CITY OF ALBUQUERQUE

March 23, 2017

Asa Nilsson-Weber, P.E.
Isaacson & Arfman, PA
128 Monroe St NE
Albuquerque, NM 87108

Re: Storm Cloud Unit 4 Lots 1-3
Request for Engineer Pad Certification - Accepted
Engineer's Stamp dated: 11-7-16 (H09D022A)
Certification dated: 3-21-17

Dear Ms. Nilsson-Weber,

Based upon the information provided in your submittal received 3/21/2017, the above referenced Certification is acceptable for building permit.

If you have any questions, you can contact me at 924-3999 or Totten Elliott at 924-3982.

Sincerely,

for Shahab Biazar, P.E.
City Engineer, Planning Dept.
Development Review Services

TE/SB
C: email

PO Box 1293

Albuquerque

New Mexico 87103

www.cabq.gov

City of Albuquerque

Planning Department

Development & Building Services Division

DRAINAGE AND TRANSPORTATION INFORMATION SHEET (REV 09/2015)

Project Title: Storm Cloud Unit 4 - Lots 1 -3 Building Permit #: _____ City Drainage #: H09/D022A

DRB#: 16DRB-70303 EPC#: _____ Work Order#: CPN: 691582

Legal Description: Lots 1, 2 & 3, Storm Cloud Unit 4

City Address: _____

Engineering Firm: Isaacson & Arfman, P.A. Contact: Fred Arfman

Address 128 Monroe Street NE - Albuquerque, NM 87108

Phone#: (505) 268-8828 Fax#: _____ E-mail: freda@iacivil.com

Owner: Pulte Homes Contact: Matt Dyer

Address: 7601 Jefferson St NE, Suite 320 Albuquerque, NM 87109

Phone#: (505) 345-8591 Fax#: _____ E-mail matthew.dyer@pultegroup.com

Architect: NA 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:

X ENGINEER/ ARCHITECT CERTIFICATION

____ CONCEPTUAL G & D PLAN
X GRADING PLAN
____ DRAINAGE MASTER PLAN
____ DRAINAGE REPORT
____ CLOMR/LOMR

____ TRAFFIC CIRCULATION LAYOUT (TCL)
____ TRAFFIC IMPACT STUDY (TIS)
____ EROSION & SEDIMENT CONTROL PLAN (ESC)

____ OTHER (SPECIFY) _____

RECEIVED
MAR 21 2017
LAND DEVELOPMENT SECTION

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
X GRADING/ PAD CERTIFICATION
____ WORK ORDER APPROVAL
____ CLOMR/LOMR

____ PRE-DESIGN MEETING
____ OTHER (SPECIFY) _____

IS THIS A RESUBMITTAL? ____ Yes X No

DATE SUBMITTED March 21, 2017 By: Fred C. Arfman, PA

COA STAFF ELECTRONIC SUBMITTAL RECEIVED ___

CITY OF ALBUQUERQUE

Richard J. Berry, Mayor

December 9, 2016

Åsa Nilsson-Weber, P.E.
Isaacson & Arfman, P.A.
128 Monroe Street NE
Albuquerque, NM, 87108

RE: Stormcloud Subdivision Units 4A & 4B
Grading and Drainage Plan & Report
Engineer's Stamp Date 8-12-2016 (File: H09D022A)
Revised Plan dated 11-7-2016

Dear Ms. Nilsson-Weber:

Based upon the information provided in your submittal received 8-12-2016, the above referenced Plan is approved for ESC Grading Permit, and was previously approved for Preliminary Plat.

Conditions 1-4 from the previous approval letter no longer apply.

Prior to Pad Certification and/or Release of Financial Guarantee approval, Engineer Certification per the DPM checklist will be required.

If you have any questions, you can contact me at 924-3986.

Sincerely,

Abiel Carrillo, P.E.
Principal Engineer, Planning Dept.
Development Review Services

PO Box 1293
Albuquerque
New Mexico 87103
www.cabq.gov

City of Albuquerque

Planning Department

Development & Building Services Division

DRAINAGE AND TRANSPORTATION INFORMATION SHEET (REV 09/2015)

Project Title: Stormcloud Subdivision Units 4A & 4B Building Permit #: _____ City Drainage #: H09/D022A

DRB#: 1005029 EPC#: _____ Work Order#: 691582

Legal Description: Bulk Land Plat of Tracts A, B, & C, Stormcloud Subdivision

City Address: _____

Engineering Firm: Isaacson & Arfman, P.A. Contact: Asa Nilsson-Weber

Address: 128 Monroe Street NE - Albuquerque, NM 87108

Phone#: (505) 268-8828 Fax#: _____ E-mail: asaw@iacivil.com

Owner: Western Albuquerque Land Holdings, LLC Contact: Jeff Garrett

Address: 6900 East Camelback Road, Suite 607 - Scottsdale, AZ 85251

Phone#: (480) 970-4002 Fax#: _____ E-mail: _____

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
X GRADING PLAN
___ DRAINAGE MASTER PLAN
___ DRAINAGE REPORT
___ CLOMR/LOMR

___ TRAFFIC CIRCULATION LAYOUT (TCL)
___ TRAFFIC IMPACT STUDY (TIS)
___ EROSION & SEDIMENT CONTROL PLAN (ESC)

___ OTHER (SPECIFY) _____

RECEIVED
NOV 08 2016
LAND DEVELOPMENT SECTION

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
X 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: November 7, 2016 By: Åsa Nilsson-Weber

COA STAFF ELECTRONIC SUBMITTAL RECEIVED ___

City of Albuquerque

Planning Department

Development & Building Services Division

DRAINAGE AND TRANSPORTATION INFORMATION SHEET (REV 09/2015)

Project Title: Stormcloud Subdivision Units 4A & 4B Building Permit #: _____ City Drainage # H09 D022A

DRB#: 1005029 EPC#. _____ Work Order# _____

Legal Description: Tracts B & J, The Crossing and Tract R, Stormcloud Subdivision, Unit 3

City Address: _____

Engineering Firm: Isaacson & Arfman, P.A. Contact. Asa Nilsson-Weber

Address. 128 Monroe Street NE - Albuquerque, NM 87108

Phone#· (505) 268-8828 Fax#: _____ E-mail asaw@iacivil.com

Owner: Western Albuquerque Land Holdings, LLC Contact. Jeff Garrett

Address 6900 East Camelback Road, Suite 607 - Scottsdale, AZ 85251

Phone#: (480) 970-4002 Fax#: _____ E-mail _____

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
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X PRELIMINARY PLAT APPROVAL
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____ SIA/ RELEASE OF FINANCIAL GUARANTEE
____ FOUNDATION PERMIT APPROVAL
X GRADING PERMIT APPROVAL
____ SO-19 APPROVAL
____ PAVING PERMIT APPROVAL
____ GRADING/ PAD CERTIFICATION
____ WORK ORDER APPROVAL
____ CLOMR/LOMR

____ PRE-DESIGN MEETING
____ OTHER (SPECIFY) _____

RECEIVED
AUG 1 2 2016
LAND DEVELOPMENT SECTION

$2815.00

IS THIS A RESUBMITTAL?. ____ Yes X No

DATE SUBMITTED· August 12, 2016 By Asa Nilsson-Weber

COA STAFF ELECTRONIC SUBMITTAL RECEIVED ___

CITY OF ALBUQUERQUE

Richard J. Berry, Mayor

September 12, 2016

Åsa Nilsson-Weber, P.E.
Isaacson & Arfman, P.A.
128 Monroe Street NE
Albuquerque, NM, 87108

RE: Stormcloud Subdivision Units 4A & 4B
Grading and Drainage Plan & Report
Engineer's Stamp Date 8-12-2016 (File: H09D022A)

Dear Ms. Nilsson-Weber:

Based upon the information provided in your submittal received 8-12-2016, the above referenced submittal is approved for Preliminary Plat. It is also approved for ESC Grading Permit, with the condition that the following supplemental information is provided:

1. Check the lot elevations for proper drainage; for example, Lot 9 on Monsoon Road does not appear to have fall along the side yard. ✓

2. Clarify the parallel longitudinal street slopes on the grading plan; for example on Jet Stream Rd half the road shows a slope of 4% and the other half shows a slope of 2.6%.

3. Do you anticipate any Storm Drain conflicts with the Sanitary Sewer line at Chinook and Summer Breeze Rd? DRC DRC

4. Show the intended elevation of the invert of the outfall pipe for the first flush pond on the grading plan.

5. We understand that some existing walls will be demolished because they are deficient, or have collapsed. Pad Certifications/Release of Financial Guarantee submittals will be expected to include an accounting of additional walls that may have been replaced.

6. Since the Phasing of the Units has not been completely resolved, it should be understood that the DRC Sets will need to include phasing elements (temporary ponds, etc) that are not described in the Report.

Prior to Pad Certification and/or Release of Financial Guarantee approval, Engineer Certification per the DPM checklist will be required.

If you have any questions, you can contact me at 924-3986.

Sincerely,

Abiel Carrillo, P.E.
Principal Engineer, Planning Dept.
Development Review Services

PO Box 1293
Albuquerque
New Mexico 87103
www.cabq.gov

AUGUST 12, 2016

DRAINAGE REPORT

FOR

STORMCLOUD SUBDIVISION, UNITS 4A & 4B

A 181-DWELLING UNIT SINGLE-DETACHED RESIDENTIAL SUBDIVISION

ALBUQUERQUE, NEW MEXICO

This report includes revisions to Unit 4 calculations included in Drainage Report for Stormcloud Subdivision Units 4 & 5, dated 2/10/12 prepared by Isaacson & Arfman, P.A.

BY

RECEIVED
12
LAND DEVELOPMENT SECTION

ÅSA M. NILSSON-WEBER
NEW MEXICO
17631
LICENSED PROFESSIONAL ENGINEER
8-12-16

ISAACSON & ARFMAN, P.A.
Consulting Engineering Associates

Thomas O. Isaacson, PE & LS
Fred C. Arfman, PE
Åsa Nilsson-Weber, PE

I&A Project No 2174/1821

SEPTEMBER 7, 2016

REVISED/SUPPLEMENTAL CALCULATIONS

FOR

STORMCLOUD SUBDIVISION, UNITS 4A & 4B

A 181-DWELLING UNIT SINGLE-DETACHED RESIDENTIAL SUBDIVISION

ALBUQUERQUE, NEW MEXICO

Revised/supplemental calculations for the Drainage Report for Stormcloud Subdivision Units 4A&4B, dated 8/12/16 prepared by Isaacson & Arfman, P.A.

BY

ÅSA M. NILSSON-WEBER
NEW MEXICO
17631
LICENSED PROFESSIONAL ENGINEER

9-7-16

ISAACSON & ARFMAN, P.A.
Consulting Engineering Associates

Thomas O. Isaacson, PE & LS
Fred C. Arfman, PE
Åsa Nilsson-Weber, PE

I&A Project No. 2174/1821

Received
9-7-16
Abel C.

EXPLANATION OF REVISIONS

The revised calculations include the following:

Appendix E

- Revised storm drain calculations for the Gunnison storm drain system based on a downstream WSEL of 5264.5 in the first flush pond.
- Added storm drain calculations for the outfall pipe from the first flush pond to the Mirehaven Arroyo.
- Added calculations for the outfall pipe from the first flush pond to the Mirehaven Arroyo.

Appendix F

- Revised first flush volume calculations based on a water surface elevation of 5264.5 (previously set at 5266.0).

The storm drain calculations for the Gunnison storm drain indicates that the HGL is 0.2'-0.3' higher than the top of grate at sump inlets #9 & 10 (line 6) and 0.4'-0.5' higher than top of grate at sump inlets #5 & 6 (line 10). This is acceptable since the flows will be contained in the street.

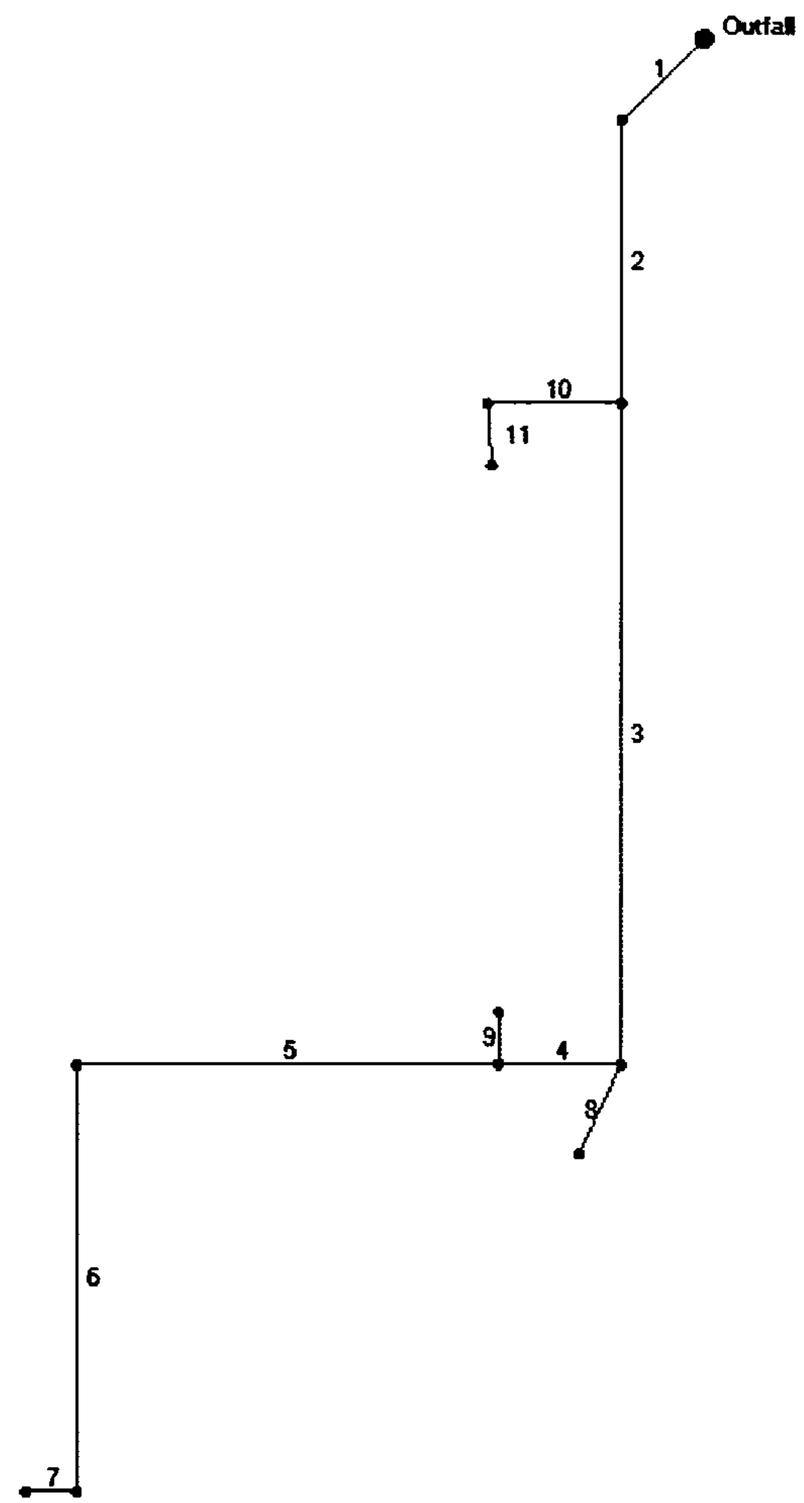
The first flush volume calculations resulted in a total available volume of ~14,770 cf, which is greater than the required volume of ~12,600 cf.

APPENDIX E

Revised Gunnison Storm Drain Calculations

Added Storm Drain Calculations for Storm Drain Pipe from First Flush Pond to the Mirehaven Arroyo

GUNNISON SD



Project File: 1821 GUNNISON SD.stm	Number of lines 11	Date: 8/11/2016

Storm Sewers v11.00

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
1		42.60	36	Cir	52.000	60 50	61.09	1.135	64.50*	64.71*	0.50	65.21	End	Manhole
2		20.20	36	Cir	288.000	61.19	62.34	0.399	65.21*	65.48*	0.13	65.61	1	Manhole
3		17.20	24	Cir	52.970	62.44	62.65	0.396	65.61*	65.91*	0.47	66.38	2	Manhole
4		14.00	24	Cir	182.000	62.75	63.48	0.401	66.38*	67.08*	0.31	67.39	3	Manhole
5		14.00	24	Cir	186.000	63 58	64.13	0.296	67.39*	68.10*	0.46	68.56	4	Generic
6		7.00	18	Cir	22.000	64.23	64.30	0.318	68.56*	68.66*	0.24	68.90	5	Generic
7		3.00	18	Cir	42.800	62 44	62.77	0.771	65.61*	65.64*	0.04	65.69	2	Generic
8		3.20	18	Cir	23.000	62.97	64.40	6.217	66.38*	66.40*	0.05	66.45	3	Generic
9		22.40	24	Cir	57.800	61.19	62.40	2.093	65.21*	65.78*	1.19	66.97	1	Generic
10		11.20	24	Cir	27.100	62.60	62.75	0.554	66.97*	67.03*	0.20	67.23	9	Generic

GUNNISON SD | Number of lines: 10 | Run Date: 9/3/2016

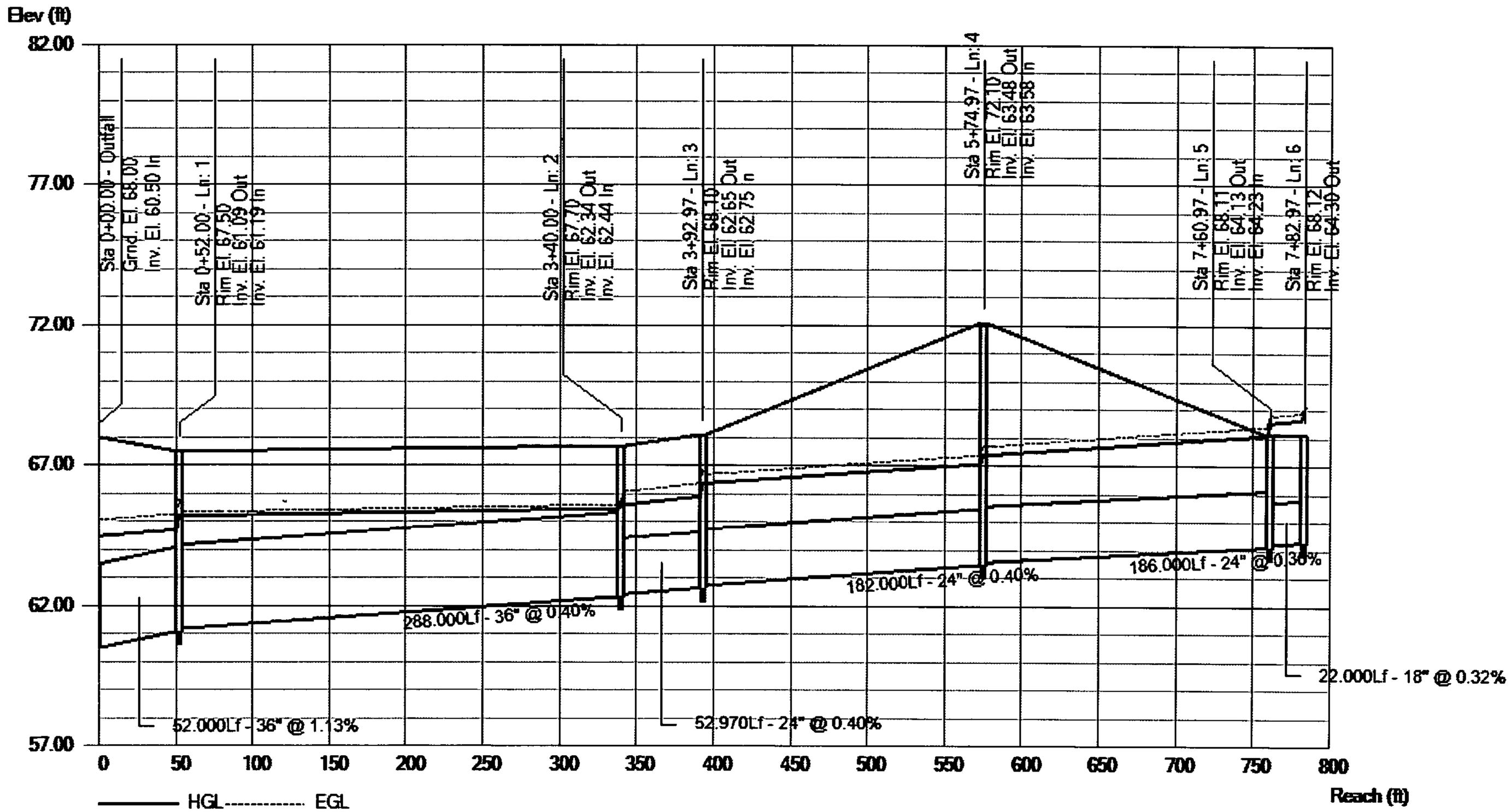
NOTES: Return period = 2 Yrs. ; *Surcharged (HGL above crown).

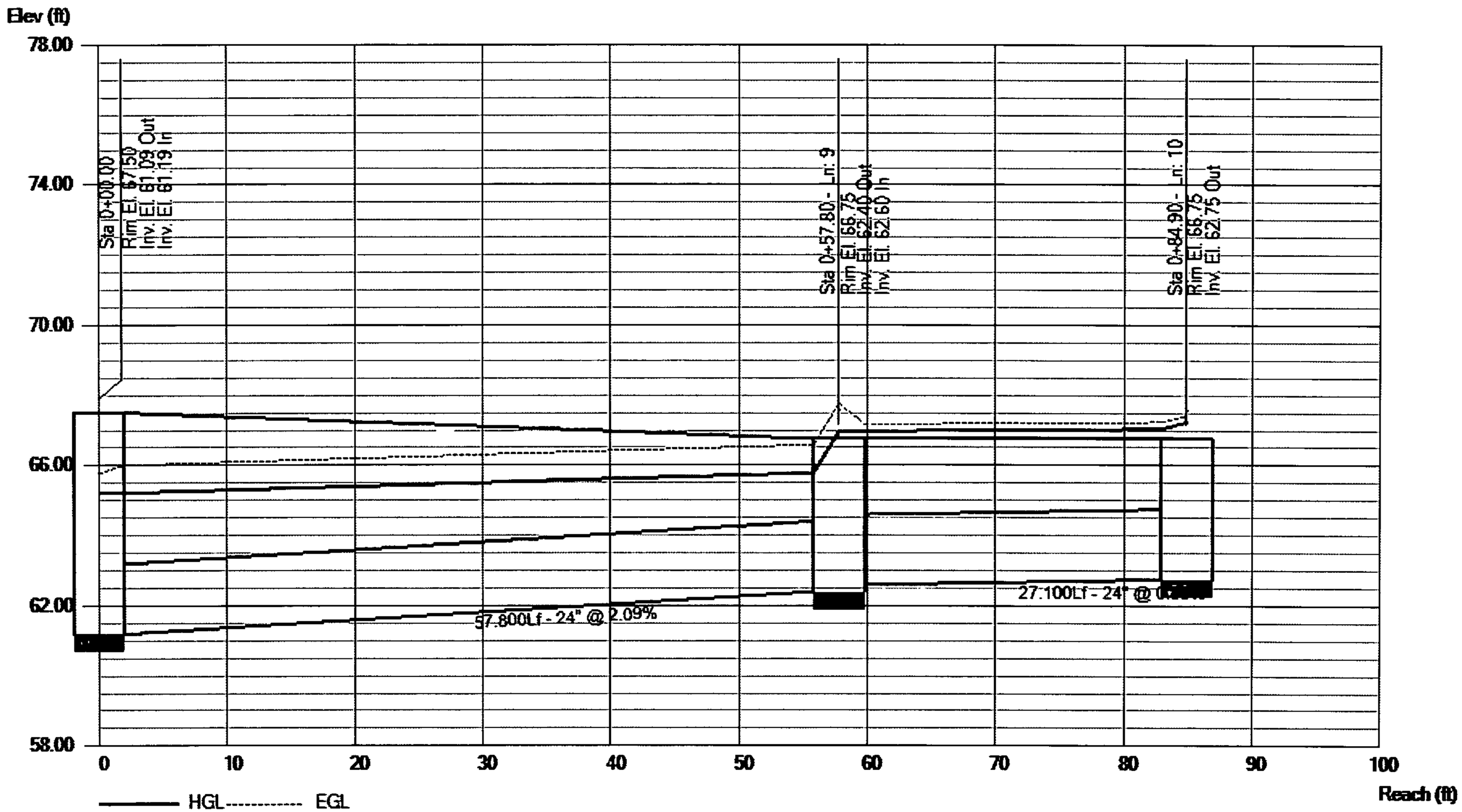
Storm Sewer Tabulation

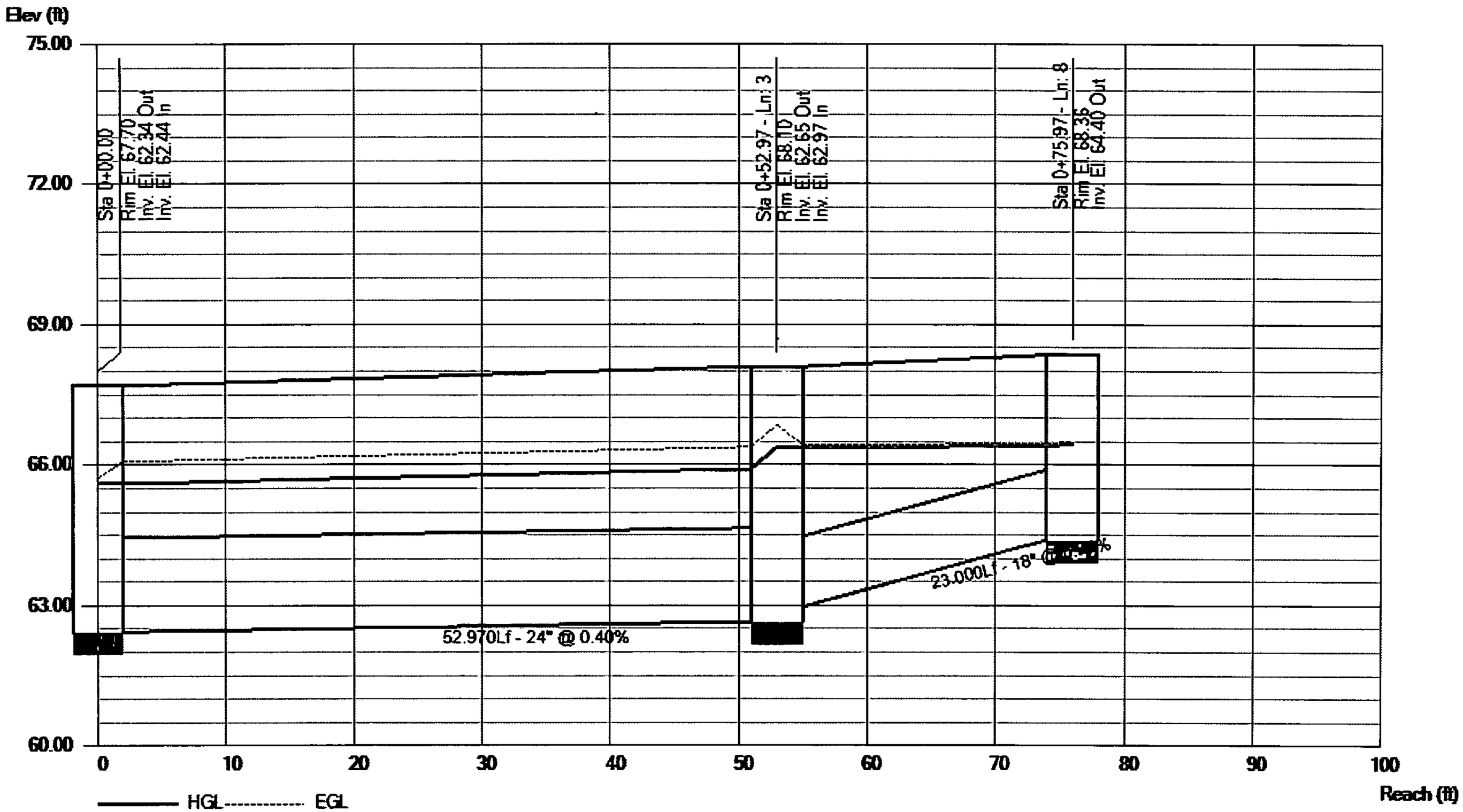
Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	52.000	0.00	0.00	0.00	0.00	0.00	0.0	3.3	0.0	42.60	71.04	6.03	36	1.13	60.50	61.09	64.50	64.71	68.00	67.50	
2	1	288.000	0.00	0.00	0.00	0.00	0.00	0.0	1.6	0.0	20.20	42.14	2.86	36	0.40	61.19	62.34	65.21	65.48	67.50	67.70	
3	2	52.970	0.00	0.00	0.00	0.00	0.00	0.0	1.5	0.0	17.20	14.24	5.48	24	0.40	62.44	62.65	65.61	65.91	67.70	68.10	
4	3	182.000	0.00	0.00	0.00	0.00	0.00	0.0	0.8	0.0	14.00	14.32	4.46	24	0.40	62.75	63.48	66.38	67.08	68.10	72.10	
5	4	186.000	0.00	0.00	0.00	0.00	0.00	0.0	0.1	0.0	14.00	12.30	4.46	24	0.30	63.58	64.13	67.39	68.10	72.10	68.11	
6	5	22.000	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	7.00	5.92	3.96	18	0.32	64.23	64.30	68.56	68.66	68.11	68.12	
7	2	42.800	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	3.00	9.22	1.70	18	0.77	62.44	62.77	65.61	65.64	67.70	66.17	
8	3	23.000	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	3.20	26.18	1.81	18	6.22	62.97	64.40	66.38	66.40	68.10	68.36	
9	1	57.800	0.00	0.00	0.00	0.00	0.00	0.0	0.1	0.0	22.40	32.72	7.13	24	2.09	61.19	62.40	65.21	65.78	67.50	66.75	
10	9	27.100	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	11.20	16.83	3.57	24	0.55	62.60	62.75	66.97	67.03	66.75	66.75	

GUNNISON SD	Number of lines: 10	Run Date: 9/3/2016

NOTES:Intensity = 69.87 / (Inlet time + 13.10) ^ 0.87; Return period =Yrs. 2 ; c = cir e = ellip b = box


Elev (ft)
82.00
77.00
72.00
67.00
62.00
57.00
Sta 0+00.00 - Outfall
Grnd. El. 68.00
Inv. El. 60.50 In
Sta 0+52.00 - Ln: 1
Rim El. 67.50
Inv. El. 61.09 Out
Inv. El. 61.19 In
Sta 3+40.00 - Ln: 2
Rim El. 67.70
Inv. El. 62.34 Out
Inv. El. 62.44 In
Sta 3+92.97 - Ln: 3
Rim El. 68.10
Inv. El. 62.65 Out
Inv. El. 62.75 In
Sta 5+74.97 - Ln: 4
Rim El. 72.10
Inv. El. 63.48 Out
Inv. El. 63.58 In
Sta 7+60.97 - Ln: 5
Rim El. 68.11
Inv. El. 64.13 Out
Inv. El. 64.23 In
Sta 7+82.97 - Ln: 6
Rim El. 68.12
Inv. El. 64.30 Out
52.000Lf - 36" @ 1.13%
288.000Lf - 36" @ 0.40%
52.970Lf - 24" @ 0.40%
182.000Lf - 24" @ 0.40%
186.000Lf - 24" @ 0.36%
22.000Lf - 18" @ 0.32%
0
50
100
150
200
250
300
350
400
450
500
550
600
650
700
750
800
Reach (ft)
HGL
EGL


Elev (ft)
78.00
74.00
70.00
66.00
62.00
58.00
Sta 0+00.00
Rim El. 67.50
Inv. El. 61.09 Out
Inv. El. 61.19 In
Sta 0+57.80 - Ln: 9
Rim El. 66.75
Inv. El. 62.40 Out
Inv. El. 62.60 In
Sta 0+84.90 - Ln: 10
Rim El. 66.75
Inv. El. 62.75 Out
57.800Lf - 24" @ 2.09%
27.100Lf - 24" @
0
10
20
30
40
50
60
70
80
90
100
Reach (ft)
HGL
EGL


Elev (ft)
75.00
72.00
69.00
66.00
63.00
60.00
Sta 0+00.00
Rim El. 67.70
Inv. El. 62.34 Out
Inv. El. 62.44 In
Sta 0+52.97 - Ln: 3
Rim El. 68.10
Inv. El. 62.65 Out
Inv. El. 62.97 In
Sta 0+75.97 - Ln: 8
Rim El. 68.36
Inv. El. 64.40 Out
52.970Lf - 24" @ 0.40%
23.000Lf - 18"
0
10
20
30
40
50
60
70
80
90
100
Reach (ft)
HGL
EGL

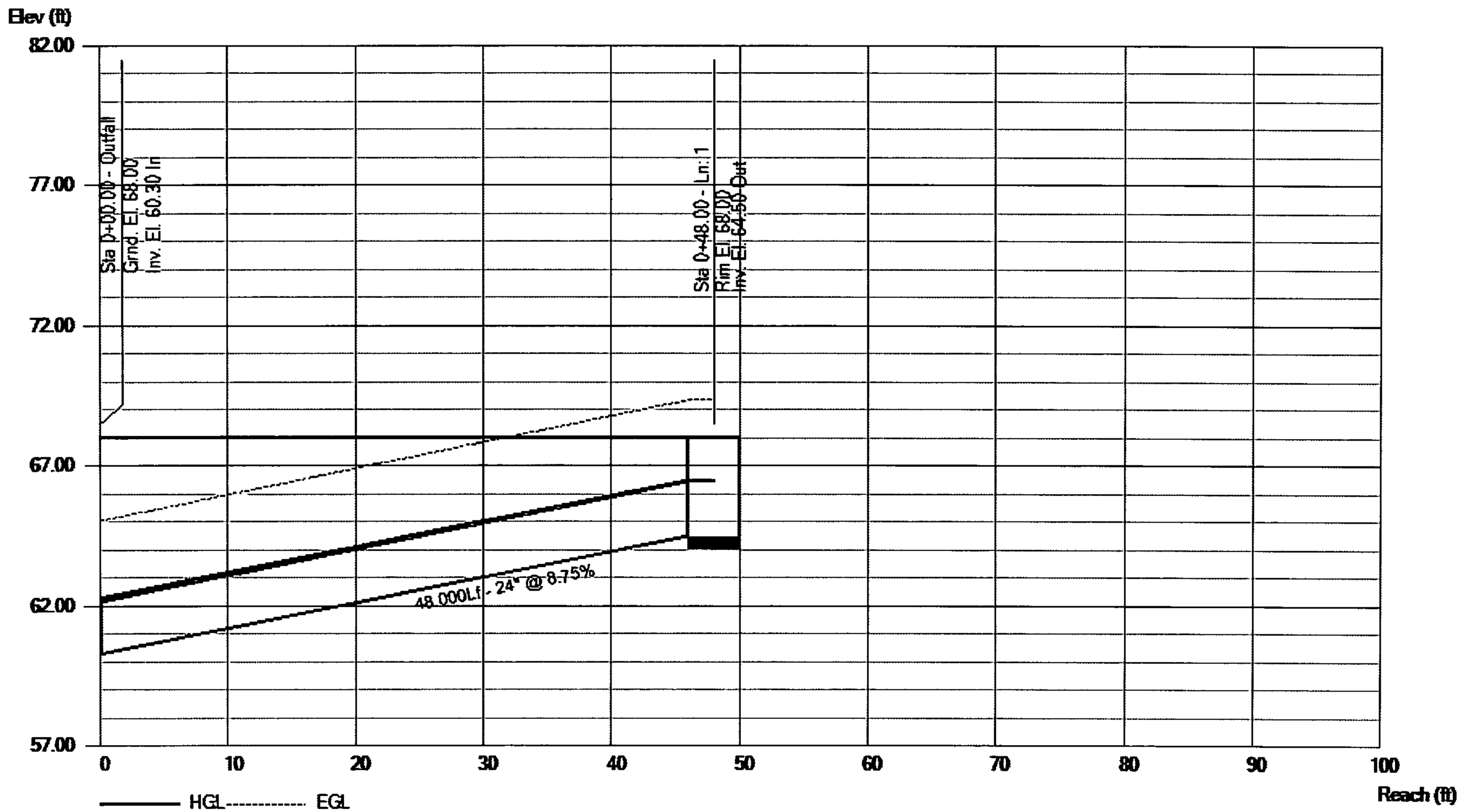
SD PIPE FROM FIRST FLUSH POND TO MIREHAVEN ARROYO

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
1		42.60	24	Cir	48.000	60.30	64.50	8.750	62.17	66.46	2.57	66.46	End	Manhole

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	48.000	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	42.60	66.90	13.78	24	8.75	60.30	64.50	62.17	66.46	68.00	68.00	


Elev (ft)
82.00
77.00
72.00
67.00
62.00
57.00
Sta 0+00.00 - Outfall
Grnd. El. 68.00
Inv. El. 60.30 In
Sta 0+48.00 - Ln: 1
Rim El. 68.00
Inv. El. 64.50 Out
48.000LF - 24" @ 8.75%
0
10
20
30
40
50
60
70
80
90
100
Reach (ft)
HGL
EGL

APPENDIX F

First Flush Calculations

Required First Flush Volume

The total first flush volume required (the first 0.34 inches) is calculated as follows:

181 lots * (70*35) sf pad size *0.34 in./12 in./ft = **12,564 cf.**

Pond in Tract E

The pond in Tract E will treat and store the first flush volumes for the basins draining to the Mirehaven Arroyo. This pond will accept flows from not only the buildings, but the entire basins including streets.

Top of Pond Elev = 5268.0

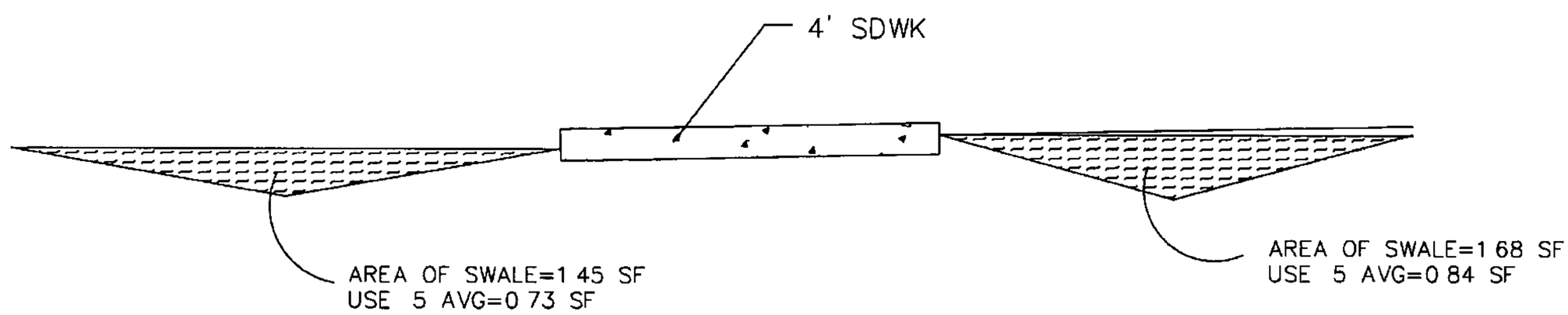
WSEL = 5264.5; Area = 2,426 sf

Bottom of Pond = 5260.5; Area = 714 sf

Pond Volume = (2,426+714)/2 * (5264.5-5260.5) = **6,280 cf**

Swales along Roadway and along Lot Frontage

The first flush from the remaining site will be stored/treated in swales along roadways and lot frontages. The volume for the swales are calculated per detail below.



TOTAL LENGTH OF FRONTAGE ADJACENT TO HOMES = 8,666 LF

LESS DRIVEWAYS 181 EA @ 18 FT = 3,258 LF

TOTAL FF VOLUME = 5,408 LF * (0 84 + 0 73) SF = 8,491 CF

Total Available First Flush Storage

Total available first flush storage = 6,280+8,491 cf = **14,771 cf > 12,564 cf required.**

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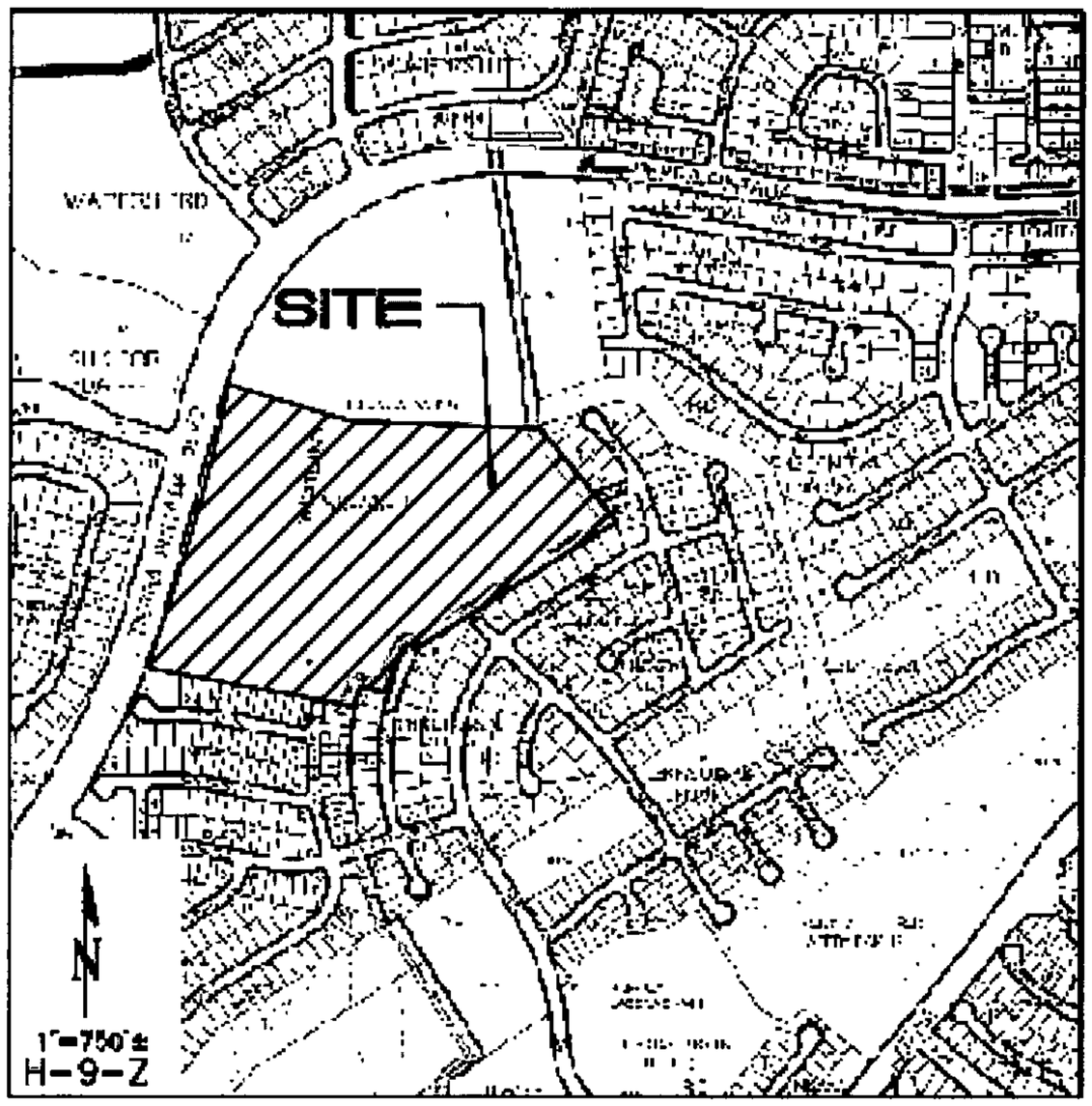
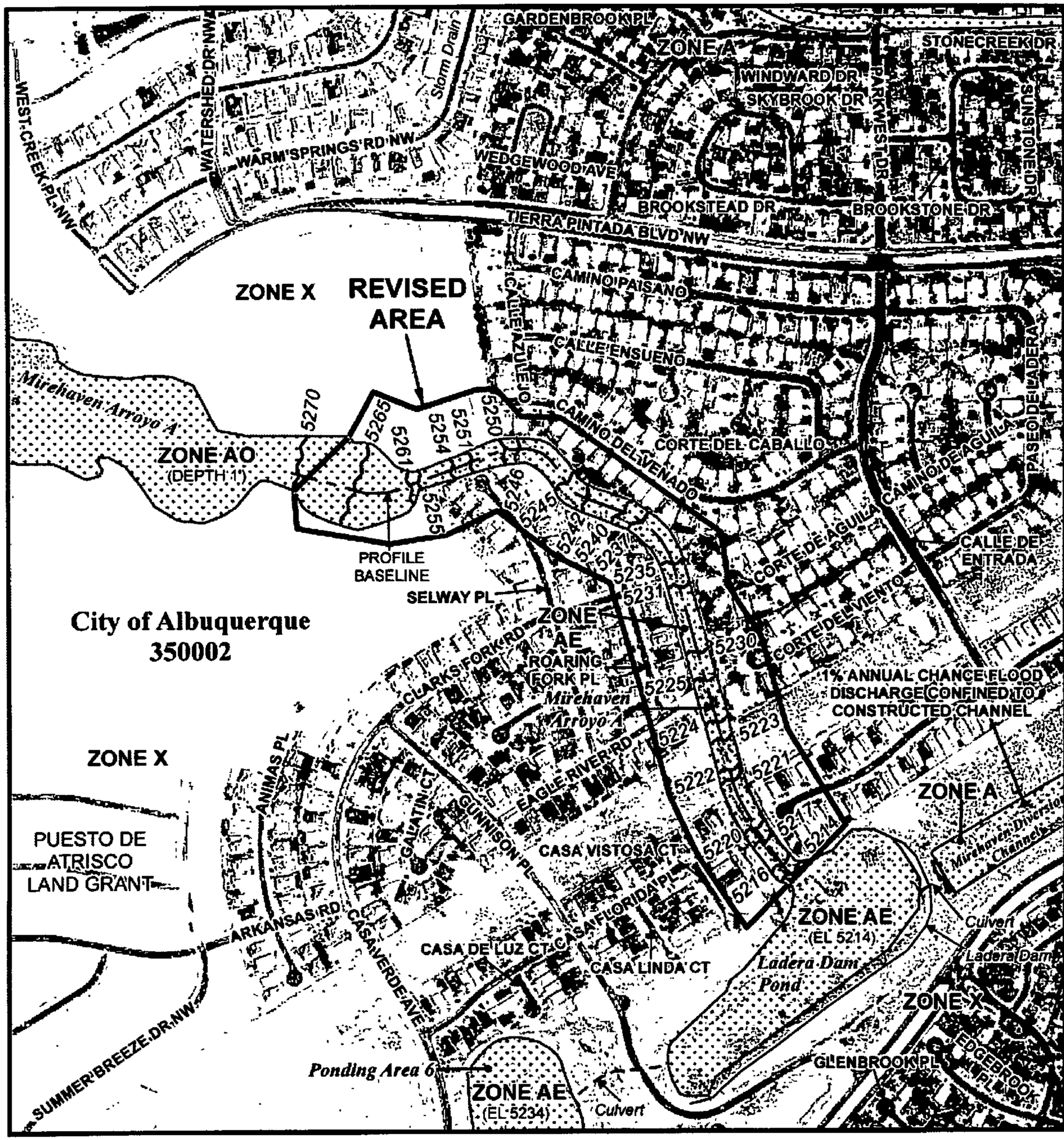
POCKETS

Units 4A & 4B Grading Plans



VICINITY MAP H-9-Z



MAP LEGEND

- 1% annual chance (100-Year) Floodplain
- 1% annual chance (100-Year) Floodway
- 0.2% annual chance (500-Year) Floodplain

BASE MAP IMAGERY DATED JANUARY 9, 2010 WAS OBTAINED FROM THE NAIP.

MAP SCALE 1" = 500'

500 250 0 500 FEET

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0326H

FIRM

FLOOD INSURANCE RATE MAP

BERNALILLO COUNTY, NEW MEXICO

AND INCORPORATED AREAS

PANEL 326 OF 825

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
ALBUQUERQUE, CITY OF	350002	0326	H
BERNALILLO COUNTY UNINCORPORATED AREAS	350001	0326	H

REVISED TO REFLECT LOMR EFFECTIVE: October 3, 2013

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

MAP NUMBER 35001C0326H

MAP REVISED AUGUST 16, 2012

Federal Emergency Management Agency

I. PROJECT INFORMATION

PROPOSED LEGAL DESCRIPTION:
Storm Cloud Subdivision, Units 4A & 4B

EXISTING LEGAL DESCRIPTION:
A portion of Tracts B & J, The Crossings, and Tract R, Storm Cloud Subdivision, Unit 3

ENGINEER: Isaacson & Arfman, P.A.
128 Monroe Street NE
Albuquerque, NM 87108
(505) 268-8828
Attn: Åsa Nilsson-Weber

SURVEYOR: Surv-Tek, Inc.
(505) 897-3366
Attn: Russ P. Hugg, NMPLS No. 9750

DEVELOPER: WALH, LLC
c/o The Garrett Group
Attn: Jeff Garrett

NUMBER OF PROPOSED DWELLING UNITS: 181

TOTAL AREA: Units 4A & 4B = 31.036 AC.
Mirehaven Arroyo = 2.802 Ac.

FLOOD PLAIN: This site lies within Zone "X" (areas determined to be outside the 0.2% annual chance floodplain), Zone "A0, (DEPTH 1')" (Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined), and Zone "AE" (Base Flood Elevations determined) as shown on National Flood Insurance Program Flood Insurance Rate Map Number 35001C0326H, Map Revised October 3, 2013.

II. INTRODUCTION—EXPLANATION OF REVISIONS

This site is bounded on the west and north by Tierra Pintada, NW, and on the east and south by existing subdivisions (see vicinity map). The Mirehaven Arroyo separates Unit 4 being on the south side and Unit 5 on the north side. The Storm Cloud Subdivision, Unit 4 layout was revised with more 45-foot wide lots resulting in an additional 27 lots (total 181 lots), but the street layout will remain the same. This report includes revised drainage calculations for hydrology and hydraulics because of the increased flow due to the higher percent impervious land treatment. This report also addresses the "first flush" requirements.

III. EXISTING CONDITIONS

The site has been graded and retaining and perimeter walls have been partially installed per the original grading plan. A retaining wall investigation has been performed, and a number of walls are failing and some have already collapsed. Unit 4 is graded to drain to the Mirehaven Arroyo, to a storm drain system in Summer Breeze Drive, and via surface flow to Gunnison Road and Animas Place.

IV. PROPOSED CONDITIONS

The site layout re-design resulted in that the lot count increased by 27 lots (from 154 to 181 lots). The site will be developed in two phases with 103 lots in Unit 4A and 78 lots in Unit 4B. The interior retaining walls and portions of the perimeter walls shall be removed and the site shall be re-graded.

The Grading & Drainage Plans and Retaining Wall Plans for Units 4A & 4B are included in the back pockets of this report.

LAND TREATMENTS & BASIN AREAS

Land treatment percent D was calculated based on the equation in DPM 22.2 Table A-6, and the remaining area was split between land treatments B and C. See Appendix A for land treatment calculations and basin area table and Appendix C for Drainage Basin Exhibits. The impervious percent land treatment increased from 49% to 56% due to the increased density.

HYDROLOGY

The 100-year, 6-hour flows were calculated using AHYMO. The summary file is included in Appendix B. The Drainage Basin Exhibits in Appendix C show the flow rates for each basin, street flow at critical analysis points (AP) and storm drain flows for each inlet. Below is a summary of discharge locations:

Unit 4:

- 30.2 cfs Summer Breeze Drive—30.0 to existing 36" storm drain and 0.2 cfs surface flow (29.8 cfs allowed)--Exeeded by 0.4 cfs OK. ok
- 3.3 cfs Animas Place south end—surface flow (3.5 cfs allowed)
- 18.9 cfs Animas Place north end—surface flow (20.5 cfs allowed)
- 12.5 cfs Gunnison Place—surface flow (13 cfs allowed)
- 43.1 cfs Mirehaven Arroyo—42.6 cfs to 36" storm drain ; 0.5 cfs surface flow

  108.0 cfs total

The total allowable discharge rates listed are per the approved drainage report for Storm Cloud Units 4 & 5 by Advanced Engineering, 2006.

The total flows increased by 3.0 cfs compared to the original layout that had 27 lots less.

STREET CAPACITY

The streets in Unit 4 will be public, and all streets will have mountable or standard curb and gutter. Appendix D shows street flow depths at critical analysis points, which are labeled on the Drainage Basin Exhibits in Appendix C.

STORM DRAIN

On-grade inlets were sized using DPM Plates 22.3-D5 and 22.3-D6, and sump inlet capacities were calculated based on the orifice equation (See Appendix E). There will be two separate storm drain systems on Units 4A & 4B. Hydraflow Storm Sewer Calculations are included in Appendix E.

A 36" storm drain with two on-grade inlets in Chinook Road and two sump inlets in Summer Breeze Drive will convey 30.0 cfs to an existing 36" storm drain at the south end of the site. In case the sump inlets would clog, emergency overflow would be directed south in Summer Breeze Drive. The starting HGL for the storm drain was assumed at 62.7 per HGL shown on the as-built drawing.

A 36"/24" storm drain system discharges 42.6 cfs to the Mirehaven Arroyo. The storm drain extends from the Mirehaven Arroyo, a drainage easement, through Gunnison Place and Jet Stream Road, and terminates at two sump inlets in Summer Breeze Dr. In case of clogging, the emergency

overflow would be directed south to the sump inlets connecting to the two sump inlets connected to the storm drain system in Summer Breeze Drive, which have been conservatively sized with double grates. Three on-grade inlets are located at the intersection of Jet Stream Rd and Gunnison Place, and two sump inlets are located in Monsoon Drive. The emergency overflow would be directed to the east in Monsoon Drive, and continue northeast in Animas Place.

SIDEWALK CULVERT

The size of the park in Unit 4A was reduced to nearly half the size with the new layout, and therefore, the sidewalk culvert at the northeast corner of the park at Animas Place has been reduced from a 3' sidewalk culvert to a 2' sidewalk culvert.

FIRST FLUSH REQUIREMENTS

The total first flush volume required (to capture the first 0.34 inches) is 12,564 cf. There will be a first flush pond constructed in a drainage easement on Tract E adjacent to the Mirehaven Arroyo to capture and treat the first flush volumes from the basins draining to the Mirehaven Arroyo (approximately 40% of the site). This pond will accept flows from the entire basins, including roadways—not only the building areas.

The first flush volumes from the remainder of the site shall be treated and stored in swales adjacent to the roadway and in the front yards of the lots per detail shown on the details on the grading plan in the back pocket. The total first flush volume available for the total site is 30,620 cf. See Appendix F for calculations.

MIREHAVEN ARROYO

The channel improvements shall be constructed with either Unit 4A or Unit 5 to the north, whichever is developed first.

TIERRA PINTADA

The Tierra Pintada street improvements have been completed, and the only improvement required with the Units 4A & 4B developments is a multi-use trail adjacent to the site.

Check I.C.

V. SUMMARY & CONCLUSIONS

The site will be developed in two phases—Unit 4A and Unit 4B, with 4A being developed first. The Mirehaven Arroyo channel shall be constructed with either Unit 4A or Unit 5 to the north, whichever is first to be developed.

Based on this report, it is recommended that the following improvements be constructed (as shown on the Grading Plans in the back pockets) with Units 4A and 4B:

- Standard or mountable curb as shown on plans
- Retaining walls as shown on plans
- Inlets as shown on plans
- 18"-36" storm drains as shown on plans
- 2' sidewalk culvert to convey flows from park tract onto Animas Place
- A pond with standpipe located in Tract E between lots 18 & 19 adjacent to the Mirehaven Arroyo and swales between curb and sidewalk and on lot frontages to treat and store first flush volumes

How is this handled on the I.L.?

APPENDIX A

Land Treatments & Basin Areas

LAND TREATMENT CALCULATIONS

(Per the City of Albuquerque DPM Section 22.2, Table A-5)

PROJECT NAME: **Storm Cloud, Units 4A & 4B**

JOB NUMBER: 1821

Total Area 31.04 Acres

# of Lots 181 lots

N = 5.83 D.U./Ac.

Percentage of Impervious Land (Type D)

$\%D = 7(N^2+5N)^{1/2}$

%D= 55.63 %

A+D= 55.63 %

B+C= 44.37 %

LAND TREATMENTS		USE	
Type A=	0 %	0	%
Type B=	22.18 %	22	%
Type C=	22.18 %	22	%
Type D=	55.63 %	56	%
Σ=	100 %		

STORM CLOUD, UNITS 4A & 4B

BASIN AREA AND LAND TREATMENT TABLE -- PROPOSED CONDITIONS

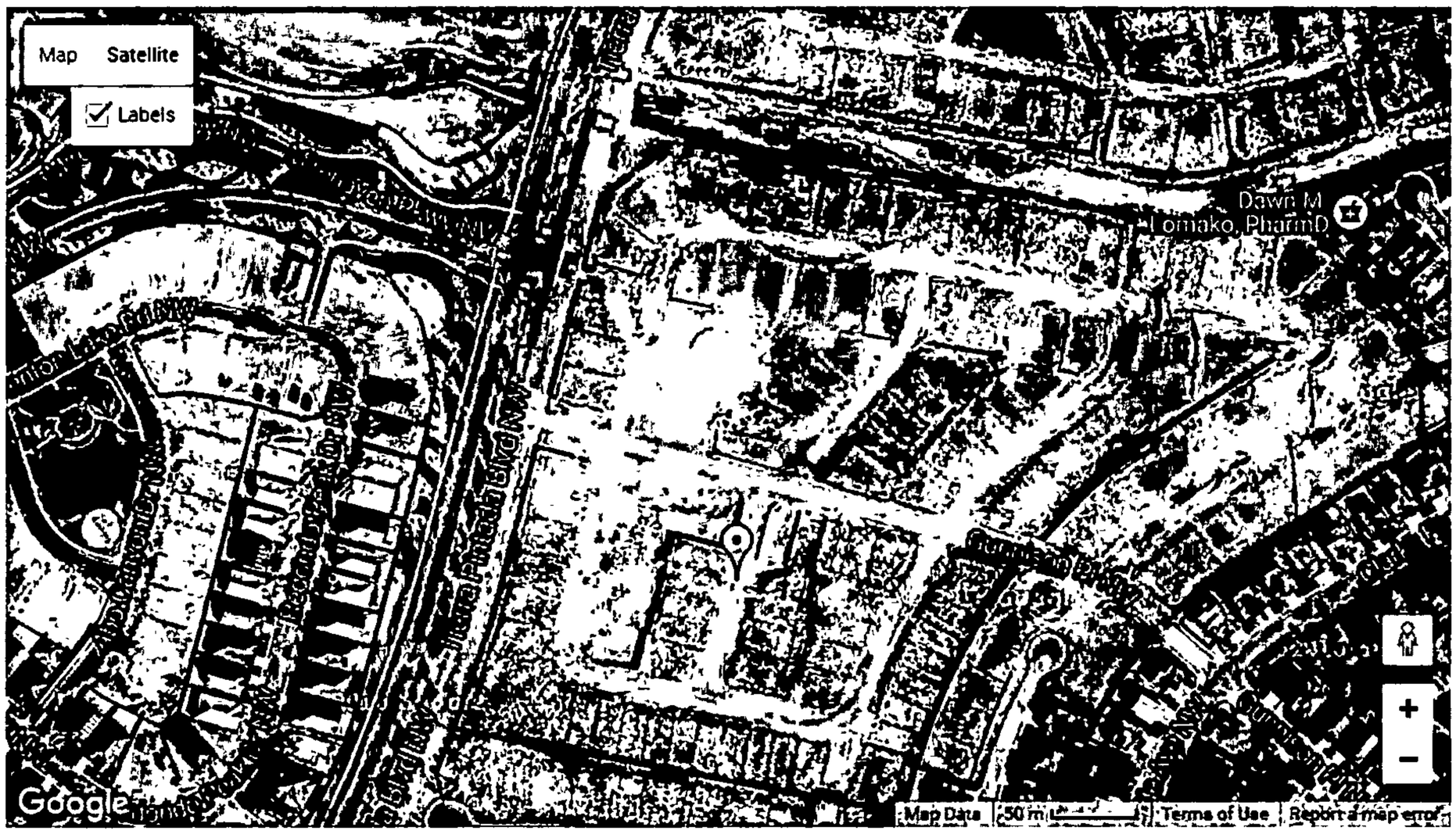
BASIN	AREA			LAND TREATMENT (%)				Q100, cfs
	SF	AC.	SQ. MI.	A	B	C	D	
A1	90130	2.0691	0.00323	0	22	22	56	7.2
A2	153082	3.5143	0.00549	0	22	22	56	12.2
A3	65521	1.5042	0.00235	0	22	22	56	5.2
A4	69002	1.5841	0.00248	0	22	22	56	5.5
A5	2625	0.0603	0.00009	0	22	22	56	0.2
B	41794	0.9595	0.00150	0	22	22	56	3.3
C	96700	2.2199	0.00347	0	22	22	56	7.7
D1	78985	1.8132	0.00283	0	22	22	56	6.3
D2	68298	1.5679	0.00245	0	22	22	56	5.5
D3	32372	0.7432	0.00116	0	22	22	56	2.6
D4	101608	2.3326	0.00364	0	22	22	56	8.1
D5	36266	0.8326	0.00130	0	22	22	56	2.9
D6	283100	6.4991	0.01015	0	22	22	56	22.5
D7	5772	0.1325	0.00021	0	22	22	56	0.5
E1	23200	0.5326	0.00083	0	22	22	56	1.9
E2	204000	4.6832	0.00732	0	22	22	56	16.2
TOTAL	1352456	31.0481	0.0485					107.8

Q100, cfs	OUTFALL LOCATIONS
18.9	Animas north surface flow
3.3	Animas south surface flow
12.5	Gunnison surface flow
0.2	Summer Breeze surface flow
30	Summer Breeze storm drain
42.6	Gunnison storm drain to Mirehaven
0.5	NW corner rundown to Mirehaven
108	TOTAL

APPENDIX B

Drainage Calculations

Latitude and Longitude of a Point



Clear / Reset | Remove Last Blue Marker | Center Red Marker

Get the Latitude and Longitude of a Point

When you click on the map, move the marker or enter an address the latitude and longitude coordinates of the point are inserted in the boxes below.

Latitude: 35.106723

Longitude: -106 742064

	Degrees	Minutes	Seconds
Latitude:	35	6	24 2028
Longitude:	-106	44	31.4298

Show Point from Latitude and Longitude

Use this if you know the latitude and longitude coordinates of a point and want to see where on the map the point is.

Use: **+** for *N* Lat or *E* Long **-** for *S* Lat or *W* Long.

Example: +40.689060 -74.044636

Note: Your entry should not have any embedded spaces.

Decimal Deg. Latitude:

Decimal Deg. Longitude:

Show Point

Example: **+34 40 50.12** for *34N 40' 50.12"*

	Degrees	Minutes	Seconds
Latitude:			
Longitude:			

Show Point

NOAA Atlas 14, Volume 1, Version 5
Location name: Albuquerque, New Mexico, US*
Latitude: 35.1067°, Longitude: -106.7421°
Elevation: 5286 ft*
* source: Google Maps

POINT PRECIPITATION FREQUENCY ESTIMATES

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

NOAA, National Weather Service, Silver Spring, Maryland

PF tabular | PF graphical | Maps & aerials

PF tabular

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

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.162 (0.139-0.189)	0.210 (0.179-0.245)	0.283 (0.240-0.331)	0.340 (0.289-0.396)	0.419 (0.353-0.487)	0.480 (0.404-0.558)	0.546 (0.455-0.633)	0.615 (0.509-0.713)	0.709 (0.581-0.824)	0.784 (0.638-0.910)
10-min	0.247 (0.212-0.288)	0.320 (0.273-0.373)	0.430 (0.366-0.503)	0.518 (0.439-0.603)	0.637 (0.537-0.741)	0.731 (0.615-0.849)	0.830 (0.693-0.963)	0.936 (0.775-1.08)	1.08 (0.885-1.25)	1.19 (0.971-1.39)
15-min	0.306 (0.263-0.357)	0.397 (0.338-0.463)	0.534 (0.454-0.624)	0.642 (0.545-0.747)	0.790 (0.666-0.919)	0.906 (0.762-1.05)	1.03 (0.859-1.19)	1.16 (0.961-1.34)	1.34 (1.10-1.55)	1.48 (1.20-1.72)
30-min	0.412 (0.353-0.481)	0.534 (0.455-0.623)	0.719 (0.611-0.841)	0.865 (0.734-1.01)	1.06 (0.897-1.24)	1.22 (1.03-1.42)	1.39 (1.16-1.61)	1.56 (1.29-1.81)	1.80 (1.48-2.09)	1.99 (1.62-2.31)
60-min	0.510 (0.438-0.595)	0.661 (0.564-0.771)	0.889 (0.756-1.04)	1.07 (0.908-1.25)	1.32 (1.11-1.53)	1.51 (1.27-1.75)	1.72 (1.43-1.99)	1.93 (1.60-2.24)	2.23 (1.83-2.59)	2.47 (2.01-2.86)
2-hr	0.592 (0.508-0.697)	0.757 (0.648-0.893)	1.01 (0.858-1.18)	1.21 (1.02-1.41)	1.48 (1.25-1.73)	1.71 (1.43-1.99)	1.95 (1.62-2.26)	2.20 (1.81-2.55)	2.56 (2.08-2.96)	2.85 (2.29-3.30)
3-hr	0.641 (0.558-0.752)	0.816 (0.707-0.958)	1.07 (0.929-1.25)	1.28 (1.10-1.49)	1.56 (1.33-1.81)	1.79 (1.52-2.08)	2.03 (1.72-2.36)	2.29 (1.92-2.66)	2.66 (2.20-3.08)	2.95 (2.42-3.44)
6-hr	0.740 (0.647-0.858)	0.936 (0.819-1.09)	1.21 (1.06-1.40)	1.43 (1.24-1.65)	1.72 (1.49-1.98)	1.95 (1.68-2.25)	2.20 (1.88-2.53)	2.45 (2.09-2.82)	2.81 (2.36-3.23)	3.10 (2.58-3.58)
12-hr	0.822 (0.724-0.936)	1.04 (0.913-1.18)	1.32 (1.16-1.50)	1.54 (1.35-1.75)	1.84 (1.60-2.08)	2.07 (1.79-2.34)	2.31 (1.99-2.61)	2.56 (2.19-2.90)	2.90 (2.45-3.28)	3.17 (2.67-3.60)
24-hr	0.938 (0.829-1.07)	1.18 (1.04-1.33)	1.47 (1.30-1.67)	1.71 (1.51-1.93)	2.03 (1.79-2.29)	2.27 (1.99-2.57)	2.53 (2.21-2.85)	2.79 (2.43-3.14)	3.14 (2.71-3.53)	3.41 (2.93-3.84)
2-day	0.985 (0.878-1.10)	1.24 (1.10-1.39)	1.54 (1.38-1.73)	1.79 (1.59-2.00)	2.12 (1.88-2.36)	2.36 (2.09-2.64)	2.62 (2.31-2.93)	2.88 (2.53-3.23)	3.23 (2.82-3.62)	3.50 (3.04-3.93)
3-day	1.13 (1.02-1.25)	1.41 (1.27-1.56)	1.75 (1.58-1.93)	2.01 (1.81-2.22)	2.37 (2.13-2.61)	2.64 (2.36-2.91)	2.91 (2.60-3.21)	3.19 (2.84-3.52)	3.56 (3.15-3.94)	3.84 (3.39-4.28)
4-day	1.28 (1.17-1.40)	1.58 (1.45-1.74)	1.95 (1.77-2.13)	2.23 (2.03-2.44)	2.62 (2.38-2.86)	2.91 (2.64-3.18)	3.20 (2.89-3.50)	3.50 (3.15-3.82)	3.88 (3.49-4.25)	4.18 (3.73-4.58)
7-day	1.46 (1.34-1.60)	1.82 (1.66-1.98)	2.22 (2.03-2.42)	2.53 (2.31-2.75)	2.94 (2.68-3.19)	3.24 (2.95-3.52)	3.55 (3.23-3.85)	3.84 (3.49-4.17)	4.22 (3.83-4.60)	4.51 (4.07-4.91)
10-day	1.63 (1.49-1.77)	2.02 (1.85-2.20)	2.48 (2.27-2.69)	2.83 (2.60-3.07)	3.31 (3.02-3.58)	3.66 (3.34-3.97)	4.02 (3.68-4.36)	4.37 (3.97-4.74)	4.83 (4.37-5.24)	5.17 (4.68-5.62)
20-day	2.05 (1.88-2.24)	2.55 (2.33-2.78)	3.10 (2.84-3.37)	3.51 (3.21-3.82)	4.04 (3.69-4.39)	4.42 (4.04-4.81)	4.80 (4.37-5.21)	5.15 (4.68-5.59)	5.59 (5.07-6.08)	5.91 (5.35-6.43)
30-day	2.46 (2.26-2.67)	3.06 (2.80-3.31)	3.69 (3.38-3.99)	4.15 (3.80-4.49)	4.73 (4.33-5.11)	5.15 (4.70-5.58)	5.54 (5.06-5.99)	5.92 (5.39-6.39)	6.37 (5.79-6.88)	6.68 (6.07-7.23)
45-day	3.01 (2.77-3.26)	3.72 (3.43-4.03)	4.44 (4.09-4.81)	4.96 (4.56-5.36)	5.58 (5.14-6.03)	6.01 (5.53-6.50)	6.41 (5.89-6.92)	6.76 (6.21-7.30)	7.16 (6.58-7.74)	7.41 (6.82-8.01)
60-day	3.47 (3.19-3.76)	4.30 (3.96-4.66)	5.13 (4.73-5.55)	5.72 (5.28-6.19)	6.44 (5.93-6.96)	6.93 (6.39-7.49)	7.38 (6.80-7.99)	7.79 (7.17-8.43)	8.26 (7.61-8.95)	8.56 (7.89-9.27)

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

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

Please refer to NOAA Atlas 14 document for more information.

```
AHYMO PROGRAM SUMMARY TABLE (AHYMO-S4)                    - Ver. S4.01a, Rel: 01a      RUN DATE (MON/DAY/YR) =08/05/2016
INPUT FILE = M:\PROJECTS\1800-1899\1821\CALCS\AHYMO\1821P1.DAT                        USER NO.= AHYMO_Temp_User:20122010

                              FROM  TO                  PEAK        RUNOFF                TIME TO    CFS      PAGE =   1
                HYDROGRAPH    ID    ID        AREA    DISCHARGE     VOLUME      RUNOFF     PEAK     PER
COMMAND       IDENTIFICATION  NO.   NO.     (SQ MI)     (CFS)       (AC-FT)    (INCHES)  (HOURS)    ACRE     NOTATION

*S*******************************************************************
*S       STORM CLOUD, UNIT 4
*S       DEVELOPED CONDITIONS
*S       100-YR, 6-HR STORM
*S       1821P1.DAT
*S       AUGUST 2016
*S       BY ASA NILSSON-WEBER
*S       ISAACSON & ARFMAN, P.A.
*S*******************************************************************
START                                                                                                   TIME=      0.00
RAINFALL  TYPE= 1 NOAA 14                                                                               RAIN6=    2.200
*S  BASIN A1
COMPUTE NM HYD        101.00   -     1       0.00323        7.18       0.253      1.46703    1.530    3.474 PER IMP=  56.00
*S  BASIN A2
COMPUTE NM HYD        102.00   -     2       0.00549       12.20       0.430      1.46703    1.530    3.471 PER IMP=  56.00
*S  BASIN A3
COMPUTE NM HYD        103.00   -     3       0.00235        5.23       0.184      1.46703    1.530    3.478 PER IMP=  56.00
*S  BASIN A4
COMPUTE NM HYD        104.00   -     4       0.00248        5.52       0.194      1.46703    1.530    3.477 PER IMP=  56.00
*S  BASIN A5
COMPUTE NM HYD        105.00   -     5       0.00009        0.22       0.007      1.46703    1.530    3.786 PER IMP=  56.00
*S  BASIN B
COMPUTE NM HYD        106.00   -     6       0.00150        3.34       0.117      1.46703    1.530    3.484 PER IMP=  56.00
*S  BASIN C
COMPUTE NM HYD        107.00   -     7       0.00347        7.71       0.271      1.46703    1.530    3.474 PER IMP=  56.00
*S  BASIN D1
COMPUTE NM HYD        108.00   -     8       0.00283        6.29       0.221      1.46703    1.530    3.476 PER IMP=  56.00
*S  BASIN D2
COMPUTE NM HYD        109.00   -     9       0.00245        5.45       0.192      1.46703    1.530    3.477 PER IMP=  56.00
*S  BASIN D5
COMPUTE NM HYD        110.00   -    10       0.00130        2.90       0.102      1.46703    1.530    3.487 PER IMP=  56.00
*S  BASIN D3
COMPUTE NM HYD        111.00   -    11       0.00116        2.59       0.091      1.46703    1.530    3.490 PER IMP=  56.00
*S  BASIN D4
*S  *** AP5 ***
COMPUTE NM HYD        112.00   -    12       0.00364        8.09       0.285      1.46703    1.530    3.473 PER IMP=  56.00
*S  BASIN D6
COMPUTE NM HYD        113.00   -    13       0.01015       22.53       0.794      1.46703    1.530    3.469 PER IMP=  56.00
*S  BASIN D7
COMPUTE NM HYD        114.00   -    14       0.00021        0.48       0.016      1.46703    1.530    3.600 PER IMP=  56.00
*S  BASIN E1
COMPUTE NM HYD        115.00   -    15       0.00083        1.86       0.065      1.46703    1.530    3.499 PER IMP=  56.00
*S  BASIN E2
```

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION
COMPUTE NM HYD	116.00	-	16	0.00732	16.25	0.573	1.46703	1.530	3.470	PER IMP= 56.00
*S ROUTE FLOWS FROM BASIN A1 THROUGH 30' F-F STREET										
ROUTE MCUNGE	200.00	1	20	0.00323	7.18	0.253	1.46698	1.550	3.475	CCODE = 0.2
*S ADD BASINS A1 & A2										
*S *** AP1 ***										
ADD HYD	200.10	2&20	21	0.00872	19.28	0.682	1.46696	1.540	3.455	
*S DIVIDE FLOWS, 7.6 CFS TO SD; REM. IN STREET										
DIVIDE HYD	220.SD	21	22	0.00635	7.60	0.497	1.46696	1.410	1.869	
	230.ST	and	23	0.00237	11.68	0.185	1.46696	1.540	7.711	
*S ADD BASINS A3 & D1										
*S *** AP2 ***										
ADD HYD	240.00	3& 8	24	0.00518	11.53	0.405	1.46692	1.530	3.476	
*S ROUTE FLOWS FROM BASIN A3 THROUGH 26' F-F STREET										
ROUTE MCUNGE	200.00	3	25	0.00235	5.23	0.184	1.46696	1.540	3.476	CCODE = 0.2
*S ADD FLOWS AT BASIN AP3-LOW POINT										
*S *** AP3 ***										
ADD HYD	260.00	25& 4	26	0.00483	10.72	0.378	1.46691	1.540	3.467	
ADD HYD	270.00	23&26	27	0.00720	22.40	0.563	1.46692	1.540	4.863	
*S ROUTE FLOWS FROM BASIN D2 THROUGH 26' F-F STREET										
ROUTE MCUNGE	280.00	9	28	0.00245	5.45	0.192	1.46697	1.540	3.477	CCODE = 0.2
*S ADD FLOWS AT AP4-LOW POINT (BASINS D1-D3)										
*S *** AP4 ***										
ADD HYD	290.00	8&11	29	0.00399	8.89	0.312	1.46689	1.530	3.480	
ADD HYD	300.00	28&29	30	0.00644	14.31	0.504	1.46690	1.530	3.472	
*S DIVIDE FLOWS FROM BASIN D4, 3.2 CFS TO SD; REM. IN STREET										
*S *** AP5 ***										
DIVIDE HYD	310.SD	12	31	0.00266	3.20	0.208	1.46695	1.400	1.882	
	320.ST	and	32	0.00098	4.89	0.077	1.46695	1.530	7.770	
*S ADD BASIN D5										
*S *** AP6 ***										
ADD HYD	330.00	10&32	33	0.00228	7.79	0.179	1.46687	1.530	5.332	
*S DIVIDE FLOWS, 3.0 CFS TO SD; REM. IN STREET										
DIVIDE HYD	340.SD	33	34	0.00152	3.00	0.119	1.46687	1.430	3.083	
	350.ST	and	35	0.00076	4.79	0.060	1.46687	1.530	9.810	
*S ADD BASIN C										
*S *** AP8 ***										
ADD HYD	360.00	7&35	36	0.00423	12.51	0.331	1.46693	1.530	4.616	
*S ADD BASINS E1 & E2										
*S *** AP9 ***										
ADD HYD	370.00	15&16	37	0.00815	18.11	0.638	1.46696	1.530	3.473	
FINISH										

APPENDIX C

Drainage Basin Exhibit

APPENDIX D

Street Flow Capacity Calculations

STREET NAME:	CHINOOK			1
LOCATION:	AP1; INLETS 1 & 2			
STREET INFORMATION		**HALF STREET CALCULATIONS**		
Slope	0.04	Road Width/2	15	
Q_{100}	19.3	Curb Height	0.67	
Right-of-way Width	51	1/2 Wetted Perimeter (P)	14.637	
Road Width	30	1/2 Area(STD)	2.059	
Curb Type	STD	1/2 Area(MDN)	—	
Road Cross Slope	0.02	1/2 Area(MTBL)	—	
Manning's N	0.017	Discharge (1/2 Q)	9.675	
Depth	0.287			

RESULTS

HGL

Q_{100} FLOWCAPACITY =	19.35 cfs	OK		
at an HGL Depth=	0.29 ft	<	Curb height =	0.67
		OK		

EGL

Velocity	4.70 fps			
$V^2/2g$	0.34 ft			
EGL Depth =	0.63 ft	<	Right-of-way height =	0.87
		OK		

STREET NAME:	WIND SOCK			2
LOCATION:	AP2			
STREET INFORMATION		**HALF STREET CALCULATIONS**		
Slope	0.034	Road Width/2	14	
Q_{100}	11.5	Curb Height	0.33	
Right-of-way Width	47	1/2 Wetted Perimeter (P)	12.444	
Road Width	28	1/2 Area(STD)	—	
Curb Type	MTBL	1/2 Area(MDN)	—	
Road Cross Slope	0.02	1/2 Area(MTBL)	1.488	
Manning's N	0.017	Discharge (1/2 Q)	5.783	
Depth	0.244			

RESULTS

HGL

Q_{100} FLOWCAPACITY =	11.57 cfs	OK		
at an HGL Depth=	0.24 ft	<	Curb height =	0.33
		OK		

EGL

Velocity	3.89 fps			
$V^2/2g$	0.23 ft			
EGL Depth =	0.48 ft	<	Right-of-way height =	0.51
		OK		

Basins
D1 + A3

STREET NAME:	SUMMER BREEZE			3
LOCATION:	AP3; INLETS 3 & 4			
STREET INFORMATION		**HALF STREET CALCULATIONS**		
Slope	0.005	Road Width/2	13	
Q_{100}	22.4	Curb Height	0.67	
Right-of-way Width	45	1/2 Wetted Perimeter (P)	13.442	
Road Width	26	1/2 Area(STD)	4.056	
Curb Type	STD	1/2 Area(MDN)	—	
Road Cross Slope	0.02	1/2 Area(MTBL)	—	
Manning's N	0.017	Discharge (1/2 Q)	11.233	
Depth	0.442			

RESULTS

HGL

Q_{100} FLOWCAPACITY =	22.47 cfs	OK		
at an HGL Depth=	0.44 ft	<	Curb height =	0.67
		OK		

EGL

Velocity	2.77 fps			
$V^2/2g$	0.12 ft			
EGL Depth =	0.56 ft	<	Right-of-way height =	0.85
		OK		

STREET FLOW CAPACITY CALCULATIONS, STORM CLOUD, UNITS 4A & 4B

STREET NAME: SUMMER BREEZE 4
LOCATION: AP4; INLETS 9 & 10

STREET INFORMATION		HALF STREET CALCULATIONS	
Slope	0.005	Road Width/2	13
Q_{100}	14	Curb Height	0.67
Right-of-way Width	46	1/2 Wetted Perimeter (P)	13.365
Road Width	26	1/2 Area(STD)	3.055
Curb Type	STD	1/2 Area(MDN)	—
Road Cross Slope	0.02	1/2 Area(MTBL)	—
Manning's N	0.017	Discharge (1/2 Q)	7.025

Depth: 0.365

RESULTS

HGL

Q_{100} FLOW CAPACITY = 14.05 cfs OK
at an HGL Depth= 0.37 ft < Curb height = 0.67
OK

EGL

Velocity 2.30 fps
$V^2/2g$ 0.08 ft
EGL Depth = 0.46 ft < Right-of-way height = 0.86
OK

STREET NAME: JET STREAM 5
LOCATION: AP5; INLET 8 =7.9 cfs north side

STREET INFORMATION		HALF STREET CALCULATIONS	
Slope	0.012	Road Width/2	15
Q_{100}	16.2	Curb Height	0.67
Right-of-way Width	51	1/2 Wetted Perimeter (P)	15.331
Road Width	30	1/2 Area(STD)	2.715
Curb Type	STD	1/2 Area(MDN)	—
Road Cross Slope	0.02	1/2 Area(MTBL)	—
Manning's N	0.017	Discharge (1/2 Q)	8.151

Depth: 0.331

RESULTS

HGL

Q_{100} FLOW CAPACITY = 16.30 cfs OK
at an HGL Depth= 0.33 ft < Curb height = 0.67
OK

EGL

Velocity 3.00 fps
$V^2/2g$ 0.14 ft
EGL Depth = 0.47 ft < Right-of-way height = 0.87
OK

STREET NAME: GUNNISON 6
LOCATION: AP6; INLET 7 =7.5 cfs west side

STREET INFORMATION		HALF STREET CALCULATIONS	
Slope	0.047	Road Width/2	15
Q_{100}	15.6	Curb Height	0.67
Right-of-way Width	51	1/2 Wetted Perimeter (P)	13.107
Road Width	30	1/2 Area(STD)	1.551
Curb Type	STD	1/2 Area(MDN)	—
Road Cross Slope	0.02	1/2 Area(MTBL)	—
Manning's N	0.017	Discharge (1/2 Q)	7.810

Depth: 0.257

RESULTS

HGL

Q_{100} FLOW CAPACITY = 15.62 cfs OK
at an HGL Depth= 0.26 ft < Curb height = 0.67
OK

EGL

Velocity 4.73 fps
$V^2/2g$ 0.35 ft
EGL Depth = 0.60 ft < Right-of-way height = 0.87
OK

STREET NAME:	MONSOON RD		7
LOCATION:	AP7; INLETS 5 & 6		
STREET INFORMATION		**HALF STREET CALCULATIONS**	
Slope	0.005	Road Width/2	15
Q_{100}	22.5	Curb Height	0.67
Right-of-way Width	51	1/2 Wetted Perimeter (P)	15.437
Road Width	30	1/2 Area (STD)	4.298
Curb Type	STD	1/2 Area (MDN)	—
Road Cross Slope	0.02	1/2 Area (MTBL)	—
Manning's N	0.017	Discharge (1/2 Q)	11.277
Depth	0.437		

RESULTS

HGL

Q_{100} FLOW CAPACITY =	22.55 cfs	OK	
at an HGL Depth=	0.44 ft	< OK	Curb height = 0.67

EGL

Velocity	2.62 fps		
$V^2/2g$	0.11 ft		
EGL Depth =	0.54 ft	< OK	Right-of-way height = 0.87

STREET NAME:	GUNNISON		8
LOCATION:	AP8		
STREET INFORMATION		**HALF STREET CALCULATIONS**	
Slope	0.04	Road Width/2	14
Q_{100}	12.5	Curb Height	0.67
Right-of-way Width	47	1/2 Wetted Perimeter (P)	12.444
Road Width	28	1/2 Area (STD)	1.488
Curb Type	STD	1/2 Area (MDN)	—
Road Cross Slope	0.02	1/2 Area (MTBL)	—
Manning's N	0.017	Discharge (1/2 Q)	6.272
Depth	0.244	Flow in West Haven Street = 14.57 cfs	

RESULTS

HGL

Q_{100} FLOW CAPACITY =	12.54 cfs	OK	
at an HGL Depth=	0.24 ft	< OK	Curb height = 0.67

EGL

Velocity	4.21 fps		
$V^2/2g$	0.28 ft		
EGL Depth =	0.52 ft	< OK	Right-of-way height = 0.85

STREET NAME:	ANIMAS PL		9
LOCATION:	AP9		
STREET INFORMATION		**HALF STREET CALCULATIONS**	
Slope	0.015	Road Width/2	14
Q_{100}	18.9	Curb Height	0.67
Right-of-way Width	47	1/2 Wetted Perimeter (P)	14.333
Road Width	28	1/2 Area (STD)	2.702
Curb Type	STD	1/2 Area (MDN)	—
Road Cross Slope	0.02	1/2 Area (MTBL)	—
Manning's N	0.017	Discharge (1/2 Q)	9.458
Depth	0.333		

RESULTS

HGL

Q_{100} FLOW CAPACITY =	18.92 cfs	OK	
at an HGL Depth=	0.33 ft	< OK	Curb height = 0.67

EGL

Velocity	3.50 fps		
$V^2/2g$	0.19 ft		
EGL Depth =	0.52 ft	< OK	Right-of-way height = 0.85

STREET NAME:	JET STREAM		10
LOCATION:	AP10		

STREET INFORMATION		HALF STREET CALCULATIONS	
Slope	0.051	Road Width/2	15
Q_{100}	11.3	Curb Height	0.33
Right-of-way Width	51	1/2 Wetted Perimeter (P)	11.450
Road Width	30	1/2 Area (STD)	—
Curb Type	MTBL	1/2 Area (MDN)	—
Road Cross Slope	0.02	1/2 Area (MTBL)	1.260
Manning's N	0.017	Discharge (1/2 Q)	5.670
Depth	0.225		

RESULTS

HGL

Q_{100} FLOWCAPACITY =	11.34 cfs	OK		
at an HGL Depth=	0.22 ft	<	Curb height =	0.33
		OK		

EGL

Velocity	4.50 fps			
$V^2/2g$	0.31 ft			
EGL Depth =	0.54 ft	>	Right-of-way height =	0.53

APPENDIX E

Sump Inlet and Storm Drain Calculations

STORM CLOUD, UNITS 4A & 4B

SUMP INLET CAPACITY

GRATE OPEN AREA:
(per COA std dwg #2220, single grate)

GROSS AREA FOR ONE GRATE =	(25 in/12)(40 in/12) =	6.94	SF
LESS BEARING BARS =	(0.5 in/12)(3.33 ft)(13) =	1.80	SF
LESS CROSS BARS =	(0.5 in/12)(7)[(25 in/12)-(13)(0.5 in/12)] =	0.45	SF
NET GRATE OPEN AREA =		4.69	SF
GRATE OPEN AREA (assuming 50% clogging factor) =		2.35	SF

ORIFICE EQUATION:

$$Q = CA(2gh)^{1/2}$$

Where:

C = 0.67
A = 2.35 ft^2
g = 32.2 ft/sec^2
h = height of the water surface above the grate

CAPACITY CALCULATIONS:

INLET # 3 & 4
LOCATION: SUMMER BREEZE AP-3

h = 0.67 ft
$Q_{(capacity)}$ = 10.32273 cfs REQUIRED Q = 22.4 cfs

NUMBER OF GRATES REQUIRED = 3

INLET # 5 & 6
LOCATION: MONSOON AP-7

h = 0.67 ft
$Q_{(capacity)}$ = 10.32273 cfs REQUIRED Q = 22.5 cfs

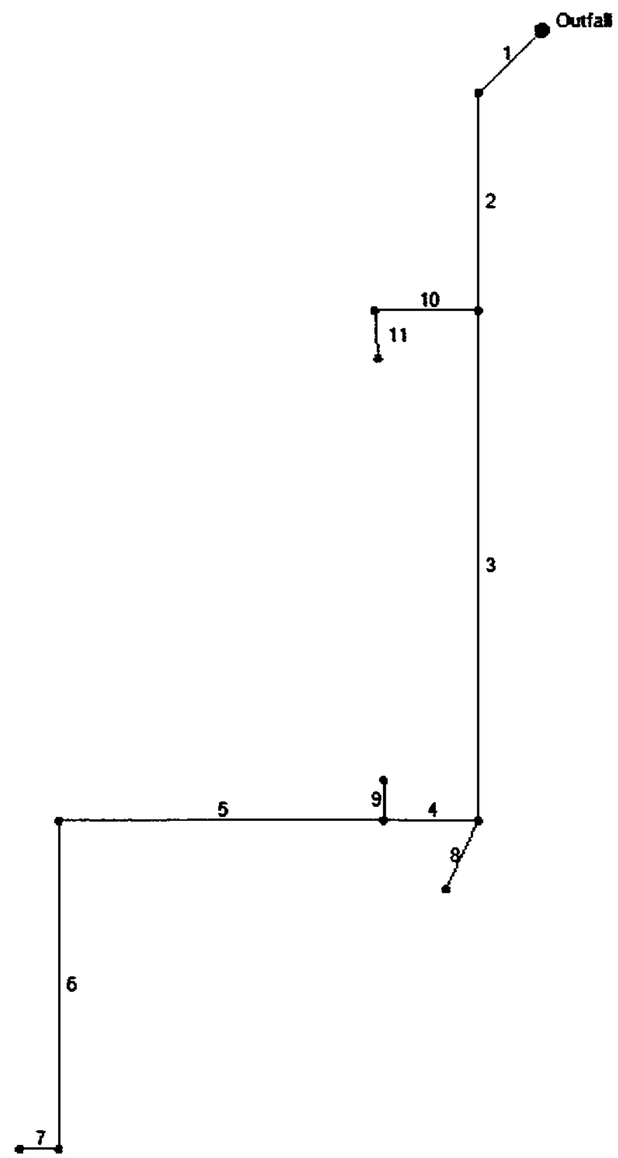
NUMBER OF GRATES REQUIRED = 3

INLET # 9 & 10
LOCATION: SUMMER BREEZE AP-4

h = 0.67 ft
$Q_{(capacity)}$ = 10.32273 cfs REQUIRED Q = 14 cfs

NUMBER OF GRATES REQUIRED = 2

GUNNISON SD



Project File: 1821 GUNNISON SD stm	Number of lines: 11	Date: 8/11/2016

Storm Sewers v11.00

Storm Sewer Summary Report

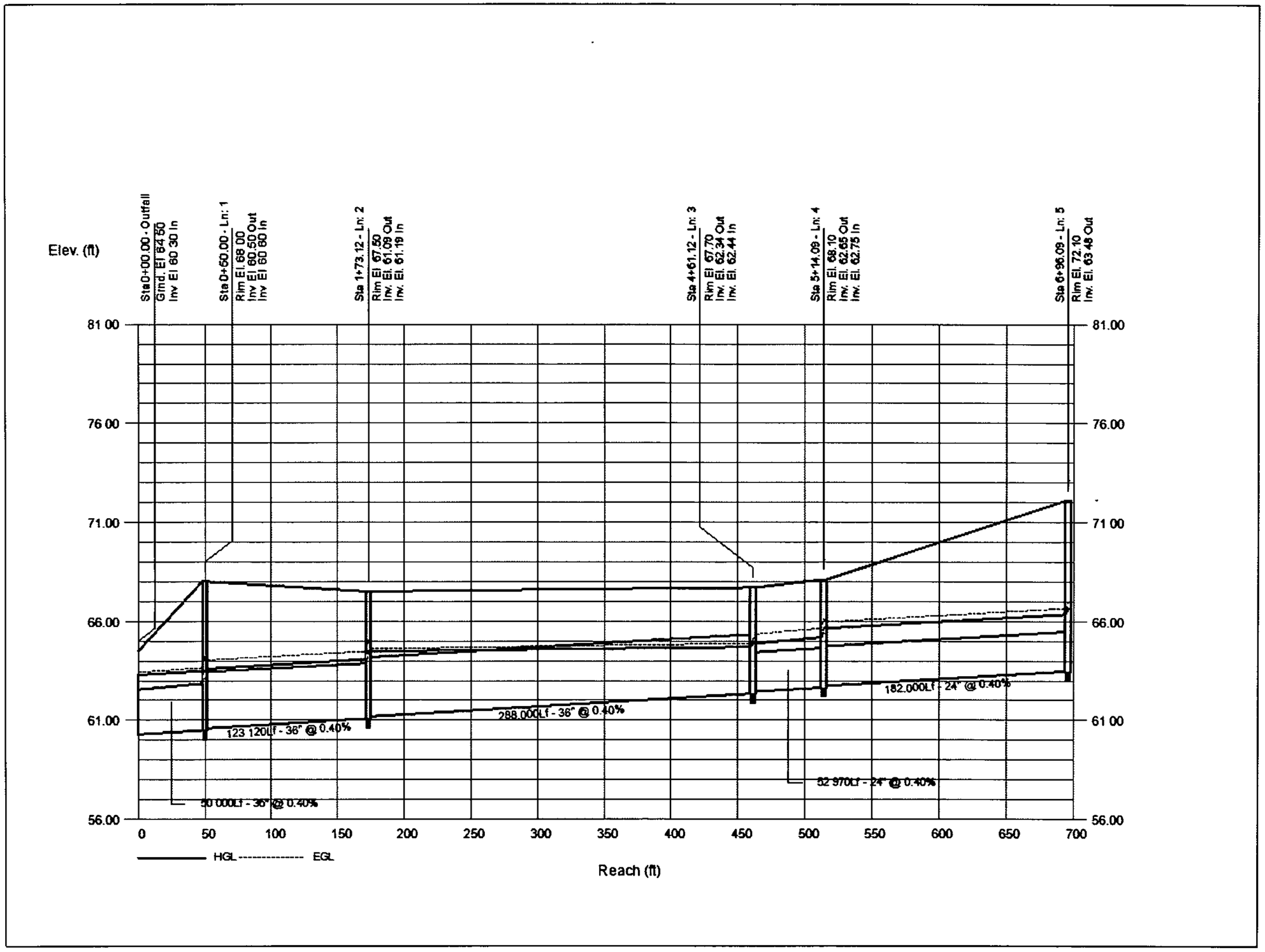
Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
1		42.60	36	Cir	50.000	60 30	60.50	0.400	62 55	62.86	0.59	63.46	End	Manhole
2		42.60	36	Cir	123.120	60.60	61.09	0.398	63.46	63.88	0.60	64.48	1	Manhole
3		20.20	36	Cir	288.000	61.19	62.34	0.399	64.48	64.70	0 18	64.88	2	Manhole
4		17.20	24	Cir	52.970	62.44	62.65	0.396	64 88*	65.19*	0 47	65.65	3	Manhole
5		14.00	24	Cir	182.000	62.75	63.48	0.401	65.65*	66.35*	0.31	66.66	4	Manhole
6		14.00	24	Cir	186.000	63.58	64.13	0.296	66 66*	67.37*	0 46	67.83	5	Generic
7		7.00	18	Cir	22.000	64.23	64.30	0.318	67 83*	67.93*	0 24	68.18	6	Generic
8		3.00	18	Cir	42.800	62.44	62.77	0.771	64.88*	64.91*	0.04	64.96	3	Generic
9		3.20	18	Cir	23 000	62.97	64.40	6.217	65.65	65.66	0.06	65.72	4	Generic
10		22.40	24	Cir	57 800	61.19	62.40	2.093	64.48*	65.05*	1.19	66 23	2	Generic
11		11.20	24	Cir	27.100	62.60	62.75	0.554	66.23*	66.30*	0.20	66.49	10	Generic

Summary | DOT | Inlet | FL-DOT | Calc | Cost | > | MyReport | ...

Line	To Line	Line Length	Incr. Area	Total Area	Runoff Coeff.	Incr C x A	Total C x A	Inlet Time	Time Conc	Rnfal Int	Total Runoff	Adnl Flow	Total Flow	Capac Full	Veloc	Pipe Size	Pipe Slope	Inv Elev Dn	Inv Elev Up	HGL Dn	HGL Up	Grnd/Rim Dn	Grnd/Rim Up	Line ID
		(ft)	(ac)	(ac)	(C)			(min)	(min)	(in/hr)	(cfs)	(cfs)	(cfs)	(cfs)	(ft/s)	(in)	(%)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
1	Outfall	50.000	0.00	0.00	0.00	0.00	0.00	0.0	3.7	0.0	0.00	0.00	42.60	42.18	7.31	36	0.40	60.30	60.50	62.55	62.86	64.50	68.00	
2	1	123.120	0.00	0.00	0.00	0.00	0.00	0.0	3.3	0.0	0.00	0.00	42.60	42.07	6.18	36	0.40	60.60	61.09	63.46	63.88	68.00	67.50	
3	2	288.000	0.00	0.00	0.00	0.00	0.00	0.0	1.6	0.0	0.00	0.00	20.20	42.14	3.12	36	0.40	61.19	62.34	64.48	64.70	67.50	67.70	
4	3	52.970	0.00	0.00	0.00	0.00	0.00	0.0	1.5	0.0	0.00	0.00	17.20	14.24	5.48	24	0.40	62.44	62.65	64.88	65.19	67.70	68.10	
5	4	182.000	0.00	0.00	0.00	0.00	0.00	0.0	0.8	0.0	0.00	0.00	14.00	14.32	4.46	24	0.40	62.75	63.48	65.65	66.35	68.10	72.10	
6	5	186.000	0.00	0.00	0.00	0.00	0.00	0.0	0.1	0.0	0.00	7.00	14.00	12.30	4.46	24	0.30	63.58	64.13	66.66	67.37	72.10	68.11	
7	6	22.000	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.00	7.00	7.00	5.92	3.96	18	0.32	64.23	64.30	67.83	67.93	68.11	68.12	
8	3	42.800	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.00	3.00	3.00	9.22	1.70	18	0.77	62.44	62.77	64.88	64.91	67.70	66.17	
9	4	23.000	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.00	3.20	3.20	26.18	1.92	18	6.22	62.97	64.40	65.65	65.66	68.10	68.36	
10	2	57.800	0.00	0.00	0.00	0.00	0.00	0.0	0.1	0.0	0.00	11.20	22.40	32.72	7.13	24	2.09	61.19	62.40	64.48	65.05	67.50	66.75	
11	10	27.100	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.00	11.20	11.20	16.83	3.57	24	0.55	62.60	62.75	66.23	66.30	66.75	66.75	

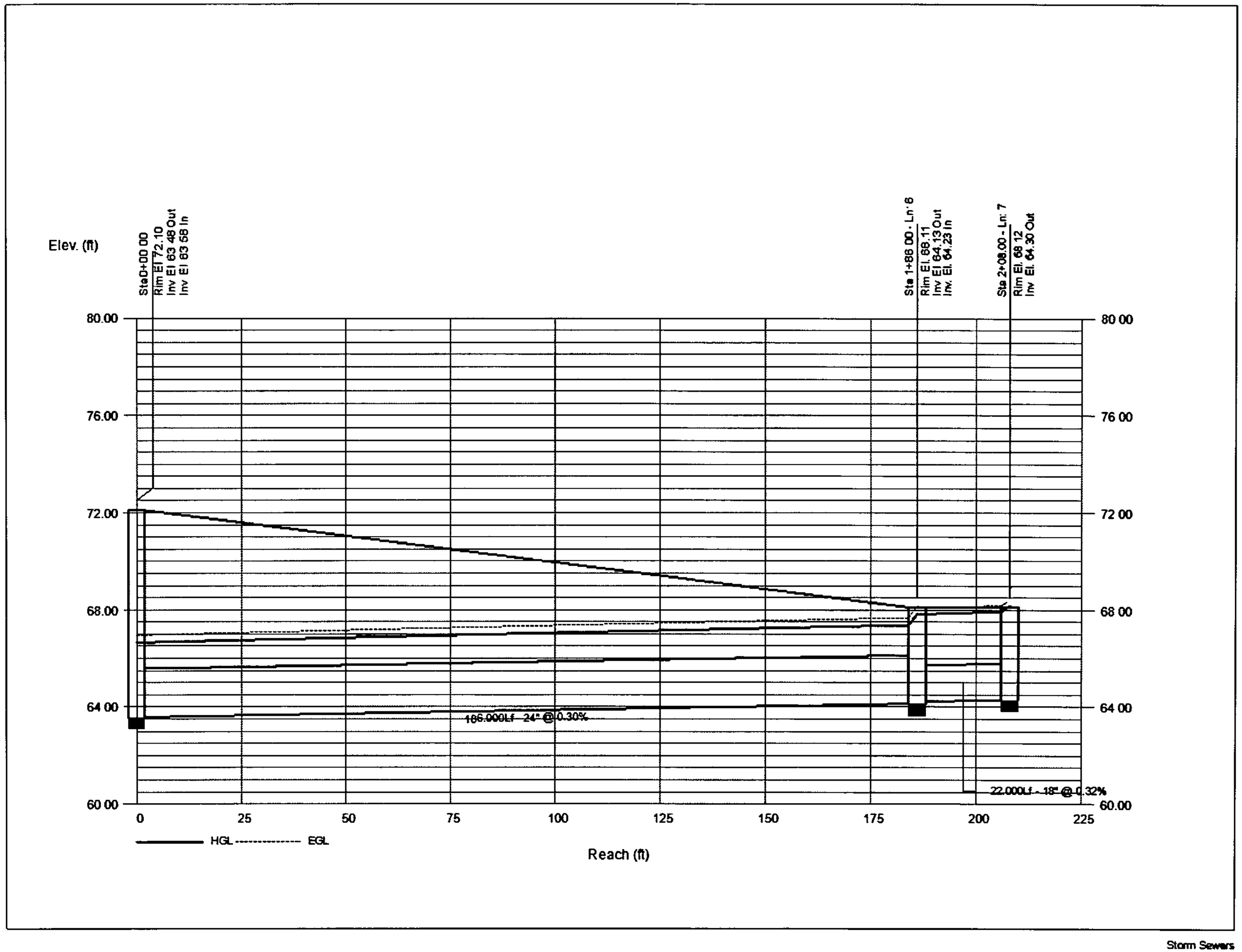
Storm Sewer Profile

Proj. file: 1821 GUNNISON SD.stm

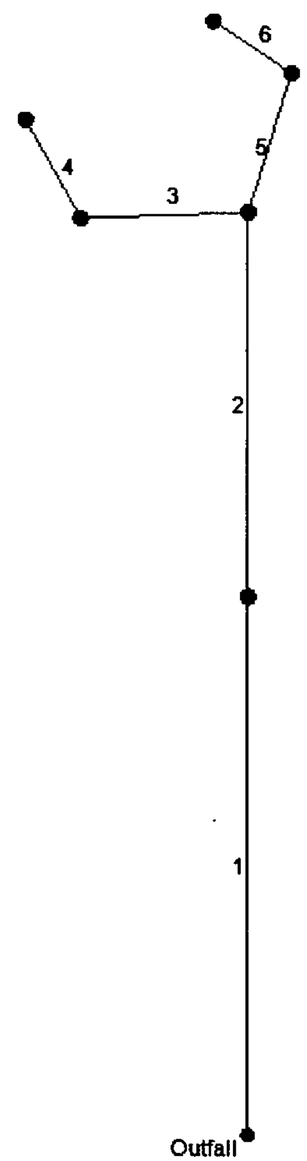


Storm Sewer Profile

Proj. file: 1821 GUNNISON SD.stm



1821 SUMMER BREEZE SD



Project File 1821 SUMMER BREEZE SD.stm	Number of lines : 6	Date: 8/11/2016

Storm Sewers v11.00

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
1		30.00	36	Cir	144.000	48.36	52.68	3.000	59.70*	59 99*	0.04	60.03	End	Manhole
2		30 00	42	Cir	102.370	52.78	55.85	2.999	60.03*	60.12*	0.15	60.28	1	Manhole
3		7.60	24	Cir	44.500	56.85	59.80	6.629	60 28	60 78	n/a	60.78 j	2	Generic
4		3.80	18	Cir	30.200	60.00	60.80	2.649	60 78	61.54	n/a	61.54 j	3	Generic
5		22 40	24	Cir	39.000	56.85	57.65	2.051	60.28*	60.66*	1.15	61.80	2	Generic
6		11.20	24	Cir	24.800	57.85	58.10	1 008	61 80*	61.87*	0.20	62.06	5	Generic

1821 SUMMER BREEZE SD	Number of lines: 6	Run Date: 8/11/2016

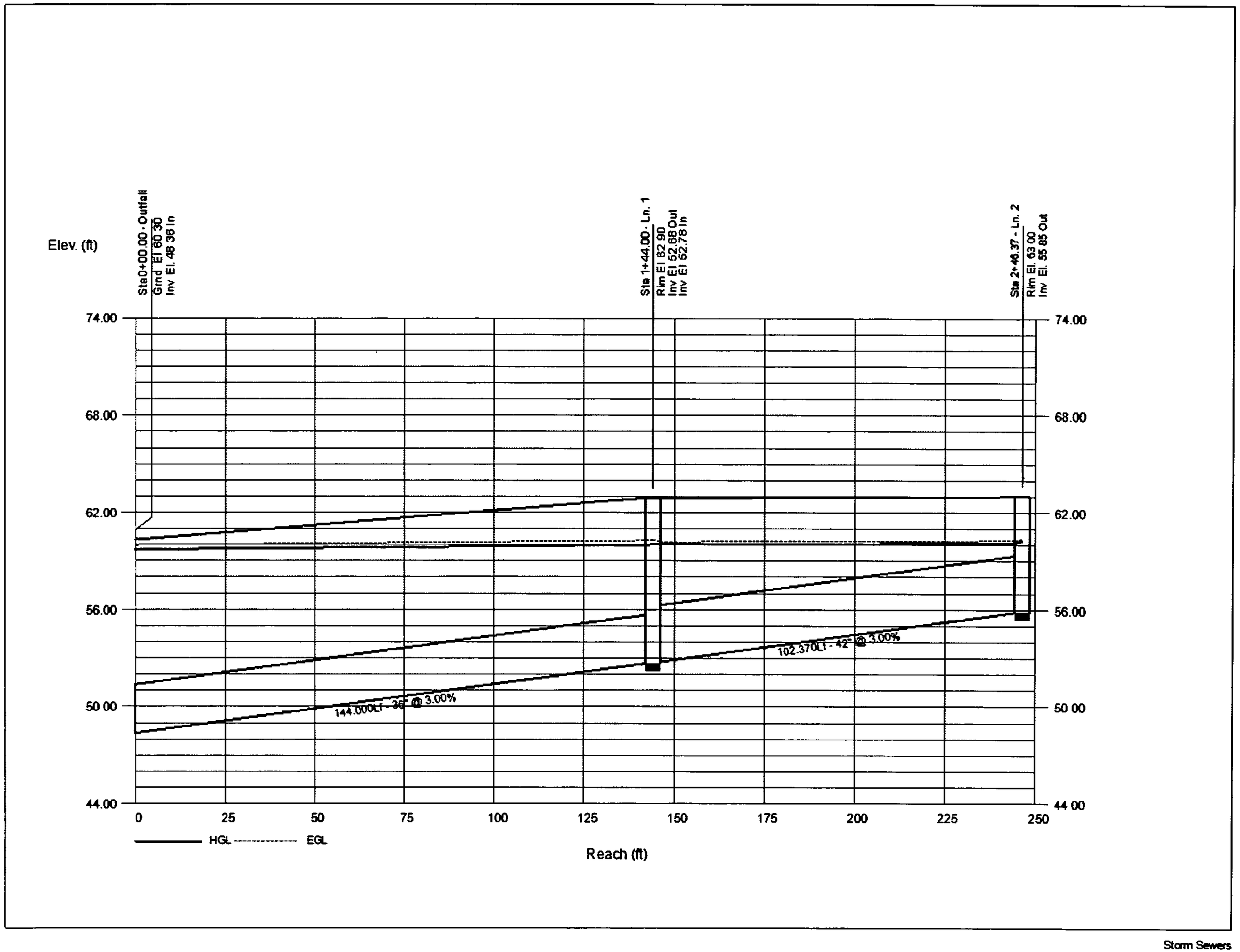
NOTES: Return period = 2 Yrs , *Surcharged (HGL above crown) ; j - Line contains hyd jump.

Summary | DOT | Inlet | FL-DOT | Calc | Cost | > | MyReport | ...

Line	To Line	Line Length	Incr. Area	Total Area	Runoff Coeff.	Incr C x A	Total C x A	Inlet Time	Time Conc	Rnfal Int	Total Runoff	Adnl Flow	Total Flow	Capac Full	Veloc	Pipe Size	Pipe Slope	Inv Elev Dn	Inv Elev Up	HGL Dn	HGL Up	Grnd/Rim Dn	Grnd/Rim Up	Line ID
		(ft)	(ac)	(ac)	(C)			(min)	(min)	(in/hr)	(cfs)	(cfs)	(cfs)	(cfs)	(ft/s)	(in)	(%)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
1	Outfall	144.000	0.00	0.00	0.00	0.00	0.00	0.0	1.1	0.0	0.00	0.00	30.00	115.52	4.24	36	3.00	48.36	52.68	59.70	59.99	60.30	62.90	
2	1	102.370	0.00	0.00	0.00	0.00	0.00	0.0	0.5	0.0	0.00	0.00	30.00	174.23	3.12	42	3.00	52.78	55.85	60.03	60.12	62.90	63.00	
3	2	44.500	0.00	0.00	0.00	0.00	0.00	0.0	0.2	0.0	0.00	3.80	7.60	58.23	3.69	24	6.63	56.85	59.80	60.28	60.78	63.00	63.82	
4	3	30.200	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.00	3.80	3.80	17.09	4.22	18	2.65	60.00	60.80	60.78	61.54	63.82	64.55	
5	2	39.000	0.00	0.00	0.00	0.00	0.00	0.0	0.1	0.0	0.00	11.20	22.40	32.39	7.13	24	2.05	56.85	57.65	60.28	60.66	63.00	62.33	
6	5	24.800	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.00	11.20	11.20	22.71	3.57	24	1.01	57.85	58.10	61.80	61.87	62.33	62.33	

Storm Sewer Profile

Proj. file: 1821 SUMMER BREEZE SD.stm



APPENDIX F

First Flush Calculations

Required First Flush Volume

The total first flush volume required (the first 0.34 inches) is calculated as follows:

181 lots * (70*35) sf pad size *0.34 in./12 in./ft = **12,564 cf.**

Pond in Tract E

The pond in Tract E will treat and store the first flush volumes for the basins draining to the Mirehaven Arroyo. This pond will accept flows from not only the buildings, but the entire basins including streets.

Top of Pond Elev = 5268.0

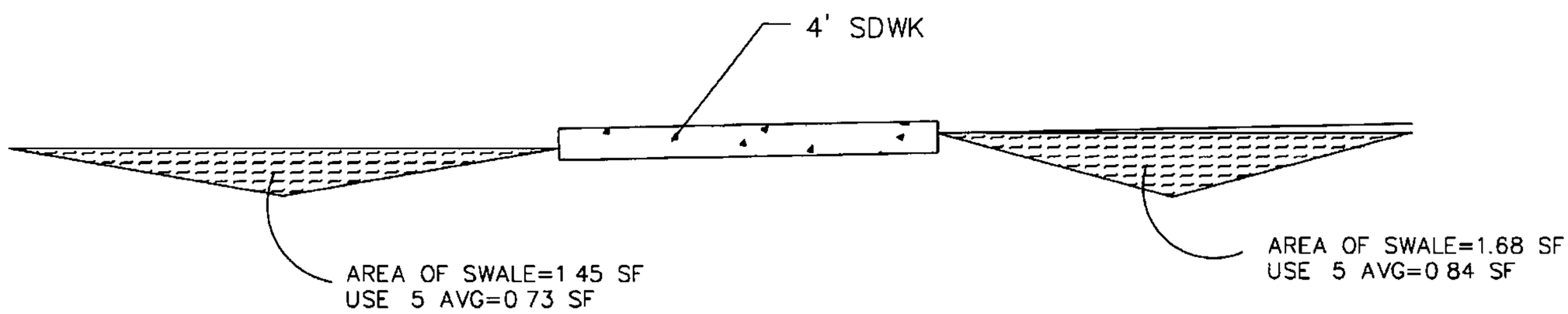
WSEL (Top of Stand Pipe) = 5267.0; Area = 3,344 sf

Bottom of Pond = 5260.5; Area = 60.5 sf

Pond Volume = (3,344+60.5)/2 * (5267.0-5260.5) = **22,129 cf**

Swales along Roadway and along Lot Frontage

The first flush from the remaining site will be stored/treated in swales along roadways and lot frontages. The volume for the swales are calculated per detail below.



TOTAL LENGTH OF FRONTAGE ADJACENT TO HOMES = 8,666 LF

LESS DRIVEWAYS 181 EA @ 18 FT = 3,258 LF

TOTAL FF VOLUME = 5,408 LF * (0.84 + 0.73) SF = 8,491 CF

Total Available First Flush Storage

Total available first flush storage = 22,129+8,491 cf = 30,620 cf > 12,564 cf required.

Current DRC. 691582
Project Number: 1005029

FIGURE 12

#1005029
9-21-16

ORIGINAL

INFRASTRUCTURE LIST
(Rev. 9-20-05)
EXHIBIT "A"
TO SUBDIVISION IMPROVEMENTS AGREEMENT
DEVELOPMENT REVIEW BOARD (D.R.B.) REQUIRED INFRASTRUCTURE LIST

Date Submitted. September 21, 2016
Date Site Plan Approved:
Date Preliminary Plat Approved: 9-21-16
Date Preliminary Plat Expires: 9-21-17
DRB Project No : 1005029
DRB Application No.: 16DRB-70303

STORMCLOUD SUBDIVISION, UNIT 4A
PROPOSED NAME OF PLAT

REPLAT OF TRACTS B & J, THE CROSSING & TRACT R, STORMCLOUD SUBDIVISION, UNIT 3
EXISTING LEGAL DESCRIPTION PRIOR TO PLATTING ACTION

Following is a summary of PUBLIC/PRIVATE Infrastructure required to be constructed or financially guaranteed for the above development. This Listing is not necessarily a complete listing. During the SIA process and/or in the review of the construction drawings, if the DRC Chair determines that appurtenant items and/or unforeseen items have not been included in the infrastructure listing, the DRC Chair may include those items in the listing and related financial guarantee. Likewise, if the DRC Chair determines that appurtenant or non-essential items can be deleted from the listing, those items may be deleted as well as the related portions of the financial guarantees. All such revisions require approval by the DRC Chair, the User Department and agent/owner. If such approvals are obtained, these revisions to the listing will be incorporated administratively. In addition, any unforeseen items which arise during construction which are necessary to complete the project and which normally are the Subdivider's responsibility will be required as a condition of project acceptance and close out by the City

Financially Guaranteed DRC #	Constructed Under DRC #	Size	Type of Improvement	Location	From	To	Construction Certification: Private Inspector	Private P.E.	City Cnst Engineer
		UNIT 4A							
			WATERLINE, 3WR						
		8"	Waterline PVC C-900 -3WR	White Squall Dr NW	Lot 101	Monsoon Rd NW	/	/	/
		8"	Waterline PVC C-900 -3WR	Monsoon Rd NW	Tierra Pintada Blvd. NW Exst 10" WL	White Squall Dr NW	/	/	/
		8"	Waterline PVC C-900 -3WR	Summer Breeze Dr NW	S Property Line (Lot 89)	Jet Stream Rd NW	/	/	/
		8"	Waterline PVC C-900 -3WR	Monsoon Rd NW	White Squall Dr NW	Gunnison Pl NW	/	/	/
		6"	Waterline PVC C-900 -3WR	Monsoon Rd NW	Gunnison Pl NW	Animas Pl NW	/	/	/
		6"	Waterline PVC C-900 -3WR	Jet Stream Rd NW	White Squall Dr NW	Summer Breeze Dr NW	/	/	/
		8"	Waterline PVC C-900 -3WR	Jet Stream Rd NW	Summer Breeze Dr NW	Gunnison Pl NW	/	/	/
		6"	Waterline PVC C-900 -3WR	Gunnison Pl NW	Animas Pl NW	Jet Stream Rd NW	/	/	/

Financially Guaranteed DRC #	Constructed Under DRC #	Size	Type of Improvement	Location	From	To	Construction Certification: Private Inspector	Construction Certification: Private P.E.	Construction Certification: City Cnst Engineer
		8"	Waterline PVC C-900 -3WR	Gunnison Pl NW	Jet Stream Rd NW	Monsoon Rd NW	/	/	/
		6"	Waterline PVC C-900 -3WR	Animas Pl NW	Lot 74 (Unit 4B)	Monsoon Rd NW	/	/	/
		8"	Waterline PVC C-900 -3WR	20' WL Easement	S Property Line @ Summer Breeze WL Easement	S End of Easement Existing 10" WL	/	/	/
			WATERLINE, 2W						
		6"	Waterline PVC C-900 -2W	Animas Pl NW	Gunnison Pl NW	Lot 75 (Unit 4B)	/	/	/
		6"	Waterline PVC C-900 -2W	Gunnison Pl NW	Animas Pl NW	SE Property Line Existing 8" Waterline	/	/	/
		6"	Waterline PVC C-900 - 2W	Animas Place	Lots 31/32	NE Property line Existing 6" Waterline	/	/	/
			SANITARY SEWER						
		8"	Sanitary Sewer Line SDR-35	White Squall Dr NW	Lot 101	Lot 103	/	/	/
		8"	Sanitary Sewer Line SDR-35	Monsoon Rd NW	Lot 1	Animas Pl NW	/	/	/
		8"	Sanitary Sewer Line SDR-35	Jet Stream Rd NW	Lot 70	Gunnison Pl NW	/	/	/
		8"	Sanitary Sewer Line SDR-35	Animas Pl NW	Lot 41	Lot 30 Existing 8" SAS	/	/	/
		8"	Sanitary Sewer Line SDR-35	Gunnison Pl NW	Animas Pl NW	Lot 50	/	/	/
		10"	Sanitary Sewer Line SDR-35	Gunnison Pl NW	East Property Line Existing 10" SAS	Animas Pl NW	/	/	/

Financially Guaranteed DRC #	Constructed Under DRC #	Size	Type of Improvement	Location	From	To	Construction Certification: Private Inspector	Construction Certification: Private P.E.	Construction Certification: City Cnst Engineer
			PAVING						
		30' F-F	Residential Pavement	White Squall Dr NW	Lot 101	Monsoon Rd NW	/	/	/
			C&G on Both Sides						
		**	4' Sidewalk on Both Sides						
		26' F-F	Residential Pavement	Summer Breeze Dr NW	South Property Line	Jet Stream Rd NW	/	/	/
			C&G on Both Sides		Lot 89				
		**	4' Sidewalk on Both Sides						
		30' F-F	Residential Pavement	Monsoon Rd NW	White Squall Dr NW	Animas Pl NW	/	/	/
			C&G on Both Sides						
		**	4' Sidewalk on Both Sides						
		30' F-F	Residential Pavement	Jet Stream Rd NW	Gunnison Pl NW	White Squall Dr NW	/	/	/
			C&G on Both Sides						
		**	4' Sidewalk on Both Sides						
		28' F-F	Residential Pavement	Animas Pl NW	Gunnison Pl	NE Property Line	/	/	/
			C&G on Both Sides		Lot 75, Unit 4B	Lot 30			
		**	4' Sidewalk on Both Sides						
		50' F-F	Residential Pavement	Monsoon Rd NW	Tierra Pintada Blvd NW	White Squall Dr NW	/	/	/
			C&G on Both Sides & Median C&G	(Entrance)	~10' W of East R/W				
		**	6' Sidewalk on Both Sides		@ existing partially				
					constructed entrance				
		30' F-F	Residential Pavement	Gunnison Pl NW	Monsoon Rd NW	Animas Pl NW	/	/	/
			C&G on Both Sides						
		**	4' Sidewalk on Both Sides						
		28' F-F	Residential Pavement	Gunnison Pl NW	Animas Pl NW	SE Property Line	/	/	/
			C&G on Both Sides						
		**	4' Sidewalk on Both Sides						
		10'	Trail on East Side Only	Tierra Pintada Blvd NW	South Property Line,	South Property Line,	/	/	/
					Unit 4A	Unit 5			
			Traffic Calming Device	Monsoon Rd NW	Approx. midway between Monsoon Rd		/	/	/
			Type to be determined at DRC		Entrance and Gunnison Pl				

Financially Guaranteed DRC #	Constructed Under DRC #	Size	Type of Improvement	Location	From	To	Construction Certification: Private Inspector	Private P.E.	City Cnst Engineer
		24"	Storm Sewer Pipe RCP	Monsoon Rd NW	Lots 55/56	Gunnison Pl NW	/	/	/
		36"	Storm Sewer Pipe RCP	Gunnison Pl NW	Monsoon Rd NW	Jet Stream Rd NW	/	/	/
		24"	Storm Sewer Pipe RCP	Jet Stream Rd NW	Gunnison Pl NW	Summer Breeze Dr NW	/	/	/
		24"	Storm Sewer Pipe RCP	Summer Breeze Dr NW	Jet Stream Rd NW	Esmt @ S Property Line S of Lot 89	/	/	/
		36"	Storm Sewer Pipe RCP	Drainage Easement W of Lot 20	Monsoon Rd NW	N Property Line Unit 4A	/	/	/
		24"	Storm Sewer Pipe RCP	Mirehaven Arroyo	Drainage Easement N of Monsoon Rd NW	Mirehaven Arroyo	/	/	/
		$40,000	LOMR***	Mirehaven Arroyo	East Property Line Unit 4A	West Property Line Unit 4A	/	/	/
		53' Top Width	Shotcrete Channel***	Mirehaven Arroyo	East Property Line Unit 4A	West Property Line Unit 4A	/	/	/
		2'	Sidewalk Culvert	Animas Pl NW	West of Lot 43		/	/	/
		6280 cf (approx.)	First Flush Pond	Drainage Easement in Tract E			/	/	/
							/	/	/
							/	/	/
							/	/	/

The items listed below are on the CCIP and approved for Impact Fee credits. Signatures from the Impact Fee Administrator and the City User Department is required prior to DRB approval of this listing. The Items listed below are subject to the standard SIA requirements.

Financially Guaranteed DRC #	Constructed Under DRC #	Size	Type of Improvement	Location	From	To	Construction Certification: Private Inspector	Private P.E.	City Cnst Engineer
							/	/	/
							/	/	/

Approval of Creditable Items:	Approval of Creditable Items:
Impact Fee Administrator Signature Date	City User Dept. Signature Date

NOTES

If the site is located in a floodplain, then the financial guarantee will not be released until the LOMR is approved by FEMA.

Street lights per City requirements.

1. Water infrastructure to include services, valves, fittings, valve boxes, and fire hydrants as required.
2. Catch basin and manholes connection included with storm sewer pipe
3. Sanitary sewer to include manholes and service connections as required.
4. Signage and striping per DRC.
5. Certified grading and drainage and walls for SIA/Financial Release.

**6. Sidewalks which front the lots will be deferred and built during the construction of the individual houses.

7. Wall certification from Registered Engineer and/or Registered Architect prior to Release of Financial Guarantee.
8. Certification that perimeter wall has been constructed per DRB approved design prior to Release of Financial Guarantee.
9. Approval of LOMR is required for release of SIA and Financial Guarantee.

***10. To be constructed with development of either Unit 4A or Unit 5 constructed first.

AGENT / OWNER

Asa Nilsson-Weber, PE
NAME (print)

Isaacson & Arfman, P.A.
FIRM

Asa Nilsson-Weber 9/21/16
SIGNATURE - date

DEVELOPMENT REVIEW BOARD MEMBER APPROVALS

9-21-16
DRB CHAIR - date

Carol S. Dumont 9-21-16
PARKS & ~~GENERAL~~ RECREATION - date

9/21/16
TRANSPORTATION DEVELOPMENT - date

AMAFCA - date

09/01/16
ABCWUA - date

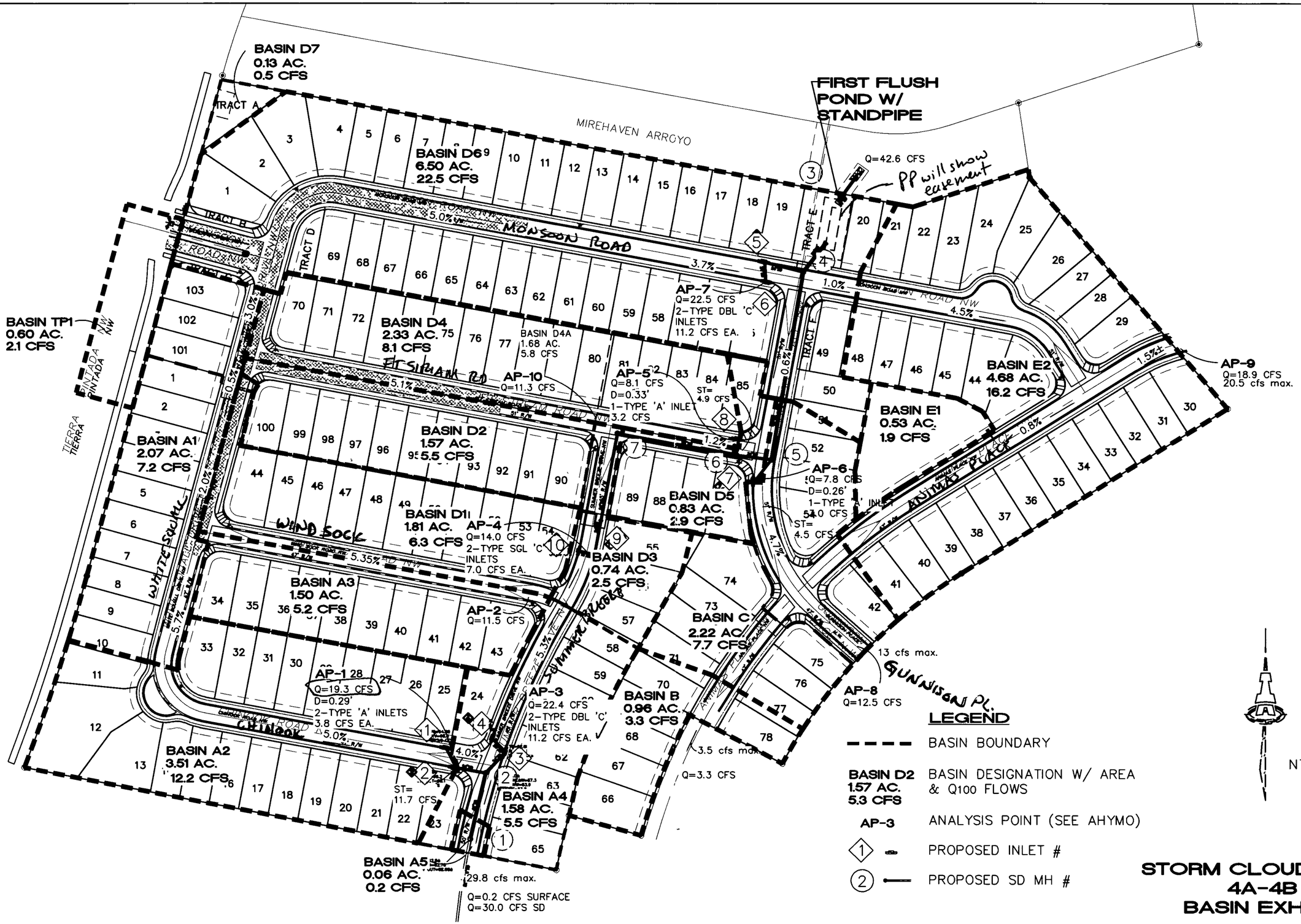
_____ - date

9-21-16
CITY ENGINEER - date

_____ - date

DESIGN REVIEW COMMITTEE REVISIONS

REVISION	DATE	DRC CHAIR	USER DEPARTMENT	AGENT /OWNER



STORM CLOUD UNITS 4A-4B BASIN EXHIBIT