Author's Names

1501 Mercer University Drive

Macon, GA 31207

December 7, 2020

Don Hicks, Director of Facilities, and Associates

Mercer Campus Improvements Department

1937 College Drive

Macon, GA 31201

Dear Don Hicks and other members of the Campus Improvements Department,

This recommendation report, entitled “Mercer University Parking Garage Proposal”, has been put together by the members of the Mercer community, which consists of Author's Names. We are responding to a general consensus by the student population that more parking would be of huge benefit to us and the faculty (Neill, 2015). We have all been very excited to jump on board for this project and discuss potential solutions to Mercer’s parking situation and share what we believe is the best way forward. We hope that you consider our proposal to be worthy of further pursuit.

We have determined that Mercer has a parking issue, and in order to solve this, we recommend construction of a four-story parking garage. This project, if implemented, is expected to increase the total parking at Mercer University’s Macon Campus by 14%. The Parking Deck will take approximately 2 years to construct and will cost 12 million dollars. It would also increase the safety of students who commute.

We are very excited to be sharing this project, as we feel that many Mercer students would support it, and it could also give Mercer University a clear path forward for expansion. Mercer can’t expand its student population without first addressing this problem. We hope that you consider our proposal and the project to be potentially beneficial to the student and faculty population. Our team can be contacted via email at authors@live.mercer.edu.

Sincerely,

Author's Names

Mercer University Parking Garage Proposal

Author's Names

Mercer University School of Engineering

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Executive Summary

In this proposal, our team is requesting approval to plan, schedule, and implement a construction strategy for a three-story parking garage outside of Mercer Hall on Mercer University's Macon campus. Mercer's campus is consistently rife with parking-related issues, ranging from late attendance and scheduling problems to unsafe driving practices. The proposed parking garage will increase parking space by 14% and increase campus safety for commuting students.

Our team consists of four students studying mechanical and electrical engineering at Mercer University. Steeped in schedule management and team collaboration, our team plans to organize all necessary 3rd-party companies to carry out the construction and zoning of the parking garage.

The parking garage will be constructed utilizing the following dimensions: 50,000 square feet on the bottom deck, with a height of 4 stories. The construction of the garage may also include the development of a small retention pond if required by law. The exact design (with regard to floor height, elevators, stairwell dimensions, etc.) for the parking garage will largely be overseen by the 3rd-party construction company, in accordance with our team's specifications. The approximate cost for the project will be $12 million, according to national estimates and a quote from Sheridan Construction.

A parking garage would be the best way to provide convenient parking for all Mercer faculty and staff. Construction of this garage would cost around $12 million and would take around two years to complete. As Mercer engineering students, we are very experienced in problem solving in the Mercer community, and would be well equipped to solve the issue.

1. Introduction

There is currently not enough parking at Mercer University for all students and staff to have a parking spot. As of 2019 the Mercer Police Department has issued 3,715 parking decals while there are only 2,927 parking spaces at Mercer (Eason,2019). This parking deficit causes delays and added stress to Mercer's students and faculty.

1.1 Purpose

As Mercer continues to grow as a university, the parking needs are only going to increase. To solve this issue, we have determined that building a parking garage in the Mercer Hall parking lot would add enough new parking spaces to provide students with enough convenient parking. The purpose of this document is to describe what led us to this conclusion and analyze how we would implement this solution.

1.2 Experience

As engineering students at Mercer University, our team has ample experience in several areas related to the issue at hand. Namely, we have experience in team management. Each team member has academic experience with participating in, supplementing, and managing multi-faceted projects. This experience has well prepared our team to effectively communicate with and hire out a 3rd party contractor to construct the parking garage.

A second way our team is prepared to take responsibility for this project is our basic construction background. Several members of our team have experience in areas such as concrete-mixing, wooden structures, and roofing. While not extensive, we believe our experience will allow us to communicate well with a contractor to organize and plan our proposed solution.

1.3 Overview

The following document will include a technical volume and operations plan. The technical volume will include a merit and feasibility analysis of solutions to the parking problem here at Mercer, and why constructing a parking deck is the best solution to the problem. After the technical volume, there is an operation plan which will include a management plan, cost analysis of the solution, plan for quality control, and the timeline of the project.

2. Technical Volume

As previously mentioned, the problem facing Mercer University is an inadequate amount of parking spaces. The proposed parking garage reduces this issue. Providing over 550 brand new parking spaces, our solution will increase the parking availability on Mercer's campus by 14%. Furthermore, this increased parking will lead to reduced parking time for students therefore lowering the percentage of tardy commuter students and increased safety among students due to the nature of the surrounding area and time spent circling campus or parking off campus.

2.1 Feasibility Analysis

To determine a solution to Mercer University's parking problem, possible solutions were compared against feasibility criteria. For a solution to be considered feasible, it must meet the following criteria:

- must cost less than 12.5 million dollars to implement
- must not increase the inconvenience of finding a parking spot

- Allows more students to park on campus

The cost criteria were determined based on a fraction of what Mercer University has spent on buildings in the past. Our team looked at the second phase of the Lofts at Mercer Landing, which cost 25 million which included a new parking garage (Construction Begins on Second Phase of Lofts at Mercer Landing). Since the money also went to increasing the available housing on Mercer's campus, we determined that a feasible solution to the parking problem would cost half of what Mercer has been willing to spend in the past. A feasible solution to the parking problem will cost less than 12.5 million dollars.

The second feasibility criteria were that the solution to the parking problem must not increase the time it will take to find a parking spot or the time it will take for the student to get where they need to go. Mercer University's Chief of Police, Gary Collins, said "parking is not the issue, but people actually complain about the convenience of parking." (Eason,2019). In order to fix this problem at Mercer first it must be determined what makes a parking spot inconvenient. A parking spot is convenient if it is easy to find and close the student's destination. Therefore, a feasible solution must not increase the inconvenience associated with finding a parking spot.

The third and final feasibility criteria is that the solution must allow more students to park. Currently Mercer University does not have a parking spot for all the decals that it issues, so at any given moment there isn't enough parking if everyone is one campus at the same time. The image below is a breakdown of the parking available on campus versus how many decals are issued.

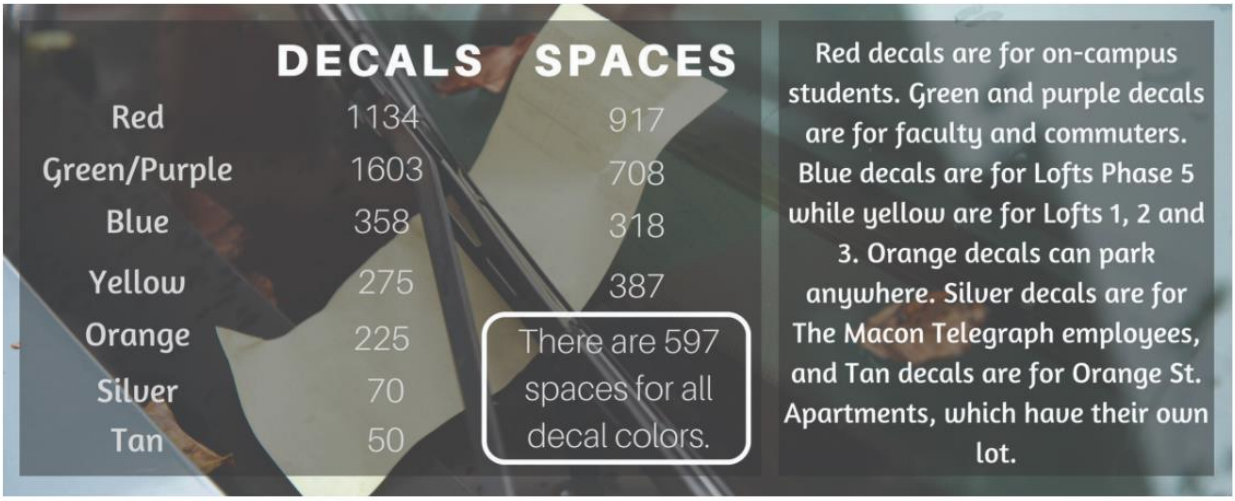


Figure 1: the number of available parking spaces versus the number of decals issued courtesy of Mercer Cluster

As the image above shows, only the yellow decals have enough parking spots of all the decals issued. "Kyle Sears, the Director of Media Relations at Mercer University, said "On any university campus, you are going to have more decals than parking spaces because you never have everyone on campus at the same time," (Eason,2019). For faculty and commuting students what Kyle Sears is saying makes sense, but resident students always need a parking spot on campus. Whether you live in a house or in an apartment complex it is expected that a parking spot is available near your home yet for 257 students, there is not a place for them to park at

their home. For that reason, a feasible solution to Mercer's parking problem must add additional parking places.

Four solutions were tested against the feasibility criteria: build a parking garage, assign parking spaces, implement shuttles for off campus parking, and do nothing. Constructing a new parking garage is the only solution that met all the feasibility criteria.

Table 1: Feasibility Matrix

	Less Than $12.5 Million	Makes parking more convenient Does not add additional time	Allows more students to park
Parking Garage	✓	✓	✓
Assigned Parking Spaces	✓	✓	
Shuttles for off Campus Parking	✓		✓
Do Nothing	✓	✓	

To establish the cost of the parking garage statistics showing the average cost to construct parking garages in the Atlanta area were used. The average price per spot for construction as of 2019 was $19,133 according to The Wantman Group Inc (Gonzalez, 2017). Currently the parking lot near Mercer Hall has 138 spots if a four-story parking deck was constructed in its place then 550 parking spots can be added. The figure below is a rough draft of the parking deck layout, which has the exact same square footage and road size as the current parking lot.

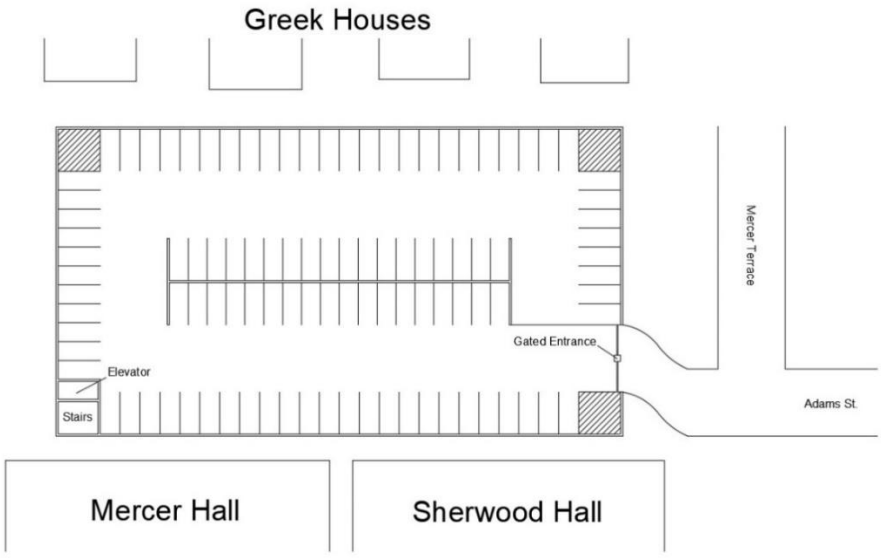


Figure 2: Rough drawing of parking garage layout

If this parking deck was built, it would cost approximately 12 million dollars and will add 552 new parking spaces.

Depending on the location of the parking garage it will make finding a parking spot in a convenient location easier for students and staff. The best location for this parking garage is the Mercer Hall parking lot. The Mercer Hall parking lot is at a central location on campus being between the School of Music and University Center. This would provide easy access to class buildings located near the Historic Quad and Cruz Plaza.

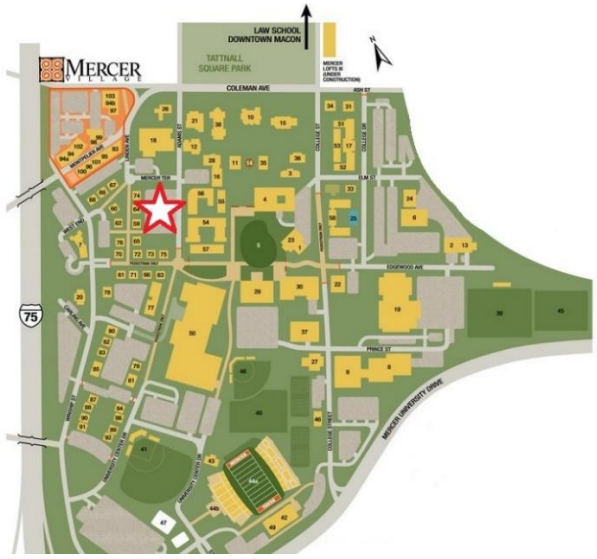


Figure 3: Map of Mercer's campus with Mercer Hall parking lot highlighted with a star.

The Mercer Hall parking lot currently has 138 parking spaces and is only available to residents with a red parking decal. The parking lot is around 50,000 square feet or 1.24 acres. The Mercer Hall parking lot provides parking to residents at Greek Village, Mercer Hall, Roberts Hall, Sherwood Hall and Shorter Hall.

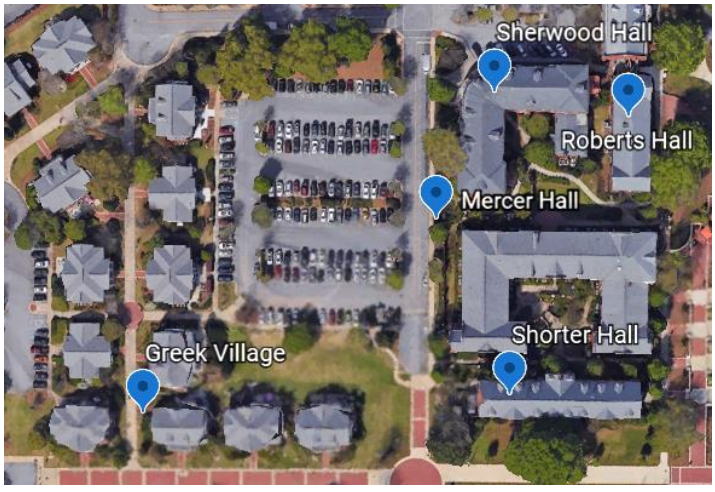


Figure 4: Mercer Hall parking lot and the residence hall that it provides for. (Google Earth,2020) [Modified by User]

As the figure above shows the Mercer Hall parking lot provides parking for a multitude of residence halls on campus. The 138 parking spaces is inadequate for the number of students that live near that area. Constructing a parking garage in the place of this lot will increase to convenience of finding a parking spot for all students that live in the buildings shown is the figure above.

Due to the nature of a parking deck, it will increase the total amount of parking spots available at Mercer University. The parking deck is estimated to have a 552-car capacity. This will add 414 new parking spots to campus parking.

2.2 Merit Analysis:

To evaluate which solution was the best option each solution was rated on a scale of 1 to 5 for each of the following criteria

- the cost to implement the solution (0= greater than 12.5 million, 5= Free)
- the effectiveness of the solution (0= No change to issue, 5= Completely solves issue)
- the environmental effects of the solution (0 = Causes significant damage, 5 = No effect on environment)
- convenience for the students (0 = Very inconvenient, 5 = Very convenient)

Each of the merit criteria is weighted equally in the merit analysis. The first merit criterion is cost. The cost that is being considered is both the start-up cost and the operating/maintenance cost. Cost is an important factor to consider with any solution because if it is too expensive to maintain are implement than the solution will not be used. The next merit criterion is the effectiveness of the solution the efficacy of the solution is important to the overall quality and value that the solution will be to Mercer. The third criterion is the environmental impact that the solution will have. Mercer being a private university must maintain a certain public image, so the best solution to Mercer's parking problem will not hurt the university's reputation. The fourth and final criterion is convenience for students. Parking is a problem that effects the students every day and the best solution will make parking the easiest on students. The following table shows the results of the merit analysis.

Table 2: Merit Analysis Results

	Parking Garage	Assigned Parking Spaces	Shuttles for Off Campus Parking	Do Nothing
Cost	2	4	3	5
Effectiveness	5	3	4	0
Environmental Effect	3	4	3	5
Convenience	5	3	1	0
Total	3.75	3.5	2.75	2.5

The worst solution was to do nothing. Doing nothing received a zero for both effectiveness and convenience because it takes no steps toward solving the problem. Shuttles received the second lowest score because of its high cost and the inconvenience it would put on students. The operation cost of a bus is between $34,000 and $38,000 per year per bus (Newby). This

solution is more expensive than assigning parking and doing nothing but much cheaper than a parking garage. Assigning parking to all students is the second highest solution because it received average scores in all categories. The only cost associated with assigning parking is labeling the parking spots. This solution is not very effective because it doesn't add any parking spaces to campus. The best solution is building a parking garage. Even though this is the most expensive solution it is also the most convenient and the most effective solution to Mercer's parking problem.

2.3 Evaluation Plan

To analyze the project success, our team will perform careful comparisons between the parking deck's final metrics and the project goals. The goals and standards for the project are increasing the number of additional parking spaces, costing less than 12.5 million dollars, and reducing the parking-time for students. Each of these metrics will be evaluated in a specific, distinct manner.

Many of the quantities can be compared by simply checking the final value for the measured quantity with the estimated or projected quantity. The final cost of the project can easily be compared with the estimated cost to determine the success of the project with regards to budget and finances. Similarly, the number of spots provided with the finished parking deck can be compared with the estimate for additional parking space to measure success for the project original project goal, expanding parking on campus.

To determine some of the more qualitative aspects of our project goals, our team is intending to carry out several surveys. These surveys will consist of 5-6 questions that will aid in our measurement of the parking deck's success. One survey as seen in Table 3, a deck-specific parking survey, will be sent out after the parking deck is complete. This survey will simply ask students for their opinions on the new construction. If results are generally positive, our team will consider this a positive metric in measuring the success of the parking deck. Another survey shown in Table 4 is a general parking survey, will be sent out both before and after the construction of the parking deck. The results should indicate either:

- general agreement that parking time and parking safety has been reduced
- that nothing has changed

If the first option is obtained in the survey, our team will consider the parking deck a success with regard to parking safety and parking time reduction.

Table 3: Deck-Specific Survey (Post-Construction)

Question #	Question	Your Answer
1.	Have you parked at the new parking deck on Mercer's Campus (Y/N)?	
2.	Do you approve of the new parking deck on Mercer's campus (Y/N)?	
3.	Do you intend to park at the new parking deck in the future (Y/N)?	
4.	Would you agree the parking deck has helped solve the parking issue at Mercer? Why or why not?	

Table 4: General Parking Survey (Pre- and Post-Construction)

Question #	Question	Your Answer
1.	Do you consistently feel unsafe in-or-around parking areas due to aggressive driving (Y/N)?	
2.	Do you believe Mercer has sufficient parking availability for its students (Y/N)?	
3.	How long do you spend looking for parking on average?	

3. Operations Plan

In our operations plan, we intend to show in detail our specific layout for the organization, plan implementation, cost analysis, and quality control.

3.1 Management and Organization

As the team responsible for overseeing the parking deck's construction, we are placing a proper management plan at the top of the priority list. Several human resources will be steeply involved in the formulation and completion of the parking garage. These resources include a 3rd party contractor to perform all necessary construction work, Mercer Police (for blocking off necessary areas near the construction zone), and, if required, a second 3rd party company responsible for removing all trash and debris from the premises both after the destruction of the original parking lot and after the completion of the parking garage.

Our team plans to have consistent, direct, face-to-face interaction with the chosen contracting company from the first step of the process to the day of completion. Any changes or deviants from the initial cost or time estimates will be immediately brought to the team's attention, and will be dealt with swiftly and effectively. While some changes due to material delivery and weather requirements may not be easily altered, our team will ensure that the project is completed in a similar timeline to the original time estimate.

To ensure that our plan is carried out quickly and efficiently we have divided the workers needed into different groups and organized them on in a chain of leadership. At the top is Mercer Administration. Everything that is done will need to be approved by Mercer Administration before it is carried out. Under Mercer Administration is the Mercer Campus Improvements Department and our team of engineers. We will work closely with the Campus Improvements department to ensure that every aspect of this project is up to Mercer's standard.

Under our leadership there are two separate companies that will be decided on by the University. One company is for constructing the parking garage and another for designing and zoning the garage. These companies will report directly to us and the University will receive frequent updates on the progress of the project.

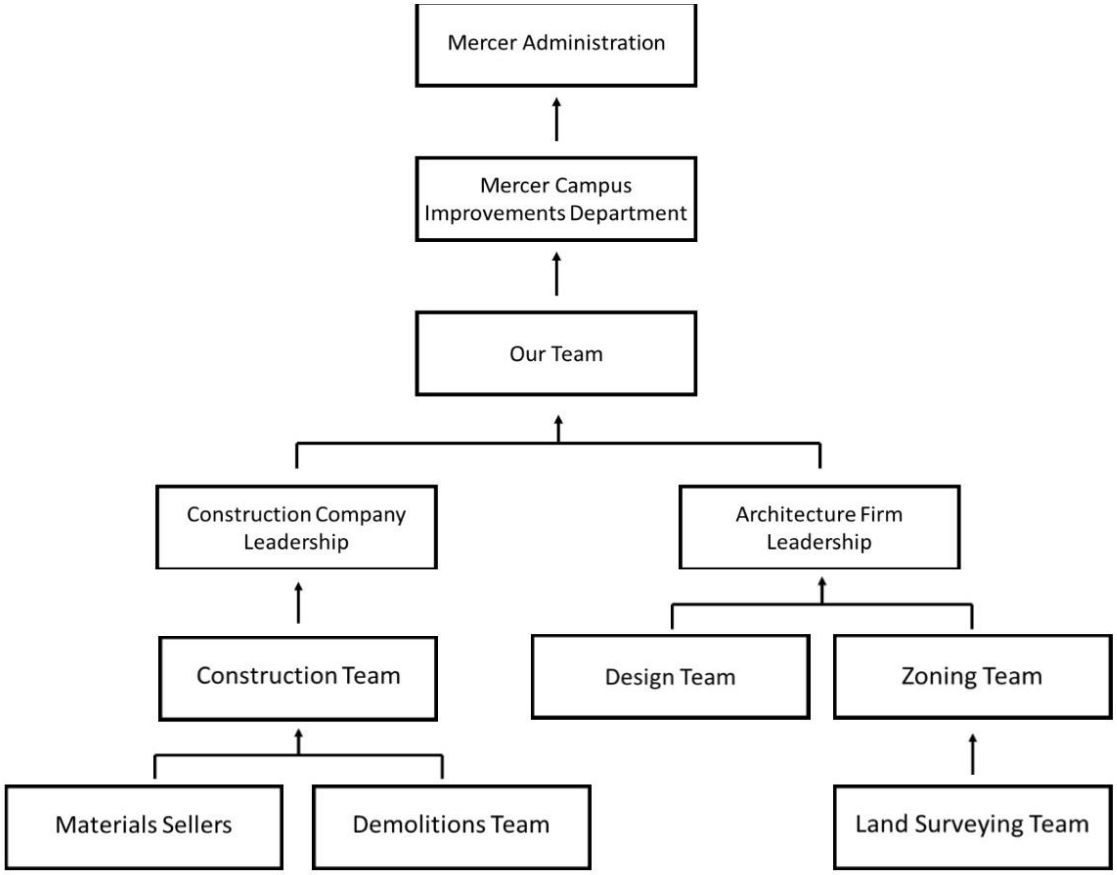


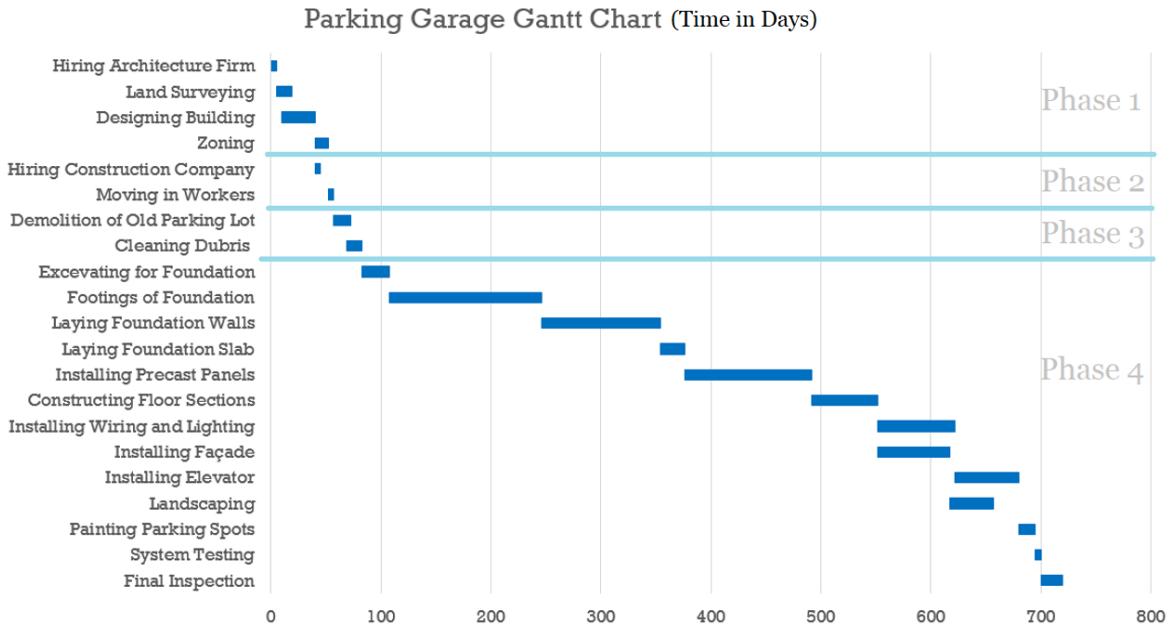
Figure 5: Chain of leadership (Arrows point from group to the group they report to)

3.2 Plan Implementation

According to estimates given by Sheridan Construction, a parking garage of this size would take about a year to complete. This estimate included aspects of clearing the current parking lot and constructing the parking garage. In addition to this year we have added an additional period of time (6 months) to allow plans for the garage to be made as well as zoning and surveying of the land. In total the whole project should take around one and a half years to complete plus or minus about 6 months.

To make sure this given time period is used effectively and does not fall behind schedule, we have divided the project into four phases containing many subtasks which are displayed on the Gantt chart below times for each subtask are calculated based on a similar parking garage constructed for Redland Tech. At the end of each phase Mercer administration will be updated on the progress of the project to make sure it is to their satisfaction. Below, the Gantt chart each phase is described in more detail.

Figure 6: Gantt chart displaying each step in the construction process.



1. Planning and Designing (2-3 months)
    - All the necessary people will be hired to ensure the project is completed. This includes architects, contractors, and construction workers.
    - Land will be surveyed, and plans will be made and finalized.
    - Necessary permit will be obtained.
    - Final cost estimate is made.
2. Preparing Students and Staff (1 month)
    - The Mercer Police Department will be notified of the construction.
    - The Mercer Hall parking lot will slowly be blocked of and residents will be encouraged to park in alternate spaces.
3. Preparation of Site (1-2 months)
    - The old pavement will be removed and cleaned from the site.
    - Materials for construction will be purchased and shipped to the site.
4. Construction of Garage (1-2 years)
    - Crew hired in phase one will begin work on the garage during the summer of 2021.
    - Progress will be checked weekly to make sure schedule is kept.

For our project schedule, each stage (1-4) represents a particular aspect of the project. For each stage, there is an associated series of checkpoints and tasks for individuals working in that scope of the project.

The following table outlines the responsibilities of each party involved in the construction and maintenance of this parking garage. For each stage of the construction process the necessary parties are given an “R” if they are the party responsible, a “C” if the party needs to be consulted,

a “I” if the party needs to be informed, a “Q” if the party is responsible for insuring the quality of that stage, and a “A” if the party is accountable for that stage.

Table 3:Responsibility Matrix

Tasks	Group 2	Building Maintenance	Campus Improvements Department	Construction Contractor (Sheridan)	3rd-party Inspector (Paragon)	Civil Engineer	Mercer Police
Planning & Scheduling	R	A	C	R,A	I	I	I
Parking Deck Construction	A	I	A,C	R	R	R	C
Parking Deck Inspection and/or Approval	I	I	C,I	A	R	R	I
Initial Quality Control	A	I	I	A	R	R	I
Maintenance Quality Control	A	R	I	I	I	I	I

R-Responsible, A-Accountable, C-Consulted, Q-Quality Control, I-Informed

3.3 Cost Analysis and Budgeting

The cost of building a parking garage can be broken down into three main categories. Those being:

- Labor Cost
- Cost of Materials
- Architect/Designer

To get a rough estimate of how much a parking garage we were able to use statistics provided by Gordian’s RS Means Construction Cost Database. This database provides an estimated cost per square foot to construct a parking garage for each of the categories listed above. RS Means provided an estimate for unionized labor and non-unionized. Since unionized labor is more expensive those are the prices shown in the table below. The table below is a cost breakdown of building the parking garage using the design specifications listed in the technical volume. If a 4-story parking garage was constructed in the Mercer Hall parking lot it would be approximately 200 thousand square feet.

Table 4:Cost Breakdown for a parking garage. (Gordian, n.d.) [Modified]

Category	Unit Cost per ft^2	Quantity	Cost
Architect/Designer	$3.40	200,000 ft^2	$680,000.00
Materials	$45.39	200,000 ft^2	$9,078,000.00
Labor Cost	$11.39	200,000 ft^2	$2,278,000.00
Total Cost			12,036,000.00

3.4 Quality Control Plan

To ensure the project is properly completed and maintained, our team developed a two-stage quality control plan. The initial stage of this plan focuses on determining the quality level of the completed project (before considering any sort of repetitive maintenance). This stage will be most related to issues such as structural integrity, electricity, safety, and water runoff, and will be largely overseen by the 3rd-party construction company. The second stage of our quality control plan, the maintenance stage, will focus on the continual maintenance and upkeep of the parking garage and will be carried out by an "in-house" team currently established at Mercer University.

3.4.1 Initial Stage

As previously mentioned, the initial stage of the quality control plan focuses primarily on the finished product, the complete parking garage. According to Sheridan, the construction company typically employed by Mercer for building projects, several metrics exist to assess the quality of a completed parking garage. First, the company will analyze the surrounding environment to determine if a retention pond is necessary to reduce water run-off. A conclusion of this analysis will complete any environmental concerns related to the project. Second, the contractors will hire out an inspection company Paragon Inspectors to run a full quality inspection of the building. This should account for all legal quality requirements and certify the building for public use. Finally, a civil engineer will sign off on the completed structure. This signature is a stamp of approval that the parking deck meets all necessary specifications regarding usability, reliability, and safety.

3.4.2 Maintenance Stage

The maintenance stage will be comprised of any and all work associated with keeping the parking deck in optimum condition on a day-to-day basis. For a parking deck, this includes upkeep such as light-fixture repair, electrical fixes, pest control, occasional painting work, and elevator repair. The team responsible for various types of such upkeep at Mercer University is the Building Maintenance team, under Director of Facilities Don Hicks. Henceforth, our team will notify and utilize the Building Maintenance team to perform quality control on the parking deck. With their consistent attention and maintenance, the parking deck is guaranteed to remain in prime condition throughout its lifetime.

4. Conclusion

Based on our research, we recommend the construction of a new parking garage. It would vastly impact and improve Mercer's parking situation. If selected for this construction, our team will take on full responsibility for the planning and scheduling of the project. All proper teams will be contacted, consulted, and employed to complete the parking garage in less than 2 years. Upon completion, Mercer's parking space will be increased by 14%, which will likely reduce parking time and increase safety on Mercer's campus. To confirm the success of the parking deck, several surveys will be distributed to the student body both before and after the construction. The total cost for the project will be approximately $12 million, which is under the threshold value of $12 million Considering the widespread need among Mercer's faculty and student body, this cost is negligible compared to the benefits associated with improved parking. With this new parking

construction, Mercer's campus will be safer, more efficient, and easier to navigate. Consequentially, the college will be more attractive to students, new faculty, and even Mercer employees that utilize on-campus parking. We appreciate your concern for this prevalent issue, and we ask for your approval to implement the most strategic solution available to solve the problem and improve Mercer's campus.

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