Preliminary Drainage Report

for

Menifee Riverwalk Townhomes

APN # 338-150-029 and 338-150-031

April 30, 2021
Updated 5-16-21
Updated 7-5-21

Prepared by:

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DESCRIPTION PAGE

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1. PURPOSE AND SCOPE

The Menifee Riverwalk Townhomes Project (consisting of APNs 338-150-029 and 338-150-031) is a proposed residential development located in the City of Menifee. The project proposes to construct 201 residential lots, a bioretention basin, a modular wetlands units and utility infrastructure. The purpose of this study is to determine the preliminary storm drain infrastructure and water quality Best Management Practices required for the project.

The scope of the study includes the following:

1. Determination of points of flow concentration and watershed subareas for the onsite and offsite Bradley Road fronting the project site.
2. Determination 100-year and 10-year peak flow rates based upon the post-project condition utilizing the Rational Method as outlined in the Riverside County Hydrology Manual.
3. Determine the required storm drain infrastructure to convey storm flows to the bioretention basin to Bradley Road Channel.
4. Determine the required water quality volume and flow rate to be treated within the bioretention basin.
5. Preparation of a hydrology report, which consists of hydrological and analytical results and exhibits.

2. PROJECT SITE AND DRAINAGE AREA

The Menifee Residential Project (consisting of APNs 338-150-029 and 338-150-031) is a proposed residential development located in the City of Menifee. The project proposes to construct 201 residential lots, a bioretention basin, a modular wetlands units and utility infrastructure. The project site will construct a storm drain system onsite that will discharge flows to and from the bioretention basin into the Bradley Road Channel, and a storm drain system within the Bradley Road right-of-way that will discharge flows from the proposed modular wetlands units directly into Salt Creek Channel. The proposed storm drain system and modular wetlands is as proposed on the approved Bradley Road Bridge Plans. The project site is approximately 14.4 acres, and is roughly bounded by Bradley Road to the east, Lazy Creek Road (and the Church of Jesus Christ of Latter-day Saints) to the south, Bradley Road Channel to the west, and Salt Creek Channel to the north.

The project site is currently undeveloped land. Flows within the project boundary flow from the south east to the north westerly portion of the project site. The project site is tributary to Salt Creek Channel based upon the existing terrain and low point adjacent to Salt Creek Channel, however, the project site will connect directly to the Bradley Road Channel approximately 50 feet upstream of the Salt Creek Channel right-

of-way for the following reasons:

- The Bradley Road Channel is a concrete lined channel, and Salt Creek Channel is an earthen channel that would require environmental permitting in order to connect directly to the channel
- The 100-year flow rate generated by the onsite area is 32 ft3/s (see hydrology section for discussion on hydrology calculations), and the design flow rate for the Bradley Road Channel (per the Bradley Road Channel Improvement Plans included in Excerpt B) is 906 ft3/s. The 32 ft3/s is only 3.6% of the total flow rate, and would have negligible impacts to the channel design.
- The Bradley Road Channel is a 6 foot high trapezoidal channel, and based upon the normal depth calculations for the channel (included in the hydraulics section of the report), the 100-year depth is 3.82 feet. A normal depth calculation was performed for 938 ft3/s (906 ft3/s + 32 ft3/s), resulting in a normal depth of 3.90 feet. The impact of the 100 year peak flow is only an increase 0.08 feet, still leaving over 2 feet of freeboard within the channel.

Based upon the above summarized factors, connecting directly to the Bradley Road Channel would not impact the existing channel.

3. HYDROLOGY

The Riverside County Hydrology Manual (Reference 1), was used to develop the hydrological parameters for the hydrology analyses. The rational method calculations were performed using a spreadsheet following the tables provided in the manual and CivilD software.

The existing soil classification for the area consists of Hydrologic Soil Group “D, as shown in Exhibit C. Exhibit C is a Soils Map obtained from the United States Department of Agriculture Natural Resources Conservation Service WebSoil Survey. An Antecedent Moisture Condition (AMC) II was utilized for the 10-year and 100-year storm event.

The rainfall values were obtained from the Riverside County Hydrology Manual’s Isohyetal Maps, which indicate a 2-year, 1-hour rainfall value of 0.50 inches, a 100-year, 1-hour rainfall value of 1.30 inches, and a slope of intensity duration curve of 0.53. The rainfall maps and the Slope of Intensity Duration Curves have been included as Exhibit D.

The hydrology calculations utilized apartment land use for the onsite area, with the exception of the basin area which utilized vegetated basin bottom with good cover. Utilizing apartment land use (with an 80% impervious percentage) is considered conservative for this development since it is a detached residential development, however, the development has approximately 14 du/ac. Per the County of Riverside Transportation

Department, High Density Residential has 8 – 14 DU/AC, and Very High Density Residential has 14-20 DU/AC, so the project site falls within the border of these two land uses. Multi-family dwellings, including apartments, fall within 20+ DU/AC (Highest Density Residential), therefore using apartment land use for the hydrology calculations results in conservative flow rates for the project site. The street area was analyzed as commercial land use.

The onsite area consists of Area A. Runoff is conveyed in the streets to the storm drain system, which is then conveyed to the bioretention basin to a sump pump then into a basin forebay where the flows are spread and filtrated through the proposed bio-retention basin. The offsite street area consisted of Area B, and is two subareas, offsite and along the developed easterly edge of the project.

Rational Method calculations were performed for the 10-year and 100-year storm events. The 100-year flow rates were utilized for the storm drain sizing using open channel hydraulics methods such that the water surface elevation never exceeds the top of pipe elevation.

The rational method hydrology calculations have been included in Appendix A, and the rational method hydrology map has been included as Figure 1 and a pipe sizing map is included as Figure 2.

4. HYDRAULICS

The project site will utilize the interior streets to convey the flows emanating from the onsite area to a storm drain network system and to the bioretention basin. Prior to entering the bioretention system, the storm drain main lines will junction into a proposed 8 foot diameter concrete vault which houses two sump pumps with 8" diameter pressure piping proposed. The primary pump shall turn on when the ponding depth reaches 36 inches and turn off once the vault is fully drained. The secondary pump will only turn on if the primary pump fails and the depth reaches 48 inches. The system is also designed such that any water surface elevation above the Q100/Vbmp maximum ponding depth at elevation 1416.8 feet shall be conveyed hydraulicly by gravity flow in the event both pumps were to fail or during a temporary power outage. The system is also designed such that in the event of total system failure, no water surface elevations shall exceed any top of grate elevations.

Based upon the street capacity analyses, 4" rolled curbs are the minimum allowable curb heights needed to convey the flows, and no portion of the streets in tract can have a longitudinal slope of less than 0.4%. All streets were designed with 0.5% minimum slopes along concrete valley at the c/l of the interior street and drive aisles.

In order to design the the storm drain, a water surface elevation within the Bradley Road Channel had to be determined. A normal depth calculation was performed for the Bradley Road Channel for the reach of channel in which the project site will connect to. The flow rate used for this section was the design flow rate of 906 ft3/s obtained from the Bradley Road Channel improvement plans plus the onsite 100-year flow rate of 32 ft3/s, resulting in a total flow rate of 938 ft3/s. This is considered conservative since the timing of both flow rates was not considered and the flow rates were added directly. Using this flow rate, the normal depth within the channel is 3.9 feet, which results in a 100-year water surface elevation of 1415. The project site will connect to the channel where the invert is approximately 1411.10. Using this downstream water surface elevation, hydraulic calculations show 24" concrete outlet pipe is sufficient with the slopes proposed to convey the 100-year storm flows.

The catch basin outlet structure of the bioretention basin will incorporate a 6-inch diameter perforated drain network and an overflow grate inlet that will be elevated such that the ponding depth does not exceed 6" in the basin. An emergency overflow catch basin with grate inlet is proposed in the event the primary system fails one foot above the primary. The catch basins proposed are 3'x5' brooks precast or equal.

The storm drain system located within the Bradley Road right-of-way discharges directly into the Salt Creek Channel and that system was designed for the 100-year storm ultimate conditions in Bradley Road. No changes are proposed other than minor adjustments for the proposed private road that junctions with Bradley Road and Aligns with Rio Vista Drive.

5. WATER QUALITY

The required water quality volume to be treated was determined using the Santa Ana BMP Design Volume

Spreadsheet. The rainfall depth utilized was 0.60 inches, and was obtained from the Isohyetal Map for the 85th Percentile 24-hour Storm Event (included in Appendix 6).

During the preliminary stages, impervious percentages were measured and calculated for DMA's A and B. DMA A is the onsite residential area, which consists of a total of 201 lots on 13.98 acres, which is consistent with high density residential. An impervious percentage of 78% was calculated for the onsite area, and the remaining 22% is pervious area. The offsite street area (DMA B) was analyzed as 86% and 65% impervious for each sub area.

Bioretention Basin A consists of 3 feet of surface depth, 2 feet of soil media, and a gravel bedding layer that will incorporate the underdrain system. The water quality volume ponds within the first 0.5 feet above the soil media, and the remaining 1 foot of depth will be utilized to convey flows greater than the water quality volume out to the Bradley Road Channel.

In order to determine the minimum elevations for the bioretention basin, normal depth calculations were performed for the 2-year flow rate and the 100-year flow rate. The 100-year flow rate of 906 ft3/s was obtained from the Bradley Road Channel Improvement plans (Dwg. No. 4-550, included in Appendix 2), and the 2-year flow rate of 349 ft3/s was obtained from multiplying the 100-year flow rate by the ratio of the 2-year rainfall value of 0.50 divided by the 100-year rainfall value of 1.30, resulting in a ratio of 0.385. Multiplying 906 ft3/s by 0.385 results in 349 ft3/s. Based upon the normal depth calculations, the ponded depths are 2.23 feet and 3.82 feet for the 2-year and 100-year flow rates, respectively. This results in water surface elevations within the channel at the connection point with the bioretention basin outlet pipe of approximately 1413.3 and 1415.0 (when added to the invert of 1411.1 and rounded up to the nearest tenth place), respectively. Therefore the finished surface of the soil media has been located at elevation 1416.3 (which is higher than the 2-year water surface elevation) and the 100-year flows will begin to exit from the bioretention basin at elevation 1416.8, which is higher than the channel water surface elevation and the upstream water surface elevation within the outlet structure. The required water quality volume to be stored within bioretention basin A is 21,998 cu. ft., and the volume provided up to 0.5 feet of depth above the soil media (including the storage within the soil media and the gravel) is 22,292 cu. ft., which is sufficient volume to treat for water quality.

The modular wetlands will be located within the Bradley Road right-of-way as currently proposed on the Bradley Bridge Improvement Plans. The improvement plans account for offsite improvements for the bridge project in the ultimate condition. The modular wetlands will be constructed (Model No. MWS-L-4-21), which has a treatment capacity of 5,853 cu.ft for a 24-hour drawdown time. The required water quality volume to be treated is 3,069 cu. ft., therefore this is sufficient to treat the easterly Bradley Road roadway as proposed on the bridge improvement plans. The modular wetlands will then discharge directly into Salt Creek.

The water quality calculations and spreadsheets have been included in

Appendix 6.

6. CONCLUSION

The hydrology and hydraulic analyses evaluated the proposed development to determine the necessary drainage improvements required to convey the peak 100-year flow rates and to treat for water quality purposes. It has been concluded that:

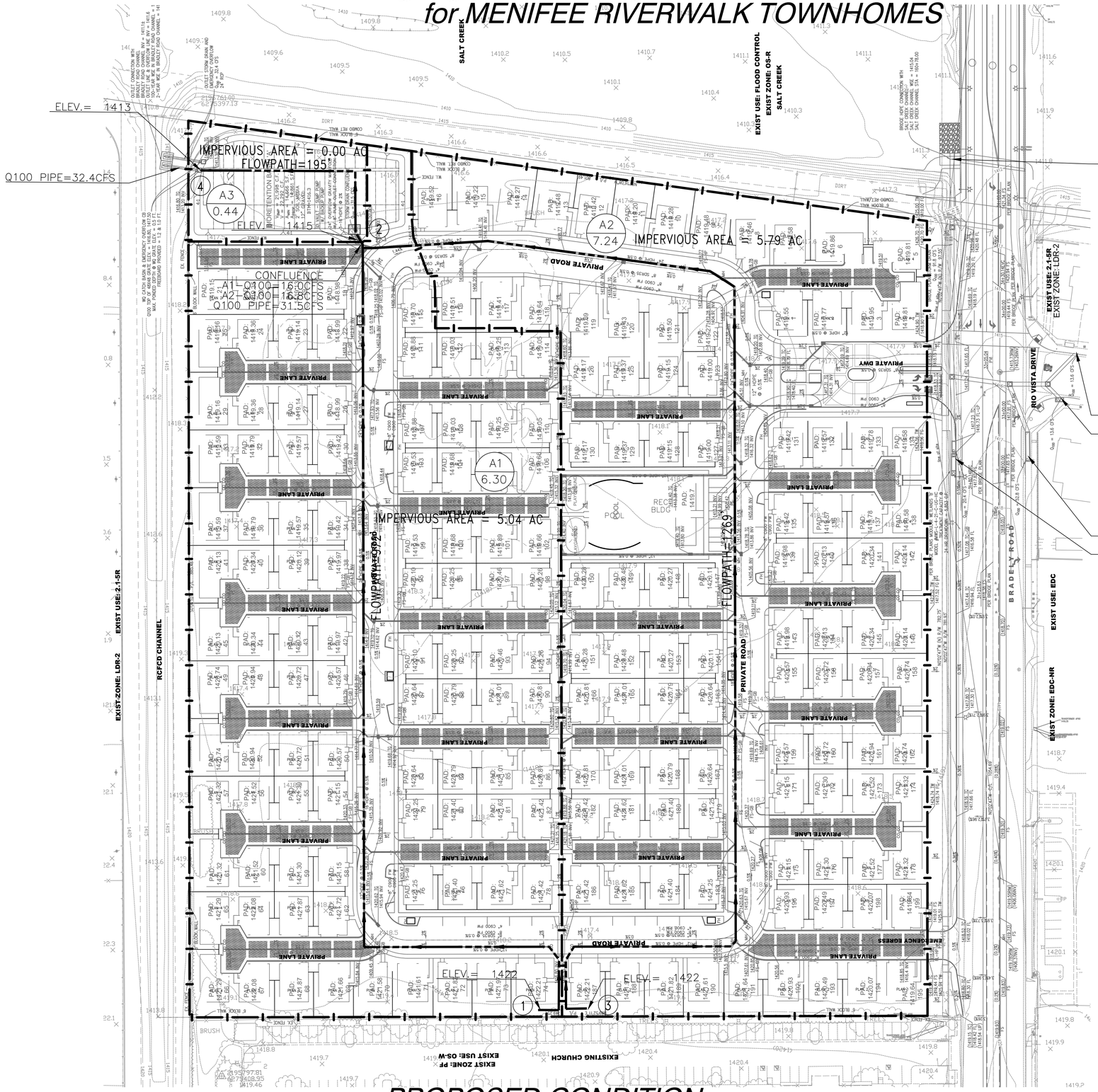
1. The proposed bioretention basin, as proposed herein and in the Water Quality Management Plan, will adequately treat the require water quality volume. Elevations provided herein are required in order to ensure that the bioretention basin will function from a water quality perspective. Minimum surface area provided herein is the minimum required.
2. The proposed streets within the onsite area, provided that the dimensions and minimum longitudinal slope of 0.4%+ are provided, can adequately convey the 100-year flow rate emanating from the project site. The project proposes minimum street slopes of 0.5%.
3. The proposed storm drain systems can adequately convey the post-project 100-yearflow rates. The minimum criteria required for these systems, and the controlling parameters, have been provided herein. Full analysis of the storm drain system will be provided in final engineering stage. Preliminary open channel hydraulics calcs and pressure calcs show the system is designed with adequate capacity to convey all 100 year peak flowrates.
4. Since the project site is discharging into a system that has been designed for the peak flow rates for this site as a developed site, the project will not require mitigation for increased runoff. Additionally, since all conveyances are to Salt Creek Channel (approximately 40 feet of the Bradley Road Channel) are engineered, hardened and maintained, AND Salt Creek Channel is an engineered and maintained facility to Canyon Lake and Lake Elsinore, which is a sump, the project site is exempt from hydromodifications. Based upon processing previous WQMPs within the area, the project site will be exempt from hydromodification.

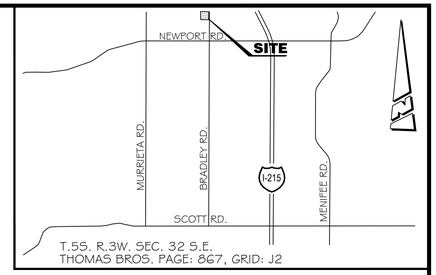
MENIFEE RIVERWALK TOWNHOMES

VICINITY MAP

Figure 1

PROPOSED RATIONAL HYDROLOGY MAP
for MENIFEE RIVERWALK TOWNHOMES





VICINITY MAP

NOT TO SCALE

SITE ADDRESS:

NORTHEAST CORNER OF BRADLEY ROAD AND LAZY CREEK ROAD, MENIFEE, CA 92584

ASSESSOR'S PARCEL NO.:

338-150-029 AND 338-150-031

FLOOD ZONE DESIGNATION:

THIS PROPERTY IS IN FLOODWAY AREA ZONE X AND AE, AS IS SHOWN ON FLOOD INSURANCE RATE MAPS FOR THE COUNTY OF RIVERSIDE, CALIFORNIA, SHOWN ON COMMUNITY PANEL NUMBER 06065C2055H.

ON-SITE BASIN AREA:

13.98 ACRES

PROPOSED RATIONAL HYDROLOGY DATA		
AREA ID	10 YEAR Q	100 YEAR Q
A	21.6 CFS	32.4 CFS

LEGEND

- PROP. BLDG PERIMETER
- BOUNDARY LINE
- RIGHT OF WAY
- CENTERLINE
- FLOW LINE
- FENCE LINE
- DRAINAGE MANAGEMENT AREA
- (XXX) EX. CONTOUR
- [XXX] PROP. CONTOUR
- EX. PALM TREE
- EX. TREE
- EX. FIRE HYDRANT
- EX. BUILDING
- P.C.C. CONCRETE SURFACE
- SUBAREA BOUNDARY
- FLOWLINE
- BIORETENTION AREA
- REMOVE A.C. PAVEMENT
- RIPRAP
- TURF BLOCK POROUS PAVEMENT
- TOP / TOE PROPOSED SLOPE EMBANKMENT
- LANDSCAPING
- A.C. PAVEMENT
- PAINT HANDICAP/CROSSWALK
- PAINT DIRECTION ARROW
- PAINT PARKING STALL
- X1 / XX.X INDICATES SUBAREA DESIGNATION INDICATES AREA IN ACRES
- INDICATES DIRECTION OF STORMWATER RUNNOFF
- XX NODE POINTS

REGISTERED PROFESSIONAL ENGINEER
JOHN H. JOHNSON
No. 83934
Exp. 9/30/21
CIVIL
STATE OF CALIFORNIA

JOHN H. JOHNSON R.C.E. 83934 DATE
MY REGISTRATION EXPIRES ON 09/30/2021

KOLIBRIEN
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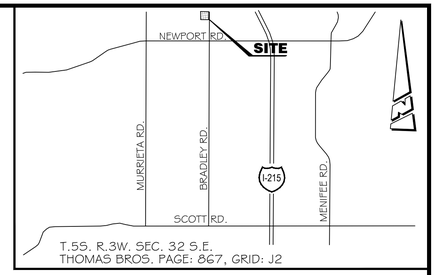
SHEET 1 OF 1

File: L02001

PROPOSED CONDITION

Figure 2

PROPOSED RATIONAL HYDROLOGY MAP - SUBAREA PROPORTION FLOWS
for MENIFEE RIVERWALK TOWNHOMES



VICINITY MAP

NOT TO SCALE

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- PROP. BLDG PERIMETER
- BOUNDARY LINE
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SHEET 1 OF 1

File: L02001

PROPOSED CONDITION

RATIONAL CALCULATIONS

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               Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
        Rational Hydrology Study        Date: 07/05/21  File:riverwalk00.out
------------------------------------------------------------------------
POST CONSTRUCTION ONSITE 10 YEAR ANALYSIS



------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

 English (in-lb) Units used in input data file

------------------------------------------------------------------------


Program License Serial Number 6387

------------------------------------------------------------------------
Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) =   10.00 Antecedent Moisture Condition = 2

Standard intensity-duration curves data (Plate D-4.1)
For the [ Sun City ] area used.
10 year storm 10 minute intensity =  2.250(In/Hr)
10 year storm 60 minute intensity =  0.870(In/Hr)
100 year storm 10 minute intensity =  3.360(In/Hr)
100 year storm 60 minute intensity =  1.300(In/Hr)

Storm event year =  10.0
Calculated rainfall intensity data:
1 hour intensity =  0.870(In/Hr)
Slope of intensity duration curve = 0.5300




++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.000 to Point/Station        2.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   972.000(Ft.)
Top (of initial area) elevation =  1422.000(Ft.)
Bottom (of initial area) elevation =  1415.140(Ft.)
Difference in elevation =     6.860(Ft.)
Slope =    0.00706  s(percent)=       0.71
TC = k(0.323)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   13.631 min.
Rainfall intensity =      1.908(In/Hr) for a    10.0 year storm
APARTMENT subarea type
Runoff Coefficient = 0.866
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.200; Impervious fraction =  0.800
Initial subarea runoff =     10.411(CFS)
Total initial stream area =        6.300(Ac.)
Pervious area fraction = 0.200


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.000 to Point/Station        2.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      6.300(Ac.)
```

```
Runoff from this stream =     10.411(CFS)
Time of concentration =   13.63 min.
Rainfall intensity =     1.908(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        3.000 to Point/Station        2.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =  1269.000(Ft.)
Top (of initial area) elevation =  1422.000(Ft.)
Bottom (of initial area) elevation =  1415.140(Ft.)
Difference in elevation =     6.860(Ft.)
Slope =    0.00541  s(percent)=       0.54
TC = k(0.323)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   15.996 min.
Rainfall intensity =      1.753(In/Hr) for a    10.0 year storm
APARTMENT subarea type
Runoff Coefficient = 0.864
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  75.00
Pervious area fraction =  0.200; Impervious fraction =  0.800
Initial subarea runoff =     10.961(CFS)
Total initial stream area =        7.240(Ac.)
Pervious area fraction = 0.200


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        3.000 to Point/Station        2.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      7.240(Ac.)
Runoff from this stream =     10.961(CFS)
Time of concentration =   16.00 min.
Rainfall intensity =     1.753(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1       10.411     13.63                1.908
2       10.961     16.00                1.753
Largest stream flow has longer time of concentration
Qp =     10.961 + sum of
          Qb         Ia/Ib
          10.411 *    0.919 =      9.565
Qp =     20.526

Total of 2 streams to confluence:
Flow rates before confluence point:
      10.411      10.961
Area of streams before confluence:
        6.300        7.240
Results of confluence:
Total flow rate =     20.526(CFS)
Time of concentration =    15.996 min.
Effective stream area after confluence =     13.540(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        2.000 to Point/Station        4.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
Estimated mean flow rate at midpoint of channel =     20.810(CFS)
Depth of flow =   0.694(Ft.), Average velocity =   0.478(Ft/s)
       ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
```

```
        1              0.00              2.50
        2             10.00              0.00
        3             70.00              0.00
        4             80.00              2.50
Manning's 'N' friction factor =   0.300
-----------------------------------------------------------------
Sub-Channel flow  =     20.810(CFS)
  '     '        flow top width =     65.551(Ft.)
  '     '    velocity=    0.478(Ft/s)
  '     '        area =     43.555(Sq.Ft)
  '     '        Froude number =     0.103

Upstream point elevation =  1415.140(Ft.)
Downstream point elevation =  1412.000(Ft.)
Flow length =   195.000(Ft.)
Travel time  =    6.80 min.
Time of concentration =   22.80 min.
Depth of flow =   0.694(Ft.)
Average velocity =   0.478(Ft/s)
Total irregular channel flow =    20.810(CFS)
Irregular channel normal depth above invert elev. =   0.694(Ft.)
Average velocity of channel(s) =   0.478(Ft/s)
 Adding area flow to channel
UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.732
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2)  =  80.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.453(In/Hr) for a    10.0 year storm
Subarea runoff =      0.468(CFS) for      0.440(Ac.)
Total runoff =     20.994(CFS)  Total area =      13.980(Ac.)
Depth of flow =   0.697(Ft.), Average velocity =   0.479(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        4.000 to Point/Station        5.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1413.200(Ft.)
Downstream point/station elevation =  1411.100(Ft.)
Pipe length  =    31.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    20.994(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =    20.994(CFS)
Normal flow depth in pipe =   11.82(In.)
Flow top width inside pipe =   17.09(In.)
Critical depth could not be calculated.
Pipe flow velocity =     17.06(Ft/s)
Travel time through pipe =    0.03 min.
Time of concentration (TC) =    22.83 min.
End of computations, total study area =           13.98 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.225
Area averaged RI index number =  75.2
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               Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
        Rational Hydrology Study        Date: 07/05/21  File:riverwalk0.out
------------------------------------------------------------------------
Q100 POST CONSTRUCTION ANALYSIS



------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

 English (in-lb) Units used in input data file

------------------------------------------------------------------------


Program License Serial Number 6387

------------------------------------------------------------------------
Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) =  100.00 Antecedent Moisture Condition = 3

Standard intensity-duration curves data (Plate D-4.1)
For the [ Sun City ] area used.
10 year storm 10 minute intensity =  2.250(In/Hr)
10 year storm 60 minute intensity =  0.870(In/Hr)
100 year storm 10 minute intensity =  3.360(In/Hr)
100 year storm 60 minute intensity =  1.300(In/Hr)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity =  1.300(In/Hr)
Slope of intensity duration curve = 0.5300




++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.000 to Point/Station        2.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   972.000(Ft.)
Top (of initial area) elevation =  1422.000(Ft.)
Bottom (of initial area) elevation =  1415.140(Ft.)
Difference in elevation =     6.860(Ft.)
Slope =    0.00706  s(percent)=       0.71
TC = k(0.323)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   13.631 min.
Rainfall intensity =      2.851(In/Hr) for a   100.0 year storm
APARTMENT subarea type
Runoff Coefficient = 0.889
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3)  =  88.00
Pervious area fraction =  0.200; Impervious fraction =  0.800
Initial subarea runoff =     15.974(CFS)
Total initial stream area =        6.300(Ac.)
Pervious area fraction = 0.200


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.000 to Point/Station        2.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      6.300(Ac.)
```

```
Runoff from this stream =     15.974(CFS)
Time of concentration =   13.63 min.
Rainfall intensity =     2.851(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        3.000 to Point/Station        2.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =  1269.000(Ft.)
Top (of initial area) elevation =  1422.000(Ft.)
Bottom (of initial area) elevation =  1415.140(Ft.)
Difference in elevation =     6.860(Ft.)
Slope =    0.00541  s(percent)=       0.54
TC = k(0.323)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   15.996 min.
Rainfall intensity =      2.620(In/Hr) for a   100.0 year storm
APARTMENT subarea type
Runoff Coefficient = 0.888
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3)  =  88.00
Pervious area fraction =  0.200; Impervious fraction =  0.800
Initial subarea runoff =     16.848(CFS)
Total initial stream area =        7.240(Ac.)
Pervious area fraction = 0.200


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        3.000 to Point/Station        2.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      7.240(Ac.)
Runoff from this stream =     16.848(CFS)
Time of concentration =   16.00 min.
Rainfall intensity =     2.620(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1       15.974     13.63                2.851
2       16.848     16.00                2.620
Largest stream flow has longer time of concentration
Qp =     16.848 + sum of
          Qb         Ia/Ib
          15.974 *    0.919 =     14.675
Qp =     31.523

Total of 2 streams to confluence:
Flow rates before confluence point:
      15.974      16.848
Area of streams before confluence:
        6.300        7.240
Results of confluence:
Total flow rate =     31.523(CFS)
Time of concentration =    15.996 min.
Effective stream area after confluence =     13.540(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        2.000 to Point/Station        4.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
______________________________________________________________________________
Estimated mean flow rate at midpoint of channel =     31.987(CFS)
Depth of flow =   0.896(Ft.), Average velocity =   0.562(Ft/s)
       ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
```

```
        1              0.00              2.50
        2             10.00              0.00
        3             70.00              0.00
        4             80.00              2.50
Manning's 'N' friction factor =   0.300
-----------------------------------------------------------------
Sub-Channel flow  =     31.987(CFS)
  '     '        flow top width =     67.164(Ft.)
  '     '    velocity=    0.562(Ft/s)
  '     '        area =     56.938(Sq.Ft)
  '     '        Froude number =     0.108

Upstream point elevation =  1415.140(Ft.)
Downstream point elevation =  1412.000(Ft.)
Flow length =   195.000(Ft.)
Travel time  =    5.79 min.
Time of concentration =   21.78 min.
Depth of flow =   0.896(Ft.)
Average velocity =   0.562(Ft/s)
Total irregular channel flow =    31.987(CFS)
Irregular channel normal depth above invert elev. =   0.896(Ft.)
Average velocity of channel(s) =   0.562(Ft/s)
 Adding area flow to channel
UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.850
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 3)  =  91.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.224(In/Hr) for a   100.0 year storm
Subarea runoff =      0.831(CFS) for      0.440(Ac.)
Total runoff =     32.354(CFS)  Total area =      13.980(Ac.)
Depth of flow =   0.902(Ft.), Average velocity =   0.564(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        4.000 to Point/Station        5.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
_________________________________________________________________________
Upstream point/station elevation =  1413.200(Ft.)
Downstream point/station elevation =  1411.100(Ft.)
Pipe length  =    31.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    32.354(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =    32.354(CFS)
Normal flow depth in pipe =   14.02(In.)
Flow top width inside pipe =   19.79(In.)
Critical depth could not be calculated.
Pipe flow velocity =     18.98(Ft/s)
Travel time through pipe =    0.03 min.
Time of concentration (TC) =    21.81 min.
End of computations, total study area =           13.98 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.225
Area averaged RI index number =  75.2
```

Appendix B

```
  ************************************************************************
                ****** PIPE FLOW CALCULATIONS ******
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  ************************************************************************

************************************************************************
For: For Licensed CivilDesign User
************************************************************************
             **** PRESSURE FLOW CALCULATIONS ****

  CALCULATE PIPE SIZE GIVEN:
  Channel Slope =    -.065031 (Ft./Ft.) =    -6.5031 %
  Invert elevation at pipe INLET =     1412.000 (Ft.)
  Invert elevation at pipe OUTLET =     1411.100 (Ft.)
  Length of pipe =       13.840 (Ft.)
  Given Flow Rate =    34.51 Cubic Feet/Second
  Not including elevation change, the
  Pressure difference (Outlet - Inlet) =    3.900 Feet of H2O



        *** PIPE PRESSURE FLOW ***


  Mannings "n" =  .013
  Minor friction loss "K" factor =     2.10
  PIPEFLOW RESULTS:
  No. of pipes =   1   Length of pipe(s) =      13.84 (Ft.)
  Velocity =    10.38     (Ft/S)
  Given pressure difference (Outlet - Inlet) =        3.900 (Ft.H2O)
    "     "          "         "          "   =           1.691 (PSI)
  Calculated pipe size =       25.000(In.)

  Elevation change inlet to outlet =        -.900 (Ft.)
  TOTAL pressure required at pipe inlet =    3.000     (Ft H2O)
      "     "         "     "    "    " =    1.301    (PSI)
  Head loss due to pipe friction =    .3891     (Ft H2O)
   "    "    "   "   "     "     =    .1687     (PSI)
  Head loss due to minor factors    3.511     (Ft H2O)
    "   "    "   "   "     "        1.522     (PSI)
  Combined pipe losses =    3.900     (Ft H2O)
     "      "       "   =    1.691     (PSI)
  Individual pipe flow =    34.51     (CFS)
       "      "     "  =    .1549E+05 (GPM)
       "      "     "  =    22.30     (MGD)
```

```
  CIVILCADD/CIVILDESIGN  Engineering Software, (c) 2004 - 2014  Version 9.0
------------------------------------------------------------------------
24 FEET WIDE PRIVATE STREET CAPACITY
A CURB WITH VALLEY GUTTER IN CENTER OF DRIVE AISLE


------------------------------------------------------------------------


Program License Serial Number 6387

------------------------------------------------------------------------
                *** Irregular Channel Analysis ***

        Upstream (headworks) Elevation =      0.500(Ft.)
        Downstream (outlet) Elevation =      0.000(Ft.)
        Runoff/Flow Distance =    100.000(Ft.)
        Maximum flow rate in channel(s) =     18.500(CFS)
------------------------------------------------------------------------


Depth of flow =   0.486(Ft.)
Average velocity =   2.122(Ft/s)
Total flow rate in 1/2 street =  18.500(CFS)
        ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
        1              0.00              0.74
        2              0.10              0.24
        3             12.00              0.00
        4             23.90              0.24
        5             24.00              0.74
Manning's 'N' friction factor =   0.025
------------------------------------------------------------------
Sub-Channel flow  =     18.500(CFS)
  '     '        flow top width =     23.898(Ft.)
  '     '    wetted perimeter =     24.306(Ft.)
  '     '        velocity=    2.122(Ft/s)
  '     '        area =      8.719(Sq.Ft)
  '     '        Froude number =     0.619

Upstream point elevation =    0.500(Ft.)
Downstream point elevation =    0.000(Ft.)
Flow length =   100.000(Ft.)
Depth of flow =   0.486(Ft.)
Average velocity =   2.122(Ft/s)
Total irregular channel flow =    18.500(CFS)
Irregular channel normal depth above invert elev. =   0.486(Ft.)
Average velocity of channel(s) =   2.122(Ft/s)
------------------------------------------------------------------

Sub-Channel No. 1 Critical depth =      0.387(Ft.)
  '     '       '     Critical flow top width =     23.859(Ft.)
  '     '       '     Critical flow velocity=    2.912(Ft/s)
  '     '       '     Critical flow area =      6.352(Sq.Ft)

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------------------------------------------------------------------------
DRIVE ASILE CAPACITY



------------------------------------------------------------------------


Program License Serial Number 6387

------------------------------------------------------------------------
                *** Irregular Channel Analysis ***

        Upstream (headworks) Elevation =      0.500(Ft.)
        Downstream (outlet) Elevation =      0.000(Ft.)
        Runoff/Flow Distance =    100.000(Ft.)
        Maximum depth(HGL) of flow at headworks =      0.500(Ft.)
------------------------------------------------------------------------


Depth of flow =   0.500(Ft.)
Average velocity =   2.195(Ft/s)
Total flow rate in 1/2 street =  18.235(CFS)
        ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
        1              0.00              0.55
        2              0.50              0.22
        3             11.00              0.00
        4             21.50              0.22
        5             22.00              0.55
Manning's 'N' friction factor =   0.025
------------------------------------------------------------------
Sub-Channel flow  =     18.235(CFS)
  '     '        flow top width =     21.848(Ft.)
  '     '    wetted perimeter =     22.021(Ft.)
  '     '        velocity=    2.195(Ft/s)
  '     '        area =      8.309(Sq.Ft)
  '     '        Froude number =     0.627

Upstream point elevation =    0.500(Ft.)
Downstream point elevation =    0.000(Ft.)
Flow length =   100.000(Ft.)
Depth of flow =   0.500(Ft.)
Average velocity =   2.195(Ft/s)
Total irregular channel flow =    18.235(CFS)
Irregular channel normal depth above invert elev. =   0.500(Ft.)
Average velocity of channel(s) =   2.195(Ft/s)
------------------------------------------------------------------

Sub-Channel No. 1 Critical depth =      0.395(Ft.)
  '     '       '     Critical flow top width =     21.529(Ft.)
  '     '       '     Critical flow velocity=    3.028(Ft/s)
  '     '       '     Critical flow area =      6.021(Sq.Ft)

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------------------------------------------------------------------------
MAX AREA PIPE FLOW CAPACITY



------------------------------------------------------------------------


Program License Serial Number 6387

------------------------------------------------------------------------
                *** Improved Channel Analysis ***

        Upstream (headworks) Elevation =      0.500(Ft.)
        Downstream (outlet) Elevation =      0.000(Ft.)
        Runoff/Flow Distance =    100.000(Ft.)
        Maximum flow rate in channel(s) =     18.500(CFS)
------------------------------------------------------------------------







------------------------------------------------------------------------
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

*** CALCULATED DEPTH DATA AT FLOW =   18.50(CFS) ***
Pipe length  =   100.00(Ft.)
Manning's N = 0.011   No. of pipes = 1
Required pipe flow  =    18.500(CFS)
Pipe size =     24.00(In.)
Calculated individual pipe flow  =    18.500(CFS)
Normal flow depth in pipe =   19.22(In.)
Flow top width inside pipe =   19.17(In.)
Critical Depth =   18.58(In.)
Pipe flow velocity =      6.86(Ft/s)



------------------------------------------------------------------------
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  CIVILCADD/CIVILDESIGN  Engineering Software, (c) 2004 - 2014  Version 9.0
------------------------------------------------------------------------
BASIN PIPE OUTLET CAPACITY



------------------------------------------------------------------------


Program License Serial Number 6387

------------------------------------------------------------------------
                *** Improved Channel Analysis ***

        Upstream (headworks) Elevation =   1412.000(Ft.)
        Downstream (outlet) Elevation =   1411.100(Ft.)
        Runoff/Flow Distance =     39.000(Ft.)
        Maximum flow rate in channel(s) =     34.500(CFS)
------------------------------------------------------------------------







------------------------------------------------------------------------
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

*** CALCULATED DEPTH DATA AT FLOW =   34.50(CFS) ***
Pipe length  =    39.00(Ft.)
Manning's N = 0.013   No. of pipes = 1
Required pipe flow  =    34.500(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Pipe size =     24.00(In.)
Calculated individual pipe flow  =    34.500(CFS)
Normal flow depth in pipe =   19.76(In.)
Flow top width inside pipe =   18.31(In.)
Critical depth could not be calculated.
Pipe flow velocity =     12.47(Ft/s)



------------------------------------------------------------------------
```

```
  CIVILCADD/CIVILDESIGN  Engineering Software, (c) 2004 - 2014  Version 9.0
------------------------------------------------------------------------
MAX AREA PIPE FLOW 2



------------------------------------------------------------------------


Program License Serial Number 6387

------------------------------------------------------------------------
                *** Improved Channel Analysis ***

        Upstream (headworks) Elevation =      0.500(Ft.)
        Downstream (outlet) Elevation =      0.000(Ft.)
        Runoff/Flow Distance =    100.000(Ft.)
        Maximum flow rate in channel(s) =     17.700(CFS)
------------------------------------------------------------------------







------------------------------------------------------------------------
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

*** CALCULATED DEPTH DATA AT FLOW =   17.70(CFS) ***
Pipe length  =   100.00(Ft.)
Manning's N = 0.011   No. of pipes = 1
Required pipe flow  =    17.700(CFS)
Pipe size =     24.00(In.)
Calculated individual pipe flow  =    17.700(CFS)
Normal flow depth in pipe =   18.42(In.)
Flow top width inside pipe =   20.27(In.)
Critical Depth =   18.19(In.)
Pipe flow velocity =      6.84(Ft/s)



------------------------------------------------------------------------
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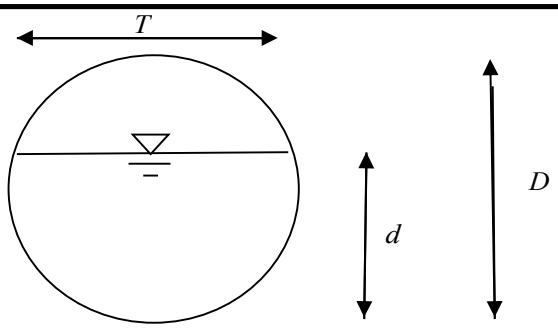
HYDRAULIC PIPE COMPUTATIONS FOR 6" HDPE



DIAMETER =	6 in.	HDPE

$$Q = \frac{K_U}{n} A \left(\frac{A}{P_W} \right)^{2/3} (S_L)^{1/2}$$

K_U	1.486	
S_L	0.005	ft/ft
n	0.011	

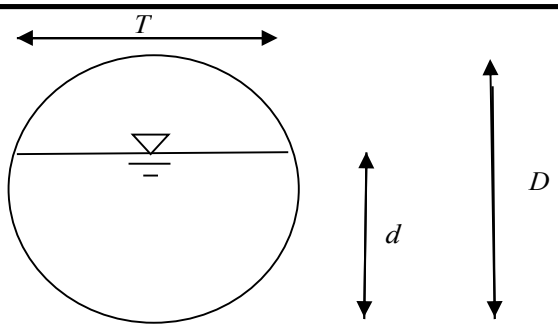
HYDRAULIC ELEMENTS FOR CIRCULAR CHANNEL

d	d/D	θ	A	T	P_W	V	Froud	Q
ft	ft/ft	°	ft²	ft	ft	ft²/s	No.	ft³/s
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.03	0.05	51.68	0.00	0.22	0.23	0.61	0.83	0.00
0.05	0.10	73.74	0.01	0.30	0.32	0.96	0.91	0.01
0.08	0.15	91.15	0.02	0.36	0.40	1.23	0.96	0.02
0.10	0.20	106.26	0.03	0.40	0.46	1.47	0.98	0.04
0.13	0.25	120.00	0.04	0.43	0.52	1.67	0.99	0.06
0.15	0.30	132.84	0.05	0.46	0.58	1.85	0.99	0.09
0.18	0.35	145.08	0.06	0.48	0.63	2.01	0.99	0.12
0.20	0.40	156.93	0.07	0.49	0.68	2.15	0.98	0.16
0.23	0.45	168.52	0.09	0.50	0.74	2.28	0.97	0.20
0.25	0.50	180.00	0.10	0.50	0.79	2.39	0.95	0.23
0.28	0.55	191.48	0.11	0.50	0.84	2.48	0.93	0.27
0.30	0.60	203.07	0.12	0.49	0.89	2.56	0.90	0.32
0.33	0.65	214.92	0.14	0.48	0.94	2.63	0.87	0.35
0.35	0.70	227.16	0.15	0.46	0.99	2.67	0.83	0.39
0.38	0.75	240.00	0.16	0.43	1.05	2.71	0.79	0.43
0.40	0.80	253.74	0.17	0.40	1.11	2.72	0.74	0.46
0.43	0.85	268.85	0.18	0.36	1.17	2.72	0.68	0.48
0.45	0.90	286.26	0.19	0.30	1.25	2.68	0.60	0.50
0.48	0.95	308.32	0.19	0.22	1.35	2.61	0.49	0.50
0.50	1.00	360.00	0.20	0.00	1.57	2.39	∞	0.47

Critical Depth	0.36	ft
Maximum Discharge	0.50	ft³/s

Completed by:	RJD
Checked by:	JHJ
Date:	6/23/2021
Sheet:	1 of 1

HYDRAULIC PIPE COMPUTATIONS FOR 8" HDPE



DIAMETER =	8 in.	HDPE

$$Q = \frac{K_U}{n} A \left(\frac{A}{P_W} \right)^{2/3} (S_L)^{1/2}$$

K_U	1.486	
S_L	0.005	ft/ft
n	0.011	

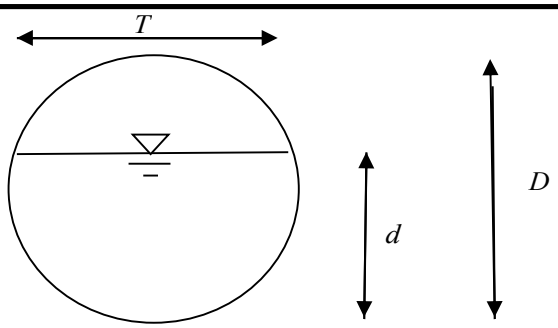
HYDRAULIC ELEMENTS FOR CIRCULAR CHANNEL

d	d/D	θ	A	T	P_W	V	Froud	Q
ft	ft/ft	°	ft²	ft	ft	ft²/s	No.	ft³/s
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.03	0.05	51.68	0.01	0.29	0.30	0.74	0.87	0.00
0.07	0.10	73.74	0.02	0.40	0.43	1.16	0.96	0.02
0.10	0.15	91.15	0.03	0.48	0.53	1.50	1.00	0.05
0.13	0.20	106.26	0.05	0.53	0.62	1.78	1.03	0.09
0.17	0.25	120.00	0.07	0.58	0.70	2.03	1.04	0.14
0.20	0.30	132.84	0.09	0.61	0.77	2.25	1.04	0.20
0.23	0.35	145.08	0.11	0.64	0.84	2.44	1.04	0.27
0.27	0.40	156.93	0.13	0.65	0.91	2.61	1.03	0.34
0.30	0.45	168.52	0.15	0.66	0.98	2.76	1.02	0.42
0.33	0.50	180.00	0.17	0.67	1.05	2.89	1.00	0.50
0.37	0.55	191.48	0.20	0.66	1.11	3.01	0.97	0.59
0.40	0.60	203.07	0.22	0.65	1.18	3.10	0.94	0.68
0.43	0.65	214.92	0.24	0.64	1.25	3.18	0.91	0.76
0.47	0.70	227.16	0.26	0.61	1.32	3.24	0.87	0.85
0.50	0.75	240.00	0.28	0.58	1.40	3.28	0.83	0.92
0.53	0.80	253.74	0.30	0.53	1.48	3.30	0.78	0.99
0.57	0.85	268.85	0.32	0.48	1.56	3.29	0.71	1.04
0.60	0.90	286.26	0.33	0.40	1.67	3.25	0.63	1.08
0.63	0.95	308.32	0.34	0.29	1.79	3.17	0.51	1.09
0.67	1.00	360.00	0.35	0.00	2.09	2.89	∞	1.01

Critical Depth	0.49	ft
Maximum Discharge	1.09	ft³/s

Completed by:	RJD
Checked by:	JHJ
Date:	6/23/2021
Sheet:	1 of 1

HYDRAULIC PIPE COMPUTATIONS FOR 12" HDPE



DIAMETER =	12 in.	HDPE

$$Q = \frac{K_U}{n} A \left(\frac{A}{P_W} \right)^{2/3} (S_L)^{1/2}$$

K_U	1.486	
S_L	0.005	ft/ft
n	0.011	

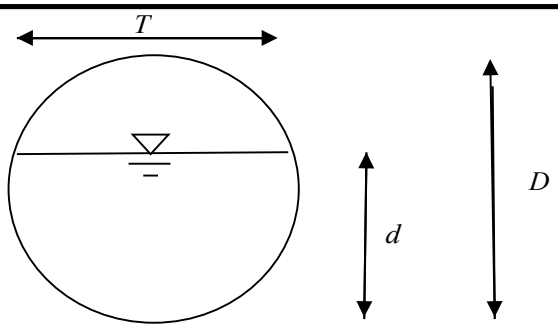
HYDRAULIC ELEMENTS FOR CIRCULAR CHANNEL

d	d/D	θ	A	T	P_W	V	Froud	Q
ft	ft/ft	°	ft²	ft	ft	ft²/s	No.	ft³/s
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.05	0.05	51.68	0.01	0.44	0.45	0.97	0.94	0.01
0.10	0.10	73.74	0.04	0.60	0.64	1.52	1.03	0.06
0.15	0.15	91.15	0.07	0.71	0.80	1.96	1.07	0.14
0.20	0.20	106.26	0.11	0.80	0.93	2.33	1.10	0.26
0.25	0.25	120.00	0.15	0.87	1.05	2.66	1.11	0.41
0.30	0.30	132.84	0.20	0.92	1.16	2.94	1.12	0.58
0.35	0.35	145.08	0.24	0.95	1.27	3.20	1.11	0.78
0.40	0.40	156.93	0.29	0.98	1.37	3.42	1.10	1.00
0.45	0.45	168.52	0.34	0.99	1.47	3.62	1.09	1.24
0.50	0.50	180.00	0.39	1.00	1.57	3.79	1.07	1.49
0.55	0.55	191.48	0.44	0.99	1.67	3.94	1.04	1.74
0.60	0.60	203.07	0.49	0.98	1.77	4.07	1.01	2.00
0.65	0.65	214.92	0.54	0.95	1.88	4.17	0.98	2.25
0.70	0.70	227.16	0.59	0.92	1.98	4.24	0.93	2.49
0.75	0.75	240.00	0.63	0.87	2.09	4.30	0.89	2.71
0.80	0.80	253.74	0.67	0.80	2.21	4.32	0.83	2.91
0.85	0.85	268.85	0.71	0.71	2.35	4.31	0.76	3.07
0.90	0.90	286.26	0.74	0.60	2.50	4.26	0.67	3.17
0.95	0.95	308.32	0.77	0.44	2.69	4.15	0.55	3.20
1.00	1.00	360.00	0.79	0.00	3.14	3.79	∞	2.98

Critical Depth	0.75	ft
Maximum Discharge	3.20	ft³/s

Completed by:	RJD
Checked by:	JHJ
Date:	6/23/2021
Sheet:	1 of 1

HYDRAULIC PIPE COMPUTATIONS FOR 16" HDPE



DIAMETER =	16 in.	HDPE

$$Q = \frac{K_U}{n} A \left(\frac{A}{P_W} \right)^{2/3} (S_L)^{1/2}$$

K_U	1.486	
S_L	0.005	ft/ft
n	0.011	

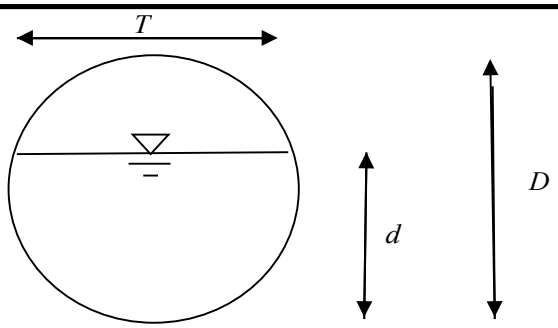
HYDRAULIC ELEMENTS FOR CIRCULAR CHANNEL

d	d/D	θ	A	T	P_W	V	Froud	Q
ft	ft/ft	°	ft²	ft	ft	ft²/s	No.	ft³/s
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.07	0.05	51.68	0.03	0.58	0.60	1.18	0.98	0.03
0.13	0.10	73.74	0.07	0.80	0.86	1.84	1.08	0.13
0.20	0.15	91.15	0.13	0.95	1.06	2.37	1.13	0.31
0.27	0.20	106.26	0.20	1.07	1.24	2.82	1.15	0.56
0.33	0.25	120.00	0.27	1.15	1.40	3.22	1.17	0.88
0.40	0.30	132.84	0.35	1.22	1.55	3.56	1.17	1.26
0.47	0.35	145.08	0.44	1.27	1.69	3.87	1.17	1.69
0.53	0.40	156.93	0.52	1.31	1.83	4.14	1.16	2.16
0.60	0.45	168.52	0.61	1.33	1.96	4.38	1.14	2.67
0.67	0.50	180.00	0.70	1.33	2.09	4.59	1.12	3.21
0.73	0.55	191.48	0.79	1.33	2.23	4.77	1.09	3.76
0.80	0.60	203.07	0.87	1.31	2.36	4.92	1.06	4.31
0.87	0.65	214.92	0.96	1.27	2.50	5.05	1.02	4.85
0.93	0.70	227.16	1.04	1.22	2.64	5.14	0.98	5.37
1.00	0.75	240.00	1.12	1.15	2.79	5.21	0.93	5.85
1.07	0.80	253.74	1.20	1.07	2.95	5.23	0.87	6.27
1.13	0.85	268.85	1.26	0.95	3.13	5.22	0.80	6.61
1.20	0.90	286.26	1.32	0.80	3.33	5.16	0.71	6.83
1.27	0.95	308.32	1.37	0.58	3.59	5.03	0.58	6.89
1.33	1.00	360.00	1.40	0.00	4.19	4.59	∞	6.42

Critical Depth	1.02	ft
Maximum Discharge	6.90	ft³/s

Completed by:	RJD
Checked by:	JHJ
Date:	6/23/2021
Sheet:	1 of 1

HYDRAULIC PIPE COMPUTATIONS FOR 18" HDPE



DIAMETER =	18 in.	HDPE

$$Q = \frac{K_U}{n} A \left(\frac{A}{P_W} \right)^{2/3} (S_L)^{1/2}$$

K_U	1.486	
S_L	0.005	ft/ft
n	0.011	

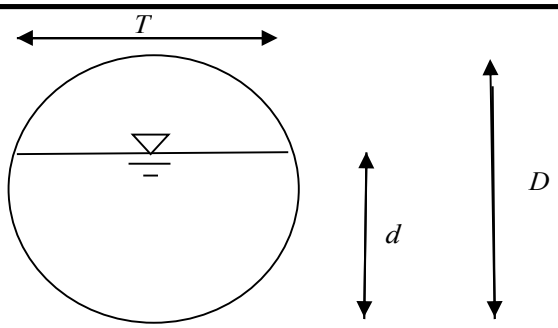
HYDRAULIC ELEMENTS FOR CIRCULAR CHANNEL

d	d/D	θ	A	T	P_W	V	Froud	Q
ft	ft/ft	°	ft²	ft	ft	ft²/s	No.	ft³/s
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.08	0.05	51.68	0.03	0.65	0.68	1.28	1.00	0.04
0.15	0.10	73.74	0.09	0.90	0.97	1.99	1.10	0.18
0.23	0.15	91.15	0.17	1.07	1.19	2.57	1.15	0.43
0.30	0.20	106.26	0.25	1.20	1.39	3.06	1.18	0.77
0.38	0.25	120.00	0.35	1.30	1.57	3.48	1.19	1.20
0.45	0.30	132.84	0.45	1.37	1.74	3.86	1.19	1.72
0.53	0.35	145.08	0.55	1.43	1.90	4.19	1.19	2.31
0.60	0.40	156.93	0.66	1.47	2.05	4.48	1.18	2.96
0.68	0.45	168.52	0.77	1.49	2.21	4.74	1.16	3.66
0.75	0.50	180.00	0.88	1.50	2.36	4.97	1.14	4.39
0.83	0.55	191.48	1.00	1.49	2.51	5.16	1.11	5.14
0.90	0.60	203.07	1.11	1.47	2.66	5.33	1.08	5.90
0.98	0.65	214.92	1.22	1.43	2.81	5.46	1.04	6.64
1.05	0.70	227.16	1.32	1.37	2.97	5.56	1.00	7.35
1.13	0.75	240.00	1.42	1.30	3.14	5.63	0.95	8.00
1.20	0.80	253.74	1.52	1.20	3.32	5.66	0.89	8.58
1.28	0.85	268.85	1.60	1.07	3.52	5.65	0.81	9.05
1.35	0.90	286.26	1.68	0.90	3.75	5.58	0.72	9.36
1.43	0.95	308.32	1.73	0.65	4.04	5.44	0.59	9.43
1.50	1.00	360.00	1.77	0.00	4.71	4.97	∞	8.78

Critical Depth	1.15	ft
Maximum Discharge	9.44	ft³/s

Completed by:	RJD
Checked by:	JHJ
Date:	6/23/2021
Sheet:	1 of 1

HYDRAULIC PIPE COMPUTATIONS FOR 24" HDPE



DIAMETER =	24 in.	HDPE

$$Q = \frac{K_U}{n} A \left(\frac{A}{P_W} \right)^{2/3} (S_L)^{1/2}$$

K_U	1.486	
S_L	0.005	ft/ft
n	0.011	

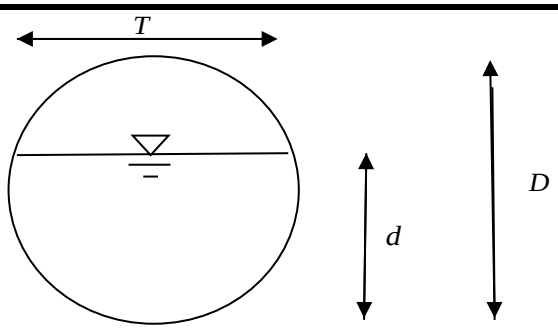
HYDRAULIC ELEMENTS FOR CIRCULAR CHANNEL

d	d/D	θ	A	T	P_W	V	Froud	Q
ft	ft/ft	°	ft²	ft	ft	ft²/s	No.	ft³/s
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.10	0.05	51.68	0.06	0.87	0.90	1.55	1.05	0.09
0.20	0.10	73.74	0.16	1.20	1.29	2.41	1.15	0.39
0.30	0.15	91.15	0.30	1.43	1.59	3.11	1.20	0.92
0.40	0.20	106.26	0.45	1.60	1.85	3.70	1.23	1.66
0.50	0.25	120.00	0.61	1.73	2.09	4.22	1.25	2.59
0.60	0.30	132.84	0.79	1.83	2.32	4.67	1.25	3.70
0.70	0.35	145.08	0.98	1.91	2.53	5.07	1.25	4.97
0.80	0.40	156.93	1.17	1.96	2.74	5.43	1.24	6.37
0.90	0.45	168.52	1.37	1.99	2.94	5.74	1.22	7.87
1.00	0.50	180.00	1.57	2.00	3.14	6.02	1.20	9.45
1.10	0.55	191.48	1.77	1.99	3.34	6.25	1.17	11.07
1.20	0.60	203.07	1.97	1.96	3.54	6.45	1.13	12.70
1.30	0.65	214.92	2.16	1.91	3.75	6.62	1.10	14.30
1.40	0.70	227.16	2.35	1.83	3.96	6.74	1.05	15.83
1.50	0.75	240.00	2.53	1.73	4.19	6.82	1.00	17.24
1.60	0.80	253.74	2.69	1.60	4.43	6.86	0.93	18.48
1.70	0.85	268.85	2.85	1.43	4.69	6.84	0.85	19.48
1.80	0.90	286.26	2.98	1.20	5.00	6.77	0.76	20.15
1.90	0.95	308.32	3.08	0.87	5.38	6.59	0.62	20.31
2.00	1.00	360.00	3.14	0.00	6.28	6.02	∞	18.91

Critical Depth	1.57	ft
Maximum Discharge	20.34	ft³/s

Completed by:	RJD
Checked by:	JHJ
Date:	6/23/2021
Sheet:	1 of 1

HYDRAULIC PIPE COMPUTATIONS FOR 24" HDPE



DIAMETER =	24 in.	HDPE

$$Q = \frac{K_U}{n} A \left(\frac{A}{P_W} \right)^{2/3} (S_L)^{1/2}$$

K_U	1.486	
S_L	0.01	ft/ft
n	0.011	

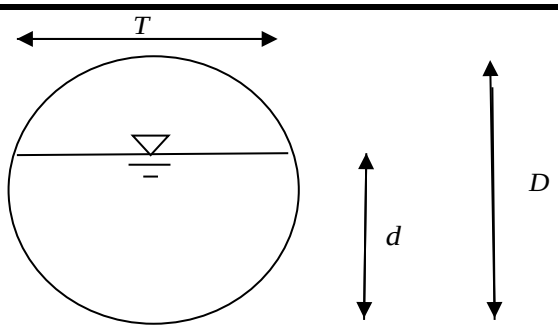
HYDRAULIC ELEMENTS FOR CIRCULAR CHANNEL

d	d/D	θ	A	T	P_W	V	Froud	Q
ft	ft/ft	°	ft²	ft	ft	ft²/s	No.	ft³/s
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.10	0.05	51.68	0.06	0.87	0.90	2.19	1.48	0.13
0.20	0.10	73.74	0.16	1.20	1.29	3.41	1.63	0.56
0.30	0.15	91.15	0.30	1.43	1.59	4.40	1.70	1.30
0.40	0.20	106.26	0.45	1.60	1.85	5.23	1.74	2.34
0.50	0.25	120.00	0.61	1.73	2.09	5.96	1.76	3.66
0.60	0.30	132.84	0.79	1.83	2.32	6.61	1.77	5.24
0.70	0.35	145.08	0.98	1.91	2.53	7.17	1.76	7.03
0.80	0.40	156.93	1.17	1.96	2.74	7.68	1.75	9.01
0.90	0.45	168.52	1.37	1.99	2.94	8.12	1.72	11.14
1.00	0.50	180.00	1.57	2.00	3.14	8.51	1.69	13.37
1.10	0.55	191.48	1.77	1.99	3.34	8.84	1.65	15.66
1.20	0.60	203.07	1.97	1.96	3.54	9.13	1.60	17.96
1.30	0.65	214.92	2.16	1.91	3.75	9.36	1.55	20.22
1.40	0.70	227.16	2.35	1.83	3.96	9.53	1.48	22.38
1.50	0.75	240.00	2.53	1.73	4.19	9.65	1.41	24.38
1.60	0.80	253.74	2.69	1.60	4.43	9.70	1.32	26.13
1.70	0.85	268.85	2.85	1.43	4.69	9.68	1.21	27.55
1.80	0.90	286.26	2.98	1.20	5.00	9.57	1.07	28.49
1.90	0.95	308.32	3.08	0.87	5.38	9.32	0.87	28.73
2.00	1.00	360.00	3.14	0.00	6.28	8.51	∞	26.75

Critical Depth	1.80	ft
Maximum Discharge	28.76	ft³/s

Completed by:	**RJD**
Checked by:	**JHJ**
Date:	**7/2/2021**
Sheet:	**1 of 1**

HYDRAULIC PIPE COMPUTATIONS FOR 24" HDPE



DIAMETER =	24 in.	HDPE

$$Q = \frac{K_U}{n} A \left(\frac{A}{P_W} \right)^{2/3} (S_L)^{1/2}$$

K_U	1.486	
S_L	0.02	ft/ft
n	0.011	

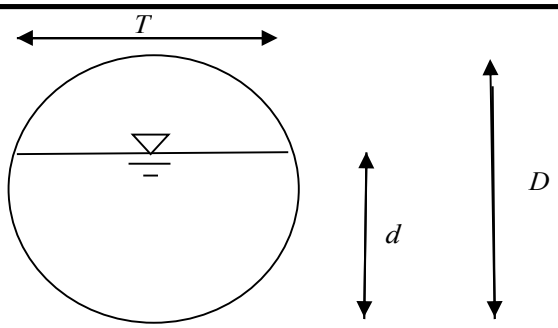
HYDRAULIC ELEMENTS FOR CIRCULAR CHANNEL

d	d/D	θ	A	T	P_W	V	Froud	Q
ft	ft/ft	°	ft²	ft	ft	ft²/s	No.	ft³/s
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.10	0.05	51.68	0.06	0.87	0.90	3.09	2.10	0.18
0.20	0.10	73.74	0.16	1.20	1.29	4.83	2.31	0.79
0.30	0.15	91.15	0.30	1.43	1.59	6.22	2.41	1.84
0.40	0.20	106.26	0.45	1.60	1.85	7.40	2.47	3.31
0.50	0.25	120.00	0.61	1.73	2.09	8.43	2.50	5.18
0.60	0.30	132.84	0.79	1.83	2.32	9.34	2.50	7.40
0.70	0.35	145.08	0.98	1.91	2.53	10.15	2.49	9.94
0.80	0.40	156.93	1.17	1.96	2.74	10.86	2.47	12.74
0.90	0.45	168.52	1.37	1.99	2.94	11.49	2.44	15.75
1.00	0.50	180.00	1.57	2.00	3.14	12.04	2.39	18.90
1.10	0.55	191.48	1.77	1.99	3.34	12.51	2.34	22.15
1.20	0.60	203.07	1.97	1.96	3.54	12.91	2.27	25.40
1.30	0.65	214.92	2.16	1.91	3.75	13.23	2.19	28.60
1.40	0.70	227.16	2.35	1.83	3.96	13.48	2.10	31.66
1.50	0.75	240.00	2.53	1.73	4.19	13.64	1.99	34.48
1.60	0.80	253.74	2.69	1.60	4.43	13.72	1.86	36.96
1.70	0.85	268.85	2.85	1.43	4.69	13.69	1.71	38.96
1.80	0.90	286.26	2.98	1.20	5.00	13.53	1.51	40.30
1.90	0.95	308.32	3.08	0.87	5.38	13.18	1.23	40.63
2.00	1.00	360.00	3.14	0.00	6.28	12.04	∞	37.83

Critical Depth	2.07	ft
Maximum Discharge	40.67	ft³/s

Completed by:	RJD
Checked by:	JHJ
Date:	7/2/2021
Sheet:	1 of 1

HYDRAULIC PIPE COMPUTATIONS FOR 30" HDPE



DIAMETER =	30 in.	HDPE

$$Q = \frac{K_U}{n} A \left(\frac{A}{P_W} \right)^{2/3} (S_L)^{1/2}$$

K_U	1.486	
S_L	0.005	ft/ft
n	0.011	

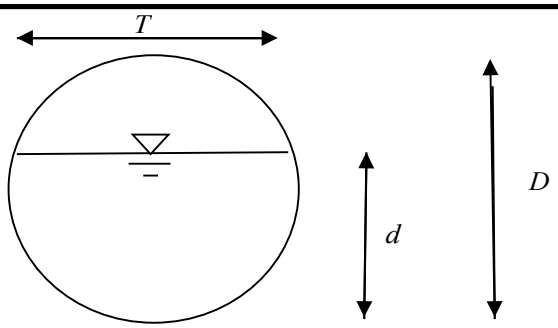
HYDRAULIC ELEMENTS FOR CIRCULAR CHANNEL

d	d/D	θ	A	T	P_W	V	Froud	Q
ft	ft/ft	°	ft²	ft	ft	ft²/s	No.	ft³/s
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.13	0.05	51.68	0.09	1.09	1.13	1.79	1.09	0.16
0.25	0.10	73.74	0.26	1.50	1.61	2.80	1.20	0.72
0.38	0.15	91.15	0.46	1.79	1.99	3.61	1.25	1.67
0.50	0.20	106.26	0.70	2.00	2.32	4.29	1.28	3.00
0.63	0.25	120.00	0.96	2.17	2.62	4.89	1.30	4.70
0.75	0.30	132.84	1.24	2.29	2.90	5.42	1.30	6.71
0.88	0.35	145.08	1.53	2.38	3.17	5.89	1.29	9.01
1.00	0.40	156.93	1.83	2.45	3.42	6.30	1.28	11.55
1.13	0.45	168.52	2.14	2.49	3.68	6.66	1.27	14.28
1.25	0.50	180.00	2.45	2.50	3.93	6.98	1.24	17.14
1.38	0.55	191.48	2.77	2.49	4.18	7.26	1.21	20.08
1.50	0.60	203.07	3.08	2.45	4.43	7.49	1.18	23.03
1.63	0.65	214.92	3.38	2.38	4.69	7.68	1.14	25.93
1.75	0.70	227.16	3.67	2.29	4.96	7.82	1.09	28.70
1.88	0.75	240.00	3.95	2.17	5.24	7.91	1.03	31.26
2.00	0.80	253.74	4.21	2.00	5.54	7.96	0.97	33.50
2.13	0.85	268.85	4.45	1.79	5.87	7.94	0.89	35.32
2.25	0.90	286.26	4.65	1.50	6.25	7.85	0.79	36.53
2.38	0.95	308.32	4.82	1.09	6.73	7.65	0.64	36.83
2.50	1.00	360.00	4.91	0.00	7.85	6.99	∞	34.29

Critical Depth	1.99	ft
Maximum Discharge	36.87	ft³/s

Completed by:	RJD
Checked by:	JHJ
Date:	6/23/2021
Sheet:	1 of 1

HYDRAULIC PIPE COMPUTATIONS FOR 30" CONC



DIAMETER =	30 in.	CONC

$$Q = \frac{K_U}{n} A \left(\frac{A}{P_W} \right)^{2/3} (S_L)^{1/2}$$

K_U	1.486	
S_L	0.005	ft/ft
n	0.013	

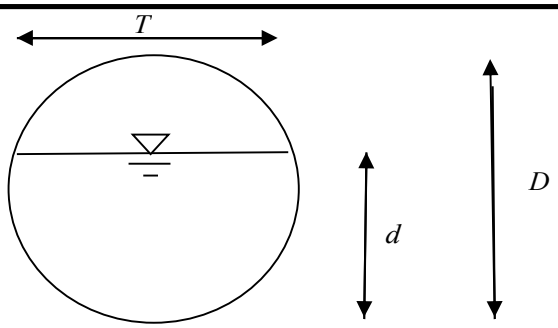
HYDRAULIC ELEMENTS FOR CIRCULAR CHANNEL

d	d/D	θ	A	T	P_W	V	Froud	Q
ft	ft/ft	°	ft²	ft	ft	ft²/s	No.	ft³/s
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.13	0.05	51.68	0.09	1.09	1.13	1.52	0.92	0.14
0.25	0.10	73.74	0.26	1.50	1.61	2.37	1.01	0.61
0.38	0.15	91.15	0.46	1.79	1.99	3.05	1.06	1.41
0.50	0.20	106.26	0.70	2.00	2.32	3.63	1.08	2.54
0.63	0.25	120.00	0.96	2.17	2.62	4.14	1.10	3.97
0.75	0.30	132.84	1.24	2.29	2.90	4.59	1.10	5.68
0.88	0.35	145.08	1.53	2.38	3.17	4.98	1.10	7.63
1.00	0.40	156.93	1.83	2.45	3.42	5.33	1.09	9.77
1.13	0.45	168.52	2.14	2.49	3.68	5.64	1.07	12.08
1.25	0.50	180.00	2.45	2.50	3.93	5.91	1.05	14.50
1.38	0.55	191.48	2.77	2.49	4.18	6.14	1.03	16.99
1.50	0.60	203.07	3.08	2.45	4.43	6.34	1.00	19.49
1.63	0.65	214.92	3.38	2.38	4.69	6.50	0.96	21.94
1.75	0.70	227.16	3.67	2.29	4.96	6.62	0.92	24.28
1.88	0.75	240.00	3.95	2.17	5.24	6.70	0.87	26.45
2.00	0.80	253.74	4.21	2.00	5.54	6.73	0.82	28.35
2.13	0.85	268.85	4.45	1.79	5.87	6.72	0.75	29.89
2.25	0.90	286.26	4.65	1.50	6.25	6.64	0.66	30.91
2.38	0.95	308.32	4.82	1.09	6.73	6.47	0.54	31.16
2.50	1.00	360.00	4.91	0.00	7.85	5.91	∞	29.02

Critical Depth	1.86	ft
Maximum Discharge	31.20	ft³/s

Completed by:	RJD
Checked by:	JHJ
Date:	6/23/2021
Sheet:	1 of 1

HYDRAULIC PIPE COMPUTATIONS FOR 12" HDPE



DIAMETER =	12 in.	HDPE

$$Q = \frac{K_U}{n} A \left(\frac{A}{P_W} \right)^{2/3} (S_L)^{1/2}$$

K_U	1.486	
S_L	0.004	ft/ft
n	0.011	

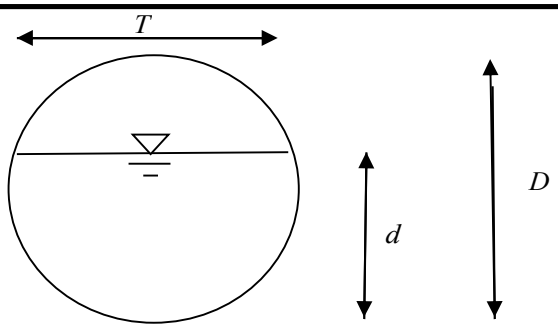
HYDRAULIC ELEMENTS FOR CIRCULAR CHANNEL

d	d/D	θ	A	T	P_W	V	Froud	Q
ft	ft/ft	°	ft²	ft	ft	ft²/s	No.	ft³/s
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.05	0.05	51.68	0.01	0.44	0.45	0.87	0.84	0.01
0.10	0.10	73.74	0.04	0.60	0.64	1.36	0.92	0.06
0.15	0.15	91.15	0.07	0.71	0.80	1.75	0.96	0.13
0.20	0.20	106.26	0.11	0.80	0.93	2.09	0.98	0.23
0.25	0.25	120.00	0.15	0.87	1.05	2.38	0.99	0.36
0.30	0.30	132.84	0.20	0.92	1.16	2.63	1.00	0.52
0.35	0.35	145.08	0.24	0.95	1.27	2.86	0.99	0.70
0.40	0.40	156.93	0.29	0.98	1.37	3.06	0.99	0.90
0.45	0.45	168.52	0.34	0.99	1.47	3.24	0.97	1.11
0.50	0.50	180.00	0.39	1.00	1.57	3.39	0.95	1.33
0.55	0.55	191.48	0.44	0.99	1.67	3.52	0.93	1.56
0.60	0.60	203.07	0.49	0.98	1.77	3.64	0.90	1.79
0.65	0.65	214.92	0.54	0.95	1.88	3.73	0.87	2.01
0.70	0.70	227.16	0.59	0.92	1.98	3.80	0.84	2.23
0.75	0.75	240.00	0.63	0.87	2.09	3.84	0.79	2.43
0.80	0.80	253.74	0.67	0.80	2.21	3.86	0.74	2.60
0.85	0.85	268.85	0.71	0.71	2.35	3.86	0.68	2.74
0.90	0.90	286.26	0.74	0.60	2.50	3.81	0.60	2.84
0.95	0.95	308.32	0.77	0.44	2.69	3.71	0.49	2.86
1.00	1.00	360.00	0.79	0.00	3.14	3.39	∞	2.66

Critical Depth	0.72	ft
Maximum Discharge	2.86	ft³/s

Completed by:	RJD
Checked by:	JHJ
Date:	7/6/2021
Sheet:	1 of 1

HYDRAULIC PIPE COMPUTATIONS FOR 16" HDPE



DIAMETER =	16 in.	HDPE

$$Q = \frac{K_U}{n} A \left(\frac{A}{P_W} \right)^{2/3} (S_L)^{1/2}$$

K_U	1.486	
S_L	0.02	ft/ft
n	0.011	

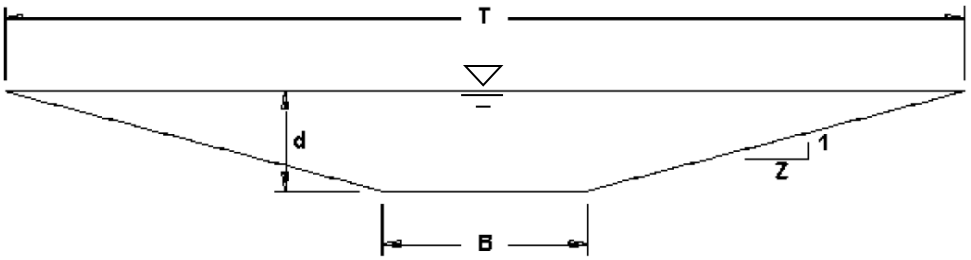
HYDRAULIC ELEMENTS FOR CIRCULAR CHANNEL

d	d/D	θ	A	T	P_W	V	Froud	Q
ft	ft/ft	°	ft²	ft	ft	ft²/s	No.	ft³/s
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.07	0.05	51.68	0.03	0.58	0.60	2.36	1.96	0.06
0.13	0.10	73.74	0.07	0.80	0.86	3.68	2.15	0.27
0.20	0.15	91.15	0.13	0.95	1.06	4.75	2.25	0.62
0.27	0.20	106.26	0.20	1.07	1.24	5.65	2.31	1.12
0.33	0.25	120.00	0.27	1.15	1.40	6.44	2.33	1.76
0.40	0.30	132.84	0.35	1.22	1.55	7.13	2.34	2.51
0.47	0.35	145.08	0.44	1.27	1.69	7.74	2.33	3.37
0.53	0.40	156.93	0.52	1.31	1.83	8.29	2.31	4.32
0.60	0.45	168.52	0.61	1.33	1.96	8.77	2.28	5.34
0.67	0.50	180.00	0.70	1.33	2.09	9.18	2.24	6.41
0.73	0.55	191.48	0.79	1.33	2.23	9.55	2.18	7.51
0.80	0.60	203.07	0.87	1.31	2.36	9.85	2.12	8.62
0.87	0.65	214.92	0.96	1.27	2.50	10.10	2.05	9.70
0.93	0.70	227.16	1.04	1.22	2.64	10.28	1.96	10.74
1.00	0.75	240.00	1.12	1.15	2.79	10.41	1.86	11.69
1.07	0.80	253.74	1.20	1.07	2.95	10.47	1.74	12.54
1.13	0.85	268.85	1.26	0.95	3.13	10.45	1.60	13.21
1.20	0.90	286.26	1.32	0.80	3.33	10.33	1.41	13.67
1.27	0.95	308.32	1.37	0.58	3.59	10.06	1.15	13.78
1.33	1.00	360.00	1.40	0.00	4.19	9.19	∞	12.83

Critical Depth	1.34	ft
Maximum Discharge	13.79	ft³/s

Completed by:	RJD
Checked by:	JHJ
Date:	7/6/2021
Sheet:	1 of 1

HYDRAULICS CALCULATIONS FOR TRAPEZOIDAL CHANNEL



Z =	**3 H:V**
B =	**8 ft**

$$Q = \frac{K_U}{n} A \left(\frac{A}{P_W} \right)^{2/3} (S_L)^{1/2}$$

K_U	**1.486**	
S_L	**0.005**	**ft/ft**
n	**0.025**	

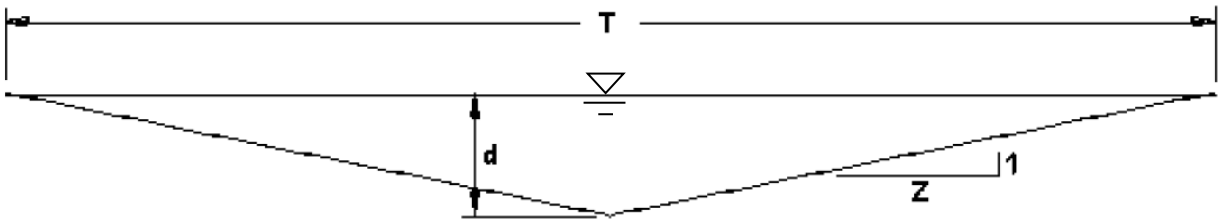
HYDRAULIC ELEMEMENTS OF TRAPEZOIDAL SECTION

d	A	T	P_W	V	Froud	Q
ft	ft²	ft	ft	ft²/s	No.	ft³/s
0.00	0.00	8.00	8.00	0	0	0
0.25	2.19	9.50	9.58	1.57	0.58	3.43
0.45	4.21	10.70	10.85	2.24	0.63	9.41
0.75	7.69	12.50	12.74	3.00	0.67	23.07
1.00	11.00	14.00	14.32	3.52	0.70	38.77
1.25	14.69	15.50	15.91	3.99	0.72	58.54
1.50	18.75	17.00	17.49	4.40	0.74	82.56
1.75	23.19	18.50	19.07	4.79	0.75	111.03
2.00	28.00	20.00	20.65	5.15	0.77	144.18
2.25	33.19	21.50	22.23	5.49	0.78	182.20
2.50	38.75	23.00	23.81	5.82	0.79	225.33
2.75	44.69	24.50	25.39	6.13	0.80	273.78
3.00	51.00	26.00	26.97	6.43	0.81	327.76
3.25	57.69	27.50	28.55	6.72	0.82	387.48
3.50	64.75	29.00	30.14	7.00	0.83	453.15
3.75	72.19	30.50	31.72	7.27	0.83	524.97
4.00	80.00	32.00	33.30	7.54	0.84	603.16
4.25	88.19	33.50	34.88	7.80	0.85	687.91
4.50	96.75	35.00	36.46	8.06	0.85	779.41
4.75	105.69	36.50	38.04	8.31	0.86	877.87
5.00	115.00	38.00	39.62	8.55	0.87	983.48

Critical Depth	6.87	ft
Critical Flowrate	2229.98	ft³/s

Completed by:	**RJD**
Checked by:	**JHJ**
Date:	**5/16/2021**
Sheet:	**1 of 1**

HYDRAULIC CALCULATIONS FOR RIBBON GUTTER



Z =	9 H:V

$$Q = \frac{K_U}{n} A \left(\frac{A}{P_W} \right)^{2/3} (S_L)^{1/2}$$

K_U	1.486	
S_L	0.005	ft/ft
n	0.013	

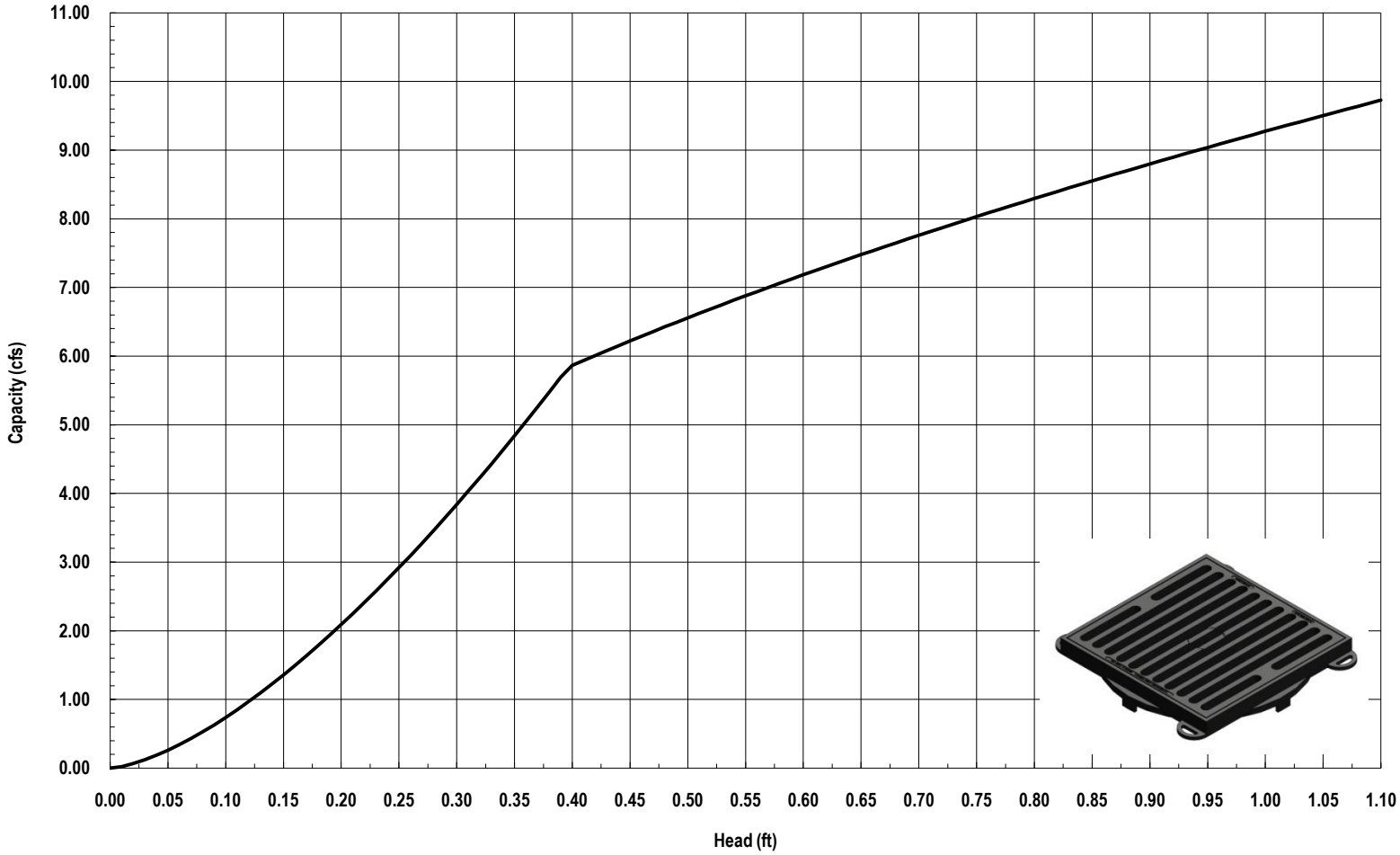
HYDRAULIC ELEMEMENTS OF TRAPEZOIDAL SECTION

d	A	T	P_W	V	Froud	Q
ft	ft²	ft	ft	ft²/s	No.	ft³/s
0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.10	0.09	1.80	1.81	1.09	0.86	0.10
0.20	0.36	3.60	3.62	1.73	0.97	0.62
0.30	0.81	5.40	5.43	2.27	1.03	1.84
0.40	1.44	7.20	7.24	2.75	1.08	3.96
0.50	2.25	9.00	9.06	3.19	1.13	7.19
0.60	3.24	10.80	10.87	3.61	1.16	11.69
0.70	4.41	12.60	12.68	4.00	1.19	17.63
0.80	5.76	14.40	14.49	4.37	1.22	25.17
0.90	7.29	16.20	16.30	4.73	1.24	34.46
1.00	9.00	18.00	18.11	5.07	1.26	45.64
1.10	10.89	19.80	19.92	5.40	1.28	58.85
1.20	12.96	21.60	21.73	5.73	1.30	74.21
1.30	15.21	23.40	23.54	6.04	1.32	91.87
1.40	17.64	25.20	25.36	6.35	1.34	111.95
1.50	20.25	27.00	27.17	6.64	1.35	134.56

Critical Depth	1.69	ft

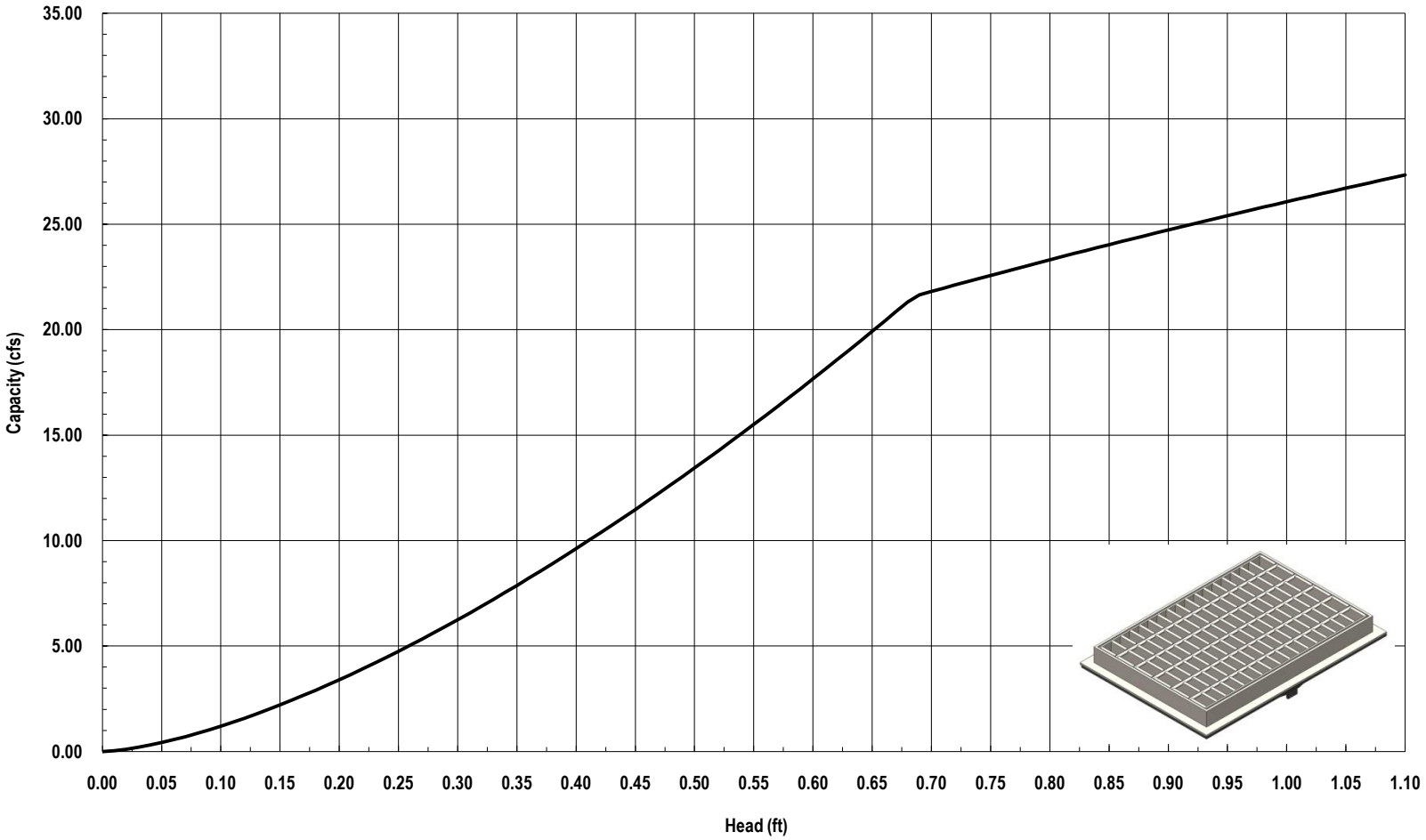
Completed by:	RJD
Checked by:	JHJ
Date:	5/16/2021
Sheet:	1 of 1

Nyloplast 2' x 2' Road & Highway Grate Inlet Capacity Chart



Nyloplast®
3130 Verona Avenue • Buford, GA 30518
(866) 888-8479 / (770) 932-2443 • Fax: (770) 932-2490

Nyloplast 2' x 3' Steel Bar / MAG Grate Inlet Capacity Chart



Nyloplast®
3130 Verona Avenue • Buford, GA 30518
(866) 888-8479 / (770) 932-2443 • Fax: (770) 932-2490

Enter open area of grate (in^2) 1152 in^2

RESET CALCULATE RESULTS

WATER DEPTH (IN):	FLOW CAPACITY (CFS):
4	24.8
5	27.8
6	30.4
7	32.9
8	35.2
9	37.3
10	39.3
11	41.3
12	43.0
13	44.9
14	46.5
15	48.1
16	49.7
17	51.2
18	52.7
19	54.2
20	55.6
21	56.9

The provided flow capacity calculators are theoretical calculations and are provided for

22	58.3
23	59.7
24	60.9

your guidance. The calculators do not take into account the many variables that occur in the field. For any questions, please contact us.

Worksheet for 100 YEAR BRADLEY CHANNEL-Existing

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.014	
Channel Slope	0.00300	ft/ft
Left Side Slope	1.50	ft/ft (H:V)
Right Side Slope	1.50	ft/ft (H:V)
Bottom Width	15.00	ft
Discharge	906.00	ft^3/s

Results

Normal Depth	3.82	ft
Flow Area	79.31	ft^2
Wetted Perimeter	28.79	ft
Hydraulic Radius	2.75	ft
Top Width	26.47	ft
Critical Depth	4.18	ft
Critical Slope	0.00217	ft/ft
Velocity	11.42	ft/s
Velocity Head	2.03	ft
Specific Energy	5.85	ft
Froude Number	1.16	
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		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	3.82	ft
Critical Depth	4.18	ft
Channel Slope	0.00300	ft/ft

Worksheet for 100 YEAR BRADLEY CHANNEL-Existing

GVF Output Data

Critical Slope	0.00217	ft/ft

Worksheet for 100 YEAR BRADLEY CHANNEL-Proposed

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.014	
Channel Slope	0.00300	ft/ft
Left Side Slope	1.50	ft/ft (H:V)
Right Side Slope	1.50	ft/ft (H:V)
Bottom Width	15.00	ft
Discharge	940.30	ft^3/s

Results

Normal Depth	3.90	ft
Flow Area	81.42	ft^2
Wetted Perimeter	29.08	ft
Hydraulic Radius	2.80	ft
Top Width	26.71	ft
Critical Depth	4.27	ft
Critical Slope	0.00216	ft/ft
Velocity	11.55	ft/s
Velocity Head	2.07	ft
Specific Energy	5.98	ft
Froude Number	1.17	
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		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	3.90	ft
Critical Depth	4.27	ft
Channel Slope	0.00300	ft/ft

Worksheet for 100 YEAR BRADLEY CHANNEL-Proposed

GVF Output Data

Critical Slope	0.00216	ft/ft

Worksheet for 2 YEAR BRADLEY CHANNEL

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.014	
Channel Slope	0.00300	ft/ft
Left Side Slope	1.50	ft/ft (H:V)
Right Side Slope	1.50	ft/ft (H:V)
Bottom Width	15.00	ft
Discharge	349.00	ft^3/s

Results

Normal Depth	2.23	ft
Flow Area	40.94	ft^2
Wetted Perimeter	23.04	ft
Hydraulic Radius	1.78	ft
Top Width	21.69	ft
Critical Depth	2.36	ft
Critical Slope	0.00247	ft/ft
Velocity	8.53	ft/s
Velocity Head	1.13	ft
Specific Energy	3.36	ft
Froude Number	1.09	
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		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	2.23	ft
Critical Depth	2.36	ft
Channel Slope	0.00300	ft/ft

Worksheet for 2 YEAR BRADLEY CHANNEL

GVF Output Data

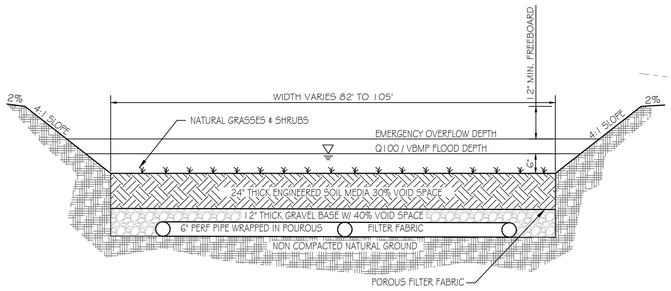
Critical Slope	0.00247	ft/ft

Appendix C

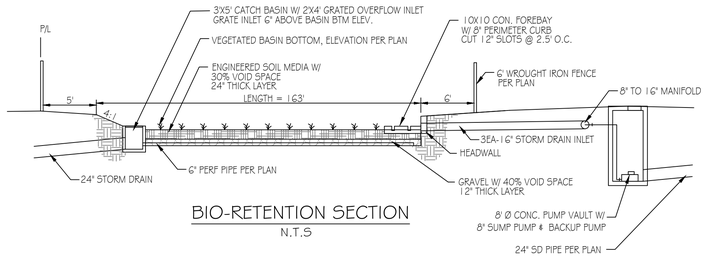
IN THE CITY OF MENIFEE, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA

MENIFEE RIVERWALK TOWNHOMES

PRELIMINARY WATER QUALITY MANAGEMENT PLAN



BIO-RETENTION BASIN
N.T.S



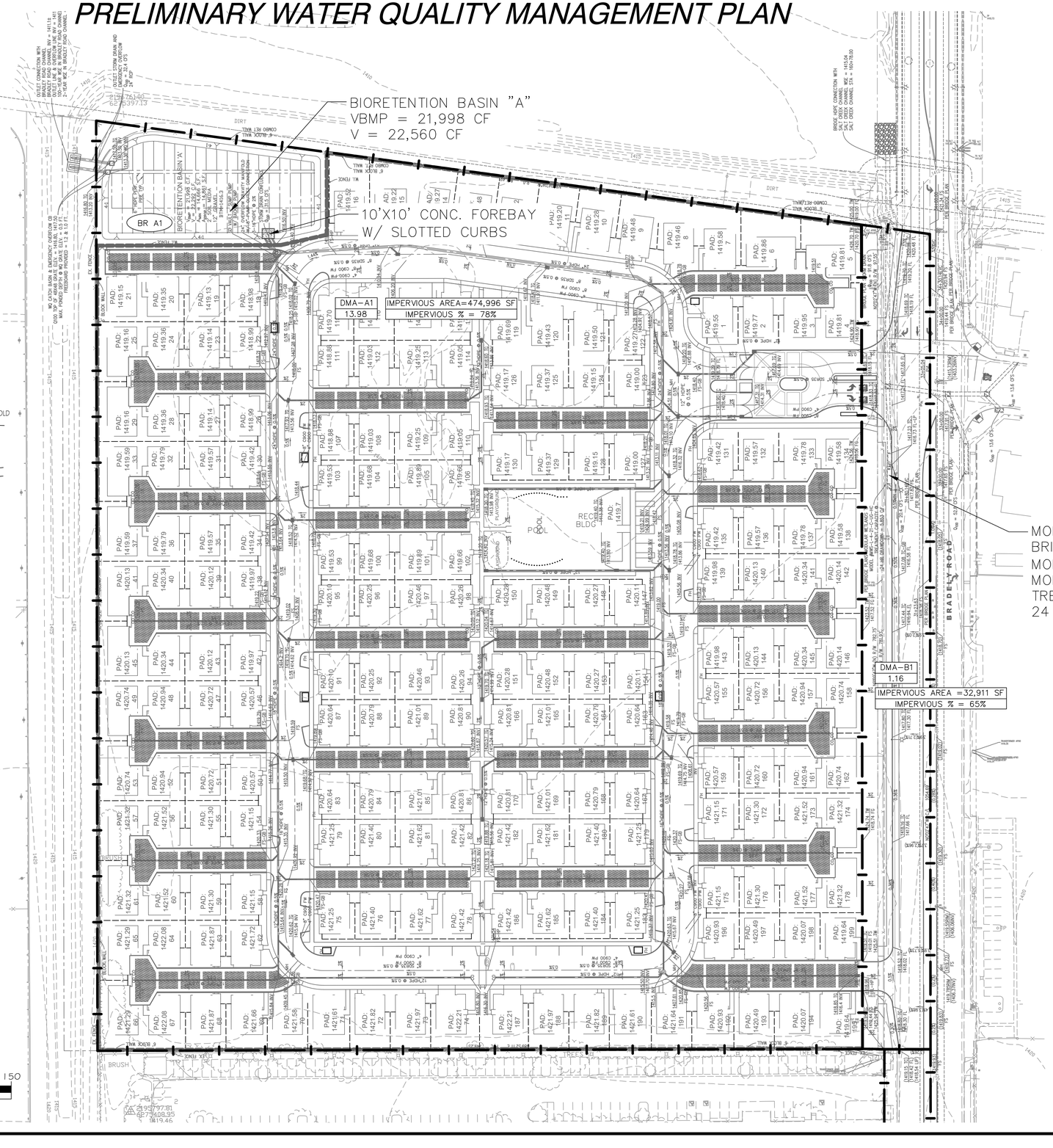
BIO-RETENTION SECTION
N.T.S

PROPOSED LEGEND

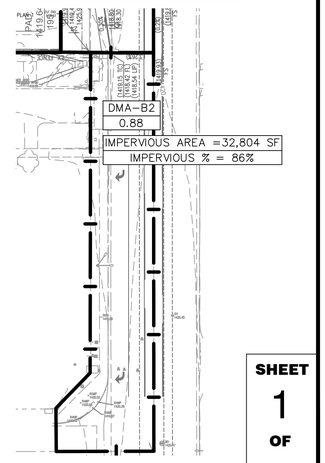
- STREET LIGHT
- SEWER MANHOLE
- STORMDRAIN CLEANOUT
- STORMDRAIN MANHOLE
- FIRE HYDRANT
- 7' WIDE CATCH BASIN
- STORMDRAIN BASIN OUTLET STRUCTURE
- STORMDRAIN BASIN INLET STRUCTURE
- 6" SEWER LATERAL
- 2" WATER LATERAL & BFP
- 4" FIRE LATERAL, DCDA, PIV & FCA
- 8" SANITARY SEWER LINE
- 2" IRRIGATION WATER LINE
- 8" WATER LINE
- STORM DRAIN LINE (SIZE/TYPE PER PLAN)
- BLOCK WALL
- 6" CURB
- 6" CURB & GUTTER
- 4' WIDE VALLEY GUTTER
- PROPERTY LINE
- RIGHT-OF-WAY LINE
- STREET CENTERLINE
- BUILDING
- BIORETENTION AREAS
- LANDSCAPING
- RAINWATER HARVEST TANK

BMP LEGEND:

DMA–A1 / 7.50	INDICATES DRAINAGE MANAGEMENT AREA ID / INDICATES AREA IN ACRES
BR A1	INDICATES BMP ID
	INDICATES SITE TRIBUTARY AREA BOUNDARY



OFFSITE TRIBUTARY



GRAPHIC SCALE
50 0 25 50 100 150
(IN FEET)
1 inch =50 ft.

KOLIBRIEN
CIVIL / STRUCTURAL / SURVEYING
27919 JEFFERSON AVE., STE. 201, TEMECULA CA, 92590
Phone: (951) 252-1034 Web: WWW.KOLIBRIEN.BIZ

SHEET 1 OF 1

File: WO1101

R 07 W | R 06 W | R 05 W | R 04 W | R 03 W | R 02 W | R 01 W | R 01 E | R 02 E | R 03 E | R 04 E | R 05 E

T 01 S | T 02 S | T 03 S | T 04 S | T 05 S | T 06 S | T 07 S | T 08 S

0.85 MiraLoma
0.61 RiversideNorth
0.68 PigeonPass
0.54 RiversideSouth
0.66 MorenoEast
0.85 Beaumont
0.88 PradoDam
0.51 Woodcrest
0.50 LakeMathews
0.68 PerrisReservoir
0.87 VistaGrandeGS
0.70 SanJacintoNWS
1.18 Idyllwild
0.68 Winchester
0.90 HurkeyCreek
0.70 ElsinoreNWS
1.11 ElCarisoStation
0.77 WildomarLaCresta
0.52 SkinnerLake
0.65 Anza
0.77 SantaRosaPlateau
1.00 TemeculaNWS
0.64 AguangaValley

Santa Ana River Watershed

Santa Margarita Watershed

Rain Gage Locations

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

Isohyetal Map for the 85th Percentile 24 hour Storm Event

July 2011

Santa Ana Watershed - BMP Design Volume, V_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	KOLIBRIEN CORP.	Date	6/30/2021
Designed by	JJ	Case No	1
Company Project Number/Name	Menifee Riverwalk Townhomes		

BMP Identification

BMP NAME / ID: BR A1 - Bioretention

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85} = 0.60 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
A1-A	*202092*	*Roofs*	*1*	*0.89*	*180266.1*			
A1-B	*272904*	*Concrete or Asphalt*	*1*	*0.89*	*243430.4*			
A1-C	*133973*	*Ornamental Landscaping*	*0.1*	*0.11*	*14798.4*			
	608969		*Total*		*438494.9*	*0.60*	*21997.8*	*22292*

Notes:

Bioretention Facility - Design Procedure	BMP ID: BR A1	Legend:	Required Entries / Calculated Cells

Company Name: Kolibrien Corp. Date: 6/30/2021

Designed by: JJ County/City Case No.:

Design Volume

Enter the area tributary to this feature A_T= 13.98 acres

Enter V_{BMP} determined from Section 2.1 of this Handbook V_{BMP}= 21,998 ft^3

Type of Bioretention Facility Design

○ Side slopes required (parallel to parking spaces or adjacent to walkways)

◉ No side slopes required (perpendicular to parking space or Planter Boxes)

Bioretention Facility Surface Area

Depth of Soil Filter Media Layer d_S = 2.0 ft

Top Width of Bioretention Facility, excluding curb w_T = 90.0 ft

Total Effective Depth, d_E

$d_E = [(0.3) \times d_S + (0.4) \times 1] + 0.5$ d_E = 1.50 ft

Minimum Surface Area, A_m

$$A_M\ (ft^2) = \frac{V_{BMP}\ (ft^3)}{d_E\ (ft)}$$

A_M = 14,666 ft^2

Proposed Surface Area A= 14,861 ft^2

Minimum Required Length of Bioretention Facility, L L = 163.0 ft

Bioretention Facility Properties

Side Slopes in Bioretention Facility z = 0 :1

Diameter of Underdrain 6 inches

Longitudinal Slope of Site (3% maximum) 0 %

6" Check Dam Spacing 0 feet

Describe Vegetation: Natural Grasses

Notes: Volume = 14861 x 1.50 = 22,292

Shrubs and natural grass vegetation, dg maintenance ramp, conc. perimeter wall

Santa Ana Watershed - BMP Design Volume, V_{BMP}

(Rev. 10-2011)

Legend: Required Entries | Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name KOLIBRIEN CORP. Date 4/26/2021

Designed by JJ Case No 1

Company Project Number/Name Menifee Riverwalk Townhomes

BMP Identification

BMP NAME / ID MODULAR WETLANDS B1

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth,
from the Isohyetal Map in Handbook Appendix E

D_{85}= 0.60 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
B1-A	*32911*	*Concrete or Asphalt*	*1*	*0.89*	*29356.6*			
B1-B	*17721*	*Ornamental Landscaping*	*0.1*	*0.11*	*1957.4*			
	50632	**Total**			**31314**	**0.60**	**1570.9**	**2280**

Notes:

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name | Date

Designed by | Case No

Company Project Number/Name

BMP Identification

BMP NAME / ID: MODULAR WETLANDS B1

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity I = 0.20 in/hr

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMAs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
B1-A	*32911*	*Concrete or Asphalt*	*1*	*0.89*	*29356.6*			
B1-B	*17721*	*Ornamental Landscaping*	*0.1*	*0.11046*	*1957.4*			
	50632		***Total***		**31314**	**0.20**	***0.1***	***0.27***

Notes:

Santa Ana Watershed - BMP Design Volume, V_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	KOLIBRIEN CORP.	Date	4/26/2021
Designed by	JJ	Case No	1
Company Project Number/Name	Menifee Riverwalk Townhomes		

BMP Identification

BMP NAME / ID: MODULAR WETLANDS B2

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85} = 0.60 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
B2-A	*32804*	*Concrete or Asphalt*	*1*	*0.89*	*29261.2*			
B2-B	*5340*	*Ornamental Landscaping*	*0.1*	*0.11*	*589.8*			
	38144		*Total*		29851	0.60	*1497.5*	*2280*

Notes:

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}
(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name | Date
Designed by | Case No
Company Project Number/Name

BMP Identification

BMP NAME / ID: MODULAR WETLANDS B2

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity I = 0.20 in/hr

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

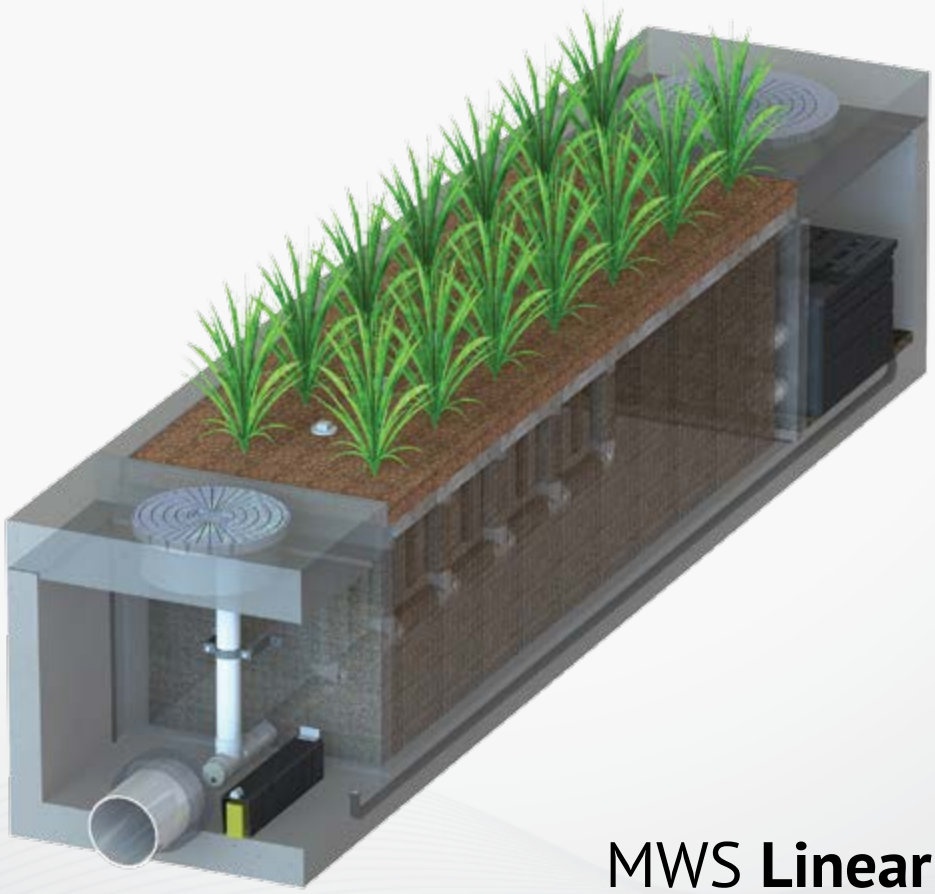
DMAs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
B2-A	*32804*	*Concrete or Asphalt*	*1*	*0.89*	*29261.2*			
B2-B	*5340*	*Ornamental Landscaping*	*0.1*	*0.11046*	*589.8*			
	38144		***Total***		**29851**	**0.20**	***0.1***	***0.27***

Notes:

MODULAR WETLANDS™

*Advanced **Stormwater** Biofiltration*



MWS **Linear**

Contents

The Urban Impact

For hundreds of years natural wetlands surrounding our shores have played an integral role as nature's stormwater treatment system. But as our cities grow and develop, these natural wetlands have perished under countless roads, rooftops, and parking lots.

Plant A Wetland

Without natural wetlands our cities are deprived of water purification, flood control, and land stability. Modular Wetlands and the MWS Linear re-establish nature's presence and rejuvenate water ways in urban areas.

MWS **Linear**

The Modular Wetland System Linear represents a pioneering breakthrough in stormwater technology as the only biofiltration system to utilize patented horizontal flow, allowing for a smaller footprint and higher treatment capacity. While most biofilters use little or no pre-treatment, the MWS Linear incorporates an advanced pre-treatment chamber that includes separation and pre-filter cartridges. In this chamber sediment and hydrocarbons are removed from runoff before it enters the biofiltration chamber, in turn reducing maintenance costs and improving performance.

Applications

The MWS Linear has been successfully used on numerous new construction and retrofit projects. The system's superior versatility makes it beneficial for a wide range of stormwater and waste water applications - treating rooftops, streetscapes, parking lots, and industrial sites.

Industrial

Many states enforce strict regulations for discharges from industrial sites. The MWS Linear has helped various sites meet difficult EPA mandated effluent limits for dissolved metals and other pollutants.

Residential

Low to high density developments can benefit from the versatile design of the MWS Linear. The system can be used in both decentralized LID design and cost-effective end-of-the-line configurations.

Streets

Street applications can be challenging due to limited space. The MWS Linear is very adaptable, and offers the smallest footprint to work around the constraints of existing utilities on retrofit projects.

Parking Lots

Parking lots are designed to maximize space and the MWS Linear's 4 ft. standard planter width allows for easy integration into parking lot islands and other landscape medians.

Commercial

Compared to bioretention systems, the MWS Linear can treat far more area in less space - meeting treatment and volume control requirements.

Mixed Use

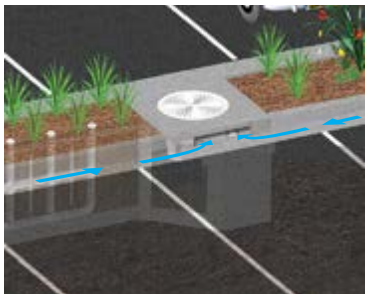
The MWS Linear can be installed as a raised planter to treat runoff from rooftops or patios, making it perfect for sustainable "live-work" spaces.

More applications are available on our website: www.ModularWetlands.com/Applications

- Agriculture
- Reuse
- Low Impact Development
- Waste Water

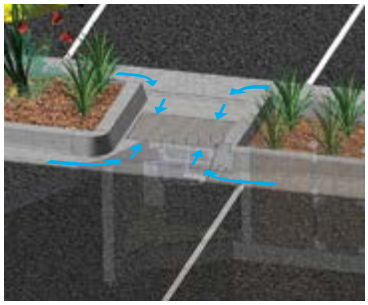
Configurations

The MWS Linear is the preferred biofiltration system of Civil Engineers across the country due to its versatile design. This highly versatile system has available "pipe-in" options on most models, along with built-in curb or grated inlets for simple integration into your stormdrain design.



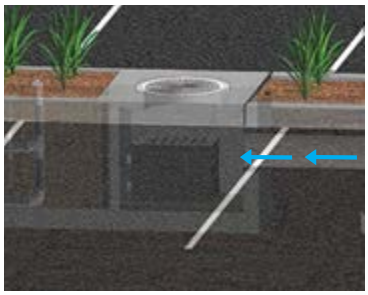
Curb Type

The *Curb Type* configuration accepts sheet flow through a curb opening and is commonly used along road ways and parking lots. It can be used in sump or flow by conditions. Length of curb opening varies based on model and size.



Grate Type

The *Grate Type* configuration offers the same features and benefits as the *Curb Type* but with a grated/drop inlet above the systems pre-treatment chamber. It has the added benefit of allowing for pedestrian access over the inlet. ADA compliant grates are available to assure easy and safe access. The *Grate Type* can also be used in scenarios where runoff needs to be intercepted on both sides of landscape islands.



Vault Type

The system's patented horizontal flow biofilter is able to accept inflow pipes directly into the pre-treatment chamber, meaning the MWS Linear can be used in end-of-the-line installations. This greatly improves feasibility over typical decentralized designs that are required with other biofiltration/bioretention systems. Another benefit of the "pipe in" design is the ability to install the system downstream of underground detention systems to meet water quality volume requirements.

Downspout Type

The *Downspout Type* is a variation of the *Vault Type* and is designed to accept a vertical downspout pipe from roof top and podium areas. Some models have the option of utilizing an internal bypass, simplifying the overall design. The system can be installed as a raised planter and the exterior can be stuccoed or covered with other finishes to match the look of adjacent buildings.

Advantages & Operation

The MWS Linear is the most efficient and versatile biofiltration system on the market, and the only system with horizontal flow which improves performance, reduces footprint, and minimizes maintenance. Figure-1 and Figure-2 illustrate the invaluable benefits of horizontal flow and the multiple treatment stages.

Featured Advantages

- Horizontal Flow Biofiltration
- Greater Filter Surface Area
- Pre-Treatment Chamber
- Patented Perimeter Void Area
- Flow Control
- No Depressed Planter Area

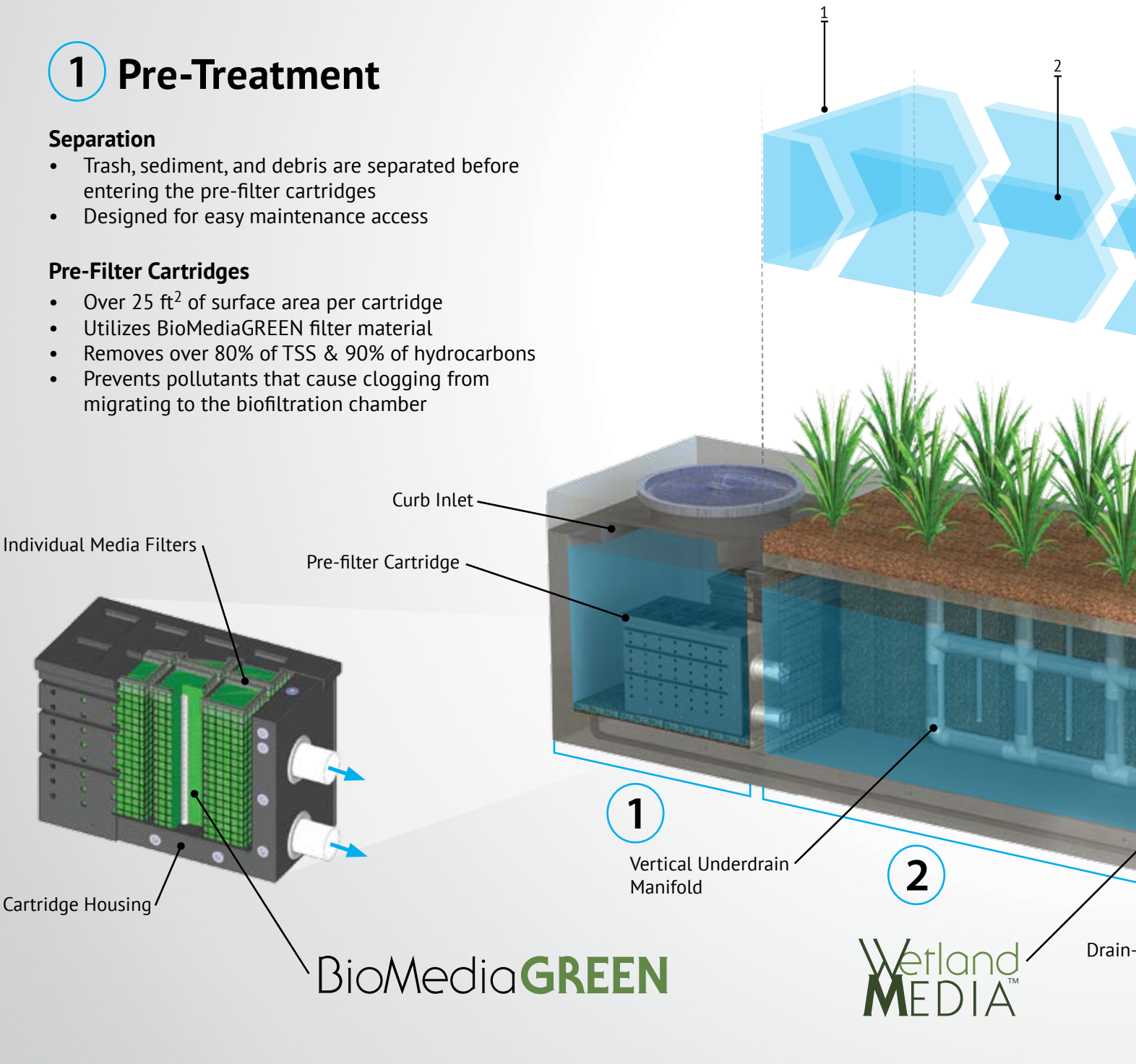
1 Pre-Treatment

Separation

- Trash, sediment, and debris are separated before entering the pre-filter cartridges
- Designed for easy maintenance access

Pre-Filter Cartridges

- Over 25 ft^2 of surface area per cartridge
- Utilizes BioMediaGREEN filter material
- Removes over 80% of TSS & 90% of hydrocarbons
- Prevents pollutants that cause clogging from migrating to the biofiltration chamber



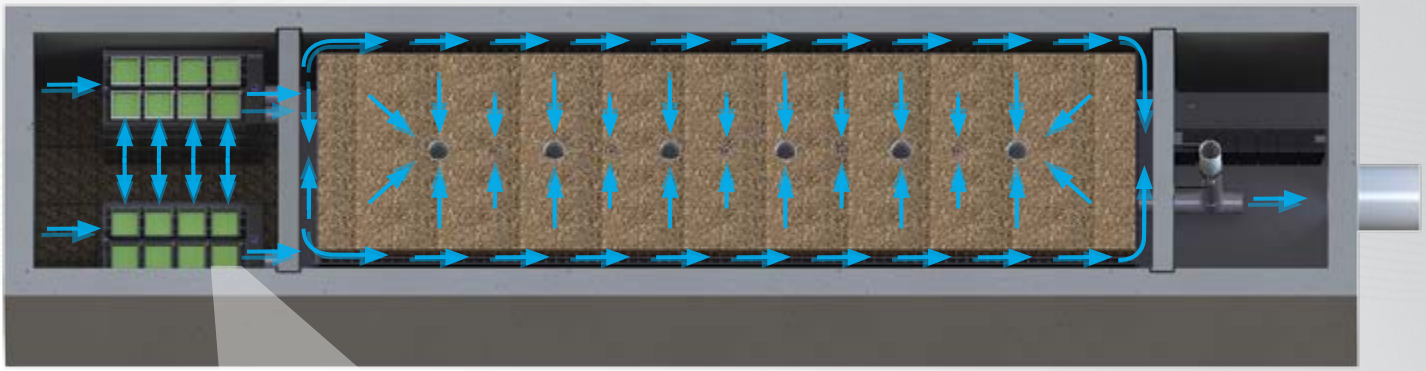


Fig. 2 - Top View

2x to 3x More Surface Area Than Traditional Downward Flow Bioretention Systems.

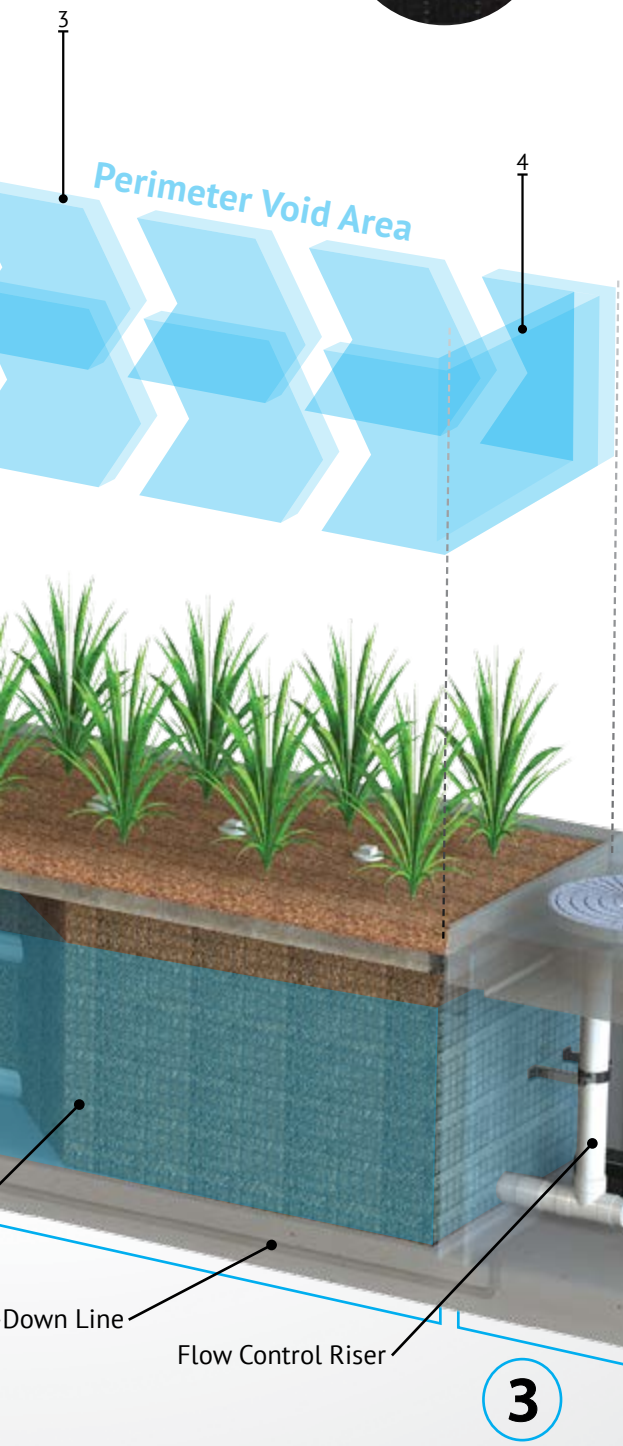


Fig. 1

2 Biofiltration

Horizontal Flow

- Less clogging than downward flow biofilters
- Water flow is subsurface
- Improves biological filtration

Patented Perimeter Void Area

- Vertically extends void area between the walls and the WetlandMEDIA on all four sides.
- Maximizes surface area of the media for higher treatment capacity

WetlandMEDIA

- Contains no organics and removes phosphorus
- Greater surface area and 48% void space
- Maximum evapotranspiration
- High ion exchange capacity and light weight

3 Discharge

Flow Control

- Orifice plate controls flow of water through WetlandMEDIA to a level lower than the media's capacity.
- Extends the life of the media and improves performance

Drain-Down Filter

- The Drain-Down is an optional feature that completely drains the pre-treatment chamber
- Water that drains from the pre-treatment chamber between storm events will be treated

Orientations

Side-By-Side

The *Side-By-Side* orientation places the pre-treatment and discharge chamber adjacent to one another with the biofiltration chamber running parallel on either side. This minimizes the system length, providing a highly compact footprint. It has been proven useful in situations such as streets with directly adjacent sidewalks, as half of the system can be placed under that sidewalk. This orientation also offers internal bypass options as discussed below.

End-To-End

The *End-To-End* orientation places the pre-treatment and discharge chambers on opposite ends of the biofiltration chamber therefore minimizing the width of the system to 5 ft (outside dimension). This orientation is perfect for linear projects and street retrofits where existing utilities and sidewalks limit the amount of space available for installation. One limitation of this orientation is bypass must be external.

Bypass

Internal Bypass Weir (Side-by-Side Only)

The *Side-By-Side* orientation places the pre-treatment and discharge chambers adjacent to one another allowing for integration of internal bypass. The wall between these chambers can act as a bypass weir when flows exceed the system's treatment capacity, thus allowing bypass from the pre-treatment chamber directly to the discharge chamber.

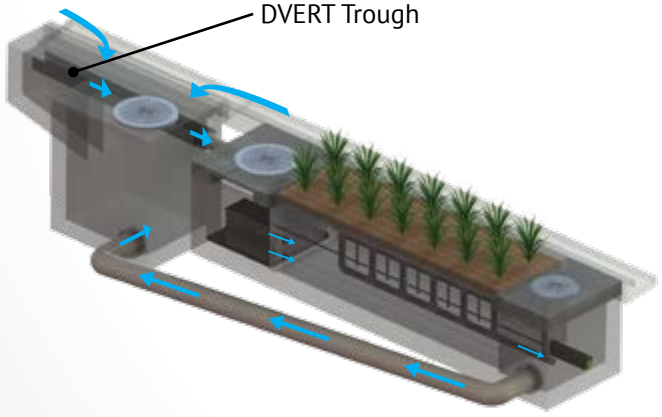
External Diversion Weir Structure

This traditional offline diversion method can be used with the MWS Linear in scenarios where runoff is being piped to the system. These simple and effective structures are generally configured with two outflow pipes. The first is a smaller pipe on the upstream side of the diversion weir - to divert low flows over to the MWS Linear for treatment. The second is the main pipe that receives water once the system has exceeded treatment capacity and water flows over the weir.

Flow By Design

This method is one in which the system is placed just upstream of a standard curb or grate inlet to intercept the first flush. Higher flows simply pass by the MWS Linear and into the standard inlet downstream.

DVERT Low Flow Diversion



This simple yet innovative diversion trough can be installed in existing or new curb and grate inlets to divert the first flush to the MWS Linear via pipe. It works similar to a rain gutter and is installed just below the opening into the inlet. It captures the low flows and channels them over to a connecting pipe exiting out the wall of the inlet and leading to the MWS Linear. The DVERT is perfect for retrofit and green street applications that allows the MWS Linear to be installed anywhere space is available.

Performance

The MWS Linear continues to outperform other treatment methods with superior pollutant removal for TSS, heavy metals, nutrients, hydrocarbons and bacteria. Since 2007 the MWS Linear has been field tested on numerous sites across the country. With it's advanced pre-treatment chamber and innovative horizontal flow biofilter, the system is able to effectively remove pollutants through a combination of physical, chemical, and biological filtration processes. With the same biological processes found in natural wetlands, the MWS Linear harnesses natures ability to process, transform, and remove even the most harmful pollutants.

Approvals

The MWS Linear has successfully met years of challenging technical reviews and testing from some of the most prestigious and demanding agencies in the nation, and perhaps the world.

Washington State TAPE Approved

The MWS Linear is approved for General Use Level Designation (GULD) for Basic, Enhanced, and Phosphorus treatment at 1 gpm/ft^2 loading rate. The highest performing BMP on the market for all main pollutant categories.

TSS	Total Phosphorus	Ortho Phosphorus	Nitrogen	Dissolved Zinc	Dissolved Copper	Total Zinc	Total Copper	Motor Oil
85%	64%	67%	45%	66%	38%	69%	50%	95%

DEQ Assignment

The Virginia Department of Environmental Quality assigned the MWS Linear, the highest phosphorus removal rating for manufactured treatment devices to meet the new Virginia Stormwater Management Program (VSMP) Technical Criteria.

Maryland Department Of The Environment Approved

Granted ESD (Environmental Site Design) status for new construction, redevelopment and retrofitting when designed in accordance with the Design Manual.

MASTEP Evaluation

The University of Massachusetts at Amherst – Water Resources Research Center, issued a technical evaluation report noting removal rates up to 84% TSS, 70% Total Phosphorus, 68.5% Total Zinc, and more.

Rhode Island DEM Approved

Approved as an authorized BMP and noted to achieve the following minimum removal efficiencies: 85% TSS, 60% Pathogens, 30% Total Phosphorus, and 30% Total Nitrogen.

Flow Based Sizing

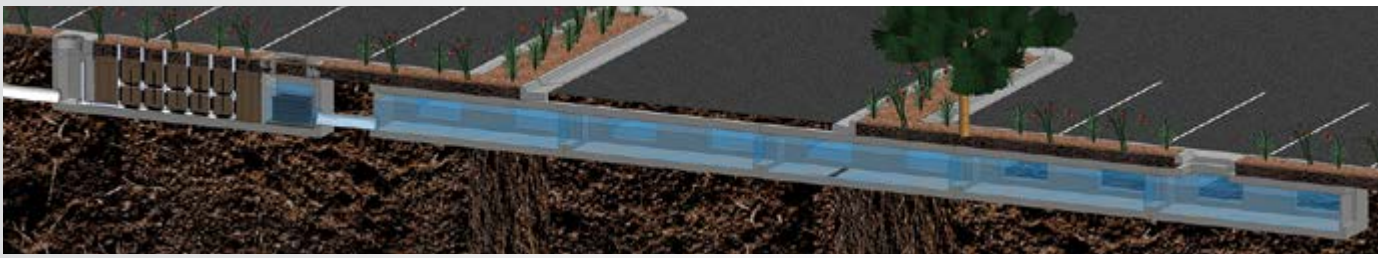
The MWS Linear can be used in stand alone applications to meet treatment flow requirements. Since the MWS Linear is the only biofiltration system that can accept inflow pipes several feet below the surface it can be used not only in decentralized design applications but also as a large central end-of-the-line application for maximum feasibility.

Treatment Flow Sizing Table

Model #	Dimensions	WetlandMedia Surface Area	Treatment Flow Rate (cfs)
MWS-L-4-4	4' x 4'	23 ft^2	0.052
MWS-L-4-6	4' x 6'	32 ft^2	0.073
MWS-L-4-8	4' x 8'	50 ft^2	0.115
MWS-L-4-13	4' x 13'	63 ft^2	0.144
MWS-L-4-15	4' x 15'	76 ft^2	0.175
MWS-L-4-17	4' x 17'	90 ft^2	0.206
MWS-L-4-19	4' x 19'	103 ft^2	0.237
MWS-L-4-21	4' x 21'	117 ft^2	0.268
MWS-L-8-8	8' x 8'	100 ft^2	0.230
MWS-L-8-12	8' x 12'	151 ft^2	0.346
MWS-L-8-16	8' x 16'	201 ft^2	0.462

Volume Based Sizing

Many states require treatment of a water quality volume and do not offer the option of flow based design. The MWS Linear and its unique horizontal flow makes it the only biofilter that can be used in volume based design installed downstream of ponds, detention basins, and underground storage systems.



Treatment Volume Sizing Table

Model #	Treatment Capacity (cu. ft.) @ 24-Hour Drain Down	Treatment Capacity (cu. ft.) @ 48-Hour Drain Down
MWS-L-4-4	1140	2280
MWS-L-4-6	1600	3200
MWS-L-4-8	2518	5036
MWS-L-4-13	3131	6261
MWS-L-4-15	3811	7623
MWS-L-4-17	4492	8984
MWS-L-4-19	5172	10345
MWS-L-4-21	5853	11706
MWS-L-8-8	5036	10072
MWS-L-8-12	7554	15109
MWS-L-8-16	10073	20145

Installation

The MWS Linear is simple, easy to install, and has a space efficient design that offers lower excavation and installation costs compared to traditional tree-box type systems. The structure of the system resembles pre-cast catch basin or utility vaults and is installed in a similar fashion.

The system is delivered fully assembled for quick installation. Generally, the structure can be unloaded and set in place in 15 minutes. Our experienced team of field technicians are available to supervise installations and provide technical support.

Maintenance

Reduce your maintenance costs, man hours, and materials with the MWS Linear. Unlike other biofiltration systems that provide no pre-treatment, the MWS Linear is a self-contained treatment train which incorporates simple and effective pre-treatment.

Maintenance requirements for the biofilter itself are almost completely eliminated, as the pre-treatment chamber removes and isolates trash, sediments, and hydrocarbons. What's left is the simple maintenance of an easily accessible pre-treatment chamber that can be cleaned by hand or with a standard vac truck. Only periodic replacement of low-cost media in the pre-filter cartridges is required for long term operation and there is absolutely no need to replace expensive biofiltration media.

Plant Selection

Abundant plants, trees, and grasses bring value and an aesthetic benefit to any urban setting, but those in the MWS Linear do even more - they increase pollutant removal. What's not seen, but very important, is that below grade the stormwater runoff/flow is being subjected to nature's secret weapon: a dynamic physical, chemical, and biological process working to break down and remove non-point source pollutants. The flow rate is controlled in the MWS Linear, giving the plants more "contact time" so that pollutants are more successfully decomposed, volatilized and incorporated into the biomass of The MWS Linear's micro/macro flora and fauna.

A wide range of plants are suitable for use in the MWS Linear, but selections vary by location and climate. View suitable plants by selecting the list relative to your project location's hardy zone.

Please visit **www.ModularWetlands.com/Plants** for more information and various plant lists.

www.ModularWetlands.com | (855) 5MOD-WET | info@ModularWetlands.com

Appendix D

EXCERPT A: SALT CREEK CHANNEL PLAN AND PROFILE, DWG. NO. 4-169

SALT CREEK CHANNEL

RIVERSIDE COUNTY, CALIFORNIA

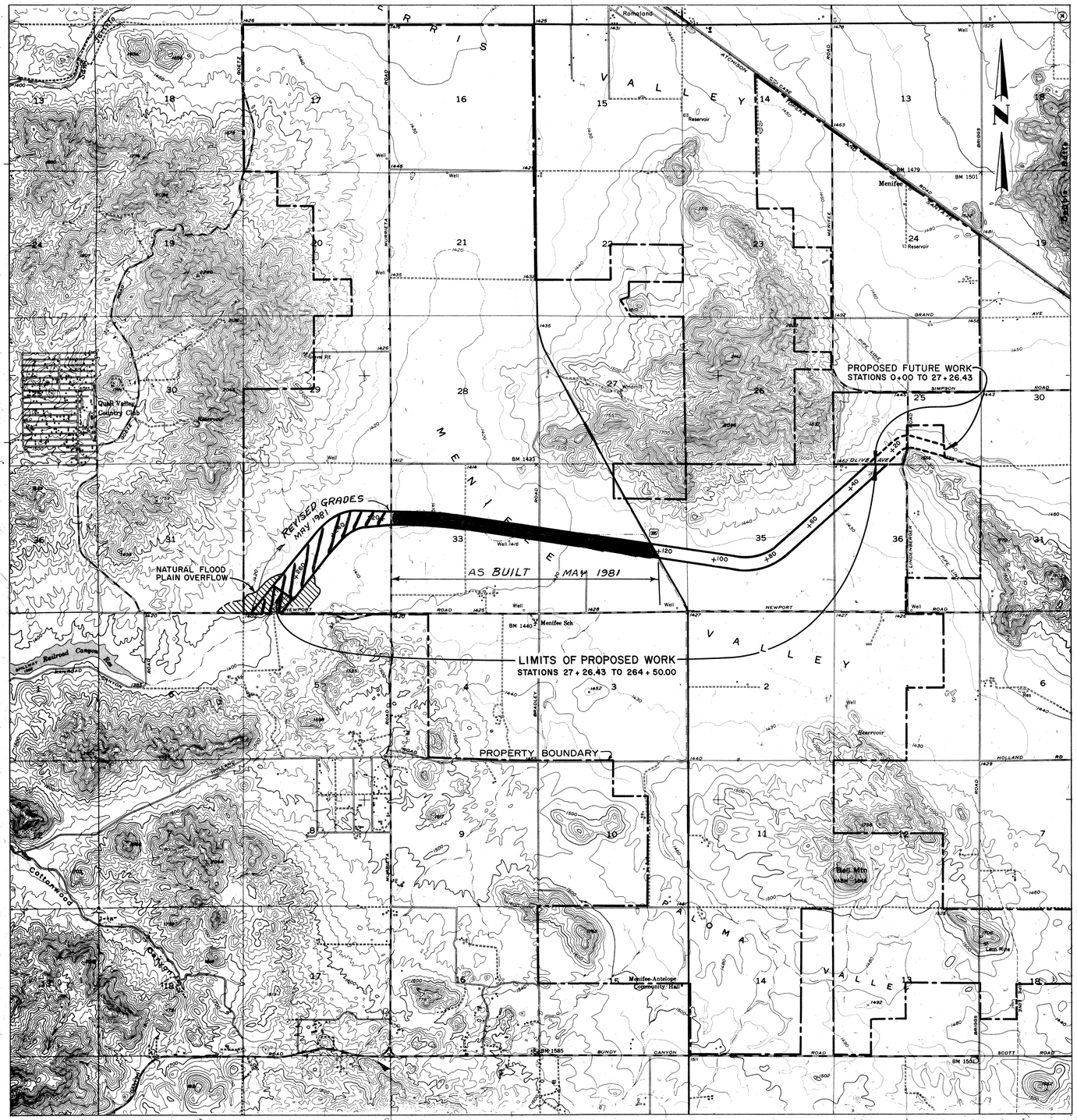
FOR

DEL E. WEBB CORPORATION

SUN CITY CALIFORNIA

WILSEY, HAM & BLAIR ENGINEERS & PLANNERS
758 WEST COLORADO BLVD, LOS ANGELES 41, CALIF.

AS BUILTS BY STAN SCHUPP & ASSOC. MAY 1981



AREA MAP

0 2000 4000
1000 0 1000 3000 5000
Scale in Feet

GENERAL NOTES

1. Elevations based upon U.S.C. & G.S. Sea Level Datum, 1929 Adjustment.
2. The California Coordinate System, Zone VI, is the basis of bearing. The line connecting U.S.C. & G.S. Stations "Menifee" and "Double" (N 86° 49' 20.5" E - 32,160.59 Feet) was used for determination of Grid Azimuth. Distances shown are ground distances.
3. Unless otherwise noted, all ground topography was prepared from 1961 aerial photography.

HYDRAULIC DESIGN DATA

Channel design is based upon Manning Formula roughness coefficient of $n = 0.030$ for the following design flows:

STATION	FLOW - CUBIC FEET/SECOND
0+00 - 132+00	12,000
132+00 - 140+00	12,000 - 13,500*
140+00 - 162+43	13,500
162+43 - 170+50	13,500 - 14,500
170+50 - 198+77	14,500
198+77 - 209+50	14,500 - 15,500
209+50 - 264+50	15,500

*Transition areas indicate allowance for Local Drainage Inflow.

SHEET INDEX

DRAINAGE PLANS APPROVED BY John W. Bugbee R.C.E. NO. 8822
RIVERSIDE COUNTY FLOOD CONTROL DISTRICT
Nov. 26 1962

AS BUILT
PROJECT NO. 4-4-110

DRWG. NO. 62-5018-D-1
1 / 12
DRWG. NO. 4-169

PROFILE

HORIZ. SCALE: 1" = 200'
VERT. SCALE 1" = 4'

ELEVATION USC & GS DATUM

STA. 0+00 BEGIN CHANNEL

STA. 12+13.33 B.C.

STA. 17+12.12 E.C.

STA. 27+26.43 OLIVE AVE. PROPERTY LINE

EXISTING GROUND

DESIGN WATER SURFACE

START OF WORK

DESIGN WATER SURFACE

1:3 SLOPE TO EXIST GROUND SEE SHT 10 FOR DETAIL

℄ CHANNEL

Q=12,000 CFS

S=0.0014

EL. 1427.8

EL. 1431.6

STA. 45+00.00 MATCH LINE - SEE SHEET No. 3

EL. 1425.3

PROPOSED FUTURE WORK STA. 0+00 to STA. 27+26.43 TO BE DONE BY OTHERS

185,700 C.Y. CHANNEL EXCAVATION 335,400 C.Y.

CONTROL PT. W.H.&B. SURVEY	COORDINATES N	COORDINATES E	BEARING	DIST.	TIE TO STA.
S 1/4 COR. SEC. 25	58,911.91	727,983.74	N68°30'22"E	1415.98	0+00
61 - 43	58,818.80	730,611.61	N 64°58'04"W	1446.20	0+00
61 - 82	58,976.68	725,117.31	S 88°46'00"E	1798.25	27+26.43

(4) EASEMENT — PERMANENT TRAINING LEVEE (SEE SHEET 10 FOR DETAIL)

(3) OVERFLOW EASEMENT LINE

NOT PART OF WEBB PROPERTY

STA. 17+12.12 E.C. N 59,623.05 E 727,663.14

STA. 12+13.33 B.C. N 59,738.03 E 728,127.48

LINDENBERGER RD.

R/W LINE

27+26.43 PROPERTY LINE

Δ = 57°05'24" R = 500' L = 498.79' T = 272.36 P.I.

℄ CHANNEL

8" C.M.P. (3)

ROAD RAMP (SEE SHEET 10 FOR DETAIL)

CHANNEL TOE

S 47°30'51"W

421'

325'

8" C.M.P.

R/W LINE

OVERFLOW EASEMENT LINE

OLIVE AVE.

(4) (SEE SHEET 10 FOR DETAIL)

EASEMENT LINE

EASEMENT

TRAINING LEVEE

DEL E. WEBB CORP.

OVERFLOW

PROPERTY LINE

℄ EXISTING DIRT RD.

S 1/4 COR. SEC. 25

CHANNEL TOE

R/W LINE

N 73°19'45" W ℄ CHANNEL

STA. 0+00 BEGIN CHANNEL

421'

325'

NOTE: DASHED CONTOUR LINES PLOTTED FROM W. H. & B. SURVEY NOTES.

(4) NOTE: INTEREST IN LAND TO BE GRANTED TO R.C.F.C. & W.C.D.
1. IMPROVED CHANNEL R/W — FEE
2. TRAINING LEVEE R/W — EASEMENT
3. FLOODING EASEMENT — LAND WITHIN THE LIMITS OF THE OVERFLOW EASEMENT LINE TO BE ACQUIRED AT THE TIME OF CONSTRUCTION OF STAGE III

NOT PART OF WEBB PROPERTY

E 725,000 N 57,000 E 727,000 E 728,000 N 58,000 E 729,000 N 59,000 E 730,000 N 60,000

PLAN
200 0 200 400
SCALE: 1" = 200'

	BY	DATE	REVISIONS
(4)	R.W.W.	11-19-62	ADDED NOTES & OVERFLOW EASEMENT LINES.
(3)	L.A.T.	NOV. 5, 1962	ADDED EASEMENT LINES & 8" C.M.P.'S
(2)	A.C.H.	10/62	REVISED TRAINING LEVEE DETAIL
(1)	J.H.D.	10-9-62	REMOVED SECTION C-C

REGISTERED PROFESSIONAL ENGINEER THOMAS MCC... APPROVED ... DATE: SEP 5 1962 STATE OF CALIFORNIA

	BY	DATE
DESIGN	T.R.H	5/62
CKD.	PRS	5/62
PROJ. ENG.	A.C.H.	9/62
FLD. BK. NO.		

ENGINEERS WILSEY, HAM & BLAIR PLANNERS

DRWG. NO. 62-5018-D-1

SALT CREEK CHANNEL
PLAN AND PROFILE
STA. 0+00 TO STA. 45+00

PROJECT NO. 4-4-110

AS BUILT

2/12

DRWG. NO. 4-169

PROFILE

HORIZ. SCALE: 1"= 200'
VERT. SCALE: 1"= 4'

STA. 91+49.32 E.C.

STA. 70+35.41 B.C.

DESIGN WATER SURFACE

EXISTING GROUND

Q = 12,000 CFS.

Q = 12000 CFS

R. CHANNEL

S = 0.0014

EL. 1416.9

EL. 1418.9

EL. 1421.8

EL. 1425.3

STA. 105+00.00, MATCH LINE - SEE SHEET No. 4

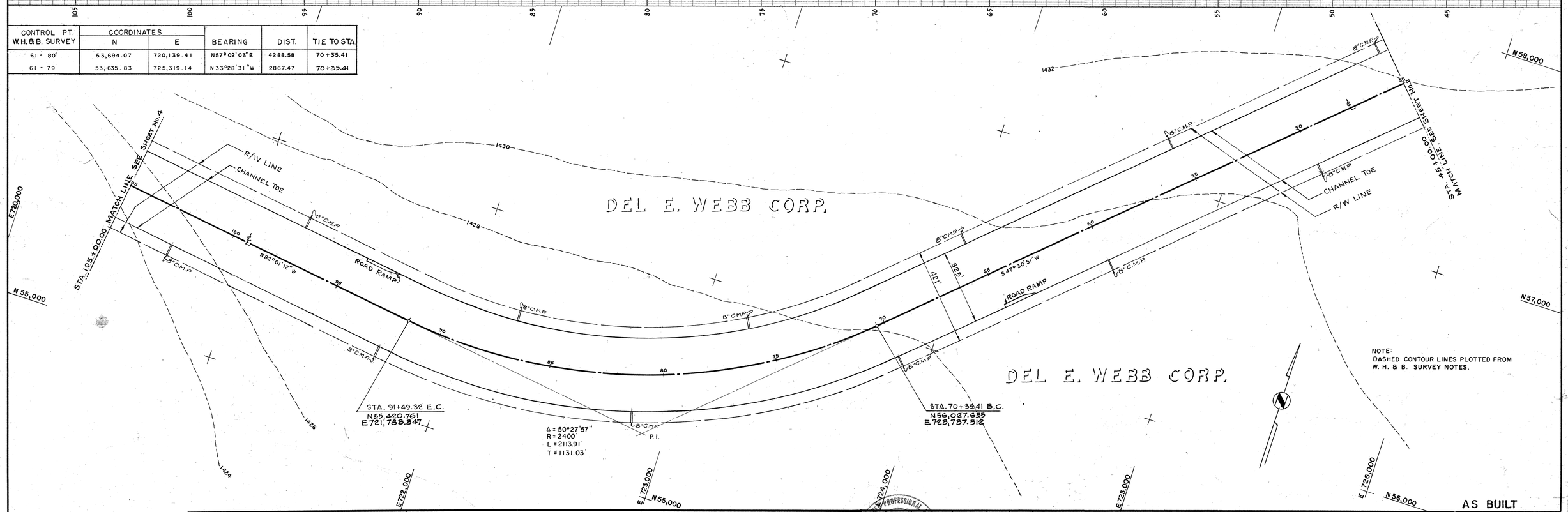
STA. 45+00.00, MATCH LINE, SEE SHEET No. 2

CHANNEL EXCAVATION 562,900 C.Y.

1435 1430 1425 1420 1415

105 100 95 90 85 80 75 70 65 60 55 50 45

CONTROL PT. W.H.&B. SURVEY	COORDINATES N	E	BEARING	DIST.	TIE TO STA
61 - 80	53,694.07	720,139.41	N57°02'03"E	4288.58	70+35.41
61 - 79	53,635.83	725,319.14	N33°28'31"W	2867.47	70+35.41



NOTE:
DASHED CONTOUR LINES PLOTTED FROM W. H. & B. SURVEY NOTES.

PLAN
200 0 200 400
SCALE: 1" = 200'

	BY	DATE	REVISIONS
3			
2			
1	L.A.T.	NOV. 29 '62	RELOCATE 8" C.M.P.'S

REGISTERED PROFESSIONAL ENGINEER THOMAS McCUTCHEN

APPROVED

DATE 12-5-62

	BY	DATE
DESIGN	T.R.H.	6/62
CKD.	P.R.S.	6/62
PROJ. ENG.	A.C.H.	9/62
FLD. BK. NO.		

ENGINEERS **WILSEY, HAM & BLAIR** PLANNERS

DRWG. NO. 62-5018-D-1

SALT CREEK CHANNEL
PLAN AND PROFILE
STA. 45+00 TO STA. 105+00

PROJECT NO. 4-4-110

AS BUILT

3/12

DRWG. NO.: 4-169

PROFILE
HORIZ. SCALE: 1"= 200'
VERT. SCALE: 1"= 4'

STA. 160+00.00 MATCH LINE - SEE SHEET No. 5

STA. 140+00 END TRANSITION

STA. 132+00 BEGIN TRANSITION

U.S. HIGHWAY 395

STA. 120+10.00

STA. 105+00.00, MATCH LINE - SEE SHEET No. 3

EXISTING GROUND

DESIGN WATER SURFACE

LT. BANK LOCAL DRAINAGE CHANNEL

BEGINNING OF CHANNEL 10:1 SLOPE

℄ CHANNEL

S = 0.0014

Q = 13,500 CFS

Q = 12,000 CFS

EL. 1409.1

EL. 1411.9

EL. 1413.0

EL. 1414.7

EL. 1416.9

CHANNEL EXCAVATION 590,800 C.Y.

CHANNEL EXCAVATION 47,800 C.Y.

1425
1420
1415
1410

160 155 150 145 140 135 130 125+ 120 115 110 105

CONTROL PT. W.H. & B. SURVEY	COORDINATES N	E	BEARING	DIST.	TIE TO STA.
61 - 75	53,726.09	714,732.62	N63° 53' 50"E	4741.51	119 + 69.44
61 - 80	53,694.07	720,139.41	N28° 28' 29"W	2409.71	119 + 69.44

The Lusk Co installed 610' -21" sewer and 1225' - 42" sewer between approx STA's 122+00 and 149+50 included are 7 manholes and lift station see EP# 4-0-110-1339

℄ of TRAINING LEVEE

OVERFLOW EASEMENT

DEL E. WEBB CORP.

EASEMENT LINE

(1) FOR STAGE I TEMPORARY TRAINING LEVEE DETAILS SEE SHEET 12

Marlborough Development constructed double RCP inlet at STA 152+43.16 one 42" RCP and one 48" RCP 10' center to center spacing and Riprap (grouted). See Encroachment Permit No. 4-0-110-1515

Carlsberg Const. Co. Installed 2-36" C.M.P. At Sta. 141+87.71 Encroachment Permit No. 4-0-110-1147 Aug. 12, 1985

Marlborough Development removed 2 ea. 36" CMP and constructed one Triple 36" RCP inlet at approx STA. 136+55.62 Encroachment Permit # 4-0-110-1761

EMWD CONST. A 48" ℄ C.M.P. RECLAIMED W.W. IN R&W FROM SUNCITY TREATMENT PLANT TO I-215 PER EMC. PERMIT # 4-0-110-2107

156+77.5 12" CMP With Headwalls

152+74 12" CMP Removed With Headwalls

146+60 8" CMP with Headwalls

136+47 8" CMP with Headwalls

129+94 8" CMP With Headwalls

125+50 12" CMP with Headwalls - FEE R/W

139+07 18" CMP No Headwalls

129+50 12" CMP with Headwalls

151+51 12" CMP with Headwalls

ROAD RAMP

CHANNEL TOE

℄ CHANNEL N82°01'12"W

R/W LINE

8' C.M.P.

EMWD 48"SS PER E.P. 4-0-110-1871

SS 21" VCP

42" SEWER

21" SEWER

STA. 140+00.00 END TRANSITION

STA. 132+00.00 BEGIN TRANSITION

Thompson Homes Box 927 Palmdale, Ca. 93550 Const. SS 21" Along S/y. R/W 10' Inside From Sta. 138+47.88 To Sta. 161+98.77 Encroachment Permit No. 4-0-110-1228 July 22 1987

Jestri Inc Construct 50'-30" RCP With 10'x10'8.2' Thick Grouted Riprap Inlet At Sta. 152+85 Encroachment Permit No. 4-0-110-1341, April 15, 1987

Cal-Neva Const. Co. Installed 36" R.C.P At Sta. 142+65 Encroachment No 4-0-110-1184 Feb. 7, 1986

W.W.T. Inc. Thompson Homes Installed 30" R.C.P. At Sta. 150+68 & 29" R.C.P. At Sta. 146+97 Inlets Encroachment Permits No's. 4-0-110-1283 Nov. 19, 1986 And 4-0-110-1282 " " "

APPROXIMATE LOCATION MAJOR LOCAL DRAINAGE CHANNEL (SEE TYPICAL DETAILS SHEET No 9)

Cord Land Development Inc. Installed 27'd 30" R.C.P. at Sta. 138+53.44, & Sta. 134+61.64 & Improved Low Flow Drain At Sta 131+00

DEL E. WEBB CORP.

Encroachment Permit No. 4-0-110-696 Nov. 16, 1981

SCE installed 5 poles between approx STA. 120+40 & STA 132+10 Encroachment Permit No. 4-0-110-1524

STA 120+10.00 ℄ U.S. HIGHWAY 395

OVERFLOW EASEMENT

U.S. HIGHWAY 395

EASEMENT LINE

℄ of TRAINING LEVEE

N 57,000
N 56,000
N 55,000
E 715,000
E 716,000
E 717,000
E 718,000
E 719,000
E 720,000
E 721,000

MUD ENTERPRISE CONSTRUCTED A DOUBLE 84"ϕ RCP S. AT STA. 1006.10 & A 48"ϕ RCP S. AT STA. 1011.25. ENC. PERMITS 4-0-110-2165

INLAND FOUNDATION ENGINEERING, INC. CONDUCTED 12 EXPLORATORY BORINGS ALONG ALIGNMENT. ACCESS RD. PER ENC. PERMIT # 4-0-110-2097

CHANNEL TOE

R/W LINE

ROAD RAMP

APPROXIMATE LOCATION MAJOR LOCAL DRAINAGE CHANNEL (SEE TYPICAL DETAIL SHEET 9)

NOTE:
DASHED CONTOUR LINES PLOTTED FROM W.H & B. SURVEY NOTES.

AS BUILT

PLAN
200 0 200 400
SCALE: 1" = 200'

	BY	DATE	REVISIONS
3	R.W.W	11-9-62	ADDED TRAINING LEVEE AND EASEMENTS
2	R.W.W.	11/5/62	RELOCATED 8" C.M.P.
1	A.C.H	10/62	ADDED NOTE

REGISTERED PROFESSIONAL ENGINEER THOMAS MCCUTCHEN APPROVED 9999 DATE 6/1/62 STATE OF CALIFORNIA

	BY	DATE
DESIGN	TRH	5/62
CKD.	PRS	5/62
PROJ. ENG.	A.C.H	5/62
FLD. BK. NO.		

ENGINEERS WILSEY, HAM & BLAIR PLANNERS

DRWG. NO. 62-5018-D-1

SALT CREEK CHANNEL
PLAN AND PROFILE
STA. 105+00 TO STA. 160+00 PROJECT NO. 4-4-110

4 / 12

DRWG. NO. 4 - 169

PROFILE

HORIZ. SCALE: 1"=200'
VERT. SCALE: 1"=4'

STA. 215+00.00, MATCH LINE, SEE SHEET NO. 6

STA. 209+50 P.I.
END TRANSITION

STA. 198+76.67 BACK =
STA. 198+75.29 AHEAD — P.I.
BEGIN TRANSITION

STA. 170+50
END TRANSITION

STA. 162+42.77 P.I.
℄ BRADLEY RD
BEGIN TRANSITION

STA. 160+00.00, MATCH LINE - SEE SHEET NO. 4

EXISTING GROUND

DESIGN WATER SURFACE

RT. BANK LOCAL DRAINAGE CHANNEL

LT. BANK LOCAL DRAINAGE CHANNEL

FL. ℄ CHANNEL TOE ⅁ S=0.0013 S=0.00132 Q=16,500 C.F.S.

TOP OF LOW FLOW CHANNEL SLOPE

FLOW LINE OF LOW FLOW CHANNEL S=0.0013

Q=15,500 C.F.S. S=0.0005

S=0.0013 S=0.00132

S=0.0013

S=0.0004 S=0.0011

S=0.0014

FL. ℄ CHANNEL TOE ⅁ STA. 202+32.21 TOP OF LOW FLOW CHANNEL SLOPE FLOW LINE OF LOW FLOW CHANNEL (BEND)

FL. ℄ CHANNEL TOE ⅁ STA. 188+05.85 TOP OF LOW FLOW CHANNEL SLOPE FLOW LINE OF LOW FLOW CHANNEL (BEND)

FL. ℄ CHANNEL TOE ⅁ STA. 192+00 TOP OF LOW FLOW CHANNEL SLOPE FLOW LINE OF LOW FLOW CHANNEL (BEND)

FL. 1402.7

FL. 1404.00

FL. 1403.10

FL. 1402.10

G6 H.P.

W 12" CM L & C

CHANNEL EXCAVATION 550,000 C.Y.

CHANNEL EXCAVATION 23,600 C.Y.

CONTROL PT. W.H.&B. SURVEY	COORDINATES N	E	BEARING	DIST.	TIE TO STA.
61 - 57 B	53,737.93	710,779.08	N56°09'53"E	4790.88	162+42.77
61 - 75	53,726.09	714,732.62	N 00°33'19" E	2679.56	162+42.77
61 - 63	59,152.63	709,438.82	S 37°41'11" E.	2818.22	198+76.57
61 - 74	59,229.90	714,797.27	S 57°35'47"W	4306.04	198+76.57

Pacific Southwest Communities Inc. Installed As Shown Slope Protection @ 548' of CL. Fence Encroachment Permit No 4-0-110-851 Dec 18, 1983

L.A. County Land constructed two 30" RCP inlets at STA 199+36. and at STA 205+06 Encroachment Permit No. 4-0-110-1428

Discovery Homes Group Constructed triple 42" RCP inlet Encroachment Permit No. 4-0-110-1574

APPROX. LOCATION MAJOR LOCAL DRAINAGE CHANNEL (SEE TYPICAL DETAILS SHEET NO. 9)

STA. 198+76.67 BACK = STA. 198+75.29 AHEAD - P.I. BEGIN TRANSITION N 56,922.38 E 711,161.71

Discovery Homes installed 46' of 24" RCP 24" outlet structure and a 10'x10' pad of grouted rip-rap at STA 186+91.50 Encroachment Permit No 4-0-110-1514

192+26 48" CMP No Headwalls

185+41 8" CMP With Headwalls

196+59 8" CMP with Headwalls

205+68.5 8" CMP with Headwalls

INLAND FOUNDATION ENGINEERING, INC. CONDUCTED 22 EXPLORATORY BORINGS ALONG N. ACCESS RD. PER ENC. PERMIT # 4-0-110-2097

R.C.R. Dept. installed 39" R.C.P. with 8" Thick Slope Paving As Shown Encroachment Permit No. 4-0-110-595 - June 26, 1980

ROAD RAMPS

STA. 170+50 P.I. END TRANSITION N 56,529.96 E 713,961.00

173+49 With Conc

18" RCP Overflow Slab

164+13 39" RCP With Headwalls

STA. 162+42.77 P.I. ℄ BRADLEY ROAD BEGIN TRANSITION N 56,405.53 E 714,758.58

161+78.8 CMP No Headwalls

EMWD CONST. A 48" ℄ CM L & C RECLAIMED W.L. IN ROW FROM SUNCITY TREATMENT PLANT TO I 215 PER ENC. PERMIT # 4-0-110-2107

4-30" RCP

EAST 1/4 COR. SEC. 33

DRY WEATHER CROSSING SEE TYPICAL SECTIONS SHEET 8

161+64.5 12" CMP With Headwalls

168+00 12" CMP No Headwalls

APPROX. LOCATION MAJOR LOCAL DRAINAGE CHANNEL (SEE TYPICAL DETAILS - SHEET NO. 9) (BRADLEY CHANNEL)

Thompson Homes Box 927 Palmdale Ca. 93550 Const. SS21 along Sly. R/W 10 Inside From Sta. 138+41.88 To Sta. 161+98.77 Encroachment Permit No. 4-0-110-1228 July 22, 1987

℄ MURRIETA RD.

STA. 215+00.00 MATCH LINE - SEE SHEET NO. 6

2-44-61 8" CMP with Headwalls

10.9' Easement

35 21

360'

420'

316'

73'

N 88°13'-12" W

N 87°53'24" W 1408.3

207+53 12" CMP with Headwalls

24" ℄ PVC WATERLINE E.P. 2441

2-48" SD

197+21 12" CMP with Headwalls

R/W LINE

E.M.W.D. 48" SS PER E.P. 4-0-110-1871

194+25 72" RCP With Headwalls

12" ℄ PVC WELL BLOW OFF PIPE, E.P. 2441.

187+24 12" CMP with Headwalls

CHANNEL TOE

N 82°01'-12" W

N 81°07'-58" W

180+50

176+23 36" CMP No Headwalls

8" ELECTRICAL CONDUIT EP 2570

Inland Concrete Enterprises constructed one 8" sewer connection and manhole at STA 178+97.54 Encroachment Permit No. 4-0-110-1496.

171+50

STA. 209+50 P.I. END TRANSITION N 56,955.76 E 710,087.52

WEST 1/4 COR. SEC. 33

EMWD CONST. APPROX. 610' OF 27" S.L. ALONG ROW OF N. SIDE AS SEEN ENC. PERMIT # 4-0-110-2139

USGS INSTALLED A FLOW GAGE ON RT. BANK JUST UP STREAM OF ROAD. SEE E.P. 4-0-020/110-2445

Forecast Mortgage Corp. constructed one 36" RCP inlet at Sta. 188+05.85 and one 42" RCP inlets at Sta. 202+32.21 See Encroachment Permit No. 4-0-110-1385.

DEL E. WEBB CORP.

N 57,000

N 56,000

E 710,000 E 711,000 E 712,000 E 713,000 E 714,000 E 715,000

PLAN
200 0 200 400
SCALE: 1" = 200'

BY	DATE	REVISIONS
L.A.T.	NOV. 5, 1982	ADDED TURN AROUNDS, CORRECTED STA. & RELOCATED 8" C.M.P.'S

	BY	DATE
DESIGN	T.R.H	5/62
CKD.	P.R.S	5/62
PROJ. ENG.	A.C.H	9/62
FLD. BK. NO.		

APPROVED 6890
DATE: 5/1/62

ENGINEERS **WILSEY, HAM & BLAIR** PLANNERS

DRWG. NO. 62-5018-D-1

SALT CREEK CHANNEL
PLAN AND PROFILE
STA. 160+00 TO STA. 215+00

PROJECT NO. 4-4-110

AS BUILT

5 / 12

DRWG. NO. 4-169

PROFILE
HORIZ. SCALE: 1"= 200'
VERT. SCALE: 1"= 4'

STA. 264+50 LIMIT OF WORK
STA 245+57.64 E.C
STA. 242+20 END E.M.W.D. PROTECTION DIKE
STA. 242+05.83 B.C.
STA. 234+14.80 E.C.
STA. 227+50 CONNECT RT SERVICE RD TO E.M.W.D. PROTECTION DIKE
STA. 225+67.13 B.C.
STA. 215+78.42 P.I. MURRIETA RD.
DESIGN WATER SURFACE
EXISTING GROUND
EL. 1400.40
EL. 1400.58
EL. 1400.97
EL. 1401.40
EL. 1401.90
EL. 1398.20 ?
Q 13,500 C.F.S.
FL. & CHANNEL TOE?
TOP OF LOW FLOW CHANNEL SLOPE VARIES
FLOW LINE OF LOW FLOW CHANNEL
S=0.00025 ?%
S=0.0005
S=0.00
S=0.000052
S=0.0013
1399.99
1399.46
0.53'
1.49'
1.63'
1.68'
1.53'
1.58'
1.63'
1461.38
1400.85
FL 1397.96
Sta. 271+68.68
FL 1399.35
Sta 216+05.42
FL 1399.37
Sta. 216+51.42
STA 271+98.68 E of NEWPORT ROAD
INVERT OF CULVERT 1398.40
END OF LOW FLOW CHAN 1398.40
STA 270+00 FL & CHANNEL TOE 1398.68
FL & CHANNEL TOE 1398.20 ?
FLOW LINE OF LOW FLOW CHANNEL 1398.00
FL & CHANNEL TOE 1400.22
TOP OF LOW FLOW CHANNEL SLOPE 1400.40
FLOW LINE OF LOW FLOW CHANNEL 1398.00
STA 215+00 MATCH LINE, SEE SHEET NO.5
FL & CHANNEL TOE 1401.98
TOP OF LOW FLOW CHANNEL SLOPE 1401.40
FLOW LINE OF LOW FLOW CHANNEL 1399.00
GRADE BREAK
30' 30' Varies
8'
0.5'
3' 1' 3'
1:20 1:20
FL of low flow Channel
Top of Low Flow Channel
FL & Channel Toe
CHANNEL EXCAVATION 697,300 C.Y.
REVISED LOW FLOW CHANNEL
STA. 120+00 TO 271+68.68

CONTROL PT. W.H.&B. SURVEY	COORDINATES N	E	BEARING	DIST.	TIE TO STA.
NE COR. SEC. 32	59,129.50	709,474.01	S 00°22'58"W	2147.00	215+78.42
61 - 59	53,847.58	704,188.63	S 87°31'33"E	994.10	271+98.90
61 - 58	54,491.36	707,987.55	S 76°14'51"W	2888.56	271+98.90

JOHN LAING HOMES CONST. A 48" MAINT. RD. & INSTALLED 1,370' OF 12" ϕ S.L. ON N. MAINT. RD. CONNECTING TO EXISTING S.L. SEE E.P. # 4-0-110-2419

EMWD DRILLED TWO AUGER BORINGS W/IN N. MAINTENANCE RD AT STA. 250+60 & 230+90 APPROX. PER ENC. PERMIT # 4-0-110-2017

EMWD CONST. APPROX. 3500' OF 54" ϕ W.L. ADJ. TOW. R OF W FROM STA. 271+98.68 TO 237+00 APPROX. PER ENC. PERMIT # 4-0-110-2051

INLAND FOUNDATION ENGINEERING, INC. CONDUCTED 12 EXPLORATORY BORINGS ALONG N. ACCESS RD. PER ENC. PERMIT # 4-0-110-2087

DAYLIGHT LOW WATER CHANNEL FROM LIMIT OF WORK TO NEWPORT ROAD

FORECAST CORP. INSTALLED ONE 10'W x 5'H RCB AT APPROX STA. 262+76 SOUTH SIDE PER ENC. PERMIT # 4-0-110-1668

FORECAST CORP CONSTRUCTED ONE 30" RCP AT APPROX STA. 250+86 SOUTH SIDE PER ENC. PERMIT # 4-0-110-1668

Forecast Corp constructed one 42" RCP inlet at approx Sta 243+58 Encroachment Permit No 4-0-110-1690

Forecast Corp constructed one 36" RCP at approx. Sta. 241+32 South Side per enc permit # 4-0-110-1668

Forecast Corp. constructed 36" RCP inlet, slope paving and riprap at approx STA 225+78 Encroachment Permit No 4-0-110-1691

Forecast Corp. constructed one 48" sewer line crossing at approx. STA 220+10 Encroachment Permit No 4-0-110-1659

Forecast Mortgage Corp. installed 24' of 21" ϕ C.P. sewer line ties into existing manhole at STA 215+08 to STA 215+34 Encroachment Permit No. 4-0-110-1944

E.M.W.D. 48"SS PER E.P. 4-0-110-1871

DEL E. WEBB CORP.

BOUNDARY LINE, E.M.W.D. TREATMENT PLANT

ACCESS ROAD WITHIN BOUNDARY OF E.M.W.D. WITH RIGHT OF USE TO R.C.F.C. & W.C.D.

TO E.M.W.D. Facility 4

NATURAL FLOOD PLAIN OVERFLOW

NATURAL FLOOD PLAIN OVERFLOW

Channel Rough Graded Murrieta Rd to Sta 222+00 May 1981

200' Wide Min. Width Channel Sta. 229+00 to Newport Rd.

40' Width Paving by R.C.R.D.

2-10'x3.75'x48" RCB by R.C.R.D.

24" D.I.P. WATER LINE EX. 2441

24" D.I.P. WATER LINE EX. 2464

8" C.M.P.

48"

NOTE:
DASHED CONTOUR LINES PLOTTED FROM W. H. & B. SURVEY NOTES.

EP# 4-0-110-3053
General Electric Intermountain Inc.
E.M.W.D
March 9, 2007

COUNTY OF RIVERSIDE EXECUTIVE OFFICE INSTALL 4" ϕ RECLAIMED WATER SERVICE LINE IN SALT CREEK CHANNEL CROSSING MURRIETA RD. FROM STA. 9+47.6 TO STA. 9+92.9 ENCROACHMENT PERMIT # 4-0-110-2376

WILLIAMS COMM., INC. INSTALLED 2 PARALLEL FIBER OPTIC LINES 30' BELOW RIVER AT STA. 215+80 & 216+30 SEE E.P. 4-0-030110/110/1901/2454

STA. 215+78.42 P.I.
MURRIETA ROAD
N 56,982.55
E 709,459.67

DRY WEATHER CROSSING SEE TYPICAL SECTIONS SHEET 8

See sh 5 for Sewer

MATCH LINE SEE SHEET 5

STA. 271+98.68 END ℄

STA. 264+50 LIMIT OF WORK

NEWPORT ROAD ℄

PLAN
200 0 200 400
SCALE: 1"= 200'

	BY	DATE	REVISIONS
3			
2	L.A.T.	NOV. 19 1962	ACCESS ROAD ADDED
1	L.A.T.	5/1962	RELOCATE R/W LINE & 8"C.M.P.'S

	BY	DATE
DESIGN	TRH	5/62
CKD.	PRS	5/62
PROJ. ENG.	ACH	9/62
R.E. IN CHG.		

APPROVED
DATE

ENGINEERS WILSEY, HAM & BLAIR PLANNERS

DRWG. NO. 62-5018-D-1

SALT CREEK CHANNEL
PLAN AND PROFILE
STA. 215+00 TO STA. 264+50

AS BUILT

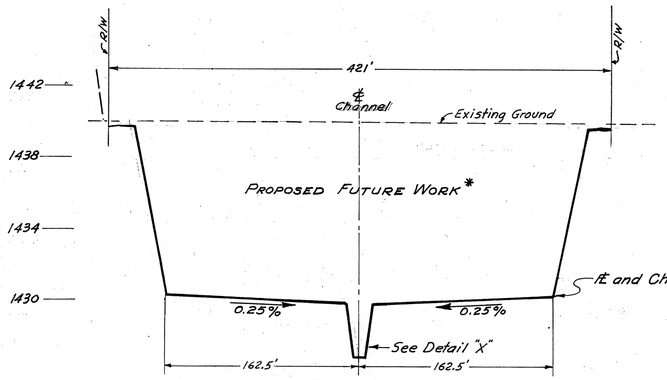
PROJECT NO. 4-4-110

6 / 12

DRWG. NO. 4-169

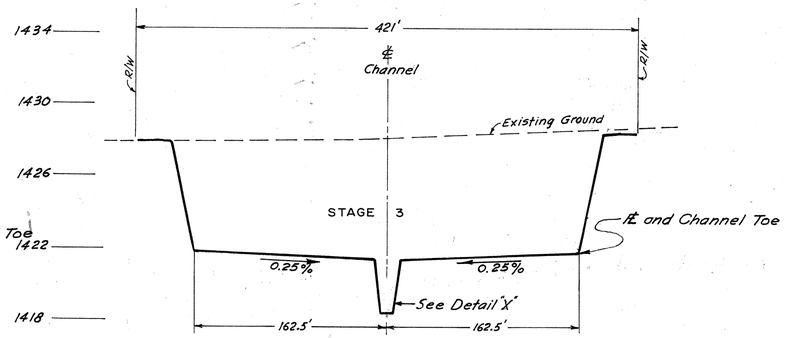
TYPICAL SECTIONS

HORIZ. SCALE: 1"= 60'
VERT. SCALE: 1"= 4'

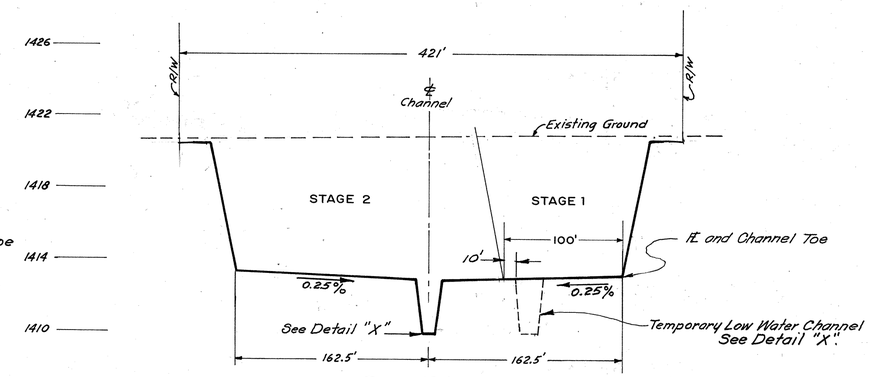


STA. 10+00

*Refers to Construction Staging See Sheet 11

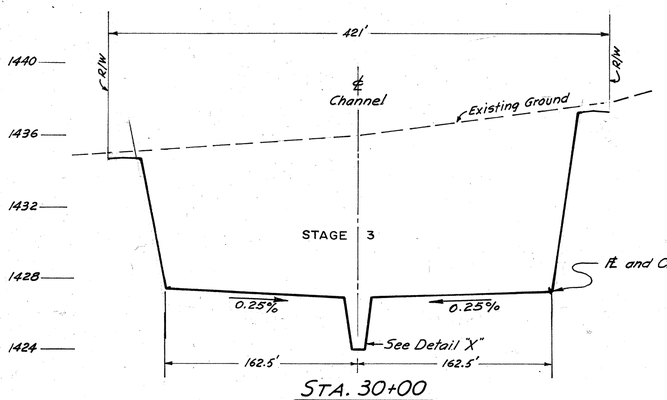


STA. 70+00



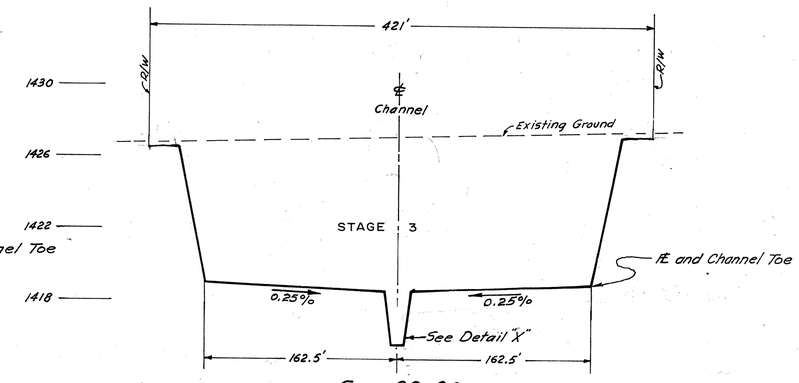
STA. 130+00

ELEVATION - USC & GS DATUM

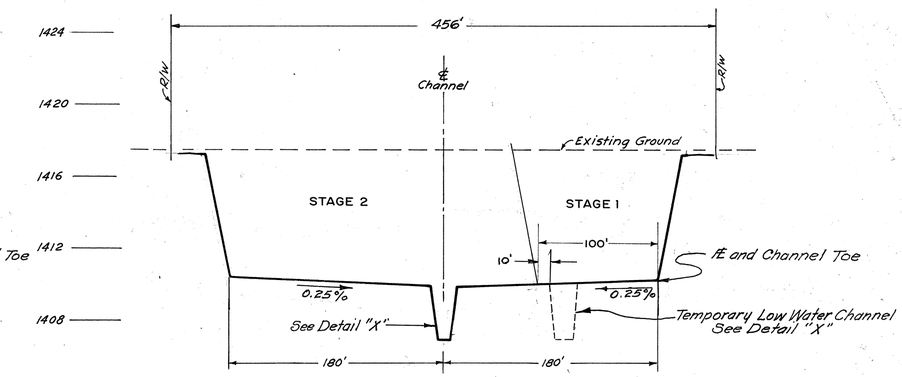


STA. 30+00

*Refers to Construction Staging See Sheet 11



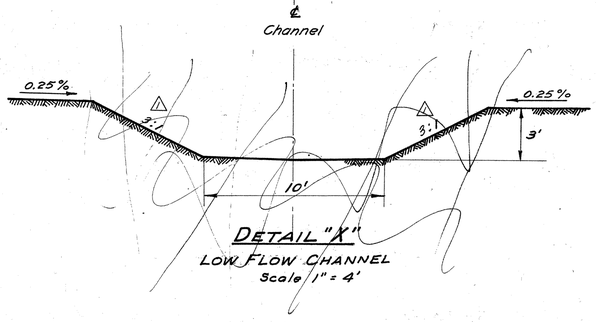
STA. 90+00



STA. 150+00

STA. 50+00

STA. 110+00



DETAIL "X"
LOW FLOW CHANNEL
Scale 1" = 4'

REVISED

AS BUILT

NOTES: 1. All Sections drawn facing downstream.
2. All Channel Side Slopes are 3:1 unless otherwise noted.

	BY	DATE	REVISIONS
3			
2			
1	L.A.T	NOV. 5, 1962	REVISED LOW FLOW CHANNEL SLOPE.

REGISTERED PROFESSIONAL ENGINEER — THOMAS McCUTCHEN — 9880 — CIVIL — STATE OF CALIFORNIA — DATE

	BY	DATE
DESIGN	PRS	5/62
CKD.	TRH	6/62
PROJ. ENG.	ACH	9/62
FLD. BK. NO.		

ENGINEERS WILSEY, HAM & BLAIR PLANNERS

DRWG. NO. 62-5018-D-1

SALT CREEK CHANNEL
TYPICAL SECTIONS
STA. 0+00 TO STA. 165+00

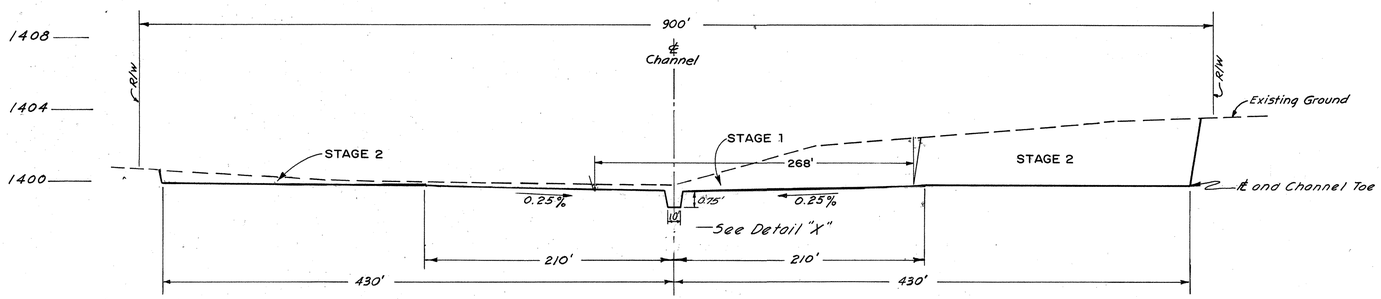
PROJECT NO. 4-4-110

7/12

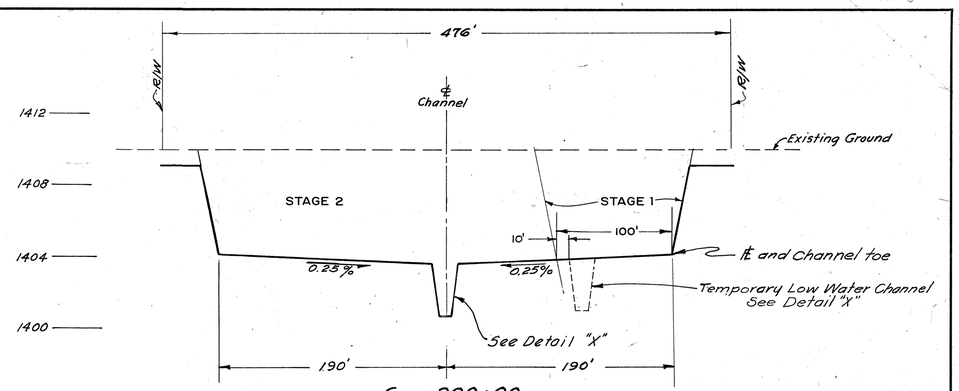
DRWG. NO. 4-169

TYPICAL SECTIONS

HORIZ. SCALE: 1"= 60'
VERT. SCALE: 1"= 4'

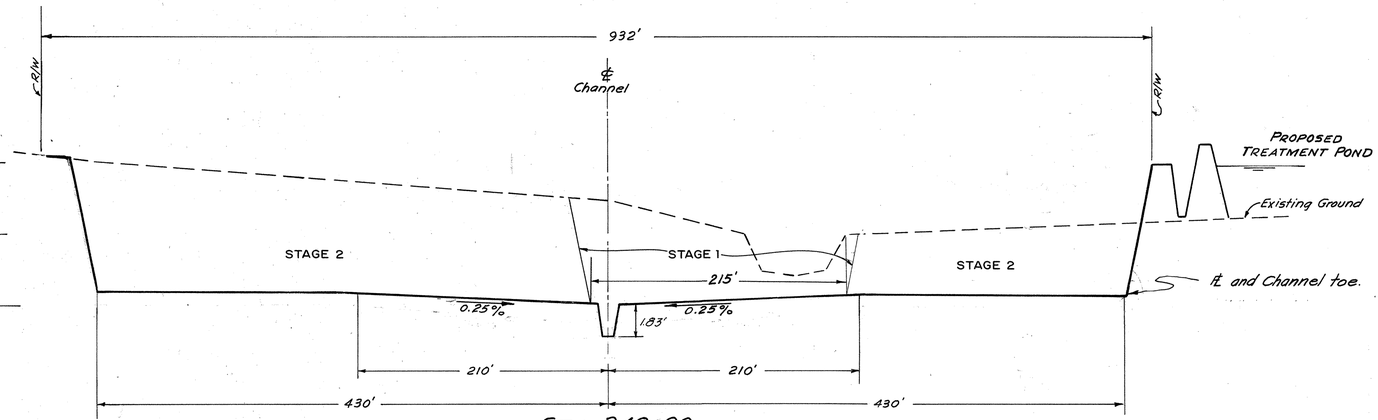


STA. 260+00

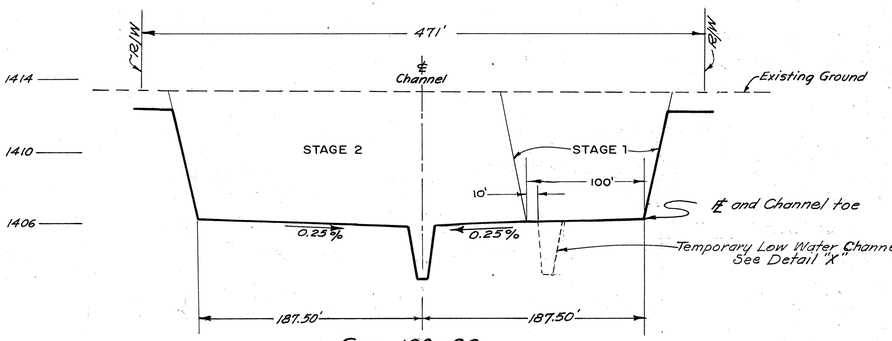


STA. 200+00

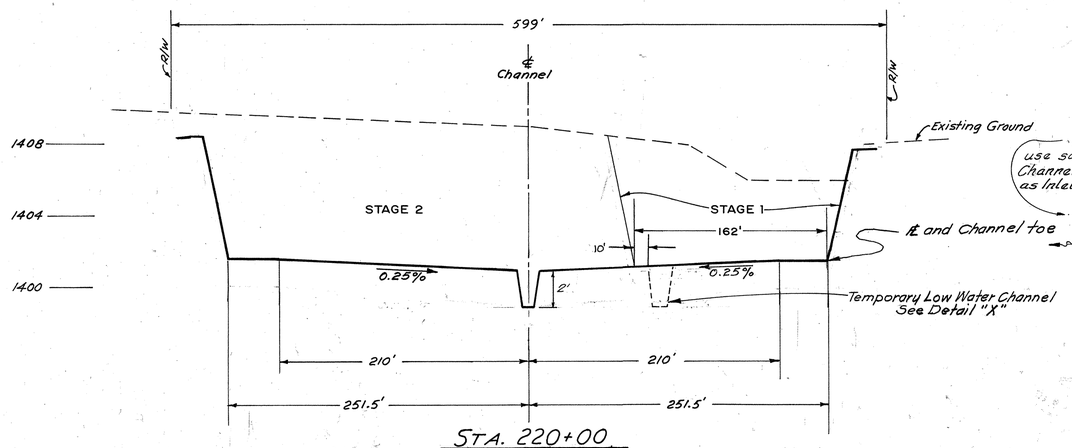
ELEVATION - U.S.C. & G.S. DATUM



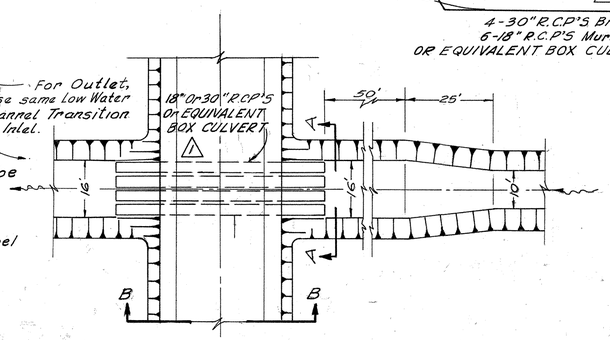
STA. 240+00



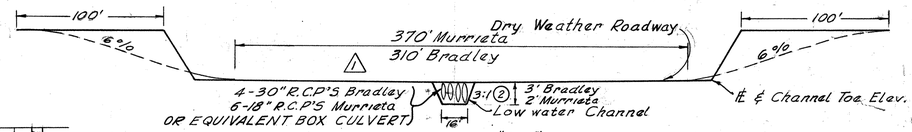
STA. 180+00



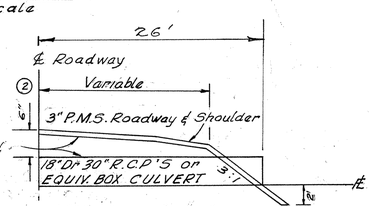
STA. 220+00



PLAN
Scale: 1"= 20'



SECTION "A-A"
No Scale



SECTION "B-B"
No Scale

TYPICAL DRY WEATHER CROSSING

MURRIETA ROAD & BRADLEY ROAD

AS BUILT

For Typical Section Notes, see Sheet No.7.

BY	DATE	REVISIONS
3		
2 L.A.T.	NOV. 5, 1962	REVISED LOW FLOW CHANNEL SLOPE & PAVEMENT THICKNESS
1 J.H.D.	10-7-64	REVISED DRY WEATHER CROSSING DETAIL

REGISTERED PROFESSIONAL ENGINEER THOMAS MCCUTCHEN APPROVED
DATE: STATE OF CALIFORNIA

	BY	DATE
DESIGN	PRS	5/62
CKD.	TEH	6/62
PROJ. ENG.	ACH	9/62
FLD. BK. NO.		

ENGINEERS **WILSEY, HAM & BLAIR** PLANNERS

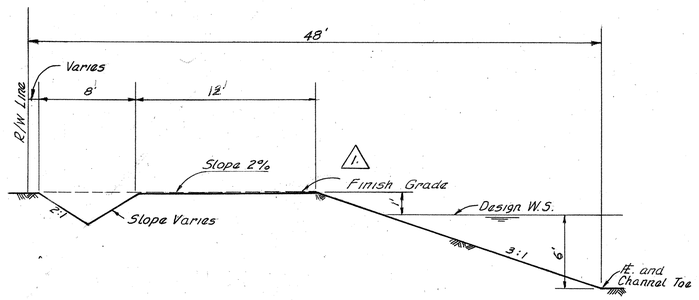
DRWG. NO. 62-5018-D-1

SALT CREEK CHANNEL
TYPICAL SECTIONS
STA. 165+00 TO STA. 264.50

PROJECT NO.
4-4-110

8/12

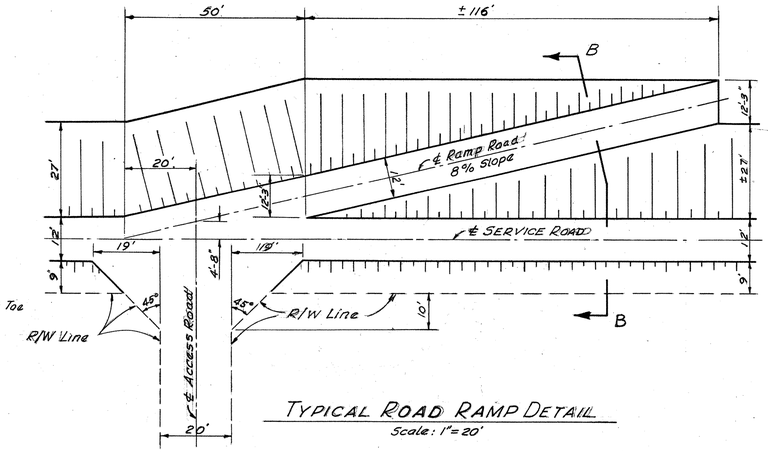
DRWG. NO. 4-169



TYPICAL SECTION OF SERVICE ROAD

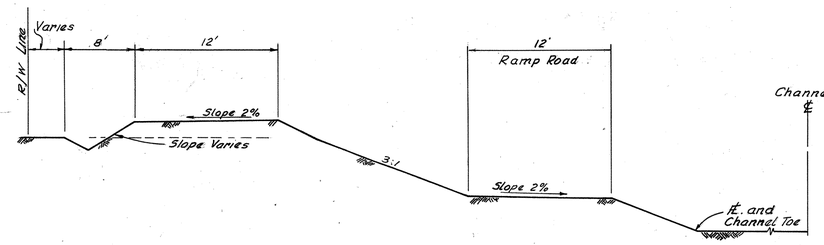
Scale: 1"=6'

Note: 3 Service Roads to be Constructed on The Right And Left Bank of Channel And Will be 1.0' Min. Above Design Water Surface



TYPICAL ROAD RAMP DETAIL

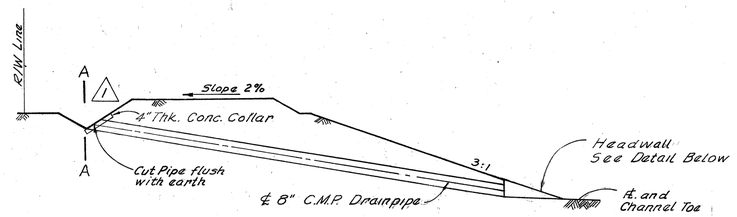
Scale: 1"=20'



SECTION "B-B"

TYPICAL ROAD RAMP

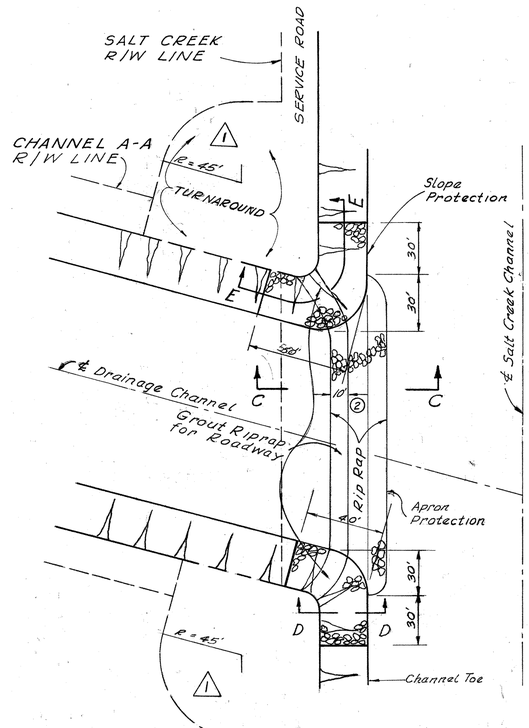
Scale: 1"=6'



TYPICAL DRAINPIPE INSTALLATION

Scale: 1"=6'

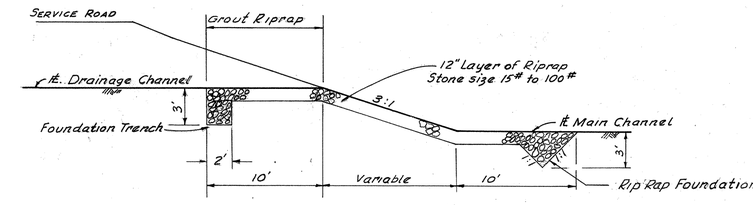
Note: 8" Drainpipes to be installed as indicated on Plan and Profile or as directed by the Engineer.



TYPICAL CONNECTION

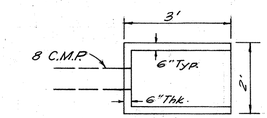
MAJOR LOCAL DRAINAGE CHANNEL TO SALT CREEK CHANNEL

No Scale

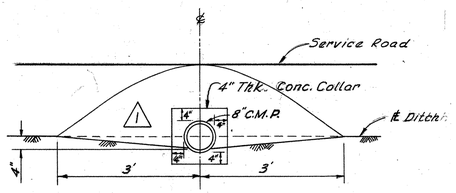


SECTION "C-C"

Scale: 1"=6'

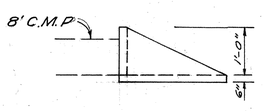


PLAN



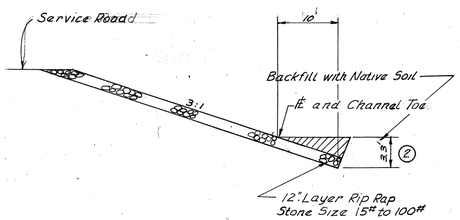
SECTION "A-A"

Scale: 1"=20'



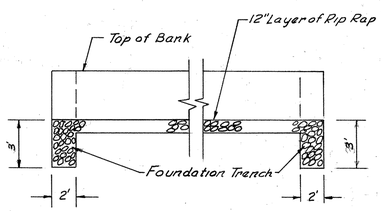
ELEVATION

HEADWALL DETAIL



SECTION "D-D"

No Scale



SECTION "E-E"

No Scale

Notes

1. Rip-rap to be placed as shown or as directed by the Engineer

AS BUILT

	BY	DATE	REVISIONS
3	E.N.W.	11-10-62	REVISED NOTE
2	L.A.T.	NOV. 5, 1962	ADDED ROADWAY WIDTH AND DEPTH FOR RIP-RAP
1	J.H.D.	10-9-62	Added Drainpipe Collar & Service Road Turnaround. Revised R/W Line

	BY	DATE
DESIGN	T.R.H	5/62
CKD.	P.R.S	6/62
PROJ. ENG.	A.C.H	9/62
FLD. BK. NO.		

REGISTERED PROFESSIONAL ENGINEER — JAMES McCULLAGH — APPROVED — 9999 — DATE: October 22 — STATE OF CALIFORNIA

ENGINEERS WILSEY, HAM & BLAIR PLANNERS

DRWG. NO. 62-5018-D-1

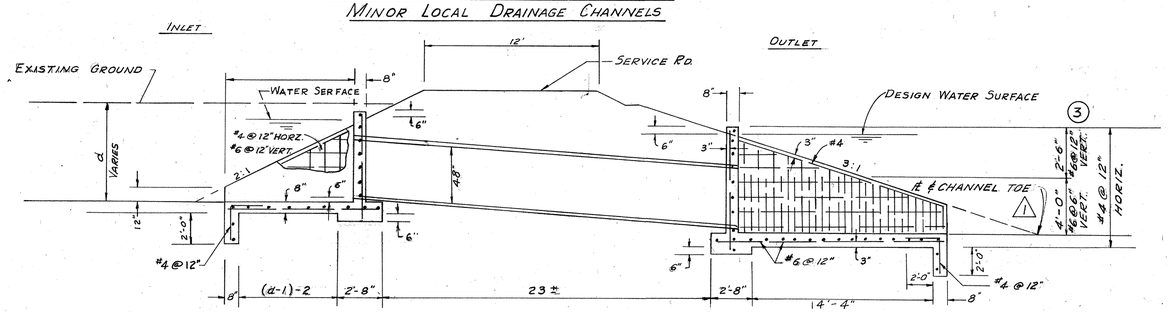
SALT CREEK CHANNEL
TYPICAL DETAILS
SERVICE ROADS, ROAD RAMPS, LOCAL DRAINAGE CHANNEL

PROJECT NO. 4-4-110

9/12

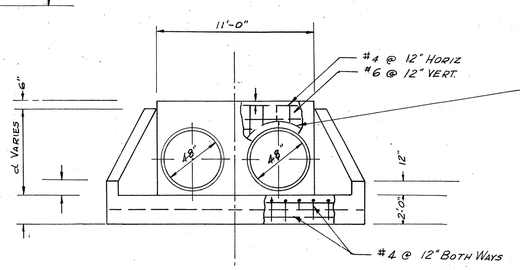
DRWG. NO. 4-169

TYPICAL INLET - OUTLET STRUCTURES
MINOR LOCAL DRAINAGE CHANNELS

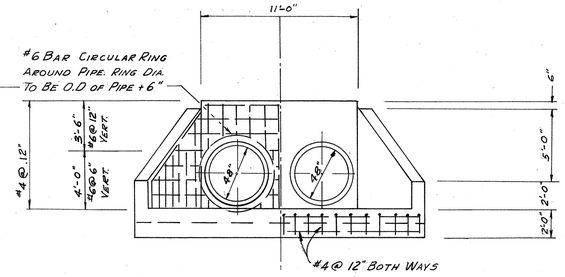


SECTION C-C
SCALE 1"=5'

NOTE::
PROVIDE 2½" OF COVER ON REINFORCING BARS

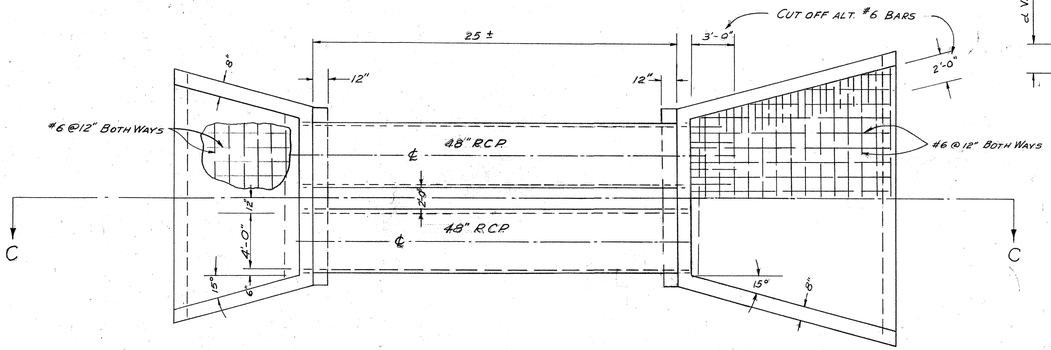


INLET

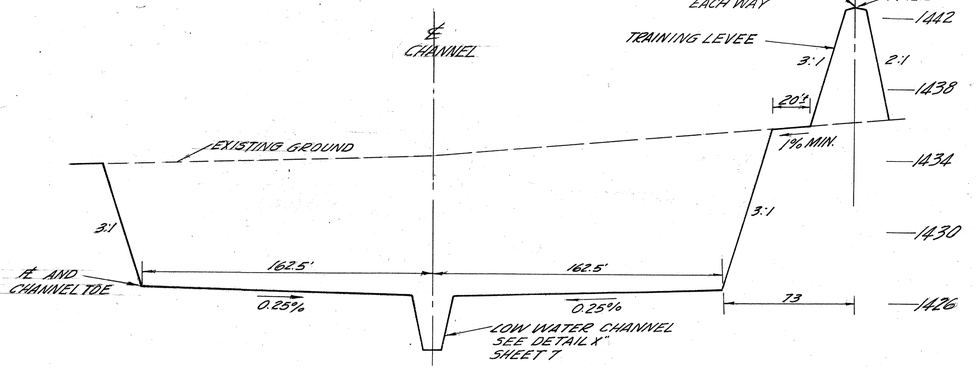


FRONT VIEW
SCALE 1"=5'

OUTLET

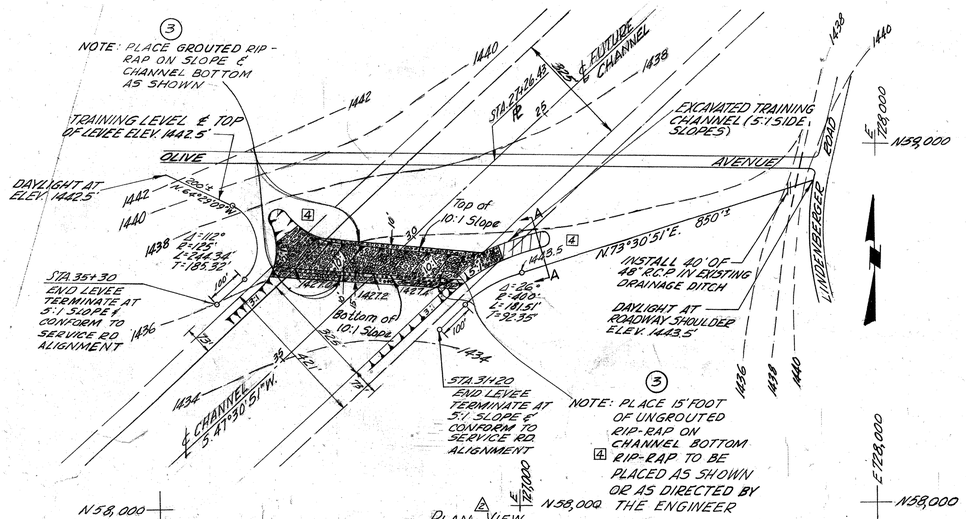


PLAN VIEW
SCALE 1"=5'



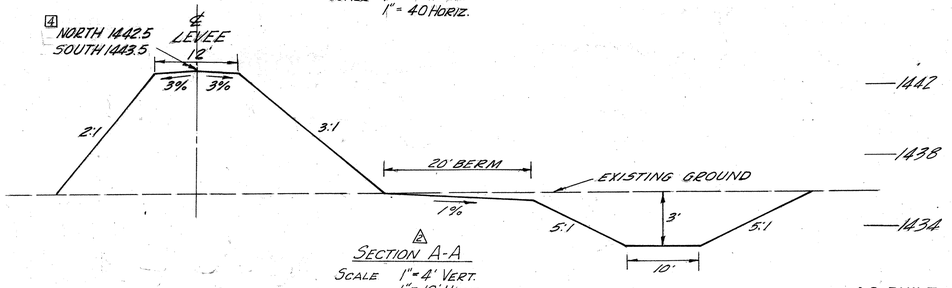
STA. 34+50
SCALE 1" = 4' VERT.
1" = 40' HORIZ.

ELEVATION - U.S.C. & G.S. DATUM



PLAN VIEW

PERMANENT TRAINING LEVEE
SCALE: 1"=200'



SECTION A-A
SCALE 1"=4' VERT.
1"=10' HORIZ.

NOTE: Sections drawn facing downstream

AS BUILT

	BY	DATE	REVISIONS
4	L.A.T.	NOV. 19 1962	RAISED SOUTH TRAINING LEVEE, REVISED LIMIT OF RIP-RAP & ADDED NOTE.
3	L.A.T.	NOV. 5, 1962	CORRECTED INLET STRUCTURE DIMENSION E ADDED RIP-RAP
2	J.C.H.	10/62	Training Levee Details Added
1	J.H.D.	10-9-62	Raised Outlet Struct. in Relation to ℄ & Channel Toe. Removed Training Levee Sec C-C. Notes Revised.

	BY	DATE
DESIGN	TRH	5/62
CKD.	PRS	5/62
PROJ. ENG.	ACH	9/62
FLD. BK. NO.		

REGISTERED PROFESSIONAL ENGINEER THOMAS McCONE APPROVED 8890 STATE OF CALIFORNIA

ENGINEERS **WILSEY, HAM & BLAIR** PLANNERS

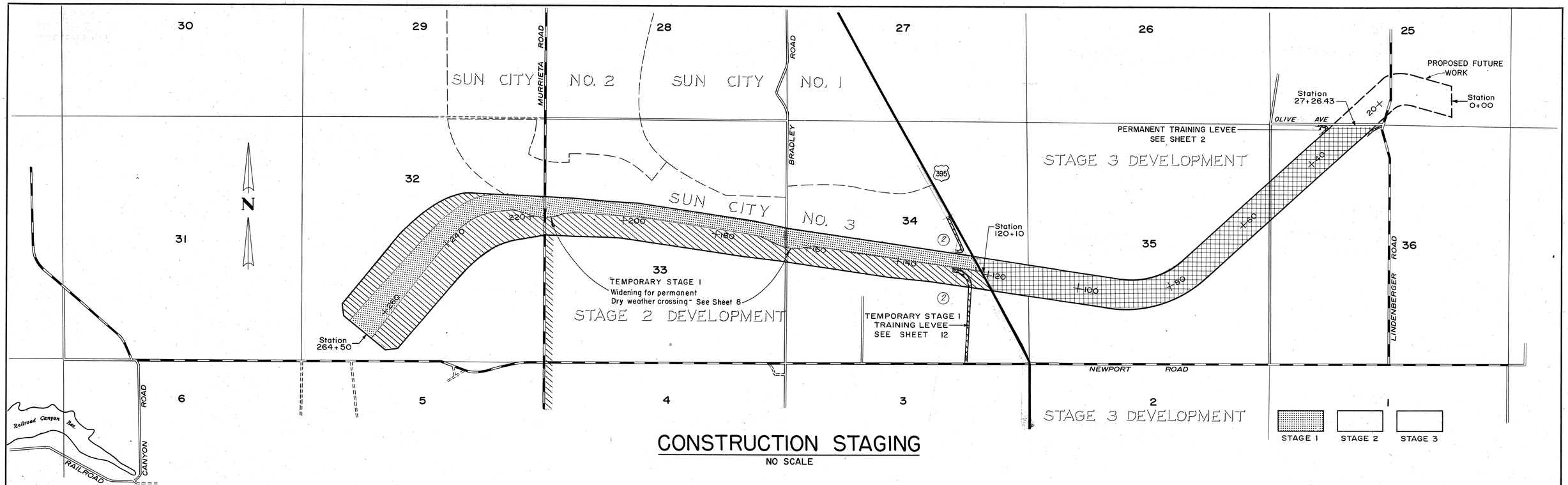
DRWG. NO. 62-5018-D-1

SALT CREEK CHANNEL
TYPICAL DETAILS
LOCAL DRAINAGE STRUCTURES

PROJECT NO. 4-4-110

10 / 12

DRWG. NO. 4-169



CONSTRUCTION STAGING

NO SCALE

ESTIMATED QUANTITIES

ITEM	UNITS	ULTIMATE CHANNEL STA. 27+26 TO 264+50	CONSTRUCTION STAGING STAGE 1	STAGE 2	STAGE 3
SALT CREEK CHANNEL					
CHANNEL EXCAVATION	CU. YDS.	2,558,100	456,600	1,205,100	896,400
LEVEE EMBANKMENT	CU. YDS.	10,800	17,000*	—	10,800
8" C.M.P.	LIN. FT.	650	175	250	225
RIGHT OF WAY	ACRES	285	62	133	90
36" R.C.P.	LIN. FT.	480	480	0	0
MAJOR LOCAL DRAINAGE CHANNELS					
STONE RIP RAP	TONS	9,150	3,550	4,000	1,600
MINOR LOCAL DRAINAGE CHANNELS					
48" R.C.P.	LIN. FT.	375	75	130	170
REINFORCED CONCRETE	CU. YDS.	155	42	56	57

* TEMPORARY STAGE I TRAINING LEVEE

AS BUILT

BY	DATE	REVISIONS
ACH	10/62	RELOCATED TRAINING LEVEE
THD	10-9-62	REMOVED DETAIL "2"

REGISTERED PROFESSIONAL ENGINEER THOMAS McCUTCHEN APPROVED DATE STATE OF CALIFORNIA

	BY	DATE
DESIGN	ACH	5/62
CKD.	TRH	5/62
PROJ. ENG.	ACH	9/62
FLD. BK. NO.		

ENGINEERS WILSEY, HAM & BLAIR PLANNERS

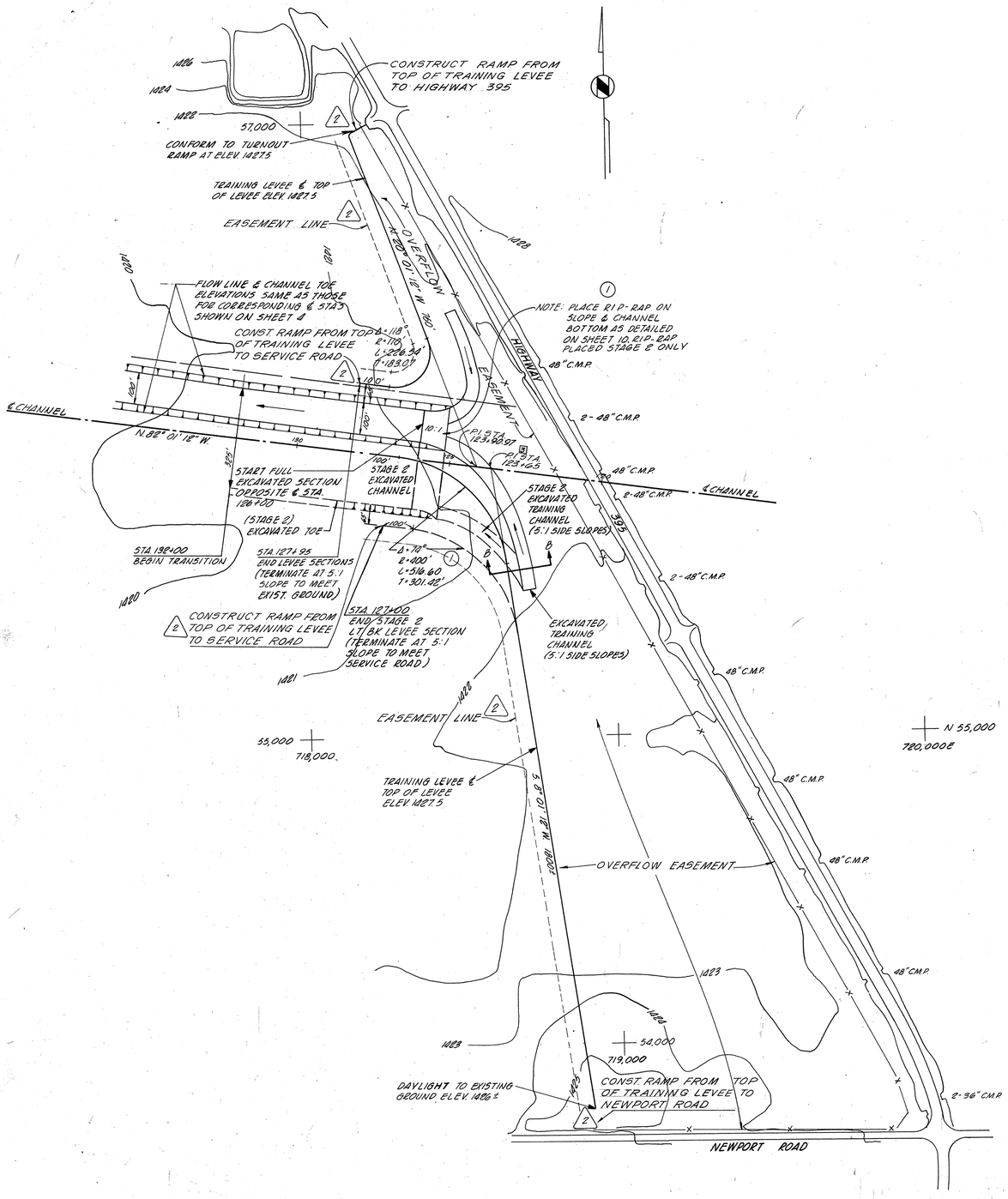
DRWG NO 62-5018-D-1

SALT CREEK CHANNEL PROJECT NO. 4-4-110

CONSTRUCTION STAGING & ESTIMATED QUANTITIES

11/12

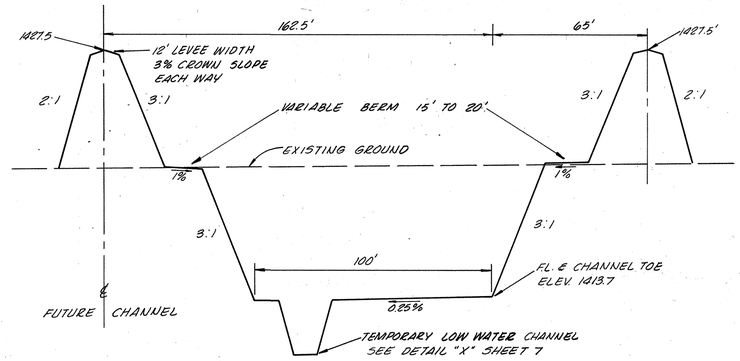
DRWG. NO. 4-169



PLAN

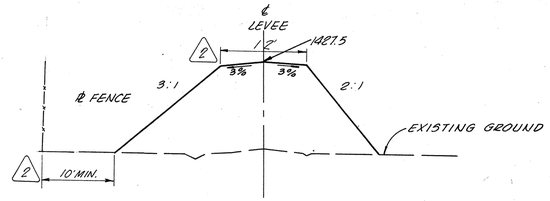
200 0 200 400

SCALE: 1" = 200'



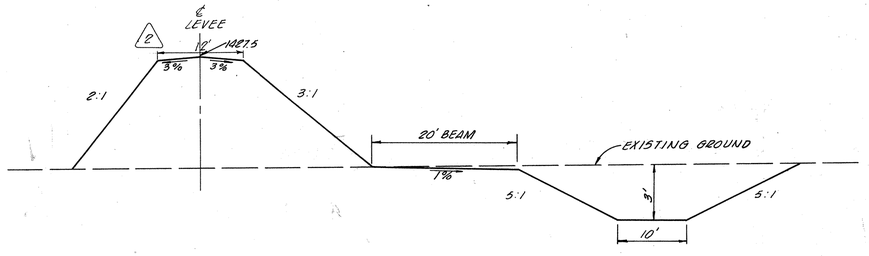
STA 127+00

SCALE: 1" = 4' VERT.
1" = 10' HORZ.



SECTION A-A

SCALE: 1" = 4' VERT.
1" = 10" HORZ.



SECTION B-B

SCALE: 1" = 4' VERT.
1" = 10' HORZ.

ELEVATION - USC & GS DATUM

1428 1424 1420 1416 1412 1410 1408 1404 1400

AS BUILT

NOTE: ALL SECTIONS DRAWN FACING DOWNSTREAM

	BY	DATE	REVISIONS
3	E.S.T.	12-12-62	REVISED STATIONING
2	R.W.W.	11-19-62	RELOCATED NORTH TRAINING LEVEE, REVISED EASEMENTS & CLAIMS
1	L.A.T.	NOV. 5, 1968	ADDED STAGE 2 TRAINING LEVEE & RIP-RAP

REGISTERED PROFESSIONAL ENGINEER THOMAS McCUE STATE OF CALIFORNIA

APPROVED: [signature] 12/20/62

DATE: 5 Oct. 62

	BY	DATE
DESIGN		
CKD.		
PROJ. ENG.		
FLD. BK. NO.		

ENGINEERS **WILSEY, HAM & BLAIR** PLANNERS

DRWG. NO. 62-5018-D-1

SALT CREEK CHANNEL
PLAN AND SECTIONS
STAGE I TRAINING LEVEE

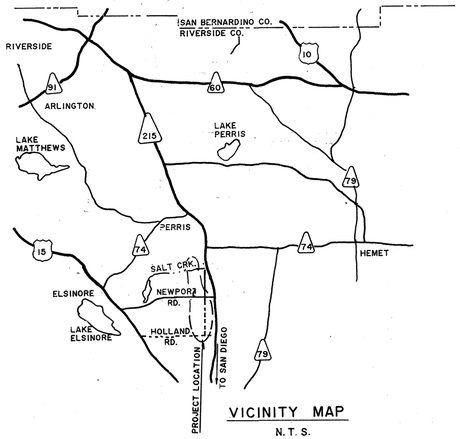
PROJECT NO. 4-4-110

12/12

DRWG. NO. 4-169

EXCERPT B: BRADLEY ROAD CHANNEL PLAN AND PROFILE, DWG. NO. 4-550

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT



LOCATION MAP

VICINITY MAP

N. T. S.

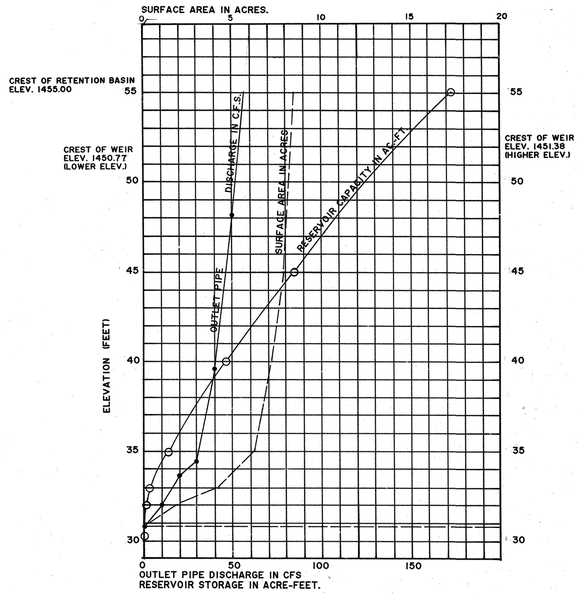
FUTURE STREET DIRECTORY

1. WOODEN FOREST DR.
2. BROKEN BRANCH RD.
3. YELLOW PINE ST.
4. WILLOW REED WAY
5. WHITE FOXTAIL CT.
6. WILLOW GLEN CT.
7. RAINWATER DR.
8. BAROMETER CT.
9. FORECAST ST.
10. WEATHERGLASS CT.
11. WEATHERVANE CIR.
12. CROCUS CT.
13. KINGLET CIR.
14. LUANA CIR.
15. MUNSON CT.
16. SESSILE CT.
17. SUN BLOSSOM DR.
18. PAMIRS CIR.
19. TASSEL CIR.
20. PARK BASIN RD.
21. CANDLEBERRY CT.
22. ROCKMOUNT WAY
23. ROXIE CIR.
24. MURPHY LN.
25. CHESTER MORRISON WAY
26. SAWYER RD.
27. FROST CT.
28. WILDSMITH RD.
29. TWAIN DR.
30. SCHOOL PARK DR.
31. LAMDIN AVE.
32. BLUME CIR.
33. MITCHNER DR.
34. CLEARY ST.
35. HEMINGWAY CT.
36. GODWIN CT.
37. GLASPELL CT.
38. FITZGERALD PL.
39. EARLY DAWN RD.
40. JUNIE LN.
41. RED RACER CIR.
42. DESERT EAGLE CIR.
43. GOLDEN POND CT.
44. ZENALL RD.
45. RUSTIC RAINBOW DR.
46. WHITE SWAN CT.
47. GREEN BRANCH CT.
48. YENSO CIR.
49. YOUNG DOVE CT.
50. STERN DR.

DRAINAGE AREA = 3.22 SQ. MI.
BASIN CAPACITY = 172.61 AC.-FT. [ELEV. 1455.00]

STORM / HYDROGRAPHS	ROUTING DATA		
STORM	MAX INFLOW	MAX OUTFLOW	MAX W.S.
100 YR. 1 HR.	1433.20	43.8	1442.9
100 YR. 3 HR.	1601.18	51.4	1449.5
100 YR. 6 HR.	1671.58	54.6	1452.8
100 YR. 24 HR.	604.11	51.6	1449.7

FUTURE SUBDIVISION AREAS FOR STOCKPILE.



GENERAL NOTES

1. ALL RESURFACING OF STREETS AND ANY OTHER EXISTING IMPROVEMENTS DAMAGED OR REMOVED DURING THE COURSE OF CONSTRUCTION OF THE STORM DRAIN IS TO BE REPLACED AT THE SAME LINE AND GRADE AND LOCATION AS BEFORE, UNLESS OTHERWISE SPECIFIED.
2. ALL ROADWAY STRIPING, TRAFFIC CONTROL DEVICES AND CONDUITS REMOVED OR DAMAGED DURING THE COURSE OF CONSTRUCTION SHALL BE REPLACED TO THE SPECIFICATIONS OF THE COUNTY OF RIVERSIDE.
3. ELEVATIONS OF UTILITIES ARE APPROXIMATE UNLESS NOTED OTHERWISE.
4. THE CONTRACTOR SHALL NOTIFY UNDERGROUND SERVICE ALERT (1-800-422-4133) A MINIMUM OF 48 HOURS BEFORE EXCAVATION.
5. TOPOGRAPHIC FEATURES, BOTH CONTOURS & CULTURE, ARE BASED ON AERIAL MAPPING & SURVEY DATA DATED MARCH, 1987.
6. ALL ELEVATIONS SHOWN ARE IN FEET BASED ON U.S.G.S. DATUM.
7. ALL CHANNEL & PIPE DRAIN SECTIONS ARE TAKEN LOOKING DOWNSTREAM.
8. ALL STATIONING REFERS TO ℄ OF CONSTRUCTION, EXCEPT WHERE NOTED.
9. THE STREET IMPROVEMENTS SHOWN ALONG BRADLEY ROAD, HOLLAND ROAD, AND FUTURE CHESTER MORRISON WAY, FUTURE SCHOOL PARK DRIVE, FUTURE LA PIEDRA AVENUE, FUTURE EARLY DAWN ROAD, AND FUTURE PARK BASIN ROAD ARE NOT A PART OF THE CONSTRUCTION OF BRADLEY ROAD CHANNEL.
10. INSTALL GUIDE MARKERS AT A DISTANCE OF 10 FEET WEST OF BURIED MANHOLE COVERS. INDICATE LOCATION OF BURIED MANHOLE COVERS ON BACK OF GUIDE MARKERS.
11. EXCESS EXCAVATED MATERIAL SHALL BE STOCKPILED WITHIN THE FUTURE SUBDIVISION AREAS SHOWN ON THE "LOCATION MAP". SEE SPECIAL CONDITIONS PARAGRAPH 6.6 OF THE SPECIFICATIONS FOR SPECIFIC INFORMATION.

REGISTERED PROFESSIONAL ENGINEER KENNETH L. EDWARDS NO. 12400 Exp. 3-31-93 STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER HEAL SMITHHAMMER No. 16757 Exp. 6-30-93 CIVIL STATE OF CALIFORNIA

AS BUILT
APPROVED BY: [illegible]
DATE: 7/24/91

REGISTERED PROFESSIONAL ENGINEER JOHN SEXTON RCE 14358 Exp. 3/31/93 STATE OF CALIFORNIA

SEXTON ASSOCIATES
1033 DRACENA CT.
REDLANDS, CA. 92373
714 / 792 - 4876

APPROVED BY: John Sexton
DATE: 11/13/89
JOHN SEXTON, RCE. 14358

BENCH MARK

M-16, RESET 1979, RIV. CO. LOCATED 25 FEET SOUTH OF NEWPORT ROAD & 25 FEET EAST OF BRADLEY ROAD.

ELEV. 1434.410, DATE: 6/84.

REVISIONS			
REF.	DESCRIPTION	APPR	DATE

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

RECOMMENDED FOR APPROVAL BY: [signature]
DESIGN ENGINEER R.E. NO. 16757
DATE: 11/14/89

APPROVED BY:
CHIEF ENGINEER R.E. NO. 12400
DATE:

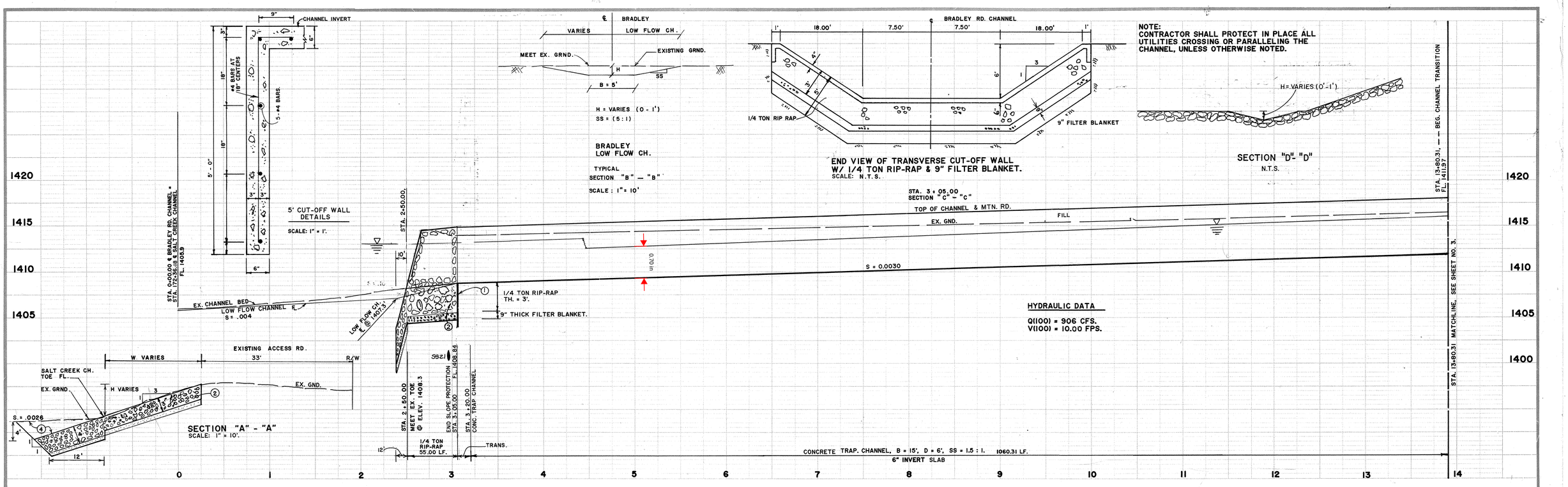
County of Riverside

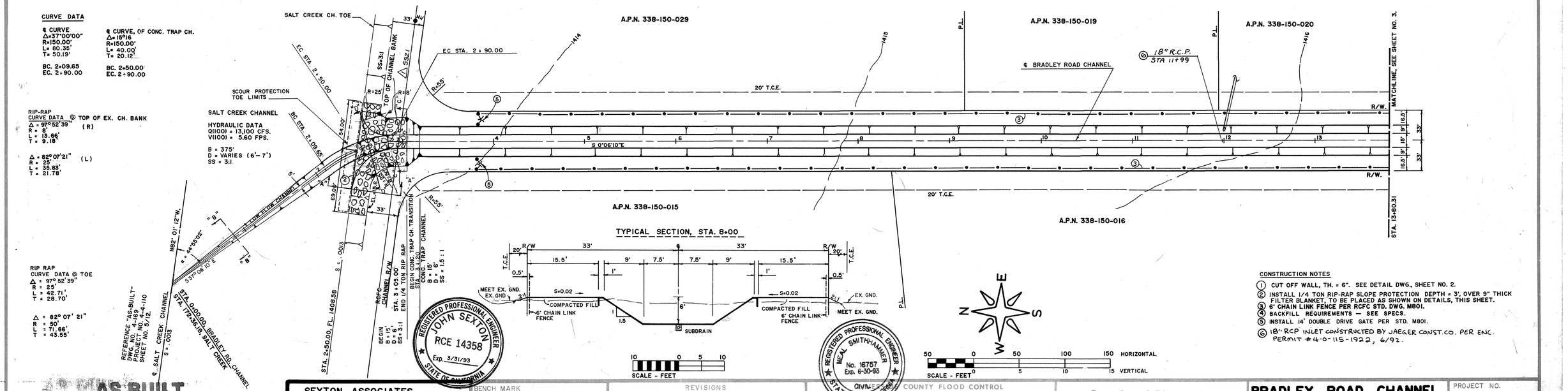
APPROVED BY: [signature]
FOR ROAD COMMISSIONER
RIVERSIDE COUNTY, CALIF.
DATE: 11/14/89

BRADLEY ROAD CHANNEL

ASSESSMENT DISTRICT NO. 4 - 5

PROJECT NO. 4-0-115
DRAWING NO. 4-550
SHEET NO. 1 OF 55





REGISTERED PROFESSIONAL ENGINEER JOHN SEXTON RCE 14358 Exp. 3/31/93 STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER NEAL SMITH-HAMMER No. 16757 Exp. 6-30-93 CIVIL STATE OF CALIFORNIA

AS BUILT
APPROVED BY: [illegible]
DATE 7/24/91

SEXTON ASSOCIATES
1033 DRACENA CT.
REDLANDS, CA. 92373
714 / 792 - 4876

APPROVED BY: John Sexton
DATE: 11/13/89 JOHN SEXTON, RCE. 14358

BENCH MARK
M-16, RESET 1979, RIV. CO. LOCATED 25 FEET SOUTH OF NEWPORT ROAD & 25 FEET EAST OF BRADLEY ROAD.
ELEV. 1434.410, DATE: 6/84.

REVISIONS			
REF.	DESCRIPTION	APPR.	DATE
1	ADDED 21" SS		

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

RECOMMENDED FOR APPROVAL BY: [signature] DESIGN ENGINEER R.E. NO. 16757 DATE: 11/14/89

APPROVED BY: [signature] CHIEF ENGINEER R.E. NO. 12400 DATE: 11-14-89

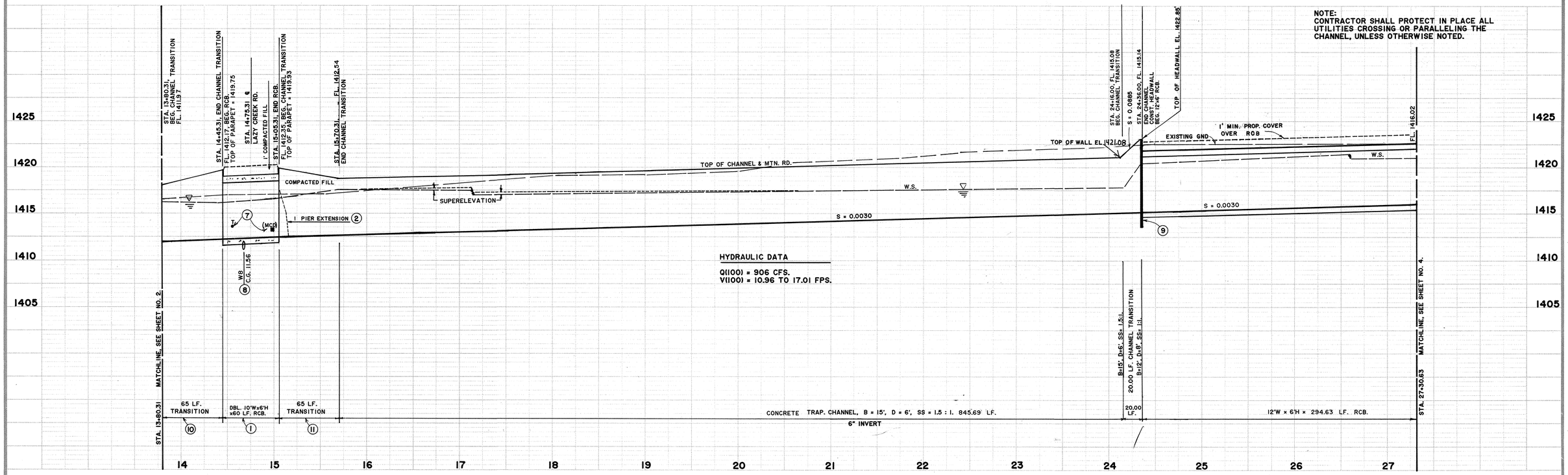
County of Riverside

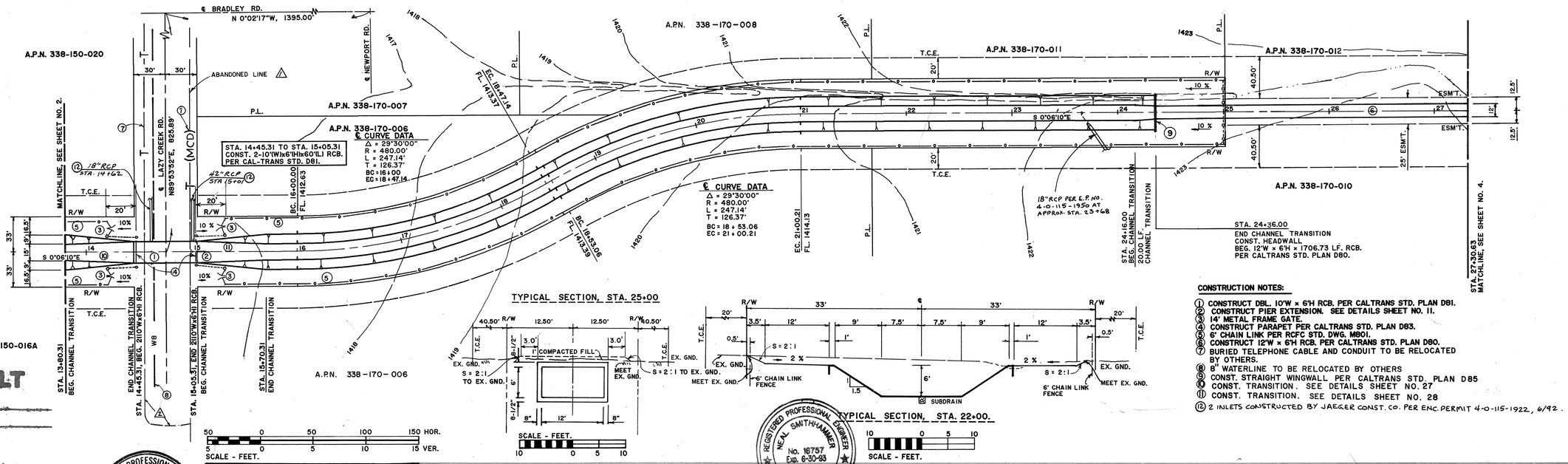
APPROVED BY: [signature] FOR ROAD COMMISSIONER RIVERSIDE COUNTY, CALIF. DATE: 11/14/89

BRADLEY ROAD CHANNEL

ASSESSMENT DISTRICT NO. 4 - 5

PROJECT NO. 4-0-115
DRAWING NO. 4-550
SHEET NO. 2 OF 55





CONSTRUCTION NOTES:

1. CONSTRUCT DBL. 10'W x 6'H RCB. PER CALTRANS STD. PLAN D81.
2. CONSTRUCT PIER EXTENSION. SEE DETAILS SHEET NO. 11.
3. 14' METAL FRAME GATE.
4. CONSTRUCT PARAPET PER CALTRANS STD. PLAN D83.
5. 6' CHAIN LINK PER RCFC STD. DWG. M801.
6. CONSTRUCT 12'W x 6'H RCB. PER CALTRANS STD. PLAN D80.
7. BURIED TELEPHONE CABLE AND CONDUIT TO BE RELOCATED BY OTHERS.
8. 8" WATERLINE TO BE RELOCATED BY OTHERS
9. CONST. STRAIGHT WINGWALL PER CALTRANS STD. PLAN D85
10. CONST. TRANSITION. SEE DETAILS SHEET NO. 27
11. CONST. TRANSITION. SEE DETAILS SHEET NO. 28
12. 2 INLETS CONSTRUCTED BY JAEGER CONST. CO. PER ENC. PERMIT 4-0-115-1922, 6/92.

AS BUILT
APPROVED BY: [illegible]
DATE 7/24/91

REGISTERED PROFESSIONAL ENGINEER JOHN SEXTON RCE 14358 Exp 3/31/93 STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER NEAL SMITH-HAMMER No. 16757 Exp. 6-30-93 CIVIL STATE OF CALIFORNIA

SEXTON ASSOCIATES
1033 DRACENA CT.
REDLANDS, CA. 92373
714 / 792 - 4876

APPROVED BY: John Sexton
DATE: 11/13/89 JOHN SEXTON, RCE. 14358

BENCH MARK
M-16, RESET 1979, RIV. CO. LOCATED 25 FEET SOUTH OF NEWPORT ROAD & 25 FEET EAST OF BRADLEY ROAD.
ELEV. 1434.410, DATE: 6/84.

REVISIONS			
REF.	DESCRIPTION	APPR.	DATE
1	ABANDONED TELEPHONE LINE		
2	RELOCATE TELEPHONE LINE		

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
RECOMMENDED FOR APPROVAL BY: Neal A. Smithhammer, DESIGN ENGINEER R.E. NO. 16757
DATE: 11/14/89

APPROVED BY: Kenneth L. Edwards, CHIEF ENGINEER R.E. NO. 12400
DATE: 11-14-89

County of Riverside
APPROVED BY: [illegible]
FOR ROAD COMMISSIONER
RIVERSIDE COUNTY, CALIF.
DATE: 11/14/89

BRADLEY ROAD CHANNEL
ASSESSMENT DISTRICT NO. 4 - 5

PROJECT NO. 4-0-115
DRAWING NO. 4-550
SHEET NO. 3 OF 55

NOTE:
CONTRACTOR SHALL PROTECT IN PLACE ALL UTILITIES CROSSING OR PARALLELING THE CHANNEL, UNLESS OTHERWISE NOTED.

STA. 27+30.63 FL. 1416.02
STA. 27+45.00 STA. 0+00.00 ℄ 18" R.C.P.
MATCHLINE, SEE SHEET NO. 3.
1' MIN. PROPOSED COVER OVER RCB
B.B. STA. 28+00.00, PVI, FL. 1416.23
STA. 28+92.63, ℄ NEWPORT RD.
STA. 29+00.63 - CONSTRUCT MANHOLE NO. 3.
STA. 29+27.63 ℄ CHANNEL = STA. 93+03.06 ℄ NEWPORT RD. = STA. 99+69.83 ℄ NEWPORT RD. (WATER PLANS, D-13323)
STA. 29+49 T(10 - 4" PVC) BOX
W.S.
S = 0.0030
S = 0.0052
21"W x 15"H C.G. 2.18
HYDRAULIC DATA
Q(100) = 906 CFS.
V(100) = 15.69 FPS.
STA. 32+20.00 ℄ CH. = STA. 0+00.00 ℄ 60" RCP. CH. FL. 18.41 Q(100) = 112 CFS.
6.B. STA. 33+00.00, PVI, FL. 1418.83
STA. 34+76.00 CONST. MANHOLE NO. 3.
EX. GND.
H.G.L.
S = 0.0037
HYDRAULIC DATA
Q(100) = 794 CFS.
V(100) = 11.07 FPS.
STA. 38+55.52 ℄ CH. = STA. 0+00.00 ℄ 60" RCP. CH. FL. 20.87 Q(100) = 118 CFS
STA. 39+76.00 CONST. MANHOLE NO. 3.
STA. 41+09.85, PVI, FL. 1421.80
HYDRAULIC DATA
Q(100) = 676 CFS.
V(100) = 9.42 FPS.
STA. 40+78.45 ℄ CH. = STA. 40+66.57 ℄ 39" RCP. CH. FL. 21.69 STA. 40+66.57 = 39" RCP. FL. 21.78 END JUNCT. STR. NO. 1. BEG. 39" RCP., 2000-D.
℄ 39" RCP.
S=0.03146
2000-D.
S = 0.0024
TRAP. CHANNEL HYDRAULIC DATA
Q(100) = 621 CFS.
V(100) = 8.66 FPS.
STA. 41+82.73, FL. 24.09 END RCB. TRAP. CHANNEL TRANSITION TOP OF PARAPET = 31.80
STA. 42+42.73, FL. 1425.98 END CHANNEL TRANSITION
RCP. FL. 22.15
STA. 42+42.73 MATCHLINE, SEE SHEET NO. 5.
1425
1420
1415
1410
12'W x 6'H x 1452.10 LF. RCB.
60 LF. TRANSITION
28 29 30 31 32 33 34 35 36 37 38 39 40 41 42

CONSTRUCTION NOTES:
(6) 14' METAL FRAME DOUBLE GATE
(7) GTE MANHOLE & BURIED CABLE TO BE RELOCATED BY OTHERS.
(8) WATER LINE TO BE RELOCATED BY OTHERS.
(9) PROTECT IN PLACE EXISTING POWER POLE (PP#2065816E).
(10) CONSTRUCT PARAPET PER CALTRANS STD. PLAN D83.
(11) CONSTRUCT 12'W x 6'H RCB. PER CALTRANS STD PLAN D80.
(12) 6' CHAIN LINK FENCE PER RCFC STD. DWG. M801.
(13) MANHOLE NO. 3 PER RCFC STD. DWG. MH253.
(14) RESURFACE AFFECTED LANES IN KIND.

(1) STA. 27+45.00 ℄ CHANNEL
CONSTRUCT:
JUNCT. STR. NO. 1
PER RCFC STD. DWG. NO. JS226.
ELEV. S=1416.50, ELEV. R=1416.53
C=17', B=18", Δ=30°.
2 LF. OF 18" RCP. CL. IV.
INLET TYPE IX PER RCFC STD. DWG. NO. CB107.
DETAILS SHEET NO. 10.

(2) DELETED

(3) CONST. JUNCT. STR. NO. 1
PER RCFC STD. DWG. NO. JS226
STA. 32+20.00 ℄ CH. =
STA. 0+00.00 ℄ 60" RCP.
ELEV. S = 18.67, ELEV. R = 18.69
C = 20.4'
B = 60", Δ = 30°
DETAILS SHEET NO. 10.
PLACE CONCRETE BULKHEAD PER RCFC STD. DWG. NO. M816.
4 LF. OF 60" RCP., D-1000.

(4) CONST. JUNCT. STR. NO. 1
PER RCFC STD. DWG. NO. JS226
STA. 38+55.52 ℄ CHANNEL
STA. 0+00.00 ℄ 60" RCP.
ELEV. S = 21.26, ELEV. R = 21.29
C = 20.50'
B = 60", Δ = 30°
DETAILS SHEET NO. 10.
PLACE CONCRETE BULKHEAD PER R.C.F.C. STD. DWG. M816.
4 LF. OF 60" RCP. 1000-D

(5) CONST. JUNCT. STR. NO. 1
PER RCFC STD. DWG. NO. JS226
STA. 40+78.45 ℄ CH. =
STA. 40+66.57 ℄ 39" RCP.
ELEV. S = 21.76, ELEV. R = 21.78
C = 19'
B = 39", Δ = 28° 18' 08"
DETAILS SHEET NO. 12.
STA. 40+85.57, FL. 1421.78
JOIN JUNCT. STR. NO. 1
BEG. 39" RCP., 2000-D.

℄ CURVE DATA
Δ = 61°48'46"
R = 480.00'
L = 517.84'
T = 287.35'
BC = STA. 29+50.29
EC = STA. 34+68.13

TYPICAL SECTION, STA. 34+00
12.5' ℄ 12.5'
EX. GND. EX. GND.
8-1/2" 6' 6" 12' 8"
ESM'T. ESM'T.
* BACKFILL TO DRAIN AND TO BLEND WITH EXISTING GROUND.

℄ CURVE DATA
Δ = 62°12'24"
R = 480.00'
L = 521.14'
T = 289.59'
BC = STA. 35+88.71
EC = STA. 41+09.85

39" R.C.P. ℄ CURVE DATA
Δ = 32°03'04"
R = 250.00'
L = 139.85'
T = 71.81'
BC = STA. 40+97.51
EC = STA. 42+37.36

SCALE - FEET 10 0 5 10
SCALE - FEET 50 0 50 100 150 HOR. 0 5 10 15 VER.

TYPICAL SECTION STA. 27+31
EX. GROUND 3.0' 1' MIN COVER OVER R.C.B. 3.0' S=2:1 TO EX. GROUND EX. GROUND
6' 6" 8" 12' 12.5' 12.5' ESM'T ESM'T

REGISTERED PROFESSIONAL ENGINEER JOHN SEXTON RCE 14358 Exp 3/31/93 STATE OF CALIFORNIA

SEXTON ASSOCIATES
1033 DRACENA CT.
REDLANDS, CA. 92373
714 / 792 - 4876

APPROVED BY: John Sexton
DATE: 11/13/89 JOHN SEXTON, RCE. 14358

BENCH MARK
M-16, RESET 1979, RIV. CO. LOCATED 25 FEET SOUTH OF NEWPORT ROAD & 25 FEET EAST OF BRADLEY ROAD.
ELEV. 1434.410, DATE: 6/84.

REF.	REVISIONS	APPR.	DATE
1	4" DUCKS OVER R.C.B. ENCASED IN CONC.		7-24-91
2	LOWERED 21" WATER &		7-24-91

REGISTERED PROFESSIONAL ENGINEER NEAL SMITHHAMMER No. 16757 Exp. 6-30-93 CIVIL STATE OF CALIFORNIA

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
RECOMMENDED FOR APPROVAL BY: Neal Smithhammer
DESIGN ENGINEER R.E. NO. 16757
DATE: 11/14/89
APPROVED BY: Kenneth R. Edwards
CHIEF ENGINEER R.E. NO. 12400
DATE: 11-14-89

County of Riverside
APPROVED BY: Dave F. Ballenger
FOR ROAD COMMISSIONER
RIVERSIDE COUNTY, CALIF.
DATE: 11/14/89

FORECAST HOMES REPLACED CHANNEL ROW FENCE ON THE WEST SIDE FROM STA. 41+00 TO STA. 50+75 WITH A BLOCK WALL PER 6-F.M.S. 4-0-0116-2507

AS BUILT
APPROVED BY: [illegible]
DATE: 7/24/91

BRADLEY ROAD CHANNEL
ASSESSMENT DISTRICT NO. 4 - 5

PROJECT NO. 4-0-115
DRAWING NO. 4-550
SHEET NO. 4 OF 55

STA. 42+42.73, FL. 1425.98
END CHANNEL TRANSITION

STA. 43+50.00 ℄ 39" RCP. =
STA. 87+95.23 ℄ BRADLEY RD.
RCFC MANHOLE NO. 2
FL. 1422.41, GR. EL. 1432.66

STA. 47+50 ℄ 39" R.C.P. =
STA. 83+95.23 ℄ BRADLEY RD.
R.C.FC. MANHOLE NO. 2
FL. 1423.37, GR. EL. 1434.26

STA. 50+00.00 ℄ CH. =
STA. 0+00.00 ℄ 48" RCP.
CH. FL. 1428.01
Q(100) = 56 CFS.

STA. 50+33.24, FL. 1429.14
BEG. CHANNEL TRANSITION

STA. 50+93.24, FL. 1429.38
END CHANNEL TRANSITION ③
BEG. RCB.
TOP OF PARAPET = 37.17

STA. 51+33.24 ℄
GATERIDGE DR.

STA. 51+73.24, FL. 1429.70
END CHANNEL TRANSITION ③
BEG. CHANNEL TRANSITION
TOP OF PARAPET = 37.49

STA. 52+00 ℄ 39" R.C.P. =
STA. 79+45.23 ℄ BRADLEY RD.
R.C.FC. MANHOLE NO. 2
FL. 1436.13

STA. 52+33.24, FL. 1429.94
END CHANNEL TRANSITION

STA. 55+50.00 ℄ 39" RCP. =
STA. 75+95.23 ℄ BRADLEY RD.
RCFC MANHOLE NO. 2
FL. 1428.28, GR. EL. 1437.46

STA. 56+83.78, FL. 1431.74
BEG. CHANNEL TRANSITION

TOP OF CHANNEL
W.S.
FILL
EX. GND.
CHANNEL INVERT
PIPE INVERT
S=0.0040
S=0.0024 39" R.C.P. 2000-D
S = 0.0040

1422.41
1423.37
1424.44
1425.28

1435
1430
1425
1420
1415
1410

STA. 42+42.73 MATCHLINE, SEE SHEET NO. 4.
RCP. FL. 22.15

RCP. FL. 25.60
MATCHLINE, SEE SHEET NO. 6.

CHANNEL
HYDRAULIC DATA

Q (100) = 621 CFS
V (100) = 11.53 FPS

CHANNEL
HYDRAULIC DATA

Q(100) = 565 CFS.
V(100) = 11.27 FPS.

39" PIPE
HYDRAULIC DATA

Q(100) = 55 CFS
V(100) = 7.78 FPS

NOTE:
CONTRACTOR SHALL PROTECT IN PLACE ALL UTILITIES CROSSING OR PARALLELING THE CHANNEL, UNLESS OTHERWISE NOTED.

CONSTRUCTION NOTES:

② 14' METAL FRAME GATE.
③ CONSTRUCT PARAPET PER CALTRANS STD. PLAN D83.
④ CONSTRUCT 14'W x 6'H RCB. PER CALTRANS STD. PLAN D80.
⑤ 6' CHAIN LINK PER RCFC STD. DWG. M801.
⑥ MANHOLE NO. 2 PER RCFC STD. DWG. MH252.
⑦ SLURRY BACKFILL - SEE SHEET NO. 12 FOR DETAILS

TRAP. CHANNEL, B = 6', D = 6', SS = 1.5 : 1. 790.51 LF.
6" INVERT

60 LF. TRANSITION SEE SHT. 30

80 LF. 14'W x 6'H RCB. ④

60 LF. TRANSITION SEE SHT. 31

TRAP. CHANNEL, B = 6', D = 6', SS = 1.5 : 1. 449.54 LF.
6" INVERT

43 44 45 46 47 48 49 50 51 52 53 54 55 56 57

STA. 42+42.73 MATCHLINE, SEE SHEET NO. 4.

STA. 43+50.00 ℄ 39" RCP. = STA. 87+95.23 ℄ BRADLEY RD. CONST. MANHOLE NO. 2 PER RCFC STD. DWG. NO. MH252. ⑥

STA. 47+50.00 ℄ 39" RCP. = STA. 84+95.23 ℄ BRADLEY RD. CONST. MANHOLE NO. 2 PER RCFC STD. DWG. NO. MH252. ⑥

STA. 52+00.00 ℄ 39" RCP. = STA. 79+95.23 ℄ BRADLEY RD. CONST. MANHOLE NO. 2 PER RCFC STD. DWG. NO. MH252. ⑥

STA. 55+50.00 ℄ 38" RCP. = STA. 75+95.23 ℄ BRADLEY RD. CONST. MANHOLE NO. 2 PER RCFC STD. DWG. NO. MH252. ⑥

MENIFEE ELEMENTARY SCHOOL

PARK

EXIST. EMWD FACILITIES TO BE RELOCATED BY OTHERS. ⚠

STA. 50+93.24 TO STA. 51+73.24
CONSTRUCT 14' x 6' RCB.
PER CALTRANS STD. PLAN D80.

TRACT NO. 22543 - 1.

TRACT NO. 22543 - 2.

℄ NEWPORT RD.

℄ BRADLEY RD.

℄ LA PIEDRA AVE.

FUTURE SCHOOL PARK DR.

FUTURE GATERIDGE DR.

PROPOSED SSI8

EX. WI2

39"RCP 2000 D

FUTURE S/W

FUTURE BICYCLE PATH

S 0°17'28"W, 1988.01'

S 0°17'28"W, 660.00'

S 0°17'28"W

STA. 50+00.00 ℄ CH. =
STA. 0+00.00 ℄ 48" RCP.
JUNCT. STR. NO. 6. ①

MATCHLINE, SEE SHEET NO. 4.

MATCHLINE, SEE SHEET NO. 6.

STA. 42+42.73
END CHANNEL TRANSITION

STA. 50+33.24
BEG. CHANNEL TRANSITION

STA. 50+93.24
END. CHANNEL TRANSITION
BEG. 14'W x 6'H RCB.

STA. 51+73.24
END. 14'W x 6'H RCB.
BEG. CHANNEL TRANSITION

STA. 52+33.24
END CHANNEL TRANSITION

STA. 56+83.78
BEG. CHANNEL TRANSITION

RCFC R/W 41.50' — BICYCLE PATH 14.00' — STREET R/W 50' — STREET 50' R/W

T.C.E. 20'

3.0' 12' 1' 9' 6' 9' 1.5' 6' 8' 6' 6' 38'

0.5' 2:1 EX. GND. 6' CHAIN LINK FENCE FILL MEET EX. GND. SUBDRAIN 6' 1.5 1' 2% 6% 2% 2% 2:1 SL. MEET EX. GND. 6' CHAIN LINK FENCE

FUTURE IMPROVEMENTS 1.5% EXISTING GROUND EXIST. WI2 39" RCP. 15' 6' 24' FUTURE SSI8

FORECAST HOMES REPLACED CHANNEL ROW FENCE ON THE WEST SIDE FROM STA. 41+46 TO STA 50+75 WITH A BLOCK WALL PER E.P. NO 4-0-0115-2507

NOTE: CONTRACTOR SHALL RESTORE GRADE ABOVE THE 39" RCP. TO MATCH EXISTING GROUND.

① STA. 0+00.00 ℄ 48" RCP. =
STA. 50+00.00 ℄ CHANNEL
CONSTRUCT:
JUNCT. STR. NO. 6, RCFC STD. DWG. NO. JS231.
ELEV. S= 1429.48, ELEV. R=1429.55
C= 7.00', D=48", L=29.5', a=30°.

8 LF. OF 48" RCP. 1300-D
PLACE CONCRETE BULKHEAD, RCFC STD. DWG. NO. M816.

SEE DETAILS, SHEET NO. 12.

TYPICAL SECTION, STA. 49+00

10 0 5 10
SCALE - FEET

50 0 50 100 150 HOR.
SCALE - FEET 0 5 10 15 VER.

N E S W

AS BUILT
APPROVED BY: [illegible]
DATE 7/24/91

REGISTERED PROFESSIONAL ENGINEER JOHN SEXTON RCE 14358 Exp. 3/31/93 STATE OF CALIFORNIA

SEXTON ASSOCIATES
1033 DRACENA CT.
REDLANDS, CA. 92373
714 / 792 - 4876

APPROVED BY:
DATE: 11/13/89 JOHN SEXTON, RCE. 14358

BENCH MARK

M-16, RESET 1979, RIV. CO. LOCATED 25 FEET SOUTH OF NEWPORT ROAD & 25 FEET EAST OF BRADLEY ROAD.

ELEV. 1434.410, DATE: 6/84.

REVISIONS			
⚠ ADDED NOTE & EMWD FACILITIES			
REF.	DESCRIPTION	APPR.	DATE

REGISTERED PROFESSIONAL ENGINEER NEAL SMITHHAMMER No. 16757 Exp. 6-30-93 STATE OF CALIFORNIA

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

RECOMMENDED FOR APPROVAL BY: DEPUTY DIRECTOR/CHIEF ENGINEER R.E. NO. 16757 DATE:

APPROVED BY: KENNETH A. EDWARDS CHIEF ENGINEER R.E. NO. 12400 DATE: 11-14-89

County of Riverside

APPROVED BY: EDWARD F. DELLINGATTE FOR ROAD COMMISSIONER RIVERSIDE COUNTY, CALIF. DATE: 11/14/89

BRADLEY ROAD CHANNEL
ASSESSMENT DISTRICT NO. 4 - 5

PROJECT NO. 4-0-115
DRAWING NO. 4-550
SHEET NO. 5 OF 55

NOTE:
CONTRACTOR SHALL PROTECT IN PLACE ALL UTILITIES CROSSING OR PARALLELING THE CHANNEL, UNLESS OTHERWISE NOTED.

CONSTRUCTION NOTES:

(5) 14' METAL FRAME GATE.
(6) CONSTRUCT PARAPET PER CALTRANS STD. PLAN D83.
(7) CONSTRUCT 14'W x 6'H RCB. PER CALTRANS STD. PLAN D80.
(8) 6' CHAIN LINK PER RCFC STD. DWG. M801.
(9) MANHOLE NO.2 PER RCFC STD. DWG. MH252

60 LF. TRANSITION SEE SHT. 32 | 102 LF. 14'W x 6'H RCB. (7) | 60 LF. TRANSITION SEE SHT. 33 | TRAP. CHANNEL, B = 6', D = 6', SS = 1.5 : 1. 591.46 LF. 651.46 LF. 6" INVERT SLAB | 20' TRANS

STA. 57+42.78, FL. 1431.98 END CHANNEL TRANSITION
BEG. 14' x 6' RCB.
CONST. PARAPET, TOP EL. 1439.77
STA. 57+55.00 ℄ CH. = STA. 59+43.14 ℄ 48" RCP.
CH. FL. 1432.03
Q(100) = 39 CFS.
STA. 57+93.78 ℄ CH. = STA. 59+22.50 LA PIEDRA RD.
FL. 1432.19
STA. 58+44.78, FL. 1432.39
END 14' x 6' RCB.
BEG. CHANNEL TRANSITION
CONST. PARAPET, TOP EL. 1440.18
G.B. STA. 59+04.78, FVI, FL. 1432.63.
END CHANNEL TRANSITION
STA. 60+00 ℄ 39" RCP = STA. 71+45.58 ℄ BRADLEY RD.
RCFC MANHOLE NO. 2
EL. 1426.35, GR. EL. 1439.56
STA. 63+50 ℄ 39" RCP = STA. 67+95.58 ℄ BRADLEY RD.
RCFC MANHOLE NO. 2
EL. 1427.19, GR. EL. 41.64
STA. 64+01.50 ℄ CH. = STA. 29+46.59 ℄ 54" RCP.
CH. FL. = 1435.83.
Q(100) = 98 CFS.
STA. 64+50.00 ℄ CH. = STA. 20+57.72 ℄ 48" RCP.
CH. FL. 1435.92
Q(100) = 60 CFS.
STA. 64+78.24, FL. 1436.08 BEG. CH. TRANS. DETAILS SHEET NO. 13.
G.B. STA. 64+96.24, PVI, FL. 1436.20
END TRAPEZOIDAL CHANNEL
CONST. HEADWALL & WINGWALL, TOP EL. 1444.20 (4)
STA. 65+33.24 ℄ 72" RCP = STA. 20+83.87 ℄ SUN BLOSSOM DR.
FL. 1436.36, ℄ EL. = 1444.10
STA. 67+50.00 ℄ 39" RCP. = STA. 63+95.58 ℄ BRADLEY RD.
RCFC MANHOLE NO. 2
FL. 1428.15, GR. EL. 1444.06
STA. 69+96.24 ℄ 78" RCP.
CONST. MANHOLE NO. 2
RCFC STD. DWG. NO. MH252.
78" RCP
FL. 33.3
39" RCP.
FL. 29.22

Ep-4-0.0115-2695
Forecast Homes
Connect a 24" diameter
Catch basin Connector Pipe to
Bradley Road Channel
With a District Standard Junction
Structure.
October 15, 2003

MATCHLINE, SEE SHEET NO. 5.
MATCHLINE, SEE SHEET NO. 7.
STA. 56+83.78 FL. 31.14
STA. 72+00.00
RCP. FL. 25.60
TOP OF CHANNEL
W.S.
CHANNEL INVERT
78" RCP INVERT
39" RCP INVERT
FUTURE FINAL GRADE OVER ℄ OF 78" RCP.
EX. GND.
6" INVERT SLAB
1455 1450 1445 1440 1435

CHANNEL HYDRAULIC DATA
S = 0.0040
Q(100) = 565 CFS.
V(100) = 11.27 FPS.

CHANNEL HYDRAULIC DATA
S = 0.0060
Q(100) = 526 CFS.
V(100) = 12.50 FPS.

CHANNEL HYDRAULIC DATA
Q(100) = 430 CFS.
V(100) = 6.00 FPS.

78" RCP HYDRAULIC DATA
S = 0.000443, 78" RCP, 900-D, 703.76 LF.
Q(100) = 370 CFS.
V(100) = 11.93 FPS.

39" RCP HYDRAULIC DATA: Q(100) = 55 CFS, V(100) = 7.78 FPS.
S = 0.0024, 39" RCP., 2000-D

1426.35 | 1427.19 | 1428.15 | 1438.41

58 59 60 61 62 63 64 65 66 67 68 69 70 71 72

1" = 50

TYPICAL SECTION, STA. 63+00

R/W 41.50' R/W 14' ST. R/W 50' ST. R/W 50'
T.C.E. MEET EX. GND. EX. GND. 3.0' 12' 1' 9' 6' 9' 1.5' 6' 8' 6' 6' 6' 38'
20' 0.5' 2% 2% 6% 2% 2% 1.5%
6' CHAIN LINK FENCE 6' 1.5' 1' SUBDRAIN 6' CHAIN LINK FENCE
BICYCLE PATH
MEET EX. GND. 2:1 2:1
EXIST. W12 15' 6' FUTURE SS18
36" RCP. 24"
24"ϕ RCP CL IV 0-2000
EXIST. EMWD FACILITIES ⚠ TO BE RELOCATED BY OTHERS
CHAN. 58+74 ℄ 14' CB
FL 24"ϕ = 1433.96 V = 5.16'
SCALE - FEET 10 0 5 10

TYPICAL SECTION, STA. 67+00

R/W 41' R/W 14' ST. R/W 50' ST. R/W 50'
27.50' 13.50' 6' 8' 6' 6' 38'
MEET EX. GND. 2:1 2:1
5% 5% 2% 1.5%
3' COVER
BICYCLE PATH
FUTURE IMPROVEMENTS
MEET EX. GND. EX. GND. EXIST. W12 15' 6' FUTURE SS18
78" RCP. 39" RCP. 24"
SCALE - FEET 10 0 5 10

PLAN OUTLET
FUTURE LA PIEDRA RD. ℄ N89°53'56"E
FUTURE DAWN RD. ℄ N89°42'41"W
BRADLEY RD
N 0°17'19"E,
S 0°17'28"W
S 0°17'24"W
S 0°17'19"W
MATCHLINE, SEE SHEET NO. 5.
MATCHLINE, SEE SHEET NO. 7.
STA. 56+83.78 BEG. CHANNEL TRANSITION
STA. 57+42.78 END CHANNEL TRANSITION BEG. 14'Wx6'H RCB.
STA. 58+44.78 END 14' x 6' RCB. BEG. CHANNEL TRANSITION
STA. 59+04.78 END CHANNEL TRANSITION
STA. 72+00.00
PROP. SS8"
PROP. 98"
PROP. W8"
FUTURE S/W
FUTURE BICYCLE PATH
R/W
T.C.E.
EX. W12
FUTURE SS18
24" 77.5' 50' 14' 41.5' 13.5'
30 LF 24"ϕ 1.41%
1433.51 PL 24"ϕ
1432.5 ℄ TRAP CHANNEL
10% 2:1

STA. 73+51.99 ℄ BRADLEY RD. = STA. 100+00.00 ℄ LA PIEDRA RD.
STA. 60+00.00 ℄ 39" RCP. = STA. 71+45.58 ℄ BRADLEY RD. (9)
CONST. MANHOLE NO. 2 PER RCFC STD. DWG. NO. MH252
STA. 63+50.00 ℄ 39" RCP. = STA. 67+95.58 ℄ BRADLEY RD. (9)
CONST. MANHOLE NO. 2 PER RCFC STD. DWG. NO. MH252
(4) STA. 64+96.24 END CHANNEL, BEG. 78" RCP. CONST. HEADWALL & WINGWALL
STA. 66+11.99 ℄ BRADLEY RD. = STA. 20+83.87 ℄ SUN BLOSSOM DR. = STA. 28+11.07 ℄ EARLY DAWN RD.
STA. 67+50.00 ℄ 39" RCP. = STA. 63+95.58 ℄ BRADLEY RD. (9)
CONST. MANHOLE NO. 2 PER RCFC STD. DWG. NO. MH252
STA. 29+46.59 ℄ 54" RCP. = STA. 64+01.50 ℄ CH. (2)
JUNCT.STR. NO. 6.
STA. 69+96.24 ℄ 78" RCP. (9)
CONST. MANHOLE NO. 2 RCFC STD. DWG. NO. MH252.

(1) STA.57+55.00 ℄ CH. = STA. 59+43.14 ℄ 48" RCP. (1)
JUNCT.STR. NO. 1.
(2) Proposed JSF to Channel
Δ=90°
STA. 57+42.78 TO STA. 58+44.78
CONSTRUCT 14' x 6' RCB.
PER CALTRANS STD. PLAN D80.
(1)
(2) STA. 29+46.59 ℄ 54" RCP. = STA. 64+01.50 ℄ CH.
CONSTRUCT:
JUNCT. STR. NO. 6, RCFC STD. DWG. NO. JS231.
ELEV. S = 1455.4, ELEV. R = 1455.74
C= 6.0', D=54", L=35.3', Δ=30° ⚠
8 LF. OF 54" RCP. 1000-D
PLACE CONCRETE BULKHEAD,
RCFC STD. DWG. NO. M816.
DETAILS SHEET NO. 13.
(3) STA. 20+57.72 ℄ 48" RCP. = STA. 64+50.00 ℄ CHANNEL
CONSTRUCT:
JUNCT. STR. NO. 6, RCFC STD. DWG. NO. JS231.
ELEV. S= 1436.66, ELEV. R= 1436.74
C= 10.0', D=48", L=34.50', Δ=23°.
8 LF. OF 48" RCP. 1300-D
PLACE CONCRETE BULKHEAD,
RCFC STD. DWG. NO. M816.
DETAILS SHEET NO. 13.
STA. 64+50.00 ℄ CH. = STA. 20+57.72 ℄ 48" RCP. (3)
JUNCT. STR. NO. 6.
(4) STA. 64+96.24 ℄ CHANNEL
END TRAP. CHANNEL, BEGIN 78" RCP.
CONST. HEADWALL & WINGWALL, TYPE "B".
CALTRANS STD. PLAN D90 AND
DETAILS SHEET NO. 13.

REGISTERED PROFESSIONAL ENGINEER JOHN SEXTON RCE 14358 Exp. 3/31/93 STATE OF CALIFORNIA

SCALE - FEET 50 0 50 100 150 HOR. 0 5 10 15 VER.

(1) CONST. JUNCT. STR. NO. 1 PER RCFC STD. DWG. NO. JS226
STA. 57+55.00 ℄ CH. =
STA. 59+43.14 ℄ 48" RCP.
ELEV. S = 32.38, ELEV. R = 32.40
C = 22'
B = 48", Δ = 30°
DETAILS SHEET NO. 12
PLACE CONCRETE BULKHEAD
PER RCFC STD. DWG. NO. M816.

AS BUILT
APPROVED BY:
DATE

SEXTON ASSOCIATES
1033 DRACENA CT.
REDLANDS, CA. 92373
714 / 792 - 4876

APPROVED BY: John Sexton
DATE: 11/13/89 JOHN SEXTON, RCE. 14358

BENCH MARK
M-16, RESET 1979, RIV. CO. LOCATED 25 FEET SOUTH OF NEWPORT ROAD & 25 FEET EAST OF BRADLEY ROAD.
ELEV. 1434.410, DATE: 6/84.

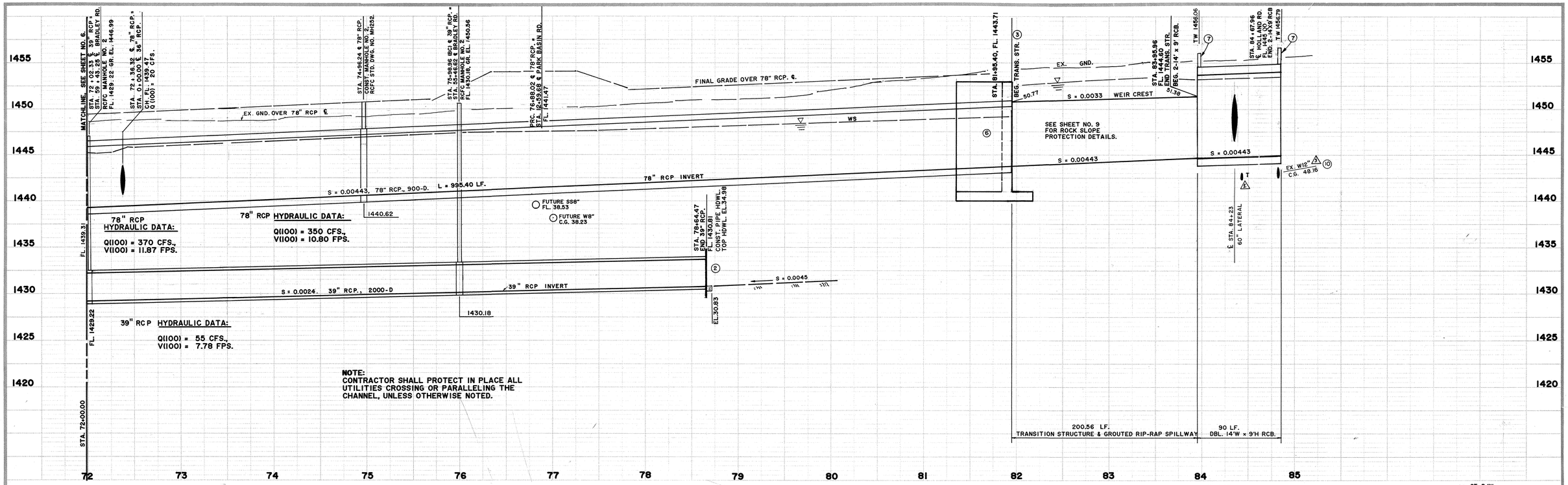
REF	DESCRIPTION	APPR.	DATE
⚠1	CHANGED DATA NOTES 2 & 3. ADDED EMWD FACILITIES + NOTE.		
⚠2	CONNECT 42" RCP S.D. AT STA. 57+70 EP 2562		
⚠3	CONNECT 24" RCP S.D. EP 2562		

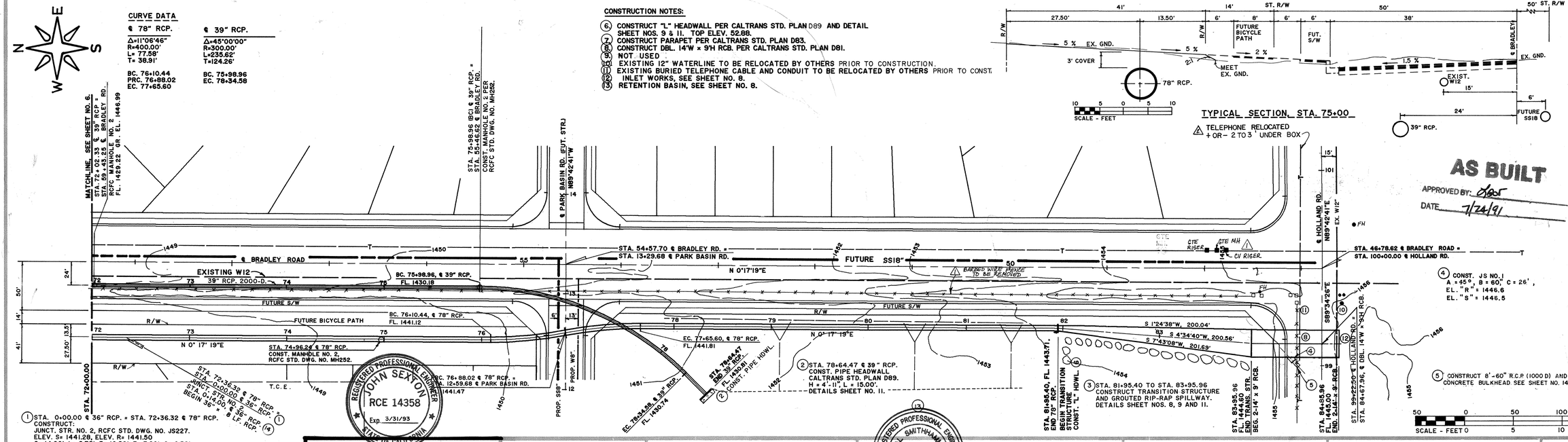
REGISTERED CIVIL ENGINEER NEAL SMITH No. 16757 Exp. 6-30-90 CIVIL
RECOMMENDED FOR APPROVAL BY: DESIGN ENGINEER RCE NO. 16757 DATE: 11/14/89
APPROVED BY: Kenneth F. Edwards CHIEF ENGINEER R.E. NO. 12400 DATE: 11-14-89
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

County of Riverside
APPROVED BY: Thomas F. Ballenger
FOR ROAD COMMISSIONER
RIVERSIDE COUNTY, CALIF. DATE: 11/14/89

BRADLEY ROAD CHANNEL
ASSESSMENT DISTRICT NO. 4 - 5

PROJECT NO. 4-0-115
DRAWING NO. 4-550
SHEET NO. 6 OF 55





SEXTON ASSOCIATES
1033 DRACENA CT.
REDLANDS, CA. 92373
714 / 792 - 4876

APPROVED BY: John Sexton
DATE: 11/13/89
JOHN SEXTON, RCE. 14358

BENCH MARK

M-16, RESET 1979, RIV. CO. LOCATED 25 FEET SOUTH OF NEWPORT ROAD & 25 FEET EAST OF BRADLEY ROAD.

ELEV. 1434.410, DATE: 6/84.

REVISIONS			
1	ADD EXIST. FENCE & UTILITIES		
2	RELOCATE TELE. LINE 3' UNDER BOX		
3	LOWERED 12" WATER LINE		
REF.	DESCRIPTION	APPR.	DATE

RECOMMENDED FOR APPROVAL BY: Neal Smithhammer
DESIGN ENGINEER R.E. NO. 16757
DATE: 11/14/89

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
APPROVED BY: Kenneth Edwards
CHIEF ENGINEER R.E. NO. 12400
DATE: 11-14-89

County of Riverside
APPROVED BY: Thomas F. Dalenguite
FOR ROAD COMMISSIONER
RIVERSIDE COUNTY, CALIF. DATE: 11/14/89

BRADLEY ROAD CHANNEL
ASSESSMENT DISTRICT NO. 4 - 5

PROJECT NO. 4-0-115
DRAWING NO. 4-550
SHEET NO. 7 OF 55

AS BUILT

APPROVED BY: LBS
DATE 7/24/91

John Sexton RCE 14358 Exp. 3/31/93 — Registered Professional Engineer, State of California

County of Riverside	SEXTON ASSOCIATES 1033 DRACENA CT. REDLANDS, CA. 92373 714 / 792 - 4876	BENCH MARK
APPROVED BY: [signature] FOR ROAD COMMISSIONER RIVERSIDE COUNTY DATE: 11/14/89	APPROVED BY: John Sexton JOHN SEXTON, RCE. 14358 DATE: 11/13/89	ELEV. 1457.411, DATE: 11/16/89. R.R. SPIKE IN PP #2293563E @ S.E. CORNER OF HOLLAND RD. & BRADLEY RD.

REVISIONS

REF.	DESCRIPTION	APPR.	DATE
1	METAL BEAM RAIL MOVED		11-28-89
2	GRADING PLAN VIEW ADDED		"
3	CHANNEL FLOWLINES CHANGED		"
4	ADDED EXISTING FENCE & UTILITIES		"
5	CHANGE ELEV. @ TYP. SECTIONS		"

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

DESIGNED BY:
DRAWN BY:
DATE DRAWN:
CHECKED BY:

RECOMMENDED FOR APPROVAL BY: Neal L. Smithhammer DESIGN ENGINEER R.E. NO. 16757 DATE: 11/14/89

APPROVED BY: Kenneth L. Edwards CHIEF ENGINEER R.E. NO. 12400 DATE: 11-14-89

Neal Smithhammer No. 16757 Exp. 6-30-93 Civil — Registered Professional Engineer, State of California

BRADLEY ROAD CHANNEL

ASSESSMENT DISTRICT NO. 4 - 5

MENIFEE MEADOWS BASIN

PROJECT NO. 4-0-115
DRAWING NO. 4-550
SHEET NO. 8 OF 55

109897

DETAILS

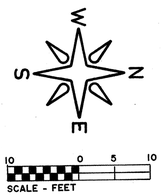
TRANSITION STRUCTURE AND GROUTED RIP-RAP SPILLWAY (THICKNESS = 3 FEET)

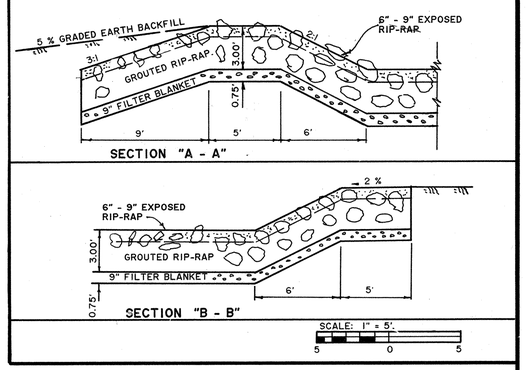
LEGEND

GROUND ELEVATION --- XX.X
FLOW LINE ---------- FL. XX.XX
TOP OF REINFORCED CONCRETE BOX ---- T.RCB. XX.XX
TOP OF TRANS. STR. RETAINING WALL --- TRW. XX.X
(BOTTOM OF DECORATIVE CONCRETE BLOCK WALL)
TOP OF SPILLWAY -- TS. XX.XX
TOP OF FOOTING ----- TF. XX.XX
TOP OF DECORATIVE CONCRETE BLOCK WALL ---TW. XX.X
6' DECORATIVE CONCRETE BLOCK WALL ------
6' CHAIN LINK FENCE --------
TOP OF SLOPE
TOE OF SLOPE (2:1)
TOP GROUTED SLOPE ----- T.GS.XX.XX

CONSTRUCTION NOTES:

(2) CONSTRUCT DECORATIVE BLOCK WALL PER DETAILS SHEET NO. 11.
(3) CONSTRUCT RECTANGULAR CHANNEL PER DETAILS SHEET NO. 11.
(4) CONSTRUCT GROUTED RIP-RAP SPILLWAY PER DETAILS SHEET NO. 11.
(5) 14' METAL FRAME GATE PER R.C.F.C. STD. DWG. M80I.
(6) CONSTRUCT PARAPET PER CALTRANS STD. PLAN D83, MODIFIED. H=1.5' (TYP.)
(7) CONSTRUCT DBL. 14'W x 9'H RCB. PER CALTRANS STD. PLAN D81.
(8) 6' CHAIN LINK PER RCFC STD. DWG. M80I. RAISE FENCE 12" ABOVE GROUND.
(9) FILL AREA OVER BOX WITH COMPACTED NATIVE SOIL.
(10) 4' WIDE ACCESS GATE.
(11) 6' CHAIN LINK FENCE PER RCFC STD. DWG. M80I.





REGISTERED PROFESSIONAL ENGINEER JOHN SEXTON RCE 14358 Exp. 3/31/93 STATE OF CALIFORNIA

AS BUILT

APPROVED BY: _____
DATE _____

County of Riverside
APPROVED BY: _____
FOR ROAD COMMISSIONER
RIVERSIDE COUNTY, CALIF. DATE: 11/14/89

SEXTON ASSOCIATES
1033 DRACENA CT.
REDLANDS, CA. 92373
714 / 792 - 4876

APPROVED BY: _____
DATE: 11/13/89 JOHN SEXTON, RCE. 14358

BENCH MARK
M-16, RESET 1979, RIV. CO. LOCATED 25 FEET SOUTH OF NEWPORT ROAD & 25 FEET EAST OF BRADLEY ROAD.
ELEV. 1434.410, DATE: 6/84.

REVISIONS

REF.	DESCRIPTION	APPR.	DATE

REGISTERED PROFESSIONAL ENGINEER NEAL SMITHHAMMER No. 16757 Exp. 6/30/91 CIVIL STATE OF CALIFORNIA

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

DESIGNED BY:
DRAWN BY:
DATE DRAWN:
CHECKED BY:

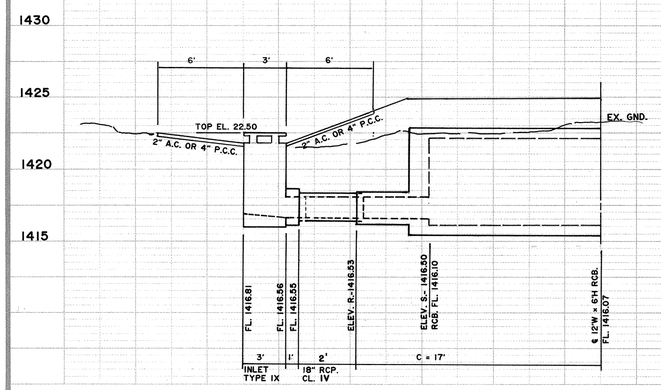
RECOMMENDED FOR APPROVAL BY: _____
DESIGN ENGINEER R.E. NO. 16757
DATE: 11/14/89

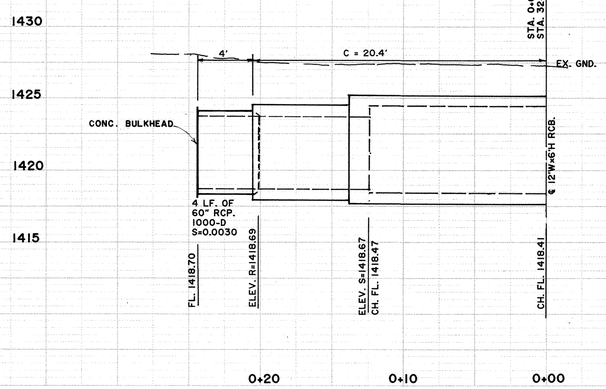
APPROVED BY: _____
CHIEF ENGINEER R.E. NO. 12400
DATE: 11-14-89

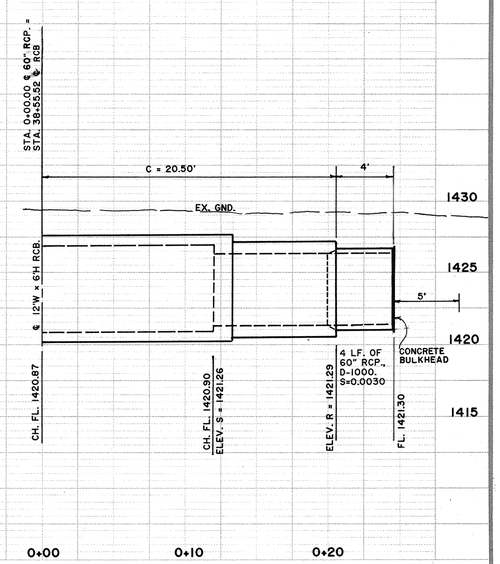
BRADLEY ROAD CHANNEL

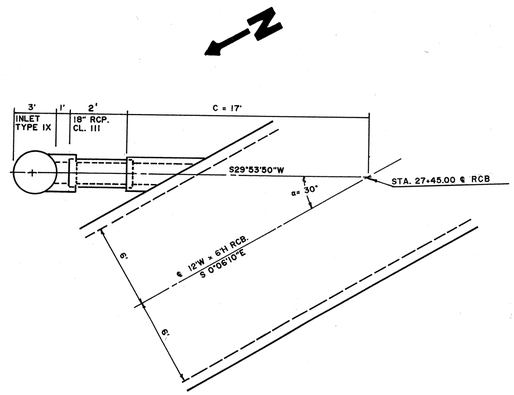
ASSESSMENT DISTRICT NO. 4 - 5

PROJECT NO. 4-0-115
DRAWING NO. 4-550
SHEET NO. 9 OF 55







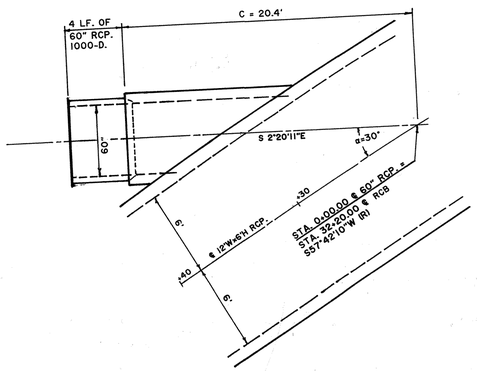


STA. 27+45.00 ℄ RCB

CONSTRUCT:
JUNCT. STR. NO. I
PER RCFC STD. DWG. NO. JS226.
ELEV. S=1416.50, ELEV. R=1416.53
C=17', B=18", A=30°.

2 LF. OF 18" RCP. CL. I.V.
INLET TYPE IX PER RCFC STD. DWG. NO. CB107.

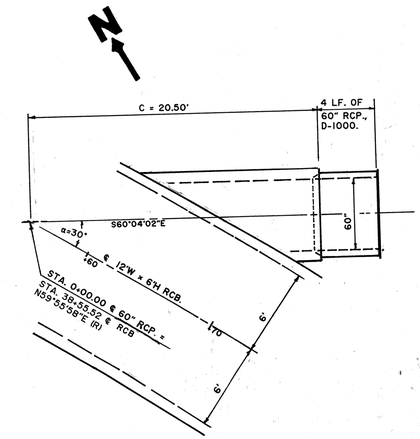
SEE PLAN SHEET NO. 4.



STA. 0+00.00 ℄ 60" RCP. = STA. 32+20.00 ℄ RCB
CONSTRUCT:
JUNCT. STR. NO. I, RCFC STD. DWG. NO. JS226.
ELEV. S=1418.67, ELEV. R=1418.69
C=20.40', B=60", A=30°.

4 LF. OF 60" RCP. 1000-D
PLACE CONCRETE BULKHEAD, RCFC STD. DWG. NO. M816.

SEE PLAN SHEET NO. 4.



STA. 0+00.00 ℄ 60" RCP. = STA. 38+55.52 ℄ RCB
CONSTRUCT:
JUNCT. STR. NO. I, RCFC STD. DWG. NO. JS226.
ELEV. S= 1421.26, ELEV. R=1421.29
C=20.50', B=60", A=30°.

4 LF. OF 60" RCP. 1000-D
PLACE CONC. BULKHEAD, RCFC STD. DWG. NO. M816

SEE PLAN SHEET NO. 4.

REGISTERED PROFESSIONAL ENGINEER
JOHN SEXTON
RCE 14358
Exp. 3/31/93
STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER
NEAL SMITHHAMMER
No. 16757
Exp. 6-30-93
CIVIL
STATE OF CALIFORNIA

SCALE: 1" = 5' (HOR. & VERT.)
5 0 5 15

AS BUILT
APPROVED BY: [illegible]
DATE 7/24/91

SEXTON ASSOCIATES
1033 DRACENA CT.
REDLANDS, CA. 92373
714 / 792 - 4876

APPROVED BY:
DATE: 11/13/89 JOHN SEXTON, RCE. 14358

BENCH MARK

M-16, RESET 1979, RIV. CO. LOCATED 25 FEET SOUTH OF NEWPORT ROAD & 25 FEET EAST OF BRADLEY ROAD.

ELEV. 1434.410, DATE: 6/84.

REVISIONS

REF.	DESCRIPTION	APPR.	DATE

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

RECOMMENDED FOR APPROVAL BY:
DESIGN ENGINEER R.E. NO. 16757
DATE: 11/14/89

APPROVED BY:
CHIEF ENGINEER R.E. NO. 12400
DATE: 11-14-89

County of Riverside

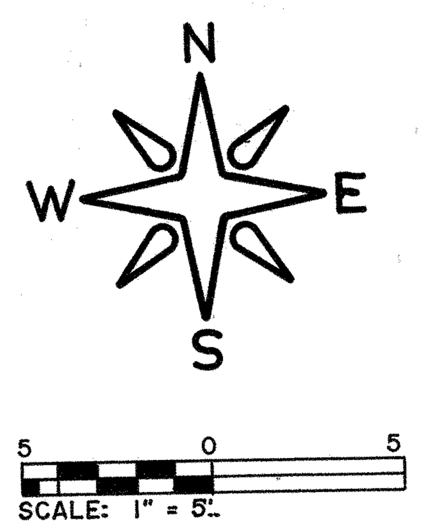
APPROVED BY:
FOR ROAD COMMISSIONER
RIVERSIDE COUNTY, CALIF. DATE: 11/14/89

BRADLEY ROAD CHANNEL

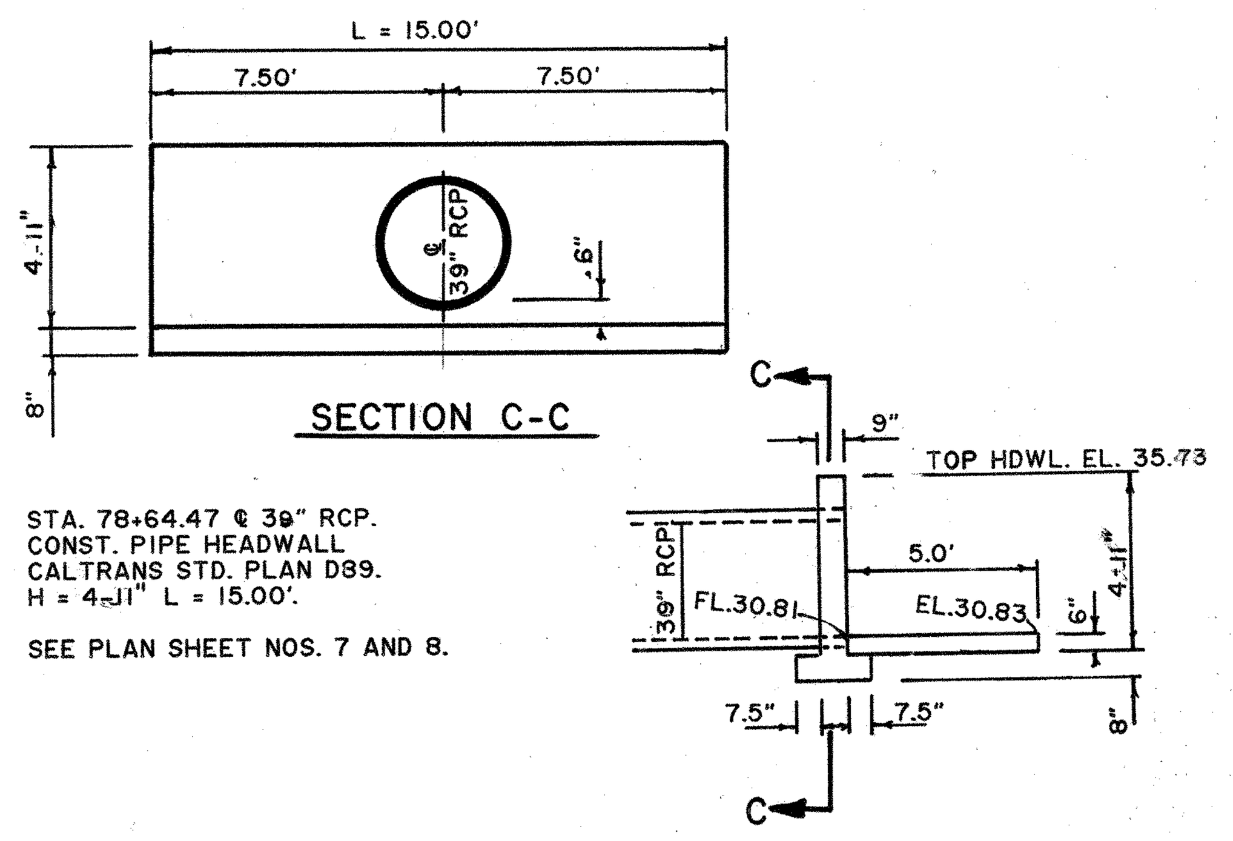
ASSESSMENT DISTRICT NO. 4-5

PROJECT NO. 4-0-115
DRAWING NO. 4-550
SHEET NO. 10 OF 55

109897



PIPE HEADWALL DETAILS

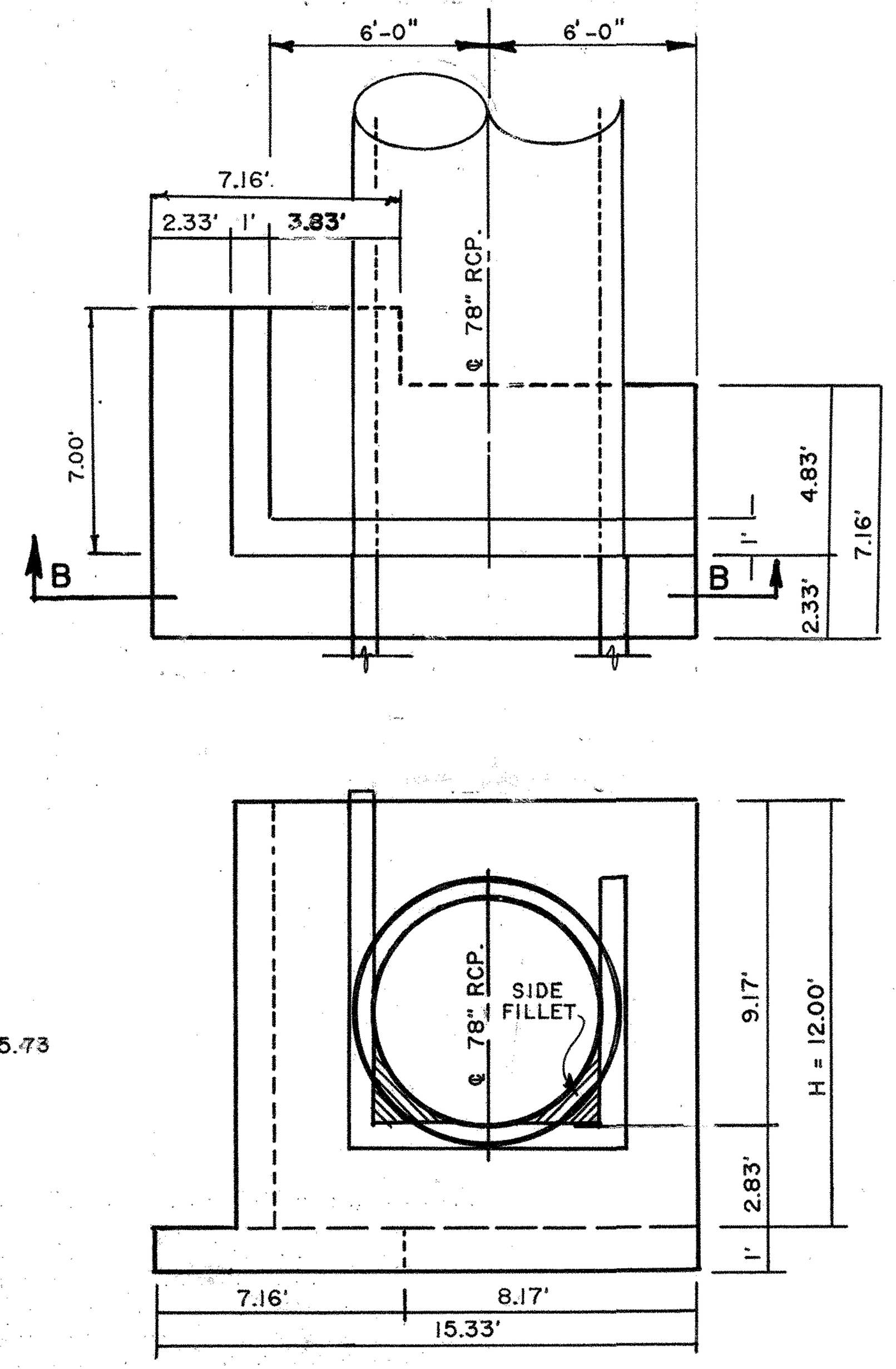


SECTION C-C

STA. 78+64.47 ℄ 39" RCP.
CONST. PIPE HEADWALL
CALTRANS STD. PLAN D89.
H = 4-11" L = 15.00'.

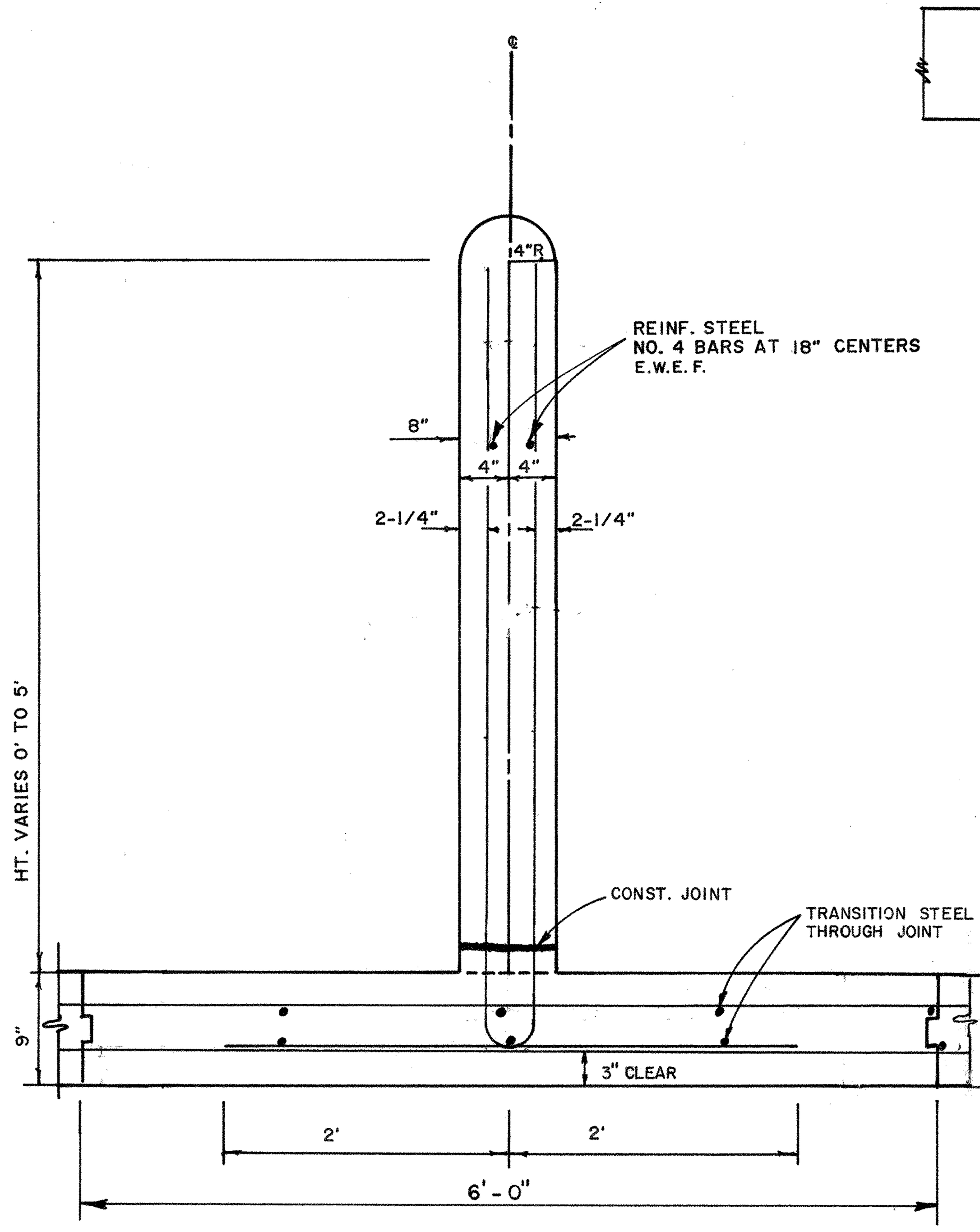
SEE PLAN SHEET NOS. 7 AND 8.

"L" PIPE HEADWALL DETAILS



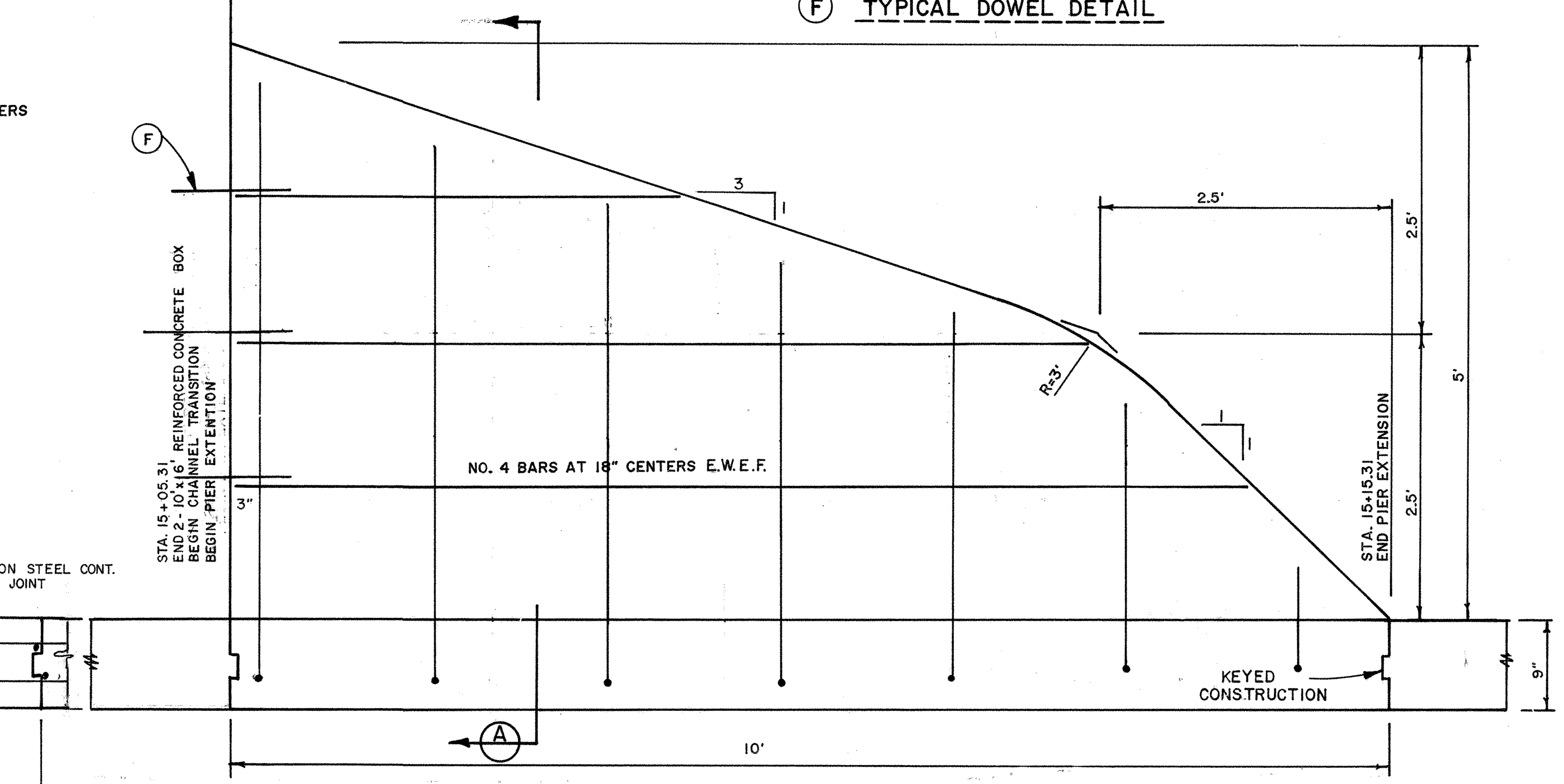
STA. 81+95.40 ℄ 78" RCP.
CONST. "L" PIPE HEADWALL
CALTRANS STD. PLAN D89.
H = 12.00', L = 7.00'.
SEE PLAN SHEET NO. 8.
SEE DETAIL SHEET NO. 9.

SECTION B-B



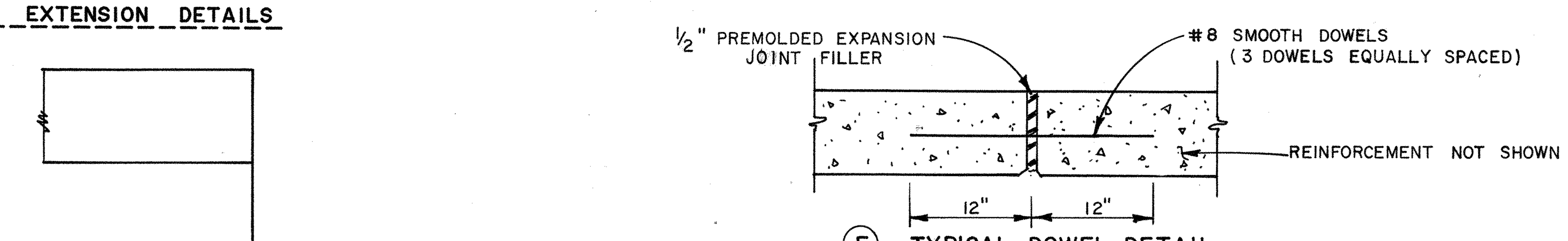
SECTION (A)

PIER EXTENSION DETAILS

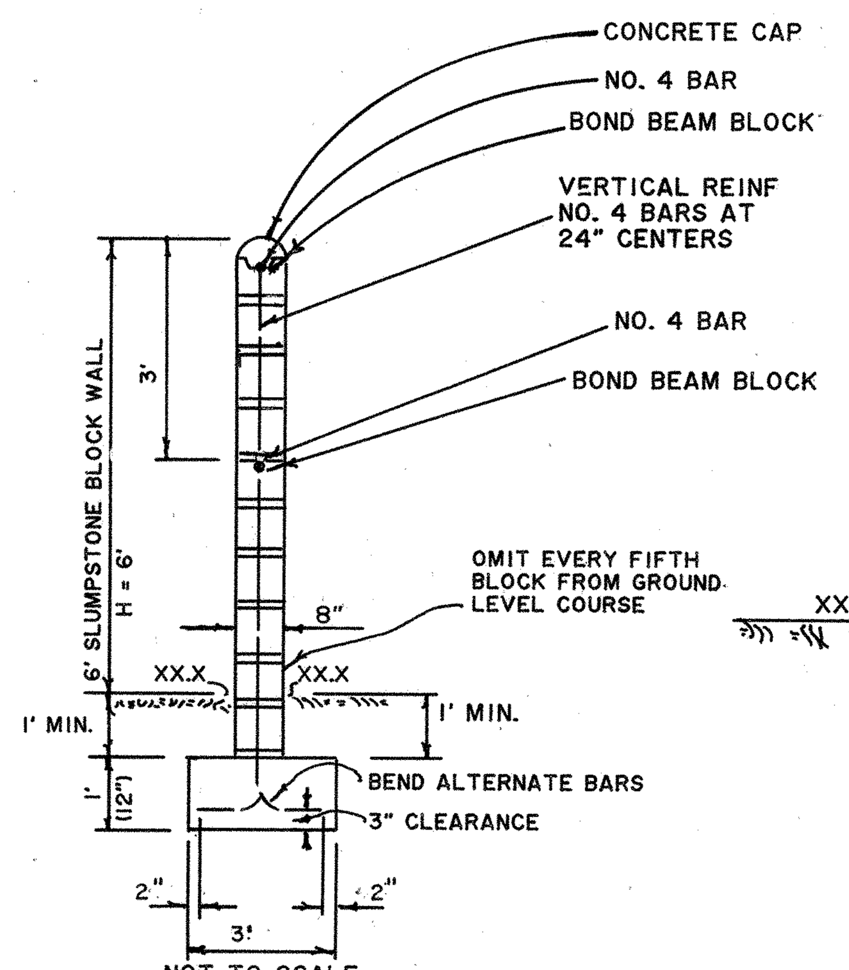


SEE PLAN SHEET NO. 3

SCALE: 1" = 1'. PIER EXTENSION



(F) TYPICAL DOWEL DETAIL



NOT TO SCALE

SLUMPSTONE DECORATIVE BLOCK WALL NOTES

ALL CELLS SHALL BE FILLED WITH GROUT TO THE TOP OF THE BOND BEAM.

BACKFILL SHALL BE COMPACTED TO A MINIMUM OF 95%.

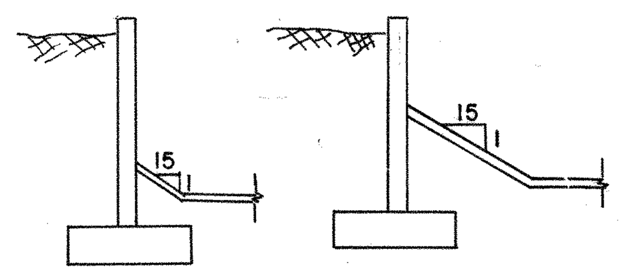
FOOTING SHALL BE CLASS B CONCRETE (6 SACK MIX).

1/2" OPEN JOINTS EXTENDING THROUGH THE ENTIRE HEIGHT OF THE WALL SHALL BE SPACED AT 50' INTERVALS.

OMIT EVERY FIFTH BLOCK FROM GROUND LEVEL COURSE.

TRANSITION STRUCTURE AND GROUTED RIP-RAP SPILLWAY DETAILS

STA. 81+95.40 TO STA. 83+95.96
PLAN VIEW, SHEET NOS. 7, 8, & 9.

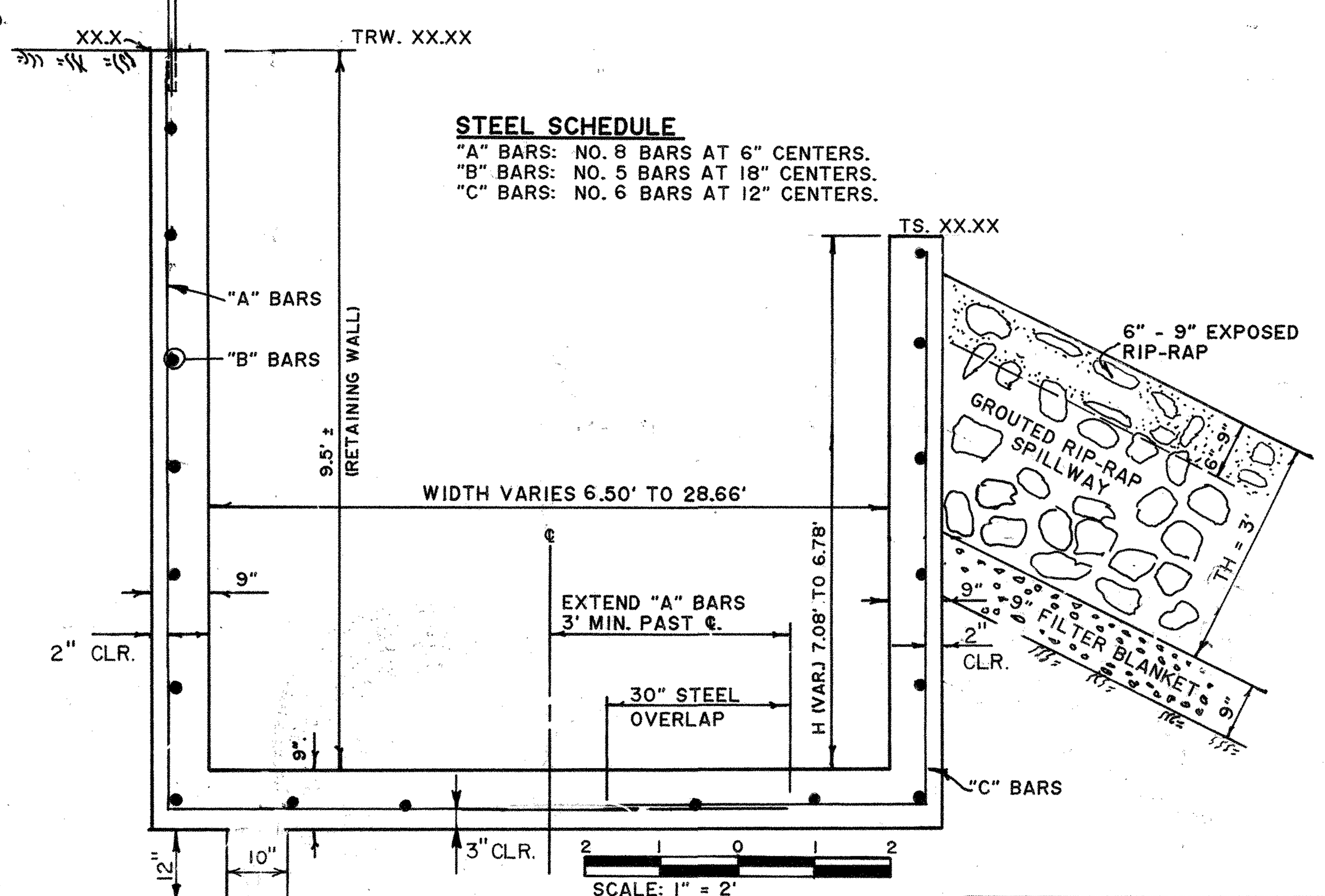


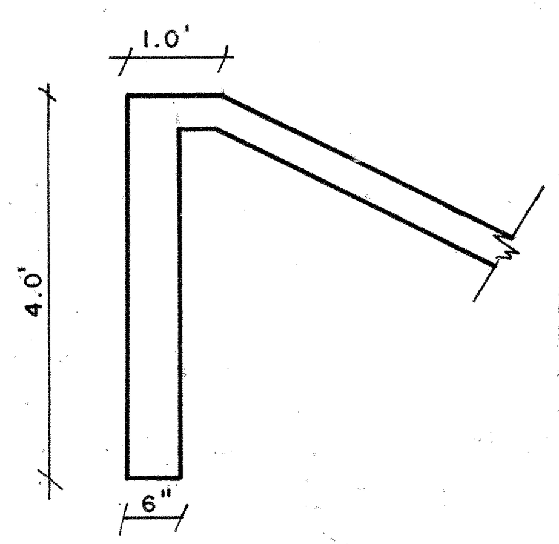
SECTION D – D
NTS

SECTION E – E
NTS

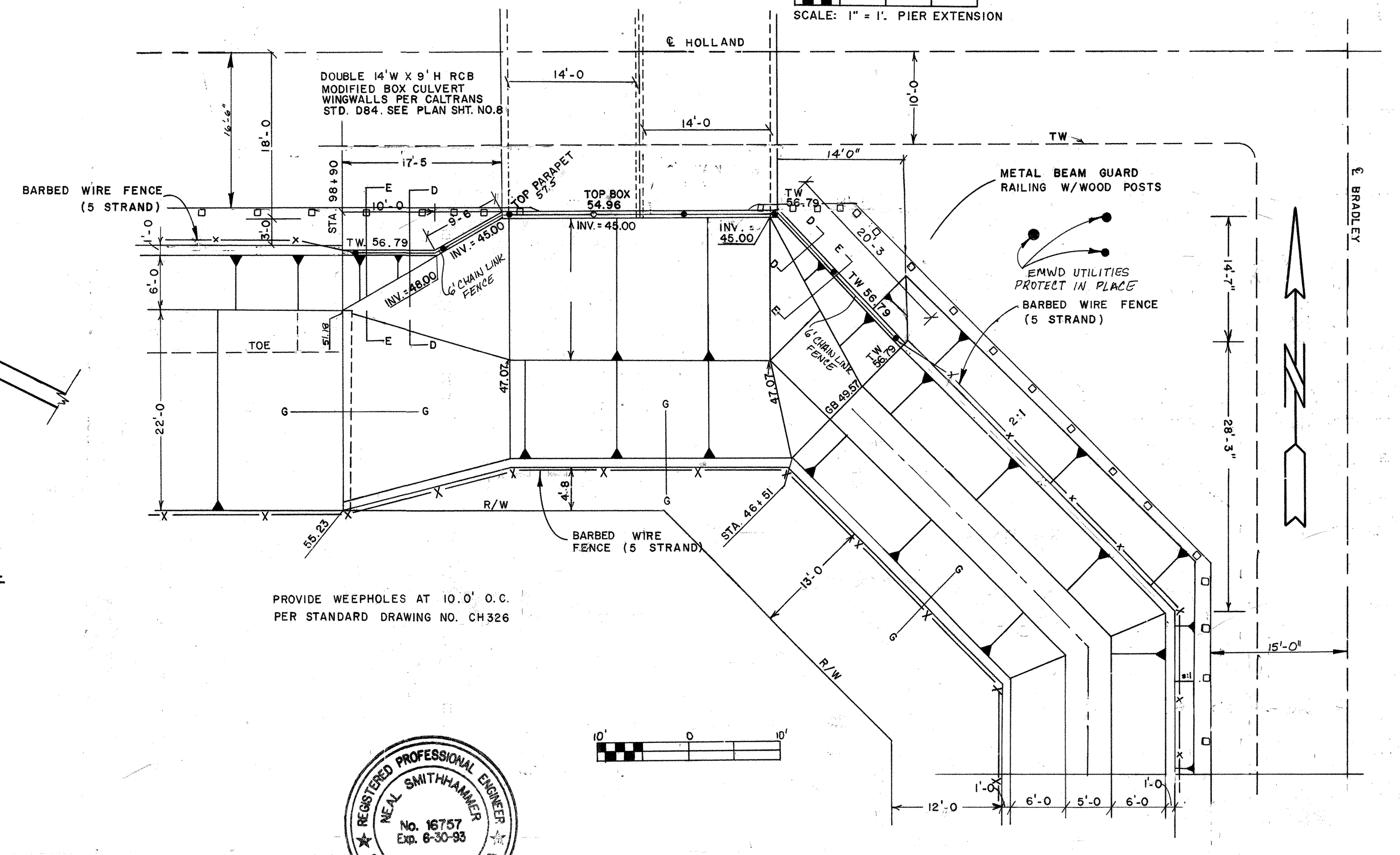
STEEL SCHEDULE

"A" BARS: NO. 8 BARS AT 6" CENTERS.
"B" BARS: NO. 5 BARS AT 18" CENTERS.
"C" BARS: NO. 6 BARS AT 12" CENTERS.





4.0' CUT - OFF WALL
SECTION G – G



PROVIDE WEEPHOLES AT 10.0' O.C.
PER STANDARD DRAWING NO. CH326

REGISTERED PROFESSIONAL ENGINEER
JOHN SEXTON
RCE 14358
Exp. 3/31/93
STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER
NEAL SMITHHAMMER
No. 16757
Exp. 6-30-93
STATE OF CALIFORNIA

AS BUILT
APPROVED BY: [signature]
DATE 7/24/91

County of Riverside
APPROVED BY: [signature]
FOR ROAD COMMISSIONER
RIVERSIDE COUNTY, CALIF. DATE: 11/14/89

SEXTON ASSOCIATES
1033 DRACENA CT.
REDLANDS, CA. 92373
714 / 792 - 4876
APPROVED BY: [signature]
DATE: 11/13/89 JOHN SEXTON, RCE. 14358

BENCH MARK
M-16, RESET 1979, RIV. CO. LOCATED 25 FEET SOUTH OF NEWPORT ROAD & 25 FEET EAST OF BRADLEY ROAD.
ELEV. 1434.410, DATE: 6/84.

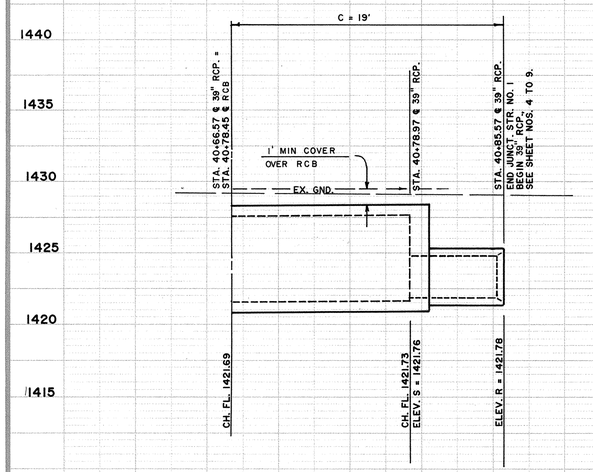
REVISIONS			
REF.	DESCRIPTION	APPR.	DATE

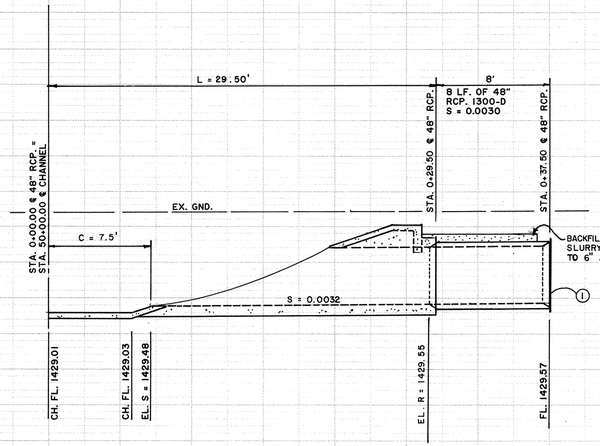
DESIGNED BY:
DRAWN BY:
DATE DRAWN:
CHECKED BY:

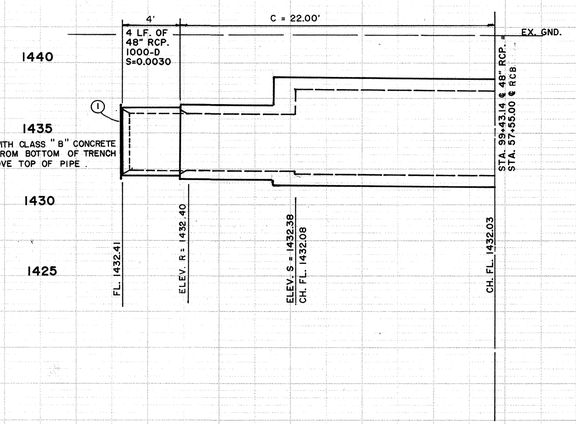
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
RECOMMENDED FOR APPROVAL BY: [signature]
DESIGN ENGINEER R.E. NO. 16757
DATE: 11/14/89
APPROVED BY: [signature]
CHIEF ENGINEER R.E. NO. 12400
DATE: 11-14-89

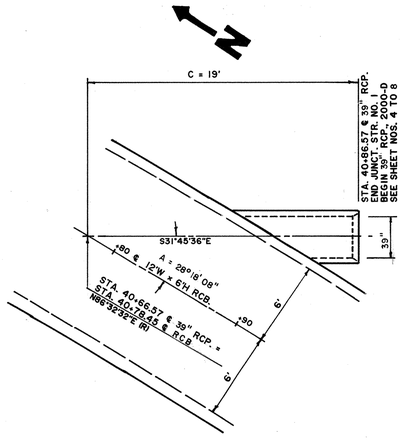
BRADLEY ROAD CHANNEL
ASSESSMENT DISTRICT NO. 4 - 5

PROJECT NO. 4-0-115
DRAWING NO. 4-550
SHEET NO. 11 OF 55



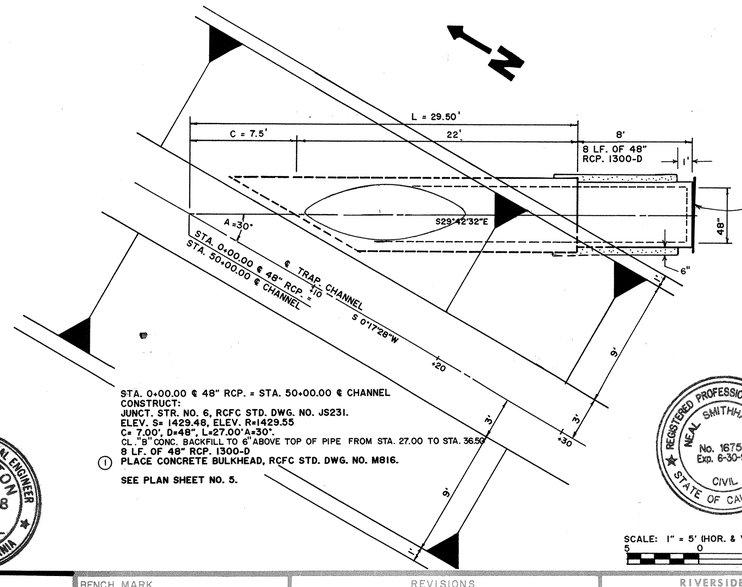






STA. 40+66.57 ℄ 39" RCP. = STA. 40+78.45 ℄ RCB
CONSTRUCT:
JUNCT. STR. NO. 1, RCFC STD. DWG. NO. JS226.
ELEV. S= 1421.76, ELEV. R=1421.78
C=19.00', B=39", A= 28°18'08"

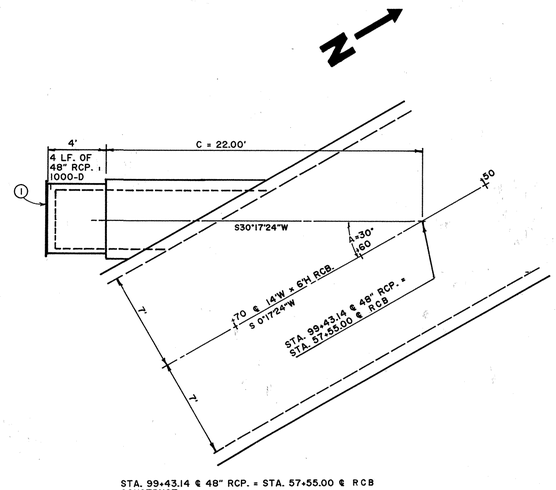
SEE PLAN SHEET NO. 4.



STA. 0+00.00 ℄ 48" RCP. = STA. 50+00.00 ℄ CHANNEL
CONSTRUCT:
JUNCT. STR. NO. 6, RCFC STD. DWG. NO. JS231.
ELEV. S= 1429.48, ELEV. R=1429.55
C= 7.00', D=48", L=27.00' A=30°.
CL "B" CONC. BACKFILL TO 6" ABOVE TOP OF PIPE FROM STA. 27.00 TO STA. 36.50
① 8 LF. OF 48" RCP. 1300-D
PLACE CONCRETE BULKHEAD, RCFC STD. DWG. NO. M816.

SEE PLAN SHEET NO. 5.

SCALE: 1" = 5' (HOR. & VERT.)
5 0 5 10 15



STA. 99+43.14 ℄ 48" RCP. = STA. 57+55.00 ℄ RCB
CONSTRUCT:
JUNCT. STR. NO. 1, RCFC STD. DWG. NO. JS226.
ELEV. S= 1432.38, ELEV. R=1432.40
C= 22.00', B=48", A=30°.

4 LF. OF 48" RCP. 1300-D
PLACE CONCRETE BULKHEAD, RCFC STD. DWG. NO. M816.

SEE PLAN SHEET NO. 6.

REGISTERED PROFESSIONAL ENGINEER JOHN SEXTON RCE 14358 Exp. 3/31/93 STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER NEAL SMITHHAMMER No. 16757 Exp. 6-30-93 CIVIL STATE OF CALIFORNIA

AS BUILT
APPROVED BY: [signature]
DATE: 7/24/91

SEXTON ASSOCIATES
1033 DRACENA CT.
REDLANDS, CA. 92373
714 / 792 - 4876

APPROVED BY: [signature]
DATE: 11/13/89 JOHN SEXTON, RCE. 14358

BENCH MARK

M-16, RESET 1979, RIV. CO. LOCATED 25 FEET SOUTH OF NEWPORT ROAD & 25 FEET EAST OF BRADLEY ROAD.

ELEV. 1434.410, DATE: 6/84.

REVISIONS			
REF.	DESCRIPTION	APPR.	DATE

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

RECOMMENDED FOR APPROVAL BY: [signature]
DESIGN ENGINEER R.E. NO. 16757
DATE: 11/14/89

APPROVED BY: [signature]
CHIEF ENGINEER R.E. NO. 12400
DATE: 11-14-89

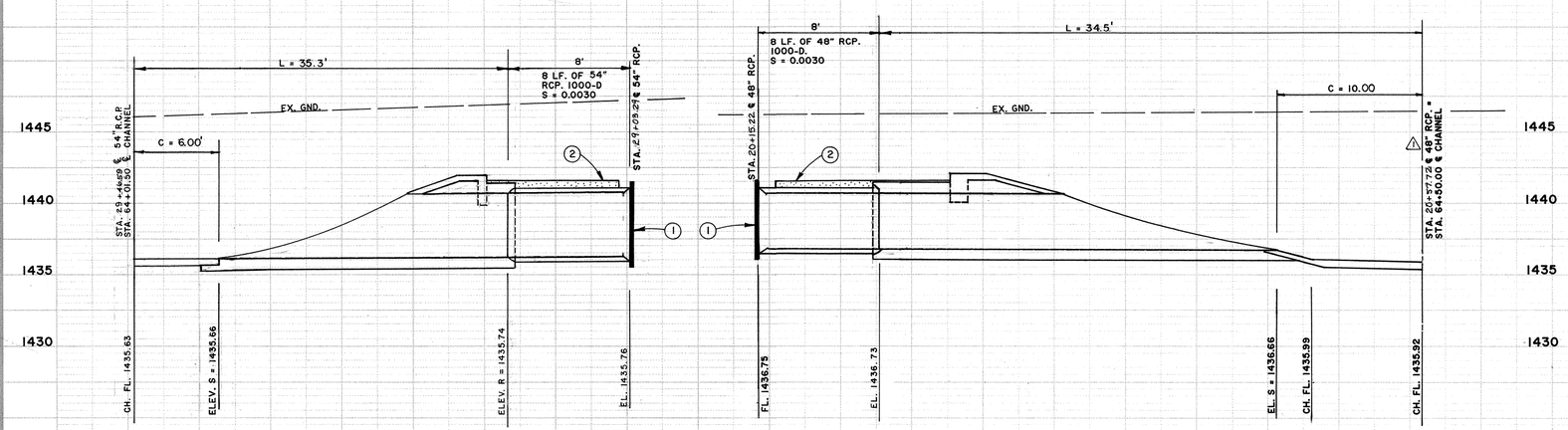
County of Riverside

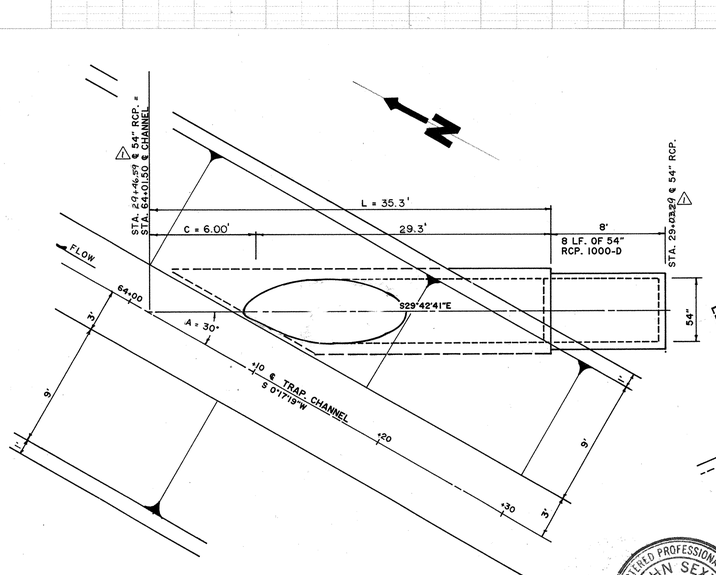
APPROVED BY: [signature]
FOR ROAD COMMISSIONER
RIVERSIDE COUNTY, CALIF. DATE: 11/14/89

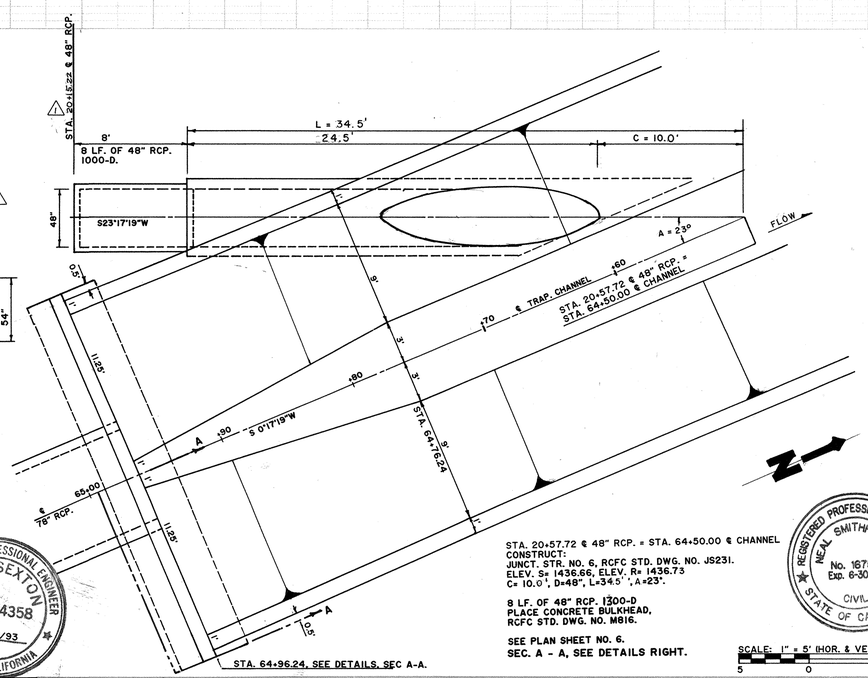
BRADLEY ROAD CHANNEL

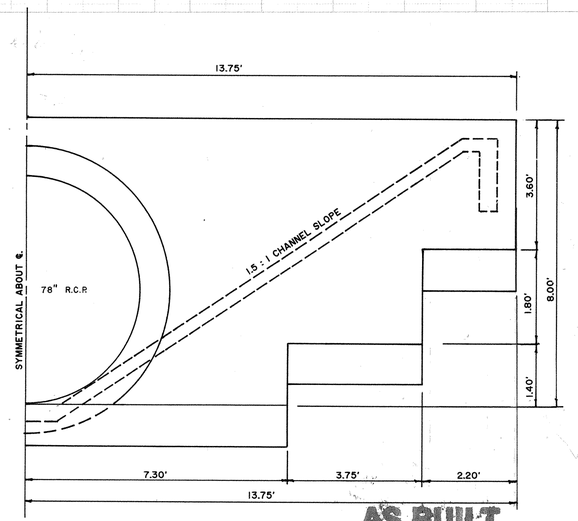
ASSESSMENT DISTRICT NO. 4 - 5

PROJECT NO. 4-0-115
DRAWING NO. 4 - 550
SHEET NO. 12 OF 55









STA. 00+00.00 ℄ 54" RCP. = STA. 64+01.50 ℄ CHANNEL
CONSTRUCT:
JUNCT. STR. NO. 6, RCFC STD. DWG. NO. JS231.
ELEV. S = 1435.66, ELEV. R = 1435.74
C= 6.0', D=54", A=30°, L = 35.3'

8 LF. OF 54" RCP. 1000-D
PLACE CONCRETE BULKHEAD, RCFC STD. DWG. NO. M816.

SEE PLAN SHEET NO. 6.

(1) CONCRETE BULKHEAD PER R.C.F.C. STD. DWG. M816.
(2) BACKFILL WITH CLASS "B" CONCRETE SLURRY FROM BOTTOM OF TRENCH TO 6" ABOVE TOP OF PIPE AND 1' FROM END OF PIPE.

REGISTERED PROFESSIONAL ENGINEER JOHN SEXTON RCE 14358 Exp. 3/31/93 STATE OF CALIFORNIA

STA. 20+57.72 ℄ 48" RCP. = STA. 64+50.00 ℄ CHANNEL
CONSTRUCT:
JUNCT. STR. NO. 6, RCFC STD. DWG. NO. JS231.
ELEV. S= 1436.66, ELEV. R= 1436.73
C= 10.0', D=48", L=34.5', A=23°.

8 LF. OF 48" RCP. 1300-D
PLACE CONCRETE BULKHEAD, RCFC STD. DWG. NO. M816.

SEE PLAN SHEET NO. 6.
SEC. A - A, SEE DETAILS RIGHT.

REGISTERED PROFESSIONAL ENGINEER NEAL SMITHHAMMER No. 16757 Exp. 6-30-93 CIVIL STATE OF CALIFORNIA

SCALE: 1" = 5' (HOR. & VER.)
5 0 5 10 15

DETAILS
SEC. A - A

STA. 64+96.24
END TRAP. CHANNEL, BEGIN 78" RCP.
CONSTRUCT ENDWALL AND WINGWALL, TYPE "B".
CALTRANS STD. PLAN D90.

SEE PLAN VIEW ON SHEET 6

AS BUILT
APPROVED BY: [signature]
DATE 7/24/91

SCALE: 1" = 2'
2 0 2 4 6

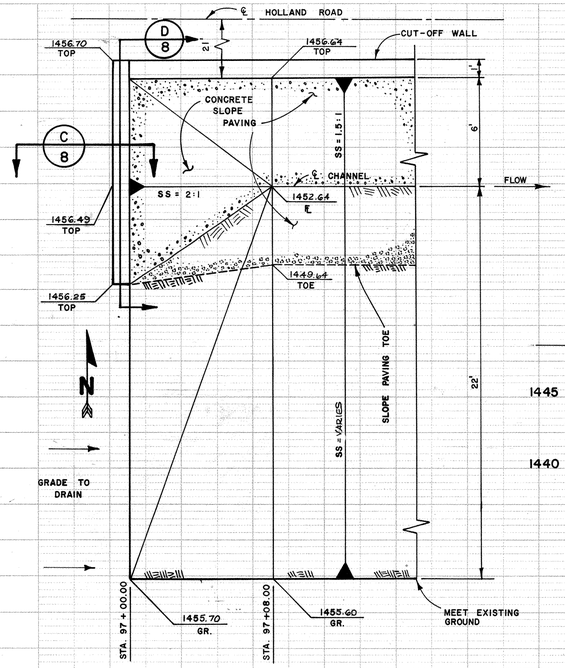
SEXTON ASSOCIATES 1033 DRACENA CT. REDLANDS, CA. 92373 714 / 792-4876	BENCH MARK M-16, RESET 1979, RIV. CO. LOCATED 25 FEET SOUTH OF NEWPORT ROAD & 25 FEET EAST OF BRADLEY ROAD. ELEV. 1434.410, DATE: 6/84.
APPROVED BY: DATE: 11/13/89 JOHN SEXTON, RCE. 14358	REVISIONS ⚠ CHANGED J.S. NO. 6 DATA & STATIONING REF. DESCRIPTION APPR. DATE

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
RECOMMENDED FOR APPROVAL BY: [signature] DESIGN ENGINEER R.E. NO. 16757 DATE: 11/14/89
APPROVED BY: [signature] CHIEF ENGINEER R.E. NO. 12400 DATE: 11-14-89

County of Riverside
APPROVED BY: [signature]
FOR ROAD COMMISSIONER
RIVERSIDE COUNTY, CALIF. DATE: 11/14/89

BRADLEY ROAD CHANNEL
ASSESSMENT DISTRICT NO. 4 - 5

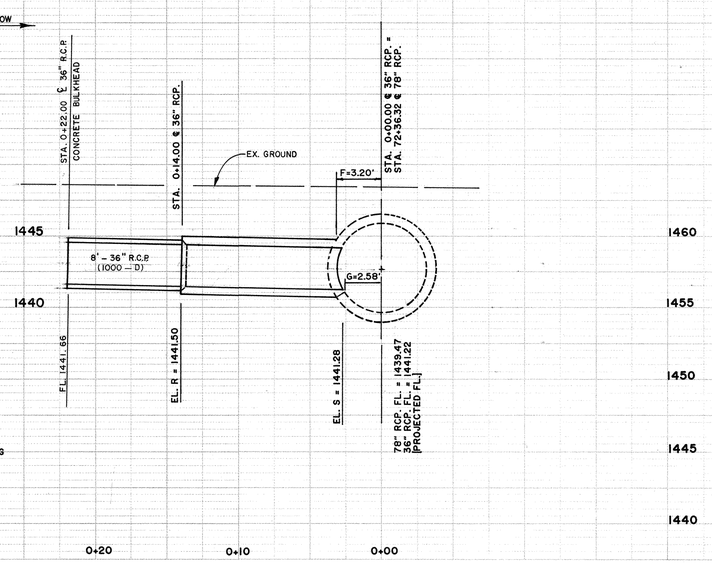
PROJECT NO.	4-0-115
DRAWING NO.	4-550
SHEET NO.	13 OF 55

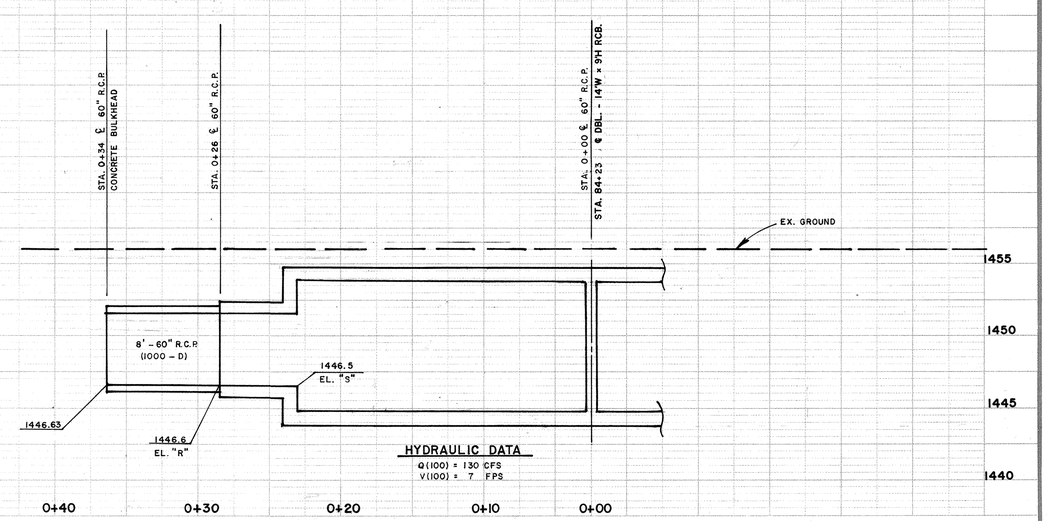


HOLLAND ROAD CHANNEL DETAIL ⚠1

STA. 97 + 00 TO STA. 97 + 08.00

PLAN VIEW SHEET 8

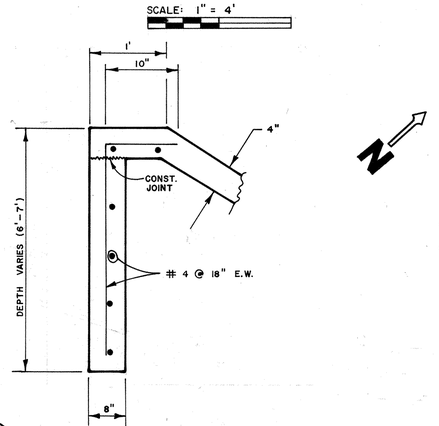




HYDRAULIC DATA

Q(100) = 130 CFS
V(100) = 7 FPS

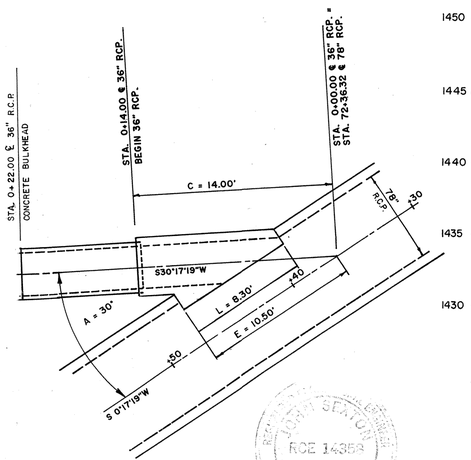
SCALE: 1" = 4'



C 8 **CUT-OFF WALL DETAIL**

STA. 97 + 00.00

N.T.S.



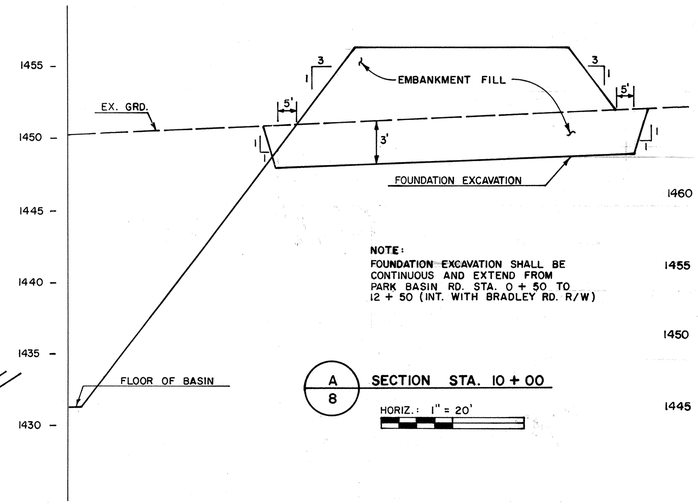
STA. 0+00.00 ℄ 36" RCP. = STA. 72+36.32 ℄ 78" RCP.

CONSTRUCT:
JUNCT. STR. NO. 2, RCFC STD. DWG. NO. JS227.
ELEV. S= 1441.28, ELEV. R= 1441.50
C= 14.00', L= 8.35', E= 10.50', F= 3.20', G= 2.58'
D=78", B=36", A=30°.

8 LF. OF 36" RCP. 1000-D
PLACE CONCRETE BULKHEAD, RCFC STD. DWG. NO. M816.

SEE PLAN SHEET NO. 7.

SCALE: 1" = 5' (HOR. & VERT.)



NOTE:
FOUNDATION EXCAVATION SHALL BE CONTINUOUS AND EXTEND FROM PARK BASIN RD. STA. 0 + 50 TO 12 + 50 (INT. WITH BRADLEY RD. R/W)

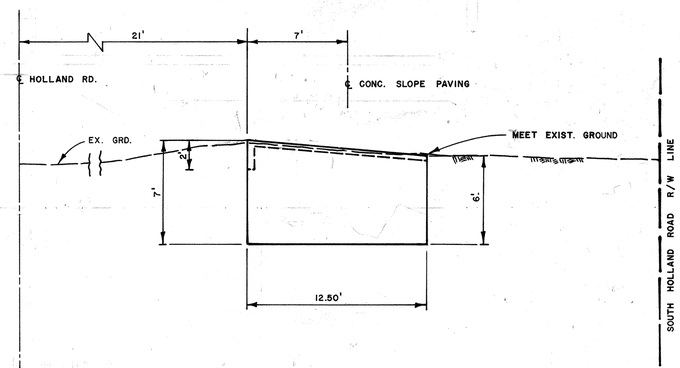
A 8 **SECTION STA. 10 + 00**

HORIZ.: 1" = 20'

60" LATERAL

STA. 84+23

PLAN VIEW SHEET 7



D 8 **TRANSVERSE CUT-OFF WALL** ⚠2

STA. 97 + 00

PLAN VIEW SHEET 8

SCALE: 1" = 5' (HOR. & VERT.)

AS BUILT
APPROVED BY: JS
DATE 7/24/91

SEXTON ASSOCIATES 1033 DRACENA CT. REDLANDS, CA. 92373 714 / 792 - 4876	BENCH MARK M-16, RESET 1979, RIV. CO. LOCATED 25 FEET SOUTH OF NEWPORT ROAD & 25 FEET EAST OF BRADLEY ROAD. ELEV. 1434.410, DATE: 6/84.
APPROVED BY: DATE: 11/13/89 JOHN SEXTON, RCE. 14358	

REVISIONS

REF.	DESCRIPTION	APPR.	DATE
⚠1	ELEVATIONS CHANGED		11-28-89
⚠2	GROUND LINE CHANGED		11/28/89

RECOMMENDED FOR APPROVAL BY:
DESIGN ENGINEER R.E. NO. 16757
DATE: 11/14/89

APPROVED BY:
CHIEF ENGINEER R.E. NO. 12400
DATE: 11-14-89

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

County of Riverside

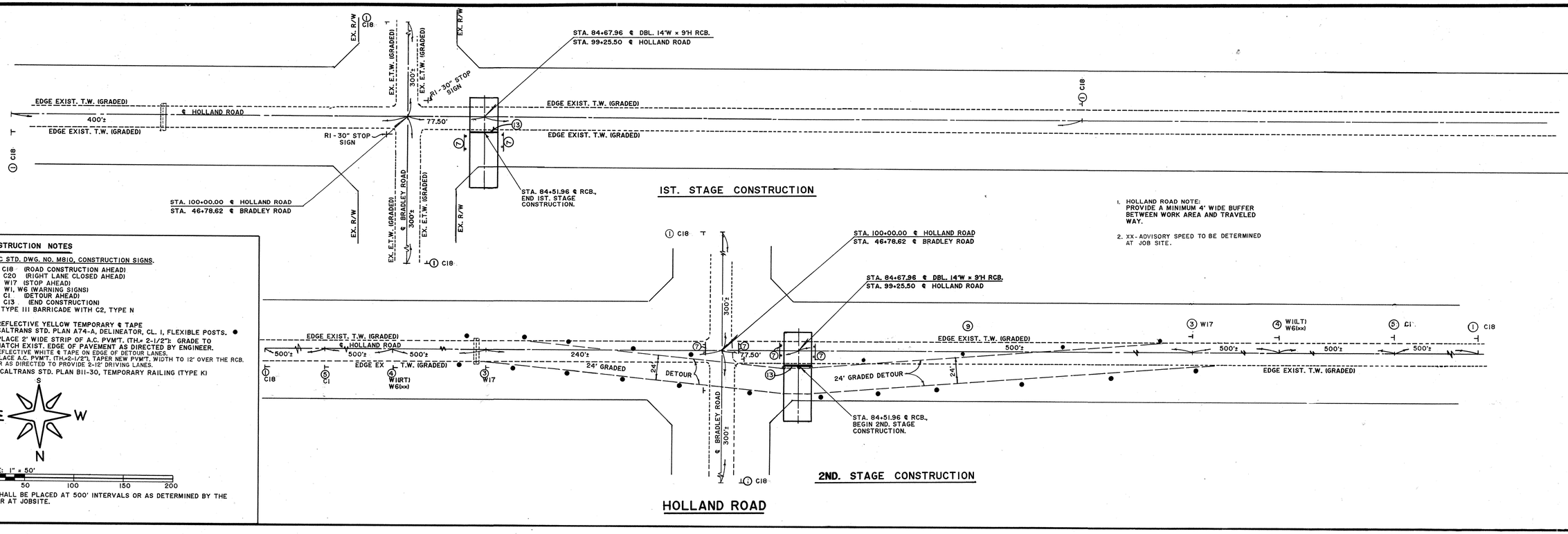
APPROVED BY:
FOR ROAD COMMISSIONER
RIVERSIDE COUNTY, CALIF.
DATE: 11/14/89

BRADLEY ROAD CHANNEL

ASSESSMENT DISTRICT NO. 4 - 5

PROJECT NO.	4-0-115
DRAWING NO.	4-550
SHEET NO.	14 OF 55

128808



CONSTRUCTION NOTES

RCFC STD. DWG. NO. M810, CONSTRUCTION SIGNS.

1. C18 (ROAD CONSTRUCTION AHEAD)
2. C20 (RIGHT LANE CLOSED AHEAD)
3. W17 (STOP AHEAD)
4. W1, W6 (WARNING SIGNS)
5. C1 (DETOUR AHEAD)
6. C13 (END CONSTRUCTION)
7. TYPE III BARRICADE WITH C2, TYPE N
8. REFLECTIVE YELLOW TEMPORARY ℄ TAPE
9. CALTRANS STD. PLAN A74-A, DELINEATOR, CL. I, FLEXIBLE POSTS. ●
10. PLACE 2' WIDE STRIP OF A.C. PVM'T. (TH.= 2-1/2"± GRADE TO MATCH EXIST. EDGE OF PAVEMENT AS DIRECTED BY ENGINEER.
11. REFLECTIVE WHITE ℄ TAPE ON EDGE OF DETOUR LANES.
12. PLACE A.C. PVM'T. (TH.=2-1/2"), TAPER NEW PVM'T. WIDTH TO 12' OVER THE RCB. OR AS DIRECTED TO PROVIDE 2-12' DRIVING LANES.
13. CALTRANS STD. PLAN B11-30, TEMPORARY RAILING (TYPE K)

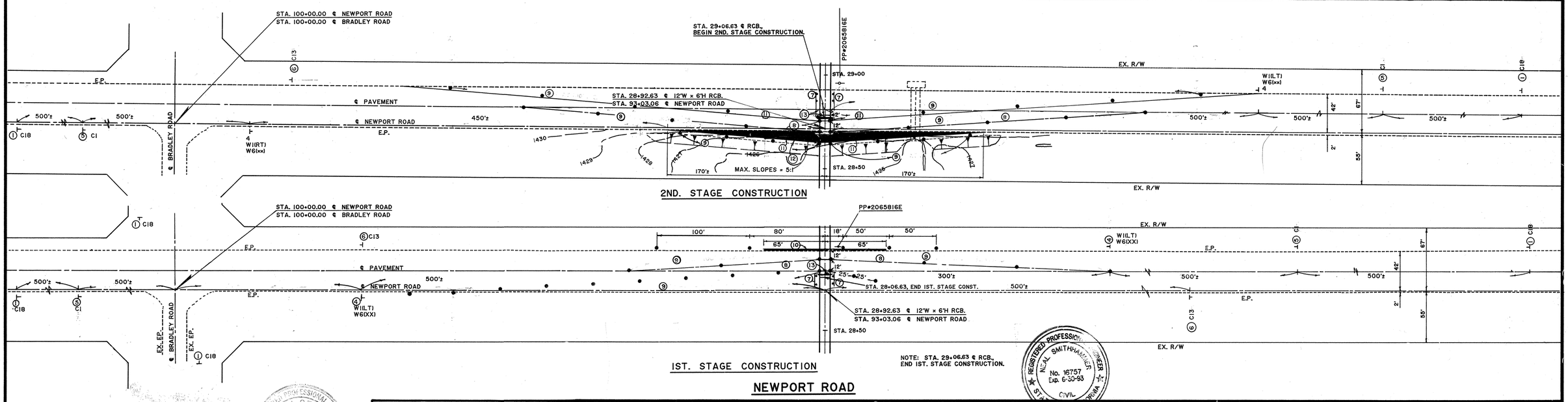
S E W N

SCALE: 1" = 50'

0 50 100 150 200

SIGNS SHALL BE PLACED AT 500' INTERVALS OR AS DETERMINED BY THE ENGINEER AT JOBSITE.

1. HOLLAND ROAD NOTE: PROVIDE A MINIMUM 4' WIDE BUFFER BETWEEN WORK AREA AND TRAVELED WAY.
2. XX- ADVISORY SPEED TO BE DETERMINED AT JOB SITE.



NOTE: STA. 29+06.63 ℄ RCB., END IST. STAGE CONSTRUCTION.

REGISTERED PROFESSIONAL ENGINEER NEAL SMITHHAMMER No. 16757 Exp. 6-30-93 CIVIL STATE OF CALIFORNIA

AS BUILT

APPROVED BY: [signature]

DATE 7/24/91

REGISTERED PROFESSIONAL ENGINEER JOHN SEXTON RCE 14358 Exp. 3/31/93 STATE OF CALIFORNIA

County of Riverside

APPROVED BY: [signature]

RICHARD BARRERA, R.E., TRAFFIC ENGINEER

DATE: 11-15-89

SEXTON ASSOCIATES
1033 DRACENA CT.
REDLANDS, CA. 92373
714 / 792 - 4876

APPROVED BY:

DATE: 11/1/89 JOHN SEXTON, RCE. 14358

REVISIONS			
REF.	DESCRIPTION	APPR.	DATE

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

DESIGNED BY:
DRAWN BY:
DATE DRAWN:
CHECKED BY:

RECOMMENDED FOR APPROVAL BY: [signature]
DESIGN ENGINEER R.E. NO. 16757
DATE: 11/15/89

APPROVED BY: David J. Skelton
ASST. CHIEF ENGINEER R.E. NO. 19339
DATE: 11/15/89

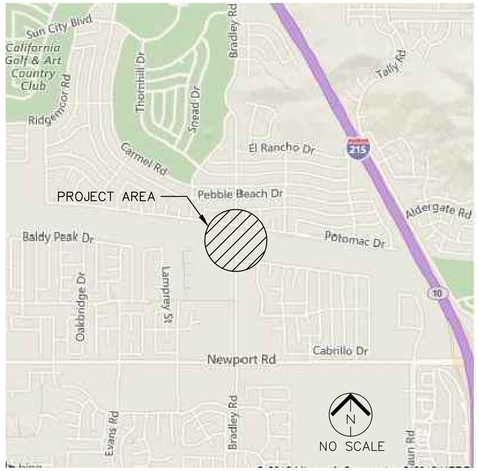
BRADLEY ROAD CHANNEL
ASSESSMENT DISTRICT NO. 4 - 5
TRAFFIC PLAN.
2 STAGE CONSTRUCTION NEWPORT ROAD HOLLAND ROAD

PROJECT NO.

DRAWING NO. 4-550

SHEET NO. 15 OF 55

EXCERPT C: **STREET IMPROVEMENT PLANS FOR BRADLEY ROAD BRIDGE OVER SALT CREEK, CIP 13-04**



VICINITY MAP

DECLARATION OF RESPONSIBLE CHARGE

I HEREBY DECLARE THAT I AM THE ENGINEER OF WORK FOR THIS PROJECT, THAT I HAVE EXERCISED RESPONSIBLE CHARGE OVER THE DESIGN OF THE PROJECT AS DEFINED IN SECTION 6703 OF THE BUSINESS AND PROFESSIONS CODE, AND THAT THE DESIGN IS CONSISTENT WITH CURRENT STANDARDS.

I UNDERSTAND THAT THE CHECK OF PROJECT DRAWINGS AND SPECIFICATIONS BY THE CITY OF MENIFEE IS CONFINED TO A REVIEW ONLY AND DOES NOT RELIEVE ME, AS ENGINEER OF WORK, OF MY RESPONSIBILITIES FOR PROJECT DESIGN.

PHILLIP REUSS, P.E. DATE
R.C.E. #82850
EXP. DATE 09/30/2018

OWNER:

CITY OF MENIFEE, CALIFORNIA
29714 HAUN ROAD
MENIFEE, CA 92586
PH (951) 672-6777 FX (951) 679-3843

APN NO.

N/A

TOPOGRAPHY SOURCE

INLAND AERIAL SURVEYS, INC.
7117 ARLINGTON AVE., SUITE A
RIVERSIDE, CA 92503
PH (951) 687-4252 FX (951) 687-4120

BENCH MARK / BASIS OF BEARING

THE BASIS OF BEARING IS THE CALIFORNIA STATE PLANE COORDINATE SYSTEM, CCS83, ZONE 6, BASED LOCALLY ON CONTROL STATIONS "PPBF", AND "BILL" NAD 83 (EPOCH 2007.00). CALCULATIONS ARE MADE AT THE CENTERLINE INTERSECTION OF BRADLEY ROAD AND NEWPORT ROAD WITH COORDINATES OF: N: 2194173.992 E: 6276144.023, USING ELEVATION 1433.97 BASED ON NAVD88.

TOTAL DISTURBED AREA

2.95 ACRES

GRADING QUANTITIES

GRADED AREA	2.90 [ACRES]	MAX CUT DEPTH	3.0 [FT]
CUT QUANTITIES	4,490 [CY]	MAX CUT SLOPE RATIO	(2:1 MAX)
FILL QUANTITIES	8,520 [CY]	MAX FILL DEPTH	8.0 [FT]
IMPORT	4,030 [CY]	MAX FILL SLOPE RATIO	(1.5:1 MAX)

WORK TO BE DONE

THE IMPROVEMENTS CONSIST OF THE FOLLOWING WORK TO BE DONE ACCORDING TO THESE PLANS AND THE FOLLOWING SPECIFICATIONS AND STANDARD DRAWINGS.

STANDARD SPECIFICATIONS:

DESCRIPTION

1. CITY OF MENIFEE SPECIAL PROVISIONS, 2016 EDITION
2. STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION (GREENBOOK), 2012 EDITION
3. CALIFORNIA DEPARTMENT OF TRANSPORTATION MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES, 2014 EDITION
4. CALIFORNIA DEPARTMENT OF TRANSPORTATION U.S CUSTOMARY STANDARD SPECIFICATIONS, 2015 EDITION
5. COUNTY OF RIVERSIDE STANDARD SPECIFICATIONS, 2007 EDITION
6. EASTERN MUNICIPAL WATER DISTRICT STANDARD DETAILED PROVISIONS, 2016 EDITION

STANDARD DRAWINGS:

DESCRIPTION

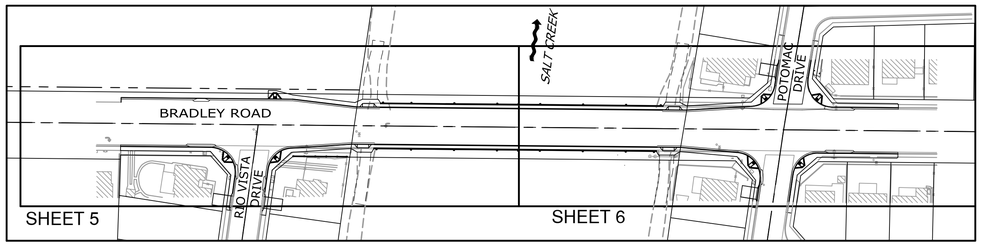
1. CITY OF MENIFEE STANDARD DRAWINGS, 2016 EDITION
2. COUNTY OF RIVERSIDE ROAD IMPROVEMENT STANDARDS, 2007 EDITION
3. RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT STANDARD MANUAL, 2011 EDITION
4. CALIFORNIA DEPARTMENT OF TRANSPORTATION STANDARD PLANS, 2015 EDITION
5. EASTERN MUNICIPAL WATER DISTRICT STANDARD DRAWINGS, 2016 EDITION

NOTE: WORK CONTAINED WITHIN THESE PLANS SHALL NOT COMMENCE UNTIL AN ENCROACHMENT AND/OR GRADING PERMIT HAS BEEN ISSUED.

STREET IMPROVEMENT PLANS FOR:

BRADLEY ROAD BRIDGE OVER SALT CREEK

CIP 13-04



SHEET INDEX MAP

0' 100' 200' 300' 400'

N

LEGEND, EXISTING

EXISTING RIGHT OF WAY	
EXISTING OVERHEAD ELECTRICAL LINE	OH
EXISTING UNDERGROUND CABLE TV LINE	TV
EXISTING WATER LINE	W
EXISTING SEWER LINE	S
EXISTING UNDERGROUND TELEPHONE CONDUIT	T
EXISTING TRAFFIC SIGNAL	TS
EXISTING GAS LINE	G
EXISTING UNDERGROUND ELECTRICAL CONDUIT	E
EXISTING STORM DRAIN	SD
EXISTING POWER POLE	
EXISTING SEWER MANHOLE	S
EXISTING WATER METER	WS W
EXISTING SIGN	
EXISTING GUARD POST	
EXISTING VALVE (GAS, WATER)	W
EXISTING FIRE HYDRANT	
EXISTING STREET LIGHT	
EXISTING TRAFFIC LIGHT	
EXISTING CONTOUR LINE	100
EXISTING CHAIN LINK FENCE	
EXISTING WROUGHT IRON FENCE	
EXISTING WOOD FENCE	
EXISTING FREE STANDING WALL	
EXISTING RETAINING WALL	
EXISTING PULLBOX	

LEGEND, PROPOSED

IMPROVEMENT	SYMBOL
PROPOSED CENTERLINE	
1" COLD PLANE MIN AND 1" RHMA	
HMA PAVEMENT (SEE TYPICAL SECTIONS)	
4" PCC SIDEWALK	
6" DG ACCESS ROAD	
MISC CONCRETE & MEDIAN PAVING	
RESIDENTIAL DRIVEWAY APRON	
CURB RAMP TYPE 'A'	
6" PCC CURB & GUTTER TYPE '6'	
SOUND WALL MASONRY BLOCK ON FOOTING	

SHEET INDEX

ABBREVIATIONS

	PROFILE ELEVATION ON PLANS	LT	LEFT
AB	ABANDONED, AGGREGATE BASE	LTW	LEFT TRAVELED WAY
ABUT	ABUTMENT	LVC	LENGTH OF VERTICAL CURVE
AC	ASPHALT CONCRETE	MAX	MAXIMUM
ACP	ASBESTOS CEMENT PIPE	MH	MANHOLE
AP	ANGLE POINT	MIN	MINIMUM
APN	ASSESSOR'S PARCEL NUMBER	MISC	MISCELLANEOUS
B	BIKE LANE	N	NORTH
BC	BEGIN CURVE	NO.	NUMBER
BCR	BEGIN CURB RETURN	N.T.S.	NOT TO SCALE
BVC	BEGIN VERTICAL CURVE	OG	ORIGINAL GROUND PER AERIAL AND SURVEY
C&G	CURB & GUTTER	OH	OVERHEAD
CFS	CUBIC FEET PER SECOND	PC	POINT OF CURVATURE
C	CENTERLINE	PCC	PORTLAND CEMENT CONCRETE
CL	CHAIN LINK	PI	POINT OF INTERSECTION
CML&C	CEMENT MORTAR LINED & COATED	PL	PLASTIC
CMU	CONCRETE MASONRY UNIT	PR.	PROPOSED
CONST.	CONSTRUCTION	PT	POINT OF TANGENCY
CSP	CALTRANS STANDARD PLANS	PVC	POLYVINYL CHLORIDE
CY	CUBIC YARD	PVI	POINT OF VERTICAL INTERSECTION
DG	DECOMPOSED GRANITE	Q	FLOW RATE
DR	DRIVE	RCFCD	RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
DRWY	DRIVEWAY		
DWG	DRAWING	RCB	REINFORCED CONCRETE BOX
E	EAST	RCP	REINFORCED CONCRETE PIPE
EC	END CURVE	RD	ROAD
ECR	END CURB RETURN	REC	RECLAIMED
EG	EXISTING GRADE	RHMA	RUBBERIZED HOT MIX ASPHALT
EL, ELEV	ELEVATION	RS	RIGHT SHOULDER
ELEC	ELECTRIC, ELECTRICAL	RSP	REVISED CALTRANS STANDARD PLAN, ROCK SLOPE PROTECTION
EMWD	EASTERN MUNICIPAL WATER DISTRICT		
EP	END POINT	RT	RIGHT
ETW	EDGE OF TRAVELED WAY	RTW	RIGHT TRAVELED WAY
EVC	END VERTICAL CURVE	R/W	RIGHT OF WAY
EX., EXIST	EXISTING	S	SLOPE, SOUTH
FH	FIRE HYDRANT	SD	STORM DRAIN
FL	FLOWLINE	STA	STATION
FO	FIBER OPTIC	STD	STANDARD
FPS	FEET PER SECOND	SW	SIDEWALK
FS	FINISH SURFACE	TC	TOP OF CURB
FT	FOOT OR FEET	TE	TOP ELEVATION
GB	GRADE BREAK	TP	TOP OF PIPE
H	HEIGHT	TW	TOP OF WALL
HGL	HYDRAULIC GRADE LINE	TWLTL	TWO-WAY LEFT TURN LANE
HMA	HOT MIX ASPHALT	TYP	TYPICAL
HORIZ.	HORIZONTAL	UG	UNDERGROUND
HP	HIGH POINT, HIGH PRESSURE	UNK	UNKOWN
INV	INVERT	V	VELOCITY, VERTICAL DIMENSION, VOLUME
L	LENGTH	VAR	VARIES
LF	LINEAR FOOT	VC	VERTICAL CURVE
LP	LOW POINT	VCP	VITRIFIED CLAY PIPE
LS	LEFT SHOULDER	VERT.	VERTICAL
		W	WEST, WIDTH

REVISIONS

SHT.	DESCRIPTION	DATE	BY	APRD

N|V|5
15092 AVENUE OF SCIENCE, SUITE 200
SAN DIEGO, CA 92128
P: 858.385.0500 WWW.NV5.COM

REGISTERED PROFESSIONAL ENGINEER PHILLIP REUSS No. 82850 CIVIL STATE OF CALIFORNIA

SCALE: 1"=20'
DESIGN: PR
DRAWN: PR
CHECKED:
APPROVED:
DATE: August 31, 2018

CITY OF MENIFEE
ENGINEERING DEPARTMENT

JONATHAN G. SMITH RCE 61253 DATE
DIRECTOR OF PUBLIC WORKS/
CITY ENGINEER

RECOMMENDED BY: RCE 75635 DATE
CARLOS E. GERONIMO

CITY OF MENIFEE
ENGINEERING DEPARTMENT

BRADLEY ROAD BRIDGE
OVER SALT CREEK

TITLE SHEET

SHEET NO. 1
1 OF 58

PROJECT NO: CIP 13-04

GENERAL NOTES

1. All work shall conform to the requirements of the City of Menifee Standard Details and Specifications, the current Standard Specifications for Public Works Construction (the "Greenbook"), the Riverside County Street Improvement Standards and Specifications and Standard Plans; County Ordinance No. 461; Caltrans Standard Plans and specifications; California Manual on Uniform Traffic Control Devices.
2. Prior to start of work, the Contractor shall apply to the City of Menifee Engineering Department for an Encroachment Permit for work performed within public right-of-way and to be responsible for satisfactory compliance for current environmental regulations during the life of construction activities for this project. Additional studies may be required.
3. Work in public streets, once begun, shall be prosecuted to completion without delay so as to provide minimum inconvenience to adjacent property owners and to the traveling public. Failure to comply with this requirement is a violation of the City of Menifee Encroachment Permit.
4. Approval of this plan by the City of Menifee does not constitute a representation as to the accuracy of, the location of, or the existence or non-existence of, any underground utility pipe or structure within the limits of this project. This note applies to all pages.
5. All revisions to improvement plans, or material substitution requests, proposed during construction shall be submitted in writing to the City Engineering Department by the Engineer of Record and shall follow the procedures as approved by the City Engineer.
6. Locations of existing underground utilities are approximate. The Contractor shall determine the exact locations and verify conditions on the job site prior to commencing work. The Contractor shall be fully responsible for damages occurred due to failure to locate and preserve underground utilities. Hand dig as needed until clear of obstructions.
7. Notify Underground Service Alert, (800) 227-2600, and all concerned utility companies at least two working days in advance of excavation.
8. A preconstruction meeting with the Public Works Inspector is required prior to start of work.
9. Right of Entry for any work performed on adjacent properties is required. Permission for Right of Entry shall be obtained in writing and the letter shall comply with City format.
10. Approval of plans and/or permit issuance does not relieve the Permittee of their responsibility to maintain work within the project property boundaries and dedicated City right-of-way. Trespassing on Private property is against the law and cause for cancellation of Permit and issuance of Stop Work notice.
11. It is the responsibility of the permittee to submit a request for permit extension to the City Engineer in writing prior to permit expiration. Extension and expiration of permits shall be in accordance with the Uniform Building Code and/or the City of Menifee Engineering Design Guidelines Policies and Procedures.
12. The Contractor shall be responsible for any clean up on City of Menifee right-of-way affected by Contractor's work. The Contractor shall keep City of Menifee right-of-way clean of debris, with dust and other nuisances being controlled at all times. Method of street cleaning shall be wet sweeping of all paved areas. There shall be no stockpiling of construction materials within the City of Menifee right-of-way without the permission of the City Engineer.
13. The Contractor shall contact the City of Menifee Public Works Inspector 48 hours prior to construction at (951) 672-6777.

STREET IMPROVEMENT NOTES

1. Underground facilities, with laterals, shall be in place prior to cap paving the street, including, but not limited to, the following: sewer, water, electric, telephone, cable, gas, storm drains.
2. A.C. pavement installed in multiple lifts shall have at least 2" in the first lift and at least 2" of asphalt in all succeeding lifts.
3. A.C. pavement sections 4" thick and greater shall be constructed in two lifts. A.C. pavement base course shall be type B-PG70-10 with a minimum 2" thickness, and the final lift shall be Type C2-PG70-10 with a minimum 2" thickness.
4. Approved signing and striping plans shall be subject to review and revision by the City of Menifee Engineering Department if not constructed within 12 months of date of City approval.
5. Any signage and striping damaged during construction shall be repaired to its original condition.
6. Provide blue retroreflective raised pavement markers (RPMs) on private streets, public streets, and driveways to indicate location of fire hydrants. RPMs shall be installed per City of Menifee Standard plan No. 705.
7. Provide additional signs and markings not included in the signing and striping plan within the project area, or on roadways adjacent to the project boundaries, upon the request of the City Engineer, to improve traffic safety on the roads under the jurisdiction of the Contractor.
8. Traffic Control Plans on existing roadways shall be prepared by a Traffic or Civil Engineer, registered in the state of California, and submitted for review and approval by the City Engineering Department, prior to permit issuance.
9. Existing storm drain pipes/culverts (whether to be connected to, extended, adjusted, drained to, or just in the project vicinity) must be repaired and/or cleaned to make them functional and acceptable to the City Engineer.
10. The Contractor shall apply to Riverside County Flood Control and Water Conservation District (RCFC & WCD) for permits when any storm drain pipe needs to be connected with a RCFC & WCD facility and add Permit #3552 on the plan.
11. Construction projects that disturb one acre or more, or on sites that are part of a larger common plan of development that disturbs one acre or more, shall obtain a National Pollutant Discharge Elimination System (NPDES) permit. Contractors shall file a Notice of Intent (NOI) with the State Water Resources Control Board (SWRCB), prepare a Storm Water Pollution Prevention Plan (SWPPP) and Monitoring Plan for the site. The Project shall comply with the latest regulations specific to the NPDES at the time of permit issuance. Prior to construction, the Contractor shall provide to the City of Menifee a copy of the NOI with a valid Waste Discharge Identification (WDID) number.
12. Provide street lights in accordance with the approved street lighting plan and provide for the temporary operation of the street lighting system.
13. Provide curb depressions and driveway approaches according the City of Menifee Standard Plan No. 205, 206, 207 and No. 208 as approved by the City Engineer.
14. There shall be no above-ground obstructions in any portion of the sidewalk (where the width, exclusive of top of curb, is 5.5 or less). Where power/telephone/cable poles, street light standards, fire hydrants, and control boxes occur in the 5.5 foot sidewalk, the sidewalk shall be modified per City of Menifee Standard Plan 402.
15. "Patching" of sidewalk damage is prohibited; repairs to sidewalk shall include replacement of the entire panel from "joint-to-joint".
16. For driveway reconstruction, Contractor shall submit to the Menifee City Engineer proof of driveway owner notification prior to construction.
17. All PCC curb ramps shall include a detecable warning system, to include truncated domes, per ADA requirements. The detectable warning system shall be Armor-Tile cast in place system, or approved equal, no adhesives shall be allowed. The contrasting color shall be yellow.
18. Cross gutters shall be constructed over 8" minimum crushed aggregate base compacted to 95% relative density.
19. Mailboxes and posts shall be installed per an approved City standard. Submit plot plan of building orientation on lot and location of mail box and post to the U.S. Post Office for approval prior to installation.
20. As-built plans and asset/attribute data shall be submitted to the City prior to acceptance of improvements and release of bonds.

STORM DRAIN NOTES

1. All work shall conform to the current Standard Specifications for Public Works Construction (the "Greenbook") and all "Standard Plans" and "Special Provisions" referenced herein. Hydraulic design shall conform to the requirements of City of Menifee storm drain design guidelines; the requirements of Riverside County Land Division Ordinance No. 460, Section 11; the requirements of the Riverside County Water Quality Management Plan for Urban Runoff; and Riverside County Flood Control District and Water Conservation District (RCFCD) Standard Drawings policies and procedures.

STORM DRAIN NOTES (CONTINUED)

2. When cover to finish grade is 2 feet or less, provide class C (420-C-2000) concrete backfill from bottom of pipe to minimum depth over pipe of 4 inches. For culverts, provide minimum two feet cover at hinge point/flow line from top of pavement to top of culvert (keep out of base). If cover is less, provide concrete saddle per Caltrans Standard Specifications Section 19-3.062 or equal. Pipes maintained by the City of Menifee shall be backfilled per City of Menifee Standard Plan No. 812.
3. The Contractor's attention is directed to Greenbook Section 7-10.4.1 in regard to safety orders and shall conform to the requirements as shown on City of Menifee Standard Plan No. 813.
4. All structural concrete shall be Portland cement concrete with an ultimate 28-day compressive strength of 3250 psi, unless otherwise noted.
5. No concrete shall be placed until the forms and reinforcing steel have been placed, inspected, and approved.
6. Transverse reinforcement and transverse joints shall be placed at right angles (or radial) to the conduit centerline except as otherwise shown on the drawings.
7. All steel adjacent to face of concrete shall have 2 1/2" clearance unless otherwise specified. Steel adjacent to face of concrete against earth shall have 3" clearance.
8. Reinforcement shall be deformed bars of intermediate grade steel, per ASTM A615, Grade 60.
9. All bar bends and hooks shall conform to the American Concrete Institute "Manual of Standard Practices".
10. Dimensions from face of concrete to steel are to centerline of steel unless otherwise noted.
11. All steel that is to be continuous shall have a minimum lap of 30 bar diameters or 18" whichever is greater. Longitudinal steel shall be continuous and extend through all construction joints.
12. All construction joints in the footing of slabs and walls shall be in the same plane. No staggering of joints will be permitted.
13. All exposed edges shall be finished with a 3/4" chamfer.
14. Unless otherwise shown, concrete dimensions shall be measured vertically or horizontally and parallel or at right angles (or radial) to the centerline of construction.
15. All RCP pipes are to be inspected and approved by the Public Works Inspector prior to installation.
16. Storm Drain manholes are to be raised after final lift of pavement.
17. All backfill and fills outside of street right-of-way shall be compacted to 90 percent of maximum density as determined by ASTM Soil Compaction Test D1557 Method 'D' unless otherwise specified. Certification by a Registered California Soils Engineer shall be submitted to the Engineering Department prior to acceptance of the work by the City.
18. All backfill and fills within street right-of-way shall be compacted in accordance with City of Menifee Standard Plan No. 812 unless otherwise noted and inspected by the City Public Works Inspector. Contractor shall notify the City Public Works Inspector at least 48 hours in advance prior to soil testing by the Private Soils Engineer.
19. All backfill and fill around closed conduit in the street right-of-way shall be brought up to subgrade of the road or to 2 feet above the top of conduit, whichever is less. The Public Works Inspector shall inspect all backfill and fill above aforementioned limits. The Contractor shall contact the Public Works Department at (951) 672-6777 to request an inspection at least 48 hours in advance.
20. The Public Works Inspector may have the option to require concrete backfill during construction when the pipe has less than 1 foot of cover and is subject to heavy equipment traffic. The concrete backfill shall consist of 1:3:5 mix, Portland cement concrete poured from wall to wall of trench and from bottom of trench to a minimum of 4 inches over the top of the pipe.
21. All pipes shall be placed in trench in natural ground and/or compacted fill. The ground level before the trenching shall be at least 3 feet above the top of the pipe elevation, or at finish surface elevation, whichever is less. All backfill in easements shall be compacted to the density required by the Grading Plan or Soils Report, whichever is more restrictive.
22. Pipe shall be embedded 5 inches into all structures including inlet and outlet headwalls, unless otherwise specified.
23. All catch basins within the dedicated street right-of-way shall be constructed per Street Improvement Plan stationing. All catch basins and connector pipes are to be inspected by the Public Works Inspector.
24. A system for contributory drainage operable at all times shall be provided by the Contractor to the satisfaction of the Menifee City Engineer until this storm drain system is accepted by the City.
25. Existing utilities shall be maintained in place by the Contractor, unless otherwise noted.
26. Where the utilities are indicated in the drawings to be supported, said supports shall be in accordance with A.P.W.A. Standard Plan No. 224-1, unless otherwise indicated.
27. All openings resulting from the cutting or partial removal of existing culverts, pipes or similar structures shall be sealed with 8 inches of brick and mortar and 6 inches of concrete, unless otherwise shown.
28. RCFCD Standard Manhole Nos. "1"-MH251, "2"-MH252, "3"-MH253 shall use RCFCD Standard Plan No. MH260 for the "24-Inch Manhole Frame and Cover" and RCFCD MH259 for the "Standard Drop Step".
27. All manhole covers not in street paving shall be provided with Allen socket set screw locking devices. The Contractor shall drill and tap two holes to a depth of 1 inch at 90 degrees to pick hole and install 3/4" x 3/4" Allen socket set screws.
28. At the beginning and end of all pours, layers of reinforcement shall be placed within 3" of the transverse construction joint.
29. After backfilling and prior to street paving, an inspection of said line by video shall be required at no cost to the City. All new mainline storm drains shall be video inspected per the provisions of Greenbook Section 500-1.1.5. The results of the video inspection shall be recorded in DVD format and a copy shall be provided to the City at no cost. The Developer of the project shall notify the City of Menifee in writing at least 48 hours in advance of the scheduled date of the video inspection.
30. Resurface all trenches within paved areas per City of Menifee Standard Plan No. 812. Full compliance with the City of Menifee street opening and pavement restoration regulations will be required.
31. Video Recording. Contractor shall submit video recording of mainline trunks along with audio detailing the size, start and end station and SD manhole number prior to final surface paving.

SIGNING AND STRIPING NOTES

1. Traffic stripes, pavement markings, and signs shall be reflectorized and in standard sizes. Striping and marking details shall match Caltrans Standard Plans. Stencils for pavement marking shall match Caltrans Standard Plans.
2. Remove conflicting stripes, pavement markings, and raised pavement markers in accordance with the plans and as approved by the Menifee City Engineer. Word or symbol pavement markings shall be removed by wet sandblasting or grinding a rectangular area obliterating the whole marking.
3. All crosswalks shall have 10 feet spacing in between the 12 inch white or yellow stripes.
4. All double yellow stripes shall have a 3 inch painted black line separating the yellow stripes.
5. All striping, pavement markings, and pavement legends shall be thermoplastic. Thermoplastic shall consist of 3M reflective elements series 50 (or approved equal) and shall allow for both wet and dry reflectivity. Thermoplastic striping shall be applied per manufacturer's recommendations.
6. Apply pavement markings including crosswalks, limit lines, turn arrow legends, and stop bars using thermoplastic material.
7. Provide raised pavement markers (RPMs) within seven working days of roadway striping or after the second coat of paint has been applied. Existing RPMs within the project area shall be replaced in kind or removed in accordance with the plans, or as approved by the Menifee City Engineer.
8. Provide blue retroreflective raised pavement markers (RPMs) on private streets, public streets, and driveways to indicate location of fire hydrants. Placement of markers shall comply with City of Menifee Standard Plan 705 and the California Manual on Uniform Traffic Control Device Figure 3B-102(CA). Obtain approval of marker placement by the Riverside County Fire Department prior to installation.
9. Square perforated steel tube posts with two piece anchor and sleeve, "Telespar", per City of Menifee Standard Plan 817 shall be used for all traffic control and informational signs within the road right-of-way.

SIGNING AND STRIPING NOTES (CONTINUED)

10. The bottom of the traffic sign shall be a minimum of 7 feet above the finished surface.
11. Signs larger than 48 inches or locations where sidewalks are less than 5 feet wide, sign posts shall be installed behind the sidewalk.
12. The exact location of signs shall be approved in the field by the Menifee City Engineer.
13. Remove signs and/or relocate in accordance with the plans and as approved by the Menifee City Engineer. The Developer/Contractor shall deliver removed signs to a designated Menifee city yard or a location as approved by the Menifee City Engineer.
14. Layout (cat-track) the proposed striping and markings in accordance with the plans within three working days of final paving. Contact City of Menifee Engineering Department at (951) 672-6777 to obtain approval of layout prior to actual installation.
15. Contractor shall maintain temporary traffic striping tabs until permanent striping is installed. Temporary traffic tabs shall not remain on the pavement for more than 10 days.
16. Coordinate all signing and striping works through the City Engineer prior to opening new roadways and existing roadways to new signing and striping.
17. Every attempt should be made to install street signs on street light standards as approved by the City of Menifee. Signs installed on Marbelite street light standards shall be in accordance with City of Menifee Standard 1202.
18. Signs shall be in standard sizes, unless noted otherwise. All sign face reflective sheeting shall be high intensity grade with protective overlay film.
19. Street name sign shall conform to City of Menifee Standard Plan No. 815 and 816.

STREET LIGHT NOTES

1. This project shall comply with the Mt Palomar Light Pollution Ordinance No. 655.
2. These plans have been examined by the City of Menifee's engineering Division to insure compliance with general engineering standards and the City's design standards and specifications. The Engineer-of-Work shall bear the sole responsibility of the mathematical data and accuracy of design shown hereon.
3. All revisions to improvement plans, or material substitution requests, proposed during construction shall be submitted in writing to the Engineering Department by the Engineer of Record and shall follow the procedures for approval outlined in the most current City of Menifee Engineering Department directives.
4. In order for the City of Menifee's Lighting District to assume the operations and maintenance of a lighting system on any public street, the street shall be accepted by the City and open to the general public.
5. Placement
   a. On street where the sidewalks are 5.5 or less in width, excluding the top of curb, and are adjacent to the curb, the street lighting electrolier standards and pull boxes shall be placed outside the sidewalk area unless otherwise specified on the City of Menifee approved plan.
   b. On all streets, handhole/pull box shall be placed "in-line" with street lighting standard and shall not be placed in front of or behind standards on sidewalks within the path of travel.
6. All lights shown on this plan shall be installed and operational prior to the acceptance of the system into the City of Menifee's Lighting District.
7. All street wiring and appurtenant apparatus shall be undergrounded.
8. Street lights shall be constructed per the City of Menifee approved plan. Lights not constructed according to the approved plan shall be removed and relocated at no expense to the City of Menifee.
9. Street Lights shall be erected such that the base door is perpendicular to the curb and located on the side of the Street Light facing oncoming traffic.
10. All equipment required hereon for furnishing electrical service, for each circuit, shall be installed and inspected prior to any other construction on that circuit.
11. The Contractor shall given written notice, 72 hours in advance of removal of a Street Light, to any public agency maintaining equipment supported by the Street Light.
12. Foundations and pull boxes not remaining in service shall be removed. The resulting excavation shall be filled with material similar to adjacent material and satisfactorily compacted with a mechanical compactor in layers not exceeding 12 inches. The surface shall be finished to match the adjacent surface.
13. All pull boxes shall be No. 5. All street lighting pull box lids shall read "STREET LIGHTING". Pull boxes located adjacent to driveways and alleys shall be installed at a minimum distance of 5 feet from the top of the driveway "X" or 5 feet from the travel way of the alley.
14. Pull boxes installed at intersections of local streets shall be installed no closer to the intersections than the B.C.R. of an assumed future 35 foot radius curb return.
15. WARNING: Safety clearance shall be obtained daily from the affected utility company before doing any work in close proximity to any overhead electric line.
16. Contractor shall be responsible for preserving the condition of all existing equipment to be reused, modified or returned to the City of Menifee Public Works Department.
17. Equipment indicated "Dispose" shall become the property of the Contractor and be properly disposed of-site by the Contractor.
18. Contractor shall repair, at his cost, the damage caused to existing landscaping and irrigation systems during the construction of this project. Repairs shall be made within 5 working days after damage occurs.
19. Contractor shall locate and protect substructure(s) shown hereon and shall provide for a minimum 12 inch horizontal clearance between foundation and substructures. In the event a 12 inch clearance cannot be achieved, the Contractor shall make arrangements for relocation of substructures with the City.
20. In the event of overhead lines conflict with Street Lights the Contractor shall make necessary arrangements with Southern California Edison to raise their overhead facilities in order to provide for the following clearances with existing and/or proposed Street Lights:
   a. Low Voltage: Minimum 3 foot clearance between overhead lines and Street Lights.
   b. High Voltage: Minimum 6 foot clearance between overhead lines and Street Lights
21. In the event of overhead communication line conflict with Street Lights, Contractor shall make necessary arrangements to provide a minimum 12 inch clearance.
22. Proposed Street Light foundations and pullboxes shall be installed outside of access ramp areas. Existing foundations and pullboxes shall be reconstructed to clear access ramps by a minimum of 12 inches.
23. Conduit that is to be abandoned shall have wires removed. The conduit shall be removed to a depth of at least 12 inches below the surface and have both ends crimped or capped.
24. As-built plans and asset/attribute data shall be submitted to the City prior to acceptance of improvements.
25. All new conduits shall be 2" PVC Schedule 80 unless shown otherwise on plans.
26. Lighting shall be maintained throughout project.
27. Lighting calculations are required to verify appropriate lighting levels.
28. Service to all existing lighting shall be maintained at all times.
29. Contractor shall furnish and install street lighting standard and light fixture as specified unless otherwise shown on plans.
30. SCE Service planner _____,
    Work order number (TD and/or PI No.) _____.

TRAFFIC CONTROL PLAN

1. All traffic control work for construction shall conform to the latest edition of:
   a. California Manual on Uniform Traffic Control Devices (CAMUTCD)
   b. City of Menifee Specifications and Requirements
   c. State of California Department of Transportation (Caltrans) Standard Plans and Specifications
   d. All O.S.H.A. Requirements
2. All temporary signing and striping shall conform to the latest Caltrans Standard Plans and Specifications, California Manual on Uniform Traffic Control Devices (CMUTCD), and the City of Menifee's latest Signing and Striping General Notes.
3. No work shall begin before 9:00 AM or continue after 3:00 PM on Arterial Streets. The only exception is when traffic control plans have been approved in advance for 24-hour lane closures. In this case, the Contractor can only work behind the traffic control devices within the approved 24-hour lane closure period. Contractor shall obtain approval from the City of Menifee for actual hours.
4. No work is permitted on Sundays or holidays unless approved otherwise by the City of Menifee.
5. During non-working hours or when work is not scheduled, all roadway lanes shall be returned to their full traffic usage on the same day by steel plating or backfilling the open trenches, and Contractor shall remove from the public right-of-way all traffic control devices used for traffic control or detour. The only exception is when traffic control plans have been approved for 24-hour lane closure. In this case, the Contractor shall maintain all traffic control devices used for traffic control or detours during the approved 24-hour lane closures.
6. Contractor shall maintain at least one access point to all adjacent properties and fire hydrants.
7. All signs shall be reflectorized and standard size. Temporary construction signs shall have black lettering/symbols on orange background unless shown otherwise.
8. Contractor shall have all signs, delineators, barricades, k-rail, etc., properly installed prior to commencing construction and shall provide safe and continuous passage of pedestrian, bicyclist, and vehicular traffic at all times. All conflicting signs shall be covered or removed.
9. Contractor shall be responsible for the placement of any additional traffic control devices required by the City to assure safety to the public at all times during construction. Exact location and type of construction signs shall be as directed by Engineer based on construction condition. The City of Menifee or its representative has the authority to initiate field changes to assure public safety.
10. Remove all conflicting striping, markings and raised pavement markers, striping shall be removed by wet sandblasting or other approved methods prior to any restriping. The Contractor shall restore any and all striping, pavement markings, and traffic signal loops damaged, or removed, during construction to the satisfaction of the City Engineer.
11. The Contractor shall telephone the City of Menifee Engineering Department at (951) 672-6777, at least two working days (48 hours) prior to the starting traffic control setup.
12. Changeable message sign boards shall be used in advanced of all lane closures and roadway closures on collector and arterial streets.
13. Contractor shall replace any traffic signal loops damaged within 72 hours.
14. It is the responsibility of the Contractor performing work on a public street to install and maintain control devices, as well as any such additional devices as may be required to insure the safe movement of traffic, bicyclists, and pedestrians through or around the work area. All traffic control devices shall be kept in their proper position at all times, and shall be repaired, replaced or cleaned as necessary to preserve their appearance and continuity.
15. A minimum 5 feet of clearance shall be maintained between any open excavation and the nearest adjacent moving traffic lane. No open trench adjacent to a traffic lane shall exceed 300 feet. Temporary concrete barrier (Type K per Caltrans Standard Plan T-3) shall be used whenever shown on the plans. The C27 (CA) "Open Trench" sign shall be utilized whenever an open excavation area exist adjacent to the travel way.
16. Lane closures shall be as shown on the traffic control plans or as directed by Menifee City Engineer. Single lane closure traffic control devices shall conform to Caltrans Standard Plan No. T11.
17. Pavement removal, reconstruction, and pavement overlay outside construction areas shown on the plans shall be by single lane closure as directed by Menifee City Engineer.
18. A traffic control permit must be obtained by the Contractor at least 48 hours prior to beginning work.
19. Use and placement of flashing arrow board sign(s) shall be as shown on the plans and as directed by Menifee City Engineer. All traffic transitions shall utilize flashing arrow boards. Flashing arrow boards shall be used on any lane closures.
20. Flashing beacons and/or warning lights shall be used on W20-1 Signs, on all Type III barricades guarding the work area overnight, and where directed by Menifee City Engineer.
21. Contractor shall comply with the requirements of the American Disability Act (ADA) as related to pedestrian access and shall maintain pedestrian access at all times per ADA requirements. Sidewalk, bike lanes, and bike trails closures/detours shall be approved by Menifee City Engineer.
22. Contractor shall install "Steel Plates Ahead" signs in advance of steel bridging. "Uneven Lanes (Symbol)" signs shall be posted in advance of pavement surface disruptions OD ½" or greater. Pavement disruptions of 1" or greater shall have beveled edge of 4 (horizontal) to 1 (vertical).
23. Contractor shall provide traffic control plans for pavement reconstruction, pavement overlay, and for work not shown on these plans.
24. Actual field conditions may require some deviation from the plans and notes, however, any such deviations shall be approved by the City of Menifee Public Works Department at least 72 hours prior to implementation.
25. All advance warning signs shall be equipped with two orange flags.
26. All advance warning signs shall be a minimum of 36" x 36".
27. Daytime channelization devices may consist of either:
   a. 28" minimum height cones, or
   b. 36" minimum height tubes, or
   c. Type one barricades.
28. All lane closures and detours that are scheduled to remain over one week shall be striped and all conflicting stripes shall be completely removed by wet sandblasting (black paint shall not be used).
29. The following are additional requirements for all night time lane closures and detours:
   a. At least one person shall be assigned full-time to maintain traffic control devices, and
   b. All traffic signs shall be reflectorized, and
   c. Type A or B (flashing) yellow flashing beacon warning lights shall be used at all warning signs.
   d. All channelization devices shall be either:
      Internally illuminated cones fitted with 7" reflective with sleeves, or
      Type 1 barricades with Type C (steady burn) yellow barricade warning lights.
30. The following are additional requirements on all roads having a posted speed limit of 45 MPH or greater:
   a. All advance warning signs should be a minimum of 48" x 48", and
   b. Type 1 or 2 flashing arrow signs (FAS) shall be used on all lane closures.
31. No trenches shall be left open overnight without the express written permission of Menifee City Engineer. Trenches shall be backfilled or plated per City of Menifee Standard Plan No. 812 and 813.
32. Access shall be maintained at all times to all intersecting streets & driveways, except as shown.
33. Contractor shall coordinate with the City of Menifee at (951) 672-6777 a minimum of five (5) working days prior to work affecting any traffic signal within construction area. Contact City of Menifee Public Works Department for traffic signal operational changes when traffic loops are damaged, or for traffic control conditions noted on the plans.
34. Any damages to the traffic signal interconnect conduit, interconnect cable, or detection loop system during operations of the approved permit shall be replaced within 72 hours to the satisfaction of Menifee City Engineer.

REVISIONS

SHT.	DESCRIPTION	DATE	BY	APRD

NV5
15092 AVENUE OF SCIENCE, SUITE 200
SAN DIEGO, CA 92128
P: 858.385.0500 WWW.NV5.COM

REGISTERED PROFESSIONAL ENGINEER
PHILLIP REUSS
No. 82850
CIVIL
STATE OF CALIFORNIA

SCALE: 1"=20'
DESIGN: PR
DRAWN: PR
CHECKED:
APPROVED:
DATE: August 31, 2018

CITY OF MENIFEE
ENGINEERING DEPARTMENT

JONATHAN G. SMITH RCE 61253 DATE
DIRECTOR OF PUBLIC WORKS/
CITY ENGINEER

RECOMMENDED BY: RCE 75635 DATE
CARLOS E. GERONIMO

CITY OF MENIFEE
ENGINEERING DEPARTMENT

BRADLEY ROAD BRIDGE
OVER SALT CREEK

NOTES

SHEET NO. 2
2 OF 58

PROJECT NO: CIP 13-04

DEMOLITION LEGEND

1. PROTECT IN PLACE
2. REMOVE
3. ABANDON
4. REMOVED OR RELOCATED BY OTHERS
5. ADJUST TO GRADE
6. ADJUSTED TO GRADE BY UTILITY OWNER
7. REMOVE AND RELOCATE
8. CLEAR AND GRUB
9. REMOVE AND REPLACE/RECONSTRUCT IN KIND
10. SEE WATER MAIN RELOCATION PLANS

REMOVE EXISTING AC PAVEMENT SECTION

REMOVE CONCRETE

NOTE:
SEE SHEET 16 FOR SIGN REMOVAL AND RELOCATION DETAILS.

MATCHLINE SEE ABOVE

MATCHLINE SEE BELOW

BRADLEY ROAD - DEMOLITION PLAN

SCALE: 1"=20'

BRADLEY ROAD - DEMOLITION PLAN

SCALE: 1"=20'

GRAPHIC SCALE
0' 10' 20' 30' 40' 60' 80'
SCALE 1"= 20'

REVISIONS

SHT.	DESCRIPTION	DATE	BY	APRD

N|V|5
15092 AVENUE OF SCIENCE, SUITE 200
SAN DIEGO, CA 92128
P: 858.385.0500 WWW.NV5.COM

REGISTERED PROFESSIONAL ENGINEER PHILLIP REUSS No. 82850 CIVIL STATE OF CALIFORNIA

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DRAWN:	PR
CHECKED:	
APPROVED:	
DATE:	August 31, 2018

CITY OF MENIFEE
ENGINEERING DEPARTMENT

JONATHAN G. SMITH RCE 61253 DATE
DIRECTOR OF PUBLIC WORKS/
CITY ENGINEER

RECOMMENDED BY: RCE 75635 DATE
CARLOS E. GERONIMO

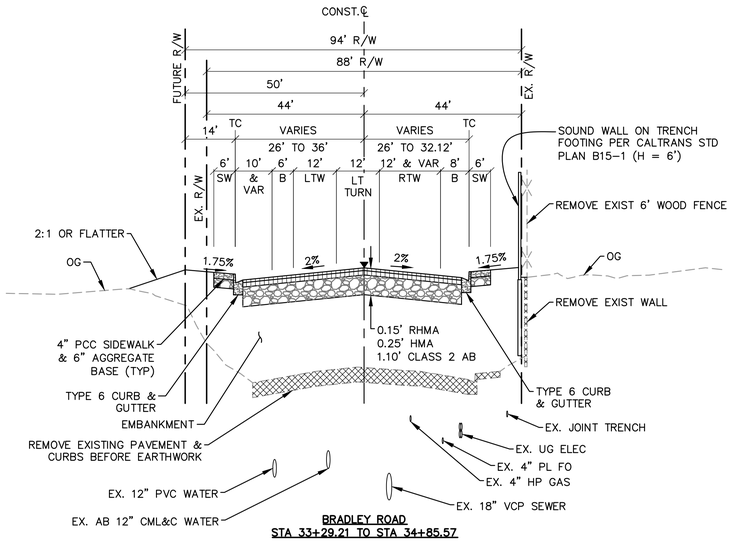
CITY OF MENIFEE
ENGINEERING DEPARTMENT

BRADLEY ROAD BRIDGE
OVER SALT CREEK

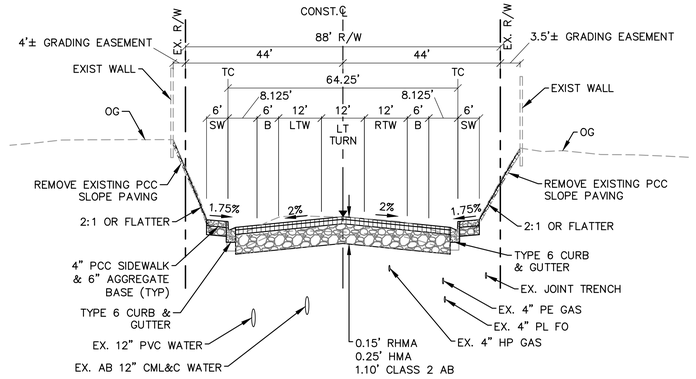
DEMOLITION PLAN

SHEET NO. 3
3 OF 58

PROJECT NO: CIP 13-04



BRADLEY ROAD
STA 33+29.21 TO STA 34+85.57
N.T.S.



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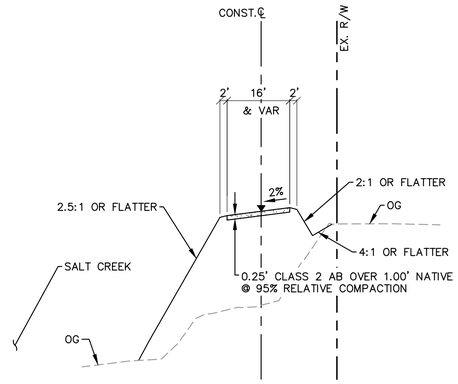
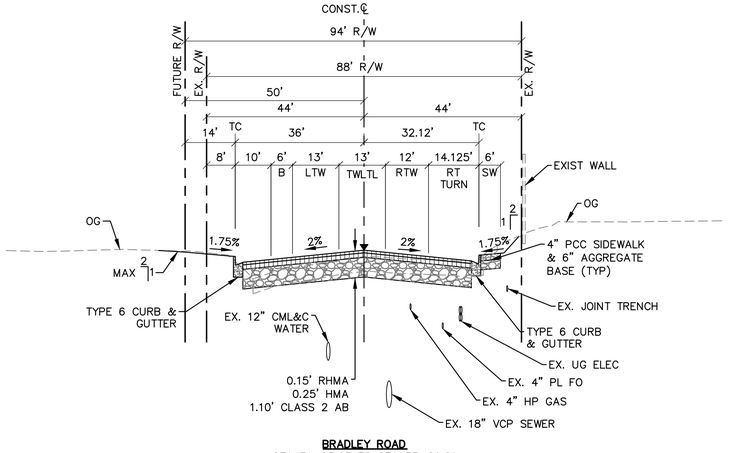


ACCESS ROADS
(TYPICAL)
N.T.S.



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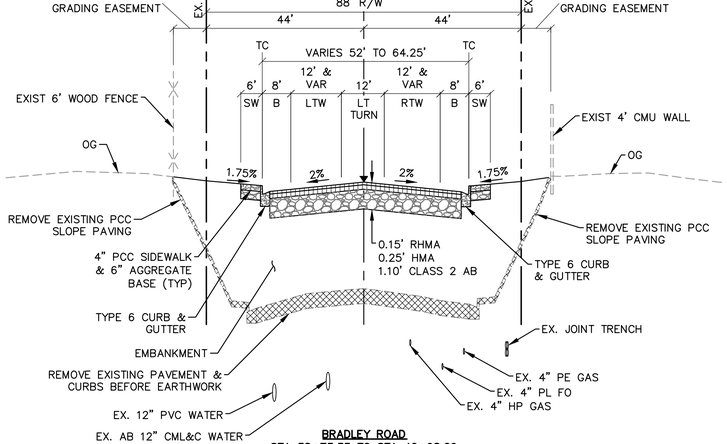
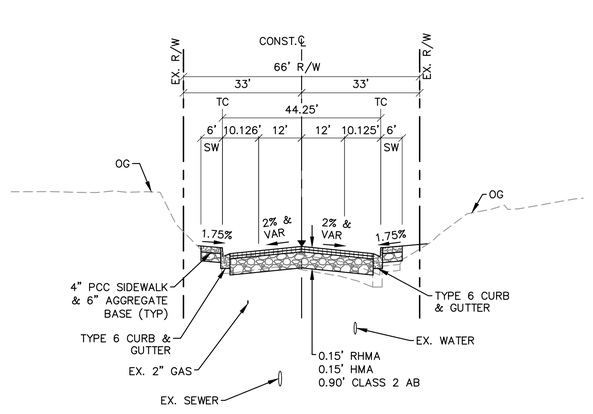
STA 31+23.63 TO STA 33+29.21
N.T.S.



BRADLEY ROAD
STA 38+73.33 TO STA 40+98.29
N.T.S.



RIO VISTA DRIVE
STA 10+00.00 TO STA 10+94.96
N.T.S.

POTOMAC DRIVE
STA 10+45.00 TO STA 12+88.57
N.T.S.

REVISIONS

SHT.	DESCRIPTION	DATE	BY	APRD

NV5
15092 AVENUE OF SCIENCE, SUITE 200
SAN DIEGO, CA 92128
P: 858.385.0500 WWW.NV5.COM

REGISTERED PROFESSIONAL ENGINEER — PHILLIP REISS — No. 82850 — CIVIL — STATE OF CALIFORNIA

SCALE: 1"=20'
DESIGN: PR
DRAWN: PR
CHECKED:
APPROVED:
DATE: August 31, 2018

CITY OF MENIFEE
ENGINEERING DEPARTMENT

JONATHAN G. SMITH RCE 61253 DATE
DIRECTOR OF PUBLIC WORKS/
CITY ENGINEER

RECOMMENDED BY: RCE 75635 DATE
CARLOS E. GERONIMO

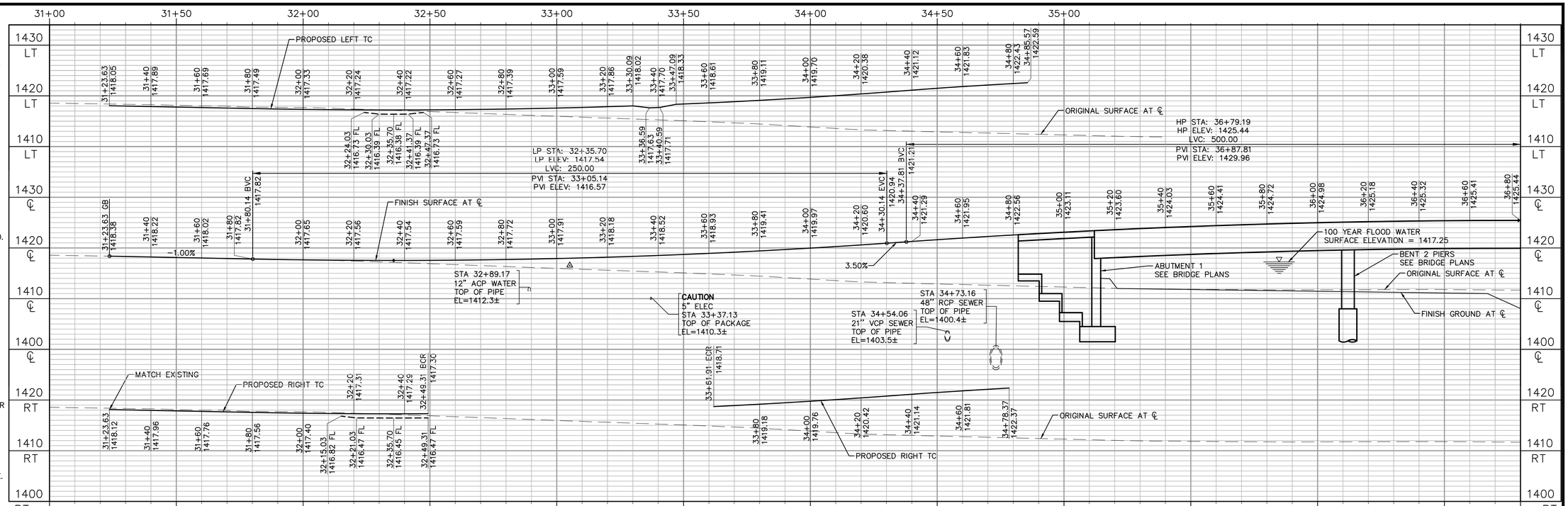
CITY OF MENIFEE — OCTOBER 1, 2008

CITY OF MENIFEE
ENGINEERING DEPARTMENT
BRADLEY ROAD BRIDGE OVER SALT CREEK
TYPICAL SECTIONS

SHEET NO. 4
4 OF 58
PROJECT NO: CIP 13-04

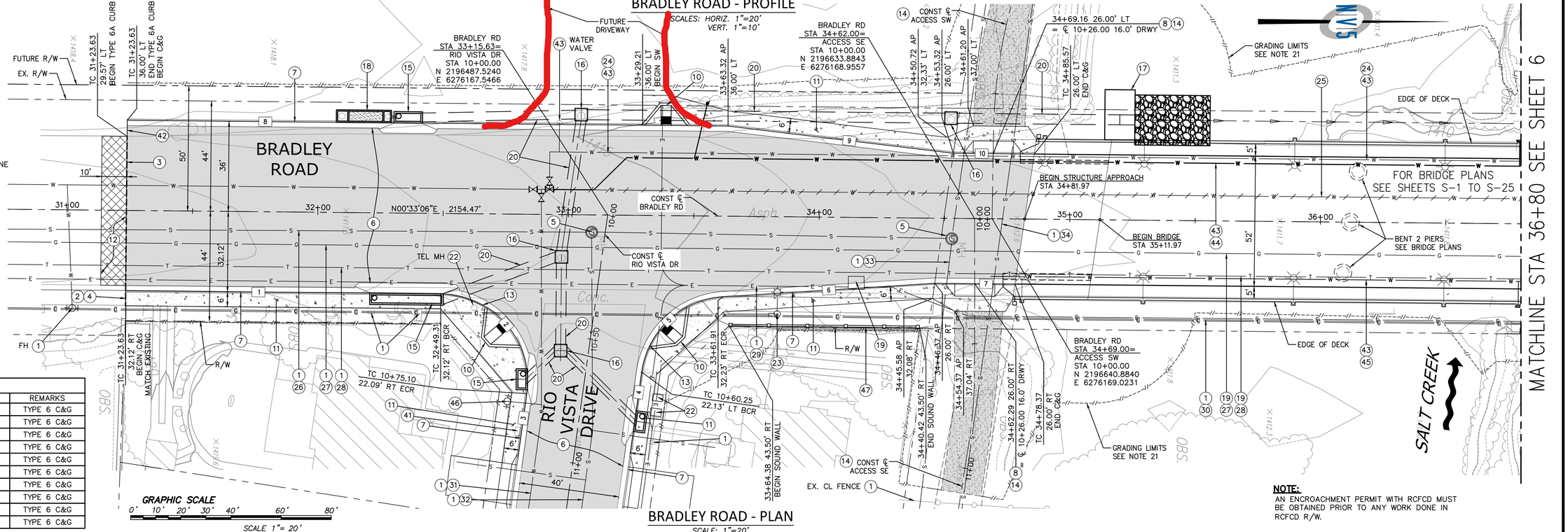
CONSTRUCTION NOTES

1. PROTECT IN PLACE.
2. MATCH EXISTING IMPROVEMENT.
3. SAWCUT EXISTING ASPHALT PAVEMENT 4" DEEP MIN.
4. SAWCUT EXISTING CONCRETE 4" DEEP MIN.
5. ADJUST MANHOLE COVER TO GRADE PER EMWD REQUIREMENTS.
6. NEW RHMA/HMA AND BASE PER TYPICAL SECTION ON SHEET 3.
7. MINOR CONCRETE, TYPE 6 CURB AND GUTTER PER CITY STD 200.
8. MINOR CONCRETE, RESIDENTIAL DRIVEWAY APPROACH PER CITY STD 206 (8" THICK).
9. MINOR CONCRETE, CROSS GUTTER AND SPANDREL PER CITY STD 209.
10. MINOR CONCRETE, PEDESTRIAN RAMP TYPE I PER CITY STD 405.
11. MINOR CONCRETE, SIDEWALK PER CITY STD 400.
12. COLD PLANE EXISTING ASPHALT SURFACE 0.1' DEEP.
13. FOR CURB RETURN PROFILES, SEE SHEETS 9 THROUGH 11.
14. FOR ACCESS ROAD PLAN AND PROFILE, SEE SHEET 8.
15. CATCH BASIN No. 1 PER RCFCD STD DWG No. CB100.
16. MANHOLE No. 1 PER RCFCD STD DWG No. MH251.
17. JUNCTION STRUCTURE No. 8 – SEE DETAIL SHEET 15.
18. STORMWATER BIOFILTRATION SYSTEM – SEE DETAIL SHEET 15.
19. RELOCATE OR ADJUST BY OTHERS, CONTRACTOR TO COORDINATE.
20. STORM DRAIN PLAN AND PROFILE PER SHEETS 13 AND 14.
21. FOR GRADING PLAN SEE SHEET 12.
22. ADJUST UTILITY COVER TO GRADE.
23. REMOVE EXISTING STREET LIGHT AND PULL BOX. REPLACE/RECONSTRUCT IN KIND.
24. EXISTING 12" PVC WATER LINE (EMWD).
25. EXISTING ABANDONED 12" CML&C WATER LINE (EMWD). REMOVE AS NEEDED.
26. EXISTING 18" VCP SEWER (EMWD).
27. EXISTING 4" HP GAS (SOCAL GAS).
28. EXISTING 4" PL FO (AT&T).
29. EXISTING UG ELEC (SOCAL EDISON).
30. EXISTING JOINT TRENCH.
31. EXISTING 12" ACP WATER (EMWD).
32. EXISTING 8" VCP SEWER (EMWD).
33. EXISTING 21" VCP SEWER (EMWD).
34. EXISTING 48" RCP SEWER (EMWD).
35. EXISTING 30" RCP STORM DRAIN (RCFCD). REMOVE CULVERTS AND HEADWALLS.
36. EXISTING 48" CML&C RECLAIMED WATER LINE (EMWD).
37. EXISTING OH ELEC (SOCAL EDISON).
38. EXISTING 8" PVC WATER LINE (EMWD).
39. EXISTING 10" VCP SEWER (EMWD).
40. EXISTING 39" RCP STORM DRAIN.
41. RESET MAILBOX TO FINISH GRADE.
42. MINOR CONCRETE, TYPE 6A CURB PER CITY STD 202.
43. WATER LINE RELOCATION PER SHEETS W-1 TO W-9.
44. PROPOSED 12" CML&C WATER MAIN.
45. PROPOSED 24" CML&C WATER MAIN.
46. ADJUST FIRE HYDRANT TO GRADE.
47. SOUND WALL ON TRENCH FOOTING PER CALTRANS STD DWG B15-1 (H = 6').



BRADLEY ROAD - PROFILE

SCALES: HORIZ. 1"=20'
VERT. 1"=10'



BRADLEY ROAD - PLAN

SCALE: 1"=20'

GRAPHIC SCALE
0' 10' 20' 30' 40' 60' 80'
SCALE 1"= 20'

CURB DATA

NO	DELTA/BEARING	RADIUS	LENGTH	REMARKS
1	N 00°33'06" E	–	125.67'	TYPE 6 C&G
2	△=97°22'17"	35.00'	59.48'	TYPE 6 C&G
3	S 82°04'37" E		19.85'	TYPE 6 C&G
4	N 82°01'02" W	–	34.70'	TYPE 6 C&G
5	△=97°22'17"	35.00'	47.86'	TYPE 6 C&G
6	N 03°39'56" W	–	84.69'	TYPE 6 C&G
7	N 00°33'06" E	–	32.00'	TYPE 6 C&G
8	N 00°33'06" E	–	239.68'	TYPE 6 C&G
9	N 06°53'30" E	–	90.55'	TYPE 6 C&G
10	N 00°33'06" E	–	32.25'	TYPE 6 C&G

NOTE:
AN ENCROACHMENT PERMIT WITH RCFCD MUST BE OBTAINED PRIOR TO ANY WORK DONE IN RCFCD R/W.

REVISIONS

⚠	SHT.	DESCRIPTION	DATE	BY	APRD

NV5
15092 AVENUE OF SCIENCE, SUITE 200
SAN DIEGO, CA 92128
P: 858.385.0500 WWW.NV5.COM

REGISTERED PROFESSIONAL ENGINEER
PHILLIP REISS
No. 82850
CIVIL
STATE OF CALIFORNIA

SCALE:	1"=20'
DESIGN:	PR
DRAWN:	PR
CHECKED:	
APPROVED:	
DATE:	August 31, 2018

CITY OF MENIFEE
ENGINEERING DEPARTMENT

JONATHAN C. SMITH RCE 61253 DATE
DIRECTOR OF PUBLIC WORKS/
CITY ENGINEER

RECOMMENDED BY: RCE 75635 DATE
CARLOS E. GERONIMO

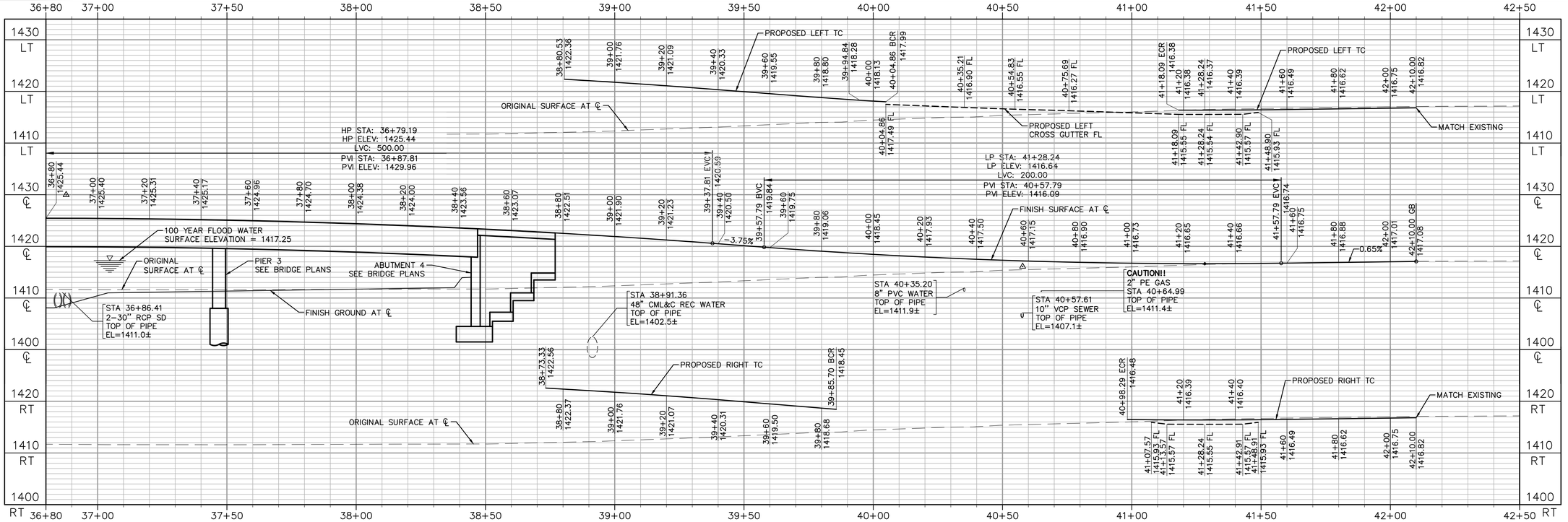
CITY OF MENIFEE
ENGINEERING DEPARTMENT

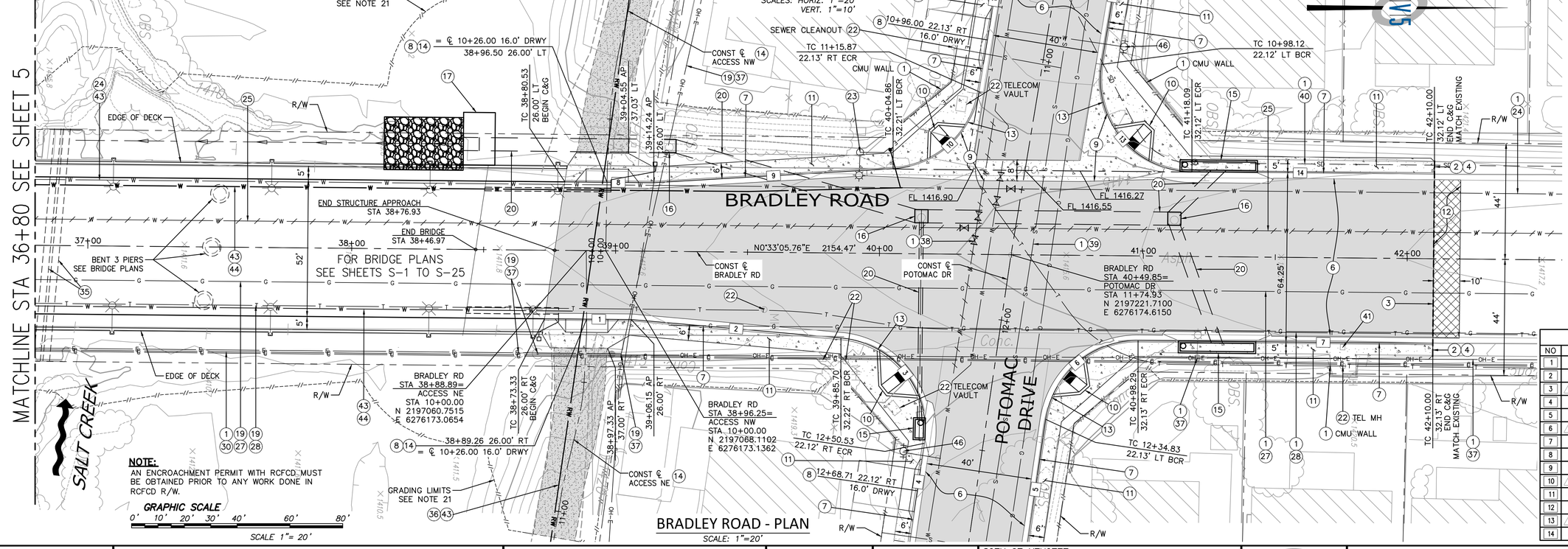
BRADLEY ROAD BRIDGE
OVER SALT CREEK

BRADLEY RD. PLAN & PROFILE STA 31+10 TO STA 36+80

SHEET NO. 5
5 OF 58

PROJECT NO: CIP 13-04





BRADLEY ROAD - PROFILE

SCALES: HORIZ. 1"=20'
VERT. 1"=10'

BRADLEY ROAD - PLAN

SCALE: 1"=20'

CONSTRUCTION NOTES

1. PROTECT IN PLACE.
2. MATCH EXISTING IMPROVEMENT.
3. SAWCUT EXISTING ASPHALT PAVEMENT 4" DEEP MIN.
4. SAWCUT EXISTING CONCRETE 4" DEEP MIN.
5. ADJUST MANHOLE COVER TO GRADE PER EMWD REQUIREMENTS.
6. NEW RHMA/HMA AND BASE PER TYPICAL SECTION ON SHEET 3.
7. MINOR CONCRETE, TYPE 6 CURB AND GUTTER PER CITY STD 200.
8. MINOR CONCRETE, RESIDENTIAL DRIVEWAY APPROACH PER CITY STD 206 (8" THICK).
9. MINOR CONCRETE, CROSS GUTTER AND SPANDREL PER CITY STD 209.
10. MINOR CONCRETE, PEDESTRIAN RAMP TYPE I PER CITY STD 405.
11. MINOR CONCRETE, SIDEWALK PER CITY STD 400.
12. COLD PLANE EXISTING ASPHALT SURFACE 0.1' DEEP.
13. FOR CURB RETURN PROFILES, SEE SHEETS 9 THROUGH 11.
14. FOR ACCESS ROAD PLAN AND PROFILE, SEE SHEET 8.
15. CATCH BASIN No. 1 PER RCFCD STD DWG No. CB100.
16. MANHOLE No. 1 PER RCFCD STD DWG No. MH251.
17. JUNCTION STRUCTURE No. 8 – SEE DETAIL SHEET 15.
18. STORMWATER BIOFILTRATION SYSTEM – SEE DETAIL SHEET 15.
19. RELOCATE OR ADJUST BY OTHERS, CONTRACTOR TO COORDINATE.
20. STORM DRAIN PLAN AND PROFILE PER SHEETS 13 AND 14.
21. FOR GRADING PLAN SEE SHEET 12.
22. ADJUST UTILITY COVER TO GRADE.
23. REMOVE EXISTING STREET LIGHT AND PULL BOX. REPLACE/RECONSTRUCT IN KIND.
24. EXISTING 12" PVC WATER LINE (EMWD).
25. EXISTING ABANDONED 12" CML&C WATER LINE (EMWD). REMOVE AS NEEDED.
26. EXISTING 18" VCP SEWER (EMWD).
27. EXISTING 4" HP GAS (SOCAL GAS).
28. EXISTING 4" PL FO (AT&T).
29. EXISTING UG ELEC (SOCAL EDISON).
30. EXISTING JOINT TRENCH.
31. EXISTING 12" ACP WATER (EMWD).
32. EXISTING 8" VCP SEWER (EMWD).
33. EXISTING 21" VCP SEWER (EMWD).
34. EXISTING 48" RCP SEWER (EMWD).
35. EXISTING 30" RCP STORM DRAIN (RCFCD). REMOVE CULVERTS AND HEADWALLS.
36. EXISTING 48" CML&C RECLAIMED WATER LINE (EMWD).
37. EXISTING OH ELEC (SOCAL EDISON).
38. EXISTING 8" PVC WATER LINE (EMWD).
39. EXISTING 10" VCP SEWER (EMWD).
40. EXISTING 39" RCP STORM DRAIN.
41. RESET MAILBOX TO FINISH GRADE.
42. MINOR CONCRETE, TYPE 6A CURB PER CITY STD 202.
43. WATER LINE RELOCATION PER SHEETS W-1 TO W-9.
44. PROPOSED 12" CML&C WATER MAIN.
45. PROPOSED 24" CML&C WATER MAIN.
46. ADJUST FIRE HYDRANT TO GRADE.

CURB DATA

NO	DELTA/BEARING	RADIUS	LENGTH	REMARKS
1	N 00°33'06" E	–	32.82'	TYPE 6 C&G
2	N 05°01'34" E	–	79.79'	TYPE 6 C&G
3	△=93°21'02"	35.00'	57.02'	TYPE 6 C&G
4	S 81°37'24" E	–	38.04'	TYPE 6 C&G
5	N 81°37'24" E	–	38.04'	TYPE 6 C&G
6	△=82°10'30"	35.00'	50.20'	TYPE 6 C&G
7	N 00°33'06" E	–	101.75'	TYPE 6 C&G
8	N 00°33'06" E	–	33.71'	TYPE 6 C&G
9	N 03°22'04" W	–	90.84'	TYPE 6 C&G
10	△=77°15'01"	35.00'	47.19'	TYPE 6 C&G
11	N 80°37'05" W	–	70.86'	TYPE 6 C&G
12	S 80°37'05" E	–	53.11'	TYPE 6 C&G
13	△=98°49'49"	35.00'	60.37'	TYPE 6 C&G
14	N 00°33'06" E	–	81.94'	TYPE 6 C&G

REVISIONS

SHT.	DESCRIPTION	DATE	BY	APRD

NV5
15092 AVENUE OF SCIENCE, SUITE 200
SAN DIEGO, CA 92128
P: 858.385.0500 WWW.NV5.COM

REGISTERED PROFESSIONAL ENGINEER PHILLIP REDDS No. 82850 CIVIL STATE OF CALIFORNIA

SCALE: 1"=20'
DESIGN: PR
DRAWN: PR
CHECKED:
APPROVED:
DATE: August 31, 2018

CITY OF MENIFEE
ENGINEERING DEPARTMENT

JONATHAN C. SMITH RCE 61253 DATE
DIRECTOR OF PUBLIC WORKS/
CITY ENGINEER

RECOMMENDED BY: RCE 75635 DATE
CARLOS E. GERONIMO

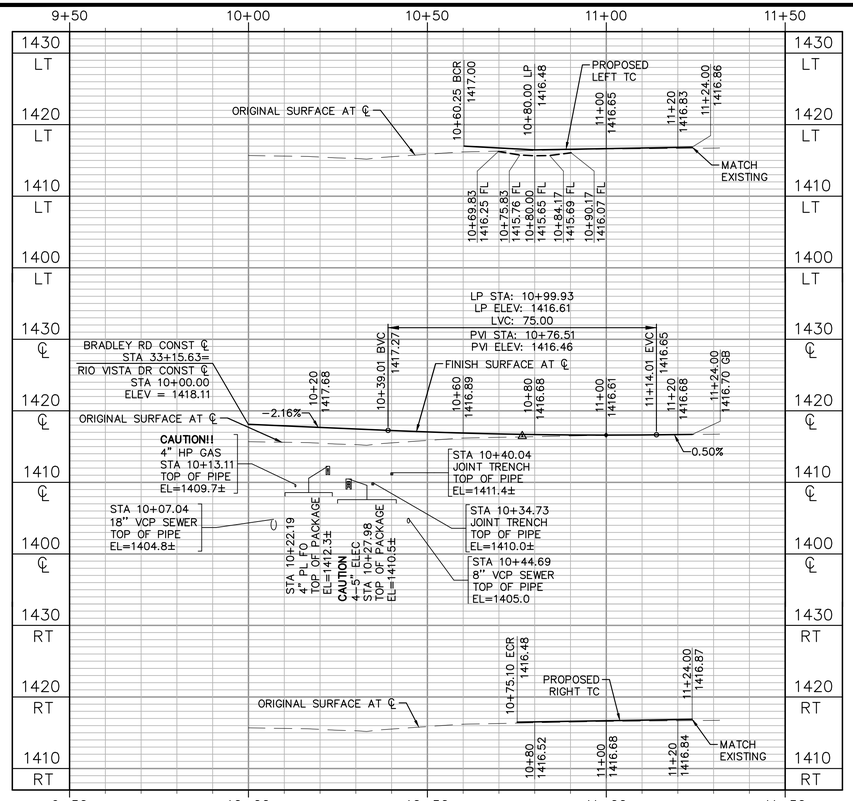
CITY OF MENIFEE
ENGINEERING DEPARTMENT

BRADLEY ROAD BRIDGE
OVER SALT CREEK

BRADLEY RD. PLAN & PROFILE STA 36+80 TO STA 42+10

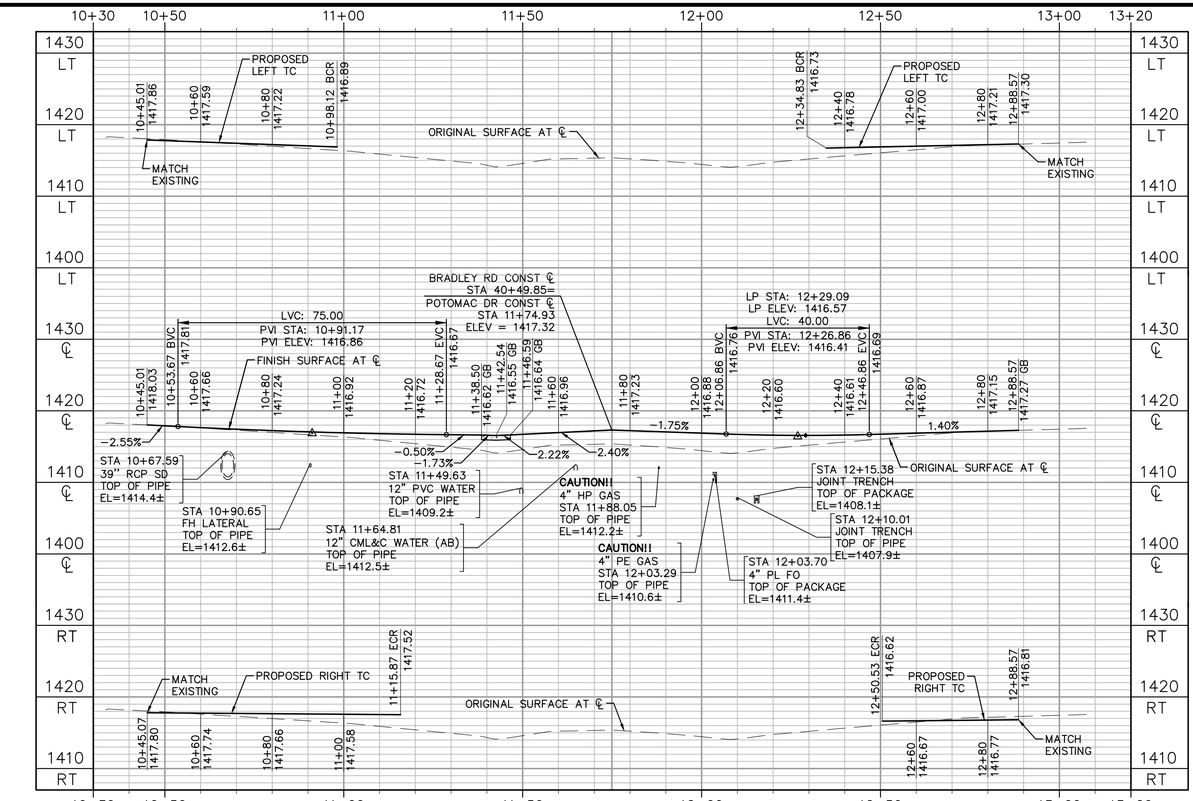
SHEET NO. 6
6 OF 58

PROJECT NO: CIP 13-04



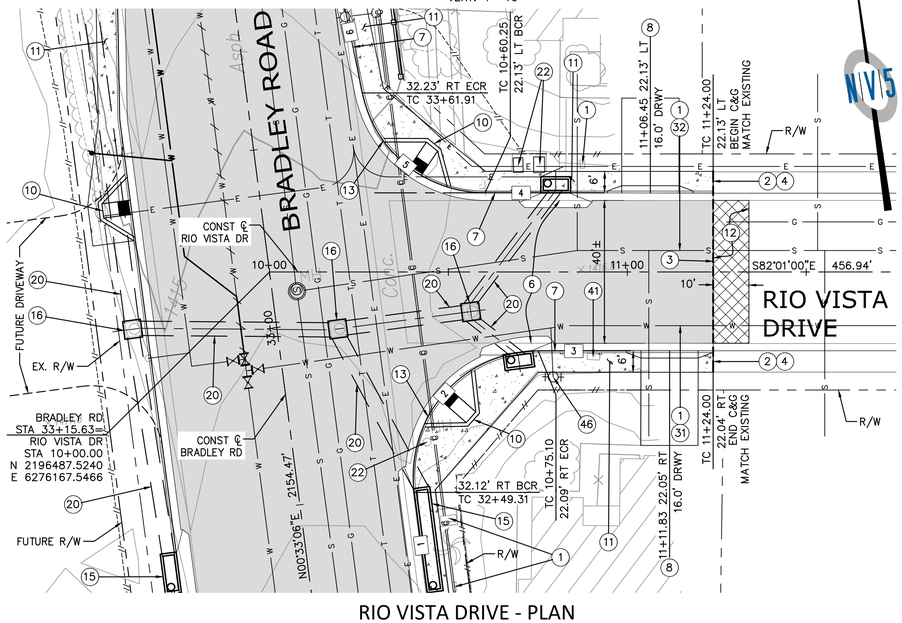
RIO VISTA DRIVE - PROFILE

SCALES: HORIZ. 1"=20'
VERT. 1"=10'



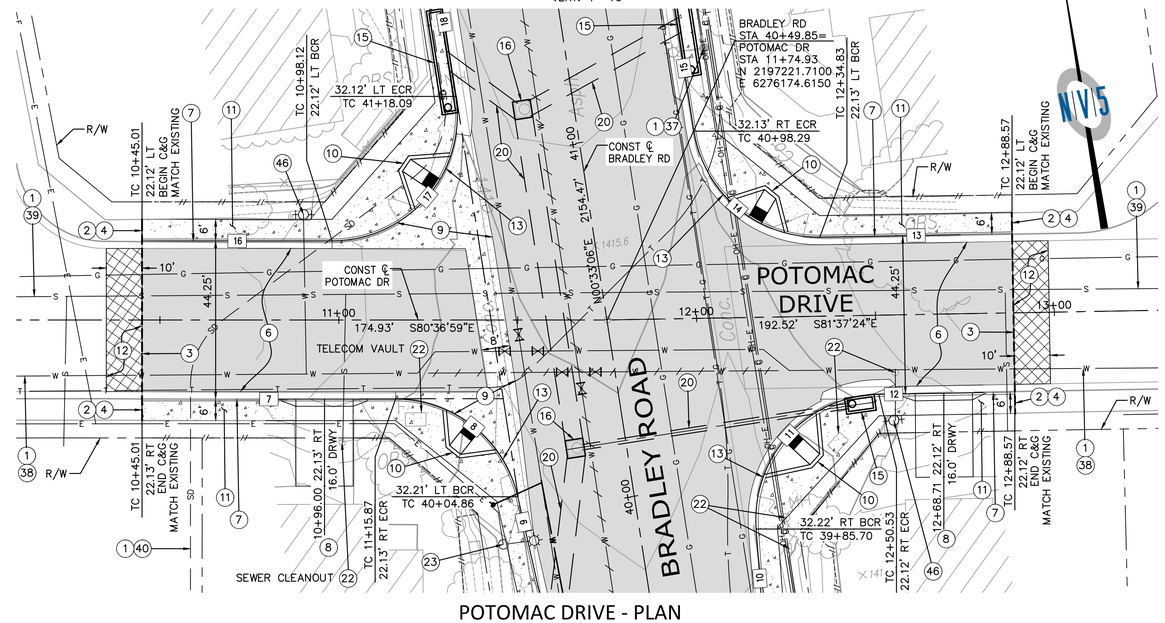
POTOMAC DRIVE - PROFILE

SCALES: HORIZ. 1"=20'
VERT. 1"=10'



RIO VISTA DRIVE - PLAN

SCALE: 1"=20'



POTOMAC DRIVE - PLAN

SCALE: 1"=20'

CONSTRUCTION NOTES

1. PROTECT IN PLACE.
2. MATCH EXISTING IMPROVEMENT.
3. SAWCUT EXISTING ASPHALT PAVEMENT 4" DEEP MIN.
4. SAWCUT EXISTING CONCRETE 4" DEEP MIN.
5. ADJUST MANHOLE COVER TO GRADE PER EMWD REQUIREMENTS.
6. NEW RHMA/HMA AND BASE PER TYPICAL SECTION ON SHEET 3.
7. MINOR CONCRETE, TYPE 6 CURB AND GUTTER PER CITY STD 200.
8. MINOR CONCRETE, RESIDENTIAL DRIVEWAY APPROACH PER CITY STD 206 (8" THICK).
9. MINOR CONCRETE, CROSS GUTTER AND SPANDREL PER CITY STD 209.
10. MINOR CONCRETE, PEDESTRIAN RAMP TYPE I PER CITY STD 405.
11. MINOR CONCRETE, SIDEWALK PER CITY STD 400.
12. COLD PLANE EXISTING ASPHALT SURFACE 0.1' DEEP.
13. FOR CURB RETURN PROFILES, SEE SHEETS 9 THROUGH 11.
14. FOR ACCESS ROAD PLAN AND PROFILE, SEE SHEET 8.
15. CATCH BASIN No. 1 PER RCFCD STD DWG No. CB100.
16. MANHOLE No. 1 PER RCFCD STD DWG No. MH251.
17. JUNCTION STRUCTURE No. 8 – SEE DETAIL SHEET 15.
18. STORMWATER BIOFILTRATION SYSTEM – SEE DETAIL SHEET 15.
19. RELOCATE OR ADJUST BY OTHERS, CONTRACTOR TO COORDINATE.
20. STORM DRAIN PLAN AND PROFILE PER SHEETS 13 AND 14.
21. FOR GRADING PLAN SEE SHEET 12.
22. ADJUST UTILITY COVER TO GRADE.
23. REMOVE EXISTING STREET LIGHT AND PULL BOX. REPLACE/RECONSTRUCT IN KIND.
24. EXISTING 12" PVC WATER LINE (EMWD).
25. EXISTING ABANDONED 12" CML&C WATER LINE (EMWD). REMOVE AS NEEDED.
26. EXISTING 18" VCP SEWER (EMWD).
27. EXISTING 4" HP GAS (SOCAL GAS).
28. EXISTING 4" PL FO (AT&T).
29. EXISTING UG ELEC (SOCAL EDISON).
30. EXISTING JOINT TRENCH.
31. EXISTING 12" ACP WATER (EMWD).
32. EXISTING 8" VCP SEWER (EMWD).
33. EXISTING 21" VCP SEWER (EMWD).
34. EXISTING 48" RCP SEWER (EMWD).
35. EXISTING 30" RCP STORM DRAIN (RCFCD). REMOVE CULVERTS AND HEADWALLS.
36. EXISTING 48" CML&C RECLAIMED WATER LINE (EMWD).
37. EXISTING OH ELEC (SOCAL EDISON).
38. EXISTING 8" PVC WATER LINE (EMWD).
39. EXISTING 10" VCP SEWER (EMWD).
40. EXISTING 39" RCP STORM DRAIN (RCFCD).
41. RESET MAILBOX TO FINISH GRADE.
42. MINOR CONCRETE, TYPE 6A CURB PER CITY STD 202.
43. WATER LINE RELOCATION PER SHEETS W–1 TO W–9.
44. PROPOSED 12" CML&C WATER MAIN.
45. PROPOSED 24" CML&C WATER MAIN.
46. ADJUST FIRE HYDRANT TO GRADE.

CURB DATA

NO	DELTA/BEARING	RADIUS	LENGTH	REMARKS
1	N 00°33'06" E	–	125. 67'	TYPE 6 C&G
2	△=93°21'02"	35. 00'	59. 48'	TYPE 6 C&G
3	S 82°04'37" E	–	19. 85'	TYPE 6 C&G
4	N 82°01'02" W	–	34. 70'	TYPE 6 C&G
5	△=78°21'07"	35. 00'	47. 86'	TYPE 6 C&G
6	N 03°39'56" W	–	84. 69'	TYPE 6 C&G
7	N 80°37'05" W	–	70. 86'	TYPE 6 C&G
8	△=77°15'01"	35. 00'	47. 19'	TYPE 6 C&G
9	N 03°22'04" W	–	90. 84'	TYPE 6 C&G
10	N 05°01'34" E	–	79. 79'	TYPE 6 C&G
11	△=93°21'02"	35. 00'	57. 02'	TYPE 6 C&G
12	S 81°37'24" E	–	38. 04'	TYPE 6 C&G
13	N 81°37'24" E	–	53. 74'	TYPE 6 C&G
14	△=82°10'30"	35. 00'	50. 20'	TYPE 6 C&G
15	N 00°33'06" E	–	101. 75'	TYPE 6 C&G
16	S 80°37'05" E	–	53. 11'	TYPE 6 C&G
17	△=98°49'49"	35. 00'	60. 37'	TYPE 6 C&G
18	N 00°33'06" E	–	81. 94'	TYPE 6 C&G

REVISIONS

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NV5
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SAN DIEGO, CA 92128
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REGISTERED PROFESSIONAL ENGINEER PHILLIP REISS No. 82850 CIVIL STATE OF CALIFORNIA

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DATE: August 31, 2018

CITY OF MENIFEE
ENGINEERING DEPARTMENT

JONATHAN G. SMITH RCE 61253 DATE
DIRECTOR OF PUBLIC WORKS/
CITY ENGINEER

RECOMMENDED BY: RCE 75635 DATE
CARLOS E. GERONIMO

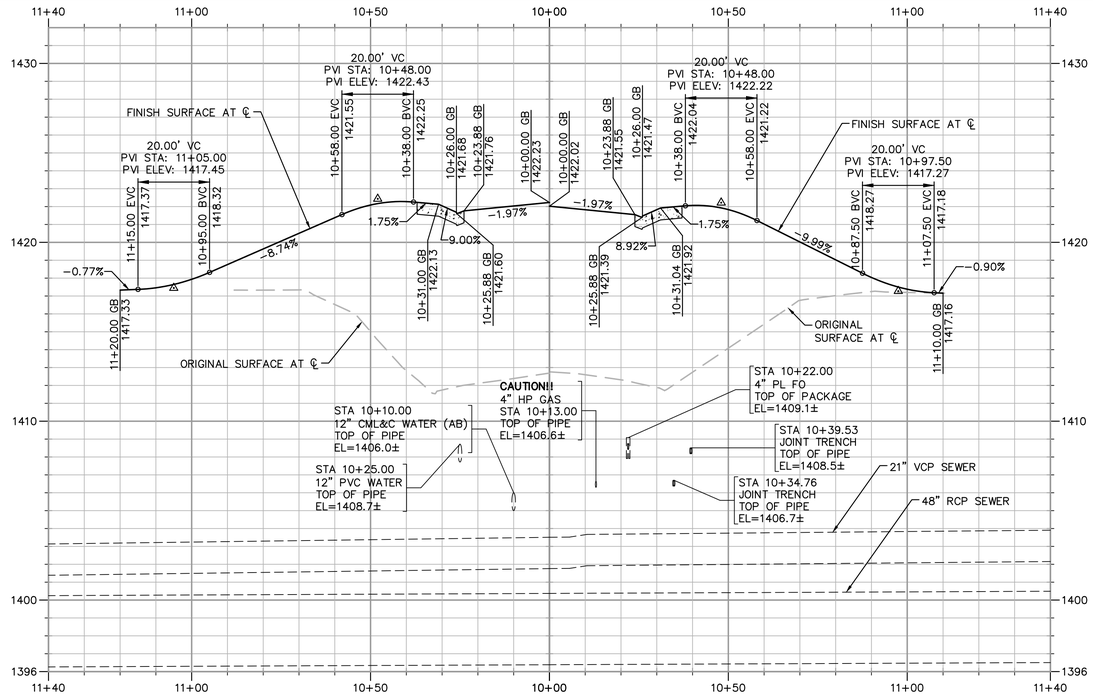
CITY OF MENIFEE
ENGINEERING DEPARTMENT

BRADLEY ROAD BRIDGE
OVER SALT CREEK

PLAN & PROFILE – RIO VISTA DRIVE & POTOMAC DRIVE

SHEET NO. 7
7 OF 58

PROJECT NO: CIP 13-04

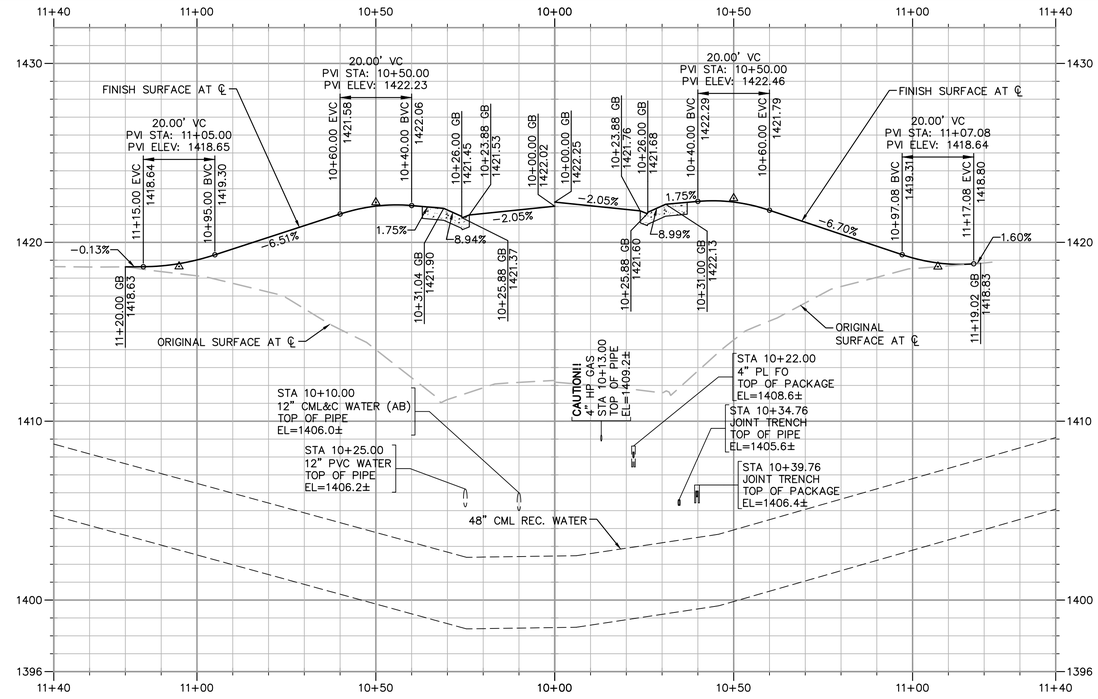


SOUTHWEST ACCESS ROAD - PROFILE

SCALES: HORIZ. 1"=20'
VERT. 1"=4'

SOUTHEAST ACCESS ROAD - PROFILE

SCALES: HORIZ. 1"=20'
VERT. 1"=4'



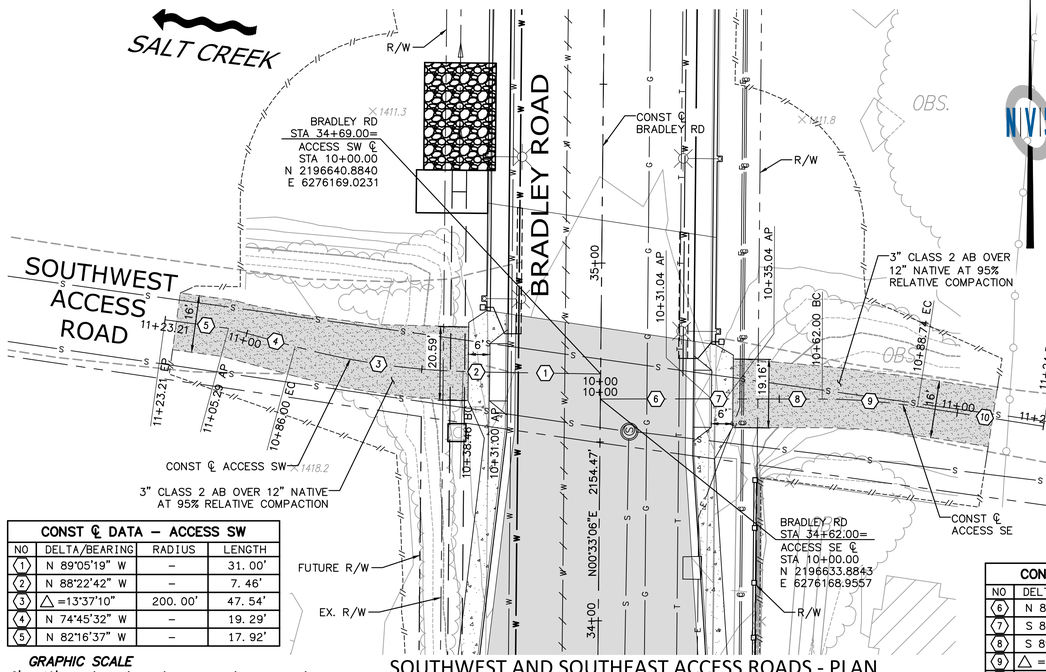
NORTHWEST ACCESS ROAD - PROFILE

SCALES: HORIZ. 1"=20'
VERT. 1"=4'

NORTHEAST ACCESS ROAD - PROFILE

SCALES: HORIZ. 1"=20'
VERT. 1"=4'

CONST ℄ DATA – ACCESS NW			
NO	DELTA/BEARING	RADIUS	LENGTH
11	N 88°53'23" E	–	31. 04'
12	N 86°57'41" W	–	18. 28'
13	△ =10°54'09"	180. 00'	34. 25'
14	N 76°03'32" W	–	3. 95'
15	△ =5°21'27"	200. 00'	18. 70'
16	N 81°24'59" W	–	37. 12'



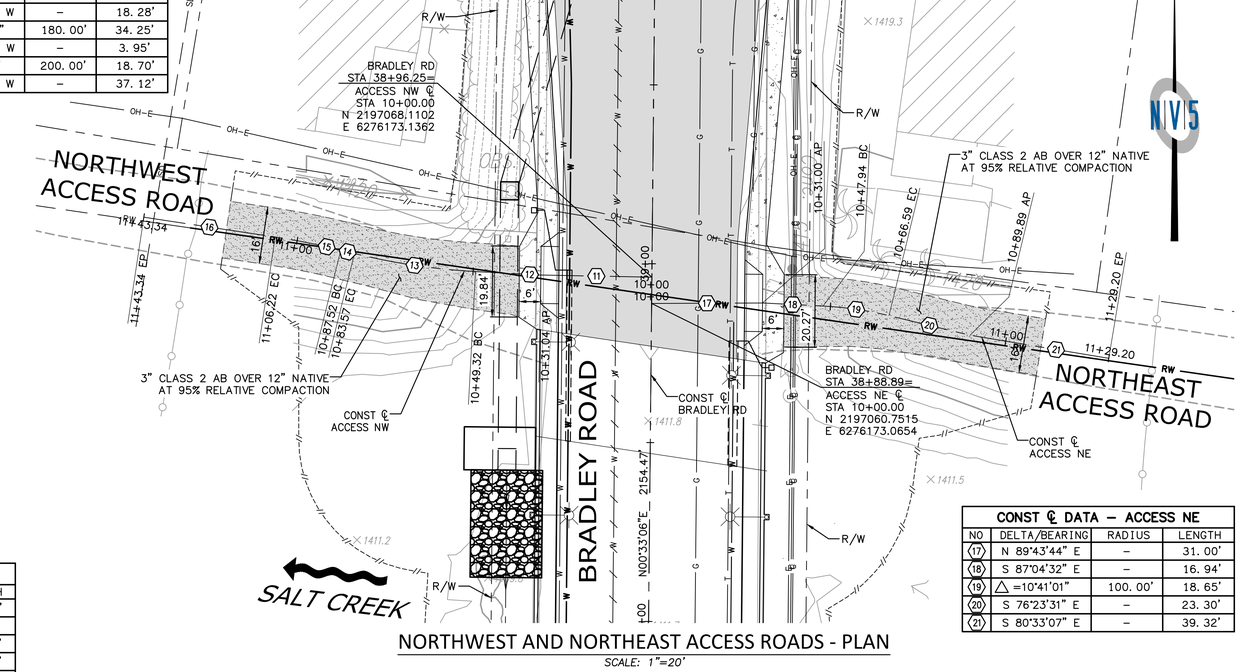
CONST ℄ DATA – ACCESS SW			
NO	DELTA/BEARING	RADIUS	LENGTH
1	N 89°05'19" W	–	31. 00'
2	N 88°22'42" W	–	7. 46'
3	△ =13°37'10"	200. 00'	47. 54'
4	N 74°45'32" W	–	19. 29'
5	N 82°16'37" W	–	17. 92'

CONST ℄ DATA – ACCESS SE			
NO	DELTA/BEARING	RADIUS	LENGTH
6	N 89°54'13" E	–	31. 04'
7	S 89°39'19" E	–	4. 00'
8	S 89°52'48" E	–	26. 96'
9	△ =8°46'33"	174. 59'	26. 74'
10	S 81°06'15" E	–	35. 64'

GRAPHIC SCALE
0' 10' 20' 30' 40' 60' 80'
SCALE 1"= 20'

SOUTHWEST AND SOUTHEAST ACCESS ROADS - PLAN

SCALE: 1"=20'



CONST ℄ DATA – ACCESS NE			
NO	DELTA/BEARING	RADIUS	LENGTH
17	N 89°43'44" E	–	31. 00'
18	S 87°04'32" E	–	16. 94'
19	△ =10°41'01"	100. 00'	18. 65'
20	S 76°23'31" E	–	23. 30'
21	S 80°33'07" E	–	39. 32'

NORTHWEST AND NORTHEAST ACCESS ROADS - PLAN

SCALE: 1"=20'

REVISIONS

SHT.	DESCRIPTION	DATE	BY	APRD

NV5
15092 AVENUE OF SCIENCE, SUITE 200
SAN DIEGO, CA 92128
P: 858.385.0500 WWW.NV5.COM

REGISTERED PROFESSIONAL ENGINEER PHYLLIP REISS No. 82850 CIVIL STATE OF CALIFORNIA

SCALE: 1"=20'
DESIGN: PR
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CHECKED:
APPROVED:
DATE: August 31, 2018

CITY OF MENIFEE
ENGINEERING DEPARTMENT

JONATHAN G. SMITH RCE 61253 DATE
DIRECTOR OF PUBLIC WORKS/
CITY ENGINEER

RECOMMENDED BY: RCE 75635 DATE
CARLOS E. GERONIMO

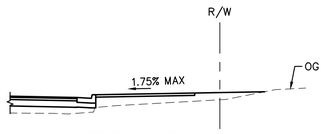
CITY OF MENIFEE
ENGINEERING DEPARTMENT

BRADLEY ROAD BRIDGE OVER SALT CREEK

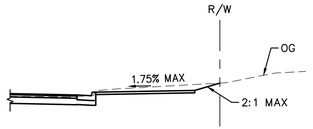
PLAN & PROFILE – ACCESS ROADS

SHEET NO. 8
8 OF 58

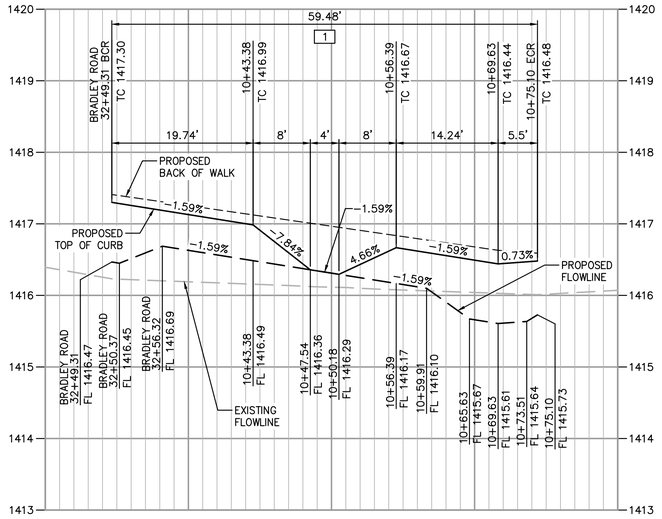
PROJECT NO: CIP 13-04



SECTION B–B
NO SCALE

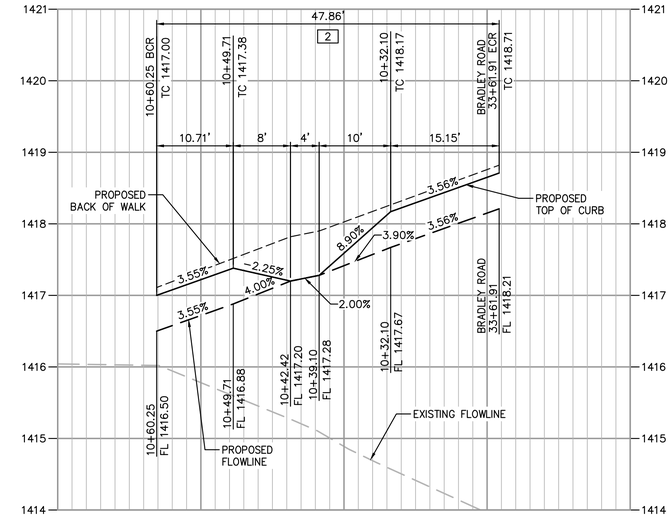


SECTION A–A
NO SCALE



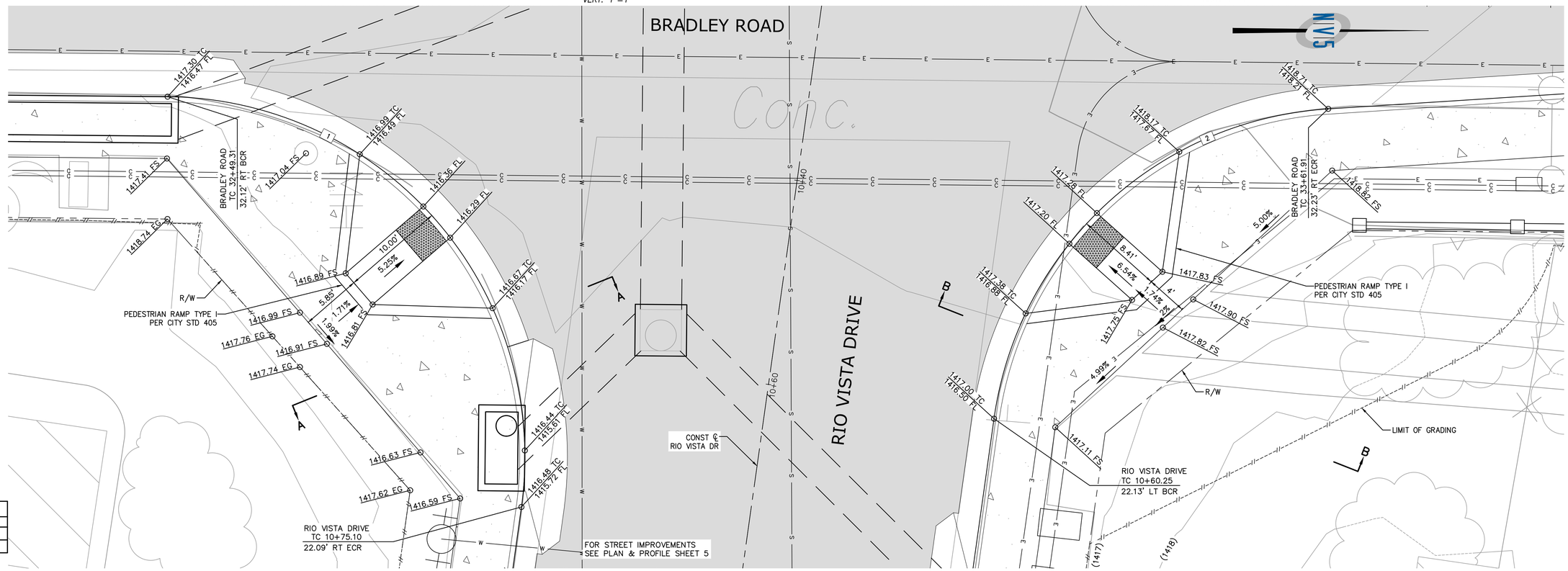
BRADLEY ROAD AND RIO VISTA DRIVE - INTERSECTION
SOUTH EAST QUADRANT

SCALES: HORIZ. 1"=10'
VERT. 1"=1'



BRADLEY ROAD AND RIO VISTA DRIVE - INTERSECTION
NORTH EAST QUADRANT

SCALES: HORIZ. 1"=10'
VERT. 1"=1'



CURB DATA			
NO	DELTA/BEARING	RADIUS	LENGTH
1	△=97°22'17"	35. 00'	59. 48'
2	△=78°21'07"	35. 00'	47. 86'

NOTE:
ALL STATIONING REFERS TO CONSTRUCTION ℄ RIO VISTA DRIVE UNLESS OTHERWISE NOTED.

BRADLEY ROAD AND RIO VISTA DRIVE - INTERSECTION
CROSS GUTTER DETAILS

SCALE: 1"=5'

REVISIONS

⚠	SHT.	DESCRIPTION	DATE	BY	APRD

NV5
15092 AVENUE OF SCIENCE, SUITE 200
SAN DIEGO, CA 92128
P: 858.385.0500 WWW.NV5.COM

REGISTERED PROFESSIONAL ENGINEER PHILLIP REISS No. 82850 CIVIL STATE OF CALIFORNIA

SCALE:	1"=20'
DESIGN:	PR
DRAWN:	PR
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APPROVED:	
DATE:	August 31, 2018

CITY OF MENIFEE
ENGINEERING DEPARTMENT

JONATHAN G. SMITH RCE 61253 DATE
DIRECTOR OF PUBLIC WORKS/
CITY ENGINEER

RECOMMENDED BY: RCE 75635 DATE
CARLOS E. GERONIMO

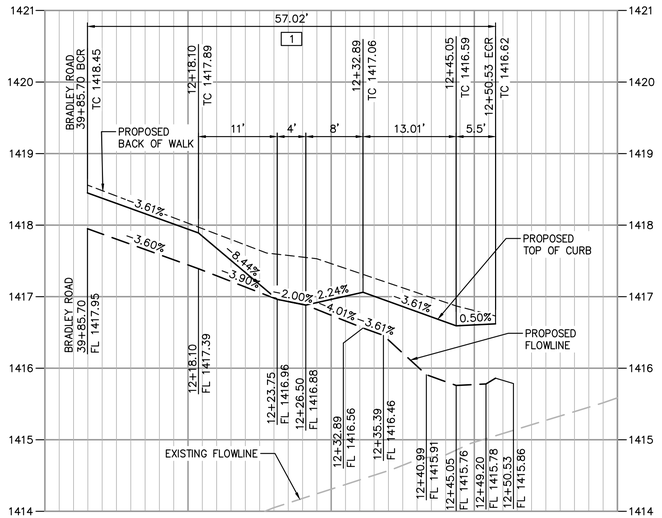
CITY OF MENIFEE
ENGINEERING DEPARTMENT

BRADLEY ROAD BRIDGE
OVER SALT CREEK

INTERSECTION DETAILS – BRADLEY RD AND RIO VISTA DR

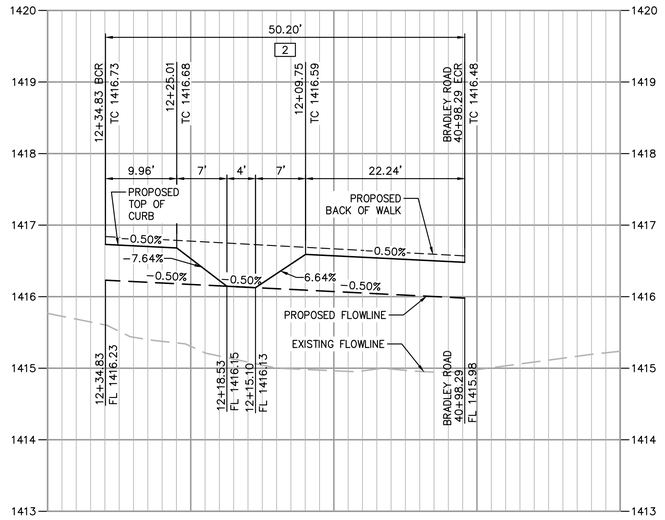
SHEET NO. 9
9 *OF* 58

PROJECT NO: CIP 13-04



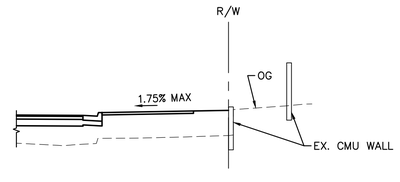
BRADLEY ROAD AND POTOMAC DRIVE - INTERSECTION
SOUTH EAST QUADRANT

SCALES: HORIZ. 1"=10'
VERT. 1"=1'

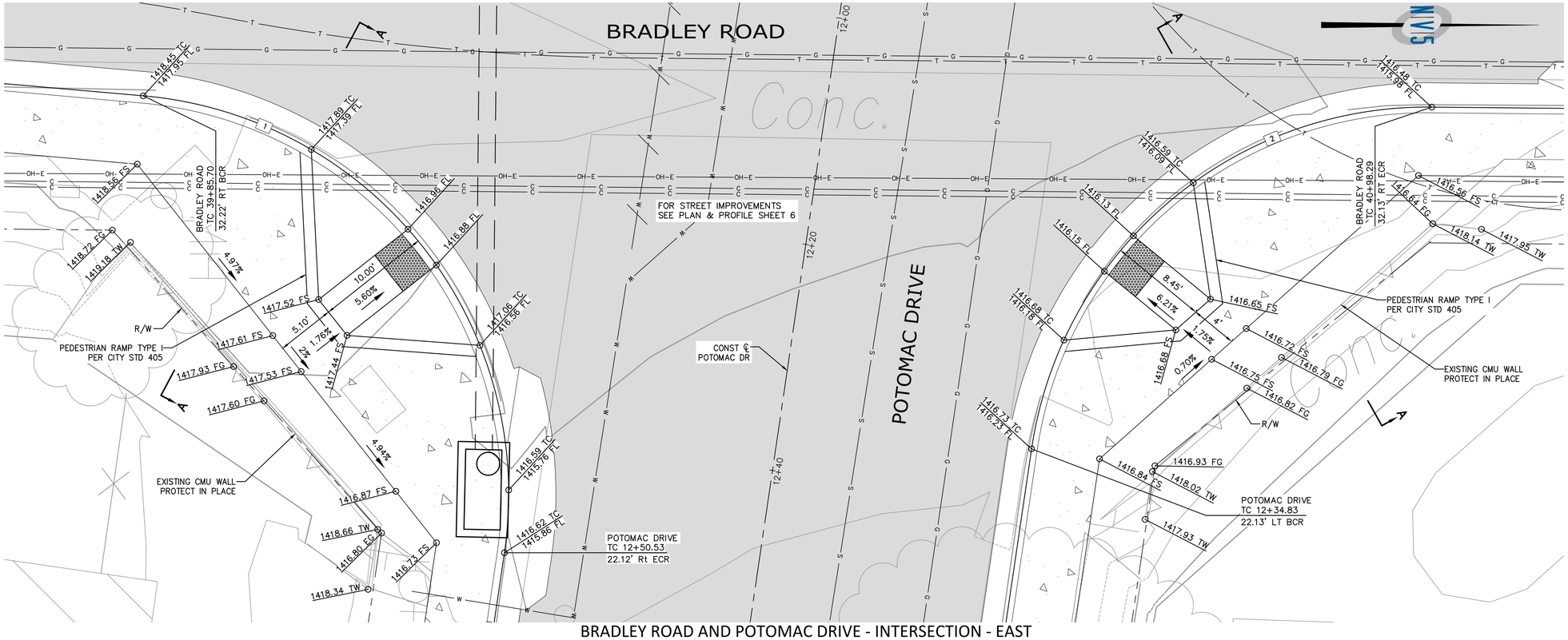


BRADLEY ROAD AND POTOMAC DRIVE - INTERSECTION
NORTH EAST QUADRANT

SCALES: HORIZ. 1"=10'
VERT. 1"=1'



SECTION A–A
NO SCALE



CURB DATA			
NO	DELTA/BEARING	RADIUS	LENGTH
1	△=93°21'02"	35.00'	57.02'
2	△=82°10'30"	35.00'	50.20'

NOTE:
ALL STATIONING REFERS TO CONSTRUCTION ℄ POTOMAC DRIVE UNLESS OTHERWISE NOTED.

BRADLEY ROAD AND POTOMAC DRIVE - INTERSECTION - EAST
CROSS GUTTER DETAILS

SCALE: 1"=5'

REVISIONS				
SHT.	DESCRIPTION	DATE	BY	APRD

NV5
15092 AVENUE OF SCIENCE, SUITE 200
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P: 858.385.0500 WWW.NV5.COM

REGISTERED PROFESSIONAL ENGINEER
PHILLIP REISS
No. 82850
CIVIL
STATE OF CALIFORNIA

SCALE:	1"=20'
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CITY OF MENIFEE
ENGINEERING DEPARTMENT

JONATHAN G. SMITH RCE 61253 DATE
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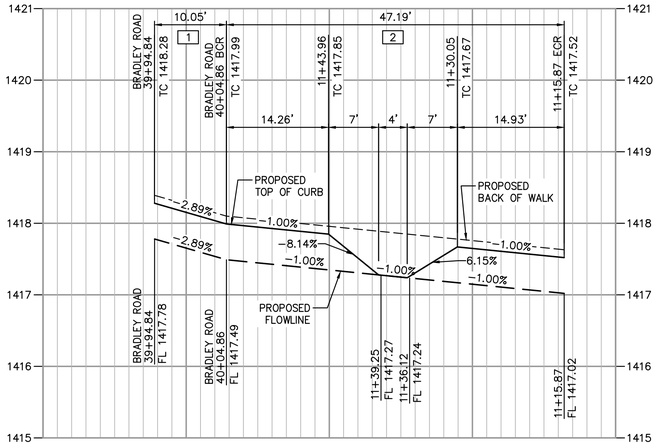
CITY OF MENIFEE
ENGINEERING DEPARTMENT

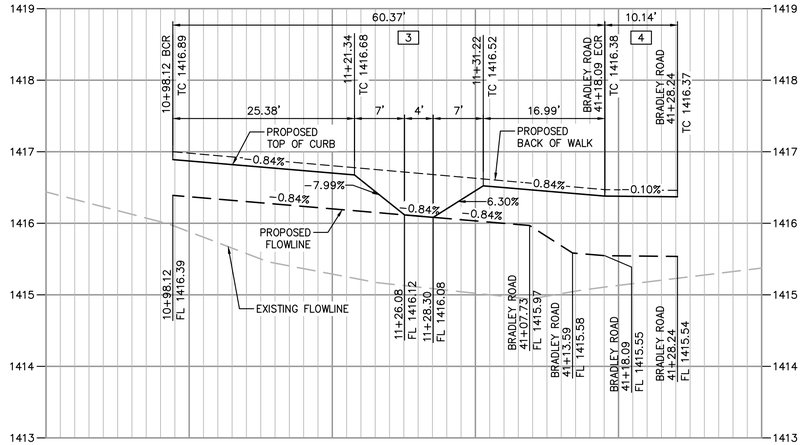
BRADLEY ROAD BRIDGE
OVER SALT CREEK

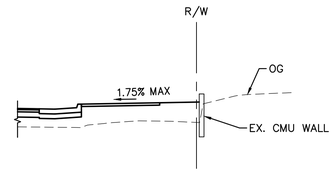
INTERSECTION DETAILS – BRADLEY RD AND POTOMAC DR

SHEET NO. 10
10 *OF* 58

PROJECT NO: CIP 13-04







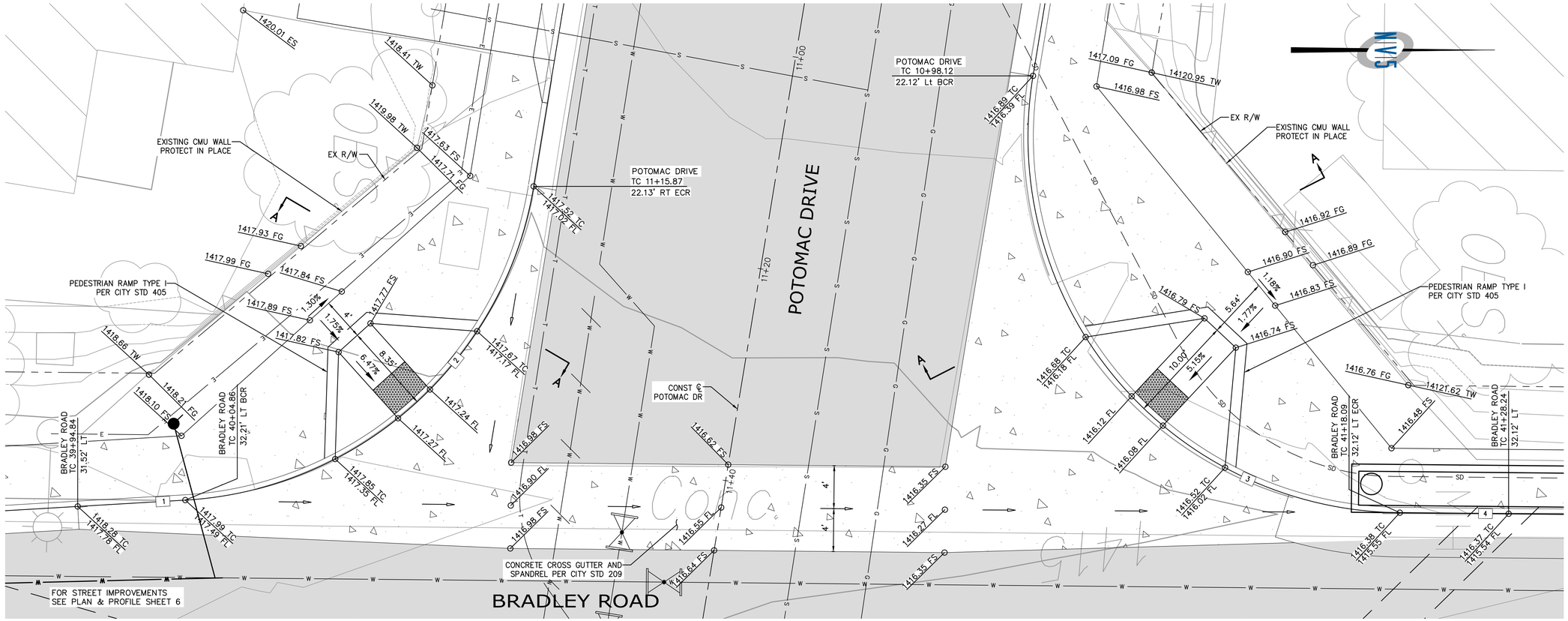
SECTION A–A
NO SCALE

BRADLEY ROAD AND POTOMAC DRIVE - INTERSECTION SOUTH WEST QUADRANT

SCALES: HORIZ. 1"=10'
VERT. 1"=1'

BRADLEY ROAD AND POTOMAC DRIVE - INTERSECTION NORTH WEST QUADRANT

SCALES: HORIZ. 1"=10'
VERT. 1"=1'



CURB DATA			
NO	DELTA/BEARING	RADIUS	LENGTH
1	N 03°22'04" W	–	10. 05'
2	△=77°15'01"	35. 00'	47. 19'
3	△=98°49'49"	35. 00'	60. 37'
4	N 00°33'06" E	–	10. 15'

NOTE:
ALL STATIONING REFERS TO CONSTRUCTION ℄ POTOMAC DRIVE UNLESS OTHERWISE NOTED.

BRADLEY ROAD AND POTOMAC DRIVE - INTERSECTION - WEST CROSS GUTTER DETAILS

SCALE: 1"=5'

REVISIONS

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RECOMMENDED BY: RCE 75635 DATE
CARLOS E. GERONIMO

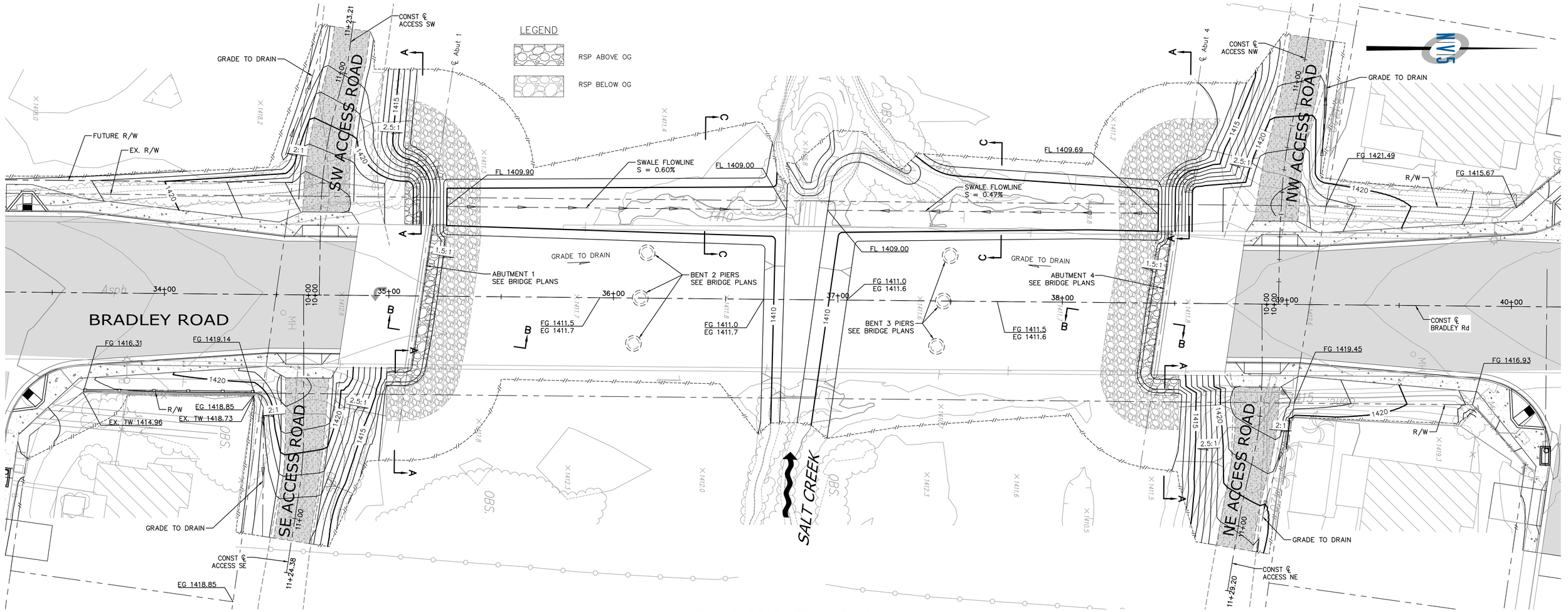
CITY OF MENIFEE
ENGINEERING DEPARTMENT

BRADLEY ROAD BRIDGE
OVER SALT CREEK

INTERSECTION DETAILS – BRADLEY RD AND POTOMAC DR

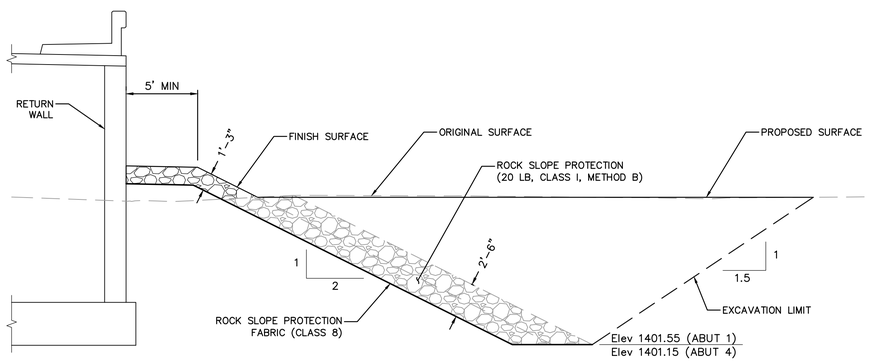
SHEET NO. 11 OF 58

PROJECT NO: CIP 13-04

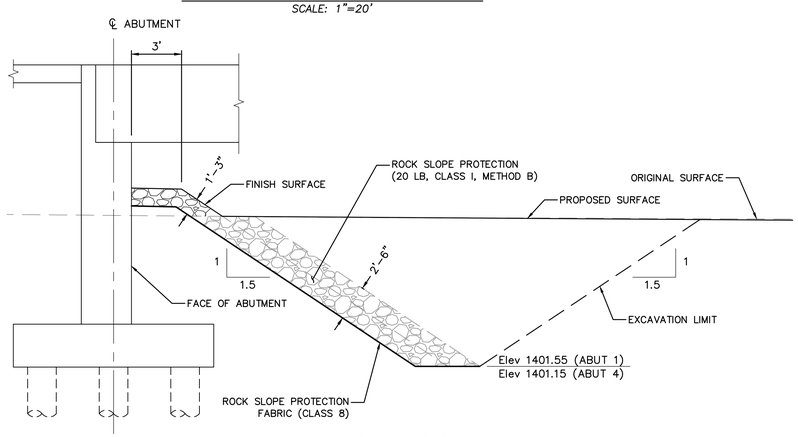


BRADLEY ROAD - GRADING PLAN

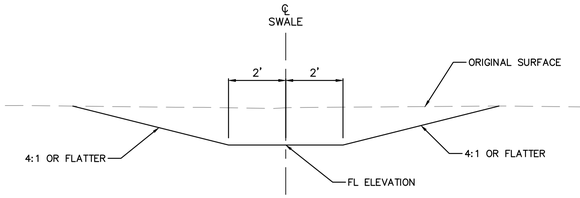
SCALE: 1"=20'



SECTION A–A
NO SCALE



SECTION B–B
NO SCALE



SECTION C–C
NO SCALE

GRAPHIC SCALE
0' 10' 20' 30' 40' 60' 80'
SCALE 1"= 20'

REVISIONS					
⚠ SHT.	DESCRIPTION	DATE	BY	APRD

NV5
15092 AVENUE OF SCIENCE, SUITE 200
SAN DIEGO, CA 92128
P: 858.385.0500 WWW.NV5.COM

REGISTERED PROFESSIONAL ENGINEER PHILLIP REUSS No. 82850 CIVIL STATE OF CALIFORNIA

SCALE:	1"=20'
DESIGN:	PR
DRAWN:	PR
CHECKED:	
APPROVED:	
DATE:	August 31, 2018

CITY OF MENIFEE
ENGINEERING DEPARTMENT

JONATHAN G. SMITH RCE 61253 DATE
DIRECTOR OF PUBLIC WORKS/
CITY ENGINEER

RECOMMENDED BY: RCE 75635 DATE
CARLOS E. GERONIMO

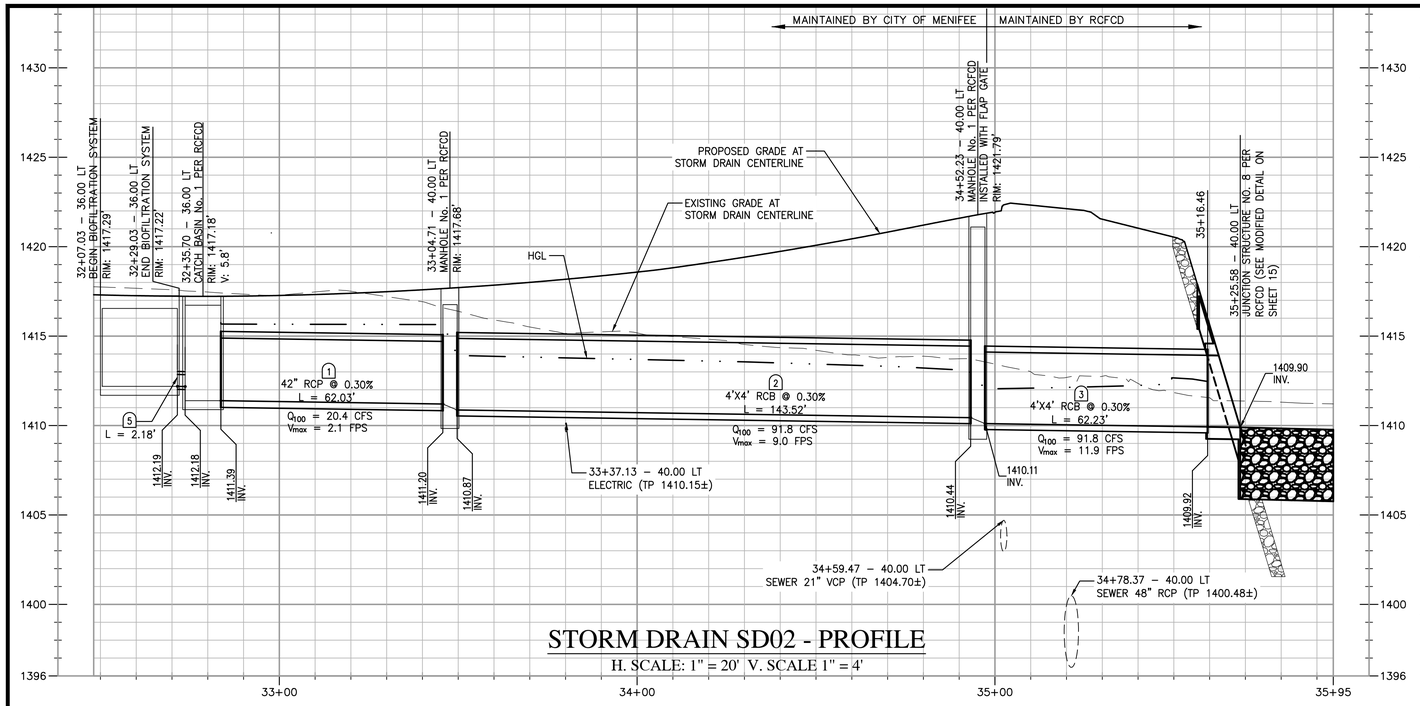
CITY OF MENIFEE
ENGINEERING DEPARTMENT

BRADLEY ROAD BRIDGE
OVER SALT CREEK

GRADING PLAN

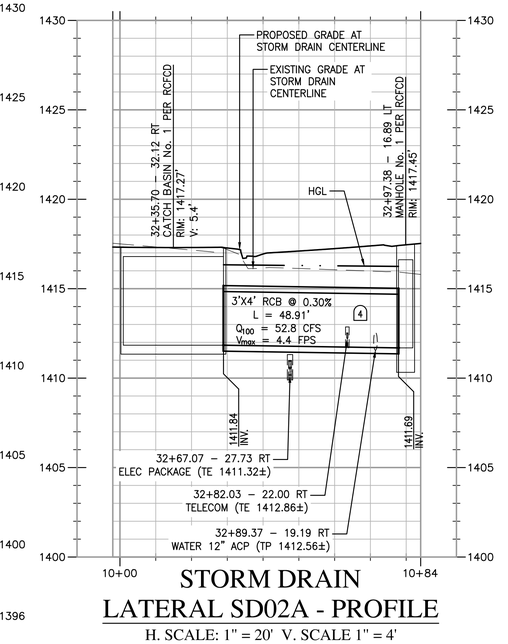
SHEET NO. 12
12 OF 58

PROJECT NO: CIP 13-04



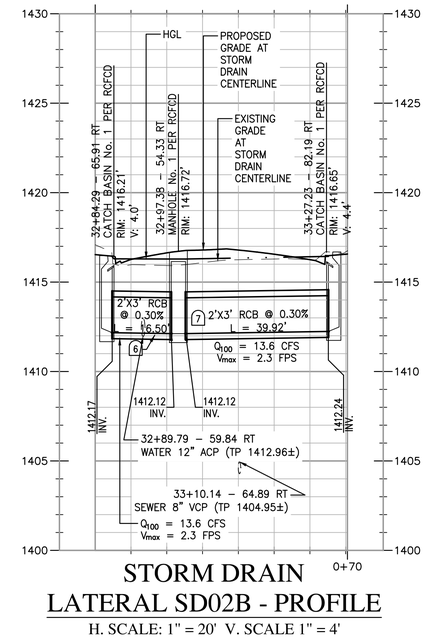
STORM DRAIN SD02 - PROFILE

H. SCALE: 1" = 20' V. SCALE 1" = 4'



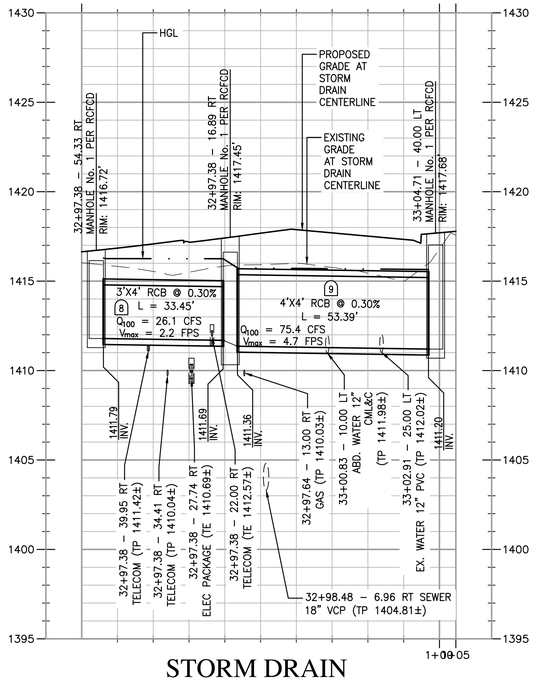
STORM DRAIN LATERAL SD02A - PROFILE

H. SCALE: 1" = 20' V. SCALE 1" = 4'



STORM DRAIN LATERAL SD02B - PROFILE

H. SCALE: 1" = 20' V. SCALE 1" = 4'



STORM DRAIN LATERAL SD02C - PROFILE

H. SCALE: 1" = 20' V. SCALE 1" = 4'

CONSTRUCTION NOTES

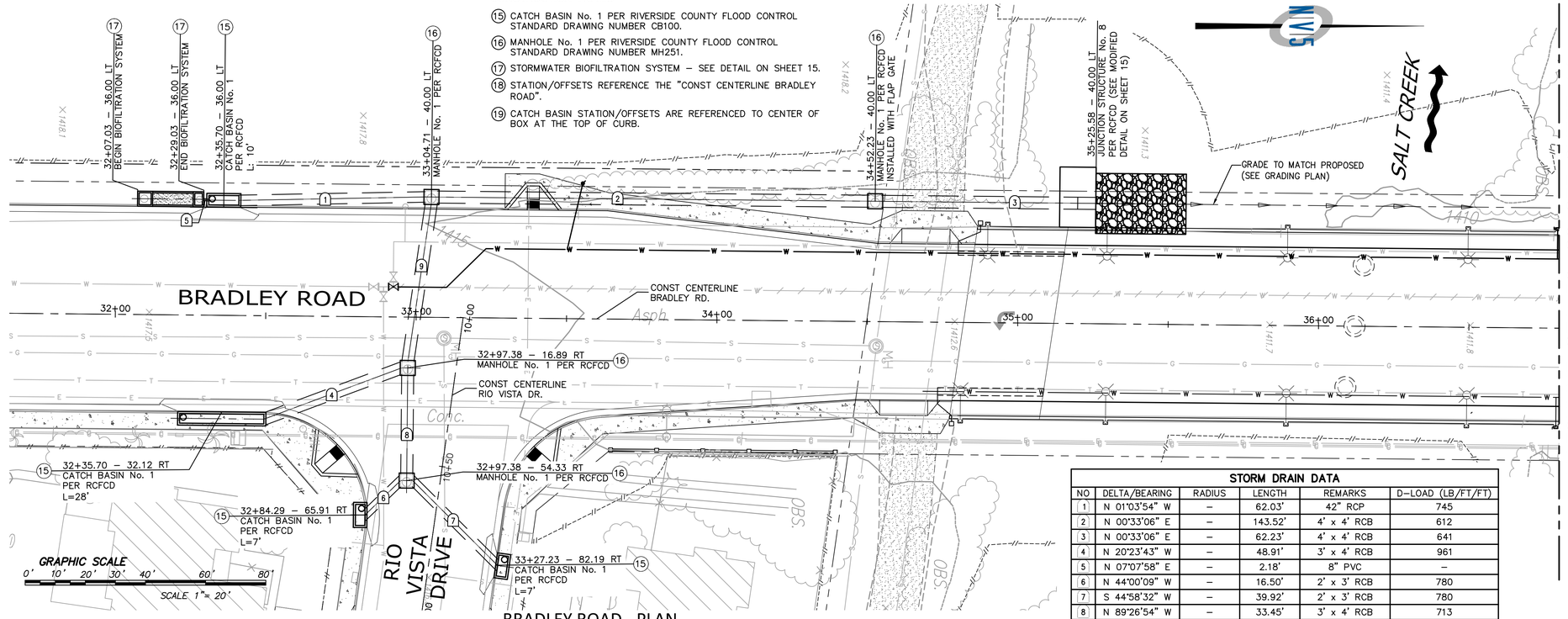
(15) CATCH BASIN No. 1 PER RIVERSIDE COUNTY FLOOD CONTROL STANDARD DRAWING NUMBER CB100.

(16) MANHOLE No. 1 PER RIVERSIDE COUNTY FLOOD CONTROL STANDARD DRAWING NUMBER MH251.

(17) STORMWATER BIOFILTRATION SYSTEM – SEE DETAIL ON SHEET 15.

(18) STATION/OFFSETS REFERENCE THE "CONST CENTERLINE BRADLEY ROAD".

(19) CATCH BASIN STATION/OFFSETS ARE REFERENCED TO CENTER OF BOX AT THE TOP OF CURB.



BRADLEY ROAD - PLAN

SCALE: 1"=20'

MATCHLINE STA 36+80 SEE SHEET 14

STORM DRAIN DATA

NO	DELTA/BEARING	RADIUS	LENGTH	REMARKS	D-LOAD (LB/FT/FT)
1	N 01°03'54" W	–	62.03'	42" RCP	745
2	N 00°33'06" E	–	143.52'	4' x 4' RCB	612
3	N 00°33'06" E	–	62.23'	4' x 4' RCB	641
4	N 20°23'43" W	–	48.91'	3' x 4' RCB	961
5	N 07°07'58" E	–	2.18'	8" PVC	–
6	N 44°00'09" W	–	16.50'	2' x 3' RCB	780
7	S 44°58'32" W	–	39.92'	2' x 3' RCB	780
8	N 89°26'54" W	–	33.45'	3' x 4' RCB	713
9	N 81°33'24" W	–	53.36'	4' x 4' RCB	713

REVISIONS

SHT.	DESCRIPTION	DATE	BY	APRD

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DATE:	August 31, 2018

CITY OF MENIFEE
ENGINEERING DEPARTMENT

JONATHAN G. SMITH RCE 61253 DATE
DIRECTOR OF PUBLIC WORKS/
CITY ENGINEER

RECOMMENDED BY: RCE 75635 DATE
CARLOS E. GERONIMO

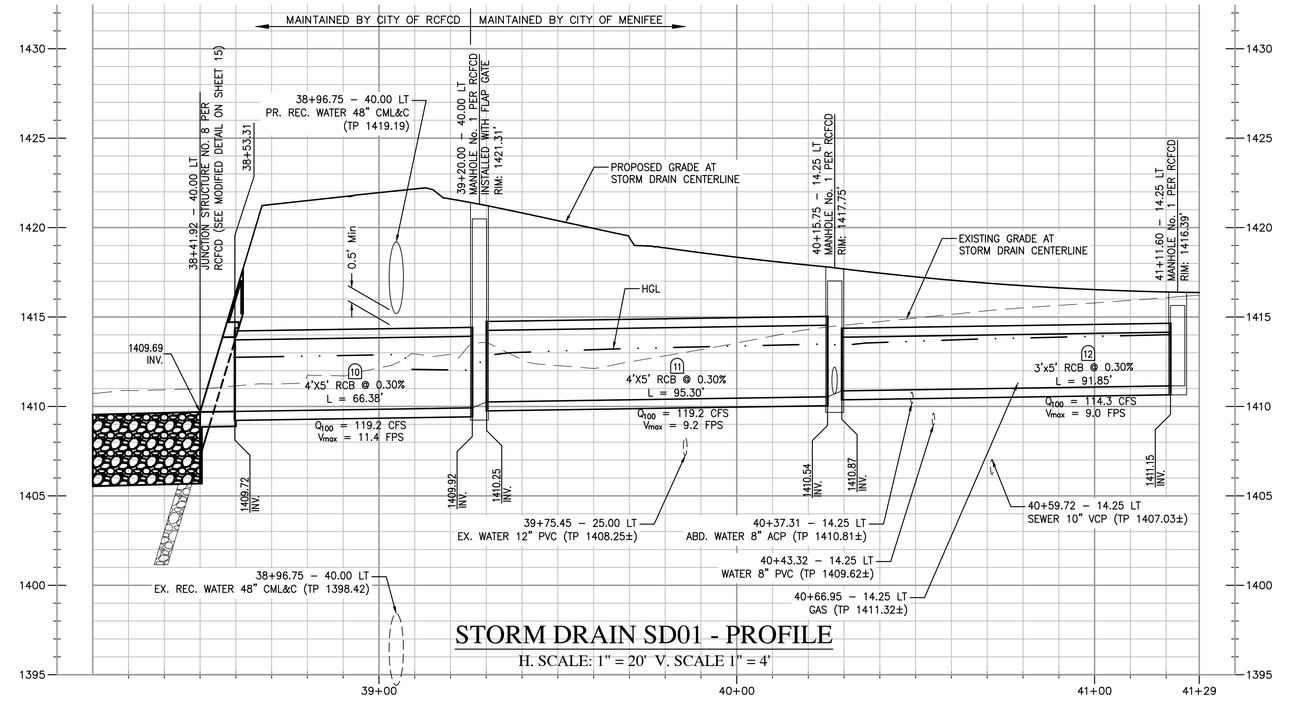
CITY OF MENIFEE
ENGINEERING DEPARTMENT

BRADLEY ROAD BRIDGE
OVER SALT CREEK

STORM DRAIN PLAN & PROFILE STA 31+10 TO STA 36+80

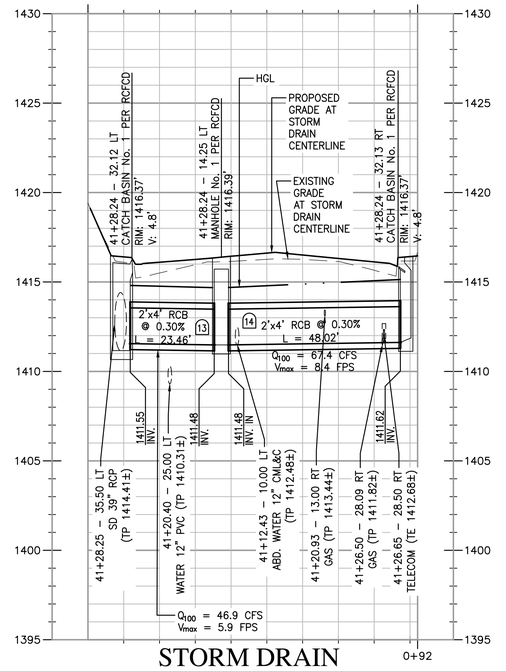
SHEET NO. 13
13 OF 58

PROJECT NO: CIP 13-04



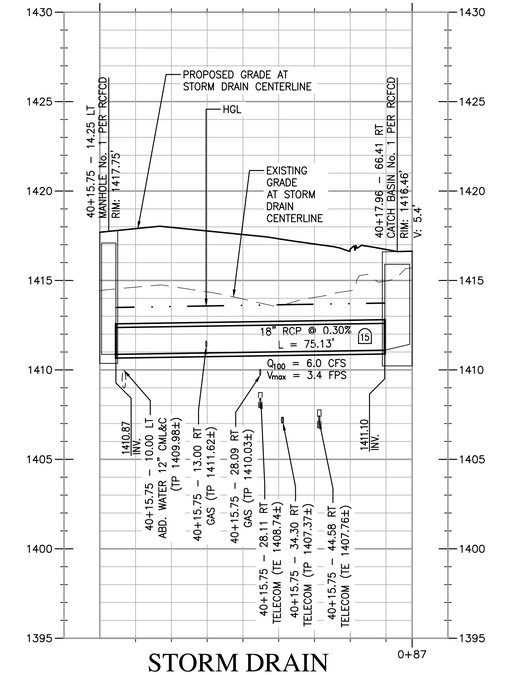
STORM DRAIN SD01 - PROFILE

H. SCALE: 1" = 20' V. SCALE 1" = 4'



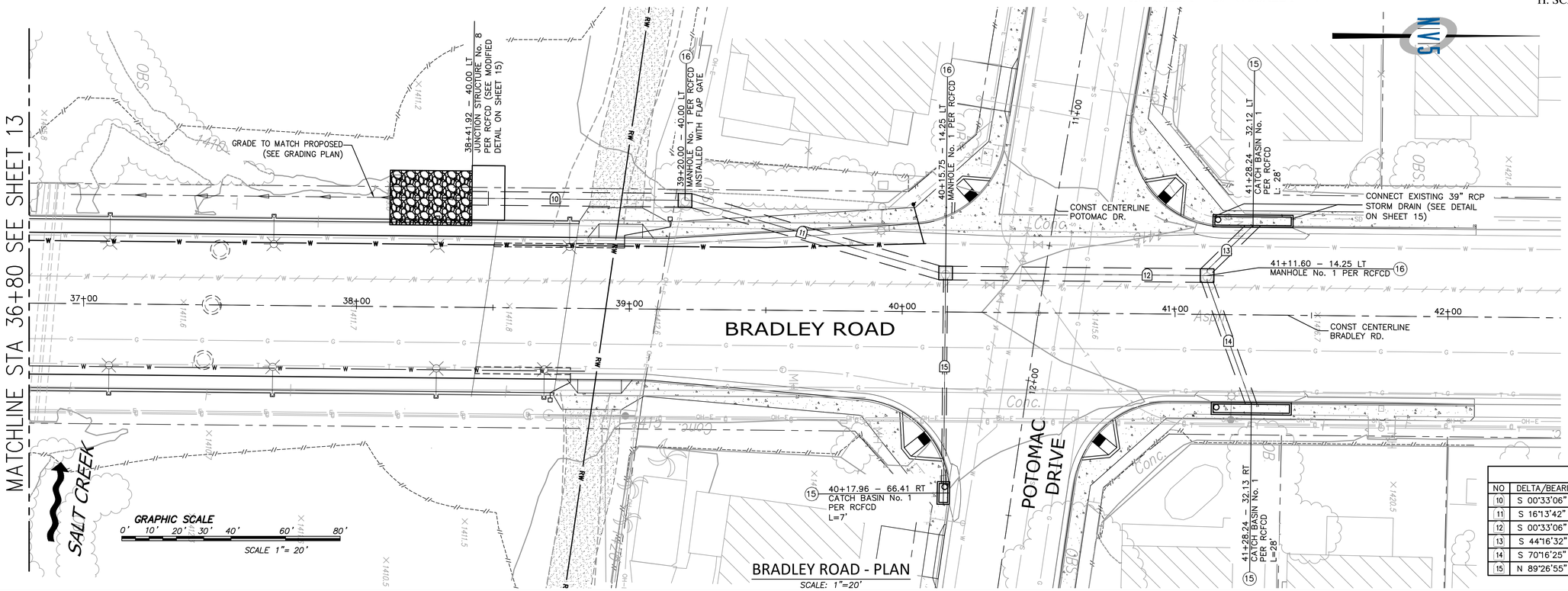
STORM DRAIN LATERAL SD01A - PROFILE

H. SCALE: 1" = 20' V. SCALE 1" = 4'



STORM DRAIN LATERAL SD01B - PROFILE

H. SCALE: 1" = 20' V. SCALE 1" = 4'



BRADLEY ROAD - PLAN

SCALE: 1"=20'

CONSTRUCTION NOTES

15 CATCH BASIN No. 1 PER RIVERSIDE COUNTY FLOOD CONTROL STANDARD DRAWING NUMBER CB100.

16 MANHOLE No. 1 PER RIVERSIDE COUNTY FLOOD CONTROL STANDARD DRAWING NUMBER MH251.

17 STATION/OFFSETS REFERENCE THE "CONST CENTERLINE BRADLEY ROAD".

18 CATCH BASIN STATION/OFFSETS ARE REFERENCED TO CENTER OF BOX AT THE TOP OF CURB.

STORM DRAIN DATA

NO	DELTA/BEARING	RADIUS	LENGTH	REMARKS	D-LOAD (LB/FT/FT)
10	S 00°33'06" W	–	66.38'	4' x 5' RCB	646
11	S 16°13'42" W	–	95.30'	4' x 5' RCB	615
12	S 00°33'06" W	–	91.85'	3' x 5' RCB	596
13	S 44°16'32" E	–	23.46'	2' x 4' RCB	961
14	S 70°16'25" W	–	48.02'	2' x 4' RCB	713
15	N 89°26'55" W	–	75.13'	18" RCP	593

REVISIONS

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CITY OF MENIFEE
ENGINEERING DEPARTMENT

JONATHAN G. SMITH RCE 61253 DATE
DIRECTOR OF PUBLIC WORKS/
CITY ENGINEER

RECOMMENDED BY: RCE 75635 DATE
CARLOS E. GERONIMO

CITY OF MENIFEE
ENGINEERING DEPARTMENT

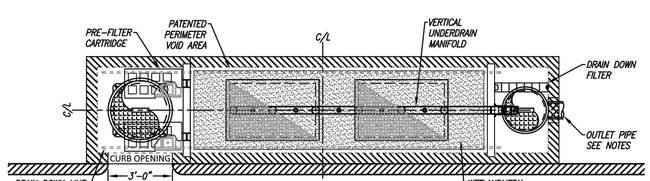
BRADLEY ROAD BRIDGE
OVER SALT CREEK

STORM DRAIN PLAN & PROFILE STA 36+80 TO STA 42+10

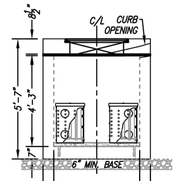
SHEET NO. 14
14 OF 58

PROJECT NO: CIP 13-04

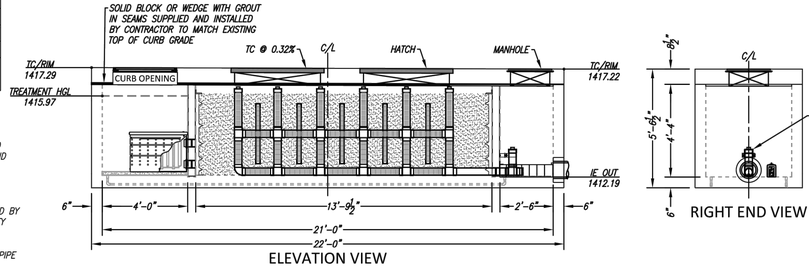
SITE SPECIFIC DATA			
PROJECT NUMBER		4128	
PROJECT NAME		BRADLEY RD BRIDGE	
PROJECT LOCATION		MENIFEE, CA	
STRUCTURE ID			
TREATMENT REQUIRED			
VOLUME BASED (CF)		FLOW BASED (CFS)	
		0.27	
TREATMENT HGL AVAILABLE (FT)			N/A
PEAK BYPASS REQUIRED (CFS) – IF APPLICABLE			FLOW-BY
PIPE DATA	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	N/A	N/A	N/A
INLET PIPE 2	N/A	N/A	N/A
OUTLET PIPE	1412.19	N/K	8"
	PRETREATMENT	BIOFILTRATION	DISCHARGE
RIM ELEVATION	1417.29	VARIES	1417.22
SURFACE LOAD	PEDESTRIAN	PEDESTRIAN	PEDESTRIAN
FRAME & COVER	ø30"	2 EA 30" X 48"	ø24"
WETLANDMEDIA VOLUME (CY)			7.79
WETLANDMEDIA DELIVERY METHOD			PER CONTRACT
ORIFICE SIZE (DIA. INCHES)			ø2.30"
NOTES: PRELIMINARY, NOT FOR CONSTRUCTION.			



PLAN VIEW



LEFT END VIEW



ELEVATION VIEW

RIGHT END VIEW

INSTALLATION NOTES

1. CONTRACTOR TO PROVIDE ALL LABOR, EQUIPMENT, MATERIALS AND INCIDENTALS REQUIRED TO OFFLOAD AND INSTALL THE SYSTEM AND APPURTENANCES IN ACCORDANCE WITH THIS DRAWING AND THE MANUFACTURERS SPECIFICATIONS, UNLESS OTHERWISE STATED IN MANUFACTURERS CONTRACT.
2. UNIT MUST BE INSTALLED ON LEVEL BASE. MANUFACTURER RECOMMENDS A MINIMUM 6" LEVEL ROCK BASE UNLESS SPECIFIED BY THE PROJECT ENGINEER. CONTRACTOR IS RESPONSIBLE TO VERIFY PROJECT ENGINEERS RECOMMENDED BASE SPECIFICATIONS.
3. ALL PIPES MUST BE FLUSH WITH INSIDE SURFACE OF CONCRETE. (PIPES CANNOT INTRUDE BEYOND FLUSH). INVERT OF OUTFLOW PIPE MUST BE FLUSH WITH DISCHARGE CHAMBER FLOOR. ALL GAPS AROUND PIPES SHALL BE SEALED WATER TIGHT WITH A NON-SHRINK GROUT PER MANUFACTURERS STANDARD CONNECTION DETAIL AND SHALL MEET OR EXCEED REGIONAL PIPE CONNECTION STANDARDS.
4. CONTRACTOR TO SUPPLY AND INSTALL ALL EXTERNAL CONNECTING PIPES.
5. CONTRACTOR RESPONSIBLE FOR INSTALLATION OF ALL RISERS, MANHOLES, AND HATCHES. CONTRACTOR TO GROUT ALL MANHOLES AND HATCHES TO MATCH FINISHED SURFACE UNLESS SPECIFIED OTHERWISE.
6. DRIP OR SPRAY IRRIGATION REQUIRED ON ALL UNITS WITH VEGETATION.

GENERAL NOTES

1. MANUFACTURER TO PROVIDE ALL MATERIALS UNLESS OTHERWISE NOTED.
2. ALL DIMENSIONS, ELEVATIONS, SPECIFICATIONS AND CAPACITIES ARE SUBJECT TO CHANGE. FOR PROJECT SPECIFIC DRAWINGS DETAILING EXACT DIMENSIONS, WEIGHTS AND ACCESSORIES PLEASE CONTACT MANUFACTURER.

TREATMENT FLOW (CFS)	0.27
OPERATING HEAD (FT)	3.7
PRETREATMENT LOADING RATE (GPM/SF)	2.4
WETLAND MEDIA LOADING RATE (GPM/SF)	1.0

THE PRODUCT DESCRIBED MAY BE PROTECTED BY ONE OR MORE OF THE FOLLOWING US PATENTS: 7,425,262; 7,470,362; 7,674,378; 8,303,816; RELATED FOREIGN PATENTS OR OTHER PATENTS PENDING

Bio Clean — A Forterra Company

MWS-L-4-21-C-UG-HC
STORMWATER BIOFILTRATION SYSTEM
STANDARD DETAIL

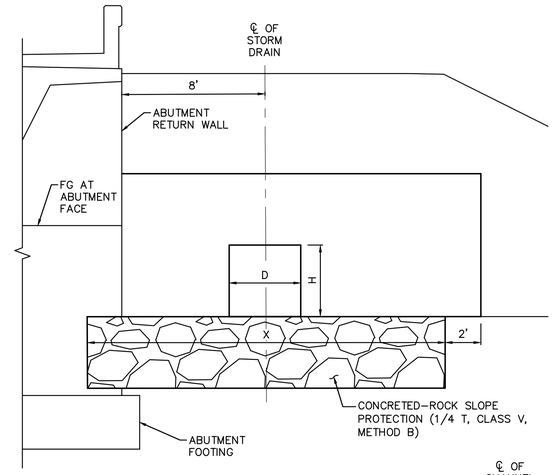
S:\B\CAD\DWGS\MWS-L-4-21-C-UG-HC.dwg

STORMWATER BIOFILTRATION SYSTEM DETAIL

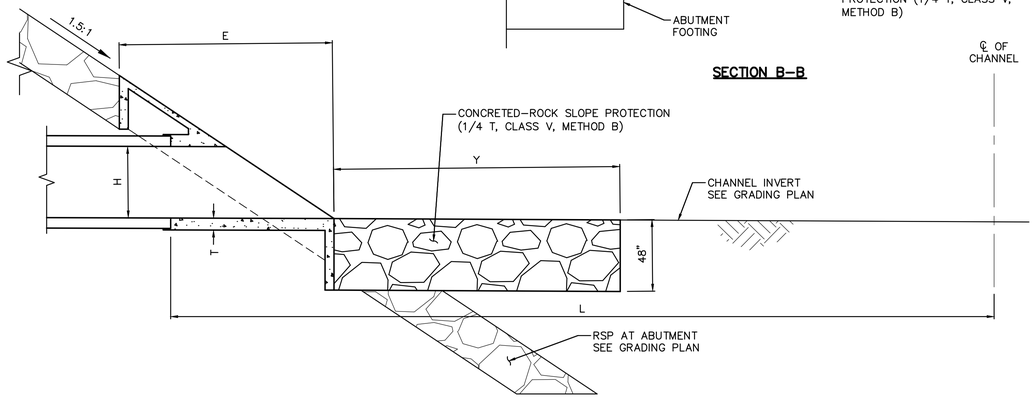
NO SCALE

JUNCTION STRUCTURE DATA										
STORM DRAIN NO.	PLAN REF.	A	D	E	H	L	T	X	Y
SD01	SHEET 14	90°	5'	12'	4'	162'	10"	20'	30'
SD02	SHEET 13	90°	4'	12'	4'	173'	8"	20'	30'

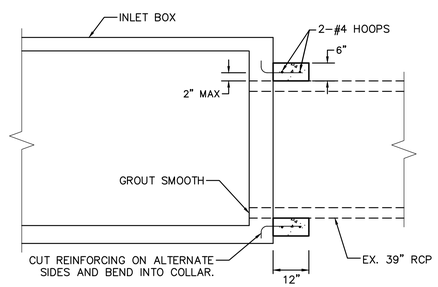
NOTE:
FOR DETAILS NOT SHOWN, SEE RCFCD STANDARD DRAWING JS233.



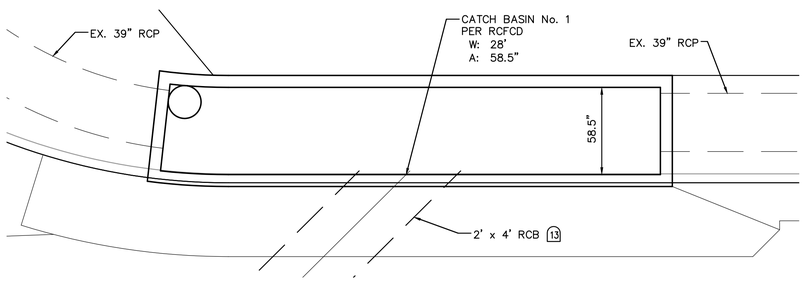
SECTION B-B



SECTION A-A



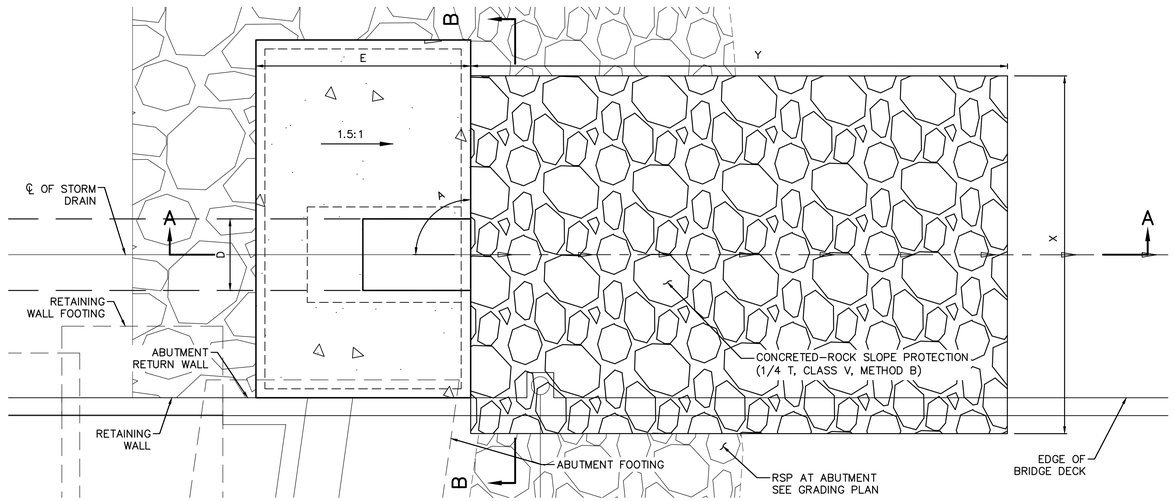
DETAIL



PLAN

EXISTING STORM DRAIN CONNECTION DETAIL

NO SCALE



PLAN

JUNCTION STRUCTURE No. 8 MODIFIED DETAIL

NO SCALE

REVISIONS					
SHT.	DESCRIPTION	DATE	BY	APRD

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RECOMMENDED BY: — RCE 75635 — DATE
CARLOS E. GERONIMO

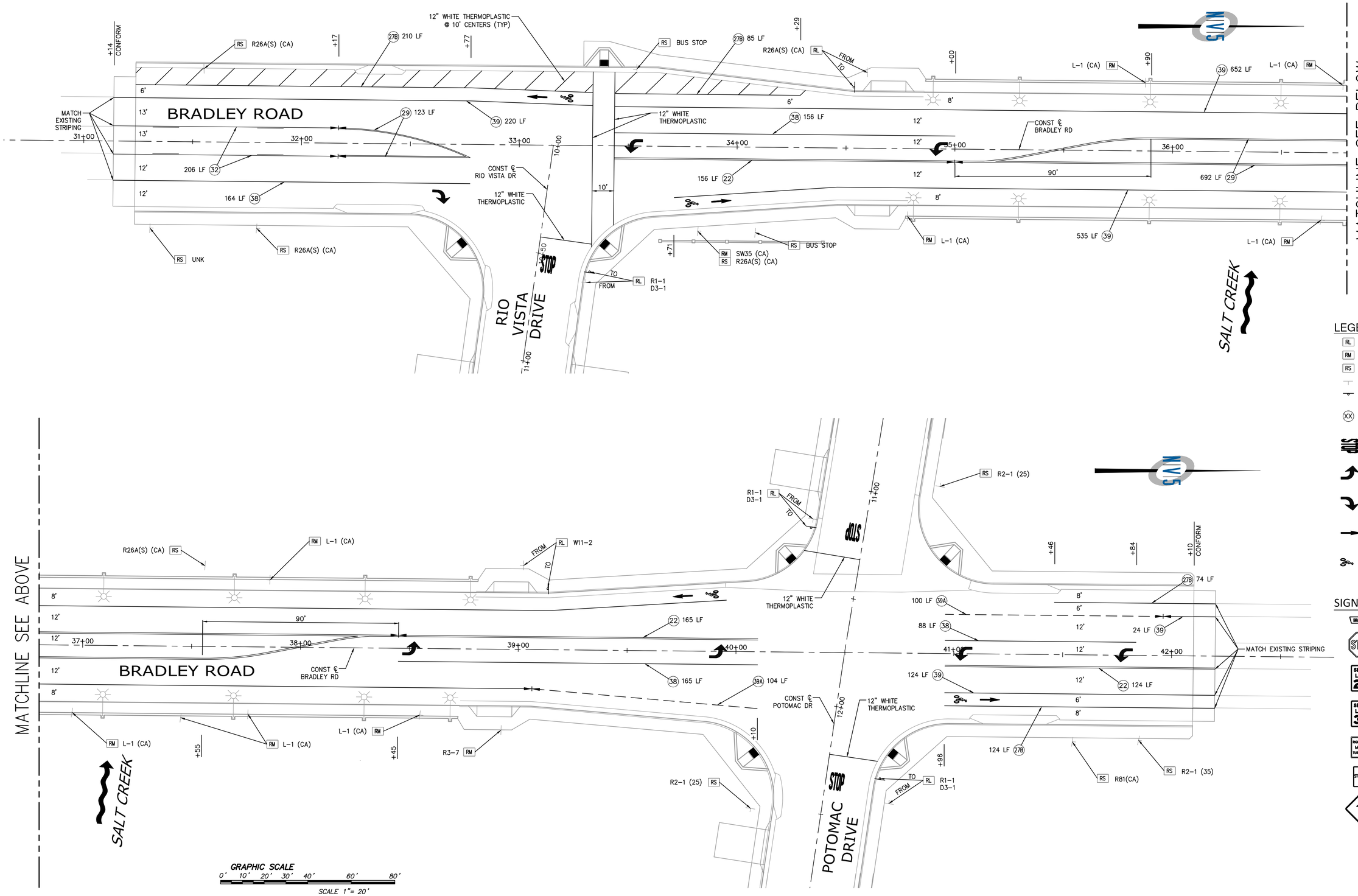
CITY OF MENIFEE
ENGINEERING DEPARTMENT

BRADLEY ROAD BRIDGE
OVER SALT CREEK

STORM DRAIN DETAILS

SHEET NO. 15 of 58

PROJECT NO: CIP 13-04



LEGEND

- RL — RELOCATE ROADSIDE SIGN
- RM — REMOVE ROADSIDE SIGN
- RS — RESET ROADSIDE SIGN
- EXISTING ROADSIDE SIGN
- PROPOSED ROADSIDE SIGN
- (XX) — THERMOPLASTIC TRAFFIC STRIPE PER CALTRANS STRIPING DETAILS. SEE REVISED STANDARD PLAN RSP A20A THRU RSP A20D
- INSTALL WHITE THERMOPLASTIC PAVEMENT MARKING WORDS PER CALTRANS STANDARD PLAN A24D
- INSTALL WHITE THERMOPLASTIC TYPE IV (L) ARROW PAVEMENT MARKING PER CALTRANS STANDARD PLAN A24A
- INSTALL WHITE THERMOPLASTIC TYPE IV (R) ARROW PAVEMENT MARKING PER CALTRANS STANDARD PLAN A24A
- INSTALL WHITE THERMOPLASTIC BIKE LANE ARROW PAVEMENT MARKING PER CALTRANS STANDARD PLAN A24A
- INSTALL WHITE THERMOPLASTIC BIKE LANE SYMBOL WITH PERSON PAVEMENT MARKING PER CALTRANS STANDARD PLAN A24C

SIGN LEGEND

- BRADLEY W — D3-1
- STOP — R1-1
- SPEED LIMIT 25 — R2-1 (25)
- SPEED LIMIT 35 — R2-1 (35)
- RIGHT LANE MUST TURN RIGHT — R3-7
- NO STOPPING ANY TIME — R26A(S) (CA)
- W11-2

REVISIONS				
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CARLOS E. GERONIMO

CITY OF MENIFEE
ENGINEERING DEPARTMENT

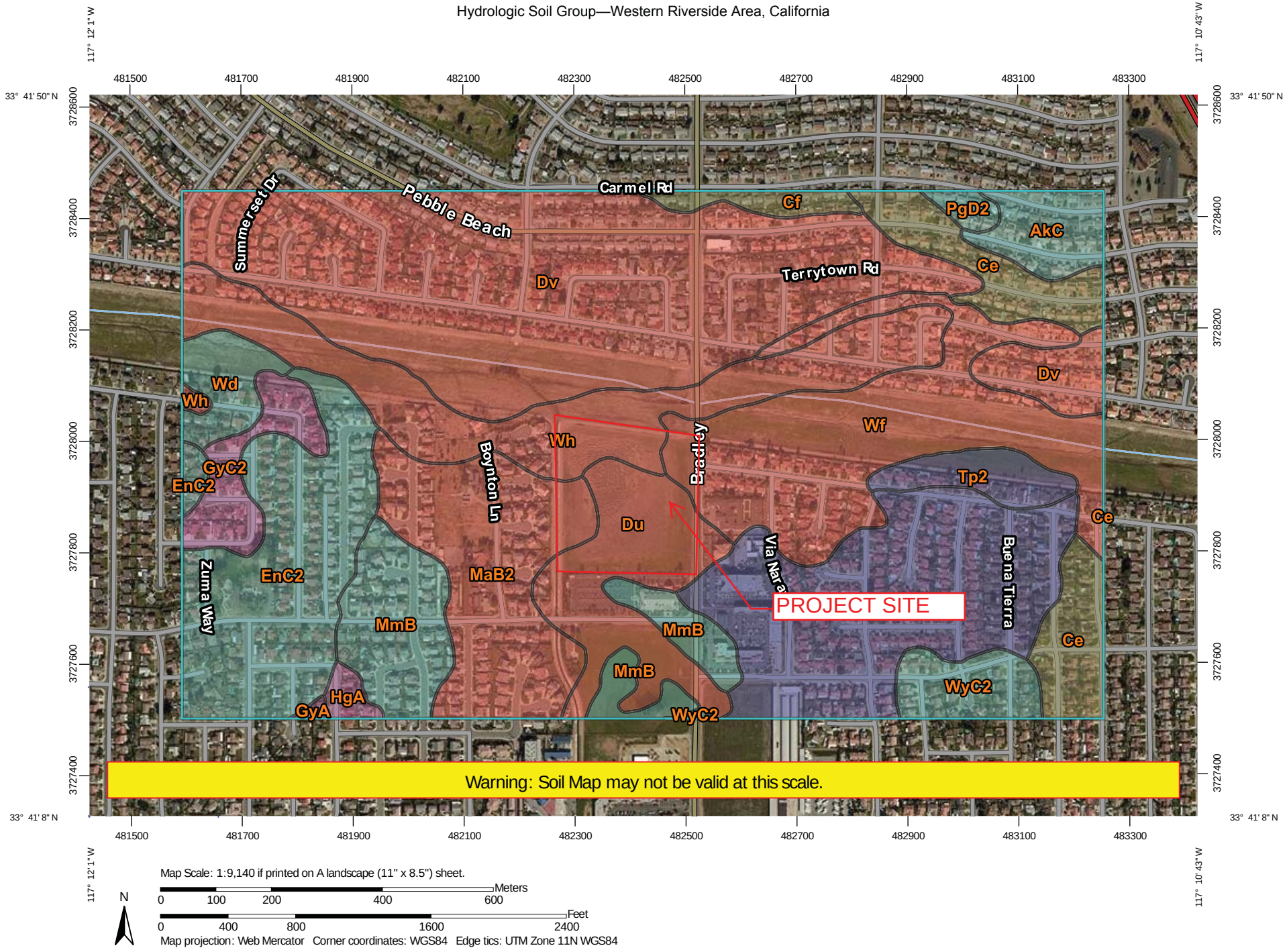
BRADLEY ROAD BRIDGE
OVER SALT CREEK

STRIPING AND SIGNING PLAN

SHEET NO. 16
16 OF 58

PROJECT NO: CIP 13-04

EXHIBIT C: HYDROLOGIC SOILS MAP


117° 12' 1" W
117° 10' 43" W
33° 41' 50" N
33° 41' 8" N
481500
481700
481900
482100
482300
482500
482700
482900
483100
483300
3728600
3728400
3728200
3728000
3727800
3727600
3727400
Summerset Dr
Pebble Beach
Carmel Rd
Terrytown Rd
Boynton Ln
Bradley
Via Nara
Buena Tierra
Zuma Way
Cf
PgD2
AkC
Ce
Dv
Wd
Wh
Wf
Tp2
GyC2
EnC2
Du
MaB2
MmB
WyC2
HgA
GyA
PROJECT SITE
Warning: Soil Map may not be valid at this scale.
Map Scale: 1:9,140 if printed on A landscape (11" x 8.5") sheet.
N
Meters
0 100 200 400 600
Feet
0 400 800 1600 2400
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

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

Soil Rating Lines

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

Soil Rating Points

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

Water Features

Streams and Canals

Transportation

Rails
Interstate Highways
US Routes
Major Roads
Local Roads

Background

Aerial Photography

MAP INFORMATION

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

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

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

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

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
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 9, Sep 12, 2016

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

Date(s) aerial images were photographed: Jan 5, 2015—Feb 26, 2015

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

Hydrologic Soil Group

Hydrologic Soil Group— Summary by Map Unit — Western Riverside Area, California (CA679)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
AkC	Arbuckle loam, 2 to 8 percent slopes	C	7.4	1.9%
Ce	Chino silt loam, drained	C/D	18.1	4.6%
Cf	Chino silt loam, drained, saline-alkali	C/D	3.4	0.9%
Du	Domino silt loam	D	21.2	5.4%
Dv	Domino silt loam, saline-alkali	D	97.7	25.0%
EnC2	Exeter sandy loam, 2 to 8 percent slopes, eroded	C	35.2	9.0%
GyA	Greenfield sandy loam, 0 to 2 percent slopes	A	0.3	0.1%
GyC2	Greenfield sandy loam, 2 to 8 percent slopes, eroded	A	8.2	2.1%
HgA	Hanford fine sandy loam, 0 to 2 percent slopes	A	1.7	0.4%
MaB2	Madera fine sandy loam, 2 to 5 percent slopes, eroded	D	30.1	7.7%
MmB	Monserate sandy loam, 0 to 5 percent slopes	C	21.0	5.4%
PgD2	Perkins gravelly loam, 8 to 15 percent slopes, eroded	C	1.7	0.4%
RaA	Ramona sandy loam, 0 to 2 percent slopes, MLRA 19	B	46.1	11.8%
Tp2	Traver loamy fine sand, eroded	B	6.1	1.6%
Wd	Waukena loam, saline-alkali	C	6.4	1.6%
Wf	Willows silty clay	D	43.4	11.1%
Wh	Willows silty clay, strongly saline-alkali	D	35.1	9.0%
WyC2	Wyman loam, 2 to 8 percent slopes, eroded	C	7.5	1.9%
Totals for Area of Interest			**390.6**	**100.0%**

Description

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

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

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

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

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

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

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

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: *None Specified*

Tie-break Rule: Higher

EXHIBIT D: RAINFALL MAPS

2 YEAR, 1 HOUR

MENIFEE RESIDENTIAL
RAINFALL VALUE = 0.50

Notes:
1. Isohyetals based on NOAA Atlas 2, Volume XI - California, 1973

RCFC & WCD
HYDROLOGY MANUAL

RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT

2-YEAR — 1-HOUR
PRECIPITATION

APPROVED CHIEF ENGINEER R.E. NO. 8833	DRAWN BY A.A.L.	SHEET NO
DATE	PLATE D-4.3	DR. NO

REVISED:

100 YEAR, 1 HOUR

MENIFEE RESIDENTIAL
RAINFALL VALUE = 1.30

NOTES:
1. Isohyetals based on NOAA Atlas 2, Volume XI - California, 1973.

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HYDROLOGY MANUAL

RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT

100-YEAR — 1-HOUR
PRECIPITATION

DRAWN BY:

SHEET No.

SLOPE INTENSITY CURVE

MENIFEE RESIDENTIAL
SLOPE VALUE = 0.53

.50 .55 .58 .60 .65 .45

Slope of Intensity-Duration Curve based on District analysis of automatic recording rain gage records

RCFC & WCD

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

SLOPE OF INTENSITY DURATION CURVE

APPROVED | DRAWN BY | SHEET NO