US-EPA FOG ABATEMENT & EMERGING POLLUTANTS TRAINING:

EFFECTIVE FOG & EMERGING POLLUTANTS ABATEMENT PROGRAM IMPLEMENTATION

USDA Rural Development
U.S. DEPARTMENT OF AGRICULTURE

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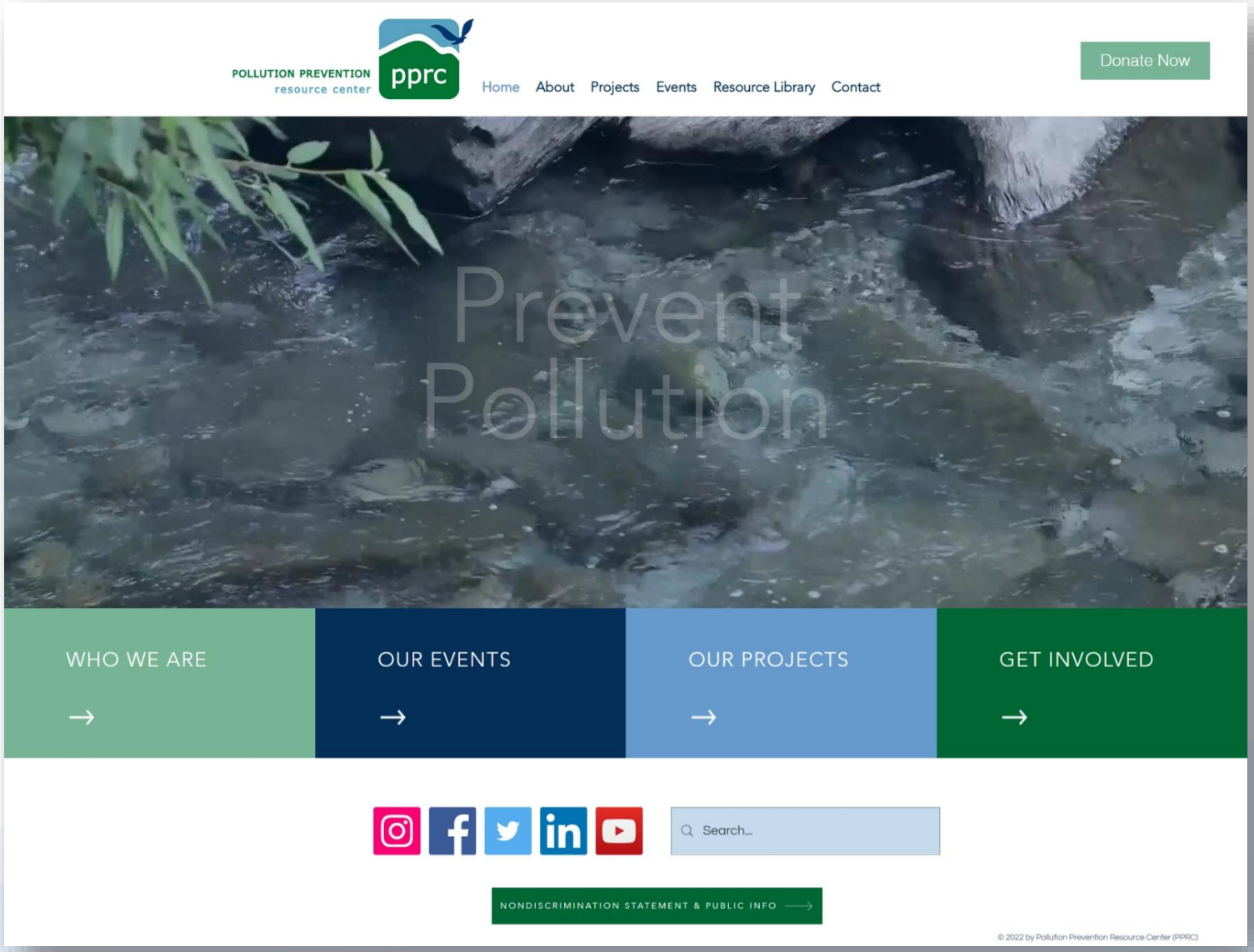

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As part of our mission to provide unbiased information, WSA offers this resource library containing factsheets, videos, case studies, and other useful resources. The resource library is updated regularly and can be searched by clicking the categories below or entering key words in the search bar at the top of this page.

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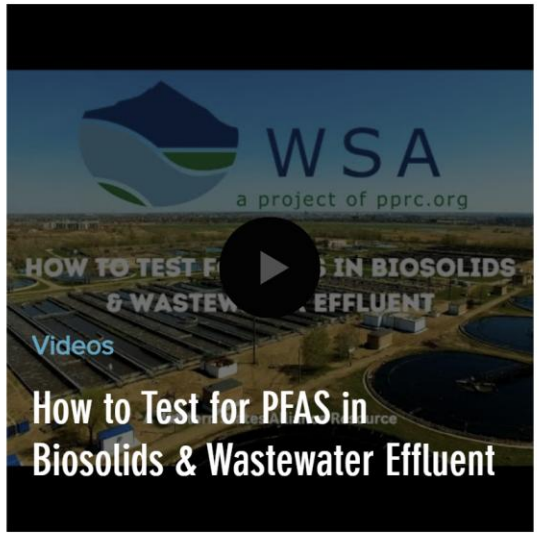

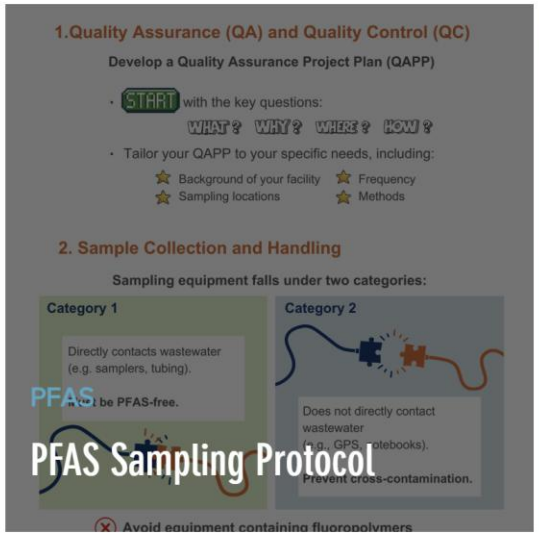

FOG PRESENTATION TEAM MEMBERS & PEER REVIEWERS

Clayton Brown	Pollution Prevention Resource Center
Patrick Bryan	
Vincent Chavez	Western States Alliance
Arjen DeHoop	
Lauren Huey	Oregon ACWA
Ken Loucks	
Jill Hoyenga	AZ-FOG
Ken Grimm	
Michael O'Dwyer	APWA Pre-FOG
Andria Swann	
Ed Gilmore	R8PA
David James	
John Harland	NACWA
Jean Waters	
Jude Brown	CIPCA

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EMERGING POLLUTANTS PRESENTATION TEAM MEMBERS & PEER REVIEWERS

- Clayton Brown
- Jude Brown
- Patrick Bryan
- Arjen DeHoop
- Ken Grimm
- Ed Gilmore
- David James
- John Harland
- Jean Waters

- Pollution Prevention Resource Center
- Western States Alliance

TRAINERS:

Clayton Brown
Jude Brown
Patrick Bryan
Arjen DeHoop
Ed Gilmore
Ken Grimm
David James
Jean Waters

MORNING

BUILDING THE BUSINESS CASE

PROGRAM IMPLEMENTATION

FOG Program - Building a Business Case

- Establishing the Need For A FOG Program
- Data Needed
  - Excess Operation & Maintenance Costs
  - Program Development Costs - Planning
  - Program Development Costs – Initial Implementation

FOG Program - Implementation

- Data Acquisition and Management
- Cost-Benefit Analysis
- FOG Program Plan
- Setting FOG Program Outcomes/Outputs
- Legal Authority
- Stakeholder Engagement
- FOG Triage

AFTERNOON

PROGRAM IMPLEMENTATION

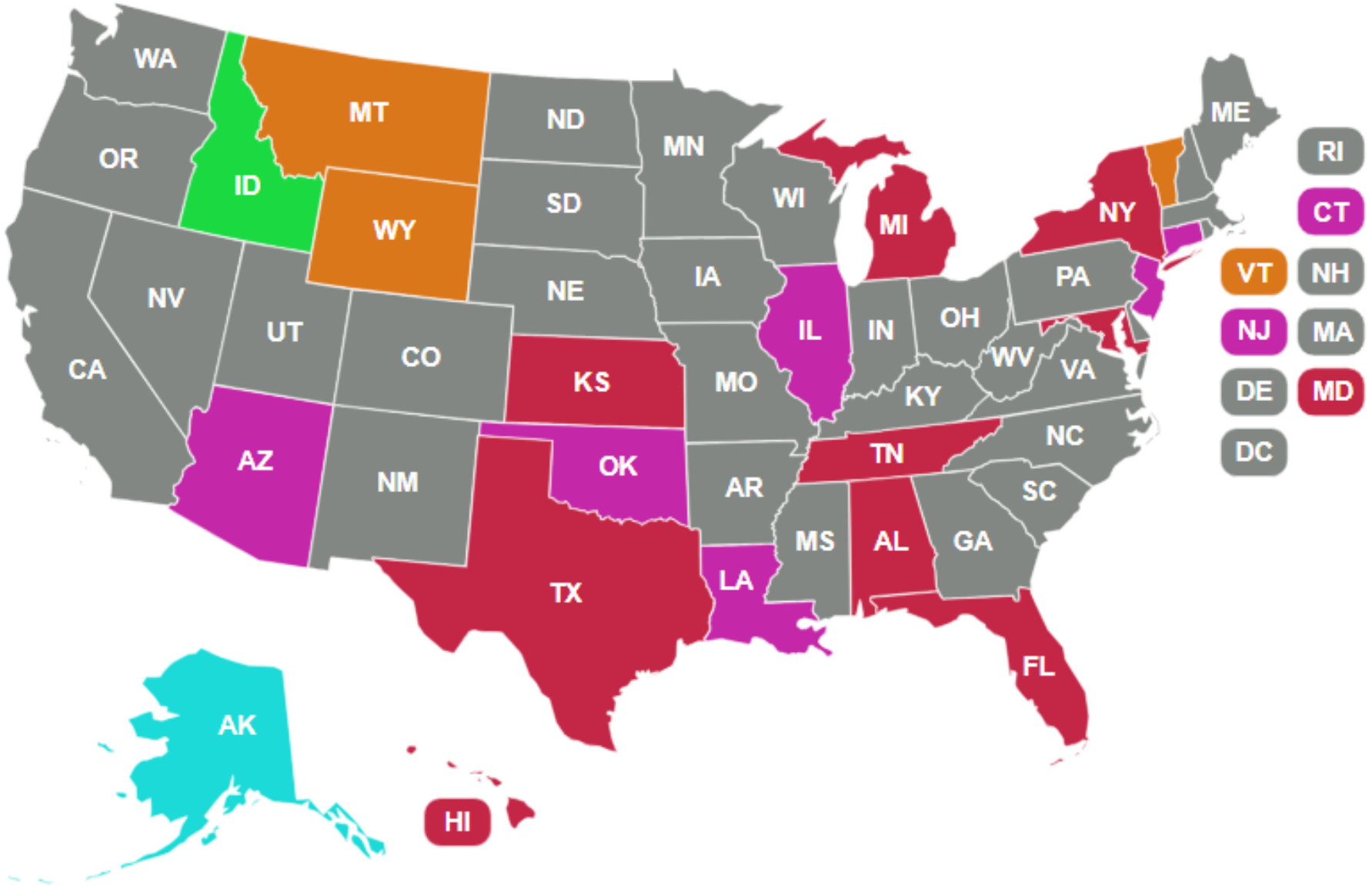
- FSE FOG MANAGEMENT PRACTICES
- PUBLIC OUTREACH
- FSE EFFECTIVE FOG PRETREATMENT
- FOG AND WATER SEPARATION
- GREASE REMOVAL DEVICES (GRD)

- FSE INSPECTIONS
- PREFERRED PUMPER PROGRAMS
- CONTAMINANTS OF EMERGING CONCERN AND PFAS

WHY ARE WE TALKING ABOUT FOG?

- What are fats, oils, & grease (FOG)?
- Why fog is a concern/issue
- FOG is a prohibited discharge
- FOG can result in prohibited sewer overflows & ENFORCEMENT
- Fog costs cities alot of money to control

Examples of FOG issues in states



Red: Active Consent Decrees

Pink: SSOs

Orange: Maintenance due to FOG

Blue: Grease trap non-compliance

Green: educational initiative

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FOG CHARACTERISTICS

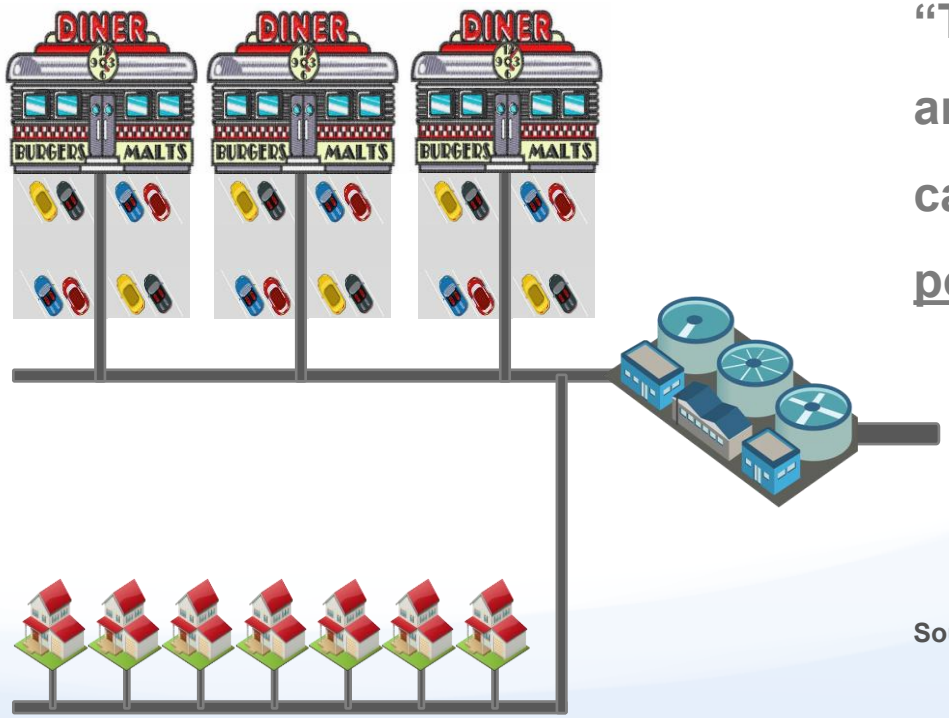
Yellow Grease vs Brown Grease

- Yellow grease fryers, recovered from grease recovery devices can be recycled/reused
- Brown grease material removed from grease traps and interceptors

Polar and Non-Polar

- Polar: animal or vegetable origin
- Non-Polar: petroleum or mineral origin

FOOD SERVICE ESTABLISHMENT FOG PRODUCTION



"The annual production of collected grease trap waste and uncollected grease entering sewage treatment plants can be significant and ranges from 800 to 17,000 pounds/year per restaurant."

Source:

Controlling Fats, Oils, and Grease Discharges from Food Service Establishments National Pretreatment Program, Office of Water, EPA-833-F-12-003, September 2012

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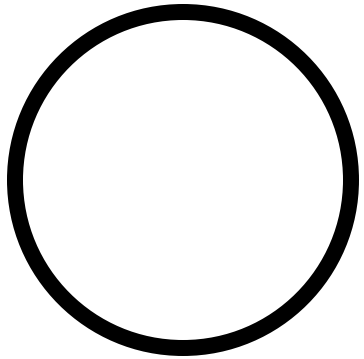
FOG Accumulation Reduces Pipe Capacity

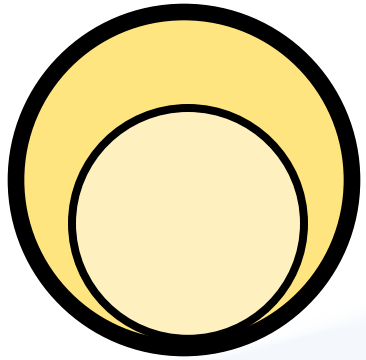
Gravity flow, low pressure, 2 f/s

New Condition



78 GPM

Critical Stage

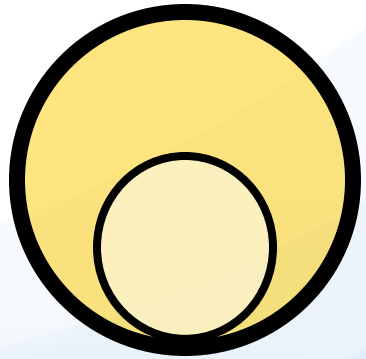


3 Inches

44 GPM

~ 45 % Reduction in Flow

Failure Stage



2 Inches

20 GPM

~ 75 % Reduction in Flow

Adapted from Neal Klimek, Know Grease LLC

ESTABLISHING THE NEED FOR A FOG PROGRAM

What are the regulatory/health drivers and problems/costs that drive the decision to establish AND MAINTAIN a fog program?

Clean Water Act

FEDERAL EPA created, 1970

Clean Water Act, 1972 & National Pollution Discharge Elimination Systems (NPDES) Program

⇩

STATE AND REGIONAL GOVERNMENT

⇩

COUNTY/CITY REGULATIONS

⇩

YOU/ME

NEED FOR A FOG PROGRAM

FOG is a Prohibited Discharge

Causes illegal sanitary sewer overflows (SSOs)

- Human and Environmental Health
- Regulatory Compliance

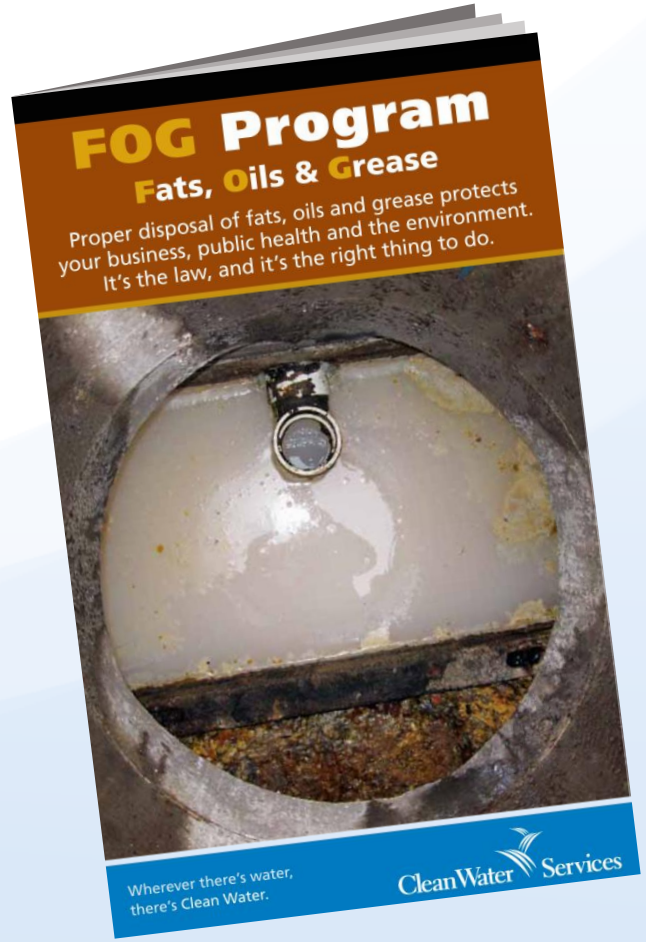
FOG COSTS UTILITIES A LOT OF MONEY

Increased Maintenance and Operational Cost

- Collection System Cleaning
- Pump Stations
- Treatment Plants
- Treatment Capacity

FOG Program Desired Outcomes

- Protect public health and the environment
- Comply with State and Federal Regulations
- Cost effective, data driven program
- Reduce Impact of FOG on Collection System and Wastewater Treatment Plant O&M Costs (CMOM)



What is Capacity, Management, Operations & Maintenance (CMOM)?

- Voluntary or Mandatory
- EPA believes CMOM should be considered by most utilities
- A framework for municipalities to identify and incorporate practices to:
  - Better manage, operate, and maintain collection systems.
  - Investigate capacity and constrained areas of the collection system.
  - Respond to sanitary sewer overflow (SSO) events

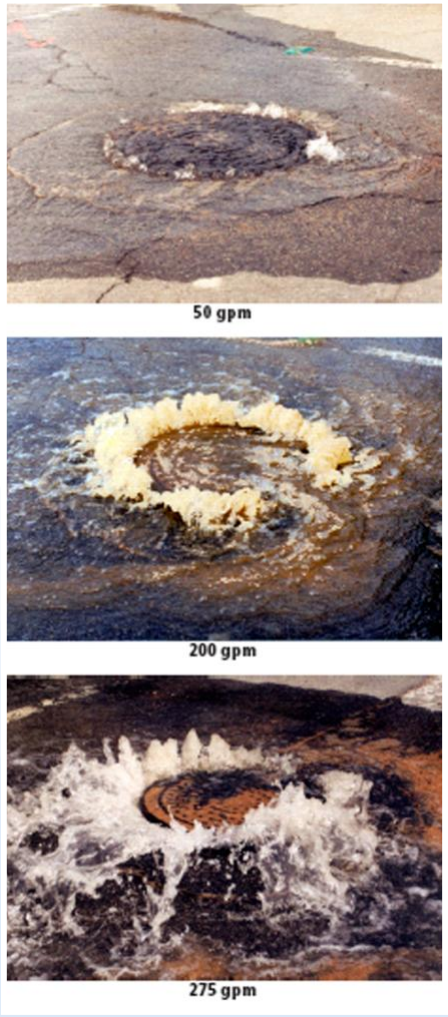
National Pretreatment Program - Controlling Fats, Oils, and Grease Discharges from Food Service Establishments (epa.gov)

WHAT IS IMPORTANT TO YOUR CITY LEADERS?

- **Excess costs for FOG maintenance?**
- **Asset management?**
- **Care about small businesses?**
- **Reputation of the City or Sewer District?**
- **Customer complaints?**
- **Third-party lawsuits?**
- **State and Federal enforcement?**

Regulatory Drivers

- National Pollutant Discharge Elimination System (NPDES) Wastewater Permits
  - Prohibited Discharges
  - Prohibits Sanitary Sewer Overflows (SSOs)
  - Requires Proper Operation & Maintenance of Sanitary Collection System
- Federal Pretreatment Program Prohibits FOG Interference with Public Sanitary Sewer System
- EPA Enforcement Priority



Infrastructure Drivers for FOG-Related Costs

- Blockages and Overflows
- Operation & Maintenance
  - Collection System Pipes
  - Manholes, Pump Stations, & Air Relief Valves
  - Treatment Plants
- Infrastructure Damage
- Treatment Plant Operation
- Treatment Capacity

Ed Gilmore

11 years Restaurant Owner

20 years, Source Control Specialist,
Clackamas County, Oregon
Industrial Pretreatment, FOG, P2 and Septage programs

Currently Trainer, Western States Alliance, PPRC

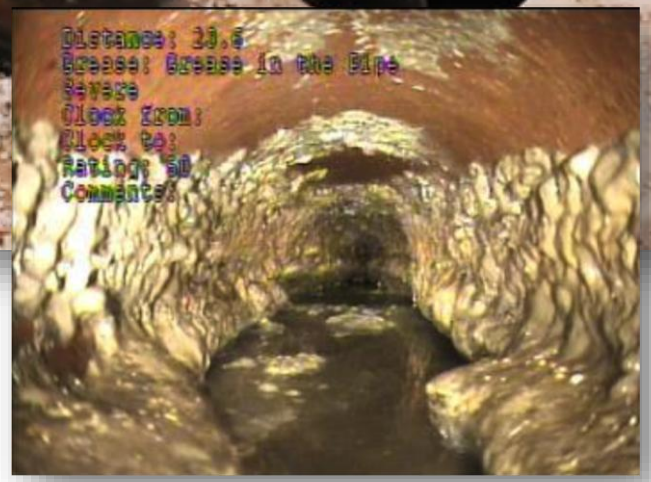
Bachelor of Science, Biochemistry, Portland State University

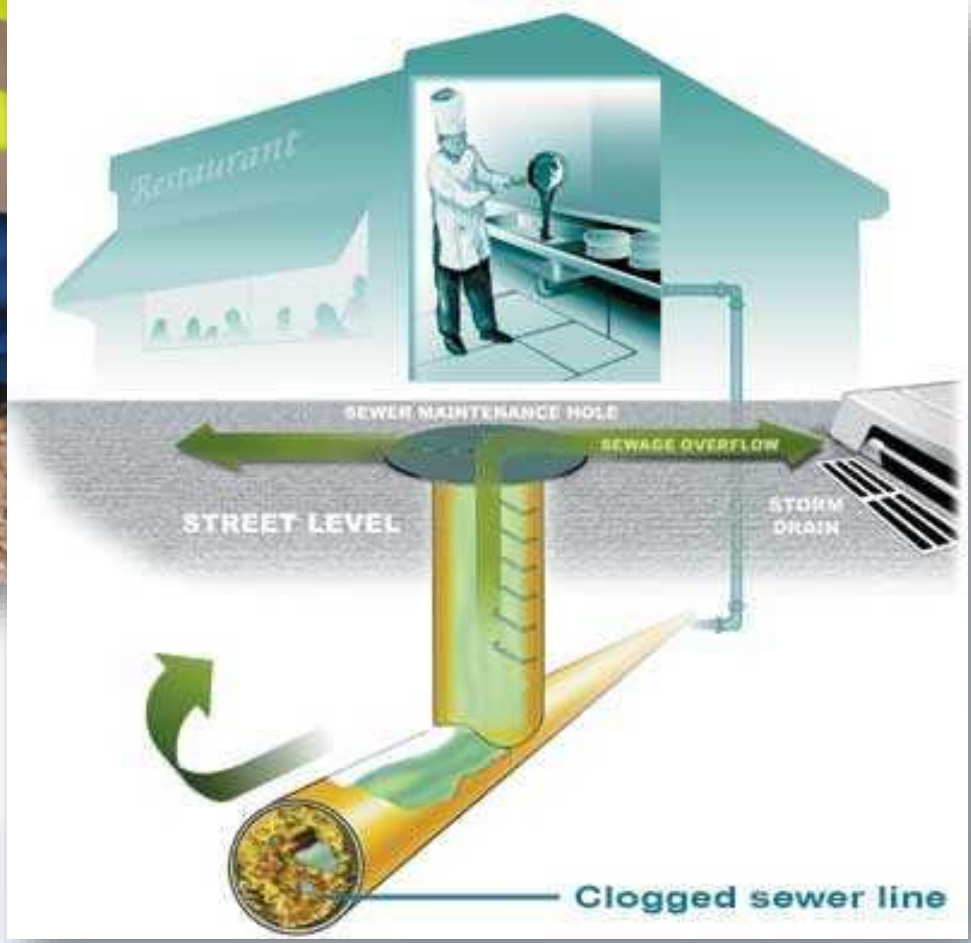
“An effective FOG program must be data-driven, not effort-driven.”

Gary Christiansen,
City of Seattle Public Works

Why do we need to document the infrastructure operation & maintenance costs?

- Collection system resources
- FOG-related costs WWTP
- Justify FOG program activities
- Cost-benefit analysis





- WHERE ARE YOUR FOG LINES?
- HOW OFTEN ARE THEY CLEANED?
- WHAT ARE EQUIPMENT AND STAFFING NEEDS?

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EXCESS LINE MAINTENANCE COSTS

- How many linear feet of collection system are being cleaned in excess of the normal cleaning cycle (usually once every three to five years)?
- What is the city's cost per foot to clean and televise lines?
- Is traffic control necessary, and if so, what is the cost?
- Where is the FOG disposed of, and what is the cost per gallon?

Collection System Maintenance

Sewer Line Cleaning

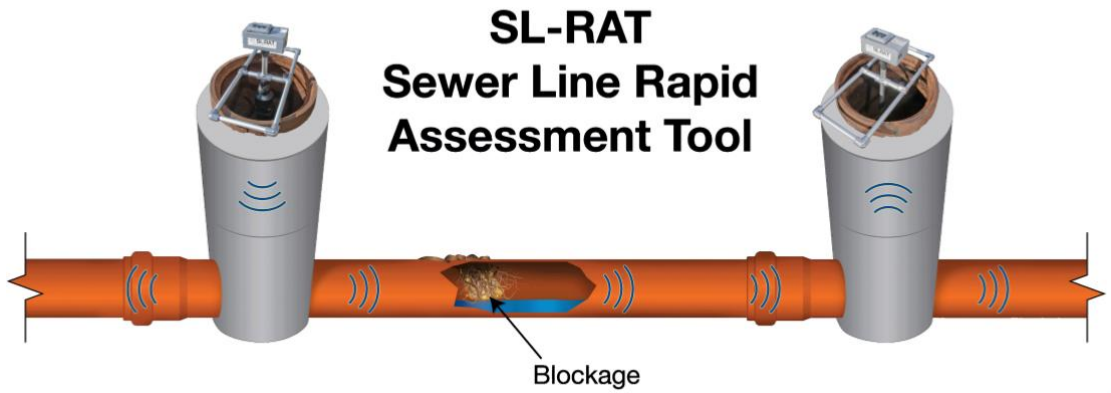
Source of photo: http://heritage20s.weebly.com/photos.html

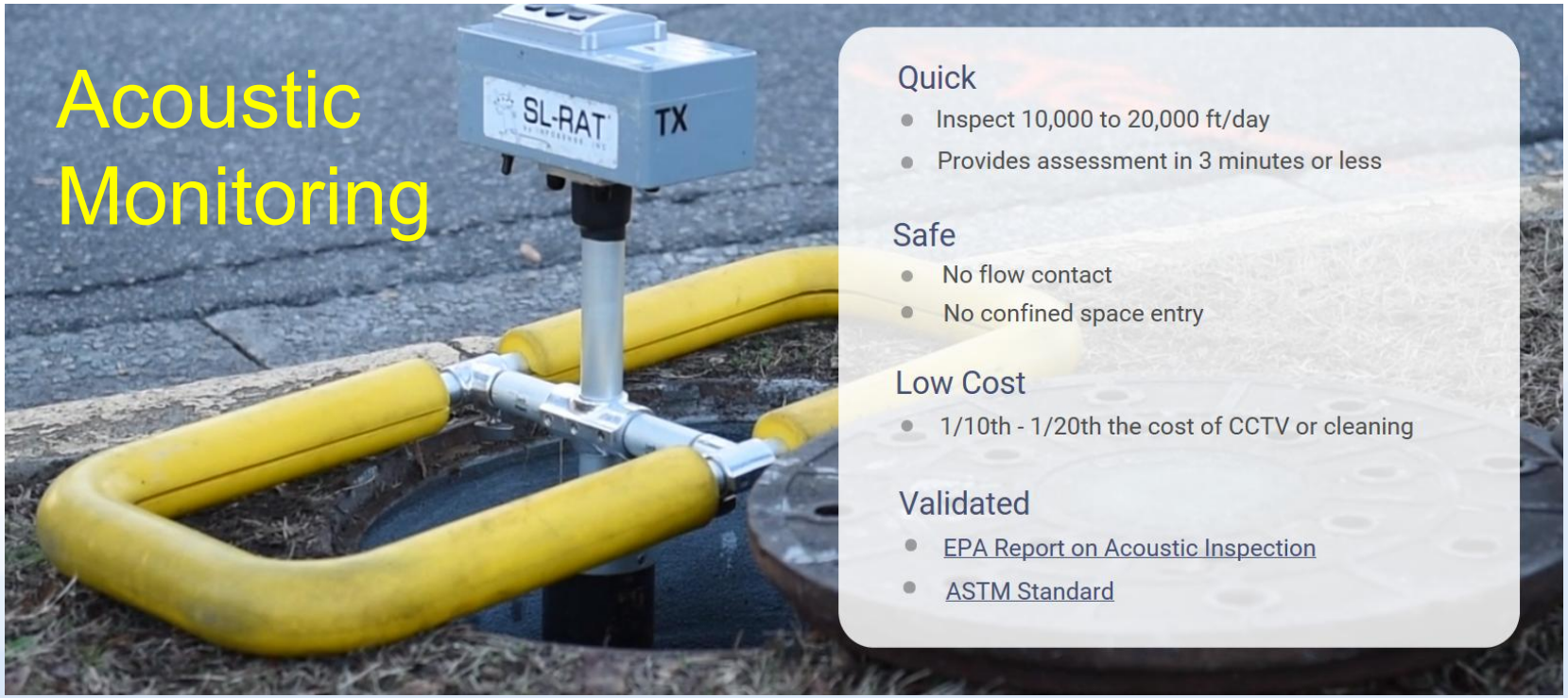
Collection System Maintenance

Closed Circuit Television Camera (CCTV)

Locate and remove sewer line blockages.

Where are Fog "Hot Spots" Developing?



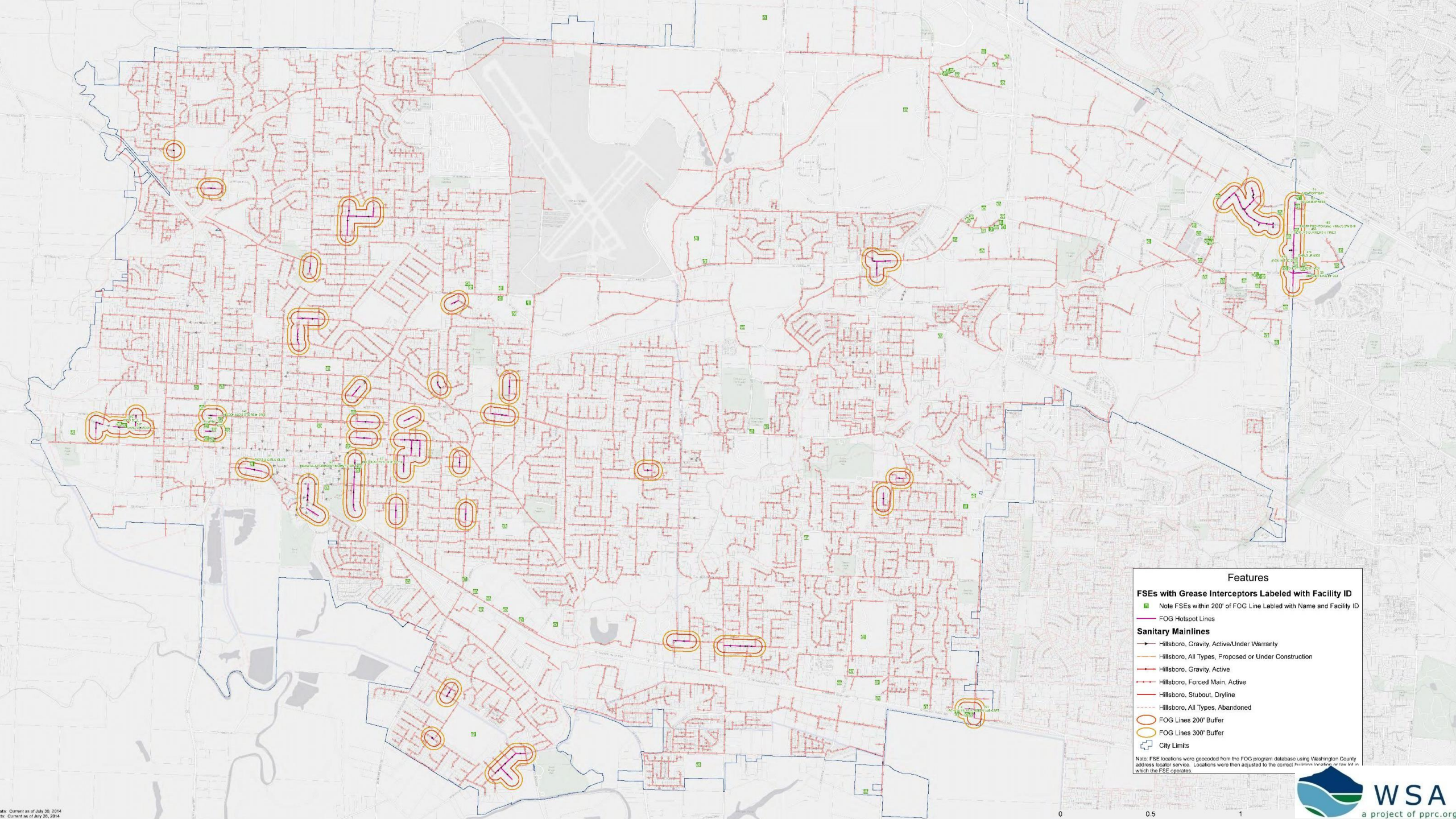


Courtesy Infosense, Inc. Not an endorsement

EMERGENCY LINE CLEANING

Associated cost

- Shop to shop
- Equipment
- Fuel
- Material
- Disposal
- Employee salary


Features
FSEs with Grease Interceptors Labeled with Facility ID
Note FSEs within 200' of FOG Line Labled with Name and Facility ID
FOG Hotspot Lines
Sanitary Mainlines
Hillsboro, Gravity, Active/Under Warranty
Hillsboro, All Types, Proposed or Under Construction
Hillsboro, Gravity, Active
Hillsboro, Forced Main, Active
Hillsboro, Stubout, Dryline
Hillsboro, All Types, Abandoned
FOG Lines 200' Buffer
FOG Lines 300' Buffer
City Limits
Note: FSE locations were geocoded from the FOG program database using Washington County address locator service. Locations were then adjusted to the correct building location or tax lot in which the FSE operates.
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1
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FOG Abatement Program. EPA's enforcement response guidance, written in 1989, Guidance for Developing Control Authority Enforcement Response Plans is still valid and is a thorough and complete treatment of this subject.

The FOG Rules Template can be used to help create rules for a municipality. EPA created an example ordinance, EPA R8 Example Ordinance, that can be used for municipalities without approved pretreatment programs. The Plumbing and Drainage Institute created a Model Grease Ordinance that can be used to update or establish a grease ordinance.

Step 3:

Establishing Program Administration. There are overlapping jurisdictions within a municipality with an in interest and authority over Food Service Establishments (FSEs). Creating a FOG Abatement Program takes coordination and communication with many stakeholders. The FOG Abatement Program – Establishing Program Administration worksheet is useful to clarify motivations and outcomes for the program.

The fact sheet, Establishing an Ordinance to Control Fats Oils and Greases is effective to communicate with stakeholders about the need for a FOG Abatement Program and basic program components. View the fact sheet in English or Spanish

Step 4:

Developing the FOG Abatement Program. The overall program development includes selection of the approach for regulating facilities (e.g., permits, incentives, or education), establishing FOG handling and disposal practices, developing a database, and establishing an operating budget. The FOG Abatement program – Establishing the Business Case Worksheet helps identify all the costs currently being incurred by the municipality – the cost of doing nothing, plus it contains considerations for ongoing program, stakeholder engagement, and implementation costs.

Incorporating a Preferred Pumper Program (PPP) into your FOG Abatement program can save you and your FSEs time and money. This 4-minute video explains what a preferred pumper program is and the reasons to have one.

Establishing the Business Case Worksheets

- Use to document costs
- Found in our National Resource Reference Guide on the website

[The NRRG on westernstatesalliance.org]

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NON-ROUTINE/ RECURRING FOG LINE CLEANING

FOG Abatement Program – Establishing the Business Case Worksheet

Utility FOG-line Cleaning Costs

What **data** is currently collected?

- FOG analysis by an environmental laboratory
- Photographs of grease interceptors or FOG build-up
- Videos of clean or dirty sewer lines
- FSE inspections
- Pump-out dates and quantities
- Other _____

How many **lineal feet of collection system are being cleaned** in excess of normal cleaning cycle (normal cleaning is typically 3-5 years)

Number of feet cleaned	Cleaning frequency (months)

What is the routine cleaning frequency for all other sanitary sewer lines?

- Every three years
- Every four years
- Other _____

NON-ROUTINE/ RECURRING FOG LINE CLEANING COSTS

What is the cost to clean sanitary sewer lines per lineal foot?

Column A	Column B	Column C	Column D	
Time to clean each line section (hrs)	Fully loaded labor rate ($/hr)	Equipment cost ($/hr)	Traffic Control ($/hr)	Total cost (A*(B+C+D))

FOG REMOVAL DISPOSAL COSTS FROM SEWER LINES

What does it cost to dispose of FOG removed from lines?

Column A	Column B	Column C	Column D	Column E	
Number of Loads	Fully loaded labor rate ($/hr)	R.T. Time to haul waste FOG (hrs)	Transportation costs ($/load)	Disposal Costs ($/load)	Total disposal cost (A*(D+E)+B*C)

Transportation costs may be estimated based on the cost for renting equipment to move the waste FOG. Disposal costs are landfill tipping fees, the cost to mix FOG in with municipal biosolids, or to dry it, etc.

- Do you have a map of "FOG Lines" with Food Service Establishments (FSEs) proximity to them? (Use this to calculate costs, communicate with stakeholders, and prioritize inspections.)

Example Contractor Sewer Line Cleaning Bids

BID SCHEDULE

BID ITEM NO.	ITEM DESCRIPTION	QTY.	UNIT	Company A		Company B	
				UNIT COST	TOTAL	UNIT COST	TOTAL
1	Mobilization and Demobilization	1	LS	$ 1,070.00	$ 1,070.00	$ -	$ -
2	Traffic Control System	1	LS	$ 10,000.00	$ 10,000.00	$ 41,400.00	$ 41,400.00
3	Sanitary Sewer Cleaning of 4 Inch up to 12 Inch diameter sewer pipelines via hydroject	10,100	LF	$ 1.90	$ 19,190.00	$ 1.37	$ 13,837.00
4	CCTV Inspection of 12-Inch diameter and smaller sewer pipelines	40,300	LF	$ 1.80	$ 72,540.00	$ 1.47	$ 59,241.00

EXCESS PUMP STATION MAINTENANCE COSTS

- How many pump stations are impacted by FOG?
- What is the cost to clean FOG from a pump station?
- How many air relief valves are being impacted by FOG?
- What is the cost to clean the air relief valves?
- What is the efficiency loss for failure to clean air relief valves?
- Is excess energy being used due to FOG impacts?
- How much do "Additives" cost?

PUMP STATIONS ARE WONDERFUL INTERCEPTORS!

FOG Impacts on Lift Stations

Grease floating and accumulating on float switches and pipes

Grease build-up on submersible pump in lift station

NON-ROUTINE/ RECURRING PUMP STATION CLEANING DUE TO FOG

What is the cost to clean pump stations?

Column A	Column B	Column C	Column D	
Time to clean each pump station (hrs)	Fully loaded labor rate ($/hr)	Equipment cost ($/hr)	Traffic Control ($/hr)	Total cost (A*(B+C+D))

PUMP STATION FOG REMOVAL DISPOSAL COSTS

What does it cost to dispose of FOG removed from pump stations?

Column A	Column B	Column C	Column D	Column E	
Number of Loads	Fully loaded labor rate ($/hr)	R.T. Time to haul waste FOG (hrs)	Transportation costs ($/load)	Disposal Costs ($/load)	Total disposal cost (A*(D+E)+B*C)

- Are you cleaning air relief valves?
    i. What is the estimated cost of this?
    ii. If not cleaning air relief valves, are you monitoring electricity usage at the pump station?

    Perhaps air relief valves need to be cleaned.

Air Release Valve Maintenance

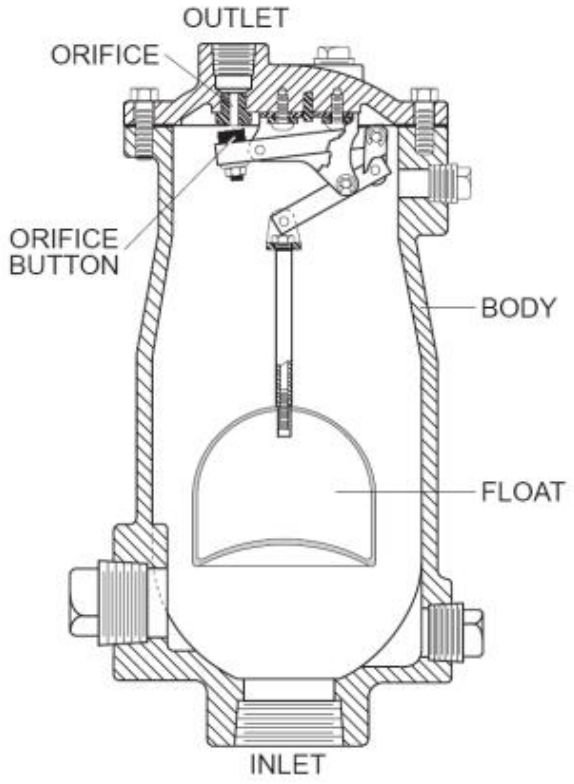

FIGURE 1. WASTEWATER AIR RELEASE VALVE

Courtesy of Val-Matic

NON-ROUTINE MANHOLE INSPECTION & MAINTENANCE COSTS DUE TO FOG

- How many manholes are impacted by FOG?
- What is the cost to inspect FOG-impacted manholes?
- What is the cost to clean FOG from a manholes?
- What is the decrease in expected life of FOG-impacted manholes?

Example Contractor Manhole Inspection Bids

BID SCHEDULE

BID ITEM NO.	ITEM DESCRIPTION	QTY.	UNIT	Company A UNIT COST	Company A TOTAL	Company B UNIT COST	Company B TOTAL
5	Complete MACP Level 1 Manhole Inspection	203	EA	$ 75.00	$ 15,225.00	$ 86.50	$ 17,559.50

Manhole Assessment and Certification Program (MACP)
Level 1 inspection produces basic assessment information regarding the general condition of a manhole.

Non-routine manhole inspection, FOG removal, & replacement costs

Manholes

What is the cost to inspect and maintain FOG-impacted manholes?

Column A	Column B	Column C	Column D	Column E	Column F	
Manhole O&M	**Number of Manholes**	**Average Labor (hrs/manhole)**	**Time Spent (hrs/yr)** (B*C)	**Fully Loaded Labor Rate ($/hr)**	**Equipment Cost ($/hr)**	**Total Annual Cost ($/yr)** (D*(E+F))
Manhole inspections						
FOG Removal						
Total Annual Cost ($/yr.)						

What is the cost to replace FOG-impacted manholes?

Column A	Column B	Column C	Column D	Column E	Column F	Column G	
Manhole Replacement	**Number of Manholes (mh)**	**Average Replacement Cost ($/mh)**	**Time Spent (hrs/mh)**	**Fully Loaded Labor Rate ($/hr)**	**Equipment Cost ($/hr)**	**Bypass Pumping ($/hr)**	**Total Annual Cost ($/yr)** ((B*C)+(D*(E+F+G)))
Manhole replacement							
Total Annual Cost ($/yr.)							

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FOG IMPACTS ON WASTEWATER TREATMENT PLANT OPERATIONS

EXCESS TREATMENT PLANT OPERATIONAL COSTS DUE TO FOG

- What is the estimated operational cost to treat one pound of COD?
- WERF estimates 1 pound of FOG = ½ pound of COD
- Case studies show that an average restaurant, with one fixture protected by a well-maintained interceptor, captures 1/10th the FOG of a restaurant with all fixtures and drains connected to a well-maintained interceptor.
- How many restaurants in the jurisdiction have all fixtures and drains protected by an interceptor?

Estimated FOG-Related WWTP Costs

Column A	Column B	Column C	Column D	Column E	
WWTP O&M	**Time Spent (hrs/yr.)**	**Fully Loaded Labor Rate ($/hr)**	**Equipment Cost ($/hr)**	**Disposal Cost ($/lb. removed)**	**Total Annual Cost ($/yr.)** B*(C+D)+E)
Cleaning preliminary treatment unit					
Cleaning clarifier weirs					
Sludge disposal					
Other					
Other					
Other					
Total Annual Cost ($/yr.)					

Estimated FOG-Related WWTP Costs

Method 1

Column A	Column B	Column C	
WWTP Treatment	**Grease Removal Device Bypass* (lbs/year)**	**Cost per Pound of FOG ($/lb)****	**Total Annual Cost ($/yr.)** (B*C)
FOG Discharge from FSEs			

* Bypass is the FOG not captured by the GRD (estimated ~15% for GGIs, ~5% for HGIs)
Use grease production value for each FSE (ASPE Design Handbook, Volume 4, Chapter 8, Table 8.3)
** 1 lb. FOG = 0.5 lb.COD, Use COD surcharge rate ($/lb.)

Method 2

Column A	Column B	Column C	Column D	Column E	
WWTP Treatment	**Influent FOG Concentration (mg/L)**	**WWTP Flow (MGD)**	**Influent FOG (lbs./day)**	**Cost/lb. of FOG ($/lb./day)***	**Total Cost ($/yr.)**** (E*365)
Influent FOG to WWTP					

* 1 lb. FOG = 0.5 lb.COD, Use COD surcharge rate ($/lb.)
** Calculate cost per yr. 365 days/yr. for annual cost

FOG Impacts on Wastewater Treatment Plants

- Enforcement action by State or EPA
  - Floatable solids in the effluent is a discharge permit violation
  - Administrative/Civil Penalties

FOG impacts on wastewater lagoons (oxidation ponds)

- Treatment
- Odors
- Discharge outlet
- Mechanical removal
- Disposal

TRACKING STAFF COSTS

Can you track costs via a time card code?

How granular should you be?

Code for line maintenance for FOG

Code for treatment plant maintenance for FOG

Code for pump station maintenance for FOG

Non-routine Costs due to FOG (summary)

Track these costs

- Excess line cleaning
- Pump station maintenance
- Air relief valves
- Manhole inspection and maintenance
- WWTP operational costs

Include all aspects of costs

- Labor
- Traffic Control
- FOG removal
- FOG disposal
- Chemical used
- Other??

PLANNING & PROGRAM DEVELOPMENT COSTS

What does it take to put together an effective fog program?

What will it cost to develop or enhance your fog abatement program?

Planning And Program Development

- Take time to map out what your FOG program outcomes are.
- Identify measures to track.
- Measures should demonstrate that outcomes have been met, or are being achieved.

ELEMENTS OF AN EFFECTIVE FOG PROGRAM

Estimate the staffing level and the cost for each element.

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ESTIMATE THE COST TO IMPLEMENT OR ENHANCE YOUR FOG PROGRAM

- How many Food Service Establishments (FSEs) are in the City?
- Will you register or issue a discharge permit each FSE?
- How many FSEs have been/need to be thoroughly inspected and monitored? How often?
- What data and information has been/needs to be tracked for each FSE?
- What type of public education & outreach will be done?
- What level of Stakeholder involvement is desired?

ESTIMATE STAFFING COSTS

- How many FSE inspections can be completed in one day?
- How many Full Time Employees (FTEs) will be needed to initiate the program?
- How many FTEs will be needed to maintain the program?

DETERMINE APPROPRIATE STAFFING LEVEL

- Initial FSE inspection setting up FOG Program estimate 3-4 hrs./FSE
- Efficient FOG program maintenance inspections estimate 1 hr./FSE
- Include travel time
- Include inspection data entry time
- Include pump-out data review and data entry time
- Estimate that 10% FSEs will need re-inspection more frequently than once per year

PROGRAM DEVELOPMENT STAFFING PLAN

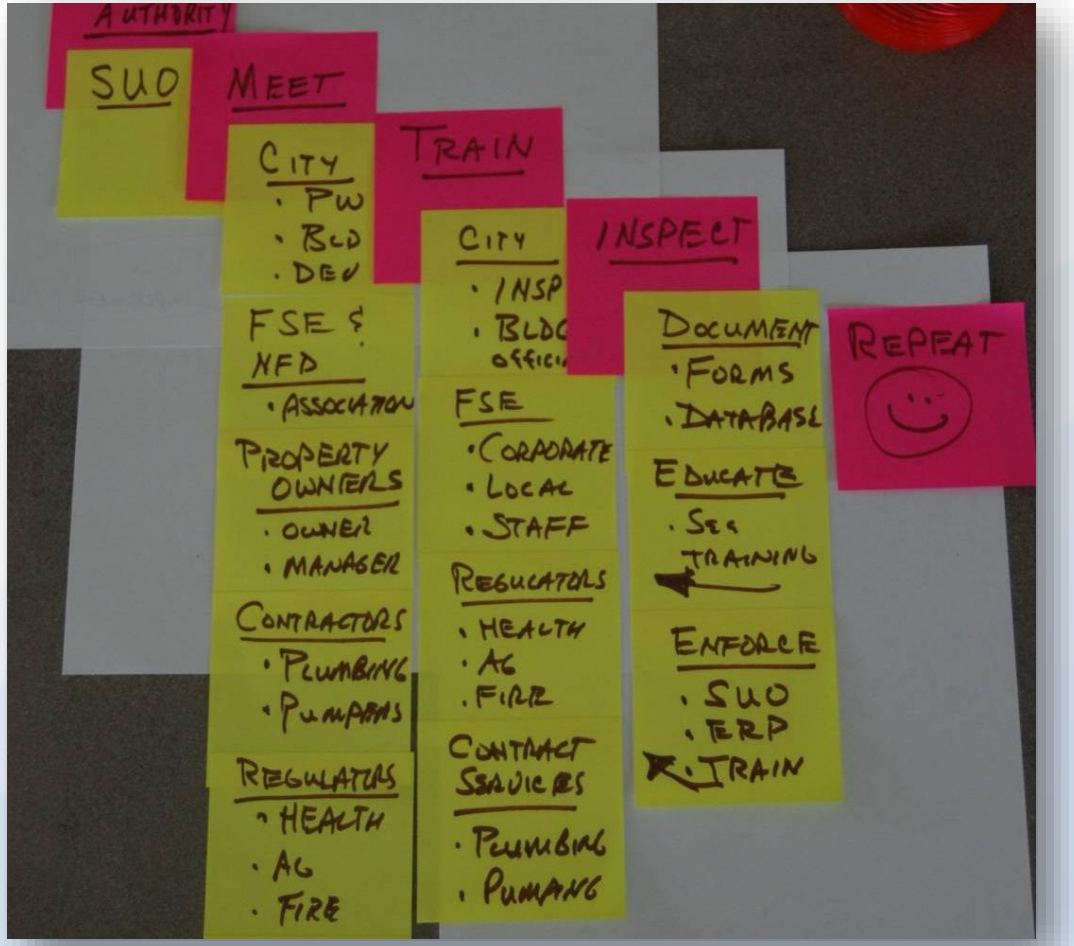
- Which staff will be involved in program development?
- One sewer district developed for a year, using
  - Division Manager (part time)
  - Program Manager (part time)
  - Communication specialist (part time)
  - Environmental Specialist (full time)

FOG PROGRAM STAFFING EXAMPLES

- City of Vancouver, Washington has approximately 800 FSEs and has two full time FOG inspectors
- Washington County, Oregon has approximately 2,400 FSEs and has one full-time and five part-time FOG inspectors
- City of Portland has approximately 4,100 FSEs and three full-time inspectors and a program manager
- Friday Harbor, Washington has about 75 FSEs and one part-time inspector
- Wilsonville, Oregon has 99 FSEs and one full-time industrial pretreatment inspector who is also responsible for the FOG program

PROGRAM DEVELOPMENT

- Put legal authority into place (covered in PM session)
- Identify all stakeholders
- Identify all “moving parts” of the program (i.e., CMOM/IPP)
- Implement, gather data, analyze, and repeat



STAKEHOLDER INVOLVEMENT PLANNING

- Have you identified the stakeholders?
- Have meetings been scheduled to discuss the FOG Program with stakeholders?
- Has the business case been presented to the municipal leadership?
- One sewer district spent one year meeting with stakeholders in monthly meetings. Four staff members from the District were involved, three part time and one full time during this year.
- What are the estimated fully-loaded labor costs to get input from stakeholders?

NO SURPRISES !

All stakeholders must be kept updated on this process through:

- Regular updates
- Meetings
- Stakeholder participation

City management must also be kept in the loop.

- Regular updates
- Feedback

Cost-Benefit Analysis

Given the costs of program implementation and expected costs of an on-going program implementation, what are the financial and health/environmental benefits?

WHAT IS A FOG PROGRAM COST-BENEFIT ANALYSIS?

- The process of comparing the costs and benefits of activities & resource allocations to achieve desired results.
- A way to evaluate effectiveness of decision-making.
- Helps collection system staff & FOG program managers make informed decisions.
- A way to determine the beak-even time period where costs equal benefits.

BASIC FOG PROGRAM COST-BENEFIT ANALYSIS

- Step 1: Existing costs to municipality if no FOG program is implemented or enhanced

  (i.e., “Status Quo” Costs)
- Step 2: Cost to develop and implement or enhance a FOG program to achieve desired outcomes
- Step 3: Cost to maintain a well-managed FOG program
- Step 4: Estimated savings due to well-managed FOG program
- Step 5: Time period to break-even

EXAMPLE OF A BUSINESS CASE PRESENTATION ON COST-BENEFITS

Sample Cost-Benefit Analysis 2,300 FSEs 4 New FSE/Month

Status Quo Annual

Item	Cost
# lineal feet /yr	$180,000
Pump Station	$45,000
Air Relief	$10,000
FOG Disposal	$22,000
WWTP maintenance	$35,000
WWTP Operations	$2,800,000
Total Cost	$3,092,000

FOG Program Costs

Item	Cost
Development	$120,500
1st Inspection	$375,000
Ongoing Insp	$90,000
Plan Review	$6,000
Data Mgmt	$45,000
Development Cost & First Insp	$495,500
Program Maintenance Cost	$141,000

Savings after 5 years, 80% Cost Reduction

Item	Cost
Line Cleaning	$36,000
Pump Station	$9,000
Air Relief	$2,000
FOG Disposal	$4,400
WWTP Maint	$7,000
WWTP Operation	$560,000
Total Cost Savings	$618,400

Total Savings after year 5 $2,473,600

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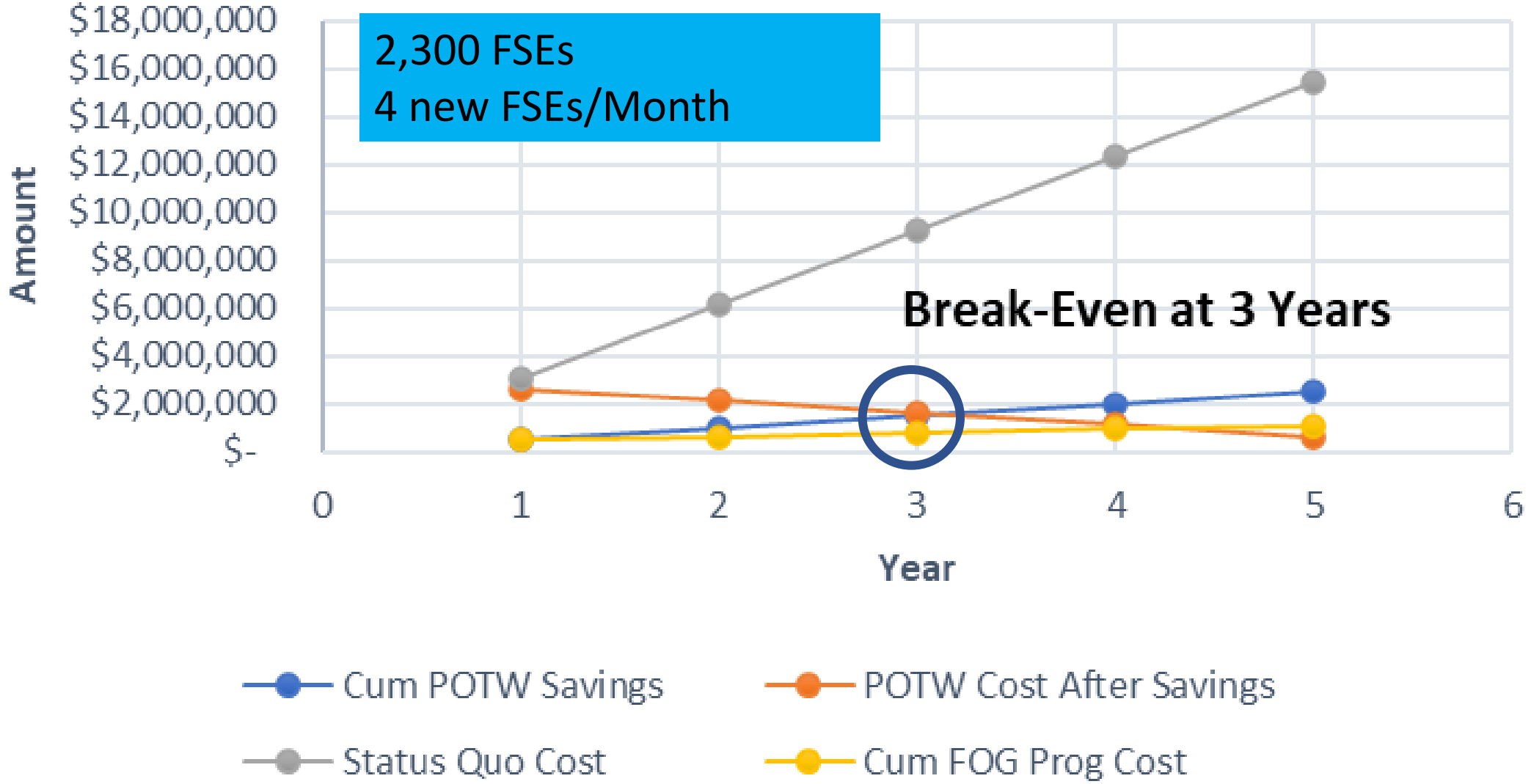
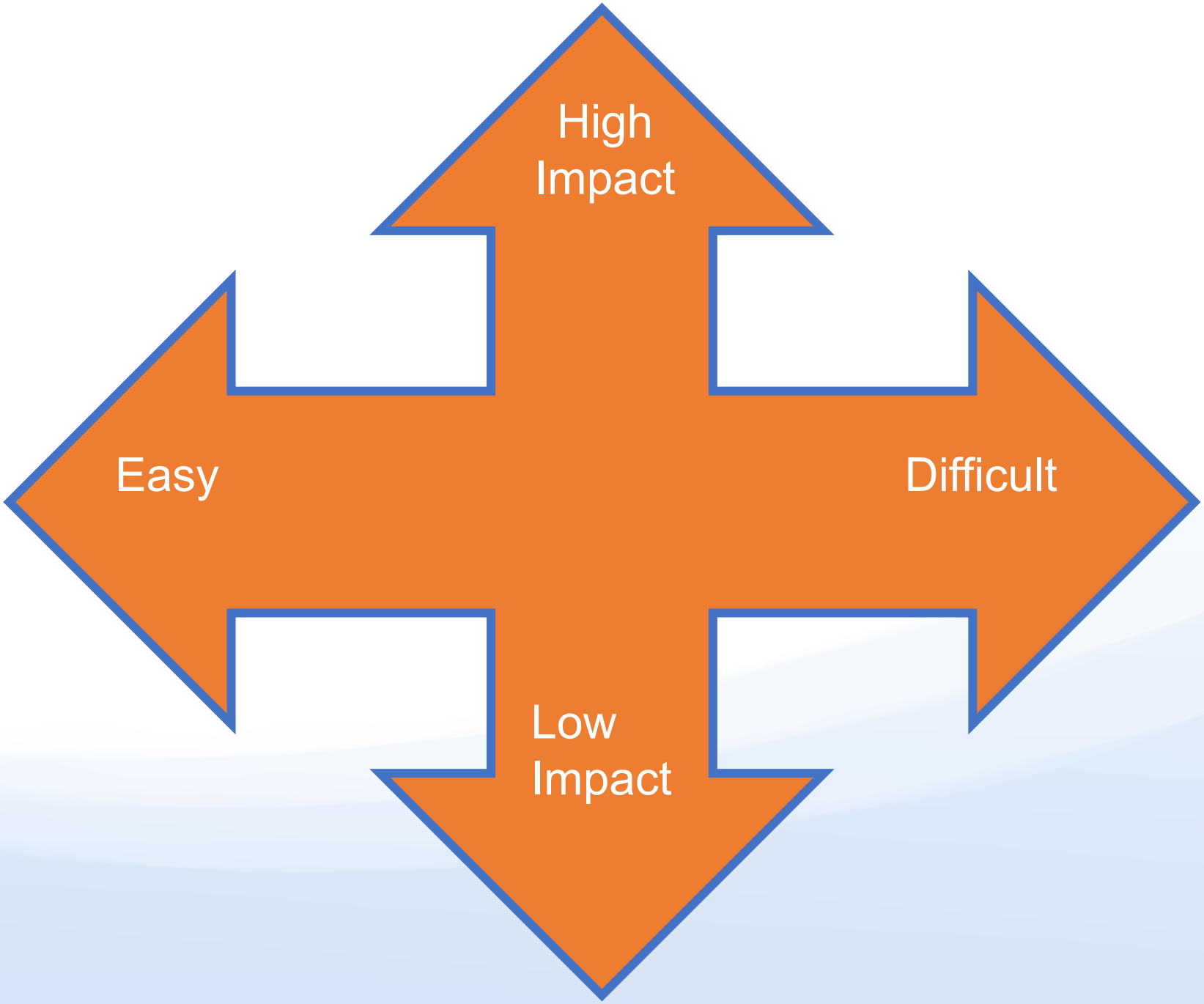
Simple FOG Program Cost-Benefit Analysis



IN SUMMARY:

FOG PROGRAM PLAN INCLUDES

- Program Development
- Program Implementation
  - Phased Approach
  - FOG Triage
  - Data Acquisition and Management
  - FOG Program Cost-Benefits


High
Impact
Easy
Difficult
Low
Impact

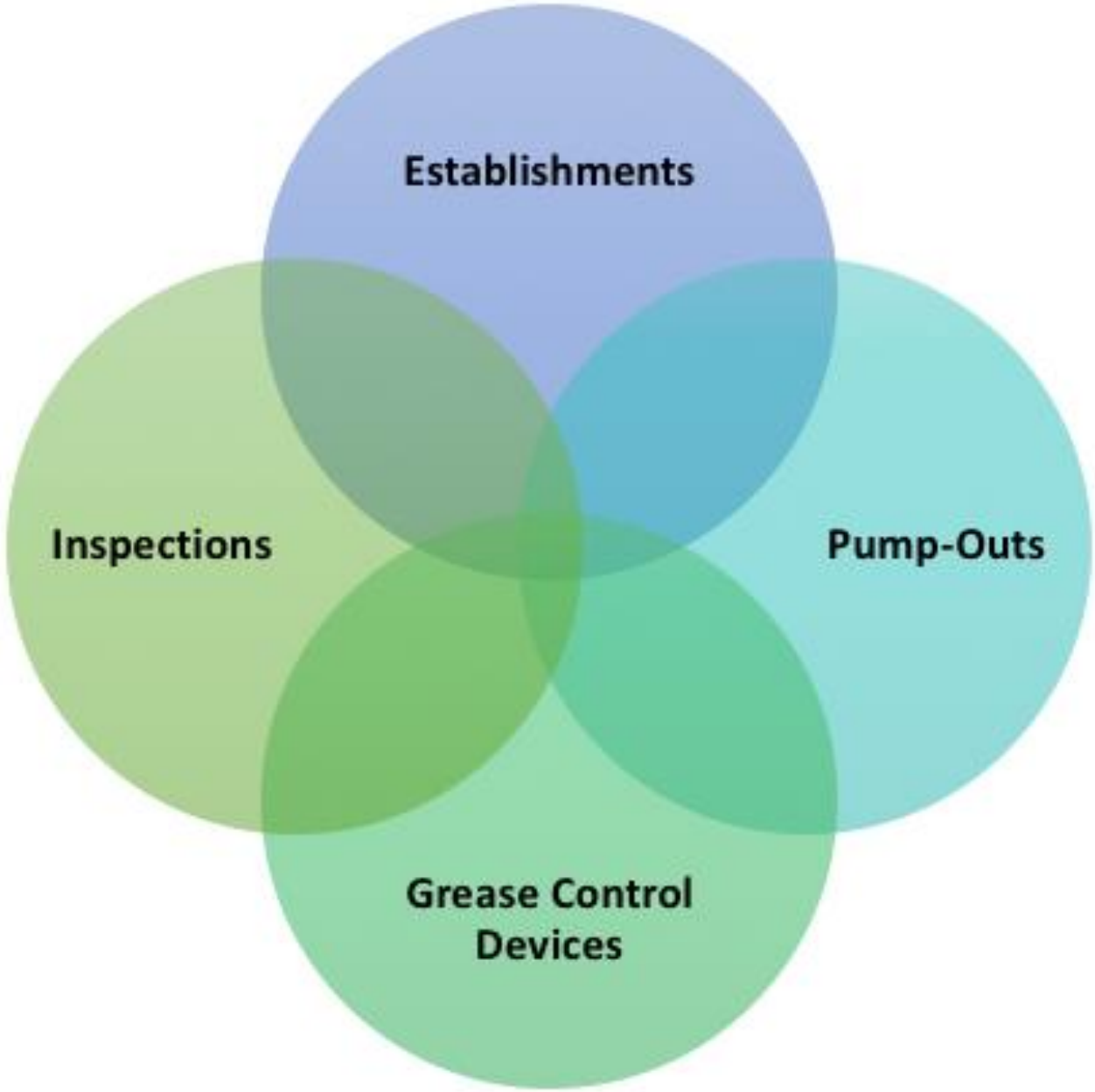
Data Acquisition and Management

Gathering data to implement the FOG program.

DATA COLLECTION & STORAGE

- What data do you need?
- How do you collect the data?
- How is the data stored?
- Can the data be easily analyzed?

Track FOG program elements as separate entities and add more as your program matures.



FSE DATA NEEDED

Partial list

- Physical address (and GIS data or latitude/longitude)
- Potential FOG loading of FSE (very high, high, medium, low)
- Proximity of FSE to a FOG-impacted sanitary sewer line (FOG line)
- Type(s) of FOG pretreatment
- Grease interceptor maintenance history
- Fixtures and drains connected to interceptor
- Contact information for FSE (email and phone)
- Landlord or property manager contact information (email and phone)

PUMPER INFORMATION MANAGEMENT

- Pumper Name
- CONTACT INFORMATION
- Registration #
- AUTHORIZED DISPOSAL SITE
- PUMPING MANIFEST
- PUMP-OUT VOLUME

FOR EACH PUMPOUT EVENT

COLLECTION SYSTEM DATA NEEDED

Partial list

- Which collection system line segments are impacted by FOG?
- What is the cleaning frequency for these FOG lines?
- Does the frequency exceed the established line cleaning frequency for the normal collection system?
- What is the cost per line segment to keep these FOG lines cleared?

COLLECTION SYSTEM DATA NEEDED

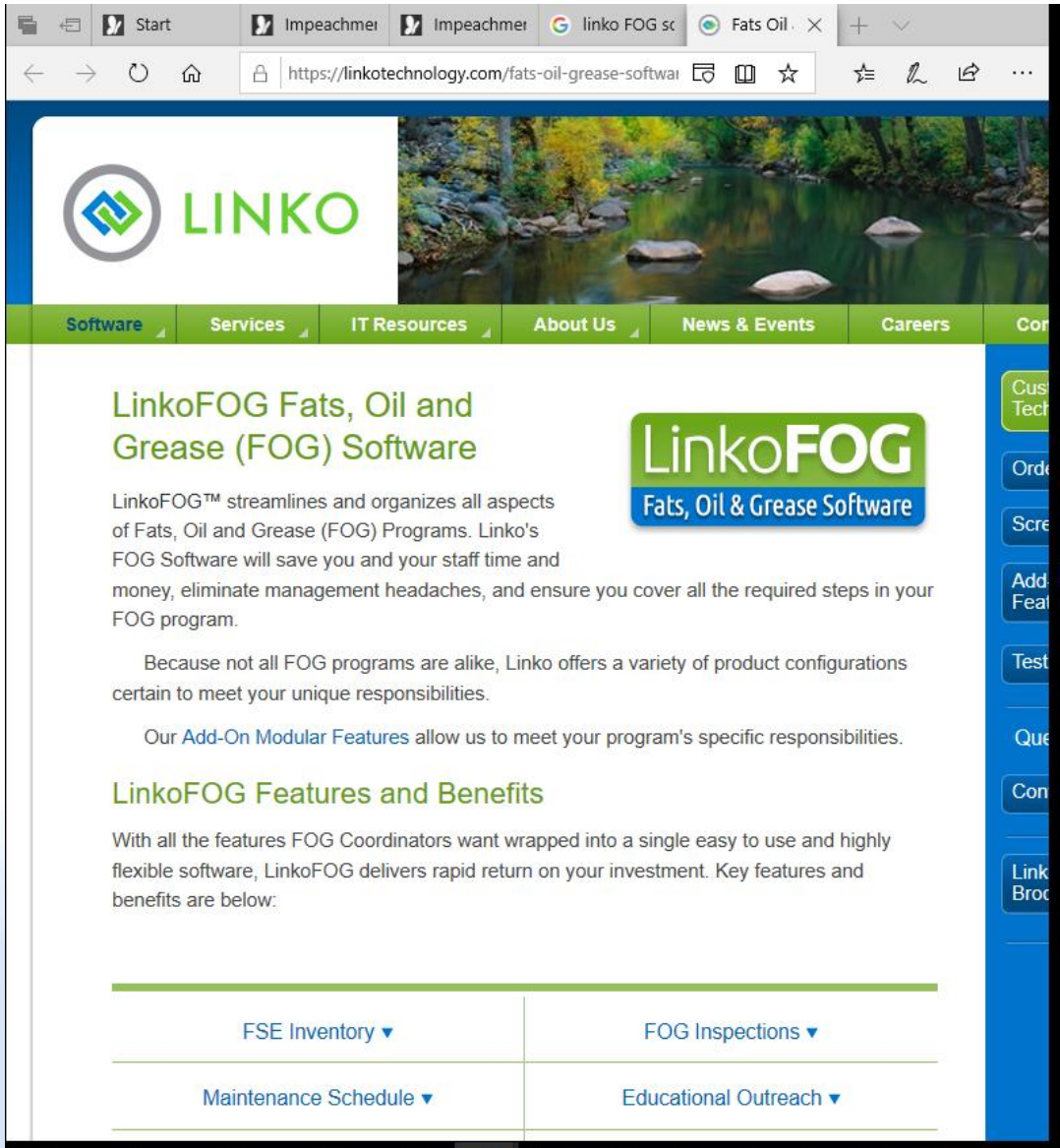
Partial list - continued

- Are there manholes impacted by FOG?
- What is the cleaning frequency for these manholes?
- Are there pump stations impacted by FOG?
- How often are these stations cleaned?
- What is the cost per cleaning?
- Are additives used in these stations to “control” FOG?
- What is the cost of using these additives?

EXCEL SPREADSHEET EXAMPLE

RESTAURANTS WITH TRAPS	HAULER	CLEANING SCHEDULE	LAST CLEANED	DUE FOR CLEANING
Abella Italian Kitchen	Baker	monthly	23-Oct-19	19-Nov
Bellagios	River City	2 months	11-Sep-19	19-Nov
Boeckman Creek School	River City	Annually	9-Jul-19	20-Jul
Boones Junction Pizza	River City	2 months	8-Oct-19	19-Dec
Boston's	Encore	monthly	19-Nov	19-Dec
Beer Station CLOSED 2018	NW Bio-fuel	3 months	18-Jul	18-Oct
Better Bean Company	Baker	6 month	18-Mar	18-Sep
Canton Phoenix	Oregon Oils	monthly	1-Jul-19	19-Aug
Charbonneau Country Club	River City	6 months	9-Jul-19	19-Dec
Corner Coffee Shop	River CIty	3 months	12-Mar-19	19-Apr

LINKO FOG


Start
https://linkotechnology.com/fats-oil-grease-softwa
LINKO
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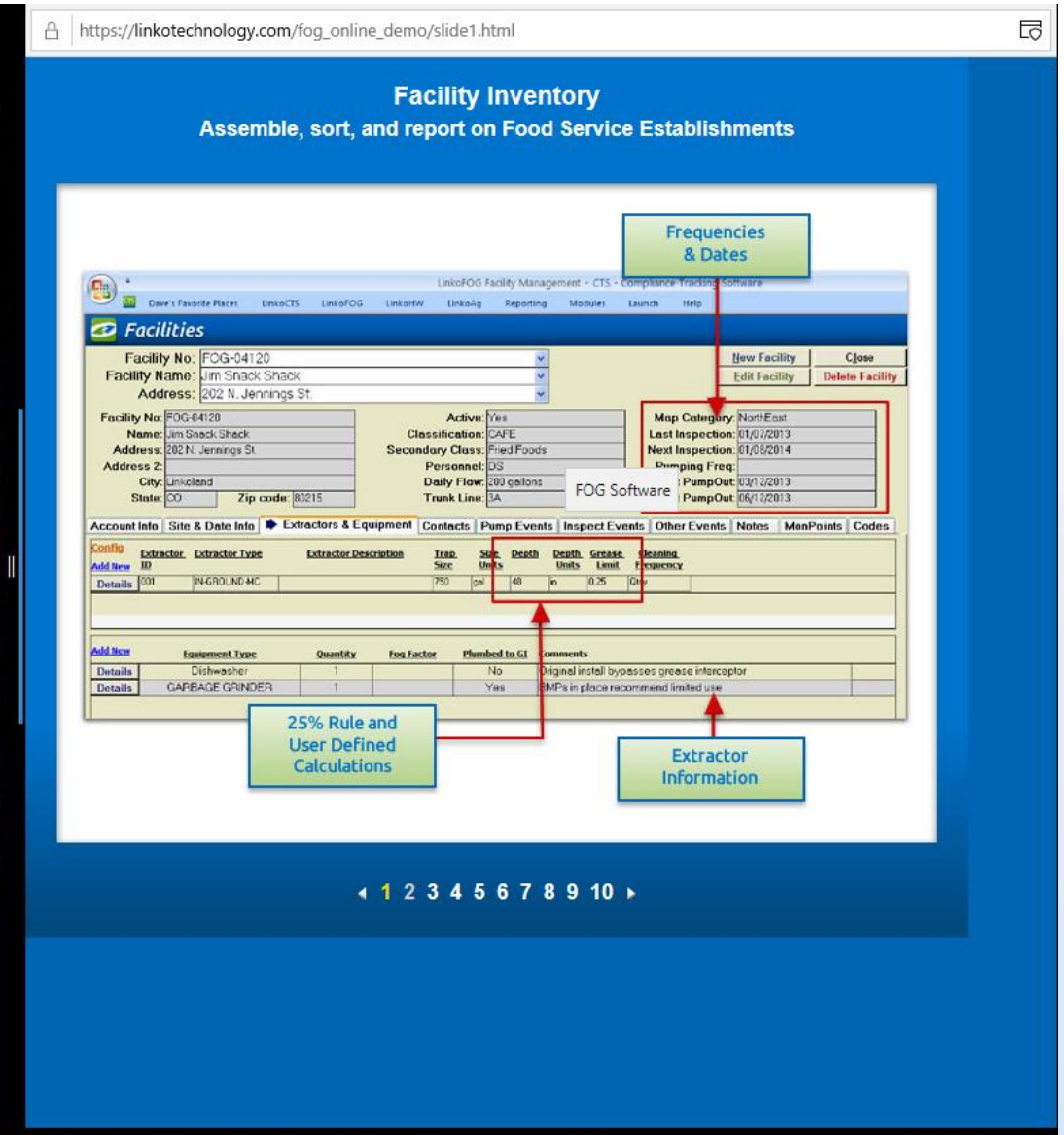
Services
IT Resources
About Us
News & Events
Careers
LinkoFOG Fats, Oil and Grease (FOG) Software
LinkoFOG
Fats, Oil & Grease Software
LinkoFOG™ streamlines and organizes all aspects of Fats, Oil and Grease (FOG) Programs. Linko's FOG Software will save you and your staff time and money, eliminate management headaches, and ensure you cover all the required steps in your FOG program.
Because not all FOG programs are alike, Linko offers a variety of product configurations certain to meet your unique responsibilities.
Our Add-On Modular Features allow us to meet your program's specific responsibilities.
LinkoFOG Features and Benefits
With all the features FOG Coordinators want wrapped into a single easy to use and highly flexible software, LinkoFOG delivers rapid return on your investment. Key features and benefits are below:
FSE Inventory ▾
FOG Inspections ▾
Maintenance Schedule ▾
Educational Outreach ▾

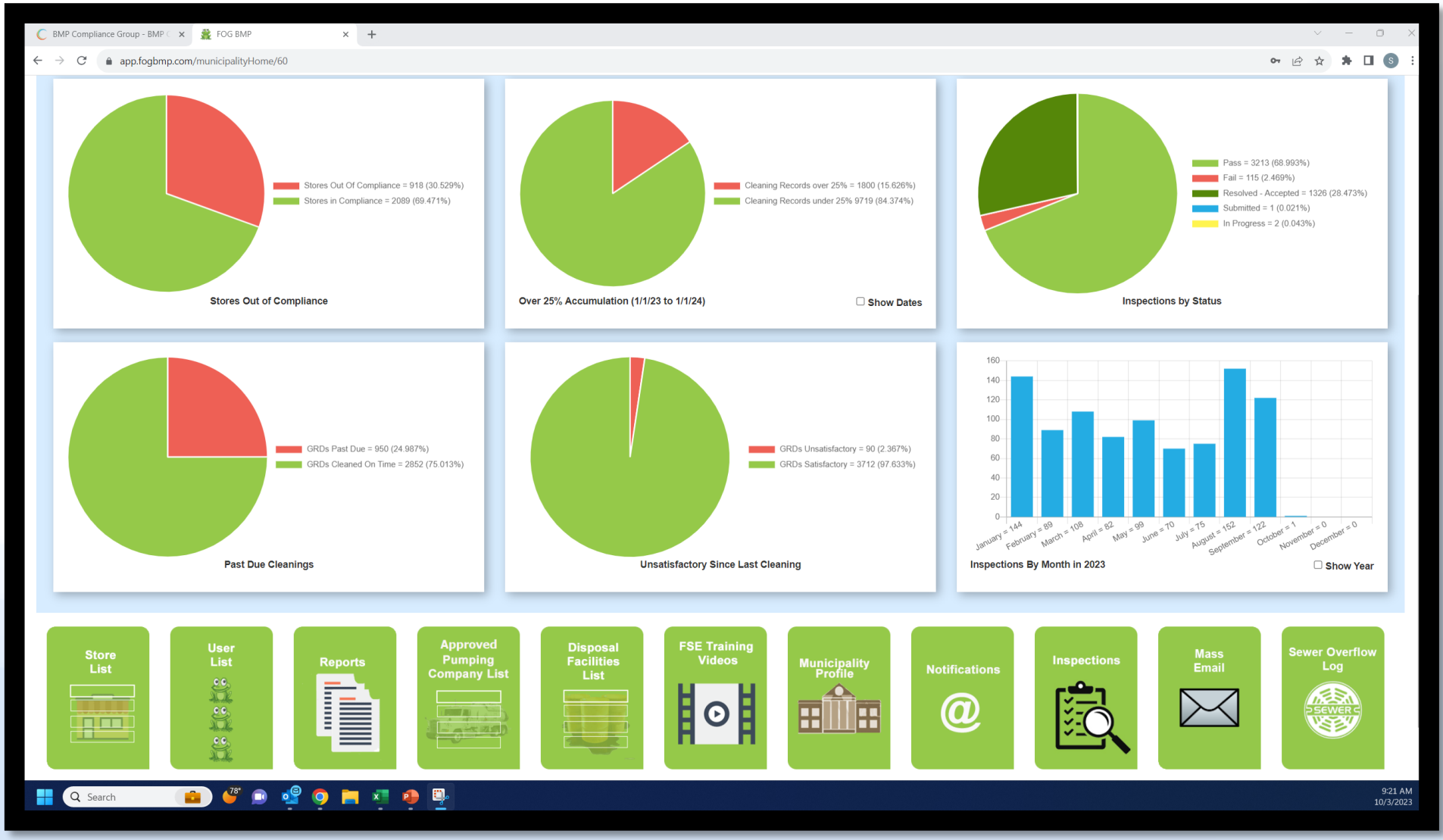

https://linkotechnology.com/fog_online_demo/slide1.html
Facility Inventory
Assemble, sort, and report on Food Service Establishments
Frequencies & Dates
Facilities
FOG Software
25% Rule and User Defined Calculations
Extractor Information
1 2 3 4 5 6 7 8 9 10

FOG BMP™

Save. Comply. Sustain.

Turn-Key Municipal F.O.G. Program

- Cloud Based
- Mobile Friendly
- Transparent Pricing
- Easy to use
- 100% American Made & Veteran Owned
- Designed by F.O.G. Experts
- 100% Satisfaction Guaranteed



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FREE MUNICIPAL SETUP AND DEMO

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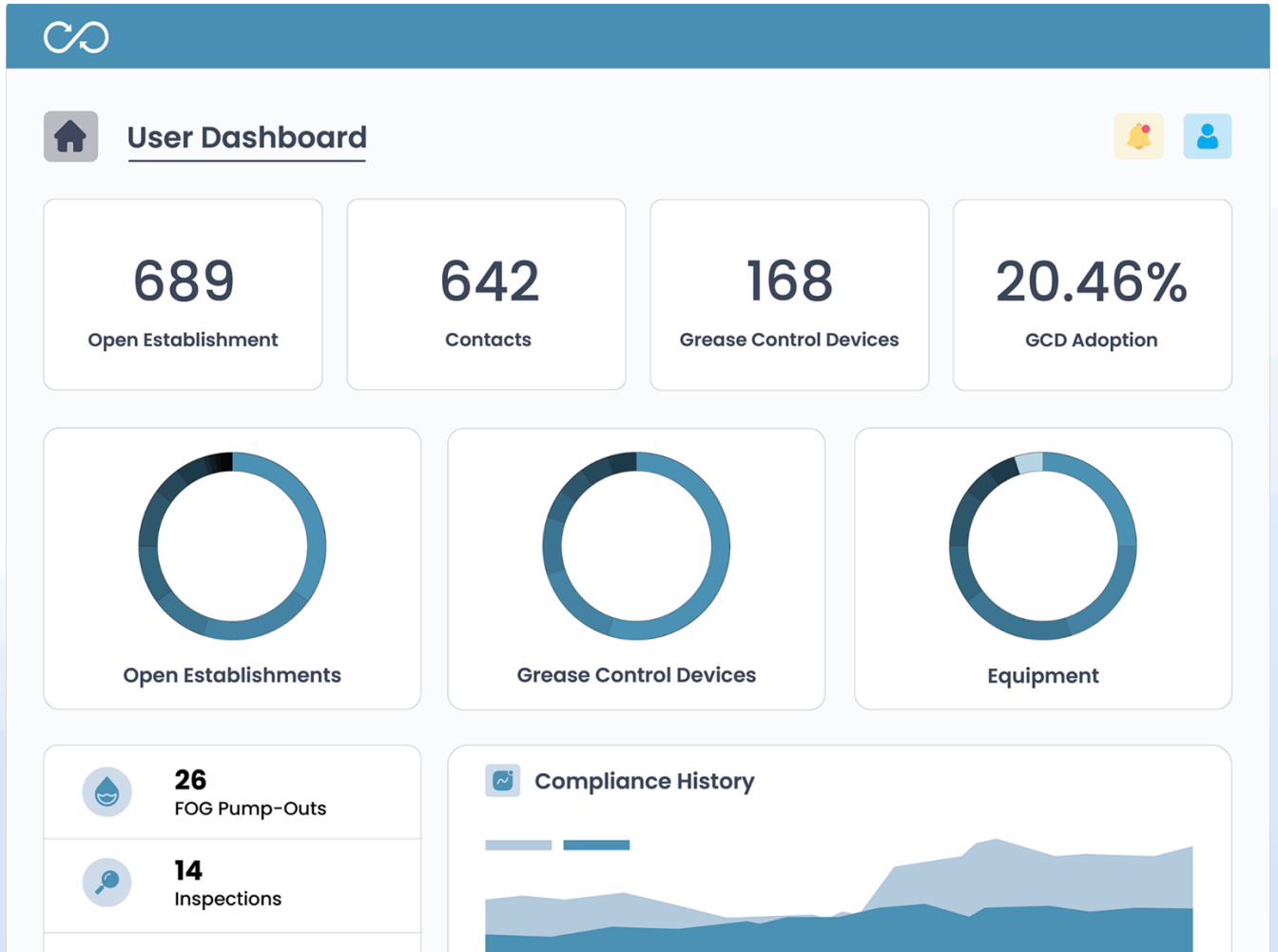
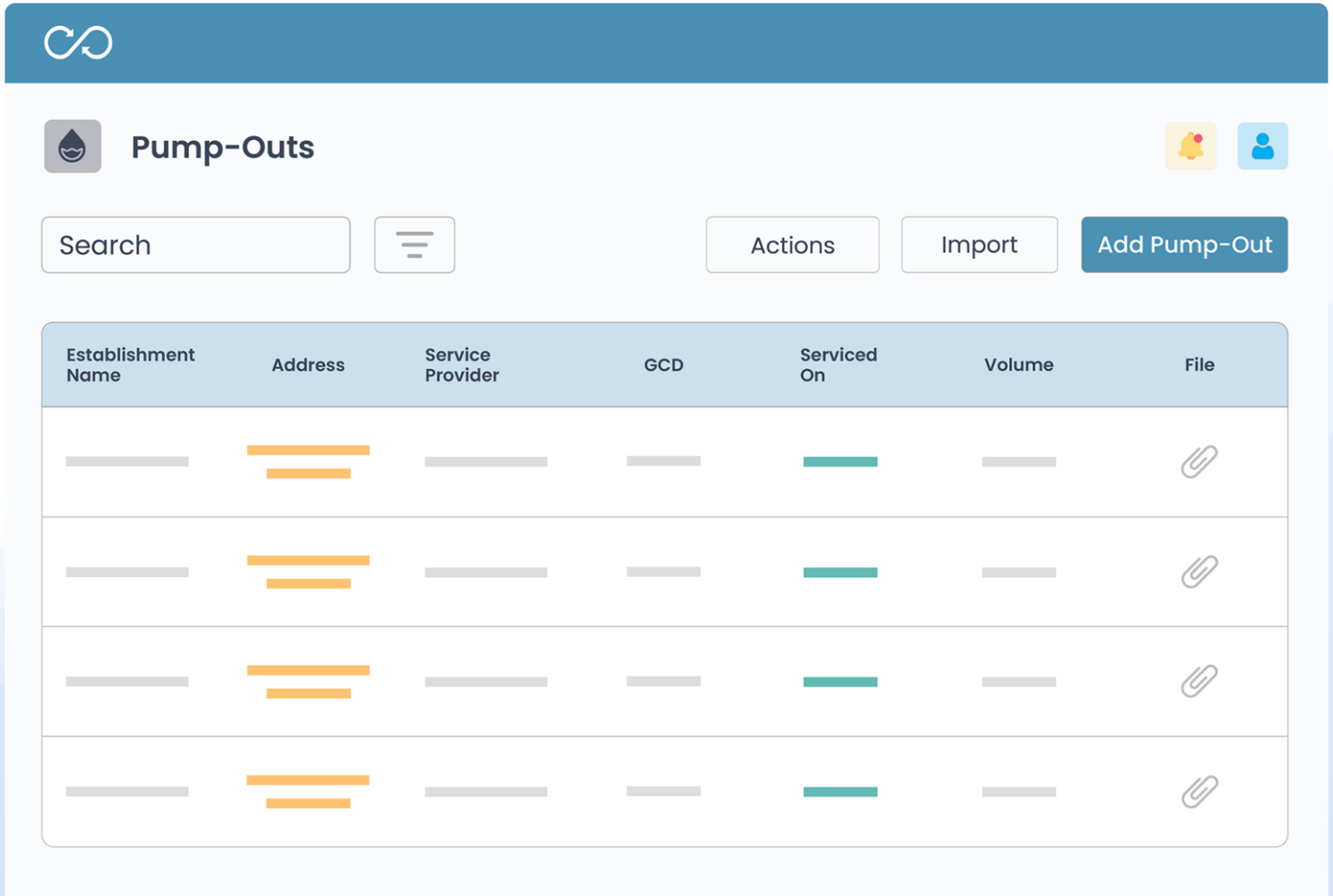
EMAIL: **INFO@FOGBMP.COM**

CALL: **1.855.FOG.BMP1**

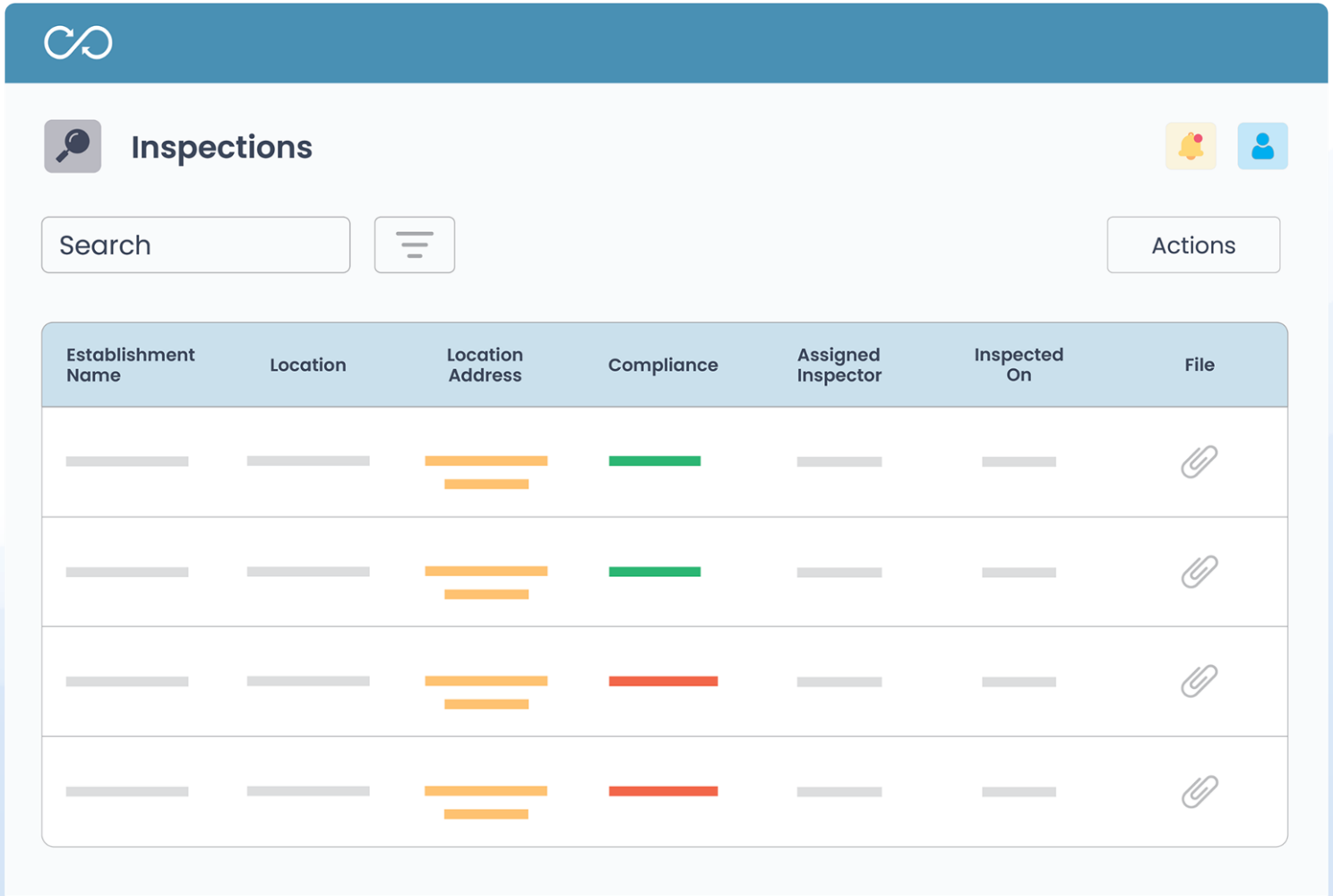
Modern FOG Management Simplified



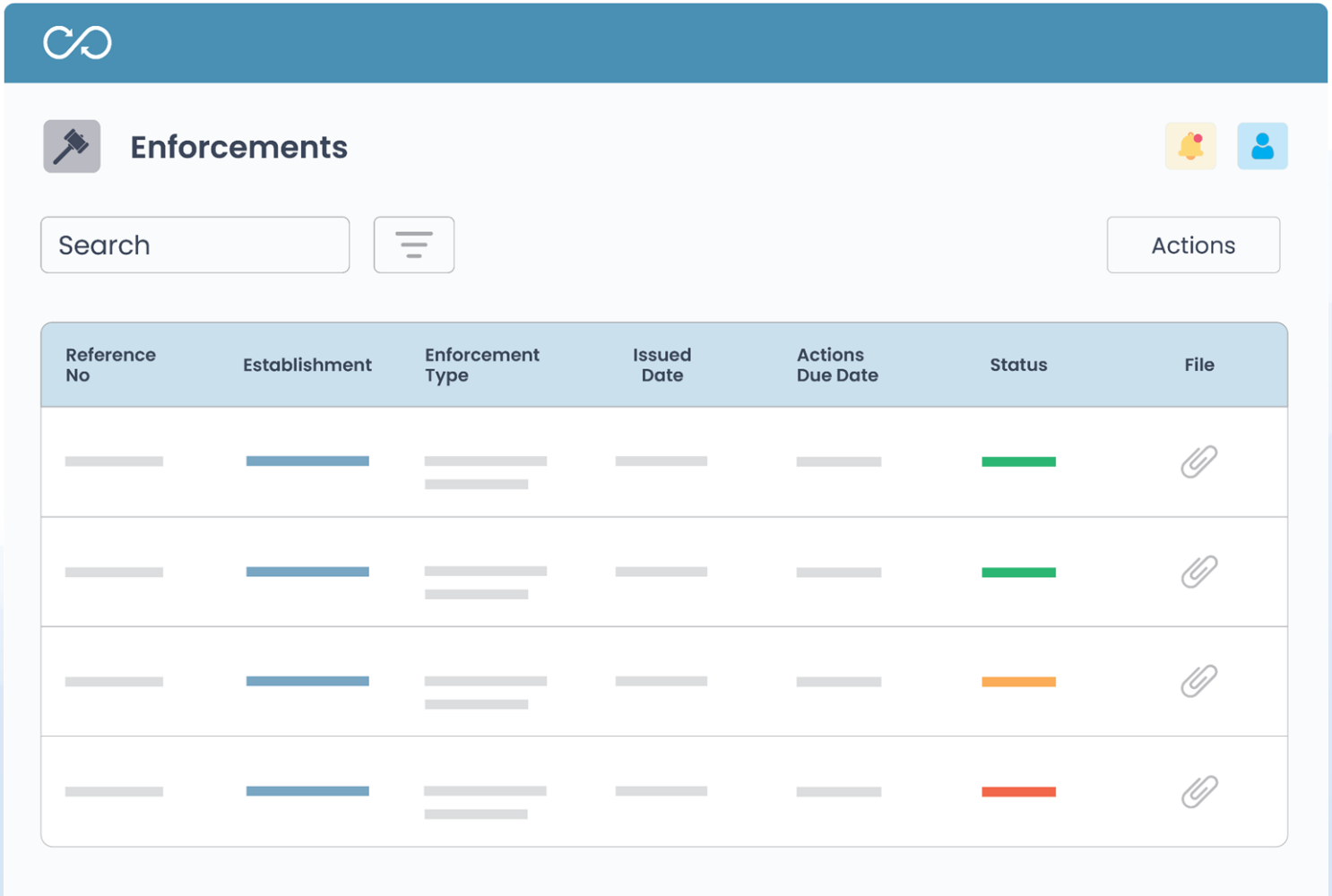
Track and manage pump out reports with ease



Auto-schedule inspections & submit reports from the field



Make it easy for your users to maintain compliance

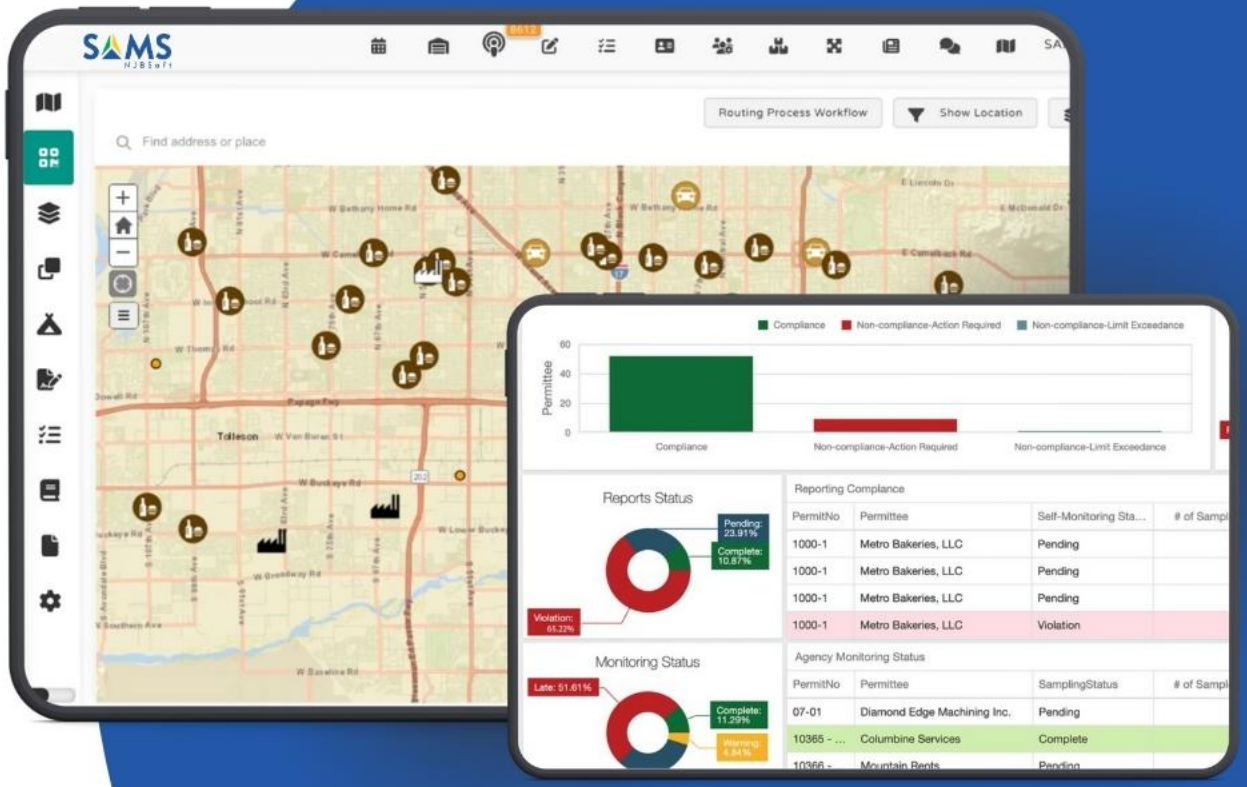


SAMS IPP

esri Partner Network Member

Industrial Pretreatment Management Software

- ✓ Prevent violations before they happen
- ✓ Enforce permit limits with confidence
- ✓ Audit-ready, defensible records
- ✓ One connected system of truth



Automated compliance | CROMERR-ready portals | Mobile workflows

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AICPA SOC aicpa.org/soc4so SOC for Service Organizations | Service Organizations

NJBSoft.com

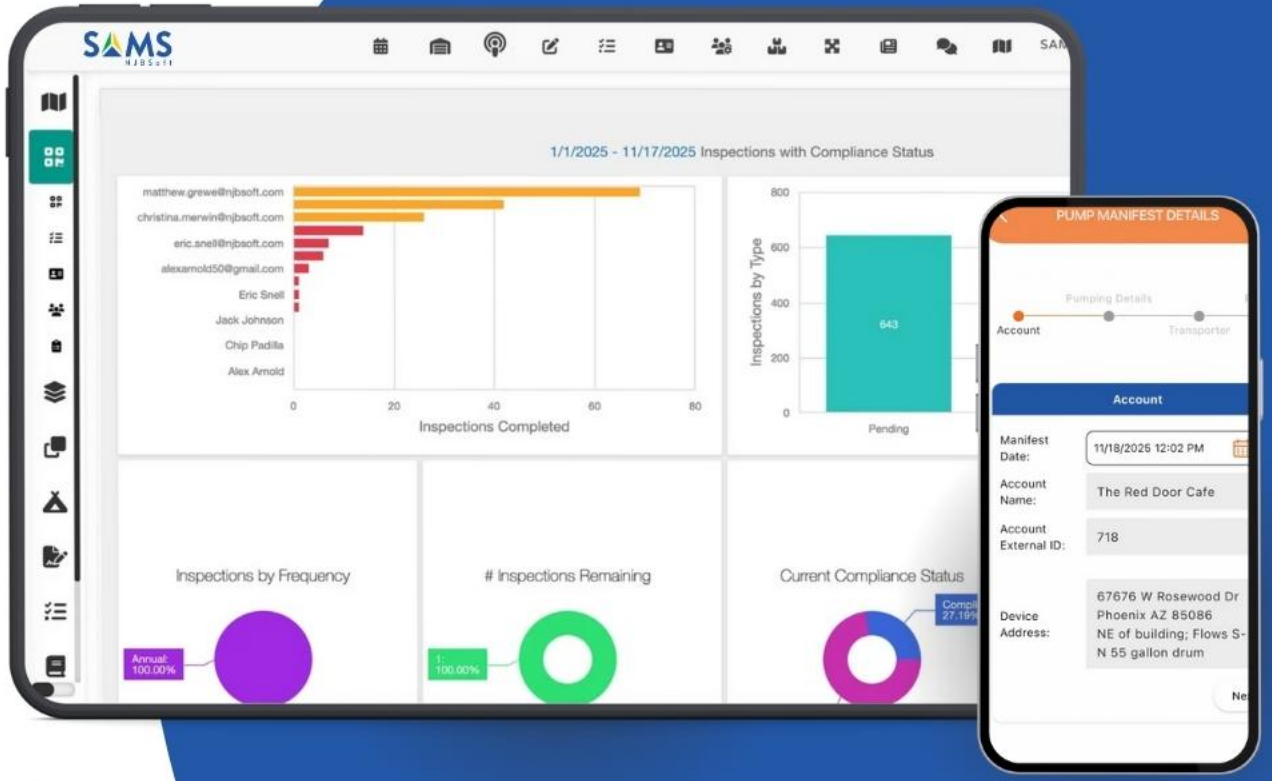
Book a Demo

SAMS FOG

esri Partner Network Member

FOG Compliance Management Software

- ✓ Stop blockages at the source
- ✓ Defensible, inspection-ready data
- ✓ One connected system of truth
- ✓ Dedicated customer and hauler portals



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The All-In-One Operating System For Water Management

Klir Industrial Pretreatment & FOG

WSA/PPRC Pretreatment Program
May, 2024

Jessica Wood
jessica.wood@klir.com
858-722-5377

FOG INFORMATION MANAGEMENT SOFTWARE QUESTIONS

1. What is the ANNUAL cost per user license?
2. Fully functional from desktop, tablets, and smartphones? If so, do you charge extra for mobile capability?
3. Is there an annual flat fee that grants full access to the complete program and all available features? Are there levels/tiers? If so, what are they and what are the annual costs?
4. Is there a charge for set up, data integration, and implementation/? if so, how much?
5. Is there a charge for multiple municipal users? If so, how much per user?

Adapted from “Choosing the right software to manage your FOG Control Program”, FOG in the News, US FOG ALLIANCE, June 2022

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FOG INFORMATION MANAGEMENT SOFTWARE QUESTIONS

6. Is there a charge for program training? If so, how much?
7. Is there ever any potential charge for customer/technical support? If so, how much?
8. Are there additional charges for program updates? If so, how much?
9. Are software downloads required? If so, how much extra cost?
10. Can FSE users access the portal with their own passwords? If so, is this an extra cost? How much?
11. Can transporters access the portal with their own passwords? If so, is this an extra cost? How much?

Adapted from “Choosing the right software to manage your FOG Control Program”, FOG in the News, US FOG ALLIANCE, June 2022

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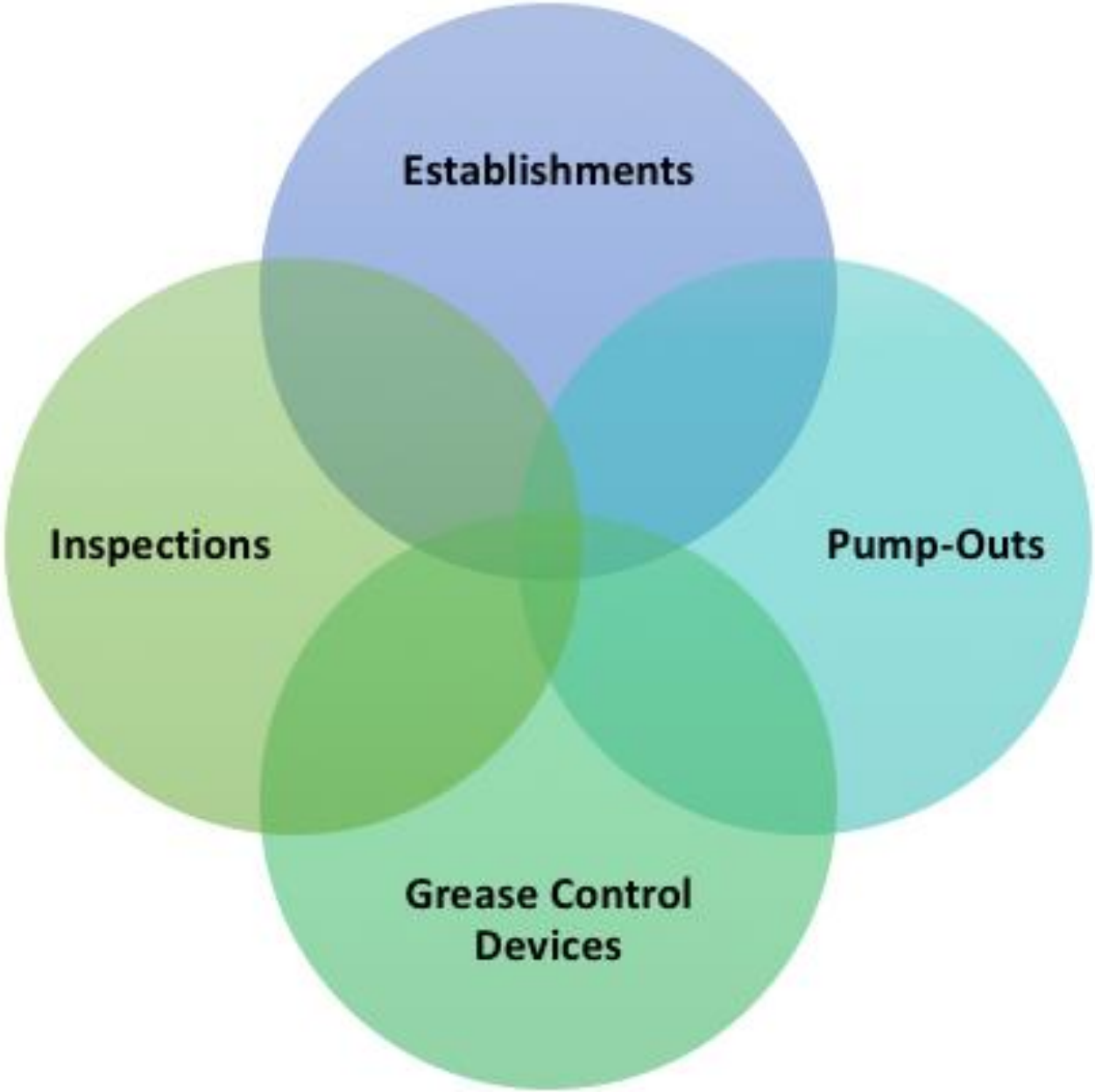
WHATEVER YOU DECIDE TO USE

You'll want to include these four elements:



FOG HAPPENS

noodles & company

IN-N-OUT BURGER

Red Lobster

Denny's

IHOP RESTAURANT

OUTBACK STEAKHOUSE

SUBWAY

T.G.I. FRIDAY'S

BUFFALO WILD WINGS GRILL & BAR

Wendy's OLD FASHIONED HAMBURGERS

CHIPOTLE MEXICAN GRILL

Jack in the box

HOOTERS

A&W ALL AMERICAN FOOD

DUNKIN' DONUTS

Krispy Kreme DOUGHNUTS

Applebee's

KFC

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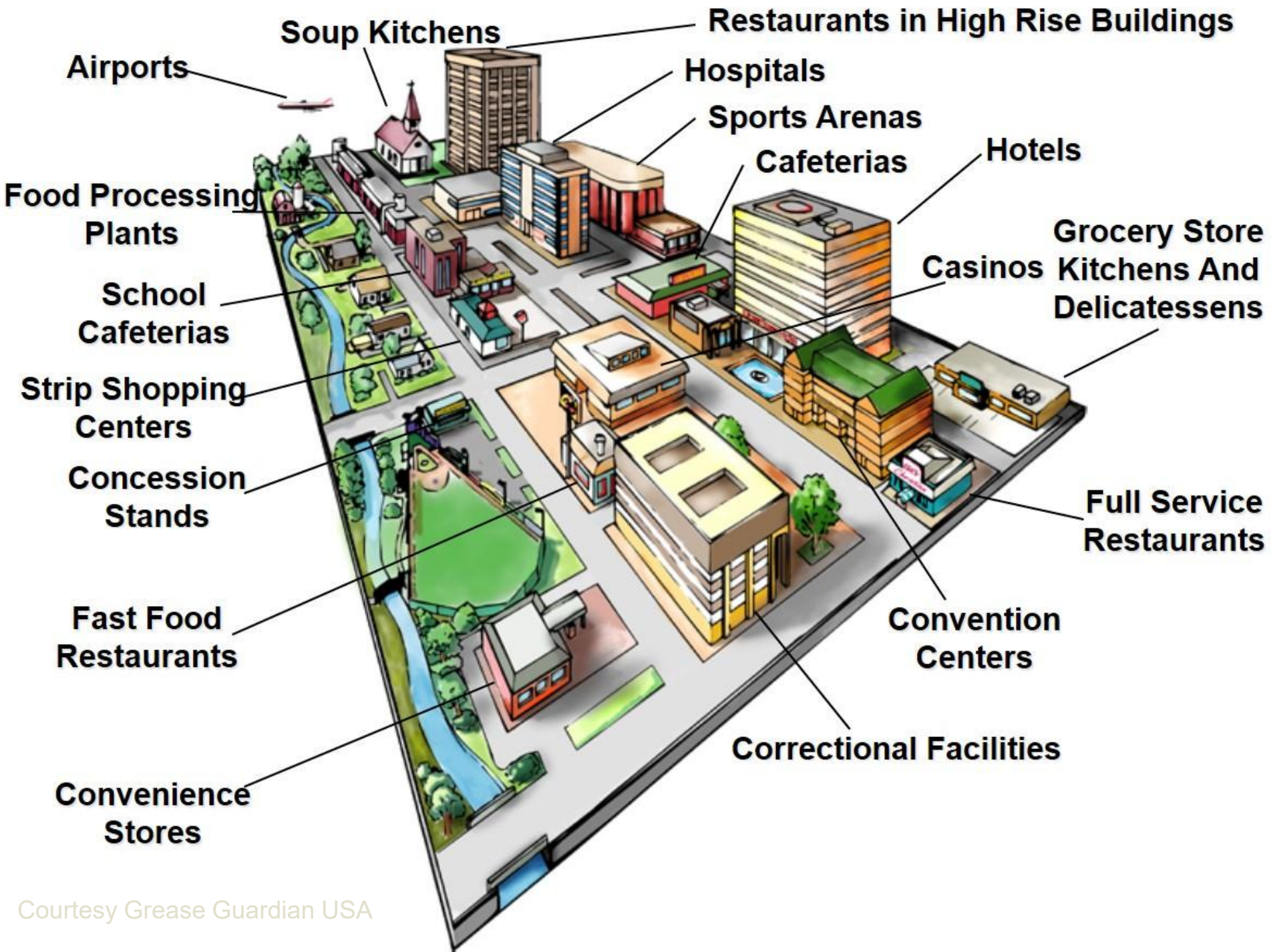


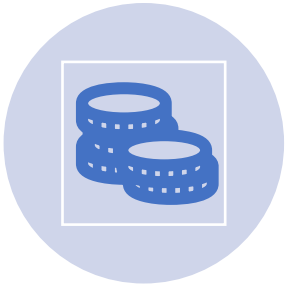
Courtesy Grease Guardian USA

Ultimate FOG Program Outcomes

- No Sanitary Sewer Overflows (SSOs)
- No FOG-Blocked Sewer Lines
- Entire Sewer Collection System Operation & Maintenance
- No Wastewater Treatment Plant Discharge Permit Violations due to FOG
- All FSEs are compliant

HOW DO WE HELP ACHIEVE THESE GOALS?

Performance Management



Inputs: Money and resources needed

Outcomes: What do we want to achieve

Outputs: How do we know we're making progress

Performance Measures: Tracking progress to achieve funded activities

Outcomes

Reduce/Eliminate FOG-related Sanitary Sewer Overflows (SSO)

- **Metrics – reduction in number of SSOs attributed to FOG**

What are the numeric values or %-reduction values to use?

Outcomes

Reduction of non-routine FOG-related collection system cleaning

- **Metrics – reduction in the lineal feet of FOG lines (“hot” or “red” lines) cleaned**

Reduction in the number of FOG-related pump station services

- **Metrics – reduction in number of pump station services related to FOG annually**

What are the numeric values or %-reduction values to use?

Outcomes

Increased FSE compliance

- **Metrics – increase in the number of FSEs that are in compliance with FOG program requirements**

What are the numeric values or %-reduction values to use?

Establish/ MODIFY Legal Authority

Legal Authority

- State and/or Local Plumbing Codes
  - Uniform Plumbing Code
  - International Plumbing Code
  - American Society of Plumbing Engineers Plumbing Engineer Design Handbook, Vol 4, Chapter 8, Table 8.3.
- Sewer Use Ordinance

INDUSTRIAL PRETREATMENT LEGAL AUTHORITY

- Applies to all non-domestic discharges
- National pretreatment regulations (40cfr part 403)
- Ordinance examples
- Protection still required for potws without an approved pretreatment program

40 CFR Part 403 PROHIBITED DISCHARGES

NONE = No revision necessary REQ = Require Revision REC = Recommend Revision

	Part 403 Citation	Model SUO Section	REVISIONS NONE	REQ	REC	POTW Ordinance Section	Comments / Notes
15. Slug Load or Slug Discharge	403.8(f)(2)(vi)	§ 1.4 HH					
16. Other definitions based on terms used in the POTW Ordinance							
B. National Pretreatment Standards – Prohibited Discharges							
1. General Prohibitions							
a. Interference	403.5(a)	§ 2.1A					
b. Pass Through	403.5(a)	§ 2.1A					
2. Specific Prohibitions [403.5(b)]							
a. Fire/Explosion Hazard (60° C or 140° F flashpoint)	403.5(b)(1)	§ 2.1B(1)					
b. pH/Corrosion	403.5(b)(2)	§ 2.1B(2)					
c. Solid or Viscous/Obstruction	403.5(b)(3)	§					
d. Flow Rate/Concentration (BOD, etc.)	403.5(b)(4)	§					
e. Heat; exceeds 40° C (104°F)	403.5(b)(5)	§					
f. Petroleum/Nonbiodegradable Cutting/Mineral Oils	403.5(b)(6)	§ 2.1B(6)					
g. Toxic Gases/Vapor/Fumes	403.5(b)(7)	§					
h. Trucked/Hauled Waste	403.5(b)(8)	§					

Office of Water
EPA-833-B-07-001
February 2007

Applies to All POTWs

- **pH>5.0**
- **No obstruction from solid or viscous wastes**
- **Trucked/hauled waste**

Legal Authority Needed

FOG CONTROL ORDINANCE

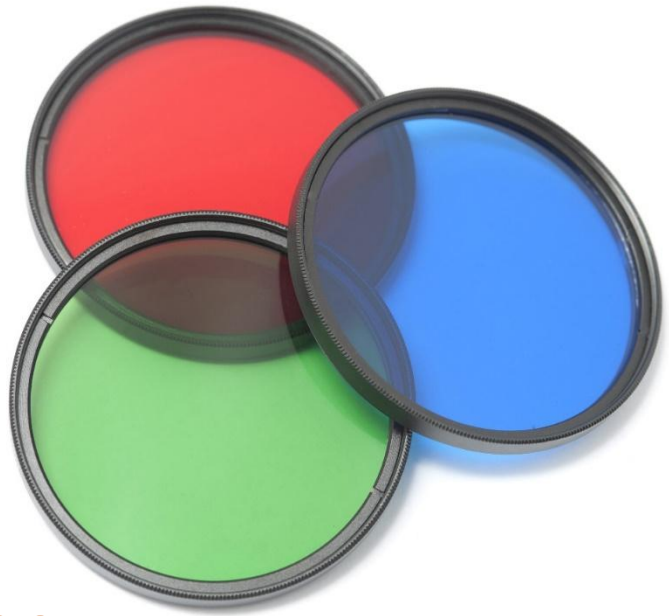
- Develop the proper legal authority for a FOG control program TO:
  - Condition or prohibit fog discharges
  - Require GREASE REMOVAL DEVICES (GRD);
  - REQUIRE registration and/or permitting (OPTIONAL);
  - Establish minimum performance requirements;
  - Establish design, operation & maintenance standards;
  - Perform monitoring, inspections & enforcement;
  - REQUIRE RECORDKEEPING, REPORTING & notifications
  - Regulate waste haulers and disposal.

JURISDICTIONAL AND LEGAL AUTHORITY CHALLENGES

Overlapping Jurisdictions

There are three overlapping jurisdictions, each with their own code and authority:

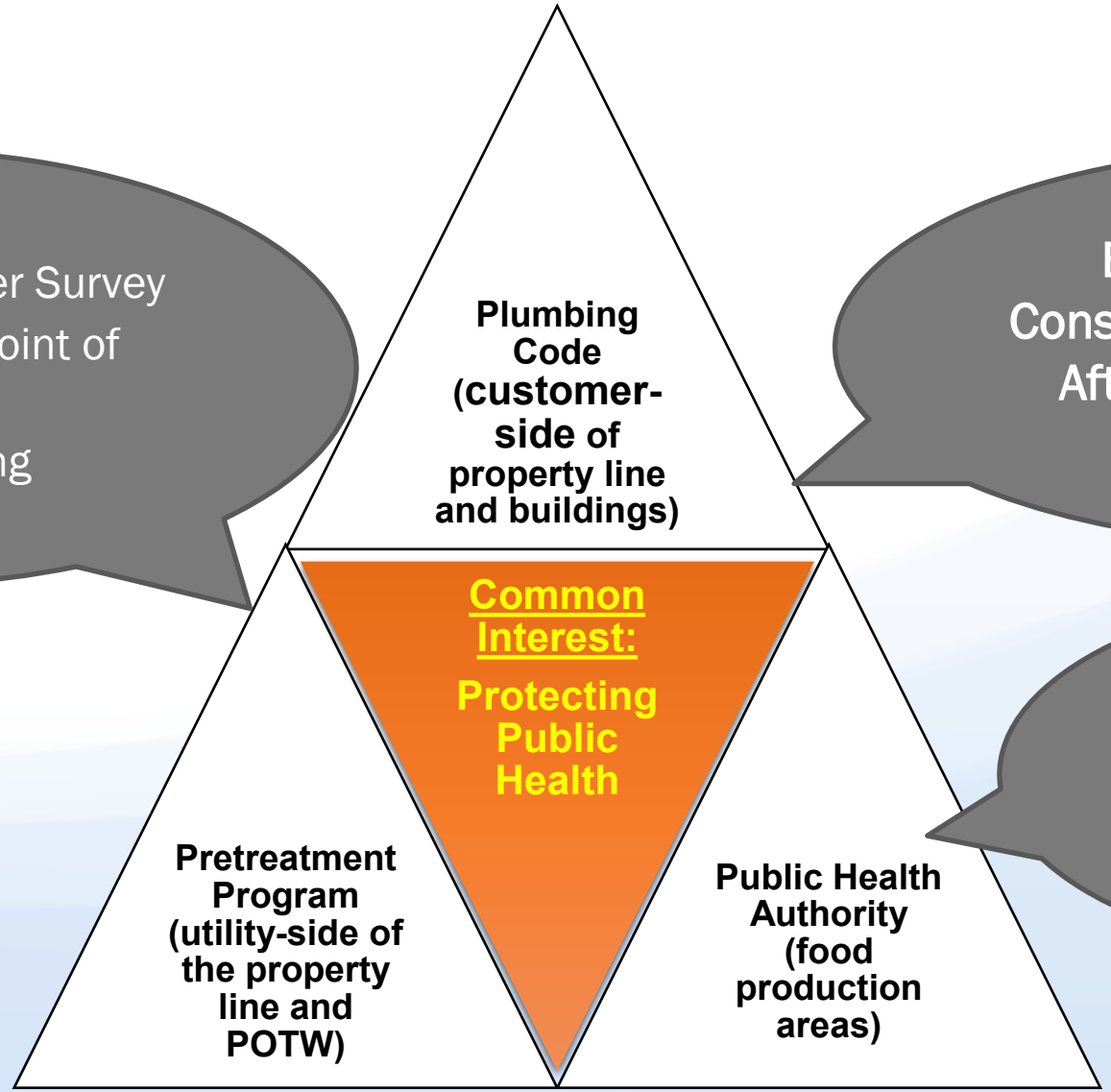
- Plumbing Code (State or Local)
- Pretreatment Program (NPDES)
- Public Health Authority



"Authority Having Jurisdiction" (AHJ) ?????

Jurisdictional Authority

Before – Wastewater Survey
Construction – Point of Connection
After - Ongoing



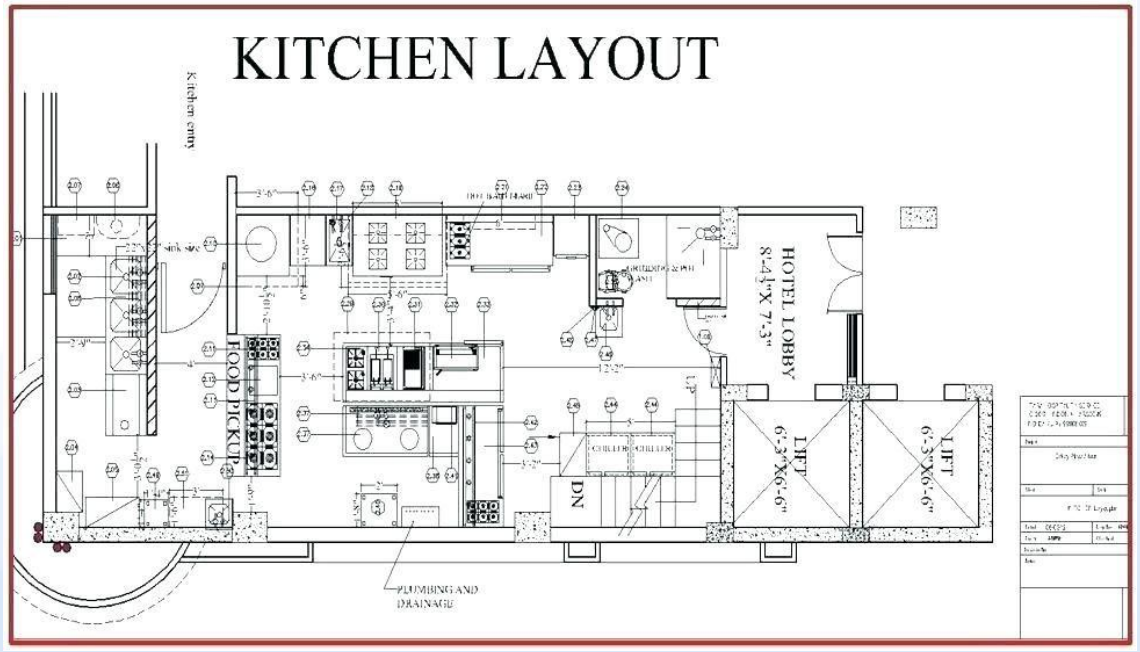
Before – Plans Review
Construction – Permit issuance
After – No jurisdiction after permit is signed off

Relationship begins just before the FSE opens its doors for business

What is the current plan review process?

Are you or can you be part of the Review Process?

Grease Interceptor Sizing
It Is Not Magic…



- § 25-12-153 LOCAL AMENDMENTS TO THE UNIFORM PLUMBING CODE.
  - **1009.2 Approval.** Austin Water approves the size, design, type, and location of each interceptor or separator. Except as otherwise specifically allowed by the City Code, wastes that do not require treatment or separation may not be discharged into any interceptor. A grease, sand, or other gravity interceptor must be field tested by applying a minimum of a one-inch water column above the lid seal of the interceptor.

APPROACHING ENFORCEMENT

- Broad Authority
  - Each application individual
  - Time consuming and potentially expensive
  - Administrative process lacking

- Situational
  - Re-inspection fee as needed
  - Cost Recovery for SSOs, Illicit discharges or Cleaning when source(s) identified
  - Non-conforming, illicit actions or construction
  - Repeated SSO, Illicit discharge, recalcitrant follow-up

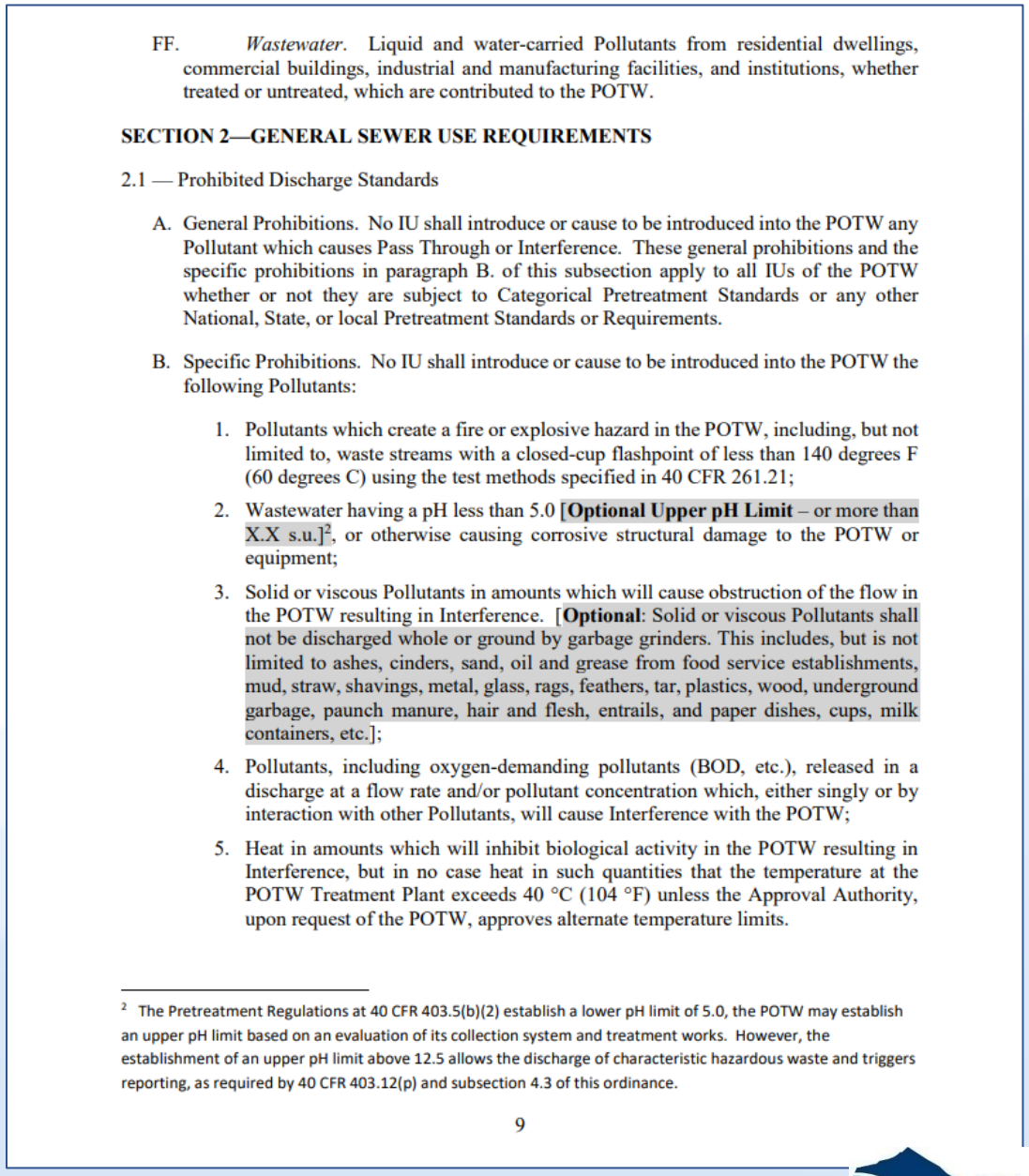
Enforcement Options

Use existing municipal code

- Can you use municipal “Nuisance” code?
- Typically enforced by code enforcement officer using a “ticket”

Use Sewer Use Ordinance

- Enforcement Response Plan should describe
  - Warning Letters
  - Escalating Administrative Penalties
  - Orders (Show Cause, Consent, Compliance)



FF. *Wastewater*. Liquid and water-carried Pollutants from residential dwellings, commercial buildings, industrial and manufacturing facilities, and institutions, whether treated or untreated, which are contributed to the POTW.

SECTION 2—GENERAL SEWER USE REQUIREMENTS

2.1 — Prohibited Discharge Standards

A. General Prohibitions. No IU shall introduce or cause to be introduced into the POTW any Pollutant which causes Pass Through or Interference. These general prohibitions and the specific prohibitions in paragraph B. of this subsection apply to all IUs of the POTW whether or not they are subject to Categorical Pretreatment Standards or any other National, State, or local Pretreatment Standards or Requirements.

B. Specific Prohibitions. No IU shall introduce or cause to be introduced into the POTW the following Pollutants:

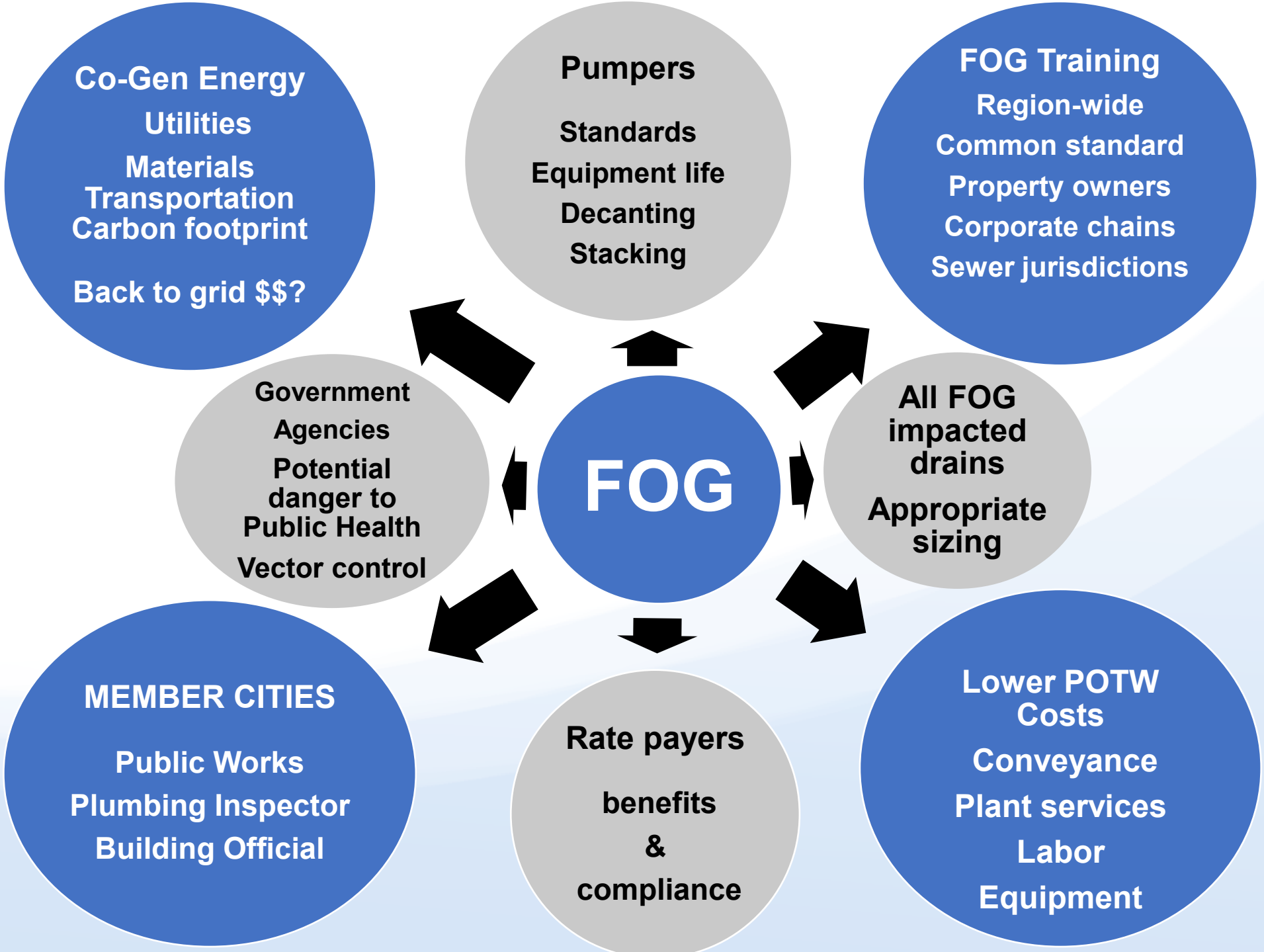
1. Pollutants which create a fire or explosive hazard in the POTW, including, but not limited to, waste streams with a closed-cup flashpoint of less than 140 degrees F (60 degrees C) using the test methods specified in 40 CFR 261.21;
2. Wastewater having a pH less than 5.0 [**Optional Upper pH Limit** – or more than X.X s.u.][2], or otherwise causing corrosive structural damage to the POTW or equipment;
3. Solid or viscous Pollutants in amounts which will cause obstruction of the flow in the POTW resulting in Interference. [**Optional**: Solid or viscous Pollutants shall not be discharged whole or ground by garbage grinders. This includes, but is not limited to ashes, cinders, sand, oil and grease from food service establishments, mud, straw, shavings, metal, glass, rags, feathers, tar, plastics, wood, underground garbage, paunch manure, hair and flesh, entrails, and paper dishes, cups, milk containers, etc.];
4. Pollutants, including oxygen-demanding pollutants (BOD, etc.), released in a discharge at a flow rate and/or pollutant concentration which, either singly or by interaction with other Pollutants, will cause Interference with the POTW;
5. Heat in amounts which will inhibit biological activity in the POTW resulting in Interference, but in no case heat in such quantities that the temperature at the POTW Treatment Plant exceeds 40 °C (104 °F) unless the Approval Authority, upon request of the POTW, approves alternate temperature limits.

[2] The Pretreatment Regulations at 40 CFR 403.5(b)(2) establish a lower pH limit of 5.0, the POTW may establish an upper pH limit based on an evaluation of its collection system and treatment works. However, the establishment of an upper pH limit above 12.5 allows the discharge of characteristic hazardous waste and triggers reporting, as required by 40 CFR 403.12(p) and subsection 4.3 of this ordinance.

9

Stakeholders

- *FSE's* (small businesses, chains, schools, churches, hospitals, industrial campuses, institutional kitchens)
- Building, plumbing officials, plan reviewers
- Health inspectors
- Pumpers
- Contractors, builders, architects
- Landlords, property managers
- DEQ, EPA, Cities



Food Services Establishments Do They Know…

- The municipality has FOG requirements
- They need have a Grease Removal Device (GRD)
- They must maintain the GRD with regularly scheduled pump outs
- They need to keep records of the pump outs
- There is potential for enforcement action

FOG Triage

- Identify the FOG Hot Spots
- Rate the FSE's FOG Production
- Create a Plan
  - Inspect the FSE
  - Effective Pretreatment
  - Effective Maintenance

Watch WSA's "A How-to Guide on FOG Triage" Video on www.westernstatesalliance.org in the Resource Library

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Do an do an FSE inventory and characterize your FSEs.

FSE Data (partial list)

- Physical Address (and GIS data or latitude/longitude)
- Potential FOG Loading of FSE (very high, high, medium, low)
- Proximity of FSE to a FOG-impacted sanitary sewer line (FOG line)
- Type(s) of FOG pretreatment
- Interceptor maintenance history
- Fixtures and drains connected to interceptor
- Contact information for FSE
- Landlord or property manager contact information

Prioritizing Inspections

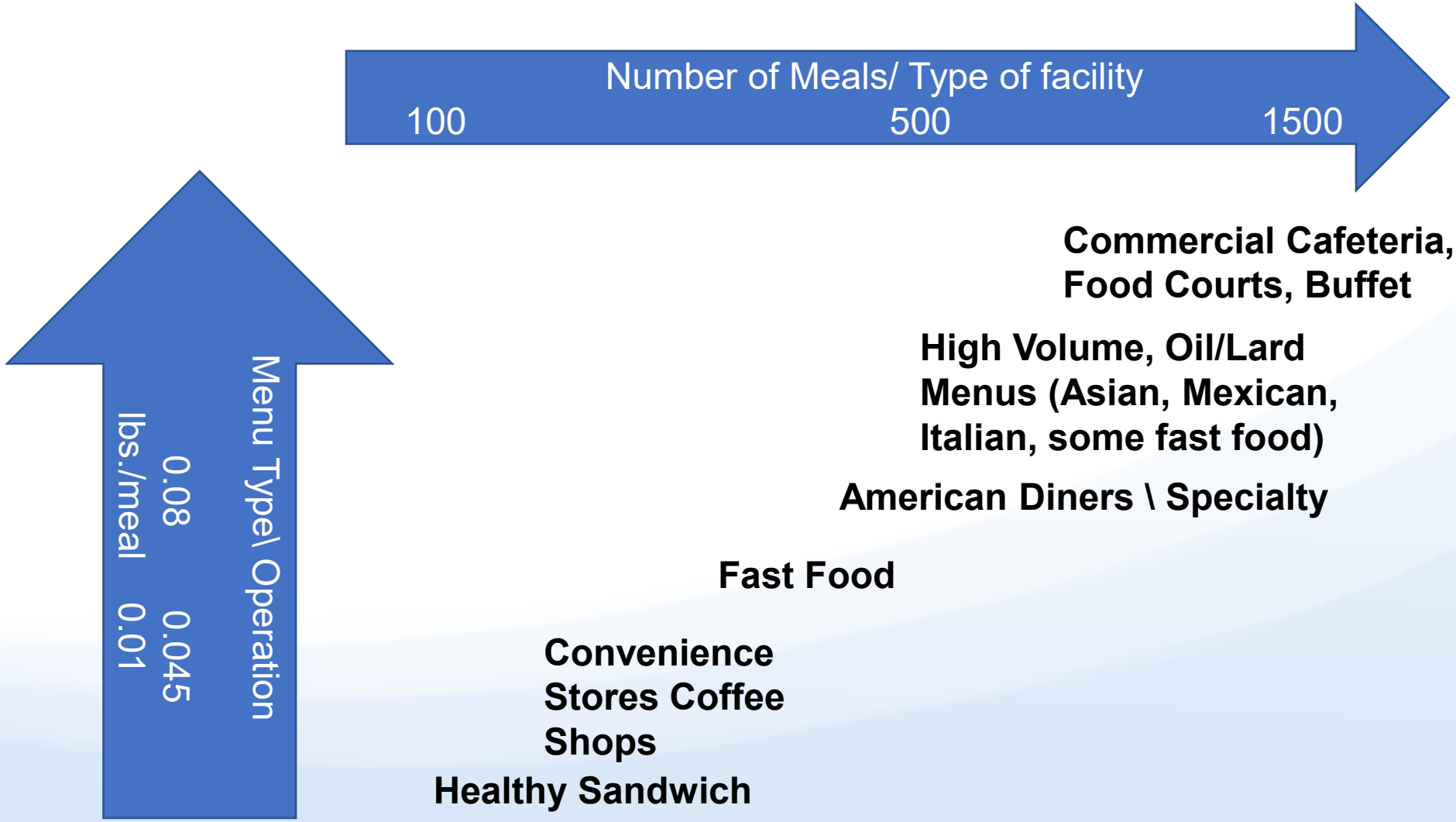
- Give priority to FSEs on most frequently cleaned lines.
- Give priority to FSEs that produce the most FOG.

COLLECTION SYSTEM EFFORTS

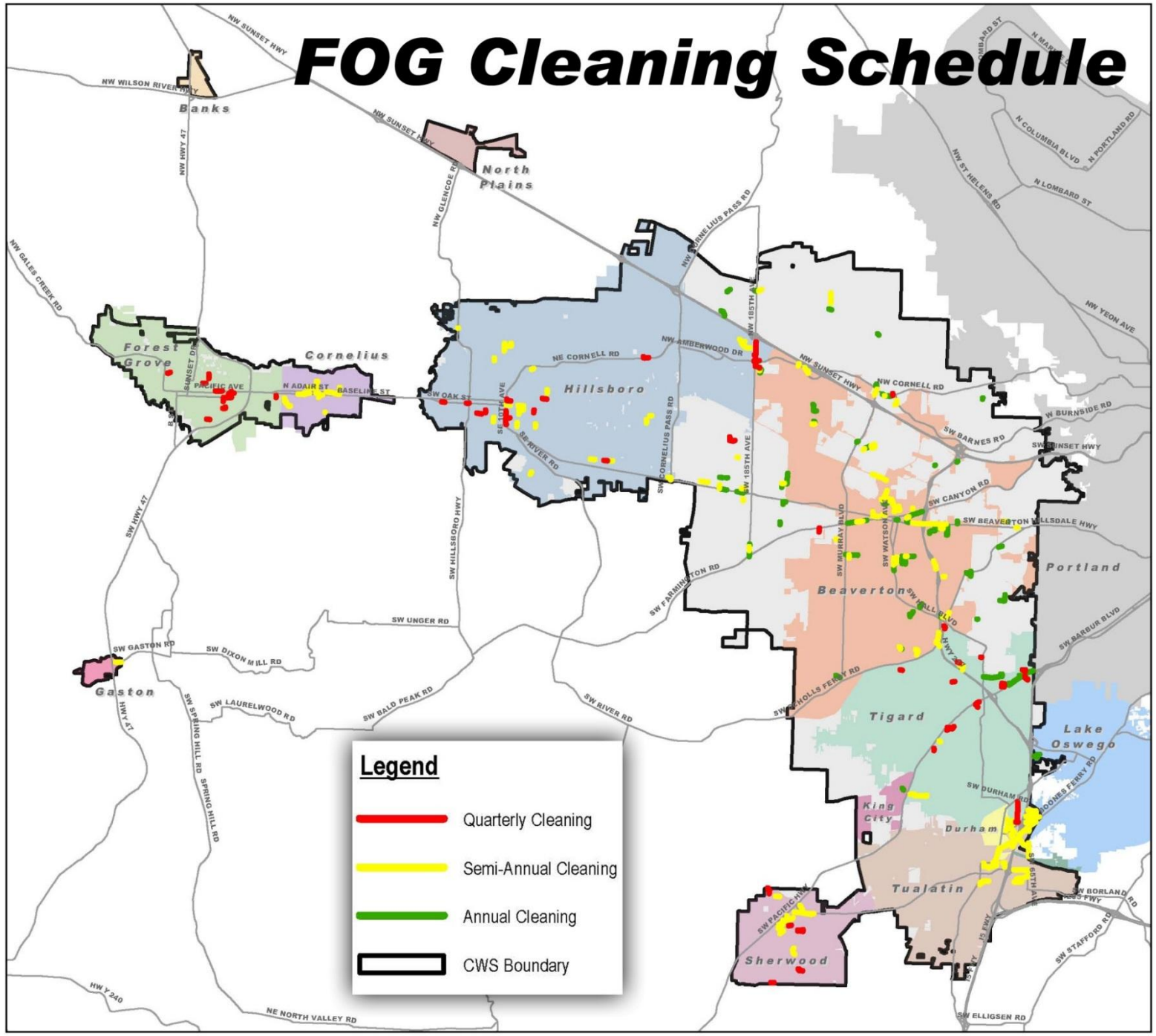
Collection System Data (partial list)

- Which collection system line segments are impacted by FOG?
- What is the cleaning frequency for these FOG lines?
- Does the frequency exceed the established line cleaning frequency for the normal collection system?
- What is the cost per line segment to keep these FOG lines cleared?
- Are there pump stations impacted by FOG?
- How often are these stations cleaned?
- What is the cost per cleaning?

FOG PRODUCTION



FOG Cleaning Schedule



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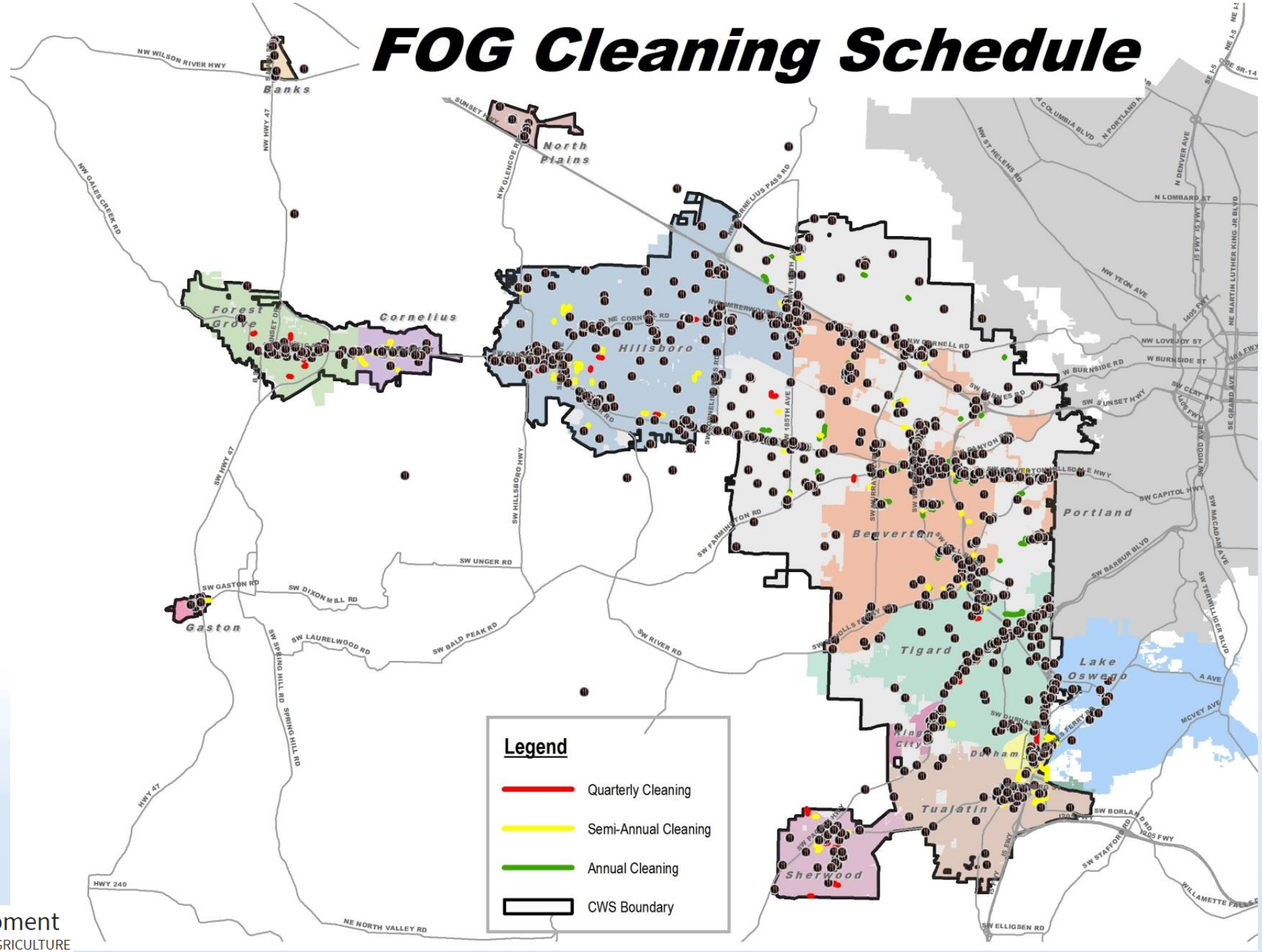
FOG Cleaning Schedule



FOG Production

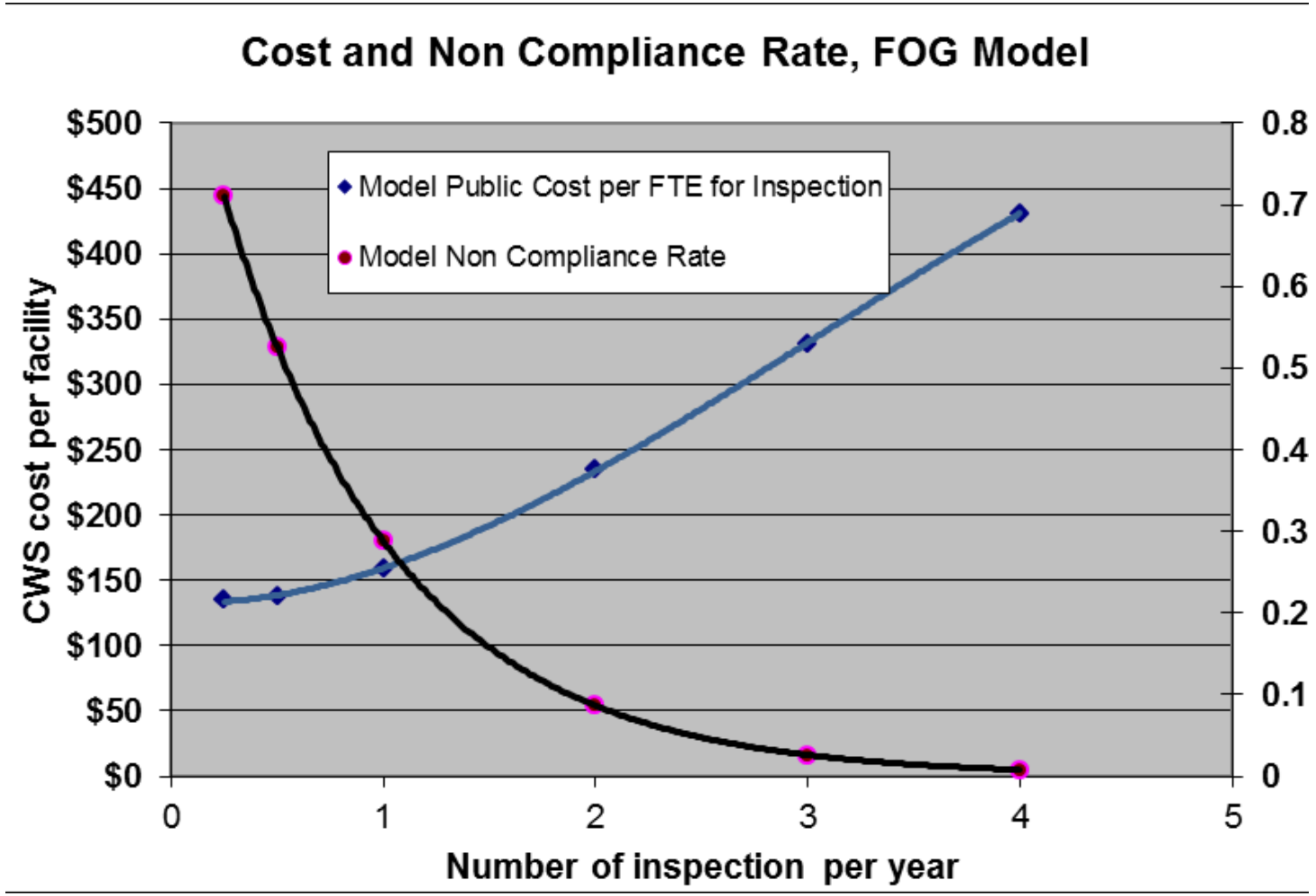
- Very High
- High
- Medium
- Low

Focus Your “Triage” Efforts

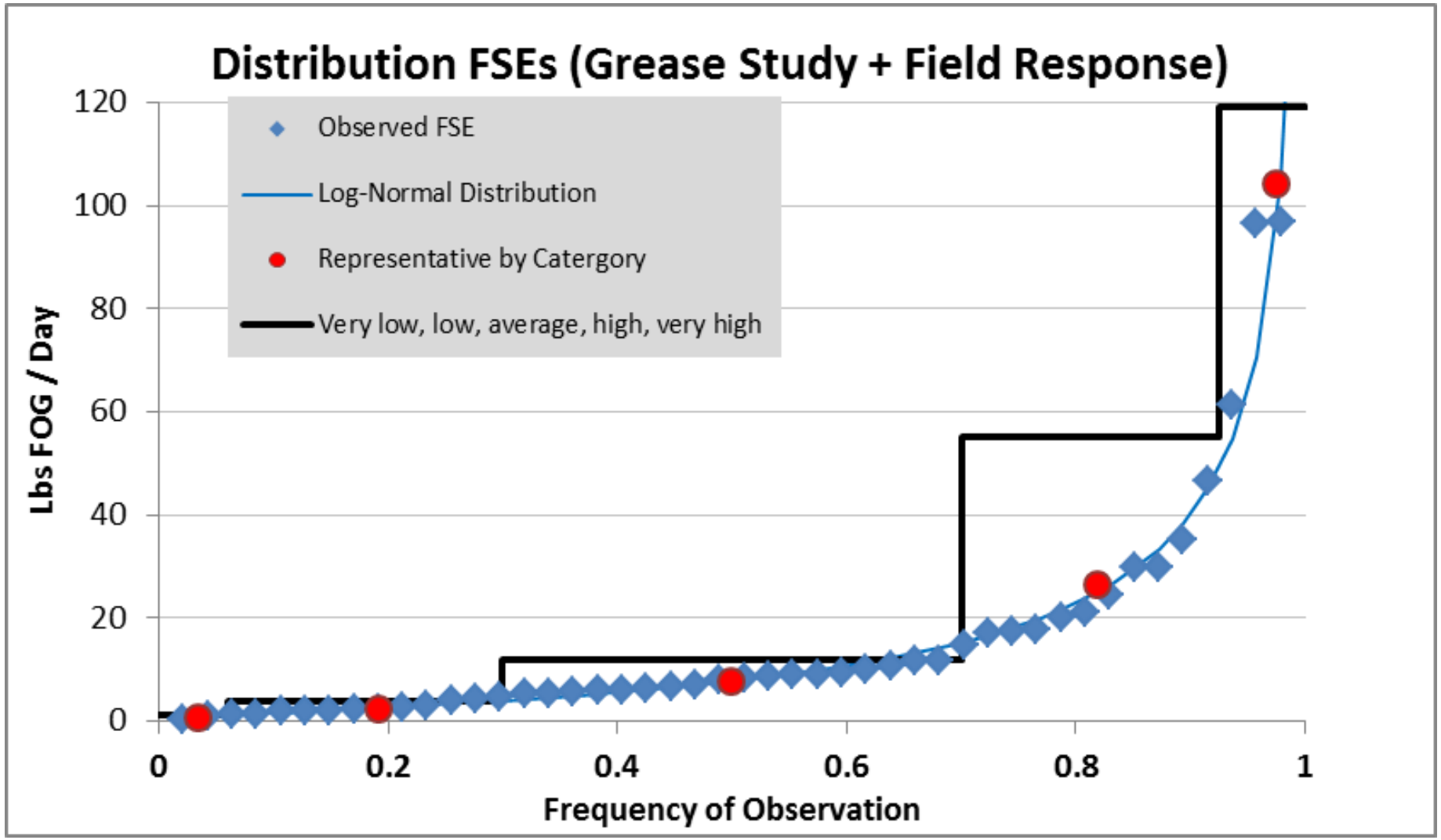
- Performance goals
  - High and very high FOG FSE
- Plan review
- Pump stations, BLOCKAGES
- SSOs
- Outreach efforts
  - Multi-family housing
  - FOG lines residential areas

Performance Goals

- **Current, all FSEs / year**
  - Initial inspections, status
  - Annual inspection, 1 pump out
  - Inspections similar for all FSEs
- **Prioritized Inspection**
  - 15-20% of FSE
  - Results oriented inspections and follow-up
  - Technical support to FSE
  - Consistent inspector training, by jurisdiction
  - Program support by Jurisdiction
  - Expectations specific by each Jurisdiction



Not all FSEs Generate the same FOG load…



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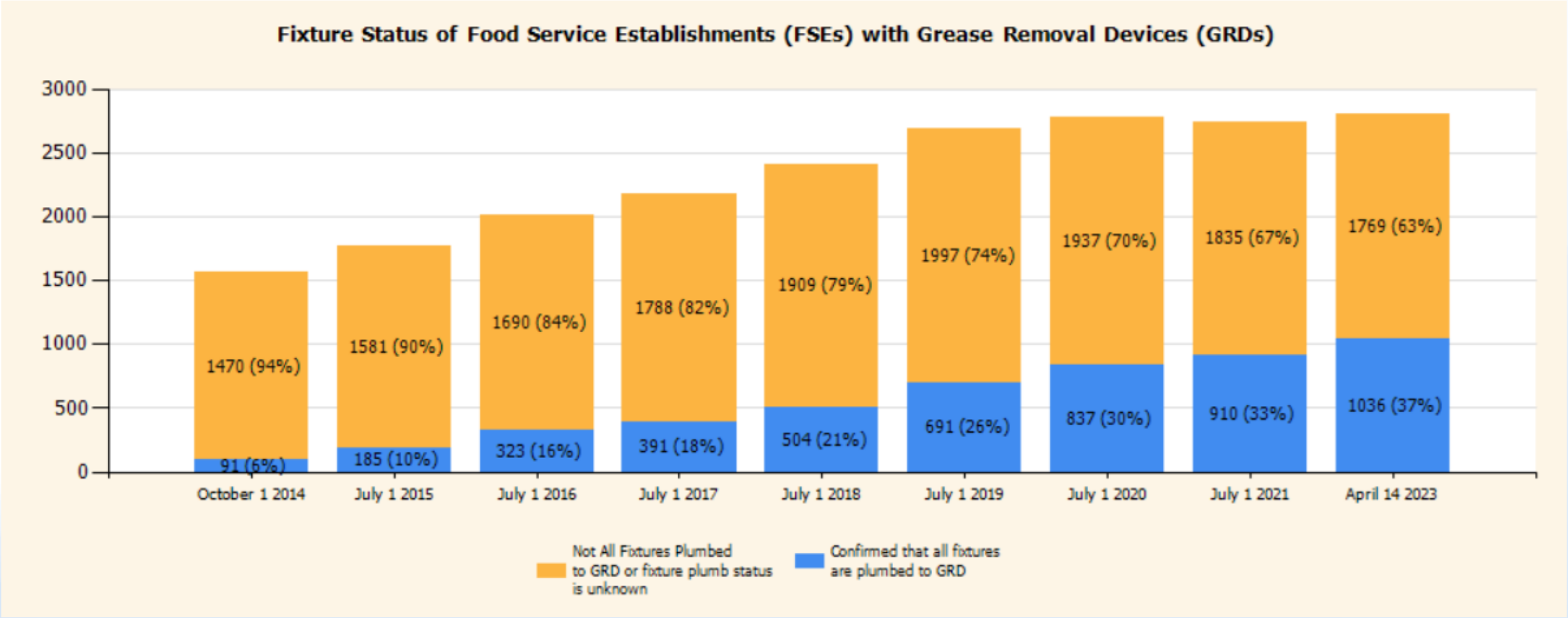
PORTLAND INSPECTION RESULTS



MORNING

BUILDING THE BUSINESS CASE

PROGRAM IMPLEMENTATION

FOG Program - Building a Business Case

- Establishing the Need For A FOG Program
- Data Needed
  - Excess Operation & Maintenance Costs
  - Program Development Costs - Planning
  - Program Development Costs – Initial Implementation

FOG Program - Implementation

- Data Acquisition and Management
- Cost-Benefit Analysis
- FOG Program Plan
- Setting FOG Program Outcomes/Outputs
- Legal Authority
- Stakeholder Engagement
- FOG Triage

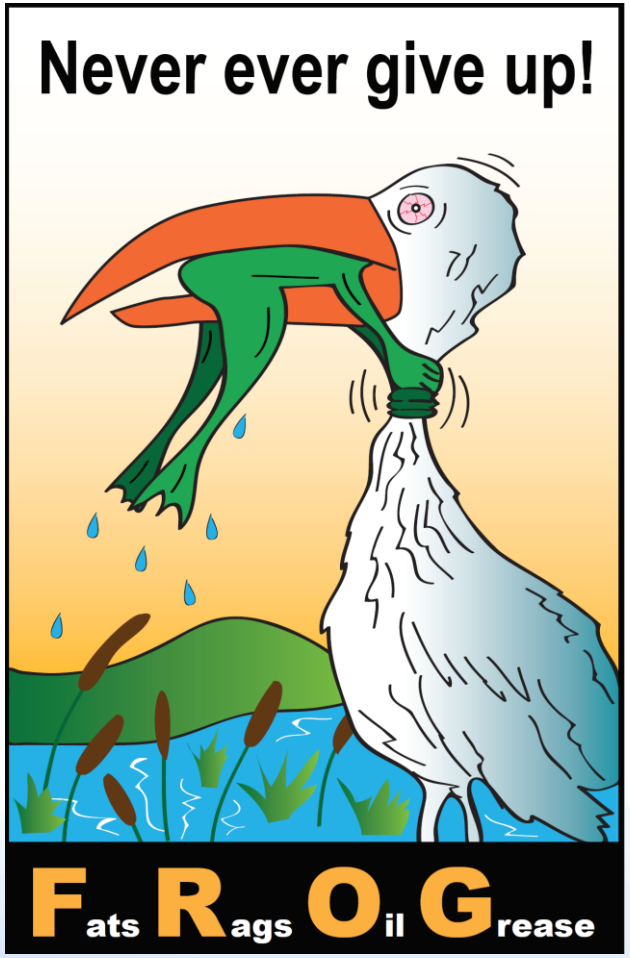
AFTERNOON

PROGRAM IMPLEMENTATION

- FSE FOG MANAGEMENT PRACTICES
- PUBLIC OUTREACH
- FSE EFFECTIVE FOG PRETREATMENT
- FOG AND WATER SEPARATION
- GREASE REMOVAL DEVICES (GRD)

- FSE INSPECTIONS
- PREFERRED PUMPER PROGRAMS
- CONTAMINANTS OF EMERGING CONCERN AND PFAS

CONTACTS:



Arjen DeHoop
(206) 352-2050 ext. 116
E-mail: adehoop@pprc.org

Ed Gilmore
(206) 352-2050 ext. 108
E-mail: egilmore@pprc.org

Ken Grimm
(206) 352-2050 ext. 102
E-mail: kgrimm@pprc.org

David James
(206) 352-2050 ext. 113
E-mail: djames@pprc.org

Jean Waters
(206) 352-2050 ext. 110
E-mail: jwaters@pprc.org

Jude Brown
(206) 352-2050 ext. 104
E-mail: Jbrown@pprc.org

Daniela Garcia
(206) 352-2050 ext. 118
E-mail: dgarcia@pprc.org

Clayton Brown
(206) 352-2050 ext. 109
E-mail: cbrown@pprc.org

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