



AWWA Free Water Audit Software: Worksheet

FWAS v6.0
American Water Works Association.
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Water Audit Report for: **West Valley Water District**
Audit Year: **2022** **Jan 01 2022 - Dec 31 2022** **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: ACRE-FEET PER YEAR

Water Supplied Error Adjustments

choose entry option:

VOS	Volume from Own Sources:	n	g	7	15,591.520	Acre-ft/Yr	n	g	9	percent	VOSEA
WI	Water Imported:	n	g	6	5,229.385	Acre-ft/Yr	n	g	4	percent	WIEA
WE	Water Exported:	n	g	6	1,086.356	Acre-ft/Yr	n	g	4	percent	WEEA

WATER SUPPLIED: Acre-ft/Yr

AUTHORIZED CONSUMPTION

BMAC	Billed Metered:	n	g	8	18,490.254	Acre-ft/Yr					
BUAC	Billed Unmetered:	n	g	n/a	0.000	Acre-ft/Yr					
UMAC	Unbilled Metered:	n	g	4	0.000	Acre-ft/Yr					
UUAC	Unbilled Unmetered:	n	g	4	239.770	Acre-ft/Yr					

choose entry option: acre-ft/yr

AUTHORIZED CONSUMPTION: Acre-ft/Yr

WATER LOSSES

Acre-ft/Yr

Apparent Losses

Default option selected for Systematic Data Handling Errors, with automatic data grading of 3

SDHE	Systematic Data Handling Errors:	n	g	3	46.226	Acre-ft/Yr					
CMI	Customer Metering Inaccuracies:	n	g	4	377.352	Acre-ft/Yr					
UC	Unauthorized Consumption:	n	g	3	46.226	Acre-ft/Yr					

Default option selected for Unauthorized Consumption, with automatic data grading of 3

Apparent Losses: Acre-ft/Yr

choose entry option:

0.25%	default
2.00%	percent
0.25%	default

[under-registration](#)

Real Losses

Real Losses: Acre-ft/Yr

WATER LOSSES: Acre-ft/Yr

NON-REVENUE WATER

NON-REVENUE WATER: Acre-ft/Yr

SYSTEM DATA

Lm	Length of mains:	n	g	10	434.5	miles	(including fire hydrant lead lengths)
Nc	Number of service connections:	n	g	10	23,926		(active and inactive)
	Service connection density:					55	conn./mile main
Lp	Are customer meters typically located at the curbstop/property line?	Yes					
AOP	Average length of customer service line has been set to zero and a data grading of 10 has been applied						
	Average Operating Pressure:	n	g	5	70.0	psi	

COST DATA

CRUC	Customer Retail Unit Charge:	n	g	5	\$2.47	\$/100 cubic feet (ccf)	Total Annual Operating Cost
VPC	Variable Production Cost:	n	g	9	\$350.34	\$/acre-ft	\$36,363,270 \$/yr (optional input)

WATER AUDIT DATA VALIDITY TIER:

*** The Water Audit Data Validity Score is in Tier III (51-70). 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: Volume from Own Sources (VOS)
2: Customer Metering Inaccuracies (CMI)
3: Billed Metered (BMAC)

KEY PERFORMANCE INDICATOR TARGETS:

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

Unit Total Losses:		gal/conn/day
Unit Apparent Losses:		gal/conn/day
Unit Real Losses ¹ :		gal/conn/day
Unit Real Losses ² :		gal/mile/day

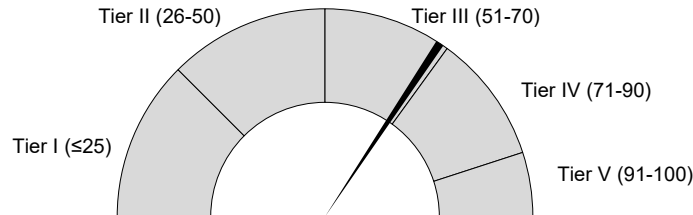
If entered above by user, targets will display on KPI gauges (see Dashboard)



Data Validity

Data Validity Score: **68** Data Validity Tier: **Tier III (51-70)**

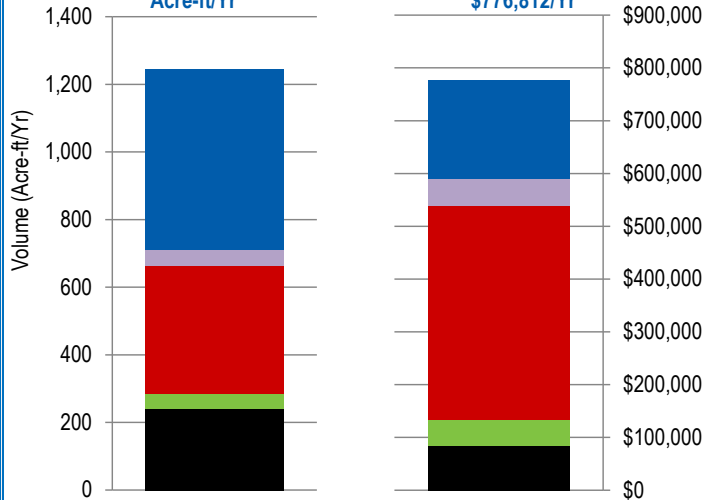
See [Loss Control Planning](#) for Tier Details



NRW Components Summary

Total Volume of NRW = 1,244
Acre-ft/Yr

Total Cost of NRW =
\$776,812/Yr



Real Losses	Unauthorized Consumption
Systematic Data Handling Errors	Unbilled Unmetered Auth Cons
Customer Metering Inaccuracies	Unbilled Metered Authorized Cons

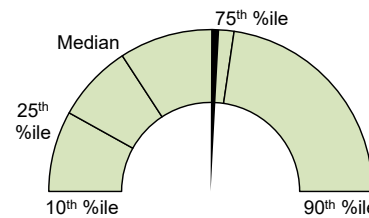
	Volume Acre-ft/Yr	Value \$/Yr	Basis of Valuation
Apparent Losses	469.8	\$505,477	CRUC
Real Losses	534.7	\$187,334	VPC
Unbilled Authorized Cons	239.8	\$84,001	VPC
Non-Revenue Water	1,244.3	\$776,812	Blended

Actual KPI result

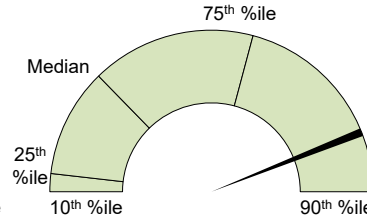
Key Performance Indicators

gauge %iles per validated industry ranges²

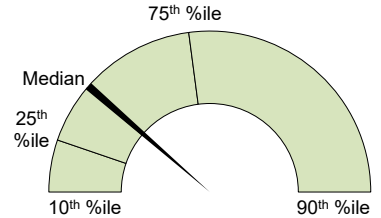
Target (see Worksheet)



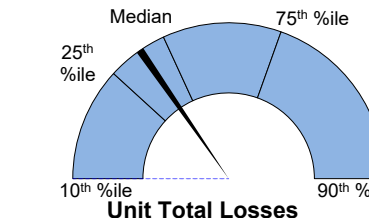
Total Loss Cost Rate
28.96 \$/conn/year



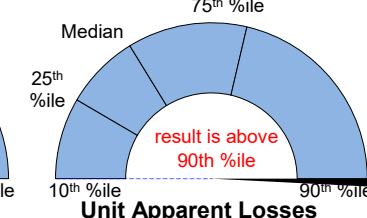
Apparent Loss Cost Rate
21.13 \$/conn/year



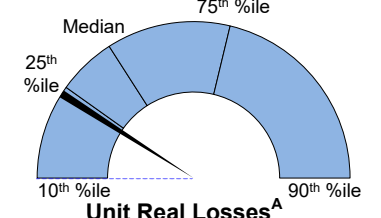
Real Loss Cost Rate
7.83 \$/conn/year



Unit Total Losses
37.5 gal/conn/day

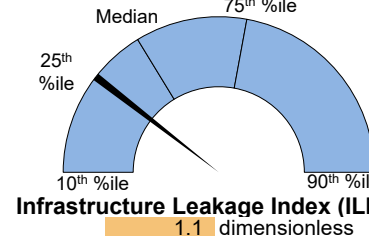
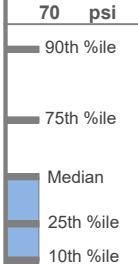


Unit Apparent Losses
17.5 gal/conn/day

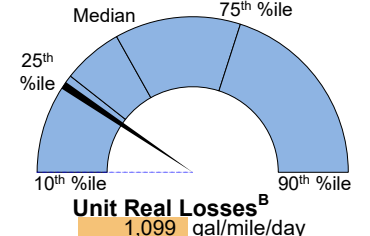


Unit Real Losses^A
20.0 gal/conn/day

Average Operating Pressure



Infrastructure Leakage Index (ILI)
1.1 dimensionless



Unit Real Losses^B
1,099 gal/mile/day

See UARL definition for additional guidance on the ILI

(UARL) Unavoidable Annual Real Losses 465.7 Acre-ft/Yr 17.4 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.

Table 1

Source: AWWA Water Loss Control Committee Report (2020)¹, with naming conventions updated

2020 AWWA Water Audit Method – Water Audit Outputs and Key Performance Indicators: Uses and Limitations

Type	Indicator	Description	Suitable Purposes					Uses and Limitations	Principal Users
			Assessment	Bench-Marking	Target-Setting	Planning	Tracking		
Attribute	Apparent Loss Volume	Calculated by Free Water Audit Software	✓				✓	Assess loss level	Utility, Regulators
	Apparent Loss Cost	Calculated by Free Water Audit Software	✓				✓	Assess cost loss level	Utility, Regulators
	Real Loss Volume	Calculated by Free Water Audit Software	✓				✓	Assess loss level	Utility, Regulators
	Real Loss Cost	Calculated by Free Water Audit Software	✓				✓	Assess loss cost level	Utility, Regulators
	Unavoidable Annual Real Loss (UARL)	Calculated by Free Water Audit Software	✓				✓	Reveal theoretical technical low level of leakage	Utility, Regulators
Volume	Unit Apparent Losses (vol/conn/day)	Strong and understandable indicator for multiple users.	✓	✓	✓	✓	✓	Used for performance tracking and target-setting	Utility, Regulators
	Unit Real Losses ^A (vol/conn/day)	Strong and understandable indicator for multiple users.	✓	✓	✓	✓	✓	Used for performance tracking and target-setting	Utility, Regulators, Policy Makers
	Unit Real Losses ^B (vol/pipeline length/day)	Strong and understandable indicator for use by utilities with low connection density.	✓	✓	✓	✓	✓	Data collection and assessment of systems with “low” connection density	Utility, Regulators, Policy Makers
	Unit Total Losses (vol/conn/day) New KPI	Strong and understandable indicator, suitable for high-level performance measurement.	✓				✓	High level indicator for trending analysis. Not appropriate for target-setting or benchmarking	Utilities, Customers
	Infrastructure Leakage Index (ILI)	Robust, specialized ratio KPI; can be influenced by pressure and connection density.	✓	✓			✓	Benchmarking after pressure management is implemented	Utilities
Value	Apparent Loss Cost Rate (value/conn/year) New KPI	Indicators with sufficient technical rigor. Provide the unit financial value of each type of loss, which is useful for planning and assessment of cost efficiency of water loss reduction and control interventions and programs.	✓			✓	✓	Data collection and assessment on AWWA indicators or contextual parameters to use in conjunction with Loss Cost Rates	Utilities, Regulators, Customers
	Real Loss Cost Rate (value/conn/year) New KPI		✓			✓	✓		Utilities, Regulators, Customers
Validity	Data Validity Tier (DVT)	Strong indicator of water loss audit data quality, if data has been validated. Tier provides guidance on priority areas of activity.	✓	✓		✓	✓	Assess caliber of data inputs of the water audit	Regulators, Utilities