

# A Student From State Street



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To: Spectrum Division Solutions  
From: Western Washington University ENVS 471 Winter, 2018: Jimi  
Grace Jensen



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## Executive Summary

To conduct research to help the new development on N State St. and stakeholders to understand student mode choices as well as propose possible solutions for more sustainable transportation.

Paulo Nunes-Ueno, from Spectrum Division Solutions, approached our team with the idea of finding ideal transportation to campus for a new student housing complex that is in the design stage. This 480 person unit will be located on North State Street, currently where the Hub Community Bike shop is located (Appendice). Plan designs include two buildings, saving space for the existing Hub spill out.

Although the location is only around a mile away, the lack of direct and safe routes, along with the steep topographical grade, means it is likely many students will rely on cars to get to and from campus. With poor transit planning oriented around the North State Street location, students are continuously being pushed toward the use of automobiles. Furthermore, the increase of 480 students on a poorly developed one-way street also has the potential for large traffic increases.

Our approach to this issue is to have the development provide incentives that push students to partake in other forms of transportation that meets our campuses sustainable needs. Our team has looked at three potential solutions to the problem the student development is facing. The most viable options are the implementation of e-bike and shuttle systems.

Our first solution is a bus shuttle system for students living in the development, aimed at adapting to the poor public bus infrastructure in the areat. The shuttle could be run during school peak hours or continued on a fixed schedule throughout the day. The developer would have to hire a driver or multiple drivers to deal with the capacity of the housing development. The shuttle would pull up to the loading zone of the new facility and the students would be made aware of the schedule through a newsletter or email provided monthly to the students. The students' monthly rent would account for the cost of the shuttle. If the usage of the shuttle is high then the cost would be reflected in the students cost of living.

Our team has also provided the solution of implementing E-bikes at the new development. E-bikes can strengthen the developments request for less parking as well as provide an alternate and more sustainable transportation option. Fleet of E-bikes can be purchased by the developer and provided to the students through a check-in check-out type of service. On the other hand, students can have the option to purchase their very own E-bike through the developer. This can incentivize students to leave their automobiles at home and to utilize a sustainable form of transportation to and from school. Depending on how Spectrum Solutions chooses to provide E-bikes, someone on site will have to manage the bike storage and possibly maintenance.

Out team was approached by stakeholders with interest in rideshare car apps. Sites like Turo (where users rent out their personal car for use) and ZipCar (where students share a provided ZipCar) initially seemed like worthwhile ideas. However, after researching the two carshare

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companies, both requiring monthly subscriptions, waivers, and insurance information, we decided to pursue e-bikes and a shuttle instead. Not only are the latter more user friendly, but car sharing companies require additional cars to be located at the development, which goes against the stakeholders initial desire of less parking.

Our project is a researched based assessment of how students currently get to campus, barriers to using alternative modes of transportation, possible incentives for students to use alternative modes, case studies of other university campuses facing the same issues, and proposed and easily-accessible solutions to said problems.

### **Statement of Need**

This project is necessary because the large influx of students on North State Street that will occur when a 490 person housing unit is installed. Western Washington University holds sustainability goals outlined in the Sustainable Action Plan of 2017. Such goals are: Western recognizes its role as a member of the larger transportation community and engages in local, regional, and state transportation issues and solutions (SAF 2017). It is clear that WWU is interested in sustainably transporting students to and from off campus housing with minimal environmental impact. Adding 400+ students on a one way street with lack of infrastructure can lead to communal transportation issues.

Paulo Nunes-Ueno and his team are also working to reduce the number of parking spots at the new development. In order to do this, Nunes-Ueno needs to be insured that students will opt to use less cars in their day to day life. In order to do this, this project is necessary to find optimal alternative transportation methods (whether that be shuttles, bus, walking, biking, or ridesharing).

Immediate effects of building a large student housing in the proposed location would be a large influx of students who need to be transported (likely multiple times a day) to and from WWU campus. This means vast increase in bus ridership, car traffic during already busy hours (business hours), and more students walking paths to school. In order to keep up with the population influx while still maintaining WWUs mission of sustainability, alternative modes of transportation need to be implemented.

There are multiple beneficiaries to this research project. For one, Nunes-Ueno will be able to use this information for building development. If convinced to implement green bikes, shuttles, and e-bikes, Nunes-Ueno and Spectrum Division Solutions will likely be able to have a stronger claim for the reduction of automobile parking spaces at the development (a goal which was brought forward to this team by Nunes-Ueno). Secondly, WWU will have another project of sustainability in their reservoir, furthering reputation as an environmentally-friendly school and aligning with the goals of the WWU Sustainability Action Plan. Thirdly, students will have more options for sustainable and efficient modes of transportation to campus. This relates to the community members as well, as findings from this research will lead to students not relying on public transportation- leading to overcrowding on already limited community transit buses.

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Furthermore, by researching alternative modes it is hoped that students will be convinced against driving. This will lessen the traffic burden on the community as well. Lastly, this project leads to sustainable action, helping to care for the environment.

Obviously, sustainability is the driving cause of this project. The more students we can reduce driving alone, the less the impact on the climate. Furthermore, leading students to use alternative mode of transportation would reduce traffic and road noise in the surrounding neighborhoods, which is beneficial for community members (as community members have already put much backlash on The Gather complex on North Garden Street).

### **Project Description**

The first stage of the project is data collection. Through case studies and student surveys conducted across the United States (as well as strictly Bellingham surveys), student and stakeholder barriers to using alternative transportation services are identified. We will use case studies of other universities and communities in order to find useful incentives and strong barriers. We will also gather primary information, by taking established routes to and from the unit and campus in order to see first hand ideal routes and issues with each routes (i.e. lack of lighting/sidewalks, time efficiency, and handicapped students).

When identifying possible solutions, we will also examine case studies in order to find the most appropriate, effective, and cost-effective solutions implemented by other universities. This will help us to persuade stakeholders into implementing our solutions by providing exact data that has shown to be effective in similar situations and institutions.

One method that will be utilized is public survey. Both this team and Western Washington University's Office of Survey Research have published transportation surveys throughout the student body. This will allow for primary data on how students are currently transporting themselves and possible initiatives for more sustainable transportation. Secondly, a case study from Portland State University shows how students respond to possible incentives.

**Figure 5. Incentives for Choosing Alternative Modes**

*If you ever DRIVE ALONE to campus, what benefits would encourage you to try an alternative? [check up to THREE options] (n=382)*

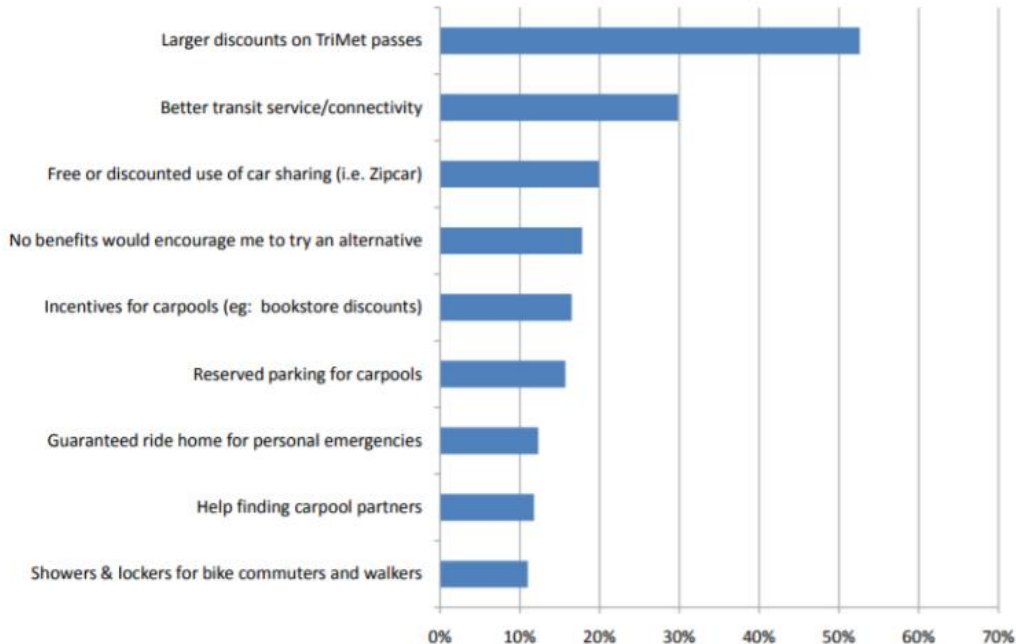


Figure 1: Incentives for Choosing Alternative Modes, Student Commute Spring 2009, Portland State University

By looking at surveys such as these, we are able to see what students find as a useful incentive to alternates of driving alone. Although this survey was conducted at Portland State University as opposed to WWU, we argue that the populations are similar enough to use this information. Twenty percent of students would be incentivized free or discounted car sharing, while thirty percent of student respondents would be incentivized by better transit or connectivity. After speaking with Chris Comeau, a transportation planner from Bellingham, we found it unlikely and poor use of time to chase “better transit service.” However, this is where the proposed shuttle would come in useful. Furthermore, around fifteen percent of students would respond to increased carpool parking- another area being explored in this project.

Western’s Sustainability Action Plan, “addresses the continuing need for programs that improve and enhance Western’s brand of sustainability...while continuing to operate in a budget constrained environment,” (Sustainability Action Plan 2015). One target for Campus and Community Engagement is to, “Establish multiple sustainability-infused immersive experiences, cooperatively designed and supported by WWU and community partners,” (SAP 2015). By working with Paulo Nunes-Ueno and possible vendors (such as e-bikes, ZipCar, and shuttle companies), us Western students are working to put this target goal into action. If students use any of these transportation methods, we have successfully started sustainable actions. valuable incentive to using alternative modes of campus transportation.

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## EBIKE

A second suggestion we propose is a shuttle system through Spectrum Division. The addition of a shuttle via the student housing development would ensure proper connectivity for students, which the current infrastructure does not provide. (Appendices Image 2.2). With current bus routes, students would either be sent north to the downtown Bellingham Transit Station or south to Fairhaven. This means average times is near thirty minutes, a time that could be unattractive to student residents- leading to increased car use. Furthermore, a large influx of students would be straining for the existing bus infrastructure (only two buses pass near the area, on 30 minute rotations).

A shuttle deployed by the housing development would ensure a direct and quick ride to campus. This means better transit connectivity for students. A case study of a housing development College Housing Northwest (CHNW) near Portland State University (Appendices Case Study 1) examines a shuttle with similar occupant size and shuttle ride distance. The shuttle is reported to have high usage by students from the development, with occasional more shuttle rides needed during peak hours (which align with morning class times). Scheduled shuttle rides are also offered multiple times a week to grocery stores, or on a student request basis.

Such connectivity and reliance can ensure students that bringing a car to Bellingham is not always necessary. The shuttle at CHNW is funded by student rent and driven by student drivers, meaning the development itself is not dipping into funds to provide the service. The only initial cost needed by the development would be the purchase of the shuttle itself (see Budget).

## Budget

The Development or Paulo has not given us a budget so we are listing the prices of what may be important. The cost of this proposed project will depend on the mode of transportation used. The main modes of transportation we are thinking of using were E-bikes and a shuttle to go from the new development to Westerns campus.

The first mode of transportation, E-bikes, will have a high initial cost. We are recommending 10 e-bikes to start out for the North State Street Development. Ten E-bikes is a very manageable amount for any future maintenance that needs to be done. Looking online and from a local source we are looking at a range of about 2,000 to 5,000 dollars per new E-bike.(See Budget) E-bike batteries are not cheap then can be almost half the cost of the bike according to the Bike Educator on campus Kellen Lynch so around 500 to 800 dollars. Buying in bulk is another possibility but we have no way to look at those prices because we are not a large developer. The suggested partner, Spin, chooses the number of bikes for deployment, although the price of leasing e-bikes from Spin is always free of charge to the university/developer.

The second mode of transportation is a shuttle. A shuttle system will cost 60-100 dollars an hour just for the driver of the vehicle. Maintenance and upkeep for a shuttle system like this will cost

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upwards of 2000 dollars a year. 360 to 550 dollars for four oil changes, 40 to 75 for an air filter change, 65 to 125 dollars for a fuel filter, 100 to 150 for two tire rotations, brakes are going to be between 450 and 500 dollars to replace and other miscellaneous costs will be around 200 dollars for a year of maintenance. Diesel Engines will be more expensive than Gas Engines. (See Appendix 6.2)

Figure 2: Overall costs for a bus shuttle

Shuttle costs	Gas engine	Diesel Engine
Oil Changes (4x)	\$360	\$550
Air Filters (1x)	\$40	\$75
Fuel Filters (1x)	\$65	\$125
Tire Rotations (2x)	\$100	\$150
A/C Service (1x)	\$95	\$100
Brakes	\$450	\$500
Misc.	\$200	\$200
Total cost	\$1,310	\$1,700








Entry-Level: \$1500 or less					
	<b>Sondors Fat Bike</b>	<b>Addmotor Motan M-550</b>	<b>Rad Power Bikes RadRover</b>	<b>DIY - Mongoose Dolomite &amp; Luna Components</b>	<b>DIY - Mongoose Dolomite &amp; Chinese Components</b>
Price without shipping	\$598 (6.8Ah)/\$783 (12.5Ah)	\$1,399	\$1,499	\$219 (bike) + \$1239.95 (parts)	\$219 (bike) + \$1155.49 (parts)
USA shipping cost	\$194	Free	Free	\$45 (Luna)	Free
Total price (excl. tax)	\$792 (6.8Ah)/\$977 (12.5Ah)	\$1,399	\$1,499	\$1,503.95	\$1,374.49
Motor: watts/type	350w Bafang	500w Bafang	750w Bafang	750w/1500w Bafang BBSHD	1000w* Bafang BBSHD
Volts	36v	48v	48v	52v	48v
Hub or mid-drive	Hub (geared)	Hub (geared)	Hub (geared)	Mid-Drive	Mid-Drive
Battery: Volts/Ah	36v/6.8Ah or 12.5Ah	48v/10.4Ah	48v/11.6Ah	52v/13.5Ah	48v/11.6Ah
Battery amps continuous	Not listed	Not listed	30A	30A	34.8A
Battery cells used	Samsung	Samsung	Samsung 29E	Panasonic GA	Panasonic PF
Display	LCD - B&W	LCD - B&W	LCD - B&W	LCD - Color	LCD - Color
Frame material	Steel	6061 Aluminum	6061 Aluminum	Steel	Steel
Fork material	Steel	MOZO Aluminum	Suspension fork (unbranded)	Steel	Steel
Brakes	Tektro Mechanical	Wuxing Radius	Tektro Mechanical	JAK Mechanical	JAK Mechanical
Pas / Throttle	✓ PAS (5 level) / ✗	✓ (5 level) / ✓ (1/2 twist)	✓ (5 level) / ✓ (1/2 twist)	✓ (9 level) / ✓ (thumb)	✓ (9 level) / ✓ (thumb)
Drivetrain	1-speed	7-speed, Shimano TX-55	7-speed, Shimano	7-speed, Shimano TX-7	7-speed, Shimano TX-7
Tires	26x4.9"	26x4" CST BFT	26x4" Kenda Juggernaut	26x4"	26x4"
Claimed top speed	18 mph	23 mph	20 mph	30 mph (off-road)	30 mph (off-road)
Notes	Available with 2 different batteries	Available with solid or suspension fork	Includes LED headlight & gel saddle	750w street-legal 1500w off-road only	*Can be re-programmed to 1500w

Figure 3: Pricing and designs characteristics

### Suggestion 1: Spin E-Bikes



Figure 4: Spin E-Bike

- Overview: As you saw previously, Spin typically works with universities as well as businesses.
- -Spin is an attractive company because the use of their services for a business is completely free. They also do their own marketing and data collection through their app platform.
- Spin chooses amount of bikes needed
- - AGREEMENT UW-Spin Agreement

This Dock-less Bike Share Summer Pilot Operating Agreement (“Agreement”) is entered into as of September 27, 2017 (“Effective Date”) between the University of Washington, a state institution of higher learning and an agency of the state of Washington (“University”), and Spin, a private, San Francisco, CA-based operator of dock-less bicycle sharing systems, for the purpose of permitting Spin to include University property within the service area of the bike sharing system Spin is operating in the City of Seattle.

#### AGREEMENT

1. **Definitions.** User(s): Includes Spin and all of Spin’s owners, directors, officers, employees, agents, contractors, customers, guests, invitees and permitted successors and assigns.  
UW Property: The area defined as UW property for this agreement is defined in Exhibit A.
2. **Term; Termination.** The term of this agreement (“Term”) begins on the Effective Date and shall continue through 26 March 2018. **Either party may terminate this Agreement for any**

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reason or no reason upon 30 days written termination notice to the other party. Upon receiving any notice of termination from the University, Spin must completely remove all bikes associated with its service from UW property within 30 days.

3. **License.** University acknowledges and agrees that any member of the public at large may become a User simply by using the Spin's bike share service and that, subject to this Section, each User will be allowed access to bicycles located on University property which are part of Spin's system. University does hereby grant the following non-exclusive, revocable licenses (collectively, "License"): (i) to Spin and its successors and assigns: the right and license to place bicycles on bicycle racks located on University property ("University bike racks") subject to the placement limitations described in this agreement, and to use and enjoy all rights appurtenant thereto, including the right to enter the Property as may be reasonably necessary and appropriate to exercise all License rights; (ii) to all Users: the right and license to access and use University bike racks to access or deposit bike share equipment owned by Spin; and (iii) to Spin and its successors and assigns: the right and license to enter the Property to enjoy, undertake, or perform any of Spin's rights or obligations arising under this agreement.

4. **Insurance/Waiver:** For the duration of the Term, Spin shall maintain at its sole expense the following insurance:

- a. commercial general liability policy with limits of not less than \$6,500,000.00 per occurrence;
- b. business automobile liability policy covering owned, non-owned and hired vehicles with limits of not less than \$1,000,000.00 per accident;
- c. workers' compensation insurance with limits as required by law; and
- d. employer's liability insurance with limits of at least \$1 million per injury or occupational disease

All such insurance shall be issued by carriers acceptable to University and shall contain a provision whereby the carrier agrees not to cancel the insurance without providing thirty (30) days' prior written notice to University. All liability insurance required to be carried by Spin shall name University as an additional insured per ISO # GS 20 36 04 13 or its equivalent. Proof of such coverage shall be delivered to University prior to execution of this Agreement and annually thereafter upon renewal of the policies. Spin shall be solely responsible for payment of premiums, deductibles and co-payments.

Notwithstanding any other provision of this Agreement, Spin hereby releases University from, and waives its entire right of recovery for, loss or damage to Spin's bike(s) located on University property, to the extent that the loss or damage is covered by (a) Spin's insurance or (b) the insurance Spin is required to carry under this Agreement, whichever is greater. This waiver applies whether or not the loss is due to the negligent acts or omissions of University, or their respective officers, directors, employees, agents, contractors or invitees. Spin shall have its insurers endorse the applicable insurance policies to reflect the foregoing waiver of claims, provided however, that the endorsement shall not be required if the applicable policy of insurance permits the named insured to waive rights of subrogation on a blanket basis, in which

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case the blanket waiver shall be acceptable. This provision shall survive termination of this Agreement.

5. **Indemnification of University:** Spin shall indemnify, defend, and hold University, its regents, officers, agents and employees, harmless from and against any demands, claims, damages, fees (including attorney's fees), fines, costs, expenses, or liabilities (collectively "Claims") arising out of or in any way connected with this Agreement or any User's use of Service, without limitation, including but not limited to Claims for loss or damage to any property, or for death or injury to any person or persons, except such Claims that arise from the sole negligence of the University, or its officers, agents or employees acting in their capacity as such. This provision shall survive termination of this Agreement.

6. **Right to operate in Seattle.** Spin affirms that it has been granted a permit to operate a bike share system on Seattle public right of way by the Seattle Department of Transportation. Spin agrees that if that permit should in any way lapse, be revoked, or be terminated during the term of this Agreement, the Agreement between the University and Spin is likewise terminated. If this Agreement is terminated due to a lapse in the SDOT-issued pilot permit, Spin has 30 days to completely remove all bikes associated with its service from UW property.

7. **Safety requirements for system operation on UW property**

- a. Spin agrees that all bikes associated with its service on University property shall be permitted to operate on City of Seattle Public Right of Way.
- b. Spin agrees University is not responsible for educating Users regarding helmet requirements and other laws, nor is University responsible for educating users regarding specific rules for riding and parking bikes on UW property as given in these guidelines or in the Washington Administrative Code. Spin agrees to instruct Users to place bikes only on University bike racks for all trips ending on University property. This information should be posted in-app at the conclusion of each ride, in the user agreement, or be visibly posted on the bike. Spin agrees to explore the feasibility of new and creative means of educating users.

8. **Parking requirements for system operation on UW property.** Spin shall ensure that bikes are parked only at bicycle racks on the UW campus, as required by the Washington Administrative Code (Chapter 498-116). The UW has a limited amount of bike parking. These guidelines are designed to ensure that capacity remains available campus wide for personal bikes. Bike placement related to bike share operations shall be limited as follows:

- a. All bikes parked on campus shall be placed on or within 4 feet of a bicycle rack;
- b. Bikes shall not block any part of a pedestrian pathway;
- c. Bikes shall not block other bikes from being parked at or removed from a bike rack;
- d. Bikes shall not be placed on grass or in university landscaping at any time;
- e. Bikes shall not block building doors in any way;
- f. Bikes are not to be placed inside buildings, in bike rooms, or in campus bike cages;

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- g. Bicycles shall be upright when parked on University property; and
- h. Any bicycle that is parking incorrectly on University property shall be re-parked in a correct manner or shall be removed by Spin based on these times:
  - o 6am to 6pm on weekdays, not including holidays – within two hours of receiving notice,
  - o All other times – within 10 hours of receiving notice.

9. **Parking requirements specific to system rebalancing.** For bikes placed by Spin staff or associated private contractors (rebalancing), the following guidelines shall be observed:

- a. No more than 3 Spin bikes shall be placed at a single campus bike rack location (groups of racks of the same physical type, as defined in Exhibit B) except for identified rebalance locations (Exhibit C) where up to 10 Spin bikes total may be placed.
- b. Placement totals as given above shall include bikes already present at a given location before rebalancing takes place. For example, if a rack location already has two bikes, Spin staff may only add one. If an identified rebalance location already has six bikes owned by Spin, Spin staff may only add four.
- c. Spin may place (rebalance) up to 50 bikes on University property. Once 50 bikes owned by Spin are present on UW property, Spin may not place any additional bikes on University property. Bikes ridden to and placed on University property as a bike share trip by members of the public using the service may exceed this 50 bike limit, but no more bikes may be added by Spin's employees, agents, or contractors until the total number of bikes present on UW property drops below 50.

10. **Operations requirements for system operation on UW campus.**

- a. Spin agrees that it shall make no alteration of any kind to University property, including but not limited to moving or installing racks, painting or marking surfaces, or placing permanent or temporary signs or banners. Any alteration to University property must be separately permitted in writing by University.
- b. University retains the right to create geo-fenced parking zones or geo-fenced no-parking zones.
- c. Any bicycle that is parked in one location on University property for more than 7 consecutive days without moving may be removed by University crews and taken to a University facility for storage at the expense of Spin. University will invoice Spin at standard labor rates for time spent moving and/or impounding bicycles.
- d. Any inoperable bicycle, or any bicycle that is not safe to operate shall be removed from University property within 24 hours of notice by any means to the Spin by any individual or entity, and shall be repaired before putting the bicycle into revenue service on University property.
- e. If University or any department or entity thereof incurs any costs addressing or abating any violations of the requirements of this Agreement, or incurs any costs of repair or maintenance of University property, upon receiving written notice of the University's costs, Spin shall reimburse University for such costs within thirty days.

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- f. University reserves the right to alter operating requirements as given in this Agreement. University will provide written notice of alterations to Spin. Upon notice of alterations to operating requirements, Spin will alter its operations on University property within 30 days in accordance with altered requirements.
- g. University requests notice of changes to the size of Spin's total bike share fleet operating in Seattle and of changes to Spin's service area.
- h. University reserves the right to impound any Spin-owned bike at any time for any reason or for no reason.
- i. Spin shall comply with all University advertising and sponsorship policies.
- j. Spin shall not interfere with the normal operation and activities of University and shall conduct its activities to minimize inconvenience to University, its agents, employees, and invitees.

**11. Data sharing requirements for system operation on UW campus.**

- a. Spin shall provide access to their bicycle location and trip routing application programming interface (API), or equivalent access that provides University with real-time record of all Spin bikes parked on University property
- b. Spin shall make available to UW all data specified in SDOT requirements DS4 and DS5.
- c. Spin shall keep records of any reported collisions, falls, or injuries caused or attributed to Spin's bike(s) taking place on University property, and shall submit these records to University weekly.
- d. Spin shall provide anonymized GPS tracks for trips starting or ending on University property as GIS shapefiles submitted monthly.
- e. If Spin has a signed agreement with the UW Transportation Data Collaborative (TDC), they are exempt from requirements (a) through (d) of this section. Instead, the signed agreement must show that the company is inputting the data defined in SDOT requirement DS6 into the UW TDC, via API keys obtained from the TDC to Spin.

Please submit all identified data in sections (a) through (d) above to the Active Transportation Specialist at ucommute@uw.edu, unless submitting to UW TDC as described in (e) of this section.

**12. Fees.**

- a. Prior to execution of this agreement, Spin shall pay University \$2,500.00 to be used by the University to subsidize or otherwise create access to bicycle helmets for the campus community.
- b. During the term of the agreement, Spin will compensate the University for the presence of Spin's bikes on UW-owned bike racks. Spin shall pay University monthly for bike share trips beginning and ending on University property:
  - a. For all trips beginning on University property, \$0.05 per trip.
  - b. For all trips ending on University property, \$0.05 per trip.

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Payment for trips shall be made by the 15<sup>th</sup> of each month, covering trips made the preceding month. Payment shall be made to Transportation Services at the address given in Notices, below.

c. The University shall waive the fees described in Section 12(b) during any period where Spin provides a discount of at least 40% off the cost of 30 minute rides, or a minimum of 40% off monthly or annual memberships/subscriptions to the service, to all individuals with email addresses ending in "@uw.edu." If offering a standing discount, Spin shall describe the discount including its start and end dates in writing to ucommute@uw.edu.

13. **Disputes.** This Agreement is governed by the laws of Washington. For every dispute regarding this Agreement: (i) the prevailing Party is entitled to its costs, expenses, and reasonable attorney fees (whether incurred at trial, on appeal, or otherwise) incurred in resolving or settling the dispute, in addition to all other damages or awards to which the Party may be entitled; and (ii) each Party consents to the exclusive jurisdiction of the Washington State Superior Court for King County located in Seattle, Washington, and agrees that that court has personal jurisdiction over each Party. No waiver of any provision of breach hereof is a waiver of any other provision or breach. All rights and remedies are cumulative and nonexclusive.

14. **Survival.** In addition to those provisions whose survival is expressly provided for, any other provision of this Agreement that can be reasonably construed as being intended to survive the termination or expiration of this Agreement shall survive any such termination or expiration.

15. **Notices.** All notices and other communications provided hereunder must be in writing and are deemed given: (i) on hand-delivery; (ii) when sent by email (with confirmation of transmission); (iii) the day after sending by a nationally recognized overnight delivery service (with confirmation of transmission); or (iv) three days after sending by certified mail (return receipt requested).

If to University, notices shall be sent to:

University of Washington  
Transportation Services  
1320 NE Campus Parkway  
Seattle, WA 98195  
Attention: Zachary Howard  
Phone: 206-221-3701  
Fax: 206-685-1565  
Email: ucommute@uw.edu

If to Spin, notices shall be sent to:

Spin:  
Address:  
Attention:  
Phone:  
Fax:  
Email:

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- With an agreement with the city and WWU spin can be a city wide rideshare program for all who reside within city limits or visitors.
- As we have seen in seattle, a city wide rideshare program can be extremely successful and solve the first and last mile problem. E-Bikes can get you places quickly and within a timely matter.
- Spin seems to be an excellent partner with universities and their team will design their rack locations uniquely to each campus.
- Bellingham has included in their comp. Plan that the public has expressed interest within a dockless rideshare program and it is the cities job to find out if it is feasible.

### **Suggestion 2: Purchase a fleet of 10 E-Bikes**



We suggest that if the developer chooses to purchase their own E-Bikes then they should start with 10

- Many different models, engine types and weights
- We would suggest that the developer finds a bulk buy situation with a e-bike provider.
- 10 bikes will be easy enough to maintain within building A. and easy enough measure the use through the facility
- A benefit of having their own fleet means the development gets to control how the bikes are used and maintain them at the facilities desired speed.
- Being the first student housing with Electric bikes is something to brag about and might even draw students to live there

Research of weight and models:

#### 1. Research Models

Relatively high upfront purchase price, battery costs, risk of theft, higher weight than conventional bicycles, range anxiety, and uncertainty about a new technology.

- Price: The purchase price of an electric bicycle depends on the brand, motor, battery size, and purpose with prices ranging from around 1,200 to 9,000 dollars.
  - In 2016, according to electricbicyclereview.com, the average cost was \$3,050 for a cruiser electric bicycle, \$4,150 for a mountain electric



bicycle, \$2,800 for a city electric bicycle, \$1,750 for a folding electric bicycle, and \$3,300 for a cargo bicycle ( Electric Bike Review, 2017).

- In contrast, a conventional hybrid bicycle costs approximately between \$300 and \$2000, the average new car costs \$33,560, and the average used car costs \$15,900 (Shrieves, n.d.; Healey, 2015; Gardner, 2015).
- The cost of electricity to run the bicycle averages out to be less than 2
- cents per mile, whereas the cost of owning, operating, and maintaining a car is 60.9 cents per mile (Stepp, 2013).
- **Additional Costs**
  - Theft and parking in public places: This concern can be mitigated by carrying a heavier U-lock with the bike, since the electric assist allows carrying more cargo
- **Weight: Most E-Bikes are heavier than the traditional bike.**
  - This problem will be mitigated through extensive research on a bike that equally can handle the electric motor and can be handled up stairs.
- **Battery Life/Cost and General Description : Electric bike batteries are increasingly self-contained.**
  - The cost to charge an electric bike battery is in the range of \$0.02-\$0.06 (assuming a utility rate of \$0.01/kwh). (If they are personal bikes)
  - These batteries are sensitive to heat and moisture and benefit from shade and cover, especially during charging which generates additional heat and requires the charging connection on the battery pack to be open.
  - Modern electric bike batteries use lithium ion technology, the same technology used in laptops, cell phones and electric cars.
  - E-bike batteries are nearly half the cost of the E-bike itself. (Kellen)
- **Storage cost: Planners can support electric bike riders by providing covered, APBP-compliant bike storage with access to 110 volt outlets.**
  - “Bicycle parking is a critical strategy for promoting bicycling for transportation and recreation” (APBP, Executive Summary).

### **Suggestion 3: Bus Shuttle**



We propose a shuttle system take place at the housing development (CHNW case study possessed an 11 passenger van- although it was often full, we recommend not going too much larger, initially, to ensure full usership and avoid possible overspending).

- Shuttle maintenance paid for via tenant rent
- Possible student employment, paid via tenant rent (for money saving and inclusivity)
- Run on a 30 minute schedule on weekdays, 7:40am-11:00pm
  - Likely more frequent routes needed at peak hours (9am-12pm, 4pm-6pm)
  - Start weekday shuttle at 7:40am, as first classes at WWU start at 8:00am
  - Late night shuttle schedule should also be implemented to ensure safe transport for students coming to and from campus late
- Possibility for organized trips
  - I.e. grocery stores, specialty stores, trips to Mt. Baker
  - Can be bi-weekly or also upon student demand (to ensure full usership)
- Upfront costs of shuttle needed to be supplied by Spectrum Division Solutions
  - Average cost of 11 passenger van around \$35,000
  - Possible hybrid shuttle for further sustainable practices, \$40,000 +
  - Advertising through paint design for community awareness
- Advertisement of a shuttle during application process could ensure students that bringing a personal car to the housing development is not necessary

### **Sustainability**

The implementation of this project is a research oriented endeavor in which we will pass on the data that we have collected during our research to another group next quarter. Institutionally this

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project will not be completed for a couple of years so we are not the last leg of the project by any means. Socio-Culturally, we are hoping for more sustainable actions from the project that we are proposing whether it is e-bikes, walking or taking the bus to school. Students of Western University should be able to take the route that they find the best weather it is about sustainability or ease of passage. We are hoping the diverse offering of transportation methods will allow for those without the means to be able to go where they want on campus.

This project will be an ongoing endeavor. In order to keep the project as successful as possible, WWU can keep having sustainable project classes in which they will further develop the idea of having sustainable transportation of multiple types on Western. Sustainable transportation to get up the hilly topography of Bellingham is the goal of this project, and e-bikes and a shuttle will do so in a sustainable, cost effective, and efficient way that will in turn help reduce traffic on N. State Street as well as move to approval of reduced parking permits.

## **Conclusion**

In conclusion, our project is working to bring sustainable transportation to the forefront of student minds. In order to do so, we are working to find useful incentives and sustainable options which Spectrum Division Solutions, student tenants, and Western Washington University find viable and can actually be implemented. These implementations are important in order to ensure minimal traffic will be added to both WWUs campus and surrounding communities. Continuously, implementation of said suggestions, and advertising of solutions during the tenant application process could lead to the reduction of cars brought to the new development, lessening the amount of parking infrastructure needed.

Through our research, we found that e-bikes and a shuttle system are the most viable possible solutions for our stakeholders- relating to operating costs, ease of student usability, and popularity.

For our methods, survey research and taking the routes first hand proved to be immensely useful. Case studies showcasing similar projects and population sizes allow for comparable comparisons and nearby populations in order to highlight effectiveness of implementation in the Bellingham student community.

This way, we can experience the barriers first hand. It is also possible that we will add mapping and communication boards at the housing development in order to make transportation options to the student's housing. This project will give valuable information to teams in the future regarding future implementation of green transportation as well as inform Paulo Nunes-Ueno with information about best practices for transporting students and how this ties in with building design. Hopefully, this data will lead students in the future to be more sustainable as well as lead to less parking lots for the development.

## **Appendices:**

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## Interviews and email with Stakeholder

### 1) Email with Paulo Nunes-Ueno (phone)

New Direction-

Research all for you (*what new information do you need*)  
Schools altering transit  
Safe routes  
Student initiatives

What do you see as end goal? Deliverables, map/app/website?

*The objective is to not try and get a new transit line going*

*An assessment of current conditions (describing students for this building, traveling by transit these are current options, how long it takes at peak class time, evening and weekends) then make an assessment and evaluation.*

*It feels a little out of direction to go to transit center or fairhaven*

*Provide a type of recommendation*

*Currently low student density but after this development and other, would be reasonable for WTA to reconsider*

*A good assessment- transit trip a few times*

*Matrix- apples to apples- this is bike trip now*

*Evaluate current state (Cost, trip time, time of day/week, convenience, safety)*

*Then recommendations*

*As more and more students make this particular trips....*

*What solutions are pumped up and we can do better*

*\*Possible idea- alternative to zipcar, peer to puro, Turo.com\**

*Just for tenants*

*How students use peer to peer car sharing*

*Age limitations?*

*People who use cars do it rarely and for longer trips*

*What can help solve this need without a full car in a stall that's parked in its entire life*

*Student cars parked 99% of time*

*\*How much is it used already- is there a facebook or group on campus\**

Paid student for conducting student forums

*Collin gathered focus groups to obtain information, hopefully work together and get information*

Shuttle interest- is there any budget at all, what information would you need to pursue that

WWU didn't put any money into NXNW shuttle

If yes, would this be included in rent or straight up at beginning

*Super expensive- 60-100/hour*

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*Unlikely building would provide  
How well their used*

E-bikes/increased zipcars

*Talking about charging stations for both*

*Cars and bikes- will have 50% more bike parking than code minimum (different kinds- vertical,  
people who cant hang up bike, cargo bikes)*

*What students have e-bikes, would that incentivize you more?*

*Dont spend tons of times trying to figure out numbers*

*Do- 3 years ago e-bikes would be this, now they cost this*

*Bike shops in town?*

*Make assumptions- on average do student spend on bikes*

*Retailer in town that sell e-bikes, test ride, ride up the hill and see if useful, write a write up*

*Is bike parking on campus safe enough/sufficient for campus*

*BIke parking on campus*

When will the building be finally up and housing- when is the last date for planning

*Currently design review stage*

*Hope is new residence move in in fall of 2020*

*Week of March 5th- an open house, neighborhood meeting! About the building*

*Plans/questions/transportation*

2)

Hi Paulo,

The team and I are wondering if we can set up a phone call with you tomorrow morning,

2/28/2017

We would like to go over exactly what information you would like about the e-bikes and in general.

Do you already have spots reserved for e-bikes? Do you have ballpark estimates of amount of bikes/budgets?

We are working on case studies but need some more direction from you.

We would also like to talk about the parking permits.

Best,

Grace Jensen

*Hi Grace,*

*Unfortunately I'm traveling for a project in Memphis until the end of the week and I won't be able to talk on the phone.*

*Can you send me your questions via email? I will do my best to help you guys out with direction.*

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*In terms of ebikes, I think most interesting observations you guys could bring to the project are around student use or potential to use ebikes.*

*I look forward to your responses!*

*Best,  
Paulo*

*PS can you remind me when you're final presentation is going to be? It will be really helpful to have details so I can invite folks from the project team*

4)  
Hello Paulo,

I hope you are doing well. Our hope with this email is to catch you up with where we are in or research as well as receive feedback and guidance on the next step. So far we have found that electric bikes and a shuttle for the facility, represents the most value.

E-Bikes: What we have found and what we are looking into. Most categories we have cases studies/or peer reviewed articles to justify the best solution.

- Model: Pricing, best weight, battery life, etc.
- Health Benefits: Physical/Mental
- Incentive to erase use of vehicles
- Maintenance: Cheaper than car
- Increased capabilities: Faster, longer, hillier, and Bike oriented
- Growing bike community
- Equity
- Consistency with travel times

Shuttle Bus: What we have found and cases we have to back it up.

- Case study: comparable, size and distance to location
- Phone call about funding today
- pricing
- Will it be utilized (how many students)

Questions:

- Will building A be maintained as a bike hub?
- Will there be e-bike docks (should we go dockles)?
- will there be a maintenance person?

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- Any progression on the parking reduction request?
- Any thing you can send us about the parking reduction requesting?

Anything else you can give us would be amazing! Thank you so much Paulo.

Group A thanks you,  
Nick Schmeck

#### 5) Stakeholder Update- Paulo Nunes-Ueno

*I hope you are doing well. Our hope with this email is to catch you up with where we are in or research as well as receive feedback and guidance on the next step. So far we have found that electric bikes and a shuttle for the facility, represents the most value.*

*E-Bikes: What we have found and what we are looking into. Most categories we have cases studies/or peer reviewed articles to justify the best solution.*

- Model: Pricing, best weight, battery life, etc.
- Health Benefits: Physical/Mental
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- Maintenance: Cheaper than car
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- Equity
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*Interesting. I'm looking forward to seeing your findings on this. Would students use them if the building made ebikes available? How could we test that? Speaking of testing, have you guys ridden the route to campus on an ebike and compared it to a standard bike? Your research on these questions would be really useful to us. If you can find examples of in-building bike share programs that would be really great. Back 10 or 12 years an architecture firm in Bellevue that was a short ride from the Bellevue transit center used refurbished older bikes all with combination locks set to the same combo as really low-tech; low cost bike share between their campus and the transit center. People would find one of their bikes and just use the common code to unlock it.*

*Obviously with a more expensive ebike we would want something a bit more secure, and to have folks that use it sign an agreement and put up a credit car for replacement or damage to the bike. Can you guys make some suggestions about how something like this might work at the building level?*

*Shuttle Bus: What we have found and cases we have to back it up.*

- Case study: comparable, size and distance to location
- Phone call about funding today
- pricing
- Will it be utilized (how many students)

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*I'm a bit skeptical that a shuttle would be used that much by students. But I'm curious to see what your findings are.*

Questions:

*The project at this stage is a 'proposal' so nothing really is set in stone. So you guys (and I, too) should be making recommendations for elements that we think will work and show why we think that. My personal recommendation to the building would NOT be to provide a bike dock based on my experience with the cost and bulk of the docks.*

*-Will building A be maintained as a bike hub?*

*Yes. I think that most of the bike parking will be in the North Building (A).*

*-Will there be e-bike docks (should we go dockles)?*

*-will there be a maintenance person?*

*Perhaps we can contract with Bike Hub to maintain this fleet of bikes.*

*-Any progression on the parking reduction request?*

*-Any thing you can send us about the parking reduction requesting?*

*Not yet. Still working on it. But the study I'm putting together on the parking demand and possible mitigation will be a public doc and I'll make sure to share it with you all. And your work is helping me a lot.*

6)

*Hi Folks,*

*I'm looking forward to your presentations tomorrow morning. I may be a few minutes late because my Bolt Bus gets into Cordata at 830a...But I'll do my best to get there as fast as I can.*

*Gabriel Grant from Spectrum, the development company working on the North State project, can't come unfortunately. But he would really like to hear your presentations. Would you be available to meet with us on Thursday 3/22 after 3pm?*

*We can reserve a room at a coffee shop like Primer or another place that you might suggest and hear your presentation and pick your brains about what you discovered.*

*Here are my asks of you:*

*1) Can you reply whether someone from your group can make it at this time?*

*2) Can you please forward to folks not copied here...I couldn't find everyone's address...And;*

*3) Can you suggest a good place to meet?*

*Thanks!*

*Paul*

3) Portland State University- Clint Culpeper (phone)

1/30/2018



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Where were you able to gain funding for building the bike garages? Was any money allocated from student fees?

*Within parking and transportation department- bike as one of those options*

*Budget within department*

*Paid for garages as a mix through budget and grants, some just cheap because already a room and just put access control inside*

*Two stand alone garages built funded by grants-*

*Revenue through campus bike shop*

*\$100,000 budget*

*Smaller projects 10-35 thousand dollars*

*One project in a year work around the 100,000 budget*

Were all the bicycle garages built at once?

*Were not all built at once*

Has there been less cars on campus?

*Hard to tell*

*City bike commutes, saw drop before city*

*Students living real far*

*Parking permits too low*

Has Portland State University had any influence on transit routes

*At mercy of TransMet*

*No own shuttles*

*No sway*

*They are downtown*

*All spoked in to downtown- already benefiting from location*

College Housing NorthWest- in Portland area

*Great case study, even though not official housing*

*Potential solution for dorms- restricts certain parking passes*

*Only eligible for all these passes*

*Connect existing amenities to new amenities- bike permit access to existing garages*

*Rather than building them themselves*

*Partnered with the gym?*

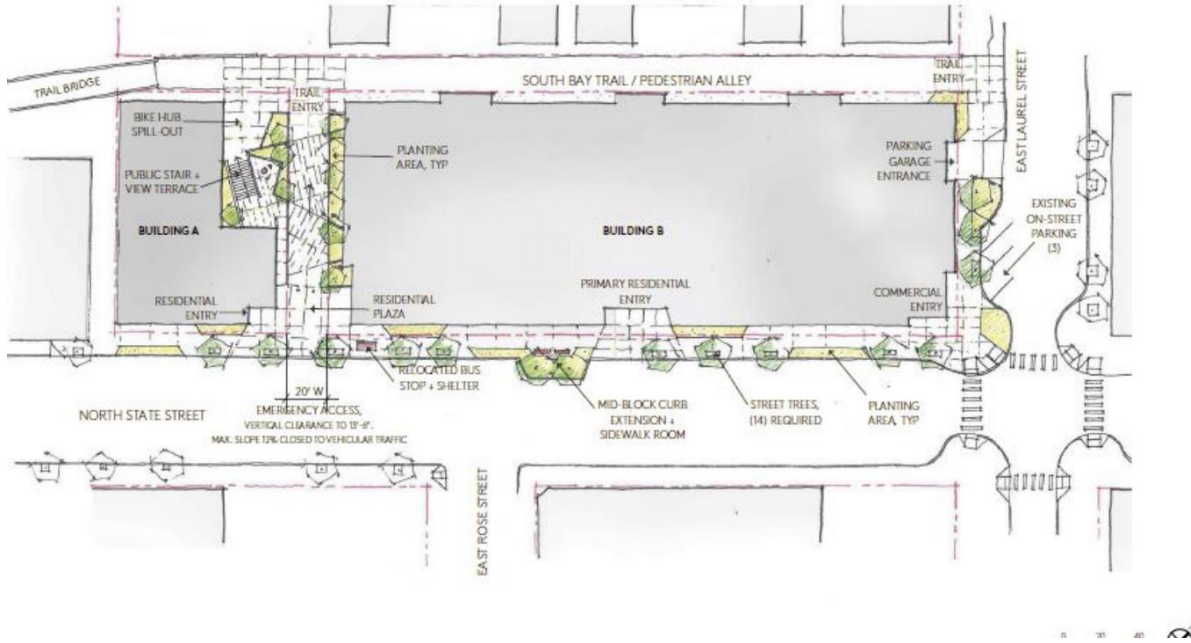
*Great for existing riders, doesn't force people to give up car*

*Still struggles with infrastructure of the city -that's the problem (i.e. bike lanes, TransMet pass, city rent being too high to live within biking area)Communication based- targeted marketing, message needs to be spread to newcomers*

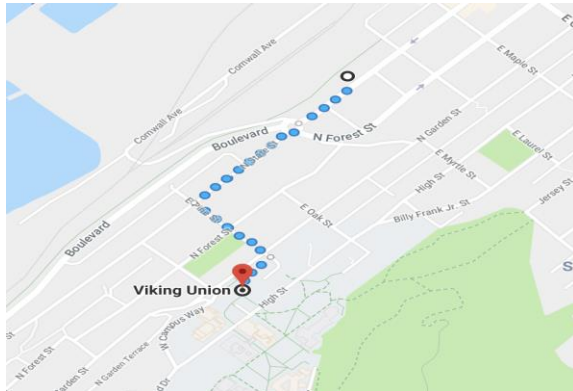
## **2 - Mapping and Site Layout**

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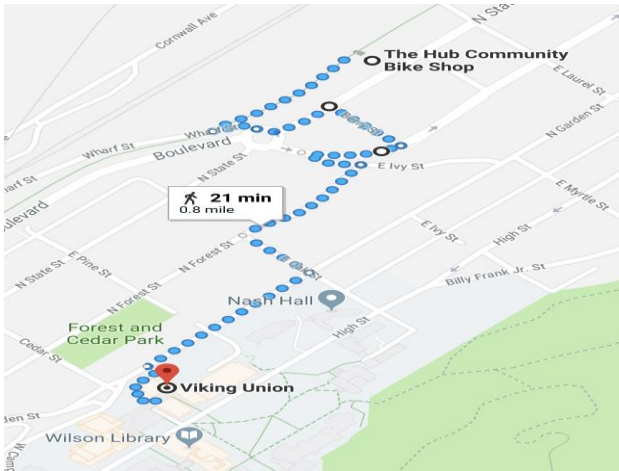
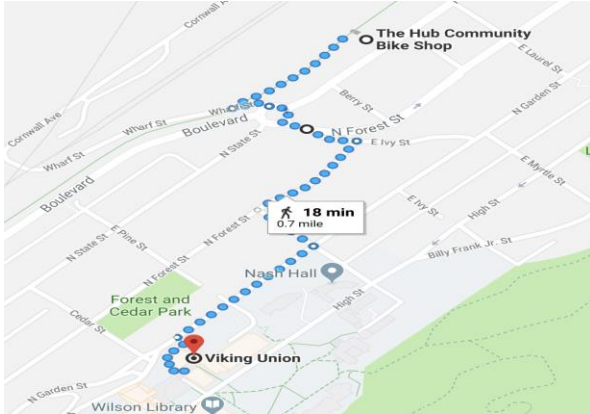
## 2.1 - Site Layout



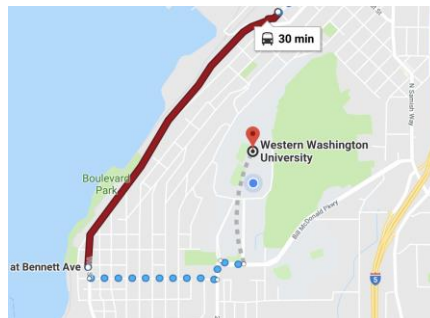
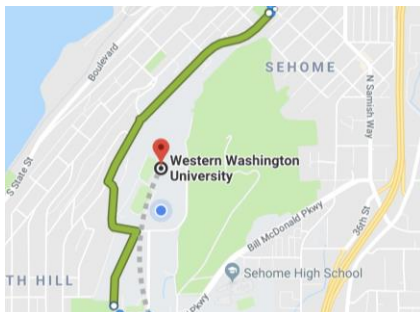
## 2.2 - Walking Routes



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### 2.3 - Bus Routes



### 3 - Case Studies

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### 3.1 CHNW



College Housing Northwest (CHNW), a non-profit housing developer, has provided free shuttle services from their Goose Hollow Plaza development in Portland to the downtown Portland State University campus. All residents of Goose Hollow Plaza are post-secondary students. Dylan Hatcher, the Goose Hollow Transportation Lead, was able to provide useful shuttle information to this project. The shuttle distance from Goose Hollow Plaza to PSU is roughly one mile. This is applicable to the new development and WWU, as the distance between the housing development and campus is 0.7 miles (for most direct routes).

Hatcher notes that the Goose Hollow shuttle, although advertised as free, is paid through earnings that CHNW makes from leasing apartments. The Goose Hollow shuttle drives roughly 300 riders on average per day, a number that is comparable to the 490 person unit being implemented for this project. The shuttle completes two trips an hour to and from PSU, from 7am-10pm with peak rider times between 9am-12pm and 4pm to 6pm. Although the shuttle does not run on the weekends, CHNW offers occasional grocery store trips on the weekends. This would be beneficial for the State St. development as the developer has requested less parking spots be developed than city regulations. Offering occasional weekend shuttles would ensure students that a car in this development is not a necessity.

CHNW is a great case study for WWU and the N. State Street development. Shuttle distances and amount of riders are very comparable to the size of distance of the new development. This means that weakly and monthly costs are likely to be very similar, giving stakeholders a good idea of monthly budgeting.

In a later email, Hatcher breaks down the usual shuttle's costs and maintenance fees:

<i>Cost Type</i>	<i>Frequency</i>	<i>Cost (\$)</i>	<i>Cost Per Month (\$)</i>
Refuel	2x a week	-140	-280.00
Oil Change	~every 3 months	-50	-17.00

### 3.2 PSU Case Study

Portland State University conducted a student transportation survey study report to see the modal choices students make in their everyday lives. They surveyed the student population and found

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driving, busing, biking and walking information. A total of 2776 mode choices were included in the 2009 analysis, each representing a single trip to PSU. Students made an average of 4.17 trips to PSU during the survey week. Riding transit is the most used at 38 percent of students. Driving alone is second most at 24.75 percent. Our project is proposing to limit unsustainable transportation like single driver cars by having transportation alternatives like an e-bike or shuttle. The large increase in bike trips represents the greatest change in student mode split between 2007 and 2009. In 2009, 14% of survey respondents who traveled to the PSU campus in the previous week biked at least one day. Of those students who biked, 53% had used more than one transportation mode to commute to campus during the study week, including 24% who arrived by motor vehicle at least one day.

### 3.3 UWE Case Study

The University of West England provided bicycles to students at 50 pounds for the whole year. Bristol has a lot of problems with traffic and road work that it decided to give the students the choice of being healthy by biking to school. This University is committed to sustainability. The fleet of bikes will be numbering over 100, they were able to get estimates from many different bike sellers and maintenance before finding a price the University liked. The model of bike they chose was not the cheapest or the most expensive but the build quality was excellent and scored well with those that rode it. The bike program is in their third year and is still very popular with students.

Phone Transcription with Dylan Hatcher (Goose Hollow Transportation Lead)  
2/28/2018

How do you employ and choose student drivers?

*To become a student driver, a regular job application must be filed out. Residents of GooseHollow have first priority of the application and job position. There is a background check that is completed as well. The job is part-time, with no student having over 29 hours a week.*

What is the rate of pay for students? And where does that money come from?

*Students are paid \$12.30 an hour, so slightly over minimum wage [Portland minimum wage as of July 2017 is \$10.25]. Students are also provided with a nice phone stipend, since we expect them to be in contact about routes, shuttle schedules, and work schedules.*

What kind of shuttle do you currently use?

*It is a Nissan NV 11 passenger van, which we were able to get just a few years ago as the budget permitted. We previously had a Mercedes van but there was a lot of maintenance costs. This van has had virtually no problems at all, yet.*

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How much of the student's rent goes towards the van program each month?

*I wasn't able to calculate those numbers yet, but I will let you know as soon as I do. Paying for the van via rent is not something that is advertised or disclaimed to students when they sign the lease. I imagine it cannot be too large of a percentage each month.*

I know you run routinely on the weekdays, do you run at all on the weekends? Do you only go to campus?

*We only run on weekends for special trips. For instance, there is a large Indian student population here, and I received a request to go to an Indian specialty store that is a ways out, so we go there monthly. I am always willing to do special trips, as long as there is a driver available.*

*We also do grocery store trips on Monday, Wednesday, and Friday and when it's farmer market season, we often do runs to those as well.*

All in all, would you say the shuttle system is worth it?

*Absolutely. We have about 600 residents here at Goose Hollow and I would say that about 300 people use the shuttle consistently. Sometimes, I will go to take students to campus and see that I have to immediately make a second trip because there is a large amount of students still waiting. I would say there are rarely (if ever) any runs during the day where there are no student riders on them. We have also been busier than ever, as people are being exposed to it more.*

## 6 - Website Links and Other

### 6.1 Bristol Bikes

<https://www.bristolbicycles.co.uk/for-business/fleets/case-study-university/>

### 6.2 Shuttle Bus costs

<https://www.carpenterbus.com/2015/01/annual-mini-bus-maintenance-costs/>

### 6.3 E-Bike costs

<https://www.electricbike.com/fat-e-bike-pricing/>

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