REQUEST FOR
CONDITIONAL LETTER OF MAP REVISION

UNNAMED TRIBUTARY TO
BLACK SQUIRREL CREEK,
FALCON FIELD

Falcon, El Paso County, Colorado
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DBC Project No. 21705-00BLWR

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FALCON FIELD

1.0 INTRODUCTION

1.1 Background

The following report and supporting documentation are being submitted to FEMA for the purpose of requesting a Conditional Letter of Map Revision (CLOMR) for a portion of the Unnamed Tributary to Black Squirrel Creek (UTBSC) in El Paso County, Colorado.

Falcon Field consists of approximately 57 acres adjacent to and southeast of Highway 24 near Rio Lane as shown in **Figure 1**. The UTBSC flows southeast across the property and is proposed to be contained within an 8'x4' box culvert and open channel that will discharge into the existing tributary. A general site layout of the Falcon Field development is shown in the construction drawings included in **Appendix 1**.

The improvements associated with Falcon Field are in general conformance with the Falcon Basin, Drainage Basin Planning Study (Falcon DBPS), prepared by El Paso County in 2015. The hydrologic analysis completed for the Falcon DBPS was used as the basis for the current CLOMR.

The Effective FEMA Flood Insurance Rate Map (FIRM) Numbers 08041C0553G and 08041C0561G in **Appendix 5** show the UTBSC 100-year Zone A floodplain across the center of the Falcon Field. This report includes detailed hydraulic models showing that the proposed 100-year floodplain will be contained within a proposed box culvert and open channel.

It is the Owner/Developer's intent to comply with all floodplain regulations.

1.2 General Location and Project Description

This CLOMR is limited to the 57-acre parcel located at the southwest corner of Highway 24 and Rio Lane, in the east half of Section 7, Township 13 South, Range 64 West of the 6th P.M. in El Paso County, Colorado. The subject property will be developed with a mixed-use commercial and residential development (Falcon Field).

The Falcon Field development includes regrading the site and containing the UTBSC across the site. Approximately 1024 feet of the tributary will be impacted by the development, which intercepts the existing creek south of Highway 24 and conveys it via an 8'x4' box culvert and open channel to the existing creek downstream. The box culvert and open channel are designed to convey the full 100-year discharge.

Figure 1 – Vicinity Map

1.3 Regulatory Floodplain

The Effective Zone A limits for the UTBSC on the Falcon Field site are defined on Map Numbers 8041C0553G and 08041C0561G dated December 7, 2018. No flow rates, floodway data or flood profiles were defined for this section of UTBSC in the effective FIS for El Paso County, Colorado, Revised December 7, 2018.

2.0 PREVIOUS STUDIES

El Paso County completed hydrologic and hydraulic analyses summarized in a report titled Falcon Basin, Drainage Basin Planning Study, Selected Plan Report, Final, September 2015 (Falcon DBPS). The Falcon DBPS encompasses three unnamed tributaries to Black Squirrel Creek, including the "East Tributary" which flows across the subject property. Select output from the Falcon DBPS is included in **Appendix 2**.

3.0 HYDROLOGIC ANALYSIS

The Falcon DBPS completed hydrologic analysis for the Falcon Basin Watershed, using HEC-HMS v3.5 software, for historical, existing, and future land use conditions by applying a 24-hour storm event with 2-, 5-, 10-, 25-, 50-, and 100-year recurrence intervals and current drainage infrastructure. Chapter 3 and Appendix A of the Falcon DBPS include a detailed discussion of the hydrologic analysis. An electronic copy of the HEC-HMS model (File: Aug15_Working_Falcon_DBPS_S.hms) is also provided.

El Paso County requires regional drainage infrastructure to be sized for future land use conditions. Therefore, peak discharges with existing drainage infrastructure and future land use conditions near Falcon Field are summarized in Table 3-1.

Table 3-1. Future Land Use Conditions Peak Discharges near Falcon Field on the East Tributary, Falcon DBPS

Model Location	Physical Location	Proximity to Falcon Field	Q100 (cfs)
JET090	Highway 24	Upstream of Site	390
JET100	Pinto Pony Road	Downstream of Site	390

4.0 HYDRAULIC ANALYSIS

4.1 General

The effective FIRM identifies an approximate Zone A floodplain across the Falcon Field property with no flood profiles, discharges, or BFE's defined. The Falcon Field development includes filling and regrading the site and rerouting the UTBSC through a box culvert and open channel across the site.

4.2 Vertical Datum

The effective FIRM is on the North American Vertical Datum of 1988 (NAVD88). The survey completed for the site, the design and construction drawings, and the hydraulic analysis completed for this CLOMR are all on the NAVD88. The Falcon DBPS was completed on the NGVD29.

4.3 Horizontal Datum

The field survey, design, construction drawings and hydraulic modeling for the Falcon Field project were completed on the North American Datum of 1983 (NAD83), Colorado State Plane coordinate system, Central Zone.

4.4 Box Culvert Hydraulic Analysis

Under existing conditions, the UTBSC discharges to an open channel through the site from 2-12’H x 4.83’W box culverts under Highway 24. The Falcon Field property limits are approximately 46 feet downstream of the Highway 24 box culvert exit. There is an 8-foot concrete vertical wall/drop immediately downstream of the culvert, then a short riprap channel section (shown in the photo below), before the open channel returns to a vegetated

section through the site. This section of the tributary was realigned with the construction of the upstream railroad and highway and does not follow the historic flow path.

Existing 2-12'H x 4.83' W box culverts under Highway 24

The proposed 8' x 4' box culvert will begin at the upstream property boundary (approximately the fence line shown in the photo above) at a headwall and convey the tributary flows 750 feet downstream to a proposed open channel. StormCAD was used to evaluate the hydraulic performance of the box culvert. The profile and output for the 100-year storm event is included in **Appendix 3**, and the model files are provided.

Per DCM 10.5.1 Side slopes for grass lined channels shall be no steeper than 4:1

provide the type of channel/description for the roughness coefficients.

hannel Hydraulic Analysis

The proposed box culvert discharges to a proposed open channel via a headwall. The proposed open channel conveys the UTBSC 275 feet downstream to the existing creek, and will be vegetated with mowable short grasses. The open channel has a 20-foot bottom width in a v-shape with two 10-foot sections set at a 2% slope to the invert. The side slopes above the v-shape bottom are set at a 3H:1V slope. HEC-RAS version 6.2 was used to model the proposed open channel and existing creek downstream. The profile and output for the 100-year storm event is included in **Appendix 3**, and the model files are provided.

The proposed geometry includes six cross sections over a modeled reach of 400 feet. Roughness coefficients (n-values) of 0.04 and 0.08 were used for the proposed and existing channel, respectively. The model was computed in a subcritical flow regime for the design flow of 390 cfs, with a normal depth starting water surface elevation.

5.0 NFIP REGULATION COMPLIANCE

5.1 Floodplain Work Map and Annotated FIRM

The effective Zone A 100-year floodplain delineation for the UTBSC begins downstream of Highway 24. The 100-year flood discharge will be contained in the proposed box culvert. The proposed floodplain for the on-site open channel is delineated on the Floodplain Work Map and Annotated FIRM in **Appendix 5**. The proposed Zone AE floodplain ties into the effective Zone A floodplain approximately 225 feet downstream of the Falcon Field downstream property limits.

5.2 Forms and Notifications

The appropriate FEMA forms are located in **Appendix 4**. Modifications to 100-year floodplain elevations and delineations are limited to the Falcon Field development. Furthermore, there are no proposed increases to the BFE's or floodplain extents. Therefore, individual legal notices are not required for this CLOMR submittal.

5.3 Compliance with Section 65.12

Although there are no increases to BFE's due to the proposed project, an alternatives evaluation was performed to evaluate options for closed conduit and open channel conveyance of the UTBSC. The alternatives evaluation can be provided upon request.

Furthermore, no structures are located in areas that would be impacted by the floodplain modifications proposed by this CLOMR.

5.4 Endangered Species Act (ESA)

ESA Compliance information is provided in **Appendix 6**.

6.0 CONCLUSIONS

The Falcon Field development will relocate a portion of an Unnamed Tributary to Black Squirrel Creek (East Tributary). This report and supporting documentation are being submitted to FEMA for the purpose of requesting a CLOMR to conditionally change the floodplain in accordance with NFIP regulations.

7.0 REFERENCES

Bentley (formerly Haestad Methods, Inc.), StormCAD v4.1.1.

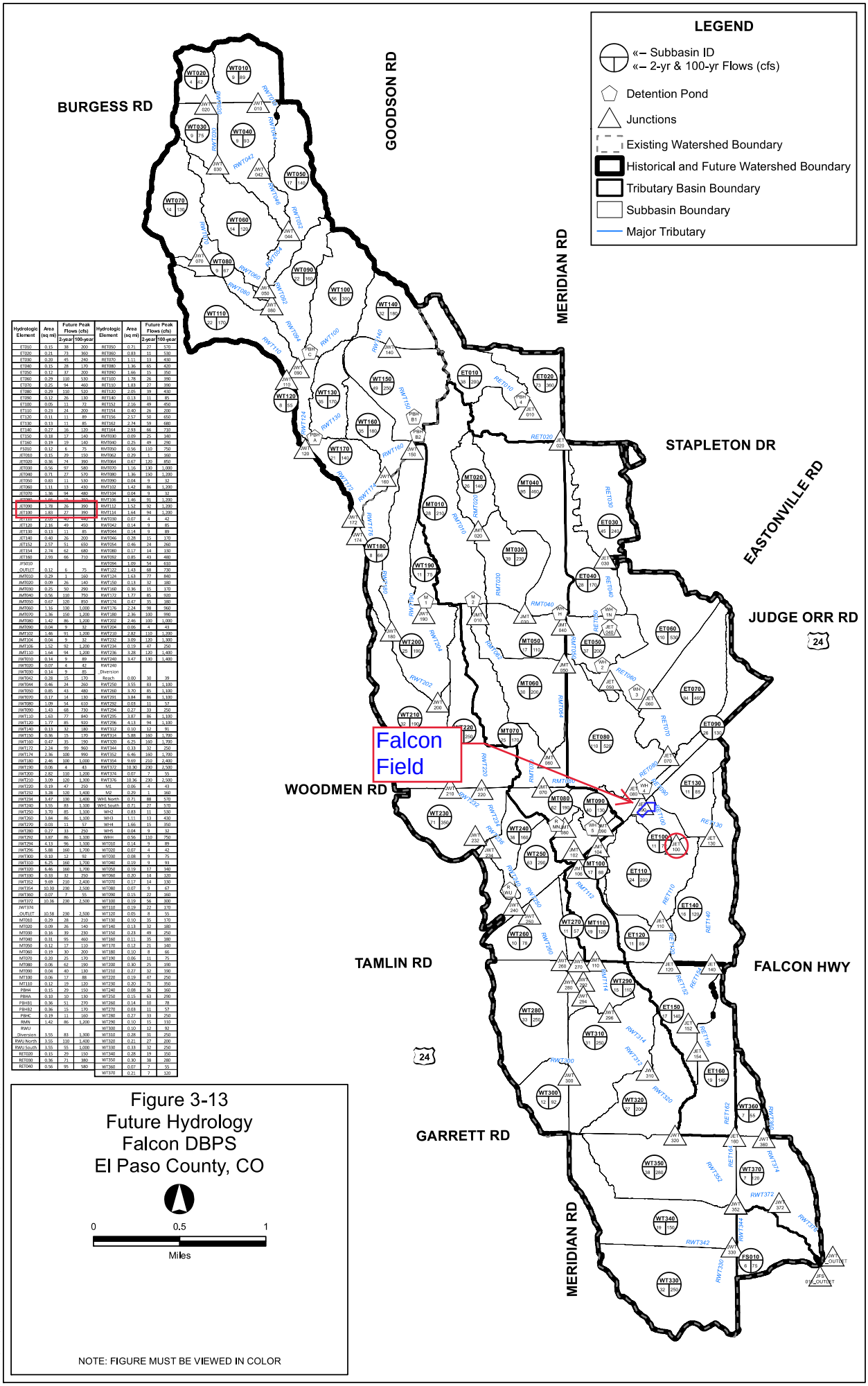
El Paso County, *Drainage Criteria Manual*, October 2018.

FEMA, *FIRM Numbers 08041C0553G and 08041C0561G, El Paso County, Colorado and Incorporated Areas,* Revised December 7, 2018.

FEMA, *FIS Number 08041CV001A, El Paso County, Colorado and Incorporated Areas,* Revised December 7, 2018.

Matrix Design Group, *Falcon Drainage Basin Planning Study, Selected Plan Report, Final,* September 2015.

USACE, *Hydrologic Engineering Center River Analysis System (HEC-RAS), Version 6.2,* March 2022.



Hydrologic Element	Area (sq mi)	Future Peak Flows (cfs) 2-year	100-year
ET010	0.15	38	200
ET020	0.21	73	360
ET030	0.20	45	240
ET040	0.15	38	170
ET050	0.12	37	200
ET060	0.29	110	530
ET070	0.25	94	460
ET080	0.29	110	520
ET090	0.12	26	130
ET100	0.05	11	72
ET110	0.23	24	200
ET120	0.11	11	89
ET130	0.13	11	85
ET140	0.27	16	120
ET150	0.18	17	140
ET160	0.19	19	140
FS010	0.12	6	75
JET010	0.35	29	160
JET020	0.36	74	390
JET030	0.56	97	580
JET040	0.71	27	570
JET050	0.83	11	530
JET060	1.11	13	430
JET070	1.36	94	480
JET080	1.65	15	860
JET090	1.78	26	990
JET100	1.83	27	950
JET110	2.03	49	980
JET120	2.16	49	450
JET130	0.13	11	85
JET140	0.40	26	200
JET152	2.57	51	650
JET154	2.74	62	680
JET160	2.93	66	710
JFS010			
OUTLET	0.32	6	75
JMT010	0.29	1	160
JMT020	0.09	26	140
JMT030	0.25	50	290
JMT040	0.56	110	750
JMT050	0.67	120	850
JMT060	1.16	130	1,000
JMT070	1.36	150	1,200
JMT080	1.42	86	1,200
JMT090	0.04	9	32
JMT102	1.46	91	1,200
JMT104	0.04	9	32
JMT110	1.64	94	1,200
JWT010	0.14	9	89
JWT020	0.07	4	42
JWT030	0.14	9	85
JWT040	0.28	15	170
JWT044	0.46	24	260
JWT050	0.85	43	480
JWT070	0.17	14	130
JWT080	1.09	54	610
JWT090	1.43	68	730
JWT110	1.63	77	840
JWT120	1.77	85	920
JWT140	0.13	32	180
JWT150	0.36	15	170
JWT160	0.47	35	190
JWT172	2.24	99	960
JWT174	2.36	100	990
JWT180	2.46	100	1,000
JWT190	0.06	4	43
JWT200	2.82	110	1,200
JWT210	3.09	120	1,300
JWT220	0.19	47	350
JWT232	3.28	120	1,400
JWT234	3.47	130	1,400
JWT240	3.55	83	1,100
JWT250	3.70	85	1,100
JWT260	3.84	86	1,100
JWT270	0.09	11	57
JWT280	0.27	33	250
JWT292	3.87	86	1,100
JWT294	4.13	96	1,300
JWT296	5.88	160	1,700
JWT300	0.10	12	92
JWT320	6.25	160	1,700
JWT330	0.33	32	250
JWT352	8.69	210	2,400
JWT354	10.39	230	2,500
JWT360	0.07	7	55
JWT372	10.38	230	2,500
JWT374			
OUTLET	10.58	230	2,500
MT010	0.29	28	210
MT020	0.09	26	140
MT030	0.16	39	230
MT040	0.31	95	460
MT050	0.12	17	110
MT060	0.19	30	200
MT070	0.20	25	170
MT080	0.06	62	190
MT090	0.04	40	130
MT100	0.06	17	88
MT110	0.12	19	120
PBH4	0.15	29	150
PBHA	0.10	30	130
PBHB1	0.36	51	270
PBHB2	0.36	15	170
PBHC	0.19	11	160
RMN	1.42	86	1,200
RWU			
Diversion	3.55	83	1,300
RWU North	3.55	110	1,400
RWU South	3.55	55	1,000
RET020	0.15	29	150
RET030	0.36	71	380
RET040	0.56	95	580
RET050	0.71	27	570
RET060	0.83	11	530
RET070	1.11	13	430
RET080	1.36	150	1,200
RET090	0.04	9	32
RET100	1.46	91	1,200
RET102	1.42	86	1,200
RET104	0.04	9	32
RET106	1.46	91	1,200
RET112	1.52	92	1,200
RET114	1.64	94	1,200
RET030	0.07	4	42
RET042	0.14	9	85
RET044	0.14	9	89
RET046	0.28	15	170
RET054	0.46	24	260
RET080	0.17	14	130
RET092	0.85	43	480
RET094	1.09	54	610
RET122	1.43	68	730
RET124	1.63	77	840
RET150	0.13	32	180
RET160	0.36	15	170
RET172	1.77	85	920
RET174	0.47	35	190
RET176	2.24	99	960
RET180	2.36	100	990
RET202	2.46	100	1,000
RET204	0.06	4	43
RET210	2.82	110	1,200
RET232	3.09	120	1,300
RET234	0.19	47	350
RET236	3.28	120	1,400
RET240	3.47	130	1,400
RET240 Diversion			
Reach	0.00	30	39
RET250	3.55	83	1,100
RET260	3.70	85	1,100
RET261	3.84	86	1,100
RET262	0.03	11	57
RET294	0.27	33	250
RET295	3.87	86	1,100
RET296	4.13	94	1,100
RET312	0.10	12	91
RET314	5.88	160	1,700
RET320	6.25	160	1,700
RET344	0.33	32	250
RET352	6.46	160	1,700
RET354	9.69	210	2,400
RET372	10.30	230	2,500
RET374	0.07	7	55
RET376	10.36	230	2,500
M1	0.06	4	43
M2	0.29	1	160
WH1 North	0.71	88	570
WH1 South	0.71	27	570
WH2	0.83	11	530
WH3	1.11	13	430
WH4	1.65	15	350
WH5	0.04	9	32
WH6	0.96	150	750
WT010	0.14	9	89
WT020	0.07	4	42
WT030	0.08	9	75
WT040	0.19	9	93
WT050	0.19	17	140
WT060	0.20	14	120
WT070	0.17	13	130
WT080	0.07	9	67
WT090	0.15	22	160
WT100	0.19	56	300
WT110	0.19	22	170
WT120	0.05	8	55
WT130	0.10	15	170
WT140	0.13	32	180
WT150	0.23	49	250
WT160	0.11	35	180
WT170	0.12	21	140
WT180	0.10	8	66
WT190	0.06	11	75
WT200	0.30	25	190
WT210	0.27	32	190
WT220	0.19	47	250
WT230	0.20	71	350
WT240	0.08	36	160
WT250	0.15	63	290
WT260	0.14	16	78
WT270	0.03	11	57
WT280	0.27	33	250
WT290	0.10	15	110
WT300	0.10	12	92
WT310	0.28	31	250
WT320	0.21	27	200
WT330	0.33	32	250
WT340	0.28	19	150
WT350	0.30	38	280
WT360	0.07	7	55
WT370	0.21	7	120

Figure 3-13
Future Hydrology
Falcon DBPS
El Paso County, CO

0 0.5 1
Miles

NOTE: FIGURE MUST BE VIEWED IN COLOR

FILE: G:\gis_projects\Falcon_Creek_DBPS\active\apps\20110613\hydrology_future.mxd, 12/22/2011, wilson_wheeler

Table 3-15. Peak Flows at Points of Interest within the Falcon Watershed

Location	HEC-HMS Element[2]	Area (sq mi)	Historical Peak Flows (cfs)				Existing Peak Flows (cfs)[3]				Future Peak Flows (cfs)			
			2-year	5-year	10-year	100-year	2-year	5-year	10-year	100-year	2-year	5-year	10-year	100-year
West Tributary														
Raygor Rd.	JWT030	0.14	6	15	23	75	9	20	30	85	9	20	30	85
Stapleton Rd.	JWT120	1.77	58	150	230	750	84	190	300	910	85	190	300	920
Woodmen Rd.	JWT210	3.09	80	200	320	1,000	21	50	170	950	120	250	400	1,300
Hwy. 24	JWT250	3.70	84	210	330	1,100	39	75	100	890	85	210	390	1,100
Falcon Hwy.	JWT260	3.84	86	220	340	1,100	47	92	130	910	86	210	390	1,100
Garrett Rd.	JWT320	6.46	110	290	430	1,500	120	250	370	1,300	160	410	630	1,700
East Blaney Rd.	JWT354	10.30	110	310	470	1,700	190	400	590	1,900	230	560	870	2,500
Upstream of Bennett Ranch Tributary[1]	JWT374_Outlet	10.58	110	310	470	1,700	190	400	600	1,900	230	560	860	2,500
Middle Tributary														
Woodmen Hills Dr.	JMT010	0.29	1	7	13	57	1	11	25	160	1	11	25	160
Woodmen Rd.	JMT070	1.36	24	67	110	350	61	180	280	760	150	350	490	1,200
Hwy. 24	JMT106	1.52	24	68	110	360	45	120	260	800	92	320	490	1,200
Falcon Hwy.	JMT110	1.64	22	63	120	360	46	120	260	820	94	320	500	1,200
Confluence with West Tributary	RMT114	1.64	22	63	110	360	46	120	260	820	94	320	500	1,200
East Tributary														
Stapleton Dr.	JET020	0.36	20	45	67	200	44	85	120	280	74	130	170	390
Woodmen Hills Dr.	JET040	0.71	19	48	74	240	23	59	110	480	27	85	140	570
Eastonville Rd.	JET060	1.11	19	48	77	260	13	28	45	340	13	32	68	430
Hwy. 24	JET090	1.78	17	47	75	260	15	39	64	370	26	47	81	390
Pinto Pony Rd.	JET100	1.83	17	47	75	260	15	40	65	380	27	49	83	390
Falcon Hwy.	JET120	2.16	17	47	77	270	17	48	84	430	49	110	160	450
Garrett Rd.	JET160	2.93	18	48	81	300	32	96	150	620	66	150	230	710
Confluence with West Tributary	RET164	2.93	18	48	81	300	32	96	150	620	66	150	230	710

Notes:
[1] Falcon Watershed Outlet
[2] Reference Figure 3-12 and Figure 3-13
[3] Existing results are less than historic results in some cases because of the diversion berm in the northwestern portion of the watershed. The diversion berm exists for existing conditions but is assumed to not exist for historic and future conditions.

Falcon DBPS

Subbasin Properties

Subbasin ID	Area (mi^2)[2]	Existing % Impervious[3]	Curve Number[3]			Lag Time (min)		
			Historical	Existing	Future	Historical[4]	Existing[2]	Future[5]
ET010	0.15	21.72%	61	69	72	33.64	25.23	18.92
ET020	0.21	19.07%	61	68	73	23.15	17.37	13.02
ET030	0.20	27.31%	41	71	72	42.61	31.96	23.97
ET040	0.15	20.35%	42	69	69	29.71	22.28	22.28
ET050	0.12	19.07%	39	68	68	10.36	7.77	7.77
ET060	0.29	21.94%	39	69	69	7.38	5.54	5.54
ET070	0.25	26.60%	39	71	71	10.51	7.88	7.88
ET080	0.29	37.81%	39	75	76	25.98	19.49	14.61
ET090	0.12	12.34%	39	61	74	54.90	41.18	30.88
ET100	0.05	3.12%	39	48	63	10.67	8.00	6.00
ET110[1]	0.23	1.49%	39	54	61	25.68	25.68	19.26
ET120	0.11	6.79%	39	60	61	38.28	28.71	21.53
ET130	0.13	6.57%	39	61	63	61.63	46.22	34.67
ET140	0.27	3.21%	39	61	63	92.13	69.09	51.82
ET150[1]	0.18	1.79%	39	62	62	25.39	25.39	25.39
ET160	0.19	3.36%	42	64	64	41.04	30.78	30.78
FS010	0.12	1.16%	44	49	56	41.23	30.92	23.19
MT010	0.29	6.99%	45	64	64	42.16	31.62	31.62
MT020[1]	0.09	1.48%	57	62	68	12.94	12.94	9.71
MT030	0.16	13.35%	54	66	67	19.92	14.94	11.21
MT040	0.31	7.07%	55	64	75	35.44	26.58	19.93
MT050	0.12	16.00%	39	67	67	34.84	26.13	26.13
MT060[1]	0.19	1.83%	39	55	66	27.90	27.90	20.93
MT070	0.20	5.68%	42	59	67	54.09	40.57	30.42
MT080	0.06	63.24%	48	86	87	6.91	5.18	3.88
MT090	0.04	60.08%	39	83	85	4.92	3.69	2.77
MT100	0.06	13.21%	39	67	70	21.19	15.89	11.92
MT110	0.12	18.56%	39	68	68	32.51	24.38	24.38
WT010[1]	0.14	2.31%	56	58	58	24.38	24.38	24.38
WT020[1]	0.07	2.39%	56	59	59	27.95	27.95	27.95
WT030	0.08	3.57%	57	59	59	17.99	13.49	13.49
WT040[1]	0.19	2.72%	56	58	58	34.99	34.99	34.99
WT050[1]	0.19	1.60%	60	62	62	26.99	26.99	26.99
WT060	0.20	2.35%	59	61	61	44.53	33.40	33.40
WT070[1]	0.17	1.31%	56	58	58	18.77	18.77	18.77
WT080[1]	0.07	1.95%	60	62	62	17.52	17.52	17.52
WT090[1]	0.15	0.66%	61	62	63	21.52	21.52	16.14
WT100[1]	0.19	1.28%	61	62	69	13.65	13.65	10.24
WT110[1]	0.19	2.04%	60	61	63	29.57	29.57	22.18
WT120[1]	0.05	2.96%	43	54	63	19.24	19.24	14.43

Falcon DBPS
Curve Numbers

Historical Curve Numbers

Land Use	Hydrologic Soil Group			
	A	B	C	D
Rangeland Good Condition	39	61	74	80
Woods Good Condition	30	55	70	77
Water	98	98	98	98

Notes:

1 Rangeland Good Condition values from Aerawide Urban Runoff Conrol Manual, Pg. 26-27

2 Other values from TR55, Table 2-2

Existing Curve Numbers

Land Use	Hydrologic Soil Group			
	A[1]	B	C	D
Rangeland Good Condition	39	61	74	80
Woods Good Condition	30	55	70	77
Open Space Good Condition	39	61	74	80
Gravel Roads	76	85	89	91
Water	98	98	98	98
Impervious Area	98	98	98	98

Notes:

[1] All HSG Type A soils that have been graded shall be considered HSG Type B soils

2 Rangeland Good Condition values from Aerawide Urban Runoff Conrol Manual, Pg. 26-27

3 Other values from TR55, Table 2-2

Future Curve Numbers

Land Use	Average CN
0.50 Acre Residential	71
2.5 Acre Rural Residentail	64
5 Acre Rural Residentail - Woods	58
5 Acre Rural Residential - Rangeland	62
Community Commercial/Service Commercial	81
Light Industrial	96
Single Family Urban	79

Notes:

1 Values represent the average CN values that were developed for Existing Conditions for each corresponding land use

Falcon DBPS

Ia Adjustment

Subbasin ID	Historical CN	Ia (in)	Existing CN	Ia (in)	Future CN	Ia (in)
ET010	61	0.64	69	0.45	72	0.39
ET020	61	0.64	68	0.47	73	0.37
ET030	41	1.44	71	0.41	72	0.39
ET040	42	1.38	69	0.45	69	0.45
ET050	39	1.56	68	0.47	68	0.47
ET060	39	1.56	69	0.45	69	0.45
ET070	39	1.56	71	0.41	71	0.41
ET080	39	1.56	75	0.33	76	0.32
ET090	39	1.56	61	0.64	74	0.35
ET100	39	1.56	48	1.08	63	0.59
ET110	39	1.56	54	0.85	61	0.64
ET120	39	1.56	60	0.67	61	0.64
ET130	39	1.56	61	0.64	63	0.59
ET140	39	1.56	61	0.64	63	0.59
ET150	39	1.56	62	0.61	62	0.61
ET160	42	1.38	64	0.56	64	0.56
FS010	44	1.27	49	1.04	56	0.79
MT010	45	1.22	64	0.56	64	0.56
MT020	57	0.75	62	0.61	68	0.47
MT030	54	0.85	66	0.52	67	0.49
MT040	55	0.82	64	0.56	75	0.33
MT050	39	1.56	67	0.49	67	0.49
MT060	39	1.56	55	0.82	66	0.52
MT070	42	1.38	59	0.69	67	0.49
MT080	48	1.08	86	0.16	87	0.15
MT090	39	1.56	83	0.20	85	0.18
MT100	39	1.56	67	0.49	70	0.43
MT110	39	1.56	68	0.47	68	0.47
WT010	56	0.79	58	0.72	58	0.72
WT020	56	0.79	59	0.69	59	0.69
WT030	57	0.75	59	0.69	59	0.69
WT040	56	0.79	58	0.72	58	0.72
WT050	60	0.67	62	0.61	62	0.61
WT060	59	0.69	61	0.64	61	0.64
WT070	56	0.79	58	0.72	58	0.72
WT080	60	0.67	62	0.61	62	0.61
WT090	61	0.64	62	0.61	63	0.59
WT100	61	0.64	62	0.61	69	0.45
WT110	60	0.67	61	0.64	63	0.59
WT120	43	1.33	54	0.85	63	0.59
WT130	60	0.67	72	0.39	72	0.39
WT140	61	0.64	62	0.61	70	0.43
WT150	61	0.64	65	0.54	74	0.35

Falcon DBPS

Existing Time of Concentration Calculations

Worksheet for computation of time of travel according to TR-55 methodology

Blue - GIS defined, Green - user specified, White and yellow - calculated, Red - final result

Watershed Name	WT060	WT050	WT080	WT090	WT110	WT100	ET070	WT150	WT140	MT010	ET060	WT170
Watershed ID	**177**	**66**	**342**	**69**	**70**	**71**	**83**	**332**	**146**	**151**	**210**	**282**
Sheet Flow Characteristics												
Manning's Roughness Coefficient	0.4	0.15	0.15	0.15	0.4	0.011	0.011	0.011	0.15	0.15	0.011	0.15
Flow Length (ft)	100	297	152	131	125	47.4265	100	100	252.4879	220.7734	44.6252	120.7109
Two-Year 24-hour Rainfall (in)	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
Land Slope (ft/ft)	0.0776	0.0316	0.0712	0.0669	0.0937	0.0401	0.0437	0.0174	0.0715	0.0874	0.1261	0.0224
Sheet Flow Tt (hr)	0.26	0.40	0.17	0.15	0.29	0.01	0.02	0.03	0.25	0.21	0.01	0.22
Shallow Concentrated Flow Characteristics												
Surface Description (1 - unpaved, 2 - paved)	1	1	1	1	1	1	1	1	1	1	1	1
Flow Length (ft)	629	630	921	4216	2838	625.1232	564.9179	0	340.5642	3491.1034	278.3003	723.4077
Watercourse Slope (ft/ft)	0.0429	0.0401	0.0474	0.0339	0.034	0.0471	0.0115	0	0.0301	0.0267	0.0446	0.0168
Average Velocity - computed (ft/s)	3.34	3.23	3.51	2.97	2.98	3.50	1.73	0.00	2.80	2.64	3.41	2.09
Shallow Concentrated Flow Tt (hr)	0.05	0.05	0.07	0.39	0.26	0.05	0.09	0.00	0.03	0.37	0.02	0.10
Channel Flow Characterisitics												
Cross-sectional Flow Area (ft2)	3.82	102.48	26.55	41.73	5.37	112.64	9.62	9	3.47	60.78	15.9	76.89
Wetted Perimeter (ft)	12.23	70.06	41.28	84.92	11.19	110.27	11	14.04	12.11	77.26	14.14	58.7
Hydraulic Radius - computed (ft)	0.31	1.46	0.64	0.49	0.48	1.02	0.87	0.64	0.29	0.79	1.12	1.31
Channel Slope (ft/ft)	0.0344	0.024	0.0247	0.012	0.0219	0.021	0.013	0.0036	0.0255	0.0226	0.0132	0.0184
Manning's Roughness Coefficient	0.06	0.05	0.05	0.03	0.05	0.05	0.013	0.05	0.05	0.05	0.013	0.05
Average Velocity - computed (ft/s)	2.12	5.95	3.49	3.39	2.70	4.38	11.95	1.33	2.07	3.82	14.24	4.84
Flow Length (ft)	4722	6298	3073	604	2635	5032.4692	4731.5554	5328.7401	2294.7909	4121.0832	6400.2723	3430.8373
Channel Flow Tt (hr)	0.62	0.29	0.24	0.05	0.27	0.32	0.11	1.11	0.31	0.30	0.12	0.20
Watershed Time of travel (hr)	**0.93**	**0.75**	**0.49**	**0.60**	**0.82**	**0.38**	**0.22**	**1.14**	**0.60**	**0.88**	**0.15**	**0.52**
Watershed Lag Time (min)	**33.40**	**26.99**	**17.52**	**21.52**	**29.57**	**13.65**	**7.88**	**41.04**	**21.46**	**31.62**	**5.54**	**18.61**

Number of watersheds	64
MXD Path	Falcon_DBPS.mxd
Stored workbook	
$AVHOME directory	
Name of the table to store the results of the calculation	Subbasin1
Workspace path	C:\GeoHMS\Falcon_DBPS\Falcon_DBPS.mdb

Notes:

[1] Sheet Flow Manning's n values from Table 3-1 in TR55

[2] For LFP's with no Shallow Concentrated Flow length, slopes were manually changed from NaN (default) to 0 and Shallow Concentrated Flow Tc was changed to 0 so Watershed Time of Travel could be computed.

[3] Channel Flow Manning's n values were selected from multiple sources and are documented in the Manning's n Value Selection Quality Assurance packet

[4] Watershed Lag Time = 0.6*Watershed Time of Travel

Falcon DBPS

Existing Time of Concentration Calculations

Worksheet for computation of time of travel according to TR-55 methodology

Blue - GIS defined, Green - user specified, White and yellow - calculated, Red - final result

Watershed Name	WT120	ET030	WT160	ET150	MT100	MT090	MT080	MT030	MT060	ET080	MT070	MT110	WT310	WT300
Watershed ID	**284**	**303**	**298**	**551**	**612**	**608**	**613**	**633**	**643**	**94**	**157**	**167**	**171**	**173**
Sheet Flow Characteristics														
Manning's Roughness Coefficient	0.15	0.011	0.011	0.15	0.15	0.011	0.011	0.15	0.011	0.24	0.15	0.011	0.011	0.15
Flow Length (ft)	191.3389	20.537	26.2133	100	142.9726	100	119.91	88.6543	43.2844	141.055	145.5913	54.54	37.3701	292.2798
Two-Year 24-hour Rainfall (in)	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
Land Slope (ft/ft)	0.057	0.0182	0.0352	0.0443	0.0452	0.0054	0.0008	0.0979	0.0326	0.0316	0.0154	0.067	0.0459	0.0418
Sheet Flow Tt (hr)	0.22	0.01	0.01	0.15	0.19	0.04	0.10	0.10	0.01	0.32	0.30	0.01	0.01	0.35
Shallow Concentrated Flow Characteristics														
Surface Description (1 - unpaved, 2 - paved)	1	1	2	1	1	2	2	1	1	1	1	1	1	1
Flow Length (ft)	515.1666	710.4925	0	2978.6929	0	259.7955	0	1309.2521	6116.429	844.1173	6399.686	3391.19	1766.78	883.1998
Watercourse Slope (ft/ft)	0.021	0.0337	0	0.0221	0	0.0253	0	0.032	0.0194	0.0183	0.0204	0.012	0.0273	0.0351
Average Velocity - computed (ft/s)	2.34	2.96	0.00	2.40	0.00	3.23	0.00	2.89	2.25	2.18	2.30	1.77	2.67	3.02
Shallow Concentrated Flow Tt (hr)	0.06	0.07	0.00	0.34	0.00	0.02	0.00	0.13	0.76	0.11	0.77	0.53	0.18	0.08
Channel Flow Characterisitics														
Cross-sectional Flow Area (ft2)	39.43	20.5	4.39	18.39	6.31	25.13	64	19.13	19.69	15.9	4.9	19.9	6.02	3.64
Wetted Perimeter (ft)	101.84	42.22	23.26	32.36	22.61	25.13	32	49.99	35.22	14.14	26.77	39.66	24.31	13.97
Hydraulic Radius - computed (ft)	0.39	0.49	0.19	0.57	0.28	1.00	2.00	0.38	0.56	1.12	0.18	0.50	0.25	0.26
Channel Slope (ft/ft)	0.0154	0.0093	0.0249	0.0094	0.0105	0.0093	0.014	0.0207	0.0355	0.0124	0.012	0.013	0.015	0.0239
Manning's Roughness Coefficient	0.03	0.07	0.013	0.05	0.03	0.013	0.013	0.03	0.06	0.013	0.03	0.07	0.06	0.03
Average Velocity - computed (ft/s)	3.27	1.27	5.95	1.98	2.17	11.05	21.53	3.77	3.18	13.80	1.75	1.53	1.20	3.13
Flow Length (ft)	2950.9478	3715.1193	4363.7964	1523.8687	1939.0988	1519.2867	3055.11	2604.7205	97.6779	5559.793	335.5838	744.17	2422.127	1259.995
Channel Flow Tt (hr)	0.25	0.81	0.20	0.21	0.25	0.04	0.04	0.19	0.01	0.11	0.05	0.13	0.56	0.11
Watershed Time of travel (hr)	**0.53**	**0.89**	**0.21**	**0.71**	**0.44**	**0.10**	**0.14**	**0.42**	**0.78**	**0.54**	**1.13**	**0.68**	**0.75**	**0.55**
Watershed Lag Time (min)	**19.24**	**31.96**	**7.58**	**25.39**	**15.89**	**3.69**	**5.18**	**14.94**	**27.90**	**19.49**	**40.56**	**24.38**	**27.12**	**19.69**

Number of watersheds
MXD Path
Stored workbook
$AVHOME directory
Name of the table to store the results of the calculation
Workspace path

Falcon DBPS

Existing Time of Concentration Calculations

Worksheet for computation of time of travel according to TR-55 methodology

Blue - GIS defined, Green - user specified, White and yellow - calculated, Red - final result

Watershed Name	WT010	WT280	ET140	ET130	WT230	WT040	MT020	MT050	WT240	WT250	ET110	ET100	WT220	WT370	WT350	WT340	WT330
Watershed ID	**183**	**247**	**351**	**353**	**407**	**588**	**635**	**649**	**663**	**667**	**681**	**682**	**267**	**114**	**214**	**116**	**123**
Sheet Flow Characteristics																	
Manning's Roughness Coefficient	0.4	0.15	0.15	0.15	0.24	0.4	0.15	0.24	0.011	0.011	0.15	0.011	0.011	0.15	0.15	0.15	0.15
Flow Length (ft)	146.5688	68.6391	118.6398	119.4977	45.0001	128.3412	16.2369	167.7821	54	110.7786	296.0756	48.2844	56.2392	148.5814	199.706	296.2138	298.7012
Two-Year 24-hour Rainfall (in)	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
Land Slope (ft/ft)	0.0766	0.0321	0.0214	0.0243	0.1104	0.0443	0.0215	0.0209	0.037	0.0125	0.0362	0.1191	0.019	0.0363	0.024	0.0345	0.05
Sheet Flow Tt (hr)	0.35	0.12	0.22	0.22	0.08	0.39	0.05	0.44	0.01	0.03	0.38	0.01	0.02	0.22	0.33	0.39	0.34
Shallow Concentrated Flow Characteristics																	
Surface Description (1 - unpaved, 2 - paved)	1	1	1	1	2	1	1	2	2	2	1	1	1	1	1	1	1
Flow Length (ft)	742.1945	1860.327	1172.282	828.555	181.5689	984.9924	3260.587	275.2087	0	0	2365.505	762.0473	5060.256	0	3420.637	4497.88	5188.524
Watercourse Slope (ft/ft)	0.04	0.0259	0.0172	0.0128	0.0228	0.0516	0.032	0.0239	0	0	0.0271	0.0225	0.021	0	0.0467	0.0237	0.0225
Average Velocity - computed (ft/s)	3.23	2.60	2.12	1.83	3.07	3.67	2.89	3.14	0.00	0.00	2.66	2.42	2.34	0.00	3.49	2.48	2.42
Shallow Concentrated Flow Tt (hr)	0.06	0.20	0.15	0.13	0.02	0.07	0.31	0.02	0.00	0.00	0.25	0.09	0.60	0.00	0.27	0.50	0.60
Channel Flow Characterisitics																	
Cross-sectional Flow Area (ft2)	3.99	2.43	25.47	21.02	4.39	8.4	20.97	2.91	4.39	4.39	39.65	4.58	6.73	30.81	59.79	6.55	12.59
Wetted Perimeter (ft)	15.4	9.26	84.23	169.15	23.26	26.23	40.88	6.68	23.26	23.26	105.42	8.91	12.27	26.96	38.47	17.42	25.95
Hydraulic Radius - computed (ft)	0.26	0.26	0.30	0.12	0.19	0.32	0.51	0.44	0.19	0.19	0.38	0.51	0.55	1.14	1.55	0.38	0.49
Channel Slope (ft/ft)	0.0324	0.0179	0.0113	0.0144	0.009	0.026	0	0.0173	0.0175	0.0112	0.0114	0.0119	0.0108	0.0119	0.0088	0.0209	0.0119
Manning's Roughness Coefficient	0.06	0.03	0.06	0.05	0.013	0.05	0.05	0.03	0.013	0.013	0.03	0.03	0.03	0.05	0.05	0.03	0.05
Average Velocity - computed (ft/s)	1.82	2.72	1.19	0.89	3.58	2.25	0.00	3.75	4.99	3.99	2.76	3.48	3.46	3.55	3.75	3.74	2.01
Flow Length (ft)	1719.181	2209.347	6595.197	3022.555	4460.603	4086.883	0	3582.906	4002.366	3560.407	866.4156	1602.548	1573.016	6132.815	3083.294	4257.557	508.9379
Channel Flow Tt (hr)	0.26	0.23	1.54	0.94	0.35	0.50	0.00	0.27	0.22	0.25	0.09	0.13	0.13	0.48	0.23	0.32	0.07
Watershed Time of travel (hr)	**0.68**	**0.55**	**1.92**	**1.28**	**0.44**	**0.97**	**0.36**	**0.73**	**0.23**	**0.28**	**0.71**	**0.22**	**0.74**	**0.70**	**0.83**	**1.21**	**1.00**
Watershed Lag Time (min)	**24.38**	**19.72**	**69.09**	**46.22**	**15.88**	**34.99**	**12.94**	**26.13**	**8.45**	**10.10**	**25.68**	**8.00**	**26.77**	**25.11**	**29.76**	**43.40**	**36.05**

Number of watersheds	
MXD Path	
Stored workbook	
$AVHOME directory	
Name of the table to store the results of the calculation	
Workspace path	

Falcon DBPS

Existing Time of Concentration Calculations

Worksheet for computation of time of travel according to TR-55 methodology

Blue - GIS defined, Green - user specified, White and yellow - calculated, Red - final result

Watershed Name	WT030	WT020	WT210	ET160	WT360	WT260	WT290	WT270	ET120	ET090	WT180	MT040	WT200	WT190	WT130	WT320	ET010
Watershed ID	**187**	**189**	**199**	**221**	**227**	**256**	**238**	**242**	**252**	**262**	**848**	**272**	**276**	**278**	**288**	**308**	**318**
Sheet Flow Characteristics																	
Manning's Roughness Coefficient	0.15	0.4	0.15	0.15	0.011	0.15	0.011	0.011	0.011	0.24	0.25	0.15	0.15	0.011	0.15	0.15	0.15
Flow Length (ft)	141.2626	266.2251	285.0006	80.005	87.4266	100	100	40.3554	61.2133	138.9952	296	75.2183	183.5462	100	88.7973	261.2747	78
Two-Year 24-hour Rainfall (in)	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
Land Slope (ft/ft)	0.103	0.1066	0.0231	0.0189	0.0402	0.0508	0.0513	0.0274	0.0332	0.0589	0.027	0.0608	0.0297	0.0174	0.0421	0.0858	0.0256
Sheet Flow Tt (hr)	0.14	0.50	0.44	0.17	0.02	0.14	0.02	0.01	0.01	0.25	0.64	0.10	0.28	0.03	0.14	0.24	0.15
Shallow Concentrated Flow Characteristics																	
Surface Description (1 - unpaved, 2 - paved)	1	1	1	1	1	1	1	1	1	1	2	1	1	1	2	1	1
Flow Length (ft)	432.1399	295.3505	4198.315	3912.236	2241.548	1133.028	267.4881	0	5817.561	0	4489.17	3144.352	9180.05	0	0	2919.894	528
Watercourse Slope (ft/ft)	0.0424	0.0619	0.0198	0.0146	0.0171	0.0154	0.0196	0	0.0164	0	0.024	0.03	0.0209	0	0	0.0372	0.0303
Average Velocity - computed (ft/s)	3.32	4.01	2.27	1.95	2.11	2.00	2.26	0.00	2.07	0.00	3.15	2.79	2.33	0.00	0.00	3.11	2.81
Shallow Concentrated Flow Tt (hr)	0.04	0.02	0.51	0.56	0.30	0.16	0.03	0.00	0.78	0.00	0.40	0.31	1.09	0.00	0.00	0.26	0.05
Channel Flow Characterisitics																	
Cross-sectional Flow Area (ft2)	6.12	8.51	39.77	22.37	10.27	0.82	41.59	9.66	25.13	9.72	163.44	4.32	25.69	3.88	4.39	28.9	15.97
Wetted Perimeter (ft)	11.83	29.87	160.6	24.5	37.46	3.97	114.48	33.28	25.13	31.92	140.79	7.39	57.74	14.09	23.26	26.6	31.94
Hydraulic Radius - computed (ft)	0.52	0.28	0.25	0.91	0.27	0.21	0.36	0.29	1.00	0.30	1.16	0.58	0.44	0.28	0.19	1.09	0.50
Channel Slope (ft/ft)	0.0224	0.0271	0.0145	0.0093	0.0083	0.0082	0.0107	0.0147	0.005	0.0096	0.0135	0.0172	0.0316	0.0232	0.0249	0.0101	0.0217
Manning's Roughness Coefficient	0.05	0.06	0.06	0.03	0.05	0.06	0.05	0.03	0.013	0.03	0.05	0.03	0.05	0.03	0.013	0.05	0.05
Average Velocity - computed (ft/s)	2.87	1.77	1.18	4.51	1.15	0.79	1.57	2.64	8.10	2.20	3.82	4.55	3.09	3.20	5.95	3.17	2.77
Flow Length (ft)	2076.623	1662.612	2770.435	2028.925	1285.17	2358.52	2236.363	3268.233	47.5001	7102.49	443	5292.631	316	3336.891	3894.055	2166.302	4966.49
Channel Flow Tt (hr)	0.20	0.26	0.65	0.13	0.31	0.83	0.40	0.34	0.00	0.90	0.03	0.32	0.03	0.29	0.18	0.19	0.50
Watershed Time of travel (hr)	**0.37**	**0.78**	**1.61**	**0.85**	**0.62**	**1.13**	**0.45**	**0.35**	**0.80**	**1.14**	**1.07**	**0.74**	**1.40**	**0.32**	**0.32**	**0.69**	**0.70**
Watershed Lag Time (min)	**13.49**	**27.95**	**57.82**	**30.78**	**22.45**	**40.67**	**16.05**	**12.76**	**28.71**	**41.18**	**38.49**	**26.58**	**50.45**	**11.37**	**11.44**	**24.97**	**25.23**

Number of watersheds
MXD Path
Stored workbook
$AVHOME directory
Name of the table to store the results of the calculation
Workspace path

Falcon DBPS

Existing Time of Concentration Calculations

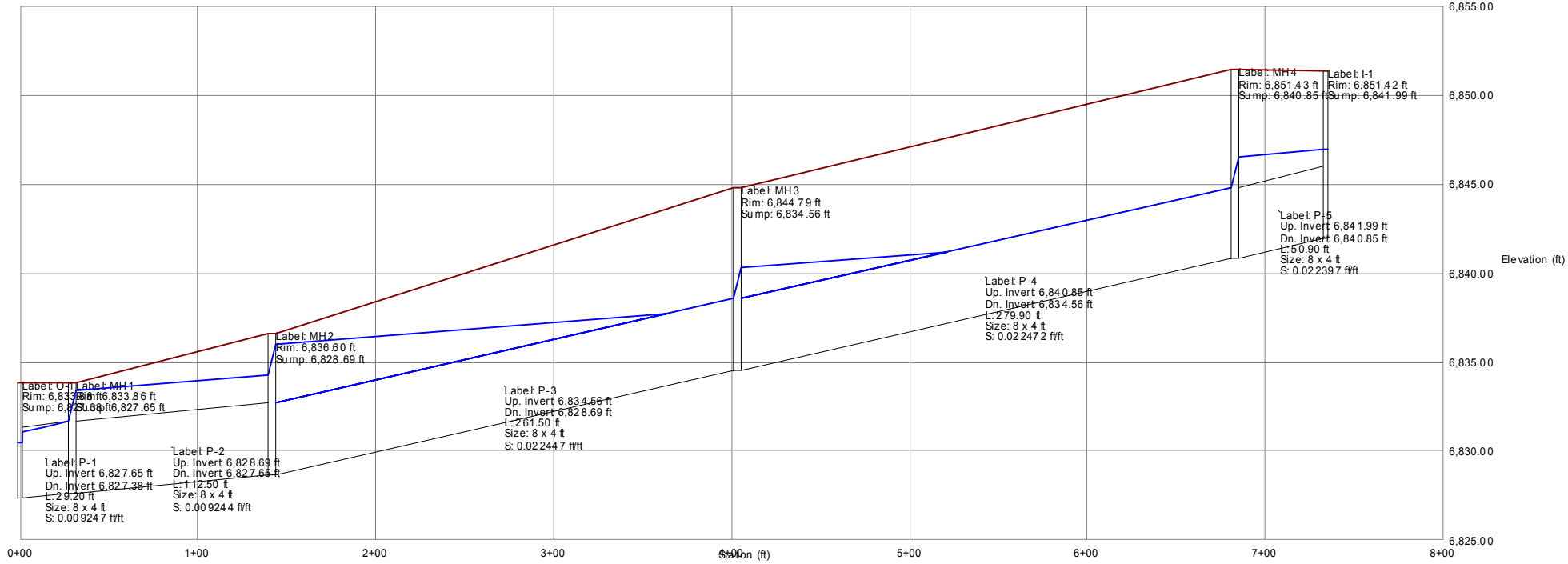
Worksheet for computation of time of travel according to TR-55 methodology

Blue - GIS defined, Green - user specified, White and yellow - calculated, Red - final result

Watershed Name	ET020	WT070	ET050	ET040	FS010
Watershed ID	**328**	**343**	**467**	**468**	**5**
Sheet Flow Characteristics					
Manning's Roughness Coefficient	0.15	0.4	0.011	0.011	0.011
Flow Length (ft)	43.6613	45.0001	47.0712	301.3711	29
Two-Year 24-hour Rainfall (in)	2.1	2.1	2.1	2.1	2.1
Land Slope (ft/ft)	0.1105	0.0566	0.0263	0.052	0.0552
Sheet Flow Tt (hr)	0.05	0.15	0.01	0.04	0.01
Shallow Concentrated Flow Characteristics					
Surface Description (1 - unpaved, 2 - paved)	2	1	1	1	1
Flow Length (ft)	0	861.3369	1478.833	0	0
Watercourse Slope (ft/ft)	0	0.0441	0.0202	0	0
Average Velocity - computed (ft/s)	0.00	3.39	2.29	0.00	0.00
Shallow Concentrated Flow Tt (hr)	0.00	0.07	0.18	0.00	0.00
Channel Flow Characterisitics					
Cross-sectional Flow Area (ft2)	3.55	13.56	12.57	2.07	10
Wetted Perimeter (ft)	9.58	20.48	12.57	6.76	40.01
Hydraulic Radius - computed (ft)	0.37	0.66	1.00	0.31	0.25
Channel Slope (ft/ft)	0.0211	0.0236	0.0125	0.0171	0.0208
Manning's Roughness Coefficient	0.03	0.05	0.013	0.03	0.06
Average Velocity - computed (ft/s)	3.72	3.48	12.81	2.95	1.42
Flow Length (ft)	5760.795	3717.648	1130.583	6137.448	4362
Channel Flow Tt (hr)	0.43	0.30	0.02	0.58	0.85
Watershed Time of travel (hr)	**0.48**	**0.52**	**0.22**	**0.62**	**0.86**
Watershed Lag Time (min)	**17.37**	**18.77**	**7.77**	**22.28**	**30.92**

Number of watersheds	1
MXD Path	Falcon_DBPS.mxd
Stored workbook	
$AVHOME directory	
Name of the table to store the results of the calculation	Subbasin3
Workspace path	C:\GeoHMS\Falcon_DBPS_South\Falcon_DBPS_South.mdb

Profile
Scenario: Base



```
================================================================
Scenario: Base


>>>> Info: Subsurface Analysis iterations: 1
>>>> Info: Convergence was achieved.


================================================================
Gravity subnetwork discharging at: O-1
----------------------------------------------------------------
>>>> Info: Loading and hydraulic computations completed
     successfully.
>>>> Warning: P-1 Pipe fails minimum cover constraint.
>>>> Warning: P-2 Pipe fails minimum cover constraint.
>>>> Info: P-3 Hydraulic jump formed.
>>>> Info: P-3 Critical depth assumed upstream.
>>>> Info: P-4 Hydraulic jump formed.
>>>> Info: P-4 Critical depth assumed upstream.
```

CALCULATION SUMMARY FOR SURFACE NETWORKS

Label	Inlet Type	Inlet	Total Intercepted Flow (cfs)	Total Bypassed Flow (cfs)	Capture Efficiency (%)	Gutter Spread (ft)	Gutter Depth (ft)
I-1	Generic Inlet	Generic Default 100%	0.00	0.00	100.0	0.00	0.00

CALCULATION SUMMARY FOR SUBSURFACE NETWORK WITH ROOT: O-1

Label	Number of Sections	Section Size	Section Shape	Length (ft)	Total System Flow (cfs)	Average Velocity (ft/s)	Hydraulic Grade Upstream (ft)	Hydraulic Grade Downstream (ft)
P-1	1	8 x 4 ft	Box	29.20	390.00	12.71	6,831.65	6,831.07
P-2	1	8 x 4 ft	Box	112.50	390.00	12.19	6,834.25	6,833.38
P-3	1	8 x 4 ft	Box	261.50	390.00	12.19	6,838.56	6,835.98
P-4	1	8 x 4 ft	Box	279.90	390.00	12.19	6,844.85	6,840.29
P-5	1	8 x 4 ft	Box	50.90	390.00	12.19	6,846.98	6,846.58

Label	Total System Flow (cfs)	Ground Elevation (ft)	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)
O-1	390.00	6,833.88	6,830.45	6,830.45
MH1	390.00	6,833.86	6,833.38	6,831.65
MH2	390.00	6,836.60	6,835.98	6,834.25
MH3	390.00	6,844.79	6,840.29	6,838.56
MH4	390.00	6,851.43	6,846.58	6,844.85
I-1	390.00	6,851.42	6,846.98	6,846.98

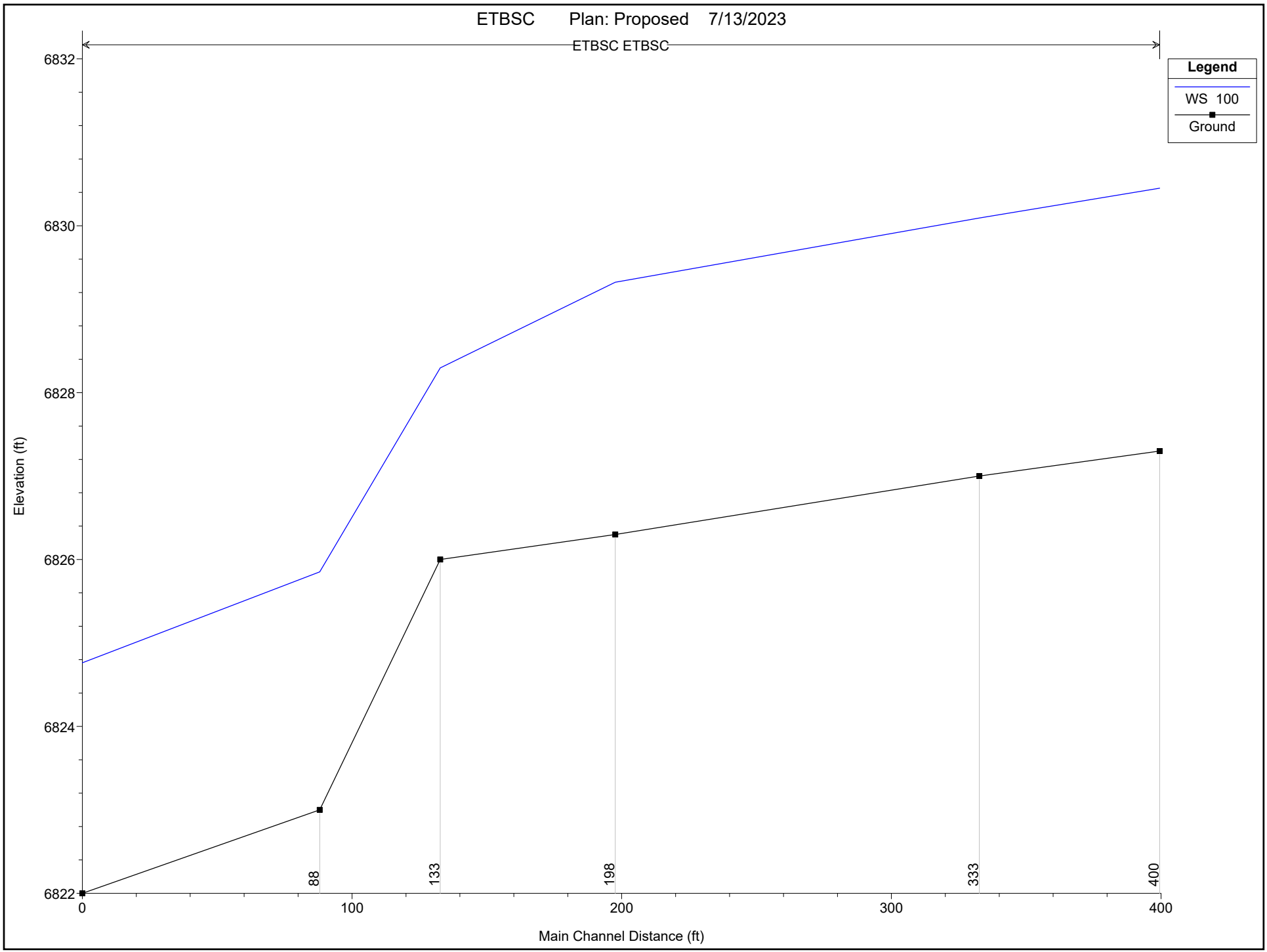
Per DCM Ch8 HGL lines shall in no case be closer than 1 ft to the ground

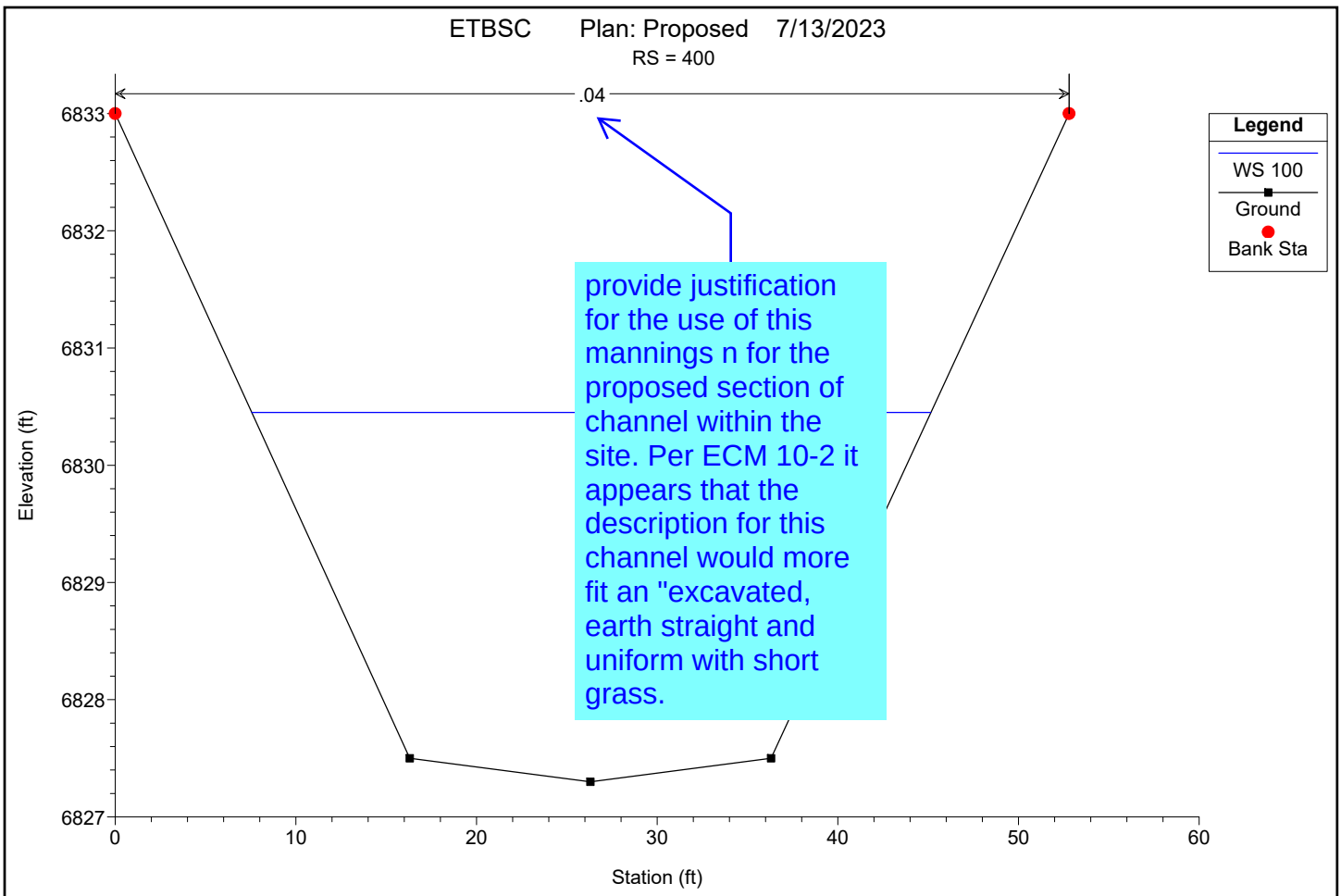
```
================================================================
Completed: 08/06/2023 04:42:59 PM
```

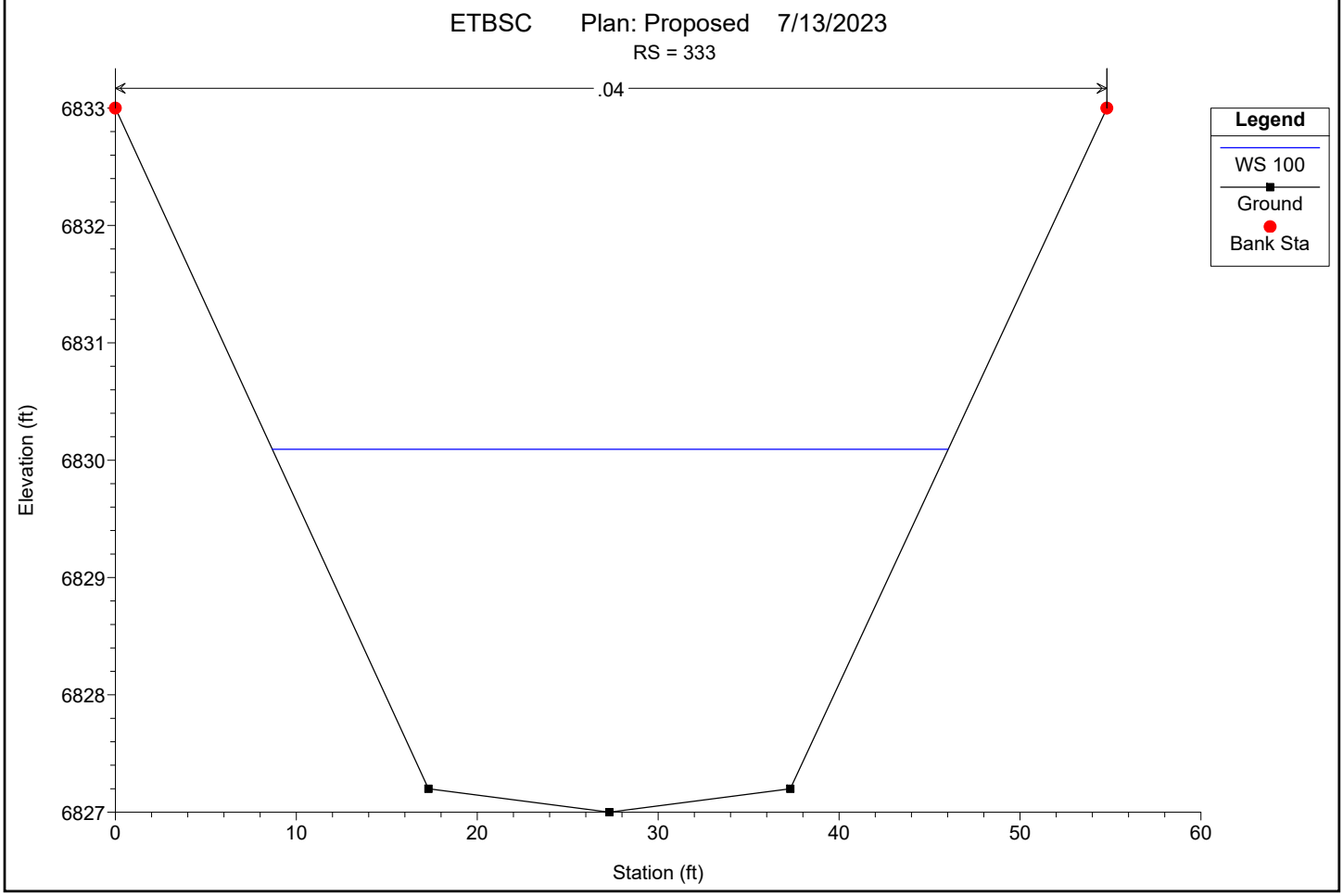
HEC-RAS Plan: Proposed River: ETBSC Reach: ETBSC Profile: 100

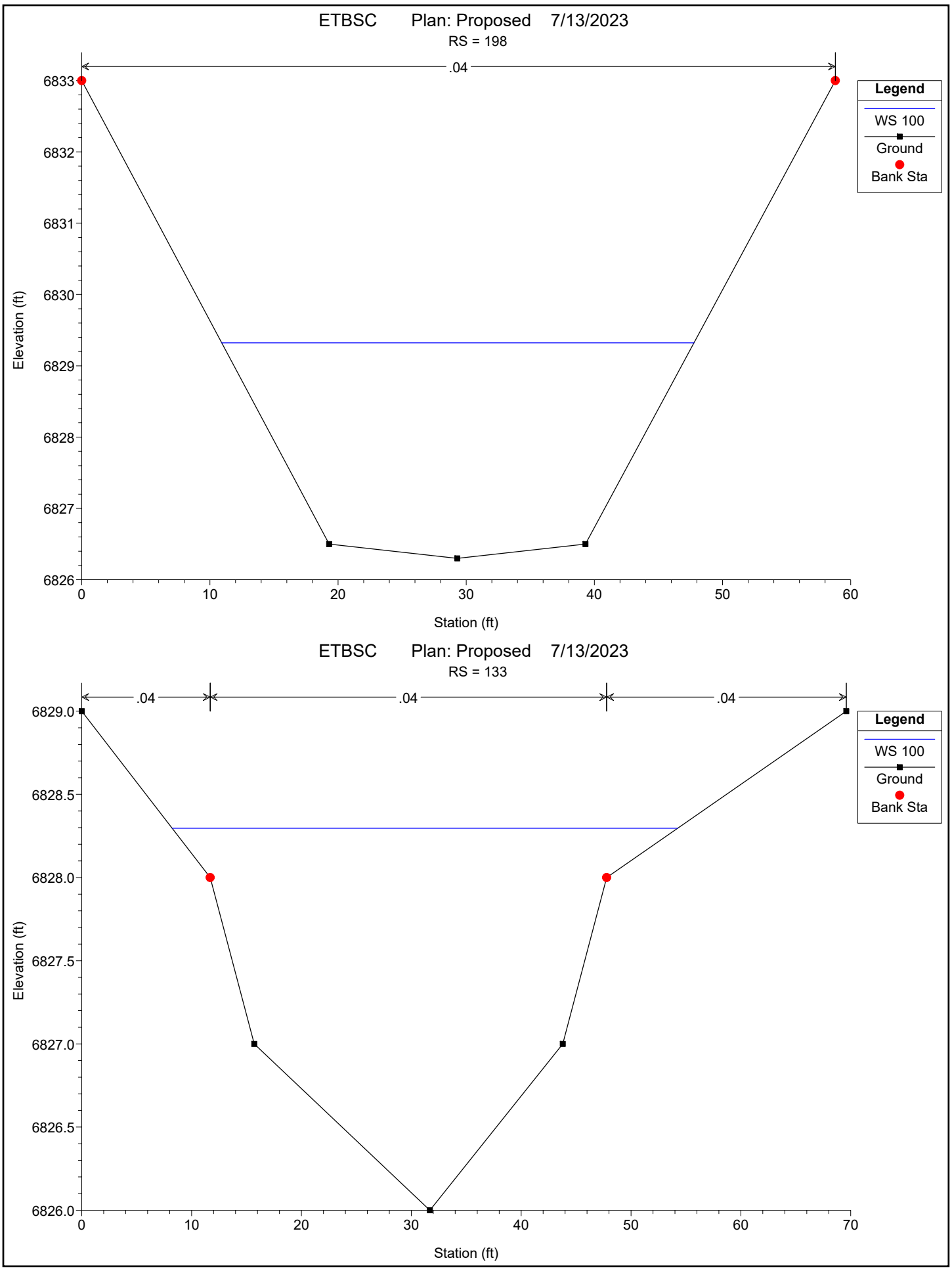
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
ETBSC	400	100	390.00	6827.30	6830.45		6830.76	0.004929	4.48	86.96	37.59	0.52
ETBSC	333	100	390.00	6827.00	6830.09		6830.42	0.005282	4.59	84.94	37.35	0.54
ETBSC	198	100	390.00	6826.30	6829.32		6829.67	0.005776	4.74	82.24	36.85	0.56
ETBSC	133	100	390.00	6826.00	6828.30	6828.30	6829.02	0.018645	6.83	58.30	46.02	0.96
ETBSC	88	100	390.00	6823.00	6825.85		6826.06	0.017841	3.66	106.47	58.94	0.48
ETBSC	0	100	390.00	6822.00	6824.76	6823.69	6824.88	0.010018	2.77	140.56	76.70	0.36

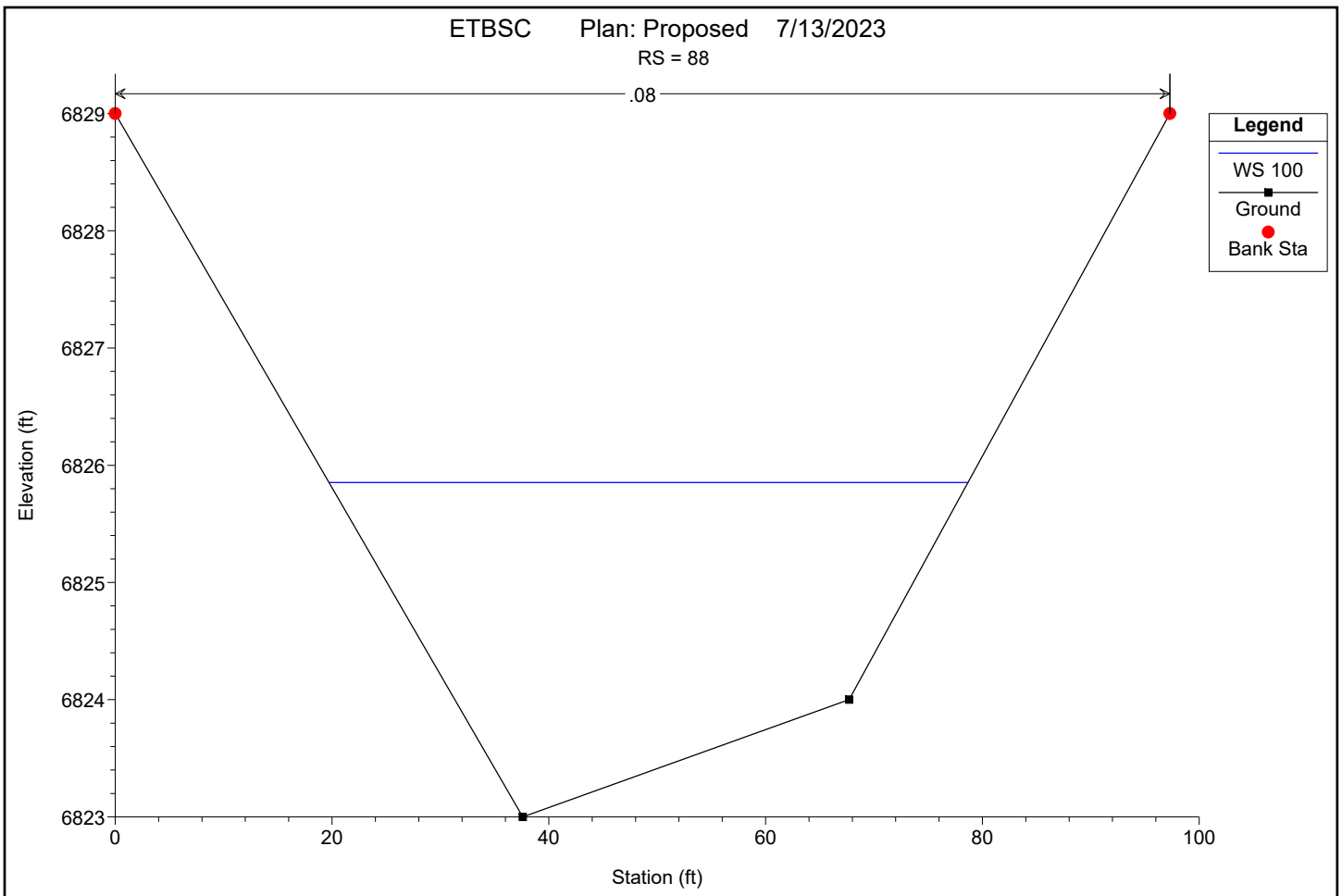
How are the high velocities and froude mitigated? Please refer to DCM 10.4 for max permissible velocities as well as DCM10.7 which states that channels shall be designed for Froude # less than 0.9

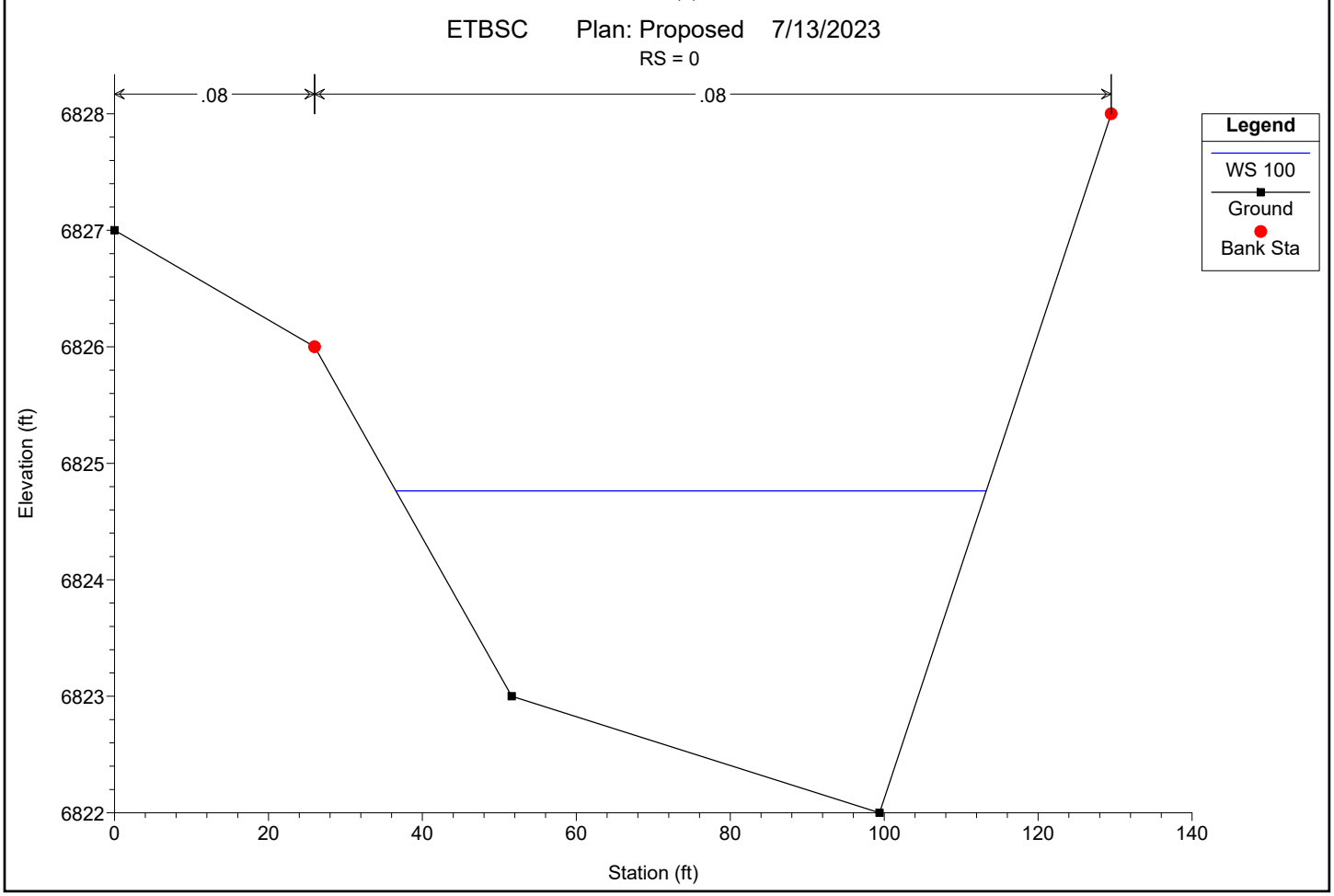

ETBSC Plan: Proposed 7/13/2023
ETBSC ETBSC
Legend
WS 100
Ground
6832
6830
6828
6826
6824
6822
Elevation (ft)
0
100
200
300
400
Main Channel Distance (ft)
88
133
198
333
400


ETBSC Plan: Proposed 7/13/2023
RS = 400
.04
Legend
WS 100
Ground
Bank Sta
provide justification for the use of this mannings n for the proposed section of channel within the site. Per ECM 10-2 it appears that the description for this channel would more fit an "excavated, earth straight and uniform with short grass.
Elevation (ft)
Station (ft)
6833
6832
6831
6830
6829
6828
6827
0
10
20
30
40
50
60


ETBSC Plan: Proposed 7/13/2023
RS = 333
.04
Legend
WS 100
Ground
Bank Sta
Elevation (ft)
Station (ft)
6833
6832
6831
6830
6829
6828
6827
0
10
20
30
40
50
60


ETBSC Plan: Proposed 7/13/2023
RS = 198
.04
Legend
WS 100
Ground
Bank Sta
Elevation (ft)
6833
6832
6831
6830
6829
6828
6827
6826
0
10
20
30
40
50
60
Station (ft)
ETBSC Plan: Proposed 7/13/2023
RS = 133
.04
.04
.04
Legend
WS 100
Ground
Bank Sta
Elevation (ft)
6829.0
6828.5
6828.0
6827.5
6827.0
6826.5
6826.0
0
10
20
30
40
50
60
70
Station (ft)


ETBSC Plan: Proposed 7/13/2023
RS = 88
.08
Legend
WS 100
Ground
Bank Sta
Elevation (ft)
6829
6828
6827
6826
6825
6824
6823
0
20
40
60
80
100
Station (ft)


ETBSC Plan: Proposed 7/13/2023
RS = 0
.08
.08
Legend
WS 100
Ground
Bank Sta
Elevation (ft)
6828
6827
6826
6825
6824
6823
6822
0
20
40
60
80
100
120
140
Station (ft)

ROCK ISLAND TRAIL

EX. 2-12'X4.83' CONCRETE BOX CULVERT INV. (OUT)=6853.40

PR. INV. (IN)=6841.99

50.9 LF 2.25% 8'X4' CBC

PR. INV.=6840.85

PROPOSED 1% ANNUAL CHANCE FLOOD CONTAINED WITHIN 8'X4' CONCRETE BOX CULVERT

RIO LANE

279.9 LF 2.25% 8'X4' CBC

PR. INV. (IN) 6834.56

261.5 LF 2.25% 8'X4' CBC

SAPOYA PLACE

HIGHWAY 24

PERULA WAY

JACKDAW DRIVE

PR. INV.=6828.69

112.5 LF 0.92% 8'X4' CBC

MOTMOT WAY

AVOCET PLACE

PR. INV.=6827.65

WOODMEN RD

JACAMAR PLACE

29.2 LF 0.92% 8'X4' CBC

BUTEOS LANE

RETAIL ROW ST

PR. INV.(OUT)=6827.38

BARBET DRIVE

UNNAMED TRIBUTARY TO BLACK SQUIRREL CREEK

ZONE AE

ZONE A

PINTO PONY RD

LEGEND

- EX. CONTOUR
- PR. CONTOUR
- EX. STORM SEWER
- OR
- PR. CBC STORM SEWER
- PR. ON-SITE STORM DRAINAGE
- EFFECTIVE FEMA FLOODPLAIN (ZONE A)
- PROPOSED FLOODPLAIN (ZONE AE)
- CROSS SECTION
- CROSS SECTION LABEL
- FLOW DIRECTION
- PR. ON-SITE DETENTION
- PR. EASEMENT
- PR. LOT
- EX. PROPERTY LINE
- PR. SITE BOUNDARY
- PROPOSED CURB LINE & SIDEWALK

NOTES

1. SPATIAL PROJECTION IS NAD83 COLORADO STATE PLANE, CENTRAL ZONE (FEET).
2. VERTICAL DATUM IS NAVD88.

80 40 0 80 160

SCALE IN FEET

PREPARED BY:

DBC
Drexel, Barrell & Co.
Traditional Surveying, Innovative Solutions
Since 1978

Drexel, Barrell & Co.
Engineers • Surveyors
1376 MINERS DRIVE, STE 107
LAFAYETTE, COLORADO 800026
CONTACT: MICHELLE IBLINGS, P.E.
(303) 442-4338

LAFAYETTE
COLORADO SPRINGS

OWNER/CLIENT:

PJ ANDERSON
FALCON FIELD, LLC
3230 ELECTRA DR. N
COLORADO SPRINGS, CO 80906

EXHIBIT FOR:
FALCON FIELD
FALCON, COLORADO

ISSUE	DATE
EXHIBIT	8/3/23

DESIGNED BY:	MLI
DRAWN BY:	CAF
CHECKED BY:	MLI
FILE NAME:	21705-00 FPWM

COLORADO LICENSED
MICHELLE IBLINGS
43515
PROFESSIONAL ENGINEER
Michelle Iblings
Digitally signed by Michelle Iblings
Date: 2023.08.03 08:26:51 -06'00'

DRAWING SCALE:
HORIZONTAL: SEE PLAN
VERTICAL: N/A

CLOMR
FLOODPLAIN
WORK MAP

PROJECT:21705-00BLWR

DRAWING NO.

FPWM

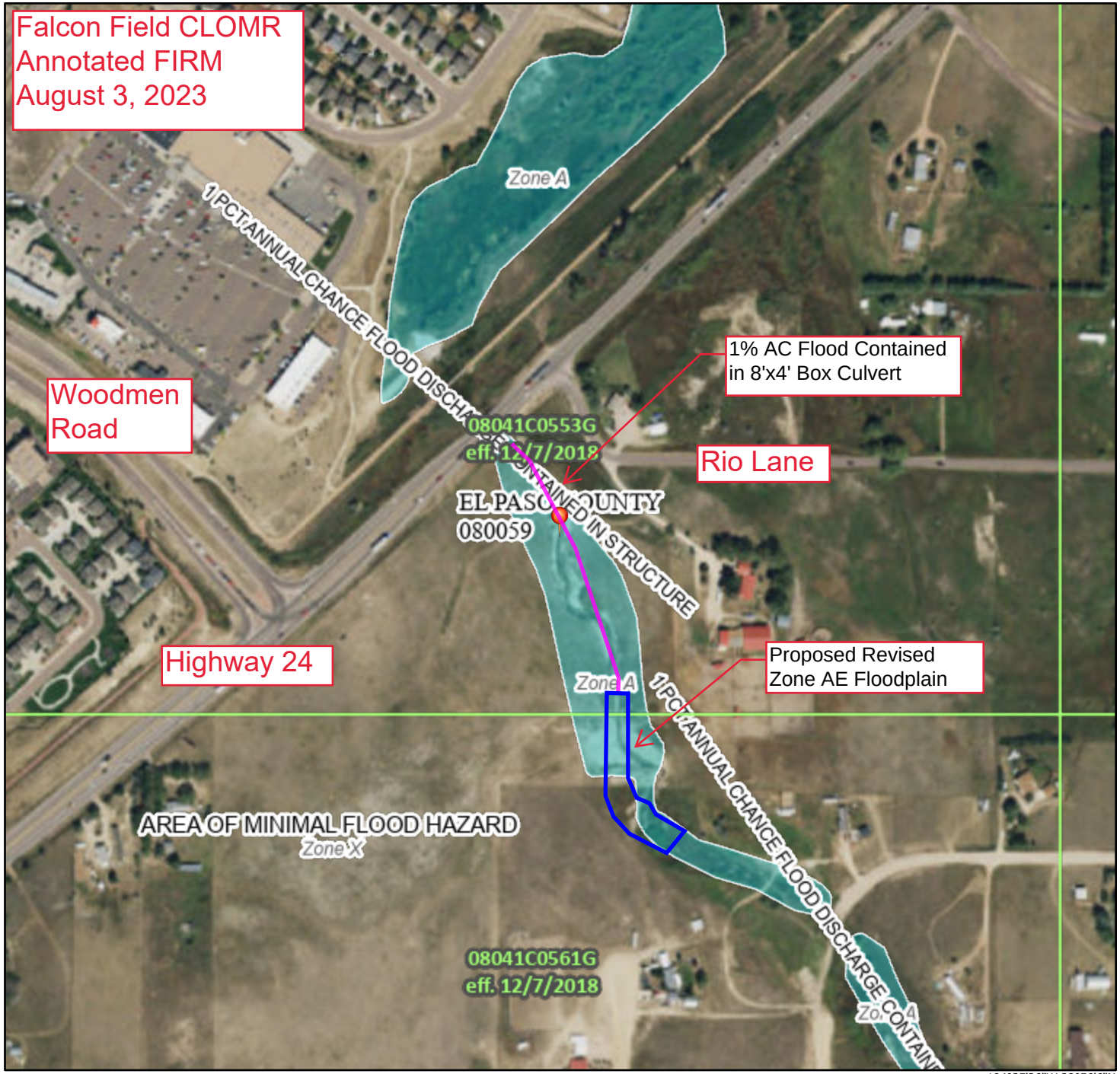
SHEET: 1 OF 1

H:\21705-00BLWR\Plans\Sheets\21705-00 FPWM.dwg, 8/3/2023 2:02:51 PM

National Flood Hazard Layer FIRMette

FEMA

104°36'13"W 38°56'34"N



104°35'36"W 38°56'6"N

Feet

0 250 500 1,000 1,500 2,000

1:6,000

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 Cross Sections with 1% Annual Chance / Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 10/11/2021 at 10:04 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, ALBUQUERQUE DISTRICT
SOUTHERN COLORADO REGULATORY BRANCH
201 WEST 8TH STREET, SUITE 350
PUEBLO, COLORADO 81003

August 26, 2022

Regulatory Division

SUBJECT: Jurisdictional Determination – Action No. SPA-2021-00180, Falcon Field

P. J. Anderson
Falcon Field, LLC
31 North Tejon Street, Suite 516
Colorado Springs, CO 80903
pja5713@gmail.com

Dear P.J. Anderson:

This letter responds to your request for a jurisdictional determination (JD) for property located at latitude 38.936555635255, longitude -104.600429740897, in El Paso County, Colorado. We have assigned Action No. SPA-2021-00180 to your request. Please reference this number in all future correspondence concerning the site.

Based on the information provided, we have determined that the site does not contain waters of the United States that are subject to regulation under Section 404 of the Clean Water Act. The attached JD form describes the area that was evaluated and determined to contain no waters of the United States. If you intend to conduct work that could result in a discharge of dredged or fill material into waters of the United States, please contact this office for a determination of Department of the Army permit requirements and refer to Action No. SPA-2021-00180.

The basis for this approved JD (attached) is that the project site contains isolated wetlands and/or other waters. Wetland 1 through 5 are intrastate, isolated waters that do not flow into a traditional navigable waterway (attached). A copy of this JD is also available at http://www.spa.usace.army.mil/reg/JD. This approved JD is valid for 5 years unless new information warrants revision of the determination before the expiration date.

You may accept or appeal this approved JD or provide new information in accordance with the attached Notification of Administration Appeal Options and Process and Request for Appeal. If you elect to appeal this approved JD, you must complete Section II of the form and return it to the Army Engineer Division, South Pacific, CESPD-PDS-O, Attn: Travis Morse, Administrative Appeal Review Officer, P.O. Box 36023, 450 Golden Gate Avenue, San Francisco, CA 94102 within 60 days of the date of this notice. Failure to notify the Corps within 60 days of the date of this notice means that you accept the approved JD in its entirety and waive all rights to appeal the approved JD.

If you have any questions, please contact Kraig Jashinsky at (719) 439-7281 or by email at Kraig.A.Jashinsky@usace.army.mil. At your convenience, please complete a Customer Service Survey online at https://regulatory.ops.usace.army.mil/customer-service-survey/.

Sincerely,

Kara A. Hellige
Chief, Southern Colorado Regulatory Branch

cc:
Daniel Maynard, Bristlecone Ecology, LLC, dmaynard@bristleconeecology.com

APPROVED JURISDICTIONAL DETERMINATION FORM
U.S. Army Corps of Engineers

This form should be completed by following the instructions provided in Section IV of the JD Form Instructional Guidebook.

SECTION I: BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR APPROVED JURISDICTIONAL DETERMINATION (JD): August 26, 2022

B. DISTRICT OFFICE, FILE NAME, AND NUMBER: Albuquerque District, Falcon Field AJD Request, SPA-2021-00180

C. PROJECT LOCATION AND BACKGROUND INFORMATION:

State: **Colorado** County/parish/borough: **El Paso County** City:
Center coordinates of site (lat/long in degree decimal format): Lat. **38.936555635255°**, Long. **-104.600429740897°**
Universal Transverse Mercator: **13 534630.43 4309812.02**
Name of nearest waterbody: **Jimmy Camp Creek**
Name of nearest Traditional Navigable Water (TNW) into which the aquatic resource flows:
Name of watershed or Hydrologic Unit Code (HUC): **Chico, 11020004**
☐ Check if map/diagram of review area and/or potential jurisdictional areas is/are available upon request.
☐ Check if other sites (e.g., offsite mitigation sites, disposal sites, etc…) are associated with this action and are recorded on a different JD form:

D. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):

☒ Office (Desk) Determination. Date: **July 14, 2022**
☒ Field Determination. Date(s): **June 28, 2022**

SECTION II: SUMMARY OF FINDINGS

A. RHA SECTION 10 DETERMINATION OF JURISDICTION.

There **Are no** "*navigable waters of the U.S.*" within Rivers and Harbors Act (RHA) jurisdiction (as defined by 33 CFR part 329) in the review area. [*Required*]

☐ Waters subject to the ebb and flow of the tide.
☐ Waters are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce.
Explain:

B. CWA SECTION 404 DETERMINATION OF JURISDICTION.

There **Are no** "*waters of the U.S.*" within Clean Water Act (CWA) jurisdiction (as defined by 33 CFR part 328) in the review area. [*Required*]

1. **Waters of the U.S.**
   a. **Indicate presence of waters of U.S. in review area (check all that apply):** [1]
      ☐ TNWs, including territorial seas
      ☐ Wetlands adjacent to TNWs
      ☐ Relatively permanent waters[2] (RPWs) that flow directly or indirectly into TNWs
      ☐ Non-RPWs that flow directly or indirectly into TNWs
      ☐ Wetlands directly abutting RPWs that flow directly or indirectly into TNWs
      ☐ Wetlands adjacent to but not directly abutting RPWs that flow directly or indirectly into TNWs
      ☐ Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs
      ☐ Impoundments of jurisdictional waters
      ☐ Isolated (interstate or intrastate) waters, including isolated wetlands

   b. **Identify (estimate) size of waters of the U.S. in the review area:**
      Non-wetland waters: linear feet, wide, and/or acres.
      Wetlands: acres.

   c. **Limits (boundaries) of jurisdiction** based on: **Pick List**
      Elevation of established OHWM (if known):

2. **Non-regulated waters/wetlands (check if applicable):**[3]
   ☒ Potentially jurisdictional waters and/or wetlands were assessed within the review area and determined to be not jurisdictional.
   Explain: **The review area contains five wetlands totalling 7.15 acres. A review of the downstream connectivity of the associated wetlands found there to be a lack of a connection to downstream waters. The drainage features and associated wetlands presented a southward flow path until reaching E. Blaney Road. The flow path consisting of a varying degree of broken stream channel and connected wetlands terminated across a portion of flat terrain with not apparent wetland vegetation. Flow does not appear to reach any downstream waters via the nearby roadside ditch. Flow also does not cross E. Blaney Road due to the lack of culverts and a slight elevation rise. Due to a lack of downstream connectivity, the drainage features and associated wetlands under review are found to be isolated.**

[1] Boxes checked below shall be supported by completing the appropriate sections in Section III below.
[2] For purposes of this form, an RPW is defined as a tributary that is not a TNW and that typically flows year-round or has continuous flow at least "seasonally" (e.g., typically 3 months).
[3] Supporting documentation is presented in Section III.F.

SECTION III: CWA ANALYSIS

A. TNWs AND WETLANDS ADJACENT TO TNWs

The agencies will assert jurisdiction over TNWs and wetlands adjacent to TNWs. If the aquatic resource is a TNW, complete Section III.A.1 and Section III.D.1. only; if the aquatic resource is a wetland adjacent to a TNW, complete Sections III.A.1 and 2 and Section III.D.1.; otherwise, see Section III.B below.

1. TNW
Identify TNW:

Summarize rationale supporting determination:

2. Wetland adjacent to TNW
Summarize rationale supporting conclusion that wetland is "adjacent":

B. CHARACTERISTICS OF TRIBUTARY (THAT IS NOT A TNW) AND ITS ADJACENT WETLANDS (IF ANY):

This section summarizes information regarding characteristics of the tributary and its adjacent wetlands, if any, and it helps determine whether or not the standards for jurisdiction established under *Rapanos* have been met.

The agencies will assert jurisdiction over non-navigable tributaries of TNWs where the tributaries are "relatively permanent waters" (RPWs), i.e. tributaries that typically flow year-round or have continuous flow at least seasonally (e.g., typically 3 months). A wetland that directly abuts an RPW is also jurisdictional. If the aquatic resource is not a TNW, but has year-round (perennial) flow, skip to Section III.D.2. If the aquatic resource is a wetland directly abutting a tributary with perennial flow, skip to Section III.D.4.

A wetland that is adjacent to but that does not directly abut an RPW requires a significant nexus evaluation. Corps districts and EPA regions will include in the record any available information that documents the existence of a significant nexus between a relatively permanent tributary that is not perennial (and its adjacent wetlands if any) and a traditional navigable water, even though a significant nexus finding is not required as a matter of law.

If the waterbody[4] is not an RPW, or a wetland directly abutting an RPW, a JD will require additional data to determine if the waterbody has a significant nexus with a TNW. If the tributary has adjacent wetlands, the significant nexus evaluation must consider the tributary in combination with all of its adjacent wetlands. This significant nexus evaluation that combines, for analytical purposes, the tributary and all of its adjacent wetlands is used whether the review area identified in the JD request is the tributary, or its adjacent wetlands, or both. If the JD covers a tributary with adjacent wetlands, complete Section III.B.1 for the tributary, Section III.B.2 for any onsite wetlands, and Section III.B.3 for all wetlands adjacent to that tributary, both onsite and offsite. The determination whether a significant nexus exists is determined in Section III.C below.

1. Characteristics of non-TNWs that flow directly or indirectly into TNW

(i) General Area Conditions:
Watershed size: **Pick List**
Drainage area: **Pick List**
Average annual rainfall: inches
Average annual snowfall: inches

(ii) Physical Characteristics:
(a) Relationship with TNW:
☐ Tributary flows directly into TNW.
☐ Tributary flows through **Pick List** tributaries before entering TNW.

Project waters are **Pick List** river miles from TNW.
Project waters are **Pick List** river miles from RPW.
Project waters are **Pick List** aerial (straight) miles from TNW.
Project waters are **Pick List** aerial (straight) miles from RPW.
Project waters cross or serve as state boundaries. Explain:

Identify flow route to TNW[5]:
Tributary stream order, if known:

[4] Note that the Instructional Guidebook contains additional information regarding swales, ditches, washes, and erosional features generally and in the arid West.
[5] Flow route can be described by identifying, e.g., tributary a, which flows through the review area, to flow into tributary b, which then flows into TNW.

(b) General Tributary Characteristics (check all that apply):

Tributary is: ☐ Natural
☐ Artificial (man-made). Explain:
☐ Manipulated (man-altered). Explain:

Tributary properties with respect to top of bank (estimate):
Average width: feet
Average depth: feet
Average side slopes: **Pick List.**

Primary tributary substrate composition (check all that apply):

☐ Silts	☐ Sands	☐ Concrete
☐ Cobbles	☐ Gravel	☐ Muck
☐ Bedrock	☐ Vegetation. Type/% cover:	
☐ Other. Explain:		

Tributary condition/stability [e.g., highly eroding, sloughing banks]. Explain:
Presence of run/riffle/pool complexes. Explain:
Tributary geometry: **Pick List**
Tributary gradient (approximate average slope): %

(c) Flow:
Tributary provides for: **Pick List**
Estimate average number of flow events in review area/year: **Pick List**
Describe flow regime:
Other information on duration and volume:

Surface flow is: **Pick List.** Characteristics:

Subsurface flow: **Pick List**. Explain findings:
☐ Dye (or other) test performed:

Tributary has (check all that apply):
☐ Bed and banks
☐ OHWM[6] (check all indicators that apply):

☐ clear, natural line impressed on the bank	☐ the presence of litter and debris
☐ changes in the character of soil	☐ destruction of terrestrial vegetation
☐ shelving	☐ the presence of wrack line
☐ vegetation matted down, bent, or absent	☐ sediment sorting
☐ leaf litter disturbed or washed away	☐ scour
☐ sediment deposition	☐ multiple observed or predicted flow events
☐ water staining	☐ abrupt change in plant community
☐ other (list):	

☐ Discontinuous OHWM.[7] Explain:

If factors other than the OHWM were used to determine lateral extent of CWA jurisdiction (check all that apply):

☐ High Tide Line indicated by:	☐ Mean High Water Mark indicated by:
☐ oil or scum line along shore objects	☐ survey to available datum;
☐ fine shell or debris deposits (foreshore)	☐ physical markings;
☐ physical markings/characteristics	☐ vegetation lines/changes in vegetation types.
☐ tidal gauges	
☐ other (list):	

(iii) Chemical Characteristics:
Characterize tributary (e.g., water color is clear, discolored, oily film; water quality; general watershed characteristics, etc.).
Explain:
Identify specific pollutants, if known:

(iv) Biological Characteristics. Channel supports (check all that apply):
☐ Riparian corridor. Characteristics (type, average width):
☐ Wetland fringe. Characteristics:
☐ Habitat for:

[6]A natural or man-made discontinuity in the OHWM does not necessarily sever jurisdiction (e.g., where the stream temporarily flows underground, or where the OHWM has been removed by development or agricultural practices). Where there is a break in the OHWM that is unrelated to the waterbody's flow regime (e.g., flow over a rock outcrop or through a culvert), the agencies will look for indicators of flow above and below the break.
[7]Ibid.

☐ Federally Listed species. Explain findings:
☐ Fish/spawn areas. Explain findings:
☐ Other environmentally-sensitive species. Explain findings:
☐ Aquatic/wildlife diversity. Explain findings:

2. Characteristics of wetlands adjacent to non-TNW that flow directly or indirectly into TNW

(i) Physical Characteristics:

(a) General Wetland Characteristics:
Properties:
Wetland size: acres
Wetland type. Explain:
Wetland quality. Explain:
Project wetlands cross or serve as state boundaries. Explain:

(b) General Flow Relationship with Non-TNW:
Flow is: **Pick List**. Explain:

Surface flow is**: Pick List**
Characteristics:

Subsurface flow: **Pick List**. Explain findings:
☐ Dye (or other) test performed:

(c) Wetland Adjacency Determination with Non-TNW:
☐ Directly abutting
☐ Not directly abutting
☐ Discrete wetland hydrologic connection. Explain:
☐ Ecological connection. Explain:
☐ Separated by berm/barrier. Explain:

(d) Proximity (Relationship) to TNW
Project wetlands are **Pick List** river miles from TNW.
Project waters are **Pick List** aerial (straight) miles from TNW.
Flow is from: **Pick List.**
Estimate approximate location of wetland as within the **Pick List** floodplain.

(ii) Chemical Characteristics:

Characterize wetland system (e.g., water color is clear, brown, oil film on surface; water quality; general watershed characteristics; etc.). Explain:
Identify specific pollutants, if known:

(iii) Biological Characteristics. Wetland supports (check all that apply):

☐ Riparian buffer. Characteristics (type, average width):
☐ Vegetation type/percent cover. Explain:
☐ Habitat for:
☐ Federally Listed species. Explain findings:
☐ Fish/spawn areas. Explain findings:
☐ Other environmentally-sensitive species. Explain findings:
☐ Aquatic/wildlife diversity. Explain findings:

3. Characteristics of all wetlands adjacent to the tributary (if any)

All wetland(s) being considered in the cumulative analysis: **Pick List**
Approximately acres in total are being considered in the cumulative analysis.

For each wetland, specify the following:

Directly abuts? (Y/N)	Size (in acres)	Directly abuts? (Y/N)	Size (in acres)

Summarize overall biological, chemical and physical functions being performed:

C. SIGNIFICANT NEXUS DETERMINATION

A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by any wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical, and biological integrity of a TNW. For each of the following situations, a significant nexus exists if the tributary, in combination with all of its adjacent wetlands, has more than a speculative or insubstantial effect on the chemical, physical and/or biological integrity of a TNW. Considerations when evaluating significant nexus include, but are not limited to the volume, duration, and frequency of the flow of water in the tributary and its proximity to a TNW, and the functions performed by the tributary and all its adjacent wetlands. It is not appropriate to determine significant nexus based solely on any specific threshold of distance (e.g. between a tributary and its adjacent wetland or between a tributary and the TNW). Similarly, the fact an adjacent wetland lies within or outside of a floodplain is not solely determinative of significant nexus.

Draw connections between the features documented and the effects on the TNW, as identified in the *Rapanos* Guidance and discussed in the Instructional Guidebook. Factors to consider include, for example:

- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to carry pollutants or flood waters to TNWs, or to reduce the amount of pollutants or flood waters reaching a TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), provide habitat and lifecycle support functions for fish and other species, such as feeding, nesting, spawning, or rearing young for species that are present in the TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to transfer nutrients and organic carbon that support downstream foodwebs?
- Does the tributary, in combination with its adjacent wetlands (if any), have other relationships to the physical, chemical, or biological integrity of the TNW?

Note: the above list of considerations is not inclusive and other functions observed or known to occur should be documented below:

1. **Significant nexus findings for non-RPW that has no adjacent wetlands and flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary itself, then go to Section III.D:

2. **Significant nexus findings for non-RPW and its adjacent wetlands, where the non-RPW flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D:

3. **Significant nexus findings for wetlands adjacent to an RPW but that do not directly abut the RPW.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D:

D. DETERMINATIONS OF JURISDICTIONAL FINDINGS. THE SUBJECT WATERS/WETLANDS ARE (CHECK ALL THAT APPLY):

1. **TNWs and Adjacent Wetlands.** Check all that apply and provide size estimates in review area:
   - ☐ TNWs: linear feet, wide, Or acres.
   - ☐ Wetlands adjacent to TNWs: acres.

2. **RPWs that flow directly or indirectly into TNWs.**
   - ☐ Tributaries of TNWs where tributaries typically flow year-round are jurisdictional. Provide data and rationale indicating that tributary is perennial:
   - ☐ Tributaries of TNW where tributaries have continuous flow "seasonally" (e.g., typically three months each year) are jurisdictional. Data supporting this conclusion is provided at Section III.B. Provide rationale indicating that tributary flows seasonally:

   Provide estimates for jurisdictional waters in the review area (check all that apply):
   - ☐ Tributary waters: linear feet wide.
   - ☐ Other non-wetland waters: acres.
     Identify type(s) of waters:

3. **Non-RPWs[8] that flow directly or indirectly into TNWs.**
   - ☐ Waterbody that is not a TNW or an RPW, but flows directly or indirectly into a TNW, and it has a significant nexus with a TNW is jurisdictional. Data supporting this conclusion is provided at Section III.C.

   Provide estimates for jurisdictional waters within the review area (check all that apply):
   - ☐ Tributary waters: linear feet, wide.
   - ☐ Other non-wetland waters: acres.
     Identify type(s) of waters:

[8]See Footnote # 3.

4. **Wetlands directly abutting an RPW that flow directly or indirectly into TNWs.**
☐ Wetlands directly abut RPW and thus are jurisdictional as adjacent wetlands.
☐ Wetlands directly abutting an RPW where tributaries typically flow year-round. Provide data and rationale indicating that tributary is perennial in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW:

☐ Wetlands directly abutting an RPW where tributaries typically flow "seasonally." Provide data indicating that tributary is seasonal in Section III.B and rationale in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW:

Provide acreage estimates for jurisdictional wetlands in the review area: acres.

5. **Wetlands adjacent to but not directly abutting an RPW that flow directly or indirectly into TNWs.**
☐ Wetlands that do not directly abut an RPW, but when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisidictional. Data supporting this conclusion is provided at Section III.C.

Provide acreage estimates for jurisdictional wetlands in the review area: acres.

6. **Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs.**
☐ Wetlands adjacent to such waters, and have when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisdictional. Data supporting this conclusion is provided at Section III.C.

Provide estimates for jurisdictional wetlands in the review area: acres.

7. **Impoundments of jurisdictional waters.[9]**
As a general rule, the impoundment of a jurisdictional tributary remains jurisdictional.
☐ Demonstrate that impoundment was created from "waters of the U.S.," or
☐ Demonstrate that water meets the criteria for one of the categories presented above (1-6), or
☐ Demonstrate that water is isolated with a nexus to commerce (see E below).

E. ISOLATED [INTERSTATE OR INTRA-STATE] WATERS, INCLUDING ISOLATED WETLANDS, THE USE, DEGRADATION OR DESTRUCTION OF WHICH COULD AFFECT INTERSTATE COMMERCE, INCLUDING ANY SUCH WATERS (CHECK ALL THAT APPLY):[10]
☐ which are or could be used by interstate or foreign travelers for recreational or other purposes.
☐ from which fish or shellfish are or could be taken and sold in interstate or foreign commerce.
☐ which are or could be used for industrial purposes by industries in interstate commerce.
☐ Interstate isolated waters. Explain:
☐ Other factors. Explain:

Identify water body and summarize rationale supporting determination:

Provide estimates for jurisdictional waters in the review area (check all that apply):
☐ Tributary waters: linear feet, wide.
☐ Other non-wetland waters: acres.
Identify type(s) of waters:
☐ Wetlands: acres.

F. NON-JURISDICTIONAL WATERS, INCLUDING WETLANDS (CHECK ALL THAT APPLY):
☐ If potential wetlands were assessed within the review area, these areas did not meet the criteria in the 1987 Corps of Engineers Wetland Delineation Manual and/or appropriate Regional Supplements.
☒ Review area included isolated waters with no substantial nexus to interstate (or foreign) commerce.
☒ Prior to the Jan 2001 Supreme Court decision in "*SWANCC*," the review area would have been regulated based solely on the "Migratory Bird Rule" (MBR).
☐ Waters do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction. Explain:
☐ Other: (explain, if not covered above):

[9] To complete the analysis refer to the key in Section III.D.6 of the Instructional Guidebook.
[10] Prior to asserting or declining CWA jurisdiction based solely on this category, Corps Districts will elevate the action to Corps and EPA HQ for review consistent with the process described in the Corps/EPA *Memorandum Regarding CWA Act Jurisdiction Following Rapanos.*

Provide acreage estimates for non-jurisdictional waters in the review area, where the sole potential basis of jurisdiction is the MBR factors (i.e., presence of migratory birds, presence of endangered species, use of water for irrigated agriculture), using best professional judgment (check all that apply):

☐ Non-wetland waters (i.e., rivers, streams): linear feet, wide.
☐ Lakes/ponds: acres.
☒ Other non-wetland waters: acres. List type of aquatic resource:
☒ Wetlands: **7.15** acres.

Provide acreage estimates for non-jurisdictional waters in the review area that do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction (check all that apply):

☐ Non-wetland waters (i.e., rivers, streams): linear feet, wide.
☐ Lakes/ponds: acres.
☐ Other non-wetland waters: acres. List type of aquatic resource:
☐ Wetlands: acres.

SECTION IV: DATA SOURCES.

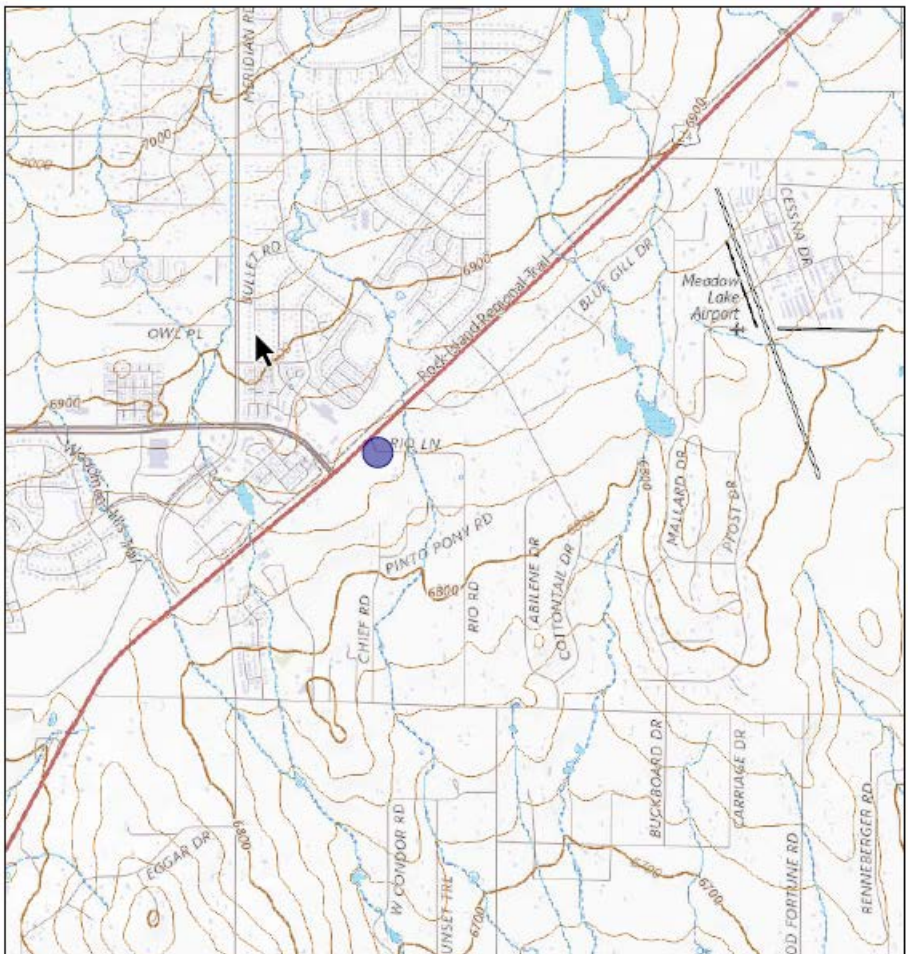
A. SUPPORTING DATA. Data reviewed for JD (check all that apply - checked items shall be included in case file and, where checked and requested, appropriately reference sources below):

☒ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant: **2021-180 Falcon Field AJD Request 12-15-2020_29-Nov-21.pdf**
☐ Data sheets prepared/submitted by or on behalf of the applicant/consultant.
  ☐ Office concurs with data sheets/delineation report.
  ☐ Office does not concur with data sheets/delineation report.
☐ Data sheets prepared by the Corps:
☐ Corps navigable waters' study:
☐ U.S. Geological Survey Hydrologic Atlas:
  ☐ USGS NHD data.
  ☐ USGS 8 and 12 digit HUC maps.
☐ U.S. Geological Survey map(s). Cite scale & quad name: **1:24K; Falcon**
☒ USDA Natural Resources Conservation Service Soil Survey. Citation: **2021-180 Soil Map**
☒ National wetlands inventory map(s). Cite name: **2021-180 NWI Map**
☐ State/Local wetland inventory map(s):
☐ FEMA/FIRM maps:
☐ 100-year Floodplain Elevation is: (National Geodectic Vertical Datum of 1929)
☐ Photographs: ☒ Aerial (Name & Date): **2021-180 Aerial - May 2020**
  or ☐ Other (Name & Date):
☐ Previous determination(s). File no. and date of response letter:
☐ Applicable/supporting case law:
☐ Applicable/supporting scientific literature:
☒ Other information (please specify): **2021-180 EPA Watershed Report, 2021-180 Flow Path and Pictures, 2021-180 Inspection Report - June 2022, 2021-180 NE Stream StreamStats, 2021-180 SW Stream StreamStats, 2021-180 USGS Topo**

B. ADDITIONAL COMMENTS TO SUPPORT JD:

A review of the downstream connectivity of the associated wetlands found there to be a lack of a connection to downstream waters. The drainage features and associated wetlands presented a southward flow path until reaching E. Blaney Road. The flow path consisting of a varying degree of broken stream channel and connected wetlands terminated across a portion of flat terrain with not apparent wetland vegetation. Flow does not appear to reach any downstream waters via the nearby roadside ditch. Flow also does not cross E. Blaney Road due to the lack of culverts and a slight elevation rise. Due to a lack of downstream connectivity, the drainage features and associated wetlands under review are found to be isolated.

2021-180 USGS Topo



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1:36,112

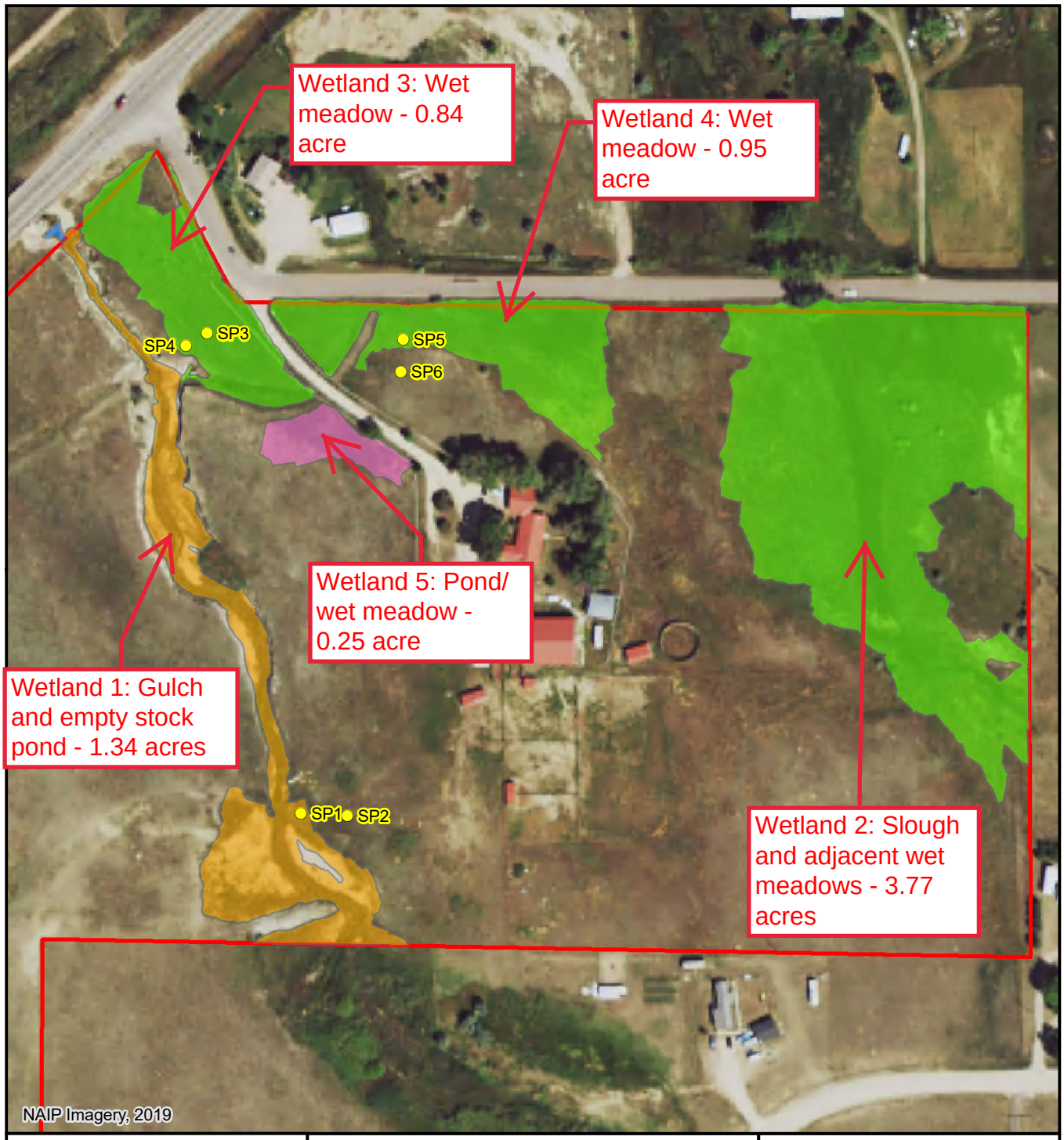
0 0.23 0.45 0.9 mi

0 0.38 0.75 1.5 km

- Override 1
- Forest/shrub Wetlands
- Emergent Wetlands
- Inland Waters
- Normal Intermediate Contours
- Normal Index Contours

USGS The National Map: National Boundaries Dataset, 3DEP Elevation Program, Geographic Names Information System, National Hydrography Dataset, National Land Cover Database, National Structures Dataset, and National Transportation Dataset; USGS Global Ecosystems; U.S. Census

USGS
2021 USGS



Colorado

El Paso County

Project Area
Data Point
Open Water
Pond
Slough
Wet Meadow

Feet
0
200
400

N

Falcon Field

Wetlands

bristlecone ecology

12/8/2020 C:\GIS_Projects\Bristlecone_Ecology\20_013_Falcon_Field\Wetlands_Zoomed.mxd