



Newtown Artesian Water Company 2024 Water Audit

Attached with this letter is the completed 2024 Water Audit for Newtown Artesian Water Company, docket number M-2025-3052805.

Please contact me with any questions.

Sincerely,

Richard Pierone

Richard Pierone
Director of Operations
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AWWA Free Water Audit Software v6.0

FWAS v6.0

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This spreadsheet-based water audit tool is designed to help quantify and track water losses associated with water distribution systems and identify areas for improved efficiency and cost recovery. It provides a "top-down" summary water audit format and is not meant to take the place of a full-scale, comprehensive water audit format. Auditors are strongly encouraged to refer to the most current edition of AWWA M36 Manual for Water Audits for detailed guidance on the water auditing process and targeting loss reduction levels. This tool contains several separate worksheets. Sheets can be accessed using the tabs at the bottom of the screen, or by clicking the TOC links below.

Table of Contents (TOC)

- Start Page** The current sheet. Enter contact information and basic audit details.
- Worksheet** Enter the required data on this worksheet to calculate the water balance and data grading.
- Interactive Data Grading** Answer questions about operational practices for each audit input, and the data validity grades will automatically populate.
- Dashboard** Review NRW components, performance indicators and graphical outputs to evaluate the results of the audit.
- Notes** Enter notes to explain how values were calculated, document data sources, and related information about data management practices.
- Blank Sheet** By popular demand! A blank sheet. The world is your canvas.
- Water Balance** The values entered in the Worksheet automatically populate the Water Balance.
- Loss Control Planning** Use this sheet to interpret the results of the audit validity score and performance indicators.
- Definitions** Use this sheet to understand the terms used in the audit process.
- Service Connection Diagram** Diagrams depicting possible customer service connection line configurations.
- Acknowledgements** Acknowledgements for development of the AWWA Free Water Audit Software v6.0.

AWWA Web Resources for Water Loss Control
<https://www.awwa.org/Resources-Tools/Resource-Topics/Water-Loss-Control>
 Items referenced in the Free Water Audit Software v6.0 on the web:
 Data Grading Matrix v6.0
 Example Water Audit v6.0
 Water Audit Compiler v6.0
 AWWA Reports on Performance Indicators
 M36 Manual

Enter Basic Information

Name of Utility:	Newtown Artesian Water Company
Name of Contact Person:	Richard Pierone
Email:	Richard.Pierone@NewtownWater.com
Telephone Ext.:	215-968-6781
City/Town/Municipality:	Newtown
State / Province:	Pennsylvania (PA)
Country:	USA
Audit Preparation Date:	Mar 10 2025
Audit Year:	2024
Audit Year Label:	Calendar (Fiscal, Calendar, etc)
Audit Period Start Date:	Jan 01 2024
Audit Period End Date:	Dec 31 2024
Volume Reporting Units:	Million gallons (US)
Water System Structure:	Retail
Water Type:	Potable Water
System ID Number:	1090043
Validator Name/ID:	
Validator Email:	
Estimated Total Population Served by Water Utility:	38,500

Key of Input Acronyms *In order of appearance in the Worksheet*

- VOS** Volume from Own Sources
- VOSEA** VOS Error Adjustment
- WI** Water Imported
- WIEA** WI Error Adjustment
- WE** Water Exported
- WEEA** WE Error Adjustment
- BMAC** Billed Metered Authorized Consumption
- BUAC** Billed Unmetered Authorized Consumption
- UMAC** Unbilled Metered Authorized Consumption
- UUAC** Unbilled Unmetered Authorized Consumption
- SDHE** Systematic Data Handling Errors
- CMI** Customer Metering Inaccuracies
- UC** Unauthorized Consumption
- Lm** Length of mains
- Nc** Number of service connections
- Lp** Average length of (private) customer service line
- AOP** Average Operating Pressure
- CRUC** Customer Retail Unit Charge
- VPC** Variable Production Cost

Color Key

User input Calculated Optional default

Guidance for the Worksheet

Choosing to enter unit of **percent** or **volume** (applies to VOSEA, WIEA, WEEA, CMI)
 choose entry option:

1.00%	percent	or
	volume	25.000

Choosing to enter **default** or **custom input** (applies to UUAC, SDHE, UC)
 choose entry option:

0.25%	default	or
	custom	75.000

Guidance for the Interactive Data Grading

Use acronym buttons in IDG header to navigate among inputs. Acronym Key above. White = needs answers, orange = complete, clear = not required. Example below.

VOS	VOSEA	WI	WIEA	WE	WEEA	BMAC	BUAC	UMAC	UUAC
SDHE	CMI	UC	Lm	Nc	Lp	AOP	CRUC	VPC	

After clicking an acronym button, answer all visible questions in the order they're presented, choosing best-fit answer

Grade will populate when all visible questions are complete for an input **7**

The limiting criteria will be labeled along the right. If only 1 limiting criterion is shown, improving on that criterion will achieve a higher data grade. If multiple limiting criteria are shown, improving on *each* limiting criterion is necessary to achieve a higher data grade. A complete inventory of data grading criteria is available in the Data Grading Matrix v6.0 (see web resources)

Limiting

If you have questions or comments regarding this software please contact us at: wlc@awwa.org



AWWA Free Water Audit Software: Worksheet

FWAS v6.0
American Water Works Association.
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Water Audit Report for: **Newtown Artesian Water Company**
 Audit Year: **2024** | **Jan 01 2024 - Dec 31 2024** | **Calendar**

Click 'n' to add notes | Click 'g' to determine data validity grade | To edit water system info: [go to start page](#)

To access definitions, click the [input name](#) | All volumes to be entered as: MILLION GALLONS (US) PER YEAR

Water Supplied Error Adjustments

choose entry option:

WATER SUPPLIED	Volume from Own Sources: <input type="text" value="n"/> <input type="text" value="g"/> <input type="text" value="7"/> 267.238 MG/Yr	<input type="text" value="n"/> <input type="text" value="g"/> <input type="text" value="8"/> 3.92% percent	<input type="text" value="under-registration"/> VOSEA
VOS	Water Imported: <input type="text" value="n"/> <input type="text" value="g"/> <input type="text" value="7"/> 504.600 MG/Yr	<input type="text" value="n"/> <input type="text" value="g"/> <input type="text" value="9"/> 0.10% percent	<input type="text" value="over-registration"/> WIEA
WI	Water Exported: <input type="text" value="n"/> <input type="text" value="g"/> <input type="text" value="n/a"/> 0.000 MG/Yr		WEEA
WE			

WATER SUPPLIED: 782.237 MG/Yr

AUTHORIZED CONSUMPTION

BMAC	Billed Metered: <input type="text" value="n"/> <input type="text" value="g"/> <input type="text" value="7"/> 719.465 MG/Yr		
BUAC	Billed Unmetered: <input type="text" value="n"/> <input type="text" value="g"/> <input type="text" value="n/a"/> MG/Yr		
UMAC	Unbilled Metered: <input type="text" value="n"/> <input type="text" value="g"/> <input type="text" value="10"/> 4.024 MG/Yr		choose entry option:
UUAC	Unbilled Unmetered: <input type="text" value="n"/> <input type="text" value="g"/> <input type="text" value="10"/> 7.644 MG/Yr		<input type="text" value="custom"/> <input type="text" value="7.644"/> MG/Yr

AUTHORIZED CONSUMPTION: 731.133 MG/Yr

WATER LOSSES 51.104 MG/Yr

Apparent Losses

SDHE	Default option selected for Systematic Data Handling Errors, with automatic data grading of 3		choose entry option:
	Systematic Data Handling Errors: <input type="text" value="n"/> <input type="text" value="g"/> <input type="text" value="3"/> 1.799 MG/Yr	<input type="text" value="0.25%"/> default	
CMI	Customer Metering Inaccuracies: <input type="text" value="n"/> <input type="text" value="g"/> <input type="text" value="9"/> 19.465 MG/Yr	<input type="text" value="2.62%"/> percent	<input type="text" value="under-registration"/>
UC	Unauthorized Consumption: <input type="text" value="n"/> <input type="text" value="g"/> <input type="text" value="3"/> 1.799 MG/Yr	<input type="text" value="0.25%"/> default	
	Default option selected for Unauthorized Consumption, with automatic data grading of 3		
	Apparent Losses: 23.063 MG/Yr		

Real Losses

Real Losses: 28.041 MG/Yr

WATER LOSSES: 51.104 MG/Yr

NON-REVENUE WATER

NON-REVENUE WATER: 62.772 MG/Yr

SYSTEM DATA

Lm	Length of mains: <input type="text" value="n"/> <input type="text" value="g"/> <input type="text" value="10"/> 137.7 miles	(including fire hydrant lead lengths)	
Nc	Number of service connections: <input type="text" value="n"/> <input type="text" value="g"/> <input type="text" value="8"/> 11,021	(active and inactive)	
	Service connection density: <input type="text" value="n"/> <input type="text" value="g"/> <input type="text" value="8"/> 80 conn./mile main		
	Are customer meters typically located at the curbstop/property line? <input type="text" value="No"/>		
Lp	Average length of (private) customer service line: <input type="text" value="n"/> <input type="text" value="g"/> <input type="text" value="10"/> 68.8 ft	(average distance between property line and meter)	
AOP	Average Operating Pressure: <input type="text" value="n"/> <input type="text" value="g"/> <input type="text" value="7"/> 73.3 psi		

COST DATA

CRUC	Customer Retail Unit Charge: <input type="text" value="n"/> <input type="text" value="g"/> <input type="text" value="9"/> \$6.64 \$/1000 gallons (US)		Total Annual Operating Cost
VPC	Variable Production Cost: <input type="text" value="n"/> <input type="text" value="g"/> <input type="text" value="8"/> \$2,742.74 \$/Million gallons		<input type="text" value=""/> \$/yr (optional input)

WATER AUDIT DATA VALIDITY TIER:

***** The Water Audit Data Validity Score is in Tier IV (71-90). See Dashboard tab for additional outputs. *****

[go to dashboard](#)

A weighted scale for the components of supply, consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION TO IMPROVE DATA VALIDITY:

Based on the information provided, audit reliability can be most improved by addressing the following components:

- 1: Water Imported (WI)
- 2: Billed Metered (BMAC)
- 3: Volume from Own Sources (VOS)

KEY PERFORMANCE INDICATOR TARGETS:

OPTIONAL: If targets exist for the operational performance indicators, they can be input below:

Unit Total Losses:	<input type="text" value=""/>	gal/conn/day
Unit Apparent Losses:	<input type="text" value=""/>	gal/conn/day
Unit Real Losses ^A :	<input type="text" value=""/>	gal/conn/day
Unit Real Losses ^B :	<input type="text" value=""/>	gal/mile/day

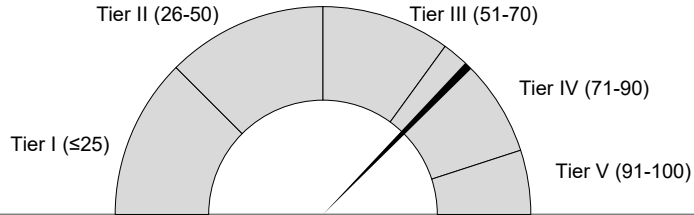
If entered above by user, targets will display on KPI gauges (see Dashboard)



Data Validity

Data Validity Score: **74** Data Validity Tier: **Tier IV (71-90)**

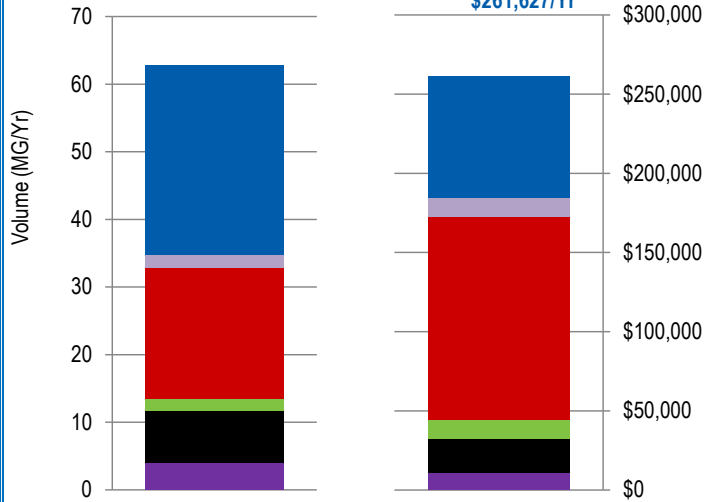
See [Loss Control Planning](#) for Tier Details



NRW Components Summary

Total Volume of NRW = 63 MG/Yr

Total Cost of NRW = \$261,627/Yr



Component	Volume (MG/Yr)	Value (\$/Yr)	Basis of Valuation
Real Losses	23.1	\$152,715	CRUC
Systematic Data Handling Errors	28.0	\$76,910	VPC
Customer Metering Inaccuracies	11.7	\$32,002	VPC
Unauthorized Consumption	62.8	\$261,627	Blended
Unbilled Unmetered Auth Cons			
Unbilled Metered Authorized Cons			

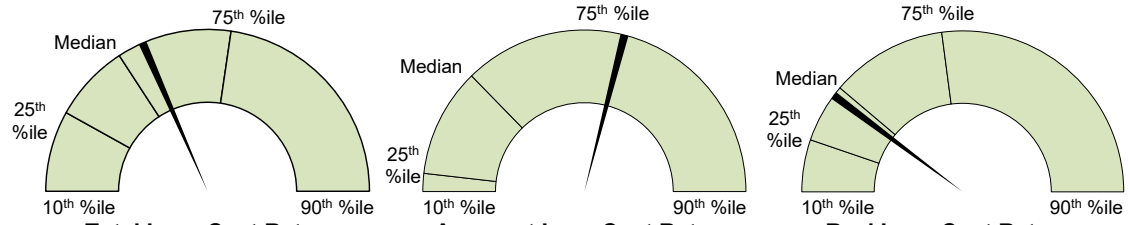
Component	Volume (MG/Yr)	Value (\$/Yr)	Basis of Valuation
Apparent Losses	23.1	\$152,715	CRUC
Real Losses	28.0	\$76,910	VPC
Unbilled Authorized Cons	11.7	\$32,002	VPC
Non-Revenue Water	62.8	\$261,627	Blended

Actual KPI result

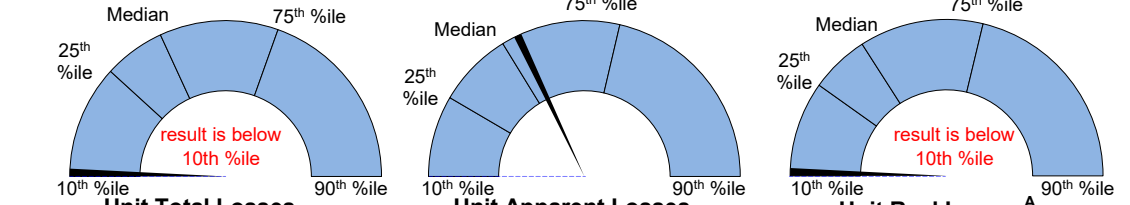
Key Performance Indicators

Target (see Worksheet)

gauge %iles per validated industry ranges²



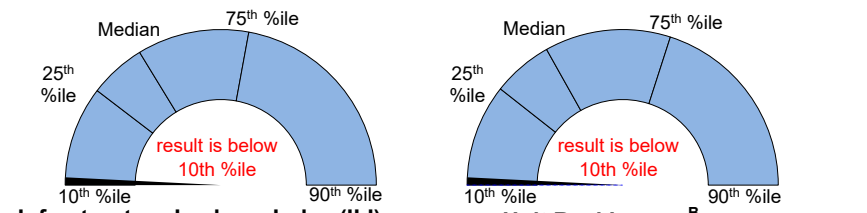
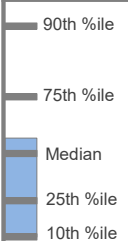
Total Loss Cost Rate 20.84 \$/conn/year	Apparent Loss Cost Rate 13.86 \$/conn/year	Real Loss Cost Rate 6.98 \$/conn/year
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Unit Total Losses 12.7 gal/conn/day	Unit Apparent Losses 5.7 gal/conn/day	Unit Real Losses^A 7.0 gal/conn/day
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Average Operating Pressure

73.3 psi



Infrastructure Leakage Index (ILI) 0.3 dimensionless	Unit Real Losses^B 558 gal/mile/day
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See UARL definition for additional guidance on the ILI

(UARL) Unavoidable Annual Real Losses **93.0** MG/Yr **23.1** gal/conn/day

Guidance Information for Key Performance

- The eight indicators shown are the recommended suite per the AWWA Water Loss Control Committee 2020 Position on KPIs¹.
- A suite of KPIs is necessary, as no single KPI can holistically communicate water loss performance for a given water system.
- See Table 1 below for Uses and Limitations for each KPI, excerpted from the AWWA Water Loss Control Committee Report (2020)¹, with naming conventions updated.
- Percentiles (%iles) shown on KPI gauges come from Level 1 validated data in the AWWA WLCC Reference Water Audit Dataset (2020)².
- KPI %iles shown above are not segregated by cohorts. Limited KPI data by cohorts may be found in WRF 4695 Guidance Manual, Appendix B (2019)³.
- Actual KPI results that fall below 10th %ile or above 90th %ile do not necessarily imply error, but should be viewed with scrutiny.
- Percentiles not intended to imply targets. Targets may be input by user for operational KPIs, if desired, on Worksheet.
- See UARL and ILI in Definitions tab for discussion of size and pressure limitations.
- Systems that fall on the extreme ends of size or connection density should use caution when interpreting Unit Losses KPIs.