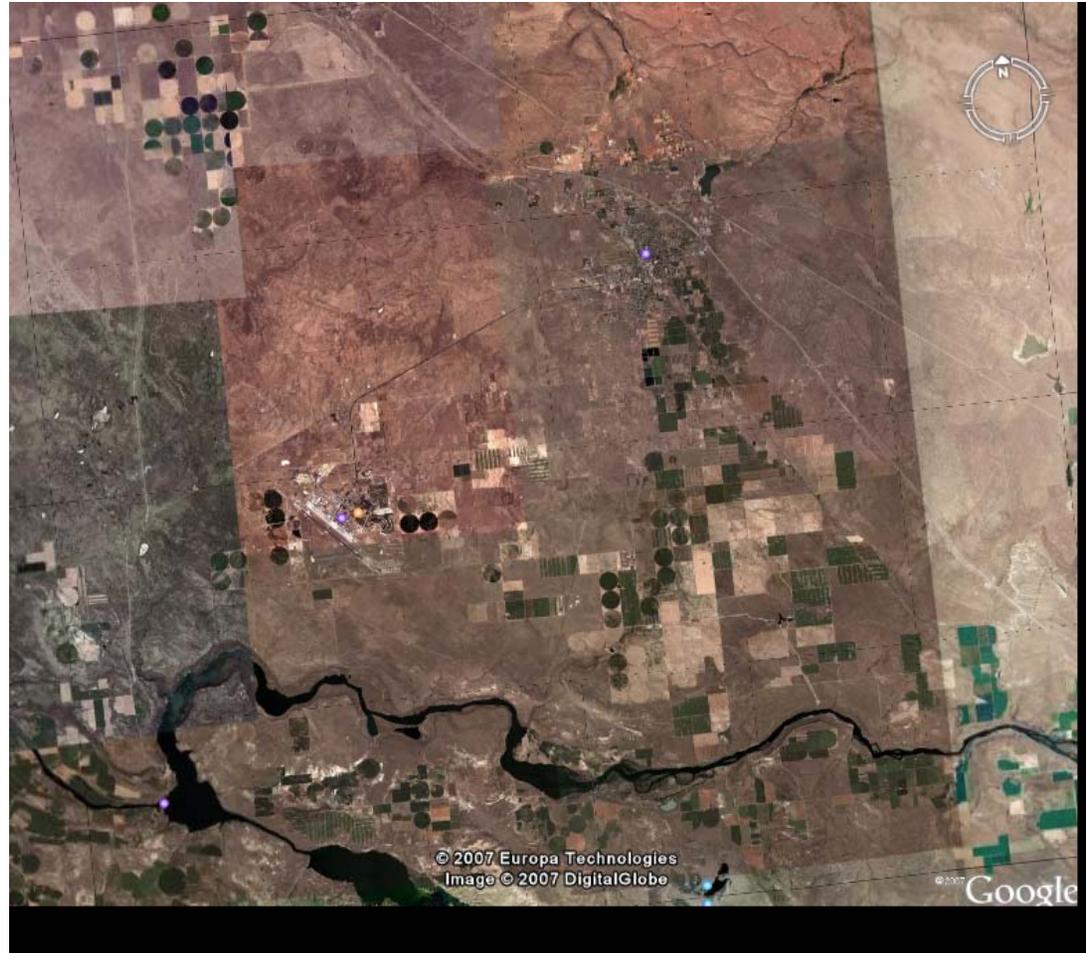

WASTEWATER REUSE AT THE MOUNTAIN HOME AIR FORCE BASE

Daniel D. Ayers, CH2M HILL

William Leaf, CH2M HILL

Tom Kendall, Mountain Home Air Force Base

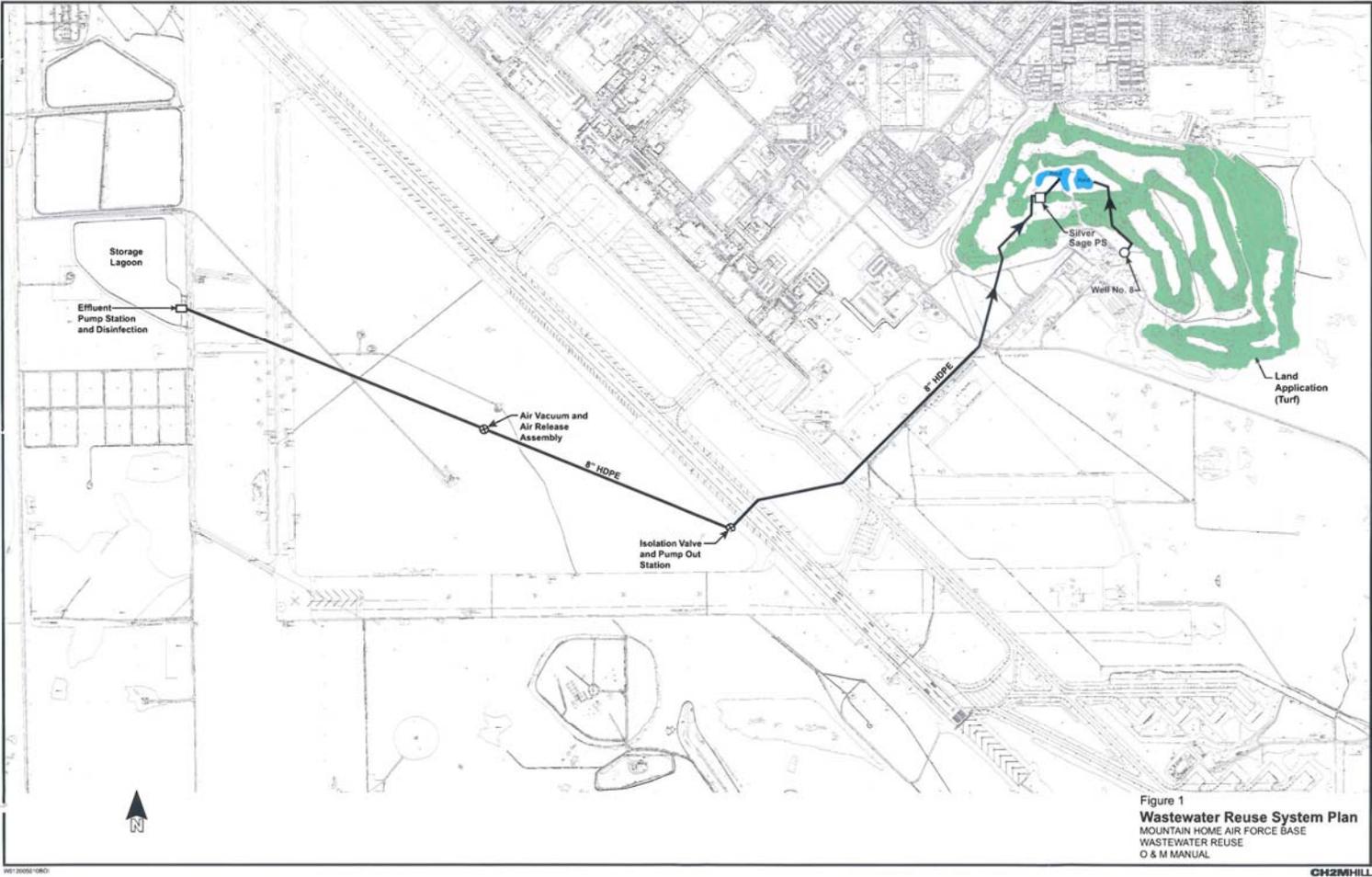
Vicinity Map



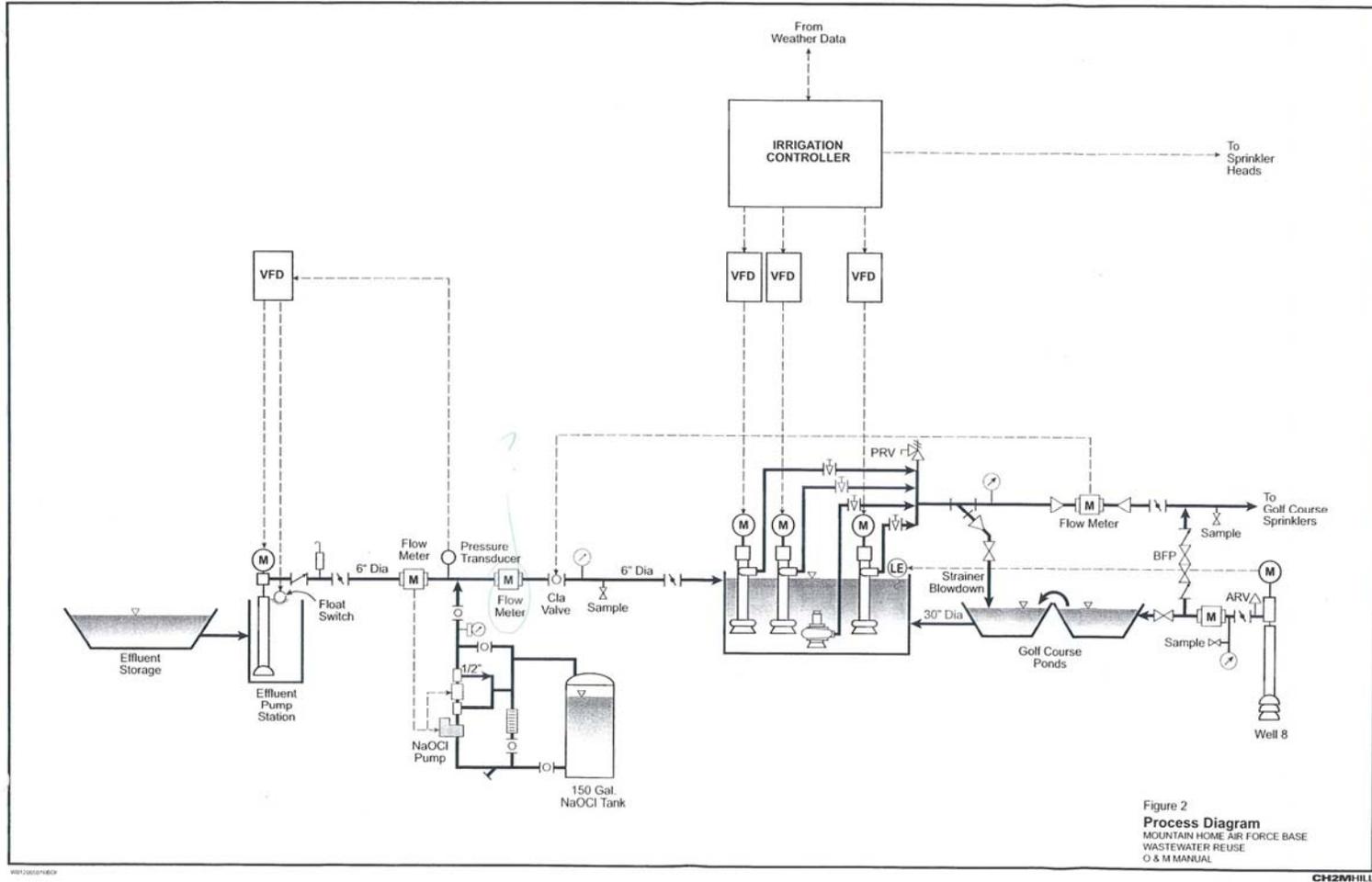
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Reuse System Layout



Reuse System Schematic



Influent Characteristics

Annual Average Flow, mgd	0.43
Maximum Month, mgd	0.49
Maximum Day, mgd	0.93
Peak Hour, mgd	1.87
Biochemical Oxygen Demand, mg/l	238
Total Suspended Solids, mg/l	219
Total Kjeldahl Nitrogen, mg/l	39.3
Nitrate, mg/l	0.033
Nitrite, mg/l	0.071

Effluent Characteristics

Parameter	Annual Average	Max Month
BOD, mg/l	4	13
TSS, mg/l	5	11
TKN, mg/l	1.48	2.19
Nitrate, mg/l	5.25	7.5
Nitrite, mg/l	0.0055	0.0113
TP, mg/l	2.89	4.65

Permit Requirements

- Permitted Discharges
 - Rapid Infiltration
 - Plant Grounds Irrigation
 - Golf Course Irrigation
 - Compost Moisture Control
 - Soil Farm Moisture Control
 - Landfill Dust Suppression
 - NPDES

Permit Requirements

- Rapid Infiltration Discharge
 - Flow - 310 MG annually
 - TSS - 100 mg/l, 30 day average
 - TN - 20mg/l, 30 day average

Permit Requirements

- Reuse
 - Application Season - 4/1 to 10/1
 - Application time
 - 85 lbs TN/acre-year
 - Buffer Distances and Disinfection
 - *100 feet requires 2.2 TC/100 ml*
 - *300 feet requires 23 TC/100 ml*
 - *1,000 feet requires 230 TC/100 ml*
 - Disinfection – 23 TC/100 ml
 - Future Filtration

Reuse Permit Issues

- Buffer Zone of 300 feet • Wind Drift Analysis



Reuse Permit Issues

- Isolation of Potable Water
- New Backflow Preventer



Reuse Permit Issues

- Irrigation Watering Times
- Effluent at Night
- Well water during day



Reuse Permit Issues

- Sampling Times
- Change of Sample procedures



Reuse Permit Issues

New Reporting Requirements

- Reuse Wastewater and Well Water Flows
- Total Coliform
- Nitrogen and Phosphorus
 - Reuse Wastewater
 - Fertilizer
 - Soil



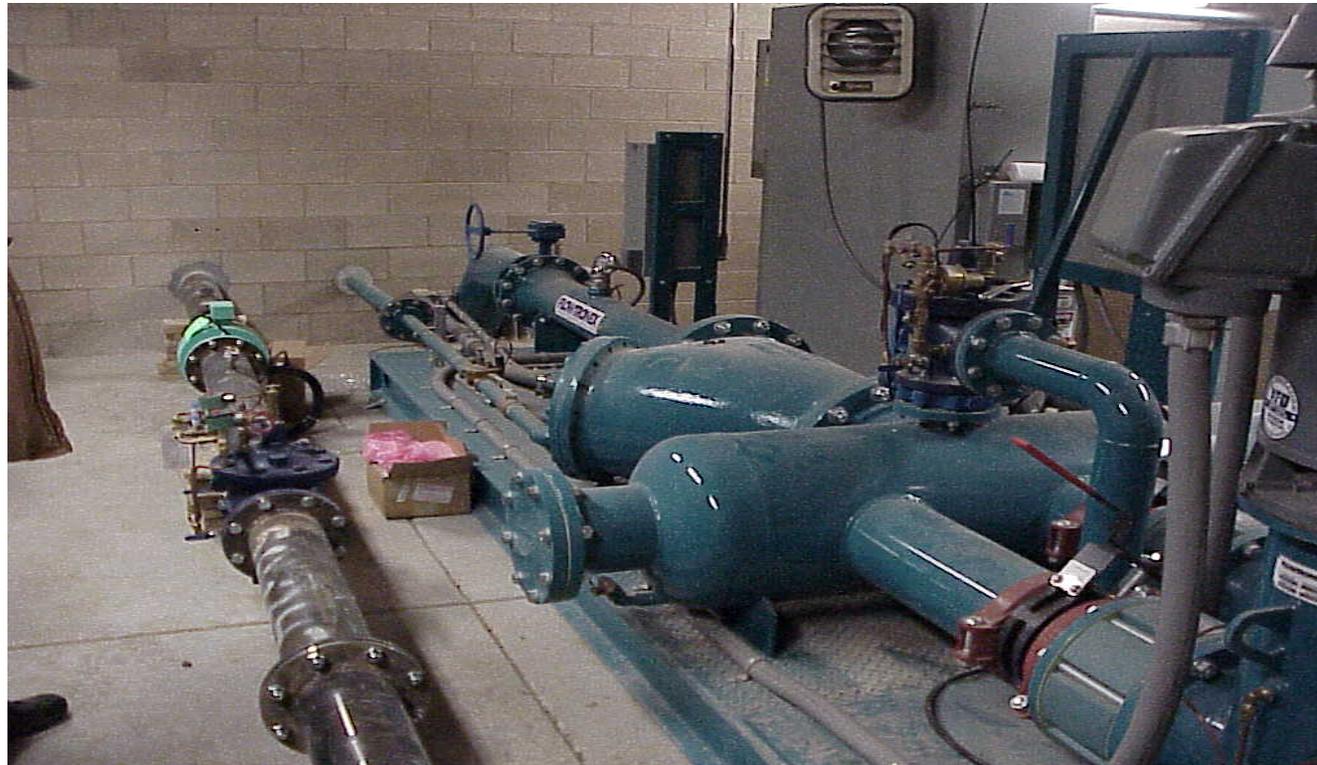
Reuse Permit Issues

- Pond Water Quality
- Post Chlorination
- Point of Compliance



Reuse Permit Issues

- Water Balance
- Historical Usage



Filtration Study - Scope

- Class A versus Class B
- UV Disinfection Upgrade
- Equalization
- Effluent Storage
- Filtration Technologies

Filtration Study – Design Criteria

- **Class A/B common criteria**
 - Suitable for Golf Course Irrigation
 - Secondary Treatment
 - Filtration
 - Disinfection - 2.2TC/100 ml
 - Pilot testing

Filtration Study – Design Criteria

- Class A only requirements
 - Allows reuse for residential homes, groundwater recharge, parks, playgrounds
 - Chlorine Disinfection CT=450 mg-min/l, modal contact time=90 minutes
 - 5 log inactivation of virus
 - BOD <5 mg/l for groundwater recharge, <10 mg/l for residential irrigation
 - TN < 10 mg/l for groundwater recharge, <30 mg/l for residential irrigation

Filtration Study – Design Criteria

- **Class A Redundancy Requirements**
 - Alternative disposal option or 7 days storage
 - Redundant facilities
 - Standby Power
 - Standby Filtration or bypass to alternate disposal

Filtration Study – UV versus Hypochlorite Disinfection

- Class A Disinfection Limits
- Equalization
 - New or Retrofit CCT
- CCT Retrofit
 - Equalization and UV disinfection
 - Construction Sequence



Filtration Study – Retrofit of existing Hypochlorite Building versus new Building

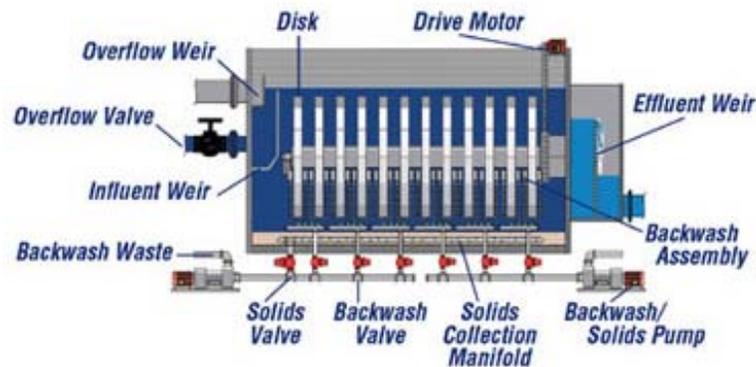
- Code Issues
- Construction Sequencing
- New Building

Reuse Water Storage Analysis

- Mixing of Class A water with existing stored water
- Storage Options
 - Pond Cleaning
 - New Steel Tank
 - New pond Storage
- New Pump Station

Filtration Study – Filtration Technologies

- Cloth Disk
- Zimpro Hydroclear
- Parkson Dynasand



Filtration Study – Filter Comparison Criteria

- Title 22 Certified
- Performance
- Fit in Existing Hypochlorite Building
- Backwash volume
- Headloss
- Cost
- Maintenance Issues

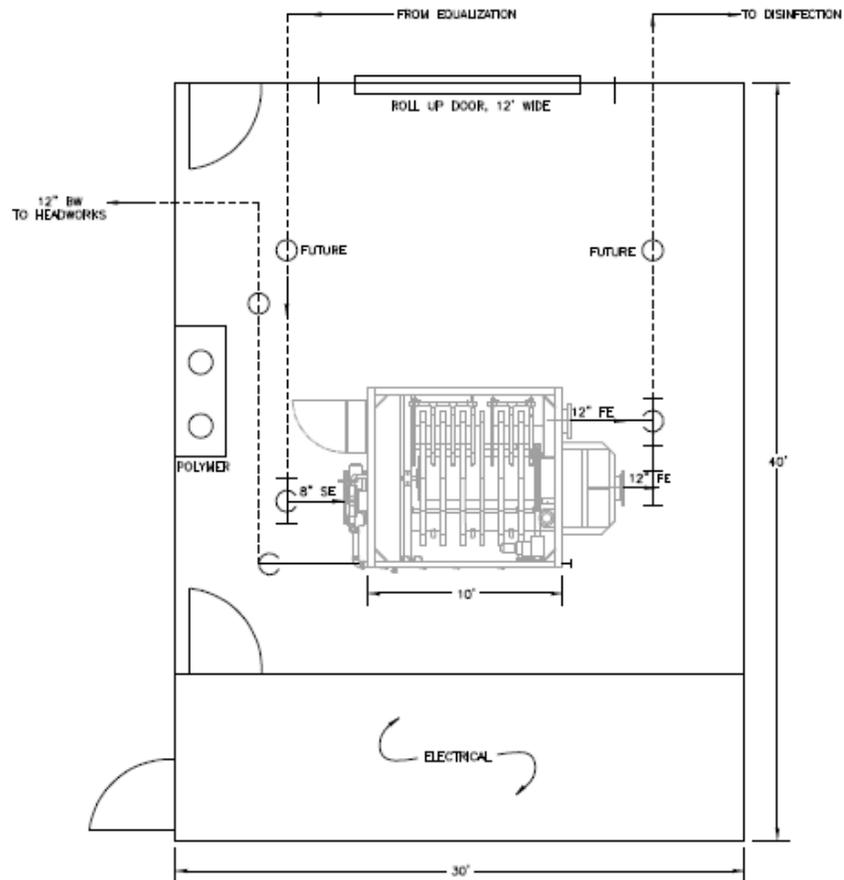
Filtration Study – Filtration Comparison and Selection

- All Filters Title 22 certified
- All Filters had acceptable performance history
- Cloth Disk Fit Best in Hypo building
- All filters had acceptable BW volumes
- Cloth Disk lowest headloss, pumped anyway
- Cloth Disk lowest quote
- Cloth Disk low maintenance
- Cloth Disk selected for this application

Filtration Study – Option 1 versus Option 2

- UV versus Hypo analysis affected option costs
- Option 2 selected
- Keep Hypochlorite disinfection
- New Cloth Disk Filter installed in a new filter building
- Requires New Equalization tank
- New Effluent Storage and Pumping

Filtration Study – Option 2



Filtration Study – Current Status of Project

- Waiting on funding for design and construction



Aqua Aerobics Factory Visit



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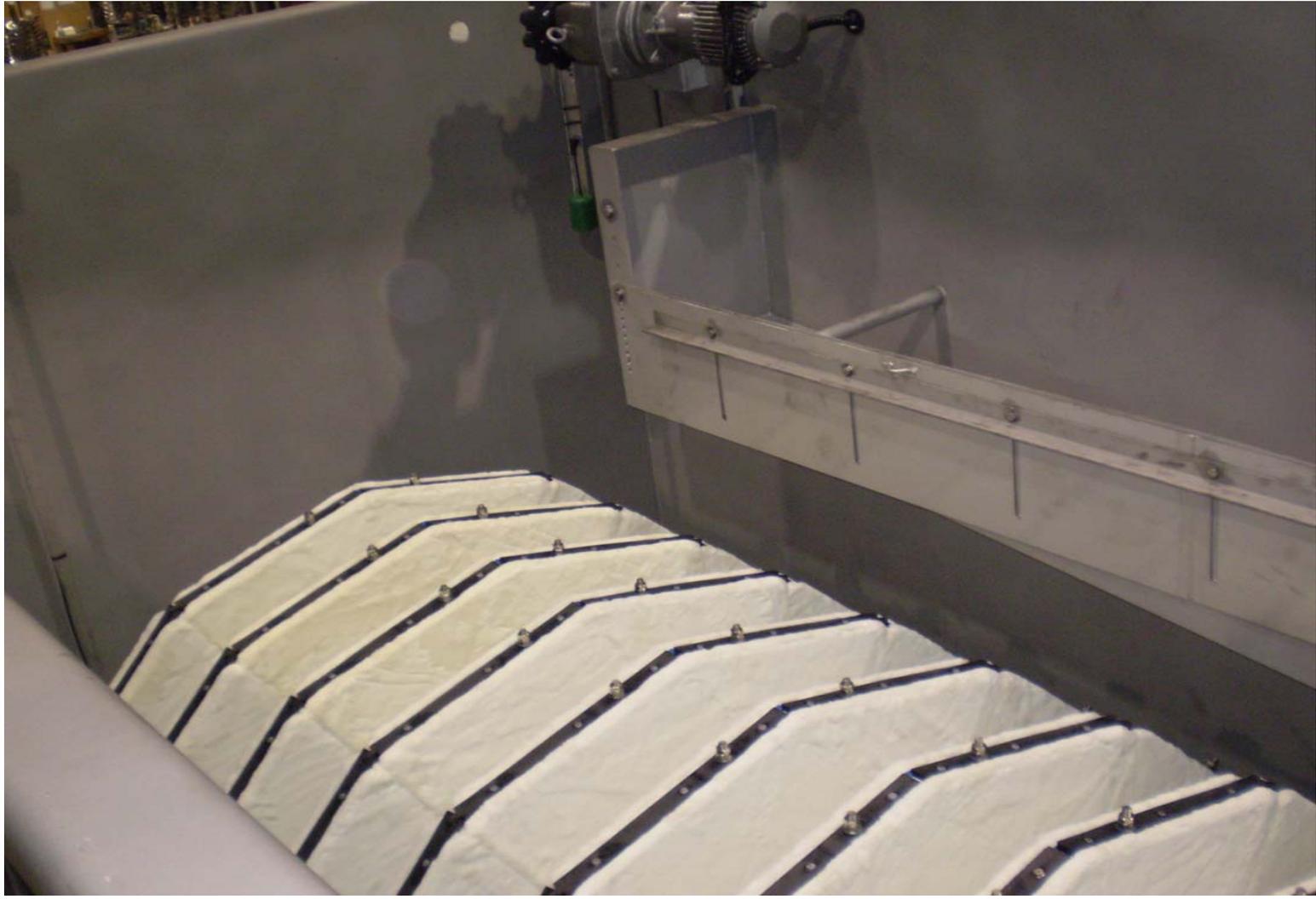
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QUESTIONS?

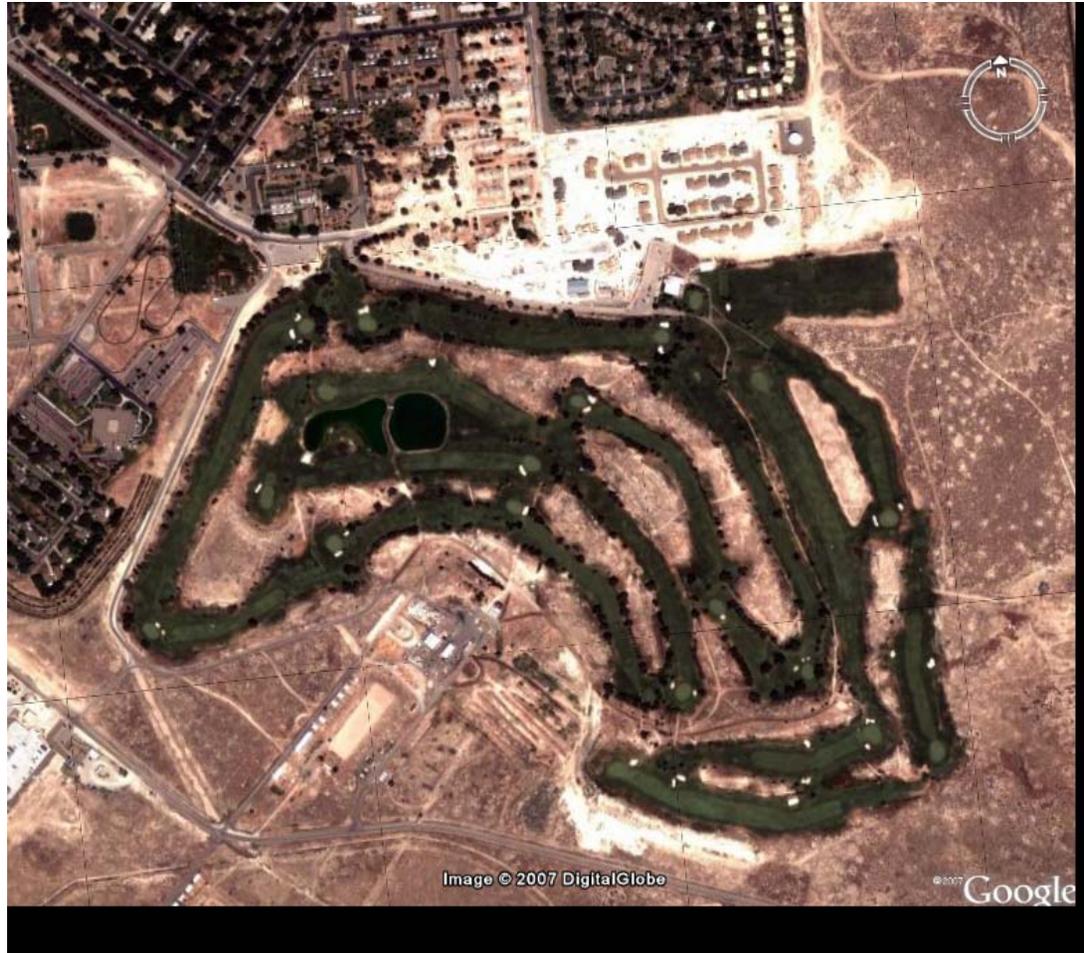
Storage



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Golf Course



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Treatment Plant



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