



**MASTER DEVELOPMENT DRAINAGE REPORT
FOR
MEADOWLAKE RANCH
SKETCH PLAN
SKP-18-004**

MAY 2019

Prepared for:
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Job No. 1822.00

DRAINAGE REPORT STATEMENT

Design Engineer's Statement

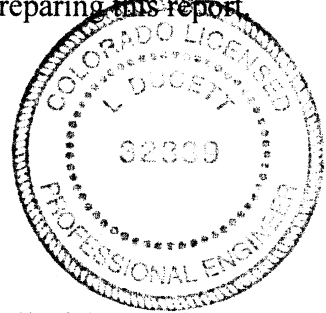
This attached drainage plan and report were prepared under my direction and supervision and are correct to the best of my knowledge and belief. Said drainage report has been prepared according to the criteria established by the County for drainage reports and said report is in conformity with the master 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.



L DUCETT, P.E. 32339

5/16/19

Seal



Developers Statement

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

MEADOWLAKE RANCH

Business Name

By:



Title:

OWNER

Address:

13202 JUDGE BREED

FALCON, CO 80831

El Paso County Approval:

Filed in accordance with the requirements of the Drainage Criteria Manual, Volumes 1 & 2, El Paso County Engineering Criteria Manual and Land Development Code as amended.

Jennifer Irvine,
County Engineer / ECM Administrator

Date

Conditions:

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PURPOSE

This document is a Master Development Drainage Plan for the Meadowlake Ranch Sketch Plan. The purpose of this report is to schematically address on-site and off-site drainage patterns as discussed and approved within the Master Development Drainage Plan (MDDP) for Meadowlake Ranch and provide general methods to handle these flows based on the Sketch Plan via on-site detention and possible channel improvements in order to limit any flows released off-site to historic levels or less. This report will remain in general compliance with the El Paso County Drainage Criteria and will be followed up with a Preliminary Drainage Report submitted in conjunction with any Preliminary Plan submittals. Thus, some County review was completed on this report but no approval was required for the Sketch Plan approval.

GENERAL DESCRIPTION

The Meadowlake Ranch (Sketch Plan) site (311.6 ac) is located at the northwest corner of State Highway 24 and Judge Orr Road. The site is bounded on the north by Bandanero Drive and on the northwest by Eastonville Road. To the west are properties in the Woodmen Hills Filing No. 10 subdivision and to the northeast are properties owned by Distinctive Marine Company. Judge Orr Road and State Highway 24 form the southern and eastern borders, respectively. The El Paso County's Rock Island Trail runs between the eastern property line and State Highway 24.

The primary site influences affecting the proposed land use are the Meadow Lake Airport and the ponds/wetlands within the property. To mitigate the impact of air traffic, industrial land use is proposed for the south-central portion of the site nearest the airport. To the west of this industrial area, urban residential land use is proposed to be served by the Woodmen Hills Metropolitan District. To the south of the urban residential area, a frontage of commercial land use is proposed along Judge Orr Road to its intersection with State Highway 24. For the balance of the property, north and east of the industrial area, rural residential land use with well and septic systems is proposed and will be accessed via Bandanero Drive.

Within the proposed urban residential area the existing ponds/wetlands will form part of an open space. The ponds/wetlands are fed by a spring in the northeast portion of the property next to the old railroad right of way along Eastonville Road. The system of ponds within the wetlands, running generally north to south, was excavated by horse-drawn equipment in the early 1900s and the ponds

were reportedly connected by pipes and French drains. The ponds/wetlands are situated along the high ground between the Bennett and Haegler basins and form an independent basin within the property.

Soils for this project are delineated by the S.C.S. "El Paso County Area Soil Survey" as Columbine (gravelly sandy loam) and Stapleton (sandy loam) with Hydrologic Group designations of A and B, respectively (see Appendix). The majority of the site is covered with native grasses with a greater variety of vegetation along the natural drainage ways and in the wetland areas.

EXISTING DRAINAGE CONDITIONS

The boundary between the Bennett Ranch Basin and the Haegler Ranch Basin runs generally north to south along the eastern edge of the ponds/wetlands area on the property. Therefore, roughly the western third of the property is subject to the Bennett Ranch Pilot Project, Drainage Basin Planning Study, (Stormwater & Environmental Consultants, November 2001) and the remaining eastern portion is subject to the Haegler Ranch Basin, Drainage Basin Planning Study, (URS, May 2009).

The Bennett Ranch DBPS recommended regional detention ponds, roadway culvert upgrades, and channel improvements be used to mitigate flooding in and downstream of the Bennett Ranch Basin as the basin is developed. The regional detention ponds, located in the upper reaches of the basin, are required to release at 80% of existing flow values to reduce peak flows downstream. The improvements noted in the Bennett Ranch DBPS in the area of Meadowlake Ranch are in place (see Exhibit in the Appendices). The 24" pipe culvert under Judge Orr Road (Design Point 1) was not addressed in the report (see the discussion for this pipe on page 8).

The Haegler Ranch DBPS recommended subregional detention ponds, roadway culvert upgrades, and channel improvements be used to mitigate flooding in and downstream of the Haegler Ranch Basin. The purpose of the detention basins is to limit peak discharges to existing levels and are to be installed as the basin is developed. One of the proposed subregional detention ponds (SR-2) is identified in the Haegler Ranch DBPS as located in the Meadowlake Ranch Basin EX-3 (Design Point 3). The basin is shown as providing 5 ac-ft of storage with a release value of $Q_{100} = 250$ cfs (see Exhibit in the Appendices). There are no channel improvements recommended in the Haegler

Ranch DBPS for the Meadowlake Ranch property and the downstream crossing at State Highway 24 is considered adequate.

Existing drainage from the Meadowlake Ranch (Sketch Plan) site is generally from northwest to southeast by way of existing natural drainage swales. The outfall channel from the Bennett Ranch Regional Detention Pond that regulates the developed areas to the northwest of the site runs just outside the western property line. The Bennett Ranch DBPS listed the channel segment running south from Eastonville Road to Judge Orr Road along the west side of the Meadowlake Ranch property (hereafter, the Eastonville Channel) as deficient and recommended the channel be improved to carry the outflow from the then proposed Bennett Ranch Regional Detention Pond located on the north side of Eastonville Road. This work has been completed. The natural channel was left mostly intact to preserve wetlands, but the flow capacity of the drainage way was improved by constructing an adjacent trapezoidal channel approximately 2600 ft long at a slope of 1% having a low flow channel 24 ft wide by 1 ft deep within a main channel set at 65 ft wide with drop structures every 800 ft (Eastonville Channel Improvement, Woodmen Hills Metro/GTL Development, JDS-Hydro Consultants, August 2005). Per the Final Drainage And Erosion Control – Woodmen Hills Filing No. 11 (URS, November 2002), the major storm design flow for the Eastonville Channel is 1164 cfs. At a depth of 2.5 feet the capacity of the trapezoidal channel, not including the adjacent natural channel, is approximately 1171 cfs. At that depth the drainage way's eastern bank is not overtopped (see Exhibit in the Appendices). The slope of the Meadowlake Ranch property drains away from the eastern bank of the Eastonville Channel, making the channel bank the drainage boundary and essentially separating the runoff in the channel, which flows south, from the runoff on the property, which drains east. Therefore, existing runoff from the Meadowlake Ranch site does not contribute to Bennett Ranch Regional Detention Pond outflows and runoff from the proposed conditions will maintain historic drainage patterns.

In addition, the Bennett Ranch DBPS recommended that the existing dual 36" pipe culverts under Judge Orr Road be replaced with a box culvert 30 ft wide by 7 ft high. However, at the time of this report, the flow from the Eastonville Channel is conveyed under Judge Orr Road via a recently constructed double 12' x 8' box culvert which has replaced the interim triple 72" CMP culverts put in place due to a roadway washout. The LOMR dated September 2008, which covers this drainage channel from just north of Judge Orr Road southward to Highway 24, indicates that Judge Orr Road

is overtopped by the 100 year flood at the crossing and to the west of the crossing. The Meadowlake Ranch property is minimally affected by the overtopping of Judge Orr Road.

The existing ponds/wetlands area contains five standing water ponds that have been in existence since the early 1900s and are fed by a spring and runoff from the immediately surrounding area. The downstream berms for the ponds are well vegetated and stable with no discernable outlet structures. As a consequence, the area is not considered to be contributing to the runoff from the property. Should future development increase runoff to the ponds/wetlands area or if the ponds/wetlands are eliminated for development, then the appropriate hydrologic, hydraulic, and geotechnical analyses for this area must be included in the future Drainage Report (see discussion under Developed Drainage Conditions and Exhibit in the Appendices).

The Rock Island Trail running outside the eastern property line intercepts runoff from the site rather than allowing it to flow directly into the drainage ways along State Highway 24.

Concentrated runoff enters the site at two locations along its boundary with Bandanero Drive draining Basins OS-1 and OS-2. Per the approved design in the Final Drainage Report for 4 Way Ranch Phase 1 – Filing No. 1, (JR Engineering, March 2006) the developed flows for Basin OS-1 (118 ac) are $Q_5 = 16$ cfs and $Q_{100} = 119.0$ cfs. Flow passes under Bandanero Drive via dual 36” RCP culverts. As designed, the allowable headwater elevation is 6932.40 and the computed headwater elevation for Q_{100} is 6932.34. A visit to the site has indicated that the pipe culverts are silted in with cattails and grasses. Should the pipe culverts not perform as designed, the flow would divert into the ditch running east along the north side of the roadway and end up at the pipe culvert conveying flow from Basin OS-2 under Bandanero Drive.

Per the approved design in the Final Drainage Report for 4 Way Ranch Phase 1 – Filing No. 1, (JR Engineering, March 2006), the developed flows for Basin OS-2 (13.4 ac) are $Q_5 = 11.3$ cfs and $Q_{100} = 25.5$ cfs. Flow passes under Bandanero Drive via a 30” RCP culvert (inlet elevation 6915.31). As designed, the allowable headwater elevation is 6918.00 and the computed headwater elevation for Q_{100} is 6917.50. The maximum allowable headwater elevation without overtopping the roadway is 6918.80 and the capacity of the culvert under that headwater depth (assuming inlet control with $HW/D = 1.4$) is 33 cfs, which provides some extra capacity should any flow from Basin

OS-1 be diverted to Basin OS-2 (see Exhibit in the Appendices). In any case, should the roadway overtop at either location, the flow would continue on to Design Point 3 as before.

The topography as shown in the Final Drainage Report for 4 Way Ranch Phase I – Filing No. 1 indicates a swale ditch along the property line at northeast corner of the Meadowlake Ranch site that directs flow toward the east. Also, the topography as shown in the Master Development Drainage Plan and Preliminary Drainage Report for Four Way Ranch, (JR Engineering, March 2005) indicates that along the eastern boundary of the property the ground slopes southeast away from Meadowlake Ranch.

The hydrologic data taken from the Final Drainage Report for 4 Way Ranch Phase 1 – Filing No. 1, (JR Engineering, March 2006) for basins OS-1 and OS-2 is used in the hydrologic modeling for Meadowlake Ranch.

The runoff leaving the property is conveyed offsite at one of three locations. The first location is Design Point 1 where runoff from basin EX-1 passes through a 24” CMP under Judge Orr Road near its intersection with State Highway 24. This point drains approximately the western third of the site and encompasses range land, wetland area and the ranch house. No offsite areas contribute to this runoff. The total drainage area for EX-1 is 55.7 acres, producing runoff values of $Q_5 = 4.0$ cfs and $Q_{100} = 29.1$ cfs for existing conditions. The headwater to depth ratio for a 24” pipe under inlet control is $HW/D = 0.6$ for the 5 year event and $HW/D = 3.0$ for the 100 year event (see Exhibit in the Appendices). At $HW/D = 3.0$, Judge Orr Road would be overtopped. Therefore, the 24” pipe culvert may need to be upgraded. However, the downstream drainage way for Design Point 1 will need to be further studied in future Drainage Reports to assess the impact to Design Point 1 because just downstream of Judge Orr Rd the flow goes east under Rock Island Trail via a 42” CMP and into the ditch area between the trail and State Highway 24. The flow then passing southeast under Highway 24 is restricted by an 18” opening on the inlet end of a 10’x5’ box culvert. Presumably, the runoff would pond between the State Highway 24 and Rock Island Trail, as well as the area between Rock Island Trail and Judge Orr Road. Potentially, the ponding could also extend to the north side of Judge Orr Road (see Exhibit in Appendices).

The second location is Design Point 2 where runoff from basin EX-2 passes through a 20" iron pipe under the Rock Island Trail and enters the public drainage way adjacent to State Highway 24. EX-2 encompasses a small area in the southern part of the site and includes range land and some ranch buildings. No offsite areas contribute this runoff. There are areas where the runoff from EX-2 ponds along Rock Island Trail, but the grade breaks are such that the flow would make its way to Design Point 2 before overtopping the trail. In addition, runoff likely ponds between Rock Island Trail and State Highway 24 to some degree as well. The total drainage area for EX-2 is 24.0 acres, producing runoff values of $Q_5 = 2.3$ cfs and $Q_{100} = 15.5$ cfs for existing conditions.

The third location is Design Point 3 where runoff from basin EX-3 passes through dual 66" CMPs under State Highway 24 at the southeast corner of the site. Design Point 3 drains the northeastern portion of the property, including runoff from the offsite conveyances at Bandanero Drive (OS-1 & OS-2). The drainage area for EX-3, made up of primarily range land, is 168.9 acres, not including the offsite contributing areas, and produces runoff values of $Q_5 = 13.6$ cfs and $Q_{100} = 102.1$ cfs for existing conditions. The combined drainage area for basins OS-1, OS-2 and EX-3 is 300.4 acres producing existing condition flows of $Q_5 = 41.1$ cfs and $Q_{100} = 247.0$ cfs. The headwater to depth ratio for the dual 66" pipes under inlet control is $HW/D < 0.5$ for the 5 year event and $HW/D = 0.85$ for the 100 year event; therefore, the system is adequate (see Exhibit in the Appendices). This is also the finding of the Haegler Ranch DBPS.

Changes in the 4 Way Ranch Drainage Plan to the north of the Meadowlake Ranch site could affect the drainage design of Meadowlake Ranch as given in this report and should be considered in future drainage reports for this site.

DEVELOPED DRAINAGE CONDITIONS

This MDDP is schematically addressing on-site and off-site drainage patterns for the developed conditions of this site. The individual Preliminary and Final Drainage Report(s) will better define developed flows within each basin to determine curb capacity/at-grade inlet requirements and specific sump inlet sizing based on flows for developed conditions.

The existing ponds/wetlands area will remain as part of an open space area for the proposed development. This location was analyzed by dividing the wetland area into three basins (WP-A,

WP-B, and WP-C) according to the three major areas of standing water (see Exhibit in Appendix) and determining the runoff volumes for the developed 100 year event. The 100 yr developed runoff volumes are as follows: WP-A = 4.0 ac-ft, WP-B = 5.8 ac-ft, and WP-C = 1.6 ac-ft. To retain these ponds/wetlands in the future development, these runoff volumes should be multiplied by the appropriate safety factor and the berms re-graded to provide adequate storage above the pond-full elevation plus freeboard. Calculations for the runoff volumes are included with the Exhibit in the Appendix. The ponds and spillways to remain will be evaluated for safety/stability by a geotechnical engineer. The appropriate hydrologic, hydraulic, and geotechnical analyses for this area must be included in the future Drainage Report.

Basin PR-1 will largely encompass the area addressed in EX-1. The proposed land uses for this area include urban residential, commercial, wetlands and open space. The total drainage area for PR-1 is 65.8 acres, producing runoff values of $Q_5 = 97.6$ cfs and $Q_{100} = 198.8$ cfs for developed conditions. All runoff will be conveyed to Design Point 1 located near the intersection of Judge Orr Road and State Highway 24 (see discussion of Design Point 1 for existing conditions on page 8). Full Spectrum Detention will be provided at Design Point 1 by Pond-1 and proposed outflows will not exceed the flows for existing conditions.

DP-1: Pond 1 – Preliminary Sizing (Full Spectrum Detention)

Required WQCV = 1.072 ac-ft

Required EURV = 3.409 ac-ft

Required 100-Yr Detention Volume = 6.094 ac-ft

Approximate size: L= 350 ft, W= 175 ft, D=4.5 ft

Existing Flow at DP1: $Q_5 = 4.0$ cfs, $Q_{100} = 29.1$ cfs

Proposed Inflow at DP1: $Q_5 = 97.6$ cfs, $Q_{100} = 198.8$ cfs

Proposed Outflow at Pond-1: $Q_5 = 4.0$ cfs, $Q_{100} = 29.1$ cfs

Concrete Riser Box elevation = TBD

Max. 100 yr. WSE = TBD

Basin PR-2 encompasses the areas addressed in EX-2 and EX-3 by eliminating Design Point 2 and routing all the runoff for the proposed conditions to Design Point 3. The proposed land uses for this area include industrial, commercial, urban residential and rural residential. The drainage area for

PR-2 is 219.0 acres, not including the offsite basins, and produces runoff values of $Q_5 = 334.3$ cfs and $Q_{100} = 647.1$ cfs for developed conditions. The combined flows for PR-2, OS-1, and OS-2 for the developed conditions are $Q_5 = 356.1$ cfs and $Q_{100} = 834.6$ cfs.

At Design Point 3 the water quality needs for the combined area of basins PR-2, OS-1, and OS-2 for the proposed conditions will be addressed by Pond 2. Additionally, this pond will serve as the subregional detention pond (SR-2) recommended in the Haeglar Ranch DBPS and will be constructed to detain for both purposes. The release flows for Pond-2 will be at or below the values for the existing conditions; therefore, the downstream drainage way at this location will not be affected by the elimination of Design Point 2.

DP-3: Pond 2 – Preliminary Sizing (Water Quality and Detention)

Required WQCV = 4.424 ac-ft

Required EURV = 10.791 ac-ft

Required 100-Yr Detention Volume = 21.211 ac-ft

Approximate size: L= 550 ft, W= 275 ft, D=4.5 ft

Existing Flow at DP3: $Q_5 = 41.1$ cfs, $Q_{100} = 247.0$ cfs

Proposed Inflow at DP3: $Q_5 = 356.1$ cfs, $Q_{100} = 834.6$ cfs

Proposed Outflow at Pond-2: $Q_5 = 41.1$ cfs, $Q_{100} = 247.0$ cfs

Concrete Riser Box elevation = TBD

Max. 100 yr. WSE = TBD

The drainage way for Design Point 2 as it proceeds downstream from State Highway 24 is an open field lacking a well-defined channel. Rerouting the runoff to Design Point 3 will not cause any hydraulic impact downstream of Design Point 2; however, there is a potential water rights issue stemming from the rerouting of the runoff which should be addressed in future Drainage Reports and a Deviation Request may be necessary. An alternative to rerouting the runoff from Design Point 2 would be to leave the drainage pattern as it exists and provide a detention pond at Design Point 2 that would provide water quality control and maintain post-development runoff at existing levels. The existing dual 66 inch culverts under Highway 24 are adequate for the proposed flows.

CHANNEL IMPROVEMENTS

Neither the Bennett Ranch DBPS nor the Haeglar Ranch DBPS recommends channel improvements within the Meadowlake Ranch project site. However, any needed channel improvements due to the developed conditions will likely be phased based on Final Platting. Channel improvement design will also be presented with each individual Final Plat. The specific areas where the natural channels are either too shallow or incised, improvements will be provided to handle the developed flows and control velocities. Probable improvements in such areas may include but not be limited to the following: minor grade control structures, weirs, vegetation enhancements and varying channel widths. Detailed design of these natural channel corridors will be further presented in the final drainage report(s).

MDDP CONFORMANCE

This proposed MDDP, from a drainage standpoint, follows the general scheme of the Master Development Drainage Plan and Preliminary Drainage Report for Four Way Ranch, (JR Engineering, March 2005).

FOUR STEP PROCESS

As part of a Low Impact Design approach, the existing ponds/wetlands in the western portion of the site will be retained as open space. In addition, the wetlands along the natural drainage ways in the eastern portion of the site will also be retained, some as part of a buffer zone between industrial and residential land uses and the remainder left in-situ and avoided by building sites. The Four Step Process to minimize the adverse effects of urbanization is addressed as follows:

Reduce Runoff – To promote infiltration where possible, runoff will be routed across grass buffers (MDCIA) and grass swales will be used to convey surface flow.

Treat and Slowly Release WQCV – Two EDBs are proposed that will provide water quality treatment for the site.

Stabilize Stream Channels – Existing stable channels receiving runoff from the development will receive no increase in flow due to the development. Existing channels within the development will be stabilized as needed and new channels will be designed for stability.

Source Controls – The site includes areas designated for commercial and industrial land use. Therefore, site specific source control practices should be implemented as appropriate to the land usage at the time of construction to protect the receiving waters.

DETENTION FACILITIES

All on-site detention facilities will be designed to accommodate the required full spectrum Excess Urban Runoff Volume (EURV) as described by the Denver Urban Drainage and Flood Control District. These facilities are proposed to be publically owned and maintained by a District. The on-site developed outflows from the detention facilities will be limited to existing levels.

Sizing and placement of the detention facilities are based on the preliminary calculations contained in the Appendix. Additional design information related to exact size, location, and outlet structure design will be provided for each facility within the final drainage report(s) on an as platted basis.

HYDROLOGIC CALCULATIONS

Hydrologic calculations were performed using the City of Colorado Springs/El Paso County Drainage Criteria Manual, dated May 2014. The overall drainage basin design was calculated using HEC-HMS 4.2 and the SCS methodology described in the Drainage Criteria Manual. Hydrologic Soil Group B was used for all calculations to be consistent with the procedures used in the Master Development Drainage Plan and Preliminary Drainage Report for Four Way Ranch, (JR Engineering, March 2005) and the Final Drainage Report for 4 Way Ranch Phase 1 – Filing No. 1, (JR Engineering, March 2006).

FLOODPLAIN STATEMENT

The LOMR dated September, 2008 for Map No. 08041C575 F indicates that a small portion of the southwest corner of the Meadowlake Ranch site may fall within the FEMA 100-year floodplain.

DRAINAGE & BRIDGE FEES

Portions of this site are within both the Bennett Ranch and Haegler Ranch Drainage Basins. The Drainage and Bridge Fees are as follows:

Basin Name	Drainage Fee (per Imp. Acre)	Bridge Fee (per Imp. Acre)
Bennett Ranch	\$11,588	\$4,433
Haegler Ranch	\$10,324	\$1,524

These fees will be calculated according to which basin the developed properties lie within at time of Final Platting using the impervious acreage method approved by El Paso County.

SUMMARY

This proposed development remains consistent with the previously approved reports. All detention facilities will be designed to release at or below existing rates. The proposed development will not adversely impact surrounding developments.

PREPARED BY:

Terra Nova Engineering, Inc.

L Ducett, P.E.

President

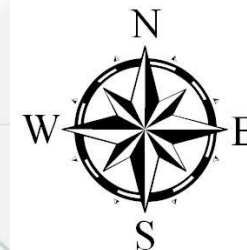
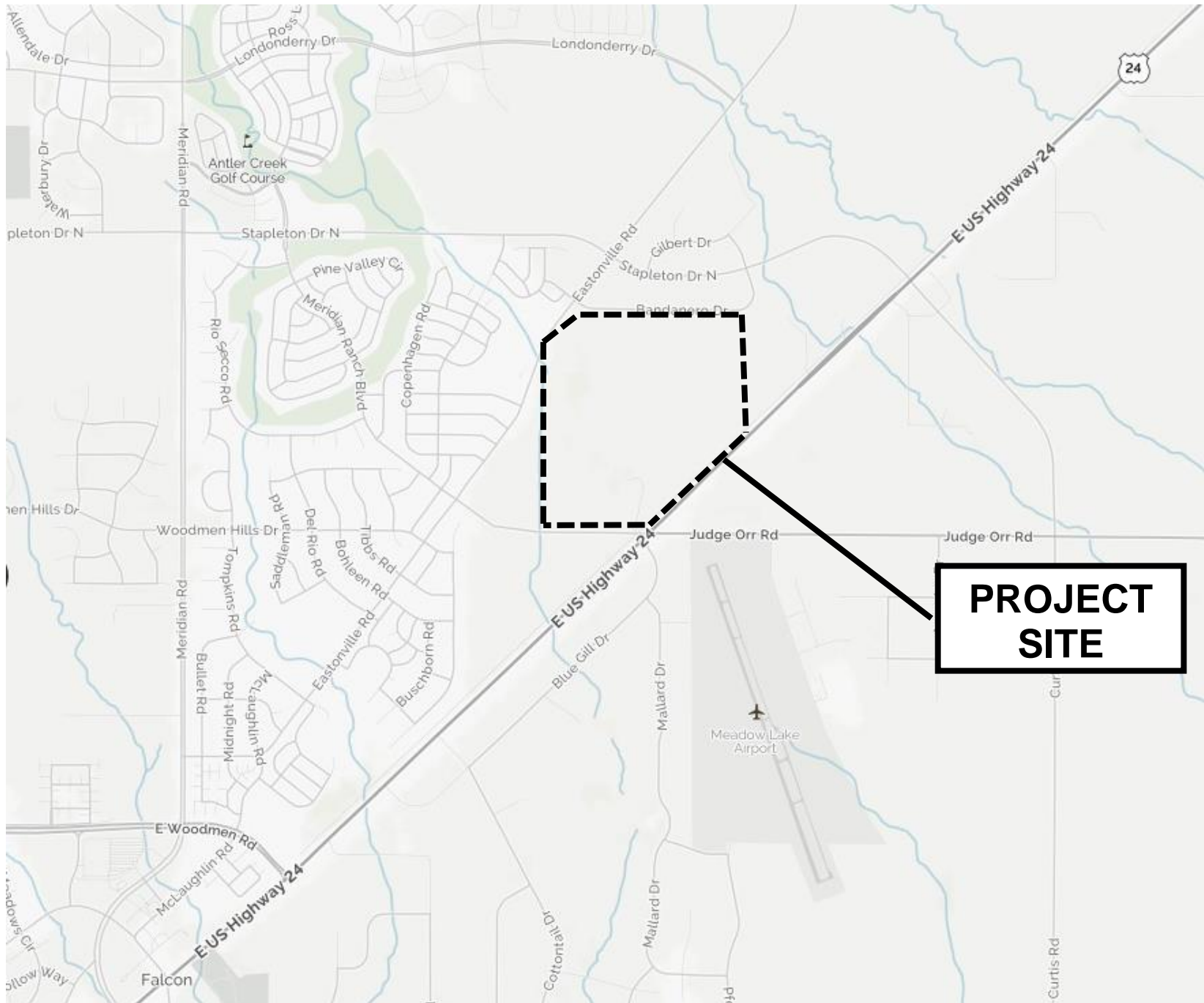
1822.00/DRAINAGE/MDDP Report Items/182200mddp.doc

REFERENCES

1. City of Colorado Springs/County of El Paso Drainage Criteria Manual, dated May 2014.
2. Master Development Drainage Plan Bennett Ranch (URS, August 2000).
3. Bennett Ranch Pilot Project, Drainage Basin Planning Study, (Stormwater & Environmental Consultants, November 2001).
4. Final Drainage And Erosion Control – Woodmen Hills Filing No. 11 (URS, November 2002).
5. Master Development Drainage Plan and Preliminary Drainage Report for Four Way Ranch, (JR Engineering, March 2005).
6. Final Drainage Report for 4 Way Ranch Phase 1 – Filing No. 1, (JR Engineering, March 2006).
7. Eastonville Channel Improvement, Woodmen Hills Metro / GTL Development, (JDS-Hydro Consultants, August 2005).
8. Haegler Ranch Basin, Drainage Basin Planning Study, (URS, May 2009).

APPENDICES

VICINITY MAP



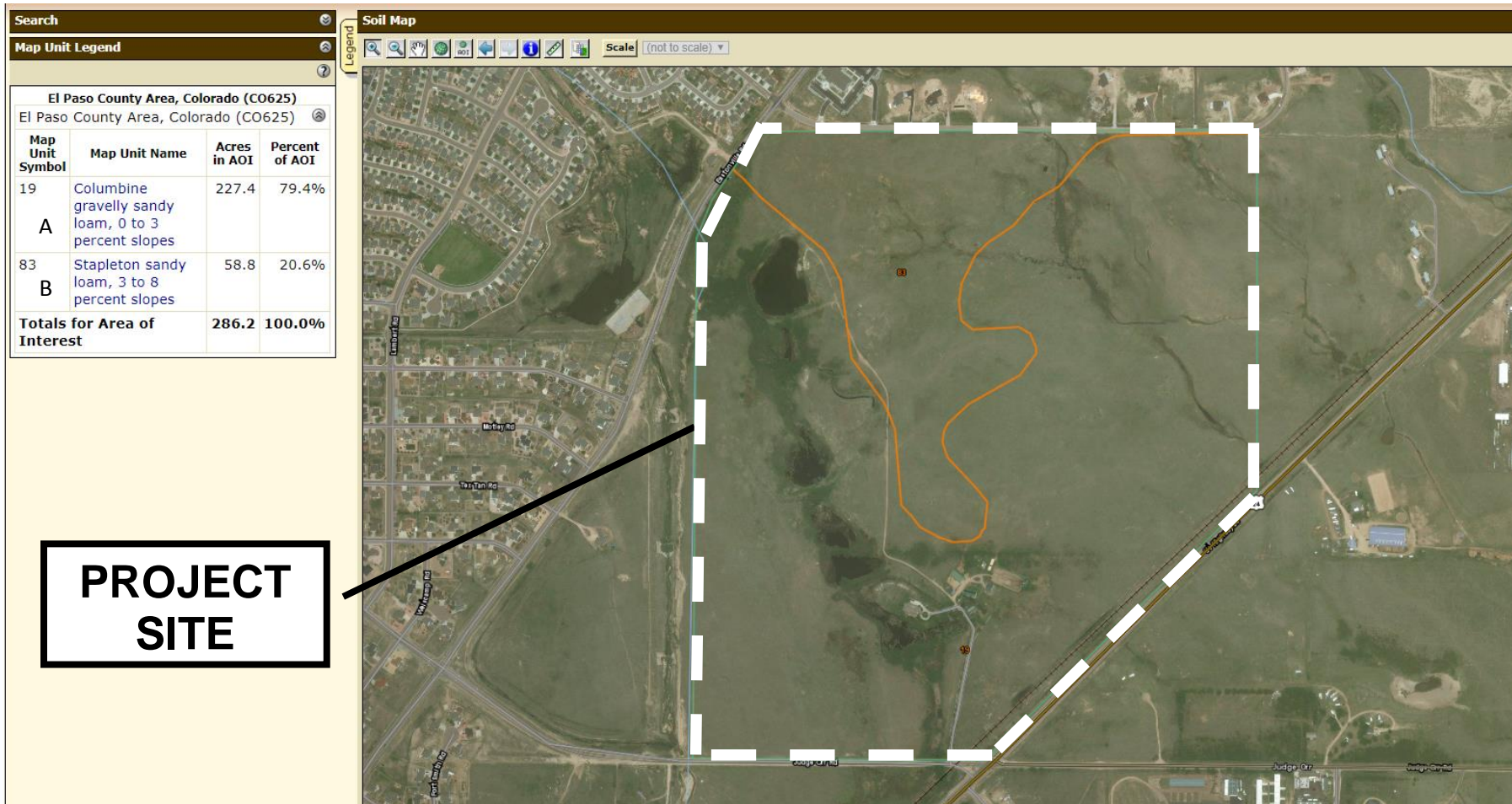
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**PROJECT
SITE**

1822.00 Meadowlake Ranch

VICINITY MAP

SOILS MAP



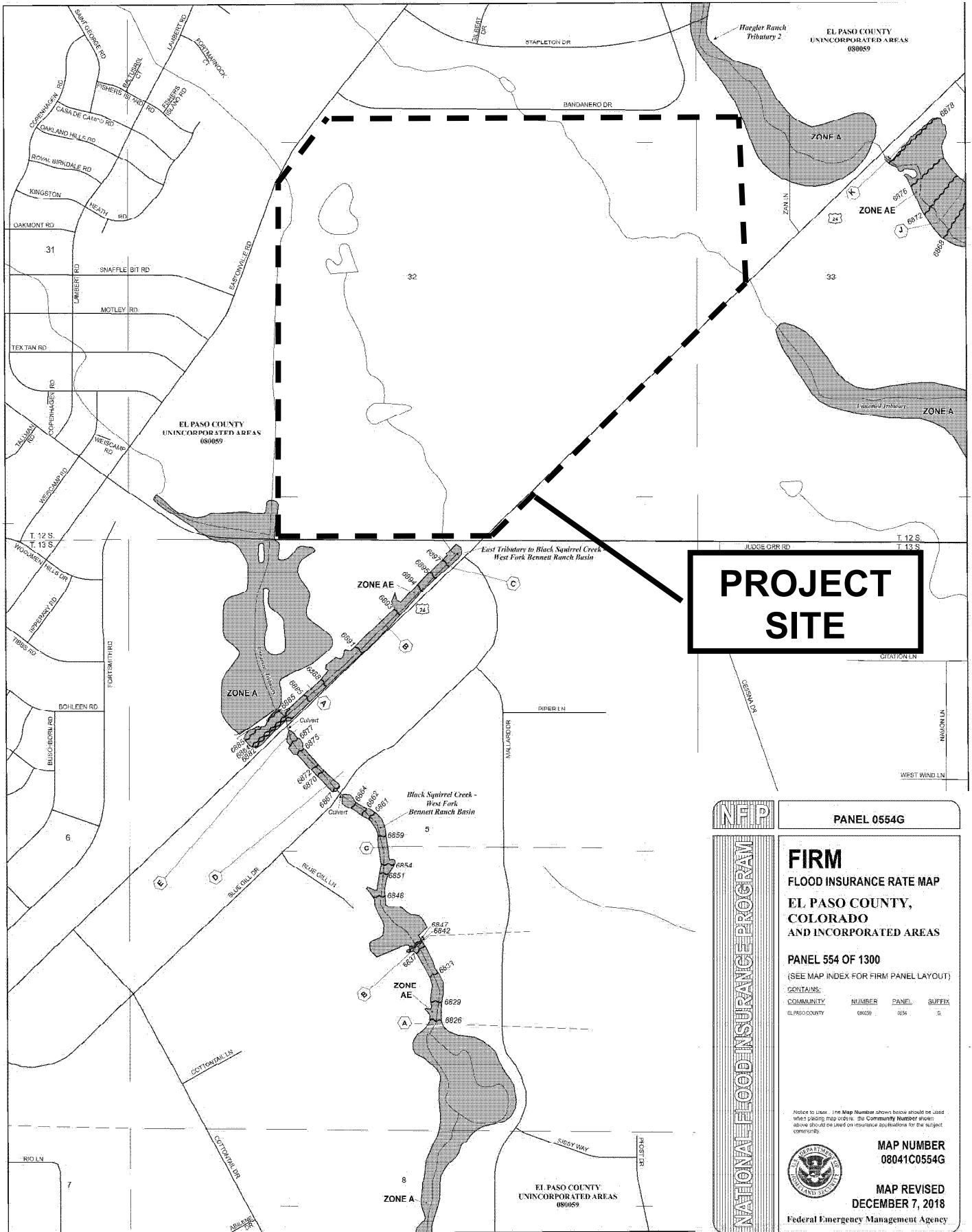
1822.00 Meadowlake Ranch

SOILS MAP



Not to Scale

F.E.M.A MAP



NFP

PANEL 0554G

FIRM

FLOOD INSURANCE RATE MAP

EL PASO COUNTY, COLORADO AND INCORPORATED AREAS

PANEL 554 OF 1300

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
EL PASO COUNTY	08059	554	G

MAP NUMBER
08041C0554G

MAP REVISED
DECEMBER 7, 2018

Federal Emergency Management Agency

1822.00 Meadowlake Ranch

FIRM MAP

EXHIBITS

Bennett Ranch DBPS Plans

Haegler Ranch DBPS Plans

Eastonville Channel Improvements

Meadowlake Ranch Pond/Wetland Areas

Bandanero Drive – HW/D for 30” Pipe Culvert at Basin OS-2

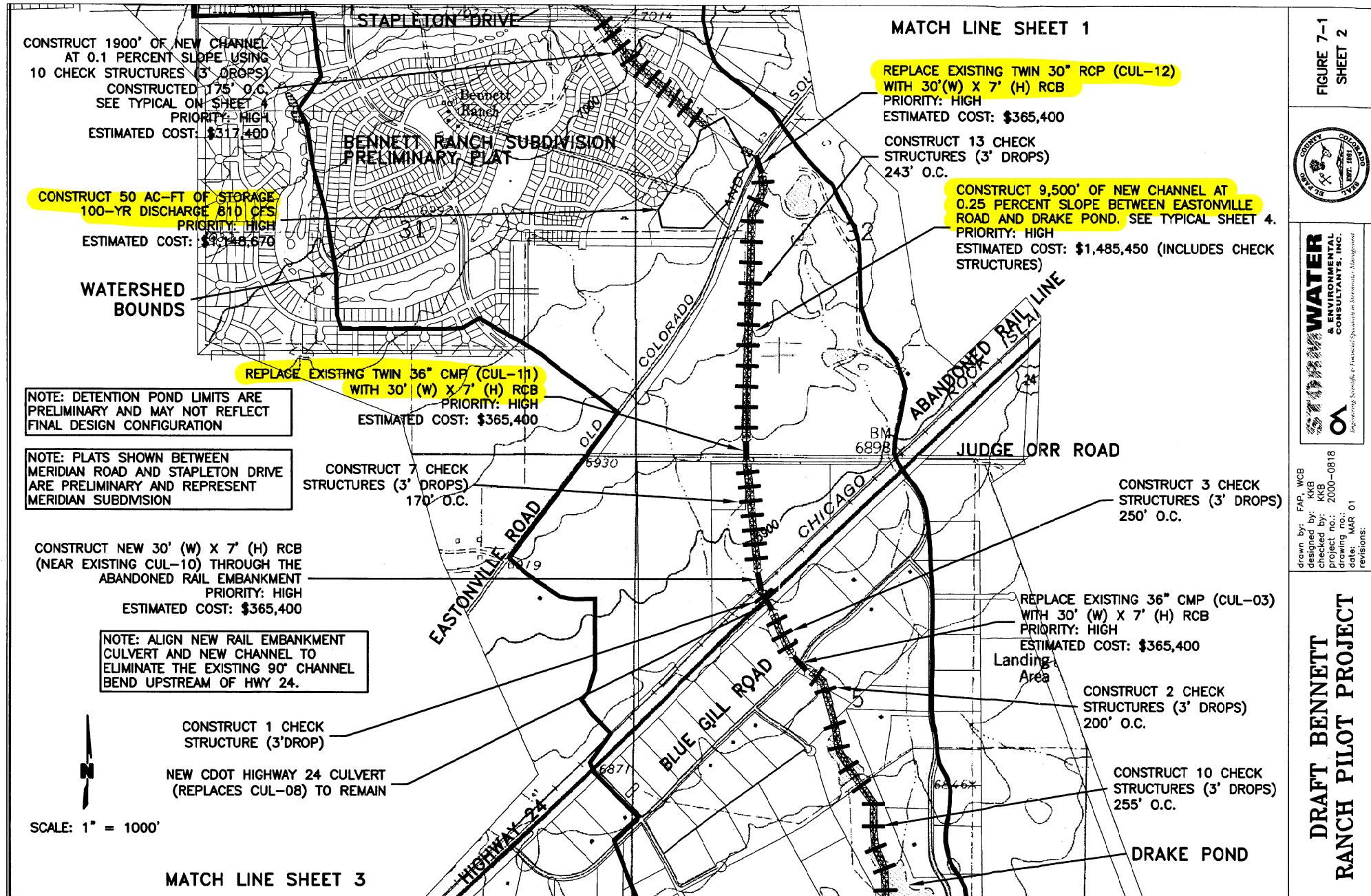
Judge Orr Road – HW/D for 24” Pipe Culvert at Basin EX-1

Design Point 1 Downstream Drainage Way


State Highway 24 – HW/D for Dual 66” Pipe Culverts at Basin EX-3


Meadowlake Ranch Sketch Plan


Sourced from Bennett Ranch Pilot Project, Drainage Basin Planning Study, (Stormwater & Environmental Consultants, November 2001).
Highlighted areas are in the vicinity of the Meadowlake Ranch project site.





Sourced from
Haegler Ranch Basin, Drainage Basin Planning Study
 (URS, May 2009)

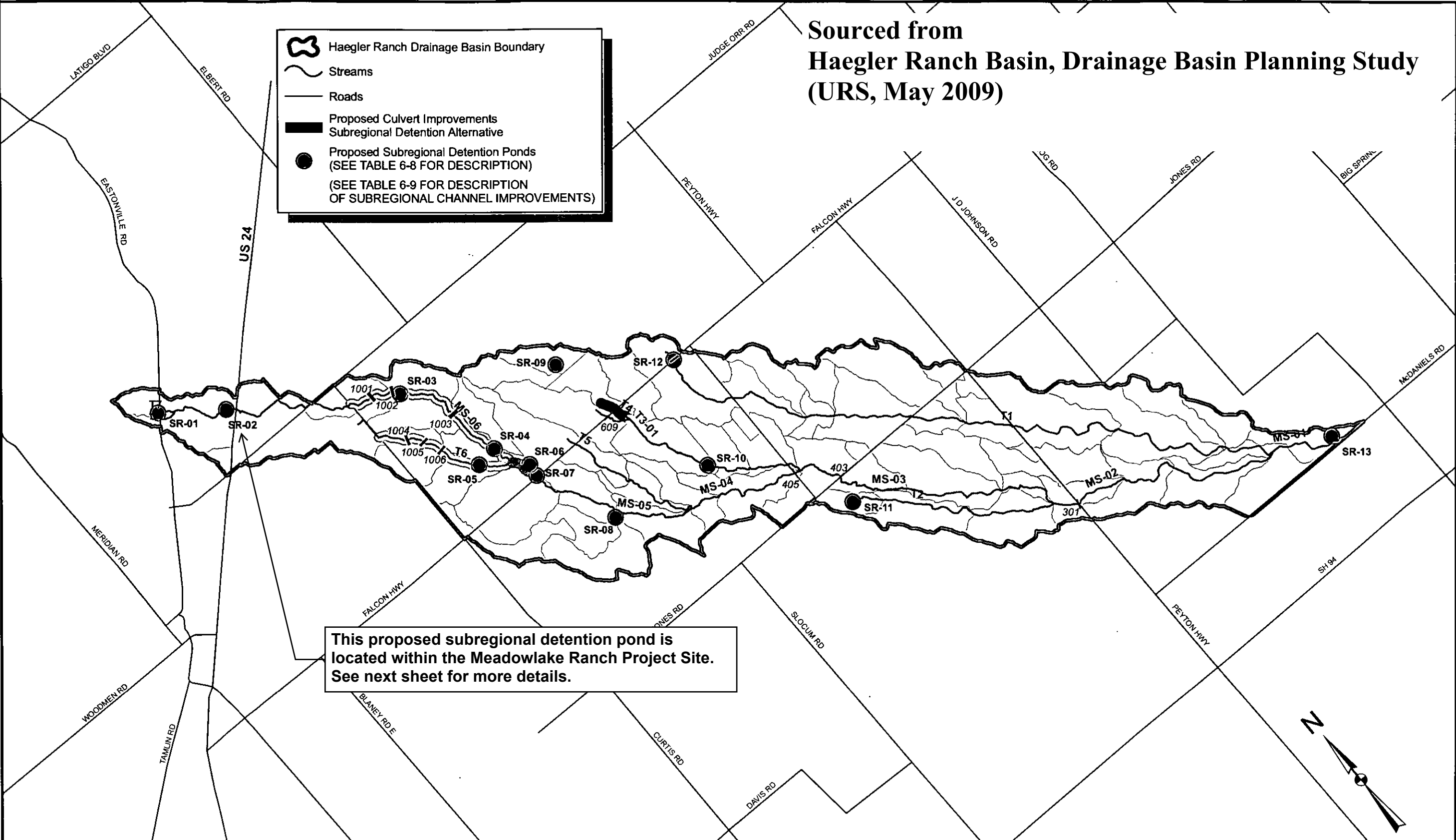

 Haegler Ranch Drainage Basin Boundary


 Streams

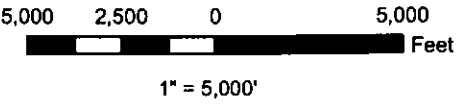

 Roads


 Proposed Culvert Improvements
 Subregional Detention Alternative


 Proposed Subregional Detention Ponds
 (SEE TABLE 6-8 FOR DESCRIPTION)
 (SEE TABLE 6-9 FOR DESCRIPTION
 OF SUBREGIONAL CHANNEL IMPROVEMENTS)



URS
 9960 Federal Dr.
 Suite 300
 Colorado Springs, CO 80921
 719.531.0001

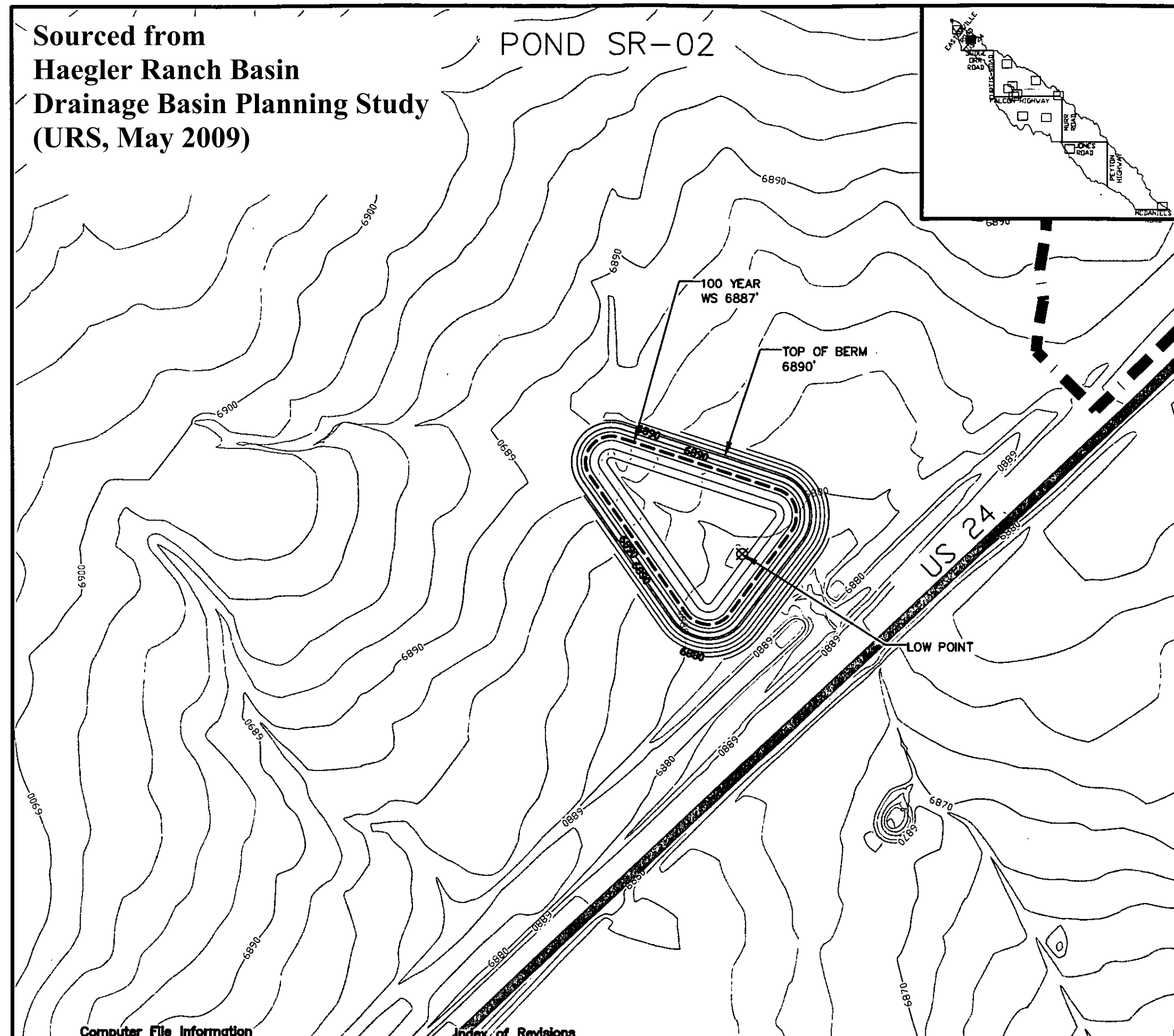


DATE: 05/08

HAEGLER RANCH DRAINAGE BASIN
SUBREGIONAL DETENTION
ALTERNATIVES
FIGURE 6-2

Sourced from
Haegler Ranch Basin
Drainage Basin Planning Study
(URS, May 2009)

POND SR-02



LEGEND	
	PROPOSED CONTOURS - MAJOR ELEVATION
	PROPOSED CONTOURS - MINOR ELEVATION
	EXISTING CONTOURS - MAJOR ELEVATION
	EXISTING CONTOURS - MINOR ELEVATION
	WATERSHED BOUNDARY
	ROADS
	RIVER
	100 YEAR WATER SURFACE ELEVATION
	OUTLET

POND SR-02
DISCHARGE

Q100 250 CFS
Q2 3 CFS

POND VOLUME AC FT 5

BERM WIDTH 10'
SIDESLOPES 8:1



1"=200'



Computer File Information

Index of Revisions

Profiles

Full Path: P:\21711039\CAD\PLANSHTS
Drawing File Name: PONDS.DWG
Acad. Ver. 2006 Scale: 1"=200' Units: Feet





URS

6000 Piedmont Drive, Suite 200
Colorado Springs, CO 80921
(719) 535-0000
Fax (719) 535-0007

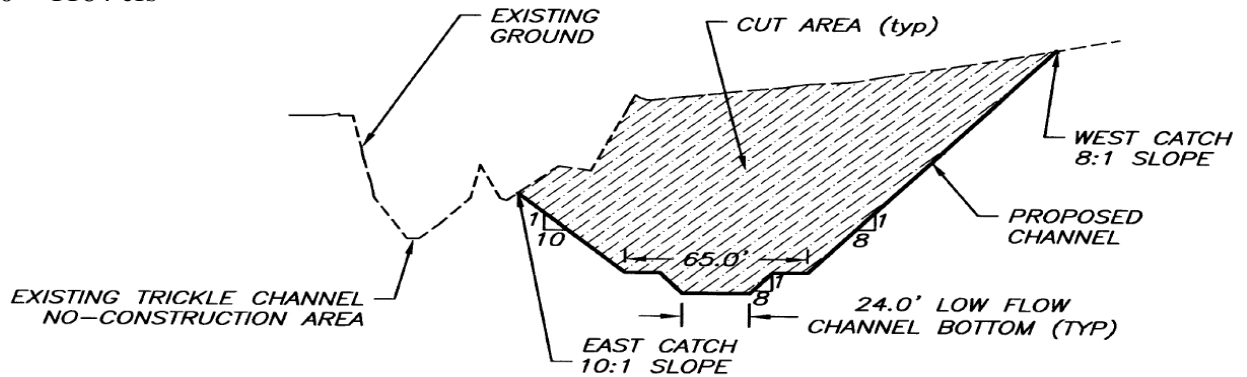
Designed by: KAP
Detailed by: DRM
Checked by: JAJ

Structure
Numbers

HAEGLER RANCH DRAINAGE BASIN
Sheet Number SR02

Eastonville Channel Capacity (depth = 2.5 ft)

Q100 = 1164 cfs



**TYPICAL
CHANNEL DETAIL SECTION**

Low Flow Channel	
Z ₁ :1 (side slopes, ft)	8
Z ₂ :1 (side slopes, ft)	8
w (bottom width, ft)	24
d (depth, ft)	1
Area (sqft)	40.00
Wetted Perimeter (ft)	40.12

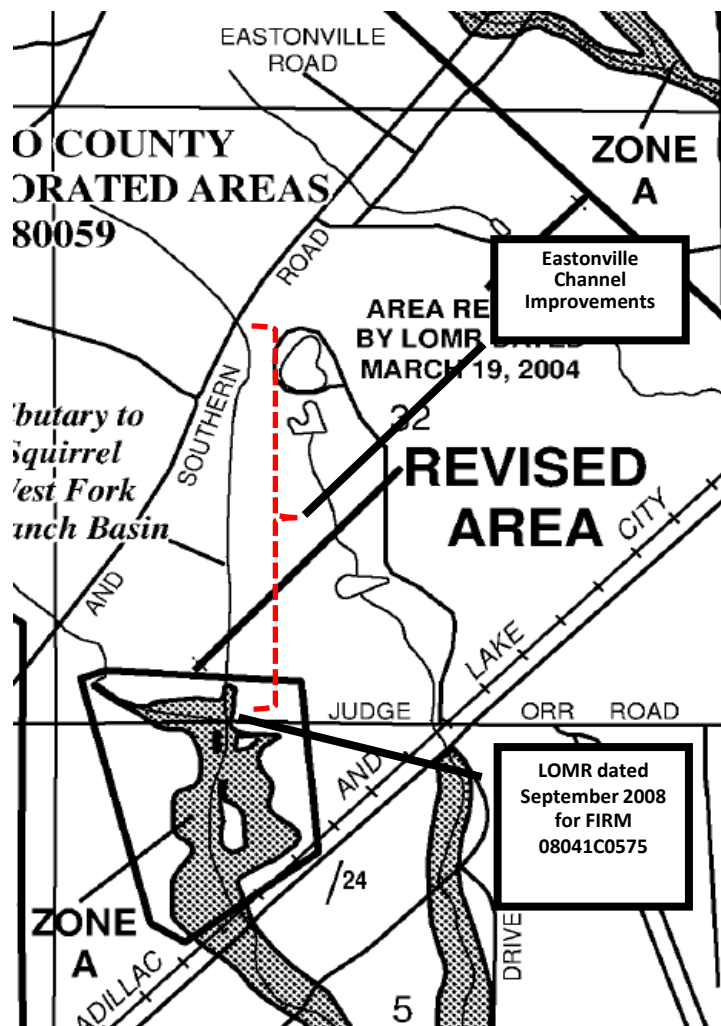
Above Low Flow Channel	
Z ₁ :1 (side slopes, ft)	10
Z ₂ :1 (side slopes, ft)	8
w (bottom width, ft)	65
d (depth, ft)	1.5
Area (sqft)	124.50
Wetted Perimeter (ft)	83.25

Area = 40.00 + 124.50 = 164.50 sqft

Wetted Perimeter = 40.12 + 83.25 - 40.00 = 83.37 ft

Channel at 2.5 ft deep	
n (mannings)	0.033
s (channel slope, ft/ft)	0.01
Area (sqft)	164.50
Wetted Perimeter (ft)	83.37
Velocity (fps)	7.1
Q (cfs)	1171.1

> 1164 cfs



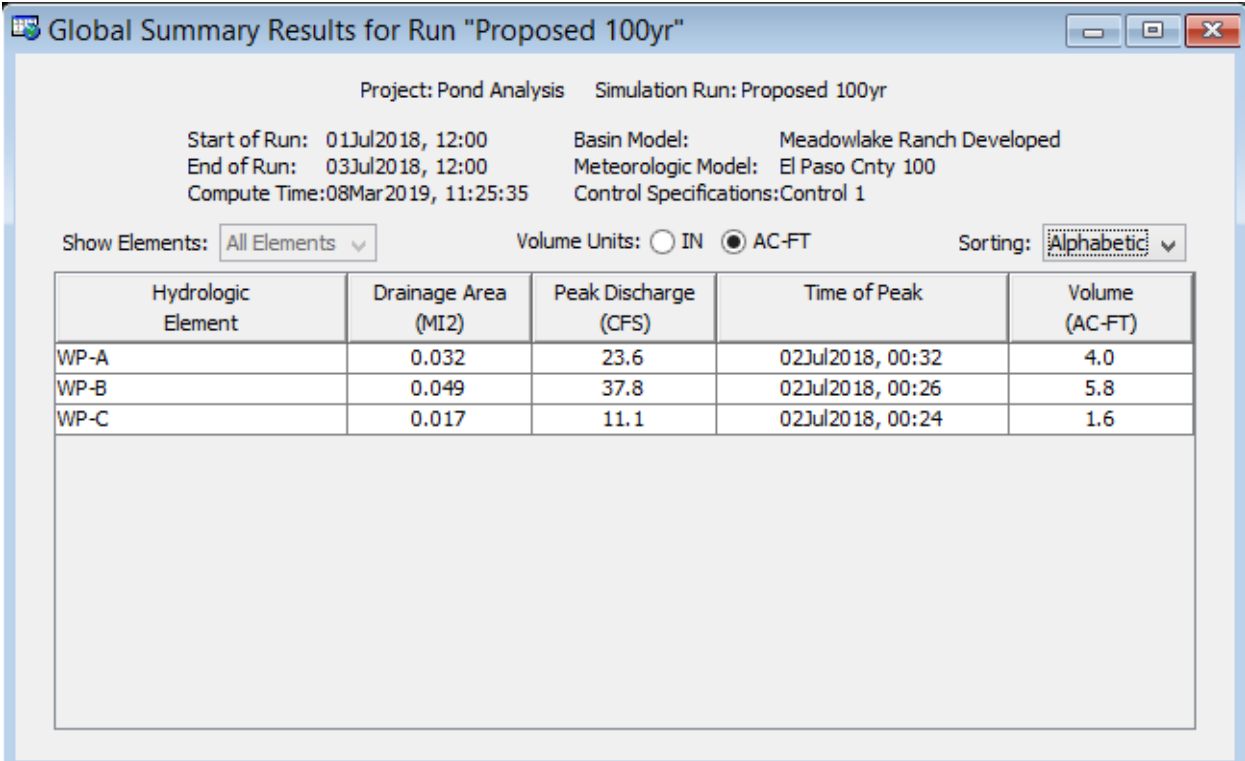


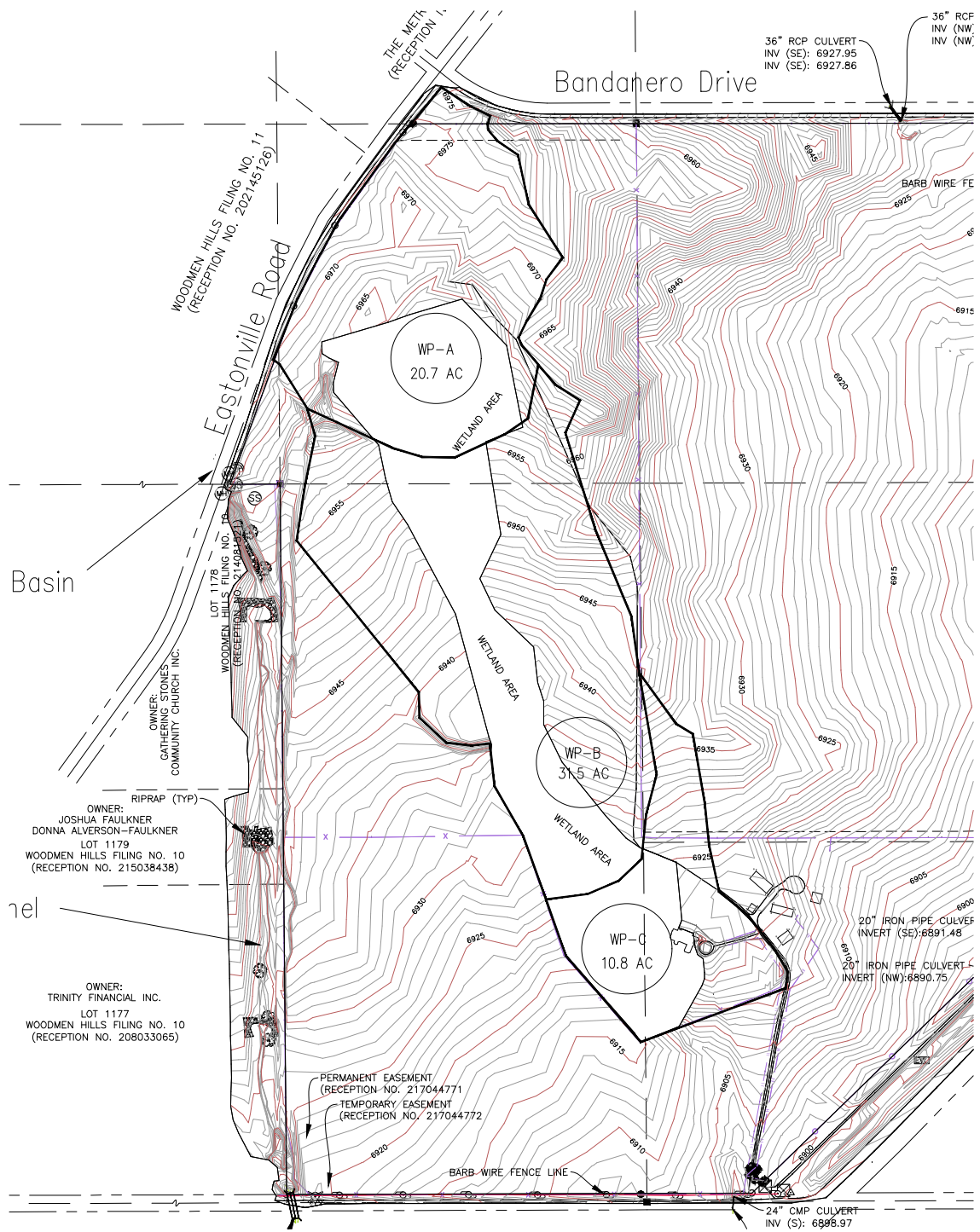
WP-A

WP-B

WP-C

**Meadowlake Ranch
Wetland Area / Pond**





SCS METHOD - CN & Percent Impervious
Meadowlake Ranch

BASIN	TOTAL		WEIGHTED	UNDEVELOPED		COMMERCIAL		RANCH or INDUSTRIAL		URBAN RES.		RURAL RES.	
	(Acres)	(sq mi)	CN	AREA (Acres)	CN	AREA (Acres)	CN	AREA (Acres)	CN	AREA (Acres)	CN	AREA (Acres)	CN
WP-A	20.7	0.032	69	5.2	61					15.5	72		
WP-B	31.5	0.049	68	10.7	61					20.8	72		
WP-C	10.8	0.017	65	6.6	61					4.20	72		

BASIN	TOTAL		WEIGHTED	UNDEVELOPED		COMMERCIAL		RANCH or INDUSTRIAL		URBAN RES.		RURAL RES.	
	(Acres)	(sq mi)	% Imp	AREA (Acres)	% Imp	AREA (Acres)	% Imp	AREA (Acres)	% Imp	AREA (Acres)	% Imp	AREA (Acres)	% Imp
WP-A	20.7	0.032	22	5.2	0					15.5	30		
WP-B	31.5	0.049	20	10.7	0					20.8	30		
WP-C	10.8	0.017	12	6.6	0					4.2	30		

SCS METHOD - Time of Concentration

Meadowlake Ranch

BASIN: WP-A

T_c		T_{lag}	
(hr)	(min)	(hr)	(min)
1.05	63	0.63	38

OVERLAND FLOW					
n	P ₂	Length	Height	Slope	T _i
	(in)	(ft)	(ft)	(ft/ft)	(hr)
n from Table 6-11: dense grasses					
0.24	1.19	300	5.0	0.017	1.01

SHALLOW CONC. FLOW			
Length	Slope	Velocity	T _t
(ft)	(%)	(fps)	(hr)
Velocity from Fig. 6.25: Grassed Waterway			
398	2.8%	2.5	0.04

CONCENTRATED FLOW		
Length	Velocity	T _t
(ft)	(fps)	(hr)
Velocity from Mannings Equation		
0	4.6	0.00

Mannings Equation			
Open Channel		Mannings Equation	
z:1 (side slopes, ft)	50	Pipe Flowing 1/2 Full	
w (bottom width, ft)	0	d (diameter, in)	
d (depth, ft)	1	n (mannings)	
n (roughness coef.)	0.025	s (pipe slope, ft/ft)	
s (channel slope, ft/ft)	0.015	Area (sqft)	0.00
Area (sqft)	50.00	Wetted Perimeter (ft)	0.00
Wetted Perimeter (ft)	100.02	Velocity (fps)	#DIV/0!
Velocity (fps)	4.6		

SCS METHOD - Time of Concentration

Meadowlake Ranch

BASIN: WP-B

T_c		T_{lag}	
(hr)	(min)	(hr)	(min)
0.92	55	0.55	33

OVERLAND FLOW					
n	P ₂	Length	Height	Slope	T _i
	(in)	(ft)	(ft)	(ft/ft)	(hr)
n from Table 6-11: dense grasses					
0.24	1.19	300	11.0	0.037	0.74

SHALLOW CONC. FLOW			
Length	Slope	Velocity	T _t
(ft)	(%)	(fps)	(hr)
Velocity from Fig. 6.25: Grassed Waterway			
1300	1.8%	2.0	0.18

CONCENTRATED FLOW		
Length	Velocity	T _t
(ft)	(fps)	(hr)
Velocity from Mannings Equation		
0	4.6	0.00

Mannings Equation			
Open Channel		Mannings Equation	
z:1 (side slopes, ft)	50	Pipe Flowing 1/2 Full	
w (bottom width, ft)	0	d (diameter, in)	
d (depth, ft)	1	n (mannings)	
n (roughness coef.)	0.025	s (pipe slope, ft/ft)	
s (channel slope, ft/ft)	0.015	Area (sqft)	0.00
Area (sqft)	50.00	Wetted Perimeter (ft)	0.00
Wetted Perimeter (ft)	100.02	Velocity (fps)	#DIV/0!
Velocity (fps)	4.6		

SCS METHOD - Time of Concentration Meadowlake Ranch

BASIN: WP-C

T_c		T_{lag}	
(hr)	(min)	(hr)	(min)
0.85	51	0.51	30

OVERLAND FLOW					
n	P ₂	Length	Height	Slope	T _i
	(in)	(ft)	(ft)	(ft/ft)	(hr)
n from Table 6-11: dense grasses					
0.24	1.19	300	10.0	0.033	0.77

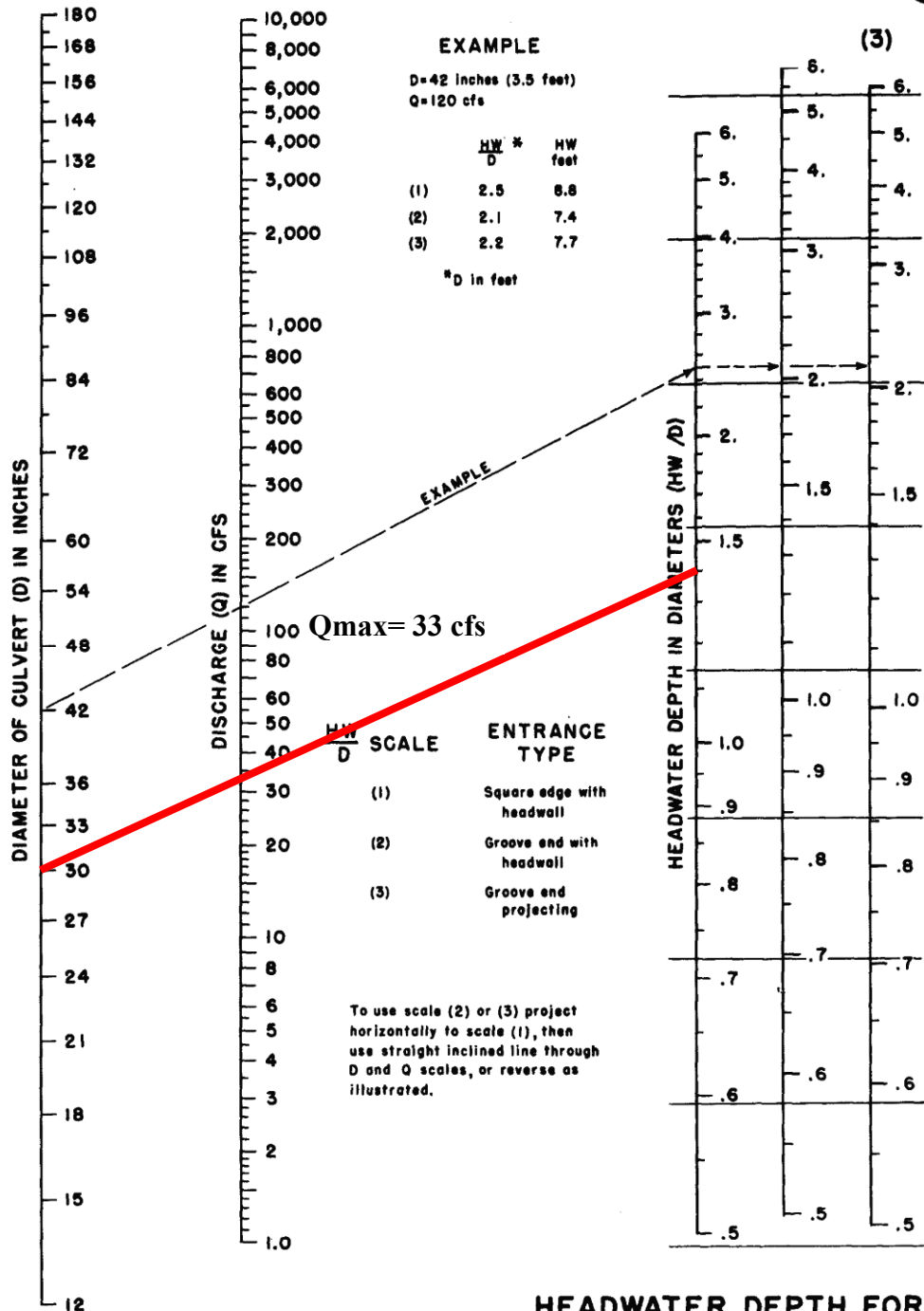
SHALLOW CONC. FLOW			
Length	Slope	Velocity	T _t
(ft)	(%)	(fps)	(hr)
Velocity from Fig. 6.25: Grassed Waterway			
604	2.0%	2.1	0.08

CONCENTRATED FLOW		
Length	Velocity	T _t
(ft)	(fps)	(hr)
Velocity from Mannings Equation		
0	4.6	0.00

Mannings Equation			
Open Channel			
z:1 (side slopes, ft)	50	Mannings Equation	
w (bottom width, ft)	0	Pipe Flowing 1/2 Full	
d (depth, ft)	1	d (diameter, in)	
n (roughness coef.)	0.025	n (mannings)	
s (channel slope, ft/ft)	0.015	s (pipe slope, ft/ft)	
Area (sqft)	50.00	Area (sqft)	0.00
Wetted Perimeter (ft)	100.02	Wetted Perimeter (ft)	0.00
Velocity (fps)	4.6	Velocity (fps)	#DIV/0!

Single 30" Pipe Culvert under Bandanero Drive (Basin OS-2)
 Square Edge with Headwall
 Maximum allowable HW/D = 1.4

CHART 1B

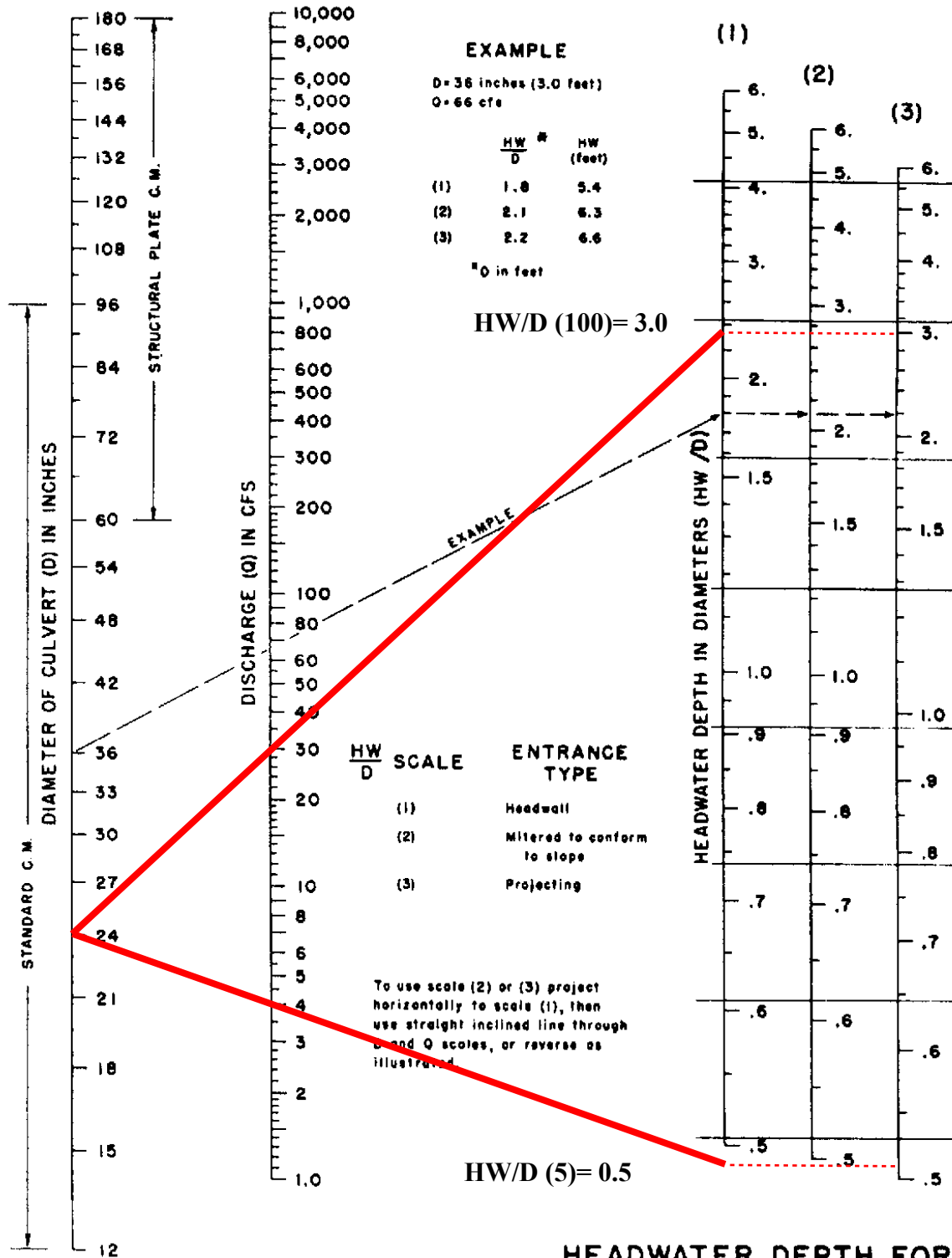


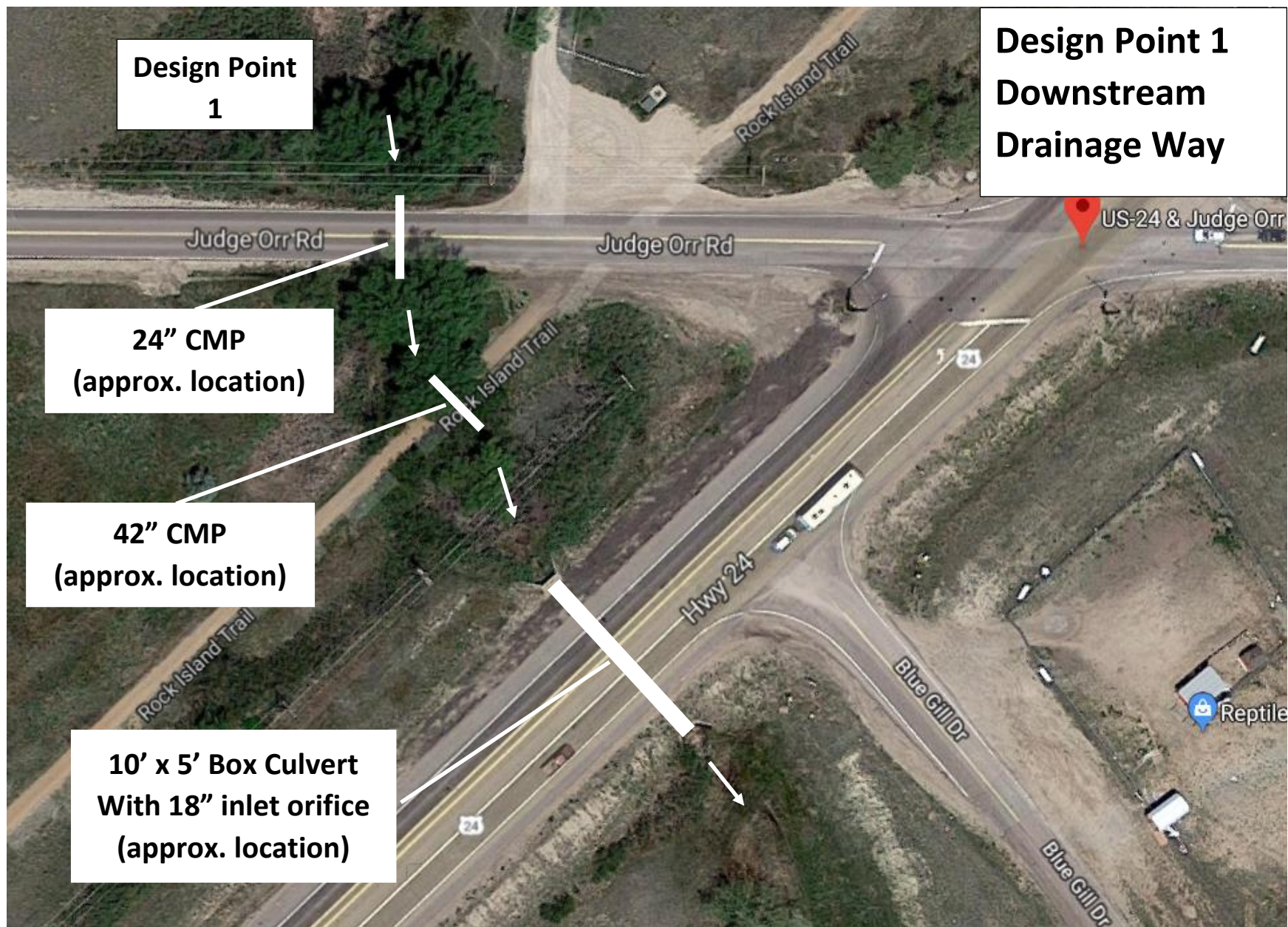
HEADWATER DEPTH FOR CONCRETE PIPE CULVERTS WITH INLET CONTROL

HEADWATER SCALES 2 & 3
 REVISED MAY 1964

Single 24" Pipe Culvert under Judge Orr Road (Design Point 1)
 Q5= 4.0 cfs, Q100= 29.1 cfs
 Projecting End

CHART 2B





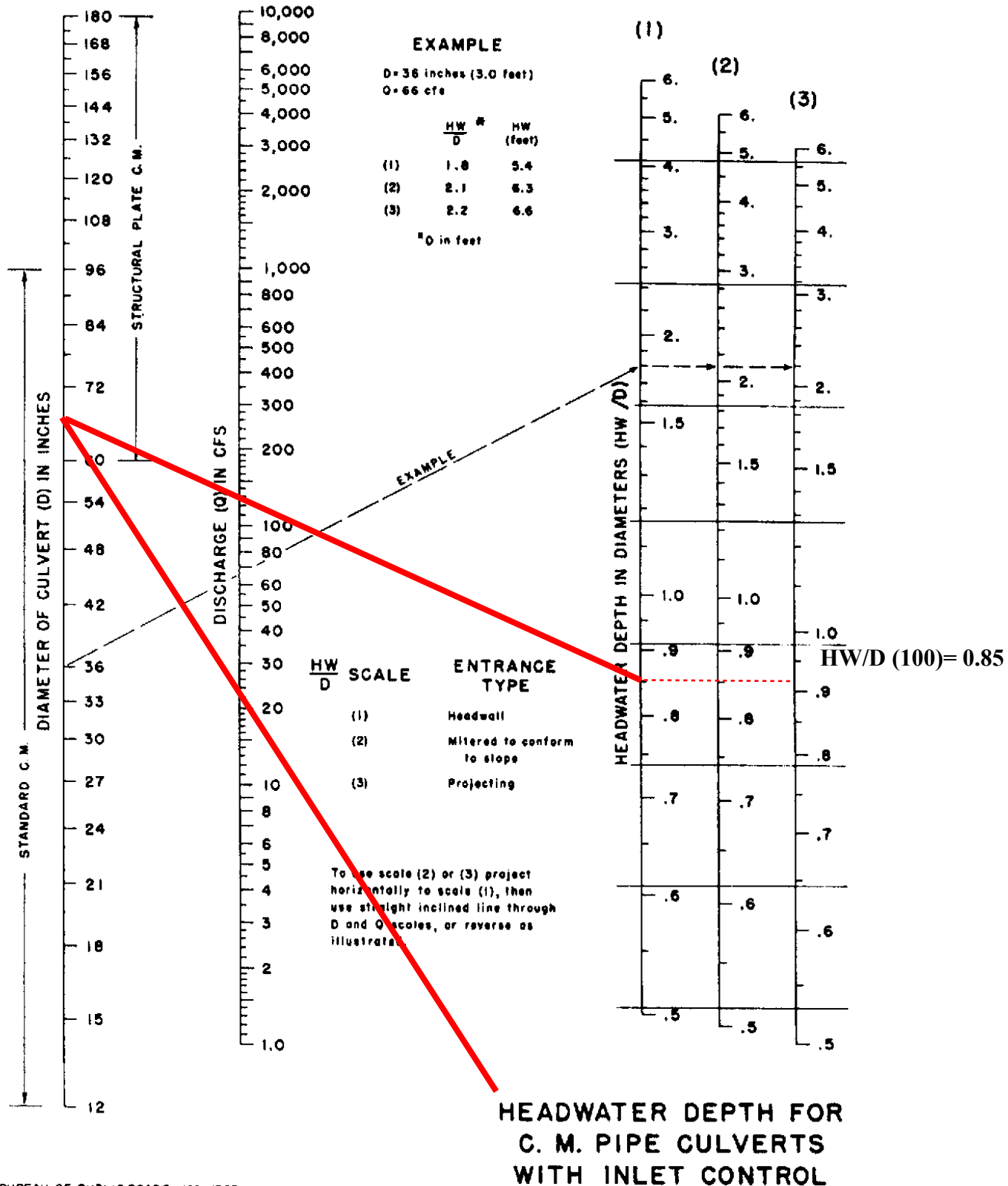
Dual 66" Pipe Culverts under Highway 24 (Design Point 3)

Total Flow: Q5= 41.1 cfs, Q100= 247.0 cfs

(Q5= 20.6 cfs per culvert, Q100= 123.5 cfs per barrel)

Projecting End

CHART 2B



MEADOWLAKE RANCH SKETCH PLAN

LOCATED IN SECTION 32 & SECTION 33, TOWNSHIP 12 SOUTH,
RANGE 64 WEST OF THE 6TH PRINCIPAL MERIDIAN

Owner:
Daniel S. Ferguson
13202 Judge Orr Rd.
Peyton, CO 80831

Planner/Landscape Architect:
N.E.S. Inc.
619 N. Cascade Ave. Suite 200
Colorado Springs, Colorado 80903

Civil Engineer:
Terra Nova Engineering, Inc.
Ability Design Build, LLC
721 S. 23rd St.
Colorado Springs, Colorado 80904

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Landscape
Architecture

Urban Design

NES

N.E.S. Inc.
619 N. Cascade Avenue, Suite 200
Colorado Springs, CO 80903

Tel. 719.471.0073
Fax 719.471.0267

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LEGAL DESCRIPTION

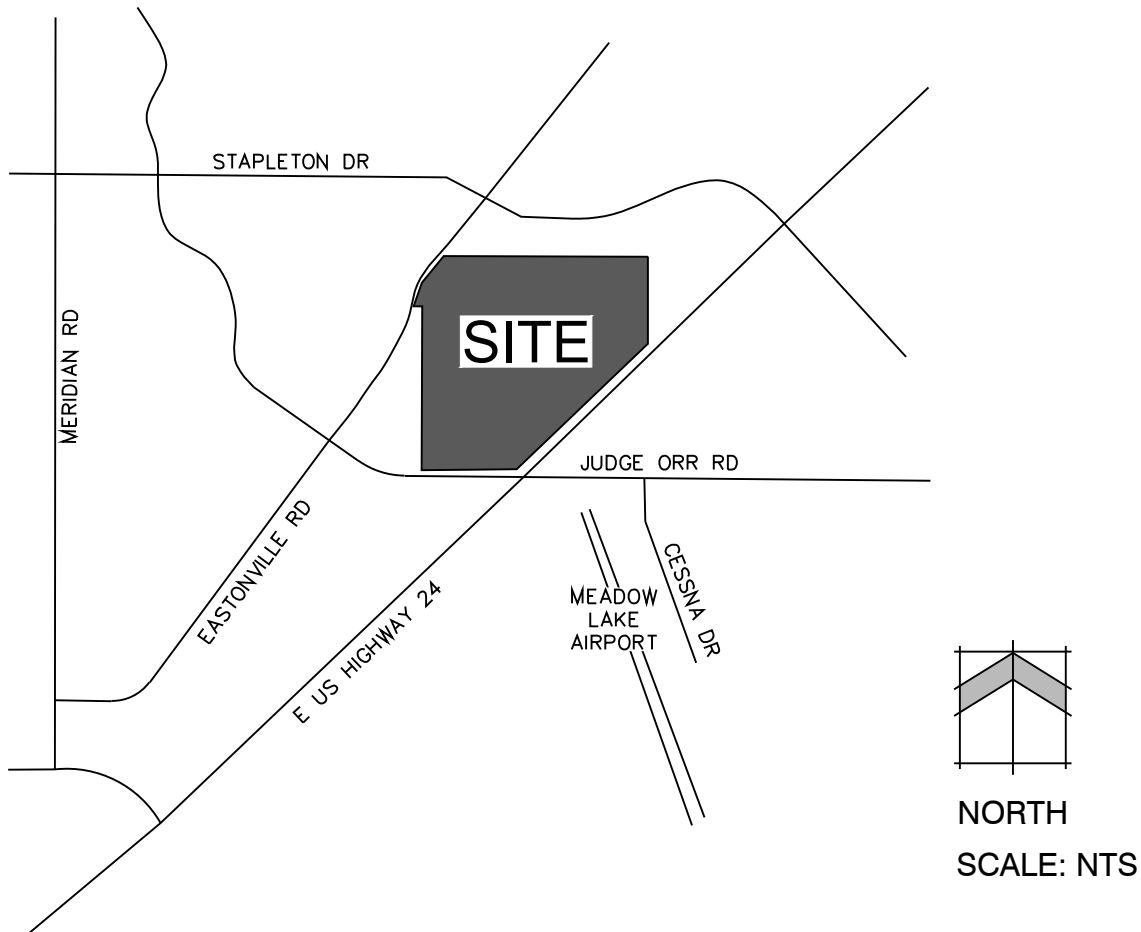
PARCEL A:
THAT PORTION OF THE SOUTHEAST QUARTER OF THE NORTHWEST QUARTER, THE EAST HALF OF THE SOUTHWEST QUARTER, THE SOUTHEAST QUARTER, AND THE SOUTH HALF OF THE NORTHEAST QUARTER OF SECTION 32, TOGETHER WITH THAT PORTION OF THE SOUTHWEST QUARTER OF THE NORTHWEST QUARTER, AND THE NORTHWEST QUARTER OF THE THE SOUTHWEST QUARTER SECTION 33, ALL IN TOWNSHIP 12 SOUTH, RANGE 64 WEST OF THE 6TH PRINCIPAL MERIDIAN, EL PASO COUNTY, COLORADO, MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT THE SOUTHWEST CORNER OF SAID EAST HALF OF THE SOUTHWEST QUARTER OF SECTION 32, THENCE NORTH ALONG THE WEST LINE OF SAID EAST HALF TO THE SOUTHWEST CORNER OF SAID SOUTHEAST QUARTER OF THE NORTHWEST QUARTER, THENCE NORTH ALONG THE WEST LINE OF SAID SOUTHEAST QUARTER OF THE NORTHWEST QUARTER TO ITS INTERSECTION WITH THE NORTHWESTERLY RIGHT OF WAY LINE OF THE COLORADO AND SOUTHERN RAILROAD, SAID LINE ALSO BEING THE SOUTHEASTERLY RIGHT OF WAY OF EASTONVILLE ROAD, THENCE NORTHEASTERLY ALONG SAID SAID SOUTHEASTERLY RIGHT OF WAY TO ITS INTERSECTION WITH THE NORTH LINE OF SAID SOUTHEAST QUARTER OF THE NORTHWEST QUARTER, THENCE EAST ALONG SAID NORTH LINE OF THE SOUTHEAST QUARTER OF THE NORTHWEST QUARTER TO THE NORTHWEST CORNER OF SAID NORTH (SOUTH) HALF OF THE NORTHEAST QUARTER, THENCE EAST ALONG THE NORTH LINE OF SAID NORTH (SOUTH) HALF TO THE NORTHWEST CORNER OF SAID SOUTHWEST QUARTER OF THE THE NORTHWEST QUARTER OF SAID SECTION 33, THENCE EAST ALONG THE NORTH LINE OF SAID SOUTHWEST QUARTER OF THE NORTHWEST QUARTER TO THE WEST LINE OF THAT TRACT OF LAND DESCRIBED IN DEED RECORDED NOVEMBER 26, 1971 IN BOOK 2451 AT PAGE 758 OF THE RECORDS OF SAID COUNTY, THENCE SOUTH ALONG SAID WEST LINE TO ITS INTERSECTION WITH THE NORTH LINE OF SAID NORTHWEST QUARTER OF THE SOUTHWEST QUARTER OF SECTION 33, THENCE CONTINUE SOUTH ALONG SAID WEST LINE TO ITS INTERSECTION WITH THE NORTHWESTERLY RIGHT OF WAY LINE OF THE CHICAGO, ROCK ISLAND AND PACIFIC RAILROAD, THENCE SOUTHWESTERLY ALONG SAID NORTHWESTERLY RIGHT OF WAY LINE TO ITS INTERSECTION WITH THE EAST LINE OF SAID SECTION 32, THENCE CONTINUING SOUTHWESTERLY ALONG SAID NORTHWESTERLY RIGHT OF WAY LINE TO ITS INTERSECTION WITH THE SOUTH LINE OF SAID SECTION 32, THENCE WEST ALONG SAID SOUTH LINE TO THE POINT OF BEGINNING; EXCEPTING THEREFROM THE SOUTH 38 FEET OF THE NORTHWEST QUARTER OF THE SOUTHEAST QUARTER OF SECTION 32.

PARCEL B:
THE SOUTHEAST QUARTER OF THE SOUTHWEST QUARTER OF THE NORTHWEST QUARTER OF SECTION 32, TOWNSHIP 12 SOUTH, RANGE 64 WEST OF THE 6TH P.M., COUNTY OF EL PASO, STATE OF COLORADO, LYING EASTERLY OF EASTONVILLE ROAD ALSO SHOWN AS TRACT 16 ON THE LAND SURVEY PLAT OF HUGH BENNETT ESTATES RECORDED SEPTEMBER 23, 1997 UNDER RECEPTION NO. 97111407 AND APRIL 8, 1998 UNDER RECEPTION NO. 98045158.

TOTAL ACERAGE IS 307.469 AC.

VICINITY MAP



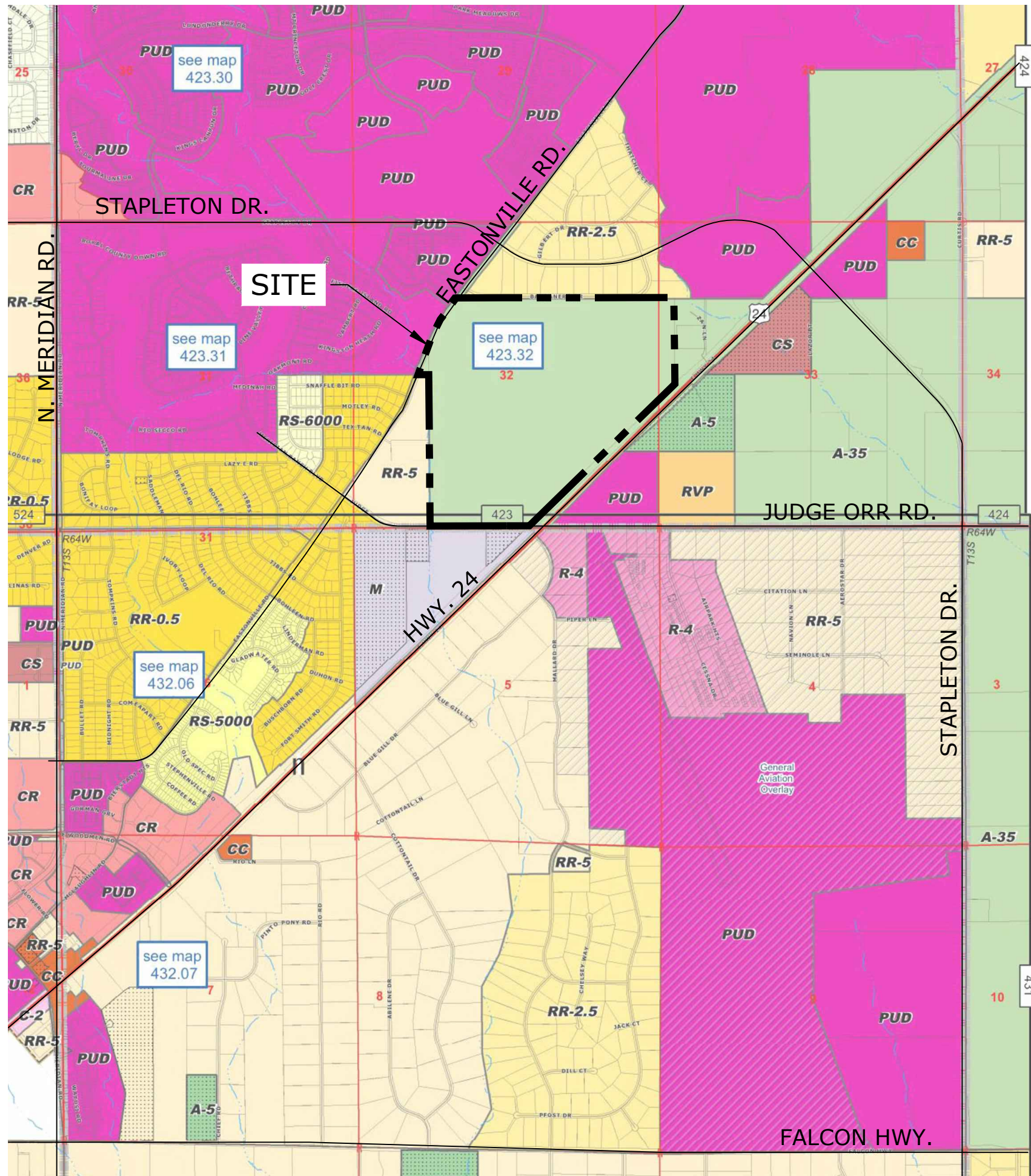
GENERAL NOTES

1. A NOXIOUS WEED MANAGEMENT PLAN WILL BE PROVIDED WITH THE PRELIMINARY PLAN.
2. A NOISE STUDY FOR HIGHWAY 24 WILL BE PROVIDED WITH THE PRELIMINARY PLAN.
3. THE PROPERTY IS SUBJECT TO FINDINGS OF A GEOLOGIC HAZARD REPORT BY ENTECH DATED JULY 30, 2018. CONTACT EL PASO COUNTY PLANNING & COMMUNITY DEVELOPMENT IF YOU WOULD LIKE TO REVIEW A COPY OF SAID REPORT.
4. NO ACCESS PERMITTED TO HIGHWAY 24.
5. SETBACKS AND BUFFERS BETWEEN INDUSTRIAL LAND USE AND RESIDENTIAL LAND USE WILL BE ESTABLISHED WITH ZONING AND PRELIMINARY PLAN.
6. NO PORTION OF THE MEADOWLAKE RANCH SITE FALLS WITHIN THE FEMA 100-YEAR FLOODPLAIN AS DESIGNATED ON MAP NO. 08041C575F.
7. ALL PROPOSED ACCESS LOCATIONS AND PROPOSED ROADS ON THIS SKETCH PLAN ARE CONCEPTUAL AND SUBJECT TO CHANGE. DEVIATION REQUESTS MUST BE APPROVED FOR TRANSPORTATION AND ACCESS DESIGN THAT IS NOT IN CONFORMANCE WITH EPC ENGINEERING CRITERIA MANUAL STANDARDS.
8. DISTRICTS PROVIDING SERVICE:
 - ELECTRIC- MOUNTAIN VIEW ELECTRIC
 - GAS- COLORADO SPRINGS UTILITIES
 - FIRE PROTECTION- FALCON PROTECTION DISTRICT
 - SCHOOLS- FALCON DISTRICT #49
 - WATER AND WASTEWATER- PROPOSED WOODMEN HILLS METROPOLITAN DISTRICT
9. INTERNAL TRAIL CONNECTIONS TO THE ROCK ISLAND TRAIL WILL BE SHOWN ON PRELIMINARY PLANS.
10. A 25' EASEMENT WILL BE PROVIDED FOR COUNTY TRAILS ALONG THE NORTH SIDE OF JUDGE ORR RD. AND THE EAST SIDE OF EASTONVILLE RD., TO BE SHOWN ON PRELIMINARY PLANS.
11. TERMS, CONDITIONS, PROVISIONS, BURDENS, OBLIGATIONS AND EASEMENTS AS SET FORTH AND GRANTED IN AVIGATION EASEMENT GRANTED TO MEADOW LAKE AIRPORT, RECORDED APRIL 08, 1969, IN BOOK 2285 AT PAGE 310.
12. IT IS ANTICIPATED THAT HIGH GROUNDWATER LEVELS WILL REQUIRE AN UNDERDRAIN SYSTEM, IN OR NEXT TO THE PUBLIC STREETS. LOCATION AND MAINTENANCE OF ANY UNDERDRAIN SYSTEMS WILL BE DETERMINED WITH FUTURE DESIGN.

DISTRICTS PROVIDING SERVICE:

1. ELECTRIC: MOUNTAIN VIEW ELECTRIC
2. GAS: COLORADO SPRINGS UTILITIES
3. FIRE PROTECTION: FALCON PROTECTION DISTRICT
4. SCHOOLS: FALCON DISTRICT #49
5. WATER AND WASTEWATER- PROPOSED: WOODMEN HILLS METROPOLITAN DISTRICT

ZONING MAP



SHEET INDEX

- | | |
|---------------|------------------------------|
| Sheet 1 of 3: | Cover Sheet |
| Sheet 2 of 3: | Sketch Plan |
| Sheet 3 of 3: | Adjacent Property Owners Map |

MEADOWLAKE RANCH

SKETCH PLAN

DATE: 6-13-18
PROJECT MGR: J. MAYNARD
PREPARED BY: R. SAWYER

ENTITLEMENT

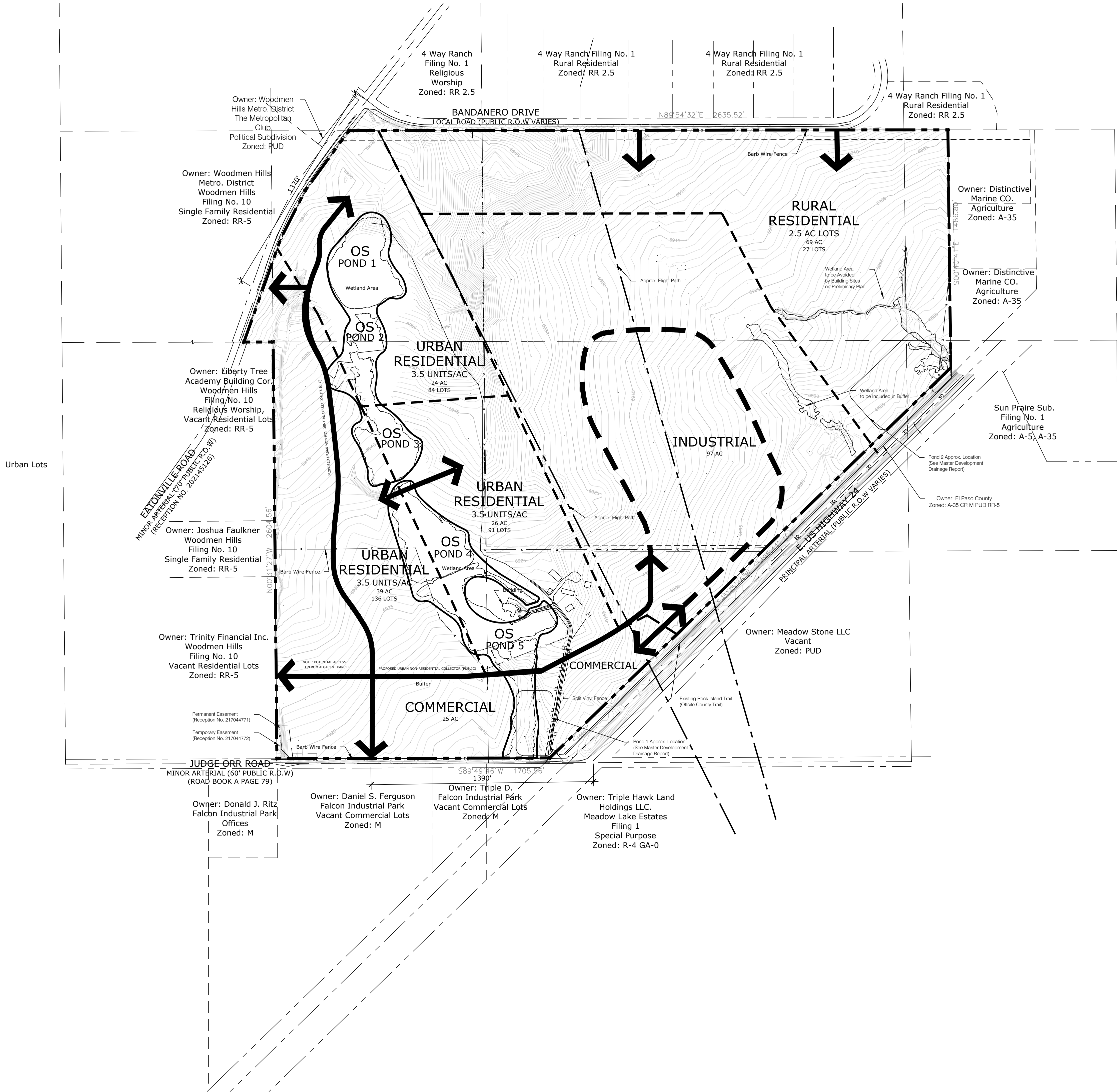
DATE: 11-15-18 BY: RS DESCRIPTION: REVISIONS PER COUNTY COMMENTS

COVER

1

1 OF 3

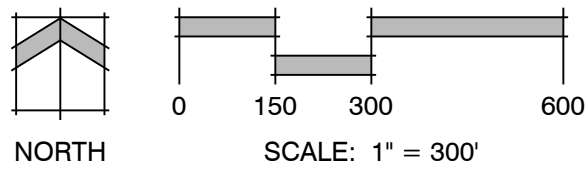
P:\Dan Ferguson\Judge Orr Road & Highway 24\Drawings\Planning\Development\HLS Sketch Plan.dwg [Sketch Plan] 12/10/2018 10:57:07 AM rsawyer



Land Use Table			
Land Use	Density	Acres	Lots/Units
Rural Residential	2.5 AC Lots	69 AC	27 Lots
Urban Residential	3.5 Units/AC	89 AC	311 Units
Commercial	25 AC		N/A
Industrial	97 AC		N/A
Open Space	27.4 AC		N/A
Total		307.4 AC	338 Lots/Units

Legend:

- Property Line
- Land Use Bubble
- Approximate Flight Path
- Open Space (OS)
- Access Arrow



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619 N. Cascade Avenue, Suite 200
Colorado Springs, CO 80903

Tel. 719.471.0073
Fax 719.471.0267

www.nescolorado.com

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MEADOWLAKE RANCH

SKETCH PLAN

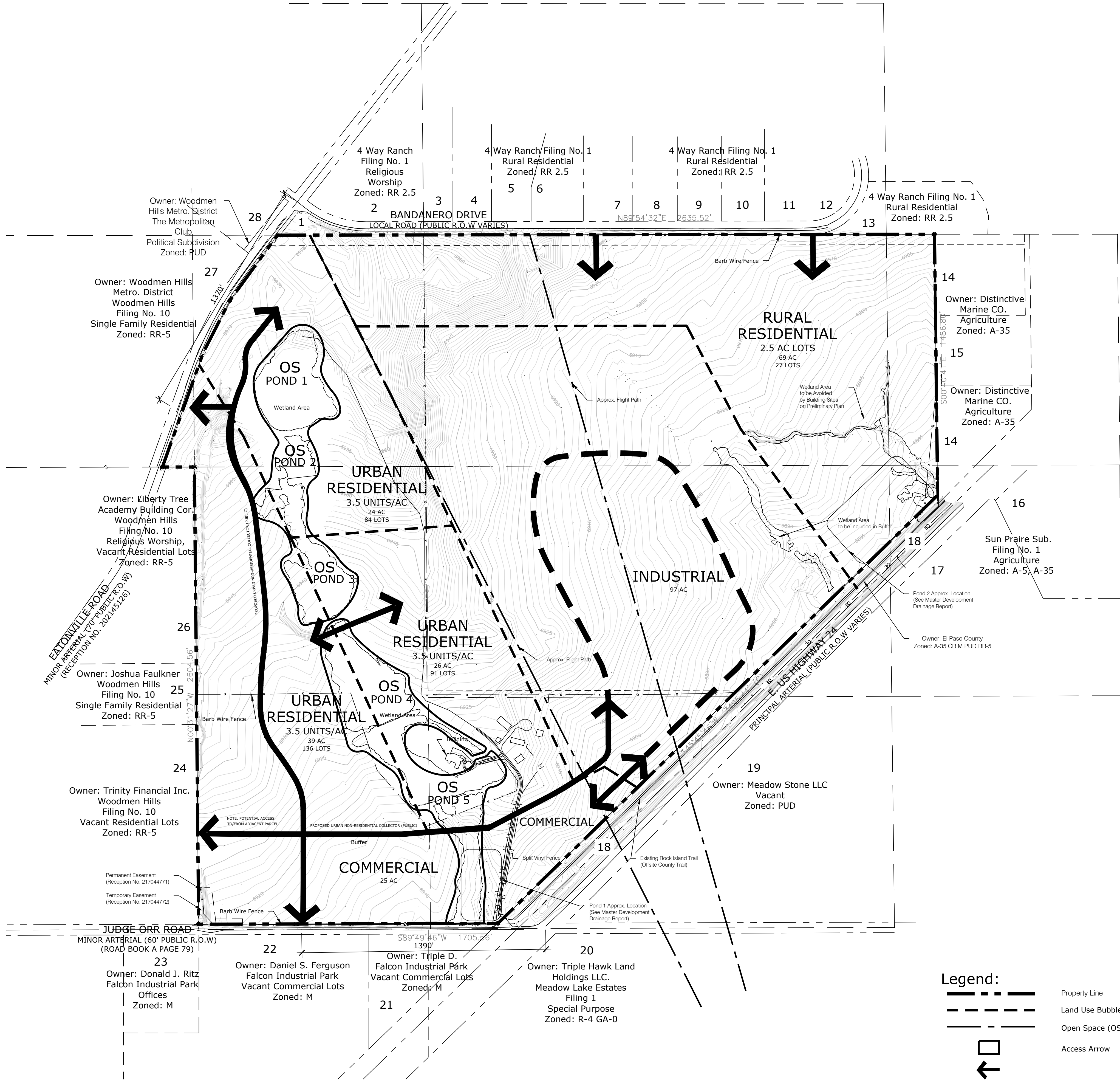
DATE:	6-13-18
PROJECT MGR:	J. MAYNARD
PREPARED BY:	R. SAWYER

ENTITLEMENT

DATE:	BY:	DESCRIPTION:
11-15-18	RS	REVISIONS PER COUNTY COMMENTS

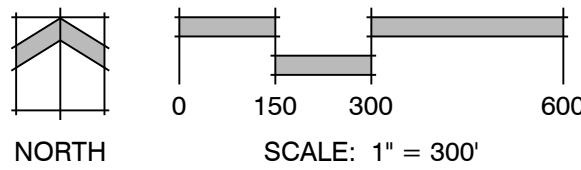
SKETCH PLAN

P:\Dan Ferguson\Judge Orr Road & Highway 24\Drawings\Planning\Development\Sketch Plan.dwg [Adjacent Owners] 12/12/2018 9:22:29 AM Planner



Legend:

- Property Line
- Land Use Bubble
- Open Space (OS)
- Access Arrow



ADJACENT PROPERTY OWNERS

- | | |
|---|---|
| 1. 423207001
Peter R. Martz
Location: 13211 Bandanero Dr.
Mailing: PO BOX 50223
Colorado Springs, CO 80949-0223 | 14. 423300004
Distinctive Marine CO.
Location: Zan Ln.
Mailing Address: PO BOX 9732
Colorado Springs, CO 80932-0732 |
| 2. 423206004
Presiding Bishop of the Church of Jesus Christ of Latter-Day Saints
Attn: File #592-1028
Location: 13210 Bandanero Dr.
Mailing: 50 E North Temple Fl 22
Salt Lake City, UT 84150-0022 | 15. 423300005
Distinctive Marine CO.
Location: Zan Ln.
Mailing Address: PO BOX 9732
Colorado Springs, CO 80932-0732 |
| 3. 4232103001
Daneil Rae & Michael Allen Pugh
13310 Bandanero Dr.
Peyton, CO 80831-3810 | 16. 4233001002
H30 Investments LLC
Location: 13955 E. Highway 24
Mailing Address: 704 Silver Oak Grv.
Colorado Springs, CO 80906-8627 |
| 4. 4232103002
Michael J. II & Susan P. Drake
13360 Bandanero Dr.
Peyton, CO 80831-3810 | 17. 4233001001
Aaron L. & Tanisha R. Smith
13925 E. US Highway 24
Peyton, CO 80831-8407 |
| 5. 4232103003
David M. & Jennifer A. Post
13410 Bandanero Dr.
Peyton, CO 80831-3805 | 18. 420000265
El Paso County
Location: E. Highway 24
Mailing: 27 E. Vermijo Ave.
Peyton, CO 80903-2208 |
| 6. 4232103004
803 Equity Holdings- Independence
Location: 13460 Bandanero Dr.
2376 Margaux Valley Way
Colorado Springs, CO 80921 | 19. 420000249
Meadow Stone LLC
Location: 13580 Judge Orr Rd.
Mailing: 11605 Meridian Mkt. VW #124/270
Peyton, CO 80831-8238 |
| 7. 4232103005
Robert W. & Sheri L. Miller
Location: 13510 Bandanero Dr.
Mailing: 7475 N. Peyton Hwy.
Peyton, CO 80831-7307 | 20. 4200000249
Triple Hawk Land Holdings LLC
Location: 8345 Blue Gill Dr.
Mailing: 4185 Cherryvale Dr.
Colorado Springs, CO 80918-6139 |
| 8. 4232103006
Amber Templin-Brown
13560 Bandanero Dr.
Peyton, CO 80831-3807 | 21. 4305006001
Triple D.
Location: 12925 Judge Orr Rd.
Mailing: 4207 Falkner Dr.
Naperville, IL 60564-7104 |
| 9. 4232103007
Mark W. & Gayle L. Belles
13610 Bandanero Dr.
Peyton, CO 80831-3808 | 22. 4305005002
Daniel S. & Tina D. Ferguson Family LLP
Location: 12925 Judge Orr Rd.
Mailing: 13202 Judge Orr Rd.
Peyton, CO 80831-8401 |
| 10. 4232103008
Gary Marshall & Brenda K. Brown
13660 Bandanero Dr.
Peyton, CO 80831-3808 | 23. 4305006003
Donald J. & Nyla R. Ritz
Location: 12825 Judge Orr Rd.
Mailing: 4105 Radium Springs Rd.
Albany, GA 31705-9324 |
| 11. 4232103009
John K. & Andrea R. Crosby
13710 Bandanero Dr.
Peyton, CO 80831-3809 | 24. 4232302003
Trinity Financial Inc.
Location: 8507 Eastonville Rd.
Mailing: 20201 Deer Shadow Way
Monument, CO 80132-8041 |
| 12. 4232103010
Paul T. JR. & Cathy A. Hartmann
13760 Bandanero Dr.
Peyton, CO 80831-3809 | 25. 4232302002
Joshua Faulkner & Donna Alverson-Faulkner
8555 Eastonville Rd.
Peyton, CO 80831-4087 |
| 13. 4233301002
Ramon F. & Beth R. Garcia
Location: 13761 Bandanero Dr.
Mailing: 13811 Bandanero Dr.
Peyton, CO 80831-3804 | 26. 4232302001
Liberty Tree Academy Building Cor.
Location: 8579 Eastonville Rd.
Mailing: PO BOX 64614
Colorado Springs, CO 80962 |
| | 27. 4232202003
Woodmen Hills Metropolitan District &
Meridian Service Metro District
C/O Community Resource SVCS
Location: 9002 & 9252 Eastonville Rd.
Mailing: 7995 E. Prentice Ave. STE 103E
Englewood, CO 80111-2710 |
| | 28. 4232202078
Woodmen Hills Metropolitan District
Location: 13195 Bandanero Rd.
Mailing: 8046 Eastonville Rd.
Peyton, CO 80831-6175 |

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619 N. Cascade Avenue, Suite 200
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Fax 719.471.0267

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MEADOWLAKE
RANCH

SKETCH PLAN

DATE: 6-13-18
PROJECT MGR: J. MAYNARD
PREPARED BY: R. SAWYER

ENTITLEMENT

DATE: 11-15-18
BY: RS
DESCRIPTION: REVISIONS PER COUNTY COMMENTS

ADJACENT
PROPERTY OWNERS

3
3 OF 3

HYDROLOGIC/DETENTION CALCULATIONS

DRAINAGE CALCULATIONS SUMMARY TABLE 1

Meadowlake Ranch

Rainfall/Runoff - SCS METHOD

Basin Parameters and Results - Existing Conditions

Basin Name	Area		CN	% Imp.	T _c		T _{lag}		Q5	Q100
	acres	sq mi	weighted values		hr	min	hr	min	cfs	cfs
EX-1	55.7	0.087	61	0	1.06	64	0.64	38	4.0	29.1
EX-2	24.0	0.038	62	0	0.88	53	0.53	32	2.3	15.5
EX-3	168.9	0.264	61	0	0.86	52	0.52	31	13.6	102.1
OS-1	118.3	0.185	62	2	0.35	21	0.21	13	24.4	144.2
OS-2	13.2	0.021	65	12	0.32	19	0.19	11	7.3	24.3

Basin Parameters and Results - Proposed Conditions

Basin Name	Area		CN	% Imp.	T _c		T _{lag}		Q5	Q100
	acres	sq mi	weighted values		hr	min	hr	min	cfs	cfs
PR-1	65.8	0.103	77	45	0.42	25	0.25	15	97.6	198.8
PR-2	219.0	0.342	78	46	0.46	28	0.27	16	334.3	674.1
OS-1	118.3	0.185	62	2	0.35	21	0.21	13	24.4	144.2
OS-2	13.2	0.021	65	12	0.32	19	0.19	11	7.3	24.3

DRAINAGE CALCULATIONS SUMMARY TABLE 2

Meadowlake Ranch

Reach Routing Paramters - MUSKINGUM-CUNGE METHOD

Reach Name	length	Slope	Mannin gs n	Bottom Width	Side Slopes	Description
	ft	ft/ft				
Thru EX-3	2850	0.0168	0.025	0	30	existing grassy swale
Thru PR-2	2155	0.016	0.025	10	4	proposed trapezoidal channel

Reach Routing Results - Existing Conditions

Design Point	Area	Q5	Q100	Notes
	sq mi	cfs	cfs	
1	0.087	4.0	29.1	No routing - Basin EX-1 only
2	0.038	2.3	15.5	No routing - Basin EX-2 only
3	0.470	41.1	247.0	Basins OS-1, OS-2 & EX-3

Reach Routing Results - Proposed Conditions

Design Point	Area	Q5	Q100	Notes
	sq mi	cfs	cfs	
1	0.103	97.6	198.8	No routing - Basin PR-1 only
2	--	--	--	Area included in PR-2
3	0.548	356.1	834.6	Basins OS-1, OS-2 & PR-2

SCS METHOD - CN & Percent Impervious
Meadowlake Ranch

			WEIGHTED	UNDEVELOPED		COMMERCIAL		RANCH or INDUSTRIAL		URBAN RES.		RURAL RES.		NOTES
BASIN	TOTAL		CN	AREA	CN	AREA	CN	AREA	CN	AREA	CN	AREA	CN	
	(Acres)	(sq mi)		(Acres)		(Acres)		(Acres)		(Acres)		(Acres)		
EX-1	55.7	0.087	61	55.7	61									
EX-2	24.0	0.038	62	23.0	61			1.0	74					Ranch
EX-3	168.9	0.264	61	168.9	61									
PR-1	65.8	0.103	77			17.5	92			48.3	72			
PR-2	219.0	0.342	78			9.1	92	100.4	88	37.5	72	72.0	65	Industrial
OS-1*	118.3	0.185	62	99.0	61							19.3	65	
OS-2*	13.2	0.021	65									13.2	65.00	

			WEIGHTED	UNDEVELOPED		COMMERCIAL		RANCH or INDUSTRIAL		URBAN RES.		RURAL RES.		NOTES
BASIN	TOTAL		% Imp	AREA	% Imp	AREA	% Imp	AREA	% Imp	AREA	% Imp	AREA	% Imp	
	(Acres)	(sq mi)		(Acres)		(Acres)		(Acres)		(Acres)		(Acres)		
EX-1	55.7	0.087	0	55.7	0									
EX-2	24.0	0.038	0	24.0	0									
EX-3	168.9	0.264	0	168.9	0									
PR-1	65.8	0.103	45			17.5	85			48.3	30			
PR-2	219.0	0.342	46			9.1	85	100.4	72	37.5	30	72.0	12	Industrial
OS-1*	118.3	0.185	2	99.0	0							19.3	12	
OS-2*	13.2	0.021	12									13.2	12	

* Basin areas and CNs are from the MDDP Four Way Ranch and the FDR for 4 Way Ranch Filing No. 1

SCS METHOD - Time of Concentration

Meadowlake Ranch

BASIN: EX-1

T_c		T_{lag}	
(hr)	(min)	(hr)	(min)
1.06	64	0.64	38

OVERLAND FLOW					
n	P ₂	Length	Height	Slope	T _i
	(in)	(ft)	(ft)	(ft/ft)	(hr)
n from Table 6-11: dense grasses					
0.24	1.19	300	7.0	0.023	0.88

SHALLOW CONC. FLOW			
Length	Slope	Velocity	T _t
(ft)	(%)	(fps)	(hr)
Velocity from Fig. 6.25: Grassed Waterway			
970	1.9%	2.7	0.10

CONCENTRATED FLOW		
Length	Velocity	T _t
(ft)	(fps)	(hr)
Velocity from Mannings Equation		
1260	4.6	0.08

Mannings Equation			
Open Channel			
z:1 (side slopes, ft)	50	Mannings Equation	
w (bottom width, ft)	0	Pipe Flowing 1/2 Full	
d (depth, ft)	1	d (diameter, in)	
n (roughness coef.)	0.025	n (mannings)	
s (channel slope, ft/ft)	0.015	s (pipe slope, ft/ft)	
Area (sqft)	50.00	Area (sqft)	0.00
Wetted Perimeter (ft)	100.02	Wetted Perimeter (ft)	0.00
Velocity (fps)	4.6	Velocity (fps)	#DIV/0!

SCS METHOD - Time of Concentration

Meadowlake Ranch

BASIN: EX-2

T_c		T_{lag}	
(hr)	(min)	(hr)	(min)
0.88	53	0.53	32

OVERLAND FLOW					
n	P ₂	Length	Height	Slope	T _i
	(in)	(ft)	(ft)	(ft/ft)	(hr)
n from Table 6-11: dense grasses					
0.24	1.19	300	9.0	0.030	0.80

SHALLOW CONC. FLOW			
Length	Slope	Velocity	T _t
(ft)	(%)	(fps)	(hr)
Velocity from Fig. 6.25: Grassed Waterway			
520	3.3%	2.8	0.05

CONCENTRATED FLOW		
Length	Velocity	T _t
(ft)	(fps)	(hr)
Velocity from Mannings Equation		
610	5.9	0.03

Mannings Equation			
Open Channel		Mannings Equation	
z:1 (side slopes, ft)	50	Pipe Flowing 1/2 Full	
w (bottom width, ft)	0	d (diameter, in)	
d (depth, ft)	1	n (mannings)	
n (roughness coef.)	0.025	s (pipe slope, ft/ft)	
s (channel slope, ft/ft)	0.025	Area (sqft)	0.00
Area (sqft)	50.00	Wetted Perimeter (ft)	0.00
Wetted Perimeter (ft)	100.02	Velocity (fps)	#DIV/0!
Velocity (fps)	5.9		

SCS METHOD - Time of Concentration

Meadowlake Ranch

BASIN: EX-3

T_c		T_{lag}	
(hr)	(min)	(hr)	(min)
0.86	52	0.52	31

OVERLAND FLOW					
n	P ₂	Length	Height	Slope	T _i
	(in)	(ft)	(ft)	(ft/ft)	(hr)
n from Table 6-11: dense grasses					
0.24	1.19	300	20.0	0.067	0.58

SHALLOW CONC. FLOW			
Length	Slope	Velocity	T _t
(ft)	(%)	(fps)	(hr)
Velocity from Fig. 6.25: Grassed Waterway			
1720	2.6%	2.4	0.20

CONCENTRATED FLOW		
Length	Velocity	T _t
(ft)	(fps)	(hr)
Velocity from Mannings Equation		
1260	4.3	0.08

Mannings Equation			
Open Channel			
z:1 (side slopes, ft)	30	Mannings Equation	
w (bottom width, ft)	0	Pipe Flowing 1/2 Full	
d (depth, ft)	1	d (diameter, in)	
n (roughness coef.)	0.025	n (mannings)	
s (channel slope, ft/ft)	0.013	s (pipe slope, ft/ft)	
Area (sqft)	30.00	Area (sqft)	0.00
Wetted Perimeter (ft)	60.03	Wetted Perimeter (ft)	0.00
Velocity (fps)	4.3	Velocity (fps)	#DIV/0!

SCS METHOD - Time of Concentration

Meadowlake Ranch

BASIN: PR-1

T_c		T_{lag}	
(hr)	(min)	(hr)	(min)
0.42	25	0.25	15

OVERLAND FLOW					
n	P ₂	Length	Height	Slope	T _i
	(in)	(ft)	(ft)	(ft/ft)	(hr)
n from Table 6-11: short prairie grass					
0.15	1.19	100	2.0	0.020	0.27

SHALLOW CONC. FLOW			
Length	Slope	Velocity	T _t
(ft)	(%)	(fps)	(hr)
Velocity from Fig. 6.25: Paved Area			
500	2.0%	2.8	0.05

CONCENTRATED FLOW		
Length	Velocity	T _t
(ft)	(fps)	(hr)
Velocity from Mannings Equation		
4100	11.0	0.10

Mannings Equation			
Open Channel			
z:1 (side slopes, ft)		Mannings Equation	
w (bottom width, ft)		Pipe Flowing 1/2 Full	
d (depth, ft)		d (diameter, in)	36
n (roughness coef.)	0.025	n (mannings)	0.013
s (channel slope, ft/ft)		s (pipe slope, ft/ft)	0.014
Area (sqft)	0.00	Area (sqft)	3.53
Wetted Perimeter (ft)	0.00	Wetted Perimeter (ft)	4.71
Velocity (fps)	#DIV/0!	Velocity (fps)	11.2

SCS METHOD - Time of Concentration Meadowlake Ranch

BASIN: PR-2

T_c		T_{lag}	
(hr)	(min)	(hr)	(min)
0.46	27	0.27	16

OVERLAND FLOW					
n	P ₂	Length	Height	Slope	T _i
	(in)	(ft)	(ft)	(ft/ft)	(hr)
n from Table 6-11: short prairie grass					
0.15	1.19	100	4.0	0.040	0.20

SHALLOW CONC. FLOW			
Length	Slope	Velocity	T _t
(ft)	(%)	(fps)	(hr)
Velocity from Fig. 6.25: Grassed Waterway			
1425	2.8%	2.5	0.16

CONCENTRATED FLOW		
Length	Velocity	T _t
(ft)	(fps)	(hr)
Velocity from Mannings Equation		
2155	6.3	0.10

Mannings Equation			
Open Channel			
z:1 (side slopes, ft)	4	Mannings Equation	
w (bottom width, ft)	10	Pipe Flowing 1/2 Full	
d (depth, ft)	1	d (diameter, in)	
n (roughness coef.)	0.025	n (mannings)	
s (channel slope, ft/ft)	0.016	s (pipe slope, ft/ft)	
Area (sqft)	14.00	Area (sqft)	0.00
Wetted Perimeter (ft)	18.25	Wetted Perimeter (ft)	0.00
Velocity (fps)	6.3	Velocity (fps)	#DIV/0!

SCS METHOD - Time of Concentration

BASIN: OS-1*

T_c		T_{lag}	
<i>(hr)</i>	<i>(min)</i>	<i>(hr)</i>	<i>(min)</i>
0.35	21	0.21	13

* values for T_c and T_{lag} are from the MDDP for Four Way Ranch

SCS METHOD - Time of Concentration

Meadowlake Ranch

BASIN: OS-2 derived from FDR for 4 Way Ranch Filing No. 1

T_c		T_{lag}	
(hr)	(min)	(hr)	(min)
0.32	19	0.19	12

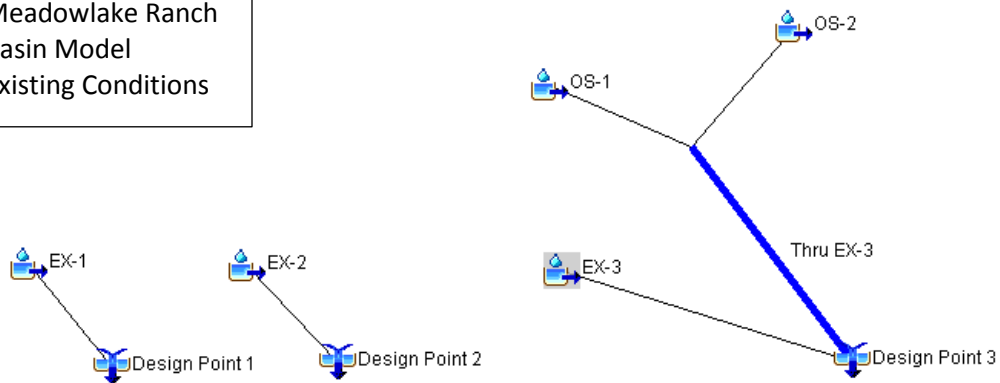
OVERLAND FLOW					
n	P ₂	Length	Height	Slope	T _i
	(in)	(ft)	(ft)	(ft/ft)	(hr)
n from Table 6-11: short prairie grass					
0.15	1.19	130	8.0	0.062	0.21

SHALLOW CONC. FLOW			
Length	Slope	Velocity	T _t
(ft)	(%)	(fps)	(hr)
Velocity from Fig. 6.25: Paved Area			
470	2.6%	2.4	0.05

CONCENTRATED FLOW		
Length	Velocity	T _t
(ft)	(fps)	(hr)
Velocity from Mannings Equation		
900	4.5	0.06

Mannings Equation			
Open Channel		Mannings Equation	
z:1 (side slopes, ft)	4	Pipe Flowing 1/2 Full	
w (bottom width, ft)	0	d (diameter, in)	
d (depth, ft)	1	n (mannings)	
n (roughness coef.)	0.025	s (pipe slope, ft/ft)	
s (channel slope, ft/ft)	0.015	Area (sqft)	0.00
Area (sqft)	4.00	Wetted Perimeter (ft)	0.00
Wetted Perimeter (ft)	8.25	Velocity (fps)	#DIV/0!
Velocity (fps)	4.5		

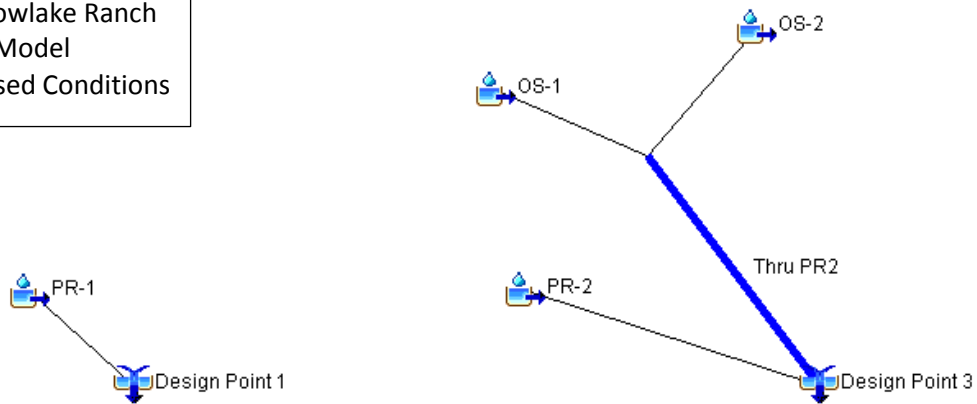
Meadowlake Ranch
Basin Model
Existing Conditions



Global Summary Results for Run "Existing 5yr"				
Project: 1822.00 Meadowlake Ranch Simulation Run: Existing 5yr				
Start of Run: 01Jul2018, 12:00		Basin Model: Meadowlake Ranch Existing		
End of Run: 03Jul2018, 12:00		Meteorologic Model: El Paso Cnty 5		
Compute Time: 23Jul2018, 10:50:08		Control Specifications: Control 1		
Show Elements: All Elements		Volume Units: <input checked="" type="radio"/> IN <input type="radio"/> AC-FT		Sorting: Alphabetic
Hydrologic Element	Drainage Area (MI ²)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
Design Point 1	0.087	4.0	02Jul2018, 00:46	0.26
Design Point 2	0.038	2.3	02Jul2018, 00:36	0.29
Design Point 3	0.470	41.1	02Jul2018, 00:20	0.31
EX-1	0.087	4.0	02Jul2018, 00:46	0.26
EX-2	0.038	2.3	02Jul2018, 00:36	0.29
EX-3	0.264	13.6	02Jul2018, 00:36	0.26
OS-1	0.185	24.4	02Jul2018, 00:10	0.33
OS-2	0.021	7.3	02Jul2018, 00:06	0.65
Thru EX-3	0.206	31.0	02Jul2018, 00:20	0.37

Global Summary Results for Run "Existing 100yr"				
Project: 1822.00 Meadowlake Ranch Simulation Run: Existing 100yr				
Start of Run: 01Jul2018, 12:00		Basin Model: Meadowlake Ranch Existing		
End of Run: 03Jul2018, 12:00		Meteorologic Model: El Paso Cnty 100		
Compute Time: 23Jul2018, 10:52:14		Control Specifications: Control 1		
Show Elements: All Elements		Volume Units: <input checked="" type="radio"/> IN <input type="radio"/> AC-FT		Sorting: Alphabetic
Hydrologic Element	Drainage Area (MI ²)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
Design Point 1	0.087	29.1	02Jul2018, 00:36	1.14
Design Point 2	0.038	15.5	02Jul2018, 00:28	1.20
Design Point 3	0.470	247.0	02Jul2018, 00:16	1.22
EX-1	0.087	29.1	02Jul2018, 00:36	1.14
EX-2	0.038	15.5	02Jul2018, 00:28	1.20
EX-3	0.264	102.1	02Jul2018, 00:28	1.14
OS-1	0.185	144.2	02Jul2018, 00:08	1.27
OS-2	0.021	24.3	02Jul2018, 00:06	1.78
Thru EX-3	0.206	167.3	02Jul2018, 00:14	1.32

Meadowlake Ranch
Basin Model
Proposed Conditions



Global Summary Results for Run "Proposed 5yr"				
Project: 1822.00 Meadowlake Ranch Simulation Run: Proposed 5yr				
Start of Run: 01Jul2018, 12:00		Basin Model: Meadowlake Ranch Developed		
End of Run: 03Jul2018, 12:00		Meteorologic Model: El Paso Cnty 5		
Compute Time: 04Jan2019, 11:21:20		Control Specifications: Control 1		
Show Elements:	All Elements	Volume Units:	<input checked="" type="radio"/> IN <input type="radio"/> AC-FT	Sorting: Alphabetic
Hydrologic Element	Drainage Area (MI ²)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
Design Point 1	0.103	97.6	02Jul2018, 00:08	1.69
Design Point 3	0.548	356.1	02Jul2018, 00:08	1.22
OS-1	0.185	24.4	02Jul2018, 00:10	0.33
OS-2	0.021	7.3	02Jul2018, 00:06	0.65
PR-1	0.103	97.6	02Jul2018, 00:08	1.69
PR-2	0.342	334.3	02Jul2018, 00:08	1.74
Thru PR2	0.206	31.1	02Jul2018, 00:14	0.37

Global Summary Results for Run "Proposed 100yr"				
Project: 1822.00 Meadowlake Ranch Simulation Run: Proposed 100yr				
Start of Run: 01Jul2018, 12:00		Basin Model: Meadowlake Ranch Developed		
End of Run: 03Jul2018, 12:00		Meteorologic Model: El Paso Cnty 100		
Compute Time: 04Jan2019, 11:08:08		Control Specifications: Control 1		
Show Elements:	All Elements	Volume Units:	<input checked="" type="radio"/> IN <input type="radio"/> AC-FT	Sorting: Alphabetic
Hydrologic Element	Drainage Area (MI ²)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
Design Point 1	0.103	198.8	02Jul2018, 00:08	3.33
Design Point 3	0.548	834.6	02Jul2018, 00:08	2.62
OS-1	0.185	144.2	02Jul2018, 00:08	1.27
OS-2	0.021	24.3	02Jul2018, 00:06	1.78
PR-1	0.103	198.8	02Jul2018, 00:08	3.33
PR-2	0.342	674.1	02Jul2018, 00:08	3.40
Thru PR2	0.206	167.2	02Jul2018, 00:10	1.32

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

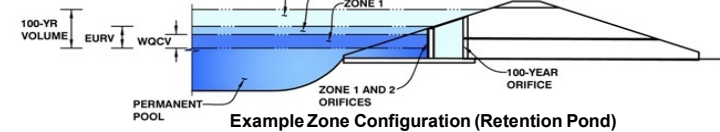
UD-Detention, Version 3.07 (February 2017)

Basin ID: Future Pond-1

ZONE 3

ZONE 2

ZONE 1



Selected BMP Type = **EDB**

Watershed Area =	65.80	acres
Watershed Length =	4,700	ft
Watershed Slope =	0.014	ft/ft
Watershed Imperviousness =	46.00%	percent
Percentage Hydrologic Soil Group A =	100.0%	percent
Percentage Hydrologic Soil Group B =	0.0%	percent
Percentage Hydrologic Soil Groups C/D =	0.0%	percent
Desired WQCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Depths = User Input		
Water Quality Capture Volume (WQCV) =	1.072	acre-feet
Excess Urban Runoff Volume (EURV) =	3.409	acre-feet
2-yr Runoff Volume (P1 = 1.03 in.) =	2.008	acre-feet
5-yr Runoff Volume (P1 = 1.32 in.) =	2.690	acre-feet
10-yr Runoff Volume (P1 = 1.59 in.) =	3.432	acre-feet
25-yr Runoff Volume (P1 = 2.01 in.) =	4.774	acre-feet
50-yr Runoff Volume (P1 = 2.38 in.) =	6.364	acre-feet
100-yr Runoff Volume (P1 = 2.77 in.) =	8.279	acre-feet
500-yr Runoff Volume (P1 = 3.85 in.) =	13.538	acre-feet
Approximate 2-yr Detention Volume =	1.891	acre-feet
Approximate 5-yr Detention Volume =	2.536	acre-feet
Approximate 10-yr Detention Volume =	3.208	acre-feet
Approximate 25-yr Detention Volume =	4.364	acre-feet
Approximate 50-yr Detention Volume =	5.150	acre-feet
Approximate 100-yr Detention Volume =	6.094	acre-feet

Optional User Override
1-hr Precipitation

1.03	inches
1.32	inches
1.59	inches
2.01	inches
2.38	inches
2.77	inches
3.85	inches

Zone 1 Volume (WQCV) = 1.072 acre-feet

Zone 2 Volume (EURV - Zone 1) =	2.337	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	2.685	acre-feet
Total Detention Basin Volume =	6.094	acre-feet

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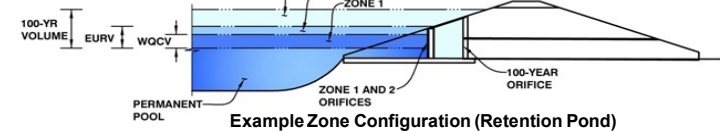
DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)

Basin ID: Pond-2 Detention for Basin PR-2

ZONE 3

ZONE 2



Selected BMP Type = **EDB**

Watershed Area =	219.00
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Watershed Length = 3,620 ft

Watershed Slope =	0.027	ft/ft
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Watershed Imperviousness =	46.00%	per
Percentage Hydrologic Soil Group A =	0.0%	per

Percentage Hydrologic Soil Group A =	0.0%	percent
Percentage Hydrologic Soil Group B =	100.0%	percent

Percentage Hydrologic Soil Groups C/D =	0.0%	percent
---	------	---------

Desired WQCV Drain Time = 40.0 hours

Location for 1-hr Rainfall Depths = User Input

Water Quality Capture Volume (WQCV) =	3.569
---------------------------------------	-------

Excess Urban Runoff Volume (EURV) =	10.698	acre-feet
-------------------------------------	--------	-----------

2-yr Runoff Volume (P1 = 1.03 in.) =	7.404	acre-feet
5-yr Runoff Volume (P1 = 1.32 in.) =	10.353	acre-feet

5-yr Runoff Volume (P1 = 1.32 in.) =	10.332	acre-feet
10-yr Runoff Volume (P1 = 1.59 in.) =	14.715	acre-feet

25-yr Runoff Volume (P1 = 2.01 in.) =	23.321	acre-feet
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50-yr Runoff Volume (P1 = 2.38 in.) = 29.626 acre-feet

100-yr Runoff Volume (P1 = 2.77 in.) =	37.708	acre-feet
--	--------	-----------

500-yr Runoff Volume (P1 = 3.85 in.) =	57.806	acre-feet
Approximate 2-yr Detention Volume =	6.036	acre-feet

Approximate 2-yr Detention Volume =	6.926	acre-feet
Approximate 5-yr Detention Volume =	9.720	acre-feet

Approximate 5-yr Detention Volume =	6.726	acre-feet
Approximate 10-yr Detention Volume =	13.476	acre-feet

Approximate 25-yr Detention Volume = 16.433 acre-feet

Approximate 50-yr Detention Volume =

18.107

 acre-feet

Approximate 100-yr Detention Volume = 21.211 acre-feet

Stage-Storage Calculation

Zone 1 Volume (WQCV) = 3.569 acre-feet

Zone 1 Volume (WQCV) = 3.569

Zone 2 Volume (EURV - Zone 1) =	7.129	acre-feet
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Zone 3 Volume (100-year - Zones 1 & 2) =	10.513	acre-feet
Total Detention Basin Volume =	21.214	

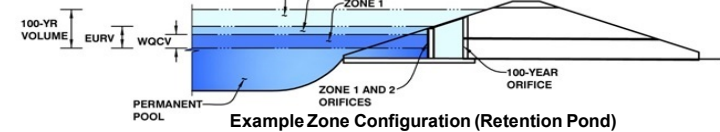
Total Detention Basin Volume = 21.211 acre-feet

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DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)

Basin ID: Pond-2 WQ for Offsite Basins (OS-1 and OS-2) and Detention for Basin PR-2

[illegible]

Selected BMP Type =	EDB	
Watershed Area =	350.50	acres
Watershed Length =	7,685	ft
Watershed Slope =	0.018	ft/ft
Watershed Imperviousness =	30.00%	percent
Percentage Hydrologic Soil Group A =	0.0%	percent
Percentage Hydrologic Soil Group B =	100.0%	percent
Percentage Hydrologic Soil Groups C/D =	0.0%	percent
Desired WQCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Depths =	User Input	
Water Quality Capture Volume (WQCV) =	4.424	acre-feet
Excess Urban Runoff Volume (EURV) =	10.791	acre-feet
2-yr Runoff Volume (P1 = 1.03 in.) =	7.159	acre-feet
5-yr Runoff Volume (P1 = 1.32 in.) =	10.361	acre-feet
10-yr Runoff Volume (P1 = 1.59 in.) =	16.329	acre-feet
25-yr Runoff Volume (P1 = 2.01 in.) =	30.223	acre-feet
50-yr Runoff Volume (P1 = 2.38 in.) =	40.208	acre-feet
100-yr Runoff Volume (P1 = 2.77 in.) =	53.204	acre-feet
500-yr Runoff Volume (P1 = 3.85 in.) =	84.744	acre-feet
Approximate 2-yr Detention Volume =	6.682	acre-feet
Approximate 5-yr Detention Volume =	9.721	acre-feet
Approximate 10-yr Detention Volume =	14.639	acre-feet
Approximate 25-yr Detention Volume =	18.782	acre-feet
Approximate 50-yr Detention Volume =	20.828	acre-feet
Approximate 100-yr Detention Volume =	25.590	acre-feet

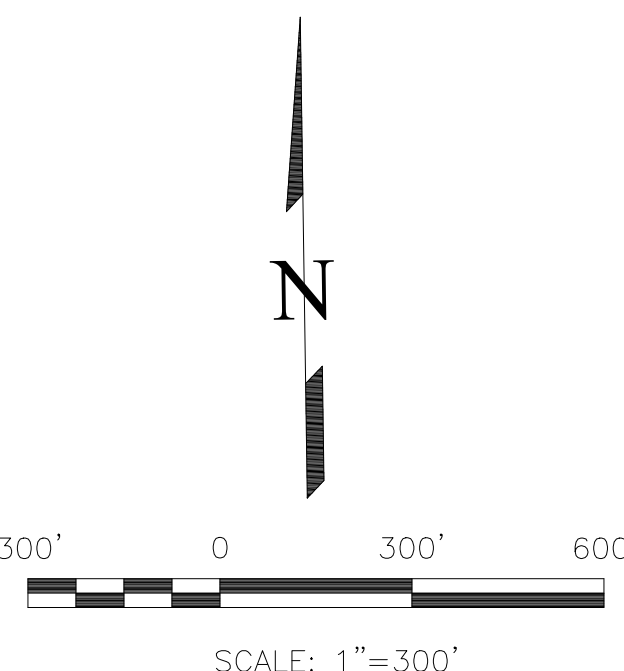
2-yr Runoff Volume (P1 = 1.03 in.) =	7.159	acre-feet	1.03	inches
5-yr Runoff Volume (P1 = 1.32 in.) =	10.361	acre-feet	1.32	inches
10-yr Runoff Volume (P1 = 1.59 in.) =	16.329	acre-feet	1.59	inches
25-yr Runoff Volume (P1 = 2.01 in.) =	30.223	acre-feet	2.01	inches
50-yr Runoff Volume (P1 = 2.38 in.) =	40.208	acre-feet	2.38	inches
100-yr Runoff Volume (P1 = 2.77 in.) =	53.204	acre-feet	2.77	inches
500-yr Runoff Volume (P1 = 3.85 in.) =	84.744	acre-feet	3.85	inches

Zone 1 Volume (WQCV) =	4.424	acre-feet
Zone 2 Volume (EURV - Zone 1) =	6.367	acre-feet
Zone 3 Volume (User Defined - Zones 1 & 2) =	10.420	acre-feet
Total Detention Basin Volume =	21.211	acre-feet

Zone 2 Volume (EURV - Zone 1) =	6.367	acre-feet	Total detention volume is less than 100-year volume.
Zone 3 Volume (User Defined - Zones 1 & 2) =	10.420	acre-feet	
Total Detention Basin Volume =	21.211	acre-feet	

[illegible]

DRAINAGE AREA MAPS

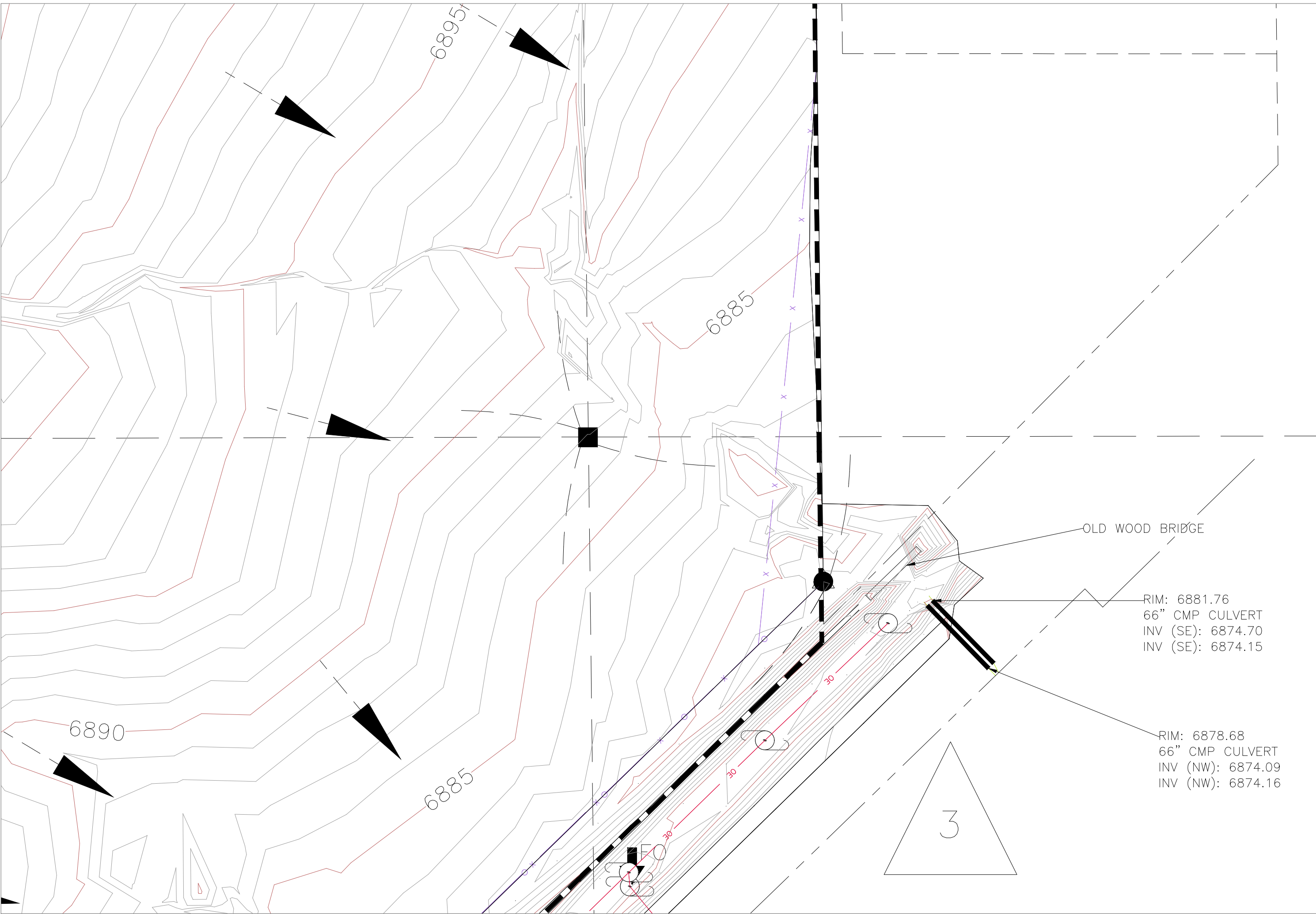
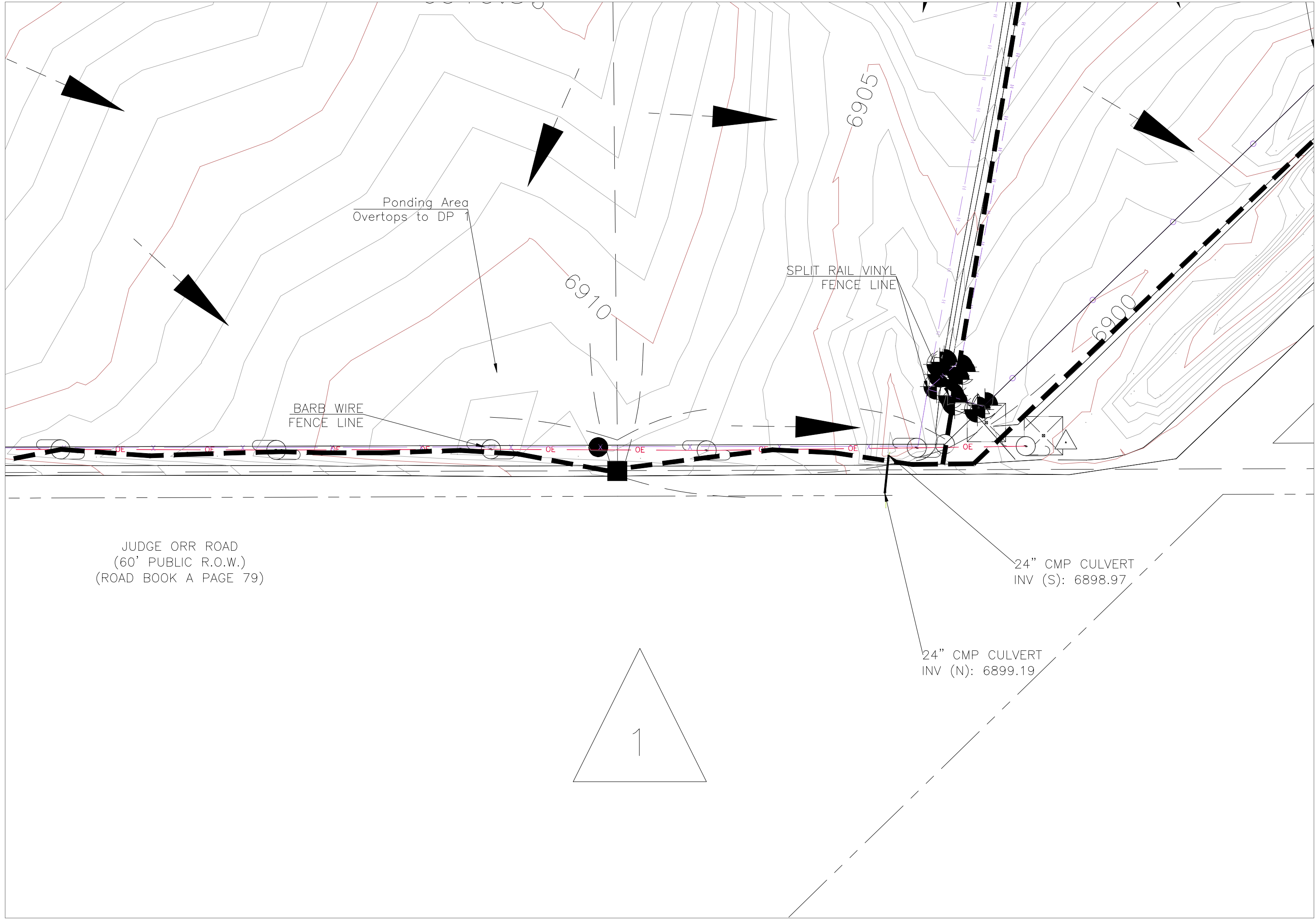


EXISTING CONDITIONS			
BASIN	MI ²	Q5 CFS	Q100 CFS
EX-1	0.087	4.0	29.1
EX-2	0.038	2.3	15.5
EX-3	0.264	13.6	102.1
OS-1	0.185	24.4	144.2
OS-2	0.021	7.3	24.3

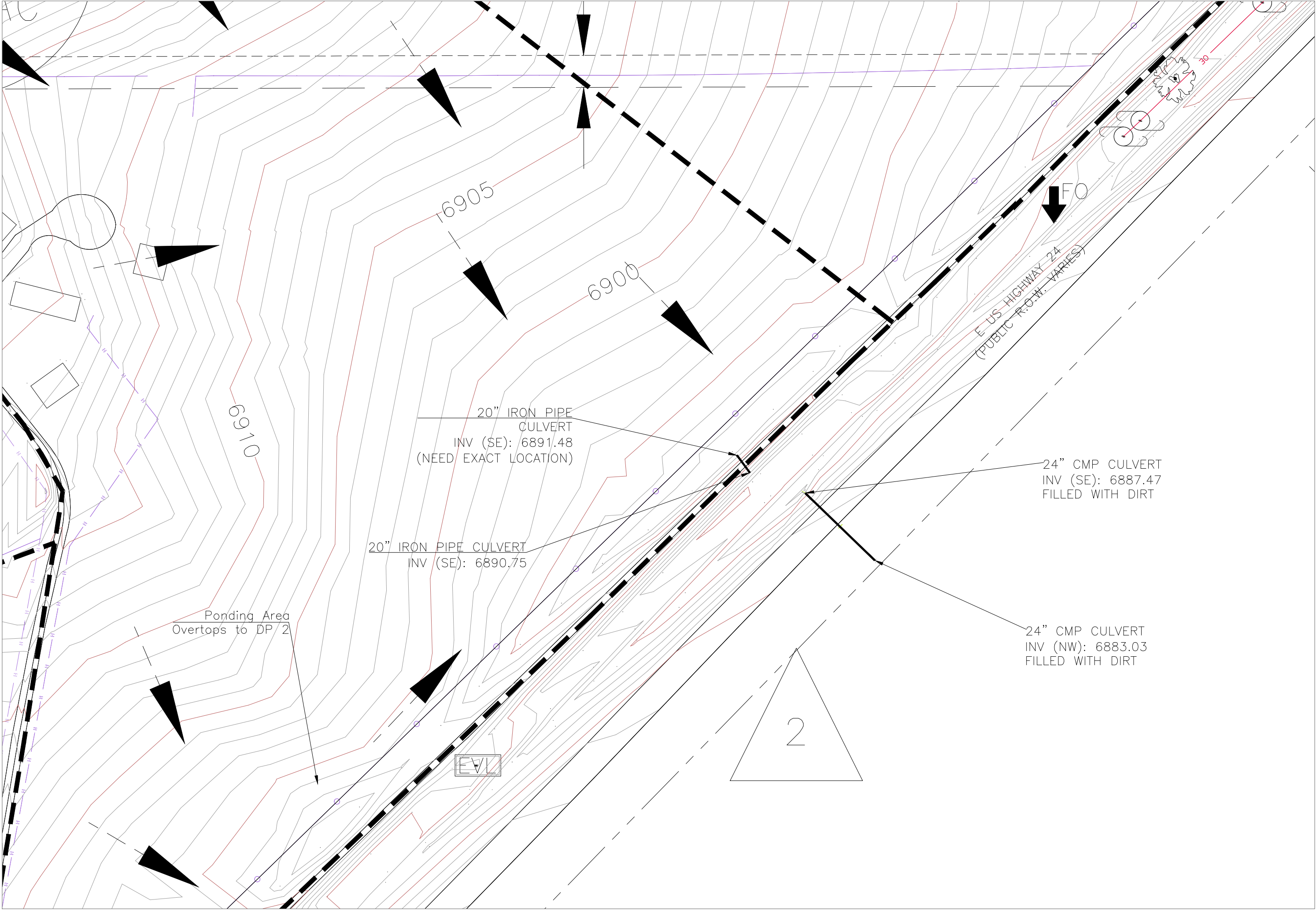
See Sheet 2 for Design Point detail.

MEADOWLAKE MDDP		DESIGNED BY DWD	
EXISTING DRAINAGE PLAN		DRAWN BY DWD	
		CHECKED BY LD	
H-SCALE		AS SHOWN	
V-SCALE		N/A	
JOB NO. 1822.00			
DATE ISSUED 11/14/18			
SHEET NO. 1		OF 3	

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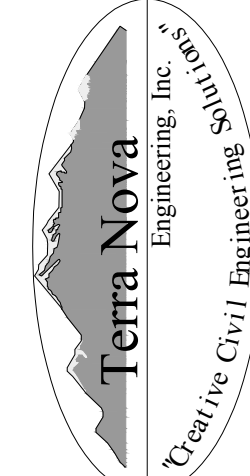
- LEGEND
- BASIN DESIGNATION
 - AREA IN BASIN (AC)
 - DESIGN POINT
 - BASIN BOUNDARY
 - EXISTING 2' CONTOUR
 - EXISTING 10' CONTOUR
 - FEMA MAPPED EXISTING FLOODPLAIN
 - ROAD AND DITCH FLOW DIRECTION
 - SURFACE FLOW DIRECTION
 - SC250 North American Green fabric Location
 - PROPERTY LINE



REVISIONS	DESCRIPTION	DATE
NO.		

UNTIL SUCH TIME AS THESE
DRAWINGS ARE APPROVED
BY THE APPROPRIATE
REVIEWING AGENCIES,
TERRA NOVA ENGINEERING,
INC. APPROVES THEIR USE
ONLY FOR THE PURPOSES DESIGNATED BY
WRITTEN AUTHORIZATION.

PREPARED FOR:
DAN FERGUSON
ATTN: DAN FERGUSON
13202 JUDGE ORR ROAD
PEYTON CO 80831-8401



721 S. 23RD STREET
COLORADO SPRINGS, CO 80904
OFFICE: 719-635-6422
FAX: 719-635-6426
www.tnecinc.com

MEADOWLAKE MDDP
EXISTING DRAINAGE PLAN
DETAILED

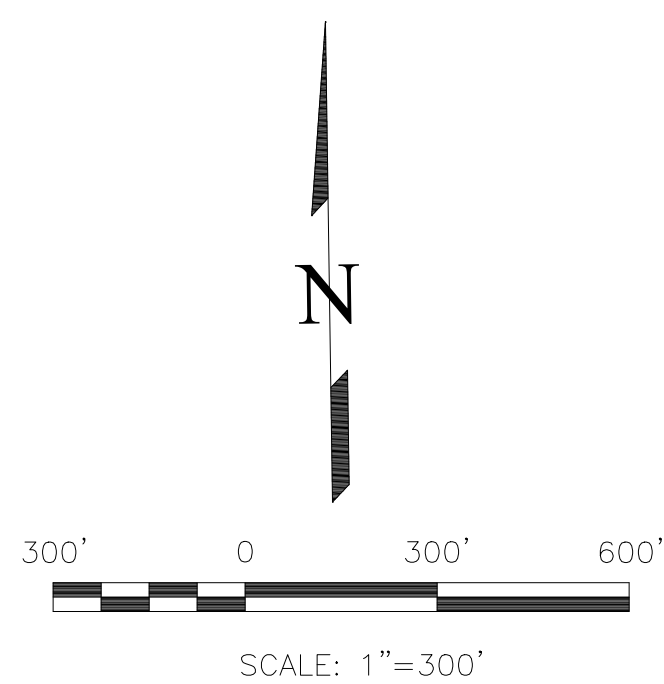
DESIGNED BY	DWD
DRAWN BY	DWD
CHECKED BY	LD
H-SCALE	AS SHOWN
V-SCALE	N/A
JOB NO.	1822.00
DATE ISSUED	11/14/18
SHEET NO.	2 OF 3

DESIGN POINT SUMMARY

DESIGN POINT	BASIN TRIBUTARY	FLOW	
		5 YR (cfs)	100 YR (cfs)
1	PR-1	97.6	198.8
2	--	--	--
3	OS-1, OS-2 & PR-3	356.1	834.6

LEGEND

- BASIN DESIGNATION
AREA IN BASIN (AC)
- DESIGN POINT
- BASIN BOUNDARY
- EXISTING 2' CONTOUR
- EXISTING 10' CONTOUR
- FEMA MAPPED EXISTING FLOODPLAIN
- ROAD AND DITCH FLOW DIRECTION
- PROPERTY LINE



Bennett Ranch
Regional Detention Basin
Outfall

Eastonville Channel

OWNER:
JOSHUA FAULKNER
DONNA ALVERSON-FAULKNER
LOT 1179
WOODMEN HILLS FILING NO. 10
(RECEPTION NO. 215038438)

OWNER:
TRINITY FINANCIAL INC.
LOT 1177
WOODMEN HILLS FILING NO. 10
(RECEPTION NO. 208033065)

PERMANENT EASEMENT
(RECEPTION NO. 217044771)
TEMPORARY EASEMENT
(RECEPTION NO. 217044772)

Approximate Location of
Double 12'x8' Box Culvert

Bennett Ranch
Drainage Basin

Haegler Ranch
Drainage Basin

Bandanero Drive

NOTE: The development will be graded such that no additional area will drain to the ponds/wetlands above the existing 63.0 AC. Should future development increase runoff to the ponds/wetlands area or if the ponds/wetlands are eliminated, then the appropriate hydrologic and hydraulic analyses must be included in the future Drainage Report. Also, all ponds and berms to remain must be evaluated for safety/stability by a geotechnical engineer.

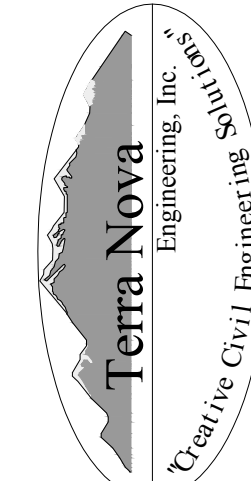
Future Pond 1

Future Pond 2

PROPOSED CONDITIONS

BASIN	MI^2	Q5 CFS	Q100 CFS
PR-1	0.103	97.6	198.8
PR-2	0.342	334.3	674.1
OS-1	0.185	24.4	144.2
OS-2	0.021	7.3	24.3

PREPARED FOR:
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www.tnecinc.com

MEADOWLAKE MDDP

PROPOSED DRAINAGE PLAN

DESIGNED BY DWD
DRAWN BY DWD
CHECKED BY LD
H-SCALE AS SHOWN
V-SCALE N/A
JOB NO. 1822.00
DATE ISSUED 7/24/18
SHEET NO. 2 OF 2