



THE **UNDERGROUND** UTILITIES EVENT

Underground Construction Technology | Jan. 29-31, 2019 | Fort Worth, TX

Mud Management

Cory Maker



UNIVERSITY OF
TEXAS
ARLINGTON

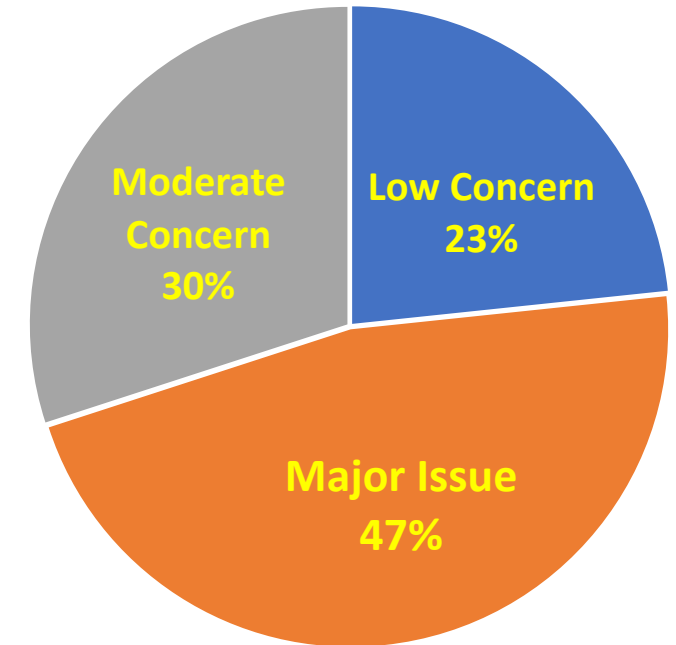
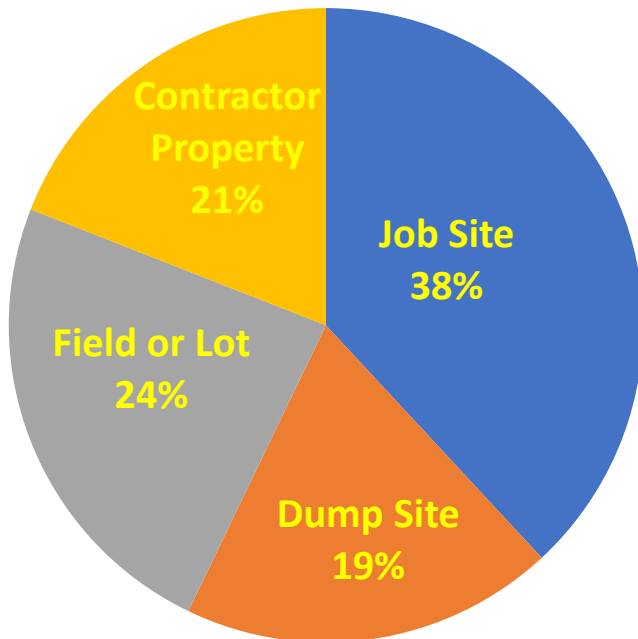


Key Survey Points

Question:

How big of an issue is mud disposal?

(Rank it. 10 = Major Issue)



Question:

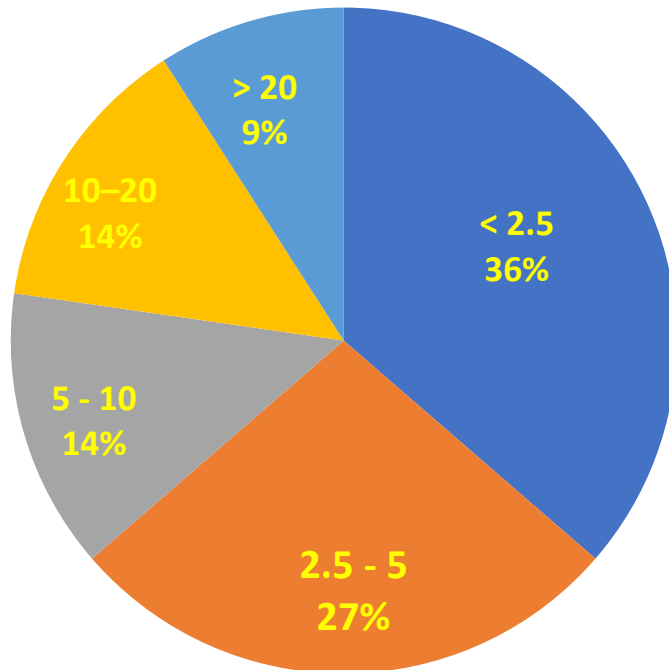
What does your usual fluid disposal activity look like?



Key Survey Points

Question:

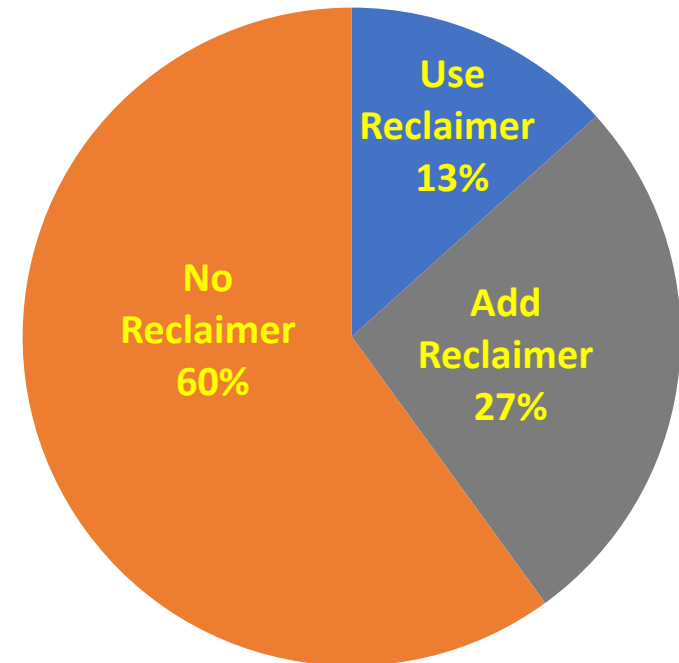
How much mud do you dispose of per week?



Mud Disposal 1000 Gal/Week

Question:

Do you utilize a Reclaimer?



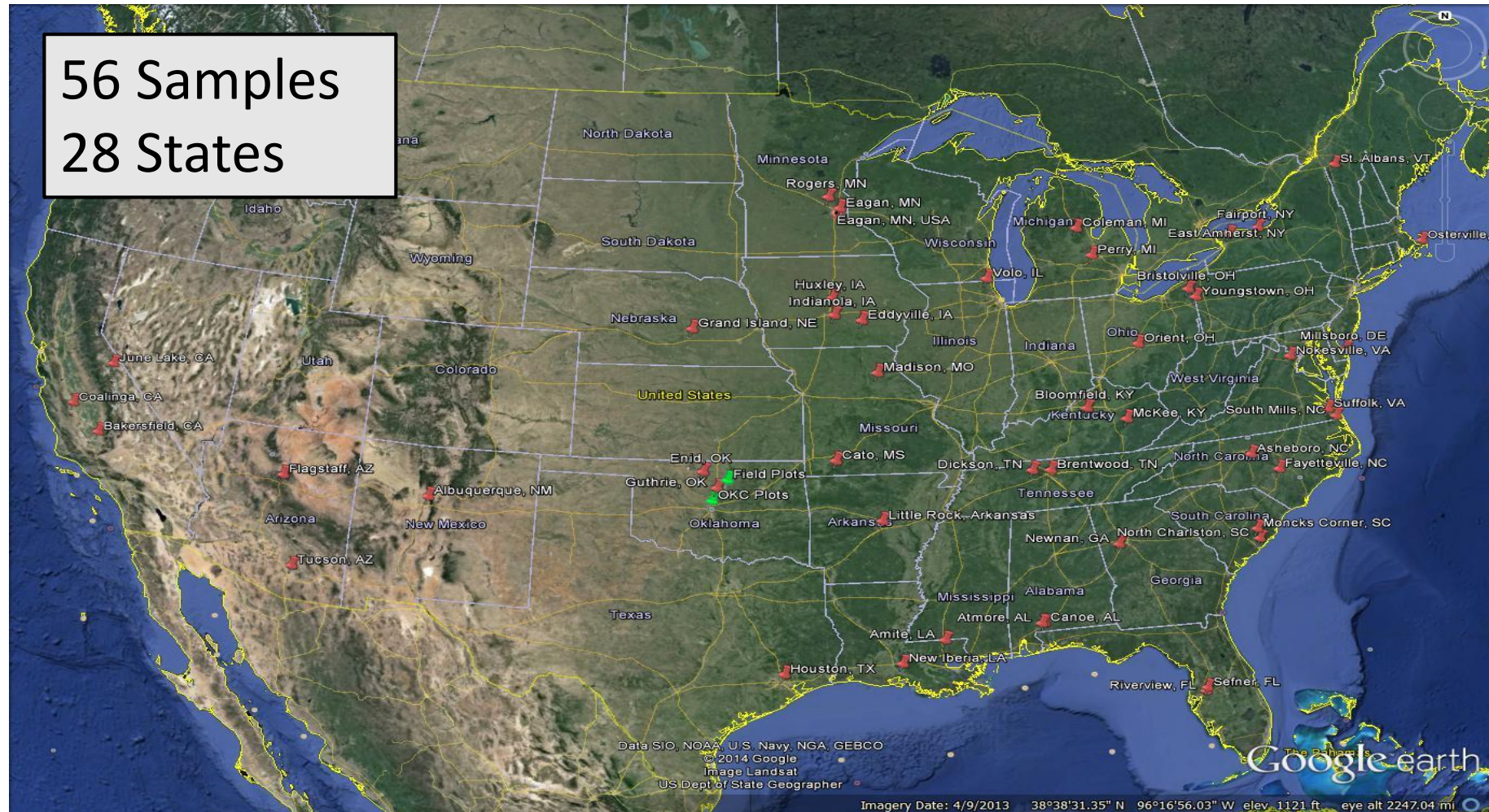


Mud Sample Survey and Analysis

Everyone says it's harmless,
so why is it so hard to dispose of muddy water?



Mud Sample Survey





Mud Sample Analysis

EPA 3050B Solids Digestion

Metal	Typical Levels in Soil (mg/Kg)
Copper	6 - 80
Manganese	80 - 1300
Zinc	17 - 125
Nickel	4 - 55
Arsenic	4 - 9
Chromium	7 - 221
Cobalt	1 - 22
Cadmium	0.06 - 1.1
Lead	10 - 84



Mud Sample Analysis

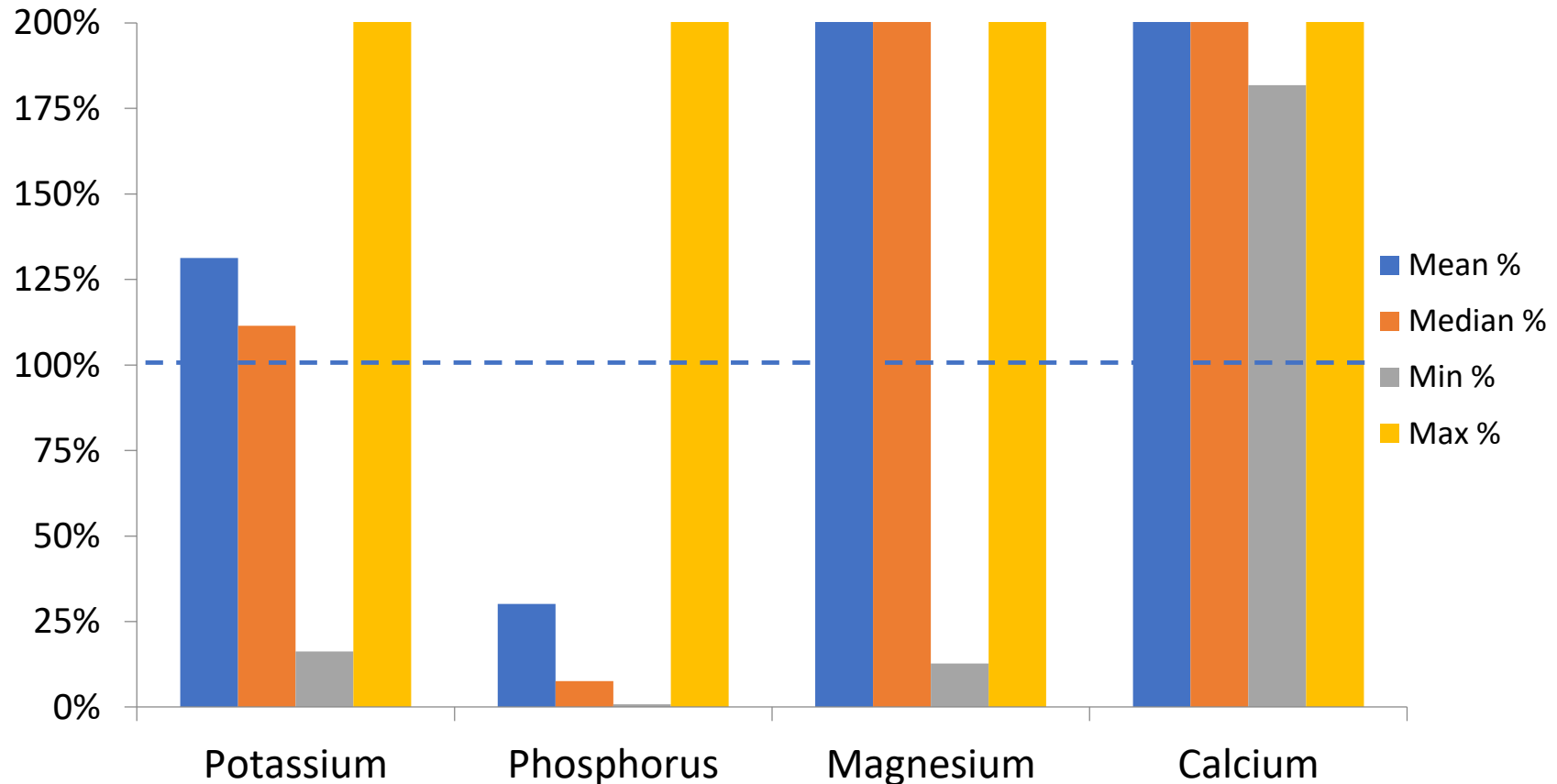
EPA 3050B Solids Digestion

Metal	Typical Levels in Soil (mg/Kg)	Number of Samples Above Range Of Typical Soils
Copper	6 - 80	5
Manganese	80 - 1300	1
Zinc	17 - 125	1
Nickel	4 - 55	0
Arsenic	4 - 9	0
Chromium	7 - 221	0
Cobalt	1 - 22	0
Cadmium	0.06 - 1.1	0
Lead	10 - 84	0



Mud Sample Analysis Plant Available Nutrients

Percent of Agronomic Optimum (for turf grass)





Available Options



Mud Reclaimer Example

Example:

- Disposing of 8000 gallons/week
- \$27/ton disposal fee (or \$0.45/gal)
- 60-mile round trip for disposal
- Assume mud reuse rate is 10:1





Mud Reclaimer Example

Example of Disposing 8000 Gallons/Week @ \$0.45/Gal

Est. Disposal Fees using Conventional Mud Mixing				Est. Disposal Fees using Mud Cleaner			
312,000	Total Mud Gal/Yr Disposed	\$140,400	Disposal Fees \$/Year	134,160	Tot Gal/Yr Disposed, Incl Soil Cuttings	\$60,372	Disposal Fees \$/Year
24,960	Total Miles Driven/Tr	\$28,080	Vehicle Op Cost for Disposal	10,733	Total Miles Driven/Yr	\$12,074	Vehicle Op Cost
1,129	Disposal Labor Hrs + 1 Hr per Trip	\$22,583	Tot Labor Cost for Disposal	486	Disposal Hrs + 1 Hr per Trip	\$9,711	Total Labor Cost for Disposal
347	Number of Batches Mixed/Yr	\$14,560	Tot Mud Cost per Year (Labor + Additives)	35	Number of Batches Mixed/Yr	\$1,456	Tot Mud Cost per Year (Labor + Additives)
\$ 278,000	Total Equip Cost (Fluid Mixer + 2Vac + 2Trucks)	\$92,667	Equip Cost (1/3 each yr)	\$ 205,000	Total Equip Cost (Mud Reclaimer + Vac + Truck)	\$67,650	Equip Cost (1/3 each yr)
\$298,290				\$151,263			
Yearly Disposal & Operating Cost				Yearly Disposal & Operating Cost			

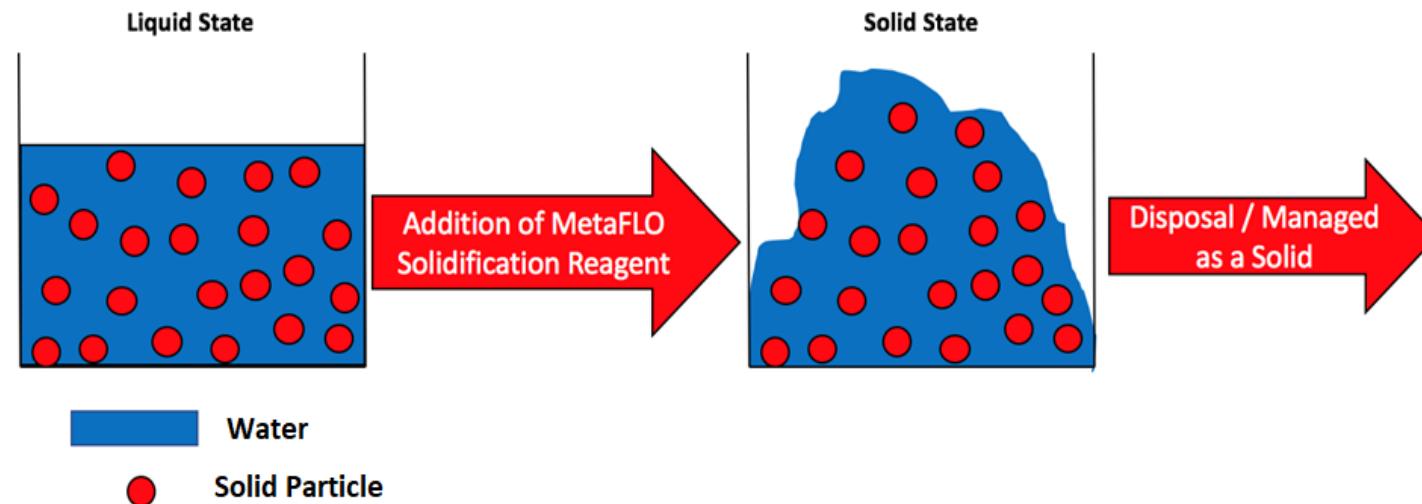


Solidification



Solidification

- Conversion of liquid waste sample into a solid by the addition of a solidification reagent
- Solidification reagent absorbs and encapsulates water
- No water is removed
- Depending on site condition, solid material can be stacked and water can be removed by evaporation





Solidification Dosage Rates

- Reagents absorb water (up to 300 times its own weight in distilled water)
- More water = higher dosage
- Less water = lower dosage
- Typical ranges of dosages: 0.5-2.0% by weight



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MetaFLO Treated Directional Drilling Fluid



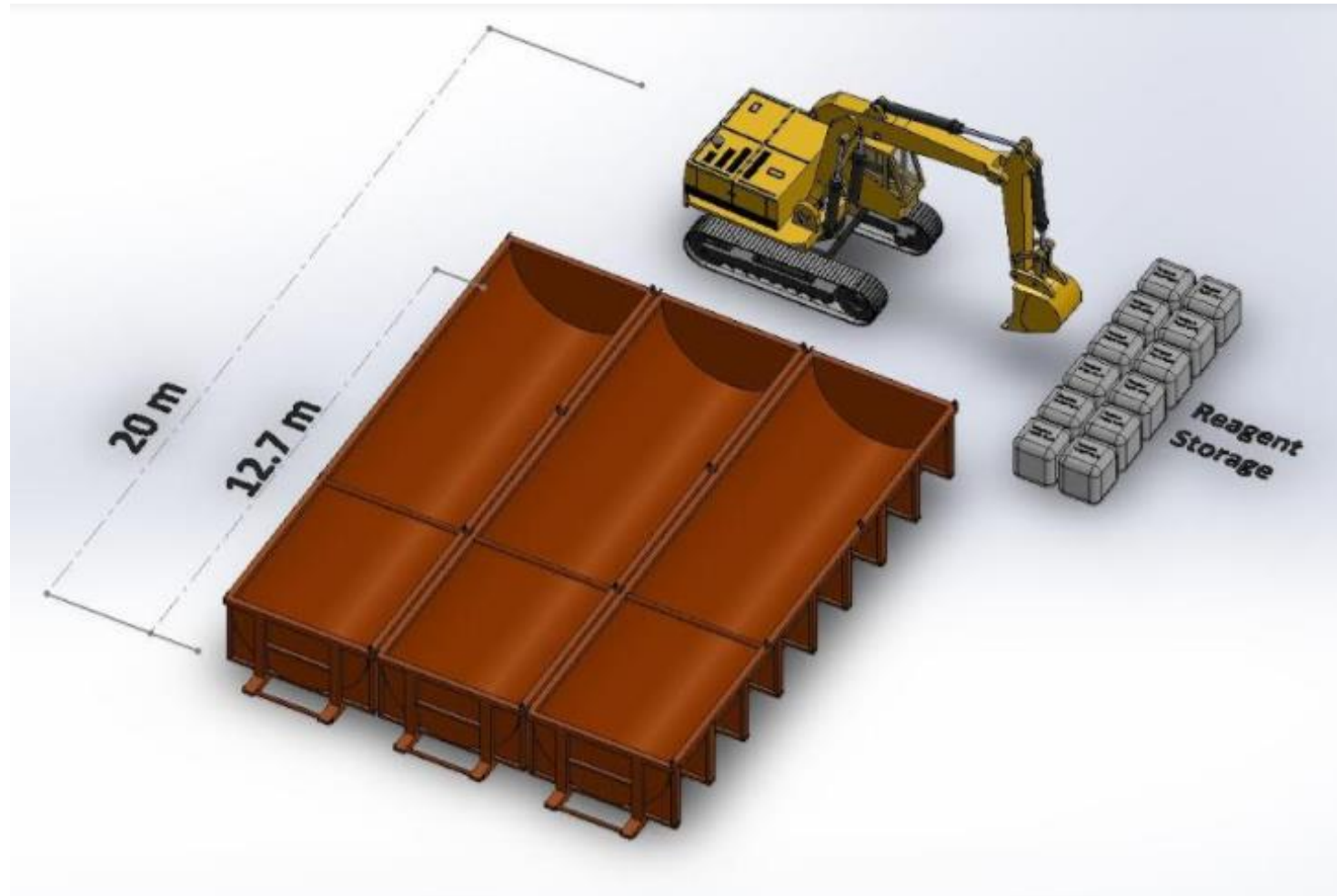
Before



After



Bulk Mixing Site Setup





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Liquid Mixing Systems



- Specifically designed for HDD mud
- Equipment scales for higher volume
- Continuous processing
- 300GPM capable
- Designed for less than 12lb drill fluid



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Questions