

Final Project: Mitigating Heat Vulnerability for Phoenix

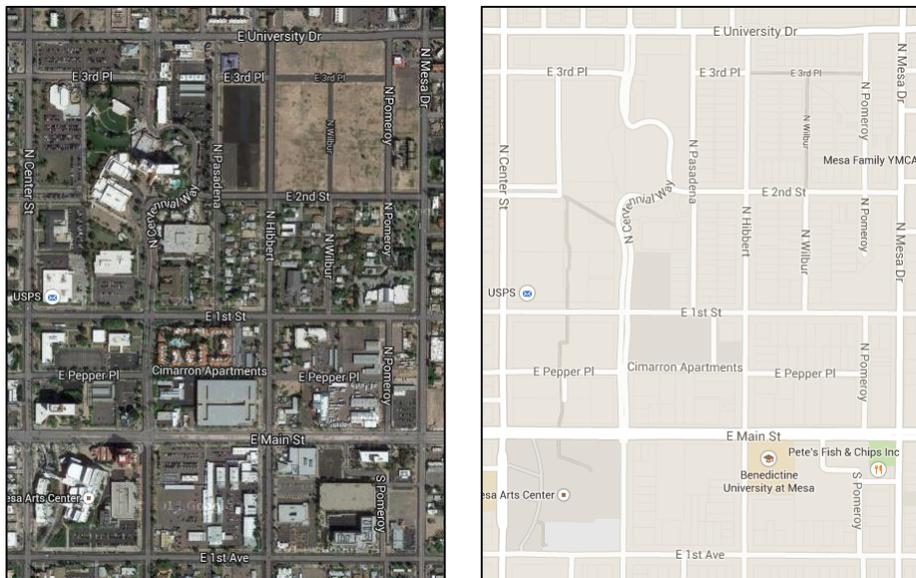
HO: Thursday, January 15th, 2015

Final Project

DUE: Thursday, April 23rd and Thursday, May 7th, 2015

Project Description

After successful completion of your Construction Engineering or Management degree from Arizona State University, you have set up shop as a contractor in the Phoenix Valley. Your latest project as a contractor focuses on the redevelopment of land in Mesa, AZ. The specific site is bounded by: University Drive to the north, Central Street to the west, Mesa Drive to the east, and 1st Avenue to the south. This area is shown below:



This specific location will be mixed-use, and will consist of: (1) small commercial retail space, (2) small commercial office space, (3) single-family residential homes, (4) multi-family residential homes, (5) and other unique building types, such as schools, libraries or museums. For the final project, there will be twenty teams total. Ten teams will focus on the new development of that mixed-use space type, while the other ten teams will focus on adaptive reuse for that mixed-use space type. Within each development type, two of the ten groups will each focus on one of the five space types listed above.

	Commercial Retail Space	Commercial Office Space	Single-Family Residential	Multi-Family Residential	Other Building Types
New Development	Team 1	Team 2	Team 3	Team 4	Team 5
	Team 6	Team 7	Team 8	Team 9	Team 10
Adaptive Reuse	Team 11	Team 12	Team 13	Team 14	Team 15
	Team 16	Team 17	Team 18	Team 19	Team 20

Since increasing temperatures in the valley have become such a prevalent issue, the mayor of Mesa, Dr. Kristen Parrish, is asking for all construction projects to explicitly address how they will mitigate this threat. All construction endeavors, including materials and methods used, should be strategically chosen to combat the issue of heat vulnerability in the Phoenix metropolitan area.

Being a very innovative mayor, Parrish has opted to hire an integrated project delivery team based on their presentation to the City of Mesa's Planning and Engineering Divisions, rather than via a hard bid. The integrated project delivery teams will include designers, engineers, and contractors. Your team will be the General Contractor leading the contractor team. The contractor team is responsible for the following scope of work: **(a)** the roof, **(b)** the windows, **(c)** the building envelope (the exterior skin, the insulation and the interior), **(d)** the structural system, and **(e)** the building mechanical systems.

The mayor has the following goals for the building:

- The building will mitigate heat vulnerability issues, and will be designed and built in such a way that it is a precedent for future construction.
- The construction time for this development will be expedited to bring in new tenants as quick as possible.
- The building will serve as a demonstration space for energy-efficient technologies.

Each general contractor team (represented by a team of 4 or 5 students) will prepare a description of their proposed concept for the building. The team will write a written report where they present **three building concepts, how they developed these, the concept they think is best (one of the three), and why they selected that concept.** Each team will be expected to produce a **written proposal** describing all aspects of their building concept. This report should include, at a minimum, the following sections:

1. **Cover Page** listing all team members names, the building type, and new/adaptive re-use project
2. **Table of Contents**
3. **Executive Summary** that briefly summarizes your proposal. This is limited to **1 page!**
4. **Introduction** that introduces the team, their expertise, and why they are qualified to do this project. Recall that this proposal will go directly to the Mesa City Council, so be succinct! The introduction should also introduce your three possible concepts and state which one you chose and why (this statement should be no more than 3 sentences as you will describe in more detail later).
5. **Background** that describes the team's understanding of the project, *including a description of how the mayor's goals translate into technical goals for the team.*
6. **Proposed Concepts** that describes three building concepts and how each of these concepts meet the mayor's goals. This should reference any research you did on materials, methods, and systems (you will likely want to leverage the selection tables provided on blackboard). Photos and other illustrations will augment this section and should be used if possible. This is the team's chance to impress the project manager with their knowledge of the available system(s) for each of the scope areas (a-e listed above).
7. **Selected Concept** that states which of the three concepts you recommend be built and explains why you selected the concept you did. Photos and other illustrations will augment this section as well and should be used if possible. Make sure this section is clear about *why the proposed concept was selected.* (Hint: the reasoning should be based on the concept's ability to meet the mayor's goals.)

8. **Proposed Schedule** that describes how (e.g., in what order) the team will install the selected concept. This does not need to be very detailed, but should also reference the alternative tables and explain the relative schedule benefits or drawbacks of the selected concept.
9. **Project Value** that describes qualitatively how the team anticipates delivering value to the City of Mesa that is aligned with the cost of the project. Note that specific costs need not be presented, but this section should demonstrate an understanding of whether or not the proposed system(s) concept would involve additional costs than a “typical” building of your type. This is also the “but wait, there’s more!” section of your report where you explain that in addition to receiving a building that meets the City’s needs, this also offers the City some qualitative benefits; for example, a museum may strengthen the sense of community or bring additional tourism.
10. **Appendices** that will include resumes for each of the team members (as Appendix A) and any calculations or supporting materials (Appendix B – Appendix n). Each Appendix should be labeled. All alternative tables should be included in the Appendices.

Each team will be responsible for making a presentation to the mayor and the City of Mesa’s Planning and Engineering Divisions, as well as the public. This presentation will be your team’s “pitch” to the mayor and City Divisions, where you try to “sell” the concept your team thinks is best. This presentation will be evaluated according to the rubric posted on blackboard, but there are no rules about who speaks, how long any given speaker speaks, etc. How you deliver your team’s pitch is entirely up to you. You will have **10 minutes** to make your presentation, not including time for Q&A.

Learning Objectives

For each team, this project addresses the following learning objectives for the course:

1. **Remember** and explain the vernacular of building design and construction including terminology, units of measure, standard designations, sizes, graduations, testing methods, reference standards, and regulatory codes.
2. **Summarize** the basic processes of designing and constructing a building.
3. **Summarize** the differences between various types of excavations and building foundation systems and components, and **explain** those systems most currently in use.
4. **Summarize** the differences between various types of building structural systems and **explain** those systems most currently in use.
5. **Explain** why we seek to keep structures free from water infiltration and **remember** the systems used to do this, including roofing, caulking, etc.
6. **Summarize** various mechanical, electrical, plumbing, and vertical transportation systems.
7. **Utilize** teamwork and team-building skills to **integrate** information from various team members.
8. **Present** construction method and material options and **explain** the advantages of each in written, oral, and graphical communication.

Timeline

Presentation

All teams will be ready to present their pitch in class on **Thursday, April 23rd, 2015**. Dr. Parrish will draw numbers from a hat to determine presenters for Thursday (April 23rd), Tuesday (April 28th), and Thursday (April 30th). **All presentation materials must be turned in to Dr. Parrish on blackboard and all students should show up to class prepared to address a professional audience.**

Written Report

All teams will need to send their written reports to Dr. Parrish by the final exam time: Thursday, May 7th. Late proposals **WILL NOT BE ACCEPTED. Your team will take a zero on this portion of the final if your proposal is not uploaded on blackboard by 4:20 PM on Thursday, May 7th.**

Grading

Refer to the Final Project Rubrics on Blackboard.