A PRESENTATION TO
ON POWER, WASTEWATER, AND WATER UTILITY ISSUES ARISING FROM PROPOSED MILITARY BUILDUP

CHAIRWOMAN NANCY SUTLEY

COUNCIL ON ENVIRONMENTAL QUALITY

March 2010

GUAM WATERWORKS AUTHORITY

GUAM POWER AUTHORITY
GPA
POWER TO SERVE

PRESENTATION GOALS

- PROVIDE THE LATEST INFORMATION AVAILABLE
  - Recent discussions since the release of the DEIS
  - Emerging Solutions
  - Unresolved Issues
  - Policy perspectives
  - Q & A

Four Things The Federal Government Must Know

- There are appropriate solutions that can insure Guam's pristine environment remains preserved and protected for the long term, beyond the Buildup (a "Green Guam")
- Solutions will require resources that must be provided in sufficient amounts and in a timely manner to assure comprehensive infrastructure improvements that serve "One Guam"
- Federal support must address both direct and induced buildup impacts to shield Guam ratepayers from utility costs arising from the buildup that would price essential services beyond their reach
- Failure to provide enough timely federal support will lead to serious, significant and permanent environmental loss of a "Green Guam" and the creation of two Guams instead of "One Guam".

THE PROPOSED GUAM MILITARY BUILDUP: GPA/DoD POWER DISCUSSIONS TO DATE

March 2010

Guam Power Authority (GPA) Fact Sheet

- Sole Provider of Electricity on Guam
  - Congress authorized the conversion of Navy to a customer in1984, In 1992, GPA and Navy entered into first Customer Service Agreement.
- 46,000 customers
  - 39,000 Residential
  - 18 Metering Points Serving the Navy (DOD)
  - 18% Base Rate Revenues from the Navy
- Projected Fiscal Year 2010 Budget
  - $386 MM Total
  - $236 MM Fuel (100% oil dependent)

THERE IS ENOUGH INITIAL POWER GENERATION CAPACITY

- GPA Generation Capacity – 552 MW
- Current Peak – 272 MW
- Peak after Build Up ~ 312 MW (est)
- Excess Generation Capacity after build up – 240 MW
- GPA & DOD agree there is sufficient generation capacity to support the initial build up requirements

Generation Improvement Solutions

- GPA & DOD agree that 3 GPA Combustion Turbines (CT) should be refurbished to support construction phase reliability
  - Estimated cost $30 million
  - Upgrades ~60 MW of existing capacity)
  - Start by 2012
- DOD to pay $30 million “reliability fee” for the cost to refurbish and operate CT’s to repay
- All ratepayers will benefit from this improvement in reliability

Generation Unresolved Issues

- To insure continued generation reliability, GPA believes buildup accelerates the need for the next base load generator from 2022 to 2017
- GPA believes DOD should pay for induced impacts caused by accelerating the need for the new base load
- GPA and DOD have yet to determine and agree on induced impact

New Base Load: Buildup accelerates need from 2022 to 2017

- 60 MW Base Load requirement
- $150 million for conventional oil fired
  - $120 million for the plant + $30 million for additional fuel storage
- $300 million for Liquefied Natural Gas (LNG) system (includes fuel storage)

Alternative Energy & Fuel Diversification - Ongoing Discussions

- GPA is pursuing 80MW of renewable energy sources, primarily from wind and solar
- GPA and DOD have been working collaboratively on renewable efforts
  - DOD is sharing wind data
  - Recent meeting with NREL, GovGuam, DoD and others
- GPA will not support renewable power generation solutions that only serve on-base needs. All renewable generation benefits must be shared with the entire island grid via GPA

Alternative Energy & Fuel Diversification - Ongoing Discussions

- Fuel diversification strategies include evaluating Liquefied Natural Gas and Geothermal options as base load solutions
- No “magic bullet”. Renewables are not firm 24/7 base load power sources. It will take a mix of technologies to buy down the cost of future energy
- No subsidies are available from GovGuam or GPA for attracting renewable investments. This threatens the price competitiveness of renewable energy

$300 to $450 million for new Generation needs over the next decade

Generation New Supply Projects (x $1,000)		
1	60 MW Base Load using Fossil Fuel	120,000
2	-Additional fuel storage	30,000
3	60 MW Base Load using Liquefied Natural Gas (LNG)	300,000
4	Renewable Energy Acquisition (80 MW)	140,000

Transmission & Substation Direct Impacts: $77 million

- Based on most recent DOD load data, GPA and DoD are discussing $77 million in Transmission and Substation projects to be paid by DoD to serve the buildup.
- Due to the uncertainty of where workforce housing will be sited, GPA is increasingly concerned about induced impacts on T&D assets in the civilian sector

Transmission & Substation Upgrades NORTH

	PROJECT			EST. COST (X $1,000)
1	Harmon to Andersen 115 kV Overhead Line	12	miles	21,788
2	Andersen Substation 112 MVA Transformer and Substation			4,830
3	Andersen Substation Capacitor Banks (2-6 MVAR)	12	MVAr	315
4	North Finegayan Substation Capacitor Banks (2-6 MVAR)	12	MVAr	315
5	North Ramp Substation Capacitor Banks (2-3 MVAR)	6	MVAr	158
6	Harmon - North Finegayan - Underground Line	4	miles	9,818
7	North Finegayan - Potts Junction - Andersen - Underground Line	7	miles	15,593
8	Harmon - North Finegayan Overhead Line Upgrade	4	miles	945
9	North Finegayan - Potts Junction - Andersen - Overhead Line Upgrade	7	miles	1,523
10	Harmon Substation Reconstruction 115 kV & 34.5 kV			7,508
	TOTAL PROJECTS - NORTH			62,790

Transmission & Substation - NORTH

Transmission & Substation Upgrades SOUTH

	PROJECT			EST. COST (X $1,000)
1	Piti to Orote 115 kV Overhead Line	4	miles	8,505
2	Orote Substation 112 MVA Transformer and Substation			4,830
3	Orote Substation Capacitor Banks (2-6 MVAR)	12	MVAr	315
4	Polaris Point Capacitor Banks (2-3 MVAR)	6	MVAr	315
5	Piti X20 to Orote X35 Overhead Line Upgrade	4	miles	945
	TOTAL PROJECTS - SOUTH			14,910

Transmission & Substation - SOUTH

Transmission & Distribution: Induced Impacts

Substation Reliability Improvement and Capacity Upgrade Projects (x $1,000)		
1	New NCTAMS 30 MVA Substation	4,655
2	Dededo Substation Upgrade (18 MVA - 30 MVA)	4,655
3	Tumon Substation Upgrade (22 MVA - 30 MVA)	1,530
4	Agana Substation Upgrade (22 MVA - 30 MVA)	1,250
5	Piti Substation Upgrade (14 MVA - 30 MVA)	4,655
6	Apra Substation Upgrade (14 MVA - 30 MVA)	4,655
		21,400

Transmission & Distribution: Induced Impacts

Distribution Reliability Improvement and Line Extension Projects (x $1,000)		
1	P003 Underground Extension to Port Authority	4,776
2	Distribution Capacitor Program	400
3	NCTAMS Distribution System Overhead Extension & Sectionalizing	688
4	Dededo Distribution System Overhead Extension & Sectionalizing	688
5	Tumon Distribution System Sectionalizing	160
6	Agana Distribution System Sectionalizing	160
7	Piti Distribution System Overhead Extension & Sectionalizing	688
8	Apra Distribution System Overhead Extension & Sectionalizing	688
		8,248

Transmission & Distribution: Induced Impacts: $30 million

T&D Improvements Military Induced		
1	Substation Reliability Improvement and Capacity Upgrade Projects	21,400
2	Distribution Reliability Improvement and Line Extension Projects	8,248
		29,648

Induced Impacts: An Example Younex Development

- ~8 Megawatts (MW) of demand
- 16,000 workers
- High density area adjacent to Northern Treatment Plant
- Discovered through zoning application & inquiries made to Engineering firms
- Engineering plans not finalized, no permits issued
- Construction planned for 4 phases/2 MW each phase
- Phase I - tentative December 2010 completion
- System Impact – Existing substations and distribution system in this area cannot support additional 8 MW without violating system operating standards

- It is unknown where all the other construction housing will occur and how power service to these other areas will be impacted by large construction housing populations

Ultra Low Sulfur Diesel Fuel (ULSD)

- Established a ULSD Working Group (USLDWG) to develop a strategy for ULSD for Guam
  - GPA, USEPA, GEPA, DoD, and fuel industry representatives comprise this group
- ULSDWG has achieved consensus for moving to an island-wide adoption of ULSD by a target transitional date of December 2012
- The ULSDWG may modify the target transition date upon creation of a ULSD Transition Business Case Analysis.
- 18-March 2010 ULSDWG Meeting Action Items
  - Collect extensive data to determine the fueling logistics, cost implications, and other economic factors associated with making this transition including the impact on the CNMI and other regional fuel markets
  - Create the business case analysis for this effort
  - Guam EPA will discuss proposed timeline and outcomes of the conference call with the Governor

Smart Grid

- GPA has secured a $16M matching grant for Smart Grid
- GPA's Smart Grid Initiative goals:
  - Improve Electric Power System Reliability and Power Quality
  - Reduce Electric Power System Costs, Peak Demand, and Environmental Impacts
  - Increase Customer Options to Manage Their Energy Use and Costs
  - Strengthen the Electric Grid Capability to Accommodate Renewable Energy and Reduce Greenhouse Gas Emissions.
  - Provide Economic Opportunities for Businesses and New Jobs for Workers

Power Impacts Summary

- Generation:
  - CT upgrade: $30M
  - Baseload addition: $150M to $300M
  - Renewable Energy: $140M

  Sub-Total $300M TO $500M
- T&D:
  - Direct: $ 77 M
  - Indirect: $ 30 M

  Sub-Total: $107M
- Total: $400 to $600 Million

GUAM WATERWORKS AUTHORITY

THE PROPOSED GUAM MILITARY BUILDUP: GWA/DoD DISCUSSIONS TO DATE

March 2010

GUAM WATERWORKS AUTHORITY (GWA)

- $60M Annual Budget
- 300 Employees
- 39,0000 Customers
- $337M in Total Assets
- GWA website http://www.guamwaterworks.org

GUAM WATERWORKS AUTHORITY

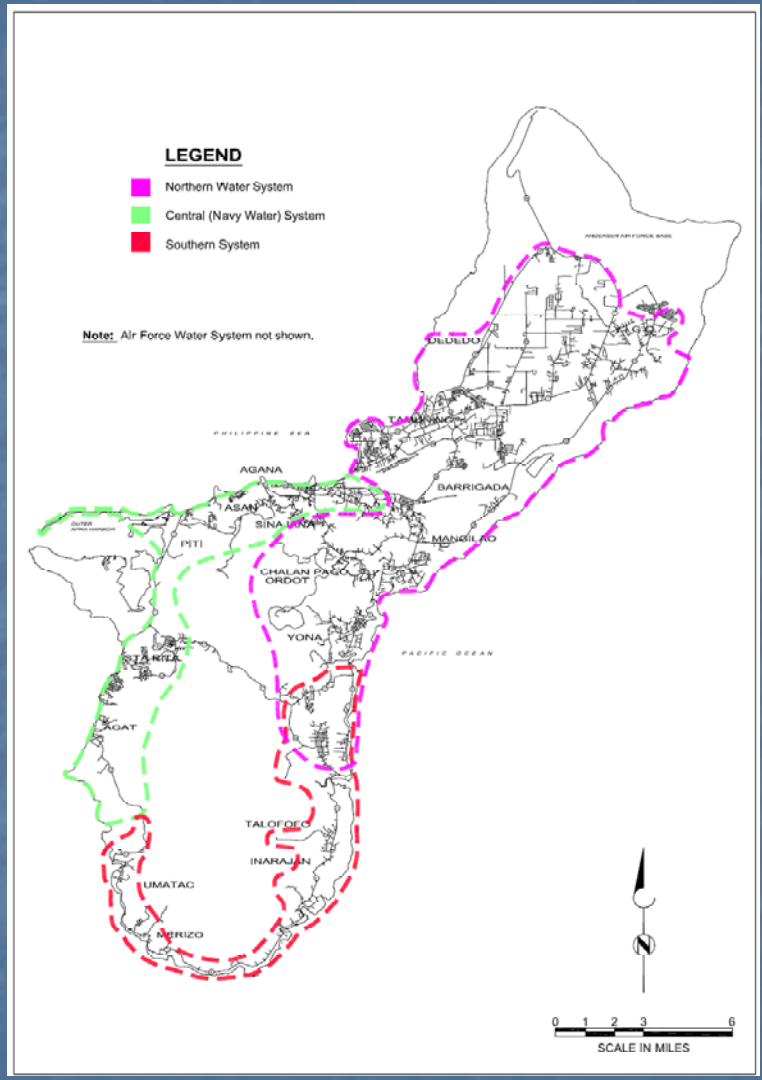
GWA provides all water service to civilian Guam

- **3 Water Systems**
- **Extensive Facilities**

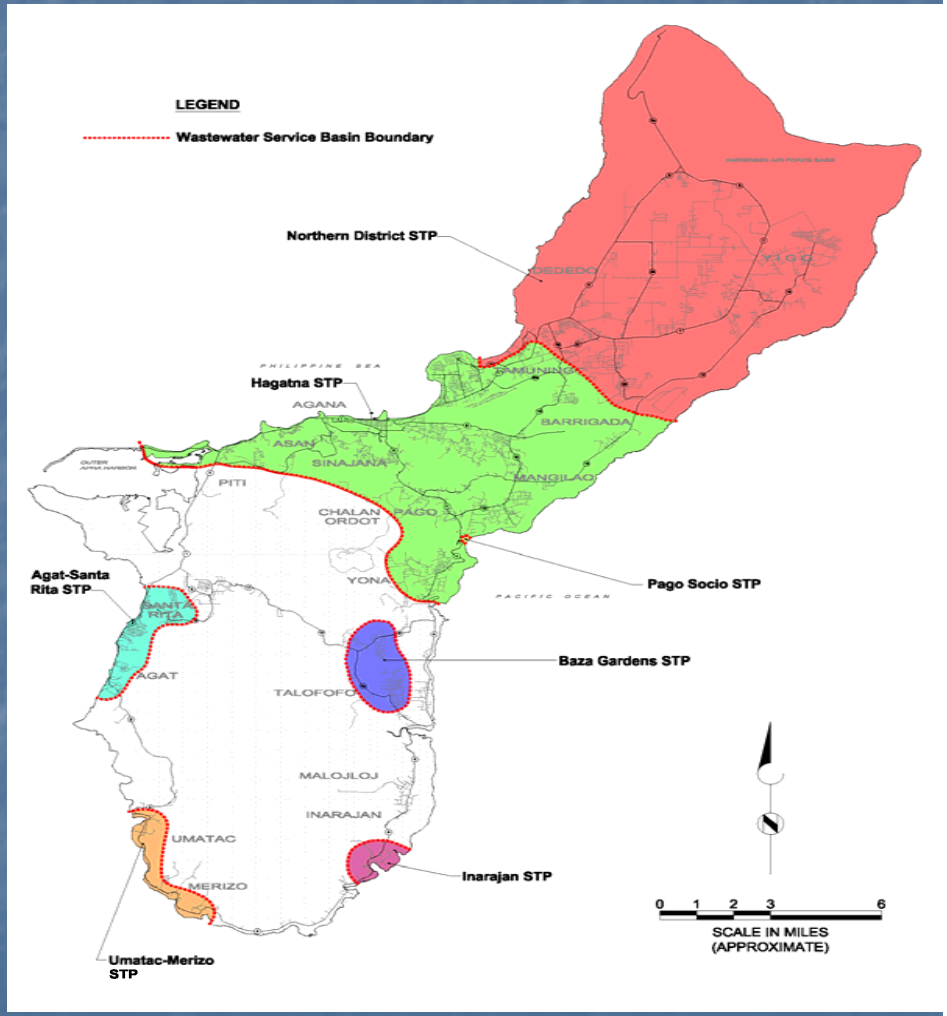
121 wells, 5 springs,

  - 1 treatment plant
  - 40 reservoirs
  - 36 booster stations
  - 420 miles of pipe

- **Population served**
  - 157,000 (civilian)
  - DoD maintains separate system(s)
  - GWA buys some water from Navy for its needs



- ***GWA collects and treats wastewater***
- **7 Service Basins**
- **Extensive Facilities**
  - 238 miles of pipe
  - 77 pumping stations
  - 7 treatment plants
  - 3 ocean outfalls
- **Population served**
  - Civilian 100,000 (58% only)
  - Treats all Air Force and part of Navy Wastewater



- **Since the 2003 Stipulated Order, GWA has embarked on a major reconstruction and upgrade effort to modernize Guam's aging water and wastewater systems.**
- **Nov. 2005: GWA secures the its first public financing ever with $100 Million in bond financing**
- **Feb 2007: 20 Year Master Plan completed**
  - Pre-Buildup: Only civilian needs were captured in original plan.
  - Planned improvements total nearly $900 million over the next 20 years.
  - **Aug 2009: Five Year $300M Financing Plan and 2nd 40% multi-year phased rate increase approved to implement next phase of Master Plan**
  - **Few of these improvements are planned to meet buildup requirements**

GWA/DoD WW Treatment: Emerging Solutions:

$200 M to upgrade and expand NDWWTP with Marines becoming a GWA customer (like AAFB)

- End 2013 – complete rehab of NWWTP to provide "primary" treatment
  - Marines would need to provide $50M
  - Rehab required to handle construction surge load
- End 2016 – complete next upgrade
  - Secondary Treatment would be mandatory due to increased WW loads from buildup
  - Estimated to cost about $150M
  - Possibly expand capacity from 12 to 18 million gals/day (MGD)

GWA/DoD WW Treatment: Emerging Concerns:

- GWA concerned that construction phase impacts will be significant on existing fragile WW treatment systems since construction housing will be located throughout Guam and not just limited to the north.
- Only recently have there been discussions of potential impacts to Central Guam's WWTP, particularly as it relates to 2nd treatment upgrades required as a result of the buildup
- Depending on USEPA/GWA discussions re: 2nd Treatment, all GWA WWTP will require significant upgrades to comply with treatment and volume requirements


Hagatna WWTP

WW Collection System
Emerging Solutions:

- DoD to build new sewer line from Finegayan base to NWWTP paid by DoD
- DoD also studying the Route 3 sewer line from AAFB to NWWTP to see if it can handle expected growth
  - If Route 3 sewer line capacity is insufficient to meet growth, then DoD proposes to install a new sewer along Route 3

WW Collection System: Unresolved issues

- DoD did not look at other “collection” impacts in the civilian community that will occur away from the areas of the new base.
- Limitations of existing “fragile” collection system lines, Sewer Pump Stations (SPS) and other sections of system not considered
- DoD suggests “development fees” from housing contractor’s will cover all other direct and induced costs
  - Magnitude of need and timing of “fees” will not provide a viable solution

Projected Wastewater Needs

Northern WWTP (2nd treatment)	$249,000,000
Northern Collection System	$26,000,000
Agat WWTP (2nd treatment)	$70,000,000
Hagatna WWTP (2nd treatment)	$180,000,000
Central Collection System Upgrades	$62,000,000
SCADA/Technical Support/Studies	$9,000,000
Total	$596,000,000

INSURING "GWA"
"GOOD WATER ALWAYS"

- All decisions related to the buildup begin and end with protecting our "priceless" northern aquifer and our surrounding ocean resources to insure our environment is capable of serving the long term future needs of all the people of Guam, beyond the buildup
- All decisions must lead to solutions that are viable and sustainable
- Water cannot be priced beyond the reach of people to afford it

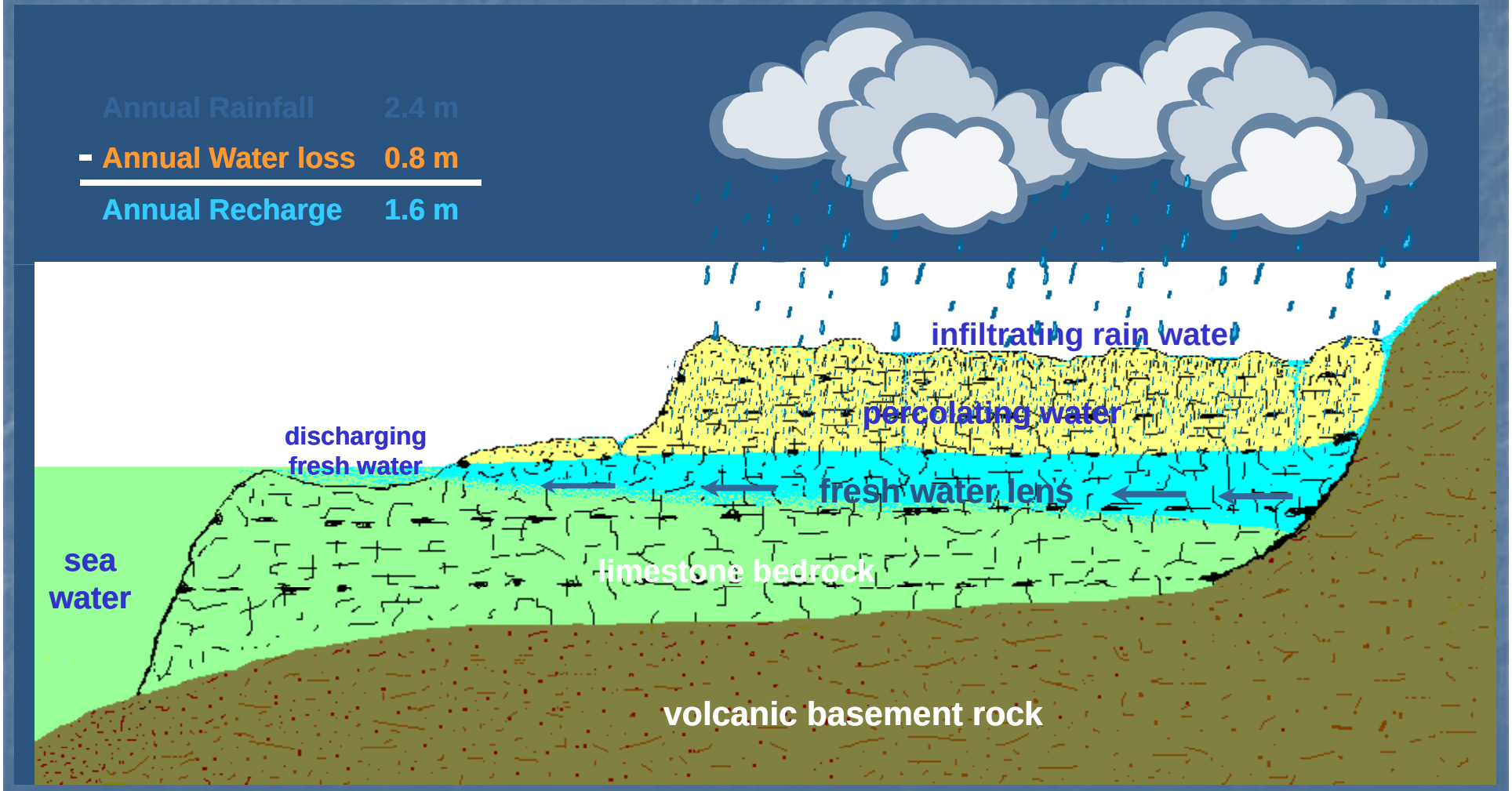
Aquifer Yield

- Aquifer can yield 80 million gallons/day (MGD)[1]
  - Annual rainfall of 100 inches per year results in about 67 inches being re-captured by the lens. Good "recharge" supports the aquifer
  - 336 billion gallons estimated total amount of water in the aquifer
- Current usage is 50 MGD
- Peak during construction surge is 63 MGD
- Post construction (base open) usage is 58 MGD
- After build-up ~22 MGD will remain in reserve
- Detailed study of how best to draw from the aquifer without threatening sustainability underway involving USGS, USEPA, UOG-WERI, GWA and DoD

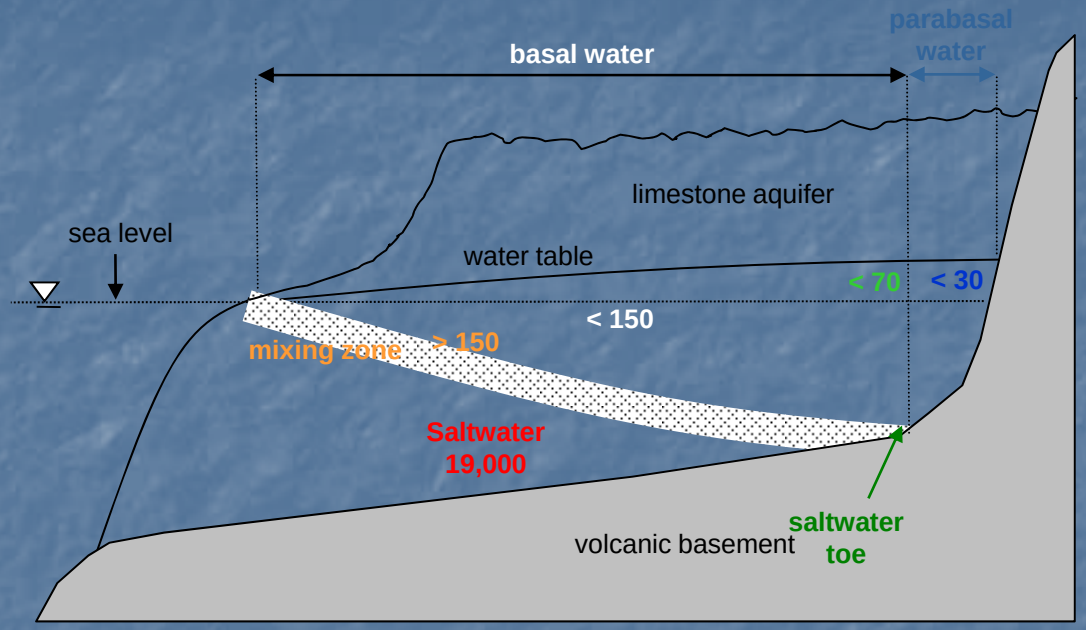
1 – Theoretical Sustainable Yield from 1992 Groundwater Study by Barrett/Mink. 2009 Review by UOG-WERI. Concurred by GWA, DoD, GEPA.

Northern Guam Lens Aquifer

	Annual Rainfall	2.4 m
-	Annual Water loss	0.8 m
	Annual Recharge	1.6 m



Chloride Benchmarks



parabasal range **≤ 30 mg/l**

saltwater toe range **> 30 to 70 mg/l**

basal range **> 70 to < 150 mg/l**

saltwater intrusion **≥ 150 mg/l**

Safe Drinking Water guideline 250 mg/l

Water Source Options

- 16 wells drilled on GWA/civilian properties for all civilian needs
- 22 New wells drilled on Military property for military needs
- DEIS states that there is enough water supply

  "*provided that the proposed [GWA] system expansion is operational in time to meet"* the buildup"

  THIS IS A HUGE ASSUMPTION THAT MUST BE ADDRESSED BEFORE GWA CAN PERMIT THE CONSTRUCTION OF ANY CONSTRUCTION HOUSING FACILTIES
- No additional off-base options proposed in DEIS

Water: GWA/DoD
Emerging Solutions:

- Because they may access funding sooner, DoD has proposed to sell additional water from their new wells to GWA to support construction build-up until GWA's new wells come on-line.
- "Construction housing" customers of GWA would pay GWA for their consumption to off-set DoD water sales to GWA until new wells come on line

Water: Unresolved Issues

- No plans exist to address cumulative impacts on
  - Major water lines
  - Storage tanks
  - Water pumps
- DoD insists that “development fees” will address all system growth. GWA does not concur
  - Individual contractors will upgrade only direct impacts (adjacent water lines, potentially an additional well)

Water: Indirect Impacts

- DoD must pay for all impacts, direct and indirect, arising from the buildup
  - Indirect Impacts
    - Civilian growth accelerated/caused by the buildup
      - Wells/water sources
      - Operational costs & personnel
      - Storage tanks
      - Transmission lines

Estimated Water Upgrades

16 New Water Wells	$17,000,000
Distribution Line Upgrades/ Replacement	$44,000,000
Northern Distribution Improvements	$19,000,000
Central Distribution Improvements	$ 6,000,000
Southern Distribution Improvements	$19,000,000
SCADA / Technical Support / Studies	$ 9,000,000
Transmission Raw Water Transmission	$46,00,000
Total	$160,000,000

Total Water & Wastewater

Water	$160,000,000
Wastewater	$596,000,000
Total	$756,000,000

SUMMARY OF UTILITY ISSUES FACING BUILDUP

GUAM WATERWORKS AUTHORITY

GUAM POWER AUTHORITY
GPA
POWER TO SERVE

- Our approach begins with the premise that all Guam infrastructure systems must be holistically integrated and upgraded in order to insure the most reliable and affordable systems for all of Guam, civilian and military.
- This is a Guam (and Marianas buildup), not just a military buildup
- Our water, wastewater and power systems are fragile and in need of significant upgrade and investment to meet our historic growth as well as the proposed buildup.

Affordability is a real issue

- Guam's per capita income is significantly below US standards. Utility costs already challenge ratepayers.
  - The sheer magnitude of the buildup's infrastructure impact on Guam citizens will outpace their ability to afford water, wastewater and power services on Guam.
  - We cannot price essential services beyond the reach of citizens and businesses
  - We cannot afford to leverage our future with excessive debt as we are seeing in California, Hawaii and other mainland communities on the brink of financial collapse.
- Existing ratepayers cannot bear any financial burden caused by the buildup. Existing ratepayer resources should remain dedicated to paying for costs and improvements needed to existing systems
- DoD must pay for all impacts, direct and indirect, arising from the buildup

What will happen if Guam receives insufficient or untimely federal support?

- Guam's fragile water and wastewater systems will fail, putting our water resources and environment at unacceptable risk
- If water and wastewater needs cannot be addressed properly, permits for construction worker housing cannot be granted. Without construction workers, no "buildup" can be built
- We will fail to shift to new energy paradigms that can lower the amount and cost of energy needed in the future

Infrastructure Summaries

- GPA: $400 to $600 million
- GWA: $756 million

- TOTAL: As much as **$1.35 Billion** must be invested to insure “One Guam” is also a “Green Guam”
- NO SIGNIFICANT FEDERAL FUNDS HAVE YET BEEN INDENTIFIED TO SUPPORT THESE EFFORTS
  - HOW CAN WE HELP YOU HELP US CHAIRWOMAN SUTLEY?

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