CRESTOP WELL TREATMENT DESIGN

Leah Dorris, Leila Kenner, Katie Papineau, & Reilly Ray| ENVE Capstone Design

PROBLEM STATEMENT

The Crestop Well is contaminated with iron, manganese, and hydrogen sulfide, causing aesthetic issues noticeable to consumers.

OBJECTIVE

Design a treatment process capable of providing the best quality of water to consumers.

DESIGN PROCESS

Define Scope
Identify criteria, constraints & goals

Research
Review treatment options

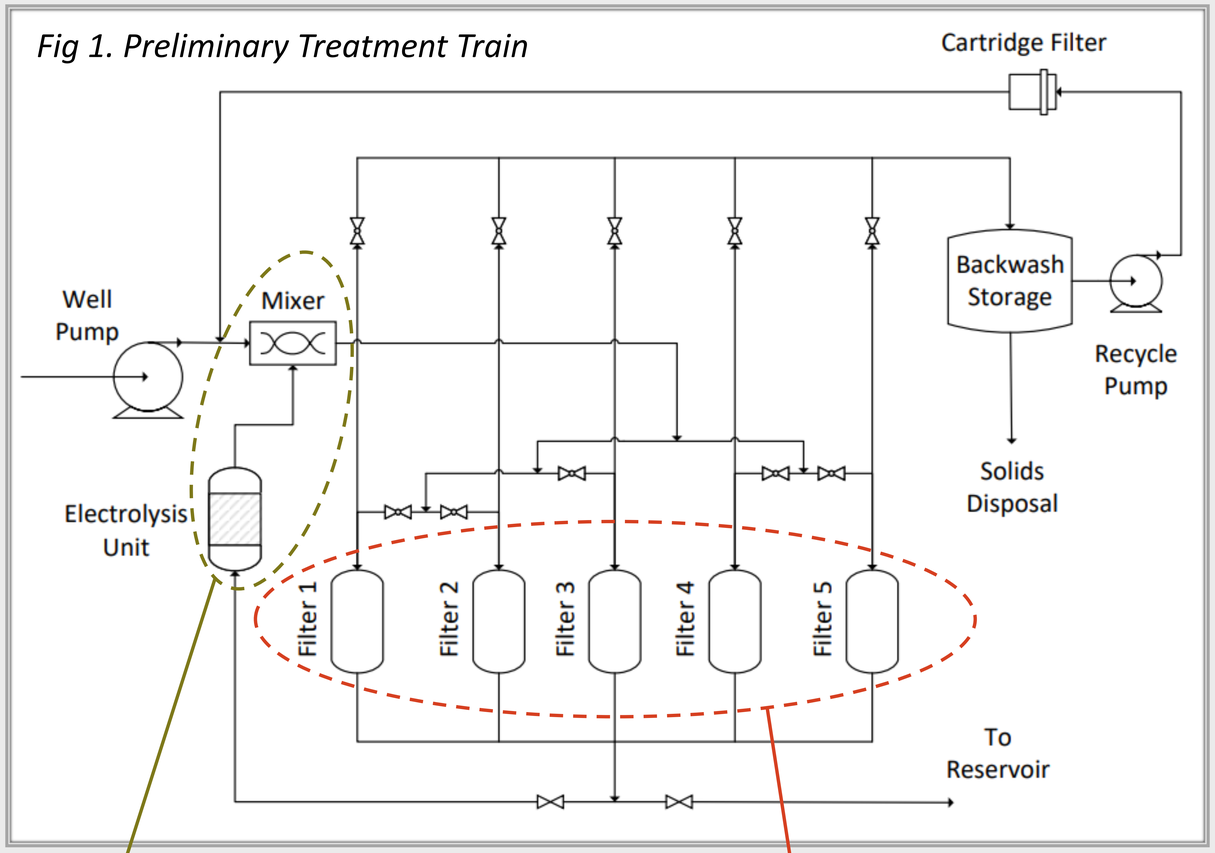
Alternatives Analysis
Consider pros & cons of each treatment option and select two for consideration

Sizing
Dimensional calcs for each unit

Costing
Comparison for each alternative

Process Selection and Design
Select most cost-effective option. Complete design & process analysis

Fig 1. Preliminary Treatment Train



DESIGN SUMMARY

Chlorine converts iron and hydrogen sulfide to filterable forms. Greensand catalyzes the oxidation of manganese and incorporates the reaction products. Continuous chlorine feed and periodic backwashing preserve the filter for up to ten years.

NEXT STEPS

- Finalize process design
- Conduct cost analysis
- Sustainability analysis
- Risk assessment
- Quality management plan

OXIDATION & MIXING

- On-site salt hopper and electrolysis for generation of sodium hypochlorite
  - Safe handling & transportation
- Oxidation prepares the water for filtration
- Static in-line mixer ensures uniform treatment and prevents corrosion

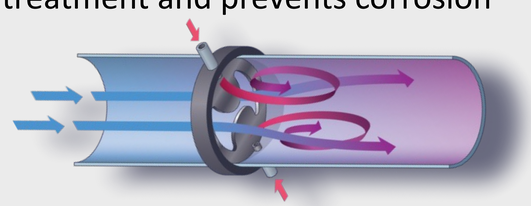


Fig 2. In-line Static Mixer

Image: Westfall Manufacturing

DUAL MEDIA FILTRATION

- Catalytic oxidation with Greensand removes solids and provides additional manganese treatment.
  - Reliable treatment
  - High-quality end product
  - Industry standard
- Continuous generation minimizes maintenance.
  - 10-year media life
  - Simple maintenance

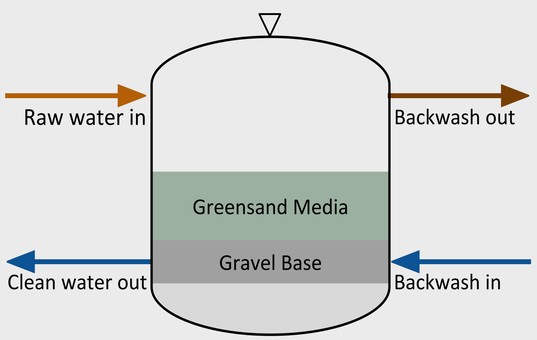


Fig 3. Greensand Filter Design

Oregon State University