



GUAM **WATERWORKS** AUTHORITY



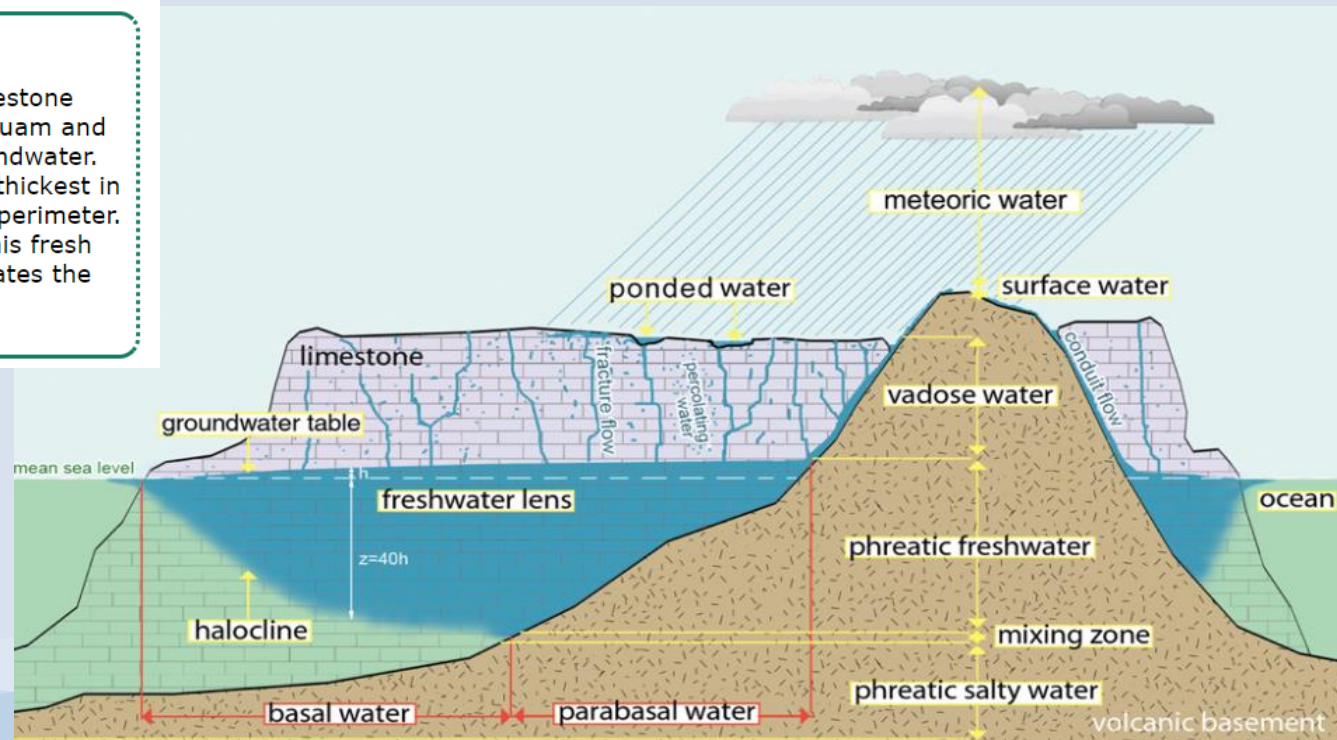
PROTECTING THE HEALTH AND SUSTAINABLE YIELD OF NOTHERN GUAM'S LENS AQUIFER

10TH ASSEMBLY OF PLANNERS SYMPOSIUM | AUGUST 19, 2025

THE NORTHERN GUAM LENS AQUIFER

What is the NGLA?

The Northern Guam Lens Aquifer (NGLA) is the limestone bedrock that underlies the entire northern half of Guam and contains a large and permanent body of fresh groundwater. This body is approximately lens-shaped, being the thickest in the island's interior and thinnest along the island's perimeter. Because fresh water is less dense than seawater, this fresh groundwater lens floats upon saltwater that permeates the bedrock beneath it.



Lens Geometry and Zones of the NGLA, Hydroguam.net, [Digital Atlas of Northern Guam](#) | WERI | IREI ([hydroguam.net](#))

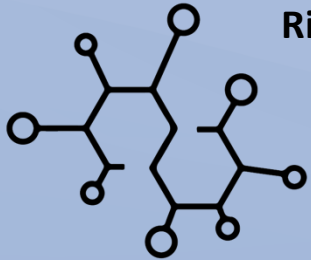
CURRENT CHALLENGES



Aging Infrastructure



Lack of Production Redundancy



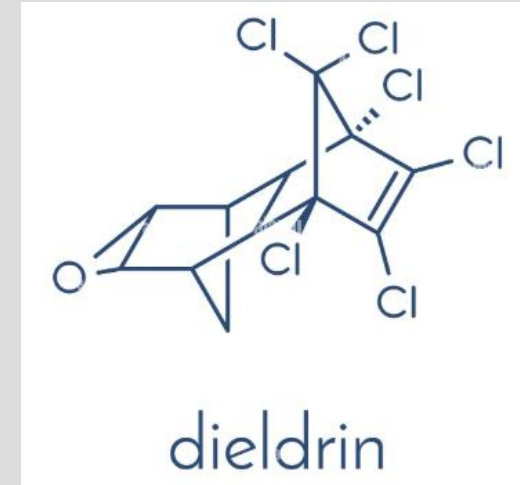
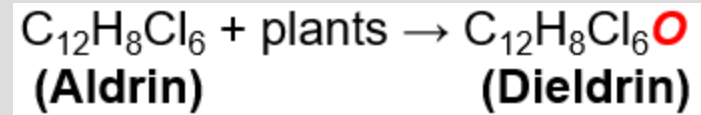
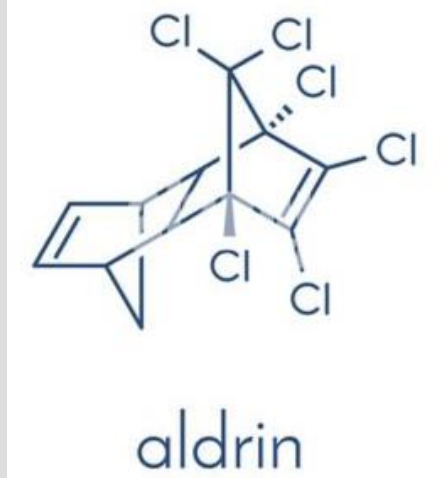
Rising Contaminants



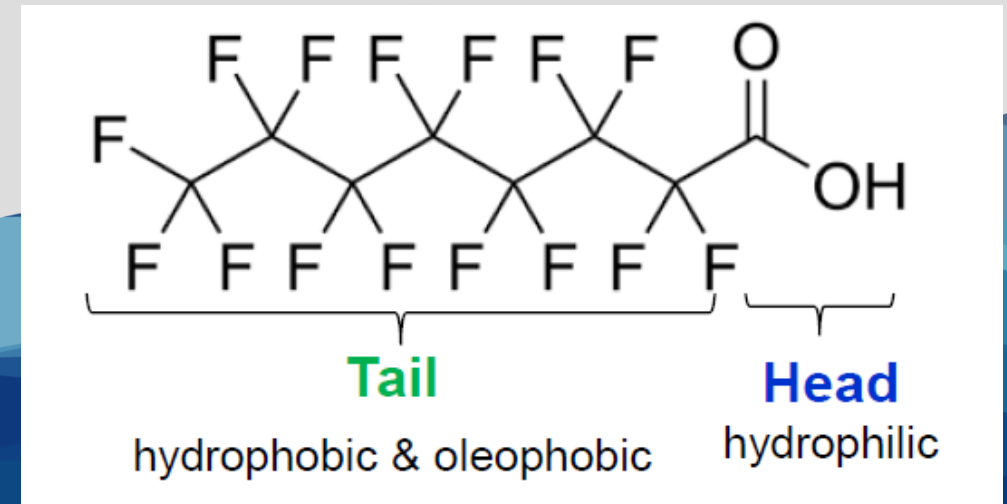
Increasing Population

RIISING CONTAMINANTS

- Dieldrin
 - Powerful insecticide
 - Used 1950s to 1970s
 - Probable human carcinogen
 - Interim Action Level (IAL): 0.2 ppb or ug/L
- PFAS
 - PFOS, PFOA, PFNA, PFHxS



PFAS	Health Effects	Maximum Contaminant Level (MCL) (ng/L)	RfDo (ng/kg-day)
PFOA	Cancer	4.0	3
PFOS	Cancer	4.0	2
PFNA	Developmental	10	3
PFHxS	Thyroid	10	20
GenX	Liver	10	3



GRANULAR ACTIVATED CARBON (GAC) TREATMENT

Treatments

- Ion Exchange Resin
- High-Pressure Membranes: Reverse Osmosis or Nanofiltration
- GAC
 - Removes many organic compounds
 - Works on both PFAS and Dieldrin
 - Simple Operations
 - Requires large footprint
 - Waste media disposal



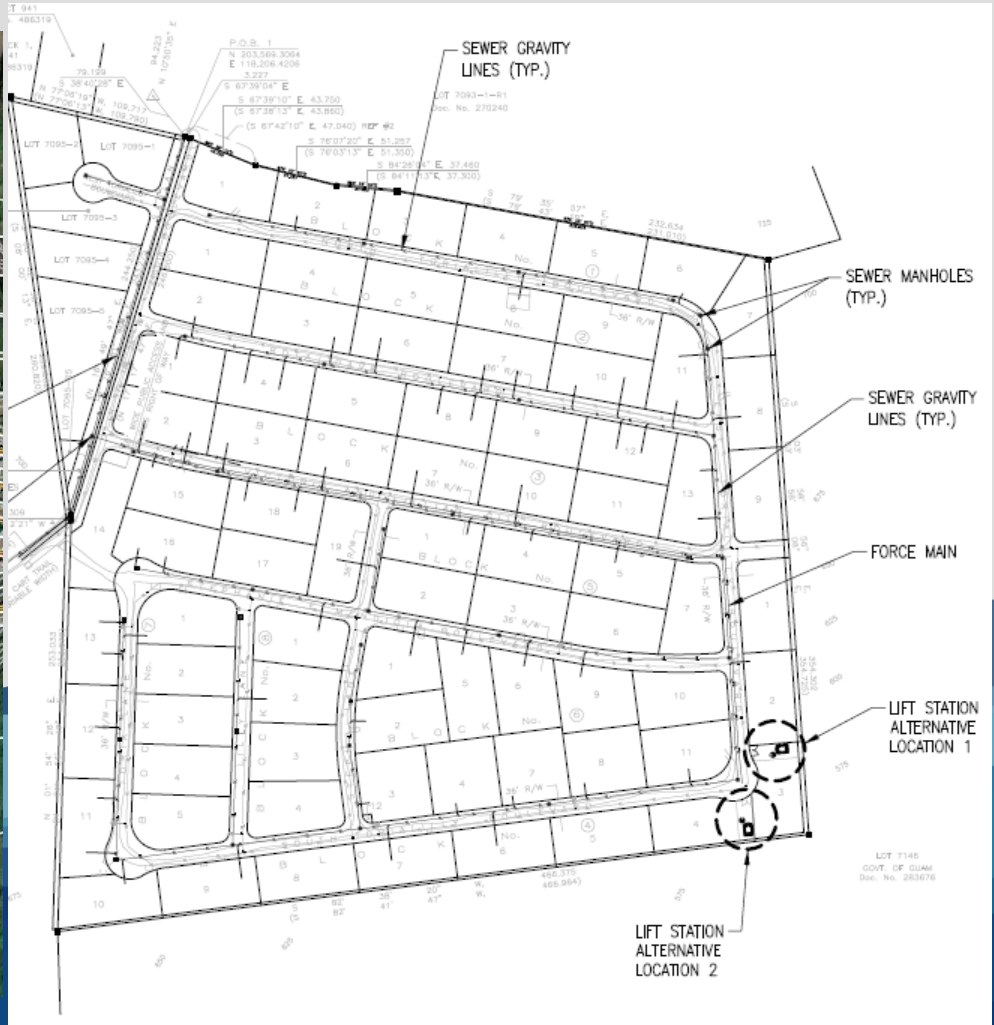
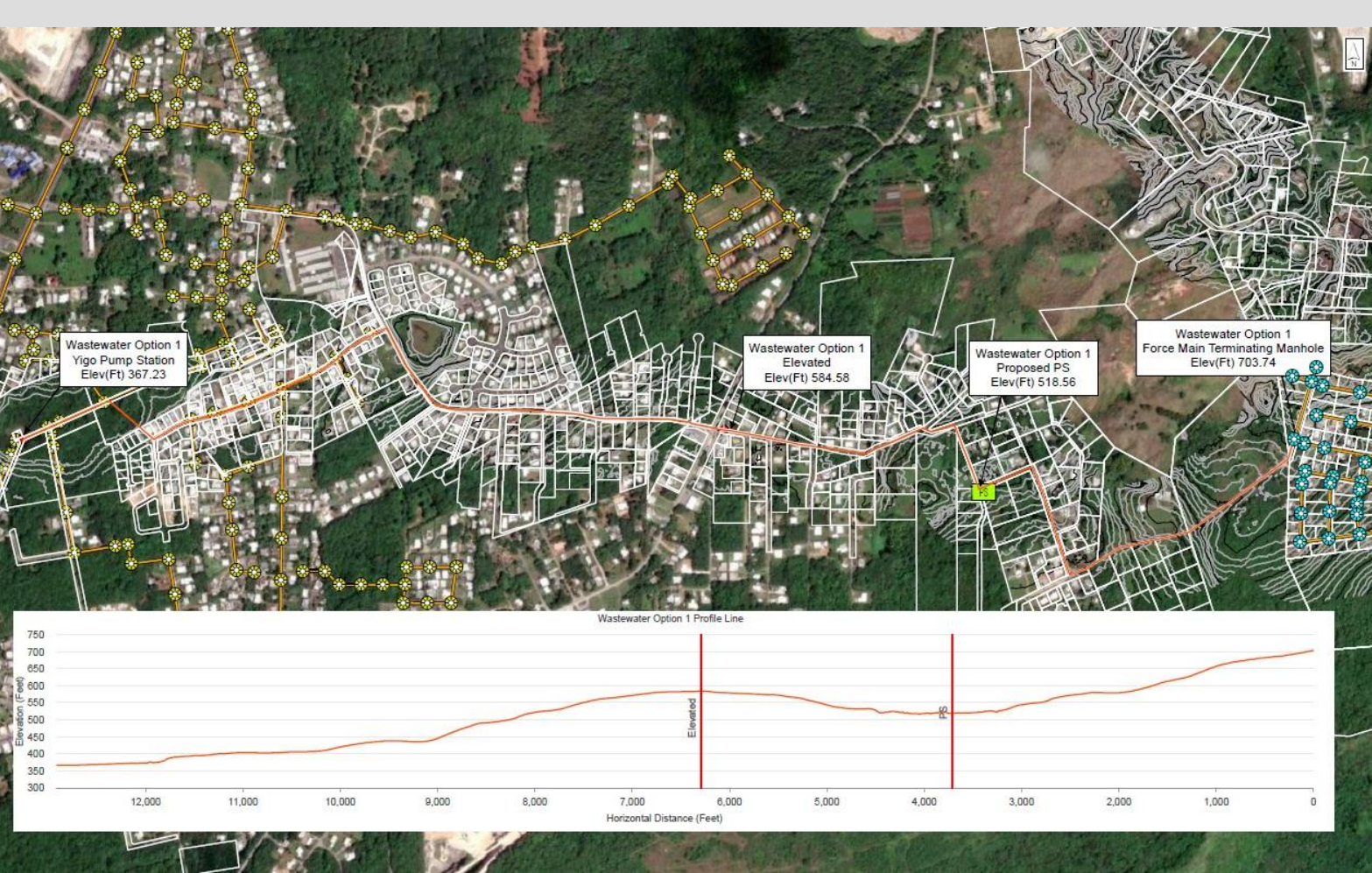
CONTAMINANTS: NITRATES

Nitrates

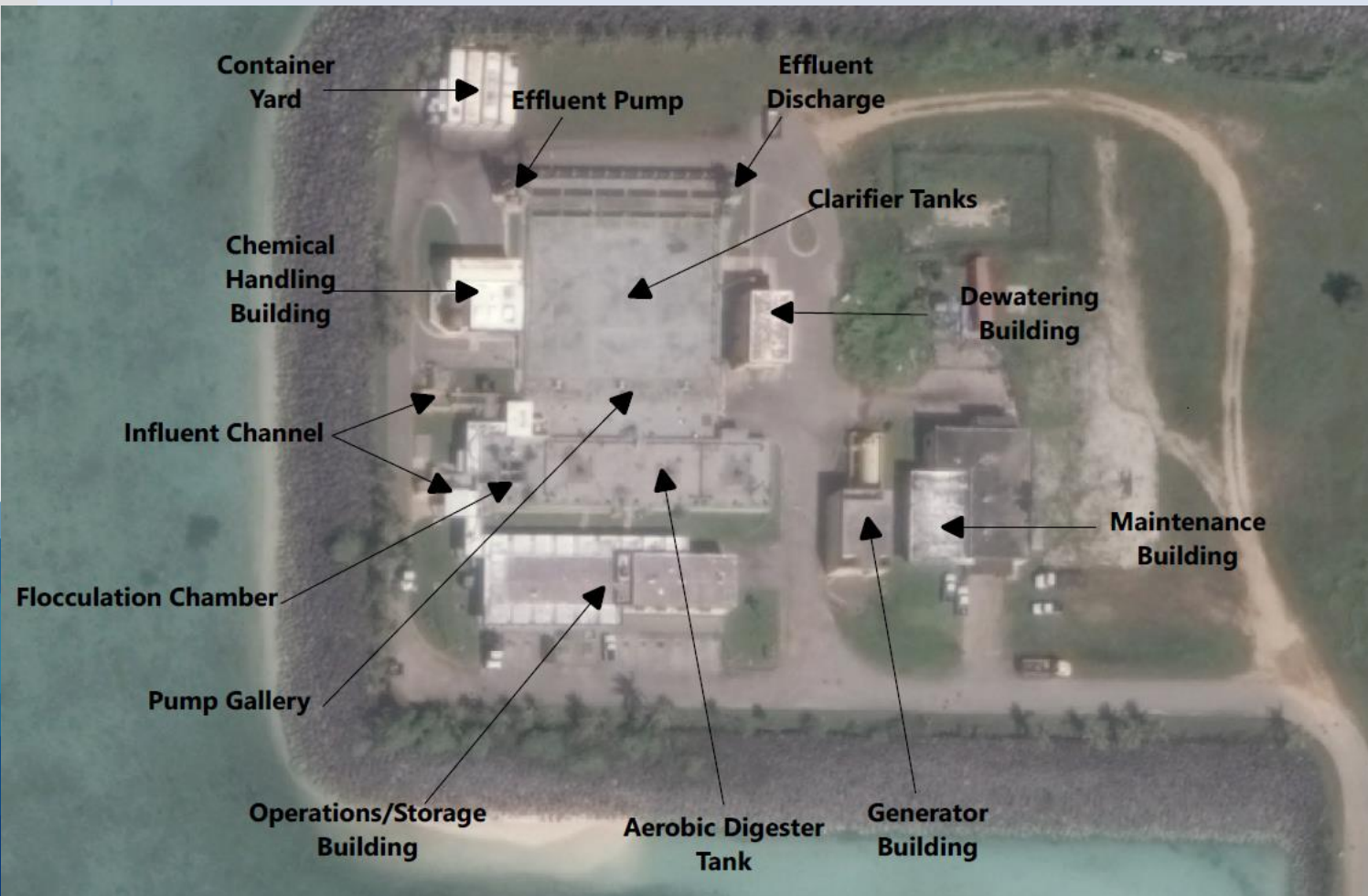
- Naturally occurring
- High nitrate concentrations in wastewater
- Adverse health effects in pregnancy
 - Blue Baby Syndrome
- Safe Drinking Water Standard:
 - 10 mg/L
- 1986 to 2019 - 84 wells w/ increasing nitrates

Rank	Well	Location	Maximum Concentration (mg/L)	Maximum Concentration Sample Date	2029 Prediction (mg/L)	Number of water-only customers within 1000'	Number of water-only customers within 300'
1	EX-11	Adacao, Mangilao	4.9	1/1/2002 & 7/15/2018	6.5	48	2
2	F-18	Chalan Piga, Dededo	4.7	7/15/2018	6.3	18	0
3	M-15	Mogfog , Dededo	5 (5.5 mg/L in 2020)	3/17/2013 & 3/18/2012	6.3	32	0
4	M-4	Adacao, Mangilao	5	3/1/2000	6.3	27	2
5	D-17	Chalan Henry Kaiser, Dededo	4.6	7/29/2018	5.9	3	0
6	M-2	Adacao, Mangilao	4.6	10/14/2017	5.9	15	2
7	M-3	Adacao, Mangilao	4.9	7/15/2018	5.6	13	1
8	M-8	Adacao, Mangilao	4.8	7/15/2018	5.6	24	1
9	M-9	Adacao, Mangilao	4.9	4/7/2018	5.2	7	2
10	F-12	Chalan Koda, Dededo	4.7	2/8/2015	4.8	19	1

CAPACITY ASSURANCE PROJECTS (GILL BREEZE SUBDIVISION)



HAGATNA WASTEWATER TREATMENT PLANT UPGRADES

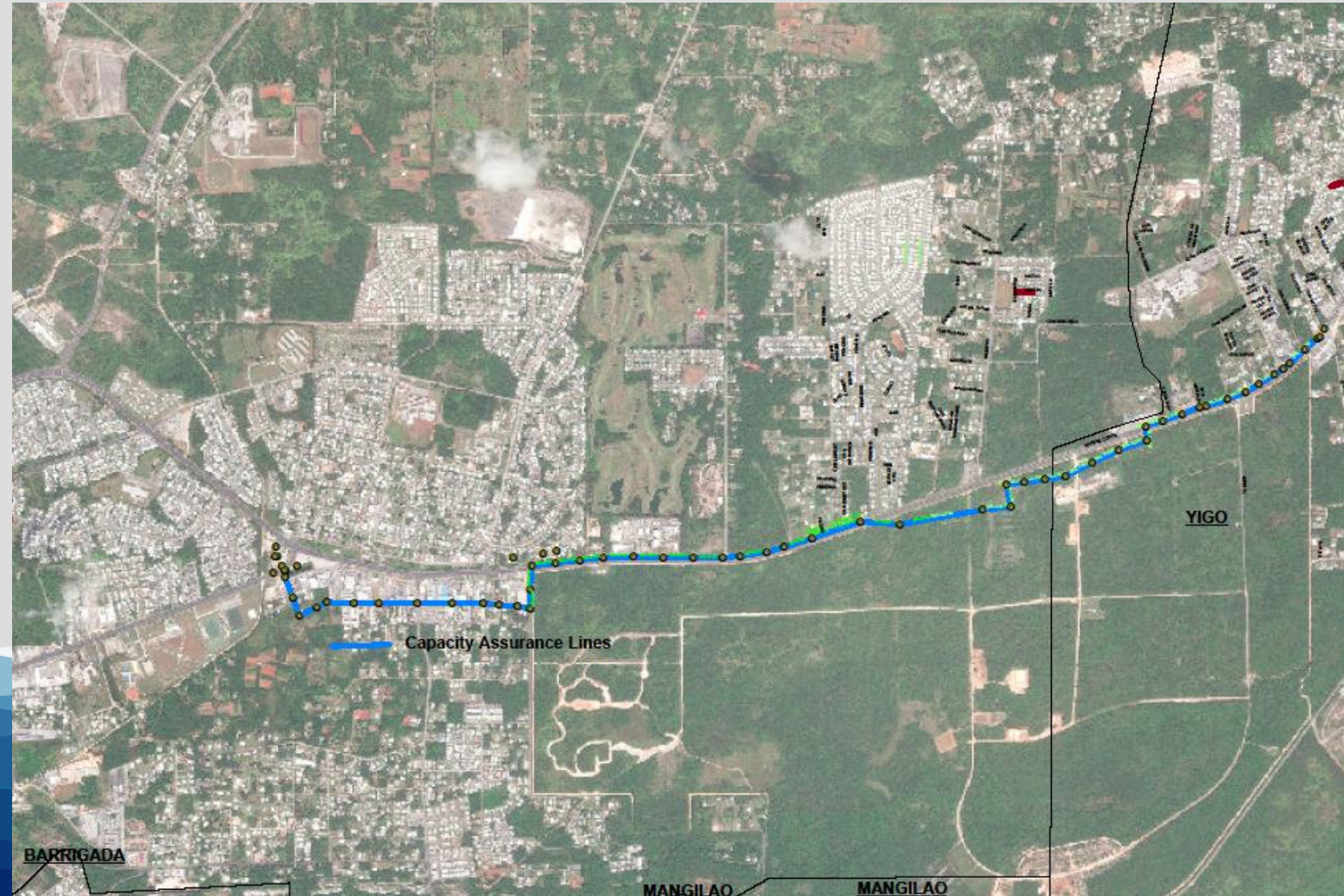


- ~4,000 LF of sewer pipe
- 14 to 18" diameter pipe
- Upsizing for Capacity

CAPACITY ASSURANCE PROJECTS (NORTHERN DISTRICT)

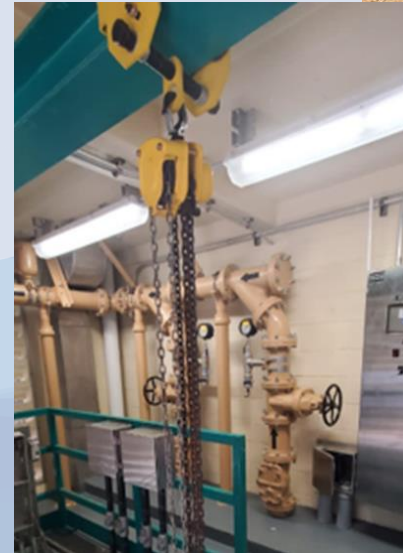
Dededo

- ~21,000 LF of sewer pipe
- 15 to 30" diameter pipe
- Upsizing for Capacity



WASTEWATER PUMP STATION UPGRADES

- Pump Station Priority Projects
- Tier 1 Pump Station and Force Main Inspections





Q&A OPEN DISCUSSION