CITY OF ALBUQUERQUE

Hydrology Section Planning Department
David S. Campbell, Director

Timothy M. Keller, Mayor

October 12, 2018

Yolanda Padilla-Moyer, PE
Bohannan-Huston
7500 Jefferson St NE Courtyard I
Albuquerque, NM 87109

Re: Del Webb @ Mirehaven Units 3 & 4
Grading and Drainage Plan Engineer's Stamp dated: 7/9/2018, Drainage Report Engineer's Stamp dated 5/10/2018, and Amendment #1 to the Drainage Report Engineer's Stamp dated: 9/18/2018 (H09D017G)

Dear Ms. Padilla-Moyer,

Based on the application received 9/26/2018, the above referenced plan cannot be approved for Grading Permit, Work Order, or Final Plat until the following comments are addressed.

1. The Grading and Drainage plans were only approved for Preliminary Plat and amended Site Plan for Building Permit, so grading has been going on without approval for Grading Permit. The Grading and Drainage plans need to be updated where changes have occurred during Work Order review and the plans resubmitted for Grading Permit.
2. The discussion offered in Amendment #1 is vague. A specific description of the calculations is needed. The incomplete sentence "This amendment provides some additional calculation to show that the subdivision is below the allowable 100-yr 6yr storm event approved in the" needs to be revised to form a complete sentence. Include a statement in the discussion comparing the 2013 flow rate to the flow rate with this revised version of Del Webb Units 3 and 4. Restate in the amendment what the total flow is at AP2 on exhibit A, and include the upstream offsite basin map and the AHYMO summary printout as presented in the 2013 Drainage Master Plan.
3. Provide HGL calculations per DPM and profiles showing HGL. Normal depth calculations as shown on the plans are not sufficient for final design, and the InRoads calculations in appendix C do not use DPM equations. An overall plan view and profiles should be included with the hydrology submittal and must agree with the G&D Plan and the DRC plans. Profiles of all pipes, including the laterals, are required both in the Hydrology submittal and on the DRC plans. Programs proven to use Bernoulli's Equation, the momentum equation for junction losses, manhole losses, contraction losses, expansion losses, and bend losses per the DPM include, WSPGW - Water Surface Pressure Gradient by CivilDesign, HydroCad, and Stormwater Studio. The HEC-22 3rd Edition

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Albuquerque

NM 87103

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calculations agree with the DPM but the earlier editions do not use Bernoulli's correctly and that may be the problem here.

4. Label the inverts of the pipes, the top elevation of the baffle, the normal pool elevation and pond volume, the Q_{100}, and the 100 year water surface elevation on the grading plan and on the pond detail. The 100 year water surface elevation should be based on either weir depth over the baffle or inlet control on the outlet pipe whichever is higher plus losses between the pond and inlet. The calculations and an explanation of the calculations are required in the amendment. A section showing the length of the weir should be added. Hydraulic calculations must be contained in a bound report with an engineer's stamp and signature on it.
5. The invert of the pipe into the pond should be set at the invert of the pond, or provide a concrete rundown between the end of the pipe and the invert of the pond. Riprap is not sufficient to stabilize the slope when subject to concentrated flow and should be only used in the flat part of the pond bottom. Specify the
6. The fee in lieu of constructing the required first flush volume must be paid prior to plan approval. Fee amounts are subject to change as the depth of first flush precipitation changes. E-mail a separate request for waiver of the first flush requirements and permission to pay fee in lieu of construction to me and I will generate an invoice to be paid at the City Treasurer. Include the receipts of payment with the next hydrology submittal.
7. Hydrology review fees must be paid prior to the next review.

If you have any questions, please contact me at 924-3986 or e-mail jhughes@cabq.gov.

Sincerely,

James D. Hughes, P.E.
Principal Engineer, Planning Dept.
Development and Review Services

C: file

PO Box 1293
Albuquerque
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City of Albuquerque

Planning Department

Development & Building Services Division

DRAINAGE AND TRANSPORTATION INFORMATION SHEET (REV 09/2015)

Project Title: Del Webb @ MIREHAVEN PHASE 3 & 4 Building Permit #: _____ City Drainage #: H-9

DRB#: 10006864 EPC#: _____ Work Order#: _____

Legal Description: Tracts N-2-B-1, N-2-B-2, N-2-C-1

City Address: _____

Engineering Firm: BOHANNAN HUSTON INC Contact: Yolanda Moyer

Address: 7500 JEFFERSON ST NE COURTYARD 1 ALBUQUERQUE NM 87109

Phone#: 798-7945 Fax#: _____ E-mail: ypadilla@bhinc.com

Owner: PULTE Contact: KEVIN PATTON

Address: 7601 JEFFERSON STREET NE SUITE 310 ALBUQ. NM 87109

Phone#: 505-341-8591 Fax#: _____ E-mail: kevin.patton@pultegroup.com

Architect: _____ Contact: _____

Address: _____

Phone#: _____ Fax#: _____ E-mail: _____

Other Contact: _____ Contact: _____

Address: _____

Phone#: _____ Fax#: _____ E-mail: _____

Check all that Apply:

DEPARTMENT:

x HYDROLOGY/ DRAINAGE

_____ TRAFFIC/ TRANSPORTATION

_____ MS4/ EROSION & SEDIMENT CONTROL

TYPE OF SUBMITTAL:

_____ ENGINEER/ ARCHITECT CERTIFICATION

_____ CONCEPTUAL G & D PLAN

_____ GRADING PLAN

_____ DRAINAGE MASTER PLAN

x DRAINAGE REPORT

_____ CLOMR/LOMR

_____ TRAFFIC CIRCULATION LAYOUT (TCL)

_____ TRAFFIC IMPACT STUDY (TIS)

_____ EROSION & SEDIMENT CONTROL PLAN (ESC)

_____ OTHER (SPECIFY) _____

CHECK TYPE OF APPROVAL/ACCEPTANCE SOUGHT:

_____ BUILDING PERMIT APPROVAL

_____ CERTIFICATE OF OCCUPANCY

_____ PRELIMINARY PLAT APPROVAL

_____ SITE PLAN FOR SUB'D APPROVAL

_____ SITE PLAN FOR BLDG. PERMIT APPROVAL

_____ FINAL PLAT APPROVAL

_____ SIA/ RELEASE OF FINANCIAL GUARANTEE

_____ FOUNDATION PERMIT APPROVAL

_____ GRADING PERMIT APPROVAL

_____ SO-19 APPROVAL

_____ PAVING PERMIT APPROVAL

_____ GRADING/ PAD CERTIFICATION

x WORK ORDER APPROVAL

_____ CLOMR/LOMR

_____ PRE-DESIGN MEETING

_____ OTHER (SPECIFY) _____

IS THIS A RESUBMITTAL?: x Yes _____ No

DATE SUBMITTED: 09-25-18 By: YOLANDA PADILLA MOYER, P.E.

COA STAFF: ELECTRONIC SUBMITTAL RECEIVED: ___

Bohannan Huston

Courtyard I
7500 Jefferson St. NE
Albuquerque, NM
87109-4335

www.bhinc.com

voice: 505.823.1000
facsimile: 505.798.7988
toll free: 800.877.5332

September 24, 2018

Mr. James D. Hughes, P.E.
Principal Engineer
City of Albuquerque
Planning Department
600 2nd Street NW
Albuquerque, NM 87103

Re: Del Webb at Mirehaven Phase 3&4 Grading and Drainage Plan and Drainage Report
Engineers Stamp Dated: 05/10/2018 (H09D017G)

Dear Mr. Hughes:

Enclosed are responses to the comments provided on June 19, 2018. Responses are listed in red below.

Prior to approval of Work Order the drainage report must be revised to include:

4. The Drainage Report for Units 3 & 4 does not address the effects of this development on downstream capacity. Representatives of the Unit 3 &4 development stated in meetings that the downstream capacity was demonstrated in other reports, specifically the West 1-40 DMP and the 2013 Drainage Master Plan for the Watershed Subdivision. However, the hydrology from the West 1-40 Drainage Management Plan, as referenced in the 2013 Drainage Master Plan for the Watershed Subdivision, does not account for either the increased density of this development nor the increased area draining to the Mirehaven Arroyo. The West I-40 DMP developed the basin which were allowed to discharge to Ladera Dam 12. The Mirehaven Masterplan analyzed the entire Q for this area as well as the Mirehaven Arroyo which was review and approved by the City of Albuquerque and set forth the requirements for each subdivisions within the Masterplan. We are adhering to that Masterplan in this report. We cite flows allowances and provided exhibits within the report from this Master Plan and Del Webb Phase 1 approved reports which indicated that we are below the allowable Q100 for Del Webb Phases 3 and 4. Additional, specific information is provided below. Therefore, pursuant to article 14-5-2-12(0) of the Albuquerque Code of Ordinances which states "The City Engineer shall not approve any plan or report pertaining to proposed construction, platting or other development where the proposed activity or change in the land affected would result in downstream capacity being exceeded", neither the Final Plat nor the Work Order can be approved until downstream capacity has been demonstrated in accordance with the standards established in the DPM.

The Drainage Report for Units 3 & 4 must be modified to include corrected basins for the Mirehaven watershed in accordance with the standards established in the DPM instead of using in the referenced West 1-40 DMP, as was done in the 2013 DMP. The basins must be corrected to show the higher density of this development and the increased area draining to the Mirehaven Arroyo. Downstream capacity must be determined based both on existing and fully developed watersheds for the channel and crossing structures of the Mirehaven. AMAFCA indicated in an e-mail on June 2, 2018 that the capacity ofthe downstream reservoir is not of concern. If additional infrastructure is required it must be added to the infrastructure list.

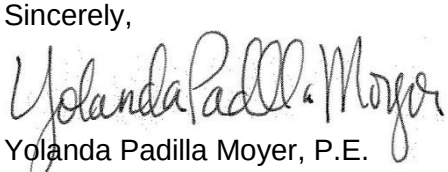
The submitted Drainage Report Dated 7-14-18 references the approved Drainage Master Plan for the Mirehaven Master Planned Community (see page 2), which set forth the allowable flows for the future subdivisions within the Mirehaven Subdivision. On Page 4, VI. Developed Conditions, A. Allowable the Final Amendment No. 2 For the above mentioned drainage report indicates an allowable Q100 of 135.9 cfs to the existing 42" SD on Willows Canyon Trail and 33.2 into Mirehaven Parkway which ultimately get picked up at the lowpoint upstream of Del Webb Blvd and into the same storm drain network for total combined Q100 of 168.1cfs. The total Q100 from Del Webb 3 and 4 will be 144.9cfs into the 42" SD in Willow Canyon which is less the combined 168.1cfs combine allowable into the SD network. As noted on page 6 the additional Q100 between the 144.9cfs vs 135.9cfs was analyzed and the additional 9.0 cfs had no impact to the downstream infrastructure information provided in the above mentioned report in Appendix C. Furthermore, as stated above the total flow is 32.2cfs less than what the downstream infrastructure was anticipated and designed for since there is no discharge into Mirehaven Parkway.

As indicated on the Overall Basin Map from the Approved Mirehaven Master Plan Report (which is included in the original report as Exhibit A) Outfall B has an allowable discharge of 277.6cfs. 73.5 cfs was allotted to DW1 and 160.7 was allocated for the future DW3&4, 22.1 cfs for Offsite Basins 2 &3 and 21.4 for Mirehaven Parkway. See enclosed Exhibit A (Drainage Masterplan Overall Basin Map), B (Del Webb 3 and 4 Basin Maps) and C (Del Webb Unit 1 Basin Map), the actual flow from Del Webb 3 & is 147.6 cfs which is below the allowable 160.7cfs per the approved Masterplan. Exhibit A and B are in the above reference report. Exhibit C was added for additional information to supplement the total basin calculations. These exhibits with flow breakdowns are provide in the enclosed Addendum #1.

5. HGL calculations per DPM and profiles showing HGL,. HGLs are shown on the construction plans and the computer output for the HGL calculations are provided in Appendix C in the enclosed Addendum #1.
6. A Detail of the pond outlet structure. Hydraulic calculations must be contained in a bound report with an engineer's stamp and signature on it. Detail of the pond and storm drain are provided in the construction plans and the detail sheet is provided in the enclosed Addendum #1 as Exhibit D. The Pond Volume calculations are provided as Appendix B.

Addendum #1 to the approved Report is enclosed mentioned above is enclosed. Please feel free to contact me at 823-1000 with questions or comments.

Sincerely,



Yolanda Padilla Moyer, P.E.
Senior Project Manager
Community Development and Planning

YPM/cc
Enclosures

cc: Kevin Patton, Pulte Group w/enclosures

AMENDMENT NO. 1

DRAINAGE MANAGEMENT PLAN FOR DEL WEBB @ MIREHAVEN PHASES 3 AND 4

SEPTEMBER 18, 2018

Prepared for:

Pulte Homes of New Mexico
7601 Jefferson St NE – Suite 320
Albuquerque, NM 87109

Bohannan Huston
Engineering
Spatial Data
Advanced Technologies

AMENDMENT NO. 1
DRAINAGE MANAGEMENT PLAN
FOR
DEL WEBB @ MIREHAVEN PHASES 3 AND 4

SEPTEMBER 18, 2018

Prepared for:

PULTE HOMES OF NEW MEXICO
7601 JEFFERSON BLVD. NE, SUITE 320
ALBUQUERQUE, NM 87109

Prepared by:

BOHANNAN HUSTON, INC.
COURTYARD I
7500 JEFFERSON STREET NE
ALBUQUERQUE, NM 87109

Prepared by:

Yolanda Padilla Moyer 9/24/18

Yolanda Padilla Moyer, P.E. Date
Senior Project Manager

TABLE OF CONTENTS

APPENDICES

EXHIBITS

I. PURPOSE

This report will serve as Amendment No. 1 to the Drainage Management Plan for Del Webb @ Mirehaven Phases 3 and 4, June 2018, which was prepared for Pulte Homes of New Mexico. The DMP provides drainage analysis to support proposed site-specific drainage infrastructure for Del Webb @ Mirehaven Phase 3 and 4. This amendment provides some additional calculation to show that the subdivision is below the allowable 100-yr 6yr storm event approved in the. The original approved report speaks to this, however more detailed calculations are included in Exhibit A. Also included are Exhibits B and C which are references to the Basins discharging to Outfall B, the outfall location for a majority Del Webb 3 & 4 in the Mirehaven Arroyo.

The pond detail requested is enclosed as Exhibit D and the volume is provided in Appendix B.

Also enclosed is Appendix A which are the inlet spacing calculations for the inlets in series the minimum 25' connector pipe is adequate. In addition, Appendix C shows the Inroad hydraulic output calculating the HGL. HGL is shown on the work order set of plans.

APPENDICES

APPENDIX A: INLET SPACING CALCULATIONS

APPENDIX B: POND VOLUME CALCULATIONS

APPENDIX C: INROADS STORM DRAIN OUTPUT FILES

APPENDIX D: MANUFACTURES JOINT GAP RECOMMENDATION AND SHOP DRAWING

APPENDIX A

INLET SPACING CALCULATIONS

Bohannan Huston

PLATE 22.3 D-11

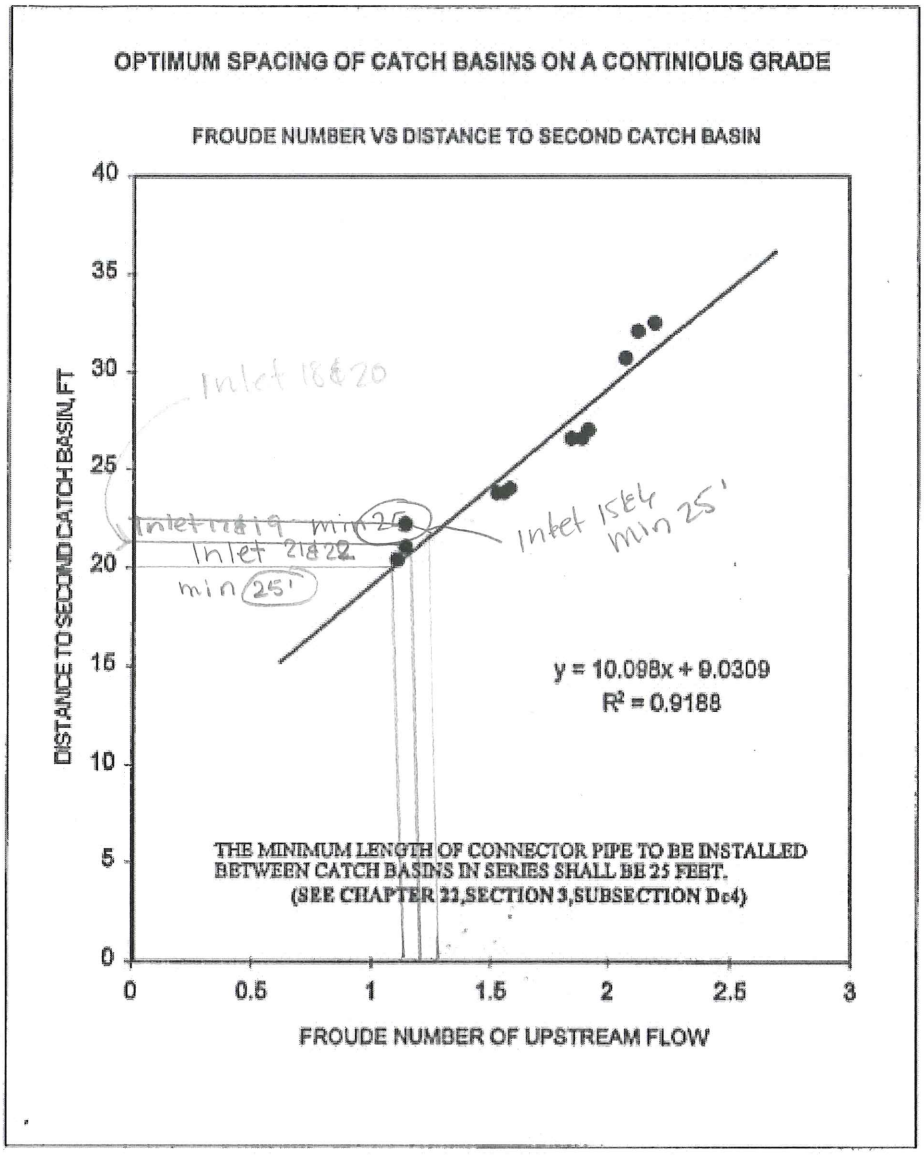
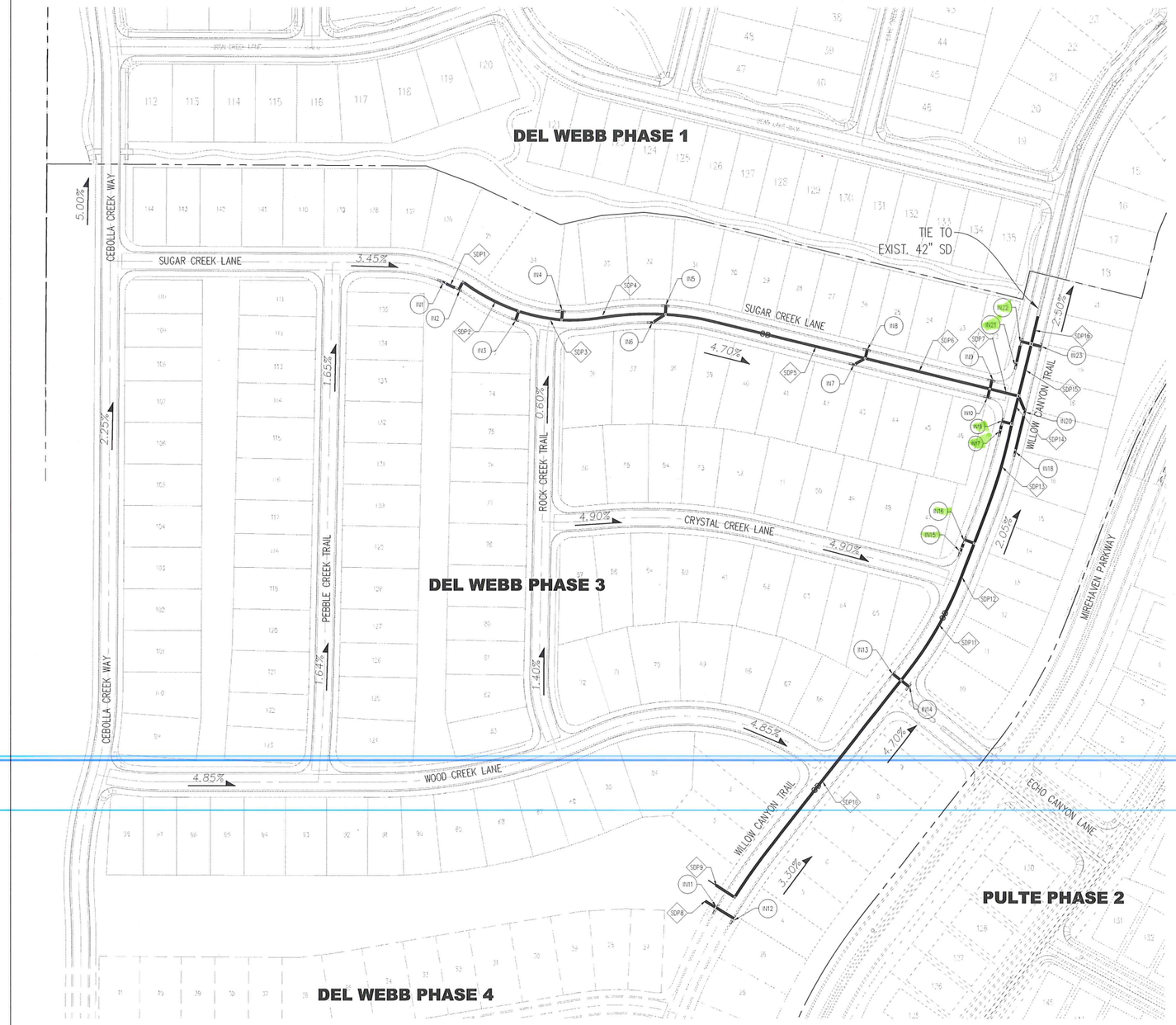


PLATE 22.3 D-12

d. Catch Basins in Series



DEL WEBB @ MIREHAVEN PHASE 3
STORM DRAIN NETWORK
JUNE 2018

INLET TABLE

Inlet #	Inlet Type	Actual Flow	Avail Head ft
IN1	1-SGL COA TYPE A	5.90	0.38
IN2	1-SGL COA TYPE C	5.90	0.38
IN3	1-SGL COA TYPE C	4.70	0.37
IN4	1-SGL COA TYPE A	4.70	0.32
IN5	1-SGL COA TYPE C	4.40	0.31
IN6	1-SGL COA TYPE A	4.40	0.31
IN7	1-SGL COA TYPE C	4.40	0.32
IN8	1-SGL COA TYPE C	4.40	0.32
IN9	1-SGL COA TYPE C	4.30	0.33
IN10	1-SGL COA TYPE C	4.30	0.33
IN11	1-SGL COA TYPE A	4.40	0.36
IN12	1-SGL COA TYPE A	4.40	0.36
IN13	1-SGL COA TYPE A	6.00	0.37
IN14	1-SGL COA TYPE A	6.00	0.37
IN15	1-SGL COA TYPE A	5.50	0.44
IN16	1-SGL COA TYPE C	4.80	0.38
IN17	1-SGL COA TYPE C	5.20	0.41
IN18	1-SGL COA TYPE C	5.20	0.41
IN19	1-SGL COA TYPE C	3.80	0.36
IN20	1-SGL COA TYPE C	3.80	0.36
IN21	1-SGL COA TYPE C	4.60	0.38
IN22	1-SGL COA TYPE C	4.20	0.36
IN23	1-SGL COA TYPE C	4.20	0.36

STORM DRAIN PIPE TABLE

PIPE #	Size in.	Slope	Capacity[1] cfs	ACTUAL FLOW cfs	PIPE LENGTH ft
ONSITE					
SDP1	18	1.00%	10.50	5.90	
SDP2	18	2.00%	14.86	11.80	
SDP3	24	2.00%	31.99	16.50	
SDP4	24	2.00%	31.99	21.20	
SDP5	24	2.00%	31.99	30.00	
SDP6	30	1.00%	41.02	38.80	
SDP7	30	2.00%	58.01	47.40	
SDP8	18	1.00%	10.50	8.80	
SDP9	30	2.00%	58.01	44.20	
SDP10	30	2.00%	58.01	44.20	
SDP11	30	2.00%	58.01	56.20	
SDP12	30	2.00%	58.01	56.20	
SDP13	36	1.00%	66.70	66.50	
SDP14	36	2.00%	94.33	75.50	
SDP15	42	2.00%	142.28	131.90	
SDP16	42	2.50%	159.08	144.90	

1- Capacity Based on Manning's Eq w/ N= 0.013

NOTE: ALL BLOCKS DRAIN TOWARD THE FRONT/STREET UNLESS OTHERWISE NOTED BY FLOW ARROW/DIRECTION ABOVE.

LEGEND

- BASIN BOUNDARY
- FLOW ARROW
- PROPOSED STORM DRAIN
- EXISTING STORM DRAIN
- PROPOSED STREET SLOPE OR FLOW PATH 2.19%
- PROPOSED STORM DRAIN MANHOLE
- PROPOSED STORM DRAIN INLET

N

80 40 0 80

SCALE: 1"=80'

Bohannan Huston
www.bhinc.com 800.877.5332

Wed, 13-Jun-2018 - 8:22:am, Plotted by: AORTIZ
P:\20180338\CDP\Plans\General\DMP\20180338_SD_ph3.dwg

Inlet 21 & 22 (36.7')
@21 d=.38 ft V=3.98 ft/s
g=32.2
Fr = 3.98 / (32.2x.38)^½ = 1.14

Inlet 17 & 19 (17')
@17 d=.41 V=4.27
Fr = 4.27 / (32.2x.41)^½ = 1.18

Inlet 15 & 16 (16.85)
@15 d=.44 V=4.67
Fr = 4.67 / (32.2x.44)^½ = 1.24

@inlet 18 & 20
@18 d=.41 V=4.27
Fr = 4.27 / (32.2x.41)^½ = 1.18

APPENDIX B

POND VOLUME CALCULATIONS

Bohannan Huston

Elevation	Incremental Volume	Cumulative Volume	Acre-Feet	Surface Area	
	cu ft	cu ft		sq ft	
5383.0000	10.1155	10.1155	0.0002	1014.6655	
5383.5000	589.2446	599.3601	0.0138	1350.3579	
5384.0000	769.1545	1368.5146	0.0314	1734.3040	
5384.5000	973.1925	2341.7070	0.0538	2166.5100	
5385.0000	1201.3585	3543.0655	0.0813	2646.9685	
5385.5000	1463.3986	5006.4641	0.1149	3216.3860	
5386.0000	1762.7789	6769.2430	0.1554	3844.5186	req'd Vol = 6863 CF
5386.0500	193.8746	6963.1176	0.1599	3910.5588	

APPENDIX C

INROADS STORM DRAIN OUTPUT FILES

Bohannan Huston

Design Log

```
========================================================================
InRoads Storm & Sanitary Design Log

Drainage File:  P:\20180338\CDP\Control\Data\20180338SD.sdb

Design File:  P:\20180338\CDP\DESIGN\20180338_UTIL.DWG

Display Log:  P:\20180338\CDP\DESIGN\design.log

Date:  Wednesday, September 12, 2018 7:53:00 AM
========================================================================

Designing inlet IN12
   WARNING:  Spread is greater than maximum spread (2.5000 ft )
   WARNING:  Inlet forced to capture all flow, ignoring capacity calculations.
   WARNING:  Pipe Too large for valid connection to inlet.

  Results:
        Gutter Flow:     4.4000 cfs               Flow From: Injected Storm

             Status:      Fixed
        Inlet Length:     2.9500 ft              Inlet Width:     2.0000 ft
     Flow Downstream:     4.4000 cfs                Bypass To:     0.0000 cfs
         Percent Cap:   100.0000 %                   Capacity:     0.0000 cfs
              Spread:   761.7212 ft
     Depth in Gutter:     0.0180 ft          Assigned Bypass:        N/A


Designing pipe SDP5
   WARNING:  Full flow velocity is greater than maximum (0.0000)

  Results:
         Total Flow:     4.4000 cfs               Flow From:   Upstream

             Status:      Fixed                        Slope:     0.0100 ft/ft
         Pipe Width:    24.0000 in              Pipe Height:    24.0000 in
      Depth of Flow:     0.5970 ft              Flow Status:    Partial
     Critical Depth:     0.7300 ft                 Capacity:    22.6224 cfs
           Velocity:     5.5766 ft/s
      Froude Number:     1.4992                 Flow Regime: SuperCritical


   WARNING:  Pipe Too large for valid connection to inlet.
Designing pipe SDP6
   WARNING:  Full flow velocity is greater than maximum (0.0000)

  Results:
         Total Flow:    33.4000 cfs               Flow From: Injected Storm

             Status:      Fixed                        Slope:    -0.0098 ft/ft
         Pipe Width:    24.0000 in              Pipe Height:    24.0000 in
      Depth of Flow:     2.0000 ft              Flow Status:       Full
     Critical Depth:     2.0000 ft                 Capacity:    22.4449 cfs
           Velocity:    10.6316 ft/s
      Froude Number:     0.0000                 Flow Regime: Subcritical
```

```
Designing inlet IN11
   WARNING:  Spread is greater than maximum spread (2.5000 ft )
   WARNING:  Inlet forced to capture all flow, ignoring capacity calculations.
   WARNING:  Pipe Too large for valid connection to inlet.

  Results:
        Gutter Flow:     4.4000 cfs               Flow From: Injected Storm

             Status:      Fixed
       Inlet Length:     6.5000 ft              Inlet Width:     2.0000 ft
    Flow Downstream:    42.2000 cfs                Bypass To:     0.0000 cfs
        Percent Cap:   100.0000 %                   Capacity:     0.0000 cfs
             Spread:   145.5797 ft
    Depth in Gutter:     0.0486 ft          Assigned Bypass:        N/A


Designing pipe SDP47
   WARNING:  Full flow velocity is greater than maximum (0.0000)

  Results:
        Total Flow:    42.2000 cfs               Flow From:   Upstream

             Status:      Fixed                       Slope:     0.1738 ft/ft
         Pipe Width:    24.0000 in              Pipe Height:    24.0000 in
      Depth of Flow:     0.9370 ft              Flow Status:    Partial
     Critical Depth:     1.9600 ft                 Capacity:    94.2995 cfs
           Velocity:    29.1663 ft/s
      Froude Number:     6.0436                 Flow Regime: SuperCritical


   WARNING:  Pipe Too large for valid connection to inlet.
Designing pipe SDP23
   No flow in structure
Designing manhole SDMH1

  Results:
        Total Flow:    42.2000 cfs               Flow From:   Upstream

             Status:      Fixed
      Chamber Width:     6.0000 ft           Chamber Length:     6.0000 ft


Designing pipe SDP25
   WARNING:  Full flow velocity is greater than maximum (0.0000)

  Results:
        Total Flow:    42.2000 cfs               Flow From:   Upstream

             Status:      Fixed                       Slope:     0.0407 ft/ft
         Pipe Width:    30.0000 in              Pipe Height:    30.0000 in
      Depth of Flow:     1.2650 ft              Flow Status:    Partial
     Critical Depth:     2.1700 ft                 Capacity:    82.7083 cfs
           Velocity:    16.9181 ft/s
      Froude Number:     2.9874                 Flow Regime: SuperCritical


Designing pipe SDP24
   WARNING:  Full flow velocity is greater than maximum (0.0000)
```

```
  Results:
        Total Flow:    42.2000 cfs              Flow From:   Upstream

            Status:      Fixed                      Slope:     0.0407 ft/ft
        Pipe Width:    30.0000 in             Pipe Height:    30.0000 in
     Depth of Flow:     1.2650 ft             Flow Status:    Partial
    Critical Depth:     2.1700 ft                Capacity:    82.7083 cfs
          Velocity:    16.9181 ft/s
     Froude Number:     2.9874                 Flow Regime: SuperCritical


Designing inlet IN13
   WARNING:  Spread is greater than maximum spread (2.5000 ft )
   WARNING:  Inlet forced to capture all flow, ignoring capacity calculations.

  Results:
       Gutter Flow:     6.0000 cfs              Flow From: Injected Storm

            Status:      Fixed
      Inlet Length:     2.9500 ft             Inlet Width:     2.0000 ft
   Flow Downstream:     6.0000 cfs               Bypass To:     0.0000 cfs
       Percent Cap:   100.0000 %                 Capacity:     0.0000 cfs
            Spread:   381.9358 ft
   Depth in Gutter:     0.0328 ft          Assigned Bypass:        N/A


Designing pipe SDP7
   WARNING:  Full flow velocity is greater than maximum (0.0000)

  Results:
        Total Flow:     6.0000 cfs              Flow From:   Upstream

            Status:      Fixed                      Slope:     0.1217 ft/ft
        Pipe Width:    18.0000 in             Pipe Height:    18.0000 in
     Depth of Flow:     0.4100 ft             Flow Status:    Partial
    Critical Depth:     0.9400 ft                Capacity:    36.6399 cfs
          Velocity:    15.2687 ft/s
     Froude Number:     4.9737                 Flow Regime: SuperCritical


Designing inlet IN14
   WARNING:  Spread is greater than maximum spread (2.5000 ft )
   WARNING:  Inlet forced to capture all flow, ignoring capacity calculations.

  Results:
       Gutter Flow:     6.0000 cfs              Flow From: Injected Storm

            Status:      Fixed
      Inlet Length:     2.9500 ft             Inlet Width:     2.0000 ft
   Flow Downstream:     6.0000 cfs               Bypass To:     0.0000 cfs
       Percent Cap:   100.0000 %                 Capacity:     0.0000 cfs
            Spread:  5122.4695 ft
   Depth in Gutter:     0.0069 ft          Assigned Bypass:        N/A


Designing pipe SDP8
   WARNING:  Full flow velocity is greater than maximum (0.0000)
```

```
  Results:
        Total Flow:     6.0000 cfs              Flow From:   Upstream

            Status:      Fixed                      Slope:     0.1358 ft/ft
        Pipe Width:    18.0000 in             Pipe Height:    18.0000 in
     Depth of Flow:     0.3990 ft             Flow Status:    Partial
    Critical Depth:     0.9400 ft                Capacity:    38.7143 cfs
          Velocity:    15.8602 ft/s
     Froude Number:     5.2433                Flow Regime: SuperCritical


Designing manhole SDMH2

  Results:
        Total Flow:    54.2000 cfs              Flow From:   Upstream

            Status:      Fixed
     Chamber Width:     4.0000 ft          Chamber Length:     4.0000 ft


Designing pipe SDP26
   WARNING:  Full flow velocity is greater than maximum (0.0000)

  Results:
        Total Flow:    54.2000 cfs              Flow From:   Upstream

            Status:      Fixed                      Slope:     0.0463 ft/ft
        Pipe Width:    30.0000 in             Pipe Height:    30.0000 in
     Depth of Flow:     1.4160 ft             Flow Status:    Partial
    Critical Depth:     2.3400 ft                Capacity:    88.2157 cfs
          Velocity:    18.8809 ft/s
     Froude Number:     3.0939                Flow Regime: SuperCritical


Designing pipe SDP28
   WARNING:  Full flow velocity is greater than maximum (0.0000)

  Results:
        Total Flow:    54.2000 cfs              Flow From:   Upstream

            Status:      Fixed                      Slope:     0.0463 ft/ft
        Pipe Width:    30.0000 in             Pipe Height:    30.0000 in
     Depth of Flow:     1.4160 ft             Flow Status:    Partial
    Critical Depth:     2.3400 ft                Capacity:    88.2155 cfs
          Velocity:    18.8809 ft/s
     Froude Number:     3.0939                Flow Regime: SuperCritical


Designing manhole SDMH2A

  Results:
        Total Flow:    54.2000 cfs              Flow From:   Upstream

            Status:      Fixed
     Chamber Width:     4.0000 ft          Chamber Length:     4.0000 ft


Designing pipe SDP13
   WARNING:  Full flow velocity is greater than maximum (0.0000)
```

```
  Results:
        Total Flow:    54.2000 cfs              Flow From:   Upstream

            Status:      Fixed                      Slope:     0.0182 ft/ft
        Pipe Width:    30.0000 in             Pipe Height:    30.0000 in
     Depth of Flow:     2.0050 ft             Flow Status:    Partial
    Critical Depth:     2.3400 ft                Capacity:    55.3007 cfs
          Velocity:    12.8381 ft/s
     Froude Number:     1.5552                Flow Regime: SuperCritical


Designing pipe SDP27
   WARNING:  Full flow velocity is greater than maximum (0.0000)

  Results:
        Total Flow:    54.2000 cfs              Flow From:   Upstream

            Status:      Fixed                      Slope:     0.0182 ft/ft
        Pipe Width:    30.0000 in             Pipe Height:    30.0000 in
     Depth of Flow:     2.0050 ft             Flow Status:    Partial
    Critical Depth:     2.3400 ft                Capacity:    55.3002 cfs
          Velocity:    12.8381 ft/s
     Froude Number:     1.5552                Flow Regime: SuperCritical


Designing inlet IN15
   WARNING:  Spread is greater than maximum spread (2.5000 ft )
   WARNING:  Inlet forced to capture all flow, ignoring capacity calculations.

  Results:
       Gutter Flow:     5.5000 cfs              Flow From: Injected Storm

            Status:      Fixed
       Inlet Length:     2.9500 ft             Inlet Width:     2.0000 ft
   Flow Downstream:     5.5000 cfs               Bypass To:     0.0000 cfs
       Percent Cap:   100.0000 %                 Capacity:     0.0000 cfs
            Spread:  2309.4141 ft
   Depth in Gutter:     0.0106 ft          Assigned Bypass:        N/A


Designing pipe SDP39
   WARNING:  Full flow velocity is greater than maximum (0.0000)

  Results:
        Total Flow:     5.5000 cfs              Flow From:   Upstream

            Status:      Fixed                      Slope:     0.0684 ft/ft
        Pipe Width:    18.0000 in             Pipe Height:    18.0000 in
     Depth of Flow:     0.4550 ft             Flow Status:    Partial
    Critical Depth:     0.9000 ft                Capacity:    27.4693 cfs
          Velocity:    12.1107 ft/s
     Froude Number:     3.7263                Flow Regime: SuperCritical


Designing inlet IN16
   WARNING:  Spread is greater than maximum spread (2.5000 ft )
   WARNING:  Inlet forced to capture all flow, ignoring capacity calculations.
   WARNING:  Pipe Too large for valid connection to inlet.
```

```
  Results:
        Gutter Flow:     4.8000 cfs               Flow From: Injected Storm

             Status:      Fixed
       Inlet Length:     2.9500 ft              Inlet Width:     2.0000 ft
    Flow Downstream:    10.3000 cfs                Bypass To:     0.0000 cfs
       Percent Cap:   100.0000 %                   Capacity:     0.0000 cfs
             Spread:  2078.4121 ft
    Depth in Gutter:     0.0104 ft          Assigned Bypass:        N/A


Designing pipe SDP40
   WARNING:  Full flow velocity is greater than maximum (0.0000)

  Results:
        Total Flow:    10.3000 cfs               Flow From:   Upstream

             Status:      Fixed                       Slope:     0.0389 ft/ft
         Pipe Width:    24.0000 in              Pipe Height:    24.0000 in
      Depth of Flow:     0.6530 ft              Flow Status:    Partial
     Critical Depth:     1.1400 ft                 Capacity:    44.6432 cfs
           Velocity:    11.5359 ft/s
      Froude Number:     2.9509                 Flow Regime: SuperCritical


   WARNING:  Pipe Too large for valid connection to inlet.
Designing manhole SDMH3

  Results:
        Total Flow:    64.5000 cfs               Flow From:   Upstream

             Status:      Fixed
      Chamber Width:     6.0000 ft           Chamber Length:     6.0000 ft


Designing pipe SDP29
   WARNING:  Full flow velocity is greater than maximum (0.0000)

  Results:
        Total Flow:    64.5000 cfs               Flow From:   Upstream

             Status:      Fixed                       Slope:     0.0243 ft/ft
         Pipe Width:    36.0000 in              Pipe Height:    36.0000 in
      Depth of Flow:     1.7100 ft              Flow Status:    Partial
     Critical Depth:     2.5700 ft                 Capacity:   103.9404 cfs
           Velocity:    15.4855 ft/s
      Froude Number:     2.3063                 Flow Regime: SuperCritical


Designing pipe SDP30
   WARNING:  Full flow velocity is greater than maximum (0.0000)

  Results:
        Total Flow:    64.5000 cfs               Flow From:   Upstream

             Status:      Fixed                       Slope:     0.0243 ft/ft
         Pipe Width:    36.0000 in              Pipe Height:    36.0000 in
      Depth of Flow:     1.7100 ft              Flow Status:    Partial
```

```
     Critical Depth:     2.5700 ft                Capacity:   103.9412 cfs
           Velocity:    15.4855 ft/s
      Froude Number:     2.3063                 Flow Regime: SuperCritical


Designing pipe SDP31
   WARNING:  Full flow velocity is greater than maximum (0.0000)

  Results:
         Total Flow:    64.5000 cfs              Flow From:   Upstream

             Status:      Fixed                      Slope:     0.0243 ft/ft
         Pipe Width:    36.0000 in             Pipe Height:    36.0000 in
      Depth of Flow:     1.7100 ft             Flow Status:    Partial
     Critical Depth:     2.5700 ft                Capacity:   103.9412 cfs
           Velocity:    15.4855 ft/s
      Froude Number:     2.3063                 Flow Regime: SuperCritical


Designing inlet IN17
   WARNING:  Spread is greater than maximum spread (2.5000 ft )
   WARNING:  Inlet forced to capture all flow, ignoring capacity calculations.

  Results:
        Gutter Flow:     5.2000 cfs              Flow From: Injected Storm

             Status:      Fixed
        Inlet Length:     2.9500 ft             Inlet Width:     2.0000 ft
    Flow Downstream:     5.2000 cfs               Bypass To:     0.0000 cfs
        Percent Cap:   100.0000 %                  Capacity:     0.0000 cfs
             Spread:  5126.4356 ft
    Depth in Gutter:     0.0063 ft          Assigned Bypass:        N/A


Designing pipe SDP37
   WARNING:  Full flow velocity is greater than maximum (0.0000)

  Results:
         Total Flow:     5.2000 cfs              Flow From:   Upstream

             Status:      Fixed                      Slope:     0.1139 ft/ft
         Pipe Width:    18.0000 in             Pipe Height:    18.0000 in
      Depth of Flow:     0.3880 ft             Flow Status:    Partial
     Critical Depth:     0.8700 ft                Capacity:    35.4466 cfs
           Velocity:    14.2945 ft/s
      Froude Number:     4.7977                 Flow Regime: SuperCritical


Designing inlet IN19
   WARNING:  Spread is greater than maximum spread (2.5000 ft )
   WARNING:  Inlet forced to capture all flow, ignoring capacity calculations.
   WARNING:  Pipe Too large for valid connection to inlet.

  Results:
        Gutter Flow:     3.8000 cfs              Flow From: Injected Storm

             Status:      Fixed
        Inlet Length:     2.9500 ft             Inlet Width:     2.0000 ft
    Flow Downstream:     9.0000 cfs               Bypass To:     0.0000 cfs
```

```
        Percent Cap:   100.0000 %                 Capacity:     0.0000 cfs
             Spread:   417.1044 ft
    Depth in Gutter:     0.0237 ft          Assigned Bypass:        N/A


Designing pipe SDP38
   WARNING:  Full flow velocity is greater than maximum (0.0000)

  Results:
         Total Flow:     9.0000 cfs               Flow From:   Upstream

             Status:      Fixed                       Slope:     0.0882 ft/ft
         Pipe Width:    24.0000 in              Pipe Height:    24.0000 in
      Depth of Flow:     0.4940 ft              Flow Status:    Partial
     Critical Depth:     1.0700 ft                 Capacity:    67.1780 cfs
           Velocity:    14.8628 ft/s
      Froude Number:     4.4289                 Flow Regime: SuperCritical


   WARNING:  Pipe Too large for valid connection to inlet.
Designing inlet IN18
   WARNING:  Spread is greater than maximum spread (2.5000 ft )
   WARNING:  Inlet forced to capture all flow, ignoring capacity calculations.

  Results:
        Gutter Flow:     5.2000 cfs               Flow From: Injected Storm

             Status:      Fixed
       Inlet Length:     2.9500 ft              Inlet Width:     2.0000 ft
    Flow Downstream:     5.2000 cfs               Bypass To:     0.0000 cfs
        Percent Cap:   100.0000 %                 Capacity:     0.0000 cfs
             Spread:   125.6511 ft
    Depth in Gutter:     0.0587 ft          Assigned Bypass:        N/A


Designing pipe SDP41
   WARNING:  Full flow velocity is greater than maximum (0.0000)

  Results:
         Total Flow:     5.2000 cfs               Flow From:   Upstream

             Status:      Fixed                       Slope:     0.0219 ft/ft
         Pipe Width:    18.0000 in              Pipe Height:    18.0000 in
      Depth of Flow:     0.5970 ft              Flow Status:    Partial
     Critical Depth:     0.8700 ft                 Capacity:    15.5502 cfs
           Velocity:     7.9130 ft/s
      Froude Number:     2.0877                 Flow Regime: SuperCritical


Designing inlet IN20
   WARNING:  Spread is greater than maximum spread (2.5000 ft )
   WARNING:  Inlet forced to capture all flow, ignoring capacity calculations.
   WARNING:  Pipe Too large for valid connection to inlet.

  Results:
        Gutter Flow:     3.8000 cfs               Flow From: Injected Storm

             Status:      Fixed
       Inlet Length:     2.9500 ft              Inlet Width:     2.0000 ft
```

```
    Flow Downstream:     9.0000 cfs              Bypass To:     0.0000 cfs
        Percent Cap:   100.0000 %                 Capacity:     0.0000 cfs
             Spread:  1590.0314 ft
    Depth in Gutter:     0.0106 ft          Assigned Bypass:        N/A


Designing pipe SDP43
   WARNING:  Full flow velocity is greater than maximum (0.0000)

  Results:
         Total Flow:     9.0000 cfs              Flow From:   Upstream

             Status:      Fixed                      Slope:     0.3155 ft/ft
         Pipe Width:    24.0000 in             Pipe Height:    24.0000 in
      Depth of Flow:     0.3600 ft             Flow Status:    Partial
     Critical Depth:     1.0700 ft                Capacity:   127.0595 cfs
           Velocity:    23.3115 ft/s
      Froude Number:     8.2158                Flow Regime: SuperCritical


   WARNING:  Pipe Too large for valid connection to inlet.
Designing manhole SDMH4

  Results:
         Total Flow:    82.5000 cfs              Flow From:   Upstream

             Status:      Fixed
      Chamber Width:     6.0000 ft          Chamber Length:     6.0000 ft


Designing pipe SDP32
   WARNING:  Full flow velocity is greater than maximum (0.0000)

  Results:
         Total Flow:    82.5000 cfs              Flow From:   Upstream

             Status:      Fixed                      Slope:     0.0307 ft/ft
         Pipe Width:    36.0000 in             Pipe Height:    36.0000 in
      Depth of Flow:     1.8590 ft             Flow Status:    Partial
     Critical Depth:     2.7900 ft                Capacity:   116.9280 cfs
           Velocity:    17.9199 ft/s
      Froude Number:     2.5137                Flow Regime: SuperCritical


Designing inlet IN1
   WARNING:  Spread is greater than maximum spread (2.5000 ft )
   WARNING:  Inlet forced to capture all flow, ignoring capacity calculations.

  Results:
        Gutter Flow:     5.9000 cfs              Flow From: Injected Storm

             Status:      Fixed
       Inlet Length:     2.9500 ft             Inlet Width:     2.0000 ft
    Flow Downstream:     5.9000 cfs              Bypass To:     0.0000 cfs
        Percent Cap:   100.0000 %                 Capacity:     0.0000 cfs
             Spread:   719.4957 ft
    Depth in Gutter:     0.0222 ft          Assigned Bypass:        N/A
```

```
Designing pipe SDP1
   WARNING:  Full flow velocity is greater than maximum (0.0000)

  Results:
        Total Flow:     5.9000 cfs              Flow From:   Upstream

            Status:      Fixed                      Slope:     0.1070 ft/ft
        Pipe Width:    18.0000 in              Pipe Height:    18.0000 in
     Depth of Flow:     0.4200 ft              Flow Status:    Partial
    Critical Depth:     0.9300 ft                 Capacity:    34.3635 cfs
          Velocity:    14.5180 ft/s
     Froude Number:     4.6675                 Flow Regime: SuperCritical


Designing inlet IN2
   WARNING:  Spread is greater than maximum spread (2.5000 ft )
   WARNING:  Inlet forced to capture all flow, ignoring capacity calculations.
   WARNING:  Pipe Too large for valid connection to inlet.

  Results:
       Gutter Flow:     5.9000 cfs              Flow From: Injected Storm

            Status:      Fixed
      Inlet Length:     2.9500 ft              Inlet Width:     2.0000 ft
    Flow Downstream:    11.8000 cfs              Bypass To:     0.0000 cfs
        Percent Cap:   100.0000 %                 Capacity:     0.0000 cfs
            Spread:   984.7193 ft
    Depth in Gutter:     0.0184 ft          Assigned Bypass:        N/A


Designing pipe SDP2
   WARNING:  Full flow velocity is greater than maximum (0.0000)

  Results:
        Total Flow:    11.8000 cfs              Flow From:   Upstream

            Status:      Fixed                      Slope:     0.0200 ft/ft
        Pipe Width:    24.0000 in              Pipe Height:    24.0000 in
     Depth of Flow:     0.8400 ft              Flow Status:    Partial
    Critical Depth:     1.2300 ft                 Capacity:    31.9929 cfs
          Velocity:     9.4088 ft/s
     Froude Number:     2.0828                 Flow Regime: SuperCritical


   WARNING:  Pipe Too large for valid connection to inlet.
Designing manhole SDMH7

  Results:
        Total Flow:    11.8000 cfs              Flow From:   Upstream

            Status:      Fixed
     Chamber Width:     4.0000 ft           Chamber Length:     4.0000 ft


Designing pipe SDP3
   WARNING:  Full flow velocity is greater than maximum (0.0000)

  Results:
        Total Flow:    11.8000 cfs              Flow From:   Upstream
```

```
            Status:      Fixed                      Slope:     0.0414 ft/ft
        Pipe Width:    24.0000 in              Pipe Height:    24.0000 in
     Depth of Flow:     0.6900 ft              Flow Status:    Partial
    Critical Depth:     1.2300 ft                 Capacity:    46.0159 cfs
          Velocity:    12.2562 ft/s
     Froude Number:     3.0396                 Flow Regime: SuperCritical


Designing inlet IN3
   WARNING:  Spread is greater than maximum spread (2.5000 ft )
   WARNING:  Inlet forced to capture all flow, ignoring capacity calculations.

  Results:
       Gutter Flow:     4.7000 cfs              Flow From: Injected Storm

            Status:      Fixed
      Inlet Length:     2.9500 ft              Inlet Width:     2.0000 ft
    Flow Downstream:     4.7000 cfs              Bypass To:     0.0000 cfs
       Percent Cap:   100.0000 %                 Capacity:     0.0000 cfs
            Spread:    94.5030 ft
   Depth in Gutter:     0.0656 ft          Assigned Bypass:        N/A


Designing pipe SDP4
   WARNING:  Full flow velocity is greater than maximum (0.0000)

  Results:
       Total Flow:     4.7000 cfs              Flow From:   Upstream

            Status:      Fixed                      Slope:     0.1396 ft/ft
        Pipe Width:    18.0000 in              Pipe Height:    18.0000 in
     Depth of Flow:     0.3500 ft              Flow Status:    Partial
    Critical Depth:     0.8300 ft                 Capacity:    39.2535 cfs
          Velocity:    14.9375 ft/s
     Froude Number:     5.2991                 Flow Regime: SuperCritical


Designing manhole SDMH8

  Results:
       Total Flow:    16.5000 cfs              Flow From:   Upstream

            Status:      Fixed
     Chamber Width:     4.0000 ft           Chamber Length:     4.0000 ft


Designing pipe SDP9
   WARNING:  Full flow velocity is greater than maximum (0.0000)

  Results:
       Total Flow:    16.5000 cfs              Flow From:   Upstream

            Status:      Fixed                      Slope:     0.0233 ft/ft
        Pipe Width:    24.0000 in              Pipe Height:    24.0000 in
     Depth of Flow:     0.9730 ft              Flow Status:    Partial
    Critical Depth:     1.4600 ft                 Capacity:    34.5566 cfs
          Velocity:    10.8638 ft/s
     Froude Number:     2.1989                 Flow Regime: SuperCritical
```

Designing inlet IN4
   WARNING: Spread is greater than maximum spread (2.5000 ft)
   WARNING: Inlet forced to capture all flow, ignoring capacity calculations.

  Results:
        Gutter Flow: 4.7000 cfs   Flow From: Injected Storm

             Status: Fixed
       Inlet Length: 2.9500 ft   Inlet Width: 2.0000 ft
    Flow Downstream: 4.7000 cfs   Bypass To: 0.0000 cfs
        Percent Cap: 100.0000 %   Capacity: 0.0000 cfs
             Spread: 1257.7806 ft
    Depth in Gutter: 0.0139 ft   Assigned Bypass: N/A

Designing pipe SDP10
   WARNING: Full flow velocity is greater than maximum (0.0000)

  Results:
        Total Flow: 4.7000 cfs   Flow From: Upstream

             Status: Fixed   Slope: 0.1554 ft/ft
         Pipe Width: 18.0000 in   Pipe Height: 18.0000 in
      Depth of Flow: 0.3410 ft   Flow Status: Partial
     Critical Depth: 0.8300 ft   Capacity: 41.4117 cfs
           Velocity: 15.4980 ft/s
      Froude Number: 5.5749   Flow Regime: SuperCritical

Designing manhole SDMH8A

  Results:
        Total Flow: 21.2000 cfs   Flow From: Upstream

             Status: Fixed
      Chamber Width: 4.0000 ft   Chamber Length: 4.0000 ft

Designing pipe SDP11
   WARNING: Full flow velocity is greater than maximum (0.0000)

  Results:
        Total Flow: 21.2000 cfs   Flow From: Upstream

             Status: Fixed   Slope: 0.0506 ft/ft
         Pipe Width: 24.0000 in   Pipe Height: 24.0000 in
      Depth of Flow: 0.8990 ft   Flow Status: Partial
     Critical Depth: 1.6400 ft   Capacity: 50.9036 cfs
           Velocity: 15.4617 ft/s
      Froude Number: 3.2861   Flow Regime: SuperCritical

Designing pipe SDP12
   WARNING: Full flow velocity is greater than maximum (0.0000)

  Results:
        Total Flow: 21.2000 cfs   Flow From: Upstream

```
            Status:      Fixed                      Slope:     0.0506 ft/ft
        Pipe Width:    24.0000 in              Pipe Height:    24.0000 in
     Depth of Flow:     0.8990 ft              Flow Status:    Partial
    Critical Depth:     1.6400 ft                 Capacity:    50.9038 cfs
          Velocity:    15.4617 ft/s
     Froude Number:     3.2861                 Flow Regime: SuperCritical


Designing inlet IN5
   WARNING:  Spread is greater than maximum spread (2.5000 ft )
   WARNING:  Inlet forced to capture all flow, ignoring capacity calculations.

  Results:
       Gutter Flow:     4.4000 cfs              Flow From: Injected Storm

            Status:      Fixed
      Inlet Length:     2.9500 ft              Inlet Width:     2.0000 ft
    Flow Downstream:     4.4000 cfs              Bypass To:     0.0000 cfs
       Percent Cap:   100.0000 %                 Capacity:     0.0000 cfs
            Spread:   122.5640 ft
   Depth in Gutter:     0.0539 ft          Assigned Bypass:        N/A


Designing pipe SDP45
   WARNING:  Full flow velocity is greater than maximum (0.0000)

  Results:
       Total Flow:     4.4000 cfs              Flow From:   Upstream

            Status:      Fixed                      Slope:     0.2010 ft/ft
        Pipe Width:    18.0000 in              Pipe Height:    18.0000 in
     Depth of Flow:     0.3090 ft              Flow Status:    Partial
    Critical Depth:     0.8000 ft                 Capacity:    47.0941 cfs
          Velocity:    16.6870 ft/s
     Froude Number:     6.3252                 Flow Regime: SuperCritical


Designing inlet IN6
   WARNING:  Spread is greater than maximum spread (2.5000 ft )
   WARNING:  Inlet forced to capture all flow, ignoring capacity calculations.

  Results:
       Gutter Flow:     4.4000 cfs              Flow From: Injected Storm

            Status:      Fixed
      Inlet Length:     2.9500 ft              Inlet Width:     2.0000 ft
    Flow Downstream:     4.4000 cfs              Bypass To:     0.0000 cfs
       Percent Cap:   100.0000 %                 Capacity:     0.0000 cfs
            Spread:  1299.9998 ft
   Depth in Gutter:     0.0131 ft          Assigned Bypass:        N/A


Designing pipe SDP46
   WARNING:  Full flow velocity is greater than maximum (0.0000)

  Results:
       Total Flow:     4.4000 cfs              Flow From:   Upstream
```

```
            Status:      Fixed                      Slope:     0.0100 ft/ft
        Pipe Width:    18.0000 in              Pipe Height:    18.0000 in
     Depth of Flow:     0.6770 ft              Flow Status:    Partial
    Critical Depth:     0.8000 ft                 Capacity:    10.5043 cfs
          Velocity:     5.6720 ft/s
     Froude Number:     1.3885                 Flow Regime: SuperCritical


Designing manhole SDMH12

  Results:
        Total Flow:    30.0000 cfs               Flow From:   Upstream

            Status:      Fixed
     Chamber Width:     4.0000 ft           Chamber Length:     4.0000 ft


Designing pipe WLP103
   WARNING:  Full flow velocity is greater than maximum (0.0000)

  Results:
        Total Flow:    30.0000 cfs               Flow From:   Upstream

            Status:      Fixed                      Slope:     0.0508 ft/ft
        Pipe Width:    24.0000 in              Pipe Height:    24.0000 in
     Depth of Flow:     1.1020 ft              Flow Status:    Partial
    Critical Depth:     1.8600 ft                 Capacity:    50.9992 cfs
          Velocity:    16.8878 ft/s
     Froude Number:     3.1526                 Flow Regime: SuperCritical


Designing pipe SDP16
   WARNING:  Full flow velocity is greater than maximum (0.0000)

  Results:
        Total Flow:    30.0000 cfs               Flow From:   Upstream

            Status:      Fixed                      Slope:     0.0508 ft/ft
        Pipe Width:    24.0000 in              Pipe Height:    24.0000 in
     Depth of Flow:     1.1020 ft              Flow Status:    Partial
    Critical Depth:     1.8600 ft                 Capacity:    51.0009 cfs
          Velocity:    16.8878 ft/s
     Froude Number:     3.1526                 Flow Regime: SuperCritical


Designing inlet IN8
   WARNING:  Spread is greater than maximum spread (2.5000 ft )
   WARNING:  Inlet forced to capture all flow, ignoring capacity calculations.

  Results:
       Gutter Flow:     4.4000 cfs               Flow From: Injected Storm

            Status:      Fixed
      Inlet Length:     2.9500 ft              Inlet Width:     2.0000 ft
    Flow Downstream:    4.4000 cfs                Bypass To:     0.0000 cfs
        Percent Cap:   100.0000 %                  Capacity:     0.0000 cfs
            Spread:   587.1412 ft
   Depth in Gutter:     0.0211 ft          Assigned Bypass:        N/A
```

```
Designing pipe SDP17
   WARNING:  Full flow velocity is greater than maximum (0.0000)

  Results:
         Total Flow:     4.4000 cfs               Flow From:   Upstream

             Status:      Fixed                       Slope:     0.3235 ft/ft
         Pipe Width:    18.0000 in              Pipe Height:    18.0000 in
      Depth of Flow:     0.2750 ft              Flow Status:    Partial
     Critical Depth:     0.8000 ft                 Capacity:    59.7460 cfs
           Velocity:    19.7090 ft/s
      Froude Number:     7.9439                 Flow Regime: SuperCritical


Designing inlet IN7
   WARNING:  Spread is greater than maximum spread (2.5000 ft )
   WARNING:  Inlet forced to capture all flow, ignoring capacity calculations.

  Results:
        Gutter Flow:     4.4000 cfs               Flow From: Injected Storm

             Status:      Fixed
       Inlet Length:     2.9500 ft              Inlet Width:     2.0000 ft
    Flow Downstream:     4.4000 cfs                Bypass To:     0.0000 cfs
        Percent Cap:   100.0000 %                   Capacity:     0.0000 cfs
             Spread:  4425.5130 ft
    Depth in Gutter:     0.0063 ft          Assigned Bypass:        N/A


Designing pipe SDP18
   WARNING:  Full flow velocity is greater than maximum (0.0000)

  Results:
         Total Flow:     4.4000 cfs               Flow From:   Upstream

             Status:      Fixed                       Slope:     0.3047 ft/ft
         Pipe Width:    18.0000 in              Pipe Height:    18.0000 in
      Depth of Flow:     0.2790 ft              Flow Status:    Partial
     Critical Depth:     0.8000 ft                 Capacity:    57.9831 cfs
           Velocity:    19.3058 ft/s
      Froude Number:     7.7226                 Flow Regime: SuperCritical


Designing manhole SDMH10

  Results:
         Total Flow:    38.8000 cfs               Flow From:   Upstream

             Status:      Fixed
      Chamber Width:     4.0000 ft           Chamber Length:     4.0000 ft


Designing pipe SDP19
   WARNING:  Full flow velocity is greater than maximum (0.0000)

  Results:
         Total Flow:    38.8000 cfs               Flow From:   Upstream
```

```
            Status:      Fixed                      Slope:     0.0451 ft/ft
        Pipe Width:    30.0000 in              Pipe Height:    30.0000 in
      Depth of Flow:     1.1680 ft              Flow Status:    Partial
     Critical Depth:     2.1000 ft                 Capacity:    87.1084 cfs
           Velocity:    17.2290 ft/s
      Froude Number:     3.1986                 Flow Regime: SuperCritical


Designing inlet IN9
   WARNING:  Spread is greater than maximum spread (2.5000 ft )
   WARNING:  Inlet forced to capture all flow, ignoring capacity calculations.

  Results:
        Gutter Flow:     4.3000 cfs              Flow From: Injected Storm

            Status:      Fixed
       Inlet Length:     2.9500 ft              Inlet Width:     2.0000 ft
    Flow Downstream:     4.3000 cfs                Bypass To:     0.0000 cfs
        Percent Cap:   100.0000 %                   Capacity:     0.0000 cfs
            Spread:  1043.9687 ft
    Depth in Gutter:     0.0147 ft          Assigned Bypass:        N/A


Designing pipe SDP20
   WARNING:  Full flow velocity is greater than maximum (0.0000)

  Results:
         Total Flow:     4.3000 cfs              Flow From:   Upstream

            Status:      Fixed                      Slope:     0.3400 ft/ft
        Pipe Width:    18.0000 in              Pipe Height:    18.0000 in
      Depth of Flow:     0.2690 ft              Flow Status:    Partial
     Critical Depth:     0.7900 ft                 Capacity:    61.2503 cfs
           Velocity:    19.8795 ft/s
      Froude Number:     8.1059                 Flow Regime: SuperCritical


Designing inlet IN10
   WARNING:  Spread is greater than maximum spread (2.5000 ft )
   WARNING:  Inlet forced to capture all flow, ignoring capacity calculations.

  Results:
        Gutter Flow:     4.3000 cfs              Flow From: Injected Storm

            Status:      Fixed
       Inlet Length:     2.9500 ft              Inlet Width:     2.0000 ft
    Flow Downstream:     4.3000 cfs                Bypass To:     0.0000 cfs
        Percent Cap:   100.0000 %                   Capacity:     0.0000 cfs
            Spread:  1685.5399 ft
    Depth in Gutter:     0.0110 ft          Assigned Bypass:        N/A


Designing pipe SDP21
   WARNING:  Full flow velocity is greater than maximum (0.0000)

  Results:
         Total Flow:     4.3000 cfs              Flow From:   Upstream

            Status:      Fixed                      Slope:     0.2400 ft/ft
```

```
         Pipe Width:    18.0000 in              Pipe Height:    18.0000 in
      Depth of Flow:     0.2930 ft              Flow Status:    Partial
     Critical Depth:     0.7900 ft                 Capacity:    51.4605 cfs
           Velocity:    17.5919 ft/s
      Froude Number:     6.8581                 Flow Regime: SuperCritical


Designing manhole SDMH11

  Results:
         Total Flow:    47.4000 cfs               Flow From:   Upstream

             Status:      Fixed
      Chamber Width:     6.0000 ft           Chamber Length:     6.0000 ft


Designing pipe SDP22
   WARNING:  Full flow velocity is greater than maximum (0.0000)

  Results:
         Total Flow:    47.4000 cfs               Flow From:   Upstream

             Status:      Fixed                       Slope:     0.0280 ft/ft
         Pipe Width:    36.0000 in              Pipe Height:    36.0000 in
      Depth of Flow:     1.3640 ft              Flow Status:    Partial
     Critical Depth:     2.2400 ft                 Capacity:   111.6903 cfs
           Velocity:    15.1445 ft/s
      Froude Number:     2.6098                 Flow Regime: SuperCritical


Designing manhole SDMH5

  Results:
         Total Flow:   129.9000 cfs               Flow From:   Upstream

             Status:      Fixed
      Chamber Width:     6.0000 ft           Chamber Length:     6.0000 ft


Designing pipe SDP33
   WARNING:  Full flow velocity is greater than maximum (0.0000)

  Results:
         Total Flow:   129.9000 cfs               Flow From:   Upstream

             Status:      Fixed                       Slope:     0.0239 ft/ft
         Pipe Width:    42.0000 in              Pipe Height:    42.0000 in
      Depth of Flow:     2.4450 ft              Flow Status:    Partial
     Critical Depth:     3.3000 ft                 Capacity:   155.5403 cfs
           Velocity:    18.0901 ft/s
      Froude Number:     2.1335                 Flow Regime: SuperCritical


Designing inlet IN21
   WARNING:  Spread is greater than maximum spread (2.5000 ft )
   WARNING:  Inlet forced to capture all flow, ignoring capacity calculations.

  Results:
        Gutter Flow:     4.6000 cfs               Flow From: Injected Storm
```

```
            Status:      Fixed
       Inlet Length:     2.9500 ft              Inlet Width:     2.0000 ft
    Flow Downstream:     4.6000 cfs                Bypass To:     0.0000 cfs
        Percent Cap:   100.0000 %                   Capacity:     0.0000 cfs
            Spread:   280.0962 ft
    Depth in Gutter:     0.0337 ft          Assigned Bypass:        N/A


Designing pipe SDP42
   WARNING:  Full flow velocity is greater than maximum (0.0000)

  Results:
         Total Flow:     4.6000 cfs               Flow From:   Upstream

            Status:      Fixed                        Slope:     0.1180 ft/ft
        Pipe Width:    18.0000 in              Pipe Height:    18.0000 in
     Depth of Flow:     0.3610 ft              Flow Status:    Partial
    Critical Depth:     0.8200 ft                 Capacity:    36.0894 cfs
          Velocity:    13.9949 ft/s
     Froude Number:     4.8831                 Flow Regime: SuperCritical


Designing inlet IN22
   WARNING:  Spread is greater than maximum spread (2.5000 ft )
   WARNING:  Inlet forced to capture all flow, ignoring capacity calculations.
   WARNING:  Pipe Too large for valid connection to inlet.

  Results:
       Gutter Flow:     4.2000 cfs               Flow From: Injected Storm

            Status:      Fixed
       Inlet Length:     2.9500 ft              Inlet Width:     2.0000 ft
    Flow Downstream:     8.8000 cfs                Bypass To:     0.0000 cfs
        Percent Cap:   100.0000 %                   Capacity:     0.0000 cfs
            Spread:  1632.5762 ft
    Depth in Gutter:     0.0111 ft          Assigned Bypass:        N/A


Designing pipe SDP35
   WARNING:  Full flow velocity is greater than maximum (0.0000)

  Results:
         Total Flow:     8.8000 cfs               Flow From:   Upstream

            Status:      Fixed                        Slope:     0.0200 ft/ft
        Pipe Width:    24.0000 in              Pipe Height:    24.0000 in
     Depth of Flow:     0.7160 ft              Flow Status:    Partial
    Critical Depth:     1.0500 ft                 Capacity:    31.9929 cfs
          Velocity:     8.6918 ft/s
     Froude Number:     2.1109                 Flow Regime: SuperCritical


   WARNING:  Pipe Too large for valid connection to inlet.
Designing inlet IN23
   WARNING:  Spread is greater than maximum spread (2.5000 ft )
   WARNING:  Inlet forced to capture all flow, ignoring capacity calculations.

  Results:
```

```
        Gutter Flow:     4.2000 cfs              Flow From: Injected Storm

             Status:      Fixed
       Inlet Length:     2.9500 ft             Inlet Width:     2.0000 ft
    Flow Downstream:     4.2000 cfs               Bypass To:     0.0000 cfs
        Percent Cap:   100.0000 %                 Capacity:     0.0000 cfs
             Spread:   629.8607 ft
    Depth in Gutter:     0.0196 ft          Assigned Bypass:        N/A


Designing pipe SDP36
   WARNING:  Full flow velocity is greater than maximum (0.0000)

  Results:
        Total Flow:     4.2000 cfs              Flow From:   Upstream

             Status:      Fixed                     Slope:     0.2156 ft/ft
         Pipe Width:    18.0000 in             Pipe Height:    18.0000 in
      Depth of Flow:     0.2970 ft             Flow Status:    Partial
     Critical Depth:     0.7800 ft                Capacity:    48.7749 cfs
           Velocity:    16.8535 ft/s
      Froude Number:     6.5234                Flow Regime: SuperCritical


Designing manhole SDMH6

  Results:
        Total Flow:   142.9000 cfs              Flow From:   Upstream

             Status:      Fixed
      Chamber Width:     6.0000 ft           Chamber Length:     6.0000 ft


Designing pipe SDP34
   WARNING:  Full flow velocity is greater than maximum (0.0000)

  Results:
        Total Flow:   142.9000 cfs              Flow From:   Upstream

             Status:      Fixed                     Slope:     0.0294 ft/ft
         Pipe Width:    48.0000 in             Pipe Height:    48.0000 in
      Depth of Flow:     2.1870 ft             Flow Status:    Partial
     Critical Depth:     3.5300 ft                Capacity:   246.2969 cfs
           Velocity:    20.3154 ft/s
      Froude Number:     2.6957                Flow Regime: SuperCritical




HGL/EGL Computations:


  Table A:

  Struct_ID          D       Q       L       V       d       dc      V^2/2g    Sf   Dn_Soffit EGLdn   HGLdn   Tot_Loss EGLup   HGLup    Rim_Elev.
                    (in)    (cfs)   (ft)   (ft/s)   (ft)     (ft)     (ft)   (ft/ft)  (ft)    (ft)     (ft)      (ft)     (ft)     (ft)      (ft)

  Outfall            -       -       -       -       -       -       -       -       -       -       -       -       -     5350.19     -
```

SDP34	48	142.90	44.01	20.32	2.19	3.53	6.41	-	5352.00	5356.60	5350.19	-	5357.81	5351.39	-
SDMH6	-	-	-	-	-	-	-	-	-	5357.81	5351.39	-	5357.81	5351.39	5357.74
SDP33	42	129.90	82.67	18.09	2.44	3.30	5.09	-	5353.00	5357.03	5351.94	-	5358.86	5353.78	-
SDMH5	-	-	-	-	-	-	-	-	-	5358.86	5353.78	-	5358.86	5353.78	5359.69
SDP32	36	82.50	44.09	17.92	1.86	2.79	4.99	-	5354.43	5358.77	5353.78	-	5359.45	5354.46	-
SDMH4	-	-	-	-	-	-	-	-	-	5359.45	5354.46	-	5359.45	5354.46	5360.60
SDP31	36	64.50	38.50	15.49	1.71	2.57	3.73	-	5355.70	5358.19	5354.46	-	5359.00	5355.27	-
Junction	-	-	-	15.49	-	-	3.73	-	-	-	-	-	5359.00	5355.27	-
SDP30	36	64.50	99.36	15.49	1.71	2.57	3.73	-	5356.56	5359.00	5355.27	-	5361.41	5357.68	-
Junction	-	-	-	15.49	-	-	3.73	-	-	-	-	-	5361.41	5357.68	-
SDP29	36	64.50	42.24	15.49	1.71	2.57	3.73	-	5358.97	5361.41	5357.68	-	5362.36	5358.64	-
SDMH3	-	-	-	-	-	-	-	-	-	5362.36	5358.64	-	5362.36	5358.64	5364.28
SDP27	30	54.20	67.96	12.84	2.00	2.34	2.56	-	5359.61	5361.68	5359.12	-	5362.86	5360.30	-
Junction	-	-	-	12.84	-	-	2.56	-	-	-	-	-	5362.86	5360.30	-
SDP13	30	54.20	78.94	12.84	2.00	2.34	2.56	-	5360.79	5362.86	5360.30	-	5364.26	5361.69	-
SDMH2A	-	-	-	-	-	-	-	-	-	5364.26	5361.69	-	5364.26	5361.69	5367.69
SDP28	30	54.20	87.99	18.88	1.42	2.34	5.54	-	5362.29	5367.24	5361.69	-	5370.72	5365.18	-
Junction	-	-	-	18.88	-	-	5.54	-	-	-	-	-	5370.72	5365.18	-
SDP26	30	54.20	84.61	18.88	1.42	2.34	5.54	-	5366.26	5370.72	5365.18	-	5374.54	5369.00	-
SDMH2	-	-	-	-	-	-	-	-	-	5374.54	5369.00	-	5374.54	5369.00	5375.58
SDP24	30	42.20	264.43	16.92	1.26	2.17	4.45	-	5370.18	5373.44	5369.00	-	5384.05	5379.61	-
Junction	-	-	-	16.92	-	-	4.45	-	-	-	-	-	5384.05	5379.61	-
SDP25	30	42.20	92.56	16.92	1.26	2.17	4.45	-	5380.84	5384.05	5379.61	-	5387.69	5383.24	-
SDMH1	-	-	-	-	-	-	-	-	-	5387.69	5383.24	-	5387.69	5383.24	5389.98
SDP47	24	42.20	33.20	29.17	0.94	1.96	13.22	-	5384.08	5396.46	5383.24	-	5400.76	5387.54	-
IN11	-	-	-	-	-	-	-	-	-	5400.76	5387.54	-	5400.76	5387.54	5390.52
(Alternate HGL and EGL Used)													5390.36	5388.60	
SDP6	24	33.40	42.56	10.63	-	-	1.76	0.0218	5388.60	5390.36	5388.60	0.93	5391.28	5389.53	-
New Branch	-	-	-	-	-	-	-	-	-	-	-	-	5357.81	5351.39	-
SDMH6	-	-	-	-	-	-	-	-	-	5357.81	5351.39	-	5357.81	5351.39	5357.74
SDP35	24	8.80	15.83	8.69	0.72	1.05	1.17	-	5352.00	5352.57	5351.39	-	5352.11	5350.94	-
IN22	-	-	-	-	-	-	-	-	-	5352.11	5350.94	-	5352.11	5350.94	5357.37
SDP42	18	4.60	36.99	13.99	0.36	0.82	3.04	-	5351.72	5353.98	5350.94	-	5357.61	5354.57	-
IN21	-	-	-	-	-	-	-	-	-	5357.61	5354.57	-	5357.61	5354.57	5358.29
New Branch	-	-	-	-	-	-	-	-	-	-	-	-	5357.81	5351.39	-
SDMH6	-	-	-	-	-	-	-	-	-	5357.81	5351.39	-	5357.81	5351.39	5357.74
SDP36	18	4.20	16.19	16.85	0.30	0.78	4.41	-	5353.00	5356.21	5351.80	-	5358.58	5354.17	-
IN23	-	-	-	-	-	-	-	-	-	5358.58	5354.17	-	5358.58	5354.17	5357.37
New Branch	-	-	-	-	-	-	-	-	-	-	-	-	5358.86	5353.78	-
SDMH5	-	-	-	-	-	-	-	-	-	5358.86	5353.78	-	5358.86	5353.78	5359.69
SDP22	36	47.40	46.03	15.14	1.36	2.24	3.56	-	5354.48	5357.34	5353.78	-	5357.53	5353.97	-
SDMH11	-	-	-	-	-	-	-	-	-	5357.53	5353.97	-	5357.53	5353.97	5360.63
SDP19	30	38.80	208.81	17.23	1.17	2.10	4.61	-	5355.62	5358.90	5354.28	-	5368.08	5363.47	-
SDMH10	-	-	-	-	-	-	-	-	-	5368.08	5363.47	-	5368.08	5363.47	5370.01
SDP16	24	30.00	226.73	16.89	1.10	1.86	4.43	-	5364.40	5367.93	5363.50	-	5379.34	5374.91	-
Junction	-	-	-	16.89	-	-	4.43	-	-	-	-	-	5379.34	5374.91	-
WLP103	24	30.00	96.62	16.89	1.10	1.86	4.43	-	5375.81	5379.34	5374.91	-	5384.14	5379.71	-
SDMH12	-	-	-	-	-	-	-	-	-	5384.14	5379.71	-	5384.14	5379.71	5385.09
SDP12	24	21.20	82.87	15.46	0.90	1.64	3.72	-	5380.71	5383.43	5379.71	-	5387.41	5383.70	-
Junction	-	-	-	15.46	-	-	3.72	-	-	-	-	-	5387.41	5383.70	-
SDP11	24	21.20	63.53	15.46	0.90	1.64	3.72	-	5384.80	5387.41	5383.70	-	5390.52	5386.81	-
SDMH8A	-	-	-	-	-	-	-	-	-	5390.52	5386.81	-	5390.52	5386.81	5391.91
SDP9	24	16.50	67.87	10.86	0.97	1.46	1.83	-	5388.01	5388.82	5386.98	-	5390.31	5388.47	-
SDMH8	-	-	-	-	-	-	-	-	-	5390.31	5388.47	-	5390.31	5388.47	5394.99
SDP3	24	11.80	97.13	12.26	0.69	1.23	2.33	-	5389.60	5390.81	5388.47	-	5394.47	5392.14	-
SDMH7	-	-	-	-	-	-	-	-	-	5394.47	5392.14	-	5394.47	5392.14	5398.45

SDP2	24	11.80	11.42	9.41	0.84	1.23	1.38	-	5393.45	5393.67	5392.29	-	5393.82	5392.45	-
IN2	-	-	-	-	-	-	-	-	-	5393.82	5392.45	-	5393.82	5392.45	5398.14
SDP1	18	5.90	26.28	14.52	0.42	0.93	3.28	-	5393.11	5395.72	5392.45	-	5397.79	5394.51	-
IN1	-	-	-	-	-	-	-	-	-	5397.79	5394.51	-	5397.79	5394.51	5399.09
New Branch	-	-	-	-	-	-	-	-	-	-	-	-	5359.45	5354.46	-
SDMH4	-	-	-	-	-	-	-	-	-	5359.45	5354.46	-	5359.45	5354.46	5360.60
SDP38	24	9.00	15.52	2.86	-	-	0.13	0.0016	5354.75	5359.45	5354.46	0.02	5359.47	5359.35	-
IN19	-	-	-	-	-	-	-	-	-	5359.47	5359.35	0.18	5359.65	5359.52	5360.22
SDP37	18	5.20	28.16	2.94	-	-	0.13	0.0025	5355.22	5359.65	5359.52	0.07	5359.72	5359.58	-
IN17	-	-	-	-	-	-	-	-	-	5359.72	5359.58	-	5359.72	5359.58	5360.80
New Branch	-	-	-	-	-	-	-	-	-	-	-	-	5359.45	5354.46	-
SDMH4	-	-	-	-	-	-	-	-	-	5359.45	5354.46	-	5359.45	5354.46	5360.60
SDP43	24	9.00	16.21	2.86	-	-	0.13	0.0016	5354.75	5359.45	5354.46	0.03	5359.48	5359.35	-
IN20	-	-	-	-	-	-	-	-	-	5359.48	5359.35	0.12	5359.60	5359.47	5360.23
SDP41	18	5.20	41.29	2.94	-	-	0.13	0.0025	5357.72	5359.60	5359.47	0.10	5359.70	5359.57	-
IN18	-	-	-	-	-	-	-	-	-	5359.70	5359.57	-	5359.70	5359.57	5361.07
New Branch	-	-	-	-	-	-	-	-	-	-	-	-	5362.36	5358.64	-
SDMH3	-	-	-	-	-	-	-	-	-	5362.36	5358.64	-	5362.36	5358.64	5364.28
SDP40	24	10.30	16.01	11.54	0.65	1.14	2.07	-	5359.23	5360.70	5358.64	-	5360.39	5358.32	-
IN16	-	-	-	-	-	-	-	-	-	5360.39	5358.32	-	5360.39	5358.32	5364.09
SDP39	18	5.50	30.07	12.11	0.46	0.90	2.28	-	5359.17	5360.60	5358.32	-	5362.25	5359.98	-
IN15	-	-	-	-	-	-	-	-	-	5362.25	5359.98	-	5362.25	5359.98	5364.52
New Branch	-	-	-	-	-	-	-	-	-	-	-	-	5374.54	5369.00	-
SDMH2	-	-	-	-	-	-	-	-	-	5374.54	5369.00	-	5374.54	5369.00	5375.58
SDP7	18	6.00	15.57	15.27	0.41	0.94	3.62	-	5369.25	5372.62	5369.00	-	5373.24	5369.62	-
IN13	-	-	-	-	-	-	-	-	-	5373.24	5369.62	-	5373.24	5369.62	5375.21
New Branch	-	-	-	-	-	-	-	-	-	-	-	-	5374.54	5369.00	-
SDMH2	-	-	-	-	-	-	-	-	-	5374.54	5369.00	-	5374.54	5369.00	5375.58
SDP8	18	6.00	15.60	15.86	0.40	0.94	3.91	-	5371.08	5373.89	5369.98	-	5375.52	5371.61	-
IN14	-	-	-	-	-	-	-	-	-	5375.52	5371.61	-	5375.52	5371.61	5375.21
New Branch	-	-	-	-	-	-	-	-	-	-	-	-	5400.76	5387.54	-
IN11	-	-	-	-	-	-	-	-	-	5400.76	5387.54	-	5400.76	5387.54	5390.52
SDP5	24	4.40	31.66	5.58	0.60	0.73	0.48	-	5388.70	5388.02	5387.54	-	5388.06	5387.58	-
IN12	-	-	-	-	-	-	-	-	-	5388.06	5387.58	-	5388.06	5387.58	5390.52
New Branch	-	-	-	-	-	-	-	-	-	-	-	-	5357.53	5353.97	-
SDMH11	-	-	-	-	-	-	-	-	-	5357.53	5353.97	-	5357.53	5353.97	5360.63
SDP20	18	4.30	14.22	19.88	0.27	0.79	6.14	-	5354.57	5360.11	5353.97	-	5362.54	5356.40	-
IN9	-	-	-	-	-	-	-	-	-	5362.54	5356.40	-	5362.54	5356.40	5360.13
New Branch	-	-	-	-	-	-	-	-	-	-	-	-	5357.53	5353.97	-
SDMH11	-	-	-	-	-	-	-	-	-	5357.53	5353.97	-	5357.53	5353.97	5360.63
SDP21	18	4.30	13.84	17.59	0.29	0.79	4.81	-	5354.47	5358.78	5353.97	-	5360.23	5355.42	-
IN10	-	-	-	-	-	-	-	-	-	5360.23	5355.42	-	5360.23	5355.42	5360.39
New Branch	-	-	-	-	-	-	-	-	-	-	-	-	5368.08	5363.47	-
SDMH10	-	-	-	-	-	-	-	-	-	5368.08	5363.47	-	5368.08	5363.47	5370.01
SDP17	18	4.40	14.00	19.71	0.28	0.80	6.04	-	5363.95	5369.50	5363.47	-	5371.95	5365.92	-
IN8	-	-	-	-	-	-	-	-	-	5371.95	5365.92	-	5371.95	5365.92	5369.64
New Branch	-	-	-	-	-	-	-	-	-	-	-	-	5368.08	5363.47	-
SDMH10	-	-	-	-	-	-	-	-	-	5368.08	5363.47	-	5368.08	5363.47	5370.01
SDP18	18	4.40	14.64	19.31	0.28	0.80	5.79	-	5363.95	5369.26	5363.47	-	5371.72	5365.93	-

IN7	-	-	-	-	-	-	-	-	-	5371.72	5365.93	-	5371.72	5365.93	5369.80	
New Branch	-	-	-	-	-	-	-	-	-	-	-	-	5384.14	5379.71	-	
SDMH12	-	-	-	-	-	-	-	-	-	5384.14	5379.71	-	5384.14	5379.71	5385.09	
SDP45	18	4.40	13.73	16.69	0.31	0.80	4.33	-	5380.70	5384.04	5379.71	-	5385.85	5381.52	-	
IN5	-	-	-	-	-	-	-	-	-	5385.85	5381.52	-	5385.85	5381.52	5384.72	
New Branch	-	-	-	-	-	-	-	-	-	-	-	-	5384.14	5379.71	-	
SDMH12	-	-	-	-	-	-	-	-	-	5384.14	5379.71	-	5384.14	5379.71	5385.09	
SDP46	18	4.40	13.46	5.67	0.68	0.80	0.50	-	5380.25	5380.21	5379.71	-	5380.03	5379.53	-	
IN6	-	-	-	-	-	-	-	-	-	5380.03	5379.53	-	5380.03	5379.53	5384.72	
New Branch	-	-	-	-	-	-	-	-	-	-	-	-	5390.52	5386.81	-	
SDMH8A	-	-	-	-	-	-	-	-	-	5390.52	5386.81	-	5390.52	5386.81	5391.91	
SDP10	18	4.70	13.65	15.50	0.34	0.83	3.73	-	5387.56	5390.54	5386.81	-	5391.63	5387.90	-	
IN4	-	-	-	-	-	-	-	-	-	5391.63	5387.90	-	5391.63	5387.90	5391.56	
New Branch	-	-	-	-	-	-	-	-	-	-	-	-	5390.31	5388.47	-	
SDMH8	-	-	-	-	-	-	-	-	-	5390.31	5388.47	-	5390.31	5388.47	5394.99	
SDP4	18	4.70	14.34	14.94	0.35	0.83	3.47	-	5389.15	5391.94	5388.47	-	5392.97	5389.50	-	
IN3	-	-	-	-	-	-	-	-	-	5392.97	5389.50	-	5392.97	5389.50	5394.65	

Table B:

LOSSES								LOSS_COEFFICENTS							
Str_ID	Hf	Hb	Hstr	Hc	He	Hj	Total	Dstr	Ko	CD	Cd	Cq	Cp	Cb	K
Outfall	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SDP34	-	-	-	-	-	-	SuperCrt	-	-	-	-	-	-	-	-
SDMH6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SDP33	-	-	-	-	-	-	SuperCrt	-	-	-	-	-	-	-	-
SDMH5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SDP32	-	-	-	-	-	-	SuperCrt	-	-	-	-	-	-	-	-
SDMH4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SDP31	-	-	-	-	-	-	SuperCrt	-	-	-	-	-	-	-	-
Junction	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SDP30	-	-	-	-	-	-	SuperCrt	-	-	-	-	-	-	-	-
Junction	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SDP29	-	-	-	-	-	-	SuperCrt	-	-	-	-	-	-	-	-
SDMH3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SDP27	-	-	-	-	-	-	SuperCrt	-	-	-	-	-	-	-	-
Junction	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SDP13	-	-	-	-	-	-	SuperCrt	-	-	-	-	-	-	-	-
SDMH2A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SDP28	-	-	-	-	-	-	SuperCrt	-	-	-	-	-	-	-	-
Junction	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SDP26	-	-	-	-	-	-	SuperCrt	-	-	-	-	-	-	-	-
SDMH2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SDP24	-	-	-	-	-	-	SuperCrt	-	-	-	-	-	-	-	-
Junction	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SDP25	-	-	-	-	-	-	SuperCrt	-	-	-	-	-	-	-	-
SDMH1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SDP47	-	-	-	-	-	-	SuperCrt	-	-	-	-	-	-	-	-
IN11	-	-	-	-	-	-	User	0.94	-	-	-	-	-	-	-
SDP6	0.93	-	-	-	-	-	0.93	-	-	-	-	-	-	-	-
New Branch	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

SDMH6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SDP35	-	-	-	-	-	-	SuperCrt	-	-	-	-	-	-	-	-
IN22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SDP42	-	-	-	-	-	-	SuperCrt	-	-	-	-	-	-	-	-
IN21	-	-	-	-	-	-	-	0.36	-	-	-	-	-	-	-
New Branch	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SDMH6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SDP36	-	-	-	-	-	-	SuperCrt	-	-	-	-	-	-	-	-
IN23	-	-	-	-	-	-	-	0.30	-	-	-	-	-	-	-
New Branch	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SDMH5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SDP22	-	-	-	-	-	-	SuperCrt	-	-	-	-	-	-	-	-
SDMH11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SDP19	-	-	-	-	-	-	SuperCrt	-	-	-	-	-	-	-	-
SDMH10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SDP16	-	-	-	-	-	-	SuperCrt	-	-	-	-	-	-	-	-
Junction	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WLP103	-	-	-	-	-	-	SuperCrt	-	-	-	-	-	-	-	-
SDMH12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SDP12	-	-	-	-	-	-	SuperCrt	-	-	-	-	-	-	-	-
Junction	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SDP11	-	-	-	-	-	-	SuperCrt	-	-	-	-	-	-	-	-
SDMH8A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SDP9	-	-	-	-	-	-	SuperCrt	-	-	-	-	-	-	-	-
SDMH8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SDP3	-	-	-	-	-	-	SuperCrt	-	-	-	-	-	-	-	-
SDMH7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SDP2	-	-	-	-	-	-	SuperCrt	-	-	-	-	-	-	-	-
IN2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SDP1	-	-	-	-	-	-	SuperCrt	-	-	-	-	-	-	-	-
IN1	-	-	-	-	-	-	-	0.42	-	-	-	-	-	-	-
New Branch	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SDMH4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SDP38	0.02	-	-	-	-	-	0.02	-	-	-	-	-	-	-	-
IN19	-	-	0.18	-	-	-	0.18	5.63	1.484	1.000	0.930	1.000	1.000	1.000	1.380
SDP37	0.07	-	-	-	-	-	0.07	-	-	-	-	-	-	-	-
IN17	-	-	-	-	-	-	-	3.01	-	-	-	-	-	-	-
New Branch	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SDMH4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SDP43	0.03	-	-	-	-	-	0.03	-	-	-	-	-	-	-	-
IN20	-	-	0.12	-	-	-	0.12	3.13	1.484	1.000	0.654	1.000	1.000	1.000	0.970
SDP41	0.10	-	-	-	-	-	0.10	-	-	-	-	-	-	-	-
IN18	-	-	-	-	-	-	-	2.51	-	-	-	-	-	-	-
New Branch	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SDMH3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SDP40	-	-	-	-	-	-	SuperCrt	-	-	-	-	-	-	-	-
IN16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SDP39	-	-	-	-	-	-	SuperCrt	-	-	-	-	-	-	-	-
IN15	-	-	-	-	-	-	-	0.45	-	-	-	-	-	-	-
New Branch	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SDMH2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SDP7	-	-	-	-	-	-	SuperCrt	-	-	-	-	-	-	-	-
IN13	-	-	-	-	-	-	-	0.41	-	-	-	-	-	-	-

New Branch	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SDMH2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SDP8	-	-	-	-	-	-	SuperCrt	-	-	-	-	-	-	-	-
IN14	-	-	-	-	-	-	-	0.40	-	-	-	-	-	-	-
New Branch	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
IN11	-	-	-	-	-	-	User	-	-	-	-	-	-	-	-
SDP5	-	-	-	-	-	-	SuperCrt	-	-	-	-	-	-	-	-
IN12	-	-	-	-	-	-	-	0.60	-	-	-	-	-	-	-
New Branch	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SDMH11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SDP20	-	-	-	-	-	-	SuperCrt	-	-	-	-	-	-	-	-
IN9	-	-	-	-	-	-	-	0.27	-	-	-	-	-	-	-
New Branch	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SDMH11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SDP21	-	-	-	-	-	-	SuperCrt	-	-	-	-	-	-	-	-
IN10	-	-	-	-	-	-	-	0.29	-	-	-	-	-	-	-
New Branch	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SDMH10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SDP17	-	-	-	-	-	-	SuperCrt	-	-	-	-	-	-	-	-
IN8	-	-	-	-	-	-	-	0.27	-	-	-	-	-	-	-
New Branch	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SDMH10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SDP18	-	-	-	-	-	-	SuperCrt	-	-	-	-	-	-	-	-
IN7	-	-	-	-	-	-	-	0.28	-	-	-	-	-	-	-
New Branch	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SDMH12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SDP45	-	-	-	-	-	-	SuperCrt	-	-	-	-	-	-	-	-
IN5	-	-	-	-	-	-	-	0.31	-	-	-	-	-	-	-
New Branch	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SDMH12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SDP46	-	-	-	-	-	-	SuperCrt	-	-	-	-	-	-	-	-
IN6	-	-	-	-	-	-	-	0.68	-	-	-	-	-	-	-
New Branch	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SDMH8A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SDP10	-	-	-	-	-	-	SuperCrt	-	-	-	-	-	-	-	-
IN4	-	-	-	-	-	-	-	0.34	-	-	-	-	-	-	-
New Branch	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SDMH8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SDP4	-	-	-	-	-	-	SuperCrt	-	-	-	-	-	-	-	-
IN3	-	-	-	-	-	-	-	0.35	-	-	-	-	-	-	-

APPENDIX D

MANUFACTURES JOINT GAP RECOMMENDATION AND SHOP DRAWING

Bohannan Huston

6560 Langfield Rd. Bldg. 3
Houston, Texas 77092
832-590-5300
832-590-5399 (fax)

September 13, 2018

12" – 108" Gasketed Joint Concrete Pipe (RCP)
Bernalillo Facility
Albuquerque, New Mexico

The 12" – 108" RCP rubber gasket pipe joint that is currently produced at our Bernalillo facility is designed to provide an adequate seal when the joint is not fully 'homed'. The allowable joint gaps that will still maintain an adequate seal for these sizes are listed below.

Pipe Diameter	Allowable Joint Gap
12"	0.75"
15"	0.75"
18"	0.75"
24"	0.75"
30"	1.00"
36"	1.00"
48"	1.00"
54"	1.00"
60"	1.00"
66"	1.00"
72"	1.00"
78"	1.00"
84"	1.00"
90"	1.00"
96	1.00"
102"	1.00"
108"	1.00"

Steve Hiner, P.E.
Director – Product Development/Corporate Engineer
Rinker Materials
6560 Langfield Road
Houston, TX 77092
832-590-5351 (work)
281-435-8237 (cell)
www.lovicks.hiner@rinkerpipe.com

Rinker MATERIALS™
A QUIKRETE® COMPANY

Concrete Pipe Division
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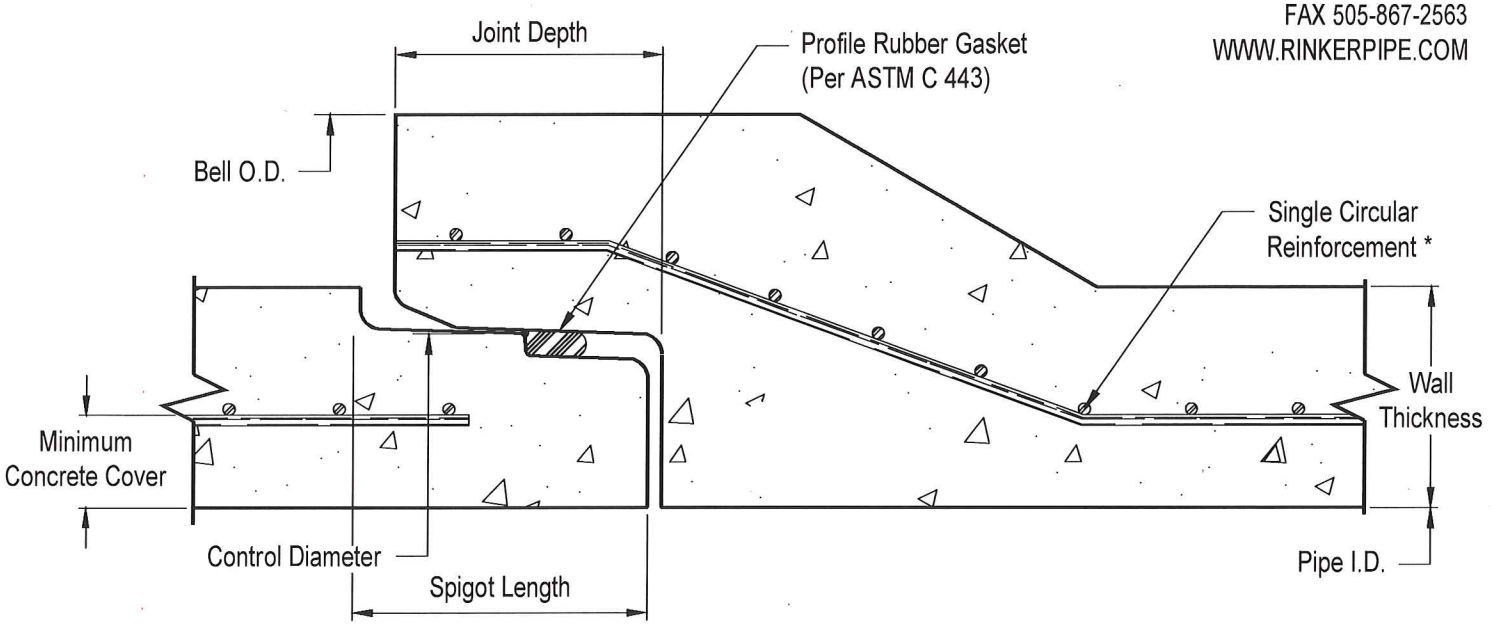
3700 HIGHWAY 528
BERNALILLO, NM 87004-6600
PHONE 505-867-2394
FAX 505-867-2563
WWW.RINKERPIPE.COM

Reinforced Concrete Pipe (RCP)
Single Offset Joint 12"Ø - 36"Ø Diameter



Section Thru Joint

12"Ø to 36"Ø RCP (Big Bell Single Offset Joint) w/ Single Cage Reinforcement								
Pipe I.D. (Nom.)	Wall Thickness	Joint Depth	Spigot Length	Control Diameter	Gasket Height	Bell O.D.	RCP Length	Weight (Lbs./Foot)
12"Ø	2" (B)	3 5/8"	3 3/4"	15 1/4"Ø	3/4"	20"Ø	8'	95
15"Ø	2 1/4" (B)	3 5/8"	3 3/4"	18 3/4"Ø	3/4"	23 7/8"Ø	8'	130
18"Ø	2 1/2" (B)	3 5/8"	3 3/4"	22 1/8"Ø	3/4"	27 3/4"Ø	8'	175
24"Ø	3" (B)	3 7/8"	4"	29"Ø	3/4"	35 1/2"Ø	8'	275
30"Ø	3 1/2" (B)	4 5/8"	4 3/4"	35 5/8"Ø	13/16"	42 1/4"Ø	8'	395
36"Ø	4" (B)	4 7/8"	5"	42 5/16"Ø	13/16"	50 1/4"Ø	8'	540
"X" RCP (size & class) are included as part of the submittal for the project identified on the cover letter herein.								

NOTES:

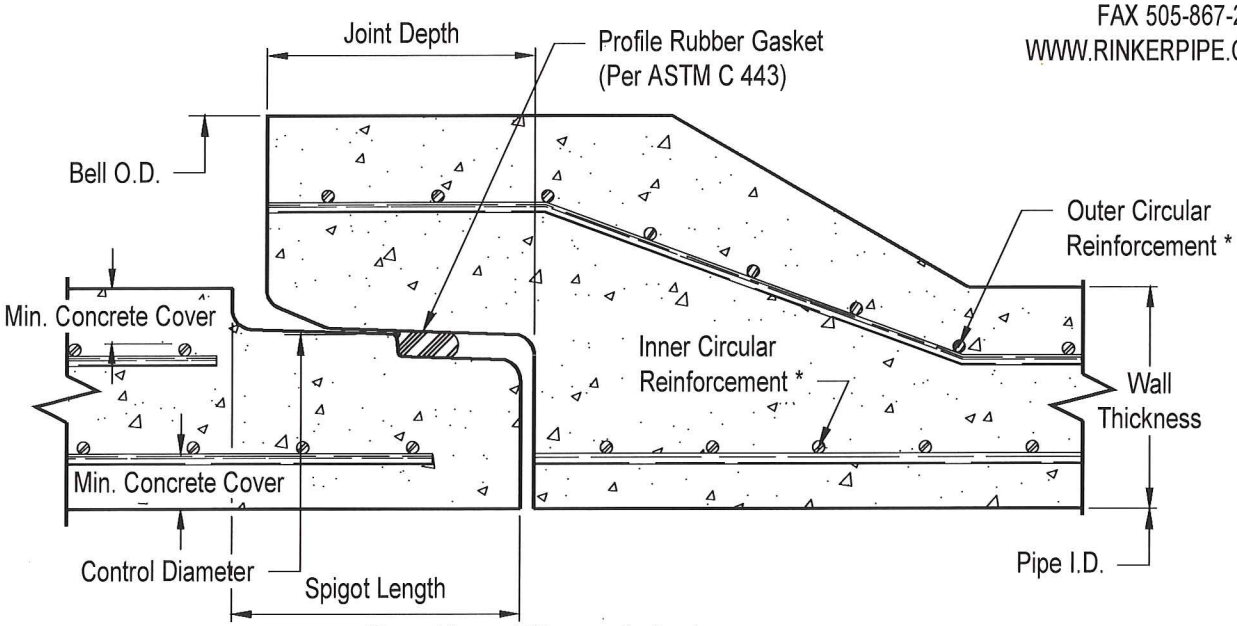
1. Reinforced Concrete Pipe (RCP) manufactured to meet ASTM C76 & AASHTO M170 specifications (latest edition). RCP strength classification requirements as per project requirements and or determined by a qualified engineer.
* 2. Product Data subject to change without notice, reinforcement shown may vary.
3. Profile rubber gaskets are furnished with the pipe and will meet the performance requirements of ASTM C443.
4. Consult a Rinker Materials representative for further details and information not shown.

Rinker MATERIALS™
A QUIKRETE® COMPANY

Concrete Pipe Division

ALBUQUERQUE, NM PIPE (BERNALILLO)
3700 HIGHWAY 528
BERNALILLO, NM 87004-6600
PHONE 505-867-2394
FAX 505-867-2563
WWW.RINKERPIPE.COM

Reinforced Concrete Pipe (RCP)
Single Offset Joint 30"Ø - 72"Ø Diameter



Section Thru Joint

30"Ø to 72"Ø RCP (Big Bell Single Offset Joint) w/ Double Cage Reinforcement

Pipe I.D. (Nom.)	Wall Thickness	Joint Depth	Spigot Length	Control Diameter	Gasket Height	Bell O.D.	RCP Length	Weight (Lbs./Foot)
30"Ø	3 1/2" (B)	4 5/8"	4 3/4"	35 5/8"Ø	13/16"	42 1/4"Ø	8'	395
36"Ø	4" (B)	4 7/8"	5"	42 5/16"Ø	13/16"	50 1/4"Ø	8'	540
42"Ø	4 1/2" (B)	5 1/4"	5 3/8"	49 5/16"Ø	13/16"	58"Ø	8'	705
48"Ø	5" (B)	5 1/2"	5 5/8"	55 5/16"Ø	13/16"	64"Ø	8'	895
54"Ø	6 1/4" (C)	5 1/2"	5 5/8"	61 1/4"Ø	13/16"	70"Ø	8'	1270
60"Ø	6 3/4" (C)	5 1/2"	5 5/8"	67 1/4"Ø	13/16"	76"Ø	8'	1525
66"Ø	7 1/4" (C)	5 1/2"	5 5/8"	73 1/4"Ø	13/16"	82"Ø	8'	1800
72"Ø	7 3/4" (C)	5 1/2"	5 5/8"	79 1/4"Ø	13/16"	88"Ø	8'	2090

"X" RCP (size & class) are included as part of the submittal for the project identified on the cover letter herein.

NOTES:

1. Reinforced Concrete Pipe (RCP) manufactured to meet ASTM C76 & AASHTO M170 specifications (latest edition). RCP strength classification requirements as per project requirements and or determined by a qualified engineer.
* 2. Product Data subject to change without notice, reinforcement shown may vary.
3. Profile rubber gaskets are furnished with the pipe and will meet the performance requirements of ASTM C443.
4. Consult a Rinker Materials representative for further details and information not shown.

Rinker MATERIALS™
A QUIKRETE® COMPANY

Concrete Pipe Division

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PHONE 505-867-2394
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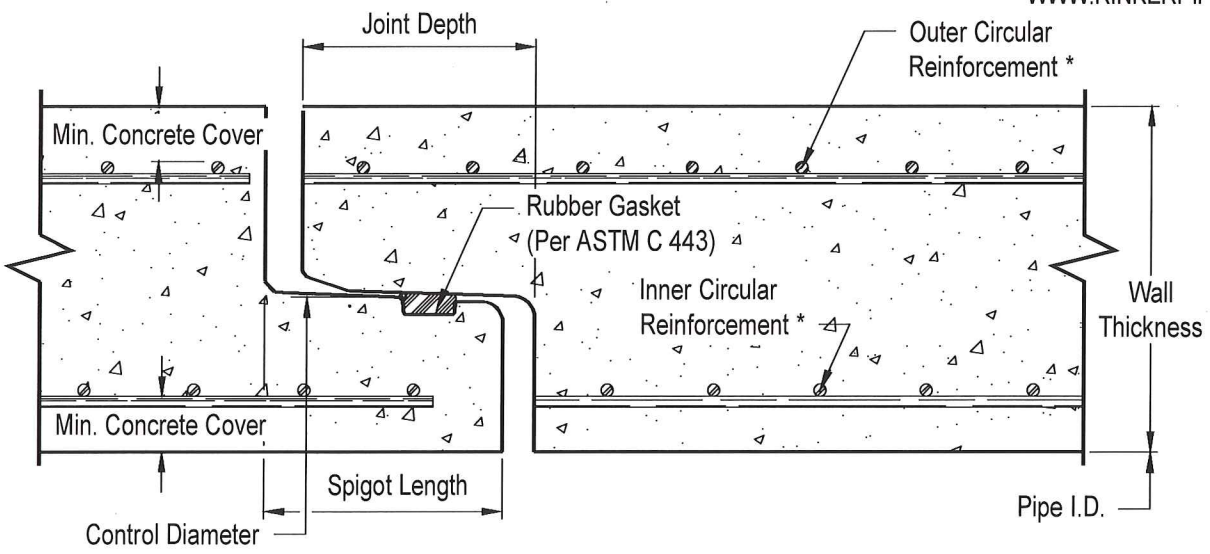
WWW.RINKERPIPE.COM

Reinforced Concrete Pipe (RCP)
Rubber Gasket Joint 78"Ø - 96"Ø Diameter



Section Thru Joint

78"Ø to 96"Ø RCP (Flush Bell Rubber Gasket Joint) w/ Double Cage Reinforcement								
Pipe I.D. (Nom.)	Wall Thickness	Joint Depth	Spigot Length	Control Diameter	Gasket Height	Pipe O.D.	RCP Length	Weight (Lbs./Foot)
78"Ø	8 1/4" (C)	5 1/2"	5 5/8"	85 1/4"Ø	13/16"	94 1/2"Ø	8'	2410
84"Ø	8" (B)	5 3/4"	5 7/8"	91"Ø	13/16"	100"Ø	8'	2490
90"Ø	8 1/2" (B)	6 1/8"	6 1/4"	97 1/2"Ø	13/16"	107"Ø	8'	2830
96"Ø	9" (B)	6 5/8"	6 3/4"	104"Ø	13/16"	114"Ø	8'	3195
"X" RCP (size & class) are included as part of the submittal for the project identified on the cover letter herein.								

NOTES:

1. Reinforced Concrete Pipe (RCP) manufactured to meet ASTM C76 & AASHTO M170 specifications (latest edition). RCP strength classification requirements as per project requirements and or determined by a qualified engineer.
* 2. Product Data subject to change without notice, reinforcement shown may vary.
3. Rubber gaskets are furnished with the pipe and will meet the performance requirements of ASTM C443.
4. Consult a Rinker Materials representative for further details and information not shown.

EXHIBITS

EXHIBIT A: OVERALL BASIN MAP FROM THE APPROVED MIREHAVEN MASTERPLAN (Exhibit B in the approved Del Webb 3&4 Drainage Report

EXHIBIT B: PROPOSED BASIN MAPS FOR DEL WEBB PHASE 3 & 4 (NO CHANGE FROM THE APPROVED REPORT – Exhibit D in the approved drainage report for Del Webb Phase 3&4)

EXHIBIT C: PROPOSED BASIN MAP FROM THE APPROVED DRAINAGE REPORT FOR DEL WEBB PHASE 1 & 2

EXHIBIT D: POND DETAIL

EXHIBIT A

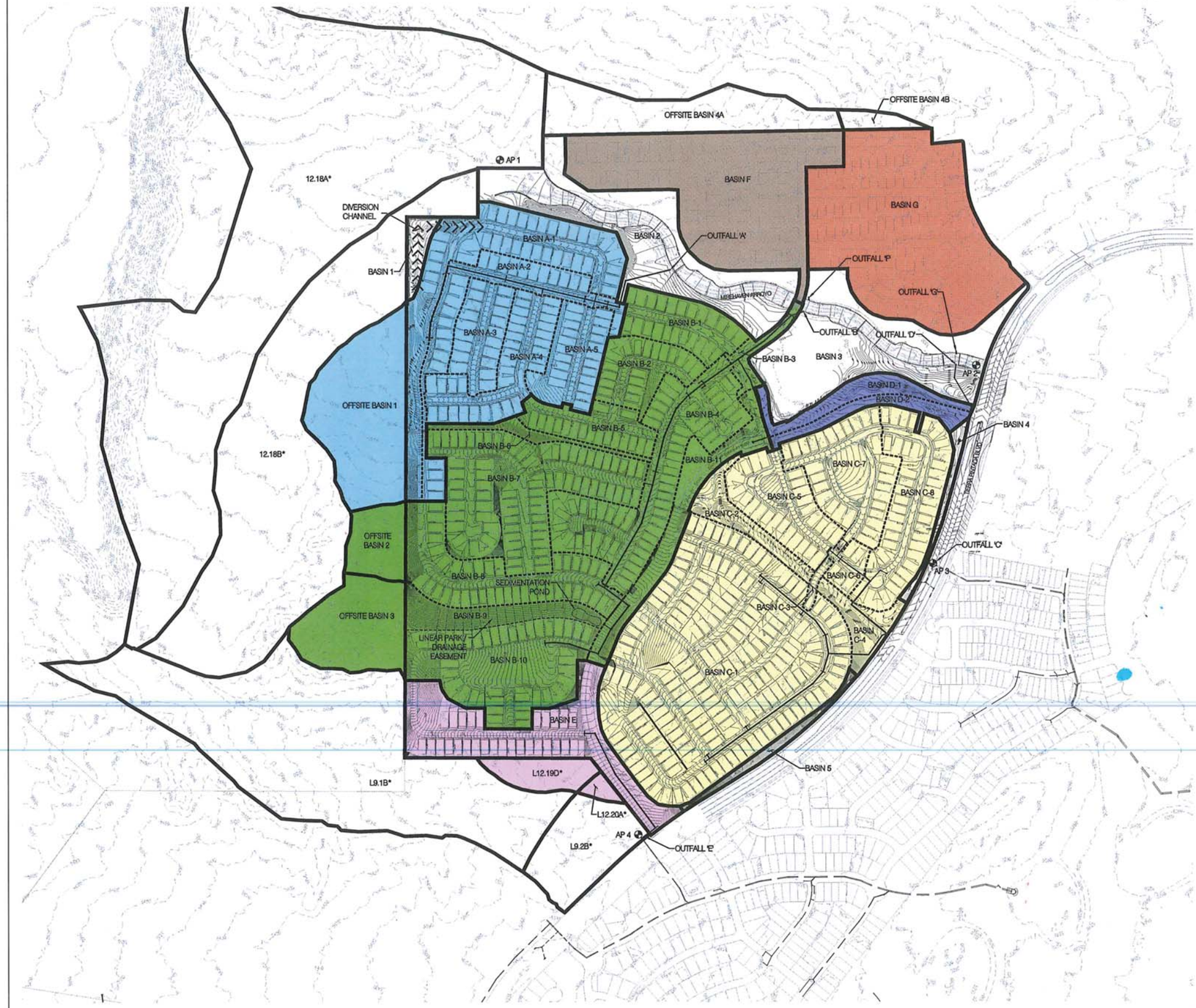
OVERALL BASIN MAP FROM THE APPROVED MIREHAVEN MASTERPLAN (Exhibit B in the approved Del Webb 3&4 Drainage Report

Bohannan Huston

DRAINAGE MASTER PLAN FOR THE MIREHAVEN MASTER PLANNED COMMUNITY

OVERALL BASIN MAP

11/2013



BASIN I.D.	AREA (AC)	Q (CFS) 100YR
Offsite Basin 1	12.0	19.8
Offsite Basin 2	3.5	6.9
Offsite Basin 3	7.6	16.3
Offsite Basin 4A	9.8	17.3
Offsite Basin 4B	1.1	1.9
12.18B	42.0	65.0
Basin A-1	12.4	40.3
Basin A-2	7.2	23.4
Basin A-3	4.4	14.3
Basin A-4	7.0	22.8
Basin A-5	5.1	16.6
Basin B-1	5.0	16.3
Basin B-2	4.6	15.0
Basin B-3	1.4	5.6
Basin B-4	13.6	44.2
Basin B-5	4.0	13.0
Basin B-6	1.3	3.4
Basin B-7	16.2	52.7
Basin B-8	9.5	30.9
Basin B-9	3.8	12.4
Basin B-10	12.6	40.7
Basin B-11	6.9	21.4
Basin C-1	39.6	128.8
Basin C-2	2.7	7.1
Basin C-3	0.4	1.7
Basin C-4	2.5	6.6
Basin C-5	6.5	21.1
Basin C-6	1.4	4.6
Basin C-7	8.4	27.3
Basin C-8	9.2	29.9
Basin D-1	3.0	10.9
Basin D-2	2.2	8.0
Basin E	11.6	37.7
Basin F	21.6	69.9
Basin G	26.0	84.6
Basin 1	1.4	4.4
Basin 2	15.8	44.7
Basin 3	16.2	49.0
Basin 4	2.5	6.6
Basin 5	1.4	3.7

22.1 cfs

OUTFALL I.D.	SIZE (IN)	Q (CFS) 100YR
A	48	137.3
B	60	277.6
C	60	238.2
D	24	10.9
E	30	37.7
F	42	87.2
G	42	88.6

DW1 portion = 20.2 cfs see exhibit G

DW1 Basins to outfall B

DW 3 & 4 Basins to outfall B

Offsite Basins to outfall B

Mirehaven Pkwy

LEGEND

- BASIN BOUNDARY
- SUB BASIN BOUNDARY
- FUTURE / PROPOSED STORM DRAIN
- EXISTING STORM DRAIN
- DIVERSION CHANNEL

Q100

Total DW1 Basins to outfall B

B1-B6 = 73.5 cfs

Total DW34 (Q100) Basins to outfall B

B7-B10 = 136.7
B4 remain 24.00
= 160.7

* BASIN FLOWS ARE FROM THE "WEST I-40 DPM". THE EXISTING, UNDEVELOPED PORTIONS OF BASIN 12.18 HAS BEEN SPLIT INTO TWO BASINS, 12.18A AND 12.18B. BASIN 12.18B WILL BE INTERCEPTED BY A DIVERSION SWALE THAT WILL BE LOCATED IN BASIN 1.

ANALYSIS POINT	Qallowable (CFS)
1	1373****
2	1495*****
3	375***
4	216**

Outfall B = 277.6 ✓

= DW1 73.5
DW 3/4 160.7
MP 21.4
offsite 2&3 22.1
277.7 ✓

** PER "DRAINAGE ANALYSIS REPORT FOR ARROYO VISTA BLVD & TIERRA PINTADA BLVD", APRIL 4, 2012

*** PER "DRAINAGE REPORT FOR STORMCLOUD SUBDIVISION", MAY 27, 2005

****UPSTREAM FLOWS ARE FROM "WEST I-40 DMP UPDATE 2011", DECEMBER 2011

***** PER TECHNICAL MEMORADANDUM "PRELIMINARY HYDRAULIC ANALYSIS FOR MIREHAVEN ARROYO CROSSING", JANUARY 10, 2012.

From Actual DW 3 & 4 Exhibit B

DW 3 116.5
DW 4 31.1
147.6

is less than 160.7 from master plan above

N

300 150 0 300
SCALE: 1"=300'

Bohannan Huston
800.877.5332

Tue, 19-Nov-2013 - 11:11:am, Plotted by: AROMERO
P:\20130375\CDP\Plans\General\Drainage Master Plan\20130375overallBasins.dwg

EXHIBIT A

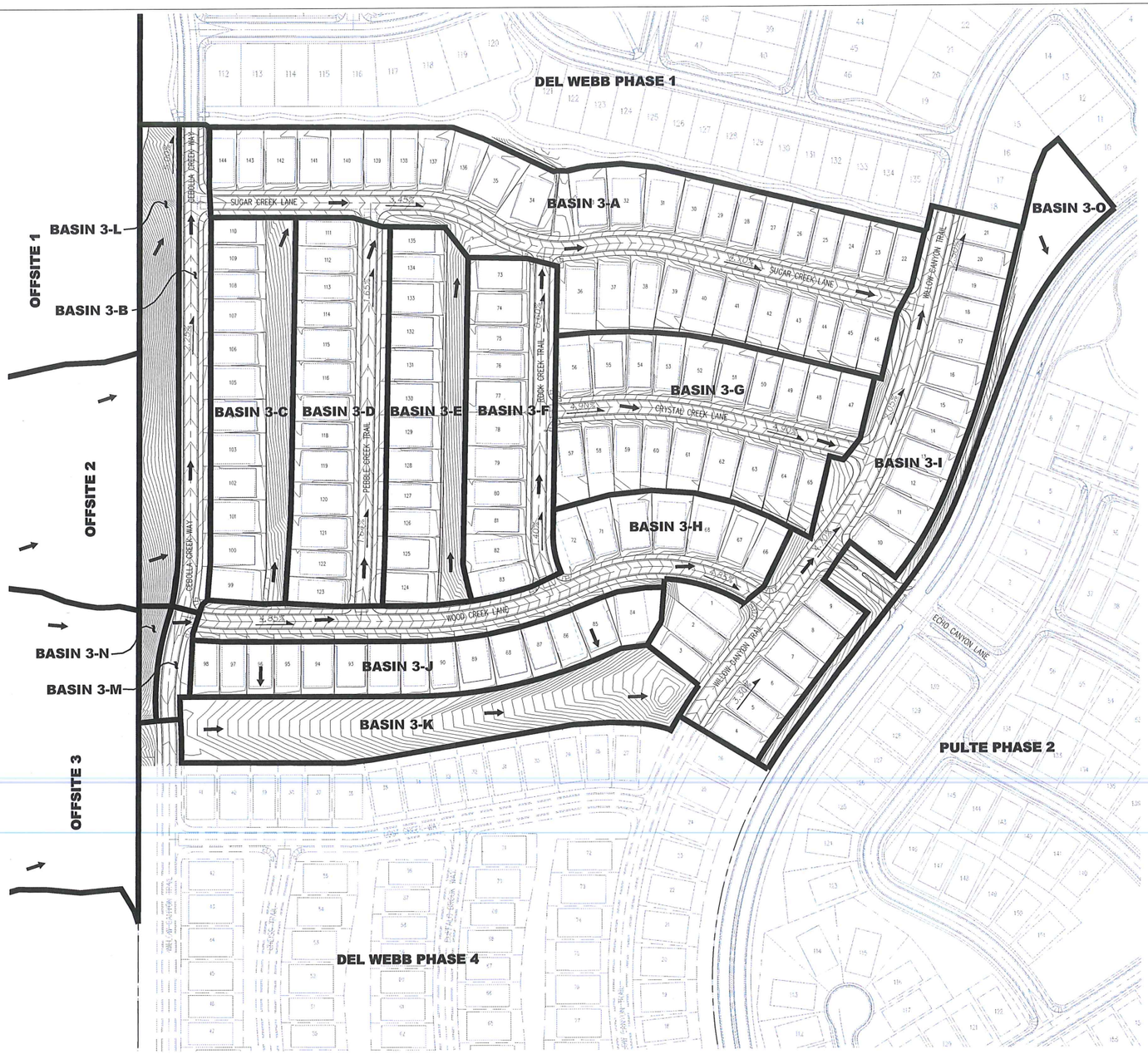
EXHIBIT B

PROPOSED BASIN MAPS FOR DEL WEBB PHASE 3 & 4 (NO CHANGE FROM THE APPROVED REPORT – Exhibit D in the approved drainage report for Del Webb Phase 3&4)

Bohannan Huston

DEL WEBB @ MIREHAVEN PHASE 3
PROPOSED BASINS MAP

JUNE 2018



DEVELOPED BASIN SUMMARY

BASIN I.D.	AREA (AC)		% LAND TREATMENT A	B	C	D	DISCHARGE (CFS) 100YR	VOLUME (AC-FT)
3-A	7.59		0.00%	29.00%	29.00%	42.00%	24.7	0.83
3-B	1.31		0.00%	0.00%	34.00%	66.00%	5.1	0.18
3-C	2.64		0.00%	29.00%	29.00%	42.00%	8.6	0.29
3-D	3.10		0.00%	29.00%	29.00%	42.00%	10.1	0.34
3-E	2.49		0.00%	29.00%	29.00%	42.00%	8.1	0.27
3-F	2.51		0.00%	29.00%	29.00%	42.00%	8.2	0.27
3-G	4.00		0.00%	29.00%	29.00%	42.00%	13.0	0.44
3-H	2.87		0.00%	29.00%	29.00%	42.00%	9.3	0.31
3-I	5.25		0.00%	29.00%	29.00%	42.00%	17.1	0.57
3-J	2.21		0.00%	29.00%	29.00%	42.00%	7.2	0.24
3-K	2.61		0.00%	0.00%	90.00%	10.00%	7.9	0.24
3-L	1.59		0.00%	20.00%	80.00%	0.00%	4.3	0.12
3-M	0.41		0.00%	0.00%	10.00%	90.00%	1.7	0.06
3-N	0.21		0.00%	20.00%	80.00%	0.00%	0.6	0.02
3-O	1.59		0.00%	20.00%	80.00%	0.00%	4.3	0.12
OFFSITE 1	12.80		64.00%	35.00%	1.00%	0.00%	19.8	0.56
OFFSITE 2	3.50		19.00%	50.00%	31.00%	0.00%	7.5	0.21
OFFSITE 3	7.60		19.00%	50.00%	31.00%	0.00%	16.3	0.46
TOTAL	56.69						173.7	5.5

To outfall B

3A	24.7
3C–K	89.5
3N–3M	2.3
	116.5

NOTE: ALL BLOCKS DRAIN TOWARD THE FRONT/STREET UNLESS OTHERWISE NOTED BY FLOW ARROW/DIRECTION ABOVE.

LEGEND

- BASIN BOUNDARY
- FLOW ARROW
- PROPOSED STORM DRAIN
- EXISTING STORM DRAIN
- PROPOSED STREET SLOPE OR FLOW PATH (2.19%)
- PROPOSED STORM DRAIN MANHOLE
- PROPOSED STORM DRAIN INLET

N

100 50 0 100

SCALE: 1"=100'

Bohannan Huston
www.bhinc.com 800.877.5332

Wed, 13-Jun-2018 – 9:00:am, Plotted by: AORTIZ
P:\20180338\CDP\Plans\General\DMP\20180338_ProposedBasins_ph3.dwg

EXHIBIT B
Phase3

DEL WEBB @ MIREHAVEN PHASE 4
PROPOSED BASINS MAP

JUNE 2018

DEVELOPED BASIN SUMMARY

BASIN	AREA		% LAND TREATMENT				DISCHARGE (CFS)	VOLUME (AC-FT)
I.D.	(AC)		A	B	C	D	100YR	
4-A	2.19		0.00%	30.00%	30.00%	40.00%	7.0	0.23
4-B	0.59		0.00%	0.00%	34.00%	66.00%	2.3	0.08
4-C	4.75		0.00%	30.00%	30.00%	40.00%	15.3	0.51
4-D	2.75		0.00%	30.00%	30.00%	40.00%	8.8	0.29
4-E	4.56		0.00%	30.00%	30.00%	40.00%	14.7	0.49
4-F	2.14		0.00%	30.00%	30.00%	40.00%	6.9	0.23
4-G	0.41		0.00%	20.00%	80.00%	0.00%	1.1	0.03
4-H	3.06		0.00%	30.00%	30.00%	40.00%	9.8	0.33
4-I	0.38		0.00%	20.00%	80.00%	0.00%	1.0	0.03
4-J	0.37		0.00%	20.00%	80.00%	0.00%	1.0	0.03
OFFSITE 3	7.60		19.00%	50.00%	31.00%	0.00%	16.3	0.46
TOTAL	28.80						84.2	2.7

To Outfall B
4A 7.0
4B 15.3
4C 8.8
31.1

NOTE: ALL BLOCKS DRAIN TOWARD THE FRONT/STREET UNLESS OTHERWISE NOTED BY FLOW ARROW/DIRECTION ABOVE.

LEGEND

- BASIN BOUNDARY
- FLOW ARROW
- PROPOSED STORM DRAIN
- EXISTING STORM DRAIN
- PROPOSED STREET SLOPE OR FLOW PATH (2.19%)
- PROPOSED STORM DRAIN MANHOLE
- PROPOSED STORM DRAIN INLET

N

80 40 0 80

SCALE: 1"=80'

Bohannan Huston
www.bhinc.com 800.877.5332

L9.1B

Wed, 13-Jun-2018 - 9:05:am, Plotted by: AORTIZ
P:\20180338\CDP\Plans\General\DMP\20180338_ProposedBasins.dwg

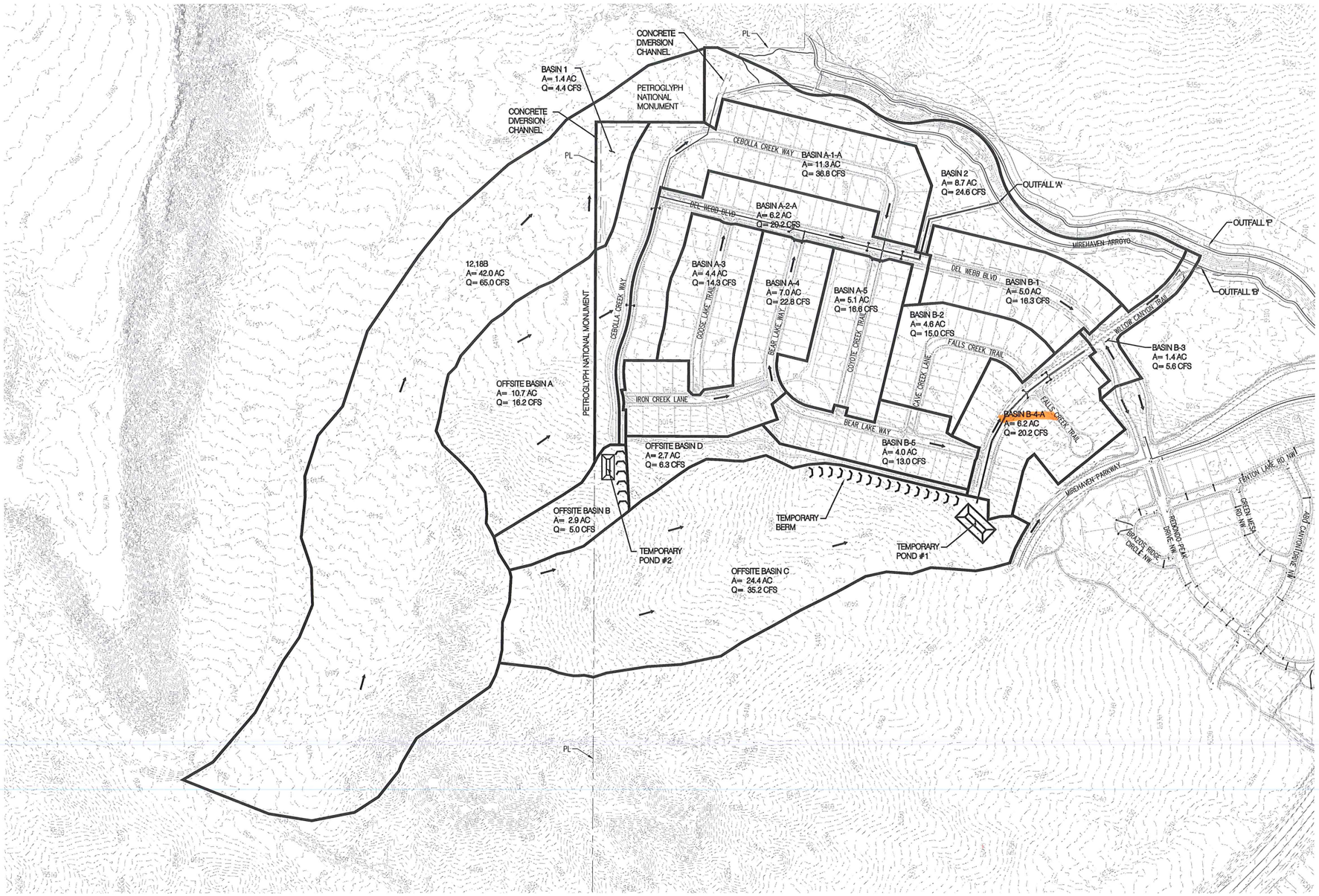
Exhibit B
Phase 4

EXHIBIT C

PROPOSED BASIN MAP FROM THE APPROVED DRAINAGE REPORT FOR DEL WEBB PHASE 1 & 2

Bohannan Huston

DEL WEBB @ MIREHAVEN
PHASE I & 2
BASIN MAP - PHASE I
2/2014



BASIN	AREA	Q (CFS)
I.D.	(AC)	100YR
Offsite Basin A	10.7	16.2
Offsite Basin B	2.9	5.0
Offsite Basin C	24.4	35.2
Offsite Basin D	2.7	6.3
Basin A-1-A	11.3	36.8
Basin A-2-A	6.2	20.2
Basin A-3	4.4	14.3
Basin A-4	7.0	22.8
Basin 4-5	5.1	16.6
Basin B-1	5.0	16.3
Basin B-2	4.6	15.0
Basin B-3	1.4	5.6
Basin B-4-A	6.2	20.2
Basin B-5	4.0	13.0
Basin 1	1.4	4.4
Basin 2	8.7	24.6

LEGEND

- BASIN BOUNDARY
- FLOW ARROW
- PROPOSED STORM DRAIN
- EXISTING STORM DRAIN

N

200 100 0 200

SCALE: 1"=200'

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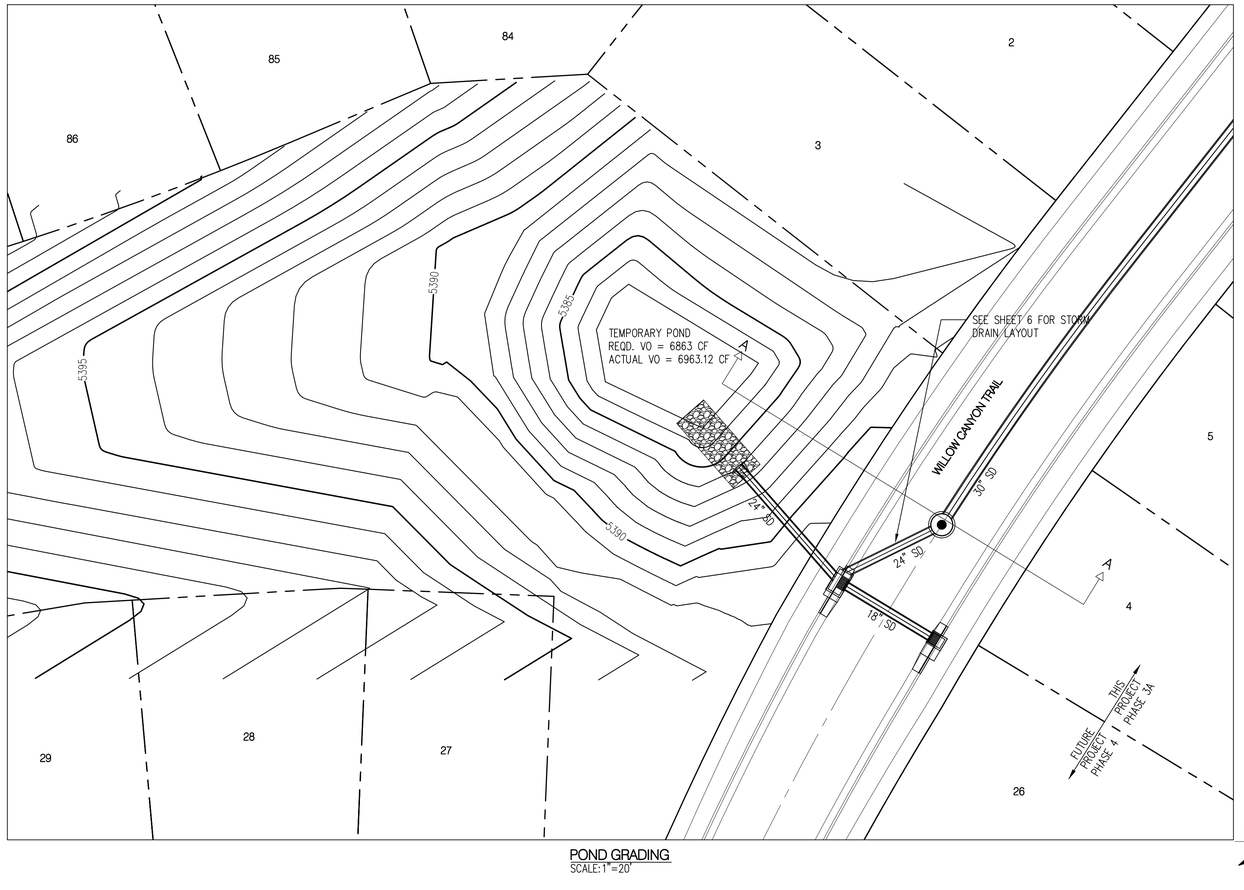
Thu, 30-Jan-2014 – 6:35:pm, Plotted by: BPATTERSON
P:\20130375\CDP\Plans\General\DW_1A\Drainage Report Exhibits\20130375_DW Phases 1 and 2 Basins.dwg

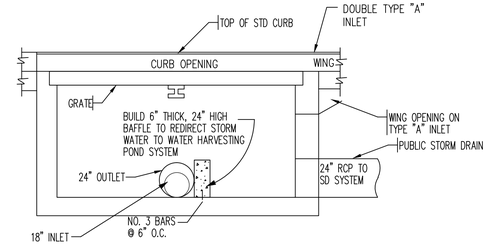
EXHIBIT C

EXHIBIT D
POND DETAIL

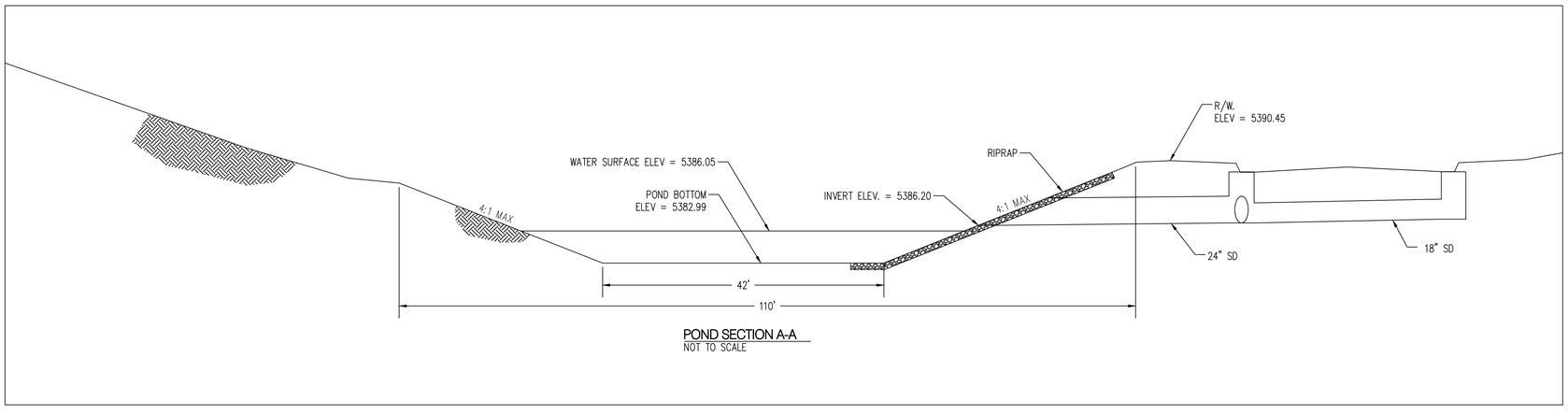
Bohannan Huston



POND GRADING
SCALE: 1" = 20'



WATER - HARVESTING INLET DETAIL
NOT TO SCALE



POND SECTION A-A
NOT TO SCALE

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Tue, 18-Sep-2018 - 4:48:pm, Plotted by: AROMERO

BHI JOB NO. 20180338

AS-BUILT INFORMATION

CONTRACTOR WORK STAKED BY — DATE
SURVEYED BY — DATE
ACCEPTANCE BY — DATE
FIELD VERIFICATION BY — DATE
DRAWINGS CORRECTED BY — DATE

MICRO-FILM INFORMATION

RECORDED BY — DATE
NO. — DATE

BENCH MARKS

USC&GS BRASS DISC STAMPED "REWARD 1969"
GEOGRAPHIC POSITION (NAD 83)
N.M. STATE PLANE COORDINATES
(CENTRAL ZONE)
N=1487364.063 E=1491190.819
GROUND TO GRID = 0.999675005
DELTA ALPHA = -00°17'12.26"
NAVD 1988 ELEVATION = 5319.688

SURVEY INFORMATION

FIELD NOTES

NO.	BY	DATE

ENGINEER'S SEAL

NO.	DATE	REMARKS	BY

REVISIONS

DESIGN
DESIGNED BY YPM — DATE 04/18
DRAWN BY AR — DATE 04/18
CHECKED BY YPM — DATE 04/18

Bohannan Huston
www.bhinc.com 800.877.5332

CITY OF ALBUQUERQUE
DEPARTMENT OF MUNICIPAL DEVELOPMENT

DEL WEBB @ MIREHAVEN PHASE 3A
POND GRADING

DESIGN REVIEW COMMITTEE	CITY ENGINEER APPROVAL	LAST DESIGN UPDATE	MO./DAY/YR.	MO./DAY/YR.

CITY PROJECT NO.	ZONE MAP NO.	SHEET	OF
650482	H-8/9	15	26