

DRAFT

Effects of Fecal Sludge in Wastewater Stabilization Ponds: Port-au-Prince, Haiti

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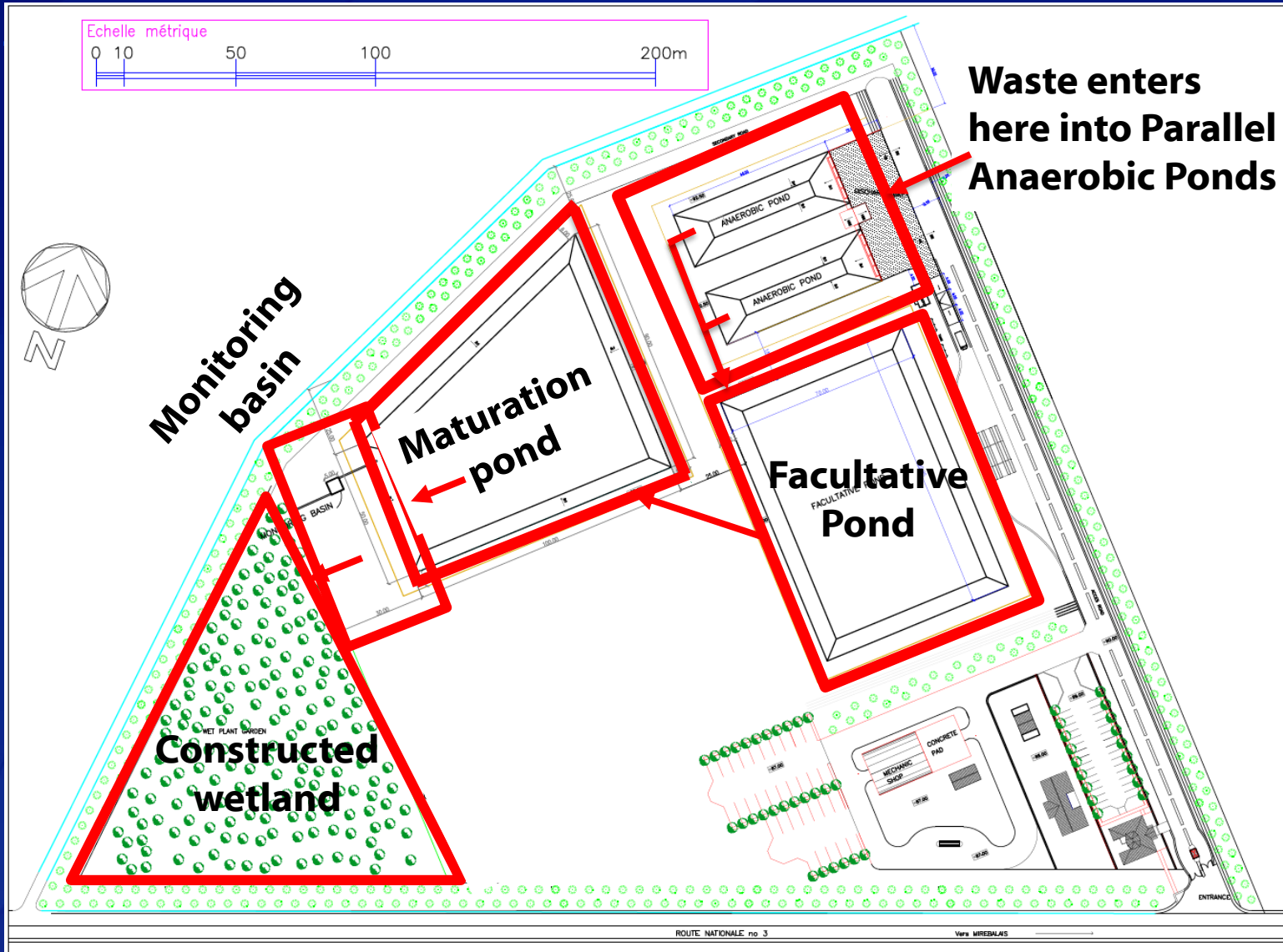
Emergency Response and Recovery Branch
Center for Global Health
Centers for Disease Control and Prevention

Overview

- ❑ **Evaluation of Wastewater Stabilization Pond at request of Haitian National Water and Sanitation Directorate (DINEPA)**
- ❑ **Design largely based on sewage (wastewater)**
 - **but with higher BOD₅ design value**
- ❑ **All waste trucked to site (fecal sludge)**



Morne à Cabri Wastewater Lagoon



MAITRE D'OUVRAGE

REVISION

PROJET:
STATION D'EPURATION
DES EAUX USEES A MORNE A CABRIT
TITRE:
Plan d'ensemble
Croix des bouquets -Port-au-Prince



CONSORTIUM



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DATE :
Jui 2011

ECHELLE:
indiquée

Feuille
Planche

A01

Influent Fecal Sludge

- ❑ **Fecal Sludge**
 - All waste emptied from on-site sanitation facilities that has not been transported through a sewer network
- ❑ **Pumper Trucks**
 - Mostly septic tanks
 - Approximately 75% of influent
- ❑ **Barrel Trucks**
 - Mostly latrines
 - Approximately 25% of influent
- ❑ **Highly variable strength of fecal sludge coming from pumper trucks and barrel trucks**

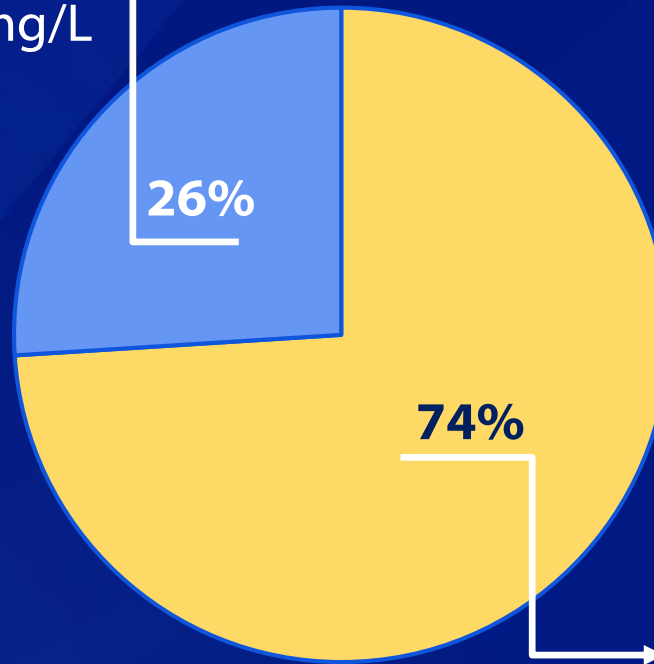


Results: Influent Fecal Sludge

Volumetric Loading

Barrel Trucks

BOD₅: 5,160 – 40,000 mg/L



Pumper Trucks

BOD₅: 252-3,228 mg/L

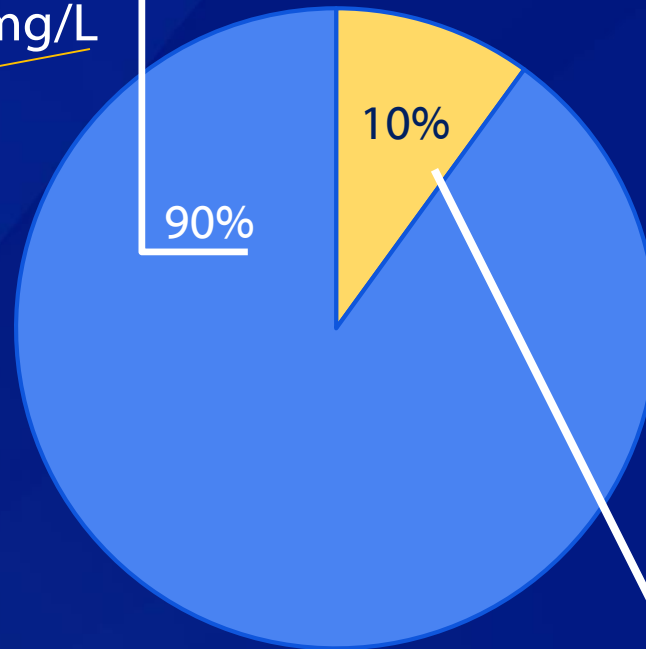
BOD₅ for typical sewage = 200 – 400 mg/l

Results: Influent Fecal Sludge

BOD₅ Volumetric Loading

Barrel Trucks

BOD₅: 5,160 – 40,000 mg/L



Pumper Trucks

BOD₅: 252-3,228 mg/L

Total Weighted Average, using geometric mean:

BOD₅ = 4,059 mg/L

Volumetric BOD₅ Loading Rate Estimates

	Actual (Estimated)	Design
Influent BOD ₅	4,059 mg/l	1,500 mg/L
Daily Flow	160 m ³ /day	500 m ³ /day
Anaerobic Pond Volume	3780m ³	3780m ³
Volumetric Loading Rate	171 g/m ³ /day	198 g/m ³ /day

* Actual volume decreases over time with sludge accumulation

While the volume of fecal sludge entering the system is less than a third of the design flow, the volumetric loading rate is approximately at capacity due to high strength of waste coming into facility

Percent Reduction of BOD₅ and other parameters

Sampling Location	BOD ₅ *	Design Value for BOD ₅	COD	TN	TP	TSS
Anaerobic pond 1	86%	70-85%	79%	81%	78%	86%
Anaerobic pond 2	51%		8.0%	58%	42%	18%
Facultative pond	56%	73-87%	82%	66%	65%	89%
Maturation pond	72%	25%	8.0%	59%	60%	31%
Overall	98%	97%	96%	97%	97%	99%

* Influent data taken from all 3 sampling events, but the other treatment process units were only taken from Nov. 2014 sampling event

Challenges with Fecal Sludge



- ❑ **Accumulation of solids**
 - Decreases the effective treatment volume and retention time
 - Requires increased maintenance and occasional shut down for sludge removal

- ❑ **BOD₅ reduction in facultative pond lower than expected design value**
 - Sludge accumulation
 - Ammonia production

Conclusion

- ❑ Reduction of BOD₅ and other key parameters meets overall design targets; however, system is near capacity due to high-strength fecal sludge from latrines
- ❑ More investment needed for fecal sludge management
- ❑ More research needed to better understand how high-strength waste affects treatment in wastewater lagoons
- ❑ Routine monitoring of system is needed in country
 - Construction of wastewater lab planned

Special Thanks

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 - Myrline Mompont, Sanitation Department
 - Pierre Ricky Constant, Morne a Cabri Manager
 - Staff at Morne a Cabri facility who helped with sampling

THANK YOU QUESTIONS?

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The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

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