

# Water, Sewer, and Recycled Water Master Plans

## Progress Report



Marina Coast Water District  
Water Master Plan



Marina Coast Water District  
Sewer Master Plan



Marina Coast Water District  
Recycled Water Master Plan



August 15, 2018



# Project Team

- **District Staff:**
  - Mike Wegley
  - Brian True
  - Derek Cray
- **Akel Engineering Group: Master Plans**
- **Subconsultants**
  - **GHD:** Lift Station Condition and Seawater Intrusion
  - **V&A:** Flow Monitoring
  - **Bartle Wells:** Funding

# Workshop Goals

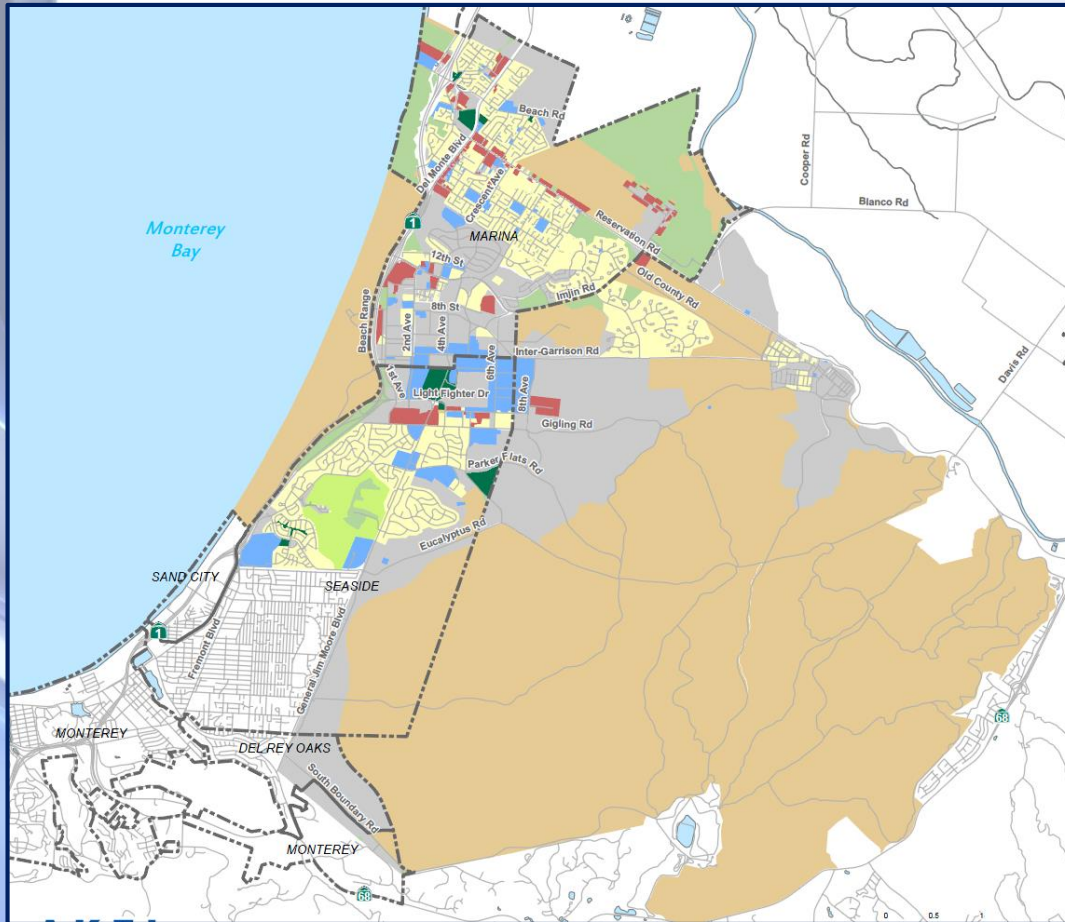
- Introduce Master Plans for:
  - Water Infrastructure
  - Sewer Infrastructure
  - Recycled Water Infrastructure
- Brief Discussion on Methodology
- Existing Infrastructure
- Future Capacity Needs
- *Preliminary* Capital Improvements Costs



# Master Plans Methodology

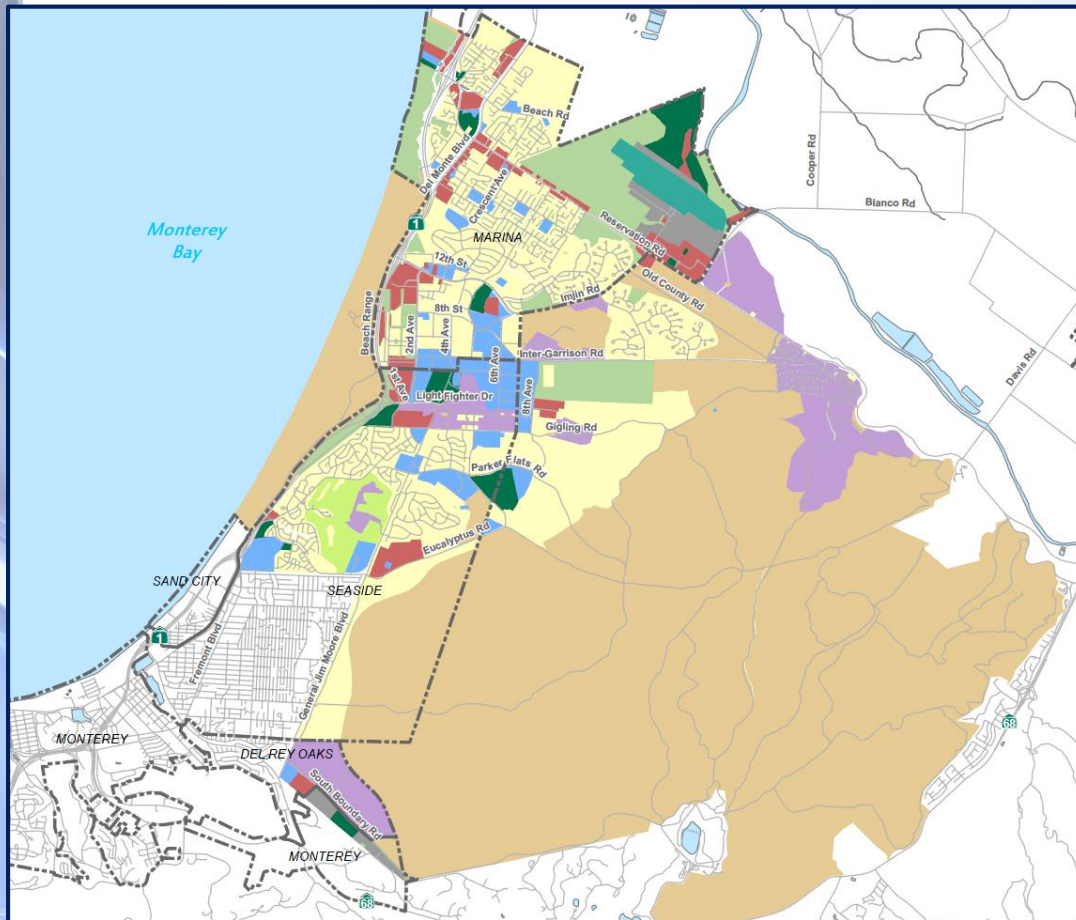
- Confirm **Land Use**
- Calculate **Water Demands and Sewer Flows**
- Develop GIS-based **Hydraulic Models**
- **Calibrate** the hydraulic models
- Evaluate **existing system capacities**
- Recommend **improvements to mitigate existing deficiencies**
- Recommend **improvements to service growth**
- Develop **Capital Improvement Program**

# Existing Land Use



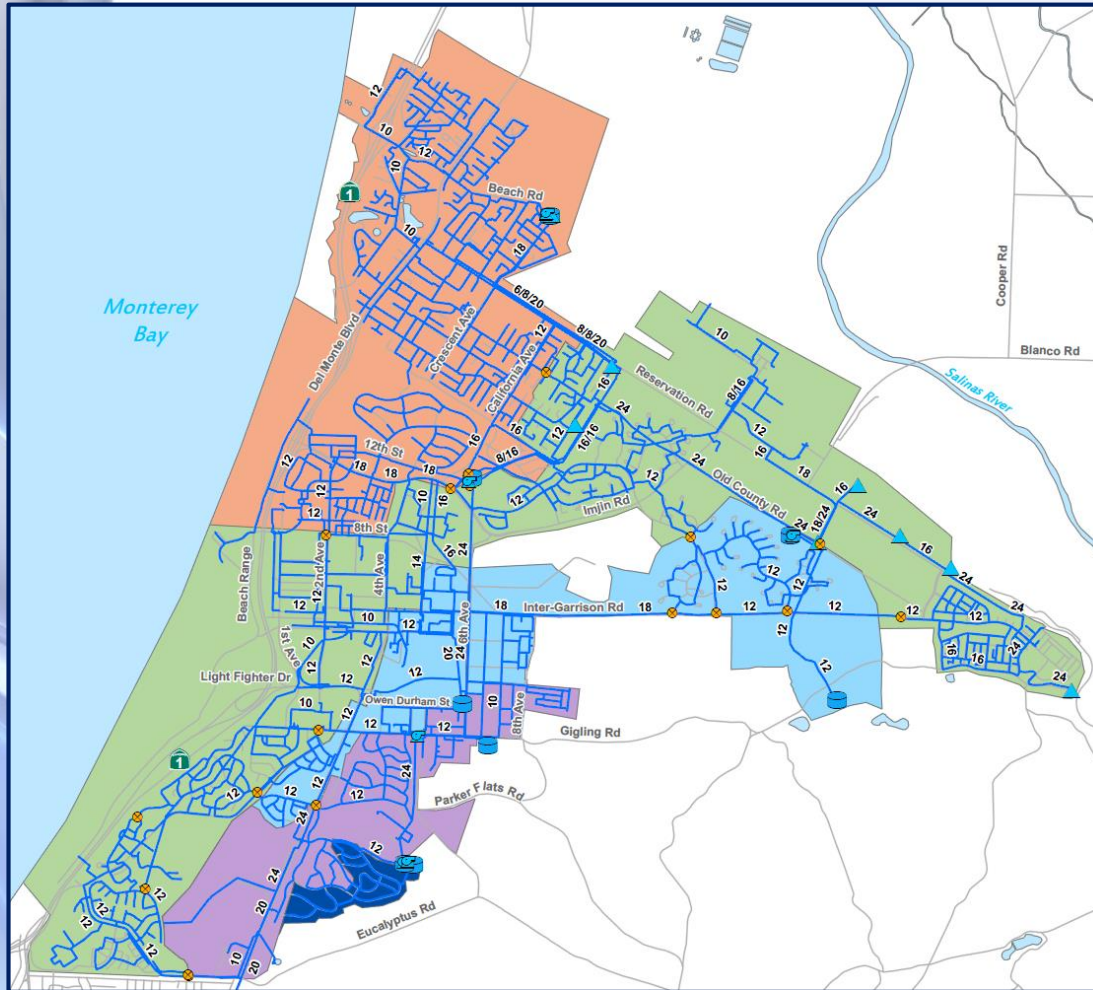
- GIS-based land use mapping developed from parcel data

# Future System: City of Marina, Fort Ord Community, City of Seaside General Plans



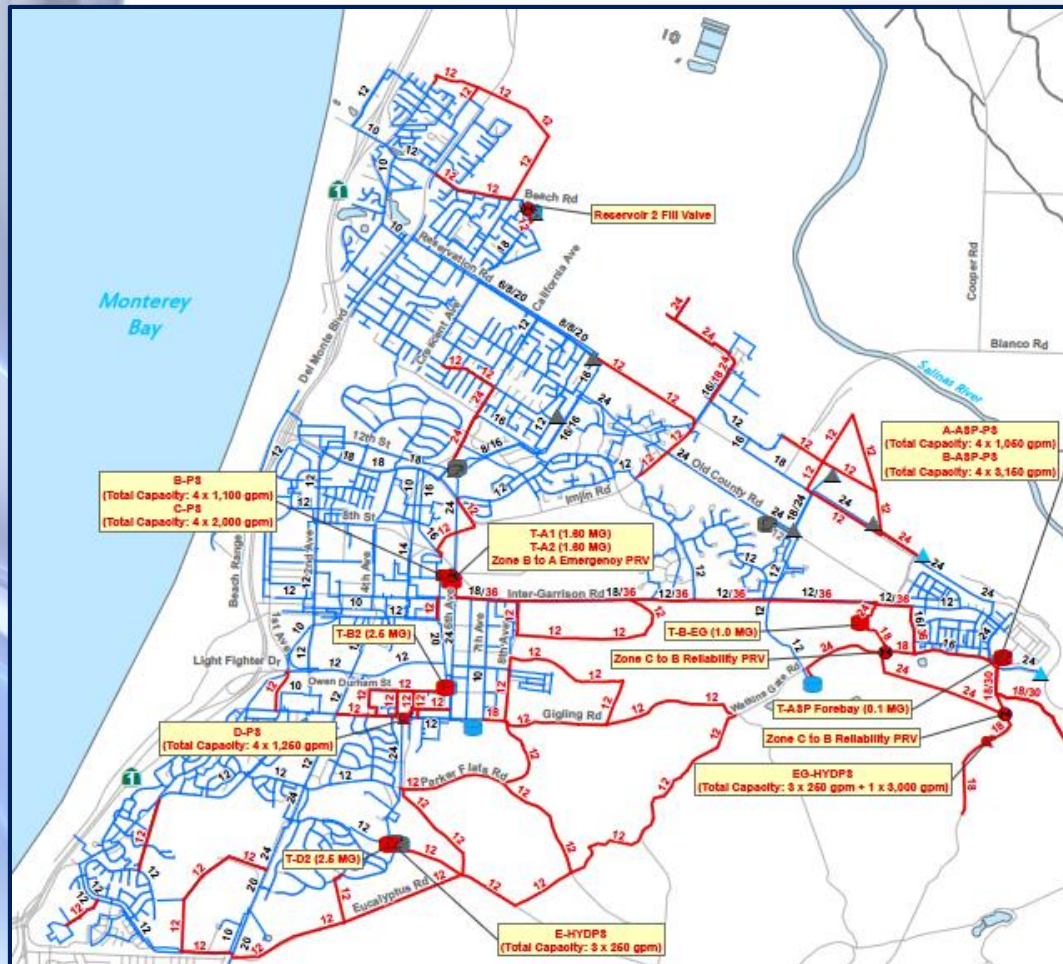
- Source is Existing General Plans.
- Developed and consolidated in GIS.
- Reflects staff mark-ups as of March 2018

# Existing Water System



- New GIS-based mapping.
- Developed based on CAD and maintenance mapping
- **194** miles of Pipeline
- **7** Active Wells
- **5** Booster Stations
- **8** Storage Reservoirs

# Future Water System

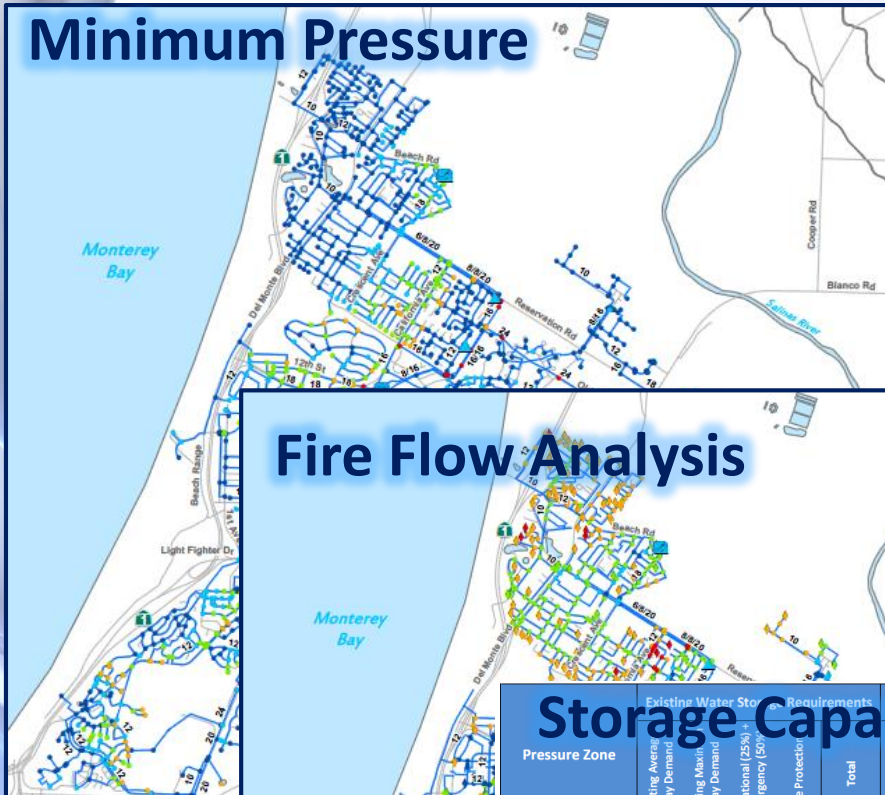


- New Eastern Well Field to replace existing wells
- Pump stations and transmission mains convey water supply to distribution system
- Improvements provide capacity for future development

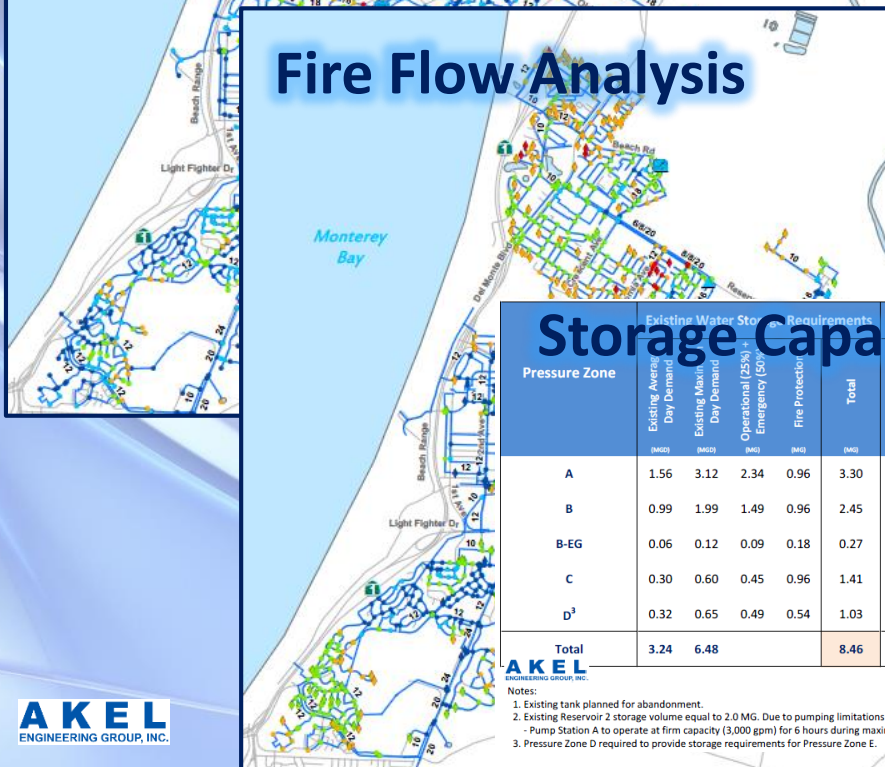


# Existing System Evaluations

## Minimum Pressure



## Fire Flow Analysis



## Supply Capacity

	Year							
	2020	2035	2040	2045	2050			
	(MGD)	(MGD)	(MGD)	(MGD)	(MGD)	(MGD)	(MGD)	
<b>Projected Demands - Population Method</b>								
Projected Population	34,347	37,531	43,509	50,439	58,473	67,786	78,583	91,099
Average Day Demands	3.5	3.8	4.4	5.1	5.9	6.8	7.9	9.2
Maximum Day Demands	6.9	7.6	8.8	10.2	11.8	13.7	15.9	18.4
Peak Hour Demands	12.1	13.3	15.4	17.8	20.7	24.0	27.8	32.2
<b>Projected Demands - Land Use Method</b>								
Average Day Demands	3.2	3.8	4.7	5.6	6.5	7.5	8.4	9.3
Maximum Day Demands	6.5	7.6	9.4	11.3	13.1	14.9	16.8	18.6
Peak Hour Demands	11.3	13.3	16.5	19.7	22.9	26.1	29.3	32.6
<b>Supply vs. Demand Analysis</b>								
Existing System Capacity	19.68	-	-	-	-	-	-	-
Existing System Capacity with Firm Supply	16.09	-	-	-	-	-	-	-
Existing System Capacity with Firm Supply	6.9	7.6	8.8	10.2	11.8	13.7	15.9	18.4
Existing System Capacity with Firm Supply	9.2	8.5	7.3	5.9	4.3	2.4	0.2	-2.3
Existing System Capacity with Firm Supply	9.2	8.6	6.6	7.4	5.7	6.0	4.0	0.3
Existing System Capacity with Firm Supply	1 New Well 1 New Well 1 New Well 1 New Well 1 New Well 1 New Well 1 New Well							
Existing System Capacity with Firm Supply	Well 10	Well 11		Well 29		Well 30	Well 31	

Pressure Zone	Existing Water Storage Requirements				Future Water Storage Requirements				Total Existing and Future Storage Requirement	Existing Storage Reservoirs						Proposed New Storage Reservoirs										
	Existing Average Day Demand (MGD)	Existing Maximum Day Demand (MGD)	Operational (95%) Emergency (50%) (MG)	Fire Protection (MG)	Future Average Day Demand (MGD)	Future Maximum Day Demand (MGD)	Operational + Emergency (MG)	Fire Protection (MG)		Total	Reservoir 2 Intermediate Reservoir <sup>1</sup> Sand Tank <sup>1</sup>	B1	C1	C2	D1	Huffman	Total	Storage Balance for Existing Demands	A1	A2	B3	B-EG	D2	Total	Total Storage	Existing and Future Storage Balance
A	1.56	3.12	2.34	0.96	3.30	0.65	1.31	0.98	0.96	1.94	4.28	1.1 <sup>2</sup>	0.2	1.0			2.25	-1.05	1.60	1.60				3.20	4.28	0.00
B	0.99	1.99	1.49	0.96	2.45	1.31	2.63	1.97	0.96	2.93	4.42		2.0			2.00	-0.45			2.50			2.50	4.50	0.08	
B-EG	0.06	0.12	0.09	0.18	0.27	0.19	0.38	0.28	0.54	0.82	0.91	East Garrison Supplied by Zone C Tanks <sup>2</sup>										1.00		1.00	1.00	0.09
C	0.30	0.60	0.45	0.96	1.41	1.62	3.24	2.43	0.96	3.39	3.84		2.0	2.0		4.00	2.68						0.00	4.00	0.16	
D <sup>3</sup>	0.32	0.65	0.49	0.54	1.03	2.29	4.58	3.44	0.54	3.98	4.47				2.0	0.1	2.06	1.03			2.50		2.50	4.56	0.09	
<b>Total</b>	<b>3.24</b>	<b>6.48</b>	<b></b>	<b>8.46</b>	<b>6.07</b>	<b>12.13</b>	<b></b>	<b>13.06</b>	<b>17.92</b>	<b></b>	<b></b>	<b></b>	<b></b>	<b></b>	<b></b>	<b>10.31</b>	<b>2.21</b>	<b></b>	<b></b>	<b></b>	<b></b>	<b></b>	<b>9.20</b>	<b>18.34</b>	<b>0.42</b>	

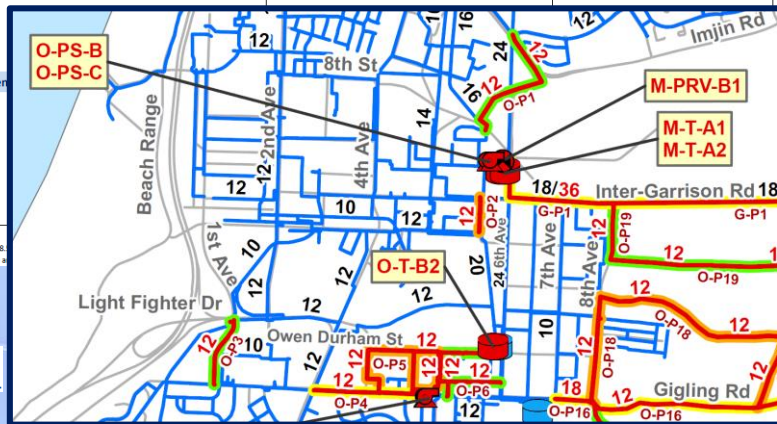
Notes:  
1. Existing tank planned for abandonment.  
2. Existing Reservoir 2 storage volume equal to 2.0 MG. Due to pumping limitations the reservoir's useable capacity is defined based on the following assumptions as approved by District staff:  
- Pump Station A to operate at firm capacity (3,000 gpm) for 6 hours during maximum day demand conditions, providing a daily volume of 1.1 MG under peak demand conditions.  
3. Pressure Zone D required to provide storage requirements for Pressure Zone E.

# Capital Improvement Program – Water

Improv. No.	Improv. Type	Pressure Zone	Alignment	Limits	Improvement Details				Infrastructure Costs		Baseline Construction Cost (\$)	Estimated Construction Cost <sup>1</sup> (\$)	Capital Improvement Cost <sup>2</sup> (\$)	Construction Trigger	Suggested Cost Allocation		Cost Sharing	
					Existing Diameter (in)	New/Parallel/Replace	Diameter (in)	Length (ft)	Unit Cost (\$/unit)	Infr. Cost (\$)					Existing Users	Future Users	Existing Users	Future Users
<b>City of Marina Water System</b>																		
<b>Pipeline Improvements</b>																		
M-P1	Reliability	Zone A	ROW	From existing Reservoir 2 Site to Crescent Ave	-	New	12	425	98	43,797	42,000	63,000	79,000	With Reservoir 2 Fill Valve	100%	0%	79,000	0
M-P2	Reliability	Zone A	Beach Rd	From De Forest Rd to Del Monte Blvd	-	New	12	2,725	98	267,994	268,000	398,000	498,000	With Reservoir 2 Fill Valve	100%	0%	498,000	0
M-P3	Development	Zone A	Armstrong Ranch	Future Armstrong Ranch Development	-	New	12	7,575	98	744,375	745,000	1,107,000	1,384,000	With Development	0%	100%	0	1,384,000

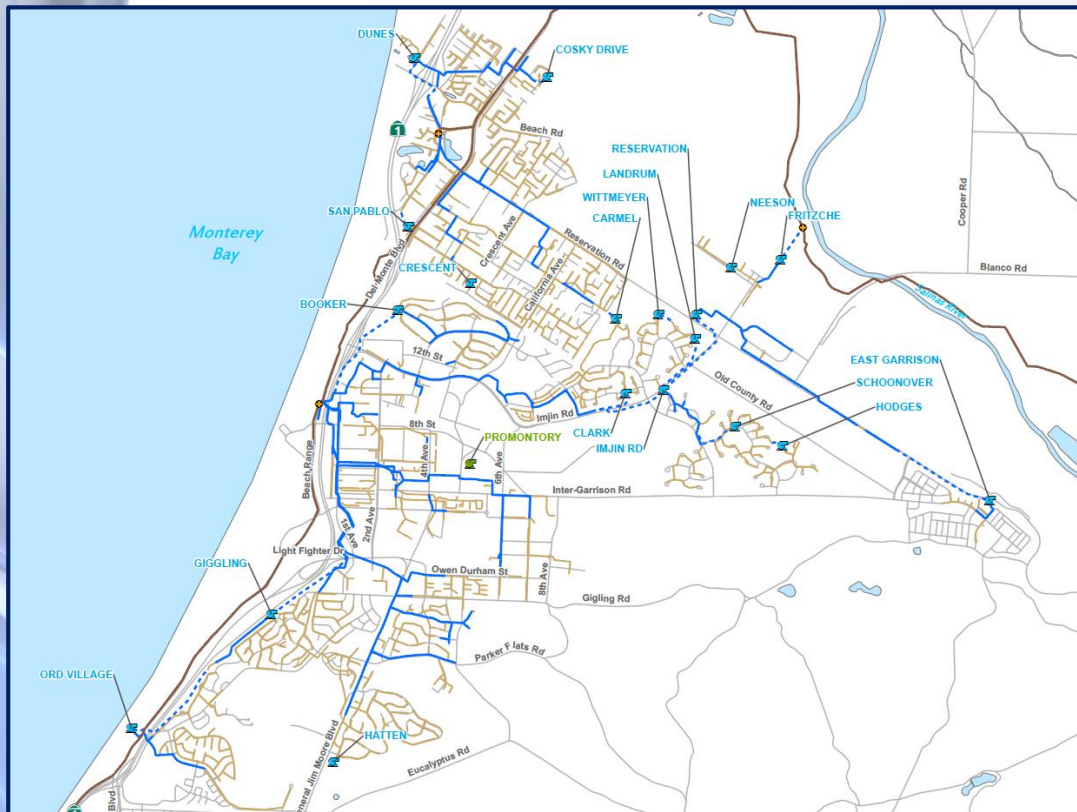
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					Existing Diameter (in)	New/Parallel/Replace	Diameter (in)	Length (ft)	Unit Cost (\$/unit)	Infr. Cost (\$)					Existing Users	Future Users	Existing Users	Future Users
<b>Fort Ord Water System</b>																		
<b>Pipeline Improvements</b>																		
O-P1	Reliability	Zone B	Imjin Rd and 12th St	From 8th St to Abrams Dr	-	New	12	2,950	98	290,122	291,000	433,000	542,000	Immediately	100%	0%	542,000	0
O-P2	Fire Flow	Zone B	A Ave	From 3rd Rd to 1st St	8	Replace	12	750	98	73,760	74,000	110,000	138,000	Immediately	100%	0%	138,000	0
O-P3	Reliability	Zone B	First Ave	From Lightfighter Dr to Giggling Ave	-	New	12	1,500	98	147,520	148,000	220,000	275,000	Immediately	50%	50%	137,500	137,500
O-P4	Condition	Zone C	Giggling Rd	From General Jim Moore Blvd to Zone D Pump Station	12	Replace	12	2,300	98	226,197	227,000	338,000	423,000	Immediately	100%	0%	423,000	0
O-P5	Fire Flow	Zone C	Planned Mixed Use Development	N/O Giggling Ave, between Malmey Rd and Parker Flats Rd	6, 8	Replace	12	4,775	98	469,605	470,000	698,000	873,000	With Development	0%	100%	0	873,000
O-P6	Fire Flow	Zone D	Planned Mixed Use Development	N/O Giggling Ave, between Parker Flats Rd and 6th Ave	6, 8	Replace	12	3,500	98	344,213	345,000	513,000	642,000	With Development	0%	100%	0	642,000
O-P7	Fire Flow	Zone B	Existing ROW	From Monterey Rd to Leinbach Ave	8	Replace	12	2,425	98	238,490	239,000	355,000	444,000	Immediately	100%	0%	444,000	0
O-P8	Fire Flow	Zone B	Existing ROW	From Coe Ave to Seaside High School	8	Replace	12	1,475	98	145,061	146,000	217,000	272,000	Immediately	100%	0%	272,000	0
O-P9	Development	Zone D	McClure Rd and ROW	From the intersection of General Jim Moore Blvd and McClure Rd to Coe Ave	-	New	12	5,325	98	523,695	524,000	779,000	974,000	With Development	0%	100%	0	974,000
O-P10	Capacity	Zone D	Coe Ave	From General Jim Moore Blvd to approx. 1,700' w/o General Jim Moore Blvd	8	Replace	12	1,725	98	169,648	170,000	253,000	317,000	Immediately	100%	0%	317,000	0
O-P11	Development	Zone D	Eucalyptus Rd	From General Jim Moore Blvd to approx. 1,500' e/o General Jim Moore Blvd	-	New	12	1,350	98	132,768	133,000	198,000	248,000	With Development	0%	100%	0	248,000

Improv. No.	Improv. Type	Pressure Zone	Alignment	Limits	Improvement Details				Infrastructure Costs		Baseline Construction Cost (\$)	Estimated Construction Cost <sup>1</sup> (\$)	Capital Improvement Cost <sup>2</sup> (\$)	Construction Trigger	Suggested Cost Allocation		Cost Sharing	
					Unit Cost (\$/unit)	Infr. Cost (\$)	Existing Users	Future Users	Existing Users	Future Users								
<b>Total City of Marina Improvement Costs</b>																		
<b>Total Combined Improvement Costs</b>																		
Pipeline Improvements 16,979,910 16,981,000 25,218,000 31,523,000 11,033,050 20,489,950																		
Supply Improvements 29,743,467 29,744,000 44,171,000 55,215,000 19,325,250 35,889,750																		
<b>Total Water System Improvements</b>																		
O-T-B2 136,150 252,850																		
M-PRV-B1 1,005,750 1,244,250																		
M-T-A1 1,439,000 1,439,000																		
M-T-A2 1,284,000 1,284,000																		
O-P1 20,487,050 61,381,950																		
O-P2 19,325,250 35,889,750																		
O-P3 8,548,550 6,532,450																		
O-P4 301,400 246,600																		
O-P5 1,897,900 4,785,100																		
<b>Total Water System Improvements</b>																		
50,560,150 108,835,850																		



AKEL ENGINEERING GROUP, INC.  
 Notes:  
 1. Estimated Construction costs include 48"  
 2. Capital Improvement Costs also include 48"

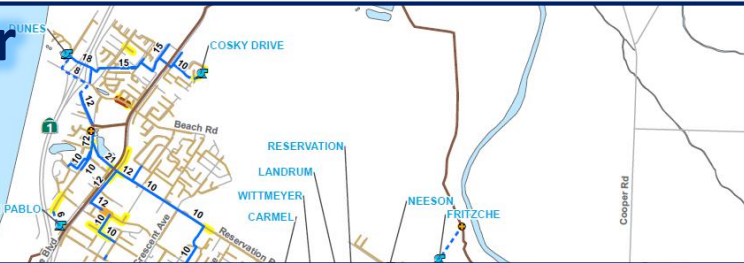
# Existing Sewer System



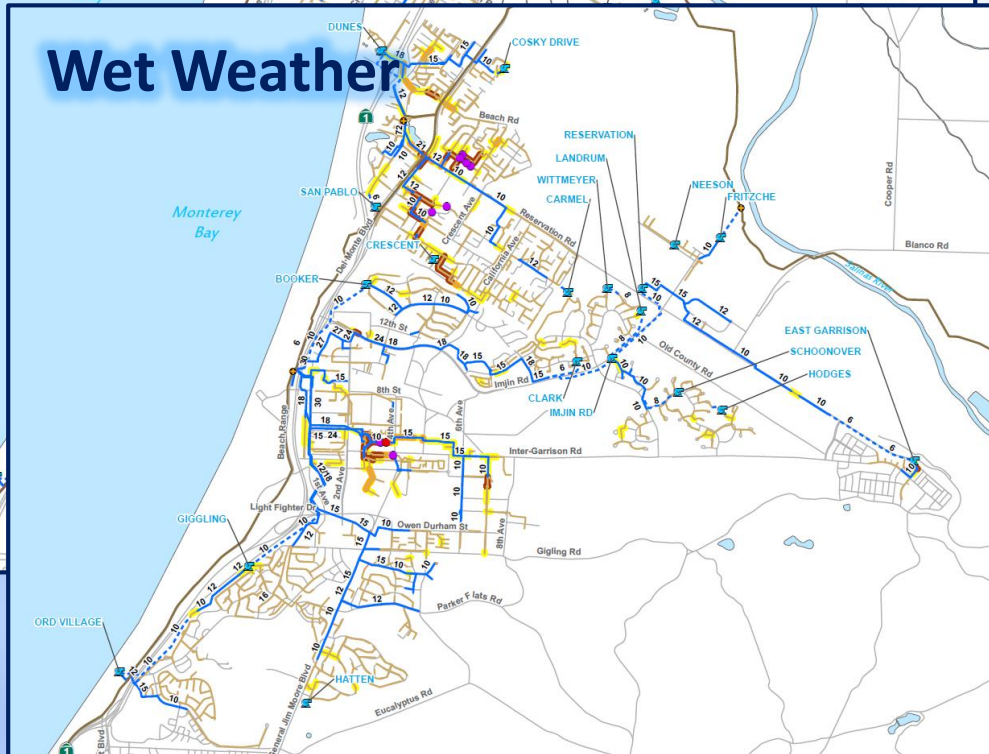
- New GIS-based mapping.
- Developed based on CAD and maintenance mapping
- Flows conveyed to Monterey 1 Water Treatment Plant
- **150** miles of pipeline
- **16** Lift Stations

# Existing System Evaluations

## Dry Weather

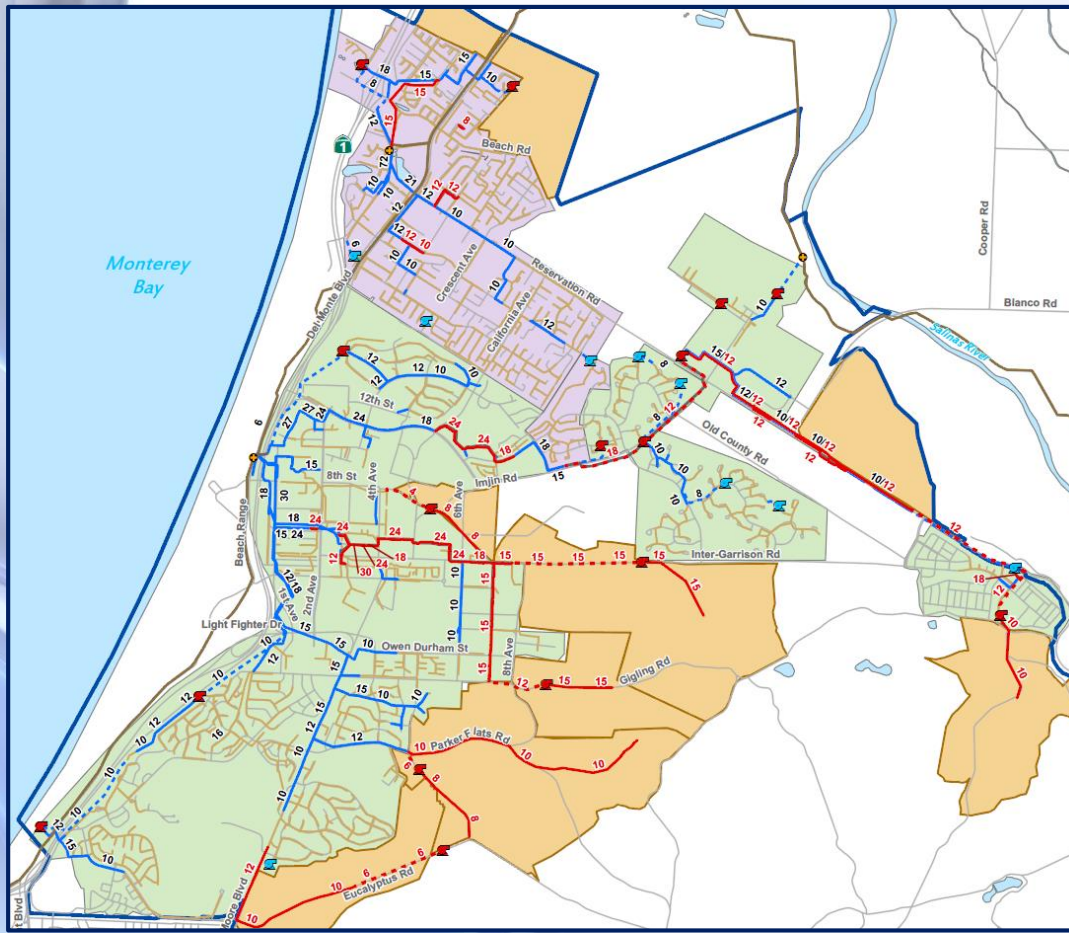


## Wet Weather



- Dry Weather flow evaluation
- Wet Weather flow evaluation
- Document deficiencies

# Future Sewer System



- Capacity improvements include gravity mains, force mains and lift stations
- Also includes Lift Station based on results of condition assessment

# Capital Improvement Program – Sewer

Improv. No.	Type of Improvement	Alignment	Limits	Improvement Details	Infrastructure Costs				Construction Trigger	Suggested Cost Allocation		Cost Allocation					
					Unit Cost	Inf. Cost	Baseline Const. Costs	Estimated Const. Cost <sup>1</sup>		Capital Improv. Cost <sup>2</sup>	Existing Users	Future Users	Existing Users	Future Users			
(#)	(#)	(#)	(#)	(#)	(#)	(#)	(#)	(#)	(%)	(%)	(#)	(#)					
<b>City of Marina Sewer System</b>																	
<b>Gravity Main Improvements</b>																	
				Existing Diameter	New/Parallel/Replace	Diameter	Length										
				(in)		(in)	(ft)										
M-P1	Gravity Main	Begonia Cir	From end of Begonia Cir to 250 ft w/o dead-end	8	Replace	8	243	243	49,529	49,600	73,700	92,200	Immediately	100%	0%	92,200	0
M-P2	Gravity Main	ROW, Cowe Way, Cardoza Ave	From Abdy Way to Reservation Rd	-	New	15	1,965	337	661,904	662,000	983,100	1,228,900	With Development	0%	100%	0	1,228,900
M-P3	Gravity Main	Reservation Rd	From Cardoza Ave to 150 ft s/o Seaside Cir	-	New	15	1,710	337	576,008	576,100	855,600	1,069,500	With Development	0%	100%	0	1,069,500
M-P4	Gravity Main	Eucalyptus St, Peninsula Dr, Vista	From Viking Ln to Reservation Rd	8	Replace	12	1,335	310	413,715	413,800	614,500	768,200	Near-Term	0%	100%	0	768,200
M-P5	Gravity Main	Carmel Ave	From Seacrest Ave to Sunset Ave	8	Replace	10	570	269	153,602	153,700	228,300	285,400	Near-Term	0%	100%	0	285,400
M-P6	Gravity Main	Reservation Rd	From Sunset Ave to Casa de Bolea	8	Replace	12	345	310	106,915	107,000	158,900	198,700	Near-Term	0%	100%	0	198,700
<b>Subtotal - City of Marina Pipeline Improvements</b>										<b>1,961,674</b>	<b>1,962,200</b>	<b>2,914,100</b>	<b>3,642,900</b>			<b>92,200</b>	<b>3,550,700</b>
<b>Lift Station Improvements</b>																	
				Existing Capacity	Improvement Type	Recommended Capacity											
				(gpm)		(gpm)											
M-LS0	Capacity Upgrade	Dunes Lift Station		2 @ 550	Capacity Upgrade	3 @ 600		1,127,627	1,127,700	1,674,700	2,093,400	2,093,400	Immediately	100%	0%	2,093,400	0
<b>Subtotal - City of Marina Lift Station Improvements</b>										<b>1,127,627</b>	<b>1,127,700</b>	<b>1,674,700</b>	<b>2,093,400</b>			<b>2,093,400</b>	<b>0</b>
<b>Condition Assessment Improvements</b>																	
				Improvement Type													

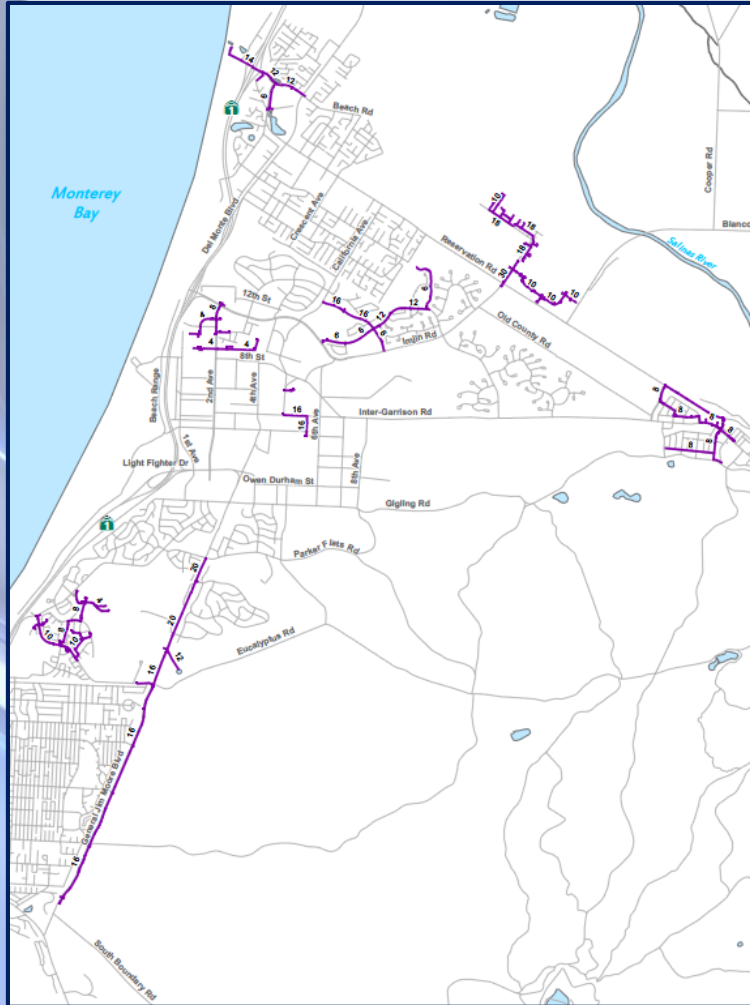
## Fort Ord Sewer System

Improv. No.	Type of Improvement	Alignment	Limits	Improvement Details	Infrastructure Costs				Construction Trigger	Suggested Cost Allocation		Cost Allocation					
					Unit Cost	Inf. Cost	Baseline Const. Costs	Estimated Const. Cost <sup>1</sup>		Capital Improv. Cost <sup>2</sup>	Existing Users	Future Users	Existing Users	Future Users			
(#)	(#)	(#)	(#)	(#)	(#)	(#)	(#)	(#)	(%)	(%)	(#)	(#)					
<b>Gravity Main Improvements</b>																	
				Existing Diameter	New/Parallel/Replace	Diameter	Length										
				(in)		(in)	(ft)										
O-P1	Gravity Main	Barloy Canyon Road	3,000 ft of Future pipeline to convey future flows from development	-	New	12	2,940	310	911,103	911,200	1,353,200	1,691,500	With Development	0%	100%	0	1,691,500
O-P2	Gravity Main	ROW	From Ord Avenue to East Garrison Lift Station	15	Replace	18	405	364	147,337	147,400	218,900	273,700	Immediately	100%	0%	273,700	0
O-P3	Gravity Main	Reservation Rd	From 4,700 ft w/o East Garrison Lift Station to Reservation Road Lift Station	-	New	12	9,885	310	3,063,353	3,063,400	4,549,200	5,686,500	Phase 2 East Garrison	0%	100%	0	5,686,500
O-P4	Gravity Main	ROW	From 2,150 ft e/o W Blanco Rd to W Blanco Rd	10	Replace	12	2,385	310	739,109	739,200	1,097,800	1,372,300	Approx. 4,125 EDUs	100%	0%	1,372,300	0
O-P5	Gravity Main	Reservation Rd	From 700 ft e/o Mbest Dr to Mbest Dr	10	Replace	12	750	310	232,424	232,500	345,300	431,700	Approx. 4,125 EDUs	100%	0%	431,700	0



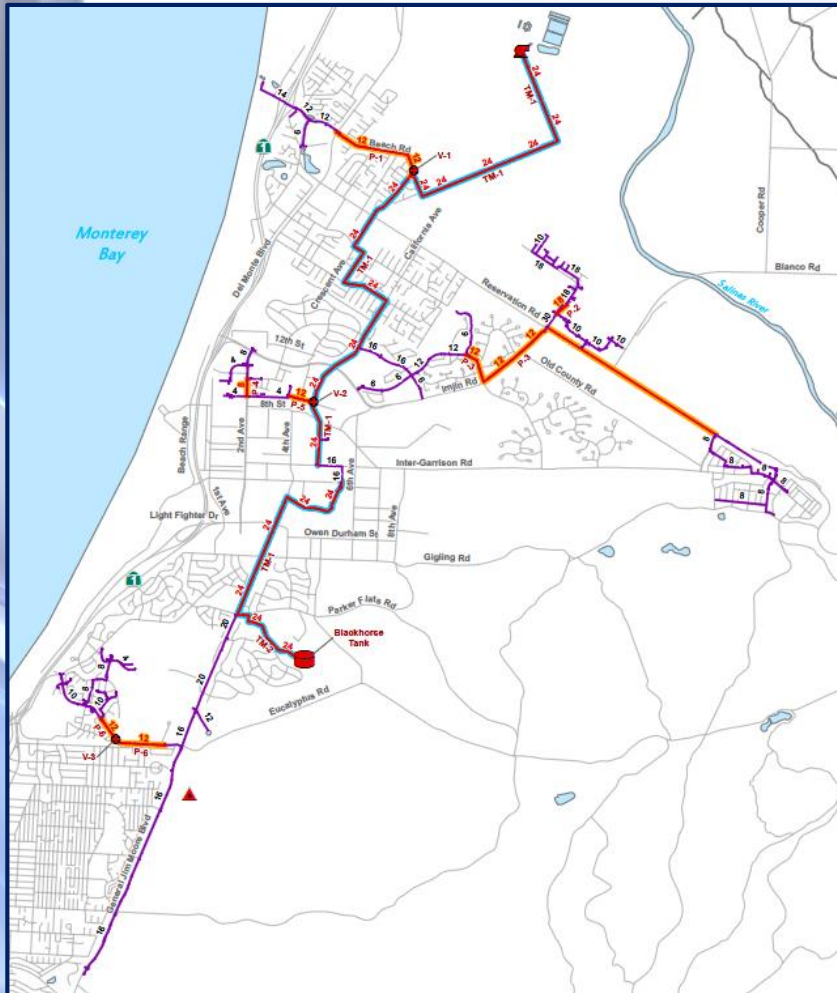
Lift Station	Assessment Factor	Lift Station Component	Construction Cost <sup>1</sup>	Baseline Const. Cost	Estimated Const. Cost <sup>2</sup>	Capital Improv. Cost <sup>3</sup>
			(\$)	(\$)	(\$)	(\$)
<b>City of Marina Sewer System</b>						
<b>Dunes<sup>1</sup></b>						
DUN-1	Wet Well	Discharge Pipes	3,200	3,200	4,800	6,000
DUN-2	Wet Well	Concrete Wall	19,900	19,900	29,600	37,000
DUN-3	Electrical Equipment	120 volt convenience receptacle	500	500	800	1,000
<b>Lift Station Subtotal -</b>			<b>23,600</b>	<b>23,600</b>	<b>35,200</b>	<b>44,000</b>
<b>San Pablo</b>						
SPB-1	Hatches	Structural Support	4,000	4,000	6,000	7,500
SPB-2	Electrical Equipment	NEMA 3R equipment enclosure	2,200	2,200	3,300	4,200
SPB-3	Electrical Equipment	Conduit	2,000	2,000	3,000	3,800
SPB-4	Backup Power	Generator	16,300	16,300	24,300	30,400
SPB-5	Controls	Float Switches	100	100	200	300
<b>Lift Station Subtotal -</b>			<b>24,600</b>	<b>24,600</b>	<b>36,800</b>	<b>46,200</b>
<b>Crescent</b>						
CRE-1	Piping / Valves	Valve Pit, Valves, Piping, and Valve Pit Structure	5,900	5,900	8,800	11,000
CRE-2	Electrical Equipment	Pump Control Panel Enclosure	500	500	800	1,000
CRE-3	Electrical Equipment	Transfer Switch Enclosure	300	300	500	700
CRE-4	Electrical Equipment	Conduits entering the wet well	100	100	200	300
CRE-5	Controls	Float Switches	17,800	17,800	26,500	33,200
CRE-6	Access / Safety	Expand Fence	25,100	25,100	37,300	46,700
<b>Lift Station Subtotal -</b>			<b>49,700</b>	<b>49,700</b>	<b>74,100</b>	<b>92,900</b>

# Existing Recycled Water System



- New GIS-based mapping.
- Developed based on CAD and maintenance mapping
- Existing Infrastructure in place
- **17.5 miles**

# Future Recycled Water System



- Includes transmission and distribution pipelines
- Improvements phased based on recycled water supply availability
- Blackhorse Tank currently under construction



# Capital Improvement Program – Recycled Water

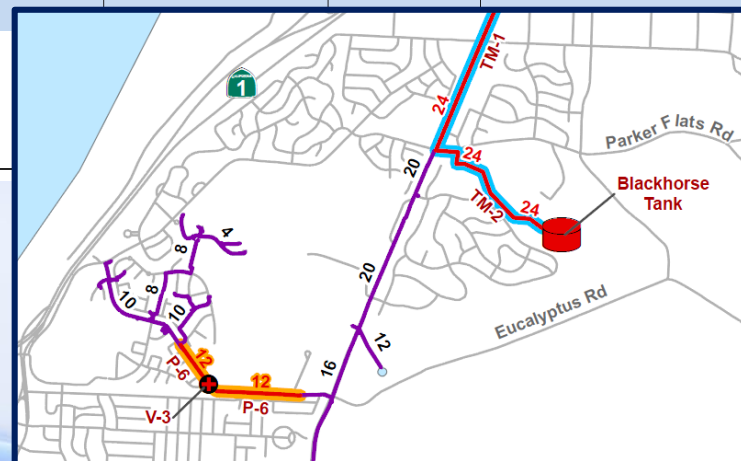
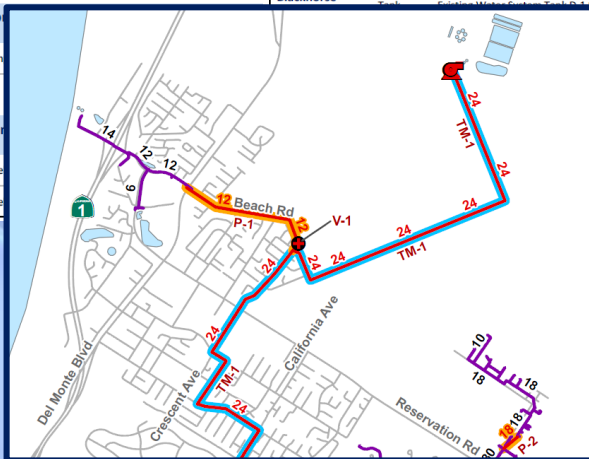
Improv. No.	Improv. Type	Alignment	Limits	Improvement Details		Infrastructure Costs		Baseline Construction Cost (\$)	Estimated Construction Cost <sup>1</sup> (\$)	Capital Improvement Cost <sup>2</sup> (\$)	Construction Trigger		
				Existing Diameter (in)	New/Parallel/Replace	Diameter (in)	Length (ft)					Unit Cost (\$/unit)	Infr. Cost (\$)
<b>Distribution Pipeline Improvements<sup>3</sup></b>													
P-1	Pipeline	Beach Rd	From Del Monte to Crescent Ave	-	New	12	4,000	99	394,112	394,200	585,400	731,800	Phase 2 Supply
P-2	Pipeline	Imjin Rd	From UC MBEST to Reservation Rd	-	New	18	900	190	171,439	171,500	254,700	318,400	Phase 2 Supply
P-3	Pipeline	Abrams Rd, Imjin Rd	From Macarthur Dr to Reservation Rd	-	New	12	4,875	99	480,324	480,400	713,400	891,800	Phase 2 Supply
P-4	Pipeline	2nd Ave	From 10th St to 9th St	-	New	8	750	66	49,264	49,300	73,300	91,700	Phase 2 Supply
P-5	Pipeline	9th St	From Sea Glass Ave to 5th Ave	-	New	12	1,050	99	103,454	103,500	153,700	192,200	Phase 2 Supply
P-6	Pipeline	Coe Ave	From Pacific Crest Dr to Paralta Ave	-	New	12	1,500	99	147,792	147,800	219,500	274,400	Phase 2 Supply
<b>Subtotal - Distribution System Improvements</b>									<b>1,346,385</b>	<b>1,346,700</b>	<b>2,000,000</b>	<b>2,500,300</b>	
<b>Pressure Reducing Valve Improvements</b>													
PRV-1	PRV	Intersection of Beach Rd and Crescent Ave		New	2								Phase 2 Supply
PRV-2	PRV	Intersection of 9th St and 5th Ave											
PRV-3	PRV	Intersection of Coe Ave and Buttercup Blvd											

Improv. No.	Improv. Type	Alignment	Limits	Improvement Details		Infrastructure Costs		Baseline Construction Cost (\$)	Estimated Construction Cost <sup>1</sup> (\$)	Capital Improvement Cost <sup>2</sup> (\$)	Construction Trigger		
				Unit Cost (\$/unit)	Infr. Cost (\$)								
<b>Blackhorse</b>													
<b>Subtotal - Planned RUWAP Improvements</b>													

Pump Station Improvements	
PS-1	New Pump Station

Planned RUWAP Improvements	
TM-1	Pipeline
TM-2	Pipeline



7/13/2018

# What's Next

- Finalize Capital Improvement Program
- Initiate Funding Analysis
  - To be scheduled at a later date
  - **Workshop by Bartle Wells**
- Finalize Report

# Water, Sewer, and Recycled Water Master Plans

## Thank You



Marina Coast Water District  
Water Master Plan



Marina Coast Water District  
Sewer Master Plan



Marina Coast Water District  
Recycled Water Master Plan



August 15, 2018