

## CA-NV AWWA Water Loss Technical Assistance Program Wave 4 Water Audit Level 1 Validation Document

### Audit Information:

Utility: Marina Coast Water District      PWS ID: 2710017

System Type: Potable      Audit Period: Calendar 2016

Utility Representation: Paul Lord, James Derbin, Kelly Cadiente, Mike Wegley

Validation Date: 6/29/2017      Call Time: 9:00am      Sufficient Supporting Documents Provided: Yes

### Validation Findings & Confirmation Statement:

#### Key Audit Metrics:

Data Validity Score: 71    Data Validity Band (Level): Band IV (71-90)

ILI: 1.41      Real Loss: 24.57 (gal/conn/day)      Apparent Loss: 3.10 (gal/conn/day)

Non-revenue water as percent of cost of operating system: 4.4

#### Certification Statement by Validator:

This water loss audit report has been Level 1 validated per the requirements of California Code of Regulations Title 23, Division 2, Chapter 7 and the California Water Code Section 10608.34.

All recommendations on volume derivation and Data Validity Grades were incorporated into the water audit.

### Validator Information:

Water Audit Validator: Tory Wagoner      Validator Qualifications: Contractor for CA-NV AWWA Water Loss TAP

Validator Provided



#	AWWA Water Audit Input	Code	Final DVG	Basis on Input Derivation	Basis on Data Validity Grade
1	Volume from Own Sources	VOS	8	<p><b>Supply meter profile:</b> 8 wells, only 7 active with wells located centrally in the system (2 in Marina, 5 in Ord)</p> <p><b>VOS input derived from:</b> Manual reads from production meters as archived.</p> <p><b>Comments:</b> Input derivation from supporting documents confirmed. Exclusion of non-potable volumes confirmed.</p>	<p><b>Percent of own supply metered:</b> 100%</p> <p><b>Signal calibration frequency:</b> Annual.</p> <p><b>Volumetric testing frequency:</b> Annual.</p> <p><b>Volumetric testing method:</b> Clamp on meter with pump efficiency testing</p> <p><b>Percent of own supply volumetrically tested:</b> 100% of active supply.</p> <p><b>Comments:</b> No additional comments.</p>
2	VOS Master Meter & Supply Error Adjustment	VOS MMSEA	3	<p><b>Input derivation:</b> Volumetrically weighted calculation</p> <p><b>Net storage change included in MMSEA input:</b> Yes.</p> <p><b>Comments:</b> No additional comments.</p>	<p><b>Supply meter read frequency:</b> Daily.</p> <p><b>Supply meter read method:</b> Manual.</p> <p><b>Frequency of data review for trends &amp; anomalies:</b> Weekly.</p> <p><b>Storage levels monitored in real-time:</b> Yes.</p> <p><b>Comments:</b> No additional comments.</p>
3	Water Imported	WI	n/a	<p><b>Import meter profile:</b> One emergency connection with Cal American water, but not used during audit period.</p>	
4	WI Master Meter & Supply Error Adjustment	WI MMSEA	n/a		
5	Water Exported	WE	n/a		
6	WE Master Meter & Supply Error Adjustment	WE MMSEA	n/a		
7	Billed metered	BMAC	6	<p><b>Customer meter profile:</b></p> <p><b>Age profile:</b> Many of small meters are less than 10 years old</p> <p><b>Reading system:</b> AMR.</p> <p><b>Read frequency:</b> Monthly.</p>	<p><b>Percent of customers metered:</b> 91%</p> <p><b>Small meter testing policy:</b> Reactive - complaint based or flagged-consumption testing only.</p> <p><b>Number of small meters tested/year:</b> 0</p> <p><b>Large meter testing policy:</b> Testing is conducted every three years for all testable large meters.</p>



#	AWWA Water Audit Input	Code	Final DVG	Basis on Input Derivation	Basis on Data Validity Grade
				<b>Comments:</b> Lag-time correction is not employed in input derivation. Input derivation from supporting documents confirmed. Exclusion of non-potable volumes confirmed.	<b>Number of large meters tested/year:</b> 10 in group <b>Meter replacement policy:</b> Based on an age threshold (15 years) <b>Number of replacements/year:</b> Variable based on funding. <b>Billing data auditing:</b> Standard billing QC, plus review of volumes by use type each billing cycle. <b>Comments:</b> No additional comments.
8	Billed unmetered	BUAC	7	<b>Profile:</b> Approximately 800 military housing connections <b>Input derivation:</b> Extrapolation from like use data on metered connections (0.28 acre-feet/year). <b>Comments:</b> In process of installing meters with plan to meter in the next 3 years	<b>Policy for metering exemptions:</b> All connections require metering but a few unmetered connections remain. <b>Comments:</b> No additional comments.
9	Unbilled metered	UMAC	8	<b>Profile:</b> Own facilities, vector/valve/jetter truck, lift stations <b>Input derivation:</b> Direct from meter readings read annually. <b>Comments:</b> Input derivation from supporting documents confirmed.	<b>Policy for billing exemptions:</b> Limited to own facilities. <b>Comments:</b> No additional comments.
10	Unbilled unmetered	UUAC	6	<b>Profile:</b> Operational flushing and fire department usage. <b>Comments:</b> The District records hydrant run times for line flushing, fire pressure testing and fire training. Run times are converted to water use estimates and recorded in the work order database.	<b>Comments:</b> Reasonable recordkeeping and estimation practices
11	Unauthorized consumption	UC	5	<b>Comments:</b> Default input applied.	<b>Comments:</b> Default grade applied.
12	Customer metering inaccuracies	CMI	3	See BMAC comments regarding meter testing & replacement activities. <b>Input derivation:</b> Rudimentary estimate. <b>Comments:</b> No additional comments.	<b>Characterization of meter testing:</b> Routine (proactive), but not fully representative. <b>Characterization of meter replacement:</b> Routine (proactive), but limited. <b>Comments:</b> No additional comments.
13	Systematic data handling errors	SDHE	5	<b>Comments:</b> Default input applied.	<b>Comments:</b> Default grade applied.
14	Length of mains	Lm	9	<b>Input derivation:</b> Totaled from GIS based map. <b>Hydrant leads included:</b> Yes. <b>Comments:</b> No additional comments.	<b>Mapping format:</b> Digital. <b>Asset management database:</b> In place and integrated with GIS system.



#	AWWA Water Audit Input	Code	Final DVG	Basis on Input Derivation	Basis on Data Validity Grade
					<p><b>Map updates &amp; field validation:</b> Accomplished through normal work order processes.</p> <p><b>Comments:</b> No additional comments.</p>
15	Number of service connections	Ns	7	<p><b>Input derivation:</b> Standard report run from billing system to generate total metered connections. Assumed 70% of the total share a connection in Marina system, 33.6% in Ord system. Added 576 for unmetered fire service connections</p> <p><b>Basis for database query:</b> Location or other premise-based ID.</p> <p><b>Comments:</b> No additional comments.</p>	<p><b>CIS updates &amp; field validation:</b> no proactive visits to meters</p> <p><b>Estimated error of total count within:</b> 3%.</p> <p><b>Comments:</b> No additional comments.</p>
16	Ave length of cust. service line	Lp	10	<p><b>Comments:</b> Default input and grade applied, as customer meters are typically located at the property boundary given California climate.</p>	
17	Average operating pressure	AOP	5	<p><b>Number of zones, general profile:</b> 5 pressure zones (Ord) &amp; 2 in Marina controlled by PRVs</p> <p><b>Typical pressure range:</b> 30 to 90 psi</p> <p><b>Input derivation:</b> Calculated as simple average from analysis of field data.</p> <p><b>Comments:</b> No additional comments.</p>	<p><b>Extent of static pressure data collection:</b> Hydrant pressures taken during routine system flushing and/or hydrant testing.</p> <p><b>Characterization of real-time pressure data collection:</b> Basic - telemetry or pressure logging at boundary points (supply locations, tanks, PRVs, boosters).</p> <p><b>Hydraulic model:</b> One exists but has not been calibrated within the last 5 years.</p> <p><b>Comments:</b> Limiting criteria is well covered vs. basic coverage for telemetry.</p>
18	Total annual operating cost	TAOC	10	<p><b>Input derivation:</b> From official financial reports.</p> <p><b>Comments:</b> Confirmed costs limited to water only, and water debt service included.</p>	<p><b>Frequency of internal auditing:</b> Annually.</p> <p><b>Frequency of third-party CPA auditing:</b> Annually.</p> <p><b>Comments:</b> No additional comments.</p>
19	Customer retail unit cost	CRUC	9	<p><b>Input derivation:</b> Total consumptive revenue divided by Billed Metered Authorized Consumption. Sewer charges are not based on water meter readings. Sewer revenues are not applicable.</p> <p><b>Comments:</b> Rate structures are different for Marina &amp; Ord systems, but were combined in the calculation.</p>	<p><b>Characterization of calculation:</b> Weighted average composite of all rates. Input calculations have not been reviewed by an M36 water loss expert.</p> <p><b>Comments:</b> Score increased based on method of calculation.</p>
20	Variable production cost	VPC	5	<p><b>Supply profile:</b> Own sources only.</p> <p><b>Primary costs included:</b> Treatment chemicals and supply &amp; distribution power.</p>	<p><b>Characterization of calculation:</b> Primary costs only. Input calculations have not been reviewed by an M36 water loss expert.</p>



#	AWWA Water Audit Input	Code	Final DVG	Basis on Input Derivation	Basis on Data Validity Grade
				<p><b>Secondary costs included:</b> None currently included.</p> <p><b>Comments:</b> Calculation conducted for Marina and Ord separately and then weighted by volume produced for each system.</p>	<p><b>Comments:</b> Score increased based on method of calculations.</p>



**Key Audit Metrics**

(~)	VALIDITY	Data Validity Score: 71	Data Validity Band (Level): Band IV (71-90)
(#)	VOLUME	ILI: 1.41	Real Loss: 24.57 (gal/conn/day)      Apparent Loss: 3.10 (gal/conn/day)
(\$)	VALUE	Annual Cost of Apparent Losses: \$49,716	Annual Cost of Real Losses: \$393,902

**Infrastructure & Water Loss Management Practices:**

Infrastructure age profile: Ord system was inherited from federal gov't.      Infrastructure replacement policy (current, historic): Any rehab areas are being fully replaced.

Estimated main failures/year: 7 to 10      Estimated service failures/year: 4 or 5

Extent of proactive leakage management: Have purchased leak equipment and are implementing pilot program.

Other water loss management comments: Have isolated unused areas of the system and seen reduction in leaks.

**Comments on Audit Metrics & Validity Improvements**

The Infrastructure Leakage Index (ILI) of 1.41 describes a system that experiences leakage at 1.41 times the modeled technical minimum for its system characteristics.

The Data Validity Score falling within Band IV (71-90) suggests that next steps may be focused primarily on evaluating cost-effective interventions for water & revenue loss recovery, while maintaining data collection & validation processes with data improvements as warranted. Opportunities to improve the reliability of audit inputs and outputs include:

- Temporal alignment of Billed Metered Authorized Consumption with Water Supplied: consider pro-rating the first and last months of the audit period to better align consumption with actual dates of use, and using read date as basis for reporting.
- Improved estimation of CMI: consider a customer meter testing program which tests a sample of random meters whose stratification (by size, age, or other characteristics) represents the entire customer meter stock.

When the CA-NV AWWA Water Audit Validator (WAV) program comes online after this year, is the utility planning on having a staff member become certified to perform the Level 1 Validation for future audits? Unsure.



**CA-NV AWWA Water Loss Technical Assistance Program**  
**Wave 4 Water Audit Level 1 Validation Document**

Water System Name:

Marina Coast Water District

Water System ID Number:

#2710017

Water Audit Period: Select

Calendar Year 2016

**Water Audit & Water Loss Improvement Steps:**

*Steps taken in preceding year to increase data validity, reduce real loss and apparent loss as informed by the annual validated water audit:*

In-house staff completed this year's Water Loss Report, utilizing a broader scope of monthly data recorded by Operations and Maintenance and Customer Service Departments versus outside contractors utilizing limited data from annual reports. This helped produce results that better reflected the utilities practices.

In addition, the number of unmetered accounts has been reduced, and efforts to replace older meter registers expanded.

**Certification Statement by Utility Executive:**

This water loss audit report meets the requirements of California Code of Regulations Title 23, Division 2, Chapter 7 and the California Water Code Section 10608.34 and has been prepared in accordance with the method adopted by the American Water Works Association, as contained in their manual, *Water Audits and Loss Control Programs, Manual M36, Fourth Edition* and in the Free Water Audit Software version 5.

Utility Provided

Keith Van Der Maaten

Executive Name (Print)

General Manager

Executive Position

[Signature]

Signature

9/27/17

Date