

Hauled Waste Disposal Station

Andrea Moreno, Tony Heng Liang, Kevin Manasan

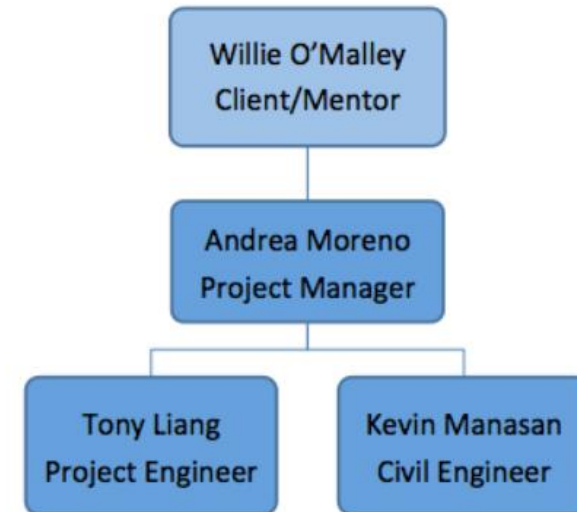
CE 438 - Civil Engineering Systems Design

April 14, 2017



Overview

- Meet The Team
- Background
 - Location
 - Issues With Existing
- Approach
 - Historical Data Analysis
 - Process Evaluation
 - Building Layout
- Summary & Conclusion



Andrea Moreno, Project Manager

- Interest in the water and sewer systems and hands on experience
- Experience interning with the Alaska Native Tribal Health Consortium
- Sparked a particular interest in the Hauled Waste Disposal Station project for AWWU
- Past President of AISES
- Enjoys snowboarding, hiking, fishing, frofing, painting, and enjoying the rays from the big yellow object in the sky



Tony Heng Liang, EIT

- **Worked For Alaska Department of Transportation Northern Region, R&M Consultants, Inc., UAA Biology Lab**
- **Planning to graduate with departmental honors December 2017**
- **Member of student chapter ASCE, Seawolf Debate, NSLS, APO, BBBS**
- **Enjoys travelling, politics & economics**
- **Spare time spent between research, stock trading, debates, playing piano**
- **Current Goal: Get fit**

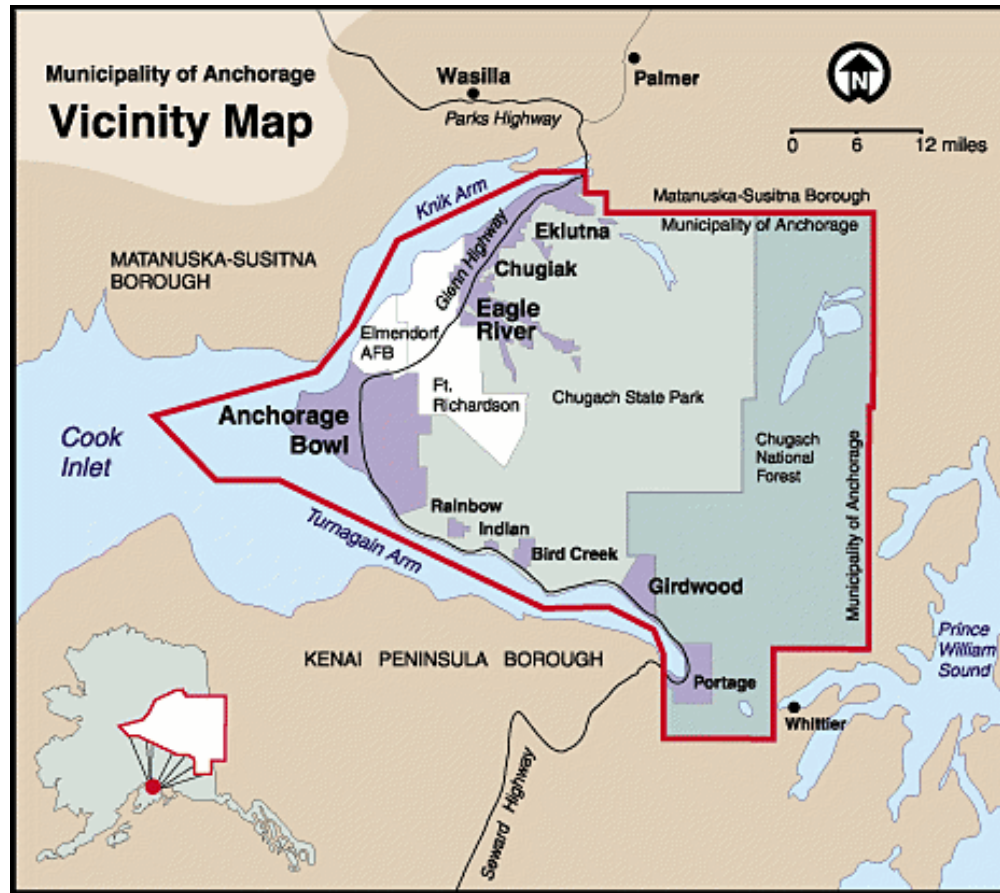


Kevin Manasan

- Has taken both water classes and the water elective course
- Interested in using the gained knowledge from UAA to help make the community a better place
- Enjoys drawing and sleeping



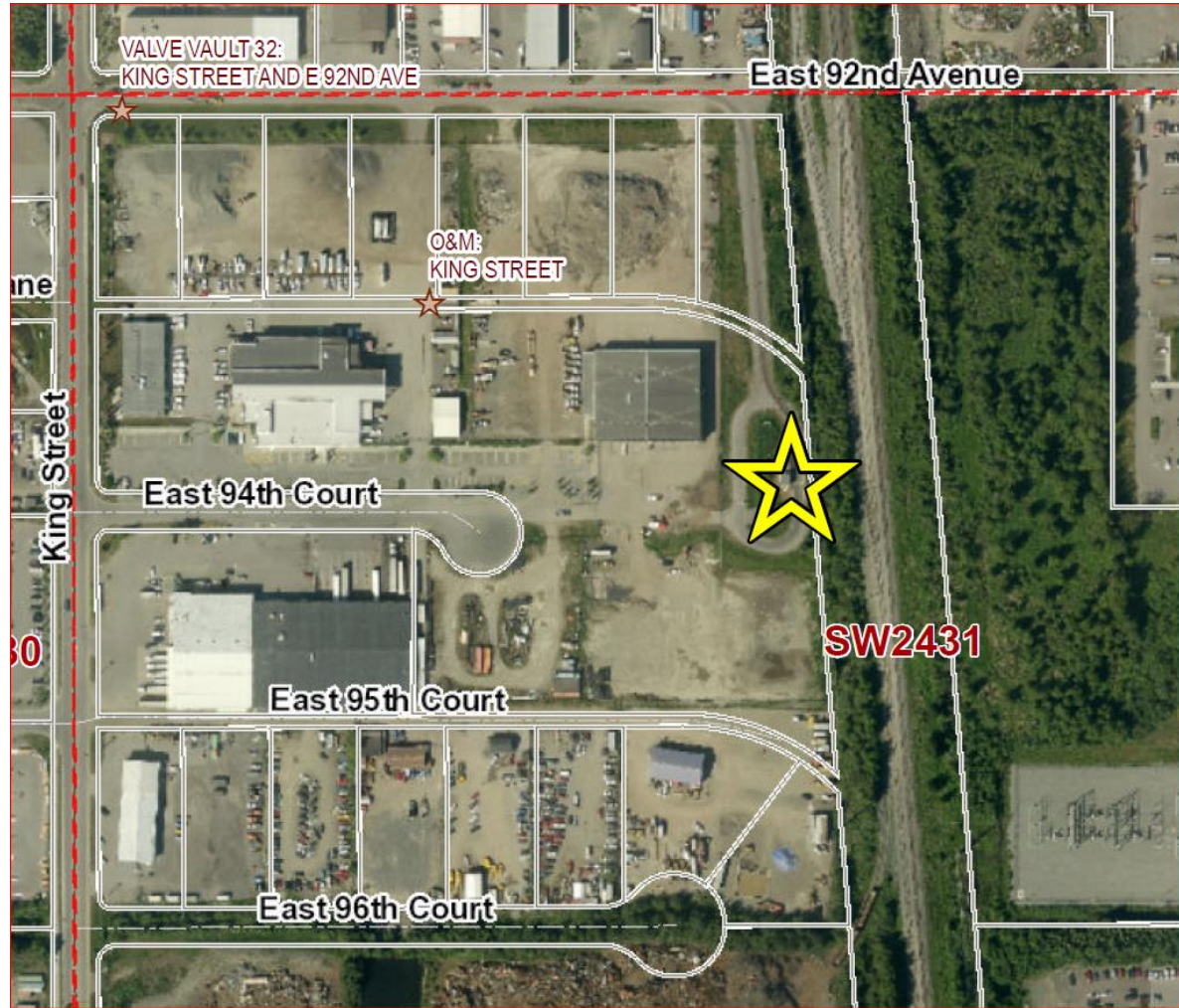
Background



Location



Location



Issues With Existing

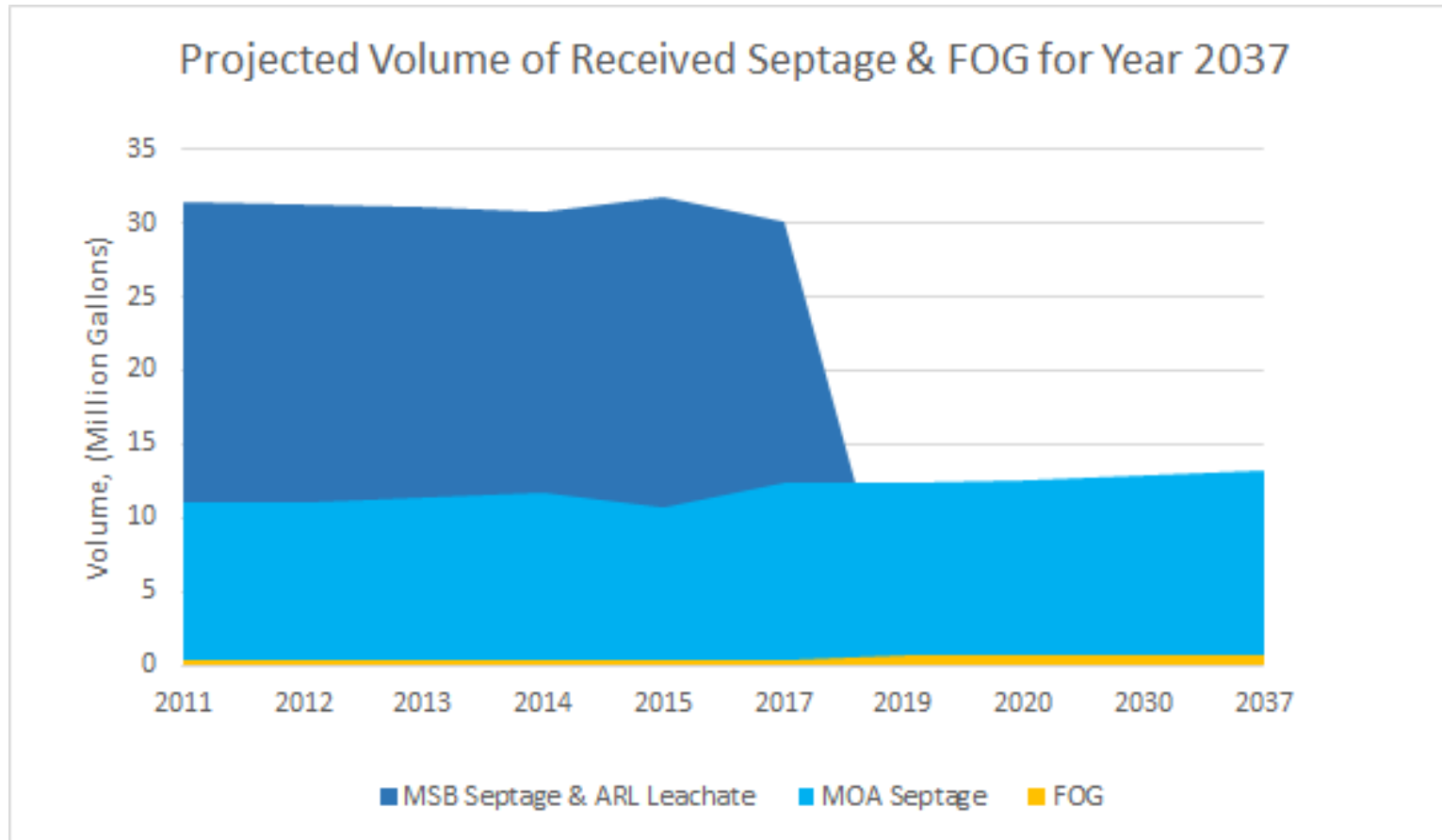
- **High O&M costs due to clogged trunk & interceptor pipes. (~\$1 M per year emergency cleaning)**

Caused by: FOG, screenings, and large sediment

- **Inaccurate flow measurement**



King Street Volume Projection



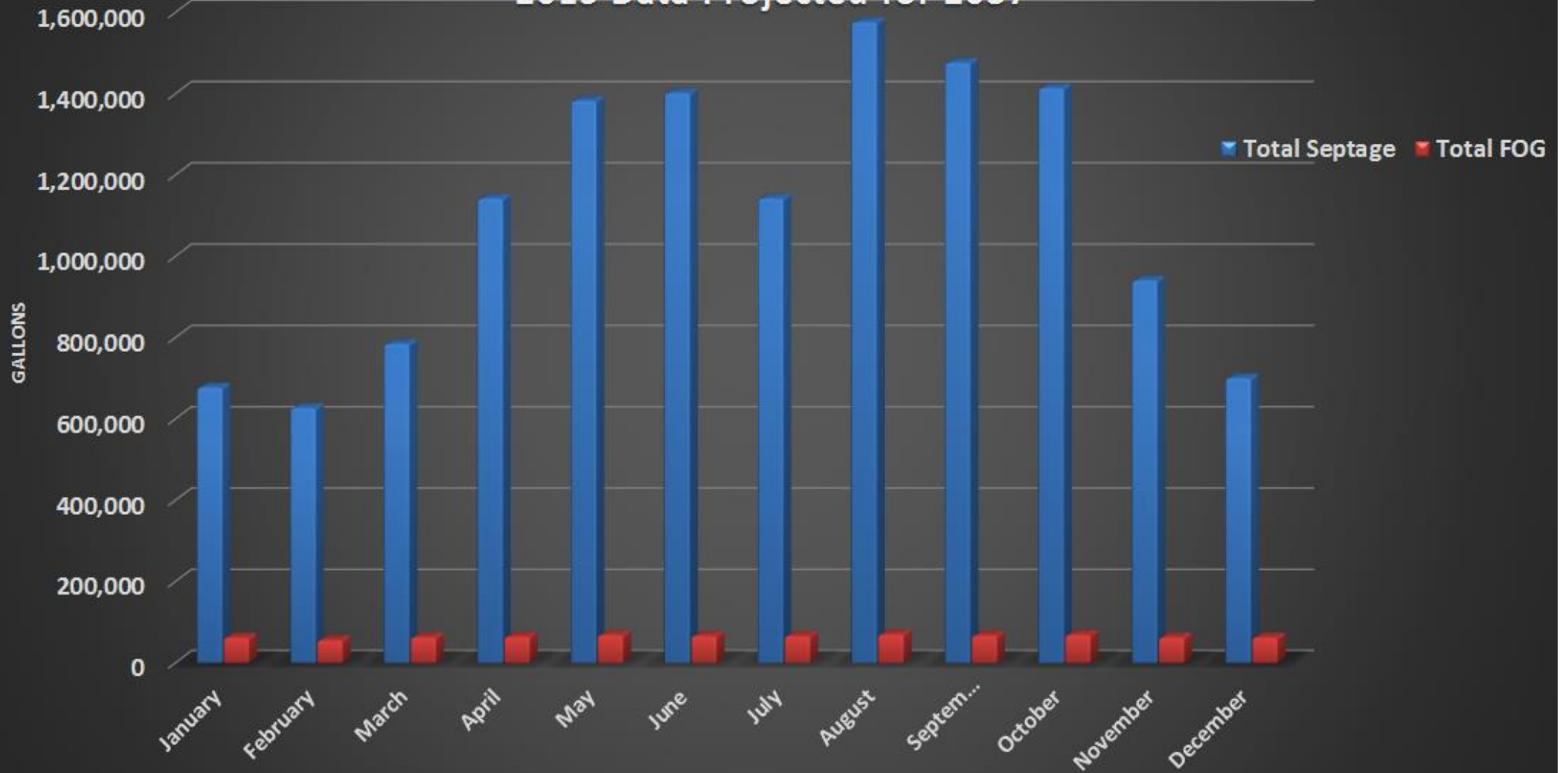
Criteria – Size/Volume

Accommodation for largest vehicles

Volume (gal)	4000 (truck) /3000 (pup)
Length (ft)	36
Pup length (ft)	40
Discharge rate (gpm)	670



Seasonal Fluctuation in Volume 2015 Data Projected for 2037



UNIVERSITY of ALASKA
ANCHORAGE.

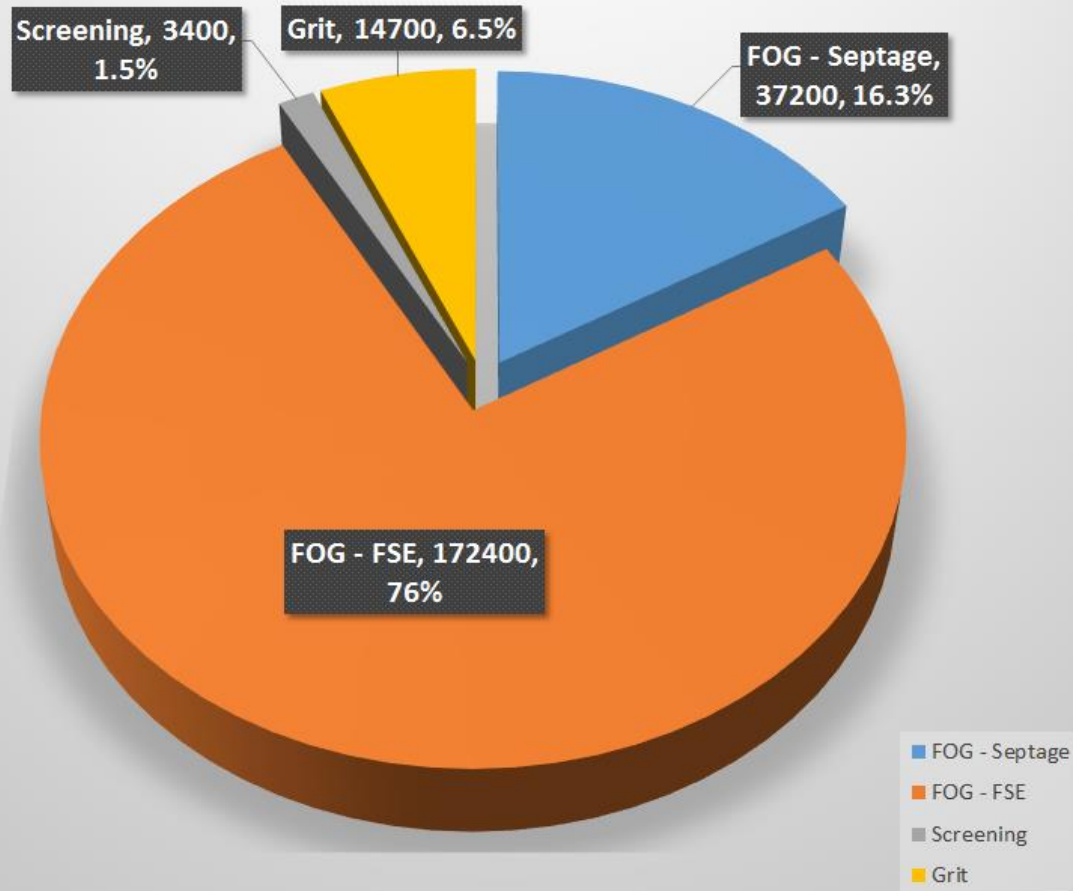
Anchorage Water & Wastewater Utility



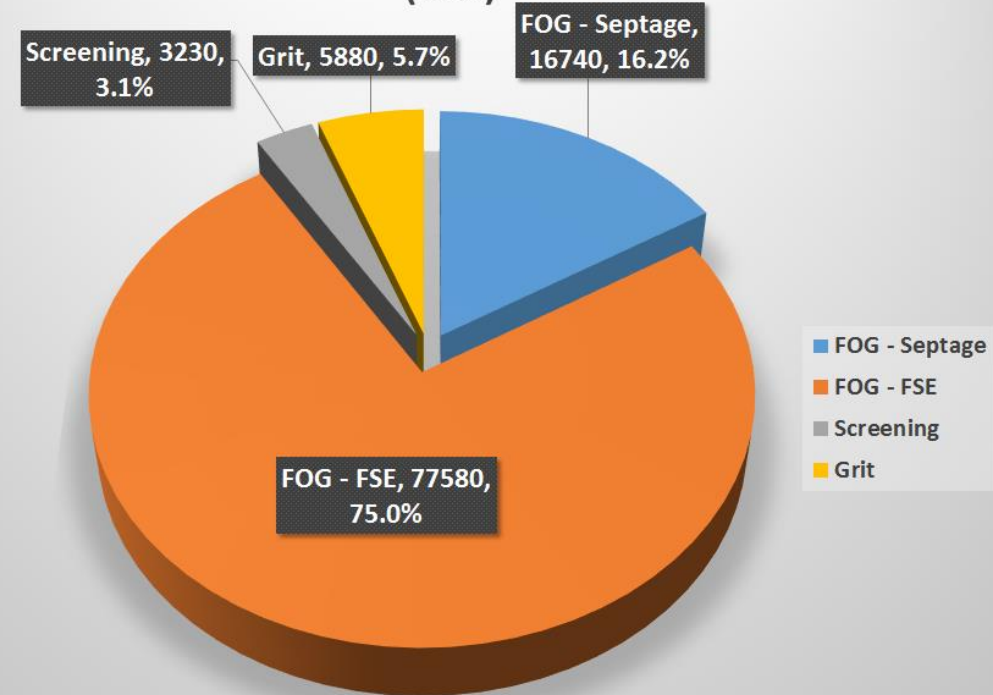
Clearly



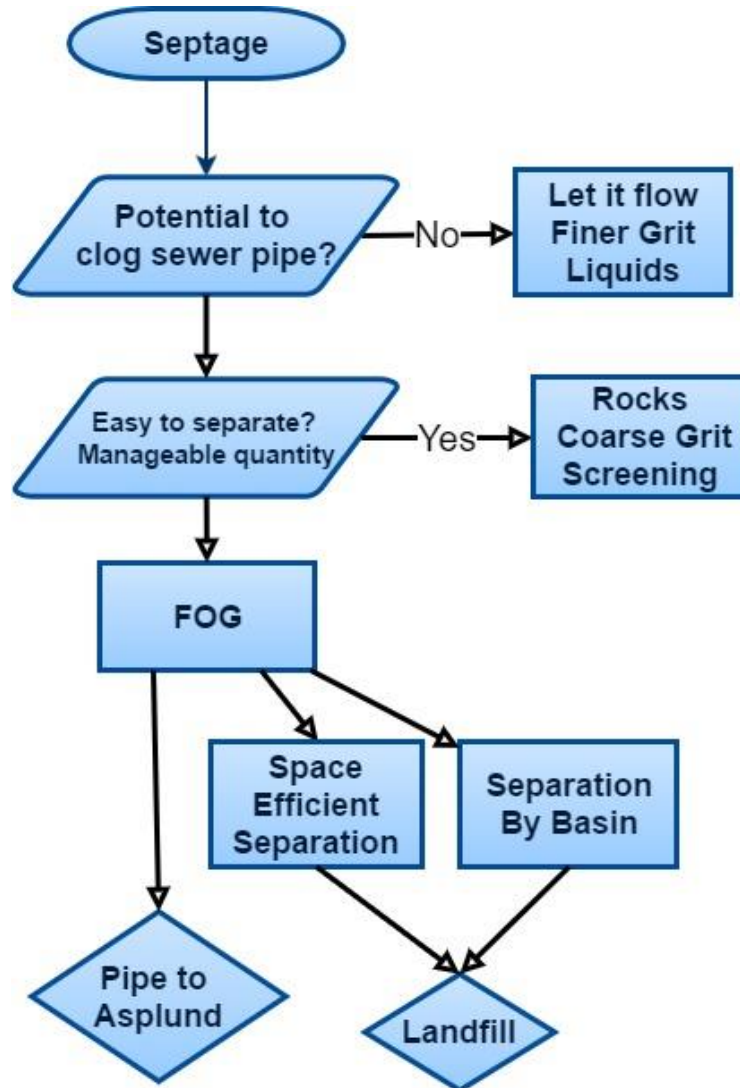
Expected Quantity of Solids Received 2037 (lbs.)



Estimated Removal Quantity By Concept 2 (lbs.)



Process Overview



FOG

- **Clogging- Transition of burden**
 - From smaller diameter collector pipes to large pipes
 - 8 miles of concrete trunk/collector pipes to Asplund
- **Ca⁺⁺ calcification**
 - Calcified FOG 9x stronger than non-reacted solidified FOG
 - Concrete corrosion releases calcium ions

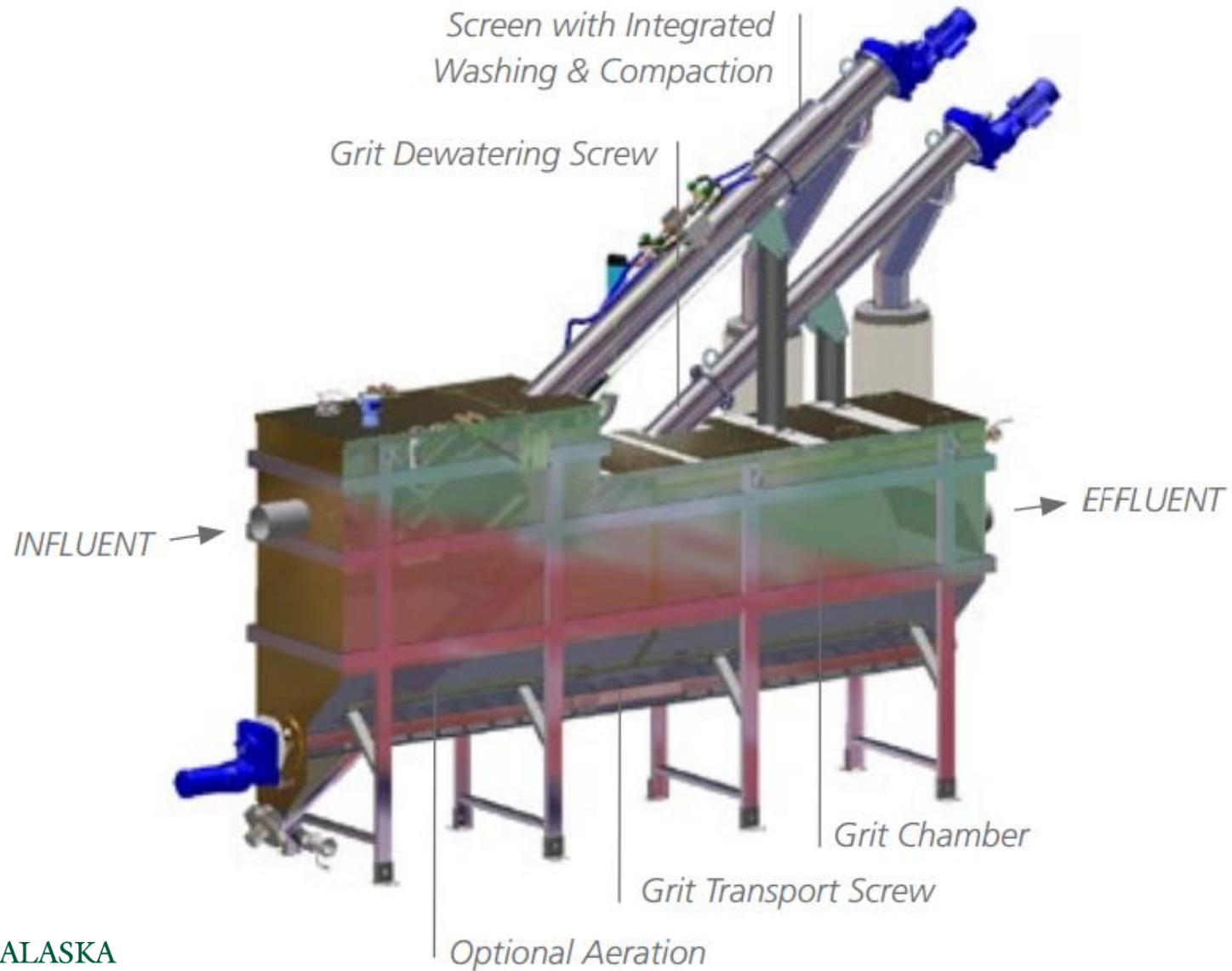
Prefabricated Receiving Stations



Features by Product

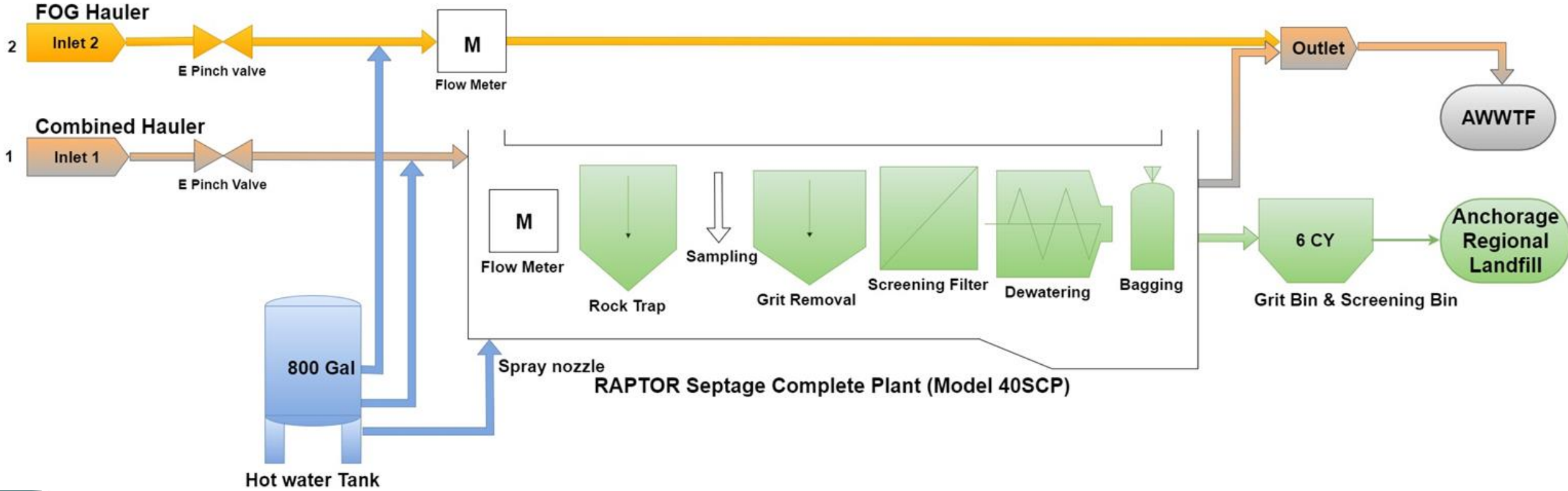
Features	Franklin Miller	Flowpoint	JWC HM	Savi	Huber Ro5 large plant	Lakeside Raptor full acceptance plant
FOG separation		-			✓	✓
Grit separation					✓	✓
Debris grinder	✓	✓	✓			
Rock trap	✓	✓	✓		✓	✓
Screening	✓		✓	✓	✓	✓
Screening compaction					✓	✓
700+ GPM	-	-	✓	-	✓	✓
Solids wash			✓	✓	✓	✓
Flow Meter	✓	✓	✓		✓	✓
pH sensor		✓	✓		✓	✓
Automated control	✓		✓		✓	✓
Automated Sampler		✓			✓	✓
Housing		✓				

Raptor® Complete Plant Flow Diagram

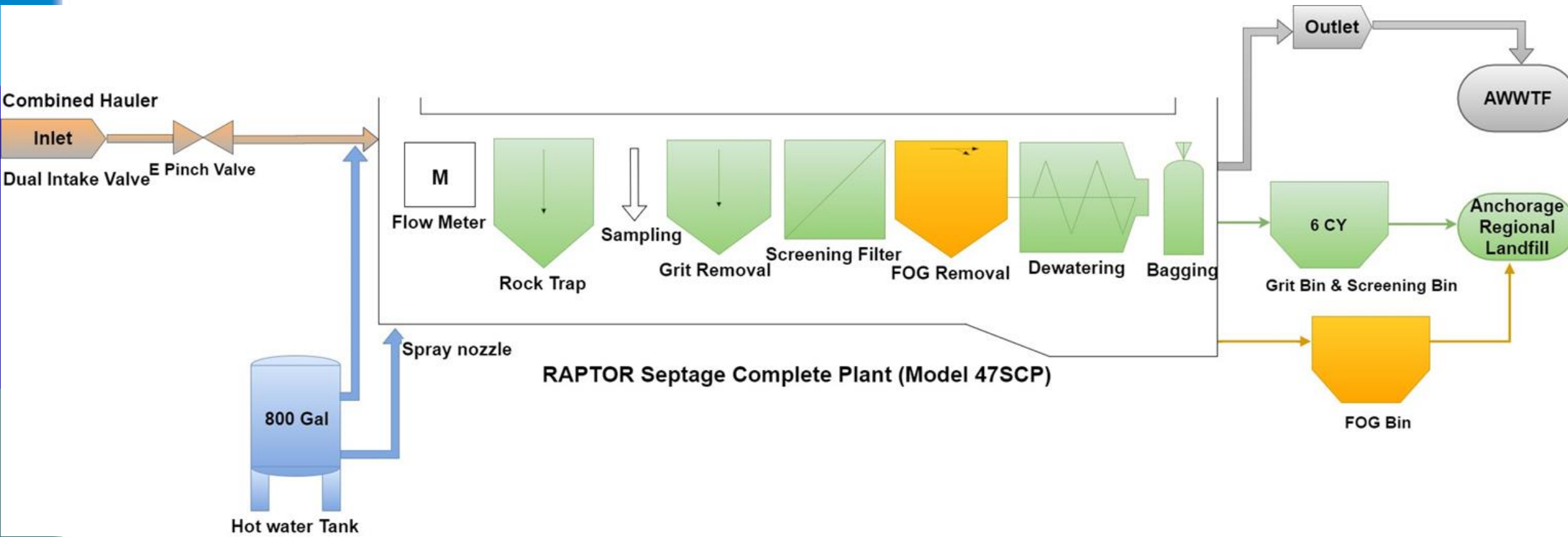


[Video of Honey Monster
- a similar product](#)

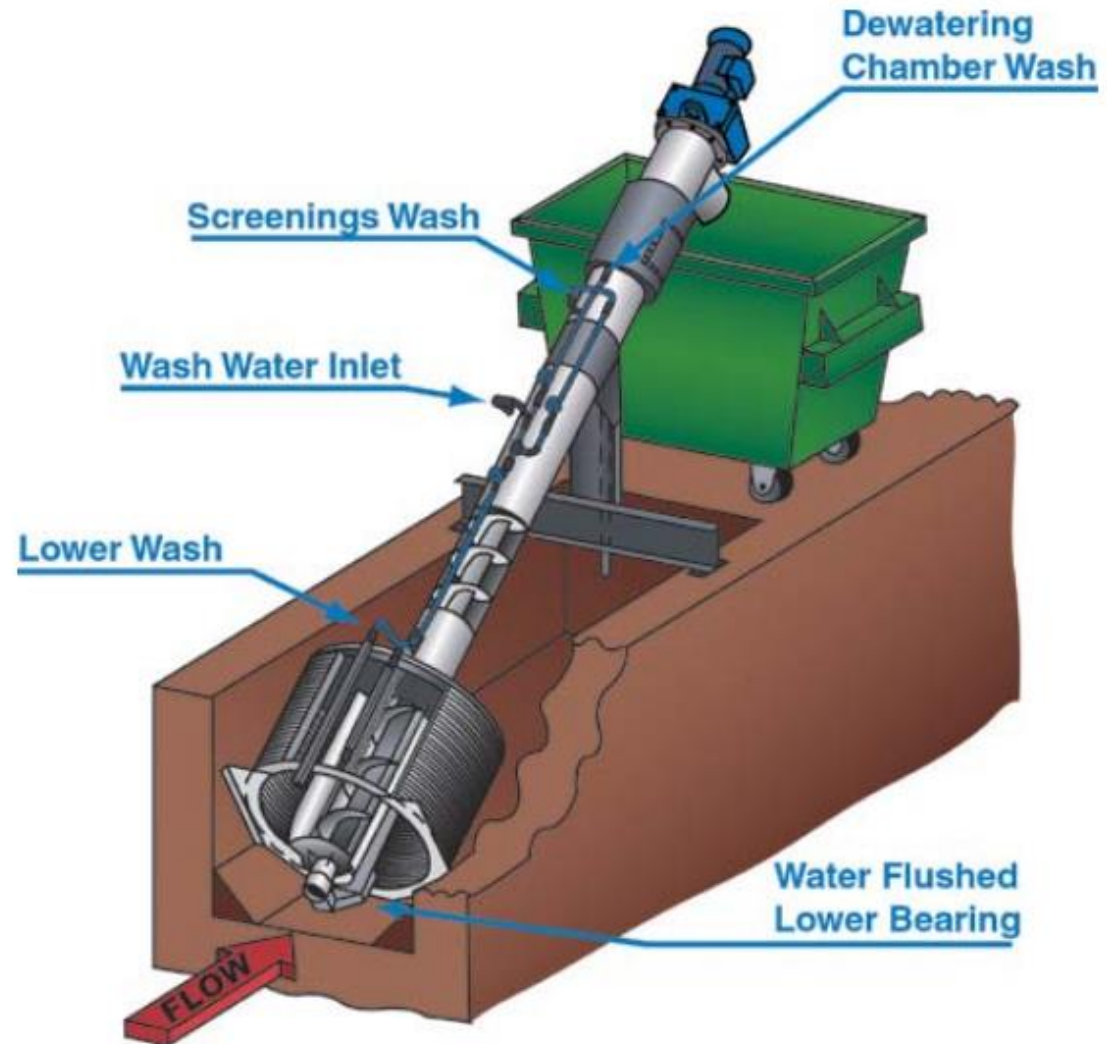
Concept 1 - FOG Bypass



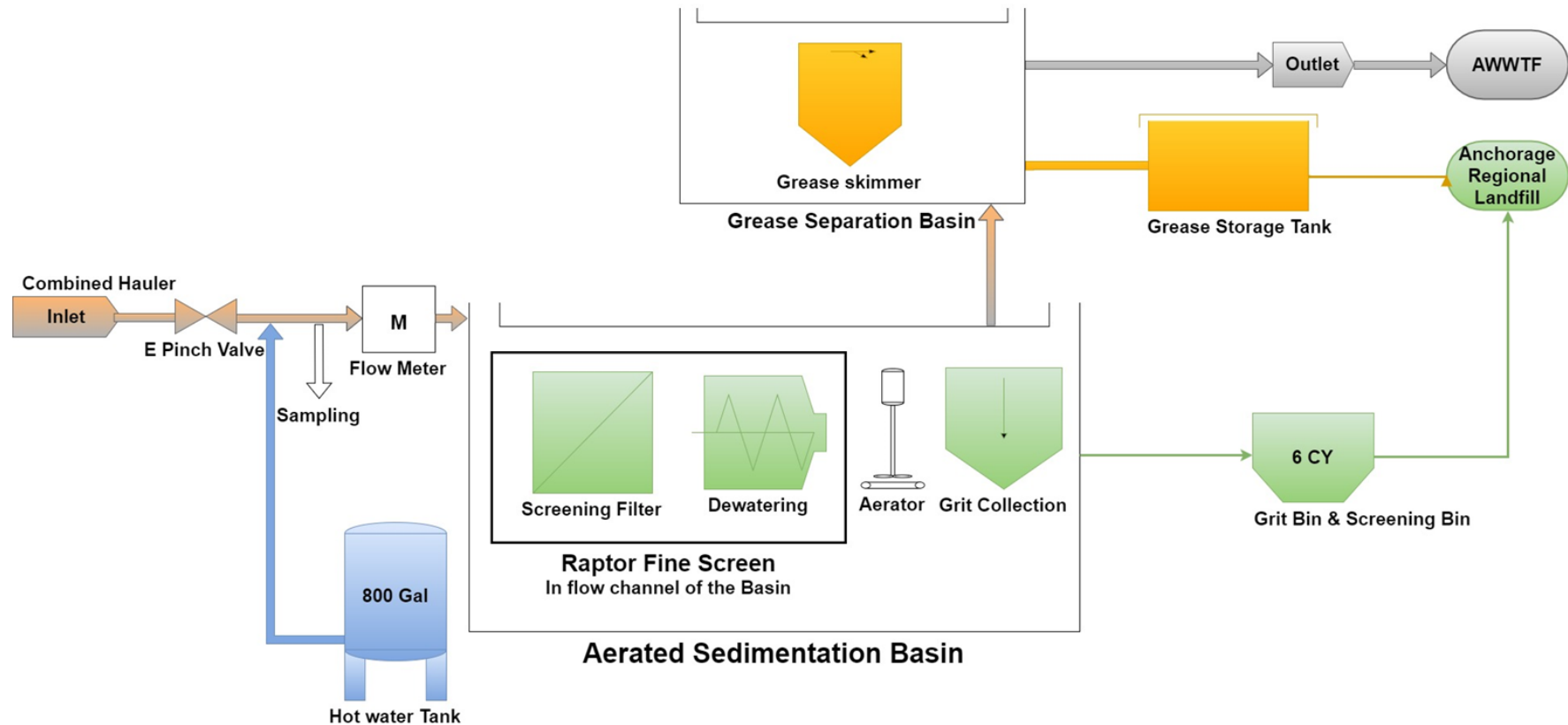
Concept 2 - Partial FOG Collection



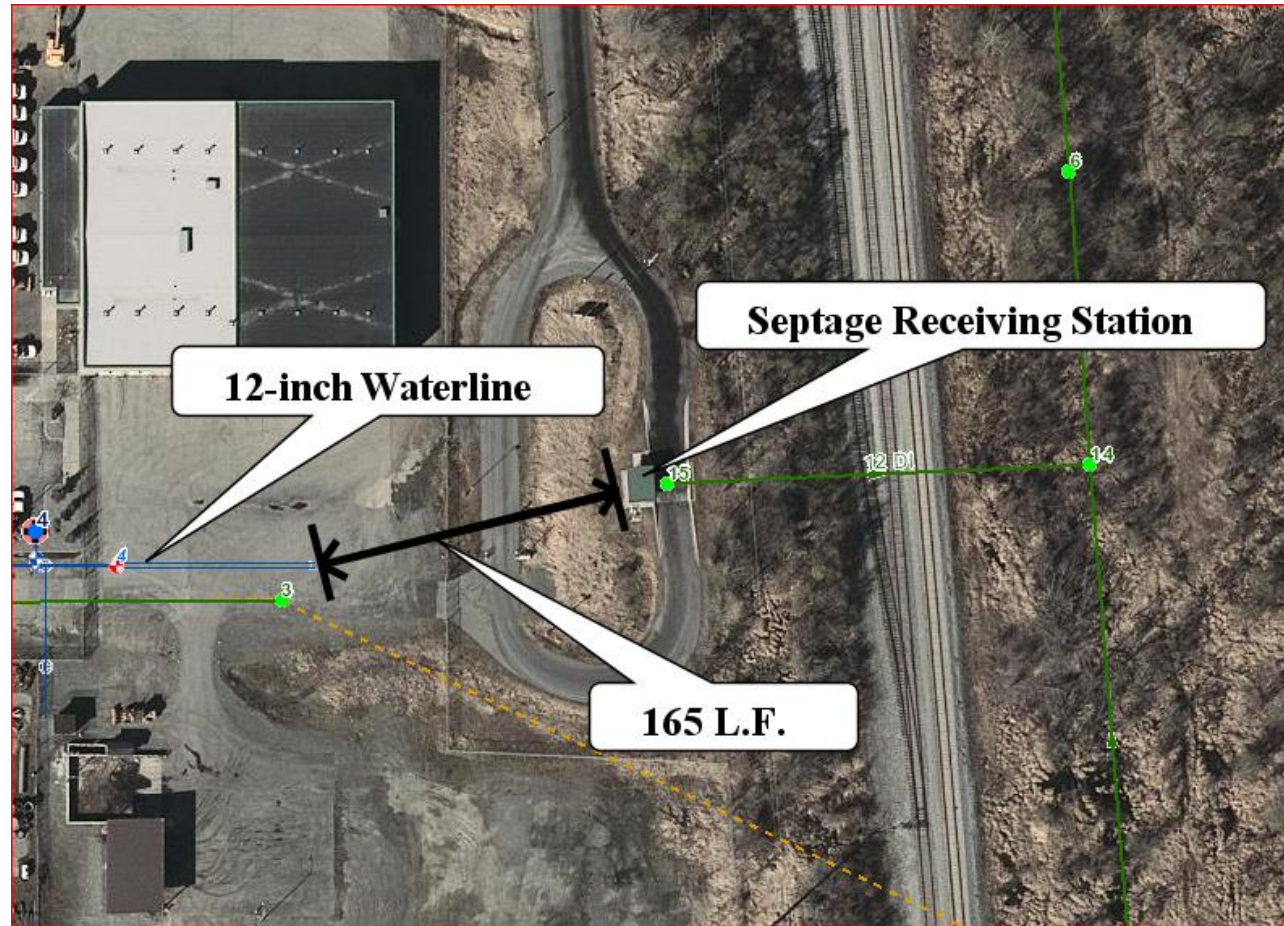
Raptor Fine Screen



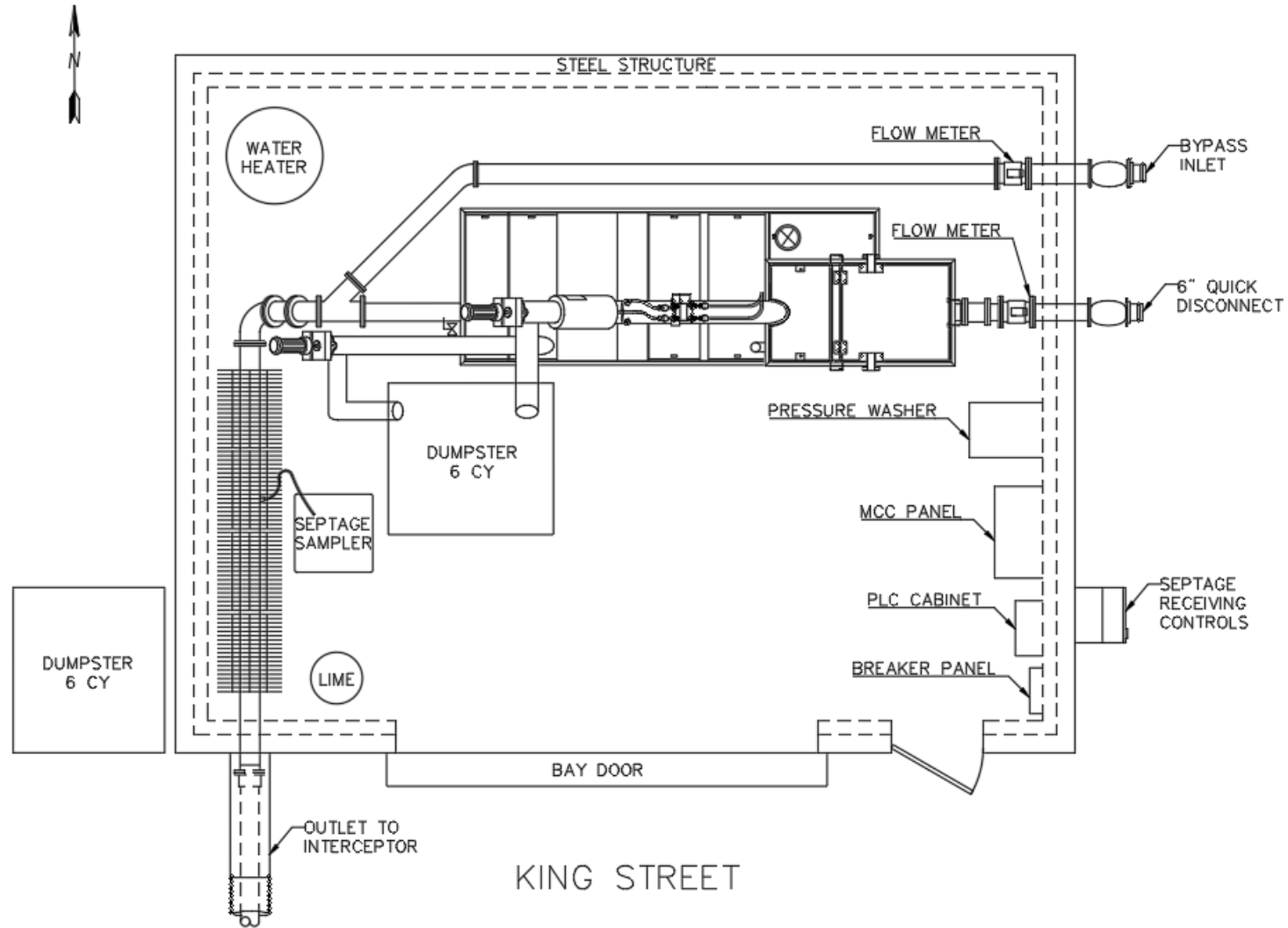
Concept 3 - Separation Basins



Tap Into Buried Water Line



Building Layout

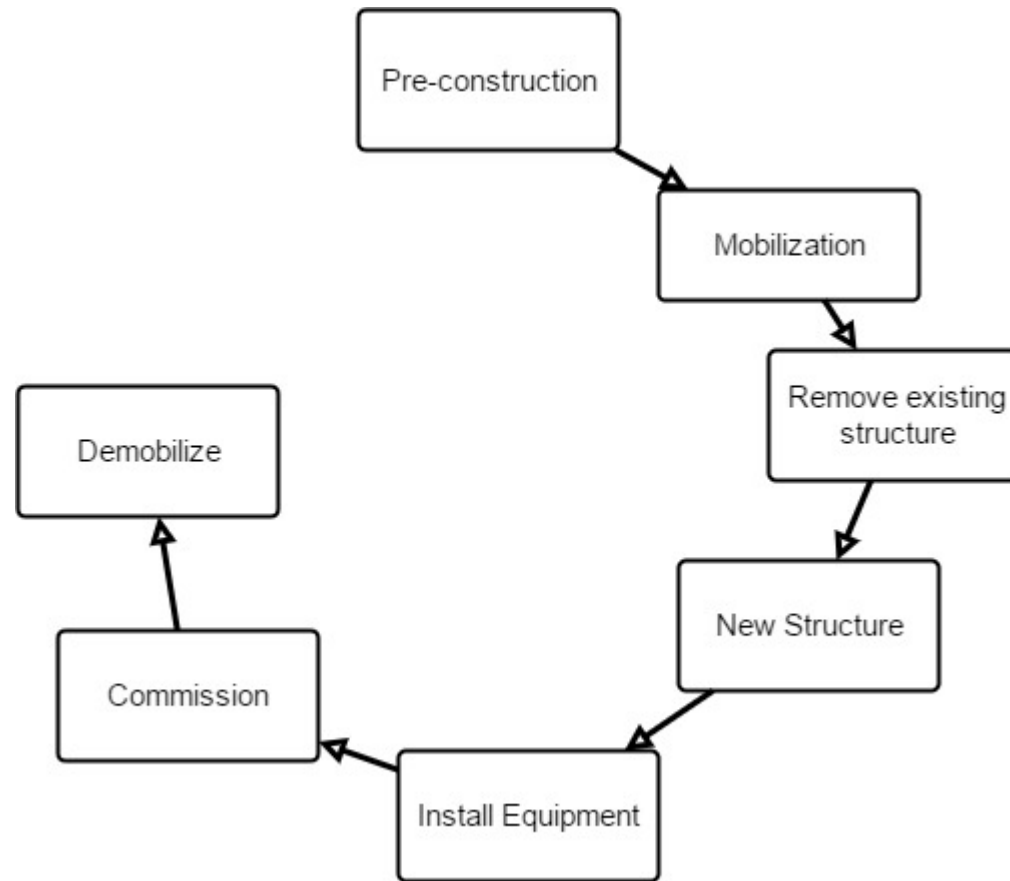


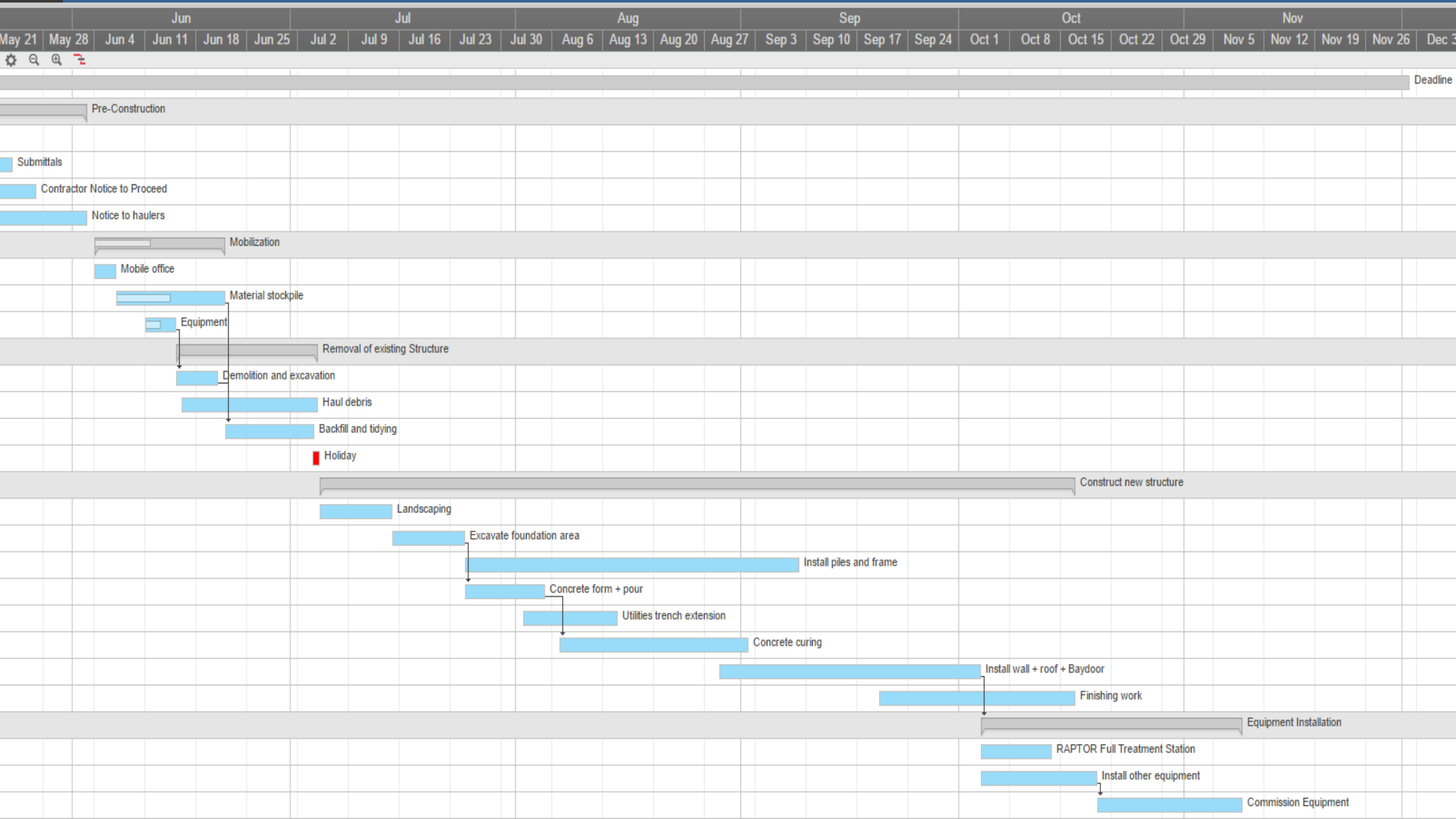
Permits

- Memorandum of Understanding between AWWU and the landfill
- Approval to Construct from Alaska Department of Environmental Conservation (ADEC)
- Building Safety Permit from MOA

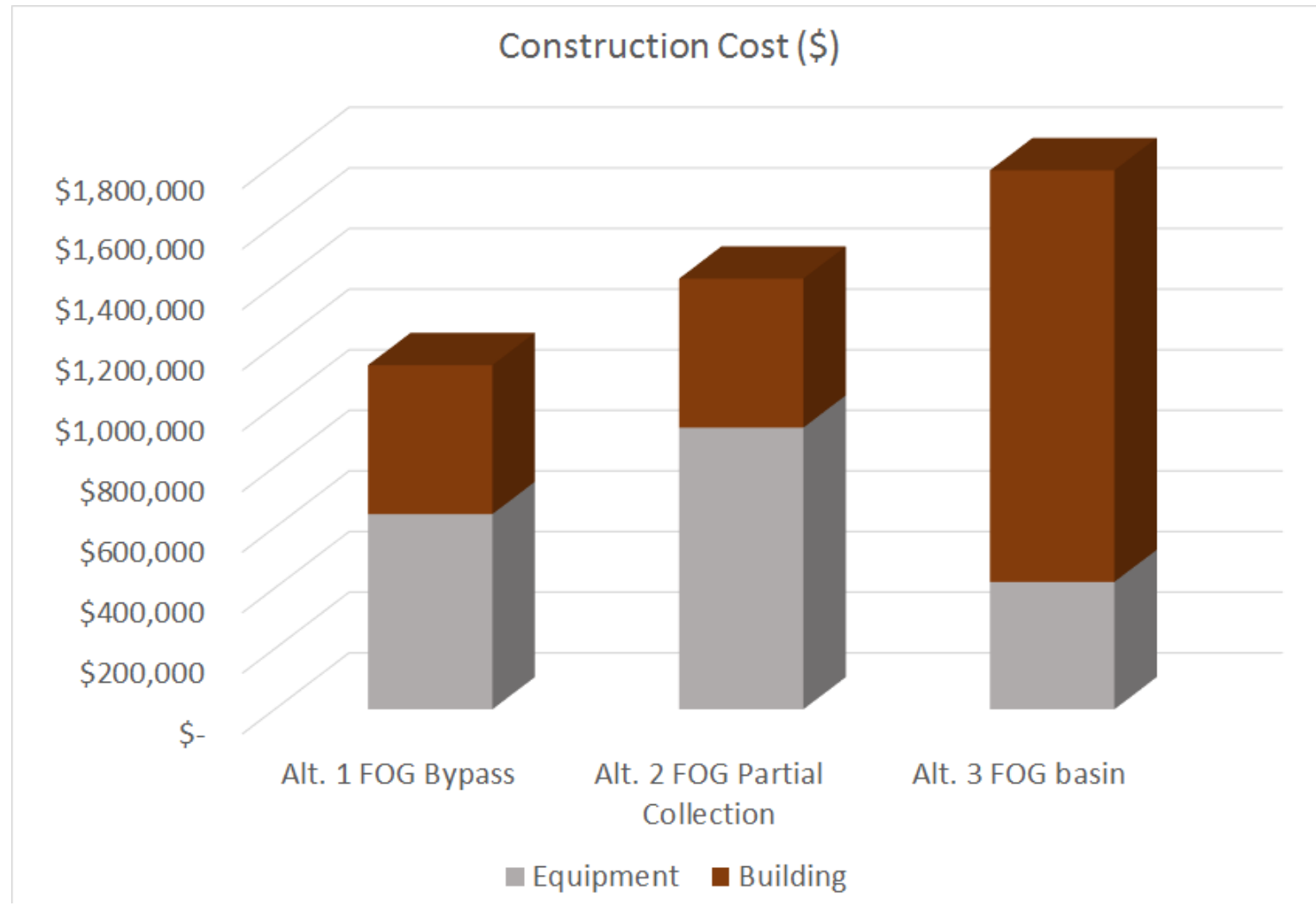
Commercial Permit Worksheet							
Municipality of Anchorage		4700 Estimote Road Telephone (907)343-8211		Building Safety Division			
TAX CODE NUMBER		PERMIT NUMBER					
COMPLETE ALL APPLICABLE PARTS							
SUBDIVISION:	LOT:			BLOCK:			
TRACT:	PLAT #:	GRID #:	ZONING:				
PLEASE CIRCLE WHICH BEST APPLIES TO YOUR LOT: (EX = EXISTING OR N = NEW)							
UTILITIES TO LOT:	PUBLIC WATER: EX N	PUBLIC SEWER: EX N	WELL: EX N	SEPTIC: EX N			
ACCESS TO LOT:	UNDEVELOPED	GRAVEL	STRIP PAVED	CURB AND TYPE:	Y	N	1 2 OTHER
Construction Site Address: _____ City: _____							
Legal Property Owner: _____							
Address: _____		Phone: _____		Fax: _____			
Permittee: _____							
Address: _____		Phone: _____		Fax: _____			
Contractor: _____							
Email Address: _____		Phone: _____		Fax: _____			
Contact Person: _____							
Email Address: _____		Phone: _____		Fax: _____			
Designer/Architect: _____							
Email Address: _____		Phone: _____		Fax: _____			
NEW OR ADDITION							
Sub-Family	Number of Stories	# of Dwelling Units	Living Area Sq Ft	Garage Sq Ft	Carpent Sq. Ft.	Air Conditioning	Speaker Sq. Ft.
Dwelling	Type of Const.		Use	Occupancy	Square Footage per Occupancy		
New Commercial Bldg							
FILL, GRADING OR EXCAVATION							
Cubic Yards of:	Fill: _____	Excavation: _____	Grading: _____				
SIGNS							
Electric:	Quantity: _____	Non Electric	Quantity: _____	Valuation: _____			
COMMERCIAL ALTERATIONS							
DESCRIPTION OF WORK:	# OF INSPECTIONS: _____	TOTAL CONSTRUCTION VALUATION: _____					
COMPLETED BY: _____ DATE: _____							

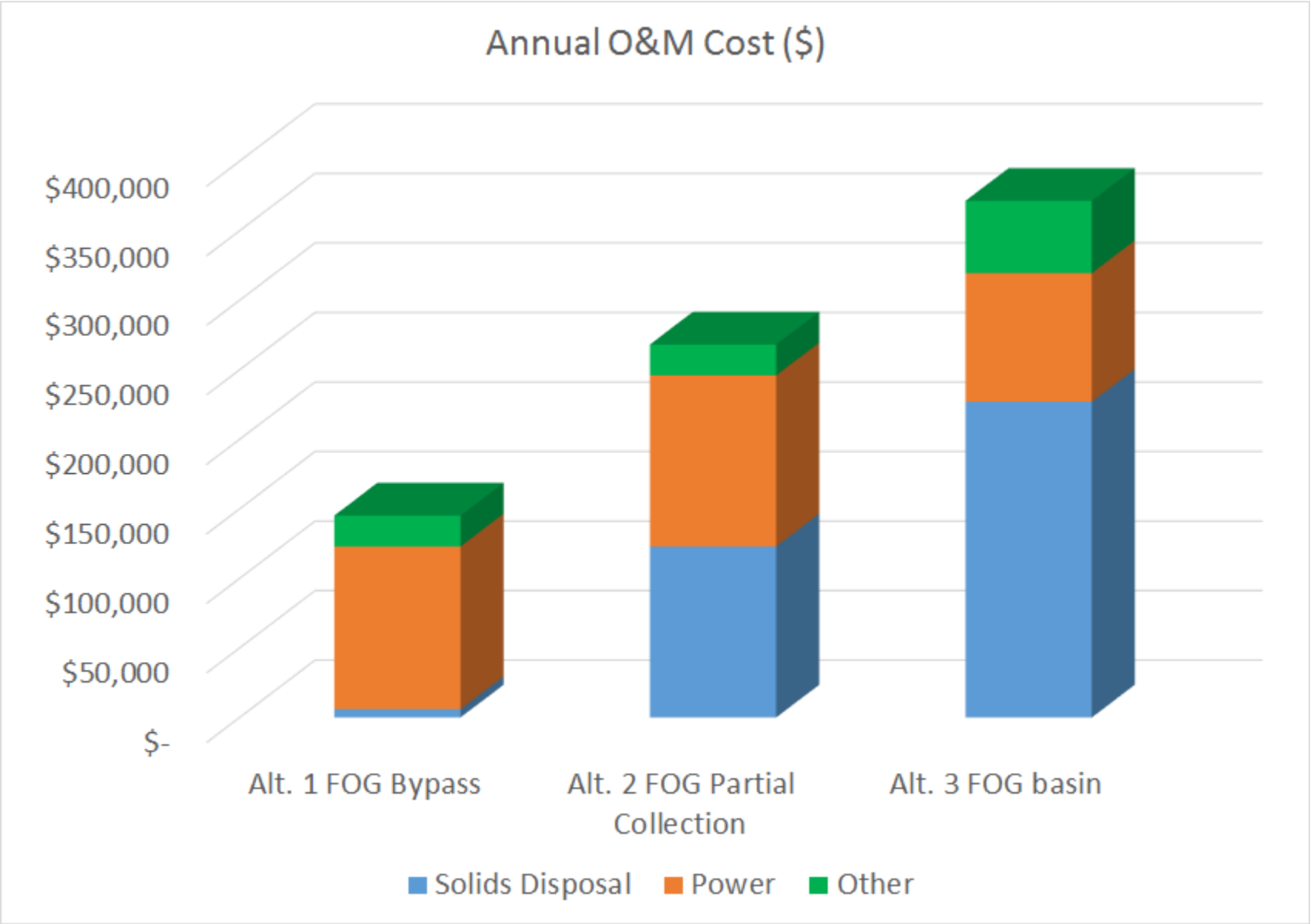
Construction Plan

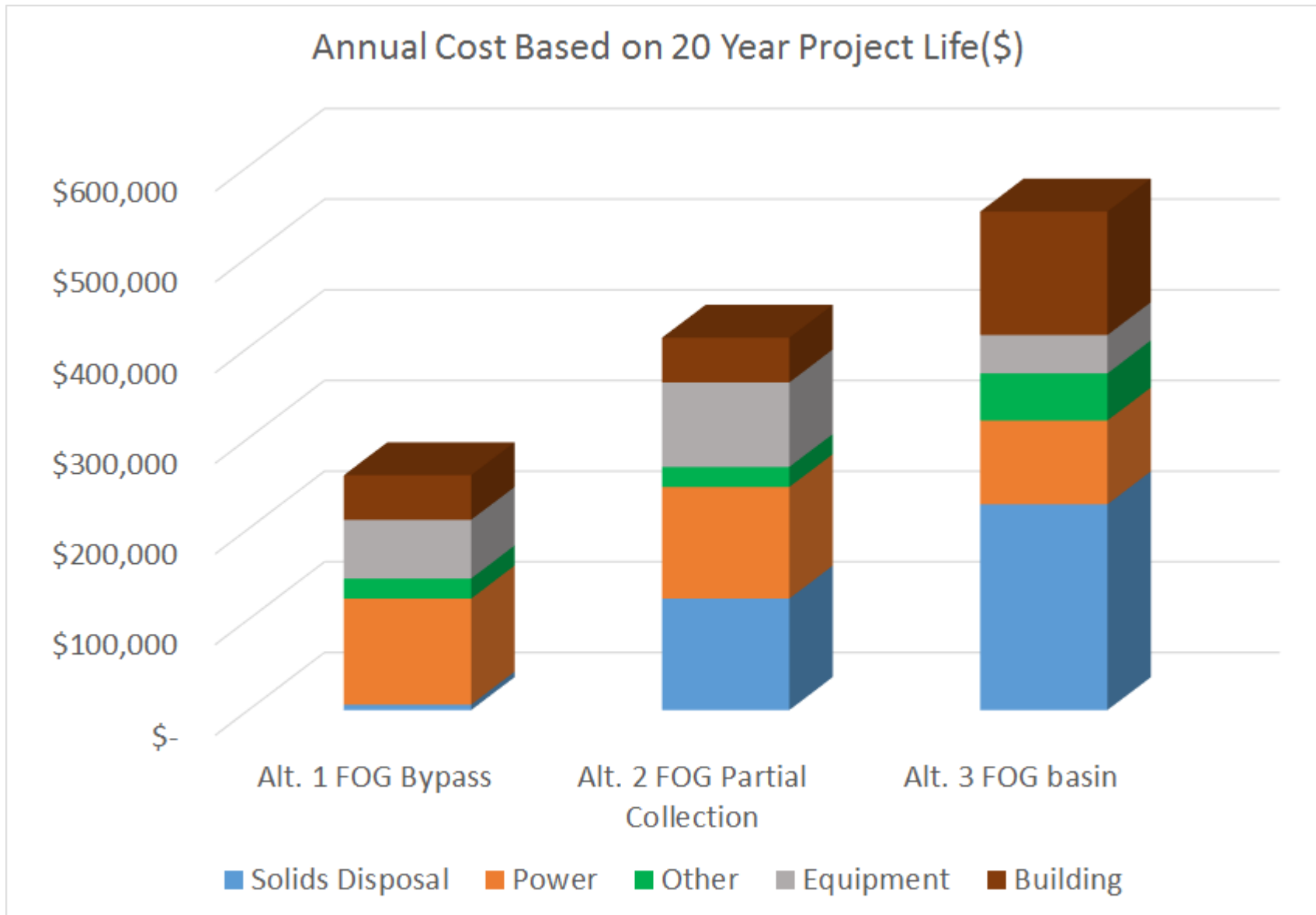




Cost Comparison







Summary & Conclusion

Design Concept 1

Total 2037 Projected Volume	13.3 Million Gallons
Average Daily Screenings/Grit Volume Removed	0.11 CY/ 0.13 CY
Peak Daily Screenings/Grit Volume Collected	0.44 CY/ 0.52 CY
Peak Week Screenings/Grit Volume Collected	1.4 CY/ 1.7 CY
Peak Week Screenings/Grit Volume into Sewer Interceptor	~0 CY/ 2.6 CY
FOG	Handle at the AWWTF but accept on-site
Dumpster Pick-Up	Weekly pickup
Estimated Construction Cost	\$1.25 Million



Sources

1. Pearce, N. (n.d.). NFPA 820: Standard for Fire Protection in Wastewater Treatment and Collection Facilities. Retrieved March 30, 2017, from <http://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards?mode=code&code=820>
2. Fan, G. (2015, January 08). Biodegradation of Fat, Oil, and Grease (FOG) in Wet Wells. Retrieved March 25, 2017, from <https://era.library.ualberta.ca/files/pk02cb85d#.WNcODTsrKHt>
3. https://www.awwu.biz/website/media/documents/Reports/MasterPlans/WasteWater/2014_draft/AWWU_WWMP_2014_PublicReviewDraft.pdf
4. "GUIDE TO SEPTAGE TREATMENT AND DISPOSAL." EPA. Environmental Protection Agency, 22 Dec. 2005. Web. 09 Mar. 2017.
5. He, Xia. Mechanism of Fat, Oil and Grease. *Water research*. Vol. 47. Kidlington: International Water Association, 2013. Web.



Questions?

