

Validator Provided

**Audit Information:**

Utility: City of San Luis Obispo Utilities

PWS ID: CA4010009

System Type: Potable

Audit Period: Calendar 2018

Utility Representation: Mychal Boerman (Water Resources), Marcus Henderson (Distribution), Jason Meeks (Production), Miguel Barcenas (Engineer)

Validation Date: 9/20/2019

Call Time: 14:30

Sufficient Supporting Documents Provided: Yes

**Validation Findings & Confirmation Statement:**

Key Audit Metrics:

Data Validity Score: 48      Data Validity Band (Level): Level II

ILI: 0.97      Real Loss: 16.00 gallons/connection/day      Apparent Loss: 8.99 gallons/connection/day

Non-revenue water as percent of cost of operating system: 2.3%

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.

**Validator Information:**

Water Audit Validator: Bryan Chen

Validator Qualifications: AWWA California Water Audit Validator

**Water Supplier Name:** City of San Luis Obispo Utilities

**Water Supplier ID Number:** CA4010009

**Water Audit Period:** Calendar 2018

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

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

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During 2018 the City of San Luis Obispo began the planning and purchasing necessary for the installation and calibration of water meters at the water treatment plant. During this time period the water meters that measure “exported water” that is sold to Cal Poly were calibrated or replaced. A refinement of how Cal Poly’s agricultural water is accounted for has also reduced water loss since the City is now better accounting for agricultural water that exits the water treatment plant into agricultural irrigation ponds, this water is not used for domestic use and was previously unintentionally shown as being delivered into our water distribution system.

During 2018 the City also continued replacement of aged water meters within the water distribution system and began replacing meters over 6” with smaller multi-meter setups that help better register low and medium flows that were not being registered on these larger meters.

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**Certification Statement by Utility Executive:**

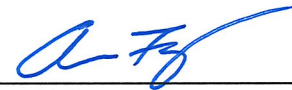
This water loss audit report meets the requirements of California Code of Regulations Title 23, Division 2, Chapter 7 and the California Water Code Section 10608.34 and has been prepared in accordance with the method adopted by the American Water Works Association, as contained in their manual, *Water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

AARON FLOYD

Executive Name (Print)

UTILITIES DIRECTOR

Executive Position



Signature

9/24/19

Date

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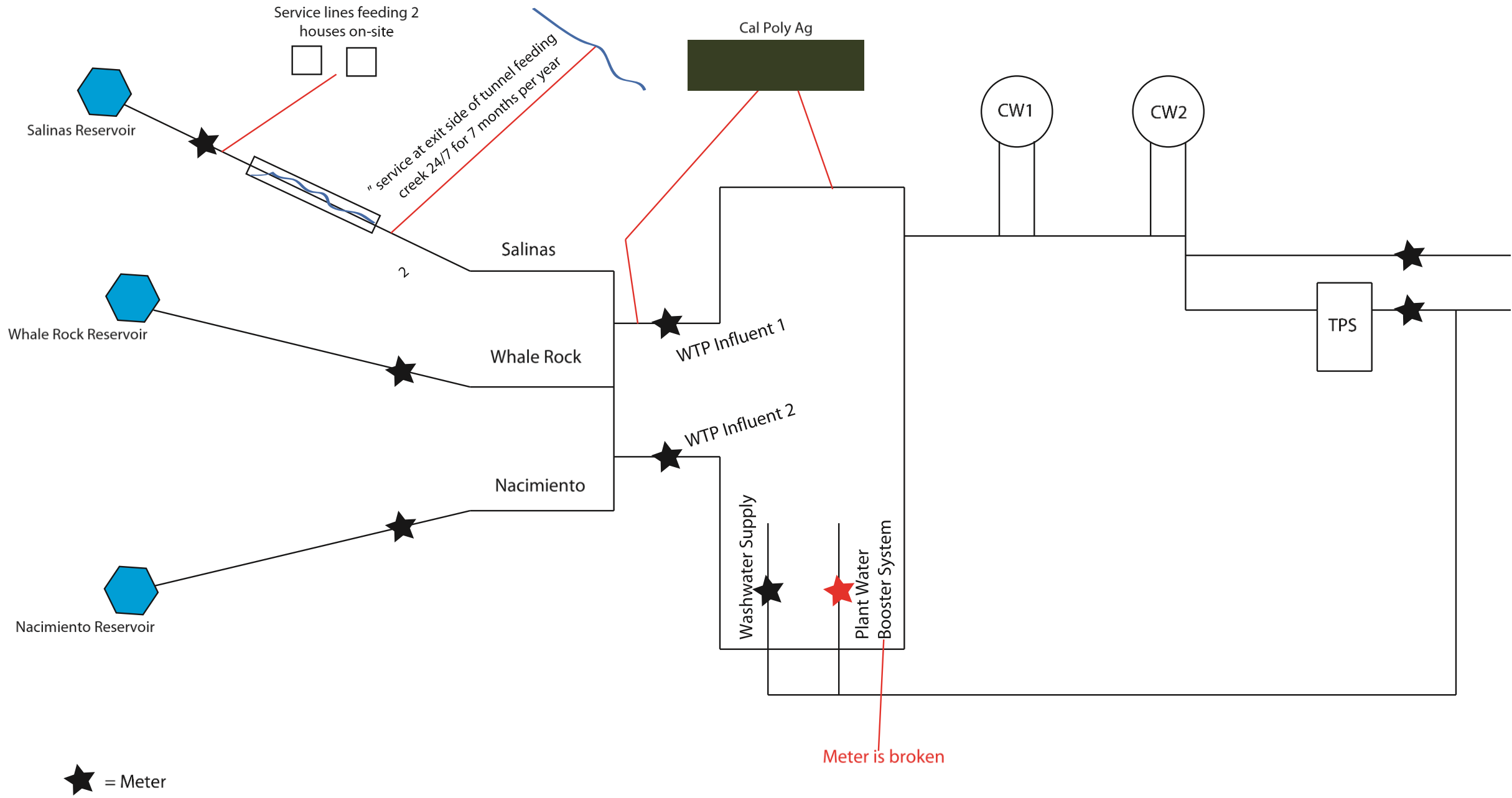
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**Validator Information:**

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#	AWWA Water Audit Input	Code	Final DVG	Basis on Input Derivation	Basis on Data Validity Grade
1	Volume from Own Sources	VOS	3	<p><b>Supply meter profile:</b> Whale Rock, Salinas, Nacimiento Reservoirs, groundwater per supporting documents. Influent and production meters are used, limited effluent meters. Not regularly calibrated or tested.</p> <p><b>VOS input derived from:</b> SCADA reads from production meters.</p> <p><b>Comments:</b> Data taken from supporting documents. Potable water only</p>	<p><b>Percent of own supply metered:</b> 99+%</p> <p><b>Signal calibration frequency:</b> No data</p> <p><b>Volumetric testing frequency:</b> None</p> <p><b>Volumetric testing method:</b> N/A</p> <p><b>Percent of own supply volumetrically tested:</b> N/A</p> <p><b>Comments:</b> DVG 3 assigned due to lack of testing and calibration.</p>
2	VOS Master Meter & Supply Error Adjustment	VOS MMSEA	3	<p><b>Input derivation:</b> No data, left blank</p> <p><b>Net storage change included in MMSEA input:</b> No</p> <p><b>Comments:</b> Production meter data is logged electronically (SCADA) with monthly adjustment</p>	<p><b>Supply meter read frequency:</b></p> <p><b>Supply meter read method:</b></p> <p><b>Frequency of data review for trends &amp; anomalies:</b></p> <p><b>Storage levels monitoring frequency:</b></p> <p><b>Comments:</b> Estimate of daily changes in storage required for DVG 4</p>
3	Water Imported	WI	n/a	<b>Comments:</b> No connections for imported water	
4	WI Master Meter & Supply Error Adjustment	WI MMSEA	n/a		
5	Water Exported	WE	3	<p><b>Export meter profile:</b> 8 Meters to Cal Poly, no testing or calibration info</p> <p><b>Comments:</b> Data taken from supporting documents. Potable only. Not included in BMAC</p>	<p><b>Percent of export supply metered:</b> 100</p> <p><b>Signal calibration frequency:</b> None</p> <p><b>Volumetric testing frequency:</b> None</p> <p><b>Volumetric testing method:</b> N/A</p> <p><b>Percent of export supply volumetrically tested:</b> N/A</p> <p><b>Comments:</b> Testing or maintenance required for DVG 4</p>

#	AWWA Water Audit Input	Code	Final DVG	Basis on Input Derivation	Basis on Data Validity Grade
6	WE Master Meter & Supply Error Adjustment	WE MMSEA	1	<p>Input derivation: No test data</p> <p>Comments:</p>	<p>Export meter read frequency: Monthly</p> <p>Export meter read method: Manual</p> <p>Frequency of data review for trends &amp; anomalies: Monthly</p> <p>Comments: Written meter testing agreement required for DVG 2</p>
7	Billed metered	BMAC	5	<p>Customer meter profile:</p> <p>Age profile:</p> <p>Reading system: Manual</p> <p>Read frequency: Monthly</p> <p>Comments: Data taken from supplemental documents. Potable only. Month column on consumption spreadsheet corresponds with meter read date; read reflects usage for month prior. No lag time correction. Current CIP in progress to replace meters. Billing data on Springbrook.</p>	<p>Percent of customers metered: 100%</p> <p>Small meter testing policy: Upon customer complaint.</p> <p>Number of small meters tested/year: 0.</p> <p>Replaced upon failure.</p> <p>Large meter testing policy: None.</p> <p>Number of large meters tested/year: 0</p> <p>Replaced upon failure.</p> <p>Meter replacement policy: Replaced upon failure and customer request. CIP started 2018, in progress.</p> <p>Number of replacements/year:</p> <p>Billing data auditing: Standard QC by billing division. Volumes are reviewed by account type/class. Financial auditor performs sampling review on select accounts each year.</p> <p>Comments: Needs larger meter replacement % to qualify as "limited accuracy testing"</p>
8	Billed unmetered	BUAC	n/a		
9	Unbilled metered	UMAC	5	<p>Profile: Serrano Trough, Reservoir Canyon 1, Miozzi Trough, Mission Prep, WRRF Make-up water.</p> <p>Input derivation: Monthly meter reading.</p> <p>Comments: Data taken from supporting documents.</p>	<p>Policy for billing exemptions: Legacy accounts. Policy is to not add any new accounts to this category; accounts existed prior to developing the policy.</p> <p>Comments:</p>

#	AWWA Water Audit Input	Code	Final DVG	Basis on Input Derivation	Basis on Data Validity Grade
10	Unbilled unmetered	UUAC	6	<p><b>Profile:</b> Fire department usage, operational flushing.</p> <p><b>Comments:</b> Estimated for wastewater collection system flushing and cleaning (number of truck loads), hydrant flushing (flow rate) and firefighting (number of fires).</p>	<p><b>Comments:</b> Policy is restricted to Utilities and Fire Department usage. Volumes inferred based on time in field.</p>
11	Unauthorized consumption	UC	5	<p><b>Comments:</b> Default input (0.25%) applied</p>	<p><b>Comments:</b> Default grade applied</p>
12	Customer metering inaccuracies	CMI	4	<p><b>Input derivation:</b> Estimated based on consultant recommendation.</p> <p><b>Comments:</b></p>	<p><b>Characterization of meter testing:</b> Upon request and consumption flag.</p> <p><b>Characterization of meter replacement:</b> Upon failure. CIP for meter replacement started 2018, in progress.</p> <p><b>Comments:</b> No routine meter testing.</p>
13	Systematic data handling errors	SDHE	5	<p><b>Comments:</b> Default input (.25%) applied</p>	<p><b>Comments:</b> Default grade applied</p>
14	Length of mains	Lm	8	<p><b>Input derivation:</b> GIS based</p> <p><b>Hydrant leads included:</b> Yes</p> <p><b>Comments:</b></p>	<p><b>Mapping format:</b> Digital</p> <p><b>Asset management database:</b> In place and integrated with GIS</p> <p><b>Map updates &amp; field validation:</b> Routine through work orders</p> <p><b>Comments:</b> Until active, random asset verification is practiced, DVG will remain &lt;10.</p>
15	Number of service connections	Ns	1	<p><b>Input derivation:</b> Number of service laterals. Hydrant connections not included.</p> <p><b>Basis for database query:</b> Database of service connections from land-use data.</p> <p><b>Comments:</b></p>	<p><b>GIS updates &amp; field validation:</b> None</p> <p><b>Estimated error of total count within:</b> &gt;5%</p> <p><b>Comments:</b></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.</p>	

#	AWWA Water Audit Input	Code	Final DVG	Basis on Input Derivation	Basis on Data Validity Grade
17	Average operating pressure	AOP	3	<p>Number of zones, general profile: 16 pressure zones. The average pressure is 70 psi under peak hour demand (PHD), and 78 psi under average day demand (ADD).</p> <p>Typical pressure range: 30-130 psi</p> <p>Input derivation: Information gathered by engineer from hydraulic model.</p> <p>Comments:</p>	<p>Extent of static pressure data collection: Hydrant pressures taken during routine system flushing and/or hydrant testing.</p> <p>Characterization of real-time pressure data collection: None</p> <p>Hydraulic model: In place and calibrated within the last 5 years.</p> <p>Comments: Data measured at PRV' but not logged. Planning SCADA project for all PRV's, plants, tanks.</p>
18	Total annual operating cost	TAOC	10	<p>Input derivation: Financial report</p> <p>Comments: Water only, water debt included</p>	<p>Frequency of internal auditing: Annual</p> <p>Frequency of third-party CPA auditing: Annual</p> <p>Comments:</p>
19	Customer retail unit cost	CRUC	8	<p>Input derivation: Total consumption revenue divided by Billed Metered Authorized Consumption. Sewer charges are based on water usage and not included in calculation.</p> <p>Comments:</p>	<p>Characterization of calculation: Weighted average composite of all rates. Calculations have not been reviewed by an M36 water loss expert.</p> <p>Comments:</p>
20	Variable production cost	VPC	4	<p>Supply profile: Own sources</p> <p>Primary costs included: Electrical, chemical</p> <p>Secondary costs included: Not included</p> <p>Comments:</p>	<p>Characterization of calculation: Primary costs only. Calculations have not been reviewed by an M36 water loss expert.</p> <p>Comments:</p>

### Key Audit Metrics

(~) VALIDITY  
 (#) VOLUME  
 (\$) VALUE

Data Validity Score: 48  
 ILI: 0.97      Real Loss: 16.00 (gal/con/day)  
 Annual Cost of Real Losses: \$55,573

Data Validity Band (Level): Level II  
 Apparent Loss: 8.99 (gal/conn/day)  
 Annual Cost of Apparent Losses: \$367,951