

ADDENDUM #2 TO THE TECHNICAL DRAINAGE STUDY FOR THRIVE TOWNHOMES

Project No. 2112062

March 2022

Prepared for:

ANN ROAD I-215 INTERCHANGE LLC
1635 VILLAGE CENTER CIR #100
LAS VEGAS, NV 89134

Prepared by:



BLUE DIAMOND CIVIL ENGINEERING
9816 Gilespe St. Ste. #120
Las Vegas, NV 89183
(702) 478-8580

HYDROLOGIC CRITERIA AND DRAINAGE MANUAL
DRAINAGE STUDY INFORMATION FORM

Name of Development: Thrive Townhomes Date: 3/14/22

Location of Development: a) Descriptive (Cross Streets) North/South: Shaumber Road

East/West: Hammer Lane

b) Section: 36 Township: T19S Range: R59E

c) APN : 126-36-101-008

Name of Owner: Ann Road I-215 Interchange LLC

Telephone No.: 702-830-0918 Fax No.: NA E-Mail Address: NA

Address: 1635 Village Center Cir #100 Las Vegas, NV 89134

Contact Person-Name: Philip D. Wakefield, P.E. Telephone No.: 702-478-8580

* E-Mail Address: pwakefield@bdce-lv.com Fax No.: _____

Firm: Blue Diamond Civil Engineering

Address: 9816 Gilespe St. Ste 120, Las Vegas, NV 89183

Type of Land Development/Land Disturbance Process:

<input type="checkbox"/> Rezoning	<input type="checkbox"/> Subdivision Map	<input type="checkbox"/> Clearing and Grading Only
<input type="checkbox"/> Parcel Map	<input type="checkbox"/> Planned Unit Development	<input type="checkbox"/> Other (Please specify below)
<input type="checkbox"/> Large Parcel Map	<input checked="" type="checkbox"/> Building Permit	

1. Total Owned Land Area: At Site: 5.00+/- Acres Being Developed/Disturbed: 5.00+/- Acres

2. Is a portion or all of the subject property located in a designated FEMA Flood Hazard Area? Yes** No

3. Is the property bordered or crossed by an existing or proposed Clark County Regional Flood Control District Master Planned Facility? Yes** No

4. Proposed type of development (Residential, Commercial, Etc.): Residential

5. Approximate upstream land area which drains to the subject site: 9.47+/- Acres

6. Has the site drainage been evaluated in the past? YES NO If yes, please identify documentation: _____

7. If known, please briefly identify the proposed discharge point(s) of runoff from the site: _____
Site discharges north and east onto adjacent parcels.

8. Briefly describe your proposed schedule for the subject project: ASAP

Submit this form as part of the required drainage study to the local entity which has jurisdiction over the subject property. This form may provide sufficient information to serve as the Conceptual Drainage Study.

***New Required Field**

****Review and concurrence of the Clark County Regional Flood Control District is required.**

	Revision	Date

Local Entity File No.		

Engineer's Seal

REFERENCE:

STANDARD FORM 1

March 14, 2022

Albert Sung, P.E.
City of Las Vegas Flood Control
495 S. Main Street
Las Vegas, NV 89101

**Re: Addendum #2 to the Technical Drainage Study for Thrive Townhomes
CLV DS#5527**

Mr. Sung:

Blue Diamond Civil Engineering has received the City of Las Vegas review comments for the above referenced study, dated March 7, 2022. The comments in the subject memorandum have been reproduced with accompanying responses as follows:

Comment 1: The site is also adjacent to the Clark County. The engineer must coordinate with Clark County Public Works Department (CCPW) and incorporate any concerns for boundary conditions along the northern border. CCPW concurrence is required prior to final acceptance of the study.

Response 1: Noted.

Comment 2: The site is adjacent to or crosses an existing or proposed Clark County Regional Flood Control District (CCRFCD) master planned facility. Therefore, CCRFCD concurrence is required prior to final approval of the drainage study.

Please note that effective March 15, 2019, the CCRFCD adopted new requirements for drainage study concurrence submittal. Follow the link below for specific guidance.

<http://gustfront.ccrfcd.org/LandDev/LandDev.aspx>

Please note that effective April 6, 2020, only electronic submittals to the CCRFCD will be accepted for regional concurrence. Contact cwang@regionalflood.org for direction.

When it's applicable, structural calculations of facilities must be approved by the City prior to submittal to the Clark County Regional Flood Control District for their review and concurrence.

***** Do not submit the Drainage Study to Clark County Regional Flood Control District (CCRFCD) prior to the Structural Design and Calculations being approved by the City Building & Safety Department**

Response 2: Noted.

Comment 3: Provide a summary table for prorated subbasin flows including concentration points. Sum of “Onsite Street Flow Calculation” is 115%. Also, depth shown on “Offsite Street Flow Calculations” doesn’t match the Flowmaster calculation. Revise and reflect changes accordingly.

Response 3: The project has been divided into 8 prorated subbasins. The flow patterns have been annotated on the basin maps. The street sections summary table show the concentrated flow and the applicable subbasins that contribute the total flow at the section. The sum of the subbasins is 100%. The Offsite Street Flow Calculations table has been revised to reflect the correct calculations. A summary of the prorated subbasin flows can be seen in the following table:

ONSITE SUBBASIN SUMMARY

SUBBASIN	AREA (acres)	PORTION OF ONSITE BASIN (%)	Q ₁₀ /Q ₁₀₀ (cfs)
1	0.46	9	1/2
2	0.22	4	<1/1
3	0.78	16	1/3
4	0.87	18	2/3
5	0.64	13	1/2
6	0.84	17	2/3
7	0.88	18	2/3
8	0.24	5	<1/1
Total	4.93	100	9/18

The following is a summary of the onsite street calculations:

ONSITE STREET FLOW CALCULATIONS

STREET	Q ₁₀ /Q ₁₀₀ (cfs)	D ₁₀ /D ₁₀₀ (ft)	V ₁₀ /V ₁₀₀ (ft/s)	V x D
Thrive Canyon Street (Sect a1) 17% FUTON1 (Subbasin 6)	2/3	0.27/0.30	2.98/3.20	0.80/0.96
Thrive Canyon Street (Sect a2) 18% FUTON1 (Subbasin 4)	2/3	0.27/0.30	2.98/3.20	0.80/0.96
Triumph Valley Way (Sect b) 34% FUTON1 (Subbasin 3 + 4)	3/6	0.23/0.28	3.79/4.48	0.87/1.25
Blossoming Hills Way (Sect c) 30% FUTON1 (Subbasin 5 + 6)	3/5	0.23/0.26	3.79/4.29	0.87/1.12
Prospering Valley Way (Sect d) 18% FUTON1 (Subbasin 7)	2/3	0.20/0.23	3.46/3.79	0.69/0.87
Section e Subbasins 6, 7, 8, and 50% of 5	--/8	--/0.41	--/4.86	--/1.99
Section f Subbasins 1, 2, 3, 4, and 50% of 5	--/10	--/0.22	--/11.21	--/2.45

The following is a summary of the offsite street calculations:

OFFSITE STREET FLOW CALCULATIONS

STREET	Q₁₀/Q₁₀₀ (cfs)	D₁₀/D₁₀₀ (ft)	V₁₀/V₁₀₀ (ft/s)	V x D
Hammer Ln (Sect 1) COM2	6/11 (5/9)	0.35/0.41 (0.33/0.38)	5.04/5.78 (4.85/5.52)	1.76/2.37 (1.60/2.10)

Note: Future (Interim)

Comment 4: For FlowMaster Section C, revise curb type to match the grading plan.

Response 4: Section C has been revised to match the grading plan and has been included in the appendix. A summary of the calculation has been provided in the response to comment 3.

Comment 5: For FlowMaster calculation for Area Drain @ Lot 25, can't locate the area drain in the grading plan next to Lot 25.

Response 5: We have reviewed the plans and the area drain is shown between Lot 25 and Lot 16.

Comment 6: Revise FlowMaster calculation for "NDOT Type 2 along E. PL" to use grate area of 4' x 6' to match grading plan.

Response 6: The Flowmaster calculation has been revised and included in the appendix.

Comment 7: Revise construction callout for area inlet located Blossoming Hills and Prospering Valley. The FlowMaster calculation calls out 2'x2' drop inlet.

Response 7: The GP sheets have been revised to show 24" x 24" inlets at Blossoming Hills and Prospering Valley.

Comment 8: Sheet GP-1: Add cutoff wall in front of concrete apron, change concrete thickness to 6-inch, and revise profile sheet to show concrete apron. Provide proposed grading at the 30-inch pipe inlet area and along the 30-inch pipe. Provide construction callout for 4-inch area inlet north of Lot 31. Add top of wall elevation and bottom of footing elevation at the northeast corner of property and at Junction Structure #2.

Response 8: A 3' Cutoff wall was added in front of a 6" concrete apron. The profile has been revised to show a cutoff wall and apron. Proposed grading contours were added along the pipe to show the grading over the 30" SD pipe. A construction note #20 was added to identify the area drain north of Lot 31. Top of retaining and top of footing elevations were added along Junction Structure #2 walls.

Comment 9: Sheet GP-2: Label slope for the Eastern channel. Label area inlet grate elevations. Provide concrete collar detail for construction note 34 and detail.

Response 9: The slopes on the eastern channel are shown. All area drains have a TG elevation called out. A concrete collar detail has been included as Detail 15 on sheet DT-2.

Comment 10: Sheet GP-4: Label TW/BF elevations for all corners around Junction Structure #1 and beginning of 18-inch RCP area. Provide proposed grading along proposed 30-inch RCP. Change manhole callout to Type III (406.1). Provide outlet protection of 30-inch RCP. Provide supporting calculation for Outlet protection.

Response 10: Top of retaining and top of footing elevations have been shown along Junction Structure #1 and the entrance to the 18" RCP SD. The proposed grading has been provided at the SDMH#1 and SDMH#2. However, there is no proposed grading along the 30" RCP SD along Shaumber Rd. The pipe will be installed and the grading will remain as is. The contractor will backfill the pipe to existing grade elevations. All SD Manholes are called out as Type III. The plans show a 10' x 10' minimum Riprap pad of D50=1' and Thickness of 2'. This is more conservative than what is required per the calculations. Supporting calculations have been provided in the appendix.

Comment 11: Sheet PP-7: Label Top of Headwall elevation. Revise profile to include concrete apron area.

Response 11: A top of headwall elevation and concrete apron have been provided on PP-7.

Comment 12: Sheet DT-1: Label pipe offset from property line on Section F. Provide detail for area Inlet.

Response 12: The pipe is 2.5' away from the PL. This is about 1.8' away from the inside of the retaining wall. If the pipe ever needs to be excavated, the retaining wall will act as shoring to allow for excavation of pipe for repair.

Comment 13: Sheet DT-2: Provide structural calculation for pipe penetration and provide detail.

Response 13: Per an email conversation with Oh-Sang (City of Las Vegas reviewer), Oh-Sang will allow CVL to resubmit the Technical Drainage Study for review without the structural calculations. However, the structural calculations and details for the pipe penetrations are required to be submitted and approved prior to final approval of the civil improvement plans.

Comment 14: Sheet DT-3: Change access gate to use portion of the Standard Drawing 425.S1. Provide fall protection along the steps. Change concrete apron thickness to 6-inch.

Response 14: An access gate detail was added as details 4 and 5 of sheet DT-3. Detail 1 of sheet DT-3 was also modified to comply closer to the USD No.425.S1.

Comment 15: Please be advised that all land surface area disturbances over 1 acre or any area adjacent to a water way must submit to the Nevada Division of Environmental Protection a "Notice of Intent" to discharge that certifies a stormwater pollution prevention plan has been developed and is maintained on site; for inclusion in the Stormwater General Permit No. NVR100000. A phased construction unit in a contiguous subdivision is considered under construction until all stripped or disturbed surface areas have been covered by paving, building construction or planting. For more information, including forms and applications see <http://ndep.nv.gov/bwpc/storm01.htm> or call (775) 687-9429

Response 15: Noted.

I trust this satisfies your concerns regarding this project. If there are any questions or additional information necessary, please contact this office.

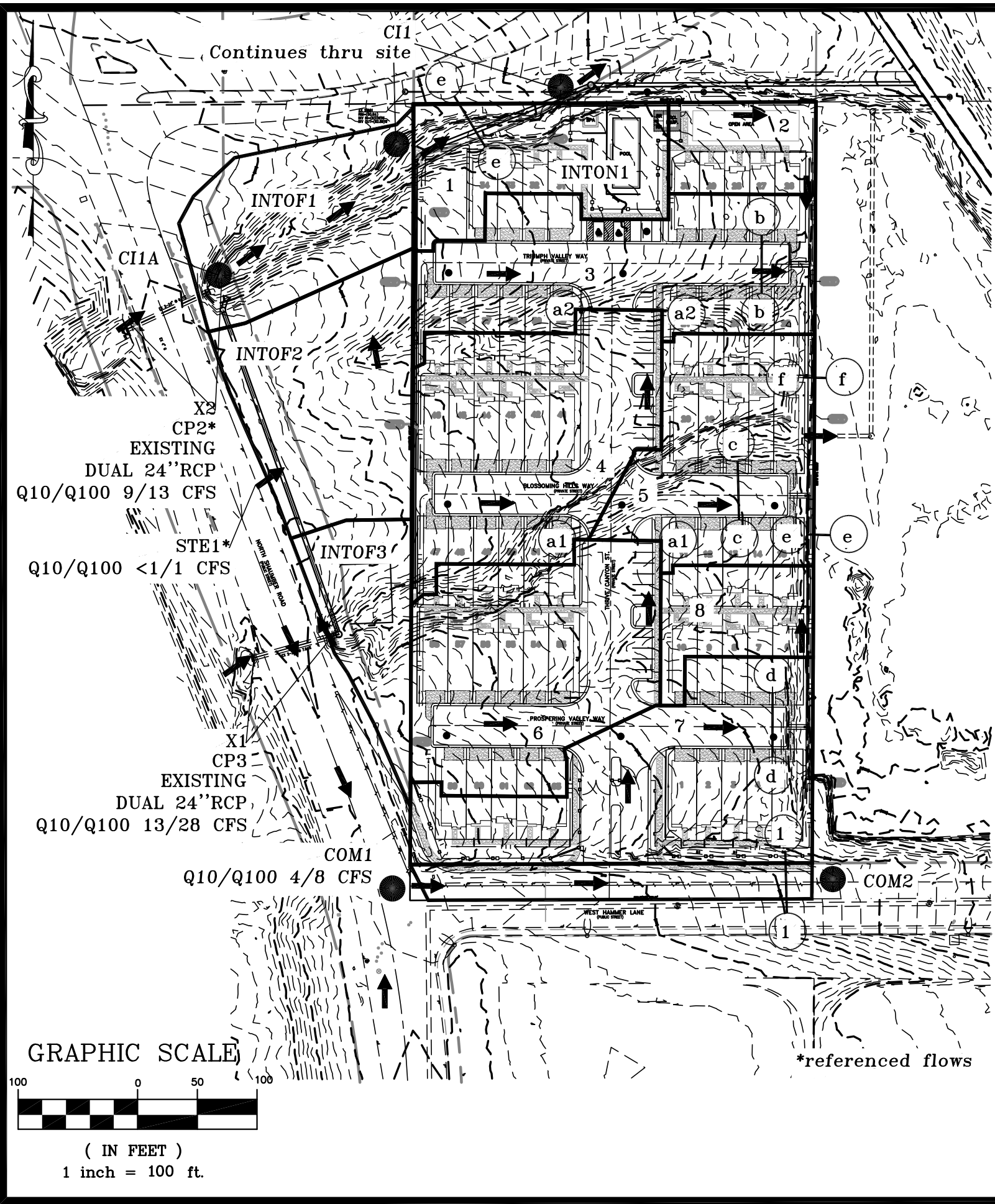
Sincerely,

Blue Diamond Civil Engineering

Philip D. Wakefield, P.E.
Principal

APPENDIX

Revised Figures



10-YEAR / 100-YEAR, 6-HOUR STORM EVENT
INTERIM RUNOFF AMOUNTS

BASIN NAME/ CONCENTRATION POINT	AREA (acres)	10-YEAR FLOW (cfs)	100-YEAR FLOW (cfs)
INTON1	4.93	9	18
INTOF1	0.53	1	1
INTOF2	0.64	1	2
INTOF3	0.30	<1	1
STD2	0.23	1	1
CI1A*	--	21	42
CI1*	--	23	46
COM1*	--	4	8
COM2*	--	5	9

*Includes referenced flows from DS 5314 HEC-1 model.

OFFSITE STREET FLOW CALCULATIONS

STREET	Q ₁₀ /Q ₁₀₀ (cfs)	D ₁₀ /D ₁₀₀ (ft)	V ₁₀ /V ₁₀₀ (ft/s)	V x D
Hammer Ln (Sect 1)	6/11	0.35/0.41	5.04/5.78	1.76/2.37
COM2	(5/9)	(0.33/0.38)	(4.85/5.52)	(1.60/2.10)

Note: Future (Interim)

ONSITE STREET FLOW CALCULATIONS

STREET	Q ₁₀ /Q ₁₀₀ (cfs)	D ₁₀ /D ₁₀₀ (ft)	V ₁₀ /V ₁₀₀ (ft/s)	V x D
Thrive Canyon Street (Sect a1) 17% FUTON1 (Subbasin 6)	2/3	0.27/0.30	2.98/3.20	0.80/0.96
Thrive Canyon Street (Sect a2) 18% FUTON1 (Subbasin 4)	2/3	0.27/0.30	2.98/3.20	0.80/0.96
Triumph Valley Way (Sect b) 34% FUTON1 (Subbasin 3 + 4)	3/6	0.23/0.28	3.79/4.48	0.87/1.25
Blossoming Hills Way (Sect c) 30% FUTON1 (Subbasin 5 + 6)	3/5	0.23/0.26	3.79/4.29	0.87/1.12
Prospering Valley Way (Sect d) 18% FUTON1 (Subbasin 7)	2/3	0.20/0.23	3.46/3.79	0.69/0.87
Section e Subbasins 6, 7, 8, and 50% of 5	--/8	--/0.41	--/4.86	--/1.99
Section f Subbasins 1, 2, 3, 4, and 50% of 5	--/10	--/0.22	--/11.21	--/2.45

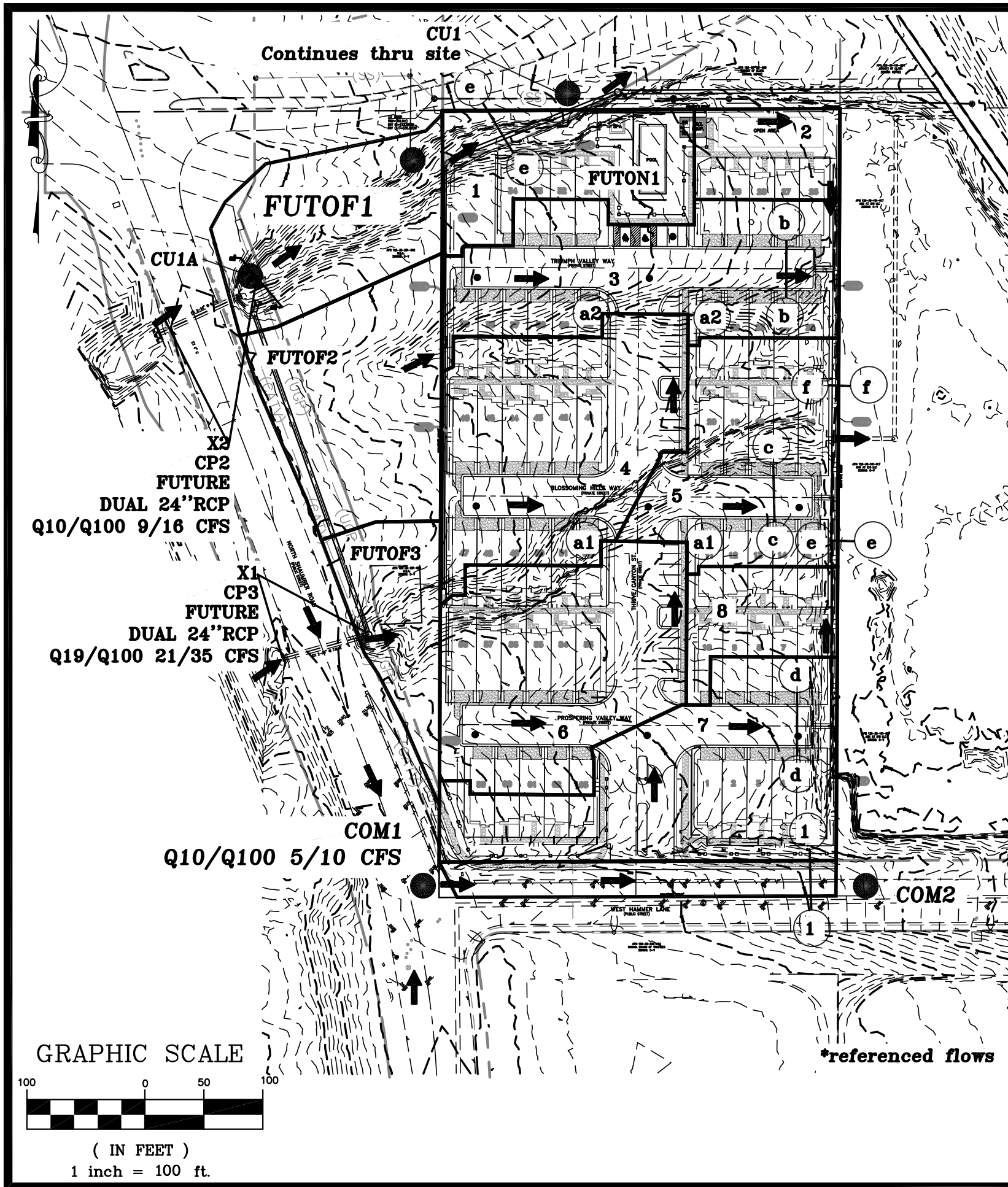
LEGEND

- DEV1 BASIN NAME
- CONCENTRATION POINT
- ➔ FLOW DIRECTION
- BASIN BOUNDARY
- ⑦ HYDRAULIC SECTION
- 1 ONSITE SUBBASIN NAME

FIGURE 10

INTERIM ONSITE
BASIN MAP

BLUE DIAMOND CIVIL ENGINEERING
9816 Gilespe St. Ste. #120
LAS VEGAS, NV 89183
(702)478-8580



**10-YEAR / 100-YEAR, 6-HOUR STORM EVENT
FUTURE RUNOFF AMOUNTS**

BASIN NAME/ CONCENTRATION POINT	AREA (acres)	10-YEAR FLOW (cfs)	100-YEAR FLOW (cfs)
FUTON1	4.93	9	18
FUTOF1	0.53	1	2
FUTOF2	0.64	1	3
FUTOF3	0.30	1	1
STD2	0.23	1	1
CU1A*	--	29	50
CU1*	--	32	56
COM1*	--	5	10
COM2*	--	6	11

*Includes referenced flows from DS 5314 HEC-1 model.

OFFSITE STREET FLOW CALCULATIONS

STREET	Q ₁₀ /Q ₁₀₀ (cfs)	D ₁₀ /D ₁₀₀ (ft)	V ₁₀ /V ₁₀₀ (ft/s)	V x D
Hammer Ln (Sect 1)	6/11	0.35/0.41	5.04/5.78	1.76/2.37
COM2	(5/9)	(0.33/0.38)	(4.85/5.52)	(1.60/2.10)

Note: Future (Interim)

ONSITE STREET FLOW CALCULATIONS

STREET	Q ₁₀ /Q ₁₀₀ (cfs)	D ₁₀ /D ₁₀₀ (ft)	V ₁₀ /V ₁₀₀ (ft/s)	V x D
Thrive Canyon Street (Sect a1) 17% FUTON1 (Subbasin 6)	2/3	0.27/0.30	2.98/3.20	0.80/0.96
Thrive Canyon Street (Sect a2) 18% FUTON1 (Subbasin 4)	2/3	0.27/0.30	2.98/3.20	0.80/0.96
Triumph Valley Way (Sect b) 34% FUTON1 (Subbasin 3 + 4)	3/6	0.23/0.28	3.79/4.48	0.87/1.25
Blossoming Hills Way (Sect c) 30% FUTON1 (Subbasin 5 + 6)	3/5	0.23/0.26	3.79/4.29	0.87/1.12
Prospering Valley Way (Sect d) 18% FUTON1 (Subbasin 7)	2/3	0.20/0.23	3.46/3.79	0.69/0.87
Section e Subbasins 6, 7, 8, and 50% of 5	--/8	--/0.41	--/4.86	--/1.99
Section f Subbasins 1, 2, 3, 4, and 50% of 5	--/10	--/0.22	--/11.21	--/2.45

FIGURE 12

**FUTURE ONSITE
BASIN MAP**

BLUE DIAMOND CIVIL ENGINEERING
9816 Gilespe St. Ste. #120
LAS VEGAS, NV 89183
(702)478-8580

Revised Hydraulic Calculations

Worksheet for Add2: 10yr Blossoming Hills Sect c

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth
Input Data	
Channel Slope	0.0400 ft/ft
Discharge	3.00 cfs

Section Definitions

	Station (ft)	Elevation (ft)
	0+00.00	0.38
	0+00.38	0.38
	0+01.50	0.00
	0+02.50	0.08
	0+34.50	0.72
	0+35.50	0.64
	0+36.62	1.02
	0+37.00	1.02

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.38)	(0+02.50, 0.08)	0.013
(0+02.50, 0.08)	(0+34.50, 0.72)	0.016
(0+34.50, 0.72)	(0+37.00, 1.02)	0.013

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	0.23 ft
Roughness Coefficient	0.015
Elevation	0.23 ft
Elevation Range	0.00 to 1.02 ft
Flow Area	0.8 ft ²
Wetted Perimeter	8.99 ft
Hydraulic Radius	0.09 ft
Top Width	8.94 ft
Normal Depth	0.23 ft
Critical Depth	0.29 ft
Critical Slope	0.0071 ft/ft

Worksheet for Add2: 10yr Blossoming Hills Sect c

Results

Velocity	3.79 ft/s
Velocity Head	0.22 ft
Specific Energy	0.45 ft
Froude Number	2.250
Flow Type	Supercritical

GVF Input Data

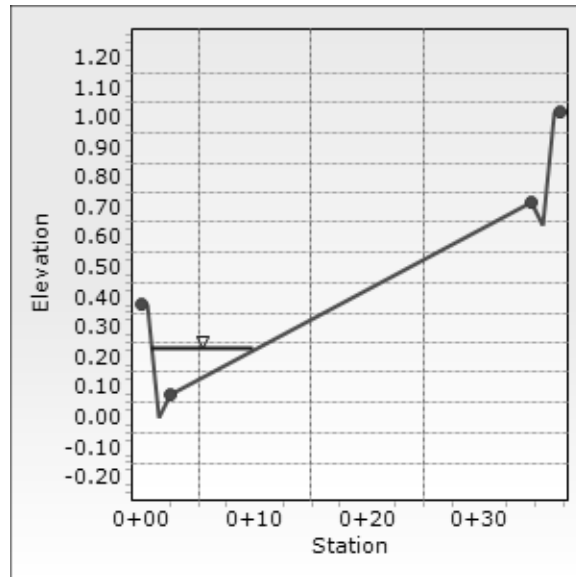
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.23 ft
Critical Depth	0.29 ft
Channel Slope	0.0400 ft/ft
Critical Slope	0.0071 ft/ft

Cross Section for Add2: 10yr Blossoming Hills Sect c

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth
Input Data	
Channel Slope	0.0400 ft/ft
Normal Depth	0.23 ft
Discharge	3.00 cfs



Worksheet for Add2: 100yr Blossoming Hills Sect c

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth
Input Data	
Channel Slope	0.0400 ft/ft
Discharge	5.00 cfs

Section Definitions

	Station (ft)	Elevation (ft)	
	0+00.00		0.38
	0+00.38		0.38
	0+01.50		0.00
	0+02.50		0.08
	0+34.50		0.72
	0+35.50		0.64
	0+36.62		1.02
	0+37.00		1.02

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.38)	(0+02.50, 0.08)	0.013
(0+02.50, 0.08)	(0+34.50, 0.72)	0.016
(0+34.50, 0.72)	(0+37.00, 1.02)	0.013

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	0.26 ft
Roughness Coefficient	0.016
Elevation	0.26 ft
Elevation Range	0.00 to 1.02 ft
Flow Area	1.2 ft ²
Wetted Perimeter	11.00 ft
Hydraulic Radius	0.11 ft
Top Width	10.95 ft
Normal Depth	0.26 ft
Critical Depth	0.35 ft
Critical Slope	0.0067 ft/ft

Worksheet for Add2: 100yr Blossoming Hills Sect c

Results

Velocity	4.29 ft/s
Velocity Head	0.29 ft
Specific Energy	0.55 ft
Froude Number	2.314
Flow Type	Supercritical

GVF Input Data

Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

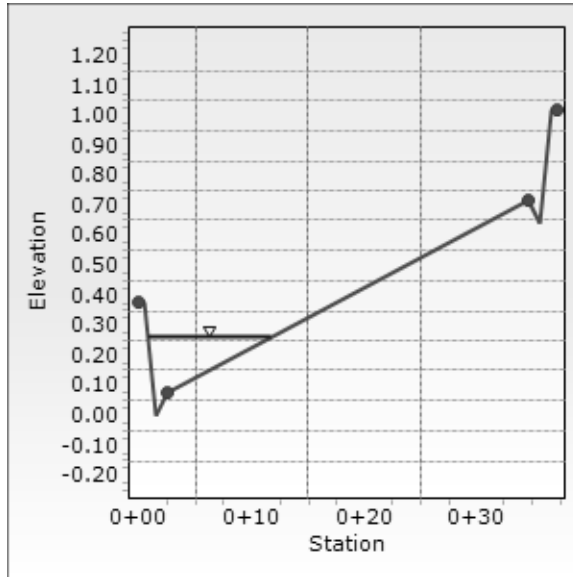
GVF Output Data

Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.26 ft
Critical Depth	0.35 ft
Channel Slope	0.0400 ft/ft
Critical Slope	0.0067 ft/ft

Cross Section for Add2: 100yr Blossoming Hills Sect c

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.0400 ft/ft
Normal Depth	0.26 ft
Discharge	5.00 cfs



Worksheet for 30" RCP Outlet Protection

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.0910 ft/ft
Discharge	35.00 cfs

Section Definitions

	Station (ft)	Elevation (ft)
	0+00.00	2,913.00
	0+16.00	2,905.00
	0+23.00	2,903.50
	0+31.00	2,905.00
	0+54.00	2,913.00

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 2,913.00)	(0+54.00, 2,913.00)	0.035

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	0.95 ft
Roughness Coefficient	0.035
Elevation	2,904.45 ft
Elevation Range	2,903.50 to 2,913.00 ft
Flow Area	4.5 ft ²
Wetted Perimeter	9.72 ft
Hydraulic Radius	0.47 ft
Top Width	9.53 ft
Normal Depth	0.95 ft
Critical Depth	1.25 ft
Critical Slope	0.0214 ft/ft
Velocity	7.71 ft/s
Velocity Head	0.92 ft
Specific Energy	1.88 ft
Froude Number	1.969
Flow Type	Supercritical

Worksheet for 30" RCP Outlet Protection

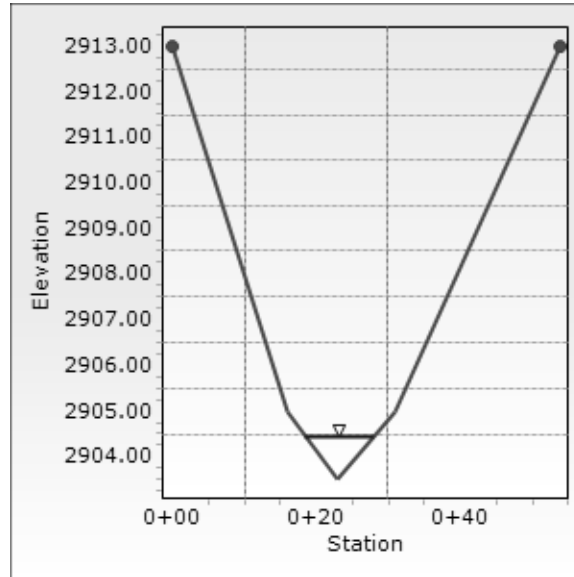
GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.95 ft
Critical Depth	1.25 ft
Channel Slope	0.0910 ft/ft
Critical Slope	0.0214 ft/ft

Cross Section for 30" RCP Outlet Protection

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.0910 ft/ft
Normal Depth	0.95 ft
Discharge	35.00 cfs



RIPRAP CALCULATION

$$D_{50} = 0.023D*(Q/D^{2.5}) / (Y_t/D)^{1.2} \quad (\text{Equation 760 from the CCRFCD HC\&DDM})$$

Where:

D_{50} = Rock size for which 50 percent of the riprap weight is smaller (ft)

Q = Design discharge (cfs)

D = Diameter of circular conduit (ft)

Y_t = Tailwater depth (ft)

Input:

Q = 35 cfs

D = 3.5 ft

Y_t = 0.95 ft

Valid if:

$$Q/D^{2.5} \leq 6.0$$

$$Q/D^{2.5} = 1.53$$

Therefore equation valid

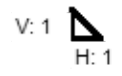
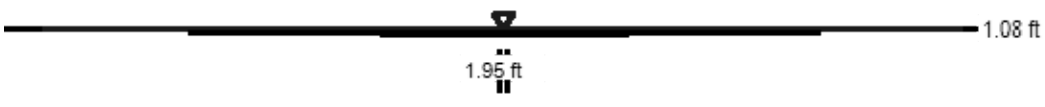
$$D_{50} = \underline{\underline{0.59 \text{ ft}}}$$

Worksheet for Add2: NDOT Type 2 Along E. PL

Project Description	
Solve For	Spread
Input Data	
Discharge	18.00 cfs
Left Side Slope	100.000 H:V
Right Side Slope	100.000 H:V
Bottom Width	1.95 ft
Grate Width	1.95 ft
Grate Length	3.67 ft
Local Depression	0.0 in
Local Depression Width	0.0 in
Grate Type	P-50 mm (P-1 -7/8")
Clogging	50.0 %
Results	
Spread	218.25 ft
Depth	1.08 ft
Wetted Perimeter	218.26 ft
Top Width	218.25 ft
Open Grate Area	3.2 ft ²
Active Grate Weir Length	9.29 ft

Cross Section for Add2: NDOT Type 2 Along E. PL

Project Description	
Solve For	Spread
Input Data	
Discharge	18.00 cfs
Spread	218.25 ft
Left Side Slope	100.000 H:V
Right Side Slope	100.000 H:V
Bottom Width	1.95 ft
Grate Width	1.95 ft
Grate Length	3.67 ft
Local Depression	0.0 in
Local Depression Width	0.0 in
Grate Type	P-50 mm (P-1 -7/8")
Clogging	50.0 %



Comment Letter

CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM		DATE: 03/07/2022	
TO: Land Development Services Department of Building & Safety		FROM: Albert Sung, P.E. Flood Control Project Engineer Department of Public Works	
SUBJECT:	Drainage Study for:	COPIES TO:	
Thrive Townhomes		Blue Diamond Civil Engineering	
Cross Streets:	Shaumber Road and Hammer Lane	Ann Road I-215 Interchange LLC	
File Number:	F:\Depot\DSMemos\DS05527B.doc	Bart Anderson, P.E., DevCo	
Parcel Number:	126-36-101-008		
Zoning Action:			
FEMA Flood Zone	YES	NO	X
Proposed Storm Drain	YES	X	NO

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Payment Trn #
1 st Submittal	12/02/2021	12/11/2021	Not Approved	\$400	496382: \$400
2 nd Submittal	02/17/2022	03/07/2022	See Comments Below	\$400	4656657: \$400
TOTAL FEES (LDDRS):				\$800	----

REMARKS:

The Drainage Study for the subject project has been reviewed and:

	is approved subject to conformance to all City standards and the following conditions:
X	must be resubmitted or supplemented including the following:
	is conditionally approved subject to Clark County Regional Flood Control District concurrence.
	is conditionally approved subject to Clark County Public Works Department concurrence.

The following are comments pertaining to the subject site specific drainage study and grading plans:

1. The site is also adjacent to the Clark County. The engineer must coordinate with *Clark County Public Works Department (CCPW)* and incorporate any concerns for boundary conditions along the northern border. CCPW concurrence is required prior to final acceptance of the study.
2. The site is adjacent to or crosses an existing or proposed *Clark County Regional Flood Control District (CCRFCD)* master planned facility. Therefore, CCRFCD concurrence is required prior to final approval of the drainage study.

Please note that effective March 15, 2019, the CCRFCD adopted new requirements for drainage study concurrence submittal. Follow the link below for specific guidance.

<http://gustfront.ccrfcd.org/LandDev/LandDev.aspx>

Please note that effective April 6, 2020, only electronic submittals to the CCRFCD will be accepted for regional concurrence. Contact cwang@regionalflood.org for direction.

When it's applicable, structural calculations of facilities must be approved by the City prior to submittal to the Clark County Regional Flood Control District for their review and concurrence.

***** Do not submit the Drainage Study to Clark County Regional Flood Control District (CCRFCD) prior to the Structural Design and Calculations being approved by the City Building & Safety Department**

3. Provide a summary table for prorated subbasin flows including concentration points. Sum of "Onsite Street Flow Calculation" is 115%. Also, depth shown on "Offsite Street Flow Calculations" doesn't match the Flowmaster calculation. Revise and reflect changes accordingly.
4. For FlowMaster Section C, revise curb type to match the grading plan.
5. For FlowMaster calculation for Area Drain @ Lot 25, can't locate the area drain in the grading plan next to Lot 25.
6. Revise FlowMaster calculation for "NDOT Type 2 along E. PL" to use grate area of 4' x 6' to match grading plan.
7. Revise construction callout for area inlet located Blossoming Hills and Prospering Valley. The FlowMaster calculation calls out 2'x2' drop inlet.
8. Sheet GP-1: Add cutoff wall in front of concrete apron, change concrete thickness to 6-inch, and revise profile sheet to show concrete apron. Provide proposed grading at the 30-inch pipe inlet area and along the 30-inch pipe. Provide construction callout for 4-inch area inlet north of Lot 31. Add top of wall elevation and bottom of footing elevation at the northeast corner of property and at Junction Structure #2.
9. Sheet GP-2: Label slope for the Eastern channel. Label area inlet grate elevations. Provide concrete collar detail for construction note 34 and detail.
10. Sheet GP-4: Label TW/BF elevations for all corners around Junction Structure #1 and beginning of 18-inc RCP area. Provide proposed grading along proposed 30-inch RCP. Change manhole callout to Type III (406.1). Provide outlet protection of 30-inch RCP. Provide supporting calculation for Outlet protection.
11. Sheet PP-7: Label Top of Headwall elevation. Revise profile to include concrete apron area.
12. Sheet DT-1: Label pipe offset from property line on Section F. Provide detail for area Inlet.
13. Sheet DT-2: Provide structural calculation for pipe penetration and provide detail.
14. Sheet DT-3: Change access gate to use portion of the Standard Drawing 425.S1. Provide fall protection along the Steps. Change concrete apron thickness to 6-inch.
15. **NOTE:** Please be advised that all land surface area disturbances over 1 acre or any area adjacent to a water way must submit to the Nevada Division of Environmental Protection a "Notice of Intent" to discharge that certifies a stormwater pollution prevention plan has been developed and is maintained on site; for inclusion in the Stormwater General Permit No. NVR100000. A phased construction unit in a contiguous subdivision is considered under construction until all stripped or disturbed surface areas have been covered by paving, building construction or planting. For more information, including forms and applications see <http://ndep.nv.gov/bwpc/storm01.htm> or call (775) 687-9429.

END OF REMARKS

T/R/S: T19S/R59E/S36
AREA F-36

Project Plans