



METER REPLACEMENT PROGRAM

PNWS-AWWA 2015 SECTION CONFERENCE
APRIL 29, 2015

560 MILLING GALLONS PER YEAR

\$130,000 PER YEAR

2.6% OF RATES

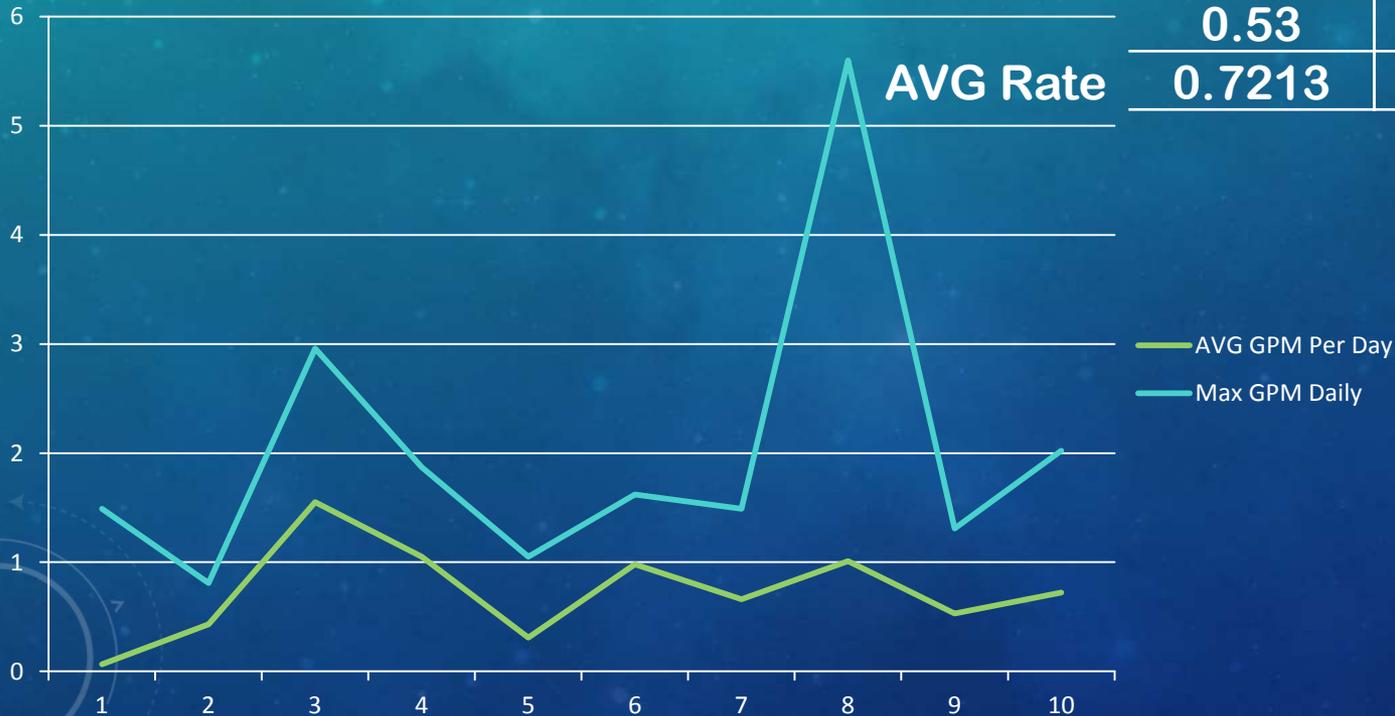


The background is a teal-to-blue gradient with faint technical graphics. On the right side, there is a large circular gauge with a scale from 0 to 210 and a needle pointing towards 180. Below it is a smaller circular diagram with arrows. In the bottom left, there is another circular diagram with arrows. The overall aesthetic is clean and modern, suggesting a technical or data-driven context.

WHAT WE HAVE DONE TO DATE

Innovate Registers on SRII Meters Field Results on Rate of Flow

AVG GPM	Max Daily GPM
0.065	1.49
0.43	0.81
1.55	2.96
1.05	1.87
0.31	1.05
0.98	1.62
0.66	1.49
1.01	5.6
0.53	1.31
0.7213	2.022



Flow Results from Iperl and C2 Meters

Based on Data Collection From Iperls over 30 periods

	Meter Size	Avg CF/Min	Avg GPM
Misc Homes	3/4"	0.338	2.531
Misc Homes	3/4"	0.125	0.931
Misc Homes	3/4"	0.147	1.100
Misc Homes	3/4"	0.325	2.431
Misc Homes	3/4"	0.101	0.754
Misc Homes	3/4"	0.244	1.825
Misc Homes	3/4"	0.429	3.209
Misc Homes	3/4"	0.420	3.142
Misc Homes	3/4"	0.311	2.326
Misc Homes	3/4"	0.336	2.513
Misc Homes	3/4"	0.101	0.754
Wood Lake	1.5"	0.607	4.540
Wood Lake	1.5"	0.414	3.097
Seeley LK	2"	0.404	3.025
Seeley LK	2"	0.603	4.513
Seeley LK	2"	0.138	1.031
Seeley LK	3"	0.219	1.636
	AVG All	0.310	2.319

Average GPM 5/8" x 3/4"	1.956
Average GPM 1.5"	3.819
Average GPM 2"	2.857
Average GPM 3"	1.636

Accuracy with Mechanical Register (GPM)

Meter #	Brand	Out Read (Ft3)	1/16	1/8	1/4	1/2	1	2	5	10
43067279	Sensus	125,500.83	9.53%	85.21%	98.50%	101.22%	101.70%	100.79%	100.26%	99.97%
44095903	Sensus	93,625	9.90%	92.15%	98.68%	100.15%	104.05%	100.03%	101.00%	100.08%
464597899	Sensus	85,651	7.33%	77.11%	89.47%	106.55%	103.68%	100.92%	99.90%	100.29%
39739130	Sensus	92,265	8.80%	88.48%	97.70%	99.62%	101.46%	101.08%	100.79%	100.92%
11995248	Sensus	121,440	7.00%	84.82%	96.50%	99.94%	101.40%	99.55%	100.21%	99.95%
66195174	Sensus	156,415	7.33%	81.54%	96.60%	99.80%	101.33%	101.80%	101.00%	100.80%
47422471	Sensus	109,694	14.66%	90.60%	100.10%	100.05%	101.33%	100.82%	100.60%	100.75%
Average Age		Avg. Accuracy (used meters)	9.2%	85.7%	96.8%	101.0%	102.1%	100.7%	100.5%	100.4%

			1/16	1/8	1/4	1/2	1	2	5	10
		Diff.	85.5%	12.8%	3.2%	-0.4%	-1.2%	-0.3%	-0.5%	-0.6%

Accuracy with Innov8 Register (GPM)

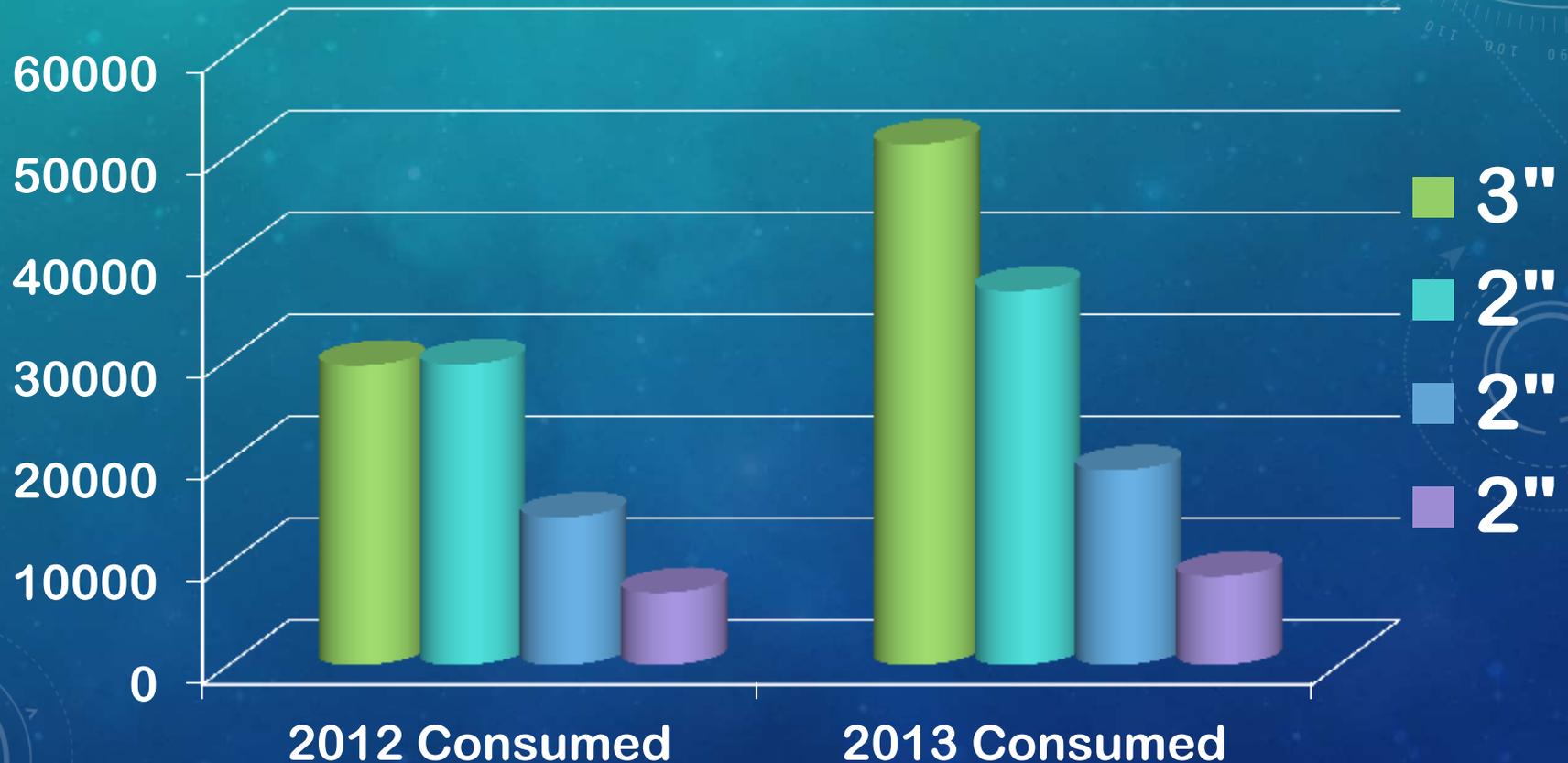
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43067279	Sensus	125,500.83	92.7%	97.3%	101.2%	101.0%	101.7%	100.4%	99.9%	99.4%
44095903	Sensus	93,625	93.20%	98.78%	100.57%	100.95%	100.87%	100.50%	100.17%	100.17%
464597899	Sensus	85,651	97.33%	99.89%	100.57%	101.04%	101.07%	100.56%	99.63%	99.84%
39739130	Sensus	92,265	97.33%	99.89%	100.37%	100.70%	100.91%	100.71%	100.31%	99.87%
11995248	Sensus	121,440	92.60%	97.50%	100.04%	100.74%	100.72%	99.38%	99.70%	99.32%
66195174	Sensus	156,415	92.80%	97.47%	97.35%	99.68%	100.63%	100.63%	100.42%	100.17%
47422471	Sensus	109,694	97.00%	98.38%	99.95%	100.54%	100.91%	100.41%	100.01%	99.73%
Average Age		Avg. Accuracy (used meters)	94.7%	98.5%	100.0%	100.7%	101.0%	100.4%	100.0%	99.8%

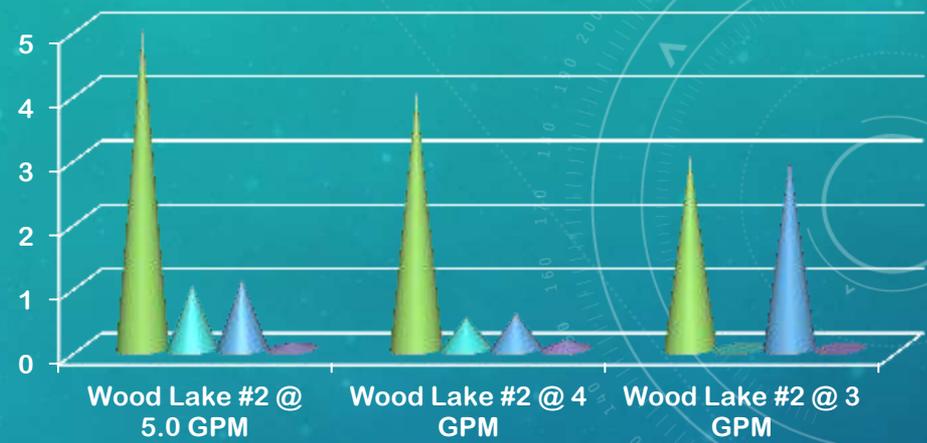
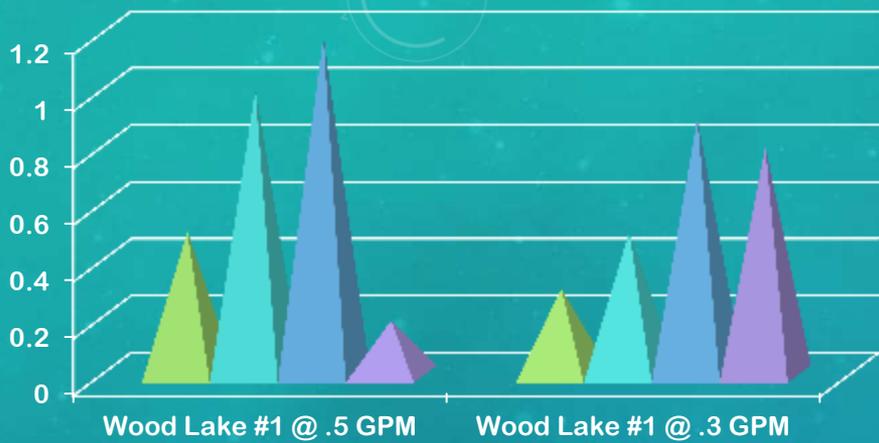


— AVG GPM Per Day
— Max GPM Daily

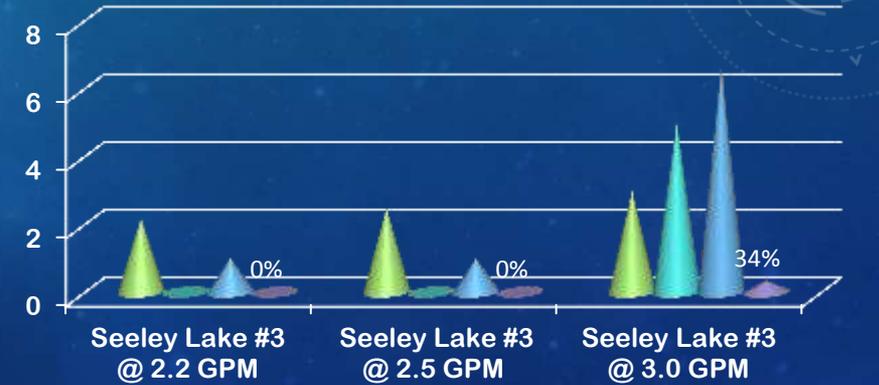
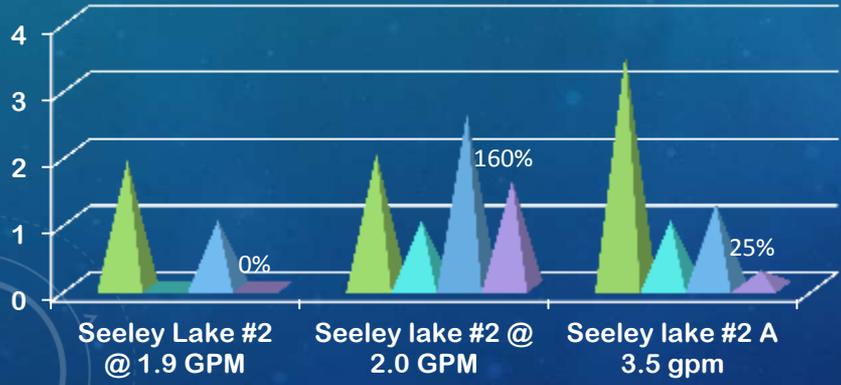
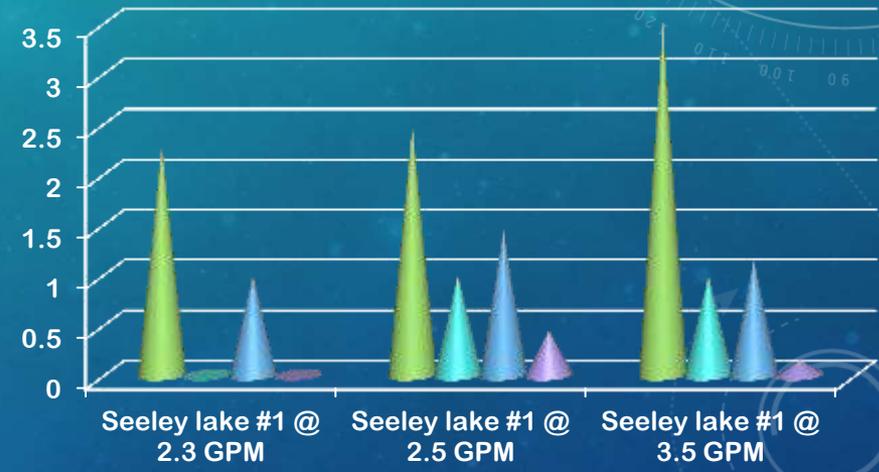
Turbine Replacement at Seeley Lake Usage Comparison

		2012	2013	# Units	Variance	
2 month	3"	29,400	51,100	42	74%	
May/June	2"	29,500	36,700	32	24%	
	2"	14,500	19,100	18	32%	38% AVG



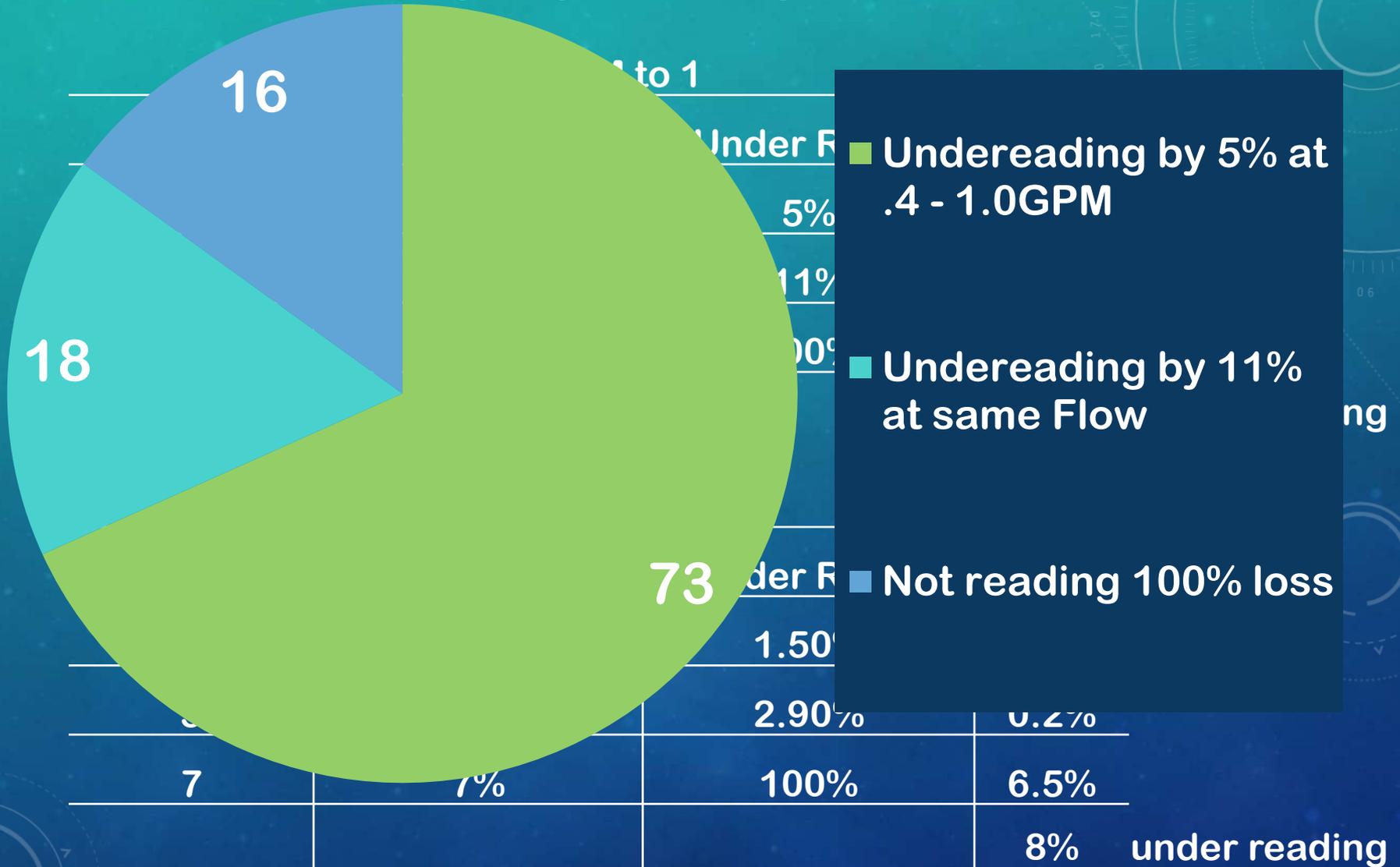


- Flow Rate
- LWD Meter GPM
- Test Meter GPM
- % variance



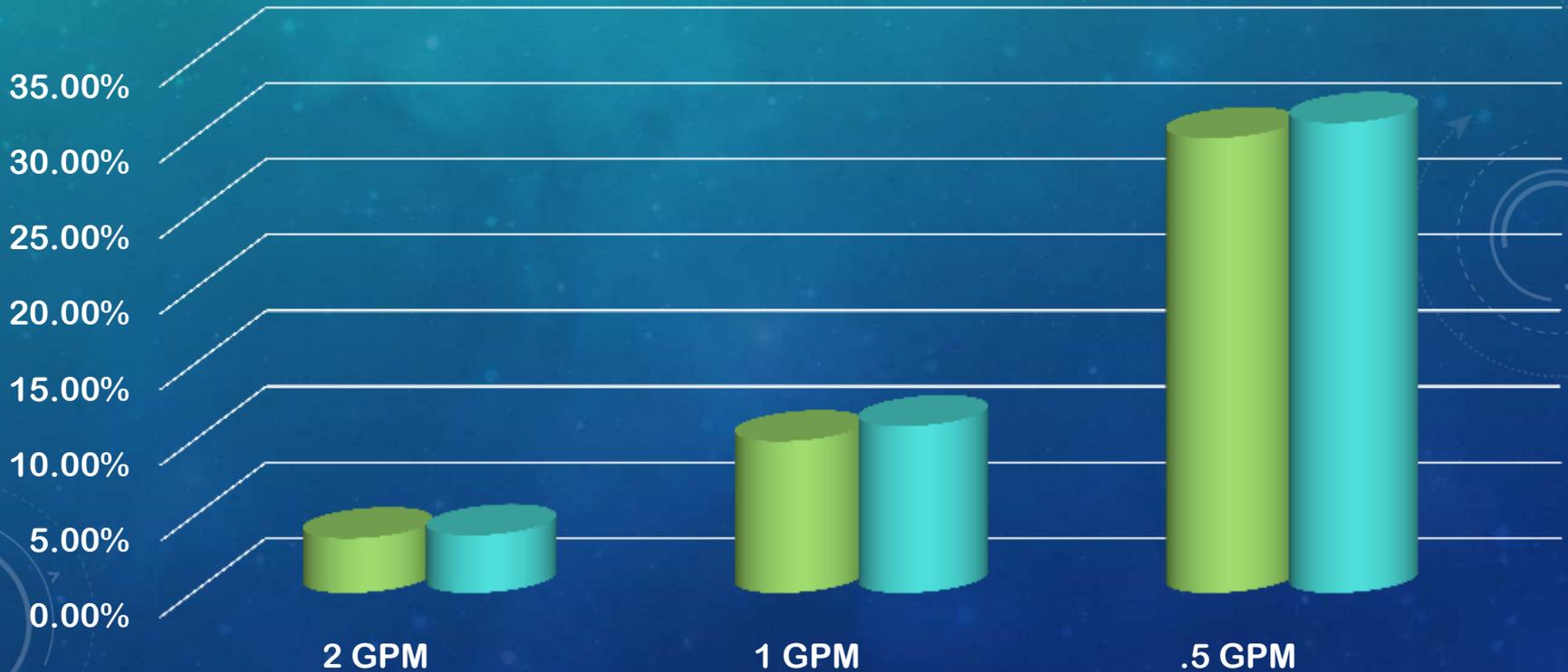
Results of Tacoma Bench Tests

Using Weighted Averages Based on Meters

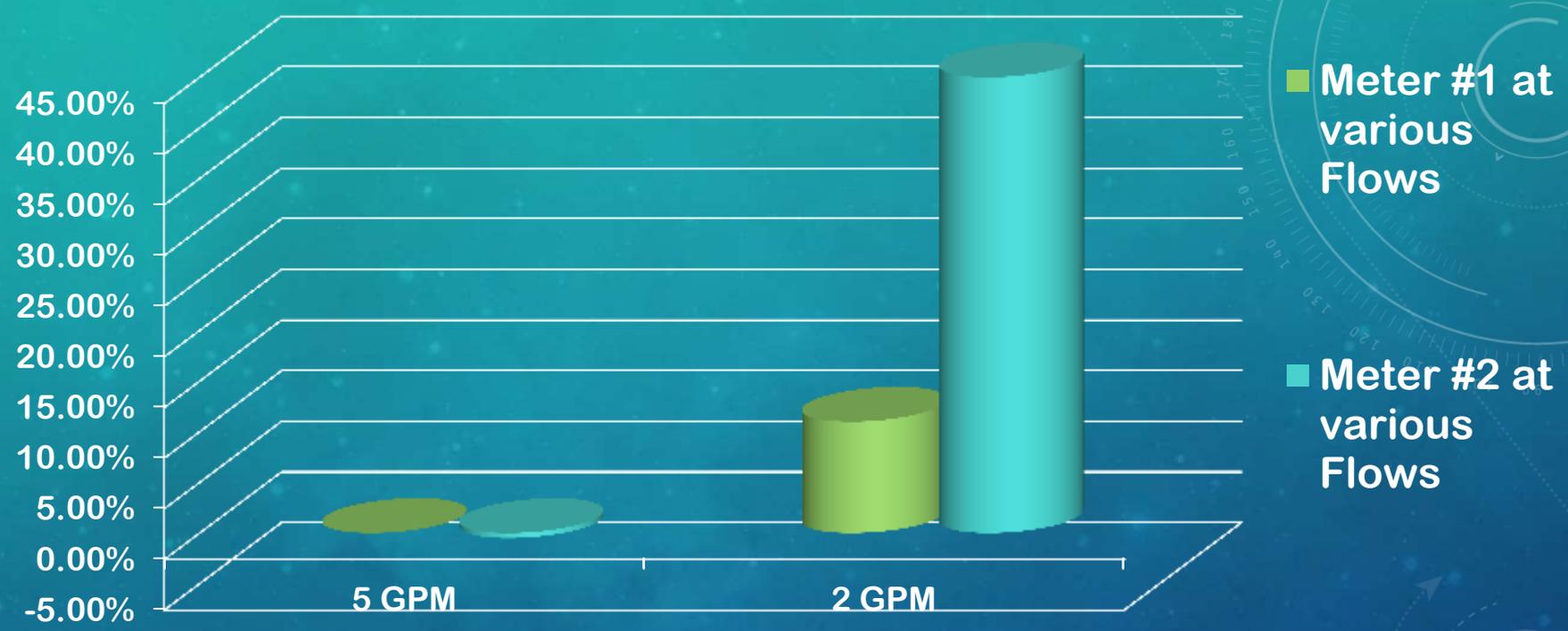


Tacoma Bench Test Results 2" PD Meters

2" PD Meter	% Under at 2 GPM	% Under at 1 GPM	% Under at .5 GPM
	2 GPM	1 GPM	.5 GPM
Meter #1	3.60%	10%	30%
Meter #2	3.80%	11%	31%



Tacoma Bench Test Results 2" Turbine Meters



2" Turbine Meter	% Under at 5 GPM	% Under at 2 GPM
Meter #1	0.00%	11%
Meter #2	-0.50%	45%

NOTE: 3" and below Meters AVG 2.46 GPM

AMI

AUTOMATED METERING INFRASTRUCTURE

AQUASENSE



PROS OF AMI

- **Eliminates Meter Reader: 1 FTE**
- **Eliminates many Service Orders and Labor:**
 - We could eliminate 75% of 6,552 service orders ,each requiring 1 hour to generate and act on.
- **Saves 4,914 Labor Hours or 2.8 FTE's net Benefit in Labor Savings**
 - Using AMI could save \$283,000 if we credited all the savings we anticipate.
- **New Meters Accuracy**
 - This will generate the increase in revenue of \$430,000.00 (conservative estimate).
- **Generates usable management data on a daily basis, assisting in analyzing District trends**

PROS OF AMI

- **Generates leak detection and other alerts daily**
- **Interacts automatically with billing software**
- **Reduce costs of leaks to customer and District**
- **The time a leak is undetected would be reduced to 3 days, compared to 60 days billing then notification of the customer.**
- **Notices of leaks could go out by text or e-mail eliminating the need to write a S/O for leak detection.**
- **Interfaces with SCADA to accurately compare WUE Pumped vs Sold on a daily or weekly basis.**



UPDATING METERS AND REGISTERS ALL AT ONCE

Both Small and Large Over a Condensed Time Frame

PROS

- Deployment condensed
- Labor savings generated more quickly
- Recognize increase in sales due to new Meters
- Accurate, timely information available quickly
- Warranty on new products – 20 years
- District-wide adjustment; no one group will be impacted more than the others
- Replace SR meters which are obsolete, and SRII which will be discontinued in December 2013
- WUE information can be generated and evaluated more quickly – The more accurate meters will account for a much greater volume of water sold, and thus reduce the water we are showing as unaccounted for at present.
- Better customer service information – Near Real-time hosted website where customers can view their accounts
- We can turn in the old Brass meters for recycle EST - \$ 150,000.00 rebate.

Cons

- **Upfront Costs = \$6.3 Million for 16,500 meters**
- **Future replacement programs faced with large numbers of meters that will be the same vintage**
- **Borrowing to fund Meters replacement competes with R & R**
- **Requires Contractor to handle the large Volume of replacements**
- **Rates will increase to cover Depreciation**

\$5,998,000.00 ANNUAL SALES

38% EARNINGS

127,240.00

FOUR
MEMBERS

ANNUAL

51% OF ANNUAL

\$1,619,200.00

- **AMI allows you to capture daily usages and monitor meters daily if you choose.**
- **AMI also allows you to conduct activities like taking move-in and move-out reads and meter leak detection consumption comparisons from the office without sending out a technician.**
- **The savings in labor and the relevancy of the information amongst the other reasons listed below are why we choose to pursue the AMI initiative over the AMR.**



ON-CALL REDUCTION

RETIREMENT



CROSS CONNECTION

REASSIGNMENT

WELL HEAD PROTECTION

GIS PROGRAM

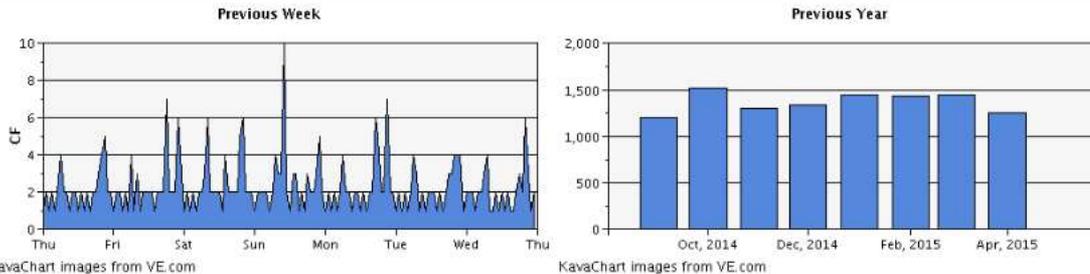


Location Summary for 11900 Change Location

Location Details

Location No.	11900	Billing Info	Cycle 19
Address	9506 WAVERLY DR SW , Lakewood, WA	Active Services	W
Location Class	multi-resi	Active Meters	77827177 (W) Installed on: 2014-09-11 (ON)

Water Consumption



Map

15870 meters found, but the limit is 1000. No Meters are shown. Zoom in or tighten filters. The searched meter is not part of the filtered results.

Meter ID: 77827177

Meter Name	9506 WAVERLY DR SW (77827177 - 11900)
Alternate ID	80902624
Location Class	multi-resi
Meter Type	5/8
Install Date	2014/09/11
First Communicated	2014/09/12
Last Communicated	Today
Connection Status	ON

Event Summary

1 rows found

Meter Id	Event Type	First Occured	Last Occured	Total Occurrences
77827177	Leak Detected	2014/09/12 (223 days ago)	2015/04/22 (1 days ago)	32

Latest Register Reads

1 rows fo

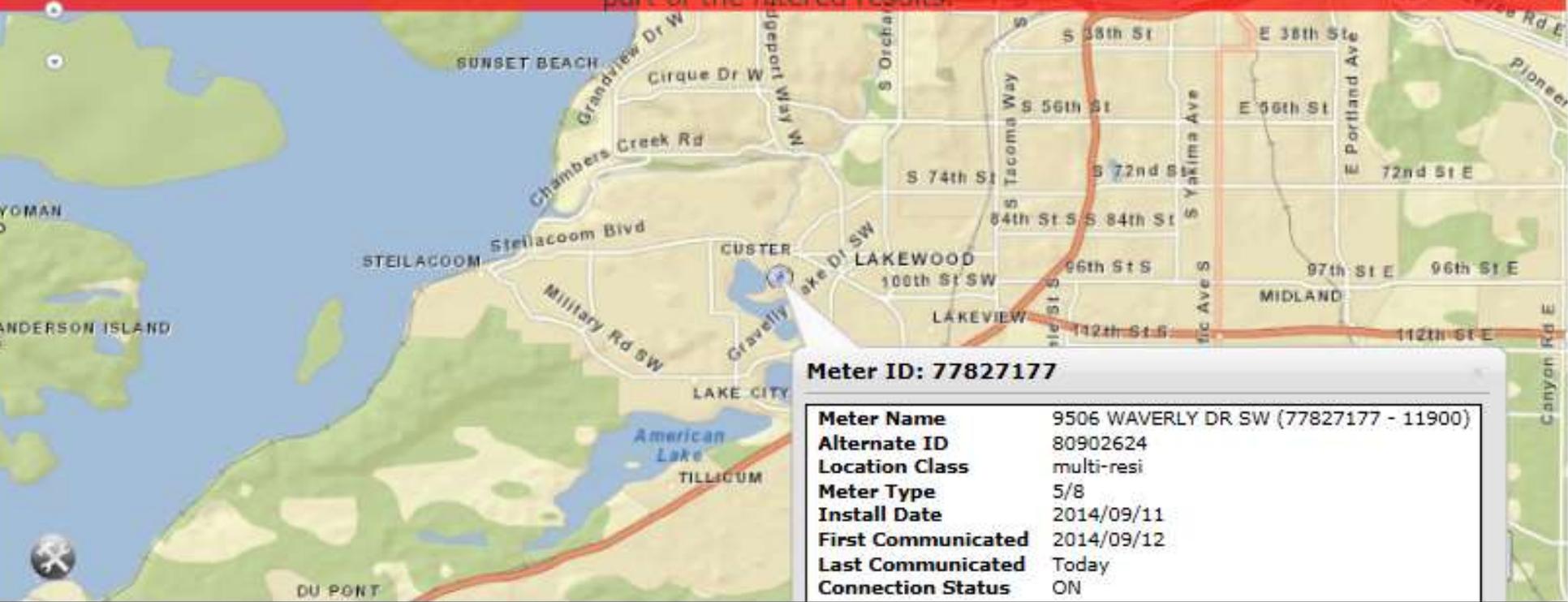
Meter Id	Channel Id	Read Date/Time	Read Date/Time DST	Read Value
77827177	1	2015/04/22 23:00:00	2015/04/23 00:00:00	11049 C

30 Day Interval Read Summary

1 rows found

Meter Id	Passed	Failed	Missing
77827177	719	0	1

15870 meters found, but the limit is 1000. No Meters are shown. Zoom in or tighten filters. The searched meter is not part of the filtered results.



The map displays the Steilacoom area, including Sunset Beach, Steilacoom, Custer, Lakewood, Lakeview, and Midland. A blue circle with a white dot marks the location of meter 77827177 on Gravelly Lake Dr SW. The map also shows American Lake and various streets such as Military Rd SW, Gravelly Lake Dr SW, and S 74th St.

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Event Summary

Excel
 PDF
 1 rows found

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77827177	Leak Detected	2014/09/12 (224 days ago)	2015/04/22 (2 days ago)	32

Latest Register Reads

Excel
 PDF
 1 rows found

Meter Id	Channel Id	Read Date/Time	Read Date/Time DST	Read Value
77827177	1	2015/04/23 23:00:00	2015/04/24 00:00:00	11097 C

30 Day Interval Read Summary

Excel
 PDF
 1 rows found

Meter Id	Passed	Failed	Missing
77827177	719	0	1

Other Meter Data

SQL ERROR: java.sql.SQLException: ORA-00942: table or view does not exist SQL STATEMENT WAS:

LESSONS LEARNED

The background features a teal-to-blue gradient with a subtle pattern of small white dots. On the right side, there is a large, faint circular scale with numerical markings from 0 to 210. Several circular arrows and dashed lines are scattered across the background, suggesting a technical or scientific theme.

1. ADDED STRESSES FOR FIELD AND OFFICE STAFF CONCERNING CONTRACTOR QUALITY CONTROL

2. YOUR SYSTEM IS NOT AS GOOD AS YOU THINK IT IS.

3. YOUR CUSTOMER SERVICE INFORMATION IS LIKELY TO CONTAIN DUPLICATES AND DATA ENTRY ERRORS THAT YOU ARE UNAWARE OF.

4. THE CHOICE OF CONTRACTORS IS KEY IN THIS PROCESS – VENDORS AND CONTRACTORS ARE DIFFERENT, AND THEY DO NOT THINK ALIKE.

5. WRITE YOUR CONTRACTS AS TIGHT AS YOU CAN MAKE THEM WITH RESPECT TO RETURN VISITS TO METERS THAT CANNOT BE INTALLED, APPOINTMENTS, ETC.

6. **WARRANTIES ARE NEGOTIABLE**

7. MAKE SURE YOU MAKE THE VENDORS **COMPETE** FOR YOUR BUSINESS

8. BE VERY SPECIFIC IN THE **TIME FRAME** ALLOWED TO **INSTALL AND TROUBLESHOOT** YOUR SYSTEM.

9. GET IT IN WRITING: **EVERYTHING**

10. REQUIRE THAT THE MANAGEMENT TEAM BE **NAMED AND NOT CHANGED** WITHOUT YOUR APPROVAL

11. SET HEAVY LIQUIDATED DAMAGES FOR THE PROJECT – I SUGGEST USING **WSDOT LD'S FORMULA**

END

The background features a teal-to-blue gradient with a field of white particles. On the right side, there are technical diagrams including a large circular scale with numerical markings from 0 to 210 and a smaller circular diagram with arrows indicating a clockwise cycle.