

NAVY / MARINE CORPS

**ENERGY
EFFICIENCY**

Water Efficiency

(Thinking Outside The Bowl)



Creative Conservation

by

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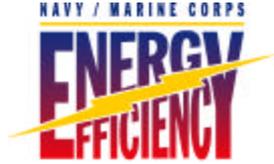
**ENERGY
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Water Efficiency



💧 Standard Methods

- 💧 Showerheads
- 💧 Low Flow Toilets
- 💧 Aerators
- 💧 Nozzles



Water Efficiency



💧 More Creative Methods

- 💧 Reclamation

- 💧 Re-use

- 💧 Recycling

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**ENERGY
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Water Efficiency



💧 More Creative Methods

💧 **NAS Jacksonville (Reclamation)**

💧 **MCAS Iwakuni (Re-use)**

💧 **NAS Patuxent River (Reclamation)**

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NAS Jacksonville



- 💧 **A 1994 study found that effluent reuse was feasible and economical.**
- 💧 **However, the NAS Jacksonville golf course was too far away, and the activity did not see any obvious applications for the reclaimed effluent.**
- 💧 **The St. John's River Water Management District was eager to implement re-use.**

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NAS Jacksonville



💧 **The St. John’s River Water Management District “suggested” that the Navy effluent be “given” to the neighboring Timuquana Country Club for their golf course.**

💧 **As a result, the effluent from NAS Jacksonville, is now used to water the neighboring golf course.**

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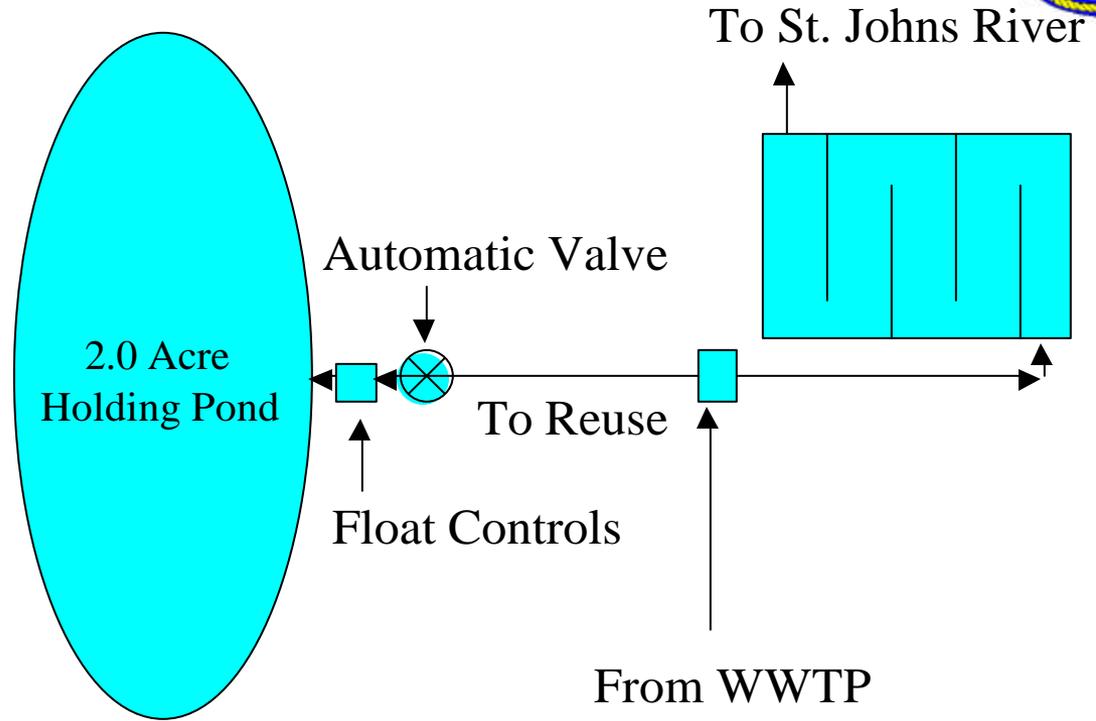
NAS Jacksonville



- 💧 **The project cost \$250K - which the country club paid for.**
- 💧 **The demand on the treatment plant is 25% of it's total capacity.**

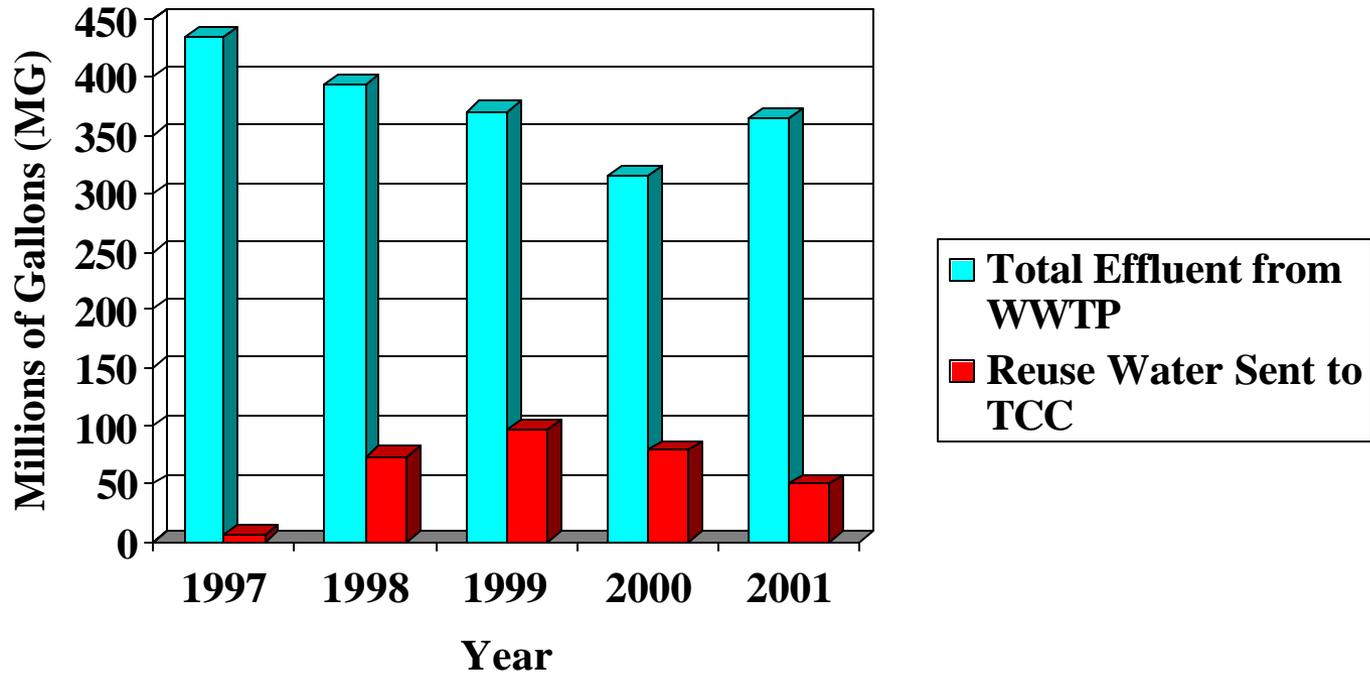


Reuse System





Reuse Water Usage



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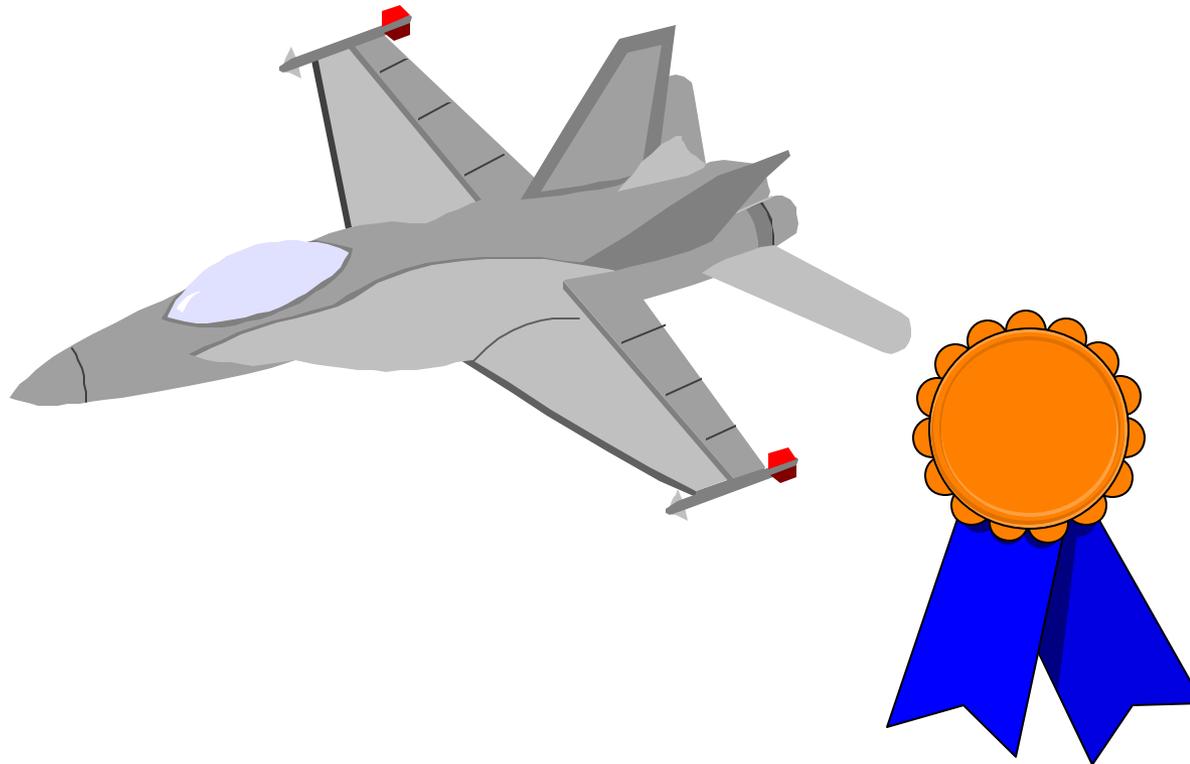
NAS Jacksonville

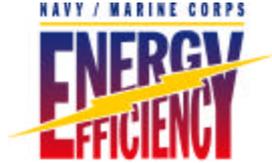


- ◆ **As an added bonus, the station effluent is now of “re-use” quality and the other 75% unused flow is available for further re-use.**
- ◆ **The activity is now expanding their earlier view of “obvious re-use” candidates, and has identified several new options, including ballfields, cooling tower, another neighboring park.**



MCAS Iwakuni

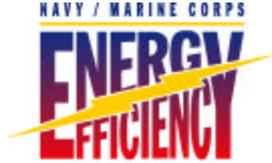




MCAS Iwakuni



- 💧 **Need to find low cost initiatives due to cost sharing with the Government of Japan.**
- 💧 **Very proactive energy staff in place.**
- 💧 **Looking for ways to reduce water consumption beyond the traditional methods.**



MCAS Iwakuni



- 💧 **MCAS Iwakuni uses a sludge incinerator as part of their sewage treatment.**
- 💧 **They use potable water for cooling the bearings on the exhaust fans and air for combustion.**



MCAS Iwakuni



- **The proposal is to use the sewage effluent to provide this cooling.**
- **Savings:**
 - **Between 1.5 and 2.0 million gallons of potable water annually.**
 - **Approximately \$15,000 per year.**
 - **Cost: \$60,000**



Patuxent River NAS Wastewater Reuse Project



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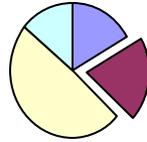
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NAS PAX River



- 💧 Existing water treatment plant at capacity.
- 💧 \$3.63M to upgrade plant to meet future loading with an additional \$107K annual operation cost.
- 💧 Reclamation, if uses could be found, would eliminate the need to expand the plant.

Potential Water Uses (gpd)



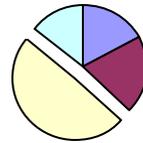
42,000

Cooling Water



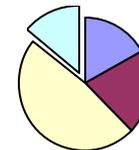
36,000

Golf Course Irrigation



103,000

Agriculture Field Irrigation



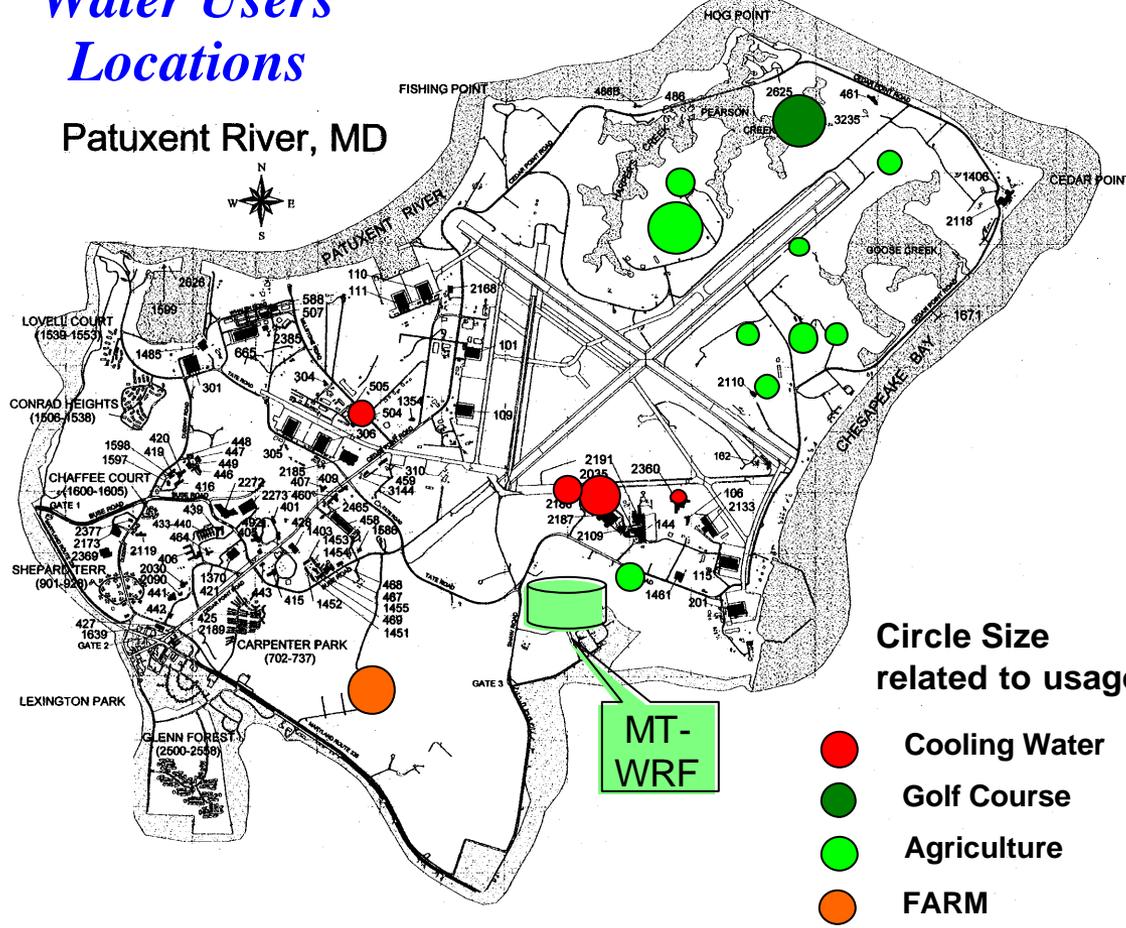
30,000

FARM Irrigation



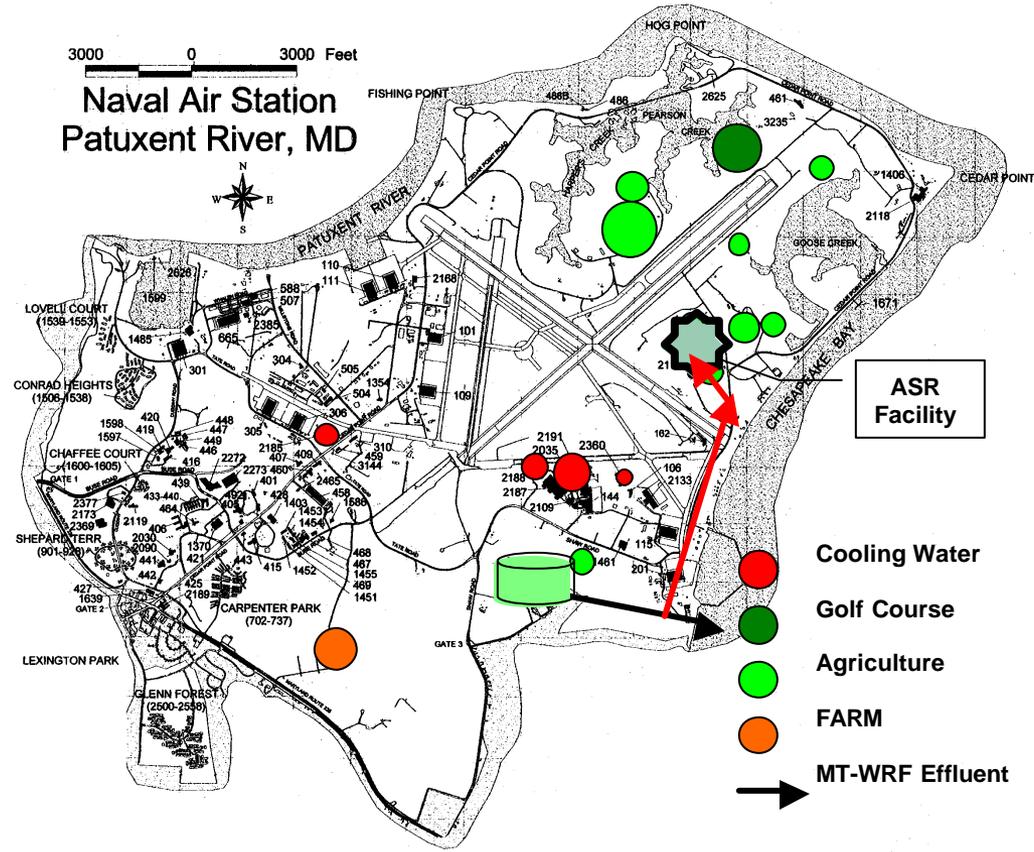
Water Users Locations

Patuxent River, MD



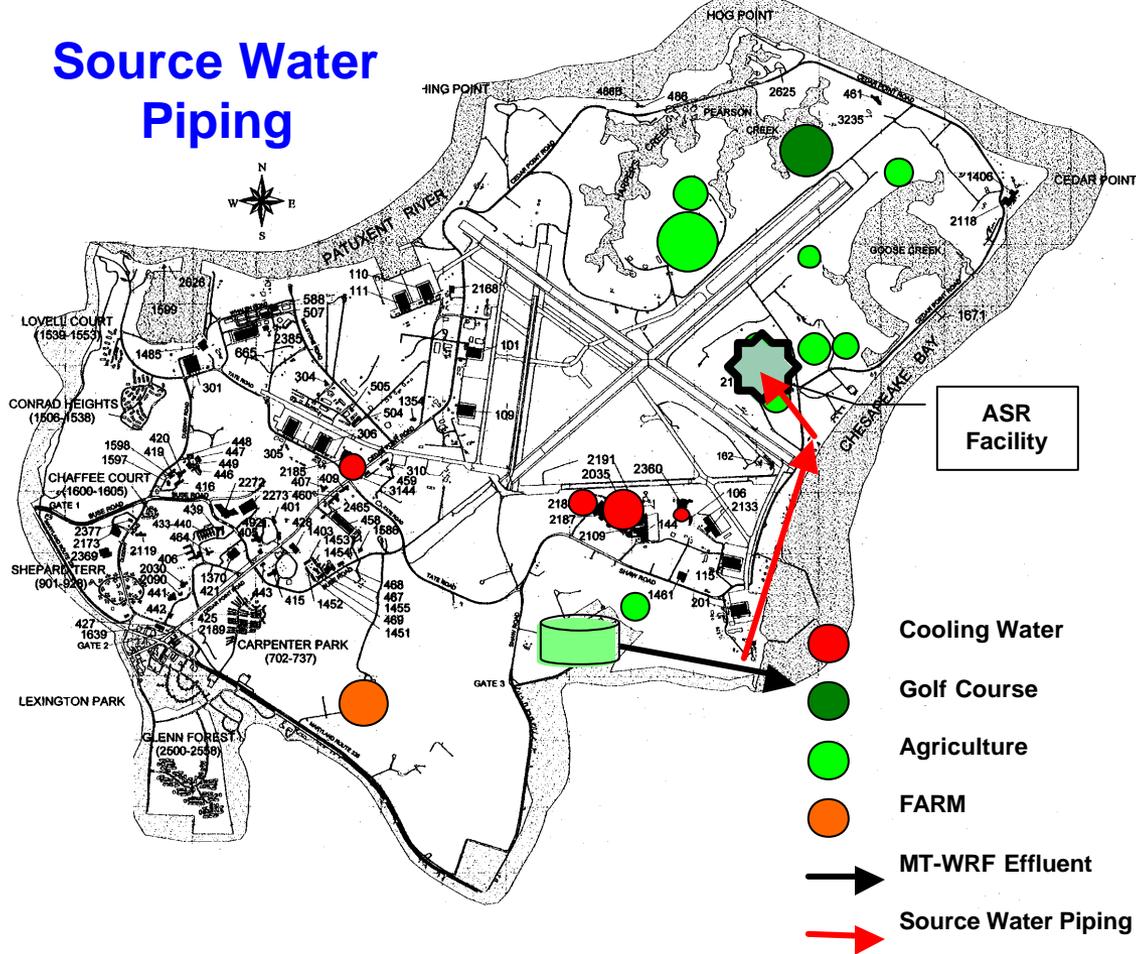


Good ASR Location Near Users

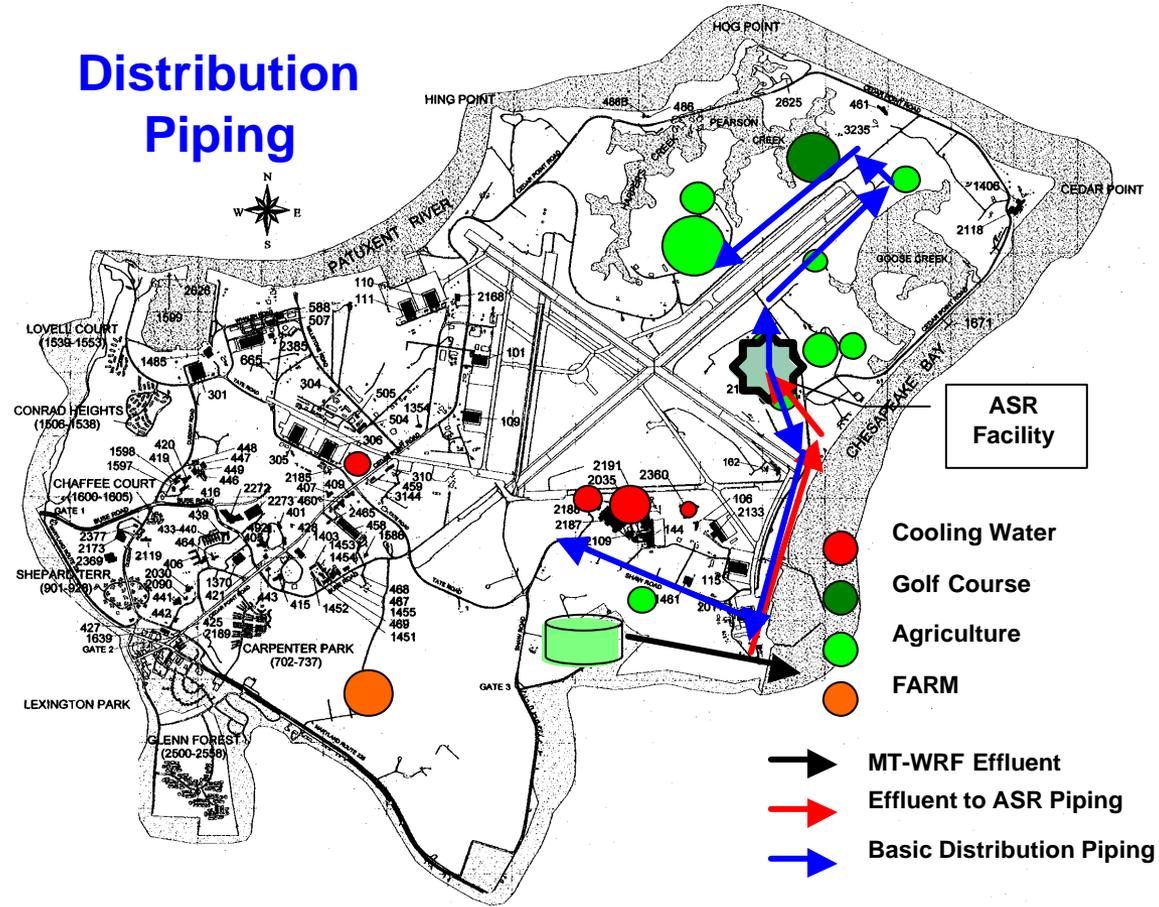




Source Water Piping



Distribution Piping



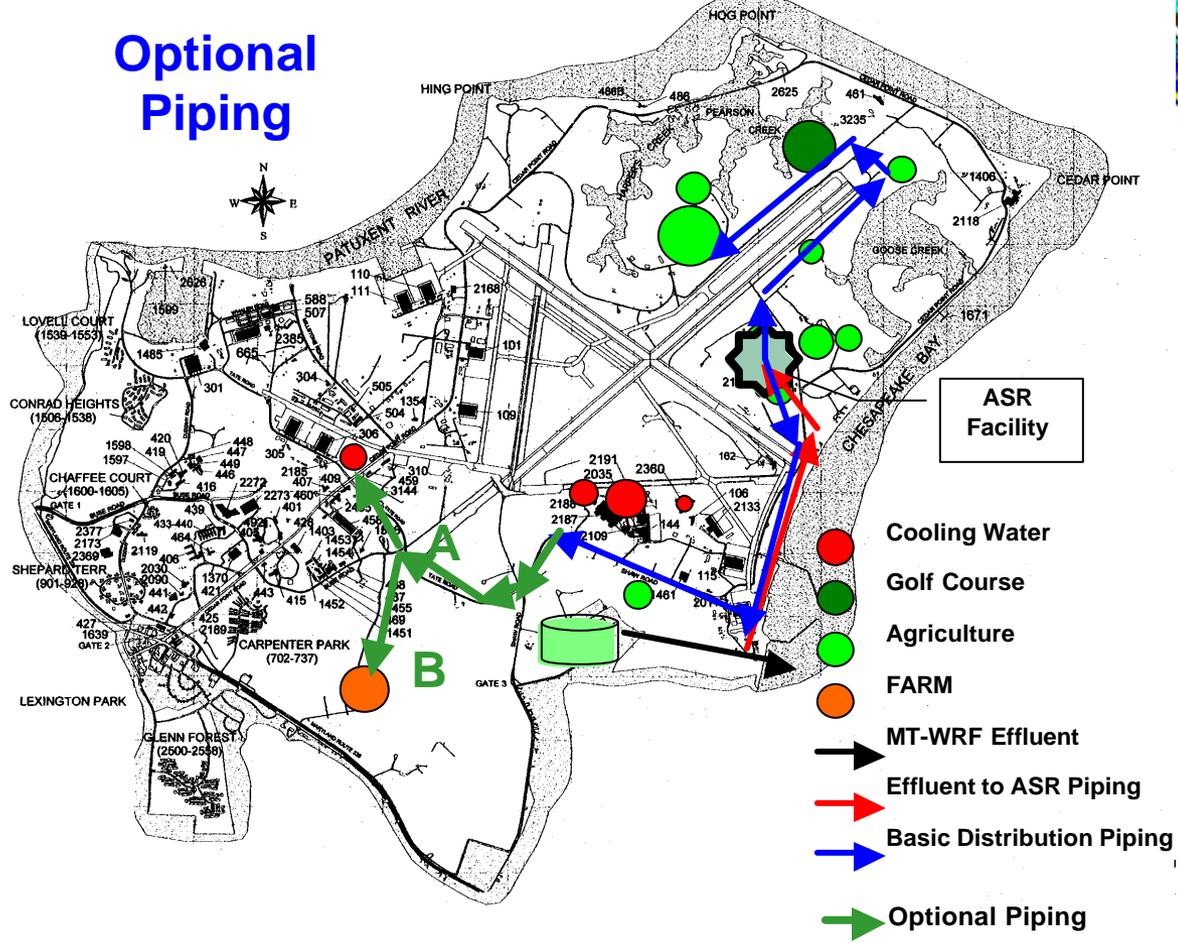
ASR Facility

- Cooling Water
- Golf Course
- Agriculture
- FARM

- ➔ MT-WRF Effluent
- ➔ Effluent to ASR Piping
- ➔ Basic Distribution Piping



Optional Piping





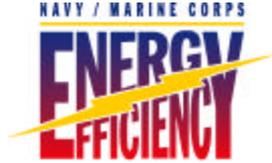
Cost for 1.2 MGD Reuse System



| | |
|------------------------------|--------------------|
| Booster Pump Station | \$50,000 |
| Aquifer Storage and Recovery | \$420,000 |
| Wet Well and Pump Station | \$170,000 |
| Piping | \$1,410,000 |
| <hr/> | |
| Total Basic System | \$2,050,000 |

Option A: Connect N Engineering \$360,000

Option B: Connect to FARM \$190,000



Savings due to ASR



| | |
|---------------------------------|--------------------|
| Avoided Cost for MT-WRF Upgrade | \$3,630,000 |
| - Cost for Basic Reuse System | (\$2,050,000) |
| <hr/> | |
| Capital Cost Savings | \$1,630,000 |
| | |
| Annual O&M Savings (METCOM) | \$107,000 |
| Annual Water Savings (Navy) | \$200,000 |
| <hr/> | |
| Total Annual Savings | \$307,000 |

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