

Appendix G

Preliminary Stormwater/Drainage Analysis Memo

TECHNICAL MEMORANDUM

Date: August 11, 2017
To: Steve Krahn, City of Folsom
From: Steve Smith
CC: Kari Nichols, Mead & Hunt
Subject: Preliminary Storm Drainage Evaluation for the Russell Ranch Phase 2 Development



INTRODUCTION

The Folsom Plan Area (Plan Area) is comprised of approximately 3,513 acres, located in the southern portion of the City of Folsom (City). The FPA is bounded by Highway 50 on the north, White Rock Road on the south, Prairie City Road on the west and the Sacramento/El Dorado County line on the east. The Russell Ranch Phase 2 development is an approximately 135.1 acre planned community located within the FPA. The location of the Russell Ranch Phase 2 development is shown within the Plan Area on the "Vicinity Map" attached as Exhibit 1 in the Appendix.

On June 2, 2016, a Specific Plan Amendment and Large Lot and Small Lot Vesting Tentative Subdivision Maps for the Russell Ranch Project were approved by the City, which amended the FPA Specific Plan. The approved land use plan for Russell Ranch Phase 2 is shown as Exhibit 2 in the Appendix. To better suit the needs of the current and future development climate of the City and to attract the Active Adult market segment, a Vesting Tentative Large Lot Merger and Resubdivision Map was submitted to the City for approval. The proposed land use plan for Russell Ranch Phase 2 is shown as Exhibit 3 in the Appendix.

The purpose of this technical memo is to:

- Present a preliminary storm drainage evaluation for the proposed Russell Ranch Phase 2 development by comparing it with the existing and approved Folsom Plan Area Storm Drain Master Plan (FPA SDMP), dated October, 2014.

- Where land use categories, impervious / pervious surface areas, shed area boundaries, or proposed storm drainage facilities have changed from the FPA SDMP, the hydrology and hydraulic models will be updated.
- Determine if the storm drainage characteristics of the Russell Ranch Phase 2 development are consistent with the FPA SDMP.
- Conclude that the Russell Ranch Phase 2 development is adequate to maintain drainage impacts equal to or below the existing predeveloped condition.

DISCUSSION

This technical memo concentrates on the affects the land use plan modifications will have on the FPA as the impervious percentage ratios have changed. Refer to Exhibit 6 – Proposed Project Shed Areas and Exhibit 7 – Watershed Data Elements located in the Appendix. The proposed developed condition will be analyzed to ensure the drainage impacts will be less than or equal to the existing predeveloped condition. For reference, an enlarged version of Exhibits D and J from the FPA SDMP were created as Exhibit 4 – Existing Shed Map with Compliance Points Folsom Plan Area and Exhibit 5 – Developed Shed Map per Approved FPA Storm Drainage Master Plan. Both exhibits are located in the Appendix.

MODELING FILES

The Sacramento Area Hydrology Model (SAHM) and Sacramento Hydrologic Calculator (SacCalc) modeling files from the Preliminary Storm Drainage Evaluation for the Folsom Heights development, approved on March 31, 2017, were updated to include modifications to Russell Ranch Phase 2 watersheds due to the proposed land use and impervious percentage changes to sheds 803, 804, 805, and 806.

RESULTS

Table 1 compares the existing predeveloped condition, the developed condition per FPA SDMP, and the proposed land use condition. The results indicate the proposed land use condition's drainage impacts are below or equal to the FPA existing predeveloped condition. Thus, the Russell Ranch Phase 2 development does not negatively impact downstream drainage conditions.

Table 1: Peak Flows at Compliance Point Numbers 8

Compliance Point Number	FPA Existing Predeveloped Condition (cfs)					Developed Condition per FPA SDMP (cfs)					Proposed Land Use Condition (cfs)				
	2-yr/ 24-hr	10-yr/ 24-hr	100-yr/ 24-hr	100-yr/ 10-day	200-yr/ 24-hr	2-yr/ 24-hr	10-yr/ 24-hr	100-yr/ 24-hr	100-yr/ 10-day	200-yr/ 24-hr	2-yr/ 24-hr	10-yr/ 24-hr	100-yr/ 24-hr	100-yr/ 10-day	200-yr/ 24-hr
CP8	62	134	243	192	271	47	104	176	176	192	39	87	146	149	161

Detention basin #11 was modified from the FPA SDMP by increasing the basin depth from 12 feet to 18 feet. The basin's water surface area increased from 2.73 acres to 5.31 acres and volume increased from 19.96 acre-feet to 30.92 acre-feet. Detention basin #11 stage and storage table is shown on Table 2.

Hydromodification basin #27 corresponds with the FPA SDMP as no changes were made to the basin.

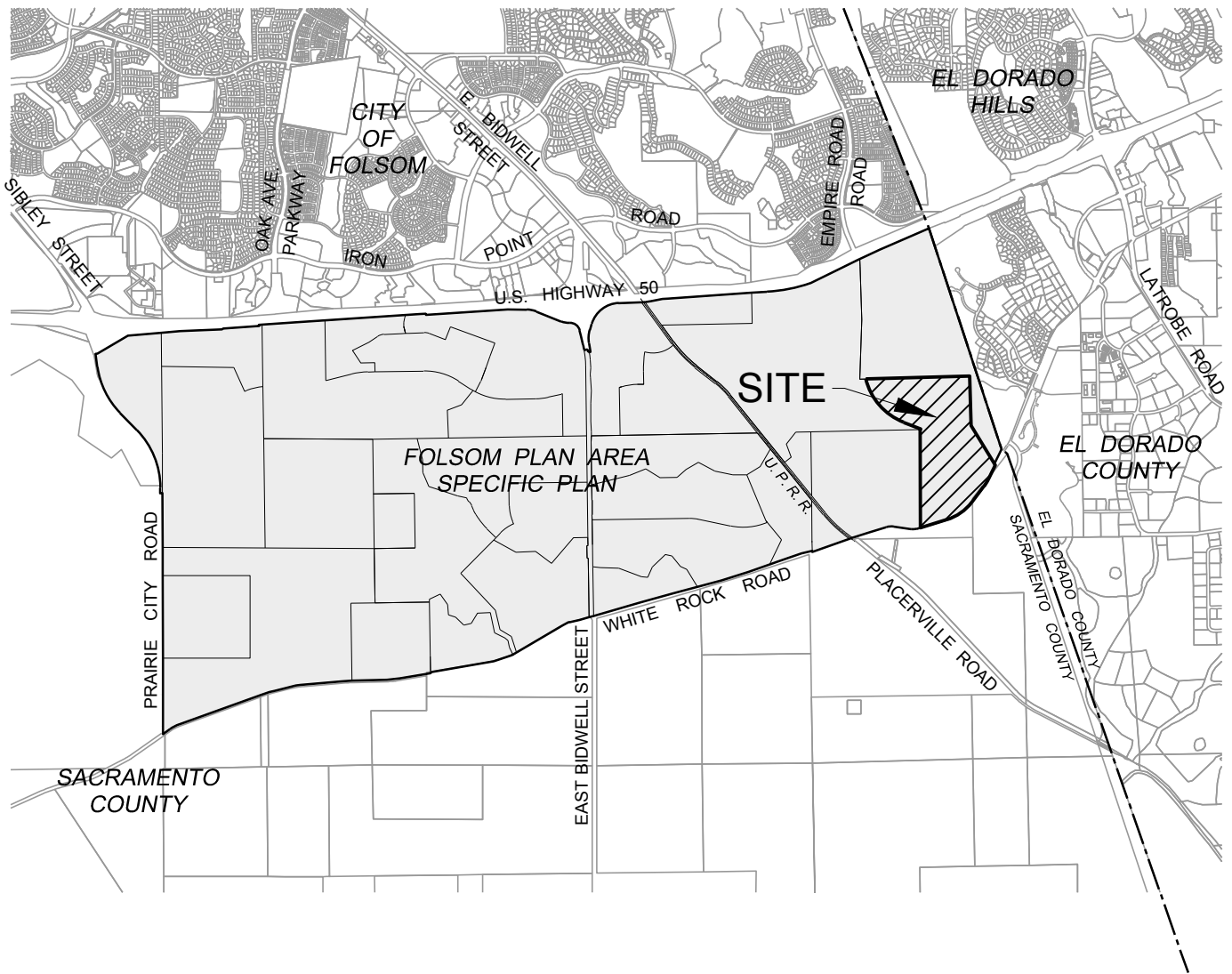
As improvement plans progress, the characteristics of each detention basin will be assessed because of the increased level of detail. Optimization of the basins will be achieved during final design.

CONCLUSION

The results of the analysis performed for this Technical Memorandum demonstrate that there is not a need to update the FPA SDMP for land use entitlement approvals of the proposed Vesting Tentative Large Lot Merger and Resubdivision Map. Further, this Technical Memorandum adequately summarizes the Russell Ranch Phase 2 drainage characteristics and is suitable for submittal to the City of Folsom as a part of the Russell Ranch Phase 2 entitlement package.

Table 2: Detention Basin #11 Drainage Capacities

Depth (feet)	Water Surface Area (acres)	Average End Area Volume (acre-feet)	Discharge (cubic feet / second)
0	0.00	0.00	0.00
1	0.26	0.29	3.33
2	0.36	0.60	5.90
3	0.50	0.98	7.61
4	0.66	1.49	9.01
5	0.85	2.19	10.21
6	1.07	3.12	11.29
7	1.33	4.32	19.93
8	1.61	5.80	34.85
9	1.92	7.61	53.84
10	2.25	9.75	76.11
11	2.62	12.24	101.23
12	3.01	14.95	128.63
13	3.39	17.61	155.52
14	3.78	20.27	182.41
15	4.16	22.93	209.30
16	4.54	25.59	236.20
17	4.92	28.26	263.09
18	5.31	30.92	289.98



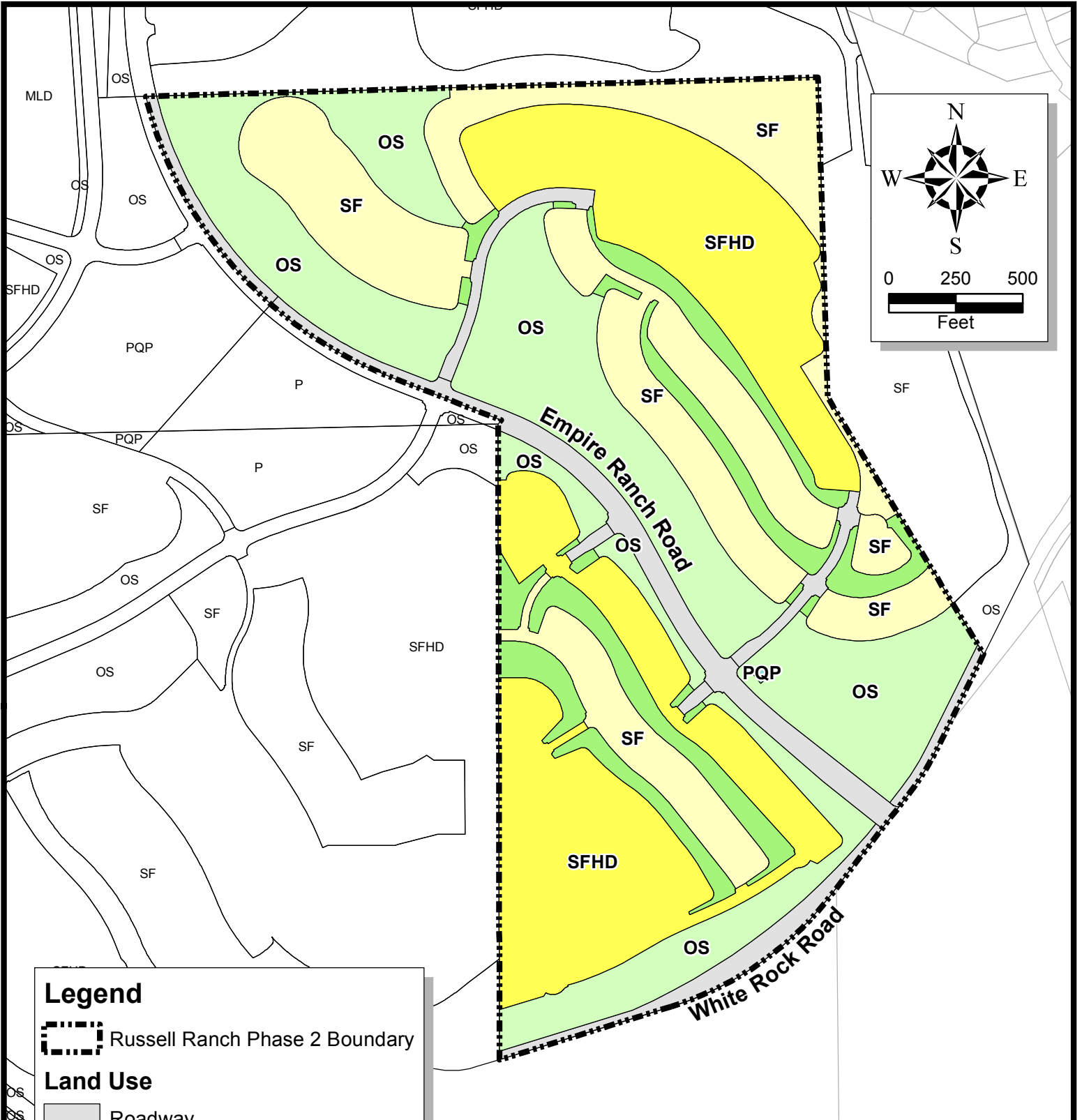
*Exhibit 1
Vicinity Map*

Russell Ranch Phase 2


City of Folsom
Scale 1"=40'

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California
August 11, 2017
Job No 27107.PH2



Legend

 Russell Ranch Phase 2 Boundary

Land Use








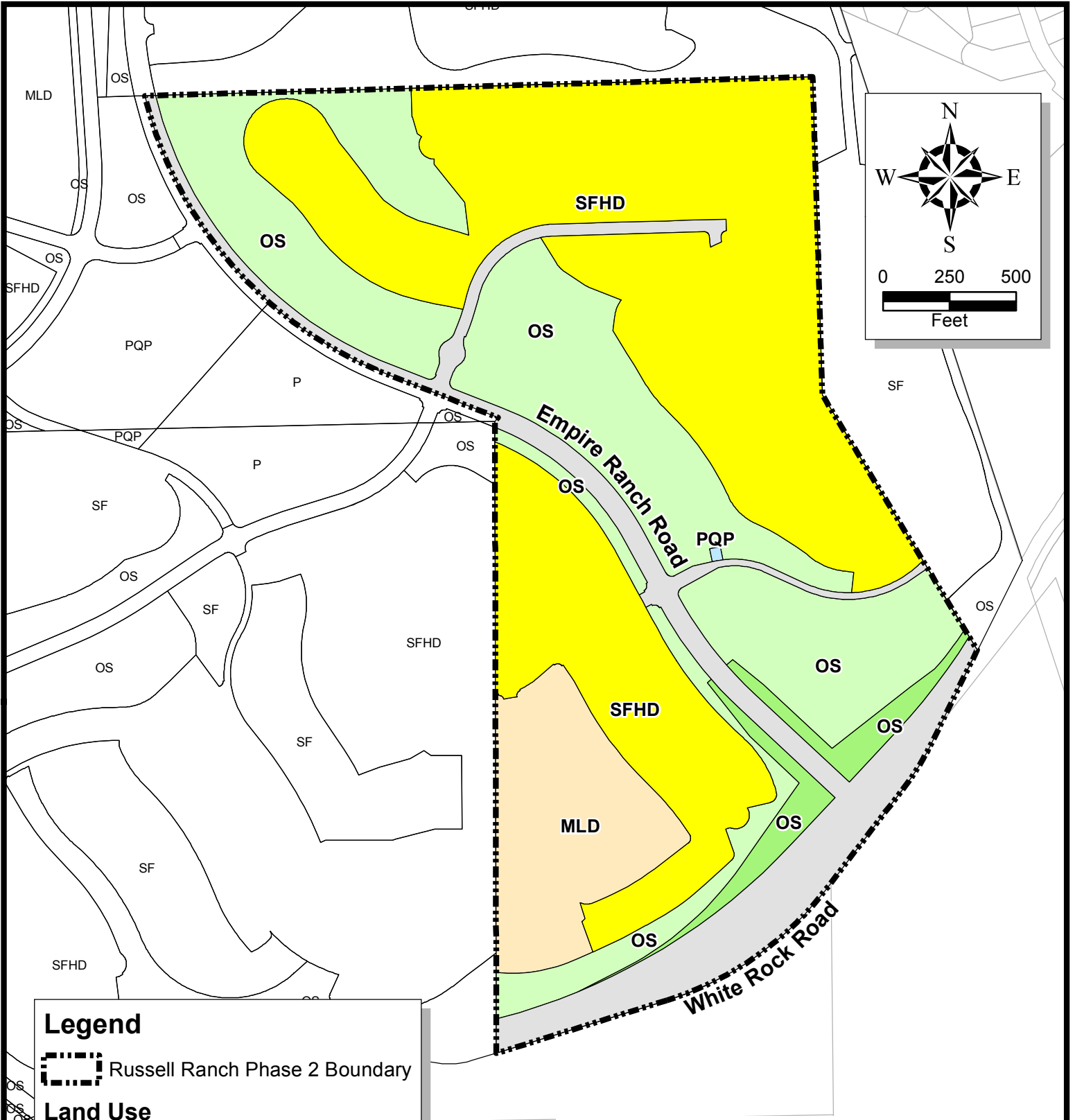
-  Roadway
-  SF
-  SFHD
-  MLD
-  PQP
-  OS; OS-LC
-  OS-SLOPE

Exhibit 2
Approved FPASP Land Use Plan
Russell Ranch Phase 2

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Legend








-  Russell Ranch Phase 2 Boundary
- Land Use**
-  Roadway
-  SFHD
-  MLD
-  PQP
-  OS; OS-LC
-  OS-OTHER

Exhibit 3
Proposed FPASP Land Use Plan
Russell Ranch Phase 2

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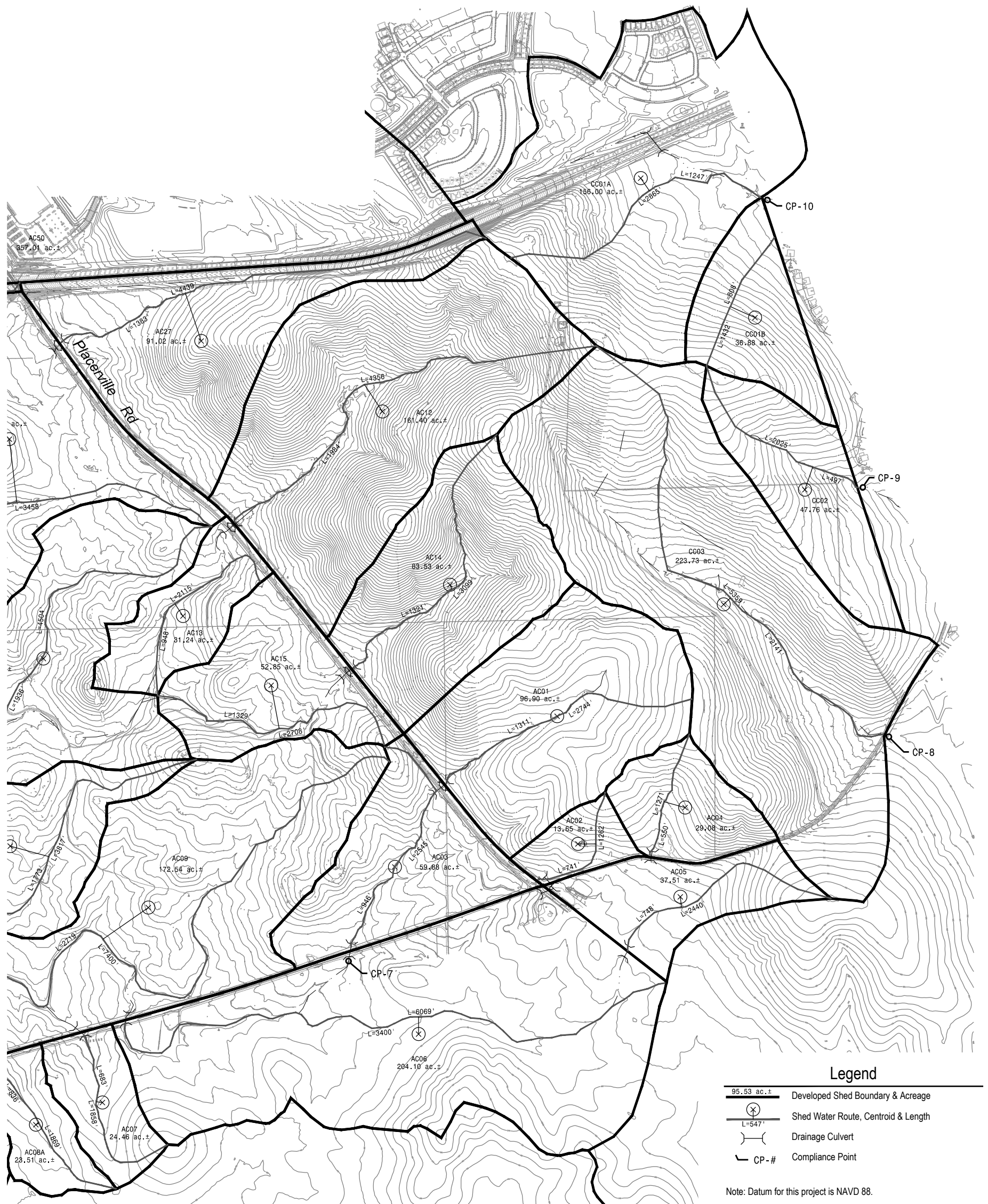
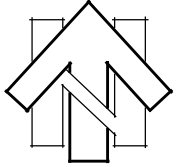
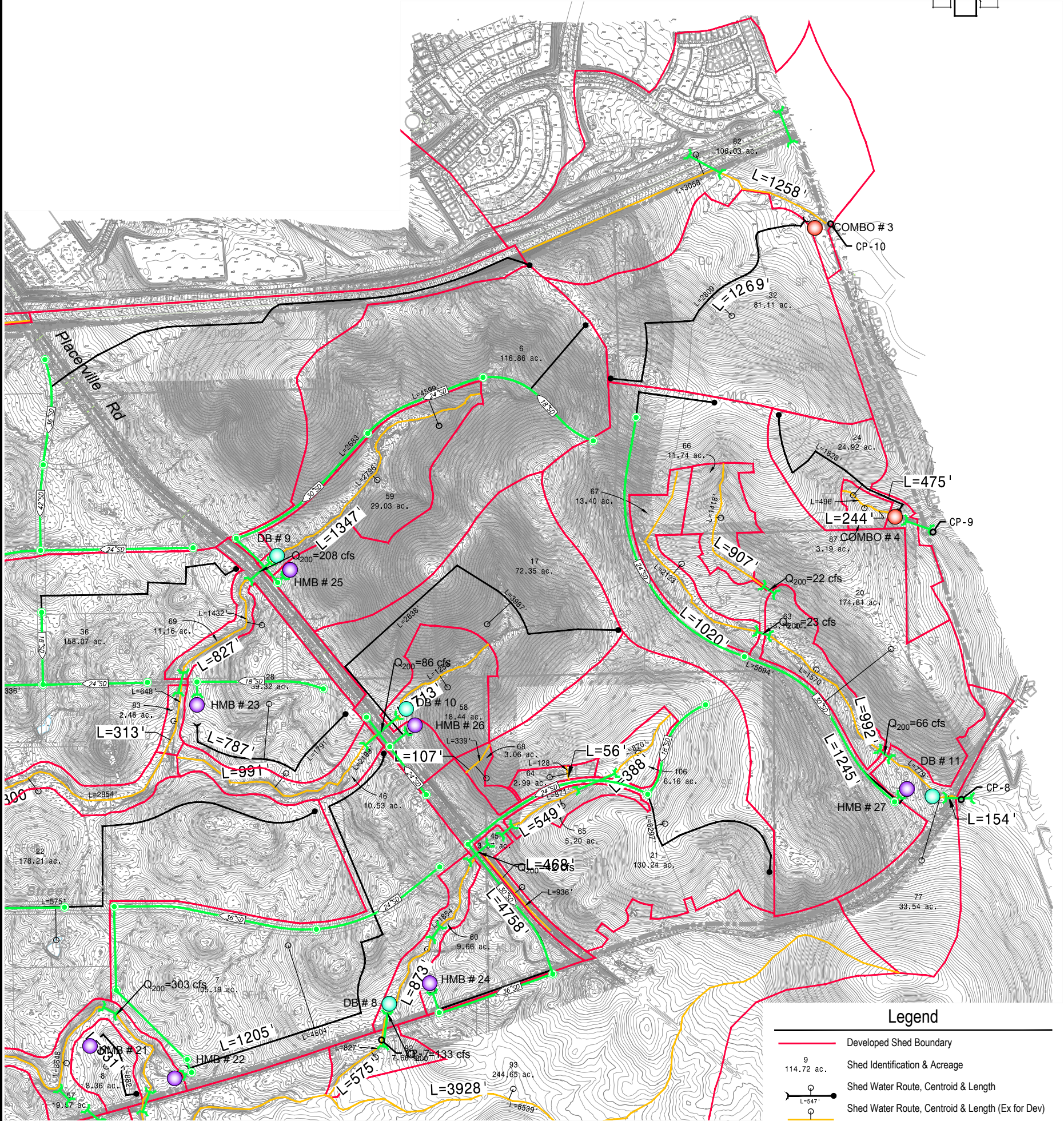
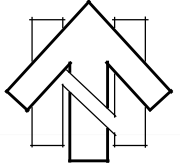


Exhibit 4 Existing Shed Map With Compliance Points Folsom Plan Area

City of Folsom,
Scale: 1"=1000'

California
Oct 7, 2016



Legend

- Developed Shed Boundary
- 9 Shed Identification & Acreage
- Shed Water Route, Centroid & Length
- Shed Water Route, Centroid & Length (Ex for Dev)
- Water Quality - Hydromodification Basin
- Water Quality - Hydromodification Detention Basin
- In-Stream Detention Basin
- Drainage Culvert
- Storm Drain Pipeline
- Bridge
- CP-# Compliance Point

Note: Datum for this project is NAVD 88.

INFRASTRUCTURE ABBREVIATIONS

DB	Detention Basin
HMB	Hydro-modification Basin
COMBO	Combination Basin

Exhibit 5 Developed Shed Map Per Approved FPA Storm Drainage Master Plan

City of Folsom,
Scale: 1"=1000'

California
Oct 7, 2016



Shed Area Summary	Land Use / Impervious %										
	GC	MLD	Offsite Pervious	OS	OS-SLOPE	P	PQP	Roadway	SF	SFHD	Grand Total
Shed ID	90%	55%	95%	2%	20%	15%	50%	90%	50%	55%	
803	0.16	18.77	0.00	21.89	9.01	5.43	0.81	21.17	4.93	62.37	144.55
804				8.72	0.40					1.02	10.15
805				10.17				0.06		0.11	10.33
806			21.58	1.58				2.54	0.02		25.73
Grand Total	0.16	18.77	21.58	42.36	9.41	5.43	0.81	23.77	4.96	63.51	190.76

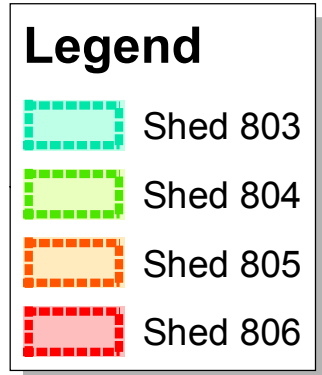
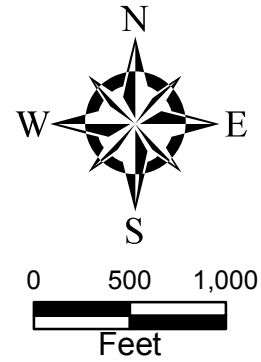
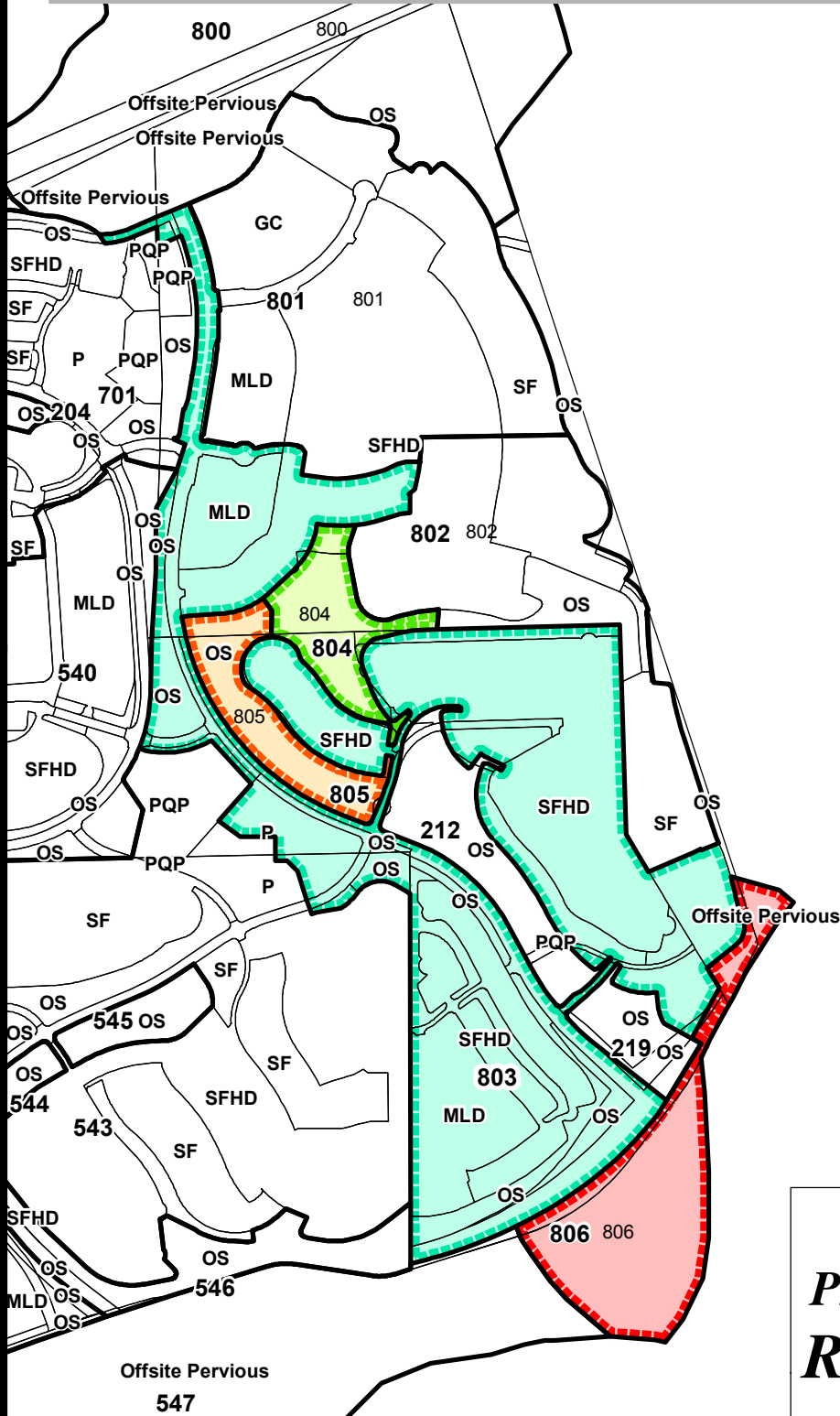


Exhibit 6
Proposed Project Shed Areas
Russell Ranch Phase 2

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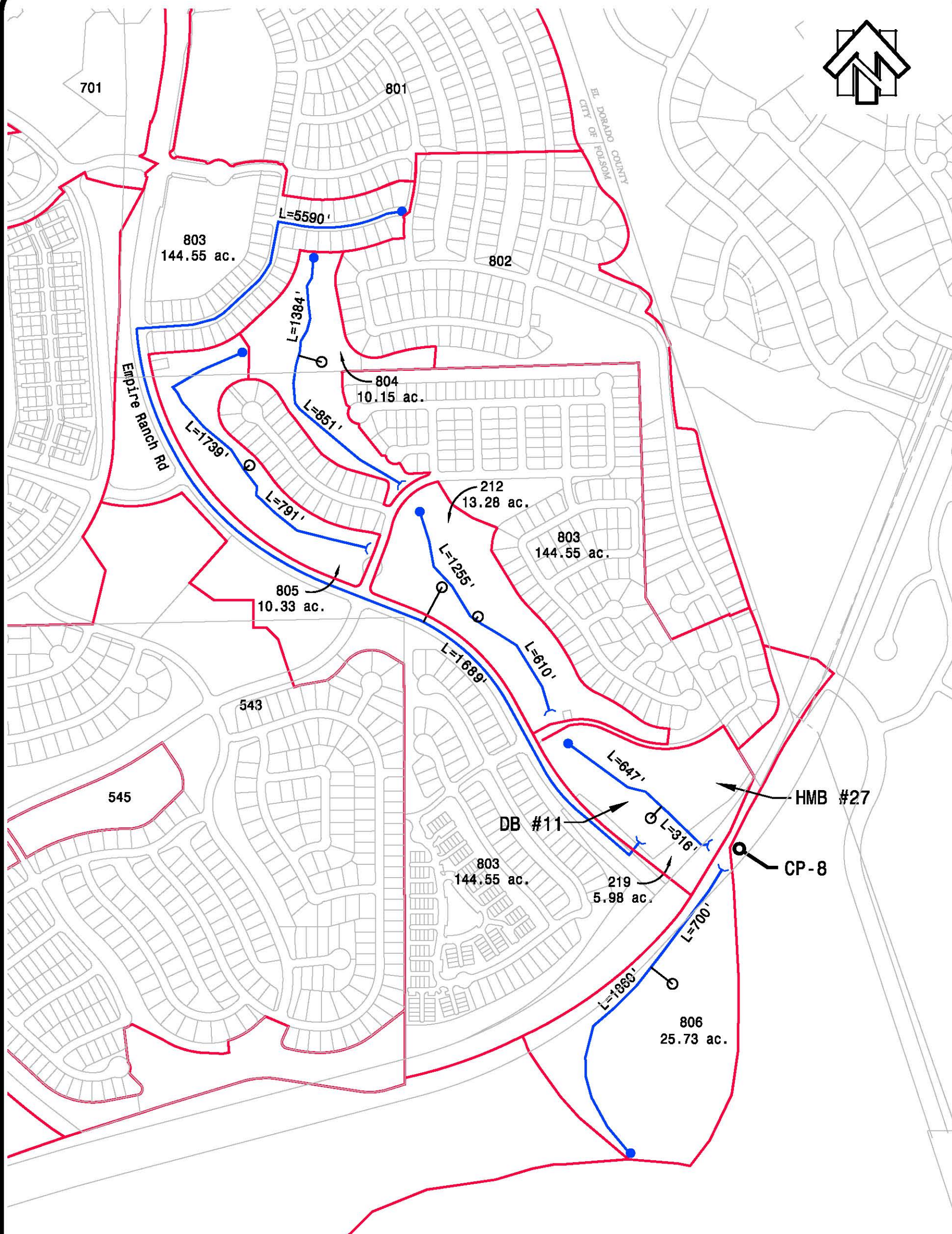
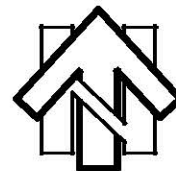


Exhibit 7
Water Shed Data Elements
Russell Ranch Phase 2

City of Folsom,
 Scale: 1"=500'

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 August 4, 2017