

San Marcos Building's Evacuation Routes: Progress Report

San Martian Evacuators



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1. Introduction

1.1 Summary

The San Martian Evacuators (SME) have outlined the work for the revised standardized emergency preparedness map project to ensure the smooth workflow for the submission to our City of San Marcos (CoSM) clients. Our key objects remain the same, the first being, developing standards for emergency preparedness maps, to ensure similar data between all facilities. We will create maintainable and shareable maps and data that are accurate and updated, and we will produce static maps to be displayed within these selected city facilities for staff and visitor use.

In this progress report, we have divided our workload into three task sections: Data Collection and Cleanup, Data Processing and Standardization, and Template Creation. These tasks were broken into further sections that include Work Completed, Present Work, Future Work, and Challenges. This was done to highlight the project's timely process and future agenda. Additionally, the scope of the project and timetable are two sections that have been revised from our original proposal to fit our timely schedule and ensure the proper completion of the project.

1.2 Purpose

The CoSM has outdated emergency preparedness maps that need to be revised and updated, the San Martian Evacuators were tasked to create new map for a select five buildings and implement a template standard to be used for future maps in CoSM facilities. Doing these processes entails the collection of data through ArcGIS Field Maps via site visitations, the processing and standardization of the data both given by the city of San Marcos as well as that collected, and the creation of a Python script to be used as a future template for other San Marcos city buildings. This process has been carried out in phases since the beginning of the project in late January and will conclude with the submission of our project on April 29th, 2026.

1.3 Scope

This project focuses on the city-owned facilities within the San Marcos city limits. As our project has progressed, we have decided to narrow our focus to only three buildings, for the purpose of properly reaching our projected deadline. Originally, in our research proposal, we were tasked with five selected buildings; however, due to a time constraint and approval from our client, we have discarded the San Marcos Activity Center and the Public Library. City Hall, Grant Harris, and the Municipal Building, seen in Figure 1, are the three buildings we have

shifted our main focus to. This revision will aid in the completion of the project on April 29th, 2026.

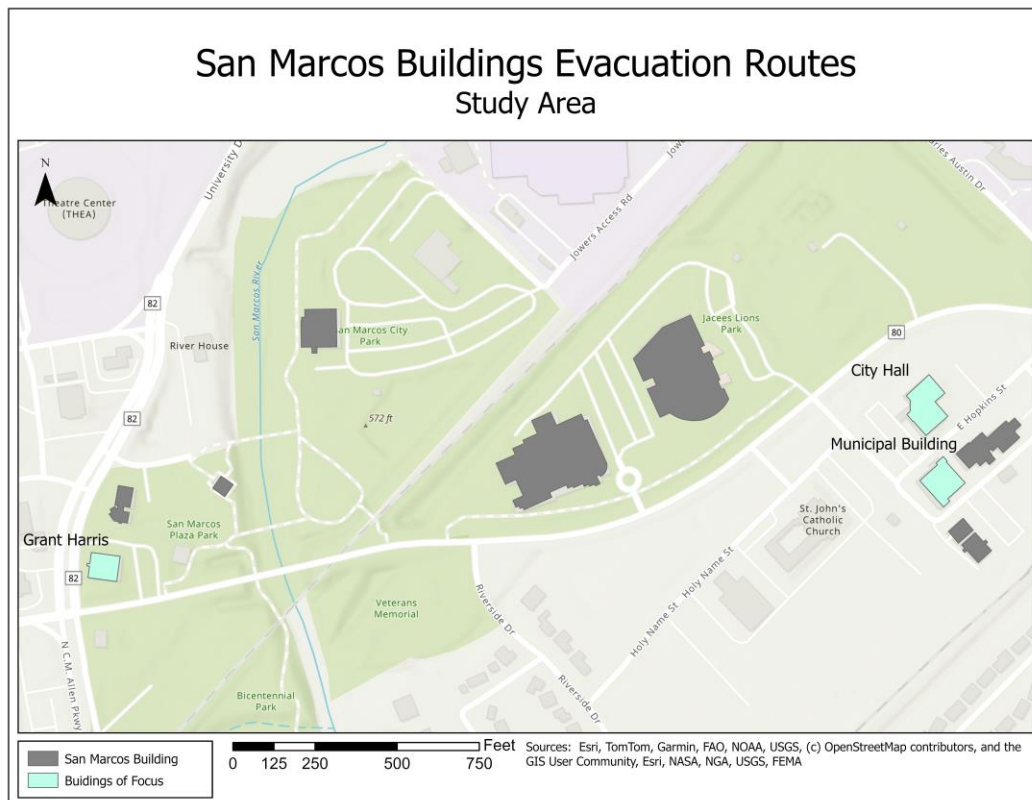


Figure 1. Area of interest

2. Tasks

2.1 Data Collection and Cleanup

2.1.1 Work Completed

Primary data collection has occurred for our three selected CoSM facilities: Grant Harris, City Hall, and Municipal buildings. Using the Field Maps app, we did field work at the three buildings on March 6th, March 9th, and March 25th, 2026. We decided to not use the Survey123 application since the Field Maps application was well equipped for our data collection. Seventeen features were collected including Doors, Defibrillators (AED), Emergency Exit Signage, Fire Extinguishers, Fire Alarms, Fire Alarm Pulls, First Aid, etc. Additionally, forms were implemented to each feature describing items including Asset Number, Floor Level, Access Type, Relative Location, etc. Additional data was given to us from the CoSM, which included the building's floor plans and other assets (e.g., doors) that have been revised and updated.

2.1.2 Current Work

Presently, we are updating the facilities' walls in ArcGIS, by lining up the doors, and cutting out the parts that are blocking these doorways. Additionally, we made notes of walls that did not exist altogether and are needed of further revision. In map viewer, we are cleaning up the fields attached to the features, so that their responses are uniform amongst all records. This current task begun after the first data collection date, March 6th, at the Grant Harris facility.

2.1.3 Future Work

As data cleanup continues, our group members will review and collect any items that were possibly missed during our original data collection period. Additionally, for data collection, we still need to define rally points and rally zones, to properly collect this feature. After all data collection and cleanup is finalized, we will change the symbology of the features to correspond to their standard design.

2.1.4 Challenges

As data collection has almost neared its end, no complex challenges have originated. However, the longevity of this primary data collection task has caused the timetable to modify substantially. This time issue has also been affected by the current work of data cleanup. The timetable has been amended to address both timely issues.

2.2 Data Processing and Standardization

2.2.1 Work Completed

Our team created a Microsoft Excel spreadsheet to reorganize and standardize some of the original data that was given to us. We made it so that the field name of doors, walls, (etc...) was standardized between all buildings. A basic symbology was created to separate each feature in a unique way. Some of the buildings had incomplete data via misnamed or unnamed building labels.

2.2.2 Current Work

We have completed a spreadsheet that standardizes the original data we received. The dataset included room, door, and wall information, which our team organized by building and aligned with the correct records. The records of these data were then named according to the building they were found in with the same naming.

2.2.3 Future Work

For the door data, some of the door types have null values that need to be found and filled in. Additionally, the door type values are slightly confusing in how they are labeled “swing” or “door”, so those values need to be standardized for clarity as well. There are similar types of inconsistencies in the data that will be addressed with the room and wall data. We plan on also including the new data that we have been collecting into those standardized final documents.

2.2.4 Challenges

When the initial data files were received, our team identified missing and inconsistently labeled data that made the process more challenging. We are also concerned about how smooth the standardized .CSV file will be imported back into ArcGIS. This issue will be addressed in the coming weeks.

2.3 Template Creation

2.3.1 Work Completed

In our original research proposal, we declared Model Builder as our preferred application, however, since then we have switch to the Python program. For our final task, we have created numerous different Python scripts for modifying data. These scripts include selecting features, creating room points, and running Euclidean distance from each point. We have also created some quality-of-life scripts that allow us to prevent broken code. It does this by ensuring the data we are using exists, so our scripts do not break when running faulty inputs.

2.3.2 Current Work

Currently, we are creating more scripts to make the whole route creation plug-and-play. Doing this will make it so any user, no matter the level of Python experience, can run the code. Additionally, the least cost path code block creation is currently being determined.

2.3.3 Future Work

In the next few weeks, we would like to employ a model builder in our code by converting the Python scripts to Python tools in their own toolbox. This would allow the user to interact with a more presentable UI rather than editing and running a Python script. Once finished with the standardization and template creation, we will create the three final static maps for our selected buildings and then further submit the data and template to our client.

2.3.4 Challenges

When creating these Python scripts, we realized that we need to create more code for the current block to work. This has led us to start working backwards and generate quality of life code that will ensure the code will run smoothly. No other challenges have arisen for template creation.

2.4 Updated Timetable

The San Martian Evacuators have revised and updated our timetable based on the tasks completed and those that are planned. To better suit our project, we altered our original timetable in the project proposal from six phases to four, as seen in Figure 2. After starting data collection and clean up, it was realized that we would need more time in these phases, so we consolidated them into phase two. Additionally, we split up the original phase five into either the phase before it or the final phase. Since we determined we are no longer using Survey123, nor Model Builder, these applications are no longer shown on our timetable. This new updated timetable has made our plan more flexible for the group members. Updating this timetable also gives us more room to expand upon each task.

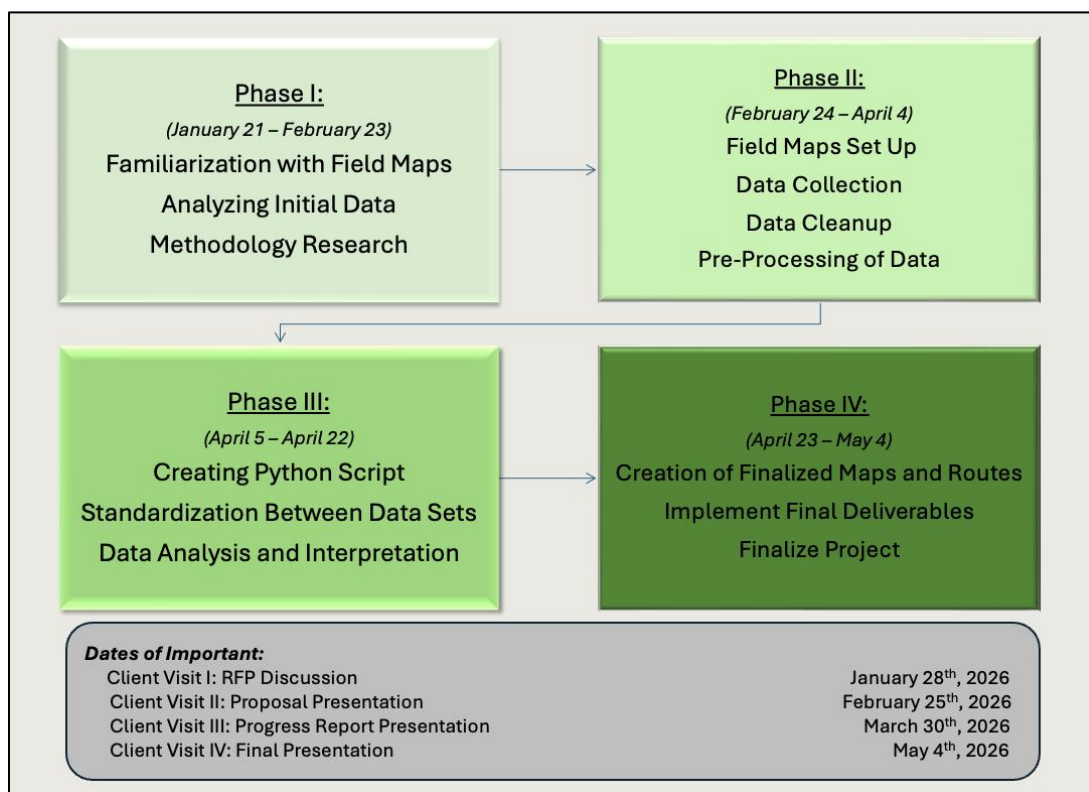


Figure 2. Revised San Martians Evacuator's Timetable

3. Conclusion

Through data collection, standardization/processing, and script creation, we plan to create a workflow that streamlines modern evacuation map creation. Achieving our goals will provide the CoSM facilities with updated routes as well as a standard for any future building developments, while also reducing the workload of future GIS employees. Additionally, this standardization and script creation will be produced for static maps of Grant Harris, the Municipal building, and City Hall for faculty and public use. A revision was made over our timetable to better fit our agenda, and the scope was amended from five selected facilities to three to be more suitable for our timely schedule. With this task implementation, we can ensure that city officials will have an easier and faster time evacuating during an emergency.