



NERPCA

New England

Regional Pretreatment Coordinators Association



**27th Annual New England
Pretreatment Coordinators Workshop
October 2025**

Development & Implementation of New Rates for Industrial Users and Hauled Wastes



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Des Moines, Iowa



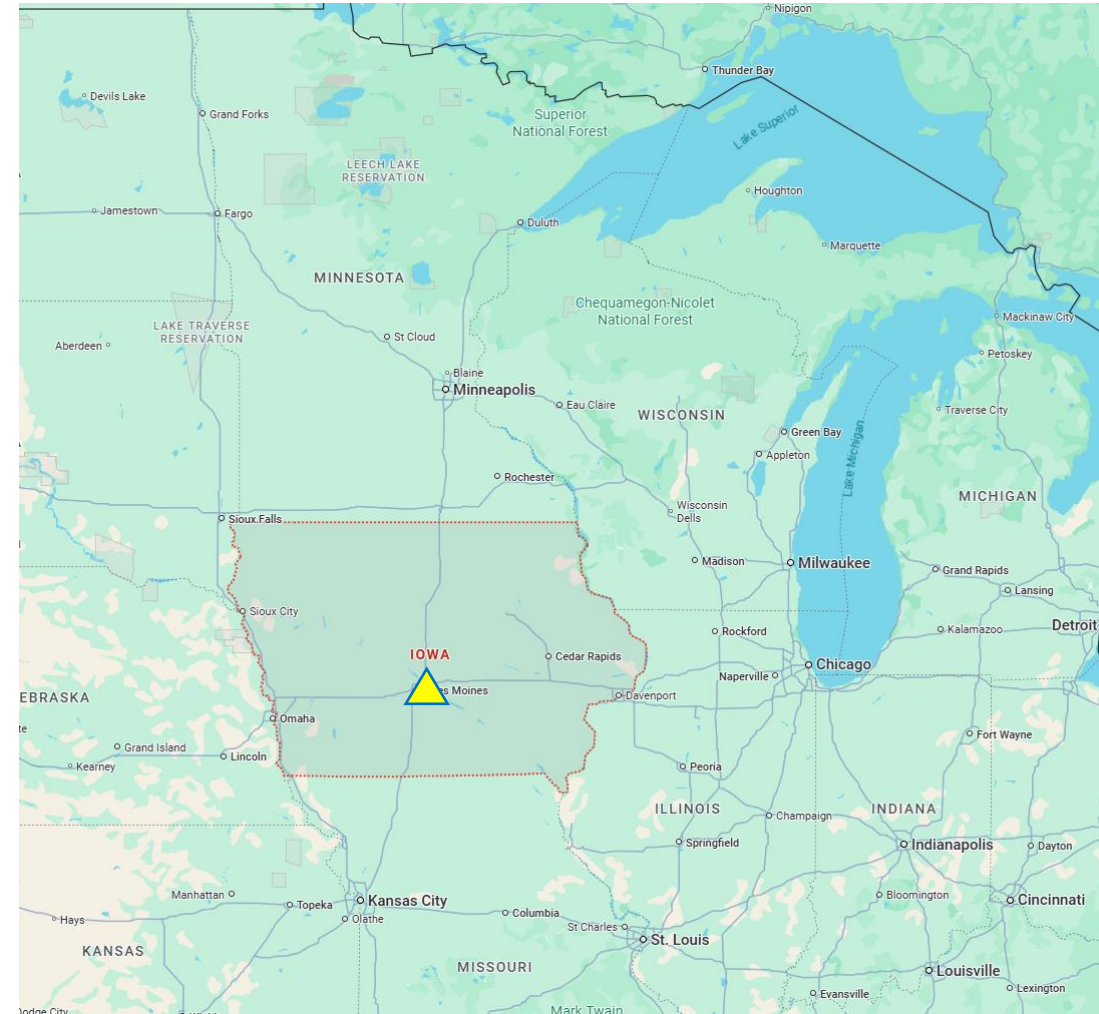
AGENDA

- **WRA Stats**
- **Background**
- **Methodology**
- **Fee Calculator**
- **Implementing New Rates**
- **Other Considerations**



Des Moines Metropolitan WRA Stats

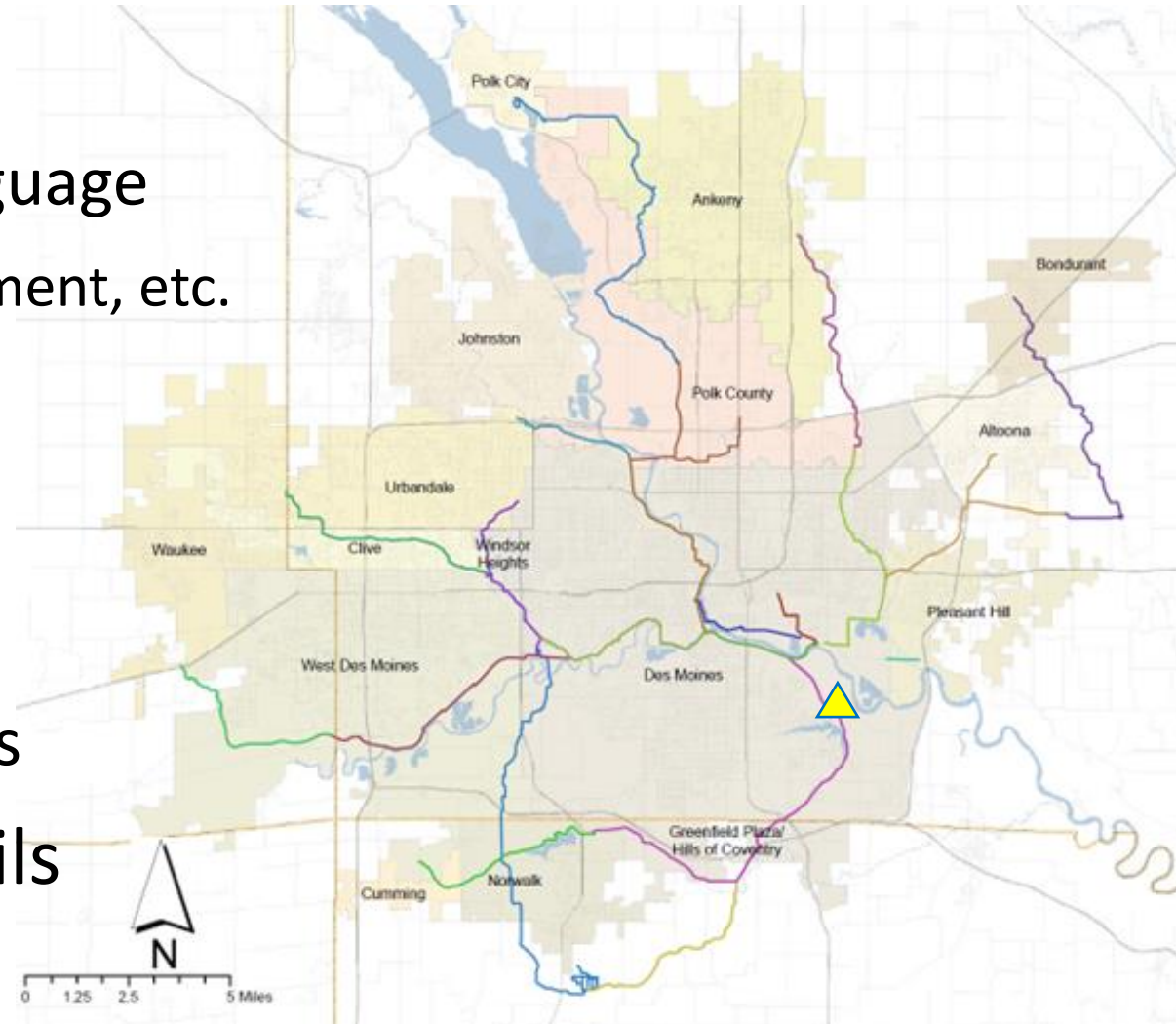
- Metro population: 600,000
- 50 MGD avg. dry weather
- 200 MGD max wet weather
- 77 Permitted IUs
 - 45 SIUs
 - 20 Non-CIUs (conventional pollutants)
 - 25 CIUs
 - 15 Hauled waste generator permits
- 100+ Discharge authorizations





Des Moines WRA Structure

- 18 Member communities
 - All adopt the same ordinance language
 - Fee structures, surcharges, enforcement, etc.
- WRA Board
 - 1-2 Community reps per Member
- WRA Technical Committee
 - ~18 Member Public Works officials
- 18 Individual City/County Councils





Des Moines Metropolitan Wastewater Reclamation Facility



Goal

- Develop a rate model to determine our cost to treat wastewater
 - ...Seems easy enough, right?
- Cost to treat wastewater coming in from:
 - 1) Collection system
 - 2) Hauled waste:
 - a) **Headworks** receiving station
 - b) **Digesters** receiving station
 - c) and by waste type or specific customer



Why do a Rate Study?

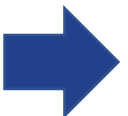
- How long has it been since your last rate study?
 - 10 years? 20 years? ...or more?
- Probably needed if you've altered any major processes
- So you can appropriately and justifiably bill your industrial users and hauled waste customers



Provide for equitable distribution of treatment and industrial pretreatment costs resulting from pollutants introduced into the POTW. -- Sec. 118-320 of City of Des Moines code



WRA Rate Study - 2022

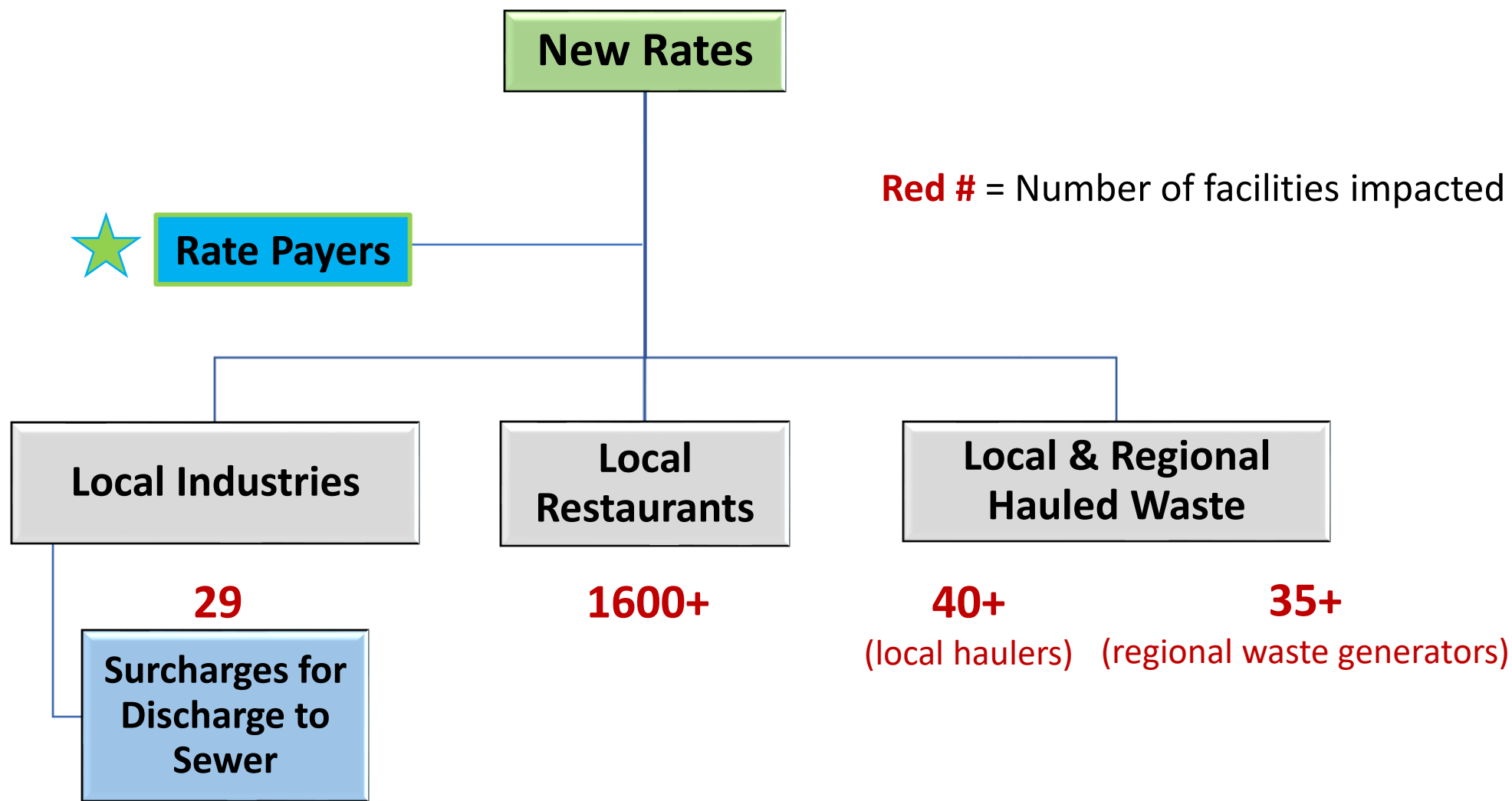
- Last study done in 2000 ...**22 years prior**
- Added new processes in last 5+ years 
- Hauled waste program grew 3x in 10 years
- WRA's surcharge rates seemed comparatively low
 - Discharge by pipe to collection system
 - Discharge by truck to treatment plant

Recent WRA Upgrades:

- CSSSF
- Hauled Waste Tank
- Digester Improvements
- Grit Facility Improvements
- Primary Clarifier Improvements
- Biogas Conditioning
- Blended Sludge Pumps
- Primary Sludge Pumps
- Trickling Filter Removal
- Flood Protection Improvements
- Final Clarifier Improvements
- Phosphorus Treatment (Future)

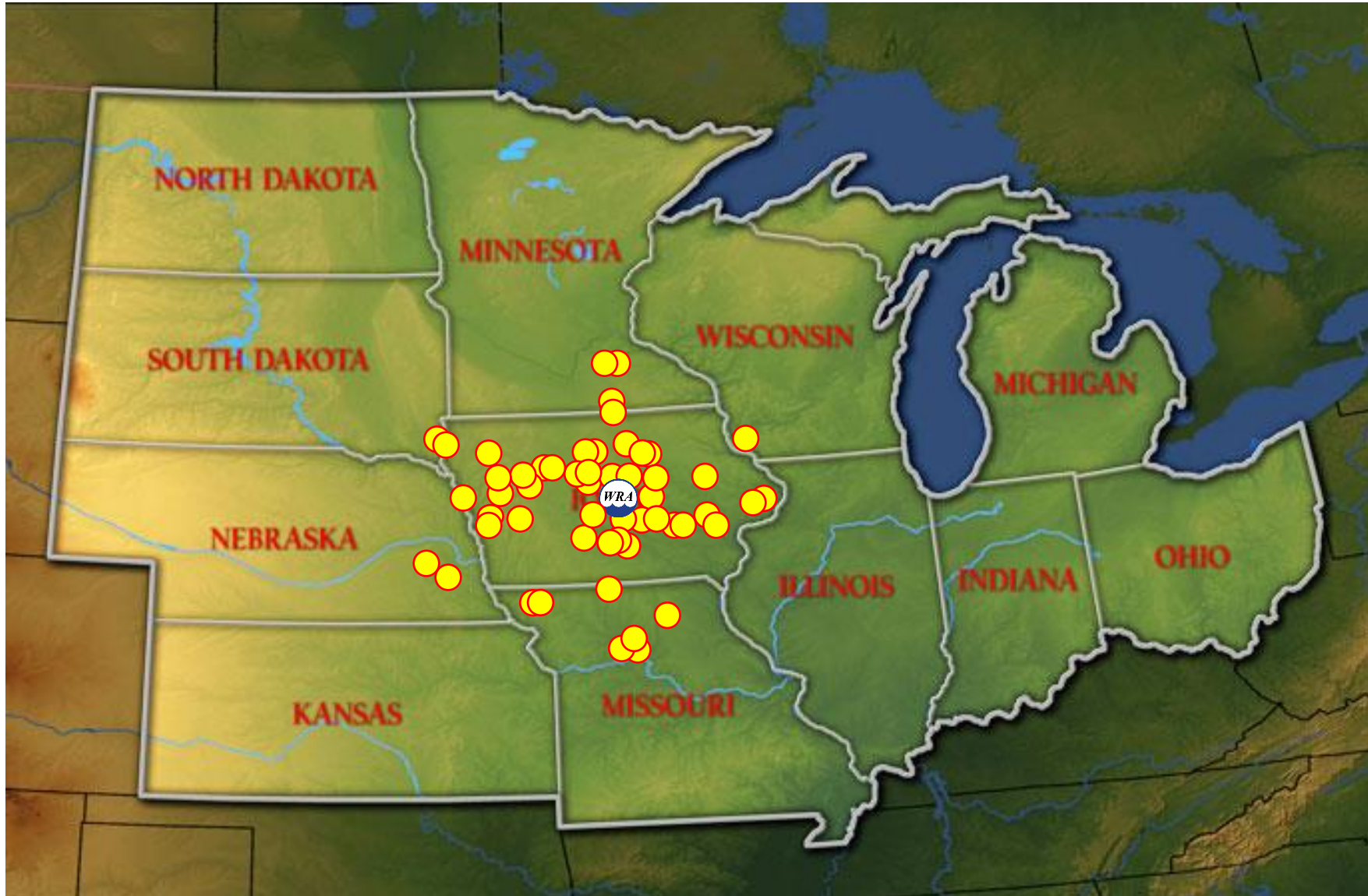


Determine who is impacted by new rates





Regional Waste Generators to WRF





Develop List of IUs by Community

Count	# of Industries by City
4	Altoona
4	Ankeny
2	Clive
36	Des Moines
1	Grimes
1	Norwalk
6	Pleasant Hill
1	Polk County
3	Urbandale
2	West Des Moines
16	Non-Member Communities (hailed waste)

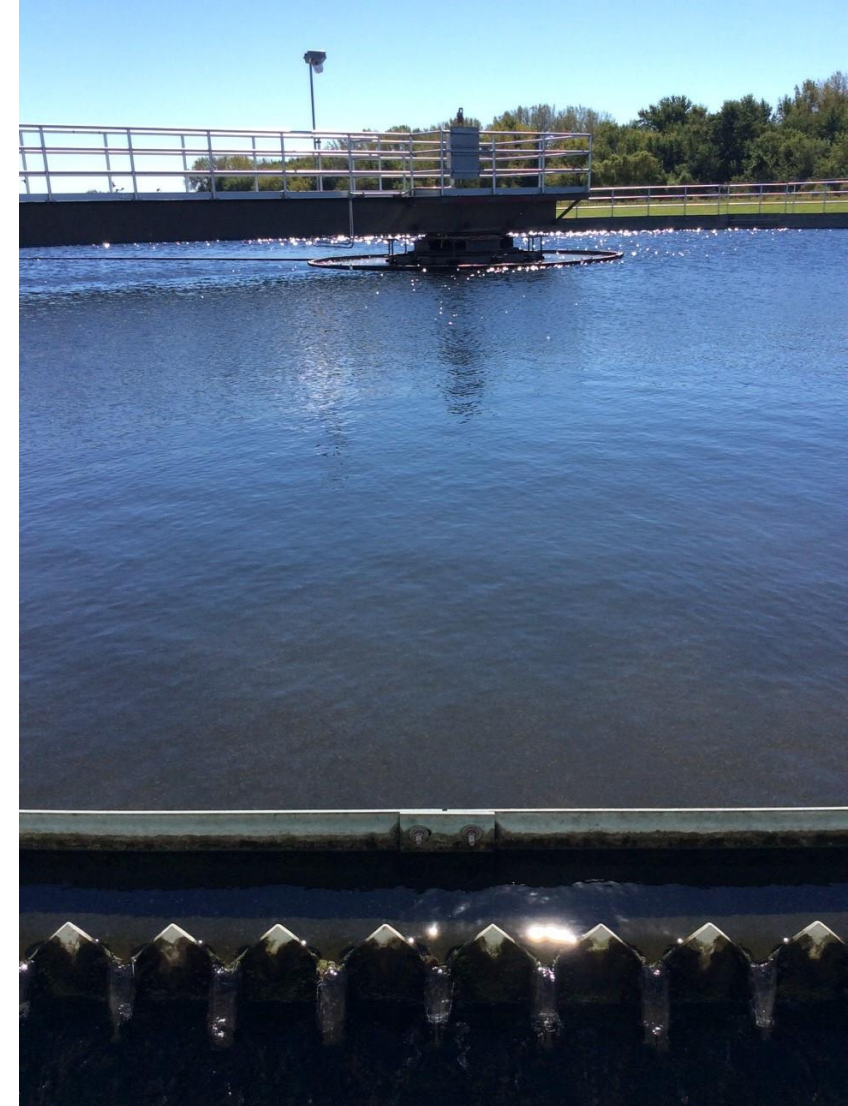
Surcharged vs. Non-Surcharged

76	Total Permitted Industries
59	Discharge to POTW by Pipe
20	Class A, surcharged 
5	Class A
9	Class B, surcharged 
25	Class B
17	Hauled Waste (only) to WRF
5	Class A
12	Class B



Develop New Rates – Compile Data!

- Conduct in-depth review of your WWTP to determine cost per plant process
 - Plant flow & pollutant loadings
 - Loading to each process
 - Volume & concentration of hauled wastes
 - Energy usage (and \$ kWh rates)
 - (May need power monitors)
 - Labor, Equipment, Materials, Fuel
 - Solids management expenses
 - Capital Improvement Projects Costs
- Develop a rate model to determine treatment costs per lb. of pollutant



How to Develop New Rates??

Suzie Carpenter
Black & Veatch
carpenters@bv.com



You get some help!



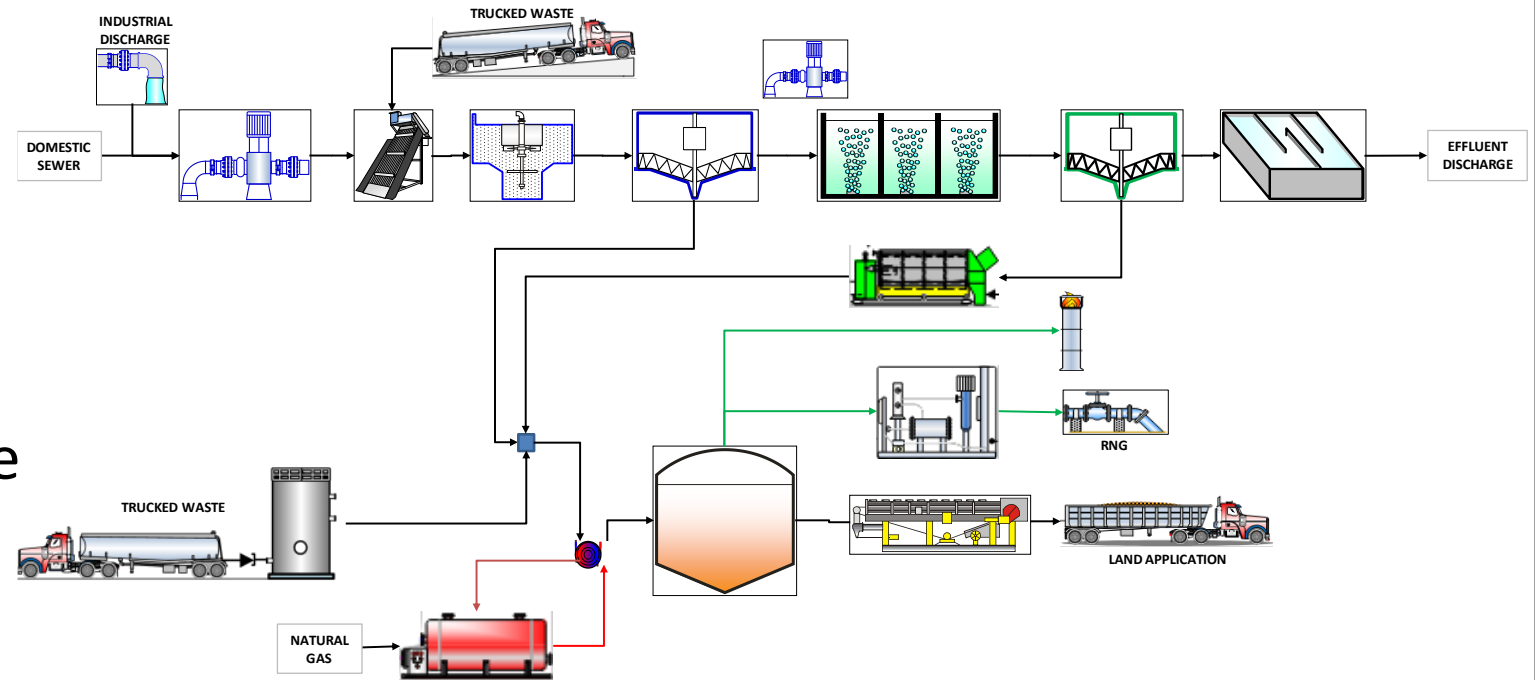
PARAMETERS EVALUATED

- **Biologic Oxygen Demand (BOD)**
- **Total Suspended Solids (TSS)**
- **Total Kjeldahl Nitrogen (TKN)**
- **Oil and Grease (O&G)**
- **Total Phosphorous (TP) (for future use)**



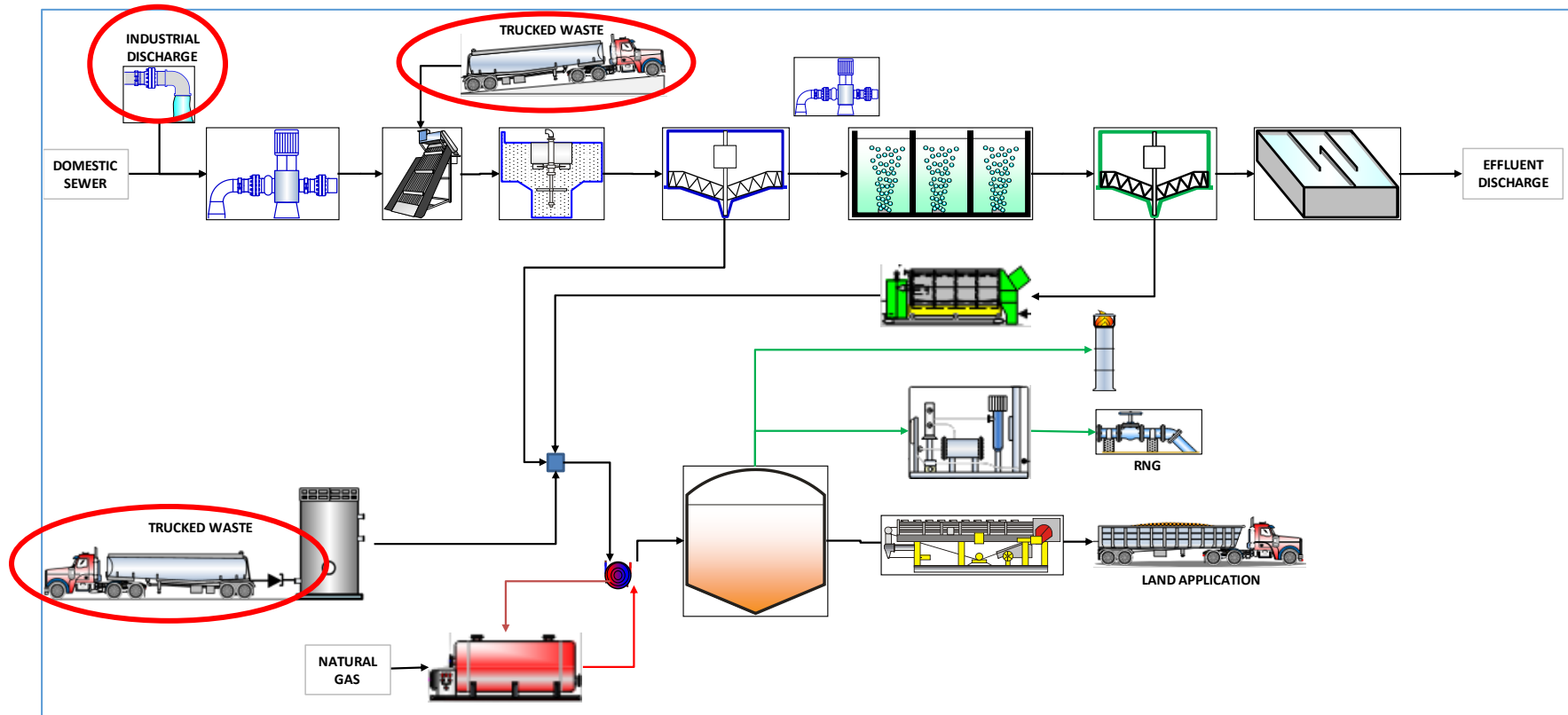
SIMULATED WASTE CHARACTERISTICS

- Costs – Chemicals, Power, Labor, Maintenance, CIP
- Historical loadings and treatment process operation
- Developed Surcharge Rate (\$/lb) for each parameter

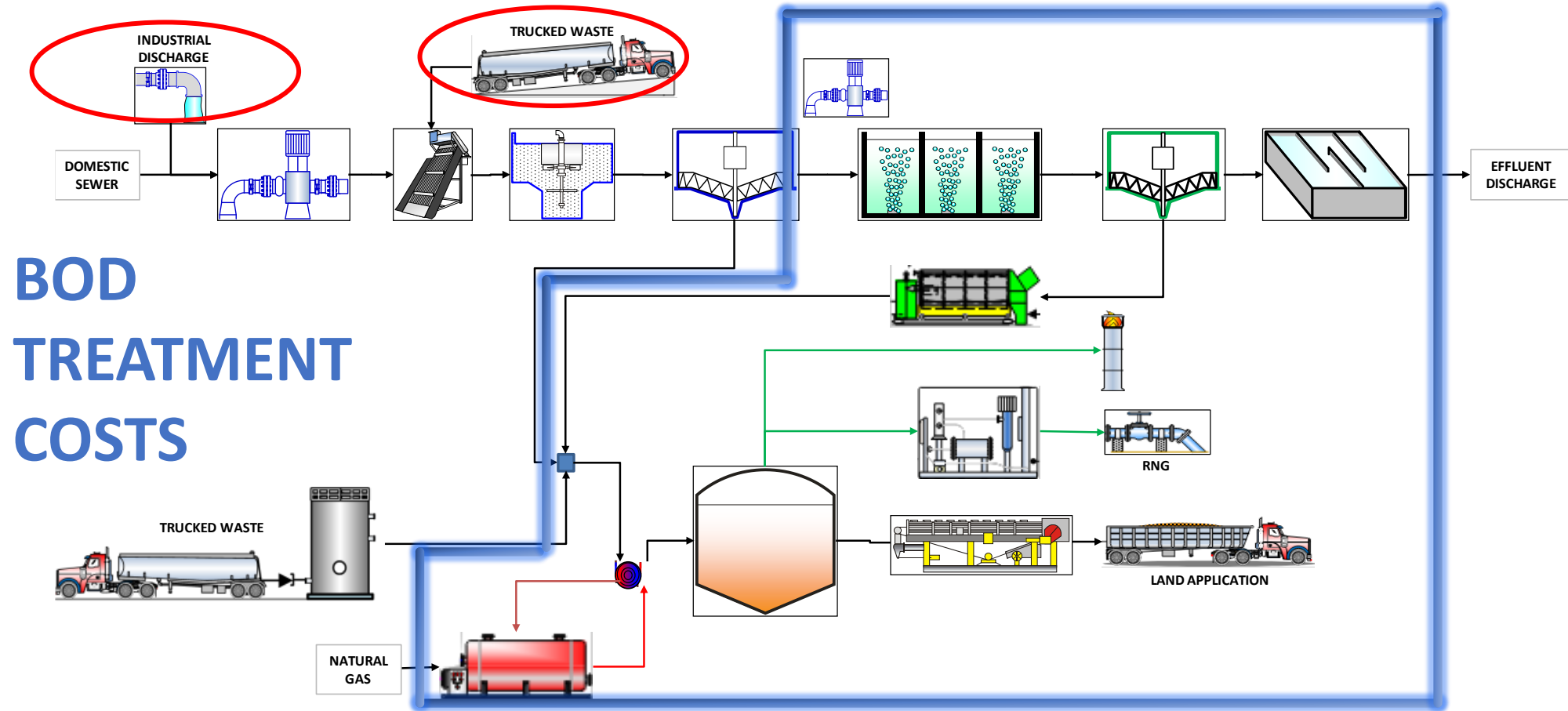


RATES EVALUATED

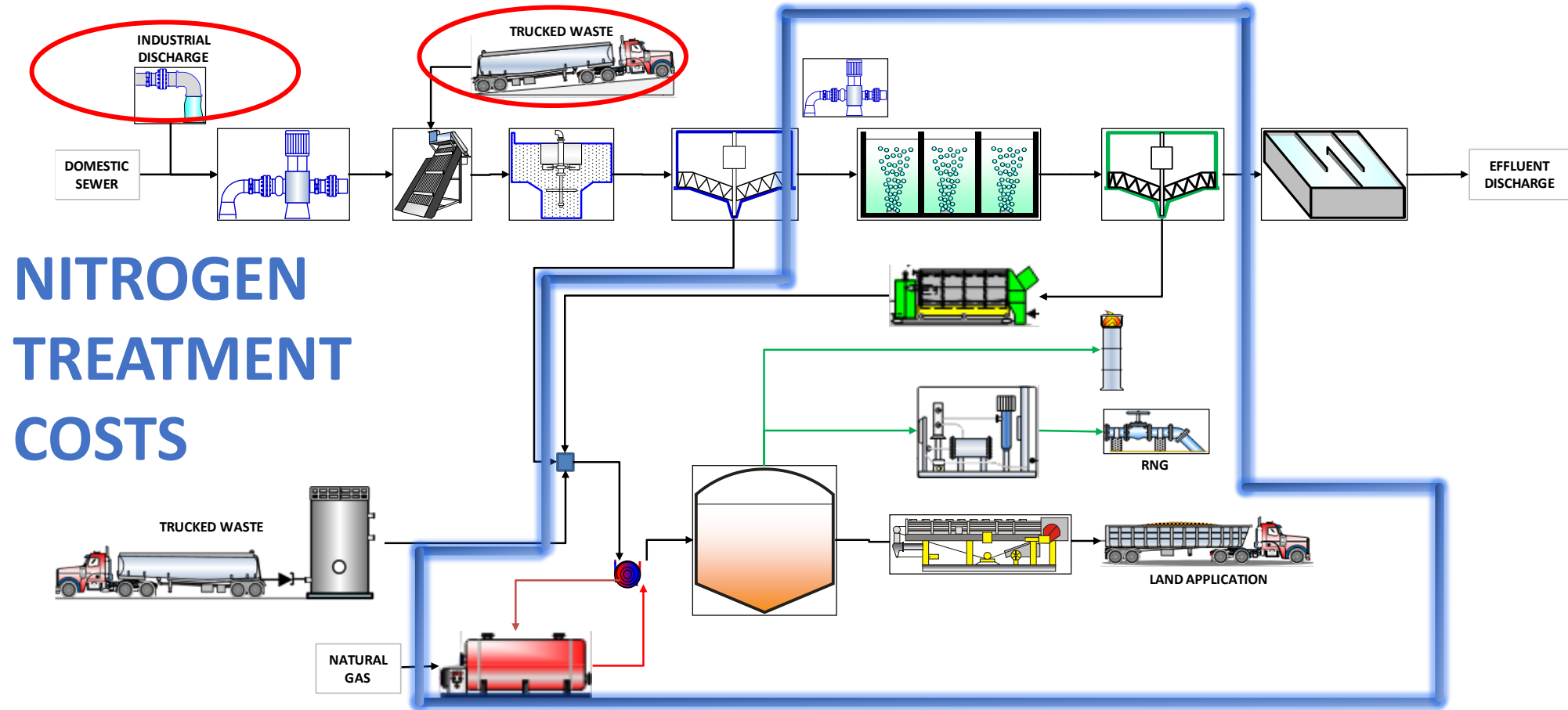
- Direct discharge from industrial facilities
- Hauled wastes discharged to digestion or headworks

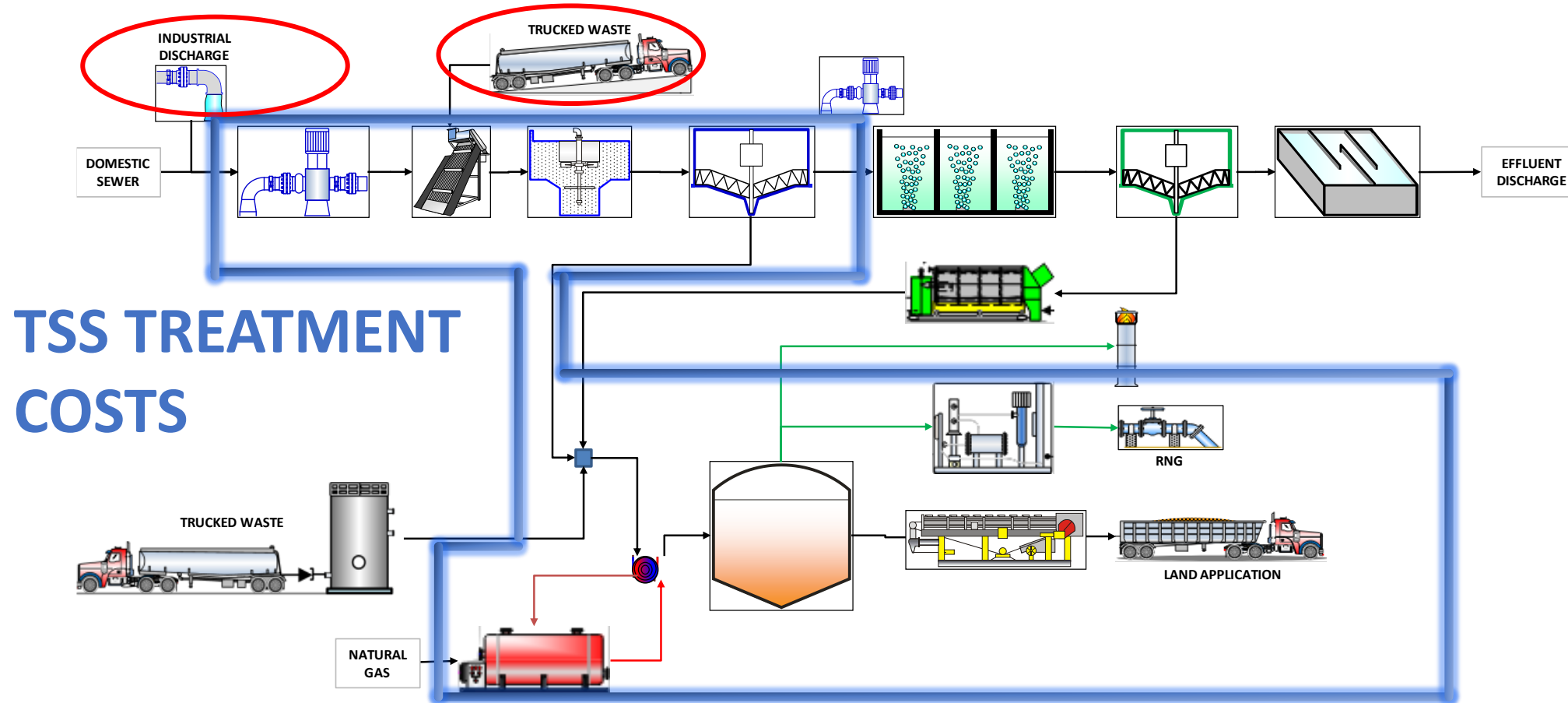


Impact of Discharge Location

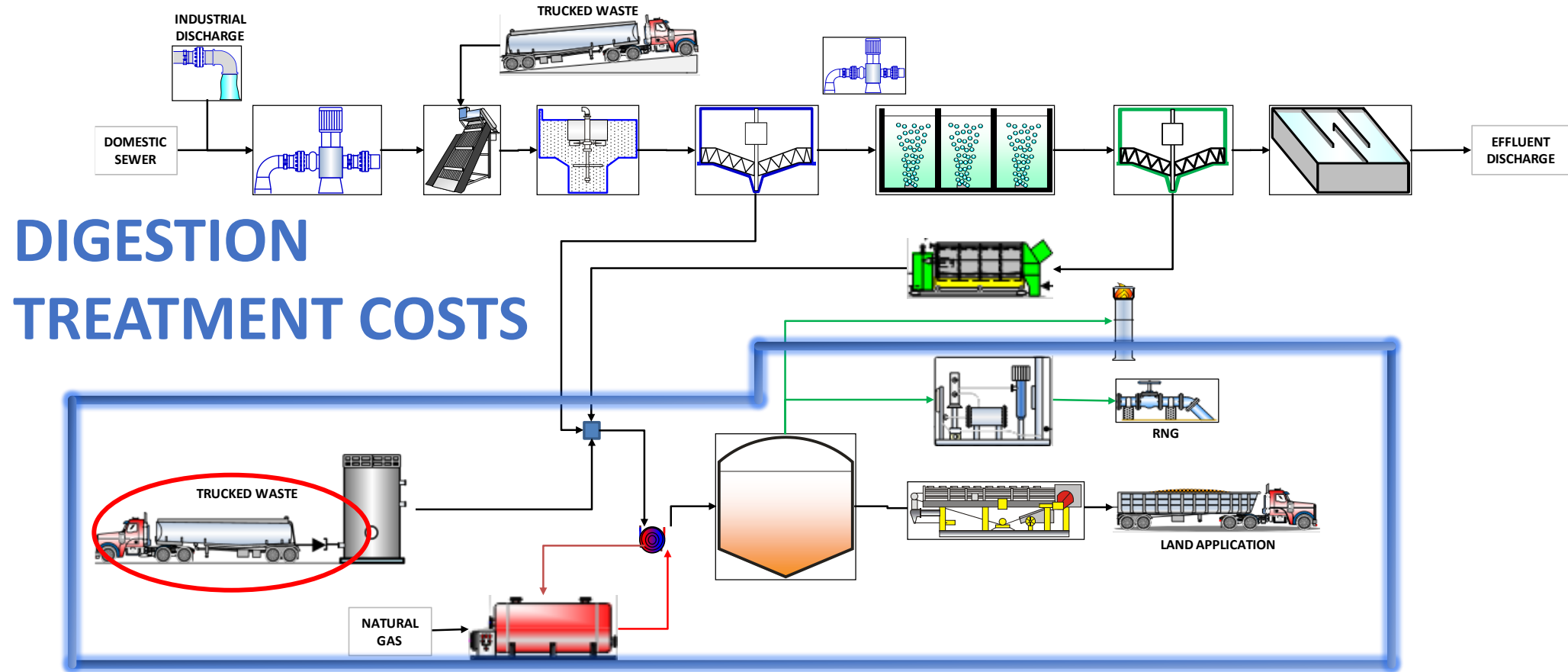


Impact of Discharge Location





Impact of Discharge Location





Develop Assumptions



PROCESS ASSUMPTIONS

OIL & GREASE

Oil and Grease Specific Gravity	0.90	
O&G Removal in Liquid Treatment, %	70%	Assumed most of O&G will be removed in primary and secondary clarifiers
Removed O&G TS, %	7%	Scum concentrator is not being used. However, a lower TS results in high flows to digesters.
Removed O&G VS, %	95%	
COD/VS Ratio	2.00	
Nit of VS Feed, %	0%	

PRIMARY CLARIFIERS

Primary Clarifier TSS Removal, %	55.0%	updated
Primary Sludge Concentration, %	4.5%	ok
Primary Sludge VS, %	78.0%	
Primary Sludge COD/VS Ratio	1.60	
Primary Sludge Nit of VS Feed, %	4.0%	For blended sludge 6%, for WAS 8.6%
VS/COD Conversion in Digester, %	60.0%	Primary Sludge 60%, Secondary Sludge 40% per 2013 Digester Model

SECONDARY TREATMENT FOR BOD REMOVAL

BOD Removal in Clarifiers, %	30%	ok
lb oxygen needed: lb BOD removed	1.2	ok
Effluent BOD, mg/l	7	updated
AOR/SOR	0.33	Fine bubble 0.33, Coarse bubble 0.50
Diffuser submergence, ft	19	Per Facility Plan Update 2014
OTE, %/ft	2.00%	Coarse bubble 0.75, fine bubble 2.0
Air, lb O ₂ /scfm @ 100% OTE	0.0173	

SECONDARY TREATMENT FOR NITROGEN REMOVAL



Determine Parameter Specific Operating Costs

Calculated using historical Influent BOD loads to the plant					Assumed 30% BOD removal in PCs and 1.2 lb O2 per lb BOD removed, and effluent BOD of 7 mg/l.			
BOD BASED PROCESSES	Influent BOD Load lb/d	Aeration (diffused air) kWh/d	Aeration (diffused air) kWh/lb BOD		BOD Removed in Secondary lb/d	Air Demand lb O2/d	Aeration (diffused air) kWh/d	Aeration (diffused air) kWh/lb O2
Jan-20	91,793	36,558	0.398		61,072	73,286	36,558	0.499
Feb-20	98,747	42,859	0.434		65,688	78,826	42,859	0.544
Mar-20	123,935	40,145	0.324		82,450	98,940	40,145	0.406
Apr-20	104,327	42,441	0.407		68,678	82,414	42,441	0.515
May-20	104,723	43,184	0.412		69,132	82,958	43,184	0.521
Jun-20	103,910	46,967	0.452		68,254	81,905	46,967	0.573
Jul-20	87,942	45,703	0.520		58,524	70,229	45,703	0.651
Aug-20	97,347	43,240	0.444		65,782	78,939	43,240	0.548
Average	101,590.6	42,637.1	0.424		67,447.7	80,937.2	42,637.1	0.532
St. Dev	10,891.1	3,208.6	0.055		7,133.7	8,560.5	3,208.6	0.069
RPD	11%	8%	13%		11%	11%	8%	13%

\$ 0.03 \$/lb BOD



BREAKDOWN OF INDUSTRIAL DISCHARGE RATE TO SEWER

[CLICK HERE TO GO BACK TO FEE CALCULATOR](#)

CONFIDENTIAL – WRA USE ONLY

Parameter	Gallon	Surcharge \$/1000 gal
Flow	1	\$ -

Industrial dischargers already pay this fee through billing

Parameter	Average Concentration mg/l	Allowed Concentration mg/l	Surcharge mg/l	Surcharge lb	Rate \$/lb	Treatment Cost \$
COD	4,000	300	3,700	0.031	-	-
Estimated BOD	2,667	200	2,467	0.021	\$ 0.2100	\$ 0.0043
TSS	400	250	150	0.001	\$ 0.2200	\$ 0.0003
TKN	200	30	170	0.001	\$ 0.4200	\$ 0.0006
O&G	300	100	200	0.002	\$ 0.1100	\$ 0.0002
TP	0	0	0	0.000	\$ -	\$ -
Total Cost - Pollutants, \$/Gallon						\$ 0.0054
Total Cost - Flow, \$/Gallon						\$ -
TOTAL COST, \$/Gallon						\$ 0.0054
Program Cost, \$/Gallon						\$ -
Adjusted Rate, \$/Gallon						\$ 0.0054



BREAKDOWN OF TRUCKED WASTE RATE TO HEADWORKS

[CLICK HERE TO GO BACK TO FEE CALCULATOR](#)

CONFIDENTIAL – WRA USE ONLY

Parameter	Gallon	Surcharge \$/1000 gal
Flow	1	\$ 7.94

Parameter	Average Concentration mg/l	Allowed Concentration mg/l	Surcharge mg/l	Surcharge lb	Rate \$/lb	Treatment Cost \$
COD	30,000	300	29,700	0.248	-	-
Estimated BOD	20,000	200	19,800	0.165	\$ 0.2100	\$ 0.0347
TSS	40,000	250	39,750	0.332	\$ 0.2200	\$ 0.0729
TKN	1,000	30	970	0.008	\$ 0.4200	\$ 0.0034
O&G	7,000	100	6,900	0.058	\$ 0.1100	\$ 0.0063
TP	0	0	0	0.000	\$ -	\$ -
Total Cost - Pollutants, \$/Gallon						\$ 0.1173
Total Cost - Flow, \$/Gallon						\$ 0.0079
TOTAL COST, \$/Gallon						\$ 0.1253
Program Cost, \$/Gallon						\$ -
Adjusted Rate, \$/Gallon						\$ 0.1253



Calculated New Rates for WRA

	<u>2021 Rates</u>	vs.	<u>New Rates</u>	<u>Change</u>
BOD:	\$0.11		\$0.21	+0.10
TSS:	\$0.16		\$0.22	+0.06
TKN:	\$0.61		\$0.42	-\$0.19
O&G:	\$0.06		\$0.11	+\$0.05

Note:

These new WRA rates have not been finalized and approved for publication yet.



Implementation of New Rates

- A stepped approach to new rates:

	<u>2021</u>		<u>2022</u>	<u>2023</u>	<u>2024</u>	...	<u>2025</u>
BOD:	\$0.11		\$0.14	\$0.17	\$0.21		*
TSS:	\$0.16		\$0.18	\$0.20	\$0.22		*
TKN:	\$0.61		\$0.55	\$0.49	\$0.42		*
O&G:	\$0.06		\$0.08	\$0.10	\$0.11		*

* Increase future rates by 2% per year



	AVERAGE mg/l	ALLOW mg/l	DIF. mg/l	LB/MO	CHARGE PER LB	MONTH COST	
CBOD	5893	200	5693	108872	0.21	\$22,863.08	
TSS	67	250			0.22		
TKN	763	30	733	14017	0.42	\$5,887.11	
O&G	1108	100	1008	19282	0.11	\$2,121.02	
TOT. FLOW	2,292,888	GALLONS					
						NEW Rates	Old Total
SURCHARGE SUB-TOTAL						\$30,871.22	\$21,683.15
INDUSTRIAL SAMPLING CHARGES						\$100.00	\$100.00
INDUSTRIAL ANALYSIS CHARGES						\$360.00	\$360.00
TAX						\$2,193.19	\$1,550.02
TOTAL						\$33,524.41	\$23,693.17



Determine how much impact per I.U.

July 2020 - June 2021 Averages	MIN (Current)	MAX (Current)	CURRENT	NEW	BOD	TSS	TKN	O&G
	\$ /month Avg.		\$ /month Avg.	\$ /month Avg.	lbs.	lbs.	lbs.	lbs.
Company A	\$ 25,466	\$ 47,730	\$ 33,351	\$ 57,781	220,896	46,980	2,517	0
Company B	\$ 5,247	\$ 47,298	\$ 19,657	\$ 26,489	95,580	152	14,799	1,530
Company C	\$ 4,233	\$ 16,806	\$ 10,083	\$ 17,421	66,408	11,084	1,154	5,017
Company D	\$ 2,225	\$ 34,367	\$ 9,195	\$ 15,578	57,724	8,136	1,667	8,781
Company E	\$ 5,433	\$ 9,818	\$ 7,386	\$ 9,494	32,078	926	6,081	0
Company F	\$ 2,774	\$ 9,530	\$ 5,572	\$ 10,525	48,851	971	37	336
Company G	\$ 1,481	\$ 5,674	\$ 3,407	\$ 6,255	25,564	2,790	0	2,480
Company H	\$ 1,680	\$ 3,683	\$ 2,542	\$ 4,616	18,556	2,519	20	1,420

- Finalize new rates
- Determine before/after surcharges
- Notify your industries several months in advance



Now let's look at Hauled Waste disposal rates...





Two main disposal locations:

Headworks



Digesters





HEADWORKS

07 Dump
Station

Old Vac
Pad

Bldg.
12

Scale 3

Scale 1

DIGESTERS

Bldg. 70

Scale 2

← ENTRANCE

EXIT →

Vandalla Rd

SE 30th

91



Identification of Waste Types - Headworks

- Categorize your waste types and compile information:

		Pollutant average					
HEADWORKS	Volume (gal)	COD (mg/L)	TSS (mg/L)	TS (%)	VS (%)	TKN (mg/L)	O&G (mg/L)
Industrial Waste (general)	27,062,878	37,822	18,947	2	61	851	4,053
Landfill Leachate	32,703,249	833	54	--	--	201	85
Portable Toilets	5,264,505	37,023	17,883	13	69	2,946	3,108
Sand/Oil Traps, pit waste	2,532,216	38,380	140,296	18	9	594	16,101
Septic tanks	1,574,921	28,687	27,176	1	69	856	3,457
Sewer line cleanings	1,149,125	43,024	28,553	--	--	234	13,973



Calculate Disposal Rates by Waste Type

PARAMETER	UNIT	VALUE
Flow	gal	1
Weight	lbs	1

Flow and Weight should be 1 to obtain unit cost. Otherwise TOTAL cost is calculated.

						Average
COD	mg/l	30,000				30,000
TSS	mg/l	30,000				30,000
TS	%	3.0				3.0
VS	%	70				70
TKN	mg/l	1,000				1,000
Oil & Grease	mg/l	3,500				3,500

Direct Discharge to POTW?	N
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Headworks or Digesters	Headworks
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In Service Area or Out of Service Area	In Service
--	------------

\$0.1037
per gallon



\$0.0124
per lbs



Identification of Waste Types - Digesters

- Categorize your waste types and compile information:

		Pollutant average					
DIGESTERS	Volume (gal)	COD (mg/L)	TSS (mg/L)	TS (%)	VS (%)	TKN (mg/L)	O&G (mg/L)
Biofuels Mfg.	103,306,040	93,978	14,309	5	78	657	18,004
Restaurant FOG	63,126,258	40,588	21,801	13	86	1,034	11,444
Food Mfg.	99,877,759	168,672	47,368	9	85	3,071	35,761
Municipal Sludge	1,778,619	58,100	--	5	64	2,170	--
Other	722,194	130,808	26,696	10	51	4,257	4,928



Calculate Disposal Rates by Waste Type

PARAMETER	UNIT	VALUE
Flow	gal	1
Weight	lbs	1

Flow and Weight should be 1 to obtain unit cost. Otherwise TOTAL cost is calculated.

						Average
COD	mg/l	200,000				200,000
TSS	mg/l	40,000				40,000
TS	%	4.0				4.0
VS	%	85				85
TKN	mg/l	2,000				2,000
Oil & Grease	mg/l	25,000				25,000

Direct Discharge to POTW?	N
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Headworks or Digesters	Digesters
------------------------	-----------

Pick Waste Type	Food Mfr (80% VSR)
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In Service Area or Out of Service Area	In Service
--	------------

\$0.0820
per gallon



\$0.0098
per lbs



Summary of Hauled Waste Rates

HEADWORKS Loads:

Waste Type	2021 Rate per gal.	New Rate per gal.
Industrial Waste	\$0.1607	\$0.1500
Portable Toilets	\$0.1607	\$0.1500
Residential Septic	\$0.1607	\$0.1500
Sand/Oil Traps	\$0.1607	\$0.2484
Sewer Cleanings	\$0.1607	\$0.1500
Landfill Leachate	\$0.03-0.07	\$0.0500

All rates are In-Service area rates
(Out of Service Area = 150%)



Summary of Hauled Waste Rates

DIGESTER Loads:

Waste Type	2021 Rate per gal.	New Rate per gal.
Industrial Waste - Other	\$0.03-0.06	\$0.07
Biofuel Mfg. Waste	\$0.0318	\$0.0626
Food Mfg. Waste	\$0.03-\$0.05	\$0.0857
Municipal Sludge	\$0.03	\$0.0815
FOG Waste	\$0.0189	\$0.0765* \$0.0350**

All rates are In-Service area rates
(Out of Service Area = 150%)

* Actual calculated rate

** **Recommended new rate**





Calibrating your Rate Model

- How do you know it's accurate?
- A simple approach:
 - What is your annual operating budget? ...\$30,000,000
 - What is your maximum industrial loading to your POTW?
(Including hauled waste) ...33%

Total revenue from **industrial surcharges + hauled waste** = **\$10,000,000**



Other Considerations

- Meetings with / Notices to Stakeholders
 - Boards, Councils, member communities, industries, haulers
 - Lots of presentations
- Will need to approve and adopt into your ordinance first
 - *(Review ordinance for other necessary changes too!)*
- Provide sufficient notice to those impacted for their budgeting purposes
 - 4-6 months
- Provide notice of ordinance changes to Approval Authority



Questions / Comments?

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