



## OWEA Plant Operations Workshop **Grease Unloading Station**

Presented by:  
Harry Shaposka, PE – (216) 881-6600  
Jeff Ifft, PE- (216) 606-1316

# Summary

- Project Overview and Objectives
- Background
- Design
- Operations and Maintenance provisions
- Performance and Feedback from Plant

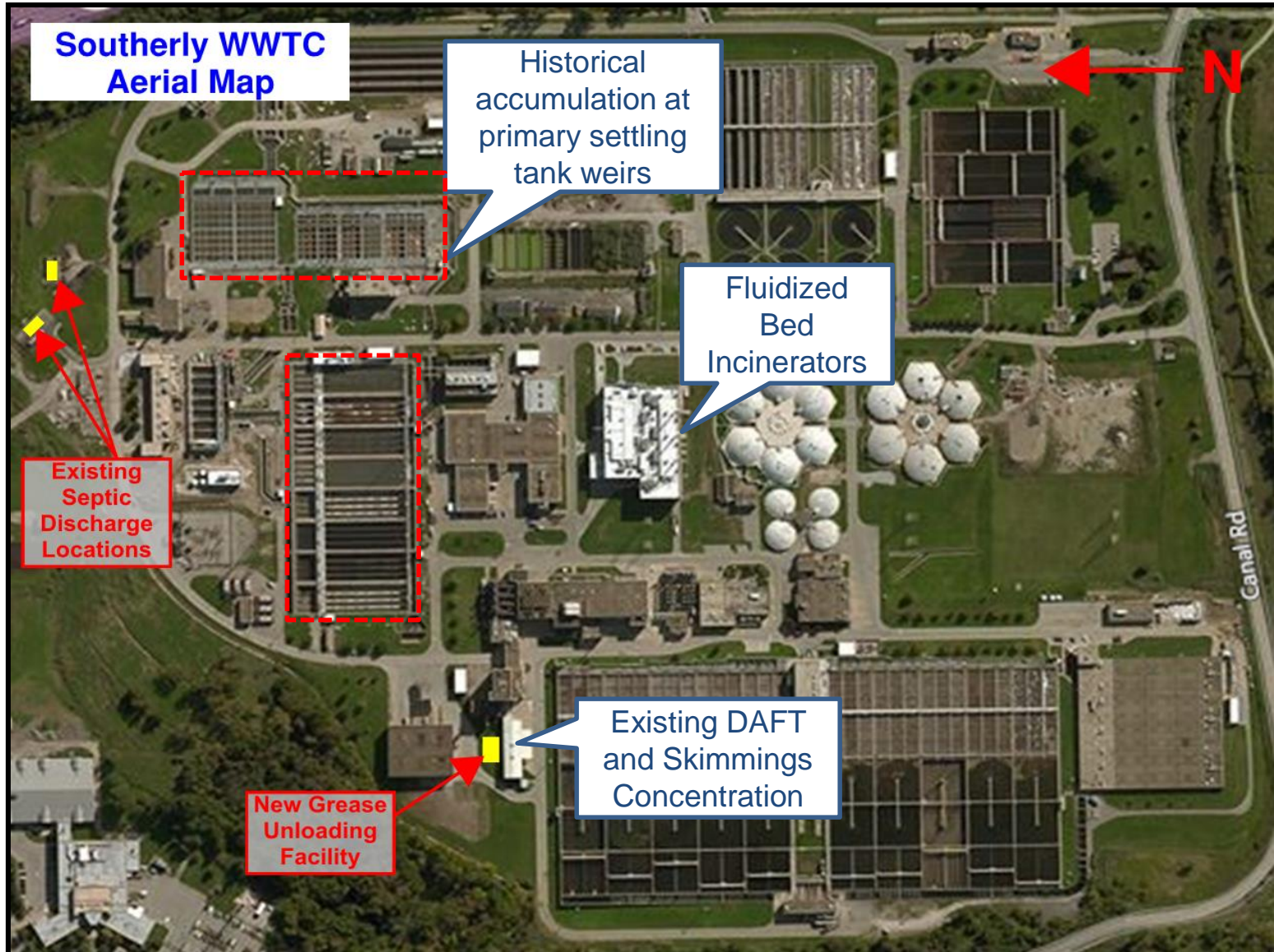
# Overview and Project Objectives

- Grease delivered by privately owned trucking companies
- Grease was unloaded from the trucks into the septage receiving location upstream of the headworks
- Grease and septage were handled in the same manner
- **Project Objectives:** Do not dilute concentrated grease, preserve for reuse, reduce the downstream O&M issues of weir clogging

**Note:** The existing Septage Receiving Station will remain as a backup discharge location



# Southerly WWTC Overview



# Background - Existing Septage/Grease Unloading

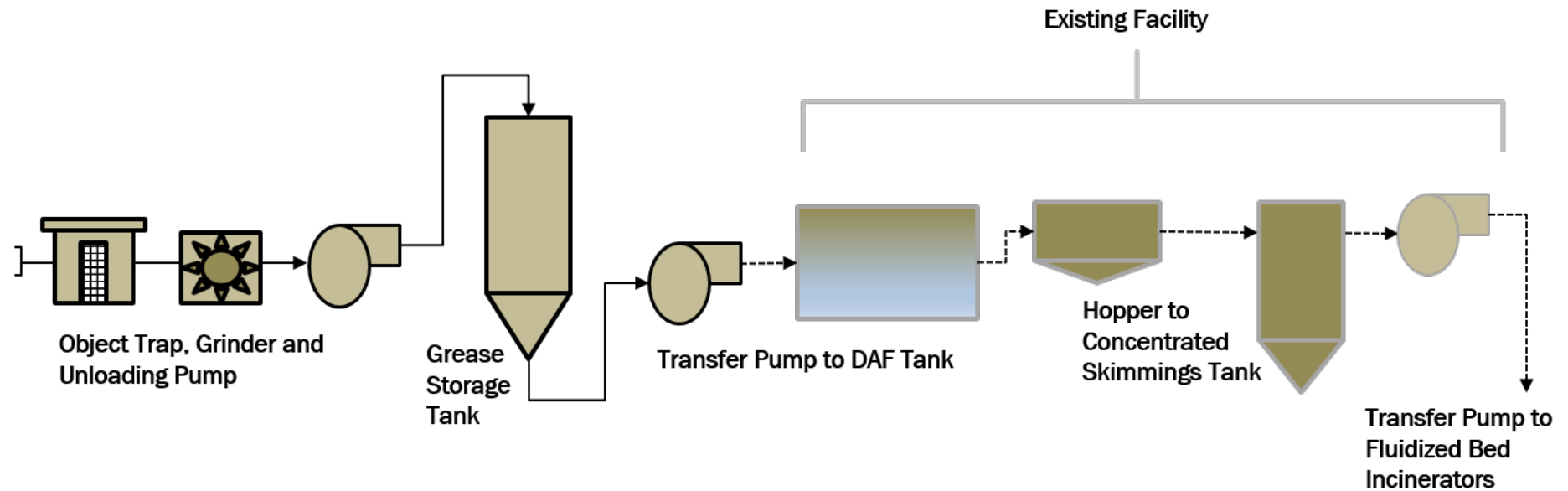


# Design Conditions

Parameter	Value
Estimated Number of Trucks per Day • Average / Max Day	8 / 17
Volume per Truck, gallons	3,000 to 4,000
Grease Total Solids, %	2 to 5
Grease Specific Weight, lbs/gal	8.3
Estimated Flow per Day • Average / Max Day, gpd	25,200 / 38,800
Two Tanks Provided	13,000 gal each



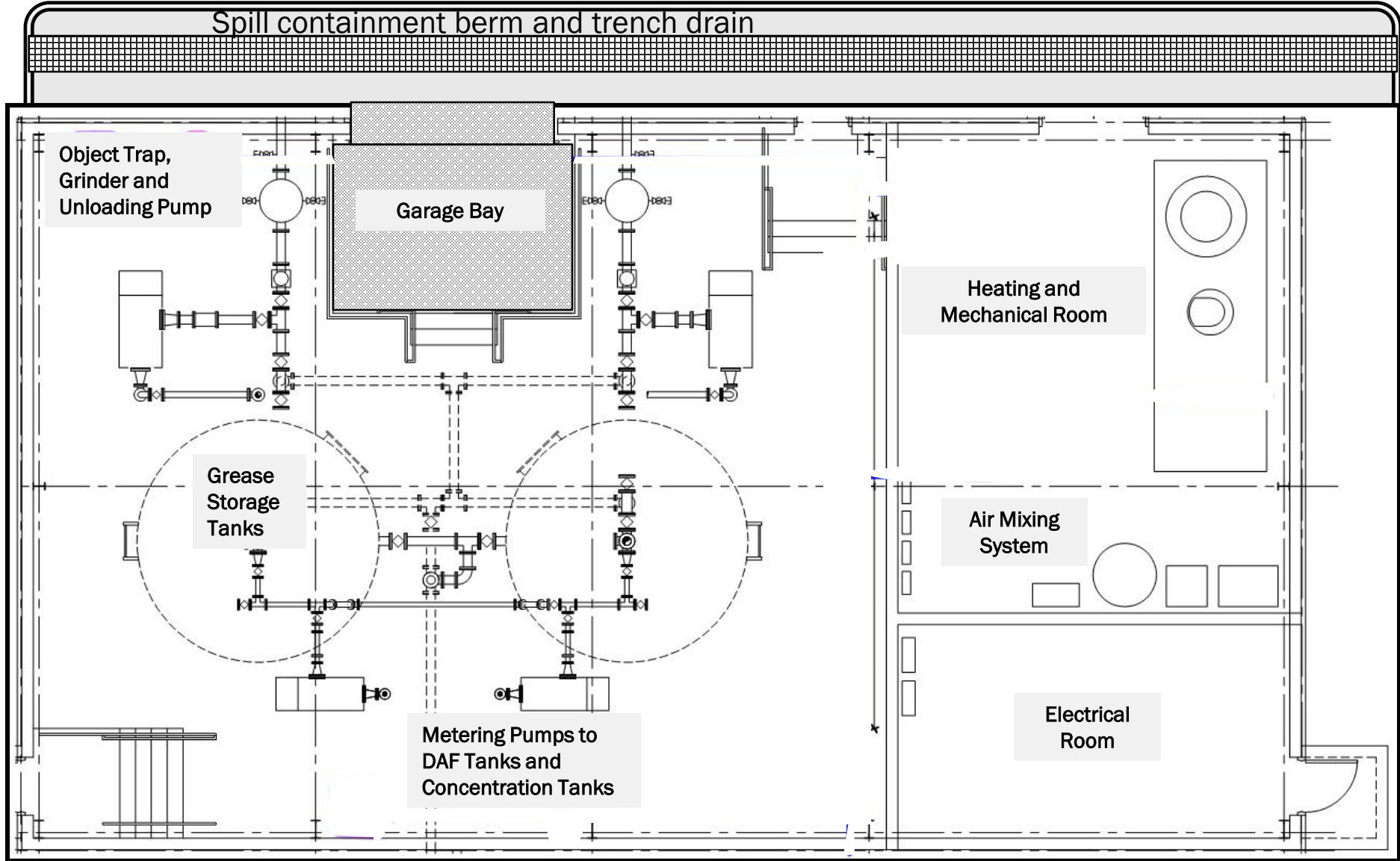
# Design Process Schematic



# General Layout

*Challenge: Protect stormwater system during unloading process.*

Spill containment berm and trench drain





# New Grease Unloading Facility



Single Story 2800 SF Facility,  
Prefab Metal Building  
Started up Summer 2016  
\$3.3M and 19 months to complete

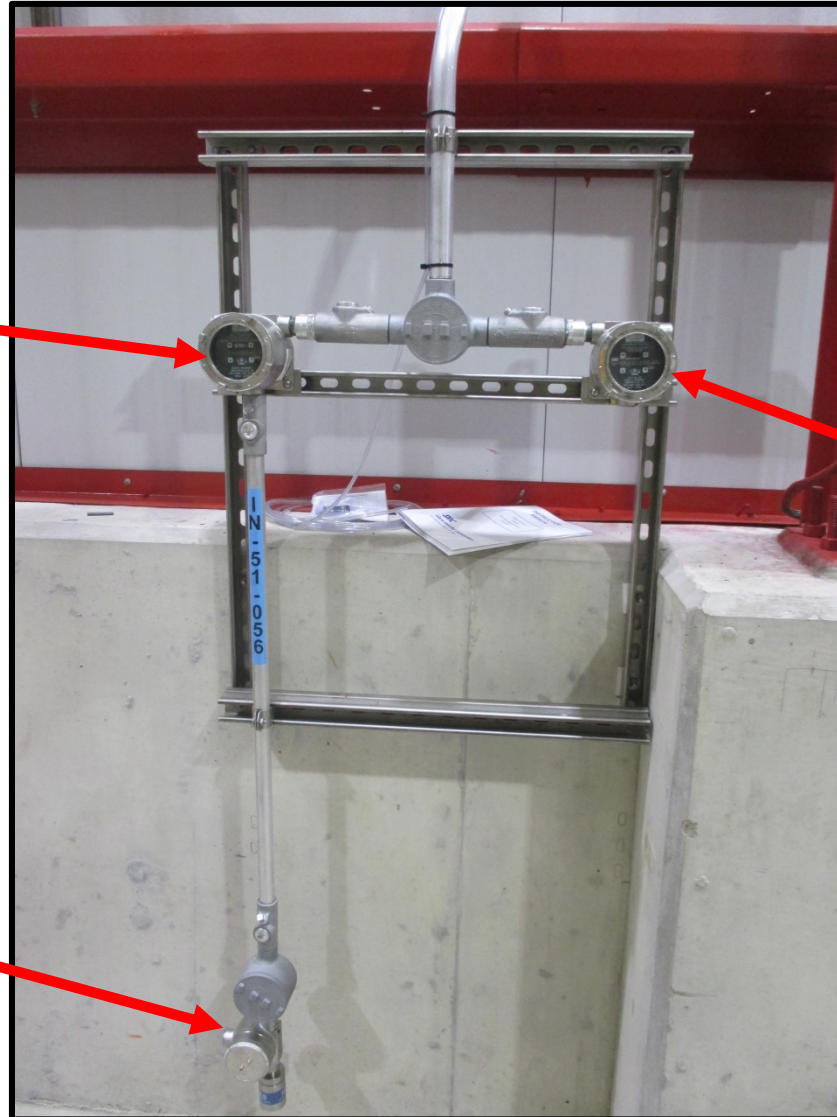
- Keeps concentrated waste product separate from the liquid treatment process and avoids downstream removal and pumping
- Preserves the grease, a waste product with relatively high BTU content for use as a fuel in the fluidized bed incinerators
- Improves hydraulic distribution at weirs and within conduits

# Safety Features - Combustible and Methane Gas Detectors

Combustible Gas Indicator (H<sub>2</sub>S)

Methane Gas Indicator (Sensor at Ceiling)

Floor Level Combustible Gas Sensing Head



# Unloading Stations / Docks



2 Grease  
Unloading  
Stations

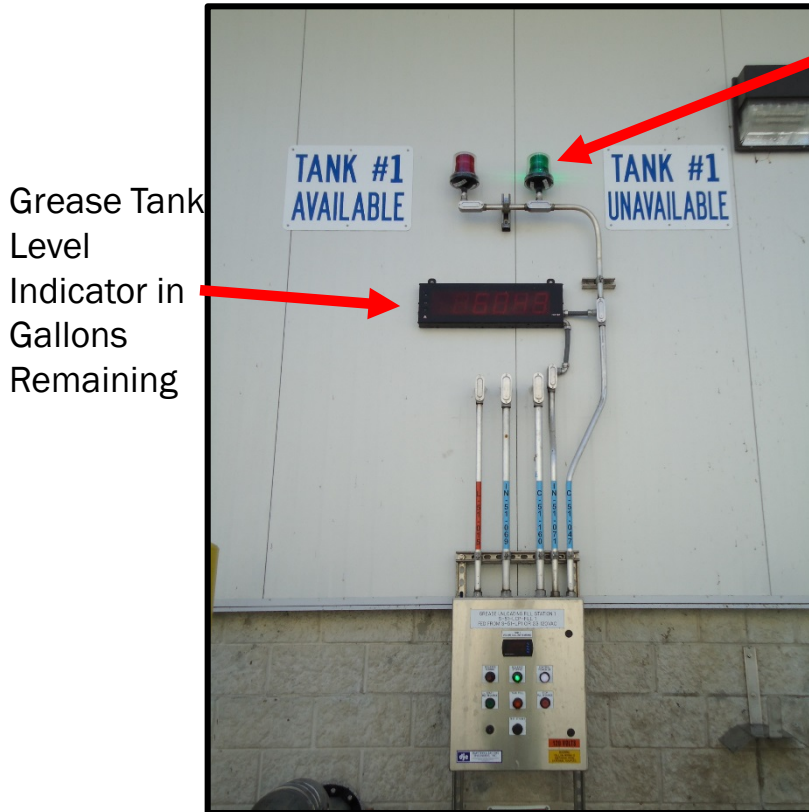
A sample is  
collected from  
every truck



*Challenge: Assure contract haulers  
are only unloading grease*

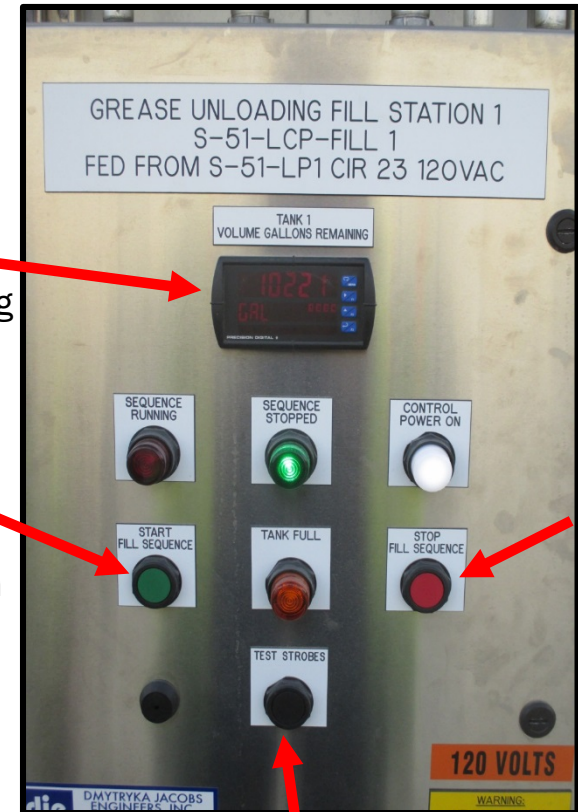


# Unloading Station



Grease Tank  
Level  
Indicator in  
Gallons  
Remaining

Tank Level Light



Gallons  
Remaining

Start Fill  
Sequence  
Pushbutton

Stop Fill  
Sequence  
Pushbutton

Test Strobes  
Pushbuttons

*Challenge: Make the unloading panels intuitive for non-NEORSD staff*



# Rock Traps and Grinders

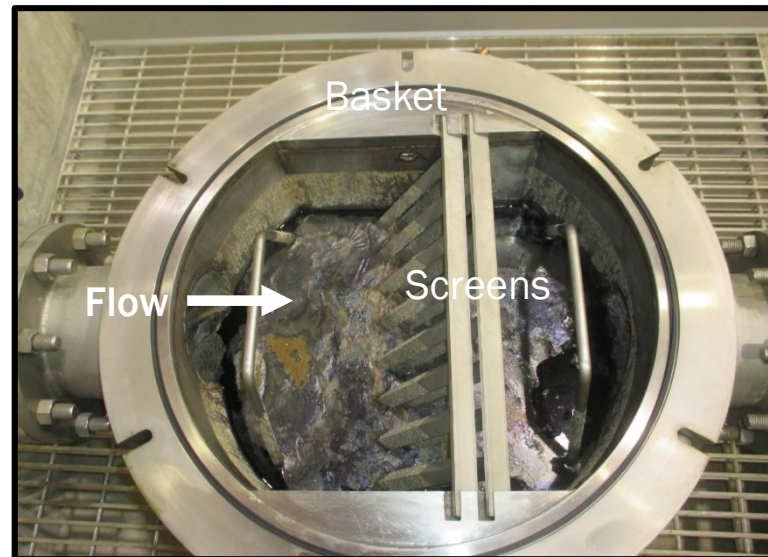
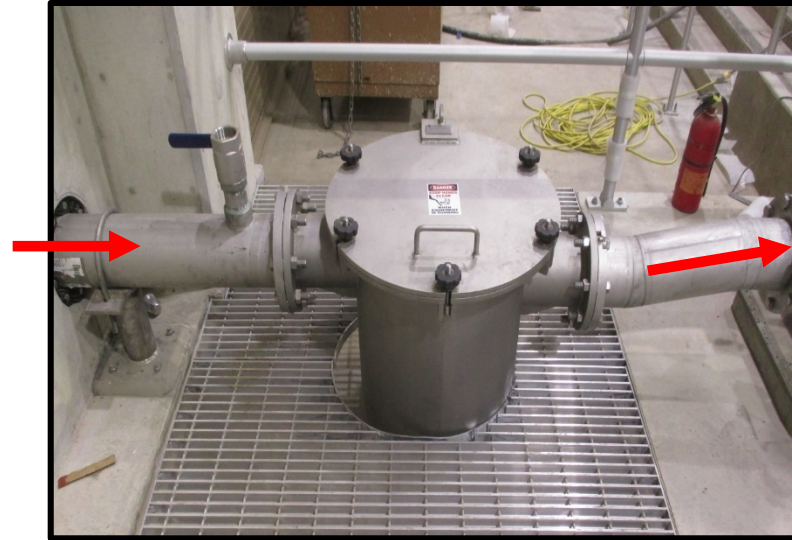
Manuf.: JWC Environmental

No. 2

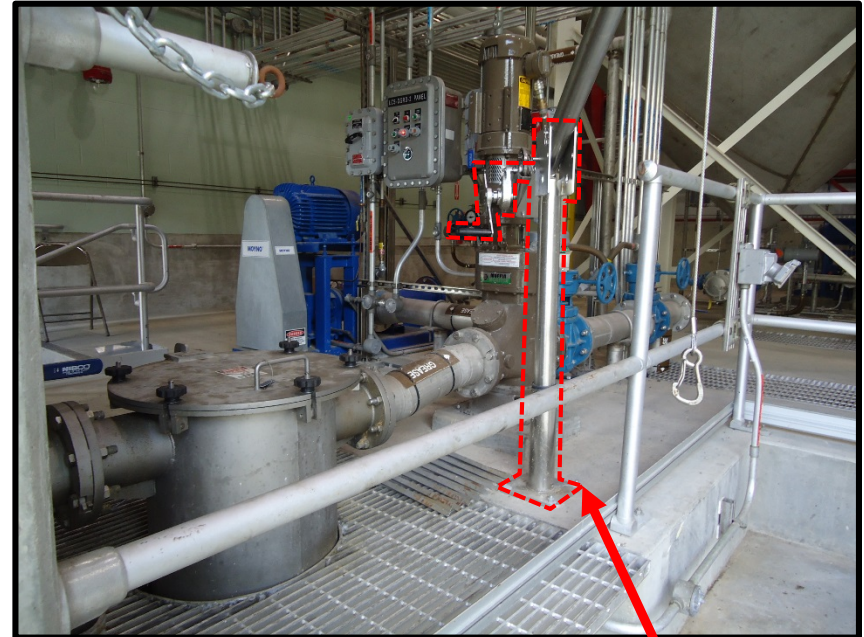
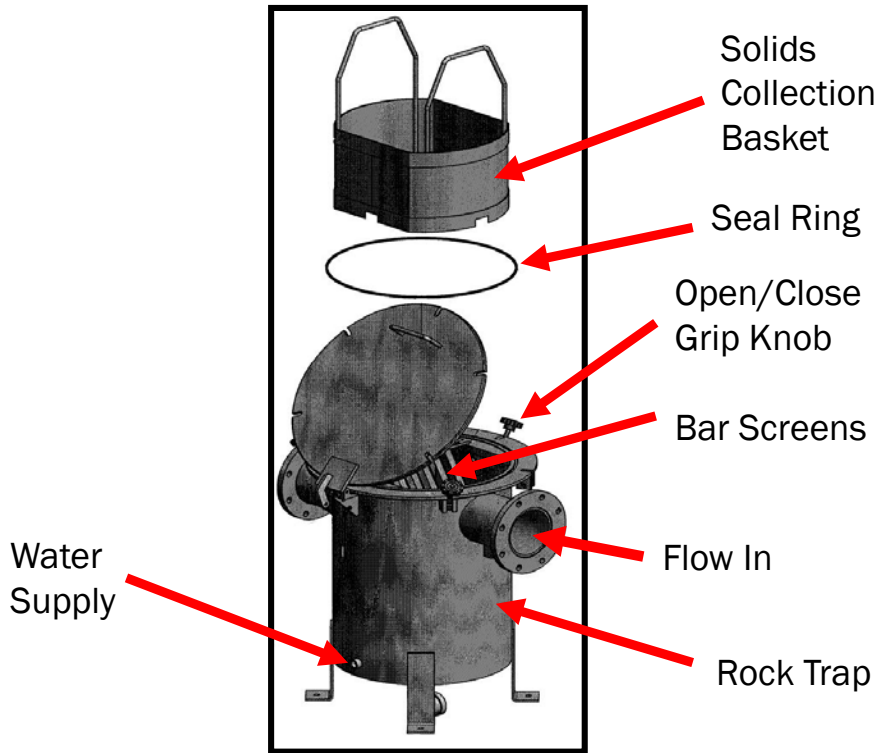
Capacity per Trap: 600  
gpm, 5 HP

## Purpose:

To collect heavy material before reaching the grinder, which then grinds remaining debris and protect the pumps



# Rock Trap with Basket and Grinder

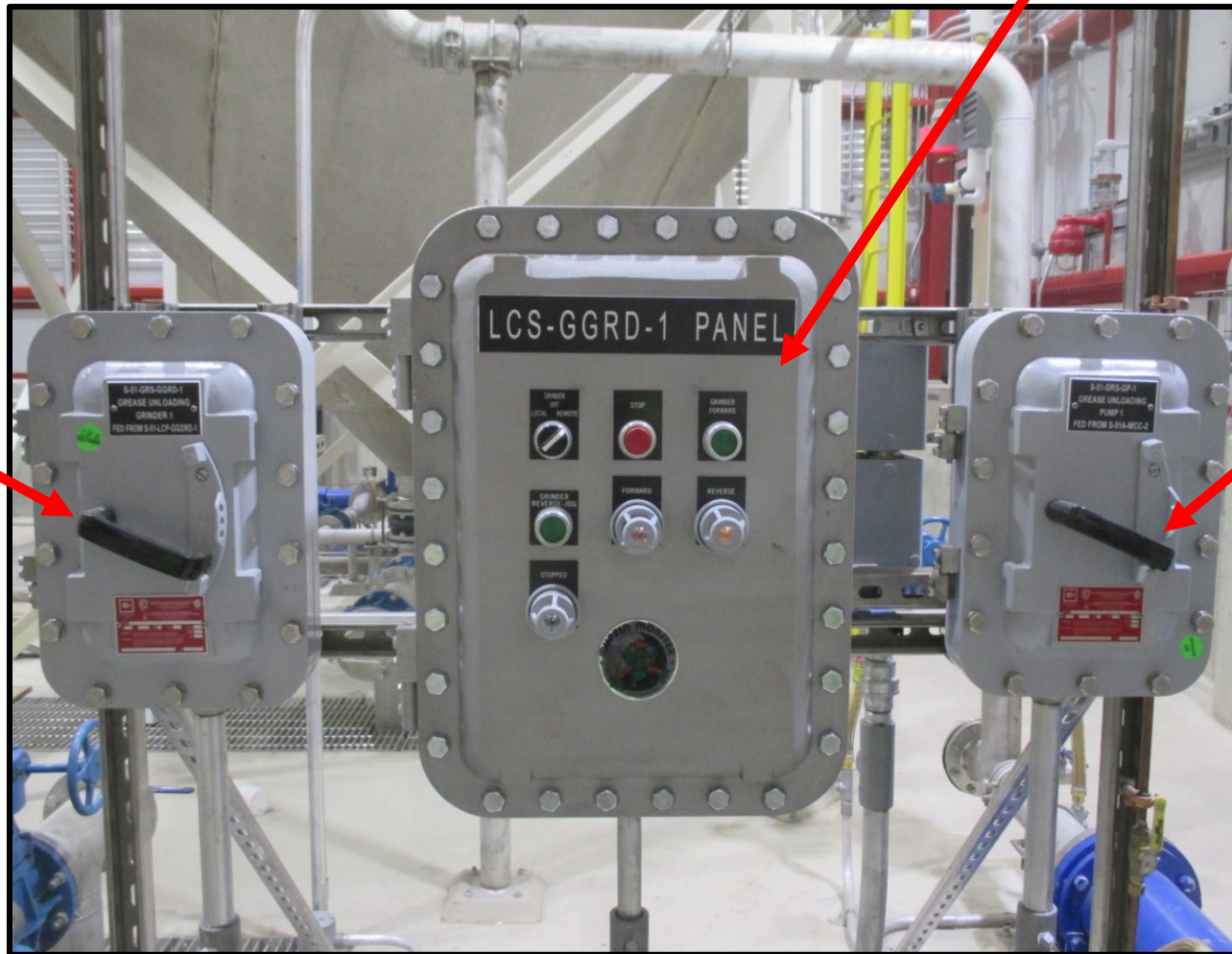


Davit for Basket



# In-line Grinder Control Panel

In Auto, Grinder Control Panel, controlled by "Fill Start" sequence



Grinder Disconnect Switch

Pump Disconnect Switch

The Grease Storage Room is classified as an explosion proof area (Class 1, Div 1) and the Electrical Room is unclassified.

# Grease Unloading Pumps

Qty: 1 per Tank

Manufacturer: Moyno (NOV)

Series: 2000

No. of Pumps: 2

Type: Positive displacement,  
progressive cavity

Capacity per Pump: 350 gpm

Discharge Head: 100 ft

Motor Hp: 20





# Liquid Grease Storage and Mixing Tanks

Manufacturer: International Production Specialists (IPS)

No. of Tanks: 2

Unheated

Dimensions

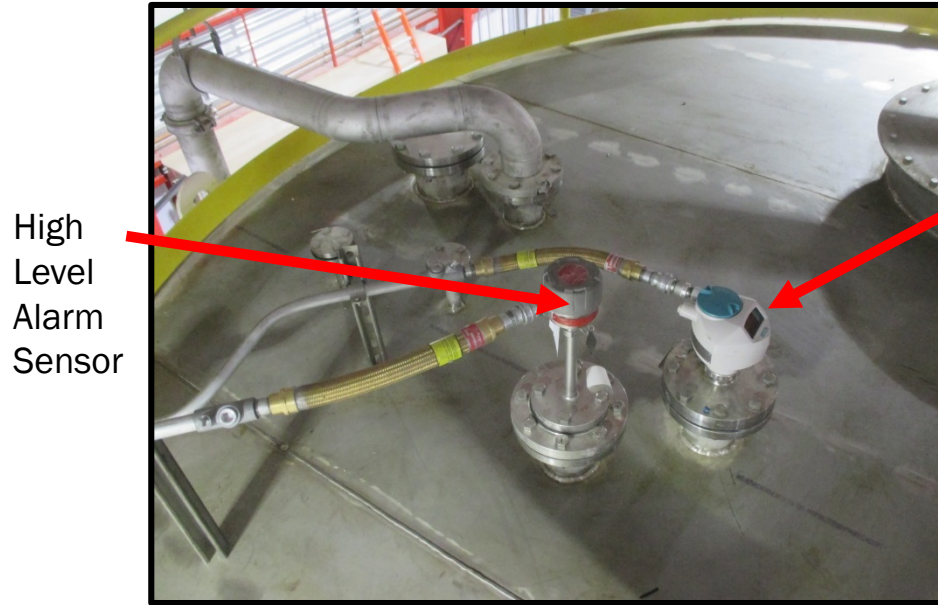
- Diameter – 13.5 ft.
- Side Height – 12 ft.
- Max. Liquid Depth – 10 ft.
- Cone Depth – 6.75 ft.

Capacity per Tank: 13,000 gallons

*Challenge: Future thickening/subcanting may be desired*



# Liquid Grease Storage Tank Monitoring



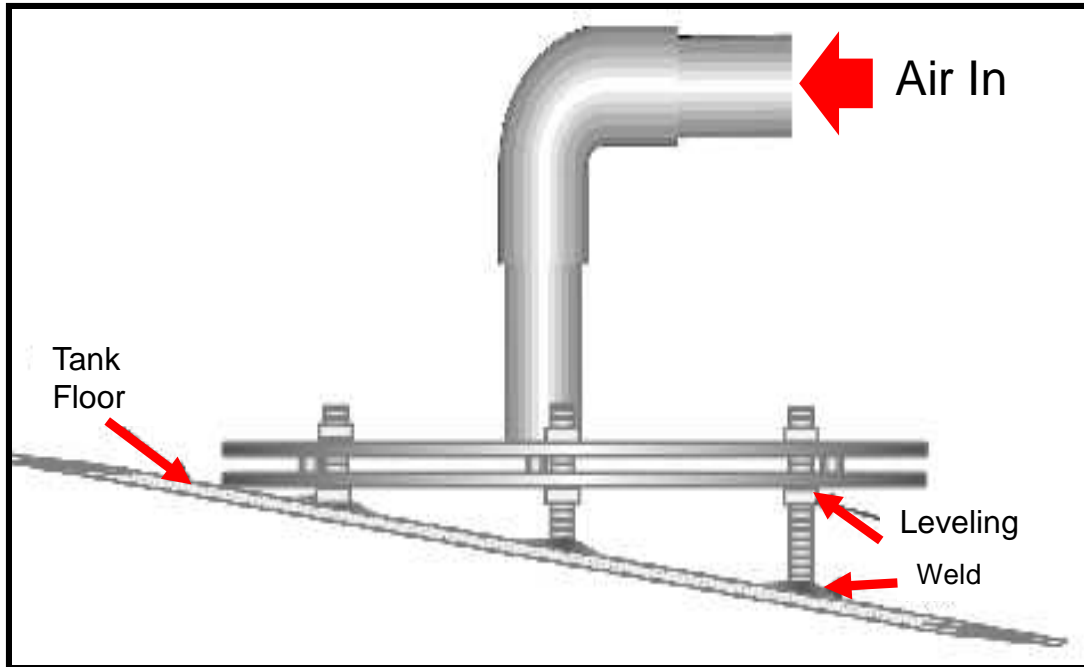
High  
Level  
Alarm  
Sensor

Liquid Level  
Sensor



Level  
Indicator

# Grease Storage Tank Air Mixing



*Challenge: Prevent stratification*

1. System parameters that control mixing efficiency:
  - Air Pressure
  - Pulse Duration
  - Pulse Frequency
2. Compressed air is injected to the diffuser plates at short pulses within the range of 40 to 80 psig.
3. The number of times the air valve opens (Pulse Rate) can be adjusted by the operator to optimize mixing from 1 to 6 times per minute.
4. Pulse duration can be adjusted by the operator between 0.2 to 0.8 seconds.

# Grease Transfer Pumps

Manufacturer: Moyno (NOV)

Series: 2000

No. of Pumps: 2

Type: Positive displacement, progressive cavity

Capacity per Pump: 50 gpm

Discharge Head: 230 ft

Motor Hp: 10

No Flow Sensor  
(There is a no flow  
sensor on each of  
the four grease  
pumps)





# **Where can the grease that is removed from the Grease Storage Tanks be pumped?**

*Challenge: Integrate into existing skimmings handling facility which is not continuously staffed*

# Existing DAF Tanks and Concentrated Skimmings Tanks

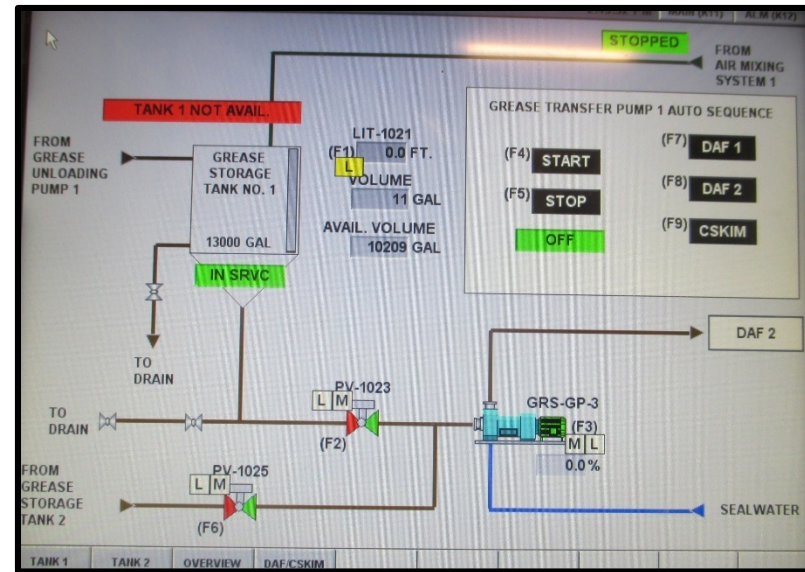
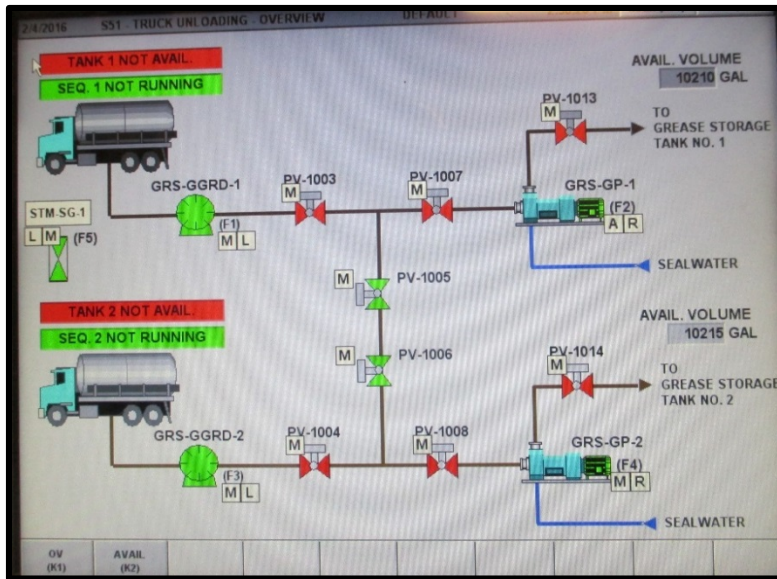


DAF Tank contents transferred to CSKIM Tanks



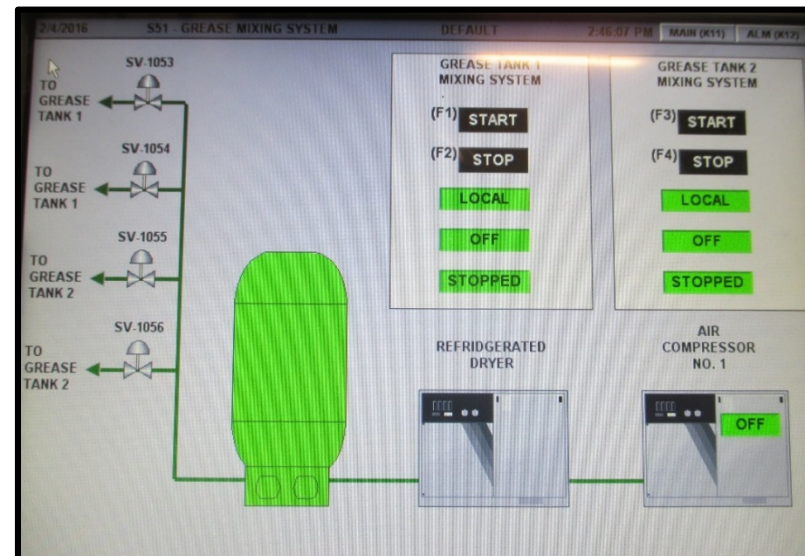
Heated CSKIM Tank

# SCADA Operational Overview Provisions



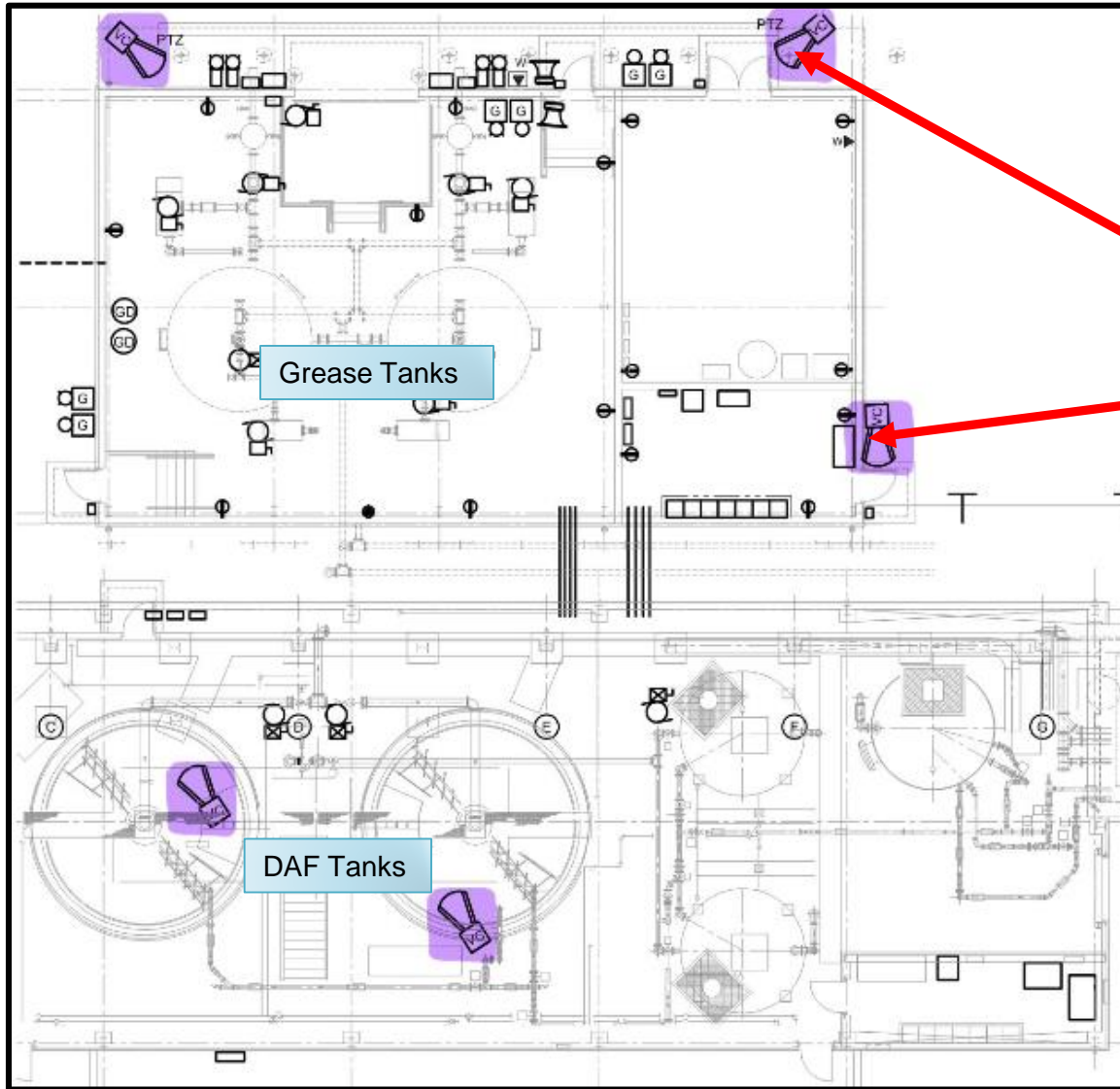
Three screens developed with Operations Staff

- Unloading
- Transferring
- Mixing





# Operations Remote Monitoring Provisions



Five video cameras for security and to monitor the process

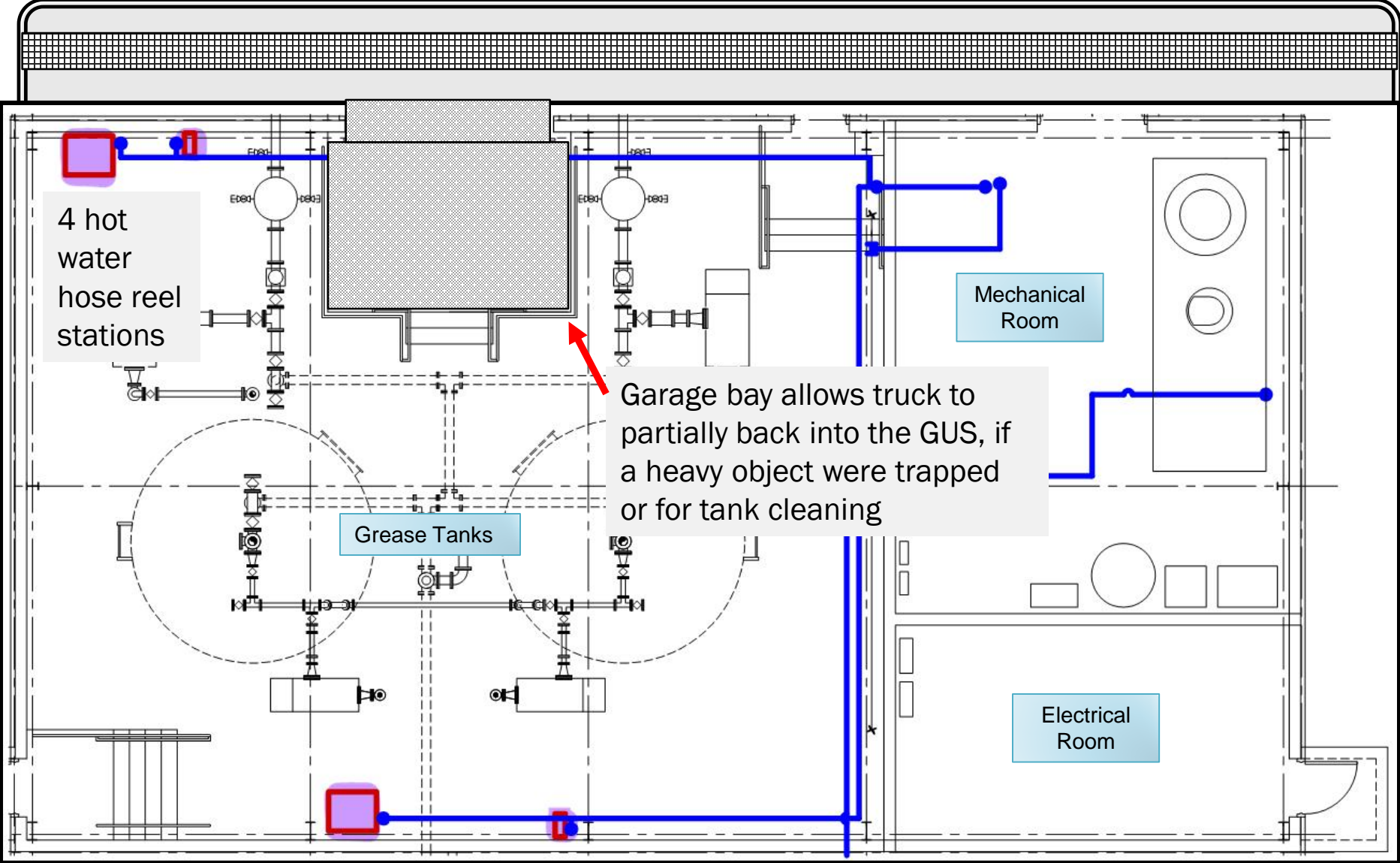


*Challenge: remotely monitor DAF tanks to prevent overflowing from other skimmings pumps*



# Maintenance Provisions

Spill containment berm and trench drain



# Recent Performance

2016-2017	June	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
# Loads	10	34	103	126	62	138	108	108	128	120	125	139
Gallons	40,000	133,000	380,000	440,000	152,000	470,000	405,000	392,000	427,000	396,000	432,000	482,000
# of Vendors	2	3	5	11	14	14	10	10	9	11	10	10
Loads/day	No data	2.3	4.7	6.0	6.2	6.0	4.1	4.9	6.4	5.2	6.3	6
Avg gal/load	4,000	3,900	3,700	3,500	2,500	3,400	3,800	3,600	3,300	3,300	3,400	3,500

*Challenge: Building confidence that contract haulers are only unloading grease*

# Lessons Learned / Operations Feedback



- Two shift operation, 24 hours a day, 28 staff trained
- 5 days a week, operating at 50% capacity
- Loads received during day shift
- Night shift cleans and flushes
- <15 minutes to unload, not every truck is full
- Storage tanks operated in tandem
- Rock trap is efficient but heavy, so davits added
- Tanker weighed, converted to gallons for billing
- Provisions need for winter draining of traps

NEORS currently charges a flat charge of \$40.00 per grease truck up to 1000 gallons. Over 1000 gallons, the fee charged is \$0.04/gallon.

# Lessons Learned / Operations Feedback



Existing DAFT and Skimmings Facility

- Trucks with “heavy grease” are routed directly to DAFT; some haulers concentrate before delivery
- Grease transferred to DAFT, subcanted and mixed in two skimmings concentration tanks, then discharged to 3<sup>rd</sup> tank
- Fed to Fluidized Bed Incinerators 1-2 gpm
- 15,000 BTU/lb volatile solids, thickened ~50% solids, heated to 140° F



**Questions**

