

REVISED PER REQUEST

Revise to Preliminary/Final Drainage Report for
Riverbend Crossing Filings No. 1 and 2.

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MASTER DEVELOPMENT DRAINAGE REPORT FOR RIVERBEND CROSSING AND FINAL DRAINAGE REPORT FOR RIVERBEND CROSSING FILINGS NO. 1 AND 2

SEPTEMBER 2018

Prepared for:

Avatar Fountain, LP.
6800 Jericho Tpke., Suite 120W #204
Syosset, NY 11791

Prepared By:


CATAMOUNT
ENGINEERING
PO BOX 221
Woodland Park, CO 80866
719-426-2124

Added

Add PCD File No. SP187, SF1843,
& SF1844

Revise the second sentence to "Said drainage report has been prepared according to the criteria established by the County for drainage reports and said report is in conformity with the applicable master plan of the drainage basin"

MASTER DEVELOPMENT DRAINAGE REPORT FOR RIVERBEND CROSSING AND
FINAL DRAINAGE REPORT FOR REIVERBEND CROSSING FILING NO. 1 AND 2

REVISED

Engineer's Statement:

The attached drainage plan and report were prepared under my direction and supervision and are correct to the best of my knowledge and belief. Said drainage report has been prepared according to the criteria established for drainage reports and said report is in conformity with the master plan of the drainage basin. I accept responsibility for any liability caused by any negligent acts, errors, or omissions on my part in preparing this report.

Certification Statement:

This report and plan for the preliminary and final drainage design for the RIVERBEND CROSSING was prepared by me (or under my direct supervision) in accordance with the provisions of City of Colorado Springs/El Paso County Drainage Criteria Manual Volumes 1 and 2 Drainage Design and Technical Criteria for the owners thereof. I understand that El Paso County does not and will not assume liability for drainage facilities designed by others.

David L. Mijares, Colorado PE #40510
For and on behalf of Catamount Engineering

Date

Developer's Statement:

I, the developer have read and will comply with all of the requirements specified in this drainage report and plan.

AVATAR FOUNTAIN, LP. hereby certifies that the drainage facilities for RIVERBEND CROSSING shall be constructed according to the design presented in this report. I understand that El Paso County does not and will not assume liability for the drainage facilities designed and or certified by my engineer and that the El Paso County reviews drainage plans pursuant to Colorado Revised Statutes, Title 30, Article 28; but cannot, on behalf of RIVERBEND CROSSING guarantee that final drainage design review will absolve AVATAR FOUNTAIN, LP. and/or their successors and/or assigns of future liability for improper design. I further understand that approval of the final plat does not imply approval of my engineer's drainage design.

AVATAR FOUNTAIN, LP.
Business Name

By: Alan Toth

Title: Managing Partner

Address: 6800 Jericho Turnpike, Suite 120W #204

Syosset, NY 11791

El Paso County:

Filed in accordance with the requirements of the El Paso County land Development Code and the Drainage Criteria manual Volumes 1 and 2, and the El Paso County Engineering Criteria Manual, latest revision.

Jennifer Irvine, PE
County Engineer/ECM Administrator

Date

Conditions:

Update. Shaded Zone X

ADDED

EXISTING DRAINAGE

State whether or not there has been a change in character or topography on the adjacent parcels since the preliminary drainage report. If there are then an updated existing drainage map and analysis will need to be provided.

ADDED DISCUSSION OF ST. DOMINIC.

The parcels are located within the West Little Johnson Drainage Basin and are directly tributary to Fountain Creek within the reach. The Little Johnson/Security Creek Drainage Basin Planning Study identifies three separate sub-basins (75, 76, and 77) within the parcel. The majority of the parcels are identified as within Zone X 500-year floodplain and the southerly portion of the property not proposed for development lies with Zone AE 100-yr floodplain and floodway. The effective firm panel is included in the appendix of the report. The West Little Johnson drainage basin contains approximately five square miles located in the semi-arid region of the high plains. Precipitation within the basin ranges from 14 to 16 inches per year with thunderstorms typical in the summer months.

The existing drainage patterns for the parcel were summarized in the "Preliminary Drainage Study Riverbend Crossing", prepared by Nolte and Associates, inc. dated 2/14/2007. No development within the parcel has been pursued since the Nolte analysis was completed and the existing drainage analysis has been accepted in this report.

The report indicates the 3 sub-basins identified in the Drainage Basin Planning Study as sub-basins 75, 76, and 77. The basins are direct flow basins directly tributary to Fountain Creek and traverse the site from north to south where they enter Fountain Creek.

Basin 77 represents the existing commercial center development northwest of proposed Riverbend Crossing Filings No. 1 and 2 and the southeasterly portion of the residential filings. Redevelopment of the commercial development within the City of Fountain is being concurrently pursued by the developer of both properties. Existing flows entering the residential portion at the southern limits of the commercial development were modeled as $Q_5=25.99$ cfs, $Q_{100}=45.15$ cfs in the Preliminary Drainage Report and are conveyed in a drainage swale to outfall within Fountain Creek. Total outfall to Fountain Creek from Basin 77 was $Q_5=15.28$ cfs, $Q_{100}=31.70$ cfs.

Basin 76 represents the central portion of the undeveloped parcel and the northwesterly portion of the existing commercial development and is directly tributary to Fountain Creek. The property north of Basin 76 is contained within the St. Dominic's Church Subdivision. Storm runoff from the St. Dominic's Church Subdivision is collected on-site and conveyed through a private detention pond prior to historic release east of the parcel. The Preliminary Drainage Report shows $Q_5=6.89$ cfs, $Q_{100}=12.07$ cfs entering the residential parcel from the northwest corner of the commercial development and exhibits $Q_5=11.87$ cfs, $Q_{100}=28.05$ cfs leaving the site and entering Fountain Creek.

Basin 75 contains the westerly portion of the proposed residential development. The preliminary drainage report indicates that $Q_5=20.28$ cfs, $Q_{100}=45.99$ cfs enter the west side of the parcel from the adjacent agricultural property. Topography does not indicate a channelized flow but rather overland flow from the west. The anticipated long term use for the adjacent parcel is to remain agricultural. The foundation that owns the parcel is extending an irrigation ditch along the west boundary of the subject property to divert flows from the adjacent parcel south to Fountain Creek. An additional 15' setback is proposed in the residential development plan to allow for grading of a fill slope to convey flows south the Fountain Creek.

BASIN	AREA	Q ₂	Q ₅	Q ₁₀	Q ₂₅	Q ₅₀	Q ₁₀₀	Type R Inlet
B1	1.60	2.0	2.8	3.6	4.6	5.5	6.5	10'
B2	1.21	1.8	2.4	3.1	3.9	4.6	5.4	10'
B3	2.29	2.9	4.0	5.2	6.6	7.9	9.3	10'
B4	1.26	1.8	2.5	3.2	4.0	4.8	5.6	5'
B5	3.36	4.5	6.2	7.9	9.9	11.7	13.8	10'
B6	1.60	2.0	2.8	3.5	4.4	5.2	6.1	10'
B7	3.79	4.0	5.7	7.7	9.9	11.9	14.2	10'
B8	0.33	0.5	0.7	0.9	1.1	1.3	1.6	5'
B9	3.07	4.2	5.7	7.3	9.2	10.8	12.7	10'
B10	1.43	2.0	2.7	3.4	4.3	5.1	6.0	10'
B11	4.45	6.1	8.3	10.7	13.4	15.8	18.5	15'
B12	3.29	4.5	6.2	7.9	9.9	11.7	13.7	10'
B13	3.52	4.5	6.1	7.8	9.8	11.5	13.5	None
B14	4.29	5.4	7.3	9.4	11.8	13.9	16.3	None
B15	4.25	1.4	3.7	6.5	10.3	13.3	16.8	Pond

The development contains roadways with minimum grades of 1.0%. Roadway conveyance at minimum grade of 1.0% is $Q_5=8.5$ cfs and $Q_{100}=37$ cfs exceeding individual basin runoff. Inlets were developed in sump locations throughout the development and flow-by is not anticipated. Inlet calculations for Basins B1 through B12 are provided in the appendix.

Basin B13 and Basin B14 are combined in the southerly cul-de-sac at design Point 1B. Combined flows at Design Point 1B of $Q_5=13.3$ cfs and $Q_{100}=29.7$ cfs are collected in a 20' sump inlet within the cul-de-sac. Inlet calculation is provided in the appendix.

'C Basins'

Is the intent to provide side lot swales for the residential development. If so, state as such and provide a typical lot detail in the grading plan.

NOTED AND SKETCHED

Basin C (11.25 Acres, $Q_2=20.6$ cfs, $Q_5=26.3$ cfs, $Q_{10}=31.5$ cfs, $Q_{25}=37.3$ cfs, $Q_{50}=42.4$ cfs, and $Q_{100}=48.0$ cfs) represents the combined flow generated within the commercial development. Runoff generated within the commercial development sheetflows within the proposed curb line and is collected within private inlets on-site and will be conveyed in a private storm sewer to outfall within the shared extended detention basin at Design Point P.

Storm Sewer

Flows collected within 'B' designated basin inlets will be conveyed in a public storm sewer system located predominantly within the street ROW which outfalls to the private extended detention basin. Mannings equation calculations are provided in the appendix of this report. Hydraulic Grade Line Calculations will be developed upon development of initial review comments.

Pipe Design Point 1 ($Q_5=5.0$ cfs and $Q_{100}=11.5$) represents combined flows from basins B1 and B2 and will be conveyed in a public 24" RCP at a minimum grade of 0.5%.

HGL's will
BE DEVELOPED
UPON CONCEPT
BUY-10.

Update. Include HGL calculations with the resubmittal. HGL is based on 100 year

Provide a narrative regarding offsite sub-basins 75-77 in the proposed condition

ADDED PRIOR TO DETAILED
ANALYSIS OF OFF-SITE BASINS.

pond elevations does
not match the
grading plan.

Revised Both

EXTENDED DETENTION BASIN

The parcel proposes to develop 52.00 acres within the West Little Johnson Drainage Basin directly tributary to Fountain Creek requiring development of water quality treatment and full-spectrum detention per the criteria of the El Paso County Drainage Criteria Manual Volume 2. The proposed extended detention basin will be developed to provide water quality and full spectrum detention for both the Riverbend Crossing residential development Filings No. 1 and 2 and the Riverbend Crossing Commons Commercial development within the City of Fountain. The proposed Extended Detention Basin located in the southerly portion of the development has 51.10 tributary acres of development with an average imperviousness of 65.40%. Full spectrum pond development requires 1.089 acre-ft of water quality capture volume ponding to an elevation of 5679.94, an EURV volume of 3.455-acre ft ponding to an elevation of 5682.09, and a total volume of 5.742 acre-ft ponding to an elevation of 5683.68 providing full spectrum detention of the 100-YR event.

Runoff generated within the site will be conveyed to the pond through storm sewer systems or as direct sheetflow. The storm sewer systems will outfall directly to a 6" concrete forebays with baffle providing adequate protection at discharge point. The concrete forebays requires 950 cubic feet of volume (2% of the design WQCV). The forebay will be constructed of a concrete slab with sides conforming to the pond slopes and 1' wall with a rectangular notch which outfalls to the proposed trickle channel at the downstream end.

The pond will be constructed with 3:1 minimum side slopes above the 100-YR water surface elevation and 4:1 minimum side slopes within the ponded surface to be vegetated per the approved final landscape plan. A 4' wide by 6" deep concrete trickle channel with a 0.5% longitudinal slope will convey low flows across the pond bottom to the micropool/outlet structure. The trickle channel will outfall to a 17' long by 7' wide by 2.5' deep concrete micropool. The micropool will provide a surface area of 120 square feet and an initial surcharge volume of 40 cubic feet utilizing a 4" initial surcharge depth.

The outlet structure will consist of a concrete box with orifice plate and screen providing water quality outlet and weir with trash rack for larger storm outfall. The pond will outfall through a private 30" HDPE pipe system directly to Fountain Creek.

The emergency spillway will consist of a 40' weir along the southerly end of the pond at an elevation of 5684.10. The overflow area will consist of 12" depth of type VL soil riprap.

Outfall from the extended detention basin of $Q_2=1.0$ cfs, $Q_5=2.6$ cfs, $Q_{10}=7.8$ cfs, $Q_{25}=18.2$ cfs, $Q_{50}=27.2$ cfs, and $Q_{100}=36.4$ will be conveyed in a private 30" HDPE. Combined flows at Design P-out is less than historic runoff from basins 75, 76, and 77. Outfall from the onsite extended detention basin will be conveyed directly to Sand Creek through the private 30" HDPE and full spectrum release will have no impacts on the Fountain Creek Drainage.

List each step as a subheader.
Step 2 does not address Stabilize Drainageways.

4-STEP PROCESS

1. The development addresses Low Impact Development strategies primarily through the utilization of landscape swales within sides and rear of proposed residential lots and directing runoff from buildings and walkways through swales with minimal longitudinal grade prior to outfall to street collection and storm conveyance systems.
2. On-site flow is directed to the on-site private proposed full spectrum extended detention basin constructed with development of the project which outfalls directly to historic outfall within Fountain Creek. The extended detention basin provides Water Quality Capture Volume required for this site and concurrent commercial development and attenuates release of flows to approximate historic runoff.
3. The ultimate recipient of runoff from the site is Fountain Creek. Flows from the site are tributary to the full spectrum extended detention basin constructed on site with development of the Riverbend Crossing community and commercial center attenuating flows to predevelopment levels. No impacts to Sand Creek are anticipated.
4. A Grading, Erosion Control, and Stormwater Quality Plan and narrative will be approved by El Paso County prior to any soil disturbance. The erosion control plan will include specific source control BMP's as well as defined overall site management practices for the construction period. The grading narrative will address materials storage and spill containment during construction operations.

COST ESTIMATE

Public Improvements Non-reimbursable

5' Type R Inlet	2 EA	@ \$ 3,800/EA	\$ 7,600
10' Type R Inlet	9 EA	@ \$ 5,500/EA	\$ 49,500
15' Type R Inlet	1 EA	@ \$ 8,000/EA	\$ 8,000
20' Type R Inlet	1 EA	@ \$ 10,000/EA	\$ 10,000
Type I Manhole	11 EA	@ \$ 4,000/EA	\$ 40,000
18" RCP	213 LF	@ \$ 45/LF	\$ 9,585
24" RCP	2,102 LF	@ \$ 55/LF	\$ 115,610
30" RCP	1,411 LF	@ \$ 68/LF	\$ 95,948
42" RCP	152 LF	@ \$ 90/LF	\$ 13,680
48" RCP	151 LF	@ \$ 110/LF	\$ 16,610

SUBTOTAL	\$ 366,533
10% CONTINGENCY	\$ 36,653
<u>TOTAL</u>	<u>\$ 403,168</u>

Private Improvements Non-reimbursable

48" HDPE	552 LF	@ \$ 85/LF	\$ 46,920
WATER QUALITY POND	1 EA	@ \$ 65,000/EA	\$ 65,000

SUBTOTAL	\$ 111,920
10% CONTINGENCY	\$ 11,192
<u>TOTAL</u>	<u>\$ 123,112</u>

DRAINAGE FEE CALCULATION

Riverbend Crossing Filing No. 1 contains 36.5 acres to be platted within the West Little Johnson Drainage Basin. Riverbend Crossing Filing No. 2 contains 15.5 acres to be platted within the West Little Johnson Drainage Basin. The 2018 fee for the West Little Johnson Drainage Basin (A miscellaneous Drainage Basin) is \$1,133/ per impervious acre.

Filing No.1-36.547 total acres.

Use	Acres	Imperviousness
1/8 acre or less	23.45	65%
Open Space	13.09	7%
Composite Imperviousness:	44.2%	

$$36.547 \text{ acres} \times 44.2\% \times \$1,133.00 = \$18,311$$

Filing No.2-15.452 total acres.

Use	Acres	Imperviousness
1/8 acre or less	14.48	65%
Open Space	0.97	7%
Composite Imperviousness:	61.4%	

$$15.452 \text{ acres} \times 61.4\% \times \$1,133.00 = \$10,742$$

DRAINAGE METHODOLOGY

This drainage report was prepared in accordance to the criteria established in the City of Colorado Springs/El Paso County Drainage Criteria Manual Volumes 1 and 2, as revised May 2014.

The rational method for drainage basin study areas of less than 100 acres was utilized in the analysis. For the Rational Method, flows were calculated for the 2, 5, 10, 25, 50, and 100-year recurrence intervals. The average runoff coefficients, 'C' values, are taken from Table 6-6 and the Intensity-Duration-Frequency curves are taken from Figure 6-5 of the City Drainage Criteria Manual. Time of concentration for overland flow and storm drain or gutter flow are calculated per Section 3.2 of the City Drainage Criteria Manual. Calculations for the Rational Method are shown in the Appendix of this report.

Urban Drainage and Flood Control District methodology was utilized for determination of street capacity, inlet sizing, and extended detention basin design. UD-Inlet Version 4.05 was utilized in street capacity and inlet sizing calculations. UD-Culvert Version 3.05 was utilized in developing preliminary pipe sizing. Details and analysis of final storm drain conveyance and collection system will be developed in an addendum to the final drainage report submitted with Private Storm Sewer Plans for Fillmore Apartments Subdivision. Preliminary sizing calculations were provided in the appendix of this report. UD-Detention version 3.07 was utilized in development of extended detention basin and outfall. Calculations are included in the appendix of this report.

Since this report is associated with the final plats, final design must be provided with this report.

SUMMARY

NGW'S WILL BE DEVELOPED
UPON PRELIMINARY OR PER
CONCEPT CONCURRENCE.

Development of Riverbend Crossing Filings No. 1 and No. 2 will require that flows be treated for water quality and be detained to historic levels prior to release from the site. Site runoff and storm drain and appurtenances will not adversely affect the downstream and surrounding developments. This report is in general conformance with all previously approved reports which included this site.

State who maintains the private facilities. HOA or District?

DISTRICT ADDED

REFERENCES:

City of Colorado Springs Engineering Division Drainage Criteria Manual Volumes 1 and 2, revised May 2014

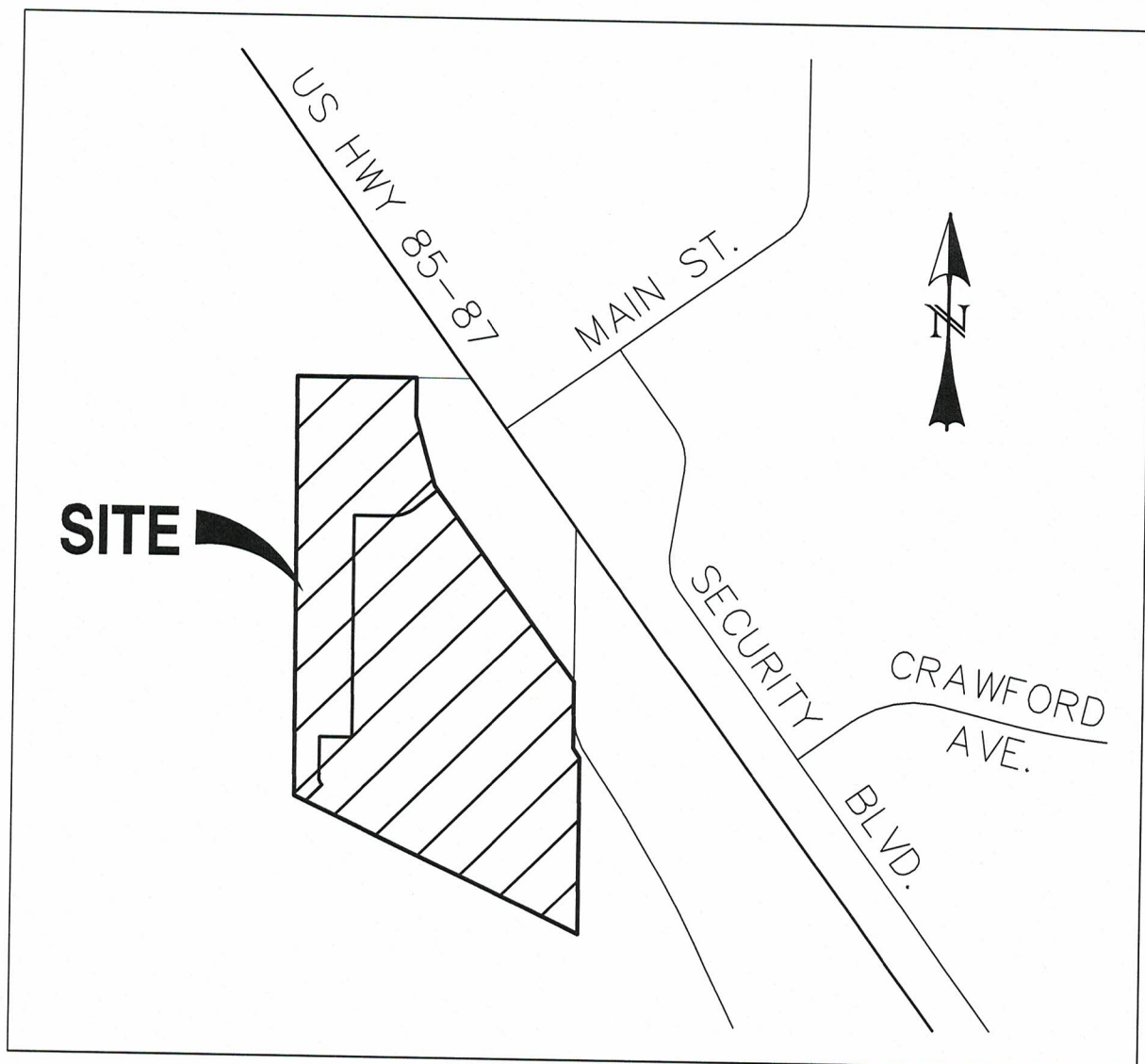
“Little Johnson/Security Creek Drainage Basin Planning Study” prepared by Simons, Li and Associates, Inc. dated December 1987.

“Preliminary Drainage Study Riverbend Crossing” prepared by Nolte and Associates, Inc.” accepted February 2017.

“Preliminary/Final Drainage Report for St. Dominic’s Church Subdivision”, accepted October 2007.


Natural Resources Conservation Service Web Soil Survey

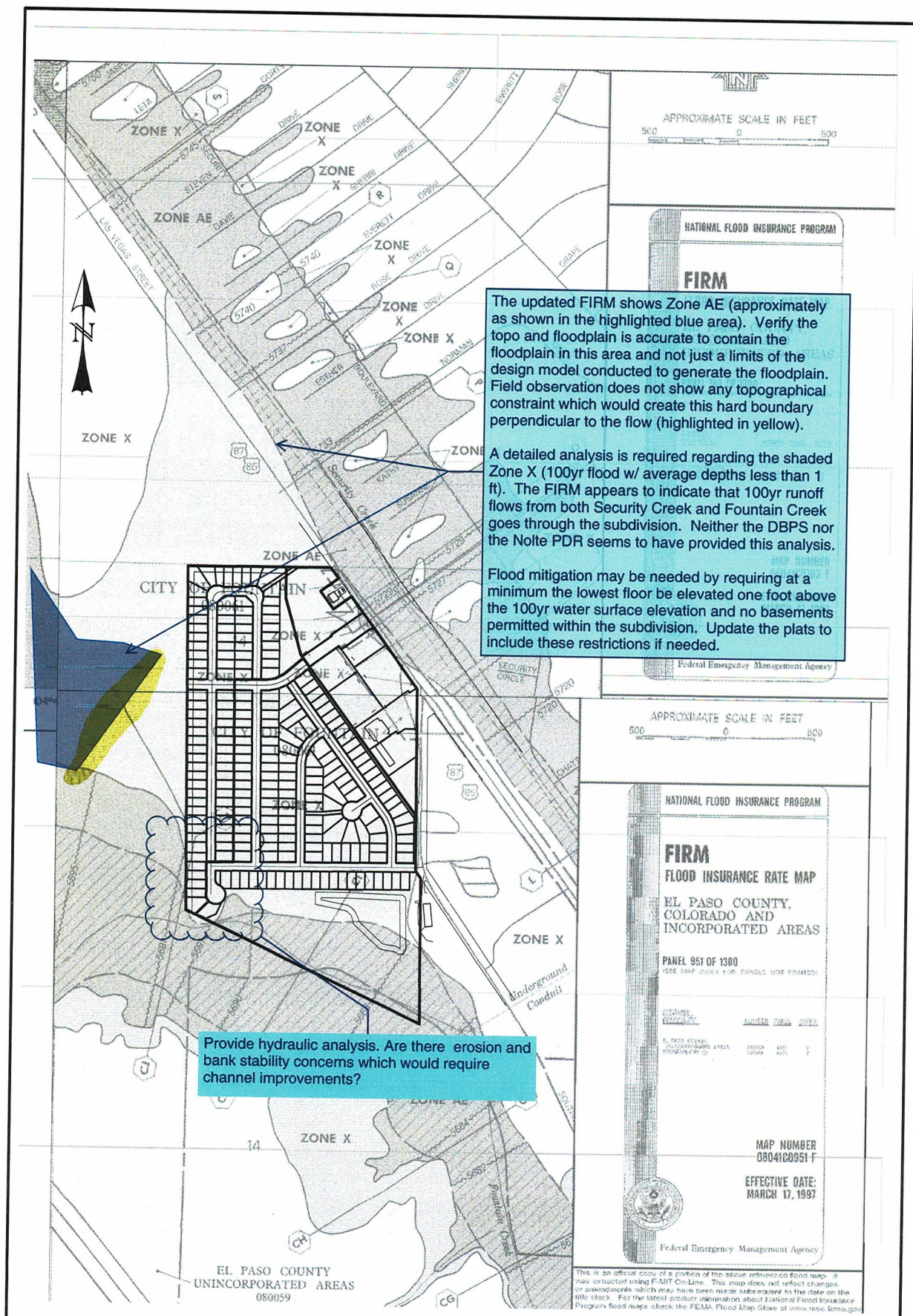
APPENDIX




VICINITY MAP

SCALE: N.T.S.

 PO BOX 692 DIVIDE, CO 80814 (719) 426-2124	RIVERBEND CROSSING	SCALE: NTS	DATE: 09/05/18
	VICINITY MAP	JOB NO.: 17-114	SHEET: 1 OF 1



 <p>PO BOX 692 DIVIDE, CO 80814 (719) 426-2124</p>	PREPARED FOR: AVATAR EQUITES 6800 JERICHO TURNPIKE SUITE 120W, #204 SYSOSSET, NY 11791	RIVERBEND CROSSING		SCALE:	DRAWN BY:
		EXISTING FLOODMAP EXHIBIT		1"=500'	DLM
				JOB NUMBER	DATE:
				17-114	XX/XX/XX
				SHEET	
				1 OF 1	

Revise Basin A1 Rational Method land use to 1/8 acre. Rear building setback is 25 ft. So this basin is not entirely landscape.

BASIN REVISED

'A' LOTS = SMALLER BASIN

Include a Header/Title. Typical for all worksheets.

BASIN	AREA TOTAL (Acres)	CONVEYANCE/TC										TT TOTAL (min)	INTENSITY						TOTAL FLOWS										
		C ₂	C ₅	C ₁₀	C ₂₅	C ₅₀	C ₁₀₀	Length (ft)	Height (ft)	TI (min)	Length (ft)		Height (ft)	C _v	Slope (%)	Velocity (fps)	TC (min)	I ₂ (in/hr)	I ₅ (in/hr)	I ₁₀ (in/hr)	I ₂₅ (in/hr)	I ₅₀ (in/hr)	I ₁₀₀ (in/hr)	Q ₂ (c.f.s.)	Q ₅ (c.f.s.)	Q ₁₀ (c.f.s.)	Q ₂₅ (c.f.s.)	Q ₅₀ (c.f.s.)	Q ₁₀₀ (c.f.s.)
A1 Landscape	2.23 2.23	0.09 0.09	0.19 0.19	0.29 0.29	0.40 0.40	0.46 0.46	0.52 0.52	70 70	1.8 1.8	10.1 10.1	1373 1373	10 10	15 15	0.7% 0.7%	1.3 1.3	17.9 17.9	2.1 2.1	2.6 2.6	3.0 3.0	3.5 3.5	3.9 3.9	4.3 4.3	0.4 0.4	1.1 1.1	2.0 2.0	3.1 3.1	4.0 4.0	5.0 5.0	
A2 Residential 1/8 acre Landscape	0.99 0.59 0.40	0.30 0.45 0.09	0.37 0.49 0.19	0.44 0.54 0.29	0.51 0.59 0.40	0.56 0.62 0.46	0.60 0.65 0.52	62 62	1.5 1.5	7.8 7.8	136 11	11 10	10 8.1%	8.1%	2.8 2.8	0.8 0.8	3.5 3.5	4.4 4.4	5.1 5.1	5.8 5.8	6.5 6.5	7.3 7.3	1.0 1.6	2.2 2.2	3.0 3.0	3.6 3.6	4.3 4.3		
B1 Residential 1/8 acre Landscape	1.60 1.43 0.17	0.41 0.45 0.09	0.46 0.49 0.19	0.51 0.54 0.29	0.57 0.59 0.40	0.60 0.62 0.46	0.64 0.65 0.52	100 100	2 2	9.2 9.2	382 3.8	3.8 20	20 1.0%	1.0%	2.0 2.0	3.2 3.2	3.0 3.0	3.8 3.8	4.4 4.4	5.1 5.1	5.7 5.7	6.4 6.4	2.0 2.8	3.6 3.6	4.6 4.6	5.5 5.5	6.5 6.5		
B2 Residential 1/8 acre	1.21 1.21	0.45 0.45	0.49 0.49	0.54 0.54	0.59 0.59	0.62 0.62	0.65 0.65	83 100	1.6 2	8.1 9.2	252 344	2.5 3	20 20	1.0% 0.9%	2.0 1.9	2.1 3.1	3.3 3.0	4.1 3.8	4.8 4.5	5.5 5.1	6.2 5.7	6.9 6.4	1.8 2.9	2.4 4.0	3.1 5.2	3.9 6.6	4.6 7.9	5.4 9.3	
B3 Residential 1/8 acre Landscape	2.29 2.04 0.25	0.41 0.45 0.09	0.46 0.49 0.19	0.51 0.54 0.29	0.57 0.59 0.40	0.60 0.62 0.46	0.64 0.65 0.52	100 84	2 1.6	9.2 8.2	344 312	3 4	20 20	0.9% 1.3%	1.9 2.3	3.1 2.3	12.3 10.5	3.8 3.2	4.5 4.1	5.1 5.4	5.7 6.1	6.4 6.8	2.9 1.8	4.0 2.5	5.2 3.2	6.6 4.0	7.9 4.8	9.3 5.6	
B4 Residential 1/8 acre	1.26 1.26	0.45 0.45	0.49 0.49	0.54 0.54	0.59 0.59	0.62 0.62	0.65 0.65	100 100	2 2	8.8 8.8	320 11	11 7	7 3.4%	3.4%	1.3 1.3	4.1 4.1	12.9 12.9	3.0 3.0	3.8 3.8	4.4 5.0	5.6 6.3	6.3 4.5	6.2 4.5	7.9 9.9	9.9 11.7	13.8 13.8			
B5 Residential 1/8 acre	3.36 3.36	0.45 0.45	0.49 0.49	0.54 0.54	0.59 0.59	0.62 0.62	0.65 0.65	100 100	2 2	8.8 8.8	100 710	2 12	7 20	2.0% 1.7%	1.0 2.6	4.6 4.6	15.0 15.0	2.8 2.8	3.5 3.5	4.1 4.7	5.3 5.9	5.9 2.0	2.8 2.8	3.5 4.4	4.4 5.2	6.1 6.1			
B6 Residential 1/8 acre	1.40 1.40	0.45 0.45	0.49 0.49	0.54 0.54	0.59 0.59	0.62 0.62	0.65 0.65	100 100	2 2	8.8 8.8	100 710	2 12	7 20	2.0% 1.7%	1.0 2.6	4.6 4.6	15.0 15.0	2.8 2.8	3.5 3.5	4.1 4.7	5.3 5.9	5.9 2.0	2.8 2.8	3.5 4.4	4.4 5.2	6.1 6.1			
B7 Residential 1/8 acre Landscape	3.79 2.91 0.88	0.37 0.45 0.09	0.42 0.49 0.19	0.48 0.54 0.29	0.55 0.59 0.40	0.58 0.62 0.46	0.62 0.65 0.52	100 100	12 12	5.4 5.4	100 780	3 6	7 20	3.0% 0.8%	1.2 1.8	1.4 7.4	14.2 14.2	2.9 2.9	3.6 3.6	4.2 4.8	5.4 5.4	6.1 6.1	4.0 5.7	7.7 9.9	9.9 11.9	14.2 14.2			

Calculated by: DLM
Date: 8/12/2018

AZ REMOVED

Revise A2 to only be Residential. The sub-basin shown consists of residential lots only.

DESIGN POINT	AREA TOTAL (Acres)	WEIGHTED					TT TOTAL (min)	INTENSITY						TOTAL FLOWS					
		C ₂	C ₅	C ₁₀	C ₂₅	C ₅₀		I ₂ (in/hr)	I ₅ (in/hr)	I ₁₀ (in/hr)	I ₂₅ (in/hr)	I ₅₀ (in/hr)	I ₁₀₀ (in/hr)	Q ₂ (c.f.s.)	Q ₅ (c.f.s.)	Q ₁₀ (c.f.s.)	Q ₂₅ (c.f.s.)	Q ₅₀ (c.f.s.)	Q ₁₀₀ (c.f.s.)
		0.43	0.47	0.52	0.58	0.61													
1	2.81	0.43	0.47	0.52	0.58	0.61	12.4	3.0	3.8	4.4	5.1	5.7	6.4	3.7	5.0	6.5	8.2	9.8	11.5
BASIN B1	1.60	0.41	0.46	0.51	0.57	0.60	12.4												
BASIN B2	1.21	0.45	0.49	0.54	0.59	0.62	10.2												
2	3.55	0.42	0.47	0.52	0.58	0.61	12.3	3.0	3.8	4.5	5.1	5.7	6.4	4.6	6.4	8.3	10.4	12.4	14.6
BASIN B3	2.29	0.41	0.46	0.51	0.57	0.60	12.3												
BASIN B4	1.26	0.45	0.49	0.54	0.59	0.62	10.5												
3	8.51	0.44	0.48	0.53	0.58	0.62	15.0	2.8	3.5	4.1	4.7	5.3	5.9	10.5	14.4	18.6	23.4	27.7	32.5
BASIN B5	3.36	0.45	0.49	0.54	0.59	0.62	12.9												
BASIN B6	1.60	0.45	0.49	0.54	0.59	0.62	15.0												
DP-2	3.55	0.42	0.47	0.52	0.58	0.61	12.3												
4	11.32	0.44	0.48	0.53	0.58	0.61	15.0	2.8	3.5	4.1	4.7	5.3	5.9	13.9	19.1	24.7	31.0	36.7	43.2
DP-1	2.81	0.43	0.47	0.52	0.58	0.61	12.4												
DP-3	8.51	0.44	0.48	0.53	0.58	0.62	15.0												
5	4.12	0.37	0.43	0.49	0.55	0.59	14.2	2.9	3.6	4.2	4.8	5.4	6.1	4.4	6.3	8.4	10.9	13.0	15.5
BASIN B7	3.79	0.37	0.42	0.48	0.55	0.58	14.2												
BASIN B8	0.33	0.45	0.49	0.54	0.59	0.62	8.5												
6	8.62	0.41	0.46	0.51	0.57	0.60	14.2	2.9	3.6	4.2	4.8	5.4	6.1	10.3	14.3	18.6	23.6	28.1	33.2
BASIN B9	3.07	0.45	0.49	0.54	0.59	0.62	12.5												
BASIN B10	1.43	0.45	0.49	0.54	0.59	0.62	12.3												
DP 5	4.12	0.37	0.43	0.49	0.55	0.59	14.2												
7	19.94	0.43	0.47	0.52	0.58	0.61	15.0	2.8	3.5	4.1	4.7	5.3	5.9	23.9	33.0	42.9	54.1	64.2	75.6
DP-4	11.32	0.44	0.48	0.53	0.58	0.61	15.0												
DP-6	8.62	0.41	0.46	0.51	0.57	0.60	14.2												
8	7.74	0.45	0.49	0.54	0.59	0.62	12.3	3.0	3.8	4.5	5.1	5.7	6.4	10.6	14.5	18.6	23.2	27.5	32.2
BASIN B11	4.45	0.45	0.49	0.54	0.59	0.62	12.3												
BASIN B12	3.29	0.45	0.49	0.54	0.59	0.62	12.2												
9	27.68	0.45	0.49	0.54	0.59	0.62	15.0	2.8	3.5	4.1	4.7	5.3	5.9	35.0	47.8	61.4	76.7	90.7	106.4
DP-7	19.94	0.43	0.47	0.52	0.58	0.61	15.0												
DP-8	7.74	0.45	0.49	0.54	0.59	0.62	12.3												
10	35.49	0.45	0.49	0.54	0.59	0.62	15.4	2.8	3.5	4.1	4.6	5.2	5.9	44.5	60.6	77.9	97.3	115.1	135.0
BASIN B13	7.81	0.45	0.49	0.54	0.59	0.62	15.4												
BASIN B14	4.29	0.45	0.49	0.54	0.59	0.62	15.4												
1B	7.81	0.45	0.49	0.54	0.59	0.62	15.4	2.8	3.5	4.1	4.6	5.2	5.9	9.8	13.3	17.2	21.4	25.3	29.7
BASIN B15	3.52	0.45	0.49	0.54	0.59	0.62	15.0												
P-IN	50.99	0.50	0.54	0.59	0.64	0.66	23.4	2.3	2.9	3.3	3.8	4.3	4.8	57.9	78.3	99.5	123.5	145.1	169.2
BASIN C	4.25	0.09	0.19	0.29	0.40	0.46	7.7												
DP-10	11.25	0.80	0.82	0.84	0.87	0.88	23.4												
DP-10	35.49	0.45	0.49	0.54	0.59	0.62	15.4												
P-OUT POND OUTLET	47.47													1.0	2.6	7.8	18.2	27.2	36.4

Calculated by: DLM

Date: 8/12/2018

Update to include the routing of the off-site flows entering off-site flows.

Why is the area for P-OUT less than P-IN?

OFFSITE FLOWS EXCLUDED THE POND ARE INCLUDED

ENTER SAME AREA 54.90

Reference the UD-Detention Worksheet.

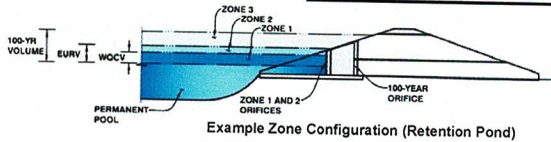
Submit the UD-BMP worksheet
which provides the design calc for
the forebay. INCLUDED

Detention Basin Outlet Structure Design

UD-Detention, Version 3.07 (February 2017)

Project: RIVERBEND CROSSING

Basin ID: EXTENDED DETENTION BASIN



Example Zone Configuration (Retention Pond)

	Stage (ft)	Zone Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	3.94	1.089	Orifice Plate
Zone 2 (EURV)	6.09	2.366	Orifice Plate
Zone 3 (100-year)	7.68	2.288	Weir & Pipe (Restrict)
		5.742	Total

User Input: Orifice at Underdrain Outlet (typically used to drain WQCV in a Filtration BMP)

Underdrain Orifice Invert Depth =	N/A	ft (distance below the filtration media surface)
Underdrain Orifice Diameter =	N/A	inches

Calculated Parameters for Underdrain

Underdrain Orifice Area =	N/A	ft ²
Underdrain Orifice Centroid =	N/A	feet

User Input: Orifice Plate with one or more orifices or Elliptical Slot Weir (typically used to drain WQCV and/or EURV in a sedimentation BMP)

Invert of Lowest Orifice =	0.00	ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Orifice Plate =	6.09	ft (relative to basin bottom at Stage = 0 ft)
Orifice Plate: Orifice Vertical Spacing =	24.40	inches
Orifice Plate: Orifice Area per Row =	N/A	inches

Calculated Parameters for Plate

WQ Orifice Area per Row =	N/A	ft ²
Elliptical Half-Width =	N/A	feet
Elliptical Slot Centroid =	N/A	feet
Elliptical Slot Area =	N/A	ft ²

User Input: Stage and Total Area of Each Orifice Row (numbered from lowest to highest)

	Row 1 (required)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	0.00	2.03	4.06					
Orifice Area (sq. inches)	4.19	4.19	10.00					

	Row 9 (optional)	Row 10 (optional)	Row 11 (optional)	Row 12 (optional)	Row 13 (optional)	Row 14 (optional)	Row 15 (optional)	Row 16 (optional)
Stage of Orifice Centroid (ft)								
Orifice Area (sq. inches)								

User Input: Vertical Orifice (Circular or Rectangular)

	Not Selected	Not Selected	
Invert of Vertical Orifice =	N/A	N/A	ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Vertical Orifice =	N/A	N/A	ft (relative to basin bottom at Stage = 0 ft)
Vertical Orifice Diameter =	N/A	N/A	inches

Calculated Parameters for Vertical Orifice

	Not Selected	Not Selected	
Vertical Orifice Area =	N/A	N/A	ft ²
Vertical Orifice Centroid =	N/A	N/A	feet

User Input: Overflow Weir (Dropbox) and Grate (Flat or Sloped)

	Zone 3 Weir	Not Selected	
Overflow Weir Front Edge Height, H _o =	6.09	N/A	ft (relative to basin bottom at Stage = 0 ft)
Overflow Weir Front Edge Length =	4.00	N/A	feet
Overflow Weir Slope =	4.00	N/A	H:V (enter zero for flat grate)
Horiz. Length of Weir Sides =	4.00	N/A	feet
Overflow Grate Open Area % =	70%	N/A	%, grate open area/total area
Debris Clogging % =	50%	N/A	%

Calculated Parameters for Overflow Weir

	Zone 3 Weir	Not Selected	
Height of Grate Upper Edge, H _u =	7.09	N/A	feet
Over Flow Weir Slope Length =	4.12	N/A	feet
Grate Open Area / 100-yr Orifice Area =	2.35	N/A	should be ≥ 4
Overflow Grate Open Area w/o Debris =	11.54	N/A	ft ²
Overflow Grate Open Area w/ Debris =	5.77	N/A	ft ²

User Input: Outlet Pipe w/ Flow Restriction Plate (Circular Orifice, Restrictor Plate, or Rectangular Orifice)

	Zone 3 Restrictor	Not Selected	
Depth to Invert of Outlet Pipe =	2.50	N/A	ft (distance below basin bottom at Stage = 0 ft)
Outlet Pipe Diameter =	30.00	N/A	inches
Restrictor Plate Height Above Pipe Invert =	30.00		inches

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

	Zone 3 Restrictor	Not Selected	
Outlet Orifice Area =	4.91	N/A	ft ²
Outlet Orifice Centroid =	1.25	N/A	feet
Half-Central Angle of Restrictor Plate on Pipe =	3.14	N/A	radians

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage =	8.10	ft (relative to basin bottom at Stage = 0 ft)
Spillway Crest Length =	40.00	feet
Spillway End Slopes =	4.00	H:V
Freeboard above Max Water Surface =	1.00	feet

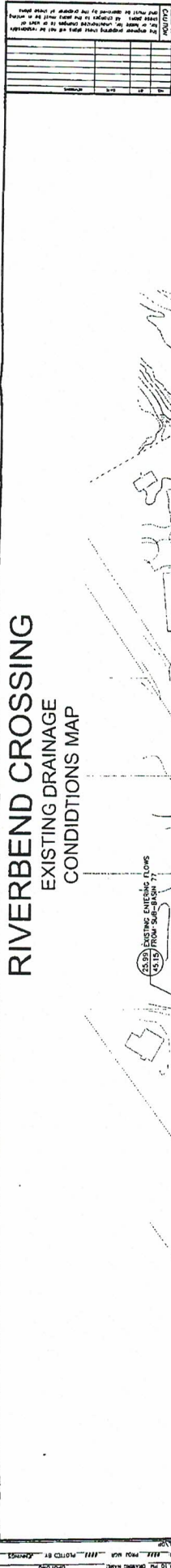
Calculated Parameters for Spillway

Spillway Design Flow Depth =	0.95	feet
Stage at Top of Freeboard =	10.05	feet
Basin Area at Top of Freeboard =	1.82	acres

Routed Hydrograph Results

	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
Design Storm Return Period =									
One-Hour Rainfall Depth (in) =	0.53	1.07	1.19	1.50	1.75	2.00	2.25	2.52	3.14
Calculated Runoff Volume (acre-ft) =	1.089	3.455	3.028	4.192	5.148	6.490	7.630	9.020	11.954
OPTIONAL Override Runoff Volume (acre-ft) =									
Inflow Hydrograph Volume (acre-ft) =	1.088	3.455	3.029	4.192	5.142	6.483	7.632	9.017	11.948
Predevelopment Unit Peak Flow, q (cfs/acre) =	0.00	0.00	0.01	0.08	0.21	0.50	0.69	0.95	1.45
Predevelopment Peak Q (cfs) =	0.0	0.0	0.5	3.9	10.7	25.4	35.1	48.3	74.2
Peak Inflow Q (cfs) =	15.2	47.6	41.8	57.6	70.3	88.1	103.3	121.5	159.5
Peak Outflow Q (cfs) =	0.5	1.1	1.0	2.6	7.8	18.2	27.2	36.4	80.2
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	0.7	0.7	0.7	0.8	0.8	1.1
Structure Controlling Flow =	Plate	Plate	Plate	Overflow Grate 1	Overflow Grate 1	Overflow Grate 1	Overflow Grate 1	Overflow Grate 1	Spillway
Max Velocity through Grate 1 (fps) =	N/A	N/A	N/A	0.1	0.6	1.5	2.2	3.0	3.6
Max Velocity through Grate 2 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Time to Drain 97% of Inflow Volume (hours) =	38	67	63	71	71	69	68	67	64
Time to Drain 99% of Inflow Volume (hours) =	40	72	68	77	78	77	77	76	74
Maximum Ponding Depth (ft) =	3.83	5.95	5.63	6.41	6.82	7.30	7.65	8.07	8.54
Area at Maximum Ponding Depth (acres) =	0.79	1.33	1.25	1.38	1.43	1.48	1.52	1.57	1.63
Maximum Volume Stored (acre-ft) =	0.998	3.257	2.846	3.882	4.459	5.157	5.683	6.331	7.098

These off-site flows does not appear to have been accounted for in the proposed condition.



EXISTING DRAINAGE BASINS 75, 76 AND 77 WERE TAKEN FROM THE APPROVED LITTLE JOHNSON DRAINAGE BASIN PLANNING STUDY, DATED: APRIL, 1988

Species	Date	Composite mean CDD (°C)		Optimal CDD (°C)	Length of growing season		Composite CDD range		Days with CDD > 10°C	Days with CDD > 15°C	Days with CDD > 20°C
		1950-1999	1980-2000		Start	End	1950-1999	1980-2000			
1. <i>P. fuscus</i>	23 May	10.1	10.1	10.5	10 May	10 Jun	10.0-10.5	10.0-10.5	10	10	10
2. <i>P. fuscus</i>	23 May	8.9	8.9	9.3	8 May	9 Jun	8.0-9.0	8.0-9.0	8	8	8
3. <i>P. fuscus</i>	23 May	10.1	10.1	10.5	10 May	10 Jun	10.0-10.5	10.0-10.5	10	10	10
4. <i>P. fuscus</i>	23 May	10.1	10.1	10.5	10 May	10 Jun	10.0-10.5	10.0-10.5	10	10	10
5. <i>P. fuscus</i>	23 May	10.1	10.1	10.5	10 May	10 Jun	10.0-10.5	10.0-10.5	10	10	10
6. <i>P. fuscus</i>	23 May	10.1	10.1	10.5	10 May	10 Jun	10.0-10.5	10.0-10.5	10	10	10
7. <i>P. fuscus</i>	23 May	10.1	10.1	10.5	10 May	10 Jun	10.0-10.5	10.0-10.5	10	10	10
8. <i>P. fuscus</i>	23 May	10.1	10.1	10.5	10 May	10 Jun	10.0-10.5	10.0-10.5	10	10	10
9. <i>P. fuscus</i>	23 May	10.1	10.1	10.5	10 May	10 Jun	10.0-10.5	10.0-10.5	10	10	10
10. <i>P. fuscus</i>	23 May	10.1	10.1	10.5	10 May	10 Jun	10.0-10.5	10.0-10.5	10	10	10
11. <i>P. fuscus</i>	23 May	10.1	10.1	10.5	10 May	10 Jun	10.0-10.5	10.0-10.5	10	10	10
12. <i>P. fuscus</i>	23 May	10.1	10.1	10.5	10 May	10 Jun	10.0-10.5	10.0-10.5	10	10	10
13. <i>P. fuscus</i>	23 May	10.1	10.1	10.5	10 May	10 Jun	10.0-10.5	10.0-10.5	10	10	10
14. <i>P. fuscus</i>	23 May	10.1	10.1	10.5	10 May	10 Jun	10.0-10.5	10.0-10.5	10	10	10
15. <i>P. fuscus</i>	23 May	10.1	10.1	10.5	10 May	10 Jun	10.0-10.5	10.0-10.5	10	10	10
16. <i>P. fuscus</i>	23 May	10.1	10.1	10.5	10 May	10 Jun	10.0-10.5	10.0-10.5	10	10	10
17. <i>P. fuscus</i>	23 May	10.1	10.1	10.5	10 May	10 Jun	10.0-10.5	10.0-10.5	10	10	10
18. <i>P. fuscus</i>	23 May	10.1	10.1	10.5	10 May	10 Jun	10.0-10.5	10.0-10.5	10	10	10
19. <i>P. fuscus</i>	23 May	10.1	10.1	10.5	10 May	10 Jun	10.0-10.5	10.0-10.5	10	10	10
20. <i>P. fuscus</i>	23 May	10.1	10.1	10.5	10 May	10 Jun	10.0-10.5	10.0-10.5	10	10	10
21. <i>P. fuscus</i>	23 May	10.1	10.1	10.5	10 May	10 Jun	10.0-10.5	10.0-10.5	10	10	10
22. <i>P. fuscus</i>	23 May	10.1	10.1	10.5	10 May	10 Jun	10.0-10.5	10.0-10.5	10	10	10
23. <i>P. fuscus</i>	23 May	10.1	10.1	10.5	10 May	10 Jun	10.0-10.5	10.0-10.5	10	10	10
24. <i>P. fuscus</i>	23 May	10.1	10.1	10.5	10 May	10 Jun	10.0-10.5	10.0-10.5	10	10	10
25. <i>P. fuscus</i>	23 May	10.1	10.1	10.5	10 May	10 Jun	10.0-10.5	10.0-10.5	10	10	10
26. <i>P. fuscus</i>	23 May	10.1	10.1	10.5	10 May	10 Jun	10.0-10.5	10.0-10.5	10	10	10
27. <i>P. fuscus</i>	23 May	10.1	10.1	10.5	10 May	10 Jun	10.0-10.5	10.0-10.5	10	10	10
28. <i>P. fuscus</i>	23 May	10.1	10.1	10.5	10 May	10 Jun	10.0-10.5	10.0-10.5	10	10	10
29. <i>P. fuscus</i>	23 May	10.1	10.1	10.5	10 May						

NOTE
ELECTRONIC ENGINEERING
ACADEMY BLVD., SUITE 304
8500 TEL. 719.268.9700 FAX
COLORADO SPRINGS, CO 809
WWW.NOTE.CO

PRELIMINARY
NOT FOR CONSTRUCTION

DP01
9/20/2004 17:14

1	or 2	25015
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SCALE
VERTICAL: N/A
HORIZONTAL: 1" = 100'

by person for	
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DATE SUBMITTED: FEB 17, 2006

RIVERBEND CROSSING
EXISTING DRAINAGE CONDITIONS

PREPARED FOR: DR HORTON - MELODY SERIES

COLORED SPRINGS, CO 80912
WWW.JOITE.COM

ENGINEERING

719 268.8500 TEL 719 268 9200 FAX

5	3
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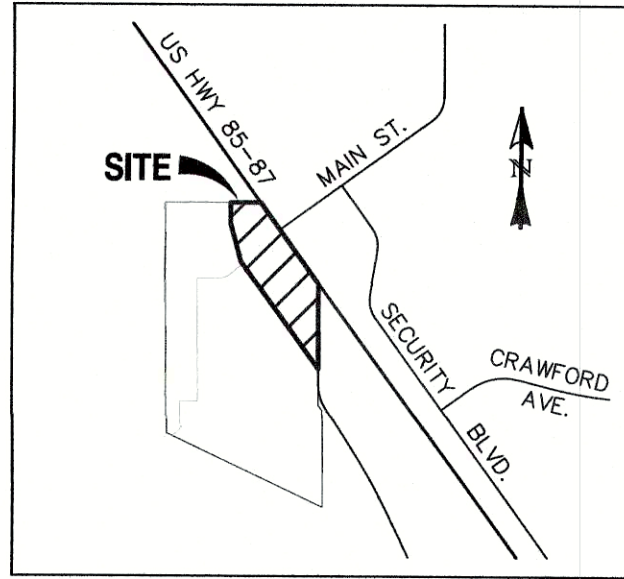
The Nolte PDR identified the need to provide toe/slope protection. The Nolte report noted that the analysis/ HEC-RAS modeling was preliminary in nature. Final hydraulic analysis, design and construction is required.

100-yr PROTECTION INCLUDED

Both the Nolte PDR and this report's narrative identified the need for a drainage swale along the western boundary. This drainage swale must be located within a tract.

16' BOTTOM WIDTH SWALE @ 0.5% DRAINAGE SWALE ADDED

County GIS shows this would drain back into the subdivision at the southwest corner



VICINITY MAP
SCALE: N.T.S.

PROPOSED DRAINAGE BASINS						
BASIN	AREA (ACRES)	Q2 (CFS)	Q5 (CFS)	Q10 (CFS)	Q25 (CFS)	Q50 (CFS)
A1	2.23	0.4	1.1	2.0	3.1	4.0
A2	0.99	1.0	1.6	2.2	3.0	3.6
B1	1.60	2.0	2.8	3.6	4.6	5.5
B2	1.21	1.8	2.4	3.1	3.9	4.6
B3	2.29	2.9	4.0	5.2	6.6	7.9
B4	1.26	1.8	2.5	3.2	4.0	4.8
B5	3.36	4.5	6.2	7.9	9.9	11.7
B6	1.60	2.0	2.8	3.5	4.4	5.2
B7	3.79	4.0	5.7	7.7	9.9	11.7
B8	0.33	0.5	0.7	0.9	1.1	1.3
B9	3.70	4.2	5.7	7.3	9.2	10.8
B10	1.43	2.0	2.7	3.4	4.3	5.1
B11	4.45	6.1	8.3	10.7	13.4	15.8
B12	3.29	4.5	6.2	7.9	9.9	11.7
B13	3.52	4.5	6.1	7.8	9.8	11.5
B14	4.29	5.4	7.3	9.4	11.8	13.9
B15	4.25	1.4	3.7	6.5	10.3	13.3
C	11.25	20.6	26.3	31.5	37.3	42.4

PROPOSED DESIGN POINTS						
DESIGN POINT	Q2 (CFS)	Q5 (CFS)	Q10 (CFS)	Q25 (CFS)	Q50 (CFS)	Q100 (CFS)
1	3.7	5.0	6.5	8.2	9.8	11.5
2	4.6	6.4	8.3	10.4	12.4	14.6
3	10.5	14.4	18.6	23.4	27.7	32.5
4	13.9	19.1	24.7	31.0	36.7	43.2
5	4.4	6.3	8.4	10.9	13.0	15.5
6	10.3	14.3	18.6	23.6	28.1	33.2
7	23.9	33.0	42.9	54.1	64.2	75.6
8	10.6	14.5	18.6	23.2	27.5	32.2
9	35.0	47.8	61.4	76.7	90.7	106.4
10	40.1	54.6	70.2	87.7	103.6	121.6
1B	9.8	13.3	17.2	21.4	25.3	29.7
P-IN	54.3	73.4	93.1	115.6	135.7	158.2
P-OUT	1.0	2.6	7.8	18.2	27.2	36.4

Show BFE. The FEMA BFE appears to be from 5691 to 5688. The pond appears to be submerged during the 100yr storm event negating the effectiveness of the detention pond.

Relocate the FSD pond outside the 100yr floodplain. The pond must be above the BFE. If the outlet structure is located below the BFE then tailwater effect must be analyzed.

FLOODPLAIN SHOULD HAVE BEEN FROM 'F' SERIES MAP TO EFFECT AT TIME OF SUBMITTAL. MAPS HAVE BEEN REVISED WITH NEW FLOODPLAIN. BASE FLOOD ELEVATIONS HAVE BEEN ADDED.

Revise the contours or place drainage swale in a drainage easement. Revised to 'N' lots.

A PORTION OF THE POND REMAINS BELOW THE BFE. EXCESS CAPACITY ABOVE BFE WAS DESIGNING INTO POND. THE CAPACITY ABOVE THE BFE EXCEEDED 100-YR VOLUME. INLET CONDITIONS REQUIRED ADDITIONAL DEPTH.

Provide maintenance access path from a public street and a ramp to the bottom of pond.

Include Provide the riprap sizing calculation.

Add on the legend what this symbol represents.

Highway REMOVED

0 100 200
SCALE: 1" = 100'

Per DCM Chapter 11 Section 11.3.3 the top width of the top of embankment shall be a minimum of 12 feet. TOP WIDTH MIN 12 FT. 27' ~ 53'

Provide access around the perimeter of the EDB. PROVIDED

Revise Basin B14 boundary. The inlets at the side streets are in a sump condition which continues the cross slope of Booker Blvd down to the inlets. The crosspans will not be able to convey runoff through the intersections. Runoff will turn to the north and into the inlets. Revised w/ Main Pond BETWEEN 10 LOTS AND CROSS-PAD

Proposed C&G and sidewalk must extend to the proposed intersection. NOTED

Indicate the emergency overflow path for the Commercial sub-basin and update to discuss in the narrative. ADDED

Revise the sub-basin. Based on the contours portions of the commercial development drains into the residential development via Main Street.

The inlet calculation for basin B7 indicates a 10' inlet. Revise accordingly. Revised

Revised

Flows listed for design point 10 do not match the calculations or the narrative. Revise. Revised

1. Make the basin boundary darker for clarity.
2. If applicable, update hydraulic calculations to incorporate the additional 100yr offsite flows from Security Creek and Security Creek going through the shaded zone X. A LOW MODIFIED 100-YR CROSS-ROAD CUL. OF 85' BT
3. provide contour labels.
4. Include a pond summary table in the proposed drainage map. ADDED

LEGEND

EXISTING	(E)
FUTURE	(F)
PROPOSED	(P)
CURB AND GUTTER	C&G
EASEMENT	ESMT
BOUNDARY	
RIGHT-OF-WAY	
LOT LINE	
EASEMENT	
SETBACK	
(E) CONTOUR, INDEX	5970
(E) CONTOUR	5970
(E) STORM SEWER, INLET, MH	
(P) CONTOUR, INDEX	
(P) CONTOUR	
(P) FENCE	
(P) STORM SEWER, INLET, MH	
BASIN BOUNDARY	
missing	

REV.	DESCRIPTION	DATE	PREPARED FOR: AVATAR EQUITIES 6800 JERICHO TURNPIKE SUITE 120W, #204 SYOSSET, NY 11791	PREPARE DAVID	VEERING	CATAMOUNT ENGINEERING 321 W. HENRIETTA AVE WOODLAND PARK, CO 80886 (719) 682-5124	RIVERBEND CROSSING PROPOSED DRAINAGE PLAN	DESIGNED BY: DLM SCALE: 1" = 60' JOB NUMBER: 17-115	DRAWN BY: DBM DATE: 08/28/18 SHEET: 1 OF X
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