CITY OF ALBUQUERQUE

Planning Department
Brennon Williams, Director

Mayor Timothy M. Keller

November 12, 2020

Howard Cake, P.E.
TyLin International
500 4th St NW, Suite 403F
Albuquerque, NM 87102

RE: Shari Vista
Draft Drainage Memo
Engineer's Stamp Date: No Stamp
Hydrology File: L12D013

Dear Mr. Cake:

Based upon the information provided in your submittal received 11/03/2020, the Draft Drainage Memo **is not** approved for Work Order. The following comments need to be addressed for approval of the above referenced project:

1. Per the Department of Municipal Development, the City is not willing to accept maintenance on the underground infiltrators that you have designed for placement in the street, unless the County agrees to maintain them.

2. Since this project centers around this underground system, any further review of the Draft Drainage Memo is pointless at this time.

If you have any questions, please contact me at 924-3995 or rbrissette@cabq.gov.

Sincerely,

Renée C. Brissette

Renée C. Brissette, P.E. CFM
Senior Engineer, Hydrology
Planning Department

PO Box 1293

Albuquerque

NM 87103

www.cabq.gov

City of Albuquerque

Planning Department

Development & Building Services Division

DRAINAGE AND TRANSPORTATION INFORMATION SHEET (REV 11/2018)

Project Title: Shari Vista from Pear Road Building Permit #: _____ Hydrology File #: _____

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

Legal Description: Shari Vista just east of Pear Road within the City ROW

City Address: Shari Vista just east of Pear Road

Applicant: T.Y. Lin Contact: Howard Cake

Address: 500 4th Street NW, Albuquerque, NM 87102

Phone#: 505-730-0882 Fax#: None E-mail: Howard.cake@tylin.com

Owner: City of Albuquerque - Project is being developed by Bernalillo County Contact: Rodirgo Eichwald

Address: 2400 SE Broadway, Albuquerque, NM 871020

Phone#: 505-301-6933 Fax#: _____ E-mail: rledichwald@bernco.gov

TYPE OF SUBMITTAL:_____ PLAT (___# OF LOTS) ____ RESIDENCE ____ DRB SITE ____ ADMIN SITE

IS THIS A RESUBMITTAL?: _____ Yes X No

DEPARTMENT: _____ TRAFFIC/ TRANSPORTATION X HYDROLOGY/ DRAINAGE

Check all that Apply:

TYPE OF SUBMITTAL:

____ ENGINEER/ARCHITECT CERTIFICATION
____ PAD CERTIFICATION
____ CONCEPTUAL G & D PLAN
____ GRADING PLAN
____ DRAINAGE MASTER PLAN
X DRAINAGE REPORT
____ FLOODPLAIN DEVELOPMENT PERMIT APPLIC
____ ELEVATION CERTIFICATE
____ CLOMR/LOMR
____ TRAFFIC CIRCULATION LAYOUT (TCL)
____ TRAFFIC IMPACT STUDY (TIS)
____ OTHER (SPECIFY) _____
____ PRE-DESIGN MEETING?

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
____ WORK ORDER APPROVAL
____ CLOMR/LOMR
____ FLOODPLAIN DEVELOPMENT PERMIT
X OTHER (SPECIFY) Drainage Report Approval

DATE SUBMITTED: 11/4/2020 By: Howard Cake

COA STAFF: ELECTRONIC SUBMITTAL RECEIVED: _____

FEE PAID: _____

Subject: *Draft Drainage Memo for Shari Vista Road (Pear Road to End of Shari Vista Road), Albuquerque, New Mexico*
Bernalillo County Engineering Services On-Call
Task Order #3, P.W.C.O. 2020-XXXX

October 27, 2020

This memo documents the drainage improvements for the Shari Vista Road project (Pear Road to End of Shari Vista Road). Included are the onsite hydrologic and hydraulic calculations for the proposed drainage infrastructure based on the roadway improvements. A hydraulic analysis was performed to determine the extent of drainage improvements required to address ponding issues within the roadway.

SITE DESCRIPTION

The Shari Vista Road project is located in Albuquerque, New Mexico. Shari Vista Road is an existing 2-lane roadway without curb and gutter or pedestrian facilities. Shari Vista terminates at a cul-de-sac and does not have an outlet. Roadway slopes vary greatly and have a longitudinal slope ranging from zero to 0.5% with an average cross-slope of 0.5%. The roadway is bounded in all directions by single-family residential developments. The area is relatively flat.

Existing onsite stormwater runoff flows from adjacent properties onto Shari Vista Road. There are no existing storm inlets or drainage infrastructure within the project corridor.

Exhibit 1 in **Appendix C** displays the Shari Vista Road existing conditions and hydrologic results.

PROPOSED IMPROVEMENTS

The general design of the proposed roadway is a two-lane facility with curb, gutter and sidewalk on each side. The typical section is at a normal crown with a low point within the cul-de-sac where stormwater runoff will be captured by proposed storm inlets routes flows to a proposed underground storage chamber located within the corridor. **Figure 1** depicts the proposed typical section for the Shari Vista project.

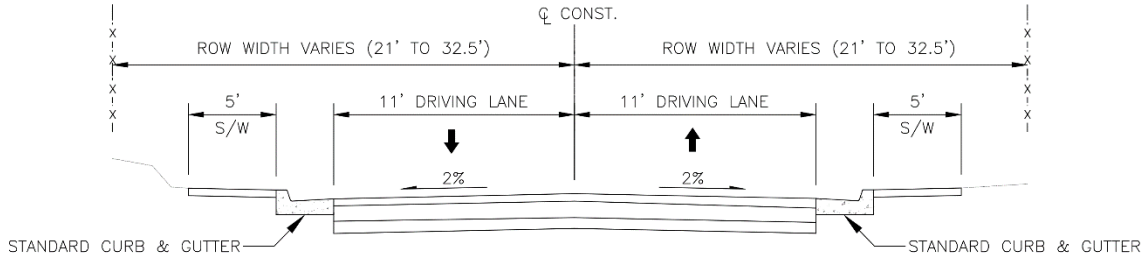

Figure 1 Proposed Typical Section

OFFSITE HYDROLOGY

Smaller localized flow generated within the residential development adjacent to the roadway are analyzed as onsite stormwater runoff. Based on our initial review, the proposed roadway improvements along Shari Vista Road will not impact offsite or onsite flow patterns or concentration points.

Re-evaluating the offsite hydrology is beyond the scope of this project. However, future review of the Pear Road improvement project, drainage report and field verification of flow patterns and concentration points will be conducted upon receipt of the Pear Road improvement project documents. Based on current conditions along Pear Road and adjacent residences, existing grading, wall elevations and elevations slope away from Shari Vista Road. There is not expected to be any offsite flow impacts.

HYDROLOGIC CALCULATIONS

A hydrologic evaluation was performed for the Shari Vista Road project using the methodology from Chapter 6 of the City of Albuquerque Development Process Manual (DPM) (2020). The peak discharges for the 2-year, 10-year, and 100-year frequency design storms were calculated for the existing and proposed conditions of the new improvements. As specified in the DPM, the 6-hour storm duration for these events was used. Only the improvement areas were calculated. The existing areas consist of both soil type C (unpaved lots, roads, trails and desert landscaping) and soil type D (impervious areas) as specified in the DPM. **Table 1** summarizes the onsite stormwater discharge.

Table 1 Onsite Subbasin Discharge

Basin ID	Contributing Area (sf)	Contributing Area (ac)	Q_{P2} Discharge (cfs)	Q_{P10} Discharge (cfs)	Q_{P100} Discharge (cfs)
BASIN01	61,721	1.42	1.1	2.5	4.6

Exhibit 2 in **Appendix C** displays the Shari Vista proposed improvements. Onsite hydrologic calculations are provided in **Appendix A**.

HYDRAULIC CALCULATIONS

Onsite roadway drainage is intercepted by COA standard detail storm drain inlets located either on-grade or in sumps. The inlets are designed at the low point of the roadway, within the cul-de-sac, based upon criteria established within Chapter 6 of the DPM. Once intercepted, storm water is conveyed via connector pipes which discharge to the proposed underground storage chamber.

Inlet capacities and spread calculations for storm inlets were calculated using Bentley FlowMaster V8i. FlowMaster calculates inlet interception capacity and spread based on roadway variables including cross-slope, pavement grade, etc. Clogging factors used for curb openings and grate calculations were 80% and 50%, respectively.

Spread calculations were performed just upstream of catch basins utilizing the concrete gutter and asphalt Manning's n-values. According to the DPM, flow depths in the event of a 10-year design discharge may not exceed 0.5 feet in any collector or arterial street. For a 100-year design discharge, flow depths may not exceed 0.2 feet above curb height and shall be contained within the street right-of-way. Once the spread calculations were performed and deemed adequate, catch basins were placed and designed to capture a minimum of 80% of the incoming flow. Bypass flows were routed to the appropriate downstream catch basin.

Inlet capacities and spread calculations are provided in **Appendix B**.

Table 2 Shari Vista Proposed Storm Inlets – 10-year Design Storm

Inlet ID	Station	Type	Storm Runoff Captured (cfs)	Inlet Efficiency	Calculated Spread (ft)
Inlet-01	3+96 RT	Type A Single, On Grade	1.17	93%	9.6
Inlet-02	4+17 LT	Type A Single, On Grade	1.17	93%	9.6
Inlet-03	4+21 RT	Type A Single, Double Wing, Sag	0.17	100%	-

StormCAD version V8i (Select Series 5, Bentley 2016) was used to calculate and document the storm drain hydraulics. The captured flow from each grate inlet was input into the StormCAD model to calculate the storm drain system hydraulic grade line (HGL) accounting for friction loss, junctions, bends transitions, and manholes. The headloss method used to model the storm drain systems is derived from the Federal Highway Administration Hydraulic Engineering Circular No. 22, Second Edition (HEC-22) Urban Drainage Design Manual (2009). The HEC-22 Headloss method computes an adjusted headloss coefficient using correction factors for the diameter of the pipe, flow depth, relative flow, plunging flow, and benching of the structure. These correction factors are then multiplied to the initial headloss coefficient and then multiplied to the velocity head at the outlet pipe to determine the total junction headloss for the storm inlet and manhole structures.

The proposed storm drain system is modeled for a 100-year design storm event. The hydraulic criteria for the storm drain system is such that the 100-year HGL is maintained below the gutter elevation for this project.

The results for the StormCAD analysis is provided in **Appendix B**.

STORMWATER STORAGE CHAMBER

The proposed underground stormwater storage chamber will provide storage volume for a 100-year, 6-hour design storm. The total storage volume required for the project is 0.14 ac-ft, approximately 6,285 cubic feet. The excess precipitation and volumetric runoff calculation has been provided in **Appendix A.** The infrastructure stage-storage volume report has been provided in **Appendix B**.

The existing utilities within Shari Vista Road run parallel with multiple service lines crossing the roadway to the adjacent properties. The proposed underground storage chamber and storm drain system cross underground gas, water, cable utilities. The potential utility conflicts will be coordinated with each utility company.

SUMMARY

This memo documents the drainage analysis of the Shari Vista roadway improvements. Three storm inlets are proposed within the cul-de-sac of Shari Vista Road to capture stormwater runoff and conveyed to an underground stormwater storage chamber proposed within the Shari Vista Road corridor. The proposed roadway improvements and storm drain infrastructure adequately address the existing ponding issues.

Sincerely,

Howard Cake , P.E.
Sr. Project Manager
T.Y. Lin International

Tate Toledo, P.E.
Project Engineer
T.Y. Lin International

APPENDIX A

Hydrologic Data & Calculations

T·Y·LIN INTERNATIONAL

On-Site Subbasin Calculations

Project: Shari Vista Road
Location: Albuquerque, NM
Date: October 7, 2020

References: City of Albuquerque Development Process Manual (2020), Chapter 6 - Drainage, Flood Control, and Erosion Control

Precipitation Zone: 1

	Intensity
2-yr, 6-hr=	1.86
10-yr, 6-hr=	3.00
100-yr, 6-hr=	4.77

Basin ID: BASIN01

1. Land Treatment Areas

A:	0 sq.ft.	0.00 ac.
B:	0 sq.ft.	0.00 ac.
C:	48732 sq.ft.	1.12 ac.
D:	12989 sq.ft.	0.30 ac.
TOTAL:	61721 sq.ft.	1.42 ac.

2. Weighted C*A, Rational Coefficient*Acre

$C*A_2$=	0.6
$C*A_{10}$=	0.8
$C*A_{100}$=	1.0

3. Peak Discharge, Q

Q_2=	1.1	cfs
Q_{10}=	2.5	cfs
Q_{100}=	4.6	cfs

TY·LIN INTERNATIONAL

Excess Precipitation & Volumetric Runoff

Project: Shari Vista Road
Location: Albuquerque, NM
Date: October 6, 2020

References: City of Albuquerque Development Process Manual (2020), Chapter 6 - Drainage, Flood Control, and Erosion Control

Precipitation Zone: 1
Basin ID: Shari Vista

1. Land Treatment Areas, A

A:	0	sq.ft.	0.00 ac.
B:	0	sq.ft.	0.00 ac.
C:	48732	sq.ft.	1.12 ac.
D:	12989	sq.ft.	0.30 ac.
Total:	61721	sq.ft.	1.42 ac.

2. Excess Precipitation, E

A:	0.55	in.
B:	0.73	in.
C:	0.95	in.
D:	2.24	in.

2. Weighted E

E*A / Total A= 1.22

3. Runoff Volume (6-hour), V_{360}

Weighted E * Total A= 0.14 acre-ft
6283 cf

Required Volume = 6285 cf

NOAA Atlas 14, Volume 1, Version 5
Location name: Albuquerque, New Mexico, USA*
Latitude: 35.0641°, Longitude: -106.6862°
Elevation: 4942.65 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

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

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

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

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	2.03 (1.75-2.36)	2.64 (2.27-3.06)	3.53 (3.02-4.10)	4.24 (3.61-4.91)	5.20 (4.40-6.01)	5.94 (5.02-6.89)	6.73 (5.65-7.80)	7.57 (6.31-8.76)	8.71 (7.18-10.1)	9.60 (7.86-11.1)
10-min	1.55 (1.33-1.80)	2.00 (1.72-2.33)	2.69 (2.30-3.13)	3.22 (2.75-3.73)	3.95 (3.35-4.58)	4.52 (3.82-5.24)	5.13 (4.30-5.93)	5.76 (4.80-6.67)	6.62 (5.46-7.67)	7.31 (5.98-8.46)
15-min	1.28 (1.10-1.49)	1.66 (1.42-1.93)	2.22 (1.90-2.58)	2.66 (2.27-3.09)	3.27 (2.77-3.78)	3.74 (3.16-4.33)	4.24 (3.55-4.90)	4.76 (3.96-5.51)	5.47 (4.51-6.34)	6.04 (4.94-7.00)
30-min	0.862 (0.742-1.00)	1.12 (0.958-1.30)	1.49 (1.28-1.74)	1.79 (1.53-2.08)	2.20 (1.87-2.55)	2.52 (2.13-2.91)	2.85 (2.39-3.30)	3.21 (2.67-3.71)	3.69 (3.04-4.27)	4.07 (3.33-4.71)
60-min	0.533 (0.459-0.619)	0.690 (0.592-0.803)	0.925 (0.792-1.08)	1.11 (0.947-1.29)	1.36 (1.15-1.58)	1.56 (1.32-1.80)	1.77 (1.48-2.04)	1.98 (1.65-2.30)	2.28 (1.88-2.64)	2.52 (2.06-2.91)
2-hr	0.302 (0.260-0.358)	0.387 (0.332-0.459)	0.512 (0.438-0.606)	0.614 (0.522-0.720)	0.754 (0.636-0.884)	0.868 (0.727-1.01)	0.988 (0.821-1.16)	1.11 (0.919-1.30)	1.29 (1.05-1.51)	1.44 (1.16-1.68)
3-hr	0.216 (0.187-0.255)	0.275 (0.237-0.324)	0.360 (0.311-0.424)	0.429 (0.368-0.502)	0.524 (0.445-0.611)	0.600 (0.508-0.700)	0.682 (0.573-0.794)	0.769 (0.640-0.895)	0.889 (0.732-1.03)	0.987 (0.804-1.15)
6-hr	0.126 (0.110-0.147)	0.158 (0.138-0.185)	0.204 (0.178-0.238)	0.241 (0.209-0.280)	0.290 (0.250-0.337)	0.329 (0.282-0.381)	0.370 (0.316-0.429)	0.412 (0.350-0.478)	0.472 (0.396-0.547)	0.521 (0.433-0.605)
12-hr	0.070 (0.061-0.080)	0.088 (0.077-0.100)	0.111 (0.098-0.127)	0.130 (0.114-0.148)	0.155 (0.135-0.176)	0.174 (0.151-0.198)	0.194 (0.167-0.220)	0.215 (0.184-0.244)	0.243 (0.206-0.276)	0.266 (0.223-0.303)
24-hr	0.039 (0.035-0.045)	0.049 (0.044-0.056)	0.061 (0.054-0.069)	0.071 (0.063-0.080)	0.084 (0.074-0.095)	0.094 (0.083-0.106)	0.105 (0.092-0.118)	0.115 (0.101-0.130)	0.130 (0.112-0.146)	0.141 (0.121-0.158)
2-day	0.021 (0.018-0.023)	0.026 (0.023-0.029)	0.032 (0.029-0.036)	0.037 (0.033-0.041)	0.044 (0.039-0.048)	0.049 (0.043-0.054)	0.054 (0.047-0.060)	0.059 (0.052-0.066)	0.066 (0.058-0.074)	0.071 (0.062-0.079)
3-day	0.015 (0.014-0.017)	0.019 (0.017-0.021)	0.023 (0.021-0.025)	0.026 (0.024-0.029)	0.031 (0.028-0.034)	0.034 (0.031-0.038)	0.038 (0.034-0.042)	0.041 (0.037-0.045)	0.046 (0.041-0.051)	0.049 (0.044-0.054)
4-day	0.012 (0.011-0.013)	0.015 (0.014-0.016)	0.018 (0.017-0.020)	0.021 (0.019-0.023)	0.025 (0.022-0.027)	0.027 (0.025-0.030)	0.030 (0.027-0.032)	0.032 (0.029-0.035)	0.036 (0.032-0.039)	0.038 (0.035-0.042)
7-day	0.008 (0.007-0.009)	0.010 (0.009-0.011)	0.012 (0.011-0.013)	0.014 (0.012-0.015)	0.016 (0.014-0.017)	0.017 (0.016-0.018)	0.019 (0.017-0.020)	0.020 (0.018-0.022)	0.022 (0.020-0.024)	0.023 (0.021-0.025)
10-day	0.006 (0.006-0.007)	0.008 (0.007-0.008)	0.009 (0.009-0.010)	0.011 (0.010-0.011)	0.012 (0.011-0.013)	0.013 (0.012-0.014)	0.015 (0.013-0.016)	0.016 (0.015-0.017)	0.017 (0.016-0.019)	0.019 (0.017-0.020)
20-day	0.004 (0.003-0.004)	0.005 (0.004-0.005)	0.006 (0.005-0.006)	0.006 (0.006-0.007)	0.007 (0.007-0.008)	0.008 (0.007-0.009)	0.009 (0.008-0.009)	0.009 (0.008-0.010)	0.010 (0.009-0.011)	0.010 (0.010-0.011)
30-day	0.003 (0.003-0.003)	0.004 (0.003-0.004)	0.004 (0.004-0.005)	0.005 (0.005-0.005)	0.006 (0.005-0.006)	0.006 (0.006-0.007)	0.007 (0.006-0.007)	0.007 (0.006-0.008)	0.007 (0.007-0.008)	0.008 (0.007-0.008)
45-day	0.002 (0.002-0.003)	0.003 (0.003-0.003)	0.004 (0.003-0.004)	0.004 (0.004-0.004)	0.004 (0.004-0.005)	0.005 (0.004-0.005)	0.005 (0.005-0.005)	0.005 (0.005-0.006)	0.006 (0.005-0.006)	0.006 (0.005-0.006)
60-day	0.002 (0.002-0.002)	0.003 (0.002-0.003)	0.003 (0.003-0.003)	0.003 (0.003-0.004)	0.004 (0.004-0.004)	0.004 (0.004-0.004)	0.004 (0.004-0.005)	0.005 (0.004-0.005)	0.005 (0.005-0.005)	0.005 (0.005-0.005)

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

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

Please refer to NOAA Atlas 14 document for more information.

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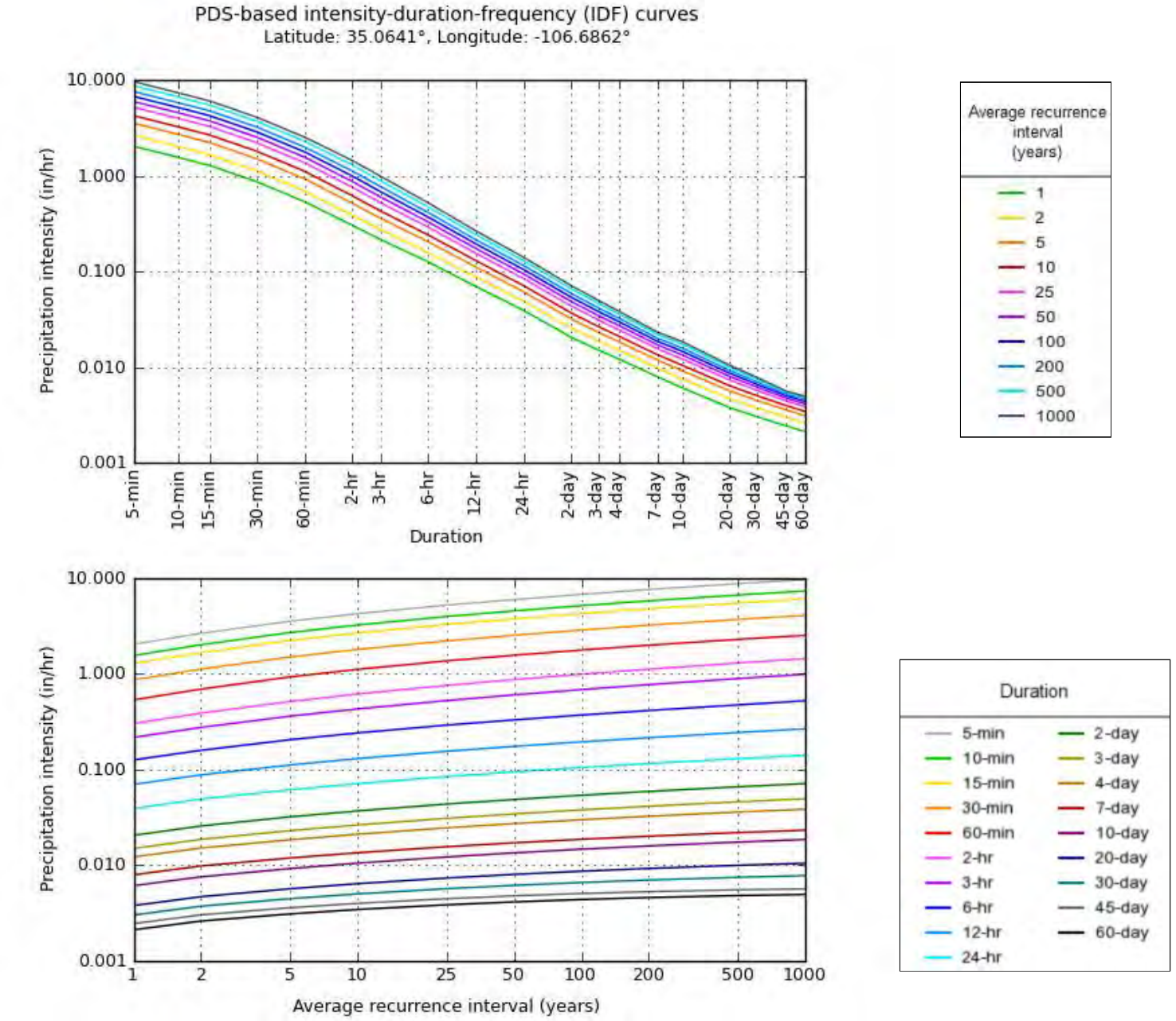
PF graphical



NOAA Atlas 14, Volume 1, Version 5

Created (GMT): Wed Jun 10 20:06:22 2020

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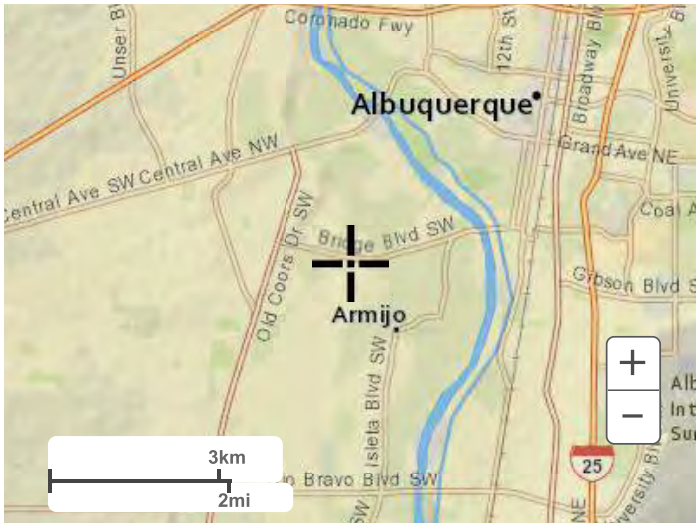
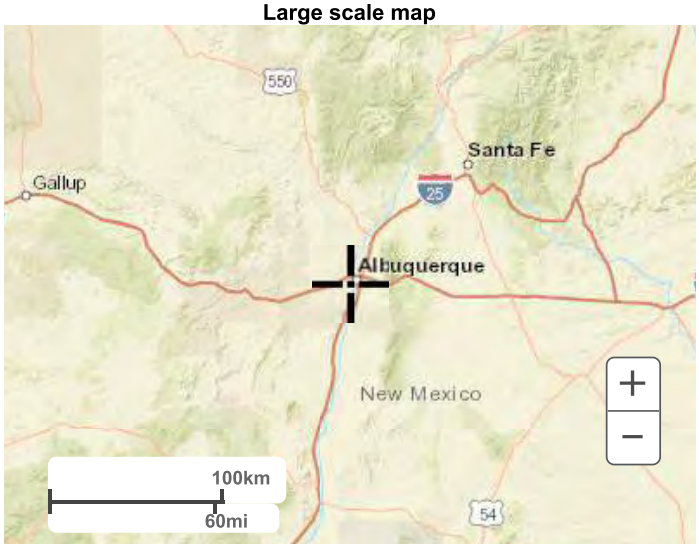
Maps & aerials

Small scale terrain



Large scale terrain

Large scale map



Large scale aerial

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US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

NOAA Atlas 14, Volume 1, Version 5
Location name: Albuquerque, New Mexico, USA*
Latitude: 35.0641°, Longitude: -106.6862°
Elevation: 4942.65 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

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

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

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	**0.169** (0.146-0.197)	**0.220** (0.189-0.255)	**0.294** (0.252-0.342)	**0.353** (0.301-0.409)	**0.433** (0.367-0.501)	**0.495** (0.418-0.574)	**0.561** (0.471-0.650)	**0.631** (0.526-0.730)	**0.726** (0.598-0.840)	**0.800** (0.655-0.927)
10-min	**0.258** (0.222-0.300)	**0.334** (0.287-0.389)	**0.448** (0.383-0.521)	**0.537** (0.458-0.622)	**0.659** (0.559-0.763)	**0.754** (0.637-0.873)	**0.855** (0.716-0.989)	**0.960** (0.800-1.11)	**1.10** (0.910-1.28)	**1.22** (0.997-1.41)
15-min	**0.320** (0.275-0.372)	**0.414** (0.356-0.482)	**0.555** (0.475-0.646)	**0.665** (0.568-0.772)	**0.817** (0.693-0.946)	**0.934** (0.789-1.08)	**1.06** (0.888-1.23)	**1.19** (0.991-1.38)	**1.37** (1.13-1.59)	**1.51** (1.24-1.75)
30-min	**0.431** (0.371-0.501)	**0.558** (0.479-0.649)	**0.747** (0.640-0.870)	**0.896** (0.765-1.04)	**1.10** (0.933-1.27)	**1.26** (1.06-1.46)	**1.43** (1.20-1.65)	**1.60** (1.34-1.86)	**1.84** (1.52-2.13)	**2.03** (1.67-2.36)
60-min	**0.533** (0.459-0.619)	**0.690** (0.592-0.803)	**0.925** (0.792-1.08)	**1.11** (0.947-1.29)	**1.36** (1.15-1.58)	**1.56** (1.32-1.80)	**1.77** (1.48-2.04)	**1.98** (1.65-2.30)	**2.28** (1.88-2.64)	**2.52** (2.06-2.91)
2-hr	**0.605** (0.519-0.716)	**0.774** (0.663-0.918)	**1.02** (0.876-1.21)	**1.23** (1.04-1.44)	**1.51** (1.27-1.77)	**1.74** (1.45-2.03)	**1.98** (1.64-2.31)	**2.23** (1.84-2.60)	**2.59** (2.11-3.02)	**2.87** (2.32-3.36)
3-hr	**0.649** (0.562-0.765)	**0.825** (0.712-0.973)	**1.08** (0.934-1.27)	**1.29** (1.11-1.51)	**1.57** (1.34-1.84)	**1.80** (1.53-2.10)	**2.05** (1.72-2.38)	**2.31** (1.92-2.69)	**2.67** (2.20-3.11)	**2.96** (2.42-3.46)
6-hr	**0.753** (0.656-0.880)	**0.949** (0.828-1.11)	**1.22** (1.07-1.43)	**1.44** (1.25-1.68)	**1.74** (1.50-2.02)	**1.97** (1.69-2.28)	**2.22** (1.89-2.57)	**2.47** (2.09-2.86)	**2.83** (2.37-3.28)	**3.12** (2.59-3.62)
12-hr	**0.840** (0.737-0.959)	**1.06** (0.931-1.21)	**1.34** (1.18-1.53)	**1.57** (1.37-1.78)	**1.87** (1.63-2.12)	**2.10** (1.82-2.38)	**2.34** (2.02-2.66)	**2.59** (2.21-2.94)	**2.93** (2.48-3.33)	**3.20** (2.69-3.65)
24-hr	**0.941** (0.834-1.07)	**1.18** (1.05-1.33)	**1.47** (1.31-1.67)	**1.71** (1.51-1.93)	**2.02** (1.78-2.28)	**2.26** (1.99-2.55)	**2.52** (2.20-2.83)	**2.77** (2.41-3.11)	**3.11** (2.69-3.50)	**3.38** (2.91-3.80)
2-day	**0.986** (0.879-1.11)	**1.23** (1.10-1.38)	**1.54** (1.37-1.72)	**1.77** (1.58-1.98)	**2.09** (1.86-2.33)	**2.33** (2.07-2.60)	**2.58** (2.28-2.87)	**2.83** (2.49-3.16)	**3.16** (2.77-3.53)	**3.42** (2.98-3.82)
3-day	**1.08** (0.976-1.19)	**1.34** (1.22-1.48)	**1.65** (1.50-1.82)	**1.90** (1.72-2.09)	**2.23** (2.01-2.45)	**2.47** (2.22-2.72)	**2.72** (2.44-2.99)	**2.98** (2.66-3.27)	**3.31** (2.94-3.64)	**3.56** (3.15-3.92)
4-day	**1.17** (1.07-1.28)	**1.45** (1.33-1.58)	**1.77** (1.62-1.93)	**2.02** (1.85-2.20)	**2.36** (2.15-2.56)	**2.61** (2.38-2.84)	**2.87** (2.61-3.11)	**3.12** (2.83-3.39)	**3.45** (3.12-3.75)	**3.69** (3.33-4.02)
7-day	**1.34** (1.23-1.45)	**1.65** (1.52-1.79)	**2.00** (1.84-2.17)	**2.27** (2.09-2.45)	**2.62** (2.41-2.83)	**2.88** (2.64-3.11)	**3.13** (2.87-3.38)	**3.38** (3.09-3.64)	**3.68** (3.37-3.98)	**3.90** (3.57-4.22)
10-day	**1.47** (1.35-1.59)	**1.82** (1.67-1.97)	**2.21** (2.04-2.39)	**2.52** (2.33-2.72)	**2.93** (2.70-3.15)	**3.23** (2.97-3.47)	**3.53** (3.24-3.79)	**3.82** (3.50-4.11)	**4.19** (3.82-4.51)	**4.46** (4.06-4.80)
20-day	**1.82** (1.67-1.98)	**2.25** (2.08-2.45)	**2.73** (2.51-2.96)	**3.08** (2.84-3.34)	**3.53** (3.25-3.82)	**3.85** (3.54-4.16)	**4.16** (3.82-4.49)	**4.44** (4.08-4.79)	**4.79** (4.39-5.17)	**5.03** (4.61-5.43)
30-day	**2.17** (2.00-2.35)	**2.69** (2.48-2.90)	**3.23** (2.97-3.47)	**3.62** (3.33-3.89)	**4.10** (3.78-4.40)	**4.44** (4.09-4.76)	**4.76** (4.38-5.10)	**5.05** (4.65-5.41)	**5.39** (4.96-5.77)	**5.62** (5.17-6.02)
45-day	**2.65** (2.45-2.86)	**3.28** (3.03-3.53)	**3.89** (3.60-4.18)	**4.32** (4.00-4.64)	**4.83** (4.48-5.18)	**5.17** (4.80-5.55)	**5.47** (5.09-5.86)	**5.72** (5.33-6.12)	**5.98** (5.59-6.39)	**6.12** (5.74-6.52)
60-day	**3.05** (2.82-3.30)	**3.76** (3.49-4.06)	**4.47** (4.15-4.81)	**4.97** (4.62-5.34)	**5.56** (5.17-5.98)	**5.96** (5.55-6.40)	**6.32** (5.88-6.78)	**6.62** (6.18-7.11)	**6.95** (6.50-7.46)	**7.13** (6.70-7.65)

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

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

Please refer to NOAA Atlas 14 document for more information.

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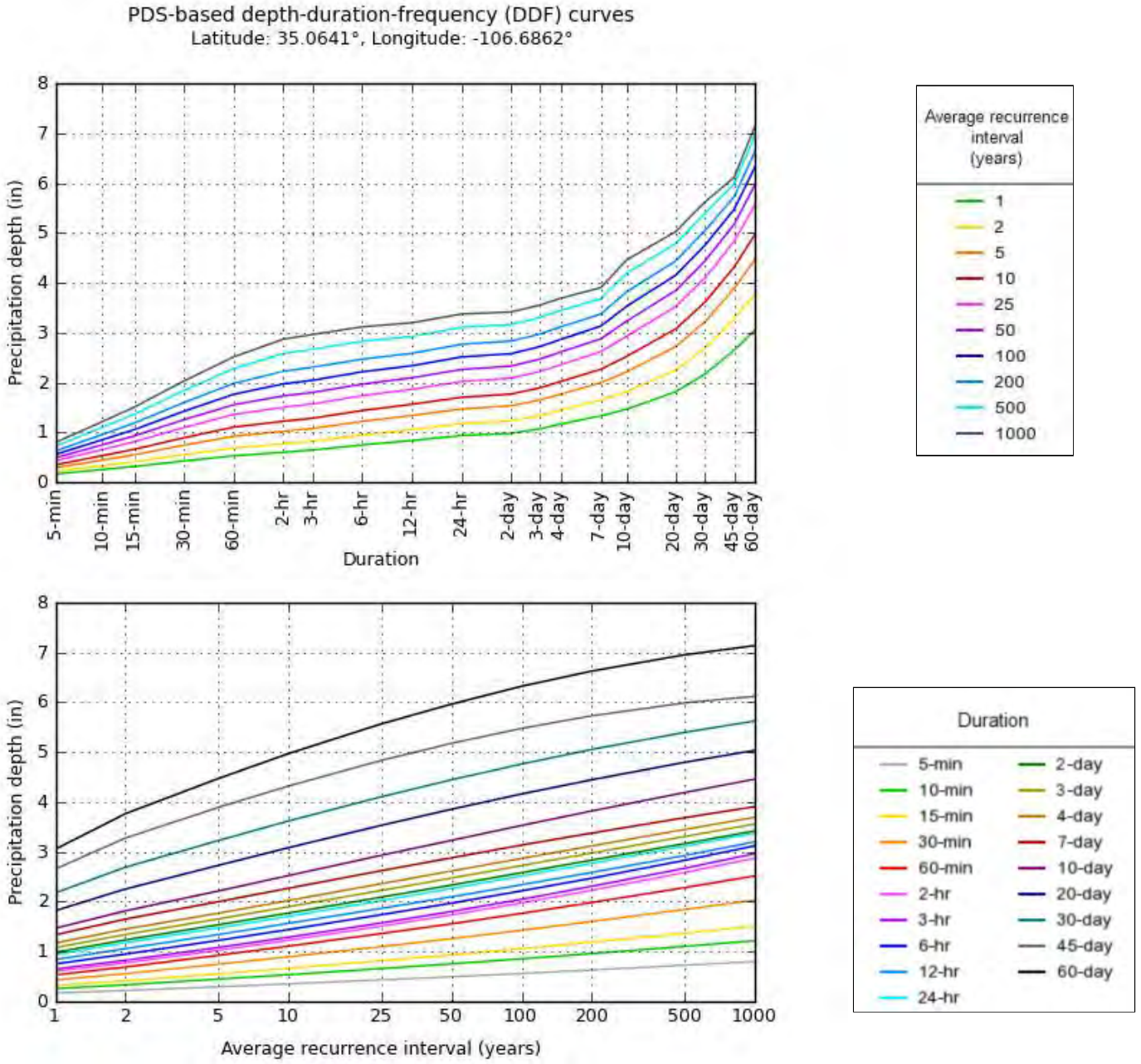
PF graphical



NOAA Atlas 14, Volume 1, Version 5

Created (GMT): Wed Jun 10 20:04:36 2020

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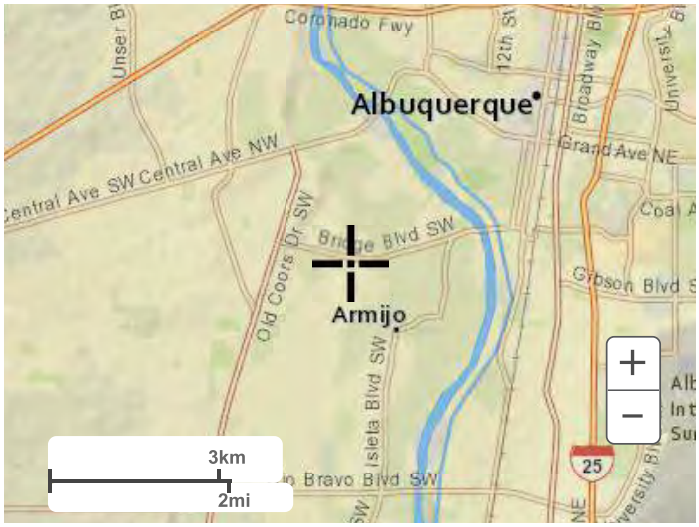
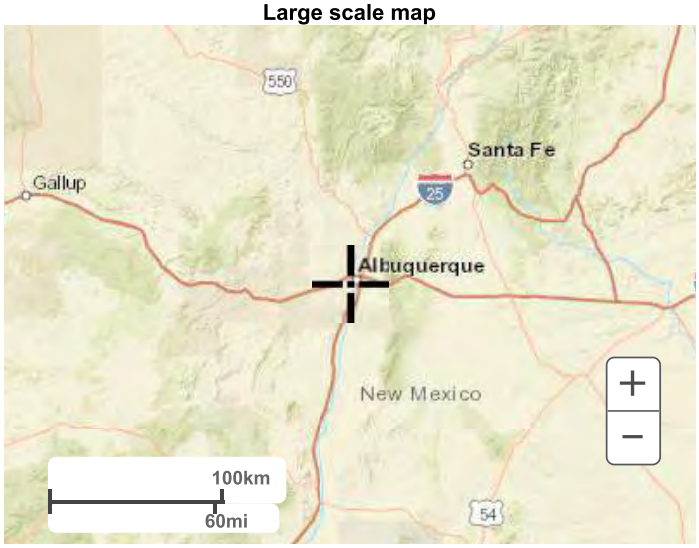
Maps & aerials

Small scale terrain



Large scale terrain

Large scale map



Large scale aerial

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National Water Center
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Disclaimer

APPENDIX B

Hydraulic Calculation

Project: Shari Vista Road
Location: Albuquerque, NM
Date: October 7, 2020
Subject: Inlet Summary Calculations

Proj. Engineer: T. Toledo
Checker: A. Herting / H. Cake

10-year Design Storm

Inlet (ID)	Road	Station	Offset	Contributing Subbasins	Inlet Type	Wing/Inlet Opening (ft)	Effective Opening (ft)	Slope (ft/ft)	Subbasin Flow (cfs)	Total Flow (Including Bypass) (cfs)	Captured Flow (cfs)	Captured Flow (%)	Bypass Flow (cfs)	Bypass To (Inlet ID)	Max Spread (ft)	Calculated Spread (ft)	Spread Acceptable? (Yes/No)
Inlet-01	Shari Vista Road	3+96	30' Rt	BASIN01	Type 'A', Single	7.5	6.0	0.0050	1.26	1.26	1.17	93%	0.09	Inlet-03	12.5	9.6	Yes
Inlet-02	Shari Vista Road	4+17	20' Lt	BASIN01	Type 'A', Single	7.5	6.0	0.0050	1.26	1.26	1.17	93%	0.09	Inlet-03	12.5	9.6	Yes
Inlet-03	Shari Vista Road	4+21	11' Rt	BASIN01	Type 'A', Single, Double Wing	14.5	11.6	SUMP	-	0.17	0.17	-	0.00	End of Project	-	-	-

100-year Design Storm

Inlet (ID)	Road	Station	Offset	Contributing Subbasins	Inlet Type	Wing/Inlet Opening (ft)	Effective Opening (ft)	Slope (ft/ft)	Subbasin Flow (cfs)	Total Flow (Including Bypass) (cfs)	Captured Flow (cfs)	Captured Flow (%)	Bypass Flow (cfs)	Bypass To (Inlet ID)	Calculated Spread (ft)	Calculated Depth (in)	Depth Acceptable? (Yes/No)
Inlet-01	Shari Vista Road	3+96	30' Rt	BASIN01	Type 'A', Single	7.5	6.0	0.0050	2.32	2.32	1.90	82%	0.42	Inlet-03	12.2	3.3	Yes
Inlet-02	Shari Vista Road	4+17	20' Lt	BASIN01	Type 'A', Single	7.5	6.0	0.0050	2.32	2.32	1.90	82%	0.42	Inlet-03	12.2	3.3	Yes
Inlet-03	Shari Vista Road	4+21	11' Rt	BASIN01	Type 'A', Single, Double Wing	14.5	11.6	SUMP	-	0.85	0.85	-	0.00	End of Project	-	-	-

Notes:
1) Effective opening for curb inlets is 80%. If a grate is included, a 50% clogging factor is appied
2) Captured flow calculations were performed using Bentley Flowmaster V8i.
3) Spread calculations were performed using Bentley Flowmaster V8i.
4) Storm Inlet Types per COA Standard Detail Drawings, Revised May 2020, Update 1C
5) Per COA DPM, flow depths in the event of a 10-year design discharge may not exceed 0.5 feet in any collector or arterial street. One lane free of flowing or standing water in each traffic direction must be preserved on arterial street
6) Per COA DPM, flow depths in the event of a 100-year design discharge may not exceed 0.2 feet above curb height and shall be contained within the street right-of-way

Worksheet for 10yr Spread Calculation - S=0.50%

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.005 ft/ft
Discharge	1.26 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00	10.00
0+00	10.00
0+01	9.33
0+02	9.40
0+13	9.62

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 10.00)	(0+02, 9.40)	0.013
(0+02, 9.40)	(0+13, 9.62)	0.017

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	2.7 in
Elevation Range	9.3 to 10.0 ft
Flow Area	0.9 ft²
Wetted Perimeter	9.7 ft
Hydraulic Radius	1.2 in
Top Width	9.57 ft
Normal Depth	2.7 in
Critical Depth	2.4 in
Critical Slope	0.009 ft/ft
Velocity	1.35 ft/s
Velocity Head	0.03 ft
Specific Energy	0.25 ft
Froude Number	0.759
Flow Type	Subcritical

GVF Input Data

Worksheet for 10yr Spread Calculation - S=0.50%

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	2.7 in
Critical Depth	2.4 in
Channel Slope	0.005 ft/ft
Critical Slope	0.009 ft/ft

Worksheet for 10yr Storm Inlet 1&2 - On Grade

Project Description	
Solve For	Efficiency

Input Data	
Discharge	1.25 cfs
Slope	0.005 ft/ft
Gutter Width	2.50 ft
Gutter Cross Slope	0.042 ft/ft
Road Cross Slope	0.020 ft/ft
Roughness Coefficient	0.013
Local Depression	2.8 in
Local Depression Width	90.0 in
Grate Width	2.08 ft
Grate Length	3.3 ft
Grate Type	P-50 mm (P-1 -7/8")
Clogging	50.0 %
Curb Opening Length	6.0 ft

Options	
Calculation Option	Use Both
Grate Flow Option	Exclude None

Results	
Efficiency	93.39 %
Intercepted Flow	1.17 cfs
Bypass Flow	0.08 cfs
Spread	7.6 ft
Depth	2.5 in
Flow Area	0.6 ft²
Gutter Depression	0.7 in
Total Depression	3.4 in
Velocity	1.95 ft/s
Splash Over Velocity	7.39 ft/s
Frontal Flow Factor	1.000
Side Flow Factor	0.115
Grate Flow Ratio	0.641
Equivalent Cross Slope	0.047 ft/ft
Active Grate Length	1.7 ft
Length Factor	0.383
Total Interception Length	11.3 ft

Worksheet for 10yr Storm Inlet 3 - Sag

Project Description	
Solve For	Spread

Input Data	
Discharge	0.17 cfs
Gutter Width	2.50 ft
Gutter Cross Slope	0.042 ft/ft
Road Cross Slope	0.020 ft/ft
Local Depression	2.8 in
Local Depression Width	174.0 in
Grate Width	2.08 ft
Grate Length	3.3 ft
Grate Type	P-50 mm (P-1 -7/8")
Clogging	50.0 %
Curb Opening Length	11.6 ft
Opening Height	0.5 ft
Curb Throat Type	Horizontal
Throat Incline Angle	90.00 degrees

Options	
Calculation Option	Use Both

Results	
Spread	1.9 ft
Depth	-1.4 in
Gutter Depression	0.7 in
Total Depression	3.4 in
Open Grate Area	3.1 ft²
Active Grate Weir Length	5.4 ft

Worksheet for 100yr Spread Calculation - S=0.50%

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.005 ft/ft
Discharge	2.32 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00	10.00
0+00	10.00
0+01	9.33
0+02	9.40
0+13	9.62

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 10.00)	(0+02, 9.40)	0.013
(0+02, 9.40)	(0+13, 9.62)	0.017

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	3.3 in
Elevation Range	9.3 to 10.0 ft
Flow Area	1.5 ft²
Wetted Perimeter	12.4 ft
Hydraulic Radius	1.4 in
Top Width	12.15 ft
Normal Depth	3.3 in
Critical Depth	3.0 in
Critical Slope	0.008 ft/ft
Velocity	1.55 ft/s
Velocity Head	0.04 ft
Specific Energy	0.31 ft
Froude Number	0.781
Flow Type	Subcritical

GVF Input Data

Worksheet for 100yr Spread Calculation - S=0.50%

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	3.3 in
Critical Depth	3.0 in
Channel Slope	0.005 ft/ft
Critical Slope	0.008 ft/ft

Worksheet for 100yr Storm Inlet 1&2 - On Grade

Project Description	
Solve For	Efficiency

Input Data	
Discharge	2.32 cfs
Slope	0.005 ft/ft
Gutter Width	2.50 ft
Gutter Cross Slope	0.042 ft/ft
Road Cross Slope	0.020 ft/ft
Roughness Coefficient	0.013
Local Depression	2.8 in
Local Depression Width	90.0 in
Grate Width	2.08 ft
Grate Length	3.3 ft
Grate Type	P-50 mm (P-1 -7/8")
Clogging	50.0 %
Curb Opening Length	6.0 ft

Options	
Calculation Option	Use Both
Grate Flow Option	Exclude None

Results	
Efficiency	81.89 %
Intercepted Flow	1.90 cfs
Bypass Flow	0.42 cfs
Spread	9.9 ft
Depth	3.0 in
Flow Area	1.0 ft²
Gutter Depression	0.7 in
Total Depression	3.4 in
Velocity	2.22 ft/s
Splash Over Velocity	7.39 ft/s
Frontal Flow Factor	1.000
Side Flow Factor	0.093
Grate Flow Ratio	0.523
Equivalent Cross Slope	0.043 ft/ft
Active Grate Length	1.7 ft
Length Factor	0.277
Total Interception Length	15.6 ft

Worksheet for 100yr Storm Inlet 3 - Sag

Project Description	
Solve For	Spread

Input Data	
Discharge	0.85 cfs
Gutter Width	2.50 ft
Gutter Cross Slope	0.042 ft/ft
Road Cross Slope	0.020 ft/ft
Local Depression	2.8 in
Local Depression Width	174.0 in
Grate Width	2.08 ft
Grate Length	3.3 ft
Grate Type	P-50 mm (P-1 -7/8")
Clogging	50.0 %
Curb Opening Length	11.6 ft
Opening Height	0.5 ft
Curb Throat Type	Horizontal
Throat Incline Angle	90.00 degrees

Options	
Calculation Option	Use Both

Results	
Spread	3.6 ft
Depth	-0.3 in
Gutter Depression	0.7 in
Total Depression	3.4 in
Open Grate Area	3.1 ft²
Active Grate Weir Length	5.4 ft

Project: Shari Vista Road
Location: Albuquerque, NM
Date: 10/19/2020
Scenario: Proposed 100 year Design Storm - StormCAD Results

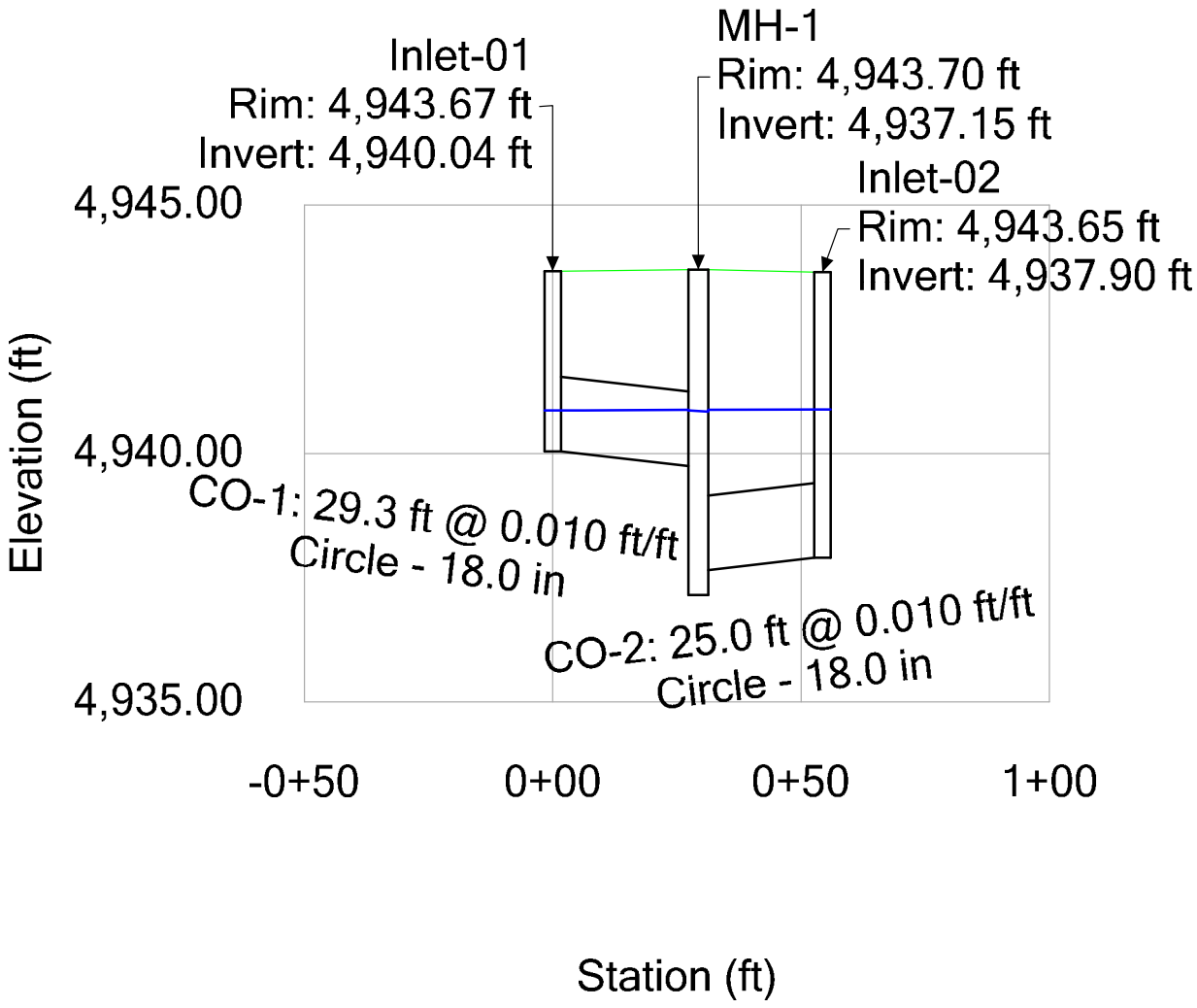
Label	Start Node	Stop Node	Invert (Start) (ft)	Invert (Stop) (ft)	Length (ft)	Slope (ft/ft)	Diameter (Inches)	# of Barrels	Manning's n	Velocity (ft/sec)	Flow (cfs)	Full Flow Capacity (cfs)	Full Flow Capacity (%)	Elevation Ground (Start) (ft)	Elevation Ground (Stop) (ft)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Energy Grade Line (In) (ft)	Energy Grade Line (Out) (ft)
CO-1	Inlet-01	MH-1	4940.04	4939.75	29.3	0.010	18	1	0.013	4.49	1.90	10.45	18.2	4943.67	4943.70	4940.87	4940.88	4940.92	4940.90
CO-2	Inlet-02	MH-1	4937.90	4937.65	25.0	0.010	18	1	0.013	1.08	1.90	10.50	18.1	4943.65	4943.70	4940.89	4940.88	4940.91	4940.90
CO-3	Inlet-03	MH-1	4939.89	4939.75	13.7	0.010	18	1	0.013	3.60	0.85	10.62	8.0	4943.63	4943.70	4940.87	4940.87	4940.87	4940.87
CO-4	MH-1	O-1	4937.15	4937.09	5.8	0.010	24	1	0.013	1.48	4.65	23.01	20.2	4943.70	4944.00	4940.84	4940.84	4940.88	4940.87

Label	Downstream Conduit	Ground Elevation (ft)	Invert Elevation (ft)	Inlet Location	Headloss Method	HEC-22 Benching Method	Headloss (ft)	Captured Flow (cfs)	Capture Efficiency (%)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Energy Grade Line (In) (ft)	Energy Grade Line (Out) (ft)
Inlet-01	CO-1	4943.67	4940.04	On Grade	HEC-22 Energy (Second Edition)	Depressed	0	1.90	100	4,940.87	4,940.87	4,940.92	4,940.92
Inlet-02	CO-2	4943.65	4937.90	On Grade	HEC-22 Energy (Second Edition)	Depressed	0	1.90	100	4,940.89	4,940.89	4,940.91	4,940.91
Inlet-03	CO-3	4943.63	4939.89	In Sag	HEC-22 Energy (Second Edition)	Depressed	0	0.85	100	4,940.87	4,940.87	4,940.87	4,940.87

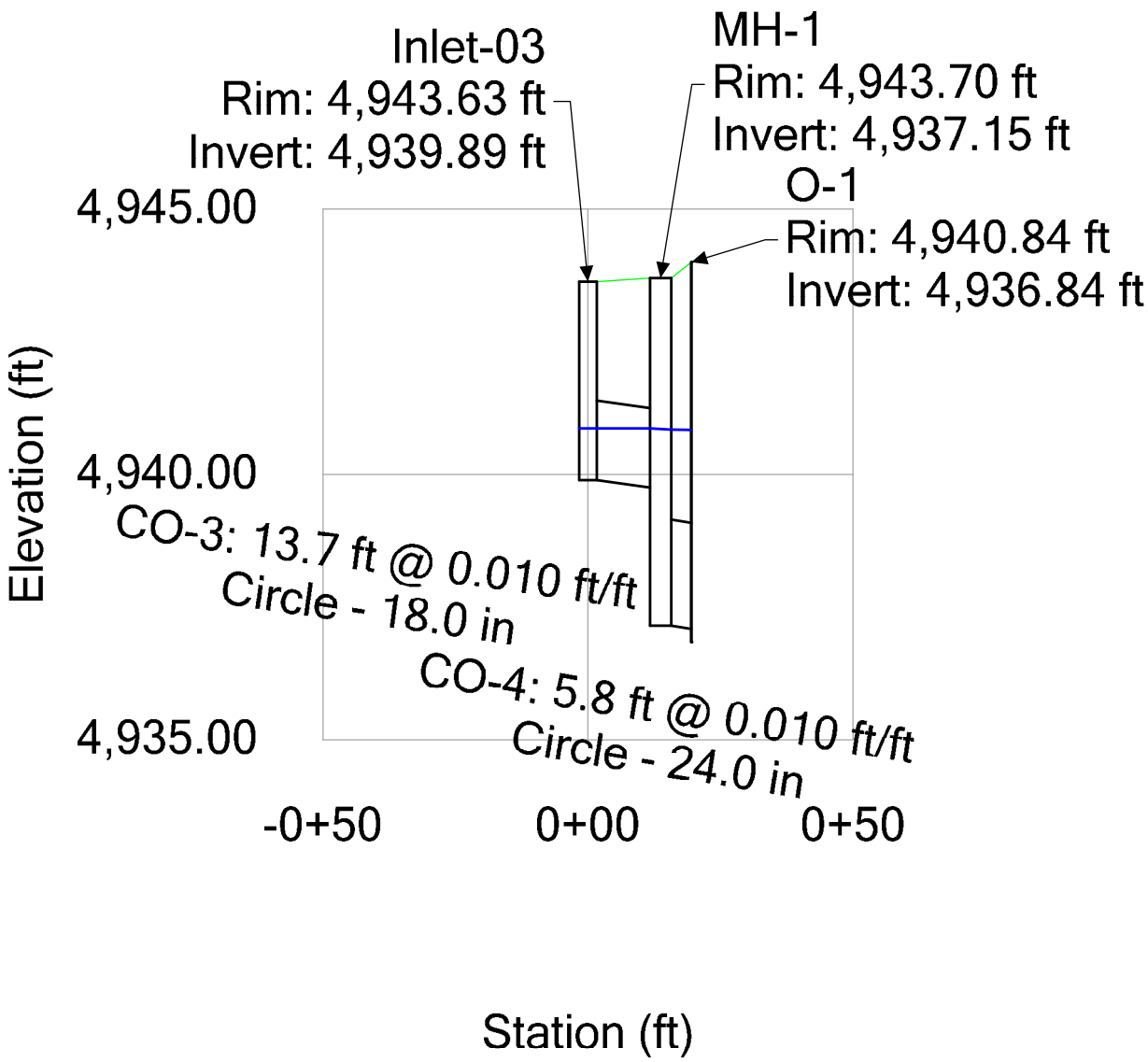
Label	Downstream Conduit	Elevation (Ground) (ft)	Elevation (Invert) (ft)	Depth (In) (ft)	Depth (Out) (ft)	Flow (Total Out) (cfs)	Headloss Method	HEC-22 Benching Method	Headloss (ft)	Velocity (ft/sec)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Energy Grade Line (In) (ft)	Energy Grade Line (Out) (ft)
MH-1	CO-4	4943.70	4937.15	0.76	0.76	4.65	HEC-22 Energy (Second Edition)	Depressed	0.02	1.48	4940.87	4940.84	4940.87	4940.88

Label	Elevation (Ground) (ft)	Elevation (Invert) (ft)	Boundary Condition Type	User Defined Tailwater (ft)	Hydraulic Grade (ft) (ft)	Total Flow (cfs)	Notes
O-1	4944.00	4936.84	User Defined Tailwater	4940.84	4940.84	4.65	Underground Storage Chamber

Profile Report
Engineering Profile - Inlet 1 and Inlet 2 Lateral (ShariVista_100yr.stsw)



Profile Report
Engineering Profile - Inlet 3 to Chamber (ShariVista_100yr.stsw)



CULTEC Stormwater Design Calculator

Date:	October 06, 2020

Project Number:	P.W.C.O XXX

Project Information:

SHARI VISTA ROAD

ALBUQUERQUE, NM

Calculations Performed By:

TATE TOLEDO, P.E.
TY LIN INTERNATIONAL

CHECKED BY: HOWARD CAKE, P.E.

RECHARGER 902HD

Recharger 902HD Chamber Specifications

Height	**48.0**	inches
Width	**78.0**	inches
Length	**4.10**	feet
Installed Length	**3.67**	feet
Bare Chamber Volume	**63.47**	cu. feet
Installed Chamber Volume	**99.22**	cu. feet

Breakdown of Storage Provided by Recharger 902HD Stormwater System

Within Chambers	**3,623.31**	cu. feet
Within Feed Connectors	**-**	cu. feet
Within Stone	**2,695.32**	cu. feet
Total Storage Provided	**6,318.6**	**cu. feet**
Total Storage Required	6285.00	cu. feet

Materials List

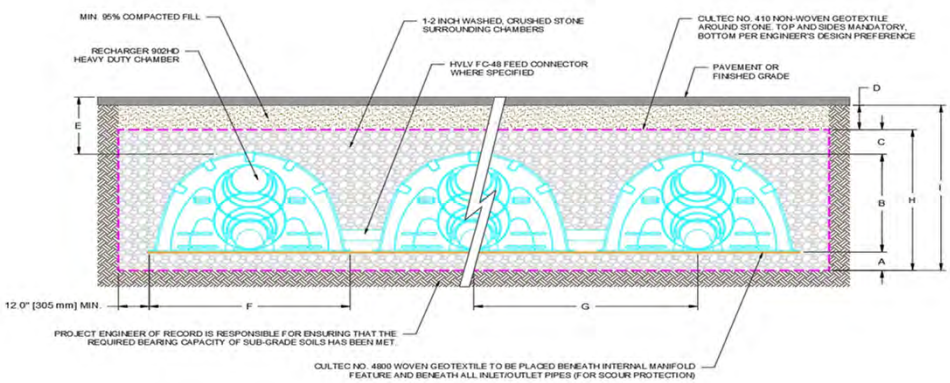
Recharger 902HD			
Total Number of Chambers Required	**57**	**pieces**	
Separator Row Chambers	**57**	pieces	Separator Row Qty Included in Total
Chamber Units	**57**	pieces	
End Caps	**2**	pieces	
HVLV FC-48 Feed Connectors	**0**	pieces	*Based on 2 Internal Manifolds*
CULTEC No. 410 Non-Woven Geotextile	**853**	sq. yards	
CULTEC No. 4800 Woven Geotextile	**238**	feet	
Stone	**250**	cu. yards	

Bed Detail

Bed detail for reference only. Not project specific. Not to scale.

Bed Layout Information

Number of Rows Wide	**1**	pieces
Number of Chambers Long	**57**	pieces
Chamber Row Width	**6.50**	feet
Chamber Row Length	**210.00**	feet
Bed Width	**8.50**	feet
Bed Length	**212.00**	feet
Bed Area Required	**1802.02**	sq. feet
Length of Separator Row	**210.00**	feet



Conceptual graphic only. Not job specific.

Cross Section Table Reference

A	Depth of Stone Base	**9.0**	inches
B	Chamber Height	**48.0**	inches
C	Depth of Stone Above Units	**12.0**	inches
D	Depth of 95% Compacted Fill	**12.0**	inches
E	Max. Depth Allowed Above the Chamber	**8.33**	feet
F	Chamber Width	**78.0**	inches
G	Center to Center Spacing	**7.25**	feet
H	Effective Depth	**5.75**	feet
I	Bed Depth	**6.75**	feet

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CULTEC Stage-Storage Calculations

Date:	October 6, 2020

Project Information:

SHARI VISTA ROAD

ALBUQUERQUE, NM

Project Number:

P.W.C.O XXX

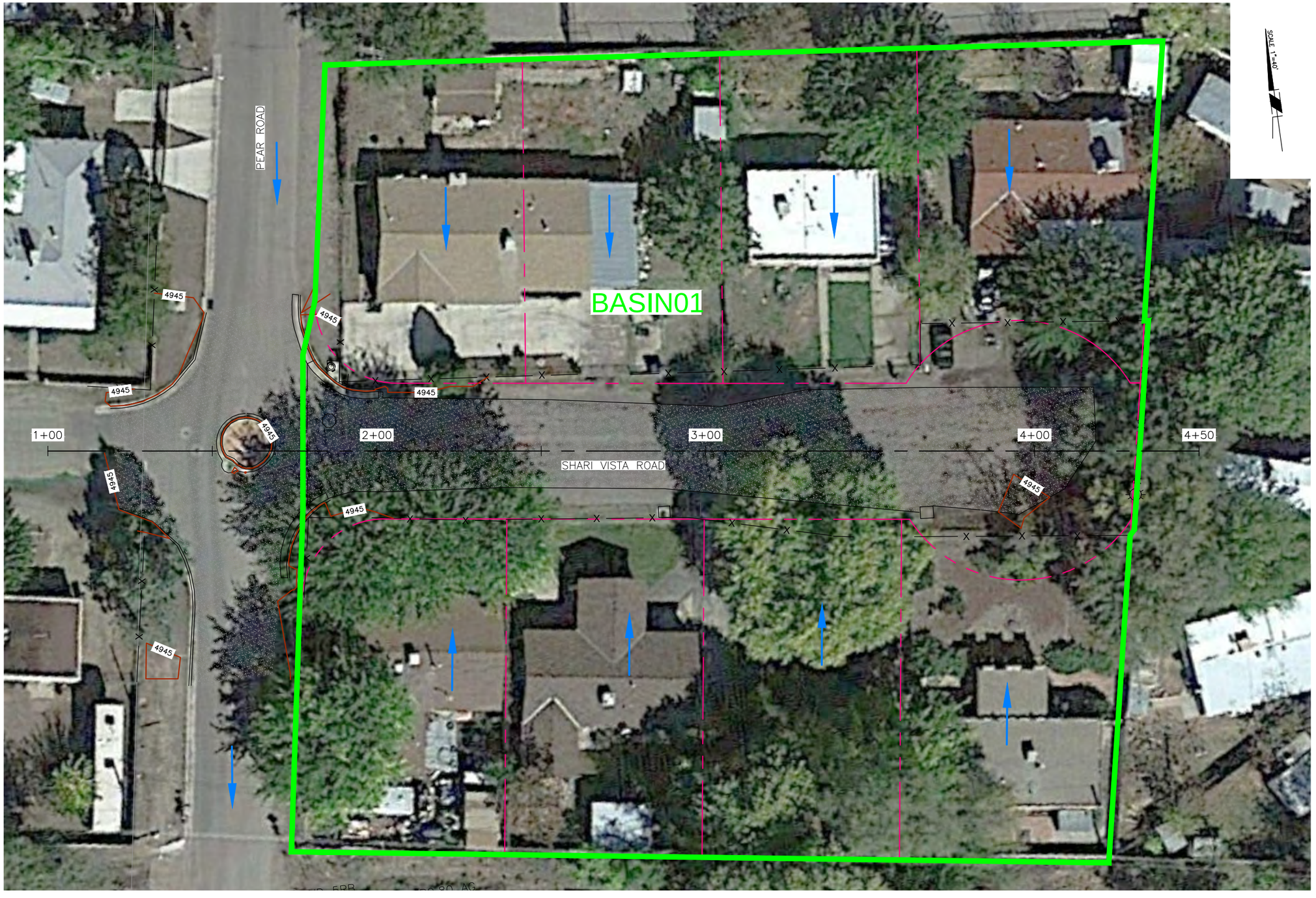
Chamber Model -	**Recharger 902HD**	
Number of Rows-	1	units
Total Number of Chambers -	57	units
HVLV FC-48 Feed Connectors-	0	units
Stone Void -	40	%
Stone Base -	9	inches
Stone Above Units -	12	inches
Area -	1802.02	ft2
Base of Stone Elevation -	4936.09	

Recharger 902HD Incremental Storage Volumes

Height of System		Chamber Volume		HVLV Feed Connector Volume		Stone Volume		Cumulative Storage Volume		Total Cumulative Storage Volume		Elevation		
in	mm	ft³	m³	ft3	m3	ft³	m³	ft³	m³	ft³	m³	ft	m	
69.0	1753	0.0	0.0	0.0	0.0	60.1	1.7	60.067	1.7	6318.52	178.92	4941.84	4937.84	Top of Stone Elevation
68.0	1727	0.0	0.0	0.0	0.0	60.1	1.7	60.067	1.7	6258.46	177.22	4941.76	4937.82	
67.0	1702	0.0	0.0	0.0	0.0	60.1	1.7	60.067	1.7	6198.39	175.52	4941.67	4937.79	
66.0	1676	0.0	0.0	0.0	0.0	60.1	1.7	60.067	1.7	6138.32	173.82	4941.59	4937.77	
65.0	1651	0.0	0.0	0.0	0.0	60.1	1.7	60.067	1.7	6078.25	172.12	4941.51	4937.74	
64.0	1626	0.0	0.0	0.0	0.0	60.1	1.7	60.067	1.7	6018.19	170.42	4941.42	4937.72	
63.0	1600	0.0	0.0	0.0	0.0	60.1	1.7	60.067	1.7	5958.12	168.71	4941.34	4937.69	
62.0	1575	0.0	0.0	0.0	0.0	60.1	1.7	60.067	1.7	5898.05	167.01	4941.26	4937.66	
61.0	1549	0.0	0.0	0.0	0.0	60.1	1.7	60.067	1.7	5837.98	165.31	4941.17	4937.64	
60.0	1524	0.0	0.0	0.0	0.0	60.1	1.7	60.067	1.7	5777.92	163.61	4941.09	4937.61	
59.0	1499	0.0	0.0	0.0	0.0	60.1	1.7	60.067	1.7	5717.85	161.91	4941.01	4937.59	
58.0	1473	0.0	0.0	0.0	0.0	60.1	1.7	60.067	1.7	5657.78	160.21	4940.92	4937.56	
57.0	1448	4.2	0.1	0.0	0.0	58.4	1.7	62.598	1.8	5597.72	158.51	4940.84	4937.54	Top of Chamber Elevation
56.0	1422	10.5	0.3	0.0	0.0	55.9	1.6	66.372	1.9	5535.12	156.74	4940.76	4937.51	
55.0	1397	14.7	0.4	0.0	0.0	54.2	1.5	68.880	2.0	5468.75	154.86	4940.67	4937.49	
54.0	1372	25.2	0.7	0.0	0.0	50.0	1.4	75.162	2.1	5399.87	152.91	4940.59	4937.46	
53.0	1346	33.5	0.9	0.0	0.0	46.7	1.3	80.189	2.3	5324.70	150.78	4940.51	4937.44	
52.0	1321	41.9	1.2	0.0	0.0	43.3	1.2	85.194	2.4	5244.51	148.51	4940.42	4937.41	
51.0	1295	46.1	1.3	0.0	0.0	41.6	1.2	87.713	2.5	5159.32	146.10	4940.34	4937.39	
50.0	1270	50.3	1.4	0.0	0.0	40.0	1.1	90.221	2.6	5071.61	143.61	4940.26	4937.36	
49.0	1245	56.5	1.6	0.0	0.0	37.5	1.1	93.983	2.7	4981.39	141.06	4940.17	4937.33	
48.0	1219	56.5	1.6	0.0	0.0	37.5	1.1	93.983	2.7	4887.40	138.40	4940.09	4937.31	
47.0	1194	60.7	1.7	0.0	0.0	35.8	1.0	96.491	2.7	4793.42	135.73	4940.01	4937.28	
46.0	1168	62.8	1.8	0.0	0.0	34.9	1.0	97.757	2.8	4696.93	133.00	4939.92	4937.26	
45.0	1143	64.9	1.8	0.0	0.0	34.1	1.0	98.999	2.8	4599.17	130.23	4939.84	4937.23	
44.0	1118	69.1	2.0	0.0	0.0	32.4	0.9	101.507	2.9	4500.17	127.43	4939.76	4937.21	
43.0	1092	71.2	2.0	0.0	0.0	31.6	0.9	102.773	2.9	4398.66	124.56	4939.67	4937.18	
42.0	1067	73.2	2.1	0.0	0.0	30.8	0.9	104.015	2.9	4295.89	121.65	4939.59	4937.16	
41.0	1041	73.2	2.1	0.0	0.0	30.8	0.9	104.015	2.9	4191.88	118.70	4939.51	4937.13	
40.0	1016	75.4	2.1	0.0	0.0	29.9	0.8	105.281	3.0	4087.86	115.76	4939.42	4937.11	
39.0	991	77.4	2.2	0.0	0.0	29.1	0.8	106.523	3.0	3982.58	112.77	4939.34	4937.08	
38.0	965	79.6	2.3	0.0	0.0	28.2	0.8	107.801	3.1	3876.06	109.76	4939.26	4937.06	
37.0	940	81.6	2.3	0.0	0.0	27.4	0.8	109.031	3.1	3768.25	106.70	4939.17	4937.03	
36.0	914	81.6	2.3	0.0	0.0	27.4	0.8	109.043	3.1	3659.22	103.62	4939.09	4937.00	
35.0	889	83.7	2.4	0.0	0.0	26.6	0.8	110.297	3.1	3550.18	100.53	4939.01	4936.98	
34.0	864	83.7	2.4	0.0	0.0	26.6	0.8	110.285	3.1	3439.88	97.41	4938.92	4936.95	
33.0	838	85.8	2.4	0.0	0.0	25.7	0.7	111.551	3.2	3329.60	94.28	4938.84	4936.93	
32.0	813	85.8	2.4	0.0	0.0	25.7	0.7	111.551	3.2	3218.05	91.12	4938.76	4936.90	
31.0	787	85.8	2.4	0.0	0.0	25.7	0.7	111.563	3.2	3106.50	87.97	4938.67	4936.88	
30.0	762	87.9	2.5	0.0	0.0	24.9	0.7	112.805	3.2	2994.93	84.81	4938.59	4936.85	
29.0	737	87.9	2.5	0.0	0.0	24.9	0.7	112.805	3.2	2882.13	81.61	4938.51	4936.83	
28.0	711	87.9	2.5	0.0	0.0	24.9	0.7	112.805	3.2	2769.32	78.42	4938.42	4936.80	
27.0	686	90.0	2.5	0.0	0.0	24.1	0.7	114.059	3.2	2656.52	75.22	4938.34	4936.78	
26.0	660	90.0	2.5	0.0	0.0	24.1	0.7	114.059	3.2	2542.46	71.99	4938.26	4936.75	
25.0	635	92.1	2.6	0.0	0.0	23.2	0.7	115.325	3.3	2428.40	68.76	4938.17	4936.73	
24.0	610	92.1	2.6	0.0	0.0	23.2	0.7	115.313	3.3	2313.08	65.50	4938.09	4936.70	
23.0	584	94.2	2.7	0.0	0.0	22.4	0.6	116.567	3.3	2197.76	62.23	4938.01	4936.67	
22.0	559	94.2	2.7	0.0	0.0	22.4	0.6	116.567	3.3	2081.20	58.93	4937.92	4936.65	
21.0	533	94.2	2.7	0.0	0.0	22.4	0.6	116.579	3.3	1964.63	55.63	4937.84	4936.62	
20.0	508	94.2	2.7	0.0	0.0	22.4	0.6	116.567	3.3	1848.05	52.33	4937.76	4936.60	
19.0	483	96.3	2.7	0.0	0.0	21.6	0.6	117.833	3.3	1731.48	49.03	4937.67	4936.57	
18.0	457	96.3	2.7	0.0	0.0	21.6	0.6	117.833	3.3	1613.65	45.69	4937.59	4936.55	
17.0	432	96.3	2.7	0.0	0.0	21.6	0.6	117.833	3.3	1495.82	42.36	4937.51	4936.52	
16.0	406	96.3	2.7	0.0	0.0	21.6	0.6	117.833	3.3	1377.99	39.02	4937.42	4936.50	
15.0	381	98.3	2.8	0.0	0.0	20.7	0.6	119.075	3.4	1260.15	35.68	4937.34	4936.47	
14.0	356	98.4	2.8	0.0	0.0	20.7	0.6	119.087	3.4	1141.08	32.31	4937.26	4936.45	
13.0	330	100.5	2.8	0.0	0.0	19.9	0.6	120.341	3.4	1021.99	28.94	4937.17	4936.42	
12.0	305	100.5	2.8	0.0	0.0	19.9	0.6	120.352	3.4	901.65	25.53	4937.09	4936.39	
11.0	279	100.5	2.8	0.0	0.0	19.9	0.6	120.341	3.4	781.30	22.12	4937.01	4936.37	
10.0	254	100.5	2.8	0.0	0.0	19.9	0.6	120.352	3.4	660.96	18.72	4936.92	4936.34	
9.0	229	0.0	0.0	0.0	0.0	60.1	1.7	60.067	1.7	540.61	15.31	4936.84	4936.32	Bottom of Chamber Elevation
8.0	203	0.0	0.0	0.0	0.0	60.1	1.7	60.067	1.7	480.54	13.61	4936.76	4936.29	
7.0	178	0.0	0.0	0.0	0.0	60.1	1.7	60.067	1.7	420.47	11.91	4936.67	4936.27	
6.0	152	0.0	0.0	0.0	0.0	60.1	1.7	60.067	1.7	360.40	10.21	4936.59	4936.24	
5.0	127	0.0	0.0	0.0	0.0	60.1	1.7	60.067	1.7	300.34	8.50	4936.51	4936.22	
4.0	102	0.0	0.0	0.0	0.0	60.1	1.7	60.067	1.7	240.27	6.80	4936.42	4936.19	
3.0	76	0.0	0.0	0.0	0.0	60.1	1.7	60.067	1.7	180.20	5.10	4936.34	4936.17	
2.0	51	0.0	0.0	0.0	0.0	60.1	1.7	60.067	1.7	120.13	3.40	4936.26	4936.14	
1.0	25	0.0	0.0	0.0	0.0	60.1	1.7	60.067	1.7	60.07	1.70	4936.17	4936.12	
0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.0	0.00	0.00	4936.09	4936.09	Bottom of Stone Elevation
-1.0														
-2.0														

APPENDIX C

Drainage Exhibits



SCALE: 1"=40'

LEGEND

- SUBBASIN
- BASIN11 SUBBASIN ID
- FLOW ARROW
- EXISTING CONTOURS
- EXISTING STORM DRAIN

Basin ID	BASIN01	
Contributing Area	61,720.8 sf	0.30 ac
Q_{P2} Discharge	1.1 cfs	
Q_{P10} Discharge	2.5 cfs	
Q_{P100} Discharge	4.6 cfs	

BERNALILLO COUNTY STATE OF NEW MEXICO

SHARI VISTA ROAD
PEAR RD. TO END OF SHARI VISTA RD.
P.W.C.O. 2020-XXXX

EXHIBIT 1
ONSITE DRAINAGE MAP
EXISTING CONDITIONS

0 15' 30' 60'
SCALE: 1"= 30'

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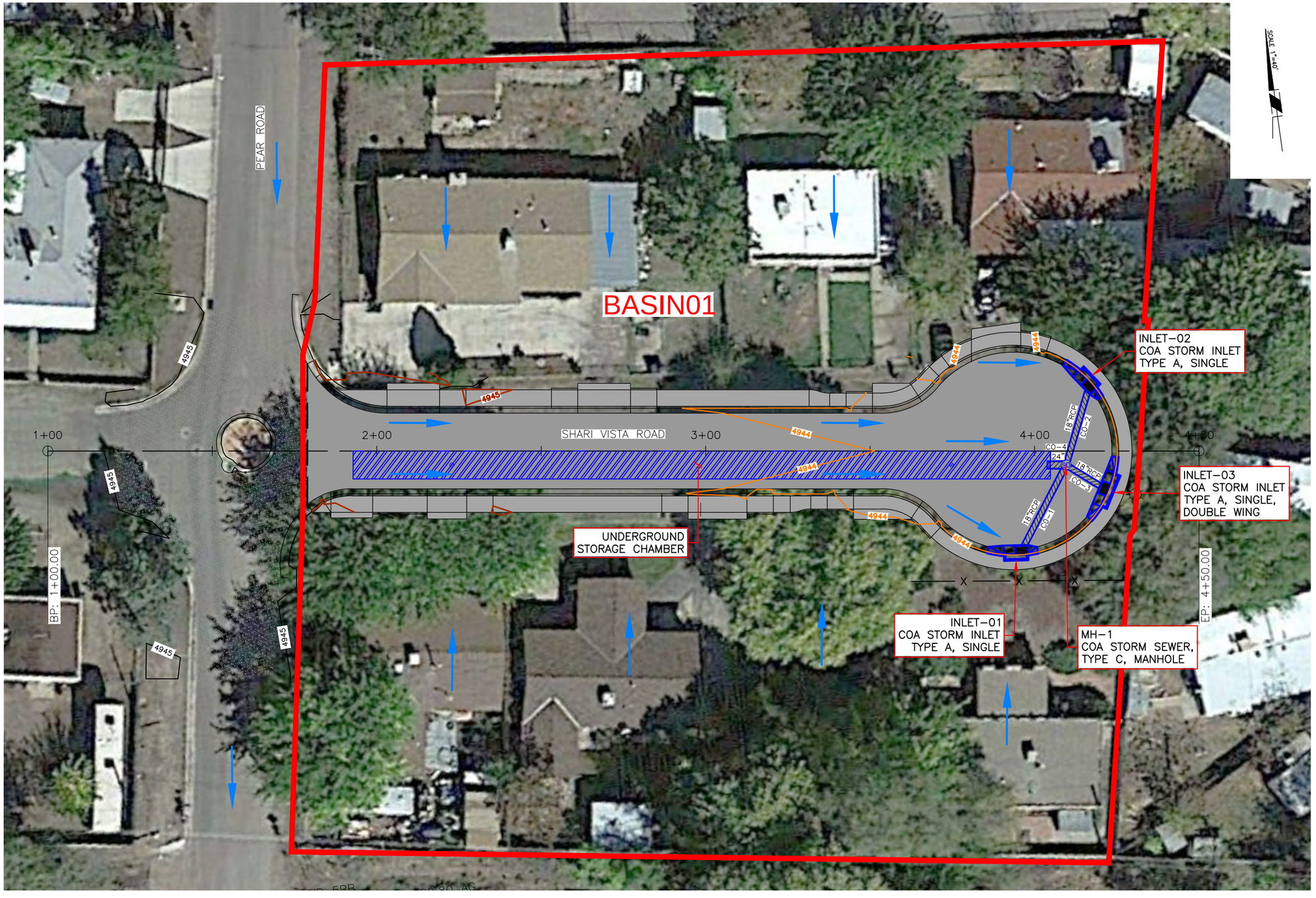

LEGEND

- SUBBASIN
- BASIN01 — SUBBASIN ID
- FLOW ARROW
- EXISTING CONTOURS
- PROPOSED CONTOURS
- PROPOSED STORM DRAIN INFRASTRUCTURE

Basin ID	BASIN01	
Contributing Area	61,720.8 sf	0.30 ac
Q_{P2} Discharge	1.1 cfs	
Q_{P10} Discharge	2.5 cfs	
Q_{P100} Discharge	4.6 cfs	

BERNALILLO COUNTY — STATE OF NEW MEXICO

SHARI VISTA ROAD

PEAR RD. TO END OF SHARI VISTA RD.

P.W.C.O. 2020-XXXX

EXHIBIT 2

ONSITE DRAINAGE MAP

PROPOSED CONDITIONS

0 15' 30' 60'

SCALE: 1"= 30'

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