Preliminary Hydrology Report

Tentative Parcel Map No. 38256
Fist Hathaway Logistics Center
Banning, California

Prepared:

June 22, 2023

Prepared for:

First Industrial Acquisition II, LLC
898 N Pacific Coast Hwy., Ste. 175
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Project No. 2042611701.200.008

REGISTERED PROFESSIONAL ENGINEER
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78576
CIVIL
STATE OF CALIFORNIA

07/13/2023

Table of Contents

1.0 PURPOSE

The purpose of this report is to prepare preliminary hydrologic calculations for the proposed 95-acre light industrial project to be located at the northeast corner of Hathaway and Nicolet streets in the City of Banning, CA. This report is prepared at the request of First Industrial Realty, *the Client,* as a component of the submittal application for proposed Tentative Parcel Map No. 38256. The Tentative Map includes three (3) proposed parcels ranging in size from 1.7 acres to 75.5 acres.

On the largest parcel it is planned to construct a single 1.4 M.S.F industrial building which is compatible with the City's General Plan designation as "Business Park".

This preliminary study examines drainage characteristics and patterns of the local watershed in regard to distribution and management of storm water run-off. The study investigates the watershed for two scenarios. Scenario 1 is the pre-project condition and Scenario 2 is the post-project fully improved condition.

Flood protection from the upstream watershed is examined so that flows which naturally approach the project boundary are safely managed to prevent deterioration of proposed improvements. Equally, the proposed storm drain system is designed to provide flood protection to downstream properties and has been based on limiting the flows by retaining the 100-year 3-hour storm generated on the project site. Local downstream facilities include three storms drain pipes and an 6' x 3' RCB (each of which is located near State of California right-of-way). Analysis of the conveyance capacity of these downstream facilities are beyond the scope of this preliminary report.

This study includes preliminary retention facilities that satisfy the sizing requirements of (a) the provisions described in the City's Stormwater Code (Ordinance No. 1415); and (b) Engineering Condition of Approval # 20 from PAC No. 21-06. As such, in the post-project storm condition, the infiltration facilities for each respective drainage basin are designed to retain storm volumes for 100-year 3-hour event.

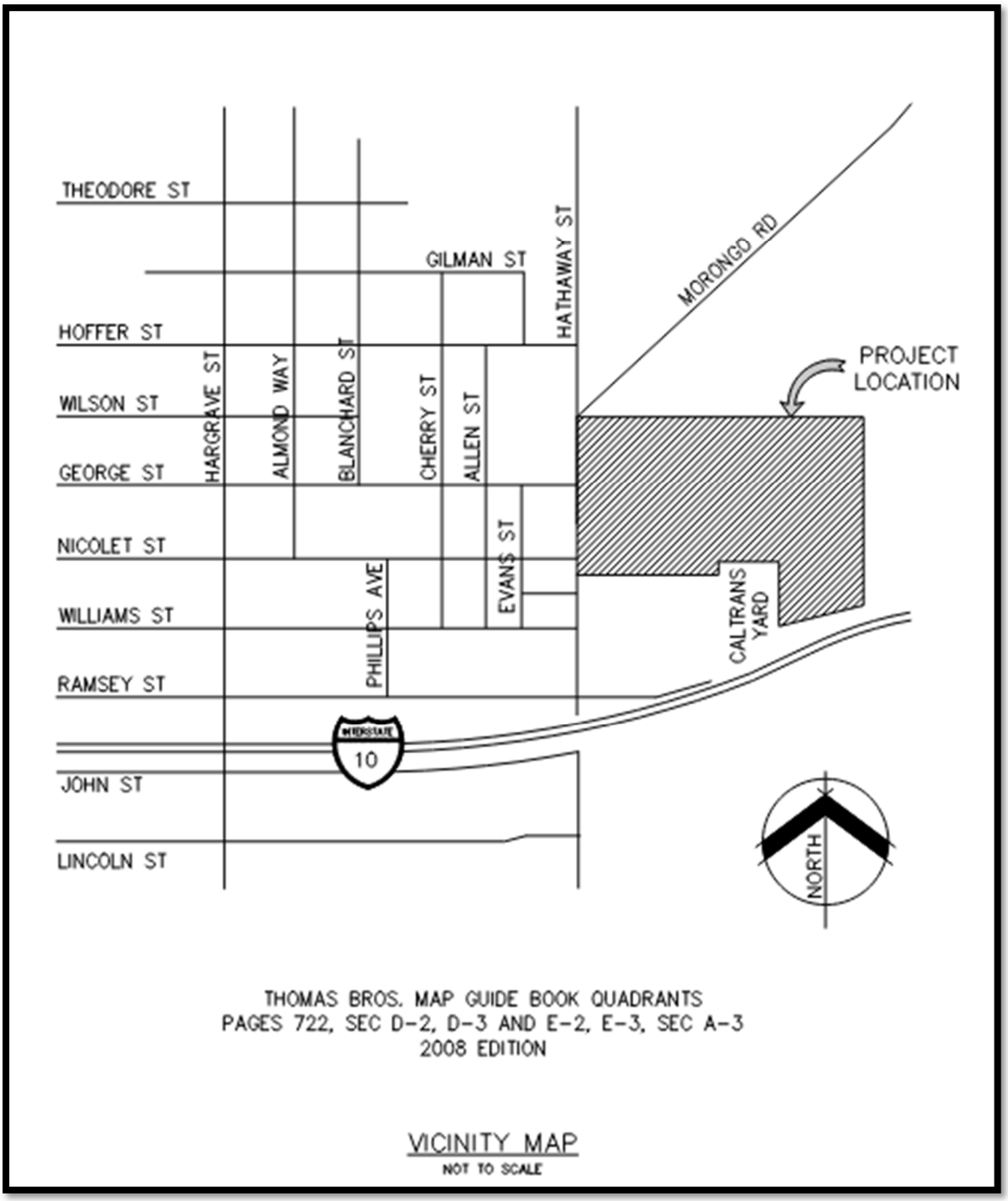
2.0 PROJECT DESCRIPTION

Located in the eastern area of the City of Banning, the project has a gross area of 95.0 acres and lies within the Whitewater River Region of Riverside County. On the most recent National Flood Insurance Rate Map the site is within Zone X (an Area of Minimal Flood Hazard) on Map No. 06065C0836G which bears an effective date of August 28, 2008. The project is not located within a Special Flood Hazard Area.

The proposed Tentative Parcel Map will consolidate six (6) existing parcels and subsequently subdivide the land into three (3) new parcels. Parcels 1 is proposed to have the 1.4 M.S.F. building, Parcel 2 is proposed to provide parking and a retention facility, and Parcel 3 is proposed as open space. The parking areas of Parcels 1 and 2 will be surfaced with asphaltic concrete pavement.

The property is composed of a former Orco Block facility and partial completion of the 2012 Banning Business Park. The Improvements associated with the Banning Business Park were approved in 2012 but only partially constructed due to slowdown in economic activity. Much of the former Orco facility has been demolished with only a single structure remaining. The demolished areas have been reduced to concrete foundations and asphalt pavement.

Surrounding land uses include existing residential to the west, vacant land owned by the Morongo Band of Mission Indians on the north, and vacant land on the east and south. On-site land use is vacant land.



THOMAS BROS. MAP GUIDE BOOK QUADRANTS
PAGES 722, SEC D-2, D-3 AND E-2, E-3, SEC A-3
2008 EDITION

VICINITY MAP
NOT TO SCALE

3.0 PRE-PROJECT CONDITIONS

This drainage report investigates three (3) drainage subareas. They are identified as Areas A, C, and D on **Exhibit 1**, the Pre-Project Conditions Hydrology Map. Drainage Area A is watershed which discharges to an existing 48-inch storm drain pipe along First Industrial Way. It is comprised mostly of off-site tributary area north of Wilson Street. Drainage Area C is in the eastern portion of the project and dewaters toward the existing 6' X 3' reinforced concrete box (RCB) culvert under Interstate 10.

Drainage Area D includes the former Orco Block facility and includes the westerly portion of the project site. This storm run-off is currently directed into a retention basin until exiting the site at the south project boundary. From this discharge location (which is just west of the CalTrans yard) flow travels within a natural earthen channel before reaching an existing 36-inch culvert at Interstate 10.

3.1 OFF-SITE - UPSTREAM:

The upper boundary of the watershed is determined to be the intersection of Repplier Road and Hargrave Street (just south of the Robertson's Ready Mix Quarry). As delineated in **Exhibit 1** the watershed extends southeasterly to Wilson Street to form a total off-site drainage area of 169.1 acres. As shown on the Exhibit, the land cover consists of mixed density single-family residential and naturally covered lands. The underlying soils type for the entire watershed is classified as Hydrologic Soils Group A. This includes all areas; those areas that are off-site, on-site, upstream, and downstream. The Appendix includes a project specific soils report from the Natural Resources Conservation Service (NRCS).

Initial storm flows are conveyed by the local street network until discharging into natural unlined channels on Morongo Tribal Lands. The peak flow exceeds the half street capacity at two locations within Drainage Area A before reaching the channel. These include Gilman Street and Hoffer Street. Flows exceeded at Gilman Street are conveyed south to Hoffer Street. Flows exceeded at Hoffer Street are conveyed out of the watershed impacting the project site. The half street capacity was based on the typical 40 ft roadway section shown on Plate D-7.5 with each street's slope, respectively. These natural channels convey flows through natural terrain and discharge into an earthen channel that was constructed with the 2012 Banning Business Park improvements. The earthen channel is dewatered by a 48-inch RCP line that was also constructed with the 2012 improvements. The discharge location of the 48-inch pipe is approximately 400 feet south of the intersection of Wilson Street and First Industrial Way.

Per As-Built plans provided in the Appendix (December 3, 2012) the 48-inch pipe (SD Line "C") was designed to convey 152 CFS of storm water. Per this current study, at this location (Node 1.8), it is determined that the hydrological upper limit for peak run-off is 160 CFS. The 160 CFS is the 100-year off-site flow tributary to the earthen channel north of Wilson Street. The off-site watershed boundary outlined in this report is consistent with the watershed boundary of the Banning Master Plan of Drainage.

In contrast, the 152 CFS peak run-off presented in the 2012 Banning Business Park study is based on models with a smaller off-site watershed boundary (87.7 acres). It is noted that watershed boundary of the 2012 study contained hydrological boundaries that differ from both the findings of this report and the findings of the Flood Control District's MDP.

Detailed pipe and street hydraulics are not included in this preliminary study; therefore, the capacity of existing SD Line "C" is not verified at this preliminary stage.

There is a small 11.1-acre portion of on-site run-off contributing to the existing 48-inch SD Line. The run-off from the northeast portion of the project site is identified as areas A13 and A14 on the Pre-Project Conditions Hydrology Map. The pre-project 100-yr peak flow rate for Drainage Area A is 172 CFS. On the map the discharge location is identified as Node 1.9.

3.2 ON-SITE:

The on-site hydrology calculations were modeled based on existing conditions which are consistent with rough graded conditions of the 2012 Business Park improvements.

Drainage Area C is defined by a minor ridge on the former Orco Block facility and extends easterly to First Industrial Way. Stormwater flows north-to-south across vacant land that is poorly covered with scatter brush and occasional piles of excavated materials. Some stormwater is collected with drainage pipes and conveyed into interim detention areas. Flows from within the detention areas are collected by a second storm drain system before discharging at the south project boundary. The discharge location is approximately 420 L.F. upstream of an existing 6' x 3' RCB culvert. The calculated 100-year return peak flow for Drainage Area C is 62 CFS.

Drainage Area D is bounded by Wilson Street on the north and Hathaway Street on the west. Stormwater flows north-to-south across vacant land that is poorly covered with concrete, AC pavement, and scattered brush. Within this drainage area there is a pair of stockpiles formed with excavation materials. Nicolet Street is poorly graded and exists in a "rough-cut" street condition. The calculated 100-year peak flow for Drainage Area D is 66 CFS.

4.0 PROPOSED PROJECT

The project is designed to replicate existing flow patterns and maintain existing discharge locations. Flood protection will be provided by the combination of Low Impact Development (LID) practices, a storm drain network and conveyance of flow through improved roadways. The LID features include vegetated swales, disconnected down drains, and infiltration-based retention. To attenuate the post-project storm volumes, the project includes infiltration chambers as well as an open space retention basin. The proposed drainage layout is shown on the Grading Exhibit which is included in the Appendix.

Consistent with the Riverside County's Hydrology Manual the peak discharge was determined per the Rational Method. The peak values are a result of hydrology models processed with the

use of Advanced Engineering Systems (AES) software. Flood protection of the building is designed for a 100-year storm event and retention facilities are designed to retain the storm volume for a 100-year 3-hour storm event.

4.1 DRAINAGE AREA A

The watershed totals 205 acres and is comprised of Wilson Street, the upstream watershed north of Wilson Street and portions of the proposed Industrial site. Storm flows north of Wilson Street will continue to be intercepted by the earthen channel that is parallel to the roadbed. This channel will be extended and widened to effectively capture upstream flows. Replicating the pre-project condition, the flow will discharge at its historical location. The existing storm drain system will be modified due to the realignment of First Industrial Way.

Storm flows originating from within the Wilson Street right-of-way will be collected by a proposed westerly extension of the storm drain line that currently exists within Wilson Street. These flows will confluence with the channel flows and discharge at the location described above. Storm flows originating on-site will be collected by a private storm drain and directed into an underground retention system. The on-site watershed contributing flows to this retention system is 33.6 acres.

Consistent with the County's Hydrology Manual storm volumes were computed based on the shortcut method of the synthetic unit hydrograph. **Table 1** is a summary of the minimum required retention volume and detailed calculations are included in the Appendix.

Table 1
100-year 3-Hour Storm Hydrograph - Summary

DRAINAGE AREA	Minimum Required Volume AC-FT
A	**6.37**
C	**6.82**
D	**2.30**

At this planning stage, the proposed chamber system drawdown is based on a preliminary design infiltration rate of 1.9 inches/hour. This infiltration rate was abstracted from prior soils studies at nearby testing locations and includes a safety factor of 2.5 and a drawdown period of 72 hours. Final construction documents shall not be based on the preliminary infiltration rate and shall be based on results of future infiltration tests.

4.2 DRAINAGE AREA C

Drainage Area C is comprised of south side of the Industrial site, portions of Nicolet and First Industrial Streets as well as the additional parking lot which is located south of Nicolet Street. The proposed drainage pattern for this will outlet in the same location as the existing condition analysis. The 37.6-acre post-project drainage area generates an unmitigated peak 100-year runoff of 110 cfs. Lowering the peak flow leaving the site will be accomplished by providing underground infiltration chamber together with an at-grade detention basin.

The storm volume was modeled per the synthetic unit hydrograph short cut method of the County's Hydrology Manual. The area includes additional contributions from C8 and C10 which are landscape areas that are designed to discharge into the public storm drain system. The total area used to size the retention was 37.6 acres. The retention was based on the County methodology and the following parameters: (1) 100-year 3-hour rainfall of depth of 2.72 inches; (2) the calculated mean soil-loss of 0.18 inches/hour; (3) the maximum permitted low soil-loss rate 18-percent and (4) a unit time interval of 10 minutes.

From the results, a minimum of 6.82 acre-feet of storage should be provided. Of this volume, a minimum of 3 acre-feet is proposed to be provided in open space infiltration basin and the additional 4 acre-feet is to be provided in the infiltration chambers. The 72-hour drawdown time of the basins are based on the same preliminary 1.9 inches/hour.

4.3 DRAINAGE AREA D

On the west side of the watershed, Drainage Area D consists of a small 12.0-acre portion of the project site. The proposed drainage pattern for Drainage Area D will outlet as the same location as the existing condition analysis. The drainage area is reduced from 27.4 acres (pre-project) to 12.0-acres (post-project) resulting in a 21 cfs decrease. The 100-year 3-hour storm volume required retention volume is 2.30 ac-ft. Of this volume, a minimum of 1.3 acre-feet is proposed to be provided in open space infiltration basin and the additional 1 acre-feet is to be provided in the infiltration chambers. The 72-hour drawdown time of the basins are based on the same preliminary 1.9 inches/hour.

5.0 SUMMARY AND CONCLUSIONS

This preliminary report is intended for planning purposes in preparation of Tentative Parcel Map 38256. With construction of the proposed drainage system, adequate flood protection will be provided for a 100-year storm event. Existing drainage flows patterns will be maintained, and Infiltration facilities will effectively retain the 100-year 3-hour volume generated from the project site. LID principles will be implemented to recreate natural flow characteristics and promote natural movement of storm water run-off.

Detailed hydraulics are not included in this study and subsequent analysis is required to size drainage structures, refine sizing of retention facilities and design drainage outlets for the

basins. The future analysis shall also evaluate street capacities to meet the design criteria of the City, in which 10-year flow is contained at the top-of-curb and 100-year flow is contained within the street right-of-way. The sizing of the infiltration facilities are based on preliminary infiltration values. Future infiltration tests may have a significant impact to the magnitude of the footprints proposed as part of this preliminary report.

A storm routing analysis is not included in this preliminary report. Future analysis shall be performed to confirm and refine the proposed infiltration system.

Table 2

Rational Method Summary - 100 year

DRAINAGE AREA	Pre-Project Condition		Unmitigated Post-Project Condition	
	Area (Acres)	Run-off (CFS)	Area (Acres)	Run-off (CFS)
A	**180.2**	**172.9**	**205.3**	**248.0**
C	**55.1**	**65.9**	**47.0**	**143.4**
D	**27.4**	**66.4**	**12.0**	**40.6**

6.0 APPENDICES

I. TENTATIVE PARCEL MAP 38256

II. HYDROLOGY MAPS

III. HYDROLOGY MODELS – RATIONAL METHOD AND STORM HYDROGRAPHS

IV. PRELIMINARY GRADING PLAN

V. NOAA RAINFALL DATA

VI. SOILS INFILTRATION TESTING

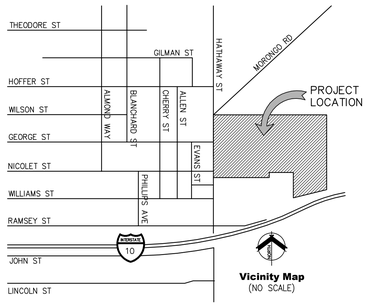
VII. NRCS SOILS REPORT

VIII. STORM DRAIN AS-BUILTS

I. TENTATIVE PARCEL MAP 38256

IN THE CITY OF BANNING, STATE OF CALIFORNIA

TENTATIVE PARCEL MAP NO. 38256



OWNER:
FR HATHAWAY, LLC.
898 N. SEPULVEDA BLVD., SUITE 175
EL SEGUNDO, CA 90245

DEVELOPER:
FIRST INDUSTRIAL REALTY TRUST, INC.
898 N. SEPULVEDA BLVD., SUITE 175
EL SEGUNDO, CA 90245
(310) 606-1634

ENGINEER / REP.
STANTEC CONSULTING, INC.
735 E. CARNEGIE DRIVE, SUITE 280
SAN BERNARDINO, CA 92408
ATT: STEPHEN CREVOISERAT, PE.
R.C.E. # 78576
(909) 255-8235

ASSESSOR'S PARCEL NO:
ASSESSOR'S PARCEL NO: 532-110-001, 002, 003, 008, 009 & 010

ACREAGE:
TOTALS:
GROSS: 94.86 AC.
NET: 84.12 AC.

ZONING DATA:
EXISTING GENERAL PLAN: BUSINESS PARK
EXISTING ZONE: BP
PROPOSED GENERAL PLAN: BUSINESS PARK
PROPOSED ZONE: BP

LAND USE:
EXISTING: VACANT
PROPOSED: INDUSTRIAL
EXISTING SURROUNDING LAND USE: INDUSTRIAL, RESIDENTIAL

LEGAL DESCRIPTION:
A PORTION OF THE NORTHWEST 1/4 OF SECTION 11, TOWNSHIP 3 SOUTH, RANGE 1 EAST, SAN BERNARDINO BASE AND MERIDIAN.

BENCH MARK:
BM-DX3470 ELEVATION= 2118.09' NAVD88
PER NATIONAL GEODETIC SURVEY (NGS) DATA SHEET.

TOPOGRAPHY SOURCE:
ROBERT J. LUNG & ASSOCIATES, 3/19/21

FLOOD ZONE DESIGNATION:
THE AREA OF LAND SHOWN DOES NOT LIE WITHIN A FLOOD ZONE.

GENERAL NOTES:
1. TOTAL NUMBER OF LOTS: 7 (3 PARCELS AND 4 LETTERED LOTS)
2. THERE ARE NO KNOWN EXISTING WELLS ON THE PROPERTY OR WITHIN 200' OF THE PROJECT.
3. THERE IS ONE EXISTING BUILDING ON THE PROPERTY.

SCHOOL:
BANNING UNIFIED SCHOOL DISTRICT
161 W. WILLIAMS ST.
BANNING, CA 92220
PH. (909) 922-0200

UTILITIES:
WATER/SEWER:
CITY OF BANNING, PUBLIC WORKS
99 EAST RAMSEY ST.
BANNING, CA 92220
(951) 922-3130

ELECTRIC:
CITY OF BANNING, ELECTRIC UTILITY
99 EAST RAMSEY ST.
BANNING, CA 92220
(951) 922-3260

GAS:
SO. CAL GAS
155 SOUTH G. STREET
SAN BERNARDINO, CA 92410
(877) 238-0092

STORM DRAIN:
R.C.F.C.D. (AND CITY PUBLIC WORKS)
1995 MARKET STREET
RIVERSIDE, CA 92501
(909) 955-1200

TELEPHONE:
VERIZON
(800) 483-4000

TV:
TIME WARNER CABLE
300 S. HIGHLAND SPRINGS AVE., SUITE 10 B
BANNING, CA 92220
(760) 340-2225

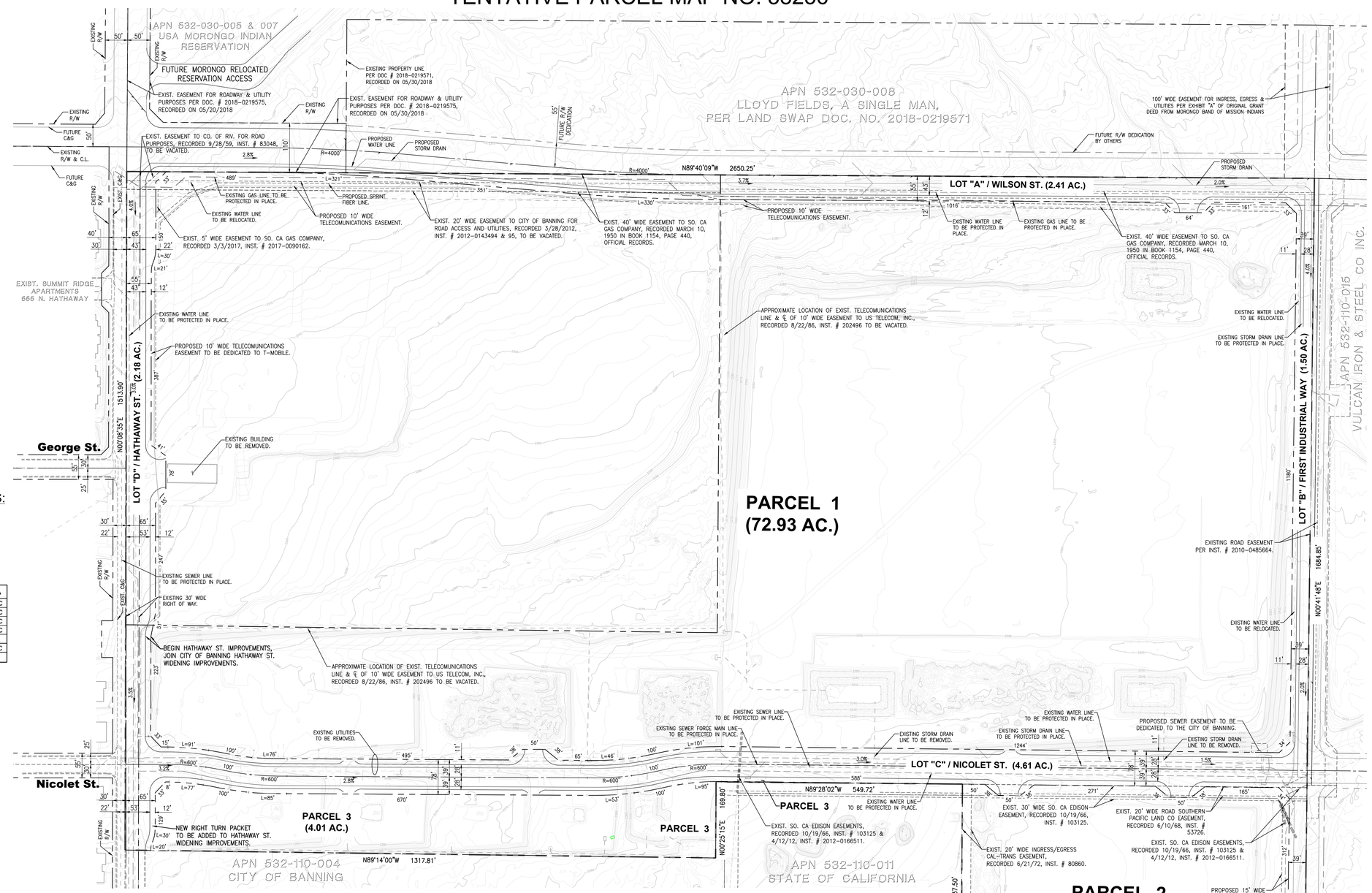
TRASH:
WASTE MANAGEMENT OF INLAND EMPIRE
800 SOUTH TEMESCAL ST.
CORONA, CA 92879
(951) 280-5440

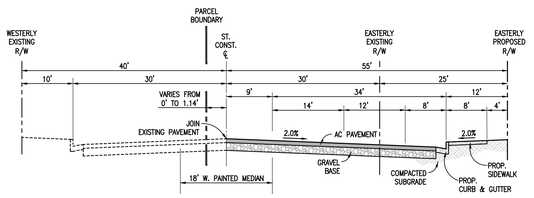
EARTHWORK QUANTITIES:

CUT = 950,000 C.Y.
FILL = 950,000 C.Y.

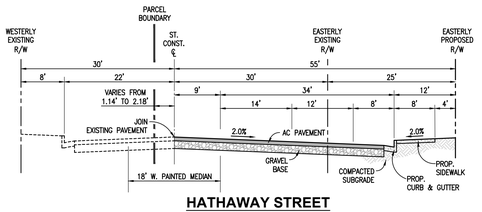
SEE GRADING ON SHEET 2.

PARCEL	AREA	LOT	AREA
1	72.89 AC	LOT "A"-WILSON ST.	2.40 AC
2	7.22 AC	LOT "B"-FIRST I. WAY	1.50 AC
3	4.01 AC	LOT "C"-NICOLET ST.	4.60 AC
		LOT "D"-HATHAWAY ST.	2.24 AC
TOTAL: 84.12 AC		TOTAL: 10.74 AC	
GRAND TOTAL: 94.86 AC			

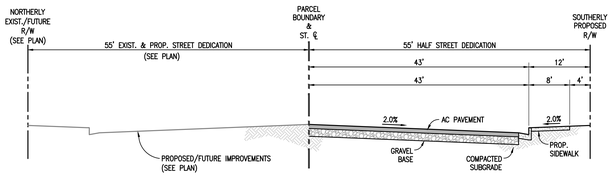




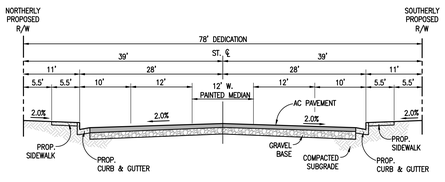
HATHAWAY STREET
ARTERIAL HIGHWAY
NORTH OF GEORGE ST.



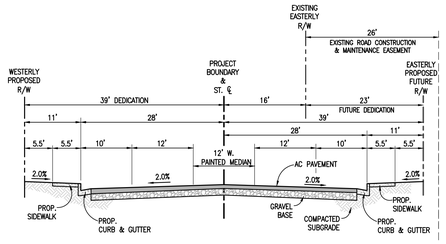
HATHAWAY STREET
ARTERIAL HIGHWAY
SOUTH OF GEORGE ST.



WILSON STREET
ARTERIAL HIGHWAY



NICOLET STREET
COLLECTOR STREET



FIRST INDUSTRIAL WAY
COLLECTOR STREET

LEGEND
- MAP BOUNDARY
- PARCEL LINE
- FUTURE R/W
- EXISTING R/W
- PROP. CURB
- PROP. STREET ℄

GRAPHIC SCALE
100 0 50 100 200 400
(IN FEET)
1 inch = 100 ft.

INTERSTATE 10
NORTH

MARCH, 2023

PREPARED FOR:
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FIRST INDUSTRIAL ACQUISITION II, LLC
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REGISTERED PROFESSIONAL ENGINEER STANLEY C. CREVOISERAT 78576 CIVIL STATE OF CALIFORNIA

CITY OF BANNING
RECOMMENDED FOR APPROVAL BY:
KEVIN D. SIN, RCE # 71299 EXP. DATE
SENIOR CIVIL ENGINEER
RECOMMENDED FOR APPROVAL BY:
NATHAN SMITH, RCE # EXP. DATE
ASST. PWD/CITY ENGINEER

TENTATIVE PARCEL MAP NO. 38256

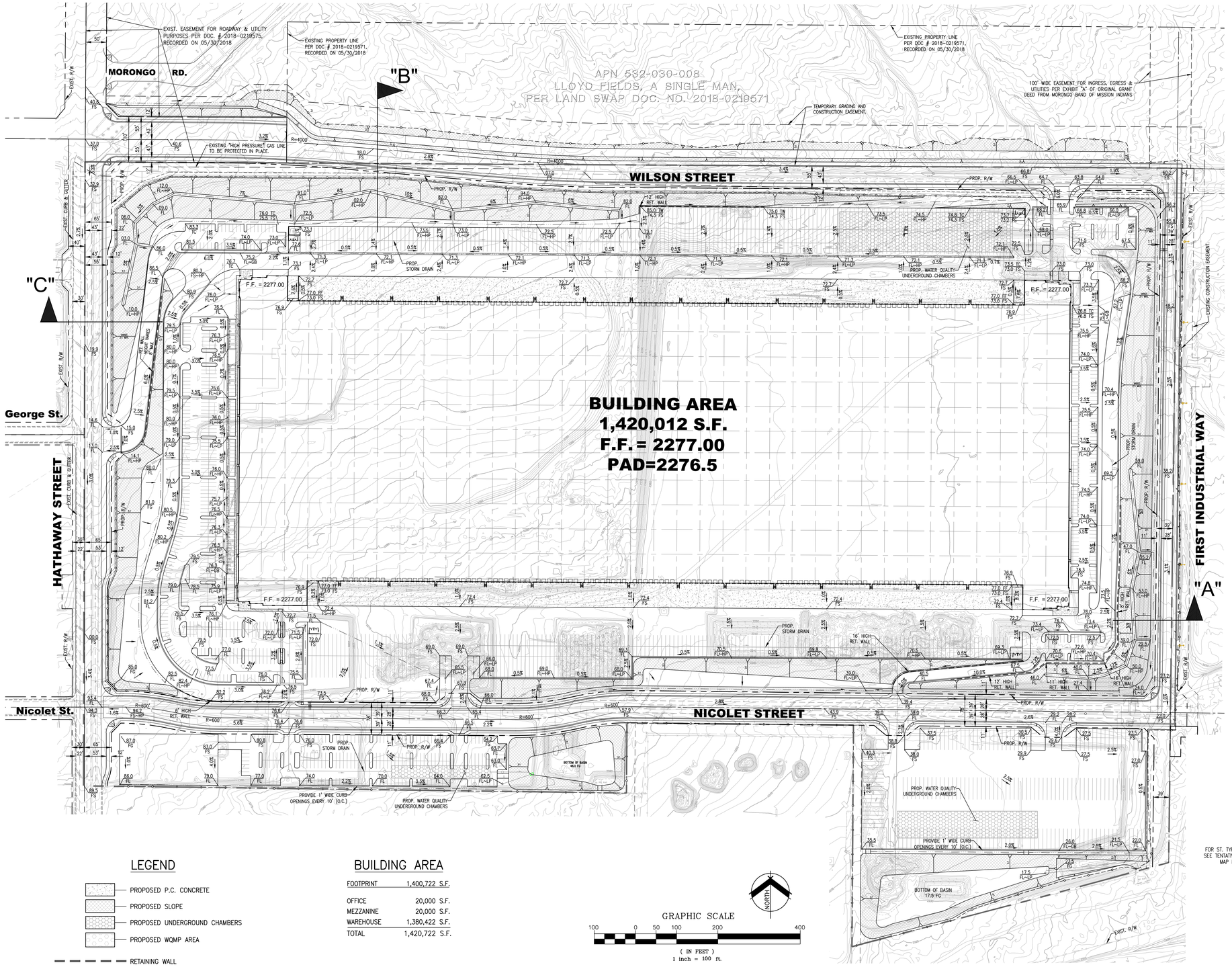
2042611700

HORIZONTAL SCALE: 1" = 100' VERTICAL SCALE: N/A

SHEET 1 OF 2

DRAWING: x:\2042\active\2042611700\drawing\exhibit files\611700c-px7004.dwg PLOTTED: 3/13/2023 7:25 AM BY: Sainz, Victor

PRELIMINARY GRADING EXHIBIT
FOR
TENTATIVE PARCEL MAP NO. 38256



BUILDING AREA
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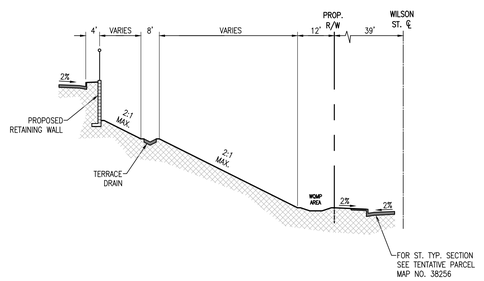
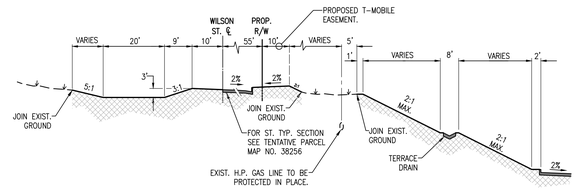
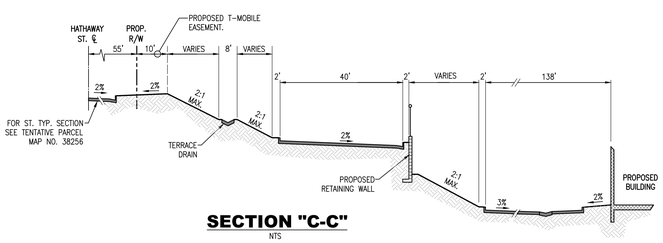
F.F. = 2277.00
PAD=2276.5



SECTION "A-A"
NTS



SECTION "B-B"
NTS



SECTION "C-C"
NTS

LEGEND

- PROPOSED P.C. CONCRETE
- PROPOSED SLOPE
- PROPOSED UNDERGROUND CHAMBERS
- PROPOSED WQMP AREA
- RETAINING WALL
- MAP BOUNDARY
- PROPOSED R/W
- PROP/EXIST. ST. ℄

BUILDING AREA

FOOTPRINT	1,400,722 S.F.
OFFICE	20,000 S.F.
MEZZANINE	20,000 S.F.
WAREHOUSE	1,380,422 S.F.
TOTAL	1,420,722 S.F.

GRAPHIC SCALE
100 0 50 100 200 400
(IN FEET)
1 inch = 100 ft.

NORTH

MARCH, 2023

PREPARED FOR:
FIRST INDUSTRIAL REALTY-TRUST
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NATHAN SMITH, RCE # EXP. DATE
ASST. PWD/CITY ENGINEER

PRELIMINARY GRADING EXHIBIT
FOR
TENTATIVE PARCEL MAP NO. 38256

2042611700

HORIZONTAL SCALE: 1" = 100' VERTICAL SCALE: N/A

SHEET 2 OF 2

II. HYDROLOGY MAPS

HYDROLOGY LEGEND

- WATERSHED BOUNDARY
- MAJOR DRAINAGE AREA BOUNDARY
- MINOR DRAINAGE BOUNDARY
- MAJOR STREAM FLOW
- MINOR STREAM FLOW
- GENERAL FLOW DIRECTION
- PROPERTY BOUNDARY
- MAJOR CONTOUR (3300)
- MINOR CONTOUR
- DRAINAGE AREA DESIGNATION — A11 / 55.4
- SUBAREA ACREAGE
- NODE IDENTIFICATION — 303.33 — ELEVATION / DOWN_STREAM_LENGTH

EAST REPPLIER ROAD
EAST INDIAN SCHOOL LANE
FLORIDA STREET
HARGRAVE STREET
BLANCHARD STREET
DIVERSION BERM
THEODORE STREET
PHILLIPS STREET
GILMAN STREET
CHERRY STREET
EVANS STREET
HOFFER STREET
MORONGO ROAD
WILSON STREET
GEORGE STREET
HATHAWAY STREET
FIRST INDUSTRIAL WAY
EXISTING STOCKPILES
EXISTING STRUCTURE
EXISTING 48" RCP

1.1 EL=2516 L=997.5
1.2 EL=2484 L=331.4
1.3 EL=2476 L=736.9
1.4 EL=2452 L=1260.3
1.61 EL=2464 L=764.3
1.62 EL=2436 L=690.6
1.63 EL=2412 L=327.7
1.64 EL=2404 L=339.7
1.65 EL=2400 L=467.1
1.66 EL=2392 L=108.8
1.5 EL=2412 L=794.9
1.6 EL=2360 L=656.7
1.7 EL=2296 L=1325.0
1.8 EL=2254.6 L=500.0 Q_{100}=160.0cfs
1.91 EL=2296 L=928.6
1.92 EL=2255 L=712.9
1.9 EL=2236.2 L=0 Q_{100}=172.9cfs Tc=29.72 min.
EL=2334 L=787.1 20.1
EL=2320 L=794.4 30.1

A1 5.5
A2 7.3
A3 11.8
A4 17.0
A5 20.0
A6 2.5
A7 3.0
A8 4.9
A9 5.1
A10 7.3
A11 55.4
A12 29.2
A13 3.9
A14 7.2
B1 2.4

MATCHLINE
SEE SHEET 2 OF 2

1.46%
2.77%
2.23%

200 100 0 200 400 600
GRAPHIC SCALE (IN FEET)
1 inch = 200 ft.

AREA B – THIS SMALL AREA RUNOFF IS NOT MODELED IN THE PRE-PROJECT CONDITION. THE DISCHARGE LOCATION IS REMOVED) AS PART OF THE PROPOSED IMPROVEMENTS.

IN THE POST-PROJECT CONDITION THE SUBAREA IS INCLUDED WITHIN DRAINAGE AREA C.

EXHIBIT 1 **FEBRUARY 2023**

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FIRST INDUSTRIAL REALTY TRUST
FIRST INDUSTRIAL ACQUISITION II, LLC
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CITY OF BANNING	SHEET
FIRST HATHAWAY LOGISTICS	1 OF 2 SHTS.
EXISTING HYDROLOGY AT PROPOSED STORM DRAIN OUTLETS	FILE NO.

Plotted: Jan 30, 2023 - 12:27pm By: cehizondo
DWG: V:\2042\active\20426117001\drawing\Exhibit_Files\41170DC-EX7007.DWG

HYDROLOGY LEGEND

- WATERSHED BOUNDARY
- MAJOR DRAINAGE AREA BOUNDARY
- MINOR DRAINAGE BOUNDARY
- MAJOR STREAM FLOW
- MINOR STREAM FLOW
- GENERAL FLOW DIRECTION
- PROPERTY BOUNDARY
- MAJOR CONTOUR (3300)
- MINOR CONTOUR
- DRAINAGE AREA DESIGNATION — A11 / 55.4
- SUBAREA ACREAGE
- NODE IDENTIFICATION — 303.33 ELEVATION / DOWN_STREAM_LENGTH

EL=2334
L=787.1
20.1
MORONGO ROAD
NATURAL AREA
EXISTING DIRT ROAD
WILSON STREET
MATCHLINE
SEE SHEET 1 OF 2
EL=2320
L=794.4
30.1
1.7
EL=2296
L=1325.0
NATURAL AREA
EXISTING EARTHEN CHANNEL
1.8
EL=2254.6
L=500.0
Q_{100}=160.0cfs
1.91
EL=2296
L=928.6
PROPERTY LINE
A14
7.2
A13
3.9
1.92
EL=2255
L=712.9
EXISTING
48" RCP
2340
EXISTING CURB
D1
4.5
C1
2.4
D2
5.1
DEMOLITION AREA
20.2
EL=2304
L=411.2
30.61
EL=2289
L=920.0
1.9
EL=2236.2
L=0
Q_{100}=172.9cfs
Tc=29.72 min.
EXISTING
STRUCTURE
GEORGE STREET
D3
11.5
EL=2294
L=539.6
30.2
30.62
EL=2254.8
L=718.5
C8
7.7
FIRST INDUSTRIAL WAY
EL=2290
L=388.2
20.3
C2
6.7
C9
13.5
PROPERTY LINE
B1
2.4
AREA B – THIS SMALL AREA RUNOFF IS NOT MODELED IN THE PRE-PROJECT CONDITION. THE DISCHARGE LOCATION IS REMOVED AS PART OF THE PROPOSED IMPROVEMENTS.
IN THE POST-PROJECT CONDITION THE SUBAREA IS INCLUDED WITHIN DRAINAGE AREA C.
EL=2272.1
L=280.9
20.4
EL=2265
L=146.3
30.3
HATHAWAY STREET
30.41
EL=2305
L=729.8
EXISTING BERM
EXISTING
STOCKPILE
30.42
EL=2273.5
L=680.3
EXISTING
STOCKPILE
EXISTING
STOCKPILE
C3
3.1
C4
3.3
C5
2.5
EX. 30" RCP (TBR)
30.4
EL=2249.6
L=457.6
EL=2232.5
L=154.9
30.63
EX. 36" RCP (TBR)
EX. RCP (TBR)
EX. RCP (TBR)
21.52
EL=2277
L=413.0
C6
2.2
EX. 24" RCP (TBR)
30.5
EL=2235.8
L=646.2
D4
1.6
NICOLET STREET
NICOLET STREET
C7
5.06
EX. 24"-30" RCP
21.51
EL=2283.7
L=598.5
30.51
EL=2282
L=797.0
EL=2257.3
L=370.7
20.5
EL=2220.2
L=210.4
30.6
30.52
EL=2254.5
L=291.4
EL=2216.7
L=416.3
30.7
EXISTING BERM
PROPERTY LINE
D5
4.7
EXISTING 30" RCP (TBR)
EX. 30" TBR
EL=2257.0
L=357.6
20.6
CAL-TRANS YARD
EXISTING
STOCKPILE
Q_{100}=61.5 cfs
Tc=25.13 min.
EXISTING
36" RCP"
C10
4.6
EL=2214
L=419.4
30.8
Q_{100}=66.4 cfs
Tc=12.65 min.
JACINTO VIEW STREET
EXISTING CURB
2280
C11
4.0
EXISTING
STRUCTURE
30.9
EL=2201.6
L=0
Q_{100}=65.9 cfs
Tc=26.12 min.
EXISTING 6'x3' RCB
OFF RAMP
WILLIAMS STREET
D6
24.7
EXISTING 18" RCP
I-10 FREEWAY
2260
EXISTING 18" RCP
20.7
EL=2230
L=0
Q_{100}=104.6 cfs
Tc=15.16 min.
EXISTING 36" RCP
2240
2220
2200

100 50 0 100 200 300
GRAPHIC SCALE (IN FEET)
1 inch = 100 ft.

EXHIBIT 1 **FEBRUARY 2023**

CITY OF BANNING	SHEET
FIRST HATHAWAY LOGISTICS	2 OF 2 SHTS.
EXISTING HYDROLOGY AT PROPOSED STORM DRAIN OUTLETS	FILE NO.

Stantec
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HYDROLOGY LEGEND

- WATERSHED BOUNDARY
- MAJOR DRAINAGE AREA BOUNDARY
- MINOR DRAINAGE BOUNDARY
- MAJOR STREAM FLOW
- MINOR STREAM FLOW
- GENERAL FLOW DIRECTION
- PROPERTY BOUNDARY
- MAJOR CONTOUR (3300)
- MINOR CONTOUR
- DRAINAGE AREA DESIGNATION — A11 / 55.4
- SUBAREA ACREAGE
- NODE IDENTIFICATION — 303.33 ELEVATION / DOWN_STREAM_LENGTH
- PROPOSED PUBLIC STORM DRAIN
- PROPOSED PRIVATE STORM DRAIN
- EXISTING STORM DRAIN (TO REMAIN)
- EXISTING STORM DRAIN (TO BE REMOVED)
- RETENTION CHAMBER

MINE CUT SLOPE
EAST REPPLIER ROAD
EAST INDIAN SCHOOL LANE
FLORIDA STREET
HARGRAVE STREET
BLANCHARD STREET
DIVERSION BERM
RESIDENTIAL
ELEV=
EXCAVATED AREA
THEODORE STREET
PLOWED AREA
PHILLIPS STREET
GILMAN STREET
CROWN CAPACITY EXCEEDED
SPLIT FLOW TO NODE 102.6
CHERRY STREET
EVANS STREET
CROWN CAPACITY EXCEEDED
SPLIT FLOW EXITS
CATCHMENT AREA
HOFFER STREET
NATURAL AREA
MORONGO ROAD
APN 532-030-008
LLOYD FIELDS, A SINGLE MAN,
PER LAND SWAP DOC. NO. 2018-0219571
WILSON STREET
PROPERTY LINE
EXISTING CURB
GEORGE STREET
MATCHTLINE
SEE SHEET 2 OF 2
PARCEL 1
120' DMP RETENTION CHAMBER
Vol=4.4 AC-FT
Q_{100}=118.7 cfs
Tc=10.02 min.
TRAP CHANNEL
47H x 20'W
EXISTING OUTLET STRUCTURE

NOTE:
ON-SITE FLOWS TO BE MITIGATED WITH RETENTION BASINS FACILITIES.

****UNMITIGATED FLOWS ARE SHOWN FOR THE PURPOSE OF DISPLAYING THE RESULTS OF THE RATIONAL METHOD.**

200 100 0 200 400 600
GRAPHIC SCALE (IN FEET)
1 inch = 200 ft.

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EXHIBIT 2

CITY OF BANNING	SHEET
FIRST HATHAWAY LOGISTICS	1 OF 2 SHTS.
POST PROJECT HYDROLOGY AT PROPOSED STORM DRAIN OUTLETS	FILE NO.

Plotted: Jun 22, 2023 – 1:47pm By: rdelgado\jr
DWG: V:\2042\Active\%2042611700\drawing\Exhibit_Plan\611700C-EX7008.DWG

WILSON STREET
MORONGO
MATCHLINE
SEE SHEET 1 OF 2
PARCEL 1
PARCEL 2
PARCEL 3
NICOLET STREET
FIRST INDUSTRIAL WAY
HATHAWAY STREET
GEORGE STREET
NICOLET STREET
JACINTO VIEW STREET
WILLIAMS STREET
CAL-TRANS YARD
I-10 FREEWAY
OFF RAMP
NATURAL AREA
TRAP CHANNEL 4'H x 20'W
PROPERTY LINE
EXISTING CURB
42"-SD (Q100=50)
48"-SD (Q100=86)
42"-SD (Q100=43)
48"-SD (Q100=67)
120" CMP RETENTION CHAMBER Vol=6.4 AC-FT
BASIN A
LINE A
LINE A1
LINE C
LINE C1
LINE D
LINE E
LINE F (EX)
Q_{100}=118.7 cfs
Tc=10.02 min.
Q_{100}=252.2 cfs
Tc=27.06 min.
(UNMITIGATED PEAK)**
Q_{100}=168.1 CFS
(MITIGATED PEAK)
EXISTING OUTLET STRUCTURE
120" CMP RETENTION CHAMBER Vol=1.0 AC-FT
RETENTION BASIN Vol=1.3 AC-FT
Q_{100}=45.7 cfs
Tc=8.61 min.
BASIN D
EXISTING 30" RCP
EX. 30" TBR
EXISTING BERM
120" CMP RETENTION CHAMBER Vol=4.0 AC-FT
BASIN C
RETENTION BASIN Vol=3.0 AC-FT
Q100=28.4 CFS
Q100=138.5 CFS (UNMITIGATED)**
Q_{100}=109.6 cfs
Tc=11.41 min.
Q100=143.3 CFS (UNMITIGATED)**
Q100=35 CFS (MITIGATED PEAK)
HISTORIC FLOW=48 CFS (SEE EXHIBIT VIII-A APPENDIX VIII HISTORIC HYDROLOGY MAP)
EXISTING 18" RCP
EXISTING 6'x3' RCB
EXISTING 36" RCP
Q100=90.3 CFS (UNMITIGATED)**
Q100=45 CFS (MITIGATED PEAK WITH Tc=11.7 MIN)
PROVIDE 1' WIDE CURB OPENINGS EVERY 10' (O.C.)
GRAPHIC SCALE (IN FEET)
1 inch = 100 ft.
HYDROLOGY LEGEND
WATERSHED BOUNDARY
MAJOR DRAINAGE AREA BOUNDARY
MINOR DRAINAGE BOUNDARY
MAJOR STREAM FLOW
MINOR STREAM FLOW
GENERAL FLOW DIRECTION
PROPERTY BOUNDARY
MAJOR CONTOUR
MINOR CONTOUR
DRAINAGE AREA DESIGNATION
SUBAREA ACREAGE
NODE IDENTIFICATION
ELEVATION
DOWN_STREAM_LENGTH
PROPOSED PUBLIC STORM DRAIN
PROPOSED PRIVATE STORM DRAIN
EXISTING STORM DRAIN (TO REMAIN)
EXISTING STORM DRAIN (TO BE REMOVED)
RETENTION CHAMBER

NOTE:
ON-SITE FLOWS TO BE MITIGATED WITH RETENTION BASINS FACILITIES.

**UNMITIGATED FLOWS ARE SHOWN FOR THE PURPOSE OF DISPLAYING THE RESULTS OF THE RATIONAL METHOD.

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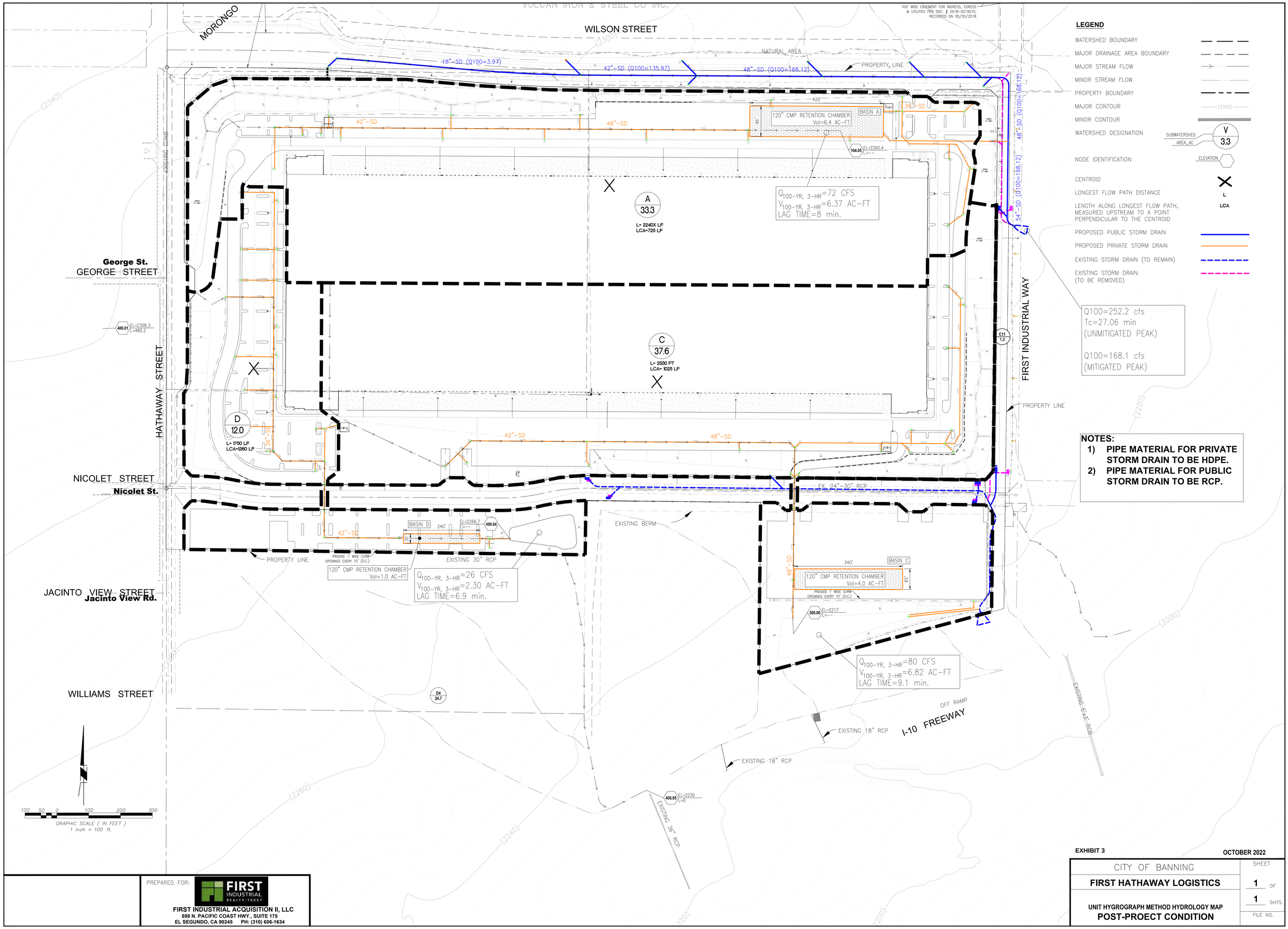
EXHIBIT 2

CITY OF BANNING
FIRST HATHAWAY LOGISTICS
POST PROJECT HYDROLOGY AT PROPOSED STORM DRAIN OUTLETS

SHEET 2 OF 2 SHTS.
FILE NO.



LEGEND

- WATERSHED BOUNDARY
- MAJOR DRAINAGE AREA BOUNDARY
- MAJOR STREAM FLOW
- MINOR STREAM FLOW
- PROPERTY BOUNDARY
- MAJOR CONTOUR (3300)
- MINOR CONTOUR
- WATERSHED DESIGNATION — SUBWATERSHED / AREA_AC (V / 3.3)
- NODE IDENTIFICATION — ELEVATION
- CENTROID
- LONGEST FLOW PATH DISTANCE — L / LCA
- LENGTH ALONG LONGEST FLOW PATH, MEASURED UPSTREAM TO A POINT PERPENDICULAR TO THE CENTROID
- PROPOSED PUBLIC STORM DRAIN
- PROPOSED PRIVATE STORM DRAIN
- EXISTING STORM DRAIN (TO REMAIN)
- EXISTING STORM DRAIN (TO BE REMOVED)

Q100=252.2 cfs
Tc=27.06 min
(UNMITIGATED PEAK)

Q100=168.1 cfs
(MITIGATED PEAK)

NOTES:

1) **PIPE MATERIAL FOR PRIVATE STORM DRAIN TO BE HDPE.**
2) **PIPE MATERIAL FOR PUBLIC STORM DRAIN TO BE RCP.**

PREPARED FOR:

FIRST INDUSTRIAL REALTY TRUST

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EXHIBIT 3

OCTOBER 2022

CITY OF BANNING

FIRST HATHAWAY LOGISTICS

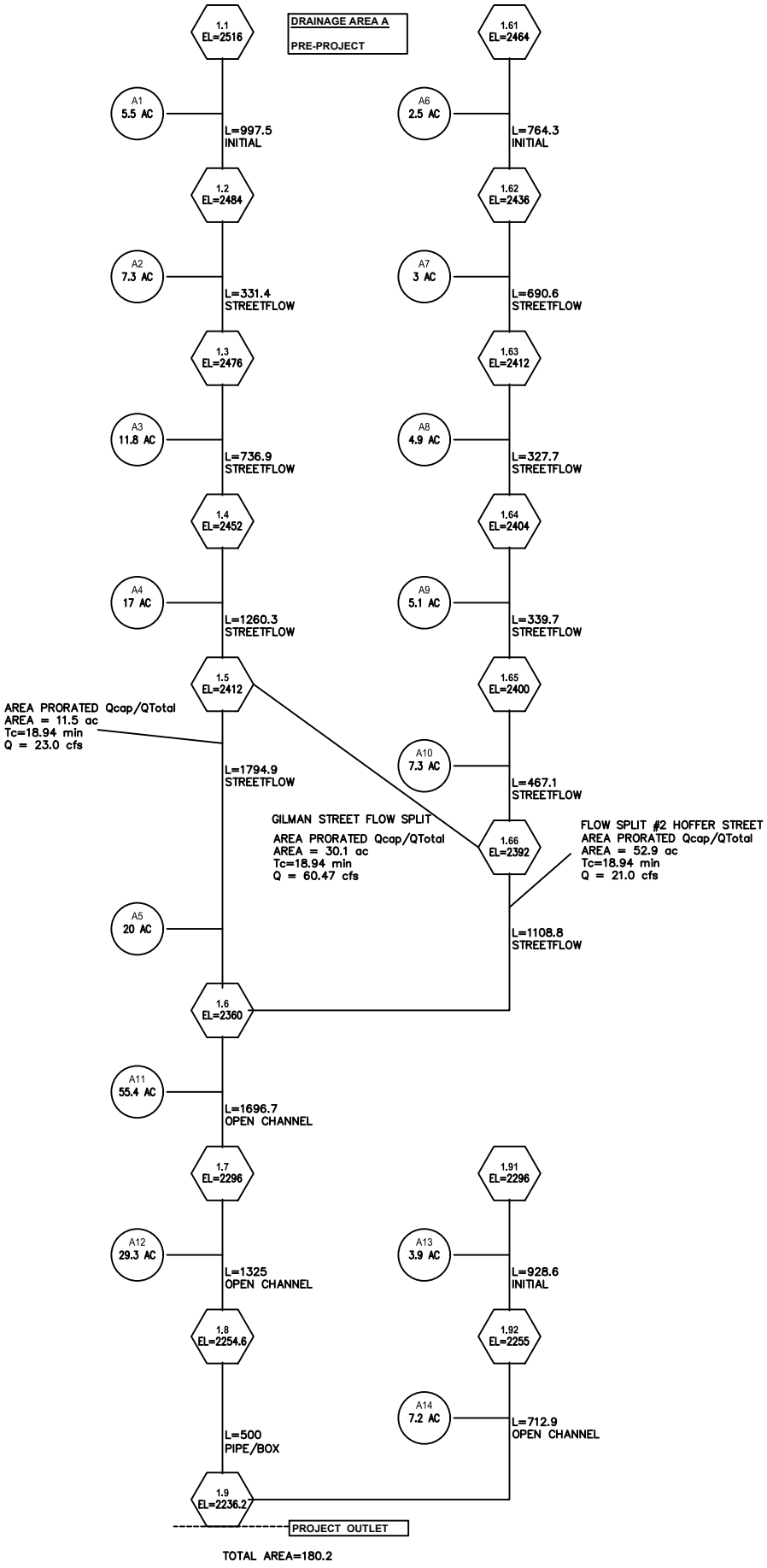
UNIT HYGROGRAPH METHOD HYDROLOGY MAP
POST-PROECT CONDITION

SHEET 1 OF 1 SHTS.

FILE NO.

III. HYDROLOGY MODELS – RATIONAL METHOD AND STORM HYDROGRAPHS

Rational Method Pre-Project


DRAINAGE AREA A
PRE-PROJECT
1.1
EL=2516
1.61
EL=2464
A1
5.5 AC
A6
2.5 AC
L=997.5
INITIAL
L=764.3
INITIAL
1.2
EL=2484
1.62
EL=2436
A2
7.3 AC
A7
3 AC
L=331.4
STREETFLOW
L=690.6
STREETFLOW
1.3
EL=2476
1.63
EL=2412
A3
11.8 AC
A8
4.9 AC
L=736.9
STREETFLOW
L=327.7
STREETFLOW
1.4
EL=2452
1.64
EL=2404
A4
17 AC
A9
5.1 AC
L=1260.3
STREETFLOW
L=339.7
STREETFLOW
1.5
EL=2412
1.65
EL=2400
AREA PRORATED Qcap/QTotal
AREA = 11.5 ac
Tc=18.94 min
Q = 23.0 cfs
A10
7.3 AC
L=1794.9
STREETFLOW
L=467.1
STREETFLOW
GILMAN STREET FLOW SPLIT
AREA PRORATED Qcap/QTotal
AREA = 30.1 ac
Tc=18.94 min
Q = 60.47 cfs
1.66
EL=2392
FLOW SPLIT #2 HOFFER STREET
AREA PRORATED Qcap/QTotal
AREA = 52.9 ac
Tc=18.94 min
Q = 21.0 cfs
A5
20 AC
L=1108.8
STREETFLOW
1.6
EL=2360
A11
55.4 AC
L=1696.7
OPEN CHANNEL
1.7
EL=2296
1.91
EL=2296
A12
29.3 AC
A13
3.9 AC
L=1325
OPEN CHANNEL
L=928.6
INITIAL
1.8
EL=2254.6
1.92
EL=2255
A14
7.2 AC
L=500
PIPE/BOX
L=712.9
OPEN CHANNEL
1.9
EL=2236.2
PROJECT OUTLET
TOTAL AREA=180.2

```
______________________________________________________________________________
******************************************************************************
          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                    (RCFC&WCD)  1978 HYDROLOGY MANUAL
         (c) Copyright 1982-2016 Advanced Engineering Software (aes)
                    (Rational Tabling Version 23.0)
                Release Date: 07/01/2016  License ID 1535

                          Analysis prepared by:

                                 Stantec



 ************************ DESCRIPTION OF STUDY ************************
* first industrial - banning ca                                       *
* pre project 100 yr                                                  *
* 2042611700 vadjr 9-20-2022                                          *
 **********************************************************************

  FILE NAME: EXA100YR.DAT
  TIME/DATE OF STUDY: 12:00 09/20/2022
------------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.130
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.978
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  3.860
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.780
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.4344152
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.4320075
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =  100.00   1-HOUR INTENSITY(INCH/HOUR) =   1.780
  SLOPE OF INTENSITY DURATION CURVE = 0.4320
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: COMPUTE CONFLUENCE VALUES ACCORDING TO RCFC&WCD HYDROLOGY MANUAL
        AND IGNORE OTHER CONFLUENCE COMBINATIONS FOR DOWNSTREAM ANALYSES
  *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     12.0    0.015/0.050/0.020   0.50    2.00 0.0313 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.50 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  8.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

******************************************************************************
  FLOW PROCESS FROM NODE      1.10 TO NODE      1.20 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS SINGLE FAMILY(1/2 ACRE)
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   997.50
  UPSTREAM ELEVATION(FEET) =   2516.00
  DOWNSTREAM ELEVATION(FEET) =   2484.00
  ELEVATION DIFFERENCE(FEET) =     32.00
  TC = 0.422*[(  997.50**3)/(    32.00)]**.2 =   13.296
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.413
  SINGLE-FAMILY(1/2 ACRE LOT) RUNOFF COEFFICIENT = .6551
  SOIL CLASSIFICATION IS "A"
  SUBAREA RUNOFF(CFS) =     12.30
  TOTAL AREA(ACRES) =      5.50   TOTAL RUNOFF(CFS) =     12.30

******************************************************************************
  FLOW PROCESS FROM NODE      1.20 TO NODE      1.30 IS CODE =  62
------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
==============================================================================
  UPSTREAM ELEVATION(FEET) = 2484.00  DOWNSTREAM ELEVATION(FEET) = 2476.00
  STREET LENGTH(FEET) =   331.40   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  12.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.015
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.050

  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 =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      18.17
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.58
    HALFSTREET FLOOD WIDTH(FEET) =   14.73
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.97
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    3.48
  STREET FLOW TRAVEL TIME(MIN.) =   0.92   Tc(MIN.) =   14.22
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.315
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .4853
  SOIL CLASSIFICATION IS "A"
  SUBAREA AREA(ACRES) =    7.30      SUBAREA RUNOFF(CFS) =   11.74
  TOTAL AREA(ACRES) =       12.8        PEAK FLOW RATE(CFS) =      24.04

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.64   HALFSTREET FLOOD WIDTH(FEET) =  18.34
  FLOW VELOCITY(FEET/SEC.) =  6.17   DEPTH*VELOCITY(FT*FT/SEC.) =   3.92
  *NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
         AND L =  331.4 FT WITH ELEVATION-DROP =   8.0 FT, IS   13.5 CFS,
         WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE      1.30
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.30 =    1328.90 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE      1.30 TO NODE      1.40 IS CODE =  62
------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
==============================================================================
  UPSTREAM ELEVATION(FEET) = 2476.00  DOWNSTREAM ELEVATION(FEET) = 2452.00
  STREET LENGTH(FEET) =   736.90   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  12.00
```

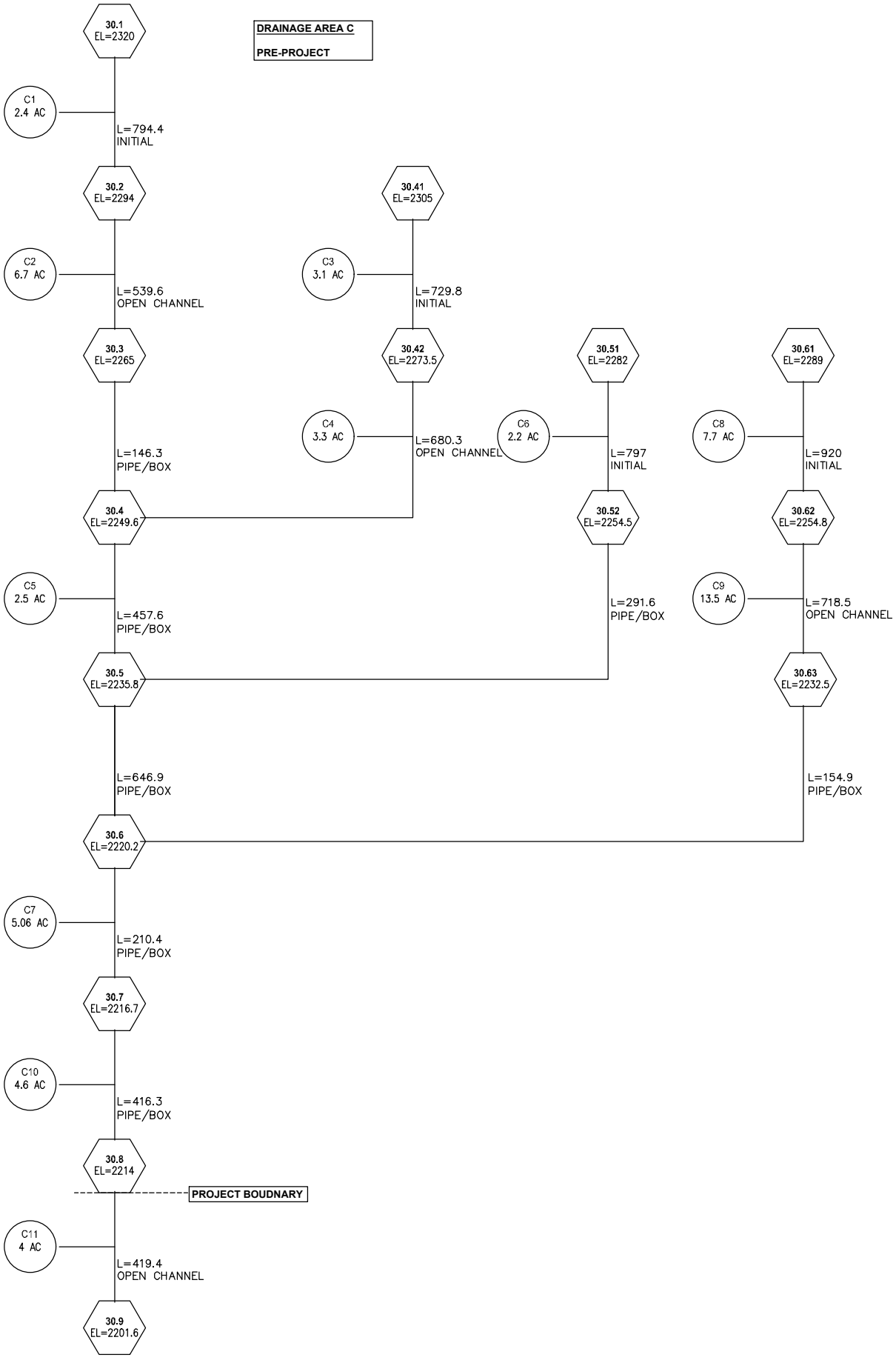
```
  INSIDE STREET CROSSFALL(DECIMAL) =  0.015
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.050

  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 =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      36.85
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.69
    HALFSTREET FLOOD WIDTH(FEET) =   22.16
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    7.37
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    5.08
  STREET FLOW TRAVEL TIME(MIN.) =   1.67   Tc(MIN.) =   15.89
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.160
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .6873
  SOIL CLASSIFICATION IS "A"
  SUBAREA AREA(ACRES) =   11.80      SUBAREA RUNOFF(CFS) =   25.63
  TOTAL AREA(ACRES) =       24.6        PEAK FLOW RATE(CFS) =      49.67

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.75   HALFSTREET FLOOD WIDTH(FEET) =  26.43
  FLOW VELOCITY(FEET/SEC.) =  7.66   DEPTH*VELOCITY(FT*FT/SEC.) =   5.75
  *NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
         AND L =  736.9 FT WITH ELEVATION-DROP =  24.0 FT, IS   30.9 CFS,
         WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE      1.40
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.40 =    2065.80 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.40 TO NODE      1.50 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   2452.00  DOWNSTREAM(FEET) =   2412.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1260.30   CHANNEL SLOPE =  0.0317
  CHANNEL FLOW THRU SUBAREA(CFS) =      49.67
  FLOW VELOCITY(FEET/SEC) =   6.88 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   3.05   Tc(MIN.) =   18.94
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.50 =    3326.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.40 TO NODE      1.50 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.929
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .6787
  SOIL CLASSIFICATION IS "A"
  SUBAREA AREA(ACRES) =   17.00   SUBAREA RUNOFF(CFS) =   33.80
  TOTAL AREA(ACRES) =       41.6   TOTAL RUNOFF(CFS) =      83.47
  TC(MIN.) =   18.94

****************************************************************************
  FLOW PROCESS FROM NODE      1.50 TO NODE      1.50 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

+--------------------------------------------------------------------------+
| The street Crown Capacity is exceeded. Flow is split to downstream       |
| Node 1.6 (east) and 1.66 (south)                                         |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE      1.50 TO NODE      1.50 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  18.94   RAIN INTENSITY(INCH/HOUR) =  2.93
  TOTAL AREA(ACRES) =    11.50   TOTAL RUNOFF(CFS) =     23.00

****************************************************************************
  FLOW PROCESS FROM NODE      1.50 TO NODE      1.60 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 2412.00  DOWNSTREAM ELEVATION(FEET) = 2360.00
  STREET LENGTH(FEET) =  1794.90   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  12.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.015
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.050

  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 =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      37.13
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.57
    HALFSTREET FLOOD WIDTH(FEET) =   13.74
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    6.53
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    3.72
  STREET FLOW TRAVEL TIME(MIN.) =   4.58   Tc(MIN.) =   23.52
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.668
  SINGLE-FAMILY(1-ACRE LOT) RUNOFF COEFFICIENT = .5292
  SOIL CLASSIFICATION IS "A"
  SUBAREA AREA(ACRES) =   20.00      SUBAREA RUNOFF(CFS) =   28.23
  TOTAL AREA(ACRES) =       31.5        PEAK FLOW RATE(CFS) =      51.23

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.63   HALFSTREET FLOOD WIDTH(FEET) =  18.01
  FLOW VELOCITY(FEET/SEC.) =  6.72   DEPTH*VELOCITY(FT*FT/SEC.) =   4.24
  *NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
         AND L = 1794.9 FT WITH ELEVATION-DROP =  52.0 FT, IS   31.8 CFS,
         WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE      1.60
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.60 =    5121.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.60 TO NODE      1.60 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      1.61 TO NODE      1.62 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
```

```
        ASSUMED INITIAL SUBAREA UNIFORM
        DEVELOPMENT IS SINGLE FAMILY (1/4 ACRE)
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   764.30
  UPSTREAM ELEVATION(FEET) =   2464.00
  DOWNSTREAM ELEVATION(FEET) =   2436.00
  ELEVATION DIFFERENCE(FEET) =     28.00
  TC = 0.393*[(  764.30**3)/(    28.00)]**.2 =   10.826
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.730
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .7057
  SOIL CLASSIFICATION IS "A"
  SUBAREA RUNOFF(CFS) =      6.58
  TOTAL AREA(ACRES) =      2.50   TOTAL RUNOFF(CFS) =      6.58

****************************************************************************
  FLOW PROCESS FROM NODE      1.62 TO NODE      1.63 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 2436.00  DOWNSTREAM ELEVATION(FEET) = 2412.00
  STREET LENGTH(FEET) =   690.60   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  12.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.015
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.050

  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 =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      10.23
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.45
    HALFSTREET FLOOD WIDTH(FEET) =    7.89
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    6.22
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.81
  STREET FLOW TRAVEL TIME(MIN.) =   1.85   Tc(MIN.) =   12.68
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.484
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .6982
  SOIL CLASSIFICATION IS "A"
  SUBAREA AREA(ACRES) =    3.00      SUBAREA RUNOFF(CFS) =    7.30
  TOTAL AREA(ACRES) =        5.5        PEAK FLOW RATE(CFS) =      13.88

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.50   HALFSTREET FLOOD WIDTH(FEET) =   8.93
  FLOW VELOCITY(FEET/SEC.) =  6.73   DEPTH*VELOCITY(FT*FT/SEC.) =   3.37
  LONGEST FLOWPATH FROM NODE      1.61 TO NODE      1.63 =    1454.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.63 TO NODE      1.64 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 2412.00  DOWNSTREAM ELEVATION(FEET) = 2404.00
  STREET LENGTH(FEET) =   327.70   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  12.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.015
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.050

  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 =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      19.64
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.60
    HALFSTREET FLOOD WIDTH(FEET) =   15.60
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    6.07
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    3.62
  STREET FLOW TRAVEL TIME(MIN.) =   0.90   Tc(MIN.) =   13.57
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.383
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .6949
  SOIL CLASSIFICATION IS "A"
  SUBAREA AREA(ACRES) =    4.90      SUBAREA RUNOFF(CFS) =   11.52
  TOTAL AREA(ACRES) =       10.4        PEAK FLOW RATE(CFS) =      25.40

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.64   HALFSTREET FLOOD WIDTH(FEET) =  18.99
  FLOW VELOCITY(FEET/SEC.) =  6.24   DEPTH*VELOCITY(FT*FT/SEC.) =   4.02
  *NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
         AND L =  327.7 FT WITH ELEVATION-DROP =   8.0 FT, IS   14.7 CFS,
         WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE      1.64
  LONGEST FLOWPATH FROM NODE      1.61 TO NODE      1.64 =    1782.60 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.64 TO NODE      1.65 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 2404.00  DOWNSTREAM ELEVATION(FEET) = 2400.00
  STREET LENGTH(FEET) =   339.70   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  12.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.015
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.050

  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 =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      29.40
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.75
    HALFSTREET FLOOD WIDTH(FEET) =   26.10
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.62
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    3.45
  STREET FLOW TRAVEL TIME(MIN.) =   1.22   Tc(MIN.) =   14.80
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.259
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .4814
  SOIL CLASSIFICATION IS "A"
  SUBAREA AREA(ACRES) =    5.10      SUBAREA RUNOFF(CFS) =    8.00
  TOTAL AREA(ACRES) =       15.5        PEAK FLOW RATE(CFS) =      33.40

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.77   HALFSTREET FLOOD WIDTH(FEET) =  28.07
  FLOW VELOCITY(FEET/SEC.) =  4.69   DEPTH*VELOCITY(FT*FT/SEC.) =   3.63
```

```
  *NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
         AND L =  339.7 FT WITH ELEVATION-DROP =   4.0 FT, IS    8.5 CFS,
         WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE      1.65
  LONGEST FLOWPATH FROM NODE      1.61 TO NODE      1.65 =    2122.30 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.65 TO NODE      1.66 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 2400.00  DOWNSTREAM ELEVATION(FEET) = 2392.00
  STREET LENGTH(FEET) =   467.10   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  12.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.015
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.050

  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 =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      39.79
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.77
    HALFSTREET FLOOD WIDTH(FEET) =   27.85
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.66
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    4.36
  STREET FLOW TRAVEL TIME(MIN.) =   1.38   Tc(MIN.) =   16.18
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.136
  SINGLE-FAMILY(1-ACRE LOT) RUNOFF COEFFICIENT = .5582
  SOIL CLASSIFICATION IS "A"
  SUBAREA AREA(ACRES) =    7.30      SUBAREA RUNOFF(CFS) =   12.78
  TOTAL AREA(ACRES) =       22.8        PEAK FLOW RATE(CFS) =      46.18

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.80   HALFSTREET FLOOD WIDTH(FEET) =  30.15
  FLOW VELOCITY(FEET/SEC.) =  5.78   DEPTH*VELOCITY(FT*FT/SEC.) =   4.65
  *NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
         AND L =  467.1 FT WITH ELEVATION-DROP =   8.0 FT, IS   14.9 CFS,
         WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE      1.66
  LONGEST FLOWPATH FROM NODE      1.61 TO NODE      1.66 =    2589.40 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.61 TO NODE      1.66 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

+--------------------------------------------------------------------------+
| Addition of split flow from Gilman Street via Cherry Street              |
| Upstream Split is from Node 1.5                                          |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE      1.50 TO NODE      1.66 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  18.94   RAIN INTENSITY(INCH/HOUR) =  2.93
  TOTAL AREA(ACRES) =    30.10   TOTAL RUNOFF(CFS) =     60.47

****************************************************************************
  FLOW PROCESS FROM NODE      1.66 TO NODE      1.66 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       60.47    18.94       2.929       30.10
  LONGEST FLOWPATH FROM NODE      1.61 TO NODE      1.66 =    2589.40 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       46.18    16.18       3.136       22.80
  LONGEST FLOWPATH FROM NODE      1.61 TO NODE      1.66 =    2589.40 FEET.

 ****************************WARNING*****************************
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ****************************************************************************

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      97.82      16.18        3.136
      2     103.60      18.94        2.929

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     103.60   Tc(MIN.) =   18.94
  TOTAL AREA(ACRES) =       52.9

****************************************************************************
  FLOW PROCESS FROM NODE      1.66 TO NODE      1.66 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

+--------------------------------------------------------------------------+
| Split Flow#2: The street crown capacity is exceeded.                     |
| Flow is split to downstream node 1.6 (east) and all flow exceeding       |
| crown flows out of the system, to exterior catchment area                |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE      1.66 TO NODE      1.66 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  18.94   RAIN INTENSITY(INCH/HOUR) =  2.93
  TOTAL AREA(ACRES) =    52.90   TOTAL RUNOFF(CFS) =     21.00

****************************************************************************
  FLOW PROCESS FROM NODE      1.66 TO NODE      1.60 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
```

```
==========================================================================
  UPSTREAM ELEVATION(FEET) = 2392.00  DOWNSTREAM ELEVATION(FEET) = 2360.00
  STREET LENGTH(FEET) =  1108.80   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  12.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.015
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.050

  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 =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      21.01
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.59
    HALFSTREET FLOOD WIDTH(FEET) =   15.38
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    6.60
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    3.91
  STREET FLOW TRAVEL TIME(MIN.) =   2.80   Tc(MIN.) =   21.74
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.760
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .4441
  SOIL CLASSIFICATION IS "A"
  SUBAREA AREA(ACRES) =    0.01      SUBAREA RUNOFF(CFS) =    0.01
  TOTAL AREA(ACRES) =       52.9        PEAK FLOW RATE(CFS) =      21.01

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.59   HALFSTREET FLOOD WIDTH(FEET) =  15.38
  FLOW VELOCITY(FEET/SEC.) =  6.60   DEPTH*VELOCITY(FT*FT/SEC.) =   3.91
  LONGEST FLOWPATH FROM NODE      1.61 TO NODE      1.60 =    3698.20 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.61 TO NODE      1.60 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       21.01    21.74       2.760       52.91
  LONGEST FLOWPATH FROM NODE      1.61 TO NODE      1.60 =    3698.20 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       51.23    23.52       2.668       31.50
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.60 =    5121.00 FEET.

 ********************************WARNING***********************************
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 **************************************************************************

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      68.37      21.74        2.760
      2      71.54      23.52        2.668

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      71.54   Tc(MIN.) =   23.52
  TOTAL AREA(ACRES) =       84.4

****************************************************************************
  FLOW PROCESS FROM NODE      1.60 TO NODE      1.70 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   2360.00  DOWNSTREAM(FEET) =   2296.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1696.70   CHANNEL SLOPE =  0.0377
  CHANNEL FLOW THRU SUBAREA(CFS) =      71.54
  FLOW VELOCITY(FEET/SEC) =   8.34 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   3.39   Tc(MIN.) =   26.91
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.70 =    6817.70 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.60 TO NODE      1.70 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.517
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .4234
  SOIL CLASSIFICATION IS "A"
  SUBAREA AREA(ACRES) =   55.40   SUBAREA RUNOFF(CFS) =   59.04
  TOTAL AREA(ACRES) =      139.8   TOTAL RUNOFF(CFS) =     130.58
  TC(MIN.) =   26.91

****************************************************************************
  FLOW PROCESS FROM NODE      1.70 TO NODE      1.80 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   2296.00  DOWNSTREAM(FEET) =   2254.60
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1325.00   CHANNEL SLOPE =  0.0312
  CHANNEL FLOW THRU SUBAREA(CFS) =     130.58
  FLOW VELOCITY(FEET/SEC) =   9.09 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   2.43   Tc(MIN.) =   29.34
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.80 =    8142.70 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.70 TO NODE      1.80 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.425
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .4150
  SOIL CLASSIFICATION IS "A"
  SUBAREA AREA(ACRES) =   29.30   SUBAREA RUNOFF(CFS) =   29.48
  TOTAL AREA(ACRES) =      169.1   TOTAL RUNOFF(CFS) =     160.06
  TC(MIN.) =   29.34

****************************************************************************
  FLOW PROCESS FROM NODE      1.80 TO NODE      1.90 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  2254.60  DOWNSTREAM(FEET) =  2236.20
  FLOW LENGTH(FEET) =   500.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  29.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  21.95
```

```
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     160.06
  PIPE TRAVEL TIME(MIN.) =   0.38    Tc(MIN.) =   29.72
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.90 =    8642.70 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.90 TO NODE      1.90 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.) =   29.72
  RAINFALL INTENSITY(INCH/HR) =   2.41
  TOTAL STREAM AREA(ACRES) =   169.11
  PEAK FLOW RATE(CFS) AT CONFLUENCE =    160.06

****************************************************************************
  FLOW PROCESS FROM NODE      1.91 TO NODE      1.92 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH POOR COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   928.60
  UPSTREAM ELEVATION(FEET) =   2296.00
  DOWNSTREAM ELEVATION(FEET) =   2255.00
  ELEVATION DIFFERENCE(FEET) =     41.00
  TC = 0.533*[(  928.60**3)/(    41.00)]**.2 =   15.295
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.213
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .4782
  SOIL CLASSIFICATION IS "A"
  SUBAREA RUNOFF(CFS) =      5.99
  TOTAL AREA(ACRES) =      3.90   TOTAL RUNOFF(CFS) =      5.99

****************************************************************************
  FLOW PROCESS FROM NODE      1.92 TO NODE      1.90 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   2255.00  DOWNSTREAM(FEET) =   2236.20
  CHANNEL LENGTH THRU SUBAREA(FEET) =   712.90   CHANNEL SLOPE =  0.0264
  CHANNEL FLOW THRU SUBAREA(CFS) =       5.99
  FLOW VELOCITY(FEET/SEC) =   3.58 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   3.32   Tc(MIN.) =   18.62
  LONGEST FLOWPATH FROM NODE      1.91 TO NODE      1.90 =    1641.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.92 TO NODE      1.90 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.951
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .4592
  SOIL CLASSIFICATION IS "A"
  SUBAREA AREA(ACRES) =    7.20   SUBAREA RUNOFF(CFS) =    9.76
  TOTAL AREA(ACRES) =       11.1   TOTAL RUNOFF(CFS) =      15.75
  TC(MIN.) =   18.62

****************************************************************************
  FLOW PROCESS FROM NODE      1.91 TO NODE      1.90 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.) =   18.62
  RAINFALL INTENSITY(INCH/HR) =   2.95
  TOTAL STREAM AREA(ACRES) =    11.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     15.75

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1      160.06    29.72        2.411        169.11
      2       15.75    18.62        2.951         11.10

 ********************************WARNING*********************************
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ************************************************************************

  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      116.02    18.62        2.951
      2      172.93    29.72        2.411

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     172.93   Tc(MIN.) =   29.72
  TOTAL AREA(ACRES) =      180.2
  LONGEST FLOWPATH FROM NODE      1.10 TO NODE      1.90 =    8642.70 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      180.2  TC(MIN.) =     29.72
  PEAK FLOW RATE(CFS)   =     172.93
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```


DRAINAGE AREA C
PRE-PROJECT
30.1
EL=2320
C1
2.4 AC
L=794.4
INITIAL
30.2
EL=2294
C2
6.7 AC
L=539.6
OPEN CHANNEL
30.3
EL=2265
L=146.3
PIPE/BOX
30.4
EL=2249.6
C5
2.5 AC
L=457.6
PIPE/BOX
30.5
EL=2235.8
L=646.9
PIPE/BOX
30.6
EL=2220.2
C7
5.06 AC
L=210.4
PIPE/BOX
30.7
EL=2216.7
C10
4.6 AC
L=416.3
PIPE/BOX
30.8
EL=2214
PROJECT BOUDNARY
C11
4 AC
L=419.4
OPEN CHANNEL
30.9
EL=2201.6
TOTAL AREA=55.06
30.41
EL=2305
C3
3.1 AC
L=729.8
INITIAL
30.42
EL=2273.5
C4
3.3 AC
L=680.3
OPEN CHANNEL
30.51
EL=2282
C6
2.2 AC
L=797
INITIAL
30.52
EL=2254.5
L=291.6
PIPE/BOX
30.61
EL=2289
C8
7.7 AC
L=920
INITIAL
30.62
EL=2254.8
C9
13.5 AC
L=718.5
OPEN CHANNEL
30.63
EL=2232.5
L=154.9
PIPE/BOX

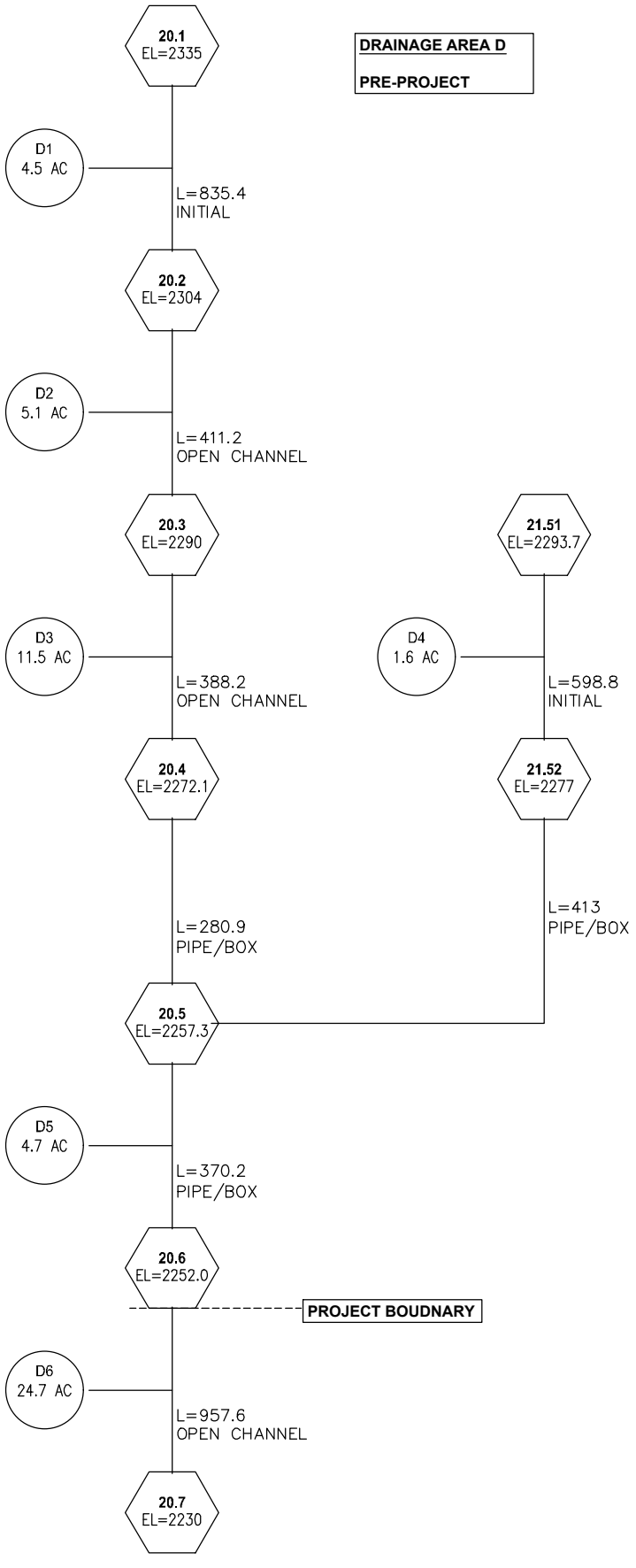
```
______________________________________________________________________________
******************************************************************************
          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                    (RCFC&WCD)  1978 HYDROLOGY MANUAL
         (c) Copyright 1982-2016 Advanced Engineering Software (aes)
                    (Rational Tabling Version 23.0)
                Release Date: 07/01/2016  License ID 1535

                         Analysis prepared by:

                                Stantec



 ************************ DESCRIPTION OF STUDY ************************
* first industrial - banning ca                                       *
* pre project area c 100 yr                                           *
* 2042611700 vadjr 10-28-2021                                         *
 **********************************************************************

  FILE NAME: EXC100YR.DAT
  TIME/DATE OF STUDY: 15:51 10/28/2021
------------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.130
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.978
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  3.860
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.780
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.4344152
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.4320075
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =  100.00   1-HOUR INTENSITY(INCH/HOUR) =   1.780
  SLOPE OF INTENSITY DURATION CURVE = 0.4320
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: COMPUTE CONFLUENCE VALUES ACCORDING TO RCFC&WCD HYDROLOGY MANUAL
        AND IGNORE OTHER CONFLUENCE COMBINATIONS FOR DOWNSTREAM ANALYSES
  *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     12.0    0.015/0.050/0.020   0.50    2.00 0.0313 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.50 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  8.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

******************************************************************************
  FLOW PROCESS FROM NODE     30.10 TO NODE     30.20 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH FAIR COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   794.40
  UPSTREAM ELEVATION(FEET) =   2320.00
  DOWNSTREAM ELEVATION(FEET) =   2294.00
  ELEVATION DIFFERENCE(FEET) =     26.00
  TC = 0.709*[(  794.40**3)/(    26.00)]**.2 =   20.320
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.842
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .4507
  SOIL CLASSIFICATION IS "A"
  SUBAREA RUNOFF(CFS) =      3.07
  TOTAL AREA(ACRES) =      2.40   TOTAL RUNOFF(CFS) =      3.07

******************************************************************************
  FLOW PROCESS FROM NODE     30.20 TO NODE     30.30 IS CODE =  52
------------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   2294.00  DOWNSTREAM(FEET) =   2265.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   539.60   CHANNEL SLOPE =  0.0537
  CHANNEL FLOW THRU SUBAREA(CFS) =       3.07
  FLOW VELOCITY(FEET/SEC) =   4.38 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   2.05   Tc(MIN.) =   22.37
  LONGEST FLOWPATH FROM NODE     30.10 TO NODE     30.30 =    1334.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE     30.20 TO NODE     30.30 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.726
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .4413
  SOIL CLASSIFICATION IS "A"
  SUBAREA AREA(ACRES) =    6.70   SUBAREA RUNOFF(CFS) =    8.06
  TOTAL AREA(ACRES) =        9.1   TOTAL RUNOFF(CFS) =      11.13
  TC(MIN.) =   22.37

******************************************************************************
  FLOW PROCESS FROM NODE     30.30 TO NODE     30.40 IS CODE =  31
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  2265.00  DOWNSTREAM(FEET) =  2249.60
  FLOW LENGTH(FEET) =   146.30   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.93
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.13
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =   22.52
  LONGEST FLOWPATH FROM NODE     30.10 TO NODE     30.40 =    1480.30 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE     30.40 TO NODE     30.40 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.) =   22.52
  RAINFALL INTENSITY(INCH/HR) =   2.72
  TOTAL STREAM AREA(ACRES) =     9.10
```

```
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     11.13

****************************************************************************
  FLOW PROCESS FROM NODE     30.41 TO NODE     30.42 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
        ASSUMED INITIAL SUBAREA UNIFORM
        DEVELOPMENT IS: UNDEVELOPED WITH POOR COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   729.80
  UPSTREAM ELEVATION(FEET) =   2305.00
  DOWNSTREAM ELEVATION(FEET) =   2273.50
  ELEVATION DIFFERENCE(FEET) =     31.50
  TC = 0.533*[(  729.80**3)/(    31.50)]**.2 =   13.953
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.343
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .4871
  SOIL CLASSIFICATION IS "A"
  SUBAREA RUNOFF(CFS) =      5.05
  TOTAL AREA(ACRES) =      3.10   TOTAL RUNOFF(CFS) =      5.05

****************************************************************************
  FLOW PROCESS FROM NODE     30.42 TO NODE     30.40 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   2273.50  DOWNSTREAM(FEET) =   2249.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   680.30   CHANNEL SLOPE =  0.0353
  CHANNEL FLOW THRU SUBAREA(CFS) =       5.05
  FLOW VELOCITY(FEET/SEC) =   3.97 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   2.85   Tc(MIN.) =   16.81
  LONGEST FLOWPATH FROM NODE     30.41 TO NODE     30.40 =    1410.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     30.42 TO NODE     30.40 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.084
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .4691
  SOIL CLASSIFICATION IS "A"
  SUBAREA AREA(ACRES) =    3.30   SUBAREA RUNOFF(CFS) =    4.77
  TOTAL AREA(ACRES) =        6.4   TOTAL RUNOFF(CFS) =       9.82
  TC(MIN.) =   16.81

****************************************************************************
  FLOW PROCESS FROM NODE     30.41 TO NODE     30.40 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   16.81
  RAINFALL INTENSITY(INCH/HR) =   3.08
  TOTAL STREAM AREA(ACRES) =     6.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.82

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       11.13    22.52        2.718          9.10
      2        9.82    16.81        3.084          6.40

 ********************************WARNING**********************************
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 *************************************************************************

  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       18.13    16.81        3.084
      2       19.79    22.52        2.718

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      19.79   Tc(MIN.) =   22.52
  TOTAL AREA(ACRES) =       15.5
  LONGEST FLOWPATH FROM NODE     30.10 TO NODE     30.40 =    1480.30 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     30.40 TO NODE     60.50 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  2249.50  DOWNSTREAM(FEET) =  2235.80
  FLOW LENGTH(FEET) =   457.60   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.16
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      19.79
  PIPE TRAVEL TIME(MIN.) =   0.63    Tc(MIN.) =   23.15
  LONGEST FLOWPATH FROM NODE     30.10 TO NODE     60.50 =    1937.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     30.40 TO NODE     30.50 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.686
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .4380
  SOIL CLASSIFICATION IS "A"
  SUBAREA AREA(ACRES) =    2.50   SUBAREA RUNOFF(CFS) =    2.94
  TOTAL AREA(ACRES) =       18.0   TOTAL RUNOFF(CFS) =      22.73
  TC(MIN.) =   23.15

****************************************************************************
  FLOW PROCESS FROM NODE     30.50 TO NODE     30.50 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.) =   23.15
  RAINFALL INTENSITY(INCH/HR) =   2.69
  TOTAL STREAM AREA(ACRES) =    18.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     22.73

****************************************************************************
  FLOW PROCESS FROM NODE     30.51 TO NODE     30.52 IS CODE =  21
```

```
--------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
================================================================================
        ASSUMED INITIAL SUBAREA UNIFORM
        DEVELOPMENT IS: UNDEVELOPED WITH FAIR COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   797.00
  UPSTREAM ELEVATION(FEET) =   2282.00
  DOWNSTREAM ELEVATION(FEET) =   2254.50
  ELEVATION DIFFERENCE(FEET) =     27.50
  TC = 0.709*[(  797.00**3)/(    27.50)]**.2 =   20.133
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.853
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .4516
  SOIL CLASSIFICATION IS "A"
  SUBAREA RUNOFF(CFS) =      2.83
  TOTAL AREA(ACRES) =      2.20   TOTAL RUNOFF(CFS) =      2.83

********************************************************************************
  FLOW PROCESS FROM NODE     30.52 TO NODE     30.50 IS CODE =  31
--------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  2254.50  DOWNSTREAM(FEET) =  2235.80
  FLOW LENGTH(FEET) =   291.60   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.63
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.83
  PIPE TRAVEL TIME(MIN.) =   0.50    Tc(MIN.) =   20.64
  LONGEST FLOWPATH FROM NODE     30.51 TO NODE     30.50 =    1088.60 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE     30.51 TO NODE     30.50 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.) =   20.64
  RAINFALL INTENSITY(INCH/HR) =   2.82
  TOTAL STREAM AREA(ACRES) =     2.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.83

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       22.73    23.15        2.686         18.00
      2        2.83    20.64        2.823          2.20

 ********************************WARNING*********************************
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ************************************************************************

  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       23.10    20.64        2.823
      2       25.43    23.15        2.686

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      25.43   Tc(MIN.) =   23.15
  TOTAL AREA(ACRES) =       20.2
  LONGEST FLOWPATH FROM NODE     30.10 TO NODE     30.50 =    1937.90 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE     30.50 TO NODE     30.60 IS CODE =  31
--------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  2235.80  DOWNSTREAM(FEET) =  2220.20
  FLOW LENGTH(FEET) =   646.90   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.94
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      25.43
  PIPE TRAVEL TIME(MIN.) =   0.90    Tc(MIN.) =   24.05
  LONGEST FLOWPATH FROM NODE     30.10 TO NODE     30.60 =    2584.80 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE     30.60 TO NODE     30.60 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.) =   24.05
  RAINFALL INTENSITY(INCH/HR) =   2.64
  TOTAL STREAM AREA(ACRES) =    20.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     25.43

********************************************************************************
  FLOW PROCESS FROM NODE     30.61 TO NODE     30.62 IS CODE =  21
--------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
================================================================================
        ASSUMED INITIAL SUBAREA UNIFORM
        DEVELOPMENT IS: UNDEVELOPED WITH FAIR COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   920.00
  UPSTREAM ELEVATION(FEET) =   2289.00
  DOWNSTREAM ELEVATION(FEET) =   2254.80
  ELEVATION DIFFERENCE(FEET) =     34.20
  TC = 0.709*[(  920.00**3)/(    34.20)]**.2 =   21.007
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.801
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .4474
  SOIL CLASSIFICATION IS "A"
  SUBAREA RUNOFF(CFS) =      9.65
  TOTAL AREA(ACRES) =      7.70   TOTAL RUNOFF(CFS) =      9.65

********************************************************************************
  FLOW PROCESS FROM NODE     30.62 TO NODE     30.63 IS CODE =  52
--------------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   2254.80  DOWNSTREAM(FEET) =   2232.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   718.50   CHANNEL SLOPE =  0.0310
```

```
 CHANNEL FLOW THRU SUBAREA(CFS) =       9.65
 FLOW VELOCITY(FEET/SEC) =   4.36 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 TRAVEL TIME(MIN.) =   2.74   Tc(MIN.) =   23.75
 LONGEST FLOWPATH FROM NODE     30.61 TO NODE     30.63 =    1638.50 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     30.62 TO NODE     30.63 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.656
 UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .4355
 SOIL CLASSIFICATION IS "A"
 SUBAREA AREA(ACRES) =   13.50   SUBAREA RUNOFF(CFS) =   15.62
 TOTAL AREA(ACRES) =       21.2   TOTAL RUNOFF(CFS) =      25.27
 TC(MIN.) =   23.75

****************************************************************************
 FLOW PROCESS FROM NODE     30.63 TO NODE     30.60 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  2232.50  DOWNSTREAM(FEET) =  2220.20
 FLOW LENGTH(FEET) =   154.90   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  18.41
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      25.27
 PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =   23.89
 LONGEST FLOWPATH FROM NODE     30.61 TO NODE     30.60 =    1793.40 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     30.61 TO NODE     30.60 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.) =   23.89
 RAINFALL INTENSITY(INCH/HR) =   2.65
 TOTAL STREAM AREA(ACRES) =    21.20
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     25.27

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1       25.43    24.05        2.642         20.20
     2       25.27    23.89        2.650         21.20

 ********************************WARNING*********************************
 IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
 ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
 WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ************************************************************************

 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       50.53    23.89       2.650
     2       50.62    24.05       2.642

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      50.62   Tc(MIN.) =   24.05
 TOTAL AREA(ACRES) =       41.4
 LONGEST FLOWPATH FROM NODE     30.10 TO NODE     30.60 =    2584.80 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     30.60 TO NODE     30.70 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  2220.20  DOWNSTREAM(FEET) =  2216.70
 FLOW LENGTH(FEET) =   210.40   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  24.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  11.97
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      50.62
 PIPE TRAVEL TIME(MIN.) =   0.29    Tc(MIN.) =   24.34
 LONGEST FLOWPATH FROM NODE     30.10 TO NODE     30.70 =    2795.20 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     30.60 TO NODE     30.70 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.628
 UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .4331
 SOIL CLASSIFICATION IS "A"
 SUBAREA AREA(ACRES) =    5.06   SUBAREA RUNOFF(CFS) =    5.76
 TOTAL AREA(ACRES) =       46.5   TOTAL RUNOFF(CFS) =      56.38
 TC(MIN.) =   24.34

****************************************************************************
 FLOW PROCESS FROM NODE     30.70 TO NODE     30.80 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  2216.70  DOWNSTREAM(FEET) =  2214.00
 FLOW LENGTH(FEET) =   416.30   MANNING'S N =  0.013
 DEPTH OF FLOW IN  39.0 INCH PIPE IS  28.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.80
 ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      56.38
 PIPE TRAVEL TIME(MIN.) =   0.79    Tc(MIN.) =   25.13
 LONGEST FLOWPATH FROM NODE     30.10 TO NODE     30.80 =    3211.50 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     30.70 TO NODE     30.80 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.592
 UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .4300
 SOIL CLASSIFICATION IS "A"
 SUBAREA AREA(ACRES) =    4.60   SUBAREA RUNOFF(CFS) =    5.13
 TOTAL AREA(ACRES) =       51.1   TOTAL RUNOFF(CFS) =      61.51
 TC(MIN.) =   25.13

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

```
  FLOW PROCESS FROM NODE     30.80 TO NODE     30.90 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   2214.00  DOWNSTREAM(FEET) =   2201.60
  CHANNEL LENGTH THRU SUBAREA(FEET) =   419.40   CHANNEL SLOPE =  0.0296
  CHANNEL FLOW THRU SUBAREA(CFS) =      61.51
  FLOW VELOCITY(FEET/SEC) =   7.07 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.99   Tc(MIN.) =   26.12
  LONGEST FLOWPATH FROM NODE     30.10 TO NODE     30.90 =    3630.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     30.80 TO NODE     30.90 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.550
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .4263
  SOIL CLASSIFICATION IS "A"
  SUBAREA AREA(ACRES) =    4.00   SUBAREA RUNOFF(CFS) =    4.35
  TOTAL AREA(ACRES) =       55.1   TOTAL RUNOFF(CFS) =      65.86
  TC(MIN.) =   26.12
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       55.1  TC(MIN.) =     26.12
  PEAK FLOW RATE(CFS)   =      65.86
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```


DRAINAGE AREA D
PRE-PROJECT
20.1
EL=2335
D1
4.5 AC
L=835.4
INITIAL
20.2
EL=2304
D2
5.1 AC
L=411.2
OPEN CHANNEL
20.3
EL=2290
21.51
EL=2293.7
D3
11.5 AC
D4
1.6 AC
L=388.2
OPEN CHANNEL
L=598.8
INITIAL
20.4
EL=2272.1
21.52
EL=2277
L=280.9
PIPE/BOX
L=413
PIPE/BOX
20.5
EL=2257.3
D5
4.7 AC
L=370.2
PIPE/BOX
20.6
EL=2252.0
PROJECT BOUDNARY
D6
24.7 AC
L=957.6
OPEN CHANNEL
20.7
EL=2230
TOTAL AREA=52.1

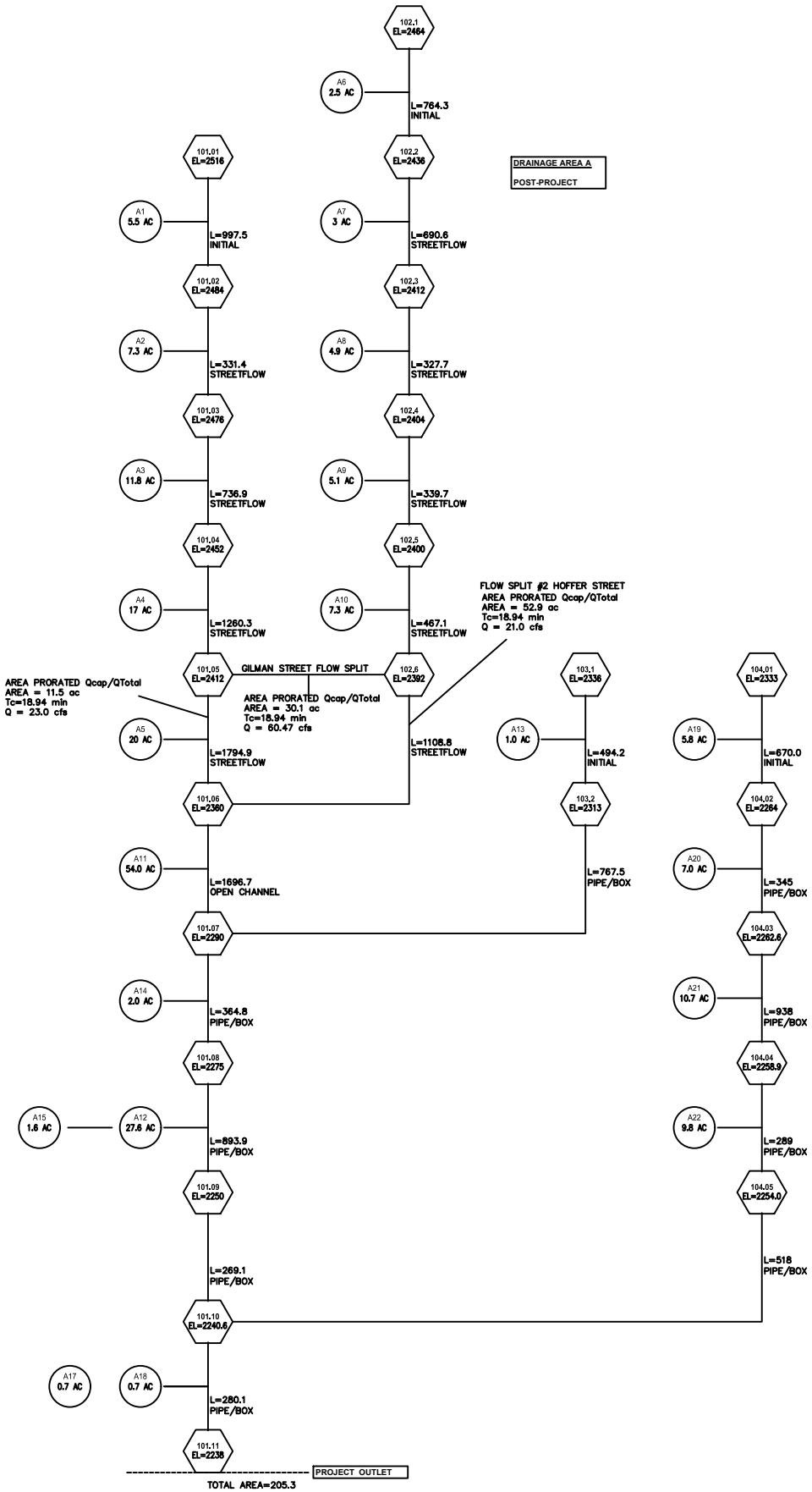
```
______________________________________________________________________________
******************************************************************************
          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                    (RCFC&WCD)  1978 HYDROLOGY MANUAL
         (c) Copyright 1982-2016 Advanced Engineering Software (aes)
                    (Rational Tabling Version 23.0)
                Release Date: 07/01/2016  License ID 1535

                          Analysis prepared by:

                                 Stantec



 ************************ DESCRIPTION OF STUDY ************************
* first industrial - banning ca                                       *
* PRE PROJECT AREA D 100 YEAR                                         *
* 2042611700 vadjr 10-30-2021                                         *
 **********************************************************************

  FILE NAME: EXD100YR.DAT
  TIME/DATE OF STUDY: 09:44 11/02/2021
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.130
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.978
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  3.860
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.780
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.4344152
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.4320075
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =  100.00   1-HOUR INTENSITY(INCH/HOUR) =   1.780
  SLOPE OF INTENSITY DURATION CURVE = 0.4320
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: COMPUTE CONFLUENCE VALUES ACCORDING TO RCFC&WCD HYDROLOGY MANUAL
        AND IGNORE OTHER CONFLUENCE COMBINATIONS FOR DOWNSTREAM ANALYSES
  *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     12.0    0.015/0.050/0.020   0.50    2.00 0.0313 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.50 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  8.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

******************************************************************************
  FLOW PROCESS FROM NODE     20.10 TO NODE     20.20 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS MOBILE HOME PARK
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   835.40
  UPSTREAM ELEVATION(FEET) =   2335.00
  DOWNSTREAM ELEVATION(FEET) =   2304.00
  ELEVATION DIFFERENCE(FEET) =     31.00
  TC = 0.336*[(  835.40**3)/(    31.00)]**.2 =    9.574
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.933
  MOBILE HOME PARK DEVELOPMENT RUNOFF COEFFICIENT = .8058
  SOIL CLASSIFICATION IS "A"
  SUBAREA RUNOFF(CFS) =     14.26
  TOTAL AREA(ACRES) =      4.50   TOTAL RUNOFF(CFS) =     14.26

******************************************************************************
  FLOW PROCESS FROM NODE     20.20 TO NODE     20.30 IS CODE =  52
------------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   2304.00  DOWNSTREAM(FEET) =   2290.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   411.20   CHANNEL SLOPE =  0.0340
  CHANNEL FLOW THRU SUBAREA(CFS) =      14.26
  FLOW VELOCITY(FEET/SEC) =   5.05 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.36   Tc(MIN.) =   10.93
  LONGEST FLOWPATH FROM NODE     20.10 TO NODE     20.30 =    1246.60 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE     20.20 TO NODE     20.30 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.715
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .5106
  SOIL CLASSIFICATION IS "A"
  SUBAREA AREA(ACRES) =    5.10   SUBAREA RUNOFF(CFS) =    9.67
  TOTAL AREA(ACRES) =        9.6   TOTAL RUNOFF(CFS) =      23.93
  TC(MIN.) =   10.93

******************************************************************************
  FLOW PROCESS FROM NODE     20.30 TO NODE     20.40 IS CODE =  52
------------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   2290.00  DOWNSTREAM(FEET) =   2272.10
  CHANNEL LENGTH THRU SUBAREA(FEET) =   388.20   CHANNEL SLOPE =  0.0461
  CHANNEL FLOW THRU SUBAREA(CFS) =      23.93
  FLOW VELOCITY(FEET/SEC) =   6.76 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.96   Tc(MIN.) =   11.89
  LONGEST FLOWPATH FROM NODE     20.10 TO NODE     20.40 =    1634.80 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE     20.30 TO NODE     20.40 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.582
  MOBILE HOME PARK DEVELOPMENT RUNOFF COEFFICIENT = .8006
  SOIL CLASSIFICATION IS "A"
  SUBAREA AREA(ACRES) =   11.50   SUBAREA RUNOFF(CFS) =   32.98
  TOTAL AREA(ACRES) =       21.1   TOTAL RUNOFF(CFS) =      56.92
  TC(MIN.) =   11.89

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

```
 FLOW PROCESS FROM NODE     20.40 TO NODE     20.50 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  2272.10  DOWNSTREAM(FEET) =  2257.30
 FLOW LENGTH(FEET) =   280.90   MANNING'S N =  0.013
 DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  19.45
 ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      56.92
 PIPE TRAVEL TIME(MIN.) =   0.24    Tc(MIN.) =   12.13
 LONGEST FLOWPATH FROM NODE     20.10 TO NODE     20.50 =    1915.70 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     20.50 TO NODE     20.50 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.) =   12.13
 RAINFALL INTENSITY(INCH/HR) =   3.55
 TOTAL STREAM AREA(ACRES) =    21.10
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     56.92

****************************************************************************
 FLOW PROCESS FROM NODE     21.21 TO NODE     21.52 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
        ASSUMED INITIAL SUBAREA UNIFORM
        DEVELOPMENT IS: UNDEVELOPED WITH FAIR COVER
 TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   598.80
 UPSTREAM ELEVATION(FEET) =   2293.70
 DOWNSTREAM ELEVATION(FEET) =   2277.00
 ELEVATION DIFFERENCE(FEET) =     16.70
 TC = 0.709*[(  598.80**3)/(    16.70)]**.2 =   18.738
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.943
 UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .4585
 SOIL CLASSIFICATION IS "A"
 SUBAREA RUNOFF(CFS) =      2.16
 TOTAL AREA(ACRES) =      1.60   TOTAL RUNOFF(CFS) =      2.16

****************************************************************************
 FLOW PROCESS FROM NODE     21.52 TO NODE     20.50 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  2277.00  DOWNSTREAM(FEET) =  2257.30
 FLOW LENGTH(FEET) =   413.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.01
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       2.16
 PIPE TRAVEL TIME(MIN.) =   0.86    Tc(MIN.) =   19.60
 LONGEST FLOWPATH FROM NODE     21.21 TO NODE     20.50 =    1011.80 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     21.51 TO NODE     20.50 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.) =   19.60
 RAINFALL INTENSITY(INCH/HR) =   2.89
 TOTAL STREAM AREA(ACRES) =     1.60
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.16

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1       56.92    12.13        3.551         21.10
     2        2.16    19.60        2.886          1.60

 ********************************WARNING*********************************
 IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
 ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
 WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ************************************************************************

 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       58.25    12.13        3.551
     2       48.42    19.60        2.886

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      58.25   Tc(MIN.) =   12.13
 TOTAL AREA(ACRES) =       22.7
 LONGEST FLOWPATH FROM NODE     20.10 TO NODE     20.50 =    1915.70 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     20.50 TO NODE     20.60 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  2257.30  DOWNSTREAM(FEET) =  2252.00
 FLOW LENGTH(FEET) =   370.20   MANNING'S N =  0.013
 DEPTH OF FLOW IN  33.0 INCH PIPE IS  25.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  11.81
 ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      58.25
 PIPE TRAVEL TIME(MIN.) =   0.52    Tc(MIN.) =   12.65
 LONGEST FLOWPATH FROM NODE     20.10 TO NODE     20.60 =    2285.90 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     20.50 TO NODE     20.60 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.487
 UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .4966
 SOIL CLASSIFICATION IS "A"
 SUBAREA AREA(ACRES) =    4.70   SUBAREA RUNOFF(CFS) =    8.14
 TOTAL AREA(ACRES) =       27.4   TOTAL RUNOFF(CFS) =      66.39
 TC(MIN.) =   12.65
```

Property Boundary

```
****************************************************************************
  FLOW PROCESS FROM NODE     20.60 TO NODE     20.70 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   2252.00  DOWNSTREAM(FEET) =   2230.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   957.60   CHANNEL SLOPE =  0.0230
  CHANNEL FLOW THRU SUBAREA(CFS) =      66.39
  FLOW VELOCITY(FEET/SEC) =   6.37 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   2.51   Tc(MIN.) =   15.16
  LONGEST FLOWPATH FROM NODE     20.10 TO NODE     20.70 =    3243.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     20.60 TO NODE     20.70 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.225
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .4791
  SOIL CLASSIFICATION IS "A"
  SUBAREA AREA(ACRES) =   24.70   SUBAREA RUNOFF(CFS) =   38.17
  TOTAL AREA(ACRES) =       52.1   TOTAL RUNOFF(CFS) =     104.56
  TC(MIN.) =   15.16
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       52.1  TC(MIN.) =     15.16
  PEAK FLOW RATE(CFS)   =     104.56
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

Rational Method Post-Project


102.1
EL=2464
A6
2.5 AC
L=764.3
INITIAL
101.01
EL=2516
102.2
EL=2436
DRAINAGE AREA A
POST-PROJECT
A1
5.5 AC
L=997.5
INITIAL
A7
3 AC
L=690.6
STREETFLOW
101.02
EL=2484
102.3
EL=2412
A2
7.3 AC
L=331.4
STREETFLOW
A8
4.9 AC
L=327.7
STREETFLOW
101.03
EL=2476
102.4
EL=2404
A3
11.8 AC
L=736.9
STREETFLOW
A9
5.1 AC
L=339.7
STREETFLOW
101.04
EL=2452
102.5
EL=2400
A4
17 AC
L=1260.3
STREETFLOW
A10
7.3 AC
L=467.1
STREETFLOW
FLOW SPLIT #2 HOFFER STREET
AREA PRORATED Qcap/QTotal
AREA = 52.9 ac
Tc=18.94 min
Q = 21.0 cfs
101.05
EL=2412
GILMAN STREET FLOW SPLIT
102.6
EL=2392
103.1
EL=2336
104.01
EL=2333
AREA PRORATED Qcap/QTotal
AREA = 11.5 ac
Tc=18.94 min
Q = 23.0 cfs
AREA PRORATED Qcap/QTotal
AREA = 30.1 ac
Tc=18.94 min
Q = 60.47 cfs
A5
20 AC
L=1794.9
STREETFLOW
L=1108.8
STREETFLOW
A13
1.0 AC
L=494.2
INITIAL
A19
5.8 AC
L=670.0
INITIAL
101.06
EL=2360
103.2
EL=2313
104.02
EL=2264
A11
54.0 AC
L=1696.7
OPEN CHANNEL
L=767.5
PIPE/BOX
A20
7.0 AC
L=345
PIPE/BOX
101.07
EL=2290
104.03
EL=2262.6
A14
2.0 AC
L=364.8
PIPE/BOX
A21
10.7 AC
L=938
PIPE/BOX
101.08
EL=2275
104.04
EL=2258.9
A15
1.6 AC
A12
27.6 AC
L=893.9
PIPE/BOX
A22
9.8 AC
L=289
PIPE/BOX
101.09
EL=2250
104.05
EL=2254.0
L=269.1
PIPE/BOX
L=518
PIPE/BOX
101.10
EL=2240.6
A17
0.7 AC
A18
0.7 AC
L=280.1
PIPE/BOX
101.11
EL=2238
PROJECT OUTLET
TOTAL AREA=205.3

```
______________________________________________________________________
**********************************************************************
           RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                     (RCFC&WCD)  1978 HYDROLOGY MANUAL
         (c) Copyright 1982-2016 Advanced Engineering Software (aes)
                     (Rational Tabling Version 23.0)
                Release Date: 07/01/2016  License ID 1535

                        Analysis prepared by:

                               Stantec




 ************************ DESCRIPTION OF STUDY ************************
* First Industrial - Banning, CA                                      *
* POST PROJECT AREA A 100 YR                                          *
* 2042611700 NEF 09-28-2022                                           *
 **********************************************************************

  FILE NAME: PA100YR.DAT
  TIME/DATE OF STUDY: 18:43 09/28/2022
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.130
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.978
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  3.860
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.780
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.4344152
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.4320075
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =  100.00   1-HOUR INTENSITY(INCH/HOUR) =   1.780
  SLOPE OF INTENSITY DURATION CURVE = 0.4320
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: COMPUTE CONFLUENCE VALUES ACCORDING TO RCFC&WCD HYDROLOGY MANUAL
        AND IGNORE OTHER CONFLUENCE COMBINATIONS FOR DOWNSTREAM ANALYSES
  *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     12.0    0.015/0.050/0.020   0.50    2.00 0.0313 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.50 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  8.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

**********************************************************************
  FLOW PROCESS FROM NODE    101.01 TO NODE    101.02 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
        ASSUMED INITIAL SUBAREA UNIFORM
        DEVELOPMENT IS SINGLE FAMILY(1/2 ACRE)
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   997.50
  UPSTREAM ELEVATION(FEET) =   2516.00
  DOWNSTREAM ELEVATION(FEET) =   2484.00
  ELEVATION DIFFERENCE(FEET) =     32.00
  TC = 0.422*[(  997.50**3)/(    32.00)]**.2 =   13.296
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.413
  SINGLE-FAMILY(1/2 ACRE LOT) RUNOFF COEFFICIENT = .6551
  SOIL CLASSIFICATION IS "A"
  SUBAREA RUNOFF(CFS) =     12.30
  TOTAL AREA(ACRES) =      5.50   TOTAL RUNOFF(CFS) =     12.30

**********************************************************************
  FLOW PROCESS FROM NODE    101.02 TO NODE    101.03 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 2484.00  DOWNSTREAM ELEVATION(FEET) = 2476.00
  STREET LENGTH(FEET) =   331.40   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  12.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.015
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.050

  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 =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      18.17
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.58
    HALFSTREET FLOOD WIDTH(FEET) =   14.73
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.97
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    3.48
  STREET FLOW TRAVEL TIME(MIN.) =   0.92   Tc(MIN.) =   14.22
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.315
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .4853
  SOIL CLASSIFICATION IS "A"
  SUBAREA AREA(ACRES) =    7.30      SUBAREA RUNOFF(CFS) =   11.74
  TOTAL AREA(ACRES) =       12.8        PEAK FLOW RATE(CFS) =      24.04

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.64   HALFSTREET FLOOD WIDTH(FEET) =  18.34
  FLOW VELOCITY(FEET/SEC.) =  6.17   DEPTH*VELOCITY(FT*FT/SEC.) =   3.92
  *NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
         AND L =  331.4 FT WITH ELEVATION-DROP =   8.0 FT, IS   13.5 CFS,
         WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE    101.03
  LONGEST FLOWPATH FROM NODE    101.01 TO NODE    101.03 =    1328.90 FEET.

**********************************************************************
  FLOW PROCESS FROM NODE    101.03 TO NODE    101.04 IS CODE =  62
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
==============================================================================
  UPSTREAM ELEVATION(FEET) = 2476.00  DOWNSTREAM ELEVATION(FEET) = 2452.00
  STREET LENGTH(FEET) =   736.90   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  12.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.015
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.050

  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 =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      36.85
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.69
    HALFSTREET FLOOD WIDTH(FEET) =   22.16
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    7.37
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    5.08
  STREET FLOW TRAVEL TIME(MIN.) =   1.67   Tc(MIN.) =   15.89
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.160
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .6873
  SOIL CLASSIFICATION IS "A"
  SUBAREA AREA(ACRES) =   11.80      SUBAREA RUNOFF(CFS) =   25.63
  TOTAL AREA(ACRES) =       24.6        PEAK FLOW RATE(CFS) =      49.67

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.75   HALFSTREET FLOOD WIDTH(FEET) =  26.43
  FLOW VELOCITY(FEET/SEC.) =  7.66   DEPTH*VELOCITY(FT*FT/SEC.) =   5.75
  *NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
         AND L =  736.9 FT WITH ELEVATION-DROP =  24.0 FT, IS   30.9 CFS,
         WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE    101.04
  LONGEST FLOWPATH FROM NODE    101.01 TO NODE    101.04 =    2065.80 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    101.04 TO NODE    101.05 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   2452.00  DOWNSTREAM(FEET) =   2412.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1260.30   CHANNEL SLOPE =  0.0317
  CHANNEL FLOW THRU SUBAREA(CFS) =      49.67
  FLOW VELOCITY(FEET/SEC) =   6.88 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   3.05   Tc(MIN.) =   18.94
  LONGEST FLOWPATH FROM NODE    101.01 TO NODE    101.05 =    3326.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    101.04 TO NODE    101.05 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.929
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .6787
  SOIL CLASSIFICATION IS "A"
  SUBAREA AREA(ACRES) =   17.00   SUBAREA RUNOFF(CFS) =   33.80
  TOTAL AREA(ACRES) =       41.6   TOTAL RUNOFF(CFS) =      83.47
  TC(MIN.) =   18.94

****************************************************************************
  FLOW PROCESS FROM NODE    101.05 TO NODE    101.05 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
==============================================================================

+----------------------------------------------------------------------------+
| The street crown capacity is exceeded. Flow is split to downstream         |
| Node 101.06 (east) and 102.6 (south)                                       |
|                                                                            |
+----------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE    101.05 TO NODE    101.05 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
==============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  18.94   RAIN INTENSITY(INCH/HOUR) =  2.93
  TOTAL AREA(ACRES) =    11.50   TOTAL RUNOFF(CFS) =     23.00

****************************************************************************
  FLOW PROCESS FROM NODE    101.05 TO NODE    101.06 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
==============================================================================
  UPSTREAM ELEVATION(FEET) = 2412.00  DOWNSTREAM ELEVATION(FEET) = 2360.00
  STREET LENGTH(FEET) =  1794.90   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  12.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.015
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.050

  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 =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      37.13
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.57
    HALFSTREET FLOOD WIDTH(FEET) =   13.74
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    6.53
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    3.72
  STREET FLOW TRAVEL TIME(MIN.) =   4.58   Tc(MIN.) =   23.52
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.668
  SINGLE-FAMILY(1-ACRE LOT) RUNOFF COEFFICIENT = .5292
  SOIL CLASSIFICATION IS "A"
  SUBAREA AREA(ACRES) =   20.00      SUBAREA RUNOFF(CFS) =   28.23
  TOTAL AREA(ACRES) =       31.5        PEAK FLOW RATE(CFS) =      51.23

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.63   HALFSTREET FLOOD WIDTH(FEET) =  18.01
  FLOW VELOCITY(FEET/SEC.) =  6.72   DEPTH*VELOCITY(FT*FT/SEC.) =   4.24
```

```
  *NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
         AND L = 1794.9 FT WITH ELEVATION-DROP =  52.0 FT, IS   31.8 CFS,
         WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE    101.06
  LONGEST FLOWPATH FROM NODE    101.01 TO NODE    101.06 =    5121.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    101.06 TO NODE    101.06 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    102.10 TO NODE    102.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS SINGLE FAMILY (1/4 ACRE)
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   764.30
  UPSTREAM ELEVATION(FEET) =   2464.00
  DOWNSTREAM ELEVATION(FEET) =   2436.00
  ELEVATION DIFFERENCE(FEET) =     28.00
  TC = 0.393*[(  764.30**3)/(    28.00)]**.2 =   10.826
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.730
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .7057
  SOIL CLASSIFICATION IS "A"
  SUBAREA RUNOFF(CFS) =      6.58
  TOTAL AREA(ACRES) =      2.50   TOTAL RUNOFF(CFS) =      6.58

****************************************************************************
  FLOW PROCESS FROM NODE    102.20 TO NODE    102.30 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 2436.00  DOWNSTREAM ELEVATION(FEET) = 2412.00
  STREET LENGTH(FEET) =   690.60   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  12.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.015
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.050

  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 =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      10.23
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.45
    HALFSTREET FLOOD WIDTH(FEET) =    7.89
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    6.22
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.81
  STREET FLOW TRAVEL TIME(MIN.) =   1.85   Tc(MIN.) =   12.68
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.484
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .6982
  SOIL CLASSIFICATION IS "A"
  SUBAREA AREA(ACRES) =    3.00      SUBAREA RUNOFF(CFS) =    7.30
  TOTAL AREA(ACRES) =        5.5        PEAK FLOW RATE(CFS) =      13.88

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.50   HALFSTREET FLOOD WIDTH(FEET) =   8.93
  FLOW VELOCITY(FEET/SEC.) =  6.73   DEPTH*VELOCITY(FT*FT/SEC.) =   3.37
  LONGEST FLOWPATH FROM NODE    102.10 TO NODE    102.30 =    1454.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.30 TO NODE    102.40 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 2412.00  DOWNSTREAM ELEVATION(FEET) = 2404.00
  STREET LENGTH(FEET) =   327.70   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  12.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.015
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.050

  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 =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      19.64
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.60
    HALFSTREET FLOOD WIDTH(FEET) =   15.60
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    6.07
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    3.62
  STREET FLOW TRAVEL TIME(MIN.) =   0.90   Tc(MIN.) =   13.57
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.383
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .6949
  SOIL CLASSIFICATION IS "A"
  SUBAREA AREA(ACRES) =    4.90      SUBAREA RUNOFF(CFS) =   11.52
  TOTAL AREA(ACRES) =       10.4        PEAK FLOW RATE(CFS) =      25.40

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.64   HALFSTREET FLOOD WIDTH(FEET) =  18.99
  FLOW VELOCITY(FEET/SEC.) =  6.24   DEPTH*VELOCITY(FT*FT/SEC.) =   4.02
  *NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
         AND L =  327.7 FT WITH ELEVATION-DROP =   8.0 FT, IS   14.7 CFS,
         WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE    102.40
  LONGEST FLOWPATH FROM NODE    102.10 TO NODE    102.40 =    1782.60 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.40 TO NODE    102.50 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 2404.00  DOWNSTREAM ELEVATION(FEET) = 2400.00
  STREET LENGTH(FEET) =   339.70   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  12.00
```

```
  INSIDE STREET CROSSFALL(DECIMAL) =  0.015
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.050

  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 =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      29.40
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.75
    HALFSTREET FLOOD WIDTH(FEET) =   26.10
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.62
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    3.45
  STREET FLOW TRAVEL TIME(MIN.) =   1.22   Tc(MIN.) =   14.80
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.259
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .4814
  SOIL CLASSIFICATION IS "A"
  SUBAREA AREA(ACRES) =    5.10      SUBAREA RUNOFF(CFS) =    8.00
  TOTAL AREA(ACRES) =       15.5        PEAK FLOW RATE(CFS) =      33.40

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.77   HALFSTREET FLOOD WIDTH(FEET) =  28.07
  FLOW VELOCITY(FEET/SEC.) =  4.69   DEPTH*VELOCITY(FT*FT/SEC.) =   3.63
  *NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
         AND L =  339.7 FT WITH ELEVATION-DROP =   4.0 FT, IS    8.5 CFS,
         WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE    102.50
  LONGEST FLOWPATH FROM NODE    102.10 TO NODE    102.50 =    2122.30 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.50 TO NODE    102.60 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 2400.00  DOWNSTREAM ELEVATION(FEET) = 2392.00
  STREET LENGTH(FEET) =   467.10   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  12.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.015
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.050

  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 =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      39.79
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.77
    HALFSTREET FLOOD WIDTH(FEET) =   27.85
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.66
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    4.36
  STREET FLOW TRAVEL TIME(MIN.) =   1.38   Tc(MIN.) =   16.18
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.136
  SINGLE-FAMILY(1-ACRE LOT) RUNOFF COEFFICIENT = .5582
  SOIL CLASSIFICATION IS "A"
  SUBAREA AREA(ACRES) =    7.30      SUBAREA RUNOFF(CFS) =   12.78
  TOTAL AREA(ACRES) =       22.8        PEAK FLOW RATE(CFS) =      46.18

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.80   HALFSTREET FLOOD WIDTH(FEET) =  30.15
  FLOW VELOCITY(FEET/SEC.) =  5.78   DEPTH*VELOCITY(FT*FT/SEC.) =   4.65
  *NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
         AND L =  467.1 FT WITH ELEVATION-DROP =   8.0 FT, IS   14.9 CFS,
         WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE    102.60
  LONGEST FLOWPATH FROM NODE    102.10 TO NODE    102.60 =    2589.40 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.10 TO NODE    102.60 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

+--------------------------------------------------------------------------+
| Addition of split flow from Gilman Street via Cherry Street              |
| Upstream Split is from Node 101.05                                       |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE    101.05 TO NODE    102.60 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  18.94   RAIN INTENSITY(INCH/HOUR) =  2.93
  TOTAL AREA(ACRES) =    30.10   TOTAL RUNOFF(CFS) =     60.47

****************************************************************************
  FLOW PROCESS FROM NODE    102.60 TO NODE    102.60 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       60.47    18.94       2.929       30.10
  LONGEST FLOWPATH FROM NODE    102.10 TO NODE    102.60 =    2589.40 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       46.18    16.18       3.136       22.80
  LONGEST FLOWPATH FROM NODE    102.10 TO NODE    102.60 =    2589.40 FEET.

 ********************************WARNING*********************************
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ************************************************************************

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      97.82      16.18        3.136
```

```
      2     103.60      18.94        2.929

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     103.60   Tc(MIN.) =   18.94
  TOTAL AREA(ACRES) =       52.9

****************************************************************************
  FLOW PROCESS FROM NODE    102.60 TO NODE    102.60 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

+--------------------------------------------------------------------------+
| Split Flow #2: The street crown capacity is exceeded.                    |
| Flow is split to downstream node 101.06 (east) and all flow exceeding    |
| crown flows out of the system, to exterior catchment area                |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE    102.60 TO NODE    102.60 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  18.94   RAIN INTENSITY(INCH/HOUR) =  2.93
  TOTAL AREA(ACRES) =    52.90   TOTAL RUNOFF(CFS) =     21.00

****************************************************************************
  FLOW PROCESS FROM NODE    102.60 TO NODE    101.06 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 2392.00  DOWNSTREAM ELEVATION(FEET) = 2360.00
  STREET LENGTH(FEET) =  1108.80   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  12.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.015
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.050

  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 =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      21.01
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.59
    HALFSTREET FLOOD WIDTH(FEET) =   15.38
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    6.60
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    3.91
  STREET FLOW TRAVEL TIME(MIN.) =   2.80   Tc(MIN.) =   21.74
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.760
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .4441
  SOIL CLASSIFICATION IS "A"
  SUBAREA AREA(ACRES) =    0.01      SUBAREA RUNOFF(CFS) =    0.01
  TOTAL AREA(ACRES) =       52.9        PEAK FLOW RATE(CFS) =      21.01

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.59   HALFSTREET FLOOD WIDTH(FEET) =  15.38
  FLOW VELOCITY(FEET/SEC.) =  6.60   DEPTH*VELOCITY(FT*FT/SEC.) =   3.91
  LONGEST FLOWPATH FROM NODE    102.10 TO NODE    101.06 =    3698.20 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.10 TO NODE    101.06 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       21.01    21.74       2.760       52.91
  LONGEST FLOWPATH FROM NODE    102.10 TO NODE    101.06 =    3698.20 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       51.23    23.52       2.668       31.50
  LONGEST FLOWPATH FROM NODE    101.01 TO NODE    101.06 =    5121.00 FEET.

 ****************************WARNING*****************************
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ****************************************************************

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      68.37      21.74        2.760
      2      71.54      23.52        2.668

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      71.54   Tc(MIN.) =   23.52
  TOTAL AREA(ACRES) =       84.4

****************************************************************************
  FLOW PROCESS FROM NODE    101.06 TO NODE    101.07 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   2360.00  DOWNSTREAM(FEET) =   2290.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1696.70   CHANNEL SLOPE =  0.0413
  CHANNEL FLOW THRU SUBAREA(CFS) =      71.54
  FLOW VELOCITY(FEET/SEC) =   8.73 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   3.24   Tc(MIN.) =   26.76
  LONGEST FLOWPATH FROM NODE    101.01 TO NODE    101.07 =    6817.70 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    101.06 TO NODE    101.07 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.523
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .4239
```

```
  SOIL CLASSIFICATION IS "A"
  SUBAREA AREA(ACRES) =   54.00   SUBAREA RUNOFF(CFS) =   57.75
  TOTAL AREA(ACRES) =      138.4   TOTAL RUNOFF(CFS) =     129.30
  TC(MIN.) =   26.76

****************************************************************************
  FLOW PROCESS FROM NODE    101.07 TO NODE    101.07 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.) =   26.76
  RAINFALL INTENSITY(INCH/HR) =   2.52
  TOTAL STREAM AREA(ACRES) =   138.41
  PEAK FLOW RATE(CFS) AT CONFLUENCE =    129.30

****************************************************************************
  FLOW PROCESS FROM NODE    103.10 TO NODE    103.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   494.21
  UPSTREAM ELEVATION(FEET) =   2336.00
  DOWNSTREAM ELEVATION(FEET) =   2313.00
  ELEVATION DIFFERENCE(FEET) =     23.00
  TC = 0.303*[(  494.21**3)/(    23.00)]**.2 =    6.692
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.591
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8657
  SOIL CLASSIFICATION IS "A"
  SUBAREA RUNOFF(CFS) =      3.97
  TOTAL AREA(ACRES) =      1.00   TOTAL RUNOFF(CFS) =      3.97

****************************************************************************
  FLOW PROCESS FROM NODE    103.20 TO NODE    101.07 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  2313.00  DOWNSTREAM(FEET) =  2290.00
  FLOW LENGTH(FEET) =   767.50   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.09
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.97
  PIPE TRAVEL TIME(MIN.) =   1.58    Tc(MIN.) =    8.27
  LONGEST FLOWPATH FROM NODE    103.10 TO NODE    101.07 =    1261.71 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    103.10 TO NODE    101.07 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.) =    8.27
  RAINFALL INTENSITY(INCH/HR) =   4.19
  TOTAL STREAM AREA(ACRES) =     1.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.97

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1      129.30    26.76        2.523        138.41
      2        3.97     8.27        4.189          1.00

 ********************************WARNING*************************************
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ****************************************************************************

  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       43.95     8.27       4.189
      2      131.69    26.76       2.523

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     131.69   Tc(MIN.) =   26.76
  TOTAL AREA(ACRES) =      139.4
  LONGEST FLOWPATH FROM NODE    101.01 TO NODE    101.07 =    6817.70 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    101.07 TO NODE    101.08 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  2290.00  DOWNSTREAM(FEET) =  2275.00
  FLOW LENGTH(FEET) =   364.80   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  29.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  21.26
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     131.69
  PIPE TRAVEL TIME(MIN.) =   0.29    Tc(MIN.) =   27.05
  LONGEST FLOWPATH FROM NODE    101.01 TO NODE    101.08 =    7182.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    101.07 TO NODE    101.08 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.511
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8523
  SOIL CLASSIFICATION IS "A"
  SUBAREA AREA(ACRES) =    2.00   SUBAREA RUNOFF(CFS) =    4.28
  TOTAL AREA(ACRES) =      141.4   TOTAL RUNOFF(CFS) =     135.97
  TC(MIN.) =   27.05
```

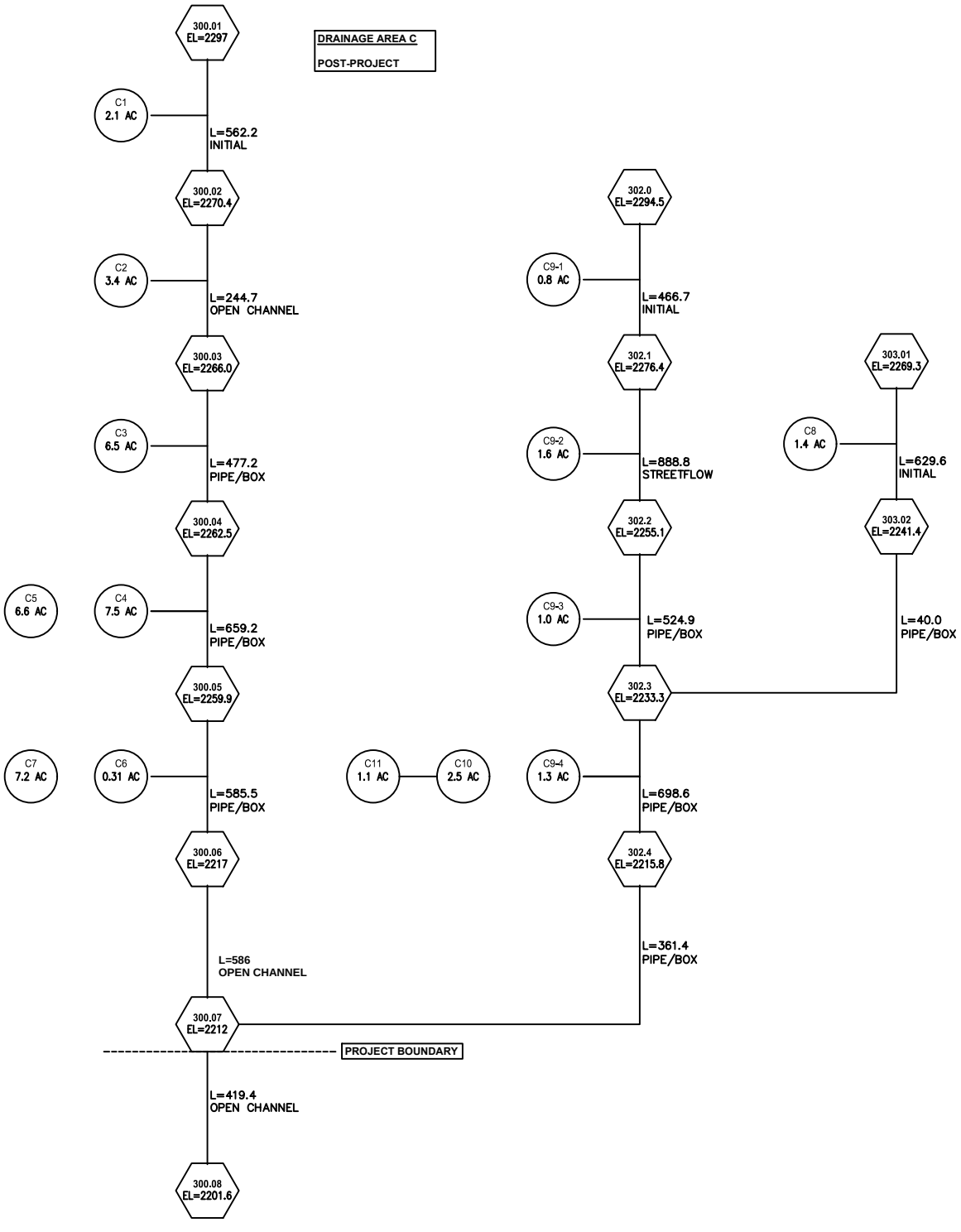
```
****************************************************************************
  FLOW PROCESS FROM NODE    101.08 TO NODE    101.09 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  2275.00  DOWNSTREAM(FEET) =  2250.00
  FLOW LENGTH(FEET) =   893.90   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  29.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.06
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     135.97
  PIPE TRAVEL TIME(MIN.) =   0.78    Tc(MIN.) =   27.83
  LONGEST FLOWPATH FROM NODE    101.01 TO NODE    101.09 =    8076.40 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    101.08 TO NODE    101.09 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.481
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8520
  SOIL CLASSIFICATION IS "A"
  SUBAREA AREA(ACRES) =    1.60   SUBAREA RUNOFF(CFS) =    3.38
  TOTAL AREA(ACRES) =      143.0   TOTAL RUNOFF(CFS) =     139.35
  TC(MIN.) =   27.83

****************************************************************************
  FLOW PROCESS FROM NODE    101.08 TO NODE    101.09 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.481
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .4201
  SOIL CLASSIFICATION IS "A"
  SUBAREA AREA(ACRES) =   27.60   SUBAREA RUNOFF(CFS) =   28.76
  TOTAL AREA(ACRES) =      170.6   TOTAL RUNOFF(CFS) =     168.12
  TC(MIN.) =   27.83

****************************************************************************
  FLOW PROCESS FROM NODE    101.09 TO NODE    101.10 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  2250.00  DOWNSTREAM(FEET) =  2240.60
  FLOW LENGTH(FEET) =   269.10   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  31.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  21.61
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     168.12
  PIPE TRAVEL TIME(MIN.) =   0.21    Tc(MIN.) =   28.04
  LONGEST FLOWPATH FROM NODE    101.01 TO NODE    101.10 =    8345.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    101.10 TO NODE    101.10 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.) =   28.04
  RAINFALL INTENSITY(INCH/HR) =   2.47
  TOTAL STREAM AREA(ACRES) =   170.61
  PEAK FLOW RATE(CFS) AT CONFLUENCE =    168.12

****************************************************************************
  FLOW PROCESS FROM NODE    104.01 TO NODE    104.02 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   670.00
  UPSTREAM ELEVATION(FEET) =   2333.00
  DOWNSTREAM ELEVATION(FEET) =   2264.00
  ELEVATION DIFFERENCE(FEET) =     69.00
  TC = 0.303*[(  670.00**3)/(    69.00)]**.2 =    6.449
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.666
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8660
  SOIL CLASSIFICATION IS "A"
  SUBAREA RUNOFF(CFS) =     23.43
  TOTAL AREA(ACRES) =      5.80   TOTAL RUNOFF(CFS) =     23.43

****************************************************************************
  FLOW PROCESS FROM NODE    104.02 TO NODE    104.03 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  2264.00  DOWNSTREAM(FEET) =  2262.60
  FLOW LENGTH(FEET) =   345.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  22.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.89
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      23.43
  PIPE TRAVEL TIME(MIN.) =   0.98    Tc(MIN.) =    7.43
  LONGEST FLOWPATH FROM NODE    104.01 TO NODE    104.03 =    1015.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    104.02 TO NODE    104.03 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.390
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8647
  SOIL CLASSIFICATION IS "A"
  SUBAREA AREA(ACRES) =    7.00   SUBAREA RUNOFF(CFS) =   26.57
  TOTAL AREA(ACRES) =       12.8   TOTAL RUNOFF(CFS) =      50.00
  TC(MIN.) =    7.43

****************************************************************************
  FLOW PROCESS FROM NODE    104.03 TO NODE    104.04 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
```

```
 ELEVATION DATA: UPSTREAM(FEET) =  2262.60  DOWNSTREAM(FEET) =  2258.90
 FLOW LENGTH(FEET) =   938.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  39.0 INCH PIPE IS  31.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.95
 ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      50.00
 PIPE TRAVEL TIME(MIN.) =   2.25    Tc(MIN.) =    9.68
 LONGEST FLOWPATH FROM NODE    104.01 TO NODE    104.04 =    1953.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    104.03 TO NODE    104.04 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.915
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8622
 SOIL CLASSIFICATION IS "A"
 SUBAREA AREA(ACRES) =   10.70   SUBAREA RUNOFF(CFS) =   36.12
 TOTAL AREA(ACRES) =       23.5   TOTAL RUNOFF(CFS) =      86.13
 TC(MIN.) =    9.68

****************************************************************************
 FLOW PROCESS FROM NODE    104.04 TO NODE    104.05 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  2258.90  DOWNSTREAM(FEET) =  2254.00
 FLOW LENGTH(FEET) =   289.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  39.0 INCH PIPE IS  26.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  14.10
 ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      86.13
 PIPE TRAVEL TIME(MIN.) =   0.34    Tc(MIN.) =   10.02
 LONGEST FLOWPATH FROM NODE    104.01 TO NODE    104.05 =    2242.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    104.04 TO NODE    104.05 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.857
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8619
 SOIL CLASSIFICATION IS "A"
 SUBAREA AREA(ACRES) =    9.80   SUBAREA RUNOFF(CFS) =   32.58
 TOTAL AREA(ACRES) =       33.3   TOTAL RUNOFF(CFS) =     118.70
 TC(MIN.) =   10.02

****************************************************************************
 FLOW PROCESS FROM NODE    104.05 TO NODE    101.10 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  2254.00  DOWNSTREAM(FEET) =  2240.60
 FLOW LENGTH(FEET) =   518.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  39.0 INCH PIPE IS  29.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  17.70
 ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
```

peak run off at chambers

```
 PIPE-FLOW(CFS) =     118.70
 PIPE TRAVEL TIME(MIN.) =   0.49    Tc(MIN.) =   10.51
 LONGEST FLOWPATH FROM NODE    104.01 TO NODE    101.10 =    2760.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    104.01 TO NODE    101.10 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.) =   10.51
 RAINFALL INTENSITY(INCH/HR) =   3.78
 TOTAL STREAM AREA(ACRES) =    33.30
 PEAK FLOW RATE(CFS) AT CONFLUENCE =    118.70

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1      168.12    28.04        2.473        170.61
     2      118.70    10.51        3.779         33.30

 ********************************WARNING*********************************
 IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
 ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
 WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ************************************************************************

 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      181.70    10.51        3.779
     2      245.79    28.04        2.473

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     245.79   Tc(MIN.) =   28.04
 TOTAL AREA(ACRES) =      203.9
 LONGEST FLOWPATH FROM NODE    101.01 TO NODE    101.10 =    8345.50 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    101.10 TO NODE    101.11 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  2240.60  DOWNSTREAM(FEET) =  2238.00
 FLOW LENGTH(FEET) =   280.10   MANNING'S N =  0.013
 DEPTH OF FLOW IN  63.0 INCH PIPE IS  46.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  14.52
 ESTIMATED PIPE DIAMETER(INCH) =  63.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     245.79
 PIPE TRAVEL TIME(MIN.) =   0.32    Tc(MIN.) =   28.36
 LONGEST FLOWPATH FROM NODE    101.01 TO NODE    101.11 =    8625.60 FEET.

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

```
  FLOW PROCESS FROM NODE    101.10 TO NODE    101.11 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.461
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .4183
  SOIL CLASSIFICATION IS "A"
  SUBAREA AREA(ACRES) =    0.70   SUBAREA RUNOFF(CFS) =    0.72
  TOTAL AREA(ACRES) =      204.6   TOTAL RUNOFF(CFS) =     246.52
  TC(MIN.) =   28.36

****************************************************************************
  FLOW PROCESS FROM NODE    101.10 TO NODE    101.11 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.461
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8518
  SOIL CLASSIFICATION IS "A"
  SUBAREA AREA(ACRES) =    0.70   SUBAREA RUNOFF(CFS) =    1.47
  TOTAL AREA(ACRES) =      205.3   TOTAL RUNOFF(CFS) =     247.98
  TC(MIN.) =   28.36
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      205.3  TC(MIN.) =     28.36
  PEAK FLOW RATE(CFS)   =     247.98
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```


DRAINAGE AREA C
POST-PROJECT
300.01
EL=2297
C1
2.1 AC
L=562.2
INITIAL
300.02
EL=2270.4
C2
3.4 AC
L=244.7
OPEN CHANNEL
300.03
EL=2266.0
C3
6.5 AC
L=477.2
PIPE/BOX
300.04
EL=2262.5
C5
6.6 AC
C4
7.5 AC
L=659.2
PIPE/BOX
300.05
EL=2259.9
C7
7.2 AC
C6
0.31 AC
L=585.5
PIPE/BOX
300.06
EL=2217
L=586
OPEN CHANNEL
300.07
EL=2212
PROJECT BOUNDARY
L=419.4
OPEN CHANNEL
300.08
EL=2201.6
TOTAL AREA=47.0
C11
1.1 AC
C10
2.5 AC
302.0
EL=2294.5
C9-1
0.8 AC
L=466.7
INITIAL
302.1
EL=2276.4
C9-2
1.6 AC
L=888.8
STREETFLOW
302.2
EL=2255.1
C9-3
1.0 AC
L=524.9
PIPE/BOX
302.3
EL=2233.3
C9-4
1.3 AC
L=698.6
PIPE/BOX
302.4
EL=2215.8
L=361.4
PIPE/BOX
303.01
EL=2269.3
C8
1.4 AC
L=629.6
INITIAL
303.02
EL=2241.4
L=40.0
PIPE/BOX

```
************************************************************************
          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                    (RCFC&WCD)  1978 HYDROLOGY MANUAL
         (c) Copyright 1982-2016 Advanced Engineering Software (aes)
                    (Rational Tabling Version 23.0)
                Release Date: 07/01/2016  License ID 1535

                        Analysis prepared by:

                               Stantec



 ************************* DESCRIPTION OF STUDY *************************
* First Industrial - Banning, CA                                       *
* Post Project Area C 100YR                                            *
* 2042611700 NEF 09-28-2022                                            *
 ************************************************************************

  FILE NAME: PAC100YR.DAT
  TIME/DATE OF STUDY: 15:51 09/28/2022
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.130
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.978
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  3.860
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.780
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.4344152
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.4320075
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =  100.00   1-HOUR INTENSITY(INCH/HOUR) =   1.780
  SLOPE OF INTENSITY DURATION CURVE = 0.4320
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: COMPUTE CONFLUENCE VALUES ACCORDING TO RCFC&WCD HYDROLOGY MANUAL
        AND IGNORE OTHER CONFLUENCE COMBINATIONS FOR DOWNSTREAM ANALYSES
  *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     12.0    0.015/0.050/0.020   0.50    2.00 0.0313 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.50 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  8.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
    OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

************************************************************************
  FLOW PROCESS FROM NODE    300.01 TO NODE    300.02 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   562.20
  UPSTREAM ELEVATION(FEET) =   2297.00
  DOWNSTREAM ELEVATION(FEET) =   2270.40
  ELEVATION DIFFERENCE(FEET) =     26.60
  TC = 0.303*[(  562.20**3)/(    26.60)]**.2 =    7.023
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.497
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8652
  SOIL CLASSIFICATION IS "A"
  SUBAREA RUNOFF(CFS) =      8.17
  TOTAL AREA(ACRES) =      2.10   TOTAL RUNOFF(CFS) =      8.17

************************************************************************
  FLOW PROCESS FROM NODE    300.02 TO NODE    300.03 IS CODE =  52
------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   2270.40  DOWNSTREAM(FEET) =   2266.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   244.70   CHANNEL SLOPE =  0.0180
  CHANNEL FLOW THRU SUBAREA(CFS) =       8.17
  FLOW VELOCITY(FEET/SEC) =   3.19 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.28   Tc(MIN.) =    8.30
  LONGEST FLOWPATH FROM NODE    300.01 TO NODE    300.03 =     806.90 FEET.

************************************************************************
  FLOW PROCESS FROM NODE    300.02 TO NODE    300.03 IS CODE =  81
------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
========================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.183
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8637
  SOIL CLASSIFICATION IS "A"
  SUBAREA AREA(ACRES) =    3.40   SUBAREA RUNOFF(CFS) =   12.28
  TOTAL AREA(ACRES) =        5.5   TOTAL RUNOFF(CFS) =      20.45
  TC(MIN.) =    8.30

************************************************************************
  FLOW PROCESS FROM NODE    300.03 TO NODE    300.04 IS CODE =  31
------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  2266.00  DOWNSTREAM(FEET) =  2262.50
  FLOW LENGTH(FEET) =   477.20   MANNING'S N =  0.013
```

```
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.21
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      20.45
  PIPE TRAVEL TIME(MIN.) =   1.10    Tc(MIN.) =    9.41
  LONGEST FLOWPATH FROM NODE    300.01 TO NODE    300.04 =    1284.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    300.03 TO NODE    300.04 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.963
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8625
  SOIL CLASSIFICATION IS "A"
  SUBAREA AREA(ACRES) =    6.50   SUBAREA RUNOFF(CFS) =   22.22
  TOTAL AREA(ACRES) =       12.0   TOTAL RUNOFF(CFS) =      42.67
  TC(MIN.) =    9.41

****************************************************************************
  FLOW PROCESS FROM NODE    300.04 TO NODE    300.05 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  2262.50  DOWNSTREAM(FEET) =  2259.90
  FLOW LENGTH(FEET) =   659.20   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  27.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.83
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      42.67
  PIPE TRAVEL TIME(MIN.) =   1.61    Tc(MIN.) =   11.01
  LONGEST FLOWPATH FROM NODE    300.01 TO NODE    300.05 =    1943.30 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    300.04 TO NODE    300.05 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.702
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8610
  SOIL CLASSIFICATION IS "A"
  SUBAREA AREA(ACRES) =    7.50   SUBAREA RUNOFF(CFS) =   23.91
  TOTAL AREA(ACRES) =       19.5   TOTAL RUNOFF(CFS) =      66.58
  TC(MIN.) =   11.01

****************************************************************************
  FLOW PROCESS FROM NODE    300.04 TO NODE    300.05 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.702
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8610
  SOIL CLASSIFICATION IS "A"
  SUBAREA AREA(ACRES) =    6.60   SUBAREA RUNOFF(CFS) =   21.04
  TOTAL AREA(ACRES) =       26.1   TOTAL RUNOFF(CFS) =      87.61
  TC(MIN.) =   11.01

****************************************************************************
  FLOW PROCESS FROM NODE    300.05 TO NODE    300.06 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  2259.90  DOWNSTREAM(FEET) =  2217.00
  FLOW LENGTH(FEET) =   585.50   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  24.55
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      87.61
  PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =   11.41
  LONGEST FLOWPATH FROM NODE    300.01 TO NODE    300.06 =    2528.80 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    300.05 TO NODE    300.06 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.646
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8606
  SOIL CLASSIFICATION IS "A"
  SUBAREA AREA(ACRES) =    0.31   SUBAREA RUNOFF(CFS) =    0.97
  TOTAL AREA(ACRES) =       26.4   TOTAL RUNOFF(CFS) =      88.59
  TC(MIN.) =   11.41

****************************************************************************
  FLOW PROCESS FROM NODE    300.05 TO NODE    300.06 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.646
  MOBILE HOME PARK DEVELOPMENT RUNOFF COEFFICIENT = .8016
  SOIL CLASSIFICATION IS "A"
  SUBAREA AREA(ACRES) =    7.20   SUBAREA RUNOFF(CFS) =   21.04
  TOTAL AREA(ACRES) =       33.6   TOTAL RUNOFF(CFS) =     109.63
  TC(MIN.) =   11.41

****************************************************************************
  FLOW PROCESS FROM NODE    300.06 TO NODE    300.07 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   2217.00  DOWNSTREAM(FEET) =   2212.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   586.00   CHANNEL SLOPE =  0.0085
  CHANNEL FLOW THRU SUBAREA(CFS) =     109.63
  FLOW VELOCITY(FEET/SEC) =   4.51 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   2.17   Tc(MIN.) =   13.58
```

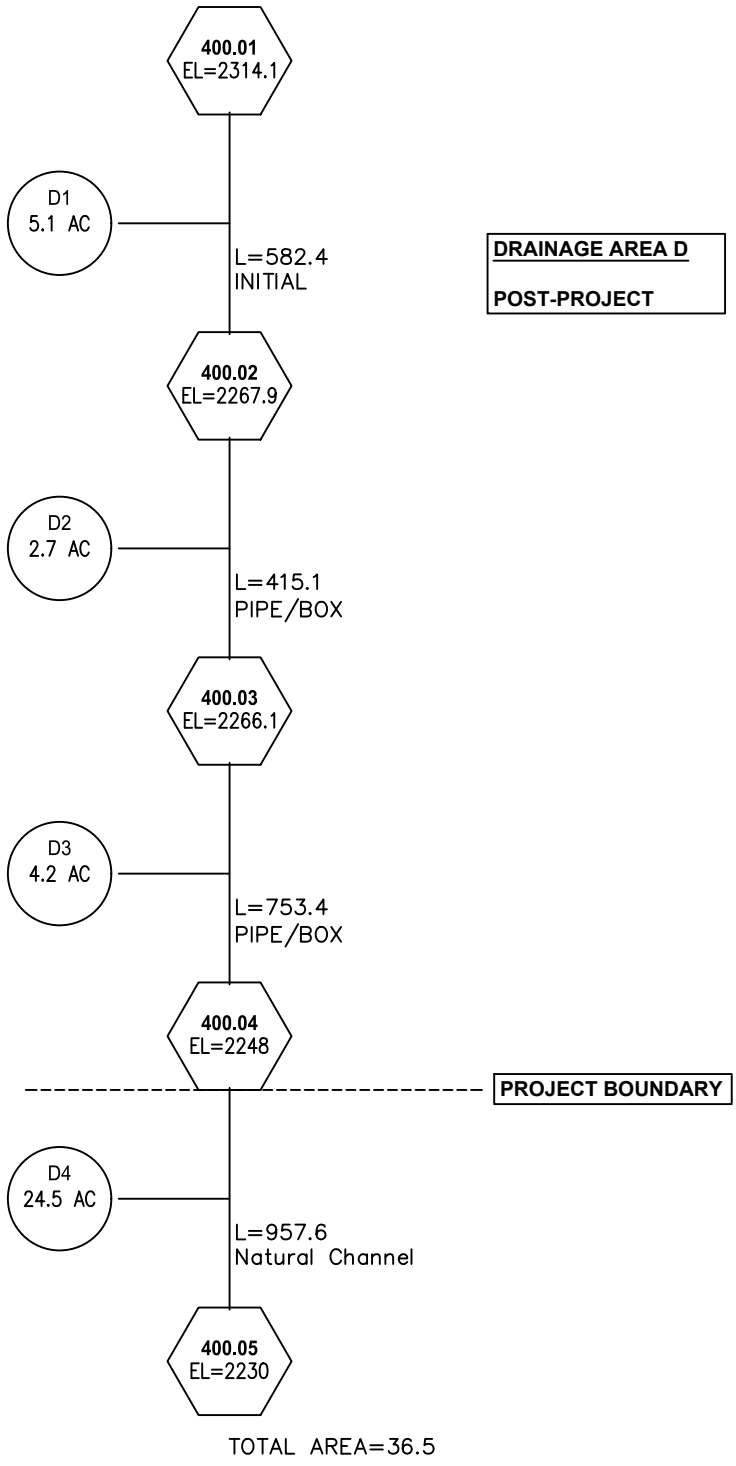
```
  LONGEST FLOWPATH FROM NODE    300.01 TO NODE    300.07 =    3114.80 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    300.07 TO NODE    300.07 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    302.00 TO NODE    302.10 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   466.70
  UPSTREAM ELEVATION(FEET) =   2294.50
  DOWNSTREAM ELEVATION(FEET) =   2276.40
  ELEVATION DIFFERENCE(FEET) =     18.10
  TC = 0.303*[(  466.70**3)/(    18.10)]**.2 =    6.784
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.564
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8655
  SOIL CLASSIFICATION IS "A"
  SUBAREA RUNOFF(CFS) =      3.16
  TOTAL AREA(ACRES) =      0.80   TOTAL RUNOFF(CFS) =      3.16

****************************************************************************
  FLOW PROCESS FROM NODE    302.10 TO NODE    302.20 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 2276.40  DOWNSTREAM ELEVATION(FEET) = 2255.10
  STREET LENGTH(FEET) =   888.80   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  12.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.015
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.050

  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 =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.78
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =    5.02
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.03
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.24
  STREET FLOW TRAVEL TIME(MIN.) =   3.67   Tc(MIN.) =   10.46
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.786
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8615
  SOIL CLASSIFICATION IS "A"
  SUBAREA AREA(ACRES) =    1.60      SUBAREA RUNOFF(CFS) =    5.22
  TOTAL AREA(ACRES) =        2.4        PEAK FLOW RATE(CFS) =       8.38

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =   5.89
  FLOW VELOCITY(FEET/SEC.) =  4.39   DEPTH*VELOCITY(FT*FT/SEC.) =   1.54
  LONGEST FLOWPATH FROM NODE    302.00 TO NODE    302.20 =    1355.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    302.20 TO NODE    302.30 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  2255.10  DOWNSTREAM(FEET) =  2233.30
  FLOW LENGTH(FEET) =   524.90   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.16
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.38
  PIPE TRAVEL TIME(MIN.) =   0.78    Tc(MIN.) =   11.24
  LONGEST FLOWPATH FROM NODE    302.00 TO NODE    302.30 =    1880.40 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    302.20 TO NODE    302.30 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.670
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8608
  SOIL CLASSIFICATION IS "A"
  SUBAREA AREA(ACRES) =    1.00   SUBAREA RUNOFF(CFS) =    3.16
  TOTAL AREA(ACRES) =        3.4   TOTAL RUNOFF(CFS) =      11.54
  TC(MIN.) =   11.24

****************************************************************************
  FLOW PROCESS FROM NODE    302.30 TO NODE    302.30 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.) =   11.24
  RAINFALL INTENSITY(INCH/HR) =   3.67
  TOTAL STREAM AREA(ACRES) =     3.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     11.54

****************************************************************************
  FLOW PROCESS FROM NODE    303.01 TO NODE    303.02 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
```

```
==========================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   629.60
  UPSTREAM ELEVATION(FEET) =   2269.30
  DOWNSTREAM ELEVATION(FEET) =   2241.40
  ELEVATION DIFFERENCE(FEET) =     27.90
  TC = 0.303*[(  629.60**3)/(    27.90)]**.2 =    7.446
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.385
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8647
  SOIL CLASSIFICATION IS "A"
  SUBAREA RUNOFF(CFS) =      5.31
  TOTAL AREA(ACRES) =      1.40   TOTAL RUNOFF(CFS) =      5.31

**************************************************************************
  FLOW PROCESS FROM NODE    303.02 TO NODE    302.30 IS CODE =  31
--------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  2235.40  DOWNSTREAM(FEET) =  2233.30
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.74
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.31
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    7.51
  LONGEST FLOWPATH FROM NODE    303.01 TO NODE    302.30 =     669.60 FEET.

**************************************************************************
  FLOW PROCESS FROM NODE    303.02 TO NODE    302.30 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.) =    7.51
  RAINFALL INTENSITY(INCH/HR) =   4.37
  TOTAL STREAM AREA(ACRES) =     1.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.31

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       11.54    11.24        3.670          3.40
      2        5.31     7.51        4.369          1.40

 ********************************WARNING*********************************
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.

 **************************************************************************

  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       13.01     7.51        4.369
      2       16.00    11.24        3.670

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      16.00   Tc(MIN.) =   11.24
  TOTAL AREA(ACRES) =        4.8
  LONGEST FLOWPATH FROM NODE    302.00 TO NODE    302.30 =    1880.40 FEET.

**************************************************************************
  FLOW PROCESS FROM NODE    302.30 TO NODE    302.40 IS CODE =  31
--------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  2233.30  DOWNSTREAM(FEET) =  2215.80
  FLOW LENGTH(FEET) =   698.60   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  14.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.45
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      16.00
  PIPE TRAVEL TIME(MIN.) =   1.11    Tc(MIN.) =   12.36
  LONGEST FLOWPATH FROM NODE    302.00 TO NODE    302.40 =    2579.00 FEET.

**************************************************************************
  FLOW PROCESS FROM NODE    302.30 TO NODE    302.40 IS CODE =  81
--------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.523
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8599
  SOIL CLASSIFICATION IS "A"
  SUBAREA AREA(ACRES) =    1.30   SUBAREA RUNOFF(CFS) =    3.94
  TOTAL AREA(ACRES) =        6.1   TOTAL RUNOFF(CFS) =      19.93
  TC(MIN.) =   12.36

**************************************************************************
  FLOW PROCESS FROM NODE    302.40 TO NODE    302.40 IS CODE =  81
--------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.523
  SINGLE-FAMILY(1-ACRE LOT) RUNOFF COEFFICIENT = .5790
  SOIL CLASSIFICATION IS "A"
  SUBAREA AREA(ACRES) =    2.50   SUBAREA RUNOFF(CFS) =    5.10
  TOTAL AREA(ACRES) =        8.6   TOTAL RUNOFF(CFS) =      25.03
  TC(MIN.) =   12.36
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    302.40 TO NODE    302.40 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.523
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8599
  SOIL CLASSIFICATION IS "A"
  SUBAREA AREA(ACRES) =    1.10   SUBAREA RUNOFF(CFS) =    3.33
  TOTAL AREA(ACRES) =       9.7   TOTAL RUNOFF(CFS) =     28.37
  TC(MIN.) =   12.36

****************************************************************************
  FLOW PROCESS FROM NODE    302.40 TO NODE    300.07 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  2215.80  DOWNSTREAM(FEET) =  2212.00
  FLOW LENGTH(FEET) =   361.40   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  20.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.83
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     28.37
  PIPE TRAVEL TIME(MIN.) =   0.68    Tc(MIN.) =   13.04
  LONGEST FLOWPATH FROM NODE    302.00 TO NODE    300.07 =    2940.40 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    302.00 TO NODE    300.07 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       28.37    13.04       3.442        9.70
  LONGEST FLOWPATH FROM NODE    302.00 TO NODE    300.07 =    2940.40 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1      109.63    13.58       3.382       33.61
  LONGEST FLOWPATH FROM NODE    300.01 TO NODE    300.07 =    3114.80 FEET.

 ****************************WARNING*************************************
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ****************************************************************************

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1     133.63      13.04        3.442
      2     137.50      13.58        3.382

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     137.50   Tc(MIN.) =   13.58
  TOTAL AREA(ACRES) =       43.3
```

Project boundary

```
****************************************************************************
  FLOW PROCESS FROM NODE    300.07 TO NODE    300.08 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   2212.00  DOWNSTREAM(FEET) =   2201.60
  CHANNEL LENGTH THRU SUBAREA(FEET) =   419.40   CHANNEL SLOPE =  0.0248
  CHANNEL FLOW THRU SUBAREA(CFS) =     137.50
  FLOW VELOCITY(FEET/SEC) =   8.23 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.85   Tc(MIN.) =   14.43
  LONGEST FLOWPATH FROM NODE    300.01 TO NODE    300.08 =    3534.20 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    300.07 TO NODE    300.08 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.295
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .4839
  SOIL CLASSIFICATION IS "A"
  SUBAREA AREA(ACRES) =    3.70   SUBAREA RUNOFF(CFS) =    5.90
  TOTAL AREA(ACRES) =       47.0   TOTAL RUNOFF(CFS) =     143.40
  TC(MIN.) =   14.43
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       47.0  TC(MIN.) =     14.43
  PEAK FLOW RATE(CFS)   =     143.40
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```


400.01
EL=2314.1
D1
5.1 AC
L=582.4
INITIAL
DRAINAGE AREA D
POST-PROJECT
400.02
EL=2267.9
D2
2.7 AC
L=415.1
PIPE/BOX
400.03
EL=2266.1
D3
4.2 AC
L=753.4
PIPE/BOX
400.04
EL=2248
PROJECT BOUNDARY
D4
24.5 AC
L=957.6
Natural Channel
400.05
EL=2230
TOTAL AREA=36.5

```
************************************************************************
           RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                     (RCFC&WCD)  1978 HYDROLOGY MANUAL
         (c) Copyright 1982-2016 Advanced Engineering Software (aes)
                     (Rational Tabling Version 23.0)
                Release Date: 07/01/2016  License ID 1535

                        Analysis prepared by:

                               Stantec



 ************************* DESCRIPTION OF STUDY *************************
* First Industrial - Banning CA                                        *
* POST PROJECT AREA D 100 Year                                         *
* 2042611700 NEF 09-28-2022                                            *
 ************************************************************************

  FILE NAME: PAD100YR.DAT
  TIME/DATE OF STUDY: 14:11 09/28/2022
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.130
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.978
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  3.860
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.780
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.4344152
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.4320075
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =  100.00   1-HOUR INTENSITY(INCH/HOUR) =   1.780
  SLOPE OF INTENSITY DURATION CURVE = 0.4320
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: COMPUTE CONFLUENCE VALUES ACCORDING TO RCFC&WCD HYDROLOGY MANUAL
        AND IGNORE OTHER CONFLUENCE COMBINATIONS FOR DOWNSTREAM ANALYSES
  *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     12.0    0.015/0.050/0.020   0.50    2.00 0.0313 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.50 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  8.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

************************************************************************
  FLOW PROCESS FROM NODE    400.01 TO NODE    400.02 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
        ASSUMED INITIAL SUBAREA UNIFORM
        DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   582.40
  UPSTREAM ELEVATION(FEET) =   2314.10
  DOWNSTREAM ELEVATION(FEET) =   2267.90
  ELEVATION DIFFERENCE(FEET) =     46.20
  TC = 0.303*[(  582.40**3)/(    46.20)]**.2 =    6.424
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.673
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8660
  SOIL CLASSIFICATION IS "A"
  SUBAREA RUNOFF(CFS) =     20.64
  TOTAL AREA(ACRES) =      5.10   TOTAL RUNOFF(CFS) =     20.64

************************************************************************
  FLOW PROCESS FROM NODE    400.02 TO NODE    400.03 IS CODE =  31
------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  2267.90  DOWNSTREAM(FEET) =  2266.10
  FLOW LENGTH(FEET) =   415.10   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.94
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      20.64
  PIPE TRAVEL TIME(MIN.) =   1.17    Tc(MIN.) =    7.59
  LONGEST FLOWPATH FROM NODE    400.01 TO NODE    400.03 =     997.50 FEET.

************************************************************************
  FLOW PROCESS FROM NODE    400.02 TO NODE    400.03 IS CODE =  81
------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
========================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.348
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8645
  SOIL CLASSIFICATION IS "A"
  SUBAREA AREA(ACRES) =    2.70   SUBAREA RUNOFF(CFS) =   10.15
  TOTAL AREA(ACRES) =        7.8   TOTAL RUNOFF(CFS) =      30.79
  TC(MIN.) =    7.59

************************************************************************
  FLOW PROCESS FROM NODE    400.03 TO NODE    400.04 IS CODE =  31
------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  2266.10  DOWNSTREAM(FEET) =  2248.00
  FLOW LENGTH(FEET) =   753.40   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.31
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      30.79
  PIPE TRAVEL TIME(MIN.) =   1.02    Tc(MIN.) =    8.61
  LONGEST FLOWPATH FROM NODE    400.01 TO NODE    400.04 =    1750.90 FEET.

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

```
 FLOW PROCESS FROM NODE    400.03 TO NODE    400.04 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.118
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8633
 SOIL CLASSIFICATION IS "A"
 SUBAREA AREA(ACRES) =    4.20   SUBAREA RUNOFF(CFS) =   14.93
 TOTAL AREA(ACRES) =       12.0   TOTAL RUNOFF(CFS) =      45.72
 TC(MIN.) =    8.61
```

Project boundary

```
****************************************************************************
 FLOW PROCESS FROM NODE    400.04 TO NODE    400.05 IS CODE =  52
----------------------------------------------------------------------------
 >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   2248.00  DOWNSTREAM(FEET) =   2230.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   957.60   CHANNEL SLOPE =  0.0188
 CHANNEL FLOW THRU SUBAREA(CFS) =      45.72
 FLOW VELOCITY(FEET/SEC) =   5.17 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 TRAVEL TIME(MIN.) =   3.09   Tc(MIN.) =   11.70
 LONGEST FLOWPATH FROM NODE    400.01 TO NODE    400.05 =    2708.50 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    400.04 TO NODE    400.05 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.607
 UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .5041
 SOIL CLASSIFICATION IS "A"
 SUBAREA AREA(ACRES) =   24.50   SUBAREA RUNOFF(CFS) =   44.55
 TOTAL AREA(ACRES) =       36.5   TOTAL RUNOFF(CFS) =      90.28
 TC(MIN.) =   11.70
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =       36.5  TC(MIN.) =     11.70
 PEAK FLOW RATE(CFS)   =      90.28
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

Hydrographs

RCFC & WCD	SYNTHETIC UNIT HYDROGRAPH METHOD	Project:		Date: 06.05.2023		Sheet
	Unit Hydrograph and Effective Rain	**First Hathaway**				1 of
	Calculation Form	Banning, CA				1

[1] Concentration Point	**104.05**	[2] Area Designation	**Post Project A**
[3] Drainage Area Sq Miles (THIS WORKSHEET in ACRES)	**33.3**	[4] Ultimate Discharge-CFS-HRS/IN (645*[3])	**n/a**
[5] Unit Time Minutes (SAMPLE 100% -200% of LAG)	**10**	[6] LAG Time Minutes (0.8*Tc)	**8**
[7] Unit Time-Percent of Lag (100*[5]/[6])	**n/a**	[8] S-Curve	**n/a**
[9] Storm Frequency & Duration (SAMPLE 100 year 3 Hour)	**100yr-3hr**	[10] Total Adjusted Storm Rain- INCHES	**2.72**
[11] Variable Loss Rate(AVG) - INCHES/HOUR	**n/a**	[12] Minimum Loss Rate (for VAR. LOSS) - IN/HR	**n/a**
[13] Constant Loss Rate - INCHES/HOUR (see note 1)	**0.14**	[14] Low Loss Rate- PERCENT	**18**

	[15]	[16]	[17]	[18]	[19]	[20]	[21]	[22]		[23]	[24]
	Unit time period	Time percent of LAG	Cumlative average percent of ultimate discharge	Distrib Graph percent	Unit Hydrograph CFS-HRS/IN	Pattern Percent	Storm Rain IN/HR	LOSS RATE IN/HR		Effective Rain IN/HR	FLOW CFS
		[7] * [15]	(S-Graph)	[17]m-[17]m-1	([4]*[18])/100	(PL E-5.9)	60*[10]*[20]/100*[5]	Max	Low	[21]-[22]	[3]*[23]
							0.1632*[20]		[21]-(([21]*([14]/100))		[3]*[23]
1		**n/a**	**n/a**	**n/a**	**n/a**	2.6	0.424	0.14		0.28	9.5
2						2.6	0.424	0.14		0.28	9.5
3						3.3	0.539	0.14		0.40	13.3
4						3.3	0.539	0.14		0.40	13.3
5						3.3	0.539	0.14		0.40	13.3
6						3.4	0.555	0.14		0.41	13.8
7						4.4	0.718	0.14		0.58	19.3
8		**SHORTCUT METHOD**				4.2	0.685	0.14		0.55	18.2
9						5.3	0.865	0.14		0.72	24.1
10						5.1	0.832	0.14		0.69	23.1
11						6.4	1.044	0.14		0.90	30.1
12						5.9	0.963	0.14		0.82	27.4
13						7.3	1.191	0.14		1.05	35.0
14						8.5	1.387	0.14		1.25	41.5
15						14.1	2.301	0.14		2.16	72.0
16						14.1	2.301	0.14		2.16	72.0
17						3.8	0.620	0.14		0.48	16.0
18						2.4	0.392	0.14		0.25	8.4
19											
20											
21											
22											
23											
24											
25											
26											
27											
28											
29											
30											
31											
32											
33											
34											
35											
36											
						100			SUM	13.78	

Notes:

1. Fp obtained from Plate E-6.2; Loss Rate (F) from page E-8
where F=Fp if 100 percent pervious cover

Effective Rain= Sum[23] * Unit Time (HRS)
= 13.78*(10/60)= 13.78*0.1667
= **2.30** **INCHES**

Flood Volume = Effective Rain * Area
= 2.3*(1/12)*33.3 ACRES
6.37 **ACRE-FEET**

Plate E-2.2

RCFC & WCD	SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: **First Hathaway** Banning, CA	Date: 06.05.2023	Sheet 1 of 1

[1] Concentration Point	**300.06**	[2] Area Designation	**Post Project C**
[3] Drainage Area Sq Miles (THIS WORKSHEET in ACRES)	**37.6**	[4] Ultimate Discharge-CFS-HRS/IN (645*[3])	**n/a**
[5] Unit Time Minutes (SAMPLE 100% -200% of LAG)	**10**	[6] LAG Time Minutes (0.8*Tc)	**9.1**
[7] Unit Time-Percent of Lag (100*[5]/[6])	**n/a**	[8] S-Curve	**n/a**
[9] Storm Frequency & Duration (SAMPLE 100 year 3 Hour)	**100yr-3hr**	[10] Total Adjusted Storm Rain- INCHES	**2.72**
[11] Variable Loss Rate(AVG) - INCHES/HOUR	**n/a**	[12] Minimum Loss Rate (for VAR. LOSS) - IN/HR	**n/a**
[13] Constant Loss Rate - INCHES/HOUR (see note 1)	**0.18**	[14] Low Loss Rate- PERCENT	**18**

	[15]	[16]	[17]	[18]	[19]	[20]	[21]	[22]		[23]	[24]
	Unit time period	Time percent of LAG	Cumlative average percent of ultimate discharge	Distrib Graph percent	Unit Hydrograph CFS-HRS/IN	Pattern Percent	Storm Rain IN/HR	LOSS RATE IN/HR		Effective Rain IN/HR	FLOW CFS
		[7] * [15]	(S-Graph)	[17]m-[17]m-1	([4]*[18])/100	(PL E-5.9)	60*[10]*[20]/100*[5]	Max	Low	[21]-[22]	[3]*[23]
							0.1632*[20]		[21]-(([21]*([14]/100))		[3]*[23]
1		**n/a**	**n/a**	**n/a**	**n/a**	2.6	0.424	0.18		0.24	9.2
2						2.6	0.424	0.18		0.24	9.2
3						3.3	0.539	0.18		0.36	13.5
4						3.3	0.539	0.18		0.36	13.5
5						3.3	0.539	0.18		0.36	13.5
6						3.4	0.555	0.18		0.37	14.1
7						4.4	0.718	0.18		0.54	20.2
8						4.2	0.685	0.18		0.51	19.0
9						5.3	0.865	0.18		0.68	25.8
10						5.1	0.832	0.18		0.65	24.5
11						6.4	1.044	0.18		0.86	32.5
12						5.9	0.963	0.18		0.78	29.4
13						7.3	1.191	0.18		1.01	38.0
14						8.5	1.387	0.18		1.21	45.4
15						14.1	2.301	0.18		2.12	79.8
16						14.1	2.301	0.18		2.12	79.8
17						3.8	0.620	0.18		0.44	16.6
18						2.4	0.392	0.18		0.21	8.0
19											
20											
21											
22											
23											
24											
25											
26											
27											
28											
29											
30											
31											
32											
33											
34											
35											
36											
						100			SUM	13.06	

SHORTCUT METHOD

Bypass flow from Streets is excluded from this hydrograph analysis

Notes:

1. Fp obtained from Plate E-6.2; Loss Rate (F) from page E-8

where F=Fp if 100 percent pervious cover

Effective Rain= Sum[23] * Unit Time (HRS)

= 13.06*(10/60)= 13.06*0.1667

= **2.18** **INCHES**

Flood Volume = Effective Rain * Area

= 2.18*(1/12)*37.6 ACRES

6.82 **ACRE-FEET**

Plate E-2.2

RCFC & WCD	SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: **First Hathaway** Banning, CA	Date: 06.05.2023	Sheet 1 of 1

[1] Concentration Point	**400.04**	[2] Area Designation	**Post Project D**
[3] Drainage Area Sq Miles (THIS WORKSHEET in ACRES)	**12**	[4] Ultimate Discharge-CFS-HRS/IN (645*[3])	**n/a**
[5] Unit Time Minutes (SAMPLE 100% -200% of LAG)	**10**	[6] LAG Time Minutes (0.8*Tc)	**6.9**
[7] Unit Time-Percent of Lag (100*[5]/[6])	**n/a**	[8] S-Curve	**n/a**
[9] Storm Frequency & Duration (SAMPLE 100 year 3 Hour)	**100yr-3hr**	[10] Total Adjusted Storm Rain- INCHES	**2.72**
[11] Variable Loss Rate(AVG) - INCHES/HOUR	**n/a**	[12] Minimum Loss Rate (for VAR. LOSS) - IN/HR	**n/a**
[13] Constant Loss Rate - INCHES/HOUR (see note 1)	**0.14**	[14] Low Loss Rate- PERCENT	**18**

	[15]	[16]	[17]	[18]	[19]	[20]	[21]	[22]		[23]	[24]
	Unit time period	Time percent of LAG	Cumlative average percent of ultimate discharge	Distrib Graph percent	Unit Hydrograph CFS-HRS/IN	Pattern Percent	Storm Rain IN/HR	LOSS RATE IN/HR		Effective Rain IN/HR	FLOW CFS
		[7] * [15]	(S-Graph)	[17]m-[17]m-1	([4]*[18])/100	(PL E-5.9)	60*[10]*[20]/100*[5]	Max	Low	[21]-[22]	[3]*[23]
							0.1632*[20]		[21]-(([21]*([14]/100))		[3]*[23]
1		**n/a**	**n/a**	**n/a**	**n/a**	2.6	0.424	0.14		0.28	3.4
2						2.6	0.424	0.14		0.28	3.4
3						3.3	0.539	0.14		0.40	4.8
4						3.3	0.539	0.14		0.40	4.8
5						3.3	0.539	0.14		0.40	4.8
6						3.4	0.555	0.14		0.41	5.0
7						4.4	0.718	0.14		0.58	6.9
8		**SHORTCUT METHOD**				4.2	0.685	0.14		0.55	6.5
9						5.3	0.865	0.14		0.72	8.7
10						5.1	0.832	0.14		0.69	8.3
11						6.4	1.044	0.14		0.90	10.9
12						5.9	0.963	0.14		0.82	9.9
13						7.3	1.191	0.14		1.05	12.6
14						8.5	1.387	0.14		1.25	15.0
15						14.1	2.301	0.14		2.16	25.9
16						14.1	2.301	0.14		2.16	25.9
17						3.8	0.620	0.14		0.48	5.8
18						2.4	0.392	0.14		0.25	3.0
19											
20											
21											
22											
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24											
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26											
27											
28											
29											
30											
31											
32											
33											
34											
35											
36											
						100			SUM	13.78	

Notes:

1. Fp obtained from Plate E-6.2; Loss Rate (F) from page E-8
where F=Fp if 100 percent pervious cover

Effective Rain= Sum[23] * Unit Time (HRS)
= 13.78*(10/60)= 13.78*0.1667
= **2.30** **INCHES**

Flood Volume = Effective Rain * Area
= 2.3*(1/12)*12 ACRES
2.30 **ACRE-FEET**

Plate E-2.2

HYDRAULICS

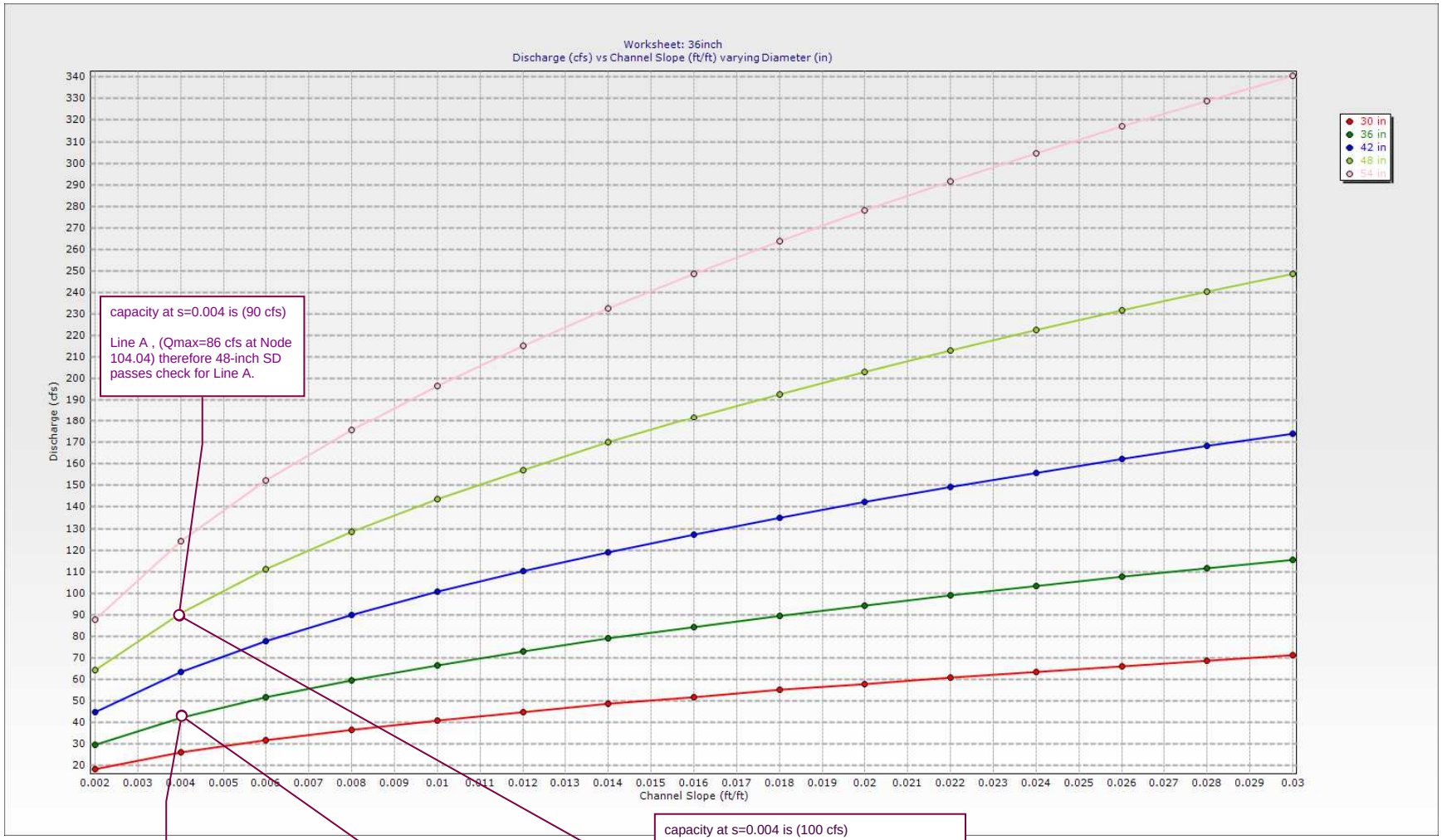
Rating Curve for 36inch

Project Description	
Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.004 ft/ft
Normal Depth	3.00 ft
Diameter	36.0 in
Discharge	42.18 cfs

Bentley Systems, Inc. Haestad Methods Solution Center
27 Siemon Company Drive Suite 200 W Watertown, CT 06795 USA
+1-203-755-1666

Rating Curve for 36inch



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+1-203-755-1666

Worksheet for Line_A

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.004 ft/ft
Diameter	4.0 ft
Discharge	90.00 cfs

Results	
Normal Depth	3.25 ft
Flow Area	10.9 ft²
Wetted Perimeter	8.97 ft
Hydraulic Radius	1.22 ft
Top Width	3.13 ft
Critical Depth	2.88 ft
Percent Full	81.1 %
Critical Slope	0.005 ft/ft
Velocity	8.24 ft/s
Velocity Head	1.055 ft
Specific Energy	4.30 ft
Froude Number	0.778
Maximum Discharge	97.72 cfs
Discharge Full	90.84 cfs
Slope Full	0.004 ft/ft
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	73.8 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	3.25 ft
Critical Depth	2.88 ft
Channel Slope	0.004 ft/ft
Critical Slope	0.005 ft/ft

Worksheet for Line_C

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data		
Roughness Coefficient	0.013	
Channel Slope	0.010	ft/ft
Diameter	3.5	ft
Discharge	100.00	cfs

Results		
Normal Depth	2.85	ft
Flow Area	8.4	ft²
Wetted Perimeter	7.88	ft
Hydraulic Radius	1.07	ft
Top Width	2.72	ft
Critical Depth	3.07	ft
Percent Full	81.4	%
Critical Slope	0.009	ft/ft
Velocity	11.92	ft/s
Velocity Head	2.208	ft
Specific Energy	5.06	ft
Froude Number	1.197	
Maximum Discharge	108.22	cfs
Discharge Full	100.60	cfs
Slope Full	0.010	ft/ft
Flow Type	Supercritical	

GVF Input Data		
Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data		
Upstream Depth	0.00	ft
Profile Description	N/A	
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.0	%
Normal Depth Over Rise	81.4	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	2.85	ft
Critical Depth	3.07	ft
Channel Slope	0.010	ft/ft
Critical Slope	0.009	ft/ft

Worksheet for Line_D

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.004 ft/ft
Diameter	3.0 ft
Discharge	42.00 cfs

Results	
Normal Depth	2.45 ft
Flow Area	6.2 ft²
Wetted Perimeter	6.76 ft
Hydraulic Radius	0.91 ft
Top Width	2.33 ft
Critical Depth	2.11 ft
Percent Full	81.6 %
Critical Slope	0.006 ft/ft
Velocity	6.80 ft/s
Velocity Head	0.719 ft
Specific Energy	3.17 ft
Froude Number	0.736
Maximum Discharge	45.37 cfs
Discharge Full	42.18 cfs
Slope Full	0.004 ft/ft
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	55.0 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	2.45 ft
Critical Depth	2.11 ft
Channel Slope	0.004 ft/ft
Critical Slope	0.006 ft/ft

Worksheet for OpenChannel_north_of_WilsonSt

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.025
Channel Slope	0.010 ft/ft
Left Side Slope	5.000 H:V
Right Side Slope	3.000 H:V
Bottom Width	20.00 ft
Discharge	160.00 cfs

Results	
Normal Depth	1.14 ft
Flow Area	27.9 ft²
Wetted Perimeter	29.38 ft
Hydraulic Radius	0.95 ft
Top Width	29.09 ft
Critical Depth	1.16 ft
Critical Slope	0.009 ft/ft
Velocity	5.74 ft/s
Velocity Head	0.512 ft
Specific Energy	1.65 ft
Froude Number	1.033
Flow Type	Supercritical

GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

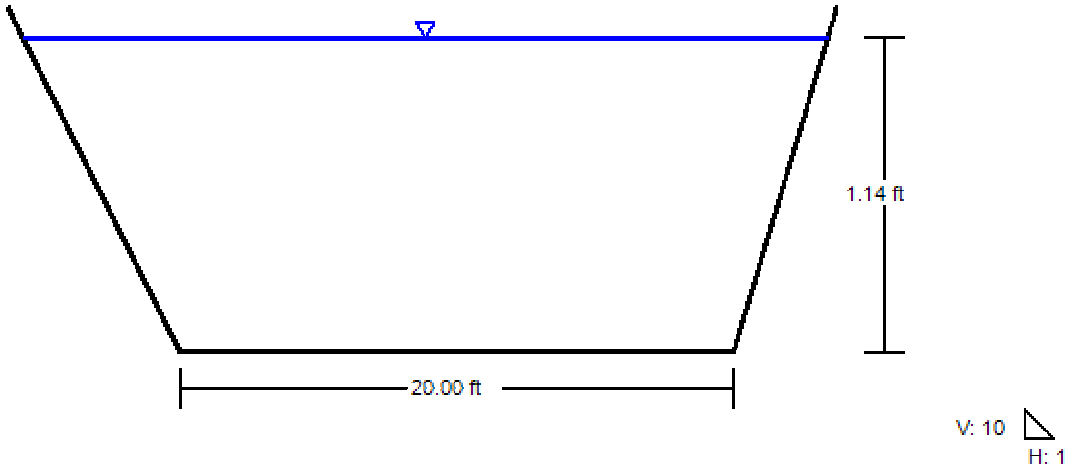
GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	1.14 ft
Critical Depth	1.16 ft
Channel Slope	0.010 ft/ft
Critical Slope	0.009 ft/ft

Normal Depth=1.14'
Channel Depth= 3.00'
Channel has sufficient capacity
Freeboard is approximately 1.9'

Cross Section for OpenChannel_north_of_WilsonSt

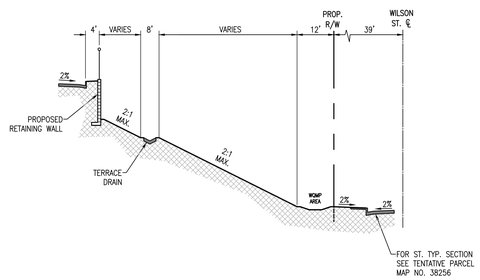
Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.025
Channel Slope	0.010 ft/ft
Normal Depth	1.14 ft
Left Side Slope	5.000 H:V
Right Side Slope	3.000 H:V
Bottom Width	20.00 ft
Discharge	160.00 cfs



IV. PRELIMINARY GRADING PLAN

PRELIMINARY GRADING EXHIBIT
FOR
TENTATIVE PARCEL MAP NO. 38256



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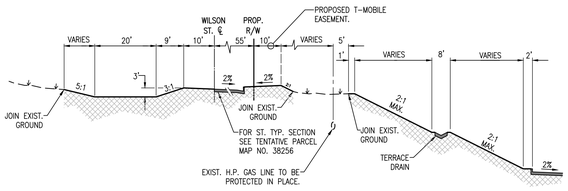
NTS



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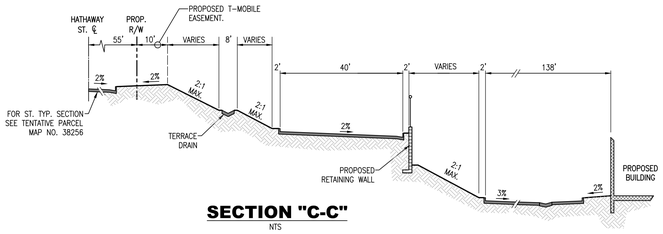
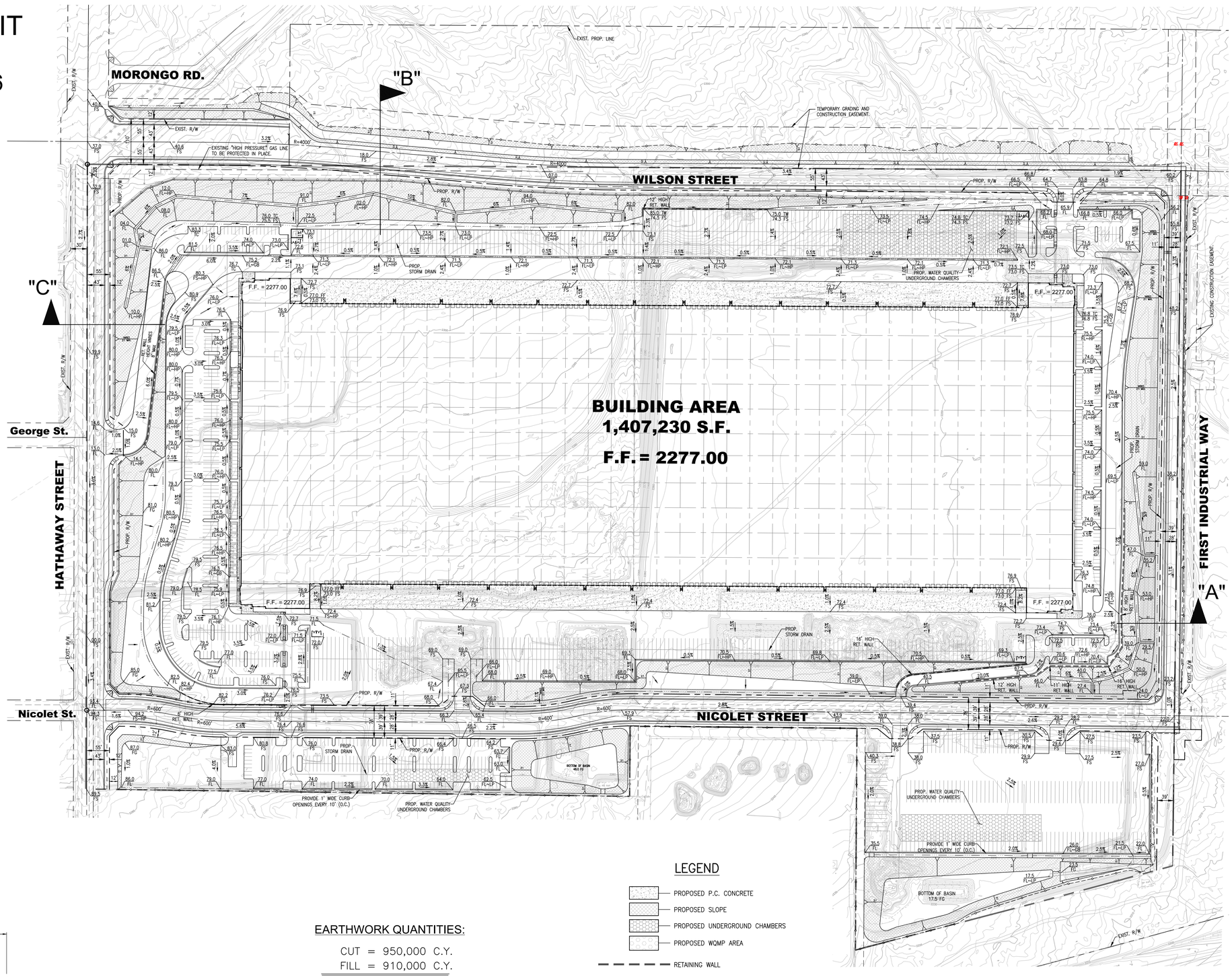


SECTION "C-C"
NTS



EARTHWORK QUANTITIES:

CUT = 950,000 C.Y.
FILL = 910,000 C.Y.
EXPORT = 40,000 C.Y.

LEGEND

- PROPOSED P.C. CONCRETE
- PROPOSED SLOPE
- PROPOSED UNDERGROUND CHAMBERS
- PROPOSED WQMP AREA
- RETAINING WALL
- MAP BOUNDARY
- PROPOSED R/W
- PROP/EXIST. ST. ℄

NORTH

GRAPHIC SCALE
100 0 50 100 200 400
(IN FEET)
1 inch = 100 ft.

OCTOBER 2022

PREPARED FOR:
FIRST INDUSTRIAL REALTY TRUST
FIRST INDUSTRIAL ACQUISITION II, LLC
898 N. PACIFIC COAST HWY., SUITE 175
EL SEGUNDO, CA 90245 PH: (310) 606-1634

PREPARED BY:
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909.335.6116 stantec.com

REGISTERED PROFESSIONAL ENGINEER STEPHEN F. CREVOISERAT 78576 CIVIL STATE OF CALIFORNIA

CITY OF BANNING

RECOMMENDED FOR APPROVAL BY:
KEVIN D. SIN, RCE # 71299 EXP. DATE
SENIOR CIVIL ENGINEER

RECOMMENDED FOR APPROVAL BY:
NATHAN SMITH, RCE # EXP. DATE
ASST. PWD/CITY ENGINEER

PRELIMINARY GRADING EXHIBIT
FOR
TENTATIVE PARCEL MAP NO. 38256

2042611700

HORIZONTAL SCALE: 1" = 100' VERTICAL SCALE: N/A

SHEET 1 OF 1

V. NOAA RAINFALL DATA

NOAA Atlas 14, Volume 6, Version 2
Location name: Banning, California, USA*
Latitude: 33.9312°, Longitude: -116.8562°
Elevation: 2291.56 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

Intensity for Rational Method

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches/hour)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**1.43** (1.19-1.73)	**1.82** (1.52-2.22)	**2.42** (2.02-2.95)	**2.96** (2.44-3.65)	**3.82** (3.02-4.85)	**4.55** (3.54-5.90)	**5.39** (4.09-7.18)	**6.36** (4.69-8.71)	**7.87** (5.56-11.2)	**9.20** (6.28-13.6)
10-min	**1.03** (0.852-1.24)	**1.31** (1.09-1.59)	**1.74** (1.44-2.12)	**2.13** (1.75-2.61)	**2.73** (2.17-3.47)	**3.26** (2.54-4.24)	**3.86** (2.93-5.14)	**4.56** (3.36-6.25)	**5.64** (3.98-8.06)	**6.60** (4.50-9.77)
15-min	**0.824** (0.688-1.00)	**1.06** (0.880-1.28)	**1.40** (1.16-1.70)	**1.72** (1.41-2.10)	**2.20** (1.75-2.80)	**2.63** (2.04-3.41)	**3.12** (2.36-4.14)	**3.68** (2.71-5.04)	**4.54** (3.21-6.50)	**5.32** (3.63-7.88)
30-min	**0.618** (0.514-0.750)	**0.790** (0.658-0.960)	**1.05** (0.870-1.28)	**1.28** (1.06-1.58)	**1.65** (1.31-2.09)	**1.97** (1.53-2.55)	**2.33** (1.77-3.10)	**2.75** (2.03-3.77)	**3.40** (2.40-4.86)	**3.98** (2.72-5.90)
60-min	**0.471** (0.392-0.571)	**0.603** (0.501-0.732)	**0.799** (0.663-0.973)	**0.978** (0.805-1.20)	**1.26** (0.999-1.60)	**1.50** (1.17-1.95)	**1.78** (1.35-2.37)	**2.10** (1.55-2.87)	**2.59** (1.83-3.71)	**3.04** (2.07-4.49)
2-hr	**0.340** (0.282-0.412)	**0.432** (0.359-0.524)	**0.562** (0.467-0.685)	**0.678** (0.558-0.833)	**0.850** (0.676-1.08)	**0.994** (0.773-1.29)	**1.15** (0.874-1.53)	**1.33** (0.978-1.82)	**1.59** (1.12-2.27)	**1.81** (1.23-2.68)
3-hr	**0.278** (0.231-0.337)	**0.352** (0.293-0.428)	**0.457** (0.379-0.556)	**0.547** (0.450-0.672)	**0.679** (0.540-0.863)	**0.788** (0.613-1.02)	**0.905** (0.687-1.20)	**1.03** (0.762-1.42)	**1.22** (0.861-1.74)	**1.37** (0.937-2.04)
6-hr	**0.198** (0.165-0.240)	**0.252** (0.210-0.306)	**0.326** (0.270-0.397)	**0.388** (0.319-0.477)	**0.477** (0.379-0.606)	**0.549** (0.427-0.713)	**0.625** (0.474-0.831)	**0.706** (0.521-0.967)	**0.821** (0.580-1.17)	**0.915** (0.624-1.36)
12-hr	**0.134** (0.111-0.162)	**0.173** (0.144-0.210)	**0.225** (0.187-0.274)	**0.269** (0.222-0.331)	**0.331** (0.263-0.421)	**0.380** (0.296-0.494)	**0.431** (0.327-0.574)	**0.485** (0.358-0.665)	**0.561** (0.396-0.802)	**0.622** (0.424-0.921)
24-hr	**0.089** (0.078-0.102)	**0.117** (0.104-0.135)	**0.156** (0.137-0.180)	**0.188** (0.164-0.219)	**0.233** (0.197-0.280)	**0.268** (0.223-0.330)	**0.305** (0.247-0.384)	**0.344** (0.272-0.446)	**0.399** (0.302-0.538)	**0.443** (0.324-0.617)
2-day	**0.053** (0.047-0.062)	**0.073** (0.064-0.084)	**0.099** (0.088-0.115)	**0.122** (0.107-0.142)	**0.154** (0.131-0.186)	**0.180** (0.149-0.221)	**0.208** (0.168-0.261)	**0.237** (0.187-0.307)	**0.279** (0.211-0.376)	**0.313** (0.230-0.437)
3-day	**0.038** (0.034-0.044)	**0.053** (0.047-0.061)	**0.073** (0.065-0.085)	**0.091** (0.079-0.106)	**0.116** (0.098-0.140)	**0.137** (0.114-0.168)	**0.159** (0.129-0.201)	**0.184** (0.145-0.238)	**0.219** (0.166-0.295)	**0.248** (0.182-0.346)
4-day	**0.031** (0.027-0.036)	**0.043** (0.038-0.049)	**0.060** (0.053-0.069)	**0.074** (0.065-0.087)	**0.096** (0.081-0.115)	**0.113** (0.094-0.139)	**0.132** (0.107-0.166)	**0.153** (0.120-0.198)	**0.183** (0.138-0.246)	**0.208** (0.152-0.290)
7-day	**0.020** (0.018-0.023)	**0.028** (0.025-0.032)	**0.039** (0.034-0.045)	**0.048** (0.042-0.056)	**0.062** (0.052-0.075)	**0.073** (0.061-0.090)	**0.086** (0.069-0.108)	**0.099** (0.078-0.128)	**0.119** (0.090-0.160)	**0.135** (0.099-0.188)
10-day	**0.015** (0.014-0.018)	**0.021** (0.019-0.024)	**0.029** (0.026-0.034)	**0.036** (0.032-0.042)	**0.046** (0.039-0.056)	**0.055** (0.046-0.068)	**0.064** (0.052-0.081)	**0.074** (0.059-0.096)	**0.089** (0.067-0.120)	**0.101** (0.074-0.141)
20-day	**0.010** (0.008-0.011)	**0.013** (0.011-0.015)	**0.018** (0.016-0.021)	**0.022** (0.019-0.026)	**0.028** (0.024-0.034)	**0.034** (0.028-0.041)	**0.039** (0.032-0.050)	**0.045** (0.036-0.059)	**0.054** (0.041-0.073)	**0.062** (0.045-0.086)
30-day	**0.007** (0.007-0.009)	**0.010** (0.009-0.012)	**0.014** (0.012-0.016)	**0.017** (0.015-0.020)	**0.022** (0.019-0.027)	**0.026** (0.022-0.032)	**0.031** (0.025-0.039)	**0.035** (0.028-0.046)	**0.042** (0.032-0.057)	**0.048** (0.035-0.067)
45-day	**0.006** (0.005-0.007)	**0.008** (0.007-0.009)	**0.011** (0.010-0.013)	**0.014** (0.012-0.016)	**0.018** (0.015-0.021)	**0.021** (0.017-0.026)	**0.024** (0.020-0.031)	**0.028** (0.022-0.036)	**0.033** (0.025-0.045)	**0.038** (0.028-0.053)
60-day	**0.005** (0.004-0.006)	**0.007** (0.006-0.008)	**0.010** (0.008-0.011)	**0.012** (0.010-0.014)	**0.015** (0.013-0.018)	**0.018** (0.015-0.022)	**0.021** (0.017-0.026)	**0.024** (0.019-0.031)	**0.028** (0.021-0.038)	**0.032** (0.023-0.045)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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PF graphical

NOAA Atlas 14, Volume 6, Version 2
Location name: Banning, California, USA*
Latitude: 33.9312°, Longitude: -116.8562°
Elevation: 2291.56 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

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NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

Depth for Unit Hydrographs

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.119 (0.099-0.144)	0.152 (0.127-0.185)	0.202 (0.168-0.246)	0.247 (0.203-0.304)	0.318 (0.252-0.404)	0.379 (0.295-0.492)	0.449 (0.341-0.598)	0.530 (0.391-0.726)	0.656 (0.463-0.937)	0.767 (0.523-1.14)
10-min	0.171 (0.142-0.207)	0.218 (0.182-0.265)	0.290 (0.240-0.353)	0.355 (0.292-0.435)	0.455 (0.362-0.578)	0.543 (0.423-0.706)	0.644 (0.489-0.857)	0.760 (0.560-1.04)	0.940 (0.664-1.34)	1.10 (0.750-1.63)
15-min	0.206 (0.172-0.250)	0.264 (0.220-0.321)	0.350 (0.290-0.426)	0.429 (0.353-0.526)	0.550 (0.438-0.699)	0.657 (0.511-0.853)	0.779 (0.591-1.04)	0.919 (0.677-1.26)	1.14 (0.803-1.62)	1.33 (0.907-1.97)
30-min	0.309 (0.257-0.375)	0.395 (0.329-0.480)	0.524 (0.435-0.638)	0.642 (0.528-0.788)	0.824 (0.655-1.05)	0.984 (0.765-1.28)	1.17 (0.884-1.55)	1.38 (1.01-1.88)	1.70 (1.20-2.43)	1.99 (1.36-2.95)
60-min	0.471 (0.392-0.571)	0.603 (0.501-0.732)	0.799 (0.663-0.973)	0.978 (0.805-1.20)	1.26 (0.999-1.60)	1.50 (1.17-1.95)	1.78 (1.35-2.37)	2.10 (1.55-2.87)	2.59 (1.83-3.71)	3.04 (2.07-4.49)
2-hr	0.679 (0.565-0.823)	0.863 (0.718-1.05)	1.13 (0.934-1.37)	1.36 (1.12-1.67)	1.70 (1.35-2.16)	1.99 (1.55-2.58)	2.30 (1.75-3.07)	2.65 (1.96-3.64)	3.17 (2.24-4.53)	3.61 (2.46-5.35)
3-hr	0.834 (0.694-1.01)	1.06 (0.880-1.28)	1.37 (1.14-1.67)	1.64 (1.35-2.02)	2.04 (1.62-2.59)	2.37 (1.84-3.07)	2.72 (2.06-3.62)	3.10 (2.29-4.25)	3.66 (2.59-5.23)	4.13 (2.82-6.11)
6-hr	1.19 (0.989-1.44)	1.51 (1.26-1.83)	1.95 (1.62-2.38)	2.33 (1.91-2.86)	2.86 (2.27-3.63)	3.29 (2.56-4.27)	3.74 (2.84-4.98)	4.23 (3.12-5.79)	4.92 (3.48-7.03)	5.48 (3.74-8.11)
12-hr	1.61 (1.34-1.95)	2.08 (1.73-2.53)	2.72 (2.25-3.31)	3.25 (2.67-3.99)	3.99 (3.17-5.07)	4.58 (3.56-5.95)	5.20 (3.94-6.92)	5.85 (4.31-8.01)	6.76 (4.78-9.66)	7.49 (5.11-11.1)
24-hr	2.12 (1.88-2.45)	2.81 (2.49-3.24)	3.74 (3.29-4.32)	4.51 (3.94-5.26)	5.59 (4.73-6.73)	6.44 (5.34-7.92)	7.33 (5.94-9.23)	8.27 (6.52-10.7)	9.58 (7.25-12.9)	10.6 (7.78-14.8)
2-day	2.56 (2.27-2.96)	3.49 (3.09-4.03)	4.77 (4.21-5.52)	5.86 (5.12-6.83)	7.40 (6.27-8.91)	8.65 (7.18-10.6)	9.96 (8.08-12.5)	11.4 (8.98-14.7)	13.4 (10.1-18.1)	15.0 (11.0-21.0)
3-day	2.75 (2.43-3.17)	3.80 (3.36-4.39)	5.27 (4.65-6.10)	6.54 (5.72-7.62)	8.37 (7.09-10.1)	9.87 (8.19-12.1)	11.5 (9.30-14.4)	13.2 (10.4-17.1)	15.8 (11.9-21.2)	17.9 (13.1-24.9)
4-day	2.97 (2.63-3.42)	4.12 (3.64-4.75)	5.73 (5.06-6.63)	7.13 (6.24-8.32)	9.17 (7.77-11.1)	10.9 (9.01-13.3)	12.7 (10.3-16.0)	14.7 (11.6-19.0)	17.5 (13.3-23.6)	20.0 (14.6-27.8)
7-day	3.42 (3.03-3.95)	4.71 (4.16-5.43)	6.52 (5.75-7.55)	8.10 (7.09-9.45)	10.4 (8.82-12.5)	12.3 (10.2-15.1)	14.4 (11.7-18.1)	16.6 (13.1-21.5)	19.9 (15.1-26.9)	22.7 (16.6-31.6)
10-day	3.72 (3.29-4.28)	5.08 (4.49-5.86)	7.01 (6.18-8.11)	8.69 (7.61-10.1)	11.2 (9.45-13.4)	13.2 (11.0-16.2)	15.4 (12.5-19.4)	17.8 (14.1-23.1)	21.3 (16.2-28.8)	24.3 (17.8-33.8)
20-day	4.56 (4.04-5.26)	6.24 (5.51-7.20)	8.60 (7.59-9.95)	10.7 (9.33-12.4)	13.7 (11.6-16.5)	16.2 (13.4-19.9)	18.9 (15.3-23.8)	21.8 (17.2-28.2)	26.1 (19.8-35.2)	29.7 (21.8-41.4)
30-day	5.34 (4.73-6.16)	7.32 (6.47-8.44)	10.1 (8.90-11.7)	12.5 (11.0-14.6)	16.0 (13.6-19.3)	19.0 (15.7-23.3)	22.1 (17.9-27.8)	25.5 (20.1-33.0)	30.5 (23.1-41.1)	34.6 (25.4-48.3)
45-day	6.35 (5.62-7.32)	8.72 (7.71-10.1)	12.0 (10.6-13.9)	14.9 (13.1-17.4)	19.1 (16.2-23.0)	22.5 (18.7-27.7)	26.2 (21.3-33.0)	30.2 (23.8-39.1)	36.0 (27.3-48.5)	40.8 (29.9-56.9)
60-day	7.29 (6.46-8.40)	10.0 (8.85-11.6)	13.8 (12.2-16.0)	17.1 (15.0-19.9)	21.8 (18.5-26.3)	25.7 (21.3-31.6)	29.9 (24.2-37.6)	34.4 (27.1-44.4)	40.8 (30.9-55.0)	46.2 (33.8-64.3)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

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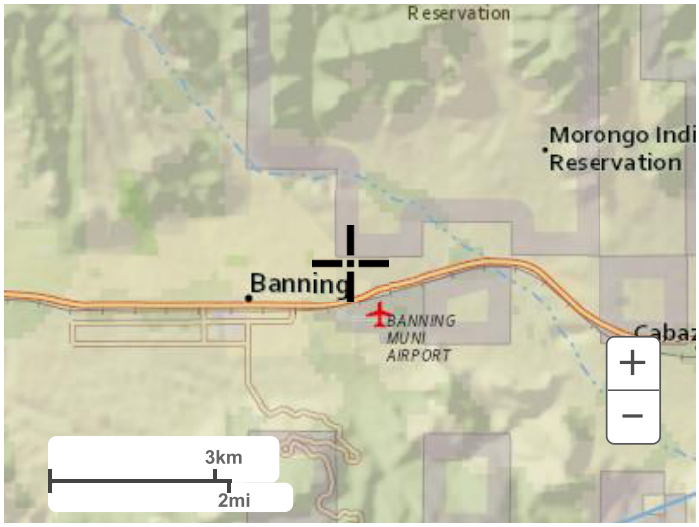
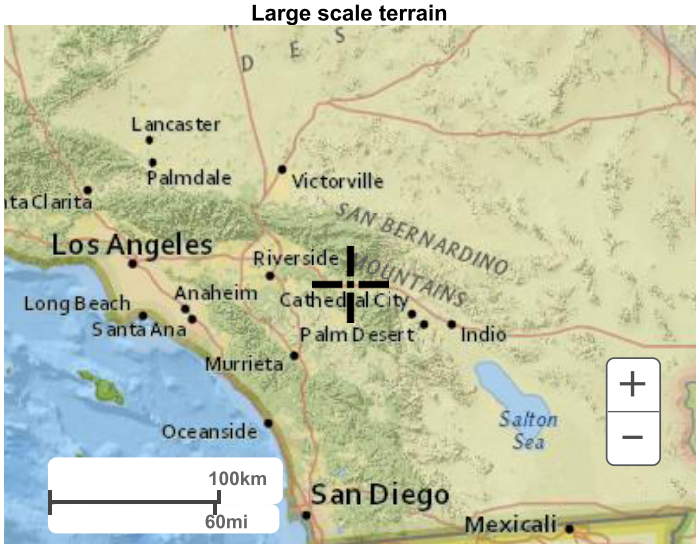
PF graphical



Large scale terrain



Large scale map

Large scale aerial

VI. SOILS INFILTRATION TESTING

This pages are extracted from prior geotechnical investigation of the subject property

Reference:
Stagecoach Business Park (March 16, 2018). *Results of Infiltration Testing*. (Project No. 18G115-2). Southern California Geotechnical.

Laboratory Testing

Grain Size Analysis

The grain size distribution of selected soils from the base of each infiltration test trench has been determined using a range of wire mesh screens. These tests were performed in general accordance with ASTM D-422 and/or ASTM D-1140. The weight of the portion of the sample retained on each screen is recorded and the percentage finer or coarser of the total weight is calculated. The results of these tests are presented at the end of this report.

Design Recommendations

A total of six (6) infiltration tests were performed at the subject site. As noted above, the calculated infiltration rates at the infiltration test locations range from 4.7 to 18.6 inches per hour. The primary reasons for the varying infiltration rates are the varying relative densities and the silt content of the soils encountered, which vary at different depths and locations. Higher silt content was observed within the soil exposed at the bottom of Infiltration Test No. I-1, which exhibited a slower infiltration rate.

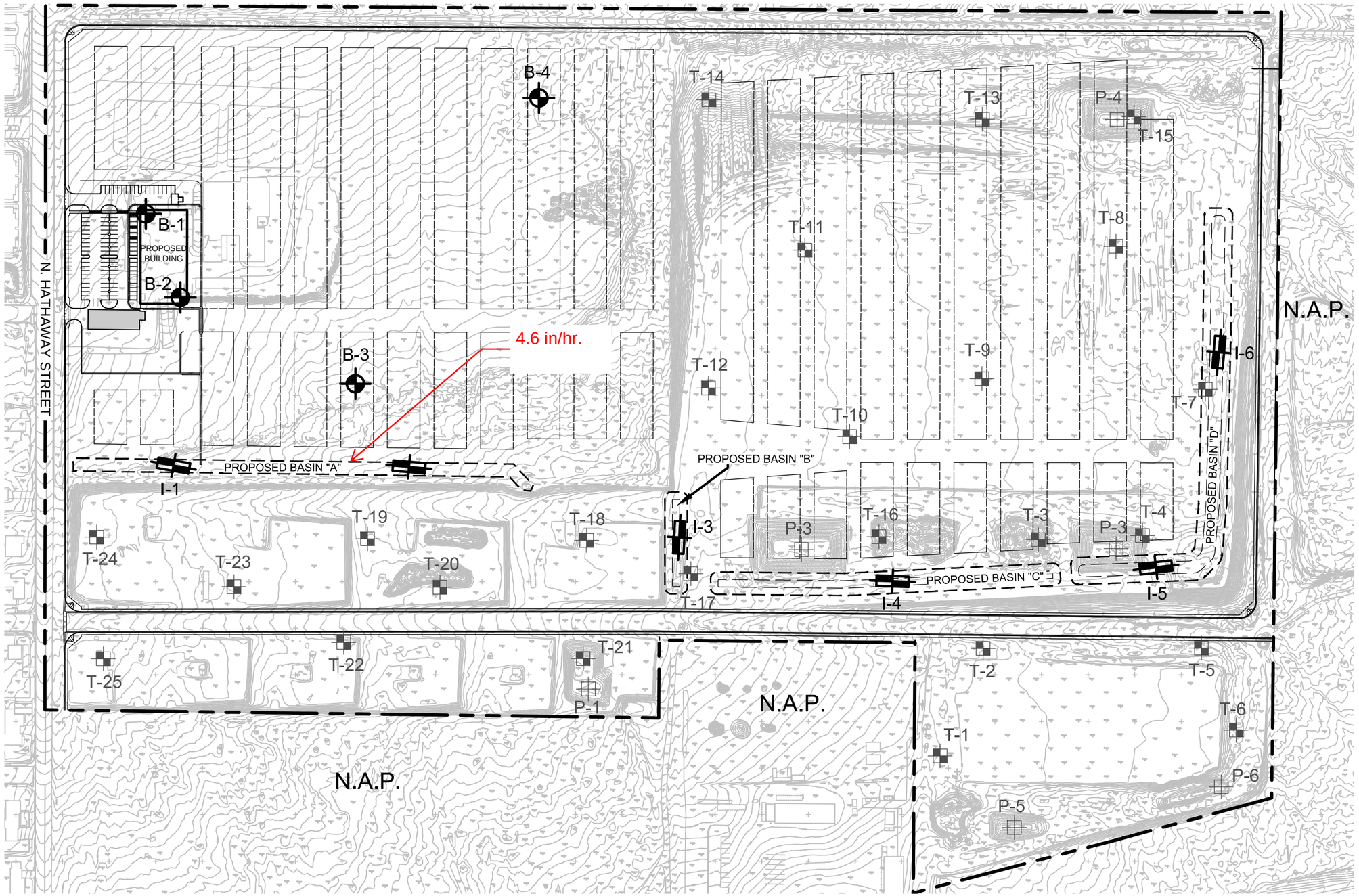
Based on the infiltration test results, the following infiltration rates are recommended:

Infiltration Basin	Infiltration Rate (in/hr)
A	4.7
B	15.4
C	14.2
D	16.2

The design of the proposed storm water infiltration systems should be performed by the project civil engineer, in accordance with the City of Banning and/or Riverside County guidelines. However, it is recommended that the systems be constructed so as to facilitate removal of silt and clay, or other deleterious materials from any water that may enter the systems. The presence of such materials would decrease the effective infiltration rates. **The project civil engineer should apply an appropriate factor of safety. The infiltration rates recommended above are based on the assumption that only clean water will be introduced to the subsurface profile. Any fines, debris, or organic materials could significantly impact the infiltration rate.** It should be noted that the recommended infiltration rates are based on infiltration testing at six (6) discrete locations and the overall infiltration rates of the storm water infiltration systems could vary considerably.

Infiltration versus Permeability

Infiltration rates are based on unsaturated flow. As water is introduced into soils by infiltration, the soils become saturated and the wetting front advances from the unsaturated zone to the saturated zone. Once the soils become saturated, infiltration rates become zero, and water can only move through soils by hydraulic conductivity at a rate determined by pressure head and soil



For reference Only.

Infiltration rates used in this preliminary were abstracted from prior Infiltration tests performed at Location I-1.

GEOTECHNICAL LEGEND

- APPROXIMATE INFILTRATION TEST LOCATION
- APPROXIMATE BORING LOCATION FROM CONCURRENT STUDY (SCG PROJECT NO. 18G115-1)
- EXISTING BUILDING TO BE DEMOLISHED
- PREVIOUS TRENCH LOCATION (SCG PROJECT NO. 06G227-1)
- PREVIOUS INFILTRATION TRENCH LOCATION (SCG PROJECT NO. 06G227-5)

NOTE: SITE PLAN PREPARED BY STANTEC, INC.

INFILTRATION TEST LOCATION PLAN

PROPOSED STAGECOACH BUSINESS PARK

BANNING, CALIFORNIA

SCALE: 1" = 220'	
DRAWN: SM CHKD: GKM	
SCG PROJECT 18G115-2	
PLATE 2	

SOUTHERN CALIFORNIA GEOTECHNICAL

INFILTRATION CALCULATIONS

Project Name	Proposed Stagecoach Business Park
Project Location	Banning, CA
Project Number	18G115-2
Engineer	Scott McCann

Infiltration Test No: I-1

Constants

	Diameter (ft)	Area (ft^2)	Area (cm^2)
Inner	1	0.79	730
Anlr. Spac	2	2.36	2189

*Note: The infiltration rate was calculated based on current time interval

Test Interval		Time (hr)	Interval **Elapsed** (min)	Flow Readings: Inner Ring (ml)	Flow Readings: Ring Flow (cm^3)	Flow Readings: Annular Ring (ml)	Flow Readings: Space Flow (cm^3)	Infiltration Rates: Inner Ring* (cm/hr)	Infiltration Rates: Annular Space* (cm/hr)	Infiltration Rates: Inner Ring* (in/hr)	Infiltration Rates: Annular Space* (in/hr)
1	Initial	1:00 PM	5	350	900	700	2900	14.80	15.90	5.83	6.26
	Final	1:05 PM	**5**	1250		3600					
2	Initial	1:06 PM	5	125	775	500	2650	12.75	14.53	5.02	5.72
	Final	1:11 PM	**11**	900		3150					
3	Initial	1:12 PM	5	900	800	3150	2450	13.16	13.43	5.18	5.29
	Final	1:17 PM	**17**	1700		5600					
4	Initial	1:18 PM	5	925	775	2650	2400	12.75	13.16	5.02	5.18
	Final	1:23 PM	**23**	1700		5050					
5	Initial	1:24 PM	5	1700	750	5200	2400	12.33	13.16	4.86	5.18
	Final	1:29 PM	**29**	2450		7600					
6	Initial	1:30 PM	5	2450	750	8100	2400	12.33	13.16	4.86	5.18
	Final	1:35 PM	**35**	3200		10500					
7	Initial	1:36 PM	5	100	750	300	2400	12.33	13.16	4.86	5.18
	Final	1:41 PM	**40**	850		2700					
8	Initial	1:42 PM	5	200	725	250	2400	11.92	13.16	4.69	5.18
	Final	1:47 PM	**46**	925		2650					

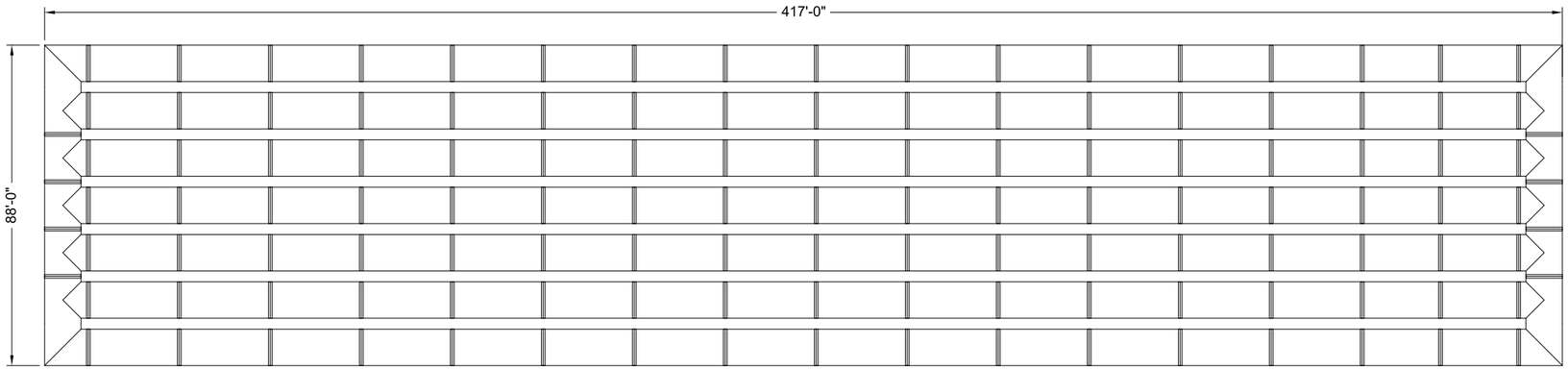
PROJECT SUMMARY

CALCULATION DETAILS
- LOADING = HS20/HS25
- APPROX. LINEAR FOOTAGE = 2,955 LF

STORAGE SUMMARY
- STORAGE VOLUME REQUIRED = 305,000 CF
- PIPE STORAGE VOLUME = 232,085 CF
- BACKFILL STORAGE VOLUME = 73,090 CF
- TOTAL STORAGE PROVIDED = 305,175 CF

PIPE DETAILS
- DIAMETER = 120"
- CORRUGATION = 5x1
- GAGE = 14
- COATING = ALT2
- WALL TYPE = PERFORATED
- BARREL SPACING = 36"

BACKFILL DETAILS
- WIDTH AT ENDS = 12"
- ABOVE PIPE = 6"
- WIDTH AT SIDES = 12"
- BELOW PIPE = 6"



NOTES

- ALL RISER AND STUB DIMENSIONS ARE TO CENTERLINE. ALL ELEVATIONS, DIMENSIONS, AND LOCATIONS OF RISERS AND INLETS, SHALL BE VERIFIED BY THE ENGINEER OF RECORD PRIOR TO RELEASING FOR FABRICATION.
- ALL FITTINGS AND REINFORCEMENT COMPLY WITH ASTM A998.
- ALL RISERS AND STUBS ARE 2⅔" x ½" CORRUGATION AND 16 GAGE UNLESS OTHERWISE NOTED.
- RISERS TO BE FIELD TRIMMED TO GRADE.
- QUANTITY OF PIPE SHOWN DOES NOT PROVIDE EXTRA PIPE FOR CONNECTING THE SYSTEM TO EXISTING PIPE OR DRAINAGE STRUCTURES. OUR SYSTEM AS DETAILED PROVIDES NOMINAL INLET AND/OR OUTLET PIPE STUB FOR CONNECTION TO EXISTING DRAINAGE FACILITIES. IF ADDITIONAL PIPE IS NEEDED IT IS THE RESPONSIBILITY OF THE CONTRACTOR.
- BAND TYPE TO BE DETERMINED UPON FINAL DESIGN.
- THE PROJECT SUMMARY IS REFLECTIVE OF THE DYODS DESIGN, QUANTITIES ARE APPROX. AND SHOULD BE VERIFIED UPON FINAL DESIGN AND APPROVAL. FOR EXAMPLE, TOTAL EXCAVATION DOES NOT CONSIDER ALL VARIABLES SUCH AS SHORING AND ONLY ACCOUNTS FOR MATERIAL WITHIN THE ESTIMATED EXCAVATION FOOTPRINT.
- THESE DRAWINGS ARE FOR CONCEPTUAL PURPOSES AND DO NOT REFLECT ANY LOCAL PREFERENCES OR REGULATIONS. PLEASE CONTACT YOUR LOCAL CONTECH REP FOR MODIFICATIONS.

ASSEMBLY
SCALE: 1" = 40'

CONCEPTUAL SIZING FOR RETENTION BASIN "A"

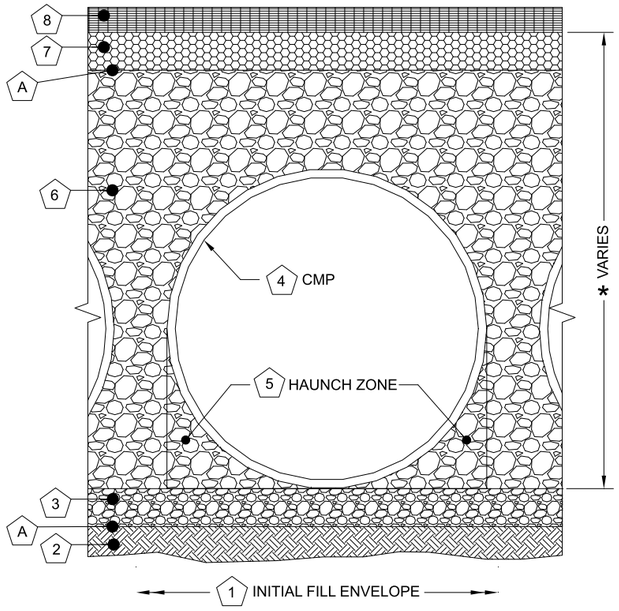
DATE	REVISION DESCRIPTION	BY

CONTECH® ENGINEERED SOLUTIONS LLC
www.ContechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

CONTECH® CMP DETENTION SYSTEMS
CONTECH **DYODS** DRAWING

DYO21805 First Hathaway Logistics
120" CMP Detention - 305,000 C.F. - BASIN A
Banning, CA
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
4469	21805	9/23/2022
DESIGNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: DYO	
SHEET NO.: 1		



Infiltration Systems - CMP Infiltration & CMP Perforated Drainage Pipe			
Material Location	Description	Material Designation	Designation
8 Rigid or Flexible Pavement (if applicable)			
7 Road Base (if applicable			
A Geotextile Layer	Non-Woven Geotextile	CONTECH C-40 or C-45	Engineer Decision for consideration to prevent soil migration into varying soil types. Wrap the trench only.
6 Backfill	Infiltration pipe systems have a pipe perforation sized of 3/8" diameter. An open graded, free draining stone, with a particle size of ½" – 2 ½" diameter is recommended.	AASHTO M 145-A-1 or AASHTO M 43 - 3, 4	Material shall be worked into the pipe haunches by means of shovel-slicing, rodding, air-tamper, vibratory rod, or other effective methods. Compaction of all placed fill material is necessary and shall be considered adequate when no further yielding of the material is observed under the compactor, or under foot, and the Project Engineer or his representative is satisfied with the level of compaction"
3 Bedding Stone	Well graded granular bedding material w/maximum particle size of 3"	AASHTO M43 - 3,357,4,467, 5, 56, 57	For soil aggregates larger than 3/8" a dedicated bedding layer is not required for CMP. Pipe may be placed on the trench bottom comprised of native suitable well graded & granular material. For Arch pipes it is recommended to be shaped to a relatively flat bottom or fine-grade the foundation to a slight v-shape. Soil aggregates less than 3/8" and unsuitable material should be over-excavated and re-placed with a 4"-6" layer of well graded & granular stone per the material designation.
A Geotextile Layer	None	None	Contech does not recommend geotextiles be placed under the invert of Infiltration systems due to the propensity for geotextiles to clog over time.
* Note: The listed AASHTO designations are for gradation only. The stone must also be angular and clean.			

1 MINIMUM WIDTH DEPENDS ON SITE CONDITIONS AND ENGINEERING JUDGEMENT.

FOUNDATION/BEDDING PREPARATION

2 PRIOR TO PLACING THE BEDDING, THE FOUNDATION MUST BE CONSTRUCTED TO A UNIFORM AND STABLE GRADE. IN THE EVENT THAT UNSUITABLE FOUNDATION MATERIALS ARE ENCOUNTERED DURING EXCAVATION, THEY SHALL BE REMOVED AND BROUGHT BACK TO THE GRADE WITH A FILL MATERIAL AS APPROVED BY THE ENGINEER.

5 HAUNCH ZONE MATERIAL SHALL BE PLACED AND UNIFORMLY COMPACTED WITHOUT SOFT SPOTS.

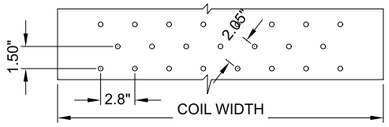
BACKFILL

MATERIAL SHALL BE PLACED IN 8"-10" MAXIMUM LIFTS. INADEQUATE COMPACTION CAN LEAD TO EXCESSIVE DEFLECTIONS WITHIN THE SYSTEM AND SETTLEMENT OF THE SOILS OVER THE SYSTEM. BACKFILL SHALL BE PLACED SUCH THAT THERE IS NO MORE THAN A TWO-LIFT DIFFERENTIAL BETWEEN THE SIDES OF ANY PIPE IN THE SYSTEM AT ALL TIMES DURING THE BACKFILL PROCESS. BACKFILL SHALL BE ADVANCED ALONG THE LENGTH OF THE SYSTEM AT THE SAME RATE TO AVOID DIFFERENTIAL LOADING ON ANY PIPES IN THE SYSTEM.

EQUIPMENT USED TO PLACE AND COMPACT THE BACKFILL SHALL BE OF A SIZE AND TYPE SO AS NOT TO DISTORT, DAMAGE, OR DISPLACE THE PIPE. ATTENTION MUST BE GIVEN TO PROVIDING ADEQUATE MINIMUM COVER FOR SUCH EQUIPMENT. MAINTAIN BALANCED LOADING ON ALL PIPES IN THE SYSTEM DURING ALL SUCH OPERATIONS.

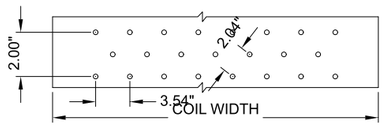
OTHER ALTERNATE BACKFILL MATERIAL MAY BE ALLOWED DEPENDING ON SITE SPECIFIC CONDITIONS. REFER TO TYPICAL BACKFILL DETAIL FOR MATERIAL REQUIRED.

2 2/3" x 1/2" CORRUGATION - STEEL AND ALUMINUM CMP EDGE SPACING EQUAL ON BOTH SIDES



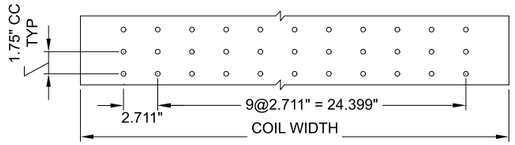
OPEN AREA = 3.76 SQ IN/SQ FT

3" x 1" CORRUGATION - STEEL AND ALUMINUM CMP (COIL PROVIDED FROM CONTECH LANTANA, FL PLANT)



OPEN AREA = 4.16 SQ IN/SQ FT

5" x 1" CORRUGATION - STEEL ONLY
EDGE SPACING EQUAL ON BOTH SIDES



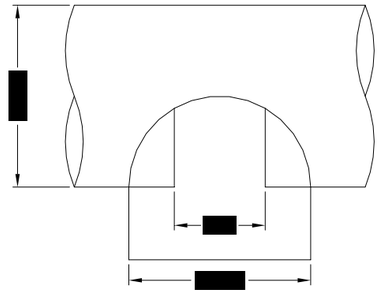
OPEN AREA = 3.33 SQ IN/SQ FT

NOTES:

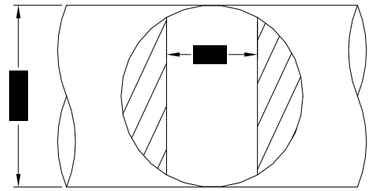
1. PERFORATIONS MEET AASHTO AND ASTM SPECIFICATIONS.
2. PERFORATION OPEN AREA PER SQUARE FOOT OF PIPE IS BASED ON THE NOMINAL DIAMETER AND LENGTH OF PIPE.
3. ALL DIMENSIONS ARE SUBJECT TO MANUFACTURING TOLERANCES.
4. ALL HOLES ⌀3/8".

TYPICAL PERFORATION DETAIL

SCALE: N.T.S.



PLAN

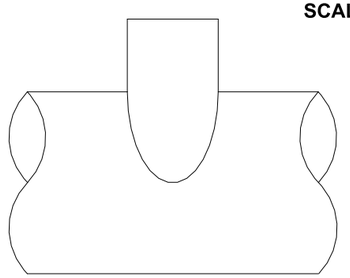


FRONT

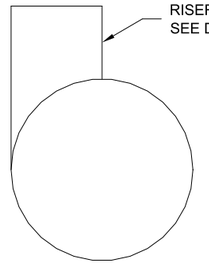
TYPICAL MANWAY DETAIL

SCALE: N.T.S.

NOTE:
MANWAY DETAIL APPLICABLE FOR CMP SYSTEMS WITH DIAMETERS 48" AND LARGER. MANWAYS MAY BE REQUIRED ON SMALLER SYSTEMS DEPENDING ON ACTUAL SITE SPECIFIC CONDITIONS.



ELEVATION

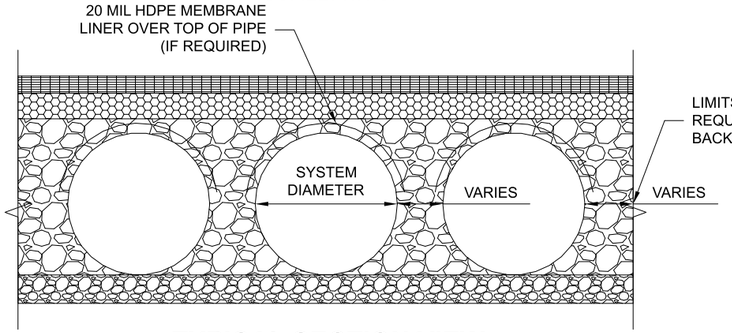


END

TYPICAL RISER DETAIL

SCALE: N.T.S.

NOTE:
LADDERS ARE OPTIONAL AND ARE NOT REQUIRED FOR ALL SYSTEMS.



TYPICAL SECTION VIEW

LINER OVER ROWS
SCALE: N.T.S.

NOTE: IF SALTING AGENTS FOR SNOW AND ICE REMOVAL ARE USED ON OR NEAR THE PROJECT, AN HDPE MEMBRANE LINER IS RECOMMENDED WITH THE SYSTEM. THE IMPERMEABLE LINER IS INTENDED TO HELP PROTECT THE SYSTEM FROM THE POTENTIAL ADVERSE EFFECTS THAT MAY RESULT FROM A CHANGE IN THE SURROUNDING ENVIRONMENT OVER A PERIOD OF TIME. PLEASE REFER TO THE CORRUGATED METAL PIPE DETENTION DESIGN GUIDE FOR ADDITIONAL INFORMATION.

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CONTECH CMP DETENTION SYSTEMS
CONTECH DYODS DRAWING

DYO21805 First Hathaway Logistics
120" CMP Detention - 305,000 C.F. - BASIN A
Banning, CA
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
4469	21805	9/23/2022
DESIGNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: DYO	
SHEET NO.: 1		

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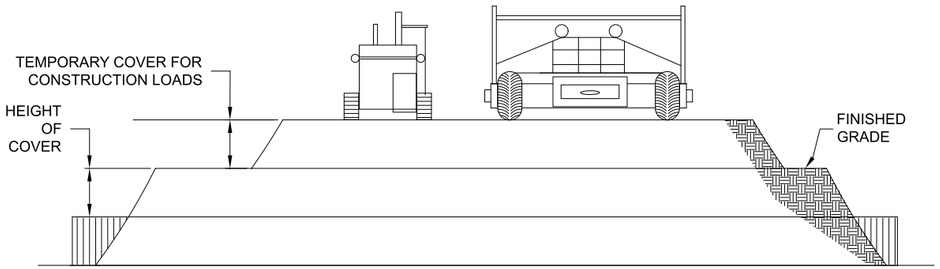

CONSTRUCTION LOADS

FOR TEMPORARY CONSTRUCTION VEHICLE LOADS, AN EXTRA AMOUNT OF COMPACTED COVER MAY BE REQUIRED OVER THE TOP OF THE PIPE. THE HEIGHT-OF-COVER SHALL MEET THE MINIMUM REQUIREMENTS SHOWN IN THE TABLE BELOW. THE USE OF HEAVY CONSTRUCTION EQUIPMENT NECESSITATES GREATER PROTECTION FOR THE PIPE THAN FINISHED GRADE COVER MINIMUMS FOR NORMAL HIGHWAY TRAFFIC.

PIPE SPAN, INCHES	AXLE LOADS (kips)			
	18-50	50-75	75-110	110-150
	MINIMUM COVER (FT)			
12-42	2.0	2.5	3.0	3.0
48-72	3.0	3.0	3.5	4.0
78-120	3.0	3.5	4.0	4.0
126-144	3.5	4.0	4.5	4.5

*MINIMUM COVER MAY VARY, DEPENDING ON LOCAL CONDITIONS. THE CONTRACTOR MUST PROVIDE THE ADDITIONAL COVER REQUIRED TO AVOID DAMAGE TO THE PIPE. MINIMUM COVER IS MEASURED FROM THE TOP OF THE PIPE TO THE TOP OF THE MAINTAINED CONSTRUCTION ROADWAY SURFACE.

CONSTRUCTION LOADING DIAGRAM

SCALE: N.T.S.

SPECIFICATION FOR DESIGNED DETENTION SYSTEM:

SCOPE
THIS SPECIFICATION COVERS THE MANUFACTURE AND INSTALLATION OF THE DESIGNED DETENTION SYSTEM DETAILED IN THE PROJECT PLANS.

MATERIAL
THE MATERIAL SHALL CONFORM TO THE APPLICABLE REQUIREMENTS LISTED BELOW:

ALUMINIZED TYPE 2 STEEL COILS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M-274 OR ASTM A-92.

THE GALVANIZED STEEL COILS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M-218 OR ASTM A-929.

THE POLYMER COATED STEEL COILS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M-246 OR ASTM A-742.

THE ALUMINUM COILS SHALL CONFORM TO THE APPLICABLE OF AASHTO M-197 OR ASTM B-744.

CONSTRUCTION LOADS
CONSTRUCTION LOADS MAY BE HIGHER THAN FINAL LOADS. FOLLOW THE MANUFACTURER'S OR NCSPA GUIDELINES.

PIPE
THE PIPE SHALL BE MANUFACTURED IN ACCORDANCE TO THE APPLICABLE REQUIREMENTS LISTED BELOW:

ALUMINIZED TYPE 2: AASHTO M-36 OR ASTM A-760

GALVANIZED: AASHTO M-36 OR ASTM A-760

APPLICABLE POLYMER COATED: AASHTO M-245 OR ASTM A-762

ALUMINUM: AASHTO M-196 OR ASTM B-745

APPLICABLE
HANDLING AND ASSEMBLY
SHALL BE IN ACCORDANCE WITH NCSP'S (NATIONAL CORRUGATED STEEL PIPE ASSOCIATION) FOR ALUMINIZED TYPE 2, GALVANIZED OR POLYMER COATED STEEL. SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS FOR ALUMINUM PIPE.
REQUIREMENTS
INSTALLATION
SHALL BE IN ACCORDANCE WITH AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, SECTION 26, DIVISION II DIVISION II OR ASTM A-798 (FOR ALUMINIZED TYPE 2, GALVANIZED OR POLYMER COATED STEEL) OR ASTM B-788 (FOR ALUMINUM PIPE) AND IN CONFORMANCE WITH THE PROJECT PLANS AND SPECIFICATIONS. IF THERE ARE ANY INCONSISTENCIES OR CONFLICTS THE CONTRACTOR SHOULD DISCUSS AND RESOLVE WITH THE SITE ENGINEER.

IT IS ALWAYS THE RESPONSIBILITY OF THE CONTRACTOR TO FOLLOW OSHA GUIDELINES FOR SAFE PRACTICES.

NOTE:
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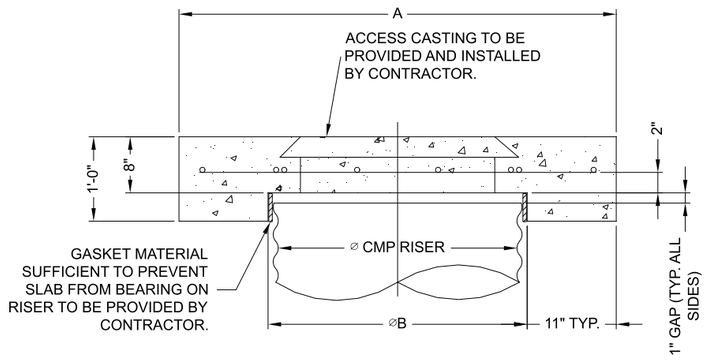
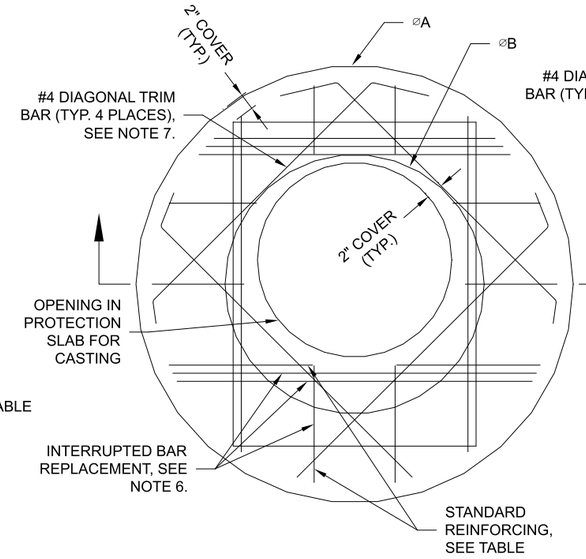


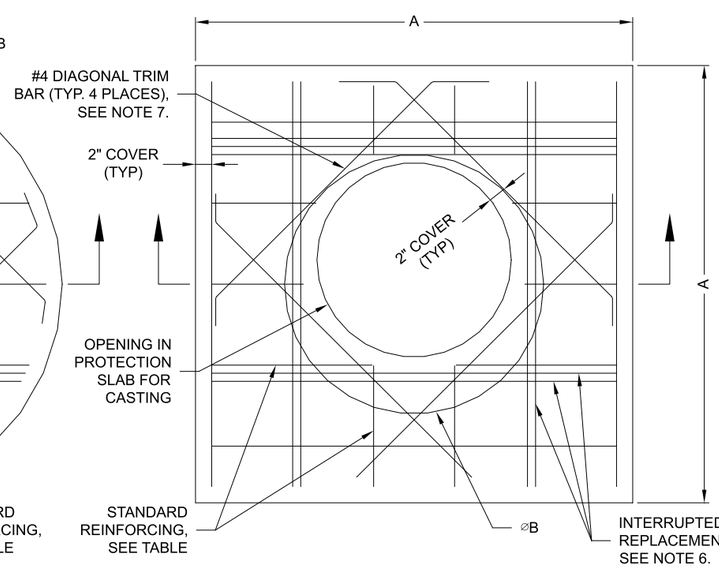
SECTION VIEW

REINFORCING TABLE				
⌀ CMP RISER	A	⌀ B	REINFORCING	**BEARING PRESSURE (PSF)
24"	⌀ 4' 4'X4'	26"	#5 @ 12" OCEW #5 @ 12" OCEW	2,410 1,780
30"	⌀ 4'-6" 4'-6" X 4'-6"	32"	#5 @ 12" OCEW #5 @ 12" OCEW	2,120 1,530
36"	⌀ 5' 5' X 5'	38"	#5 @ 10" OCEW #5 @ 10" OCEW	1,890 1,350
42"	⌀ 5'-6" 5'-6" X 5'-6"	44"	#5 @ 10" OCEW #5 @ 9" OCEW	1,720 1,210
48"	⌀ 6' 6' X 6'	50"	#5 @ 9" OCEW #5 @ 8" OCEW	1,600 1,100

** ASSUMED SOIL BEARING CAPACITY



ROUND OPTION PLAN VIEW



SQUARE OPTION PLAN VIEW

NOTES:

1. DESIGN IN ACCORDANCE WITH AASHTO, 17th EDITION.
2. DESIGN LOAD HS25.
3. EARTH COVER = 1' MAX.
4. CONCRETE STRENGTH = 3,500 psi
5. REINFORCING STEEL = ASTM A615, GRADE 60.
6. PROVIDE ADDITIONAL REINFORCING AROUND OPENINGS EQUAL TO THE BARS INTERRUPTED, HALF EACH SIDE. ADDITIONAL BARS TO BE IN THE SAME PLANE.
7. TRIM OPENING WITH DIAGONAL #4 BARS, EXTEND BARS A MINIMUM OF 12" BEYOND OPENING, BEND BARS AS REQUIRED TO MAINTAIN BAR COVER.
8. PROTECTION SLAB AND ALL MATERIALS TO BE PROVIDED AND INSTALLED BY CONTRACTOR.
9. DETAIL DESIGN BY DELTA ENGINEERING, BINGHAMTON, NY.

MANHOLE CAP DETAIL

SCALE: N.T.S.

DATE	REVISION DESCRIPTION	BY

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CONTECH CMP DETENTION SYSTEMS
CONTECH DYODS DRAWING

DYO21805 First Hathaway Logistics
120" CMP Detention - 305,000 C.F. - BASIN A
Banning, CA
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
4469	21805	9/23/2022
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CHECKED: DYO	APPROVED: DYO	
SHEET NO.: 1		

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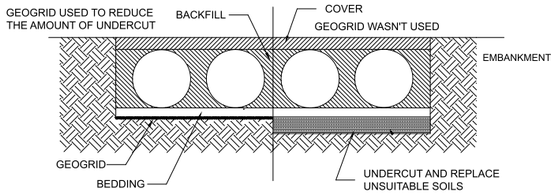
CMP DETENTION INSTALLATION GUIDE

PROPER INSTALLATION OF A FLEXIBLE UNDERGROUND DETENTION SYSTEM WILL ENSURE LONG-TERM PERFORMANCE. THE CONFIGURATION OF THESE SYSTEMS OFTEN REQUIRES SPECIAL CONSTRUCTION PRACTICES THAT DIFFER FROM CONVENTIONAL FLEXIBLE PIPE CONSTRUCTION. CONTECH ENGINEERED SOLUTIONS STRONGLY SUGGESTS SCHEDULING A PRE-CONSTRUCTION MEETING WITH YOUR LOCAL SALES ENGINEER TO DETERMINE IF ADDITIONAL MEASURES, NOT COVERED IN THIS GUIDE, ARE APPROPRIATE FOR YOUR SITE.

FOUNDATION

CONSTRUCT A FOUNDATION THAT CAN SUPPORT THE DESIGN LOADING APPLIED BY THE PIPE AND ADJACENT BACKFILL WEIGHT AS WELL AS MAINTAIN ITS INTEGRITY DURING CONSTRUCTION.

IF SOFT OR UNSUITABLE SOILS ARE ENCOUNTERED, REMOVE THE POOR SOILS DOWN TO A SUITABLE DEPTH AND THEN BUILD UP TO THE APPROPRIATE ELEVATION WITH A COMPETENT BACKFILL MATERIAL. THE STRUCTURAL FILL MATERIAL GRADATION SHOULD NOT ALLOW THE MIGRATION OF FINES, WHICH CAN CAUSE SETTLEMENT OF THE DETENTION SYSTEM OR PAVEMENT ABOVE. IF THE STRUCTURAL FILL MATERIAL IS NOT COMPATIBLE WITH THE UNDERLYING SOILS AN ENGINEERING FABRIC SHOULD BE USED AS A SEPARATOR. IN SOME CASES, USING A STIFF REINFORCING GEOGRID REDUCES OVER EXCAVATION AND REPLACEMENT FILL QUANTITIES.

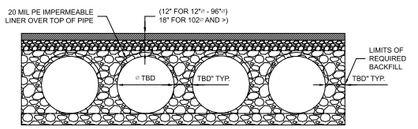


GRADE THE FOUNDATION SUBGRADE TO A UNIFORM OR SLIGHTLY SLOPING GRADE. IF THE SUBGRADE IS CLAY OR RELATIVELY NON-POROUS AND THE CONSTRUCTION SEQUENCE WILL LAST FOR AN EXTENDED PERIOD OF TIME, IT IS BEST TO SLOPE THE GRADE TO ONE END OF THE SYSTEM. THIS WILL ALLOW EXCESS WATER TO DRAIN QUICKLY, PREVENTING SATURATION OF THE SUBGRADE.

GEOMEMBRANE BARRIER

A SITE'S RESISTIVITY MAY CHANGE OVER TIME WHEN VARIOUS TYPES OF SALTING AGENTS ARE USED, SUCH AS ROAD SALTS FOR DEICING AGENTS. IF SALTING AGENTS ARE USED ON OR NEAR THE PROJECT SITE, A GEOMEMBRANE BARRIER IS RECOMMENDED WITH THE SYSTEM. THE GEOMEMBRANE LINER IS INTENDED TO HELP PROTECT THE SYSTEM FROM THE POTENTIAL ADVERSE EFFECTS THAT MAY RESULT FROM THE USE OF SUCH AGENTS INCLUDING PREMATURE CORROSION AND REDUCED ACTUAL SERVICE LIFE.

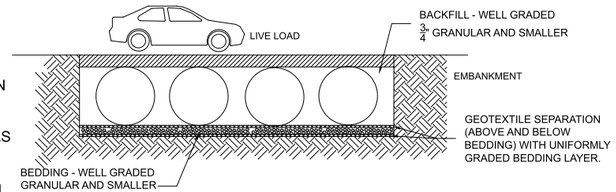
THE PROJECT'S ENGINEER OF RECORD IS TO EVALUATE WHETHER SALTING AGENTS WILL BE USED ON OR NEAR THE PROJECT SITE, AND USE HIS/HER BEST JUDGEMENT TO DETERMINE IF ANY ADDITIONAL PROTECTIVE MEASURES ARE REQUIRED. BELOW IS A TYPICAL DETAIL SHOWING THE PLACEMENT OF A GEOMEMBRANE BARRIER FOR PROJECTS WHERE SALTING AGENTS ARE USED ON OR NEAR THE PROJECT SITE.



IN-SITU TRENCH WALL

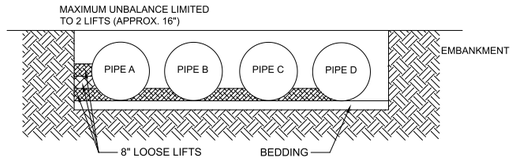
IF EXCAVATION IS REQUIRED, THE TRENCH WALL NEEDS TO BE CAPABLE OF SUPPORTING THE LOAD THAT THE PIPE SHEDS AS THE SYSTEM IS LOADED. IF SOILS ARE NOT CAPABLE OF SUPPORTING THESE LOADS, THE PIPE CAN DEFLECT. PERFORM A SIMPLE SOIL PRESSURE CHECK USING THE APPLIED LOADS TO DETERMINE THE LIMITS OF EXCAVATION BEYOND THE SPRING LINE OF THE OUTER MOST PIPES.

IN MOST CASES THE REQUIREMENTS FOR A SAFE WORK ENVIRONMENT AND PROPER BACKFILL PLACEMENT AND COMPACTION TAKE CARE OF THIS CONCERN.



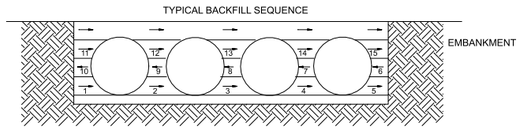
BACKFILL PLACEMENT

MATERIAL SHALL BE WORKED INTO THE PIPE HAUNCHES BY MEANS OF SHOVEL-SLICING, RODDING, AIR TAMPER, VIBRATORY ROD, OR OTHER EFFECTIVE METHODS.

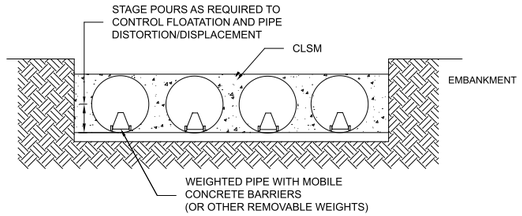


IF AASHTO T99 PROCEDURES ARE DETERMINED INFEASIBLE BY THE GEOTECHNICAL ENGINEER OF RECORD, COMPACTION IS CONSIDERED ADEQUATE WHEN NO FURTHER YIELDING OF THE MATERIAL IS OBSERVED UNDER THE COMPACTOR, OR UNDER FOOT, AND THE GEOTECHNICAL ENGINEER OF RECORD (OR REPRESENTATIVE THEREOF) IS SATISFIED WITH THE LEVEL OF COMPACTION.

FOR LARGE SYSTEMS, CONVEYOR SYSTEMS, BACKHOES WITH LONG REACHES OR DRAGLINES WITH STONE BUCKETS MAY BE USED TO PLACE BACKFILL. ONCE MINIMUM COVER FOR CONSTRUCTION LOADING ACROSS THE ENTIRE WIDTH OF THE SYSTEM IS REACHED, ADVANCE THE EQUIPMENT TO THE END OF THE RECENTLY PLACED FILL, AND BEGIN THE SEQUENCE AGAIN UNTIL THE SYSTEM IS COMPLETELY BACKFILLED. THIS TYPE OF CONSTRUCTION SEQUENCE PROVIDES ROOM FOR STOCKPILED BACKFILL DIRECTLY BEHIND THE BACKHOE, AS WELL AS THE MOVEMENT OF CONSTRUCTION TRAFFIC. MATERIAL STOCKPILES ON TOP OF THE BACKFILLED DETENTION SYSTEM SHOULD BE LIMITED TO 8- TO 10-FEET HIGH AND MUST PROVIDE BALANCED LOADING ACROSS ALL BARRELS. TO DETERMINE THE PROPER COVER OVER THE PIPES TO ALLOW THE MOVEMENT OF CONSTRUCTION EQUIPMENT SEE TABLE 1, OR CONTACT YOUR LOCAL CONTECH SALES ENGINEER.



WHEN FLOWABLE FILL IS USED, YOU MUST PREVENT PIPE FLOATATION. TYPICALLY, SMALL LIFTS ARE PLACED BETWEEN THE PIPES AND THEN ALLOWED TO SET-UP PRIOR TO THE PLACEMENT OF THE NEXT LIFT. THE ALLOWABLE THICKNESS OF THE CLSM LIFT IS A FUNCTION OF A PROPER BALANCE BETWEEN THE UPLIFT FORCE OF THE CLSM, THE OPPOSING WEIGHT OF THE PIPE, AND THE EFFECT OF OTHER RESTRAINING MEASURES. THE PIPE CAN CARRY LIMITED FLUID PRESSURE WITHOUT PIPE DISTORTION OR DISPLACEMENT, WHICH ALSO AFFECTS THE CLSM LIFT THICKNESS. YOUR LOCAL CONTECH SALES ENGINEER CAN HELP DETERMINE THE PROPER LIFT THICKNESS.

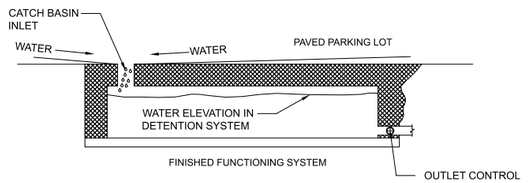


CONSTRUCTION LOADING

TYPICALLY, THE MINIMUM COVER SPECIFIED FOR A PROJECT ASSUMES H-20 LIVE LOAD. BECAUSE CONSTRUCTION LOADS OFTEN EXCEED DESIGN LIVE LOADS, INCREASED TEMPORARY MINIMUM COVER REQUIREMENTS ARE NECESSARY. SINCE CONSTRUCTION EQUIPMENT VARIES FROM JOB TO JOB, IT IS BEST TO ADDRESS EQUIPMENT SPECIFIC MINIMUM COVER REQUIREMENTS WITH YOUR LOCAL CONTECH SALES ENGINEER DURING YOUR PRE-CONSTRUCTION MEETING.

ADDITIONAL CONSIDERATIONS

BECAUSE MOST SYSTEMS ARE CONSTRUCTED BELOW-GRADE, RAINFALL CAN RAPIDLY FILL THE EXCAVATION; POTENTIALLY CAUSING FLOATATION AND MOVEMENT OF THE PREVIOUSLY PLACED PIPES. TO HELP MITIGATE POTENTIAL PROBLEMS, IT IS BEST TO START THE INSTALLATION AT THE DOWNSTREAM END WITH THE OUTLET ALREADY CONSTRUCTED TO ALLOW A ROUTE FOR THE WATER TO ESCAPE. TEMPORARY DIVERSION MEASURES MAY BE REQUIRED FOR HIGH FLOWS DUE TO THE RESTRICTED NATURE OF THE OUTLET PIPE.



CMP DETENTION SYSTEM INSPECTION AND MAINTENANCE

UNDERGROUND STORMWATER DETENTION AND INFILTRATION SYSTEMS MUST BE INSPECTED AND MAINTAINED AT REGULAR INTERVALS FOR PURPOSES OF PERFORMANCE AND LONGEVITY.

INSPECTION

INSPECTION IS THE KEY TO EFFECTIVE MAINTENANCE OF CMP DETENTION SYSTEMS AND IS EASILY PERFORMED. CONTECH RECOMMENDS ONGOING, ANNUAL INSPECTIONS. SITES WITH HIGH TRASH LOAD OR SMALL OUTLET CONTROL ORIFICES MAY NEED MORE FREQUENT INSPECTIONS. THE RATE AT WHICH THE SYSTEM COLLECTS POLLUTANTS WILL DEPEND MORE ON SITE SPECIFIC ACTIVITIES RATHER THAN THE SIZE OR CONFIGURATION OF THE SYSTEM.

INSPECTIONS SHOULD BE PERFORMED MORE OFTEN IN EQUIPMENT WASHDOWN AREAS, IN CLIMATES WHERE SANDING AND/OR SALTING OPERATIONS TAKE PLACE, AND IN OTHER VARIOUS INSTANCES IN WHICH ONE WOULD EXPECT HIGHER ACCUMULATIONS OF SEDIMENT OR ABRASIVE/ CORROSIVE CONDITIONS. A RECORD OF EACH INSPECTION IS TO BE MAINTAINED FOR THE LIFE OF THE SYSTEM

MAINTENANCE

CMP DETENTION SYSTEMS SHOULD BE CLEANED WHEN AN INSPECTION REVEALS ACCUMULATED SEDIMENT OR TRASH IS CLOGGING THE DISCHARGE ORIFICE.

ACCUMULATED SEDIMENT AND TRASH CAN TYPICALLY BE EVACUATED THROUGH THE MANHOLE OVER THE OUTLET ORIFICE. IF MAINTENANCE IS NOT PERFORMED AS RECOMMENDED, SEDIMENT AND TRASH MAY ACCUMULATE IN FRONT OF THE OUTLET ORIFICE. MANHOLE COVERS SHOULD BE SECURELY SEATED FOLLOWING CLEANING ACTIVITIES. CONTECH SUGGESTS THAT ALL SYSTEMS BE DESIGNED WITH AN ACCESS/INSPECTION MANHOLE SITUATED AT OR NEAR THE INLET AND THE OUTLET ORIFICE. SHOULD IT BE NECESSARY TO GET INSIDE THE SYSTEM TO PERFORM MAINTENANCE ACTIVITIES, ALL APPROPRIATE PRECAUTIONS REGARDING CONFINED SPACE ENTRY AND OSHA REGULATIONS SHOULD BE FOLLOWED.

ANNUAL INSPECTIONS ARE BEST PRACTICE FOR ALL UNDERGROUND SYSTEMS. DURING THIS INSPECTION, IF EVIDENCE OF SALTING/DE-ICING AGENTS IS OBSERVED WITHIN THE SYSTEM, IT IS BEST PRACTICE FOR THE SYSTEM TO BE RINSED, INCLUDING ABOVE THE SPRING LINE SOON AFTER THE SPRING THAW AS PART OF THE MAINTENANCE PROGRAM FOR THE SYSTEM.

MAINTAINING AN UNDERGROUND DETENTION OR INFILTRATION SYSTEM IS EASIEST WHEN THERE IS NO FLOW ENTERING THE SYSTEM. FOR THIS REASON, IT IS A GOOD IDEA TO SCHEDULE THE CLEANOUT DURING DRY WEATHER.

THE FOREGOING INSPECTION AND MAINTENANCE EFFORTS HELP ENSURE UNDERGROUND PIPE SYSTEMS USED FOR STORMWATER STORAGE CONTINUE TO FUNCTION AS INTENDED BY IDENTIFYING RECOMMENDED REGULAR INSPECTION AND MAINTENANCE PRACTICES. INSPECTION AND MAINTENANCE RELATED TO THE STRUCTURAL INTEGRITY OF THE PIPE OR THE SOUNDNESS OF PIPE JOINT CONNECTIONS IS BEYOND THE SCOPE OF THIS GUIDE.

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DATE	REVISION DESCRIPTION	BY

CONTECH ENGINEERED SOLUTIONS LLC
www.ContechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

CONTECH CMP DETENTION SYSTEMS
CONTECH **DYODS** DRAWING

DYO21805 First Hathaway Logistics
120" CMP Detention - 305,000 C.F. - BASIN A
Banning, CA
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
4469	21805	9/23/2022
DESIGNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: DYO	
SHEET NO.: 1		

PROJECT SUMMARY

CALCULATION DETAILS
- LOADING = HS20/HS25
- APPROX. LINEAR FOOTAGE = 1,697 LF

STORAGE SUMMARY
- STORAGE VOLUME REQUIRED = 175,000 CF
- PIPE STORAGE VOLUME = 133,282 CF
- BACKFILL STORAGE VOLUME = 42,149 CF
- TOTAL STORAGE PROVIDED = 175,432 CF

PIPE DETAILS
- DIAMETER = 120"
- CORRUGATION = 5x1
- GAGE = 14
- COATING = ALT2
- WALL TYPE = PERFORATED
- BARREL SPACING = 36"

BACKFILL DETAILS
- WIDTH AT ENDS = 12"
- ABOVE PIPE = 6"
- WIDTH AT SIDES = 12"
- BELOW PIPE = 6"

NOTES

- ALL RISER AND STUB DIMENSIONS ARE TO CENTERLINE. ALL ELEVATIONS, DIMENSIONS, AND LOCATIONS OF RISERS AND INLETS, SHALL BE VERIFIED BY THE ENGINEER OF RECORD PRIOR TO RELEASING FOR FABRICATION.
- ALL FITTINGS AND REINFORCEMENT COMPLY WITH ASTM A998.
- ALL RISERS AND STUBS ARE $2\frac{2}{3}$" x $\frac{1}{2}$" CORRUGATION AND 16 GAGE UNLESS OTHERWISE NOTED.
- RISERS TO BE FIELD TRIMMED TO GRADE.
- QUANTITY OF PIPE SHOWN DOES NOT PROVIDE EXTRA PIPE FOR CONNECTING THE SYSTEM TO EXISTING PIPE OR DRAINAGE STRUCTURES. OUR SYSTEM AS DETAILED PROVIDES NOMINAL INLET AND/OR OUTLET PIPE STUB FOR CONNECTION TO EXISTING DRAINAGE FACILITIES. IF ADDITIONAL PIPE IS NEEDED IT IS THE RESPONSIBILITY OF THE CONTRACTOR.
- BAND TYPE TO BE DETERMINED UPON FINAL DESIGN.
- THE PROJECT SUMMARY IS REFLECTIVE OF THE DYODS DESIGN, QUANTITIES ARE APPROX. AND SHOULD BE VERIFIED UPON FINAL DESIGN AND APPROVAL. FOR EXAMPLE, TOTAL EXCAVATION DOES NOT CONSIDER ALL VARIABLES SUCH AS SHORING AND ONLY ACCOUNTS FOR MATERIAL WITHIN THE ESTIMATED EXCAVATION FOOTPRINT.
- THESE DRAWINGS ARE FOR CONCEPTUAL PURPOSES AND DO NOT REFLECT ANY LOCAL PREFERENCES OR REGULATIONS. PLEASE CONTACT YOUR LOCAL CONTECH REP FOR MODIFICATIONS.

ASSEMBLY
SCALE: 1" = 40'

CONCEPTUAL SIZING FOR RETENTION BASIN "C"

DATE	REVISION DESCRIPTION	BY

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800-338-1122 513-645-7000 513-645-7993 FAX

CONTECH® CMP DETENTION SYSTEMS
CONTECH DYODS DRAWING

DYO21982 First Hathaway Logistics
120" CMP Detention - 175,000 C.F. - BASIN C
Banning, CA
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
4469	21982	9/29/2022
DESIGNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: DYO	
SHEET NO.: 1		

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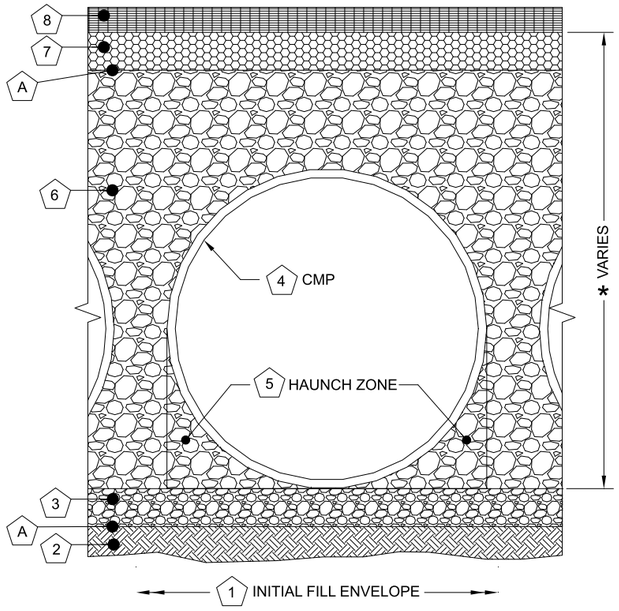


	Infiltration Systems - CMP Infiltration & CMP Perforated Drainage Pipe			
	Material Location	Description	Material Designation	Designation
8	Rigid or Flexible Pavement (if applicable)			
7	Road Base (if applicable			
A	Geotextile Layer	Non-Woven Geotextile	CONTECH C-40 or C-45	Engineer Decision for consideration to prevent soil migration into varying soil types. Wrap the trench only.
6	Backfill	Infiltration pipe systems have a pipe perforation sized of 3/8" diameter. An open graded, free draining stone, with a particle size of ½" – 2 ½" diameter is recommended.	AASHTO M 145-A-1 or AASHTO M 43 - 3, 4	Material shall be worked into the pipe haunches by means of shovel-slicing, rodding, air-tamper, vibratory rod, or other effective methods. Compaction of all placed fill material is necessary and shall be considered adequate when no further yielding of the material is observed under the compactor, or under foot, and the Project Engineer or his representative is satisfied with the level of compaction"
3	Bedding Stone	Well graded granular bedding material w/maximum particle size of 3"	AASHTO M43 - 3,357,4,467, 5, 56, 57	For soil aggregates larger than 3/8" a dedicated bedding layer is not required for CMP. Pipe may be placed on the trench bottom comprised of native suitable well graded & granular material. For Arch pipes it is recommended to be shaped to a relatively flat bottom or fine-grade the foundation to a slight v-shape. Soil aggregates less than 3/8" and unsuitable material should be over-excavated and re-placed with a 4"-6" layer of well graded & granular stone per the material designation.
A	Geotextile Layer	None	None	Contech does not recommend geotextiles be placed under the invert of Infiltration systems due to the propensity for geotextiles to clog over time.
*	Note: The listed AASHTO designations are for gradation only. The stone must also be angular and clean.			

1 MINIMUM WIDTH DEPENDS ON SITE CONDITIONS AND ENGINEERING JUDGEMENT.

FOUNDATION/BEDDING PREPARATION

2 PRIOR TO PLACING THE BEDDING, THE FOUNDATION MUST BE CONSTRUCTED TO A UNIFORM AND STABLE GRADE. IN THE EVENT THAT UNSUITABLE FOUNDATION MATERIALS ARE ENCOUNTERED DURING EXCAVATION, THEY SHALL BE REMOVED AND BROUGHT BACK TO THE GRADE WITH A FILL MATERIAL AS APPROVED BY THE ENGINEER.

5 HAUNCH ZONE MATERIAL SHALL BE PLACED AND UNIFORMLY COMPACTED WITHOUT SOFT SPOTS.

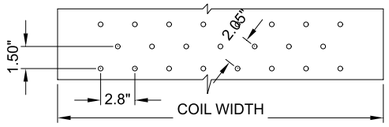
BACKFILL

MATERIAL SHALL BE PLACED IN 8"-10" MAXIMUM LIFTS. INADEQUATE COMPACTION CAN LEAD TO EXCESSIVE DEFLECTIONS WITHIN THE SYSTEM AND SETTLEMENT OF THE SOILS OVER THE SYSTEM. BACKFILL SHALL BE PLACED SUCH THAT THERE IS NO MORE THAN A TWO-LIFT DIFFERENTIAL BETWEEN THE SIDES OF ANY PIPE IN THE SYSTEM AT ALL TIMES DURING THE BACKFILL PROCESS. BACKFILL SHALL BE ADVANCED ALONG THE LENGTH OF THE SYSTEM AT THE SAME RATE TO AVOID DIFFERENTIAL LOADING ON ANY PIPES IN THE SYSTEM.

EQUIPMENT USED TO PLACE AND COMPACT THE BACKFILL SHALL BE OF A SIZE AND TYPE SO AS NOT TO DISTORT, DAMAGE, OR DISPLACE THE PIPE. ATTENTION MUST BE GIVEN TO PROVIDING ADEQUATE MINIMUM COVER FOR SUCH EQUIPMENT. MAINTAIN BALANCED LOADING ON ALL PIPES IN THE SYSTEM DURING ALL SUCH OPERATIONS.

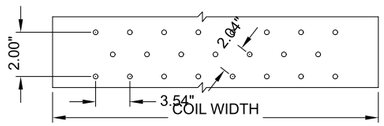
OTHER ALTERNATE BACKFILL MATERIAL MAY BE ALLOWED DEPENDING ON SITE SPECIFIC CONDITIONS. REFER TO TYPICAL BACKFILL DETAIL FOR MATERIAL REQUIRED.

2 2/3" x 1/2" CORRUGATION - STEEL AND ALUMINUM CMP EDGE SPACING EQUAL ON BOTH SIDES



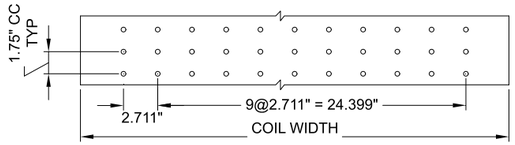
OPEN AREA = 3.76 SQ IN/SQ FT

3" x 1" CORRUGATION - STEEL AND ALUMINUM CMP (COIL PROVIDED FROM CONTECH LANTANA, FL PLANT)



OPEN AREA = 4.16 SQ IN/SQ FT

5" x 1" CORRUGATION - STEEL ONLY
EDGE SPACING EQUAL ON BOTH SIDES



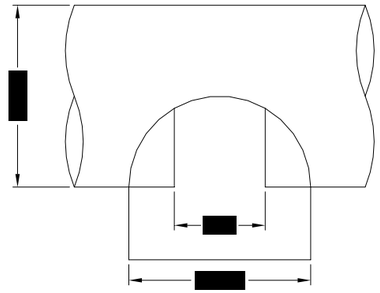
OPEN AREA = 3.33 SQ IN/SQ FT

NOTES:

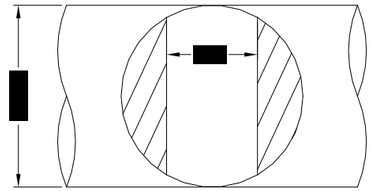
1. PERFORATIONS MEET AASHTO AND ASTM SPECIFICATIONS.
2. PERFORATION OPEN AREA PER SQUARE FOOT OF PIPE IS BASED ON THE NOMINAL DIAMETER AND LENGTH OF PIPE.
3. ALL DIMENSIONS ARE SUBJECT TO MANUFACTURING TOLERANCES.
4. ALL HOLES ⌀3/8".

TYPICAL PERFORATION DETAIL

SCALE: N.T.S.



PLAN

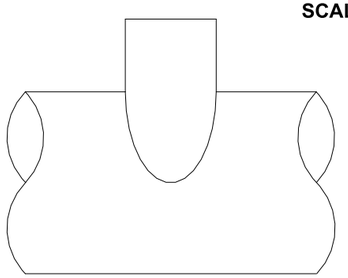


FRONT

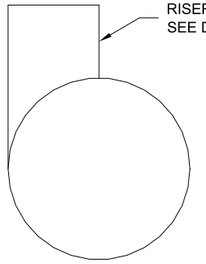
TYPICAL MANWAY DETAIL

SCALE: N.T.S.

NOTE:
MANWAY DETAIL APPLICABLE FOR CMP SYSTEMS WITH DIAMETERS 48" AND LARGER. MANWAYS MAY BE REQUIRED ON SMALLER SYSTEMS DEPENDING ON ACTUAL SITE SPECIFIC CONDITIONS.



ELEVATION

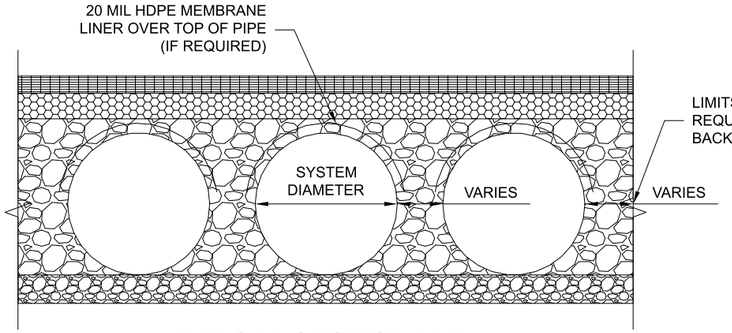


END

TYPICAL RISER DETAIL

SCALE: N.T.S.

NOTE:
LADDERS ARE OPTIONAL AND ARE NOT REQUIRED FOR ALL SYSTEMS.



TYPICAL SECTION VIEW

LINER OVER ROWS
SCALE: N.T.S.

NOTE: IF SALTING AGENTS FOR SNOW AND ICE REMOVAL ARE USED ON OR NEAR THE PROJECT, AN HDPE MEMBRANE LINER IS RECOMMENDED WITH THE SYSTEM. THE IMPERMEABLE LINER IS INTENDED TO HELP PROTECT THE SYSTEM FROM THE POTENTIAL ADVERSE EFFECTS THAT MAY RESULT FROM A CHANGE IN THE SURROUNDING ENVIRONMENT OVER A PERIOD OF TIME. PLEASE REFER TO THE CORRUGATED METAL PIPE DETENTION DESIGN GUIDE FOR ADDITIONAL INFORMATION.

DATE	REVISION DESCRIPTION	BY

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CONTECH CMP DETENTION SYSTEMS
CONTECH DYODS DRAWING

DYO21982 First Hathaway Logistics
120" CMP Detention - 175,000 C.F. - BASIN C
Banning, CA
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
4469	21982	9/29/2022
DESIGNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: DYO	
SHEET NO.: 1		

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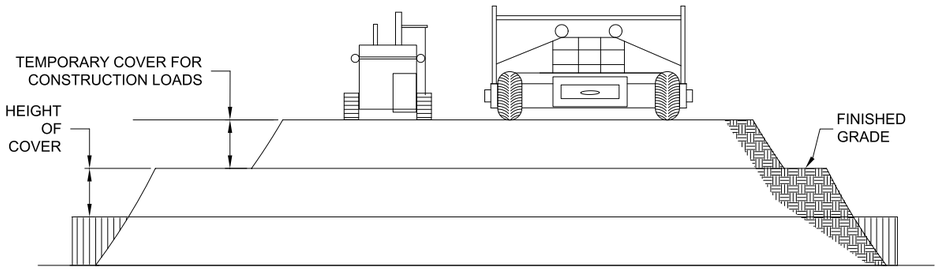

CONSTRUCTION LOADS

FOR TEMPORARY CONSTRUCTION VEHICLE LOADS, AN EXTRA AMOUNT OF COMPACTED COVER MAY BE REQUIRED OVER THE TOP OF THE PIPE. THE HEIGHT-OF-COVER SHALL MEET THE MINIMUM REQUIREMENTS SHOWN IN THE TABLE BELOW. THE USE OF HEAVY CONSTRUCTION EQUIPMENT NECESSITATES GREATER PROTECTION FOR THE PIPE THAN FINISHED GRADE COVER MINIMUMS FOR NORMAL HIGHWAY TRAFFIC.

PIPE SPAN, INCHES	AXLE LOADS (kips)			
	18-50	50-75	75-110	110-150
	MINIMUM COVER (FT)			
12-42	2.0	2.5	3.0	3.0
48-72	3.0	3.0	3.5	4.0
78-120	3.0	3.5	4.0	4.0
126-144	3.5	4.0	4.5	4.5

*MINIMUM COVER MAY VARY, DEPENDING ON LOCAL CONDITIONS. THE CONTRACTOR MUST PROVIDE THE ADDITIONAL COVER REQUIRED TO AVOID DAMAGE TO THE PIPE. MINIMUM COVER IS MEASURED FROM THE TOP OF THE PIPE TO THE TOP OF THE MAINTAINED CONSTRUCTION ROADWAY SURFACE.

CONSTRUCTION LOADING DIAGRAM

SCALE: N.T.S.

SPECIFICATION FOR DESIGNED DETENTION SYSTEM:

SCOPE
THIS SPECIFICATION COVERS THE MANUFACTURE AND INSTALLATION OF THE DESIGNED DETENTION SYSTEM DETAILED IN THE PROJECT PLANS.

MATERIAL
THE MATERIAL SHALL CONFORM TO THE APPLICABLE REQUIREMENTS LISTED BELOW:

ALUMINIZED TYPE 2 STEEL COILS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M-274 OR ASTM A-92.

THE GALVANIZED STEEL COILS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M-218 OR ASTM A-929.

THE POLYMER COATED STEEL COILS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M-246 OR ASTM A-742.

THE ALUMINUM COILS SHALL CONFORM TO THE APPLICABLE OF AASHTO M-197 OR ASTM B-744.

CONSTRUCTION LOADS
CONSTRUCTION LOADS MAY BE HIGHER THAN FINAL LOADS. FOLLOW THE MANUFACTURER'S OR NCSPA GUIDELINES.

PIPE
THE PIPE SHALL BE MANUFACTURED IN ACCORDANCE TO THE APPLICABLE REQUIREMENTS LISTED BELOW:

ALUMINIZED TYPE 2: AASHTO M-36 OR ASTM A-760

GALVANIZED: AASHTO M-36 OR ASTM A-760

APPLICABLE POLYMER COATED: AASHTO M-245 OR ASTM A-762

ALUMINUM: AASHTO M-196 OR ASTM B-745

APPLICABLE
HANDLING AND ASSEMBLY
SHALL BE IN ACCORDANCE WITH NCSP'S (NATIONAL CORRUGATED STEEL PIPE ASSOCIATION) FOR ALUMINIZED TYPE 2, GALVANIZED OR POLYMER COATED STEEL. SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS FOR ALUMINUM PIPE.
REQUIREMENTS
INSTALLATION
SHALL BE IN ACCORDANCE WITH AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, SECTION 26, DIVISION II DIVISION II OR ASTM A-798 (FOR ALUMINIZED TYPE 2, GALVANIZED OR POLYMER COATED STEEL) OR ASTM B-788 (FOR ALUMINUM PIPE) AND IN CONFORMANCE WITH THE PROJECT PLANS AND SPECIFICATIONS. IF THERE ARE ANY INCONSISTENCIES OR CONFLICTS THE CONTRACTOR SHOULD DISCUSS AND RESOLVE WITH THE SITE ENGINEER.

IT IS ALWAYS THE RESPONSIBILITY OF THE CONTRACTOR TO FOLLOW OSHA GUIDELINES FOR SAFE PRACTICES.

NOTE:
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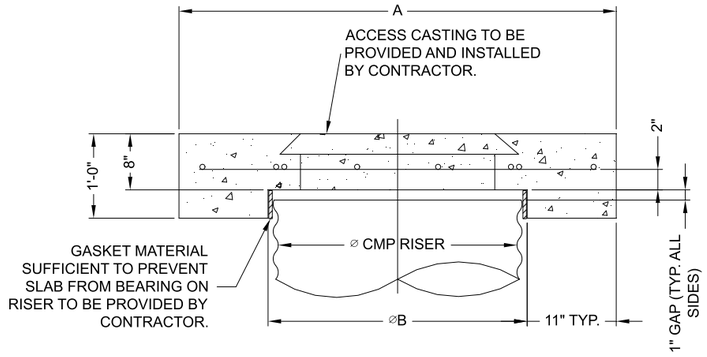
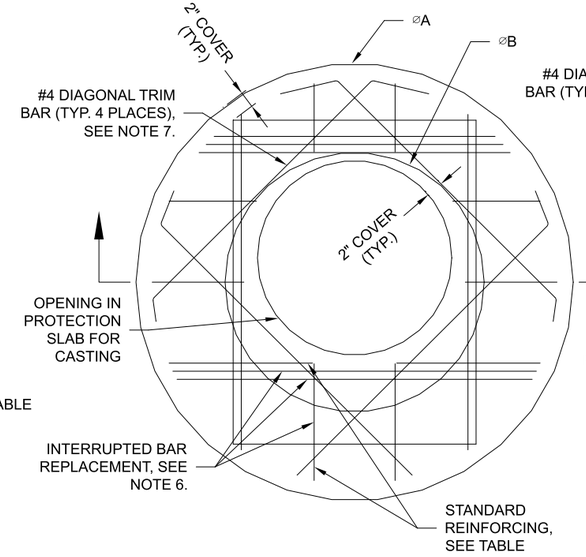


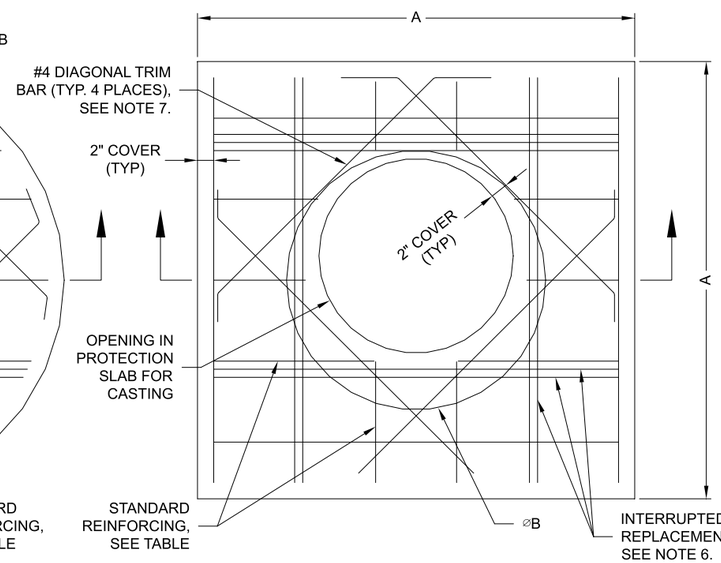
SECTION VIEW

REINFORCING TABLE				
⌀ CMP RISER	A	⌀ B	REINFORCING	**BEARING PRESSURE (PSF)
24"	⌀ 4' 4'X4'	26"	#5 @ 12" OCEW #5 @ 12" OCEW	2,410 1,780
30"	⌀ 4'-6" 4'-6" X 4'-6"	32"	#5 @ 12" OCEW #5 @ 12" OCEW	2,120 1,530
36"	⌀ 5' 5' X 5'	38"	#5 @ 10" OCEW #5 @ 10" OCEW	1,890 1,350
42"	⌀ 5'-6" 5'-6" X 5'-6"	44"	#5 @ 10" OCEW #5 @ 9" OCEW	1,720 1,210
48"	⌀ 6' 6' X 6'	50"	#5 @ 9" OCEW #5 @ 8" OCEW	1,600 1,100

** ASSUMED SOIL BEARING CAPACITY



ROUND OPTION PLAN VIEW



SQUARE OPTION PLAN VIEW

NOTES:

1. DESIGN IN ACCORDANCE WITH AASHTO, 17th EDITION.
2. DESIGN LOAD HS25.
3. EARTH COVER = 1' MAX.
4. CONCRETE STRENGTH = 3,500 psi
5. REINFORCING STEEL = ASTM A615, GRADE 60.
6. PROVIDE ADDITIONAL REINFORCING AROUND OPENINGS EQUAL TO THE BARS INTERRUPTED, HALF EACH SIDE. ADDITIONAL BARS TO BE IN THE SAME PLANE.
7. TRIM OPENING WITH DIAGONAL #4 BARS, EXTEND BARS A MINIMUM OF 12" BEYOND OPENING, BEND BARS AS REQUIRED TO MAINTAIN BAR COVER.
8. PROTECTION SLAB AND ALL MATERIALS TO BE PROVIDED AND INSTALLED BY CONTRACTOR.
9. DETAIL DESIGN BY DELTA ENGINEERING, BINGHAMTON, NY.

MANHOLE CAP DETAIL

SCALE: N.T.S.

DATE	REVISION DESCRIPTION	BY

CONTECH ENGINEERED SOLUTIONS LLC
www.ContechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

CONTECH CMP DETENTION SYSTEMS
CONTECH DYODS DRAWING

DYO21982 First Hathaway Logistics
120" CMP Detention - 175,000 C.F. - BASIN C
Banning, CA
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
4469	21982	9/29/2022
DESIGNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: DYO	
SHEET NO.: 1		

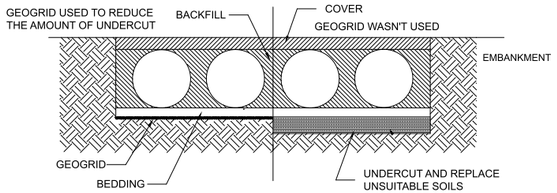
CMP DETENTION INSTALLATION GUIDE

PROPER INSTALLATION OF A FLEXIBLE UNDERGROUND DETENTION SYSTEM WILL ENSURE LONG-TERM PERFORMANCE. THE CONFIGURATION OF THESE SYSTEMS OFTEN REQUIRES SPECIAL CONSTRUCTION PRACTICES THAT DIFFER FROM CONVENTIONAL FLEXIBLE PIPE CONSTRUCTION. CONTECH ENGINEERED SOLUTIONS STRONGLY SUGGESTS SCHEDULING A PRE-CONSTRUCTION MEETING WITH YOUR LOCAL SALES ENGINEER TO DETERMINE IF ADDITIONAL MEASURES, NOT COVERED IN THIS GUIDE, ARE APPROPRIATE FOR YOUR SITE.

FOUNDATION

CONSTRUCT A FOUNDATION THAT CAN SUPPORT THE DESIGN LOADING APPLIED BY THE PIPE AND ADJACENT BACKFILL WEIGHT AS WELL AS MAINTAIN ITS INTEGRITY DURING CONSTRUCTION.

IF SOFT OR UNSUITABLE SOILS ARE ENCOUNTERED, REMOVE THE POOR SOILS DOWN TO A SUITABLE DEPTH AND THEN BUILD UP TO THE APPROPRIATE ELEVATION WITH A COMPETENT BACKFILL MATERIAL. THE STRUCTURAL FILL MATERIAL GRADATION SHOULD NOT ALLOW THE MIGRATION OF FINES, WHICH CAN CAUSE SETTLEMENT OF THE DETENTION SYSTEM OR PAVEMENT ABOVE. IF THE STRUCTURAL FILL MATERIAL IS NOT COMPATIBLE WITH THE UNDERLYING SOILS AN ENGINEERING FABRIC SHOULD BE USED AS A SEPARATOR. IN SOME CASES, USING A STIFF REINFORCING GEOGRID REDUCES OVER EXCAVATION AND REPLACEMENT FILL QUANTITIES.

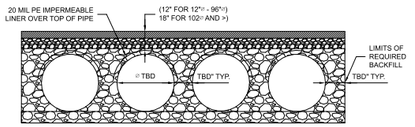


GRADE THE FOUNDATION SUBGRADE TO A UNIFORM OR SLIGHTLY SLOPING GRADE. IF THE SUBGRADE IS CLAY OR RELATIVELY NON-POROUS AND THE CONSTRUCTION SEQUENCE WILL LAST FOR AN EXTENDED PERIOD OF TIME, IT IS BEST TO SLOPE THE GRADE TO ONE END OF THE SYSTEM. THIS WILL ALLOW EXCESS WATER TO DRAIN QUICKLY, PREVENTING SATURATION OF THE SUBGRADE.

GEOMEMBRANE BARRIER

A SITE'S RESISTIVITY MAY CHANGE OVER TIME WHEN VARIOUS TYPES OF SALTING AGENTS ARE USED, SUCH AS ROAD SALTS FOR DEICING AGENTS. IF SALTING AGENTS ARE USED ON OR NEAR THE PROJECT SITE, A GEOMEMBRANE BARRIER IS RECOMMENDED WITH THE SYSTEM. THE GEOMEMBRANE LINER IS INTENDED TO HELP PROTECT THE SYSTEM FROM THE POTENTIAL ADVERSE EFFECTS THAT MAY RESULT FROM THE USE OF SUCH AGENTS INCLUDING PREMATURE CORROSION AND REDUCED ACTUAL SERVICE LIFE.

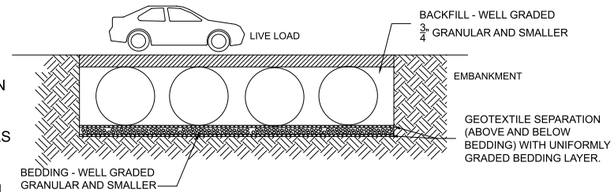
THE PROJECT'S ENGINEER OF RECORD IS TO EVALUATE WHETHER SALTING AGENTS WILL BE USED ON OR NEAR THE PROJECT SITE, AND USE HIS/HER BEST JUDGEMENT TO DETERMINE IF ANY ADDITIONAL PROTECTIVE MEASURES ARE REQUIRED. BELOW IS A TYPICAL DETAIL SHOWING THE PLACEMENT OF A GEOMEMBRANE BARRIER FOR PROJECTS WHERE SALTING AGENTS ARE USED ON OR NEAR THE PROJECT SITE.



IN-SITU TRENCH WALL

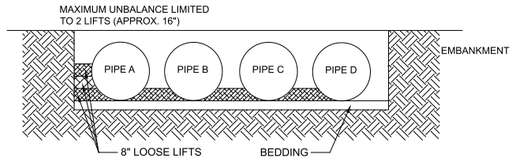
IF EXCAVATION IS REQUIRED, THE TRENCH WALL NEEDS TO BE CAPABLE OF SUPPORTING THE LOAD THAT THE PIPE SHEDS AS THE SYSTEM IS LOADED. IF SOILS ARE NOT CAPABLE OF SUPPORTING THESE LOADS, THE PIPE CAN DEFLECT. PERFORM A SIMPLE SOIL PRESSURE CHECK USING THE APPLIED LOADS TO DETERMINE THE LIMITS OF EXCAVATION BEYOND THE SPRING LINE OF THE OUTER MOST PIPES.

IN MOST CASES THE REQUIREMENTS FOR A SAFE WORK ENVIRONMENT AND PROPER BACKFILL PLACEMENT AND COMPACTION TAKE CARE OF THIS CONCERN.



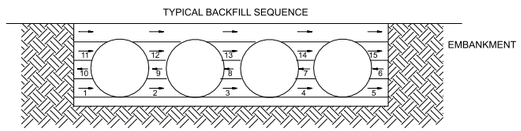
BACKFILL PLACEMENT

MATERIAL SHALL BE WORKED INTO THE PIPE HAUNCHES BY MEANS OF SHOVEL-SLICING, RODDING, AIR TAMPER, VIBRATORY ROD, OR OTHER EFFECTIVE METHODS.

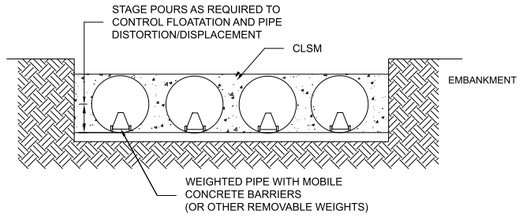


IF AASHTO T99 PROCEDURES ARE DETERMINED INFEASIBLE BY THE GEOTECHNICAL ENGINEER OF RECORD, COMPACTION IS CONSIDERED ADEQUATE WHEN NO FURTHER YIELDING OF THE MATERIAL IS OBSERVED UNDER THE COMPACTOR, OR UNDER FOOT, AND THE GEOTECHNICAL ENGINEER OF RECORD (OR REPRESENTATIVE THEREOF) IS SATISFIED WITH THE LEVEL OF COMPACTION.

FOR LARGE SYSTEMS, CONVEYOR SYSTEMS, BACKHOES WITH LONG REACHES OR DRAGLINES WITH STONE BUCKETS MAY BE USED TO PLACE BACKFILL. ONCE MINIMUM COVER FOR CONSTRUCTION LOADING ACROSS THE ENTIRE WIDTH OF THE SYSTEM IS REACHED, ADVANCE THE EQUIPMENT TO THE END OF THE RECENTLY PLACED FILL, AND BEGIN THE SEQUENCE AGAIN UNTIL THE SYSTEM IS COMPLETELY BACKFILLED. THIS TYPE OF CONSTRUCTION SEQUENCE PROVIDES ROOM FOR STOCKPILED BACKFILL DIRECTLY BEHIND THE BACKHOE, AS WELL AS THE MOVEMENT OF CONSTRUCTION TRAFFIC. MATERIAL STOCKPILES ON TOP OF THE BACKFILLED DETENTION SYSTEM SHOULD BE LIMITED TO 8- TO 10-FEET HIGH AND MUST PROVIDE BALANCED LOADING ACROSS ALL BARRELS. TO DETERMINE THE PROPER COVER OVER THE PIPES TO ALLOW THE MOVEMENT OF CONSTRUCTION EQUIPMENT SEE TABLE 1, OR CONTACT YOUR LOCAL CONTECH SALES ENGINEER.



WHEN FLOWABLE FILL IS USED, YOU MUST PREVENT PIPE FLOATATION. TYPICALLY, SMALL LIFTS ARE PLACED BETWEEN THE PIPES AND THEN ALLOWED TO SET-UP PRIOR TO THE PLACEMENT OF THE NEXT LIFT. THE ALLOWABLE THICKNESS OF THE CLSM LIFT IS A FUNCTION OF A PROPER BALANCE BETWEEN THE UPLIFT FORCE OF THE CLSM, THE OPPOSING WEIGHT OF THE PIPE, AND THE EFFECT OF OTHER RESTRAINING MEASURES. THE PIPE CAN CARRY LIMITED FLUID PRESSURE WITHOUT PIPE DISTORTION OR DISPLACEMENT, WHICH ALSO AFFECTS THE CLSM LIFT THICKNESS. YOUR LOCAL CONTECH SALES ENGINEER CAN HELP DETERMINE THE PROPER LIFT THICKNESS.

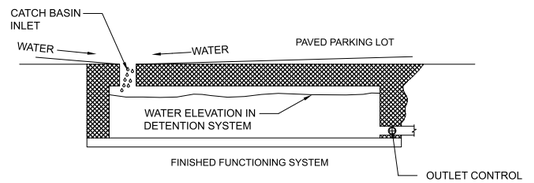


CONSTRUCTION LOADING

TYPICALLY, THE MINIMUM COVER SPECIFIED FOR A PROJECT ASSUMES H-20 LIVE LOAD. BECAUSE CONSTRUCTION LOADS OFTEN EXCEED DESIGN LIVE LOADS, INCREASED TEMPORARY MINIMUM COVER REQUIREMENTS ARE NECESSARY. SINCE CONSTRUCTION EQUIPMENT VARIES FROM JOB TO JOB, IT IS BEST TO ADDRESS EQUIPMENT SPECIFIC MINIMUM COVER REQUIREMENTS WITH YOUR LOCAL CONTECH SALES ENGINEER DURING YOUR PRE-CONSTRUCTION MEETING.

ADDITIONAL CONSIDERATIONS

BECAUSE MOST SYSTEMS ARE CONSTRUCTED BELOW-GRADE, RAINFALL CAN RAPIDLY FILL THE EXCAVATION; POTENTIALLY CAUSING FLOATATION AND MOVEMENT OF THE PREVIOUSLY PLACED PIPES. TO HELP MITIGATE POTENTIAL PROBLEMS, IT IS BEST TO START THE INSTALLATION AT THE DOWNSTREAM END WITH THE OUTLET ALREADY CONSTRUCTED TO ALLOW A ROUTE FOR THE WATER TO ESCAPE. TEMPORARY DIVERSION MEASURES MAY BE REQUIRED FOR HIGH FLOWS DUE TO THE RESTRICTED NATURE OF THE OUTLET PIPE.



CMP DETENTION SYSTEM INSPECTION AND MAINTENANCE

UNDERGROUND STORMWATER DETENTION AND INFILTRATION SYSTEMS MUST BE INSPECTED AND MAINTAINED AT REGULAR INTERVALS FOR PURPOSES OF PERFORMANCE AND LONGEVITY.

INSPECTION

INSPECTION IS THE KEY TO EFFECTIVE MAINTENANCE OF CMP DETENTION SYSTEMS AND IS EASILY PERFORMED. CONTECH RECOMMENDS ONGOING, ANNUAL INSPECTIONS. SITES WITH HIGH TRASH LOAD OR SMALL OUTLET CONTROL ORIFICES MAY NEED MORE FREQUENT INSPECTIONS. THE RATE AT WHICH THE SYSTEM COLLECTS POLLUTANTS WILL DEPEND MORE ON SITE SPECIFIC ACTIVITIES RATHER THAN THE SIZE OR CONFIGURATION OF THE SYSTEM.

INSPECTIONS SHOULD BE PERFORMED MORE OFTEN IN EQUIPMENT WASHDOWN AREAS, IN CLIMATES WHERE SANDING AND/OR SALTING OPERATIONS TAKE PLACE, AND IN OTHER VARIOUS INSTANCES IN WHICH ONE WOULD EXPECT HIGHER ACCUMULATIONS OF SEDIMENT OR ABRASIVE/ CORROSIVE CONDITIONS. A RECORD OF EACH INSPECTION IS TO BE MAINTAINED FOR THE LIFE OF THE SYSTEM

MAINTENANCE

CMP DETENTION SYSTEMS SHOULD BE CLEANED WHEN AN INSPECTION REVEALS ACCUMULATED SEDIMENT OR TRASH IS CLOGGING THE DISCHARGE ORIFICE.

ACCUMULATED SEDIMENT AND TRASH CAN TYPICALLY BE EVACUATED THROUGH THE MANHOLE OVER THE OUTLET ORIFICE. IF MAINTENANCE IS NOT PERFORMED AS RECOMMENDED, SEDIMENT AND TRASH MAY ACCUMULATE IN FRONT OF THE OUTLET ORIFICE. MANHOLE COVERS SHOULD BE SECURELY SEATED FOLLOWING CLEANING ACTIVITIES. CONTECH SUGGESTS THAT ALL SYSTEMS BE DESIGNED WITH AN ACCESS/INSPECTION MANHOLE SITUATED AT OR NEAR THE INLET AND THE OUTLET ORIFICE. SHOULD IT BE NECESSARY TO GET INSIDE THE SYSTEM TO PERFORM MAINTENANCE ACTIVITIES, ALL APPROPRIATE PRECAUTIONS REGARDING CONFINED SPACE ENTRY AND OSHA REGULATIONS SHOULD BE FOLLOWED.

ANNUAL INSPECTIONS ARE BEST PRACTICE FOR ALL UNDERGROUND SYSTEMS. DURING THIS INSPECTION, IF EVIDENCE OF SALTING/DE-ICING AGENTS IS OBSERVED WITHIN THE SYSTEM, IT IS BEST PRACTICE FOR THE SYSTEM TO BE RINSED, INCLUDING ABOVE THE SPRING LINE SOON AFTER THE SPRING THAW AS PART OF THE MAINTENANCE PROGRAM FOR THE SYSTEM.

MAINTAINING AN UNDERGROUND DETENTION OR INFILTRATION SYSTEM IS EASIEST WHEN THERE IS NO FLOW ENTERING THE SYSTEM. FOR THIS REASON, IT IS A GOOD IDEA TO SCHEDULE THE CLEANOUT DURING DRY WEATHER.

THE FOREGOING INSPECTION AND MAINTENANCE EFFORTS HELP ENSURE UNDERGROUND PIPE SYSTEMS USED FOR STORMWATER STORAGE CONTINUE TO FUNCTION AS INTENDED BY IDENTIFYING RECOMMENDED REGULAR INSPECTION AND MAINTENANCE PRACTICES. INSPECTION AND MAINTENANCE RELATED TO THE STRUCTURAL INTEGRITY OF THE PIPE OR THE SOUNDNESS OF PIPE JOINT CONNECTIONS IS BEYOND THE SCOPE OF THIS GUIDE.

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DATE	REVISION DESCRIPTION	BY

CONTECH ENGINEERED SOLUTIONS LLC
www.ContechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

CONTECH CMP DETENTION SYSTEMS
CONTECH DYODS DRAWING

DYO21982 First Hathaway Logistics
120" CMP Detention - 175,000 C.F. - BASIN C
Banning, CA
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
4469	21982	9/29/2022
DESIGNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: DYO	
SHEET NO.: 1		

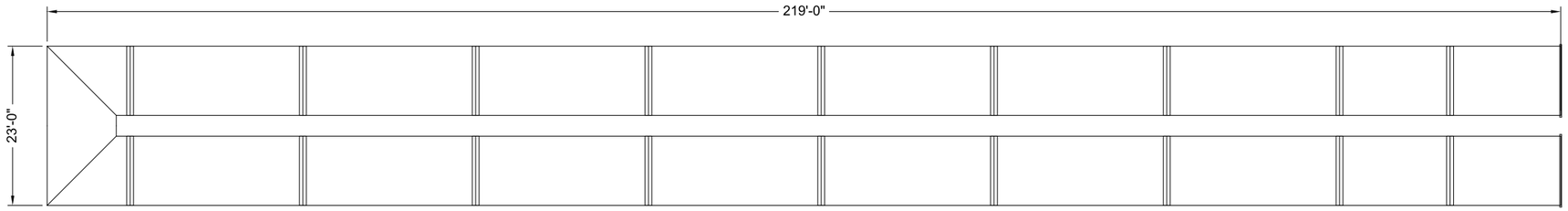
PROJECT SUMMARY

CALCULATION DETAILS
- LOADING = HS20/HS25
- APPROX. LINEAR FOOTAGE = 441 LF

STORAGE SUMMARY
- STORAGE VOLUME REQUIRED = 45,000 CF
- PIPE STORAGE VOLUME = 34,636 CF
- BACKFILL STORAGE VOLUME = 10,456 CF
- TOTAL STORAGE PROVIDED = 45,092 CF

PIPE DETAILS
- DIAMETER = 120"
- CORRUGATION = 5x1
- GAGE = 14
- COATING = ALT2
- WALL TYPE = PERFORATED
- BARREL SPACING = 36"

BACKFILL DETAILS
- WIDTH AT ENDS = 12"
- ABOVE PIPE = 6"
- WIDTH AT SIDES = 12"
- BELOW PIPE = 6"



NOTES

- ALL RISER AND STUB DIMENSIONS ARE TO CENTERLINE. ALL ELEVATIONS, DIMENSIONS, AND LOCATIONS OF RISERS AND INLETS, SHALL BE VERIFIED BY THE ENGINEER OF RECORD PRIOR TO RELEASING FOR FABRICATION.
- ALL FITTINGS AND REINFORCEMENT COMPLY WITH ASTM A998.
- ALL RISERS AND STUBS ARE $2\frac{2}{3}$" x $\frac{1}{2}$" CORRUGATION AND 16 GAGE UNLESS OTHERWISE NOTED.
- RISERS TO BE FIELD TRIMMED TO GRADE.
- QUANTITY OF PIPE SHOWN DOES NOT PROVIDE EXTRA PIPE FOR CONNECTING THE SYSTEM TO EXISTING PIPE OR DRAINAGE STRUCTURES. OUR SYSTEM AS DETAILED PROVIDES NOMINAL INLET AND/OR OUTLET PIPE STUB FOR CONNECTION TO EXISTING DRAINAGE FACILITIES. IF ADDITIONAL PIPE IS NEEDED IT IS THE RESPONSIBILITY OF THE CONTRACTOR.
- BAND TYPE TO BE DETERMINED UPON FINAL DESIGN.
- THE PROJECT SUMMARY IS REFLECTIVE OF THE DYODS DESIGN, QUANTITIES ARE APPROX. AND SHOULD BE VERIFIED UPON FINAL DESIGN AND APPROVAL. FOR EXAMPLE, TOTAL EXCAVATION DOES NOT CONSIDER ALL VARIABLES SUCH AS SHORING AND ONLY ACCOUNTS FOR MATERIAL WITHIN THE ESTIMATED EXCAVATION FOOTPRINT.
- THESE DRAWINGS ARE FOR CONCEPTUAL PURPOSES AND DO NOT REFLECT ANY LOCAL PREFERENCES OR REGULATIONS. PLEASE CONTACT YOUR LOCAL CONTECH REP FOR MODIFICATIONS.

ASSEMBLY
SCALE: 1" = 20'

CONCEPTUAL SIZING FOR RETENTION BASIN "D"

DATE	REVISION DESCRIPTION	BY

CONTECH ENGINEERED SOLUTIONS LLC
www.ContechES.com
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CONTECH CMP DETENTION SYSTEMS
CONTECH DYODS DRAWING

DYO21983 First Hathaway Logistics
120" CMP Detention - 45,000 C.F. - BASIN D
Banning, CA
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
4469	21983	9/29/2022
DESIGNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: DYO	
SHEET NO.: 1		

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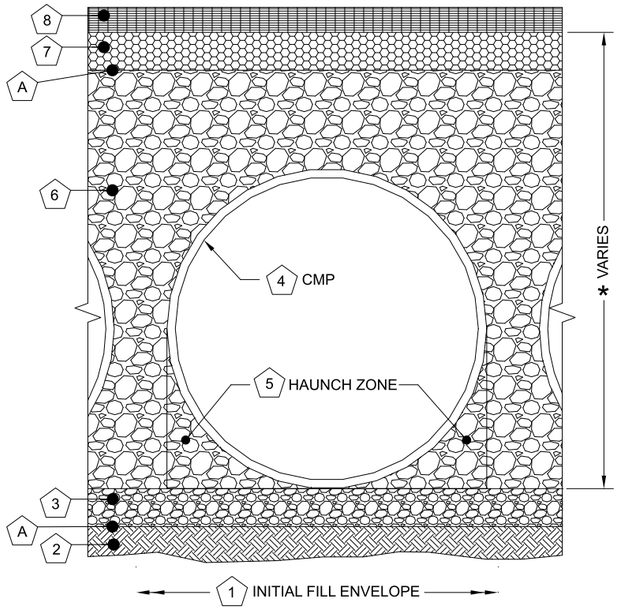


Infiltration Systems - CMP Infiltration & CMP Perforated Drainage Pipe			
Material Location	Description	Material Designation	Designation
8 Rigid or Flexible Pavement (if applicable)			
7 Road Base (if applicable			
A Geotextile Layer	Non-Woven Geotextile	CONTECH C-40 or C-45	Engineer Decision for consideration to prevent soil migration into varying soil types. Wrap the trench only.
6 Backfill	Infiltration pipe systems have a pipe perforation sized of 3/8" diameter. An open graded, free draining stone, with a particle size of ½" – 2 ½" diameter is recommended.	AASHTO M 145-A-1 or AASHTO M 43 - 3, 4	Material shall be worked into the pipe haunches by means of shovel-slicing, rodding, air-tamper, vibratory rod, or other effective methods. Compaction of all placed fill material is necessary and shall be considered adequate when no further yielding of the material is observed under the compactor, or under foot, and the Project Engineer or his representative is satisfied with the level of compaction"
3 Bedding Stone	Well graded granular bedding material w/maximum particle size of 3"	AASHTO M43 - 3,357,4,467, 5, 56, 57	For soil aggregates larger than 3/8" a dedicated bedding layer is not required for CMP. Pipe may be placed on the trench bottom comprised of native suitable well graded & granular material. For Arch pipes it is recommended to be shaped to a relatively flat bottom or fine-grade the foundation to a slight v-shape. Soil aggregates less than 3/8" and unsuitable material should be over-excavated and re-placed with a 4"-6" layer of well graded & granular stone per the material designation.
A Geotextile Layer	None	None	Contech does not recommend geotextiles be placed under the invert of Infiltration systems due to the propensity for geotextiles to clog over time.
* Note: The listed AASHTO designations are for gradation only. The stone must also be angular and clean.			

1 MINIMUM WIDTH DEPENDS ON SITE CONDITIONS AND ENGINEERING JUDGEMENT.

FOUNDATION/BEDDING PREPARATION

2 PRIOR TO PLACING THE BEDDING, THE FOUNDATION MUST BE CONSTRUCTED TO A UNIFORM AND STABLE GRADE. IN THE EVENT THAT UNSUITABLE FOUNDATION MATERIALS ARE ENCOUNTERED DURING EXCAVATION, THEY SHALL BE REMOVED AND BROUGHT BACK TO THE GRADE WITH A FILL MATERIAL AS APPROVED BY THE ENGINEER.

5 HAUNCH ZONE MATERIAL SHALL BE PLACED AND UNIFORMLY COMPACTED WITHOUT SOFT SPOTS.

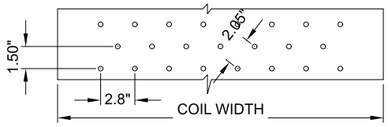
BACKFILL

MATERIAL SHALL BE PLACED IN 8"-10" MAXIMUM LIFTS. INADEQUATE COMPACTION CAN LEAD TO EXCESSIVE DEFLECTIONS WITHIN THE SYSTEM AND SETTLEMENT OF THE SOILS OVER THE SYSTEM. BACKFILL SHALL BE PLACED SUCH THAT THERE IS NO MORE THAN A TWO-LIFT DIFFERENTIAL BETWEEN THE SIDES OF ANY PIPE IN THE SYSTEM AT ALL TIMES DURING THE BACKFILL PROCESS. BACKFILL SHALL BE ADVANCED ALONG THE LENGTH OF THE SYSTEM AT THE SAME RATE TO AVOID DIFFERENTIAL LOADING ON ANY PIPES IN THE SYSTEM.

EQUIPMENT USED TO PLACE AND COMPACT THE BACKFILL SHALL BE OF A SIZE AND TYPE SO AS NOT TO DISTORT, DAMAGE, OR DISPLACE THE PIPE. ATTENTION MUST BE GIVEN TO PROVIDING ADEQUATE MINIMUM COVER FOR SUCH EQUIPMENT. MAINTAIN BALANCED LOADING ON ALL PIPES IN THE SYSTEM DURING ALL SUCH OPERATIONS.

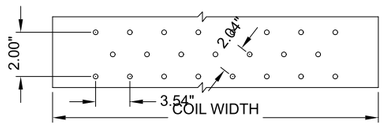
OTHER ALTERNATE BACKFILL MATERIAL MAY BE ALLOWED DEPENDING ON SITE SPECIFIC CONDITIONS. REFER TO TYPICAL BACKFILL DETAIL FOR MATERIAL REQUIRED.

2 2/3" x 1/2" CORRUGATION - STEEL AND ALUMINUM CMP EDGE SPACING EQUAL ON BOTH SIDES



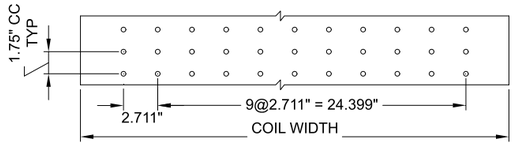
OPEN AREA = 3.76 SQ IN/SQ FT

3" x 1" CORRUGATION - STEEL AND ALUMINUM CMP (COIL PROVIDED FROM CONTECH LANTANA, FL PLANT)



OPEN AREA = 4.16 SQ IN/SQ FT

5" x 1" CORRUGATION - STEEL ONLY
EDGE SPACING EQUAL ON BOTH SIDES



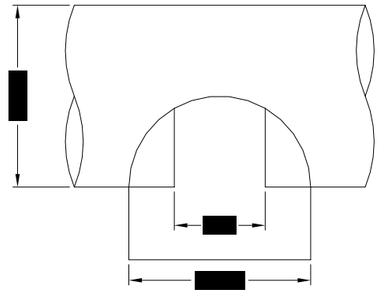
OPEN AREA = 3.33 SQ IN/SQ FT

NOTES:

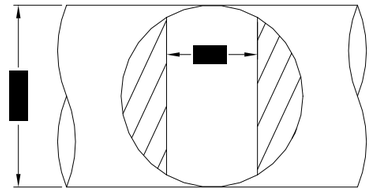
1. PERFORATIONS MEET AASHTO AND ASTM SPECIFICATIONS.
2. PERFORATION OPEN AREA PER SQUARE FOOT OF PIPE IS BASED ON THE NOMINAL DIAMETER AND LENGTH OF PIPE.
3. ALL DIMENSIONS ARE SUBJECT TO MANUFACTURING TOLERANCES.
4. ALL HOLES ⌀3/8".

TYPICAL PERFORATION DETAIL

SCALE: N.T.S.



PLAN

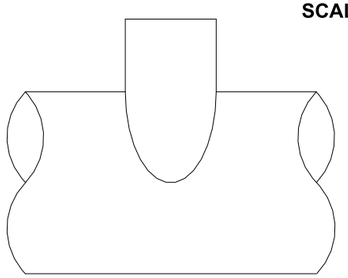


FRONT

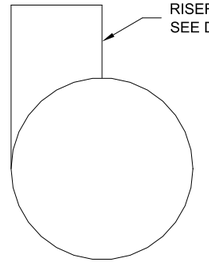
TYPICAL MANWAY DETAIL

SCALE: N.T.S.

NOTE:
MANWAY DETAIL APPLICABLE FOR CMP SYSTEMS WITH DIAMETERS 48" AND LARGER. MANWAYS MAY BE REQUIRED ON SMALLER SYSTEMS DEPENDING ON ACTUAL SITE SPECIFIC CONDITIONS.



ELEVATION

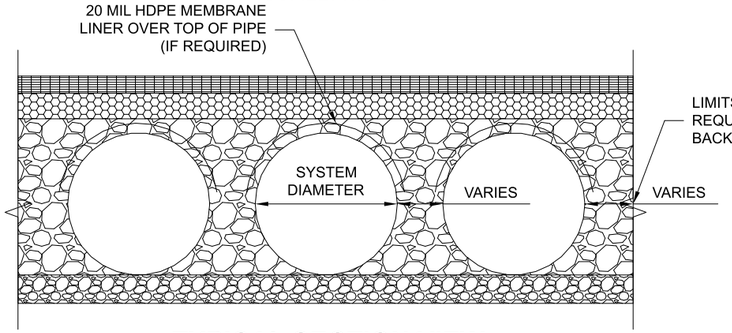


END

TYPICAL RISER DETAIL

SCALE: N.T.S.

NOTE:
LADDERS ARE OPTIONAL AND ARE NOT REQUIRED FOR ALL SYSTEMS.



TYPICAL SECTION VIEW

LINER OVER ROWS
SCALE: N.T.S.

NOTE: IF SALTING AGENTS FOR SNOW AND ICE REMOVAL ARE USED ON OR NEAR THE PROJECT, AN HDPE MEMBRANE LINER IS RECOMMENDED WITH THE SYSTEM. THE IMPERMEABLE LINER IS INTENDED TO HELP PROTECT THE SYSTEM FROM THE POTENTIAL ADVERSE EFFECTS THAT MAY RESULT FROM A CHANGE IN THE SURROUNDING ENVIRONMENT OVER A PERIOD OF TIME. PLEASE REFER TO THE CORRUGATED METAL PIPE DETENTION DESIGN GUIDE FOR ADDITIONAL INFORMATION.

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CONTECH CMP DETENTION SYSTEMS
CONTECH DYODS DRAWING

DYO21983 First Hathaway Logistics
120" CMP Detention - 45,000 C.F. - BASIN D
Banning, CA
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
4469	21983	9/29/2022
DESIGNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: DYO	
SHEET NO.: 1		

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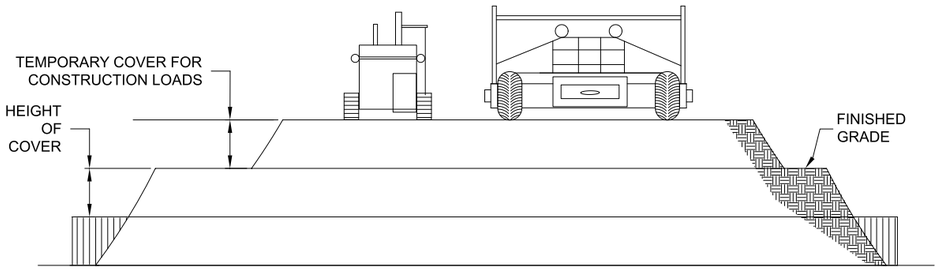


CONSTRUCTION LOADS

FOR TEMPORARY CONSTRUCTION VEHICLE LOADS, AN EXTRA AMOUNT OF COMPACTED COVER MAY BE REQUIRED OVER THE TOP OF THE PIPE. THE HEIGHT-OF-COVER SHALL MEET THE MINIMUM REQUIREMENTS SHOWN IN THE TABLE BELOW. THE USE OF HEAVY CONSTRUCTION EQUIPMENT NECESSITATES GREATER PROTECTION FOR THE PIPE THAN FINISHED GRADE COVER MINIMUMS FOR NORMAL HIGHWAY TRAFFIC.

PIPE SPAN, INCHES	AXLE LOADS (kips)			
	18-50	50-75	75-110	110-150
	MINIMUM COVER (FT)			
12-42	2.0	2.5	3.0	3.0
48-72	3.0	3.0	3.5	4.0
78-120	3.0	3.5	4.0	4.0
126-144	3.5	4.0	4.5	4.5

*MINIMUM COVER MAY VARY, DEPENDING ON LOCAL CONDITIONS. THE CONTRACTOR MUST PROVIDE THE ADDITIONAL COVER REQUIRED TO AVOID DAMAGE TO THE PIPE. MINIMUM COVER IS MEASURED FROM THE TOP OF THE PIPE TO THE TOP OF THE MAINTAINED CONSTRUCTION ROADWAY SURFACE.

CONSTRUCTION LOADING DIAGRAM

SCALE: N.T.S.

SPECIFICATION FOR DESIGNED DETENTION SYSTEM:

SCOPE
THIS SPECIFICATION COVERS THE MANUFACTURE AND INSTALLATION OF THE DESIGNED DETENTION SYSTEM DETAILED IN THE PROJECT PLANS.

MATERIAL
THE MATERIAL SHALL CONFORM TO THE APPLICABLE REQUIREMENTS LISTED BELOW:

ALUMINIZED TYPE 2 STEEL COILS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M-274 OR ASTM A-92.

THE GALVANIZED STEEL COILS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M-218 OR ASTM A-929.

THE POLYMER COATED STEEL COILS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M-246 OR ASTM A-742.

THE ALUMINUM COILS SHALL CONFORM TO THE APPLICABLE OF AASHTO M-197 OR ASTM B-744.

CONSTRUCTION LOADS
CONSTRUCTION LOADS MAY BE HIGHER THAN FINAL LOADS. FOLLOW THE MANUFACTURER'S OR NCSPA GUIDELINES.

PIPE
THE PIPE SHALL BE MANUFACTURED IN ACCORDANCE TO THE APPLICABLE REQUIREMENTS LISTED BELOW:

ALUMINIZED TYPE 2: AASHTO M-36 OR ASTM A-760

GALVANIZED: AASHTO M-36 OR ASTM A-760

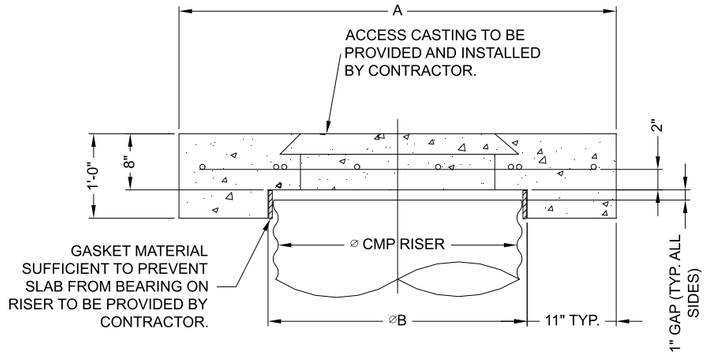
APPLICABLE POLYMER COATED: AASHTO M-245 OR ASTM A-762

ALUMINUM: AASHTO M-196 OR ASTM B-745

APPLICABLE
HANDLING AND ASSEMBLY
SHALL BE IN ACCORDANCE WITH NCSP'S (NATIONAL CORRUGATED STEEL PIPE ASSOCIATION) FOR ALUMINIZED TYPE 2, GALVANIZED OR POLYMER COATED STEEL. SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS FOR ALUMINUM PIPE.
REQUIREMENTS
INSTALLATION
SHALL BE IN ACCORDANCE WITH AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, SECTION 26, DIVISION II DIVISION II OR ASTM A-798 (FOR ALUMINIZED TYPE 2, GALVANIZED OR POLYMER COATED STEEL) OR ASTM B-788 (FOR ALUMINUM PIPE) AND IN CONFORMANCE WITH THE PROJECT PLANS AND SPECIFICATIONS. IF THERE ARE ANY INCONSISTENCIES OR CONFLICTS THE CONTRACTOR SHOULD DISCUSS AND RESOLVE WITH THE SITE ENGINEER.

IT IS ALWAYS THE RESPONSIBILITY OF THE CONTRACTOR TO FOLLOW OSHA GUIDELINES FOR SAFE PRACTICES.

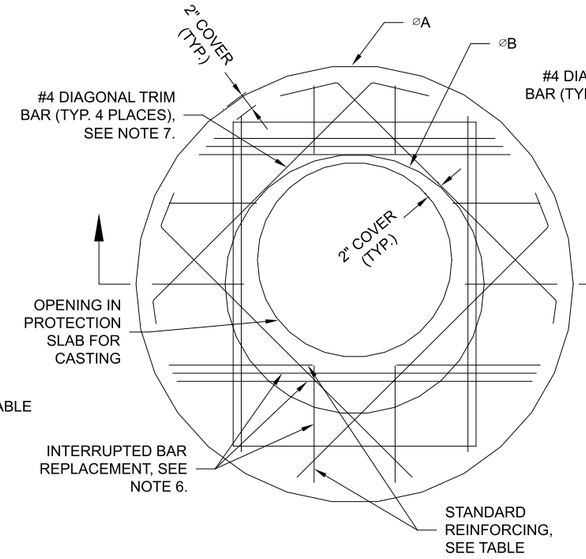
NOTE:
THESE DRAWINGS ARE FOR CONCEPTUAL PURPOSES AND DO NOT REFLECT ANY LOCAL PREFERENCES OR REGULATIONS. PLEASE CONTACT YOUR LOCAL CONTECH REP FOR MODIFICATIONS.



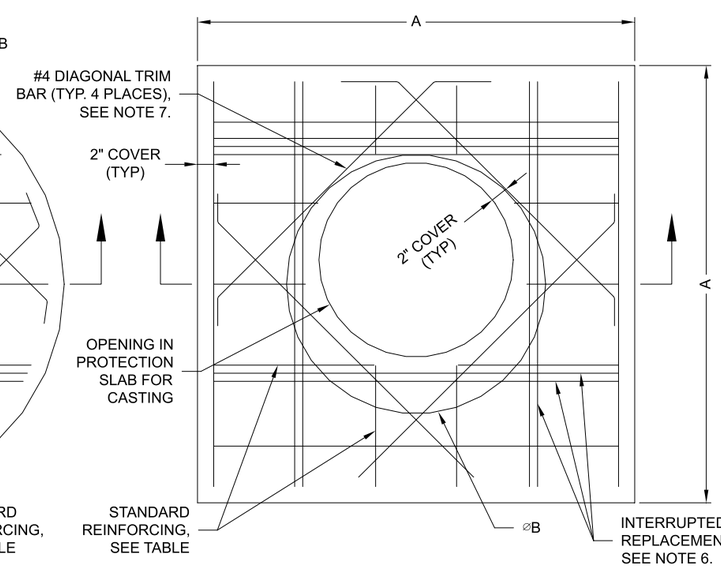
SECTION VIEW

REINFORCING TABLE				
⌀ CMP RISER	A	⌀ B	REINFORCING	**BEARING PRESSURE (PSF)
24"	⌀ 4' 4'X4'	26"	#5 @ 12" OCEW #5 @ 12" OCEW	2,410 1,780
30"	⌀ 4'-6" 4'-6" X 4'-6"	32"	#5 @ 12" OCEW #5 @ 12" OCEW	2,120 1,530
36"	⌀ 5' 5' X 5'	38"	#5 @ 10" OCEW #5 @ 10" OCEW	1,890 1,350
42"	⌀ 5'-6" 5'-6" X 5'-6"	44"	#5 @ 10" OCEW #5 @ 9" OCEW	1,720 1,210
48"	⌀ 6' 6' X 6'	50"	#5 @ 9" OCEW #5 @ 8" OCEW	1,600 1,100

** ASSUMED SOIL BEARING CAPACITY



ROUND OPTION PLAN VIEW



SQUARE OPTION PLAN VIEW

NOTES:

1. DESIGN IN ACCORDANCE WITH AASHTO, 17th EDITION.
2. DESIGN LOAD HS25.
3. EARTH COVER = 1' MAX.
4. CONCRETE STRENGTH = 3,500 psi
5. REINFORCING STEEL = ASTM A615, GRADE 60.
6. PROVIDE ADDITIONAL REINFORCING AROUND OPENINGS EQUAL TO THE BARS INTERRUPTED, HALF EACH SIDE. ADDITIONAL BARS TO BE IN THE SAME PLANE.
7. TRIM OPENING WITH DIAGONAL #4 BARS, EXTEND BARS A MINIMUM OF 12" BEYOND OPENING, BEND BARS AS REQUIRED TO MAINTAIN BAR COVER.
8. PROTECTION SLAB AND ALL MATERIALS TO BE PROVIDED AND INSTALLED BY CONTRACTOR.
9. DETAIL DESIGN BY DELTA ENGINEERING, BINGHAMTON, NY.

MANHOLE CAP DETAIL

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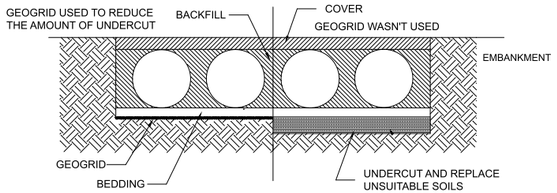
CMP DETENTION INSTALLATION GUIDE

PROPER INSTALLATION OF A FLEXIBLE UNDERGROUND DETENTION SYSTEM WILL ENSURE LONG-TERM PERFORMANCE. THE CONFIGURATION OF THESE SYSTEMS OFTEN REQUIRES SPECIAL CONSTRUCTION PRACTICES THAT DIFFER FROM CONVENTIONAL FLEXIBLE PIPE CONSTRUCTION. CONTECH ENGINEERED SOLUTIONS STRONGLY SUGGESTS SCHEDULING A PRE-CONSTRUCTION MEETING WITH YOUR LOCAL SALES ENGINEER TO DETERMINE IF ADDITIONAL MEASURES, NOT COVERED IN THIS GUIDE, ARE APPROPRIATE FOR YOUR SITE.

FOUNDATION

CONSTRUCT A FOUNDATION THAT CAN SUPPORT THE DESIGN LOADING APPLIED BY THE PIPE AND ADJACENT BACKFILL WEIGHT AS WELL AS MAINTAIN ITS INTEGRITY DURING CONSTRUCTION.

IF SOFT OR UNSUITABLE SOILS ARE ENCOUNTERED, REMOVE THE POOR SOILS DOWN TO A SUITABLE DEPTH AND THEN BUILD UP TO THE APPROPRIATE ELEVATION WITH A COMPETENT BACKFILL MATERIAL. THE STRUCTURAL FILL MATERIAL GRADATION SHOULD NOT ALLOW THE MIGRATION OF FINES, WHICH CAN CAUSE SETTLEMENT OF THE DETENTION SYSTEM OR PAVEMENT ABOVE. IF THE STRUCTURAL FILL MATERIAL IS NOT COMPATIBLE WITH THE UNDERLYING SOILS AN ENGINEERING FABRIC SHOULD BE USED AS A SEPARATOR. IN SOME CASES, USING A STIFF REINFORCING GEOGRID REDUCES OVER EXCAVATION AND REPLACEMENT FILL QUANTITIES.

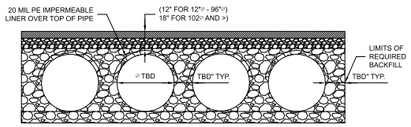


GRADE THE FOUNDATION SUBGRADE TO A UNIFORM OR SLIGHTLY SLOPING GRADE. IF THE SUBGRADE IS CLAY OR RELATIVELY NON-POROUS AND THE CONSTRUCTION SEQUENCE WILL LAST FOR AN EXTENDED PERIOD OF TIME, IT IS BEST TO SLOPE THE GRADE TO ONE END OF THE SYSTEM. THIS WILL ALLOW EXCESS WATER TO DRAIN QUICKLY, PREVENTING SATURATION OF THE SUBGRADE.

GEOMEMBRANE BARRIER

A SITE'S RESISTIVITY MAY CHANGE OVER TIME WHEN VARIOUS TYPES OF SALTING AGENTS ARE USED, SUCH AS ROAD SALTS FOR DEICING AGENTS. IF SALTING AGENTS ARE USED ON OR NEAR THE PROJECT SITE, A GEOMEMBRANE BARRIER IS RECOMMENDED WITH THE SYSTEM. THE GEOMEMBRANE LINER IS INTENDED TO HELP PROTECT THE SYSTEM FROM THE POTENTIAL ADVERSE EFFECTS THAT MAY RESULT FROM THE USE OF SUCH AGENTS INCLUDING PREMATURE CORROSION AND REDUCED ACTUAL SERVICE LIFE.

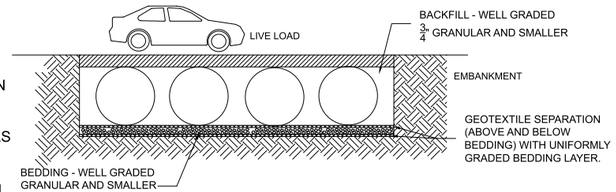
THE PROJECT'S ENGINEER OF RECORD IS TO EVALUATE WHETHER SALTING AGENTS WILL BE USED ON OR NEAR THE PROJECT SITE, AND USE HIS/HER BEST JUDGEMENT TO DETERMINE IF ANY ADDITIONAL PROTECTIVE MEASURES ARE REQUIRED. BELOW IS A TYPICAL DETAIL SHOWING THE PLACEMENT OF A GEOMEMBRANE BARRIER FOR PROJECTS WHERE SALTING AGENTS ARE USED ON OR NEAR THE PROJECT SITE.



IN-SITU TRENCH WALL

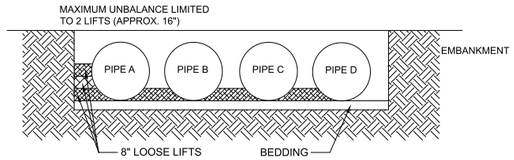
IF EXCAVATION IS REQUIRED, THE TRENCH WALL NEEDS TO BE CAPABLE OF SUPPORTING THE LOAD THAT THE PIPE SHEDS AS THE SYSTEM IS LOADED. IF SOILS ARE NOT CAPABLE OF SUPPORTING THESE LOADS, THE PIPE CAN DEFLECT. PERFORM A SIMPLE SOIL PRESSURE CHECK USING THE APPLIED LOADS TO DETERMINE THE LIMITS OF EXCAVATION BEYOND THE SPRING LINE OF THE OUTER MOST PIPES.

IN MOST CASES THE REQUIREMENTS FOR A SAFE WORK ENVIRONMENT AND PROPER BACKFILL PLACEMENT AND COMPACTION TAKE CARE OF THIS CONCERN.



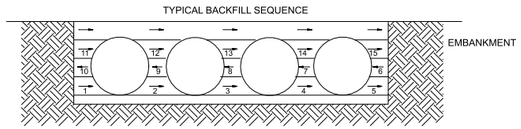
BACKFILL PLACEMENT

MATERIAL SHALL BE WORKED INTO THE PIPE HAUNCHES BY MEANS OF SHOVEL-SLICING, RODDING, AIR TAMPER, VIBRATORY ROD, OR OTHER EFFECTIVE METHODS.

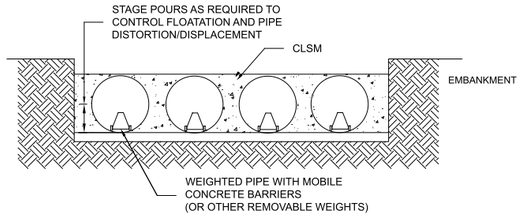


IF AASHTO T99 PROCEDURES ARE DETERMINED INFEASIBLE BY THE GEOTECHNICAL ENGINEER OF RECORD, COMPACTION IS CONSIDERED ADEQUATE WHEN NO FURTHER YIELDING OF THE MATERIAL IS OBSERVED UNDER THE COMPACTOR, OR UNDER FOOT, AND THE GEOTECHNICAL ENGINEER OF RECORD (OR REPRESENTATIVE THEREOF) IS SATISFIED WITH THE LEVEL OF COMPACTION.

FOR LARGE SYSTEMS, CONVEYOR SYSTEMS, BACKHOES WITH LONG REACHES OR DRAGLINES WITH STONE BUCKETS MAY BE USED TO PLACE BACKFILL. ONCE MINIMUM COVER FOR CONSTRUCTION LOADING ACROSS THE ENTIRE WIDTH OF THE SYSTEM IS REACHED, ADVANCE THE EQUIPMENT TO THE END OF THE RECENTLY PLACED FILL, AND BEGIN THE SEQUENCE AGAIN UNTIL THE SYSTEM IS COMPLETELY BACKFILLED. THIS TYPE OF CONSTRUCTION SEQUENCE PROVIDES ROOM FOR STOCKPILED BACKFILL DIRECTLY BEHIND THE BACKHOE, AS WELL AS THE MOVEMENT OF CONSTRUCTION TRAFFIC. MATERIAL STOCKPILES ON TOP OF THE BACKFILLED DETENTION SYSTEM SHOULD BE LIMITED TO 8- TO 10-FEET HIGH AND MUST PROVIDE BALANCED LOADING ACROSS ALL BARRELS. TO DETERMINE THE PROPER COVER OVER THE PIPES TO ALLOW THE MOVEMENT OF CONSTRUCTION EQUIPMENT SEE TABLE 1, OR CONTACT YOUR LOCAL CONTECH SALES ENGINEER.



WHEN FLOWABLE FILL IS USED, YOU MUST PREVENT PIPE FLOATATION. TYPICALLY, SMALL LIFTS ARE PLACED BETWEEN THE PIPES AND THEN ALLOWED TO SET-UP PRIOR TO THE PLACEMENT OF THE NEXT LIFT. THE ALLOWABLE THICKNESS OF THE CLSM LIFT IS A FUNCTION OF A PROPER BALANCE BETWEEN THE UPLIFT FORCE OF THE CLSM, THE OPPOSING WEIGHT OF THE PIPE, AND THE EFFECT OF OTHER RESTRAINING MEASURES. THE PIPE CAN CARRY LIMITED FLUID PRESSURE WITHOUT PIPE DISTORTION OR DISPLACEMENT, WHICH ALSO AFFECTS THE CLSM LIFT THICKNESS. YOUR LOCAL CONTECH SALES ENGINEER CAN HELP DETERMINE THE PROPER LIFT THICKNESS.

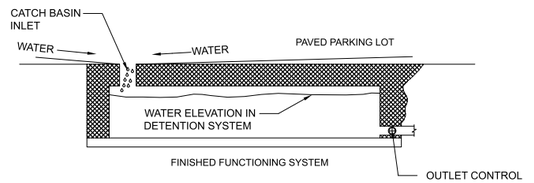


CONSTRUCTION LOADING

TYPICALLY, THE MINIMUM COVER SPECIFIED FOR A PROJECT ASSUMES H-20 LIVE LOAD. BECAUSE CONSTRUCTION LOADS OFTEN EXCEED DESIGN LIVE LOADS, INCREASED TEMPORARY MINIMUM COVER REQUIREMENTS ARE NECESSARY. SINCE CONSTRUCTION EQUIPMENT VARIES FROM JOB TO JOB, IT IS BEST TO ADDRESS EQUIPMENT SPECIFIC MINIMUM COVER REQUIREMENTS WITH YOUR LOCAL CONTECH SALES ENGINEER DURING YOUR PRE-CONSTRUCTION MEETING.

ADDITIONAL CONSIDERATIONS

BECAUSE MOST SYSTEMS ARE CONSTRUCTED BELOW-GRADE, RAINFALL CAN RAPIDLY FILL THE EXCAVATION; POTENTIALLY CAUSING FLOATATION AND MOVEMENT OF THE PREVIOUSLY PLACED PIPES. TO HELP MITIGATE POTENTIAL PROBLEMS, IT IS BEST TO START THE INSTALLATION AT THE DOWNSTREAM END WITH THE OUTLET ALREADY CONSTRUCTED TO ALLOW A ROUTE FOR THE WATER TO ESCAPE. TEMPORARY DIVERSION MEASURES MAY BE REQUIRED FOR HIGH FLOWS DUE TO THE RESTRICTED NATURE OF THE OUTLET PIPE.



CMP DETENTION SYSTEM INSPECTION AND MAINTENANCE

UNDERGROUND STORMWATER DETENTION AND INFILTRATION SYSTEMS MUST BE INSPECTED AND MAINTAINED AT REGULAR INTERVALS FOR PURPOSES OF PERFORMANCE AND LONGEVITY.

INSPECTION

INSPECTION IS THE KEY TO EFFECTIVE MAINTENANCE OF CMP DETENTION SYSTEMS AND IS EASILY PERFORMED. CONTECH RECOMMENDS ONGOING, ANNUAL INSPECTIONS. SITES WITH HIGH TRASH LOAD OR SMALL OUTLET CONTROL ORIFICES MAY NEED MORE FREQUENT INSPECTIONS. THE RATE AT WHICH THE SYSTEM COLLECTS POLLUTANTS WILL DEPEND MORE ON SITE SPECIFIC ACTIVITIES RATHER THAN THE SIZE OR CONFIGURATION OF THE SYSTEM.

INSPECTIONS SHOULD BE PERFORMED MORE OFTEN IN EQUIPMENT WASHDOWN AREAS, IN CLIMATES WHERE SANDING AND/OR SALTING OPERATIONS TAKE PLACE, AND IN OTHER VARIOUS INSTANCES IN WHICH ONE WOULD EXPECT HIGHER ACCUMULATIONS OF SEDIMENT OR ABRASIVE/ CORROSIVE CONDITIONS. A RECORD OF EACH INSPECTION IS TO BE MAINTAINED FOR THE LIFE OF THE SYSTEM

MAINTENANCE

CMP DETENTION SYSTEMS SHOULD BE CLEANED WHEN AN INSPECTION REVEALS ACCUMULATED SEDIMENT OR TRASH IS CLOGGING THE DISCHARGE ORIFICE.

ACCUMULATED SEDIMENT AND TRASH CAN TYPICALLY BE EVACUATED THROUGH THE MANHOLE OVER THE OUTLET ORIFICE. IF MAINTENANCE IS NOT PERFORMED AS RECOMMENDED, SEDIMENT AND TRASH MAY ACCUMULATE IN FRONT OF THE OUTLET ORIFICE. MANHOLE COVERS SHOULD BE SECURELY SEATED FOLLOWING CLEANING ACTIVITIES. CONTECH SUGGESTS THAT ALL SYSTEMS BE DESIGNED WITH AN ACCESS/INSPECTION MANHOLE SITUATED AT OR NEAR THE INLET AND THE OUTLET ORIFICE. SHOULD IT BE NECESSARY TO GET INSIDE THE SYSTEM TO PERFORM MAINTENANCE ACTIVITIES, ALL APPROPRIATE PRECAUTIONS REGARDING CONFINED SPACE ENTRY AND OSHA REGULATIONS SHOULD BE FOLLOWED.

ANNUAL INSPECTIONS ARE BEST PRACTICE FOR ALL UNDERGROUND SYSTEMS. DURING THIS INSPECTION, IF EVIDENCE OF SALTING/DE-ICING AGENTS IS OBSERVED WITHIN THE SYSTEM, IT IS BEST PRACTICE FOR THE SYSTEM TO BE RINSED, INCLUDING ABOVE THE SPRING LINE SOON AFTER THE SPRING THAW AS PART OF THE MAINTENANCE PROGRAM FOR THE SYSTEM.

MAINTAINING AN UNDERGROUND DETENTION OR INFILTRATION SYSTEM IS EASIEST WHEN THERE IS NO FLOW ENTERING THE SYSTEM. FOR THIS REASON, IT IS A GOOD IDEA TO SCHEDULE THE CLEANOUT DURING DRY WEATHER.

THE FOREGOING INSPECTION AND MAINTENANCE EFFORTS HELP ENSURE UNDERGROUND PIPE SYSTEMS USED FOR STORMWATER STORAGE CONTINUE TO FUNCTION AS INTENDED BY IDENTIFYING RECOMMENDED REGULAR INSPECTION AND MAINTENANCE PRACTICES. INSPECTION AND MAINTENANCE RELATED TO THE STRUCTURAL INTEGRITY OF THE PIPE OR THE SOUNDNESS OF PIPE JOINT CONNECTIONS IS BEYOND THE SCOPE OF THIS GUIDE.

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VII. NRCS SOILS REPORT

United States Department of Agriculture

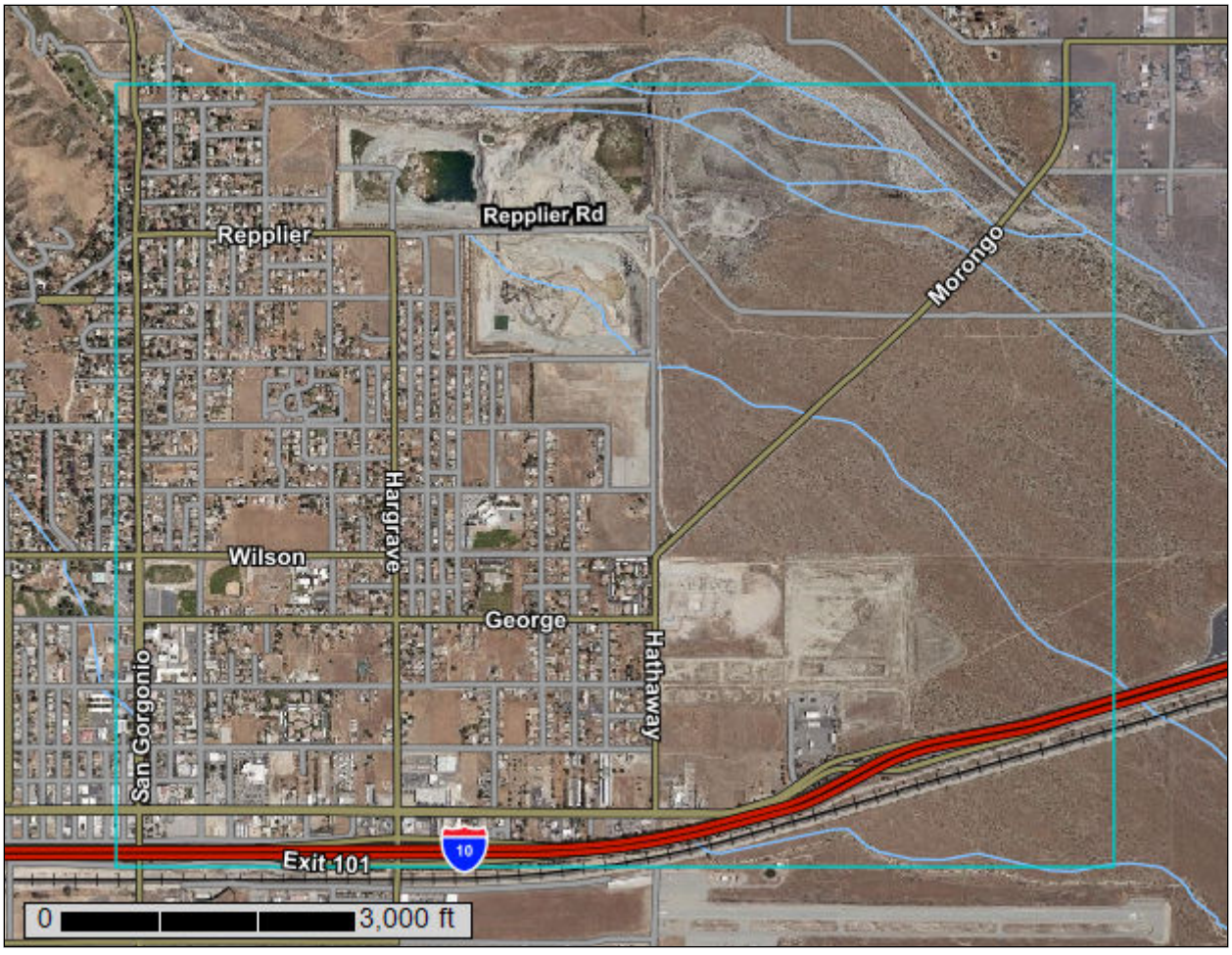
NRCS

Natural Resources Conservation Service

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

Custom Soil Resource Report for Western Riverside Area, California

First Industrial



October 20, 2021

Preface

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

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

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

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

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

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

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Contents

How Soil Surveys Are Made

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

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

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

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

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

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

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

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

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

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

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

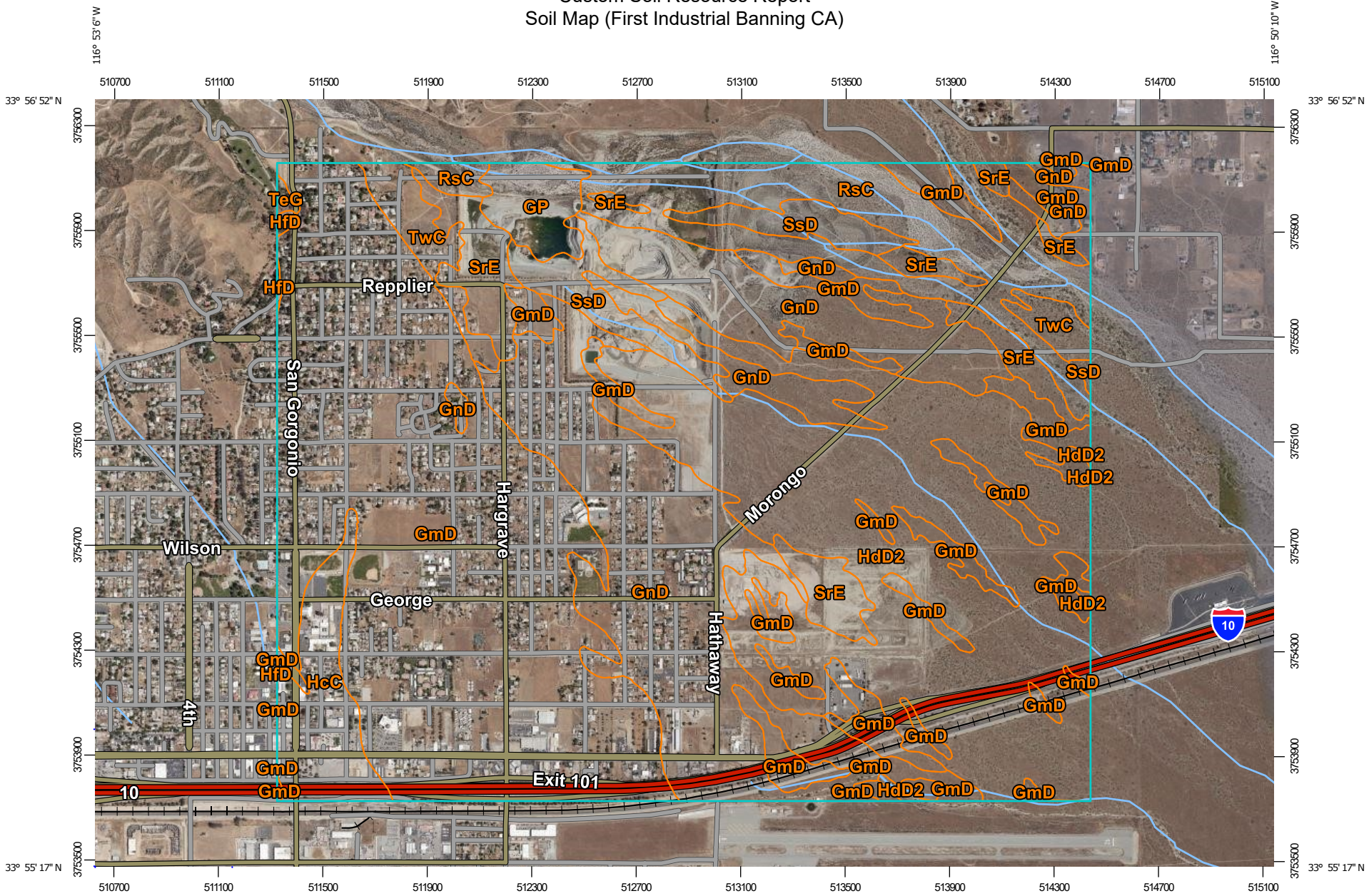
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

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

Soil Map

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

Custom Soil Resource Report
Soil Map (First Industrial Banning CA)



Map Scale: 1:20,600 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 300 600 1200 1800

Feet: 0 1000 2000 4000 6000

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

MAP LEGEND

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

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

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

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

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: Western Riverside Area, California
Survey Area Data: Version 14, Sep 13, 2021

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

Date(s) aerial images were photographed: Apr 1, 2018—Aug 22, 2018

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.

Map Unit Legend (First Industrial Banning CA)

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
GmD	Gorgonio gravelly loamy fine sand, 2 to 15 percent slop es	669.3	35.6%
GnD	Gorgonio cobbly loamy fine sand, 2 to 15 percent slopes	374.5	19.9%
GP	Gravel pits	27.9	1.5%
HcC	Hanford coarse sandy loam, 2 to 8 percent slopes	58.3	3.1%
HdD2	Hanford cobbly coarse sandy loam, 2 to 15 percent slopes, eroded	429.8	22.9%
HfD	Hanford sandy loam, 2 to 15 percent slopes	3.1	0.2%
RsC	Riverwash	147.3	7.8%
SrE	Soboba cobbly loamy sand, 2 to 25 percent slopes	75.8	4.0%
SsD	Soboba stony loamy sand, 2 to 15 percent slopes	55.4	2.9%
TeG	Terrace escarpments	1.9	0.1%
TwC	Tujunga gravelly loamy sand, 0 to 8 percent slopes	37.0	2.0%
Totals for Area of Interest		**1,880.4**	**100.0%**

Map Unit Descriptions (First Industrial Banning CA)

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

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

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

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

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

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

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

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

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

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

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion

of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

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

Western Riverside Area, California

GmD—Gorgonio gravelly loamy fine sand, 2 to 15 percent slop es

Map Unit Setting

National map unit symbol: hcvg
Elevation: 20 to 3,000 feet
Mean annual precipitation: 10 to 25 inches
Mean annual air temperature: 57 to 63 degrees F
Frost-free period: 250 to 310 days
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Gorgonio

Setting

Landform: Alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from granite

Typical profile

H1 - 0 to 15 inches: gravelly loamy fine sand
H2 - 15 to 60 inches: stratified gravelly loamy sand to gravelly loamy fine sand

Properties and qualities

Slope: 2 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.1 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Ecological site: R019XD035CA - SANDY (1975)
Hydric soil rating: No

Minor Components

Soboba

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

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

Tujunga
Percent of map unit: 4 percent
Hydric soil rating: No

Unnamed
Percent of map unit: 1 percent
Hydric soil rating: No

GnD—Gorgonio cobbly loamy fine sand, 2 to 15 percent slopes

Map Unit Setting
National map unit symbol: hcvh
Elevation: 20 to 3,000 feet
Mean annual precipitation: 10 to 25 inches
Mean annual air temperature: 57 to 63 degrees F
Frost-free period: 250 to 310 days
Farmland classification: Not prime farmland

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

Description of Gorgonio

Setting
Landform: Alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from granite

Typical profile
H1 - 0 to 15 inches: cobbly loamy fine sand
H2 - 15 to 40 inches: stratified gravelly loamy sand to gravelly loamy fine sand
H3 - 40 to 60 inches: stratified cobbly loamy sand to cobbly loamy fine sand

Properties and qualities
Slope: 2 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None

Available water supply, 0 to 60 inches: Low (about 3.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: A
Ecological site: R019XD035CA - SANDY (1975)
Hydric soil rating: No

Minor Components

Soboba

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

Hanford

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

Tujunga

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

GP—Gravel pits

Map Unit Composition

Gravel pits: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Gravel Pits

Setting

Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy and gravelly alluvium

HcC—Hanford coarse sandy loam, 2 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2y8tk
Elevation: 680 to 2,930 feet
Mean annual precipitation: 9 to 17 inches
Mean annual air temperature: 63 to 65 degrees F
Frost-free period: 290 to 365 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

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

Description of Hanford

Setting

Landform: Alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from granite

Typical profile

A - 0 to 8 inches: coarse sandy loam
C1 - 8 to 40 inches: fine sandy loam
C2 - 40 to 60 inches: stratified loamy sand to coarse sandy loam

Properties and qualities

Slope: 2 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 7.0 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: A
Ecological site: R020XD012CA - SANDY
Hydric soil rating: No

Minor Components

Greenfield

Percent of map unit: 5 percent
Landform: Alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Ramona

Percent of map unit: 5 percent
Landform: Alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Tujunga
Percent of map unit: 2 percent
Landform: Alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Unnamed
Percent of map unit: 2 percent
Hydric soil rating: No

Unnamed
Percent of map unit: 1 percent
Hydric soil rating: No

HdD2—Hanford cobbly coarse sandy loam, 2 to 15 percent slopes, eroded

Map Unit Setting
National map unit symbol: 2y8tq
Elevation: 1,260 to 3,030 feet
Mean annual precipitation: 9 to 17 inches
Mean annual air temperature: 63 to 65 degrees F
Frost-free period: 250 to 365 days
Farmland classification: Not prime farmland

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

Description of Hanford

Setting
Landform: Alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from granite

Typical profile
A - 0 to 18 inches: cobbly coarse sandy loam
C1 - 18 to 30 inches: gravelly fine sandy loam
C2 - 30 to 60 inches: stratified loamy sand to gravelly coarse sandy loam

Properties and qualities
Slope: 2 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 5.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: A
Ecological site: R019XD035CA - SANDY (1975)
Hydric soil rating: No

Minor Components

Riverwash

Percent of map unit: 10 percent
Landform: Channels
Hydric soil rating: Yes

Tujunga

Percent of map unit: 5 percent
Landform: Alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

HfD—Hanford sandy loam, 2 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2y8tw
Elevation: 620 to 3,170 feet
Mean annual precipitation: 10 to 19 inches
Mean annual air temperature: 62 to 65 degrees F
Frost-free period: 280 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Hanford

Setting

Landform: Alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Concave

Across-slope shape: Linear
Parent material: Alluvium derived from granite

Typical profile

A - 0 to 8 inches: sandy loam
C1 - 8 to 40 inches: fine sandy loam
C2 - 40 to 60 inches: stratified loamy sand to coarse sandy loam

Properties and qualities

Slope: 2 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 7.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: A
Ecological site: R019XD069CA - SANDY ALLUVIAL (1975)
Hydric soil rating: No

Minor Components

Tujunga

Percent of map unit: 5 percent
Landform: Alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Greenfield

Percent of map unit: 5 percent
Landform: Alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Ramona

Percent of map unit: 4 percent
Landform: Alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Riverwash

Percent of map unit: 1 percent
Landform: Channels
Landform position (three-dimensional): Tread

Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: Yes

RsC—Riverwash

Map Unit Setting

National map unit symbol: hcym
Elevation: 700 to 2,900 feet
Mean annual precipitation: 8 to 15 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 110 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Riverwash: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Riverwash

Setting

Landform: Channels
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy and gravelly alluvium derived from mixed sources

Typical profile

H1 - 0 to 6 inches: gravelly coarse sand
H2 - 6 to 60 inches: stratified extremely gravelly coarse sand to gravelly sand

Properties and qualities

Slope: 0 to 8 percent
Drainage class: Excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: FrequentNone
Available water supply, 0 to 60 inches: Very low (about 1.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Ecological site: R019XG905CA - Riparian
Hydric soil rating: Yes

SrE—Soboba cobbly loamy sand, 2 to 25 percent slopes

Map Unit Setting

National map unit symbol: hcz3
Elevation: 30 to 4,200 feet
Mean annual precipitation: 10 to 20 inches
Mean annual air temperature: 61 degrees F
Frost-free period: 210 to 330 days
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Soboba

Setting

Landform: Alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy and gravelly alluvium derived from granite

Typical profile

H1 - 0 to 11 inches: cobbly loamy sand
H2 - 11 to 60 inches: stratified very cobbly sand to very gravelly loamy sand

Properties and qualities

Slope: 2 to 25 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Very high (19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 1.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A
Ecological site: R019XD069CA - SANDY ALLUVIAL (1975)
Hydric soil rating: No

Minor Components

Hanford

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

Riverwash

Percent of map unit: 5 percent
Landform: Channels
Hydric soil rating: Yes

Tujunga

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

SsD—Soboba stony loamy sand, 2 to 15 percent slopes

Map Unit Setting

National map unit symbol: hcz4
Elevation: 30 to 4,200 feet
Mean annual precipitation: 10 to 20 inches
Mean annual air temperature: 61 degrees F
Frost-free period: 210 to 330 days
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Soboba

Setting

Landform: Alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy and gravelly alluvium derived from granite

Typical profile

H1 - 0 to 11 inches: very stony loamy sand
H2 - 11 to 60 inches: stratified very cobbly sand to very gravelly loamy sand

Properties and qualities

Slope: 2 to 15 percent
Surface area covered with cobbles, stones or boulders: 0.1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Very high (19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 1.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: A
Ecological site: R019XD069CA - SANDY ALLUVIAL (1975)
Hydric soil rating: No

Minor Components

Riverwash
Percent of map unit: 10 percent
Landform: Channels
Hydric soil rating: Yes

Tujunga
Percent of map unit: 2 percent
Hydric soil rating: No

Hanford
Percent of map unit: 2 percent
Hydric soil rating: No

Soboba
Percent of map unit: 1 percent
Hydric soil rating: No

TeG—Terrace escarpments

Map Unit Composition
Terrace escarpments: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Terrace Escarpments

Setting
Landform: Terraces
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Alluvium derived from mixed sources

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Ecological site: R019XD060CA - SHALLOW LOAMY (1975)
Hydric soil rating: No

TwC—Tujunga gravelly loamy sand, 0 to 8 percent slopes

Map Unit Setting
National map unit symbol: hczm
Elevation: 10 to 1,500 feet

Mean annual precipitation: 10 to 25 inches
Mean annual air temperature: 59 to 64 degrees F
Frost-free period: 250 to 350 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

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

Description of Tujunga

Setting

Landform: Alluvial fans, flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy alluvium derived from granite

Typical profile

H1 - 0 to 10 inches: gravelly loamy sand
H2 - 10 to 60 inches: loamy sand

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: NoneOccasional
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.1 inches)

Interpretive groups

Land capability classification (irrigated): 4s
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Ecological site: R019XD035CA - SANDY (1975)
Hydric soil rating: No

Minor Components

Delhi

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

Soboba

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

Soil Information for All Uses

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

Hydrologic Soil Group (First Industrial Banning CA)

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.

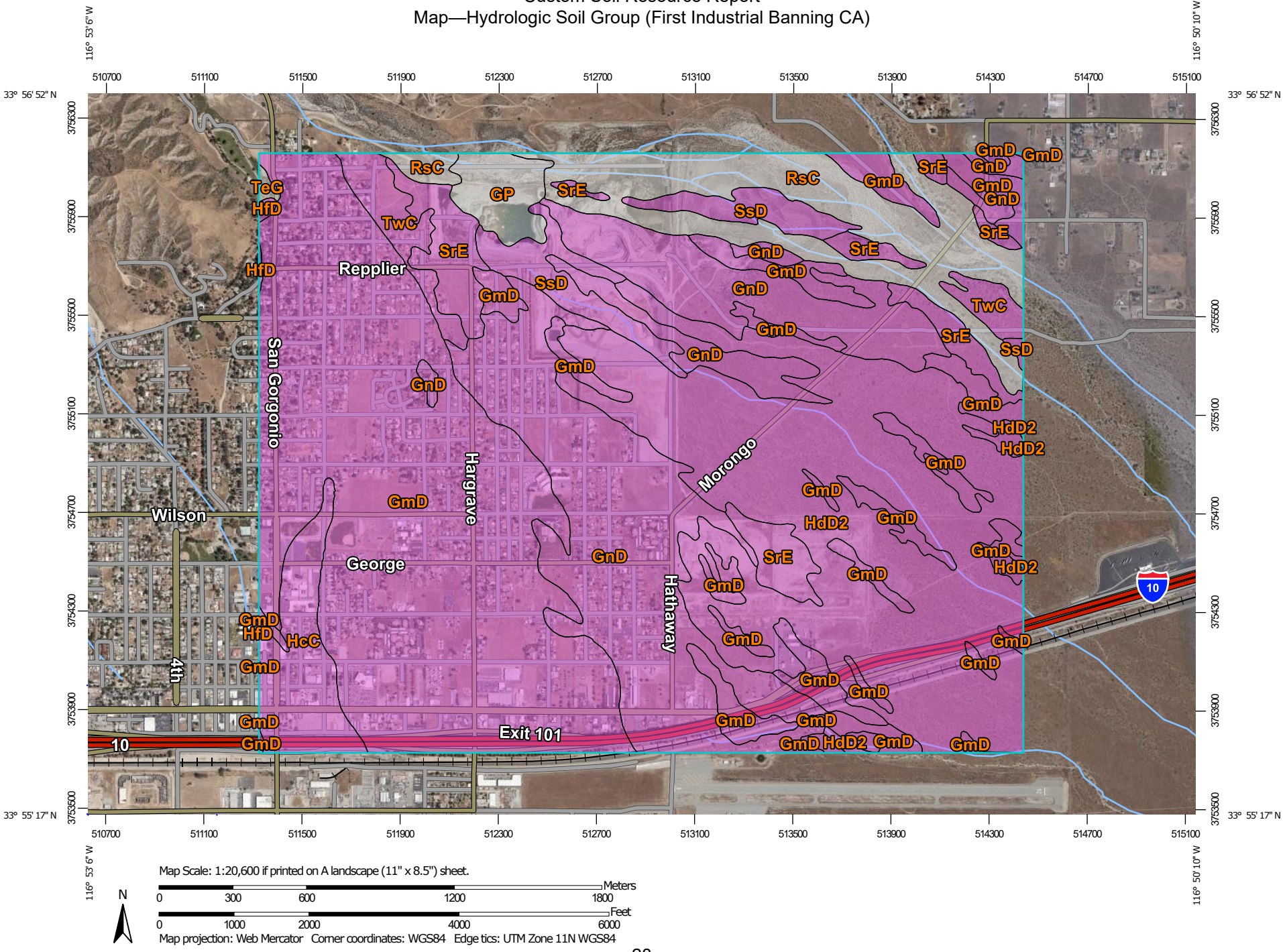
Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

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.

Map—Hydrologic Soil Group (First Industrial Banning CA)



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 1:15,800.

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: Western Riverside Area, California
Survey Area Data: Version 14, Sep 13, 2021

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

Date(s) aerial images were photographed: Apr 1, 2018—Aug 22, 2018

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.

Table—Hydrologic Soil Group (First Industrial Banning CA)

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
GmD	Gorgonio gravelly loamy fine sand, 2 to 15 percent slop es	A	669.3	35.6%
GnD	Gorgonio cobbly loamy fine sand, 2 to 15 percent slopes	A	374.5	19.9%
GP	Gravel pits		27.9	1.5%
HcC	Hanford coarse sandy loam, 2 to 8 percent slopes	A	58.3	3.1%
HdD2	Hanford cobbly coarse sandy loam, 2 to 15 percent slopes, eroded	A	429.8	22.9%
HfD	Hanford sandy loam, 2 to 15 percent slopes	A	3.1	0.2%
RsC	Riverwash		147.3	7.8%
SrE	Soboba cobbly loamy sand, 2 to 25 percent slopes	A	75.8	4.0%
SsD	Soboba stony loamy sand, 2 to 15 percent slopes	A	55.4	2.9%
TeG	Terrace escarpments		1.9	0.1%
TwC	Tujunga gravelly loamy sand, 0 to 8 percent slopes	A	37.0	2.0%
Totals for Area of Interest			**1,880.4**	**100.0%**

Rating Options—Hydrologic Soil Group (First Industrial Banning CA)

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

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VIII. STORM DRAIN AS-BUILTS

BANNING BUSINESS PARK
STORM DRAIN PLAN
PARCEL MAP 36056

DECLARATION OF ENGINEER OF RECORD

I HEREBY DECLARE THAT IN MY PROFESSIONAL OPINION, THE DESIGN OF THE IMPROVEMENTS AS SHOWN ON THESE PLANS COMPLIES WITH THE CURRENT PROFESSIONAL ENGINEERING STANDARDS AND PRACTICES. AS THE ENGINEER IN RESPONSIBLE CHARGE OF THE DESIGN OF THESE IMPROVEMENTS, I ACCEPT FULL RESPONSIBILITY FOR SUCH DESIGN. I UNDERSTAND AND ACKNOWLEDGE THAT THE PLAN CHECK OF THESE PLANS BY THE CITY OF BANNING IS A REVIEW FOR THE LIMITED PURPOSE OF ENSURING THAT THESE PLANS COMPLY WITH CITY PROCEDURES AND OTHER APPLICABLE CODES AND ORDINANCES. THE PLAN REVIEW PROCESS IS NOT A DETERMINATION OF THE TECHNICAL ADEQUACY OF THE DESIGN OF THE IMPROVEMENTS. SUCH PLAN CHECK DOES NOT THEREFORE RELIEVE ME OF MY DESIGN RESPONSIBILITY.

STANTEC CONSULTING SERVICES INC., AGREES TO INDEMNIFY THE CITY OF BANNING; ITS OFFICERS, ITS AGENT, AND ITS EMPLOYEES FROM ANY AND ALL LIABILITY, CLAIMS, DAMAGES, OR INJURIES TO ANY PERSON OR PROPERTY ARISING FROM NEGLIGENT ACTS, ERRORS OR OMISSIONS OF THE ENGINEER OF RECORD, ITS EMPLOYEES, AGENTS OR CONSULTANTS.

SIGNATURE: _____ DATE: _____

LICENSE NO. 51031 EXP: 09/30/13

LEGAL DESCRIPTION

THE LAND REFERRED TO HEREIN BELOW IS SITUATED IN THE CITY OF BANNING, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, AND IS DESCRIBED AS FOLLOWS:

PARCEL 1:

A PORTION OF THE NORTHWEST 1/4 OF SECTION 11, TOWNSHIP 3 SOUTH, RANGE 1 EAST, SAN BERNARDINO BASE AND MERIDIAN, IN THE CITY OF BANNING, COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA, ACCORDING TO THE OFFICIAL PLAT THEREOF, DESCRIBED AS FOLLOWS:

BEGINNING AT A POINT IN THE WESTERLY LINE OF SAID SECTION 11, 1132.50 FEET NORTH FROM THE WESTERLY 1/4 CORNER OF SAID SECTION 11; THENCE SOUTH 89° 30" 30" EAST, ALONG A LINE PARALLEL WITH THE SOUTHERLY LINE OF SAID SECTION 11, 1316.73 FEET, MORE OR LESS, TO THE NORTH AND SOUTH CENTER LINE OF SAID NORTHWEST 1/4; THENCE NORTH 00° 07' 30" WEST, ALONG THE SAID NORTH AND SOUTH CENTER LINE, 502.50 FEET; THENCE NORTH 89° 30" 30" WEST, 1319.45 FEET, MORE OR LESS, TO THE SAID WESTERLY LINE OF SAID SECTION 11; THENCE SOUTH 00° 11' 30" EAST, ALONG SAID WESTERLY LINE OF SECTION 11, 502.5 FEET TO THE POINT OF BEGINNING.

SAID LAND IS ALSO SITUATED IN THE CITY OF BANNING.

PARCEL 2:

THAT PORTION OF THE EAST 1/2 OF THE NORTHWEST 1/4 OF SECTION 11, TOWNSHIP 3 SOUTH, RANGE 1 EAST, SAN BERNARDINO BASE AND MERIDIAN, DESCRIBED AS FOLLOWS:

BEGINNING AT A U.S.G.L.O. BRASS CAP MARKING THE NORTH 1/4 CORNER OF SAID SECTION; THENCE ALONG THE EAST LINE OF SAID NORTHWEST 1/4, SOUTH 0° 41" 41" WEST, 1840.28 FEET; THENCE COURSE "A", SOUTH 74° 52' 01" WEST 305.01 FEET; THENCE COURSE "B", SOUTH 75° 23' 27" WEST, 411.53 FEET TO THE BEGINNING OF A TANGENT CURVE, CONCAVE SOUTHERLY AND HAVING A RADIUS OF 1060 FEET; THENCE COURSE "C", WESTERLY ALONG SAID CURVE, THROUGH A CENTRAL ANGLE OF 4° 14" 43", A DISTANCE OF 78.54 FEET TO THE EAST LINE OF THE WEST 550 FEET OF SAID EAST 1/2; THENCE ALONG SAID EAST LINE, NORTH 0° 25' 01" EAST, 695.63 FEET TO A 6" X 6" CONCRETE MONUMENT BEARING NORTH 89° 25' 57" WEST FROM A POINT IN SAID EAST LINE OF THE NORTHWEST 1/4, DISTANT ALONG SAID EAST LINE, SOUTH 0° 41' 41" WEST, 1359.31 FEET FROM SAID NORTH 1/4 CORNER; THENCE COURSE "D", NORTH 89° 25" 57" WEST ALONG SAID LINE, 550.00 FEET TO A 6" X 6" CONCRETE MONUMENT IN THE WEST LINE OF SAID EAST 1/2; THENCE ALONG SAID WEST LINE NORTH 0° 25' 01" EAST, 1353.32 FEET TO THE NORTH LINE OF SAID SECTION; THENCE ALONG SAID NORTH LINE, SOUTH 89° 40" 14" EAST 1325.26 FEET TO THE POINT OF BEGINNING.

EXCEPT THAT PORTION LYING SOUTHERLY OF A LINE PARALLEL WITH AND DISTANT 150 FEET NORTHERLY, MEASURED AT RIGHT ANGLES, AND/OR RADIALLY, AS THE CASE MAY BE, FROM THOSE LINES HEREINABOVE DESIGNATED AS COURSES "A", "B" AND "C".

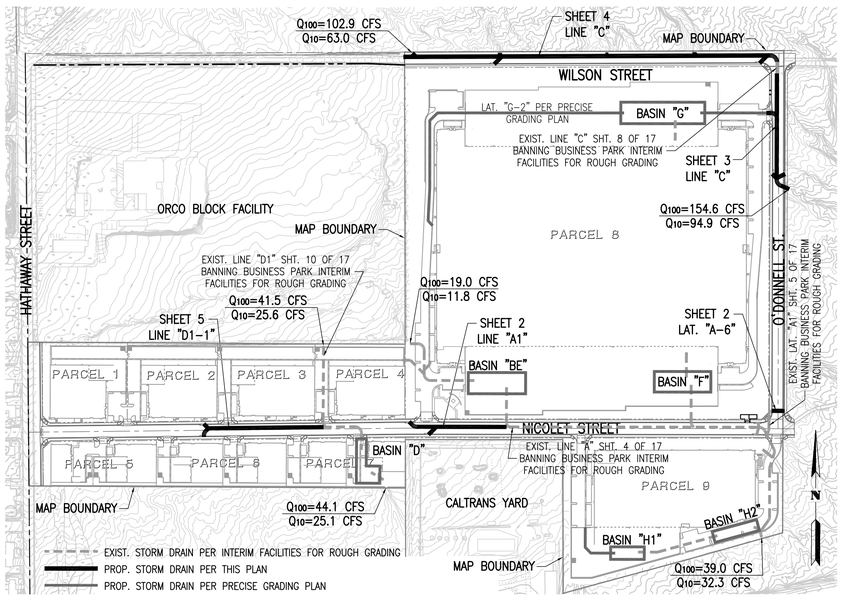
PARCEL 3:

A NON-EXCLUSIVE EASEMENT FOR INGRESS TO AND EGRESS FROM THE PARCEL OF LAND HEREIN CONVEYED UPON, OVER AND ACROSS THAT PORTION OF THE WEST 20 FEET OF SAID EAST HALF LYING SOUTHERLY OF SAID COURSE "D".

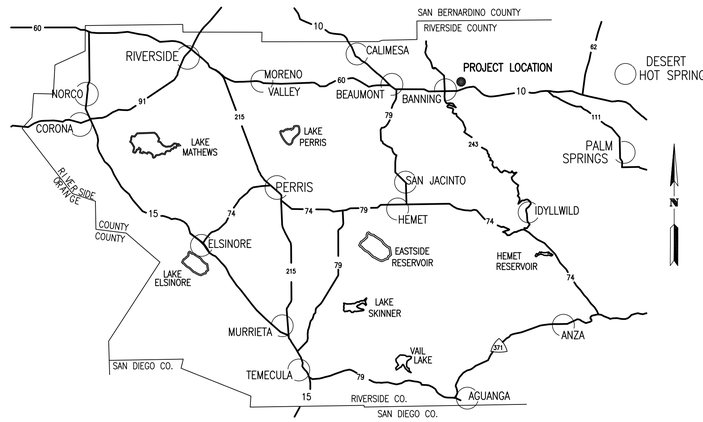
EXCEPT THAT PORTION LYING SOUTH OF THE FOLLOWING DESCRIBED LNE:

BEGINNING AT A POINT IN THE WEST LINE OF SAID EAST HALF, DISTANT ALONG SAID WEST LINE, SOUTH 0° 25' 01" WEST, 1042.10 FEET FROM THE INTERSECTION OF SAID WEST LINE AND THAT CERTAIN LINE HERHNABOVE DESIGNATED AS COURSE "D"; THENCE NORTHEASTERLY ALONG A 545-FOOT RADIUS CURVE, CONCAVE NORTHWESTERLY, FROM A TANGENT BEARING NORTH 56° 01' 52" EAST, THROUGH A CENTRAL ANGLE OF 1° 46' 37", A DISTANCE OF 16.90 FEET; THENCE NORTH 54° 15' 15" EAST, 50 FEET.

APN: 532-110-003-1, 008-6, 009-7, 010-7



INDEX MAP



VICINITY MAP

UNDERGROUND DETENTION/INFILTRATION BASIN INFORMATION

BASIN	Q10	Q100	VOLUME	DEPTH	WS ELEV	Q100 OUT
BE	22.6 CFS	34.8 CFS	1.61 ACFT	9.8'	248.8	8.6 CFS
D	34.8 CFS	55.4 CFS	0.78 ACFT	11.25'	258.5	44.1 CFS
F	22.3 CFS	34.3 CFS	1.47 ACFT	9.2'	245.2	13.0 CFS
G	27.2 CFS	41.9 CFS	1.61 ACFT	5.0'	249.0	0.7 CFS
H1	7.7 CFS	11.6 CFS	0.37 ACFT	7.3'	226.3	5.1 CFS
H2	7.1 CFS	12.0 CFS	0.25 ACFT	3.4'	218.4	7.5 CFS

GENERAL NOTES

1. ALL STATIONING REFERS TO CENTERLINE OF CONSTRUCTION.
2. ALL CHANNEL/STORM DRAIN REFERENCES AND CROSS SECTIONS ARE TAKEN LOOKING DOWNSTREAM.
3. TOPOGRAPHY BY DIGITAL PHOTOGRAMMETRIC METHODS. AERIAL PHOTOGRAPHS TAKEN AT AN ALTITUDE NOT TO EXCEED A FLYING HEIGHT TO CONTOUR INTERVAL RATIO OF 1800. PHOTOGRAPHY DATED 03-31-09
4. THE VERTICAL DATUM IS DERIVED FROM NAVD 88. THE HORIZONTAL DATUM IS DERIVED FROM NAD 83.
5. STANDARD DRAWINGS CALLED FOR ON THE PLAN & PROFILE SHALL CONFORM TO THE LATEST REVISED EDITION OF RCFC. & WCD STD DRAWINGS, OR CALTRANS/CITY STANDARD PLANS.
6. ELEVATIONS AND LOCATIONS OF UTILITIES WERE OBTAINED FROM AVAILABLE INFORMATION AND ARE SHOWN APPROXIMATELY ON THESE PLANS. 48 HOURS BEFORE EXCAVATION CALL UNDERGROUND SERVICE ALERT AT 1-800-227-2600. ALL UTILITIES SHALL BE PROTECTED IN PLACE EXCEPT AS NOTED ON PLANS AND SPECIFICATIONS.
7. THE CONTRACTOR IS REQUIRED TO CONTACT ALL UTILITY AGENCIES REGARDING TEMPORARY SUPPORT AND SHORING REQUIREMENTS FOR THE VARIOUS UTILITY LINES SHOWN ON THESE PLANS.
8. ALL OPENINGS RESULTING FROM CUTTING OR PARTIAL REMOVAL OF EXIST. CULVERTS, PIPES, OR SIMILAR STRUCTURES TO BE ABANDONED, SHALL BE SEALED AT BOTH ENDS WITH 6" MIN. CLASS "B" CONCRETE.
9. UNLESS OTHERWISE SPECIFIED, MINIMUM STREET RECONSTRUCTION SHALL BE 4" TYPE "B" ASPHALT CONCRETE OVER 6" CLASS 2 AGGREGATE BASE OR IN KIND, WHICHEVER IS GREATER.
10. ALL RECONSTRUCTION, RESURFACING AND PAVEMENT DELINEATION, CURBS, SIDEWALKS AND OTHER IMPROVEMENTS ARE TO BE RECONSTRUCTED IN KIND AT THE SAME LOCATIONS AND ELEVATIONS AS THE EXISTING IMPROVEMENTS, UNLESS OTHERWISE NOTED.

CITY OF BANNING GENERAL NOTES

1. ALL CONSTRUCTION SHALL CONFORM WITH THE CITY OF BANNING PUBLIC WORKS SPECIFICATIONS AND THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION (GREEN BOOK) LATEST EDITION. IN CASE OF CONFLICTS, BETWEEN THE CITY OF BANNING PUBLIC WORKS SPECIFICATIONS AND THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, THE CITY OF BANNING PUBLIC WORKS SPECIFICATIONS SHALL GOVERN.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE CLEARING OF THE PROPOSED WORK AREA, AND RELOCATION AND COST OF ALL EXISTING UTILITIES. ALL UNDERGROUND FACILITIES, WITH LATERALS, SHALL BE IN PLACE PRIOR TO PAVING THE STREET SECTION INCLUDING, BUT NOT LIMITED TO, THE FOLLOWING: SEWER, WATER, ELECTRIC, GAS & DRAINAGE. SUBDIVIDER MUST INFORM CITY OF CONSTRUCTION SCHEDULE AT LEAST 14 DAYS PRIOR TO BEGINNING OF CONSTRUCTION.
4. DEPTH OF BASE MATERIAL AND A.C. PAVING SHALL BE DETERMINED BY THE R-VALUE METHOD, DESIGNATED AS TEST NO. 301-F OF THE STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION, HIGHWAY DESIGN MANUAL.
7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL DAMAGES TO ON-SITE, OFF-SITE AND ADJACENT UTILITIES, FACILITIES AND PROPERTY AND SHALL CARRY SUFFICIENT INSURANCE TO PROTECT THE CITY AND ADJACENT PROPERTY.
9. THE CONTRACTOR SHALL NOTIFY THE CITY OF BANNING ENGINEERING DEPARTMENT (714) 849-4511 24 HOURS PRIOR TO STARTING ANY WORK.
12. TRIM EDGE OF EXISTING PAVING WHERE NEW PAVING JOINS THE EXISTING PAVEMENT TO A CLEAN, STRAIGHT LINE.
15. NECESSARY STORM DRAINS AND EASEMENTS SHALL BE PROVIDED IN ACCORDANCE WITH THE REQUIREMENTS OF THE CITY OF BANNING MUNICIPAL CODE.

CONSTRUCTION NOTES AND QUANTITIES

NO.	DESCRIPTION	QUANTITY	UNIT
	STORM DRAIN CONSTRUCTION NOTES		
30	CONSTRUCT 48" RCP WITH BEDDING & BACKFILL PER DETAIL A/7	530	L.F.
31	CONSTRUCT 42" RCP WITH BEDDING & BACKFILL PER DETAIL A/7	119	L.F.
1 32	~~CONSTRUCT 36" RCP WITH BEDDING & BACKFILL PER DETAIL A/7~~	~~304~~	~~L.F.~~
33	CONSTRUCT 30" RCP WITH BEDDING & BACKFILL PER DETAIL A/7	34	L.F.
34	CONSTRUCT 24" RCP WITH BEDDING & BACKFILL PER DETAIL A/7	921	L.F.
35	CONSTRUCT CONCRETE COLLAR PER R.C.F.C.W.C.D. STD. No. M803	4	EA.
36	CONSTRUCT 10' WIDE CATCH BASIN PER R.C.F.C.W.C.D. STD. No. CB100	8	EA.
37	CONSTRUCT 14' WIDE CATCH BASIN PER R.C.F.C.W.C.D. STD. No. CB100	2	EA.
1 38	~~CONSTRUCT CONCRETE DEBRIS CHANNEL PER DETAIL SD1/6A~~ FUTURE PHASE	~~1,063~~	~~L.F.~~
39	CONSTRUCT MANHOLE #1 PER R.C.F.C.W.C.D. STD. No. MH251	4	EA.
40	CONSTRUCT MANHOLE #4 PER R.C.F.C.W.C.D. STD. No. MH254	2	EA.
41	~~CONSTRUCT CONCRETE V DITCH PER DETAIL SD2/6A~~ FUTURE PHASE	~~277~~	~~L.F.~~
1 42	~~CONSTRUCT RISER INLET PER DETAIL C/7~~	~~4~~	~~EA.~~
43	CONSTRUCT CASE "E" RIP-RAP PAD PER DETAIL B/7, DIMENSIONS PER PLAN	1	EA.
44	CONSTRUCT CONCRETE BULKHEAD PER R.C.F.C.W.C.D. STD. No. M816	2	EA.
45	CONSTRUCT CONCRETE HEADWALL PER CALTRANS STD PLAN D90 TYPE A STRAIGHT WINGWALLS AND CABLE RAILING PER B11-47	1	EA.
46	CONSTRUCT INCLINED TRASH RACK PER S.P.P.W.C. STD PLAN 361-2 CASE "A"	1	EA.
47	~~CONSTRUCT 5' TRANSITION FROM DEBRIS CHANNEL TO TRAPEZOIDAL CHANNEL~~	~~1~~	~~EA.~~
1 48	~~INSTALL 5' HIGH BARBED WIRE FENCE PER DETAIL ON SHEET 9~~ FUTURE PHASE	~~1,340~~	~~L.F.~~
49	CONSTRUCT JUNCTION STRUCTURE #2 PER R.C.F.C.W.C.D. STD. No. JS227	1	EA.
50	CONSTRUCT 24" RISER INLET PER DETAIL D/8	1	EA.
51	~~CONSTRUCT TRAPEZOIDAL CHANNEL PER DETAIL SD3/6A~~ FUTURE PHASE	~~255~~	~~L.F.~~
52	~~CONSTRUCT DEBRIS CHANNEL END WALL PER DETAIL 2/11~~	~~1~~	~~EA.~~
53	~~CONSTRUCT DEBRIS CHANNEL PARTITION WALL PER DETAIL 1/11~~	~~3~~	~~EA.~~
1 54	~~CONSTRUCT REINFORCING AT INLET RISER PER DETAILS 3/11 & 4/11~~	~~9~~	~~EA.~~
P	PROTECT IN PLACE EXISTING ITEM INDICATED	–	–
	DEMOLITION NOTES		
70	REMOVE EXISTING CSP INLET / OUTLET	–	EA.
71	REMOVE EXISTING BULKHEAD	–	EA.
72	REMOVE EXISTING STORM DRAIN	–	EA.

R.C.F.C.W.C.D. – RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
S.P.P.W.C. – STANDARD PLANS FOR PUBLIC WORKS CONSTRUCTION

NOTE: ALL UNDERGROUND DETENTION/INFILTRATION BASINS AND CONNECTION MODIFICATIONS TO THE EXISTING STORM DRAIN LINES CONSTRUCTED PER BANNING BUSINESS PARK STORM DRAIN PLAN – INTERIM FACILITIES FOR ROUGH GRADING TENTATIVE PARCEL MAP 36056 SHALL BE CONSTRUCTED PER PRECISE GRADING PLAN BANNING BUSINESS PARK CITY OF BANNING, CALIFORNIA PARCEL MAP 36056

SHEET INDEX

R.C.F.C. & W.C.D. STANDARD DRAWINGS

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MH 254	MANHOLE No.4	9
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LEGEND & ABBREVIATIONS

EXISTING STORM DRAIN
PROPOSED STORM DRAIN
PROPERTY LINE / EXISTING RIGHT-OF-WAY

EXIST.	EXISTING	GB	GRADE BREAK	OCBW	ON CENTER BOTH WAYS
INV.	INVERT	HP	HIGH POINT	MIN.	MINIMUM
CB	CATCH BASIN	TW	TOP OF WALL	BW-BF	BOTH WAYS BOTH FACES
TC	TOP OF CURB	EG	EXISTING GROUND	R/W	RIGHT-OF-WAY
L.F.	LINEAL FEET	PROP.	PROPOSED	FM	SEWER FORCE MAIN
℄ C/L	CENTERLINE				
BC	BEGIN CURVE				
EC	END CURVE				
DIA.	DIAMETER				
ASSY	ASSEMBLY				
FS	FINISH SURFACE				
FG	FINISH GROUND				
CONC.	CONCRETE				
FL	FLOW LINE				
JS	JUNCTION STRUCTURE				

DIGALERT
DIAL TOLL FREE
1-800-227-2600
AT LEAST TWO DAYS BEFORE YOU DIG
UNDERGROUND SERVICE ALERT OF SOUTHERN CALIFORNIA

NO.	DATE	REVISIONS	APP.	DATE
1	11/20/12	AS-BIULT		

APPROVED BY:
CITY OF BANNING, PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION
99 E. RAMSEY STREET
BANNING, CA 92220
PH: (951) 922-3130
KAHONO OEI R.C.E. 52652 (EXP. 12/31/12)

PREPARED BY:
Stantec
STANTEC CONSULTING INC.
19 TECHNOLOGY DRIVE
IRVINE, CA 92618
949.923.6000
stantec.com
MARK B. MCLELLAN R.C.E. 51031 (EXP. 9/30/13)

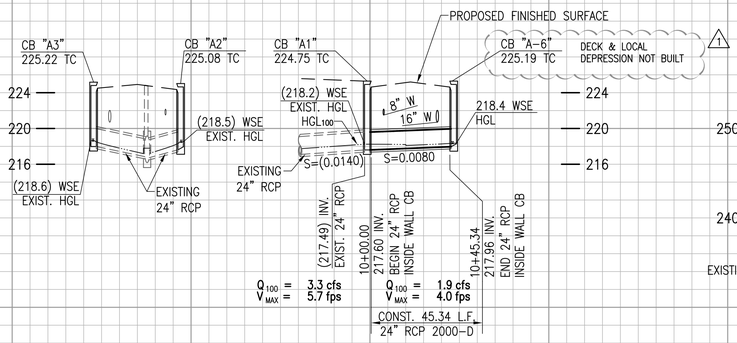
REGISTERED PROFESSIONAL ENGINEER MARK B. MCLELLAN No. 51031 Exp. 9/30/13 CIVIL STATE OF CALIFORNIA

BENCHMARK:
RECOVERED IN GOOD CONDITION. NEW DESCRIPTION FOLLOWS.
3.7 KM (2.30 MI) EAST ALONG A FRONTAGE ROAD ON THE SOUTH SIDE OF INTERSTATE HWY 10 FR. THE INTERSECTION OF SAN GORGONIO AVE. IN BANNING SOUTHWEST OF THE SOUTHWEST CORNER OF A WEIGH STATION BUILDING, (97.8 FT) NORTH OF THE NORTH RAIL OF THE SOUTHERN PACIFIC RAILROAD, 0.9 M (3 FT) WEST OF A POWER POLE. THE MARK IS 0.30 METERS EAST FROM A WITNESS POST THE MARK IS ABOVE LEVEL, LEVEL WITH THE FRONTAGE ROAD.
NAVD 88 ELEV. 2118.09 FT.

CITY OF BANNING
TITLE SHEET & NOTES
BANNING BUSINESS PARK
STORM DRAIN IMPROVEMENT PLAN

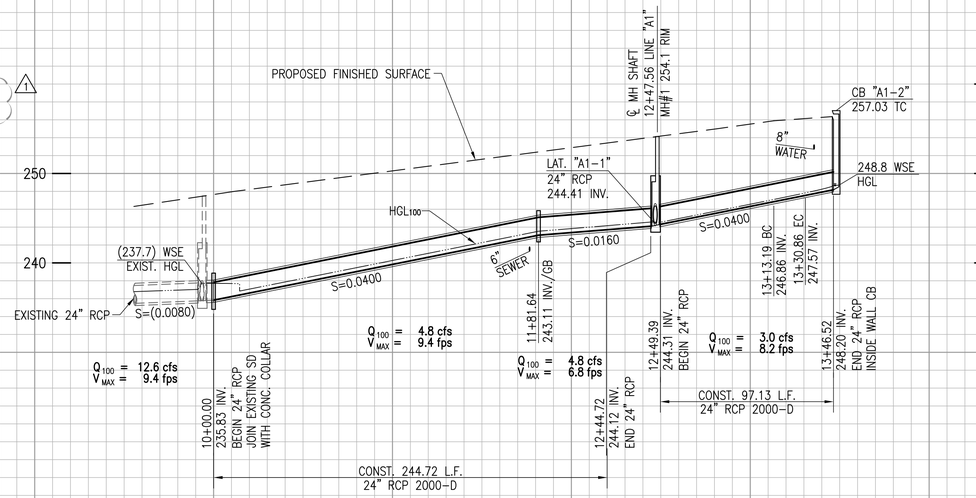
STANTEC PROJECT NO.
2042 473200
SHEET 1 OF 11

3RD SUBMITTAL - 03/22/2012

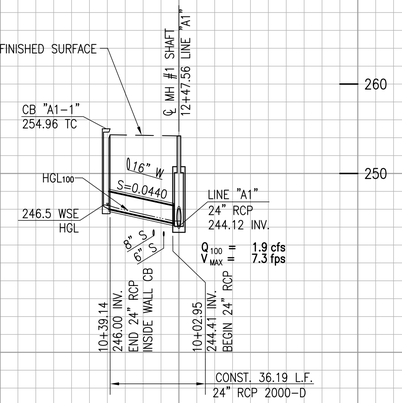


CB "A2" & "A3"
PRIVATELY MAINTAINED
PROPERTY OWNER'S ASSOCIATION

LAT. "A-6"
PRIVATELY MAINTAINED
PROPERTY OWNER'S ASSOCIATION



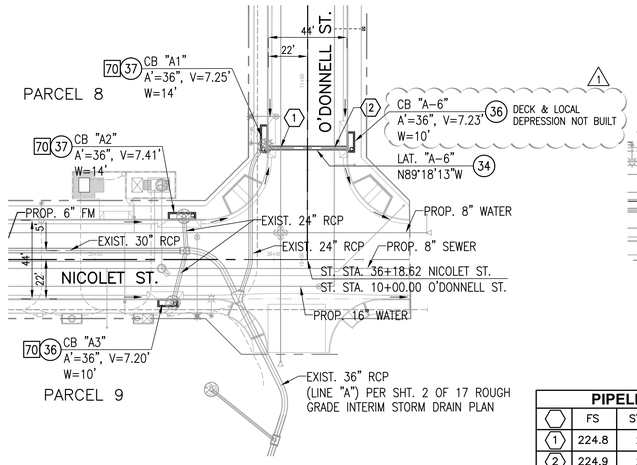
LINE "A1"
PRIVATELY MAINTAINED
PROPERTY OWNER'S ASSOCIATION



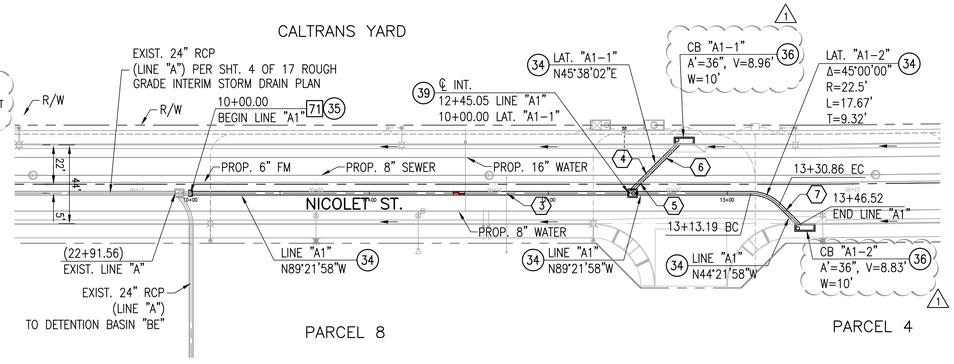
LAT. "A1-1"
PRIVATELY MAINTAINED
PROPERTY OWNER'S ASSOCIATION

PROFILE
HORIZ. 1" = 40'
VERT. 1" = 8'

10+00 10+50 | 10+00 11+00 12+00 13+00 | 10+50 10+00



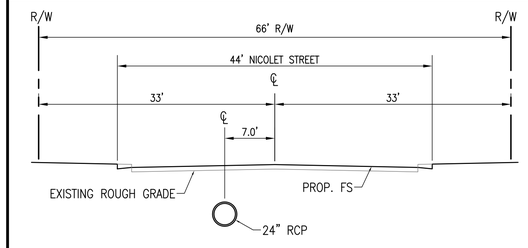
LAT. "A-6"



LINE "A1"

PIPELINE CROSSING SEPARATION CHART					
	FS	STORM DRAIN	SEWER	WATER	SEPARATION
1	224.8	219.9 TOP		221.5 BOT	1.6'
2	224.9	219.9 TOP		220.7 BOT	0.8'
3	252.3	242.8 BOT	241.8 TOP		1.0'
4	254.4	244.7 BOT	243.7 TOP		1.0'
5	254.3	244.5 BOT	243.5 TOP		1.0'
6	254.5	247.8 TOP		248.8 BOT	1.0'
7	256.5	250.1 TOP		253.3 BOT	3.2'

WHEN CROSSING SEPARATION IS LESS THAN 18", SEE DETAIL A/7 FOR SPECIAL BEDDING.



SECTION AT STA 11+50
TYPICAL FROM STA 10+00 TO 13+13

10' 0 10'

ALL X-SECTIONS TAKEN LOOKING DOWN STREAM

STORM DRAIN CONSTRUCTION NOTES
34 — CONSTRUCT 24" RCP WITH BEDDING & BACKFILL PER DETAIL A/7
35 — CONSTRUCT CONCRETE COLLAR PER R.C.F.C.W.C.D. STD. NO. M803
36 — CONSTRUCT 10' WIDE CATCH BASIN PER R.C.F.C.W.C.D. STD. NO. CB100
37 — CONSTRUCT 14' WIDE CATCH BASIN PER R.C.F.C.W.C.D. STD. NO. CB100
39 — CONSTRUCT MANHOLE #1 PER R.C.F.C.W.C.D. STD. NO. MH251

DEMOLITION NOTES
70 — REMOVE EXISTING CSP INLET
71 — REMOVE EXISTING BULKHEAD

GRAPHIC SCALE
40' 0 20' 40' 80' 160'
(IN FEET)
1 inch = 40' ft.

DIGALERT
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AT LEAST TWO DAYS BEFORE YOU DIG
UNDERGROUND SERVICE ALERT OF SOUTHERN CALIFORNIA

NO.	DATE	REVISIONS	APP.	DATE
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BENCHMARK:
RECOVERED IN GOOD CONDITION. NEW DESCRIPTION FOLLOWS.
3.7 KM (2.30 MI) EAST ALONG A FRONTAGE ROAD ON THE SOUTH SIDE OF INTERSTATE HWY 10 FR. THE INTERSECTION OF SAN GORGONIO AVE. IN BANNING SOUTHWEST OF THE SOUTHWEST CORNER OF A WEIGH STATION BUILDING, (97.8 FT) NORTH OF THE NORTH RAIL OF THE SOUTHERN PACIFIC RAILROAD, 0.9 M (3 FT) WEST OF A POWER POLE. THE MARK IS 0.30 METERS EAST FROM A WITNESS POST THE MARK IS ABOVE LEVEL, LEVEL WITH THE FRONTAGE ROAD.
NAVD 88 ELEV. 2118.09 FT.

CITY OF BANNING
LINE "A1", LAT. "A1-1" & "A1-2", LAT. "A-6", EXISTING LAT. "A2" & "A3"
BANNING BUSINESS PARK
STORM DRAIN IMPROVEMENT PLAN

STANTEC PROJECT NO.
2042 473200

SHEET 2 OF 11

3RD SUBMITTAL - 03/22/2012

DRAWING: v:\projects\2042473200\dwg\prsd0036.dwg PLOTTED: 12/3/2012 4:51 PM BY: Frey, Dove

LAT. "C-2"
PRIVATELY MAINTAINED
PROPERTY OWNER'S
ASSOCIATION

LAT. "C-1"
PRIVATELY MAINTAINED
PROPERTY OWNER'S
ASSOCIATION

LAT. "C-3"
PRIVATELY MAINTAINED
PROPERTY OWNER'S
ASSOCIATION

LAT. "C-4"
PRIVATELY MAINTAINED
PROPERTY OWNER'S
ASSOCIATION

LAT. "C-5"
PRIVATELY MAINTAINED
PROPERTY OWNER'S
ASSOCIATION

CB "C-2"
246.25 TC
241.7 WSE
HGL
Q_{100} = 3.4 cfs
V_{MAX} = 1.2 fps
S=0.0320
8" W
10+22.16
240.02 INV.
END 24" RCP
INSIDE WALL CB
CONST. 16.36 L.F.
24" RCP 2000-D

CB "C-1"
246.25 TC
HGL100
S=0.0160
16" W
Q_{100} = 1.4 cfs
V_{MAX} = 0.5 fps
241.7 WSE
HGL
10+05.80
239.50 INV.
BEGIN 24" RCP
10+04.27
239.50 INV.
BEGIN 24" RCP
10+33.10
239.96 INV.
END 24" RCP
INSIDE WALL CB
CONST. 28.83 L.F.
24" RCP 2000-D

℄ MH #4 SHAFT 10+40.89 LINE "C"
245.7 RIM, MANHOLE SHAFT PER DETAIL M
244.92 TW
PROPERTY OWNER'S
ASSOCIATION EASEMENT
234.00 TF
16" W
Q_{100} = 154.9 cfs
V_{MAX} = 12.9 fps
S=0.0080
LAT. "C-1" & "C-2"
24" RCP
239.50 INV.
9+74.82
238.00' INV.
BEGIN 48" RCP
CONST. 63.40 L.F.
48" RCP 1350-D
10+07.59 BC
238.26' INV.
10+34.10 EC
238.47' INV.
10+38.22
238.51 INV.
END 48" RCP
10+43.22
238.55 INV.
BEGIN 48" RCP
CONST. 156.48 L.F.
48" RCP 1350-D
PROPOSED FINISHED SURFACE
HGL100
S=0.0080
Q_{100} = 152.2 cfs
V_{MAX} = 19.2 fps
11+91.70
12+55.70
240.25 INV.
END 48" RCP
CONST. 56.00 L.F.
48" RCP 1350-D
WITH 1.5" COVER *

℄ MH #4 SHAFT 12+59.37 LINE "C"
PROPOSED FINISHED SURFACE
Q_{100} = 0.7 cfs
V_{MAX} = 0.2 fps
8" W
HGL100
S=0.0080
LINE "C"
48" RCP
240.25 INV.
10+39.83
240.57' INV.
END 30" RCP
PLUG END
10+23.83 EC
240.44 INV.
CONST. 33.73 L.F.
30" RCP 2000-D
℄ MH #4 SHAFT
12+59.37 LINE "C"
252.2 RIM
16" W
EXIST. 4"
TELE
(S=0.0500)
S=0.0400
LAT. "C-3"
30" RCP
240.30 INV.
Q_{100} = 152.2 cfs
V_{MAX} = 21.5 fps
12+61.70
240.30 INV.
BEGIN 48" RCP
CONST. 143.67 L.F.
48" RCP 1350-D
WITH 1.5" COVER *

CB "C-4"
260.98 TC
254.0 WSE
HGL
HGL100
8" W
S=0.0880
10+37.72
253.30 INV.
END 24" RCP
INSIDE WALL CB
CONST. 31.92 L.F.
24" RCP 2000-D
10+05.80
250.49 INV.
BEGIN 24" RCP
PROPOSED FINISHED SURFACE
℄ MH #4 SHAFT
14+94.50 LINE "C"
Q_{100} = 3.4 cfs
V_{MAX} = 10.7 fps
LINE "C"
48" RCP
248.91 INV.
℄ MH #4 SHAFT
14+94.50 LINE "C"
259.9 RIM
EXIST. 30"
GAS LINE
HGL100
8" W
S=0.0200
Q_{100} = 151.6 cfs
V_{MAX} = 16.6 fps
14+80.36 EC
248.69 INV.
LAT. "C-4"
24" RCP
250.49 INV.
14+05.37
246.00' INV.
END 48" RCP
JOIN EXIST. 48" SD
WITH CONC. COLLAR
CONTRACTOR TO VERIFY
INVERT & LOCATION
EXIST.
48" RCP
14+44.87 BC
247.98' INV.
BEGIN 48" RCP
14+91.83
248.91' INV.
END 48" RCP
14+96.83
249.00' INV.
BEGIN 48" RCP
CONST. 35.49 L.F.
48" RCP 1350-D
Q_{100} = 151.6 cfs
V_{MAX} = 21.8 fps
Q_{100} = 149.3 cfs
V_{MAX} = 18.3 fps
CONST. 215.86 L.F.
48" RCP 1350-D
℄ MH #4 SHAFT
17+16.36 LINE "C"
264.2 RIM
LAT. "C-5"
24" RCP
253.00 INV.
17+12.69
252.45' INV.
END 48" RCP
17+18.69
252.95' INV.
BEGIN 42" RCP
S=0.0280
258.03 INV.
Q_{100} = 136.5 cfs
V_{MAX} = 19.2 fps
CONST. 220.61 L.F.
42" RCP 1350-D

NOT BUILT – FUTURE PHASE

STA. 19+00 MATCHLINE – SEE SHEET 4

R/W
PROPERTY LINE
66' R/W
R/W
16' R/W DEDICATION
44' O'DONNELL STREET
℄
33'
33'
7.0'
PROP. FS
EXISTING ROUGH GRADE
48" RCP

SECTION AT STA 12+00
TYPICAL FROM STA 10+39 TO 14+05

10' 0 10'

ALL X-SECTIONS TAKEN
LOOKING DOWN STREAM

℄ MH #4 SHAFT
17+16.36 LINE "C"
268.33 TW
WALL "B"
265.90 TW
(265.9 EG)
WALL "A"
261.75 WSE HGL
260.75 RIM
258.00 FL
CHANNEL
Q_{100} = 12.8 cfs
V_{MAX} = 4.1 fps
LINE "C"
48" RCP
252.45 INV
S=0.0200
10+05.44
253.00' INV.
BEGIN 24" RCP
10+10.88
253.11' INV.
END 24" RCP
BEGIN 24" CSP
CONC. COLLAR
10+15.61
253.20' INV.
OUTSIDE EDGE
OF RISER
CONST. 5.44 L.F.
24" RCP 2000-D
CONST. 4.73 L.F.
12 GUAGE CSP

PROFILE
HORIZ. 1" = 40'
VERT. 1" = 8'

LINE "C"
PRIVATELY MAINTAINED – PROPERTY OWNER'S ASSOCIATION

10+00 11+00 12+00 13+00 14+00 15+00 16+00 17+00 18+00 19+00 10+00 10+50

* WHERE VELOCITY EXCEEDS 20 FPS IN RCP, A SPECIAL WALL WITH A MINIMUM OF 1.5-INCHES OF COVER OVER THE PIPE REINFORCEMENT ON THE INSIDE SURFACE IS REQUIRED.

244.92 TW
234.00 TF
244.50 TW
234.00 TF
239.30 TW
234.00 TF
L=5'
L=16'
L=11'
HEADWALL DETAIL

PARCEL 8

(44) 10+39.83
END LAT. "C-3"
(33) LAT. "C-3"
N89°26'40"W
(33) LAT. "C-3"
Δ=45°08'28"
R=22.5'
L=17.73'
T=9.35'
10+06.10 BC
(34) LAT. "C-2"
N44°18'12"W
CB "C-2"
A'=36", V=6.23'
W=10'
(36)
10+34.10 EC
(10)
7'
22'
44'
O'DONNELL ST.
N44°18'12"W
10+23.83 EC
(12)
20'
27'
49'
(72)
(24)
10+07.59 BC
(8)
(9)
LAT. "C-1"
N64°23'33"F
(34)
(30) LINE "C"
N00°41'48"E
(11)
(30) LINE "C"
N00°41'48"E
(72)
(70)
PARCEL MAP BOUNDARY
(P) 48" SD
14+44.87 BC
BEGIN 48" RCP
JOIN EXIST. 48" SD
(35)
(30) LINE "C"
N23°11'48"E
(46)
(45) 9+74.82
BEGIN LINE "C"
SEE HEADWALL
DETAIL ABOVE
27'
(43)
(30) LINE "C"
Δ=67°29'59"
R=22.5'
L=26.51'
T=15.03'
CB "C-1"
A'=36", V=6.29'
W=10'
(36)
℄ INT.
10+38.22 LINE "C"
10+00.00 LAT. "C-2"
10+39.22 LINE "C"
10+00.00 LAT. "C-1"
(40)
LINE "C"
N00°41'48"E
(30)
TURN AROUND AREA FOR
PROPERTY OWNER'S ASSOCIATION
AUTHORIZED VEHICLES
STORM DRAIN ACCESS AND
SLOPE EASEMENT TO PROPERTY
OWNER'S ASSOCIATION INST.
#2011-0216635
APN 532-110-005
VACANT
VULCAN IRON AND STEEL CO.
℄ INT.
12+55.98 LINE "C"
10+00.00 LAT. "C-3"
(40)
14+05.37
END 48" RCP
JOIN EXIST. 48" SD
(35)
STREET RIGHT-OF-WAY DEDICATION
TO CITY OF BANNING
INST. #2010-0485664

LINE "C"

EXIST. 30" GAS
EXIST. 4" TELEPHONE
(30) LINE "C"
Δ=90°21'28"
R=22.5'
L=35.49'
T=22.64'
PROP. 16" WATER
PROP. 8" WATER
7.5'
WILSON ST.
43'
17'
PARCEL MAP BOUNDARY
℄ WILSON ST.
SEE SHT. 6 FOR
STORM DRAIN
DEBRIS CHANNEL
SEE RIGHT
14+80.36 EC
(70)
(72)
(24)
(70)
(72)

ST. STA. 36+33.25 WILSON ST.
ST. STA. 23+21.02 O'DONNELL ST.
PARCEL MAP BOUNDARY
O'DONNELL ST.
(49)
℄ INT.
14+56.05 LINE "C"
10+00.00 LOW FLOW
LAT. "C-4"
N45°19'51"E
(34)
CB "C-4"
A'=36", V=7.68'
W=10'
(36)
S=0.1466
N39°56'53"E
(13)
PROP. 8" WATER
WILSON ST.
EXIST. 4" TELEPHONE
EXIST. 30" GAS
PARCEL 8
(1)
10+10.88 LINE
45° BEND
(35)
43'
℄ INT.
17+13.66 LINE "C"
10+00.00 LAT. "C-5"
(40)
℄ INT.
14+91.83 LINE "C"
10+00.00 LAT. "C-4"
(40)
(30) LINE "C"
N89°40'09"W
(NOT BUILT)
(34) LAT. "C-5"
N44°40'09"W
260.75 RIM
24" DIA. RISER
(31) LINE "C"
N89°40'09"W
(NOT BUILT)
SEE SHT. 6 FOR
STORM DRAIN
DEBRIS CHANNEL
℄ 24" DIA. RISER
10+16.61 LAT. "C-5"
260.75 RIM
(42)
PARCEL MAP
BOUNDARY
℄ WILSON ST.
℄ 24" DIA. RISER
10+32.75 LOW FLOW
258.75 RIM
258.0 FL V-DITCH
254.00' INV RISER
SEE LEFT
14+80.36 EC
(50)
LINE "C"
N39°40'09"W
(30)
APN 532-030-004
VACANT
MORONGO BAND OF MISSION INDIANS

LINE "C"

STA. 19+00 MATCHLINE – SEE SHEET 4

PIPELINE CROSSING SEPARATION CHART

	FS/FG	STORM DRAIN	WATER	SEPARATION
(8)	244.6	237.7 BOT	236.7 TOP	1.0'
(9)	245.8	239.5 BOT	238.4 TOP	1.1'
(10)	245.7	239.4 BOT	238.4 TOP	1.0'
(11)	252.2	243.1 TOP	248.8 BOT	5.7'
(12)	255.9	248.8 TOP	249.8 BOT	1.0'
(13)	260.0	254.6 TOP	256.2 BOT	1.6'
(24)	259.8	252.5 TOP	256.0 BOT	3.5'

WHEN CROSSING SEPARATION IS LESS THAN 18", SEE DETAIL A/7 FOR SPECIAL BEDDING.

MANHOLE #4 DATA - LINE "C"

STATION	A	B	C	D1	D2	ELEV. R	ELEV. S	LATERAL
10+38.22	63°41'45"	24"	4.69'	48"	48"	239.50	239.46	"C-1"
10+39.22	45°00'00"	24"	6.22'			239.50	239.37	"C-2"
12+55.98	45°00'00"	30"	6.52'	48"	48"	240.30	240.26	"C-3"
14+91.83	45°00'00"	24"	6.22'	48"	48"	250.49	250.14	"C-4"
17+37.92	45°00'00"	24"	5.86'	42"	48"	253.00	252.90	"C-5"

STORM DRAIN CONSTRUCTION NOTES

(30) CONSTRUCT 48" RCP WITH BEDDING & BACKFILL PER DETAIL A/7
(31) ~~CONSTRUCT 42" RCP WITH BEDDING & BACKFILL PER DETAIL A/7~~
(33) CONSTRUCT 30" RCP WITH BEDDING & BACKFILL PER DETAIL A/7
(34) CONSTRUCT 24" RCP WITH BEDDING & BACKFILL PER DETAIL A/7
(35) CONSTRUCT CONCRETE COLLAR PER R.C.F.C.W.C.D. STD. No. M803
(36) CONSTRUCT 10' WIDE CATCH BASIN PER R.C.F.C.W.C.D. STD. No. CB100
(40) CONSTRUCT MANHOLE #4 PER R.C.F.C.W.C.D. STD. No. MH254
(42) ~~CONSTRUCT RISER INLET PER DETAIL C/7~~
(43) CONSTRUCT CASE "E" RIP-RAP PAD PER DETAIL B/7, DIMENSIONS PER PLAN
(44) CONSTRUCT CONCRETE BULKHEAD PER R.C.F.C.W.C.D. STD. No. M816
(45) CONSTRUCT CONCRETE HEAD WALL PER CALTRANS STD. PLAN D90, TYPE A STRAIGHT WINGWALLS AND CABLE RAILING PER B11-47
(46) CONSTRUCT INCLINED TRASH RACK PER S.P.P.W.C. STD. PLAN 361-2 CASE "A"
(49) CONSTRUCT JS #2 PER R.C.F.C.W.C.D. STD. No. JS227, A=67°44'20", B=24", C=4.41', D=48", E=2.26', F=1.72', G=1.76', L=2.77', ELEVATION R=249.78, ELEVATION S=249.47
(50) CONSTRUCT 24" DIA. RISER INLET PER DETAIL D/8
(P) PROTECT IN PLACE EXISTING ITEM INDICATED

DEMOLITION NOTES

(70) REMOVE EXISTING CSP INLET
(72) REMOVE EXISTING STORM DRAIN

GRAPHIC SCALE
40' 0 20' 40' 80' 160'
(IN FEET)
1 inch = 40' ft.

DIGALERT
DIAL TOLL FREE
1-800-227-2600
AT LEAST TWO DAYS
BEFORE YOU DIG
UNDERGROUND SERVICE ALERT OF SOUTHERN CALIFORNIA

NO.	DATE	REVISIONS	APP.	DATE
1	11/20/12	AS-BIULT		

APPROVED BY:
CITY OF BANNING, PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION
99 E. RAMSEY STREET
BANNING, CA 92220
PH: (951) 922-3130
KAHONO OEI R.C.E. 52652 (EXP. 12/31/12)

PREPARED BY:
Stantec
STANTEC CONSULTING INC.
19 TECHNOLOGY DRIVE
IRVINE, CA 92618
949.923.6000
stantec.com
MARK B. MCLELLAN R.C.E. 51031 (EXP. 9/30/13)

REGISTERED PROFESSIONAL ENGINEER MARK B. MCLELLAN No. 51031 Exp. 9/30/13 CIVIL STATE OF CALIFORNIA

BENCHMARK:
RECOVERED IN GOOD CONDITION. NEW DESCRIPTION FOLLOWS.
3.7 KM (2.30 MI) EAST ALONG A FRONTAGE ROAD ON THE SOUTH SIDE OF INTERSTATE HWY 10 FR. THE INTERSECTION OF SAN GORGONIO AVE. IN BANNING SOUTHWEST OF THE SOUTHWEST CORNER OF A WEIGH STATION BUILDING, (97.8 FT) NORTH OF THE NORTH RAIL OF THE SOUTHERN PACIFIC RAILROAD, 0.9 M (3 FT) WEST OF A POWER POLE. THE MARK IS 0.30 METERS EAST FROM A WITNESS POST THE MARK IS ABOVE LEVEL, LEVEL WITH THE FRONTAGE ROAD.
NAVD 88 ELEV. 2118.09 FT.

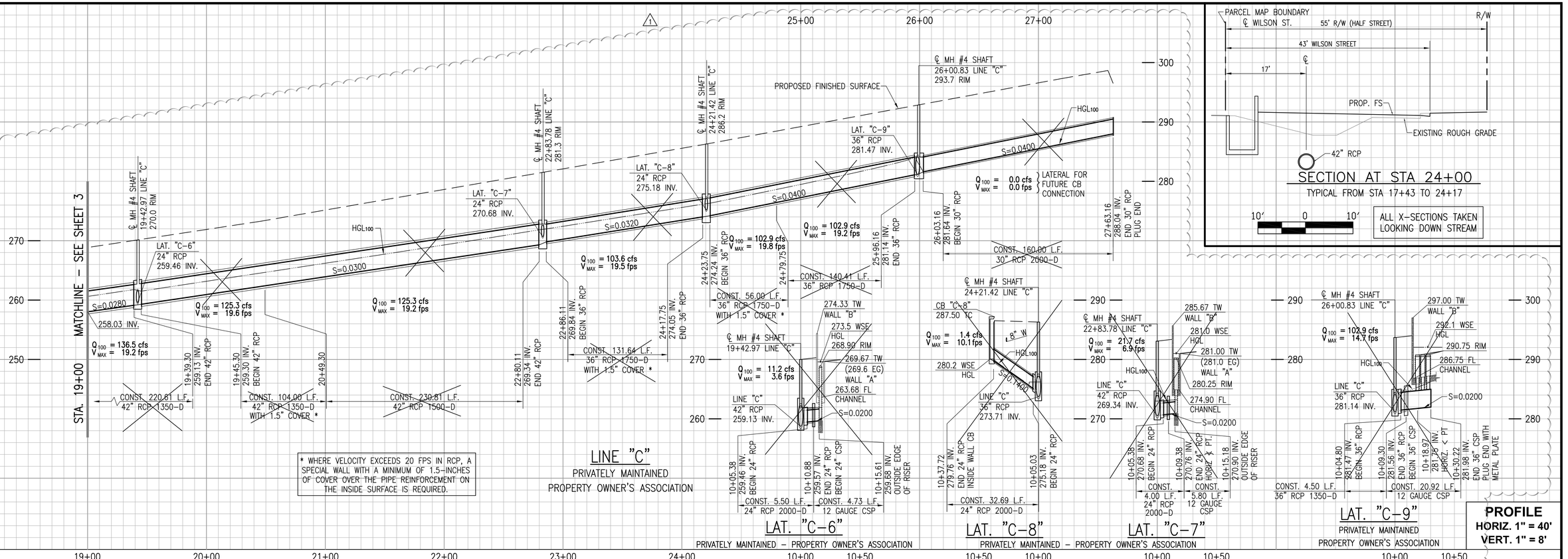
CITY OF BANNING
LINE "C"
LAT. "C-1 THROUGH "C-5"
BANNING BUSINESS PARK
STORM DRAIN IMPROVEMENT PLAN

STANTEC PROJECT NO.
2042 473200

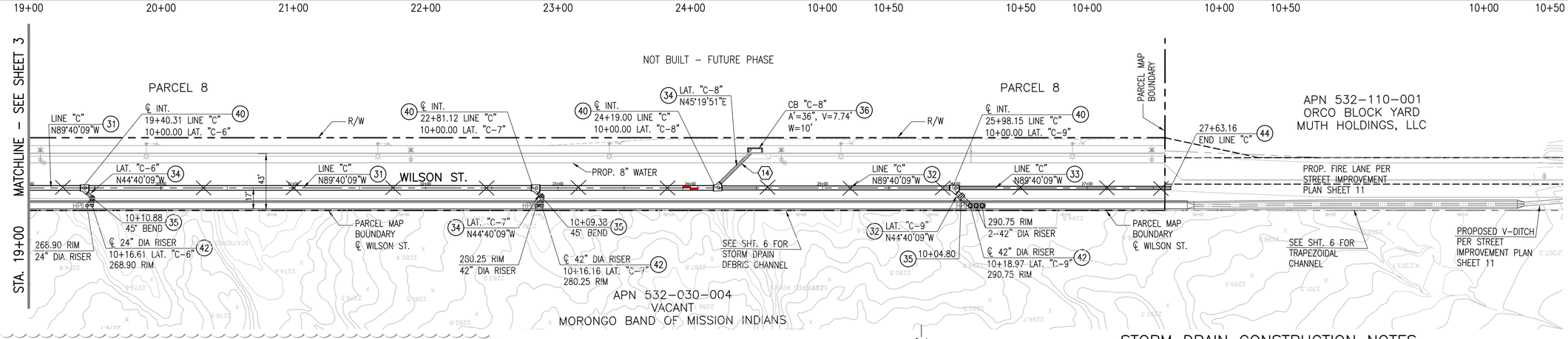
SHEET 3
OF 11

DRAWING: v:\projects\2042473200\dwg\prsd0037.dwg PLOTTED: 12/3/2012 5:03 PM BY: Frey, Dove

3RD SUBMITTAL - 03/22/2012



* WHERE VELOCITY EXCEEDS 20 FPS IN RCP, A SPECIAL WALL WITH A MINIMUM OF 1.5–INCHES OF COVER OVER THE PIPE REINFORCEMENT ON THE INSIDE SURFACE IS REQUIRED.



MANHOLE #4 DATA - LINE "C"								
STATION	A	B	C	D1	D2	ELEV. R	ELEV. S	LATERAL
20+44.08	45°00'00"	24"	5.80'	42"	42"	261.90	261.82	"C–6"
24+19.00	45°00'00"	24"	5.45'	36"	42"	273.90	273.79	"C–7"
	45°00'00"	24"	5.45'			275.18	274.70	"C–8"
27+18.01	45°00'00"	36"	5.22'	30"	36"	286.07	285.99	"C–9"

PIPELINE CROSSING SEPARATION CHART				
	FS/FG	STORM DRAIN	WATER	SEPARATION
14	286.5	280.7 TOP	282.7 BOT	2.0'

WHEN CROSSING SEPARATION IS LESS THAN 18", SEE DETAIL A/7 FOR SPECIAL BEDDING.

LINE "C"

GRAPHIC SCALE
40' 0 20' 40' 80' 160'
(IN FEET)
1 inch = 40' ft.

STORM DRAIN CONSTRUCTION NOTES

31 CONSTRUCT 42" RCP WITH BEDDING & BACKFILL PER DETAIL A/7
32 CONSTRUCT 36" RCP WITH BEDDING & BACKFILL PER DETAIL A/7
33 CONSTRUCT 30" RCP WITH BEDDING & BACKFILL PER DETAIL A/7
34 CONSTRUCT 24" RCP WITH BEDDING & BACKFILL PER DETAIL A/7
35 CONSTRUCT CONCRETE COLLAR PER R.C.F.C.W.C.D. STD. NO. M803
36 CONSTRUCT 10' WIDE CATCH BASIN PER R.C.F.C.W.C.D. STD. NO. CB100
40 CONSTRUCT MANHOLE #4 PER R.C.F.C.W.C.D. STD. NO. MH254
42 CONSTRUCT RISER INLET PER DETAIL C/7
44 CONSTRUCT CONCRETE BULKHEAD PER R.C.F.C.W.C.D. STD. No. M816

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AT LEAST TWO DAYS BEFORE YOU DIG
UNDERGROUND SERVICE ALERT OF SOUTHERN CALIFORNIA

NO.	DATE	REVISIONS	APP.	DATE
1	11/20/12	AS–BIUILT		

APPROVED BY:
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ENGINEERING DIVISION
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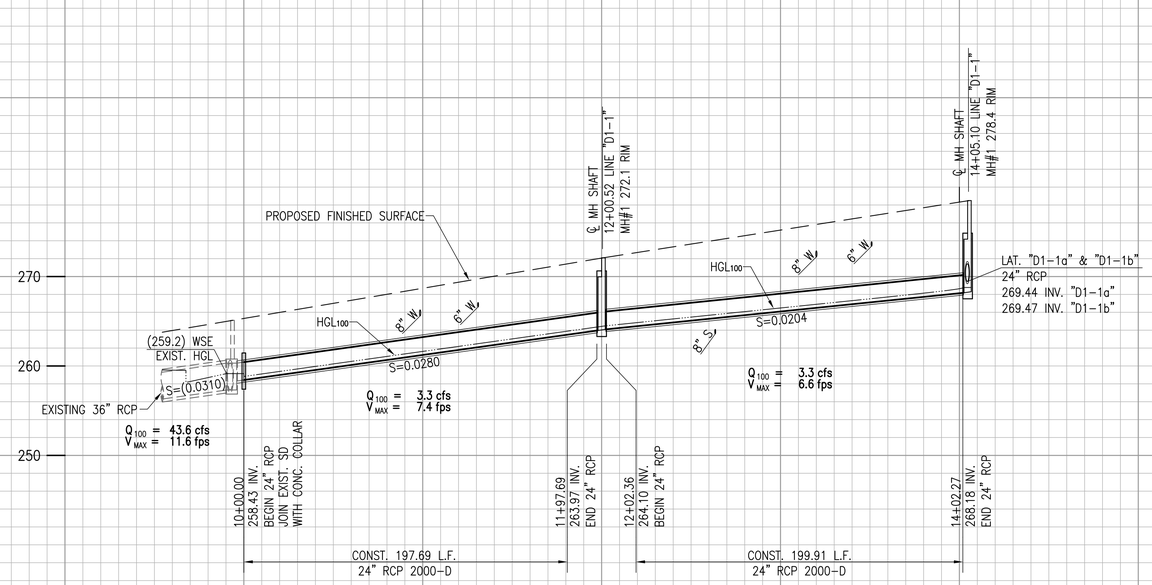
NAVD 88 ELEV. 2118.09 FT.

CITY OF BANNING
LINE "C"
LAT. "C-6" THROUGH "C-9"
BANNING BUSINESS PARK STORM DRAIN IMPROVEMENT PLAN

STANTEC PROJECT NO. 2042 473200
SHEET 4 OF 11

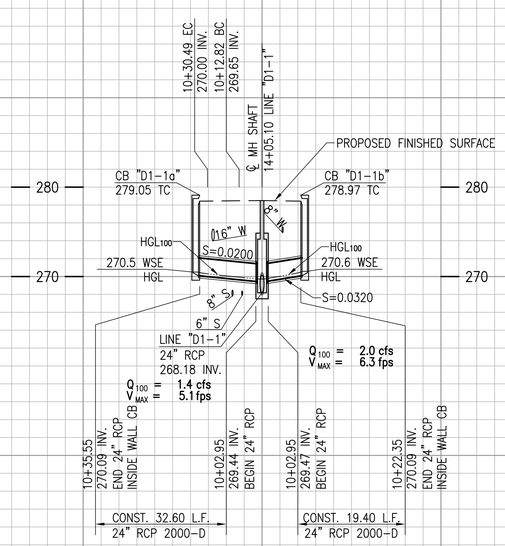
3RD SUBMITTAL - 03/22/2012

DRAWING: v:\projects\2042473200\dwg\prsd0038.dwg PLOTTED: 12/3/2012 4:52 PM BY: Frey, Dove



LINE "D1-1"

PRIVATELY MAINTAINED
PROPERTY OWNER'S
ASSOCIATION



LAT. "D1-1a"

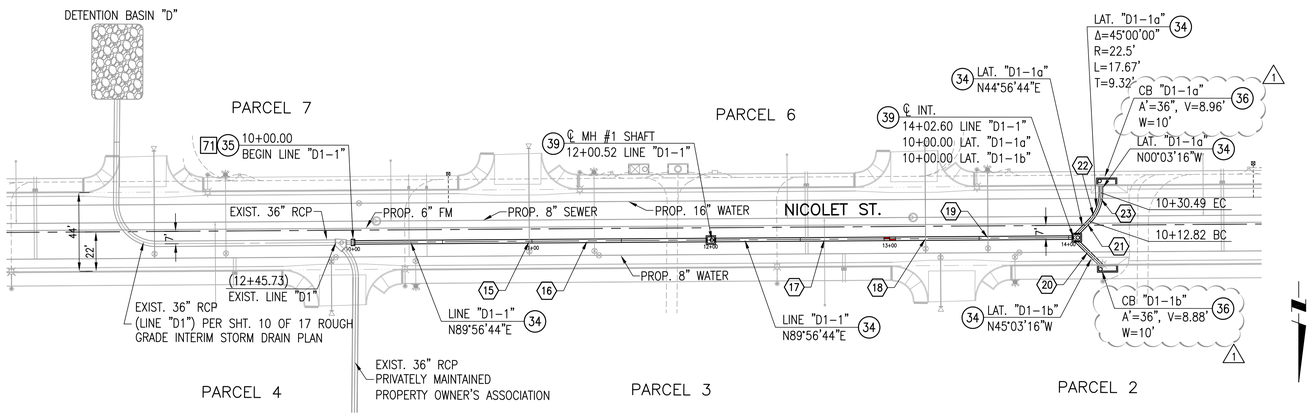
PRIVATELY MAINTAINED
PROPERTY OWNER'S
ASSOCIATION

LAT. "D1-1b"

PRIVATELY MAINTAINED
PROPERTY OWNER'S
ASSOCIATION

PROFILE
HORIZ. 1" = 40'
VERT. 1" = 8'

10+00 11+00 12+00 13+00 14+00 10+50 10+00 10+50



LINE "D1-1"

STORM DRAIN CONSTRUCTION NOTES

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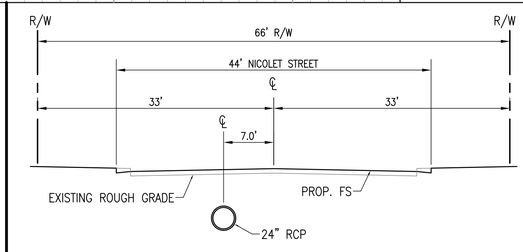
35 — CONSTRUCT CONCRETE COLLAR PER R.C.F.C.W.C.D. STD. NO. M803
36 — CONSTRUCT 10' WIDE CATCH BASIN PER R.C.F.C.W.C.D. STD. NO. CB100
39 — CONSTRUCT MANHOLE #1 PER R.C.F.C.W.C.D. STD. NO. MH251

DEMOLITION NOTES

71 — REMOVE EXISTING BULKHEAD



SECTION AT STA 13+00

TYPICAL FROM STA 10+00 TO 14+02

10' 0 10'

ALL X-SECTIONS TAKEN
LOOKING DOWN STREAM

GRAPHIC SCALE
40' 0 20' 40' 80' 160'
(IN FEET)
1 inch = 40' ft.

PIPELINE CROSSING SEPARATION CHART

	FS/FG	STORM DRAIN	SEWER	WATER	SEPARATION
15	269.0	263.4 TOP		265.6 BOT	2.2'
16	270.0	264.3 TOP		266.6 BOT	2.3'
17	274.1	265.1 BOT	264.1 TOP		1.0'
18	275.8	268.8 TOP		272.2 BOT	3.4'
19	276.8	269.4 TOP		273.4 BOT	4.0'
20	278.5	272.0 TOP		274.8 BOT	2.8'
21	278.8	269.4 BOT	268.4 TOP		1.0'
22	278.8	269.5 BOT	268.5 TOP		1.0'
23	278.7	272.2 TOP		273.2 BOT	1.0'

WHEN CROSSING SEPARATION IS LESS THAN 18", SEE DETAIL A/7 FOR SPECIAL BEDDING.

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NAVD 88 ELEV. 2118.09 FT.

CITY OF BANNING

LINE "D1-1"
LAT. "D1-1a" & "D1-1b"

BANNING BUSINESS PARK
STORM DRAIN IMPROVEMENT PLAN

STANTEC PROJECT NO.
2042 473200

SHEET 5
OF 11

3RD SUBMITTAL - 03/22/2012

DRAWING: v:\projects\2042473200\dwg\prsd0039.dwg PLOTTED: 12/3/2012 4:52 PM BY: Frey, Dove

TOTAL BLOCK AREA = 4,940 S.F.

SOUTH WALL

NORTH WALL

V-DITCH PER PLAN BELOW

9+90.00 258.00 FL

10+00.00 258.20 FL

10+08.00 8" RISER

10+18.75 261.50 TW GB

10+28.75 261.50 TW GB

10+38.00 8" RISER

10+68.00 8" RISER

10+74.75 267.00 TW GB

10+98.00 8" RISER

11+00.00 260.20 FL GB

11+24.00 8" RISER

11+46.00 8" RISER

11+68.00 8" RISER

11+88.25 272.00 TW GB

11+90.00 8" RISER

12+12.00 8" RISER

12+16.65 PARTITION 269.67 TOP 263.70 FL

12+16.75 270.50 TW GB

12+26.75 270.50 TW GB

12+34.00 8" RISER

12+56.00 8" RISER

12+78.00 8" RISER

12+91.75 274.00 TW GB

13+00.00 8" RISER

13+22.00 8" RISER

13+32.75 271.20 TW GB

13+44.00 8" RISER

13+47.75 271.20 TW GB

13+50.00 267.70 FL GB

13+63.33 8" RISER

13+82.67 8" RISER

13+85.75 272.50 TW GB

14+02.00 8" RISER

14+21.33 8" RISER

14+23.75 277.50 TW GB

14+40.67 8" RISER

14+60.00 8" RISER

14+79.33 8" RISER

14+98.67 8" RISER

15+16.67 8" RISER

15+23.75 281.00 TW GB

15+34.67 8" RISER

15+52.67 8" RISER

15+56.40 PARTITION 281.00 TOP 274.92 FL

15+70.67 8" RISER

15+73.75 281.00 TW GB

15+90.00 8" RISER

268.33 TW 19.00' 264.33 TW S=0.0200

269.00 TW 30.00' 265.00 TW 34.00'

269.67 TW 30.00' 265.67 TW 26.00'

270.33 TW 30.00' 266.33 TW 26.00'

271.00 TW 26.00' 267.00 TW F.S. AT BACK S=0.0300

271.67 TW 22.00' 267.67 TW CHANNEL FLOWLINE

272.33 TW 22.00' 268.33 TW

273.00 TW 22.00' 269.00 TW

273.67 TW 22.00' 269.67 TW

274.33 TW 22.00' 270.33 TW

275.00 TW 22.00' 271.00 TW

275.67 TW 22.00' 271.67 TW

276.33 TW 22.00' 272.33 TW S=0.0300

277.00 TW 22.00' 273.00 TW

277.67 TW 22.00' 273.67 TW

278.33 TW 19.33' 274.33 TW

279.00 TW 19.33' 275.00 TW F.S. AT BACK

279.67 TW 19.33' 275.67 TW CHANNEL FLOWLINE S=0.0350

280.33 TW 19.33' 276.33 TW

281.00 TW 19.33' 277.00 TW

281.67 TW 19.33' 277.67 TW

282.33 TW 19.33' 278.33 TW

283.00 TW 19.33' 279.00 TW

283.67 TW 18.00' 279.67 TW

284.33 TW 18.00' 280.33 TW

285.00 TW 18.00' 281.00 TW

285.67 TW 18.00' 281.67 TW

286.33 TW 19.33' 282.33 TW

287.00 TW 19.33'

S=0.0350

10+00 10+50 11+00 11+50 12+00 12+50 13+00 13+50 14+00 14+50 15+00 15+50 16+00

295 290 285 280 275 270 265 260 255 250

MATCHLINE SEE SHEET 6A

SCALE:
HORIZ. 1" = 20'
VERT. 1" = 10'

SEE BELOW-RIGHT FOR CONTINUATION

STORM DRAIN PER SHT. 3

WILSON STREET

STORM DRAIN PER SHT. 4

9+88.83 262.9 FL GB

N89°40'09"W

STORM DRAIN DEBRIS CHANNEL
PRIVATELY MAINTAINED
PROPERTY OWNER'S ASSOCIATION

NOT BUILT – FUTURE PHASE

MATCHLINE SEE SHEET 6A

S.D. ACCESS & SLOPE ESMT. TO PROPERTY OWNER'S ASSOC. INST. #2011-0216635

STREET R.O.W. DEDICATION TO CITY OF BANNING INST. #2010-0465664

O'DONNELL STREET

R/W

WILSON STREET

STORM DRAIN PER SHT. 3

7+12.79 257.6 FL

7+39.28 258.0 FL

7+69.28 258.6 FL

SECTION A-A

TRANSITION

1.96% 8+00

9+00 PARCEL MAP BOUNDARY

1.96%

SECTION B-B

SEE ABOVE LEFT FOR CONTINUATION

5' HIGH BARBED WIRE FENCE

SLOPE CHANNEL END WALL

265.90 TW

268.33 TW

264.33 TW

CONCRETE V-DITCH BEYOND

258.00 FL

SOUTH WALL

NORTH WALL

CHANNEL END SECTION A-A

STORM DRAIN CONSTRUCTION NOTES

(38) CONSTRUCT CONCRETE DEBRIS CHANNEL PER DETAIL SD1/6A

(41) CONSTRUCT CONCRETE V-DITCH PER DETAIL SD2/6A

(48) INSTALL 5' HIGH BARBED WIRE FENCE PER DETAIL ON SHEET 9

(52) CONSTRUCT DEBRIS CHANNEL END WALL PER DETAIL 2/11

(53) CONSTRUCT DEBRIS CHANNEL PARTITION WALL PER DETAIL 1/11

(54) CONSTRUCT REINFORCING AT INLET RISER PER DETAILS 3/11 & 4/11

GRAPHIC SCALE
20 0 10 20 40 80
(IN FEET)
1 inch = 20 ft.

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NAVD 88 ELEV. 2118.09 FT.

CITY OF BANNING

STORM DRAIN DEBRIS CHANNEL ADJACENT TO WILSON STREET

BANNING BUSINESS PARK
STORM DRAIN IMPROVEMENT PLAN

STANTEC PROJECT NO.
2042 473200

SHEET 6 OF 11

3RD SUBMITTAL - 03/22/2012

DRAWING: v:\projects\2042473200\dwg\prs\d0046.dwg PLOTTED: 12/3/2012 4:58 PM BY: Frey, Dove

TOTAL BLOCK AREA = 4,940 S.F.

MATCHLINE SEE SHEET 6

SOUTH WALL

NORTH WALL

SCALE:
HORIZ. 1" = 20'
VERT. 1" = 10'

16+00 16+50 17+00 17+50 18+00 18+50 19+00 19+50 20+00 20+50

MATCHLINE SEE SHEET 6

STORM DRAIN DEBRIS CHANNEL
PRIVATELY MAINTAINED
PROPERTY OWNER'S ASSOCIATION

SEE BELOW LEFT FOR CONTINUATION

SEE ABOVE RIGHT FOR CONTINUATION

APN 532-110-001
ORCO BLOCK YARD
MUTH HOLDINGS, LLC

PROP. FIRE LANE PER STREET IMPROVEMENT PLAN SHEET 11

PROPOSED V-DITCH PER STREET IMPROVEMENT PLAN SHEET 11

PROTECT IN PLACE EXISTING FENCE

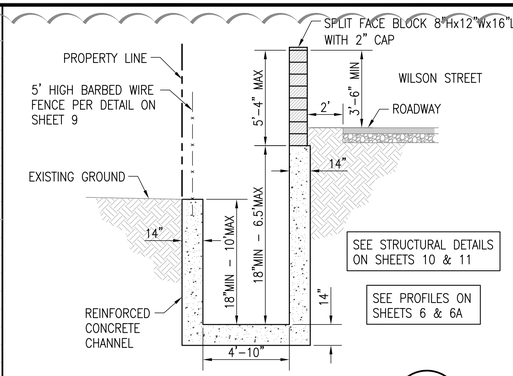
5' TRANSITION-TRAP. CHANNEL TO V-DITCH

NOT BUILT - FUTURE PHASE

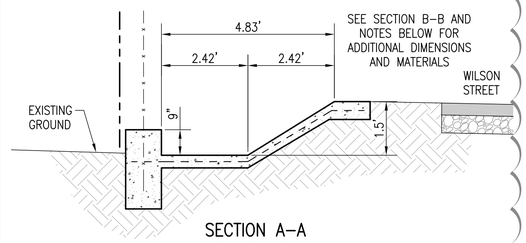
GRAPHIC SCALE
20 0 10 20 40 80
(IN FEET)
1 inch = 20 ft.

STORM DRAIN CONSTRUCTION NOTES

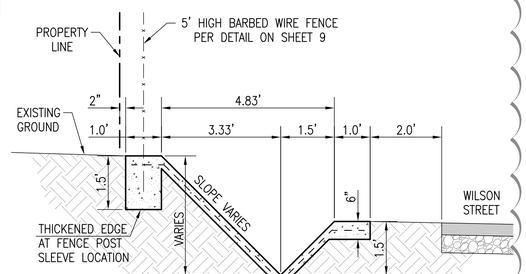
38 CONSTRUCT CONCRETE DEBRIS CHANNEL PER DETAIL SD1/6A
47 CONSTRUCT 5' TRANSITION FROM DEBRIS CHANNEL TO TRAPEZOIDAL CHANNEL
48 INSTALL 5' HIGH BARBED WIRE FENCE PER DETAIL ON SHEET 9
51 CONSTRUCT TRAPEZOIDAL CHANNEL PER DETAIL SD3/6A
53 CONSTRUCT DEBRIS CHANNEL PARTITION WALL PER DETAIL 1/11
54 CONSTRUCT REINFORCING AT INLET RISER PER DETAILS 3/11 & 4/11



CONC. DEBRIS CHANNEL SD1 6A
NOT TO SCALE



SECTION A-A
STA. 7+12.79 TO STA. 7+39.28

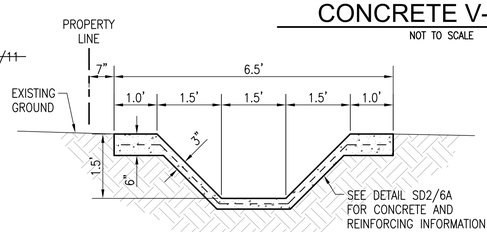


NOTES:
1. CONC. SHALL HAVE A MIN. ULTIMATE COMPRESSIVE STRENGTH OF 2500 PSI AT 28 DAYS.
2. CONC. MAY BE PNEUMATICALLY PLACED AND SHALL CONFORM TO SECT. 1924 OF THE U.B.C.

3" CONCRETE OR GUNITE REINFORCED WITH 6"x6" W1.4xW1.4 WELDED WIRE MESH. TREAT EXPOSED CONCRETE SURFACES WITH CURING COMPOUND.

SECTION B-B
STA. 7+69.28 TO STA. 9+89.00

CONCRETE V-DITCH SD2 6A
NOT TO SCALE



TRAPEZOIDAL CHANNEL SD3 6A
NOT TO SCALE

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NAVD 88 ELEV. 2118.09 FT.

CITY OF BANNING

STORM DRAIN DEBRIS CHANNEL ADJACENT TO WILSON STREET

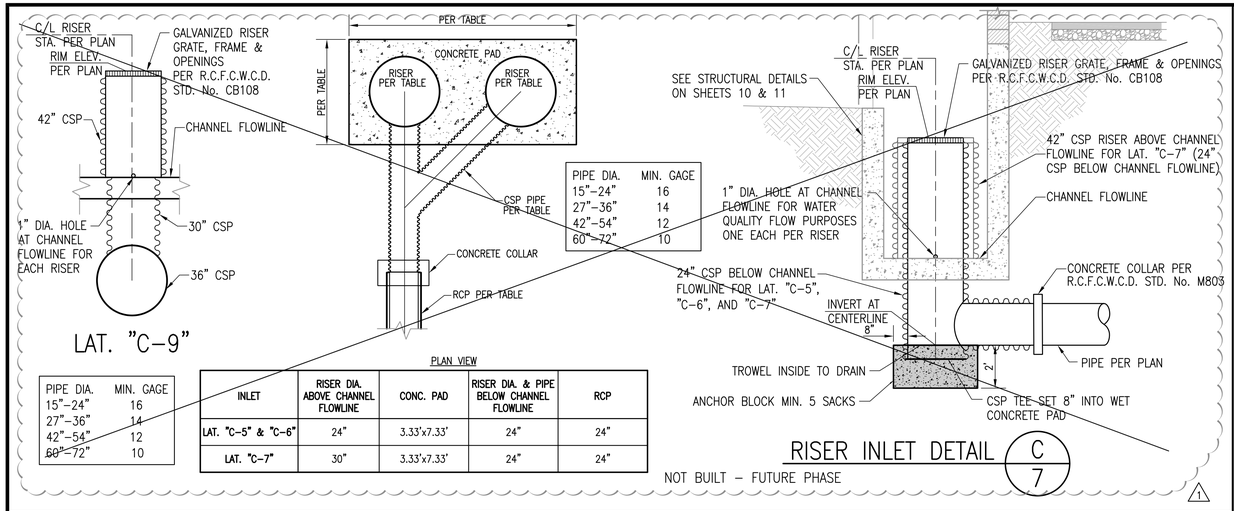
BANNING BUSINESS PARK
STORM DRAIN IMPROVEMENT PLAN

STANTEC PROJECT NO.
2042 473200

SHEET 6A
OF 11

3RD SUBMITTAL - 03/22/2012

DRAWING: v:\projects\2042473200\dwg\prsd0051.dwg PLOTTED: 12/3/2012 4:58 PM BY: Frey, Dove

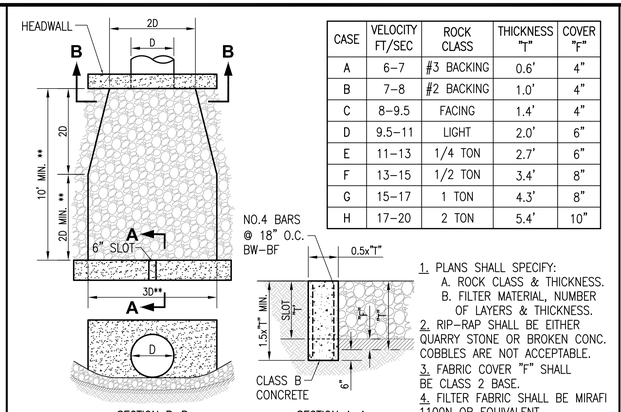


PIPE DIA.	MIN. GAGE
15"–24"	16
27"–36"	14
42"–54"	12
60"–72"	10

PIPE DIA.	MIN. GAGE
15"–24"	16
27"–36"	14
42"–54"	12
60"–72"	10

INLET	RISER DIA. ABOVE CHANNEL FLOWLINE	CONC. PAD	RISER DIA. & PIPE BELOW CHANNEL FLOWLINE	RCP
LAT. "C-5" & "C-6"	24"	3.33'x7.33'	24"	24"
LAT. "C-7"	30"	3.33'x7.33'	24"	24"

RISER INLET DETAIL C/7

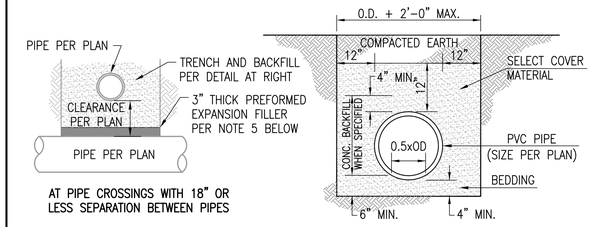


CASE	VELOCITY FT/SEC	ROCK CLASS	THICKNESS "T"	COVER "F"
A	6–7	#3 BACKING	0.6'	4"
B	7–8	#2 BACKING	1.0'	4"
C	8–9.5	FACING	1.4'	4"
D	9.5–11	LIGHT	2.0'	6"
E	11–13	1/4 TON	2.7'	6"
F	13–15	1/2 TON	3.4'	8"
G	15–17	1 TON	4.3'	8"
H	17–20	2 TON	5.4'	10"

1. PLANS SHALL SPECIFY:
   A. ROCK CLASS & THICKNESS.
   B. FILTER MATERIAL, NUMBER OF LAYERS & THICKNESS.
2. RIP–RAP SHALL BE EITHER QUARRY STONE OR BROKEN CONC. COBBLES ARE NOT ACCEPTABLE.
3. FABRIC COVER "F" SHALL BE CLASS 2 BASE.
4. FILTER FABRIC SHALL BE MIRAFI 1100N OR EQUIVALENT.

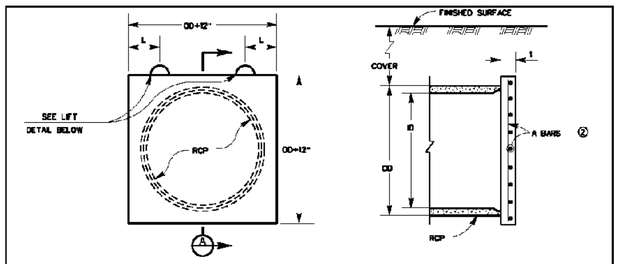
** MINIMUM DIMENSIONS, SEE PLAN FOR ACTUAL DIMENSIONS

RIP–RAP PAD DETAIL B/7

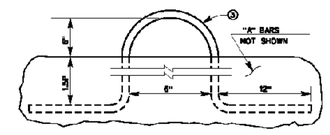


1. ALL MATERIAL MUST MEET THE APPROVAL OF THE FIELD INSPECTOR.
2. SELECT COVER MATERIAL SHALL BE SAND OR OTHER GRANULAR MATERIAL WITH A SAND EQUIVALENT GREATER THAN 30.
3. BEDDING SHALL CONSIST OF SAND OF OTHER GRANULAR MATERIAL WITH A SAND EQUIVALENT GREATER THAN 30 UNLESS GROUND WATER IS PRESENT, IN WHICH CASE BEDDING MATERIAL OF #3 ROCK IS REQUIRED.
4. BEDDING AND BACKFILL SHALL BE COMPACTED TO A RELATIVE COMPACTION OF NOT LESS THAN 90%, EXCEPT FINAL 2 FEET WHICH WILL BE NOT LESS THAN 95%.
5. THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS ON THE PREFORMED EXPANSION JOINT FILLER, FILLER SHALL COMPLY WITH ASTM D994 OR ASTM D1751.

S.D. PIPE BEDDING A/7



ID (IN)	MAX COVER (FT)	t (IN)	A BARS	L, P
48	5	4	4@6	1'–5"
	10	4	4@6	
	15	5	4@6	
60	5	4	4@6	1'–8"
	10	5	4@6	
	15	5	5@5	
66	5	5	4@6	1'–10"
	10	5	5@5	
	15	5	5@5	
72	5	5	4@6	2'–0"
	10	5	5@5	
	15	5	6@5	
78	5	5	5@5	2'–2"
	10	5	6@5	
	15	6	6@5	
84	5	5	5@5	2'–4"
	10	5	6@5	
	15	6	6@5	
90	5	5	6@5	2'–5"
	10	6	6@5	
	15	6	6@5	
96	5	5	6@5	2'–7"
	10	6	6@5	
	15	6	7@5	



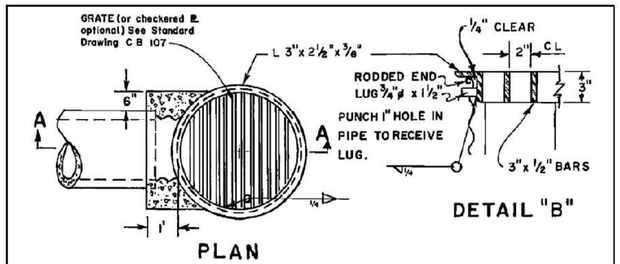
NOTES

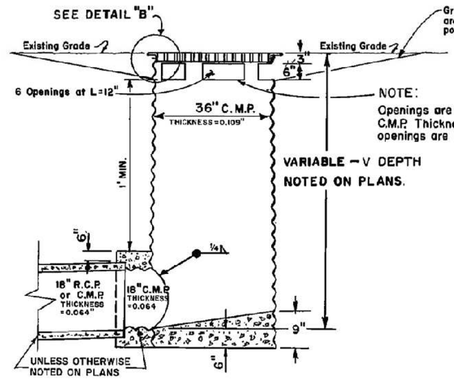
1. CONCRETE SHALL BE CLASS 'A'.
2. ALL REINFORCING STEEL SHALL BE CENTERED IN BULKHEAD EXCEPT FOR PIPE DIAMETER GREATER THAN 95", VERTICAL "A" BARS SHALL BE PLACED AT 2" CLEAR FROM THE INSIDE FACE OF THE BULKHEAD, HORIZONTAL "A" BARS SHALL BE PLACED TOWARDS OUTSIDE FACE OF BULKHEAD PER DETAIL.
3. LIFTS SHALL BE WOVEN STEEL CABLE WITH SAME MINIMUM DIAMETER (ø) AS "A" BARS. WEAVE CABLE THROUGH HORIZONTAL "A" BARS. COAT EXPOSED PORTION OF CABLE LIFTS WITH AN APPROVED BITUMINOUS PAINT PRIOR TO BACKFILLING TRENCH.

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
APPROVED BY: CHIEF ENGINEER
DATED: April 6, 2004 R.C.E. NO. 22336

CONCRETE BULKHEAD

STANDARD DRAWING NUMBER M816





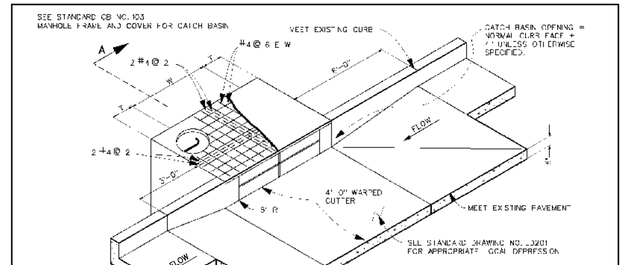
NOTES:

1. PLACE GRATE BARS PARALLEL TO FLOW.
2. GRATE AND FRAME SHALL BE GALVANIZED.

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
APPROVED BY: CHIEF ENGINEER
DATED: April 6, 2004 R.C.E. NO. 22336

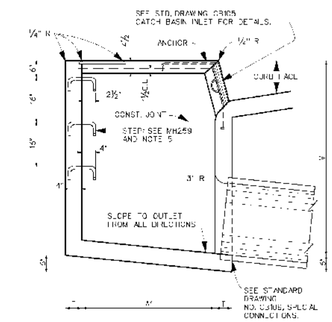
INLET TYPE X (GRATE DETAILS) FOR TEMPORARY USE ONLY

STANDARD DRAWING NUMBER CB108



NOTES

1. DIMENSIONS UNLESS OTHERWISE SPECIFIED.
   V' – 6'@ W, 7.9'@ W, 14'@ W
   V – SHALL BE SHOWN ON THE PLANS.
   H – SHALL BE SHOWN ON THE PLANS
   (7' – 0" MIN.)
   = 6" IF V IS 4'-0" OR LESS.
   = 8" IF V IS LESS THAN 6.
   = 10" IF V IS 6'-0" OR MORE.
   D – 18" UNLESS OTHERWISE SPECIFIED.
   A – 36" UNLESS OTHERWISE SPECIFIED.
2. STRUCTURAL CONCRETE SHALL BE CLASS "A" 2,500 (6 SACK)
3. ALL REINFORCING STEEL SHALL BE NUMBER 4 DEFORMED BARS CLEARANCE SHALL BE 2½" FROM THE BOTTOM OF THE SLAB. SEE NOTE 7.
4. THE SURFACE OF ALL EXPOSED CONCRETE SHALL CONFORM TO SLOPE, GRADE, COLOR, FINISH AND SCORING IN THE EXISTING OR PROPOSED CURB & WALK ADJACENT TO THE BASIN. THE BASIN FLOOR SHALL BE GIVEN A LIGHT BROOM FLOAT FINISH. CURVATURE OF THE L.H. AND S.B. WALLS AT THE GUTTER OPENING SHALL NOT BE MADE BY PLASTERING. THE OUTLET PIPE SHALL BE TRIMMED TO FINAL SLOPE AND LENGTH BEFORE THE CONCRETE IS POURED.
5. STEPS:
   ¾" PLAIN ROUND GALVANIZED STEEL STEPS SHALL BE INSTALLED 16" APART WHEN V EXCEEDS 4'-0". THE TOP STEP SHALL BE 6" BELOW THE TOP SURFACE AND SHALL BE 2½" CLEAR FROM THE WALL.
   ALL OTHER STEPS SHALL BE 4" CLEAR FROM THE WALL. ONLY ONE STEP 12" FROM THE BOTTOM SHALL BE INSTALLED IF V IS 4'-8" OR LESS. ALL STEPS SHALL BE ANCHORED NOT LESS THAN 4" INTO THE WALL OF THE BASIN.
6. CURB, GUTTER AND LOCAL DEPRESSIONS SHALL BE CLASS "B" CONCRETE.
7. SEE STANDARD DRAWING CB106 FOR WALL & FLOOR STEEL REINFORCING.



L.A.C.F.C.D. No. 2 D952.2 2/83

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
APPROVED BY: CHIEF ENGINEER
DATED: JAN. 2, 2002 R.C.E. NO. 22336

CATCH BASIN NO.1

STANDARD DRAWING NUMBER CB100

DIGALERT
DIAL TOLL FREE 1-800-227-2600
AT LEAST TWO DAYS BEFORE YOU DIG
UNDERGROUND SERVICE ALERT OF SOUTHERN CALIFORNIA

3RD SUBMITTAL - 03/22/2012

NO.	DATE	REVISIONS	APP.	DATE
1	11/20/12	AS–BIUILT		

APPROVED BY:
CITY OF BANNING, PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION
99 E. RAMSEY STREET
BANNING, CA 92220
PH: (951) 922-3130

KAHONO OEI R.C.E. 52652 (EXP. 12/31/12)

PREPARED BY:
STANTEC CONSULTING INC.
19 TECHNOLOGY DRIVE
IRVINE, CA 92618
949.923.6000
stantec.com

MARK B. MCLELLAN R.C.E. 51031 (EXP. 9/30/13)

BENCHMARK:
RECOVERED IN GOOD CONDITION. NEW DESCRIPTION FOLLOWS.
3.7 KM (2.30 MI) EAST ALONG A FRONTAGE ROAD ON THE SOUTH SIDE OF INTERSTATE HWY 10 FR. THE INTERSECTION OF SAN GORGONIO AVE. IN BANNING SOUTHWEST OF THE SOUTHWEST CORNER OF A WEIGH STATION BUILDING, (97.8 FT) NORTH OF THE NORTH RAIL OF THE SOUTHERN PACIFIC RAILROAD, 0.9 M (3 FT) WEST OF A POWER POLE. THE MARK IS 0.30 METERS EAST FROM A WITNESS POST THE MARK IS ABOVE LEVEL, LEVEL WITH THE FRONTAGE ROAD.

NAVD 88 ELEV. 2118.09 FT.

CITY OF BANNING

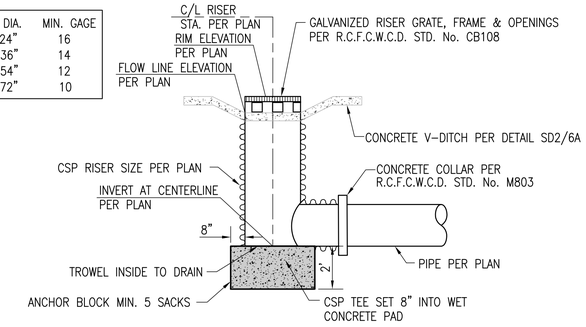
STORM DRAIN CONSTRUCTION DETAILS

BANNING BUSINESS PARK
STORM DRAIN IMPROVEMENT PLAN

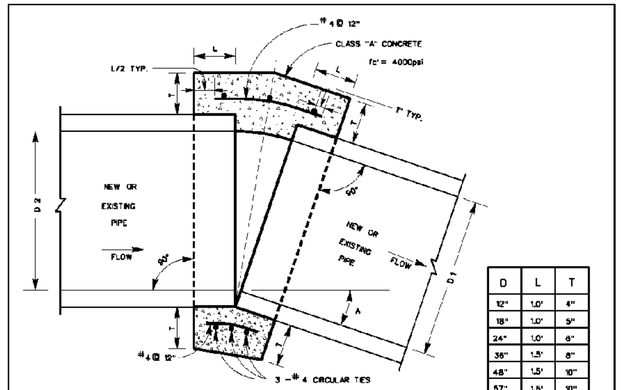
STANTEC PROJECT NO. 2042 473200

SHEET 7 OF 11

PIPE DIA.	MIN. GAGE
15"–24"	16
27"–36"	14
42"–54"	12
60"–72"	10



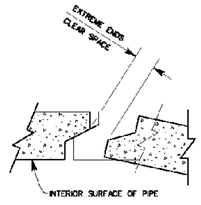
RISER INLET DETAIL D 8



D	L	T
12"	1.0'	4"
18"	1.0'	5"
24"	1.0'	6"
36"	1.5'	8"
48"	1.5'	10"
57"	1.5'	10"
60"	1.75'	11"
66"	1.75'	11"

NOTES

1. A CONCRETE COLLAR IS REQUIRED WHERE THE CHANGE IN GRADE EXCEEDS 0.10 FT. PER FOOT, OR IF CHANGE IN ALIGNMENT EXCEEDS 0.10 FT. PER FOOT.
2. IF THE EXTREME ENDS OF THE PIPE LEAVE A CLEAR SPACE THAT IS GREATER THAN 1", BUT LESS THAN 6", A CONCRETE COLLAR IS REQUIRED (SEE DETAIL A THIS SHEET). IF THE CLEAR SPACE IS 6" OR GREATER, A TRANSITION STRUCTURE IS REQUIRED.
3. CONCRETE COLLAR SHALL NOT BE USED FOR A SIZE CHANGE ON THE MAIN LINE.
4. WHERE PIPES OF DIFFERENT DIAMETERS ARE JOINED WITH A CONCRETE COLLAR, L AND T SHALL BE THOSE OF THE LARGER PIPE. D=D_1 OR D_2, WHICHEVER IS GREATER.
5. FOR PIPE LARGER THAN 66" A SPECIAL COLLAR DETAIL IS REQUIRED.
6. FOR PIPE SIZE NOT LISTED USE THE NEXT SIZE LARGER.
7. OMIT REINFORCING ON PIPES 24" AND LESS IN DIAMETER AND ON ALL PIPES WHERE ANGLE A IS LESS THAN 10°.
8. WHERE REINFORCING IS REQUIRED THE DIAMETER OF THE CIRCULAR TIES SHALL BE D + (2 X WALL THICKNESS) + 8".
9. WHEN D_1 IS EQUAL TO OR LESS THAN D_2 JOIN INVERTS AND WHEN D_1 IS GREATER THAN D_2 JOIN SOFFITS.
10. PIPE MAY BE CORRUGATED METAL PIPE, CONCRETE PIPE, OR REINFORCED CONCRETE PIPE.

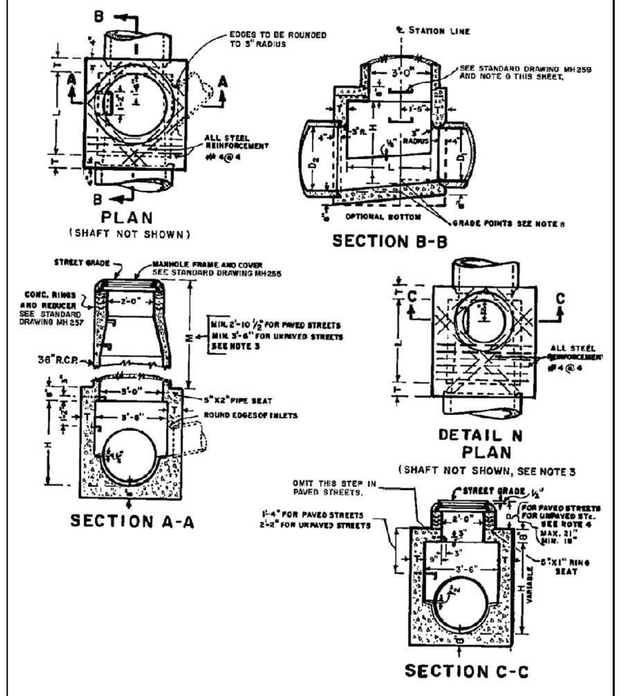


DETAIL "A"
TYPICAL JOINT FOR
REINFORCED CONCRETE PIPE

APWA STD. PLAN 380-1
LA/SFVG P-3393

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
APPROVED BY: [signature]
CHIEF ENGINEER
DATE: April 9, 2024
R.C.E. NO. 37338

CONCRETE COLLAR FOR PIPE 12 INCHES THROUGH 66 INCHES
STANDARD DRAWING NUMBER M803



RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
APPROVED BY: [signature]
CHIEF ENGINEER
DATE: April 5, 2004
R.C.E. NO. 37338

MANHOLE NO. 1
STANDARD DRAWING NUMBER MH251
SHEET 1 OF 2

1. HEIGHT H shall be not less than 4'-0" but may be increased at option of Contractor provided that the value of M shall not be less than the minimum specified and that the reducer shall be used. For H (in Sec. C-C) See Note 4.
2. LENGTH L shall be 4' unless otherwise shown on improvement plan. L may be increased or location of manhole shifted to meet pipe ends, at the option of Contractor, except that any change in location of manhole must be approved by the Engineer.
3. SHAFT shall be constructed as per Sec. C-C and Detail N when depth M from street grade to top of box is less than 2'-10½" for paved streets or 3'-6" for unpaved street.
4. DEPTH P may be reduced to an absolute limit of 6 inches when larger values of P would reduce H (in Sec. C-C) to be 3'-6" or less.
5. T shall be 8" for values of H up to and including 8 ft. T shall be 10" for values of H over 8 ft.
6. Steps shall be 3/4" round, galvanized steel and anchored not less than 4 inches in the walls of structures. Unless otherwise shown, steps shall be spaced 16" on center. The lowest step shall be not more than 2 feet above the invert.
7. REINFORCING STEEL shall be No. 4 and 1½" clear from inside face of concrete.
8. STATIONS refer to Plan & Profile sheets. Elevations at ℄ and prolonged invert grade line. See Note 2 for shifting location.
9. RINGS, reducer, and pipe for access shaft shall be seated in cement mortar and neatly pointed or wiped inside shaft.
10. FLOOR of manhole shall be steel-troweled.
11. CONCRETE shall be Class "A".

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
APPROVED BY: [signature]
CHIEF ENGINEER
DATE: April 5, 2004
R.C.E. NO. 37338

MANHOLE NO. 1
STANDARD DRAWING NUMBER MH251
SHEET 2 OF 2

DIGALERT
DIAL TOLL FREE
1-800-227-2600
AT LEAST TWO DAYS BEFORE YOU DIG
UNDERGROUND SERVICE ALERT OF SOUTHERN CALIFORNIA

NO.	DATE	REVISIONS	APP.	DATE
1	11/20/12	AS-BIULT		

APPROVED BY:
CITY OF BANNING, PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION
99 E. RAMSEY STREET
BANNING, CA 92220
PH: (951) 922-3130
KAHONO OEI R.C.E. 52652 (EXP. 12/31/12)

PREPARED BY:
STANTEC CONSULTING INC.
19 TECHNOLOGY DRIVE
IRVINE, CA 92618
949.923.6000
stantec.com
MARK B. MCLELLAN R.C.E. 51031 (EXP. 9/30/13)

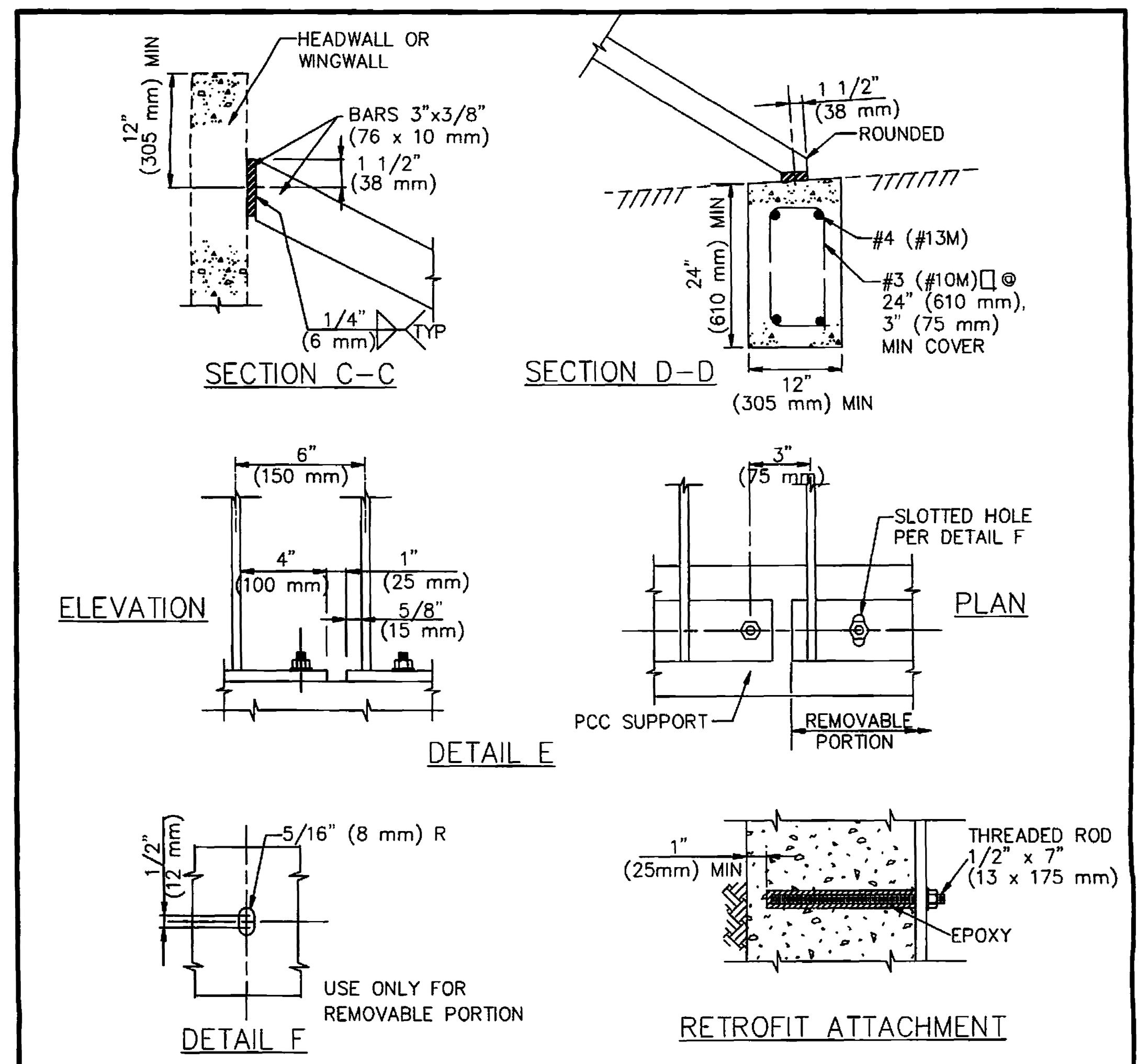
BENCHMARK:
RECOVERED IN GOOD CONDITION. NEW DESCRIPTION FOLLOWS.
3.7 KM (2.30 MI) EAST ALONG A FRONTAGE ROAD ON THE SOUTH SIDE OF INTERSTATE HWY 10 FR. THE INTERSECTION OF SAN GORGONIO AVE. IN BANNING SOUTHWEST OF THE SOUTHWEST CORNER OF A WEIGH STATION BUILDING, (97.8 FT) NORTH OF THE NORTH RAIL OF THE SOUTHERN PACIFIC RAILROAD, 0.9 M (3 FT) WEST OF A POWER POLE. THE MARK IS 0.30 METERS EAST FROM A WITNESS POST THE MARK IS ABOVE LEVEL, LEVEL WITH THE FRONTAGE ROAD.
NAVD 88 ELEV. 2118.09 FT.

CITY OF BANNING
STORM DRAIN
CONSTRUCTION DETAILS
BANNING BUSINESS PARK
STORM DRAIN IMPROVEMENT PLAN

STANTEC PROJECT NO.
2042 473200

SHEET 8
OF 11

3RD SUBMITTAL - 03/22/2012

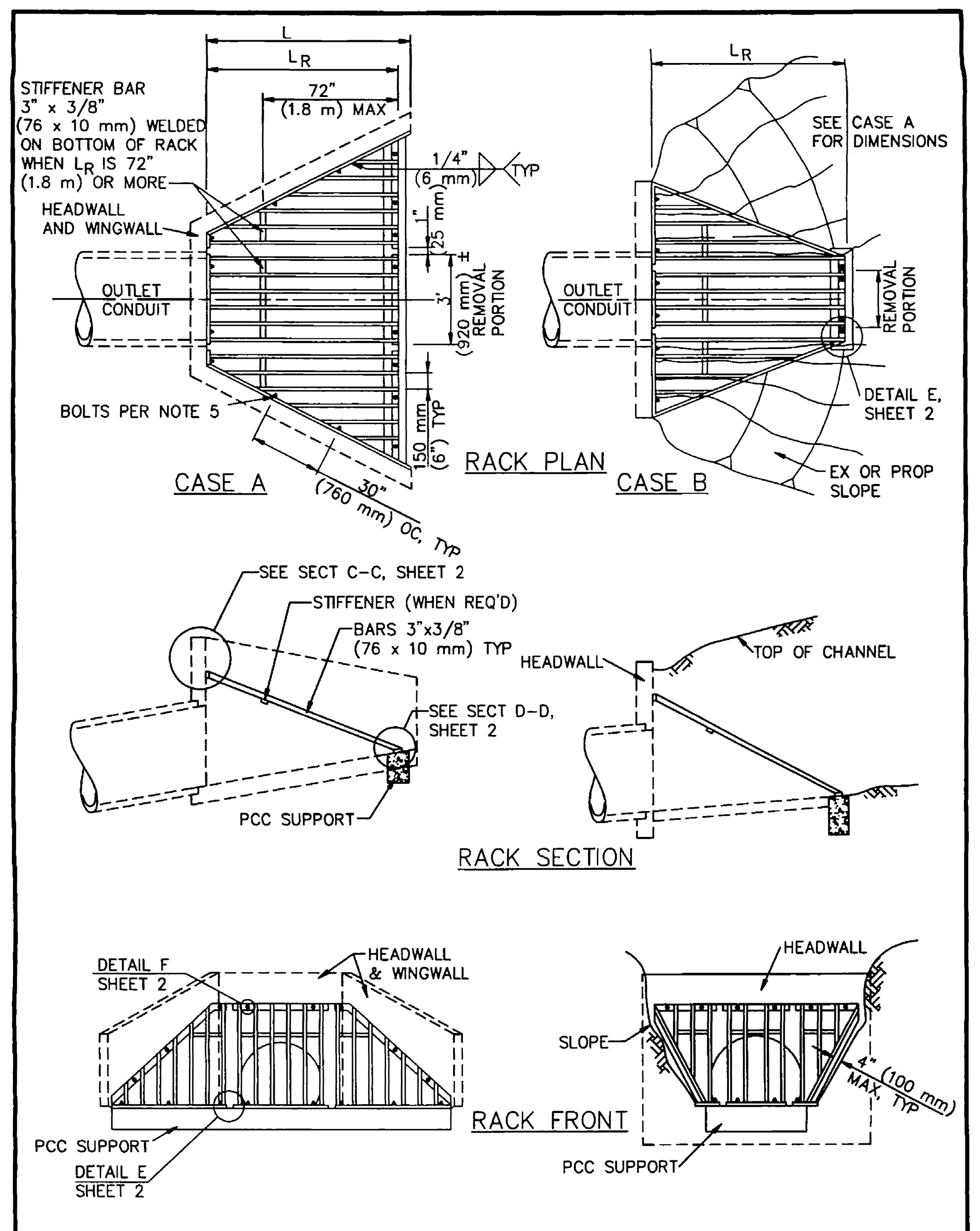


NOTES

1. MAXIMUM SIZE OF OUTLET FOR THIS RACK IS 48" (1200 mm) PIPE OR 48" (1.2 m) WIDE RCB. MAXIMUM LENGTH OF RACK L_R IS 10'-0" (3 m).
2. ADJUST L_R SO THAT THE SLOPE OF THE RACK IS APPROXIMATELY 2 HORIZONTAL TO 1 VERTICAL.
3. THE PCC SUPPORT IS NOT NEEDED IF THE INLET STRUCTURE HAS A SUITABLE CUTOFF WALL. THE PCC SUPPORT SHALL NOT REPLACE THE CUTOFF WALL.
4. GALVANIZE RACK AFTER FABRICATION.
5. BOLTS SHALL BE 1/2"x7" (13 x 175 mm). BOLTS FOR REMOVABLE PORTION SHALL BE STAINLESS STEEL. PROVIDE WASHERS AT EACH BOLT.
6. SUBMIT SHOP DRAWINGS PER SSPWC 2-5.3.3. FOR RETROFIT WORK, INCLUDE DETAILS FOR ATTACHMENT TO EXISTING STRUCTURE.

STANDARD PLANS FOR PUBLIC WORKS CONSTRUCTION

TRASH RACK (INCLINED) — STANDARD PLAN 361-2, SHEET 2 OF 2

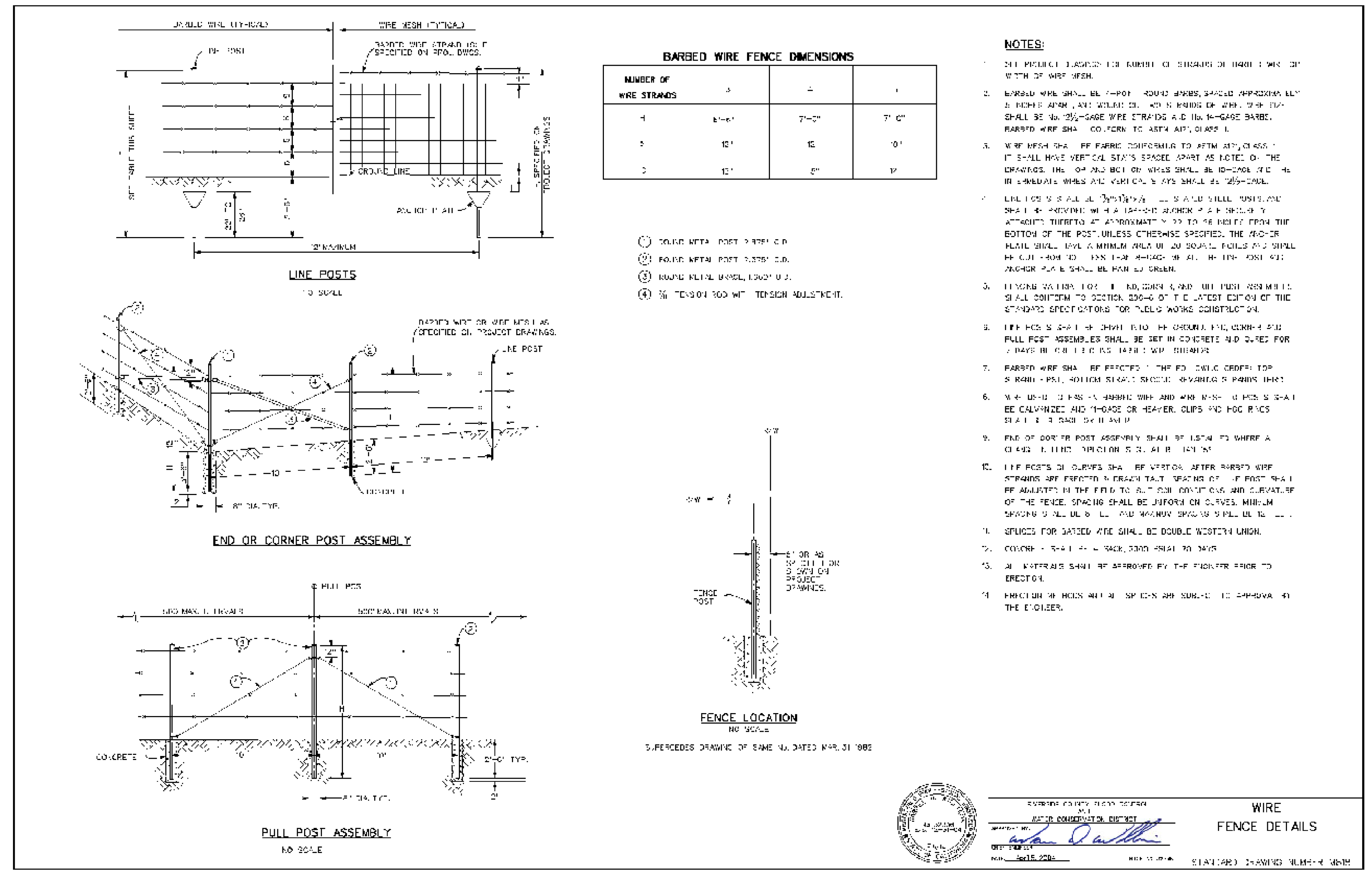


STANDARD PLANS FOR PUBLIC WORKS CONSTRUCTION

PROMULGATED BY THE PUBLIC WORKS STANDARDS INC. GREENBOOK COMMITTEE 1993 REV. 2005, 2009

TRASH RACK (INCLINED) — STANDARD PLAN 361-2, SHEET 1 OF 2

USE WITH STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION



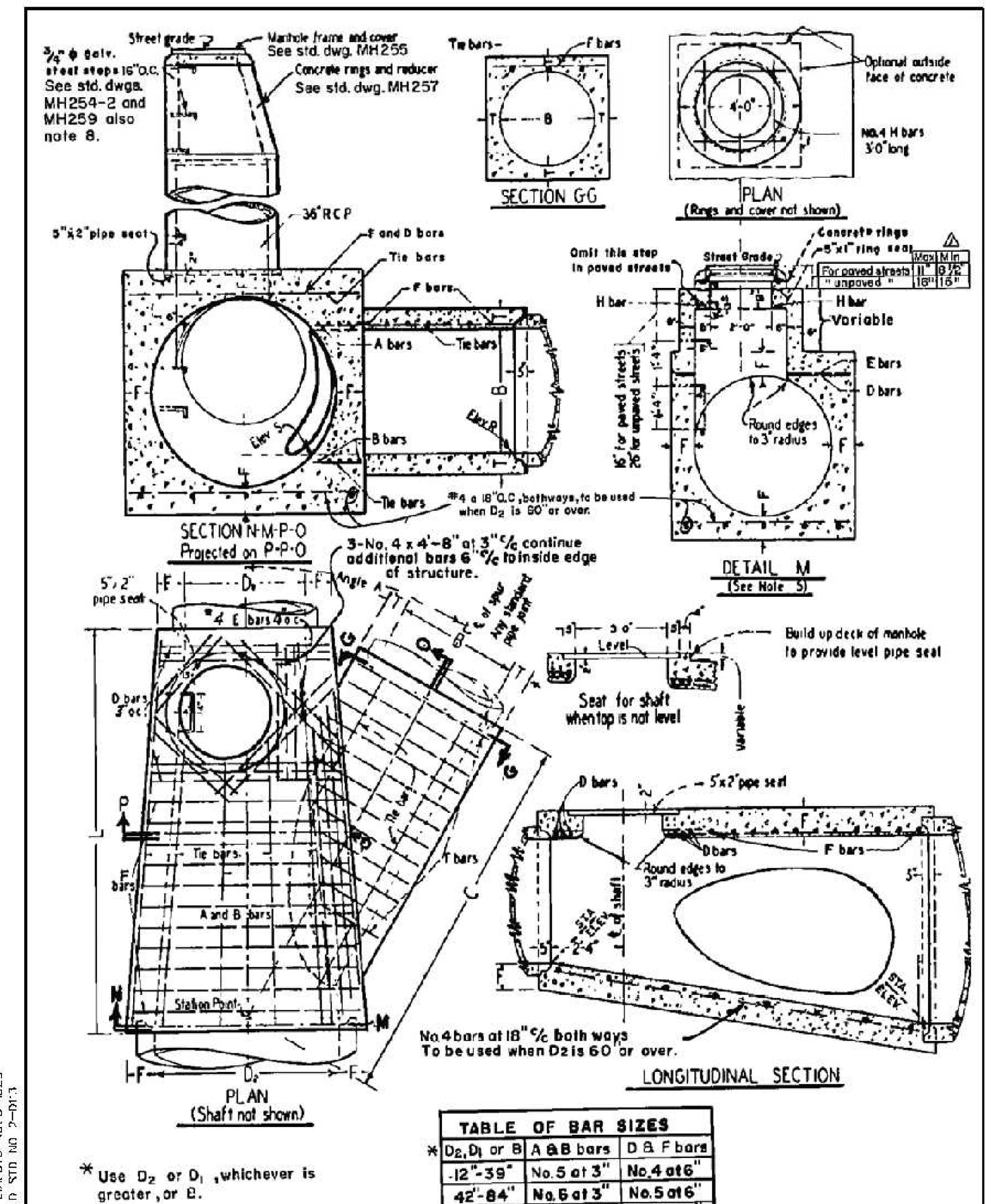


TABLE OF BAR SIZES

*D_2, D_1 or B	A & B bars	D & F bars
12"-39"	No.5 at 3"	No.4 at 6"
42"-84"	No.6 at 3"	No.5 at 6"
90"-144"	No.7 at 3"	No.6 at 8"

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

MANHOLE NO. 4 — STANDARD DRAWING NUMBER M-254, SHEET 1 OF 2

NOTES

1 - VALUES for A, B, C, D_1, D_2, Elevation R, and Elevation S are shown on the improvement plan. TABLE of values for F and T hereon
2 - LATERALS: If laterals enter on both sides of manhole, access shaft shall be located on side receiving the smaller lateral
3 - CENTER OF MANHOLE SHAFT shall be located over center line of main storm drain when D_1 is 48" or less, in which case place 8 E bars symmetrically around shaft at 45° with center line
4 - LENGTH L may be increased at option of Contractor to meet pipe ends, but any change in location of spur must be approved by the Engineer
5 - DETAIL M: When depth of manhole from street grade to top of box is less than 2'-10½" for paved streets or 3'-6" for unpaved streets, construct monolithic shaft as per Detail M. The Contractor shall have the option of constructing shaft as per Detail M for any depth of manhole. When diameter D_1 is 48" or less, center of shaft shall be located as per Note 3
6 - REINFORCING STEEL shall be round, deformed, straight bars, 1½" clear from inside face unless otherwise shown. Tie bars shall be No.4 and spaced 18" on centers or closer.
7 - CONCRETE shall be class A
8 - STEPS shall be ¾" round, galvanized steel and anchored not less than 6 inches in the walls of structure. Unless otherwise shown the spacing shall be 16" on centers. The lowest step shall be not more than 2 feet above the invert
9 - RINGS, REDUCER, AND PIPE for access shaft shall be seated in cement mortar and neatly pointed or wiped inside shaft
10 - FLOOR of manhole shall be steel troweled to springing line
11 - BODY of manhole, including spur, shall be poured in one continuous operation, except that the Contractor shall have the option of placing at the springing line a construction joint with longitudinal keyway.

* Use D_2 or D_1, whichever is greater, or B.

** If D_2, D_1 or B falls between tabulated values then use the next highest value to determine F or T.

** TABLE OF VALUES FOR F AND T

*D_2, D_1	F
12"	4"
15"	4 1/4"
18"	4 1/2"
21"	5"
24"	5 1/4"
27"	5 1/2"
30"	6"
33"	6 1/4"
36"	6 1/2"
39"	7"
42"	7 1/2"
45"	7 3/4"
48"	8"
51"	8 1/2"
54"	9"
57"	9 1/4"
60	9 1/2"
63"	10"
66"	10 1/4"
69"	10 3/4"
72"	11"
78"	11 3/4"
84"	12 1/2"
90"	13 1/4"
96"	14"
102"	15 1/2"
108"	16"
114"	16 1/2"
120"	17"
126"	17
132"	17 1/2"
138"	17 1/2"
144"	18"

B	T
12"	4"
15"	4 1/4"
18"	4 1/2"
21"	5"
24"	5 1/4"
27"	5 1/2"
30"	6"
33"	6 1/4"
36"	6 1/2"
39"	7"
42"	7 1/2"
45"	7 3/4"
48"	8"
51"	8 1/2"
54"	9"
57"	9 1/4"
60"	9 1/2"
63"	10"
66"	10 1/4"
69"	10 3/4"
72"	11"
78"	11 3/4"
84"	12 1/2"
90"	13 1/4"
96"	14"
102"	15 1/2"
108"	16"
114"	16 1/2"
120"	17"
126"	17"
132"	17 1/2"
138"	17 1/2"
144"	18"

NOTE

12 - The maximum cover above this structure shall be 25'. If the cover exceeds 25' a special structure shall be designed for the cover and detailed on the project drawing.

CITY OF RIV. STD. NO. 452
CITY OF L.A. STD. NO. B-1528

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
APPROVED BY: CHIEF ENGINEER
DATE April 5, 2004

MANHOLE NO. 4 — STANDARD DRAWING NUMBER MH254, SHEET 2 OF 2

DIGALERT
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AT LEAST TWO DAYS BEFORE YOU DIG
UNDERGROUND SERVICE ALERT OF SOUTHERN CALIFORNIA

3RD SUBMITTAL - 03/22/2012

NO.	DATE	REVISIONS	APP.	DATE
1	11/20/12	AS-BUILT		

APPROVED BY:
CITY OF BANNING, PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION
99 E. RAMSEY STREET
BANNING, CA 92220
PH: (951) 922-3130
KAHONO OEI — R.C.E. 52652 (EXP. 12/31/12)

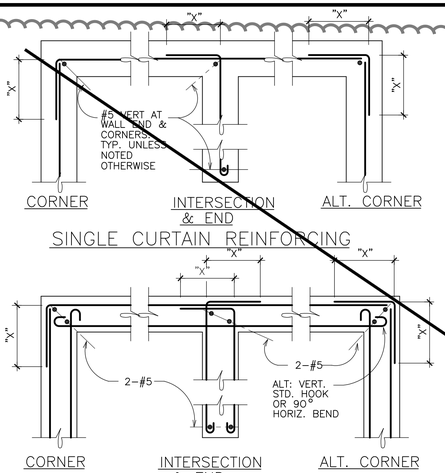
PREPARED BY:
STANTEC CONSULTING INC.
19 TECHNOLOGY DRIVE
IRVINE, CA 92618
949.923.6000
stantec.com
MARK B. MCLELLAN — R.C.E. 51031 (EXP. 9/30/13)

BENCHMARK:
RECOVERED IN GOOD CONDITION. NEW DESCRIPTION FOLLOWS.
3.7 KM (2.30 MI) EAST ALONG A FRONTAGE ROAD ON THE SOUTH SIDE OF INTERSTATE HWY 10 FR. THE INTERSECTION OF SAN GORGONIO AVE. IN BANNING SOUTHWEST OF THE SOUTHWEST CORNER OF A WEIGH STATION BUILDING, (97.8 FT) NORTH OF THE NORTH RAIL OF THE SOUTHERN PACIFIC RAILROAD, 0.9 M (3 FT) WEST OF A POWER POLE. THE MARK IS 0.30 METERS EAST FROM A WITNESS POST THE MARK IS ABOVE LEVEL, LEVEL WITH THE FRONTAGE ROAD.
NAVD 88 — ELEV. 2118.09 FT.

CITY OF BANNING
STORM DRAIN CONSTRUCTION DETAILS
BANNING BUSINESS PARK
STORM DRAIN IMPROVEMENT PLAN

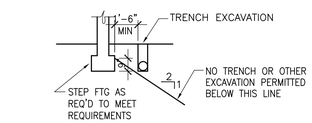
STANTEC PROJECT NO. 2042 473200

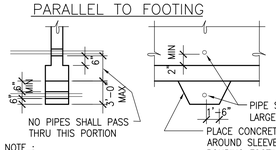
SHEET 9 OF 11



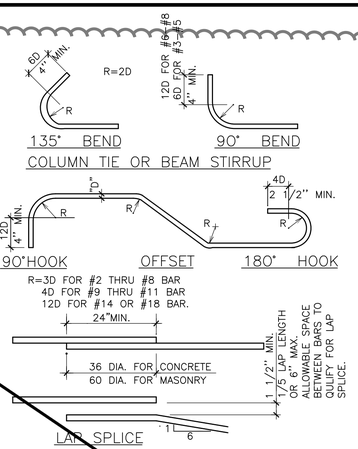
NOTE: "X" = 36 DIA. AT CONC. UNLESS NOTED
"X" = 60 DIA. AT MASONRY UNLESS NOTED

CORNER REINFORCING | N/A | 1

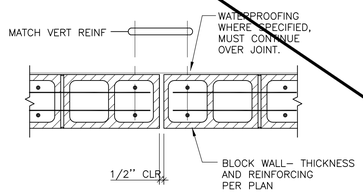




PIPE THRU FOOTING | N/A | 3



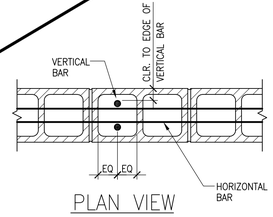
REBAR LAP SPLICE | N/A | 2



NOTE:
1. PROVIDE VERTICAL EXPANSION JOINTS IN WALL AT 20'–0"o.c. MAX. U.N.O. ON PLANS.
2. ALL HORIZONTAL REINFORCEMENT MUST STOP AT 2" FROM JOINT. TYP BOTH SIDES.

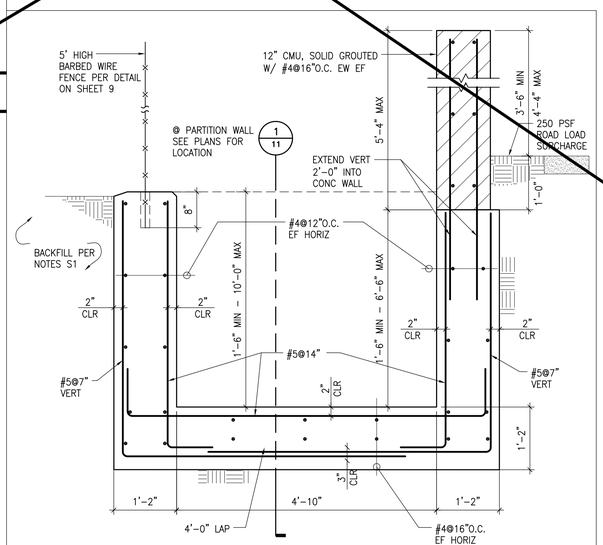
PLAN VIEW

TYP. EXPANSION JOINT DETAIL FOR MASONRY | TYPICAL DETAIL | N/A | 4



PLAN VIEW

DETAIL FOR CLEAR DISTANCE | 3/4" | 5



CHANNEL SECTION - MAIN DETAIL | N/A | 6

NOT BUILT
(FOR FUTURE PHASE)

GENERAL NOTES

FOUNDATIONS

1. FOOTINGS SHALL REST ON FIRM, UNDISTURBED OR COMPACTED SOIL AT A MINIMUM DEPTH BELOW FINISH GRADE OR NATURAL GRADE SHALL BE MINIMUM 24".

2. ALLOWABLE SOIL BEARING VALUES ARE BASED ON FOUNDATION INVESTIGATION REPORT PREPARED BY SOUTHERN CALIFORNIA GEOTECHNICAL DATED OCTOBER 25, 2006 PROJ. 06G277–1 AND SUPPLEMENTAL REPORT DATED MARCH 9, 2011

BEARING PRESSURE	3000 PSF
ACTIVE SOIL PRESSURE (LEVEL)	40 PCF
ACTIVE SOIL PRESSURE (2:1 SLOPE)	61 PCF
PASSIVE PRESSURE (LEVEL)	350 PSF/DEPTH
FRICTION	0.30
SOIL DENSITY	110 PCF
SATURATED SOIL ACTIVE PRESSURE	90 PCF

REINFORCED CONCRETE (CAST–IN–PLACE)

1. STRUCTURAL CONCRETE AND CONCRETE PRACTICES SHALL CONFORM TO ACI 318 CURRENT EDITION AS WELL AS ALL APPLICABLE CODES STATED IN GENERAL NOTE.
2. ALL CONCRETE DETAILS SHALL BE IN ACCORDANCE WITH ACI–135 "MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES", UNLESS NOTED OTHERWISE.
3. ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH AT 28 DAYS AS FOLLOWS.

	STRENGTH (PSI)	CEMENT TYPE	MAX W/C	WT (PCF)	MAX NOMINAL AGG:
FOUNDATIONS	4000	I	0.5	145	1"
ALL OTHER CONCRETE	4000	I	0.5	145	1"

4. ALL CONCRETE SHALL HAVE A MAXIMUM SLUMP NO GREATER THAN 4" EXCEPT FOR FOUNDATIONS WHICH MAY HAVE 5" MAX SLUMP.

STATEMENT OF SPECIAL INSPECTION

SPECIAL INSPECTION SHALL BE PERFORMED IN ACCORDANCE WITH CH 17 OF THE CALIFORNIA BUILDING CODE AND THE CITY OF IRVINE SPECIAL INSPECTION MANUAL.

1. ALL STRUCTURAL CONCRETE IS SUBJECT TO SPECIAL INSPECTION PER TABLE 1704.4.
2. STRUCTURAL MASONRY ELEMENTS ARE SUBJECT TO SPECIAL INSPECTION PER TABLE 1704.A 5.1 (LEVEL1) CBC
3. FOOTING EXCAVATIONS ARE SUBJECT TO VERIFICATION THAT PROPER DEPTH AND BEARING MATERIAL HAVE BEEN REACHED PRIOR TO PLACEMENT OF CONCRETE PER TABLE 1704.7 (NOTE: WORK PERFORMED UNDER A GRADING PERMIT IS SUBJECT TO SEPERATE SPECIAL INSPECTION REQUIREMENTS).

MASONRY

1. CONCRETE MASONRY UNITS SHALL CONFORM TO ASTM C90 GRADE N MED. WT. UNITS IN RUNNING BOND PATTERN. (FINISH PER OWNER). F'm = 1500 PSI UNITS.
2. GROUT ALL CELLS ON RETAINING PORTION OF THE WALL AND PARTIALLY GROUT FOR FREE–STANDING WALLS U.O.N.
3. GROUT SHALL BE FRESHLY PREPARED AND UNIFORMLY MIXED IN PROPORTION OF 1 PART CEMENT, 3 PARTS SAND, AND 2 PARTS PEA GRAVEL. GROUT SHALL ATTAIN A MINIMUM COMPRESSIVE STRENGTH OF 2000 PSI AT 28 DAYS.
4. MORTAR SHALL BE FRESHLY PREPARED AND UNIFORMLY MIXED IN ACCORDANCE WITH UBC TYPE S MORTAR MORTAR SHALL ATTAIN A MIN. COMPRESSIVE STRENGTH OF 1800 PSI AT 28 DAYS. MORTAR SHALL BE USED WITHIN TWO HOURS AFTER MIXING.
5. CEMENT SHALL CONFORM TO ASTM C150. THE USE OF PLASTIC OR MASONRY CEMENT IS NOT PERMITTED.
6. ALL MEASUREMENTS SHALL BE MADE WITH A SUITABLE CALIBRATED DEVICE. SHOVEL MEASUREMENTS WILL NOT BE ACCEPTABLE.
7. PROVIDE VERTICAL EXPANSION JOINT IN MASONRY WALL AT 20 FT. MAX. SPACING. STOP ALL HORIZONTAL WALL REINFORCING AT EXPANSION JOINT TYPICAL.
8. WALLS SHALL NOT BE BACKFILLED UNTIL THEY REACH THEIR 28 DAY STRENGTH, UNLESS TEMPORARY SHORING IS PROVIDED. BACKFILL PER SOILS ENGINEER REQUIREMENTS.
9. BLOCK STEM MAY BE WET SET 1 1/2" INTO FOOTING.
10. PROVIDE SPECIAL INSPECTION FOR ALL MASONRY CONSTRUCTION

REINFORCEMENT

1. REINFORCING STEEL SHALL CONFORM TO ASTM A615 GRADE 60 U.N.O., SHALL BE FROM IDENTIFIED STOCK WITH MILL ANALYSIS SUPPLIED.
2. ALL REINFORCING STEEL, DOWELS, ANCHOR BOLTS, ETC., SHALL BE WELL SECURED IN PLACE PRIOR TO PLACING CONCRETE. CONTRACTOR SHALL USE TEMPLATES TO ENSURE ACCURATE PLACEMENT OF ANCHOR BOLTS, DOWELS, ETC.
3. DOWELS SHALL BE PROVIDED AT POUR AND CONSTRUCTION JOINTS AND SHALL BE THE SAME SIZE AND SPACING AS THE REINFORCING SHOWN FOR THE SUBSEQUENT CONSTRUCTION.
4. ALL CONTINUOUS BARS OR DOWELS SHALL LAP 36 DIAMETERS IN CONCRETE AND 60 DIAMETERS IN MASONRY, UNLESS SHOWN
5. REINFORCING SHALL HAVE THE FOLLOWING MINIMUM COVERS:

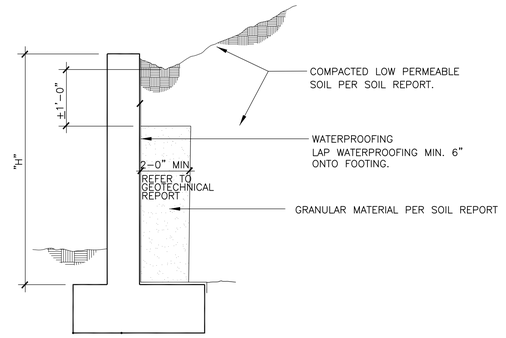
CONCRETE AGAINST EARTH NOT FORMED	3"
CONCRETE AGAINST EARTH FORMED OR TROWELED	2"

GENERAL

1. THE CONTRACTOR SHALL VERIFY AND BE RESPONSIBLE FOR ALL DIMENSIONS AND CONDITIONS AT THE JOB SITE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR BRACING AND SHORING ALL EXCAVATIONS, TEMPORARY STRUCTURES, AND PARTIALLY COMPLETED PORTIONS OF THE WORK.
2. ALL CONDITIONS NOT SPECIFICALLY SHOWN OR DETAILED SHALL BE OF THE SAME TYPE AND CHARACTER AS THOSE SHOWN FOR SIMILAR CONDITIONS.
3. ALL WORK AND MATERIAL SHALL CONFORM TO THE 2010 CALIFORNIA BUILDING CODE AND ALL LOCAL CODES.
4. VERIFY ALL WATERPROFING MATERIAL AND APPLICATION CONFORM TO PLAN.

WATERPROOFING AND DRAINAGE

1. THE WALL SHALL BE WATERPROOFED WITH AN EXTERIOR BELOW GRADE WATER PROOF COATING FOR FOUNDATION SUCH AS "THOROSEAL FOUNDATION COATING" IN CONJUNCTION WITH ACRYL 60 ARCRYLIC ADMIXTURE BY HARRIS SPECIALTY CHEMICALS, INC. OR EQUAL. ALTERNATIVELY, ELASTOMERIC MEMBRANE WATERPROOFING SYSTEM SUCH AS MAR–KOTE 5000 SYSTEM SHALL BE USED.
2. A DRAINAGE BLANKET OF GRANULAR SOIL (PER SOILS REPORT) SHALL BE INSTALLED BEHIND THE WALL TO WITHIN 1 FOOT OF THE TOP OF THE WALL AND EXTEND A HORIZONTAL DISTANCE EQUAL TO ONE FOOT MINIMUM AT THE BASE.



3. ALL RETAINING WALL BACKFILL SHOULD BE COMPACTED IN HORIZONTAL LIFTS TO AT LEAST 90 PERCENT OR MORE OF THE LABORATORY MAXIMUM DRY DENSITY (ASTM D1557–91).

1

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UNDERGROUND SERVICE ALERT OF SOUTHERN CALIFORNIA

NO.	DATE	REVISIONS	APP.	DATE
1	11/20/12	AS-BUILT		

APPROVED BY:
CITY OF BANNING, PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION
99 E. RAMSEY STREET
BANNING, CA 92220
PH: (951) 922-3130
KAHONO OEI R.C.E. 52652 (EXP. 12/31/12)

PREPARED BY:
WSI
WELSH STRUCTURES, INC.
12722 BARRETT LANE
SANTA ANA, CA 92705
PH: 714-352-6297 J.N.# 12-021
STEPHANIE L. WELSH R.S.E. 2998 (EXP. 6/30/12)

REGISTERED PROFESSIONAL ENGINEER STEPHANIE L. WELSH No. 2998 Exp. 6-30-12 STRUCTURAL STATE OF CALIFORNIA

BENCHMARK:
RECOVERED IN GOOD CONDITION. NEW DESCRIPTION FOLLOWS.
3.7 KM (2.30 MI) EAST ALONG A FRONTAGE ROAD ON THE SOUTH SIDE OF INTERSTATE HWY 10 FR. THE INTERSECTION OF SAN GORGONIO AVE. IN BANNING SOUTHWEST OF THE SOUTHWEST CORNER OF A WEIGH STATION BUILDING, (97.8 FT) NORTH OF THE NORTH RAIL OF THE SOUTHERN PACIFIC RAILROAD, 0.9 M (3 FT) WEST OF A POWER POLE. THE MARK IS 0.30 METERS EAST FROM A WITNESS POST THE MARK IS ABOVE LEVEL, LEVEL WITH THE FRONTAGE ROAD.
NAVD 88 ELEV. 2118.09 FT.

CITY OF BANNING

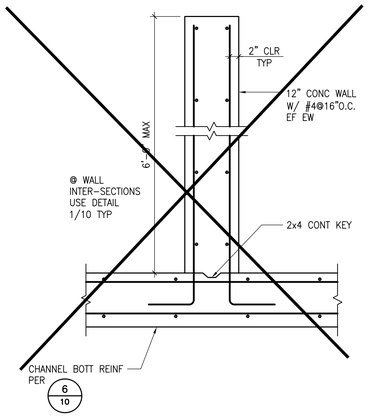
GENERAL NOTES & TYPICAL DETAILS

BANNING BUSINESS PARK
STORM DRAIN IMPROVEMENT PLAN

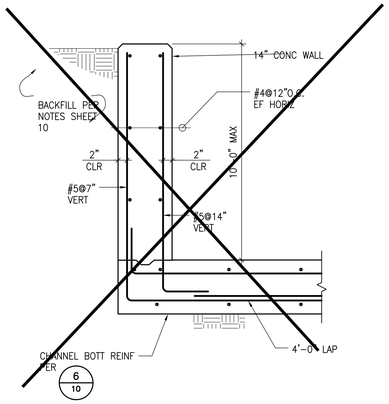
STANTEC PROJECT NO.
2042 473200

SHEET 10
OF 11

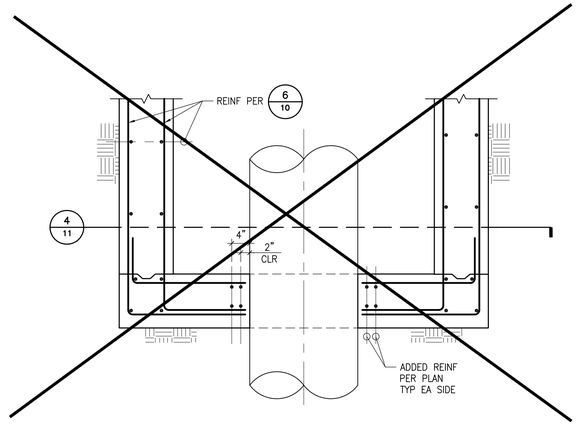
3RD SUBMITTAL - 03/22/2012



PARTITION WALL SECTION | N/A | 1



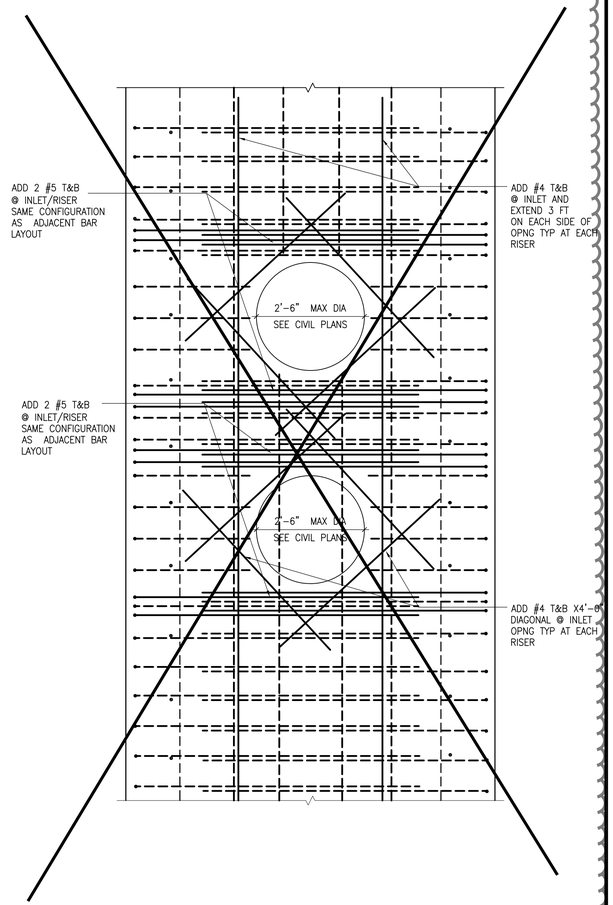
END OF CHANNEL | N/A | 2



SECTION AT INLET / RISER | N/A | 3

1

NOT USED
(F0R FUTURE PHASE)



PLAN VIEW OF REINF AT INLET / RISER | N/A | 4

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UNDERGROUND SERVICE ALERT OF SOUTHERN CALIFORNIA

NO.	DATE	REVISIONS	APP.	DATE
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NAVD 88 ELEV. 2118.09 FT.

CITY OF BANNING
WALL DETAILS
BANNING BUSINESS PARK
STORM DRAIN IMPROVEMENT PLAN

STANTEC PROJECT NO.
2042 473200

SHEET 11
OF 11

3RD SUBMITTAL - 03/22/2012

DECLARATION OF ENGINEER OF RECORD

I HEREBY DECLARE THAT IN MY PROFESSIONAL OPINION, THE DESIGN OF THE IMPROVEMENTS AS SHOWN ON THESE PLANS COMPLIES WITH THE CURRENT PROFESSIONAL ENGINEERING STANDARDS AND PRACTICES. AS THE ENGINEER IN RESPONSIBLE CHARGE OF THE DESIGN OF THESE IMPROVEMENTS, I ACCEPT FULL RESPONSIBILITY FOR SUCH DESIGN. I UNDERSTAND AND ACKNOWLEDGE THAT THE PLAN CHECK OF THESE PLANS BY THE CITY OF BANNING IS A REVIEW FOR THE LIMITED PURPOSE OF ENSURING THAT THESE PLANS COMPLY WITH CITY PROCEDURES AND OTHER APPLICABLE CODES AND ORDINANCES. THE PLAN REVIEW PROCESS IS NOT A DETERMINATION OF THE TECHNICAL ADEQUACY OF THE DESIGN OF THE IMPROVEMENTS. SUCH PLAN CHECK DOES NOT THEREFORE RELIEVE ME OF MY DESIGN RESPONSIBILITY.

STANTEC CONSULTING SERVICES INC., AGREES TO INDEMNIFY THE CITY OF BANNING; ITS OFFICERS, ITS AGENT, AND ITS EMPLOYEES FROM ANY AND ALL LIABILITY, CLAIMS, DAMAGES, OR INJURIES TO ANY PERSON OR PROPERTY ARISING FROM NEGLIGENT ACTS, ERRORS OR OMISSIONS OF THE ENGINEER OF RECORD, ITS EMPLOYEES, AGENTS OR CONSULTANTS.

SIGNATURE: _____ DATE: _____

LICENCE NO. 51031 EXP: 09/30/11

BANNING BUSINESS PARK
STORM DRAIN PLAN
INTERIM FACILITIES FOR ROUGH GRADING
TENTATIVE PARCEL MAP 36056

LEGAL DESCRIPTION

THE LAND REFERRED TO HEREIN BELOW IS SITUATED IN THE CITY OF BANNING, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, AND IS DESCRIBED AS FOLLOWS:

PARCEL 1:

A PORTION OF THE NORTHWEST 1/4 OF SECTION 11, TOWNSHIP 3 SOUTH, RANGE 1 EAST, SAN BERNARDINO BASE AND MERIDIAN, IN THE CITY OF BANNING, COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA, ACCORDING TO THE OFFICIAL PLAT THEREOF, DESCRIBED AS FOLLOWS:

BEGINNING AT A POINT IN THE WESTERLY LINE OF SAID SECTION 11, 1132.50 FEET NORTH FROM THE WESTERLY 1/4 CORNER OF SAID SECTION 11; THENCE SOUTH 89° 30" 30" EAST, ALONG A LINE PARALLEL WITH THE SOUTHERLY LINE OF SAID SECTION 11, 1316.73 FEET, MORE OR LESS, TO THE NORTH AND SOUTH CENTER LINE OF SAID NORTHWEST 1/4; THENCE NORTH 00° 07' 30" WEST, ALONG THE SAID NORTH AND SOUTH CENTER LINE, 502.50 FEET; THENCE NORTH 89° 30" 30" WEST, 1319.45 FEET, MORE OR LESS, TO THE SAID WESTERLY LINE OF SAID SECTION 11; THENCE SOUTH 00° 11' 30" EAST, ALONG SAID WESTERLY LINE OF SECTION 11, 502.5 FEET TO THE POINT OF BEGINNING.

SAID LAND IS ALSO SITUATED IN THE CITY OF BANNING.

PARCEL 2:

THAT PORTION OF THE EAST 1/2 OF THE NORTHWEST 1/4 OF SECTION 11, TOWNSHIP 3 SOUTH, RANGE 1 EAST, SAN BERNARDINO BASE AND MERIDIAN, DESCRIBED AS FOLLOWS:

BEGINNING AT A U.S.G.L.O. BRASS CAP MARKING THE NORTH 1/4 CORNER OF SAID SECTION; THENCE ALONG THE EAST LINE OF SAID NORTHWEST 1/4, SOUTH 0° 41" 41" WEST, 1840.28 FEET; THENCE COURSE "A", SOUTH 74° 52' 01" WEST 305.01 FEET; THENCE COURSE "B", SOUTH 75° 23' 27" WEST, 411.53 FEET TO THE BEGINNING OF A TANGENT CURVE, CONCAVE SOUTHERLY AND HAVING A RADIUS OF 1060 FEET; THENCE COURSE "C", WESTERLY ALONG SAID CURVE, THROUGH A CENTRAL ANGLE OF 4° 14" 43", A DISTANCE OF 78.54 FEET TO THE EAST LINE OF THE WEST 550 FEET OF SAID EAST 1/2; THENCE ALONG SAID EAST LINE, NORTH 0° 25' 01" EAST, 695.63 FEET TO A 6" X 6" CONCRETE MONUMENT BEARING NORTH 89° 25' 57" WEST FROM A POINT IN SAID EAST LINE OF THE NORTHWEST 1/4, DISTANT ALONG SAID EAST LINE, SOUTH 0° 41' 41" WEST, 1359.31 FEET FROM SAID NORTH 1/4 CORNER; THENCE COURSE "D", NORTH 89° 25" 57" WEST ALONG SAID LINE, 550.00 FEET TO A 6" X 6" CONCRETE MONUMENT IN THE WEST LINE OF SAID EAST 1/2; THENCE ALONG SAID WEST LINE NORTH 0° 25' 01" EAST, 1353.32 FEET TO THE NORTH LINE OF SAID SECTION; THENCE ALONG SAID NORTH LINE, SOUTH 89° 40" 14" EAST 1325.26 FEET TO THE POINT OF BEGINNING.

EXCEPT THAT PORTION LYING SOUTHERLY OF A LINE PARALLEL WITH AND DISTANT 150 FEET NORTHERLY, MEASURED AT RIGHT ANGLES, AND/OR RADIALLY, AS THE CASE MAY BE, FROM THOSE LINES HEREINABOVE DESIGNATED AS COURSES "A", "B" AND "C".

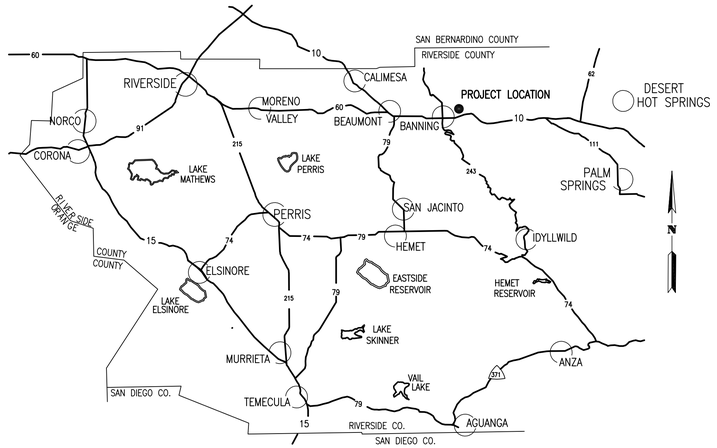
PARCEL 3:

A NON-EXCLUSIVE EASEMENT FOR INGRESS TO AND EGRESS FROM THE PARCEL OF LAND HEREIN CONVEYED UPON, OVER AND ACROSS THAT PORTION OF THE WEST 20 FEET OF SAID EAST HALF LYING SOUTHERLY OF SAID COURSE "D".

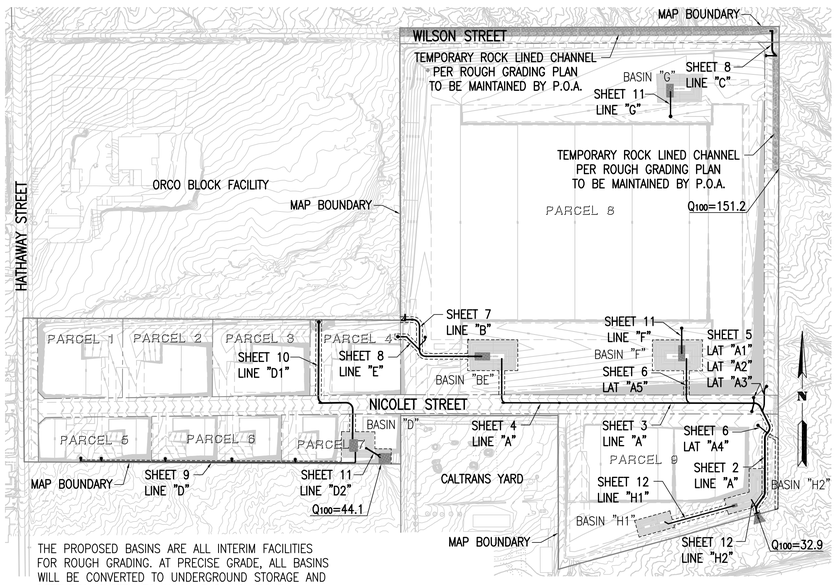
EXCEPT THAT PORTION LYING SOUTH OF THE FOLLOWING DESCRIBED LINE:

BEGINNING AT A POINT IN THE WEST LINE OF SAID EAST HALF, DISTANT ALONG SAID WEST LINE, SOUTH 0° 25' 01" WEST, 1042.10 FEET FROM THE INTERSECTION OF SAID WEST LINE AND THAT CERTAIN LINE HERHNABOVE DESIGNATED AS COURSE "D"; THENCE NORTHEASTERLY ALONG A 545-FOOT RADIUS CURVE, CONCAVE NORTHWESTERLY, FROM A TANGENT BEARING NORTH 56° 01' 52" EAST, THROUGH A CENTRAL ANGLE OF 1° 46' 37", A DISTANCE OF 16.90 FEET; THENCE NORTH 54° 15' 15" EAST, 50 FEET.

APN: 532-110-003-1, 008-6, 009-7, 010-7



VICINITY MAP



THE PROPOSED BASINS ARE ALL INTERIM FACILITIES FOR ROUGH GRADING. AT PRECISE GRADE, ALL BASINS WILL BE CONVERTED TO UNDERGROUND STORAGE AND DETENTION SYSTEM TO ALLOW PARKING ABOVE.

INDEX MAP

GENERAL NOTES

1. ALL STATIONING REFERS TO CENTERLINE OF CONSTRUCTION.
2. ALL CHANNEL/STORM DRAIN REFERENCES AND CROSS SECTIONS ARE TAKEN LOOKING DOWNSTREAM.
3. TOPOGRAPHY BY DIGITAL PHOTOGRAMMETRIC METHODS. AERIAL PHOTOGRAPHS TAKEN AT AN ALTITUDE NOT TO EXCEED A FLYING HEIGHT TO CONTOUR INTERVAL RATIO OF 1800. PHOTOGRAPHY DATED 03-31-09
4. THE VERTICAL DATUM IS DERIVED FROM (NGVD 29 OR NAVD 88). THE HORIZONTAL DATUM IS DERIVED FROM (NAD 27 OR NAD 83).
5. STANDARD DRAWINGS CALLED FOR ON THE PLAN & PROFILE SHALL CONFORM TO THE LATEST REVISED EDITION OF RCFC. & WCD STD DRAWINGS, OR CALTRANS/CITY STANDARD PLANS.
6. ELEVATIONS AND LOCATIONS OF UTILITIES WERE OBTAINED FROM AVAILABLE INFORMATION AND ARE SHOWN APPROXIMATELY ON THESE PLANS. 48 HOURS BEFORE EXCAVATION CALL UNDERGROUND SERVICE ALERT AT 1-800-227-2600. ALL UTILITIES SHALL BE PROTECTED IN PLACE EXCEPT AS NOTED ON PLANS AND SPECIFICATIONS.
7. THE CONTRACTOR IS REQUIRED TO CONTACT ALL UTILITY AGENCIES REGARDING TEMPORARY SUPPORT AND SHORING REQUIREMENTS FOR THE VARIOUS UTILITY LINES SHOWN ON THESE PLANS.
8. ALL OPENINGS RESULTING FROM CUTTING OR PARTIAL REMOVAL OF EXIST. CULVERTS, PIPES, OR SIMILAR STRUCTURES TO BE ABANDONED, SHALL BE SEALED AT BOTH ENDS WITH 6" MIN. CLASS "B" CONCRETE.
9. UNLESS OTHERWISE SPECIFIED, MINIMUM STREET RECONSTRUCTION SHALL BE 4" TYPE "B" ASPHALT CONCRETE OVER 6" CLASS 2 AGGREGATE BASE OR IN KIND, WHICHEVER IS GREATER.
10. ALL RECONSTRUCTION, RESURFACING AND PAVEMENT DELINEATION, CURBS, SIDEWALKS AND OTHER IMPROVEMENTS ARE TO BE RECONSTRUCTED IN KIND AT THE SAME LOCATIONS AND ELEVATIONS AS THE EXISTING IMPROVEMENTS, UNLESS OTHERWISE NOTED.
11. ◔ INDICATES APPROX. SOIL BORING LOCATION PER SOILS REPORT DATED 10/25/05.

CITY OF BANNING GENERAL NOTES

1. ALL CONSTRUCTION SHALL CONFORM WITH THE CITY OF BANNING PUBLIC WORKS SPECIFICATIONS AND THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION (GREEN BOOK) LATEST EDITION. IN CASE OF CONFLICTS, BETWEEN THE CITY OF BANNING PUBLIC WORKS SPECIFICATIONS AND THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, THE CITY OF BANNING PUBLIC WORKS SPECIFICATIONS SHALL GOVERN.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE CLEARING OF THE PROPOSED WORK AREA, AND RELOCATION AND COST OF ALL EXISTING UTILITIES. ALL UNDERGROUND FACILITIES, WITH LATERALS, SHALL BE IN PLACE PRIOR TO PAVING THE STREET SECTION INCLUDING, BUT NOT LIMITED TO, THE FOLLOWING: SEWER, WATER, ELECTRIC, GAS & DRAINAGE. SUBDIVIDER MUST INFORM CITY OF CONSTRUCTION SCHEDULE AT LEAST 14 DAYS PRIOR TO BEGINNING OF CONSTRUCTION.
4. DEPTH OF BASE MATERIAL AND A.C. PAVING SHALL BE DETERMINED BY THE R-VALUE METHOD, DESIGNATED AS TEST NO. 301-F OF THE STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION, HIGHWAY DESIGN MANUAL.
7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL DAMAGES TO ON-SITE, OFF-SITE AND ADJACENT UTILITIES, FACILITIES AND PROPERTY AND SHALL CARRY SUFFICIENT INSURANCE TO PROTECT THE CITY AND ADJACENT PROPERTY.
9. THE CONTRACTOR SHALL NOTIFY THE CITY OF BANNING ENGINEERING DEPARTMENT (714) 849-4511 24 HOURS PRIOR TO STARTING ANY WORK.
12. TRIM EDGE OF EXISTING PAVING WHERE NEW PAVING JOINS THE EXISTING PAVEMENT TO A CLEAN, STRAIGHT LINE.
15. NECESSARY STORM DRAINS AND EASEMENTS SHALL BE PROVIDED IN ACCORDANCE WITH THE REQUIREMENTS OF THE CITY OF BANNING MUNICIPAL CODE.

CONSTRUCTION NOTES AND QUANTITIES

NO.	DESCRIPTION	QUANTITY	UNIT
	STORM DRAIN CONSTRUCTION NOTES		
30	CONSTRUCT 36" CSP WITH BEDDING & BACKFILL PER DETAIL A/13	4	L.F.
31	CONSTRUCT 24" RCP WITH BEDDING & BACKFILL PER DETAIL A/13	1,360	L.F.
32	CONSTRUCT 30" RCP WITH BEDDING & BACKFILL PER DETAIL A/13	671	L.F.
33	CONSTRUCT 36" RCP WITH BEDDING & BACKFILL PER DETAIL A/13	936	L.F.
34	CONSTRUCT 48" RCP WITH BEDDING & BACKFILL PER DETAIL A/13	84	L.F.
35	INSTALL 12" PVC SDR-35 WITH BEDDING PER DETAIL A/13	39	L.F.
36	INSTALL 15" PVC SDR-35 WITH BEDDING PER DETAIL A/13	626	L.F.
37	INSTALL 18" PVC SDR-35 WITH BEDDING PER DETAIL A/13	522	L.F.
38	INSTALL 24" PVC SDR-35 WITH BEDDING PER DETAIL A/13	245	L.F.
39	CONSTRUCT CONCRETE COLLAR PER R.C.F.C.W.C.D. STD. No. M803	3	EA.
40	CONSTRUCT RISER INLET PER DETAIL D/13	18	EA.
41	NOT USED	–	–
42	CONSTRUCT MANHOLE #1 PER R.C.F.C.W.C.D. STD. No. MH251	6	EA.
43	CONSTRUCT MANHOLE #2 PER R.C.F.C.W.C.D. STD. No. MH252	2	EA.
44	CONSTRUCT MANHOLE #4 PER R.C.F.C.W.C.D. STD. No. MH254	1	EA.
45	CONSTRUCT JUNCTION STRUCTURE #2 PER R.C.F.C.W.C.D. STD No. JS227	1	EA.
46	CONSTRUCT JUNCTION STRUCTURE #4 PER R.C.F.C.W.C.D. STD No. JS229	1	EA.
47	CONSTRUCT DRAINAGE APRON WITH MODIFIED CB#4 PER DETAIL C/13	1	EA.
48	CONSTRUCT 2' THICK RIP-RAP PAD, DIMENSIONS PER PLAN (12" DIA. ROCK)	5,400	SF
49	CONSTRUCT CONCRETE HEADWALL PER CALTRANS STD PLAN D89 (TYPE PER PLAN)	1	EA.
50	CONSTRUCT BASIN RISER INLET PER DETAIL E/13	3	EA.
51	CONSTRUCT CONCRETE SLOPE ANCHOR PER DETAIL F/13	2	EA.
52	CONSTRUCT CASE "E" RIP-RAP PAD PER DETAIL B/13, DIMENSIONS PER PLAN	2	EA.
53	CONSTRUCT CLEANOUT PER DETAIL H/13	14	EA.
54	CONSTRUCT CONCRETE BULKHEAD PER R.C.F.C.W.C.D. STD. No. M816	2	EA.
55	CONSTRUCT CONCRETE HEADWALL PER MODIFIED CALTRANS STD PLAN D89 (TYPE PER PLAN) SEE ADDITIONAL DETAIL ON SHEET 11	1	EA.
56	CONSTRUCT ANTI-SEEP COLLAR PER DETAIL G/13	10	EA.
57	CONSTRUCT INCLINED TRASH RACK PER S.P.P.W.C. STD PLAN 316-2 & DETAIL J/13	1	EA.
58	CONSTRUCT DUAL SIZE BASIN RISER INLET PER DETAILS E/13 & K/13	2	EA.

R.C.F.C.W.C.D. – RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
S.P.P.W.C. – STANDARD PLANS FOR PUBLIC WORKS CONSTRUCTION

SHEET INDEX

R.C.F.C. & W.C.D. STANDARD DRAWINGS

M 803	CONCRETE COLLAR	14
M 816	CONCRETE BULKHEAD	13
MH 251	MANHOLE No.1	14
MH 252	MANHOLE No.2	15
MH 254	MANHOLE No.4	15
JS 227	JUNCTION STRUCTURE No.2	16
JS 229	JUNCTION STRUCTURE No.4	16
CB 101	CATCH BASIN #4 (MODIFIED)	17
CB 108	INLET GRATE DETAILS	17

DETENTION BASIN INFORMATION

BASIN	Q10	Q100	VOLUME	DEPTH	WS ELEV
BE	22.6 CFS	34.8 CFS	1.61 ACFT	9.8'	248.8
D	34.8 CFS	55.4 CFS	0.78 ACFT	7.5'	258.5
F	22.3 CFS	34.3 CFS	1.47 ACFT	9.2'	245.2
*G	27.2 CFS	41.9 CFS	1.61 ACFT	10.0'	249.0
H1	7.7 CFS	11.6 CFS	0.37 ACFT	5.3'	226.3
H2	7.1 CFS	12.0 CFS	0.25 ACFT	3.4'	218.4
*BASIN G – RETENTION SYSTEM AT ROUGH GRADE ONLY					

Don't Dig...Until You Call U.S.A. Toll Free 1-800-227-2600 for the location of buried utility lines. Don't disrupt vital services.

TWO WORKING DAYS BEFORE YOU DIG

PERMANENT BENCHMARK: USGS No. U1311
RECOVERED IN GOOD CONDITION. 3.7 KM (2.30 MI) EAST ALONG A FRONTAGE ROAD ON THE SOUTH SIDE OF INTERSTATE HWY 10 FROM THE INTERSECTION OF SAN GORGONIO AVE. IN BANNING, SOUTHWEST OF THE SOUTHWEST CORNER OF A WEIGH STATION BUILDING, (97.8 FT) NORTH OF THE NORTH RAIL OF THE SOUTHERN PACIFIC RAILROAD, 0.9 M (3.0 FT) WEST OF A POWER POLE. THE MARK IS 0.30 METERS EAST FROM A WITNESS POST. THE MARK IS ABOVE LEVEL, LEVEL WITH THE FRONTAGE ROAD.
NAVD 88 ELEV. 2118.09 FT.

REV	DESCRIPTION	APPR.	DATE
	REVISIONS		

REGISTERED PROFESSIONAL ENGINEER MARK B. MCLELLAN No. 51031 Exp. 9/30/11 CIVIL STATE OF CALIFORNIA

STANTEC CONSULTING INC.
19 TECHNOLOGY DRIVE
IRVINE, CA 92618
949.923.6000
stantec.com

MARK B. MCLELLAN R.C.E. 51031 (EXP. 9/30/11)

DESIGNED BY: MBM
DRAWN BY: BCB JLW
CHECKED BY: PKO

CITY OF BANNING
PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION
APPROVED BY:
KAHONO OEI R.C.E. 52652 EXP 12/31/10 DATE

BANNING BUSINESS PARK
STORM DRAIN PLAN
INTERIM FACILITIES FOR ROUGH GRADING
TENTATIVE PARCEL MAP 36056
TITLE SHEET

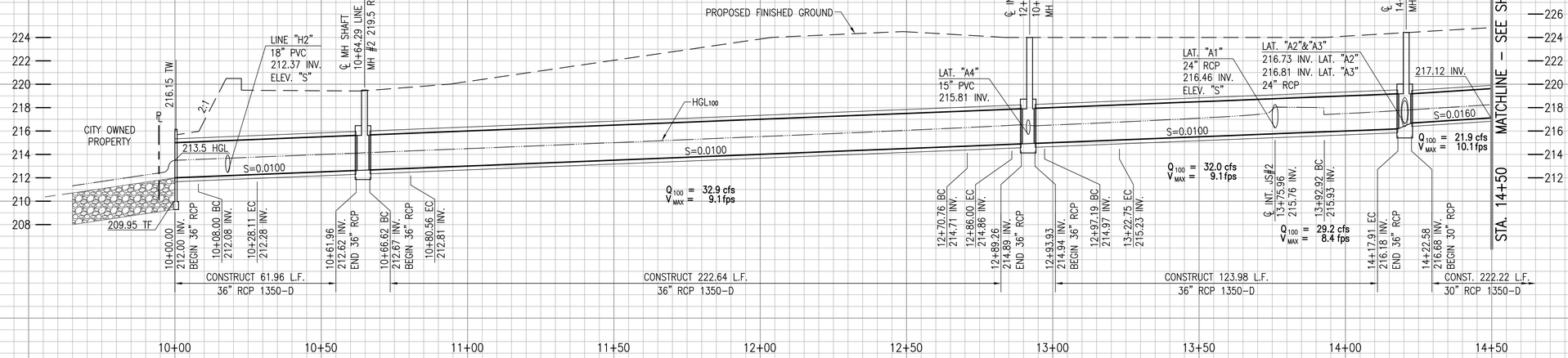
PROJECT NO. 2042473200
DRAWING NO. PRSD0017
SHEET NO. 1 OF 17

FINAL SUBMITTAL - AUGUST 26, 2010

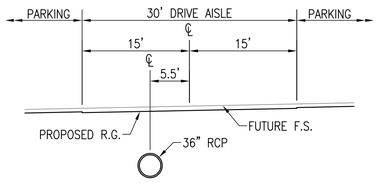
NOTE: CONTRACTOR SHALL PROTECT IN PLACE ALL UTILITIES CROSSING OR PARALLELING THE STORM DRAIN UNLESS OTHERWISE NOTED

LINE "A"

PUBLICLY MAINTAINED
CITY OF BANNING



SCALE:
HORIZ. 1" = 20'
VERT. 1" = 5'

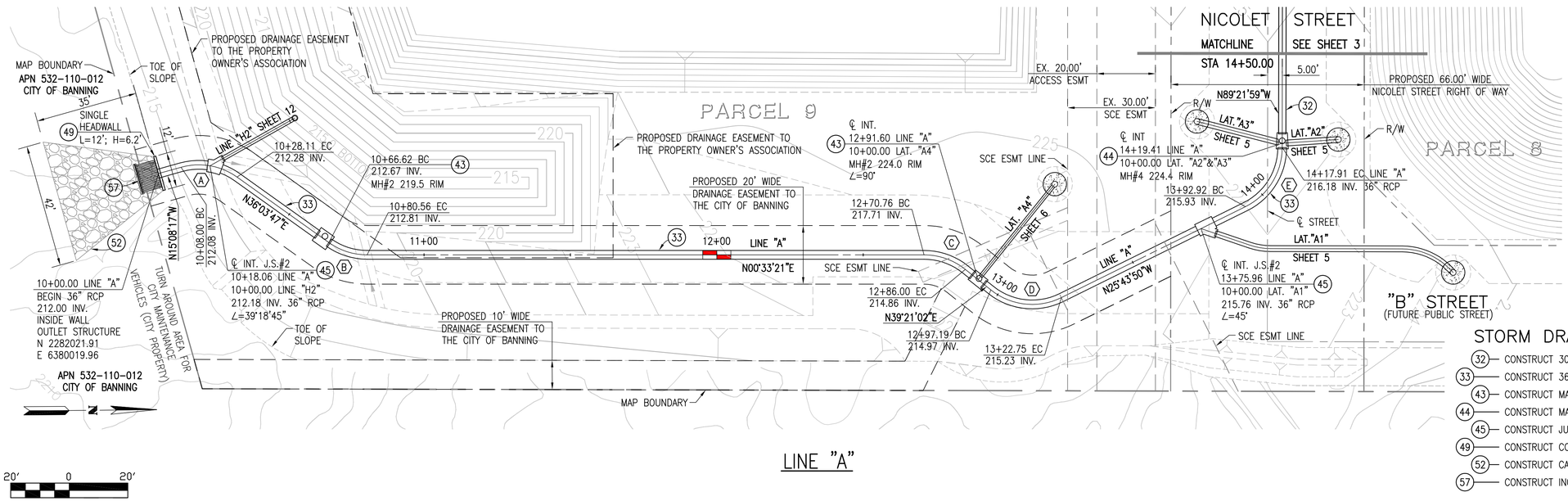


SECTION AT STA 12+00

TYPICAL FROM STA 11+00 TO 12+50

10' 0 10'

ALL X-SECTIONS TAKEN LOOKING DOWN STREAM



LINE "A"

CURVE DATA				
	DELTA	RADIUS	LENGTH	TANGENT
(A)	51°12'04"	22.50'	20.11'	10.78'
(B)	35°30'26"	22.50'	13.94'	7.20'
(C)	38°47'43"	22.50'	15.23'	7.92'
(D)	65°04'52"	22.50'	25.56'	14.36'
(E)	63°38'10"	22.50'	24.99'	13.96'

STORM DRAIN CONSTRUCTION NOTES

(32) CONSTRUCT 30" RCP WITH BEDDING & BACKFILL PER DETAIL A/13
(33) CONSTRUCT 36" RCP WITH BEDDING & BACKFILL PER DETAIL A/13
(43) CONSTRUCT MANHOLE #2 PER R.C.F.C.W.C.D. STD. No. MH252
(44) CONSTRUCT MANHOLE #4 PER R.C.F.C.W.C.D. STD. No. MH254
(45) CONSTRUCT JUNCTION STRUCTURE #2 PER R.C.F.C.W.C.D. STD No. JS227
(49) CONSTRUCT CONCRETE HEADWALL PER CALTRANS STD PLAN D89 (TYPE PER PLAN)
(52) CONSTRUCT CASE "E" RIP-RAP PAD PER DETAIL B/13, DIMENSIONS PER PLAN
(57) CONSTRUCT INCLINED TRASH RACK PER S.P.P.W.C. STD PLAN 361-2 AND DETAIL J/13

Don't Dig...Until You Call U.S.A. Toll Free
1-800-227-2600
for the location of buried utility lines.
Don't disrupt vital services.
TWO WORKING DAYS BEFORE YOU DIG

PERMANENT BENCHMARK: USGS No. U1311
RECOVERED IN GOOD CONDITION. 3.7 KM (2.30 MI) EAST ALONG A FRONTAGE ROAD ON THE SOUTH SIDE OF INTERSTATE HWY 10 FROM THE INTERSECTION OF SAN GORGONIO AVE. IN BANNING, SOUTHWEST OF THE SOUTHWEST CORNER OF A WEIGH STATION BUILDING, (97.8 FT) NORTH OF THE NORTH RAIL OF THE SOUTHERN PACIFIC RAILROAD, 0.9 M (3.0 FT) WEST OF A POWER POLE. THE MARK IS 0.30 METERS EAST FROM A WITNESS POST. THE MARK IS ABOVE LEVEL, LEVEL WITH THE FRONTAGE ROAD.
NAVD 88 ELEV. 2118.09 FT.

REV	DESCRIPTION	APPR.	DATE
	REVISIONS		

REGISTERED PROFESSIONAL ENGINEER MARK B. MCLELLAN No. 51031 Exp. 9/30/11 CIVIL STATE OF CALIFORNIA

STANTEC CONSULTING INC.
19 TECHNOLOGY DRIVE
IRVINE, CA 92618
949.923.6000
stantec.com
MARK B. MCLELLAN R.C.E. 51031 (EXP. 9/30/11)

DESIGNED BY: MBM
DRAWN BY: BCB JLW
CHECKED BY: PKO

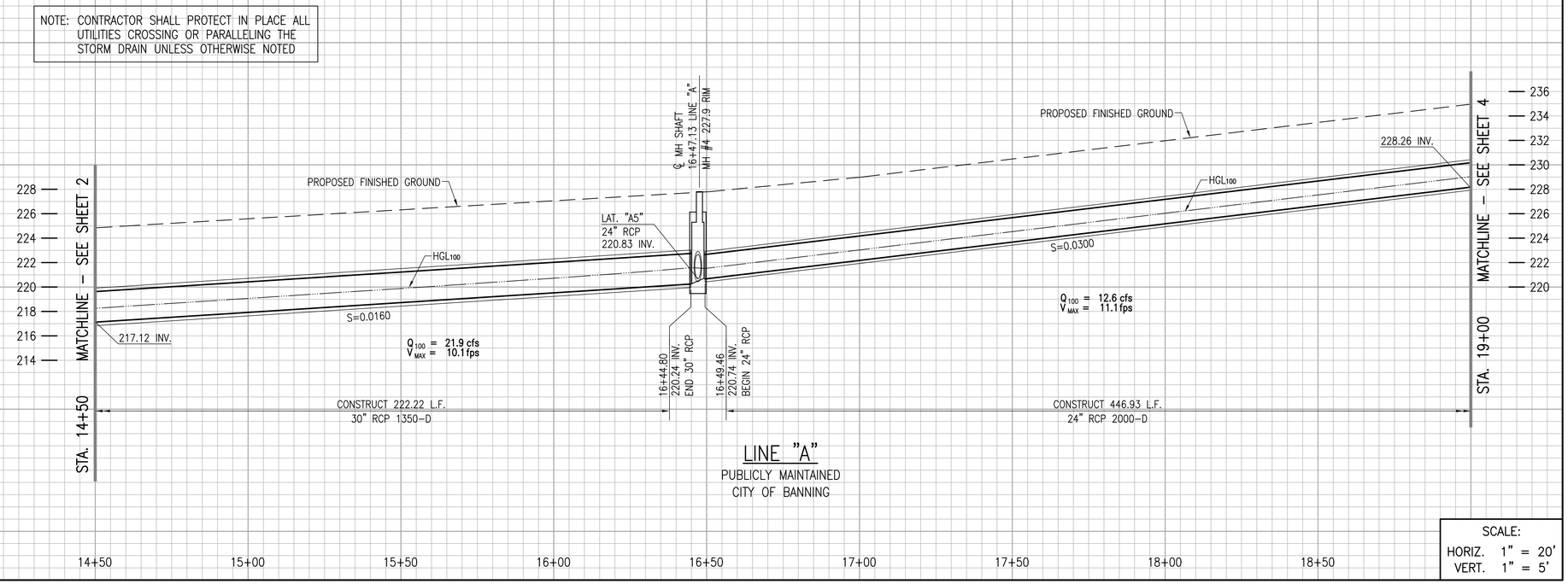
CITY OF BANNING
PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION
APPROVED BY:
KAHONO OEI R.C.E. 52652 EXP 12/31/10 DATE

BANNING BUSINESS PARK
STORM DRAIN PLAN
INTERIM FACILITIES FOR ROUGH GRADING
LINE "A"
STA. 10+00.00 TO STA. 14+50.00

PROJECT NO. 2042473200
DRAWING NO. PRSD0018
SHEET NO. 2 OF 17

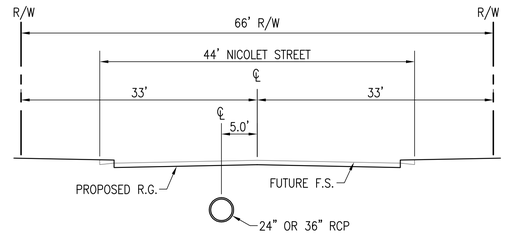
FINAL SUBMITTAL - AUGUST 26, 2010

NOTE: CONTRACTOR SHALL PROTECT IN PLACE ALL UTILITIES CROSSING OR PARALLELING THE STORM DRAIN UNLESS OTHERWISE NOTED



LINE "A"
PUBLICLY MAINTAINED
CITY OF BANNING

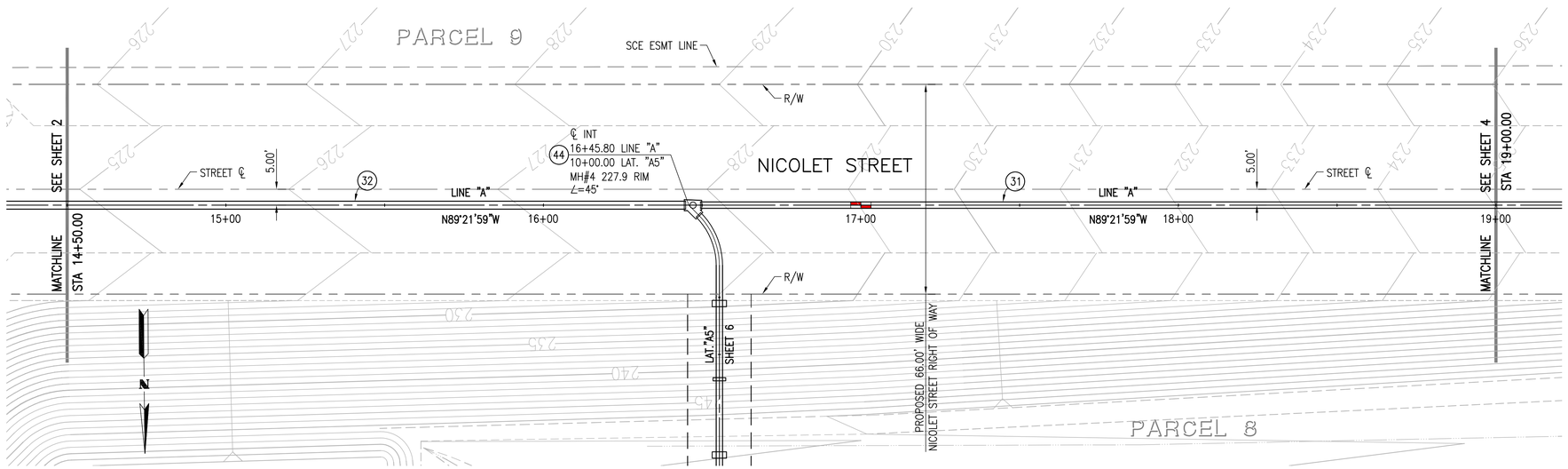
SCALE:	
HORIZ.	1" = 20'
VERT.	1" = 5'



SECTION AT STA 17+00
TYPICAL FROM STA 14+25 TO 23+00

10' 0 10'

ALL X-SECTIONS TAKEN LOOKING DOWN STREAM



LINE "A"

STORM DRAIN CONSTRUCTION NOTES
(31) CONSTRUCT 24" RCP WITH BEDDING & BACKFILL PER DETAIL A/13
(32) CONSTRUCT 30" RCP WITH BEDDING & BACKFILL PER DETAIL A/13
(44) CONSTRUCT MANHOLE #4 PER R.C.F.C.W.C.D. STD. No. MH254

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NAVD 88 ELEV. 2118.09 FT.

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MARK B. MCLELLAN R.C.E. 51031 (EXP. 9/30/11)

DESIGNED BY:	MBM
DRAWN BY:	BCB JLW
CHECKED BY:	PKO

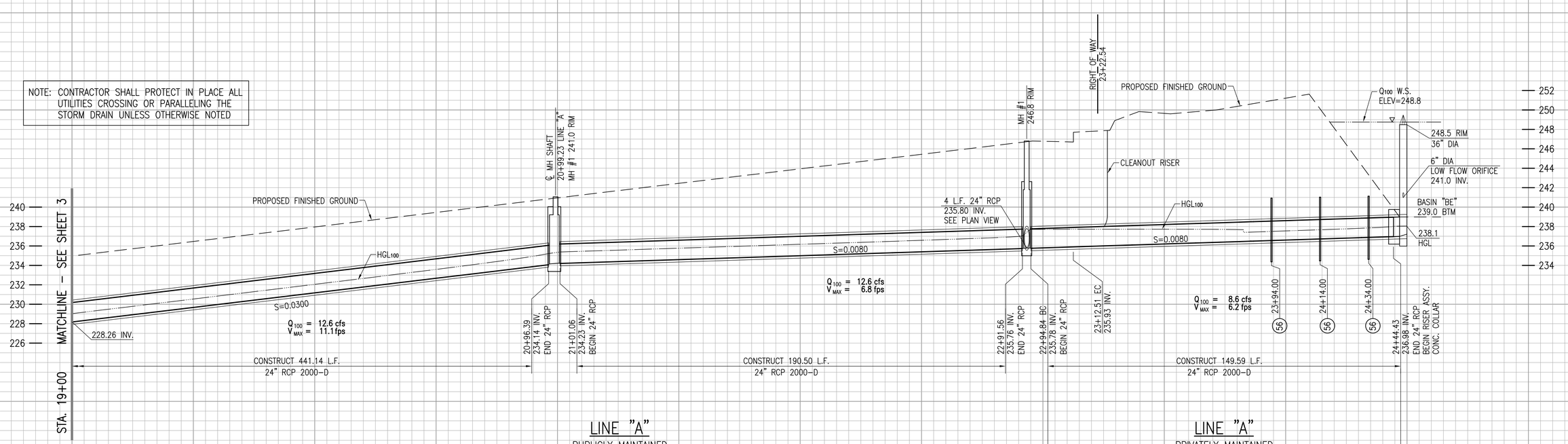
CITY OF BANNING
PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION
APPROVED BY:
KAHONO OEI R.C.E. 52652 EXP 12/31/10 DATE

BANNING BUSINESS PARK
STORM DRAIN PLAN
INTERIM FACILITIES FOR ROUGH GRADING
LINE "A"
STA. 14+50.00 TO STA. 19+00.00

PROJECT NO.	2042473200
DRAWING NO.	PRSD0019
SHEET NO.	3 OF 17

FINAL SUBMITTAL - AUGUST 26, 2010

NOTE: CONTRACTOR SHALL PROTECT IN PLACE ALL UTILITIES CROSSING OR PARALLELING THE STORM DRAIN UNLESS OTHERWISE NOTED



SCALE:
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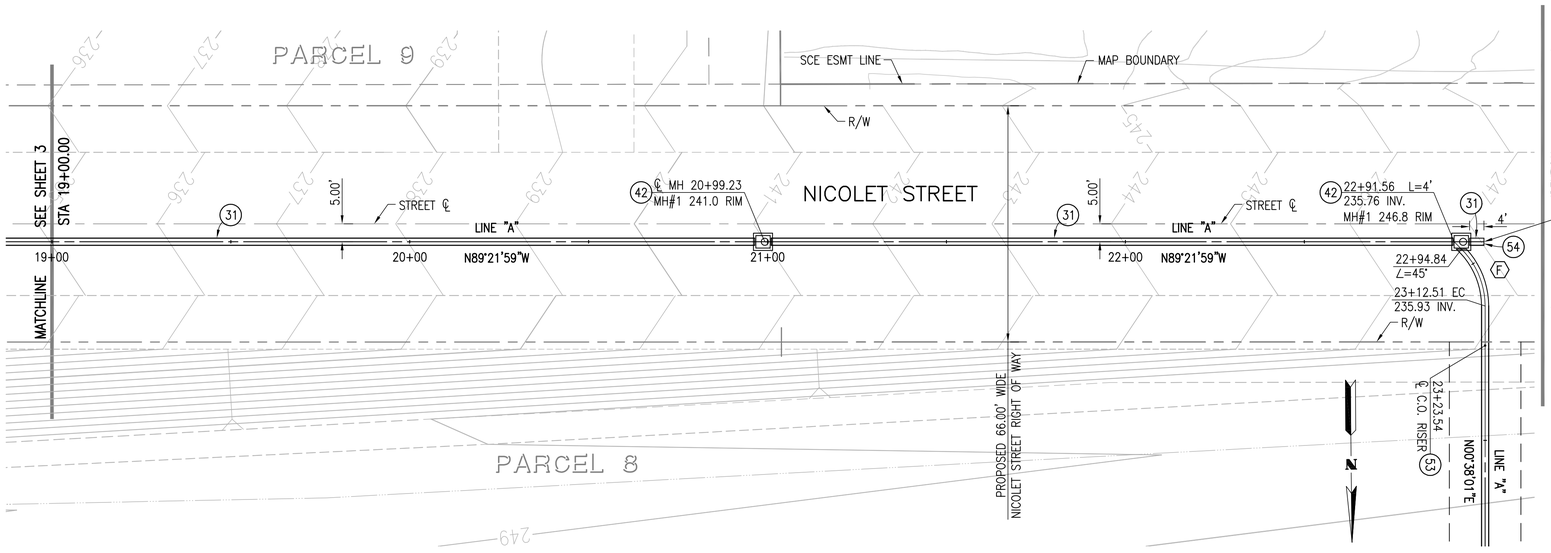
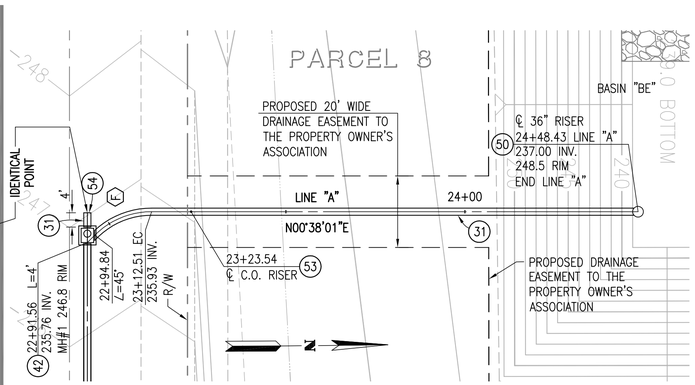
VERT. 1" = 5'



LINE "A"



CURVE DATA				
	DELTA	RADIUS	LENGTH	TANGENT
(F)	45°00'00"	22.50'	17.67'	9.32'

STORM DRAIN CONSTRUCTION NOTES

(31) CONSTRUCT 24" RCP WITH BEDDING & BACKFILL PER DETAIL A/13
(42) CONSTRUCT MANHOLE #1 PER R.C.F.C.W.C.D. STD. No. MH251
(50) CONSTRUCT BASIN RISER INLET PER DETAIL E/13
(53) CONSTRUCT CLEANOUT PER DETAIL H/13
(54) CONSTRUCT CONCRETE BULKHEAD PER R.C.F.C.W.C.D. STD. No. M816
(56) CONSTRUCT ANTI-SEEP COLLAR PER DETAIL G/13

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NAVD 88 ELEV. 2118.09 FT.

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MARK B. MCLELLAN R.C.E. 51031 (EXP. 9/30/11)

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DRAWN BY: BCB JLW
CHECKED BY: PKO

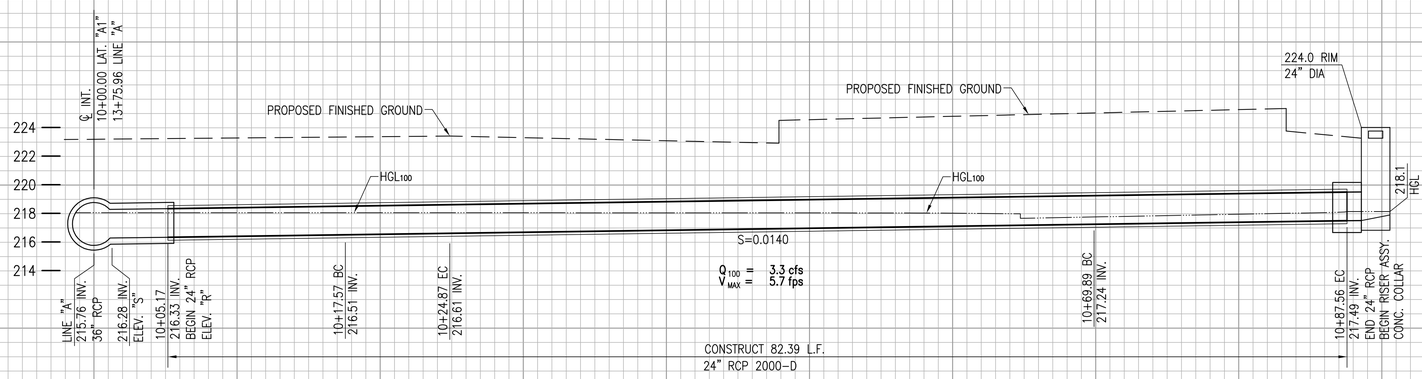
CITY OF BANNING
PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION
APPROVED BY:
KAHONO OEI R.C.E. 52652 EXP 12/31/10 DATE

BANNING BUSINESS PARK
STORM DRAIN PLAN
INTERIM FACILITIES FOR ROUGH GRADING
LINE "A"
STA. 19+00.00 TO STA. 24+51.40

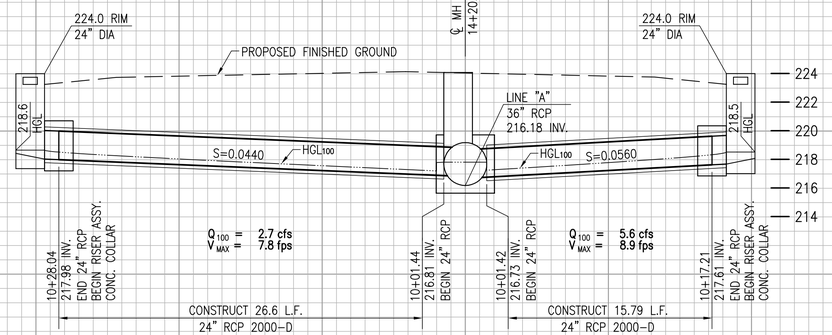
PROJECT NO. 2042473200
DRAWING NO. PRSD0020
SHEET NO. 4 OF 17

FINAL SUBMITTAL - AUGUST 26, 2010

NOTE: CONTRACTOR SHALL PROTECT IN PLACE ALL UTILITIES CROSSING OR PARALLELING THE STORM DRAIN UNLESS OTHERWISE NOTED



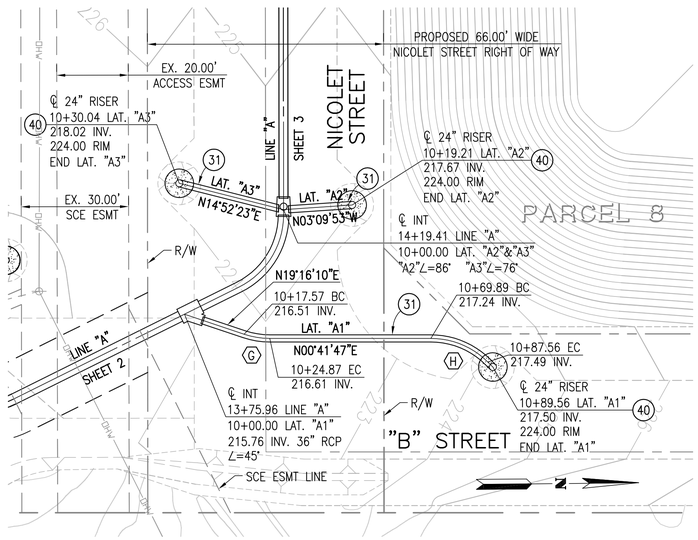
LAT. "A1"
PUBLICLY MAINTAINED
CITY OF BANNING



LAT. "A3"
PUBLICLY MAINTAINED
CITY OF BANNING

LAT. "A2"
PUBLICLY MAINTAINED
CITY OF BANNING

SCALE:
HORIZ. 1" = 5'
VERT. 1" = 5'



LAT. "A1", "A2" & "A3"

CURVE DATA				
	DELTA	RADIUS	LENGTH	TANGENT
(G)	18°34'23"	22.50'	7.29'	3.68'
(H)	45°00'00"	22.50'	17.67'	9.32'

STORM DRAIN CONSTRUCTION NOTES
(31) CONSTRUCT 24" RCP WITH BEDDING & BACKFILL PER DETAIL A/13
(40) CONSTRUCT RISER INLET PER DETAIL D/13

20' 0 20'

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NAVD 88 ELEV. 2118.09 FT.

REV	DESCRIPTION	APPR.	DATE
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DRAWN BY: BCB JLW
CHECKED BY: PKO

CITY OF BANNING
PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION
APPROVED BY:
KAHONO OEI R.C.E. 52652 EXP 12/31/10 DATE

BANNING BUSINESS PARK
STORM DRAIN PLAN
INTERIM FACILITIES FOR ROUGH GRADING
LATERALS "A1", "A2" & "A3"
CONNECTOR PIPE PROFILES

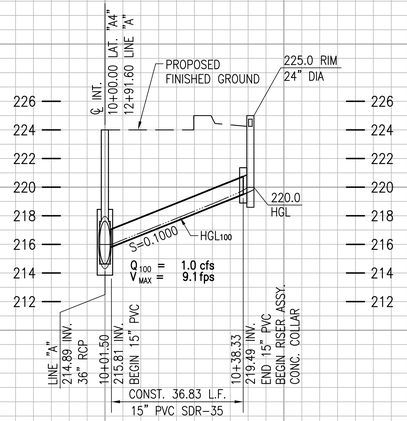
PROJECT NO. 2042473200
DRAWING NO. PRSD0026
SHEET NO. 5 OF 17

FINAL SUBMITTAL - AUGUST 26, 2010

NOTE: CONTRACTOR SHALL PROTECT IN PLACE ALL UTILITIES CROSSING OR PARALLELING THE STORM DRAIN UNLESS OTHERWISE NOTED

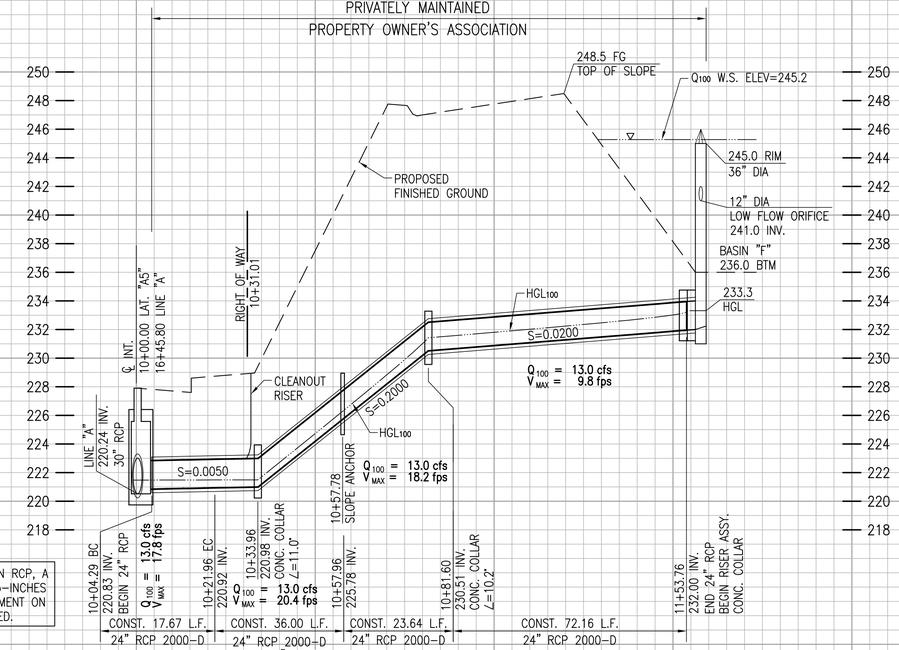
LAT. "A4"

PRIVATELY MAINTAINED
PROPERTY OWNER'S ASSOCIATION



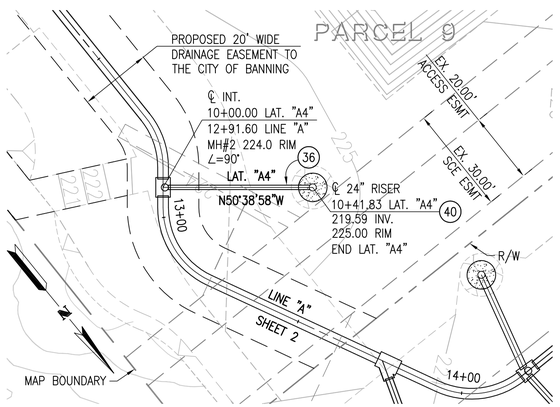
LAT. "A5"

PRIVATELY MAINTAINED
PROPERTY OWNER'S ASSOCIATION

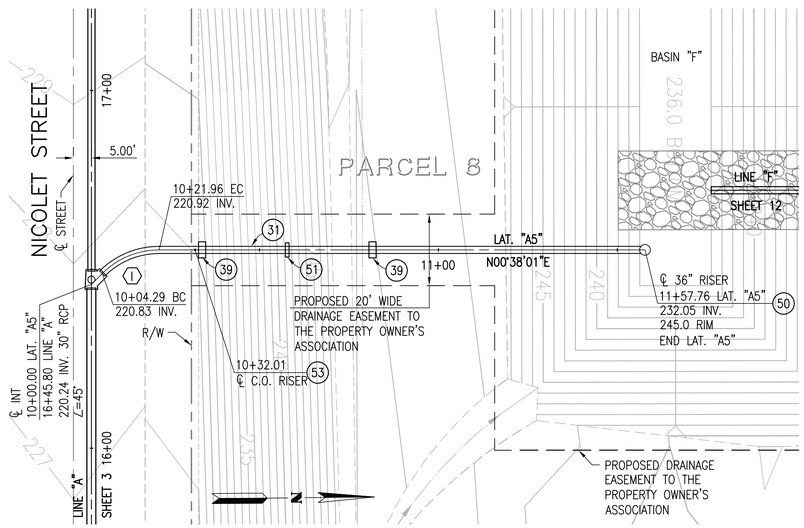


* WHERE VELOCITY EXCEEDS 20 FPS IN RCP, A SPECIAL WALL WITH A MINIMUM OF 1.5-INCHES OF COVER OVER THE PIPE REINFORCEMENT ON THE INSIDE SURFACE IS REQUIRED.

SCALE:
HORIZ. 1" = 20'
VERT. 1" = 5'



LAT "A4"



LAT "A5"

20' 0 20'

CURVE DATA				
	DELTA	RADIUS	LENGTH	TANGENT
(I)	45°00'00"	22.50'	17.67'	9.32'

STORM DRAIN CONSTRUCTION NOTES

(31) CONSTRUCT 24" RCP WITH BEDDING & BACKFILL PER DETAIL A/13
(36) INSTALL 15" PVC SDR-35 WITH BEDDING PER DETAIL A/13
(39) CONSTRUCT CONCRETE COLLAR PER R.C.F.C.W.C.D. STD. No. M803
(40) CONSTRUCT RISER INLET PER DETAIL D/13
(50) CONSTRUCT BASIN RISER INLET PER DETAIL E/13
(51) CONSTRUCT CONCRETE SLOPE ANCHOR PER DETAIL F/13
(53) CONSTRUCT CLEANOUT PER DETAIL H/13

Don't Dig...Until You Call U.S.A. Toll Free
1-800-227-2600
for the location of buried utility lines.
Don't disrupt vital services.
TWO WORKING DAYS BEFORE YOU DIG

PERMANENT BENCHMARK: USGS No. U1311
RECOVERED IN GOOD CONDITION. 3.7 KM (2.30 MI) EAST ALONG A FRONTAGE ROAD ON THE SOUTH SIDE OF INTERSTATE HWY 10 FROM THE INTERSECTION OF SAN GORGONIO AVE. IN BANNING, SOUTHWEST OF THE SOUTHWEST CORNER OF A WEIGH STATION BUILDING, (97.8 FT) NORTH OF THE NORTH RAIL OF THE SOUTHERN PACIFIC RAILROAD, 0.9 M (3.0 FT) WEST OF A POWER POLE. THE MARK IS 0.30 METERS EAST FROM A WITNESS POST. THE MARK IS ABOVE LEVEL, LEVEL WITH THE FRONTAGE ROAD.
NAVD 88 ELEV. 2118.09 FT.

REV	DESCRIPTION	APPR.	DATE

REGISTERED PROFESSIONAL ENGINEER MARK B. MCLELLAN No. 51031 Exp. 9/30/11 CIVIL STATE OF CALIFORNIA

STANTEC CONSULTING INC.
19 TECHNOLOGY DRIVE
IRVINE, CA 92618
949.923.6000
stantec.com

MARK B. MCLELLAN R.C.E. 51031 (EXP. 9/30/11)

DESIGNED BY: MBM
DRAWN BY: BCB JLW
CHECKED BY: PKO

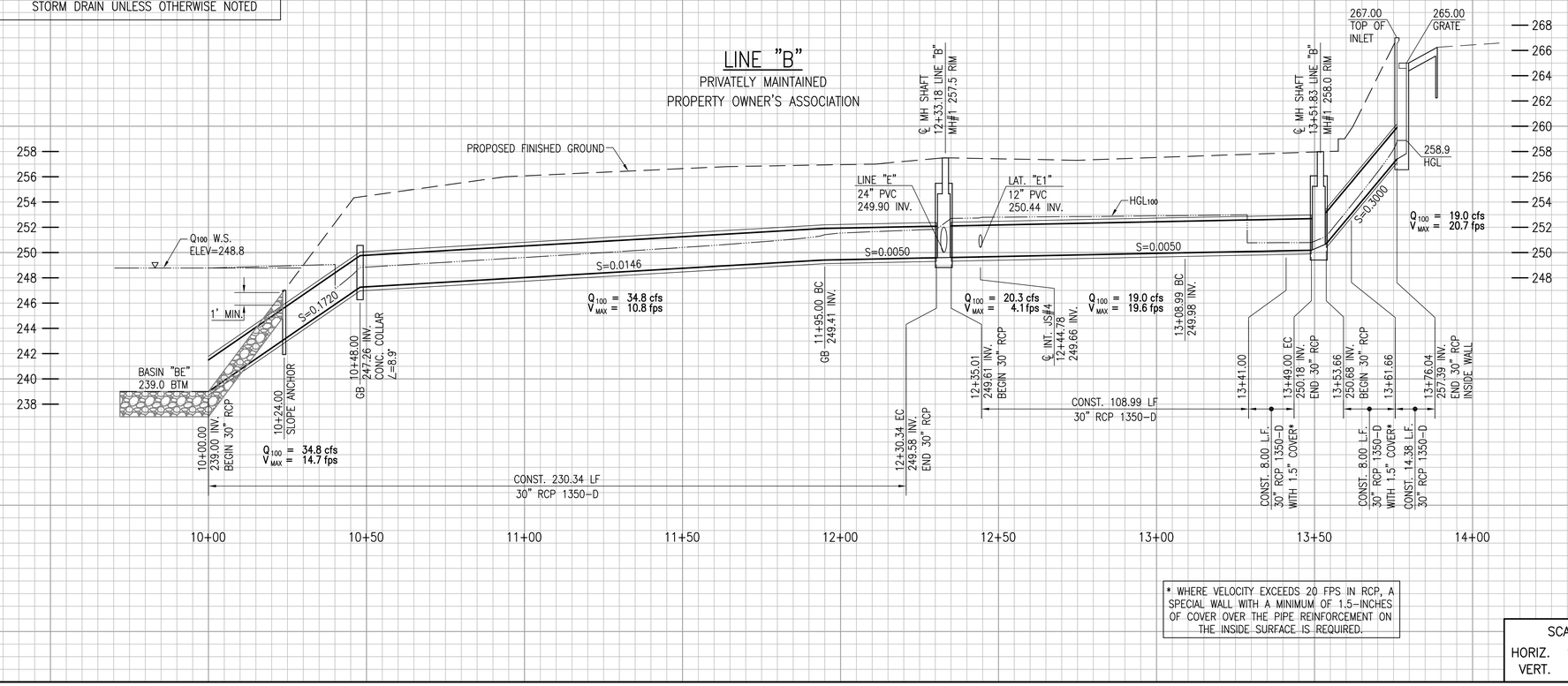
CITY OF BANNING
PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION
APPROVED BY:
KAHONO OEI R.C.E. 52652 EXP 12/31/10 DATE

BANNING BUSINESS PARK
STORM DRAIN PLAN
INTERIM FACILITIES FOR ROUGH GRADING
LATERALS "A4" & "A5"
CONNECTOR PIPE PROFILES

PROJECT NO. 2042473200
DRAWING NO. PRSD0021
SHEET NO. 6 OF 17

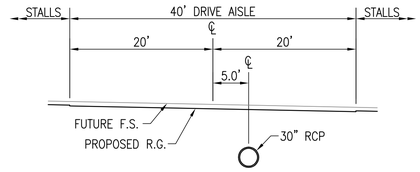
FINAL SUBMITTAL - AUGUST 26, 2010

NOTE: CONTRACTOR SHALL PROTECT IN PLACE ALL UTILITIES CROSSING OR PARALLELING THE STORM DRAIN UNLESS OTHERWISE NOTED



* WHERE VELOCITY EXCEEDS 20 FPS IN RCP, A SPECIAL WALL WITH A MINIMUM OF 1.5-INCHES OF COVER OVER THE PIPE REINFORCEMENT ON THE INSIDE SURFACE IS REQUIRED.

SCALE:
HORIZ. 1" = 20'
VERT. 1" = 5'

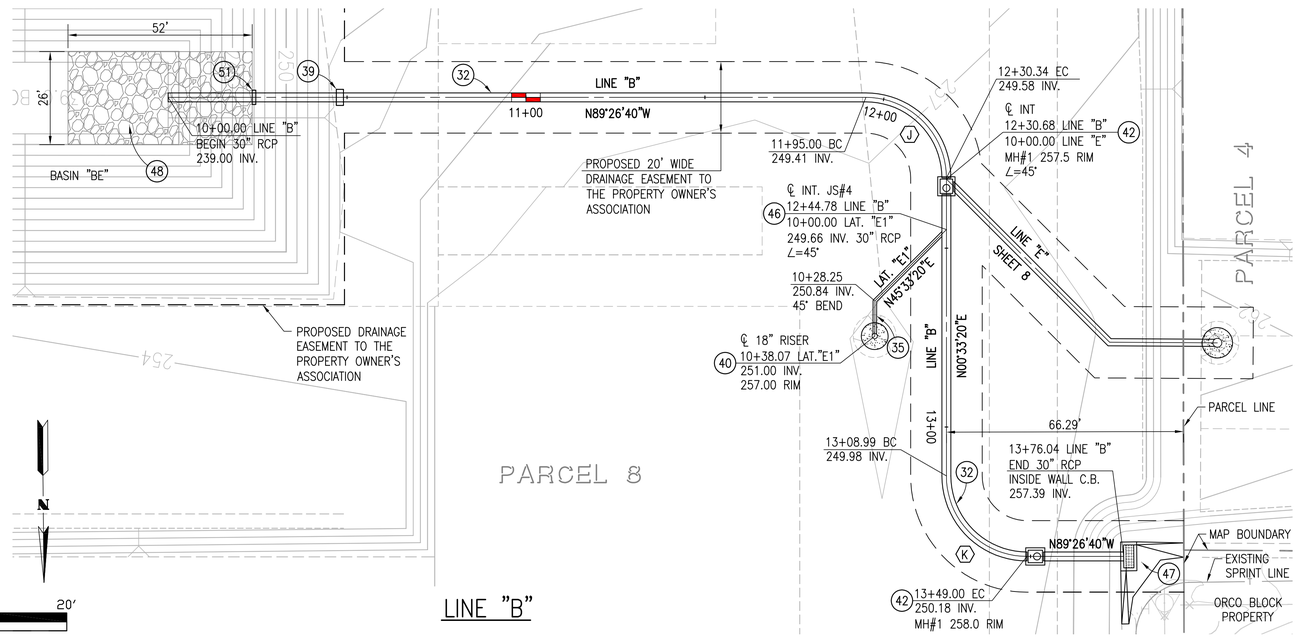


SECTION AT STA 11+00

TYPICAL FROM STA 10+75 TO 11+75

10' 0 10'

ALL X-SECTIONS TAKEN LOOKING DOWN STREAM



LINE "B"

CURVE DATA				
	DELTA	RADIUS	LENGTH	TANGENT
J	90°00'00"	22.50'	35.34'	22.50'
K	90°00'00"	22.50'	35.34'	22.50'

STORM DRAIN CONSTRUCTION NOTES

32 — CONSTRUCT 30" RCP WITH BEDDING & BACKFILL PER DETAIL A/13
35 — INSTALL 12" PVC SDR-35 WITH BEDDING PER DETAIL A/13
39 — CONSTRUCT CONCRETE COLLAR PER R.C.F.C.W.C.D. STD. No. M803
40 — CONSTRUCT RISER INLET PER DETAIL D/13
42 — CONSTRUCT MANHOLE #1 PER R.C.F.C.W.C.D. STD. No. MH251
46 — CONSTRUCT JUNCTION STRUCTURE #4 PER R.C.F.C.W.C.D. STD No. JS229
47 — CONSTRUCT DRAINAGE APRON WITH MODIFIED CB#4 PER DETAIL C/13
48 — CONSTRUCT 2' THICK RIP-RAP PAD, DIMENSIONS PER PLAN (12" DIA. ROCK)
51 — CONSTRUCT CONCRETE SLOPE ANCHOR PER DETAIL F/13

Don't Dig...Until You Call U.S.A. Toll Free
1-800-227-2600
for the location of buried utility lines.
Don't disrupt vital services.
BURIED CABLE
TWO WORKING DAYS BEFORE YOU DIG

PERMANENT BENCHMARK: USGS No. U1311
RECOVERED IN GOOD CONDITION. 3.7 KM (2.30 MI) EAST ALONG A FRONTAGE ROAD ON THE SOUTH SIDE OF INTERSTATE HWY 10 FROM THE INTERSECTION OF SAN GORGONIO AVE. IN BANNING, SOUTHWEST OF THE SOUTHWEST CORNER OF A WEIGH STATION BUILDING, (97.8 FT) NORTH OF THE NORTH RAIL OF THE SOUTHERN PACIFIC RAILROAD, 0.9 M (3.0 FT) WEST OF A POWER POLE. THE MARK IS 0.30 METERS EAST FROM A WITNESS POST. THE MARK IS ABOVE LEVEL, LEVEL WITH THE FRONTAGE ROAD.
NAVD 88 ELEV. 2118.09 FT.

REV	DESCRIPTION	APPR.	DATE
	REVISIONS		

REGISTERED PROFESSIONAL ENGINEER MARK B. MCLELLAN No. 51031 Exp. 9/30/11 CIVIL STATE OF CALIFORNIA

STANTEC CONSULTING INC.
19 TECHNOLOGY DRIVE
IRVINE, CA 92618
949.923.6000
stantec.com
MARK B. MCLELLAN R.C.E. 51031 (EXP. 9/30/11)

DESIGNED BY: MBM
DRAWN BY: BCB JLW
CHECKED BY: PKO

CITY OF BANNING
PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION
APPROVED BY:
KAHONO OEI R.C.E. 52652 EXP 12/31/10 DATE

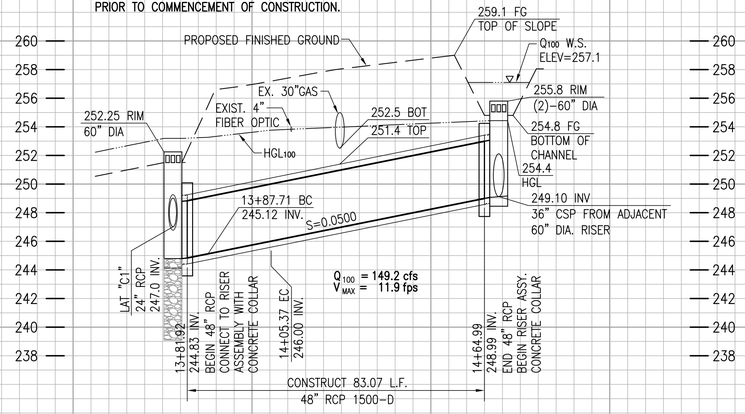
BANNING BUSINESS PARK
STORM DRAIN PLAN
INTERIM FACILITIES FOR ROUGH GRADING
LINE "B"
STORM DRAIN PLAN & PROFILE

PROJECT NO. 2042473200
DRAWING NO. PRSD0022
SHEET NO. 7 OF 17

FINAL SUBMITTAL - AUGUST 26, 2010

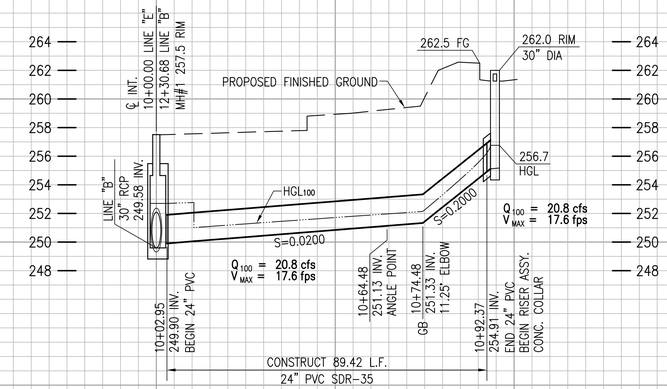
NOTE: CONTRACTOR SHALL PROTECT IN PLACE ALL UTILITIES CROSSING OR PARALLELING THE STORM DRAIN UNLESS OTHERWISE NOTED

WARNING:
CONTRACTOR SHALL USE EXTREME CAUTION WHILE WORKING AROUND EXISTING 30" GAS MAIN. LINE SHALL BE POTHOLED PRIOR TO COMMENCEMENT OF CONSTRUCTION.



LINE "C"

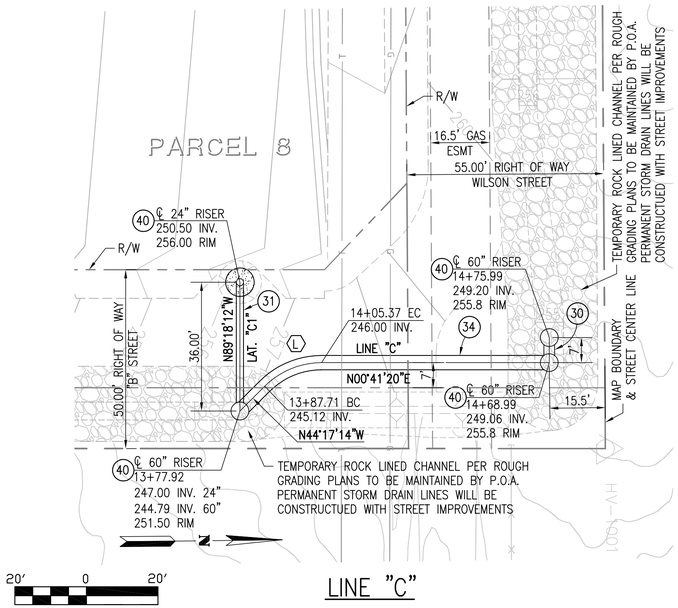
THE INTERIM CONDITION LINE "C" AND BUBBLER TO BE MAINTAINED BY PROPERTY OWNER'S ASSOCIATION UNTIL THE CITY ACCEPTS A PERMANENT STORM DRAIN WITH DOWNSTREAM DRAINAGE FACILITIES



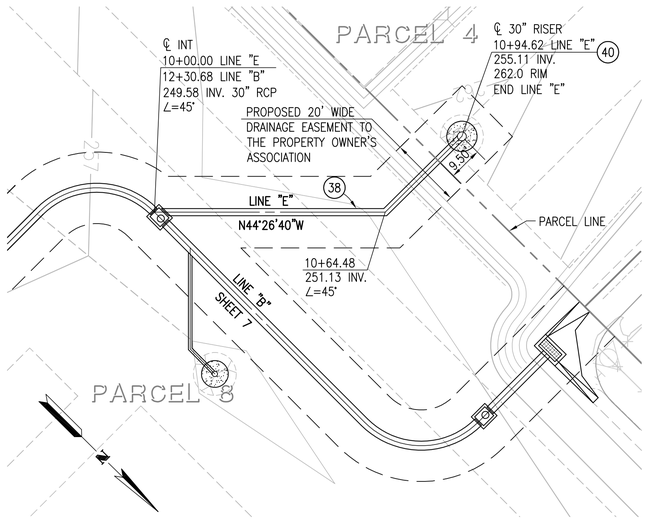
LINE "E"

PRIVATELY MAINTAINED
PROPERTY OWNER'S ASSOCIATION

SCALE:
HORIZ. 1" = 20'
VERT. 1" = 5'



LINE "C"



LINE "E"

CURVE DATA				
	DELTA	RADIUS	LENGTH	TANGENT
(L)	44°58'34"	22.50'	17.66'	9.31'

STORM DRAIN CONSTRUCTION NOTES

30 — CONSTRUCT 36" CSP WITH BEDDING & BACKFILL PER DETAIL A/13
31 — CONSTRUCT 24" RCP WITH BEDDING & BACKFILL PER DETAIL A/13
34 — CONSTRUCT 48" RCP WITH BEDDING & BACKFILL PER DETAIL A/13
38 — INSTALL 24" PVC SDR-35 WITH BEDDING PER DETAIL A/13
40 — CONSTRUCT RISER INLET PER DETAIL D/13

Don't Dig...Until You Call U.S.A. Toll Free
1-800-227-2600
for the location of buried utility lines.
Don't disrupt vital services.
TWO WORKING DAYS BEFORE YOU DIG

PERMANENT BENCHMARK: USGS No. U1311
RECOVERED IN GOOD CONDITION. 3.7 KM (2.30 MI) EAST ALONG A FRONTAGE ROAD ON THE SOUTH SIDE OF INTERSTATE HWY 10 FROM THE INTERSECTION OF SAN GORGONIO AVE. IN BANNING, SOUTHWEST OF THE SOUTHWEST CORNER OF A WEIGH STATION BUILDING, (97.8 FT) NORTH OF THE NORTH RAIL OF THE SOUTHERN PACIFIC RAILROAD, 0.9 M (3.0 FT) WEST OF A POWER POLE. THE MARK IS 0.30 METERS EAST FROM A WITNESS POST. THE MARK IS ABOVE LEVEL, LEVEL WITH THE FRONTAGE ROAD.
NAVD 88 ELEV. 2118.09 FT.

REV	DESCRIPTION	APPR.	DATE
	REVISIONS		

REGISTERED PROFESSIONAL ENGINEER MARK B. MCLELLAN No. 51031 Exp. 9/30/11 CIVIL STATE OF CALIFORNIA

STANTEC CONSULTING INC.
19 TECHNOLOGY DRIVE
IRVINE, CA 92618
949.923.6000
stantec.com
MARK B. MCLELLAN R.C.E. 51031 (EXP. 9/30/11)

DESIGNED BY: MBM
DRAWN BY: BCB JLW
CHECKED BY: PKO

CITY OF BANNING
PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION
APPROVED BY:
KAHONO OEI R.C.E. 52652 EXP 12/31/10 DATE

BANNING BUSINESS PARK
STORM DRAIN PLAN
INTERIM FACILITIES FOR ROUGH GRADING
LINES "C" & "E"
STORM DRAIN PLAN & PROFILE

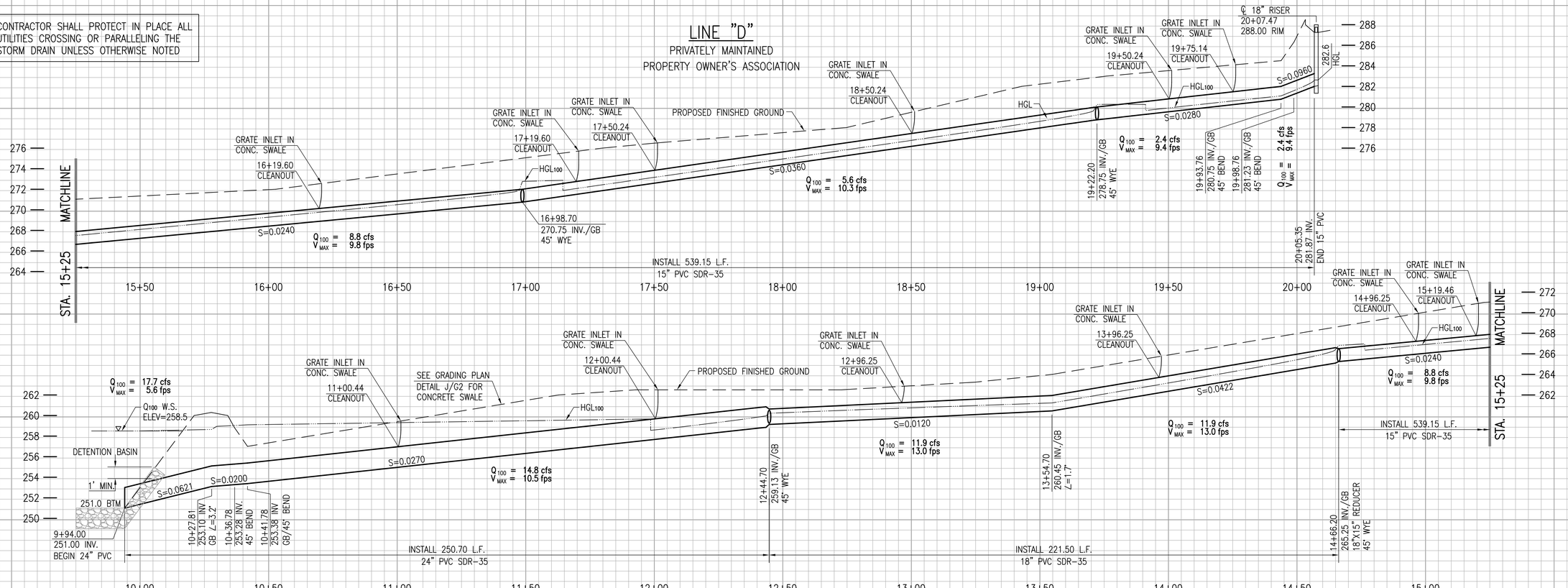
PROJECT NO. 2042473200
DRAWING NO. PRSD0023
SHEET NO. 8 OF 17

FINAL SUBMITTAL - AUGUST 26, 2010

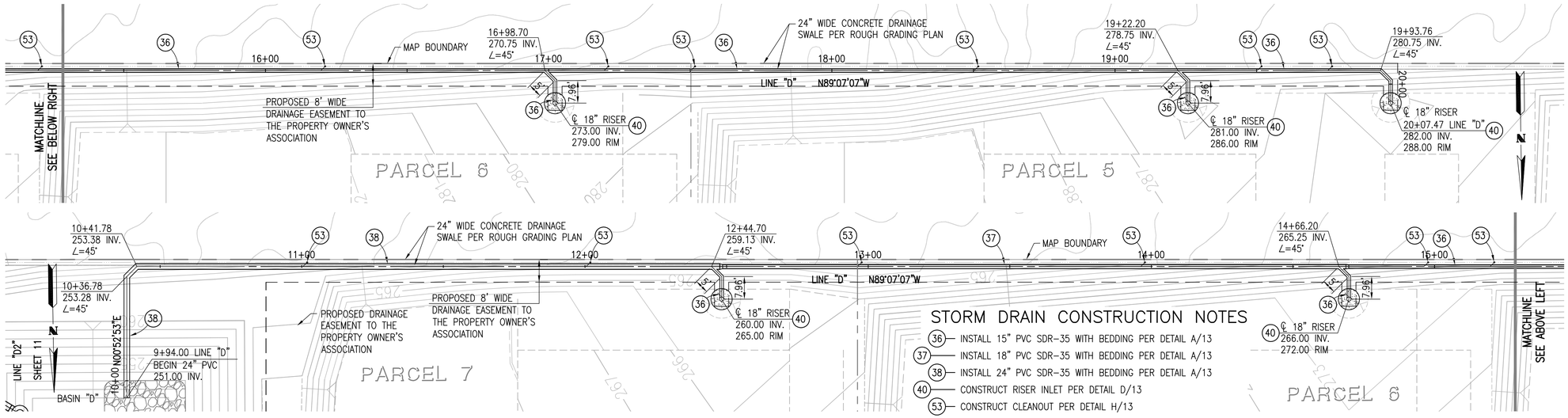
NOTE: CONTRACTOR SHALL PROTECT IN PLACE ALL UTILITIES CROSSING OR PARALLELING THE STORM DRAIN UNLESS OTHERWISE NOTED

LINE "D"

PRIVATELY MAINTAINED
PROPERTY OWNER'S ASSOCIATION



SCALE:
HORIZ. 1" = 20'
VERT. 1" = 5'



STORM DRAIN CONSTRUCTION NOTES

(36) INSTALL 15" PVC SDR-35 WITH BEDDING PER DETAIL A/13
(37) INSTALL 18" PVC SDR-35 WITH BEDDING PER DETAIL A/13
(38) INSTALL 24" PVC SDR-35 WITH BEDDING PER DETAIL A/13
(40) CONSTRUCT RISER INLET PER DETAIL D/13
(53) CONSTRUCT CLEANOUT PER DETAIL H/13

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for the location of buried utility lines.
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TWO WORKING DAYS BEFORE YOU DIG

PERMANENT BENCHMARK: USGS No. U1311
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NAVD 88 ELEV. 2118.09 FT.

REV	DESCRIPTION	APPR.	DATE
	REVISIONS		

REGISTERED PROFESSIONAL ENGINEER MARK B. MCLELLAN No. 51031 Exp. 9/30/11 CIVIL STATE OF CALIFORNIA

STANTEC CONSULTING INC.
19 TECHNOLOGY DRIVE
IRVINE, CA 92618
949.923.6000
stantec.com
MARK B. MCLELLAN R.C.E. 51031 (EXP. 9/30/11)

DESIGNED BY: MBM
DRAWN BY: BCB JLW
CHECKED BY: PKO

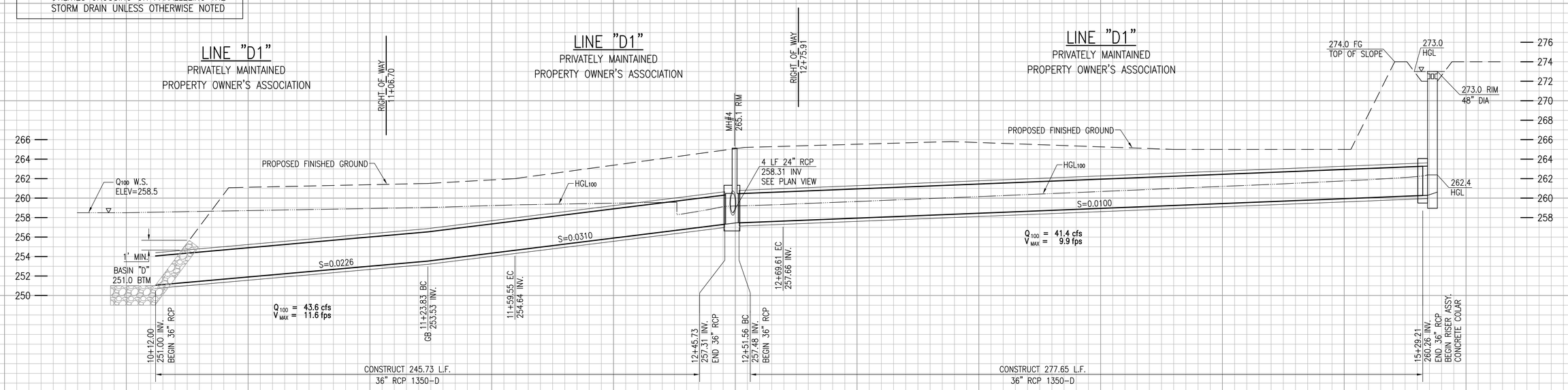
CITY OF BANNING
PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION
APPROVED BY:
KAHONO OEI R.C.E. 52652 EXP 12/31/10 DATE

BANNING BUSINESS PARK
STORM DRAIN PLAN
INTERIM FACILITIES FOR ROUGH GRADING
LINE "D"
STORM DRAIN PLAN & PROFILE

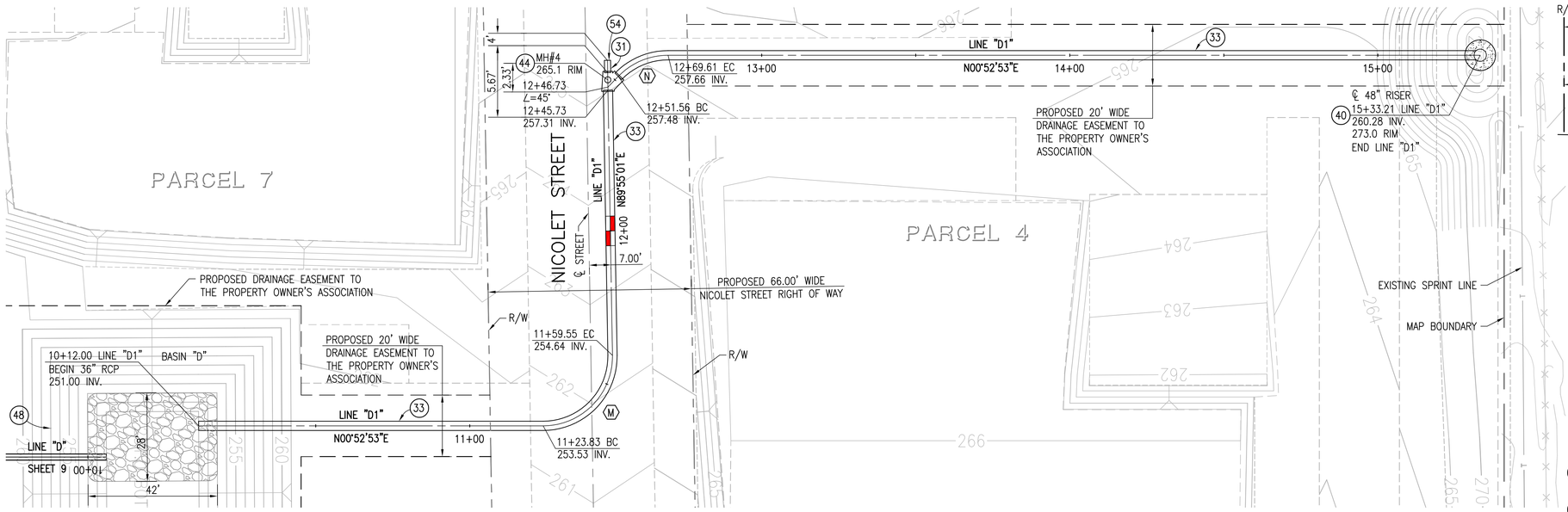
PROJECT NO. 2042473200
DRAWING NO. PRSD0024
SHEET NO. 9 OF 17

FINAL SUBMITTAL - AUGUST 26, 2010

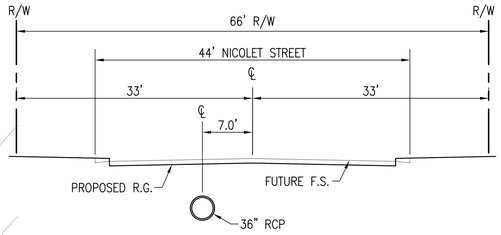
NOTE: CONTRACTOR SHALL PROTECT IN PLACE ALL UTILITIES CROSSING OR PARALLELING THE STORM DRAIN UNLESS OTHERWISE NOTED



SCALE:
HORIZ. 1" = 20'
VERT. 1" = 5'



LINE "D1"



SECTION AT STA 12+00

TYPICAL FROM STA 11+60 TO 12+50

10' 0 10'

ALL X-SECTIONS TAKEN LOOKING DOWN STREAM

CURVE DATA				
	DELTA	RADIUS	LENGTH	TANGENT
(M)	90°57'52"	22.50'	35.72'	22.88'
(N)	45°57'53"	22.50'	18.05'	9.54'

STORM DRAIN CONSTRUCTION NOTES

(31) CONSTRUCT 24" RCP WITH BEDDING & BACKFILL PER DETAIL A/13
(33) CONSTRUCT 36" RCP WITH BEDDING & BACKFILL PER DETAIL A/13
(40) CONSTRUCT RISER INLET PER DETAIL D/13
(44) CONSTRUCT MANHOLE #4 PER R.C.F.C.W.C.D. STD. No. MH254
(48) CONSTRUCT 2' THICK RIP-RAP PAD, DIMENSIONS PER PLAN (12" DIA. ROCK)
(54) CONSTRUCT CONCRETE BULKHEAD PER R.C.F.C.W.C.D. STD. No. M816

Don't Dig...Until You Call U.S.A. Toll Free
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TWO WORKING DAYS BEFORE YOU DIG

PERMANENT BENCHMARK: USGS No. U1311
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NAVD 88 ELEV. 2118.09 FT.

REV	DESCRIPTION	APPR.	DATE
	REVISIONS		

REGISTERED PROFESSIONAL ENGINEER MARK B. MCLELLAN No. 51031 Exp. 9/30/11 CIVIL STATE OF CALIFORNIA

STANTEC CONSULTING INC.
19 TECHNOLOGY DRIVE
IRVINE, CA 92618
949.923.6000
stantec.com
MARK B. MCLELLAN R.C.E. 51031 (EXP. 9/30/11)

DESIGNED BY: MBM
DRAWN BY: BCB JLW
CHECKED BY: PKO

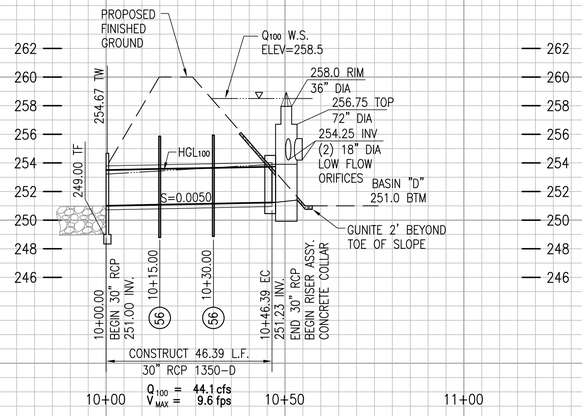
CITY OF BANNING
PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION
APPROVED BY:
KAHONO OEI R.C.E. 52652 EXP 12/31/10 DATE

BANNING BUSINESS PARK
STORM DRAIN PLAN
INTERIM FACILITIES FOR ROUGH GRADING
LINE "D1"
STORM DRAIN PLAN & PROFILE

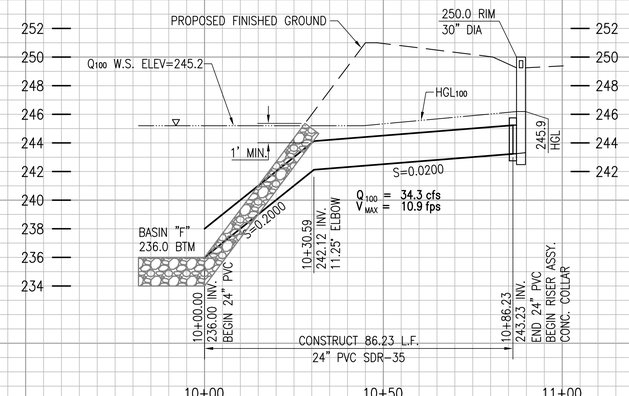
PROJECT NO. 2042473200
DRAWING NO. PRSD0027
SHEET NO. 10 OF 17

FINAL SUBMITTAL - AUGUST 26, 2010

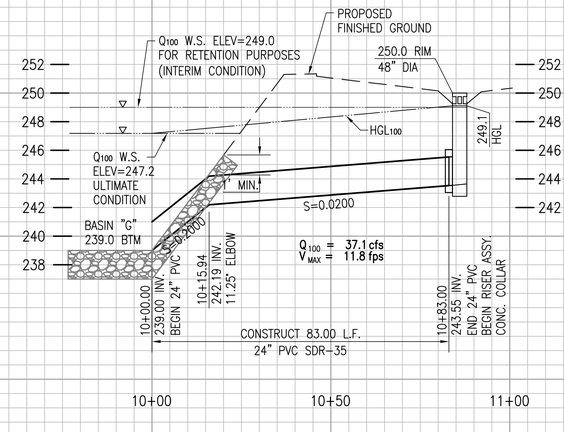
NOTE: CONTRACTOR SHALL PROTECT IN PLACE ALL UTILITIES CROSSING OR PARALLELING THE STORM DRAIN UNLESS OTHERWISE NOTED



LINE "D2"
PRIVATELY MAINTAINED
PROPERTY OWNER'S ASSOCIATION

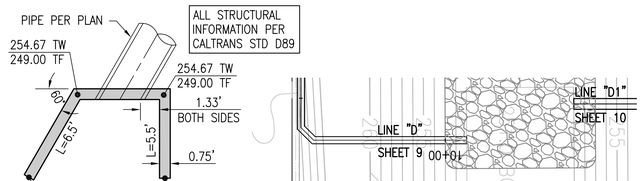


LINE "F"
PRIVATELY MAINTAINED
PROPERTY OWNER'S ASSOCIATION



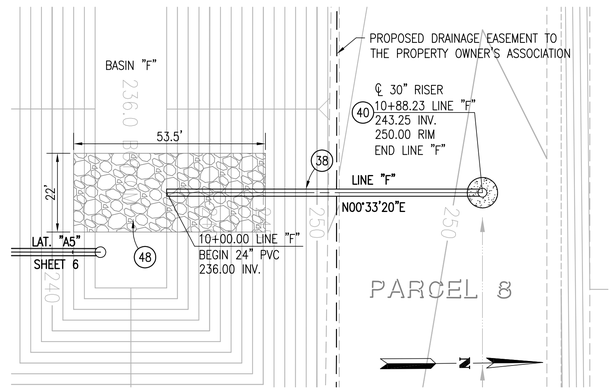
LINE "G"
PRIVATELY MAINTAINED
PROPERTY OWNER'S ASSOCIATION

SCALE:
HORIZ. 1" = 20'
VERT. 1" = 5'

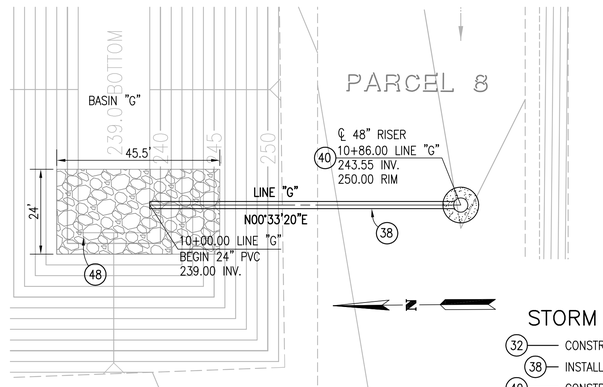


HEADWALL DETAIL

LINE "D2"



LINE "F"



LINE "G"

STORM DRAIN CONSTRUCTION NOTES

32 CONSTRUCT 30" RCP WITH BEDDING & BACKFILL PER DETAIL A/13
38 INSTALL 24" PVC SDR-35 WITH BEDDING PER DETAIL A/13
40 CONSTRUCT RISER INLET PER DETAIL D/13
48 CONSTRUCT 2' THICK RIP-RAP PAD, DIMENSIONS PER PLAN (12" DIA. ROCK)
55 CONSTRUCT CONCRETE HEADWALL PER MODIFIED CALTRANS STD PLAN D89 (TYPE PER PLAN) SEE ADDITIONAL DETAIL ON SHEET 11
56 CONSTRUCT ANTI-SEEP COLLAR PER DETAIL G/13
58 CONSTRUCT DUAL SIZE BASIN RISER INLET PER DETAILS E/13 & K/13

Don't Dig...Until You Call U.S.A. Toll Free
1-800-227-2600
for the location of buried utility lines.
Don't disrupt vital services.
TWO WORKING DAYS BEFORE YOU DIG

PERMANENT BENCHMARK: USGS No. U1311
RECOVERED IN GOOD CONDITION. 3.7 KM (2.30 MI) EAST ALONG A FRONTAGE ROAD ON THE SOUTH SIDE OF INTERSTATE HWY 10 FROM THE INTERSECTION OF SAN GORGONIO AVE. IN BANNING, SOUTHWEST OF THE SOUTHWEST CORNER OF A WEIGH STATION BUILDING, (97.8 FT) NORTH OF THE NORTH RAIL OF THE SOUTHERN PACIFIC RAILROAD, 0.9 M (3.0 FT) WEST OF A POWER POLE. THE MARK IS 0.30 METERS EAST FROM A WITNESS POST. THE MARK IS ABOVE LEVEL, LEVEL WITH THE FRONTAGE ROAD.
NAVD 88 ELEV. 2118.09 FT.

REV	DESCRIPTION	APPR.	DATE
	REVISIONS		

REGISTERED PROFESSIONAL ENGINEER MARK B. MCLELLAN No. 51031 Exp. 9/30/11 CIVIL STATE OF CALIFORNIA

Stantec
STANTEC CONSULTING INC.
19 TECHNOLOGY DRIVE
IRVINE, CA 92618
949.923.6000
stantec.com
MARK B. MCLELLAN R.C.E. 51031 (EXP. 9/30/11)

DESIGNED BY: MBM
DRAWN BY: BCB JLW
CHECKED BY: PKO

CITY OF BANNING
PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION
APPROVED BY:
KAHONO OEI R.C.E. 52652 EXP 12/31/10 DATE

BANNING BUSINESS PARK
STORM DRAIN PLAN
INTERIM FACILITIES FOR ROUGH GRADING
LINE "D2" & "F" & "G"
STORM DRAIN PLAN & PROFILE

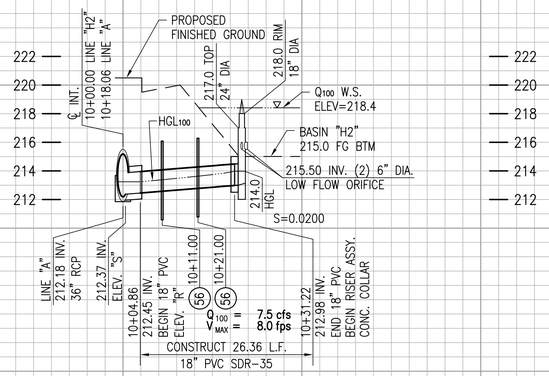
PROJECT NO. 2042473200
DRAWING NO. PRSD0028
SHEET NO. 11 OF 17

FINAL SUBMITTAL - AUGUST 26, 2010

NOTE: CONTRACTOR SHALL PROTECT IN PLACE ALL UTILITIES CROSSING OR PARALLELING THE STORM DRAIN UNLESS OTHERWISE NOTED

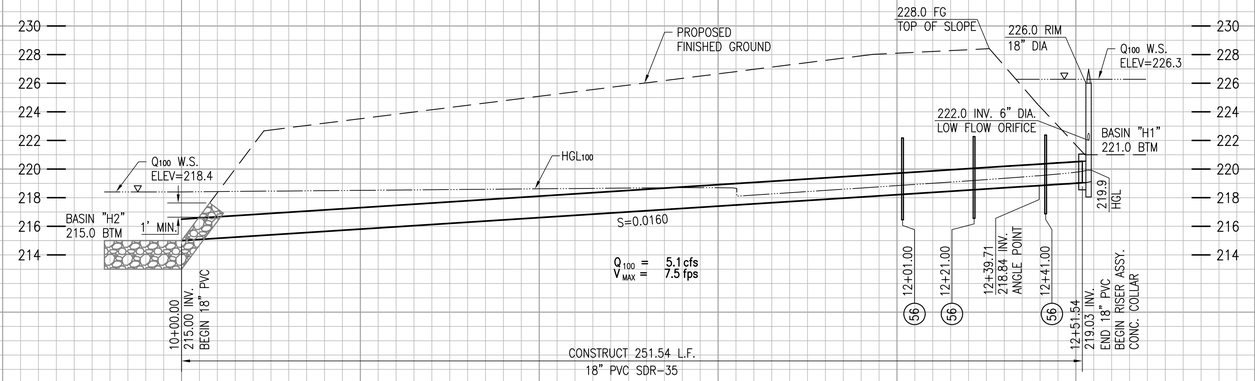
LINE "H2"

PRIVATELY MAINTAINED
PROPERTY OWNER'S ASSOCIATION

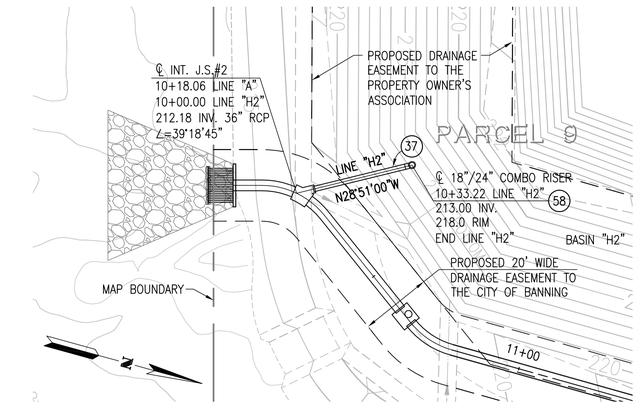


LINE "H1"

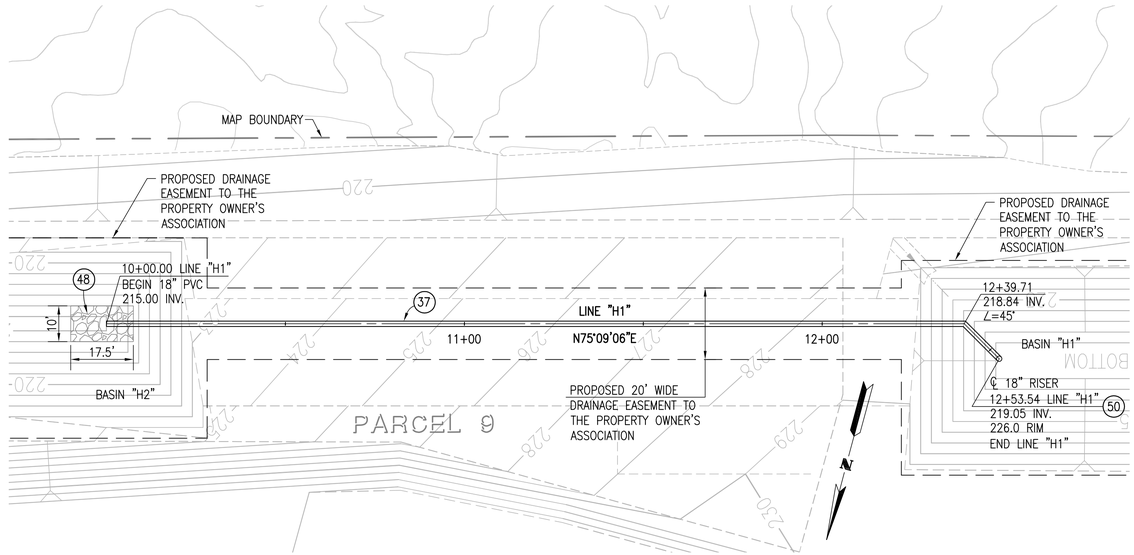
PRIVATELY MAINTAINED
PROPERTY OWNER'S ASSOCIATION



SCALE:
HORIZ. 1" = 20'
VERT. 1" = 5'



LINE "H2"



LINE "H1"

STORM DRAIN CONSTRUCTION NOTES

37 — INSTALL 18" PVC SDR-35 WITH BEDDING PER DETAIL A/13
48 — CONSTRUCT 2' THICK RIP-RAP PAD, DIMENSIONS PER PLAN (12" DIA. ROCK)
50 — CONSTRUCT BASIN RISER INLET PER DETAIL E/13
56 — CONSTRUCT ANTI-SEEP COLLAR PER DETAIL G/13
58 — CONSTRUCT DUAL SIZE BASIN RISER INLET PER DETAILS E/13 & K/13

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NAVD 88 ELEV. 2118.09 FT.

REV	DESCRIPTION	APPR.	DATE
	REVISIONS		

REGISTERED PROFESSIONAL ENGINEER MARK B. MCLELLAN No. 51031 Exp. 9/30/11 CIVIL STATE OF CALIFORNIA

STANTEC CONSULTING INC.
19 TECHNOLOGY DRIVE
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949.923.6000
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MARK B. MCLELLAN R.C.E. 51031 (EXP. 9/30/11)

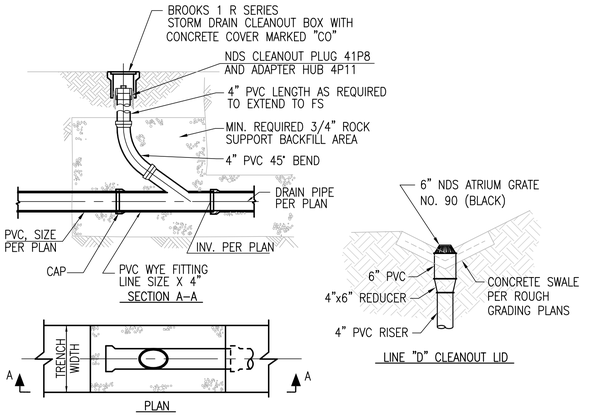
DESIGNED BY: MBM
DRAWN BY: BCB JLW
CHECKED BY: PKO

CITY OF BANNING
PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION
APPROVED BY:
KAHONO OEI R.C.E. 52652 EXP 12/31/10 DATE

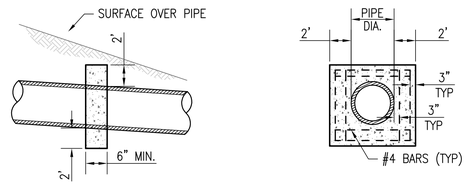
BANNING BUSINESS PARK
STORM DRAIN PLAN
INTERIM FACILITIES FOR ROUGH GRADING
LINE "H1" & "H2"
STORM DRAIN PLAN & PROFILE

PROJECT NO. 2042473200
DRAWING NO. PRSD0029
SHEET NO. 12 OF 17

FINAL SUBMITTAL - AUGUST 26, 2010

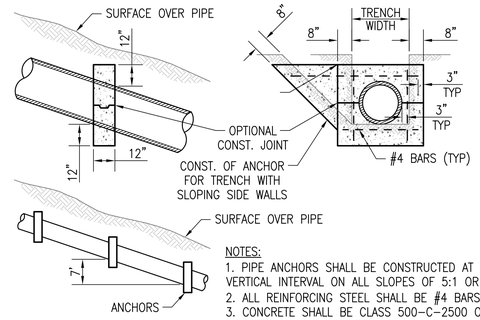


CLEANOUT DETAIL — H 13



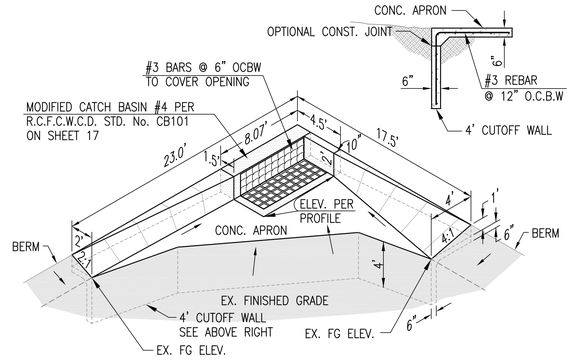
NOTES:
1. ALL REINFORCING STEEL SHALL BE #4 BARS.
2. CONCRETE SHALL BE CLASS 500-C-2500 OR AS DIRECTED BY THE ENGINEER.

ANTI-SEEP COLLAR — G 13

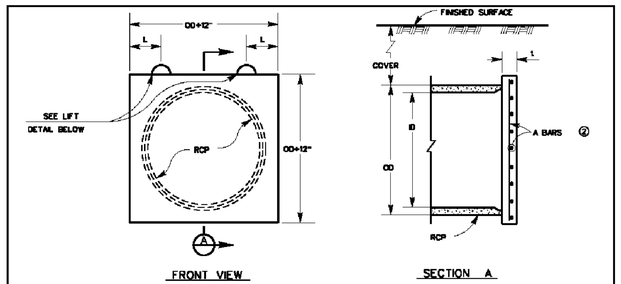


NOTES:
1. PIPE ANCHORS SHALL BE CONSTRUCTED AT 7' VERTICAL INTERVAL ON ALL SLOPES OF 5:1 OR STEEPER.
2. ALL REINFORCING STEEL SHALL BE #4 BARS.
3. CONCRETE SHALL BE CLASS 500-C-2500 OR AS DIRECTED BY THE ENGINEER.

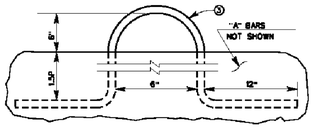
CONCRETE SLOPE ANCHOR — F 13



DRAINAGE APRON WITH MODIFIED CATCH BASIN No.4 — C 13



ID (IN)	MAX COVER (FT)	t (IN)	A BARS	L, P
48	5	4	4 @ 9	1'-6"
	10	4	4 @ 8	
	15	5	4 @ 6	
60	5	4	4 @ 6	1'-8"
	10	5	4 @ 6	
	15	5	5 @ 6	
66	5	5	4 @ 6	1'-10"
	10	5	5 @ 6	
	15	5	5 @ 6	
72	5	5	4 @ 6	2'-0"
	10	5	5 @ 6	
	15	5	6 @ 6	
78	5	5	5 @ 6	2'-2"
	10	5	6 @ 6	
	15	6	6 @ 6	
84	5	5	5 @ 6	2'-4"
	10	5	6 @ 6	
	15	6	6 @ 5	
90	5	5	6 @ 6	2'-5"
	10	6	6 @ 5	
	15	6	6 @ 5	
96	5	5	8 @ 6	2'-7"
	10	6	6 @ 5	
	15	6	7 @ 6	



NOTES

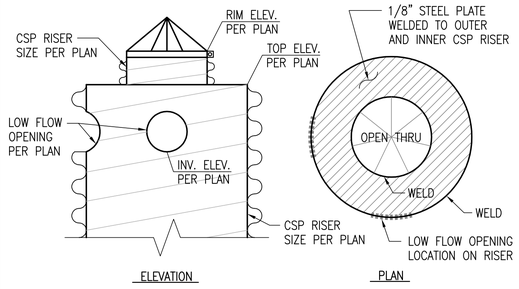
1. CONCRETE SHALL BE CLASS 'A'.
2. ALL REINFORCING STEEL SHALL BE CENTERED IN BULKHEAD EXCEPT FOR PIPE DIAMETER GREATER THAN 96". VERTICAL "A" BARS SHALL BE PLACED AT 2" CLEAR FROM THE INSIDE FACE OF THE BULKHEAD. HORIZONTAL "A" BARS SHALL BE PLACED TOWARDS OUTSIDE FACE OF BULKHEAD PER DETAIL.
3. LIFTS SHALL BE WOVEN STEEL CABLE WITH SAME MINIMUM DIAMETER (d) AS "A" BARS. WEAVE CABLE THROUGH HORIZONTAL "A" BARS. COAT EXPOSED PORTION OF CABLE LIFTS WITH AN APPROVED BITUMINOUS PAINT PRIOR TO BACKFILLING TRENCH.

REGISTERED PROFESSIONAL ENGINEER — DAVID D. BUTLER — No. 32335 — Exp. 12-31-04 — CIVIL — STATE OF CALIFORNIA

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
APPROVED BY: CHIEF ENGINEER
DATE: April 5, 2004 — R.C.E. NO. 19336

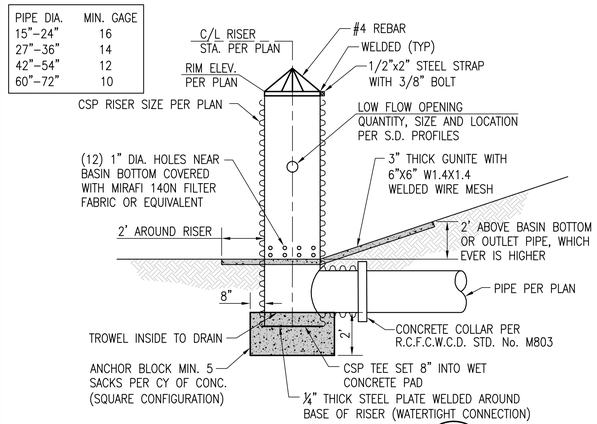
CONCRETE BULKHEAD

STANDARD DRAWING NUMBER M816

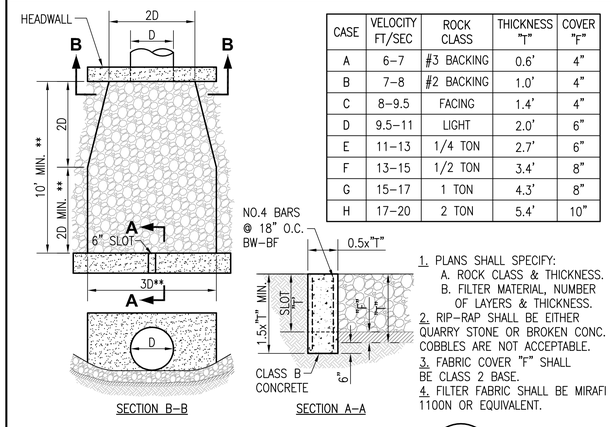


SEE DETAIL E/13 FOR ALL ADDITIONAL CONSTRUCTION INFORMATION AND DIMENSIONS

DUAL SIZE RISER INLET DETAIL — K 13



BASIN RISER INLET DETAIL — E 13

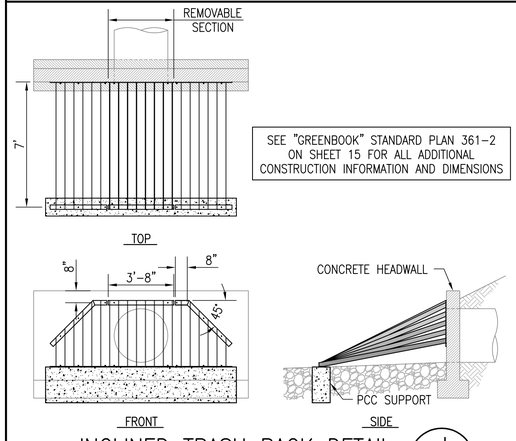


CASE	VELOCITY FT/SEC	ROCK CLASS	THICKNESS "T"	COVER "F"
A	6-7	#3 BACKING	0.6'	4"
B	7-8	#2 BACKING	1.0'	4"
C	8-9.5	FACING	1.4'	4"
D	9.5-11	LIGHT	2.0'	6"
E	11-13	1/4 TON	2.7'	6"
F	13-15	1/2 TON	3.4'	8"
G	15-17	1 TON	4.3'	8"
H	17-20	2 TON	5.4'	10"

1. PLANS SHALL SPECIFY:
   A. ROCK CLASS & THICKNESS.
   B. FILTER MATERIAL, NUMBER OF LAYERS & THICKNESS.
2. RIP-RAP SHALL BE EITHER QUARRY STONE OR BROKEN CONC. COBBLES ARE NOT ACCEPTABLE.
3. FABRIC COVER "F" SHALL BE CLASS 2 BASE.
4. FILTER FABRIC SHALL BE MIRAFI 1100N OR EQUIVALENT.

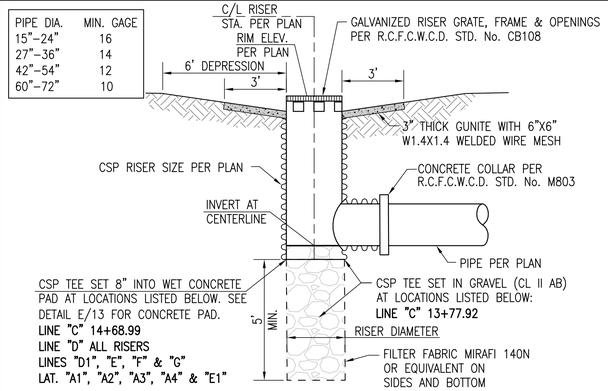
RIP-RAP PAD DETAIL — B 13

** MINIMUM DIMENSIONS, SEE PLAN FOR ACTUAL DIMENSIONS

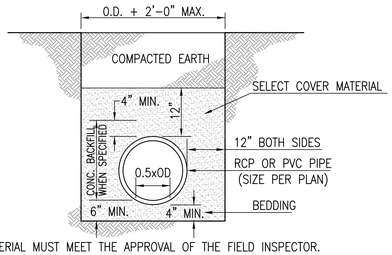


SEE "GREENBOOK" STANDARD PLAN 361-2 ON SHEET 15 FOR ALL ADDITIONAL CONSTRUCTION INFORMATION AND DIMENSIONS

INCLINED TRASH RACK DETAIL — J 13



RISER INLET DETAIL — D 13



ALL MATERIAL MUST MEET THE APPROVAL OF THE FIELD INSPECTOR.

SELECT COVER MATERIAL SHALL BE SAND OR OTHER GRANULAR MATERIAL WITH A MIN. SAND EQUIVALENT OF 25.

BEDDING SHALL CONSIST OF SAND OF OTHER GRANULAR MATERIAL WITH A MIN. SAND EQUIVALENT OF 25 UNLESS GROUND WATER IS PRESENT, IN WHICH CASE BEDDING MATERIAL OF #3 ROCK IS REQUIRED.

BEDDING AND BACKFILL SHALL BE COMPACTED TO A RELATIVE COMPACTION OF NOT LESS THAN 90%, EXCEPT FINAL 2 FEET WHICH WILL BE NOT LESS THAN 95%.

S.D. PIPE BEDDING — A 13

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NAVD 88 — ELEV. 2118.09 FT.

REV	DESCRIPTION	APPR.	DATE
	REVISIONS		

REGISTERED PROFESSIONAL ENGINEER — MARK B. MCLELLAN — No. 51031 — Exp. 9/30/11 — CIVIL — STATE OF CALIFORNIA

Stantec

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949.923.6000
stantec.com

MARK B. MCLELLAN R.C.E. 51031 (EXP. 9/30/11)

DESIGNED BY: MBM
DRAWN BY: BCB JLW
CHECKED BY: PKO

CITY OF BANNING
PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION

APPROVED BY:

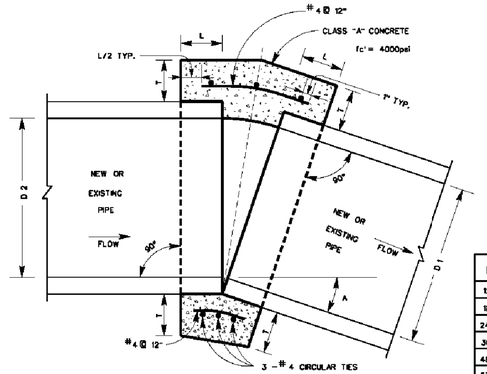
KAHONO OEI R.C.E. 52652 EXP 12/31/10 DATE

BANNING BUSINESS PARK
STORM DRAIN PLAN
INTERIM FACILITIES FOR ROUGH GRADING

CONSTRUCTION DETAILS

PROJECT NO. 2042473200
DRAWING NO. PRSD0025
SHEET NO. 13 OF 17

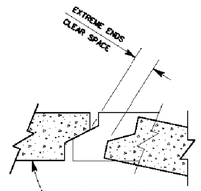
FINAL SUBMITTAL - AUGUST 26, 2010



D	L	T
12"	1.0'	4"
18"	1.0'	5"
24"	1.0'	6"
36"	1.5'	8"
48"	1.5'	10"
57"	1.5'	10"
60"	1.75'	11"
66"	1.75'	11"

NOTES

1. A CONCRETE COLLAR IS REQUIRED WHERE THE CHANGE IN GRADE EXCEEDS 0.10 FT. PER FOOT, OR IF CHANGE IN ALIGNMENT EXCEEDS 0.10 FT. PER FOOT.
2. IF THE EXTREME ENDS OF THE PIPE LEAVE A CLEAR SPACE THAT IS GREATER THAN 1", BUT LESS THAN 6", A CONCRETE COLLAR IS REQUIRED (SEE DETAIL A THIS SHEET). IF THE CLEAR SPACE IS 6" OR GREATER, A TRANSITION STRUCTURE IS REQUIRED.
3. CONCRETE COLLAR SHALL NOT BE USED FOR A SIZE CHANGE ON THE MAIN LINE.
4. WHERE PIPES OF DIFFERENT DIAMETERS ARE JOINED WITH A CONCRETE COLLAR, L AND T SHALL BE THOSE OF THE LARGER PIPE. D=D_1 OR D_2, WHICHEVER IS GREATER.
5. FOR PIPE LARGER THAN 66" A SPECIAL COLLAR DETAIL IS REQUIRED.
6. FOR PIPE SIZE NOT LISTED USE THE NEXT SIZE LARGER.
7. OMIT REINFORCING ON PIPES 24" AND LESS IN DIAMETER AND ON ALL PIPES WHERE ANGLE A IS LESS THAN 10°.
8. WHERE REINFORCING IS REQUIRED THE DIAMETER OF THE CIRCULAR TIES SHALL BE D + (2 X WALL THICKNESS) + 8".
9. WHEN D_1 IS EQUAL TO OR LESS THAN D_2 JOIN INVERTS AND WHEN D_1 IS GREATER THAN D_2 JOIN SOFFITS.
10. PIPE MAY BE CORRUGATED METAL PIPE, CONCRETE PIPE, OR REINFORCED CONCRETE PIPE.

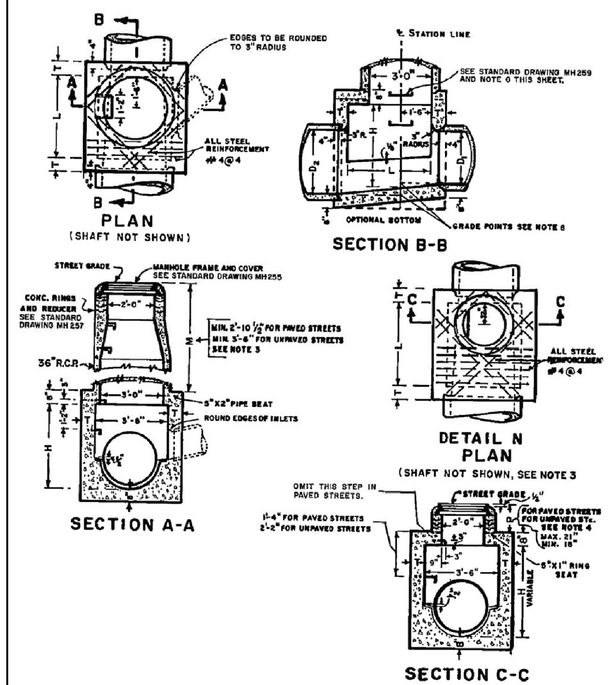


DETAIL "A"
TYPICAL JOINT FOR REINFORCED CONCRETE PIPE

APWA STD. PLAN 380-1
LA/C.F.C. 2-0303

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
APPROVED BY: [signature]
CHIEF ENGINEER
DATE: April 6, 2004
R.C.E. NO. 35336

CONCRETE COLLAR FOR PIPE 12 INCHES THROUGH 66 INCHES
STANDARD DRAWING NUMBER M803



RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
APPROVED BY: [signature]
CHIEF ENGINEER
DATE: April 5, 2004
R.C.E. NO. 35336

MANHOLE NO. 1
STANDARD DRAWING NUMBER MH251
SHEET 1 OF 2

1. HEIGHT H shall be not less than 4'-0" but may be increased at option of Contractor provided that the value of M shall not be less than the minimum specified and that the reducer shall be used. For H (in Sec. C-C) See Note 4.
2. LENGTH L shall be 4' unless otherwise shown on improvement plan. L may be increased or location of manhole shifted to meet pipe ends, at the option of Contractor, except that any change in location of manhole must be approved by the Engineer.
3. SHAFT shall be constructed as per Sec. C-C and Detail N when depth M from street grade to top of box is less than 2'-10½" for paved streets or 3'-6" for unpaved street.
4. DEPTH P may be reduced to an absolute limit of 6 inches when larger values of P would reduce H (in Sec. C-C) to be 3'-6" or less.
5. T shall be 8" for values of H up to and including 8 ft. T shall be 10" for values of H over 8 ft.
6. Steps shall be 3/4" round, galvanized steel and anchored not less than 4 inches in the walls of structures. Unless otherwise shown, steps shall be spaced 16" on center. The lowest step shall be not more than 2 feet above the invert.
7. REINFORCING STEEL shall be No. 4 and 1½" clear from inside face of concrete.
8. STATIONS refer to Plan & Profile sheets. Elevations at ℄ and prolonged invert grade line. See Note 2 for shifting location.
9. RINGS, reducer, and pipe for access shaft shall be seated in cement mortar and neatly pointed or wiped inside shaft.
10. FLOOR of manhole shall be steel-troweled.
11. CONCRETE shall be Class "A".

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
APPROVED BY: [signature]
CHIEF ENGINEER
DATE: April 5, 2004
R.C.E. NO. 35336

MANHOLE NO. 1
STANDARD DRAWING NUMBER MH251
SHEET 2 OF 2

FINAL SUBMITTAL - AUGUST 26, 2010

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DRAWN BY: BCB JLW
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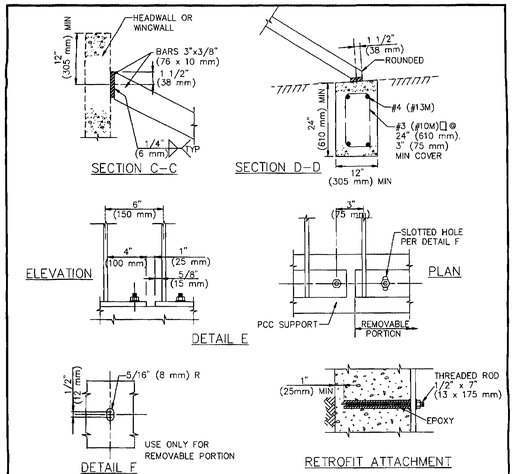
CITY OF BANNING
PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION
APPROVED BY:
KAHONO OEI R.C.E. 52652 EXP 12/31/10 DATE

BANNING BUSINESS PARK STORM DRAIN PLAN
INTERIM FACILITIES FOR ROUGH GRADING

CONSTRUCTION DETAILS

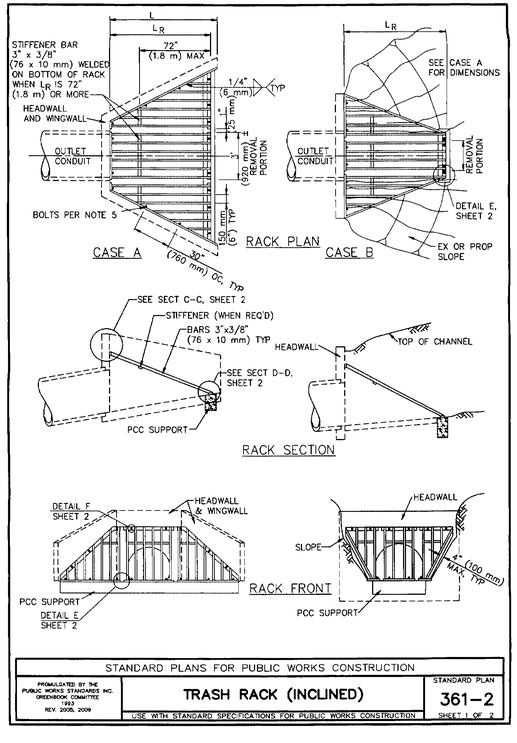
PROJECT NO. 2042473200
DRAWING NO. PRSD0031
SHEET NO. 14 OF 17



NOTES

1. MAXIMUM SIZE OF OUTLET FOR THIS RACK IS 48" (1200 mm) PIPE OR 48" (1.2 m) WIDE RCB. MAXIMUM LENGTH OF RACK L_R IS 10'-0" (3 m).
2. ADJUST L_R SO THAT THE SLOPE OF THE RACK IS APPROXIMATELY 2 HORIZONTAL TO 1 VERTICAL.
3. THE PCC SUPPORT IS NOT NEEDED IF THE INLET STRUCTURE HAS A SUITABLE CUTOFF WALL. THE PCC SUPPORT SHALL NOT REPLACE THE CUTOFF WALL.
4. GALVANIZE RACK AFTER FABRICATION.
5. BOLTS SHALL BE 1/2"x7" (13 x 175 mm). BOLTS FOR REMOVABLE PORTION SHALL BE STAINLESS STEEL. PROVIDE WASHERS AT EACH BOLT.
6. SUBMIT SHOP DRAWINGS PER SSPWC 2-5.3.3. FOR RETROFIT WORK, INCLUDE DETAILS FOR ATTACHMENT TO EXISTING STRUCTURE.

STANDARD PLANS FOR PUBLIC WORKS CONSTRUCTION	STANDARD PLAN
TRASH RACK (INCLINED)	361-2
	SHEET 2 OF 2



STANDARD PLANS FOR PUBLIC WORKS CONSTRUCTION		STANDARD PLAN
PROMULGATED BY THE PUBLIC WORKS STANDARDS INC. GREENBOOK COMMITTEE REV. 2008, 2009	TRASH RACK (INCLINED)	361-2
	USE WITH STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION	SHEET 1 OF 2

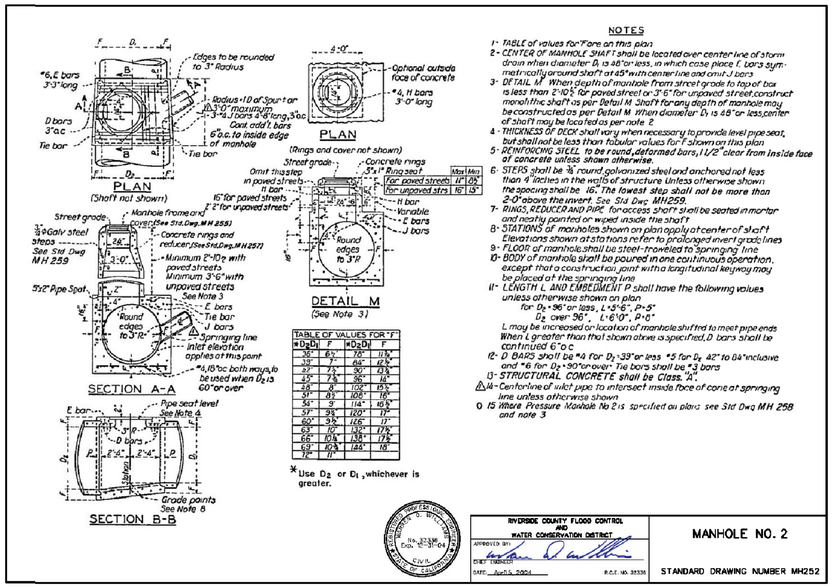


TABLE OF VALUES FOR 'F'			
D_2,D_1	F	D_2,D_1	F
18"	6½"	78"	11¾"
19"	7"	84"	12⅛"
21"	7½"	90"	13⅛"
24"	8"	96"	14"
27"	8½"	102"	15"
30"	9"	108"	15½"
33"	9½"	114"	16½"
36"	10"	120"	17"
39"	10½"	126"	17½"
42"	10¾"	132"	17½"
45"	11"	138"	17½"
48"	11¼"	144"	18"
51"	11½"		
54"	11¾"		
57"	12"		
60"	12¼"		
63"	12½"		
66"	12¾"		
69"	13"		
72"	13⅛"		

* Use D_2 or D_1, whichever is greater.

NOTES

1- TABLE of values for 'F' are on this plan
2- CENTER OF MANHOLE SHAFT shall be located over center line of storm drain when diameter D_1 is 48" or less, in which case place E bars symmetrically around shaft at 45° with center line and omit J bars
3- DETAIL M: When depth of manhole from street grade to top of box is less than 2'-10½" for paved street or 3'-6" for unpaved street, construct monolithic shaft as per Detail M. Shaft for any depth of manhole may be constructed as per Detail M. When diameter D_1 is 48" or less, center of shaft may be located as per note 2
4- THICKNESS OF BOTTOM of shaft may, when necessary to provide level pipe seat, but shall not be less than tabular values for F shown on this plan
5- REINFORCING STEEL to be round, deformed bars, 1 1/2" clear from inside face of concrete unless shown otherwise.
6- STEPS shall be ⅝" round, galvanized steel and anchored not less than 4" inches in the walls of structure. Unless otherwise shown the spacing shall be 16". The lowest step shall not be more than 2'-0" above the invert. See Std. Dwg. MH 259
7- RINGS, REDUCER AND PIPE, for access shaft shall be seated in mortar and neatly pointed or wiped inside the shaft
8- STATIONS of manholes shown on plan apply at center of shaft. Elevations shown at stations refer to prolonged invert grade lines
9- FLOOR of manhole shall be steel-troweled to springing line
10- BODY of manhole shall be poured in one continuous operation, except that a construction joint with a longitudinal keyway may be placed at the springing line
11- LENGTH L AND EMBEDMENT P shall have the following values unless otherwise shown on plan
for D_2 = 96" or less, L=3'-6", P=5"
D_2 over 96", L=6'-0", P=6"
L may be increased or location of manhole shaft may to meet pipe ends. When L greater than that shown above as specified, D bars shall be continued 6" o.c.
12- D BARS shall be #4 for D_2=39" or less, #5 for D_2 42" to 84" inclusive and #6 for D_2=90" or over. Tie bars shall be #3 bars
13- STRUCTURAL CONCRETE shall be Class 'A'.
14- Centerline of inlet pipe to intersect inside face of cone at springing line unless otherwise shown
15 Where Pressure Manhole No 2 is specified on plans see Std Dwg MH 258 and note 3

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT	MANHOLE NO. 2
APPROVED BY: DEPUTY DIRECTOR	STANDARD DRAWING NUMBER MH252
DATE: April 5, 2004 R.C.E. NO. 35336	

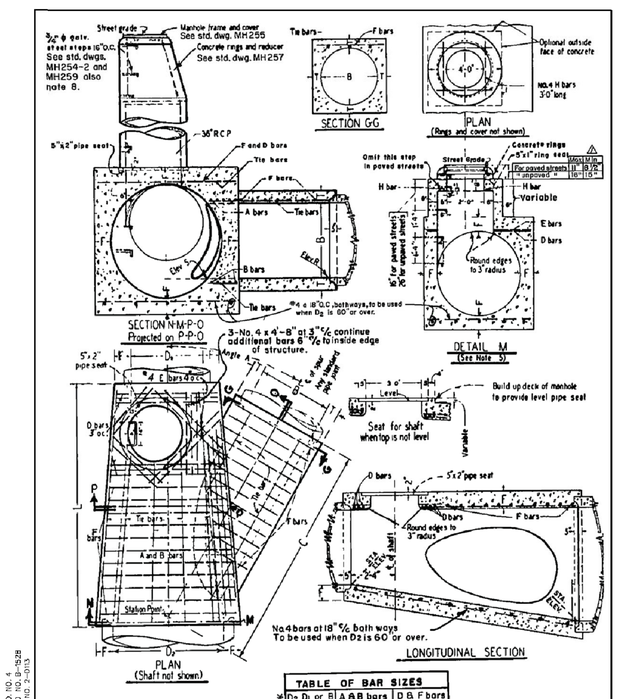


TABLE OF BAR SIZES		
* D_2,D_1 or B	A & B bars	D & F bars
12"-39"	No. 5 at 3"	No. 4 at 6"
42"-84"	No. 6 at 3"	No. 5 at 6"
90"-144"	No. 7 at 3"	No. 6 at 6"

* Use D_2 or D_1, whichever is greater, or B.

CITY OF RIV STD NO. 4
CITY OF L.A. STD NO. B-1528
L.A.C.F.C.D. STD NO. 2-0113

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT	MANHOLE NO. 4
APPROVED BY: DEPUTY DIRECTOR	STANDARD DRAWING NUMBER MH254 SHEET 1 OF 2
DATE: April 5, 2004 R.C.E. NO. 35336	

NOTES

1 - VALUES for A, B, C, D_1, D_2, Elevation R, and Elevation S are shown on the improvement plan
TABLE of values for F and T hereon
2 - LATERALS: If laterals enter on both sides of manhole, access shaft shall be located on side receiving the smaller lateral
3 - CENTER OF MANHOLE SHAFT shall be located over center line of main storm drain when D_1 is 48" or less, in which case place 8 E bars symmetrically around shaft at 45° with center line
4 - LENGTH L may be increased at option of Contractor to meet pipe ends, but any change in location of spur must be approved by the Engineer
5 - DETAIL M: When depth of manhole from street grade to top of box is less than 2'-10½" for paved streets or 3'-6" for unpaved streets, construct monolithic shaft as per Detail M
The Contractor shall have the option of constructing shaft as per Detail M for any depth of manhole
When diameter D_1 is 48" or less, center of shaft shall be located as per Note 3
6 - REINFORCING STEEL shall be round, deformed, straight bars, 1½" clear from inside face unless otherwise shown.
Tie bars shall be No. 4 and spaced 18" on centers or closer.
7 - CONCRETE shall be class A
8 - STEPS shall be ¾" round, galvanized steel and anchored not less than 6 inches in the walls of structure. Unless otherwise shown the spacing shall be 16" on centers. The lowest step shall be not more than 2 feet above the invert
9 - RINGS, REDUCER, AND PIPE for access shaft shall be seated in cement mortar and neatly pointed or wiped inside shaft
10- FLOOR of manhole shall be steel troweled to springing line
11 - BODY of manhole, including spur, shall be poured in one continuous operation, except that the Contractor shall have the option of placing at the springing line a construction joint with longitudinal keyway.

* Use D_2 or D_1, whichever is greater, or B.

** If D_2, D_1 or B falls between tabulated values then use the next highest value to determine F or T.

** TABLE OF VALUES FOR F AND T					
D_2, D_1	F	B	T	B	T
12"	4"	72"	11 3/4"		
15"	4 1/4"	84"	12 1/2"		
18"	4 1/2"	90"	13 1/4"		
21"	5"	96"	14"		
24"	5 1/4"	102"	15 1/2"		
27"	5 1/2"	108"	16"		
30"	6"	114"	16 1/2"		
33"	6 1/4"	120"	17"		
36"	6 1/2"	126"	17"		
39"	7"	132"	17 1/2"		
42"	7 1/2"	138"	17 1/2"		
45"	7 3/4"	144"	18"		
48"	8"				
51"	8 1/2"				
54"	9"				
57"	9 1/4"				
60"	9 1/2"				
63"	10"				
66"	10 1/4"				
69"	10 3/4"				
72"	11"				

NOTE

12- The maximum cover above this structure shall be 25', if the cover exceeds 25' a special structure shall be designed for the cover and detailed on the project drawing.

CITY OF RIV STD NO. 4
CITY OF L.A. STD NO. B-1528

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT	MANHOLE NO. 4
APPROVED BY: DEPUTY DIRECTOR	STANDARD DRAWING NUMBER MH254 SHEET 2 OF 2
DATE: April 5, 2004 R.C.E. NO. 35336	

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PERMANENT BENCHMARK: USGS No. U1311
RECOVERED IN GOOD CONDITION. 3.7 KM (2.30 MI) EAST ALONG A FRONTAGE ROAD ON THE SOUTH SIDE OF INTERSTATE HWY 10 FROM THE INTERSECTION OF SAN GORGONIO AVE. IN BANNING, SOUTHWEST OF THE SOUTHWEST CORNER OF A WEIGH STATION BUILDING, (97.8 FT) NORTH OF THE NORTH RAIL OF THE SOUTHERN PACIFIC RAILROAD, 0.9 M (3.0 FT) WEST OF A POWER POLE. THE MARK IS 0.30 METERS EAST FROM A WITNESS POST. THE MARK IS ABOVE LEVEL, LEVEL WITH THE FRONTAGE ROAD.
NAVD 88 ELEV. 2118.09 FT.

REV	DESCRIPTION	APPR.	DATE
	REVISIONS		

REGISTERED PROFESSIONAL ENGINEER MARK B. MCLELLAN No. 51031 Exp. 9/30/11 CIVIL STATE OF CALIFORNIA

STANTEC CONSULTING INC.
19 TECHNOLOGY DRIVE
IRVINE, CA 92618
949.923.6000
stantec.com

MARK B. MCLELLAN R.C.E. 51031 (EXP. 9/30/11)

DESIGNED BY: MBM
DRAWN BY: BCB JLW
CHECKED BY: PKO

CITY OF BANNING
PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION
APPROVED BY:
KAHONO OEI R.C.E. 52652 EXP 12/31/10 DATE

BANNING BUSINESS PARK
STORM DRAIN PLAN
INTERIM FACILITIES FOR ROUGH GRADING
CONSTRUCTION DETAILS

PROJECT NO. 2042473200
DRAWING NO. PRSD0032
SHEET NO. 15 OF 17

FINAL SUBMITTAL - AUGUST 26, 2010

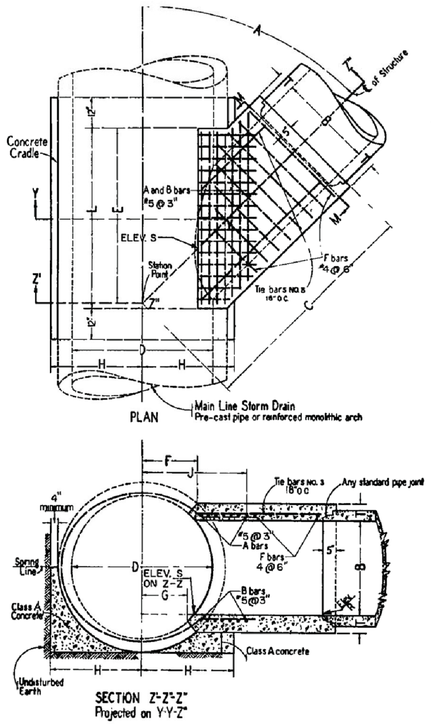


TABLE OF VALUES FOR T	
B	T
12"	4"
15"	4½"
18"	4½"
21"	5"
24"	5½"
27"	5½"
30"	6"
33"	6½"
36"	6½"
39"	7"

CITY OF RIV. STD. NO. 421
L.A.C.F.C.D. STD. NO. Z-0112
L.A.C.F.C.D. STD. NO. Z-0112

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
APPROVED BY: [signature]
CHIEF ENGINEER
DATE: April 5, 2004
R.C.E. NO. 33516

JUNCTION STRUCTURE NO. 2
STANDARD DRAWING NUMBER JS227
SHEET 1 OF 2

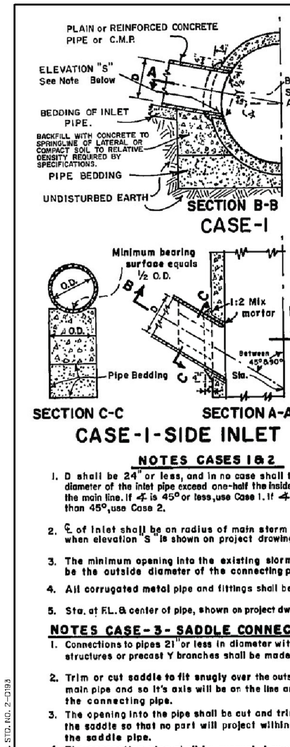
NOTES FOR JUNCTION STRUCTURE NO. 2

1. VALUES for A, B, C, D, E, F, G, L, Elevation R, and Elevation S shown on improvement plan.
2. PIPE shall be cradled in class A concrete extending longitudinally to points 1 ft. beyond the limits of L H=½ outside diameter of pipe + 4" as a minimum. Cradle may be omitted on side opposite lateral inlet when constructed in connection with existing pipe storm drain.
3. A AND B BARS shall be carried to point not less than J distance from center line, $J=\frac{7D}{12}+6"$.
4. RECTANGULAR OPENING in main line pipe shall be cut within these limits normal to pipe surface without damaging steel. Values for F, G, and L on improvement plan.
5. TRANSVERSE REINFORCEMENT in pipe shall be cut in center of opening and bent to uniform distance from top and bottom of junction structure.
6. STRUCTURAL CONCRETE shall be CLASS "A"
7. REINFORCING STEEL shall be round, deformed, straight bars, 1½" clear from inside face of concrete unless otherwise shown.
8. STEEL SCHEDULE as shown.
9. MONOLITHIC ARCH: When Junction Structure No. 2 is specified with reinforced monolithic arch storm drain, value D shall refer to the clear span of the arch. Reinforcing steel shall be cut and bent into junction structure the same as for pipe. Concrete cradle under reinforced monolithic arch is not required.
10. FLOOR of structure shall be steel-troweled to springing line.

CITY OF RIV. STD. NO. 421
L.A.C.F.C.D. STD. NO. Z-0112
CITY OF L.A. STD. NO. B-1529

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
APPROVED BY: [signature]
CHIEF ENGINEER
DATE: April 5, 2004
R.C.E. NO. 33516

JUNCTION STRUCTURE NO. 2
STANDARD DRAWING NUMBER JS227
SHEET 2 OF 2

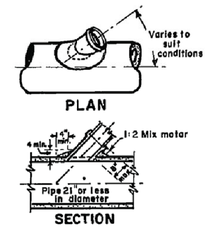


NOTE

ALL CONNECTOR PIPES (within the angles specified for Case 2) shall be encased when laid within the main line excavated trench, or when laid on fill which has not been densified.

NOTES CASES 1 & 2

1. D shall be 24" or less, and in no case shall the outside diameter of the inlet pipe exceed one-half the inside diameter of the main line. If ∠ is 45° or less, use Case 1. If ∠ is greater than 45°, use Case 2.
2. ℄ of inlet shall be on radius of main storm drain except when elevation "S" is shown on project drawing PROFILE.
3. The minimum opening into the existing storm drain shall be the outside diameter of the connecting pipe plus 1 inch.
4. All corrugated metal pipe and fittings shall be galvanized.
5. Sta. at FL. & center of pipe, shown on project dwg. PROFILE



NOTES CASE-3-SADDLE CONNECTION

1. Connections to pipes 21" or less in diameter without junction structures or precast Y branches shall be made with saddles.
2. Trim or cut saddle to fit snugly over the outside of the main pipe and so it's axis will be on the line and grade of the connecting pipe.
3. The opening into the pipe shall be cut and trimmed to fit the saddle so that no part will project within the bore of the saddle pipe.
4. The connecting pipe shall be supported as shown in Case 1 and 2.

L.A.C.F.C.D. STD. NO. Z-0113

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
APPROVED BY: [signature]
CHIEF ENGINEER
DATE: April 5, 2004
R.C.E. NO. 33516

JUNCTION STRUCTURE NO. 4
STANDARD DRAWING NUMBER JS229

FINAL SUBMITTAL - AUGUST 26, 2010

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PERMANENT BENCHMARK: USGS No. U1311
RECOVERED IN GOOD CONDITION. 3.7 KM (2.30 MI) EAST ALONG A FRONTAGE ROAD ON THE SOUTH SIDE OF INTERSTATE HWY 10 FROM THE INTERSECTION OF SAN GORGONIO AVE. IN BANNING, SOUTHWEST OF THE SOUTHWEST CORNER OF A WEIGH STATION BUILDING, (97.8 FT) NORTH OF THE NORTH RAIL OF THE SOUTHERN PACIFIC RAILROAD, 0.9 M (3.0 FT) WEST OF A POWER POLE. THE MARK IS 0.30 METERS EAST FROM A WITNESS POST. THE MARK IS ABOVE LEVEL, LEVEL WITH THE FRONTAGE ROAD.
NAVD 88 ELEV. 2118.09 FT.

REV	DESCRIPTION	APPR.	DATE
	REVISIONS		

REGISTERED PROFESSIONAL ENGINEER MARK B. MCLELLAN No. 51031 Exp. 9/30/11 CIVIL STATE OF CALIFORNIA

Stantec
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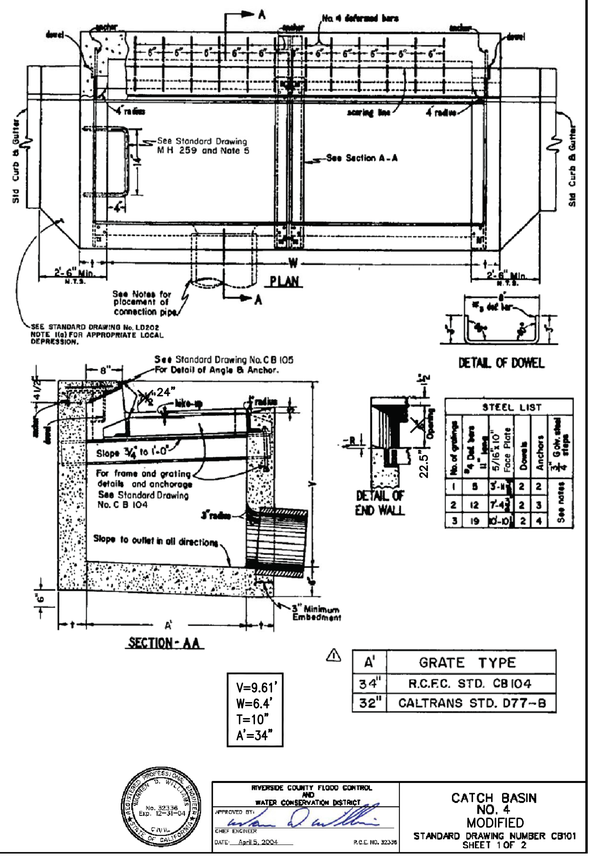
MARK B. MCLELLAN R.C.E. 51031 (EXP. 9/30/11)

DESIGNED BY: MBM
DRAWN BY: BCB JLW
CHECKED BY: PKO

CITY OF BANNING
PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION
APPROVED BY:
KAHONO OEI R.C.E. 52652 EXP 12/31/10 DATE

BANNING BUSINESS PARK
STORM DRAIN PLAN
INTERIM FACILITIES FOR ROUGH GRADING
CONSTRUCTION DETAILS

PROJECT NO. 2042473200
DRAWING NO. PRSD0033
SHEET NO. 16 OF 17



NOTES FOR CATCH BASIN NO. 4

1. Dimensions: Unless otherwise specified.

   V = 3.5 feet.
   T = 6 inches, if V is 4 feet or less.
   T = 8 inches, if V is between 4 feet and 8 feet.
   T = 10 inches, if V is 8 feet or over.
   W = 2 feet, 11-3/8 inches for one grating. Add 3 feet, 5-3/8 inches for each additional grating.
   Hike-up shall be parallel to plane of gutter - slope 3/4 inch to 1 foot.
   Slope of floor parallel with curb shall be 1 in 12.
   S = 1 1/2 inches.
   R = 3/4 inch.

2. Concrete shall be Class "A" Portland Cement Concrete (6.0 Sack).

3. The reinforcing steel shall be Number 4 deformed bars. Clearance shall be 1-1/2 inches from top of slab. See standard drawing CB106 and note 3.

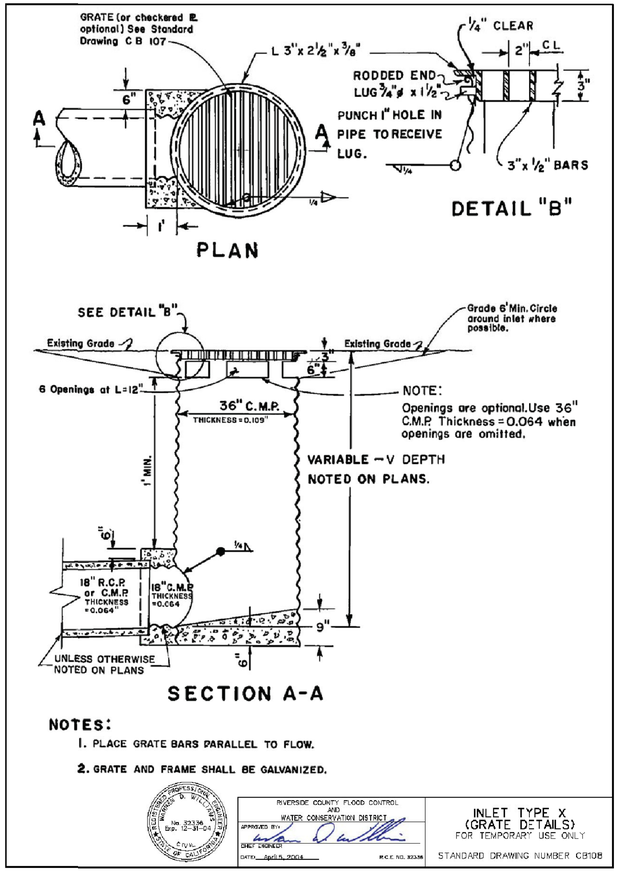
4. The surface of all exposed concrete shall conform to slope, grade, color, finish, and scoring in the existing of proposed curb and walk adjacent to the basin. The basin floor shall be given a tight wood float finish. Curvature of the lip and sidewalls at the gutter opening shall not be made by plastering. The outlet pipe shall be trimmed to final shape and length before the concrete is poured.

5. Steps: 3/4 inch plain round galvanized steel steps are required as follows:

   If V is 4.5 feet or less, no steps are required.
   If V is more than 4.5 feet, and not more than 5.0 feet, install one step 12 inches above floor of basin.
   If V is more than 5.0 feet, install steps 16 inches apart, with the top step 6 inches below the top of grating.
   All steps shall be 4 inches clear from the wall, and anchored not less than 4 inches in wall of basin.

CITY OF RIV. STD. NO. 408
CITY OF L.A. STD. NO. B-1536

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
APPROVED BY
CHIEF ENGINEER
DATE: April 5, 2004
R.C.E. NO. 30336
CATCH BASIN NO. 4 MODIFIED
STANDARD DRAWING NUMBER CB101
SHEET 2 OF 2



NOTES:

1. PLACE GRATE BARS PARALLEL TO FLOW.
2. GRATE AND FRAME SHALL BE GALVANIZED.

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
APPROVED BY
CHIEF ENGINEER
DATE: April 5, 2004
R.C.E. NO. 30336
INLET TYPE X (GRATE DETAILS) FOR TEMPORARY USE ONLY
STANDARD DRAWING NUMBER CB108

PERMANENT BENCHMARK: USGS No. U1311
RECOVERED IN GOOD CONDITION. 3.7 KM (2.30 MI) EAST ALONG A FRONTAGE ROAD ON THE SOUTH SIDE OF INTERSTATE HWY 10 FROM THE INTERSECTION OF SAN GORGONIO AVE. IN BANNING, SOUTHWEST OF THE SOUTHWEST CORNER OF A WEIGH STATION BUILDING, (97.8 FT) NORTH OF THE NORTH RAIL OF THE SOUTHERN PACIFIC RAILROAD, 0.9 M (3.0 FT) WEST OF A POWER POLE. THE MARK IS 0.30 METERS EAST FROM A WITNESS POST. THE MARK IS ABOVE LEVEL, LEVEL WITH THE FRONTAGE ROAD.
NAVD 88 ELEV. 2118.09 FT.

REV	DESCRIPTION	APPR.	DATE
	REVISIONS		

REGISTERED PROFESSIONAL ENGINEER MARK B. MCLELLAN No. 51031 Exp. 9/30/11 CIVIL STATE OF CALIFORNIA

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MARK B. MCLELLAN R.C.E. 51031 (EXP. 9/30/11)

DESIGNED BY: MBM
DRAWN BY: BCB JLW
CHECKED BY: PKO

CITY OF BANNING
PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION
APPROVED BY:
KAHONO OEI R.C.E. 52652 EXP 12/31/10 DATE

BANNING BUSINESS PARK STORM DRAIN PLAN
INTERIM FACILITIES FOR ROUGH GRADING

CONSTRUCTION DETAILS

PROJECT NO. 2042473200
DRAWING NO. PRSD0034
SHEET NO. 17 OF 17

FINAL SUBMITTAL - AUGUST 26, 2010