



Steve Horn Sedaru

Plymouth County Water Works

Asset & Data Management

2019

Steve Horn - Experience

▶ Verizon Wireless

- ▶ Bag Phones to Digital phones

▶ ChoiceOne Communications

- ▶ Local, Long Distance, web hosting, web services, web sites

▶ Neptune Technology Group

- ▶ Touch Pad to AMR to AMI

▶ Sedaru

- ▶ Asset and Data Management, predictive analysis, machine learning.....?

Asset Management - EPA/AWWA

Data Management - Industry Tools

- ▶ Maintaining a desired **LEVEL OF SERVICE** for your **CURRENT STATE OF ASSETS** to provide at the **LOWEST LIFE CYCLE COST**. LLCC refers to the best appropriate cost of rehabilitating, repairing or replacing an asset.
- ▶ There are 5 Core questions within that framework
 1. Current State of Assets
 2. Level of Service
 3. Critical Assets
 4. Minimum Life Cycle Costs
 5. Long term Funding

Current state of assets - AM

What to ask?

- ▶ What do I own
- ▶ Where is it
- ▶ Condition?
- ▶ Useful life
- ▶ Value

What to do.

- ▶ Asset Inventory
- ▶ Mapping
- ▶ Rehab and/or replace
- ▶ Values and replacement costs

Collection and Mapping of Data

Assets

- ▶ Meters
- ▶ Valves
- ▶ Hydrants
- ▶ Manholes
- ▶ Catch basin
- ▶ Pipes
- ▶ Tanks

What to do.

- ▶ Testing, replacing, rehabbing
- ▶ Exercising
- ▶ Inspection and flushing
- ▶ Inspections
- ▶ Inspections and collections
- ▶ Leak and breaks
- ▶ Maintaining/cleaning/inspecting


14 work assets (78 total forms)


#	asset	icon	asset layer	history layer	workorders	# of forms
1	Cuts		Cuts (3)	Cuts history (110)	yes	4
2	Hydrants		Hydrants (7)	Hydrants history (106)	yes	9
3	Valves		Valves (8)	Valves history (105)	yes	7
4	Meters		Meters (13)	Meters history (104)	yes	12
5	Curb Valves		Curb Valves (6)	Curb Valves history (120)	yes	10
6	Backflows		Backflows (14)	Backflows history (122)	yes	5
7	New Service Inspection		New Service Inspection (611)	New Service Inspection history (120)	yes	3
8	New Asset		New Asset (51)	New Asset history (151)	yes	8
9	WQ Device		WQ Device (11)	WQ Device history (121)	yes	5
10	Air Valve		Air Valve (10)	Air Valve history (114)	yes	5
11	Main Break		Main Break (2)	Main Break history (126)	yes	2

work tile label: Hydrants


asset type: Hydrants

style template: 136,0,0 

work tile icon: 

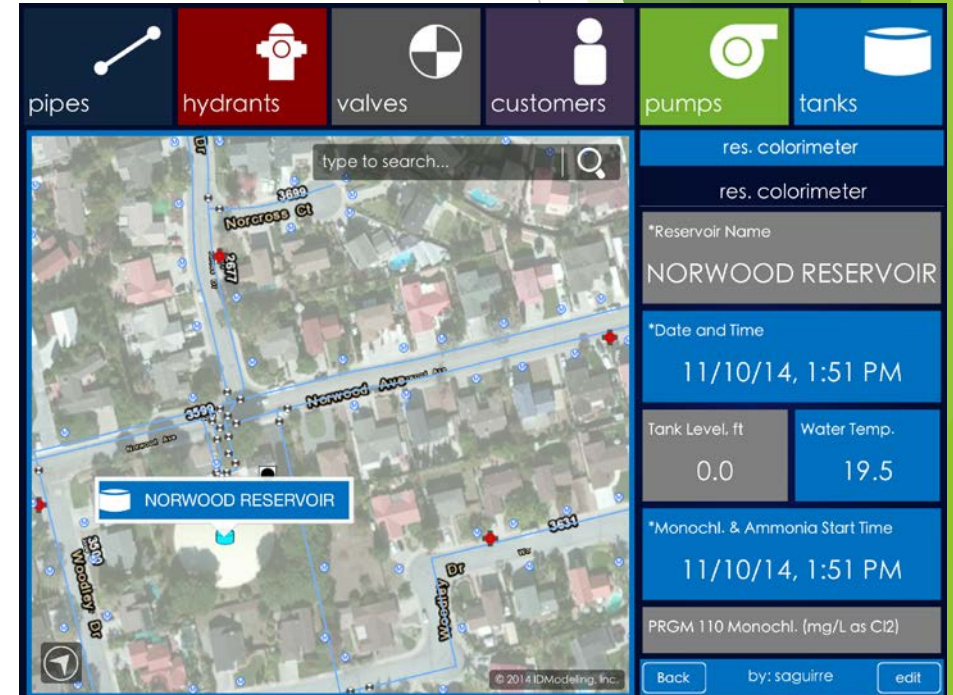
asset map settings: Hydrants (7) 

asset history settings: Hydrants history (106) 

work order settings: enabled 


form designer

Collecting through smart phones and tying to ESRI Services or other map based software



Sustainable level of Service

What to ask?

- ▶ What level do my customers demand?
- ▶ What do regulators require?
- ▶ Performance metrics
- ▶ Capabilities

What to do.

- ▶ Analyzing current and anticipated demand
- ▶ Understanding Regulatory requirements
- ▶ Performance targets
- ▶ Level of standards to track performance

Critical Assets in System

What to ask?

- ▶ How can they fail?
- ▶ How DO they fail?
- ▶ What are likelihoods and consequences?
- ▶ What does it cost to repair?
- ▶ Other costs - social, environmental

What to do.

- ▶ Listing critical assets
- ▶ Failure analysis
- ▶ Probability of failure
- ▶ Analyzing failures risks/consequences
- ▶ CIP

Asset Management Software



Performance

- Pipe Age
- Pipe Material
- Remaining Life
- Soil Corrosivity
- Number of Leaks
- Leaks Per Mile
- Pipe Avg. Pressure
- Pipe Velocity
- Fire Flow

Impact

- Critical Customer
- Diameter
- Customers
- Isolation Valves
- Average Demand
- Street Type

Ease of Collection

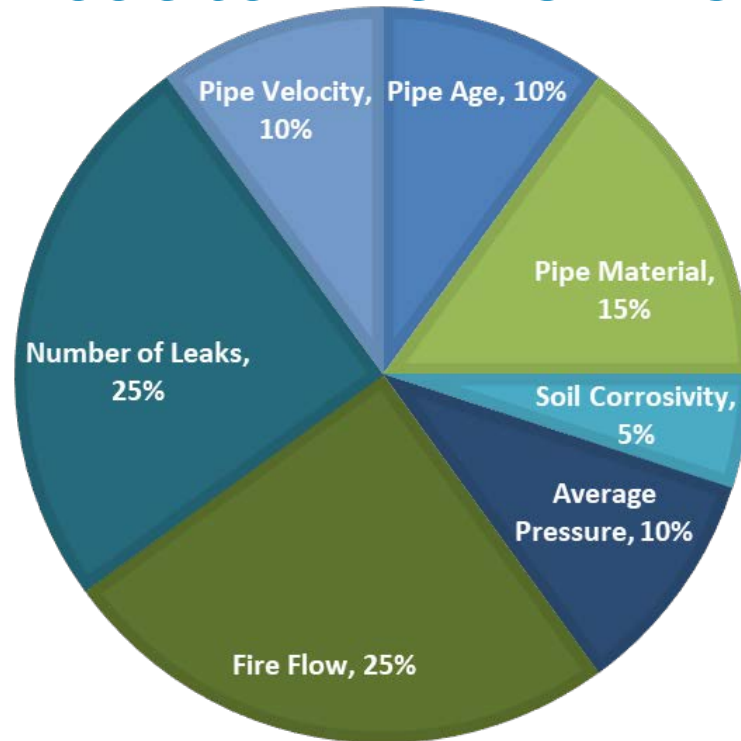
- ▶ Tie Cards Digitize them
- ▶ Pipe Age
- ▶ Leaks Paper format
- ▶ Customers Assessors (water meter bills)
- ▶ Demand Scada Information

- ▶ These are all EASILY ACCESSIBLE and can be updated quickly
- ▶ Everett MA



Condition Assessment

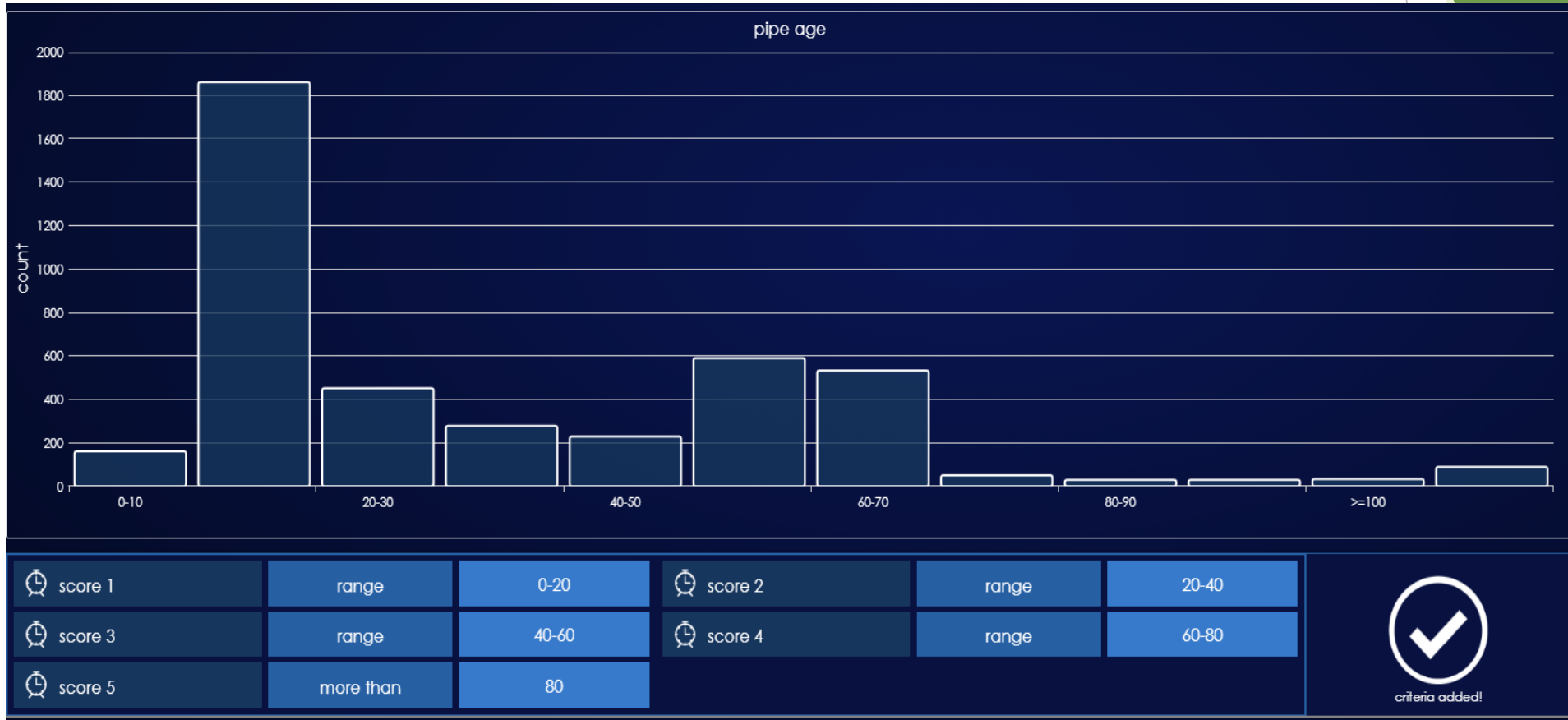
Horizontal Assets -Performance Score



Ranked each pipe from 1 to 5 (5 is most in need of upgrade)

Condition Assessment

Horizontal Assets



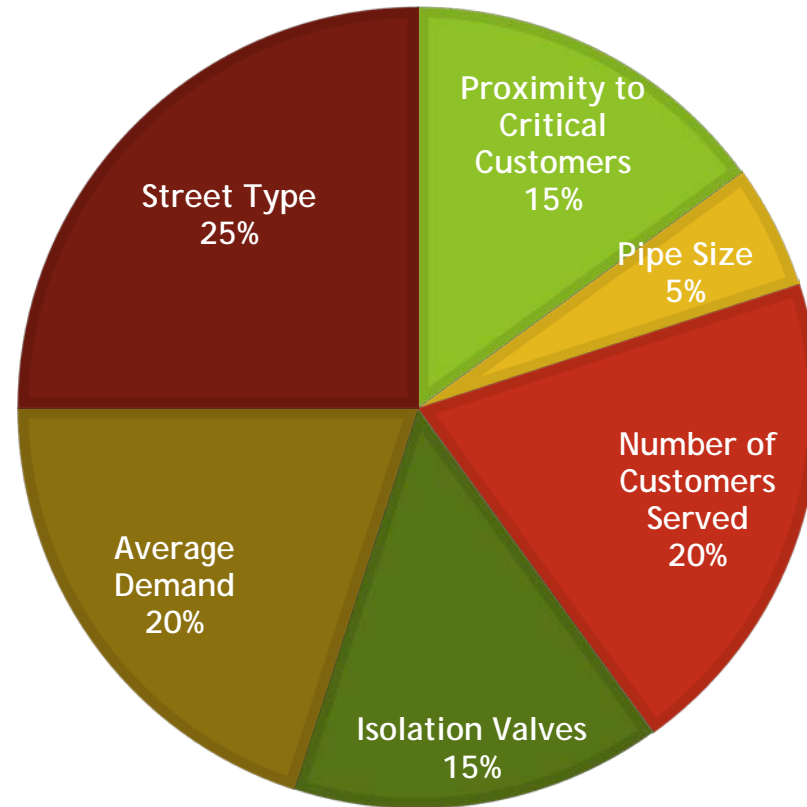
Criticality Assessment

Horizontal Assets

- ▶ Criticality to normal system operation
- ▶ Consequence of failure
- ▶ Determined using the Impact Score in CIP

Criticality Assessment

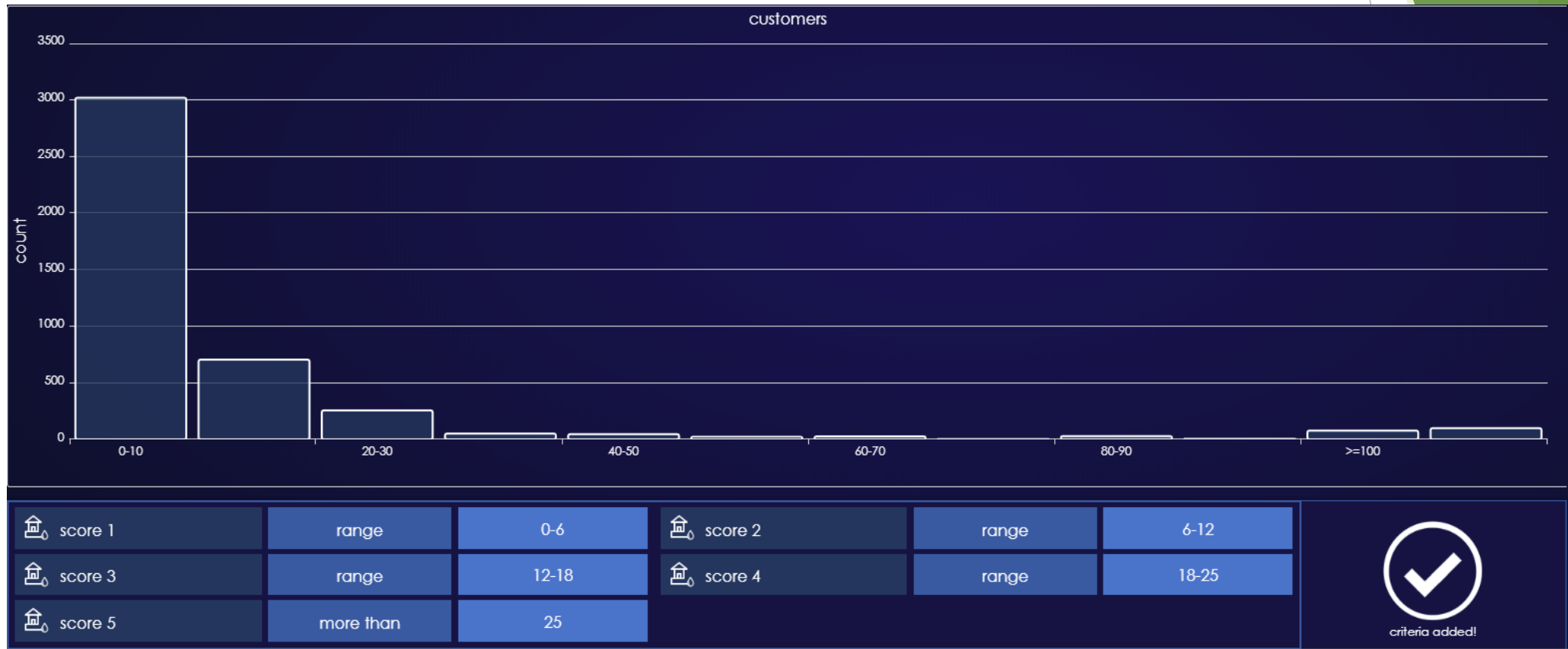
Horizontal Assets - Impact Score



Ranked each pipe from 1 to 5 (5 is most in need of upgrade)

Criticality Assessment

Horizontal Assets



Capital Improvement Plans - CIP

- ▶ With availability of Data streams can build real time models
- ▶ Field - Office Personnel - Superintendents - Engineering - Public Works
- ▶ Ties in all " Data Silos"
- ▶ Predictive and Pro-Active
- ▶ Better budgeting

Life Cycle Costs

What to ask?

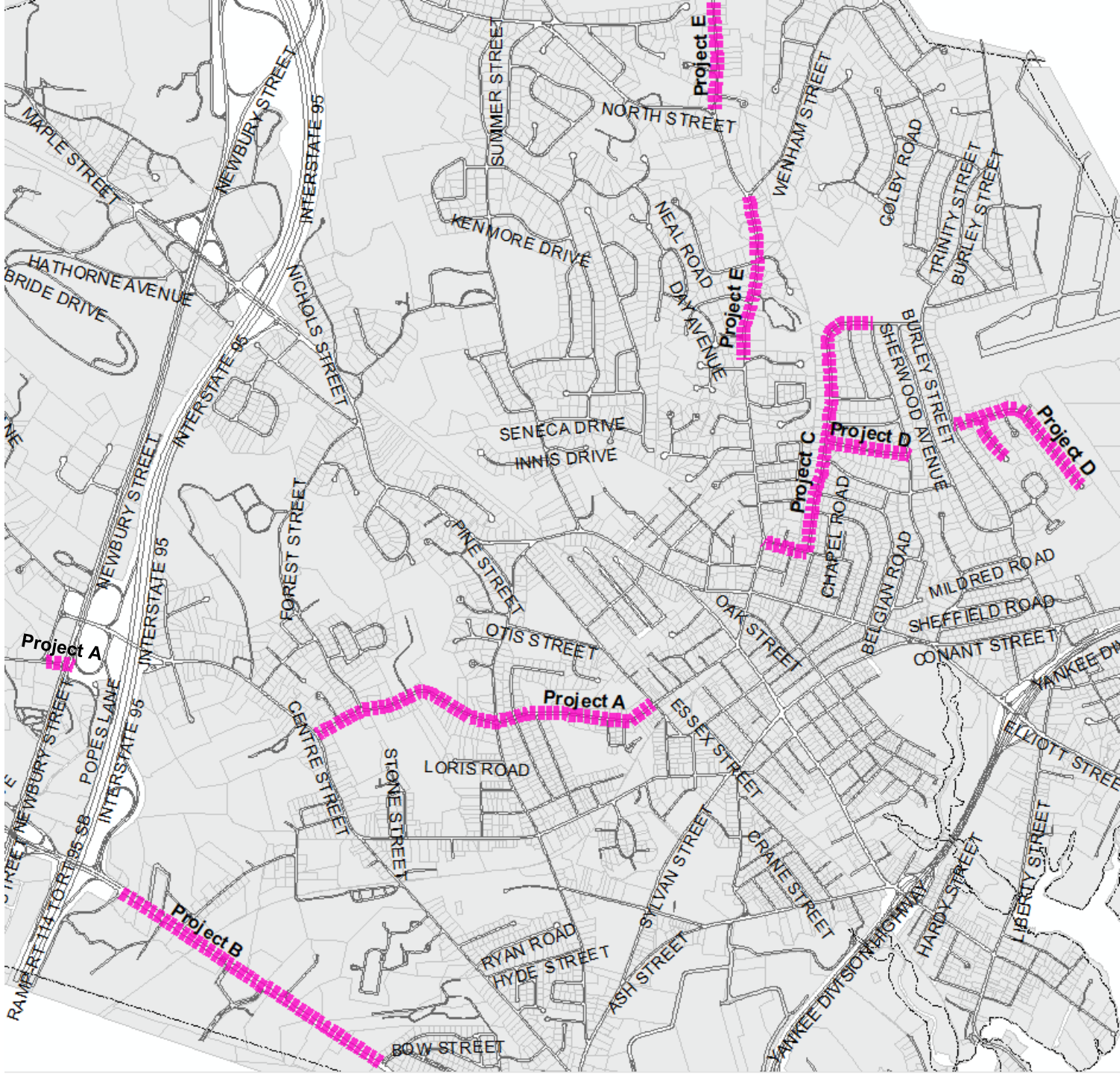
- ▶ What strategies existing for managing O&M, personnel and capital budgets
- ▶ Most feasible strategy
- ▶ What are the costs?

What to do.

- ▶ **Reactive to predictive maintenance**
- ▶ Rehab or replace?
- ▶ Life Cycle Costs
- ▶ Deploying personnel resources
- ▶ Develop a response plan

20-Year CIP Horizontal Assets

Phase 1
Years 1-5



20- Year CIP Phase 1										
Project	Street	Number of Breaks	Road Surface Rating (RSR)	Project Extents	Existing Size	Proposed New Size	Project Length (l.f.)	Replacement Cost per l.f.	Estimated Paving Cost	Projected Project Cost
Project A	Hobart St.	12	64	Centre St. to Pine St. Pine St. to Pickering St.	10-inch	12-inch	5300	\$380	\$290,900	\$2,304,900
Project A	Centre St.	1	80	Armory Rd. to Rt. 1	10-inch	12-inch	400	\$380	\$21,300	\$173,300
									Project A total	\$2,478,200
Project B	Andover St.	20	n/a	Interstate 95 to MacArthur Blvd.	8-inch	12-inch	4500	\$395	\$154,700	\$1,932,200
									Project B total	\$1,932,200
Project C	Cabot Rd.	12	58	Chestnut St. to Mass Ave.	8-Inch	12-inch	3500	\$405	\$232,700	\$1,650,200
Project C	Chestnut St.	0	64	Cabot Rd. to Locust St.	6-inch	12-inch	650	\$405	\$63,100	\$326,350
									Project C total	\$1,976,550
Project D	Cornell Rd.	3	11	Burley St. to end	10-inch	12-inch	2500	\$420	\$136,800	\$1,186,800
Project D	Oberlin Rd.	4	17	Cornell Rd. to end	8-inch	8-inch	700	\$255	\$33,700	\$212,200
Project D	Amherst St.	1	35	Cabot Rd. to Mass Ave.	6-inch	8-inch	1200	\$255	\$70,400	\$376,400
									Project D total	\$1,775,400
Project E	Locust St.	12	60	North St. to Holly Hill Wenham St. to Surrey Ln.	8-inch	12-inch	4000	\$500	\$193,900	\$2,193,900
									Project E total	\$2,193,900
									PHASE 1 TOTAL	\$10,356,250

Funding strategy

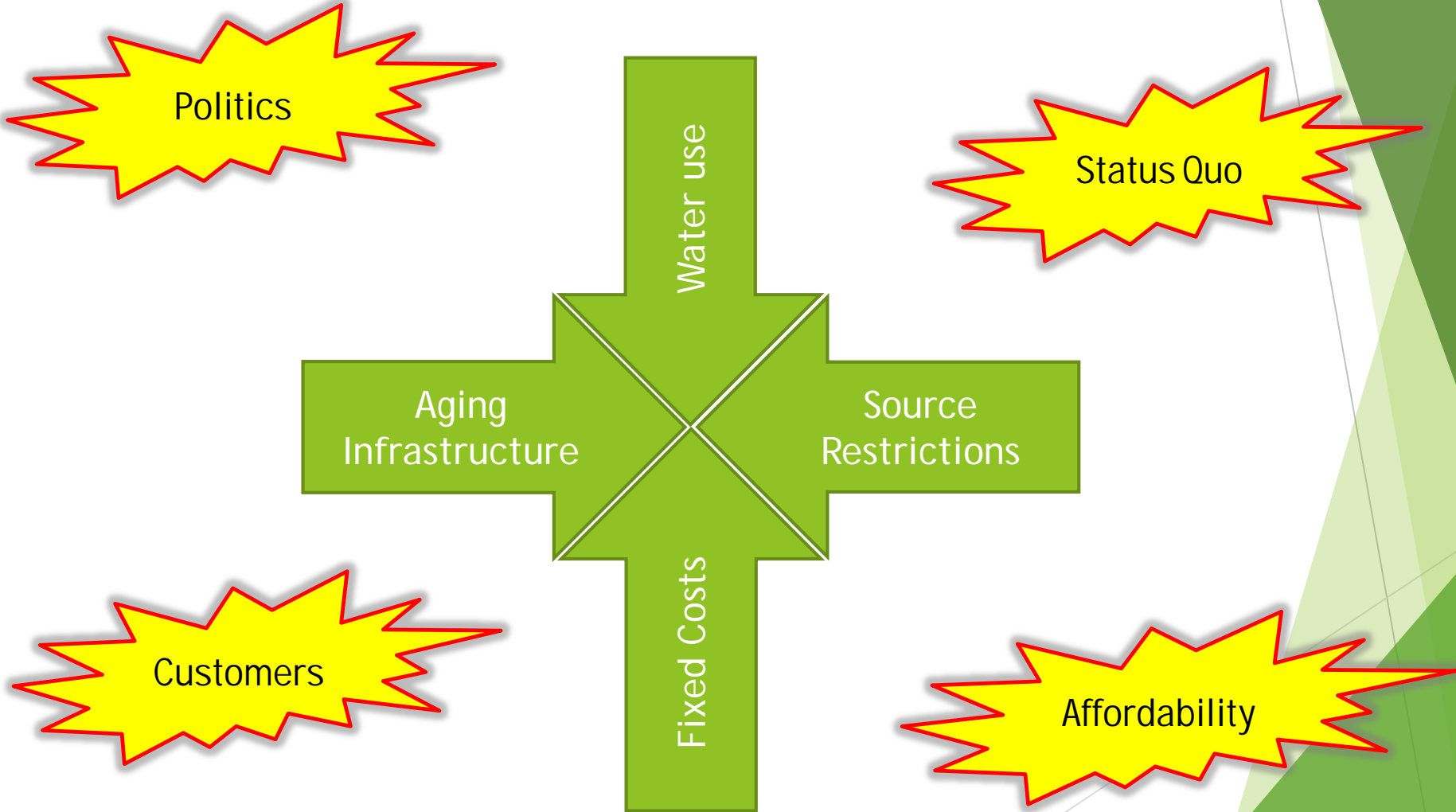
What to ask?

- ▶ Do we have enough funding to maintain our required level of services?
- ▶ Is our rate structure sustainable for our needs?

What to do.

- ▶ Revise the rate structure
- ▶ Funding from reserves
- ▶ Financing through borrowing or grants
- ▶ Test Meters
- ▶ Replace meters

CHALLENGES FACING WATER AND SEWER UTILITIES



THE PURPOSE OF WATER AND SEWER RATES

To provide a dependable and sustainable revenue source to support the full cost of service.

Full Cost of Service:

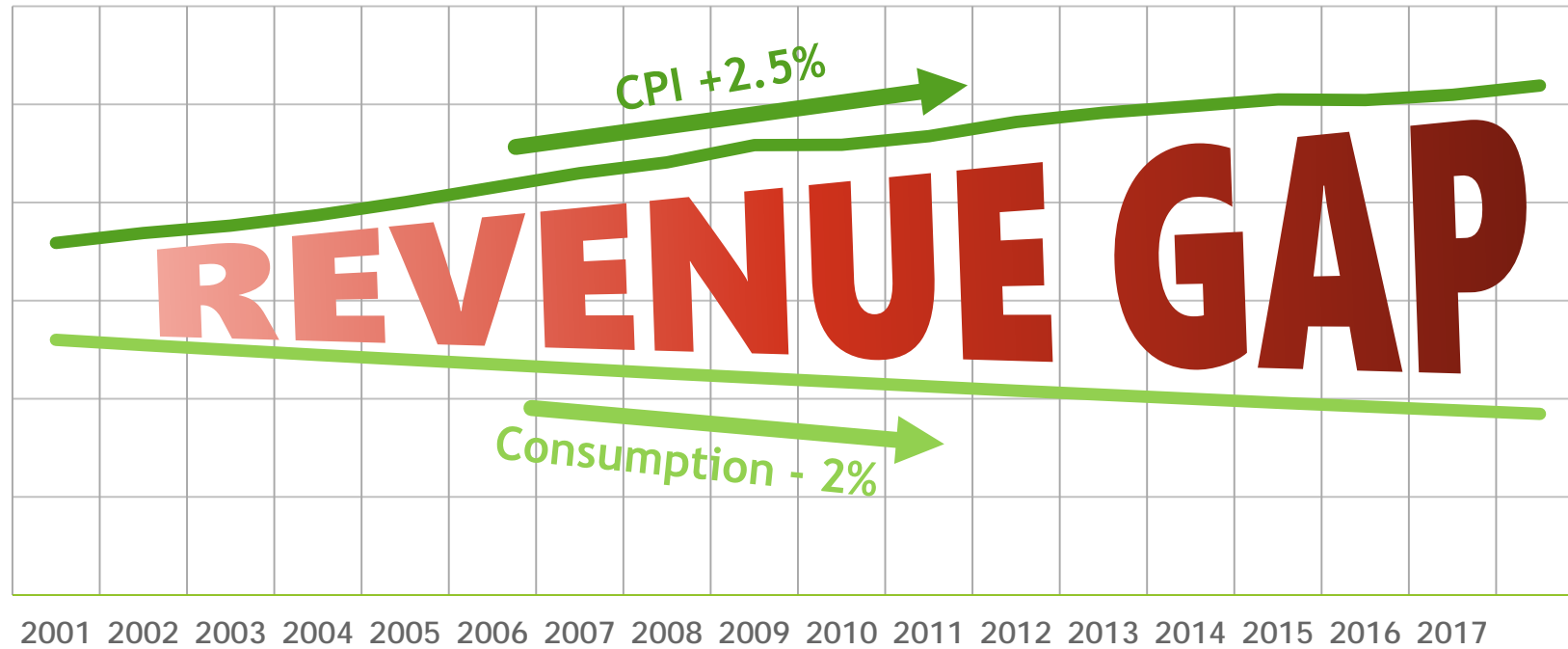
- All positions are filled
- All required operational duties being completed
- Full awareness of system needs and limitations
- Annual capital investment included in budgets

Capital Improvements are the single biggest driver of rate increases.

How to Fund Projects

- ▶ MassDEP Grants
- ▶ EPA Grants
- ▶ MassGov Grants
- ▶ Capital planning Budgets
- ▶ **Decreasing Unaccounted Water**
- ▶ **Increasing Water rates**

The consequences of decreasing consumption (doing nothing costs money)



Water Revenue - " a Tale of a City "

Water & Sewer revenues	\$ 17,800,000
Unaccounted for Water	24 %
AWWA Goal	10%
Finding the 14 %	\$ 1,5308,000
Water rate (normal)	\$ 11.40 100CF

Auburn Water and Sewer District C&I Meter Changeout

- ▶ Changed out 25 of their top accounts
- ▶ Saw an average of 20% increase in consumption for accounts
- ▶ Consumption in 1Q 2008 - 9,717,702
- ▶ Consumption in 1Q 2009 - 100,877,313
- ▶ Revenue is 1Q 2009 - \$125,524
- ▶ Revenue in 1Q 2009 - \$150,511
- ▶ Payback time for project = 2.2 months



AWWA Standards

- ▶ 5/8 to 1 " meter 15 - 20 years life
- ▶ 1 ½ & 2" Test every 5 years
- ▶ 3" Test every 4 years
- ▶ 4" and above Test Every year
- ▶ *** Commercial Meters usually represent 20% of revenue

Touch Read - 1985



- ▶ All Solid State
 - ▶ Digital Transfer of Data from Register to Billing Software
 - ▶ Highly Reliable
- ▶ Still Requires “Walking The Route”
 - ▶ Labor Costs
 - ▶ Wear & Tear on Vehicle
 - ▶ Safety Factors for Meter Reading People

Walk-By to Drive By

- ▶ Much Faster - Walk or Drive By House
 - ▶ Reduced Labor Costs



- ▶ Extremely Fast!
 - ▶ 500 to 1000 Readings per hour is typical
- ▶ More Frequent Readings Possible
 - ▶ Faster cash flow
 - ▶ Smaller incremental bills to customers
 - ▶ Reduces Delinquencies



Fixed Base Radio Reading

- ▶ No Labor for Reading Meters!
- ▶ Daily Readings Possible
 - ▶ Large Industrial Accounts
 - ▶ Water Leak Detections
- ▶ Cash Flow Improvements
- ▶ Water System Control
 - ▶ Compare Consumption with Production
 - ▶ Safest for Personnel

- ▶ 24 reads per day
- ▶ Intelligent data





iPERL Intelligent Alarms

- Alarms to monitor the application as well as the health of the iPERL

Available for reporting:

- Can detect
 - Reverse flow
 - Tamper
 - Empty pipe
 - Leak
- Lifetime alarms
 - 6 month
 - 1 month
 - Battery failure
- Condition monitoring alarms
 - High temperature
 - Low field
 - High current
 - Glide slope
 - ADC failure
 - Touchread failure
 - EMF range

DATA SILO - What do I do now?

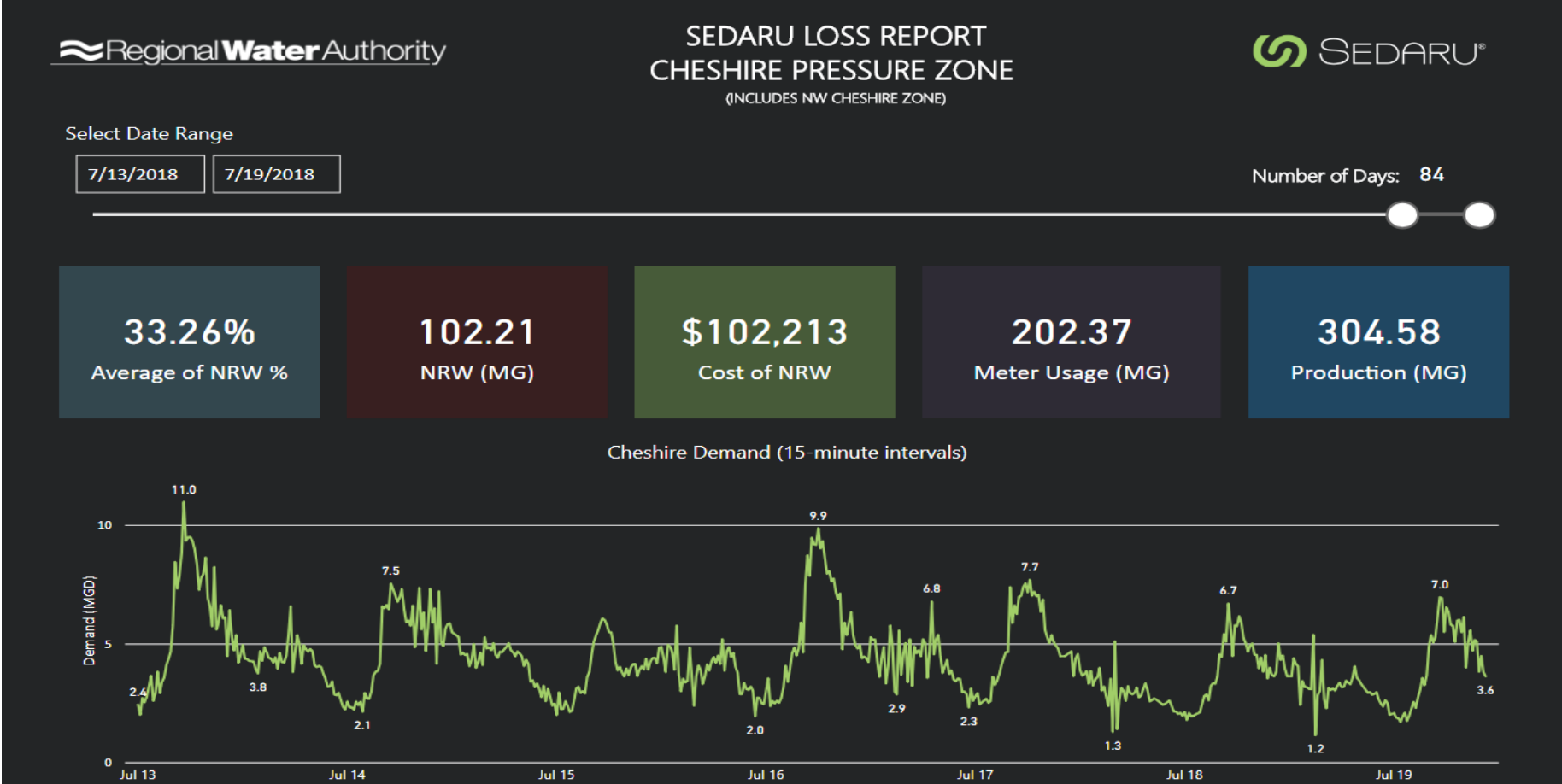
Data Received

- ▶ 24 reads per meter per day
- ▶ Leak detection
- ▶ Zero Consumption
- ▶ Backflows
- ▶ High Consumption

What to do?

- ▶ Gallons Used per day
- ▶ Identify and fix leaks
- ▶ Broken or theft?
- ▶ Safety in water system
- ▶ Major break?

Have a pro-active system for efficiency



Water Meters - Asset and Revenue

- ▶ Test your water meters
- ▶ Obtain wealth of data on a daily basis
- ▶ Be pro-active with your system
- ▶ Build your revenues
- ▶ Better Data throughout across all departments
- ▶ Evaluate water rates
- ▶ Build better Modeling
- ▶ Build better CIP's

- ▶ <https://www.mass.gov/files/documents/2017/01/wc/011717-costs-regulation-and-financing-of-mass-water-infrastructure-implications-for-municipal>
- ▶ <https://www.mass.gov/service-details/public-water-supply-tools-resources-performance-standards>
- ▶ <https://www.mass.gov/doc/residential-gallons-per-capita-day-spreadsheet>
- ▶ www.awwa.com

Thank you

The background features abstract, overlapping geometric shapes in various shades of green, ranging from light lime to dark forest green. These shapes are primarily located on the right side of the frame, creating a modern, layered effect against the white background.