Transit System Performance Review
Performance Review Sections

– March 2019 (existing) Transit System
– Problem Identification
– Data Integrity
– Focus Group Outreach
– Survey Results
– Alternative Analysis
– Additional Recommendations and Items for Consideration
An efficient and seamless transit system is essential to supporting a car-free campus and reducing reliance on the personal vehicle, integrating the three campuses, and fully utilizing all existing parking facilities.
Transit System: Deployed 2019

<table>
<thead>
<tr>
<th>Route</th>
<th># of Buses at Peak Hours</th>
<th>Monday through Friday Hours of Operation</th>
<th>Weekend Hours of Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Packer Express</td>
<td>1</td>
<td>6:30 AM to 8 PM</td>
<td>-</td>
</tr>
<tr>
<td>Campus Connector</td>
<td>5</td>
<td>5 Buses: 6:30 AM to 8 PM, 2 Buses: 8 PM to 2:30 AM</td>
<td>2 Buses: 10 AM to 2:00 AM</td>
</tr>
<tr>
<td>AccessLU (Accessibility Bus)</td>
<td>1</td>
<td>6:30 AM to 10 PM</td>
<td>10 AM to 10 PM</td>
</tr>
<tr>
<td>Founders Way Express</td>
<td>1</td>
<td>6:30 AM to 8 PM</td>
<td></td>
</tr>
</tbody>
</table>

What changed:

- The “Campus Connector” will run late night hours to all campuses and replaces the “T.R.A.C.S” route.
- The old “Campus Connector” and “Mountaintop Express” have been replaced with the new “Campus Connector” which will run 5 buses on the route during peak hour. This increases the number of buses running during peak hour between Asa Packer Campus and Mountaintop from 3 buses to 5 buses.
- The AccessLU is a new service that will provide on-demand service for those with accessibility limitations.
Performance Review: Problem Identification

– What we have heard:
  • Travel time to Goodman Commuter Lot from Asa Packer Campus takes too long.
  • Bus Service reliability is not consistent (Arrival Time/Headway).
  • Bus.lehigh.edu can be confusing.
  • Communication over construction impacts needs to be improved.
  • Class schedules are too constrained.
  • The bus stops too frequently/there are too many bus stops.
  • There is no room on the bus at peak times (12 PM, 2PM & 4 PM)
  • Founders Way Express does not connect to the rest of the system.
  • The Packer Express is not frequent enough.
  • I prefer to drive.
Data Integrity

– Campus Connector had at least 1 of 5 buses using a ‘charter’ vehicle without counters during the month of October.

– September data cannot be relied upon due to inconsistent bus size and charter vehicles. There were a number of break downs that resulted in running 4 of 5 buses at times. The schedule was also changed at the end of the month.

– Mountaintop cell service drops and causes data to upload incorrectly.

– The University is still adjusting to new parking and transit systems.
Approximate Ridership Data

– Campus Connector: 2500 one-way trips per day

– Packer Express: 600 one-way trips per day

– Founders Express: 150 one-way trips per day

Total: 3250 one-way trips per day
Packer Express Bus Stop Ridership on Peak Day

Bus Stop

- Alpha Phi
- Alpha Tau Omega
- Alumni Memorial Building
- Drown Hall
- Farrington Square
- Gamma Phi Beta
- House 93
- Pi Beta Phi
- Sigma Phi Epsilon
- STEPS Bldg - Vine St
- Taylor Clg
- Taylor Clg SB
- Whitaker Lab
- Williams Hall

Ridership

On
Off

Lehigh University
Founders Way Express Bus Stop Ridership on Peak Day

<table>
<thead>
<tr>
<th>Bus Stop</th>
<th>On</th>
<th>Off</th>
</tr>
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<tbody>
<tr>
<td>Founder's Way</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Whitaker Lab</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Founders Way Express Bus Stop Ridership on Peak Day

- Founder's Way
- Whitaker Lab

Ridership

<table>
<thead>
<tr>
<th>Bus Stop</th>
<th>Ridership</th>
</tr>
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<tbody>
<tr>
<td>Founder's Way</td>
<td>58</td>
</tr>
<tr>
<td>Whitaker Lab</td>
<td>52</td>
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</table>
Focus Group Outreach

<table>
<thead>
<tr>
<th>Session #</th>
<th>Session Focus</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Student Athlete Leadership #1</td>
<td>Thursday, September 5, 2019</td>
</tr>
<tr>
<td>2</td>
<td>Student Athlete Leadership #2</td>
<td>Friday, October 18, 2019</td>
</tr>
<tr>
<td>3</td>
<td>Graduate Student Senate</td>
<td>Wednesday, October 16, 2019</td>
</tr>
<tr>
<td>4</td>
<td>Faculty Senate Executive Committee</td>
<td>Friday, October 4, 2019</td>
</tr>
<tr>
<td>5</td>
<td>Student Senate - Transportation Committee</td>
<td>Friday, October 25, 2019</td>
</tr>
<tr>
<td>6</td>
<td>ERAC</td>
<td>Wednesday, October 9, 2019</td>
</tr>
<tr>
<td>7</td>
<td>Saucon Village Residents</td>
<td>Tuesday, October 22, 2019</td>
</tr>
<tr>
<td>8</td>
<td>Saucon Village Residents</td>
<td>Friday, November 8, 2019</td>
</tr>
<tr>
<td>9</td>
<td>Commuter Lot Users</td>
<td>Monday, October 28, 2019</td>
</tr>
<tr>
<td>10</td>
<td>Commuter Lot Users</td>
<td>Wednesday, October 30, 2019</td>
</tr>
<tr>
<td>11</td>
<td>Commuter Lot Users</td>
<td>Tuesday, November 5, 2019</td>
</tr>
<tr>
<td>12</td>
<td>Survey</td>
<td>November 18 through December 15, 2019</td>
</tr>
<tr>
<td>13</td>
<td>Bus Drivers &amp; Mechanics #1</td>
<td>Thursday, October 17, 2019</td>
</tr>
<tr>
<td>14</td>
<td>Bus Drivers #2</td>
<td>Friday, October 18, 2019</td>
</tr>
<tr>
<td>15</td>
<td>Bus Drivers Access LU #3</td>
<td>Wednesday, October 30, 2019</td>
</tr>
<tr>
<td>16</td>
<td>Tom Bogari</td>
<td>Friday, November 15, 2019</td>
</tr>
<tr>
<td>17</td>
<td>Business Managers</td>
<td>Tuesday, October 22, 2019</td>
</tr>
<tr>
<td>18</td>
<td>AccessLU Users</td>
<td>Wednesday, November 20, 2019</td>
</tr>
</tbody>
</table>
Data collected from Outreach

– Data observed from counters indicated that the last ride usually occurs at 11 PM for Mountaintop and Saucon Village. This observation was corroborated during outreach sessions with Graduate Students and Saucon Village residents.

– Buses are full at 12 PM, 2 PM and 4 PM. Sometimes drivers will only allow riders going to Mountaintop and ask them to wait for the Packer Express.

– Class times that are 50-minutes allow only 5 minutes between some classes. These are not that common - but we have heard a lot about them from user complaints.
Commuter Lot Users

- Founders Way Commuter Lot is the favorite of Faculty/Staff.
- The direct Whitaker to Founders Way route is preferred due to reliability and predictability. They do not want to have to sit on bus for multiple stops. They like it being direct.
- If the Founders Way was expanded, it would open the system up to more Faculty/Staff on the west side of campus. Currently users are predominantly from Zoellner and locations closer to Whitaker.
- Goodman is not an ideal location for a commuter lot due to travel time.
- Bus driver should not idle in commuter lot at any time.
- Founders Way Express route time is closer to 15 minutes. Riders would prefer pick-up times to be consistently on the 15 at Whitaker. 4:00, 4:15, 4:30, 4:45 etc.
- Incentives and permit fee persuaded users to try commuter lot.
Survey Highlights

• Packer Express has roughly 50% of riders compared to Campus Connector (meaning it is very popular) and we should consider reducing the headway to alleviate volume issues we have been having.

• Most popular bus stops are STEPS, Whitaker, Farrington, Williams and Drown.

• Least popular bus stops are Jordan Hall, ATO, Gamma Phi, ATLSS, Pi Phi, Cundey, Iacocca C Wing and House 93.
Survey Highlights

- Riders think SouthSide should be eliminated (83%) House 93 (25%), Gamma Phi (21%), Iacocca C Wing (19%)
- Riders prefer Transit Buses to Shuttle Buses (42% to 26%)
- Riders prefer Forward Facing Seats to Side Facing (40% to 20%). 2% indicated standing is preferred.
- Heat & AC, WiFi and enough room on the bus was the notable amenities requested.
Survey Highlights

• Farrington Square (58%) is the priority bus shelter location. Followed by Williams (44%) and Alumni Building (25%).
• 69% use bus.lehigh.edu; 24% find it reliable
• 62% use the Transportation website.
• Majority (77%) agree to somewhat agree that Transportation website has valuable information.
• Generally, lack of accurate timing was the complaint about the website and tracker.
• 62% would like the tracking tool to provide real-time alerts. Followed by 19% via text message.
Transit System User Profiles

How often do you typically take the Lehigh University Transit System?

1,221 responses

- Multiple times a day: 28.8%
- Once daily: 19.7%
- 2 to 4 times a week: 19.8%
- A few times a month: 17.2%
- One time only: 17.2%
- Never: 0.3%
### Transit System Users

#### Transit System Survey User Breakdown

<table>
<thead>
<tr>
<th>User</th>
<th>Count Of User</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contractor/Visitor</td>
<td>25</td>
</tr>
<tr>
<td>Departmental</td>
<td>2</td>
</tr>
<tr>
<td>First Year student</td>
<td>2</td>
</tr>
<tr>
<td>FS</td>
<td>387</td>
</tr>
<tr>
<td>On-Campus Vendor</td>
<td>2</td>
</tr>
<tr>
<td>Retiree</td>
<td>3</td>
</tr>
<tr>
<td>RGT</td>
<td>30</td>
</tr>
<tr>
<td>Smart Card</td>
<td>8</td>
</tr>
<tr>
<td>Student</td>
<td>174</td>
</tr>
<tr>
<td>Visitor</td>
<td>1</td>
</tr>
<tr>
<td>Wage</td>
<td>10</td>
</tr>
<tr>
<td><strong>Total Permittees that completed survey</strong></td>
<td><strong>644</strong></td>
</tr>
<tr>
<td><strong>Total Surveys Completed</strong></td>
<td><strong>1200</strong></td>
</tr>
</tbody>
</table>
Bus Routes

Which bus route(s) do you utilize? (Check all that apply)

912 responses

- Campus Connector: 815 (89.4%)
- Packer Express: 432 (47.4%)
- Founders Way Express: 113 (12.4%)
Bus Stops Utilized

- Farrington Square (To SouthSide) 4.3%
- STEPS 6.5%
- Alumni Memorial Building 3.5%
- Taylor College (To SouthSide) 2.1%
- Pi Beta Phi 1.3%
- IMBT Labs/ATLSS 2.0%
- Iacocca C Wing (To SouthSide) 4.0%
- Building C (To SouthSide) 3.2%
- Goodman Commuter Lot 1.7%
- Saucon Village 2.3%
- Building C (To Saucon Village) 2.7%
- Iacocca Hall C Wing (To Saucon Village) 1.4%
- Iacocca Hall (To Saucon Village) 4.9%
- Alpha Phi 1.6%
- House 93 1.4%
- Sigma Phi Epsilon 3.3%
- Founders Way Commuter Lot 2.6%
- SouthSide 2.6%
- Farrington Square (To Saucon Village) 10.3%
- Whitaker Lab 13.3%
- Williams Hall 9.6%
- Drown Hall 9.0%
- Taylor College (To Saucon Village) 2.7%
Bus Stops to be Eliminated

Bus Stop to be Eliminated

- Drown Hall: 1.3%
- Do not eliminate any: 3%
- Building C: 9.8%
- Saucon Village: 2.7%
- STEPS: 4.9%
- Whitaker Lab: 1.9%
- Alumni Memorial Building: 0.8%
- Pi Beta Phi: 3.5%
- Gamma Phi Beta: 4.8%
- Alpha Tau Omega: 6.7%
- Goodman Commuter Lot: 5.8%
- Cundeoy Varsity House: 3.3%
- Jordan Hall: 5.9%
- Alpha Phi: 8.1%
- Iaccoca Hall: 4.6%
- Iaccoca Hall C Wing: 6.0%
- Williams Hall: 1.4%
- Taylor College: 4.0%
- Sigma Phi Epsilon: 4.2%
- SouthSide: 12.3%
- Farrington Square: 1.4%
Route Changes

- Extend the Founders Way Express to multiple locations on Allentown Campus (i.e. Williams, Brown Hall, Taylor College, Alumni Memorial Building, Vine Street and Farrington Square)
- Extend the Campus Connector to pick up at the Founders Way Commuter Lot
- Extend the Packer Express to pick up at the SouthSide and Founders Way Commuter Lot
- Create Goodman Express Shuttle (Stops at Goodman, Taylor College Northbound, Whittaker, Taylor College Southbound, and back to Goodman)
- Create a Saucon Village to Mountain Village Express Shuttle and eliminate the Saucon Village stop from the Campus Connector
- Add a 2nd bus to the Packer Express bus to reduce wait time
- Eliminate the Packer Express
- Eliminate the House 03 Bus Stop
- Eliminate the Gamma Phi Beta Bus Stop
- Eliminate the IMBT Labs-ATLSS Bus Stop
- Eliminate the SouthSide (Mechanic Street) Bus Stop

The diagram shows the various route changes suggested, with the length of each bar indicating the level of improvement or need for change.
New Bus Stops

Do you believe any new bus stops are needed?

912 responses

- 78.7% No
- 21.3% Yes
Bus Comfort

What types of seats do you prefer?

912 responses

- 40.1% Forward Facing Seats
- 37.9% No preference
- 20% Side Facing Seats
- Standing
Vehicle Selection

We have transit buses (longer) and shuttle (shorter) buses. What type do you prefer?

912 responses

- Transit Bus: 41.7%
- Shuttle: 25.8%
- No preference: 32.6%
Do you use bus.lehigh.edu?
912 responses

- Yes: 69%
- No: 18.9%
- Sometimes: 12.2%

Do you believe bus.lehigh.edu is a reliable tracking tool?
900 responses

- Yes: 40.1%
- No: 35.8%
- Sometimes: 24.1%
Have you visited Lehigh University's Transportation Services website?
912 responses

If yes, please rank how much you agree with the following statement: “I find the information on Lehigh University's Transportation Services website valuable.”
668 responses
Method of Communication

I prefer to get real-time alerts, route delays, and other timely information on the transit system via:

912 responses

- Twitter: 19.3%
- Bus.lehigh.edu tracking tool: 10.3%
- Email: 62%
- Text Message
- Instagram
- Facebook
- HawkWatch
- Hawkwatch
General Operations

The buses are considerate to pedestrians.

The speed the bus travels is too fast.

The speed the bus travels is too slow.

The bus drivers are helpful.

The wait time for a bus is too long.

The comfort of the seats on the bus meet my needs.

It takes too long to get to my destination.
Shelter Locations

Preferred shelter locations

- Alumni Memorial Building: 11.2% (234)
- Pi Beta Phi: 2.0% (46)
- Gamma Phi Beta: 0.2% (13)
- Goodman Commuter Lot: 7.9% (164)
- Cundey Varsity House: 1.9% (39)
- Jordan Hall: 0.3% (7)
- IMBT Labs/ATLSS: 3.3% (69)
- Alpha Phi: 2.2% (46)
- House 93: 1.4% (90)
- Sigma Phi Epsilon: 4.3% (96)
- Taylor College: 4.6% (397)
- Williams Hall: 19.0% (530)
- Founders Way Commuter Lot: 10.0% (209)
- SouthSide: 6.3% (132)
- Farrington Square: 25.4% (588)
Performance Review: Alternatives for Assessment

- Extend either the Campus Connector or Packer Express to Founders Way Commuter Lot
- Extend the Founders Way Express to additional locations on Asa Packer Campus
- Add a Goodman to Asa Packer Campus Express
- Add a Saucon Village to Mountaintop Express Shuttle
- Add a Goodman stop before Saucon Village
- Eliminate stops on campus with low ridership
- Add additional buses to the system to reduce headway
- Eliminate the Packer Express
- Service Mountaintop, Goodman and Saucon Village with TapRide or Lyft at night
- Service lower ridership stops with TapRide or Lyft
Contingent Improvements

- Bus stop signage update
- Distribution of new postcards to campus
- Implementation of Bus Tracking Tool (DoubleMap) to properly sync vehicles on route.
- Implement TapRide for AccessLU
- AccessLU to run only on weekdays
- Founders Way Route must be consistent – Filmore or Hayes? Drivers and riders prefer Filmore.
Night Time Improvements
(Appplies to All Top Alternatives)

- Stop running Campus Connector at 8 PM
- Run Packer Express until 2:30 AM
- Run TapHawk from at least 8 PM until 12 AM to service Saucon Village, Mountaintop and Goodman.

Basis of recommendations:
- Last pickup at Mountaintop and Saucon Village was consistently recorded at 11 PM. The Campus Connector was going to Mountaintop, Saucon Village and Goodman without any riders from 11 PM to 2:30 AM. This is not an efficient use of a driver or vehicle.
- Campus Connector headway at night is 35-minutes. If we can run the Packer Express instead, riders will experience an 18-minute headway at night. We will get more ridership by focusing a consistent route on Asa Packer and Sayre. For those that need rides at Mountaintop, Saucon Village or Goodman, the TapHawk will offer free on-demand service.
- This will provide more efficiency for the 2nd vehicle that operates at night and increase ridership.
- It is recommended that at least 2 drivers are deployed at night for logistical reasons. Repairs, breakdowns, or sick call-outs require at least 2 drivers to be scheduled.
Communication and Reliability

- The most ubiquitous theme of all the outreach sessions performed. Drivers concur that lack of communication has been a major issue for rider satisfaction.
- If the current method of communication is Twitter, it needs to become more detailed. I.E. If you are running smaller buses today because of a break down, tell them. It is recommended that Transportation begin practicing communications now to work out kinks of messaging once we deploy DoubleMap.
- When drivers idle it is a major cause of frustration for riders. Especially while using the tracker, it is unpredictable.