TEXAS STATE
INGRAM SCHOOL OF ENGINEERING

C2.01 AFFORDABLE HOUSING

Rhiannon Moss, Avery Cousins, and Tyler Barr
Sponsored by: SATOP & Chalmette Ray
Faculty: Felipe Gutierrez & Abed Mikati

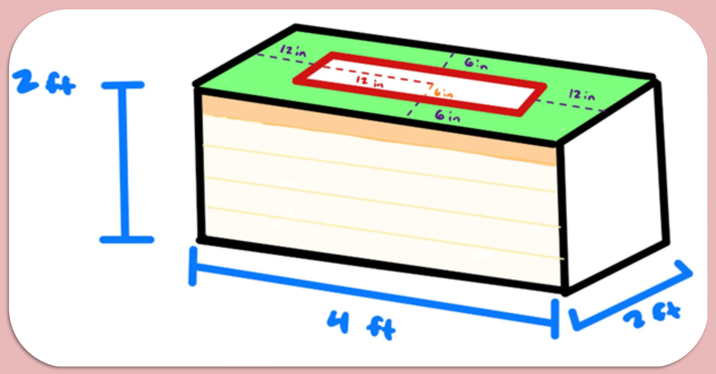
RAT DEVELOPMENTS
AFFORDABLE HOUSING SOULTIONS

PROJECT DESCRIPTION

RAT Developments has been tasked to design affordable housing for one-hundred single families of four with a focus on foundation design. In the previous term, we researched a suitable plot of land and various housing alternatives for feasibility, effectiveness, sustainability, and affordability while abiding by all relevant design codes and regulations.

This semester, we focused on foundation design and modeling. To aid our interdisciplinary efforts, we created a foundation model simulation to test their monitoring system. With an emphasis on ensuring testing repeatability, feasibility, usability and quantitative data capture.

MODEL CONCEPT

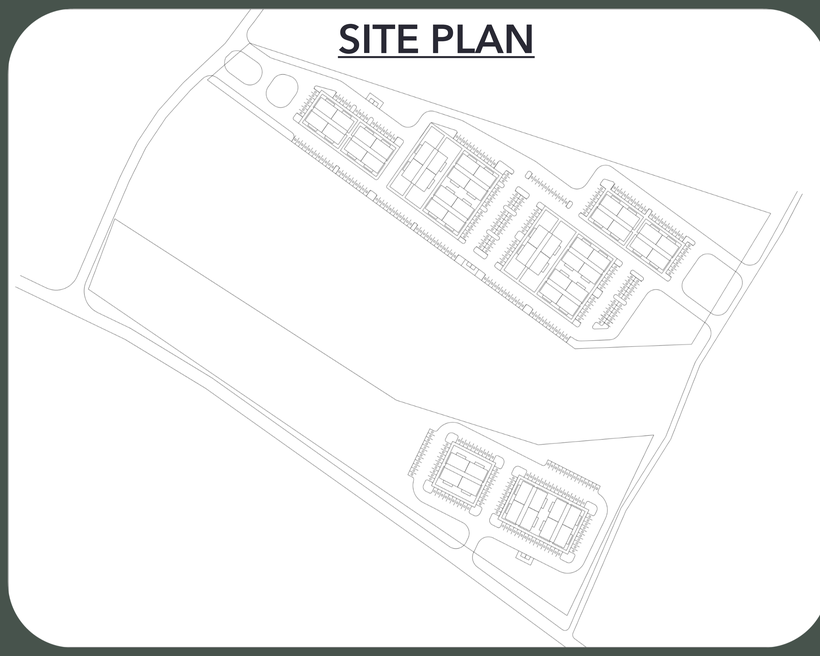


LAST SEMESTER

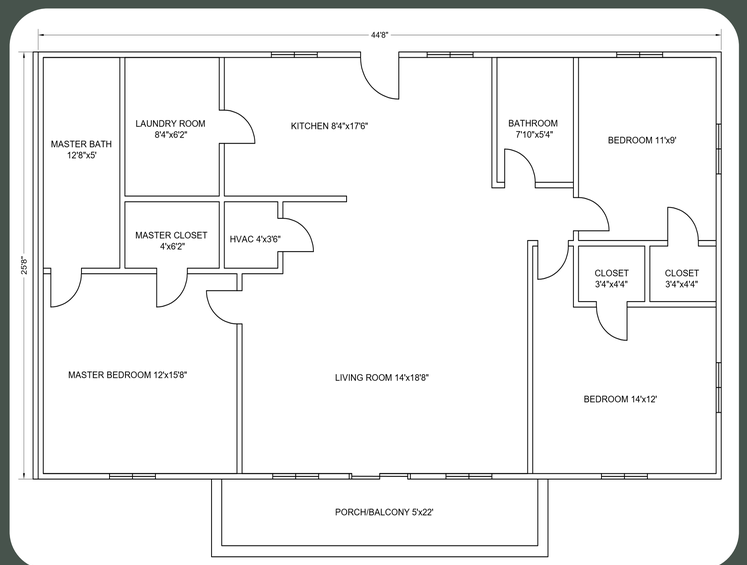
- 4 Alternatives Considered
- LEED Evaluation – Certified Status (40pts)
- Capital and Life Cycle Cost Analysis
- Net Present Value $38.5M - $52M
- Approximate Construction Timeline

Land Acquisition	$560,000
Construction Costs	$4,420,000
Engineering Fees	$500,000
Total Estimated Capital Cost	$5,480,000

SITE PLAN



ONE UNIT LAYOUT



CONSTRAINTS & STANDARDS

- Federal Emergency Management Agency
- Edwards Aquifer Recharge Zone
- United States Soil Conservation Service
- Hays County Development Regulations
- International Fire Code

SOIL PROPERTIES

According to the USDA Web Soil Survey (WSS), the site lies within the Texas Backland Prairie region, where the soil structure is predominantly clay with some rubbly associations typical of the Rumple Comfort series.

Mostly, high plasticity clays prone to shrink-swell behavior with a shallow bedrock depth of about 22 to 39 inches.

SITE SELECTION

MATERIAL EVALUATION

ILD	Theoretical Deformation (in)
14	0.062
43	0.020
51	0.017
65	0.013