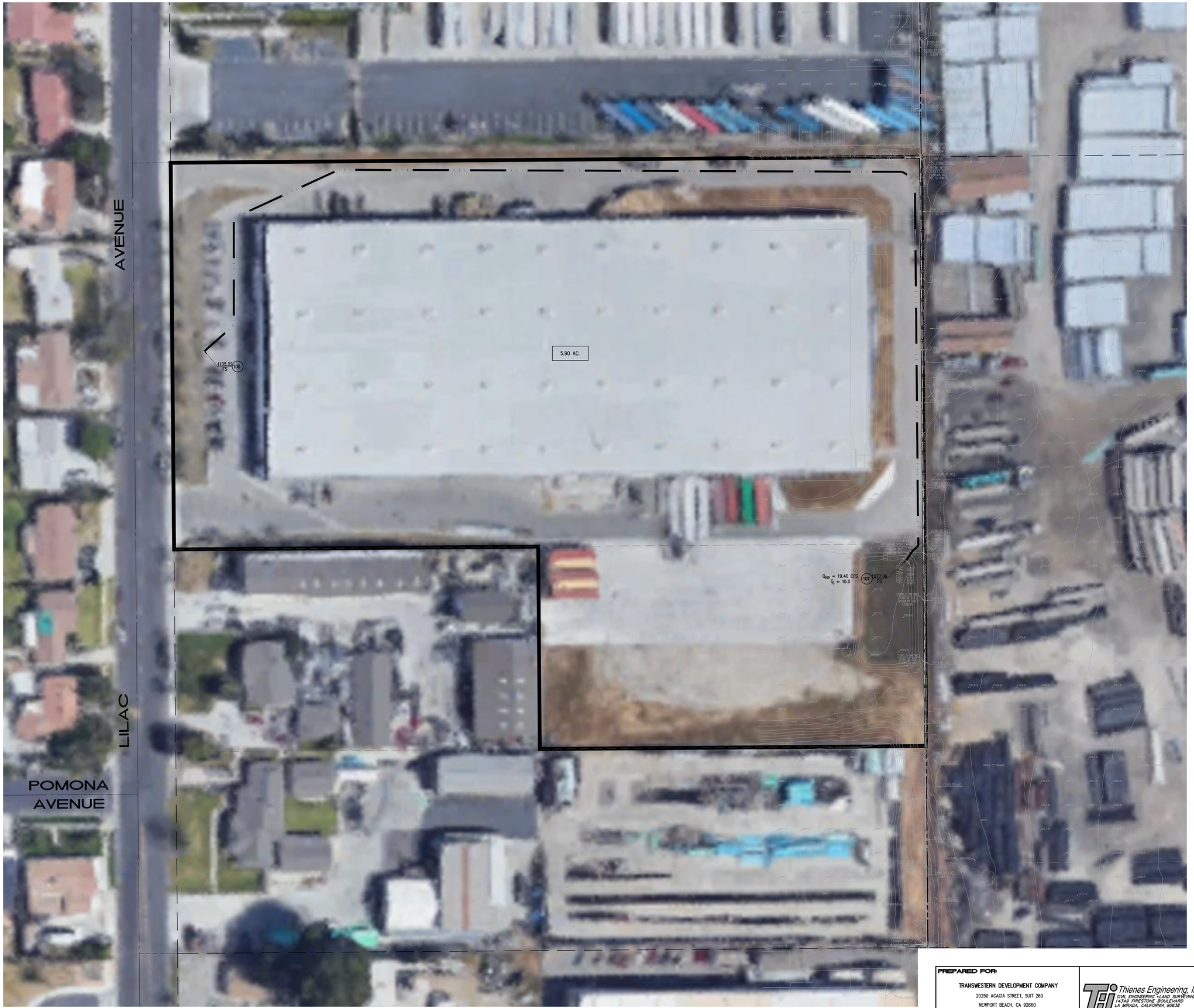
PREPARED FOR:
TRANSWESTERN DEVELOPMENT COMPANY
20250 ACACIA STREET, SUIT 260
NEWPORT BEACH, CA 92660
PHONE: (949) 351-5186

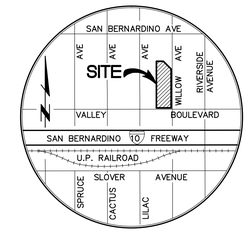
Thienes Engineering, Inc.
CIVIL ENGINEERING • LAND SURVEYING
14349 FIRESTONE BOULEVARD
LA MIRADA, CALIFORNIA 90638
PH:(714)521-4811 FAX(714)521-4173

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





VICINITY MAP

N.T.S.

LEGEND

———	PROJECT BOUNDARY
— — —	SUBAREA BOUNDARY
— · · · —	FLOW LINE
1.0 AC	SUBAREA AREA
(100)	NODE NUMBER
Tc	TIME OF CONCENTRATION
Q_{100}	DISCHARGE (CUBIC FEET PER SECOND) NUMBER DESIGNATE YEAR OF FREQUENCY

0 15 30 60 90

SCALE: 1"=30'

Last Update:12/23/19
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CITY OF RIALTO
PUBLIC WORKS DEPARTMENT

EXISTING CONDITION HYDROLOGY MAP (ADJACENT PROPERTY)

VALLEY BLVD INDUSTRIAL BUILDING
WEST VALLEY BLVD. AND S. WILLOW AVENUE

3836/1 OF 1 SHEET

PREPARED FOR:

TRANSWESTERN DEVELOPMENT COMPANY
20250 ACACIA STREET, SUIT 260
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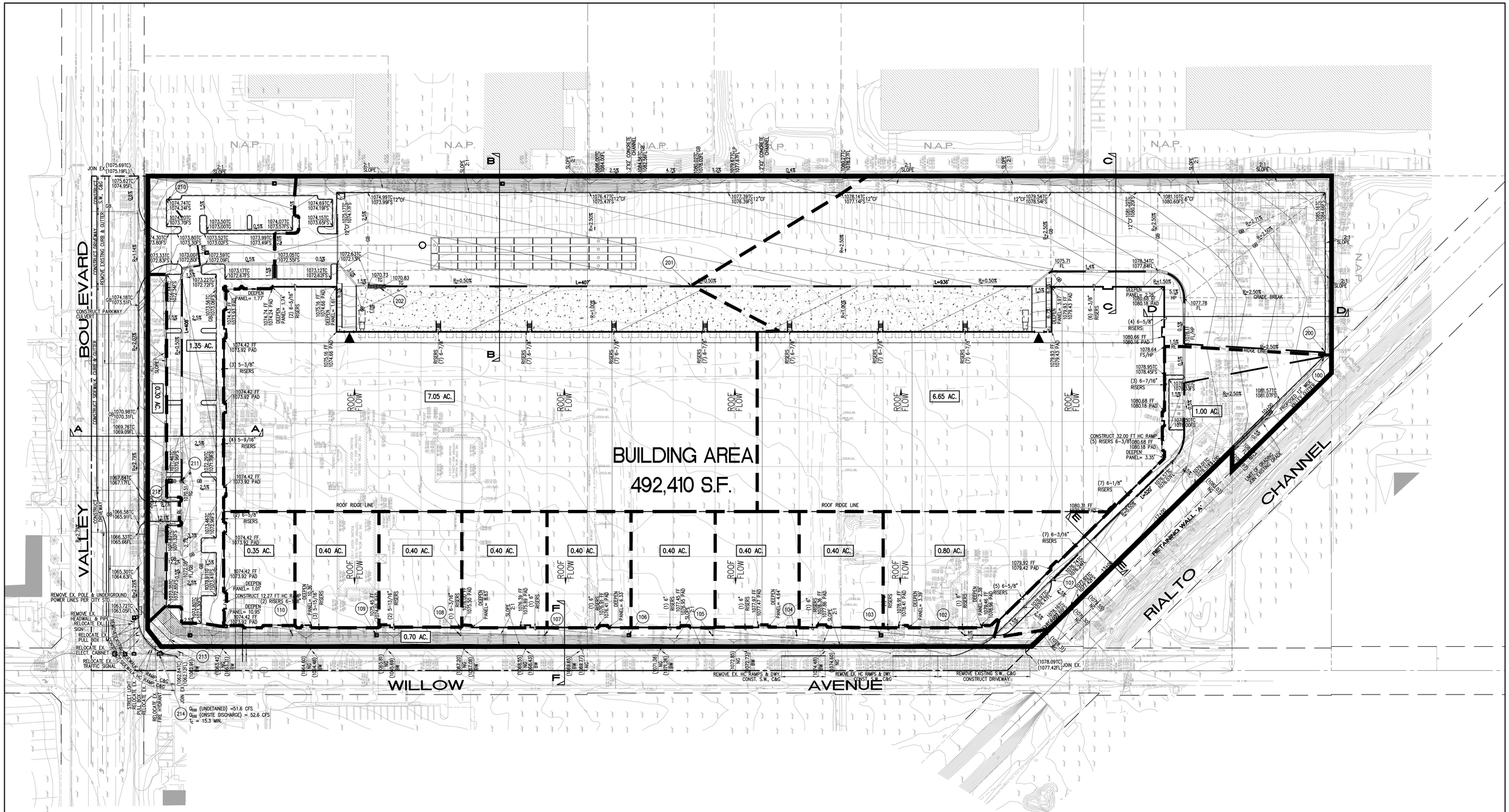
Designed by _____ Date _____
Checked by _____ Date _____
Designed by _____ Date _____
Checked by _____ Date _____

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

Sheet 1 of 1 Sheets



LEGEND

- PROJECT BOUNDARY
- SUBAREA BOUNDARY
- FLOW PATH
- 1.00 AC. — SUBAREA AREA
- 101 — NODE NUMBER
- APPROXIMATE LIMITS OF 100-YEAR PONDING
- T_C — TIME OF CONCENTRATION
- Q_{100} — DISCHARGE (CUBIC FEET PER SECOND) NUMBER DESIGNATE YEAR OF FREQUENCY

0 25 50 100 150

SCALE:1"=50'

Last Update: 7/6/21
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CITY OF RIALTO
PUBLIC WORKS DEPARTMENT

PROPOSED CONDITION HYDROLOGY MAP
VALLEY BOULEVARD INDUSTRIAL BUILDING
WEST VALLEY BLVD. AND S. WILLOW AVENUE

3836/1 OF 1 SHEET

PREPARED FOR:

TRANSWESTERN DEVELOPMENT COMPANY
20250 ACACIA STREET, SUIT 260
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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