North Tahoe Public Utility District

Capital Improvement Programming Guide

2-14-2017

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Mission Statement

The mission of the North Tahoe Public Utility District is to be effective environmental stewards through the provision of efficient, safe and accountable water and sewer service; and to provide, promote and support local and regional recreation and event facilities and activities for residents and visitors that enhance the well-being of our community.

Vision Statement

The vision for the North Tahoe Public Utility District is that we will provide the highest quality water and sewer systems, efficiently and economically managing for future demands, and that we will provide outstanding recreational facilities and services that are responsive to our community, while fostering positive long-term relationships with employees, customers, suppliers and partner agencies.

Core Values

- Public and environmental safety at the highest level
- Open Communications - be open to all points of view
- Customer Service Excellence - provide exemplary customer service, and meet or exceed our customers' expectations
- Transparency and Honesty - be fair, straightforward and factual
- Public Trust - be committed to earning this every day
- Protecting the Environment - be good stewards of what we have been given
- Innovation and Creative Solutions - contribute and be receptive to new ideas
- Cooperation - efficiencies come from collaboration and teamwork
- Accountability - be responsible, deliberate, accurate and clear
- Fiscal Stewardship - exercise careful watch over public funds

1 Introduction / Executive Summary:

This programming guide clarifies the amount of infrastructure owned/operated by the District and how the District identifies, ranks, and approves capital reinvestments back into the systems. The District's primary objective with its Capital Improvement Plan (CIP) process is minimizing the total costs of owning and operating the District's infrastructure while maintaining regulatory compliance and delivering the desired level of service.

NTPUD's primary revenue stream for funding of capital projects are the "system replacement fees". Consistent with NTPUD's "enterprise fund" accounting structure (Sewer/Water/Parks), these revenue streams are kept separate funding only Sewer, Water, or Parks projects per the dedicated revenue source. Other revenue sources, such as connection fees and grants, also provide for capital funding. However, the amount of these other sources is highly variable from year to year and as such are not able to be as accurately anticipated or budgeted for purposes of planning or scheduling projects many years out.

This Capital Improvement Programming Guide does not delve into financial policies, future revenue requirements, rates, or any other financial policy or planning aspects. If there is a desire to accomplish more capital improvements than the District's current funding capabilities, the amount of which may be addressed in a rate study.

Section 2 of this plan is a general (high level) review of the costs of owning & replacing infrastructure intended to provide sustained indefinite service. This is provided simply as a reference to review the scope & scale of District's infrastructure holdings from a big picture perspective.

Section 3 lists all the various drivers of Capital Improvement Planning. Appendix C provides a full discussion and definition of each driver identified if the reader desires a more detailed review.

Section 4 describes the District's approach to identifying, scoring, and ranking individual Capital projects for purposes of prioritization review. As this is a balance of the many different drivers noted in section 3, this section outlines a structured approach capturing the District's Computer Maintenance Management System (CMMS) tool.

Section 5 outlines the District's process for ultimately prioritizing and scheduling projects. While available funds often dictate the pace of projects, Governing body review and prioritization approval is paramount.

The Appendix provides a compiled current listing of identified projects with project descriptions, prioritization rankings, and approximate costs. These projects in the Appendix will change over time as projects are completed, new projects added, etc. Any project list is inherently a living document, in flux to one degree or another at any given time, however having a current compiled list is of significant value whereby all parties of interest (Staff, Board, Public Constituents, etc.) can be on the same page and better stick with a plan as time moves forward. To know a project is "on the list", and the respective order of the project, likewise provides comfort whereby there is knowledge all drivers have been weighed from a high elevation perspective and the time will come (sooner or later) for any given project identified.

This District wide Capital Improvement Programming Guide utilizes NTPUD's past efforts & studies for project identifications and rankings, as well as current CMMS information regarding system condition assessments & specifics.

Past studies and/or previously prepared reports utilized in the preparation of this CIP include:

- Main Sewer Pump Station Master Plan (Stantec), 2009
- Kings Beach Grid Waterline Replacement Project – Preliminary Design Report (AEC), 2007
- CIP Report (NTPUD), 2006
- Wastewater Collection System Overflow/Release Reduction Evaluation (Army Corp), 2003
- Master Water Plan (NTPUD), 1999
- Sewer Master Plan (NTPUD), 1991

These documents, and their respective project discussions/justifications, are incorporated by reference in this CIP.

Utilizing all the tools & information available as outlined above, NTPUD is able to apply fact-based findings and work with & obtain Board approval to determine how best to utilize the available Capital funding toward infrastructure improvements weighing: risk/cost, system demands, aging infrastructure, and limited resources.

2 System Life Expectancy and Costs

As with all built environments, there exists a finite period of time for its cost effective usability; or simply put, there is a life span of all infrastructure. Although this is recognized, it is by no means to say infrastructure should be replaced simply because it reaches the end of its *anticipated* range. Conditions of initial install, materials, surrounding environment, use, maintenance, and many other variables will cause infrastructure to age & degrade at varying rates. Some infrastructure may require replacement sooner than anticipated, while others may be in efficient service well beyond a typical life time frame. It is for these reasons an identification and prioritization system, as discussed in detail in sections 3 - 5, are applicable to ensure efficient use of District capital funds.

Although the District ensures capital projects are individually identified and prioritized effectively & efficiently, a basic system wide analysis utilizing typical "Useful Life" determinations is a worthwhile review. Through studies and analysis by the American Society of Civil Engineers (ASCE) and the United States Environmental Protection Agency (USEPA), the following "Useful Life Matrix" table of system components has been identified:

Table 2.1 – Useful Life Matrix*	
Water System Components	**Design Life Years**
Treatment Plants – Concrete Structures	60 - 70
Treatment Plants – Mechanical & Electrical	15 – 25
Large Diameter (Transmission) Mains	65 – 95
Pumping Stations – Concrete Structures	60 – 70
Pumping Stations – Mechanical & Electrical	25
Distribution Mains	60 - 95
Sewer System Components	**Design Life Years**
Collection System	80 – 100
Force Mains	25
Pumping Stations – Concrete Structures	50
Pumping Stations – Mechanical & Electrical	15

*** Source:** US EPA Clean Water and Drinking Water Infrastructure Gap Analysis Report, September 2002

Using this industry developed table as a starting point reference, expanding & modifying it to reflect the District's infrastructure specifics is performed to generate a general analysis of approximate system replacement costs (Table 2.2). As noted in the USEPA report: "One such approximation tool is a useful life matrix, which can serve as a tool for developing initial cost estimates and for long-range planning and evaluating programmatic scenarios…the (Useful Life Matrix) can be used at the local level as a starting point for repair and replacement, strategic planning, and cost projections."

By and large the District, unlike sprawling urban areas, does not have to manage growth and likewise, as a basic analysis, values are provided at their current rate. For purposes of this guide, it is assumed District revenue will more or less follow the region's consumer price index (CPI) over time. Table as follows:

Table 2.2 - NTPUD System Wide Infrastructure Cost Analysis

	A	B	C	D	E = C x D	F = E / B
Water System Components	Industry Design Life Years	NTPUD Design Life (Average)	District Assets Total (EA or LF)	Cost for Rehabilitation or Replacement (per unit)	Cost for Rehabilitation or Replacement (District Wide)	Rehab or Replace Cost per Year
- Source -						
Treatment Plants – Concrete Structures	60 - 70	65	1	$ 500,000	$ 500,000	$ 7,692
Treatment Plants – Mechanical, Electrical, Pumping	15 – 25	25	1	$ 800,000	$ 800,000	$ 32,000
Wells (Complete)		65	2	$ 500,000	$ 1,000,000	$ 15,385
Pumping Stations – Mechanical & Electrical	25	30	3	$ 150,000	$ 450,000	$ 15,000
Pumping Stations – Structures	60 – 70	65	2	$ 200,000	$ 400,000	$ 6,154
- Storage -						
Steel Storage Tank	20 - 30	25	8	$ 325,000	$ 2,600,000	$ 104,000
- Distribution -						
Large Diameter (Transmission) Mains	65 – 95	80	26505	$ 350	$ 9,276,750	$ 115,959
Distribution Mains	60 - 95	80	257664	$ 175	$ 45,091,200	$ 563,640
Connections & Services (w/o meter)	60 - 100	50	3872	$ 1,000	$ 3,872,000	$ 77,440
Meters (reading device)	15	15	3872	$ 650	$ 2,516,800	$ 167,787
Fire Hydrants	60 - 80	50	347	$ 5,000	$ 1,735,000	$ 34,700
- Other -						
SCADA (District Wide)	15	15	1	$ 500,000	$ 500,000	$ 33,333
Total	**Water**					**$ 1,173,090**

Table 2.2 - NTPUD System Wide Infrastructure Cost Analysis (continued)						
	A	B	C	D	E = C x D	F = E / B
Sewer System Components	Industry Design Life Years	NTPUD Design Life (Average)	District Assets Total (EA or LF)	Cost for Rehabilitation or Replacement (per unit)	Cost for Rehabilitation or Replacement (District Wide)	Rehab or Replace Cost per Year
- Gravity Collection -						
Lateral Connections	80 - 100	90	5223	$ 3,000	$ 15,669,000	$ 174,100
Collection System	80 - 100	90	396000	$ 90	$ 35,640,000	$ 396,000
Manholes	80 - 100	90	1720	$ 4,000	$ 6,880,000	$ 76,444
- Pumping Collection -						
Stations (Satellite) - Structures		100	14	$ 250,000	$ 3,500,000	$ 35,000
Stations (Satellite) – Mechanical & Electrical	15	30	14	$ 125,000	$ 1,750,000	$ 58,333
- Pumping Export -						
Stations (Mains) – Structures	50	100	4	$ 500,000	$ 2,000,000	$ 20,000
Stations (Mains) – Mechanical & Electrical	15	30	4	$ 1,500,000	$ 6,000,000	$ 200,000
Force Mains	25	50	34848	$ 300	$ 10,454,400	$ 209,088
- Other -						
SCADA (District Wide)	15	15	1	$ 500,000	$ 500,000	$ 33,333
Total	**Sewer**					**$ 1,202,299**

Table 2.2 - NTPUD System Wide Infrastructure Cost Analysis (continued)						
	A	B	C	D	E = C x D	F = E / B
Base Operations Facilities	Design Life Years	Design Life (Average)	District Assets Total (EA or LF)	Cost for Replacement (Avg. per unit)	Cost for Replacement (District Wide)	Replace Cost per Year
Base Facilities Building	60	60	1	$ 3,800,000	$ 3,800,000	$ 63,333
Fleet (Crew/Utility Trucks)	10	10	33	$ 35,000	$ 1,155,000	$ 115,500
Heavy Equipment (Utility Equip. / Large Trucks / rolling gen. / etc.)	15	15	15	$ 110,000	$ 1,650,000	$ 110,000
Hydro/Vacuum Trucks	10	10	2	$ 500,000	$ 1,000,000	$ 100,000
Medium Equipment (Air comp. / traffic trailers / arrow board / etc.)	20	20	15	$ 20,000	$ 300,000	$ 15,000
Operations Maintenance Buildings	60	60	1	$ 2,000,000	$ 2,000,000	$ 33,333
Total	**Base Operations**					**$ 437,167**

While the Design Life (column B) and Cost for Rehabilitation or Replacement (column D) values may vary some as replacement/rehabilitation projects occur and designs are more closely examined or detailed, the quantity of District assets (column C) may not. This noted, it would not be anticipated finer level adjustments to these values, intended to capture the average conditions of the entire infrastructure, would have too significant of an impact to this overall "big picture" review. In any case, performing this basic review (populated with the District's best approximations) is of value simply to provide general insight and a reference.

3 CIP Drivers, and Prioritization Factors

With this District wide guide, it is important to identify all CIP drivers and factors and subsequently develop a ranking system as discussed in section 4. In determining future projects, and their respective schedules, the District must balance the inevitable and always present trade-offs between the following drivers and factors:

- Regulatory Compliance
- Conflict with Caltrans/County Improvements
- Condition Assessment (or Probability of Failure)
- Consequences of Failure / Risk
- Capacity / System Operational Efficiencies
- Improved Operations and Maintenance (O&M) Costs
- Safety / Security
- Design Life / Best Replacement Practices
- Redundancy / Reliability
- Expected Standards for Public System
- Opportunity Projects
- Developer Extensions

As shown above, some of the CIP drivers are influenced by external factors and are therefore inherently outside the District's control, either in part or completely. The remaining are fully within the District's control and are therefore fully subject to the District's prioritization and scheduling.

Appendix C provides a thorough discussion and definition for all Drivers and Prioritization Factors noted above.

4 CIP Identification, Scoring, & Ranking Methodology:

As noted in section 1, the project lists herein this guide's appendix are a combination of those identified in the past, through several different studies, and through District's own CMMS analysis. As such it is important to identify all CIP drivers and factors and develop a consistent ranking system. While any given document (master plan, study, etc.) may have its own list and prioritization (developed relative to its respective level of importance and scope of document), the District approaches this District wide compiled guide applying factors in an objective fact-based manner to identify a level of importance balancing all drivers and factors.

4.1 External Influence

As noted in section 3, some of the capital drivers are outside NTPUD's control and must be completed (Regulatory Compliance and Conflicts in R/W). These projects by their very nature receive the highest priority as the District must maintain regulatory compliance and likewise must relocate if the owner of the property where District infrastructure resides requires the District to do so (i.e. Caltrans or County R/W). As such, these cause other projects within NTPUD's control, and of priority to the District, to defer to a later date simply due to their demand for capital funds. Fortunately, the District typically has advanced warning of these requirements and as such can adequately plan for their completion within the higher, or controlling, agency's timeframe.

4.2 Internal Determinations

For the remainder of the projects, those wholly within the District's control, the District first adopts a risk-based approach for its scoring methodology. With respect Sewer infrastructure, all identified projects receive a risk based score. With respect to Water infrastructure, if there are no *high* risk areas requiring capital improvements, projects are scored through respective weighting of all the other drivers as noted in section 3.

4.2.1 Sewer

Utilizing the risk-based determination, risk is defined as the product of two factors: Condition (or Likelihood of Failure) & Consequence of Failure. Combined they provide a quantifiable scoring output which helps rank and prioritize projects.

As thoroughly described in appendix C (section C.3), for any given asset type the District is able to perform quality Condition assessments. The end result of an assessment then ultimately scores the asset on the basic grading scale of 1 through 5:

1 = Excellent
2 = Good
3 = Fair
4 = Poor
5 = Immediate Attention

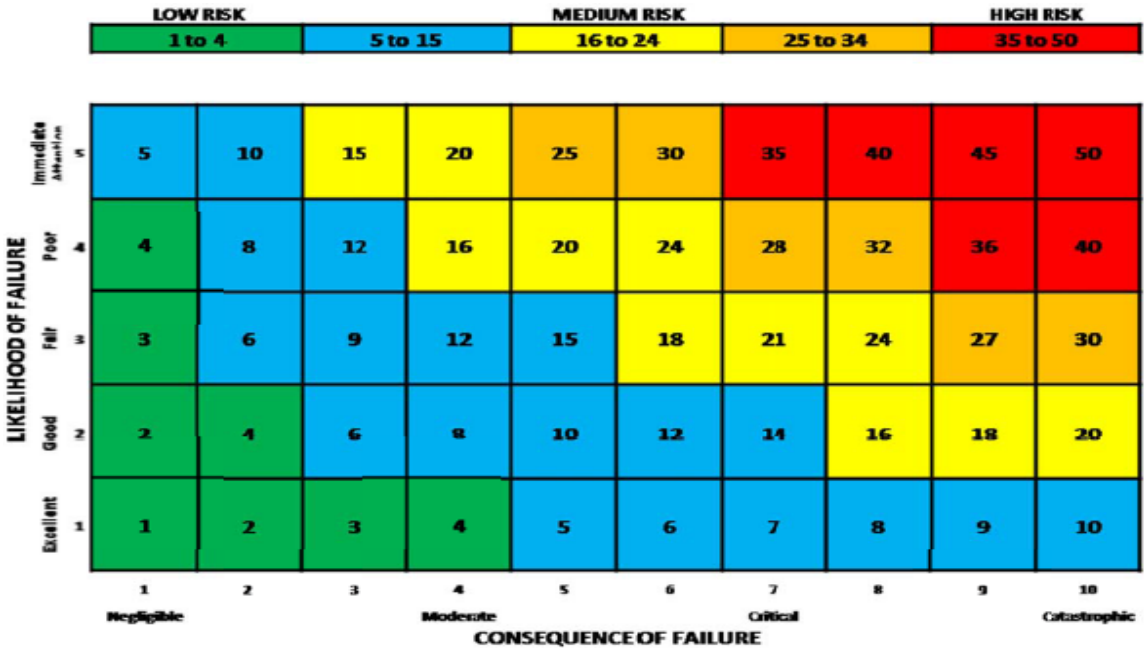
NTPUD tracks the condition of each asset through CMMS which provides filtering capabilities. The condition grade may be re-visited and/or updated every time the asset is assessed, inspected, or maintained for any reason. This constant monitoring provides key information for establishing routine maintenance activities and re-inspection frequencies as well as providing historical information used in making rehabilitation/replacement priorities.

For Consequences of Failure of an asset in question, an approach of individually scoring each of the component to consider as described in appendix C (section C.4), and subsequently average these individual scores to obtain a single score could be taken. However, for purposes of cleanliness & simplicity, the District simply views each asset with all of these components in mind to determine a single grade on a scale of 1 through 10:

1 = Negligible
4 = Moderate
7 = Critical
10 = Catastrophic

With the above factors determined, the following formula defines the overall Prioritization Matrix:

Condition (1-5) X **Consequence of Failure** (1-10) = **Score or Asset Risk** (1-50)



With the sewer gravity collection system, the District utilizes NASSCO PACP condition assessments as described in Appendix C (Section C.3.1). NASSCO condition assessment grades range from: 1 = Acceptable

Structural Condition to 5 =Collapsed or Collapse Imminent. Although exclusively used for rating of the sewer gravity collection system, the range and scoring is consistent with the District adopted condition rating scale for all other District assets. Additionally, consequences of failure are determined through a simple query of the District's GIS maps to identify the amount of sewershed above the portion of system in question and the environmental sensitivity of the location. The greater the sewershed, the greater the consequences, likewise the closer to waterways, the greater the consequences. All told the risk-based approach is applied to the gravity system in a very clean, systematic, and unbiased manner.

4.2.2 Water

Identifying risk-based driven projects is first performed. Of these, risk-based scores are applied consistent with as described above. If there are no *high* risk projects identified, projects are scored as outlined in the District's 1999 Master Water Plan (adopted by Board of Directors 2/8/2000). This approach is essentially a combined weighting of all factors as noted in section 3.

To aid in this scoring analysis, fact based reviews are performed for the majority of these factors to provide a respective weight for each to then fold into an overall score. In the case with O&M costs, CMMS work order queries, documenting the amount of District resources (Time, Materials, and Equipment) put toward District assets, is utilized to populate information contained in a cost-benefit analysis. Likewise, system inefficiencies (such as unaccounted for water, or system losses), are identified through water audit analysis considering: water production, distribution system zone meters, and individual service meters.

In summary: Through capturing and maintaining information on assets in the District's CMMS system (condition, O&M, etc.), maintaining system historian databases, and risk determinations for identified risk-based projects, the District has an analytical tool to utilize in prioritization discussions and determinations as noted in section 5.

5 CIP Prioritization, Planning, and Scheduling

Having identified, scored, and/or ranked projects, review of available funds and discussions/determinations made by the Governing body solidify project prioritization. As mentioned in section 1, the District's "system replacement fees" provide for a generally consistent (predictable) inflow of capital funds whereby scheduling a projects timeframe is a fairly straightforward process.

5.1 5-Year CIP

Each year, as part of the District's fiscal year budget preparation, the engineering and accounting departments coordinate projects and available funding. Through this process the District looks five years into the future outlining projects, and the District's capital account running balances. This five-year outline is simply referred to as the District's "5-year CIP".

The 5-year CIP is prepared and implemented as follows:

- Staff proposes a 5-year CIP based on the ranked capital projects and anticipated cash flows available.
- The Development and Planning (D&P) Committee reviews, revises, and approves the 5-year CIP.
- That 5-year CIP then becomes the basis for that year's capital budget which is reviewed and adopted by the full Board of Directors.

Appendix A provides a current copy of the 5-year CIP list.

5.2 Out-Year Project List (5 – 10 years +/- & 10 years +)

In addition to the 5-year CIP list, the District maintains a list and ranking of identified projects for completion beyond the 5-year mark. Each year, as part of the 5-year CIP discussions with Board Committee as described

above, this list is reviewed to identify which, if any, projects graduate to the 5-year CIP list. This "out-year" list aims to identify projects desired between the 5 – 10-year timeframe and beyond the 10-year timeframe. It is recognized going beyond 10 years reaches a point of diminishing returns (considering the unknowns of the many variables to consider with capital planning), however a list is maintained simply to keep a record of identified projects.

Appendix B provides a current list of projects both on the 5-year CIP list and out years.

5.3 Fixed Amount per Asset Type Approach

Addressing known problem areas in a systematic manner, by asset type, may be performed by dedicating a consistent funding amount to go toward those areas in greatest need (per asset type) on a fixed schedule or rotation.

The District could apply this model, or portions of, to all the different District asset types. However, as an example for discussion purposes, to initially develop an approach for the sewer gravity system can serve as a prototype to establish a concept the District could build on with other assets, if desired, at a later date. Approach as follows:

With the following occurring and known on the gravity system:

- Consistent CCTV Inspection Schedule (Appendix section C.3.1)
- Consistent NASCO Rating Codes (Appendix section C.3.1)
- Known Fixed Quantity (Units) of Assets (Linear feet of main, numbers of MH, number of laterals)
- Known Estimated Cost of Rehab (lining, etc.) per Unit

The District simply formally adopts a biennial (once every other year) fixed budget to dedicate toward rehabilitating or replacing the gravity system. Every other year a simple CMMS query selecting the highest risk areas (as described in section 4.2) identifies which assets are on "the list" for that year's current rehabilitation expenditure of funds.

This proactive approach is advantageous whereby the District is positioned to consistently "chip away" at these areas in greatest need with a known amount of funds. On the funding side, once an amount is solidified, the District simply incorporates this fixed amount, and its fixed schedule, in the 5-year CIP. This is of course not to take funds away from other asset types in need, which is why establishing this amount will require review/discussion/analysis with all parties as applicable.

Gravity system rehabilitation through in-situ technologies are not design intensive efforts, rather more typically an "off the shelf" specifications. Likewise, are lateral and manhole replacements. As such the District can move forward rehabilitating the entire gravity system in a very clock-work and systematic manner. It is expected spot repairs, requiring digs, would be required ahead of in-situ rehabilitations, however these are anticipated to be performed utilizing in-house resources scheduled ahead of the rehabilitation.

6 Summary

As detailed above, through consistent: monitoring of the District's infrastructure condition, capturing in District's CMMS system, and coordination with District's D&P Committee & full Board, the District is able to prioritize capital projects. This prioritization, and respective expenditure of available District capital funds, is accomplished as effectively and efficiently possible.

Appendix A:

Sewer & Water – Five Year Focus

Sewer Capital Improvement Plan - Five Year Focus

	Actual		Budget - Five Year Focus						Actual + Budget
	2016/2017 - Budget	Total 2008 - 2017	2017/2018	2018/2019	2019/2020	2020/2021	2021/2022	Total 2017 - 2022	Total 2008 - 2022
Funding									
Sewer System Replacement Fee	575,908	5,380,514	575,908	575,908	575,908	575,908	575,908	2,879,542	8,260,056
Sewer Fed/State Mandate Fee (see F&S Mandate CIP)	-	-						-	-
Connection Fees	25,000	468,868	25,000	25,000	25,000	25,000	25,000	125,000	593,868
Grant Revenue		257,907						-	257,907
Southwest Gas/Arizona Pipeline		110,021						-	110,021
Reserves	1,000,000	1,000,000	-					-	1,000,000
Total Revenue	1,600,908	7,217,310	600,908	600,908	600,908	600,908	600,908	3,004,542	10,221,852
Sewer CIP Projects									
Completed		4,552,772						-	4,552,772
Work In Process		(89,198)						-	(89,198)
Carryover		-						-	-
Gateway to Kings Beach Commercial Core Sewer Relocations	-	-						-	-
2 - Carnelian Pump Station Rehabilitation	250,000	250,000						-	250,000
Five Year Focus		-						-	-
Gateway to Kings Beach Commercial Core Sewer Relocations	39,000	39,000						-	39,000
2 - Carnelian Pump Station Rehabilitation	2,763,590	2,763,590						-	2,763,590
N-1 Sewer Pump Station Electrical Modifications		-		157,000				157,000	157,000
National Sewer Pump Station Rehabilitation - Design		-		100,000				100,000	100,000
D-5 Satellite rehab		-		150,000				150,000	150,000
Gravity System Lining (Standing Project)				200,000		200,000		400,000	400,000
Total Sewer CIP Projects	3,052,590	7,516,165	-	607,000	-	200,000	-	807,000	8,323,165
Fiscal Year Fund Balance (Over) Under	(1,451,682)	(298,855)	600,908	(6,092)	600,908	400,908	600,908	2,197,542	1,898,687
Running Accumulated Balance (Deficit)	(298,855)	(0)	302,054	295,962	896,870	1,297,779	1,898,687	1,898,687	1,898,687

Water Capital Improvement Plan - Five Year Focus

		Actual	Actual Total	Budget - Five Year Focus						
		2016/2017	2008-2017	2017/2018	2018/2019	2019/2020	2020/2021	2021/2022	2017-2022	2008-2022
Water System Replacement Fee	33-3100-3120	1,040,000	9,821,905	1,040,000	1,040,000	1,040,000	1,040,000	1,040,000	5,200,000	15,021,905
Connection Fees	32-3100-3335 and 3336	80,110	618,331	80,110	80,110	80,110	80,110	80,110	400,550	1,018,881
Grant Revenue		-	1,944,189	0	0	0	0	0	-	1,944,189
Total		1,120,110	12,384,424	1,120,110	1,120,110	1,120,110	1,120,110	1,120,110	5,600,550	17,984,974
Proceeds of Debt Financing - B of A Loan			4,500,000							4,500,000
		1,120,110	16,884,424	1,120,110	1,120,110	1,120,110	1,120,110	1,120,110	5,600,550	22,484,974
Water CIP Projects										
Actual Projects		547,095	14,110,050							14,110,050
Construction In Progress			(100,569)							(100,569)
Debt Service		222,968	891,872	222,968	222,968	222,968	222,968	222,968	1,114,840	2,006,712
Carryover of Prior Year		50,000	50,000						-	50,000
Current Year Budget		50,000	50,000	3,640,000	-	1,000,000	850,000	900,000	6,390,000	6,440,000
Current Year Budget Adjustments		-								-
Total Water CIP Projects		870,063	15,001,354	3,862,968	222,968	1,222,968	1,072,968	1,122,968	7,504,840	22,506,194
Fiscal Year Fund Balance (Over) Under		250,047	1,883,070	(2,742,858)	897,142	(102,858)	47,142	(2,858)	(1,904,290)	(21,220)
Water CIP Funding Running Balance		1,883,070		(859,788)	37,354	(65,504)	(18,362)	(21,220)	(21,220)	(21,220)

Carryover			2017	2018	2019	2020	2021	2022	2017-2021	2008-2021
1622	National Avenue Water Treatment Plant Imp		50,000						50,000	50,000
1631	Northside Salmon Services								-	-
			50,000	-	-	-			50,000	-
Budget										
39-0800-4475-1622	National Avenue Water Treatment Plant Improvements Phase 3			125,000					125,000	125,000
	Carnelian Woods #1 Water Storage Tank Rehabilitation			350,000					350,000	350,000
	Carnelian to Watson Creek Water Main Replacement Project			1,000,000					1,000,000	1,000,000
	Loch Levon and Steelhead Water Main Replacement Project			2,100,000					2,100,000	2,100,000
39-0800-4475-1710	NAWTP Joint Repair emergency		50,000							
	Lake Pump Improvements			65,000						
	Golden Water Main Replacement					1,000,000				
	Trout Water Main Replacement						850,000			
	Brook and Salmon Water Main Replacement							900,000		
			50,000	- 3,640,000	-	1,000,000	850,000	900,000	3,575,000	3,575,000

Appendix B:

Capital Projects

CAPITAL PROJECTS - SEWER

6/5/2017

Below compiled list represents projects currently not completed as of the above date.
Projects have been identified through internal analysis and/or in past studies/reports.
List shall be maintained and used for future CIP planning as applicable. List may be added to as projects are identified.

DOCUMENT, STUDY, or DISTRICT'S JUSTIFICATION SOURCE
Main Sewer Pump Station Master Plan, 2009
CIP Report, 2006
Wastewater Collection System Overflow/Release Reduction Evaluation, 2003 - Army Corps
Sewer Master Plan, 1991
Other

-or-

District CMMS

CIP DRIVER / JUSTIFICATION CATEGORY
Regulatory Compliance
Conflict in R/W
Condition / Risk-Based
Level of Service / Capacity
System or O&M Efficiencies
Safety / Security
Best Replacement Practice
Redundancy / Reliability
Expected Standards
Opportunity Project
Other

*** Note on Budget:** Amount noted is a **planning level estimate only**. Not an engineers estimate using complete design plan bid documents as a basis for cost estimation.

PROJECT * Listed in Order of Priority within Project Type (Gravity Collection, Pumping Collection, Export System)	PROJECT DESCRIPTION	BUDGET*	DOCUMENT, STUDY, or DISTRICT'S JUSTIFICATION SOURCE	CIP DRIVER / JUSTIFICATION CATEGORY	RISK (1 - 5)	CONSEQUENCES OF FAILURE (1 - 10)	RISK-BASED SCORE (1 - 50)
					A	B	= A x B
Currently in 5-Year CIP							
- Gravity Collection -							
Biennial Gravity System Lining	Standing project of $200,000 every two years. Mains prioritized per current CCTV data at time of bid. $200,000 is currently approved amount (2 years in current 5-year focus). See 5-10 year description below for amounts required to sustain the system	$ 400,000	District CMMS	Condition / Risk-Based			As determined
- Pumping Collection -							
N-1 Electrical Modifications	240V to 208V and generator fuel modifications	$ 157,000	Other - Power Company Project	Other - Power Company Poject	4	6	24
Rehabilitation of D5 Satellite Station	Rehabilitation of D5 (Model 15) Satellite Station	$ 150,000	District CMMS	Condition / Risk-Based, Best Replacement Practices	5	6	30
- Export System -							
National Pump Station Rehabilitation - (Design phase sub-consultants)	National Rehabilitation Design Phase (in-house design) - budget for sub-consultants	$ 100,000	Main Sewer Pump Station Master Plan, 2009	Condition / Risk-Based	3	7	21
Out Years (5 - 10 years +/-)							
- Gravity Collection -							
Biennial Sewer Main Rehabilitation (District Wide)	Rehabilitate gravity mains as a single project once every two years. Goal to accomplish rehabilitated pipe on 90 +/- year rotation. Peripheral Facts: Sewer collection pipes design life = 80-100 years. District owns 75 miles pipe (396,000 feet). CIPP lining = $90/LF (+/-). Cost to accomplish 90 year rotation = $396,000/yr (+/-) (or $792,000 every two years)	$792, 000 every other year	District CMMS & CIP Report, 2006	Condition / Risk-Based, Best Replacement Practices	-	-	As Determined
Sewer Main Rehabilitation	Rehabilitation of mains as identified through CCTV for five years beyond 5-year CIP (years 6 - 10)	$ 1,980,000					As Determined

Biennial Sewer Lateral Replacement Program (District Wide)	Replace lower laterals as a single project once every two years. Goal to accomplish new lateral on a 90 +/- year rotation. Peripheral Facts: Sewer collection pipes design life = 80-100 years. District owns 5223 lower laterals. Lateral replacement = $3,000 each (+/-). Cost to accomplish 90 year rotation = $174,100/yr (+/-) (or $348,200 every two years)	$348,200 every other year	District CMMS & CIP Report, 2006	Condition / Risk-Based, Best Replacement Practices	-	-	As Determined
Lateral Replacement	Replacement of laterals as identified through CCTV for five years beyond 5-year CIP (years 6 - 10)	$ 870,500					As Determined
Biennial Manhole Rehabilitation or Replacement Program (District Wide)	Rehab or Replace manholes as a single project once every two years. Goal to accomplish new manhole on a 90 +/- year rotation. Peripheral Facts: Sewer collection manhole design life = 80-100 years. District owns 1,720 manholes. Manhole replacement = $4,000 each (+/-). Cost to accomplish 90 year rotation = $76,444/yr (+/-) (or $152,888 every two years)	$152,888 every other year	District CMMS & CIP Report, 2006	Condition / Risk-Based, Best Replacement Practices	-	-	As Determined
Manhole Rehabilitation or Replacement	Rehab or Replacement of Manholes as identified through regular inspections for five years beyond 5-year CIP (years 6 - 10)	$ 382,220					As Determined

- Pumping Collection -							
N1	Rehabilitation of N1 Satellite Station (Model 16)	$ 100,000	District CMMS	Condition / Risk-Based	4	6	24
N2	Rehabilitation of N2 Satellite Station (Model 15)	$ 100,000	District CMMS	Condition / Risk-Based	4	6	24
D3	Rehabilitation of D3 Satellite Station (Model 16)	$ 100,000	District CMMS	Condition / Risk-Based	4	6	24
D4	Rehabilitation of D4 Satellite Station (Model 16)	$ 100,000	District CMMS	Condition / Risk-Based	4	5	20
C1	Rehabilitation of C1 Satellite Station (Model 16)	$ 100,000	District CMMS	Condition / Risk-Based	4	5	20
S1	Rehabilitation of S1 Satellite Station (Model 15)	$ 100,000	District CMMS	Condition / Risk-Based	4	5	20
S2	Rehabilitation of S2 Satellite Station (Model 15)	$ 100,000	District CMMS	Condition / Risk-Based	4	4	16
N3	Rehabilitation of N3 Satellite Station (Model 16)	$ 100,000	District CMMS	Condition / Risk-Based	4	4	16
C2	Rehabilitation of C2 Satellite Station (Model 16)	$ 100,000	District CMMS	Condition / Risk-Based	4	4	16
D7	Rehabilitation of D7 Satellite Station (Model 16)	$ 100,000	District CMMS	Condition / Risk-Based	4	3	12
D1	Rehabilitation of D1 Satellite Station (Model 16)	$ 100,000	District CMMS	Condition / Risk-Based	4	3	12
D6	Rehabilitation of D6 Satellite Station (Model 16)	$ 100,000	District CMMS	Condition / Risk-Based	4	3	12
D2	Rehabilitation of D2 Satellite Station (Model 15)	$ 100,000	District CMMS	Condition / Risk-Based	4	3	12

- Export System -							
National Pump Station Rehabilitation - Construction Phase	National Sewer Rehabilitation: Pump/motors, Valves, Generator, Electrical, Separate power feed (meter) from NAWTP, SCADA Controls, Well rehab, Building, etc.	$ 2,300,000	Main Sewer Pump Station Master Plan, 2009	Condition / Risk-Based	3	8	24
Force Main Inspection Ports & CAV Valves Project	CCTV inspection of the District's sewer force mains. This project would also include the installation of inspection ports as required on Force Mains. And 2 CAVs on National FM, 1 CAV on Carnelian FM	$ 2,000,000	Main Sewer Pump Station Master Plan, 2009	Condition / Risk-Based	2	9	18

Total Identified Sewer Projects (10 years +/-): $ 9,639,720

CAPITAL PROJECTS - WATER

6/5/2017

Below compiled list represents projects currently not completed as of the above date.

Projects have been identified through internal analysis and/or in past studies/reports.

List shall be maintained and used for future CIP planning as applicable. List may be added to as projects are identified.

PROJECT TYPE
Upgrade
Replacement
Rehabilitation
Other

DOCUMENT, STUDY, or DISTRICT'S JUSTIFICATION SOURCE

Kings Beach Grid Waterline Replacement, 2007
CIP Report, 2006
Master Water Plan, 1999
Other

-or-

District CMMS

CIP DRIVER / JUSTIFICATION CATEGORY

Regulatory Compliance
Conflict in R/W
Condition / Risk-Based
Level of Service / Capacity
System or O&M Efficiencies
Safety / Security
Best Replacement Practice
Redundancy / Reliability
Expected Standards
Opportunity Project
Other

* **Note on Budget:** Amount expressed is a planning level estimate only. Not an engineers estimate using complete design & plans as a basis for cost estimation

PROJECT* * Listed in Order of Priority within Project Type (Source, Storage, Distribution)	PROJECT TYPE	PROJECT DESCRIPTION	BUDGET*	DOCUMENT, STUDY, or DISTRICT'S JUSTIFICATION SOURCE	CIP DRIVER / JUSTIFICATION CATEGORY
Currently in 5-Year CIP					
- SOURCE -					
Lak Pump Improvements	Upgrade	Upgrade deficiencies found during pump replacement project	$ 65,000	District CMMS	Redundancy / Reliability
NAWTP - SCADA Phase 3	Upgrade	SCADA Phase 3 improvements	$ 175,000	Master Water Plan, 1999	System Efficiencies
- STORAGE -					
CW #1 Tank Rehabilitation	Rehabilitation	Rehabilitate Carnelian Tank	$ 350,000	Master Water Plan, 1999	Regulatory Compliance & Expected Standards
- DISTRIBUTION -					
Loch Levon & Steel head Watermains	Replacement	New watermain and services in Loch Levon and Steelhead	$ 2,100,000	Kings Beach Grid Waterline Replacement, 2007	System and O&M Efficiencies, Level of Service / Capacity
Carnelian to Watson Creek main	Replacement	New watermain and services in Hwy 28 from Garwoods to Watson Creek (2,600' +/-)	$ 1,000,000	Master Water Plan, 1999	Level of Service / Capacity & Expected Standards
Golden Watermain	Replacement	New watermain and services in Golden	$ 1,000,000	Kings Beach Grid Waterline Replacement, 2007	System and O&M Efficiencies, Level of Service / Capacity
Trout Watermain	Replacement	New watermain and services in Trout	$ 850,000	Kings Beach Grid Waterline Replacement, 2007	System and O&M Efficiencies, Level of Service / Capacity
Brook and Salmon Watermain	Replacement	New watermain and services in Brook & Salmon	$ 900,000	Kings Beach Grid Waterline Replacement, 2007	System and O&M Efficiencies, Level of Service / Capacity
Out Years (5 - 10 years +/-)					
- SOURCE -					
Carnelian - Alternative Source	Other - New	Develop additional source for Carnelian system (currently relying on single well)	$ 700,000	Master Water Plan, 1999	Redundancy / Reliability & Regulatory Compliance
Tahoe Main - Alternative Source	Other - New	Develop additional source for the Tahoe Main System	$ 700,000	Master Water Plan, 1999	Redundancy / Reliability & Regulatory Compliance
- STORAGE -					
Dollar Cove Tank Rehabilitation	Rehabilitation	Dollar Cove Rehabilitation	$ 325,000	District CMMS	Regulatory Compliance & Expected Standards
Kingswood West Tank Rehabilitation	Rehabilitation	Kingswood West Rehabilitation	$ 325,000	District CMMS	Regulatory Compliance & Expected Standards

- DISTRIBUTION -					
Kings Beach Water Main Replacements (Remainder)	Replacement	Relocate back yard water mains to the County Right of Way throughout Kings Beach.	$ 3,000,000	Kings Beach Grid Waterline Replacement, 2007	System and O&M Efficiencies, Level of Service / Capacity

Total Identified Water Projects (10 years +/-): $ 11,490,000

Out Years (10 years +)

- SOURCE -					
Park Tank to Kingswood West Tank Booster Pump Station	Upgrade	Booster station and line to Regency to provide better system dynamics for park tank & Kingswood West system	$ 1,000,000	Other - Staff	System Efficiencies
Carnelian Woods Well Building Rehab & Generator	Rehabilitation	Reconstruct the Carnelian Woods Well building and adding a stanby generator	$ 500,000	Other - Staff	Safety / Security, Redundancy / Reliability
Carnelian Woods Booster Rehab & Emergency Power Supply	Rehabilitation	Reconstruct the Carnelian Woods booster station and provisions to power from Well Generator (once installed)	$ 500,000	Other - Staff	Safety / Security, Redundancy / Reliability
Kingswood West Booster Rehab & Generator	Rehabilitation	Reconstruct the Kingswood West booster station and adding a stanby generator	$ 500,000	Other - Staff	Safety / Security, Redundancy / Reliability
Dollar Cove Water Treatment System	Other	Currently, the District purchases water from the Tahoe City Public Utility District for the Dollar Cove water system; which there is not an agreement in place for the purchased water, making this an interruptable water supply. This project would relocate and bring to current regulatory requirements and standards the inactive Dollar Cove Water Treatment Plant; replace and extend the inactive lake intake to meet current standards; install submersible pumps; and install a booster pump station to boost to the relocated treatment plant. Site C is the preferred site with a maximum pumping capacity of 0.40 MGD per the Doller Cove Water Treatment Feasibility Study.	$ 2,838,000	Other - Doller Cove Water Treatment Feasibility Study, 2009	System Efficiencies, Level of Service / Capacity

- STORAGE -					
none identified at this time (TBD)					

- DISTRIBUTION -					
Mains in R/W to abandon all "back-yard" mains remaining in District	Replacement	Project constructs numerous sections of mainline in public right-of-way as required to abandon all "back-yard" mains District currently maintains. Backyard mains are historically old, small diameter, and difficult to access. Abandoning will allow District to examine each area to improve fire protection and system efficiencies as applicable per location(s). Back-yard mains currently exist (aside from Kings Beach) in: Pino Grande neighborhood, Old County neighborhood, Speedboat, Bend, etc.	TBD	Other - Staff	System and O&M Efficiencies, Level of Service / Capacity
Chinquapin Service Laterals	Replacement	Laterals (from large diameter mains to meter @ building footprints) are requireing more frequent repair and/or replacements. 45 year old system has degraded more rapidly than expected compaired to life of new installs.	TBD	Other - Staff	O & M Efficiencies
Zone Meters	Upgrade	Placement of meters for better leak audits and comprehensions of use & dynamics of system	$ 400,000	Other - Staff	System Efficiencis
Carnelian to Main Connection	Upgrade	This project consists of the installation of approximately 8,220 lineal feet of 14 inch water main on State Highway 28 to connect the NTPUD Main and Carnelian Systems	$ 3,300,000	Master Water Plan, 1999	Redundancy / Reliablity
Dollar Cove to Carnelian Connection	Upgrade	Install approximately 7,300 feet of 14 inch main on State Highway 28 between Watson Creek and 3631 North Lake Boulevard	$ 3,000,000	Master Water Plan, 1999	Redundancy / Reliablity
HWY 28 Beach to Safeway Watermain replacement	Replacement	Install approximately 420 feet of 8 inch main on the north side of Highway 28 between Safeway and Beach St. The project will improve fire support and will replace a deteriorated section of 3 inch main that is subject to frequent repair	$ 200,000	Master Water Plan, 1999	Level of Service / Capacity

Lake Forest No. 3	Upgrade	Install approximately 2,500 feet of 8 inch main on the southwest side of Highway 28 and along the northern District boundary, and 700 feet of 8 inch main between Highway 28 and Old County Road. The project will provide for the looping of mains and improved domestic service and fire support, and will replace several thousand feet of undersized, deteriorated mains	$ 1,500,000	Master Water Plan, 1999	Level of Service / Capacity, Redundancy / Reliability
Plaza Avenue	Replacement	Install approximately 380 feet of 8 inch main (with Services and FHs). This project will replace undersized, deteriorated water pipe, relocated services, and extend fire protection.	$ 150,000	Master Water Plan, 1999	Level of Service / Capacity
Kings Run Relocation	Replacement	Install approximately 415 feet of 8 inch main and 2 inch service pipe. The project will abandon approximately 850 feet of 8 inch pipe inaccessibly located in a former development, now federally owned open space, and relocate a deteriorated multi-unit service line.	$ 100,000	Master Water Plan, 1999	O&M Efficiencies
SR 28 (Speedboat to Park) Water Main Replacement Project	Replacement	Install approximately 1,400 feet of 4 inch main (with services) on the south side of Highway 28 from Speedboat to the west, main will provide looping if desired. -or- Install South side services from Main on North side of highway. (TBD) Either way, the project will abandon 970 feet of deteriorated 2 ¼ inch diameter main that is subject to frequent repair and is under several structures.	$ 420,000	Master Water Plan, 1999	O&M Efficiencies
Tahoe Vista - Kings Beach Transmission Main	Upgrade	This project will install a water transmission main between the existing water main on National Avenue and the water main in the Tall Trees subdivision on existing unimproved street rights of way. Computer modeling will be necessary to determine the optimal pipeline size. Conventional cut and cover construction may be supplimented by directional drilling an expected 12-14" diameter water main beneath the Snow Creek Stream Environment Zone. The transmission main is needed to move water across the Main system to increase capacity of existing piping, reduce peak operating pressures created by the bottleneck of a single existing highway transmission main to transport water from all sources to the area of maximum demand, improve fire flow, improve flexibility/usage of exist water storage, remove single point of failure.	$ 1,200,000	Other - Staff	Level of Service / Capacity
Highway 28 Transmission Main - Valves	Upgrade	Install 4 – 12” insertion valves (or cut in new) on the water transmission main on Highway 28 between National Avenue and SR 267. Two pipe secitons of 2,540 linear feet and 2,400 linear feet will be broken into this sections of between 800 and 900 linear feet between valves.	$ 80,000	Other - Staff	System Efficiencies
Stag Drive Water Main	Upgrade	New watermain from Rim drive to HWY 28. Route either via easement (between Stag & HWY, down rock pile) or all the way down Stag then along highway. This project will provide loop connection to Rim/Fawn neighborhood.	$ 800,000	Other - Staff	System Efficiencies, Redundancy / Reliability
Zone 1A Pressure Reducing Valves (PRV)	Upgrade	Installation of 13 PRVs in Zone 1A to reduce pressures in lower areas (currently at 160 psi +/-)	TBD	Other - Staff	System Efficiencies

CAPITAL PROJECTS - BASE

2/14/2017

Below compiled list represents projects currently not completed as of the above date.
Projects have been identified through internal analysis and/or in past studies/reports.
List shall be maintained and used for future CIP planning as applicable. List may be added to as projects are identified.

PROJECT TYPE

Upgrade
Replacement
Rehabilitation
Other

CIP DRIVER / JUSTIFICATION CATEGORY

Regulatory Compliance
Conflict in R/W
Condition / Risk-Based
Level of Service / Capacity
System or O&M Efficiencies
Safety / Security
Best Replacement Practice
Redundancy / Reliability
Expected Standards
Opportunity Project
Other

*** Note on Budget:** Amount noted is a **planning level estimate only**. Not an engineers estimate using complete design plan bid documents as a basis for cost estimation.

PROJECT	PROJECT TYPE	PROJECT DESCRIPTION	BUDGET*	CIP DRIVER / JUSTIFICATION CATEGORY
Currently in 5-Year CIP				
Base Generator (partially grant funded)	Other	New Generator for base building	$ 200,000	Condition / Risk-Based, Redundancy / Reliability
Shop & Annex backup power supply	Other	Trench, Conduits, and Infrastructure as required to supply shop and annex with generator power from new base facilities generator project once installed	$ 50,000	Condition / Risk-Based, Redundancy / Reliability
Out Years (5 - 10 years +/-)				
Materials Storage Bin Cover	Upgrade	Weather Cover for Materials Storage Bins	$ 200,000	O&M Efficiencies
Siesmic Retrofit on Annex	Upgrade	Structural retrofit on annex building housing equipment necessary to keep District operating	$ 200,000	Condition / Risk-Based
Vehicle Cover	Upgrade	Weather Cover for Vehicle Storage	$ 300,000	O&M Efficiencies
Yard Paving	Rehabilitation	New paving in yard	$ 200,000	Condition
Shop Replacement	Replacement	New Shop	$ 250,000	Condition
		Total Identified Base Projects:	**$ 1,400,000**	

Appendix C:

CIP Driver & Prioritization Factor Definitions

C. CIP Drivers, and Prioritization Factors

As noted in the body of the Capital Improvement Plan, the District has identified the following drivers and factors as being applicable to the District's infrastructure:

C.1 Regulatory Compliance
C.2 Conflict with Caltrans/County Improvements
C.3 Condition Assessment
C.4 Consequences of Failure / Risk
C.5 Capacity / System Operational Efficiencies
C.6 Improved Operations and Maintenance (O&M) Costs
C.7 Safety / Security
C.8 Design Life / Best Replacement Practices
C.9 Redundancy / Reliability
C.10 Expected Standards for Public System
C.11 Opportunity Projects
C.12 Developer Extensions

Each CIP driver, or prioritization factor, is defined and discussed below:

C.1 Regulatory Compliance

NTPUD systems are operating in accordance with a host of federal, state, and local public health and environmental regulations and standards. The primary permitting authorities, and their respective governing regulation, for both the Sewer and Water systems are noted below:

C.1.1 Sewer

State of California Water Resources Control Board (Order No. 2006-0003-DWQ): NTPUD's boundaries are within the Lahontan defined region; as such this regulatory agency is simply referred to as Lahontan. The fundamental goal of operating under the State order is to eliminate, or minimize to the greatest extent possible, sanitary sewer overflows (SSOs). In order to monitor and maintain best compliance in meeting this goal, Order conditions require the development of, and operations under, a Sanitary Sewer Management Plan (SSMP). The District's SSMP contains a system condition assessment and capacity assurance section, among many other sections. The SSMP is audited once every two years, as mandated per General Permit. At the time of writing this CIP, this SSMP audit was last performed in Fall of 2016.

C.1.2 Water

State of California Water Resources Control Board, Division of Drinking Water (Lassen District): Now under State Water Board, the Division of Drinking Water administers the California Regulations Related to Drinking Water (Title 17 & Title 22). All three of NTPUD's water systems must comply. Compliance dictates significant monitoring and reporting requirements, as well as on going condition assessments and inspections, to ensure safe and reliable drinking water for the public.

Department of Water Resources (DWR): As a supplier with greater than 3000 connections, NTPUD is considered and Urban Water Supplier who must comply with DWR regulations. The primary goal of DWR regulations is to ensure: conservation, sustainability, and appropriate planning to provide all state consumers adequate supplies to meet future needs. In order to monitor and maintain how the District is doing toward meeting these goals, DWR requires the development and implementation of an Urban Water Management Plan (UWMP). As of writing this CIP, the District's UWMP was last updated in the Spring of 2017.

One of the primary means of meeting the DWR goals is the District's reduction of unaccounted for water, which is the difference between water produced vs delivered. The largest means available to the District to reduce unaccounted for water is to minimize system losses. The above being the case is why distribution system replacements in areas where system losses are high often receive a high priority as capital projects.

C.2 Conflict with Caltrans/County Improvements

As a public agency, the great extent of the District's sewer collection and water distribution systems infrastructure resides in public right-of-way via an encroachment permit with the owner of right-of-way. Within the District's boundaries, the two agencies with underlying control, and ownership, of the public right-of-way are: Caltrans and Placer County. The remainder of District owned assets are contained either on District owned property or easement on private property.

As a condition of the District's encroachment permit with both of these agencies, if there is a need to occupy right-of-way where District owned facilities exist with the owner's improvements, the District is obligated to relocate those facilities in conflict at District expense. This condition can create a strain on District capital funds as the District is put in a position to expend resources toward infrastructure in good condition and good level of service without gaining the benefit of overall system improvements.

C.3 Condition Assessment

Condition Assessment (or Probability of Failure) will vary on the type of asset in question. In all cases, current condition and age of the asset is captured in District's CMMS database.

C.3.1 Sewer

Gravity System (mains, manholes, services): Straight forward visual inspects utilizing closed-circuit television (CCTV) inspections are employed. All CCTV inspections are performed using National Association of Sewer Service Companies Pipe Assessment Certification Program (NASSCO PACP) Standards. District staff performing these inspections are NASSCO trained and maintain certification. As such inspections are performed in a consistent manner with consistent rating codes. Per NTPUD's Sanitary Sewer Management Plan (SSMP), the District inspects all gravity mains on a four-year rotating basis.

Pressure lines (force mains): Unlike gravity, these lines are not able to be visually inspected. As such the District has historically relied on opportunity inspections, performed due to various reasons, such as: another construction project requires exposing the exterior of the pipe, pipe requires repair (due to construction accident), or when appurtenances are added (such as by-pass ports, air release valves, etc.). These inspections, combined with many other indicators such as: pipe age, material, leak/maintenance history, etc., are utilized to provide an overall condition assessment of the pipe.

Pumping Systems (Pump Stations): Comprised of a multitude of mechanical components, condition assessments are performed through careful monitoring of system components. Monitoring of components is the combined result of: visual, auditory, and performance testing. The District performs extensive preventative maintenance (PM) checklists on varying time intervals (daily, weekly, monthly, yearly, etc.), which not only ensure smooth operation of these stations, but also constantly monitors the condition of the asset. This constant monitoring, combined with other factors such as: age, history of use, maintenance intervals, etc., provide for an overall condition assessment.

C.3.2 Water

Distribution: Condition and leak detection are available through a number of means; these includes:

- MLOG leak detection
- Main line correlation

- Leak sounding equipment
- I-TRON ERTs (customer side)
- Leak/Maintenance history
- Zone Meter reads (relative to service meter reads)
- Age
- Visual when exposed or tapped

The combined result of all above provides an overall rating of any given portion of the distribution system.

Storage: Visual inspection techniques are employed. The District performs two tank inspections each year. With a total of eight tanks, each tank is inspected once every four years on a rotating basis. Visual inspections are typically done with a robotic remote controlled CCTV submarine. In addition to this in-situ technique, on occasion the District will completely drain a tank to perform a more robust inspection.

Treatment Plant: Similar to sewer pump stations, the treatment plant is comprised of many different mechanical components. All of these are continuously monitored through the fulfillment of PM task on their respective intervals.

C.4 Consequences of Failure / Risk:

The degree of criticality of infrastructure is largely dependent on the relative measure of consequences in the event of failure. That is some portions of the overall system are much more critical than others. If it is of the greatest importance to maintain any particular component of the system in excellent operating condition, it is given the highest weight.

Determining the score (or degree) of consequences of failure considers the severity of impact of the following categories:

- Severity of Service Interruption (Customer Service)
- Violation of State / Federal Regulations (Compliance with Regulations & Environmental Impact)
- Severity of Injury or Illness to Public or Employee (Health and Safety)
- Impact to Local Business and District's Cost to Repair/Restore (Economic)
- Time to Repair/Restore to Required Level of Service (Short vs. Long Duration Time to Repair)
- Impact to Local Environment and/or Customers (Location)

C.5 Capacity / System Operational Efficiencies (Level of Service)

If deficiencies in ability to provide reliable quality service are identified, or there is an observed strain on the system to provide service, correcting these deficiencies is appropriate. Likewise, as a public agency, the District is obligated to operate the entire system as efficiently as possible within available resources. To meet this obligation, the District takes a holistic perspective of the entire system and all its interworking's.

Through: system modeling, observations identified through O&M, or other means, improvements may be identified which provide for greater capacities and/or efficiencies to the overall system dynamics if performed. In the case of this CIP driver, justification for the project would be provided through a cost-benefit analysis and compared to other drivers prior to this expenditure of capital funds.

C.6 Improved Operations and Maintenance (O&M) Costs

For the same reasons as noted above (System Operational Efficiencies), a cost savings "big picture" perspective of the entire operations, and ongoing maintenance of, the infrastructure is taken by the District. Although the operations and capital funds are separate budgets within the administration of the District, this is moot in regards to accomplishing overall expenditure of District resources in the most efficient manner possible. Capital projects to improve O&M costs may be identified as new technologies become available,

management observations, work order evaluations, or other. Prior to expenditure of capital funds to improve O&M costs, justification for the project would be provided through a cost-benefit analysis.

C.7 Safety / Security

With a significantly large existing value of hard infrastructure (past expenditure of funds), and likewise the staff who maintains it (the District's highest annual expense), this driver is always on the forefront. As areas are identified, due to changing conditions or other, protecting the District's infrastructure and staff is of utmost importance.

C.8 Design Life / Best Replacement Practices

All constructed infrastructure has a certain span of time for its usability, or simply a "Design Life". "Best Replacement Practices" is an industry coined term used to note an agencies infrastructure reinvestment strategy goal for regimentally replacing infrastructure on a rotating basis (or schedule); also referred to as "Infrastructure Sustainability". These goals may be developed through decades of service & project observations, analytical analysis of work orders associated with assets, and many other drivers as described herein.

For purposes of capital planning discussions, the two are essentially the same as once an agency defines their "Best Replacement Practice" goal, this is now the *assumed* "Design Life" they are operating under with their rates, separate account structures, capital planning, etc. Determining this goal for all the different asset types can be a challenge for districts as depending on how aggressive an agency wants to be in rehabilitating the system is directly related to the agencies respective tolerances for expenditure of public funds, system failure risk, increased O&M costs, level of service, and all the political and regulatory pressures associated with each.

Section 2 of the Capital Improvement Plan provides a basic analysis (for general reference) of what the District may anticipate for infrastructure replacement costs assuming life cycles of system components applicable to NTPUD.

C.9 Redundancy / Reliability

The underlying theme providers of critical services (Sewer & Water) strive for is to consistently provide correct and compliant operation of these systems under any condition. Doing so, depending on the service area and/or components involved, at times warrants backup systems and/or infrastructure to be in place.

C.10 Expected Standards for Public System

As a provider of public services, there is a level of service the public expects as rate and tax payers toward the system providing these services. These expectations may be above and beyond any regulating authority's requirement. Such improvements may provide: greater capacities in under sized areas, greater pressures in low pressure areas, or greater fire suppression capabilities in sensitive areas to name a few.

C.11 Opportunity Projects

In the interest of completing projects ahead of, or in combination with, outside influences, or simply as inexpensively as possible relative to District induced funds, on occasion projects may be accelerated in schedule to take advantage of these conditions. These projects may come about due to three primary reasons:

Other Agency's Projects: Through constant communication with other agencies, the District monitors large scale public infrastructure improvements scheduled in the near future. Depending on these projects

scope(s), at times it may be advantageous to complete District projects, or address known infrastructure needs, ahead of these projects. Additionally, during the course of construction on other agency's projects, District infrastructure which requires addressing or correction in some manner may be discovered or otherwise exposed to be in conflict. In these cases, the District must react in correcting these found conditions. In doing so system improvements or corrections often result; after all, if the infrastructure in the area of construction were to current standards it likely would not have been found to be in conflict to begin with.

Partnering: Again, through communications, the District monitors other agency's forthcoming project and/or their known deficiencies. Through this effort projects may be identified whereby if the two (or more) agencies partner on a project addressing both agencies needs a significant cost savings may be captured.

Grants: In the interest of maximizing infrastructure improvements using District funds to the greatest extent possible, the District monitors available grants relative to the District's mission and services. As these grants become available, and depending on their respective conditions and timing for utilization, completing a project using these external funds may be appropriate. All grants are reviewed for their respective applicability as even though at a quick glance a grant may be viewed as "free money", the District is sensitive to:

- Staying within its mission: Not performing a project outside of it, just because a grant is available.
- Maintaining project priorities: Not pushing a significantly higher priority project aside, just because a grant is available for a different *lower* priority project.
- Considering future O&M costs: Not accepting capital funds only to put a future strain on District's ability (and funding) to maintain the new improvements.

These above grant acceptance consideration "Budget Policies" are formalized in the District's 2006 CIP Study adopted by the Board of Directors on January 10, 2006. In all cases, simply managing and administering a project consumes significant District resources (staff time, etc.) even if the project's hard costs (i.e. construction contract) are paid through a grant.

C.12 Developer Extensions

As private properties are developed, or re-developed, depending on the scope(s) of these projects District infrastructure improvements to adequately serve the proposed project may be identified. In these cases, as the infrastructure improvement is driven by a private property owner's project, the cost for: design, permitting, and construction of the infrastructure improvement is the responsibility of the private party. These projects are performed utilizing the District's "Developers Extension Agreement", which provides for a formal contract arrangement between the developer and District. Although these don't *consume* District hard costs, per se, these projects are considered capital projects as with each step, from beginning to end, the project is reviewed and approved by the District to ensure full compliance. Likewise, upon final build the District accepts this infrastructure for incorporation into the District's system and capital assets.