

N F P A

Fluid Power

VEHICLE

Challenge



NFPA
Education and
Technology
Foundation

FINAL PRESENTATION &
DESIGN REVIEW
ARIZONA STATE UNIVERSITY
DR. WENLONG ZHANG
April 9th, 2026



Team Introduction

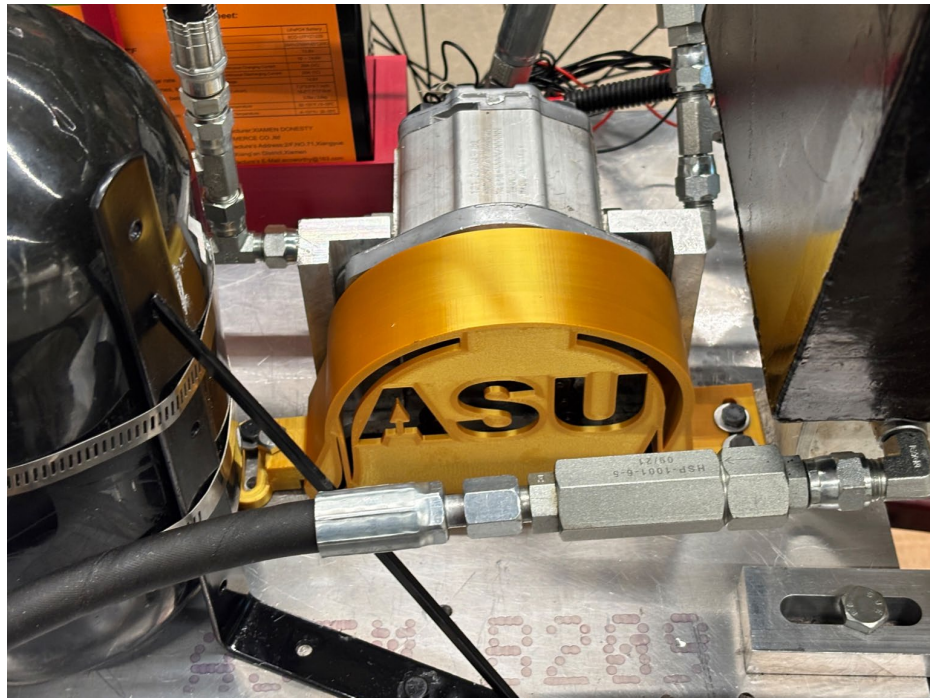


Varun Bose
Austin Marshall
Christopher Orozco

Vehicle Construction



- New Battery(Lifepo4) & New battery mount
- Fixed and Upgraded brakes
- New chain guards
- New Tires
- New Seat
- New handels bars and mount
- Added hydraulic test ports
- added cosmetics

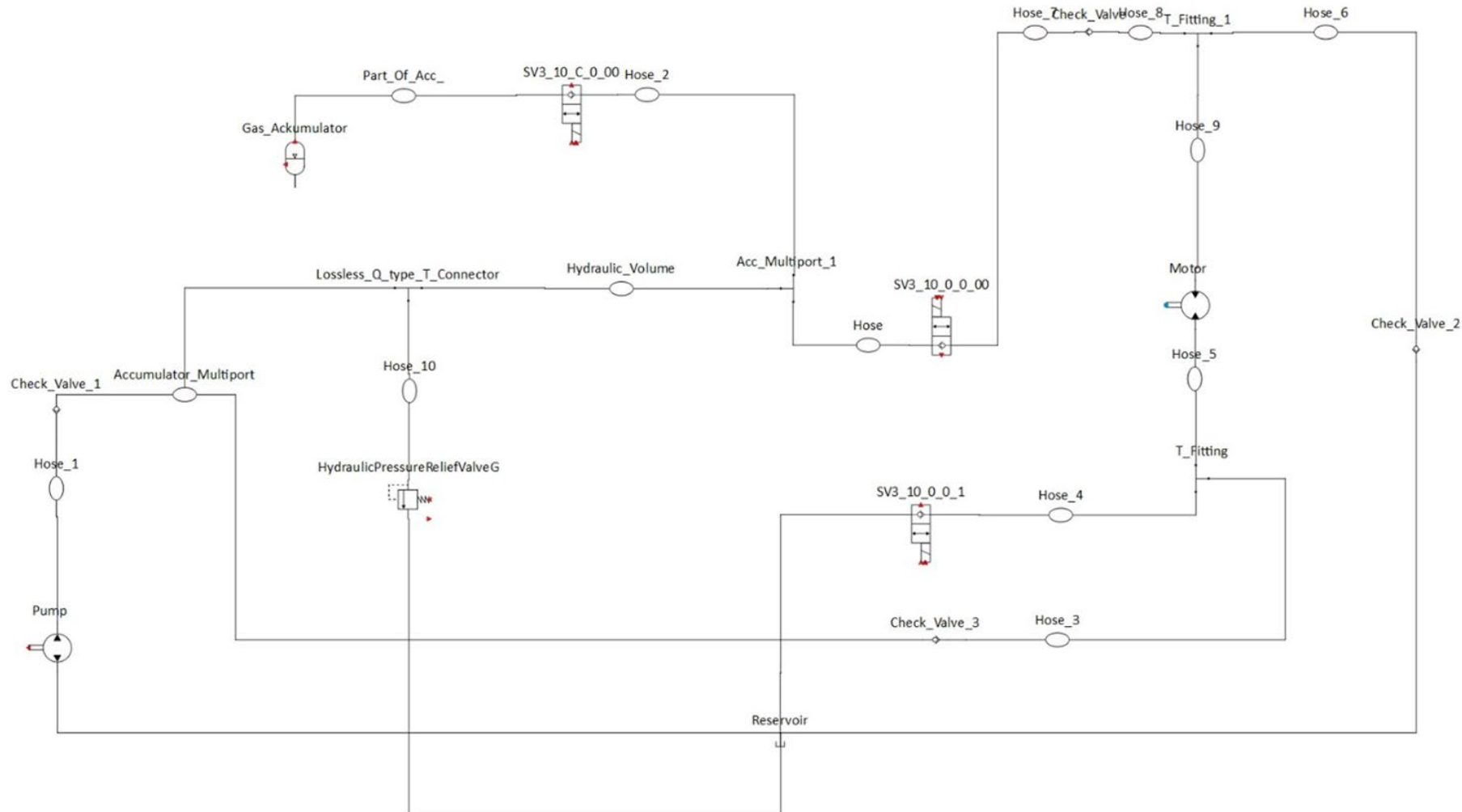


Vehicle Testing

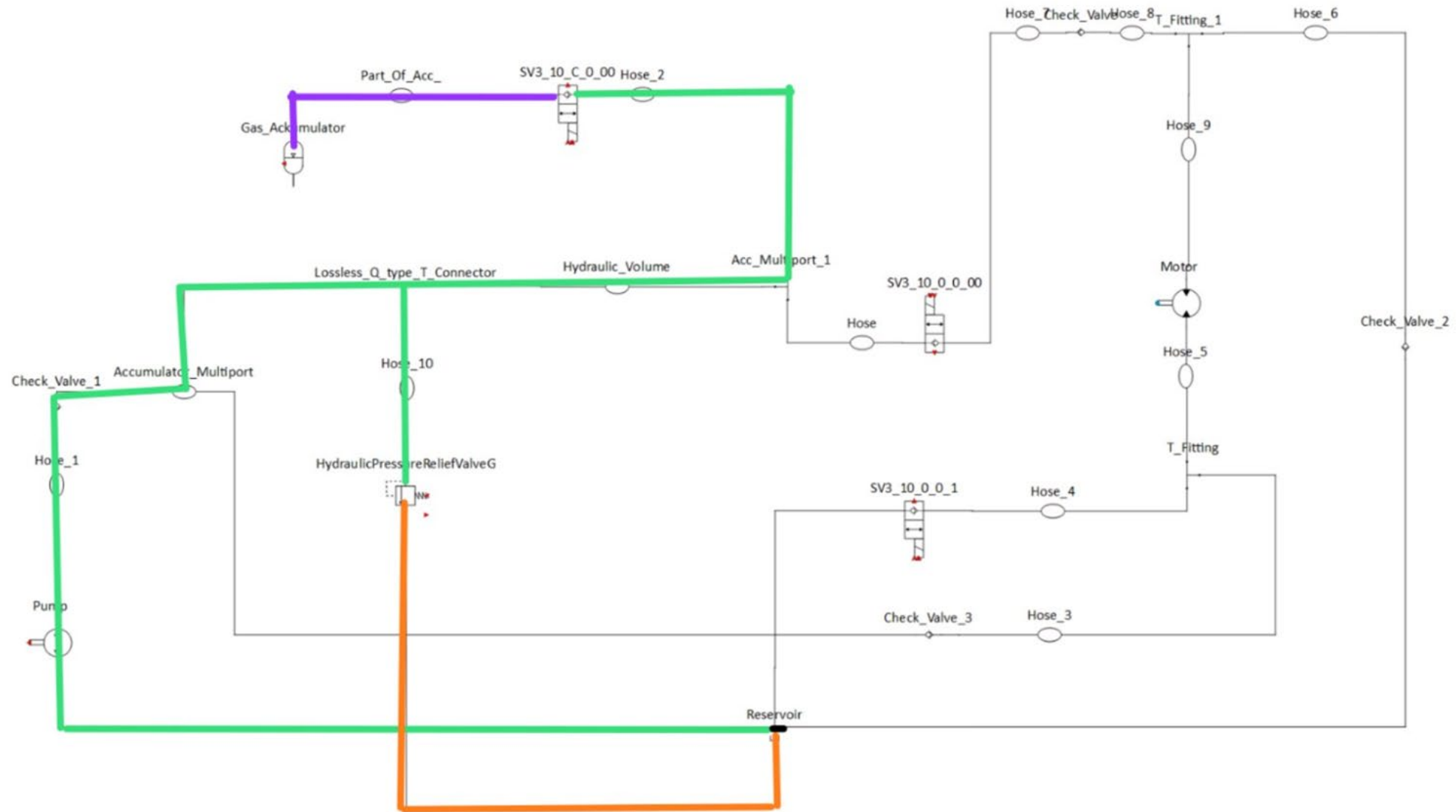


- Significant delays due to facility access constraints
 - Minimal data collection
- Lead-acid battery providing higher voltage than needed
 - ~14 V compared to the rated 12 V
 - Replaced with LiFePO4 battery
- Gear on hydraulic pump
 - 11T → 15T
 - 37% increase in pedaling torque, allowing in higher accumulator pressures.

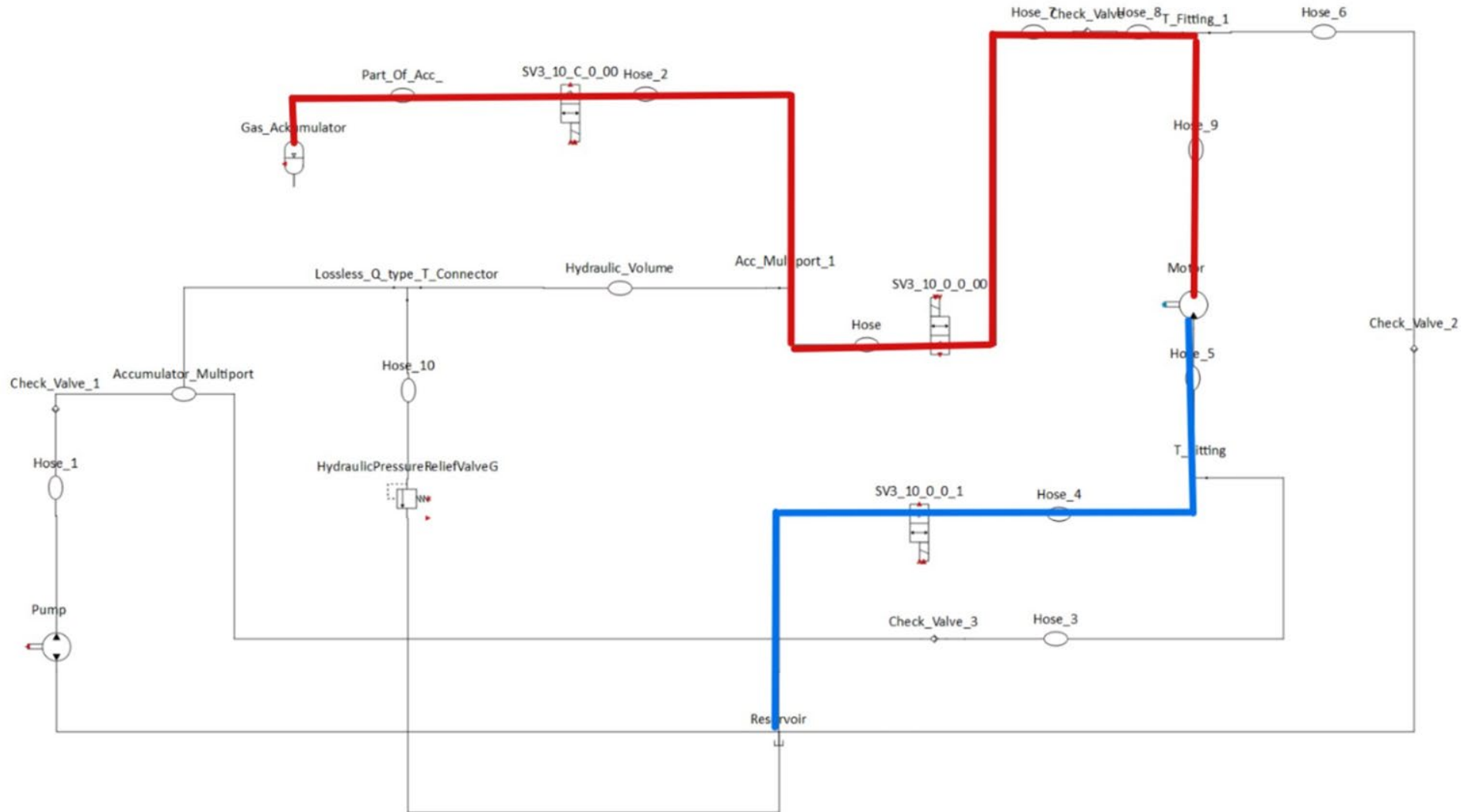
Final Schematic



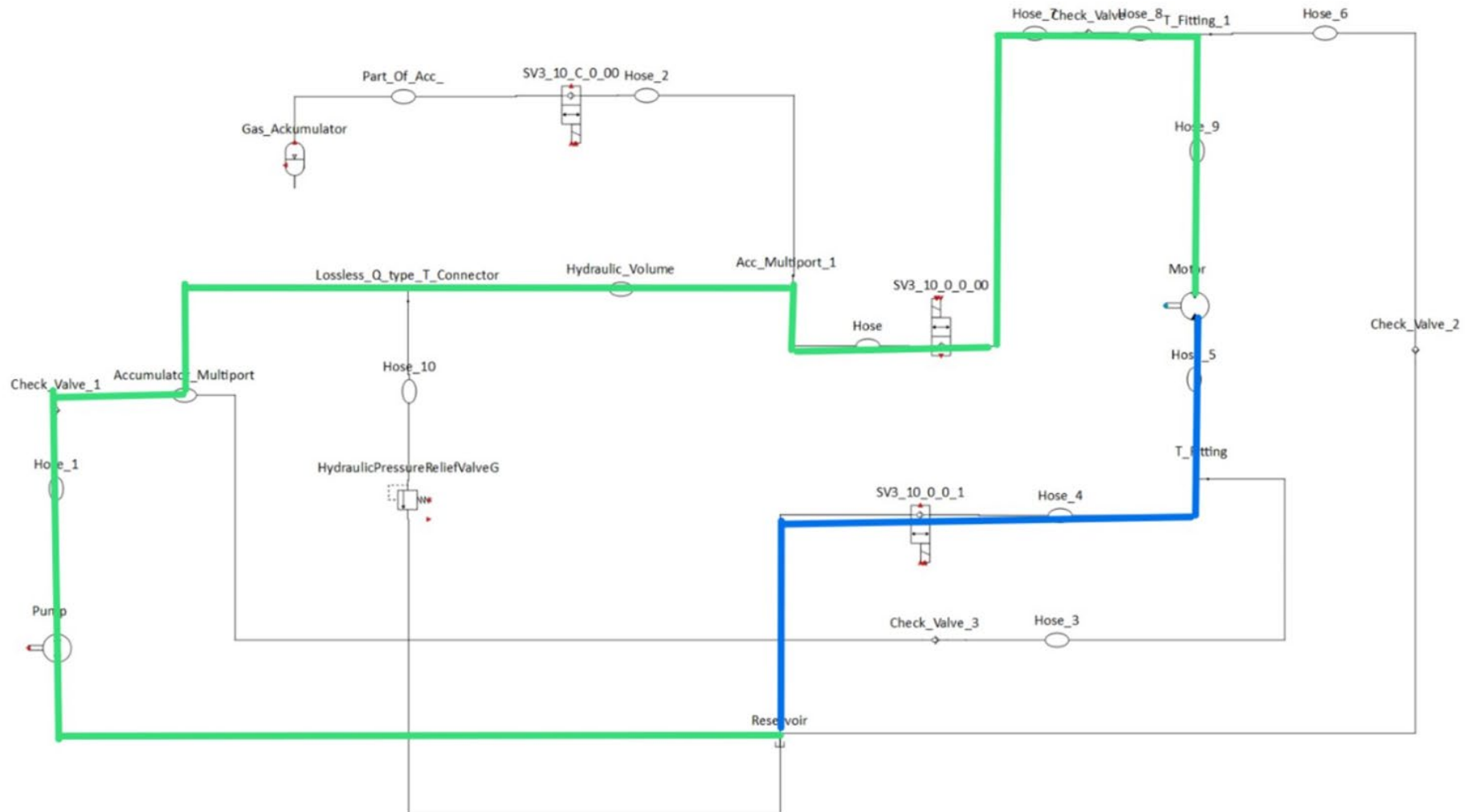
Charging



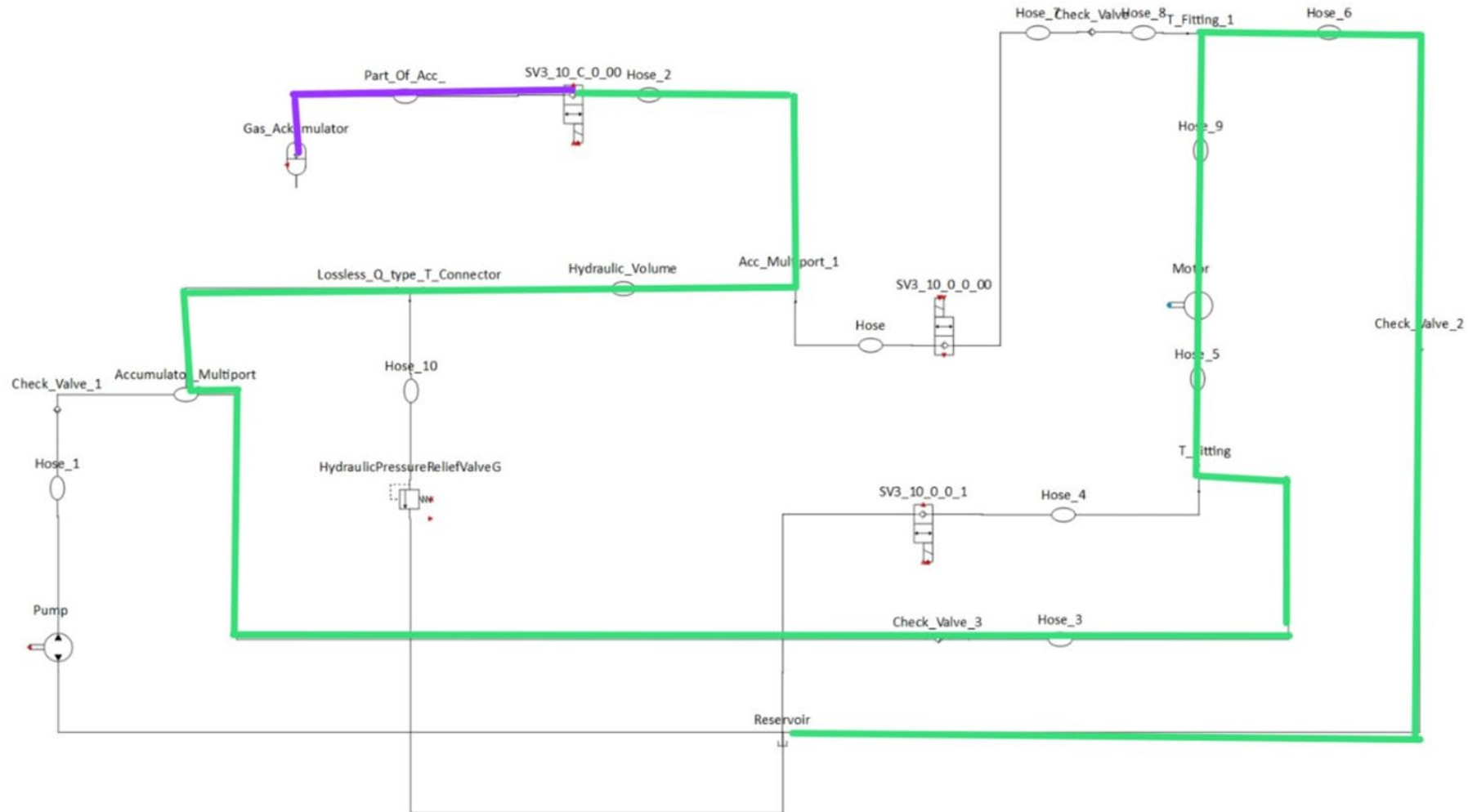
Discharging



Direct Drive



Regeneration



Lessons Learned



- Avoid dependence on baseline testing
- Prioritize theoretical calculations for component selection
- Plan ahead for work days

Questions?

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