



# REDUCING IMPACTS OF UNSEEN FOOD WASTE: HOW AN EFFECTIVE FOG ABATEMENT PROGRAM DEVELOPMENT AND IMPLEMENTATION



This training has been sponsored by a grant from the USDA Rural Utilities Service (RUS)

# PPRC



## **Ken Grimm**

12 years in industry, serving as Lead, Finishing Shop Manager, ISO Internal Auditor. Managed industrial use discharge process and permits

6 years as EHS Manager, HR Manager and facility Training Manager for Capital Industries, Inc.

Past 18 years to current serving as Industry Outreach Manager and Trainer for PPRC.

2013 to present providing FOG Program training for PPRC and WSA.

# WHY ADDRESS FOG?

## SANITARY SEWER OVERFLOW CAUSES

- 50% CAUSED BY BLOCKAGES
- 25% CAUSED BY WET WEATHER INFILTRATION AND INFLOW
- 25% CAUSED BY MECHANICAL/ELECTRICAL FAILURES
- 23,000 – 75,000 SSO EVENTS/YEAR
- MAY BE SIMILAR NUMBER OF BASEMENT BACKUPS/YEAR
- 3-10 BILLION GALLONS/YEAR

# WHY ADDRESS FOG?



# WHY ADDRESS FOG?

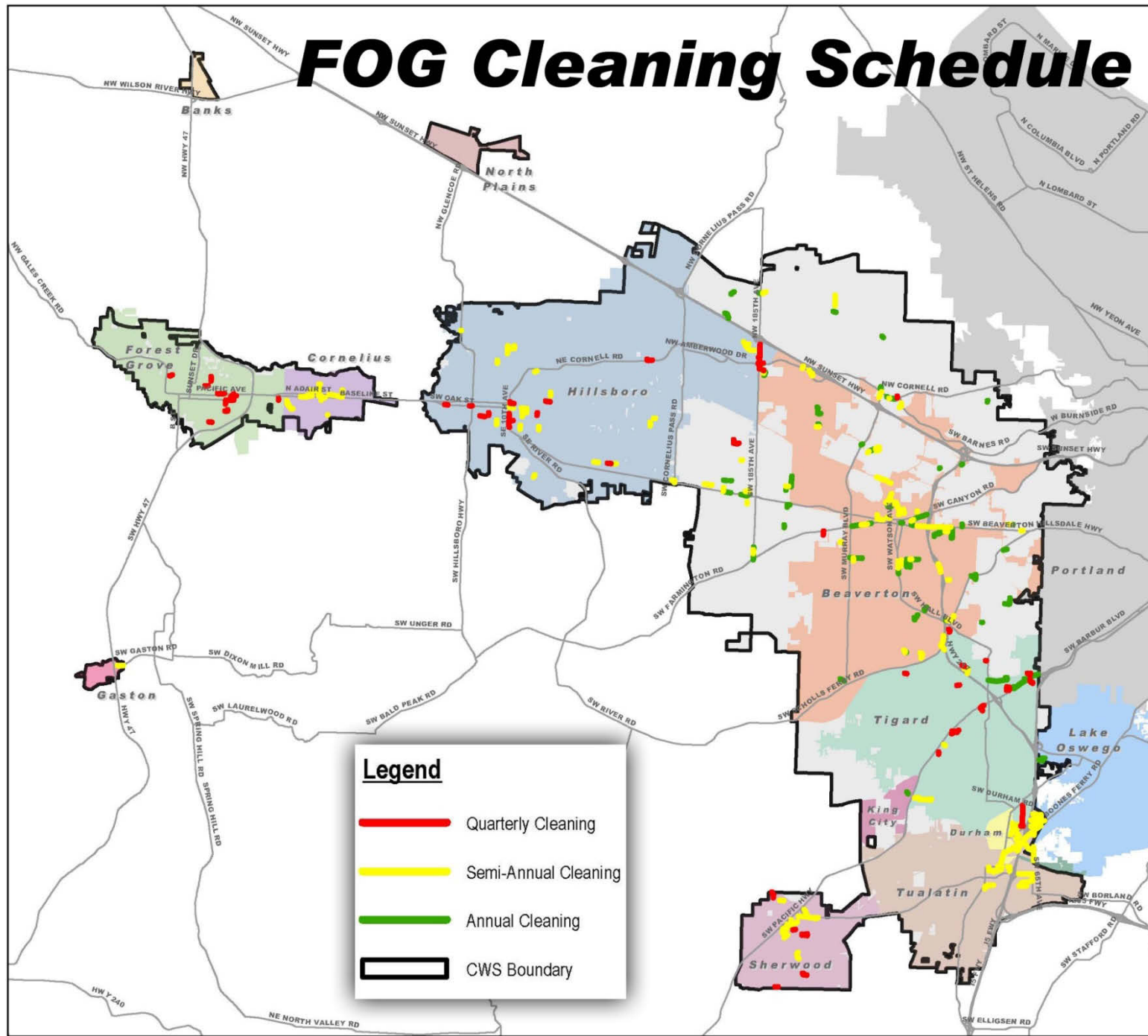
## COSTS

- 2004 ESTIMATE TO UPGRADE NATIONAL INFRASTRUCTURE IN ORDER TO REDUCE OVERFLOW EVENTS: \$88 BILLION
- >\$2,000,000,000,000 REPLACEMENT VALUE
- WATER AND WASTEWATER = SECOND LARGEST INVESTMENT
- 75% OF U.S. SEWER SYSTEMS WORK AT HALF CAPACITY BECAUSE OF GREASE CLOGS (WALL STREET JOURNAL)
- THE TAXPAYER COST JUST TO KEEP SEWERS OPEN PLUS DEAL WITH FOG TRANSLATES INTO AS MUCH AS \$25 BILLION PER YEAR!

# WHY ADDRESS FOG?



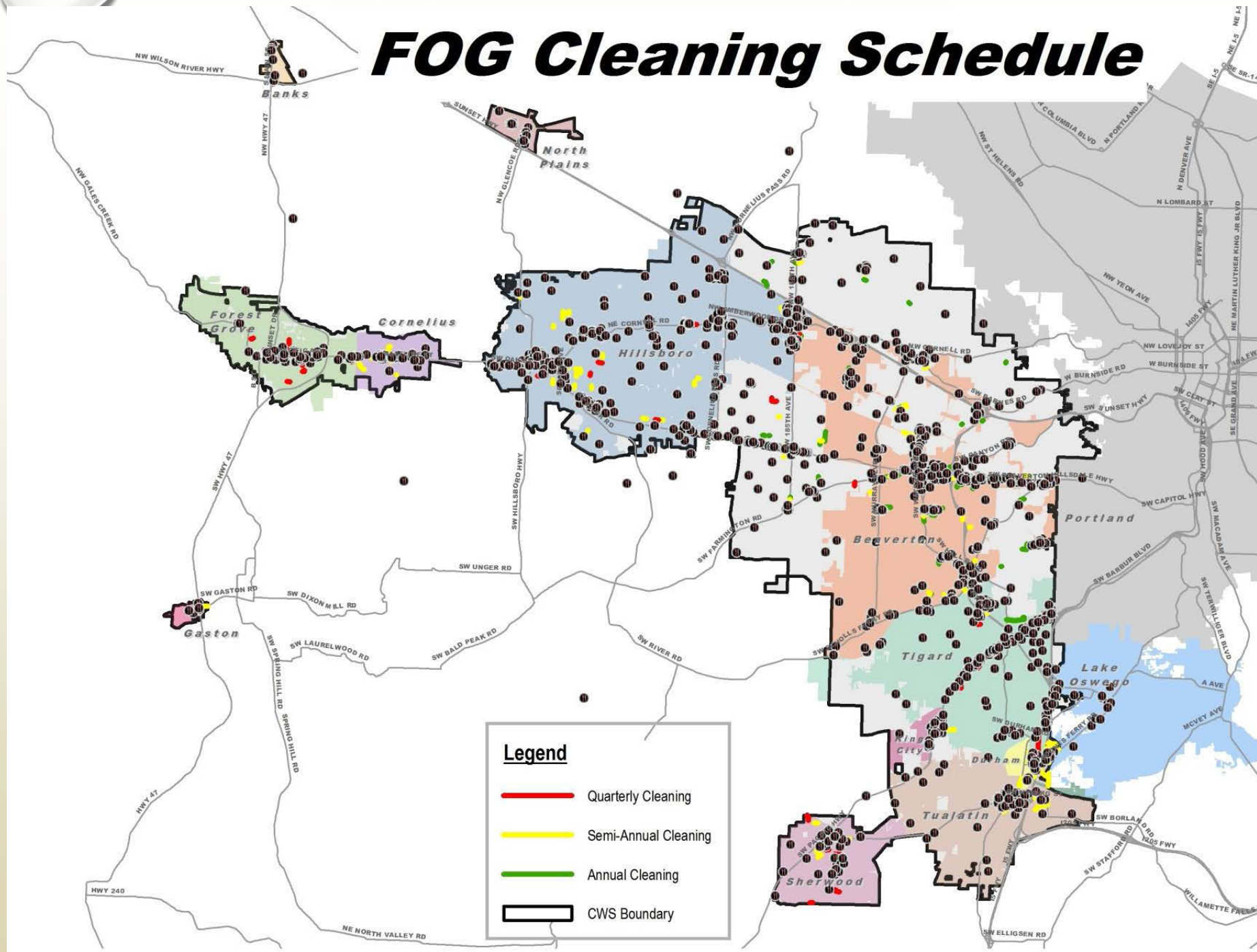
# FOG Cleaning Schedule



**Legend**

- Quarterly Cleaning
- Semi-Annual Cleaning
- Annual Cleaning
- CWS Boundary

# FOG Cleaning Schedule

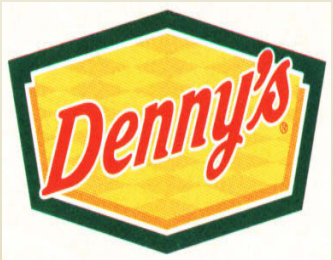


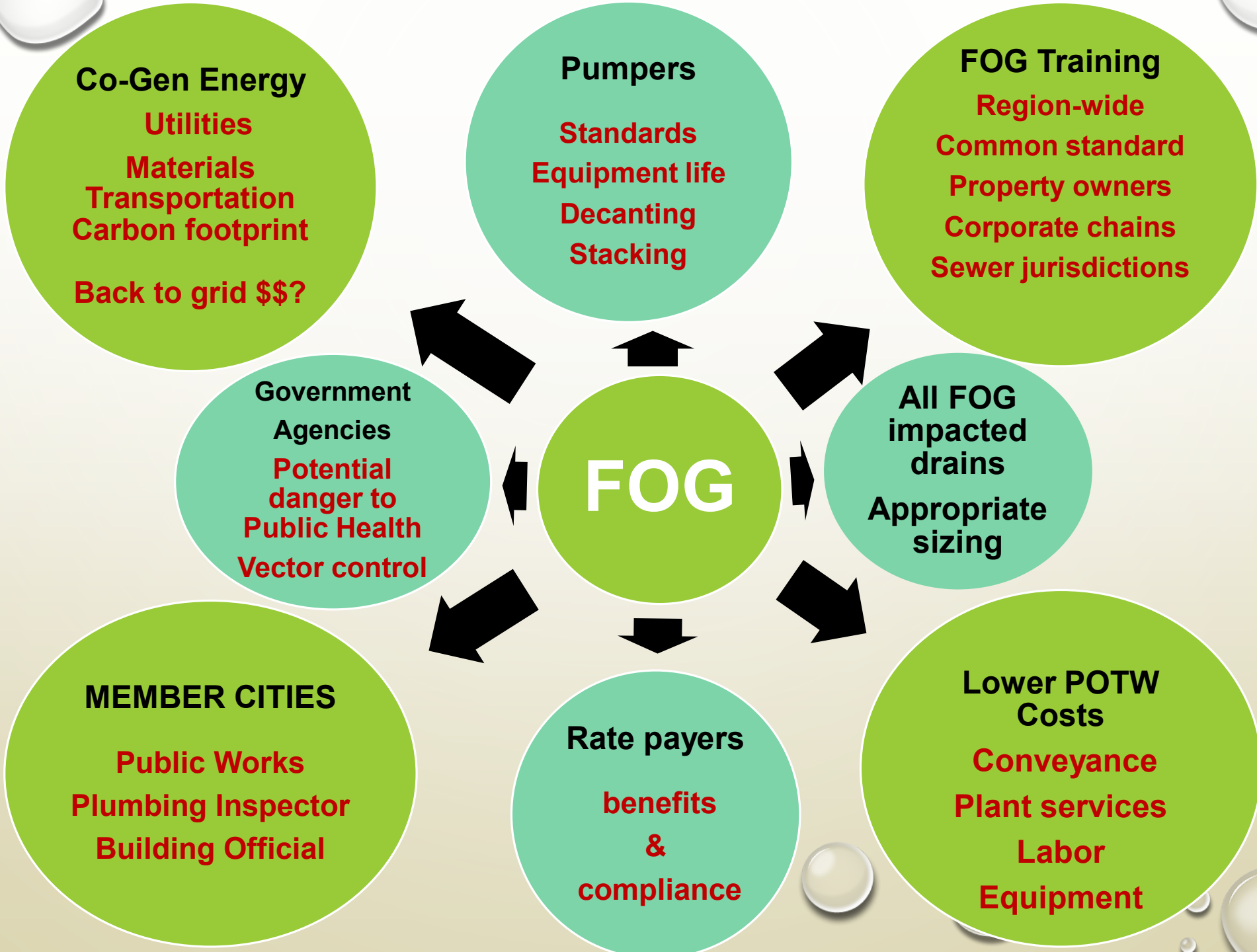


# SO WHAT DID WE DO.....?



Wakins Park Apt.





# EXAMPLE OF A BUSINESS CASE PRESENTATION

| Sample Cost-Benefit Analysis |             | 2,300 FSEs        |            | 4 New FSE/Month        |                            |
|------------------------------|-------------|-------------------|------------|------------------------|----------------------------|
| Status Quo Annual            |             | FOG Program Costs |            | Savings after 5 years, |                            |
| Item                         | Cost        | Item              | Cost       | Item                   | 80% Cost Reduction<br>Cost |
| # lineal feet /yr            | \$180,000   | Development       | \$120,500  | Line Cleaning          | \$36,000                   |
| pump station                 | \$45,000    | 1st Inspection    | \$375,000  | pump station           | \$9,000                    |
| Air Relief                   | \$10,000    | Ongoing Insp      | \$90,000   | air relief             | \$2,000                    |
| FOG Disposal                 | \$22,000    | Plan Review       | \$6,000    | FOG Disposal           | \$4,400                    |
| WWTP maintenance             | \$35,000    | Data mgmt         | \$45,000   | WWTP maint             | \$7,000                    |
| WWTP Operations              | \$2,800,000 |                   |            | WWTP operation         | \$560,000                  |
|                              |             |                   |            |                        | \$618,400                  |
| Total Cost                   | \$3,092,000 | Development Cost  | \$495,500` | Savings after year 5   | \$2,473,600                |
|                              |             | Maintenance Cost  | \$141,000  |                        |                            |

# COST-BENEFIT SUMMARY

BREAK-EVEN AT  
YEAR THREE...

|                                  |                     |  |
|----------------------------------|---------------------|--|
|                                  |                     |  |
| Dev                              | \$495,500           |  |
| Maint x 5                        | \$705,000           |  |
| Maint x 5                        | \$3,090,000         |  |
|                                  | <u>\$4,290,500</u>  |  |
|                                  |                     |  |
| Est annual savings after 5 years |                     |  |
|                                  | <u>\$2,473,600</u>  |  |
|                                  |                     |  |
| Status Quo cost for 5 years      |                     |  |
|                                  | <u>\$15,460,000</u> |  |
|                                  |                     |  |
| Total annual savings             |                     |  |
|                                  | <u>\$2,332,600</u>  |  |

# FOG PRODUCTION

- VERY HIGH
- HIGH
- MEDIUM
- LOW



# FOG PRODUCTION

- VERY HIGH
- HIGH
- MEDIUM
- LOW

| No. | Initial Designation | Revised Designation | Restaurant Type          | FSE                 | FSE_address                |
|-----|---------------------|---------------------|--------------------------|---------------------|----------------------------|
| 1   | Medium              | Medium              | Pizzeria, chain          | Pizza Hut           | 4105 SW 117th Ave, Suite B |
| 2   | Medium              | Medium              | Pizzeria, chain          | Pizza Hut           | 6047 SW 185th Ave          |
| 3   | High                | Medium              | American restaurant      | Glent               | 15840 Boomer Ferry Rd      |
| 4   | High                | Medium              | American restaurant      | Standards           | 14801 Kross Wy             |
| 5   | High                | Medium              | American restaurant      | 22nd Street Station | 2337 22nd AVE              |
| 6   | High                | Medium              | American resta           |                     |                            |
| 7   | High                | Medium              | American resta           |                     |                            |
| 8   | High                | Medium              | American resta           |                     |                            |
| 9   | High                | Medium              | American resta           |                     |                            |
| 10  | High                | Medium              | American resta           |                     |                            |
| 11  | High                | Medium              | American resta           |                     |                            |
| 12  | High                | Medium              | American resta           |                     |                            |
| 13  | High                | Medium              | American resta           |                     |                            |
| 14  | High                | Medium              | American resta           |                     |                            |
| 15  | High                | Medium              | American resta           |                     |                            |
| 16  | High                | High                | American resta           |                     |                            |
| 17  | High                | Medium              | American resta           |                     |                            |
| 18  | High                | High                | American resta           |                     |                            |
| 19  | High                | Medium              | American resta           |                     |                            |
| 20  | High                | Medium              | American resta           |                     |                            |
| 21  | High                | Medium              | American resta           |                     |                            |
| 22  | High                | Medium              | American resta           |                     |                            |
| 23  | High                | Medium              | American resta           |                     |                            |
| 24  | High                | Medium              | American resta           |                     |                            |
| 25  | High                | Medium              | American resta           |                     |                            |
| 26  | High                | Medium              | American resta           |                     |                            |
| 27  | High                | Medium              | American resta           |                     |                            |
| 28  | High                | High                | American resta           |                     |                            |
| 29  | High                | High                | American resta           |                     |                            |
| 30  | High                | Medium              | American resta           |                     |                            |
| 31  | High                | Medium              | American resta           |                     |                            |
| 32  | High                | Medium              | American resta           |                     |                            |
| 33  | High                | Medium              | American resta           |                     |                            |
| 34  | High                | Medium              | American resta           |                     |                            |
| 35  | High                | High                | American resta           |                     |                            |
| 36  | High                | High                | American resta           |                     |                            |
| 37  | High                | High                | American resta           |                     |                            |
| 38  | High                | Medium              | American resta           |                     |                            |
| 39  | High                | Medium              | American resta           |                     |                            |
| 40  | High                | Medium              | American resta           |                     |                            |
| 41  | High                | Medium              | American resta           |                     |                            |
| 42  | High                | High                | American resta           |                     |                            |
| 43  | High                | High                | American resta           |                     |                            |
| 44  | High                | High                | American resta           |                     |                            |
| 45  | Very High           | Very High           | American resta           |                     |                            |
| 46  | High                | High                | Baked Goods/Donut Places |                     |                            |
| 47  | High                | High                | Baked Goods/Donut Places |                     |                            |
| 48  | High                | High                | Baked Goods/Donut Places |                     |                            |
| 49  | High                | High                | Baked Goods/Donut Places |                     |                            |
| 50  | High                | High                | Baked Goods/Donut Places |                     |                            |
| 51  | High                | High                | Baked Goods/Donut Places |                     |                            |
| 52  | High                | High                | Baked Goods/Donut Places |                     |                            |
| 53  | High                | High                | Baked Goods/Donut Places |                     |                            |
| 54  | High                | High                | Baked Goods/Donut Places |                     |                            |
| 55  | High                | High                | Baked Goods/Donut Places |                     |                            |
| 56  | High                | High                | Baked Goods/Donut Places |                     |                            |
| 57  | High                | High                | Baked Goods/Donut Places |                     |                            |
| 58  | High                | High                | Baked Goods/Donut Places |                     |                            |
| 59  | High                | High                | Baked Goods/Donut Places |                     |                            |
| 60  | High                | High                | Baked Goods/Donut Places |                     |                            |
| 61  | High                | High                | Baked Goods/Donut Places |                     |                            |
| 62  | High                | High                | Baked Goods/Donut Places |                     |                            |
| 63  | High                | High                | Baked Goods/Donut Places |                     |                            |
| 64  | High                | High                | Baked Goods/Donut Places |                     |                            |
| 65  | High                | High                | Baked Goods/Donut Places |                     |                            |
| 66  | High                | High                | Baked Goods/Donut Places |                     |                            |
| 67  | High                | High                | Baked Goods/Donut Places |                     |                            |
| 68  | High                | High                | Baked Goods/Donut Places |                     |                            |
| 69  | High                | High                | Baked Goods/Donut Places |                     |                            |
| 70  | High                | High                | Baked Goods/Donut Places |                     |                            |
| 71  | High                | High                | Baked Goods/Donut Places |                     |                            |
| 72  | High                | High                | Baked Goods/Donut Places |                     |                            |
| 73  | High                | High                | Baked Goods/Donut Places |                     |                            |
| 74  | High                | High                | Baked Goods/Donut Places |                     |                            |
| 75  | Low                 | Low                 | Bar (drinking places)    |                     |                            |
| 76  | Low                 | Low                 | Bar (drinking places)    |                     |                            |
| 77  | Low                 | Low                 | Bar (drinking places)    |                     |                            |
| 78  | Low                 | Low                 | Bar (drinking places)    |                     |                            |
| 79  | Medium              | Medium              | Bar (drinking places)    |                     |                            |
| 80  | Medium              | Medium              | Bar (drinking places)    |                     |                            |
| 81  | Medium              | Medium              | Bar (drinking places)    |                     |                            |
| 82  | Medium              | Medium              | Bar (drinking places)    |                     |                            |
| 83  | High                | High                | Bar and Lounge           |                     |                            |
| 84  | Medium              | Medium              | Bar and Lounge           |                     |                            |
| 85  | Medium              | Medium              | Bar and Lounge           |                     |                            |
| 86  | Medium              | Medium              | Bar and Lounge           |                     |                            |
| 87  | Medium              | Medium              | Bar and Lounge           |                     |                            |
| 88  | Medium              | Medium              | Bar and Lounge           |                     |                            |
| 89  | Medium              | Medium              | Bar and Lounge           |                     |                            |
| 90  | Medium              | Medium              | Bar and Lounge           |                     |                            |
| 91  | Medium              | Medium              | Bar and Lounge           |                     |                            |
| 92  | Medium              | Medium              | Bar and Lounge           |                     |                            |
| 93  | Medium              | Medium              | Bar and Lounge           |                     |                            |
| 94  | Medium              | Medium              | Bar and Lounge           |                     |                            |
| 95  | Medium              | Medium              | Bar and Lounge           |                     |                            |

|    |           |           |                          |  |
|----|-----------|-----------|--------------------------|--|
| 38 | High      | Medium    | American restaurant      | K&K Corp / Coyote's Bar & Grill                        |
| 39 | Medium    | Medium    | American restaurant      | Dawghouse Hotdogs                                      |
| 40 | High      | Medium    | American restaurant      | Denny's Restaurant # 6803 -8787 SW Scholls Ferry Rd    |
| 41 | High      | Medium    | American restaurant      | Shairs   |
| 42 | High      | High      | American restaurant      | Sharis #159  |
| 43 | High      | High      | American restaurant      | Sharis #166  |
| 44 | High      | High      | American restaurant      | Sharis#131   |
| 45 | Very High | Very High | American restaurant      | Cheesecake Factory                                     |
| 46 | High      | High      | Baked Goods/Donut Places | Kettleman Bagels                                       |
| 47 | High      | High      | Baked Goods/Donut Places | Noah's Bagels #2158 - 11625 SW Beaverton Hillsdale Hwy |
| 48 | High      | High      | Baked Goods/Donut Places | Noah's Bagels #3420 - 8430 SW Nimbus Ave               |
| 49 | High      | High      | Baked Goods/Donut Places | Noah's Bagels #3421 - 7104 SW Hazelfern Rd             |
| 50 | High      | High      | Baked Goods/Donut Places | Panera Bread - 7202 NE Cornell Rd                      |
| 51 | High      | High      | Baked Goods/Donut Places | Noah's   |
| 52 | High      | High      | Baked Goods/Donut Places | Panera Bread   |
| 53 | High      | High      | Baked Goods/Donut Places | Sunrise Bagels   |
| 54 | High      | High      | Baked Goods/Donut Places | My Favorite Muffin Bagel /                             |
| 55 | High      | Very High | Baked Goods/Donut Places | Cinnabon # 241 - 23105 SW Tualatin Valley Hwy          |
| 56 | High      | Very High | Baked Goods/Donut Places | Donut Land   |
| 57 | High      | Very High | Baked Goods/Donut Places | Donuts Plus  |
| 58 | High      | Very High | Baked Goods/Donut Places | Great Dog Bakery                                       |

# CASE STUDIES REVEAL FOG LOADING

$$\text{Grease Capacity (See Below)} \div \left( \text{Meals Per Day} \times \text{Grease Production Values (see A B C D E F below)} \right) = \text{Operating Days Per Pump-out Cycle}$$

| model                          | GB-15 | GB-20 | GB-25 | GB-35 | GB-50 | GB-75 | GB-250 |
|--------------------------------|-------|-------|-------|-------|-------|-------|--------|
| maximum grease capacity (lbs.) | 74    | 109   | 75    | 142   | 249   | 616   | 1,076  |

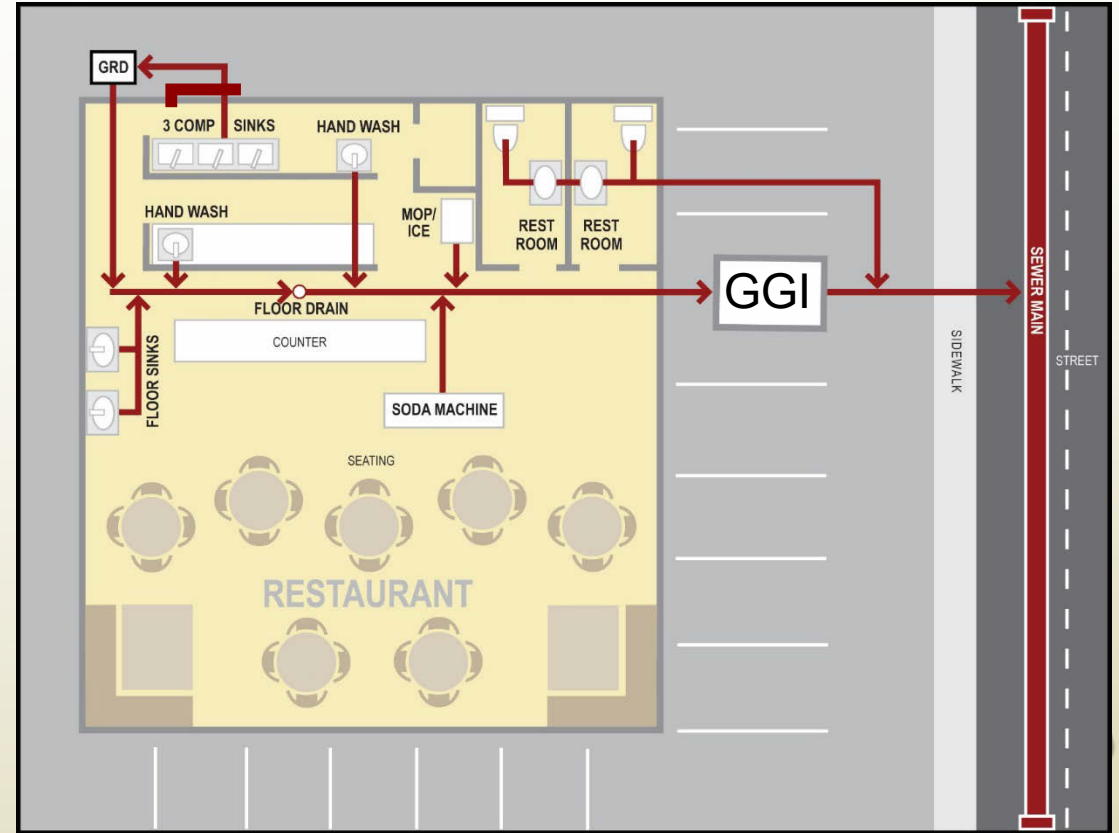
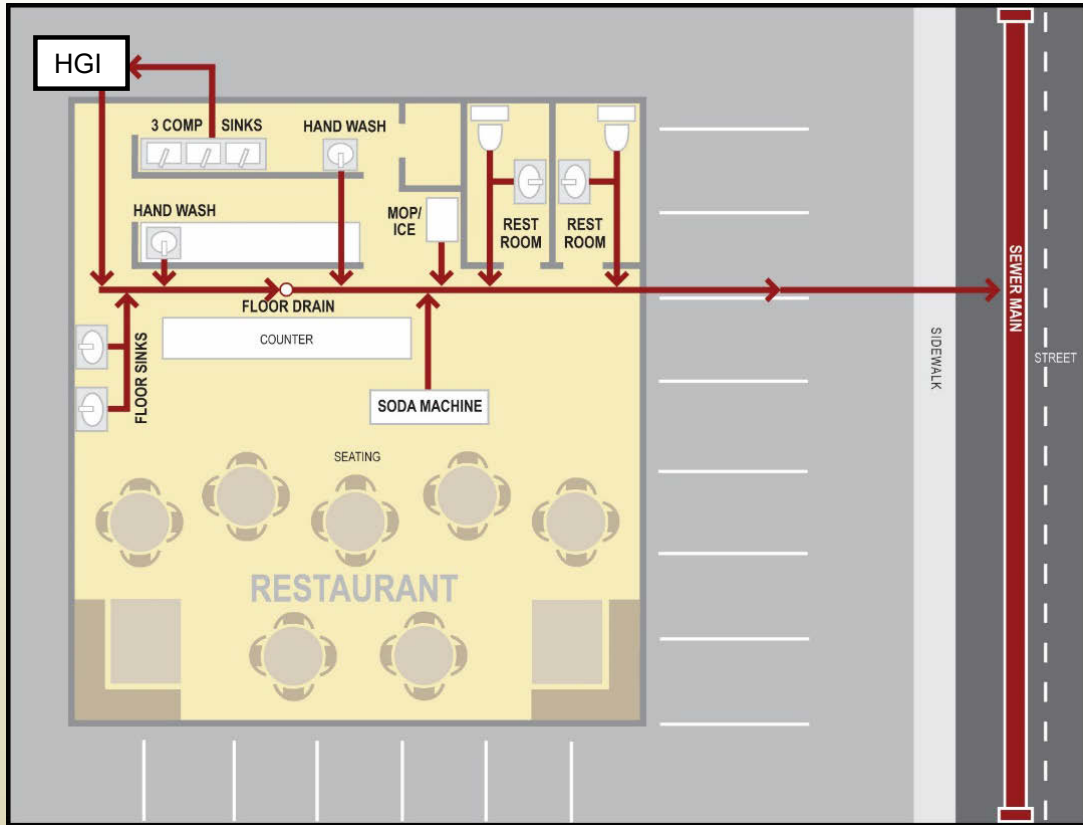
| Restaurant Type          | Grease Production Values                              | Examples  |
|--------------------------|---|---|
| Low Grease Production    | <b>A</b> 0.005 lbs (2.268 g) / meal (no flatware)     | Sandwich Shop, Convenience Store, Bar, Sushi Bar, Delicatessen, Snack Bar, Frozen Yogurt, Hotel Breakfast Bar, Residential            |
|                          | <b>B</b> 0.0065 lbs (2.948 g) / meal (with flatware)  |   |
| Medium Grease Production | <b>C</b> 0.025 lbs (11.340 g) / meal (no flatware)    | Coffee House, Pizza, Grocery Store (no fryer), Ice Cream Parlor, Fast Food, Greek, Indian, Low Grease Output FSE (w/fryer)            |
|                          | <b>D</b> 0.0325 lbs (14.742 g) / meal (with flatware) |   |
| High Grease Production   | <b>E</b> 0.035 lbs (15.876 g) / meal (no flatware)    | Cafeteria, Family Restaurant, Italian, Steak House, Bakery, Chinese, Buffet, Mexican, Seafood, Fried Chicken, Grocery Store (w/fryer) |
|                          | <b>F</b> 0.0455 lbs (20.638 g) / meal (with flatware) |   |

# SO WHAT IS THE MOST EFFECTIVE CONTROL METHOD?

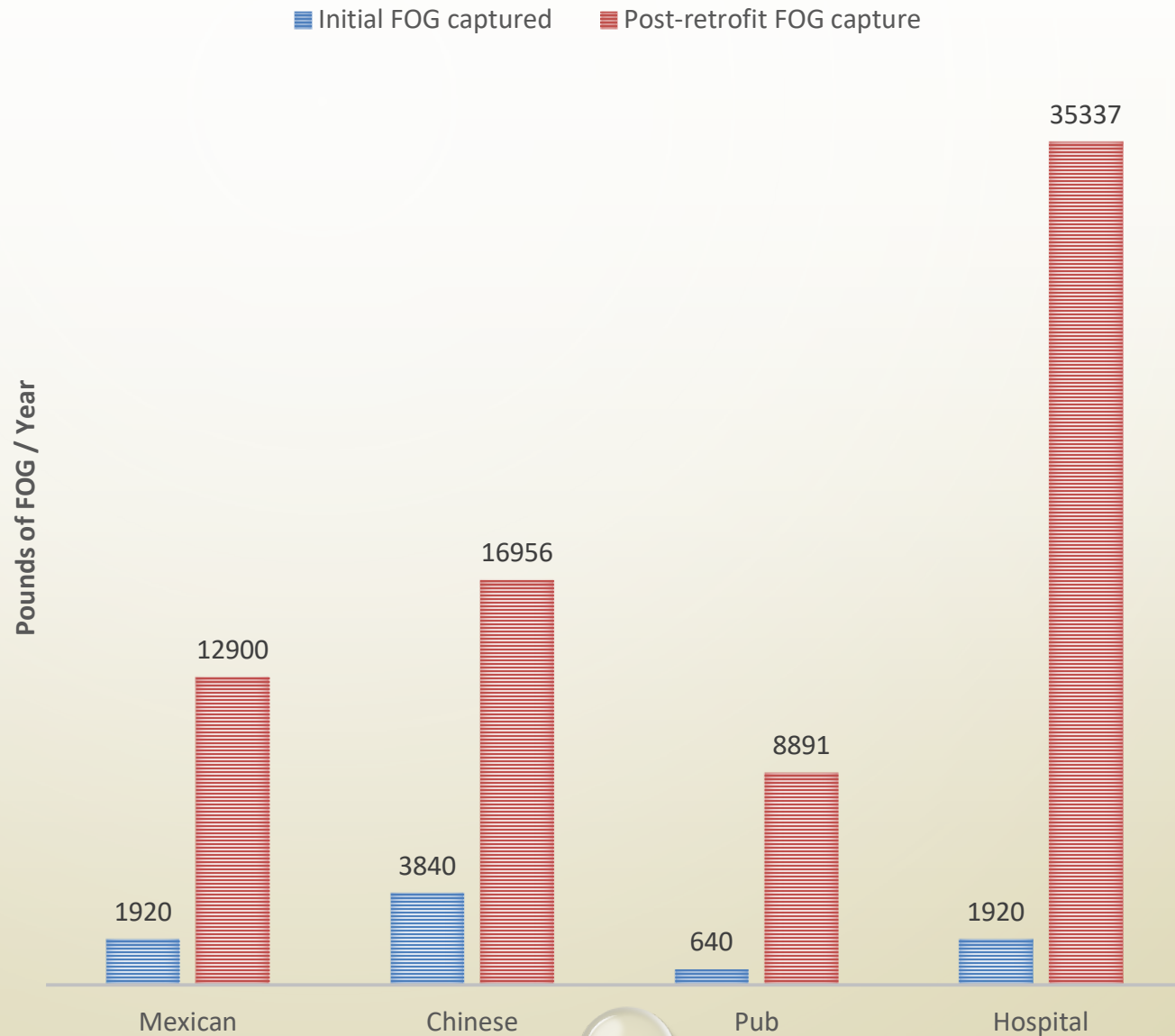
- **CONNECT ALL FIXTURES AND DRAINS IN THE FOOD/BEVERAGE SERVICE AREAS TO FOG PRETREATMENT SYSTEM**
- **SIZE FOG PRETREATMENT SYSTEM TO THE FOG GENERATOR'S FOOD/BEVERAGE OPERATION**
- **EFFECTIVE FOG PRETREATMENT SYSTEM INCLUDES MAINTENANCE PRIOR TO UNACCEPTABLE FOG BYPASS**



# INEFFECTIVE AND EFFECTIVE PRETREATMENT FOR FOG



# CASE STUDIES REVEAL PRE- RETROFIT FOG LOADING



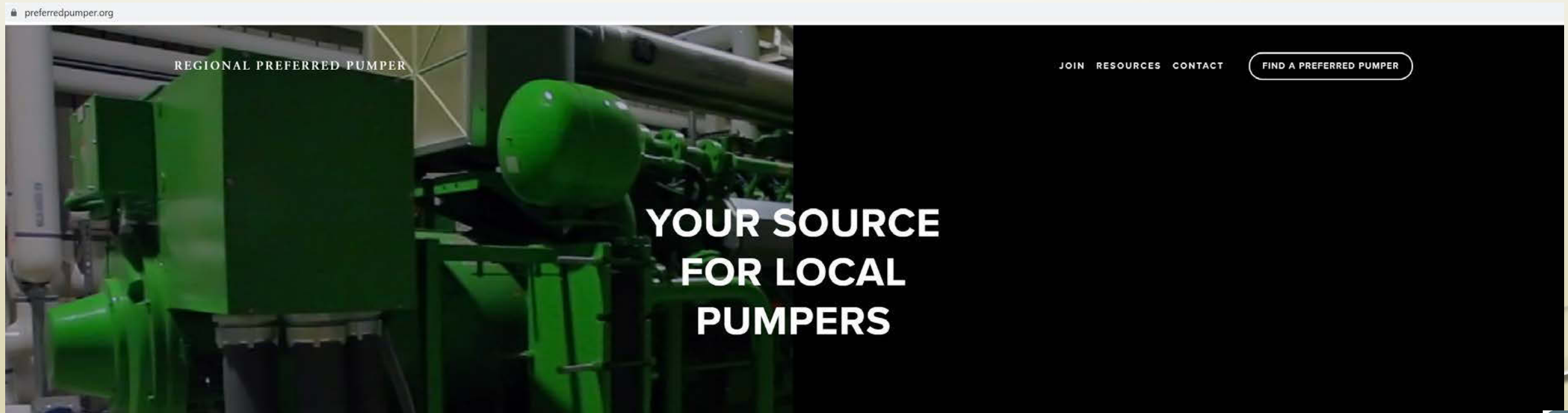
# VENT HOOD CLEANING





# PREFERRED PUMPER STANDARDS

- FOLLOWS APPROVED BEST PRACTICES FOR INTERCEPTOR SERVICE
- SUBMITS SCHEDULE OF INTERCEPTOR MAINTENANCE TO SEWER AGENCY SEVEN DAYS IN ADVANCE
- SUBMITS FOG PUMP-OUT REPORTS TO SEWER AGENCY WITHIN 10 DAYS OF PUMP-OUT
- [WWW.PREFERREDPUMPER.ORG](http://WWW.PREFERREDPUMPER.ORG)



# ESTABLISHMENT DATABASE

Establishments Actions ▾ Import Create establishment

Search by establishment  Visibility  Tags  Compliance  Type  Add filter Apply Clear

| Reference no ▲                                      | Name                         | Business address                                | Service frequency | Pumped on         | Status          | Inspected on      | Updated at                 |
|---|------------------------------|---|-------------------|-------------------|-----------------|-------------------|----------------------------|
| <span style="color: yellow;">●</span> NV-LAS-000002 | Wynn Las Vegas               | 3131 S Las Vegas Blvd, Las Vegas, NV 89109, USA | 1 day             | February 14, 2019 | Overdue service | February 07, 2019 | February 14, 2019 04:00 PM |
| <span style="color: red;">●</span> NV-LAS-000004    | Encore Las Vegas             | 3131 S Las Vegas Blvd, Las Vegas, NV 89109      | 12 days           | January 27, 2019  | Non compliant   | January 02, 2019  | February 21, 2019 04:00 PM |
| <span style="color: green;">●</span> NV-LAS-000005  | The Palazzo                  | 3325 S Las Vegas Blvd, Las Vegas, NV 89109      | 12 weeks          | February 06, 2019 | Compliant       | February 06, 2019 | February 11, 2019 11:20 AM |
| <span style="color: red;">●</span> NV-LAS-000006    | Bellagio Hotel and Casino    | 3600 S Las Vegas Blvd, Las Vegas, NV 89109      | 2 weeks           | January 08, 2019  | Non compliant   |                   | February 04, 2019 04:00 PM |
| <span style="color: yellow;">●</span> NV-LAS-000007 | Caesars Palace               | 3570 S Las Vegas Blvd, Las Vegas, NV 89109      | 6 weeks           | January 09, 2019  | Overdue service |                   | February 19, 2019 04:00 PM |
| <span style="color: red;">●</span> NV-LAS-000008    | Four Seasons Hotel Las Vegas | 3960 S Las Vegas Blvd, Las Vegas, NV 89119      | 8 weeks           | December 11, 2018 | Non compliant   | October 15, 2018  | February 18, 2019 04:00 PM |
| <span style="color: red;">●</span> NV-LAS-000009    | Planet Hollywood             | 3667 S Las Vegas Blvd, Las Vegas, NV 89109      | 12 weeks          | 1 september 2018  | Non compliant   | 11 januari 2019   | 11 January 2019 10:27      |
| <span style="color: red;">●</span> NV-LAS-000010    | Cosmopolitan of Las Vegas    | 3708 S Las Vegas Blvd, Las Vegas, NV 89109      | 12 weeks          | 19 september 2018 | Non compliant   |                   | 25 December 2018 16:10     |

Track establishments, service frequencies, and compliance status

# PROJECT RESULTS

- **2018-2019 FOCUSED ON EPA/USDA REGION 10**
  - **TRAINED 338 PEOPLE IN WASHINGTON, OREGON, IDAHO AND ALASKA**
  - **TRAINEES REPRESENTED 153 DIFFERENT PROGRAMS OR FACILITIES**
- **2019-2020 FOCUSED ON WESTERN UNITED STATES**
  - **TRAINED 393 PEOPLE IN WASHINGTON, OREGON, IDAHO, ALASKA, WYOMING, UTAH, NEVADA, COLORADO, NEW MEXICO, ARIZONA**
  - **TRAINEES REPRESENTED 166 DIFFERENT PROGRAMS OR FACILITIES**
  - **FOUR TRAININGS WERE LIVE PRE-PANDEMIC**
  - **TEN TRAININGS WERE VIRTUAL IN RESPONSE TO PUBLIC HEALTH RECOMMENDATIONS**
- **TWO YEAR TOTALS = 731 PEOPLE FROM 319 PROGRAMS/FACILITIES**

# PROJECT RESULTS

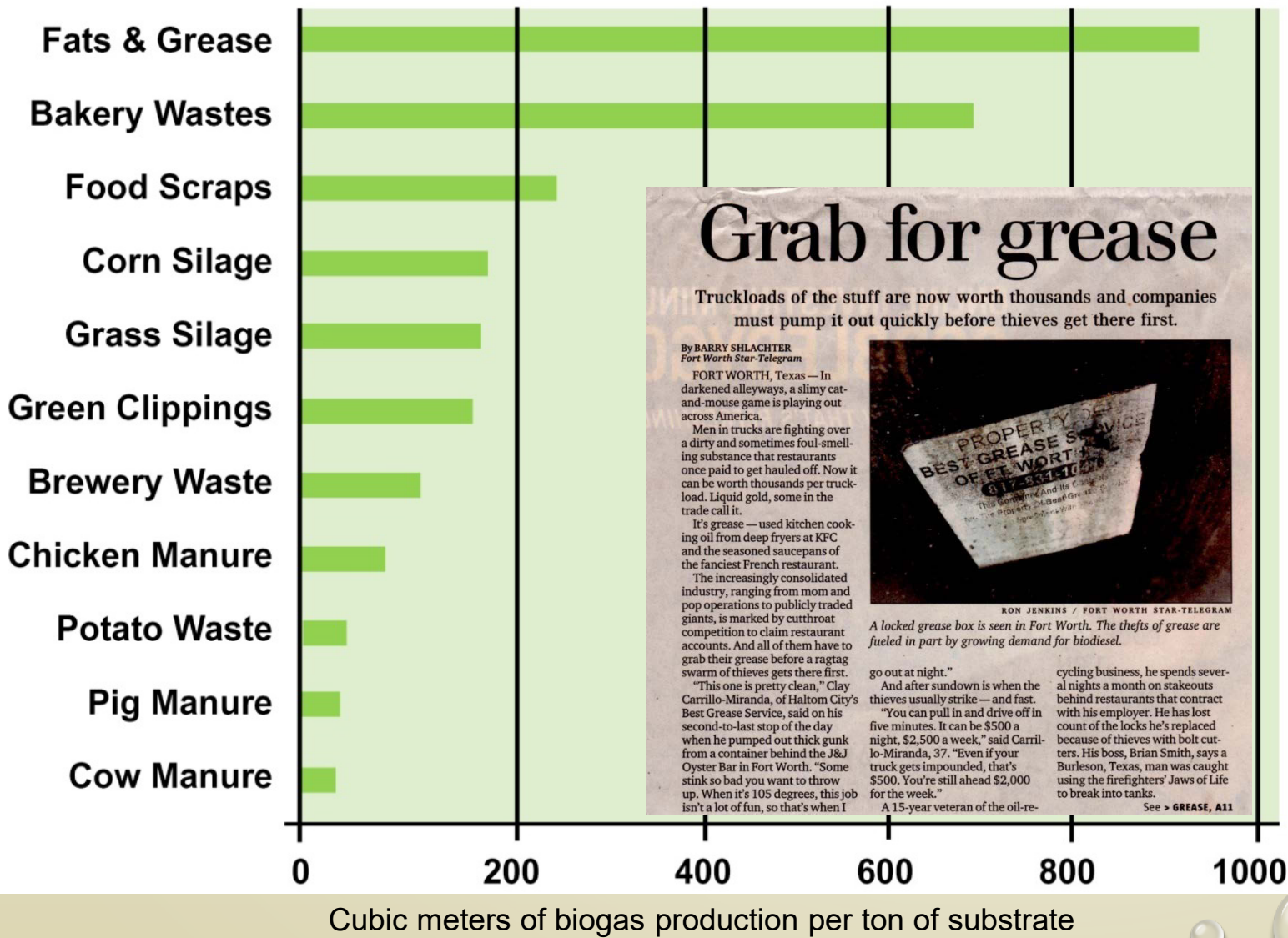
- **TIME MOVING TO VIRTUAL PLATFORM WAS UNEXPECTED**
  - **STARTED AS ONE 8-HOUR DAY OF TRAINING**
  - **ENDED WITH FOUR 2-HOUR DAYS OF TRAINING**
  - **WENT THROUGH 3-4 TRIAL RUNS WITH EACH 2-HOUR SESSION**
  - **PPRC STAFF SERVED AS AUDIENCE AND MADE RECOMMENDATIONS**
  - **TRIAL RUNS SIGNIFICANTLY IMPROVED THE TRAINING FOR THE FIRST GROUPS**



# NEXT PROJECT PHASE

- **NOW COVERING ALL OF THE UNITED STATES**
  - **MOST WILL BE EAST OF MISSISSIPPI RIVER**
  - **MOST WILL CONTINUE TO BE VIRTUAL**
  - **PLANNING FOR SOME LIVE TRAININGS IN SECOND HALF OF 2021**
  - **PLANNING TO MARKET TO CITY COUNCILS, BOARDS, MUNICIPAL MANAGERIAL STAFF – OTHER DECISION MAKERS**
  - **CREATING NATIONAL RESOURCE REFERENCE GUIDE**
  - **PLANNING TO CREATE 1-2 CASE STUDIES**
  - **ADDING EXERCISE TO EACH LIVE TRAINING TO HELP THEM COME OUT WITH AN ACTIONABLE PLAN**
  - **LONG-TERM VISION**

# VISION - BROWN GREASE AS COMMODITY!



- 1998 NREL 13# PER PERSON
- US POP 331 MILLION
- 4,303,000,000 LBS. OF FOG

**THE PRICE OF YELLOW GREASE**  
 VARIES FROM QUARTER TO QUARTER AND  
 IS LISTED BY THE USDA AGRICULTURAL  
 MARKETING SERVICE. IN JANUARY 2017, IT  
 SOLD FOR \$0.23 PER POUND OR ABOUT  
 \$8.05 FOR A 35 LB. JIB OF OIL. (ABOUT 40%  
 OF THE COST OF A \$20 FRYER OIL JIB.)  
 October 2020 price \$0.25 per lb.

## Grab for grease

Truckloads of the stuff are now worth thousands and companies must pump it out quickly before thieves get there first.

By BARRY SHLACHTER  
 Fort Worth Star-Telegram

FORT WORTH, Texas — In darkened alleyways, a slimy cat-and-mouse game is playing out across America.

Men in trucks are fighting over a dirty and sometimes foul-smelling substance that restaurants once paid to get hauled off. Now it can be worth thousands per truckload. Liquid gold, some in the trade call it.

It's grease — used kitchen cooking oil from deep fryers at KFC and the seasoned saucepans of the fanciest French restaurant.

The increasingly consolidated industry, ranging from mom and pop operations to publicly traded giants, is marked by cutthroat competition to claim restaurant accounts. And all of them have to grab their grease before a ragtag swarm of thieves gets there first.

"This one is pretty clean," Clay Carrillo-Miranda, of Haltom City's Best Grease Service, said on his second-to-last stop of the day when he pumped out thick gunk from a container behind the J&J Oyster Bar in Fort Worth. "Some stink so bad you want to throw up. When it's 105 degrees, this job isn't a lot of fun, so that's when I go out at night."

And after sundown is when the thieves usually strike — and fast.

"You can pull in and drive off in five minutes. It can be \$500 a night, \$2,500 a week," said Carrillo-Miranda, 37. "Even if your truck gets impounded, that's \$500. You're still ahead \$2,000 for the week."

A 15-year veteran of the oil-re-

cycling business, he spends several nights a month on stakeouts behind restaurants that contract with his employer. He has lost count of the locks he's replaced because of thieves with bolt cutters. His boss, Brian Smith, says a Burleson, Texas, man was caught using the firefighters' Jaws of Life to break into tanks.

See > GREASE, A11

PROPERTY OF BEST GREASE SERVICE OF FT. WORTH 817-334-1000

RON JENKINS / FORT WORTH STAR-TELEGRAM

A locked grease box is seen in Fort Worth. The thefts of grease are fueled in part by growing demand for biodiesel.

# DURHAM WASTEWATER PLANT FOG RECEIVING STATION



- 13,000,000 KWH YR = 60%



## CONTACTS:

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