Installation & Operation of a Water Treatment Plant and Distribution System:

Sri Lanka

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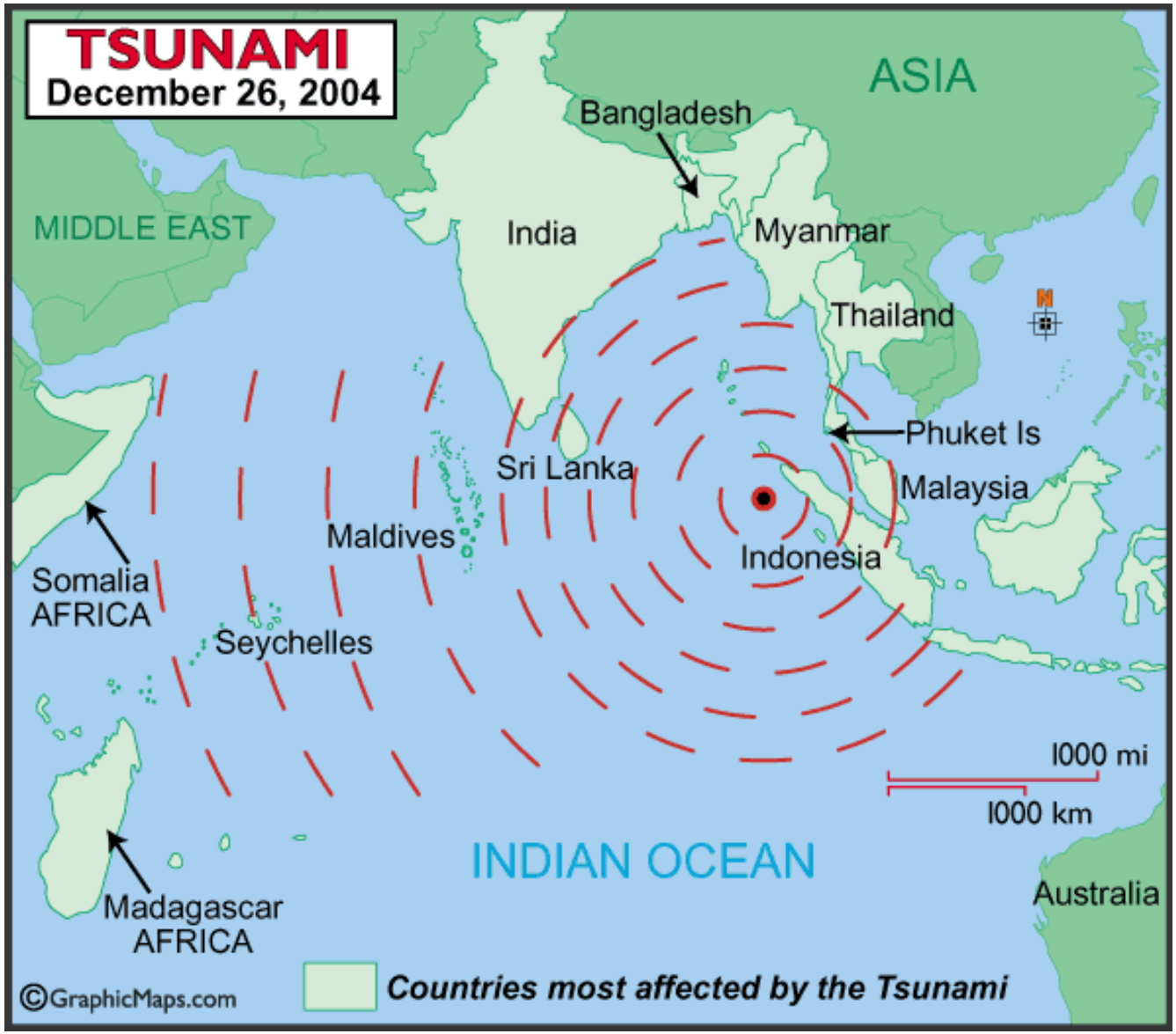
Agenda

- Why Sri Lanka
- USAID Program
- Arugam Bay Bridge
- Water Treatment Plant
- Ulla Distribution System
- Lessons Learned
- Schools
- Questions

2004 Boxing Day Tsunami



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2004 Boxing Day Tsunami

- 33,000 people in Sri Lanka died from the tsunami impact
- 800,000 directly affected through property damage, and interruptions to or loss of food supplies, shelter, livelihood, and drinking water
- In the Pottuvil District nearly 61% of the structures were partially or completely destroyed
- Shallow wells contaminated by salt water as well as chemical and biological contaminants
- Bridge connecting Pottuvil and Ulla was partially knocked off of it’s piers

2004 Boxing Day Tsunami

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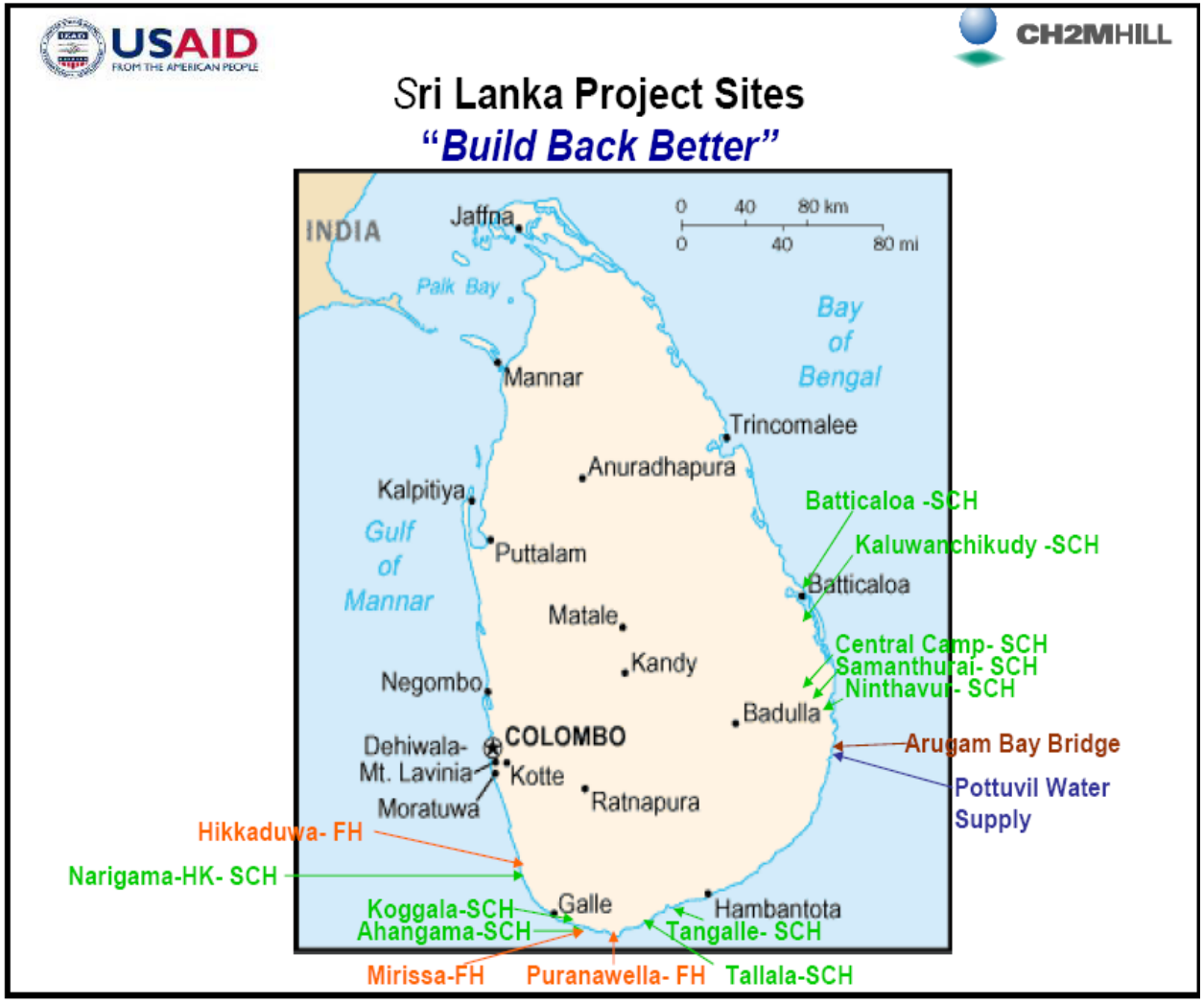
USAID Sri Lanka Tsunami Reconstruction Program

Integrated approach to rebuild infrastructure and provide technical assistance

- Promoted collaborative decision-making among the local authorities, community stakeholders, participant and beneficiaries in order to ensure sustainability of the facilities.

- $50M USD allocated for the design and construction of:
  - 9 Vocational Education Schools
  - 3 Fish Harbors
  - Arugam Bay Bridge
  - Pottuvil Water Supply System

USAID Sri Lanka Tsunami Reconstruction



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Old Arugam Bay Bridge

- Two different bridges placed together to make one bridge
- Bridge down to one lane
- Access from Pottuvil to Ulla
- Construction supplies to the WTP

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New Arugam Bay Bridge

Four lanes, 800 m long, smoothest stretch of road on the East Coast

Pottuvil Water Supply Scheme

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Pottuvil Water Supply Scheme

- Raw Water Source
  - Deep Wells near Heda Oya River
- Main pollutants
  - Iron, Manganese, Coliforms
- Treatment methods
  - MnO2 Pressure Filters, Chlorine Disinfection
- Plant capacity
  - Approximately 5200m3/day (1.4 MGD)
- Service Area
  - Ulla and Pottuvil towns (~32,000 residents combined)

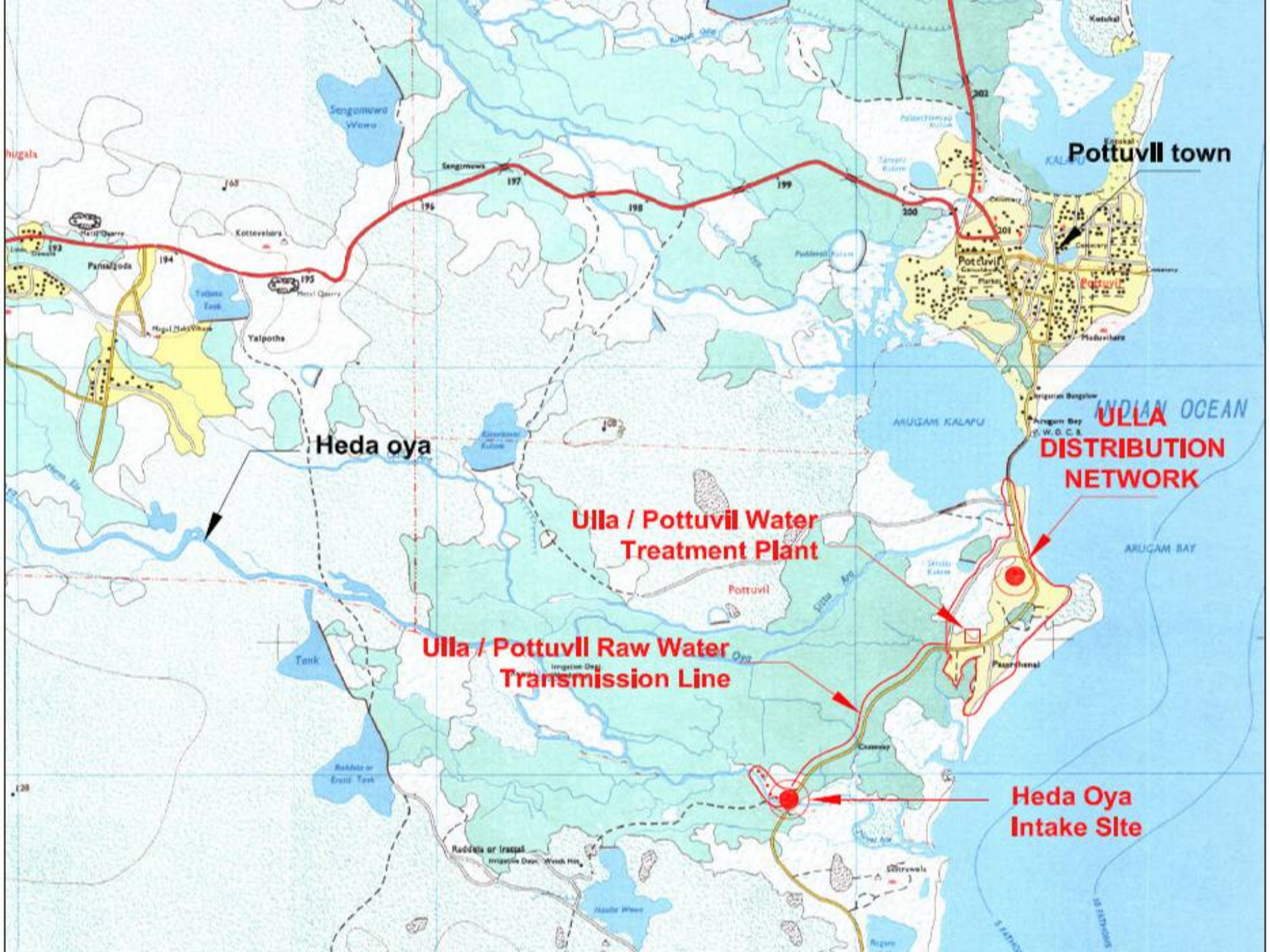
Pottuvil Water Supply Scheme

Completed Facilities

- Heda Oya Intake Site
- 4.1 km Raw Water Transmission Main
- Ulla Water Treatment Plant
- 28 km of Ulla Distribution Piping

Future Facilities (by others)

- 1000 m3 Pottuvil Tower
- Distribution System


Pottuvil town
Heda oya
ULLA
DISTRIBUTION
NETWORK
Ulla / Pottuvil Water
Treatment Plant
Ulla / Pottuvil Raw Water
Transmission Line
Heda Oya
Intake Site
INDIAN OCEAN
ARUGAM KALAPU
ARUGAM BAY
Pottuvil
Sengamuwa
Kottevelara
Pansalgoda
Yalpotha
Tank
Kotukal
Maduvihara
Irrigation Bungalow
Arugam Bay
P.W.O.C.S.
Pasarchenai
Causeway
Irrigation Dam
Raddela or Irasgal
Weeds Hill
Gittruwala
Naalle Weer
Regam
Ulla Aru
Heda Ela
Sengamuwa Weera
Tulana Tank
Hugal Maha Vihara
Metal Quarry
Puddewala Kulam
Tamara Kulam
Palaichenai Kulam
Kiranawari Kulam
Sitha Aru
Oya
Kalapu
Ugala
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Process Flow Diagram

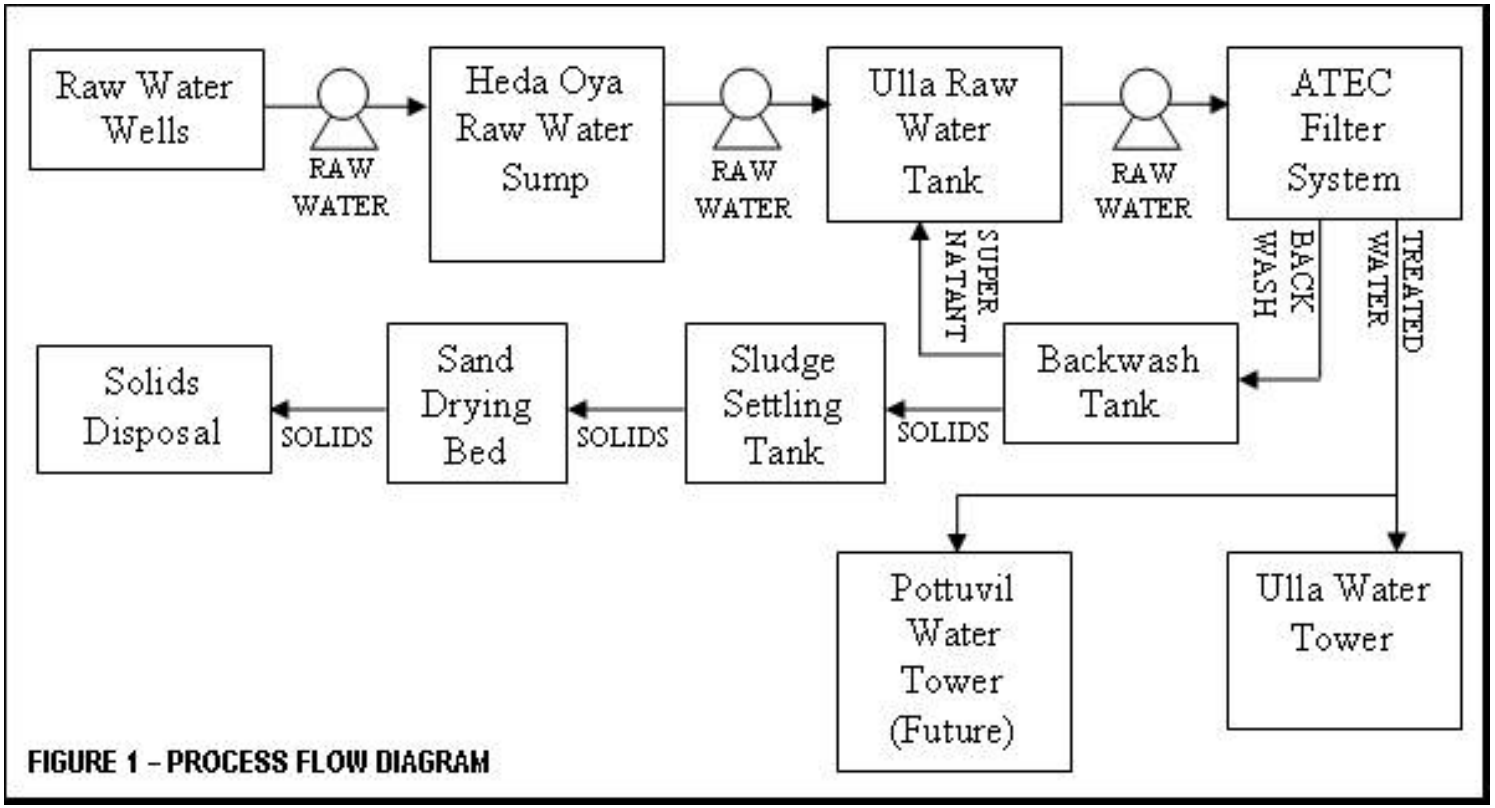

FIGURE 1 – PROCESS FLOW DIAGRAM

Pottuvil Water Supply Scheme

High Lift Pump

ATEC AS741-M Pressure Filters

Chlorine, Pump House, Filter Building

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SLUDGE
SETTLING TANK

WTP Issues

- The DI pipeline from China was going to be delayed over two months
- Contractor claimed will be able to complete the project on schedule, but will be light on work and have to send pipe crews home
- The WTP was going to be complete without a distribution system to connect to
- Another aid organization was in charge of installing the distribution systems

Water Treatment Plant with No Distribution

- The other aid organization completely backed out of providing the Ulla distribution system
- Stated they would only be providing funding for the Pottuvil Tower and a third of the Pottuvil Distribution System
  - with construction completed in a year after the WTP would be online
- Americares funded a $1 million for the Ulla Distribution System
- Hired as the construction manager and field engineer of the installation of the Ulla Distribution System

First Task Before Construction

- Finalized the Water Boards design
- Check the model
- Order materials
- Receive approvals from the local road authorizes for installing the pipeline
  - Interior Roads – PS (local government)
  - County Roads - RDD
  - Federal / highway Roads – RDA
- Final pipeline layout in the roads

First Day of Construction

Briefing conducted in three different languages with a high importance on:

Safety First!

Installation of the Pipeline

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Construction Impacts

- Construction started July 31st
- End of August all interior roads complete
  - Install 1,000 meters a day when all 5 crew pipes were working
- The main road which belongs to RDA was slow moving
- Additional material supplies
- USAID pushed for a finish date of November 1st
- RDA getting ready for repaving the main road

RDA Issues

- A MOU was signed for the transmission main from the intake site to the WTP
  - This was not acceptable to the local RDA for installing the distribution pipeline that ran down both sides of the main road
- RDA was delaying the installation of the pipeline along the main road due to the MOU had not been signed between them and the Water Board
- USAID brought this delay to the head office of RDA
- Even with a letter stating we may proceed without the MOU signed I was given trouble in the field

Compaction Testing & Bend Supports

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No job the pipe crew could not complete

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Bridge Crossing & Pressure Testing

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Community Interested in the Project

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Ulla Distribution Summary

- Project completed in time for opening ceremony
- 28 km of pipeline installed
  - almost all of the Ulla Area
  - Ran out of supplies and time
- $1 million donation from Americares
  - $930,000 used for the pipeline project
  - $70,000 used for buying the Water Board materials for repairing and maintaining the system
- Water Board is in charge of making house connections

The Crew

The Engineering Crew that made it possible for the Ulla Distribution Project to be completed

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USAID
FROM THE AMERICAN PEOPLE

Lessons Learned

- Cultural & Political Challenges
  - A woman engineer can get the job done and be respected
- Material Procurement
  - On an island many materials need to be imported
- Safety has a different meaning in Sri Lanka
  - Hard hats and vest always worn, but could not get the pipe crews out of flip flops
  - 567,000 man hours occurred on this project without one lost-time injury
- Don’t take a bribe or assume you have to give one to complete your project
- QA/QC is critical

Perspectives on International Aid

- When reacting to a disaster, it is important to stop and take a look at the bigger picture
- Interaction and communication with the community is critical
- Local designs might actually be more appropriate than the high tech solution
- Throwing money at the problem is often the WORST solution
- Be aware of everyone’s agenda

Vocational Education Schools

- 9 Schools in the East and South of Sri Lanka to provide training in areas such as:
  - Apparel
  - Hospitality
  - Small Engine Repair
  - Computers/IT
  - Construction Craft Trades
  - Baking
- Two of the schools achieved a LEED Silver certification (first in Sri Lanka)

Vocational Education Schools

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CH2MHILL
USAID

USAID

VOCATIONAL TRAINING CENTRE
NINTHAVUR

USAID

WE WARMLY
OUR GUE
DELL

Wild Life in Sri Lanka

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Kandy

10 – Wheeler in Sri Lanka

Questions…

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