Nipomo Community Services District

Water and Sewer Replacement Study

Nipomo Community Services District

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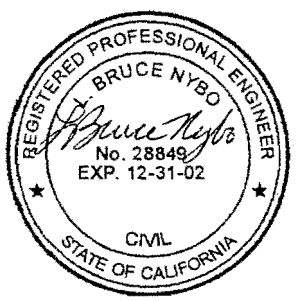

FINAL

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Revised October 1999
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BOYLE

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1.0 Introduction

1.1 Background

The Nipomo Community Services District (District) provides water and wastewater (sewer) service to a population of over 10,000 persons located along Hwy 101 in the southern portion of San Luis Obispo County, California. The District is situated approximately halfway between the cities of San Francisco and Los Angeles. The District is a Community Services District authorized by San Luis Obispo County and formed in 1965.

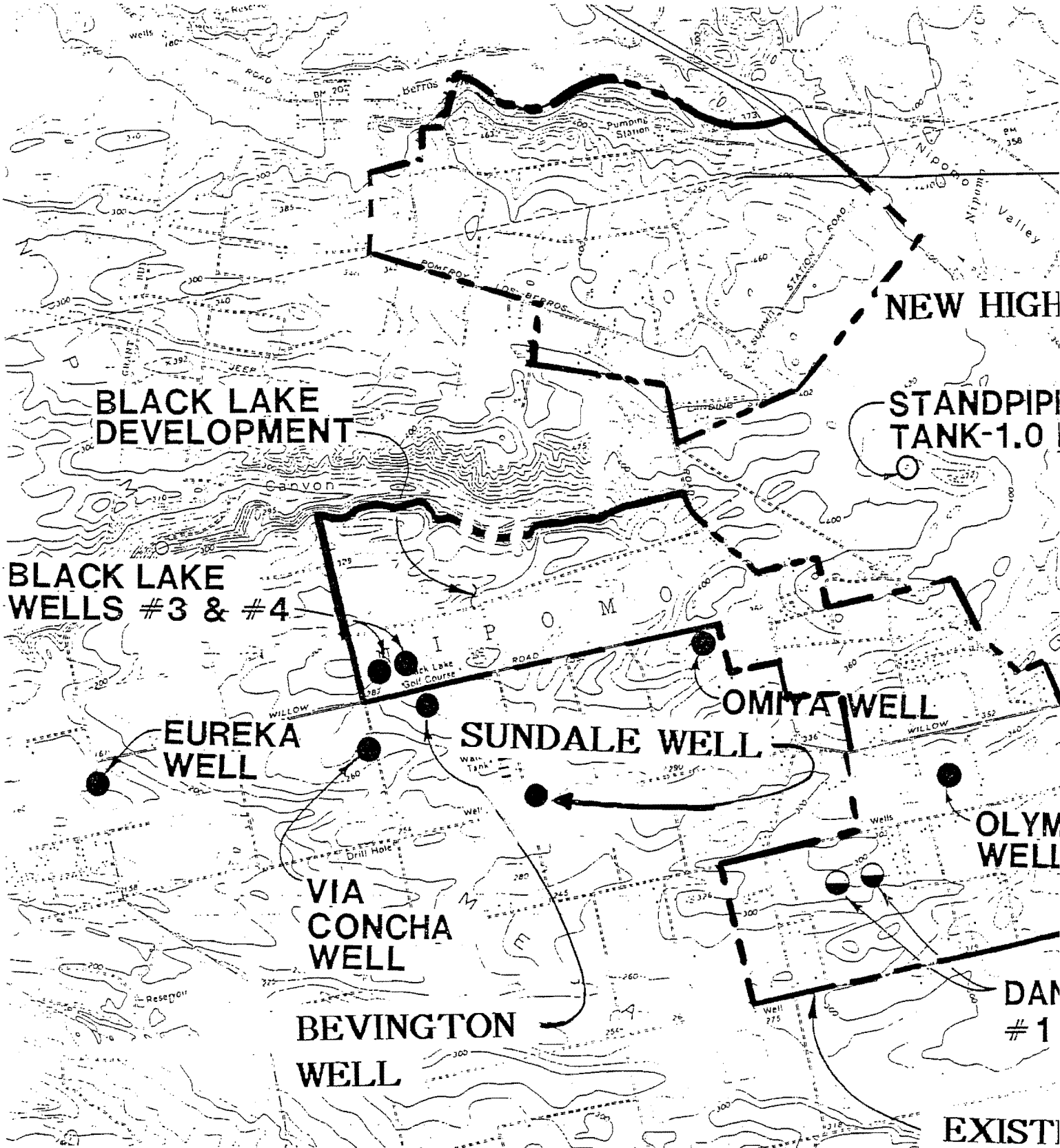
The District provides services for two areas as shown in **Exhibit 1-1** and **Exhibit 1-2**. The Town Systems serve the main area of Nipomo and the Black Lake Systems serve the Black Lake development.

The Town area is characterized as a small residential community. The Black Lake area is characterized as a predominately developed adult community oriented around the 27 hole Black Lake Golf Course.

In the 1995/1996 budget year, the District recognized the need to collect funds for the replacement of its water and wastewater infrastructure. Each component has an expected life and by planning for the replacement and building reserves for the replacement, the District will avoid or at least significantly reduce the impact of varying funding needs on a year-to-year basis and avoid significant fluctuations in water and wastewater rates to accommodate those funding needs. The replacement fund was established in 1996 via Board of Director adoption of the annual budget. The surcharge is currently 10% of the 1995/96 revenue. These funds are separated by service type and by service area in the District's budget funds #800, 801, 802, and 803.

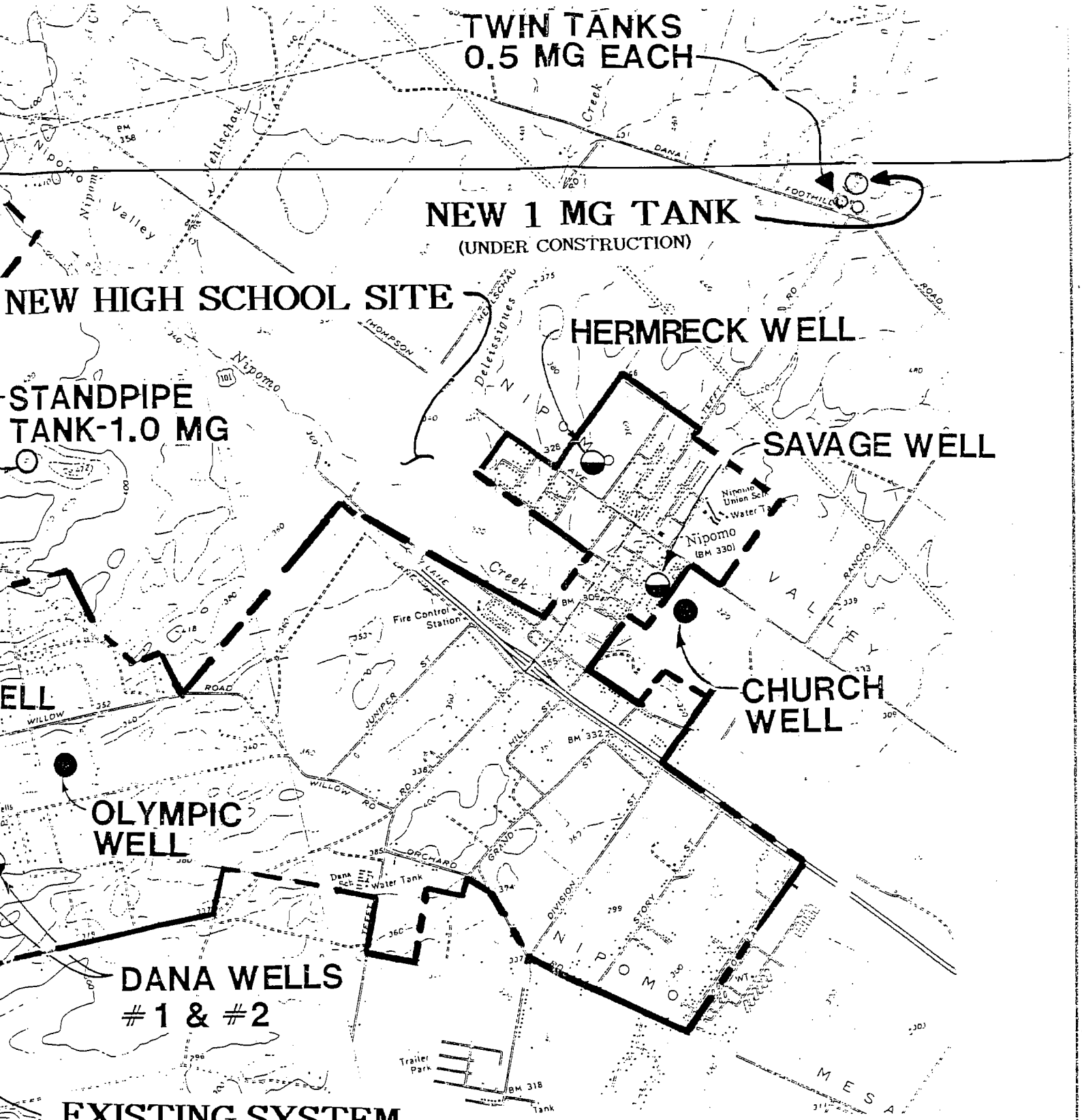
As of July 1, 1999 the above described amounts had funded reserves of approximately:

	Town System	Black Lake System
Water	$412,000	$45,000
Wastewater	$494,000	$28,000

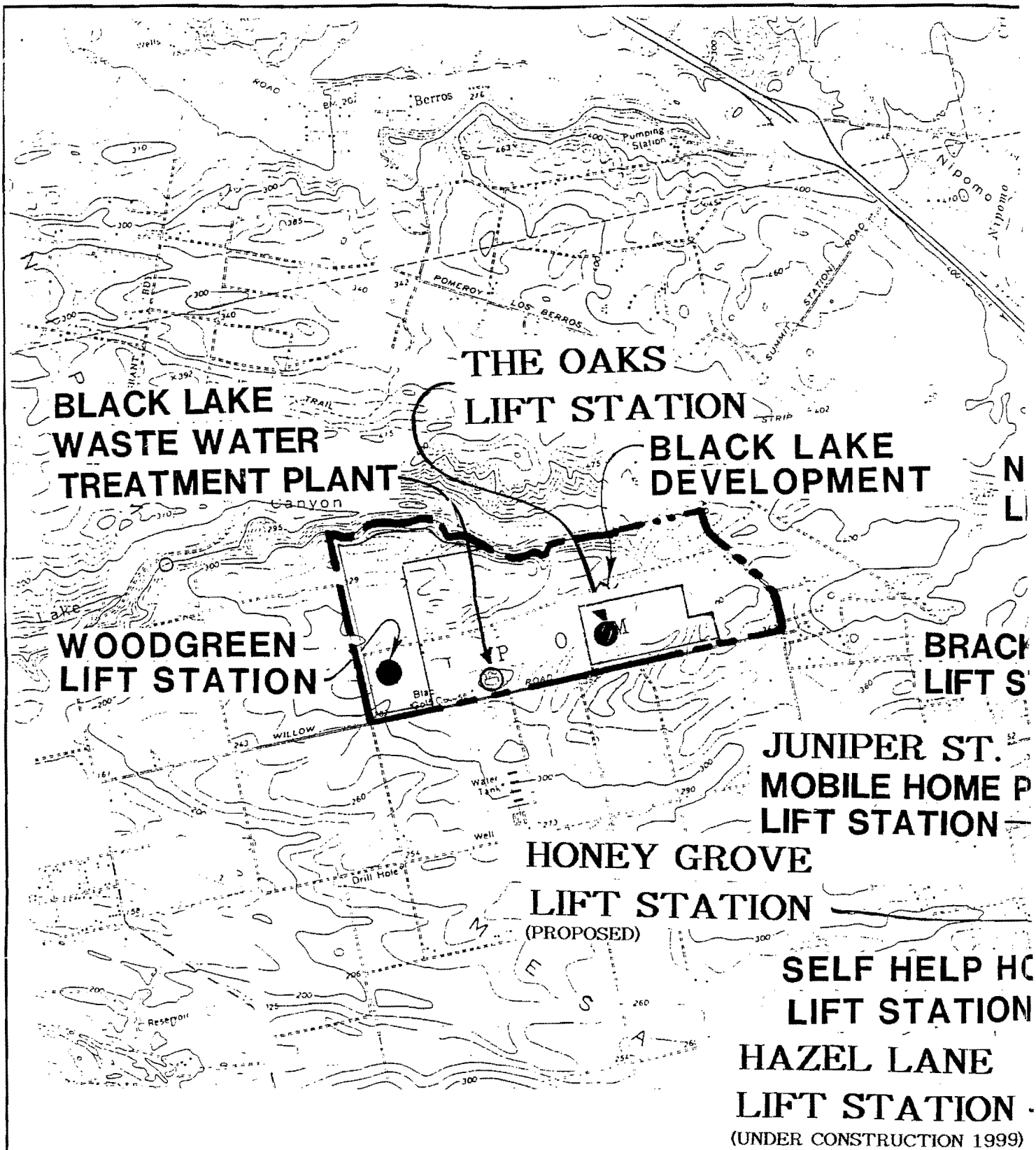


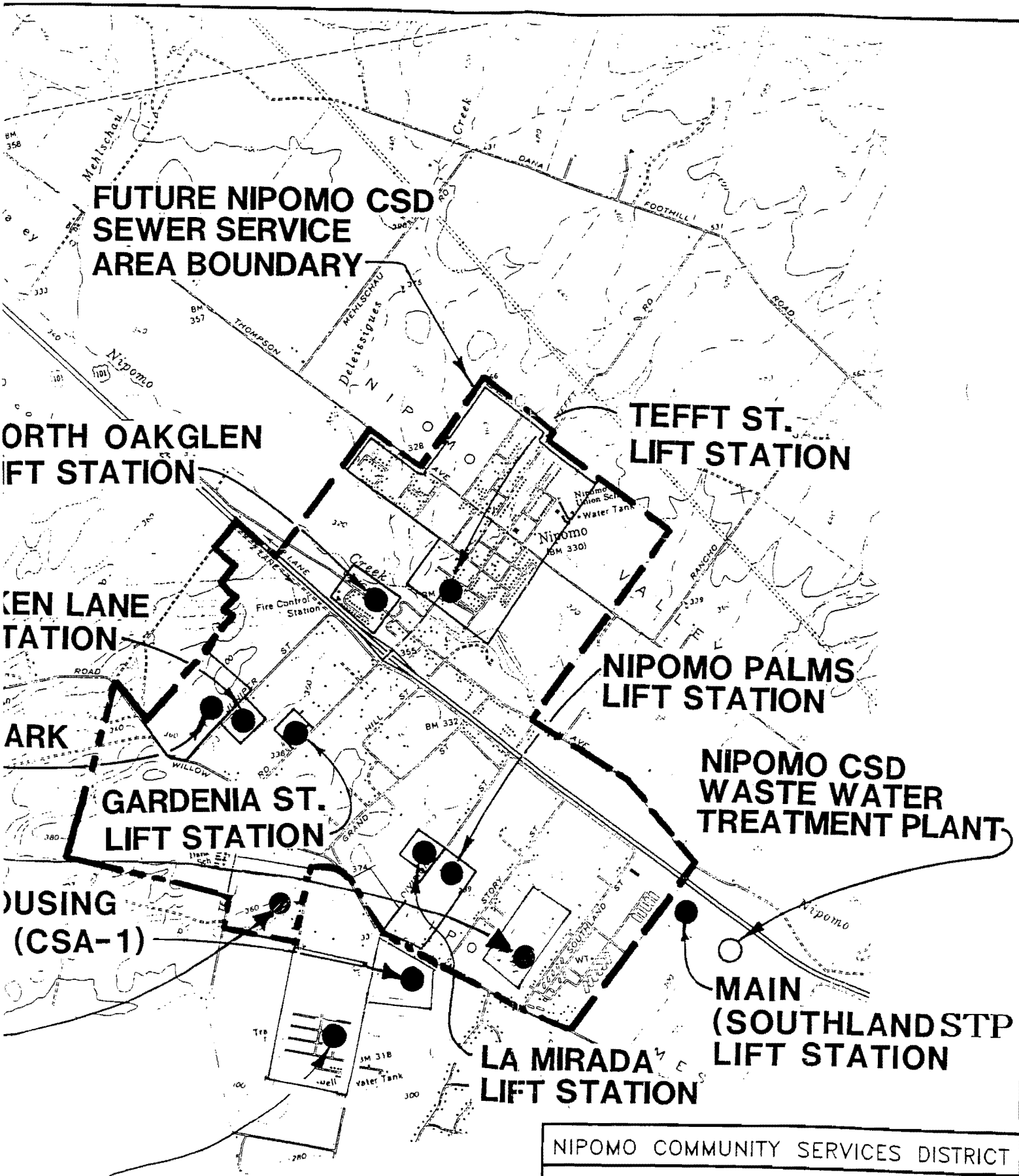
LEGEND

- ● NIPOMO CSD WELLS
- ◒ NIPOMO CSD WELLS (STANDBY)
- ○ NIPOMO CSD TANKS



NIPOMO COMMUNITY SERVICES DISTRICT
1995 WATER AND SEWER MASTER PLAN
EXISTING WATER SYSTEM SCHEMATIC
BOYLE ENGINEERING CORPORATION
VT-N04-100-01 SEPT. 1999 EXHIBIT 1-1





NIPOMO COMMUNITY SERVICES DISTRICT
1995 WATER AND SEWER MASTER PLAN
EXISTING SEWER SYSTEM SCHEMATIC
BOYLE ENGINEERING CORPORATION
VT-N04-100-01 NOV. 1995 EXHIBIT 1-2

The revenue by sources for the District are budgeted as follows:

Table 1-1
1999/2000 Budget

System	Operating Revenue
Water-Town	$890,260
Water-Black Lake	$185,000
Wastewater-Town	$449,500
Wastewater-Black Lake	$108,000

What this study does and does not do is listed below:

What Study Does	What Study Does Not Do
▪ Produces listings of facility replacement needs aggregated in 5-year increments and their costs.	▪ Determine a specific replacement year for each component
▪ Develop strategies and recommendations relative to establishment of replacement funding and timing.	▪ Assess the condition of individual facilities
▪ Assist the District in the process of gaining acceptance by the community and the District Board.	

1.2 Scope/General Methodology

1.2.1 Definitions of "Replacement"

For purposes of this study the generic term replacement refers to:

a. The reconstruction of existing facilities for which it is no longer cost effective to keep in service. That time or date can vary considerably. For a pump, it may be when the efficiency drops below a pre-determined acceptable level. For a pipeline, it may be when the costs of repair and reliability are excessive. All of us face the same questions with personal automobiles, for example.

b. Major refurbishments of facilities without full replacement. An example would be sliplining an existing pipeline rather than full replacement, thus extending the life to approximately that of a full replacement project. Reasons for doing so may include economics or reduced inconvenience to the public due to less traffic disruption. For purposes of this study, the costs assume replacement rather than refurbishments since the possibility of refurbishment needs evaluation on a case by case basis. However, this assumption is realistic from a fiscal viewpoint since the refurbishment costs usually are not significantly different than replacement.

c. Normal major refurbishments such as repainting steel reservoirs. These can have significant costs and while they could be considered as normal maintenance, it is convenient to include them in the replacement study.

Sometimes the term "replacement" becomes further blurred when after years of service, a facility is replaced and enlarged to accommodate growth or changed requirements. In such cases, the total cost may be split between the replacement fund and other capital budgets. In fact, state law requires a nexus between project costs and the costs of serving new development. Stated another way, developers should not have to fund pure replacement projects.

1.2.2 Scope

The Scope of this study includes the following:

- Project Kick-off.
- Analyze the useful and remaining life of system components.
- Breakdown the costs for rehabilitation and replacement of components in the water and wastewater systems. This includes developing a schedule for replacement.
- Prepare alternative plans to achieve funding goals.
- Prepare recommendations for the District pertaining to the rehabilitation and replacement of the District's systems. Also include recommendations relative to gaining acceptance by the community and the District Board.

1.2.3 General Methodology

The general methodology is to:

A. Inventory the existing infrastructure systems, including the age of facilities.

B. Develop unit costs for replacement.

C. Combine the above 'A' and 'B' by accumulating costs in time periods (i.e. 5-year increments).

D. Determine impacts on rates or other funding methods to accumulate funds to pay for future replacements.

1.3 Acknowledgments

Boyle Engineering Corporation wishes to acknowledge the assistance of the following persons at the Nipomo Community Services District:

- Doug Jones — General Manager
- Lisa Bognuda — Assistant Administrator
- Lee Douglas — Operations Supervisor

2.0 Existing Systems

2.1 *Water – Town Systems*

The Town System (water) serves approximately 2615 customers over an area of approximately 4 sq. miles. The water system has one pressure zone. The pressure zone contains:

- Two storage facilities, Twin Tanks and Standpipe, which total 2 million gallons (MG) of storage.
- A planned storage facility to add an additional 1 MG storage for a total of 3 MG.
- Seven active wells, which include disinfection by injecting chlorine gas into the well discharge. The seven wells are as follows:
  - Eureka Well
  - Via Concha Well
  - Bevington Well
  - Omiya Well
  - Olympic Well
  - Church Well
  - Sundale Well
- The wells range in depth from 240 feet to 730 feet. They are split between submersible motors, vertical turbine motors and natural gas engine
- A distribution system comprised of 6-, 8-, 10-, 12-, and 16-inch diameter pipes, which total approximately 341,324 feet.

In general, the Town Water System has been installed between 1966 and the current time. The operations personnel report the following:

- Good overall condition
- Pumps and motors may need replacement

The inventory* of the Town Water System is illustrated on the following tables (Back-up information is being supplied under separate cover):

* Inventories for the Town Water System and other systems were developed using data from the District. They are intended for the establishment of replacement funds and not intended as a complete listing for District depreciation purposes.

Table No.	Describing
2-1	Summary of Facilities – Water Systems
2-2	Detailed History of Water Facilities – Town Water System
2-3	Wells/Reservoirs Details – Town Water System

Table 2-1
Summary of Facilities
Water Systems

Facilities	Location Name	Town	Black Lake
Wells			
	Eureka (800 gpm)	x	
	Via Concha (700 gpm)	x	
	Bevington #2 (400 gpm)	x	
	Olympic #2 (145 gpm)	x	
	Omiya #2 (110 gpm)	x	
	Savage #2 (125 gpm)	x	
	Church #2 (160 gpm)	x	
	Sun Dale (1,000 gpm)	x	
	Black Lake #3 (325 gpm)		x
	Black Lake #4 (400 gpm)		x
Reservoirs			
	Twin Tanks #1 (0.5 MG)	x	
	Twin Tanks #2 (0.5 MG)	x	
	Standpipe (1.0 MG)	x	
	Black Lake (0.4 MG)		x
	New Reservoir (1.0 MG)	x	
Pipelines			
	6" AC	79,159	105
	6" PVC	51,695	4,691
	8" AC	40,319	17,197
	8" PVC	86,753	20,982
	10" AC	40,009	
	10" PVC	15,645	
	12" PVC	15,134	
	16" DI	12,610	
	Total Length Per System, LF	**341,324**	**42,975**
	Total Length, LF		**384,299**
Fire Hydrants		457	71
SCADA System		x	x
Hydropneumatic Tank			x

Table 2-2
Detailed History of Water Facilities
Town Water System

Facilities	Location Name	1966-70	1971-75	1976-80	1981-85	1986-90	1991-95	1996-00
Wells								
	Eureka			x				
	Via Concha						x	
	Bevington #2				x			
	Olympic #2				x			
	Omiya #2					x		
	Savage #2					x		
	Church #2				x			
	Sun Dale							x
Reservoirs								
	Twin Tanks #1	x						
	Twin Tanks #2			x				
	Standpipe						x	
	New Tank							x
Pipelines								
	6" AC	33,808	14,690	15,664	11,089	3,908		
	6" PVC				60	30,840	12,705	8,090
	8" AC	23,045		7,935	8,699	640		
	8" PVC				7,148	10,056	48,449	21,100
	10" AC	30,469		9,540				
	10" PVC				5,058	1,500	6,312	2,775
	12" PVC						7,554	7,580
	16" DI						12,610	
	Total Length Per Period, LF	87,322	14,690	33,139	32,054	46,944	87,630	39,545
	Total Length, LF							341,324
Fire Hydrants		86	20	48	43	84	133	43
SCADA System								x

Table 2-3
Well/Reservoir Details
Town Water System

Facility	Location Name	Building	No. of Pumps	Motor (h.p.)	Pump/ Motor Last Replaced/ Major Repair	Chlorine Gas Metering	Last Major Electrical Overhaul	Comments
Wells								
	Eureka	yes	1	200	1998	yes	1998	Overhaul Completed
	Via Concha	yes	1	150	1992	yes	N/A	
	*Bevington #2	yes	1	100	1997	yes	1985	Overhaul Completed
	Olympic #2	no	1	40	1997	yes	1985	New Motor Rebuild Pump end
	Omiya #2	no	1	30	1988	yes	1988	
	Savage #2	no	1	25	N/A	yes	N/A	Inactive
	Church #2	no	1	30	1985	yes	1985	
	Sun Dale	yes	1	300	1999	yes	1999	Natural Gas Engine
Facility	**Location Name**	**Steel**	**Cathodic Protection**	**Size (MG)**	**Last Exterior Painting**	**Last Interior Painting**	**Earthquake Resistant**	**Comments**
Reservoir								
	Twin Tanks #1	yes	yes	0.5	N/A	no	no	
	Twin Tanks #2	yes	yes	0.5	N/A	no	no	
	Standpipe #3	yes	yes	1	1993	1993	yes	
	Reservoir #5	yes	yes	1	1999	1999	yes	Under construction

* In 1995 Pump House was constructed.

N/A – Not Available

2.2 *Water – Black Lake System*

The Black Lake System (water) serves approximately 473 customers over an area of approximately .7 sq. miles. The water system has one pressure zone and contains:

- One storage facility, Black Lake, with a capacity of 0.4 MG.
- One 3,000 gallon hydropneumatic tank.
- Two active wells, which include disinfection by chlorine pellets into the well or at the storage facility. The two wells are as follows:
  - Black Lake #3
  - Black Lake #4
- A distribution system comprised of 6- and 8-inch diameter pipes, which total approximately 42,975 feet.

In general, the Black Lake Systems have been installed between 1985 and the current time. The operations personnel report the following:

- All Systems are functioning well

The inventory* of the Black Lake System is illustrated on the following tables (Back-up information is being supplied under separate cover):

Table No.	Describing
2-1	**Summary of Facilities – Water Systems**
2-4	**Detailed History of Water Systems - Black Lake**
2-5	**Wells/Reservoirs Details - Black Lake**

* Inventories for the Town Water System and other systems were developed using data from the District. They are intended for the establishment of replacement funds and not intended as a complete listing for District depreciation purposes.

Table 2-4
Detailed History of Water Systems
Black Lake Water System

Facilities	Location Name	1981-85	1986-90	1991-95	1996-99
Wells					
	Black Lake #3	x			
	Black Lake #4		X		
Reservoir					
	Reservoir #4	x			
Pipelines					
	6" AC	105'			
	6" PVC		1,658'	1,911'	1,122
	8" AC	8,366'	3,300'		
	8" PVC		10,630'	4,226'	11,657
Total Length per period, LF		8,471	15,588	6,137	12,779
Total Length					42,975
Fire Hydrant		19	25	10	17
Hydropneumatic Tank		x			
Pressure Pumps		x			

Table 2-5
Well/Reservoir Details
Black Lake Water System

Facility	Location Name	Building	No. of Pumps	Motor (h.p.)	Last Replaced	Chlorine Gas Metering	Last Major Electrical Overhaul	Comments
Wells								
	Black Lake #3	no	1	50	1999	yes	1984	
	Black Lake #4	no	1	60	1989	yes	1989	
Facility	**Location Name**	**Steel**	**Cathodic Protection**	**Size (MG)**	**Last Exterior Painting**	**Last Interior Painting**	**Earthquake Resistant**	**Comments**
Reservoir								
	Black Lake	yes	yes	0.4	1987	1987	no	

2.3 *Wastewater (Sewer) – Town System*

Approximately 60% of the water customers receive wastewater service from the District. The remaining 40% utilize septic systems. The wastewater system contains the following:

- Wastewater treatment is provided at the District's wastewater treatment plant, located adjacent to Highway 101 at Southland and South Frontage Road. The plant currently is rated at 0.6 MGD with a 0.3 MGD expansion currently underway. Upon completion of the expansion, the 0.9 MGD facility will be essentially new (i.e. within the past 2 years) except for ponds 1 and 2.

- The wastewater treatment facility utilizes a series of aerated lagoons to achieve the mandated discharge requirements. The wastewater enters the facility at the headworks were it is macerated prior to being pumped to the aerated lagoons for treatment, after which the treated effluent is discharged to the infiltration basins.

- The gravity wastewater pipelines and lift stations (collection system and transmission system) consist of 6-inch to 12-inch diameter pipelines and total approximately 139,910 feet. The wastewater force mains consist of 4- and 6-inch diameter pipelines and total 23,410 feet. The lines were installed between 1971 and the current time. Prior to 1985 the sewer system consisted of collection systems connected to community septic tanks.

- The wastewater transmission system includes nine lift stations ranging from 110 to 600 gpm. The lift stations are as follows:

  - Influent (Treatment Plant)
  - Tefft
  - Nipomo Palms
  - N. Oak Glen
  - Braken/Primrose
  - La Mirada
  - Juniper
  - Gardenia
  - Hazel Lane (under construction)

The inventory for the Town wastewater system is illustrated on the following tables:

Table No.	Describing
2-6	**Summary of Facilities – Wastewater System**
2-7	**Detailed History of Wastewater –Town**
2-8	**Lift Station/Treatment Plant Details - Town**

Table 2-6
Summary of Facilities
Wastewater System

Facilities	Location Name	Town	Black Lake
Lift Stations			
	Influent (Treatment Plant)	x	
	Tefft	x	
	Nipomo Palms	x	
	N. Oak Glen	x	
	Braken/Primrose	x	
	La Mirada	x	
	Gardenia	x	
	The Oaks		x
	Woodgreen		x
	Hazel Lane	x	
	Juniper	x	
Treatment Plants			
	Nipomo CSD	x	
	Black Lake		x
Pipelines			
	6" VCP	6,310	
	6" PVC	1,080	2,866
	8" VCP	6,788	
	8" PVC	99,126	31,030
	10" PVC	5,525	
	12" PVC	8,495	2,431
	Total Length Per System, LF	127,324	36,327
	Total Length, LF		163,651
Force Mains			
	4" PVC	14,301	1,284
	6" PVC	9,109	510
	Total Length Per System, LF	23,410	1,794
	Total Length, LF		25,204

Table 2-7
Detailed History of Wastewater System
Town Wastewater System

Facilities	Location Name	1960-65	1966-70	1971-75	1976-80	1981-85	1986-90	1991-95	1996-99
Lift Stations									
	Influent (Treatment Plant)					x			
	Tefft					x			
	Nipomo Palms					x			
	N. Oak Glen					x			
	Braken/Primrose						x		
	La Mirada						x		
	Gardenia						x		
	Juniper						x		
	Hazel Lane								x
Wastewater Treatment Plant									
	Nipomo CSD								x
Pipelines									
	6" VCP			5,410		900			
	6" PVC						645	375	60
	8" VCP			4,536	1,975	277			
	8" PVC					47,979	12,623	17,229	21,295
	10" PVC					5,525			
	12" PVC					8,495			
	Total Length Per Period, LF			9,946	1,975	63,176	13,268	17,604	21,355
	Total Length, LF								127,324
Force Mains									
	4" PVC			2,275'		2,426'	3,800'		5,800'
	6" PVC					7,009'	900'		1,200
	Total Length Per Period, LF			2,275		9,435	4,700		7,000
	Total Length, LF								23,410
Man Holes				38	8	19	54	61	72

Table 2-8
Lift Station/Treatment Plant Details
Town Wastewater System

Facility	Location Name	Vaults	No. of Pumps	Motor (h.p.)		Capacity (gpm)	Last Pump/Motor Refurbishment	Last Electrical Refurbishment	Comments
Lift Stations									
	Influent (Main)		2	9.6	9.6	630			New 1999
	Tefft		2	15.0	15.0	430			
	Nipomo Palms		2	7.5	7.5	175			
	N. Oak Glen		2	5.4	5.4	220			New pumps '99
	Braken/Primrose		2	7.5	7.5	110			
	La Mirada		2	5.0	5.0	190			
	Juniper		2	7.5	7.5	110			
	Gardenia		2	7.5	7.5	110			
	Hazel Lane		2	10.0	10.0	112			New 1999
Treatment Plant									
	Southland Plant (0.9 MGD)		2 *	40	40		1999		* Blowers

* Third blower under construction

2.4 Wastewater (Sewer) – Black Lake System

100% of the water residential customers receive wastewater service from the District. The wastewater system contains the following:

- Wastewater treatment is provided at the Black Lake Wastewater Treatment Plant. This treatment facility was constructed in 1986 and expanded in 1998 to its current capacity of 0.2 MGD.

- The wastewater enters the facility through a bar screen prior to entering the duplex comminutors. Once through the bar screen and comminutors the wastewater flows to the aerated lagoons for treatment. The treated effluent is then chlorinated before being discharged to the golf course irrigation storage pond.

- The wastewater pipelines (collection and transmission system) consist of 6-inch and 8-inch diameter pipelines and total approximately 36,327 feet. The wastewater force mains consist of 4-and 6-inch diameter pipelines and total 1,794 feet. These lines were installed between 1985 and the current time.

  The Black Lake System includes two lift stations each with a capacity of 175 gpm. The Lift Stations are as follows:

  - Woodgreen
  - The Oaks

The inventory for the Black Lake wastewater system is illustrated on the following tables:

Table No.	Describing
2-6	Summary of Facilities – Wastewater
2-9	Detailed History of Wastewater – Black Lake
2-10	Lift Stations/Reservoir Detail – Black Lake

Table 2-9
Detailed History of Wastewater System
Black Lake Wastewater System

Facilities	Location Name	1981-85	1986-90	1991-95	1996-99
Lift Stations					
	Woodgreen			x	
	The Oaks			x	
Wastewater Treatment Plant					
	Black Lake		x		
Pipelines					
	6" PVC		2,866		
	8" PVC	4,105	9,840	5,717	11,368
	12" PVC	2,431			
	Total				36,327
Force Mains					
	4" PVC		1,284		
	6" PVC		510		
	Total				1,794
Man Holes		24	39	16	39

Table 2-10
Lift Station/Reservoir Detail
Black Lake Wastewater System

Facility	Location Name	Vaults	No. of Pumps	Motor (h.p.)		Capacity (gpm)	Last Pump/Motor Refurbishment	Last Electrical Refurbishment	Comments
Lift Stations									
	Woodgreen		2	10	10	175			New 1998
	The Oaks		2	4.7	4.7	175			New 1999
Treatment Plant									
	Black Lake Plant (0.2 MGD)		2 *	10	10		1997		* Blowers

3.0 System Life Expectancy and Unit Costs

3.1 General

In presenting expected life and unit costs, it must be remembered that these are somewhat generic and intended to establish reasonable replacement funding levels. There is no representation that these values will coincide with the values for a particular facility. Further, with respect to "life" there are many facilities whose life has been longer than the numbers shown. However, their reliability or cost effectiveness may have been compromised. The replacement funds are intended to preclude that situation to a reasonable extent.

3.2 Expected Life

3.2.1 General

There are no absolutes in expected life of facilities. Variables include:

- Definition of "life" – This definition is at the heart of the need for an infrastructure replacement program. Expected life could be defined as:
  - The time when a component completely fails or could be anticipated to be so unreliable that failure has in essence occurred.
  - The time when repairs on a component become so frequent and costly that its retention can not be justified. "Failure" may not be at hand in terms of reliability, but the economics dictate replacement.
  - Some period before the repairs accelerate in frequency or before a component becomes unreliable. This is the "fix-it before it breaks" approach.
  - For pumps and similar equipment, the time when the lost efficiency makes it beneficial for replacement. Lost efficiency translates into increased power costs.
  - For certain facilities where critical fire protection is required, a time period before any significant failures occur which impact public safety.
  - The SRF Replacement Guidelines life expectancy or IRS depreciation life.
- Variability in "life" – The typical "life" periods used in replacement studies, by other purveyors, often are less than what maybe experienced in the field. That relates to the need for prudent planning, assuming a conservative approach. Also, if there is any error, it is better to be on the early side of the issue.
- Materials influence "life" – For example, AC pipelines have a tendency to be brittle and their useful life may be less than actual internal and external corrosion would indicate. On the other hand, PVC pipelines (AWWC 900 for water or D-3034 for wastewater) have longer anticipated lives, although the

materials in PVC pipeline construction have not been in existence long enough to know precisely their "life".

- Need to be conservative – For planning purposes, it is better to be somewhat low in the projection of life when given a choice. That provides fiscal prudence with respect to replacement of facilities. It is important to recognize that for public purveyors any funds collected in excess of true need are retained instead of provided to stockholders as may be the case for private companies. These retained earnings will be reflected in future rates.
- The life expectancies presented represent numbers based on experience with similar systems. However, it should be explained that the term "life" is variable. For purposes of this report "life" is assumed to precede experiencing problems. Realistically, many water or wastewater systems function for a number of years with problems such as line breaks which are simply fixed as they occur and indeed pipelines have lasted 60 years or more. For planning purposes a more aggressive replacement schedule is assumed. If the District's replacement program actually is less aggressive, then the funds will still be designated for the replacements/repairs – only later than expected.

3.2.2 Water System

Table 3-1 presents the estimated life expectancy for the various water system components.

Comments are:

- The pipeline systems have the longest life expectancy.
- The wells with mechanical and electrical systems require more frequent replacement.
- Replacement of reservoir coatings is critical since if not done when needed, full reservoir replacement may be required earlier than expected.

3.2.3 Wastewater System

Table 3-1 presents the estimated life expectancy for the various wastewater system components.

Comments are:

- The corrosive environment for lift stations and wastewater plant equipment reduces life expectancy.
- Manhole life can be extended through the use of one of the lining products, i.e. PVC T-lock, Polyurethane Coating.

Table 3-1
Infrastructure Cost Estimates

Facility	Components	Expected Life (Years)		Cost/Each or Unit		Notes
Water System						
Pipelines						
	6" AC[1]	40	(2)	$60	LF	There is a substantial amount of 6" AC line installed in 1966-1970.
	8" AC[1]	40	(2)	$60	LF	
	10" AC[1]	40	(2)	$69	LF	There is a substantial amount of 10" AC line installed in 1966-1970.
	6" PVC	50	(2)	$60	LF	Existing System-most installed 1986-1995
	8" PVC	50	(2)	$60	LF	Existing System-most installed 1991-1995
	10" PVC	50	(2)	$69	LF	Limited amount in existing system
	12" PVC	50	(2)	$78	LF	Existing System-most installed 1996-1999
	16" DI	50		$89	LF	Existing System-most installed 1991-1995
Fire Hydrants						
	Major Repair	10		$500	EA	Replacing internal parts. Does not include routine painting (once every 2-3 years).
	Replacement	30		$2,100	EA	
Wells						
	Pump/Motor	6 to 25		See Note	EA	15K-40K - See Table 3-2. Life expectancy can vary considerably
	Electrical Equipment - Major Repair	15		$15,000	EA	
	Electrical Equipment - Replacement	25		$20,000	EA	
	Well Rehabilitation	15		$30,000	EA	This covers the well and not the equipment. Range typically 25-30K.
	Building Replacement	30		$5,000	EA	District's well buildings are not complex.
	Well Replacement	40		See Note	EA	35K-150K depending on facility - See Table 3-2.

Table 3-1
Infrastructure Cost Estimates

Facility	Components	Expected Life (Years)	Cost/Each or Unit		Notes
Reservoirs					
	Reservoir Coatings - Exterior	Every 10 years	$22,000	MG	Based on $2/S.F. and generic ht/dia. ratio.
	Reservoir Coatings - Interior	Every 15 years	$32,000	MG	Based on $3/S.F. and generic ht./dia. ratio.
	Cathodic Protection	15	$25,000	EA	Assuming impressed current. Sacraficial anode less expensive.
	Earthquake Protection	40	$35,000	EA	Articulation in inlet-outlet lines.
	Replacement	50	$500,000	MG	35 cents/gal to 50 cents/gal depending on site needs.
Hydropneumatic System		25	$25,000	EA	
SCADA System					
	Upgrades	4	$50,000	EA	Electronic components and field sensing equipment.
	Replacement	10	$150,000	EA	The industry is rapidly changing.
Sewer System					
Pipelines					
	4" PVC[3]	50	$54	LF	
	6" PVC	50	$54	LF	
	8" PVC	50	$66	LF	
	10" PVC	50	$74	LF	
	12" PVC	50	$80	LF	
Force Mains					
	4" PVC	50	$54	LF	
	6" PVC	50	$56	LF	
	8" PVC	50	$60	LF	
	10" PVC	50	$65	LF	

Table 3-1
Infrastructure Cost Estimates

Facility	Components	Expected Life (Years)		Cost/Each or Unit		Notes
Manholes						
	Rehabilitation	30		$500	EA	Depends on variety of factors including hydrogensulfide.
	Replacement	50		$2,000	EA	
Lift Stations						
	Pumps/Motors	6 to 25		See Note	EA	$70 per Hp and $30 per gpm
	Electrical Equipment - Major Repair	15		$15,000	EA	
	Electrical Equipment - Replacement	25		$20,000	EA	
	Vaults	25		$15,000	EA	
Wastewater Treatment Plant						
	Grinders	15		$8,000	EA	
	Pumps/Motors	15		$7,500	EA	
	Pond Liners	15		$0.6	SQYD	
	Blowers	20		$30,000	EA	
	Composite Sampler	20		$5,000		

Notes

[1] All AC and VCP pipe will be replaced with PVC pipe.

[2] The "life" for PVC has really not been established due to the relative newness of the product. However, it is substantial and should easily last 50 years. The life for AC pipe has been reduced from 50 to 40 years due to its being more brittle.

[3] Assumes 4" pipe to be replaced with 6" pipe.

[4] Contingencies for design and construction services have been included in the above unit costs.

Table 3-2
Well Replacement Costs (Current Dollars)

Well Name	Well $	Pump $*
Eureka	$145,000	$40,000
Via Concha	$100,000	$40,000
Bevington #2	$85,000	$35,000
Olympic #2	$50,000	$25,000
Omiya #2	$75,000	$25,000
Savage #2 (Inactive)	$50,000	$25,000
Church #2	$35,000	$15,000
Black Lake #3	$85,000	$30,000
Black Lake #4	$83,000	$30,000
Sundale**	$145,000	$360,000

*Well pump and motor – not electrical or chlorination or natural gas engine.

** Pump and Natural Gas Engine

Note:
Well rehabilitation varies depending on the procedures performed but, typically ranges from $20,000 to $30,000.

3.3 *Unit Replacement Cost*

3.3.1 *General*

The unit replacement costs presented are based on: (1) recent experience by the District on repair/replacement projects (2) Boyle observations on similar projects or new-line projects factored upwards to better represent the increased work effort when a replacement project occurs. Those factors include, for example, the cost of re-connection of services and the cost of working in existing streets.

The cost represents our opinion of probable construction costs; they include an allowance for engineering design and construction services, where applicable. They are a "tool" to be used in addressing the broad issues; they do not represent a detailed analysis of any one facility or any one specific cost.

3.3.2 Water System

Table 3-1 presents the unit replacement costs for the water systems.

Comments are:

- 'Replacement' for pipelines could either be full pipeline replacement including trenching and laying a new pipeline. It also could mean sliplining or other trenchless technology, particularly where there are infrequent water services and depending on the number of valves. The presence of such services can alter the preferred methodology. Also, water pipelines (i.e. AC or PVC) typically reach the end of their life due to exterior rather than interior problems.
- With water systems, work is often combined with other regulatory requirements.
- Unit costs for pipelines reflect the inconvenience of dealing with existing services.
- With respect to the water treatment facilities these consist of individual well chlorine tablet units injecting into the well.

3.3.3 Wastewater System

Table 3-1 presents the unit costs for the wastewater system.

Comments are:

- 'Replacement' for pipelines could either be complete replacement or sliplining or other trenchless technology. The latter is gaining popularity due to the reduction of street/traffic impact; however, it is not applicable when the capacity of the existing line is marginal. In any event, for purposes of this study, the full replacement costs will be used.
- Replacement costs for pipelines reflect the work associated with existing laterals.
- Replacement costs for the wastewater facility reflect the costs associated with the replacement and installation of the existing equipment at the facilities.

4.0 Replacement Schedules and Costs

4.1 Overview

In this section, the information from **Sections 2 and 3** are combined to project capital needs for the future replacement of infrastructure. It is noted that pipeline and other systems have been aggregated in five year periods. While this introduces slight inaccuracies, it is judged inconsequential considering the approximations involved in life expectancy and unit costs. The general methodology is to aggregate costs in five-year periods for the various facilities. The replacement periods are based on the life expectancies established in **Section 3**. The amounts expressed are in terms of present worth dollars.

4.2 Water – Town System

Table 4-1 presents the replacement schedule and costs for the wells, reservoirs and distribution system.

- Total present worth in Table 4-1 for major repair/replacement is $26,408,418.

4.3 Water – Black Lake System

Table 4-2 presents the replacement schedule and costs for the wells, reservoirs and distribution system.

- Total present worth in Table 4-2 for major repair/replacement is $3,858,100.

4.4 Wastewater – Town System

Table 4-3 presents the replacement schedule and costs for the treatment facilities, lift stations, collection and disposal system.

- Total present worth in Table 4-3 for major repair/replacement is $11,109,997.

4.5 Wastewater – Black Lake System

Table 4.4 presents the replacement schedule and costs for the treatment facilities, lift stations, collection and disposal system.

- Total present worth in Table 4-4 for major repair/replacement is $3,037,552.

Table 4-1
Town Water System
Schedule and Cost Estimate

(1) Year Installed	(2) Facility	(3) Component	(4) Note 1 Expected Life	(5) Note 2 % Life Gone	(6) Note 3 Present Worth Unit Cost ($)	(7) Quantity per Unit	(8)	(9) Action	(10) Note 4 Replacement Date			(11) Note 5 Amount ($)
1966 - 1970	Pipeline											
		6" AC	40	80	$60	33808	LF	Replace	2006	-	2010	$2,028,480
		8" AC	40	80	$60	23045	LF	Replace	2006	-	2010	$1,382,700
		10" AC	40	80	$69	30469	LF	Replace	2006	-	2010	$2,102,361
	Fire Hydrants											
		Fire Hydrants	10	-	$500	86	EA	Repair	-	-	-	$43,000
		Fire Hydrants	30	100	$2,100	86	EA	Replace	1996	-	2000	$180,600
1971 - 1975	Pipeline											
		6" AC	40	68	$60	14690	LF	Replace	2011	-	2015	$881,400
	Fire Hydrants											
		Fire Hydrants	10	-	$500	20	EA	Repair	-	-	-	$10,000
		Fire Hydrants	30	90	$2,100	20	EA	Replace	2001	-	2005	$42,000
1976 - 1980	Pipeline											
		6" AC	40	55	$60	15664	LF	Replace	2016	-	2020	$939,840
		8" AC	40	55	$60	7935	LF	Replace	2016	-	2020	$476,100
		10" AC	40	55	$69	9450	LF	Replace	2016	-	2020	$652,050
	Fire Hydrants											
		Fire Hydrants	10	-	$500	48	EA	Repair	-	-	-	$24,000
		Fire Hydrants	30	73	$2,100	48	EA	Replace	2006	-	2010	$100,800
1981 - 1985	Pipeline											
		6" AC	40	43	$60	11089	LF	Replace	2021	-	2025	$665,340
		6" PVC	50	34	$60	60	LF	Replace	2031	-	2035	$3,600
		8" AC	40	43	$60	8699	LF	Replace	2021	-	2025	$521,940
		8" PVC	50	34	$60	7148	LF	Replace	2031	-	2035	$428,880
		10" PVC	50	34	$69	5058	LF	Replace	2031	-	2035	$349,002
	Fire Hydrants											
		Fire Hydrants	10	-	$500	43	EA	Repair	-	-	-	$21,500
		Fire Hydrants	30	57	$2,100	43	EA	Replace	2011	-	2015	$90,300

Table 4-1
Town Water System
Schedule and Cost Estimate

(1) Year Installed			(2) Facility	(3) Component	(4) Note 1 Expected Life	(5) Note 2 % Life Gone	(6) Note 3 Present Worth Unit Cost ($)	(7) Quantity per Unit	(8)	(9) Action	(10) Note 4 Replacement Date			(11) Note 5 Amount ($)
1986	-	1990	Pipeline											
				6" AC	40	30	$60	3908	LF	Replace	2026	-	2030	$234,480
				6" PVC	50	24	$60	30840	LF	Replace	2036	-	2040	$1,850,400
				8" AC	40	30	$60	640	LF	Replace	2026	-	2030	$38,400
				8" PVC	50	24	$60	10056	LF	Replace	2036	-	2040	$603,360
				10" PVC	50	24	$69	1500	LF	Replace	2036	-	2040	$103,500
			Fire Hydrants											
				Fire Hydrants	10	-	$500	84	EA	Repair	1996	-	2000	$42,000
				Fire Hydrants	30	40	$2,100	84	EA	Replace	2016	-	2020	$176,400
1991	-	1995	Pipeline											
				6" PVC	50	14	$60	12705	LF	Replace	2041	-	2045	$762,300
				8" PVC	50	14	$60	48449	LF	Replace	2041	-	2045	$2,906,940
				10" PVC	50	14	$69	6312	LF	Replace	2041	-	2045	$435,528
				12" PVC	50	14	$78	7554	LF	Replace	2041	-	2045	$589,212
				16" DI	50	14	$89	12610	LF	Replace	2041	-	2045	$1,122,290
			Fire Hydrants											
				Fire Hydrants	10	70	$500	133	EA	Repair	2001	-	2005	$66,500
				Fire Hydrants	30	23	$2,100	133	EA	Replace	2021	-	2025	$279,300
1996	-	1999	Pipeline											
				6" PVC	50	4	$60	8090	LF	Replace	2046	-	2049	$485,400
				8" PVC	50	4	$60	21100	LF	Replace	2046	-	2049	$1,266,000
				10" PVC	50	4	69	2775	LF	Replace	2046	-	2049	$191,475
				12" PVC	50	4	78	7580	LF	Replace	2046	-	2049	$591,240
			Fire Hydrants											
				Fire Hydrants	10	20	$500	43	EA	Repair	2006	-	2009	$21,500
				Fire Hydrants	30	7	$2,100	43	EA	Replace	2026	-	2029	$90,300
1976	-	1980	Eureka											
				Pump & Motor	25	88	$40,000	1	LS	Replace	2001	-	2005	$40,000
				Electrical Equipment - Major Repair	15	-	$16,000	1	EA	Repair	-	-	-	$16,000

Table 4-1
Town Water System
Schedule and Cost Estimate

(1) Year Installed	(2) Facility	(3) Component	(4) Note 1 Expected Life	(5) Note 2 % Life Gone	(6) Note 3 Present Worth Unit Cost ($)	(7) Quantity per Unit	(8)	(9) Action	(10) Note 4 Replacement Date	(11) Note 5 Amount ($)
		Electrical Equipment - Replacement	25	88	$20,000	1	EA	Replace	2001 - 2005	$20,000
		Well Rehabilitation	15	-	$30,000	1	EA	Repair	-	$30,000
		Building Replacement	30	73	$5,000	1	EA	Repair	2006 - 2010	$5,000
		Well Replacement	40	55	$145,000	1	EA	Replace	2016 - 2020	$145,000
1991 - 1995	Via Concha									
		Pump & Motor	25	28	$40,000	1	LS	Replace	2016 - 2020	$40,000
		Electrical Equipment - Major Repair	15	47	$15,000	1	EA	Repair	2006 - 2010	$15,000
		Electrical Equipment - Replacement	25	28	$20,000	1	EA	Replace	2016 - 2020	$20,000
		Well Rehabilitation	15	47	$30,000	1	EA	Repair	2006 - 2010	$30,000
		Building Replacement	30	23	$5,000	1	EA	Repair	2021 - 2025	$5,000
		Well Replacement	40	18	$100,000	1	EA	Replace	2031 - 2035	$100,000
1981 - 1985	Bevington #2									
		Pump & Motor	25	68	$35,000	1	LS	Replace	2006 - 2010	$35,000
		Electrical Equipment - Major Repair	15	-	$15,000	1	EA	Repair	1996 - 2000	$15,000

Table 4-1
Town Water System
Schedule and Cost Estimate

(1) Year Installed	(2) Facility	(3) Component	(4) Note 1 Expected Life	(5) Note 2 % Life Gone	(6) Note 3 Present Worth Unit Cost ($)	(7) Quantity per Unit	(8)	(9) Action	(10) Note 4 Replacement Date	(11) Note 5 Amount ($)
		Electrical Equipment - Replacement	25	68	$20,000	1	EA	Replace	2006 - 2010	$20,000
		Well Rehabilitation	15	-	$30,000	1	EA	Repair	1996 - 2000	$30,000
		Building Replacement	30	57	$5,000	1	EA	Repair	2011 - 2015	$5,000
		Well Replacement	40	43	$85,000	1	EA	Replace	2021 - 2025	$85,000
1981 - 1985	Olympic #2									
		Pump & Motor	25	72	$25,000	1	LS	Replace	2006 - 2010	$25,000
		Electrical Equipment - Major Repair	15	-	$15,000	1	EA	Repair	1996 - 2000	$15,000
		Electrical Equipment - Replacement	25	68	$20,000	1	EA	Replace	2006 - 2010	$20,000
		Well Rehabilitation	15	-	$30,000	1	EA	Repair	1996 - 2000	$30,000
		Well Replacement	40	43	$5,000	1	EA	Replace	2021 - 2025	$5,000
1986 - 1990	Omiya #2									
		Pump & Motor	8	-	$25,000	1	LS	Replace	- - -	$25,000
		Electrical Equipment - Major Repair	15	80	$15,000	1	EA	Repair	2001 - 2005	$15,000
		Electrical Equipment - Replacement	25	48	$2,000	1	EA	Replace	2011 - 2015	$2,000
		Well Rehabilitation	15	80	$30,000	1	EA	Repair	2001 - 2005	$30,000
		Well Replacement	40	30	$75,000	1	EA	Replace	2026 - 2030	$75,000

Table 4-1
Town Water System
Schedule and Cost Estimate

(1) Year Installed			(2) Facility	(3) Component	(4) Note 1 Expected Life		(5) Note 2 % Life Gone	(6) Note 3 Present Worth Unit Cost ($)	(7) Quantity per Unit	(8)	(9) Action	(10) Note 4 Replacement Date			(11) Note 5 Amount ($)
1986	-	1990	Savage #2	Savage #2 has been put on standby status therefore replacement and repair costs will not be included.											
				Pump & Motor	8		-	$25,000	1	LS	Replace	-	-	-	
				Electrical Equipment - Major Repair	15		80	$15,000	1	EA	Repair	2001	-	2005	
				Electrical Equipment - Replacement	25		48	$20,000	1	EA	Replace	2011	-	2015	
				Well Rehabilitation	15		80	$30,000	1	EA	Repair	2001	-	2005	
				Well Replacement	40		30	$50,000	1	EA	Replace	2026	-	2030	
1981	-	1985	Church #2												
				Pump & Motor	8		-	$25,000	1	LS	Replace	-	-	-	$25,000
				Electrical Equipment - Major Repair	15		-	$15,000	1	EA	Repair	1996	-	2000	$15,000
				Electrical Equipment - Replacement	25		68	$20,000	1	EA	Replace	2006	-	2010	$20,000
				Well Rehabilitation	15		-	$30,000	1	EA	Repair	1996	-	2000	$30,000
				Well Replacement	40		43	$35,000	1	EA	Replace	2021	-	2025	$35,000
1996	-	2000	Sun Dale												
				Pump & Motor	25		8	$40,000	1	LS	Replace	2021	-	2025	$40,000
				Electrical Equipment - Major Repair	15		13	$15,000	1	EA	Repair	2011	-	2015	$15,000

Table 4-1
Town Water System
Schedule and Cost Estimate

(1) Year Installed	(2) Facility	(3) Component	(4) Note 1 Expected Life	(5) Note 2 % Life Gone	(6) Note 3 Present Worth Unit Cost ($)	(7) Quantity per Unit	(8)	(9) Action	(10) Note 4 Replacement Date	(11) Note 5 Amount ($)
		Electrical Equipment - Replacement	25	8	$20,000	1	EA	Replace	2021 - 2025	$20,000
		Well Rehabilitation	15	13	$30,000	1	EA	Repair	2011 - 2015	$30,000
		Building Replacement	30	7	$5,000	1	EA	Repair	2026 - 2030	$5,000
		Well Replacement	40	5	$145,000	1	EA	Replace	2036 - 2040	$145,000
1966 - 1970	Twin Tanks #1									
		Reservoir Coating - Exterior	Every years	-	$22,000	0.5	MG	Repair	1976 - 1980	$11,000
			10	-	$22,000	0.5	MG	Repair	1986 - 1990	$11,000
				-	$22,000	0.5	MG	Repair	1996 - 2000	$11,000
		Reservoir Coating - Interior	Every years 15	-	$32,000	0.5	MG	Repair	1981 - 1985	$16,000
				-	$32,000	0.5	MG	Repair	1996 - 2000	$16,000
		Cathodic Protection	15	-	$25,000	1	EA	Replace	- - -	$25,000
		Earthquake Protection	40	80	$35,000	1	EA	Replace	2006 - 2010	$35,000
		Replacement	50	64	$500,000	0.5	MG	Replace	2016 - 2020	$250,000
1976 - 1980	Twin Tanks #2									
		Reservoir Coating - Exterior	Every years 10	-	$22,000	0.5	MG	Repair	1986 - 1990	$11,000
				-	$22,000	0.5	MG	Repair	1996 - 2000	$11,000
				-	$22,000	0.5	MG	Repair	2006 - 2010	$11,000
		Reservoir Coating - Interior	Every years 15	-	$32,000	0.5	MG	Repair	1991 - 1995	$16,000
					$32,000	0.5	MG	Repair	2006 - 2010	$16,000
		Cathodic Protection	15	-	$25,000	1	EA	Replace	- - -	$25,000

Table 4-1
Town Water System
Schedule and Cost Estimate

(1) Year Installed	(2) Facility	(3) Component	(4) Note 1 Expected Life	(5) Note 2 % Life Gone	(6) Note 3 Present Worth Unit Cost ($)	(7) Quantity per Unit	(8)	(9) Action	(10) Note 4 Replacement Date	(11) Note 5 Amount ($)
		Earthquake Protection	40	55	$35,000	1	EA	Replace	2016 - 2020	$35,000
		Replacement	50	44	$500,000	0.5	MG	Replace	2026 - 2030	$250,000
1991 - 1995	Standpipe									
		Reservoir Coating - Exterior	Every years	-	$22,000	1	MG	Repair	2001 - 2005	$22,000
			10	-	$22,000	1	MG	Repair	2011 - 2015	$22,000
				-	$22,000	1	MG	Repair	2021 - 2025	$22,000
		Reservoir Coating - Interior	Every years	15 47	$32,000	1	MG	Repair	2006 - 2010	$32,000
				-	$32,000	1	MG	Repair	2021 - 2025	$32,000
		Cathodic Protection	15	47	$25,000	1	EA	Replace	2006 - 2010	$25,000
		Earthquake Protection	40	18	$35,000	1	EA	Replace	2031 - 2035	$35,000
		Replacement	50	14	$500,000	1	MG	Replace	2041 - 2045	$500,000
1996 - 2000	Reservoir #5									
		Reservoir Coating - Exterior	Every years	10 20	$22,000	1	MG	Replace	2006 - 2010	$22,000
				0	$22,000	1	MG	Replace	2016 - 2020	$22,000
				0	$22,000	1	MG	Repair	2026 - 2030	$22,000
		Reservoir Coating - Interior	Every years	15 13					2011 - 2015	$32,000
				0	$32,000	1	MG	Repair	2026 - 2030	$32,000
		Cathodic Protection	15	13	$25,000	1	EA	Replace	2011 - 2015	$25,000
		Earthquake Protection	40	5	$35,000	1	EA	Replace	2036 - 2040	$35,000
		Replacement	50	4	$500,000	1	MG	Replace	2046 - 2050	$500,000

Table 4-1
Town Water System
Schedule and Cost Estimate

(1)			(2)	(3)	(4) Note 1		(5) Note 2	(6) Note 3	(7)	(8)	(9)	(10) Note 4			(11) Note 5
Year Installed			**Facility**	**Component**	**Expected Life**		**% Life Gone**	**Present Worth Unit Cost ($)**	**Quantity per Unit**		**Action**	**Replacement Date**			**Amount ($)**
1996	-	2000	SCADA System												
				Upgrades	4		-	$50,000	1	EA	Repair	2000	-	2004	$50,000
				Replacement	10		-	$150,000	1	EA	Replace	2006	-	2010	$150,000
														Grand total	$26,408,418

Notes:

1 From Table 3-1

2 (Year 2000 - Mid point of Column 1) divided by Column 4 expressed as a percentage

3 From Table 3-1

4 Column 1 plus Column 4

5 Column 6 multiplied by Column 7

Table 4-2
Black Lake Water System
Schedule and Cost Estimate

(1) Year Installed	(2) Facility	(3) Component	(4) Note 1 Expected Life	(5) Note 2 % Life Gone	(6) Note 3 Present Worth Unit Cost ($)	(7) (8) Quantity per Unit	(9) Action	(10) Note 4 Replacement Date	(11) Note 5 Amount ($)
1981 - 1985	Pipeline								
		6" AC	40	43	$60	105 LF	Replace	2021 - 2025	$6,300
		8" AC	40	43	$60	8,366 LF	Replace	2021 - 2025	$501,960
	Fire Hydrants								
		Fire Hydrants	10	-	$500	19 EA	Repair	1991 - 1995	$9,500
		Fire Hydrants	30	57	$2,100	19 EA	Replace	2011 - 2015	$39,900
1986 - 1990	Pipeline								
		6" PVC	50	24	$60	1,658 LF	Replace	2036 - 2040	$99,480
		8" AC	50	24	$60	3,300 LF	Replace	2036 - 2040	$198,000
		8" PVC	50	30	$60	10,630 LF	Replace	2036 - 2040	$637,800
	Fire Hydrants								
		Fire Hydrants	10	-	$500	25 EA	Repair	1996 - 2000	$12,500
		Fire Hydrants	30	40	$2,100	25 EA	Replace	2016 - 2020	$52,500
1991 - 1995	Pipeline								
		6" PVC	50	14	$60	1,911 LF	Replace	2041 - 2045	$114,660
		8" PVC	50	14	$60	4,226 LF	Replace	2041 - 2045	$253,560
	Fire Hydrants								
		Fire Hydrants	10	70	$500	10 EA	Repair	2001 - 2005	$5,000
		Fire Hydrants	30	23	$2,100	10 EA	Replace	2021 - 2025	$21,000
1996 - 1999	Pipeline								
		6" PVC	50	4	$60	1,122 LF	Replace	2046 - 2049	$67,320
		8" PVC	50	4	$60	11,657 LF	Replace	2046 - 2049	$699,420
	Fire Hydrants								
		Fire Hydrants	10	20	$500	17 EA	Repair	2006 - 2009	$8,500
		Fire Hydrants	30	7	$2,100	17 EA	Replace	2026 - 2029	$35,700
	Water Services	Schedule 40 PVC			$1,200	300 EA	Replace	1996 - 2000	$360,000
1981 - 1985	Well - Black Lake #3								
		Pump & Motor	25	68	$30,000	1 LS	Replace	2006 - 2010	$30,000
		Electrical Equipment - Major Repair	15	-	$15,000	1 EA	Repair	1996 - 2000	$15,000

Table 4-2
Black Lake Water System
Schedule and Cost Estimate

(1) Year Installed	(2) Facility	(3) Component	(4) Note 1 Expected Life	(5) Note 2 % Life Gone	(6) Note 3 Present Worth Unit Cost ($)	(7) Quantity per Unit	(8)	(9) Action	(10) Note 4 Replacement Date	(11) Note 5 Amount ($)
		Electrical Equipment - Replacement	25	68	$20,000	1	EA	Replace	2006 - 2010	$20,000
		Well Rehabilitation	15	-	$30,000	1	EA	Repair	1996 - 2000	$30,000
		Well Replacement	40	43	$85,000	1	EA	Replace	2021 - 2025	$85,000
1986 - 1990	Well - Black Lake #4									
		Pump & Motor	8		$30,000	1	LS	Replace	-	$30,000
		Electrical Equipment - Major Repair	15	80	$15,000	1	EA	Repair	2001 - 2005	$15,000
		Electrical Equipment - Replacement	25	48	$20,000	1	EA	Replace	2011 - 2015	$20,000
		Well Rehabilitation	15	80	$30,000	1	EA	Repair	2001 - 2005	$30,000
		Well Replacement	40	30	$83,000	1	EA	Replace	2026 - 2030	$83,000
1981 - 1985	Hydropneumatic system		40	55	$65,000	1	EA	Replace	2021 - 2025	$65,000
1981 - 1985	Reservoir #1 (Black Lake)									
		Reservoir Coating - Exterior	Every 10 years	-	$22,000	0.4	MG	Repair	- - -	$8,800
				-	$22,000	0.4	MG	Repair	2001 - 2005	$8,800
				-	$22,000	0.4	MG	Repair	2011 - 2015	$8,800
		Reservoir Coating - Interior	Every 15 years		$32,000	0.4	MG	Repair	1996 - 2000	$12,800
				-	$32,000	0.4	MG	Repair	2011 - 2015	$12,800

Table 4-2
Black Lake Water System
Schedule and Cost Estimate

(1) Year Installed	(2) Facility	(3) Component	(4) Note 1 Expected Life	(5) Note 2 % Life Gone	(6) Note 3 Present Worth Unit Cost ($)	(7) Quantity per Unit	(8)	(9) Action	(10) Note 4 Replacement Date	(11) Note 5 Amount ($)
		Cathodic Protection	15	-	$25,000	1	EA	Replace	1996 - 2000	$25,000
		Earthquake Protection	40	43	$35,000	1	EA	Replace	2021 - 2025	$35,000
		Replacement	50	34	$500,000	0.4	MG	Replace	2031 - 2035	$200,000
									Grand total	$3,858,100

Notes:

1 From Table 3-1

2 (Year 2000 - Mid point of Column 1) divided by Column 4 expressed as a percentage

3 From Table 3-1

4 Column 1 plus Column 4

5 Column 6 multiplied by Column 7

Table 4-3
Town Wastewater System
Schedule and Cost Estimate

(1) Year Installed			(2) Facility	(3) Component	(4) Note 1 Expected Life	(5) Note 2 % Life Gone	(6) Note 3 Present Worth Unit Cost ($)	(7) Quantity per Unit	(8)	(9) Action	(10) Note 4 Replacement Date			(11) Note 5 Amount ($)
1971	-	1975	Pipeline											
				6" VCP	50	54	$54	5,410	LF	Replace	2021	-	2025	$292,140
				8" VCP	50	54	$66	4,536	LF	Replace	2021	-	2025	$299,376
			Force Mains											
				4" PVC	50	54	$54	2,275	LF	Replace	2021	-	2025	$122,850
			Man Holes											
				Man Holes	30	90	$500	38	EA	Repair	2001	-	2005	$19,000
				Man Holes	50	54	$2,000	38	EA	Replace	2021	-	2025	$76,000
1976	-	1980	Pipeline											
				8" VCP	50	44	$66	1,975	LF	Replace	2026	-	2030	$130,350
			Man Holes											
				Man Holes	30	73	$500	8	EA	Repair	2006	-	2010	$4,000
				Man Holes	50	44	$2,000	8	EA	Replace	2026	-	2030	$16,000
1981	-	1985	Pipeline											
				6" VCP	50	34	$54	900	LF	Replace	2031	-	2035	$48,600
				8" VCP	50	34	$66	277	LF	Replace	2031	-	2035	$18,282
				8" PVC	50	34	$66	47,979	LF	Replace	2031	-	2035	$3,166,614
				10" PVC	50	34	$69	5,525	LF	Replace	2031	-	2035	$381,225
				12" PVC	50	34	$78	8,495	LF	Replace	2031	-	2035	$662,610
			Force Mains											
				4" PVC	50	34	$54	2,426	LF	Replace	2031	-	2035	$131,004
				6" PVC	50	34	$56	7,009	LF	Replace	2031	-	2035	$392,504
			Man Holes											
				Man Holes	30	57	$500	19	EA	Repair	2011	-	2015	$9,500
				Man Holes	50	34	$2,000	19	EA	Replace	2031	-	2035	$38,000
1986	-	1990	Pipeline											
				6" PVC	50	24	$54	645	LF	Replace	2036	-	2040	$34,830
				8" PVC	50	24	$66	12,623	LF	Replace	2036	-	2040	$833,118
			Force Mains											
				4" PVC	50	24	$54	3,800	LF	Replace	2036	-	2040	$205,200

Table 4-3
Town Wastewater System
Schedule and Cost Estimate

(1) Year Installed			(2) Facility	(3) Component	(4) Note 1 Expected Life	(5) Note 2 % Life Gone	(6) Note 3 Present Worth Unit Cost ($)	(7) Quantity per Unit	(8)	(9) Action	(10) Note 4 Replacement Date			(11) Note 5 Amount ($)
				6" PVC	50	24	$56	900	LF	Replace	2036	-	2040	$50,400
			Man Holes											
				Man Holes	30	40	$500	54	EA	Repair	2016	-	2020	$27,000
				Man Holes	50	24	$2,000	54	EA	Replace	2036	-	2040	$108,000
1991	-	1995	Pipeline											
				6" PVC	50	14	$54	375	LF	Replace	2041	-	2045	$20,250
				8" PVC	50	14	$66	17,229	LF	Replace	2041	-	2045	$1,137,114
			Man Holes											
				Man Holes	30	23	$500	61	EA	Repair	2021	-	2025	$30,500
				Man Holes	50	14	$2,000	61	EA	Replace	2041	-	2045	$122,000
1996	-	1999	Pipeline											
				6" PVC	50	4	$54	60	LF	Replace	2046	-	2049	$3,240
				8" PVC	50	4	$66	21,295	LF	Replace	2046	-	2049	$1,405,470
			Force Mains											
				6" PVC	50	4	$56	1,200	LF	Replace	2046	-	2049	$67,200
				4" PVC	50	4	$54	5,800	LF	Replace	2046	-	2049	$313,200
			Man Holes											
				Man Holes	30	15	$500	72	EA	Repair	2026	-	2029	$36,000
				Man Holes	50	4	$2,000	72	EA	Replace	2046	-	2049	$144,000
1976	-	1980	Lift Station - Juniper											
				Pumps & Motors	15	-	$6,000	2	EA	Replace	1991	-	1995	$12,000
				Electrical Equipment-Minor Repair	15	-	$15,000	1	EA	Repair	1991	-	1995	$15,000
				Electrical Equipment-Major Repair	15	68	$20,000	1	EA	Repair	1991	-	1995	$20,000
				Vaults	50	68	$15,000	1	EA	Replace	2026	-	2030	$15,000

Table 4-3
Town Wastewater System
Schedule and Cost Estimate

(1) Year Installed			(2) Facility	(3) Component	(4) Note 1 Expected Life	(5) Note 2 % Life Gone	(6) Note 3 Present Worth Unit Cost ($)	(7) Quantity per Unit	(8)	(9) Action	(10) Note 4 Replacement Date			(11) Note 5 Amount ($)
1981	-	1985	Lift Station - Influent (Main)											
				Pumps & Motors	15	-	$20,000	2	EA	Replace	1996	-	2000	$40,000
				Electrical Equipment-Minor Repair	15	-	$15,000	1	EA	Repair	1996	-	2000	$15,000
				Electrical Equipment-Major Repair	15	68	$20,000	1	EA	Repair	1996	-	2000	$20,000
				Vaults	25	68	$15,000	1	EA	Replace	2006	-	2010	$15,000
1981	-	1985	Lift Station - Tefft											
				Pumps & Motors	15	-	$12,000	2	EA	Replace	1996	-	2000	$24,000
				Electrical Equipment-Minor Repair	15	-	$15,000	1	EA	Repair	1996	-	2000	$15,000
				Electrical Equipment-Major Repair	15	68	$20,000	1	EA	Repair	1996	-	2000	$20,000
				Vaults	25	68	$15,000	1	EA	Replace	2006	-	2010	$15,000
1981	-	1985	Lift Station - Nipomo Palms											
				Pumps & Motors	15	-	$7,500	2	EA	Replace	1996	-	2000	$15,000
				Electrical Equipment-Minor Repair	15	-	$15,000	1	EA	Repair	1996	-	2000	$15,000
				Electrical Equipment-Major Repair	15	68	$20,000	1	EA	Repair	1996	-	2000	$20,000
				Vaults	25	68	$15,000	1	EA	Replace	2006	-	2010	$15,000

Table 4-3
Town Wastewater System
Schedule and Cost Estimate

(1) Year Installed	(2) Facility	(3) Component	(4) Note 1 Expected Life	(5) Note 2 % Life Gone	(6) Note 3 Present Worth Unit Cost ($)	(7) Quantity per Unit	(8)	(9) Action	(10) Note 4 Replacement Date	(11) Note 5 Amount ($)
1981 - 1985	Lift Station - N. Oak Glen									
		Pumps & Motors	15	-	$7,500	2	EA	Replace	1996 - 2000	$15,000
		Electrical Equipment-Minor Repair	15	-	$15,000	1	EA	Repair	1996 - 2000	$15,000
		Electrical Equipment-Major Repair	15	68	$20,000	1	EA	Repair	1996 - 2000	$20,000
		Vaults	25	68	$15,000	1	EA	Replace	2006 - 2010	$15,000
1986 - 1990	Lift Station - Braken/Primrose									
		Pumps & Motors	15	80	$5,500	2	EA	Replace	2001 - 2005	$11,000
		Electrical Equipment-Minor Repair	15	80	$15,000	1	EA	Repair	2001 - 2005	$15,000
		Electrical Equipment-Major Repair	15	48	$20,000	1	EA	Repair	2001 - 2005	$20,000
		Vaults	25	48	$15,000	1	EA	Replace	2011 - 2015	$15,000
1986 - 1990	Lift Station - La Mirada									
		Pumps & Motors	15	80	$6,500	2	EA	Replace	2001 - 2005	$13,000
		Electrical Equipment-Minor Repair	15	80	$15,000	1	EA	Repair	2001 - 2005	$15,000
		Electrical Equipment-Major Repair	15	48	$20,000	1	EA	Repair	2001 - 2005	$20,000
		Vaults	25	48	$15,000	1	EA	Replace	2011 - 2015	$15,000

Table 4-3
Town Wastewater System
Schedule and Cost Estimate

(1) Year Installed	(2) Facility	(3) Component	(4) Note 1 Expected Life	(5) Note 2 % Life Gone	(6) Note 3 Present Worth Unit Cost ($)	(7) Quantity per Unit	(8)	(9) Action	(10) Note 4 Replacement Date	(11) Note 5 Amount ($)
1986 - 1990	Lift Station - Gardenia									
		Pumps & Motors	15	80	$5,500	2	EA	Replace	2001 - 2005	$11,000
		Electrical Equipment-Minor Repair	15	80	$15,000	1	EA	Repair	2001 - 2005	$15,000
		Electrical Equipment-Major Repair	0	48	$20,000	1	EA	Repair	1986 - 1990	$20,000
		Vaults	50	48	$15,000	1	EA	Replace	2036 - 2040	$15,000
1996 - 1999	Lift Station - Hazel Lane									
		Pumps & Motors	15	20	$5,500	2	EA	Replace	2011 - 2014	$11,000
		Electrical Equipment-Minor Repair	15	20	$15,000	1	EA	Repair	2011 - 2014	$15,000
		Electrical Equipment-Major Repair	15	20	$20,000	1	EA	Repair	2011 - 2014	$20,000
		Vaults	25	48	$15,000	1	EA	Replace	2021 - 2024	$15,000
1996 - 1999	Nipomo CSD Wastewater Treatment Plant									
		Pond Liners @ Aeration lagoons	15	20	$0.6	110,700	SQYD	Replace	2011 - 2014	$ 66,420
		Grinders	15	20	$8,000	2	EA	Replace	2011 - 2014	$ 16,000
		Pumps/Motors	15	20	$7,500	2	EA	Replace	2011 - 2014	$ 15,000
		Blowers	20	15	$30,000	2	EA	Replace	2016 - 2020	$ 60,000
		Composite Sampler	12	25	$5,000	1	EA	Replace	2008 - 2012	$ 5,000
									Grand Total	$11,109,997

Notes:
1 From Table 3-1
2 (Year 2000 - Mid point of Column 1) divided by Column 4 expressed as a percentage
3 From Table 3-1
4 Column 1 plus Column 4
5 Column 6 multiplied by Column 7

Table 4-4
Black Lake Wastewater System
Schedule and Cost Estimate

(1) Year Installed	(2) Facility	(3) Component	(4) Note 1 Expected Life	(5) Note 2 % Life Gone	(6) Note 3 Present Worth Unit Cost ($)	(7) Quantity per Unit	(8)	(9) Action	(10) Note 4 Replacement Date	(11) Note 5 Amount ($)
1981 - 1985	Pipeline									
		8" PVC	50	34	$66	4,105	LF	Replace	2031 - 2035	$270,930
	Force Mains									
		12" PVC	50	34	$70	2,431	LF	Replace	2031 - 2035	$170,170
	Man Holes									
		Man Holes	30	57	$500	24	EA	Repair	2011 - 2015	$12,000
		Man Holes	50	34	$2,000	24	EA	Replace	2031 - 2035	$48,000
1986 - 1990	Pipeline									
		6" PVC	50	24	$54	2,866	LF	Replace	2036 - 2040	$154,764
		8" PVC	50	24	$66	9,840	LF	Replace	2036 - 2040	$649,440
	Force Mains									
		4" PVC	50	24	$54	1,284	LF	Replace	2036 - 2040	$69,336
		6" PVC	50	24	$56	510	LF	Replace	2036 - 2040	$28,560
	Man Holes									
		Man Holes	30	40	$500	39	EA	Repair	2016 - 2020	$19,500
		Man Holes	50	24	$2,000	39	EA	Replace	2036 - 2040	$78,000
1991 - 1995	Pipeline									
		8" PVC	50	14	$66	5,717	LF	Replace	2041 - 2045	$377,322
	Man Holes									
		Man Holes	30	23	$500	16	EA	Repair	2021 - 2025	$8,000
		Man Holes	50	14	$2,000	16	EA	Replace	2041 - 2045	$32,000
1996 - 1999	Pipeline									
		8" PVC	50	4	$66	11,368	LF	Replace	2046 - 2049	$750,288
	Man Holes									
		Man Holes	30	7	$500	39	EA	Repair	2026 - 2029	$19,500
		Man Holes	50	4	$2,000	39	EA	Replace	2046 - 2049	$78,000
1991 - 1995	Lift Station - Woodgreen									
		Pumps & Motors	15	47	$6,000	2	EA	Replace	2006 - 2010	$12,000

Table 4-4
Black Lake Wastewater System
Schedule and Cost Estimate

(1)	(2)	(3)	(4) Note 1	(5) Note 2	(6) Note 3	(7)	(8)	(9)	(10) Note 4			(11) Note 5
Year Installed	**Facility**	**Component**	**Expected Life**	**% Life Gone**	**Present Worth Unit Cost ($)**	**Quantity per Unit**		**Action**	**Replacement Date**			**Amount ($)**
		Electrical Equipment-Minor Repair	15	47	$15,000	1	EA	Repair	2006	-	2010	$15,000
		Electrical Equipment-Major Repair	25	28	$20,000	1	EA	Repair	2016	-	2020	$20,000
		Vaults	25	28	$15,000	1	EA	Replace	2016	-	2020	$15,000
1986 - 1990	Lift Station - The Oaks											
		Pumps & Motors	15	-	$5,000	2	EA	Replace				$10,000
		Electrical Equipment-Minor Repair	15	80	$15,000	1	EA	Repair	2001	-	2005	$15,000
		Electrical Equipment-Major Repair	25	48	$20,000	1	EA	Repair	2011	-	2015	$20,000
		Vaults	25	48	$15,000	1	EA	Replace	2011	-	2015	$15,000
	Black Lake Wastewater Treatment Plant											
		Pond Liners @ Aeration lagoons			$1	77,904	SQYD	Replace				$46,742
		Grinders	15		$8,000	1	EA	Replace		-		$8,000
		Pumps/Motors	15		$7,500	2	EA	Replace		-		$15,000
		Blowers	20		$30,000	2	EA	Replace		-		$60,000
		Chlorination	12		$20,000	1	EA	Replace		-		$20,000
											Grand Total	$3,037,552

Notes:

1 From Table 3-1

2 (Year 2000 - Mid point of Column 1) divided by Column 4 expressed as a percentage

3 From Table 3-1

4 Column 1 plus Column 4

5 Column 6 multiplied by Column 7

4.6 Discussion/Summary

Table 4-5 presents a summary of the costs associated with the replacement and repair of the two water and wastewater systems.

Table 4-5
Summary Replacement and Repair Costs

	Water Town		Water Black Lake		Wastewater Town		Wastewater Black Lake	
Period	Replacement	Repair	Replacement	Repair	Replacement	Repair	Replacement	Repair
1996-2000	$ 280,600.00	$ 424,500.00	$ 415,000.00	$ 88,600.00	$ 106,000.00	$ 195,000.00	$ 30,000.00	
2001-2005	$ 60,000.00	$ 225,500.00		$ 58,800.00	$ 35,000.00	$ 104,000.00	$ 69,742.40	$ 15,000.00
2006-2010	$ 5,944,341.00	$ 152,500.00	$ 50,000.00	$ 8,500.00	$ 60,000.00	$ 4,000.00	$ 72,000.00	$ 15,000.00
2011-2015	$ 998,700.00	$ 104,000.00	$ 59,900.00	$ 21,600.00	$ 143,420.00	$ 44,500.00	$ 15,000.00	$ 32,000.00
2016-2020	$ 2,734,390.00	$ 22,000.00	$ 52,500.00		$ 60,000.00	$ 27,000.00	$ 15,000.00	$ 39,500.00
2021-2025	$ 1,651,580.00	$ 59,000.00	$ 714,260.00		$ 805,366.00	$ 30,500.00		$ 8,000.00
2026-2030	$ 688,180.00	$ 59,000.00	$ 118,700.00		$ 161,350.00	$ 36,000.00		$ 19,500.00
2031-2035	$ 916,482.00		$ 200,000.00		$ 4,838,839.00		$ 489,100.00	
2036-2040	$ 2,737,260.00		$ 935,280.00		$ 1,246,548.00		$ 980,100.00	
2041-2045	$ 6,316,270.00		$ 368,220.00		$ 1,279,364.00		$ 409,322.00	
2046-2050	$ 3,034,115.00		$ 766,740.00		$ 1,933,110.00		$ 828,288.00	
Total	$ 25,361,918.00	$ 1,046,500.00	$ 3,680,600.00	$ 177,500.00	$ 10,668,997.00	$ 441,000.00	$ 2,908,552.40	$ 129,000.00

5.0 Replacement Fund/Funding Analysis

5.1 General

This section discusses how to fund the future system replacements along with analysis of the impacts on customer rates.

5.2 Existing Customer Base/Rates/Funds

5.2.1 Water Systems

The table below summarizes aspects of the existing customer base:

Table 5-1
Water System
Aspects of Existing Customer Base (Summer 1999)

Aspect	Town System	Black Lake System
No. total Accounts	2,615	473
No. meters 1" or less	2,573	442
Service charge bi-monthly 1" or less meter	$17.50	$13.00
Commodity charge 1st tier $/hcf	$0.80	$0.75
Commodity charge 2nd tier $/hcf	$1.15	$1.15
Capacity connection's charge[1]	$3,180.00	$0[2]
Current replacement funds	$412,161[3]	$45,337[3]
Replacement funds contributed per year	$103,100	$10,000

[1] For up to 1 inch
[2] No charge because system is built out by developers and there is no growth expected.
[3] As of June 30, 1999

5.2.2 Wastewater System

The table below summarizes aspects of the existing customer base:

Table 5-2
Wastewater System
Aspects of Existing Customer Base (Summer 1999)

Aspect	Town System	Black Lake System
No. total Accounts	1,650	438
No. single family accounts	1,516[1]	437[2]
Bimonthly service charge single family	$36.00	$43.00
Capacity charge[3]	$2,370.00	0[4]
Current replacement funds	$495,617[5]	$28,315[5]
Replacement funds contributed per year	$93,750	$6,510

[1] Includes 218 multi-units (apartments and condos)
[2] Includes 65 condos
[3] Per edu (equivalent dwelling unit)
[4] Zero because system is built out
5 Balance as of June 30, 1999

5.2.3 Water Sales

Table 5-3 summarizes the revenue per system for the past year and the anticipated revenue for the current year.

Table 5-3
Summary of Revenue Per System

Year	Town System		Black Lake System	
	Water	Sewer	Water	Sewer
1998-1999	$810,000	$400,000	$160,000	$99,500
1999-2000	$945,000	$444,000	$181,000	$127,700

5.3 Growth in Customer Base

In terms of the replacement of existing infrastructure, growth of the customer base can have an impact on the actual size of the replacement facilities if additional capacity is required. If that is the case, then there are two primary options:

a. Pay for the replacement of the existing capacity with replacement funds and charge new development for the increased capacity through connection fees/charges or similar mechanisms.

b. Pay for all of the replacement costs with replacement funds or other water operating fund revenues. New and old customers will be paying into the replacement fund.

With respect to these options, discussions with the District indicate a preference to pay for the replacement of the existing capacity with replacement funds and charge new development for the additional capacity through connection fees/charges or similar mechanisms.

The impact of growth will be to increase revenue into the water and wastewater accounts and hence revenue into the replacement/repair process. This is reasonable since growth will prompt new services which eventually will require replacements. Further growth will tax the capacities of certain systems, perhaps accelerating the need for replacement.

In terms of growth within the two service areas, the conclusions are:

Town System – Annexation will be limited. Growth in the town system will be due to infill.

Black Lake System – The community will reach buildout in the year 2000.

Conclusion – For purposes of this study there is no need to consider growth, since it is limited.

5.4 *Funding Options*

With respect to the replacement of infrastructure in water/wastewater systems, there are several options (and many variations since options can consist of combinations for the different infrastructure components). See **Table 5-4**.

Table 5-4
Funding Options

Option	Description	Comment
1.	No formal program. As needs arise, receive authorization from the Board for specific projects.	This is typical of many water and wastewater systems with the possible exception of major treatment plant equipment.
Pros:	Least cost for current customers	
Cons:	Eventually, District would have major expenses and be forced to impose major increases in rates for replacements or borrow.	
2.	Limited program to cover replacement of pumps/motors, major well rehabilitation, and replacement of items such as chemical feed units.	Many purveyors have some version of this program.
Pros:	Reduces or avoids year-to-year fluctuation in rates for routine replacements. Allows staff to implement projects quickly knowing there is a funding source.	
Cons:	Modest adjustment in rates, but generally very few customer concerns, particularly when properly explained.	
3.	Full Replacement Program	Required for government funded projects such as SRF.
Pros:	From a long term financing standpoint, this is the best with a secured revenue stream and build-up of funds to cover the inevitable replacement expenses.	
Cons:	Obvious cost impact to existing customers, some of which may not be spent by District for years to come.	
4.	A program someplace between limited (#2) and full (#3) which can be established at any supportable funding level.	
Pros:	Same as #3 except somewhat less. Easier than #3 to gain public support.	
Cons:	Not a full replacement program.	

At this point it is important to understand the cost and fees before assessing the various options.

Table 5-5
Source of Funding Options

Option		Comments
A.	A percentage of revenue, i.e. (x)% of the water and (x)% of the wastewater billing (the water and wastewater rates need not be the same).	The problem with this approach is on the water side. Since water sales (and hence revenue) fluctuates with the weather and amount of conservation, the revenue stream would also fluctuate. This may not be desirable.
B.	Fixed amounts similar to service charges apportioned between customers.	Advantage is steady income to replacement funds. Disadvantage is customers who use little water or generate little wastewater and whom therefore believe they should pay less than the fixed amount. The counter argument is most may have used the system for many years and therefore the payments are for services provided over the years.

Which program is preferred? Option A is probably easier to administer and the amounts collected will increase with the remaining portion of the rates. Providing those rate increases approximate the rate of inflation, the replacement funds will rise with inflation. This is preferable since no specific yearly action would be required of the Board.

5.5 *Required Levels of Funds*

The required levels of funding is a combination of the inventory of systems including year installed, the estimated average life of the various components and the replacement costs.

***Key Point on Analysis**: Replacement costs, although the expenditures will be in future years are expressed in terms of current dollars. The resultant rate adjustments are then in current dollars. So long as the rate of increase in construction costs more or less matches the return on investment (i.e.compound interest earned on the replacement funds in reserve), then for future projects, funding will be sufficient. If construction cost increases exceed the return on investment then the replacement funding rates can be adjusted.*

***Another Option**: A replacement fund can be phased in over a several year period so as to lessen the impact on customers.*

The funding levels shown on the exhibits are sufficient to establish average needs. Obviously some projects will be required earlier and even more would probably be required later. The object of a replacement program is to replace infrastructure before it fails. This requires discipline.

Tables 5-6 through **5-13** summarize the funds needed for system repair or replacement, by period, as identified in Tables 4-1 through 4-4.

Table 5-14 summarizes Tables 5-6 through 5-13 and presents three options for funding requirements. The first option A addresses funds required only for major repairs. Option B is funds only for replacement of existing facilities. The third option C is to fund both major repairs and replacements.

The first portion of **Table 5-15** projects the funds that will be available for each system as a result of the current District policy for funded replacements as shown in Tables 5-1 and 5-2. The last three tables of Table 5-15 looks at the three options and subtracts the projected available funds from each of the needed fund categories. It should be noted that the third option shows the funding excess/shortfall by period by system for the total anticipated needed funds for both major repairs and replacements.

5.6 Impact on Rates/Sensitivity Analyses

5.6.1 Impact on Rates

Table 5-16 is a summary of revenue needs expressed as a percent, %, of the 1999-2000 water sales and wastewater service charge revenue on a system by system and option by option basis.

A. The funding levels in five-year increments is a result of the installation dates for the facilities and the anticipated life when repairs and replacements are combined, only the Town Water System has revenue requirements which exhibit only moderated fluctuation in the five year increments. All of the others are dominated by the very large expenditures when pipeline replacements are indicated for a substantial portion of the pipeline.

B. Taken over a 40-year period, the increase above current rates (including the replacement surcharge imposed in 1995) is 20-33% for the four systems. This appears to be reasonable. However, as pointed out in "A" above, simply adjusting the rates to reflect the 40-year average requirements would have the following problems:

System	40-Year Average Increase	**Comments**
Town Water	33%	There are higher needs for the next 10years. Therefore, either the projects should be delayed or rates raised higher or some form of bonding or similar instrument be used for accumulation of sufficient funds in early years.
Town Wastewater	20%	Almost all of the increased funding would be required in 2031-2040. Supposing a 20% increase at this time will create a fund which will grow with very little use. An option is to not impose the increase above current levels until perhaps 2015. At that time impose an increase which may exceed 20%.
Black Lake Water	30%	There is a large 1-year expenditure, which certainly could spread over the following few years, bringing down the increase necessary to fund the 1999 expenditure.
Black Lake Wastewater	29%	Like the town wastewater system the major expenditures are after 2031. It would be recommended that there be a smaller increase to cover the next 10 years and then a larger increase a few years in advance of the larger expenditures between 2031 and 2040.

C. In considering the above the following is recommended (Table 5-17)

Table 5-6
Town Water System, Funds Needed for Repair
(Current Dollars)

Year	1996-2000	2001-2005	2006-2010	2011-2015	2016-2020	2021-2025	2026-2030	Total to be collected per year
2000	$ 424,500	$ 37,583	$ 13,864	$ 6,500	$ 1,048	$ 2,269	$ 1,903	$ 487,667
2001		$ 37,583	$ 13,864	$ 6,500	$ 1,048	$ 2,269	$ 1,903	$ 63,167
2002		$ 37,583	$ 13,864	$ 6,500	$ 1,048	$ 2,269	$ 1,903	$ 63,167
2003		$ 37,583	$ 13,864	$ 6,500	$ 1,048	$ 2,269	$ 1,903	$ 63,167
2004		$ 37,583	$ 13,864	$ 6,500	$ 1,048	$ 2,269	$ 1,903	$ 63,167
2005		$ 37,583	$ 13,864	$ 6,500	$ 1,048	$ 2,269	$ 1,903	$ 63,167
2006			$ 13,864	$ 6,500	$ 1,048	$ 2,269	$ 1,903	$ 25,584
2007			$ 13,864	$ 6,500	$ 1,048	$ 2,269	$ 1,903	$ 25,584
2008			$ 13,864	$ 6,500	$ 1,048	$ 2,269	$ 1,903	$ 25,584
2009			$ 13,864	$ 6,500	$ 1,048	$ 2,269	$ 1,903	$ 25,584
2010			$ 13,864	$ 6,500	$ 1,048	$ 2,269	$ 1,903	$ 25,584
2011				$ 6,500	$ 1,048	$ 2,269	$ 1,903	$ 11,720
2012				$ 6,500	$ 1,048	$ 2,269	$ 1,903	$ 11,720
2013				$ 6,500	$ 1,048	$ 2,269	$ 1,903	$ 11,720
2014				$ 6,500	$ 1,048	$ 2,269	$ 1,903	$ 11,720
2015				$ 6,500	$ 1,048	$ 2,269	$ 1,903	$ 11,720
2016					$ 1,048	$ 2,269	$ 1,903	$ 5,220
2017					$ 1,048	$ 2,269	$ 1,903	$ 5,220
2018					$ 1,048	$ 2,269	$ 1,903	$ 5,220
2019					$ 1,048	$ 2,269	$ 1,903	$ 5,220
2020					$ 1,048	$ 2,269	$ 1,903	$ 5,220
2021						$ 2,269	$ 1,903	$ 4,172
2022						$ 2,269	$ 1,903	$ 4,172
2023						$ 2,269	$ 1,903	$ 4,172
2024						$ 2,269	$ 1,903	$ 4,172
2025						$ 2,269	$ 1,903	$ 4,172
2026							$ 1,903	$ 1,903
2027							$ 1,903	$ 1,903
2028							$ 1,903	$ 1,903
2029							$ 1,903	$ 1,903
2030							$ 1,903	$ 1,903
Total to be collected per period	$ 424,500	$ 225,500	$ 152,500	$ 104,000	$ 22,000	$ 59,000	$ 59,000	$ 1,046,500

Table 5-7
Town Water System, Funds Needed for Replacement

(Current Dollars)

Year	1996-2000	2001-2005	2006-2010	2011-2015	2016-2020	2021-2025	2026-2030	2031-2035	2036-2040	2041-2045	2046-2050	Total to be collected per year
2000	$ 354,200	$ 17,000	$ 540,395	$ 63,669	$ 130,209	$ 63,522	$ 22,245	$ 25,458	$ 66,762	$ 137,310	$ 59,492	$ 1,480,262
2001		$ 17,000	$ 540,395	$ 63,669	$ 130,209	$ 63,522	$ 22,245	$ 25,458	$ 66,762	$ 137,310	$ 59,492	$ 1,126,062
2002		$ 17,000	$ 540,395	$ 63,669	$ 130,209	$ 63,522	$ 22,245	$ 25,458	$ 66,762	$ 137,310	$ 59,492	$ 1,126,062
2003		$ 17,000	$ 540,395	$ 63,669	$ 130,209	$ 63,522	$ 22,245	$ 25,458	$ 66,762	$ 137,310	$ 59,492	$ 1,126,062
2004		$ 17,000	$ 540,395	$ 63,669	$ 130,209	$ 63,522	$ 22,245	$ 25,458	$ 66,762	$ 137,310	$ 59,492	$ 1,126,062
2005		$ 17,000	$ 540,395	$ 63,669	$ 130,209	$ 63,522	$ 22,245	$ 25,458	$ 66,762	$ 137,310	$ 59,492	$ 1,126,062
2006			$ 540,395	$ 63,669	$ 130,209	$ 63,522	$ 22,245	$ 25,458	$ 66,762	$ 137,310	$ 59,492	$ 1,109,062
2007			$ 540,395	$ 63,669	$ 130,209	$ 63,522	$ 22,245	$ 25,458	$ 66,762	$ 137,310	$ 59,492	$ 1,109,062
2008			$ 540,395	$ 63,669	$ 130,209	$ 63,522	$ 22,245	$ 25,458	$ 66,762	$ 137,310	$ 59,492	$ 1,109,062
2009			$ 540,395	$ 63,669	$ 130,209	$ 63,522	$ 22,245	$ 25,458	$ 66,762	$ 137,310	$ 59,492	$ 1,109,062
2010			$ 540,395	$ 63,669	$ 130,209	$ 63,522	$ 22,245	$ 25,458	$ 66,762	$ 137,310	$ 59,492	$ 1,109,062
2011				$ 63,669	$ 130,209	$ 63,522	$ 22,245	$ 25,458	$ 66,762	$ 137,310	$ 59,492	$ 568,668
2012				$ 63,669	$ 130,209	$ 63,522	$ 22,245	$ 25,458	$ 66,762	$ 137,310	$ 59,492	$ 568,668
2013				$ 63,669	$ 130,209	$ 63,522	$ 22,245	$ 25,458	$ 66,762	$ 137,310	$ 59,492	$ 568,668
2014				$ 63,669	$ 130,209	$ 63,522	$ 22,245	$ 25,458	$ 66,762	$ 137,310	$ 59,492	$ 568,668
2015				$ 63,669	$ 130,209	$ 63,522	$ 22,245	$ 25,458	$ 66,762	$ 137,310	$ 59,492	$ 568,668
2016					$ 130,209	$ 63,522	$ 22,245	$ 25,458	$ 66,762	$ 137,310	$ 59,492	$ 504,999
2017					$ 130,209	$ 63,522	$ 22,245	$ 25,458	$ 66,762	$ 137,310	$ 59,492	$ 504,999
2018					$ 130,209	$ 63,522	$ 22,245	$ 25,458	$ 66,762	$ 137,310	$ 59,492	$ 504,999
2019					$ 130,209	$ 63,522	$ 22,245	$ 25,458	$ 66,762	$ 137,310	$ 59,492	$ 504,999
2020					$ 130,209	$ 63,522	$ 22,245	$ 25,458	$ 66,762	$ 137,310	$ 59,492	$ 504,999
2021						$ 63,522	$ 22,245	$ 25,458	$ 66,762	$ 137,310	$ 59,492	$ 374,790
2022						$ 63,522	$ 22,245	$ 25,458	$ 66,762	$ 137,310	$ 59,492	$ 374,790
2023						$ 63,522	$ 22,245	$ 25,458	$ 66,762	$ 137,310	$ 59,492	$ 374,790
2024						$ 63,522	$ 22,245	$ 25,458	$ 66,762	$ 137,310	$ 59,492	$ 374,790
2025						$ 63,522	$ 22,245	$ 25,458	$ 66,762	$ 137,310	$ 59,492	$ 374,790
2026							$ 22,245	$ 25,458	$ 66,762	$ 137,310	$ 59,492	$ 311,267
2027							$ 22,245	$ 25,458	$ 66,762	$ 137,310	$ 59,492	$ 311,267
2028							$ 22,245	$ 25,458	$ 66,762	$ 137,310	$ 59,492	$ 311,267
2029							$ 22,245	$ 25,458	$ 66,762	$ 137,310	$ 59,492	$ 311,267
2030							$ 22,245	$ 25,458	$ 66,762	$ 137,310	$ 59,492	$ 311,267
2031								$ 25,458	$ 66,762	$ 137,310	$ 59,492	$ 289,023
2032								$ 25,458	$ 66,762	$ 137,310	$ 59,492	$ 289,023
2033								$ 25,458	$ 66,762	$ 137,310	$ 59,492	$ 289,023
2034								$ 25,458	$ 66,762	$ 137,310	$ 59,492	$ 289,023
2035								$ 25,458	$ 66,762	$ 137,310	$ 59,492	$ 289,023
2036									$ 66,762	$ 137,310	$ 59,492	$ 263,565
2037									$ 66,762	$ 137,310	$ 59,492	$ 263,565
2038									$ 66,762	$ 137,310	$ 59,492	$ 263,565
2039									$ 66,762	$ 137,310	$ 59,492	$ 263,565
2040									$ 66,762	$ 137,310	$ 59,492	$ 263,565
2041										$ 137,310	$ 59,492	$ 196,803
2042										$ 137,310	$ 59,492	$ 196,803
2043										$ 137,310	$ 59,492	$ 196,803
2044										$ 137,310	$ 59,492	$ 196,803
2045										$ 137,310	$ 59,492	$ 196,803
2046											$ 59,492	$ 59,492
2047											$ 59,492	$ 59,492
2048											$ 59,492	$ 59,492
2049											$ 59,492	$ 59,492
2050											$ 59,492	$ 59,492
Total to be collected per period	$ 354,200	$ 102,000	$ 5,944,341	$ 1,018,700	$ 2,734,390	$ 1,651,580	$ 689,580	$ 916,482	$ 2,737,260	$ 6,316,270	$ 3,034,115	$ 25,498,918

Table 5-8
Town Wastewater System, Funds Needed for Repair
(Current Dollars)

Year	1996-2000	2001-2005	2006-2010	2011-2015	2016-2020	2021-2025	2026-2030	Total to be collected per year
2000	$ 195,000	$ 17,333	$ 364	$ 2,781	$ 1,286	$ 1,173	$ 1,161	$ 219,098
2001		$ 17,333	$ 364	$ 2,781	$ 1,286	$ 1,173	$ 1,161	$ 24,098
2002		$ 17,333	$ 364	$ 2,781	$ 1,286	$ 1,173	$ 1,161	$ 24,098
2003		$ 17,333	$ 364	$ 2,781	$ 1,286	$ 1,173	$ 1,161	$ 24,098
2004		$ 17,333	$ 364	$ 2,781	$ 1,286	$ 1,173	$ 1,161	$ 24,098
2005		$ 17,333	$ 364	$ 2,781	$ 1,286	$ 1,173	$ 1,161	$ 24,098
2006			$ 364	$ 2,781	$ 1,286	$ 1,173	$ 1,161	$ 6,765
2007			$ 364	$ 2,781	$ 1,286	$ 1,173	$ 1,161	$ 6,765
2008			$ 364	$ 2,781	$ 1,286	$ 1,173	$ 1,161	$ 6,765
2009			$ 364	$ 2,781	$ 1,286	$ 1,173	$ 1,161	$ 6,765
2010			$ 364	$ 2,781	$ 1,286	$ 1,173	$ 1,161	$ 6,765
2011				$ 2,781	$ 1,286	$ 1,173	$ 1,161	$ 6,401
2012				$ 2,781	$ 1,286	$ 1,173	$ 1,161	$ 6,401
2013				$ 2,781	$ 1,286	$ 1,173	$ 1,161	$ 6,401
2014				$ 2,781	$ 1,286	$ 1,173	$ 1,161	$ 6,401
2015				$ 2,781	$ 1,286	$ 1,173	$ 1,161	$ 6,401
2016					$ 1,286	$ 1,173	$ 1,161	$ 3,620
2017					$ 1,286	$ 1,173	$ 1,161	$ 3,620
2018					$ 1,286	$ 1,173	$ 1,161	$ 3,620
2019					$ 1,286	$ 1,173	$ 1,161	$ 3,620
2020					$ 1,286	$ 1,173	$ 1,161	$ 3,620
2021						$ 1,173	$ 1,161	$ 2,334
2022						$ 1,173	$ 1,161	$ 2,334
2023						$ 1,173	$ 1,161	$ 2,334
2024						$ 1,173	$ 1,161	$ 2,334
2025						$ 1,173	$ 1,161	$ 2,334
2026							$ 1,161	$ 1,161
2027							$ 1,161	$ 1,161
2028							$ 1,161	$ 1,161
2029							$ 1,161	$ 1,161
2030							$ 1,161	$ 1,161
Total to be collected per period	$ 195,000	$ 104,000	$ 4,000	$ 44,500	$ 27,000	$ 30,500	$ 36,000	$ 441,000

Table 5-9
Town Wastewater System, Funds Needed for Replacement
(Current Dollars)

Year	1996-2000	2001-2005	2006-2010	2011-2015	2016-2020	2021-2025	2026-2030	2031-2035	2036-2040	2041-2045	2046-2050	Total to be collected per year
2000	$ 303,420	$ 1,833	$ 5,455	$ 1,875	$ -	$ 30,976	$ 5,205	$ 134,412	$ 30,404	$ 27,812	$ 36,586	$ 577,978
2001		$ 1,833	$ 5,455	$ 1,875	$ -	$ 30,976	$ 5,205	$ 134,412	$ 30,404	$ 27,812	$ 36,586	$ 274,558
2002		$ 1,833	$ 5,455	$ 1,875	$ -	$ 30,976	$ 5,205	$ 134,412	$ 30,404	$ 27,812	$ 36,586	$ 274,558
2003		$ 1,833	$ 5,455	$ 1,875	$ -	$ 30,976	$ 5,205	$ 134,412	$ 30,404	$ 27,812	$ 36,586	$ 274,558
2004		$ 1,833	$ 5,455	$ 1,875	$ -	$ 30,976	$ 5,205	$ 134,412	$ 30,404	$ 27,812	$ 36,586	$ 274,558
2005		$ 1,833	$ 5,455	$ 1,875	$ -	$ 30,976	$ 5,205	$ 134,412	$ 30,404	$ 27,812	$ 36,586	$ 274,558
2006			$ 5,455	$ 1,875	$ -	$ 30,976	$ 5,205	$ 134,412	$ 30,404	$ 27,812	$ 36,586	$ 272,725
2007			$ 5,455	$ 1,875	$ -	$ 30,976	$ 5,205	$ 134,412	$ 30,404	$ 27,812	$ 36,586	$ 272,725
2008			$ 5,455	$ 1,875	$ -	$ 30,976	$ 5,205	$ 134,412	$ 30,404	$ 27,812	$ 36,586	$ 272,725
2009			$ 5,455	$ 1,875	$ -	$ 30,976	$ 5,205	$ 134,412	$ 30,404	$ 27,812	$ 36,586	$ 272,725
2010			$ 5,455	$ 1,875	$ -	$ 30,976	$ 5,205	$ 134,412	$ 30,404	$ 27,812	$ 36,586	$ 272,725
2011				$ 1,875	$ -	$ 30,976	$ 5,205	$ 134,412	$ 30,404	$ 27,812	$ 36,586	$ 267,270
2012				$ 1,875	$ -	$ 30,976	$ 5,205	$ 134,412	$ 30,404	$ 27,812	$ 36,586	$ 267,270
2013				$ 1,875	$ -	$ 30,976	$ 5,205	$ 134,412	$ 30,404	$ 27,812	$ 36,586	$ 267,270
2014				$ 1,875	$ -	$ 30,976	$ 5,205	$ 134,412	$ 30,404	$ 27,812	$ 36,586	$ 267,270
2015				$ 1,875	$ -	$ 30,976	$ 5,205	$ 134,412	$ 30,404	$ 27,812	$ 36,586	$ 267,270
2016					$ -	$ 30,976	$ 5,205	$ 134,412	$ 30,404	$ 27,812	$ 36,586	$ 265,395
2017					$ -	$ 30,976	$ 5,205	$ 134,412	$ 30,404	$ 27,812	$ 36,586	$ 265,395
2018					$ -	$ 30,976	$ 5,205	$ 134,412	$ 30,404	$ 27,812	$ 36,586	$ 265,395
2019					$ -	$ 30,976	$ 5,205	$ 134,412	$ 30,404	$ 27,812	$ 36,586	$ 265,395
2020					$ -	$ 30,976	$ 5,205	$ 134,412	$ 30,404	$ 27,812	$ 36,586	$ 265,395
2021						$ 30,976	$ 5,205	$ 134,412	$ 30,404	$ 27,812	$ 36,586	$ 265,395
2022						$ 30,976	$ 5,205	$ 134,412	$ 30,404	$ 27,812	$ 36,586	$ 265,395
2023						$ 30,976	$ 5,205	$ 134,412	$ 30,404	$ 27,812	$ 36,586	$ 265,395
2024						$ 30,976	$ 5,205	$ 134,412	$ 30,404	$ 27,812	$ 36,586	$ 265,395
2025						$ 30,976	$ 5,205	$ 134,412	$ 30,404	$ 27,812	$ 36,586	$ 265,395
2026							$ 5,205	$ 134,412	$ 30,404	$ 27,812	$ 36,586	$ 234,419
2027							$ 5,205	$ 134,412	$ 30,404	$ 27,812	$ 36,586	$ 234,419
2028							$ 5,205	$ 134,412	$ 30,404	$ 27,812	$ 36,586	$ 234,419
2029							$ 5,205	$ 134,412	$ 30,404	$ 27,812	$ 36,586	$ 234,419
2030							$ 5,205	$ 134,412	$ 30,404	$ 27,812	$ 36,586	$ 234,419
2031								$ 134,412	$ 30,404	$ 27,812	$ 36,586	$ 229,215
2032								$ 134,412	$ 30,404	$ 27,812	$ 36,586	$ 229,215
2033								$ 134,412	$ 30,404	$ 27,812	$ 36,586	$ 229,215
2034								$ 134,412	$ 30,404	$ 27,812	$ 36,586	$ 229,215
2035								$ 134,412	$ 30,404	$ 27,812	$ 36,586	$ 229,215
2036									$ 30,404	$ 27,812	$ 36,586	$ 94,802
2037									$ 30,404	$ 27,812	$ 36,586	$ 94,802
2038									$ 30,404	$ 27,812	$ 36,586	$ 94,802
2039									$ 30,404	$ 27,812	$ 36,586	$ 94,802
2040									$ 30,404	$ 27,812	$ 36,586	$ 94,802
2041										$ 27,812	$ 36,586	$ 64,399
2042										$ 27,812	$ 36,586	$ 64,399
2043										$ 27,812	$ 36,586	$ 64,399
2044										$ 27,812	$ 36,586	$ 64,399
2045										$ 27,812	$ 36,586	$ 64,399
2046											$ 36,586	$ 36,586
2047											$ 36,586	$ 36,586
2048											$ 36,586	$ 36,586
2049											$ 36,586	$ 36,586
2050											$ 36,586	$ 36,586
Total to be collected per period	$ 303,420	$ 11,000	$ 60,000	$ 30,000	$ -	$ 805,366	$ 161,350	$ 4,838,839	$ 1,246,548	$ 1,279,364	$ 1,865,910	$ 10,601,797

Table 5-10
Black Lake Water System, Funds Needed for Repair
(Current Dollars)

Year	1996-2000	2001-2005	2006-2010	2011-2015	2016-2020	2021-2025	2026-2030	Total to be collected per year
2000	$ 88,600	$ 9,800	$ 773	$ 1,350	$ -	$ -	$ -	$ 100,523
2001		$ 9,800	$ 773	$ 1,350	$ -	$ -	$ -	$ 11,923
2002		$ 9,800	$ 773	$ 1,350	$ -	$ -	$ -	$ 11,923
2003		$ 9,800	$ 773	$ 1,350	$ -	$ -	$ -	$ 11,923
2004		$ 9,800	$ 773	$ 1,350	$ -	$ -	$ -	$ 11,923
2005		$ 9,800	$ 773	$ 1,350	$ -	$ -	$ -	$ 11,923
2006			$ 773	$ 1,350	$ -	$ -	$ -	$ 2,123
2007			$ 773	$ 1,350	$ -	$ -	$ -	$ 2,123
2008			$ 773	$ 1,350	$ -	$ -	$ -	$ 2,123
2009			$ 773	$ 1,350	$ -	$ -	$ -	$ 2,123
2010			$ 773	$ 1,350	$ -	$ -	$ -	$ 2,123
2011				$ 1,350	$ -	$ -	$ -	$ 1,350
2012				$ 1,350	$ -	$ -	$ -	$ 1,350
2013				$ 1,350	$ -	$ -	$ -	$ 1,350
2014				$ 1,350	$ -	$ -	$ -	$ 1,350
2015				$ 1,350	$ -	$ -	$ -	$ 1,350
2016					$ -	$ -	$ -	$ -
2017					$ -	$ -	$ -	$ -
2018					$ -	$ -	$ -	$ -
2019					$ -	$ -	$ -	$ -
2020					$ -	$ -	$ -	$ -
2021						$ -	$ -	$ -
2022						$ -	$ -	$ -
2023						$ -	$ -	$ -
2024						$ -	$ -	$ -
2025						$ -	$ -	$ -
2026							$ -	$ -
2027							$ -	$ -
2028							$ -	$ -
2029							$ -	$ -
2030							$ -	$ -
Total to be collected per period	$ 88,600	$ 58,800	$ 8,500	$ 21,600	$ -	$ -	$ -	$ 177,500

Table 5-11
Black LakeWater System, Funds Needed for Replacement

(Current Dollars)

Year	1996-2000	2001-2005	2006-2010	2011-2015	2016-2020	2021-2025	2026-2030	2031-2035	2036-2040	2041-2045	2046-2050	Total to be collected per year
2000	$ 415,000	$ -	$ 4,545	$ 3,744	$ 2,500	$ 24,972	$ 3,829	$ 5,556	$ 22,812	$ 8,005	$ 15,034	$ 505,996
2001		$ -	$ 4,545	$ 3,744	$ 2,500	$ 24,972	$ 3,829	$ 5,556	$ 22,812	$ 8,005	$ 15,034	$ 90,996
2002		$ -	$ 4,545	$ 3,744	$ 2,500	$ 24,972	$ 3,829	$ 5,556	$ 22,812	$ 8,005	$ 15,034	$ 90,996
2003		$ -	$ 4,545	$ 3,744	$ 2,500	$ 24,972	$ 3,829	$ 5,556	$ 22,812	$ 8,005	$ 15,034	$ 90,996
2004		$ -	$ 4,545	$ 3,744	$ 2,500	$ 24,972	$ 3,829	$ 5,556	$ 22,812	$ 8,005	$ 15,034	$ 90,996
2005		$ -	$ 4,545	$ 3,744	$ 2,500	$ 24,972	$ 3,829	$ 5,556	$ 22,812	$ 8,005	$ 15,034	$ 90,996
2006			$ 4,545	$ 3,744	$ 2,500	$ 24,972	$ 3,829	$ 5,556	$ 22,812	$ 8,005	$ 15,034	$ 90,996
2007			$ 4,545	$ 3,744	$ 2,500	$ 24,972	$ 3,829	$ 5,556	$ 22,812	$ 8,005	$ 15,034	$ 90,996
2008			$ 4,545	$ 3,744	$ 2,500	$ 24,972	$ 3,829	$ 5,556	$ 22,812	$ 8,005	$ 15,034	$ 90,996
2009			$ 4,545	$ 3,744	$ 2,500	$ 24,972	$ 3,829	$ 5,556	$ 22,812	$ 8,005	$ 15,034	$ 90,996
2010			$ 4,545	$ 3,744	$ 2,500	$ 24,972	$ 3,829	$ 5,556	$ 22,812	$ 8,005	$ 15,034	$ 90,996
2011				$ 3,744	$ 2,500	$ 24,972	$ 3,829	$ 5,556	$ 22,812	$ 8,005	$ 15,034	$ 86,450
2012				$ 3,744	$ 2,500	$ 24,972	$ 3,829	$ 5,556	$ 22,812	$ 8,005	$ 15,034	$ 86,450
2013				$ 3,744	$ 2,500	$ 24,972	$ 3,829	$ 5,556	$ 22,812	$ 8,005	$ 15,034	$ 86,450
2014				$ 3,744	$ 2,500	$ 24,972	$ 3,829	$ 5,556	$ 22,812	$ 8,005	$ 15,034	$ 86,450
2015				$ 3,744	$ 2,500	$ 24,972	$ 3,829	$ 5,556	$ 22,812	$ 8,005	$ 15,034	$ 86,450
2016					$ 2,500	$ 24,972	$ 3,829	$ 5,556	$ 22,812	$ 8,005	$ 15,034	$ 82,707
2017					$ 2,500	$ 24,972	$ 3,829	$ 5,556	$ 22,812	$ 8,005	$ 15,034	$ 82,707
2018					$ 2,500	$ 24,972	$ 3,829	$ 5,556	$ 22,812	$ 8,005	$ 15,034	$ 82,707
2019					$ 2,500	$ 24,972	$ 3,829	$ 5,556	$ 22,812	$ 8,005	$ 15,034	$ 82,707
2020					$ 2,500	$ 24,972	$ 3,829	$ 5,556	$ 22,812	$ 8,005	$ 15,034	$ 82,707
2021						$ 24,972	$ 3,829	$ 5,556	$ 22,812	$ 8,005	$ 15,034	$ 80,207
2022						$ 24,972	$ 3,829	$ 5,556	$ 22,812	$ 8,005	$ 15,034	$ 80,207
2023						$ 24,972	$ 3,829	$ 5,556	$ 22,812	$ 8,005	$ 15,034	$ 80,207
2024						$ 24,972	$ 3,829	$ 5,556	$ 22,812	$ 8,005	$ 15,034	$ 80,207
2025						$ 24,972	$ 3,829	$ 5,556	$ 22,812	$ 8,005	$ 15,034	$ 80,207
2026							$ 3,829	$ 5,556	$ 22,812	$ 8,005	$ 15,034	$ 55,235
2027							$ 3,829	$ 5,556	$ 22,812	$ 8,005	$ 15,034	$ 55,235
2028							$ 3,829	$ 5,556	$ 22,812	$ 8,005	$ 15,034	$ 55,235
2029							$ 3,829	$ 5,556	$ 22,812	$ 8,005	$ 15,034	$ 55,235
2030							$ 3,829	$ 5,556	$ 22,812	$ 8,005	$ 15,034	$ 55,235
2031								$ 5,556	$ 22,812	$ 8,005	$ 15,034	$ 51,406
2032								$ 5,556	$ 22,812	$ 8,005	$ 15,034	$ 51,406
2033								$ 5,556	$ 22,812	$ 8,005	$ 15,034	$ 51,406
2034								$ 5,556	$ 22,812	$ 8,005	$ 15,034	$ 51,406
2035								$ 5,556	$ 22,812	$ 8,005	$ 15,034	$ 51,406
2036									$ 22,812	$ 8,005	$ 15,034	$ 45,851
2037									$ 22,812	$ 8,005	$ 15,034	$ 45,851
2038									$ 22,812	$ 8,005	$ 15,034	$ 45,851
2039									$ 22,812	$ 8,005	$ 15,034	$ 45,851
2040									$ 22,812	$ 8,005	$ 15,034	$ 45,851
2041										$ 8,005	$ 15,034	$ 23,039
2042										$ 8,005	$ 15,034	$ 23,039
2043										$ 8,005	$ 15,034	$ 23,039
2044										$ 8,005	$ 15,034	$ 23,039
2045										$ 8,005	$ 15,034	$ 23,039
2046											$ 15,034	$ 15,034
2047											$ 15,034	$ 15,034
2048											$ 15,034	$ 15,034
2049											$ 15,034	$ 15,034
2050											$ 15,034	$ 15,034
Total to be collected per period	$ 415,000	$ -	$ 50,000	$ 59,900	$ 52,500	$ 649,260	$ 118,700	$ 200,000	$ 935,280	$ 368,220	$ 766,740	$ 3,615,600

Table 5-12
Black Lake Wastewater System, Funds Needed for Repair
(Current Dollars)

Year	1996-2000	2001-2005	2006-2010	2011-2015	2016-2020	2021-2025	2026-2030	Total to be collected per year
2000	$ -	$ 2,500	$ 1,364	$ 2,000	$ 1,881	$ 308	$ 629	$ 8,681
2001		$ 2,500	$ 1,364	$ 2,000	$ 1,881	$ 308	$ 629	$ 8,681
2002		$ 2,500	$ 1,364	$ 2,000	$ 1,881	$ 308	$ 629	$ 8,681
2003		$ 2,500	$ 1,364	$ 2,000	$ 1,881	$ 308	$ 629	$ 8,681
2004		$ 2,500	$ 1,364	$ 2,000	$ 1,881	$ 308	$ 629	$ 8,681
2005		$ 2,500	$ 1,364	$ 2,000	$ 1,881	$ 308	$ 629	$ 8,681
2006			$ 1,364	$ 2,000	$ 1,881	$ 308	$ 629	$ 6,181
2007			$ 1,364	$ 2,000	$ 1,881	$ 308	$ 629	$ 6,181
2008			$ 1,364	$ 2,000	$ 1,881	$ 308	$ 629	$ 6,181
2009			$ 1,364	$ 2,000	$ 1,881	$ 308	$ 629	$ 6,181
2010			$ 1,364	$ 2,000	$ 1,881	$ 308	$ 629	$ 6,181
2011				$ 2,000	$ 1,881	$ 308	$ 629	$ 4,818
2012				$ 2,000	$ 1,881	$ 308	$ 629	$ 4,818
2013				$ 2,000	$ 1,881	$ 308	$ 629	$ 4,818
2014				$ 2,000	$ 1,881	$ 308	$ 629	$ 4,818
2015				$ 2,000	$ 1,881	$ 308	$ 629	$ 4,818
2016					$ 1,881	$ 308	$ 629	$ 2,818
2017					$ 1,881	$ 308	$ 629	$ 2,818
2018					$ 1,881	$ 308	$ 629	$ 2,818
2019					$ 1,881	$ 308	$ 629	$ 2,818
2020					$ 1,881	$ 308	$ 629	$ 2,818
2021						$ 308	$ 629	$ 937
2022						$ 308	$ 629	$ 937
2023						$ 308	$ 629	$ 937
2024						$ 308	$ 629	$ 937
2025						$ 308	$ 629	$ 937
2026							$ 629	$ 629
2027							$ 629	$ 629
2028							$ 629	$ 629
2029							$ 629	$ 629
2030							$ 629	$ 629
Total to be collected per period	$ -	$ 15,000	$ 15,000	$ 32,000	$ 39,500	$ 8,000	$ 19,500	$ 129,000

Table 5-13
Black Lake Wastewater System, Funds Needed for Replacement

(Current Dollars)

Year	1996-2000	2001-2005	2006-2010	2011-2015	2016-2020	2021-2025	2026-2030	2031-2035	2036-2040	2041-2045	2046-2050	Total to be collected per year
2000	$ -	$ 26,624	$ 1,091	$ 938	$ 714	$ -	$ -	$ 13,586	$ 23,905	$ 8,898	$ 16,241	$ 91,997
2001		$ 26,624	$ 1,091	$ 938	$ 714	$ -	$ -	$ 13,586	$ 23,905	$ 8,898	$ 16,241	$ 91,997
2002		$ 26,624	$ 1,091	$ 938	$ 714	$ -	$ -	$ 13,586	$ 23,905	$ 8,898	$ 16,241	$ 91,997
2003		$ 26,624	$ 1,091	$ 938	$ 714	$ -	$ -	$ 13,586	$ 23,905	$ 8,898	$ 16,241	$ 91,997
2004		$ 26,624	$ 1,091	$ 938	$ 714	$ -	$ -	$ 13,586	$ 23,905	$ 8,898	$ 16,241	$ 91,997
2005		$ 26,624	$ 1,091	$ 938	$ 714	$ -	$ -	$ 13,586	$ 23,905	$ 8,898	$ 16,241	$ 91,997
2006			$ 1,091	$ 938	$ 714	$ -	$ -	$ 13,586	$ 23,905	$ 8,898	$ 16,241	$ 65,373
2007			$ 1,091	$ 938	$ 714	$ -	$ -	$ 13,586	$ 23,905	$ 8,898	$ 16,241	$ 65,373
2008			$ 1,091	$ 938	$ 714	$ -	$ -	$ 13,586	$ 23,905	$ 8,898	$ 16,241	$ 65,373
2009			$ 1,091	$ 938	$ 714	$ -	$ -	$ 13,586	$ 23,905	$ 8,898	$ 16,241	$ 65,373
2010			$ 1,091	$ 938	$ 714	$ -	$ -	$ 13,586	$ 23,905	$ 8,898	$ 16,241	$ 65,373
2011				$ 938	$ 714	$ -	$ -	$ 13,586	$ 23,905	$ 8,898	$ 16,241	$ 64,282
2012				$ 938	$ 714	$ -	$ -	$ 13,586	$ 23,905	$ 8,898	$ 16,241	$ 64,282
2013				$ 938	$ 714	$ -	$ -	$ 13,586	$ 23,905	$ 8,898	$ 16,241	$ 64,282
2014				$ 938	$ 714	$ -	$ -	$ 13,586	$ 23,905	$ 8,898	$ 16,241	$ 64,282
2015				$ 938	$ 714	$ -	$ -	$ 13,586	$ 23,905	$ 8,898	$ 16,241	$ 64,282
2016					$ 714	$ -	$ -	$ 13,586	$ 23,905	$ 8,898	$ 16,241	$ 63,345
2017					$ 714	$ -	$ -	$ 13,586	$ 23,905	$ 8,898	$ 16,241	$ 63,345
2018					$ 714	$ -	$ -	$ 13,586	$ 23,905	$ 8,898	$ 16,241	$ 63,345
2019					$ 714	$ -	$ -	$ 13,586	$ 23,905	$ 8,898	$ 16,241	$ 63,345
2020					$ 714	$ -	$ -	$ 13,586	$ 23,905	$ 8,898	$ 16,241	$ 63,345
2021						$ -	$ -	$ 13,586	$ 23,905	$ 8,898	$ 16,241	$ 62,630
2022						$ -	$ -	$ 13,586	$ 23,905	$ 8,898	$ 16,241	$ 62,630
2023						$ -	$ -	$ 13,586	$ 23,905	$ 8,898	$ 16,241	$ 62,630
2024						$ -	$ -	$ 13,586	$ 23,905	$ 8,898	$ 16,241	$ 62,630
2025						$ -	$ -	$ 13,586	$ 23,905	$ 8,898	$ 16,241	$ 62,630
2026							$ -	$ 13,586	$ 23,905	$ 8,898	$ 16,241	$ 62,630
2027							$ -	$ 13,586	$ 23,905	$ 8,898	$ 16,241	$ 62,630
2028							$ -	$ 13,586	$ 23,905	$ 8,898	$ 16,241	$ 62,630
2029							$ -	$ 13,586	$ 23,905	$ 8,898	$ 16,241	$ 62,630
2030							$ -	$ 13,586	$ 23,905	$ 8,898	$ 16,241	$ 62,630
2031								$ 13,586	$ 23,905	$ 8,898	$ 16,241	$ 62,630
2032								$ 13,586	$ 23,905	$ 8,898	$ 16,241	$ 62,630
2033								$ 13,586	$ 23,905	$ 8,898	$ 16,241	$ 62,630
2034								$ 13,586	$ 23,905	$ 8,898	$ 16,241	$ 62,630
2035								$ 13,586	$ 23,905	$ 8,898	$ 16,241	$ 62,630
2036									$ 23,905	$ 8,898	$ 16,241	$ 49,044
2037									$ 23,905	$ 8,898	$ 16,241	$ 49,044
2038									$ 23,905	$ 8,898	$ 16,241	$ 49,044
2039									$ 23,905	$ 8,898	$ 16,241	$ 49,044
2040									$ 23,905	$ 8,898	$ 16,241	$ 49,044
2041										$ 8,898	$ 16,241	$ 25,139
2042										$ 8,898	$ 16,241	$ 25,139
2043										$ 8,898	$ 16,241	$ 25,139
2044										$ 8,898	$ 16,241	$ 25,139
2045										$ 8,898	$ 16,241	$ 25,139
2046											$ 16,241	$ 16,241
2047											$ 16,241	$ 16,241
2048											$ 16,241	$ 16,241
2049											$ 16,241	$ 16,241
2050											$ 16,241	$ 16,241
Total to be collected per period	$ -	$ 159,742	$ 12,000	$ 15,000	$ 15,000	$ -	$ -	$ 489,100	$ 980,100	$ 409,322	$ 828,288	$ 2,908,552

Table 5-14

Summary of Replacement and Repair Costs

Summary of Major Repair Costs Per 5-Year Period												
Period	1996-2000	2001-2005	2006-2010	2011-2015	2016-2020	2021-2025	2026-2030	2031-2035	2036-2040	2041-2045	2046-2050	Totals
Town Water System	$ 413,500	$ 228,500	$ 125,500	$ 114,000	$ 32,000	$ 59,000	$ 59,000		$ -	$ -	$ -	$ 1,031,500
Town Sewer System	$ 195,000	$ 104,000	$ 4,000	$ 44,500	$ 27,000	$ 30,500	$ 36,000	$ -	$ -	$ -	$ -	$ 441,000
Black Lake Water System	$ 121,000	$ 50,000	$ 8,500	$ 5,000	$ 5,000	$ -	$ -	$ -	$ -	$ -	$ -	$ 189,500
Black Lake Sewer System	$ -	$ 15,000	$ 15,000	$ 32,000	$ 39,500	$ 8,000	$ 19,500	$ -	$ -	$ -	$ -	$ 129,000

Summary of Replacement Costs Per 5-Year Period												
Period	1996-2000	2001-2005	2006-2010	2011-2015	2016-2020	2021-2025	2026-2030	2031-2035	2036-2040	2041-2045	2046-2050	Totals
Town Water System	$ 354,200	$ 102,000	$ 5,944,341	$ 1,018,700	$ 2,734,390	$ 1,651,580	$ 689,580	$ 916,482	$ 2,737,260	$ 6,316,270	$ 3,034,115	$ 25,498,918
Town Sewer System	$ 303,420	$ 11,000	$ 60,000	$ 30,000	$ -	$ 805,366	$ 161,350	$ 4,838,839	$ 1,246,548	$ 1,279,364	$ 1,865,910	$ 10,601,797
Black Lake Water System	$ 415,000	$ -	$ 50,000	$ 59,900	$ 52,500	$ 649,260	$ 118,700	$ 200,000	$ 935,280	$ 368,220	$ 766,740	$ 3,615,600
Black Lake Sewer System	$ -	$ 159,742	$ 12,000	$ 15,000	$ 15,000	$ -	$ -	$ 489,100	$ 980,100	$ 409,322	$ 828,288	$ 2,908,552

Summary of the Total Replacement and Repair Costs Per 5-Year Period												
Period	1996-2000	2001-2005	2006-2010	2011-2015	2016-2020	2021-2025	2026-2030	2031-2035	2036-2040	2041-2045	2046-2050	Totals
Town Water System	$ 767,700	$ 330,500	$ 6,069,841	$ 1,132,700	$ 2,766,390	$ 1,710,580	$ 748,580	$ 916,482	$ 2,737,260	$ 6,316,270	$ 3,034,115	$ 26,530,418
Town Sewer System	$ 498,420	$ 115,000	$ 64,000	$ 74,500	$ 27,000	$ 835,866	$ 197,350	$ 4,838,839	$ 1,246,548	$ 1,279,364	$ 1,865,910	$ 11,042,797
Black Lake Water System	$ 536,000	$ 50,000	$ 58,500	$ 64,900	$ 57,500	$ 649,260	$ 118,700	$ 200,000	$ 935,280	$ 368,220	$ 766,740	$ 3,805,100
Black Lake Sewer System	$ -	$ 174,742	$ 27,000	$ 47,000	$ 54,500	$ 8,000	$ 19,500	$ 489,100	$ 980,100	$ 409,322	$ 828,288	$ 3,037,552

Replacement Fund Available By Period At The Current Budgeted Rates

Table 5-15
Summary of Funds Available at Current Budgeted Rates After Major Repairs and Replacement
(Assuming Existing Program - 10 % - 1995/96 Level)

Funds Available Per 5-Year Period At The Current Budgeted Rates

Period	1996-2000	2001-2005	2006-2010	2011-2015	2016-2020	2021-2025	2026-2030	2031-2035	2036-2040	2041-2045	2046-2050	Totals
Town Water System	$ 412,161.00	$ 515,500.00	$ 515,500.00	$ 515,500.00	$ 515,500.00	$ 515,500.00	$ 515,500.00	$ 515,500.00	$ 515,500.00	$ 515,500.00	$ 515,500.00	$ 5,567,161.00
Town Sewer System	$ 495,617.00	$ 468,750.00	$ 468,750.00	$ 468,750.00	$ 468,750.00	$ 468,750.00	$ 468,750.00	$ 468,750.00	$ 468,750.00	$ 468,750.00	$ 468,750.00	$ 5,183,117.00
Black Lake Water System	$ 45,337.00	$ 50,000.00	$ 50,000.00	$ 50,000.00	$ 50,000.00	$ 50,000.00	$ 50,000.00	$ 50,000.00	$ 50,000.00	$ 50,000.00	$ 50,000.00	$ 545,337.00
Black Lake Sewer System	$ 28,315.00	$ 32,550.00	$ 32,550.00	$ 32,550.00	$ 32,550.00	$ 32,550.00	$ 32,550.00	$ 32,550.00	$ 32,550.00	$ 32,550.00	$ 32,550.00	$ 353,815.00

The projected funds available per the noted five year periods were estimated using replacement incomes noted in Tables 5-1 and 5-2.

Funds Available After Major Repairs

Period	1996-2000	2001-2005	2006-2010	2011-2015	2016-2020	2021-2025	2026-2030	2031-2035	2036-2040	2041-2045	2046-2050	Totals
Town Water System	$ (1,339)	$ 287,000	$ 390,000	$ 401,500	$ 483,500	$ 456,500	$ 456,500	$ 515,500	$ 515,500	$ 515,500	$ 515,500	$ 4,535,661
Town Sewer System	$ 300,617	$ 364,750	$ 464,750	$ 424,250	$ 441,750	$ 438,250	$ 432,750	$ 468,750	$ 468,750	$ 468,750	$ 468,750	$ 4,742,117
Black Lake Water System	$ (75,663)	$ -	$ 41,500	$ 45,000	$ 45,000	$ 50,000	$ 50,000	$ 50,000	$ 50,000	$ 50,000	$ 50,000	$ 355,837
Black Lake Sewer System	$ 28,315	$ 17,550	$ 17,550	$ 550	$ (6,950)	$ 24,550	$ 13,050	$ 32,550	$ 32,550	$ 32,550	$ 32,550	$ 224,815

The funds available after major repair of the four described systems are determined by taking the costs for major repairs, Table 5-14, and subtracting this value from the funds available as described above. A positive value indicates a surplus of funds while a negative value indicates additional funds required.

Funds Available After Replacement

Period	1996-2000	2001-2005	2006-2010	2011-2015	2016-2020	2021-2025	2026-2030	2031-2035	2036-2040	2041-2045	2046-2050	Totals
Town Water System	$ 57,861	$ 413,500	$ (5,428,841)	$ (503,200)	$ (2,218,890)	$ (1,136,080)	$ (174,080)	$ (400,982)	$ (2,221,780)	$ (5,800,770)	$ (2,518,615)	$ (18,931,757)
Town Sewer System	$ 192,197	$ 457,750	$ 408,750	$ 438,750	$ 468,750	$ (336,616)	$ 307,400	$ (4,370,089)	$ (777,798)	$ (810,614)	$ (1,397,160)	$ (5,418,680)
Black Lake Water System	$ (369,663)	$ 50,000	$ -	$ (9,900)	$ (2,500)	$ (599,260)	$ (68,700)	$ (150,000)	$ (885,280)	$ (318,220)	$ (718,740)	$ (3,070,263)
Black Lake Sewer System	$ 28,315	$ (127,192)	$ 20,550	$ 17,550	$ 17,550	$ 32,550	$ 32,550	$ (456,550)	$ (947,550)	$ (376,772)	$ (795,738)	$ (2,554,737)

The funds available after replacement of the four described systems are determined by taking the costs for replacement, Table 5-14, and subtracting this value from the funds available as described above. A positive value indicates a surplus of funds while a negative value indicates additional funds required.

Total Funds Available After Replacement And Repair

Period	1996-2000	2001-2005	2006-2010	2011-2015	2016-2020	2021-2025	2026-2030	2031-2035	2036-2040	2041-2045	2046-2050	Totals
Town Water System	$ (355,539)	$ 185,000	$ (5,554,341)	$ (517,200)	$ (2,250,890)	$ (1,195,080)	$ (233,080)	$ (400,982)	$ (2,221,780)	$ (5,800,770)	$ (2,518,615)	$ (20,963,257)
Town Sewer System	$ (2,803)	$ 353,750	$ 404,750	$ 394,250	$ 441,750	$ (367,116)	$ 271,400	$ (4,370,089)	$ (777,798)	$ (810,614)	$ (1,397,160)	$ (5,859,680)
Black Lake Water System	$ (490,663)	$ -	$ (8,500)	$ (14,900)	$ (7,500)	$ (599,260)	$ (68,700)	$ (150,000)	$ (885,280)	$ (318,220)	$ (716,740)	$ (3,259,763)
Black Lake Sewer System	$ 28,315	$ (142,192)	$ 5,550	$ (14,450)	$ (21,950)	$ 24,550	$ 13,050	$ (456,550)	$ (947,550)	$ (376,772)	$ (795,738)	$ (2,683,737)

The funds available after total replacement and repair of the four described systems are determined by taking the costs for total replacement and repair, Table 5-14, and subtracting this value from the funds available as described above. A positive value indicates a surplus of funds while a negative value indicates additional funds required.

Table 5-16
Summary of Revenue Required by System and by Option
(In addition to program already in place)

Town Water System

	Period	1999	2001-2010	2011-2020	2021-2030	2031-2040	Total
	Water Revenue	$ 45,000	$ 9,450,000	$ 9,450,000	$ 9,450,000	$9,450,000	$38,745,000
Option A	**Funds Needed For Major Repair**	$ 12,339	$ (653,000)	$ (905,000)	$ (913,000)	$ (1,031,000)	$ (3,489,661)
	Percent of Revenue Required	1%	-7%	-10%	-10%	-11%	-9%
Option B	**Funds Needed For Replacement**	$ (131,561)	$ 4,973,341	$ 2,702,090	$ 1,308,760	$ 2,622,742	$ 11,475,372
	Percent of Revenue Required	-14%	53%	29%	14%	28%	30%
Option C	**Funds Needed For Major Repair and Replacement**	$ 292,939	$ 5,351,341	$ 2,828,090	$ 1,426,760	$ 2,622,742	$ 12,521,872
	Percent of Revenue Required	31%	57%	30%	15%	28%	32%

The water revenue as noted above for years 2001 to 2040 is a projection based upon the expected income due for 1999. This projected income is then multiplied by
10 to obtain the projected income for the ten year periods noted above.
The funds needed are as illustrated in table 5-15. The Percent of Revenue required for each option is then determined by dividing the needed funds by the referenced revenue.
A positive percentage indicates an increase in revenue and a negative percentage indicates a decrease of revenue.

Town Wastewater System

	Period	1999	2001-2010	2011-2020	2021-2030	2031-2040	Total
	Sewer Revenue	$ 444,000	$ 4,440,000	$ 4,440,000	$ 4,440,000	$ 4,440,000	$ 18,204,000
Option A	**Funds Needed For Major Repair**	$ (300,617)	$ (829,500)	$ (866,000)	$ (871,000)	$ (937,500)	$ (3,804,617)
	Percent of Revenue Required	-68%	-19%	-20%	-20%	-21%	-21%
Option B	**Funds Needed For Replacement**	$ (389,617)	$ (842,500)	$ (734,080)	$ 29,216	$ 5,147,887	$ 3,210,906
	Percent of Revenue Required	-88%	-19%	-17%	1%	116%	18%
Option C	**Funds Needed For Major Repair and Replacement**	$ (194,617)	$ (734,500)	$ (662,580)	$ 95,716	$ 5,147,887	$ 3,651,906
	Percent of Revenue Required	-44%	-17%	-15%	2%	116%	20%

The water revenue as noted above for years 2001 to 2040 is a projection based upon the expected income due for 1999. This projected income is then multiplied by
10 to obtain the projected income for the ten year periods noted above.
The funds needed are as illustrated in table 5-15. The Percent of Revenue required for each option is then determined by dividing the needed funds by the referenced revenue.
A positive percentage indicates an increase in revenue and a negative percentage indicates a decrease of revenue.

Black Lake Water System

	Period	1999	2001-2010	2011-2020	2021-2030	2031-2040	Total
	Water Revenue	$ 181,000	$ 1,810,000	$ 1,810,000	$ 1,810,000	$ 1,810,000	$ 7,421,000

Option A	Funds Needed For Major Repair	$ 43,263	$ (32,700)	$ (78,400)	$ (100,000)	$ (100,000)	$ (267,837)
	Percent of Revenue Required	24%	-2%	-4%	-6%	-6%	-4%
Option B	Funds Needed For Replacement	$ 369,663	$ (50,000)	$ 12,400	$ 732,960	$ 1,035,280	$ 2,100,303
	Percent of Revenue Required	204%	-3%	1%	40%	57%	28%
Option C	Funds Needed For Major Repair and Replacement	$ 458,263	$ 17,300	$ 34,000	$ 732,960	$ 1,035,280	$ 2,277,803
	Percent of Revenue Required	253%	1%	2%	40%	57%	31%

The water revenue as noted above for years 2001 to 2040 is a projection based upon the expected income due for 1999. This projected income is then multiplied by
10 to obtain the projected income for the ten year periods noted above.
The funds needed are as illustrated in table 5-15. The Percent of Revenue required for each option is then determined by dividing the needed funds by the referenced revenue.
A positive percentage indicates an increase in revenue and a negative percentage indicates a decrease of revenue.

Black Lake Wastewater System

	Period	1999	2001-2010	2011-2020	2021-2030	2031-2040	Total
	Sewer Revenue	$ 127,700	$ 1,277,000	$ 1,277,000	$ 1,277,000	$ 1,277,000	$ 5,235,700
Option A	Funds Needed For Major Repair	$ (28,315)	$ (35,100)	$ 6,400	$ (37,600)	$ (65,100)	$ (159,715)
	Percent of Revenue Required	-22%	-3%	1%	-3%	-5%	-3%
Option B	Funds Needed For Replacement	$ 1,685	$ 76,642	$ (35,100)	$ (65,100)	$ 1,404,100	$ 1,382,227
	Percent of Revenue Required	1%	6%	-3%	-5%	110%	26%
Option C	Funds Needed For Major Repair and Replacement	$ 1,685	$ 106,642	$ 36,400	$ (49,100)	$ 1,404,100	$ 1,499,727
	Percent of Revenue Required	1%	8%	3%	-4%	110%	29%

The water revenue as noted above for years 2001 to 2040 is a projection based upon the expected income due for 1999. This projected income is then multiplied by
10 to obtain the projected income for the ten year periods noted above.
The funds needed are as illustrated in table 5-15. The Percent of Revenue required for each option is then determined by dividing the needed funds by the referenced revenue.
A positive percentage indicates an increase in revenue and a negative percentage indicates a decrease of revenue.

Table 5-17
Recommendations

		Recommended Annual Increase as of 1999-2000 Budget Income				
System	40-Year Average	Year 1&2	Year 3-5	Year 6-10	Year 11	Comment
Town Water	33% + Existing 10%	6 % Each Year	7 % Each Year		Review Program	Spread projects out to match funds.
Town Wastewater	20% + Existing 10%	2 % Each Year	2 % Each Year	2 % Each Year	Consider 10 %	Do not need to start significant accumulating at this time.
Black Lake Water	30% + Existing 10%	6 % Each Year	7 % Each Year		Review Program	Spread projects out to match funds.
Black Lake Wastewater	29% + Existing 10%	2 % Each Year	2 % Each Year	2 % Each Year	Consider 10 %	Do not need to start significant accumulating at this time.

5.6.2 Comments and Recommendations

It is noted in table 5-17 that:

- Treatment of the two water systems is essentially the same and treatment of the two wastewater systems is essentially the same. There is an advantage to not having differing rules where it can be done. This makes the programs more acceptable to the public.

- The new programs should be tied to revenue, rather than a percentage of a fixed year revenue. The latter tends to not keep track with the pace of inflation.

- The recommendations are not to the full level of the tabulated replacement costs. This has been purposely done reflecting a belief that it will increase public acceptance. Further, it is anticipated that the projects can be stretched out over a wider period of years. Adjustments can be made later (i.e. 10 years) after the replacement program has been employed for a number of years.

- Caution: future increases will be dependent on the District's actually using the funds available for planned projects.

- Presumably the increases in water and wastewater rates and hence program revenue, will reasonably parallel the increases for replacement/repairs.

5.7 Implementation Schedule/Adoption

5.7.1 Schedule

See table 5-17.

5.7.2 Adoption

Adoption of the water rate adjustments should be by resolution or ordinance. Adoption for the wastewater rate adjustments should be by ordinance.

5.8 Funding by Development

The Government Code requires, in essence that public purveyors adopt a 5-year capital program and that any developer connection fees or charges have a nexus between the capital improvements and their project. This law was intended to correct the purported overcharging of improvement costs to new development.

The proposed replacement fund program should not be subject to or in conflict with the Government Code providing that the developer connection fees/charges do not also cover the legitimate replacement costs. Development fees/charges could cover increases in capacity.

5.9 Fund Administration/Future Adjustments.

There are a few suggested procedures/policies, the first two of which have been in place by staff for more than 5 years:

A. Each of the four funds be kept separate for accountability

B. There should be a year-to-year accounting of beginning balances, revenues, expenditures and balance forwards as well as interest received.

C. There should be at least a two or three-year budget for replacement systems expenditures.

D. The program should be evaluated periodically for acceptability of the rates and to take into account additions to the system.