

WATER SYSTEM DEPRECIATION: A CAPITAL PLANNING TOOL FOR THE WELL-MANAGED UTILITY



Attachments to the White Paper entitled "Water System Depreciation: A Capital Planning Tool for the Authored by AE2S Nexus on behalf of the SDARWS Rural Water Center Sponsored by the the SDARWS, CoBank, and AE2S January 2020

The worksheets herein are intended to serve as a systems' tool for entry-level capital reserve planning. The cells containing formulas within have not been locked to allow systems to make changes at their sole discretion to their desired approach to system-specific capital reserve planning calculations. By using this workbook, the user agrees that the SDARWS, CoBank, AE2S and AE2S Nexus are not liable for any damages or claims that may arise from or relate to use of the tool.



Attachment 1: List of Typical Asset Lives

Use these values for estimating annual depreciation in Attachments 2 and 4.

Asset Category	Expected Service Life (Years)	Assumed Service Life (Years)
Source of Supply Plant		
Wells and Springs	25-40	
Collecting and Impounding Reservoirs	50-70	
Intake Structures	50-70	
Pumping Equipment	20-30	
Supply Mains	50-75	
Other Water Source Plant	20-25	
Pumping Plant		
Structures and Improvements	30-50	
Pumping and Power Production Equipment	20-30	
Water Treatment Plant		
Structures and Improvements	30-50	
Sand or Other Media Filtration Equipment	30-40	
Membrane Filtration Equipment	15-20	
Other Water Treatment Equipment	15-20	
Transmission and Distribution Plant		
Structures and Improvements	30-50	
Reservoirs and Standpipes	50-65	
Transmission and Distribution Mains	75-100	
Valves	30-40	
Mechanical Valves	10-20	
Services	45-60	
Meters	16-25	
Hydrants	55-75	
Other Transmission/Distribution Plant	15-30	
General Plant		
Structures and Improvements	30-50	
Office Furniture and Equipment	15-20	
Computer Equipment	3-5	
Transformers/Switchgears/Wiring	15-25	
Motor Controls/VFDs	5-15	
Transportation Equipment	5-15	
Tools, Shop and Garage Equipment	15-20	
Laboratory Equipment	15-20	
Power Operated Equipment	10-20	
Communication Equipment	5-10	
SCADA Equipment	10-12	
Miscellaneous Equipment	15-20	







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Intake Structures	50-70	
Pumping Equipment	10-30	
Supply Mains	40-75	
Other Water Source Plant	20-25	
Pumping Plant		
Structures and Improvements	30-50	
Pumping and Power Production Equipment	15-30	
Water Treatment Plant		
Structures and Improvements	30-50	
Sand or Other Media Filtration Equipment	30-40	
Membrane Filtration Equipment	15-20	
Other Water Treatment Equipment	15-20	
Transmission and Distribution Plant		
Structures and Improvements	30-50	
Reservoirs and Standpipes	20-65	
Transmission and Distribution Mains	40-100	
Valves	30-40	
Mechanical Valves	10-20	
Services	45-60	
Meters	7-25	
Hydrants	55-75	
Other Transmission/Distribution Plant	15-30	
General Plant		
Structures and Improvements	30-50	
Office Furniture and Equipment	15-20	
Computer Equipment	3-5	
Transformers/Switchgears/Wiring	15-25	
Motor Controls/VFDs	5-15	
Transportation Equipment	5-15	
Tools, Shop and Garage Equipment	15-20	
Laboratory Equipment	7-20	
Power Operated Equipment	10-20	
Communication Equipment	5-10	
SCADA Equipment	10-12	
Miscellaneous Equipment	15-20	







Attachment 2: Exi	sting Asset Inventory		Page of	
The purpose of this worksheet	is to document annual depreciation associated with all system assets.	Updated:		
This information can then be u	used as a basis for setting annual reserve planning goals.			
Complete a separate workshe	et for each asset class.			
		Current Year:		2020
Asset Class (Pumpin	g, Valves, Pipelines, etc):			
Depreciation Calculation - Sta	andard (Default) - <u>Green Columns:</u>			
Straight-Line:	Original Cost / Expected Useful Life in Years			
Depreciation Calculation - Ad	justed - use Orange Columns: If taking into consideration Replacement Cost New or Adjusting	Book Value based on Condition Assessment		

 Depreciation Calculation - Adjusted - use Orange Columns:
 If taking into consideration Replacement Cost New or Adjusting Book Value based on Condition Assessment

 Based on RCN:
 Cost of Original Asset Indexed to Year of Anticipated Replacement / Expected Useful Life in Years

 Based on Condition:
 Adjusted Current Value / Estimated Remaining Useful Life in Years

Be sure to note final year of useful life (in terms of depreciation) and don't account for depreciation beyond that point. Also remember to account for asset additions/deletions annually.

Enter Information in these Columns						These columns will populate		
Standard			Adjusted					
		Annuach		America				
		Approacn		Approacn				
Asset Description/Name/ID	Date in Service (Year)	Original Cost (\$)	Expected Useful Life (Years)	Adjusted Cost (\$)	Adjusted Expected Useful Life (Years)	Annual Depreciation (\$)	Final Year of Useful Life	
Total						\$0		



Attachment 3: Capital Improvements Plan

The purpose of this worksheet is to develop a schedule for planning system capital investment, including both new facilities and scheduled renewal/replacement. This information is used to develop planned cash-funded capital values and estimate future debt service.

Year Analysis Completed (Year 1):



These columns will calculat					ate ———				
Ent	ter Information in the	se Columns	>	Select Funding	0	1	2	3	4
Project/Improvement	Asset Type	Vear	Estimated Cost (\$)	Funding Source	Cash-Funded Capital -				
	Asset Type	Tear		Tuntaing Source	Year 1 (\$)	Year 2 (\$)	Year 3 (\$)	Year 4 (\$)	Year 5 (\$)
				Rate Revenue					
				Rate Revenue					
				Rate Revenue					
				Rate Revenue					
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				Rate Revenue					
Total					\$ -	\$ -	\$ -	\$ -	\$ -



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Attachment 4: New Asset Inventory (From CIP)

The purpose of this worksheet is to document annual depreciation associated with all system assets. This information can then be used as a basis for setting annual reserve planning goals. Complete a separate worksheet for each asset class.

Asset Class (Pumping, Valves, Pipelines, etc):	Current Year:	
	Current real.	

Depreciation Calculation - Standard (Default) - use Green Columns: Straight-Line: Original Cost / Expected Useful Life in Years

Depreciation Calculation - Adjusted - use Orange Columns: If taking into consideration Replacement Cost New or Adjusting Book Value based on Condition Assessment Based on RCN: Cost of Original Asset Indexed to Year of Anticipated Replacement / Expected Useful Life in Years Adjusted Current Value / Estimated Remaining Useful Life in Years Based on Condition:

Be sure to note final year of useful life (in terms of depreciation) and don't account for depreciation beyond that point. Also remember to account for asset additions/deletions annually.

	mns will populate	Enter Useful Life				I nese column	s will populate
		Standard		Adjusted			
		Approach		Approach			
Asset Description/Name/ID	Date in Service (Year)	Original Cost (\$)	Expected Useful Life (Years)	Adjusted Cost (\$)	Adjusted Expected Useful Life (Years)	Annual Depreciation (\$)	Final Year of Useful Life

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2020

Updated: _____

Total			\$0	



Attachment 5: Estimated Future Annual Debt Principal Payments

The purpose of this worksheet is to estimate future investment in the system through debt service principal payments based on the debt-funded capital improvements identified in Worksheet 3.

Assumed Debt Source Paramenters (update as appropriate):

Abbreviation (Debt Source Column)State Revolving Fund LoanSRFRevenue BondBondOtherOther

<u>Term (Year)</u>	<u>Rate (%)</u>

Once debt has been issued, a debt schedule indicating annual Principal and Interest payments will be provided. Until that time, annual debt service Principal Payments can be estimated by dividing the project cost by the terms of the debt: Project Cost / Debt Service Term in Years

Year Analysis Completed (Year 1):

2020

2021 2022 2023

The first payment is typically assumed to occur in the year following the year of construction. Annual projected principal payments based on Year of First Payment are totaled at the bottom. Level Debt Service is assumed (equal annual total P&I payments).

•	These column	s will calculate				
Project/Improvement	Asset Type	Year of Construction	Estimated Cost (\$)	Debt Source (Abbreviation from Above)	Annual Debt Service <u>Principal</u> Payment (\$)	Year of First Payment
		Anticipated Principal Payment - Year 1	Anticipated Principal Payment - Year 2	Anticipated Principal Payment - Year 3	Anticipated Principal Payment - Year 4	Anticipated Principal Payment - Year 5
Total Principal Payments		\$ -	\$ -	\$ -	\$ -	\$ -



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2024

Updated: _____

Attachment 6: Existing Debt Principal Payments

The purpose of this worksheet is to document system investment through debt service principal payments based on existing debt schedules.

Year Analysis Completed (Year 1):	2020	2021	2022	2023	2024
	2020	2021	2022	2023	2024

Enter **Principal Payments** from the debt schedule(s) for Years 1 through 5 with Year 1 equal to the year indicated above.

Enter Information in these Columns										
Project/Improvement	Asset Type	1st Year of	Repayment Term	Principal Payment -						
	Аззеттуре	Repayment	(Total Years)	Year 1 (\$)	Year 2 (\$)	Year 3 (\$)	Year 4 (\$)	Year 5 (\$)		
Total				\$-	\$-	\$-	\$-	\$-		



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Attachment 7: Estimated Annual Contribution to Renewal/Replacement Capital Reserves **Based on Annual Depreciation**

The purpose of this worksheet is to compare projected cash-funded capital and debt service principal payments to annual depreciation values to estimate annual contributions to reserves needed to consistently fund capital renewal/replacement.

Year Analysis Completed (Year 1):	2020 2021		2022 202		2024
	——— These column	s will calculate ——			
	Year 1	Year 2	Year 3	Year 4	Year 5
1. Annual Depreciation (Worksheet 2 - total from all asset classes)	\$-	\$-	\$-	\$-	\$-
2. Annual Depreciation on New Assets (Worksheet 4 - total from all asset classes)	\$-	\$-	\$ -	\$-	\$-
3. Annual Cash-Funded Capital (Worksheet 3)	\$-	\$ -	\$-	\$ -	\$-
4. Estimated Future Debt Service Principal Payments (Worksheet 5)	\$-	\$-	\$-	\$-	\$-
5. Existing Debt Service Principal Payments (Worksheet 6)	\$-	\$ -	\$ -	\$-	\$-
6. Subtract Lines 3 through 5 from the sum of Lines 1 and 2.	\$-	\$ -	\$ -	\$ -	\$-

If Line 6 is positive, consider the amount in Line 6 as a minimum contribution to reserves. If Line 6 is negative, the utility is meeting the minimum criteria of funding at least an amount of capital that is depleted in that year, though may still desire to fund some level of reserves based on individual utility goals.



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Attachment 8: Existing Asset Renewal/Replacement Contributions based on Future Replacement

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This worksheet can be used to estimate the annual contribution to reserves necessary to maintain	existing systems assets,	as opposed
to using annual depreciation as a target.		

Updated:		

to using annual depreciation as a ta	irget.						
Year Analysis Completed (Year 1):		s: If taking into consid	oration Poplacoment Co	st Now or Adjusting Po	ak Value bacad on Cond	ition According	
Based on BCN:	Cost of Original Asse	it Indexed to Year of An	ticinated Replacement /	Fynected Liseful Life ir	ok value based on Cond	nion Assessment	
Recent CCI:	3.06%	Reference:	20-Year average ENR C	CI December 2019			
Based on Condition:	Adjusted Current Va	lue / Estimated Remain	ing Useful Life in Years		•		
•			— These columns will	calculate			
Asset	Year Placed in Service	Original Cost (\$)	Estimated Useful Life	Years until Replacement	Annual Cost Index (%)	Current Year Share of Future Cost (\$)	Current Year Contribution to Reserves (\$)

Total				\$ -



Attachment 9: Future Asset Renewal/Replacement Contributions based on Future Replacement

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This worksheet can be used to estimate the annual contribution to reserves necessary to maintain *future systems assets*, as opposed to using annual depreciation as a target.

Year Analysis Completed (Year 1):	2020							
	These columns will calculate							
Asset	Year Placed in Service	Original Cost (\$)	Estimated Useful Life	Years until Replacement	Annual Cost Index (%)	Current Year Share of Future Cost (\$)	Annual Contribution to Reserves (\$)	
Total							\$ -	



Attachment 10: Estimated Annual Contribution to Renewal/Replacement Capital Reserves Based on Estimated Replacement Cost

The purpose of this worksheet is to compare projected cash-funded capital and debt service principal payments to annual calculated replacment values to estimate annual contributions to reserves needed to consistently fund capital renewal/replacement.

Year Analysis Completed (Year 1):	2020 2021		2022	2023	2024
•	 These columns wi 	ill calculate –			
	Year 1	Year 2	Year 3	Year 4	Year 5
1. Calculated Contribution to Reserves (Worksheets 8 and 9 - total from all asset classes)	\$-	\$-	\$-	\$-	\$-
2. Annual Cash-Funded Capital (Worksheet 3)	\$-	\$-	\$-	\$-	\$-
3. Estimated Future Debt Service Principal Payments (Worksheet 5)	\$-	\$-	\$-	\$-	\$-
4. Existing Debt Service Principal Payments (Worksheet 6)	\$-	\$-	\$-	\$-	\$-
5. Subtract Lines 2 through 4 from Line 1.	\$-	\$-	\$-	\$-	\$ -

If Line 5 is positive, consider the amount in Line 5 as a minimum contribution to reserves. If Line 5 is negative, the utility is funding a capital replacement value based on future replacement, though may still desire to fund some level of reserves based on individual utility goals.



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