Project Name/_____

ATTACHMENT 5

Drainage Report

Attach project's drainage report. Refer to the Subdivision Manual to determine the reporting requirements.

CITY OF CHULA VISTA

PRELIMINARY
DRAINAGE REPORT

NAKANO

City of Chula Vista, CA
November 3, 2022

City of Chula Vista TM#PCS21-0001,
City of San Diego PTS 647766

APN #: 624-071-02
Project Address:
North of the intersection of Dennery Rd & Regatta Lane, Chula Vista, CA 92154

Prepared For:

TriPointe Homes
13400 Sabre Springs Parkway, Suite 200
San Diego, CA 92128

Prepared By:

PROJECT DESIGN CONSULTANTS
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PDC Job No. 4409.02

Prepared by: J.Novoa, PE
Under the supervision of

Chelisa A. Pack

Chelisa A. Pack, PE RCE 71026
Registration Expires 6/30/23

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1. INTRODUCTION

This drainage report has been prepared in support of the preliminary design of the proposed storm drain improvements associated with the Nakano development project (Project) for a Tentative Map(TM) submittal. The Nakano Project is a development project on a previously graded site which will consist of a combination of detached condominiums, duplexes and multi-family dwelling units for residential use. Total Project area is 23.8 acres that is currently a vacant lot. The project is located south of Otay River, and is bounded on the south by a Kaiser Permanente building and hillside, on the east by existing residential homes and on the west by I-805 freeway. The project proposes a total of 61 detached condominiums, 84 duplexes, and 70 multi-family dwelling units. The project is currently within the City of Chula Vista jurisdiction, but may be annexed into the City of San Diego before development. Refer to the Vicinity Map below: Figure 1 for the Project location.

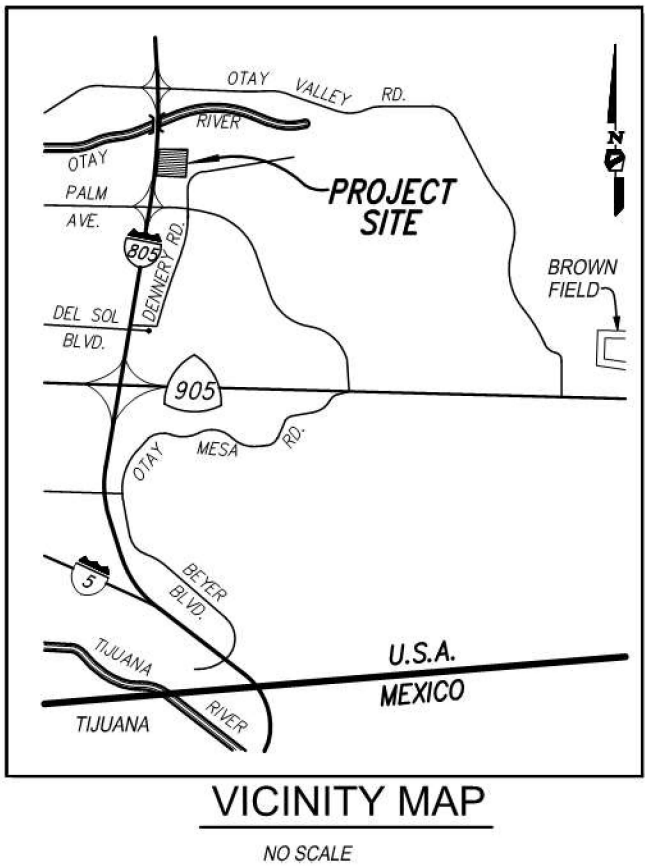


Figure 1: Vicinity Map

At present the site is mostly undeveloped land consisting primarily of natural terrain, with brush and some areas of larger trees along the existing channel going through project site from south to north along the eastern edge of the property carrying mostly runon from the south.

Presently all runoff flows across the site from south to north, and then sheet flows towards the Otay River. The proposed project will continue to send all runoff to the north with a proposed upgraded storm drain that will be constructed to convey water from the site to downstream. The eastern existing flowpath will mostly be preserved and a low flow splitter will be constructed to maintain low flows through this existing area, while the high flows will be piped through the site to the north center outlet. Two biofiltration basins and a Modular Wetland Unit with a detention vault will be implemented to manage water quality while also providing some peak flow detention. From a regional drainage perspective, the runoff through the Project site includes 10.1 acres of upstream offsite area immediately south to the project boundary. The western side of offsite upstream areas drain through the site and along the western edge. The proposed site's storm drain system will outlet into the existing terrain along the north end of the project, and runoff will sheet flow towards the Otay River, which eventually drains into the San Diego Bay. For water quality management concerns refer to the Storm Water Quality Management Plan (SWQMP) prepared by Project Design Consultants for the proposed project treatment BMPs. The project will require an a 401 and 404 permit as well as CA DFW 1602 permit.

2. EXISTING AND PROPOSED DRAINAGE PATTERNS AND IMPROVEMENTS

The following sections provide descriptions of the existing and proposed drainage patterns and improvements for the project.

2.1 Existing Drainage Patterns

There are minimal on-site drainage facilities, except for an existing natural channel along the eastern edge of the property. At present, the majority of the site runoff flows via sheet flow to the north. Upstream of the site, runoff from areas including hillside and a Kaiser Permanente building flow through and along the eastern and western edges of the project site. There is an existing channel along the eastern side of the project that runs along the edge of the property boundary. Refer to Exhibit A in Appendix 6 for the existing condition drainage map.

2.2 Proposed Drainage Improvements

The site will continue to discharge to north with brow ditches and piped storm drain to convey the runon. The project site will include a private storm drain system to convey the onsite flow. The eastern runon will enter a new RCP stormdrain pipe and will take the high flows through the site to outletting the north center outfall of the project. A low flow splitter will be constructed to maintain flow through the existing flowpath. A small wall parallel to the biofiltration basin will be installed to ensure the runon flow does not enter the project site. This area was designed to not commingle the upstream runon and allow a portion of the channel to remain natural. The proposed drainage improvements include private storm drains collecting rooftop and surface drainage. Refer to Exhibit B in Appendix 6 for the proposed condition drainage map.

Water quality requirements will be managed with two biofiltration basins and a detention vault upstream of a modular wetland unit. The detention vault will provide peak flow detention to mitigate for peak flows.

3. HYDROLOGY CRITERIA, METHODOLOGY, AND RESULTS

Hydrologic modeling was performed per City of Chula Vista Subdivision Manual criteria to provide the design flows for storm drain design and improvements.

3.1 Hydrology Criteria

Table 1 summarizes the hydrology assumptions and criteria used for hydrologic modeling.

Table 1: Hydrology Criteria

Existing and Proposed Hydrology:	100-year storm frequency
Soil Type:	Hydrologic Soil Group C & D
Land Use / Runoff Coefficients:	Based on criteria presented in the Revised 2012 City of Chula Vista Subdivision Manual Section 3-200 Hydrology/Drainage/Urban Runoff.
Rainfall intensity:	Based on intensity duration frequency relationships presented in the 2017 Chula Vista Design Standards & Revised 2012 City of Chula Vista Subdivision Manual Section 3-200 Hydrology/Drainage/Urban Runoff, see Appendix 1 .

3.2 Hydrologic Methodology

The Rational Method was used to determine the onsite 100-year storm flow for the design of the Project storm drainpipe improvements. The goal of this analysis was to:

- Determine the design flows for the sizing of any proposed storm drain improvements.
- Determine the differences in the drainage conditions between existing and proposed conditions to confirm there are no significant downstream impacts.

The AES Modified Rational Method program was used to calculate onsite and offsite runoff for the 100-year storm event. The runoff coefficient for hillsides depended on the steepness and ranged from 0.45-0.6, which were used for the existing onsite conditions while higher runoff coefficients for normal residential development, dense residential, and paved surfaces were used for the proposed onsite condition. Offsite hydrology runoff coefficients were based on land uses apparent from aerial photography, which includes vegetated slopes (Flat, Rolling, Hilly and Steep depending on the slope %).

3.3 Description of Hydrologic Modeling Software

The Modified Rational Method was used to determine the 100-year storm flow for the design of the storm system. The Advanced Engineering Software (AES) Rational Method Program was used to perform the hydrologic calculations. This section provides a brief explanation of the computational procedure used in the computer model.

The AES Modified Rational Method Hydrology Program is a computer-aided design program where the user develops a node link model of the watershed. Developing independent node link models for each interior watershed and linking these sub-models together at confluence points creates the node link model. The intensity-duration-frequency relationships are applied to each of the drainage areas in the model to get the peak flow rates at each point of interest.

3.4 Hydrology Results

The Rational Method as presented in the City of Chula Vista Subdivision Manual and County of San Diego Hydrology Manual was used to calculate the existing and proposed conditions peak storm flows. Table 2 below summarizes the Rational Method results for the comparison of the existing and proposed project site.

Table 2: Hydrology Results

	NAKANO HYDROLOGY SUMMARY							
	EXISTING CONDITION				PROPOSED CONDITION (WITH DETENTION)			
OUTFALL OF INTEREST	SYSTEM	AREA (ac)	TC (min)	Q100 (cfs)	SYSTEM	AREA (ac)	TC (min)	Q100 (cfs)
	100	15.8	9.98	50.2	System 1100(including Sys 1000)	16.3	13.41	42.8 (Undetained) 14.2 (Detained)
					1200	16.3		51.9
	130	18.9	11.86	33.4	1300	2.7	10.43	6.5
#1	160	3.5	10.17	7.9	1600	3.3	9.60	7.7
	TOTAL	**38.2**		**91.5**	**TOTAL**	**38.6**		**80.3**
	GRAND TOTAL	**38.2**		**91.5**	**GRAND TOTAL**	**38.6**		**80.3**

The site will detain post-project 100-year flows to less than pre-project 100-year flows. Final detention routing will be provided during final engineering, however, preliminary calculations are provided in Appendix 5.

4. HYDRAULIC CRITERIA, METHODOLOGY, AND RESULTS

Hydraulic calculations for pipes, inlets, and ditches will be performed during final engineering.

5. DETENTION

The vault was sized to attenuate post-project peak flow rates to pre-project levels for the 100-year storm event and water quality pollutant control. By including the north vault for detention, the post-project peak flows will be able to be reduced to below pre-project levels. Detention results from routing the basin outflow hydrographs will be included during final engineering.

6. FEMA LETTER OF MAP AMENDMENT

A Letter of Map Amendment (LOMA) was performed and certified that the existing property elevations within the Nakano project are above the Zone AE special flood hazard area base flood elevations for the Otay River. The entire property was removed from the 100-year floodplain limits. See Appendix 7 for FEMA approval letter for the LOMA.

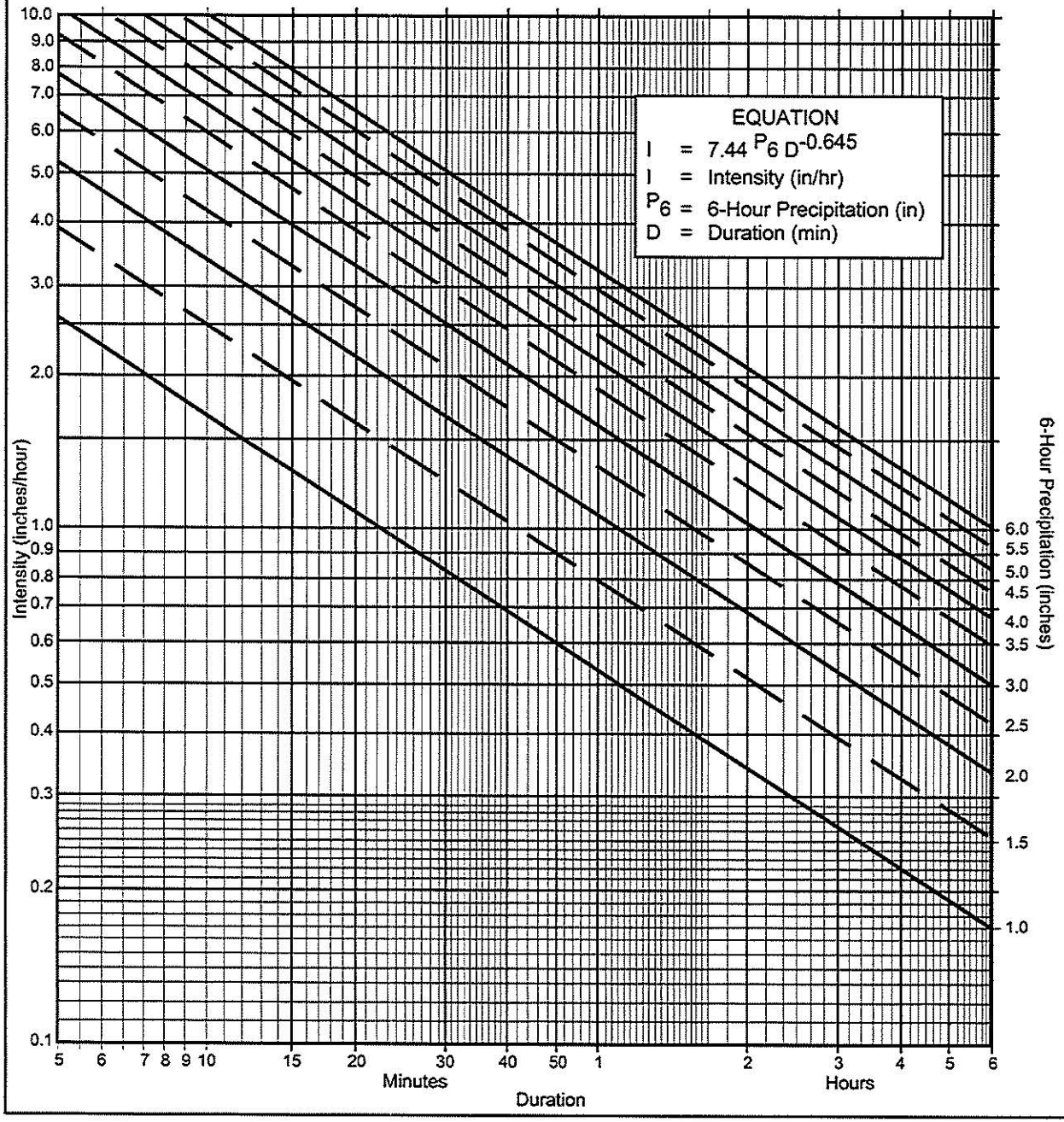
The LOMA (Case Reference #20-09-1145A) demonstrated that the existing elevations of the Nakano property are above the flood elevations indicated by Zone AE as shown in the FIRM Panel No. 06073C2158G, effective date May 16, 2012. The Zone AE floodplain extends along the north portion of the site with water surface elevations ranging from 83.8 to 92.7 ft. MSL (NGVD 29). Note that there a 2.17 conversion from NAVD88 to NGVD29 datum.

7. CONCLUSION

This drainage report has been prepared in support of the preliminary design of the storm drain improvements for the Tentative Map for the Nakano project. The purpose of this report is to provide peak discharges for use in designing the private storm drain systems for the project and to address issues regarding comparing the post-project flows to the pre-project flows. The storm drain system will be sufficient to satisfy City of Chula Vista criteria in the post-development condition.

APPENDIX 1

Supplemental Information (Intensity Duration Frequency Curve, Runoff Coefficients)



Directions for Application:

(1) From precipitation maps determine 6 hr and 24 hr amounts for the selected frequency. These maps are included in the County Hydrology Manual (10, 50, and 100 yr maps included in the Design and Procedure Manual).

(2) Adjust 6 hr precipitation (if necessary) so that it is within the range of 45% to 65% of the 24 hr precipitation (not applicaple to Desert).

(3) Plot 6 hr precipitation on the right side of the chart.

(4) Draw a line through the point parallel to the plotted lines.

(5) This line is the intensity-duration curve for the location being analyzed.

Application Form:

(a) Selected frequency 100 year

(b) P_6 = 2.4 in., P_{24} = 4.0, $\frac{P_6}{P_{24}}$ = 60 %(2)

(c) Adjusted P_6(2) = _____ in.

(d) t_x = _____ min.

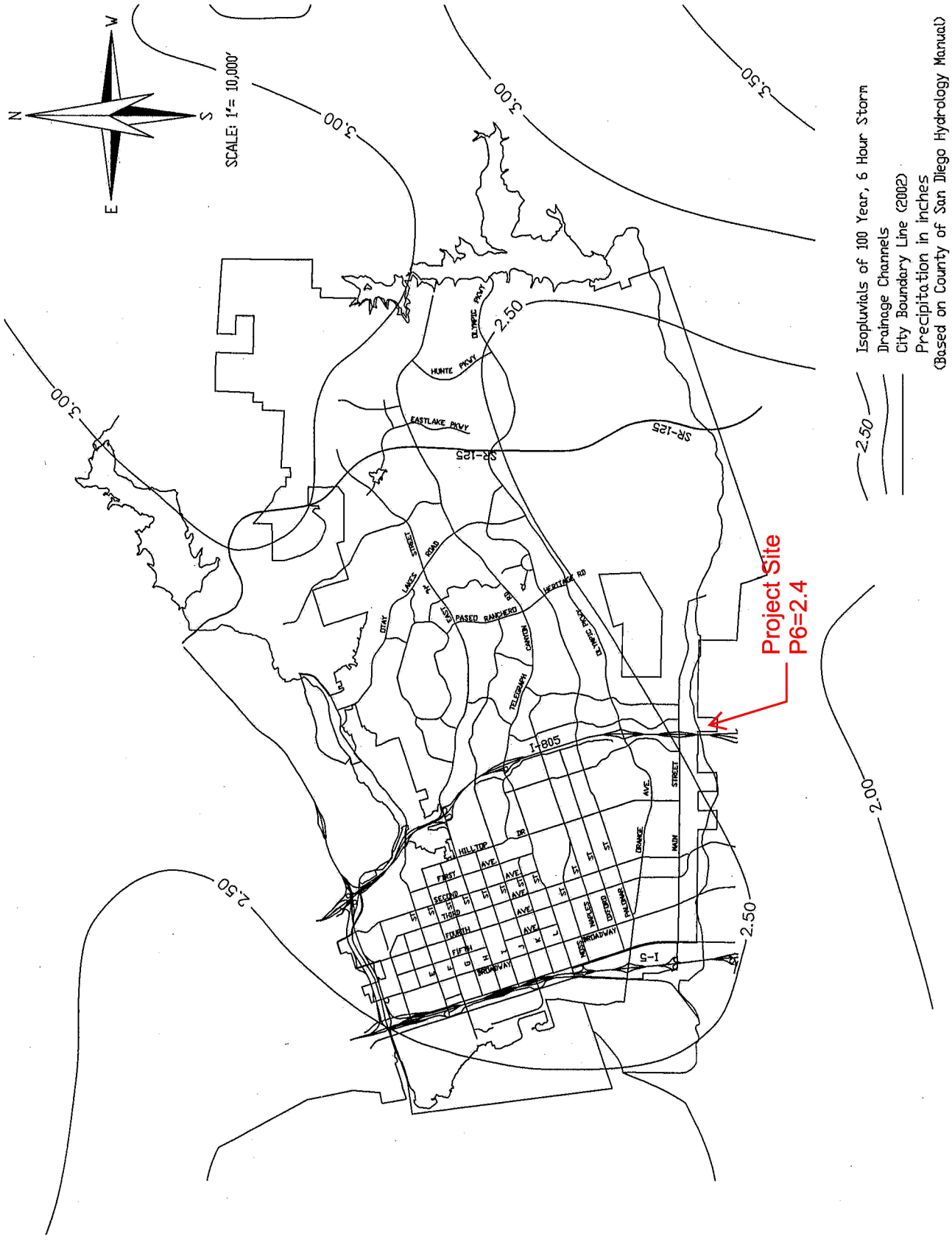
(e) I = _____ in./hr.

Note: This chart replaces the Intensity-Duration-Frequency curves used since 1965.

P6	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
Duration	I	I	I	I	I	I	I	I	I	I	I
5	2.63	3.95	5.27	6.59	7.90	9.22	10.54	11.86	13.17	14.49	15.81
7	2.12	3.18	4.24	5.30	6.36	7.42	8.48	9.54	10.60	11.66	12.72
10	1.68	2.53	3.37	4.21	5.05	5.90	6.74	7.58	8.42	9.27	10.11
15	1.30	1.95	2.59	3.24	3.89	4.54	5.19	5.84	6.49	7.13	7.78
20	1.08	1.62	2.15	2.69	3.23	3.77	4.31	4.85	5.39	5.93	6.46
25	0.93	1.40	1.87	2.33	2.80	3.27	3.73	4.20	4.67	5.13	5.60
30	0.83	1.24	1.66	2.07	2.49	2.90	3.32	3.73	4.15	4.56	4.98
40	0.69	1.03	1.38	1.72	2.07	2.41	2.76	3.10	3.45	3.79	4.13
50	0.60	0.90	1.19	1.49	1.79	2.09	2.39	2.69	2.98	3.28	3.58
60	0.53	0.80	1.06	1.33	1.59	1.86	2.12	2.39	2.65	2.92	3.18
90	0.41	0.61	0.82	1.02	1.23	1.43	1.63	1.84	2.04	2.25	2.45
120	0.34	0.51	0.68	0.85	1.02	1.19	1.36	1.53	1.70	1.87	2.04
150	0.29	0.44	0.59	0.73	0.88	1.03	1.18	1.32	1.47	1.62	1.76
180	0.26	0.39	0.52	0.65	0.78	0.91	1.04	1.18	1.31	1.44	1.57
240	0.22	0.33	0.43	0.54	0.65	0.76	0.87	0.98	1.08	1.19	1.30
300	0.19	0.28	0.38	0.47	0.56	0.66	0.75	0.85	0.94	1.03	1.13
360	0.17	0.25	0.33	0.42	0.50	0.58	0.67	0.75	0.84	0.92	1.00

Intensity-Duration Design Chart - Template

FIGURE 3-1



REVISION	BY	APPROVED	DATE
ORIGINAL			01/02
REVISION	CVM	C. SWANSON	11/02
REVISION	DPH	W. VALLE	11/17

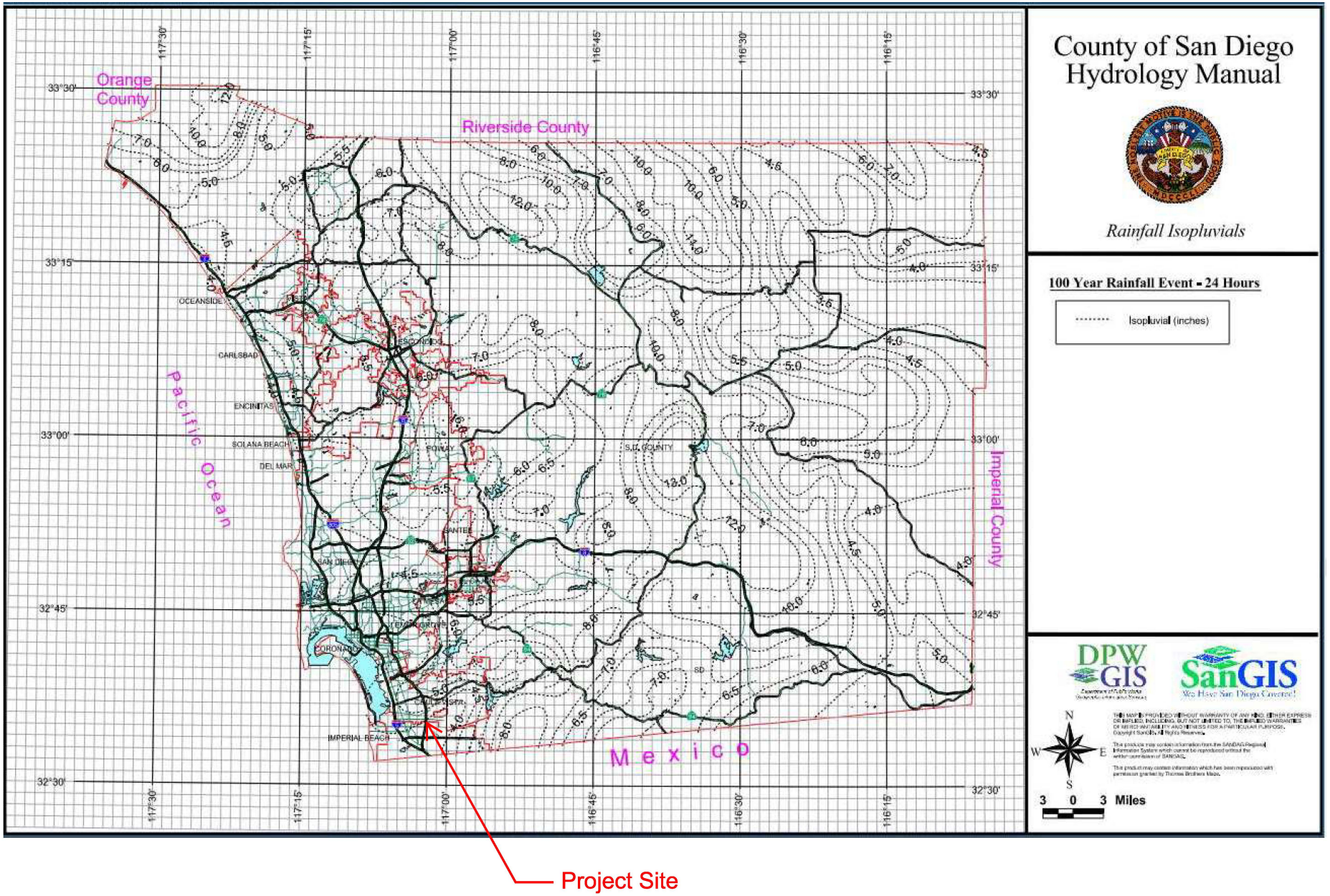
CITY OF CHULA VISTA
ENGINEERING & CAPITAL PROJECTS
STANDARD DRAWING

100-YEAR, 6-HOUR PRECIPITATION

William S. Valle

WILLIAM S. VALLE 11/21/2017
CITY ENGINEER

DRN-04


County of San Diego
Hydrology Manual
Rainfall Isopluvials
100 Year Rainfall Event - 24 Hours
Isopluvial (inches)
Orange County
Riverside County
Imperial County
Pacific Ocean
Mexico
OCEANSIDE
CARLSBAD
ENCINITAS
SOLANA BEACH
DEL MAR
POWAY
S.D. COUNTY
SANTEE
SAN DIEGO
CORONADO
IMPERIAL BEACH
DPW GIS
SanGIS
We Have San Diego Covered!
N
S
E
W
3 0 3 Miles
Project Site

3-203 Hydrology

Developers draining to a river or stream will be required to use the latest adopted County Hydrology Manual to determine the flows expected at a given frequency (Q10, Q50 Q100, etc,) Infill developments will use the following Hydrology requirements. The City Engineer will determine which projects may be considered "infill" projects.

3-203.1 Previously Approved Reports

Runoff quantities; as set forth or derived from the report prepared by Lawrence, Fogg, Florer and Smith titled "A Special Study of Storm Drain Facilities" on file in the office of the City Engineer may be used in the design of drainage facilities in Chula Vista. A hydrologic study prepared and approved at General Development Plan (GDP) or Specific Planning Area (SPA) plan may be used as determined by the City Engineer.

3-203.2

For local drainage basins, storm discharge flow may be estimated based on the Rational Method or the Modified Rational Method. For all lateral and major drainage basins the SCS method, U.S. Army Corps of Engineers HEC-1 computer method or other tabular or computer method may be used upon City Engineer approval.

3-203.3 Rational and Modified Rational Methods

(1) The rational method equation relates storm rainfall intensity (I), a selected runoff coefficient (C) and drainage area (A) to the peak runoff rate (Q):

$$Q = CIA \text{ (Empirical Units)}$$

where:

Q = Peak runoff in cubic feet per second
C = Runoff coefficient
I = Intensity, inches per hours
A = Drainage basin area in acres

Or

$$Q=0.278CIA \text{ (Metric Units)}$$

where:

Q = Peak runoff in cubic meters per second
C = Runoff coefficient
I = Intensity in millimeters per second
A = Drainage area in square kilometers

(2) Coefficient of Runoff: Consider probable development. Use highest number of the following values:

a)	Paved Surface	0.90
b)	Commercial Area	0.85
c)	Dense Residential (R2, R3)	0.75

d)	Normal Residential (R1)	0.65
e)	Suburban Property (RE)	0.55
f)	Barren Slopes Steep	0.80
g)	Barren Slopes Hilly	0.75
h)	" " Rolling	0.70
i)	" " Flat	0.65
j)	Vegetated Slopes Steep	0.60
k)	" " Hilly	0.55
l)	" " Rolling	0.50
m)	" " Flat	0.45
n)	Farm Land	0.35
o)	Parks, Golf Courses	0.30

NOTES:
Steep = Steep, rugged terrain with average slopes generally above 30%.
Hilly = Hilly terrain with average slopes of 10% to 30%.
Rolling = Rolling terrain with average slopes of 5% to 10%.
Flat = Relatively flat land, with average slopes of 0% to 5%.
Composite = Where drainage areas are composed of parts having different runoff characteristics, a weighted coefficient for the total drainage area may be used.

The runoff coefficient for a basin should be a composite coefficient made of the many different runoff coefficients for the sub-areas of the basin per equation:

$$\frac{CA_T = C_1A_1+C_2A_2+\ldots CnAn}{n}$$

(3) Time of Concentration (t_c = minutes) is the time required for runoff to flow from the most remote part of the watershed to the outlet point under consideration. With exceptions for limited natural watersheds, the time of concentration shall be calculated as follows:

a) $t_c = t_i + t_f$ where:

t_i = Initial time or overland flow time of concentration, the time required for runoff to flow to the first inlet or to the street gutter

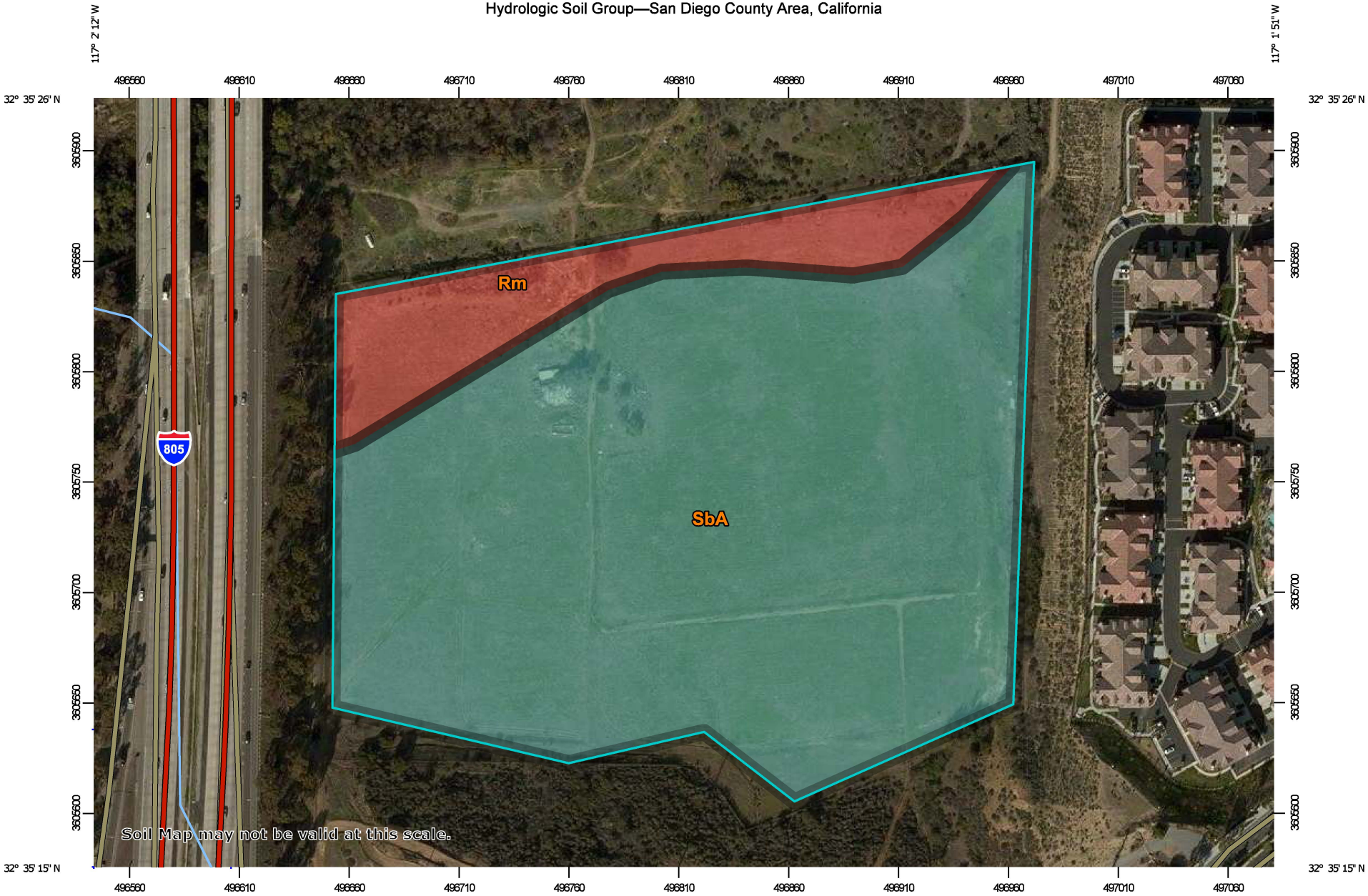
t_f = Travel time of concentration, the time required for runoff to flow within street gutters to inlets, with channels or within storm drain pipes.

b) t_i may be calculated using the following natural watershed flow formula:

$$t_i = 60x\ [(11.9L^3)/H]^{0.385}$$

L = Length of water shed (miles)
H = Difference in elevation from furthermost point to the design point (feet).

Hydrologic Soil Group—San Diego County Area, California



Map Scale: 1:2,460 if printed on A landscape (11" x 8.5") sheet.

N

0 35 70 140 210 Meters

0 100 200 400 600 Feet

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

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

- Streams and Canals

Transportation

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

Background

- Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: San Diego County Area, California
Survey Area Data: Version 14, Sep 16, 2019

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

Date(s) aerial images were photographed: Dec 7, 2014—Jan 4, 2015

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
Rm	Riverwash	D	2.6	14.1%
SbA	Salinas clay loam, 0 to 2 percent slopes, warm MAAT, MLRA 19	C	15.7	85.9%
Totals for Area of Interest			**18.3**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

APPENDIX 2

Existing Conditions Rational Method Computer Output

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

          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
          Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                       2003,1985,1981 HYDROLOGY MANUAL
       (c) Copyright 1982-2016 Advanced Engineering Software (aes)
           Ver. 23.0 Release Date: 07/01/2016  License ID 1509

                        Analysis prepared by:




 ************************* DESCRIPTION OF STUDY *************************
* NAKANO 4409                                                            *
* SYSTEM 100 - EXISTING CONDITIONS                                       *
* 100 YEAR STORM EVENT                                                   *
 ************************************************************************

  FILE NAME: S100E100.DAT
  TIME/DATE OF STUDY: 11:37 06/14/2022
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.400
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  *CITY OF CHULA VISTA TIME-OF-CONCENTRATION MODEL SELECTED.*
   (BASED ON 07/2002 ADOPTED MANUAL)
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *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.*

**************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    105.00 IS CODE =  22
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6000
  USER SPECIFIED Tc(MIN.) =    5.000
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.323
  SUBAREA RUNOFF(CFS) =      1.06
  TOTAL AREA(ACRES) =      0.28   TOTAL RUNOFF(CFS) =      1.06
```



```
**************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    110.00 IS CODE =  51
--------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    240.00  DOWNSTREAM(FEET) =    151.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   825.00   CHANNEL SLOPE =  0.1079
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.643
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.17
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.48
  AVERAGE FLOW DEPTH(FEET) =   0.16   TRAVEL TIME(MIN.) =   3.07
  Tc(MIN.) =    8.07
  SUBAREA AREA(ACRES) =     4.28       SUBAREA RUNOFF(CFS) =   11.92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.600
  TOTAL AREA(ACRES) =        4.6         PEAK FLOW RATE(CFS) =      12.70

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.22   FLOW VELOCITY(FEET/SEC.) =   5.62
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    110.00 =     825.00 FEET.

**************************************************************************
  FLOW PROCESS FROM NODE    110.00 TO NODE    110.00 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.) =    8.07
  RAINFALL INTENSITY(INCH/HR) =   4.64
  TOTAL STREAM AREA(ACRES) =     4.56
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     12.70

**************************************************************************
  FLOW PROCESS FROM NODE    109.00 TO NODE    110.00 IS CODE =   7
--------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
==========================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =   5.00   RAIN INTENSITY(INCH/HOUR) =  6.32
  TOTAL AREA(ACRES) =     5.50   TOTAL RUNOFF(CFS) =     22.20

**************************************************************************
  FLOW PROCESS FROM NODE    110.00 TO NODE    110.00 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.) =    5.00
  RAINFALL INTENSITY(INCH/HR) =   6.32
  TOTAL STREAM AREA(ACRES) =     5.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     22.20

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       12.70     8.07        4.643          4.56
```

```
      2       22.20     5.00        6.323          5.50

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF       Tc       INTENSITY
  NUMBER      (CFS)     (MIN.)    (INCH/HOUR)
      1       30.07     5.00        6.323
      2       29.00     8.07        4.643

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      30.07   Tc(MIN.) =    5.00
  TOTAL AREA(ACRES) =        10.1
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    110.00 =     825.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    110.00 TO NODE    115.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    151.00  DOWNSTREAM(FEET) =    132.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   304.00   CHANNEL SLOPE =  0.0625
  CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   2.500
  MANNING'S FACTOR = 0.045   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.726
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      37.29
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.09
  AVERAGE FLOW DEPTH(FEET) =   0.86   TRAVEL TIME(MIN.) =   0.83
  Tc(MIN.) =    5.83
  SUBAREA AREA(ACRES) =     3.16       SUBAREA RUNOFF(CFS) =   14.47
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.664
  TOTAL AREA(ACRES) =       13.2         PEAK FLOW RATE(CFS) =      50.24

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.00   FLOW VELOCITY(FEET/SEC.) =   6.66
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    115.00 =    1129.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    115.00 TO NODE    120.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    132.00  DOWNSTREAM(FEET) =    105.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   896.00   CHANNEL SLOPE =  0.0301
  CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =  50.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.049
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .4500
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      52.62
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.60
  AVERAGE FLOW DEPTH(FEET) =   0.49   TRAVEL TIME(MIN.) =   4.15
  Tc(MIN.) =    9.98
  SUBAREA AREA(ACRES) =     2.61       SUBAREA RUNOFF(CFS) =    4.76
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.629
  TOTAL AREA(ACRES) =       15.8         PEAK FLOW RATE(CFS) =      50.24

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
```



```
  DEPTH(FEET) =  0.49   FLOW VELOCITY(FEET/SEC.) =   3.54
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    120.00 =    2025.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =       15.8  TC(MIN.) =      9.98
  PEAK FLOW RATE(CFS)    =      50.24
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

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

          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
          Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                       2003,1985,1981 HYDROLOGY MANUAL
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           Ver. 23.0 Release Date: 07/01/2016  License ID 1509

                          Analysis prepared by:




 ************************* DESCRIPTION OF STUDY *************************
* NAKANO 4409                                                           *
* SYSTEM 130 - EXISTING CONDITIONS                                      *
* 100 YEAR  STORM EVENT                                                 *
 ************************************************************************

  FILE NAME: S130E100.DAT
  TIME/DATE OF STUDY: 11:38 06/14/2022
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.400
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  *CITY OF CHULA VISTA TIME-OF-CONCENTRATION MODEL SELECTED.*
   (BASED ON 07/2002 ADOPTED MANUAL)
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *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.*

**************************************************************************
  FLOW PROCESS FROM NODE    130.00 TO NODE    135.00 IS CODE =  22
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5500
  USER SPECIFIED Tc(MIN.) =    5.000
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.323
  SUBAREA RUNOFF(CFS) =      0.90
  TOTAL AREA(ACRES) =      0.26   TOTAL RUNOFF(CFS) =      0.90
```



```
**************************************************************************
  FLOW PROCESS FROM NODE    135.00 TO NODE    140.00 IS CODE =  51
--------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    202.00  DOWNSTREAM(FEET) =    122.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   354.88   CHANNEL SLOPE =  0.2254
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  50.000
  MANNING'S FACTOR = 0.045   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.198
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.94
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.33
  AVERAGE FLOW DEPTH(FEET) =   0.14   TRAVEL TIME(MIN.) =   1.78
  Tc(MIN.) =    6.78
  SUBAREA AREA(ACRES) =     4.50       SUBAREA RUNOFF(CFS) =   14.03
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.597
  TOTAL AREA(ACRES) =        4.8         PEAK FLOW RATE(CFS) =      14.78

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.19   FLOW VELOCITY(FEET/SEC.) =   4.06
  LONGEST FLOWPATH FROM NODE    130.00 TO NODE    140.00 =    1250.88 FEET.

**************************************************************************
  FLOW PROCESS FROM NODE    140.00 TO NODE    142.00 IS CODE =  51
--------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    122.00  DOWNSTREAM(FEET) =    103.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   675.00   CHANNEL SLOPE =  0.0281
  CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =  50.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.827
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .4500
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      19.48
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.73
  AVERAGE FLOW DEPTH(FEET) =   0.33   TRAVEL TIME(MIN.) =   4.12
  Tc(MIN.) =   10.89
  SUBAREA AREA(ACRES) =     5.40       SUBAREA RUNOFF(CFS) =    9.30
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.519
  TOTAL AREA(ACRES) =       10.2         PEAK FLOW RATE(CFS) =      20.18

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.34   FLOW VELOCITY(FEET/SEC.) =   2.72
  LONGEST FLOWPATH FROM NODE    130.00 TO NODE    142.00 =    1925.88 FEET.

**************************************************************************
  FLOW PROCESS FROM NODE    142.00 TO NODE    145.00 IS CODE =  51
--------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    103.00  DOWNSTREAM(FEET) =     98.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   242.00   CHANNEL SLOPE =  0.0207
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   4.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.623
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .4500
```

```
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      27.34
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.19
  AVERAGE FLOW DEPTH(FEET) =   0.54   TRAVEL TIME(MIN.) =   0.96
  Tc(MIN.) =   11.86
  SUBAREA AREA(ACRES) =     8.78       SUBAREA RUNOFF(CFS) =   14.32
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.487
  TOTAL AREA(ACRES) =       18.9         PEAK FLOW RATE(CFS) =      33.42

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.60   FLOW VELOCITY(FEET/SEC.) =   4.49
  LONGEST FLOWPATH FROM NODE    130.00 TO NODE    145.00 =    2167.88 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       18.9  TC(MIN.) =     11.86
  PEAK FLOW RATE(CFS)   =      33.42
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

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

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                        Analysis prepared by:




 ************************* DESCRIPTION OF STUDY *************************
* NAKANO 4409                                                            *
* SYSTEM 160 - EXISTING CONDITIONS                                       *
* 100 YEAR STORM EVENT                                                   *
 ************************************************************************

  FILE NAME: S160E100.DAT
  TIME/DATE OF STUDY: 11:40 06/14/2022
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.400
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  *CITY OF CHULA VISTA TIME-OF-CONCENTRATION MODEL SELECTED.*
   (BASED ON 07/2002 ADOPTED MANUAL)
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *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.*

**************************************************************************
  FLOW PROCESS FROM NODE    160.00 TO NODE    165.00 IS CODE =  22
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5500
  USER SPECIFIED Tc(MIN.) =    5.000
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.323
  SUBAREA RUNOFF(CFS) =      0.80
  TOTAL AREA(ACRES) =      0.23   TOTAL RUNOFF(CFS) =      0.80
```



```
**************************************************************************
  FLOW PROCESS FROM NODE    165.00 TO NODE    170.00 IS CODE =  51
------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    166.00  DOWNSTREAM(FEET) =    118.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   158.93   CHANNEL SLOPE =  0.3020
  CHANNEL BASE(FEET) =    4.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.857
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.82
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.20
  AVERAGE FLOW DEPTH(FEET) =   0.09   TRAVEL TIME(MIN.) =   0.63
  Tc(MIN.) =    5.63
  SUBAREA AREA(ACRES) =     0.58       SUBAREA RUNOFF(CFS) =    2.04
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.586
  TOTAL AREA(ACRES) =        0.8         PEAK FLOW RATE(CFS) =       2.78

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.11   FLOW VELOCITY(FEET/SEC.) =   4.87
  LONGEST FLOWPATH FROM NODE    160.00 TO NODE    170.00 =     400.93 FEET.

**************************************************************************
  FLOW PROCESS FROM NODE    170.00 TO NODE    175.00 IS CODE =  51
------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    118.00  DOWNSTREAM(FEET) =    100.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   681.00   CHANNEL SLOPE =  0.0264
  CHANNEL BASE(FEET) =    4.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.001
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5500
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.85
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.50
  AVERAGE FLOW DEPTH(FEET) =   0.32   TRAVEL TIME(MIN.) =   4.54
  Tc(MIN.) =   10.17
  SUBAREA AREA(ACRES) =     2.73       SUBAREA RUNOFF(CFS) =    6.01
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.558
  TOTAL AREA(ACRES) =        3.5         PEAK FLOW RATE(CFS) =       7.91

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.37   FLOW VELOCITY(FEET/SEC.) =   2.76
  LONGEST FLOWPATH FROM NODE    160.00 TO NODE    175.00 =    1081.93 FEET.
========================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =         3.5  TC(MIN.) =     10.17
  PEAK FLOW RATE(CFS)    =        7.91
========================================================================
========================================================================
  END OF RATIONAL METHOD ANALYSIS
```

APPENDIX 3

Proposed Conditions Rational Method Computer Output

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

          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
          Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
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                        Analysis prepared by:




 ************************* DESCRIPTION OF STUDY *************************
* NAKANO - PROPOSED CONDITION 4409                                      *
* SYSTEM 1000 END AT 1038 FOR DETENTION                                 *
* 100 YEAR STORM EVENT                                                  *
 ************************************************************************

  FILE NAME: 1000P100.DAT
  TIME/DATE OF STUDY: 09:46 06/14/2022
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.400
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  *CITY OF CHULA VISTA TIME-OF-CONCENTRATION MODEL SELECTED.*
   (BASED ON 07/2002 ADOPTED MANUAL)
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *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   14.5      8.0    0.018/0.018/0.020   0.50    1.50 0.0313 0.125 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.*

****************************************************************************
  FLOW PROCESS FROM NODE   1000.00 TO NODE   1001.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .9000
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   123.00
  UPSTREAM ELEVATION(FEET) =    193.00
  DOWNSTREAM ELEVATION(FEET) =    184.00
  ELEVATION DIFFERENCE(FEET) =      9.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    1.854
```



```
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =   100.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.323
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.46
  TOTAL AREA(ACRES) =      0.08   TOTAL RUNOFF(CFS) =      0.46

****************************************************************************
  FLOW PROCESS FROM NODE   1001.00 TO NODE   1002.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  184.00  DOWNSTREAM ELEVATION(FEET) =  118.00
  STREET LENGTH(FEET) =   713.50   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 14.50

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   8.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.85
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.22
    HALFSTREET FLOOD WIDTH(FEET) =    5.29
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.99
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.12
  STREET FLOW TRAVEL TIME(MIN.) =   2.38   Tc(MIN.) =    4.24
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.323
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .9000
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.900
  SUBAREA AREA(ACRES) =    0.49      SUBAREA RUNOFF(CFS) =    2.79
  TOTAL AREA(ACRES) =        0.6        PEAK FLOW RATE(CFS) =       3.24

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.26   HALFSTREET FLOOD WIDTH(FEET) =   7.22
  FLOW VELOCITY(FEET/SEC.) =  5.54   DEPTH*VELOCITY(FT*FT/SEC.) =   1.43
  LONGEST FLOWPATH FROM NODE   1000.00 TO NODE   1002.00 =     836.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1002.00 TO NODE   1003.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   114.00  DOWNSTREAM(FEET) =   113.56
  FLOW LENGTH(FEET) =    22.80   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   7.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.58
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.24
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    4.29
  LONGEST FLOWPATH FROM NODE   1000.00 TO NODE   1003.00 =     859.30 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE   1002.00 TO NODE   1003.00 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.) =    4.29
  RAINFALL INTENSITY(INCH/HR) =   6.32
  TOTAL STREAM AREA(ACRES) =     0.57
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.24

****************************************************************************
  FLOW PROCESS FROM NODE   1014.00 TO NODE   1015.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8500
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   146.70
  UPSTREAM ELEVATION(FEET) =    193.00
  DOWNSTREAM ELEVATION(FEET) =    184.00
  ELEVATION DIFFERENCE(FEET) =      9.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.458
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =   100.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.323
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.54
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.54

****************************************************************************
  FLOW PROCESS FROM NODE   1015.00 TO NODE   1016.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  184.00  DOWNSTREAM ELEVATION(FEET) =  118.00
  STREET LENGTH(FEET) =   668.70   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 14.50

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   8.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.67
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.22
    HALFSTREET FLOOD WIDTH(FEET) =    4.90
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.98
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.08
  STREET FLOW TRAVEL TIME(MIN.) =   2.24   Tc(MIN.) =    4.70
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.323
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8500
```



```
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.850
  SUBAREA AREA(ACRES) =    0.42      SUBAREA RUNOFF(CFS) =    2.26
  TOTAL AREA(ACRES) =        0.5        PEAK FLOW RATE(CFS) =       2.79

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.25   HALFSTREET FLOOD WIDTH(FEET) =   6.59
  FLOW VELOCITY(FEET/SEC.) =  5.49   DEPTH*VELOCITY(FT*FT/SEC.) =   1.36
  LONGEST FLOWPATH FROM NODE   1014.00 TO NODE   1016.00 =     815.40 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1016.00 TO NODE   1003.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   114.00  DOWNSTREAM(FEET) =   113.66
  FLOW LENGTH(FEET) =     8.10   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   5.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.51
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.79
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    4.71
  LONGEST FLOWPATH FROM NODE   1014.00 TO NODE   1003.00 =     823.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1016.00 TO NODE   1003.00 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.) =    4.71
  RAINFALL INTENSITY(INCH/HR) =   6.32
  TOTAL STREAM AREA(ACRES) =     0.52
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.79

  ** CONFLUENCE DATA **
  STREAM     RUNOFF        Tc       INTENSITY       AREA
  NUMBER      (CFS)      (MIN.)    (INCH/HOUR)     (ACRE)
      1        3.24      4.29         6.323          0.57
      2        2.79      4.71         6.323          0.52

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF       Tc       INTENSITY
  NUMBER      (CFS)     (MIN.)    (INCH/HOUR)
      1        5.79      4.29         6.323
      2        6.04      4.71         6.323

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       6.04   Tc(MIN.) =    4.71
  TOTAL AREA(ACRES) =        1.1
  LONGEST FLOWPATH FROM NODE   1000.00 TO NODE   1003.00 =     859.30 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1003.00 TO NODE   1017.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
```

```
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   113.65  DOWNSTREAM(FEET) =   113.37
  FLOW LENGTH(FEET) =    27.50   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS  11.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.89
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =        6.04
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    4.79
  LONGEST FLOWPATH FROM NODE   1000.00 TO NODE   1017.00 =     886.80 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1003.00 TO NODE   1017.00 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.) =    4.79
  RAINFALL INTENSITY(INCH/HR) =   6.32
  TOTAL STREAM AREA(ACRES) =     1.09
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.04

****************************************************************************
  FLOW PROCESS FROM NODE   1009.00 TO NODE   1010.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6000
  USER SPECIFIED Tc(MIN.) =    5.000
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.323
  SUBAREA RUNOFF(CFS) =      0.99
  TOTAL AREA(ACRES) =      0.26   TOTAL RUNOFF(CFS) =      0.99

****************************************************************************
  FLOW PROCESS FROM NODE   1010.00 TO NODE   1011.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    206.00  DOWNSTREAM(FEET) =    146.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   197.00   CHANNEL SLOPE =  0.3046
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  50.000
  MANNING'S FACTOR = 0.045   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.526
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.12
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.83
  AVERAGE FLOW DEPTH(FEET) =   0.08   TRAVEL TIME(MIN.) =   1.16
  Tc(MIN.) =    6.16
  SUBAREA AREA(ACRES) =     1.28       SUBAREA RUNOFF(CFS) =    4.24
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.600
  TOTAL AREA(ACRES) =        1.5         PEAK FLOW RATE(CFS) =       5.11

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.10   FLOW VELOCITY(FEET/SEC.) =   3.31
  LONGEST FLOWPATH FROM NODE   1009.00 TO NODE   1011.00 =     865.70 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1011.00 TO NODE   1012.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
```



```
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    146.00  DOWNSTREAM(FEET) =    132.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    28.50   CHANNEL SLOPE =  0.4912
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
  CHANNEL FLOW THRU SUBAREA(CFS) =       5.11
  FLOW VELOCITY(FEET/SEC.) =  14.83   FLOW DEPTH(FEET) =   0.10
  TRAVEL TIME(MIN.) =   0.03   Tc(MIN.) =    6.19
  LONGEST FLOWPATH FROM NODE   1009.00 TO NODE   1012.00 =     894.20 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1012.00 TO NODE   1013.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.508
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6000
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6000
  SUBAREA AREA(ACRES) =    0.41   SUBAREA RUNOFF(CFS) =    1.35
  TOTAL AREA(ACRES) =        1.9   TOTAL RUNOFF(CFS) =       6.44
  TC(MIN.) =    6.19

****************************************************************************
  FLOW PROCESS FROM NODE   1018.00 TO NODE   1013.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.508
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6500
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6078
  SUBAREA AREA(ACRES) =    0.36   SUBAREA RUNOFF(CFS) =    1.29
  TOTAL AREA(ACRES) =        2.3   TOTAL RUNOFF(CFS) =       7.73
  TC(MIN.) =    6.19

****************************************************************************
  FLOW PROCESS FROM NODE   1013.00 TO NODE   1017.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   114.00  DOWNSTREAM(FEET) =   113.50
  FLOW LENGTH(FEET) =    44.50   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.67
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.73
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =    6.30
  LONGEST FLOWPATH FROM NODE   1009.00 TO NODE   1017.00 =     938.70 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1013.00 TO NODE   1017.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.30
  RAINFALL INTENSITY(INCH/HR) =   5.45
  TOTAL STREAM AREA(ACRES) =     2.31
```

```
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.73

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        6.04     4.79        6.323          1.09
      2        7.73     6.30        5.445          2.31

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF       Tc      INTENSITY
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
      1       11.92     4.79        6.323
      2       12.93     6.30        5.445

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      12.93   Tc(MIN.) =    6.30
  TOTAL AREA(ACRES) =        3.4
  LONGEST FLOWPATH FROM NODE   1009.00 TO NODE   1017.00 =     938.70 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1017.00 TO NODE   1020.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   113.37  DOWNSTREAM(FEET) =   113.00
  FLOW LENGTH(FEET) =   139.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.38
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.93
  PIPE TRAVEL TIME(MIN.) =   0.53    Tc(MIN.) =    6.83
  LONGEST FLOWPATH FROM NODE   1009.00 TO NODE   1020.00 =    1077.70 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1021.00 TO NODE   1020.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.169
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6500
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6904
  SUBAREA AREA(ACRES) =    0.29   SUBAREA RUNOFF(CFS) =    0.97
  TOTAL AREA(ACRES) =        3.7   TOTAL RUNOFF(CFS) =      13.17
  TC(MIN.) =    6.83

****************************************************************************
  FLOW PROCESS FROM NODE   1020.00 TO NODE   1022.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   113.00  DOWNSTREAM(FEET) =   111.40
  FLOW LENGTH(FEET) =   160.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.21
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.17
  PIPE TRAVEL TIME(MIN.) =   0.37    Tc(MIN.) =    7.20
```



```
  LONGEST FLOWPATH FROM NODE   1009.00 TO NODE   1022.00 =    1237.70 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1022.00 TO NODE   1022.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.20
  RAINFALL INTENSITY(INCH/HR) =   5.00
  TOTAL STREAM AREA(ACRES) =     3.69
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     13.17

****************************************************************************
  FLOW PROCESS FROM NODE   1023.00 TO NODE   1024.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6500
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   114.70
  UPSTREAM ELEVATION(FEET) =    116.90
  DOWNSTREAM ELEVATION(FEET) =    114.90
  ELEVATION DIFFERENCE(FEET) =      2.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.922
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    77.44
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.669
  SUBAREA RUNOFF(CFS) =      0.74
  TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      0.74

****************************************************************************
  FLOW PROCESS FROM NODE   1024.00 TO NODE   1025.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  114.90  DOWNSTREAM ELEVATION(FEET) =  110.90
  STREET LENGTH(FEET) =   222.90   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 14.50

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   8.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.76
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.27
    HALFSTREET FLOOD WIDTH(FEET) =    8.03
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.53
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.69
  STREET FLOW TRAVEL TIME(MIN.) =   1.47   Tc(MIN.) =    7.39
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.914
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6500
```

```
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.650
  SUBAREA AREA(ACRES) =     0.64      SUBAREA RUNOFF(CFS) =     2.04
  TOTAL AREA(ACRES) =         0.8        PEAK FLOW RATE(CFS) =       2.68

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   9.72
  FLOW VELOCITY(FEET/SEC.) =  2.78   DEPTH*VELOCITY(FT*FT/SEC.) =   0.84
  LONGEST FLOWPATH FROM NODE   1023.00 TO NODE   1025.00 =     337.60 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1025.00 TO NODE   1022.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   108.00  DOWNSTREAM(FEET) =   107.50
  FLOW LENGTH(FEET) =     7.81   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   4.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.83
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.68
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    7.40
  LONGEST FLOWPATH FROM NODE   1023.00 TO NODE   1022.00 =     345.41 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1025.00 TO NODE   1022.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.40
  RAINFALL INTENSITY(INCH/HR) =   4.91
  TOTAL STREAM AREA(ACRES) =     0.84
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.68

****************************************************************************
  FLOW PROCESS FROM NODE   1019.00 TO NODE   1026.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6500
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   117.20
  UPSTREAM ELEVATION(FEET) =    115.70
  DOWNSTREAM ELEVATION(FEET) =    113.60
  ELEVATION DIFFERENCE(FEET) =      2.10
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.887
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    77.92
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.691
  SUBAREA RUNOFF(CFS) =      0.85
  TOTAL AREA(ACRES) =      0.23   TOTAL RUNOFF(CFS) =      0.85

****************************************************************************
  FLOW PROCESS FROM NODE   1026.00 TO NODE   1027.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
```



```
  UPSTREAM ELEVATION(FEET) =  114.60  DOWNSTREAM ELEVATION(FEET) =  110.90
  STREET LENGTH(FEET) =   234.70   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 14.50

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   8.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.16
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    9.09
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.51
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.73
  STREET FLOW TRAVEL TIME(MIN.) =   1.56   Tc(MIN.) =    7.44
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.892
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6500
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.650
  SUBAREA AREA(ACRES) =    0.82      SUBAREA RUNOFF(CFS) =    2.61
  TOTAL AREA(ACRES) =        1.0        PEAK FLOW RATE(CFS) =       3.34

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  10.97
  FLOW VELOCITY(FEET/SEC.) =  2.79   DEPTH*VELOCITY(FT*FT/SEC.) =   0.91
  LONGEST FLOWPATH FROM NODE   1019.00 TO NODE   1027.00 =     351.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1027.00 TO NODE   1022.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   108.00  DOWNSTREAM(FEET) =   107.50
  FLOW LENGTH(FEET) =    22.60   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   7.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.99
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.34
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    7.50
  LONGEST FLOWPATH FROM NODE   1019.00 TO NODE   1022.00 =     374.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1027.00 TO NODE   1022.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.50
  RAINFALL INTENSITY(INCH/HR) =   4.87
  TOTAL STREAM AREA(ACRES) =     1.05
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.34

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER       (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
```

```
      1       13.17     7.20        4.997          3.69
      2        2.68     7.40        4.909          0.84
      3        3.34     7.50        4.869          1.05

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc       INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       18.99     7.20       4.997
      2       18.92     7.40       4.909
      3       18.83     7.50       4.869

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      18.99   Tc(MIN.) =    7.20
  TOTAL AREA(ACRES) =        5.6
  LONGEST FLOWPATH FROM NODE   1009.00 TO NODE   1022.00 =    1237.70 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1022.00 TO NODE   1028.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   107.50  DOWNSTREAM(FEET) =   105.90
  FLOW LENGTH(FEET) =   159.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.92
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       18.99
  PIPE TRAVEL TIME(MIN.) =   0.33    Tc(MIN.) =    7.54
  LONGEST FLOWPATH FROM NODE   1009.00 TO NODE   1028.00 =    1396.70 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1022.00 TO NODE   1028.00 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.) =    7.54
  RAINFALL INTENSITY(INCH/HR) =   4.85
  TOTAL STREAM AREA(ACRES) =     5.58
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     18.99

****************************************************************************
  FLOW PROCESS FROM NODE   1029.00 TO NODE   1030.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6500
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   118.00
  UPSTREAM ELEVATION(FEET) =    113.20
  DOWNSTREAM ELEVATION(FEET) =    110.60
  ELEVATION DIFFERENCE(FEET) =      2.60
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.673
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    83.05
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.829
```



```
  SUBAREA RUNOFF(CFS) =      0.64
  TOTAL AREA(ACRES) =      0.17   TOTAL RUNOFF(CFS) =      0.64

****************************************************************************
  FLOW PROCESS FROM NODE   1030.00 TO NODE   1031.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  111.60  DOWNSTREAM ELEVATION(FEET) =  107.60
  STREET LENGTH(FEET) =   270.20   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 14.50

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   8.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.71
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    8.28
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.34
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.65
  STREET FLOW TRAVEL TIME(MIN.) =   1.93   Tc(MIN.) =    7.60
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.828
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6500
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.650
  SUBAREA AREA(ACRES) =    0.68      SUBAREA RUNOFF(CFS) =    2.13
  TOTAL AREA(ACRES) =        0.9        PEAK FLOW RATE(CFS) =       2.67

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =  10.09
  FLOW VELOCITY(FEET/SEC.) =  2.59   DEPTH*VELOCITY(FT*FT/SEC.) =   0.80
  LONGEST FLOWPATH FROM NODE   1029.00 TO NODE   1031.00 =     388.20 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1031.00 TO NODE   1028.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   106.20  DOWNSTREAM(FEET) =   105.90
  FLOW LENGTH(FEET) =     7.80   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   5.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.15
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.67
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    7.61
  LONGEST FLOWPATH FROM NODE   1029.00 TO NODE   1028.00 =     396.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1031.00 TO NODE   1028.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
```

```
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.61
  RAINFALL INTENSITY(INCH/HR) =   4.82
  TOTAL STREAM AREA(ACRES) =     0.85
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.67

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       18.99     7.54        4.852         5.58
      2        2.67     7.61        4.821         0.85

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF       Tc       INTENSITY
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
      1       21.63     7.54        4.852
      2       21.53     7.61        4.821

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      21.63   Tc(MIN.) =    7.54
  TOTAL AREA(ACRES) =        6.4
  LONGEST FLOWPATH FROM NODE   1009.00 TO NODE   1028.00 =    1396.70 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1033.00 TO NODE   1028.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.852
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6500
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6701
  SUBAREA AREA(ACRES) =    0.99   SUBAREA RUNOFF(CFS) =    3.12
  TOTAL AREA(ACRES) =        7.4   TOTAL RUNOFF(CFS) =      24.13
  TC(MIN.) =    7.54

****************************************************************************
  FLOW PROCESS FROM NODE   1028.00 TO NODE   1005.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   105.90  DOWNSTREAM(FEET) =   103.20
  FLOW LENGTH(FEET) =   122.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.42
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      24.13
  PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =    7.72
  LONGEST FLOWPATH FROM NODE   1009.00 TO NODE   1005.00 =    1518.70 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1028.00 TO NODE   1005.00 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.) =    7.72
```



```
  RAINFALL INTENSITY(INCH/HR) =   4.78
  TOTAL STREAM AREA(ACRES) =     7.42
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     24.13

****************************************************************************
  FLOW PROCESS FROM NODE   1036.00 TO NODE   1037.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6500
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   118.00
  UPSTREAM ELEVATION(FEET) =    113.30
  DOWNSTREAM ELEVATION(FEET) =    111.70
  ELEVATION DIFFERENCE(FEET) =      1.60
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.277
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    73.56
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.461
  SUBAREA RUNOFF(CFS) =      0.43
  TOTAL AREA(ACRES) =      0.12   TOTAL RUNOFF(CFS) =      0.43

****************************************************************************
  FLOW PROCESS FROM NODE   1037.00 TO NODE   1040.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  111.70  DOWNSTREAM ELEVATION(FEET) =  107.90
  STREET LENGTH(FEET) =   369.50   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 14.50

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   8.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.26
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.27
    HALFSTREET FLOOD WIDTH(FEET) =    7.78
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.90
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.51
  STREET FLOW TRAVEL TIME(MIN.) =   3.23   Tc(MIN.) =    9.51
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.177
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6500
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.650
  SUBAREA AREA(ACRES) =    0.61      SUBAREA RUNOFF(CFS) =    1.66
  TOTAL AREA(ACRES) =        0.7        PEAK FLOW RATE(CFS) =       1.98

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   9.59
  FLOW VELOCITY(FEET/SEC.) =  2.10   DEPTH*VELOCITY(FT*FT/SEC.) =   0.63
  LONGEST FLOWPATH FROM NODE   1036.00 TO NODE   1040.00 =     487.50 FEET.

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

```
  FLOW PROCESS FROM NODE   1039.00 TO NODE   1040.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.177
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6500
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6500
  SUBAREA AREA(ACRES) =    0.80   SUBAREA RUNOFF(CFS) =    2.17
  TOTAL AREA(ACRES) =       1.5   TOTAL RUNOFF(CFS) =       4.15
  TC(MIN.) =    9.51

****************************************************************************
  FLOW PROCESS FROM NODE   1040.00 TO NODE   1005.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   105.50  DOWNSTREAM(FEET) =   103.47
  FLOW LENGTH(FEET) =   201.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   8.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.50
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.15
  PIPE TRAVEL TIME(MIN.) =   0.61    Tc(MIN.) =   10.12
  LONGEST FLOWPATH FROM NODE   1036.00 TO NODE   1005.00 =     688.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1040.00 TO NODE   1005.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.12
  RAINFALL INTENSITY(INCH/HR) =   4.01
  TOTAL STREAM AREA(ACRES) =     1.53
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.15

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       24.13     7.72        4.780          7.42
      2        4.15    10.12        4.013          1.53

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF       Tc      INTENSITY
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
      1       27.29     7.72        4.780
      2       24.41    10.12        4.013

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      27.29   Tc(MIN.) =    7.72
  TOTAL AREA(ACRES) =        8.9
  LONGEST FLOWPATH FROM NODE   1009.00 TO NODE   1005.00 =    1518.70 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1005.00 TO NODE   1035.00 IS CODE =  31
----------------------------------------------------------------------------
```



```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   103.37  DOWNSTREAM(FEET) =   101.31
  FLOW LENGTH(FEET) =   205.50   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  20.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.61
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      27.29
  PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =    8.11
  LONGEST FLOWPATH FROM NODE   1009.00 TO NODE   1035.00 =    1724.20 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1041.00 TO NODE   1035.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.627
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6500
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6659
  SUBAREA AREA(ACRES) =    0.42   SUBAREA RUNOFF(CFS) =    1.26
  TOTAL AREA(ACRES) =       9.4   TOTAL RUNOFF(CFS) =      28.87
  TC(MIN.) =    8.11

****************************************************************************
  FLOW PROCESS FROM NODE   1035.00 TO NODE   1038.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   101.21  DOWNSTREAM(FEET) =   100.70
  FLOW LENGTH(FEET) =    32.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  17.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.54
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      28.87
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    8.16
  LONGEST FLOWPATH FROM NODE   1009.00 TO NODE   1038.00 =    1756.20 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1035.00 TO NODE   1038.00 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.) =    8.16
  RAINFALL INTENSITY(INCH/HR) =   4.61
  TOTAL STREAM AREA(ACRES) =     9.37
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     28.87

****************************************************************************
  FLOW PROCESS FROM NODE   1006.00 TO NODE   1007.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6500
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   142.80
  UPSTREAM ELEVATION(FEET) =    113.10
  DOWNSTREAM ELEVATION(FEET) =    111.00
  ELEVATION DIFFERENCE(FEET) =      2.10
```

```
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.157
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    74.71
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.529
  SUBAREA RUNOFF(CFS) =      0.58
  TOTAL AREA(ACRES) =      0.16   TOTAL RUNOFF(CFS) =      0.58

****************************************************************************
  FLOW PROCESS FROM NODE   1007.00 TO NODE   1008.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  111.00  DOWNSTREAM ELEVATION(FEET) =  109.00
  STREET LENGTH(FEET) =   580.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 14.50

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   8.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.14
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.35
    HALFSTREET FLOOD WIDTH(FEET) =   12.59
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.40
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.49
  STREET FLOW TRAVEL TIME(MIN.) =   6.93   Tc(MIN.) =   13.08
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.400
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6500
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.650
  SUBAREA AREA(ACRES) =    1.38      SUBAREA RUNOFF(CFS) =    3.05
  TOTAL AREA(ACRES) =        1.5        PEAK FLOW RATE(CFS) =       3.40

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  14.50
  FLOW VELOCITY(FEET/SEC.) =  1.52   DEPTH*VELOCITY(FT*FT/SEC.) =   0.59
  LONGEST FLOWPATH FROM NODE   1006.00 TO NODE   1008.00 =     722.80 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1008.00 TO NODE   1038.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   100.91  DOWNSTREAM(FEET) =   100.70
  FLOW LENGTH(FEET) =    21.14   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   9.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.02
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.40
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =   13.15
  LONGEST FLOWPATH FROM NODE   1006.00 TO NODE   1038.00 =     743.94 FEET.

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



```
  FLOW PROCESS FROM NODE   1008.00 TO NODE   1038.00 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.) =   13.15
  RAINFALL INTENSITY(INCH/HR) =   3.39
  TOTAL STREAM AREA(ACRES) =     1.54
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.40

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       28.87     8.16        4.609          9.37
      2        3.40    13.15        3.389          1.54

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF       Tc      INTENSITY
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
      1       30.98     8.16        4.609
      2       24.63    13.15        3.389

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      30.98   Tc(MIN.) =    8.16
  TOTAL AREA(ACRES) =       10.9
  LONGEST FLOWPATH FROM NODE   1009.00 TO NODE   1038.00 =    1756.20 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       10.9  TC(MIN.) =      8.16
  PEAK FLOW RATE(CFS)   =      30.98
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

RATIONAL METHOD HYDROGRAPH PROGRAM

RUN DATE 6/14/2022
HYDROGRAPH FILE NAME System 1000
TIME OF CONCENTRATION 8 MIN.
6 HOUR RAINFALL 2.4 INCHES
BASIN AREA 10.9 ACRES
RUNOFF COEFFICIENT 0.66
PEAK DISCHARGE 31 CFS

TIME (MIN) = 0	DISCHARGE (CFS) = 0
TIME (MIN) = 8	DISCHARGE (CFS) = 1
TIME (MIN) = 16	DISCHARGE (CFS) = 1
TIME (MIN) = 24	DISCHARGE (CFS) = 1.1
TIME (MIN) = 32	DISCHARGE (CFS) = 1.1
TIME (MIN) = 40	DISCHARGE (CFS) = 1.1
TIME (MIN) = 48	DISCHARGE (CFS) = 1.2
TIME (MIN) = 56	DISCHARGE (CFS) = 1.2
TIME (MIN) = 64	DISCHARGE (CFS) = 1.2
TIME (MIN) = 72	DISCHARGE (CFS) = 1.3
TIME (MIN) = 80	DISCHARGE (CFS) = 1.3
TIME (MIN) = 88	DISCHARGE (CFS) = 1.3
TIME (MIN) = 96	DISCHARGE (CFS) = 1.4
TIME (MIN) = 104	DISCHARGE (CFS) = 1.4
TIME (MIN) = 112	DISCHARGE (CFS) = 1.5
TIME (MIN) = 120	DISCHARGE (CFS) = 1.6
TIME (MIN) = 128	DISCHARGE (CFS) = 1.6
TIME (MIN) = 136	DISCHARGE (CFS) = 1.7
TIME (MIN) = 144	DISCHARGE (CFS) = 1.8
TIME (MIN) = 152	DISCHARGE (CFS) = 1.9
TIME (MIN) = 160	DISCHARGE (CFS) = 2
TIME (MIN) = 168	DISCHARGE (CFS) = 2.1
TIME (MIN) = 176	DISCHARGE (CFS) = 2.2
TIME (MIN) = 184	DISCHARGE (CFS) = 2.5
TIME (MIN) = 192	DISCHARGE (CFS) = 2.6
TIME (MIN) = 200	DISCHARGE (CFS) = 3
TIME (MIN) = 208	DISCHARGE (CFS) = 3.3
TIME (MIN) = 216	DISCHARGE (CFS) = 4
TIME (MIN) = 224	DISCHARGE (CFS) = 4.5
TIME (MIN) = 232	DISCHARGE (CFS) = 6.7
TIME (MIN) = 240	DISCHARGE (CFS) = 12
TIME (MIN) = 248	DISCHARGE (CFS) = 31
TIME (MIN) = 256	DISCHARGE (CFS) = 5.3
TIME (MIN) = 264	DISCHARGE (CFS) = 3.6
TIME (MIN) = 272	DISCHARGE (CFS) = 2.8
TIME (MIN) = 280	DISCHARGE (CFS) = 2.3
TIME (MIN) = 288	DISCHARGE (CFS) = 2
TIME (MIN) = 296	DISCHARGE (CFS) = 1.8

TIME (MIN) = 304 DISCHARGE (CFS) = 1.6
TIME (MIN) = 312 DISCHARGE (CFS) = 1.5
TIME (MIN) = 320 DISCHARGE (CFS) = 1.4
TIME (MIN) = 328 DISCHARGE (CFS) = 1.3
TIME (MIN) = 336 DISCHARGE (CFS) = 1.2
TIME (MIN) = 344 DISCHARGE (CFS) = 1.2
TIME (MIN) = 352 DISCHARGE (CFS) = 1.1
TIME (MIN) = 360 DISCHARGE (CFS) = 1.1
TIME (MIN) = 368 DISCHARGE (CFS) = 0

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

          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
          Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                       2003,1985,1981 HYDROLOGY MANUAL
       (c) Copyright 1982-2016 Advanced Engineering Software (aes)
           Ver. 23.0 Release Date: 07/01/2016  License ID 1509

                        Analysis prepared by:




 ************************** DESCRIPTION OF STUDY **************************
* NAKANO - PROPOSED CONDITION 4409                                        *
* SYSTEM 1100 (INCLUDING SYS1000)                                         *
* 100 YEAR STORM EVENT                                                    *
 *************************************************************************

  FILE NAME: 1100P100.DAT
  TIME/DATE OF STUDY: 11:22 06/14/2022
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.400
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  *CITY OF CHULA VISTA TIME-OF-CONCENTRATION MODEL SELECTED.*
   (BASED ON 07/2002 ADOPTED MANUAL)
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *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   14.5      8.0    0.018/0.018/0.020   0.50    1.50 0.0313 0.125 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.*

************************************************************************
  FLOW PROCESS FROM NODE   1100.00 TO NODE   1101.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6500
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   143.00
  UPSTREAM ELEVATION(FEET) =    116.80
  DOWNSTREAM ELEVATION(FEET) =    115.00
  ELEVATION DIFFERENCE(FEET) =      1.80
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.392
```



```
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    72.59
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.397
  SUBAREA RUNOFF(CFS) =      0.63
  TOTAL AREA(ACRES) =      0.18   TOTAL RUNOFF(CFS) =      0.63

************************************************************************
  FLOW PROCESS FROM NODE   1101.00 TO NODE   1102.00 IS CODE =  62
------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
========================================================================
  UPSTREAM ELEVATION(FEET) =  115.50  DOWNSTREAM ELEVATION(FEET) =  111.10
  STREET LENGTH(FEET) =   398.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 14.50

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   8.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.35
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =   10.22
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.23
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.69
  STREET FLOW TRAVEL TIME(MIN.) =   2.98   Tc(MIN.) =    9.37
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.217
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6500
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.650
  SUBAREA AREA(ACRES) =    1.24      SUBAREA RUNOFF(CFS) =    3.40
  TOTAL AREA(ACRES) =       1.4        PEAK FLOW RATE(CFS) =       3.89

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  12.66
  FLOW VELOCITY(FEET/SEC.) =  2.51   DEPTH*VELOCITY(FT*FT/SEC.) =   0.89
  LONGEST FLOWPATH FROM NODE   1100.00 TO NODE   1102.00 =     541.00 FEET.

************************************************************************
  FLOW PROCESS FROM NODE   1102.00 TO NODE   1103.00 IS CODE =  31
------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   109.00  DOWNSTREAM(FEET) =   108.70
  FLOW LENGTH(FEET) =    22.60   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   9.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.81
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.89
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    9.43
  LONGEST FLOWPATH FROM NODE   1100.00 TO NODE   1103.00 =     563.60 FEET.

************************************************************************
  FLOW PROCESS FROM NODE   1104.00 TO NODE   1103.00 IS CODE =  81
```

```
------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
========================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.199
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6500
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6500
  SUBAREA AREA(ACRES) =    1.05   SUBAREA RUNOFF(CFS) =    2.87
  TOTAL AREA(ACRES) =        2.5   TOTAL RUNOFF(CFS) =       6.74
  TC(MIN.) =    9.43

************************************************************************
  FLOW PROCESS FROM NODE   1103.00 TO NODE   1105.00 IS CODE =  31
------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   109.00  DOWNSTREAM(FEET) =   107.70
  FLOW LENGTH(FEET) =   229.70   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.92
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.74
  PIPE TRAVEL TIME(MIN.) =   0.78    Tc(MIN.) =   10.21
  LONGEST FLOWPATH FROM NODE   1100.00 TO NODE   1105.00 =     793.30 FEET.

************************************************************************
  FLOW PROCESS FROM NODE   1106.00 TO NODE   1105.00 IS CODE =  81
------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
========================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.989
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6500
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6500
  SUBAREA AREA(ACRES) =    0.45   SUBAREA RUNOFF(CFS) =    1.17
  TOTAL AREA(ACRES) =        2.9   TOTAL RUNOFF(CFS) =       7.57
  TC(MIN.) =   10.21

************************************************************************
  FLOW PROCESS FROM NODE   1105.00 TO NODE   1107.00 IS CODE =  31
------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   107.70  DOWNSTREAM(FEET) =   100.90
  FLOW LENGTH(FEET) =   230.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   9.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.54
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.57
  PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =   10.61
  LONGEST FLOWPATH FROM NODE   1100.00 TO NODE   1107.00 =    1023.30 FEET.

************************************************************************
  FLOW PROCESS FROM NODE   1005.00 TO NODE   1007.00 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.) =   10.61
  RAINFALL INTENSITY(INCH/HR) =   3.89
```



```
  TOTAL STREAM AREA(ACRES) =     2.92
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.57

************************************************************************
  FLOW PROCESS FROM NODE   1108.00 TO NODE   1109.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6500
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   138.00
  UPSTREAM ELEVATION(FEET) =    112.50
  DOWNSTREAM ELEVATION(FEET) =    111.00
  ELEVATION DIFFERENCE(FEET) =      1.50
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.632
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    70.87
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.270
  SUBAREA RUNOFF(CFS) =      0.55
  TOTAL AREA(ACRES) =      0.16   TOTAL RUNOFF(CFS) =      0.55

************************************************************************
  FLOW PROCESS FROM NODE   1109.00 TO NODE   1107.00 IS CODE =  62
------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
========================================================================
  UPSTREAM ELEVATION(FEET) =  111.00  DOWNSTREAM ELEVATION(FEET) =  109.00
  STREET LENGTH(FEET) =   191.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 14.50

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   8.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

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

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.92
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    8.34
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.97
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.55
  STREET FLOW TRAVEL TIME(MIN.) =   1.62   Tc(MIN.) =    8.25
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.578
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6500
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.650
  SUBAREA AREA(ACRES) =    1.59      SUBAREA RUNOFF(CFS) =    4.73
  TOTAL AREA(ACRES) =        1.8        PEAK FLOW RATE(CFS) =       5.21

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =  10.78
  FLOW VELOCITY(FEET/SEC.) =  2.25   DEPTH*VELOCITY(FT*FT/SEC.) =   0.72
  LONGEST FLOWPATH FROM NODE   1108.00 TO NODE   1107.00 =     329.00 FEET.

************************************************************************
  FLOW PROCESS FROM NODE   1110.00 TO NODE   1107.00 IS CODE =  81
```

```
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.578
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .9000
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7029
  SUBAREA AREA(ACRES) =     0.47   SUBAREA RUNOFF(CFS) =     1.94
  TOTAL AREA(ACRES) =        2.2   TOTAL RUNOFF(CFS) =       7.14
  TC(MIN.) =    8.25

****************************************************************************
  FLOW PROCESS FROM NODE   1111.00 TO NODE   1107.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.578
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .4500
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6820
  SUBAREA AREA(ACRES) =     0.20   SUBAREA RUNOFF(CFS) =     0.41
  TOTAL AREA(ACRES) =        2.4   TOTAL RUNOFF(CFS) =       7.56
  TC(MIN.) =    8.25

****************************************************************************
  FLOW PROCESS FROM NODE   1111.00 TO NODE   1107.00 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.) =    8.25
  RAINFALL INTENSITY(INCH/HR) =   4.58
  TOTAL STREAM AREA(ACRES) =     2.42
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.56

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        7.57    10.61        3.891          2.92
      2        7.56     8.25        4.578          2.42

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF       Tc      INTENSITY
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
      1       13.44     8.25        4.578
      2       13.99    10.61        3.891

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      13.99   Tc(MIN.) =   10.61
  TOTAL AREA(ACRES) =        5.3
  LONGEST FLOWPATH FROM NODE   1100.00 TO NODE   1107.00 =    1023.30 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1107.00 TO NODE   1055.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
```



```
  ELEVATION DATA: UPSTREAM(FEET) =   105.50  DOWNSTREAM(FEET) =   105.00
  FLOW LENGTH(FEET) =     8.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS  11.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.49
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.99
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =   10.62
  LONGEST FLOWPATH FROM NODE   1100.00 TO NODE   1055.00 =    1031.30 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1112.00 TO NODE   1055.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.889
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .4500
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6617
  SUBAREA AREA(ACRES) =     0.07   SUBAREA RUNOFF(CFS) =     0.12
  TOTAL AREA(ACRES) =        5.4   TOTAL RUNOFF(CFS) =      13.99
  TC(MIN.) =   10.62
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE   1038.00 TO NODE   1055.00 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.) =   10.62
  RAINFALL INTENSITY(INCH/HR) =   3.89
  TOTAL STREAM AREA(ACRES) =      5.41
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     13.99

****************************************************************************
  FLOW PROCESS FROM NODE   1038.00 TO NODE   1038.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
==============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  68.20   RAIN INTENSITY(INCH/HOUR) =  1.17
  TOTAL AREA(ACRES) =    10.90   TOTAL RUNOFF(CFS) =      1.55

****************************************************************************
  FLOW PROCESS FROM NODE   1038.00 TO NODE   1055.00 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.) =   68.20
  RAINFALL INTENSITY(INCH/HR) =   1.17
  TOTAL STREAM AREA(ACRES) =    10.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.55

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       13.99    10.62        3.889          5.41
      2        1.55    68.20        1.172         10.90
```

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF       Tc      INTENSITY
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
      1       14.24    10.62       3.889
      2        5.77    68.20       1.172

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      14.24   Tc(MIN.) =   10.62
  TOTAL AREA(ACRES) =       16.3
  LONGEST FLOWPATH FROM NODE   1100.00 TO NODE   1055.00 =    1031.30 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1055.00 TO NODE   1056.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    98.28  DOWNSTREAM(FEET) =    98.00
  FLOW LENGTH(FEET) =    28.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.29
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.24
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =   10.69
  LONGEST FLOWPATH FROM NODE   1100.00 TO NODE   1056.00 =    1059.30 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       16.3  TC(MIN.) =     10.69
  PEAK FLOW RATE(CFS)   =      14.24
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

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

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                            Analysis prepared by:




 ************************** DESCRIPTION OF STUDY **************************
* NAKANO 4409                                                             *
* SYSTEM 1200                                                             *
* 100 YEAR STORM EVENT                                                    *
 *************************************************************************

  FILE NAME: 1200P100.DAT
  TIME/DATE OF STUDY: 12:06 06/17/2022
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.400
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  *CITY OF CHULA VISTA TIME-OF-CONCENTRATION MODEL SELECTED.*
   (BASED ON 07/2002 ADOPTED MANUAL)
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *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   0.50    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.*
```

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

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                        Analysis prepared by:




 ************************** DESCRIPTION OF STUDY **************************
* NAKANO 4409                                                             *
* SYSTEM 1300                                                             *
* 100 YEAR STORM EVENT                                                    *
 *************************************************************************

  FILE NAME: 1300P100.DAT
  TIME/DATE OF STUDY: 12:05 06/17/2022
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.400
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  *CITY OF CHULA VISTA TIME-OF-CONCENTRATION MODEL SELECTED.*
   (BASED ON 07/2002 ADOPTED MANUAL)
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *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.*

************************************************************************
  FLOW PROCESS FROM NODE   1300.00 TO NODE   1301.00 IS CODE =  22
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6000
  USER SPECIFIED Tc(MIN.) =    5.000
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.323
  SUBAREA RUNOFF(CFS) =      0.11
  TOTAL AREA(ACRES) =      0.03   TOTAL RUNOFF(CFS) =      0.11
```



```
************************************************************************
  FLOW PROCESS FROM NODE   1301.00 TO NODE   1302.00 IS CODE =  51
------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    186.00  DOWNSTREAM(FEET) =    113.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   717.00   CHANNEL SLOPE =  0.1018
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.322
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.45
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.97
  AVERAGE FLOW DEPTH(FEET) =   0.08   TRAVEL TIME(MIN.) =   4.02
  Tc(MIN.) =    9.02
  SUBAREA AREA(ACRES) =     1.75       SUBAREA RUNOFF(CFS) =    4.54
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.600
  TOTAL AREA(ACRES) =        1.8         PEAK FLOW RATE(CFS) =       4.62

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.12   FLOW VELOCITY(FEET/SEC.) =   3.78
  LONGEST FLOWPATH FROM NODE   1300.00 TO NODE   1302.00 =     717.00 FEET.

************************************************************************
  FLOW PROCESS FROM NODE   1302.00 TO NODE   1303.00 IS CODE =  31
------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   112.00  DOWNSTREAM(FEET) =   111.50
  FLOW LENGTH(FEET) =    24.60   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   9.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.17
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.62
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    9.08
  LONGEST FLOWPATH FROM NODE   1300.00 TO NODE   1303.00 =     741.60 FEET.

************************************************************************
  FLOW PROCESS FROM NODE   1303.00 TO NODE   1304.00 IS CODE =  51
------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    111.50  DOWNSTREAM(FEET) =    106.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   345.00   CHANNEL SLOPE =  0.0159
  CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   2.500
  MANNING'S FACTOR = 0.013   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.972
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.73
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.77
  AVERAGE FLOW DEPTH(FEET) =   0.22   TRAVEL TIME(MIN.) =   1.20
  Tc(MIN.) =   10.28
  SUBAREA AREA(ACRES) =     0.93       SUBAREA RUNOFF(CFS) =    2.22
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.600
  TOTAL AREA(ACRES) =        2.7         PEAK FLOW RATE(CFS) =       6.46

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.23   FLOW VELOCITY(FEET/SEC.) =   5.00
```

```
  LONGEST FLOWPATH FROM NODE   1300.00 TO NODE   1304.00 =    1086.60 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1304.00 TO NODE   1306.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   106.00  DOWNSTREAM(FEET) =   104.00
  FLOW LENGTH(FEET) =    90.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   9.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.25
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =        6.46
  PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =   10.46
  LONGEST FLOWPATH FROM NODE   1300.00 TO NODE   1306.00 =    1176.60 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =         2.7  TC(MIN.) =     10.46
  PEAK FLOW RATE(CFS)   =        6.46
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

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

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                        Analysis prepared by:




 ************************* DESCRIPTION OF STUDY *************************
* 4409 NAKANO                                                            *
* SYSTEM 1600 - PROPOSED CONDITIONS                                      *
* 100 YEAR STORM EVENT                                                   *
 ************************************************************************

  FILE NAME: 1600P100.DAT
  TIME/DATE OF STUDY: 15:38 06/14/2022
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.400
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  *CITY OF CHULA VISTA TIME-OF-CONCENTRATION MODEL SELECTED.*
   (BASED ON 07/2002 ADOPTED MANUAL)
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *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.*

**************************************************************************
  FLOW PROCESS FROM NODE   1600.00 TO NODE   1601.00 IS CODE =  22
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6000
  USER SPECIFIED Tc(MIN.) =    5.000
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.323
  SUBAREA RUNOFF(CFS) =      0.49
  TOTAL AREA(ACRES) =      0.13   TOTAL RUNOFF(CFS) =      0.49
```



```
**************************************************************************
  FLOW PROCESS FROM NODE   1601.00 TO NODE   1602.00 IS CODE =  51
------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    178.00  DOWNSTREAM(FEET) =    140.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   126.00   CHANNEL SLOPE =  0.3016
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  50.000
  MANNING'S FACTOR = 0.045   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.763
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.37
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.71
  AVERAGE FLOW DEPTH(FEET) =   0.07   TRAVEL TIME(MIN.) =   0.77
  Tc(MIN.) =    5.77
  SUBAREA AREA(ACRES) =     1.09       SUBAREA RUNOFF(CFS) =    3.77
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.600
  TOTAL AREA(ACRES) =        1.2         PEAK FLOW RATE(CFS) =       4.22

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.09   FLOW VELOCITY(FEET/SEC.) =   3.04
  LONGEST FLOWPATH FROM NODE   1600.00 TO NODE   1602.00 =     790.00 FEET.

**************************************************************************
  FLOW PROCESS FROM NODE   1602.00 TO NODE   1605.00 IS CODE =  51
------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    141.00  DOWNSTREAM(FEET) =    116.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    49.00   CHANNEL SLOPE =  0.5102
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
  CHANNEL FLOW THRU SUBAREA(CFS) =       4.22
  FLOW VELOCITY(FEET/SEC.) =  13.61   FLOW DEPTH(FEET) =   0.09
  TRAVEL TIME(MIN.) =   0.06   Tc(MIN.) =    5.83
  LONGEST FLOWPATH FROM NODE   1600.00 TO NODE   1605.00 =     839.00 FEET.

**************************************************************************
  FLOW PROCESS FROM NODE   1605.00 TO NODE   1607.00 IS CODE =  51
------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    118.00  DOWNSTREAM(FEET) =    116.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   430.80   CHANNEL SLOPE =  0.0046
  CHANNEL BASE(FEET) =    1.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.735
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5500
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.42
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.60
  AVERAGE FLOW DEPTH(FEET) =   0.65   TRAVEL TIME(MIN.) =   2.00
  Tc(MIN.) =    7.83
  SUBAREA AREA(ACRES) =     0.92       SUBAREA RUNOFF(CFS) =    2.40
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.579
  TOTAL AREA(ACRES) =        2.1         PEAK FLOW RATE(CFS) =       5.86

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.68   FLOW VELOCITY(FEET/SEC.) =   3.64
```

```
  LONGEST FLOWPATH FROM NODE   1600.00 TO NODE   1607.00 =    1269.80 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1608.00 TO NODE   1607.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.735
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5500
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.5745
  SUBAREA AREA(ACRES) =    0.35   SUBAREA RUNOFF(CFS) =    0.91
  TOTAL AREA(ACRES) =        2.5   TOTAL RUNOFF(CFS) =       6.77
  TC(MIN.) =    7.83

****************************************************************************
  FLOW PROCESS FROM NODE   1609.00 TO NODE   1609.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    116.00  DOWNSTREAM(FEET) =     98.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   664.00   CHANNEL SLOPE =  0.0271
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.156
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.63
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.31
  AVERAGE FLOW DEPTH(FEET) =   0.31   TRAVEL TIME(MIN.) =   1.75
  Tc(MIN.) =    9.58
  SUBAREA AREA(ACRES) =     0.82       SUBAREA RUNOFF(CFS) =    1.70
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.556
  TOTAL AREA(ACRES) =        3.3         PEAK FLOW RATE(CFS) =       7.65

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.31   FLOW VELOCITY(FEET/SEC.) =   6.33
  LONGEST FLOWPATH FROM NODE   1600.00 TO NODE   1609.00 =    1933.80 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        3.3  TC(MIN.) =      9.58
  PEAK FLOW RATE(CFS)   =       7.65
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

APPENDIX 4

Hydraulic Calculations

To be completed during Final Engineering

APPENDIX 5

Preliminary Detention Analysis

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PROJECT Nakano BMP System
SUBJECT MWS

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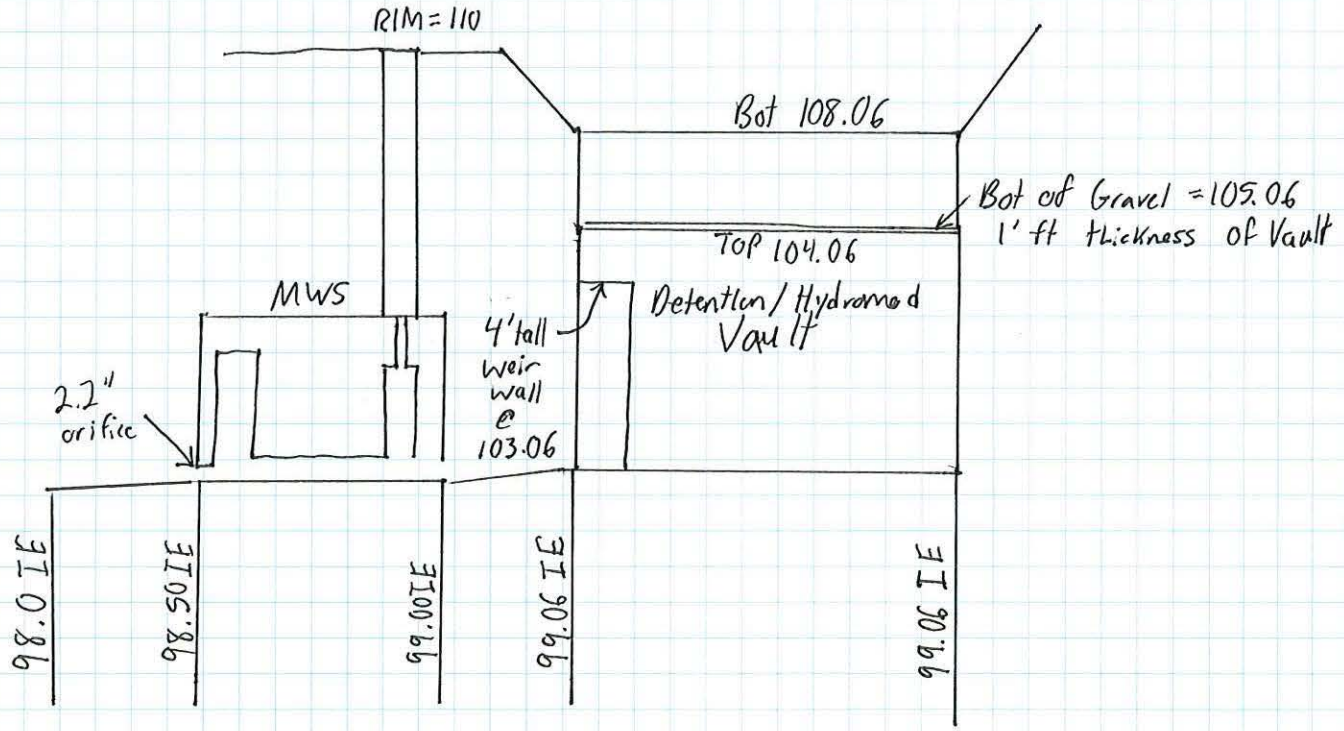

Detention/Hydromod Vault

12,376 ft² Area
5 ft Depth

2.2" orifice @ Bot MWS Elevation 98.5'

4' Weir Wall @ 103.06' w/ 8' length for By pass + Emergency overflow

Inflow Q_{100} = 29.0 cfs

outflow $Q_{Detained\text{-}100yr}$ = 1.55 cfs

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SUBJECT _____

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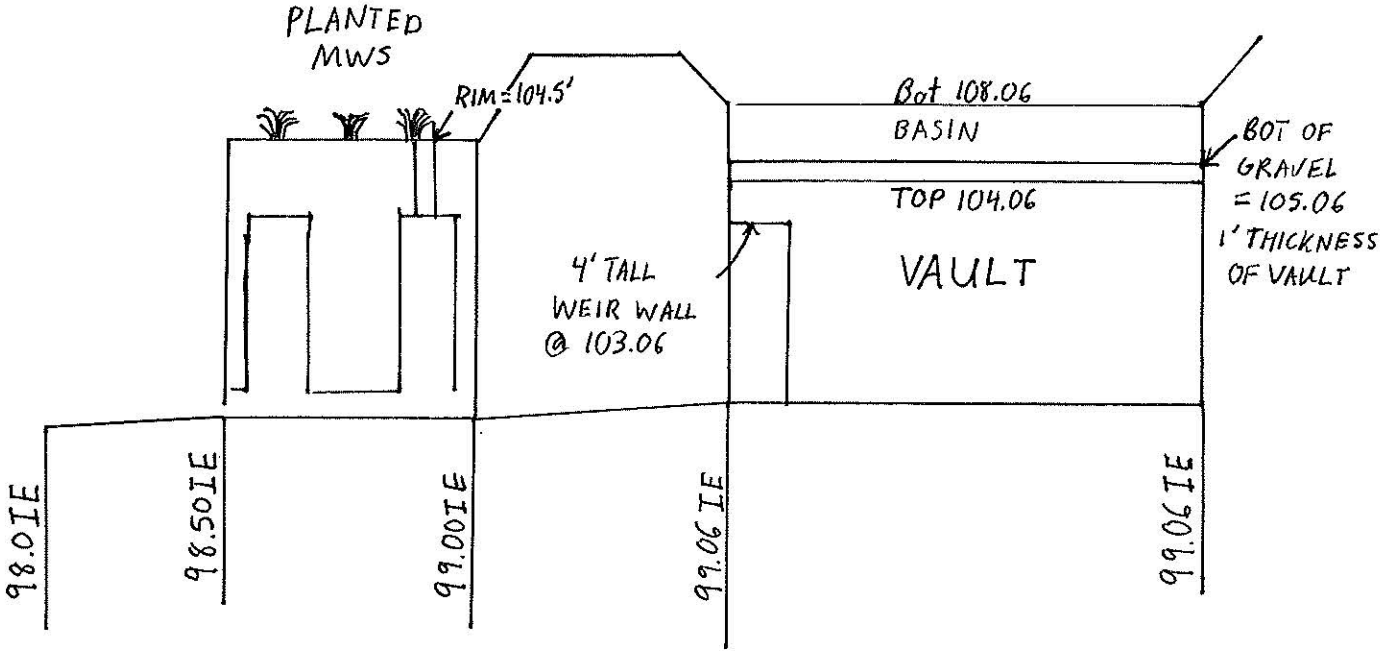
CHECKED BY : _____ DATE : _____



VAULT
12,376 ft² AREA
5 ft DEPTH

2 - 1.48" ORIFICES @ BOT MWS ELEV = 98.5' (EQUATES TO 1-2.2" ORIFICE)

4' WEIR WALL @ 103.06' w/ 8' LENGTH

FOR BYPASS + EMERGENCY OVERFLOW

Inflow Q_{100} = 31.0 cfs

Outflow $Q_{DETAINED\ 100}$ = 1.55cfs

Detention Vault

Project Summary	
Title	System 1000
Engineer	PDC
Company	PDC
Date	6/17/2022

Notes

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Detention Vault

Subsection: User Notifications

User Notifications?	No user notifications generated.

Detention Vault

Subsection: Master Network Summary

Catchments Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (min)	Peak Flow (ft³/s)
CM-1	EX10	0	1.430	248.000	31.00

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (min)	Peak Flow (ft³/s)
O-1	EX10	0	1.034	308.000	1.55

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (min)	Peak Flow (ft³/s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
1 (IN)	EX10	0	1.430	248.000	31.00	(N/A)	(N/A)
1 (OUT)	EX10	0	1.034	308.000	1.55	103.20	1.224

Detention Vault

Subsection: Read Hydrograph
Label: CM-1
Scenario: EX10

Return Event: 100 years
Storm Event:

Peak Discharge	31.00 ft³/s
Time to Peak	248.000 min
Hydrograph Volume	1.430 ac-ft

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 8.000 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
0.000	0.00	1.00	1.00	1.10	1.10
40.000	1.10	1.20	1.20	1.20	1.30
80.000	1.30	1.30	1.40	1.40	1.50
120.000	1.60	1.60	1.70	1.80	1.90
160.000	2.00	2.10	2.20	2.50	2.60
200.000	3.00	3.30	4.00	4.50	6.70
240.000	12.00	31.00	5.30	3.60	2.80
280.000	2.30	2.00	1.80	1.60	1.50
320.000	1.40	1.30	1.20	1.20	1.10
360.000	1.10	0.00	(N/A)	(N/A)	(N/A)

Detention Vault

Subsection: Time vs. Elevation
Label: 1 (OUT)
Scenario: EX10

Return Event: 100 years
Storm Event:

Time vs. Elevation (ft)

Output Time increment = 1.000 min
Time on left represents time for first value in each row.

Time (min)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
0.000	99.00	99.00	99.00	99.00	99.00
5.000	99.01	99.01	99.02	99.02	99.03
10.000	99.03	99.04	99.04	99.05	99.06
15.000	99.06	99.07	99.07	99.08	99.09
20.000	99.09	99.10	99.10	99.11	99.11
25.000	99.12	99.12	99.13	99.13	99.14
30.000	99.14	99.15	99.15	99.16	99.16
35.000	99.16	99.17	99.17	99.18	99.18
40.000	99.19	99.19	99.20	99.20	99.21
45.000	99.21	99.22	99.22	99.23	99.23
50.000	99.24	99.24	99.25	99.25	99.26
55.000	99.26	99.27	99.27	99.28	99.28
60.000	99.29	99.30	99.30	99.31	99.31
65.000	99.32	99.32	99.33	99.33	99.34
70.000	99.34	99.35	99.35	99.36	99.36
75.000	99.37	99.38	99.38	99.39	99.39
80.000	99.40	99.40	99.41	99.42	99.42
85.000	99.43	99.43	99.44	99.44	99.45
90.000	99.45	99.46	99.47	99.47	99.48
95.000	99.48	99.49	99.50	99.50	99.51
100.000	99.51	99.52	99.53	99.53	99.54
105.000	99.54	99.55	99.56	99.56	99.57
110.000	99.57	99.58	99.59	99.59	99.60
115.000	99.61	99.61	99.62	99.63	99.63
120.000	99.64	99.65	99.65	99.66	99.67
125.000	99.68	99.68	99.69	99.70	99.70
130.000	99.71	99.72	99.72	99.73	99.74
135.000	99.75	99.75	99.76	99.77	99.78
140.000	99.78	99.79	99.80	99.81	99.81
145.000	99.82	99.83	99.84	99.85	99.85
150.000	99.86	99.87	99.88	99.89	99.90
155.000	99.90	99.91	99.92	99.93	99.94
160.000	99.95	99.96	99.96	99.97	99.98
165.000	99.99	100.00	100.01	100.02	100.03
170.000	100.04	100.05	100.06	100.06	100.07
175.000	100.08	100.09	100.10	100.11	100.12
180.000	100.13	100.14	100.15	100.17	100.18
185.000	100.19	100.20	100.21	100.22	100.23
190.000	100.24	100.25	100.27	100.28	100.29
195.000	100.30	100.31	100.33	100.34	100.35

Detention Vault

Subsection: Time vs. Elevation
Label: 1 (OUT)
Scenario: EX10

Return Event: 100 years
Storm Event:

Time vs. Elevation (ft)

Output Time increment = 1.000 min
Time on left represents time for first value in each row.

Time (min)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
200.000	100.37	100.38	100.39	100.41	100.42
205.000	100.43	100.45	100.46	100.48	100.49
210.000	100.51	100.52	100.54	100.56	100.57
215.000	100.59	100.61	100.63	100.64	100.66
220.000	100.68	100.70	100.72	100.74	100.76
225.000	100.78	100.80	100.83	100.85	100.88
230.000	100.91	100.94	100.97	101.00	101.03
235.000	101.07	101.11	101.16	101.21	101.26
240.000	101.31	101.37	101.44	101.53	101.62
245.000	101.73	101.84	101.97	102.11	102.25
250.000	102.37	102.48	102.57	102.65	102.71
255.000	102.76	102.79	102.81	102.83	102.85
260.000	102.87	102.89	102.91	102.93	102.94
265.000	102.96	102.98	102.99	103.00	103.02
270.000	103.03	103.04	103.06	103.07	103.08
275.000	103.09	103.10	103.11	103.12	103.13
280.000	103.13	103.14	103.15	103.15	103.16
285.000	103.16	103.17	103.17	103.17	103.18
290.000	103.18	103.18	103.19	103.19	103.19
295.000	103.19	103.19	103.20	103.20	103.20
300.000	103.20	103.20	103.20	103.20	103.20
305.000	103.20	103.20	103.20	103.20	103.20
310.000	103.20	103.20	103.20	103.20	103.20
315.000	103.20	103.20	103.20	103.20	103.20
320.000	103.20	103.20	103.20	103.20	103.20
325.000	103.20	103.19	103.19	103.19	103.19
330.000	103.19	103.19	103.19	103.19	103.19
335.000	103.19	103.19	103.19	103.18	103.18
340.000	103.18	103.18	103.18	103.18	103.18
345.000	103.18	103.18	103.18	103.18	103.18
350.000	103.18	103.18	103.18	103.17	103.17
355.000	103.17	103.17	103.17	103.17	103.17
360.000	103.17	103.17	103.17	103.17	103.16
365.000	103.16	103.16	103.15	103.15	103.14
370.000	103.14	103.14	103.13	103.13	103.12
375.000	103.12	103.12	103.12	103.11	103.11
380.000	103.11	103.10	103.10	103.10	103.10
385.000	103.10	103.09	103.09	103.09	103.09
390.000	103.09	103.08	103.08	103.08	103.08
395.000	103.08	103.08	103.07	103.07	103.07
400.000	103.07	103.07	103.07	103.06	103.06

Detention Vault

Subsection: Time vs. Elevation
Label: 1 (OUT)
Scenario: EX10

Return Event: 100 years
Storm Event:

Time vs. Elevation (ft)

Output Time increment = 1.000 min
Time on left represents time for first value in each row.

Time (min)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
405.000	103.06	103.06	103.06	103.06	103.06
410.000	103.06	103.05	103.05	103.05	103.05
415.000	103.05	103.05	103.05	103.05	103.04
420.000	103.04	103.04	103.04	103.04	103.04
425.000	103.04	103.04	103.03	103.03	103.03
430.000	103.03	103.03	103.03	103.03	103.03
435.000	103.02	103.02	103.02	103.02	103.02
440.000	103.02	103.02	103.02	103.01	103.01
445.000	103.01	103.01	103.01	103.01	103.01
450.000	103.01	103.00	103.00	103.00	103.00
455.000	103.00	103.00	103.00	103.00	102.99
460.000	102.99	102.99	102.99	102.99	102.99
465.000	102.99	102.99	102.98	102.98	102.98
470.000	102.98	102.98	102.98	102.98	102.98
475.000	102.97	102.97	102.97	102.97	102.97
480.000	102.97	102.97	102.97	102.96	102.96
485.000	102.96	102.96	102.96	102.96	102.96
490.000	102.96	102.95	102.95	102.95	102.95
495.000	102.95	102.95	102.95	102.95	102.94
500.000	102.94	102.94	102.94	102.94	102.94
505.000	102.94	102.94	102.93	102.93	102.93
510.000	102.93	102.93	102.93	102.93	102.93
515.000	102.92	102.92	102.92	102.92	102.92
520.000	102.92	102.92	102.92	102.91	102.91
525.000	102.91	102.91	102.91	102.91	102.91
530.000	102.91	102.90	102.90	102.90	102.90
535.000	102.90	102.90	102.90	102.90	102.89
540.000	102.89	102.89	102.89	102.89	102.89
545.000	102.89	102.89	102.88	102.88	102.88
550.000	102.88	102.88	102.88	102.88	102.88
555.000	102.87	102.87	102.87	102.87	102.87
560.000	102.87	102.87	102.87	102.86	102.86
565.000	102.86	102.86	102.86	102.86	102.86
570.000	102.86	102.85	102.85	102.85	102.85
575.000	102.85	102.85	102.85	102.85	102.84
580.000	102.84	102.84	102.84	102.84	102.84
585.000	102.84	102.84	102.83	102.83	102.83
590.000	102.83	102.83	102.83	102.83	102.83
595.000	102.82	102.82	102.82	102.82	102.82
600.000	102.82	102.82	102.82	102.82	102.81
605.000	102.81	102.81	102.81	102.81	102.81

Detention Vault

Subsection: Time vs. Elevation
Label: 1 (OUT)
Scenario: EX10

Return Event: 100 years
Storm Event:

Time vs. Elevation (ft)

Output Time increment = 1.000 min
Time on left represents time for first value in each row.

Time (min)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
610.000	102.81	102.81	102.80	102.80	102.80
615.000	102.80	102.80	102.80	102.80	102.80
620.000	102.79	102.79	102.79	102.79	102.79
625.000	102.79	102.79	102.79	102.78	102.78
630.000	102.78	102.78	102.78	102.78	102.78
635.000	102.78	102.77	102.77	102.77	102.77
640.000	102.77	102.77	102.77	102.77	102.76
645.000	102.76	102.76	102.76	102.76	102.76
650.000	102.76	102.76	102.76	102.75	102.75
655.000	102.75	102.75	102.75	102.75	102.75
660.000	102.75	102.74	102.74	102.74	102.74
665.000	102.74	102.74	102.74	102.74	102.73
670.000	102.73	102.73	102.73	102.73	102.73
675.000	102.73	102.73	102.72	102.72	102.72
680.000	102.72	102.72	102.72	102.72	102.72
685.000	102.71	102.71	102.71	102.71	102.71
690.000	102.71	102.71	102.71	102.71	102.70
695.000	102.70	102.70	102.70	102.70	102.70
700.000	102.70	102.70	102.69	102.69	102.69
705.000	102.69	102.69	102.69	102.69	102.69
710.000	102.68	102.68	102.68	102.68	102.68
715.000	102.68	102.68	102.68	102.67	102.67
720.000	102.67	102.67	102.67	102.67	102.67
725.000	102.67	102.67	102.66	102.66	102.66
730.000	102.66	102.66	102.66	102.66	102.66
735.000	102.65	102.65	102.65	102.65	102.65
740.000	102.65	102.65	102.65	102.64	102.64
745.000	102.64	102.64	102.64	102.64	102.64
750.000	102.64	102.64	102.63	102.63	102.63
755.000	102.63	102.63	102.63	102.63	102.63
760.000	102.62	102.62	102.62	102.62	102.62
765.000	102.62	102.62	102.62	102.61	102.61
770.000	102.61	102.61	102.61	102.61	102.61
775.000	102.61	102.61	102.60	102.60	102.60
780.000	102.60	102.60	102.60	102.60	102.60
785.000	102.59	102.59	102.59	102.59	102.59
790.000	102.59	102.59	102.59	102.58	102.58
795.000	102.58	102.58	102.58	102.58	102.58
800.000	102.58	102.58	102.57	102.57	102.57
805.000	102.57	102.57	102.57	102.57	102.57
810.000	102.56	102.56	102.56	102.56	102.56

Detention Vault

Subsection: Time vs. Elevation
Label: 1 (OUT)
Scenario: EX10

Return Event: 100 years
Storm Event:

Time vs. Elevation (ft)

Output Time increment = 1.000 min
Time on left represents time for first value in each row.

Time (min)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
815.000	102.56	102.56	102.56	102.55	102.55
820.000	102.55	102.55	102.55	102.55	102.55
825.000	102.55	102.55	102.54	102.54	102.54
830.000	102.54	102.54	102.54	102.54	102.54
835.000	102.53	102.53	102.53	102.53	102.53
840.000	102.53	102.53	102.53	102.53	102.52
845.000	102.52	102.52	102.52	102.52	102.52
850.000	102.52	102.52	102.51	102.51	102.51
855.000	102.51	102.51	102.51	102.51	102.51
860.000	102.50	102.50	102.50	102.50	102.50
865.000	102.50	102.50	102.50	102.50	102.49
870.000	102.49	102.49	102.49	102.49	102.49
875.000	102.49	102.49	102.48	102.48	102.48
880.000	102.48	102.48	102.48	102.48	102.48
885.000	102.48	102.47	102.47	102.47	102.47
890.000	102.47	102.47	102.47	102.47	102.46
895.000	102.46	102.46	102.46	102.46	102.46
900.000	102.46	102.46	102.46	102.45	102.45
905.000	102.45	102.45	102.45	102.45	102.45
910.000	102.45	102.44	102.44	102.44	102.44
915.000	102.44	102.44	102.44	102.44	102.44
920.000	102.43	102.43	102.43	102.43	102.43
925.000	102.43	102.43	102.43	102.42	102.42
930.000	102.42	102.42	102.42	102.42	102.42
935.000	102.42	102.42	102.41	102.41	102.41
940.000	102.41	102.41	102.41	102.41	102.41
945.000	102.40	102.40	102.40	102.40	102.40
950.000	102.40	102.40	102.40	102.40	102.39
955.000	102.39	102.39	102.39	102.39	102.39
960.000	102.39	102.39	102.39	102.38	102.38
965.000	102.38	102.38	102.38	102.38	102.38
970.000	102.38	102.37	102.37	102.37	102.37
975.000	102.37	102.37	102.37	102.37	102.37
980.000	102.36	102.36	102.36	102.36	102.36
985.000	102.36	102.36	102.36	102.35	102.35
990.000	102.35	102.35	102.35	102.35	102.35
995.000	102.35	102.35	102.34	102.34	102.34
1,000.000	102.34	102.34	102.34	102.34	102.34
1,005.000	102.34	102.33	102.33	102.33	102.33
1,010.000	102.33	102.33	102.33	102.33	102.32
1,015.000	102.32	102.32	102.32	102.32	102.32

Detention Vault

Subsection: Time vs. Elevation
Label: 1 (OUT)
Scenario: EX10

Return Event: 100 years
Storm Event:

Time vs. Elevation (ft)

Output Time increment = 1.000 min
Time on left represents time for first value in each row.

Time (min)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
1,020.000	102.32	102.32	102.32	102.31	102.31
1,025.000	102.31	102.31	102.31	102.31	102.31
1,030.000	102.31	102.31	102.30	102.30	102.30
1,035.000	102.30	102.30	102.30	102.30	102.30
1,040.000	102.29	102.29	102.29	102.29	102.29
1,045.000	102.29	102.29	102.29	102.29	102.28
1,050.000	102.28	102.28	102.28	102.28	102.28
1,055.000	102.28	102.28	102.28	102.27	102.27
1,060.000	102.27	102.27	102.27	102.27	102.27
1,065.000	102.27	102.26	102.26	102.26	102.26
1,070.000	102.26	102.26	102.26	102.26	102.26
1,075.000	102.25	102.25	102.25	102.25	102.25
1,080.000	102.25	102.25	102.25	102.25	102.24
1,085.000	102.24	102.24	102.24	102.24	102.24
1,090.000	102.24	102.24	102.24	102.23	102.23
1,095.000	102.23	102.23	102.23	102.23	102.23
1,100.000	102.23	102.22	102.22	102.22	102.22
1,105.000	102.22	102.22	102.22	102.22	102.22
1,110.000	102.21	102.21	102.21	102.21	102.21
1,115.000	102.21	102.21	102.21	102.21	102.20
1,120.000	102.20	102.20	102.20	102.20	102.20
1,125.000	102.20	102.20	102.20	102.19	102.19
1,130.000	102.19	102.19	102.19	102.19	102.19
1,135.000	102.19	102.18	102.18	102.18	102.18
1,140.000	102.18	102.18	102.18	102.18	102.18
1,145.000	102.17	102.17	102.17	102.17	102.17
1,150.000	102.17	102.17	102.17	102.17	102.16
1,155.000	102.16	102.16	102.16	102.16	102.16
1,160.000	102.16	102.16	102.16	102.15	102.15
1,165.000	102.15	102.15	102.15	102.15	102.15
1,170.000	102.15	102.15	102.14	102.14	102.14
1,175.000	102.14	102.14	102.14	102.14	102.14
1,180.000	102.14	102.13	102.13	102.13	102.13
1,185.000	102.13	102.13	102.13	102.13	102.13
1,190.000	102.12	102.12	102.12	102.12	102.12
1,195.000	102.12	102.12	102.12	102.11	102.11
1,200.000	102.11	102.11	102.11	102.11	102.11
1,205.000	102.11	102.11	102.10	102.10	102.10
1,210.000	102.10	102.10	102.10	102.10	102.10
1,215.000	102.10	102.09	102.09	102.09	102.09
1,220.000	102.09	102.09	102.09	102.09	102.09

Detention Vault

Subsection: Time vs. Elevation
Label: 1 (OUT)
Scenario: EX10

Return Event: 100 years
Storm Event:

Time vs. Elevation (ft)

Output Time increment = 1.000 min
Time on left represents time for first value in each row.

Time (min)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
1,225.000	102.08	102.08	102.08	102.08	102.08
1,230.000	102.08	102.08	102.08	102.08	102.07
1,235.000	102.07	102.07	102.07	102.07	102.07
1,240.000	102.07	102.07	102.07	102.06	102.06
1,245.000	102.06	102.06	102.06	102.06	102.06
1,250.000	102.06	102.06	102.05	102.05	102.05
1,255.000	102.05	102.05	102.05	102.05	102.05
1,260.000	102.05	102.04	102.04	102.04	102.04
1,265.000	102.04	102.04	102.04	102.04	102.04
1,270.000	102.03	102.03	102.03	102.03	102.03
1,275.000	102.03	102.03	102.03	102.03	102.02
1,280.000	102.02	102.02	102.02	102.02	102.02
1,285.000	102.02	102.02	102.02	102.01	102.01
1,290.000	102.01	102.01	102.01	102.01	102.01
1,295.000	102.01	102.01	102.00	102.00	102.00
1,300.000	102.00	102.00	102.00	102.00	102.00
1,305.000	102.00	101.99	101.99	101.99	101.99
1,310.000	101.99	101.99	101.99	101.99	101.99
1,315.000	101.98	101.98	101.98	101.98	101.98
1,320.000	101.98	101.98	101.98	101.98	101.97
1,325.000	101.97	101.97	101.97	101.97	101.97
1,330.000	101.97	101.97	101.97	101.96	101.96
1,335.000	101.96	101.96	101.96	101.96	101.96
1,340.000	101.96	101.96	101.96	101.95	101.95
1,345.000	101.95	101.95	101.95	101.95	101.95
1,350.000	101.95	101.95	101.94	101.94	101.94
1,355.000	101.94	101.94	101.94	101.94	101.94
1,360.000	101.94	101.93	101.93	101.93	101.93
1,365.000	101.93	101.93	101.93	101.93	101.93
1,370.000	101.92	101.92	101.92	101.92	101.92
1,375.000	101.92	101.92	101.92	101.92	101.91
1,380.000	101.91	101.91	101.91	101.91	101.91
1,385.000	101.91	101.91	101.91	101.90	101.90
1,390.000	101.90	101.90	101.90	101.90	101.90
1,395.000	101.90	101.90	101.89	101.89	101.89
1,400.000	101.89	101.89	101.89	101.89	101.89
1,405.000	101.89	101.89	101.88	101.88	101.88
1,410.000	101.88	101.88	101.88	101.88	101.88
1,415.000	101.88	101.87	101.87	101.87	101.87
1,420.000	101.87	101.87	101.87	101.87	101.87
1,425.000	101.86	101.86	101.86	101.86	101.86

Detention Vault

Subsection: Time vs. Elevation
Label: 1 (OUT)
Scenario: EX10

Return Event: 100 years
Storm Event:

Time vs. Elevation (ft)

Output Time increment = 1.000 min
Time on left represents time for first value in each row.

Time (min)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
1,430.000	101.86	101.86	101.86	101.86	101.85
1,435.000	101.85	101.85	101.85	101.85	101.85
1,440.000	101.85	101.85	101.85	101.85	101.84
1,445.000	101.84	101.84	101.84	101.84	101.84
1,450.000	101.84	101.84	101.84	101.83	101.83
1,455.000	101.83	101.83	101.83	101.83	101.83
1,460.000	101.83	101.83	101.82	101.82	101.82
1,465.000	101.82	101.82	101.82	101.82	101.82
1,470.000	101.82	101.81	101.81	101.81	101.81
1,475.000	101.81	101.81	101.81	101.81	101.81
1,480.000	101.81	101.80	101.80	101.80	101.80
1,485.000	101.80	101.80	101.80	101.80	101.80
1,490.000	101.79	101.79	101.79	101.79	101.79
1,495.000	101.79	101.79	101.79	101.79	101.78
1,500.000	101.78	101.78	101.78	101.78	101.78
1,505.000	101.78	101.78	101.78	101.78	101.77
1,510.000	101.77	101.77	101.77	101.77	101.77
1,515.000	101.77	101.77	101.77	101.76	101.76
1,520.000	101.76	101.76	101.76	101.76	101.76
1,525.000	101.76	101.76	101.76	101.75	101.75
1,530.000	101.75	101.75	101.75	101.75	101.75
1,535.000	101.75	101.75	101.74	101.74	101.74
1,540.000	101.74	101.74	101.74	101.74	101.74
1,545.000	101.74	101.73	101.73	101.73	101.73
1,550.000	101.73	101.73	101.73	101.73	101.73
1,555.000	101.73	101.72	101.72	101.72	101.72
1,560.000	101.72	101.72	101.72	101.72	101.72
1,565.000	101.71	101.71	101.71	101.71	101.71
1,570.000	101.71	101.71	101.71	101.71	101.71
1,575.000	101.70	101.70	101.70	101.70	101.70
1,580.000	101.70	101.70	101.70	101.70	101.69
1,585.000	101.69	101.69	101.69	101.69	101.69
1,590.000	101.69	101.69	101.69	101.69	101.68
1,595.000	101.68	101.68	101.68	101.68	101.68
1,600.000	101.68	101.68	101.68	101.67	101.67
1,605.000	101.67	101.67	101.67	101.67	101.67
1,610.000	101.67	101.67	101.67	101.66	101.66
1,615.000	101.66	101.66	101.66	101.66	101.66
1,620.000	101.66	101.66	101.65	101.65	101.65
1,625.000	101.65	101.65	101.65	101.65	101.65
1,630.000	101.65	101.65	101.64	101.64	101.64

Detention Vault

Subsection: Time vs. Elevation
Label: 1 (OUT)
Scenario: EX10

Return Event: 100 years
Storm Event:

Time vs. Elevation (ft)

Output Time increment = 1.000 min
Time on left represents time for first value in each row.

Time (min)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
1,635.000	101.64	101.64	101.64	101.64	101.64
1,640.000	101.64	101.63	101.63	101.63	101.63
1,645.000	101.63	101.63	101.63	101.63	101.63
1,650.000	101.63	101.62	101.62	101.62	101.62
1,655.000	101.62	101.62	101.62	101.62	101.62
1,660.000	101.62	101.61	101.61	101.61	101.61
1,665.000	101.61	101.61	101.61	101.61	101.61
1,670.000	101.60	101.60	101.60	101.60	101.60
1,675.000	101.60	101.60	101.60	101.60	101.60
1,680.000	101.59	101.59	101.59	101.59	101.59
1,685.000	101.59	101.59	101.59	101.59	101.58
1,690.000	101.58	101.58	101.58	101.58	101.58
1,695.000	101.58	101.58	101.58	101.58	101.57
1,700.000	101.57	101.57	101.57	101.57	101.57
1,705.000	101.57	101.57	101.57	101.57	101.56
1,710.000	101.56	101.56	101.56	101.56	101.56
1,715.000	101.56	101.56	101.56	101.55	101.55
1,720.000	101.55	101.55	101.55	101.55	101.55
1,725.000	101.55	101.55	101.55	101.54	101.54
1,730.000	101.54	101.54	101.54	101.54	101.54
1,735.000	101.54	101.54	101.54	101.53	101.53
1,740.000	101.53	101.53	101.53	101.53	101.53
1,745.000	101.53	101.53	101.53	101.52	101.52
1,750.000	101.52	101.52	101.52	101.52	101.52
1,755.000	101.52	101.52	101.51	101.51	101.51
1,760.000	101.51	101.51	101.51	101.51	101.51
1,765.000	101.51	101.51	101.50	101.50	101.50
1,770.000	101.50	101.50	101.50	101.50	101.50
1,775.000	101.50	101.50	101.49	101.49	101.49
1,780.000	101.49	101.49	101.49	101.49	101.49
1,785.000	101.49	101.49	101.48	101.48	101.48
1,790.000	101.48	101.48	101.48	101.48	101.48
1,795.000	101.48	101.48	101.47	101.47	101.47
1,800.000	101.47	101.47	101.47	101.47	101.47
1,805.000	101.47	101.46	101.46	101.46	101.46
1,810.000	101.46	101.46	101.46	101.46	101.46
1,815.000	101.46	101.45	101.45	101.45	101.45
1,820.000	101.45	101.45	101.45	101.45	101.45
1,825.000	101.45	101.44	101.44	101.44	101.44
1,830.000	101.44	101.44	101.44	101.44	101.44
1,835.000	101.44	101.43	101.43	101.43	101.43

Detention Vault

Subsection: Time vs. Elevation
Label: 1 (OUT)
Scenario: EX10

Return Event: 100 years
Storm Event:

Time vs. Elevation (ft)

Output Time increment = 1.000 min
Time on left represents time for first value in each row.

Time (min)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
1,840.000	101.43	101.43	101.43	101.43	101.43
1,845.000	101.43	101.42	101.42	101.42	101.42
1,850.000	101.42	101.42	101.42	101.42	101.42
1,855.000	101.42	101.41	101.41	101.41	101.41
1,860.000	101.41	101.41	101.41	101.41	101.41
1,865.000	101.41	101.40	101.40	101.40	101.40
1,870.000	101.40	101.40	101.40	101.40	101.40
1,875.000	101.40	101.39	101.39	101.39	101.39
1,880.000	101.39	101.39	101.39	101.39	101.39
1,885.000	101.39	101.38	101.38	101.38	101.38
1,890.000	101.38	101.38	101.38	101.38	101.38
1,895.000	101.38	101.37	101.37	101.37	101.37
1,900.000	101.37	101.37	101.37	101.37	101.37
1,905.000	101.37	101.36	101.36	101.36	101.36
1,910.000	101.36	101.36	101.36	101.36	101.36
1,915.000	101.36	101.35	101.35	101.35	101.35
1,920.000	101.35	101.35	101.35	101.35	101.35
1,925.000	101.35	101.34	101.34	101.34	101.34
1,930.000	101.34	101.34	101.34	101.34	101.34
1,935.000	101.34	101.33	101.33	101.33	101.33
1,940.000	101.33	101.33	101.33	101.33	101.33
1,945.000	101.33	101.32	101.32	101.32	101.32
1,950.000	101.32	101.32	101.32	101.32	101.32
1,955.000	101.32	101.31	101.31	101.31	101.31
1,960.000	101.31	101.31	101.31	101.31	101.31
1,965.000	101.31	101.30	101.30	101.30	101.30
1,970.000	101.30	101.30	101.30	101.30	101.30
1,975.000	101.30	101.30	101.29	101.29	101.29
1,980.000	101.29	101.29	101.29	101.29	101.29
1,985.000	101.29	101.29	101.28	101.28	101.28
1,990.000	101.28	101.28	101.28	101.28	101.28
1,995.000	101.28	101.28	101.27	101.27	101.27
2,000.000	101.27	101.27	101.27	101.27	101.27
2,005.000	101.27	101.27	101.26	101.26	101.26
2,010.000	101.26	101.26	101.26	101.26	101.26
2,015.000	101.26	101.26	101.25	101.25	101.25
2,020.000	101.25	101.25	101.25	101.25	101.25
2,025.000	101.25	101.25	101.25	101.24	101.24
2,030.000	101.24	101.24	101.24	101.24	101.24
2,035.000	101.24	101.24	101.24	101.23	101.23
2,040.000	101.23	101.23	101.23	101.23	101.23

Detention Vault

Subsection: Time vs. Elevation
Label: 1 (OUT)
Scenario: EX10

Return Event: 100 years
Storm Event:

Time vs. Elevation (ft)

Output Time increment = 1.000 min
Time on left represents time for first value in each row.

Time (min)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
2,045.000	101.23	101.23	101.23	101.22	101.22
2,050.000	101.22	101.22	101.22	101.22	101.22
2,055.000	101.22	101.22	101.22	101.21	101.21
2,060.000	101.21	101.21	101.21	101.21	101.21
2,065.000	101.21	101.21	101.21	101.21	101.20
2,070.000	101.20	101.20	101.20	101.20	101.20
2,075.000	101.20	101.20	101.20	101.20	101.19
2,080.000	101.19	101.19	101.19	101.19	101.19
2,085.000	101.19	101.19	101.19	101.19	101.19
2,090.000	101.18	101.18	101.18	101.18	101.18
2,095.000	101.18	101.18	101.18	101.18	101.18
2,100.000	101.17	101.17	101.17	101.17	101.17
2,105.000	101.17	101.17	101.17	101.17	101.17
2,110.000	101.16	101.16	101.16	101.16	101.16
2,115.000	101.16	101.16	101.16	101.16	101.16
2,120.000	101.16	101.15	101.15	101.15	101.15
2,125.000	101.15	101.15	101.15	101.15	101.15
2,130.000	101.15	101.14	101.14	101.14	101.14
2,135.000	101.14	101.14	101.14	101.14	101.14
2,140.000	101.14	101.14	101.13	101.13	101.13
2,145.000	101.13	101.13	101.13	101.13	101.13
2,150.000	101.13	101.13	101.12	101.12	101.12
2,155.000	101.12	101.12	101.12	101.12	101.12
2,160.000	101.12	101.12	101.12	101.11	101.11
2,165.000	101.11	101.11	101.11	101.11	101.11
2,170.000	101.11	101.11	101.11	101.10	101.10
2,175.000	101.10	101.10	101.10	101.10	101.10
2,180.000	101.10	101.10	101.10	101.10	101.09
2,185.000	101.09	101.09	101.09	101.09	101.09
2,190.000	101.09	101.09	101.09	101.09	101.08
2,195.000	101.08	101.08	101.08	101.08	101.08
2,200.000	101.08	101.08	101.08	101.08	101.08
2,205.000	101.07	101.07	101.07	101.07	101.07
2,210.000	101.07	101.07	101.07	101.07	101.07
2,215.000	101.06	101.06	101.06	101.06	101.06
2,220.000	101.06	101.06	101.06	101.06	101.06
2,225.000	101.06	101.05	101.05	101.05	101.05
2,230.000	101.05	101.05	101.05	101.05	101.05
2,235.000	101.05	101.05	101.04	101.04	101.04
2,240.000	101.04	101.04	101.04	101.04	101.04
2,245.000	101.04	101.04	101.03	101.03	101.03

Detention Vault

Subsection: Time vs. Elevation
Label: 1 (OUT)
Scenario: EX10

Return Event: 100 years
Storm Event:

Time vs. Elevation (ft)

Output Time increment = 1.000 min
Time on left represents time for first value in each row.

Time (min)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
2,250.000	101.03	101.03	101.03	101.03	101.03
2,255.000	101.03	101.03	101.03	101.02	101.02
2,260.000	101.02	101.02	101.02	101.02	101.02
2,265.000	101.02	101.02	101.02	101.02	101.01
2,270.000	101.01	101.01	101.01	101.01	101.01
2,275.000	101.01	101.01	101.01	101.01	101.01
2,280.000	101.00	101.00	101.00	101.00	101.00
2,285.000	101.00	101.00	101.00	101.00	101.00
2,290.000	100.99	100.99	100.99	100.99	100.99
2,295.000	100.99	100.99	100.99	100.99	100.99
2,300.000	100.99	100.98	100.98	100.98	100.98
2,305.000	100.98	100.98	100.98	100.98	100.98
2,310.000	100.98	100.98	100.97	100.97	100.97
2,315.000	100.97	100.97	100.97	100.97	100.97
2,320.000	100.97	100.97	100.97	100.96	100.96
2,325.000	100.96	100.96	100.96	100.96	100.96
2,330.000	100.96	100.96	100.96	100.96	100.95
2,335.000	100.95	100.95	100.95	100.95	100.95
2,340.000	100.95	100.95	100.95	100.95	100.95
2,345.000	100.94	100.94	100.94	100.94	100.94
2,350.000	100.94	100.94	100.94	100.94	100.94
2,355.000	100.93	100.93	100.93	100.93	100.93
2,360.000	100.93	100.93	100.93	100.93	100.93
2,365.000	100.93	100.92	100.92	100.92	100.92
2,370.000	100.92	100.92	100.92	100.92	100.92
2,375.000	100.92	100.92	100.91	100.91	100.91
2,380.000	100.91	100.91	100.91	100.91	100.91
2,385.000	100.91	100.91	100.91	100.90	100.90
2,390.000	100.90	100.90	100.90	100.90	100.90
2,395.000	100.90	100.90	100.90	100.90	100.89
2,400.000	100.89	100.89	100.89	100.89	100.89
2,405.000	100.89	100.89	100.89	100.89	100.89
2,410.000	100.88	100.88	100.88	100.88	100.88
2,415.000	100.88	100.88	100.88	100.88	100.88
2,420.000	100.88	100.87	100.87	100.87	100.87
2,425.000	100.87	100.87	100.87	100.87	100.87
2,430.000	100.87	100.87	100.86	100.86	100.86
2,435.000	100.86	100.86	100.86	100.86	100.86
2,440.000	100.86	100.86	100.86	100.86	100.85
2,445.000	100.85	100.85	100.85	100.85	100.85
2,450.000	100.85	100.85	100.85	100.85	100.85

Detention Vault

Subsection: Time vs. Elevation
Label: 1 (OUT)
Scenario: EX10

Return Event: 100 years
Storm Event:

Time vs. Elevation (ft)

Output Time increment = 1.000 min
Time on left represents time for first value in each row.

Time (min)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
2,455.000	100.84	100.84	100.84	100.84	100.84
2,460.000	100.84	100.84	100.84	100.84	100.84
2,465.000	100.84	100.83	100.83	100.83	100.83
2,470.000	100.83	100.83	100.83	100.83	100.83
2,475.000	100.83	100.83	100.82	100.82	100.82
2,480.000	100.82	100.82	100.82	100.82	100.82
2,485.000	100.82	100.82	100.82	100.81	100.81
2,490.000	100.81	100.81	100.81	100.81	100.81
2,495.000	100.81	100.81	100.81	100.81	100.80
2,500.000	100.80	100.80	100.80	100.80	100.80
2,505.000	100.80	100.80	100.80	100.80	100.80
2,510.000	100.80	100.79	100.79	100.79	100.79
2,515.000	100.79	100.79	100.79	100.79	100.79
2,520.000	100.79	100.79	100.78	100.78	100.78
2,525.000	100.78	100.78	100.78	100.78	100.78
2,530.000	100.78	100.78	100.78	100.77	100.77
2,535.000	100.77	100.77	100.77	100.77	100.77
2,540.000	100.77	100.77	100.77	100.77	100.76
2,545.000	100.76	100.76	100.76	100.76	100.76
2,550.000	100.76	100.76	100.76	100.76	100.76
2,555.000	100.76	100.75	100.75	100.75	100.75
2,560.000	100.75	100.75	100.75	100.75	100.75
2,565.000	100.75	100.75	100.74	100.74	100.74
2,570.000	100.74	100.74	100.74	100.74	100.74
2,575.000	100.74	100.74	100.74	100.74	100.73
2,580.000	100.73	100.73	100.73	100.73	100.73
2,585.000	100.73	100.73	100.73	100.73	100.73
2,590.000	100.72	100.72	100.72	100.72	100.72
2,595.000	100.72	100.72	100.72	100.72	100.72
2,600.000	100.72	100.71	100.71	100.71	100.71
2,605.000	100.71	100.71	100.71	100.71	100.71
2,610.000	100.71	100.71	100.71	100.70	100.70
2,615.000	100.70	100.70	100.70	100.70	100.70
2,620.000	100.70	100.70	100.70	100.70	100.69
2,625.000	100.69	100.69	100.69	100.69	100.69
2,630.000	100.69	100.69	100.69	100.69	100.69
2,635.000	100.69	100.68	100.68	100.68	100.68
2,640.000	100.68	100.68	100.68	100.68	100.68
2,645.000	100.68	100.68	100.68	100.67	100.67
2,650.000	100.67	100.67	100.67	100.67	100.67
2,655.000	100.67	100.67	100.67	100.67	100.66

Detention Vault

Subsection: Time vs. Elevation
Label: 1 (OUT)
Scenario: EX10

Return Event: 100 years
Storm Event:

Time vs. Elevation (ft)

Output Time increment = 1.000 min
Time on left represents time for first value in each row.

Time (min)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
2,660.000	100.66	100.66	100.66	100.66	100.66
2,665.000	100.66	100.66	100.66	100.66	100.66
2,670.000	100.66	100.65	100.65	100.65	100.65
2,675.000	100.65	100.65	100.65	100.65	100.65
2,680.000	100.65	100.65	100.64	100.64	100.64
2,685.000	100.64	100.64	100.64	100.64	100.64
2,690.000	100.64	100.64	100.64	100.64	100.63
2,695.000	100.63	100.63	100.63	100.63	100.63
2,700.000	100.63	100.63	100.63	100.63	100.63
2,705.000	100.63	100.62	100.62	100.62	100.62
2,710.000	100.62	100.62	100.62	100.62	100.62
2,715.000	100.62	100.62	100.62	100.61	100.61
2,720.000	100.61	100.61	100.61	100.61	100.61
2,725.000	100.61	100.61	100.61	100.61	100.60
2,730.000	100.60	100.60	100.60	100.60	100.60
2,735.000	100.60	100.60	100.60	100.60	100.60
2,740.000	100.60	100.59	100.59	100.59	100.59
2,745.000	100.59	100.59	100.59	100.59	100.59
2,750.000	100.59	100.59	100.59	100.58	100.58
2,755.000	100.58	100.58	100.58	100.58	100.58
2,760.000	100.58	100.58	100.58	100.58	100.58
2,765.000	100.57	100.57	100.57	100.57	100.57
2,770.000	100.57	100.57	100.57	100.57	100.57
2,775.000	100.57	100.57	100.56	100.56	100.56
2,780.000	100.56	100.56	100.56	100.56	100.56
2,785.000	100.56	100.56	100.56	100.56	100.55
2,790.000	100.55	100.55	100.55	100.55	100.55
2,795.000	100.55	100.55	100.55	100.55	100.55
2,800.000	100.54	100.54	100.54	100.54	100.54
2,805.000	100.54	100.54	100.54	100.54	100.54
2,810.000	100.54	100.54	100.53	100.53	100.53
2,815.000	100.53	100.53	100.53	100.53	100.53
2,820.000	100.53	100.53	100.53	100.53	100.52
2,825.000	100.52	100.52	100.52	100.52	100.52
2,830.000	100.52	100.52	100.52	100.52	100.52
2,835.000	100.52	100.51	100.51	100.51	100.51
2,840.000	100.51	100.51	100.51	100.51	100.51
2,845.000	100.51	100.51	100.51	100.51	100.50
2,850.000	100.50	100.50	100.50	100.50	100.50
2,855.000	100.50	100.50	100.50	100.50	100.50
2,860.000	100.50	100.49	100.49	100.49	100.49

Detention Vault

Subsection: Time vs. Elevation
Label: 1 (OUT)
Scenario: EX10

Return Event: 100 years
Storm Event:

Time vs. Elevation (ft)

Output Time increment = 1.000 min
Time on left represents time for first value in each row.

Time (min)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
2,865.000	100.49	100.49	100.49	100.49	100.49
2,870.000	100.49	100.49	100.49	100.48	100.48
2,875.000	100.48	100.48	100.48	100.48	100.48
2,880.000	100.48	100.48	100.48	100.48	100.48
2,885.000	100.47	100.47	100.47	100.47	100.47
2,890.000	100.47	100.47	100.47	100.47	100.47
2,895.000	100.47	100.47	100.46	100.46	100.46
2,900.000	100.46	100.46	100.46	100.46	100.46
2,905.000	100.46	100.46	100.46	100.46	100.45
2,910.000	100.45	100.45	100.45	100.45	100.45
2,915.000	100.45	100.45	100.45	100.45	100.45
2,920.000	100.45	100.45	100.44	100.44	100.44
2,925.000	100.44	100.44	100.44	100.44	100.44
2,930.000	100.44	100.44	100.44	100.44	100.43
2,935.000	100.43	100.43	100.43	100.43	100.43
2,940.000	100.43	100.43	100.43	100.43	100.43
2,945.000	100.43	100.42	100.42	100.42	100.42
2,950.000	100.42	100.42	100.42	100.42	100.42
2,955.000	100.42	100.42	100.42	100.42	100.41
2,960.000	100.41	100.41	100.41	100.41	100.41
2,965.000	100.41	100.41	100.41	100.41	100.41
2,970.000	100.41	100.40	100.40	100.40	100.40
2,975.000	100.40	100.40	100.40	100.40	100.40
2,980.000	100.40	100.40	100.40	100.39	100.39
2,985.000	100.39	100.39	100.39	100.39	100.39
2,990.000	100.39	100.39	100.39	100.39	100.39
2,995.000	100.39	100.38	100.38	100.38	100.38
3,000.000	100.38	(N/A)	(N/A)	(N/A)	(N/A)

Detention Vault

Subsection: Time vs. Volume
Label: 1
Scenario: EX10

Return Event: 100 years
Storm Event:

Time vs. Volume (ac-ft)

Output Time increment = 1.000 min
Time on left represents time for first value in each row.

Time (min)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
0.000	0.003	0.003	0.003	0.003	0.003
5.000	0.003	0.004	0.004	0.005	0.006
10.000	0.007	0.008	0.009	0.010	0.012
15.000	0.013	0.015	0.017	0.018	0.020
20.000	0.022	0.024	0.025	0.027	0.028
25.000	0.029	0.031	0.032	0.034	0.035
30.000	0.036	0.038	0.039	0.041	0.042
35.000	0.043	0.045	0.046	0.047	0.049
40.000	0.050	0.052	0.053	0.054	0.056
45.000	0.057	0.059	0.060	0.062	0.063
50.000	0.065	0.066	0.068	0.069	0.071
55.000	0.072	0.074	0.075	0.077	0.078
60.000	0.080	0.081	0.083	0.084	0.086
65.000	0.087	0.089	0.091	0.092	0.094
70.000	0.095	0.097	0.099	0.100	0.102
75.000	0.103	0.105	0.107	0.108	0.110
80.000	0.112	0.113	0.115	0.116	0.118
85.000	0.120	0.121	0.123	0.125	0.126
90.000	0.128	0.130	0.131	0.133	0.135
95.000	0.136	0.138	0.140	0.142	0.143
100.000	0.145	0.147	0.149	0.151	0.152
105.000	0.154	0.156	0.158	0.159	0.161
110.000	0.163	0.165	0.167	0.169	0.171
115.000	0.173	0.175	0.177	0.179	0.181
120.000	0.183	0.185	0.187	0.189	0.191
125.000	0.193	0.195	0.197	0.199	0.201
130.000	0.203	0.205	0.207	0.209	0.211
135.000	0.213	0.215	0.218	0.220	0.222
140.000	0.224	0.226	0.229	0.231	0.233
145.000	0.235	0.238	0.240	0.242	0.245
150.000	0.247	0.250	0.252	0.254	0.257
155.000	0.259	0.262	0.264	0.267	0.269
160.000	0.272	0.274	0.277	0.280	0.282
165.000	0.285	0.287	0.290	0.293	0.296
170.000	0.298	0.301	0.304	0.306	0.309
175.000	0.312	0.315	0.318	0.321	0.323
180.000	0.326	0.330	0.333	0.336	0.339
185.000	0.342	0.345	0.349	0.352	0.355
190.000	0.359	0.362	0.365	0.369	0.372
195.000	0.376	0.379	0.383	0.387	0.390

Detention Vault

Subsection: Time vs. Volume
Label: 1
Scenario: EX10

Return Event: 100 years
Storm Event:

Time vs. Volume (ac-ft)

Output Time increment = 1.000 min
Time on left represents time for first value in each row.

Time (min)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
200.000	0.394	0.398	0.402	0.406	0.410
205.000	0.414	0.419	0.423	0.427	0.431
210.000	0.436	0.441	0.445	0.450	0.455
215.000	0.460	0.465	0.471	0.476	0.482
220.000	0.487	0.493	0.498	0.504	0.510
225.000	0.516	0.523	0.530	0.537	0.545
230.000	0.553	0.561	0.570	0.579	0.590
235.000	0.601	0.613	0.626	0.640	0.655
240.000	0.671	0.688	0.710	0.734	0.762
245.000	0.793	0.827	0.864	0.905	0.945
250.000	0.981	1.012	1.039	1.062	1.080
255.000	1.093	1.102	1.109	1.116	1.122
260.000	1.128	1.133	1.139	1.144	1.148
265.000	1.153	1.157	1.162	1.166	1.170
270.000	1.173	1.177	1.181	1.184	1.187
275.000	1.191	1.194	1.196	1.199	1.201
280.000	1.203	1.205	1.207	1.209	1.210
285.000	1.212	1.213	1.214	1.215	1.216
290.000	1.217	1.218	1.219	1.220	1.220
295.000	1.221	1.221	1.222	1.222	1.222
300.000	1.223	1.223	1.223	1.223	1.223
305.000	1.223	1.223	1.224	1.224	1.224
310.000	1.223	1.223	1.223	1.223	1.223
315.000	1.223	1.223	1.223	1.223	1.223
320.000	1.223	1.222	1.222	1.222	1.222
325.000	1.222	1.221	1.221	1.221	1.221
330.000	1.221	1.220	1.220	1.220	1.220
335.000	1.219	1.219	1.219	1.219	1.218
340.000	1.218	1.218	1.218	1.218	1.217
345.000	1.217	1.217	1.217	1.217	1.217
350.000	1.216	1.216	1.216	1.216	1.215
355.000	1.215	1.215	1.215	1.215	1.215
360.000	1.214	1.214	1.214	1.213	1.212
365.000	1.212	1.210	1.209	1.208	1.207
370.000	1.205	1.204	1.203	1.202	1.201
375.000	1.200	1.199	1.198	1.197	1.197
380.000	1.196	1.195	1.194	1.194	1.193
385.000	1.193	1.192	1.191	1.191	1.190
390.000	1.190	1.189	1.189	1.188	1.188
395.000	1.187	1.187	1.186	1.186	1.185
400.000	1.185	1.184	1.184	1.184	1.183

Detention Vault

Subsection: Time vs. Volume
Label: 1
Scenario: EX10

Return Event: 100 years
Storm Event:

Time vs. Volume (ac-ft)

Output Time increment = 1.000 min
Time on left represents time for first value in each row.

Time (min)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
405.000	1.183	1.182	1.182	1.182	1.181
410.000	1.181	1.181	1.180	1.180	1.179
415.000	1.179	1.179	1.178	1.178	1.178
420.000	1.177	1.177	1.177	1.176	1.176
425.000	1.175	1.175	1.175	1.174	1.174
430.000	1.174	1.173	1.173	1.172	1.172
435.000	1.172	1.171	1.171	1.171	1.170
440.000	1.170	1.170	1.169	1.169	1.168
445.000	1.168	1.168	1.167	1.167	1.167
450.000	1.166	1.166	1.165	1.165	1.165
455.000	1.164	1.164	1.164	1.163	1.163
460.000	1.163	1.162	1.162	1.161	1.161
465.000	1.161	1.160	1.160	1.160	1.159
470.000	1.159	1.159	1.158	1.158	1.157
475.000	1.157	1.157	1.156	1.156	1.156
480.000	1.155	1.155	1.154	1.154	1.154
485.000	1.153	1.153	1.153	1.152	1.152
490.000	1.152	1.151	1.151	1.150	1.150
495.000	1.150	1.149	1.149	1.149	1.148
500.000	1.148	1.148	1.147	1.147	1.146
505.000	1.146	1.146	1.145	1.145	1.145
510.000	1.144	1.144	1.144	1.143	1.143
515.000	1.142	1.142	1.142	1.141	1.141
520.000	1.141	1.140	1.140	1.140	1.139
525.000	1.139	1.138	1.138	1.138	1.137
530.000	1.137	1.137	1.136	1.136	1.136
535.000	1.135	1.135	1.134	1.134	1.134
540.000	1.133	1.133	1.133	1.132	1.132
545.000	1.132	1.131	1.131	1.130	1.130
550.000	1.130	1.129	1.129	1.129	1.128
555.000	1.128	1.128	1.127	1.127	1.126
560.000	1.126	1.126	1.125	1.125	1.125
565.000	1.124	1.124	1.124	1.123	1.123
570.000	1.122	1.122	1.122	1.121	1.121
575.000	1.121	1.120	1.120	1.120	1.119
580.000	1.119	1.119	1.118	1.118	1.117
585.000	1.117	1.117	1.116	1.116	1.116
590.000	1.115	1.115	1.115	1.114	1.114
595.000	1.113	1.113	1.113	1.112	1.112
600.000	1.112	1.111	1.111	1.111	1.110
605.000	1.110	1.110	1.109	1.109	1.108

Detention Vault

Subsection: Time vs. Volume
Label: 1
Scenario: EX10

Return Event: 100 years
Storm Event:

Time vs. Volume (ac-ft)

Output Time increment = 1.000 min
Time on left represents time for first value in each row.

Time (min)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
610.000	1.108	1.108	1.107	1.107	1.107
615.000	1.106	1.106	1.106	1.105	1.105
620.000	1.104	1.104	1.104	1.103	1.103
625.000	1.103	1.102	1.102	1.102	1.101
630.000	1.101	1.101	1.100	1.100	1.099
635.000	1.099	1.099	1.098	1.098	1.098
640.000	1.097	1.097	1.097	1.096	1.096
645.000	1.096	1.095	1.095	1.094	1.094
650.000	1.094	1.093	1.093	1.093	1.092
655.000	1.092	1.092	1.091	1.091	1.091
660.000	1.090	1.090	1.089	1.089	1.089
665.000	1.088	1.088	1.088	1.087	1.087
670.000	1.087	1.086	1.086	1.086	1.085
675.000	1.085	1.084	1.084	1.084	1.083
680.000	1.083	1.083	1.082	1.082	1.082
685.000	1.081	1.081	1.081	1.080	1.080
690.000	1.079	1.079	1.079	1.078	1.078
695.000	1.078	1.077	1.077	1.077	1.076
700.000	1.076	1.076	1.075	1.075	1.075
705.000	1.074	1.074	1.073	1.073	1.073
710.000	1.072	1.072	1.072	1.071	1.071
715.000	1.071	1.070	1.070	1.070	1.069
720.000	1.069	1.069	1.068	1.068	1.067
725.000	1.067	1.067	1.066	1.066	1.066
730.000	1.065	1.065	1.065	1.064	1.064
735.000	1.064	1.063	1.063	1.062	1.062
740.000	1.062	1.061	1.061	1.061	1.060
745.000	1.060	1.060	1.059	1.059	1.059
750.000	1.058	1.058	1.058	1.057	1.057
755.000	1.057	1.056	1.056	1.055	1.055
760.000	1.055	1.054	1.054	1.054	1.053
765.000	1.053	1.053	1.052	1.052	1.052
770.000	1.051	1.051	1.051	1.050	1.050
775.000	1.049	1.049	1.049	1.048	1.048
780.000	1.048	1.047	1.047	1.047	1.046
785.000	1.046	1.046	1.045	1.045	1.045
790.000	1.044	1.044	1.044	1.043	1.043
795.000	1.042	1.042	1.042	1.041	1.041
800.000	1.041	1.040	1.040	1.040	1.039
805.000	1.039	1.039	1.038	1.038	1.038
810.000	1.037	1.037	1.037	1.036	1.036

Detention Vault

Subsection: Time vs. Volume
Label: 1
Scenario: EX10

Return Event: 100 years
Storm Event:

Time vs. Volume (ac-ft)

Output Time increment = 1.000 min
Time on left represents time for first value in each row.

Time (min)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
815.000	1.036	1.035	1.035	1.034	1.034
820.000	1.034	1.033	1.033	1.033	1.032
825.000	1.032	1.032	1.031	1.031	1.031
830.000	1.030	1.030	1.030	1.029	1.029
835.000	1.029	1.028	1.028	1.028	1.027
840.000	1.027	1.026	1.026	1.026	1.025
845.000	1.025	1.025	1.024	1.024	1.024
850.000	1.023	1.023	1.023	1.022	1.022
855.000	1.022	1.021	1.021	1.021	1.020
860.000	1.020	1.020	1.019	1.019	1.018
865.000	1.018	1.018	1.017	1.017	1.017
870.000	1.016	1.016	1.016	1.015	1.015
875.000	1.015	1.014	1.014	1.014	1.013
880.000	1.013	1.013	1.012	1.012	1.012
885.000	1.011	1.011	1.011	1.010	1.010
890.000	1.010	1.009	1.009	1.008	1.008
895.000	1.008	1.007	1.007	1.007	1.006
900.000	1.006	1.006	1.005	1.005	1.005
905.000	1.004	1.004	1.004	1.003	1.003
910.000	1.003	1.002	1.002	1.002	1.001
915.000	1.001	1.001	1.000	1.000	1.000
920.000	0.999	0.999	0.999	0.998	0.998
925.000	0.997	0.997	0.997	0.996	0.996
930.000	0.996	0.995	0.995	0.995	0.994
935.000	0.994	0.994	0.993	0.993	0.993
940.000	0.992	0.992	0.992	0.991	0.991
945.000	0.991	0.990	0.990	0.990	0.989
950.000	0.989	0.989	0.988	0.988	0.988
955.000	0.987	0.987	0.987	0.986	0.986
960.000	0.986	0.985	0.985	0.985	0.984
965.000	0.984	0.983	0.983	0.983	0.982
970.000	0.982	0.982	0.981	0.981	0.981
975.000	0.980	0.980	0.980	0.979	0.979
980.000	0.979	0.978	0.978	0.978	0.977
985.000	0.977	0.977	0.976	0.976	0.976
990.000	0.975	0.975	0.975	0.974	0.974
995.000	0.974	0.973	0.973	0.973	0.972
1,000.000	0.972	0.972	0.971	0.971	0.971
1,005.000	0.970	0.970	0.970	0.969	0.969
1,010.000	0.969	0.968	0.968	0.968	0.967
1,015.000	0.967	0.967	0.966	0.966	0.965

Detention Vault

Subsection: Time vs. Volume
Label: 1
Scenario: EX10

Return Event: 100 years
Storm Event:

Time vs. Volume (ac-ft)

Output Time increment = 1.000 min
Time on left represents time for first value in each row.

Time (min)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
1,020.000	0.965	0.965	0.964	0.964	0.964
1,025.000	0.963	0.963	0.963	0.962	0.962
1,030.000	0.962	0.961	0.961	0.961	0.960
1,035.000	0.960	0.960	0.959	0.959	0.959
1,040.000	0.958	0.958	0.958	0.957	0.957
1,045.000	0.957	0.956	0.956	0.956	0.955
1,050.000	0.955	0.955	0.954	0.954	0.954
1,055.000	0.953	0.953	0.953	0.952	0.952
1,060.000	0.952	0.951	0.951	0.951	0.950
1,065.000	0.950	0.950	0.949	0.949	0.949
1,070.000	0.948	0.948	0.948	0.947	0.947
1,075.000	0.947	0.946	0.946	0.946	0.945
1,080.000	0.945	0.945	0.944	0.944	0.944
1,085.000	0.943	0.943	0.943	0.942	0.942
1,090.000	0.942	0.941	0.941	0.941	0.940
1,095.000	0.940	0.940	0.939	0.939	0.939
1,100.000	0.938	0.938	0.938	0.937	0.937
1,105.000	0.937	0.936	0.936	0.936	0.935
1,110.000	0.935	0.935	0.934	0.934	0.934
1,115.000	0.933	0.933	0.933	0.932	0.932
1,120.000	0.932	0.931	0.931	0.931	0.930
1,125.000	0.930	0.930	0.929	0.929	0.929
1,130.000	0.928	0.928	0.928	0.927	0.927
1,135.000	0.927	0.926	0.926	0.926	0.925
1,140.000	0.925	0.925	0.924	0.924	0.924
1,145.000	0.923	0.923	0.923	0.922	0.922
1,150.000	0.922	0.921	0.921	0.921	0.920
1,155.000	0.920	0.920	0.919	0.919	0.919
1,160.000	0.918	0.918	0.918	0.917	0.917
1,165.000	0.917	0.916	0.916	0.916	0.915
1,170.000	0.915	0.915	0.914	0.914	0.914
1,175.000	0.913	0.913	0.913	0.912	0.912
1,180.000	0.912	0.911	0.911	0.911	0.910
1,185.000	0.910	0.910	0.909	0.909	0.909
1,190.000	0.908	0.908	0.908	0.908	0.907
1,195.000	0.907	0.907	0.906	0.906	0.906
1,200.000	0.905	0.905	0.905	0.904	0.904
1,205.000	0.904	0.903	0.903	0.903	0.902
1,210.000	0.902	0.902	0.901	0.901	0.901
1,215.000	0.900	0.900	0.900	0.899	0.899
1,220.000	0.899	0.898	0.898	0.898	0.897

Detention Vault

Subsection: Time vs. Volume
Label: 1
Scenario: EX10

Return Event: 100 years
Storm Event:

Time vs. Volume (ac-ft)

Output Time increment = 1.000 min
Time on left represents time for first value in each row.

Time (min)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
1,225.000	0.897	0.897	0.896	0.896	0.896
1,230.000	0.895	0.895	0.895	0.894	0.894
1,235.000	0.894	0.893	0.893	0.893	0.892
1,240.000	0.892	0.892	0.891	0.891	0.891
1,245.000	0.890	0.890	0.890	0.889	0.889
1,250.000	0.889	0.889	0.888	0.888	0.888
1,255.000	0.887	0.887	0.887	0.886	0.886
1,260.000	0.886	0.885	0.885	0.885	0.884
1,265.000	0.884	0.884	0.883	0.883	0.883
1,270.000	0.882	0.882	0.882	0.881	0.881
1,275.000	0.881	0.880	0.880	0.880	0.879
1,280.000	0.879	0.879	0.878	0.878	0.878
1,285.000	0.877	0.877	0.877	0.876	0.876
1,290.000	0.876	0.876	0.875	0.875	0.875
1,295.000	0.874	0.874	0.874	0.873	0.873
1,300.000	0.873	0.872	0.872	0.872	0.871
1,305.000	0.871	0.871	0.870	0.870	0.870
1,310.000	0.869	0.869	0.869	0.868	0.868
1,315.000	0.868	0.867	0.867	0.867	0.866
1,320.000	0.866	0.866	0.866	0.865	0.865
1,325.000	0.865	0.864	0.864	0.864	0.863
1,330.000	0.863	0.863	0.862	0.862	0.862
1,335.000	0.861	0.861	0.861	0.860	0.860
1,340.000	0.860	0.859	0.859	0.859	0.858
1,345.000	0.858	0.858	0.857	0.857	0.857
1,350.000	0.857	0.856	0.856	0.856	0.855
1,355.000	0.855	0.855	0.854	0.854	0.854
1,360.000	0.853	0.853	0.853	0.852	0.852
1,365.000	0.852	0.851	0.851	0.851	0.850
1,370.000	0.850	0.850	0.849	0.849	0.849
1,375.000	0.849	0.848	0.848	0.848	0.847
1,380.000	0.847	0.847	0.846	0.846	0.846
1,385.000	0.845	0.845	0.845	0.844	0.844
1,390.000	0.844	0.843	0.843	0.843	0.842
1,395.000	0.842	0.842	0.842	0.841	0.841
1,400.000	0.841	0.840	0.840	0.840	0.839
1,405.000	0.839	0.839	0.838	0.838	0.838
1,410.000	0.837	0.837	0.837	0.836	0.836
1,415.000	0.836	0.835	0.835	0.835	0.835
1,420.000	0.834	0.834	0.834	0.833	0.833
1,425.000	0.833	0.832	0.832	0.832	0.831

Detention Vault

Subsection: Time vs. Volume
Label: 1
Scenario: EX10

Return Event: 100 years
Storm Event:

Time vs. Volume (ac-ft)

Output Time increment = 1.000 min
Time on left represents time for first value in each row.

Time (min)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
1,430.000	0.831	0.831	0.830	0.830	0.830
1,435.000	0.829	0.829	0.829	0.829	0.828
1,440.000	0.828	0.828	0.827	0.827	0.827
1,445.000	0.826	0.826	0.826	0.825	0.825
1,450.000	0.825	0.824	0.824	0.824	0.823
1,455.000	0.823	0.823	0.823	0.822	0.822
1,460.000	0.822	0.821	0.821	0.821	0.820
1,465.000	0.820	0.820	0.819	0.819	0.819
1,470.000	0.818	0.818	0.818	0.817	0.817
1,475.000	0.817	0.817	0.816	0.816	0.816
1,480.000	0.815	0.815	0.815	0.814	0.814
1,485.000	0.814	0.813	0.813	0.813	0.812
1,490.000	0.812	0.812	0.812	0.811	0.811
1,495.000	0.811	0.810	0.810	0.810	0.809
1,500.000	0.809	0.809	0.808	0.808	0.808
1,505.000	0.807	0.807	0.807	0.807	0.806
1,510.000	0.806	0.806	0.805	0.805	0.805
1,515.000	0.804	0.804	0.804	0.803	0.803
1,520.000	0.803	0.802	0.802	0.802	0.802
1,525.000	0.801	0.801	0.801	0.800	0.800
1,530.000	0.800	0.799	0.799	0.799	0.798
1,535.000	0.798	0.798	0.797	0.797	0.797
1,540.000	0.797	0.796	0.796	0.796	0.795
1,545.000	0.795	0.795	0.794	0.794	0.794
1,550.000	0.793	0.793	0.793	0.793	0.792
1,555.000	0.792	0.792	0.791	0.791	0.791
1,560.000	0.790	0.790	0.790	0.789	0.789
1,565.000	0.789	0.789	0.788	0.788	0.788
1,570.000	0.787	0.787	0.787	0.786	0.786
1,575.000	0.786	0.785	0.785	0.785	0.785
1,580.000	0.784	0.784	0.784	0.783	0.783
1,585.000	0.783	0.782	0.782	0.782	0.781
1,590.000	0.781	0.781	0.780	0.780	0.780
1,595.000	0.780	0.779	0.779	0.779	0.778
1,600.000	0.778	0.778	0.777	0.777	0.777
1,605.000	0.776	0.776	0.776	0.776	0.775
1,610.000	0.775	0.775	0.774	0.774	0.774
1,615.000	0.773	0.773	0.773	0.772	0.772
1,620.000	0.772	0.772	0.771	0.771	0.771
1,625.000	0.770	0.770	0.770	0.769	0.769
1,630.000	0.769	0.769	0.768	0.768	0.768

Detention Vault

Subsection: Time vs. Volume
Label: 1
Scenario: EX10

Return Event: 100 years
Storm Event:

Time vs. Volume (ac-ft)

Output Time increment = 1.000 min
Time on left represents time for first value in each row.

Time (min)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
1,635.000	0.767	0.767	0.767	0.766	0.766
1,640.000	0.766	0.765	0.765	0.765	0.765
1,645.000	0.764	0.764	0.764	0.763	0.763
1,650.000	0.763	0.762	0.762	0.762	0.762
1,655.000	0.761	0.761	0.761	0.760	0.760
1,660.000	0.760	0.759	0.759	0.759	0.758
1,665.000	0.758	0.758	0.758	0.757	0.757
1,670.000	0.757	0.756	0.756	0.756	0.755
1,675.000	0.755	0.755	0.755	0.754	0.754
1,680.000	0.754	0.753	0.753	0.753	0.752
1,685.000	0.752	0.752	0.751	0.751	0.751
1,690.000	0.751	0.750	0.750	0.750	0.749
1,695.000	0.749	0.749	0.748	0.748	0.748
1,700.000	0.748	0.747	0.747	0.747	0.746
1,705.000	0.746	0.746	0.745	0.745	0.745
1,710.000	0.745	0.744	0.744	0.744	0.743
1,715.000	0.743	0.743	0.742	0.742	0.742
1,720.000	0.742	0.741	0.741	0.741	0.740
1,725.000	0.740	0.740	0.739	0.739	0.739
1,730.000	0.738	0.738	0.738	0.738	0.737
1,735.000	0.737	0.737	0.736	0.736	0.736
1,740.000	0.736	0.735	0.735	0.735	0.734
1,745.000	0.734	0.734	0.733	0.733	0.733
1,750.000	0.733	0.732	0.732	0.732	0.731
1,755.000	0.731	0.731	0.730	0.730	0.730
1,760.000	0.730	0.729	0.729	0.729	0.728
1,765.000	0.728	0.728	0.727	0.727	0.727
1,770.000	0.727	0.726	0.726	0.726	0.725
1,775.000	0.725	0.725	0.724	0.724	0.724
1,780.000	0.724	0.723	0.723	0.723	0.722
1,785.000	0.722	0.722	0.721	0.721	0.721
1,790.000	0.721	0.720	0.720	0.720	0.719
1,795.000	0.719	0.719	0.718	0.718	0.718
1,800.000	0.718	0.717	0.717	0.717	0.716
1,805.000	0.716	0.716	0.716	0.715	0.715
1,810.000	0.715	0.714	0.714	0.714	0.713
1,815.000	0.713	0.713	0.713	0.712	0.712
1,820.000	0.712	0.711	0.711	0.711	0.710
1,825.000	0.710	0.710	0.710	0.709	0.709
1,830.000	0.709	0.708	0.708	0.708	0.708
1,835.000	0.707	0.707	0.707	0.706	0.706

Detention Vault

Subsection: Time vs. Volume
Label: 1
Scenario: EX10

Return Event: 100 years
Storm Event:

Time vs. Volume (ac-ft)

Output Time increment = 1.000 min
Time on left represents time for first value in each row.

Time (min)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
1,840.000	0.706	0.705	0.705	0.705	0.705
1,845.000	0.704	0.704	0.704	0.703	0.703
1,850.000	0.703	0.703	0.702	0.702	0.702
1,855.000	0.701	0.701	0.701	0.700	0.700
1,860.000	0.700	0.700	0.699	0.699	0.699
1,865.000	0.698	0.698	0.698	0.698	0.697
1,870.000	0.697	0.697	0.696	0.696	0.696
1,875.000	0.695	0.695	0.695	0.695	0.694
1,880.000	0.694	0.694	0.693	0.693	0.693
1,885.000	0.693	0.692	0.692	0.692	0.691
1,890.000	0.691	0.691	0.690	0.690	0.690
1,895.000	0.690	0.689	0.689	0.689	0.688
1,900.000	0.688	0.688	0.688	0.687	0.687
1,905.000	0.687	0.686	0.686	0.686	0.686
1,910.000	0.685	0.685	0.685	0.684	0.684
1,915.000	0.684	0.683	0.683	0.683	0.683
1,920.000	0.682	0.682	0.682	0.681	0.681
1,925.000	0.681	0.681	0.680	0.680	0.680
1,930.000	0.679	0.679	0.679	0.679	0.678
1,935.000	0.678	0.678	0.677	0.677	0.677
1,940.000	0.677	0.676	0.676	0.676	0.675
1,945.000	0.675	0.675	0.674	0.674	0.674
1,950.000	0.674	0.673	0.673	0.673	0.672
1,955.000	0.672	0.672	0.672	0.671	0.671
1,960.000	0.671	0.670	0.670	0.670	0.670
1,965.000	0.669	0.669	0.669	0.668	0.668
1,970.000	0.668	0.668	0.667	0.667	0.667
1,975.000	0.666	0.666	0.666	0.666	0.665
1,980.000	0.665	0.665	0.664	0.664	0.664
1,985.000	0.664	0.663	0.663	0.663	0.662
1,990.000	0.662	0.662	0.662	0.661	0.661
1,995.000	0.661	0.660	0.660	0.660	0.660
2,000.000	0.659	0.659	0.659	0.658	0.658
2,005.000	0.658	0.658	0.657	0.657	0.657
2,010.000	0.656	0.656	0.656	0.656	0.655
2,015.000	0.655	0.655	0.654	0.654	0.654
2,020.000	0.654	0.653	0.653	0.653	0.652
2,025.000	0.652	0.652	0.652	0.651	0.651
2,030.000	0.651	0.650	0.650	0.650	0.650
2,035.000	0.649	0.649	0.649	0.648	0.648
2,040.000	0.648	0.648	0.647	0.647	0.647

Detention Vault

Subsection: Time vs. Volume
Label: 1
Scenario: EX10

Return Event: 100 years
Storm Event:

Time vs. Volume (ac-ft)

Output Time increment = 1.000 min
Time on left represents time for first value in each row.

Time (min)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
2,045.000	0.646	0.646	0.646	0.646	0.645
2,050.000	0.645	0.645	0.644	0.644	0.644
2,055.000	0.644	0.643	0.643	0.643	0.642
2,060.000	0.642	0.642	0.642	0.641	0.641
2,065.000	0.641	0.640	0.640	0.640	0.640
2,070.000	0.639	0.639	0.639	0.638	0.638
2,075.000	0.638	0.638	0.637	0.637	0.637
2,080.000	0.637	0.636	0.636	0.636	0.635
2,085.000	0.635	0.635	0.635	0.634	0.634
2,090.000	0.634	0.633	0.633	0.633	0.633
2,095.000	0.632	0.632	0.632	0.631	0.631
2,100.000	0.631	0.631	0.630	0.630	0.630
2,105.000	0.629	0.629	0.629	0.629	0.628
2,110.000	0.628	0.628	0.628	0.627	0.627
2,115.000	0.627	0.626	0.626	0.626	0.626
2,120.000	0.625	0.625	0.625	0.624	0.624
2,125.000	0.624	0.624	0.623	0.623	0.623
2,130.000	0.622	0.622	0.622	0.622	0.621
2,135.000	0.621	0.621	0.621	0.620	0.620
2,140.000	0.620	0.619	0.619	0.619	0.619
2,145.000	0.618	0.618	0.618	0.617	0.617
2,150.000	0.617	0.617	0.616	0.616	0.616
2,155.000	0.615	0.615	0.615	0.615	0.614
2,160.000	0.614	0.614	0.614	0.613	0.613
2,165.000	0.613	0.612	0.612	0.612	0.612
2,170.000	0.611	0.611	0.611	0.610	0.610
2,175.000	0.610	0.610	0.609	0.609	0.609
2,180.000	0.609	0.608	0.608	0.608	0.607
2,185.000	0.607	0.607	0.607	0.606	0.606
2,190.000	0.606	0.605	0.605	0.605	0.605
2,195.000	0.604	0.604	0.604	0.604	0.603
2,200.000	0.603	0.603	0.602	0.602	0.602
2,205.000	0.602	0.601	0.601	0.601	0.601
2,210.000	0.600	0.600	0.600	0.599	0.599
2,215.000	0.599	0.599	0.598	0.598	0.598
2,220.000	0.597	0.597	0.597	0.597	0.596
2,225.000	0.596	0.596	0.596	0.595	0.595
2,230.000	0.595	0.594	0.594	0.594	0.594
2,235.000	0.593	0.593	0.593	0.593	0.592
2,240.000	0.592	0.592	0.591	0.591	0.591
2,245.000	0.591	0.590	0.590	0.590	0.590

Detention Vault

Subsection: Time vs. Volume
Label: 1
Scenario: EX10

Return Event: 100 years
Storm Event:

Time vs. Volume (ac-ft)

Output Time increment = 1.000 min
Time on left represents time for first value in each row.

Time (min)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
2,250.000	0.589	0.589	0.589	0.588	0.588
2,255.000	0.588	0.588	0.587	0.587	0.587
2,260.000	0.587	0.586	0.586	0.586	0.585
2,265.000	0.585	0.585	0.585	0.584	0.584
2,270.000	0.584	0.584	0.583	0.583	0.583
2,275.000	0.582	0.582	0.582	0.582	0.581
2,280.000	0.581	0.581	0.581	0.580	0.580
2,285.000	0.580	0.579	0.579	0.579	0.579
2,290.000	0.578	0.578	0.578	0.578	0.577
2,295.000	0.577	0.577	0.576	0.576	0.576
2,300.000	0.576	0.575	0.575	0.575	0.575
2,305.000	0.574	0.574	0.574	0.574	0.573
2,310.000	0.573	0.573	0.572	0.572	0.572
2,315.000	0.572	0.571	0.571	0.571	0.571
2,320.000	0.570	0.570	0.570	0.569	0.569
2,325.000	0.569	0.569	0.568	0.568	0.568
2,330.000	0.568	0.567	0.567	0.567	0.566
2,335.000	0.566	0.566	0.566	0.565	0.565
2,340.000	0.565	0.565	0.564	0.564	0.564
2,345.000	0.564	0.563	0.563	0.563	0.562
2,350.000	0.562	0.562	0.562	0.561	0.561
2,355.000	0.561	0.561	0.560	0.560	0.560
2,360.000	0.560	0.559	0.559	0.559	0.558
2,365.000	0.558	0.558	0.558	0.557	0.557
2,370.000	0.557	0.557	0.556	0.556	0.556
2,375.000	0.556	0.555	0.555	0.555	0.554
2,380.000	0.554	0.554	0.554	0.553	0.553
2,385.000	0.553	0.553	0.552	0.552	0.552
2,390.000	0.552	0.551	0.551	0.551	0.550
2,395.000	0.550	0.550	0.550	0.549	0.549
2,400.000	0.549	0.549	0.548	0.548	0.548
2,405.000	0.548	0.547	0.547	0.547	0.546
2,410.000	0.546	0.546	0.546	0.545	0.545
2,415.000	0.545	0.545	0.544	0.544	0.544
2,420.000	0.544	0.543	0.543	0.543	0.542
2,425.000	0.542	0.542	0.542	0.541	0.541
2,430.000	0.541	0.541	0.540	0.540	0.540
2,435.000	0.540	0.539	0.539	0.539	0.539
2,440.000	0.538	0.538	0.538	0.537	0.537
2,445.000	0.537	0.537	0.536	0.536	0.536
2,450.000	0.536	0.535	0.535	0.535	0.535

Detention Vault

Subsection: Time vs. Volume
Label: 1
Scenario: EX10

Return Event: 100 years
Storm Event:

Time vs. Volume (ac-ft)

Output Time increment = 1.000 min
Time on left represents time for first value in each row.

Time (min)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
2,455.000	0.534	0.534	0.534	0.534	0.533
2,460.000	0.533	0.533	0.532	0.532	0.532
2,465.000	0.532	0.531	0.531	0.531	0.531
2,470.000	0.530	0.530	0.530	0.530	0.529
2,475.000	0.529	0.529	0.529	0.528	0.528
2,480.000	0.528	0.528	0.527	0.527	0.527
2,485.000	0.526	0.526	0.526	0.526	0.525
2,490.000	0.525	0.525	0.525	0.524	0.524
2,495.000	0.524	0.524	0.523	0.523	0.523
2,500.000	0.523	0.522	0.522	0.522	0.522
2,505.000	0.521	0.521	0.521	0.520	0.520
2,510.000	0.520	0.520	0.519	0.519	0.519
2,515.000	0.519	0.518	0.518	0.518	0.518
2,520.000	0.517	0.517	0.517	0.517	0.516
2,525.000	0.516	0.516	0.516	0.515	0.515
2,530.000	0.515	0.515	0.514	0.514	0.514
2,535.000	0.513	0.513	0.513	0.513	0.512
2,540.000	0.512	0.512	0.512	0.511	0.511
2,545.000	0.511	0.511	0.510	0.510	0.510
2,550.000	0.510	0.509	0.509	0.509	0.509
2,555.000	0.508	0.508	0.508	0.508	0.507
2,560.000	0.507	0.507	0.507	0.506	0.506
2,565.000	0.506	0.505	0.505	0.505	0.505
2,570.000	0.504	0.504	0.504	0.504	0.503
2,575.000	0.503	0.503	0.503	0.502	0.502
2,580.000	0.502	0.502	0.501	0.501	0.501
2,585.000	0.501	0.500	0.500	0.500	0.500
2,590.000	0.499	0.499	0.499	0.499	0.498
2,595.000	0.498	0.498	0.498	0.497	0.497
2,600.000	0.497	0.497	0.496	0.496	0.496
2,605.000	0.496	0.495	0.495	0.495	0.494
2,610.000	0.494	0.494	0.494	0.493	0.493
2,615.000	0.493	0.493	0.492	0.492	0.492
2,620.000	0.492	0.491	0.491	0.491	0.491
2,625.000	0.490	0.490	0.490	0.490	0.489
2,630.000	0.489	0.489	0.489	0.488	0.488
2,635.000	0.488	0.488	0.487	0.487	0.487
2,640.000	0.487	0.486	0.486	0.486	0.486
2,645.000	0.485	0.485	0.485	0.485	0.484
2,650.000	0.484	0.484	0.484	0.483	0.483
2,655.000	0.483	0.483	0.482	0.482	0.482

Detention Vault

Subsection: Time vs. Volume
Label: 1
Scenario: EX10

Return Event: 100 years
Storm Event:

Time vs. Volume (ac-ft)

Output Time increment = 1.000 min
Time on left represents time for first value in each row.

Time (min)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
2,660.000	0.482	0.481	0.481	0.481	0.481
2,665.000	0.480	0.480	0.480	0.480	0.479
2,670.000	0.479	0.479	0.479	0.478	0.478
2,675.000	0.478	0.478	0.477	0.477	0.477
2,680.000	0.477	0.476	0.476	0.476	0.476
2,685.000	0.475	0.475	0.475	0.475	0.474
2,690.000	0.474	0.474	0.474	0.473	0.473
2,695.000	0.473	0.473	0.472	0.472	0.472
2,700.000	0.472	0.471	0.471	0.471	0.471
2,705.000	0.470	0.470	0.470	0.470	0.469
2,710.000	0.469	0.469	0.469	0.468	0.468
2,715.000	0.468	0.468	0.467	0.467	0.467
2,720.000	0.467	0.466	0.466	0.466	0.466
2,725.000	0.465	0.465	0.465	0.465	0.464
2,730.000	0.464	0.464	0.464	0.463	0.463
2,735.000	0.463	0.463	0.462	0.462	0.462
2,740.000	0.462	0.461	0.461	0.461	0.461
2,745.000	0.460	0.460	0.460	0.460	0.459
2,750.000	0.459	0.459	0.459	0.458	0.458
2,755.000	0.458	0.458	0.457	0.457	0.457
2,760.000	0.457	0.456	0.456	0.456	0.456
2,765.000	0.455	0.455	0.455	0.455	0.454
2,770.000	0.454	0.454	0.454	0.453	0.453
2,775.000	0.453	0.453	0.452	0.452	0.452
2,780.000	0.452	0.451	0.451	0.451	0.451
2,785.000	0.451	0.450	0.450	0.450	0.450
2,790.000	0.449	0.449	0.449	0.449	0.448
2,795.000	0.448	0.448	0.448	0.447	0.447
2,800.000	0.447	0.447	0.446	0.446	0.446
2,805.000	0.446	0.445	0.445	0.445	0.445
2,810.000	0.444	0.444	0.444	0.444	0.443
2,815.000	0.443	0.443	0.443	0.442	0.442
2,820.000	0.442	0.442	0.441	0.441	0.441
2,825.000	0.441	0.440	0.440	0.440	0.440
2,830.000	0.440	0.439	0.439	0.439	0.439
2,835.000	0.438	0.438	0.438	0.438	0.437
2,840.000	0.437	0.437	0.437	0.436	0.436
2,845.000	0.436	0.436	0.435	0.435	0.435
2,850.000	0.435	0.434	0.434	0.434	0.434
2,855.000	0.433	0.433	0.433	0.433	0.432
2,860.000	0.432	0.432	0.432	0.432	0.431

Detention Vault

Subsection: Time vs. Volume
Label: 1
Scenario: EX10

Return Event: 100 years
Storm Event:

Time vs. Volume (ac-ft)

Output Time increment = 1.000 min
Time on left represents time for first value in each row.

Time (min)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
2,865.000	0.431	0.431	0.431	0.430	0.430
2,870.000	0.430	0.430	0.429	0.429	0.429
2,875.000	0.429	0.428	0.428	0.428	0.428
2,880.000	0.427	0.427	0.427	0.427	0.426
2,885.000	0.426	0.426	0.426	0.426	0.425
2,890.000	0.425	0.425	0.425	0.424	0.424
2,895.000	0.424	0.424	0.423	0.423	0.423
2,900.000	0.423	0.422	0.422	0.422	0.422
2,905.000	0.421	0.421	0.421	0.421	0.420
2,910.000	0.420	0.420	0.420	0.420	0.419
2,915.000	0.419	0.419	0.419	0.418	0.418
2,920.000	0.418	0.418	0.417	0.417	0.417
2,925.000	0.417	0.416	0.416	0.416	0.416
2,930.000	0.415	0.415	0.415	0.415	0.415
2,935.000	0.414	0.414	0.414	0.414	0.413
2,940.000	0.413	0.413	0.413	0.412	0.412
2,945.000	0.412	0.412	0.411	0.411	0.411
2,950.000	0.411	0.410	0.410	0.410	0.410
2,955.000	0.410	0.409	0.409	0.409	0.409
2,960.000	0.408	0.408	0.408	0.408	0.407
2,965.000	0.407	0.407	0.407	0.406	0.406
2,970.000	0.406	0.406	0.406	0.405	0.405
2,975.000	0.405	0.405	0.404	0.404	0.404
2,980.000	0.404	0.403	0.403	0.403	0.403
2,985.000	0.402	0.402	0.402	0.402	0.402
2,990.000	0.401	0.401	0.401	0.401	0.400
2,995.000	0.400	0.400	0.400	0.399	0.399
3,000.000	0.399	(N/A)	(N/A)	(N/A)	(N/A)

Detention Vault

Subsection: Elevation-Area Volume Curve
Label: 1
Scenario: EX10

Return Event: 100 years
Storm Event:

Elevation (ft)	Planimeter (ft²)	Area (ft²)	A1+A2+sqr (A1*A2) (ft²)	Volume (ac-ft)	Volume (Total) (ac-ft)
98.50	0.0	160.000	0.000	0.000	0.000
98.96	0.0	160.000	480.000	0.002	0.002
99.06	0.0	12,736.000	14,323.501	0.011	0.013
104.06	0.0	12,736.000	38,208.000	1.462	1.475

Detention Vault

Subsection: Volume Equations
Label: 1
Scenario: EX10

Return Event: 100 years
Storm Event:

Pond Volume Equations

*** Incremental volume computed by the Conic Method for Reservoir Volumes.**

Volume = (1/3) * (EL2 - El1) * (Area1 + Area2 + sqr(Area1 * Area2))

where:	EL1, EL2	Lower and upper elevations of the increment
	Area1, Area2	Areas computed for EL1, EL2, respectively
	Volume	Incremental volume between EL1 and EL2

Detention Vault

Subsection: Outlet Input Data
Label: Outlet#1
Scenario: EX10

Return Event: 100 years
Storm Event:

Requested Pond Water Surface Elevations	
Minimum (Headwater)	98.50 ft
Increment (Headwater)	0.10 ft
Maximum (Headwater)	104.06 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Orifice-Circular	Orifice - MWS	Forward	TW	98.50	104.06
Culvert-Circular	Culvert - 1	Forward	Weir - 1	98.50	104.06
Rectangular Weir	Weir - 1	Forward	TW	103.06	104.06
Tailwater Settings	Tailwater			(N/A)	(N/A)

Detention Vault

Subsection: Outlet Input Data
Label: Outlet#1
Scenario: EX10

Return Event: 100 years
Storm Event:

Structure ID: Orifice - MWS Structure Type: Orifice-Circular	
Number of Openings	1
Elevation	98.50 ft
Orifice Diameter	2.2 in
Orifice Coefficient	0.600

Detention Vault

Subsection: Outlet Input Data
Label: Outlet#1
Scenario: EX10

Return Event: 100 years
Storm Event:

Structure ID: Culvert - 1 Structure Type: Culvert-Circular	
Number of Barrels	1
Diameter	24.0 in
Length	15.00 ft
Length (Computed Barrel)	15.01 ft
Slope (Computed)	0.033 ft/ft

Outlet Control Data	
Manning's n	0.013
Ke	0.500
Kb	0.012
Kr	0.500
Convergence Tolerance	0.00 ft

Inlet Control Data	
Equation Form	Form 1
K	0.0098
M	2.0000
C	0.0398
Y	0.6700
T1 ratio (HW/D)	0.000
T2 ratio (HW/D)	1.290
Slope Correction Factor	-0.500

Use unsubmerged inlet control 0 equation below T1 elevation.
Use submerged inlet control 0 equation above T2 elevation

In transition zone between unsubmerged and submerged inlet control,
interpolate between flows at T1 & T2...

T1 Elevation	98.50 ft	T1 Flow	15.55 ft³/s
T2 Elevation	101.08 ft	T2 Flow	17.77 ft³/s

Detention Vault

Subsection: Outlet Input Data
Label: Outlet#1
Scenario: EX10

Return Event: 100 years
Storm Event:

Structure ID: Weir - 1 Structure Type: Rectangular Weir	
Number of Openings	1
Elevation	103.06 ft
Weir Length	8.00 ft
Weir Coefficient	3.00 (ft^0.5)/s

Structure ID: TW Structure Type: TW Setup, DS Channel	
Tailwater Type	Free Outfall

Convergence Tolerances	
Maximum Iterations	30
Tailwater Tolerance (Minimum)	0.01 ft
Tailwater Tolerance (Maximum)	0.50 ft
Headwater Tolerance (Minimum)	0.01 ft
Headwater Tolerance (Maximum)	0.50 ft
Flow Tolerance (Minimum)	0.001 ft³/s
Flow Tolerance (Maximum)	10.000 ft³/s

Detention Vault

Subsection: Elevation-Volume-Flow Table (Pond)
Label: 1
Scenario: EX10

Return Event: 100 years
Storm Event:

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions	
Elevation (Water Surface, Initial)	99.00 ft
Volume (Initial)	0.003 ac-ft
Flow (Initial Outlet)	0.08 ft³/s
Flow (Initial Infiltration)	0.00 ft³/s
Flow (Initial, Total)	0.08 ft³/s
Time Increment	1.000 min

Elevation (ft)	Outflow (ft³/s)	Storage (ac-ft)	Area (ft²)	Infiltration (ft³/s)	Flow (Total) (ft³/s)	2S/t + O (ft³/s)
98.50	0.00	0.000	160.000	0.00	0.00	0.00
98.60	0.01	0.000	160.000	0.00	0.01	0.55
98.70	0.04	0.001	160.000	0.00	0.04	1.11
98.80	0.06	0.001	160.000	0.00	0.06	1.66
98.90	0.07	0.001	160.000	0.00	0.07	2.20
99.00	0.08	0.003	2,780.561	0.00	0.08	4.14
99.10	0.09	0.024	12,736.000	0.00	0.09	35.44
99.20	0.10	0.054	12,736.000	0.00	0.10	77.90
99.30	0.11	0.083	12,736.000	0.00	0.11	120.36
99.40	0.11	0.112	12,736.000	0.00	0.11	162.82
99.50	0.12	0.141	12,736.000	0.00	0.12	205.28
99.60	0.13	0.171	12,736.000	0.00	0.13	247.74
99.70	0.13	0.200	12,736.000	0.00	0.13	290.20
99.80	0.14	0.229	12,736.000	0.00	0.14	332.66
99.90	0.15	0.258	12,736.000	0.00	0.15	375.12
100.00	0.15	0.287	12,736.000	0.00	0.15	417.58
100.10	0.16	0.317	12,736.000	0.00	0.16	460.04
100.20	0.16	0.346	12,736.000	0.00	0.16	502.50
100.30	0.17	0.375	12,736.000	0.00	0.17	544.96
100.40	0.17	0.404	12,736.000	0.00	0.17	587.41
100.50	0.18	0.434	12,736.000	0.00	0.18	629.87
100.60	0.18	0.463	12,736.000	0.00	0.18	672.33
100.70	0.18	0.492	12,736.000	0.00	0.18	714.79
100.80	0.19	0.521	12,736.000	0.00	0.19	757.25
100.90	0.19	0.551	12,736.000	0.00	0.19	799.70
101.00	0.20	0.580	12,736.000	0.00	0.20	842.16
101.10	0.20	0.609	12,736.000	0.00	0.20	884.62
101.20	0.21	0.638	12,736.000	0.00	0.21	927.07
101.30	0.21	0.668	12,736.000	0.00	0.21	969.53

Detention Vault

Subsection: Elevation-Volume-Flow Table (Pond)
Label: 1
Scenario: EX10

Return Event: 100 years
Storm Event:

Elevation (ft)	Outflow (ft^3/s)	Storage (ac-ft)	Area (ft^2)	Infiltration (ft^3/s)	Flow (Total) (ft^3/s)	2S/t + O (ft^3/s)
101.40	0.21	0.697	12,736.000	0.00	0.21	1,011.99
101.50	0.22	0.726	12,736.000	0.00	0.22	1,054.45
101.60	0.22	0.755	12,736.000	0.00	0.22	1,096.90
101.70	0.22	0.785	12,736.000	0.00	0.22	1,139.36
101.80	0.23	0.814	12,736.000	0.00	0.23	1,181.82
101.90	0.23	0.843	12,736.000	0.00	0.23	1,224.27
102.00	0.23	0.872	12,736.000	0.00	0.23	1,266.73
102.10	0.24	0.901	12,736.000	0.00	0.24	1,309.19
102.20	0.24	0.931	12,736.000	0.00	0.24	1,351.64
102.30	0.24	0.960	12,736.000	0.00	0.24	1,394.10
102.40	0.25	0.989	12,736.000	0.00	0.25	1,436.56
102.50	0.25	1.018	12,736.000	0.00	0.25	1,479.01
102.60	0.25	1.048	12,736.000	0.00	0.25	1,521.47
102.70	0.26	1.077	12,736.000	0.00	0.26	1,563.93
102.80	0.26	1.106	12,736.000	0.00	0.26	1,606.38
102.90	0.26	1.135	12,736.000	0.00	0.26	1,648.84
103.00	0.27	1.165	12,736.000	0.00	0.27	1,691.30
103.06	0.27	1.182	12,736.000	0.00	0.27	1,716.77
103.10	0.46	1.194	12,736.000	0.00	0.46	1,733.94
103.20	1.53	1.223	12,736.000	0.00	1.53	1,777.47
103.30	2.81	1.252	12,736.000	0.00	2.81	1,821.19
103.40	4.07	1.282	12,736.000	0.00	4.07	1,864.91
103.50	5.54	1.311	12,736.000	0.00	5.54	1,908.84
103.60	6.81	1.340	12,736.000	0.00	6.81	1,952.56
103.70	8.06	1.369	12,736.000	0.00	8.06	1,996.26
103.80	9.33	1.399	12,736.000	0.00	9.33	2,039.98
103.90	10.37	1.428	12,736.000	0.00	10.37	2,083.48
104.00	11.51	1.457	12,736.000	0.00	11.51	2,127.07
104.06	12.10	1.475	12,736.000	0.00	12.10	2,153.13

Detention Vault

Subsection: Level Pool Pond Routing Summary
Label: 1 (IN)
Scenario: EX10

Return Event: 100 years
Storm Event:

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions	
Elevation (Water Surface, Initial)	99.00 ft
Volume (Initial)	0.003 ac-ft
Flow (Initial Outlet)	0.08 ft³/s
Flow (Initial Infiltration)	0.00 ft³/s
Flow (Initial, Total)	0.08 ft³/s
Time Increment	1.000 min

Inflow/Outflow Hydrograph Summary			
Flow (Peak In)	31.00 ft³/s	Time to Peak (Flow, In)	248.000 min
Flow (Peak Outlet)	1.55 ft³/s	Time to Peak (Flow, Outlet)	308.000 min

Elevation (Water Surface, Peak)	103.20 ft
Volume (Peak)	1.224 ac-ft

Mass Balance (ac-ft)	
Volume (Initial)	0.003 ac-ft
Volume (Total Inflow)	1.430 ac-ft
Volume (Total Infiltration)	0.000 ac-ft
Volume (Total Outlet Outflow)	1.034 ac-ft
Volume (Retained)	0.399 ac-ft
Volume (Unrouted)	0.000 ac-ft
Error (Mass Balance)	0.0 %

Detention Vault

Subsection: Pond Inflow Summary
Label: 1 (IN)
Scenario: EX10

Return Event: 100 years
Storm Event:

Summary for Hydrograph Addition at '1'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	CM-1

Node Inflows

Inflow Type	Element	Volume (ac-ft)	Time to Peak (min)	Flow (Peak) (ft^3/s)
Flow (From)	CM-1	1.430	248.000	31.00
Flow (In)	1	1.430	248.000	31.00

Detention Vault

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APPENDIX 6

Drainage Exhibits

LEGEND

- DRAINAGE SUBAREA
- HYDROLOGY NODE
- AREA FROM UPSTREAM TO DOWNSTREAM NODE (X.XX AC)
- DRAINAGE FLOWPATH
- FLOW DIRECTION

NOTE:

1) TOPOGRAPHY IS BASED ON NGVD 29 TOPOGRAPHY.
2) A LETTER OF MAP AMENDMENT (LOMA) (CASE REFERENCE #20-09-1145A) WAS PERFORMED AND CERTIFIED THAT THE EXISTING PROPERTY ELEVATIONS WITHIN THE NAKANO PROJECT ARE ABOVE THE ZONE AE SPECIAL FLOOD HAZARD AREA BASE FLOOD ELEVATIONS FOR THE OTAY RIVER. THE ENTIRE PROPERTY WAS REMOVED FROM THE 100-YEAR FLOODPLAIN LIMITS.

SCALE:	1"=60'
JOB #:	4409.02
CREATED:	12/26/19

PREPARED BY:

PROJECT DESIGN CONSULTANTS
Planning | Landscape Architecture | Environmental | Engineering | Survey
701 B Street, Suite 800 San Diego, CA 92101
619.235.6471 Tel 619.234.0349 Fax

CITY OF SAN DIEGO

NAKANO

DRAINAGE MAP
EXISTING CONDITIONS
EXHIBIT A

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OTAY RIVER

LIMITS OF FEMA 100-YEAR FLOODWAY PER FIRM 06073C2158G

LIMITS OF FEMA 100-YEAR FLOODPLAIN PER FIRM 06073C2158G

DAVIS PARCEL
APN 624-070-01
P.R. NO. 20009832
DATED 5/0/2002

388 (NGVD29)

SYSTEM 1600
TOTAL Q100 = 7.7 CFS
TOTAL AREA = 3.3 AC

SYSTEM 1100 (INCLUDING SYS 1000)
TOTAL Q100(UNDETAINED) = 42.8 CFS
TOTAL Q100(DETAINED) = 14.2 CFS
TOTAL AREA = 16.3 AC

SYSTEM 1200
TOTAL Q100 = 51.9 CFS
TOTAL AREA = 16.3 AC

SYSTEM 1300
TOTAL Q100 = 6.5 CFS
TOTAL AREA = 2.7 AC

INTERSTATE 805
M.B. 772

DENNERY VILLAGES 2/3

LOT 1

OFFSITE BYPASS

PROPERTY BOUNDARY

DENNERY ROAD

KAISER MEDICAL OFFICES

Hunsaker
Q50 = 22.2 cfs
A = 5.5 ac.

SUPPLEMENTAL TOPO FROM HUNSAKER DRAINAGE REPORT EXHIBIT (1997)

0.82 AC
0.07 AC
0.20 AC
0.47 AC
1.59 AC
0.16 AC
0.99 AC
0.45 AC
0.82 AC
1.24 AC
0.23 AC
0.18 AC
1.05 AC
0.92 AC
0.35 AC
0.13 AC
1.28 AC
1.09 AC
0.26 AC
0.28 AC
4.28 AC
1.64 AC
0.56 AC
0.16 AC
1.38 AC
0.42 AC
0.80 AC
0.89 AC
0.12 AC
0.61 AC
1.30 AC
0.17 AC
0.68 AC
0.34 AC
0.64 AC
0.20 AC
1.62 AC
0.29 AC
1.75 AC
0.36 AC
0.27 AC
0.52 AC
0.42 AC
0.10 AC
0.03 AC
0.49 AC
0.08 AC
0.41 AC

60 30 0 60
SCALE: 1"=60'

LEGEND

- DRAINAGE MANAGEMENT AREA
- HYDROLOGY NODE
- AREA FROM UPSTREAM TO DOWNSTREAM NODE (X.XX AC)
- DRAINAGE FLOWPATH

NOTE:

1) TOPOGRAPHY IS BASED ON NGVD 29 TOPOGRAPHY.
2) A LETTER OF MAP AMENDMENT (LOMA) (CASE REFERENCE #20-09-1145A) WAS PERFORMED AND CERTIFIED THAT THE EXISTING PROPERTY ELEVATIONS WITHIN THE NAKANO PROJECT ARE ABOVE THE ZONE AE SPECIAL FLOOD HAZARD AREA BASE FLOOD ELEVATIONS FOR THE OTAY RIVER. THE ENTIRE PROPERTY WAS REMOVED FROM THE 100-YEAR FLOODPLAIN LIMITS.

SCALE: 1"=60'
JOB #: 4409.02
CREATED: 3//11/20

PREPARED BY:
PROJECT DESIGN CONSULTANTS
Planning | Landscape Architecture | Environmental | Engineering | Survey
701 B Street, Suite 800 San Diego, CA 92101
619.235.6471 Tel 619.234.0349 Fax

CITY OF CHULA VISTA

NAKANO

DRAINAGE MAP
PROPOSED CONDITIONS
EXHIBIT B

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APPENDIX 7

FEMA Approval Letter for LOMA

Federal Emergency Management Agency

Washington, D.C. 20472

LETTER OF MAP AMENDMENT
DETERMINATION DOCUMENT (REMOVAL)

COMMUNITY AND MAP PANEL INFORMATION		LEGAL PROPERTY DESCRIPTION
COMMUNITY	CITY OF CHULA VISTA, SAN DIEGO COUNTY, CALIFORNIA	A portion of Section 24, Township 18 South, Range 2 West, San Bernardino Meridian, as described in the Grant Deed recorded as Document No. 2004-0777337, Pages 13994 and 13995, in the Office of the County Recorder, San Diego County, California (APN: 624-071-02)
	COMMUNITY NO.: 065021	
AFFECTED MAP PANEL	NUMBER: 06073C2158G	
	DATE: 5/16/2012	
FLOODING SOURCE: OTAY RIVER		APPROXIMATE LATITUDE & LONGITUDE OF PROPERTY: 32.588896, -117.033960 SOURCE OF LAT & LONG: LOMA LOGIC DATUM: NAD 83

DETERMINATION

LOT	BLOCK/ SECTION	SUBDIVISION	STREET	OUTCOME WHAT IS REMOVED FROM THE SFHA	FLOOD ZONE	1% ANNUAL CHANCE FLOOD ELEVATION (NAVD 88)	LOWEST ADJACENT GRADE ELEVATION (NAVD 88)	LOWEST LOT ELEVATION (NAVD 88)
--	--	--	--	Property	X (shaded)	--	--	97.9 feet

Special Flood Hazard Area (SFHA) - The SFHA is an area that would be inundated by the flood having a 1-percent chance of being equaled or exceeded in any given year (base flood).

ADDITIONAL CONSIDERATIONS (Please refer to the appropriate section on Attachment 1 for the additional considerations listed below.)

STATE LOCAL CONSIDERATIONS

This document provides the Federal Emergency Management Agency's determination regarding a request for a Letter of Map Amendment for the property described above. Using the information submitted and the effective National Flood Insurance Program (NFIP) map, we have determined that the property(ies) is/are not located in the SFHA, an area inundated by the flood having a 1-percent chance of being equaled or exceeded in any given year (base flood). This document amends the effective NFIP map to remove the subject property from the SFHA located on the effective NFIP map; therefore, the Federal mandatory flood insurance requirement does not apply. However, the lender has the option to continue the flood insurance requirement to protect its financial risk on the loan. A Preferred Risk Policy (PRP) is available for buildings located outside the SFHA. Information about the PRP and how one can apply is enclosed.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Information eXchange (FMIX) toll free at (877) 336-2627 (877-FEMA MAP) or by letter addressed to the Federal Emergency Management Agency, Engineering Library, 3601 Eisenhower Ave Ste 500, Alexandria, VA 22304-6426.

Luis V. Rodriguez, P.E., Director
Engineering and Modeling Division
Federal Insurance and Mitigation Administration

Federal Emergency Management Agency
Washington, D.C. 20472

LETTER OF MAP AMENDMENT
DETERMINATION DOCUMENT (REMOVAL)

ATTACHMENT 1 (ADDITIONAL CONSIDERATIONS)

STATE AND LOCAL CONSIDERATIONS (This Additional Consideration applies to all properties in the LOMA DETERMINATION DOCUMENT (REMOVAL))

Please note that this document does not override or supersede any State or local procedural or substantive provisions which may apply to floodplain management requirements associated with amendments to State or local floodplain zoning ordinances, maps, or State or local procedures adopted under the National Flood Insurance Program.

This attachment provides additional information regarding this request. If you have any questions about this attachment, please contact the FEMA Map Information eXchange (FMIX) toll free at (877) 336-2627 (877-FEMA MAP) or by letter addressed to the Federal Emergency Management Agency, Engineering Library, 3601 Eisenhower Ave Ste 500, Alexandria, VA 22304-6426.

Luis V. Rodriguez, P.E., Director
Engineering and Modeling Division
Federal Insurance and Mitigation Administration

Federal Emergency Management Agency

Washington, D.C. 20472

May 22, 2020

MS. CHELISA PACK
PROJECT DESIGN CONSULTANTS
701 B STREET
SUITE 800
SAN DIEGO, CA 92101

CASE NO.: 20-09-1145A
COMMUNITY: CITY OF CHULA VISTA, SAN DIEGO COUNTY, CALIFORNIA
COMMUNITY NO.: 065021

DEAR MS. PACK:

This is in reference to a request that the Federal Emergency Management Agency (FEMA) determine if the property described in the enclosed document is located within an identified Special Flood Hazard Area, the area that would be inundated by the flood having a 1-percent chance of being equaled or exceeded in any given year (base flood), on the effective National Flood Insurance Program (NFIP) map. Using the information submitted and the effective NFIP map, our determination is shown on the attached Letter of Map Amendment (LOMA) Determination Document. This determination document provides additional information regarding the effective NFIP map, the legal description of the property and our determination.

Additional documents are enclosed which provide information regarding the subject property and LOMAs. Please see the List of Enclosures below to determine which documents are enclosed. Other attachments specific to this request may be included as referenced in the Determination/Comment document. If you have any questions about this letter or any of the enclosures, please contact the FEMA Map Information eXchange (FMIX) toll free at (877) 336-2627 (877-FEMA MAP) or by letter addressed to the Federal Emergency Management Agency, Engineering Library, 3601 Eisenhower Ave Ste 500, Alexandria, VA 22304-6426.

Sincerely,

Luis V. Rodriguez, P.E., Director
Engineering and Modeling Division
Federal Insurance and Mitigation Administration

LIST OF ENCLOSURES:

LOMA DETERMINATION DOCUMENT (REMOVAL)

cc: State/Commonwealth NFIP Coordinator
Community Map Repository
Region

Federal Emergency Management Agency
Washington, D.C. 20472

ADDITIONAL INFORMATION REGARDING LETTERS OF MAP AMENDMENT

When making determinations on requests for Letters of Map Amendment (LOMAs), the Department of Homeland Security's Federal Emergency Management Agency (FEMA) bases its determination on the flood hazard information available at the time of the determination. Requesters should be aware that flood conditions may change or new information may be generated that would supersede FEMA's determination. In such cases, the community will be informed by letter.

Requesters also should be aware that removal of a property (parcel of land or structure) from the Special Flood Hazard Area (SFHA) means FEMA has determined the property is not subject to inundation by the flood having a 1-percent chance of being equaled or exceeded in any given year (base flood). This does not mean the property is not subject to other flood hazards. The property could be inundated by a flood with a magnitude greater than the base flood or by localized flooding not shown on the effective National Flood Insurance Program (NFIP) map.

The effect of a LOMA is it removes the Federal requirement for the lender to require flood insurance coverage for the property described. The LOMA *is not* a waiver of the condition that the property owner maintain flood insurance coverage for the property. *Only* the lender can waive the flood insurance purchase requirement because the lender imposed the requirement. *The property owner must request and receive a written waiver from the lender before canceling the policy*. The lender may determine, on its own as a business decision, that it wishes to continue the flood insurance requirement to protect its financial risk on the loan.

The LOMA provides FEMA's comment on the mandatory flood insurance requirements of the NFIP as they apply to a particular property. A LOMA is not a building permit, nor should it be construed as such. Any development, new construction, or substantial improvement of a property impacted by a LOMA must comply with all applicable State and local criteria and other Federal criteria.

If a lender releases a property owner from the flood insurance requirement, and the property owner decides to cancel the policy and seek a refund, the NFIP will refund the premium paid for the current policy year, provided that no claim is pending or has been paid on the policy during the current policy year. The property owner must provide a written waiver of the insurance requirement from the lender to the property insurance agent or company servicing his or her policy. The agent or company will then process the refund request.

Even though structures are not located in an SFHA, as mentioned above, they could be flooded by a flooding event with a greater magnitude than the base flood. In fact, more than 25 percent of all claims paid by the NFIP are for policies for structures located outside the SFHA in Zones B, C, X (shaded), or X (unshaded). More than one-fourth of all policies purchased under the NFIP protect structures located in these zones. The risk to structures located outside SFHAs is just not as great as the risk to structures located in SFHAs. Finally, approximately 90 percent of all federally declared disasters are caused by flooding, and homeowners insurance does not provide financial protection from this flooding. Therefore, FEMA encourages the widest possible coverage under the NFIP.

The NFIP offers two types of flood insurance policies to property owners: the low-cost Preferred Risk Policy (PRP) and the Standard Flood Insurance Policy (SFIP). The PRP is available for 1- to 4-family residential structures located outside the SFHA with little or no loss history. The PRP is available for townhouse/rowhouse-type structures, but is not available for other types of condominium units. The SFIP is available for all other structures. Additional information on the PRP and how a property owner can quality for this type of policy may be obtained by calling the Flood Insurance Information Hotline, toll free, at 1-800-427-4661. Before making a final decision about flood insurance coverage, FEMA strongly encourages property owners to discuss their individual flood risk situations and insurance needs with an insurance agent or company.

FEMA has established "Grandfather" rules to benefit flood insurance policyholders who have maintained continuous coverage. Property owners may wish to note also that, if they live outside but on the fringe of the SFHA shown on an effective NFIP map and the map is revised to expand the SFHA to include their structure(s), their flood insurance policy rates will not increase as long as the coverage for the affected structure(s) has been continuous. Property owners would continue to receive the lower insurance policy rates.

LOMAs are based on minimum criteria established by the NFIP. State, county, and community officials, based on knowledge of local conditions and in the interest of safety, may set higher standards for construction in the SFHA. If a State, county, or community has adopted more restrictive and comprehensive floodplain management criteria, these criteria take precedence over the minimum Federal criteria.

In accordance with regulations adopted by the community when it made application to join the NFIP, letters issued to amend an NFIP map must be attached to the community's official record copy of the map. That map is available for public inspection at the community's official map repository. Therefore, FEMA sends copies of all such letters to the affected community's official map repository.

When a restudy is undertaken, or when a sufficient number of revisions or amendments occur on particular map panels, FEMA initiates the printing and distribution process for the affected panels. FEMA notifies community officials in writing when affected map panels are being physically revised and distributed. In such cases, FEMA attempts to reflect the results of the LOMA on the new map panel. If the results of particular LOMAs cannot be reflected on the new map panel because of scale limitations, FEMA notifies the community in writing and revalidates the LOMAs in that letter. LOMAs revalidated in this way usually will become effective 1 day after the effective date of the revised map.

Nakano

LETTER OF MAP AMENDMENT (LOMA)

FEMA, City of Chula Vista
May 18, 2020

FIRM # 06073C2158G

Prepared For:

Pardee Homes
13400 Sabre Springs Parkway, Suite 200
San Diego, California 92128

Prepared By:

PROJECT DESIGN CONSULTANTS
Planning | Landscape Architecture | Environmental | Engineering | Survey

701 B Street, Suite 800
San Diego, CA 92101
619.235.6471 Tel
619.234.0349 Fax

PDC Job No. 4409.02

Prepared by: J. Novoa, P.E.
Under the supervision of:

Chelisa Pack, PE RCE 71026
Registration Expires 06/30/21

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2.2 Floodplain Base Flood Elevation Comparison 2

3. CONCLUSIONS 2

APPENDICES

1 FEMA Forms, Package MT-1

2 Exhibits

1. INTRODUCTION

This Letter of Map Amendment (LOMA) has been prepared in order to certify that the existing property within the Nakano project in the City of Chula Vista, California is above the flood elevations as indicated on the NFIP map.

The purpose of the application is to demonstrate that the existing elevations of the Nakano property are above the flood elevations indicated by Zone AE as shown in the FIRM Panel No. 06073C2158G, effective date May 16, 2012. The Zone AE floodplain extends along the north portion of the site with water surface elevations ranging from 83.8 to 92.7 ft. MSL (NGVD 29). Note that there a 2.17 conversion from NAVD88 to NGVD29 datum. The elevations listed on the exhibit show elevations per the NGVD29 datum.

2. SUMMARY OF METHODOLOGY

The following summarizes how the base flood elevations were determined in order to ensure the existing elevations are above the base flood and enable their removal from the special flood hazard area mapping.

2.1 Existing Condition of the Property

The Nakano site consists of approximately 23.8 acres of existing hillside and grass land use located within the Otay Mesa neighborhood of the City of Chula Vista. The site is bounded by Kaiser Permanente medical offices to the South, Interstate 805 to the West, an existing residential site to the east and Otay River to the North. Existing condition onsite includes grassland, hillside, utilities facilities, and a small dirt paths traversing the property.

Per the FIRM panel, in the existing condition, the floodplain encroaches into the site along the northern extents of the project boundary. Along the northern portion of the property the site is affected by Zone AE. Refer to Exhibit A-1 for the existing floodplain exhibit depicting the relationship of the floodplain to the property.

2.2 Floodplain Base Flood Elevation Comparison

The base flood elevations (BFE) were taken from the FEMA FIRM Panel No. 06073C2158G, effective date May 16, 2012. The Zone AE floodplain extends along the north portion of the site with water surface elevations ranging from 83.8 to 92.7 ft. MSL (NGVD 29). The lowest point on the site along the northern property line is 95.7, three feet above the highest floodplain elevation at the northwest corner of the site of 92.7. This comparison of the worst case scenario of the lowest elevation on the existing property is still three feet higher than the highest floodway elevation at any point on site indicates that the entire site can be removed from the special flood hazard area mapping.

3. CONCLUSIONS

The existing property elevations indicate that the entire site is higher than the determined Zone AE special flood hazard area base flood elevations for the Otay River. Therefore, this report supports a recommendation that the entire property identified be removed from the 100-year floodplain limits.

APPENDIX 1

FEMA Forms, Package MT-1

MT-1 Form 1

Property Information

DEPARTMENT OF HOMELAND SECURITY - FEDERAL EMERGENCY MANAGEMENT AGENCY

PROPERTY INFORMATION FORM

O.M.B. NO. 1660-0015
Expires February 28, 2014

PAPERWORK BURDEN DISCLOSURE NOTICE

Public reporting burden for this data collection is estimated to average 1.63 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and submitting the form. This collection is required to obtain or retain benefits. You are not required to respond to this collection of information unless a valid OMB control number is displayed on this form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Department of Homeland Security, Federal Emergency Management Agency, 1800 South Bell Street, Arlington, VA 20598-3005, Paperwork Reduction Project (1660-0015). **NOTE: Do not send your completed form to this address.**

This form may be completed by the property owner, property owner's agent, licensed land surveyor, or registered professional engineer to support a request for a Letter of Map Amendment (LOMA), Conditional Letter of Map Amendment (CLOMA), Letter of Map Revision Based on Fill (LOMR-F), or Conditional Letter of Map Revision Based on Fill (CLOMR-F) for existing or proposed, single or multiple lots/structures. In order to process your request, all information on this form must be completed ***in its entirety***, unless stated as optional. **Incomplete submissions will result in processing delays.** Please check the item below that describes your request:

■ LOMA	A letter from DHS-FEMA stating that an existing structure or parcel of land that has not been elevated by fill (natural grade) would not be inundated by the base flood.
☐ CLOMA	A letter from DHS-FEMA stating that a proposed structure that is not to be elevated by fill (natural grade) would not be inundated by the base flood if built as proposed.
☐ LOMR-F	A letter from DHS-FEMA stating that an **existing** structure or parcel of land that has been **elevated by fill** would not be inundated by the base flood.
☐ CLOMR-F	A letter from DHS-FEMA stating that a parcel of land or **proposed** structure that will be **elevated by fill** would not be inundated by the base flood if fill is placed on the parcel as proposed or the structure is built as proposed.

Fill is defined as material from any source (including the subject property) placed that raises the ground to or above the Base Flood Elevation (BFE). The common construction practice of removing unsuitable existing material (topsoil) and backfilling with select structural material is not considered the placement of fill if the practice does not alter the existing (natural grade) elevation, which is at or above the BFE. **Fill that is placed before the date of the first National Flood Insurance Program (NFIP) map showing the area in a Special Flood Hazard Area (SFHA) is considered natural grade.**

Has fill been placed on your property to raise ground that was previously below the BFE? ☐ Yes ■ No If yes, when was fill placed? / month/year

Will fill be placed on your property to raise ground that is below the BFE? ☐ Yes* ■ No If yes, when will fill be placed? / month/year

* If yes, Endangered Species Act (ESA) compliance must be documented to FEMA prior to issuance of the CLOMR-F determination (please refer page 4 to the MT-1 instructions).

1. Street Address of the Property (if request is for multiple structures or units, please attach additional sheet referencing each address and enter street names below):

   Nakano (North of the intersection of Dennery Rd & Regatta Lane, Chula Vista, CA)

2. Legal description of Property (Lot, Block, Subdivision or abbreviated description from the Deed):

   (APN 624-071-02) See Attached for Legal Description of Property

3. Are you requesting that a flood zone determination be completed for (check one):

   ☐ Structures on the property? What are the dates of construction? _____ (MM/YYYY)
   ☐ A portion of land within the bounds of the property? (A certified metes and bounds description and map of the area to be removed, certified by a licensed land surveyor or registered professional engineer, are **required**. For the preferred format of metes and bounds descriptions, please refer to the MT-1 Form 1 Instructions.)
   ☒ The entire legally recorded property?

4. Is this request for a (check one):

   ☐ Single structure
   ☒ Single lot
   ☐ Multiple structures (How many structures are involved in your request? List the number: _____)
   ☐ Multiple lots (How many lots are involved in your request? List the number: _____)

In addition to this form (MT-1 Form 1), please complete the checklist below. **ALL** requests must include one copy of the following:

- ■ Copy of the effective FIRM panel on which the structure and/or property location has been accurately plotted (property inadvertently located in the NFIP regulatory floodway will require Section B of MT-1 Form 3)
- ☐ Copy of the Subdivision Plat Map for the property **(with recordation data and stamp of the Recorder's Office)**

OR

- ■ Copy of the Property Deed **(with recordation data and stamp of the Recorder's Office)**, ***accompanied by*** a tax assessor's map or other certified map showing the surveyed location of the property relative to local streets and watercourses. The map should include at least one street intersection that is shown on the FIRM panel.
- ■ Form 2 – Elevation Form. If the request is to remove the structure, and an Elevation Certificate has already been completed for this property, it may be submitted in lieu of Form 2. If the request is to remove the entire legally recorded property, or a portion thereof, the lowest lot elevation must be provided on Form 2.
- ■ Please include a map scale and North arrow on all maps submitted.

For LOMR-Fs and CLOMR-Fs, the following must be submitted in addition to the items listed above:

- ☐ Form 3 – Community Acknowledgment Form

For CLOMR-Fs, the following must be submitted in addition to the items listed above:

- ☐ Documented ESA compliance, which may include a copy of an Incidental Take Permit, an Incidental Take Statement, a "not likely to adversely affect" determination from the National Marine Fisheries Service (NMFS) or the U.S. Fish and Wildlife Service (USFWS), or an official letter from NMFS or USFWS concurring that the project has "No Effect" on proposed or listed species or designated critical habitat. Please refer to the MT-1 instructions for additional information.

Please do *not* submit original documents. Please retain a copy of all submitted documents for your records.

DHS-FEMA encourages the submission of all required data in a digital format (e.g. scanned documents and images on Compact Disc [CD]). Digital submissions help to further DHS-FEMA's Digital Vision and also may facilitate the processing of your request.

Incomplete submissions will result in processing delays. For additional information regarding this form, including where to obtain the supporting documents listed above, please refer to the MT-1 Form Instructions located at http://www.fema.gov/plan/prevent/fhm/dl_mt-1.shtm.

Processing Fee (see instructions for appropriate mailing address; or visit http://www.fema.gov/fhm/frm_fees.shtm **for** the most current fee schedule)

Revised fee schedules are published periodically, but no more than once annually, as noted in the **Federal Register**. Please note: single/multiple lot(s)/structure(s) LOMAs are fee exempt. The current review and processing fees are listed below:

Check the fee that applies to your request:

- ☐ $325 (single lot/structure LOMR-F following a CLOMR-F)
- ☐ $425 (single lot/structure LOMR-F)
- ☐ $500 (single lot/structure CLOMA or CLOMR-F)
- ☐ $700 (multiple lot/structure LOMR-F following a CLOMR-F, or multiple lot/structure CLOMA)
- ☐ $800 (multiple lot/structure LOMR-F or CLOMR-F)

Please submit the Payment Information Form for remittance of applicable fees. Please make your check or money order payable to:
National Flood Insurance Program.

All documents submitted in support of this request are correct to the best of my knowledge. I understand that any false statement may be punishable by fine or imprisonment under Title 18 of the United States Code, Section 1001.

Applicant's Name (required): Chelisa Pack

Company (if applicable): Project Design Consultants

Mailing Address (required): 701 B St., Suite 800, San Diego, CA 92101

Daytime Telephone No. (required): (619) 235-6471

E-Mail Address (optional): ■ By checking here you may receive correspondence electronically at the email address provided):

chelisap@projectdesign.com

Fax No. (optional): (619) 234-0349

Date (required) 4/7/2020

Signature of Applicant (required)

LEGAL DESCRIPTION

PARCEL1:

THAT PORTION OF THE NORTHEAST QUARTER OF THE SOUTHWEST QUARTER OF SECTION 24, TOWNSHIP 18 SOUTH, RANGE 2 WEST, SAN BERNARDINO MERIDIAN IN THE CITY OF CHULA VISTA, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO THE OFFICIAL PLAT THEREOF DESCRIBED AS FOLLOWS:

BEGINNING AT THE SOUTHEAST CORNER OF SAID NORTHEAST QUARTER OF THE SOUTHEAST QUARTER; THENCE ALONG THE SOUTH LINE THEREOF SOUTH 89°42'04" WEST, 1069.30 FEET TO THE EASTERLY LINE OF FREEWAY DESCRIBED IN FINAL ORDER OF CONDEMNATION RECORDED JULY 22, 1968 AS FILE NO. 123499 OFFICAL RECORDS; THENCE ALONG SAID EASTERLY LINE NORTH 3°47'10" EAST, 918.10 FEET; THENCE NORTH 80°52"26" EAST, 1030.62 FEET TO THE EAST LINE OF SAID SECTION: THENCE ALONG SAID EAST LINE SOUTH 0°28'33" WEST, 1074.02 FEET TO THE POINT OF BEGINNING.

PARCEL 2:

AN EASEMENT FOR ROAD AND WATER PIPELINE PURPOSES 15 FEET WIDE ALONG THE EXSTING TRAVELED ROAD ACROSS THE SOUTHEAST QUARTER OF THE NORTHEAST QUARTER AND THAT PORTION OF THE NORTHEAST QUARTER OF THE SOUTHEAST QUARTER OF SAID SECTION LYING NORTHERLY OF THE NORTHERLY LINE OF PARCEL 1 ABOVE.

EXCEPTING THAT PORTION LYING WITHIN SAID FREEWAY AND OTAY VALLEY ROAD.

Annotated FIRM Panel

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations (BFEs) shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) Zone 11. The **horizontal datum** was NAD83, GRS1980 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, NNGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242** or visit its website at http://www.ngs.noaa.gov/.

Base map information shown on this FIRM was provided in digital format by the USDA National Agriculture Imagery Program (NAIP). This information was photogrammetrically compiled at a scale of 1:24,000 from aerial photography dated 2009.

This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables *in the Flood Insurance Study report (which contains authoritative hydraulic data)* may reflect stream channel distances that differ from what is shown on this map.

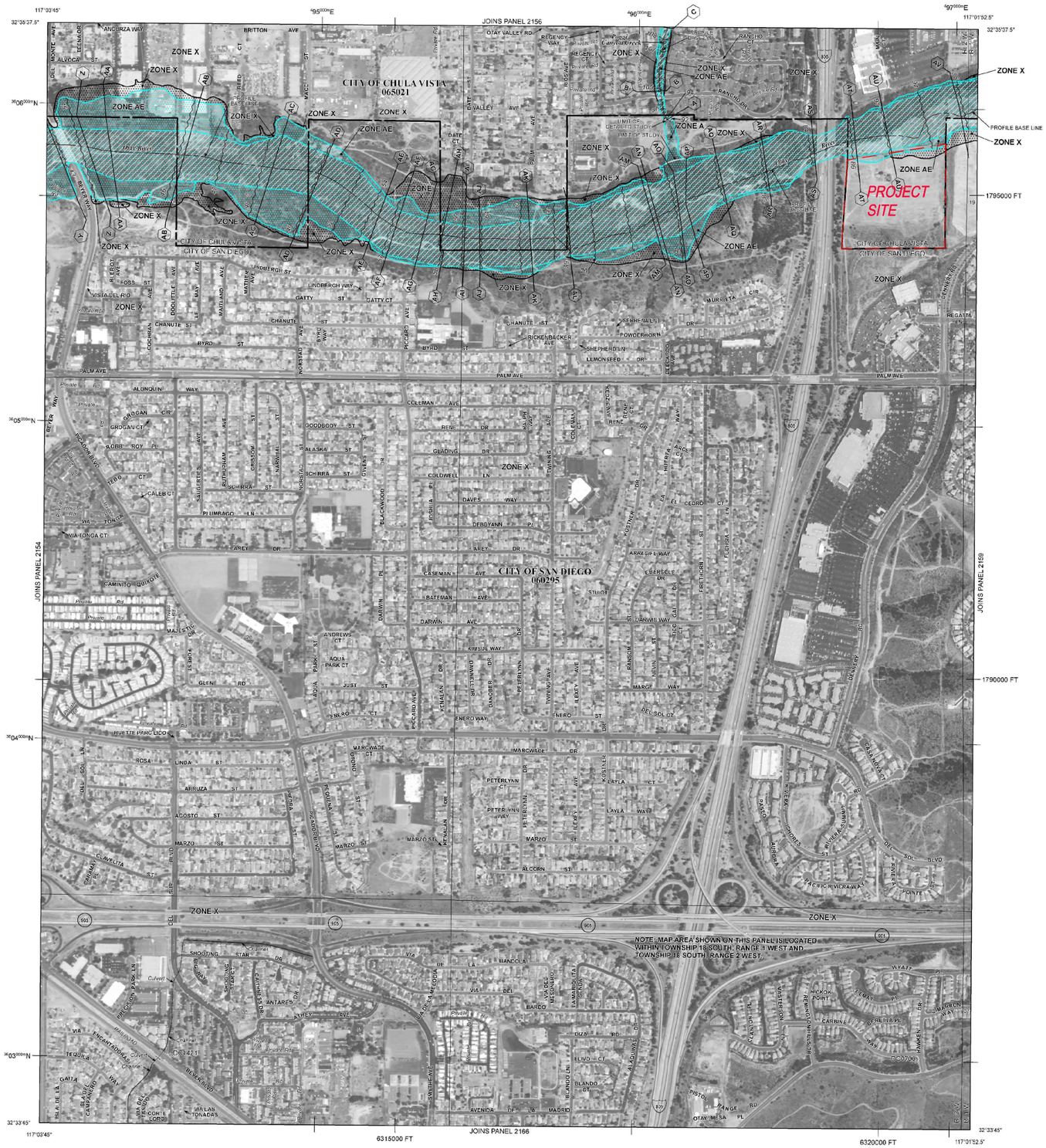
Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the **FEMA Map Service Center** at 1-877-FEMA MAP (1-877-336-2627) for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and its website at http://msc.fema.gov/.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/business/nfip/.

The ***"profile base lines"*** depicted on this map represent the hydraulic modeling baselines that match the flood profiles in the FIS report. As a result of improved topographic data, the "profile base line", in some cases, may deviate significantly from the channel centerline or appear outside the SFHA.



LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provice protection from the 1% annual chance or greater flood.
ZONE A99	Areas to be protected from 1% annual chance flood event by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- 1% annual chance floodplain boundary
- 0.2% annual chance floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths, or flood velocities
- 513 (EL 987) — Base Flood Elevation line and value; elevation in feet* / Base Flood Elevation value where uniform within zone; elevation in feet*
- * Referenced to the North American Vertical Datum of 1988
- A — A — Cross section line
- 23 — 23 — Transect line
- 97°07'30", 32°22'30" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
- 4275000 FT — 1000-meter Universal Transverse Mercator grid ticks, zone 11
- 6000000 FT — 5000-foot grid values: California State Plane coordinate system, Zone VI (FIPSZONE = 406), Lambert projection
- DX5510 — Bench mark (see explanation in Notes to Users section of this FIRM panel)
- M1.5 — River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
June 19, 1997

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
May 16, 2012 – to update corporate limits, to add roads and road names, to incorporate previously issued Letters of Map Revision, and to update map elevations to North American Vertical Datum of 1988.

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'

250 0 250 500 750 1,000 FEET
150 0 150 300 METERS

NFIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 2158G

FIRM

FLOOD INSURANCE RATE MAP

SAN DIEGO COUNTY, CALIFORNIA AND INCORPORATED AREAS

PANEL 2158 OF 2375

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
CHULA VISTA, CITY OF	065021	2158	G
SAN DIEGO, CITY OF	060295	2158	G

ANNOTATED FIRM

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
06073C2158G

MAP REVISED
MAY 16, 2012

Federal Emergency Management Agency

Last save by JEFF NOVOA, File Name P:\4409\Engr\Reports-4409.02-Nakano\Entitlement\LOMA\Exhibits\4409 Annotated FIRM.dwg, Date Last Saved 4/7/2020 10:47:40 AM, Date Plotted Last 4/7/2020 10:48:56 AM

Grant Deed

624-071-02

RECORDING REQUESTED BY:

Land Am Commercial

When Recorded Mail Document and Tax Statement To:

Pardee Construction Company
c/o Jon Lash
10880 Wilshire Blvd. Ste. 1900
Los Angeles, Ca. 90024

13994

Escrow No. 980125
Title Order No. 03202882-609-611
APN:

DOC # 2004-0777337

AUG 16, 2004 2:59 PM
OFFICIAL RECORDS
SAN DIEGO COUNTY RECORDER'S OFFICE
GREGORY J. SMITH, COUNTY RECORDER
FEES: 1068.50
OC: AFNF
PAGES: 2

2004-0777337

GRANT DEED

The undersigned grantor(s) declare(s)
Documentary transfer tax is $ 1,028.50 City tax $ _____
[X] computed on full value of property conveyed, or
[ ] computed on full value less value of liens or encumbrances remaining at time of sale,
[X] Unincorporated Area City of Chula Vista

FOR A VALUABLE CONSIDERATION, receipt of which is hereby acknowledged,
Mitsuro Nakano, Trustee U.D.T. April 7, 1995 and Tomio Nakano and Minako Nakano, Trustees U.D.T. April 12, 1995
hereby GRANT(S) to
Pardee Homes, a California Corporation

the following described real property in the City of Chula Vista
County of San Diego State of California:

That portion of the Northeast quarter of the Southeast quarter of Section 24, Township 18 South, Range 2 West, San Bernardino Meridian in the City of Chula Vista, County of San Diego, State of California, as more particularly described on the attached Exhibit 'A' made a part hereof.

DATED: May 12, 2004

Mitsuro Nakano
Mitsuro Nakano

Tomio Nakano
Tomio Nakano

Minako Nakano
Minako Nakano

STATE OF CALIFORNIA
COUNTY OF San Diego
ON August 12, 2004 before me,
A.V. Davies personally appeared
Mitsuro Nakano, Tomio Nakano,
Minako Nakano
personally known to me (or proved to me on the basis of satisfactory evidence) to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that ~~he/she~~/they executed the same in ~~his/her~~/their authorized capacity(ies), and that by ~~his/her~~/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

A. V. DAVIES
Commission # 1343846
Notary Public - California
San Diego County
My Comm. Expires Mar 16, 2006

Witness my hand and official seal.

Signature A. V. Davies

MAIL TAX STATEMENT AS DIRECTED ABOVE

A. V. DAVIES
Commission # 1343846
Notary Public - California
San Diego County
My Comm. Expires Mar 16, 2006

FD-13 (Rev 4/94) GRANT DEED

13995

EXHIBIT "A"

All that certain real property situated in the County of San Diego, State of California, described as follows:

PARCEL 1:

That portion of the Northeast quarter of the Southeast quarter of Section 24, Township 18 South, Range 2 West, San Bernardino Meridian in the City of Chula Vista, County of San Diego, State of California, according to the Official Plat thereof described as follows:

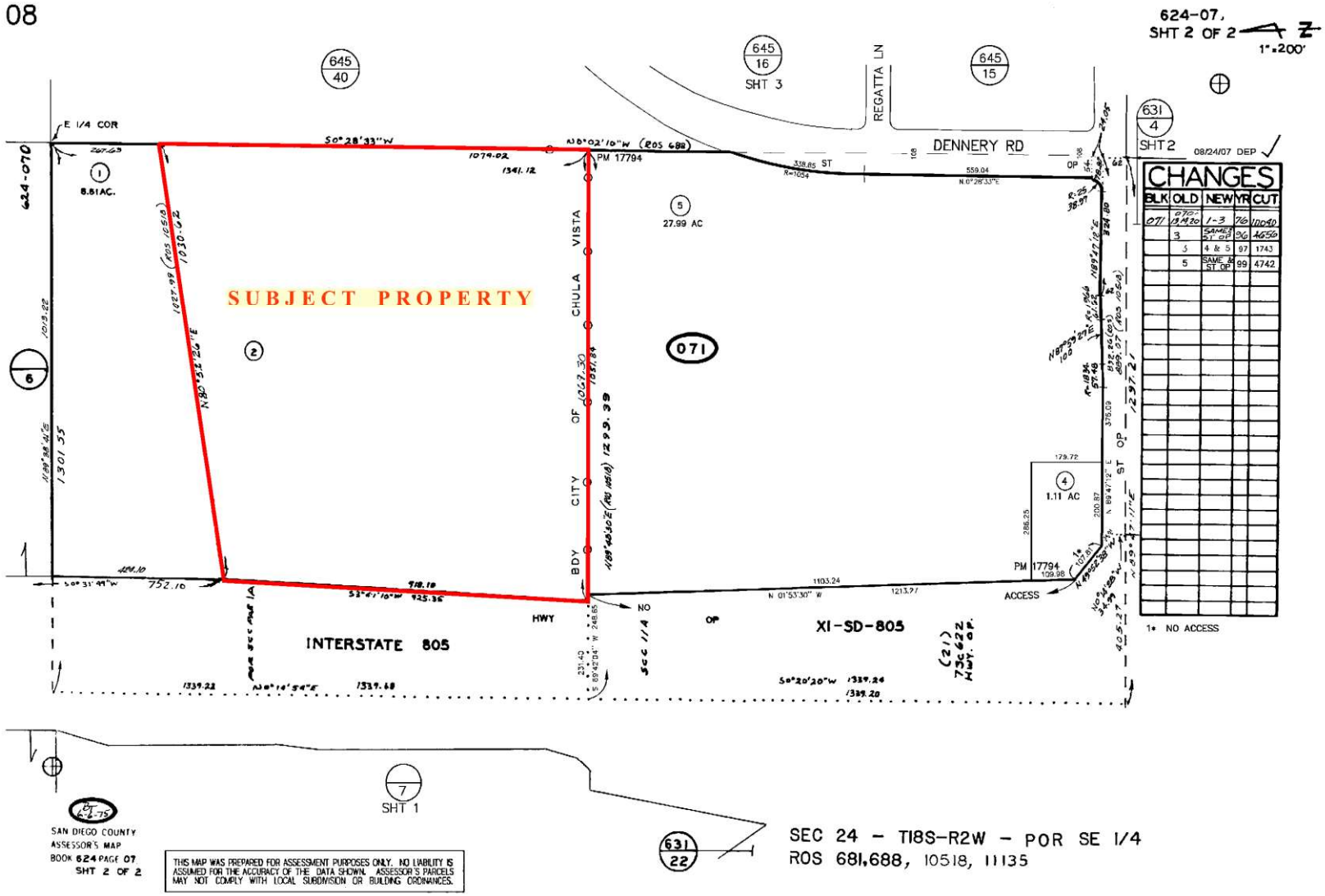
Beginning at the Southeast corner of said Northeast quarter of the Southeast quarter, thence along the South line thereof South 89°42'04" West, 1069.30 feet to the Easterly line of freeway described in final order of condemnation recorded July 22, 1968 as File No. 123488 of Official Records; thence along said Easterly line North 3°47'10" East, 918.10 feet; thence North 80°52'26" East, 1030.62 feet to the East line of said Section; thence along said East line South 0°28'33" West, 1074.02 feet to the point of beginning.

PARCEL 2:

An easement for road and water pipeline purposes 15 feet wide along the existing traveled road across the Southeast quarter of the Northeast quarter and that portion of the Northeast quarter of the Southeast quarter of said section lying Northerly of the Northerly line of Parcel 1 above.

EXCEPTING that portion lying within said Freeway and Otay Valley Road.

Assessor's Parcel Number: **624-071-02**



CHANGES				
BLK	OLD	NEW	YR	CUT
071	070-13,920	1-3	76	10040
	3	SAME & ST OF	96	16550
	3	4 & 5	97	1743
	5	SAME & ST OF	99	4742

MT-1 Form 2

Elevation Form

DEPARTMENT OF HOMELAND SECURITY - FEDERAL EMERGENCY MANAGEMENT AGENCY

ELEVATION FORM

O.M.B. NO. 1660-0015
Expires February 28, 2014

PAPERWORK BURDEN DISCLOSURE NOTICE

Public reporting burden for this data collection is estimated to average 1.25 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and submitting the form. This collection is required to obtain or retain benefits. You are not required to respond to this collection of information unless a valid OMB control number is displayed on this form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Department of Homeland Security, Federal Emergency Management Agency, 1800 South Bell Street, Arlington, VA 20598-3005, Paperwork Reduction Project (1660-0015). **NOTE: Do not send your completed form to this address.**

This form must be completed for requests and must be completed and signed by a registered professional engineer or licensed land surveyor. **A DHS - FEMA National Flood Insurance Program (NFIP) Elevation Certificate may be submitted in lieu of this form for single structure requests.**

For requests to remove a structure on natural grade OR on engineered fill from the Special Flood Hazard Area (SFHA), submit the lowest adjacent grade (the lowest ground touching the structure), ***including an attached deck or garage***. For requests to remove an entire parcel of land from the SFHA, provide the lowest lot elevation; or, if the request involves an area described by metes and bounds, provide the lowest elevation within the metes and bounds description. All measurements are to be rounded to nearest tenth of a foot. In order to process your request, all information on this form must be completed ***in its entirety***. **Incomplete submissions will result in processing delays.**

1. NFIP Community Number: 060521 Property Name or Address: Nakano (North of intersection of Dennery Rd. & Regatta Lane, Chula Vista, CA)

2. Are the elevations listed below based on ■ ***existing*** or ☐ ***proposed*** conditions? (Check one)

3. For the existing or proposed structures listed below, what are the types of construction? (check all that apply)
   ☐ crawl space ☐ slab on grade ☐ basement/enclosure ☐ other (explain)

4. Has DHS - FEMA identified this area as subject to land subsidence or uplift? (see instructions) ☐ Yes ■ No
   If yes, what is the date of the current re-leveling? / (month/year)

5. What is the elevation datum? ■ NGVD 29 ☐ NAVD 88 ☐ Other (explain)
   If any of the elevations listed below were computed using a datum different than the datum used for the effective Flood Insurance Rate Map (FIRM) (e.g., NGVD 29 or NAVD 88), what was the conversion factor? 2.17
   Local Elevation +/- ft. = FIRM Datum

6. Please provide the Latitude and Longitude of the most upstream edge of the ***structure*** (in decimal degrees to the nearest fifth decimal place):
   Indicate Datum: ☐ WGS84 ☐ NAD83 ☐ NAD27 Lat. . Long. .
   Please provide the Latitude and Longitude of the most upstream edge of the ***property*** (in decimal degrees to the nearest fifth decimal place):
   Indicate Datum: ☐ WGS84 ■ NAD83 ☐ NAD27 Lat. 32.59048 Long. 117.03231

Address	Lot Number	Block Number	Lowest Lot Elevation*	Lowest Adjacent Grade To Structure	Base Flood Elevation	BFE Source
624-071-02-00 Chula Vista, CA		N/A	95.7		92.7	FIRM 06073C2158G (Zone AE)

This certification is to be signed and sealed by a licensed land surveyor, registered professional engineer, or architect authorized by law to certify elevation information. All documents submitted in support of this request are correct to the best of my knowledge. I understand that any false statement may be punishable by fine or imprisonment under Title 18 of the United States Code, Section 1001.

Certifier's Name: Chelisa Pack	License No.: C71026	Expiration Date: 06/30/2021
Company Name: Project Design Consultants	Telephone No.: 619.235.5471	
Email: chelisap@projectdesign.com	Fax No. 619.234.0349	
Signature:	Date: 5/19/2020	

* For requests involving a portion of property, include the lowest ground elevation within the metes and bounds description.
Please note: If the Lowest Adjacent Grade to Structure is the only elevation provided, a determination will be issued for the structure only.

Seal (optional)

APPENDIX 2

Exhibits

LEGEND:

- PROPERTY BOUNDARY
- EXISTING ZONE AE FLOODPLAIN

REGISTERED PROFESSIONAL ENGINEER
CHELISA A. PORK
No. 71026
Exp. 06-30-21
CIVIL
STATE OF CALIFORNIA

TOPOGRAPHY SOURCE

ONSITE TOPOGRAPHY SHOWN IS BASED UPON AN AERIAL SURVEY BY: PROJECT DESIGN CONSULTANTS, IN DECEMBER 2019. VERTICAL DATUM OF TOPOGRAPHY AS SHOWN ON THIS EXHIBIT IS NGVD29.

SCALE:	1"=60'
JOB #:	4409.02
CREATED:	4/2/20

PREPARED BY:

PROJECT DESIGN CONSULTANTS
Planning | Landscape Architecture | Environmental | Engineering | Survey
701 B Street, Suite 800 San Diego, CA 92101
619.235.6471 Tel 619.234.0349 Fax

CITY OF CHULA VISTA

NAKANO

EXISTING CONDITIONS FEMA FLOOD MAP
LETTER OF MAP AMENDMENT
EXHIBIT A-1

P:\4409\Engr\Reports-4409.02-Nakano\Entitlement\LOMA\Exhibits\4409 - Nakano FEMA EXH.dwg 5/15/2020 8:02:19 AM

APPENDIX 7

FEMA Approval Letter for LOMA

Federal Emergency Management Agency

Washington, D.C. 20472

LETTER OF MAP AMENDMENT
DETERMINATION DOCUMENT (REMOVAL)

COMMUNITY AND MAP PANEL INFORMATION		LEGAL PROPERTY DESCRIPTION
COMMUNITY	CITY OF CHULA VISTA, SAN DIEGO COUNTY, CALIFORNIA	A portion of Section 24, Township 18 South, Range 2 West, San Bernardino Meridian, as described in the Grant Deed recorded as Document No. 2004-0777337, Pages 13994 and 13995, in the Office of the County Recorder, San Diego County, California (APN: 624-071-02)
	COMMUNITY NO.: 065021	
AFFECTED MAP PANEL	NUMBER: 06073C2158G	
	DATE: 5/16/2012	
FLOODING SOURCE: OTAY RIVER		APPROXIMATE LATITUDE & LONGITUDE OF PROPERTY: 32.588896, -117.033960 SOURCE OF LAT & LONG: LOMA LOGIC DATUM: NAD 83

DETERMINATION

LOT	BLOCK/ SECTION	SUBDIVISION	STREET	OUTCOME WHAT IS REMOVED FROM THE SFHA	FLOOD ZONE	1% ANNUAL CHANCE FLOOD ELEVATION (NAVD 88)	LOWEST ADJACENT GRADE ELEVATION (NAVD 88)	LOWEST LOT ELEVATION (NAVD 88)
--	--	--	--	Property	X (shaded)	--	--	97.9 feet

Special Flood Hazard Area (SFHA) - The SFHA is an area that would be inundated by the flood having a 1-percent chance of being equaled or exceeded in any given year (base flood).

ADDITIONAL CONSIDERATIONS (Please refer to the appropriate section on Attachment 1 for the additional considerations listed below.)

STATE LOCAL CONSIDERATIONS

This document provides the Federal Emergency Management Agency's determination regarding a request for a Letter of Map Amendment for the property described above. Using the information submitted and the effective National Flood Insurance Program (NFIP) map, we have determined that the property(ies) is/are not located in the SFHA, an area inundated by the flood having a 1-percent chance of being equaled or exceeded in any given year (base flood). This document amends the effective NFIP map to remove the subject property from the SFHA located on the effective NFIP map; therefore, the Federal mandatory flood insurance requirement does not apply. However, the lender has the option to continue the flood insurance requirement to protect its financial risk on the loan. A Preferred Risk Policy (PRP) is available for buildings located outside the SFHA. Information about the PRP and how one can apply is enclosed.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Information eXchange (FMIX) toll free at (877) 336-2627 (877-FEMA MAP) or by letter addressed to the Federal Emergency Management Agency, Engineering Library, 3601 Eisenhower Ave Ste 500, Alexandria, VA 22304-6426.

Luis V. Rodriguez, P.E., Director
Engineering and Modeling Division
Federal Insurance and Mitigation Administration

Federal Emergency Management Agency
Washington, D.C. 20472

LETTER OF MAP AMENDMENT
DETERMINATION DOCUMENT (REMOVAL)

ATTACHMENT 1 (ADDITIONAL CONSIDERATIONS)

STATE AND LOCAL CONSIDERATIONS (This Additional Consideration applies to all properties in the LOMA DETERMINATION DOCUMENT (REMOVAL))

Please note that this document does not override or supersede any State or local procedural or substantive provisions which may apply to floodplain management requirements associated with amendments to State or local floodplain zoning ordinances, maps, or State or local procedures adopted under the National Flood Insurance Program.

This attachment provides additional information regarding this request. If you have any questions about this attachment, please contact the FEMA Map Information eXchange (FMIX) toll free at (877) 336-2627 (877-FEMA MAP) or by letter addressed to the Federal Emergency Management Agency, Engineering Library, 3601 Eisenhower Ave Ste 500, Alexandria, VA 22304-6426.

Luis V. Rodriguez, P.E., Director
Engineering and Modeling Division
Federal Insurance and Mitigation Administration

Federal Emergency Management Agency

Washington, D.C. 20472

May 22, 2020

MS. CHELISA PACK
PROJECT DESIGN CONSULTANTS
701 B STREET
SUITE 800
SAN DIEGO, CA 92101

CASE NO.: 20-09-1145A
COMMUNITY: CITY OF CHULA VISTA, SAN DIEGO COUNTY, CALIFORNIA
COMMUNITY NO.: 065021

DEAR MS. PACK:

This is in reference to a request that the Federal Emergency Management Agency (FEMA) determine if the property described in the enclosed document is located within an identified Special Flood Hazard Area, the area that would be inundated by the flood having a 1-percent chance of being equaled or exceeded in any given year (base flood), on the effective National Flood Insurance Program (NFIP) map. Using the information submitted and the effective NFIP map, our determination is shown on the attached Letter of Map Amendment (LOMA) Determination Document. This determination document provides additional information regarding the effective NFIP map, the legal description of the property and our determination.

Additional documents are enclosed which provide information regarding the subject property and LOMAs. Please see the List of Enclosures below to determine which documents are enclosed. Other attachments specific to this request may be included as referenced in the Determination/Comment document. If you have any questions about this letter or any of the enclosures, please contact the FEMA Map Information eXchange (FMIX) toll free at (877) 336-2627 (877-FEMA MAP) or by letter addressed to the Federal Emergency Management Agency, Engineering Library, 3601 Eisenhower Ave Ste 500, Alexandria, VA 22304-6426.

Sincerely,

Luis V. Rodriguez, P.E., Director
Engineering and Modeling Division
Federal Insurance and Mitigation Administration

LIST OF ENCLOSURES:

LOMA DETERMINATION DOCUMENT (REMOVAL)

cc: State/Commonwealth NFIP Coordinator
Community Map Repository
Region

Federal Emergency Management Agency
Washington, D.C. 20472

ADDITIONAL INFORMATION REGARDING LETTERS OF MAP AMENDMENT

When making determinations on requests for Letters of Map Amendment (LOMAs), the Department of Homeland Security's Federal Emergency Management Agency (FEMA) bases its determination on the flood hazard information available at the time of the determination. Requesters should be aware that flood conditions may change or new information may be generated that would supersede FEMA's determination. In such cases, the community will be informed by letter.

Requesters also should be aware that removal of a property (parcel of land or structure) from the Special Flood Hazard Area (SFHA) means FEMA has determined the property is not subject to inundation by the flood having a 1-percent chance of being equaled or exceeded in any given year (base flood). This does not mean the property is not subject to other flood hazards. The property could be inundated by a flood with a magnitude greater than the base flood or by localized flooding not shown on the effective National Flood Insurance Program (NFIP) map.

The effect of a LOMA is it removes the Federal requirement for the lender to require flood insurance coverage for the property described. The LOMA *is not* a waiver of the condition that the property owner maintain flood insurance coverage for the property. *Only* the lender can waive the flood insurance purchase requirement because the lender imposed the requirement. *The property owner must request and receive a written waiver from the lender before canceling the policy*. The lender may determine, on its own as a business decision, that it wishes to continue the flood insurance requirement to protect its financial risk on the loan.

The LOMA provides FEMA's comment on the mandatory flood insurance requirements of the NFIP as they apply to a particular property. A LOMA is not a building permit, nor should it be construed as such. Any development, new construction, or substantial improvement of a property impacted by a LOMA must comply with all applicable State and local criteria and other Federal criteria.

If a lender releases a property owner from the flood insurance requirement, and the property owner decides to cancel the policy and seek a refund, the NFIP will refund the premium paid for the current policy year, provided that no claim is pending or has been paid on the policy during the current policy year. The property owner must provide a written waiver of the insurance requirement from the lender to the property insurance agent or company servicing his or her policy. The agent or company will then process the refund request.

Even though structures are not located in an SFHA, as mentioned above, they could be flooded by a flooding event with a greater magnitude than the base flood. In fact, more than 25 percent of all claims paid by the NFIP are for policies for structures located outside the SFHA in Zones B, C, X (shaded), or X (unshaded). More than one-fourth of all policies purchased under the NFIP protect structures located in these zones. The risk to structures located outside SFHAs is just not as great as the risk to structures located in SFHAs. Finally, approximately 90 percent of all federally declared disasters are caused by flooding, and homeowners insurance does not provide financial protection from this flooding. Therefore, FEMA encourages the widest possible coverage under the NFIP.

The NFIP offers two types of flood insurance policies to property owners: the low-cost Preferred Risk Policy (PRP) and the Standard Flood Insurance Policy (SFIP). The PRP is available for 1- to 4-family residential structures located outside the SFHA with little or no loss history. The PRP is available for townhouse/rowhouse-type structures, but is not available for other types of condominium units. The SFIP is available for all other structures. Additional information on the PRP and how a property owner can quality for this type of policy may be obtained by calling the Flood Insurance Information Hotline, toll free, at 1-800-427-4661. Before making a final decision about flood insurance coverage, FEMA strongly encourages property owners to discuss their individual flood risk situations and insurance needs with an insurance agent or company.

FEMA has established "Grandfather" rules to benefit flood insurance policyholders who have maintained continuous coverage. Property owners may wish to note also that, if they live outside but on the fringe of the SFHA shown on an effective NFIP map and the map is revised to expand the SFHA to include their structure(s), their flood insurance policy rates will not increase as long as the coverage for the affected structure(s) has been continuous. Property owners would continue to receive the lower insurance policy rates.

LOMAs are based on minimum criteria established by the NFIP. State, county, and community officials, based on knowledge of local conditions and in the interest of safety, may set higher standards for construction in the SFHA. If a State, county, or community has adopted more restrictive and comprehensive floodplain management criteria, these criteria take precedence over the minimum Federal criteria.

In accordance with regulations adopted by the community when it made application to join the NFIP, letters issued to amend an NFIP map must be attached to the community's official record copy of the map. That map is available for public inspection at the community's official map repository. Therefore, FEMA sends copies of all such letters to the affected community's official map repository.

When a restudy is undertaken, or when a sufficient number of revisions or amendments occur on particular map panels, FEMA initiates the printing and distribution process for the affected panels. FEMA notifies community officials in writing when affected map panels are being physically revised and distributed. In such cases, FEMA attempts to reflect the results of the LOMA on the new map panel. If the results of particular LOMAs cannot be reflected on the new map panel because of scale limitations, FEMA notifies the community in writing and revalidates the LOMAs in that letter. LOMAs revalidated in this way usually will become effective 1 day after the effective date of the revised map.

Nakano

LETTER OF MAP AMENDMENT (LOMA)

FEMA, City of Chula Vista
May 18, 2020

FIRM # 06073C2158G

Prepared For:

Pardee Homes
13400 Sabre Springs Parkway, Suite 200
San Diego, California 92128

Prepared By:

PROJECT DESIGN CONSULTANTS
Planning | Landscape Architecture | Environmental | Engineering | Survey

701 B Street, Suite 800
San Diego, CA 92101
619.235.6471 Tel
619.234.0349 Fax

PDC Job No. 4409.02

Prepared by: J. Novoa, P.E.
Under the supervision of:

Chelisa Pack, PE RCE 71026
Registration Expires 06/30/21

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1. INTRODUCTION

This Letter of Map Amendment (LOMA) has been prepared in order to certify that the existing property within the Nakano project in the City of Chula Vista, California is above the flood elevations as indicated on the NFIP map.

The purpose of the application is to demonstrate that the existing elevations of the Nakano property are above the flood elevations indicated by Zone AE as shown in the FIRM Panel No. 06073C2158G, effective date May 16, 2012. The Zone AE floodplain extends along the north portion of the site with water surface elevations ranging from 83.8 to 92.7 ft. MSL (NGVD 29). Note that there a 2.17 conversion from NAVD88 to NGVD29 datum. The elevations listed on the exhibit show elevations per the NGVD29 datum.

2. SUMMARY OF METHODOLOGY

The following summarizes how the base flood elevations were determined in order to ensure the existing elevations are above the base flood and enable their removal from the special flood hazard area mapping.

2.1 Existing Condition of the Property

The Nakano site consists of approximately 23.8 acres of existing hillside and grass land use located within the Otay Mesa neighborhood of the City of Chula Vista. The site is bounded by Kaiser Permanente medical offices to the South, Interstate 805 to the West, an existing residential site to the east and Otay River to the North. Existing condition onsite includes grassland, hillside, utilities facilities, and a small dirt paths traversing the property.

Per the FIRM panel, in the existing condition, the floodplain encroaches into the site along the northern extents of the project boundary. Along the northern portion of the property the site is affected by Zone AE. Refer to Exhibit A-1 for the existing floodplain exhibit depicting the relationship of the floodplain to the property.

2.2 Floodplain Base Flood Elevation Comparison

The base flood elevations (BFE) were taken from the FEMA FIRM Panel No. 06073C2158G, effective date May 16, 2012. The Zone AE floodplain extends along the north portion of the site with water surface elevations ranging from 83.8 to 92.7 ft. MSL (NGVD 29). The lowest point on the site along the northern property line is 95.7, three feet above the highest floodplain elevation at the northwest corner of the site of 92.7. This comparison of the worst case scenario of the lowest elevation on the existing property is still three feet higher than the highest floodway elevation at any point on site indicates that the entire site can be removed from the special flood hazard area mapping.

3. CONCLUSIONS

The existing property elevations indicate that the entire site is higher than the determined Zone AE special flood hazard area base flood elevations for the Otay River. Therefore, this report supports a recommendation that the entire property identified be removed from the 100-year floodplain limits.

APPENDIX 1

FEMA Forms, Package MT-1

MT-1 Form 1

Property Information

DEPARTMENT OF HOMELAND SECURITY - FEDERAL EMERGENCY MANAGEMENT AGENCY

PROPERTY INFORMATION FORM

O.M.B. NO. 1660-0015
Expires February 28, 2014

PAPERWORK BURDEN DISCLOSURE NOTICE

Public reporting burden for this data collection is estimated to average 1.63 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and submitting the form. This collection is required to obtain or retain benefits. You are not required to respond to this collection of information unless a valid OMB control number is displayed on this form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Department of Homeland Security, Federal Emergency Management Agency, 1800 South Bell Street, Arlington, VA 20598-3005, Paperwork Reduction Project (1660-0015). **NOTE: Do not send your completed form to this address.**

This form may be completed by the property owner, property owner's agent, licensed land surveyor, or registered professional engineer to support a request for a Letter of Map Amendment (LOMA), Conditional Letter of Map Amendment (CLOMA), Letter of Map Revision Based on Fill (LOMR-F), or Conditional Letter of Map Revision Based on Fill (CLOMR-F) for existing or proposed, single or multiple lots/structures. In order to process your request, all information on this form must be completed ***in its entirety***, unless stated as optional. **Incomplete submissions will result in processing delays.** Please check the item below that describes your request:

■ LOMA	A letter from DHS-FEMA stating that an existing structure or parcel of land that has not been elevated by fill (natural grade) would not be inundated by the base flood.
☐ CLOMA	A letter from DHS-FEMA stating that a proposed structure that is not to be elevated by fill (natural grade) would not be inundated by the base flood if built as proposed.
☐ LOMR-F	A letter from DHS-FEMA stating that an **existing** structure or parcel of land that has been **elevated by fill** would not be inundated by the base flood.
☐ CLOMR-F	A letter from DHS-FEMA stating that a parcel of land or **proposed** structure that will be **elevated by fill** would not be inundated by the base flood if fill is placed on the parcel as proposed or the structure is built as proposed.

Fill is defined as material from any source (including the subject property) placed that raises the ground to or above the Base Flood Elevation (BFE). The common construction practice of removing unsuitable existing material (topsoil) and backfilling with select structural material is not considered the placement of fill if the practice does not alter the existing (natural grade) elevation, which is at or above the BFE. **Fill that is placed before the date of the first National Flood Insurance Program (NFIP) map showing the area in a Special Flood Hazard Area (SFHA) is considered natural grade.**

Has fill been placed on your property to raise ground that was previously below the BFE? ☐ Yes ■ No If yes, when was fill placed? / month/year

Will fill be placed on your property to raise ground that is below the BFE? ☐ Yes* ■ No If yes, when will fill be placed? / month/year

* If yes, Endangered Species Act (ESA) compliance must be documented to FEMA prior to issuance of the CLOMR-F determination (please refer page 4 to the MT-1 instructions).

1. Street Address of the Property (if request is for multiple structures or units, please attach additional sheet referencing each address and enter street names below):

   Nakano (North of the intersection of Dennery Rd & Regatta Lane, Chula Vista, CA)

2. Legal description of Property (Lot, Block, Subdivision or abbreviated description from the Deed):

   (APN 624-071-02) See Attached for Legal Description of Property

3. Are you requesting that a flood zone determination be completed for (check one):

   ☐ Structures on the property? What are the dates of construction? _____ (MM/YYYY)
   ☐ A portion of land within the bounds of the property? (A certified metes and bounds description and map of the area to be removed, certified by a licensed land surveyor or registered professional engineer, are **required**. For the preferred format of metes and bounds descriptions, please refer to the MT-1 Form 1 Instructions.)
   ☒ The entire legally recorded property?

4. Is this request for a (check one):

   ☐ Single structure
   ☒ Single lot
   ☐ Multiple structures (How many structures are involved in your request? List the number: _____)
   ☐ Multiple lots (How many lots are involved in your request? List the number: _____)

In addition to this form (MT-1 Form 1), please complete the checklist below. **ALL** requests must include one copy of the following:

- ■ Copy of the effective FIRM panel on which the structure and/or property location has been accurately plotted (property inadvertently located in the NFIP regulatory floodway will require Section B of MT-1 Form 3)
- ☐ Copy of the Subdivision Plat Map for the property **(with recordation data and stamp of the Recorder's Office)**

OR

- ■ Copy of the Property Deed **(with recordation data and stamp of the Recorder's Office)**, ***accompanied by*** a tax assessor's map or other certified map showing the surveyed location of the property relative to local streets and watercourses. The map should include at least one street intersection that is shown on the FIRM panel.
- ■ Form 2 – Elevation Form. If the request is to remove the structure, and an Elevation Certificate has already been completed for this property, it may be submitted in lieu of Form 2. If the request is to remove the entire legally recorded property, or a portion thereof, the lowest lot elevation must be provided on Form 2.
- ■ Please include a map scale and North arrow on all maps submitted.

For LOMR-Fs and CLOMR-Fs, the following must be submitted in addition to the items listed above:

- ☐ Form 3 – Community Acknowledgment Form

For CLOMR-Fs, the following must be submitted in addition to the items listed above:

- ☐ Documented ESA compliance, which may include a copy of an Incidental Take Permit, an Incidental Take Statement, a "not likely to adversely affect" determination from the National Marine Fisheries Service (NMFS) or the U.S. Fish and Wildlife Service (USFWS), or an official letter from NMFS or USFWS concurring that the project has "No Effect" on proposed or listed species or designated critical habitat. Please refer to the MT-1 instructions for additional information.

Please do *not* submit original documents. Please retain a copy of all submitted documents for your records.

DHS-FEMA encourages the submission of all required data in a digital format (e.g. scanned documents and images on Compact Disc [CD]). Digital submissions help to further DHS-FEMA's Digital Vision and also may facilitate the processing of your request.

Incomplete submissions will result in processing delays. For additional information regarding this form, including where to obtain the supporting documents listed above, please refer to the MT-1 Form Instructions located at http://www.fema.gov/plan/prevent/fhm/dl_mt-1.shtm.

Processing Fee (see instructions for appropriate mailing address; or visit http://www.fema.gov/fhm/frm_fees.shtm **for** the most current fee schedule)

Revised fee schedules are published periodically, but no more than once annually, as noted in the **Federal Register**. Please note: single/multiple lot(s)/structure(s) LOMAs are fee exempt. The current review and processing fees are listed below:

Check the fee that applies to your request:

- ☐ $325 (single lot/structure LOMR-F following a CLOMR-F)
- ☐ $425 (single lot/structure LOMR-F)
- ☐ $500 (single lot/structure CLOMA or CLOMR-F)
- ☐ $700 (multiple lot/structure LOMR-F following a CLOMR-F, or multiple lot/structure CLOMA)
- ☐ $800 (multiple lot/structure LOMR-F or CLOMR-F)

Please submit the Payment Information Form for remittance of applicable fees. Please make your check or money order payable to:
National Flood Insurance Program.

All documents submitted in support of this request are correct to the best of my knowledge. I understand that any false statement may be punishable by fine or imprisonment under Title 18 of the United States Code, Section 1001.

Applicant's Name (required): Chelisa Pack

Company (if applicable): Project Design Consultants

Mailing Address (required): 701 B St., Suite 800, San Diego, CA 92101

Daytime Telephone No. (required): (619) 235-6471

E-Mail Address (optional): ■ By checking here you may receive correspondence electronically at the email address provided):

chelisap@projectdesign.com

Fax No. (optional): (619) 234-0349

Date (required) 4/7/2020

Signature of Applicant (required)

LEGAL DESCRIPTION

PARCEL1:

THAT PORTION OF THE NORTHEAST QUARTER OF THE SOUTHWEST QUARTER OF SECTION 24, TOWNSHIP 18 SOUTH, RANGE 2 WEST, SAN BERNARDINO MERIDIAN IN THE CITY OF CHULA VISTA, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO THE OFFICIAL PLAT THEREOF DESCRIBED AS FOLLOWS:

BEGINNING AT THE SOUTHEAST CORNER OF SAID NORTHEAST QUARTER OF THE SOUTHEAST QUARTER; THENCE ALONG THE SOUTH LINE THEREOF SOUTH 89°42'04" WEST, 1069.30 FEET TO THE EASTERLY LINE OF FREEWAY DESCRIBED IN FINAL ORDER OF CONDEMNATION RECORDED JULY 22, 1968 AS FILE NO. 123499 OFFICAL RECORDS; THENCE ALONG SAID EASTERLY LINE NORTH 3°47'10" EAST, 918.10 FEET; THENCE NORTH 80°52"26" EAST, 1030.62 FEET TO THE EAST LINE OF SAID SECTION: THENCE ALONG SAID EAST LINE SOUTH 0°28'33" WEST, 1074.02 FEET TO THE POINT OF BEGINNING.

PARCEL 2:

AN EASEMENT FOR ROAD AND WATER PIPELINE PURPOSES 15 FEET WIDE ALONG THE EXSTING TRAVELED ROAD ACROSS THE SOUTHEAST QUARTER OF THE NORTHEAST QUARTER AND THAT PORTION OF THE NORTHEAST QUARTER OF THE SOUTHEAST QUARTER OF SAID SECTION LYING NORTHERLY OF THE NORTHERLY LINE OF PARCEL 1 ABOVE.

EXCEPTING THAT PORTION LYING WITHIN SAID FREEWAY AND OTAY VALLEY ROAD.

Annotated FIRM Panel

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations (BFEs) shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) Zone 11. The **horizontal datum** was NAD83, GRS1980 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, NNGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242** or visit its website at http://www.ngs.noaa.gov/.

Base map information shown on this FIRM was provided in digital format by the USDA National Agriculture Imagery Program (NAIP). This information was photogrammetrically compiled at a scale of 1:24,000 from aerial photography dated 2009.

This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables *in the Flood Insurance Study report (which contains authoritative hydraulic data)* may reflect stream channel distances that differ from what is shown on this map.

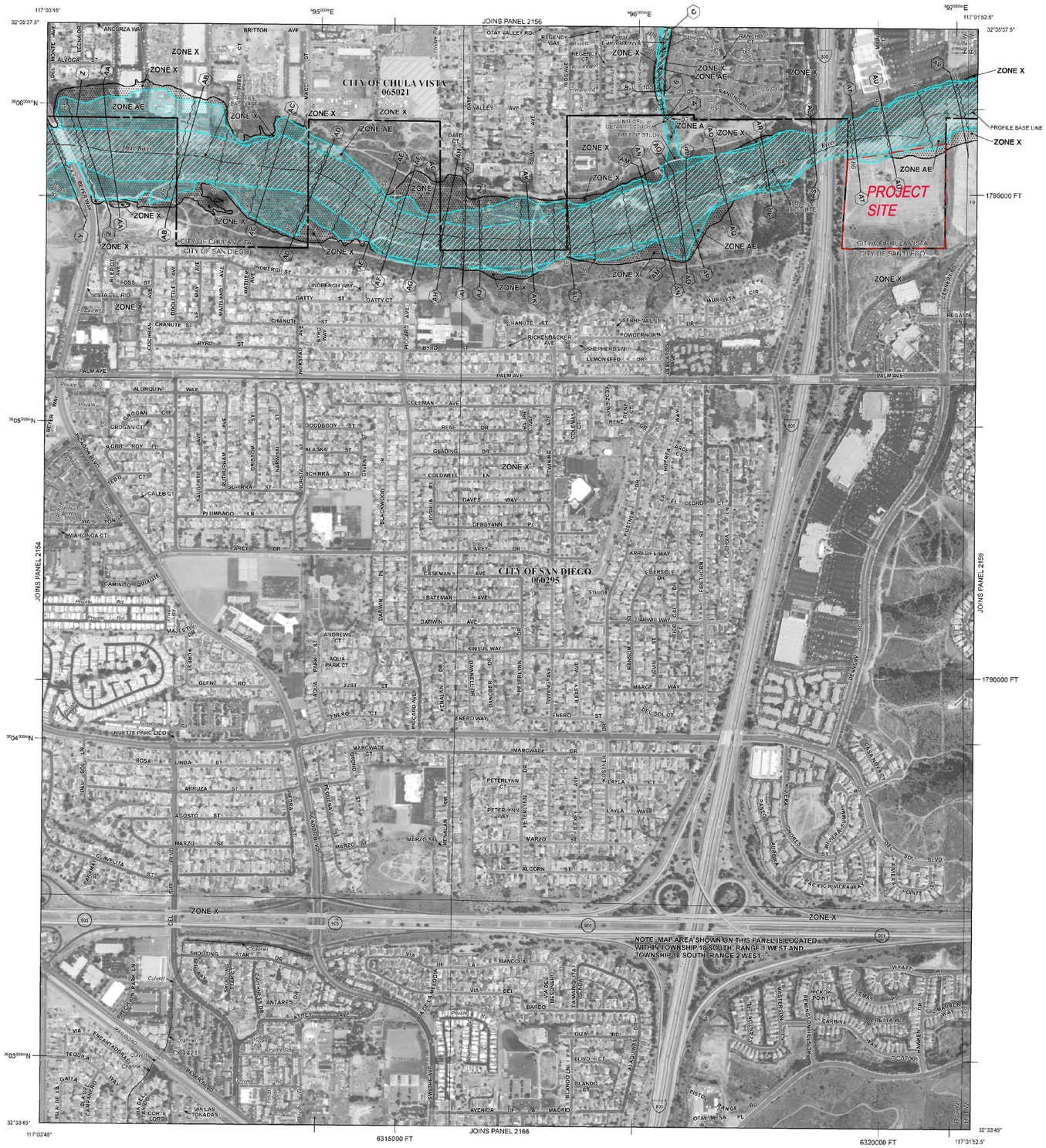
Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the **FEMA Map Service Center** at 1-877-FEMA MAP (1-877-336-2627) for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and its website at http://msc.fema.gov/.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/business/nfip/.

The ***"profile base lines"*** depicted on this map represent the hydraulic modeling baselines that match the flood profiles in the FIS report. As a result of improved topographic data, the "profile base line", in some cases, may deviate significantly from the channel centerline or appear outside the SFHA.



LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provice protection from the 1% annual chance or greater flood.
ZONE A99	Areas to be protected from 1% annual chance flood event by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- 1% annual chance floodplain boundary
- 0.2% annual chance floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths, or flood velocities
- 513 (EL 987) — Base Flood Elevation line and value; elevation in feet* / Base Flood Elevation value where uniform within zone; elevation in feet*
- * Referenced to the North American Vertical Datum of 1988
- A — A — Cross section line
- 23 — 23 — Transect line
- 97°07'30", 32°22'30" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
- 4275000 FT — 1000-meter Universal Transverse Mercator grid ticks, zone 11
- 6000000 FT — 5000-foot grid values: California State Plane coordinate system, Zone VI (FIPSZONE = 406), Lambert projection
- DX5510 — Bench mark (see explanation in Notes to Users section of this FIRM panel)
- M1.5 — River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
June 19, 1997

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
May 16, 2012 – to update corporate limits, to add roads and road names, to incorporate previously issued Letters of Map Revision, and to update map elevations to North American Vertical Datum of 1988.

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'

250 0 250 500 750 1,000 FEET
150 0 150 300 METERS

NFIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 2158G

FIRM

FLOOD INSURANCE RATE MAP

SAN DIEGO COUNTY, CALIFORNIA AND INCORPORATED AREAS

PANEL 2158 OF 2375

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
CHULA VISTA, CITY OF	065021	2158	G
SAN DIEGO, CITY OF	060295	2158	G

ANNOTATED FIRM

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
06073C2158G

MAP REVISED
MAY 16, 2012

Federal Emergency Management Agency

Last save by JEFF NOVOA, File Name P:\4409\Engr\Reports-4409.02-Nakano\Entitlement\LOMA\Exhibits\4409 Annotated FIRM.dwg, Date Last Saved 4/7/2020 10:47:40 AM, Date Plotted Last 4/7/2020 10:48:56 AM

Grant Deed

624-071-02

RECORDING REQUESTED BY:

Land Am Commercial

When Recorded Mail Document and Tax Statement To:

Pardee Construction Company
c/o Jon Lash
10880 Wilshire Blvd. Ste. 1900
Los Angeles, Ca. 90024

13994

Escrow No. 980125
Title Order No. 03202882-609-611
APN:

DOC # 2004-0777337

AUG 16, 2004 2:59 PM
OFFICIAL RECORDS
SAN DIEGO COUNTY RECORDER'S OFFICE
GREGORY J. SMITH, COUNTY RECORDER
FEES: 1068.50
OC: AFNF
PAGES: 2

2004-0777337

GRANT DEED

The undersigned grantor(s) declare(s)
Documentary transfer tax is $ 1,028.50 City tax $ _____
[X] computed on full value of property conveyed, or
[ ] computed on full value less value of liens or encumbrances remaining at time of sale,
[X] Unincorporated Area City of Chula Vista

FOR A VALUABLE CONSIDERATION, receipt of which is hereby acknowledged,
Mitsuro Nakano, Trustee U.D.T. April 7, 1995 and Tomio Nakano and Minako Nakano, Trustees U.D.T. April 12, 1995
hereby GRANT(S) to
Pardee Homes, a California Corporation

the following described real property in the City of Chula Vista
County of San Diego State of California:

That portion of the Northeast quarter of the Southeast quarter of Section 24, Township 18 South, Range 2 West, San Bernardino Meridian in the City of Chula Vista, County of San Diego, State of California, as more particularly described on the attached Exhibit 'A' made a part hereof.

DATED: May 12, 2004

Mitsuro Nakano
Mitsuro Nakano

Tomio Nakano
Tomio Nakano

Minako Nakano
Minako Nakano

STATE OF CALIFORNIA
COUNTY OF San Diego
ON August 12, 2004 before me,
A.V. Davies personally appeared
Mitsuro Nakano, Tomio Nakano,
Minako Nakano
personally known to me (or proved to me on the basis of satisfactory evidence) to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that ~~he/she~~/they executed the same in ~~his/her~~/their authorized capacity(ies), and that by ~~his/her~~/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

A. V. DAVIES
Commission # 1343846
Notary Public - California
San Diego County
My Comm. Expires Mar 16, 2006

Witness my hand and official seal.

Signature A. V. Davies

MAIL TAX STATEMENT AS DIRECTED ABOVE

A. V. DAVIES
Commission # 1343846
Notary Public - California
San Diego County
My Comm. Expires Mar 16, 2006

FD-13 (Rev 4/94) GRANT DEED

13995

EXHIBIT "A"

All that certain real property situated in the County of San Diego, State of California, described as follows:

PARCEL 1:

That portion of the Northeast quarter of the Southeast quarter of Section 24, Township 18 South, Range 2 West, San Bernardino Meridian in the City of Chula Vista, County of San Diego, State of California, according to the Official Plat thereof described as follows:

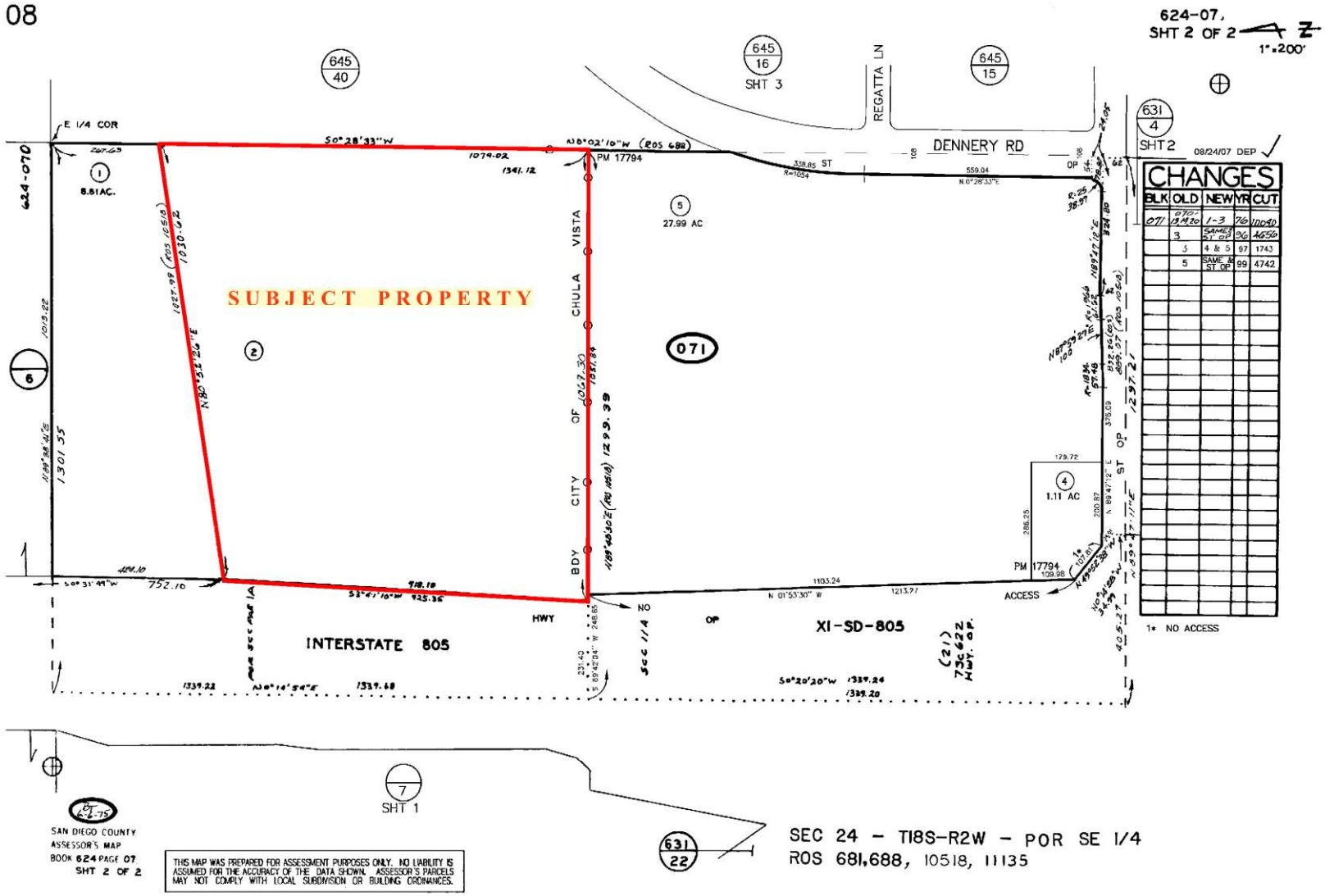
Beginning at the Southeast corner of said Northeast quarter of the Southeast quarter, thence along the South line thereof South 89°42'04" West, 1069.30 feet to the Easterly line of freeway described in final order of condemnation recorded July 22, 1968 as File No. 123488 of Official Records; thence along said Easterly line North 3°47'10" East, 918.10 feet; thence North 80°52'26" East, 1030.62 feet to the East line of said Section; thence along said East line South 0°28'33" West, 1074.02 feet to the point of beginning.

PARCEL 2:

An easement for road and water pipeline purposes 15 feet wide along the existing traveled road across the Southeast quarter of the Northeast quarter and that portion of the Northeast quarter of the Southeast quarter of said section lying Northerly of the Northerly line of Parcel 1 above.

EXCEPTING that portion lying within said Freeway and Otay Valley Road.

Assessor's Parcel Number: **624-071-02**



CHANGES				
BLK	OLD	NEW	YR	CUT
071	070-13,920	1-3	76	10040
	3	SAME & ST OF	96	16550
	3	4 & 5	97	1743
	5	SAME & ST OF	99	4742

MT-1 Form 2

Elevation Form

DEPARTMENT OF HOMELAND SECURITY - FEDERAL EMERGENCY MANAGEMENT AGENCY

ELEVATION FORM

O.M.B. NO. 1660-0015
Expires February 28, 2014

PAPERWORK BURDEN DISCLOSURE NOTICE

Public reporting burden for this data collection is estimated to average 1.25 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and submitting the form. This collection is required to obtain or retain benefits. You are not required to respond to this collection of information unless a valid OMB control number is displayed on this form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Department of Homeland Security, Federal Emergency Management Agency, 1800 South Bell Street, Arlington, VA 20598-3005, Paperwork Reduction Project (1660-0015). **NOTE: Do not send your completed form to this address.**

This form must be completed for requests and must be completed and signed by a registered professional engineer or licensed land surveyor. **A DHS - FEMA National Flood Insurance Program (NFIP) Elevation Certificate may be submitted in lieu of this form for single structure requests.**

For requests to remove a structure on natural grade OR on engineered fill from the Special Flood Hazard Area (SFHA), submit the lowest adjacent grade (the lowest ground touching the structure), ***including an attached deck or garage***. For requests to remove an entire parcel of land from the SFHA, provide the lowest lot elevation; or, if the request involves an area described by metes and bounds, provide the lowest elevation within the metes and bounds description. All measurements are to be rounded to nearest tenth of a foot. In order to process your request, all information on this form must be completed ***in its entirety***. **Incomplete submissions will result in processing delays.**

1. NFIP Community Number: 060521 Property Name or Address: Nakano (North of intersection of Dennery Rd. & Regatta Lane, Chula Vista, CA)

2. Are the elevations listed below based on ■ ***existing*** or ☐ ***proposed*** conditions? (Check one)

3. For the existing or proposed structures listed below, what are the types of construction? (check all that apply)
   ☐ crawl space ☐ slab on grade ☐ basement/enclosure ☐ other (explain)

4. Has DHS - FEMA identified this area as subject to land subsidence or uplift? (see instructions) ☐ Yes ■ No
   If yes, what is the date of the current re-leveling? / (month/year)

5. What is the elevation datum? ■ NGVD 29 ☐ NAVD 88 ☐ Other (explain)
   If any of the elevations listed below were computed using a datum different than the datum used for the effective Flood Insurance Rate Map (FIRM) (e.g., NGVD 29 or NAVD 88), what was the conversion factor? 2.17
   Local Elevation +/- ft. = FIRM Datum

6. Please provide the Latitude and Longitude of the most upstream edge of the ***structure*** (in decimal degrees to the nearest fifth decimal place):
   Indicate Datum: ☐ WGS84 ☐ NAD83 ☐ NAD27 Lat. . Long. .
   Please provide the Latitude and Longitude of the most upstream edge of the ***property*** (in decimal degrees to the nearest fifth decimal place):
   Indicate Datum: ☐ WGS84 ■ NAD83 ☐ NAD27 Lat. 32.59048 Long. 117.03231

Address	Lot Number	Block Number	Lowest Lot Elevation*	Lowest Adjacent Grade To Structure	Base Flood Elevation	BFE Source
624-071-02-00 Chula Vista, CA		N/A	95.7		92.7	FIRM 06073C2158G (Zone AE)

This certification is to be signed and sealed by a licensed land surveyor, registered professional engineer, or architect authorized by law to certify elevation information. All documents submitted in support of this request are correct to the best of my knowledge. I understand that any false statement may be punishable by fine or imprisonment under Title 18 of the United States Code, Section 1001.

Certifier's Name: Chelisa Pack	License No.: C71026	Expiration Date: 06/30/2021
Company Name: Project Design Consultants	Telephone No.: 619.235.5471	
Email: chelisap@projectdesign.com	Fax No. 619.234.0349	
Signature:	Date: 5/19/2020	

* For requests involving a portion of property, include the lowest ground elevation within the metes and bounds description.
Please note: If the Lowest Adjacent Grade to Structure is the only elevation provided, a determination will be issued for the structure only.

Seal (optional)

APPENDIX 2

Exhibits

LEGEND:

- PROPERTY BOUNDARY
- EXISTING ZONE AE FLOODPLAIN

REGISTERED PROFESSIONAL ENGINEER
CHELISA A. PORK
No. 71026
Exp. 06-30-21
CIVIL
STATE OF CALIFORNIA

TOPOGRAPHY SOURCE

ONSITE TOPOGRAPHY SHOWN IS BASED UPON AN AERIAL SURVEY BY: PROJECT DESIGN CONSULTANTS, IN DECEMBER 2019. VERTICAL DATUM OF TOPOGRAPHY AS SHOWN ON THIS EXHIBIT IS NGVD29.

SCALE:	1"=60'
JOB #:	4409.02
CREATED:	4/2/20

PREPARED BY:

PROJECT DESIGN CONSULTANTS
Planning | Landscape Architecture | Environmental | Engineering | Survey
701 B Street, Suite 800 San Diego, CA 92101
619.235.6471 Tel 619.234.0349 Fax

CITY OF CHULA VISTA

NAKANO

EXISTING CONDITIONS FEMA FLOOD MAP
LETTER OF MAP AMENDMENT
EXHIBIT A-1

P:\4409\Engr\Reports-4409.02-Nakano\Entitlement\LOMA\Exhibits\4409 - Nakano FEMA EXH.dwg 5/15/2020 8:02:19 AM