# *Letter of Transmittal*

DATE:       March 28, 2020
TO:           Brigham Young University-Idaho Administration
FROM:      Members of Group 5
CC:           Rex Fisher
SUBJECT:   Recommendation Report to Improve Student Parking and Transportation

Attached is the report of our study on improvement of large-scale parking and transportation problems at BYU-I's Campus.

Our methodology for investigation and recommendation of solutions is as follows. We've done background research, and decided on 3 solutions that we think would best solve the parking & transportation problem. These solutions include expanding the number of parking slots, making better use of the currently available spots using zoning, and implementing some form of mass transit.

We have found, and this report shows that restructuring the current parking permit system is the best overall solution of those we considered to solve the current parking and transportation problem at BYU-Idaho.

We recommend that a redesign of the BYU-Idaho on-campus parking permit system should be implemented. Due to the amount of time required to replace parking sign panels and redesign parking tags for distribution, we recommend this solution be implemented during the 2020 summer break before the Fall 2020 semester. We would also recommend considering further the possibility of implementing or contracting out a shuttle bus system.

We appreciate your reading of this report and your consideration. We look forward to working with you on any follow-up activities. If you have any questions or comments, please contact Michael Heninger at hen19024@byui.edu, Adam Kharas at kha16004@byui.edu, or Mason Weaver at wea16012@byui.edu.

# Improving BYU-I Student Parking (and Transportation)

A Recommendation Report from CS308 Group 5

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*Prepared March 28, 2020*

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# Abstract

# "Improving BYU-I Student Parking (and Transportation)"

Prepared by: Michael Heninger, BYU-I Student

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The purpose of this report is to present possible solutions on how to solve the parking and transportation at BYU-Idaho. Our methodology for investigation and recommendation of solutions is as follows. We've done background research, and decided on 3 solutions that we think would best solve the parking & transportation problem. These solutions include expanding the number of parking slots, making better use of the currently available spots using zoning, and implementing some form of mass transit. We have found, and this report shows, that restructuring the current parking permit system is the best overall solution from those we considered to solve the current parking and transportation problem at BYU-Idaho. We recommend that a redesign of the BYU-Idaho on-campus parking permit system should be implemented. Due to the amount of time required to replace parking sign panels and redesign parking tags for distribution, we recommend this solution be implemented during the 2020 summer break before the Fall 2020 semester.

**Executive Summary**

To improve parking and transportation at BYU-Idaho different strategies were analyzed to address the various issues students run into.

Parking space availability could be addressed by expanding the number of parking spaces on campus or by rezoning parking lots to allow for students to more reliably find a spot immediately (rather than hunting around and being frustrated for several minutes and sometimes finding that there are no spaces available). A multi-level parking garage and metered parking systems are good solutions for preventing these kinds of scenarios. Especially in winter months.

The public transport that exists in Rexburg essentially ends with the Walmart shuttle bus. While this service provides students with the ability to be picked up near any major apartment complex and a few select areas on campus (every 45 minutes), its only purpose is to get students to Walmart. Students would benefit from a public shuttle service similar to what The Landing has. Creating a 2 to 3 shuttle system around campus would allow students to get picked up every 25 minutes and at more locations. There could be a north campus shuttle and south campus shuttle whose sole purposes would be to connect certain apartments and campus buildings (such as the MC circle dropoff location) in a single route and to overlap 1 or 2 other shuttle stops. This would virtually eliminate parking frustrations and driving for many students and would be worthwhile financially.

It is clear that each solution has strengths and weaknesses, and some weaknesses are deal breakers. For example a multi-level parking garage is an excellent way to generate an absurd amount of parking while using a relatively small piece of land. Unfortunately, the financial obligations up front and over time make it difficult to seriously consider as does the 20 month build time. Metered parking is an excellent solution across nearly all categories, but lacks when it comes to cost for students. Public transit is the best for students cost-wise, but it requires more time for students to get from point A to B due to waiting at pickup locations.

Overall we recommend restructuring parking permits and to further consider public transit to create the most change without spending outrageous amounts of time and money.

**Introduction to BYU-I's parking and transportation problem**

BYU-I student parking, and student transportation in general in Rexburg, is lacking. A recent survey of on-campus parking usage (*2019 Parking Survey*) shows that during peak hours (9-11:30 am), on-campus parking usage is approximately 87% full, and many large "core" lots are at 95% usage. The only readily-available form of transport for students without cars or opportunities to carpool is the Walmart shuttle, which runs only every 45 minutes and only goes between major housing locations, campus, and Walmart outside the city. While helpful for grocery runs, the shuttle is not usable for transportation anywhere else within or without Rexburg limits.

Essentially, students are left with transportation options that are either prohibitively expensive (private taxis, etc), unreliable (nearby on-campus parking), or often no better than walking to the destination instead. Currently, the best solution seems to be to own your own car, but this comes with cost and parking availability downsides. This proposal suggests a few general strategies, feasible for implementation within two years, for improving the availability and reliability of new and existing forms of transport for students. Should these strategies be implemented, one of the student body's main dislikes of the university and city will be mitigated, increasing desire for continued attendance.

In this proposal, we will investigate multiple possible solutions to the BYU-I parking and transportation problems. We will investigate the probable costs and times to implement each solution, as well as to what extent each addresses the problem as stated above. Finally, we will make a recommendation for BYU-I (and perhaps the city of Rexburg as a whole) to consider implementing.

**Methods to investigate problem solutions**

Our methodology for investigation and recommendation of solutions is as follows. We've done background research, and decided on 3 solutions that we think would best solve the parking and transportation problem. These solutions include expanding the number of parking slots, making better use of the currently available spots using zoning, and implementing some form of mass transit.

In order to compare and recommend these solutions, relative to the status quo, we've done research for each of these scenarios, using examples of other similar implementations and publically-obtainable cost and satisfaction numbers to gain representative knowledge of the solutions and their approximate timelines and budgets. To decide on which to recommend, we've weighed each aspect of the solutions as appropriate to the needs of the audience, and place those weights in the decision matrix in our conclusion. We then gave each solution ratings of 1 to 5 relative to each other (higher is better) and, after multiplying weights by rating to get scores, added together final scores to determine which solution is best for the school and city as a whole. We have decided on categories of short and long term costs, time to implement, and costs to student and student time/convenience savings. These categories are weighted based

on our understanding of what the school will find most important, with cost to itself, followed by student satisfaction and timeframe.

After our decision-matrix identifies which solution is best, we will recommend it, giving all relevant information on costs and timelines and why it came out ahead. We will then conclude this report.

**Results of research on possible solutions**

**Solution 1: Expanding parking availability**

Building a parking garage and expanded parking lots are two possible solutions to add parking at BYU-Idaho. However, as parking lots at the heart of campus are at 95% capacity while other lots are at 50% capacity, only the parking garage is worth investigating, as any expanded parking lots would be even further from campus. The pros and cons of a multi-flow parking garage are discussed below.

Parking garages support hundreds of thousands of pounds and allow parking lots to be stacked, which is attractive for storing more vehicles using less land. A parking garage may virtually eliminate the feeling that there aren't any parking spaces available and therefore reduce frustration in drivers. The shelter from snow and rain is also convenient for users.

Unfortunately there are many drawbacks to building a parking garage at BYU-Idaho. The build cost for 1000 parking spaces is about $30 million. It takes 1.5 to 2 years to build a parking garage. It takes up 1.5 acres of flat land, to be taken from the core of campus. Its poor ventilation poses health risks because of the build up of exhaust fumes. It takes longer to get in and out of a parking garage than for conventional parking lots. Varying amounts of weight applied day after day cause the structure to quickly deteriorate unless maintenance is performed regularly. Weather can also compromise the integrity of the steel structure as well. The structural chemical treatments and steel/concrete additions/replacements due to the weight and weather effects are expensive. The dim light in a parking garage makes it difficult for drivers to see other cars and people walking as well as making theft a bigger issue. Parking garages are dark even in daytime and must constantly be lit. This means that electricity will need to be factored into ongoing costs.

*Budget:*

An average parking garage has an all-inclusive upfront cost of $30 million for 1000 parking spaces (*Cudney*). The timeline for building a parking garage of course depends on the amount of workers hired, and the complexity of the garage. Our parking garage could feature 5 stories of 200 parking spaces each. A parking garage takes up a lot of land and requires a flat foundation, possibly requiring replacing an existing lot or going underground. The maintenance for chemical and structural treatments, as well as light fixtures and elevators are extremely high as well. LED's should last up to 5 years and all 350 lights will cost ~$6500 to purchase (*Hall*). This means with light's failing, flickering/dying/broken lights being replaced, it will cost (6,500 *

2) = $13,000 every decade to purchase lights. Assuming each LED is 18 watts, then 350 lights * 8760 hours (hours in a year) * 18 watts * $0.1037 per Kwh in Rexburg = $5723 for electricity each year. It costs $15,000 on average to replace an elevator, and $500 to $600 to repair one (*Guderian*). That level of maintenance is recommended annually, costing $6000 every decade on top of the $15,000 up front installation. We would need multiple. Chemical treatments for deicing the structure in the winter would cost about 24 hours of $50 per hour labor (12 hours of work a day for 2 days), which would cost $1200 annually. The estimated cost of structural treatments are calculated by assuming $500 for every parking space which would come out to $500,000 annually (*HomeAdvisor*). Overall, the initial cost of a 1000-space garage would be ~$30 million, and the ongoing cost would be ~$550,000 per year.

*Timeline:*

This entire process would require about 1.5 to 2 years to complete. First the foundation is laid out to be able to deal with the pressure of 5 stories of steel, concrete, and thousand pound vehicles (roughly 2-4 months). Then the structure is built in an unfinished style along with the stairs (roughly 12-15 months). Then all of the wiring is done as well as the installation of vents (which adds more airflow to an already open design and takes roughly 2 months). Finally, the elevator and lights are installed (about 2.5 weeks). After painting parking lines, and traffic arrows, it's fully functional (about 3 days).

*Figure 1: Proposed locations for a parking garage (Map by OpenStreetMap)*
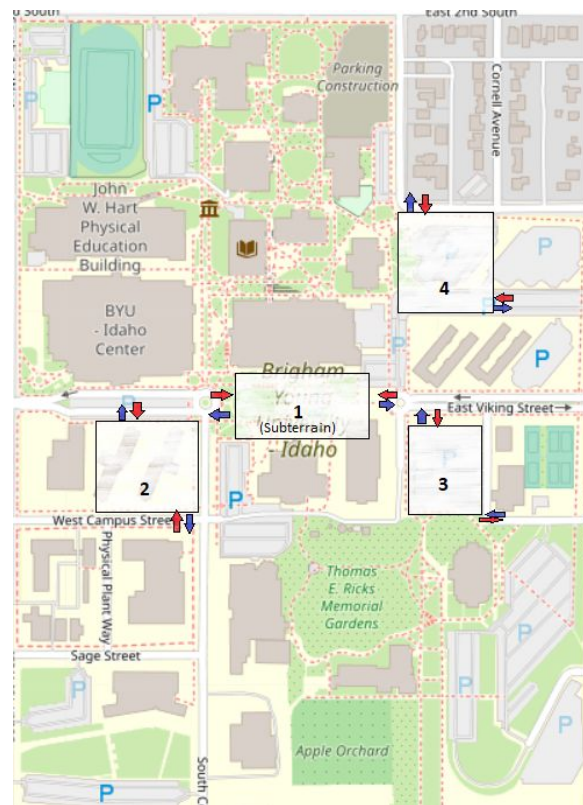
Parking garages require significant maintenance and overall, the cons of price outweigh the pros of convenience. It's not a viable option to build a parking garage on campus.

**Solution 2: Restructuring existing parking zones**

An inexpensive and quick solution to the parking problem is to restructure and reorganize the existing on-campus parking permit system. A common complaint among BYU-I students is that it takes too long to find a parking spot. Students will normally check the lots closest to their destination building in order of proximity. While students do not expect to find spots near their destination building often, they still spend the time driving through these lots in order to shorten their walk to the building. It is especially incentivizing to find a close spot during adverse weather conditions, which are common in Rexburg.

Redesigning and restructuring the existing lots to create a few extra spots may be helpful to students. However, this comes at a great cost, as the creation of parking lots has an estimated cost of up to $2.50 per square foot (*Cost to Build a Parking Lot*). Another option is to create a metered parking system. This would disincentivize students from spending extended hours on campus while occupying a parking spot. However, this change would likely not be well-received by students, as it would affect some students more than others which would lead to complaints of unfairness. A metered system would deter students from parking on campus, which would lead to more open spots, however it would also lead to student dissatisfaction.

The most ideal and inexpensive solution is to redesign the current on-campus parking permit system, making it more granular. This restructuring will create a realistic expectation for students as to where they will be able to park. It will also eliminate the extra time needed to check multiple lots for a parking spot. In this newly designed permit system, students will be assigned a specific lot where they may park, instead of either a North pass or South pass. There will also be overflow options available to students in the rare case that their assigned lot is full due to someone else's failure to park in the correct lot.

Figure 2 shows the current parking lot layout, with each lot numbered. Currently, there are only north and south passes, which would be replaced with a pass for each lot.

Essentially, in the new system, each lot (and block of street parking) open to students would be assigned its own parking pass category. The number of passes sold for each lot would be 20% over its max capacity, with preference given to students by seniority (like class registration). All pass holders could also use overflow lots around the outside of campus, or overflow-only passes could be sold for cheaper.

*Figure 2: Proposed BYU-Idaho parking permit layout (Original by BYU-I)*



*Budget:*

The cost of this solution is relatively inexpensive. The only cost, outside of additional administration, is to replace parking zone signs. The average cost to completely replace a street sign is $125. The average cost to replace a 1.5 square foot sign panel is $45 (*Moeur*). It is anticipated that only sign panels would need to be replaced. There are approximately 100 signs on campus that would need to be replaced to effectively communicate the newly designed lot locations. It is expected that it would take 0.25 hours of labor to replace one sign panel. The total cost of replacing all parking sign panels on-campus would be:

100 signs * 0.25 hours of labor * $50/hr + 100 signs * $45 per sign panel = $5,750.

We must also consider the cost of processing and redistributing existing permits. This expense can be avoided by making this transition at a semester break. The cost of printing permits for the newly-designed layout would be equal to the current cost of printing parking permits each semester.

The long-term cost of this solution is insignificant, as it is near-equal to the current cost of maintaining the existing parking permit system.

*Timeline:*

A redesign of the on-campus parking permit system could be immediately implemented as soon as it is approved. We anticipate a planning period would be required before implementing this solution. This planning period would likely be completed in 2-4 weeks. The purpose of this planning period would be to confirm permit layout plans and discuss budget-related items. As mentioned above, it would be ideal to make this transition at a break between semesters.

This solution appears to be effective. It solves many of the problems that students have with parking while being a very cost and time effective solution.

## Solution 3: Mass transit

The issue of parking and student transportation in general can also be solved in a completely new direction- by removing the need or desire to travel by car in the first place. This could be solved with a large number of existing mass transit options, but the majority (subway, light rail, streetcars, large bus networks, etc.) are infeasible due to the relatively small population and population density of Rexburg. What may be helpful, however, is a small bus network spanning Rexburg and connecting outside it (focused around campus and student housing) or a shuttle bus service similar to the Ryde at BYU.

Such a small bus network, if unsupported by public or city funding, would be unable to succeed. This is evidenced by a similar small-scale public transit system (TRPTA) made of small buses that shut down in Idaho Falls and its surrounding area due to lack of sufficient government funding, with fares of $1.75 per person (*Nelson*). Charging more than this would make travel within Rexburg less attractive, especially to students living on a budget. Expansion of TRPTA was proposed back in 2013, and was proposed to require approximately $532,000 to implement (without considering upkeep, and using existing resources). This was rejected at the time (*Law*), and all things being equal would likely be rejected again for the same reasons, lack of community support due to Rexburg's nature.

Perhaps more feasible to BYU-I students would be a university-run shuttle service similar to BYU's Ryde. This would consist of a few small shuttle busses, that would primarily commute to and from campus and housing during peak hours and around the city during evenings and the weekend. This would be more limited in scope, but perhaps more useful to students as it would be focused on them. It would require the school to bear the majority of the service's financial burden should it be offered free to students, and adding fares would both disincentivize its use (walking isn't that much of a hardship) and increase operating costs (due to the need for fee-collection infrastructure). It is therefore recommended that for this proposal, that the financial burden of the service should be borne by the university.

*Budget:*

The costs of running a shuttle service like this would depend on its scope. One slightly smaller in size to that of BYU's Ryde (as the student body is smaller) with 2 diesel buses operating 12

hours a day, 5 days a week plus 4 hours on Saturdays would cost approximately $400,000 up front, with a weekly cost of $9,000 including fuel, maintenance, and driver pay. This budget is arrived at with an approximate cost of $200,000 for a 30-foot transit bus new (*Overview of Transit Vehicles*) (less if used) and a cost of ~$70 per hour of operation including fuel, maintenance, administration, and pay (*MacKechnie*) (driver pay is 70% of operating cost). This could be contracted out instead, which would not likely save money, but rather reduce need for management.

*Figure 3: A possible set of routes for the proposed bus service (Map by OpenStreetMap)*
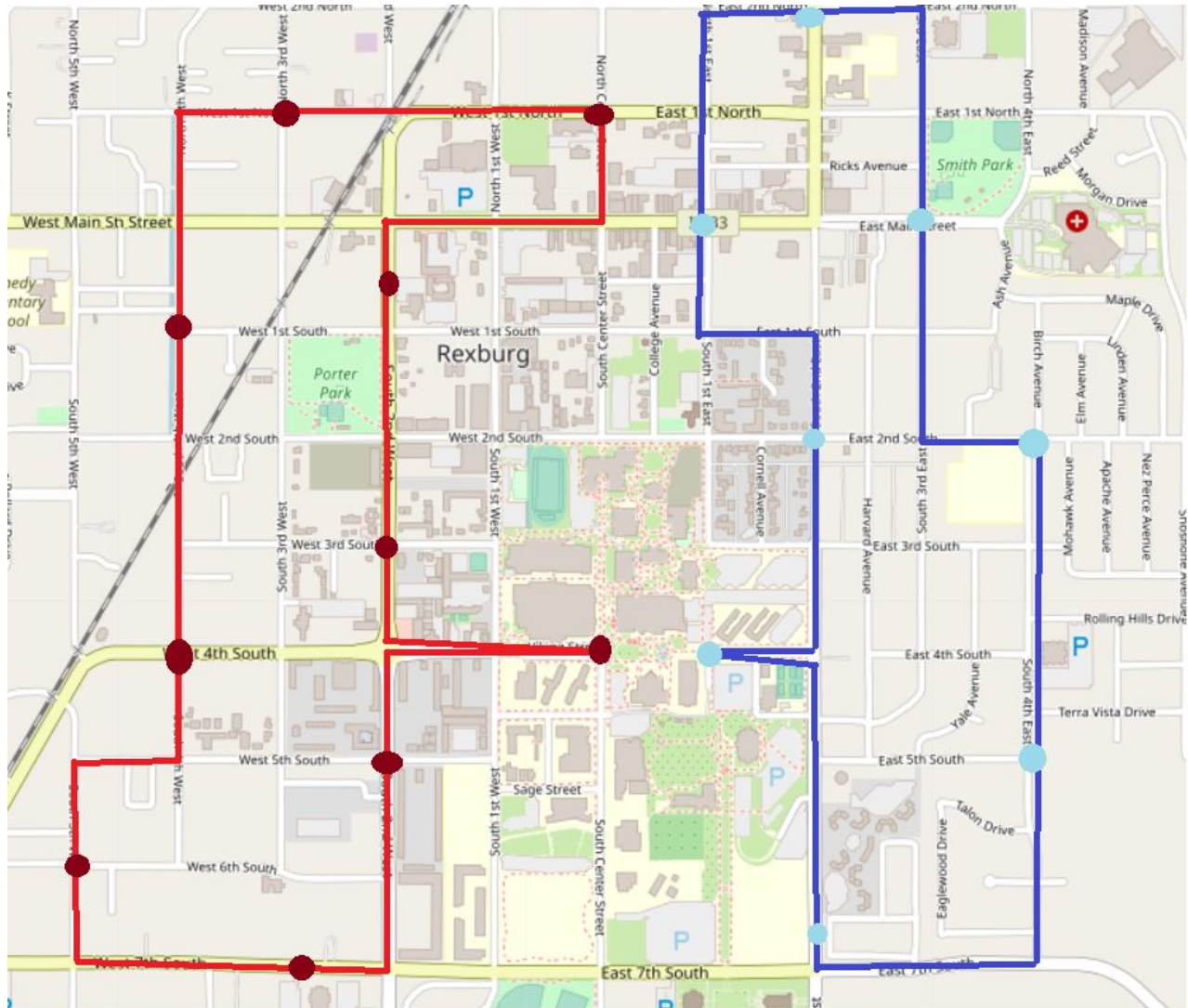


*Timeline:*

The time to implement a service like this would vary depending on interest and opportunities, but the majority of it will be spent first on planning and acquiring permits, then acquiring buses,

recruiting drivers & administration, and prepping maintenance, which could mostly happen in parallel. Buses could be maintained using existing school vehicle services, requiring only routine acquiring of necessary parts. This is unlikely to be the slowest part of implementation, requiring only a week or two of prep after knowing what busses will be used. Acquiring the busses, though larger than typical vehicles, is done through similar channels like Ebay and dealerships. This would also require only a few weeks, mostly in research and getting quotes. The thing most likely to take the most time would be recruiting drivers, which need to meet special licensing requirements from the state DOT. Assuming a planning time on the order of a month, we estimate that the school could get such a service up and running within a matter of 3 months. Should the service be contracted out instead, the bidding and implementation process would likely take even longer.

Overall, while this solution is good and useful to all students and staff, it's additional cost may make it unattractive for implementation

**Conclusions on how to solve the parking problem**

There are many solutions to improve the existing state of parking on campus, but not all of them are financially viable. It may be financially appropriate to have 2-3 shuttles constantly moving students around campus, but it's much higher cost relative to Solution 2 (restructuring permits).

In Table 1, a comparison is given of the three proposed solutions according to the criteria we have outlined previously. This comparison helps prove which solution is most viable for the current parking situation.

The ratings for the status quo have been given in the last column of the table. These ratings are used as a basis for rating the three proposed solutions. The overall cost of keeping the status quo is relatively low (ratings of 5 short term, 3 long term due to student disenfranchisement). The time to implement is negligible. The cost and time of commute received relatively average scores (3 and 2).

*Cost comparison:*

Solution 1 was rated poorly in terms of overall cost to the school, due to its cost in the millions of dollars. Solution 2 was rated highly, due to its negligible cost. Solution 3 was rated moderately well.

*Time to implement comparison:*

Solution 1 was rated poorly in terms of time to implement, at 2 years. Solution 2 was rated highest, at 4 weeks. Solution 3 was given an average rating, at 3 months.

*Student commute comparison:*

In terms of commute Solution 1 was rated moderately well, for a similar cost to students and reduced commute time. Solution 2 was also rated about the same, for the same reasons. Solution 3 was rated highly, as not needing a car significantly reduced cost.

With weights included solution 1 (expanded parking) was given an overall rating of 37, solution 2 (restructuring permits) was rated 60, Solution 3 (implementing busing) was rated 54, while the rating of the status quo was 53. This shows that solution 2, restructuring permits, is the best overall solution of those we considered to solve the current parking and transportation problem at BYU-Idaho.

*Table 1: Comparison of solution ratings*

| Criteria (1-5) | Weight | Solution 1 rating | Solution 1 score | Solution 2 rating | Solution 2 score | Solution 3 rating | Solution 3 score | Status quo rating | Status quo score |
|---|---|---|---|---|---|---|---|---|---|
| Short term cost to school | 3 | 1 | 3 | 5 | 15 | 4 | 12 | 5 | 15 |
| Long term cost to school | 5 | 3 | 15 | 4 | 20 | 3 | 15 | 3 | 15 |
| Time to implement | 2 | 1 | 2 | 4 | 8 | 3 | 6 | 5 | 10 |
| Cost of commute | 3 | 3 | 9 | 3 | 9 | 5 | 15 | 3 | 9 |
| Time of commute | 2 | 4 | 8 | 4 | 8 | 3 | 6 | 2 | 4 |
| Total | | | 37 | | 60 | | 54 | | 53 |

**Recommendations on solutions to implement**

We recommend that a redesign of the BYU-Idaho on-campus parking permit system should be implemented. Due to the amount of time required to replace parking sign panels and redesign parking tags for distribution, we recommend this solution be implemented during the 2020 summer break before the Fall 2020 semester. We would also recommend considering further the possibility of implementing or contracting out a shuttle bus system.

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**Appendix A: Work Plan**

*Memorandum*

DATE:        March 7, 2020
TO:          Members of Group 5
FROM:        Members of Group 5
CC:          Rex Fisher
SUBJECT:     Work plan for Technical Communication collaboration project

This memo will serve as our plan to carry out the collaboration project as assigned.

**Project Plan:**

This project plan will serve as the foundation to our work for the remainder of the semester. To choose a problem topic for our project, we will meet on Tuesday, March 10th to discuss possibilities. Each team member will come to that meeting prepared with at least two ideas of potential problems and we will make a final unanimous decision during that meeting.

We will then begin individual research on the chosen problem and possible solutions. Research topics will be assigned by Michael, as research coordinator. We will outline the steps required to solve our problem.

Each team member will propose a solution. We will debate the solutions, outlining pros and cons for each. We will come to a final unanimous decision on the solution and proceed with the remaining parts of the project.

We will closely follow our project calendar to keep us on track to finish each week's assignment on time. Adjustments may be made if necessary as circumstances change. The project calendar will serve as our guide for completing tasks and milestones.

Individual roles will be assigned to each team member. These roles will carry specific responsibilities. The roles have been assigned according to individual strengths and will allow us to complete the project more efficiently and with higher quality.

We will have regular team meetings as outlined in the Project Calendar section. These meetings will serve as our primary form of collaboration. Individual assignments will be given in these meetings. We do not anticipate the need to meet outside of regular class time, but have contingency plans in place should that be necessary.

**Project Calendar:**

Work on various aspects of the project will be completed in two main environments: in a group setting in scheduled, in-person meetings (via Discord after class shut-down), and individual

work as assigned, done as the individual's circumstances permit. The planned objectives of meetings and individual assignments follow, and are summarized in Figure 1.

- Week 9: Work Plan
  - Work plan due Saturday, 11:59pm
  - Meeting Wednesday: Role assignment, planning timing of decision-making, outlining document, and assignment (by Mason) of writing assignments before next meeting
  - Meeting Thursday: Collaboratively edit together a final version to submit (lead by Adam), and look ahead to the proposal assignment

- Week 10: Project Proposal
  - Proposal due Saturday, 11:59pm
  - Meeting Monday: Review feedback on work plan, present project ideas, assign preliminary background research for each (Michael)
  - Meeting Tuesday: Decide on project, begin outlining proposal, assign writing assignments (Mason)
  - Meeting Wednesday: First editing pass (Adam,) assign final writing tasks (Mason)
  - Meeting Thursday: Collaborative final edit (Adam,) discuss and assign for research proposed solutions (Michael)

- Week 11: Draft Solution Report
  - Draft report due Saturday, 11:59pm
  - Meeting Tuesday: Review proposal feedback, begin outline (Adam), assign further research (Michael)
  - Meeting Wednesday: Finalize solutions, finalize outline, assign writing assignments (Adam)
  - Meeting Thursday: Work on methods section, review results section
  - Meeting Friday: Editing pass (Mason,)

- Week 12: Final Solution Report
  - Second draft report due Tuesday, 11:59 pm, final report due Saturday, 11:59pm
  - Meeting Monday:  Assign front & back matter writing assignments, discuss feedback (Adam)
  - Meeting Tuesday: Edit addition of front & back matter (Mason), submit second draft, assign sections of draft for refinement (Adam) and visuals (Michael)
  - Meeting Wednesday: integrate feedback into refinement assignments, review and assign further refinement (Adam)
  - Meeting Thursday: Final editing pass of report (Mason), assign sections for creation of presentation

- Week 13: Report Presentation

- ○ Meet Monday to combine, edit, and practice presentation (scheduling additional practice time if necessary)
- ○ Present on Tuesday, Wednesday, or Thursday

| Project Calendar | Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|---|---|---|---|---|---|---|---|
| Week 9 (March 1-7) | | | | Meet to outline work plan, assign writing | Meet to finalize work plan, prep for proposals | | Work plan due |
| Week 10 (March 8-14) | | Meet to present ideas, assign basic research | Meet to decide on project, outline proposal, assign writing | Meet to work on proposal/outline, first editing pass | Meet to finalize proposal, assign solutions to research | | Proposal due |
| Week 11 (March 15-21) | | | Meet to review research, begin outline, assign further research | Meet to finish outline, assign writing | Meet to review writing, assign finishing sections | Meet to finalize and review draft, | Draft report due |
| Week 12 (March 22-28) | | Meet to assign report's addtl. documents | Meet to combine documents, assign section refinement | Meet to note more possible improvements & assigning them | Meet to finalize final draft, assign presentation sections | | Final report due |
| Week 13 (March 29-April 4) | | Meet to finalize & practice presentation | Presentations | Presentations | Presentations | | |

**Figure 1:** Calendar of planned meetings and relevant dates

**Team Roles and Workload Distribution:**

To efficiently complete the collaboration project, individual roles have been assigned to team members according to their strengths. However, every member will be a researcher and a writer. Each member will be assigned research and writing tasks according to that week's assignment.

Mason is assigned the role of team lead and clerk. His primary responsibilities will consist of conducting team meetings or assigning a team member to conduct a meeting (as roles require), assigning writing tasks to members of the team according to their roles and strengths, and documentation of assignment of tasks. These assignments will take place at the end of each team meeting as required.

Michael is assigned the role of research coordinator and graphics production. He will be the leader of research-focused team meetings. His primary responsibilities will consist of assigning research tasks according to each week's requirements, evaluating research done by other team members, providing feedback on research done by other team members, and designing graphics that will be included in future assignments.

Adam is assigned the role of primary editor and quality assurance specialist. He will be the leader of editing and quality assurance-focused team meetings. His primary responsibilities will consist of editing and revising documents/assignments before submission, evaluating past

weeks' work, leading discussions about quality assurance, and ensuring that the quality improvement plan is being implemented effectively.

**Collaboration Methods:**

To be as effective as possible with our time and to maximize productivity, we will have several communication methods. These are prioritized in a way that prevents us from wasting resources on communication.

Our primary communication method will be in-person team meetings during class time. In-person meetings will minimize technical difficulties and have the benefits of face-to-face communication for the bulk of this project.

Our secondary method of communication will be google docs. This will allow us to make edits simultaneously and communicate using google docs comments. We can also see team members working in real time and view past changes (as well as information about time, date, and who made the change). This will allow us to see who has done what, and constantly improve our documents.

We chose google docs as our collaboration environment because of its ease of use, real time changes, communication features, and accessibility. It will also allow us to easily leave comments to divide the work or notify team members of suggested edits.

If we need to connect outside of class time and google docs, our team has decided to use Discord and texting. Because of technical difficulties Discord is more reliable than a group text. Discord will be our main way to "call" and "text" but we will still have traditional texting as a backup. This will allow us to contact each other if we didn't anticipate major issues in our regular meetings. Discord will also serve as a way to schedule meetings and prepare for them.

(Due to campus shutting down for the Coronavirus, we have moved to call-in meetings via Discord)

**Quality Improvement Plan:**

To improve our productivity, we will have a weekly reflection period. We will take 15 minutes in the first meeting of each week to discuss instructor feedback on our submissions, and where our time and effort was best and worst spent. We will then focus on things that were most valuable. This may cause us to shift our work focus. There may also be altered assignments due to certain tasks being easier or harder than anticipated.

Another of our standard practices for improving the quality of our work will be that we revise our documents based on the feedback we receive from our instructor and peers. Sometimes a new perspective will help catch errors and give us ideas.

Adam will initiate reflections and revise documents structurally, grammatically, and technically. This will ensure clarity for the readers and us. The more clear and concise we can be, the better we can focus on a given task.