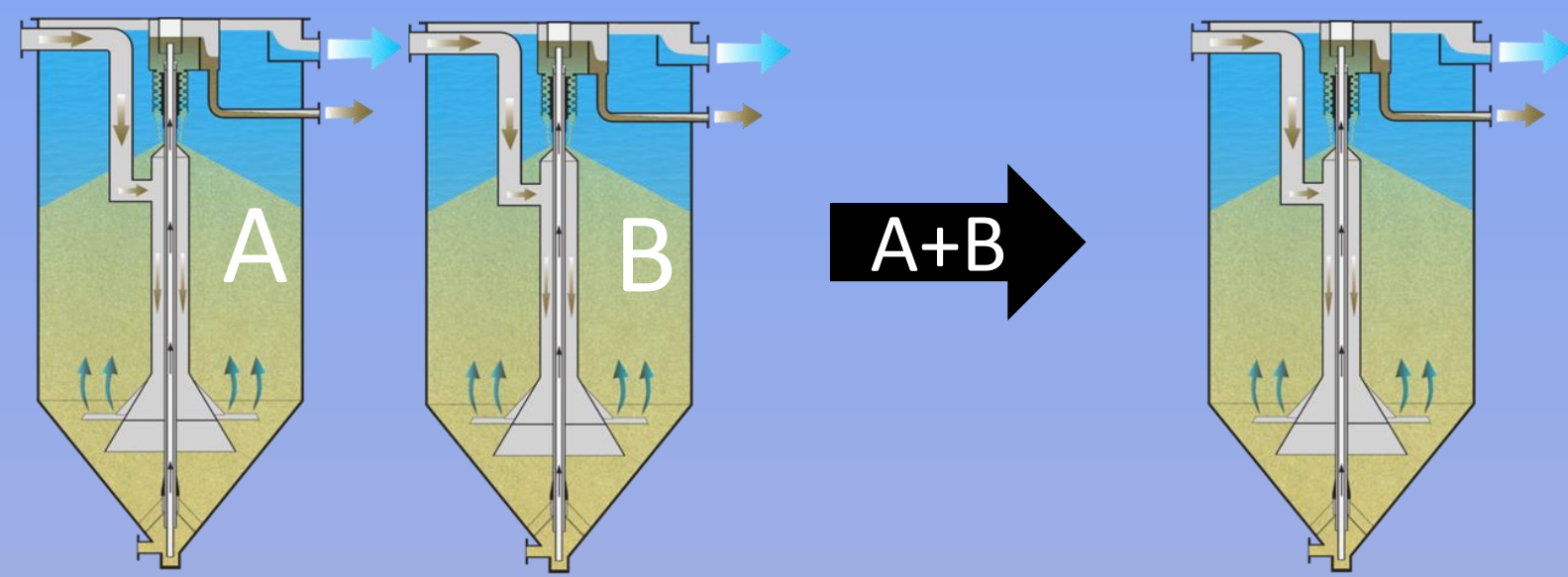


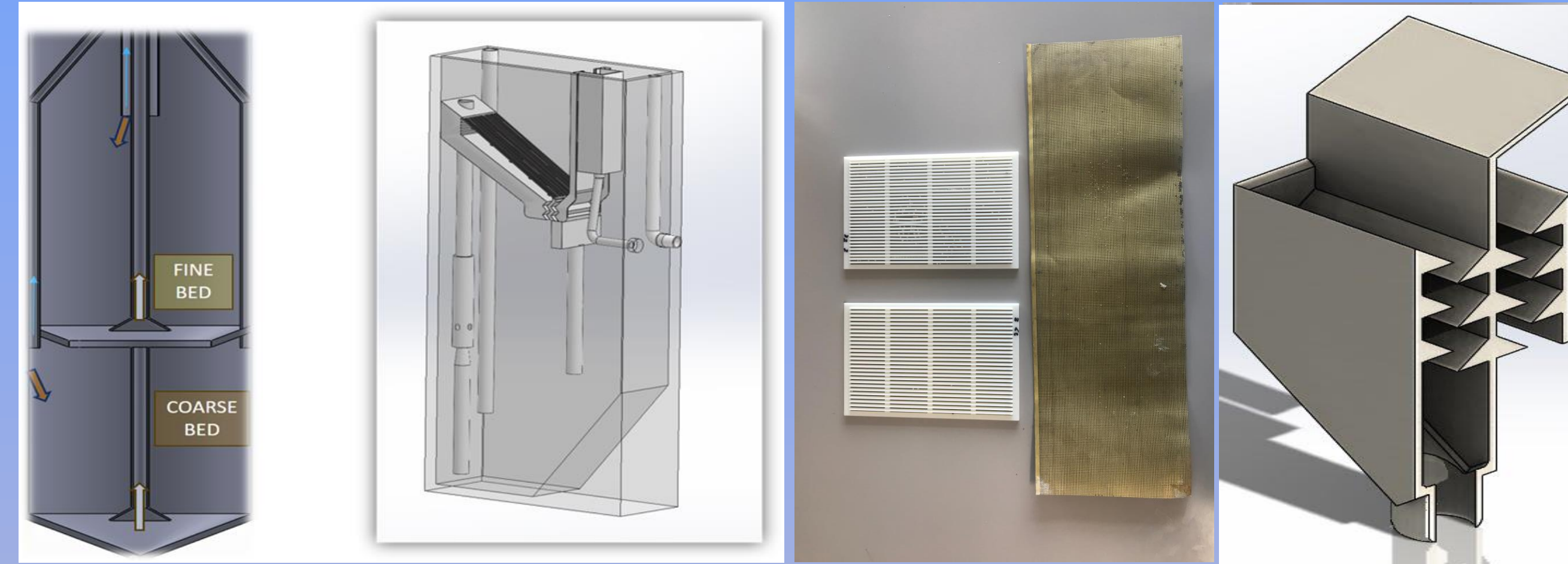
TEAM HYDRATION STATION: JADEN CAVENDER, TOBIAS FLORES-WENTZ, BENJAMIN MAREK, TAYSON THOMPSON, BLAKE URIE

Objective

Design a single-stage dual media sand filtration wash box system.



Concept Development



Design Validation

- ◆ Separation of sand particles
 - ◊ Separate beds, airlifts, and wash box chambers
- ◆ Adjustable flow
 - ◊ Flow meters installed outside of apparatus to regulate and read flow of air and water influent
- ◆ Wash box adjustability
 - ◊ Position in water column can be adjusted in order to control pressure head
- ◆ Rust and corrosion resistant coating
 - ◊ Steel parts painted with black, rust-resistant spray paint. Acrylic and PVC parts inherently corrosive resistant

Value Proposition

In 2008 a list of “14 Grand Engineering Challenges of the 21st Century” was released. One of them is providing access to clean water. It is estimated that 1 in 9 people lack access to safe water. By combining the two-stage filtration system into a single-stage, we hope to cut back on maintenance and operation costs, while increasing efficiency.

Final Design



Summary

In order to incorporate the two-stage system into one, we installed a bed separator and separate air lifts. This allows influent water to be filtered first by the coarse and then by the fine sand. The bed separator and wash box allow the sand particles to be sorted into their respective beds.

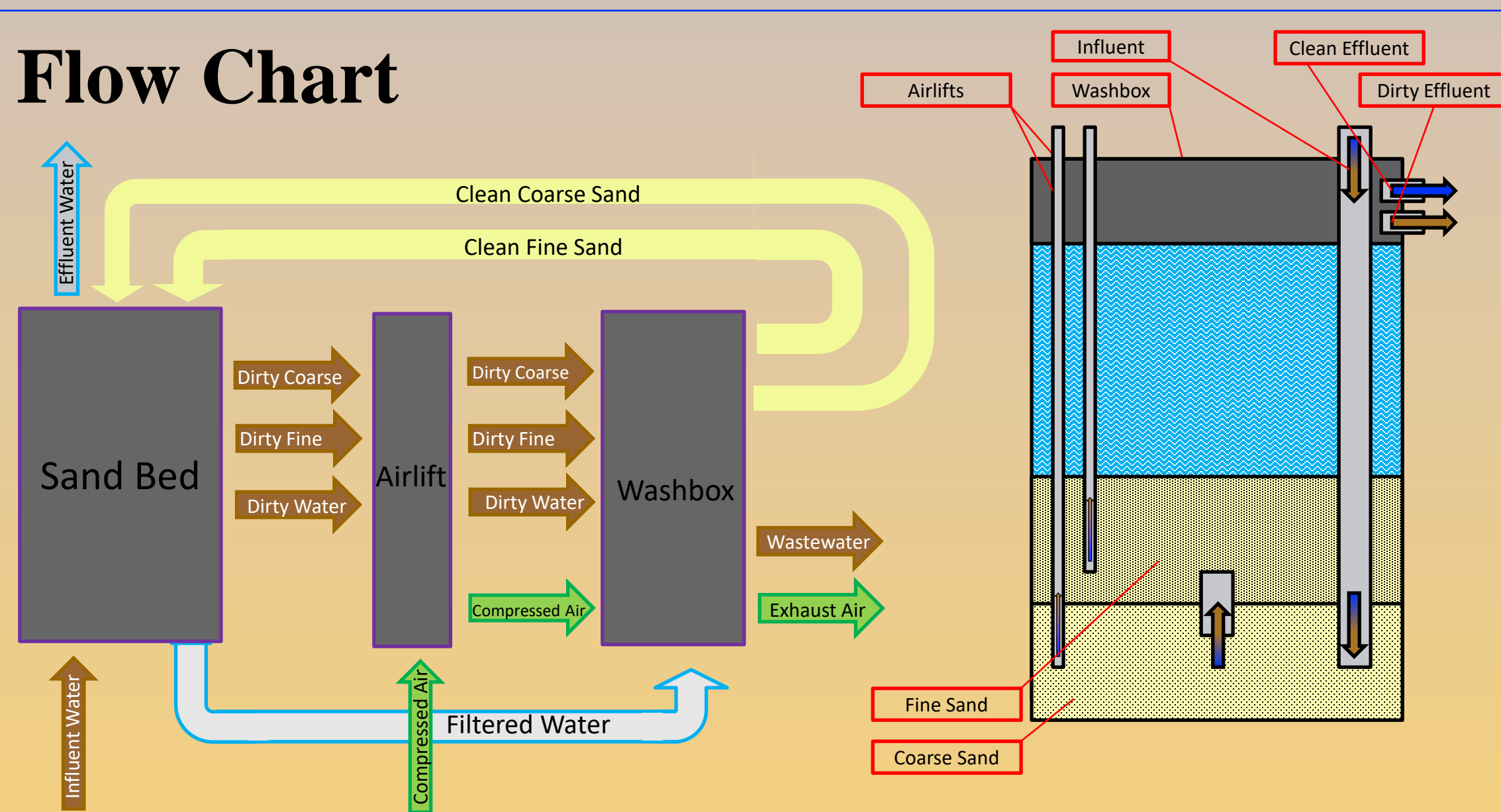
Future Considerations

- ◆ Single airlift
- ◆ Wedge wire screen
- ◆ Sloped floor for even sand uptake

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 Mr. Martin Baker

Flow Chart



Key Requirements

- ◆ Minimum 75% separation of the two sand sizes.
- ◆ Chemical and corrosion resistance.
- ◆ Minimum up flow rate of 1.8 gpm
- ◆ Maintain a bed turnover rate of 0.7 to 1.4 ipm
- ◆ Continuous operation with a maximum of 30 minutes of routine weekly maintenance.