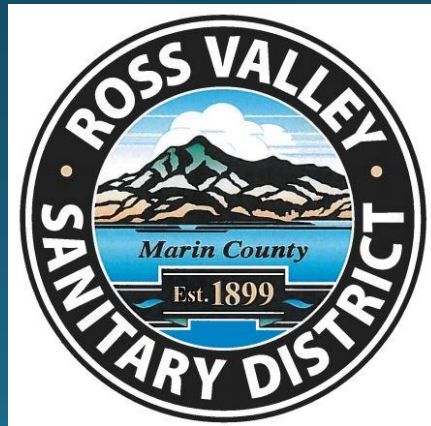


Collection Systems

Asset Management

Past, Present and the Future Path to Success



Ross Valley Sanitary District

Stephen Miksis

Operations & Maintenance Manager

smiksis@rvsd.org

System Challenges

- High I&I
 - Joints & manholes
 - Defects
 - Creeks/drainageways
- Difficult access
 - Narrow roads
 - Easements
 - Topography
- Structural condition
 - Age
 - Deferred maintenance



Regulatory Events

Pre-2006	Status quo
2006	Statewide WDRs
2006	Third party consent decree
2004-2007	Traditional master planning (SSRMP) Implementation progress
2009	River Watch settlement agreement
2012	RWQCB settlement agreement

Things Come to a Head

SSOs Major failures, high spill volumes

Condition Assessment

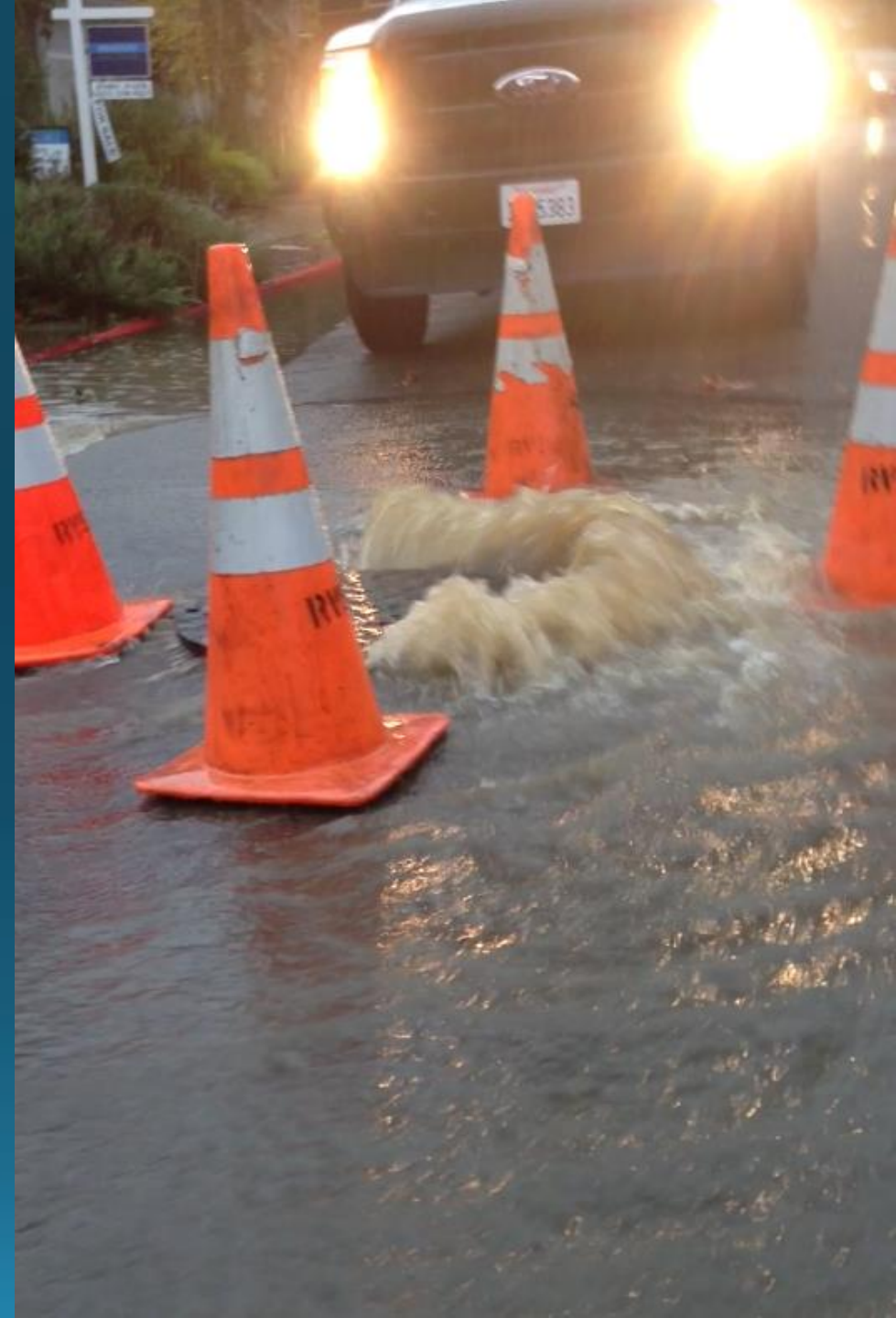
Knowledge of structural condition

Management/Political

Different visions and strategies

Financials FY 2013 Budget, Financing

Audit 2012 RWQCB and EPA Region 9



2013 Cease and Desist Order

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

CEASE AND DESIST ORDER NO. R2-2013-0020
REQUIRING THE

SANITARY DISTRICT NO. 1 OF MARIN COUNTY
(ALSO KNOWN AS "ROSS VALLEY SANITARY DISTRICT")

Tentative CDO

Traditional enforcement order

- Historical CIP projects within 5 years + Severe PACP
- >\$100 Million
- Not based in asset management

District response

Proposed asset management/risk-based

Final CDO

Incorporated asset management,
6 months to prepare Plan

IAMP

Reviewed and accepted by RWQCB

Asset Management in 5 Steps

1. Inventory

- Asset inventory

2. Define

- Condition Assessment

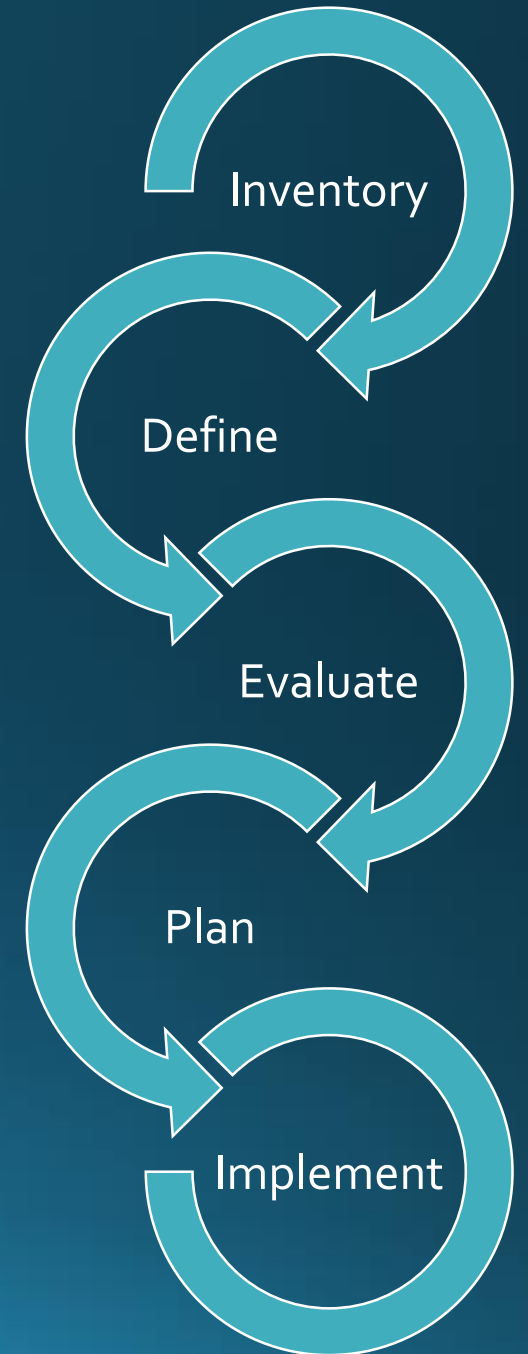
3. Evaluate

- Risk assessment

4. Plan

- Rehabilitation/replacement, Programs

5. Implement



What Does it Take?



- Competent and Trained Work Force
- Motivated Staff
- Latest Equipment and Technology
- Asset Management Software
- Mobile Apps
- Fleet Management
- Metrics
- Public Outreach
- Lateral Grant / Loan Program
- Aggressive Capital Program

Equipment And Technology

- 2 Vactor Ramjets
- 2 Harben Jetters
- 1 Vac Con
- 1 Aries Truck with Pipe Tech
- Envirosight Pole Camera
- Smart Cover Systems
- Multiple Push Camera Systems
- CIPP Repair Truck
- SL-Rat
- Etc...

- Coming SOON! IBAK Truck with Scanning Technology and WinCan



Powerful CMMS

- All Work Orders are in CMMS
 - Pipe Cleans
 - Pump Station Electrical / Mechanical
 - Pipe Repairs
 - Incident Reports
 - SSO's
 - CCTV
 - MACP
 - Lateral Inspections
 - GPS
 - Smoke Testing
 - Etc...

The screenshot displays the InfoNet Desktop software interface. The top window shows a map of a street network with various colored lines representing different types of work orders or assets. The interface includes a menu bar (File, Edit, Network, Selection, GeoPlan, Reports, Actions, Tools, Window, Help), a toolbar, and a sidebar with a tree view of the database structure. The bottom window shows a table with columns for ID, Node ID flushing from, Node ID flushing to, Date/Time planned, Date completed, Task status, Pipe Clean 6 Month, Team leader, Distance flushed (ft), Cleaning method, Debris Grit, Roots, and Grease.

ID	Node ID flushing from	Node ID flushing to	Date/Time planned	Date completed	Task status	Pipe Clean 6 Month	Team leader	Distance flushed (ft)	Cleaning method	Debris Grit	Roots	Grease
5610.0201_53634	5610.020	5610.010	04/01/2019 00:00	04/19/2019 13:04	COMP		LMC03	322.000	Jetting	Light	Clear	Light
5610.0101_53634	5610.010	5609.020	04/01/2019 00:00	04/19/2019 13:03	COMP		LMC03	240.000	Jetting	Light	Clear	Light
1555673271_5960.010_5942.090	5960.010	5942.090	04/19/2019 11:27	04/19/2019 11:45	COMP		CCTV	325.000	Jetting	Moderate	Clear	Clear
5628.0101_53634	5628.010	5611.010	04/01/2019 00:00	04/19/2019 11:20	COMP		LMC03	189.000	Jetting	Light	Clear	Light
5611.0101_53634	5611.010	5610.020	04/01/2019 00:00	04/19/2019 11:13	COMP		LMC03	450.000	Jetting	Light	Clear	Moderate
5611.0151_53634	5611.015	5611.010	04/01/2019 00:00	04/19/2019 10:59	COMP		LMC03	199.000	Jetting	Light	Clear	Heavy
1555663006_5960.030_5960.020	5960.030	5960.020	04/19/2019 09:18	04/19/2019 10:45	COMP		CCTV	350.000	Jetting	Light	Clear	Clear
5617.0101_53634	5617.010	5614.060	04/01/2019 00:00	04/19/2019 10:27	COMP		LMC03	330.000	Jetting	Light	Clear	Moderate
5617.0201_53634	5617.020	5617.010	04/01/2019 00:00	04/19/2019 10:26	COMP		LMC03	86.000	Jetting	Moderate	Light	Moderate
5617.0301_53634	5617.030	5617.020	04/01/2019 00:00	04/19/2019 10:24	COMP		LMC03	176.000	Jetting	Moderate	Light	Moderate
5618.0101_53634	5618.010	5617.010	04/01/2019 00:00	04/19/2019 10:22	COMP		LMC03	80.000	Jetting	Clear	Light	Clear
5622.0101_53634	5622.010	5614.080	04/01/2019 00:00	04/19/2019 08:37	COMP		LMC03	325.000	Jetting	Light	Clear	Light
5623.0101_53634	5623.010	5622.010	04/01/2019 00:00	04/19/2019 08:35	COMP		LMC03	345.000	Jetting	Clear	Light	Clear
155569029_8134.030_15_34	8134.030	15_34	04/19/2019 07:30	04/19/2019 08:26	COMP		CCTV	375.000	Jetting	Moderate	Clear	Clear
F210.0201_53634	F210.020	F210.010	04/01/2019 00:00	04/19/2019 08:12	COMP		LMC02	279.000	CCTV	NA	NA	NA
5703.0201_53634	5703.020	5703.010	04/01/2019 00:00	04/19/2019 07:26	COMP		LMC03	120.000	Jetting	Light	Clear	Clear
5630.0101_53634	5630.010	5615.010	04/01/2019 00:00	04/19/2019 07:25	COMP		LMC03	165.000	Jetting	Clear	Light	Clear
5703.0401_53634	5703.040	5703.020	04/01/2019 00:00	04/18/2019 13:20	COMP		LMC04	295.000	Jetting	Light	Clear	Light
5703.0221_53634	5703.022	5703.010	04/01/2019 00:00	04/18/2019 13:18	COMP		LMC04	37.000	Jetting	Light	Clear	Light
5703.0101_53634	5703.010	5700.020	04/01/2019 00:00	04/18/2019 13:16	COMP		LMC03	204.000	Jetting	Light	Clear	Light
1555589257_5811.030_5811.020	5811.030	5811.020	04/18/2019 12:07	04/18/2019 12:08	COMP		LMC04	205.000	Jetting	Light	Clear	Light
5811.0201_53634	5811.020	5811.010	04/01/2019 00:00	04/18/2019 12:06	COMP		LMC03	225.000	Jetting	Light	Clear	Light
5812.0101_53634	5812.010	5812.010	04/01/2019 00:00	04/18/2019 11:21	COMP		LMC03	390.000	Jetting	Light	Moderate	Light
5703.0601_53634	5703.060	5703.050	04/01/2019 00:00	04/18/2019 10:37	COMP		LMC04	177.000	Jetting	Light	Clear	Light
5703.0501_53634	5703.050	5703.040	04/01/2019 00:00	04/18/2019 10:32	COMP		LMC04	300.000	Jetting	Light	Clear	Heavy
5900.0802_53634	5900.080	5900.070	04/01/2019 00:00	04/18/2019 10:08	COMP		LMC03	54.000	Jetting	Light	Clear	Light
5900.0801_53634	5900.080	5900.070	04/01/2019 00:00	04/18/2019 10:07	COMP		LMC03	54.000	Jetting	Light	Clear	Light
5714.0221_53634	5714.022	5714.010	04/01/2019 00:00	04/18/2019 09:51	COMP		LMC04	130.000	Jetting	Clear	Clear	Light
5942.0701_53634	5942.070	5942.060	04/01/2019 00:00	04/18/2019 09:40	COMP		LMC03	180.000	Jetting	Light	Clear	Clear
5942.0601_53634	5942.060	5942.050	04/01/2019 00:00	04/18/2019 09:39	COMP		LMC03	145.000	Jetting	Moderate	Light	Light
5942.0101_53634	5942.010	5942.090	04/01/2019 00:00	04/18/2019 09:37	COMP		LMC03	305.000	Jetting	Moderate	Light	Light
1555653729_1213.020_1213.010	1213.020	1213.010	04/19/2019 06:02	04/18/2019 09:02	COMP		CCTV	115.000	Jetting	Clear	Light	Clear
1555576257_5230.080_5230.070	5230.080	5230.070	04/18/2019 08:30	04/18/2019 08:57	COMP		LMC04	220.000	Jetting	Heavy	Clear	Clear
1555653824_1213.040_1213.030	1213.040	1213.030	04/19/2019 06:03	04/18/2019 08:30	COMP		CCTV	150.000	Jetting	Clear	Light	Clear
1555576022_5230.090_5230.080	5230.090	5230.080	04/18/2019 08:27	04/18/2019 08:29	COMP		LMC04	230.000	Jetting	Light	Clear	Clear

Mobile Work Order Systems

- InfoAsset Mobile
- ArcGIS Explorer
- Survey 123
- ArcGIS Online
- SharePoint

InfoNet Mobile: V19.0.2 - RVSD Application - RVSD_Collection - [Map]

File Edit View Reports Application Forms Maps Tools Window Help

Home Map Schedule New Saved Completed Search

Report

- 1. Customer Ticket
- 02. Pipe Clean
- 4. Inspections
- 6. CCTV Survey Request
- 7. Pipe Repair
- 8. General Incident Report
- 9. Odor Complaint Report
- 10. Manhole Repair Reque
- 11. Manhole Repair WO
- 12. Map Change Request
- 13. Dye Test Report
- 13. MACP
- 14. Water Sampling
- 15. SSO Work Order
- 16. Sewage Release into B
- 18. USA Locator WO
- 19. Pump station Daily Che
- 20. Electrical Maintenance
- 21. Mechanical Maintenanc
- 24. General Maintenance
- FOG Report
- 23 - Smoke test
- 25 - Smoke defect observa
- 22. GPS
- 26. Acoustic

Map

- Collection - GPS survey
- Collection - Value

287 Survey Feet

X: 5978569.183159, Y: 2172780.9535, Scale: 1:2763.98, Zoom: [unreadable]

Server: rvsd There are errors with one or more server components.

Cleaning Matrix

Pipe Clean Matrix	Clear	Light	Heavy
Debris	No observable debris	One 5-gallon bucket	Two 5-gallon bucket Jet pipe segment until clean.
Grease	No observable grease	Milky white liquid with small pieces of grease	Large chunks of grease that fill more than one 5-gallon bucket
Roots	No observable roots	Any minimal sign of roots	More than half a 5-gallon bucket collected

Location Code

Flow After Cleaning

Flow Before Cleaning

Debris Grit

Distance To Any Resistance (ft)

Grease

Distance Cleaned (ft)

Roots

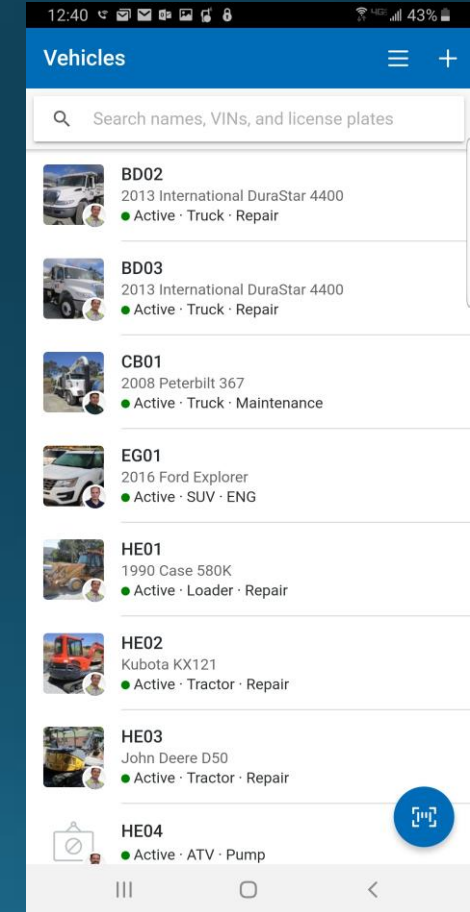
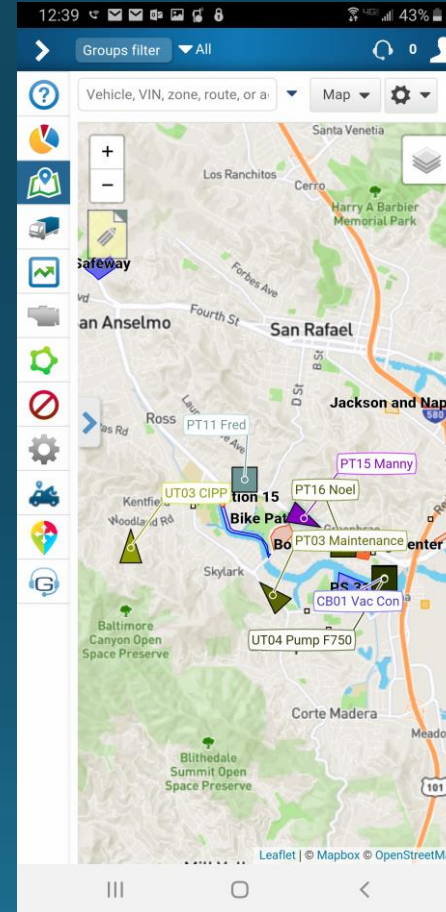
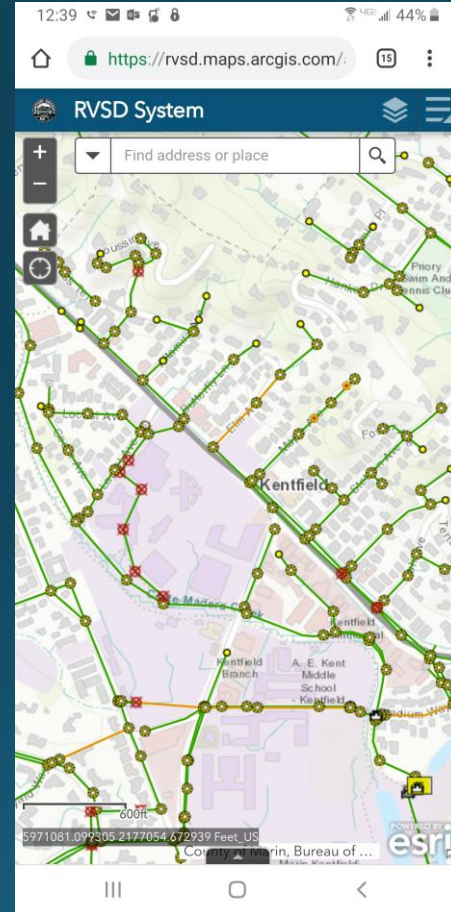
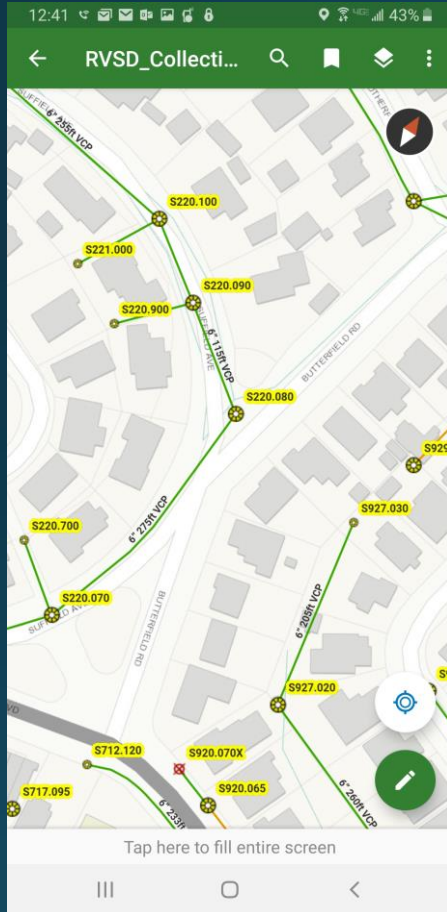
Number of Passes

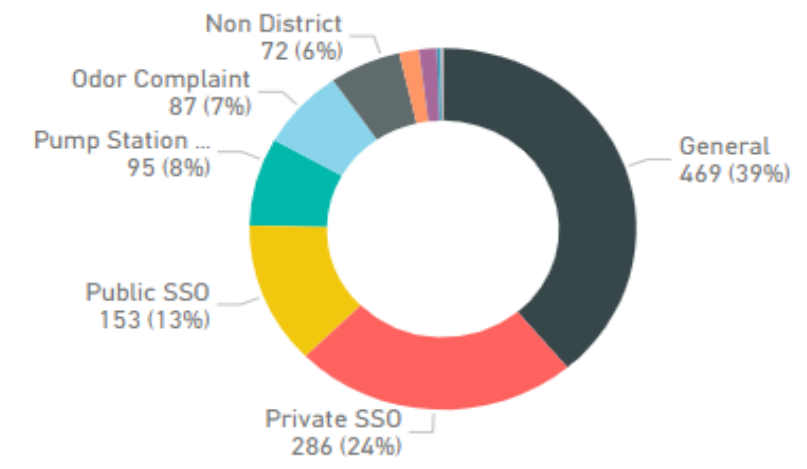
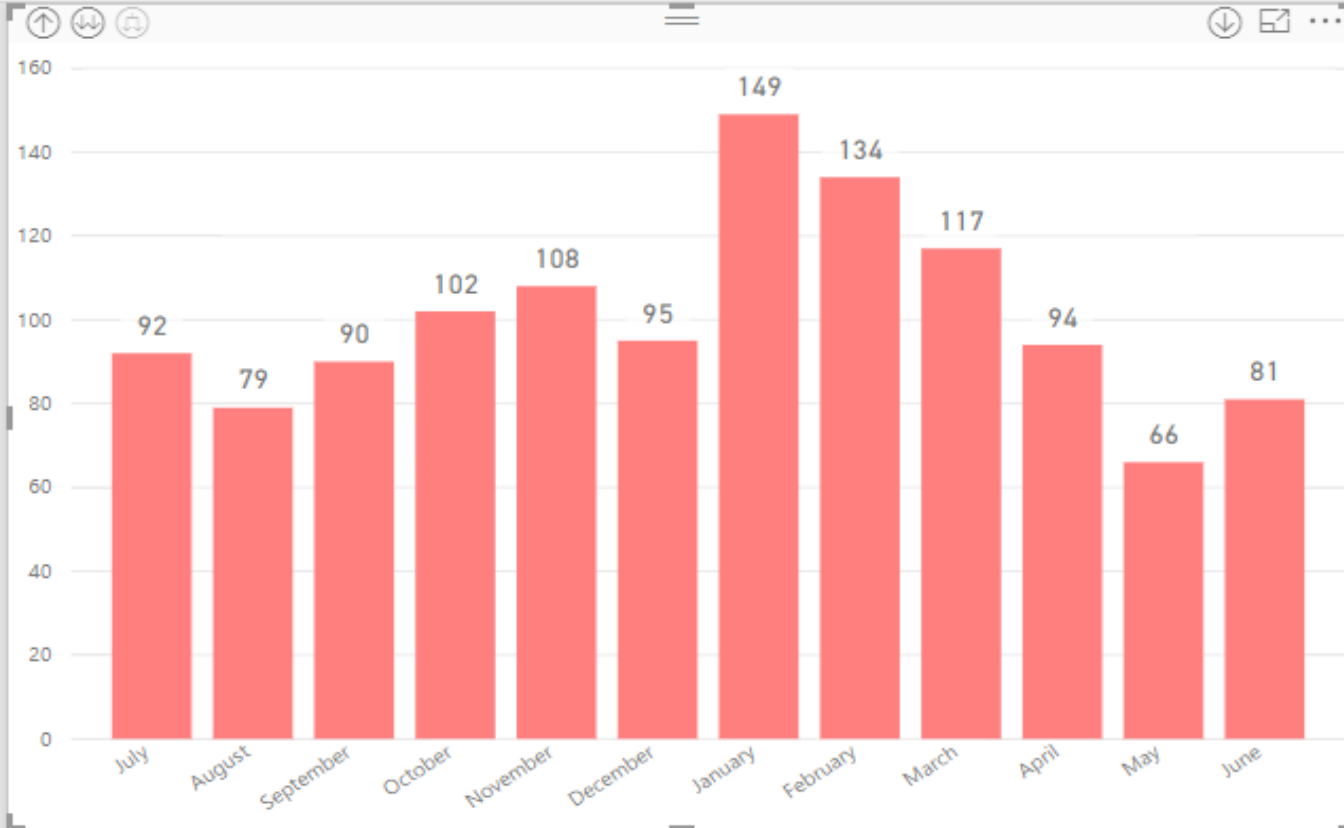
Full Length Pipe Clean

Cleaning Method

Easement Need Cleaning?

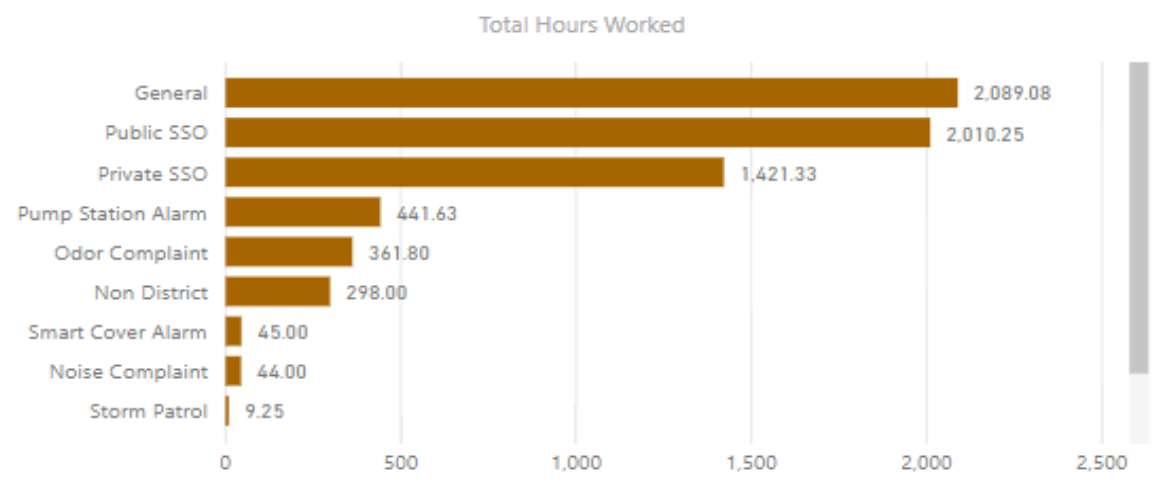
Mobile Apps for Operations





FY YY/YY	FiscalMonth	Count of Incident ID	Prior Year Incidents	Change in Incident
FY18/19	February	25	10	309
FY18/19	March	16	32	-509
FY18/19	April	5	19	-749
FY18/19	May		16	-1009
FY18/19	June		19	-1009
Total		1207	998	219

Resource_ID	Total Work Orders	Hours	Overtime	Double Time	GI Total Hours Worked
Rafael Zarco	507	1,072.70	170.50	6.00	1,249.20
Dale Olsen	352	503.87	412.50	22.00	938.37
Phill Marcantonio	180	167.95	299.75	12.50	480.20
Frank Sousa	183	380.40	31.00	21.00	432.40
Matt Jazuk	177	218.80	174.65	1.75	395.20
Noel Sandoval	129	86.40	287.10	14.00	387.50
Bruce Corlett	181	341.70	25.75	3.25	370.70
John Corids	145	273.25	88.75	6.50	368.50
Kevin Shine	168	303.96	5.00	1.50	310.46
Brady Stewart	120	180.50	74.50		255.00
Total	1207	4,645.84	1,977.00	105.00	6,727.84



Master Database

- RVSD System
 - RVSD
 - RVSD_Collection
 - RVSD MAINTENANCE USE
 - SRSD
 - JPA
 - SD2
 - RVSD Default Digitization Template
 - Queries
 - Selections
 - Validation
 - QA/QC pending
 - QA/QC completed
 - Miksis
 - Hayden
 - Vogel
 - Repairs completed FY 2015/16 by crews
 - Flow Monitoring
 - Smart Cover TVD
 - W531.010_532 Woodland Dr Flow Meter
 - Summary Report
- Themes
- Dashboards
 - Queries (Dashboard)
 - O&M
 - Crews Last Month
 - Temp
 - CDO
 - CCTV
 - Repairs
 - Test
 - Graphs
 - Layouts (Windows)
 - Layer Lists (Backgrounds)
 - Archive
 - InfoNet Mobile Validation Test
 - Corte Madera System
 - Recycle Bin (246)

O&M - 4/22/2019 1:32:14 PM

262

EMM Overdue (Count)

52968.00

EMM Overdue (Footage)

1316.00

EMM No CCTV

Cleaning Previous Month

Cleaning Past 4 Weeks

Cleaning Previous 3 Months

Clean 0-6

Cleaning Last Month

MONTH	TEAM LEAD	FOOTAGE
03/2019	CCTV	16635.00
03/2019	DWEEKS	294.00
03/2019	HFC02	10529.00
03/2019	LMC01	9936.00
03/2019	LMC02	1399.00

Cleaning -2 Months

MONTH	TEAM LEAD	FOOTAGE
02/2019	CA Sup	160.00
02/2019	CCTV	15974.00
02/2019	DWEEKS	245.00
02/2019	HFC01	1552.00
02/2019	HFC02	12415.00

Cleaning -3 Months

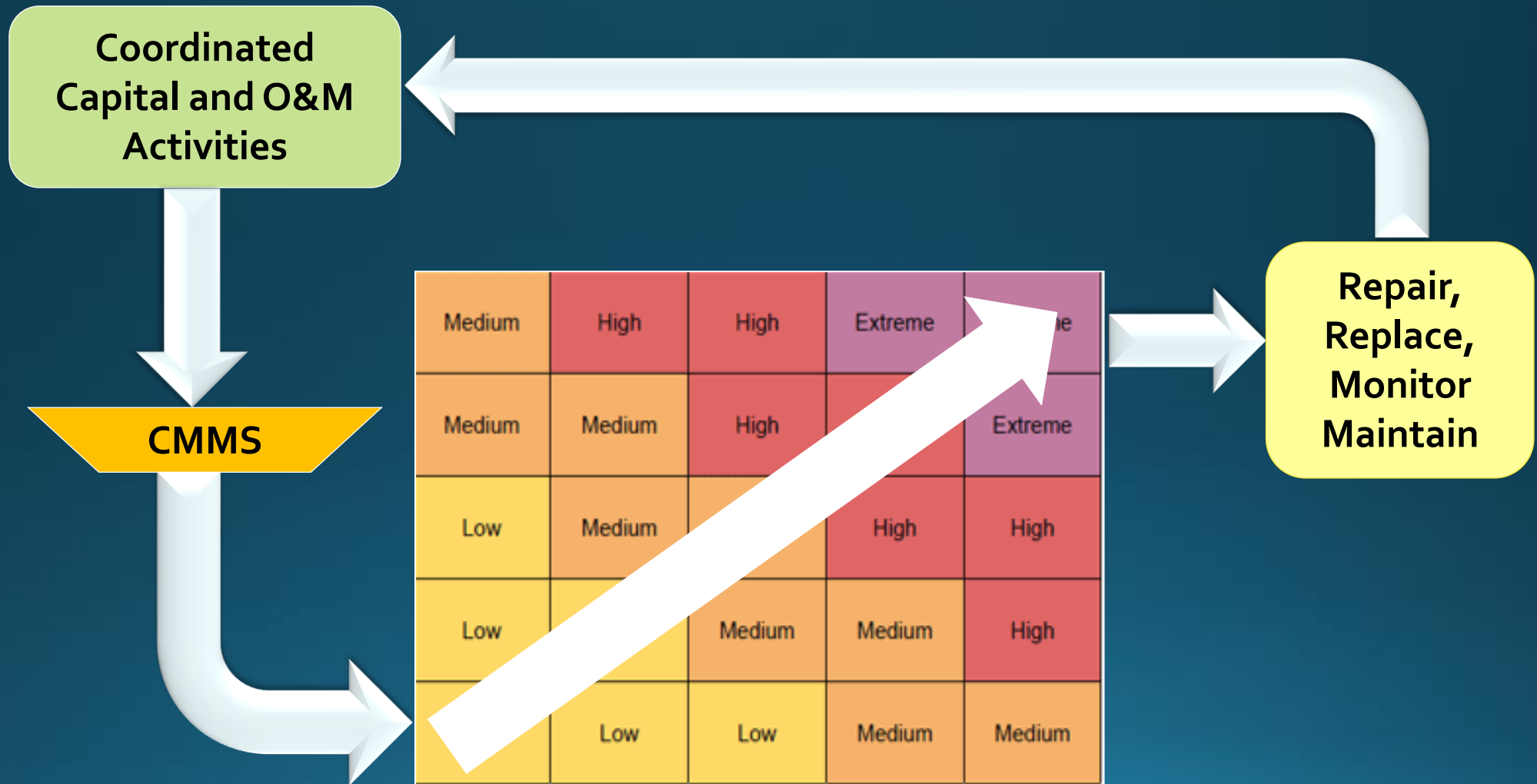
MONTH	TEAM LEAD	FOOTAGE
01/2019	CCTV	16993.00
01/2019	DWEEKS	140.00
01/2019	HFC01	3861.00
01/2019	HFC02	11345.00
01/2019	LMC01	13029.00

CCTV Last Month

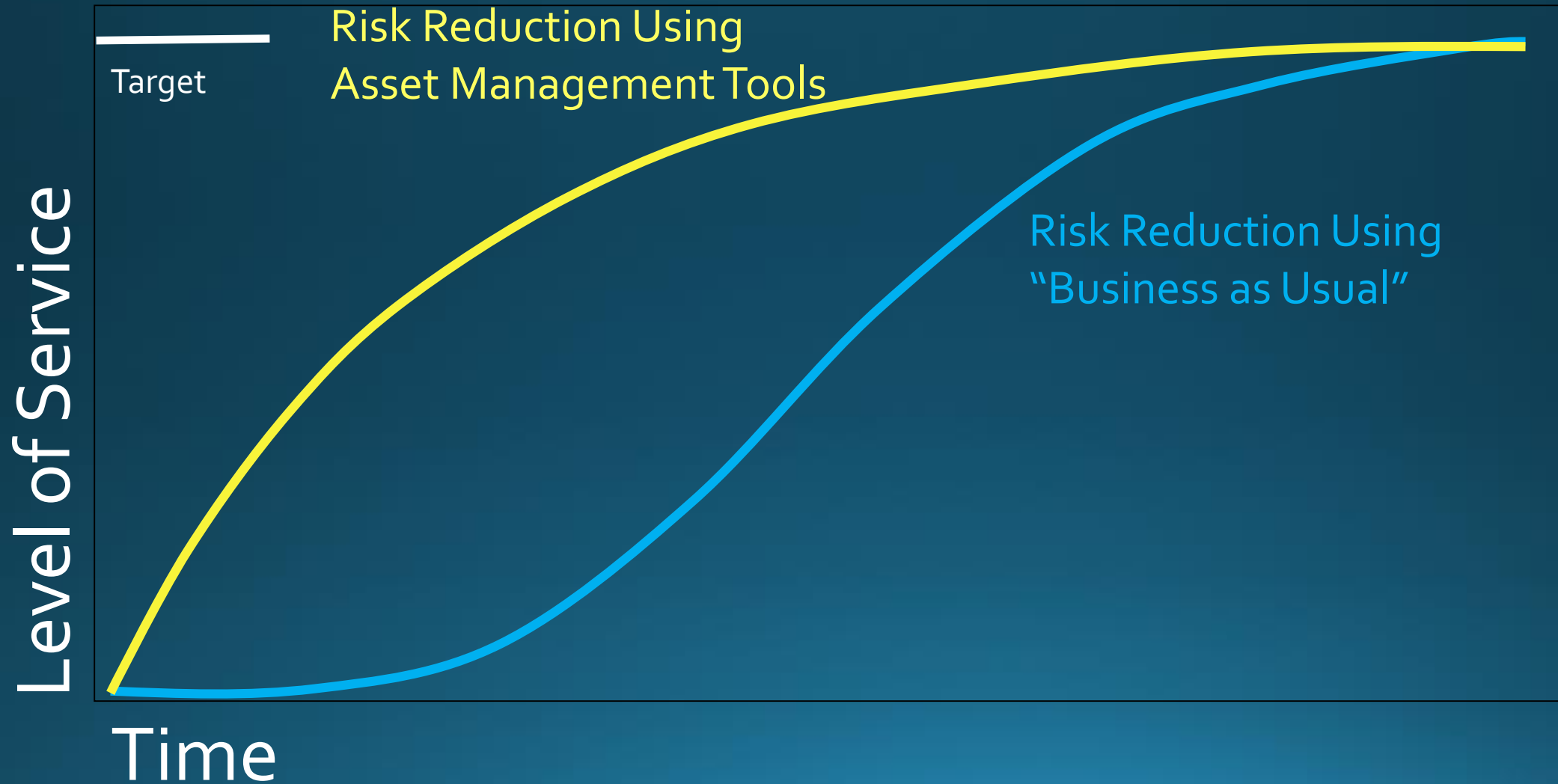
CCTV Previous 12 Months

CCTV Current to Date

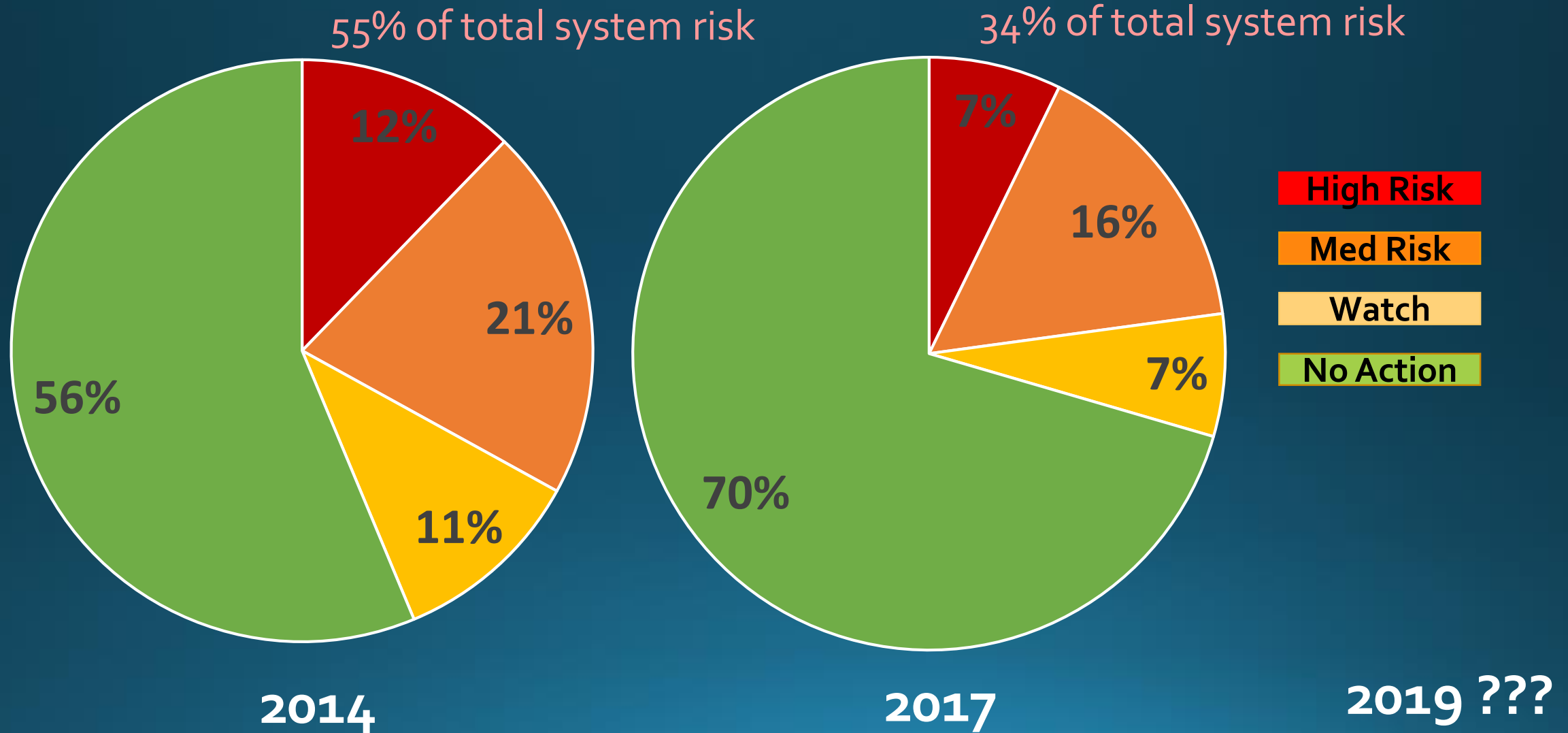
Risk Model Approach



Asset Management vs Traditional



Risk Reduction



STOP CLOGGING YOUR PIPES!



Flush only toilet paper.



Scrape food scraps & cooled grease in the garbage.

Public Outreach with Asset Management

- Brochures
- Commercials
- Online Advertising
- Public Engagement
- Door Hangers
- KPI's



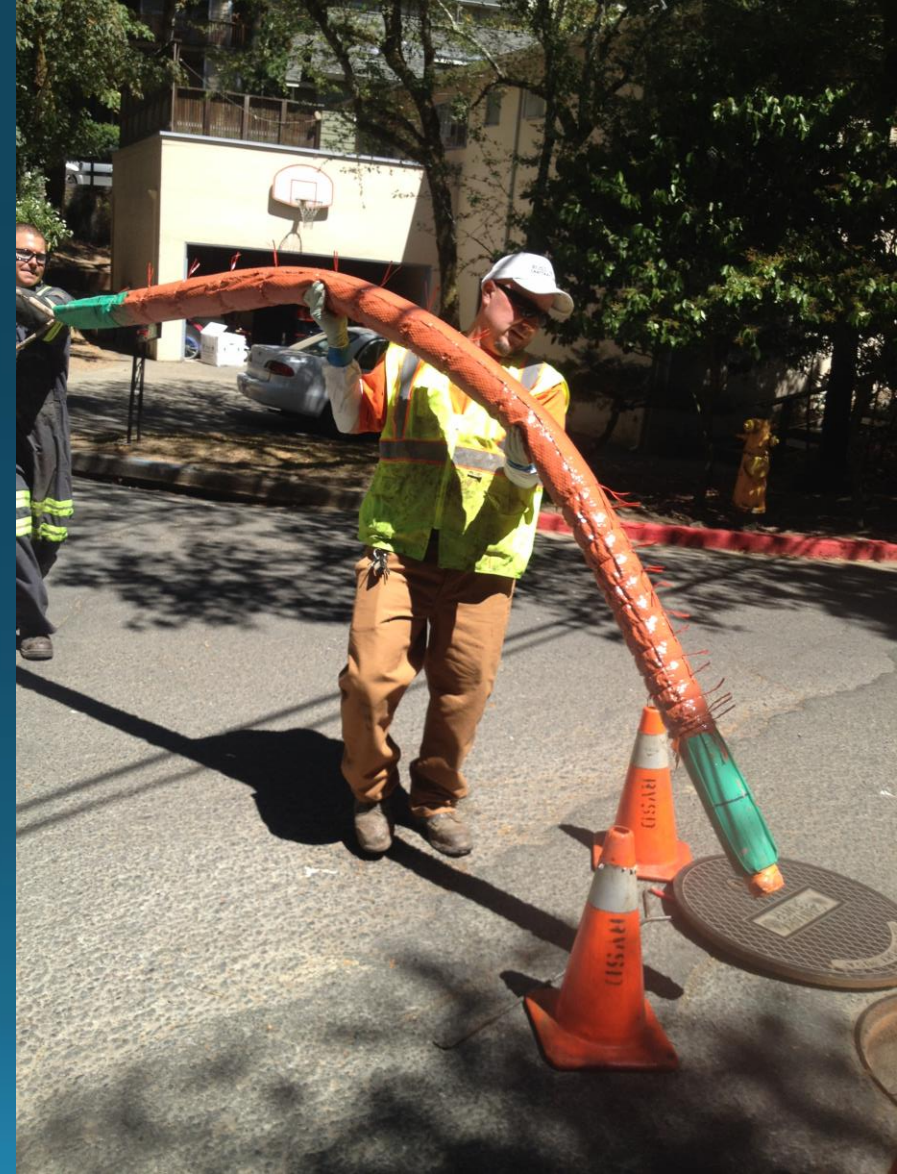
VIDEOS PROUCED

- FOG Video
- Pharmaceutical Video
- Flushable Wipe Video
- Lateral Grant Video
- Sump Pump Video



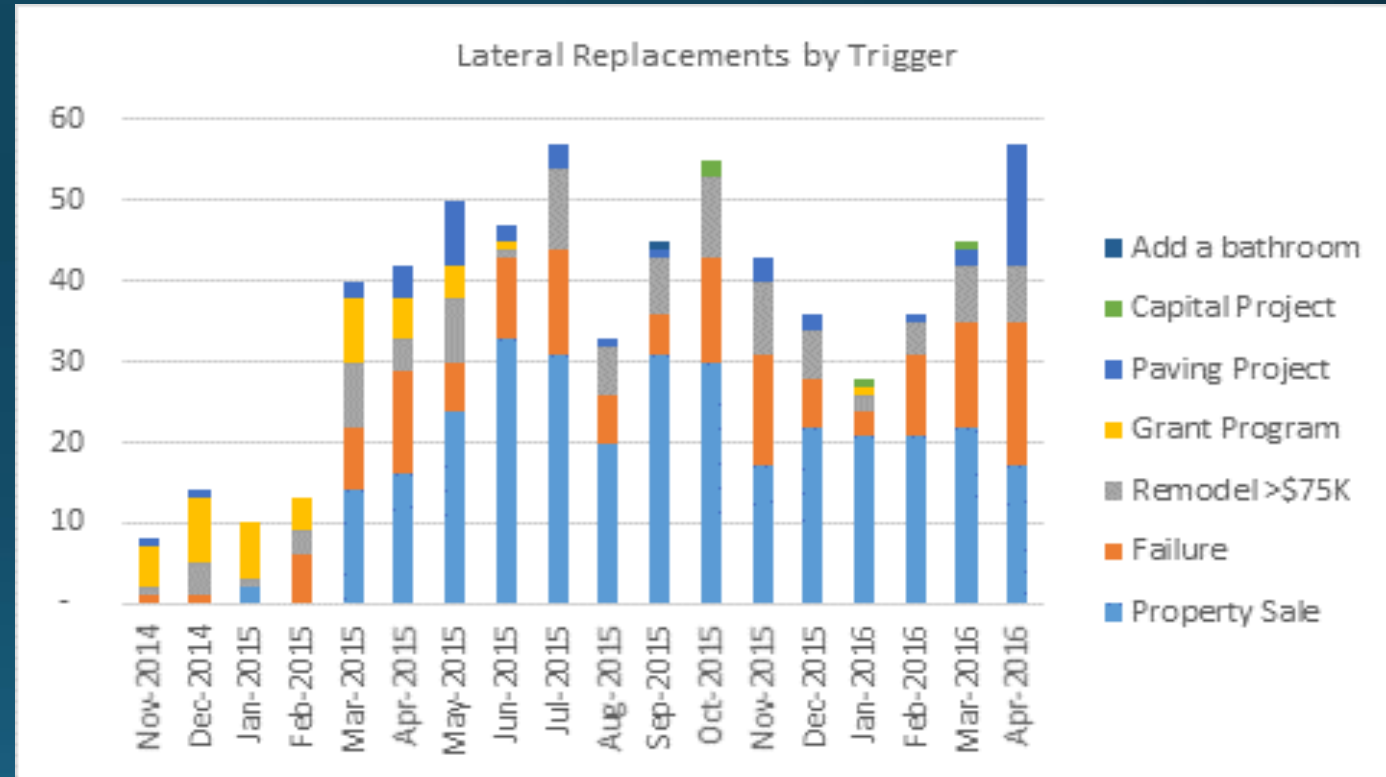
Capital Program Progress

- \$12M capital projects first 2 years
- Restored >10 miles
- \$70M in design or construction
- Project delivery efficiencies
- Integrated in-house > 2,400 repairs



Private Sewer Lateral Progress

- Lateral ordinance point of sale, permit triggers
- Replacements increased from 150-200 to 500-600 per year
- Local government paving program coordination
- Integrating into CMMS



Exceeded CDO Requirements

- ✓ Average annual rehabilitation of 4 miles **6.6 miles**
- ✓ Consider a Lateral Ordinance **Adopted Ordinance**
- ✓ Sufficient financial resources **5-year rates, bonds**
- ✓ Complete IAMP and SSMP Documents **IAMP and SSMP**
- ✓ Complete Infrastructure Assessments **Pump stations, force mains, large diameter**

Lessons Learned - Asset Management

- Regulatory Acceptance = Don't Be Afraid to Ask
- Data Driven = Need Good Data, Systems, Analysis
- Dynamic Process = Follow Up and Adjust
- Performance-Based = Apply the Best Method
- Scalable = Small and Large Systems

Lessons Learned - Resources

Invest in People= Knowledge, Skills and Abilities

Invest in Tools = New Tools and Software

Be Realistic = Goals, Timelines, Training, Day-to-Day

Collaborate = Regulators, Local Agencies (CSOTF),
Consultants, Software Companies,
Vendors, Board

Get Help = Experts, as-needed technical, other
agencies have similar approaches and
experience, regional resources
(MarinMap, BAYWORK)

Lessons Learned - Leadership

- Be Consistent = Hold your vision, keep everyone on track
- Buy In = Share vision, information, involve staff in decisions, listen and adjust
- Change = Cultural shift across every level of organization
- Take Stock = Realize how far you've come and share
- Stakeholder Support = Communicated value of asset management approach

Questions?