APPENDIX L

TECHNICAL MEMORANDUM

SUBJECT: Collection System Flow Study for Brady-Vineyard Development

PREPARED BY: Zachary Roy, Woodard & Curran

REVIEWED BY: Ian Jaffe, Woodard & Curran, PE No. 85788
Chris van Lienden, Woodard & Curran, PE No. 75034

DATE: April 19, 2018, updated May 8, 2019

RE: 0011168.00

1. BACKGROUND

Woodard & Curran was asked to analyze the impacts of the proposed Brady-Vineyard development on the existing sewers owned by the City of Roseville (City) and South Placer Wastewater Authority (SPWA). Two parcels, APN 473-020-002, and 473-020-013, comprise the development. The proposed Brady-Vineyard development, located at the intersection of Vineyard Road and Brady Lane in the City of Roseville would create 124 new Equivalent Dwelling Units (EDUs) on currently vacant land. In the 2007 SPWA Systems Evaluation, this area was assigned 52 single-family dwelling units (at 190 gpd/unit) plus 9.9 acres of public/quasi-public (at 660 gpd/acre), resulting in a total ADWF of about 16,400 gpd; however, the area was loaded directly to the Dry Creek WWTP without entering any of the City's sewers. Woodard & Curran has recently completed an update of the City's sewer collection system model (2017 Sewer Model Update) which included all existing sewers within the City. However, consistent with the 2007 Systems Evaluation, flow from the proposed development was not applied to any of the existing sewers. For this analysis, the model was revised to incorporate anticipated flows from the proposed development.

The location of the proposed development is indicated in Figure 1.

2. MODELED SEWER EVALUATION

For the purposes of estimating potential sewer flows, a unit flow factor of 190 gpd/EDU has been used, consistent with the standard ADWF factor used in the 2017 Sewer Model Update. As shown in Table 1, the development would contribute an estimated average base wastewater flow (BWF) of 23,600 gallons per day (gpd). The existing land use for the two parcels is zoned for 70 EDUs[1] (with an estimated average BWF of 13,300 gpd). The Brady-Vineyard development represents a BWF increase of 10,300 gpd more than the previously zoned land use, and 23,600 gpd more currently modeled flows.

Table 1: Estimated Development Loads

Development Description	Equivalent Dwelling Units	Unit Flow Factor (gpd/EDU)	Estimated BWF (gpd)
Medium Density Residential	124	190	23,600

[1] Zoning RS-AG-B-20 per the Placer County zoning map (http://maps.placer.ca.gov/Html5Viewer/Index.html?configBase=http://maps.placer.ca.gov/Geocortex/Essentials/REST/sites/Parcel_Query_Placer_County1/viewers/Test1/virtualdirectory/Resources/Config/Default)

Estimated development loads were added to manhole SMH-B03-007 on Foothills Boulevard based on the drainage plan included in Appendix A. Rainfall dependent inflow and infiltration (RDI/I) was added to the area based on the rainfall response in the adjacent area. The model was then run under the design storm scenario for future land use conditions with and without the proposed development. Peak wet weather flows from the development were estimated to be 0.075 mgd.

The resulting modeled profiles for the sewer downstream of the proposed development are included in Figures 2 and 3. The model indicates that no surcharging would occur downstream of the development under design peak flow conditions. The City's design standard for pipes 15-inches and larger is that d/D must be 1.0 or less. All sewers downstream of SMH-B03-007 are 15-inches or larger, and maximum d/D with the proposed Brady Vineyard development is 0.41.

Therefore, it is concluded that the proposed Brady-Vineyard development would not create any capacity issues in the City's existing sewer system, from SMH-B03-007 to the WWTP.

3. NORTHEAST AREA SEWER EVALUATION (NOVEMBER 2, 2018 UPDATE)

As part of this sewer evaluation, the City also wanted to consider the impacts of other potential developments in this area of Placer County (County) that could drain into the City sewers. The County provided an exhibit indicating the area (the NE Area, included in Appendix B), as well as potential acreages and dwelling units. Based on general plan land uses, the area could potentially include up to 325 dwelling units (124 units from the Brady-Vineyard Development plus 201 units from the rest of the NE Area), and a residential area of 247.8 acres. Based on a flow factor of 190 gpd/EDU, this results in an estimated BWF of 61,750 gpd (23,560 gpd from the Brady-Vineyard Development and 38,190 gpd from the rest of the NE Area).

Estimated development loads were added to manhole SMH-B03-007, with RDI/I flow added to the area based on the rainfall response in the adjacent area. The model was run under the design storm scenario for three future conditions: (1) as originally modeled without any flow from the NE Area; (2) with the 124 units from the proposed Brady-Vineyard Development but without any additional NE Area flows, and (3) with the full potential development of 325 units from the NE Area. Profiles of the sewer downstream of SMH-B03-007 for those three scenarios are presented in Figure 2, 3, and 4. Peak wet weather flows from the NE Area under were estimated to be 0.57 mgd. The increase in flow is primarily due to the increase in sewered area (from 19 acres to 248 acres), resulting in higher RDI/I estimates. While a newly sewered area would typically have less RDI/I per acre than existing sewers due to newer pipe materials and better construction methods, no reduction in RDI/I has been assumed.

If the entire NE Area discharges directly into SMH B03-007, the downstream sewer has a minimum d/D of 0.58.

Therefore, it is concluded that the NE Area would not create any capacity issues in the City's existing sewer system, if the area discharges directly into SMH B03-007.

Figure 1: Proposed Development Vicinity Map

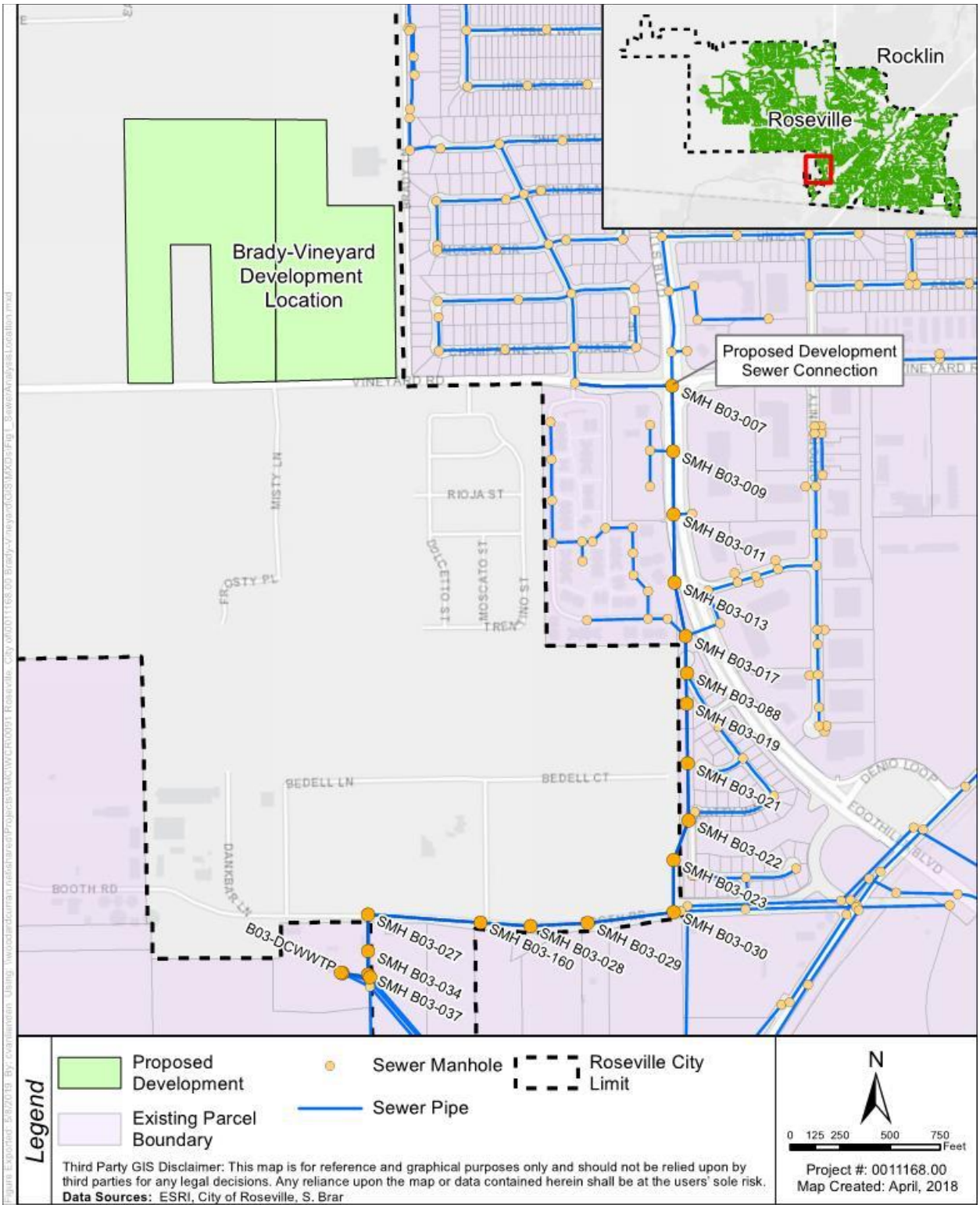
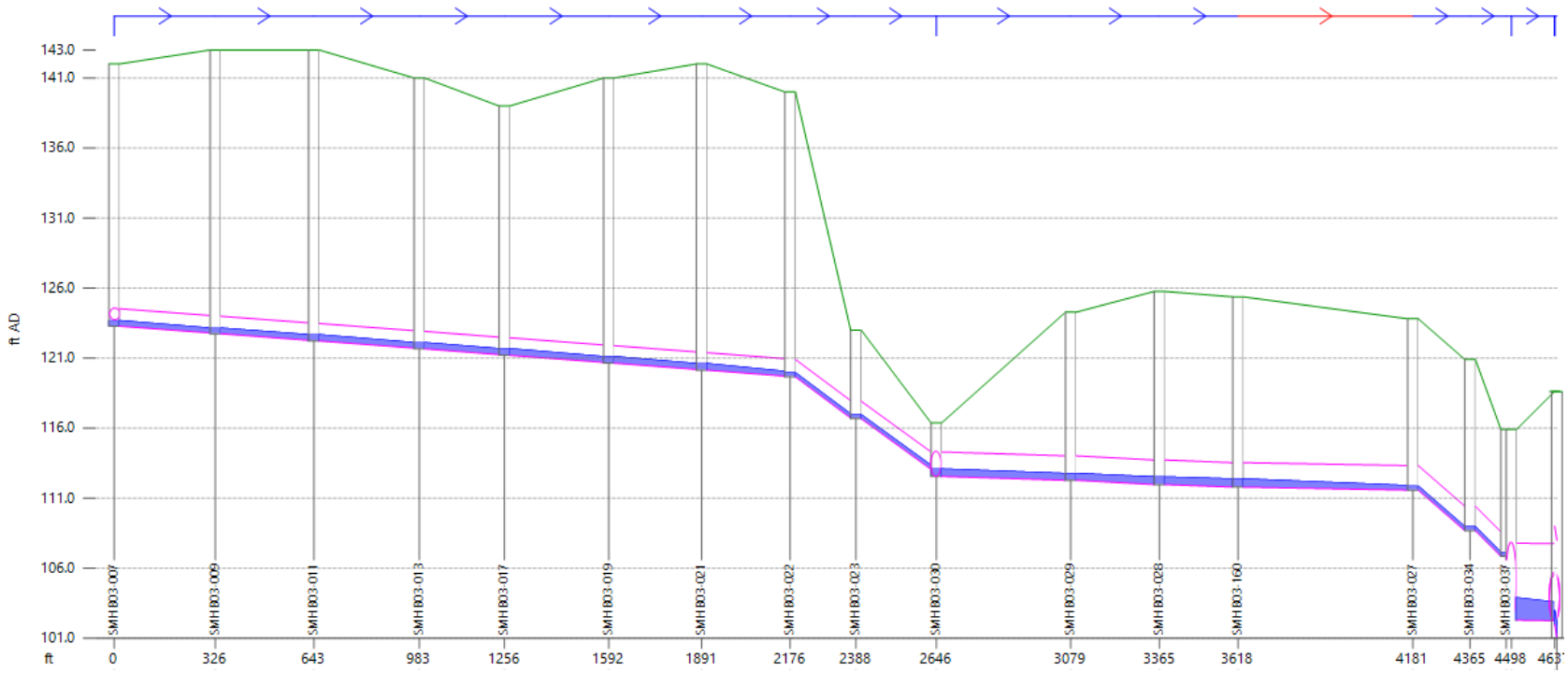


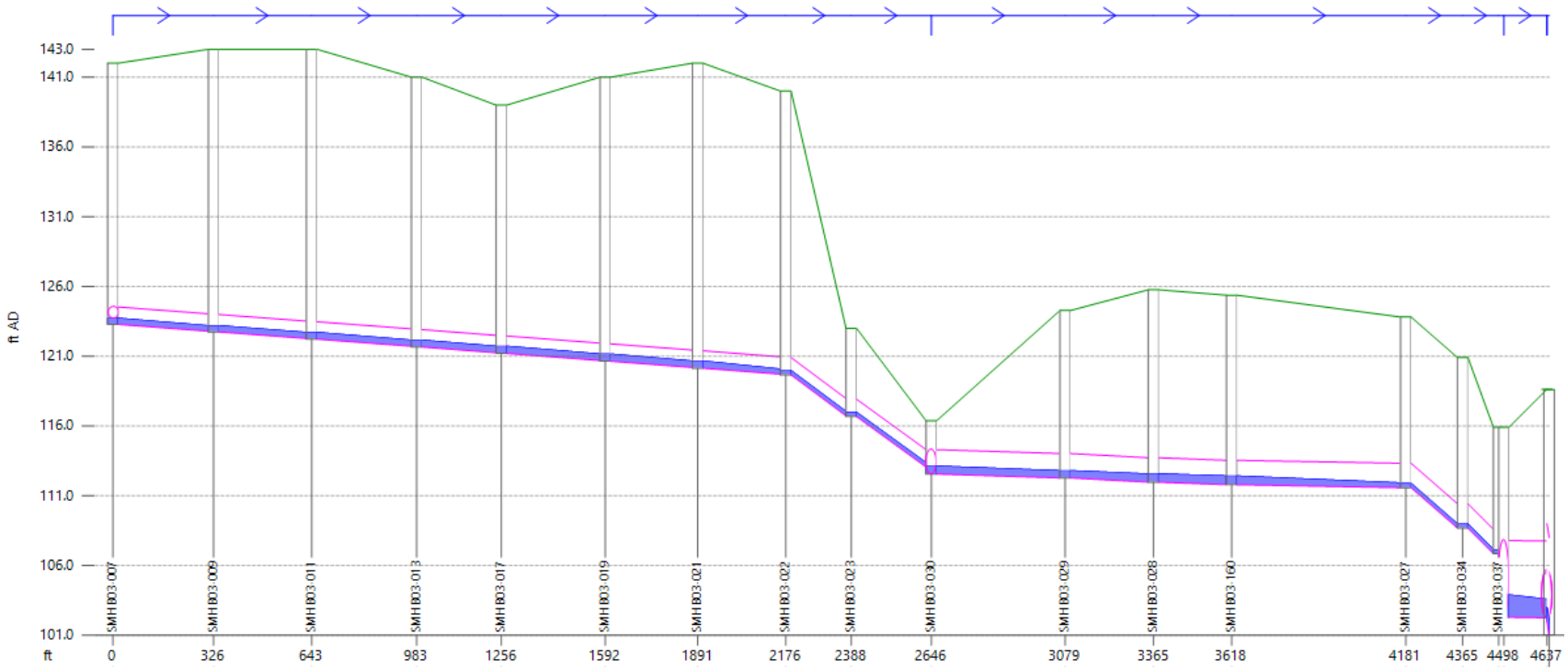
Figure 2: Future Conditions: PWWF Results in Foothills Boulevard Trunk from SMH-B03-007 (Foothill Boulevard/Vineyard Road) to the Dry Creek Waste Water Treatment Plant Outfall



Link	-	-	SMH B03-011.1	-	-	-	-	-	-	SMH B03-030.1	-	-	SMH B03-160.1	-	-	-
length (ft)	326.1	316.8	339.6	273.7	336.1	298.6	284.8	212.0	258.8	432.7	285.5	252.9	563.3	183.7	-	139.3
width (in)	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	21.0	21.0	21.0	21.0	21.0	21.0	66.0
us inv (ft AD)	123.280	122.740	122.220	121.660	121.200	120.640	120.140	119.660	116.670	112.550	112.274	111.974	111.788	111.574	-	-
ds inv (ft AD)	122.790	122.270	121.710	121.250	120.690	120.190	119.710	116.720	113.050	112.274	111.974	111.788	111.574	108.677	-	-
pfc (MGD)	1.62	1.61	1.62	1.62	1.63	1.62	1.62	4.92	4.94	2.59	3.32	2.78	2.00	12.86	-	36.79
surc	0.32	0.32	0.36	0.36	0.38	0.38	0.37	0.24	0.24	0.31	0.31	0.34	0.34	0.17	0.17	0.29
US flow (MGD)	0.3449	0.3520	0.4359	0.4358	0.4849	0.4849	0.4854	0.5025	0.5028	0.5279	0.5277	0.5275	0.5273	0.5272	-	-

Node	-	-	-	-	-	-	-	-	-	SMH B03-030	SMH B03-029	-	SMH B03-160	SMH B03-027	-
ground (ft AD)	-	143.000	143.000	141.000	139.000	141.000	142.000	140.000	123.000	116.374	124.274	125.758	125.375	123.809	-
GIS Object ID	-	15.000	16.000	17.000	18.000	19.000	20.000	21.000	22.000	29.000	28.000	27.000	70.000	26.000	-
level (ft AD)	-	123.143	122.667	122.107	121.669	121.109	120.608	119.955	116.965	113.084	112.761	112.517	112.377	111.869	-
flood dep (ft)	-	-19.857	-20.333	-18.893	-17.331	-19.891	-21.392	-20.045	-6.035	-3.290	-11.513	-13.241	-12.998	-11.940	-

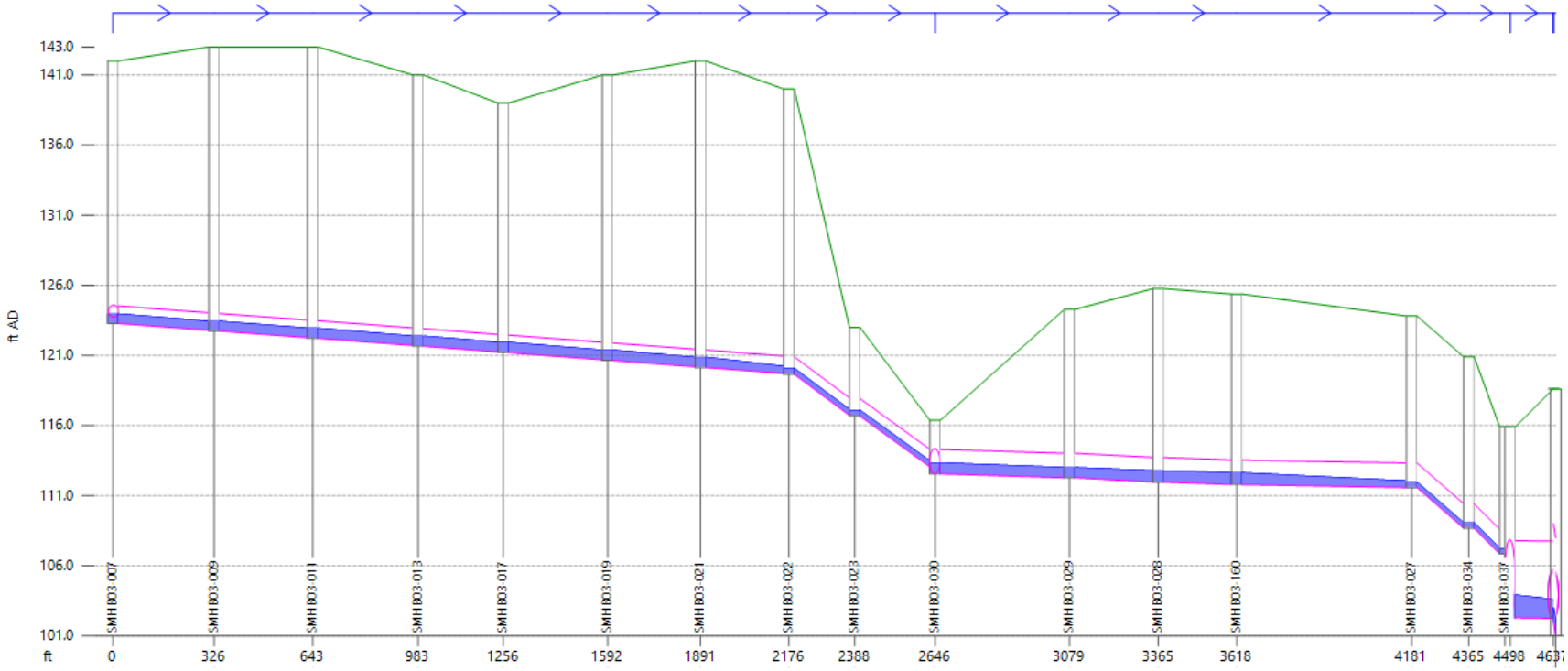
Figure 3: Future Conditions + Brady Vineyard Development: PWWF Results in Foothills Boulevard Trunk from SMH-B03-007 (Foothill Boulevard/Vineyard Road) to the Dry Creek Waste Water Treatment Plant Outfall



Link	-	-	SMH B03-011.1	-	-	-	-	-	-	SMH B03-030.1	-	-	SMH B03-160.1	-	-	-
length (ft)	326.1	316.8	339.6	273.7	336.1	298.6	284.8	212.0	258.8	432.7	285.5	252.9	563.3	183.7	-	139.3
width (in)	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	21.0	21.0	21.0	21.0	21.0	21.0	66.0
us inv (ft AD)	123.280	122.740	122.220	121.660	121.200	120.640	120.140	119.660	116.670	112.550	112.274	111.974	111.788	111.574	-	-
ds inv (ft AD)	122.790	122.270	121.710	121.250	120.690	120.190	119.710	116.720	113.050	112.274	111.974	111.788	111.574	108.677	-	-
pfc (MGD)	1.62	1.61	1.62	1.62	1.63	1.62	1.62	4.92	4.94	2.59	3.32	2.78	2.00	12.86	-	36.79
surc	0.35	0.36	0.39	0.39	0.41	0.41	0.41	0.25	0.25	0.33	0.33	0.36	0.36	0.18	0.18	0.29
US flow (MGD)	0.4184	0.4255	0.5095	0.5093	0.5583	0.5582	0.5587	0.5758	0.5760	0.6010	0.6007	0.6005	0.6003	0.6002	-	-

Node	-	-	-	-	-	-	-	-	-	SMH B03-030	SMH B03-029	-	SMH B03-160	SMH B03-027	-	
ground (ft AD)	-	143.000	143.000	141.000	139.000	141.000	142.000	140.000	123.000	116.374	124.274	125.758	125.375	123.809	-	
GIS Object ID	-	15.000	16.000	17.000	18.000	19.000	20.000	21.000	22.000	29.000	28.000	27.000	70.000	26.000	-	
level (ft AD)	-	123.184	122.705	122.145	121.712	121.152	120.650	119.975	116.985	113.124	112.791	112.557	112.414	111.884	-	
flood dep (ft)	-	-19.816	-20.295	-18.855	-17.288	-19.848	-21.350	-20.025	-6.015	-3.250	-11.482	-13.201	-12.961	-11.925	-	

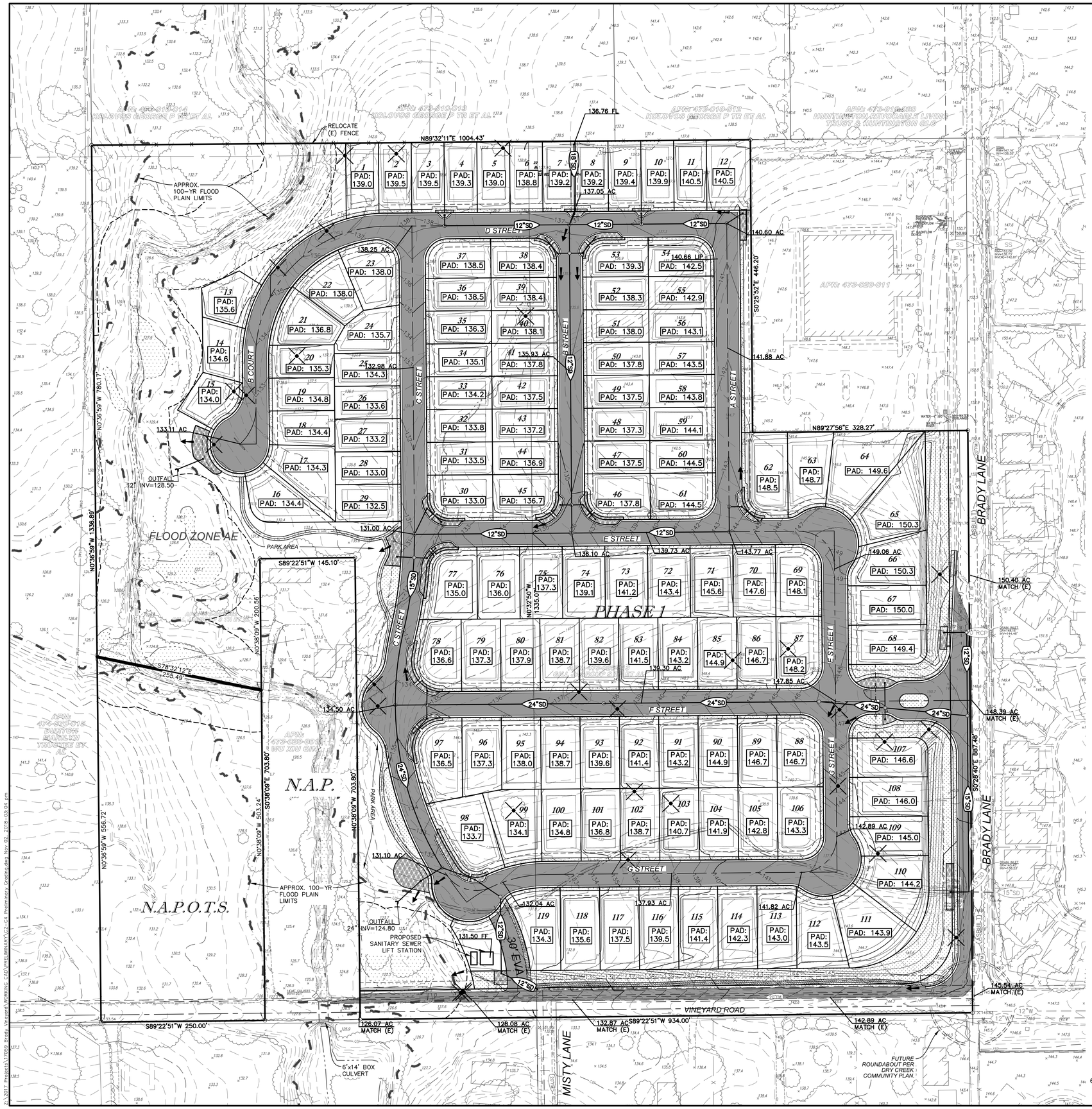
Figure 4: Future Conditions + Dry Creek NE Area: PWWF Results in Foothills Boulevard Trunk from SMH-B03-007 (Foothill Boulevard @ Vineyard Road) to the Dry Creek Waste Water Treatment Plant Outfall



Link	-	-	SMH B03-011.1	-	-	-	-	-	-	SMH B03-030.1	-	-	SMH B03-160.1	-	-	-
length (ft)	326.1	316.8	339.6	273.7	336.1	298.6	284.8	212.0	258.8	432.7	285.5	252.9	563.3	183.7	-	139.3
width (in)	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	21.0	21.0	21.0	21.0	21.0	21.0	66.0
us inv (ft AD)	123.280	122.740	122.220	121.660	121.200	120.640	120.140	119.660	116.670	112.550	112.274	111.974	111.788	111.574	-	-
ds inv (ft AD)	122.790	122.270	121.710	121.250	120.690	120.190	119.710	116.720	113.050	112.274	111.974	111.788	111.574	108.677	-	-
pfc (MGD)	1.62	1.61	1.62	1.62	1.63	1.62	1.62	4.92	4.94	2.59	3.32	2.78	2.00	12.86	-	36.79
surc	0.54	0.55	0.57	0.57	0.58	0.58	0.58	0.34	0.33	0.45	0.46	0.48	0.48	0.22	0.22	0.29
US flow (MGD)	0.9149	0.9216	1.0055	1.0054	1.0545	1.0544	1.0549	1.0721	1.0723	1.0973	1.0969	1.0965	1.0963	1.0962	-	-

Node	-	-	-	-	-	-	-	-	-	SMH B03-030	SMH B03-029	-	SMH B03-160	SMH B03-027	-
ground (ft AD)	-	143.000	143.000	141.000	139.000	141.000	142.000	140.000	123.000	116.374	124.274	125.758	125.375	123.809	-
GIS Object ID	-	15.000	16.000	17.000	18.000	19.000	20.000	21.000	22.000	29.000	28.000	27.000	70.000	26.000	-
level (ft AD)	-	123.426	122.936	122.377	121.931	121.370	120.862	120.080	117.089	113.330	112.999	112.775	112.625	111.959	-
flood dep (ft)	-	-19.574	-20.064	-18.623	-17.069	-19.630	-21.138	-19.920	-5.911	-3.044	-11.275	-12.983	-12.750	-11.850	-

APPENDIX A – PRELIMINARY GRADING PLAN



LEGEND

DESCRIPTION	EXISTING	PROPOSED
PROPERTY LINE		
ROW		
EASEMENT		
LOT LINE		
CENTERLINE		
SW, CURB & GUTTER		
DITCH / FLOWLINE		
EP		
STORM DRAIN	XX"SD	XX"SD
SANITARY SEWER	XX"SS	XX"SS
WATER	XX"W	XX"W
SDMH		D
DROP INLET		
OVERLAND RELEASE PATH		
SSMH		S
SSCO		
FIRE HYDRANT		
PIV		
FDC		
WATER VALVE		
WATER METER	WM	WM
REDUCED PRESSURE BACKFLOW PREVENTER	RP	RP
BLOW OFF ASSEMBLY		
MONUMENT WELL		
UTILITY POLE		
STREET LIGHT		
FENCE	X X	X X
RETAINING WALL		
BLOCK WALL		
INDEX CONTOUR	25	25
INTERMEDIATE CONTOURS		
CULVERT WITH FES		
GRADE BREAK LINE		GB
TREE & DRIP		REMOVAL
CONTROL POINT		100 100.00 PK
PAD ELEVATION		PAD: 123.00
SPOT ELEVATION (ASPHALT CONCRETE)	× 157.01 AC	13.34 AC / 13.61 AC
TRUNCATED DOMES		
BUILDING		
DOOR		
WETLAND AREA		
50-FOOT WETLAND SETBACK		
100 YEAR FLOOD PLAIN LIMITS		

PAVING LEGEND:

- ASPHALT PAVEMENT
- DG PATH
- LANDSCAPED AREA
- BIORETENTION
- WETLANDS

BASIS OF BEARINGS:

THE BASIS OF BEARINGS FOR THIS SURVEY IS THE WEST LINE OF THE NORTHWEST ONE-QUARTER OF SECTION 9, T. 10 N., R. 6 E., M.D.M., WHICH IS ALSO THE CENTERLINE OF COOK-RIOLO ROAD, AS SHOWN ON THAT CERTAIN RECORD OF SURVEY MAP FILED FOR RECORD IN BOOK 19 OF SURVEYS, AT PAGE 129, THE BEARING OF WHICH IS NORTH 00° 14' 16" WEST AND WAS ESTABLISHED FROM RECORD MONUMENTATION.

BENCHMARK:

THE BENCHMARK FOR THIS SURVEY IS THE NGS MONUMENT DESIGNATED "BASEWALE, PID DL9133" AND IS A SURVEY DISC STAMPED "BASEWALE 2008" RECESSED IN A WELL LOCATED 68.0 FEET SOUTH OF THE CENTERLINE OF BASELINE ROAD AND 46.7 FEET WEST OF THE CENTERLINE OF WALERGA ROAD.
ELEVATION = 116.3 FEET (NAVD 1988 DATUM)
CONVERSION TO NGVD 1929 DATUM = SUBTRACT 2.44 FEET FROM NAVD88
CONVERSION TO CITY OF ROSEVILLE DATUM = SUBTRACT 2.49 FEET FROM NAVD88

TOTAL AREA DISTURBED: 26.9 ACRES

PRELIMINARY EARTHWORK SUMMARY

CUT: 57,015 CY
FILL: 57,015 CY
NET: 0

NOTE:
EARTHWORK QUANTITIES ARE ESTIMATED TO SUBGRADE AND DO NOT TAKE INTO ACCOUNT SHRINKAGE. EXCESS MATERIALS FROM TRENCHING AND MISC. UNKNOWN STRUCTURAL SECTIONS. CONTRACTOR SHOULD VERIFY EARTHWORK QUANTITIES.

811 Know what's below. Call before you dig. or (800) 227-2600

REVISION	DATE	BY	APPRV'D

BY	CHECK NO.
SBS	RFE
SBS	RFE

DESIGN SBS
DRAWN SBS
QUANT.
0 ORIGINAL SCALE IS IN INCHES 1 2

PRELIMINARY NOT FOR CONSTRUCTION

SUKHBIR BRAR
2351 SUNSET BOULEVARD,
ROCKLIN, CA 95765
PH: (916) 749-0967

RFE ENGINEERING, INC
Civil Engineers • Planners • Surveyors
2260 Douglas Blvd., Suite 160, Roseville, CA 95661
Ph: (916) 772-7800 Fax: (916) 772-7804
www.rfeengineering.com

BRADY SUBDIVISION
VINEYARD ROAD AND BRADY LANE,
PLACER COUNTY, CA
(APNS 473-020-011 & 473-020-034)

PRELIMINARY GRADING PLAN - OVERALL

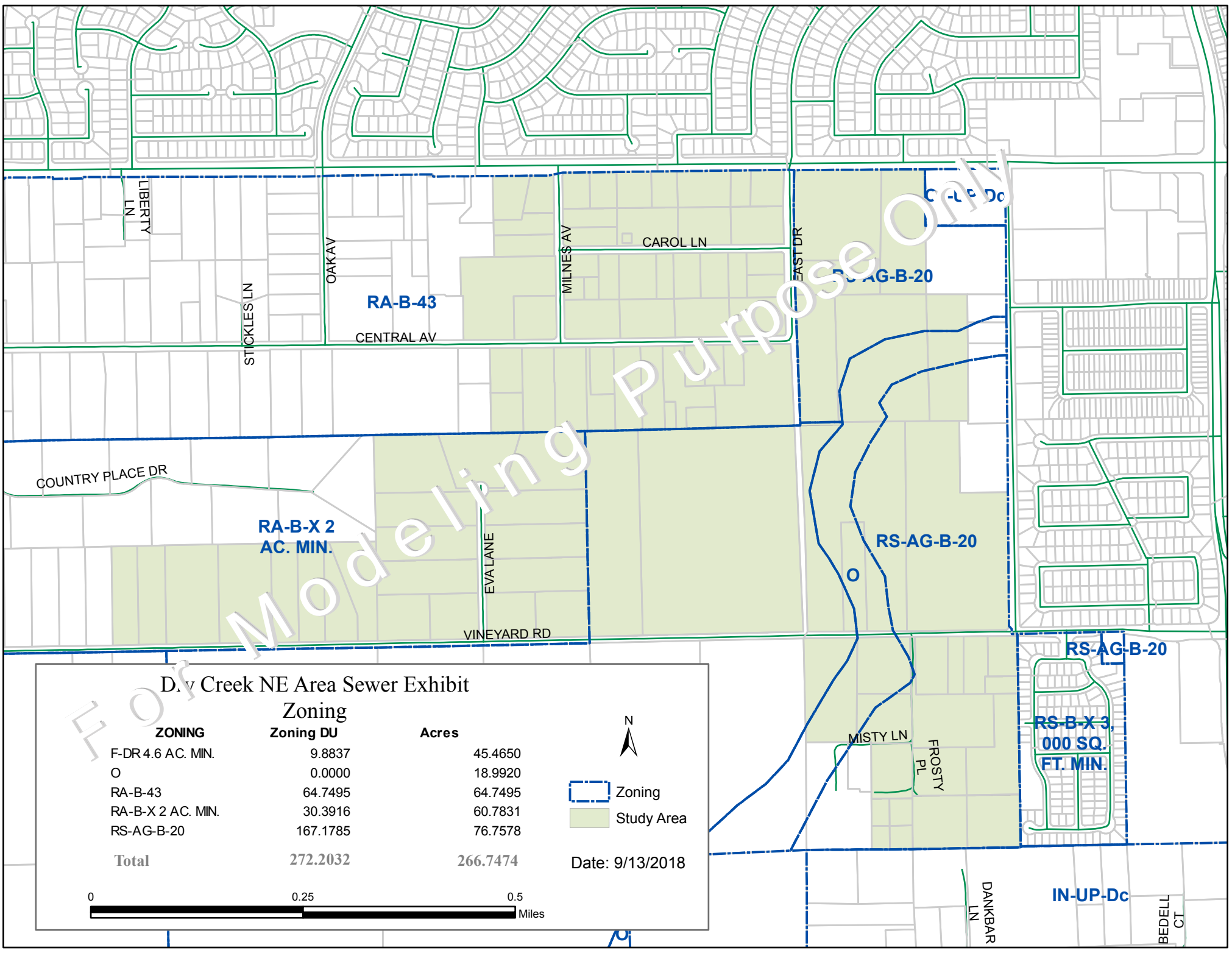
Drawing C2 of Sheet Total 13

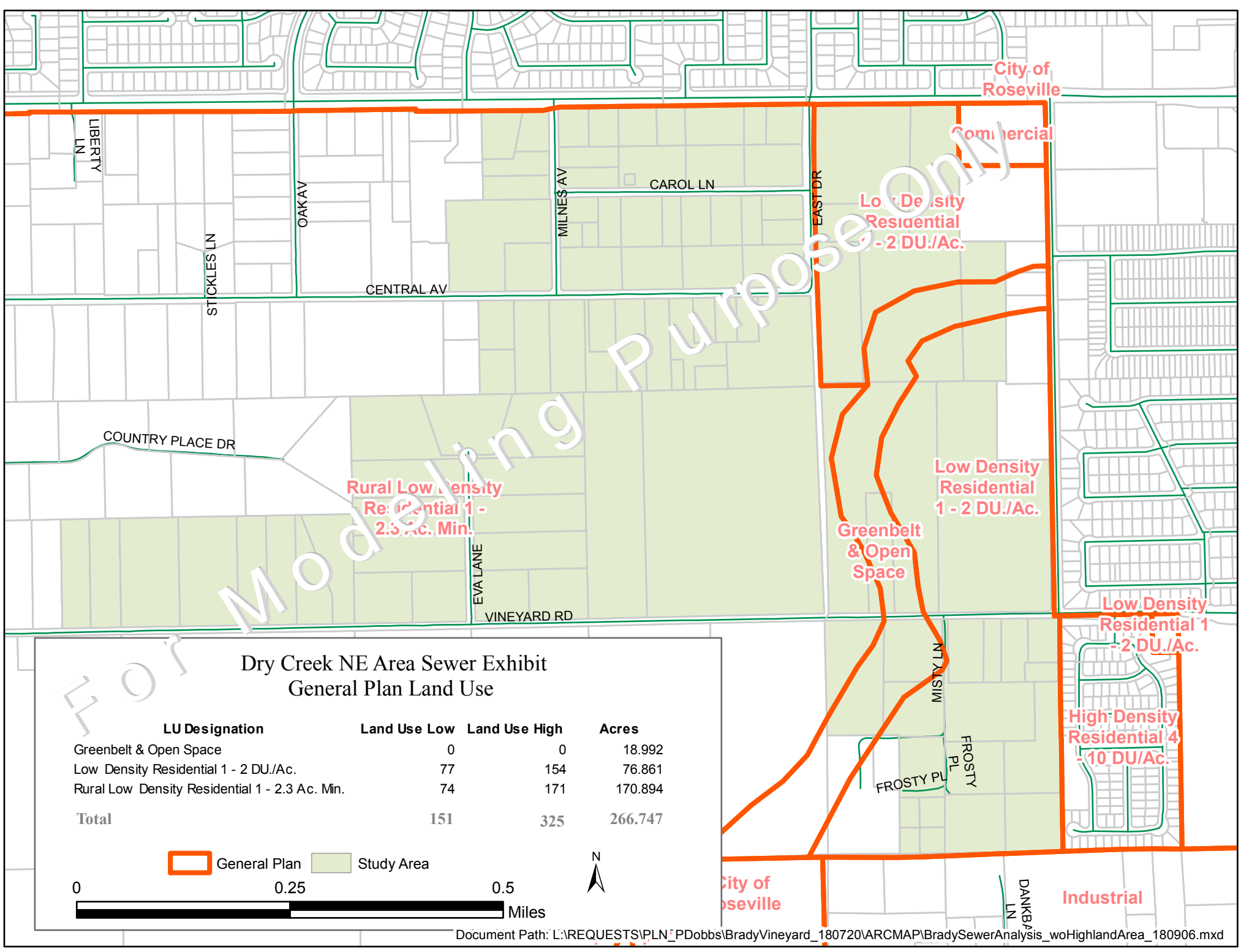
11/02/2018

RFE PROJECT #17059 – VINEYARD ROAD AND BRADY LANE, PLACER COUNTY, CALIFORNIA

Z:\2017 Projects\17059 Brady Vineyard\WORKING CAD\PRELIMINARY\C2-C4 Preliminary Grading.dwg Nov 02, 2018-03:04 pm

APPENDIX B – NORTHEAST AREA LAND USE EXHIBIT


LIBERTY LN
STICKLES LN
OAK AV
MILNES AV
CAROL LN
EAST DR
RA-B-43
CENTRAL AV
RS-AG-B-20
COUNTRY PLACE DR
RA-B-X 2 AC. MIN.
EVA LANE
RS-AG-B-20
O
VINEYARD RD
RS-AG-B-20
MISTY LN
FROSTY PL
RS-B-X 3,000 SQ. FT. MIN.
DANKBAR LN
IN-UP-Dc
BEDELL CT
Dry Creek NE Area Sewer Exhibit
Zoning
ZONING | Zoning DU | Acres
F-DR 4.6 AC. MIN. | 9.8837 | 45.4650
O | 0.0000 | 18.9920
RA-B-43 | 64.7495 | 64.7495
RA-B-X 2 AC. MIN. | 30.3916 | 60.7831
RS-AG-B-20 | 167.1785 | 76.7578
Total | 272.2032 | 266.7474
N
Zoning
Study Area
Date: 9/13/2018
0
0.25
0.5
Miles
For Modeling Purpose Only


City of Roseville
Commercial
LIBERTY LN
STICKLES LN
OAK AV
MILNES AV
CAROL LN
EAST DR
Low Density Residential 1 - 2 DU./Ac.
CENTRAL AV
COUNTRY PLACE DR
Rural Low Density Residential 1 - 2.3 Ac. Min.
Greenbelt & Open Space
Low Density Residential 1 - 2 DU./Ac.
EVA LANE
VINEYARD RD
Low Density Residential 1 - 2 DU./Ac.
MISTY LN
High Density Residential 4 - 10 DU/Ac.
FROSTY PL
FROSTY PL
City of Roseville
DANKBAR LN
Industrial
Dry Creek NE Area Sewer Exhibit
General Plan Land Use
LU Designation | Land Use Low | Land Use High | Acres
Greenbelt & Open Space | 0 | 0 | 18.992
Low Density Residential 1 - 2 DU./Ac. | 77 | 154 | 76.861
Rural Low Density Residential 1 - 2.3 Ac. Min. | 74 | 171 | 170.894
Total | 151 | 325 | 266.747
General Plan
Study Area
N
0
0.25
0.5
Miles
For Modeling Purpose Only
Document Path: L:\REQUESTS\PLN_PDobbs\BradyVineyard_180720\ARCMAP\BradySewerAnalysis_woHighlandArea_180906.mxd