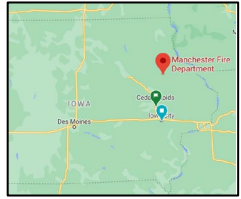


Location and Existing Conditions



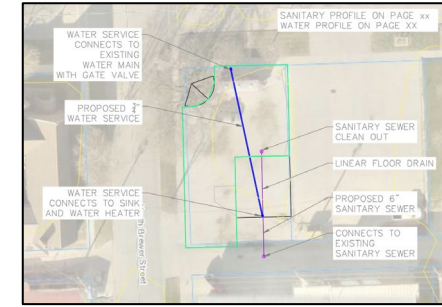
Manchester, IA is a 1.33-hour drive north of Iowa City. The existing fire department and empty lot are shown above.

PROPOSED FIRE STATION EXPANSION

for the Manchester, Iowa Fire Department

Presented by: Soe Htet, Abbie Dirks, Benjamin Rowley, Francis Hart

Site Details and Utilities

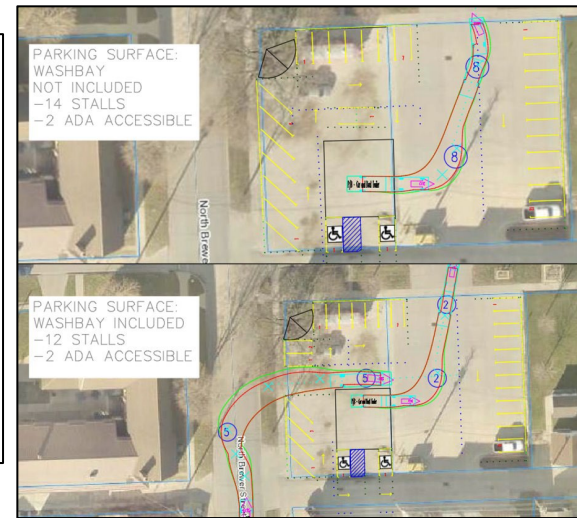


Water and sanitary sewer facilities will connect to the new storage building from existing locations.

Design Objectives

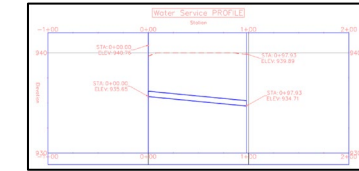
- Design a cold storage facility for storing boats, kayaks, a trailer, and other equipment
- Consider the costs and restrictions of adding a wash bay
- Remainder of site should maximize parking and maintain drainage

Final Site and Storage Building Design

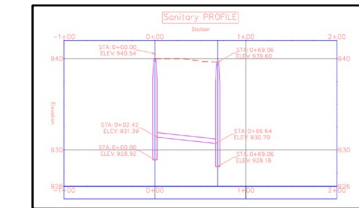


Final storage building design built on a slab-on-grade foundation with continuous footings, 8" thick CMU walls, and a wooden truss roof is shown above.

Final parking layouts including optional future addition of wash bay is shown above.



Water service profile is shown on the left



Sanitary sewer profile is shown on the left

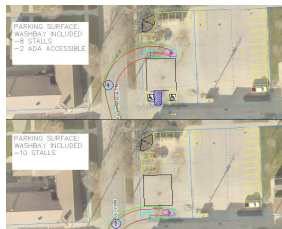
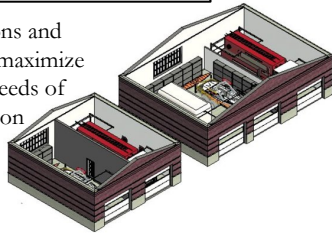
Constraints and Challenges



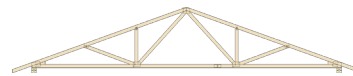
Constraints for design included set back limits, a generator (shown to the left), an oak tree, and the existing parking lot. Challenges included limited area and a need to keep costs to a minimum.

Alternatives Considered

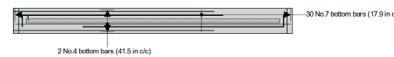
Several alternative building locations and sizes were considered in order to maximize parking and meet all the storage needs of the client. The larger building option included a wash bay but increased cost and reduced parking on site.



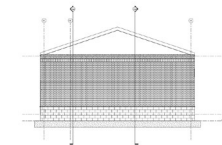
Structural Details



The roof framing system consists of nine 36' long double fan trusses. These are paired with H-rib corrugated steel decking to resist applied loads. The roof is sloped at a 4:12 pitch.



18" thick, reinforced continuous footings running the length of the building beneath CMU walls to safely support the structure.



8" thick reinforced CMU walls support the roof framing members and provide lateral force resistance. Exterior walls will be covered with brick façade and FRP sheets will line the interior walls for easy cleaning.

Final Cost Estimate

Section	Category	Cost
Structural Design	Walls	\$36,700
	Windows and Doors	\$8,500
	Foundation and Drain	\$6,425
	Roof	\$4,200
Site Design	Total Structural Costs	\$55,800
	Utilities	\$2,075
	Grading	\$1,625
	Total Site Costs	\$26,700
	Total Interior Costs	\$13,400
Interior Structural Costs	Electrical	\$6,525
	Interior Finishes	\$5,525
	Heating	\$1,325
	Total Interior Costs	\$13,400
Construction Cost		\$98,000
Construction Cost with O&P (2020)		\$140,500

Category	Cost
Construction Cost with O&P (2020)	\$140,500
Contingency	\$14,100
Engineering and Administration	\$28,100
Total Project Cost	\$183,000