



# 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  
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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) |
|--|-------------------------------|------------------------------|
| <b>Source of Supply Plant</b>              |                               |                              |
| 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                         |                              |
| <b>Pumping Plant</b>                       |                               |                              |
| Structures and Improvements                | 30-50                         |                              |
| Pumping and Power Production Equipment     | 20-30                         |                              |
| <b>Water Treatment Plant</b>               |                               |                              |
| Structures and Improvements                | 30-50                         |                              |
| Sand or Other Media Filtration Equipment   | 30-40                         |                              |
| Membrane Filtration Equipment              | 15-20                         |                              |
| Other Water Treatment Equipment            | 15-20                         |                              |
| <b>Transmission and Distribution Plant</b> |                               |                              |
| 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                         |                              |
| <b>General Plant</b>                       |                               |                              |
| 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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| Asset Category                             | Expected Service Life (Years) | Assumed Service Life (Years) |
|--|-------------------------------|------------------------------|
| <b>Source of Supply Plant</b>              |                               |                              |
| Wells and Springs                          | 25-40                         |                              |
| Collecting and Impounding Reservoirs       | 50-70                         |                              |
| Intake Structures                          | 50-70                         |                              |
| Pumping Equipment                          | 10-30                         |                              |
| Supply Mains                               | 40-75                         |                              |
| Other Water Source Plant                   | 20-25                         |                              |
| <b>Pumping Plant</b>                       |                               |                              |
| Structures and Improvements                | 30-50                         |                              |
| Pumping and Power Production Equipment     | 15-30                         |                              |
| <b>Water Treatment Plant</b>               |                               |                              |
| Structures and Improvements                | 30-50                         |                              |
| Sand or Other Media Filtration Equipment   | 30-40                         |                              |
| Membrane Filtration Equipment              | 15-20                         |                              |
| Other Water Treatment Equipment            | 15-20                         |                              |
| <b>Transmission and Distribution Plant</b> |                               |                              |
| 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                         |                              |
| <b>General Plant</b>                       |                               |                              |
| 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 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.

Updated: \_\_\_\_\_

Asset Class (Pumping, Valves, Pipelines, etc): \_\_\_\_\_

Current Year:

**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

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.

|                           |                        | ← These columns will populate |                              | Enter Useful Life → |                                       | These columns will populate |                           |
|---------------------------|------------------------|-------------------------------|------------------------------|---------------------|---------------------------------------|-----------------------------|---------------------------|
|                           |                        | Standard Approach             |                              | Adjusted 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 |
|                           |                        |                               |                              |                     |                                       |                             |                           |
|                           |                        |                               |                              |                     |                                       |                             |                           |
|                           |                        |                               |                              |                     |                                       |                             |                           |
|                           |                        |                               |                              |                     |                                       |                             |                           |
|                           |                        |                               |                              |                     |                                       |                             |                           |
|                           |                        |                               |                              |                     |                                       |                             |                           |
|                           |                        |                               |                              |                     |                                       |                             |                           |
|                           |                        |                               |                              |                     |                                       |                             |                           |
|                           |                        |                               |                              |                     |                                       |                             |                           |
|                           |                        |                               |                              |                     |                                       |                             |                           |
|                           |                        |                               |                              |                     |                                       |                             |                           |
|                           |                        |                               |                              |                     |                                       |                             |                           |
|                           |                        |                               |                              |                     |                                       |                             |                           |
|                           |                        |                               |                              |                     |                                       |                             |                           |
|                           |                        |                               |                              |                     |                                       |                             |                           |
|                           |                        |                               |                              |                     |                                       |                             |                           |
|                           |                        |                               |                              |                     |                                       |                             |                           |
|                           |                        |                               |                              |                     |                                       |                             |                           |
|                           |                        |                               |                              |                     |                                       |                             |                           |
|                           |                        |                               |                              |                     |                                       |                             |                           |
|                           |                        |                               |                              |                     |                                       |                             |                           |
|                           |                        |                               |                              |                     |                                       |                             |                           |
|                           |                        |                               |                              |                     |                                       |                             |                           |
| <b>Total</b>              |                        |                               |                              |                     |                                       | \$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.

Updated: \_\_\_\_\_

**Assumed Debt Source Parameters (update as appropriate):**

|                           | <u>Abbreviation (Debt Source Column)</u> | <u>Term (Year)</u> | <u>Rate (%)</u> |
|---------------------------|--|--------------------|-----------------|
| State Revolving Fund Loan | SRF                                      |                    |                 |
| Revenue Bond              | Bond                                     |                    |                 |
| Other                     | Other                                    |                    |                 |

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:

$$\text{Project Cost} / \text{Debt Service Term in Years}$$

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

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).

| ← Enter Information in these Columns → |            |  |  |  | These columns 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 |
| <b>Total Principal Payments</b>        |            | \$ -                                   | \$ -                                   | \$ -                                   | \$ -  | \$ -                                   |



# 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

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 | Repayment Term (Total Years) | Principal Payment - Year 1 (\$) | Principal Payment - Year 2 (\$) | Principal Payment - Year 3 (\$) | Principal Payment - Year 4 (\$) | Principal Payment - Year 5 (\$) |
|---------------------|------------|-----------------------|------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|
|                     |            |                       |                              |                                 |                                 |                                 |                                 |                                 |
|                     |            |                       |                              |                                 |                                 |                                 |                                 |                                 |
|                     |            |                       |                              |                                 |                                 |                                 |                                 |                                 |
|                     |            |                       |                              |                                 |                                 |                                 |                                 |                                 |
|                     |            |                       |                              |                                 |                                 |                                 |                                 |                                 |
|                     |            |                       |                              |                                 |                                 |                                 |                                 |                                 |
|                     |            |                       |                              |                                 |                                 |                                 |                                 |                                 |
|                     |            |                       |                              |                                 |                                 |                                 |                                 |                                 |
|                     |            |                       |                              |                                 |                                 |                                 |                                 |                                 |
|                     |            |                       |                              |                                 |                                 |                                 |                                 |                                 |
|                     |            |                       |                              |                                 |                                 |                                 |                                 |                                 |
|                     |            |                       |                              |                                 |                                 |                                 |                                 |                                 |
|                     |            |                       |                              |                                 |                                 |                                 |                                 |                                 |
|                     |            |                       |                              |                                 |                                 |                                 |                                 |                                 |
|                     |            |                       |                              |                                 |                                 |                                 |                                 |                                 |
| <b>Total</b>        |            |                       |                              | \$ -                            | \$ -                            | \$ -                            | \$ -                            | \$ -                            |





# 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

2023

2024

|   | ←      | These columns 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.







# 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 replacement 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 will 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.

