Chapter 9: Recommended Capital Improvement Program

Chapter Contents:

Chapter Highlights:

This chapter presents the recommended Capital Improvement Program for the District's existing and 2025 water system. Recommendations for improvements were described in Chapters 7 and 8.

Costs are presented in January 2006 dollars at an Engineering News Record (ENR) Construction Cost Index of 7660 (20 Cities Average). Costs include the following contingencies and allowances:

- Construction Cost Contingency = 25%
- Cost Allowances
  - Planning, Engineering and Environmental Studies = 15%
  - Construction Management = 10%
  - Program Implementation = 10%

Recommendations for implementation of the improvements are also provided.

Summary of CIP Costs:

Recommended Improvements	*Existing System CIP*	*2025 System CIP*	*Totals*
Pipeline Improvements	$9.7 M	$5.0 M	$14.7 M
New Storage Facilities	$3.0 M	$7.6 M	$10.6 M
Pump Station Improvements	$2.9 M	$6.4 M	$8.4 M
Other Improvements	$0.5 M	$0.2 M	$0.7 M
Totals	*$16.1 M*	*$19.2 M*	*$35.3 M*

CHAPTER 9. RECOMMENDED CAPITAL IMPROVEMENT PROGRAM

This chapter presents the recommended CIP for the District's existing and 2025 retail water system. Several recommendations for improvements to the existing and 2025 retail water system were described previously in Chapters 7 and 8, respectively. This chapter provides descriptions of the recommended CIP program, along with estimates of probable construction costs.

Costs are presented in January 2006 dollars based on an ENR CCI of 7,660 (20 Cities Average). Total CIP costs include the following contingencies and cost allowances:

- Construction Contingency: 25 percent
- Project Cost Allowances:
  - Planning, Engineering and Environmental Studies: 15 percent
  - Construction Management: 10 percent
  - Program Implementation: 10 percent

A complete description of the assumptions used in developing the estimates of probable construction costs is provided in Appendix B.

Geologic conditions must be considered when developing costs for the District's recommended CIP. Because of the rocky, subsurface conditions found throughout the District, trenching and pipeline construction can often be expensive. Blasting is sometimes required. Boring and jacking can be very difficult when large boulders deflect boring equipment. Even when the rock is weathered or rippable, contractors need more powerful equipment to perform the excavation. Where very large boulders are excavated, they need to be hauled away, and the voids they leave need to be filled with imported material. All of these difficulties contribute to high costs in pipeline and foundation construction.

RECOMMENDED CAPITAL IMPROVEMENT PROGRAM

Existing Water System Improvements

Chapter 7 provided a description of the evaluation of the District's existing water system and its ability to meet the established operational and design criteria described in Chapter 3. Based on the evaluation, several improvements to the existing system were recommended to eliminate existing deficiencies. These have been grouped into several recommended CIP projects and include the following:

- Pipeline improvements to meet existing peak hour and maximum day demand plus fire flow demand conditions (pipeline locations, lengths and sizes are listed in Table 9-1).
- Approximately 8,400 lf of new, 24-inch diameter pipeline from the proposed Joint Water Storage Facility (JWSF) along Sierra College Boulevard into the District's Sierra Pressure Zone.
- Approximately 5,275 lf of new, 18-inch diameter pipeline along Eureka Road from Barton Road to Auburn-Folsom Road.

Table 9-1. Recommended CIP for Existing System Pipelines

CIP ID[a]	Pressure Zone	Description of Location	Length, feet	Diameter, inches	
				Existing	Recommended
FF01	Upper Granite Bay	Along Skyway Lane from 8032 Skyway Lane to Mooney Ridge Tank Site	630	6	8
FF02	Crown Point	Along Lou Place between Crown Point Vista and Troy Way, and along Edward Court south of Lou Place	790	6	8
PH02	Sierra	From JWSF along Sierra College Boulevard into Sierra Pressure Zone	8,400	NA	24
PH03	Bacon	Along Eureka Road, from Barton road to Auburn-Folsom Road[b]	5,275	16	18
EI02[c]	Bacon	From Sierra College Boulevard to Kokila Reservoir	1,500	NA	12
PH05[d]	Lower Granite Bay	Along Cavitt-Stallman Road between Oak Pine Lane and Sierra Ponds Lane	2,550	NA	12
PH06[d]	Lower Granite Bay	Along Twin Rocks Road between Vogel Valley Road and Sierra Ponds Lane (with one connection at Turner Drive)	6,570	NA	16

(a) The "FF" in the CIP ID stands for fire flow, "PH" stands for peak hour, and "EI" stands for Emergency Intertie. This means the CIP is fire flow, peak hour or intertie related.

(b) CIP also includes replacement of the parallel 12-inch and 14-inch diameter pipelines along Eureka from Providence Lane to Auburn-Folsom Road

(c) CIP is required for emergency intertie connection from PCWA to the District

(d) The benefit and cost associated to these CIPs shall be proportionately shared by existing and future customers.

- Pipeline improvements in Lower Granite Bay which include the construction of approximately 2,500 lf of 12-inch diameter pipeline along Cavitt-Stallman Road between Oak Pine Lane and Sierra Ponds Lane, and the construction of approximately 6,600 lf of 16-inch diameter pipeline along Twin Rocks Road between Vogel Valley Road and Sierra Ponds Lane (with one connection at Turner Drive). Both these pipelines are recommended to improve system reliability/redundancy of the Lower Granite Bay Pressure Zone and increase turnover in the Los Lagos Tank.
- New or upgraded pump stations:
  - Upper Granite Bay Pump Station (4.96 mgd total capacity which includes 2.72 mgd of capacity required for existing conditions and 2.24 mgd of added capacity to meet 2025 conditions)

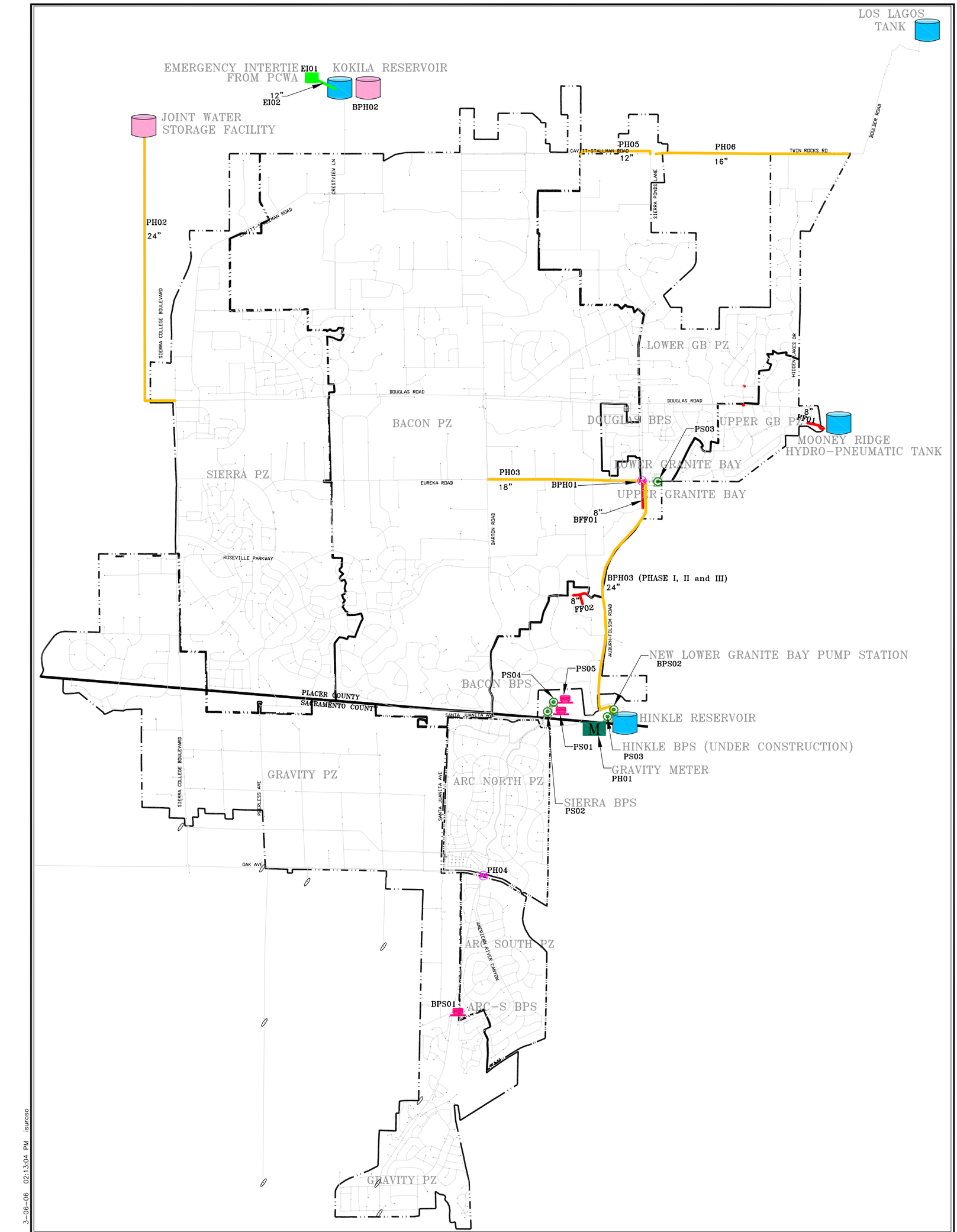
- New storage facilities:
  - New 2.6 MG Joint Water Storage Facility.
- New standby generator:
  - Bacon Pump Station
  - Sierra and ARC-North Pump Station (separate from Bacon)
- Other recommended improvements:
  - Electrical improvements (Bacon Pump Station)
  - New pressure reducing station between the ARC-North and ARC-South Pressure Zones.
  - Construction of an emergency intertie from PCWA to the Kokila Reservoir. This project includes a pressure sustaining station and a new, 12-inch diameter pipeline (approximately 1,500 lf) from Sierra College Boulevard to the Kokila Reservoir site.
  - Replacement of existing pumps (4), upgrades to electrical system at the Sierra Pump Station
  - New meter station on gravity line leaving Hinkle Reservoir. This meter will provide a means for measuring the supply provided to the Gravity system.

The locations of the recommended existing system CIP projects are shown on Figure 9-1. Details of the recommended CIP projects are provided in Chapter 7.

2025 Water System Improvements

Chapter 8 provided a description of the evaluation of the District's 2025 water system and its ability to meet the established operational and design criteria described in Chapter 3. Based on the evaluation, several improvements were recommended for the District's water system to meet 2025 demands. These have been grouped into recommended CIP projects and include the following:

- Pipeline improvements to meet 2025 peak hour and maximum day demand plus fire flow demand conditions (pipeline locations, lengths and sizes are listed on Table 9-2).
- Approximately 8,400 lf of new, 24-inch diameter pipeline from the new Lower Granite Bay Pump Station near the Hinkle Reservoir site along Auburn-Folsom Road to Eureka Road.
- Relocation of pressure zone boundary between the District's Sierra and Gravity Pressure Zones in the Peerless Avenue area (requires opening and closing certain gate valves).
- New storage facilities:
  - New, 3.0 MG Kokila Reservoir (replacement)



LEGEND

- EXISTING PIPELINE
- PRESSURE ZONE BOUNDARY
- COUNTY LINE
- MAX DAY PLUS FIRE IMPROVEMENTS
- PEAK HOUR IMPROVEMENTS
- STORAGE TANK
- RECOMMENDED STORAGE TANK
- RECOMMENDED PUMP STATION IMPROVEMENT
- RECOMMENDED PRESSURE REDUCING STATION
- STANDBY GENERATOR
- METER

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SCALE IN FEET

Figure 9-1

San Juan Water District
Retail Water Master Plan
OVERALL RETAIL SYSTEM CIP RECOMMENDATIONS

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- New or Upgraded Pump Stations:
  - Additional capacity at Upper Granite Bay Pump Station (2.24 mgd) for a total firm capacity of 4.96 mgd
  - New Lower Granite Bay Pump Station (10.1 mgd) near the Hinkle Reservoir on the water treatment plant site. Pump station sized to provide 2025 maximum day demand plus fire flow to the Lower Granite Bay Pressure Zone and the maximum day demand to the Upper Granite Bay Pump Station. The new pump station also improves system reliability/redundancy in the Bacon Pressure Zone, since the capacity is sufficient to provide average day demands to the zone.
- Other recommended improvements:
  - New pressure reducing station between the Lower Granite Bay and Bacon Pressure Zones.
  - Standby generator for ARC-South Pump Station

The locations of the recommended 2025 system CIP projects are shown on Figure 9-1. Details of the recommended CIP projects are provided in Chapter 8.

Table 9-2. Recommended CIP for 2025 System Pipelines

CIP ID[(a)]	Pressure Zone	Description	Length, feet	Diameter, inches	
				Existing	Recommended
BPH03[(b,c)]	Lower Granite Bay	From proposed pump station near Hinkle Reservoir to Auburn-Folsom Road, and along Auburn-Folsom Road to Eureka Road	8,400	NA	24
BFF01	Bacon	Along Auburn-Folsom Road, from Country Court to Eureka Road	920	6	8

(a) The "BFF" or "BPH" designation in the CIP ID corresponds to 2025 fire flow or 2025 peak hour requirements, respectively. This means the CIP is related to maintaining either the fire flow or peak hour criteria.

(b) The benefit and cost associated to these CIPs shall be proportionately shared by existing and future customers.

Recommended CIP Costs

These existing and 2025 system CIP projects are presented in Table 9-3, by construction of existing or future required improvements along with their probable construction costs. As shown, the existing system CIP cost is estimated to be $16.1 million and the future system CIP cost is estimated to be $19.2 million.

CAPITAL IMPROVEMENT PROGRAM IMPLEMENTATION

As shown in Table 9-3, several improvement projects are recommended for the existing system and the 2025 system. The recommended improvements for the existing system should be completed within the next five years. Figure 9-2 presents a five-year schedule starting in 2006 for the construction of the recommended capital improvement projects to eliminate deficiencies in the existing system.

The construction of the improvements for the 2025 system should be coordinated with the proposed schedules of future development to ensure that the required infrastructure will be in place to serve future customers. However, they are based on addressing deficiency in fire flows, emergency storage, or reliability issues, and therefore should be completed in the next 10 years. As illustrated on Figure 9-2, all the required improvements are shown to be completed by end of 2016.

The recommended CIP includes pump station upgrade projects for both the existing system and the 2025 system. For most of the pump station upgrades, it is suggested that when the recommended upgrades for the existing system are being made, accommodation for the recommended 2025 upgrades also be considered by providing space for additional pumps and/or controls.

For the pump station upgrades, probable construction costs have been estimated based on the ultimate, additional pumping capacity required. For each of the pump station upgrades, and the other recommended improvements, costs should be appropriately allocated to existing and/or future users, as shown in Table 9-3.

Table 9-3. Recommended Total CIP

CIP ID	Pressure Zone	Diameter (in) Existing	Diameter (in) Proposed	Address	Quantity	Unit Cost [a]	Major Infrastructure Construction Cost by Phase 2006	2007	2008	2009	2010	2011	2016 [b]	Total Cost [$]
Existing Capital Improvement Program														
Emergency Intertie Facility														
EI01	Bacon			Intertie facility with PCWA at Kokila Reservoir [c]	1	$109,000 /ls					$88,000			$88,000
Pipelines														
FF01	Upper Granite Bay	6	8	From Skyway Lane to Mooney Ridge	630 lf	$127 /lf					$80,000			$80,000
FF02	Crown Point	6	8	Along Lou Place between Crown Point Vista Pipeline and Troy Way	460 lf	$127 /lf					$58,000			$58,000
FF02	Crown Point	6	8	Along Edward Court south of Lou Place	330 lf	$127 /lf					$42,000			$42,000
PH02	Sierra	NA	24	From the JWSF site to Sierra College Boulevard [d]	6,636 lf	$2,179,000 /ls		$1,765,000						$1,765,000
PH03	Bacon	16	18	Along Eureka Road, from Barton Road to Auburn Folsom Road	5,275 lf	$253 /lf	$1,336,000							$1,336,000
EI02	Bacon	NA	12	From Sierra College Boulevard to Kokila Reservoir Site	1,500 lf	$182 /lf				$273,000				$273,000
BPH03 - Phase I	Lower Granite Bay	NA	24	From Auburn-Folsom Road to Eureka Road [e,f]	4,200 lf	$318 /lf		$1,095,000						$1,095,000
BPH03 - Phase II	Lower Granite Bay	NA	24	From Auburn-Folsom Road to Eureka Road [e,f]	4,200 lf	$318 /lf					$1,095,000			$1,095,000
Meter Station														
PH01	Gavity			Meter station on gravity line leaving Hinkle Reservoir	1	$109,000 /ls			$109,000					$109,000
Pressure Reducing Station														
PH04	ARC South			Pressure reducing valve at Oak Avenue on American River Canyon Drive	1	$109,000 /ls			$109,000					$109,000
Pump Station Improvements/Upgrades														
PS01	ARC North/Sierra			800 KW Standby Generator [d]	1	$380,000 /ls			$308,000					$308,000
PS02	Sierra			Pump Station Improvements for Sierra Pump Station [g]	1	$250,000 /ls		$250,000						$250,000
PS04	Bacon			Pump Station Improvements for Bacon Pump Station [h]	1	$90,000 /ls	$90,000							$90,000
PS05	Bacon			1,000 KW Standby Generator [c]	1	$450,000 /ls			$365,000					$365,000
Pump Station														
PS03	Upper Granite Bay			4.96 mgd Upper Granite Bay Pump Station [i]	4.96 mgd	$1,328,000 /ls				$730,000				$730,000
Storage Tank														
PH02	Sierra			2.6 MG JWSF with City of Roseville [d]	2.60 MG	$2,180,000 /ls		$1,766,000						$1,766,000
						Subtotal	$1,426,000	$4,876,000	$891,000	$1,003,000	$1,363,000	$0	$0	$9,559,000
						Construction Contingency (25%)	$357,000	$1,219,000	$223,000	$251,000	$341,000	$0	$0	$2,390,000
						Total Construction Cost	$1,783,000	$6,095,000	$1,114,000	$1,254,000	$1,704,000	$0	$0	$11,949,000
						Engineering (15%)	$267,000	$914,000	$167,000	$188,000	$256,000	$0	$0	$1,792,000
						Construction Management (10%)	$178,000	$610,000	$111,000	$125,000	$170,000	$0	$0	$1,195,000
						Program Implementation (10%)	$178,000	$610,000	$111,000	$125,000	$170,000	$0	$0	$1,195,000
Total Capital Improvement Program Cost for Existing System							**$2,410,000**	**$8,230,000**	**$1,500,000**	**$1,690,000**	**$2,300,000**	**$0**	**$0**	**$16,130,000**
Future Capital Improvement Program														
Emergency Intertie Facility														
EI01	Bacon			Intertie facility with PCWA at Kokila Reservoir [j]	1	$109,000 /ls					$21,000			$21,000
Pipelines														
BFF01	Bacon	6	8	Along Auburn Folsom Road, from Country Court to Eureka Road	920 lf	$127 /lf							$116,000	$116,000
PH05	Lower Granite Bay	NA	12	Along Cavitt-Stallman Road between Oak Pine Lane and Sierra Ponds Lane	2,550 lf	$182 /lf							$465,000	$465,000
PH06	Lower Granite Bay	NA	16	Along Twin Rocks Road between Vogel Valley Road and Sierra Ponds Lane (with one connection at Turner Drive)	6,570 lf	$228 /lf							$1,497,000	$1,497,000
BPH03 - Phase I	Lower Granite Bay	NA	24	From Auburn-Folsom Road to Eureka Road [e, k]	4,200 lf	$318 /lf		$240,000						$240,000
BPH03 - Phase II	Lower Granite Bay	NA	24	From Auburn-Folsom Road to Eureka Road [e, k]	4,200 lf	$318 /lf					$240,000			$240,000
PH02	Sierra	NA	24	From the JWSF site to Sierra College Boulevard [l]	1,764 lf	$2,179,000 /ls		$414,000						$414,000
Pressure Zone Boundary Modification [m]														
NA	Gravity/Sierra			Reallocate pressure zone break located north of Peerless Avenue to the intersection of Peerless Avenue and Cherry Avenue		- [m]								$0
Pressure Reducing Station														
BPH01	Bacon			Pressure reducing valve from new Lower Granite Bay Pump Station to Bacon Pressure Zone	1	$109,000 /ls							$109,000	$109,000
Pump Station Improvements/Upgrades														
PS01	ARC North/Sierra			800 KW Standby Generator [l]	1	$380,000 /ls			$72,000					$72,000
PS05	Bacon			1,000 KW mgd Standby Generator [j]	1	$450,000 /ls			$86,000					$86,000
BPS01	ARC South			200 KW mgd Standby Generator	1	$170,000 /ls			$170,000					$170,000
Pump Station														
PS03	Upper Granite Bay			4.96 mgd Upper Granite Bay Pump Station [n]	4.96 mgd	$1,328,000 /ls				$598,000				$598,000
BPS02	Lower Granite Bay			10.1 mgd Pump Station Improvements for Lower Granite Bay Pressure Zone	10.10 mgd	$2,872,000 /ls					$2,872,000			$2,872,000
Storage Tank														
PH02	Sierra			2.6 MG JWSF with City of Roseville [l]	2.60 MG	$2,180,000 /ls		$414,000						$414,000
BPH02	Bacon			3.0 MG Kokila Reservoir	3.00 MG	$4,051,000 /ls							$4,051,000	$4,051,000
						Subtotal	$0	$1,068,000	$328,000	$598,000	$3,112,000	$0	$6,238,000	$11,365,000
						Construction Contingency (25%)	$0	$267,000	$82,000	$150,000	$778,000	$0	$1,560,000	$2,841,000
						Total Construction Cost	$0	$1,335,000	$410,000	$748,000	$3,890,000	$0	$7,798,000	$14,206,000
						Engineering (15%)	$0	$200,000	$62,000	$112,000	$584,000	$0	$1,170,000	$2,131,000
						Construction Management (10%)	$0	$134,000	$41,000	$75,000	$389,000	$0	$780,000	$1,421,000
						Program Implementation (10%)	$0	$134,000	$41,000	$75,000	$389,000	$0	$780,000	$1,421,000
Total Capital Improvement Program Cost for Buildout System							**$0**	**$1,800,000**	**$550,000**	**$1,010,000**	**$5,250,000**	**$0**	**$10,530,000**	**$19,180,000**
Total CIP														**$35,310,000**

[a] Pipe cost based on January 2006 20-City ENR Index (7660).

[b] Includes all facilities required to be constructed between 2011 to 2025 to serve anticipated development.

[c] Based on existing system's proportionate share of the facility cost which is approximately eighty-one percent (Bacon Pressure Zone is currently 81% built, see Chapter 2) of the total unit price.

[d] Based on existing system's proportionate share of the facility cost which is approximately eighty-one percent (Sierra Pressure Zone is currently 81% built, see Chapter 2) of the of the total unit price.

[e] Construction schedule for the 24-inch diameter pipeline along Auburn Folsom Road is Phase I at 40 percent completion in 2007, Phase II at 30 percent completion in 2009 and Phase III at 30 percent completion in 2012.

[f] Based on existing system's proportionate share of the facility cost which is approximately eighty-two percent (Lower Granite Bay Pressure Zone is currently 82% built, see Chapter 2) of the total unit price by phase.

[g] Capital cost includes replacing all four pumps and installing new electrical service .

[h] Capital cost includes installing new electrical service.

[i] Based on existing system's proportionate share of the facility cost which is approximately 55% of the total unit price (2.72mgd/4.96 mgd) of the new Upper Granite Bay Pump Station.

[j] Based on 2025 system's proportionate share of the facility cost which is approximately nineteen percent (Bacon Pressure Zone is currently 81% built (see Chapter 2), which leaves 19% to be built) of the total unit price.

[k] Based on 2025 system's proportionate share of the facility cost which is approximately eighteen percent (Lower Granite Bay Pressure Zone is currently 82% built (see Chapter 2), which leaves 18% to be built) of the total unit price by phase.

[l] Based on 2025 system's proportionate share of the facility cost which is approximately nineteen percent (Sierra Pressure Zone is currently 81% built (see Chapter 2), which leaves 19% to be built) of the of the total unit price.

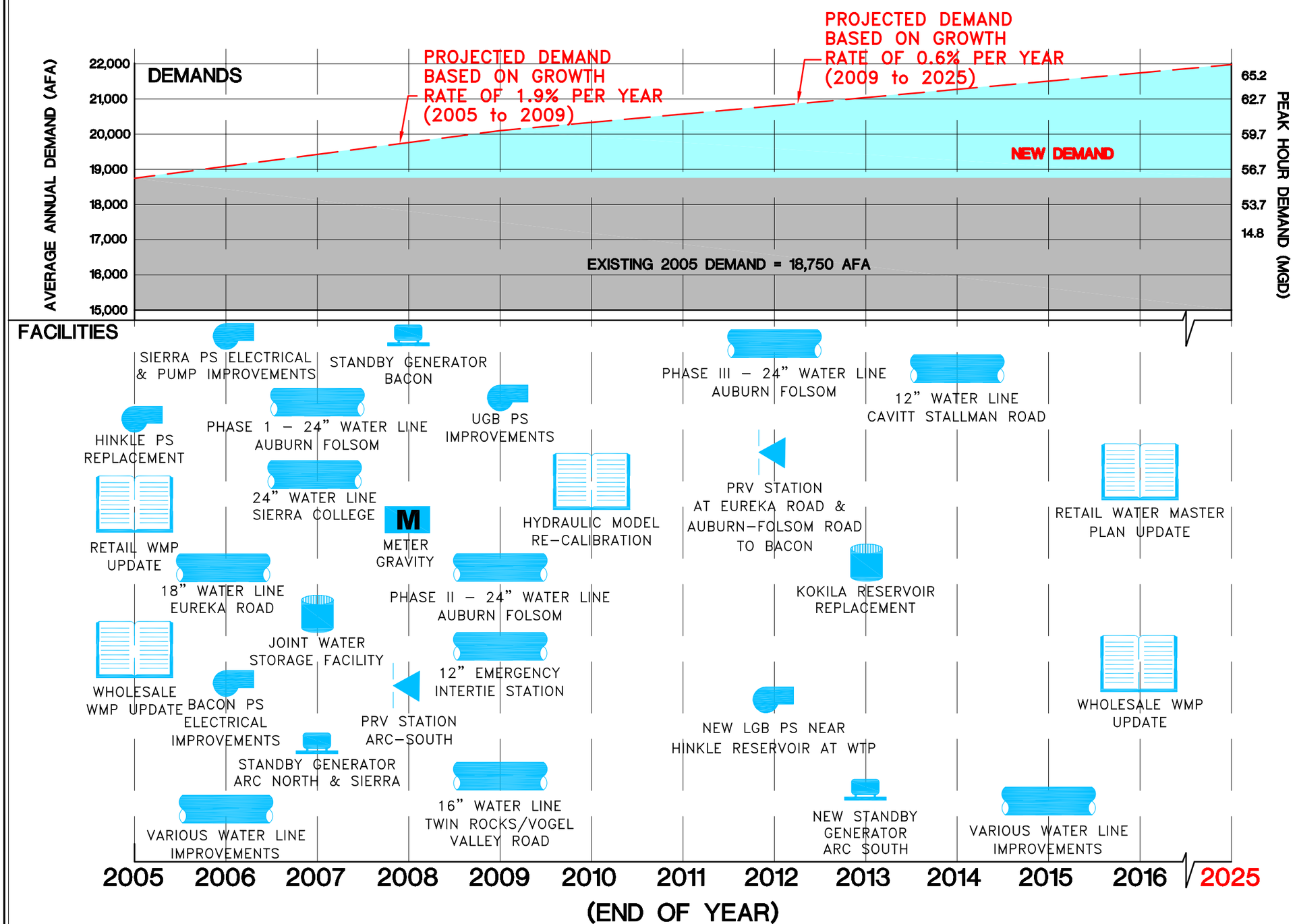
[m] Capital cost is minor (District labor cost); therefore, no cost is allocated.

[n] Based on 2025 system's proportionate share of the facility cost which is approximately 45% of the total unit price ((4.96-2.72mgd)/4.96 mgd) of the new Upper Granite Bay Pump Station.

EI - Emergency Intertie
FF - Existing Fire Flow
PH - Existing Peak Hour
BFF - Buildout Fire Flow
BPH - Buildout Peak Hour
PS - Pump Station Improvement for District's Retail Existing System.
BPS - Pump Station Improvement for District's Retail Buildout System.
NA - Not Available

Figure 9-2

San Juan Water District
Retail Water Master Plan
PHASING OF MAJOR WATER SUPPLY DISTRIBUTION AND FACILITIES



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