



STUDENT SUSTAINABILITY COMMITTEE

Final Report

Thank you for your commitment to green initiatives at the University of Illinois. One of the final steps in completing the terms of the funding agreement for your project is the submission of a Final Report with key information about your project. You will also need to submit a detailed report of expenses (if you don't list it within this document) as well as supporting photos to showcase your project.

Please be as accurate as possible in describing the project (including possible setbacks or challenges in meeting the initial goals of the project). Not fully meeting your project's goals will not disqualify you from making future funding requests as long as your reports are as complete and accurate as possible. If you have any questions, please contact the Student Sustainability Committee, at sustainability-committee@illinois.edu.

Project Name: Expansion and increased utilization of biomass heating at the Energy Farm.

Date of Report Submission: 2/1/2021

Project Purpose:

This project retrofitted drying ovens and associated workspace to utilize renewable energy heat from the Energy Farm biomass boiler. The energy required for the drying of research samples along with warming the workspace now utilized renewable non-fossil fuel derived energy for operation. Student, faculty, and staff comfort has been drastically improved through this effort as the sample handling is typically in winter months, and previously were in a non-heated space.

Working closely with Architecture faculty and students, plans were developed that not only expanded the use of low carbon heating fuels, but also incorporated insulating wall materials such as hempcrete, corcrete, and miscrete (miscanthus crete). These building materials will be visible from the inside of this room to visitors, further expanding the Energy Farm's demonstration of utilizing agricultural materials in promoting sustainability. Students worked alongside faculty and staff in producing these wall materials, further exposing them to sustainable building techniques. This additional work is funded through other sources from this granted project.

Project Summary:

- Work space was enclosed, insulated, and finished using best practices for energy efficiency. Two of the walls insulation are in progress demonstrating sustainable

construction techniques including hemp, corn, and Miscanthus plan tissues for the insulating materials.

- Two existing plant tissue ovens were retrofitted to utilize hot water hydronic heating instead of the original propane system.
- Funding for an third oven fully secured from one of the Energy Farm’s research partners, expanding the usable space by an additional 50% from the original proposal.
- Room ventilation control were optimized to utilize previously vented excess heat from the boiler room to be the primary heat for this new workspace.
- Controls developed allow the boiler system, greenhouses, and these new drying ovens to work in harmony, best optimizing the efficiency of these different systems.

Summary of Project Expenditures:

10783490 Polar heating permit – Oven Retrofit and Hydronic Heating System	34,076.61
A&K Insulation – Hydronic pipe insulation	5,923.39
TOTAL SSC EXPENSES FUNDED	\$40,000

Problems/Challenges Encountered

This project started right before beginning of the COVID pandemic. Despite the project construction starting, construction was halted until adequate precautions could be established to protect campus and the contractors involved in the work. Despite these challenges, we were able to get the majority of the work completed by the start of our typical drying season. The first three months drying operations utilized propane as a backup system until the hydronic system was completed. Since all work completed in November 2020, drying has been exclusively hydronic from biomass in two of the ovens, and the controls for the third will be completed in Spring 2021. This last bit will not require SSC funding, so we are considering it appropriate to submit this final report.

Student Involvement and Outreach to Date:

Student projects through Dr. Mark Taylor, Architecture, worked closely with this project in their required classroom studio work. 3d renderings of the final project are attached as part of this final report. The designs not only met the basic design of this project, but added sustainable building techniques involving hemp, corn, and Miscanthus fibers for the insulated walls. The wall insulation project is still ongoing with a completion date of 5/2021. Students have been involved in the mixing, testing, and installation of the fiber insulation walls.

Marketing and Promotion Efforts to Date:

Marketing and promotion have been significantly impacted by COVID-19, as all tours were cancelled in 2020. We hope to continue to promote this project and open up future field tours

once COVID restrictions ease. In the meantime, we will continue to work with the campus media outlets to publicize the improvements and sponsors this project allowed.

Additional Comments:

Any additional comments/relevant information for this report

In addition to the above fields, please provide a detailed accounting of how the funding was spent as well as pictures of the final project in an email to sustainability-committee@illinois.edu. Thank you again for your commitment to sustainability.

Framing of exterior wall around drying ovens



Finished Interior shell



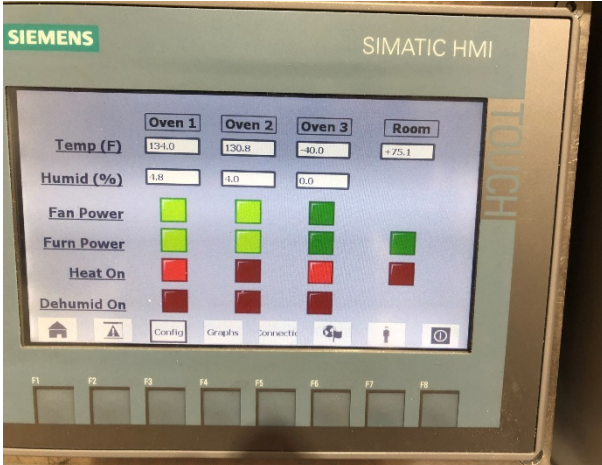
Student work inside room



Detail of "HempCrete" wall under construction



Updated controls for drying oven operation



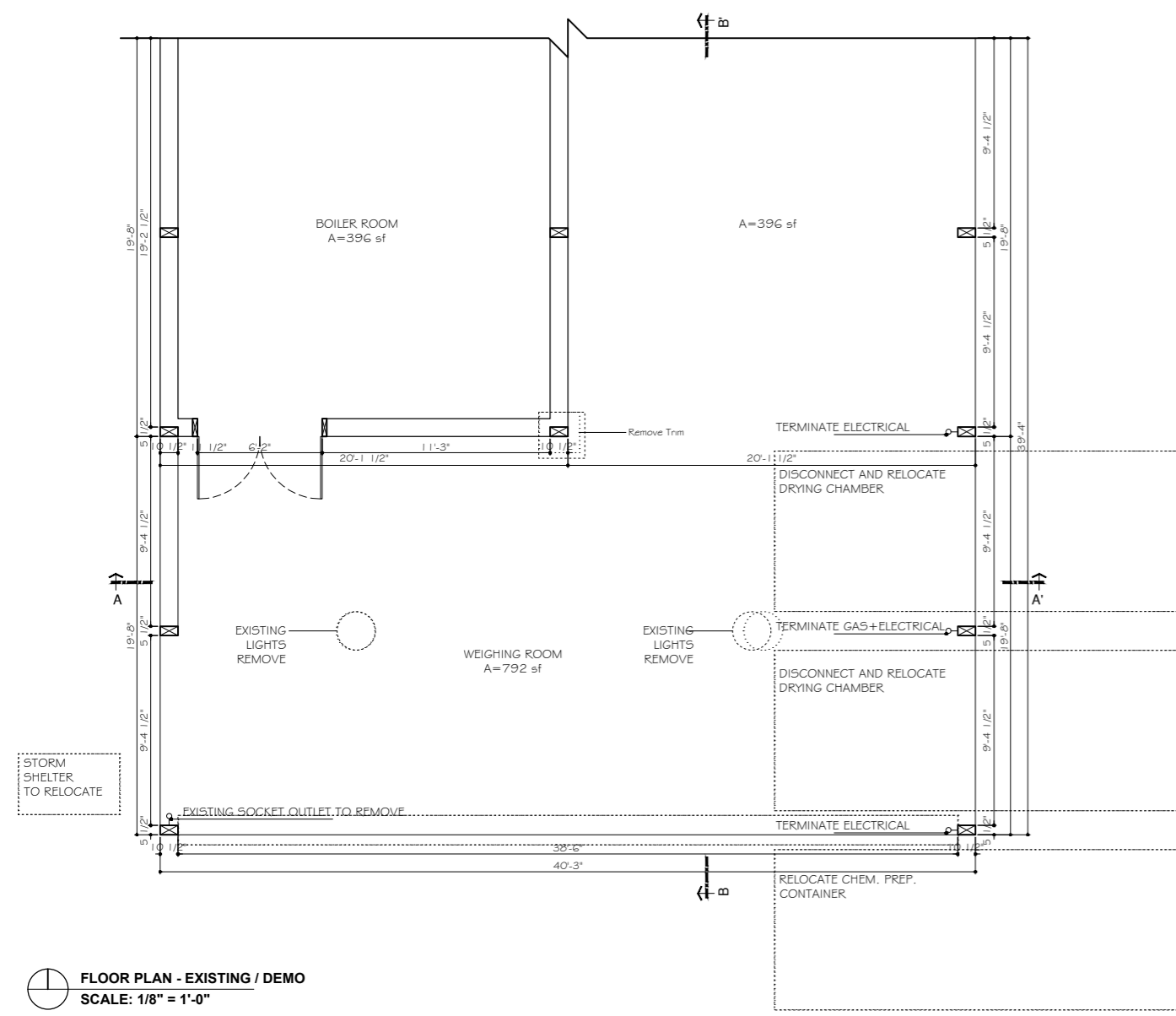
Exterior view of completed room



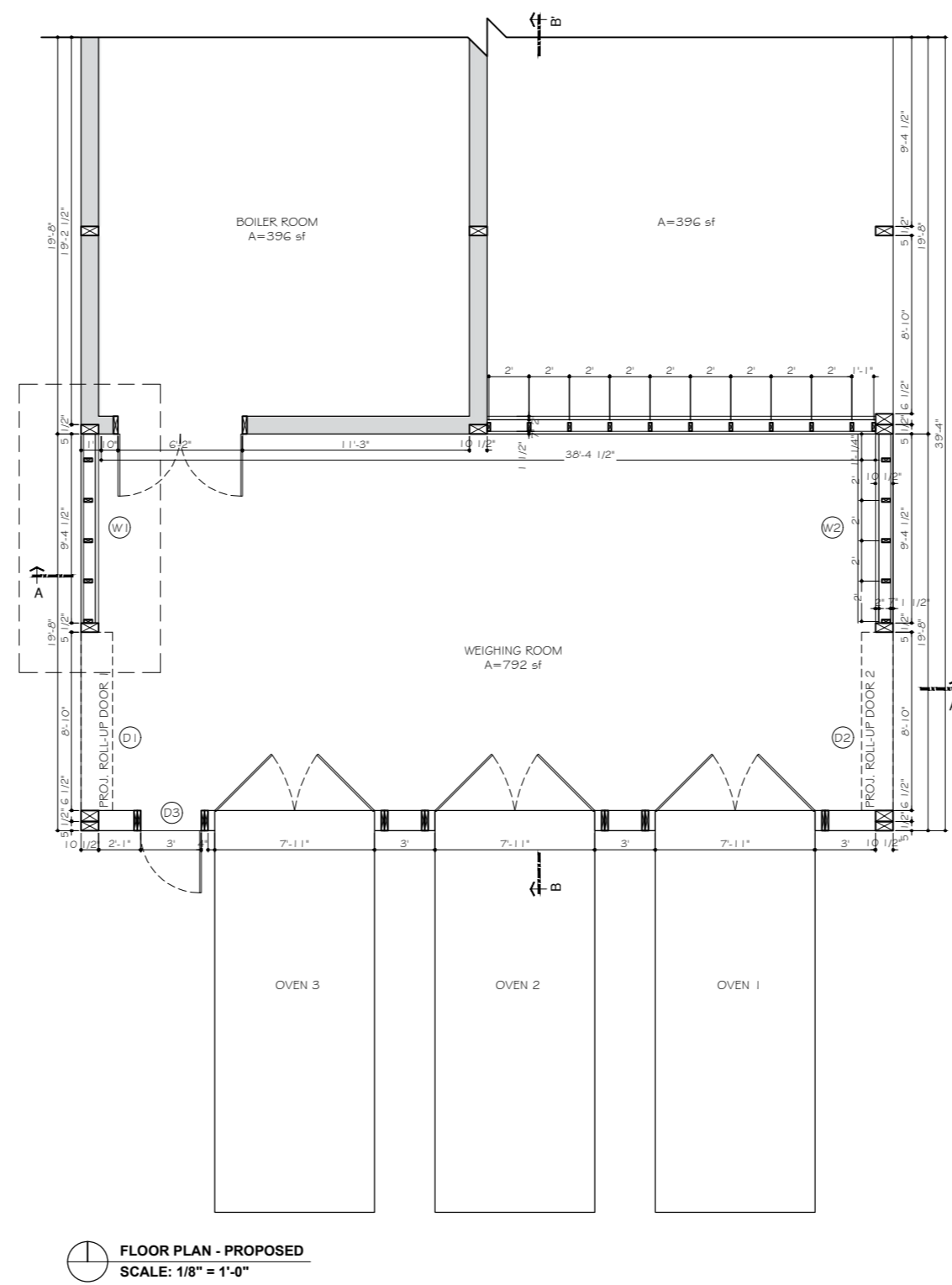
Student produced renderings of the expanded facility showing the 3 drying ovens and sustainable wall construction



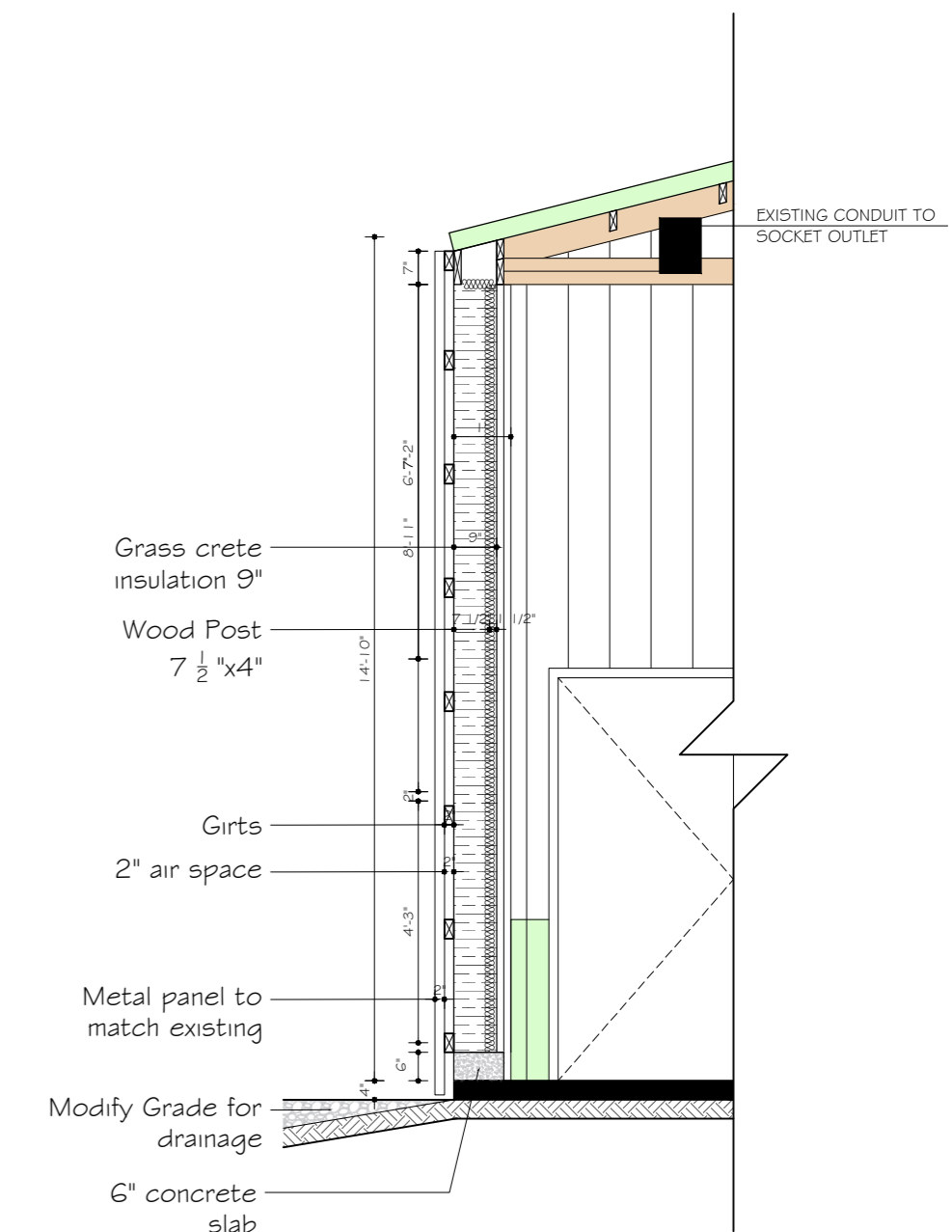
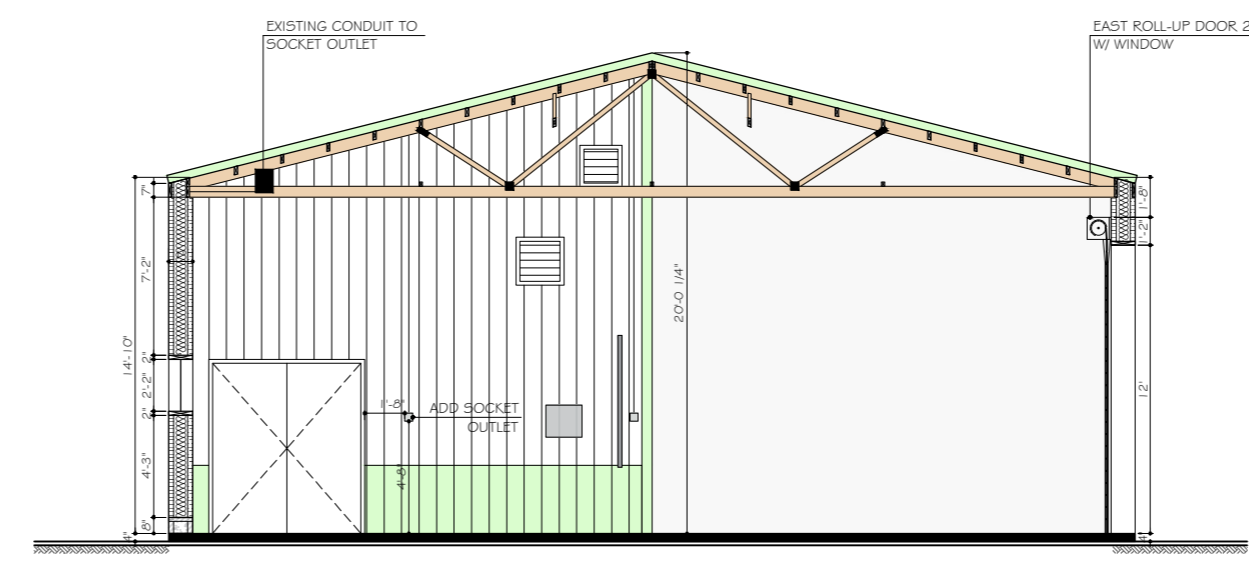
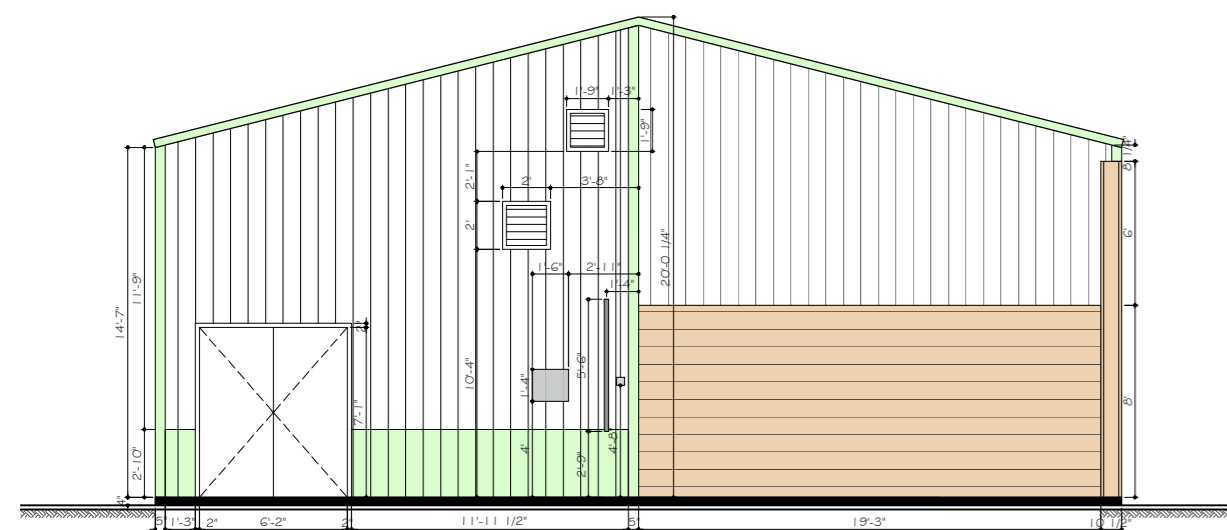
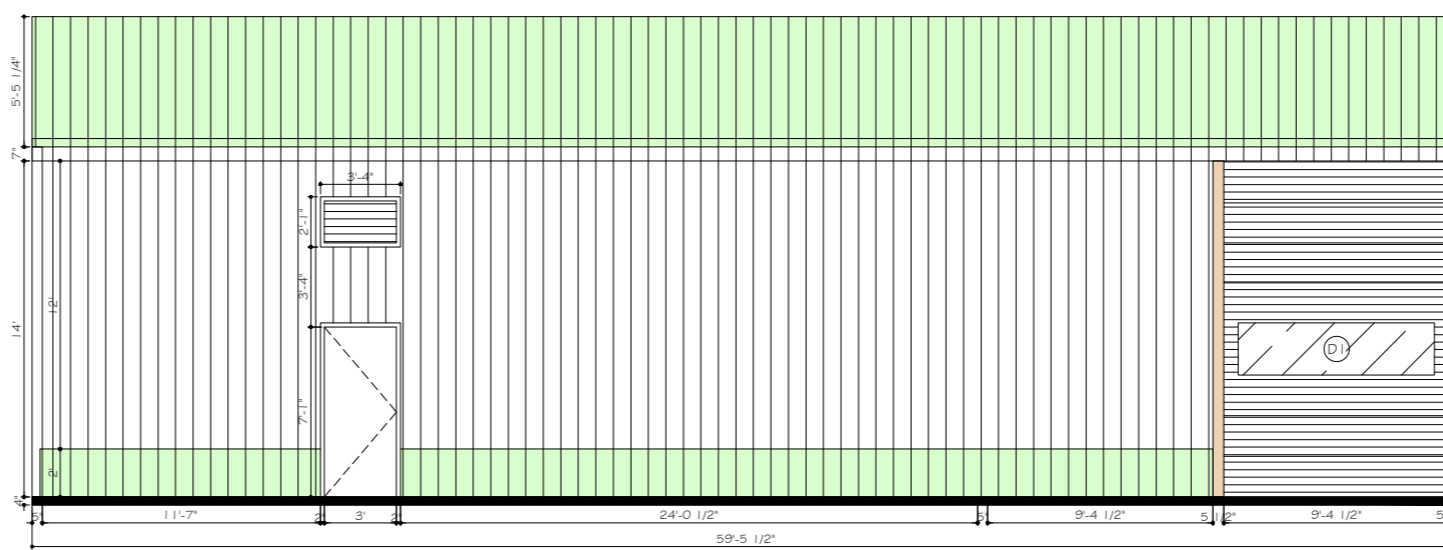
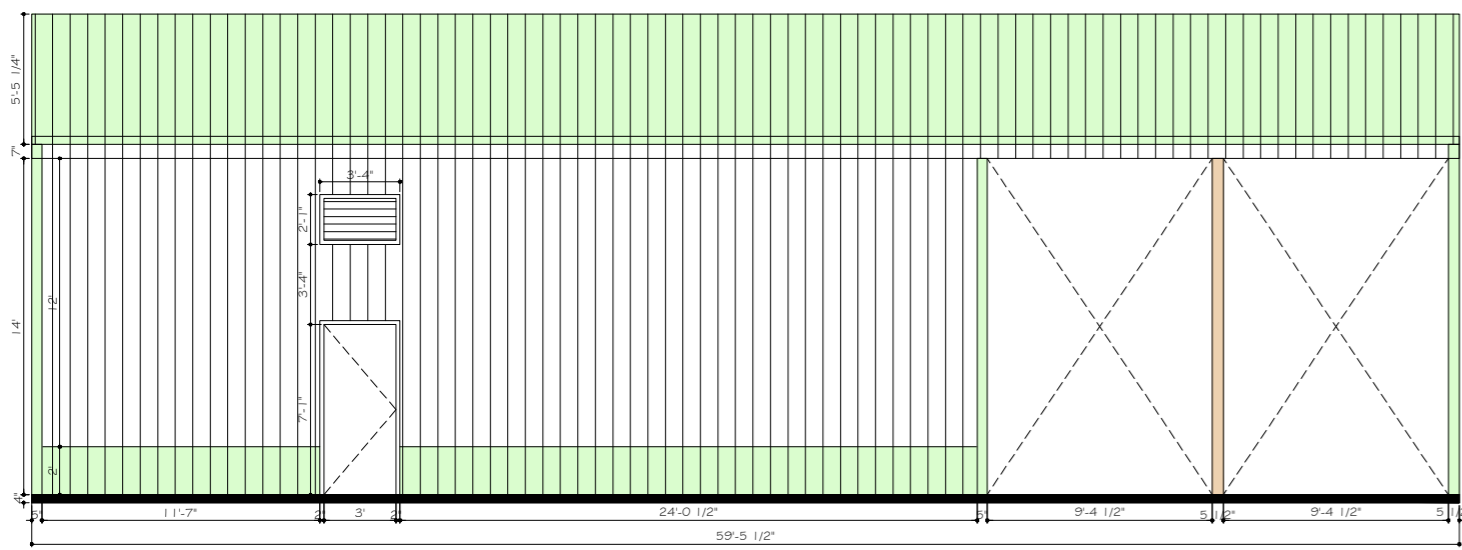
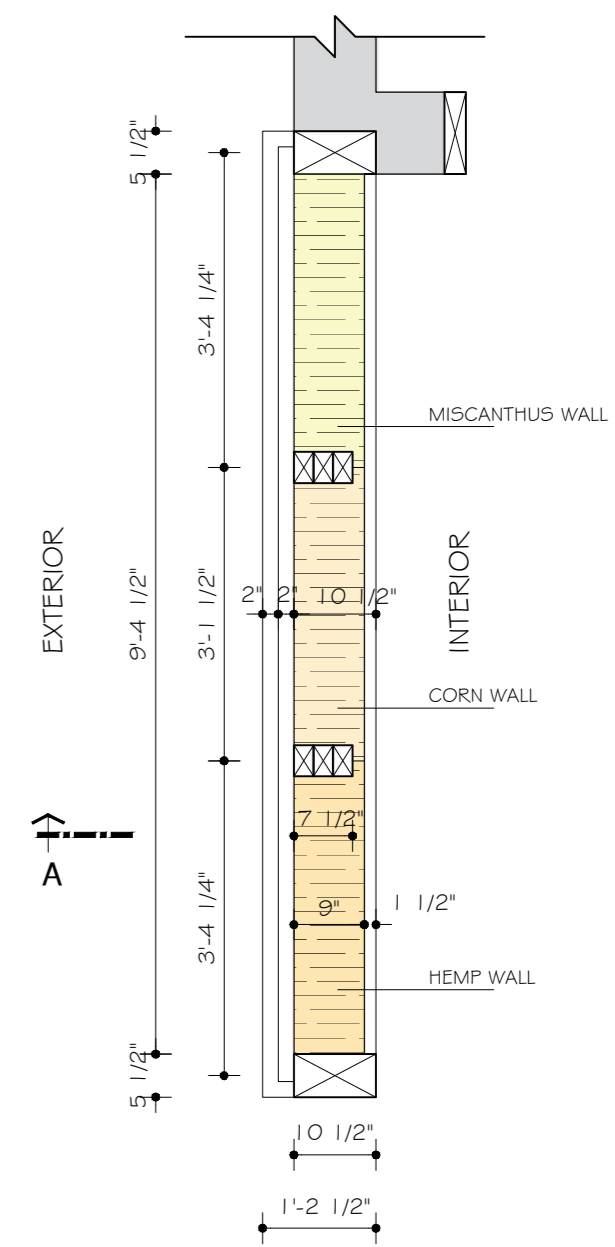
EXISTING

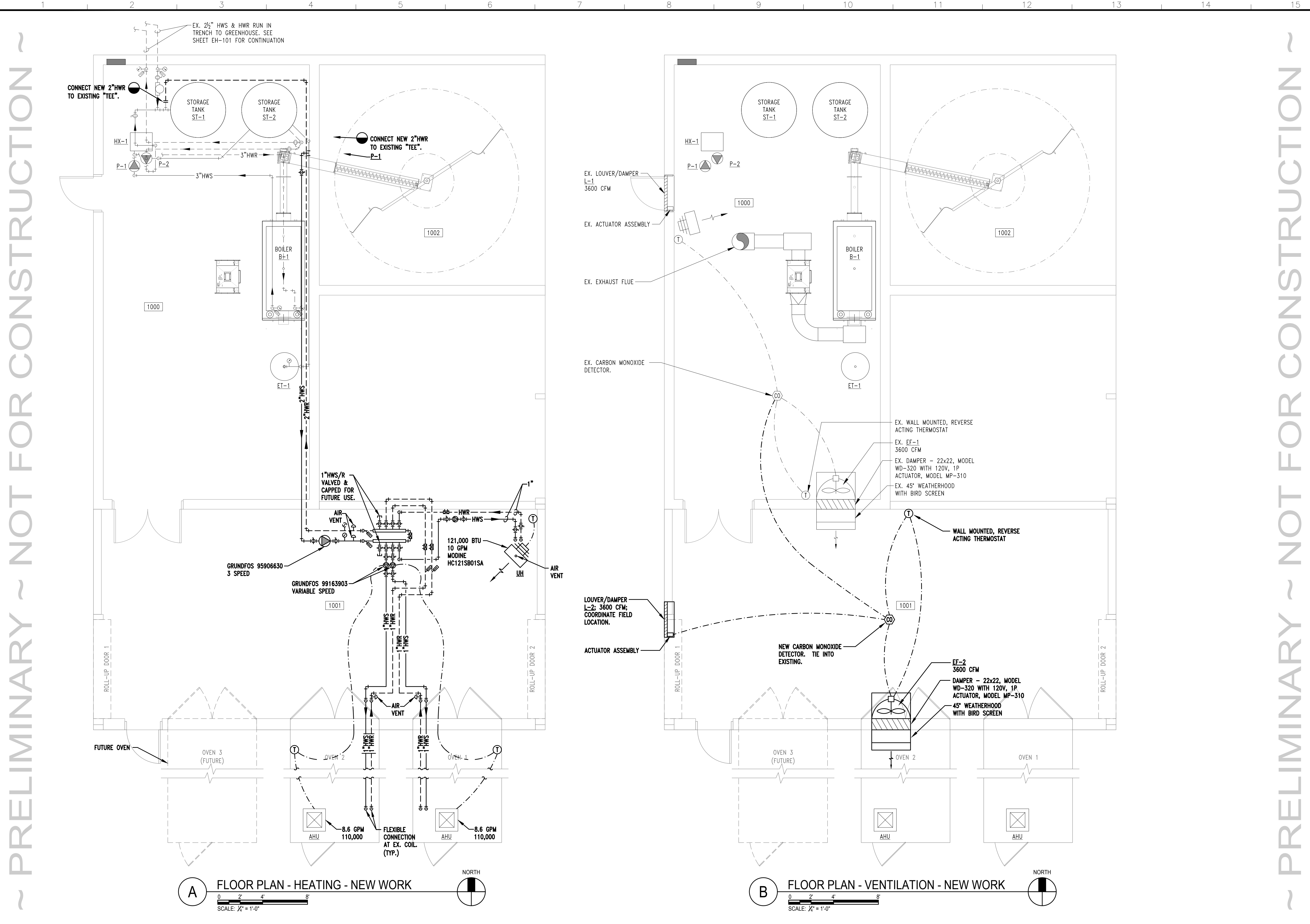


PROPOSAL



WALL 1 DETAIL





PRELIMINARY ~ NOT FOR CONSTRUCTION

PRELIMINARY ~ NOT FOR CONSTRUCTION

ILLINOIS
Facilities & Services
ENGINEERING AND CONSTRUCTION SERVICES / DESIGN SERVICES
Physical Plant Service Building
1501 S. Oak St., Champaign, IL 61801
General Information: 217-333-0697

BIOMASS DRYING SHED EXPANSION

BIOMASS DRYING SHED
BUILDING NO. 1291
4110 S. RACE ST., URBANA, IL 61801

PRELIMINARY

AS-BUILT REQUIRED
PROVIDE AS-BUILT DRAWING OF THIS PLAN REFLECTING ACTUAL INSTALLATION TO THE PROJECT COORDINATOR FOR PROJECT CLOSEOUT AND PAYMENT.

#	Date	Revision Description

FLOOR PLAN
HVAC
NEW WORK

HV-100