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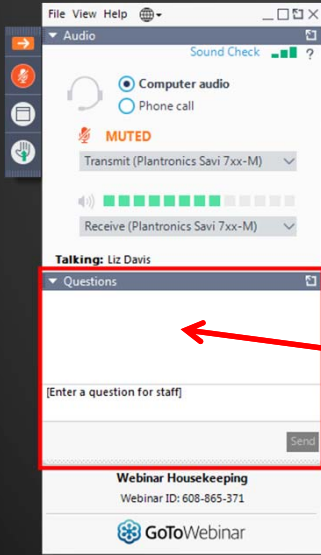
**Into the FOG  
Part 2  
Implementations & Innovations**

*Wednesday December 12 2019  
1:00 - 3:00 PM ET*


The Water Environment Federation logo is located in the bottom right corner of the slide. It features the same stylized white 'W' icon and text as seen in the first slide.

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## How to Participate Today



- Audio Modes
  - Listen using Mic & Speakers
  - Or, select "Use Telephone" and dial the conference (please remember long distance phone charges apply).
- Submit your questions using the Questions pane.
- A recording will be available for replay shortly after this webcast.


  
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## Today's Agenda

- Introductions
  - *Nicholas Anderson*
- Securing Wins from the Ground Up
  - *Don Johnson*
- Monitoring the Fatberg
  - *Michael Goldrich*
- FOG Control: Going Beyond Enforcement
  - *William Kent*
- Q & A

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TOWN of CARY  
NORTH CAROLINA



Don Johnson  
Utility Pretreatment Technician II



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WHY How Who

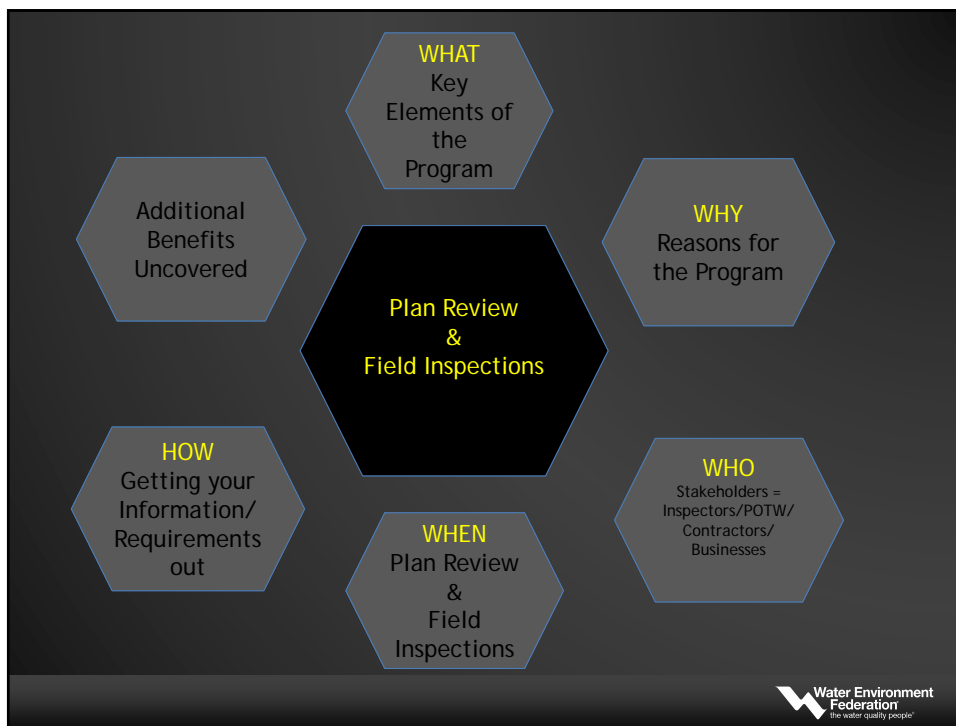
Securing Wins From the Ground Up

The Benefits of Collaboration on Design and Construction

What When



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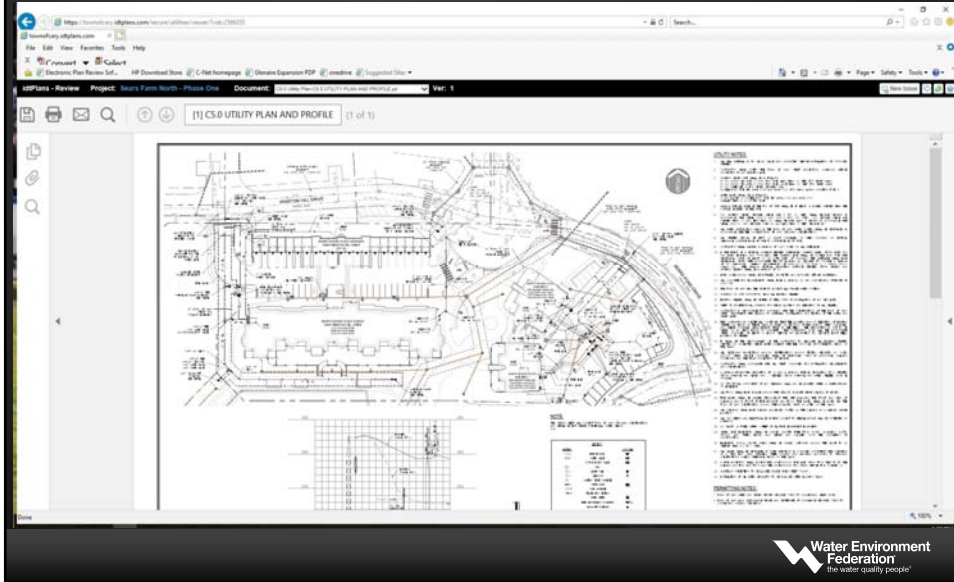
# What - Key Elements

- Pre-design consultation

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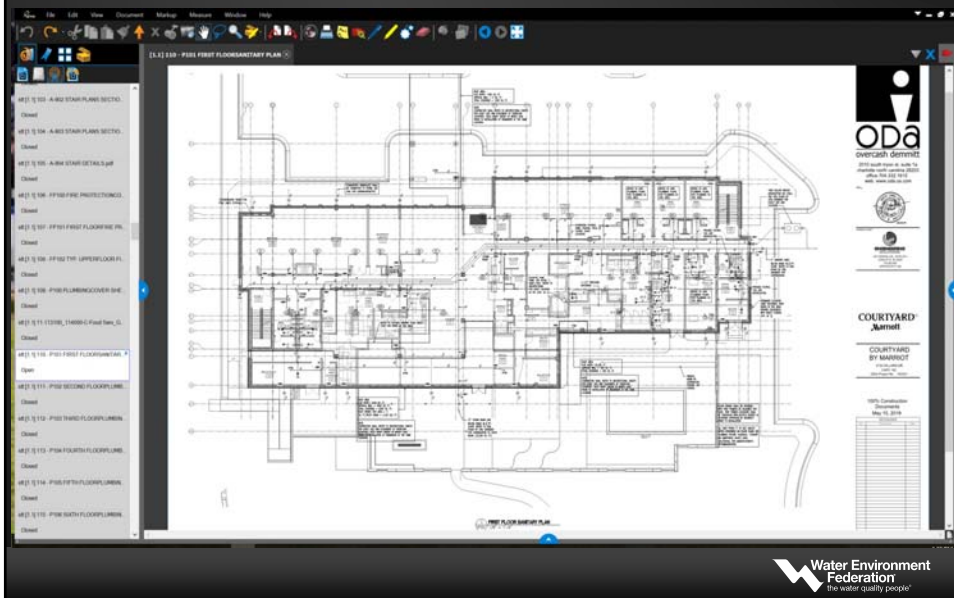
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# What - Key Elements



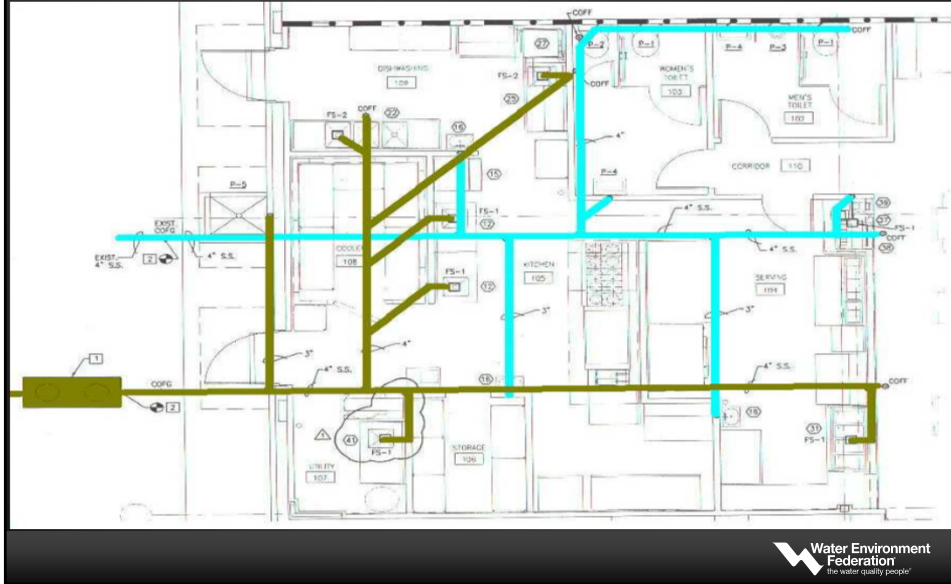
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# What - Key Elements



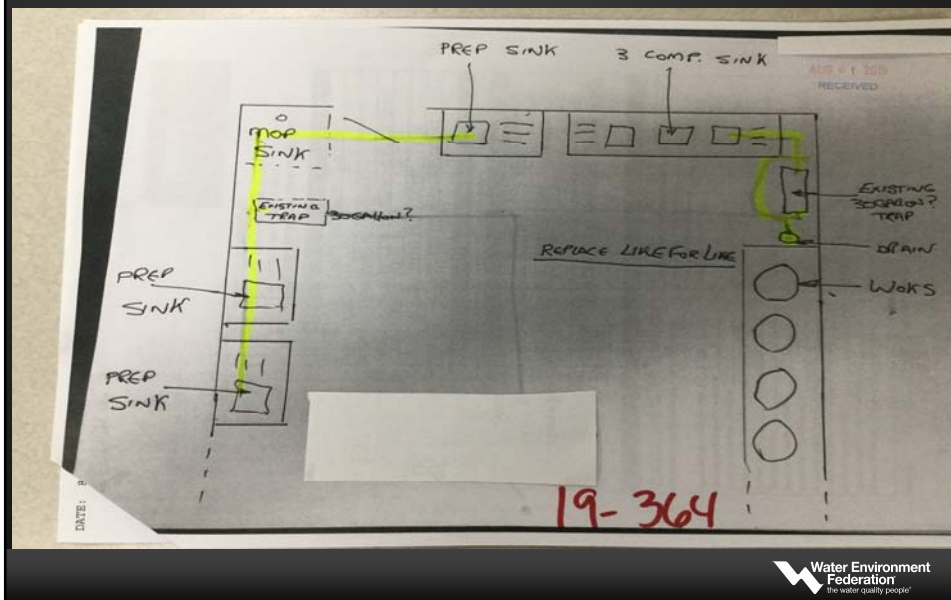
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# What - Key Elements



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# What - Key Elements



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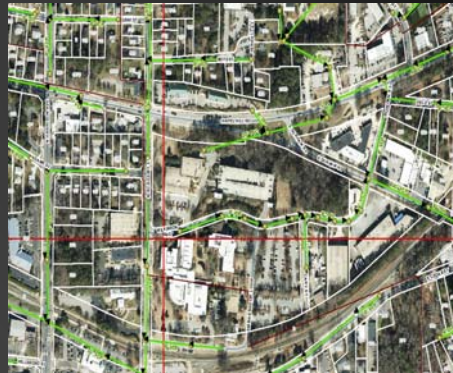
# What - Key Elements



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# Why


- Implementation and Adherence to your Sewer Use Ordinance (SUO)
- Protection of collection system and treatment facilities in a most cost- effective appropriate manner



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# Why

- Implementation and Adherence to your Sewer Use Ordinance (SUO)
  - Determining whether an industry needs permitting, spill plan, inactivation step for Biological Safety Levels (BSL) etc.
  - Determining the appropriate Pretreatment devices for each individual project
  - Prevent concessions by adhering to the SUO and its requirements
  - Prevent costly corrections or retro-fits after construction has finished



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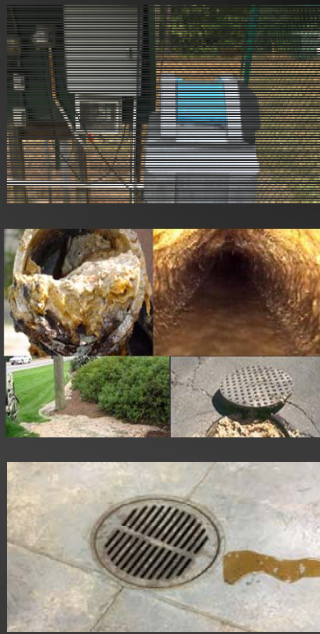

# Why

Why we require Pretreatment devices ?

Sampling equipment and flow monitoring at industries to help identify wastes streams and loading rates of pollutants to Treatment Plants.

Reduce the amount of Fats, Oils & Grease (FOG)

Oil/water separators at car wash and automotive facilities, hydraulically operated elevators.

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# Who

## ➤ Business Owners and Industries



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# Commercial Labs



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# Who

- Planning, Inspections and Permitting Department



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# Who

- Partnership with Building Code Officials



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# Who

- Design Engineers, Architects, Contractors & Builders



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# When

1. Prior to any design- ideally
2. Site plan review- general comments

## GENERAL NOTES

1. WITHIN THE SIGHT DISTANCE TRIANGLES SHOWN, NO OBSTRUCTION BETWEEN 2' AND 7' IN HEIGHT ABOVE THE CURB LINE ELEVATION SHALL BE LOCATED IN WHOLE OR IN PART. OBSTRUCTIONS INCLUDE BUT ARE NOT LIMITED TO ANY BERM, FOLIAGE, FENCE, WALL, SIGN, OR PARKED VEHICLE.
2. ALL CONSTRUCTION SHALL CONFORM TO THE LATEST TOWN OF CARY STANDARDS AND SPECIFICATIONS.
3. ALL DIMENSIONS SHOWN ON SITE PLAN ARE TO FACE OF CURB UNLESS OTHERWISE NOTED.
4. OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) STANDARDS FOR EXCAVATIONS; FINAL RULE 29CFR PART 1926, SUBPART 701 APPLIES TO ALL EXCAVATIONS EXCEEDING FIVE (5) FEET IN DEPTH. EXCAVATION EXCEEDING TWENTY (20) FEET IN DEPTH REQUIRES THE DESIGN OF A TRENCH SAFETY SYSTEM BY A REGISTERED PROFESSIONAL ENGINEER, PROVIDED BY CONTRACTOR RESPONSIBLE FOR EXCAVATION.
5. EQUIPMENT AND PRODUCTS OTHER THAN THOSE SPECIFIED MAY BE USED PROVIDED APPROVAL HAS BEEN OBTAINED FROM THE OWNER IN WRITING PRIOR TO ORDERING OR INSTALLATION. THE CONTRACTOR SHALL WAIVE ANY CLAIM FOR ADDITIONAL COST RELATED TO THE SUBSTITUTION OF ALTERNATE EQUIPMENT.
6. CONTRACTOR SHALL MAINTAIN AN "AS-BUILT" SET OF DRAWINGS TO RECORD THE EXACT LOCATION OF PRIOR TO CONCEALMENT. DRAWINGS SHALL BE GIVEN TO THE ENGINEER UPON COMPLETION OF THE PROJECT. A COPY OF THE TRANSMITTAL LETTER TO THE OWNER.
7. EXISTING IMPROVEMENTS SLATED TO REMAIN THAT ARE DAMAGED DURING CONSTRUCTION SHALL BE REPLACED/RESTORED TO THEIR ORIGINAL CONDITION OR TO THE SATISFACTION OF THE OWNER BY THE CONTRACTOR RESPONSIBLE FOR THE DAMAGE.
8. SOIL UNDER BUILDINGS AND PAVED AREAS SHALL BE COMPACTED TO STANDARD PROCTOR MAXIMUM DRY DENSITY OR AS RECOMMENDED BY THE GEOTECHNICAL ENGINEER.
9. THE CONTRACTOR SHALL NOTE THAT THE DRAWINGS MAY NOT SHOW EVERY OFFSET, TRANSITION, FITTING, ETC. THAT MAY BE REQUIRED. THE CONTRACTOR SHALL INSTALL SUCH STANDARD APPURTENANCES AS REQUIRED TO CLOSELY


## SANITARY SEWER NOTES

1. BACKWATER VALVES SHALL BE PROVIDED FOR ALL BUILDINGS WITH FINAL FLOOR ELEVATIONS LESS THAN 1'-0" ABOVE UPSTREAM MANHOLE.
2. MINIMUM COVER OF 4 FEET TO FINISHED SUBGRADE IN TRAFFIC AREAS AND 3 FEET MIN. COVER OUTSIDE TRAFFIC AREAS SHALL BE PROVIDED FOR ALL COLLECTOR LINES 4 INCHES AND LARGER. IF LESS THAN 4 FEET, DUCTILE IRON PIPE SHALL BE REQUIRED.
3. MINIMUM SLOPE FOR 4 INCH & 6 INCH SANITARY SEWER COLLECTION LINES SHALL BE NO LESS THAN 2.0% AND 1.0% RESPECTIVELY.
4. ALL SANITARY SEWER MAINS SHALL BE PVC SDR-35 EXCEPT WHERE CONDITIONS WARRANT DUCTILE IRON PIPE OR PVC SDR-26 IN ACCORDANCE WITH THE TOWN OF CARY STANDARDS AND SPECIFICATIONS.
5. A PUBLIC SANITARY SEWER EXTENSION PERMIT WILL BE REQUIRED FROM THE TOWN OF CARY PRIOR TO SEWER PIPE INSTALLATION.
6. ALL SEWER CLEANOUTS IN PAVEMENT AREAS SHALL BE HEAVY DUTY TRAFFIC RATED CONSTRUCTION WITH SEWER MINI MANHOLE COVER.
7. GREASE INTERCEPTOR AND TRASH GREASE INTERCEPTORS, SIZING AND DETAILS ARE TO BE INCLUDED WITH BUILDING CONSTRUCTION PLUMBING PLANS. A PLUMBING PERMIT WILL BE REQUIRED FOR INSTALLATION OF THE GREASE INTERCEPTOR AND ANY ASSOCIATED PLUMBING SEWER LATERAL. IF INSTALLED DURING THE SITE DEVELOPMENT PHASE OF CONSTRUCTION.
8. SANITARY SEWER SERVICES SHALL BE PVC SCHEDULE 40. CLEANOUTS SHALL BE SPACED NO MORE THAN 75 FEET APART FOR 4" LATERALS AND 100 FEET FOR 6" LATERALS.
9. CONNECTION OF SANITARY SEWER SERVICE TO AN EXISTING MANHOLE SHALL COMPLY WITH CARY'S STANDARDS, INCLUDING: CORE DRILL FOR OPENING INTO MANHOLE AND INSTALL WITH FLEXIBLE



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# When



3. Building plan review-  
electronic/paper

A Utility Pretreatment Groundwork (U100)  
A Utility Pretreatment Rough-in (U200)  
A Utility Pretreatment Final (U300)

Free Photo by Unknown Author is licensed under CC BY SA



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# When

4. Field Inspections - ground work



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# When

## 4. Field Inspections - under slab ideally



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# When

## 4. Field Inspections - ground work



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# When

## 4. Field Inspections



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# When

- 5. Upon completion of project



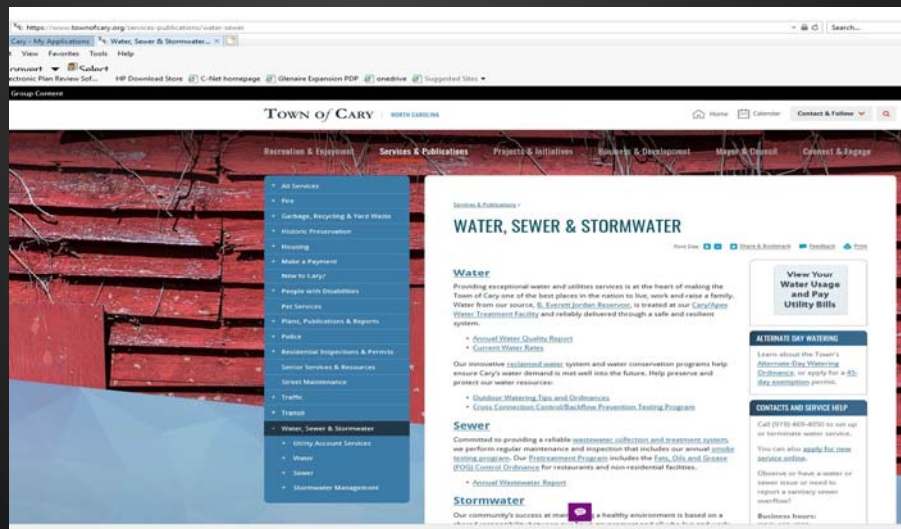
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How do we get our requirements out ?



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# How > Town of Cary Website



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# How

- Organizational awareness/collaboration - we have a step in plan review and have field inspections place holders.

Appointment	HTE Number	Number	Review	App Type	Workflow	Title	Issues	Due
20-BP-2896		1	Building Permit - Commercial	Commercial Building Permit - New Building		New Building - Andys Frozen Custard	2	10/14/2019 05:00 PM
20-BP-2889		1	Building Permit - Commercial	Commercial Building Permit - New Building		Northwoods Crossing Parcel 4 Retail Building		10/14/2019 05:00 PM
20-BP-4483		1	Building Permit - Revision to Approved Permit	Commercial Building Plan Revision		RDJ Galleria - Revise Plumbing Waste Plan	1	10/14/2019 05:00 PM
20-BP-3121		1	Building Permit - Commercial	Commercial Building Permit - Addition/Alteration		HealthPark at Kildaire MOB II - Level 01 Tenant Fit-Up	1	10/14/2019 05:00 PM
20-BP-3123		1	Building Permit - Commercial	Commercial Building Permit -		HealthPark at Kildaire MOB II - Level 02 Tenant Fit-Up	1	10/14/2019 05:00 PM

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# How

Str/Seq	Permit/Seq	Inspection type	Insp Seq	Inspector	Schedule date	Result
000 000	BN02 00	FINAL (Building)	0001	SJ	3/21/2019	DA
000 000	BN02 00	FINAL (Building)	0002	JJM	3/29/2019	DA
000 000	BN02 00	FINAL (Building)	0003	SJ	4/01/2019	AP
000 000	BN02 00	FINAL (Fire)	0001	JRD	3/21/2019	AP
000 000	MN12 00	FINAL (Mechanical)	0001	FM	2/11/2019	AP
000 000	PN12 00	Under Slab (Plumbing)	0001	WEL	1/03/2019	AP
000 000	PN12 00	Sewer Service Line	0001	WEL	3/15/2019	AP
000 000	PN12 00	FINAL (Plumbing)	0001	WEL	3/15/2019	AP
000 000	UN21 00	UTILITY GROUND WORK	0001	DEJ	1/03/2019	AP
000 000	UN21 00	UTILITY FINAL	0001	MCV	3/15/2019	AP

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# HOW

- Pre-construction meetings
- Development Liaison Department

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# Additional Benefits Realized

- Industrial Wastewater Survey
- Opportunity to identify and understand new sewer users
- Pretreatment device education
- Guide the design

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## Questions?

[don.johnson@townofcary.org](mailto:don.johnson@townofcary.org)

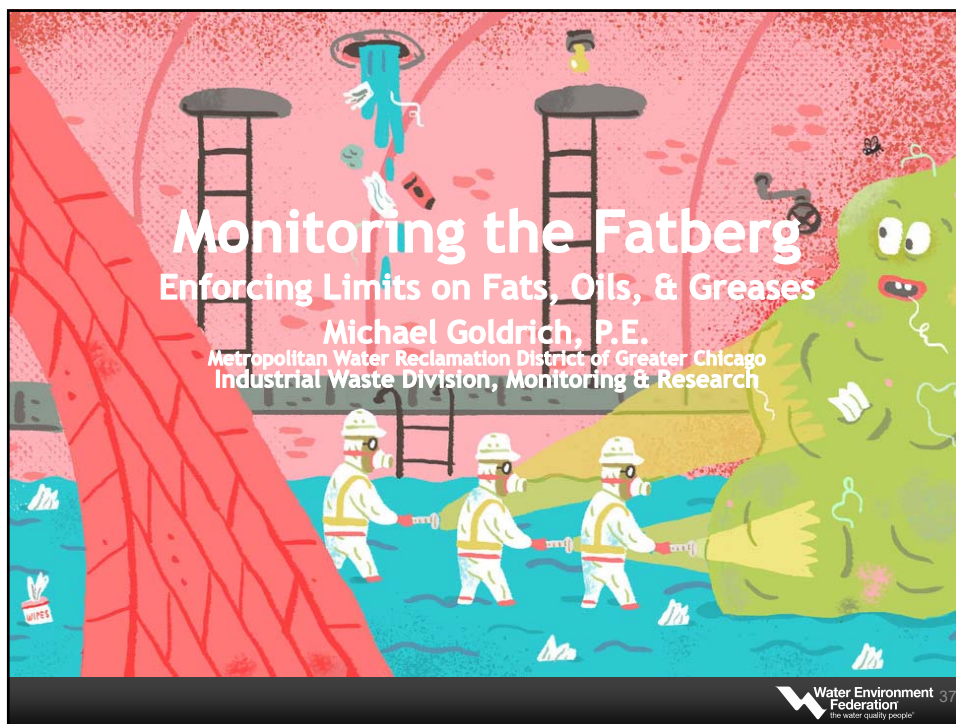
919-414-8052



[www.townofcary.org](http://www.townofcary.org)

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**Why do we monitor for FOG?**

- ❖ Our goal is to have a free-flowing collection system, unobstructed by debris.
- ❖ Fats, Oils, and Greases clog sewer pipes, which prohibits the free flow of wastewater in the collection system.
- ❖ To reduce the risk, we encourage source control with pretreatment limits.

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## Autopsy of a Fatberg

2018 London Fatberg

Component	Percentage
FOG	62%
Grit	19%
Water	10%
Other	9%

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## Is FOG a Local Problem?

The good habits of Cook County citizens coupled with the ginormous size of our tunnels help keep our waste moving.

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## Outreach Efforts



**Metropolitan Water Reclamation District of Greater Chicago**

### Press Release

Allison Fore  
Public and Intergovernmental Affairs Officer  
312.751.6628  
allison.fore@mwrdd.org  
100 East Erie Street, Chicago, Illinois 60611

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For immediate release  
November 21, 2018

## This Thanksgiving, put your pipes on a fat-free diet

As turkey day dinners are served across tables throughout Cook County, the Metropolitan Water Reclamation District of Greater Chicago (MWRD) encourages the public to think before disposing fats, oils and grease this Thanksgiving.

Known as FOG, these fats, oils and grease can create challenges for wastewater systems. Butter, cooking oil, meat drippings and other substances are often dumped down drains and toilets leading to clogged pipes, taxed collection systems and overburdened treatment plants working to transform the remnants of holiday wastewater into clean water.


"Scraps of fats, oils, greases and leftovers can wreak havoc when sent down pipes to flow to treatment plants," said MWRD President Mariyana Spyropoulos. "Just like the arteries that keep our blood flowing, the network of pipes that lead to our water reclamation plants takes considerable maintenance. We urge the 5.25 million residents we serve to help us protect our water environment."



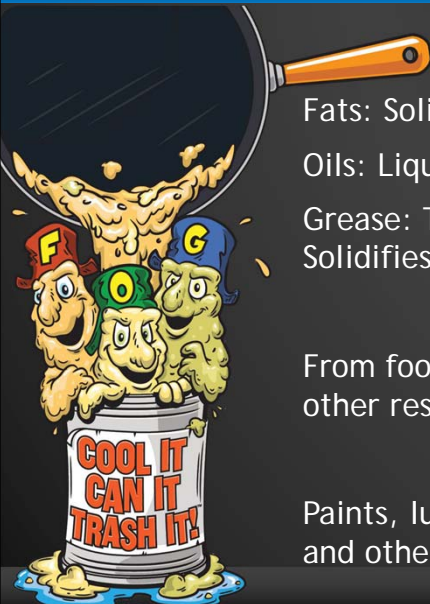
*Fats, oils and greases poured down drains flow to the Stickney Water Reclamation Plant, where the water will be treated and cleaned. The MWRD urges Thanksgiving cooks to think about what they're sending down the pipes.*


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## Who do we Monitor?




Fats: Solid at Room Temperature

Oils: Liquid at Room Temperature

Grease: Turns to Liquid When Heated, Solidifies When Cooled

From food scraps, cooking oil, soap, and other residential sources.

Paints, lubricants, biodiesel production, and other industrial sources.


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## Who do we Monitor?

**National Pretreatment Program**  
(40 CFR 403)  
Controlling Fats, Oils, and Grease Discharges from Food Service Establishments

- Food Manufacturers
- Centralize Waste Treaters
- Landfills



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## Limits

Local Limit  
250 mg/L

Polar and Non-Polar Limits  
For Categorical Regulated Facilities

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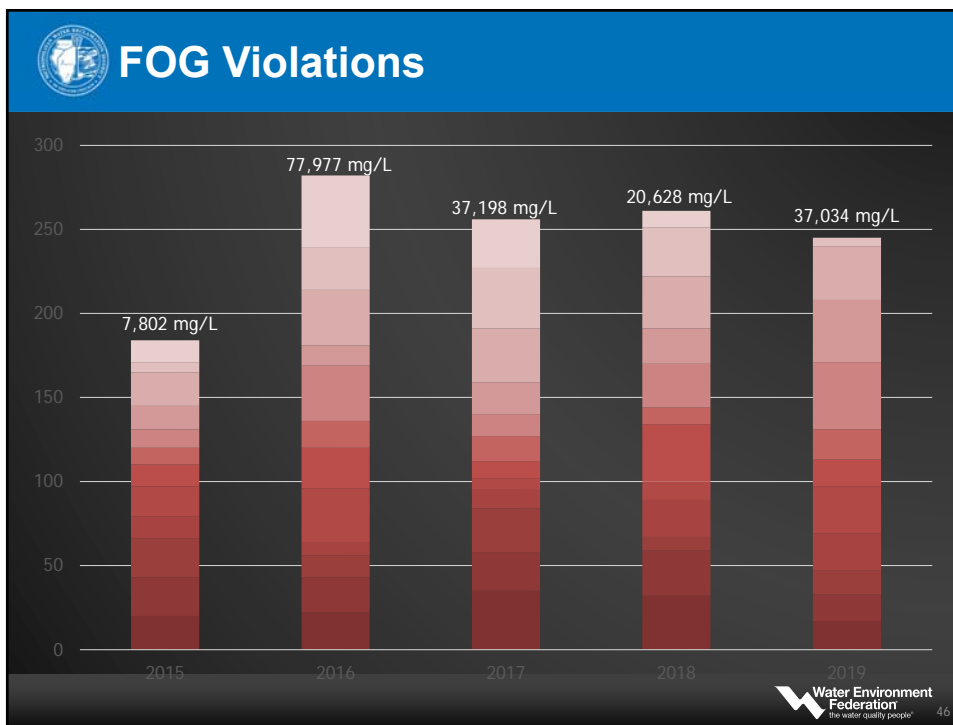
## When do we Monitor?

- Compliance sampling
- When a sheen is observed
- Wastewater is from a kitchen

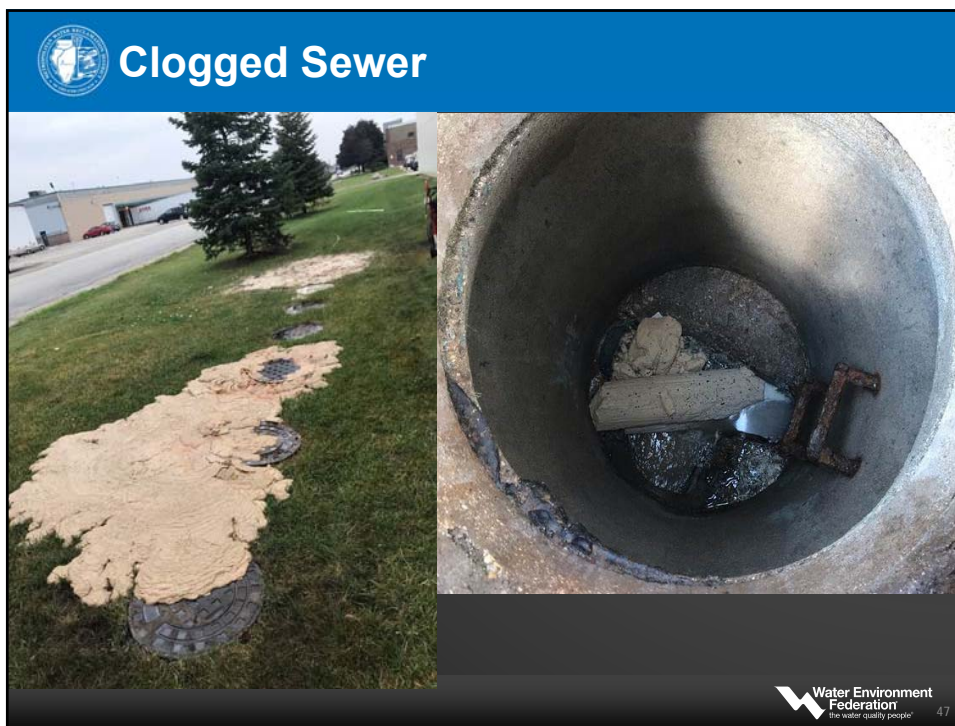



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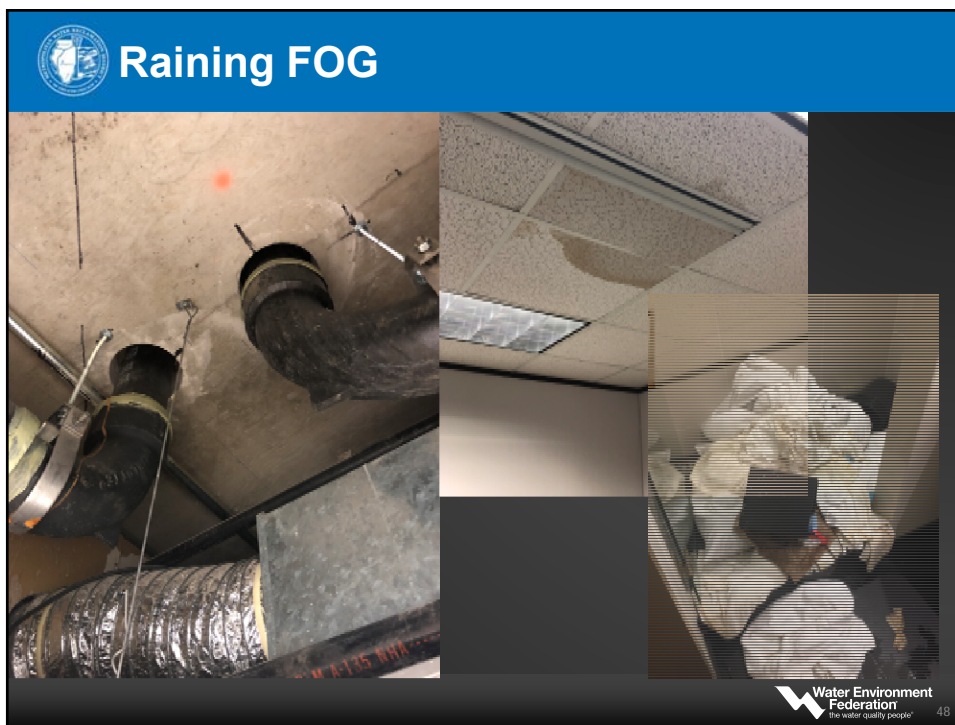
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## Closed Landfill Exemption

In 2015, the Sewage and Waste Control Ordinance was updated with the following language:

*Effluent leachate discharges from landfill facilities that are closed for the acceptance of wastes shall be exempt from this limitation for Fats, oils and greases (FOG) (total), provided that approved Best Management Practices (BMPs) are implemented and maintained. Failure to adhere to BMPs may result in enforcement action.*

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## What is the Solution?


### Good housekeeping

- Cleaning connection between facility and sewer
- May result in a decrease of user charges
- Extends the life of flow measurement equipment

### Alternate uses

- Resource Recovery
- Conversion to feedstock

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 **Resource Recovery**

Biogas Utilization


- Promotes biogas production

Biological Phosphorus Removal

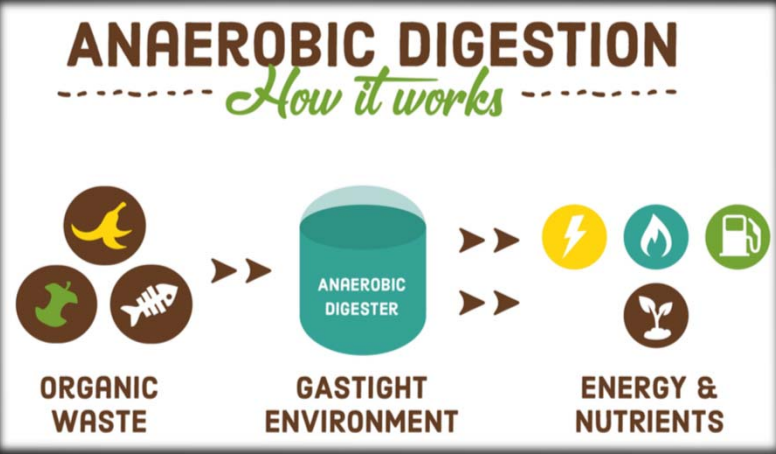
- Limit FOG same as with local limits
- Clogs in pumps and pipes

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 **Biogas Utilization**

**ANAEROBIC DIGESTION**  
*How it works*



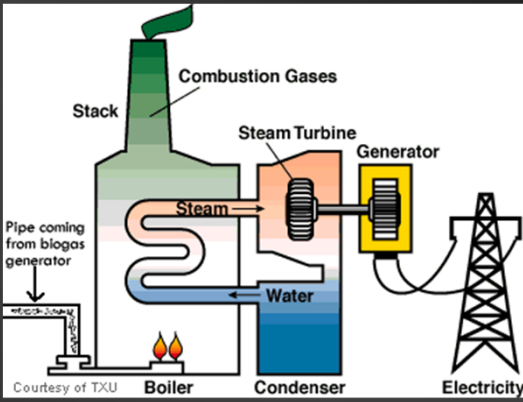
The diagram illustrates the anaerobic digestion process. On the left, under the heading "ORGANIC WASTE", are three circular icons: a banana, a green apple, and a fish skeleton. Arrows point from these icons to a central teal cylindrical tank labeled "ANAEROBIC DIGESTER". Below the tank is the text "GASTIGHT ENVIRONMENT". From the right side of the tank, two arrows point to a group of icons under the heading "ENERGY & NUTRIENTS". These icons include a yellow lightning bolt, a teal flame, a green gas pump, and a brown sprout.

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## Biogas Utilization

- Introduction of FOG can improve production
- Electricity and Heat
- Natural gas and Biofuel




Courtesy of TXU



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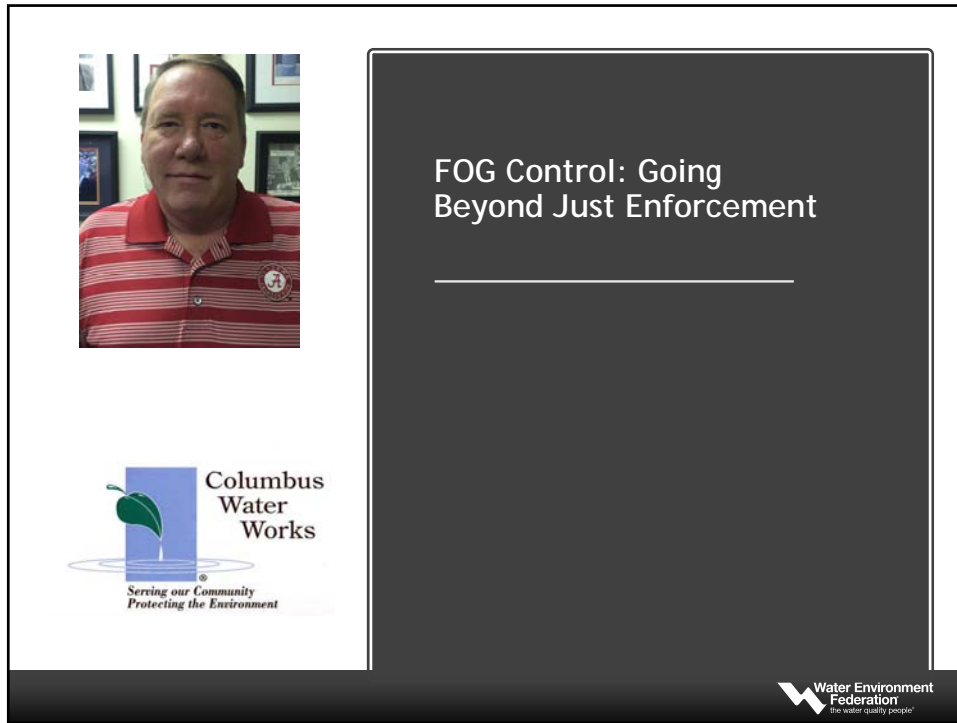
## Thank you



Contact Info:  
 (312) 751-3049  
[goldrichm@mwrld.org](mailto:goldrichm@mwrld.org)


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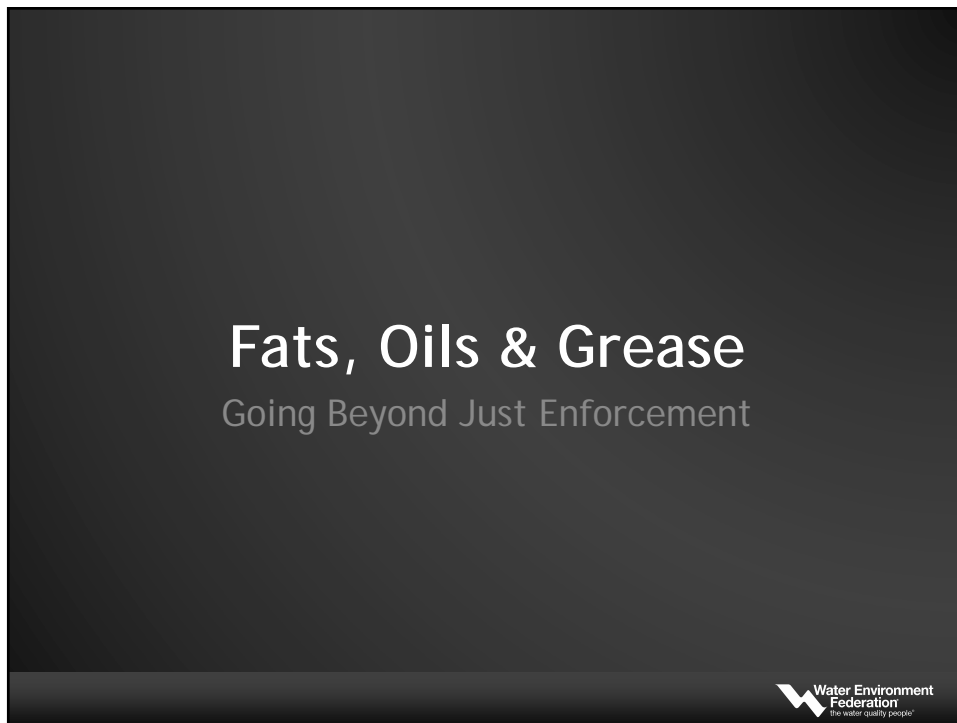


FOG Control: Going Beyond Just Enforcement

Columbus Water Works  
Serving our Community  
Protecting the Environment

Water Environment Federation  
the water quality people

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Fats, Oils & Grease  
Going Beyond Just Enforcement

Water Environment Federation  
the water quality people

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## FOG Program History

- Began in 1997
- Over 750 stop ups in sewer mains
- Causing Sanitary Sewer Overflows
- No controls on majority of restaurants
- Residential areas had major issues from FOG

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## Beginning the process

- Contacted the business license office
- Obtained a list of all restaurants in Columbus
- Began systematically inspecting all facilities
- Used EPA and WEF guidelines for inspection
- Began with larger restaurants having them install or fix old in-ground traps



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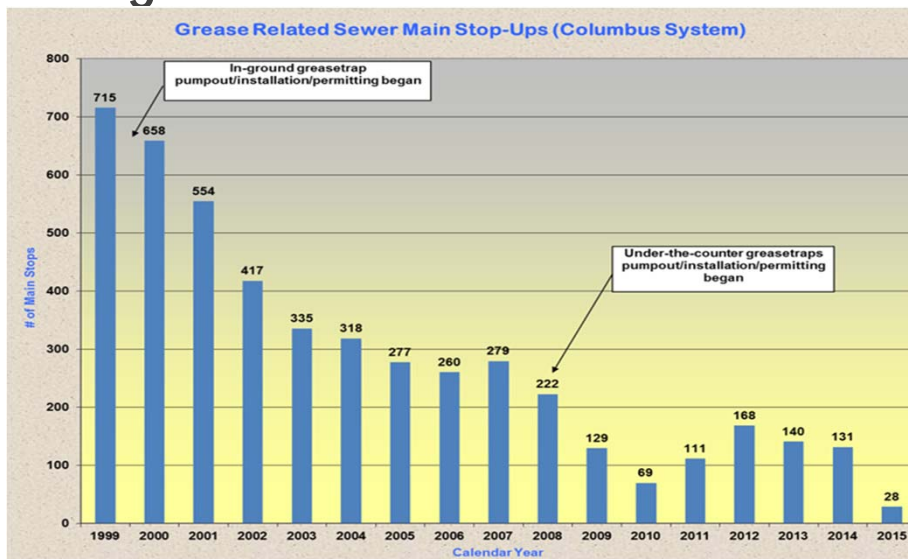
## The process continues



- Next were the secondary or smaller restaurants (Mom and Pop Stores)
- Less of a contributory load, but had multiple locations
- Began educating and trap installation

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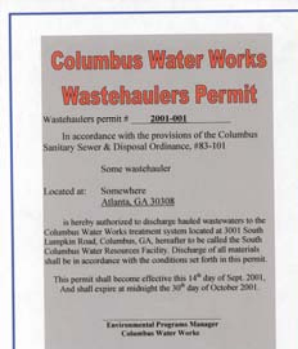
## Stages of Enforcement



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## Began permitting haulers and manifesting loads to treatment facility

- CWW permits and inspects all haulers that utilize CWW for disposal
- Manifested each load to the facility
- Majority of all hauled waste goes to head of the plant
- Later CWW built a FOG receiving station



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## But it was so much grease for the treatment plant

2017		2018	
Grease	1,581,409	Grease	1,607,440
FT Benn	360,485	FT Benn	257,700
Industrial	371,300	Industrial	353,100
Total	2,313,194	Total	2,218,240

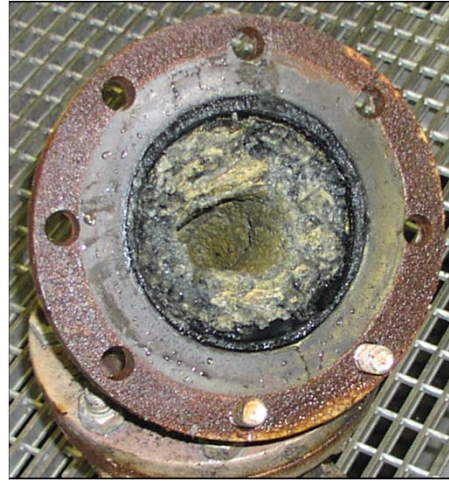


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## Receiving hauled FOG at Treatment Facility

### Grease Problems at the Waste Treatment Facility

- Receiving FOG at the head of the plant
- Clogged pumps
- Clogged transfer lines
- Eating away at the concrete walls of the plant



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## Anaerobic Digester Transfer Line



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## Good revenue stream

### Wastehauler Fees 2018

Month	Fees
Jan	\$8,002
Feb	\$11,011
Mar	\$7,629
Apr	\$8,853
May	\$10,585
Jun	\$8,969
Jul	\$8,884
Aug	\$10,603
Sep	\$7,406
Oct	\$10,414
Nov	\$10,067
Dec	\$7,900
Total for the year	\$110,323

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## Value of FOG

### COOKING OIL CONVERSION TO ELECTRICITY BY ANAEROBIC DIGESTION AND IC POWER GENERATION

1 KWH = 3412.14 BTU units conversion only

Cooking oil heating value = 125,000 BTU/gallon = 36.63 KWH units conversion only  
Conventional gas turbine power plant efficiencies are 40% but the starting point is natural gas.

Actual process conversion of heat into electrical energy by anaerobic digestion of cooking oil to methane and IC power generation at an overall efficiency of 22.2% yields 8.13 KWH which, for \$.10/KWH, is valued at \$0.81/gal.

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## CWW began a new process



- Thermophillic digestion with plug flow reactors
- Added grease to digesters and boosted methane production
- Methane then used for co-gen of electricity
- Cut plants power usage by 2/3

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## FOG Partnerships

- Smaller restaurants needed a way to dispose of the grease from their secondary traps
- Apartment Complexes were dealing with private property sewer clogs due to grease
- CWW still had issues in smaller mains in residential areas
- What was the solution?

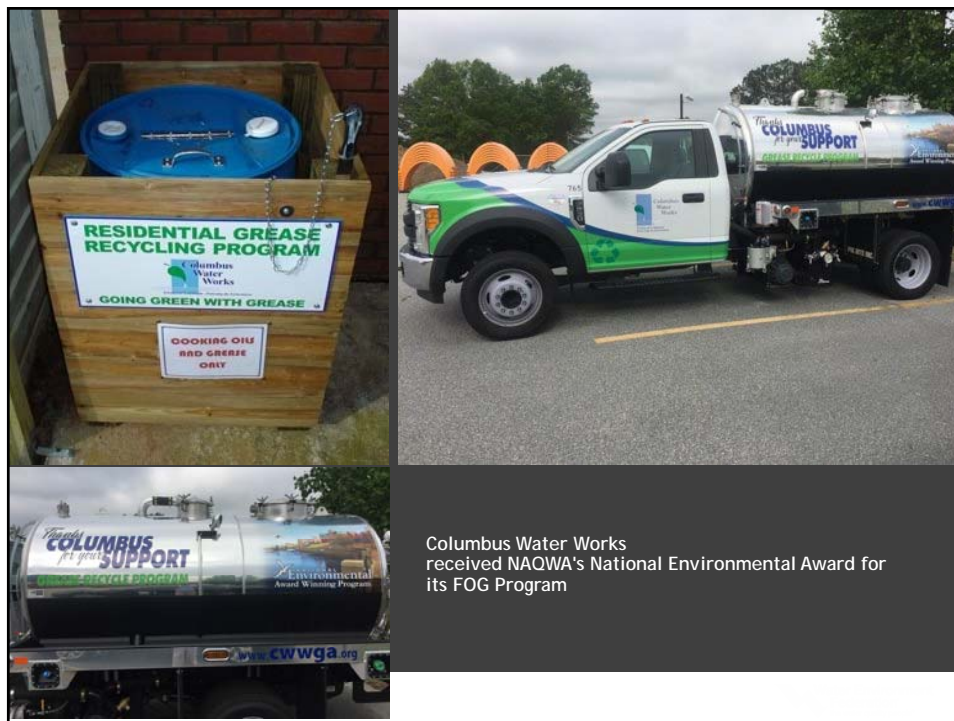
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# Grease Recycling Program

- CWW currently has over 90 small restaurants participating
- Over 80 apartment complexes
- 11 residential FOG drop off sites and currently planning 5 more



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**CWW and its partners  
host two recycling  
events each year**

Muscogee County Sherriff's partner  
for recycling pharmaceuticals



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**Questions?**



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