APPENDIX Q

Del Rio Outlying Service Area Summary

WEST YOST ASSOCIATES
Consulting Engineers

TECHNICAL MEMORANDUM

DATE: August 23, 2017

Project No.: 418-02-14-36
SENT VIA: EMAIL

TO: Tamorah Bryant, City of Modesto

CC: Miguel Alvarez, City of Modesto

FROM: Roberto Vera, PE, RCE #83500
Amy Kwong, PE, RCE #73213

REVIEWED BY: Elizabeth Drayer, PE, RCE #46872

SUBJECT: City of Modesto – Water Master Plan
Del Rio Outlying Service Area Summary

The City of Modesto (City) serves a number of outlying service areas that are detached from the City's contiguous water service area and water system. One of these outlying service areas includes Del Rio, which is a census-designated place (CDP). The last water system evaluation performed for the City's Del Rio water service area was performed for the 2010 Engineer's Report[1]. Since then, there have been few changes to the water system serving the Del Rio service area. This technical memorandum (TM) summarizes the updated annual water production and recommended facility improvements for the Del Rio service area based on the evaluation previously performed for the 2010 Engineer's Report.

This TM is organized into the following sections:

- Service Area Description
- Existing Water Production
- Projected Buildout Water Production
- Recommended Water System Improvements

[1] City of Modesto's 2010 Water System Engineer's Report Evaluation of the Existing and Buildout Water System for the Del Rio Outlying Service Area, March 30, 2010, West Yost Associates.

SERVICE AREA DESCRIPTION

Del Rio is located approximately 4 miles north of the City of Modesto. Figure 1 shows the Del Rio water service area boundary, existing groundwater production facilities, and existing pipelines. Currently, there are no interconnections with any other water systems. However, the City's contiguous water system is within four miles and the possibility of interconnecting these two independent water systems should be explored to provide water supply reliability to Del Rio.

The Del Rio service area is approximately 540 acres, primarily residential, and is considered to be approximately 57 percent[2] developed. The future areas of development in the Del Rio service area are located primarily in the east and southwest with a small amount of infill development. As discussed in Appendix D of this Master Plan, there are also areas (approximately 70 acres) that are currently privately served, but were assumed to require water service from the City at buildout. These areas are shown on Figure 1.

The Del Rio service area was originally provided with water service by the Del Este Water Company, but in the mid 1990's the City acquired the Del Este Water Company and began providing water service.

EXISTING WATER PRODUCTION

The Del Rio water service area includes three wells (Wells 271, 282, and 289), no storage tanks, and approximately 39,900 linear feet of water distribution pipelines. Existing pipelines vary in size from 4 to 10 inches in diameter and are constructed of steel or polyvinyl chloride (PVC). Table 1 summarizes the key characteristics of the existing pipelines within the Del Rio service area. The Del Rio water system has been fully metered since 2003.

Table 1. Summary of Pipeline Lengths by Diameter in the Del Rio Service Area[(a)]

Pipe Diameter, inches	Length of Pipelines, feet	Length of Pipelines, miles	Percent of Water System
4	310	0.1	0.78
6	4,729	0.9	11.85
8	15,101	2.9	37.85
10	19,761	3.7	49.53
Total	**39,901**	**7.6**	**100**

(a) Based on input by Del Rio staff in 2012 and the hydraulic model submitted as part of the 2010 Engineer's Report.

Table 2 provides a summary of the Del Rio service area's annual water production from 2009 to 2015. As noted above, there are some parcels in the Del Rio service area that are served by private groundwater wells.

[2] The area developed remains the same as the 2010 Engineer's Report based on the current water production in Del Rio.

Table 2. Summary of Del Rio Service Area Annual Production from 2009 to 2015[a]

Year	Well 271, gallons	Well 282, gallons	Well 289, gallons	Total Production		
				gallons	af	mgd
2009	1,355,060	47,196,673	175,336,083	223,887,815	687	0.61
2010	1,434,131	46,840,934	154,755,316	203,030,381	623	0.56
2011	5,974,532	39,919,651	146,342,152	192,236,334	590	0.53
2012	8,856,445	63,407,124	136,240,949	208,504,518	640	0.57
2013	5,968,797	53,871,760	176,764,764	236,605,321	726	0.65
2014	6,512,162	42,702,690	162,634,602	211,849,455	650	0.58
2015	3,275,562	44,314,136	140,527,240	188,116,937	577	0.52

[a] Data provided by City staff in March 2016, from the file "*monthly well flow totals 2002 to present.xls*".

PROJECTED BUILDOUT WATER PRODUCTION

In the 2010 Engineer's Report, the baseline water demand for the Del Rio service area was based on the average annual water production from 2001 through 2006 (approximately 695 af/yr). In this WMP, the existing baseline water demand for the Del Rio service area has been updated to represent the average annual water production from 2000 through 2013. Data from 2014 and 2015 were omitted from the average annual water production because the prolonged drought conditions have significantly reduced water use, which would not represent typical water use. As summarized in Appendix D of this Master Plan, the existing baseline water demand for the Del Rio service area has been updated to 693 af/yr, which is very similar to the existing water demand evaluated in the 2010 Engineer's Report.

In the 2010 Engineer's Report, the buildout water demand for the Del Rio service area was projected to be 1,456 af/yr. As shown in Table 3, the current projected buildout water demand for the Del Rio service area is 1,480 af/yr, which is approximately a 2 percent increase from the projection included in the 2010 Engineer's Report.

Table 3. Projected Buildout Water Production for the Del Rio Service Area[a]

Demand Component	Demand, af
Residential[b]	713
Commercial	0
Future: Total	713
Future: UAFW (10 percent)	79
Future: Total with UAFW	**792**
Existing: 2000-2013 Average Water Production	**693**
Future: Meter Retrofit Savings[c]	**(5)**
Existing and Future: Projected Water Production Required at	**1,480**

[a] Source: Appendix D - Projected Water Demand (Outlying Service Areas), Table 5 of this Master Plan.

[b] Calculated based on approximately 237.6 acres of vacant or privately served residential land and a residential unit demand factor of 3.00 af/ac/yr. This includes areas (approximately 70 acres) that are currently privately served, but are assumed to require water service from the City at buildout.

[c] Calculated based on flat account acreage and an estimated rate of water savings of 0.11 af/ac/yr.

RECOMMENDED WATER SYSTEM IMPROVEMENTS

Because the projected buildout water production for the Del Rio service area (1,480 af/yr) is similar to the buildout water demands that were evaluated in the 2010 Engineer's Report (1,456 af/yr), it was assumed that the recommended capital improvements from the 2010 Engineer's Report would still be applicable and are required to address water system deficiencies that were identified in the 2010 Engineer's Report. In addition, some of the recommended capital improvements were to address either fire flow or supply reliability deficiencies, which would be required regardless of the projected water demand. Therefore, the capital improvements identified for the Del Rio service area from the 2010 Engineer's Report will continue to be recommended in this WMP. However, locations for some of the facilities recommended from the 2010 Engineer's Report have been refined due to more recent planning and design studies. [3]

The recommended capital improvements to the existing Del Rio water system are shown on Figure 2 and include the following:

- Construct a replacement well for Well 271, with backup generator;
- Construct 850 linear feet of new 12-inch diameter pipeline from Replacement Well 271 to the existing distribution system;
- Construct a new well (with backup generator), with a pumping capacity of approximately 1,000 gpm (a proportionate share will be used and paid for by future users);
- Construct a new 0.23 MG storage tank and associated 2.4 mgd booster pump station (BPS) with backup generator;[4]
- Construct 2,600 linear feet of new 16-inch diameter transmission pipeline from the proposed tank, booster pump station, and well site to the existing distribution system (a proportionate share will be used and paid for by future users); and
- Construct 230 linear feet of new pipeline to address fire flow deficiencies.

[3] It should be noted that the City is currently in the design stages of the recommended replacement Well 271, new 1,000 gpm well, storage tank and associated booster pump station.

[4] The additional new well is now sited at the same site as the storage tank and booster pump station, and will be constructed so that it discharges directly into the tank. As a result, the booster pumping capacity of the recommended booster pump station has been expanded to access the anticipated 1,000 gpm supply from the well. Therefore, an additional 1,000 gpm in pumping capacity will need to be added to the previously recommended 1.0 mgd (695 gpm) of booster pumping capacity, for a total pump station capacity of 1,695 gpm (2.4 mgd). A proportionate share of this pump station expansion will be paid for by future users.

As illustrated on Figure 3, buildout of the Del Rio service area will include expansion of the east and southwest regions of Del Rio. Approximately 14,120 linear feet of new pipelines are needed to serve these new development areas. The recommended capital improvements to the buildout Del Rio water system are shown on Figure 3 and include the following:

- Construct 14,120 linear feet of new 10-inch diameter pipelines to serve future customers;
- A proportionate share of the recommended 16-inch diameter transmission pipeline and new well; and
- Construct an additional 1.0 mgd in pumping capacity at the BPS located at the at-grade storage tank (total pumping capacity will be 3.4 mgd).

The costs of these new facilities were allocated to existing and future Del Rio water service customers based on their proportionate share. Because the existing and future water demands for the Del Rio service area have not changed significantly since the 2010 Engineer's Report, the cost distribution between existing and future customers is similar to the 2010 Engineer's Report. Tables 4 and 5 summarize the anticipated cost of the existing and buildout water system improvements, respectively.

Table 4. Recommended CIP Program for Existing Del Rio Service Area[a]

Category Number	CIP Reason	Item	Unit	Quantity	Unit Cost[b], $	Cost[c], $
Pipelines						
9	Fire Flow	Install 8-inch pipeline along Carver Road between Riveroaks Drive and Thunderbird Drive	LF	230	121	28,000
9	Supply	Install 16-inch pipeline from proposed tank site to distribution system	LF	2,600	195	254,000[d]
9	Supply	Install 12-inch pipeline from Replacement Well 271 to the distribution system	LF	850	162	138,000
Storage Tank and Booster Pump Station						
18	Supply	0.23 MG storage tank	LS	1	1,115,000	1,115,000[e]
18	Supply	BPS (2.4 mgd)				
Wells[f]						
10	Supply	New well with 1,000 gpm capacity, backup generator, and SCADA	LS	1	2,300,000	1,150,000[d]
10	Supply	Replacement of Well 271 and backup generator	LS	1	2,300,000	2,300,000
					Subtotal (Overall Program)	4,985,000
					50% Contingency & Other Costs[g]	2,493,000
					Total Opinion of Probable Construction Cost	**7,478,000**

(a) Does not include site specific facilities. Actual pipeline configurations and well and tank / pump station locations could change when specific development plans become available.

(b) All unit prices presented in March 2017 dollars (San Francisco ENR Construction Cost Index = 11609.44). Unit prices based on combination of cost curves, construction cost guidelines and similar construction projects.

(c) Rounded to the nearest $1,000.

(d) Cost based on existing system's proportionate share of the capacity of this required project (approximately 50%).

(e) The new well is now sited at the same site as the storage tank and booster pump station, and will be constructed so that it discharges directly into the tank. As a result, the booster pumping capacity of the recommended booster pump station has been expanded by 1.4 mgd to access the anticipated supply from the well. The cost for this pump station expansion is split equally between existing and future customers.

(f) Cost does not include cost of wellhead treatment or other facilities to meet water quality standards, if necessary. Well will be contained in a building to address security, visual, and noise needs.

(g) Soft cost and contingency mark-ups of 50% include: construction contingency (20%), engineering (10%), construction management (10%), and program implementation (10%).

Table 5. Recommended CIP Program for Buildout Del Rio Service Area[a]

Category Number	CIP Reason	Item	Unit	Quantity	Unit Cost[b], $	Cost[c], $
Pipelines						
9	Supply	Install 16-inch pipeline from proposed tank site to distribution system	LF	2,600	195	254,000[d]
9	Grid	Install 10-inch future development pipelines[e]	LF	14,120	147	2,076,000
Storage Tank and Booster Pump Station						
18	Supply	BPS expansion (additional 1.0 mgd) for a total capacity of 3.4 mgd	LS	1	715,000	715,000[f]
Wells[g]						
10	Supply	New well with 1,000 gpm capacity, backup generator, and SCADA	LS	1	2,300,000	1,150,000[d]
					Subtotal (Overall Program)	4,195,000
					50% Contingency & Other Costs[h]	2,098,000
					Total Opinion of Probable Construction Cost	6,293,000

(a) Does not include site specific facilities. Actual pipeline configurations and well and tank / pump station locations could change when specific development plans become available.

(b) All unit prices presented in March 2017 dollars (San Francisco ENR Construction Cost Index = 11609.44). Unit prices based on combination of cost curves, construction cost guidelines and similar construction projects.

(c) Rounded to the nearest $1,000.

(d) Cost based on future system's proportionate share of the capacity of this required project (approximately 50%).

(e) Cost is not included in the overall capital improvement program since these improvements are assumed to be paid for by Developers.

(f) The new well is now sited at the same site as the storage tank and booster pump station, and will be constructed so that it discharges directly into the tank. As a result, the booster pumping capacity of the recommended booster pump station has been expanded by 1.4 mgd to access the anticipated supply from the well for the existing water system (refer to Table 4). The proportionate cost for the existing system pump station expansion has been allocated to future customers in addition to the cost for the future system pump station expansion of 1.0 mgd.

(g) Cost does not include cost of wellhead treatment or other facilities to meet water quality standards, if necessary. Well will be contained in a building to address security, visual, and noise needs.

(h) Soft cost and contingency mark-ups of 50% include: construction contingency (20%), engineering (10%), construction management (10%), and program implementation (10%).

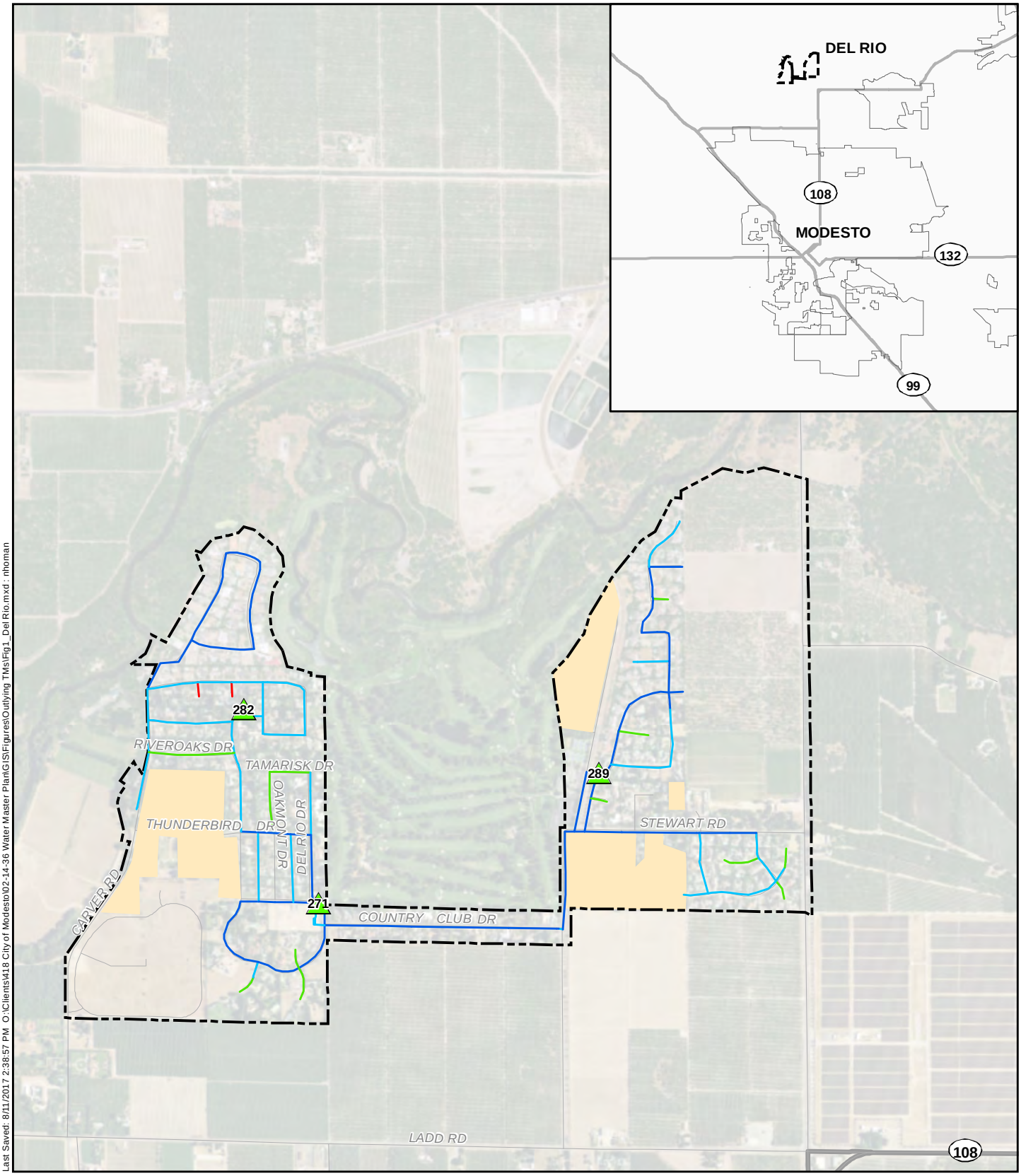
The recommended capital improvements to serve the Del Rio service area are anticipated to cost approximately $13.8M as detailed in Table 6. The capital costs are presented in March 2017 dollars at an Engineering News Record (ENR) construction cost index (CCI) of 11609.44 for San Francisco. These costs include a markup of 50 percent on the estimated construction cost to account for administration, design, and engineering costs and other factors. The costs for the facilities do not include costs for annual operation and maintenance, or costs for acquisition of pipeline right of ways.

To ensure adequate continued service for the Del Rio service area customers, the City should develop and implement a rehabilitation and replacement program for the service area's aging pipelines. The decision to repair or replace existing facilities should be based primarily on facility condition.

Table 6. Summary of Recommended CIP Program for the Del Rio Service Area

CIP Project	Cost, $		
	Existing[a]	Future[b]	Total
Pipelines			
Install 8-inch pipelines along Carver Road between Riveroaks Drive and Thunderbird Drive	28,000	-	28,000
12-inch diameter pipeline from Well 271 to existing distribution system	138,000	-	138,000
16-inch diameter transmission pipeline	254,000	254,000	508,000
10-inch future development pipelines	-	2,076,000	2,076,000
Storage Tank and Booster Pump Station			
0.23 MG storage tank	1,115,000	715,000	1,830,000
BPS (3.4 mgd)			
Well			
New well with 1,000 gpm capacity, backup generator, and SCADA	1,150,000	1,150,000	2,300,000
Replacement of Well 271 and backup generator	2,300,000	-	2,300,000
Subtotal (Overall Program)	4,985,000	4,195,000	9,180,000
50% Contingency & Other Costs	2,493,000	2,098,000	4,591,000
Total Opinion of Probable Construction Cost	**7,478,000**	**6,293,000**	**13,771,000**

[a] From Table 4.
[b] From Table 5.



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Symbology

- Active Well
- 4-inch Pipeline
- 6-inch Pipeline
- 8-inch Pipeline
- 10-inch Pipeline
- Existing Parcel Not Currently Served by City
- Del Rio Service Area

N

0 750 1,500

Scale in Feet

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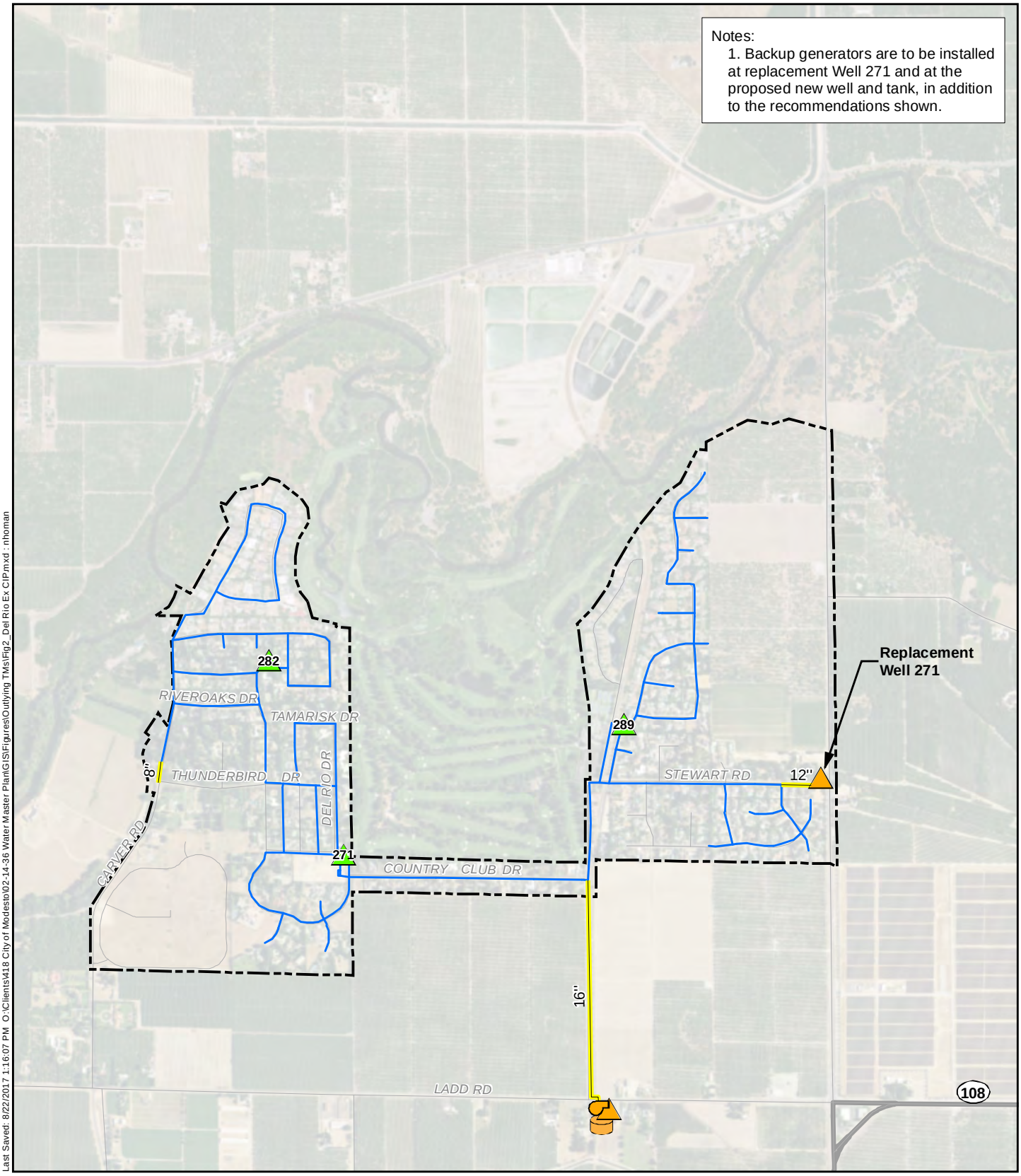
WEST YOST ASSOCIATES

FIGURE 1

City of Modesto Water Master Plan

DEL RIO EXISTING WATER SYSTEM



Symbology

- Proposed Existing CIP Pipeline
- Existing Pipeline
- Proposed Existing CIP Well
- Proposed Existing CIP BPS
- Proposed Existing CIP Tank
- Active Well
- Del Rio Service Area

0 750 1,500
Scale in Feet

N

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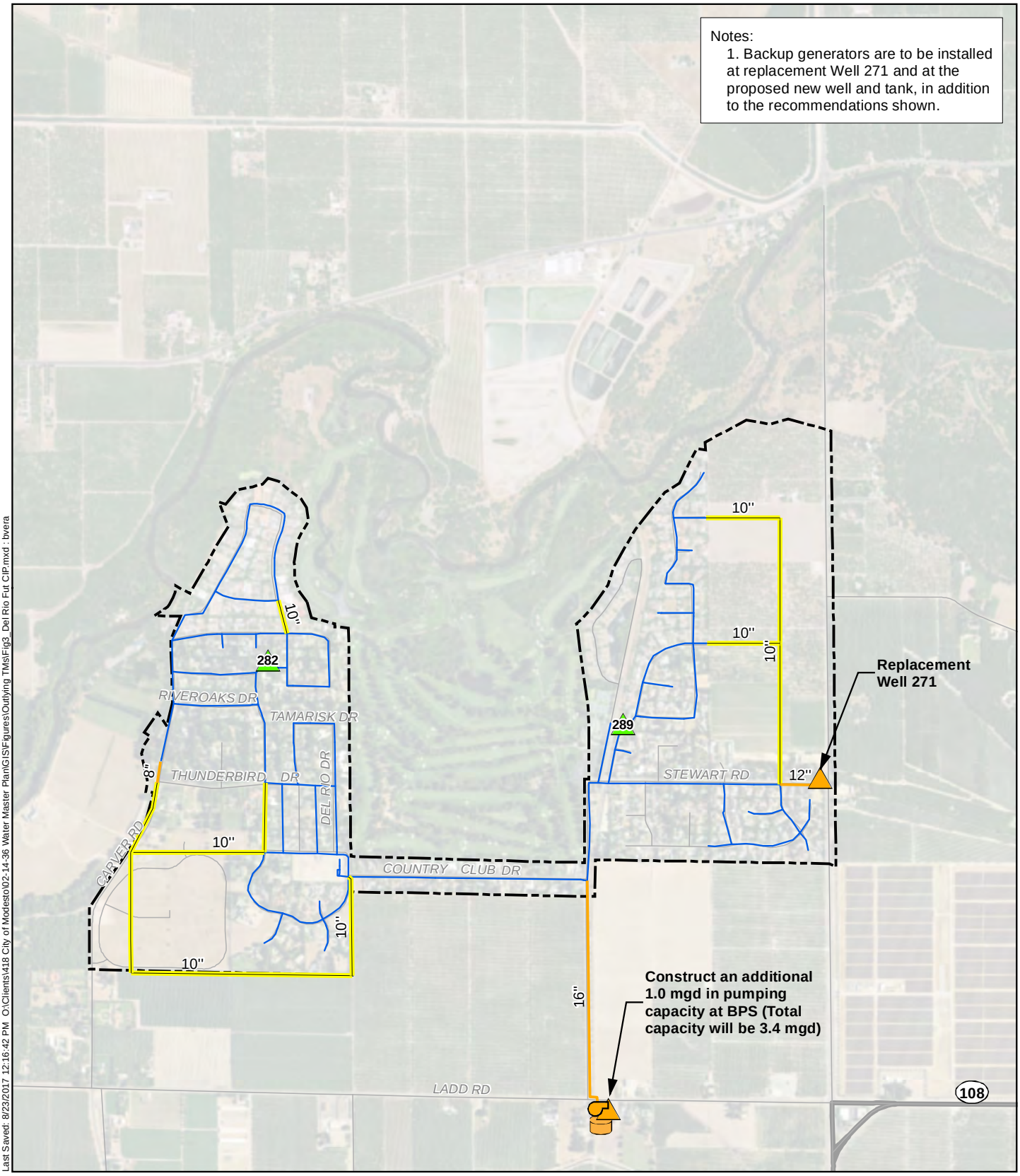
FIGURE 2

City of Modesto Water Master Plan

DEL RIO EXISTING CIP RECOMMENDATIONS



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Symbology

- Proposed Future CIP pipeline
- Proposed Existing CIP pipeline
- Existing Pipeline
- Proposed Exsting CIP Well
- Proposed Existing CIP BPS
- Proposed Existing CIP Tank
- Active Well
- Del Rio Service Area

0 750 1,500

Scale in Feet

N

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FIGURE 3

City of Modesto Water Master Plan

DEL RIO FUTURE CIP RECOMMENDATIONS