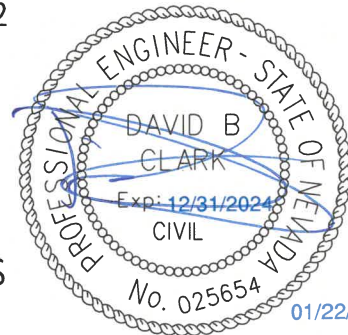




ADDENDUM #1
TO
UPDATE #3
TO THE
TECHNICAL DRAINAGE STUDY
FOR
SUMMERLIN STORAGE
(MINI STORAGE FACILITY AT WESTCLIFF AND RAINBOW)
(APN 138-27-802-001)
IN
CITY OF LAS VEGAS, NEVADA

PREPARED FOR
Summerlin Parkway Storage, LLC
2165 Horse Prairie Drive
Henderson, NV, 89052
Ph. (702)-348-5100

SUBMITTED TO
CITY OF LAS VEGAS



JANUARY 2024

HORROCKS PROJECT NUMBER: NV-LD-3629-21

Horrocks Engineers
1401 N Green Valley Pkwy, Suite 160
Henderson, NV 89074
Ph. (702)-966-4063



HYDROLOGIC CRITERIA AND DRAINAGE MANUAL
DRAINAGE STUDY INFORMATION FORM

SUMMERLIN STORAGE (MINI STORAGE FACILITY AT

Name of Development: WESTCLIFF AND RAINBOW - UPDATE#3 Date: 01/22/2024

Location of Development: a) Descriptive (Cross Streets) North/South: Rainbow Blvd
 East/West: Westcliff Drive

b) Section: 27 Township: 20S Range: 60E

c) APN : 138-27-802-001

Name of Owner: Summerlin Parkway Storage, LLC

Telephone No.: 702-348-5100 Fax No.: _____ E-Mail Address: blake.chaseconstruction@gmail.com

Address: 2165 Horse Prairie Drive, Henderson, NV, 89052

Contact Person-Name: David B. Clark Telephone No.: 702.966.4063

* E-Mail Address: dclark@horrocks.com Fax No.: _____

Firm: Horrocks Engineers

Address: 1401 N Green Valley Pkwy, Suite 160 Henderson, NV 89074

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: 2.5+/- acres Being Developed/Disturbed: 2.5+/- 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

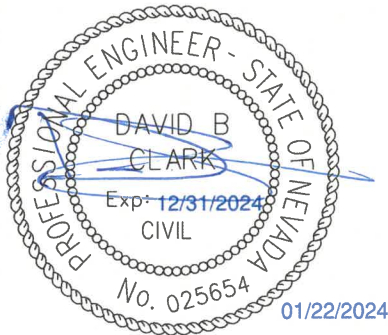
4. Proposed type of development (Residential, Commercial, Etc.): Public

5. Approximate upstream land area which drains to the subject site: 7 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:
The existing rectangular concrete channel

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



Engineer's Seal

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.**

Local Entity File No.	Revision	Date

REFERENCE:

STANDARD FORM 1

MEMORANDUM

TO: Development Review

495 S Main St,
Las Vegas, NV 89101

FROM: David Clark

DATE: **January 22, 2024**

SUBJECT: **Addendum #1 to Update #3 to the Technical Drainage Study for Summerlin Storage (Mini Storage Facility at Westcliff and Rainbow), APN: 138-27-802-001 (DS5459H)**

Horrocks Engineers hereby submits Addendum #1 to Update #3 to the Technical Drainage Study for Summerlin Storage (Mini Storage Facility at Westcliff and Rainbow (DS 5459J) which responds to the CLV comments dated on December 27, 2023. The comments are listed below together with the associated responses.

CLV FLOOD CONTROL COMMENTS AND RESPONSES

1. The slope of the swale along the west side of Building C and the north side of the property is less than 1%. Provide a 2'-wide concrete valley gutter for better drainage conveyance.

RESPONSE: A valley gutter has been included along the backside of Building C as requested. Updated normal depth calculations are provided in the Appendix. The swale along the north side now drains to the L-curb that conveys flow to the east. Cross Section 3 is still applicable and has not been revised. Figure 7 shows the updated Normal Depth Summary Table. An Updated Finished Floor Table can also be found in the Appendix with the updated flow depths. The proposed buildings still meet finished floor criteria.

The perimeter swales along the eastern boundary have also been revised to meet the 1% requirement. Section 9 assumed a 1.00% slope for the BMP swale design and is now pertinent for the upstream portion of the swale. Additional calculations haven't been provided for the revisions to the eastern boundary.



The following comments are repeated until they are complete. Address in the next submittal.

2. Revise Detail #7, Sheet C.6.1: Provide complete RCP Headwall Detail. The concrete headwall needs to include footing and cut-off wall details. The cut-off wall shall extend a minimum of 2-foot below the wall footing. The Headwall structure needs to tie into both the retaining wall footing and the adjacent CMU retaining wall. The retaining wall design needs to show the minimum wall thickness.

RESPONSE: The requested items for the proposed RCP Headwall have been added to the detail sheets. See Sheet C.6.1 for the additional details.

3. Revise Cul-de-Sac improvements to only show and construct roadway improvements within the western 30-foot BLM Grant. Update Improvement Plans accordingly.

RESPONSE: Noted.

It is anticipated that the responses above and the attached Addendum #1 along with grading plans fully address the CLV comments. We respectfully request CLV approval of the Technical Drainage Study. Please don't hesitate to contact us with any questions.

Sincerely,

David Clark, PE

Horrocks Engineers



APPENDIX

CLV Approval Letter

Figure 7: Ultimate Condition Basin Map (Revised)

Normal Depth Calculation

Finished Floor Analysis Table

CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM		DATE: December 27, 2023
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: Summerlin Storage – Update # 3	COPIES TO: Horrocks Engineers
Cross Streets:	NWQ of Rainbow Boulevard & Westcliff Drive	Summerlin Parkway Storage, LLC
File Number:	F:\Depot\DSMemos\DS5459J.doc	Bart Anderson, P.E., DevCo
Parcel Number:	138-27-802-001	CCRFCD
Zoning Action:	21-0538-EOT1 & 21-0538-EOT2	
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 (Paid: 6/9/2021)	6/2/2021 & 6/9/2021	6/22/2021	Not Approved	\$400.00	4325787: \$400
2 nd Submittal	7/26/2021	8/17/2021	Not Approved	\$400.00	4383456: \$400
3 rd Submittal (Supplement)	11/2/2021	11/9/2021	Conditional Approval	N/C	N/C
CCRFCD	12/15/2021	12/29/2021	Concurrence Recv'd	N/C	N/C
4 th Submittal	3/16/2023	4/3/2023	Not Approved	\$100.00	5187807: \$100
5 th Submittal	4/27/2023	5/11/2023	Approved	\$400.00	5247748: \$400
Supplement	5/15/2023	5/16/2023	Approved	N/C	N/C
6 th Submittal	7/19/2023	7/20/2023	Approved	\$100.00	5361482: \$100
7 th Submittal	12/12/2023	12/27/2023	See Comments Below	\$100.00	5555686: \$100
TOTAL FEES (LDDRS):				\$1,500.00	----

REMARKS:

7th Submittal: Update #3 to address the addition of Building C

6th Submittal: Update #2: Extended the Public Storm Drain from the Rock Springs Drive through the site.

Supplement: Recorded Drainage Easement Received

4th & 5th Submittals: Update #1 & Addendum to add trees in the drainage channel

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.

1. The slope of the swale along the west side of Building C and the north side of the property is less than 1%. Provide a 2'-wide concrete valley gutter for better drainage conveyance.

The following comments are repeated until they are complete. Address in the next submittal.

2. Revise Detail #7, Sheet C.6.1: Provide complete RCP Headwall Detail. The concrete headwall needs to include footing and cut-off wall details. The cut-off wall shall extend a minimum of 2-foot below the wall footing. The Headwall structure needs to tie into both the retaining wall footing and the adjacent CMU retaining wall. The retaining wall design needs to show the minimum wall thickness.
3. Revise Cul-de-Sac improvements to only show and construct roadway improvements within the western 30-foot BLM Grant. Update Improvement Plans accordingly.

***** The City of Las Vegas Flood Control is standardizing the file naming of drainage studies and plans during the digitizing process. When saving the project files in the CD or thumb drive, please follow the system below:**

If drainage study only contains one combined file, use the following naming convention in Document Title:

1st Submittal DS and Plans (for first and original submittal);

2nd Submittal DS and Plans (for second submittal (addendum #1)) etc.

If drainage study contains multiple files, use the following naming convention in Document Title:

1st Submittal DS (for the report of the drainage study)

1st Submittal Plan 1 (could be the drainage condition maps)

1st Submittal Plan 2 (could be the improvement plans) etc.

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.

NOTE: Any future changes to the proposed design (or design assumptions) as outlined in the approved drainage study and attached preliminary grading plan which affect drainage must be addressed in a Drainage Study Update and accepted by the *City of Las Vegas Flood Control Section*. Additionally, final approval of a drainage study is valid for a period of one (1) year. If the proposed construction has not been completed in that time period, the *City of Las Vegas* reserves the right to require additional conditions and/or submission and acceptance of a complete drainage study update prior to further construction of a project.

END OF REMARKS
HDR/AYS/PBJ

T/R/S: T20S/R60E/27
AREA L-27

BASIN	AREA/FLOW (AC)	Q100 (CFS)	FLOWRATE FOR 100-YR	NOTE
ON_D	2.46	8.0	3.25	
Total area treated for BMP1	0.65	2.1	3.25	BMP1 Section 9
Total area treated for BMP2	0.29	0.9	3.25	BMP2 Section 14
Total flow treated for BMP3	CU3	1.1	-	BMP3 Section 16

Note: See Figure 8 BMP Exhibit for details

FACILITY	SIZE	DESCRIPTION	FLOW (CFS)	NOTES
DI#1	(16" X 16")	ON_D11	1.3	Sump inlet with 0.06' depth
DI#2	(16" X 16")	ON_D5	1.1	Sump inlet with 0.04' depth
DI#3	(16" X 16")	ON_D4	1.2	Sump inlet with 0.05' depth
DI#4	10' CM	Captures a portion of CU2	14.5	Sump inlet with 0.55' depth
DI#5	NDOT Type 28	CU2A	7.8	Sump inlet with 0.18' depth
SD#1	12" RCP	ON_D11+ON_D5+ON_D4	3.6	
SD#2	30" RCP	SD#2 + CU2A	14.5	DI#4
SD#3	30" RCP	SD#1 + CU2A	22.3	
SD#4	30" RCP	SD#1 + SD#3	25.9	DI#4 + DI#5

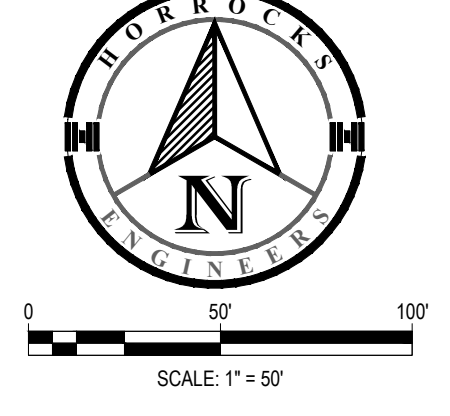
Cross Section	Description	Q ₁₀₀ (cfs)	Slope (%)	Depth (ft)	Velocity (ft/s)	D _v
Section 1A_INF&ULT_100_YR	ON_D2	0.29	0.50	0.17	1.07	0.18
Section 1A_INF&ULT_100_YR	HALF OF ON_D2	0.29	0.70	0.16	1.23	0.20
Section 2_ULT_100_YR	ON_D11	1.3	0.40	0.22	1.48	0.33
Section 3_ULT_100_YR	ON_D2 + ON_D3	2	0.50	0.40	2.09	0.84
Section 4_ULT_100_YR	ON_D6	0.4	0.50	0.22	1.58	0.35
Section 5_ULT_100_YR	ON_D4	1.2	0.40	0.21	1.45	0.30
Section 6_ULT_100_YR	ON_D7	0.9	0.65	0.29	1.98	0.57
Section 8_ULT_100_YR	CU3	1.1	0.83	0.20	2.15	0.43
Section 8_Emergency Overflow_ULT_100_YR	CU2 + OF_D4A + (ON_D1)*0.3 + ON_D8 + 3.6** + ON_D7	53.7	0.83	2.22	4.75	10.55
***Section 9_ULT_BMP1_100_YR	Total area treated for BMP1	2.1	1.00	0.52	1.98	1.03
Section 10_ULT_100_YR	ON_D10	0.1	0.50	0.20	0.86	0.17
Section 11_Parking Lot Capacity_ULT	Parking Lot Capacity	26.7	1.20	0.50	3.16	1.58
Section 11_Parking Lot_ULT_100_YR	CU2 + OF_D4A	48.3	1.20	0.59	3.65	2.15
Section 12_ULT_100_YR	CU5	2.6	2.00	0.21	2.69	0.56
Section 13_ULT_100_YR	CU4 + CU5 + SD#4	62.0	3.87	1.20	17.18	20.62
***Section 14_ULT_BMP2_100_YR	Total area treated for BMP2	0.9	0.99	0.38	1.55	0.59
Section 15_ULT_100_YR	ON_D1 + OF_D1	3.7	3.24	0.14	3.05	0.43
***Section 16_ULT_BMP3_100_YR	Total area treated for BMP3	1.1	1.00	0.41	1.63	0.67
Section 17_ULT_100_YR	SD#4	25.9	3.49	0.99	7.00	6.93

NOTES:
 ** Storm Drain Flow
 *** See Figure 8 for BMP detail

Ultimate Condition			
Basin	Area (acres)	Q ₁₀₀ (cfs)	Q ₁₀ (cfs)
CU1	-	26.0	13.0
CU2	-	43.5	22.3
CU2A	-	7.8	0.0
CU3	-	1.1	0.6
CU4	-	33.5	30.4
CU5	-	2.6	1.4
OF_D1	0.96	3.0	2.0
OF_D2	0.61	2.0	1.0
OF_D3	3.97	12.0	6.0
OF_D4	3.65	11.0	6.0
OF_D5	0.31	1.0	1.0
OF_D6	1.98	7.0	3.0
OF_D7	4.31	14.0	7.0
OF_D8	1.46	5.0	3.0
ON_D	2.46	8.0	4.0
BOA CAP***	-	26.7	26.7
CU1 = OF_D6 + OF_D7 + OF_D8			
CU2 = CU1 + OF_D3 + OF_D5 + OF_D1 + (ON_D1)*0.70			
CU2A = CU2 + (ON_D1)*0.30 - DI#4 + OF_D4A - BOA CAP***			
CU3 = ON_D8 + ON_D7			
CU4 = CU3 + BOA_CAP*** + OF_D4B			
CU5 = ON_D2 + ON_D3 + ON_D6 + ON_D9 + ON_D10			
** Storm Drain Flow			
*** Runoff that is contained within the Bank of America parking lot by the Curb. See section 11			

Developed Prorate Calculations					
Basin	Area (acres)	Q ₁₀₀ (cfs)	CFS/AC	Q ₁₀ (cfs)	CFS/AC
OF_D4	3.65	11	3.01	6	1.64
ON_D	2.46	8	3.25	4	1.63
OF_D4A	1.77	5.3	3.01	2.90	1.64
OF_D4B	1.88	5.7	3.01	3.08	1.64
SUM	3.65	11.0	3.01	6.0	1.64
ON_D1	0.23	0.7	3.25	0.37	1.63
ON_D2	0.32	1.0	3.25	0.52	1.63
ON_D3	0.30	1.0	3.25	0.49	1.63
ON_D4	0.36	1.2	3.25	0.59	1.63
ON_D5	0.35	1.1	3.25	0.57	1.63
ON_D6	0.11	0.4	3.25	0.18	1.63
ON_D7	0.29	0.9	3.25	0.47	1.63
ON_D8	0.05	0.2	3.25	0.08	1.63
ON_D9	0.03	0.1	3.25	0.05	1.63
ON_D10	0.03	0.1	3.25	0.05	1.63
ON_D11	0.39	1.3	3.25	0.63	1.63
SUM	2.46	8.0	N/A	4.0	N/A

Basin	Area (acres)	Q ₁₀₀ (cfs)	CFS/AC	Q ₁₀ (cfs)	CFS/AC
OF_D4	3.65	11	3.01	6	1.64
ON_D	2.46	8	3.25	4	1.63
OF_D4A	1.77	5.3	3.01	2.90	1.64
OF_D4B	1.88	5.7	3.01	3.08	1.64
SUM	3.65	11.0	3.01	6.0	1.64
ON_D1	0.23	0.7	3.25	0.37	1.63
ON_D2	0.32	1.0	3.25	0.52	1.63
ON_D3	0.30	1.0	3.25	0.49	1.63
ON_D4	0.36	1.2	3.25	0.59	1.63
ON_D5	0.35	1.1	3.25	0.57	1.63
ON_D6	0.11	0.4	3.25	0.18	1.63
ON_D7	0.29	0.9	3.25	0.47	1.63
ON_D8	0.05	0.2	3.25	0.08	1.63
ON_D9	0.03	0.1	3.25	0.05	1.63
ON_D10	0.03	0.1	3.25	0.05	1.63
ON_D11	0.39	1.3	3.25	0.63	1.63
SUM	2.46	8.0	N/A	4.0	N/A

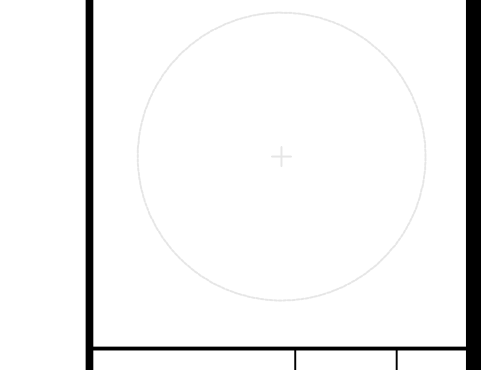


- KEY:**
- OF_D4 3.65 BASIN NAME/AREA
 - OF_D4A 1.77 PRORATE BASIN NAME/AREA
 - CU2 CONCENTRATION POINT
 - FLOW DIRECTION
 - 1 CROSS SECTION
 - BASIN BOUNDARY
 - - - PRORATE BASIN BOUNDARY
 - CCRFCD EXISTING FACILITY
 - PARCEL LINE

HORROCKS ENGINEERS
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 www.horrocks.com

WARNING
 IF THIS BAR DOES NOT MEASURE 2" THEN DRAWING IS NOT TO SCALE

DATE	REV #	DATE	REVISIONS
03/17/2021	1		DESIGNED: SBL
	2		DRAWN: SBL
	3		CHECKED: DBC
	4		PROJECT: NV-2198-2001



SUMMERLIN STORAGE
 (MINI STORAGE FACILITY AT WESTCLIFF AND RAINBOW)
 LAS VEGAS, NEVADA
 ULTIMATE CONDITION BASIN MAP
 APN: 138-27-802-001

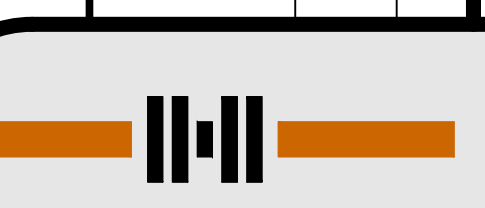


FIGURE 7

PAGE

Worksheet for Section 1A_INT&ULT_100 YR

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth
Input Data	
Channel Slope	0.50 %
Discharge	0.29 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	1.71
0+06.50	0.08
0+07.25	0.00
0+08.00	0.08
0+10.00	0.26
0+10.00	0.50

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 1.71)	(0+06.50, 0.08)	0.025
(0+06.50, 0.08)	(0+08.00, 0.08)	0.013
(0+08.00, 0.08)	(0+10.00, 0.50)	0.025

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	0.17 ft
Roughness Coefficient	0.020
Elevation	0.17 ft
Elevation Range	0.00 to 1.71 ft
Flow Area	0.3 ft ²
Wetted Perimeter	2.98 ft
Hydraulic Radius	0.09 ft
Top Width	2.95 ft
Normal Depth	0.17 ft
Critical Depth	0.14 ft
Critical Slope	1.37 %
Velocity	1.07 ft/s
Velocity Head	0.02 ft

Worksheet for Section 1A_INT&ULT_100 YR

Results

Specific Energy	0.19 ft
Froude Number	0.623
Flow Type	Subcritical

GVF Input Data

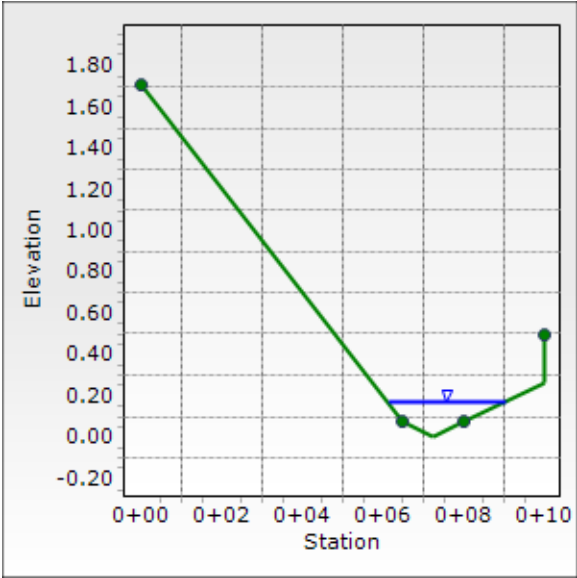
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	0.17 ft
Critical Depth	0.14 ft
Channel Slope	0.50 %
Critical Slope	1.37 %

Cross Section for Section 1A_INT&ULT_100 YR

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth
Input Data	
Channel Slope	0.50 %
Normal Depth	0.17 ft
Discharge	0.29 cfs



FINISHED FLOOR ANALYSIS TABLE

Project Number		NV-2198-2001		Project Name:		Summerlin Storage (Mini Storage Facility at Westridge & Rainbow)				
Date:		1/22/2024		Designed By		DBC/SBL				
Bldg #	FF Elev.	TBC	Flow Line	Flow Depth	WSE	Min FF Elev.	Freeboard	2X D Criteria ¹	6" Criteria ²	Comments
A	13.20	-	12.48	0.19	12.67	12.98	0.53	YES	YES	Southwest portion
A	13.20	12.02	-	0.40	11.92	12.52	1.28	YES	YES	Northwest corner
A	12.25	-	11.60	0.22	11.82	12.10	0.43	YES	YES	Northeast Portion
A	12.25	11.42	-	0.40	11.32	11.92	0.93	YES	YES	Northeast corner
A	12.25	-	11.60	0.21	11.81	12.10	0.44	YES	YES	Southeast portion
A	12.25	11.15	-	0.29	10.94	11.65	1.31	YES	YES	Southeast corner
B	12.25	-	11.60	0.21	11.81	12.10	0.44	YES	YES	Southwest portion
B	12.25	10.68	-	0.29	10.47	11.18	1.78	YES	YES	Southwest corner
B	12.25	-	11.60	0.22	11.82	12.10	0.43	YES	YES	Northwest portion
B	12.25	11.42	-	0.40	11.32	11.92	0.93	YES	YES	Northwest corner
B	11.35	10.85	-	0.40	10.75	11.35	0.60	YES	YES	Northeast corner
B	11.35	10.11	-	0.29	9.90	10.61	1.45	YES	YES	Southeast Corner
C	13.38	-	12.82	0.16	12.98	13.32	0.40	YES	YES	Southwest corner
C	12.84	-	12.13	0.16	12.29	12.63	0.55	YES	YES	West Portion
C	12.43	-	11.54	0.16	11.70	12.04	0.73	YES	YES	Northwest corner
C	13.38	-	12.72	0.19	12.91	13.22	0.47	YES	YES	Southeast Corner
C	12.93	-	12.23	0.19	12.42	12.73	0.51	YES	YES	East Portion
C	12.43	-	11.72	0.19	11.91	12.22	0.52	YES	YES	Northeast corner
Bldg #	FF Elev.	Flow line	Flow Depth	WSE	Min FF Elev.	Min. FF Criteria	Note			
A&B	12.25	11.75	0.20	11.95	11.95	YES	North side in between buildings A & B			
A&B	12.25	11.75	0.20	11.95	11.95	YES	South side in between buildings A & B			

1. Per Section 304.4 of HCDDM, The finished floor shall be set at a vertical distance above the gutter flowline of at least twice the depth of flow in the gutter flowline up to a maximum of 18 inches above the WSE in the street. The TC is generally 0.50' above gutter flowline for this project.

2. Per Section 304.4. E.1 of HCDDM, CLV requires minimum finished floor elevation is 6 inches above highest adjacent top of curb and/or flow line



GRADING PLANS