



Teresa K. Harrold
Director, Corporate Counsel
852 Wesley Drive | Mechanicsburg, PA 17055
Phone: 717-550-1562
teresa.harrold@amwater.com

VIA eFiling

April 28, 2025

Matthew L. Homsher, Secretary
Commonwealth of Pennsylvania
Pennsylvania Public Utility Commission
Commonwealth Keystone Building, 2nd Floor
400 North Street
Harrisburg, PA 17120

Re: Annual Water Audit Summaries for year ended December 31, 2024
Docket No. M-2025-3052805

Dear Secretary Homsher:

On behalf of Pennsylvania-American Water Company, I am filing the Company's annual water audit summaries for the year ended December 31, 2024.

As directed by the Commission's filing requirements, the Company is also providing a working electronic copy in Microsoft Excel format.

If you have any questions, please do not hesitate to contact me.

Sincerely,

A handwritten signature in black ink, appearing to read "Teresa K. Harrold".

Teresa K. Harrold

Enclosure

cc: C. McKinley w/Annual Water Audit Summaries and Microsoft Excel Files



AWWA Free Water Audit Software v6.0

PWAS 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.

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- 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.
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 M36 Manual

Enter Basic Information

Name of Utility:	Pennsylvania American Water
Name of Contact Person:	James Baer
Email:	james.baer@amwater.com
Telephone Ext.:	610-842-3118
City/Town/Municipality:	PAW - All Districts
State / Province:	Pennsylvania (PA)
Country:	USA
Audit Preparation Date:	Mar 04 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:	
Validator Name/ID:	
Validator Email:	
Estimated Total Population Served by Water Utility:	2,064,327

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.



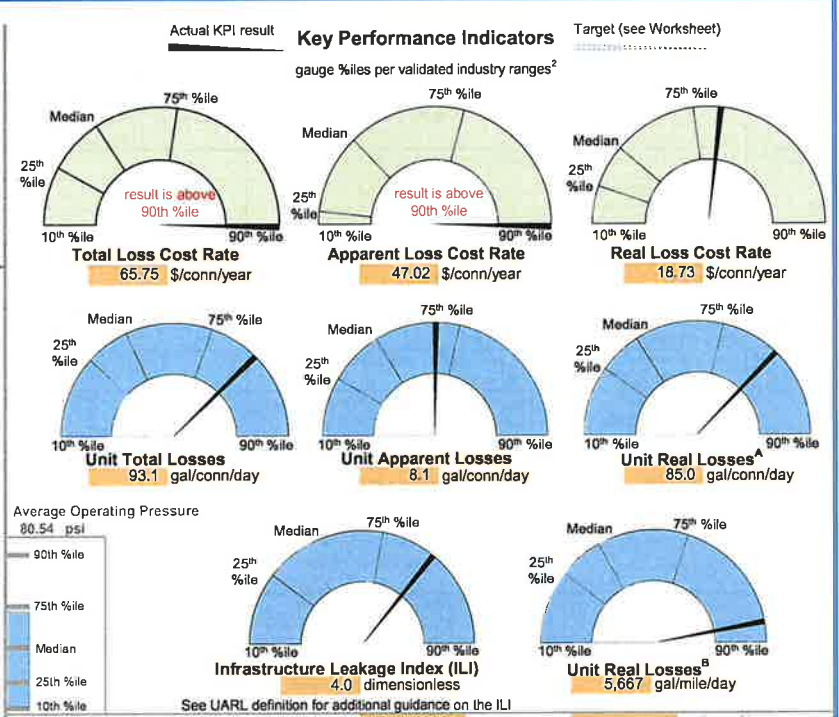
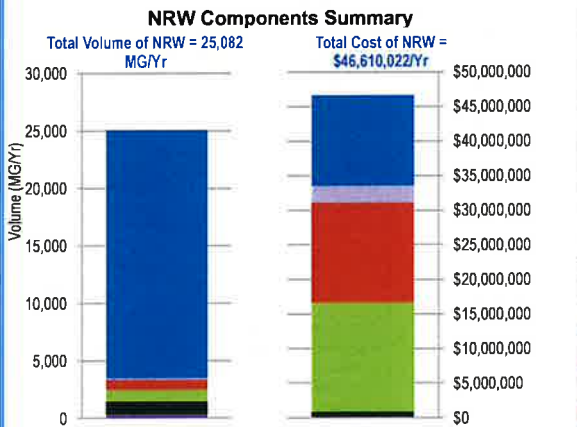
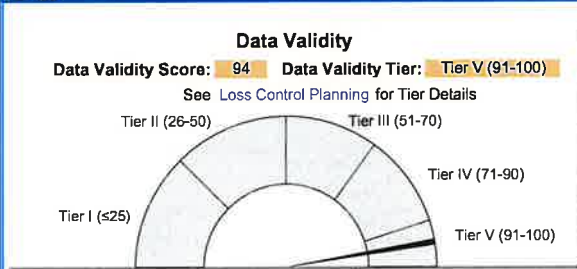
After clicking an acronym button, answer all visible questions in the order they're presented, choosing best-fit answer

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

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Limiting

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



	Volume MG/Yr	Value \$/Yr	Basis of Valuation
Apparent Losses	2,051.3	\$32,697,664	CRUC
Real Losses	21,569.3	\$13,025,922	VPC
Unbilled Authorized Cons	1,467.8	\$886,437	VPC
Non-Revenue Water	25,088.4	\$46,610,022	Blended

Guidance Information for Key Performance

- The eight indicators shown are the recommended suite per the AWWA Water Loss Control Committee 2020 Position on KPIs¹.
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- 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.



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Enter Basic Information

Name of Utility:	PAW- Pittsburgh Districts (110;210;220)
Name of Contact Person:	David Annarumo
Email:	david.annarumo@amwater.com
Telephone Ext.:	724-656-6744
City/Town/Municipality:	Pittsburgh
State / Province:	Pennsylvania (PA)
Country:	USA
Audit Preparation Date:	Mar 26 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:	5020039
Validator Name/ID:	N/A
Validator Email:	N/A
Estimated Total Population Served by Water Utility:	136,713

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

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 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

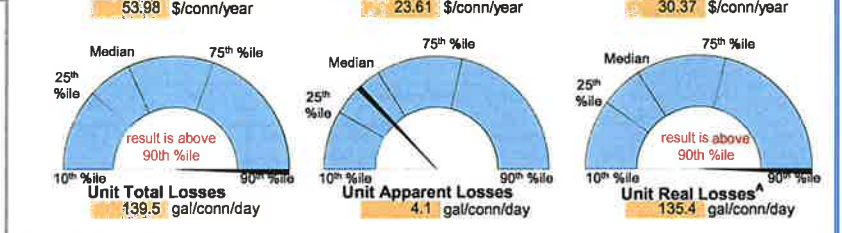
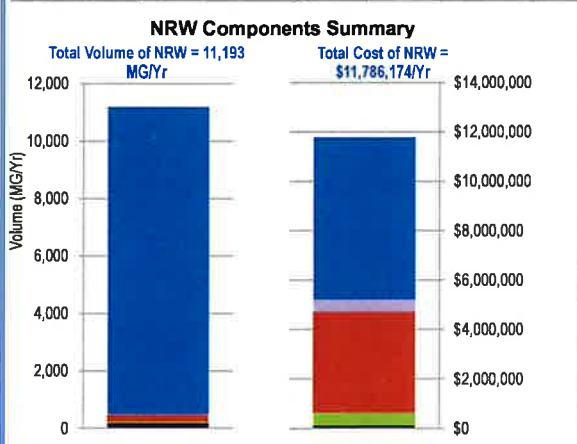
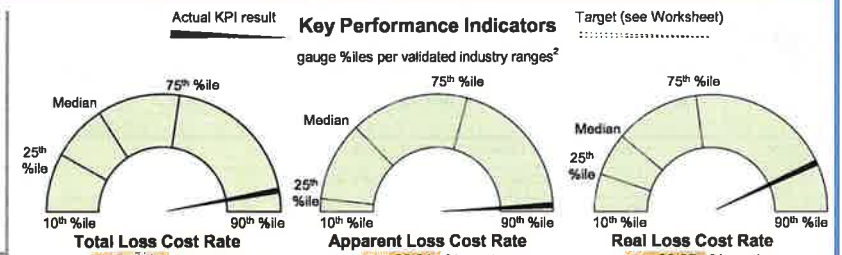
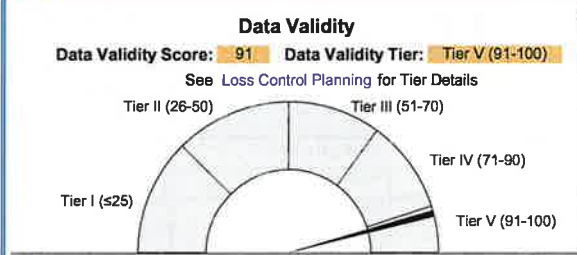
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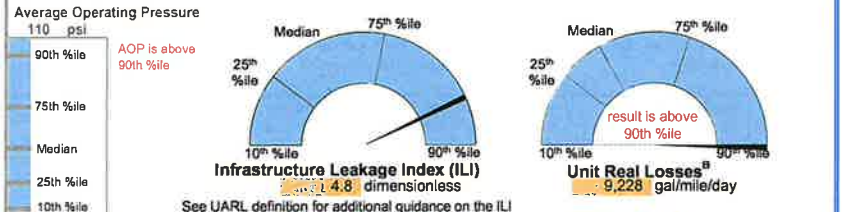
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Component	Volume (MG/Yr)	Value (\$/Yr)	Basis of Valuation
Apparent Losses	320.2	\$5,103,713	CRUC
Real Losses	10,684.1	\$8,565,704	VPC
Unbilled Authorized Cons	190.0	\$116,758	VPC
Non-Revenue Water	11,194.3	\$11,786,174	Blended



Guidance Information for Key Performance

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Enter Basic Information

Name of Utility:	PAW - 140 Steelton
Name of Contact Person:	James Baer
Email:	james.baer@armwater.com
Telephone Ext.:	610-842-3118
City/Town/Municipality:	Steelton
State / Province:	Pennsylvania (PA)
Country:	USA
Audit Preparation Date:	Mar 01 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:	7220036
Validator Name/ID:	n/a
Validator Email:	n/a
Estimated Total Population Served by Water Utility:	8,677

Key of Input Acronyms In order of appearance in the Worksheet

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- 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	25.000
	volume		

Choosing to enter **default** or **custom input** (applies to UUAC, SDHE, UC)

choose entry option:

0.25%	default	or	75.000
	custom		

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 FWAS v6.0

AWWA Free Water Audit Software: Dashboard

Water Audit Report for: PAW - 140 Steelton Audit Year: 2024 Calendar: Jan 01 2024 - Dec 31 2024

***** COMPLETE ALL VISIBLE QUESTIONS ON THE INTERACTIVE DATA GRADING TAB TO DISPLAY PERFORMANCE INDICATORS *****

Data Validity

Data Validity Score: **Data Validity Tier:**

See Loss Control Planning for Tier Details

Key Performance Indicators

Actual KPI result Target (see Worksheet)

gauge %iles per validated industry ranges²

Total Loss Cost Rate
\$/conn/year

Apparent Loss Cost Rate
\$/conn/year

Real Loss Cost Rate
\$/conn/year

Unit Total Losses
gal/conn/day

Unit Apparent Losses
gal/conn/day

Unit Real Losses^A
gal/conn/day

Infrastructure Leakage Index (ILI)
dimensionless

Unit Real Losses^B
gal/mile/day

Average Operating Pressure: 83.6 psi

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

NRW Components Summary

Total Volume of NRW = 4 MG/Yr Total Cost of NRW = \$1,007/Yr

Component	Volume (MG/Yr)	Value (\$/Yr)	Basis of Valuation
Real Losses	~5.5	~\$1,000	CRUC
Systematic Data Handling Errors	0	0	VPC
Customer Metering Inaccuracies	0	0	VPC
Unauthorized Consumption	0	0	Blended
Unbilled Unmetered Auth Cons	0	0	
Unbilled Metered Authorized Cons	0	0	

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Enter Basic Information

Name of Utility:	PAW- Uniontown/Connellsville District 230
Name of Contact Person:	David Annarumo
Email:	david.annarumo@amwater.com
Telephone Ext.:	724-656-6744
City/Town/Municipality:	Uniontown/Connellsville
State / Province:	Pennsylvania (PA)
Country:	USA
Audit Preparation Date:	Mar 26 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:	5260022-5260020
Validator Name/ID:	N/A
Validator Email:	N/A
Estimated Total Population Served by Water Utility:	13,571

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 percent or volume

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 default or custom

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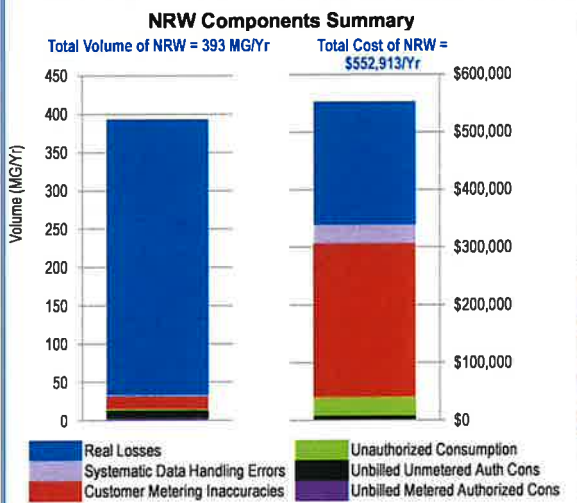
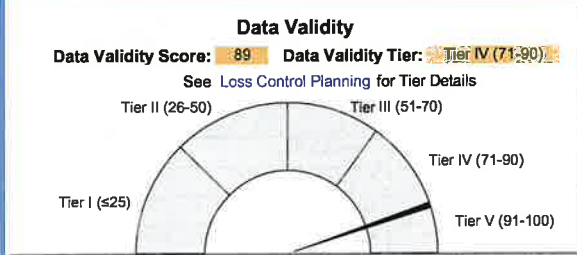
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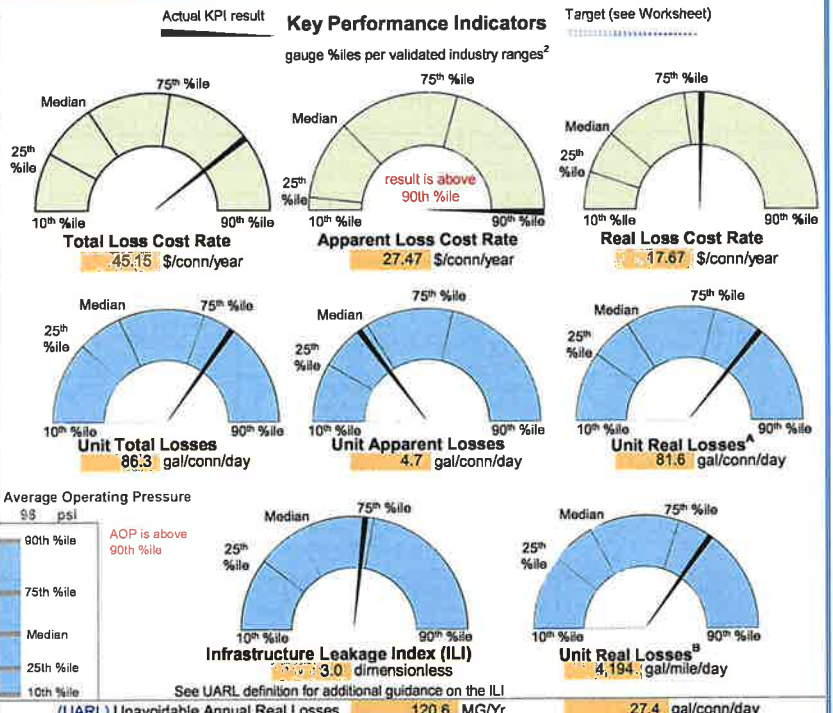
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	Volume MG/Yr	Value \$/Yr	Basis of Valuation
Apparent Losses	20.8	\$331,774	CRUC
Real Losses	359.6	\$213,445	VPC
Unbilled Authorized Cons	13.0	\$7,694	VPC
Non-Revenue Water	393.4	\$552,913	Blended



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- Systems that fall on the extreme ends of size or connection density should use caution when interpreting Unit Losses KPIs.



AWWA Free Water Audit Software v6.0

FWAS v6.0

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- Service Connection Diagram** Diagrams depicting possible customer service connection line configurations.
- Acknowledgements** Acknowledgements for development of the AWWA Free Water Audit Software v6.0.

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

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

Enter Basic Information

Name of Utility:	PAW-Brownsville District 250
Name of Contact Person:	David Annarumo
Email:	david.annarumo@amwater.com
Telephone Ext.:	724-656-6744
City/Town/Municipality:	Brownsville
State / Province:	Pennsylvania (PA)
Country:	USA
Audit Preparation Date:	Mar 26 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:	5260005
Validator Name/ID:	N/A
Validator Email:	N/A
Estimated Total Population Served by Water Utility:	4,690

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:
 percent volume

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

Guidance for the Interactive Data Grading

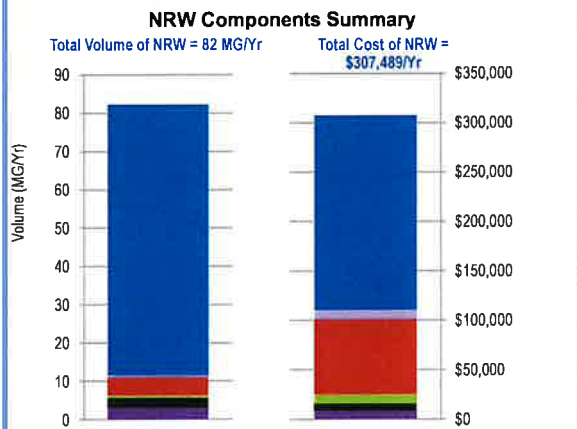
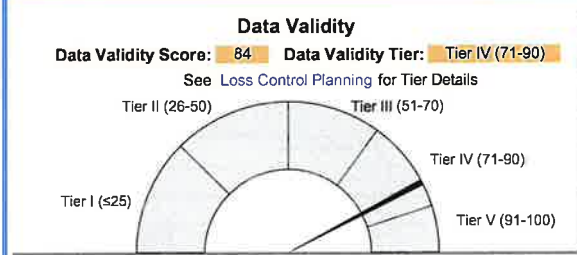
Use acronym buttons in IDG header to navigate among inputs. Acronym Key above. White = needs answers, orange = complete, clear = not required. Example below.



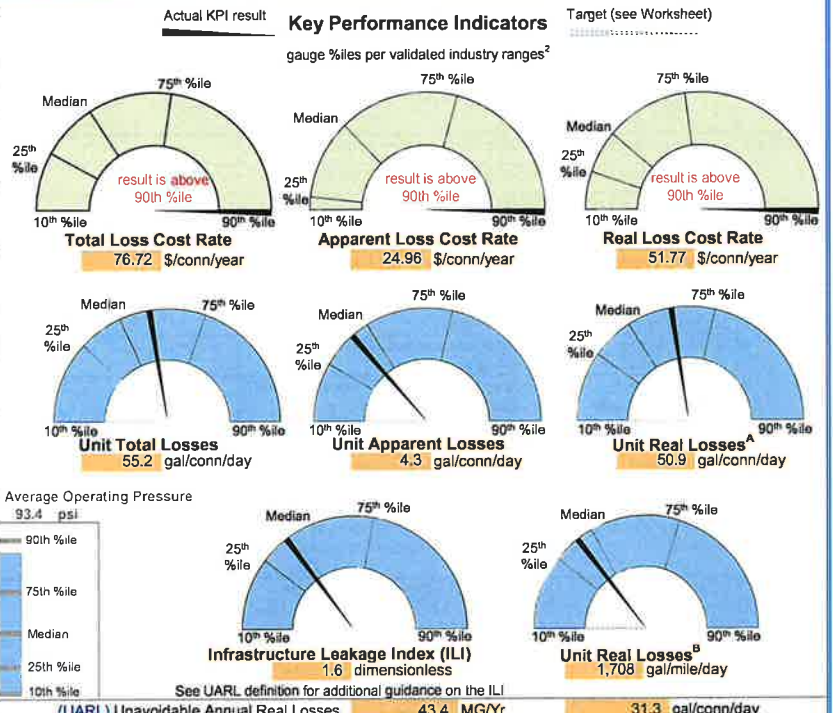
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Grade will populate when all visible questions are complete for an input

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Component	Volume (MG/Yr)	Value (\$/Yr)	Basis of Valuation
Apparent Losses	6.0	\$94,891	CRUC
Real Losses	70.6	\$196,816	VPC
Unbilled Authorized Cons	5.7	\$15,782	VPC
Non-Revenue Water	82.2	\$307,489	Blended



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

Enter Basic Information

Name of Utility:	PAW- New Castle District 310
Name of Contact Person:	David Annarumo
Email:	david.annarumo@amwater.com
Telephone Ext.:	724-656-6744
City/Town/Municipality:	New Castle/Eliwood
State / Province:	Pennsylvania (PA)
Country:	USA
Audit Preparation Date:	Mar 26 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:	6370034;6370011
Validator Name/ID:	N/A
Validator Email:	N/A
Estimated Total Population Served by Water Utility:	26,607

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	25.000
	volume		

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

0.25%	default	or	75.000
	custom		

Guidance for the Interactive Data Grading

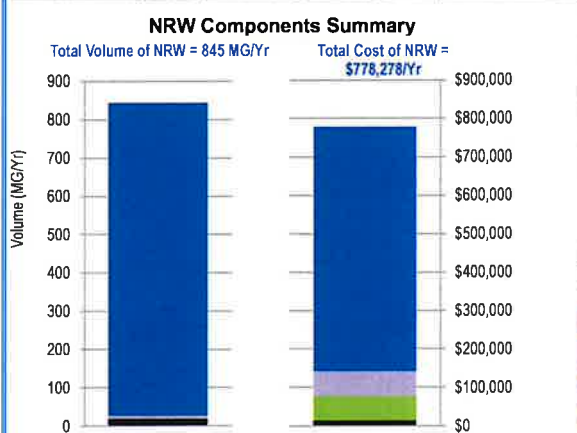
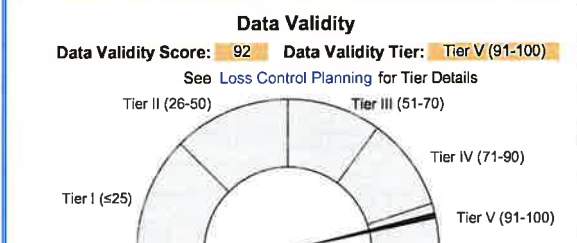
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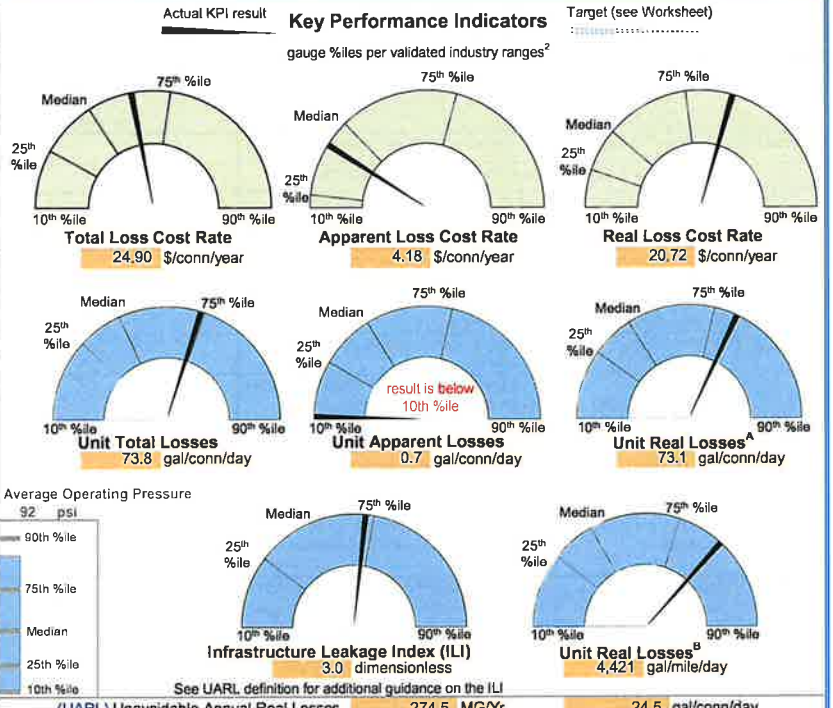
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Grade will populate when all visible questions are complete for an input 7

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	Volume MG/Yr	Value \$/Yr	Basis of Valuation
Apparent Losses	8.0	\$128,209	CRUC
Real Losses	818.0	\$635,493	VPC
Unbilled Authorized Cons	18.8	\$14,576	VPC
Non-Revenue Water	844.7	\$778,278	Blended



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Enter Basic Information

Name of Utility:	PAW-Butler District 330
Name of Contact Person:	David Annarumo
Email:	david.annarumo@amwater.com
Telephone Ext.:	724-656-6744
City/Town/Municipality:	Butler
State / Province:	Pennsylvania (PA)
Country:	USA
Audit Preparation Date:	Mar 26 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:	5100012
Validator Name/ID:	N/A
Validator Email:	N/A
Estimated Total Population Served by Water Utility:	19,505

Key of Input Acronyms In order of appearance in the Worksheet

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Guidance for the Worksheet

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 choose entry option:
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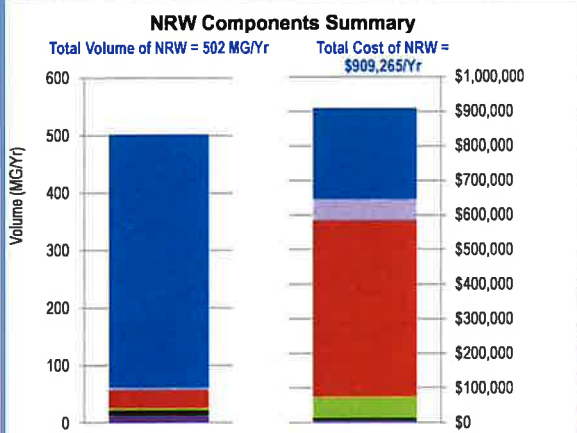
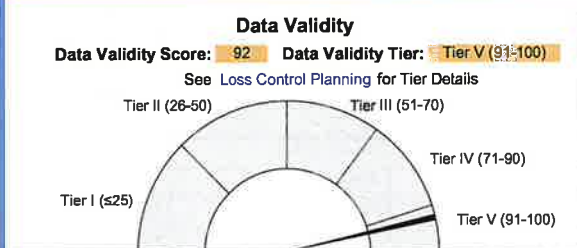
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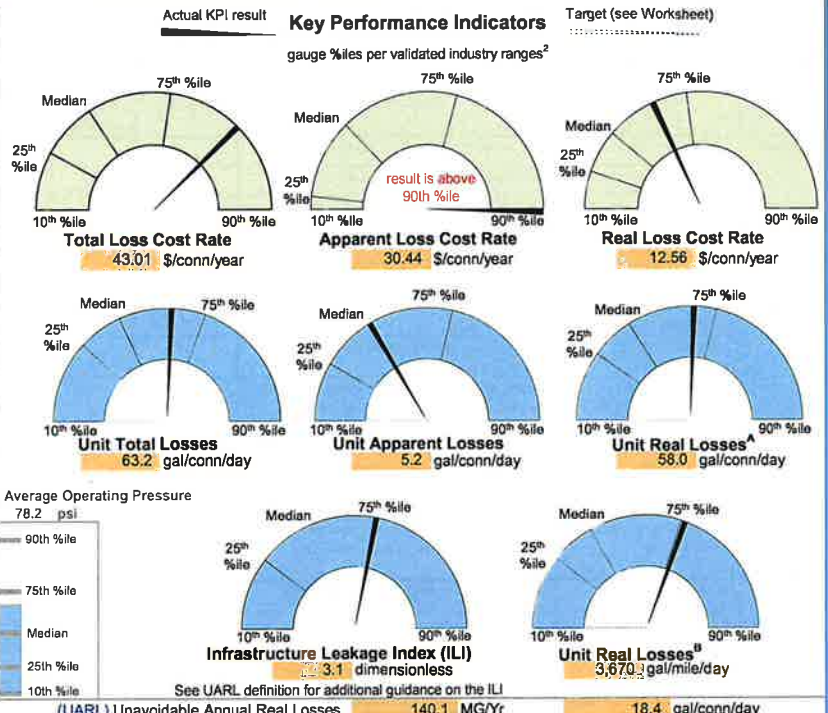
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Component	Volume (MG/Yr)	Value (\$/Yr)	Basis of Valuation
Apparent Losses	39.9	\$634,662	CRUC
Real Losses	441.2	\$261,892	VPC
Unbilled Authorized Cons	21.4	\$12,711	VPC
Non-Revenue Water	502.6	\$909,265	Blended



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Enter Basic Information

Name of Utility: PAW- Indiana District 410
 Name of Contact Person: David Annarumo
 Email: david.annarumo@amwater.com
 Telephone | Ext.: 724-856-6744
 City/Town/Municipality: Indiana
 State / Province: Pennsylvania (PA)
 Country: USA
 Audit Preparation Date: Mar 26 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: 5320025
 Validator Name/ID: N/A
 Validator Email: N/A
 Estimated Total Population Served by Water Utility: 7,510

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

- VOS Volume from Own Sources
- VOSEA VOS Error Adjustment
- WI Water Imported
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AWWA Free Water Audit Software: Dashboard

[go to worksheet](#) [go to grading](#) [go to references](#)

Water Audit Report for: PAW- Indiana District 410

Audit Year: 2024 Calendar Jan 01 2024 - Dec 31 2024

Data Validity

Data Validity Score: 92 **Data Validity Tier:** Tier V (91-100)

See Loss Control Planning for Tier Details

Tier I (≤25)
Tier II (26-50)
Tier III (51-70)
Tier IV (71-90)
Tier V (91-100)

NRW Components Summary

Total Volume of NRW = 171 MG/Yr

Total Cost of NRW = \$273,035/Yr

	Volume MG/Yr	Value \$/Yr	Basis of Valuation
Apparent Losses	14.4	\$230,148	CRUC
Real Losses	153.8	\$42,133	VPC
Unbilled Authorized Cons	2.8	\$755	VPC
Non-Revenue Water	170.9	\$273,035	Blended

Key Performance Indicators

gauge %iles per validated industry ranges² Target (see Worksheet)

Total Loss Cost Rate
37.60 \$/conn/year

Apparent Loss Cost Rate
31.78 \$/conn/year

Real Loss Cost Rate
5.82 \$/conn/year

Unit Total Losses
63.6 gal/conn/day

Unit Apparent Losses
5.5 gal/conn/day

Unit Real Losses^A
58.2 gal/conn/day

Average Operating Pressure
79.4 psi

Infrastructure Leakage Index (ILI)
2.7 dimensionless

Unit Real Losses^B
3,517 gal/mile/day

(UARL) Unavoidable Annual Real Losses 56.1 MG/Yr 21.2 gal/conn/day

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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.

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- 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.
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 Example Water Audit v6.0
 Water Audit Compiler v6.0
 AWWA Reports on Performance Indicators
 M36 Manual

Enter Basic Information

Name of Utility:	PAW- Punxsutawney District 420
Name of Contact Person:	David Annarumo
Email:	david.annarumo@amwater.com
Telephone Ext.:	724-656-6744
City/Town/Municipality:	Punxsutawney
State / Province:	Pennsylvania (PA)
Country:	USA
Audit Preparation Date:	Mar 26 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:	6330010
Validator Name/ID:	N/A
Validator Email:	N/A
Estimated Total Population Served by Water Utility:	3,623

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:
 percent or volume

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

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.

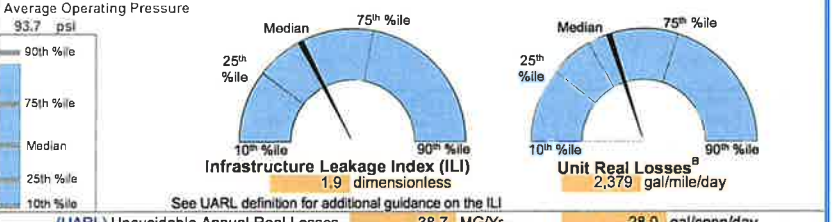
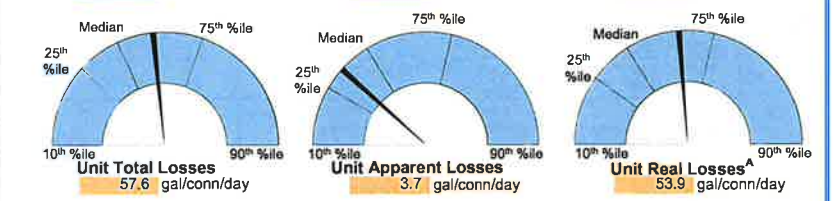
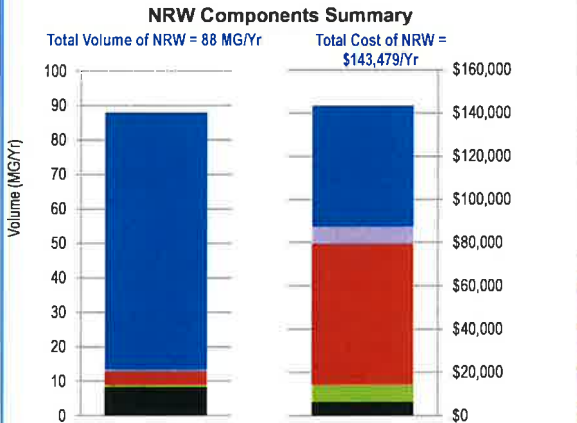
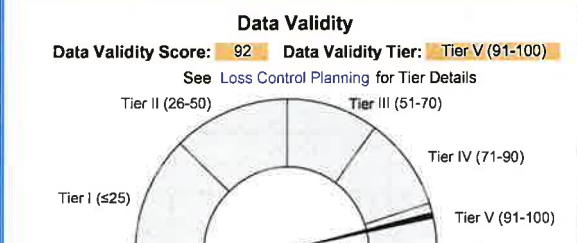


After clicking an acronym button, answer all visible questions in the order they're presented, choosing best-fit answer

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

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)

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



	Volume MG/Yr	Value \$/Yr	Basis of Valuation
Apparent Losses	5.1	\$81,262	CRUC
Real Losses	74.5	\$55,935	VPC
Unbilled Authorized Cons	8.4	\$6,282	VPC
Non-Revenue Water	88.0	\$143,479	Blended

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.
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- 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.



AWWA Free Water Audit Software v6.0

FWAS v6.0

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Enter Basic Information

Name of Utility: PAW- Clarion District 430
 Name of Contact Person: David Annarumo
 Email: david.annarumo@amwater.com
 Telephone | Ext.: 724-856-6744
 City/Town/Municipality: Clarion
 State / Province: Pennsylvania (PA)
 Country: USA
 Audit Preparation Date: Mar 26 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: 6160001
 Validator Name/ID: N/A
 Validator Email: N/A
 Estimated Total Population Served by Water Utility: 4,233

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	25.000
	volume		

Choosing to enter default or custom input (applies to UUAC, SDHE, UC)

choose entry option:

0.25%	default	or	75.000
	custom		

Guidance for the Interactive Data Grading

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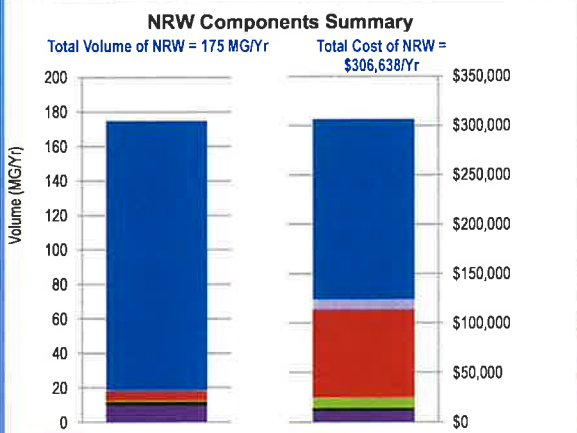
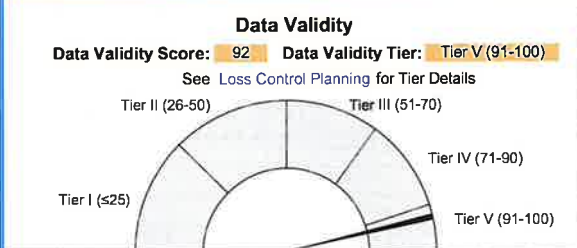
After clicking an acronym button, answer all visible questions in the order they're presented, choosing best-fit answer

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

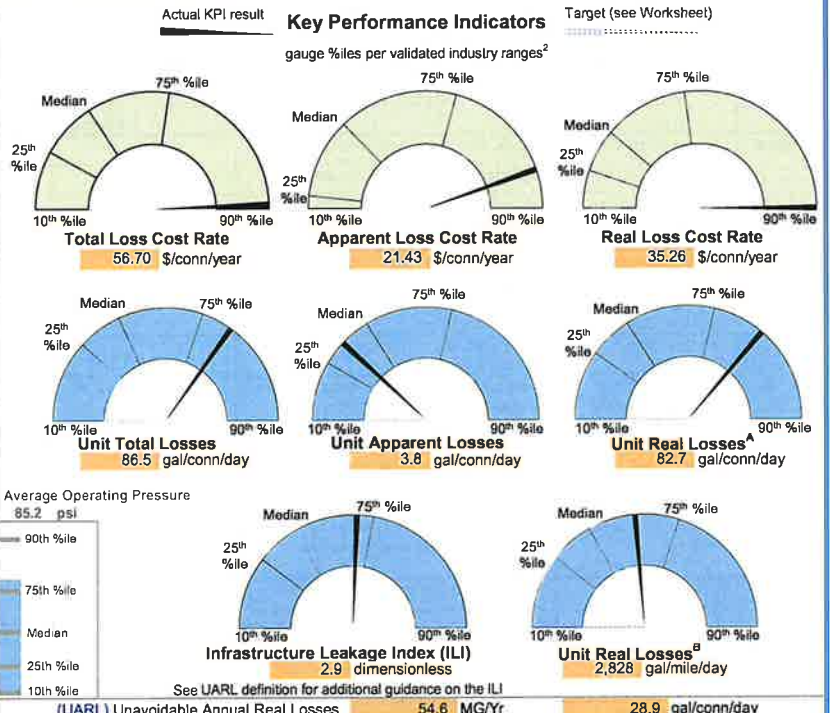
<input type="text"/>
7

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Limiting



	Volume MG/Yr	Value \$/Yr	Basis of Valuation
Apparent Losses	7.1	\$110,719	CRUC
Real Losses	155.9	\$182,168	VPC
Unbilled Authorized Cons	11.8	\$13,751	VPC
Non-Revenue Water	174.8	\$306,638	Blended



Guidance Information for Key Performance

- The eight indicators shown are the recommended suite per the AWWA Water Loss Control Committee 2020 Position on KPIs¹.
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Enter Basic Information

Name of Utility:	PAW- Kittanning District 440
Name of Contact Person:	David Annarumo
Email:	david.annarumo@amwater.com
Telephone Ext.:	724-656-6744
City/Town/Municipality:	Kittanning
State / Province:	Pennsylvania (PA)
Country:	USA
Audit Preparation Date:	Mar 26 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:	5030008
Validator Name/ID:	N/A
Validator Email:	N/A
Estimated Total Population Served by Water Utility:	1,967

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
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BUAC	Billed Unmetered Authorized Consumption
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Lp	Average length of (private) customer service line
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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:
 percent or volume

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

Guidance for the Interactive Data Grading

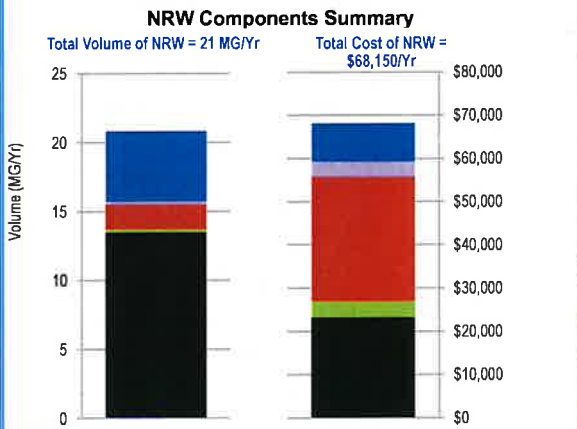
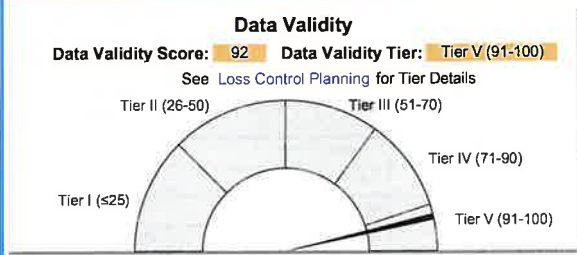
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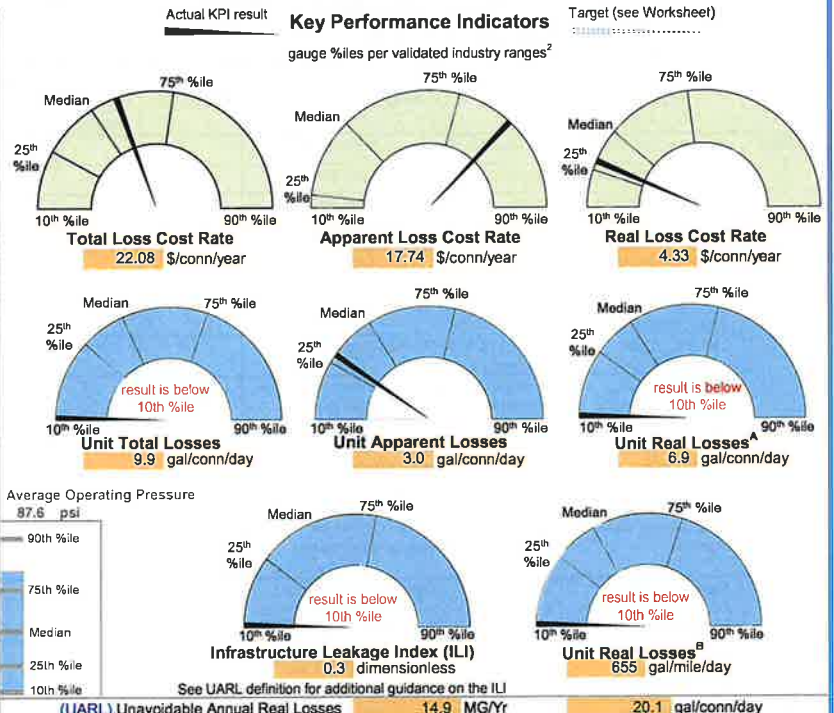
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	Volume MG/Yr	Value \$/Yr	Basis of Valuation
Apparent Losses	2.3	\$36,038	CRUC
Real Losses	5.1	\$8,803	VPC
Unbilled Authorized Cons	13.5	\$23,309	VPC
Non-Revenue Water	20.8	\$68,150	Blended



Guidance Information for Key Performance

KPI data by cohorts may be found in WRF 4695 Guidance Manual, Appendix B (2019)¹.

- 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.
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* KPI %iles shown above are not segregated by cohorts. Limited



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

Enter Basic Information

Name of Utility:	PAW- Warren District 450
Name of Contact Person:	David Annarumo
Email:	david.annarumo@amwater.com
Telephone Ext.:	724-656-6744
City/Town/Municipality:	Warren
State / Province:	Pennsylvania (PA)
Country:	USA
Audit Preparation Date:	Mar 26 2025
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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:	6620020
Validator Name/ID:	N/A
Validator Email:	N/A
Estimated Total Population Served by Water Utility:	5,423

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
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Color Key User input Calculated Optional default

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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

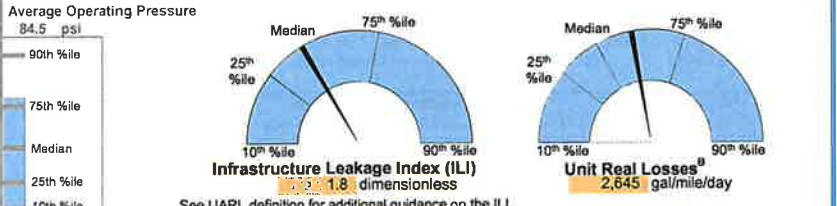
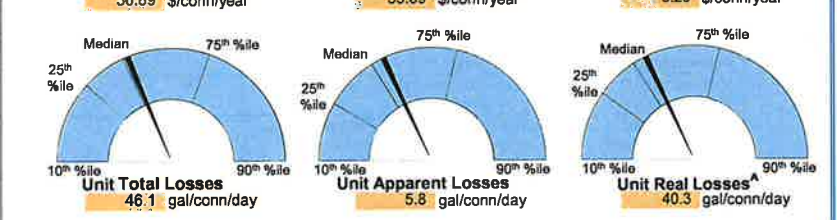
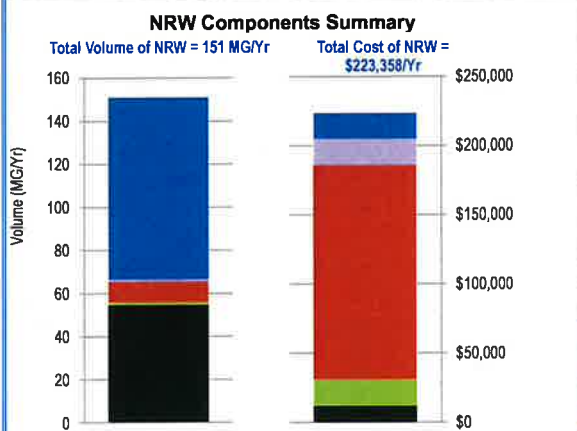
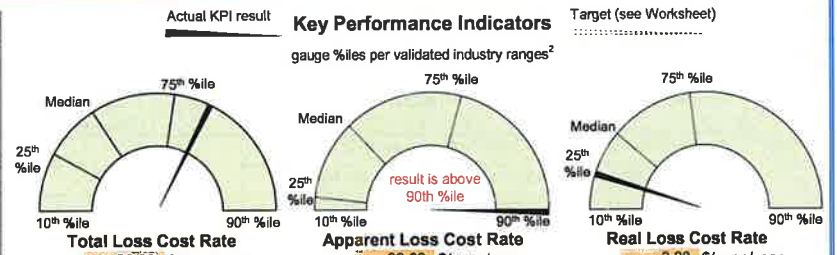
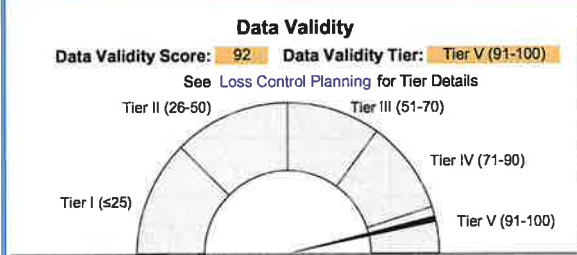
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	Volume MG/Yr	Value \$/Yr	Basis of Valuation
Apparent Losses	12.1	\$193,128	CRUC
Real Losses	84.3	\$18,342	VPC
Unbilled Authorized Cons	54.6	\$11,888	VPC
Non-Revenue Water	151.0	\$223,358	Blended

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- Definitions** Use this sheet to understand the terms used in the audit process.
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AWWA Web Resources for Water Loss Control
<https://www.awwa.org/Resources-Tools/Resource-Topics/Water-Loss-Control>
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 Example Water Audit v6.0
 Water Audit Compiler v6.0
 AWWA Reports on Performance Indicators
 M36 Manual

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

Enter Basic Information

Name of Utility:	PAW- Kane District 460
Name of Contact Person:	David Annarumo
Email:	david.annarumo@amwater.com
Telephone Ext.:	724-656-6744
City/Town/Municipality:	Kane
State / Province:	Pennsylvania (PA)
Country:	USA
Audit Preparation Date:	Mar 26 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:	6420019
Validator Name/ID:	N/A
Validator Email:	N/A
Estimated Total Population Served by Water Utility:	2,075

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	25,000
	volume		

Choosing to enter **default** or **custom input** (applies to UUAC, SDHE, UC)

choose entry option:

0.25%	default	or	75,000
	custom		

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.

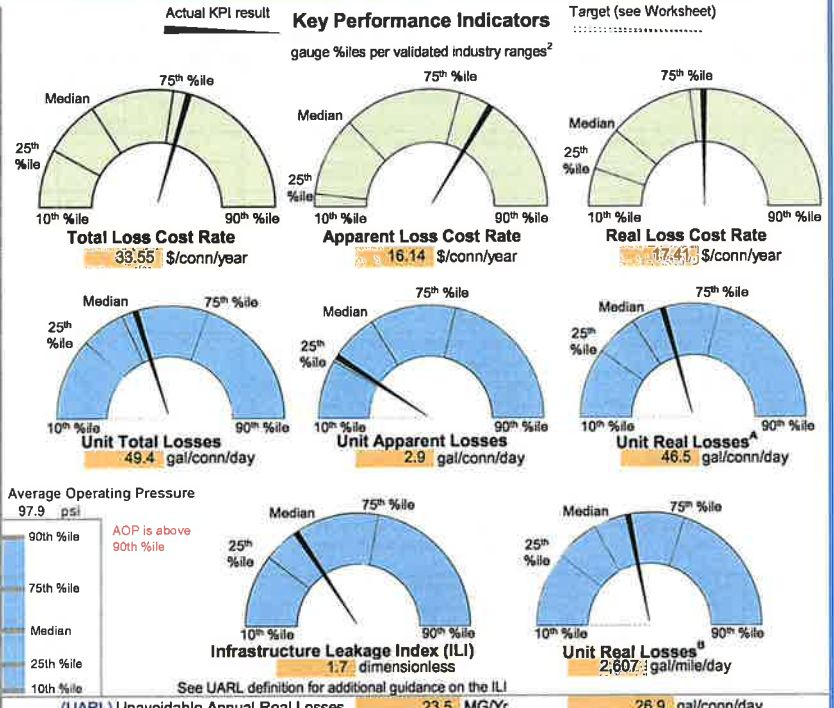
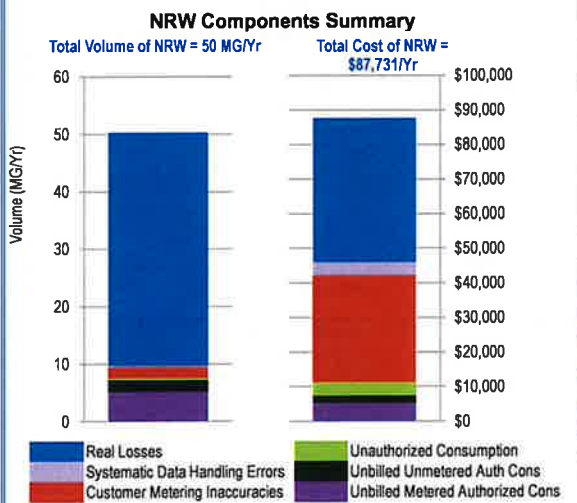
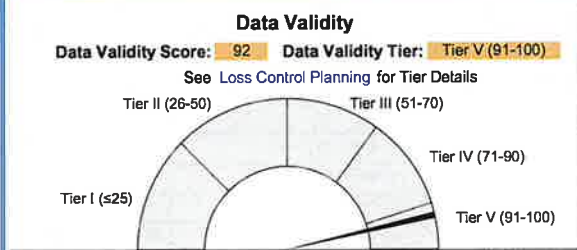


After clicking an acronym button, answer all visible questions in the order they're presented, choosing best-fit answer

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

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



Guidance Information for Key Performance

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- 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.



AWWA Free Water Audit Software v6.0

FWAS v6.0

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 Water Audit Compiler v6.0
 AWWA Reports on Performance Indicators
 M36 Manual

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

Enter Basic Information

Name of Utility:	PAW - 510 Norristown
Name of Contact Person:	James Baer
Email:	james.baer@amwater.com
Telephone Ext.:	610-842-3118
City/Town/Municipality:	Norristown
State / Province:	Pennsylvania (PA)
Country:	USA
Audit Preparation Date:	Feb 25 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:	1460046
Validator Name/D:	n/a
Validator Email:	n/a
Estimated Total Population Served by Water Utility:	117,305

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	25.000
	volume		

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

0.25%	default	or	75.000
	custom		

Guidance for the Interactive Data Grading

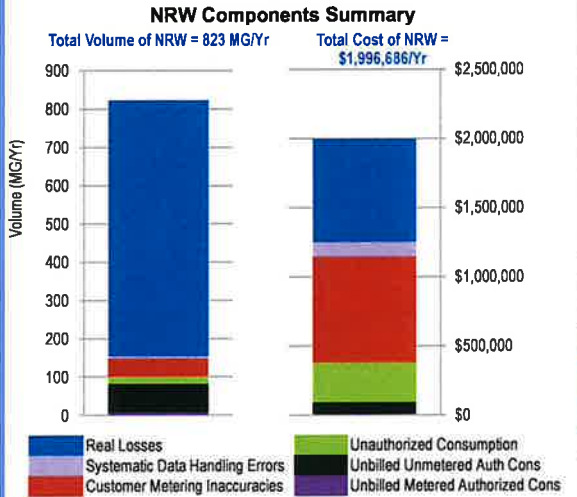
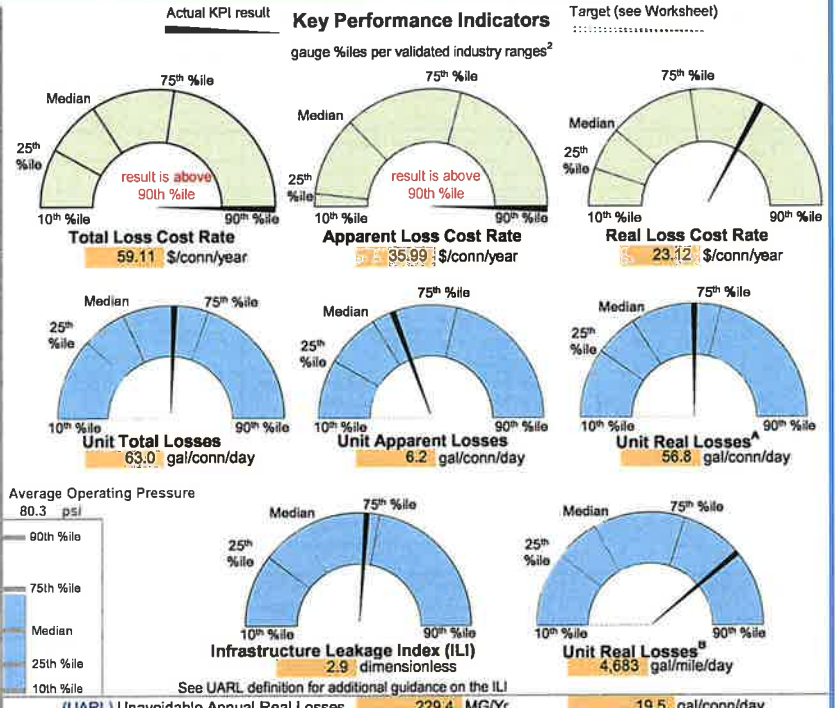
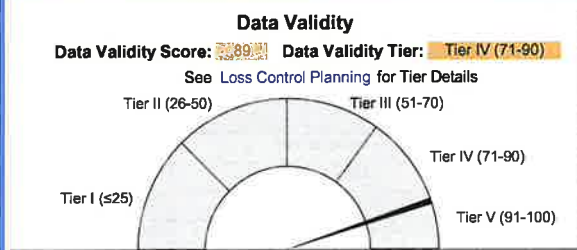
Use acronym buttons in IDG header to navigate among inputs. Acronym Key above. White = needs answers, orange = complete, clear = not required. Example below.



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**



	Volume MG/Yr	Value \$/Yr	Basis of Valuation
Apparent Losses	72.6	\$1,159,574	CRUC
Real Losses	668.0	\$744,846	VPC
Unbilled Authorized Cons	82.7	\$92,266	VPC
Non-Revenue Water	823.3	\$1,996,686	Blended

Guidance Information for Key Performance

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- 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.



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 Water Audit Compiler v6.0
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 M36 Manual

Enter Basic Information

Name of Utility:	PAW - 520 Yardley
Name of Contact Person:	James Baer
Email:	james.baer@amwater.com
Telephone Ext.:	610-842-3118
City/Town/Municipality:	Yardley
State / Province:	Pennsylvania (PA)
Country:	USA
Audit Preparation Date:	Feb 25 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:	1090074
Validator Name/ID:	n/a
Validator Email:	n/a
Estimated Total Population Served by Water Utility:	44,567

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.

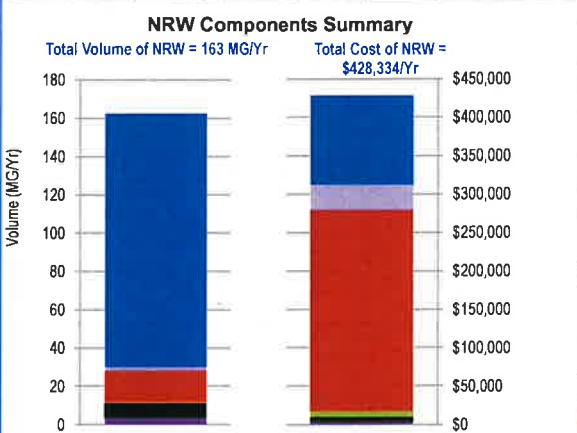
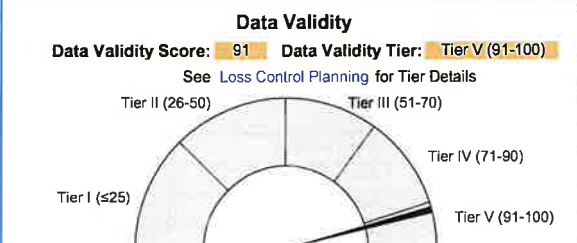


After clicking an acronym button, answer all visible questions in the order they're presented, choosing best-fit answer

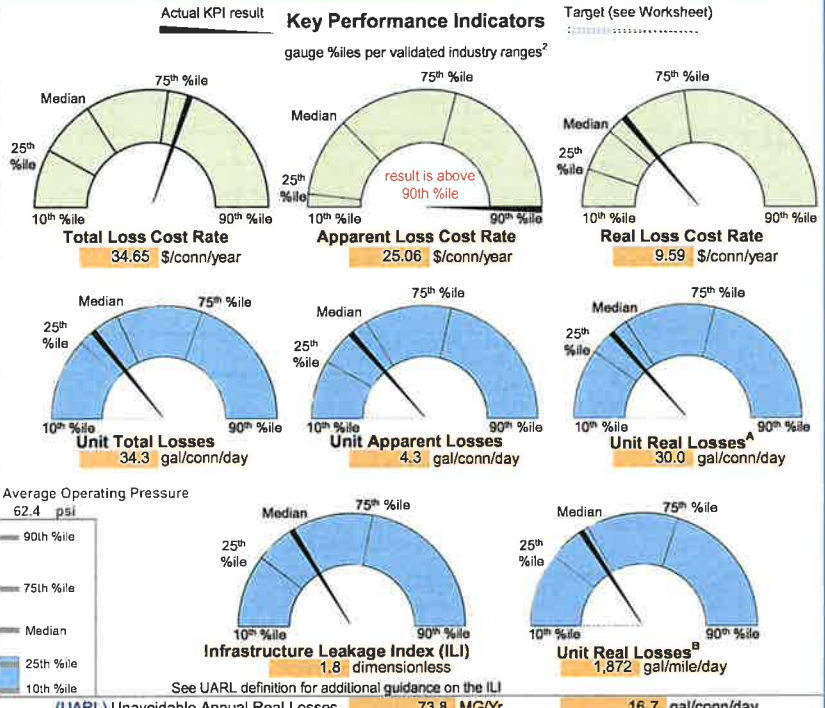
Grade will populate when all visible questions are complete for an input **7**

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



Component	Volume (MG/Yr)	Value (\$/Yr)	Basis of Valuation
Apparent Losses	19.0	\$302,622	CRUC
Real Losses	132.3	\$115,833	VPC
Unbilled Authorized Cons	11.3	\$9,879	VPC
Non-Revenue Water	162.6	\$428,334	Blended



Guidance Information for Key Performance

- The eight indicators shown are the recommended suite per the AWWA Water Loss Control Committee 2020 Position on KPIs¹.
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If you have questions or comments regarding this software please contact us at: wlc@awwa.org

Enter Basic Information

Name of Utility:	PAW - 530 Abington
Name of Contact Person:	James Baer
Email:	james.baer@amwater.com
Telephone Ext:	610-842-3118
City/Town/Municipality:	Clarks Summit
State / Province:	Pennsylvania (PA)
Country:	USA
Audit Preparation Date:	Feb 27 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:	2359008 - 2660004
Validator Name/ID:	n/a
Validator Email:	n/a
Estimated Total Population Served by Water Utility:	23,613

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
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Lp	Average length of (private) customer service line
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CRUC	Customer Retail Unit Charge
VPC	Variable Production Cost

Color Key User input Calculated Optional default

Guidance for the Worksheet

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1.00%	percent	or	
	volume		25.000

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 choose entry option:

0.25%	default	or	
	custom		75.000

Guidance for the Interactive Data Grading

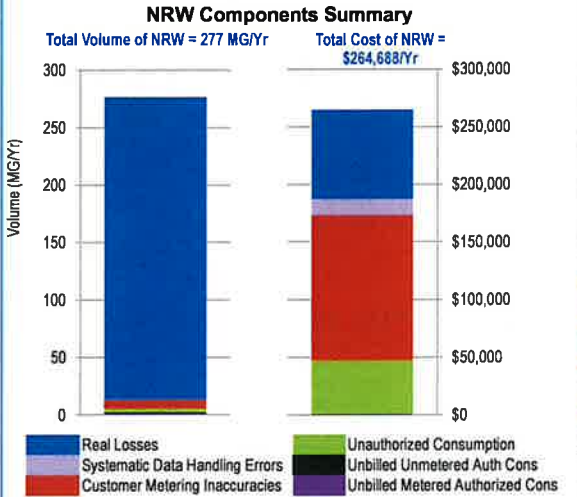
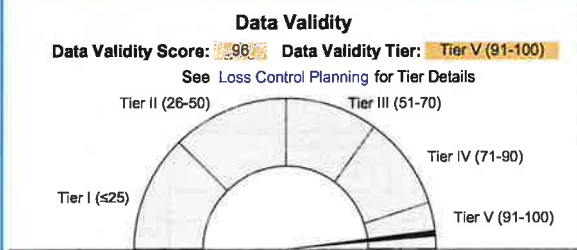
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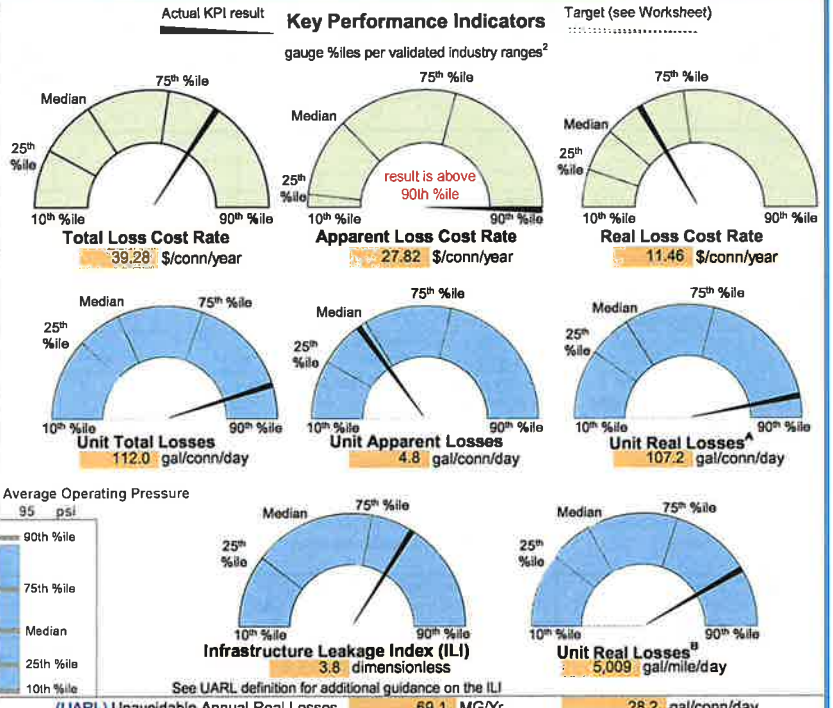
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	Volume MG/Yr	Value \$/Yr	Basis of Valuation
Apparent Losses	11.7	\$187,028	CRUC
Real Losses	263.1	\$77,048	VPC
Unbilled Authorized Cons	2.1	\$611	VPC
Non-Revenue Water	276.9	\$264,688	Blended



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Enter Basic Information

Name of Utility:	PAW - 540 Susquehanna
Name of Contact Person:	James Baer
Email:	james.baer@amwater.com
Telephone Ext.:	610-842-3118
City/Town/Municipality:	Susquehanna
State / Province:	Pennsylvania (PA)
Country:	USA
Audit Preparation Date:	Feb 27 2025
Audit Year:	2024
Audit Year Label:	Calendar (Fiscal, Calendar, etc)
Audit Period Start Date:	Jan 01 2024
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Volume Reporting Units:	Million gallons (US)
Water System Structure:	Retail
Water Type:	Potable Water
System ID Number:	2580024, 2580026, 2580023
Validator Name/ID:	n/a
Validator Email:	n/a
Estimated Total Population Served by Water Utility:	9,391

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:
 percent or volume

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

Guidance for the Interactive Data Grading

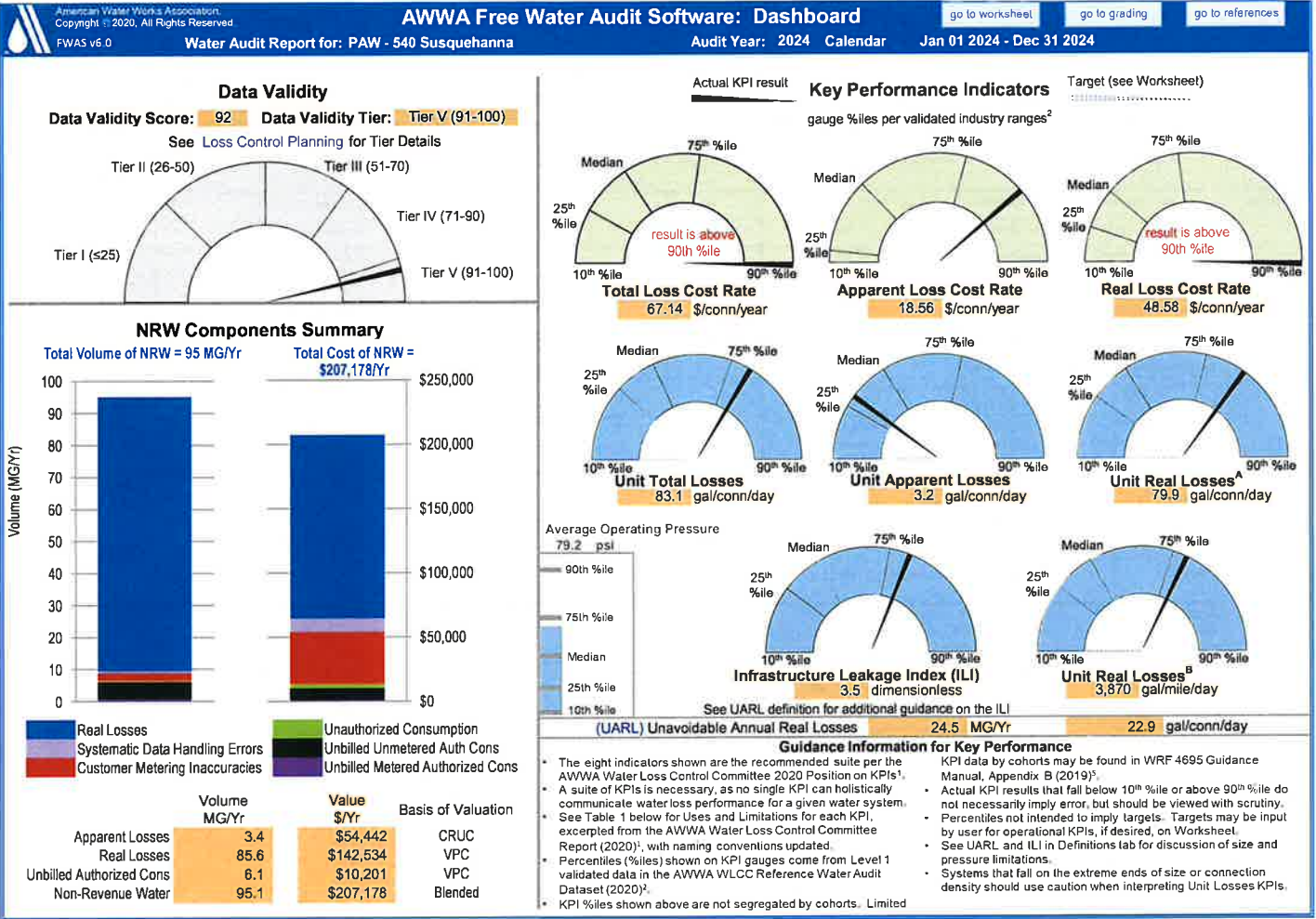
Use acronym buttons in IDG header to navigate among inputs. Acronym Key above. White = needs answers, orange = complete, clear = not required. Example below.



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

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)


AWWA Free Water Audit Software v6.0
Dashboard 1



AWWA Free Water Audit Software v6.0

FWAS v6.0

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- 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:

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- Example Water Audit v6.0
- Water Audit Compiler v6.0
- AWWA Reports on Performance Indicators
- M36 Manual

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

Enter Basic Information

Name of Utility:	PAW - 550 Bangor
Name of Contact Person:	James Baer
Email:	james.baer@amwater.com
Telephone Ext.:	610-842-3118
City/Town/Municipality:	Bangor
State / Province:	Pennsylvania (PA)
Country:	USA
Audit Preparation Date:	Feb 27 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:	3480038, 3480053
Validator Name/ID:	n/a
Validator Email:	n/a
Estimated Total Population Served by Water Utility:	13,882

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
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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	25,000
	volume		

Choosing to enter default or custom input (applies to UUAC, SDHE, UC)

choose entry option:

0.25%	default	or	75,000
	custom		

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.

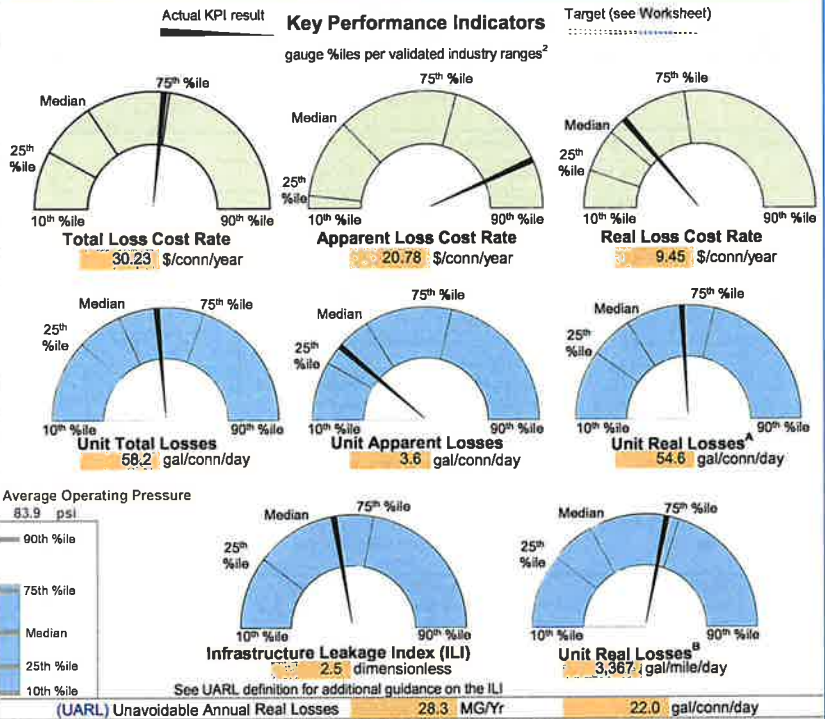
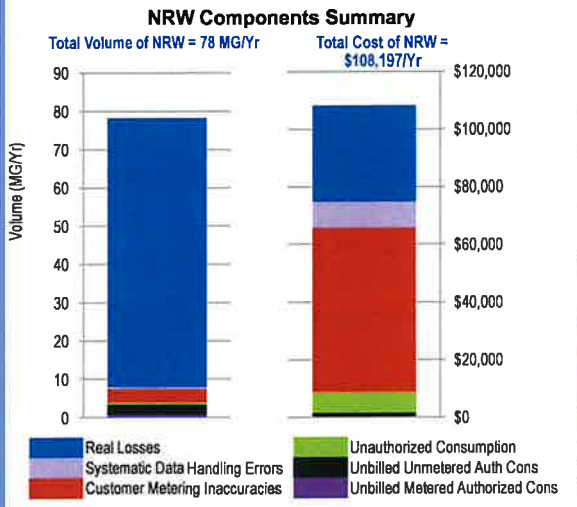
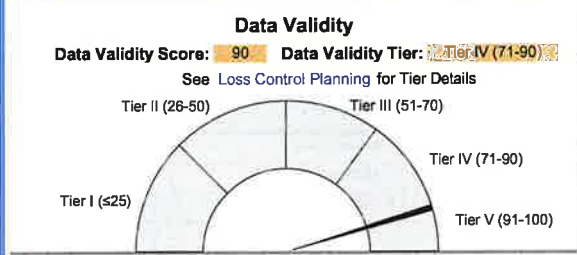


After clicking an acronym button, answer all visible questions in the order they're presented, choosing best-fit answer

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



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.
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- 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.



AWWA Free Water Audit Software v6.0

FWAS v6.0

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

Enter Basic Information

Name of Utility:	PAW - 560 Nazareth
Name of Contact Person:	James Baer
Email:	james.baer@amwater.com
Telephone Ext.:	610-842-3118
City/Town/Municipality:	Nazareth
State / Province:	Pennsylvania (PA)
Country:	USA
Audit Preparation Date:	Feb 24 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:	3480055
Validator Name/ID:	n/a
Validator Email:	n/a
Estimated Total Population Served by Water Utility:	39,194

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
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Color Key User input Calculated Optional default

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1.00%	percent	or	25,000
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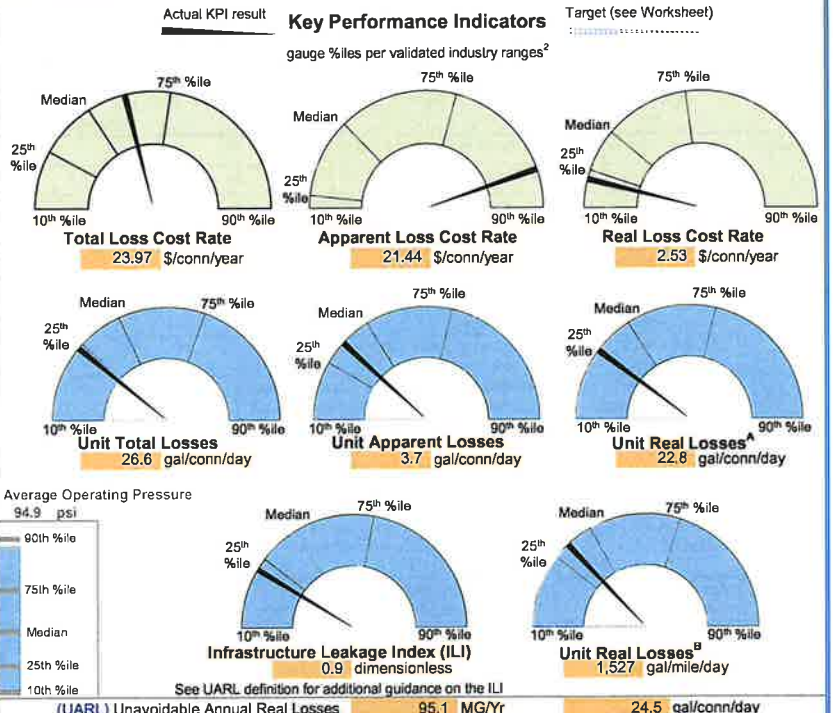
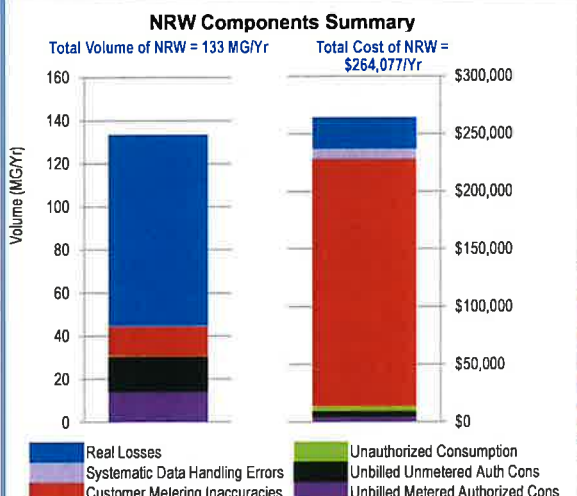
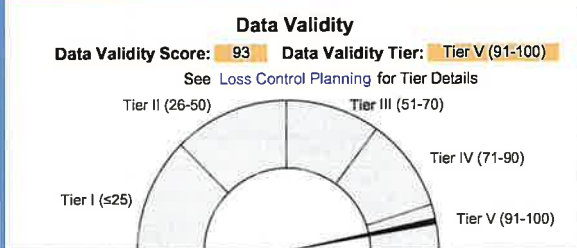
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AWWA Free Water Audit Software v6.0

FWAS v6.0

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 Water Audit Compiler v6.0
 AWWA Reports on Performance Indicators
 M36 Manual

Enter Basic Information

Name of Utility:	PAW - 570 Pocono
Name of Contact Person:	James Baer
Email:	james.baer@amwater.com
Telephone Ext:	610-842-3118
City/Town/Municipality:	Pocono
State / Province:	Pennsylvania (PA)
Country:	USA
Audit Preparation Date:	Feb 27 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:	2640047, 2450063, 2350026
Validator Name/ID:	n/a
Validator Email:	n/a
Estimated Total Population Served by Water Utility:	31,409

Key of Input Acronyms In order of appearance in the Worksheet

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- VOSEA** VOS Error Adjustment
- WI** Water Imported
- WIEA** WI Error Adjustment
- WE** Water Exported
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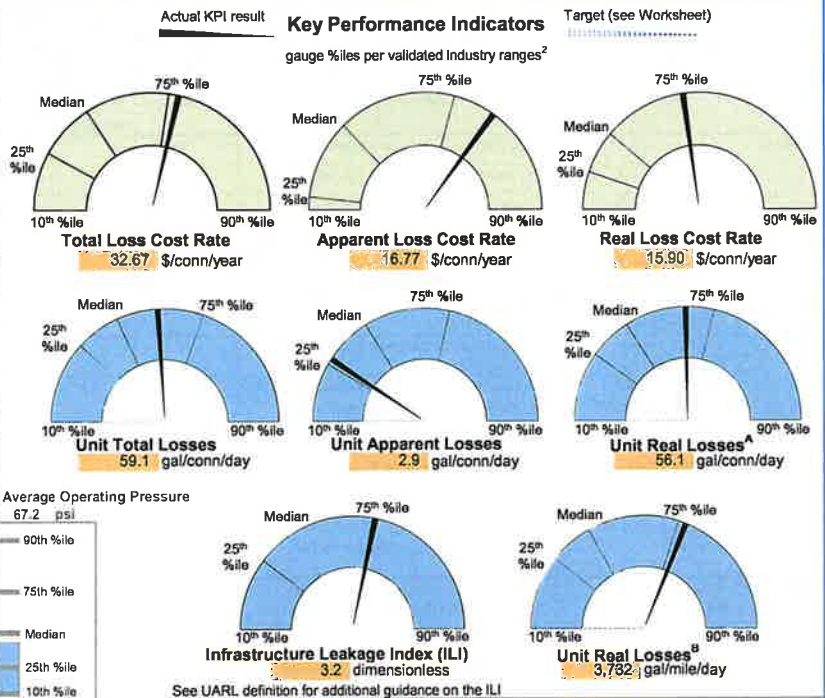
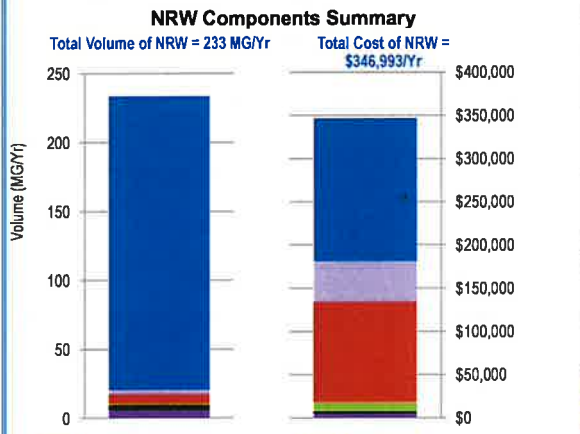
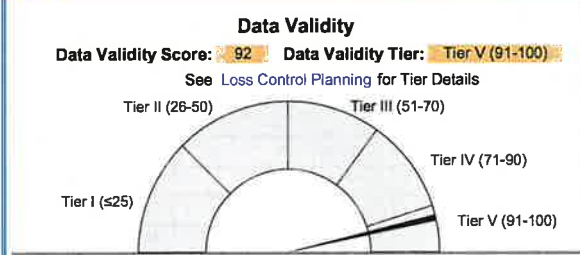


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If you have questions or comments regarding this software please contact us at: wlc@awwa.org



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.
- 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.
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FWAS v6.0

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Enter Basic Information

Name of Utility:	PAW - 590 Glen Alsace
Name of Contact Person:	James Baer
Email:	james.baer@amwater.com
Telephone Ext.:	610-842-3118
City/Town/Municipality:	Exeter
State / Province:	Pennsylvania (PA)
Country:	USA
Audit Preparation Date:	Feb 25 2025
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Audit Period End Date:	Dec 31 2024
Volume Reporting Units:	Million gallons (US)
Water System Structure:	Retail
Water Type:	Potable Water
System ID Number:	3060088, 3060126
Validator Name/ID:	n/a
Validator Email:	n/a
Estimated Total Population Served by Water Utility:	35,091

Key of Input Acronyms In order of appearance in the Worksheet

- VOS** Volume from Own Sources
- VOSEA** VOS Error Adjustment
- WI** Water Imported
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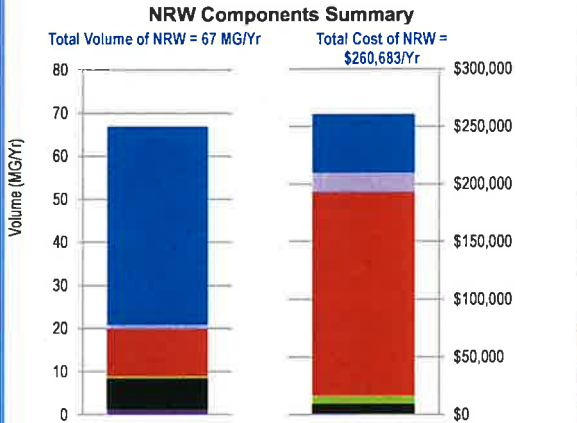
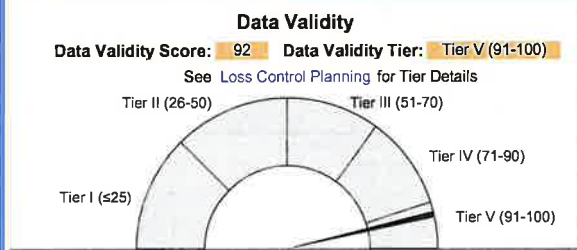


After clicking an acronym button, answer all visible questions in the order they're presented, choosing best-fit answer

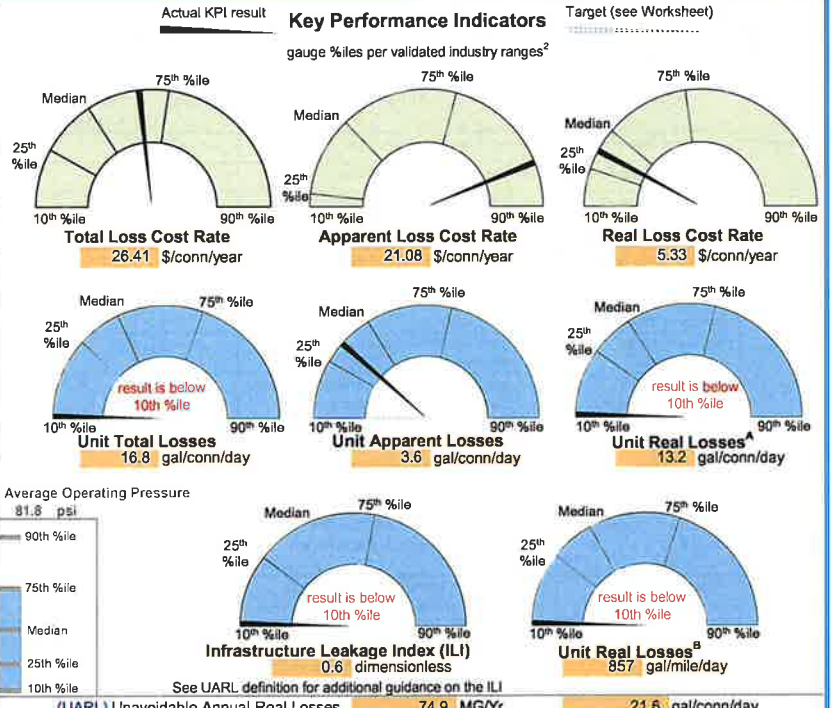
Grade will populate when all visible questions are complete for an input **7**

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



	Volume MG/Yr	Value \$/Yr	Basis of Valuation
Apparent Losses	12.6	\$200,678	CRUC
Real Losses	45.9	\$50,717	VPC
Unbilled Authorized Cons	8.4	\$9,288	VPC
Non-Revenue Water	66.9	\$260,683	Blended



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FWAS v6.0

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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.

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

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

Enter Basic Information

Name of Utility:	PAW - 610 Mechanicsburg
Name of Contact Person:	James Baer
Email:	james.baer@amwater.com
Telephone Ext.:	610-842-3118
City/Town/Municipality:	Mechanicsburg
State / Province:	Pennsylvania (PA)
Country:	USA
Audit Preparation Date:	Mar 03 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:	7210029
Validator Name/ID:	n/a
Validator Email:	n/a
Estimated Total Population Served by Water Utility:	154,334

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.

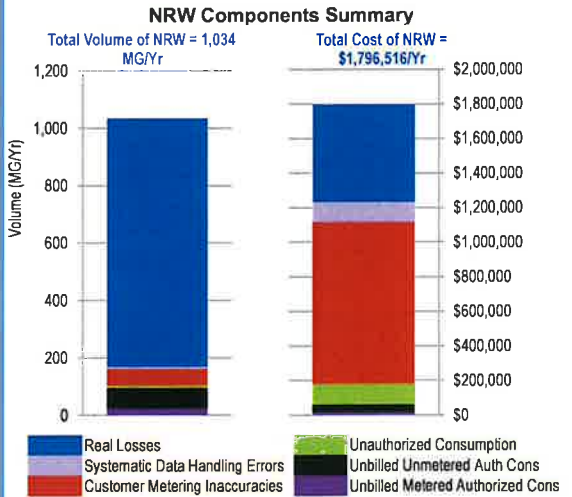
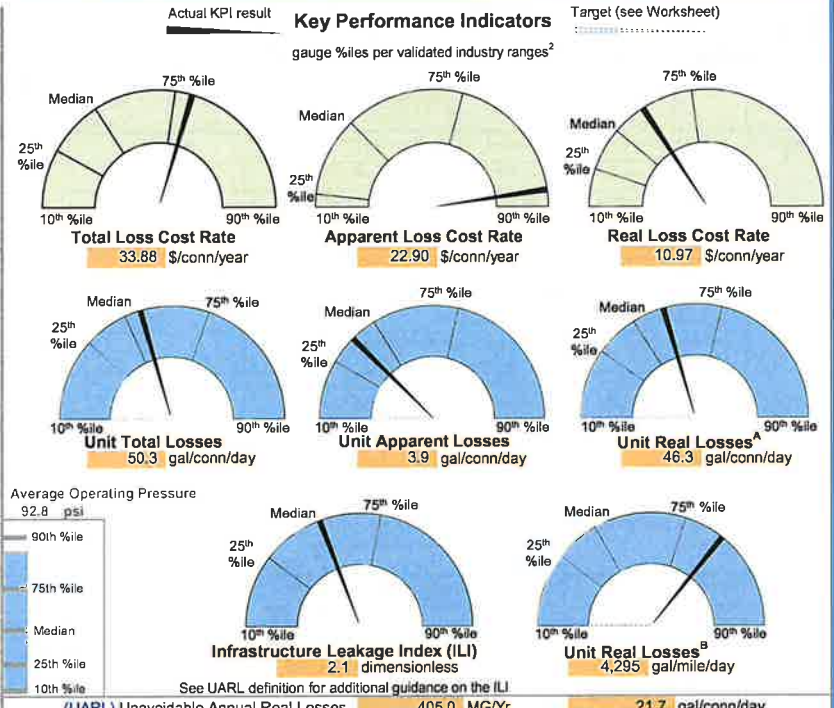
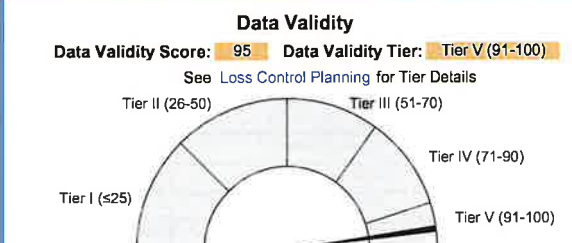


After clicking an acronym button, answer all visible questions in the order they're presented, choosing best-fit answer

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



	Volume MG/Yr	Value \$/Yr	Basis of Valuation
Apparent Losses	73.8	\$1,172,908	CRUC
Real Losses	865.9	\$562,062	VPC
Unbilled Authorized Cons	94.8	\$61,546	VPC
Non-Revenue Water	1,034.5	\$1,796,516	Blended

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.



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

Enter Basic Information

Name of Utility:	PAW - 620 Hershey
Name of Contact Person:	James Baor
Email:	James.baor@amwater.com
Telephone Ext.:	610-842-3118
City/Town/Municipality:	Hershey
State / Province:	Pennsylvania (PA)
Country:	USA
Audit Preparation Date:	Mar 03 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:	7220017
Validator Name/ID:	n/a
Validator Email:	n/a
Estimated Total Population Served by Water Utility:	75,040

Key of Input Acronyms In order of appearance in the Worksheet

VOS	Volume from Own Sources
VOSEA	VOS Error Adjustment
WI	Water Imported
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Color Key User input Calculated Optional default

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 choose entry option:
 percent or volume

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

Guidance for the Interactive Data Grading

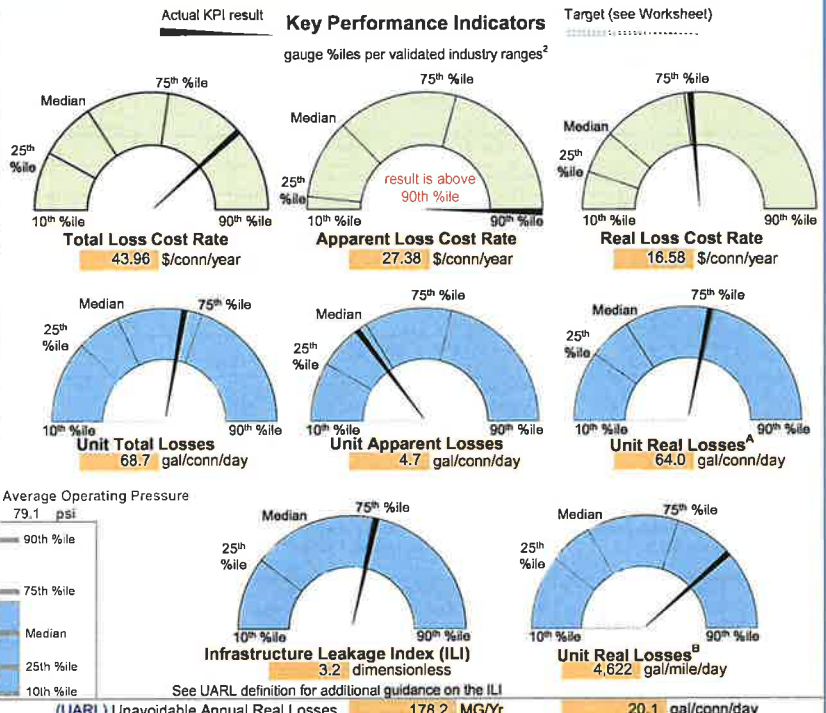
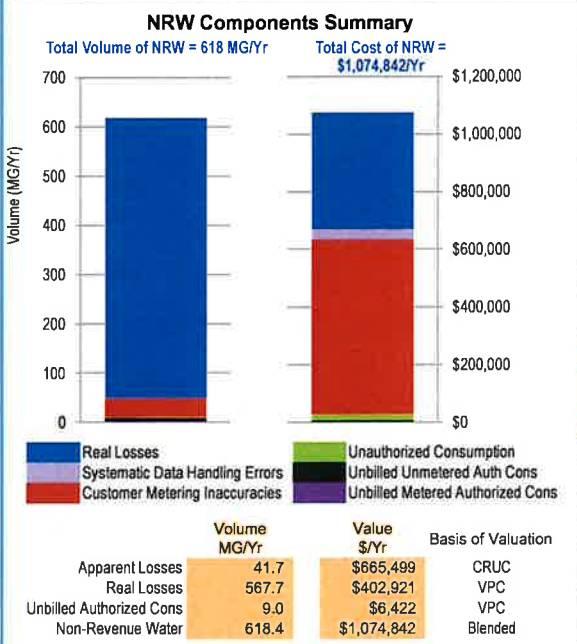
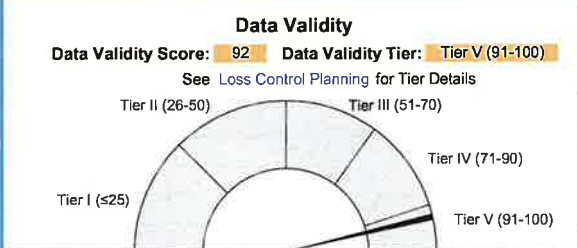
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Enter Basic Information

Name of Utility:	PAW - 630 Wyomissing
Name of Contact Person:	James Baer
Email:	james.baer@amwater.com
Telephone Ext.:	610-842-3118
City/Town/Municipality:	Wyomissing
State / Province:	Pennsylvania (PA)
Country:	USA
Audit Preparation Date:	Feb 27 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:	Select
Water Type:	Potable Water
System ID Number:	3060069
Validator Name/ID:	n/a
Validator Email:	n/a
Estimated Total Population Served by Water Utility:	44,803

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VOSEA	VOS Error Adjustment
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 percent or volume

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 default or custom

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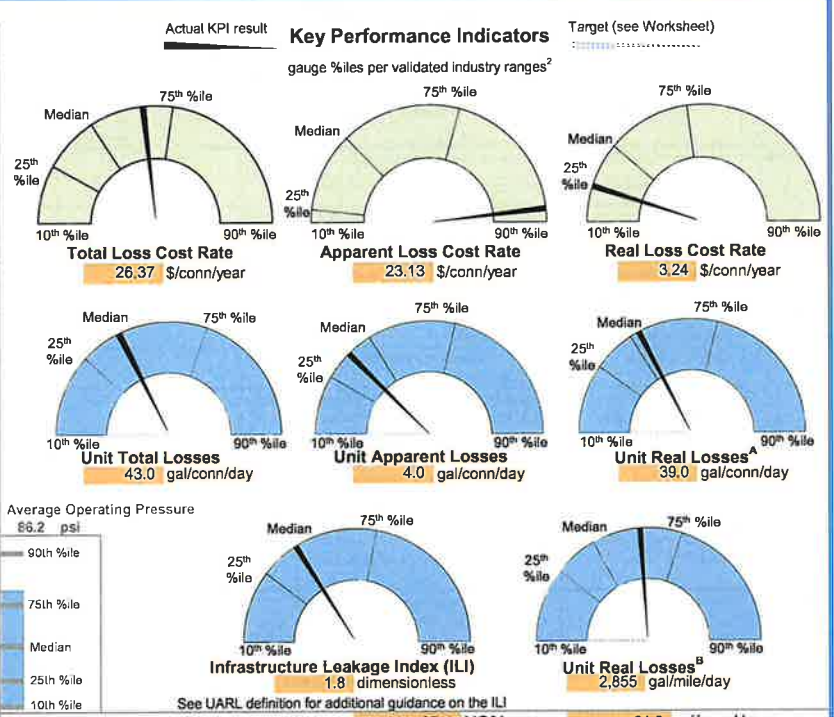
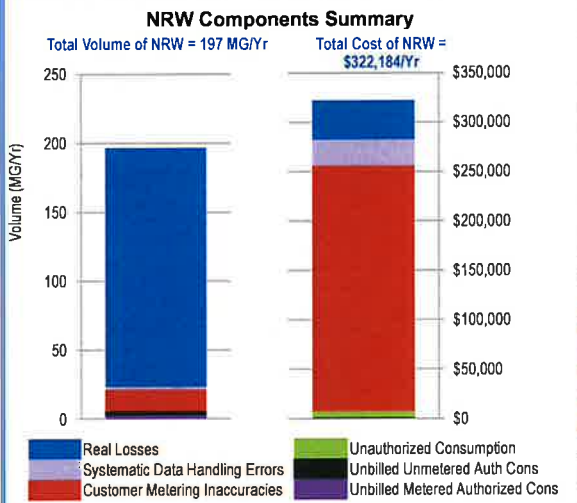
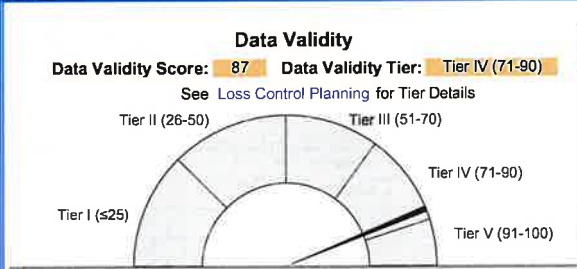
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If you have questions or comments regarding this software please contact us at: wlc@awwa.org

Enter Basic Information

Name of Utility:	PAW - 640 Royersford
Name of Contact Person:	James Baer
Email:	james.baer@amwater.com
Telephone Ext.:	610-842-3118
City/Town/Municipality:	Royersford
State / Province:	Pennsylvania (PA)
Country:	USA
Audit Preparation Date:	Feb 27 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:	1150166, 1150206
Validator Name/ID:	n/a
Validator Email:	n/a
Estimated Total Population Served by Water Utility:	68,776

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
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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:
 percent volume

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

Guidance for the Interactive Data Grading

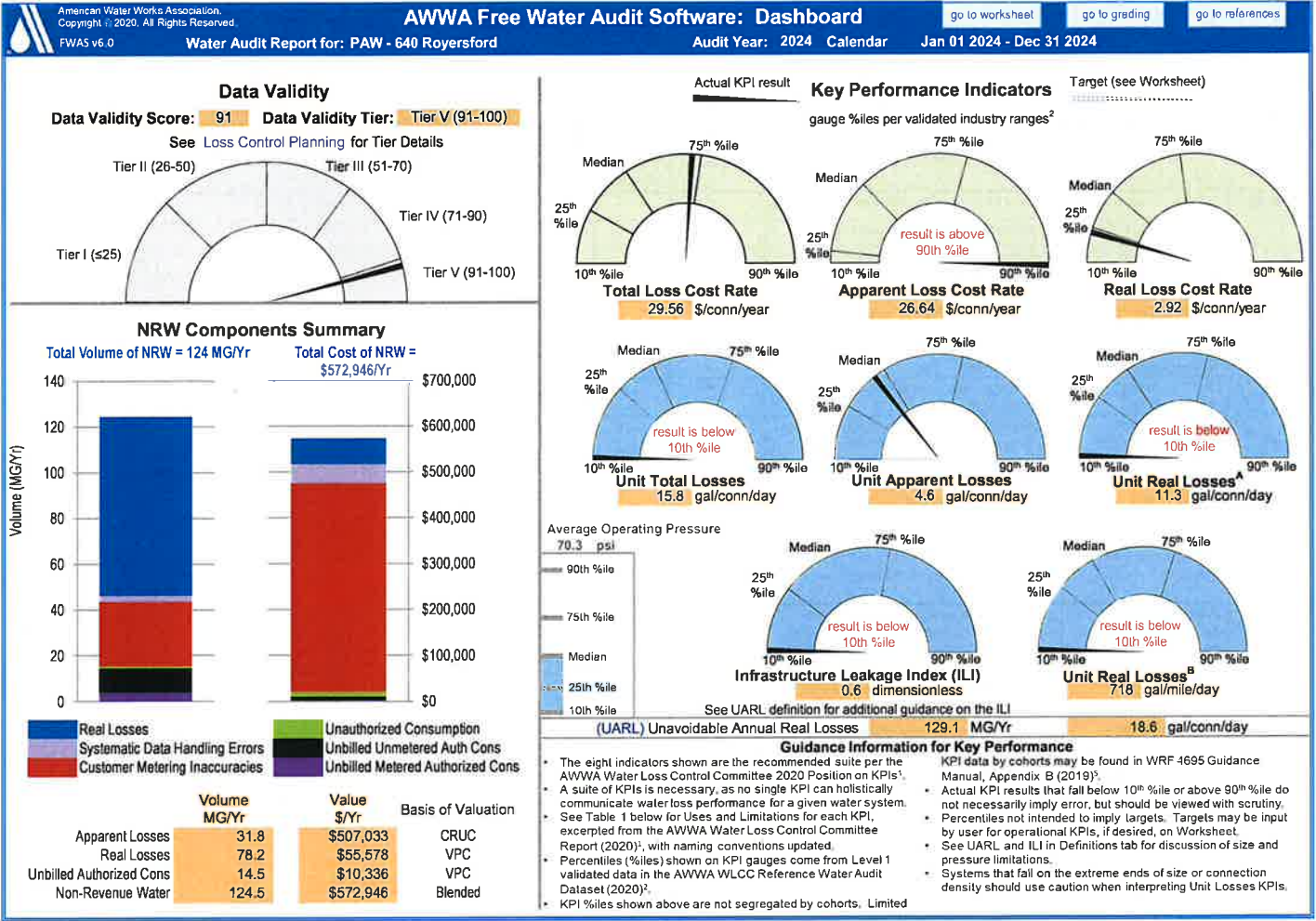
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Enter Basic Information

Name of Utility:	PAW - 650 Coatesville
Name of Contact Person:	James Baer
Email:	james.baer@amwater.com
Telephone Ext.:	610-842-3118
City/Town/Municipality:	Coatesville
State / Province:	Pennsylvania (PA)
Country:	USA
Audit Preparation Date:	Feb 27 2025
Audit Year:	2024
Audit Year Label:	Calendar (Fiscal, Calendar, etc)
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Water System Structure:	Retail
Water Type:	Potable Water
System ID Number:	1150106, 1150185
Validator Name/ID:	n/a
Validator Email:	n/a
Estimated Total Population Served by Water Utility:	49,698

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- 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
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 choose entry option:

1.00%	percent	or
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0.25%	default	or
	custom	75.000

Guidance for the Interactive Data Grading

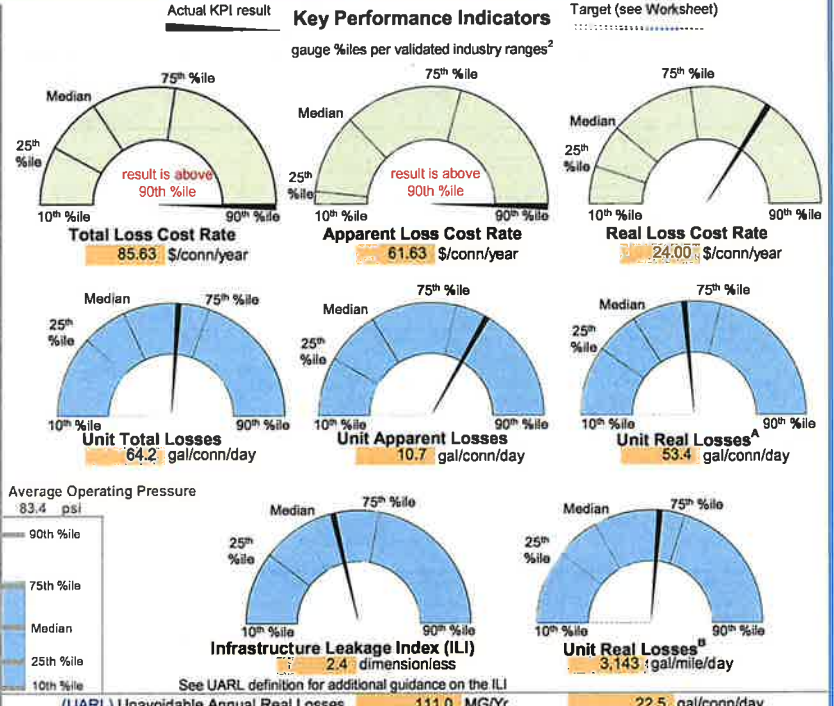
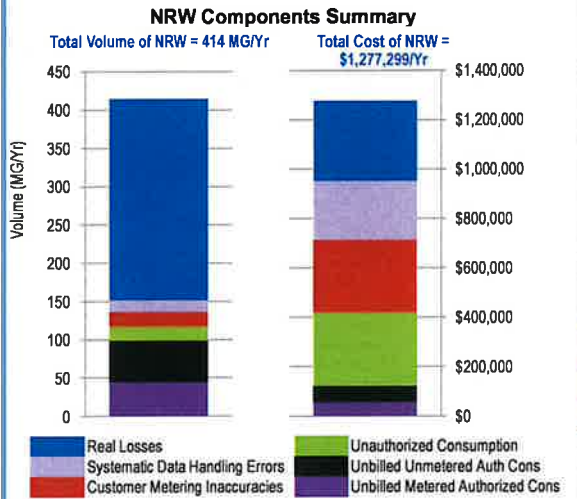
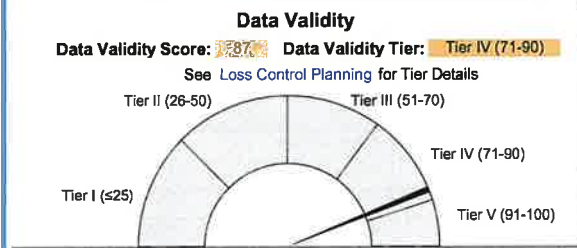
Use acronym buttons in IDG header to navigate among inputs. Acronym Key above. While = needs answers, orange = complete, clear = not required. Example below.



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



	Volume (MG/Yr)	Value (\$/Yr)	Basis of Valuation
Apparent Losses	52.9	\$831,662	CRUC
Real Losses	263.2	\$323,885	VPC
Unbilled Authorized Cons	98.9	\$121,752	VPC
Non-Revenue Water	414.9	\$1,277,299	Blended

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.
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- 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.



AWWA Free Water Audit Software v6.0

FWAS v6.0

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Enter Basic Information

Name of Utility:	PAW - 650 Creekside
Name of Contact Person:	James Baer
Email:	james.baer@amwater.com
Telephone Ext.:	610-842-3118
City/Town/Municipality:	Quarryville
State / Province:	Pennsylvania (PA)
Country:	USA
Audit Preparation Date:	Feb 27 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:	7360129
Validator Name/ID:	n/a
Validator Email:	n/a
Estimated Total Population Served by Water Utility:	530

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 25.000 volume

Choosing to enter **default** or **custom input** (applies to UUAC, SDHE, UC)
 choose entry option:
 0.25% default or 75.000 custom

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.

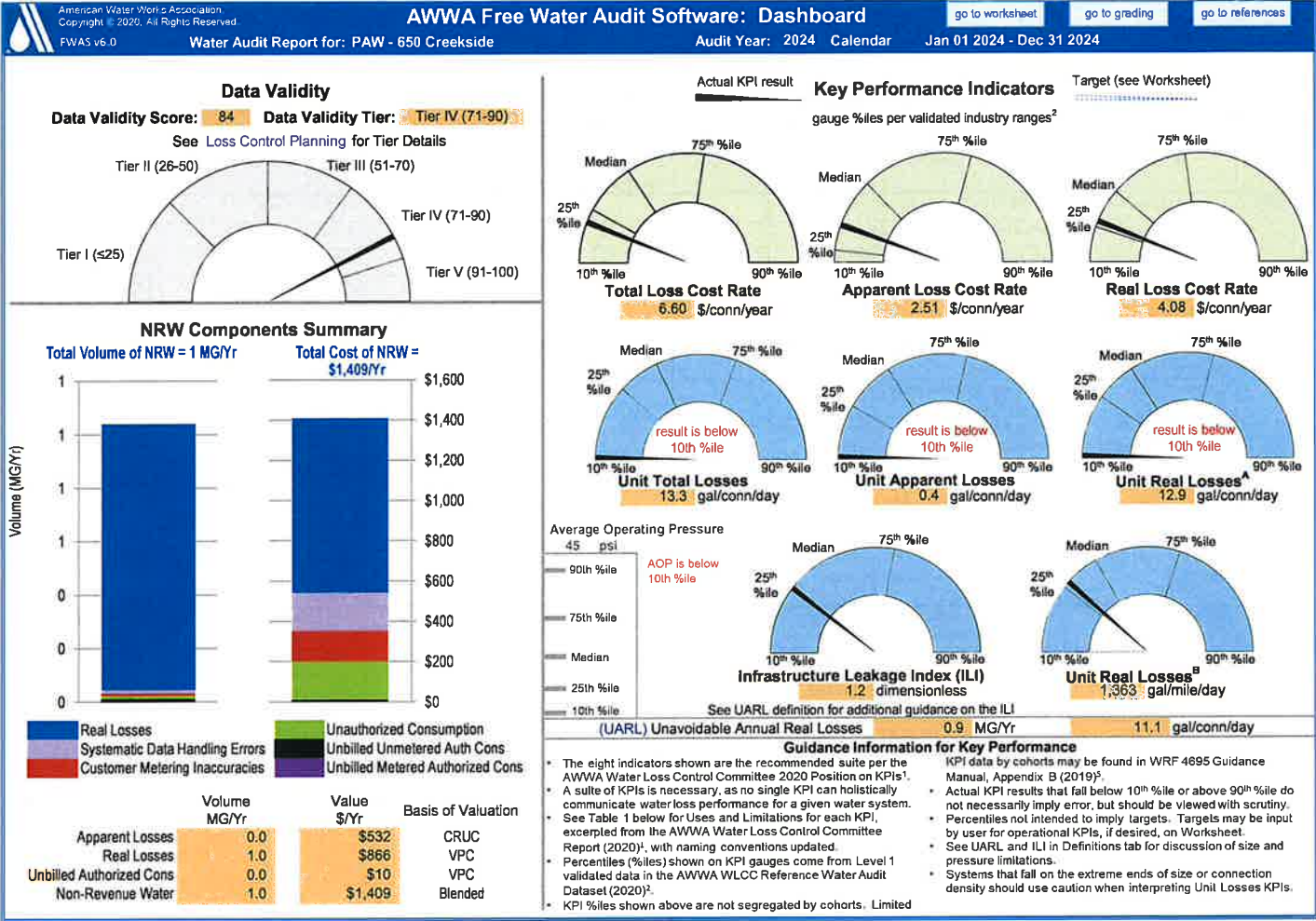


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Grade will populate when all visible questions are complete for an input 7

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



Guidance Information for Key Performance Indicators

- 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.
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- Systems that fall on the extreme ends of size or connection density should use caution when interpreting Unit Losses KPIs.



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Enter Basic Information

Name of Utility:	PAW - 660 Lake Heritage
Name of Contact Person:	James Baer
Email:	james.baer@amwater.com
Telephone Ext.:	610-842-3118
City/Town/Municipality:	Mount Joy
State / Province:	Pennsylvania (PA)
Country:	USA
Audit Preparation Date:	Mar 03 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:	7010035
Validator Name/ID:	n/a
Validator Email:	n/a
Estimated Total Population Served by Water Utility:	3,208

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
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- 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

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AWWA Free Water Audit Software: Dashboard

Water Audit Report for: PAW - 660 Lake Heritage Audit Year: 2024 Calendar: Jan 01 2024 - Dec 31 2024

***** COMPLETE ALL VISIBLE QUESTIONS ON THE INTERACTIVE DATA GRADING TAB TO DISPLAY PERFORMANCE INDICATORS *****

Data Validity

Data Validity Score: **Data Validity Tier:**

See Loss Control Planning for Tier Details

Key Performance Indicators

Actual KPI result Target (see Worksheet)

gauge %iles per validated industry ranges?

Total Loss Cost Rate
\$/conn/year

Apparent Loss Cost Rate
\$/conn/year

Real Loss Cost Rate
\$/conn/year

Unit Total Losses
gal/conn/day

Unit Apparent Losses
gal/conn/day

Unit Real Losses^A
gal/conn/day

Infrastructure Leakage Index (ILI)
dimensionless

Unit Real Losses^B
gal/mile/day

Average Operating Pressure: 74.6 psi

(UARL) Unavoidable Annual Real Losses: MG/Yr gal/conn/day

NRW Components Summary

Total Volume of NRW = 1 MG/Yr Total Cost of NRW = \$2/Yr

Component	Volume (MG/Yr)	Value (\$/Yr)	Basis of Valuation
Real Losses	1	\$2	CRUC
Systematic Data Handling Errors	0	\$0	VPC
Customer Metering Inaccuracies	0	\$0	VPC
Unauthorized Consumption	0	\$0	Blended
Unbilled Unmetered Auth Cons	0	\$0	
Unbilled Metered Authorized Cons	0	\$0	
Apparent Losses	1	\$2	CRUC
Real Losses	1	\$2	VPC
Unbilled Authorized Cons	0	\$0	VPC
Non-Revenue Water	1	\$2	Blended

Guidance Information for Key Performance

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

Enter Basic Information

Name of Utility:	PAW - 680 Lehman Pike
Name of Contact Person:	James Baer
Email:	james.baer@amwater.com
Telephone Ext.:	610-842-3118
City/Town/Municipality:	Lehman Twp
State / Province:	Pennsylvania (PA)
Country:	USA
Audit Preparation Date:	Mar 03 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:	2520056, 2450133, 2450134, 2520034, 24501
Validator Name/ID:	n/a
Validator Email:	n/a
Estimated Total Population Served by Water Utility:	30,421

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

VOS	Volume from Own Sources
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WI	Water Imported
WIEA	WI Error Adjustment
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Lp	Average length of (private) customer service line
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CRUC	Customer Retail Unit Charge
VPC	Variable Production Cost

Color Key User input Calculated Optional default

Guidance for the Worksheet

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 choose entry option:
 percent or volume

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

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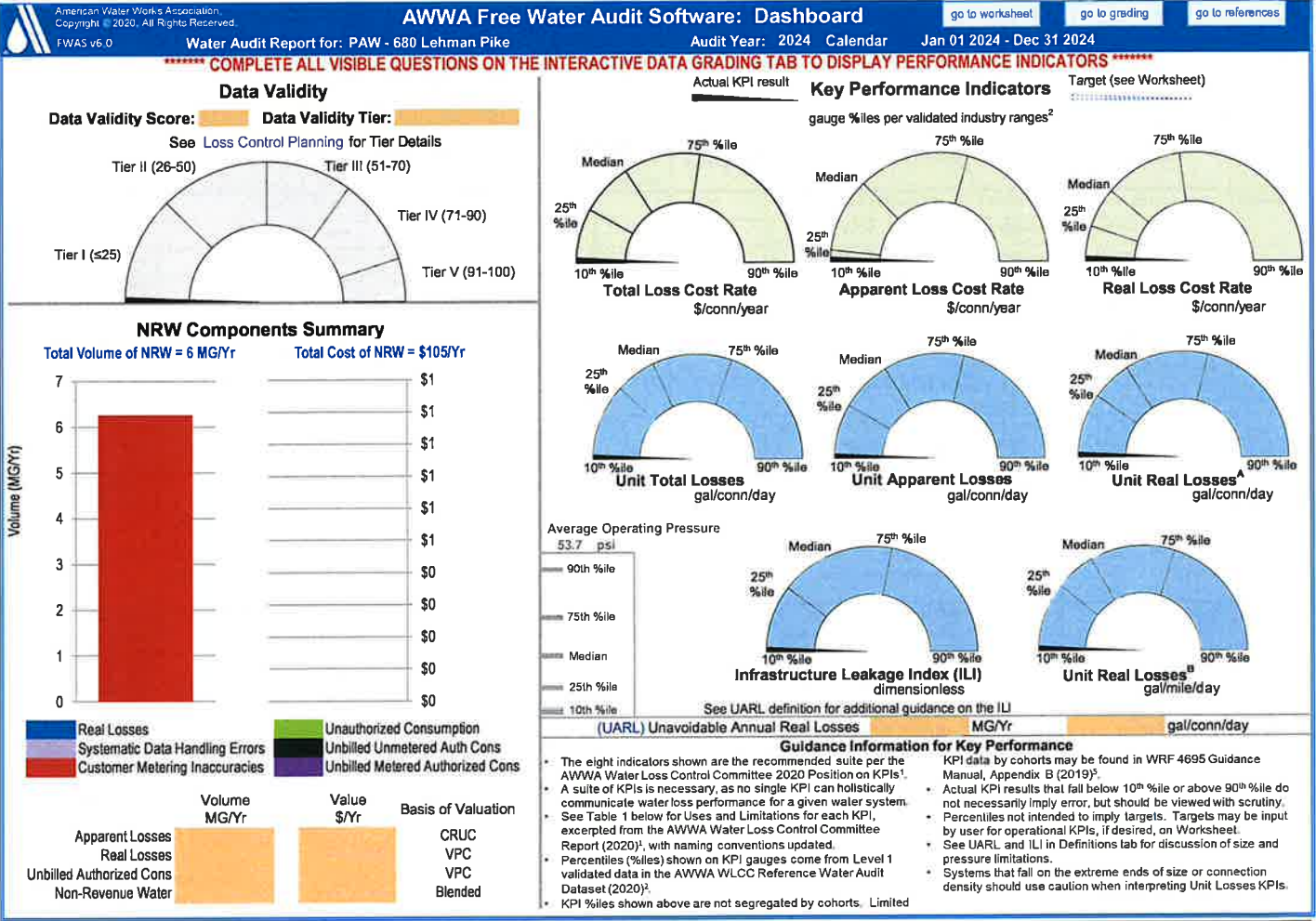


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Limiting





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Enter Basic Information

Name of Utility:	PAW - 710 Milton
Name of Contact Person:	James Baer
Email:	james.baer@amwater.com
Telephone Ext.:	610-842-3118
City/Town/Municipality:	White Deer Twp
State / Province:	Pennsylvania (PA)
Country:	USA
Audit Preparation Date:	Feb 24 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:	4490023
Validator Name/ID:	n/a
Validator Email:	n/a
Estimated Total Population Served by Water Utility:	47,782

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
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1.00%	percent	or	25.000
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	custom		

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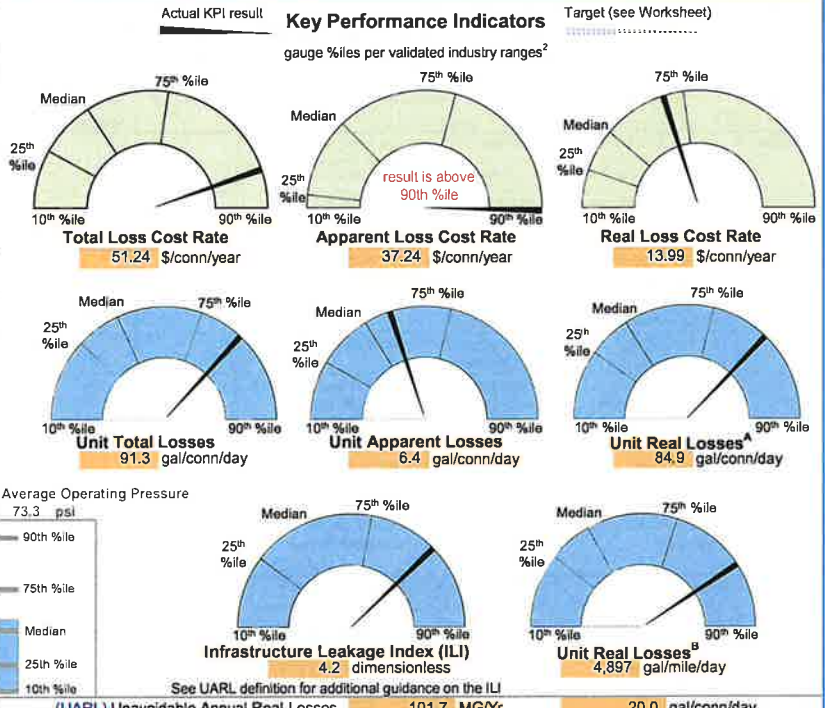
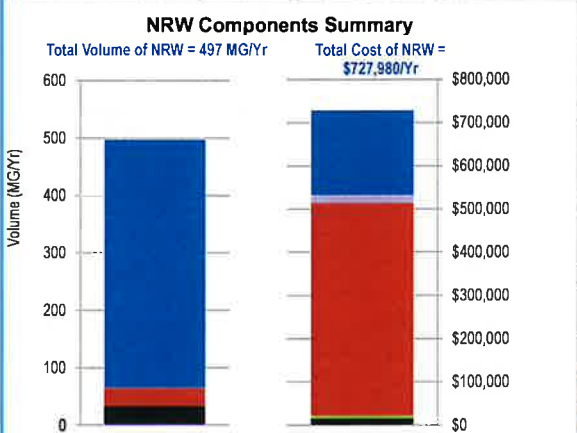
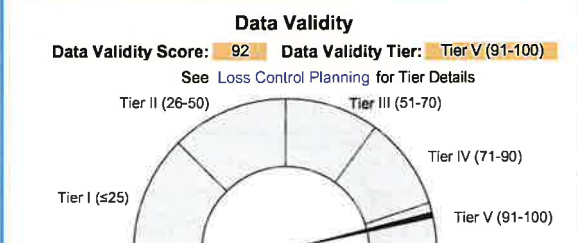
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	Volume MG/Yr	Value \$/Yr	Basis of Valuation
Apparent Losses	32.5	\$518,178	CRUC
Real Losses	431.3	\$194,710	VPC
Unbilled Authorized Cons	33.4	\$15,093	VPC
Non-Revenue Water	497.2	\$727,980	Blended

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- 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:

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- Example Water Audit v6.0
- Water Audit Compiler v6.0
- AWWA Reports on Performance Indicators
- M36 Manual

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

Enter Basic Information

Name of Utility:	PAW - 720 Philipsburg
Name of Contact Person:	James Baer
Email:	james.baer@amwater.com
Telephone Ext.:	610-842-3118
City/Town/Municipality:	Philipsburg
State / Province:	Pennsylvania (PA)
Country:	USA
Audit Preparation Date:	Feb 24 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:	4140087
Validator Name/ID:	n/a
Validator Email:	n/a
Estimated Total Population Served by Water Utility:	31,409

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.

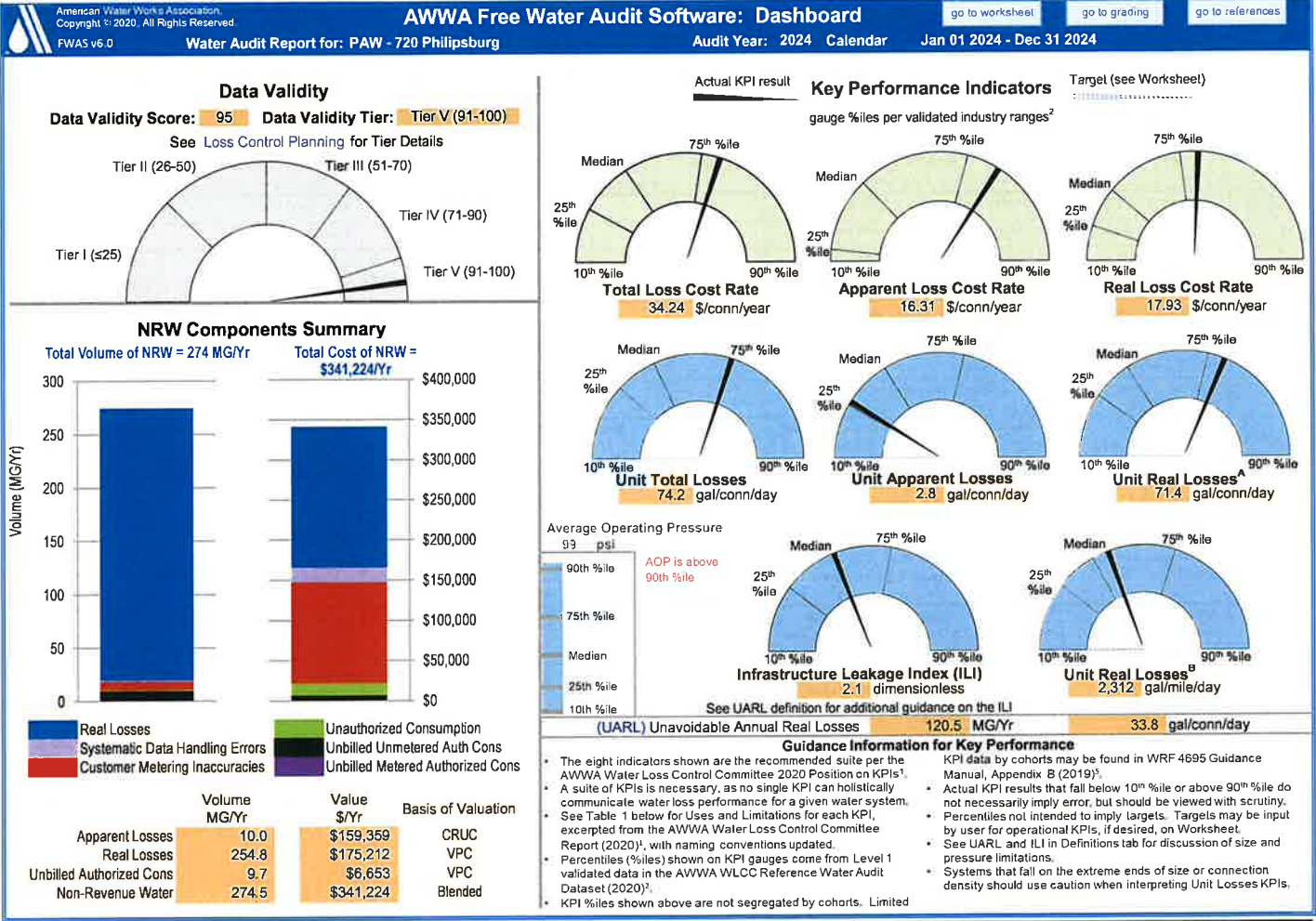


After clicking an acronym button, answer all visible questions in the order they're presented, choosing best-fit answer

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





AWWA Free Water Audit Software v6.0

FWAS v6.0

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

Enter Basic Information

Name of Utility: PAW - 730 Berwick
 Name of Contact Person: James Baer
 Email: james.baer@amwater.com
 Telephone | Ext.: 610-842-3118
 City/Town/Municipality: Berwick
 State / Province: Pennsylvania (PA)
 Country: USA
 Audit Preparation Date: Mar 03 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: 4190013
 Validator Name/ID: n/a
 Validator Email: n/a
 Estimated Total Population Served by Water Utility: 23,240

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	25.000
	volume		

Choosing to enter **default** or **custom** input (applies to UUAC, SDHE, UC)

choose entry option:

0.25%	default	or	75.000
	custom		

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.

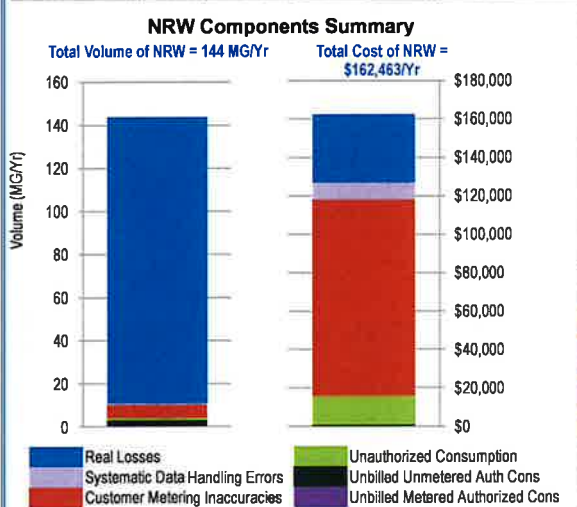
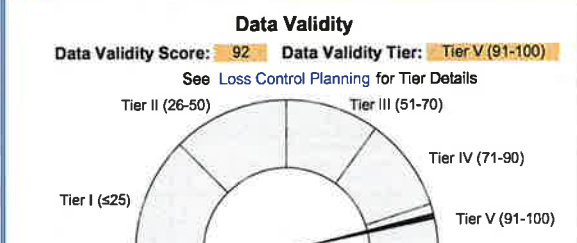


After clicking an acronym button, answer all visible questions in the order they're presented, choosing best-fit answer

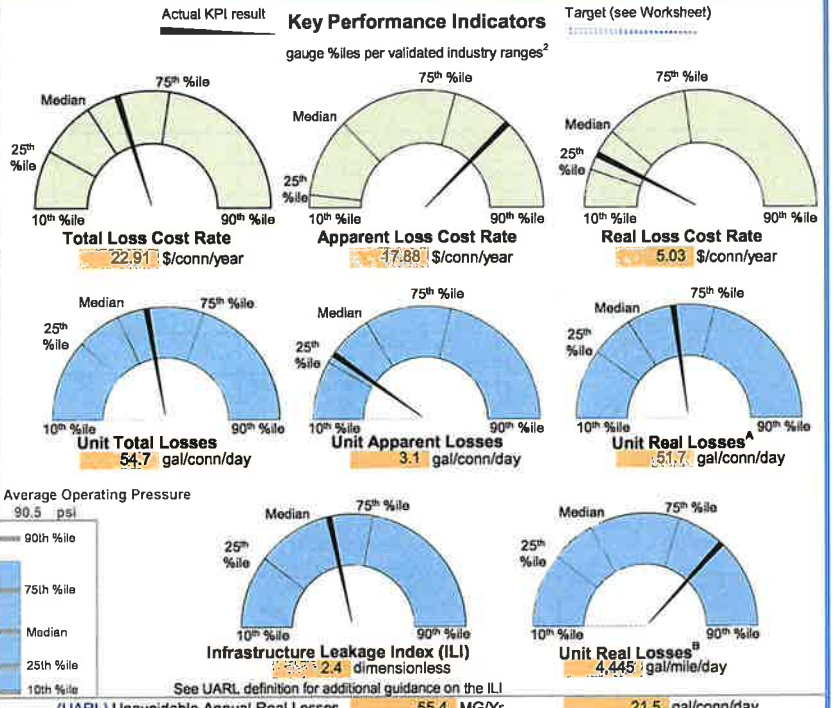
Grade will populate when all visible questions are complete for an input **7**

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



	Volume (MG/Yr)	Value (\$/Yr)	Basis of Valuation
Apparent Losses	7.9	\$126,169	CRUC
Real Losses	133.0	\$35,485	VPC
Unbilled Authorized Cons	3.0	\$810	VPC
Non-Revenue Water	144.0	\$162,463	Blended



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.
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- 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.



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FWAS v6.0

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- Water Audit Compiler v6.0
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- M36 Manual

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

Enter Basic Information

Name of Utility:	PAW - 740 Frackville
Name of Contact Person:	James Baor
Email:	james.baor@amwater.com
Telephone Ext.:	610-842-3118
City/Town/Municipality:	Frackville
State / Province:	Pennsylvania (PA)
Country:	USA
Audit Preparation Date:	Mar 03 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:	3540032, 3540072, 3540053
Validator Name/ID:	n/a
Validator Email:	n/a
Estimated Total Population Served by Water Utility:	8,651

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
LUAC	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	25.000
	volume		

Choosing to enter default or custom input (applies to LUAC, SDHE, UC)

choose entry option:

0.25%	default	or	75.000
	custom		

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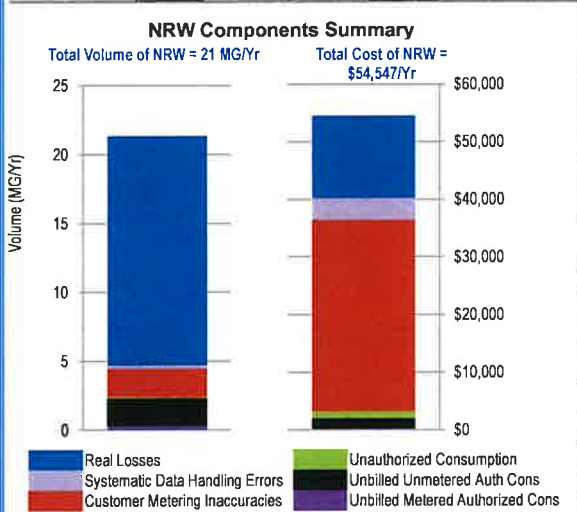
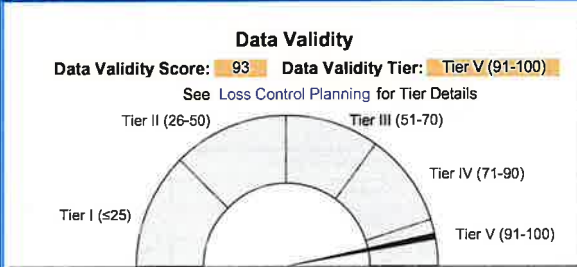


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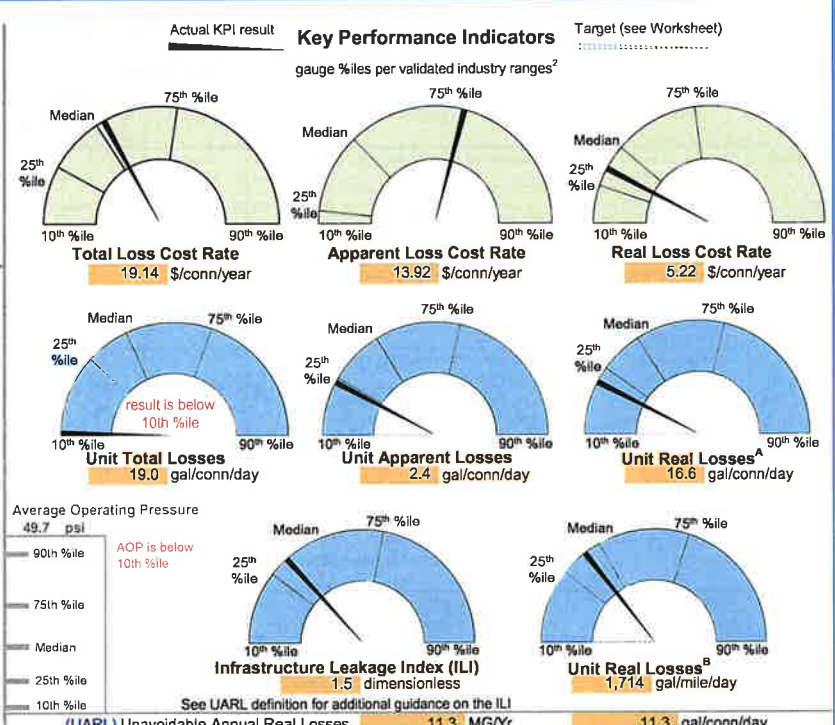
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Limiting



	Volume MG/Yr	Value \$/Yr	Basis of Valuation
Apparent Losses	2.4	\$38,225	CRUC
Real Losses	16.6	\$14,325	VPC
Unbilled Authorized Cons	2.3	\$1,997	VPC
Non-Revenue Water	21.4	\$54,547	Blended



Guidance Information for Key Performance

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- Percentiles not intended to imply targets. Targets may be input by user for operational KPIs, if desired, on Worksheet.
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- Systems that fall on the extreme ends of size or connection density should use caution when interpreting Unit Losses KPIs.



AWWA Free Water Audit Software v6.0

FWAS v6.0

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Enter Basic Information

Name of Utility: PAW - 770 Boggs
 Name of Contact Person: James Baer
 Email: james.baer@amwater.com
 Telephone | Ext.: 610-842-3118
 City/Town/Municipality: Boggs Twp
 State / Province: Pennsylvania (PA)
 Country: USA
 Audit Preparation Date: Feb 24 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: 4140101
 Validator Name/ID: n/a
 Validator Email: n/a
 Estimated Total Population Served by Water Utility: 85

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
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- 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

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

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AWWA Free Water Audit Software: Dashboard

[go to worksheet](#) [go to grading](#) [go to references](#)

Water Audit Report for: PAW - 770 Boggs Audit Year: 2024 Calendar Jan 01 2024 - Dec 31 2024

***** COMPLETE ALL VISIBLE QUESTIONS ON THE INTERACTIVE DATA GRADING TAB TO DISPLAY PERFORMANCE INDICATORS *****

Data Validity

Data Validity Score: 0.58 **Data Validity Tier:** 0.58

See Loss Control Planning for Tier Details

Key Performance Indicators

Actual KPI result Target (see Worksheet)

gauge %iles per validated industry ranges²

Total Loss Cost Rate
\$/conn/year

Apparent Loss Cost Rate
\$/conn/year

Real Loss Cost Rate
\$/conn/year

Unit Total Losses
gal/conn/day

Unit Apparent Losses
gal/conn/day

Unit Real Losses^A
gal/conn/day

Infrastructure Leakage Index (ILI)
dimensionless

See UARL definition for additional guidance on the ILI

Unit Real Losses^B
gal/mile/day

NRW Components Summary

Total Volume of NRW = MG/Yr **Total Cost of NRW = \$/Yr**

Component	Volume (MG/Yr)	Value (\$/Yr)	Basis of Valuation
Real Losses			CRUC
Systematic Data Handling Errors			VPC
Customer Metering Inaccuracies			VPC
Unauthorized Consumption			Blended
Unbilled Unmetered Auth Cons.			
Unbilled Metered Authorized Cons.			
Apparent Losses			
Real Losses			
Unbilled Authorized Cons			
Non-Revenue Water			

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Enter Basic Information

Name of Utility:	PAW - 780 Nittany
Name of Contact Person:	James Baer
Email:	james.baer@amwater.com
Telephone Ext.:	610-842-3118
City/Town/Municipality:	Walker Twp
State / Province:	Pennsylvania (PA)
Country:	USA
Audit Preparation Date:	Feb 24 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:	4140081
Validator Name/ID:	n/a
Validator Email:	n/a
Estimated Total Population Served by Water Utility:	2,142

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
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BMAC	Billed Metered Authorized Consumption
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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:
 percent or volume

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

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.



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

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)

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FWAS v6.0

AWWA Free Water Audit Software: Dashboard

Water Audit Report for: PAW - 780 Nittany

Audit Year: 2024 Calendar Jan 01 2024 - Dec 31 2024

***** COMPLETE ALL VISIBLE QUESTIONS ON THE INTERACTIVE DATA GRADING TAB TO DISPLAY PERFORMANCE INDICATORS *****

go to worksheet
go to grading
go to references

Data Validity

Data Validity Score: **Data Validity Tier:**

See Loss Control Planning for Tier Details

Tier I (<=25) Tier II (26-50) Tier III (51-70) Tier IV (71-90) Tier V (91-100)

Key Performance Indicators

Actual KPI result Target (see Worksheet)

gauge %iles per validated industry ranges?

Total Loss Cost Rate
\$/conn/year

Apparent Loss Cost Rate
\$/conn/year

Real Loss Cost Rate
\$/conn/year

Unit Total Losses
gal/conn/day

Unit Apparent Losses
gal/conn/day

Unit Real Losses^A
gal/conn/day

Average Operating Pressure

85 psi

Infrastructure Leakage Index (ILI)
dimensionless

See UARL definition for additional guidance on the ILI

Unit Real Losses^B
gal/mile/day

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

NRW Components Summary

Total Volume of NRW = 1 MG/Yr Total Cost of NRW = \$/Yr

Component	Volume (MG/Yr)	Value (\$/Yr)	Basis of Valuation
Apparent Losses			CRUC
Real Losses			VPC
Unbilled Authorized Cons			VPC
Non-Revenue Water			Blended

Guidance Information for Key Performance

- The eight indicators shown are the recommended suite per the AWWA Water Loss Control Committee 2020 Position on KPIs¹.
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- 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.



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

Enter Basic Information

Name of Utility:	PAW - 840 McEwensville
Name of Contact Person:	James Baer
Email:	james.baer@amwater.com
Telephone Ext.:	610-842-3118
City/Town/Municipality:	McEwensville Boro
State / Province:	Pennsylvania (PA)
Country:	USA
Audit Preparation Date:	Mar 03 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:	4490298
Validator Name/ID:	n/a
Validator Email:	n/a
Estimated Total Population Served by Water Utility:	481

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 25.000 volume

Choosing to enter **default** or **custom input** (applies to UUAC, SDHE, UC)
 choose entry option:
 0.25% default or 75.000 custom

Guidance for the Interactive Data Grading

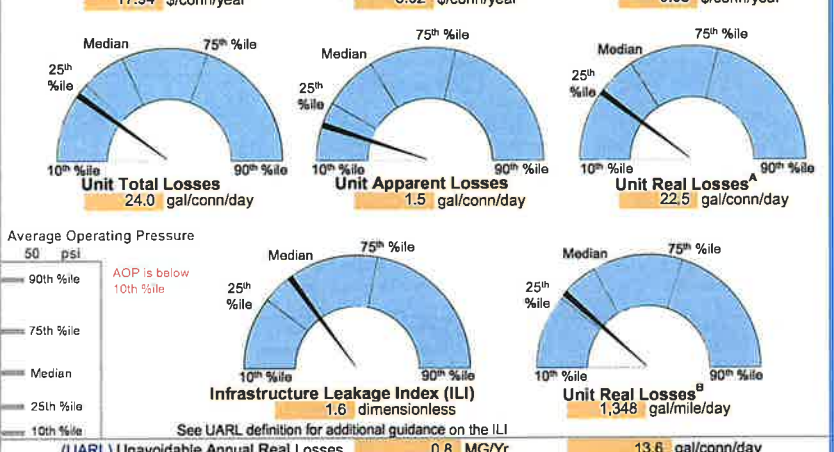
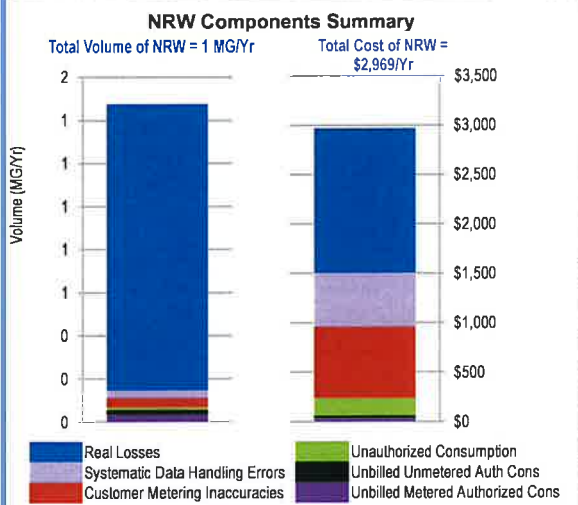
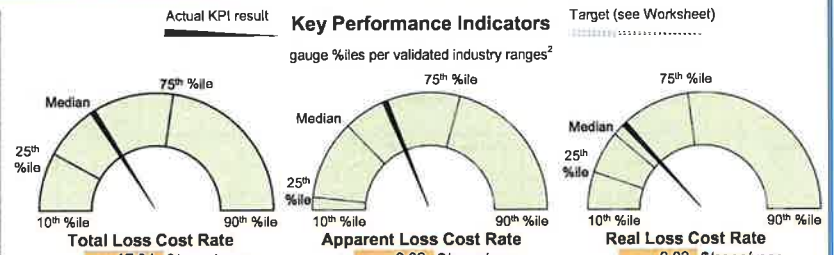
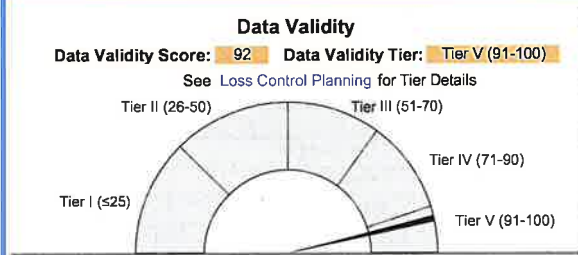
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Grade will populate when all visible questions are complete for an input 7

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	Volume MG/Yr	Value \$/Yr	Basis of Valuation
Apparent Losses	0.1	\$1,444	CRUC
Real Losses	1.3	\$1,463	VPC
Unbilled Authorized Cons	0.1	\$62	VPC
Non-Revenue Water	1.5	\$2,969	Blended

(UARL) Unavoidable Annual Real Losses 0.8 MG/Yr 13.6 gal/conn/day

Guidance Information for Key Performance

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FWAS v6.0

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<https://www.awwa.org/Resources-Tools/Resource-Topics/Water-Loss-Control>

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

Enter Basic Information

Name of Utility:	PAW - 880 Turbotville
Name of Contact Person:	James Baer
Email:	james.baer@amwater.com
Telephone Ext.:	610-842-3118
City/Town/Municipality:	Turbotville Boro
State / Province:	Pennsylvania (PA)
Country:	USA
Audit Preparation Date:	Mar 03 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:	4490016
Validator Name/ID:	n/a
Validator Email:	n/a
Estimated Total Population Served by Water Utility:	1,199

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
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BUAC	Billed Unmetered Authorized Consumption
UMAC	Unbilled Metered Authorized Consumption
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SDHE	Systematic Data Handling Errors
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Lm	Length of mains
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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	25,000
	volume		

Choosing to enter **default** or **custom input** (applies to UUAC, SDHE, UC)

choose entry option:

0.25%	default	or	75,000
	custom		

Guidance for the Interactive Data Grading

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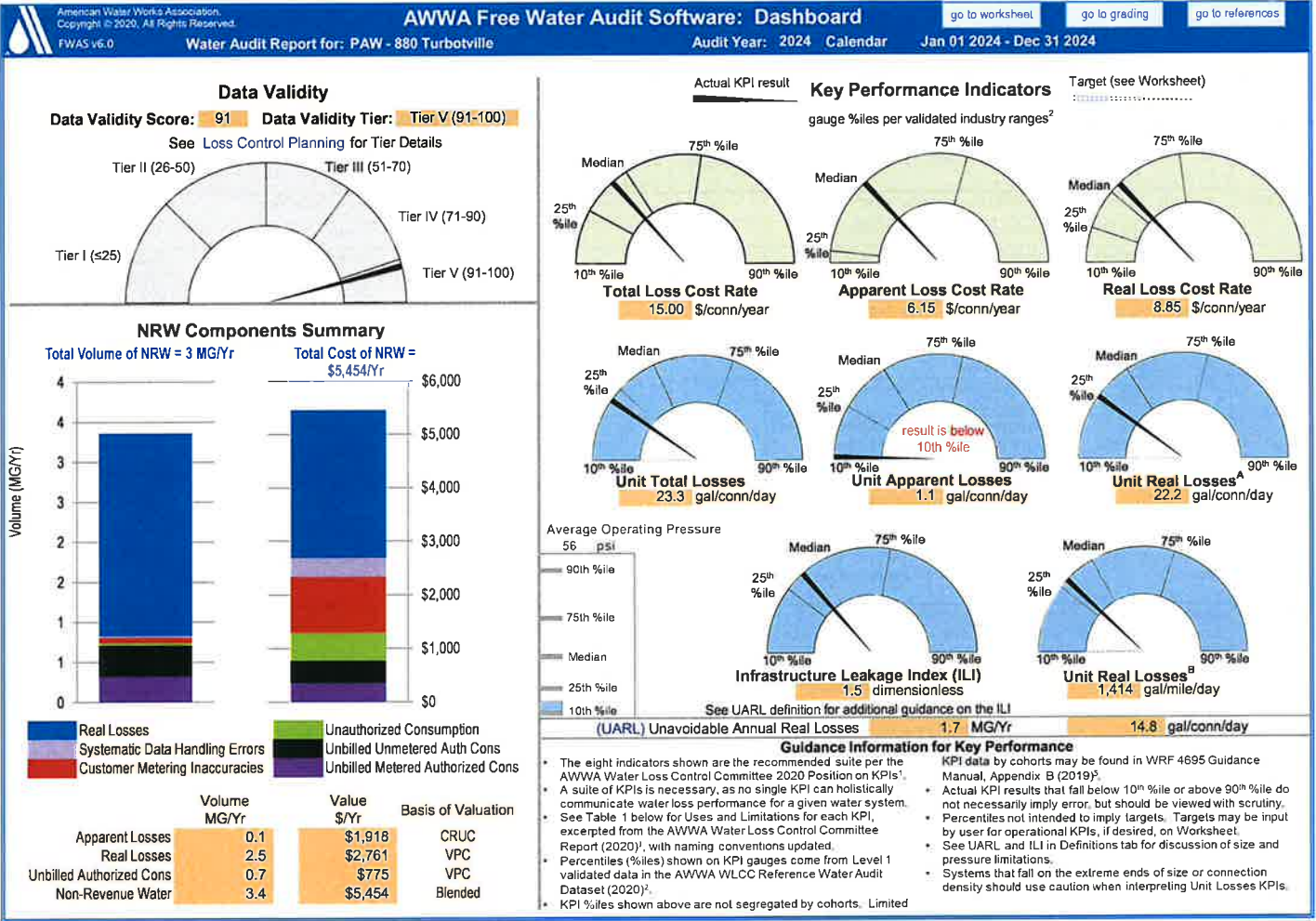


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Limiting



Guidance Information for Key Performance

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Enter Basic Information

Name of Utility:	PAW - 910 Scranton
Name of Contact Person:	James Baer
Email:	james.baer@amwater.com
Telephone Ext.:	610-842-3118
City/Town/Municipality:	Scranton
State / Province:	Pennsylvania (PA)
Country:	USA
Audit Preparation Date:	Feb 27 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:	2359001, 2359008, 2409002, 2409011, 24090
Validator Name/ID:	n/a
Validator Email:	n/a
Estimated Total Population Served by Water Utility:	504,284

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
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Color Key User input Calculated Optional default

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1.00%	percent	or	25.000
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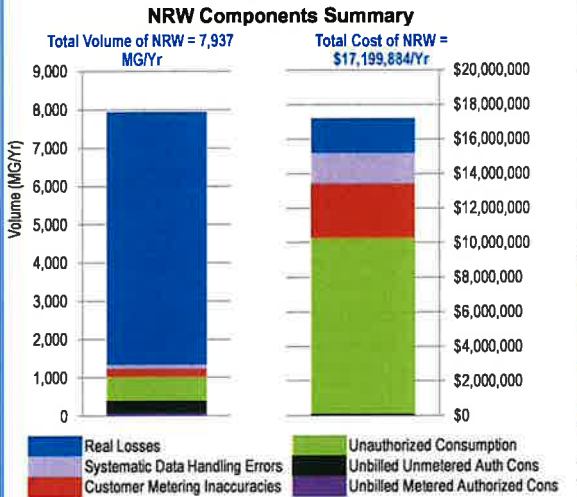
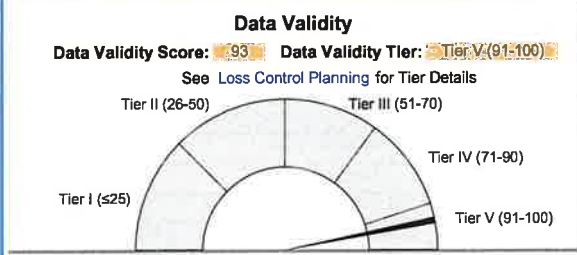


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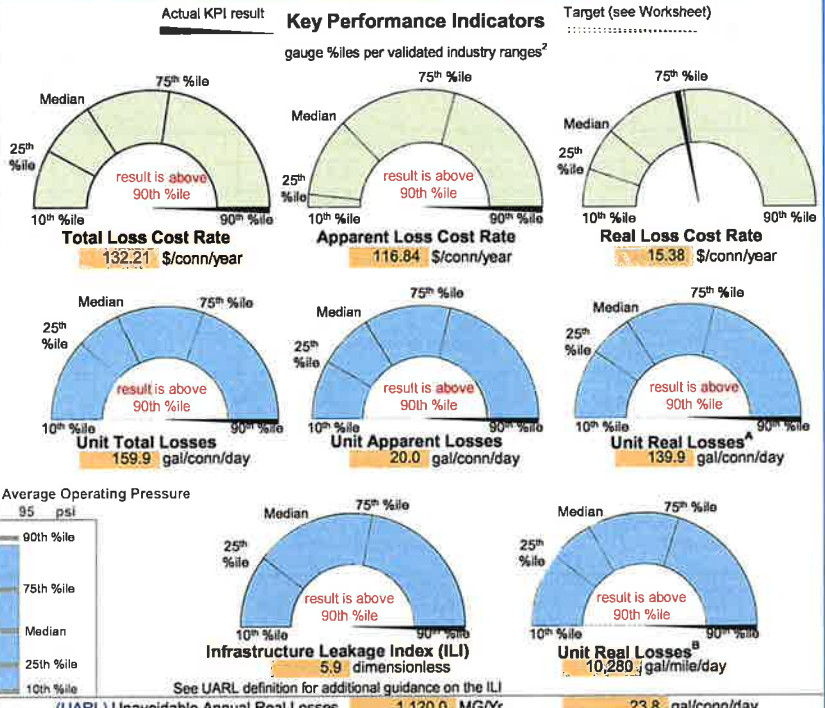
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	Volume MG/Yr	Value \$/Yr	Basis of Valuation
Apparent Losses	945.1	\$15,093,650	CRUC
Real Losses	8,595.3	\$1,986,377	VPC
Unbilled Authorized Cons	398.0	\$119,857	VPC
Non-Revenue Water	7,938.4	\$17,199,884	Blended



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