Virginia Tech

Parking & Transportation Master Plan

JULY 2016

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Invent the Future®

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Virginia Tech Montgomery Executive Airport

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Executive Summary

The Virginia Tech Parking and Transportation Master Plan (PTMP) defines a transportation and implementation strategy to enhance mobility while preserving campus character. The study process began with initial meeting to receive critical input from defined stakeholders to understand the larger vision of the campus as related to transportation. Following this, information and data are gathered and analyzed to identify problems and develop solution options. Through modeling, comparisons and statics, these solutions are evaluated for effectiveness and then prioritized for implementation within the next ten years. The PTMP recommends addressing these factors through short term and long term improvements leading to an efficient and well-managed transportation and parking system. Recommendations focus on five key transportation elements:

- **Roadways** – This component encompasses the traditional transportation element of drivable streets. Improvements are focused on improved intersection operations and new or upgraded facilities to efficiently move vehicle traffic on campus while reducing traffic in the campus core, thereby reducing conflicts with pedestrian and bicycle travel.
- **Parking** – This element requires the efficient use of available parking resources and evaluation of the parking system including pricing, enforcement, and assignment policies.
- **Transit** – The use of transit as a primary travel mode is steadily increasing in popularity among students and staff, requiring increased fleet, more frequent service, and convenient transfer locations. Additionally, the parking strategy will require additional transit connections within the campus boundaries to link parking spaces to employment and educational centers.
- **Pedestrians –** Pedestrian circulation is critical on any campus, thus it is important to support these users through expansion of the current network and provide increased connectivity, access and safety across campus.
- **Bicycles** – The bicycle component of this plan intends to improve or enhance amenities and designated routes to create a comprehensive and safe network serving the campus and the larger community of Blacksburg as well.

While each of these transportation elements are important in its own right, it is critical to understand that they work together to form an integrated, comprehensive transportation system. Only when these elements are able to work in concert with one another will Virginia Tech maximize the effectiveness and efficiency of its transportation system in supporting the mission of a thriving campus.

The Virginia Tech Parking and Transportation Master Plan serves as a powerful tool for the University for working towards an effective, safe and efficient transportation system on campus. The following proposed improvements are summarized for each individual transportation system. Following the summaries, Table ES-1 provides an implementation matrix with details on several of the specific improvements including cost, priority rank and implementation timeline. Finally, Figure ES-1 illustrates several of the larger scale infrastructure improvements recommended as part of the PTMP.

Roadway Recommendations Summary

Over time, vehicle traffic is expected to grow slightly each year with the gradual addition of new students, faculty and staff on campus. In addition, there are several major projects planned, such as the Multimodal Transit Facility (MMTF), US 460 interchange, and Southgate Drive reconfiguration that will have direct effects on vehicular mobility within specific areas of campus. The roadway enhancements are critical in the larger PTMP as they integrate a number of various modes and often are the most visible improvements to a system. Below is a summary of the infrastructure improvements recommended for the roadway network on Virginia Tech's campus.

- **Washington Street at Beamer Way:** Convert this stop controlled intersection to a roundabout, integrating the drop off loop for Cassell Coliseum into the design.
- **Washington Street at Duck Pond Drive:** Construct a roundabout at this location to

improve operations; integrate pedestrian crossings into the design.

- **West Campus Drive at Drillfield Drive:** Redesignate the existing separated ingress/egress roadways; the existing egress driveway onto West Campus Drive becomes a two-way bike path while the existing ingress driveway becomes a two-way motor vehicle roadway, tying to West Campus Drive with a new roundabout. As with the Duck Pond Drive roundabout, pedestrian crossings should be included in the design to maximize the integration of pedestrians and cars at this location.
- **Western Perimeter Road Construction:** Construct a new roadway parallel to West Campus Drive between Prices Fork Road and the Southgate Connector with appropriate peripheral improvements to facilitate connections to parking and academic hubs.
- **Stanger Street at Perry Street:** The Perry Street legs of this intersection are offset by about 150 feet along Stanger Street. The western leg is being converted into a driveway for the proposed MMTF, and the intersection with Stanger Street should be reconstructed as a roundabout. The eastern leg, which connects to Turner Street, should be paired with Old Turner Street to the south to make a one-way pair; Perry Street would operate westbound only.

Parking Recommendations Summary

The University has a robust parking system that has designated parking areas for three major user types, including Residents, Commuter/Graduates, and Faculty/Staff. It is essential to create a system that effectively supports future demand and addresses management/operation issues. Below is a summary of the analysis conclusions and parking master plan recommendations for Virginia Tech.

Existing Parking Conditions

- A total of 12,109 spaces were analyzed within the central campus area.
- Parking on campus is designated as follows: Faculty/Staff (30%), Commuter/Graduate (35%), Resident (31%), and Other (4%).
- There is currently a surplus of approximately 2,900 spaces during the typical peak parking period (noon on a weekday).

Future Parking Conditions

- Future development plans on campus will displace approximately 1,400 spaces in the next 10 years (2025).
- There is a projected increase of approximately 1,200 vehicles and a surplus of 290 spaces in 2025 during the peak parking period, without the implementation of aggressive TDM strategies.
- Parking assignments and zones will need to be reassigned to prevent a deficit in parking for Commuter/Graduate and Faculty/Staff parkers.
- Parking needs to be reallocated to effectively support future demand.

Future Parking Allocation Strategy

- The reassignment of designated parking for each permit type (i.e. F/S, C/G, and R) should

follow the current parking designation structure, which assigns the more convenient parking areas to the high demand and more parking dependent users and the less desirable parking areas to users who are less dependent on their vehicle to access and traverse campus.

- As parking on the northern end of campus becomes displaced, C/G parkers should be reassigned to the Duck Pond and Smithfield Road Lots.
- As more C/G parkers are moved into the Duck Pond Lot, Resident parkers should be reassigned to the Chicken Hill Lot and Stadium Lot.
- The effective reassignment of parking will require consistent monitoring of parking utilization and adjustments when future developments come online.

Future Parking Facility

- Even though additional parking is not necessary to support future demand, the University could construct a future structure that is financially sustainable and located in a high demand, high turnover area that has an hourly, daily and proximate permit parking rate structure.
- The Squires Lot or Architectural Annex site appears to be the most viable location for a future parking facility, as this area has high demand for parking, borders Downtown Blacksburg (i.e. Main Street), and may be needed to support the future location of a Creativity/Innovation District.
- Parking Market and Site Feasibility studies should be conducted for this site to determine the ideal location, size, rates, financial outlook, and management strategy for the facility.

Transportation Demand Management Strategies

- The University currently has a comprehensive TDM program in place that is managed by the Alternative Transportation Office, which should continue to be well supported with funding, planning and leadership.
- There are additional strategies that can be implemented to build on the current TDM plan, which include a bike-share program, continued investment in student housing, campus layout improvements, and parking pricing and management.
- Consider locating bike share stations at the peripheral parking facilities.

Parking Permit Rate Structure

- C/G and R permit rates are average compared to peer Universities, but the F/S permit rate is on the lower end of the spectrum.
- A tiered permit pricing system should be implemented on campus to help reduce traffic issues and frustration among users in locating an available space.
- For C/G permits the North Campus parking facilities, Litton Reaves Lots, and Coliseum Lot would be designated as proximate parking, while the Duck Pond Drive Lots, Track/ Fieldhouse Lot, and Smithfield Road Lots would be considered standard parking.
- Based on the current parking demand for discounted F/S permits in the Chicken Hill Lot, it may make sense to only offer proximate parking in high demand areas.

Visitor Parking

- The University should begin to charge for Visitor parking, and Visitor parking spaces should be designated throughout campus.
- Parking payment stations (i.e. pay-and-display, pay-by-plate, pay-by-space, and pay-by-phone) with hourly and daily rates should be provided adjacent to Visitor parking along with the option to purchase a daily visitor parking pass.
- Proper signage should be implemented around campus to direct visitors to the designated parking areas.

State Vehicle Parking

- Existing parking policy should establish that state vehicles park only in designated parking spaces, which will be provided in parking facilities throughout campus.

Parking Demand Reduction Strategies

- Based on the future parking supply/demand analysis and the negative financial implications, it is not suggested or necessary to limit the number of Resident parking permits issued or to implement off-site parking to support future demand.

Transit Recommendations Summary

Blacksburg Transit provides safe and reliable transit connections to multiple campus destinations from areas of Blacksburg and the surrounding region. Recent trends in the greater use of transportation alternatives by younger populations, combined with the University's growth and support of transit, has led to a higher level of bus service to campus. In response to these changes, Blacksburg Transit, in partnership with Virginia Tech, is constructing a new Multi-Modal Transit Facility (MMTF) on campus with expanded capacity and amenities for BT riders. The completion of the MMTF will have many benefits, but will also create some new challenges in terms of moving people around the main campus as a result of its displacement of parking and associated route changes. The following additional shuttle route is proposed to support changes to the parking system.

- Provide a Commuter Parking Shuttle to link the major remote parking areas to the academic core area of campus. The route will provide rapid and direct movement for commuting students traveling to the academic areas north of the Drillfield by connecting the Duck Pond Drive, Stadium, and Chicken Hill Lots to the MMTF.

Pedestrian Recommendations Summary

Pedestrians are a major component of any university setting, and Virginia Tech is no exception. Providing effective and safe pedestrian amenities and delineations is very important to the wellbeing of the transportation system as a whole. The proposed improvements for the pedestrian network are summarized below.

- Develop campus-wide crosswalk standards. This task was completed as part of the PTMP effort, and creates a normalized, recognizable standard for all campus crosswalks including markings, lightings, raised crosswalk design as needed and ADA compliant ramp designs. This familiarity will help not only pedestrians recognize safe places to make crossings, but will raise driver awareness of pedestrian presence as well.

- Enhance existing multi-use path south of the Duck Pond. Provide a dedicated two-way bicycle path adjacent to a wide walking/jogging path.
- Conversion of Duck Pond Drive to a pedestrian/bicycle only path. As part of the Western Perimeter Road project, Duck Pond Drive is proposed for realignment to better connect to the Perimeter Road and serve future buildings. Once this realignment is completed, the existing Duck Pond Drive can be retrofitted into a mixed-use path, providing a new connection between Duck Pond Drive Parking areas and the academic core.
- Parking Management on Drillfield Drive. Drillfield Drive, which loops the Drillfield has regular conflict between pedestrians, vehicle and bikes as it acts as a link between academic core to the north and more residential buildings to the south. If parking was more regulated on Drillfield Drive, there would be less vehicle traffic, reducing pedestrian conflicts.
- General ADA compliance improvements. As part of routine maintenance, the University should determine areas where individuals with disabilities are substantially rerouted due to topography and upgrade these routes to meet current ADA standards.

Bicycle Recommendations Summary

Bicycling is becoming a more and more attractive travel mode on college campuses, specifically for those who live just off campus or commute to campus and must park in satellite lots. The proposed enhanced bicycle accommodations are summarized below.

- **Washington Street:** restripe the cross section along Washington Street, from Duck Pond Drive to Kent Street, to accommodate a 7.5-foot buffered bike lane in both directions with narrowed travel lanes (11-foot). While this would result in the loss of approximately 75 on-street parking spaces, there is a substantial benefit in efficiency and safety for cyclists.
- **West Campus Drive:** complete bicycle lane network where there are existing gaps in the network.
- **Kent Street:** Remove the approximately 10 on-street parking spaces between Washington Street and Wall Street and restripe that pavement to accommodate a southbound climbing lane for cyclists.
- **Drillfield Drive:** As mentioned in the Pedestrian Recommendations section, the Drillfield presents unique challenges for the safe interaction of all travel modes. There are three main bicycle improvements for this high volume area:
  - Consider buffered bicycle lanes in the reverse direction along the inside of the Drillfield Drive loop giving cyclists a clear indication of where to ride.
  - Parking geometry should be switched to back-in angle parking along the outer edge of the loop, allowing for better views by drivers when exiting the parking space.
  - Adjust trailheads at crosswalks to bring awareness to the newly designated bike lanes.
- In addition to geometric changes and amenities, this plan supports the findings of the Virginia Tech Bicycle Parking Plan, which includes:

  - Replace all “staple” and “triangle” storage racks with inverted U-rack designs
  - Construct additional bike parking as funding becomes available
  - Prioritize districts of campus for enhancements based on areas high use and known deficiencies, with residential buildings taking precedence
  - Explore opportunities to establish large bike parking centers around campus
- As part of individual projects, effort should be made to update pavement markings related to bicycles including:
  - Green thermoplastic markings at spot locations
  - Bike sharrows
  - Bike lane and arrow markings where exclusive bike lanes are present
  - Enhance bike paths through residential areas
- Enhance bicycle pathways through the residential areas of campus south of the Drillfield. This includes removing stairs wherever re-grading can allow for an ADA-compliant path. Establish an east-west central accessible pathway that connects to the Drillfield in a relatively direct route that minimizes conflicts with pedestrians.

Table ES-1. Implementation Matrix

Category	Location	Type	Description	Jurisdiction	Priority	Timeframe	Approximate Construction Cost	Issues Addressed (3-High to 1-Low)			
								Traffic Operations	Safety	Bike/Ped Mobility	Livability-Aesthetics
Roadways	Washington Street at Beamer Way	Roundabout	Construct a roundabout at the intersection	Virginia Tech	High	Medium	$1,735,000	2	2	2	1
	Washington Street at Duck Pond Drive	Roundabout	Construct a roundabout at the intersection	Virginia Tech	Medium	Medium	$1,794,000	2	2	1	1
	Drillfield West End	Roundabout and widening to two-way approach	Construct a roundabout at the southern Drillfield Drive intersection	Virginia Tech	Medium	Long	$1,703,000	1	2	2	2
	Western edge of campus	Western Perimeter Road	Construction and opening of Western Perimeter Road	Virginia Tech / VDOT / Town of Blacksburg	High	Long	$34,400,000	3	2	2	1
	Smithfield Road	Paving between Plantation Road and Duck Pond Drive	Paving gravel portion of Smithfield Road between Plantation Road and Stroubles Creek	Virginia Tech	Low	Long	$1,309,000	2	1	1	1
	Stanger Street at Perry Street (north)	Roundabout	Construct a three-leg roundabout at the intersection	Virginia Tech / Blacksburg Transit	Medium	Medium	Already Funded	2	2	2	1
	Perry Street and Old Turner Street between Stanger Street and Turner Street	One-way Pair	Convert the current Perry Street and Old Turner Street into a one-way pair	Virginia Tech	Low	Long	$1,465,000	1	2	2	1
Pedestrians	Duck Pond Path	Multi-use Path	Upgrade the exsting path along Duck Pond to a multi-use facility accommodating pedestrians and bicyclists.	Virginia Tech	High	Short	$875,000	0	1	3	3
Bicycles	Washington Street (between Duck Pond Drive and Kent Street)	Bicycle Lane (each direction)	Remove non-ADA parking along Washington Street and provide a buffered bicycle lane in both directions	Virginia Tech	Medium	Short	$462,000	1	2	3	1
	Kent Street (between Wall Street and Washington Street)	Bicycle Lane (one direction)	Remove parking and provide a single climbing bicycle lane along Kent Street between Wall Street and Washington Street	Virginia Tech / Town of Blacksburg	High	Short	$39,000	1	2	2	1
	Drillfield Drive	Bicycle and Parking Accommodations	Switch vehicle parking to the outside edge of Drillfield Drive to provide a contraflow bike lane along the perimeter of the Drillfield.	Virginia Tech	Medium	Medium	$343,000	1	2	3	2

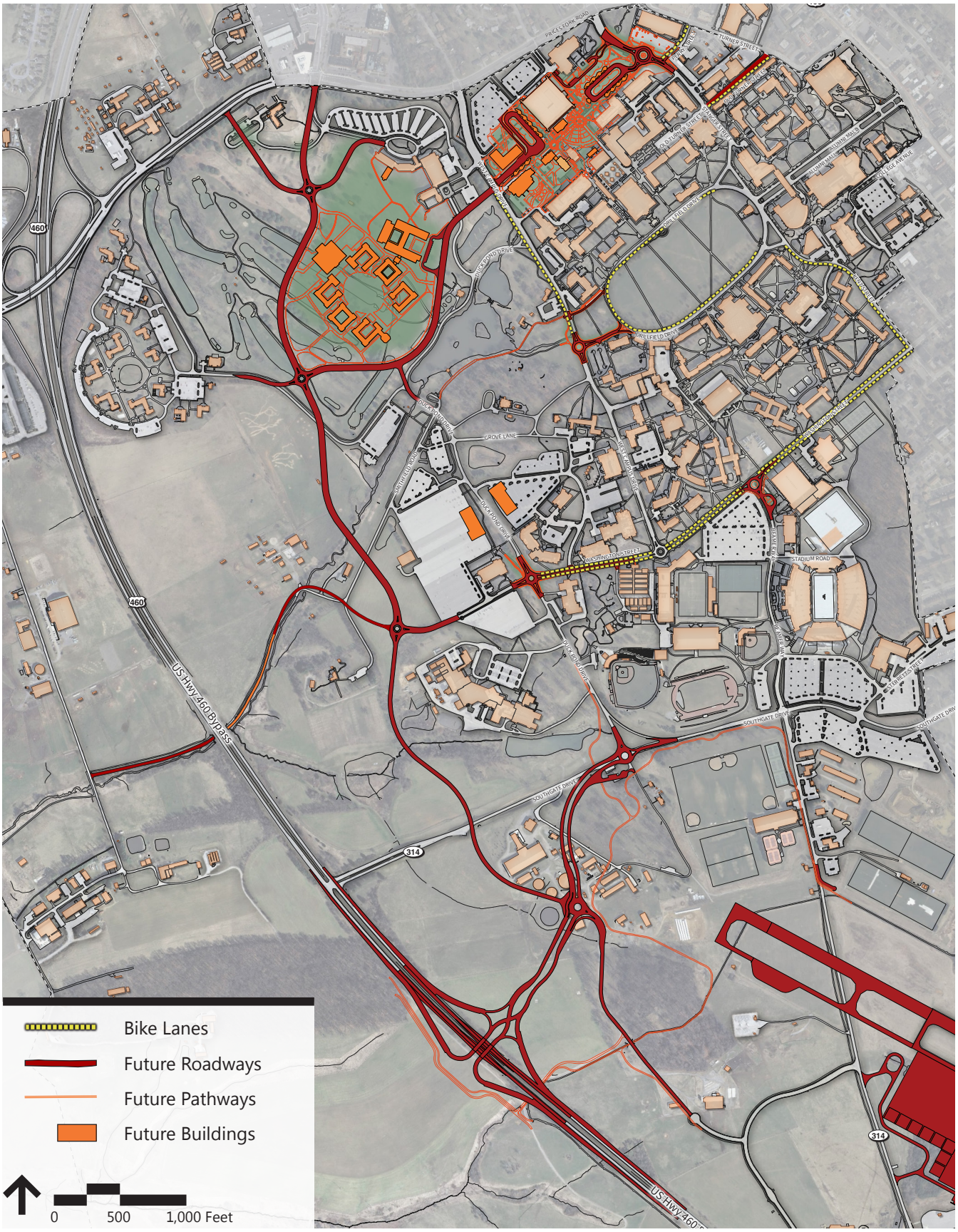

Figure ES-1. Future Infrastructure Recommendations Summary

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1 Introduction

Virginia Tech is the most comprehensive university and leading research institution not only in Virginia, but also the region, offering 240 degree programs serving over 31,000 students. While the University upholds its motto *Ut Prosim* (That I May Serve) to the state of Virginia by producing technological leadership, economic growth and job creation across the state, the University must also serve its students, faculty, staff and visitors by providing efficient and reliable transportation options on campus.

Without access to parking, a safe environment for walking and bicycling, and efficient transit connections within the campus and to housing and shopping locations in Blacksburg, the University could not function.

Study Purpose

The Virginia Tech Parking and Transportation Master Plan (PTMP) defines a transportation and implementation strategy to enhance mobility while preserving campus character. There are a number of factors driving the need for this Plan including:

- Anticipated building projects that will displace heavily utilized, proximate parking
- Planned transportation projects including the Southgate Connector and its U.S. Route 460 interchange, airport runway expansion, and Multi-Modal Transit Facility (MMTF)
- Growth in student population
- Increased pedestrian and bicycle traffic as primary transportation modes
- Need to reduce pedestrian and bicycle conflicts at key locations on campus
- Need to enhance transit connections to complement the parking strategy and construction of the MMTF

The PTMP recommends addressing these factors through short term and long term improvements leading to an efficient and well-managed transportation and parking system. Recommendations focus on five key transportation elements:

- **Roadways** – This component encompasses the traditional transportation element of drivable streets. Improvements are focused on improved intersection operations and new or upgraded facilities to efficiently move vehicle traffic on campus while reducing traffic in the campus core, thereby reducing conflicts with pedestrian and bicycle travel.
- **Parking** – This element requires the efficient use of available parking resources and evaluation of the parking system including pricing, enforcement, and assignment policies.
- **Transit** – The use of transit as a primary travel mode is steadily increasing in popularity among students and staff, requiring increased fleet, more frequent service, and convenient transfer locations. Additionally, the parking strategy will require additional transit connections within the campus boundaries to link parking spaces to employment and educational centers.
- **Pedestrians** – Pedestrian circulation is critical on any campus, thus it is important to support these users through expansion of the current network and provide increased connectivity, access and safety across campus.
- **Bicycles** – The bicycle component of this plan intends to improve or enhance amenities and designated routes to create a comprehensive and safe network serving the campus and the larger community of Blacksburg as well.

While each of these transportation elements are important in its own right, it is critical to understand that they work together to form an integrated, comprehensive transportation system. Improvements to a roadway for example, could include the addition of bike lanes to safely combine both two modes on a single facility. Likewise, transit buses are now fitted to accommodate a bike rack on the front, integrating two modes to provide better service than either could separately. Only when these elements are able to work in concert with one another will Virginia Tech maximize the effectiveness and efficiency of its transportation system in supporting the mission of a thriving campus.

Study Process and Schedule

To effectively assess and address the overall transportation needs of such a diverse, complex, and changing community, it is necessary to define the study process and follow through on each component of that process. First, it is critical to receive input from the defined stakeholders to understand the larger vision of the campus as related to transportation. Following this, information and data are gathered and analyzed to identify problems and develop solution options. Through modeling, comparisons and statics, these solutions are evaluated for effectiveness and then prioritized for implementation. Ultimately all data, evaluations, solutions and recommendations must be documented in a report. As time progresses, the recommendations are implemented and can be evaluated for updates and revisions.

To accomplish this process, a one-year schedule (Figure 1-1) was developed, with four overlapping phases:

- Phase I: Start-up, Goals, Data Collection
- Phase II: Define Transportation Issues
- Phase III: Development of Solutions
- Phase IV: Future Traffic and Parking Plan

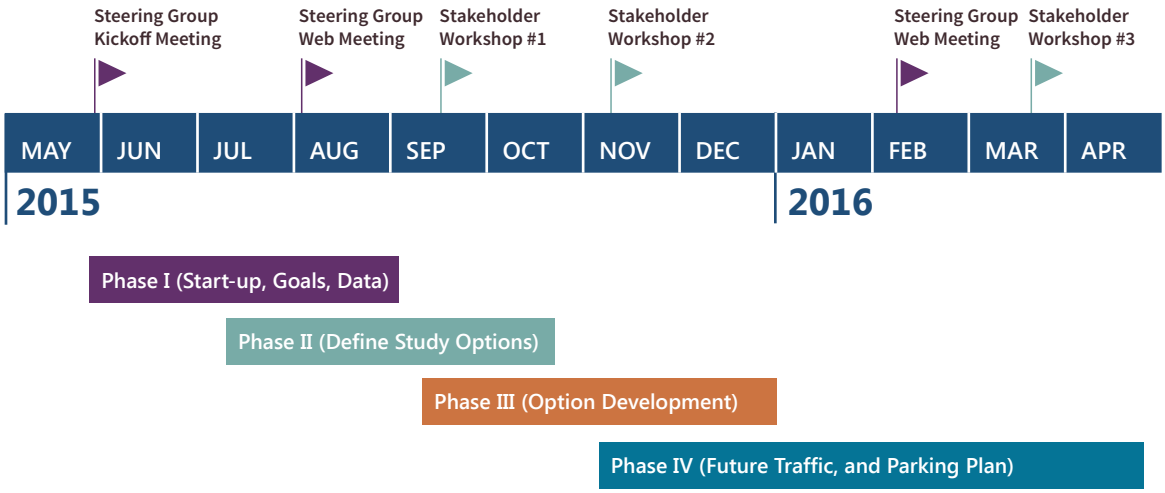

Figure 1-1. Plan Schedule

Ongoing Public Involvement

The Office of University Planning led this effort, and the project was managed by Steve Mouras with the assistance of Mike Dunn. Throughout the process, the project team held Steering Committee and Stakeholder meetings to ensure that the final product would meet the needs and expectations of the group it is meant to serve. The Steering Committee was comprised of the following individuals who provided guidance and oversight throughout the entire process:

- Jason Soileau *Assistant Vice President - Office of University Planning*
- Lisa Wilkes *Associate Vice President for Administration*
- Kevin Foust *Chief of Police and Director of Campus Security*

Additionally, the project team held three rounds of Stakeholder meetings, which allowed the University population a chance to understand the issues and proposed improvements and offer comments throughout the project process. Individuals participating in these meetings represented a wide range of campus constituents. Some of the groups represented during the Stakeholder meetings are:

- Virginia Tech Parking & Transportation & Alternative Transportation Offices
- Athletic Department
- Virginia Tech Office of University Planning
- Facility Operations & University Design & Construction
- Student Affairs
- Corps of Cadets
- GSA/SGA/BOV Representatives
- SPIA/UAP
- Faculty Senate/Staff Senate
- STS & ADA Caucus
- Parking and Transportation Committee
- Town of Blacksburg
- Blacksburg Transit
- Virginia Tech Corporate Research Center
- Virginia Tech Montgomery Executive Airport
- VDOT/NRVMPO

The interactive map and Virgina Tech Moves app were integral parts of the public outreach process. The map served as a virtual comment box to collect feedback from the community, while the app allowed users to map their individual pedestrian and bicycle routes through campus.

At a Town Hall Meeting in October at Squires Student Center, the project team gave a presentation and recieved feedback from students, faculty, and staff. TV coverage at the event allowed the project information to reach an even a wider audience.

In addition to in-person meetings, there were a number of other public outreach efforts employed to gain user perspectives on the issues. The project team maintained a project website (www.vt-ptmp.com), which housed presentations and maps, relayed schedule and upcoming events and provided an interactive map that served as a virtual comment box for collecting feedback on issues and solutions. The interactive map in particular was a primary source of receiving feedback from issues and potential solutions on campus. Over 200 "pins" were posted to the interactive map along with over 100 submitted comments. A Facebook page was created to promote the project and create awareness.

VHB also developed a "Virginia Tech Moves" app for mobile devices through which users could log their pedestrian and bicycle trips. As individuals start the app before their trip and then end the app at their destination to or from campus, the specific routes through campus were recorded. Each individual's routes were then mapped over a campus map using GIS to visual identify travel trends. Over 100 unique users used the app at some point during the project.

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2 Existing Conditions

Vehicular Environment

Virginia Tech is located in the Town of Blacksburg, within central Montgomery County. While most students live in Blacksburg, many live in Christiansburg or outside of the immediate area. Most faculty and staff live outside the immediate vicinity of Virginia Tech and use personal vehicles to access campus. As shown in Figure 2-1, US Route 460 connects to I-81 and forms the primary route to campus from the north and south. Prices Fork Road forms the primary route to campus from the west and Main Street and other local streets connect campus to the Town of Blacksburg, much of which is located to the north and east.

Roadways are a critical part of the transportation environment on Virginia Tech's campus. All modes of transportation interact with the roadway network in some form during their trip. Figure 2-2 illustrates the primary street network on campus. Most roadways and intersections on campus currently operate at acceptable levels of service. However, in the future as the campus continues to grow, congestion is expected along some important roadways such as West Campus Drive, Prices Fork Road and Washington Street. Through this Plan, roadway improvement were identified to meet four primary objectives:

- Reduce traffic volumes in the core areas of campus
- Minimize conflicts with pedestrian and bicycle movements
- Maintain accessibility and clarity of campus road network
- Provide efficient vehicular movement to and from the campus as well as within the campus

There are seven key roadways in the campus network that work together to provide the main connections for vehicular travel. Those roadways are West Campus Drive, Washington Street, Duck Pond Drive, Drillfield Drive, Beamer Way, Stanger Street/Kent Street, and Southgate Drive.

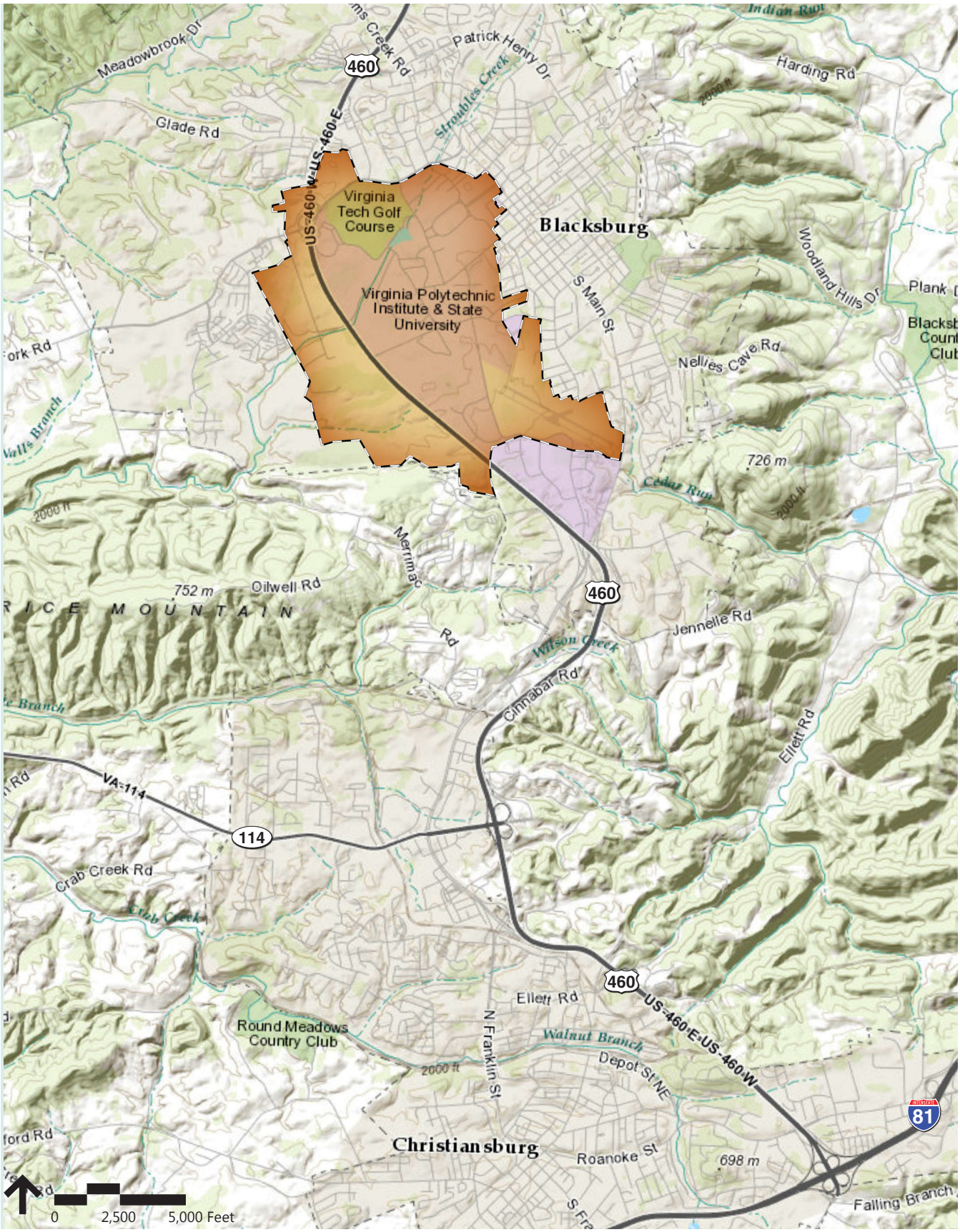


Figure 2-1. Vicinity Map

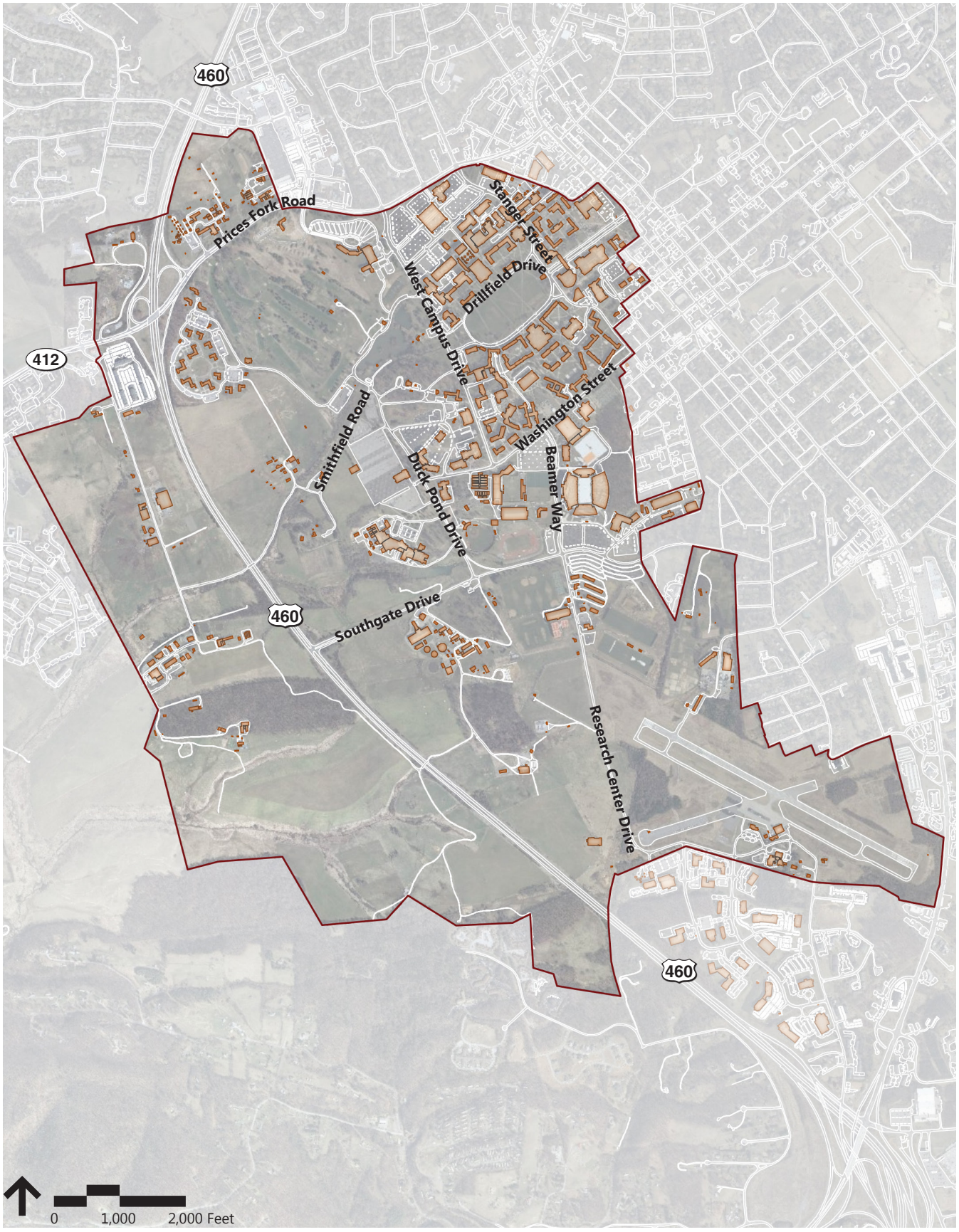


Figure 2-2. Campus Base Map

West Campus Drive

West Campus Drive is a north-south roadway through the center of campus, connecting Prices Fork Road with Washington Street. It is primarily a two-lane roadway accommodating sidewalk along the east side and exclusive bike lanes in both directions south of the Drillfield, and northbound only north of the Drillfield.

Washington Street

Washington Street is an east-west roadway in the southern part of campus, separating the athletic fields to the south from the academic and residential buildings to the north. It is primarily a two-lane roadway with wide sidewalks on both sides of the road, but does not have exclusive bike lanes.

Duck Pond Drive

Duck Pond Drive is primarily a north-south roadway on the western side of campus that curves to become an east-west roadway, meeting West Campus Drive north of the Drillfield. This roadway primarily serves the Life Sciences Precinct and the College of Veterinary Medicine. It is a two-lane roadway with no bike or pedestrian accommodations, with the exception of sidewalks within the Life Sciences precinct area.

Drillfield Drive

Drillfield Drive is unique in that it is an oval shaped loop around the Drillfield with vehicular connections on the east and west ends to Stanger Street/Kent Street and West Campus Drive, respectively. This roadway is primarily a one-way, single lane roadway parking on both sides of the street and wide sidewalk around the outer side of the loop. It provides front door access to a number of administrative and academic buildings, including Burruss Hall.

Beamer Way

Beamer Way is a north-south roadway in the southern part of campus through the athletic fields, connecting Washington Street to Southgate Drive which provides the main access from US 460 Bypass into campus. It provides access to multiple surface parking lots. It is primarily a two-lane roadway with wide sidewalks on both sides of the road, but does not have exclusive bike lanes.

Stanger Street

Stanger Street is a north-south roadway in the northeastern part of campus, connecting Prices Fork Road into the heart of campus via Drillfield Drive. It provides access to multiple surface parking lots as well as academic and commercial buildings. It is primarily a two-lane roadway with sidewalks on both sides of the road and exclusive bike lanes in both directions. South of the Drillfield, this roadway is named Kent Street, which connects to Washington Street.

Southgate Drive

Southgate Drive is an east-west roadway in the southern part of campus. The western end of this road terminates at US Route 460 at a signalized intersection, which serves as the main entrance to campus from the south. The eastern end of the road extends into residential areas of the Town. Southgate Drive is predominantly a two-lane road and has a multi-use path running along its northern edge east of Research Center Drive.

Key Intersections

Vehicle, pedestrian, and bicycle movements were collected at twelve key intersections on campus for the purposes of assessing current and future operations. For each of these locations, the peak hour level of service (LOS) was determined, which measures the adequacy of the intersection geometrics and traffic control for the given turning movement volume. Levels of service range from A through F, based on the average control delay experienced by vehicles traveling through the intersection during the peak hour. Control delay represents the portion of total delay attributed to traffic control devices. The engineering profession generally considers LOS D or better acceptable for intersections. Intersection capacity analyses were conducted using Synchro software package and the detailed technical reports associated with the scenarios are contained in **Appendix A**.

Figure 2-3 identifies the twelve intersections studied along with each intersection's current traffic control and lane geometrics. Figure 2-4 summarizes the current peak hour vehicular volumes at those intersections and Figure 2-5 illustrates the worst peak hour level of operations at those intersections. As shown in the figure, approximately two-thirds of the key intersections evaluated are approaching capacity (LOS C/D) or are failing (LOS F).

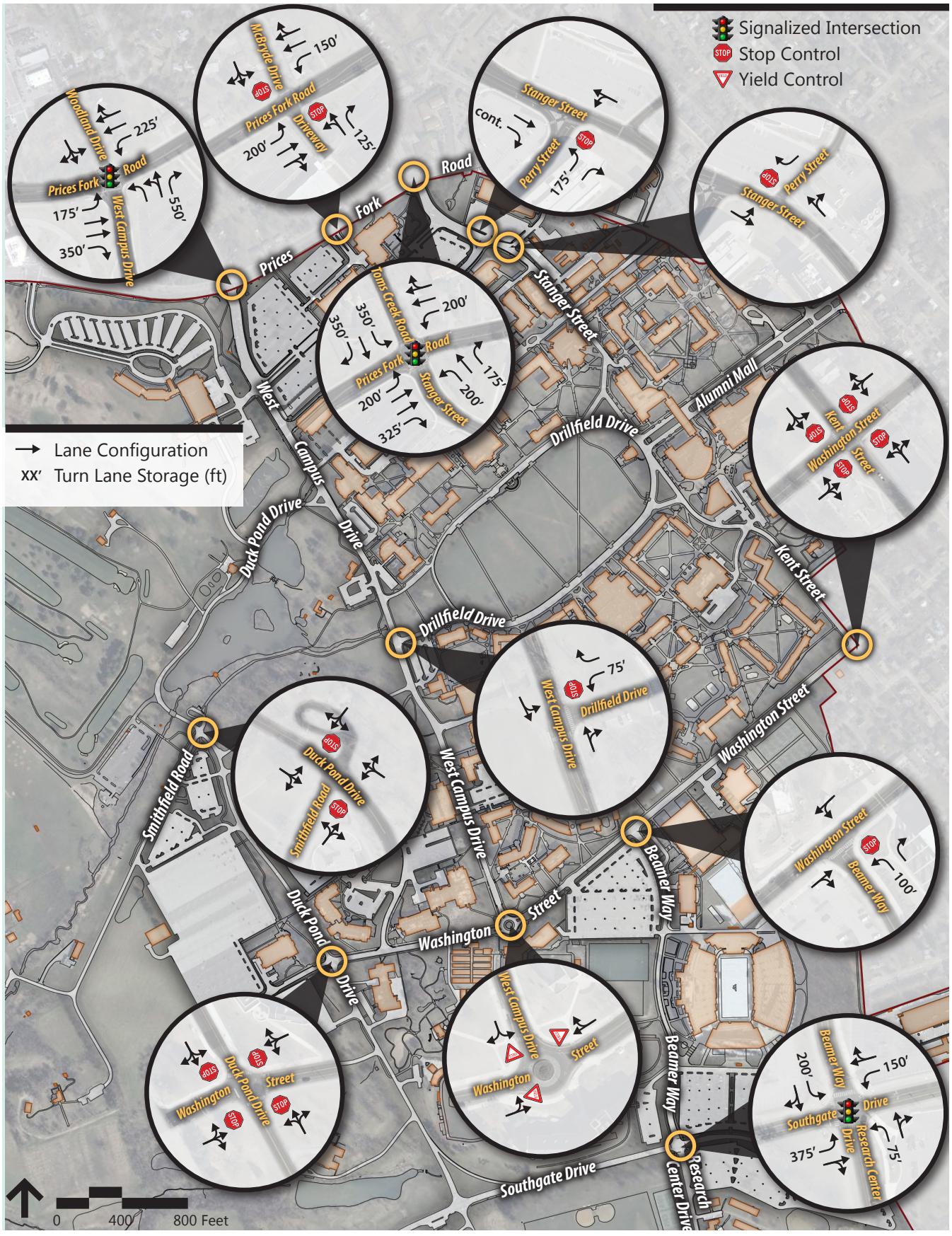


Figure 2-3. Existing Intersection Lane Geometrics and Traffic Control

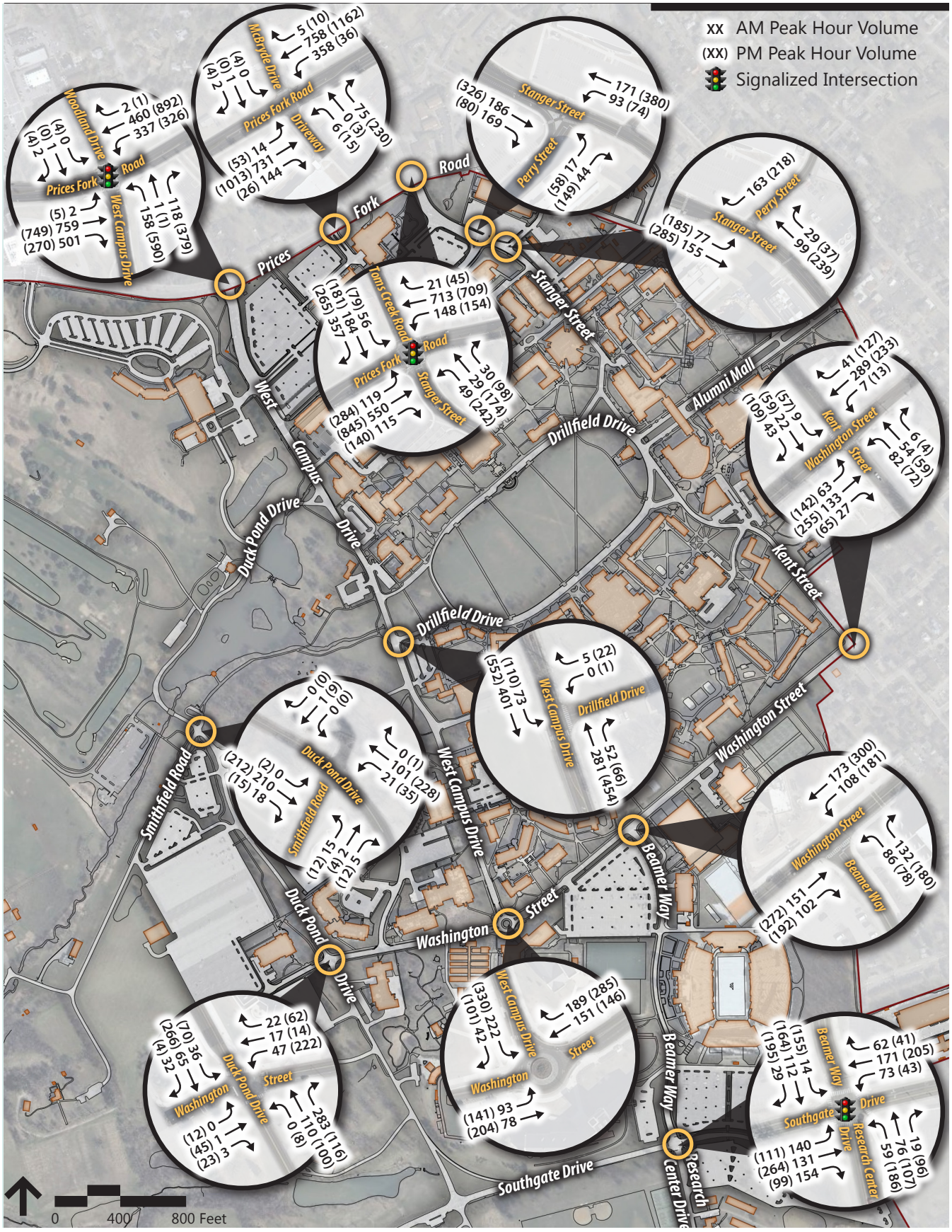


Figure 2-4. Existing AM and PM Peak Hour Turning Movement Volumes

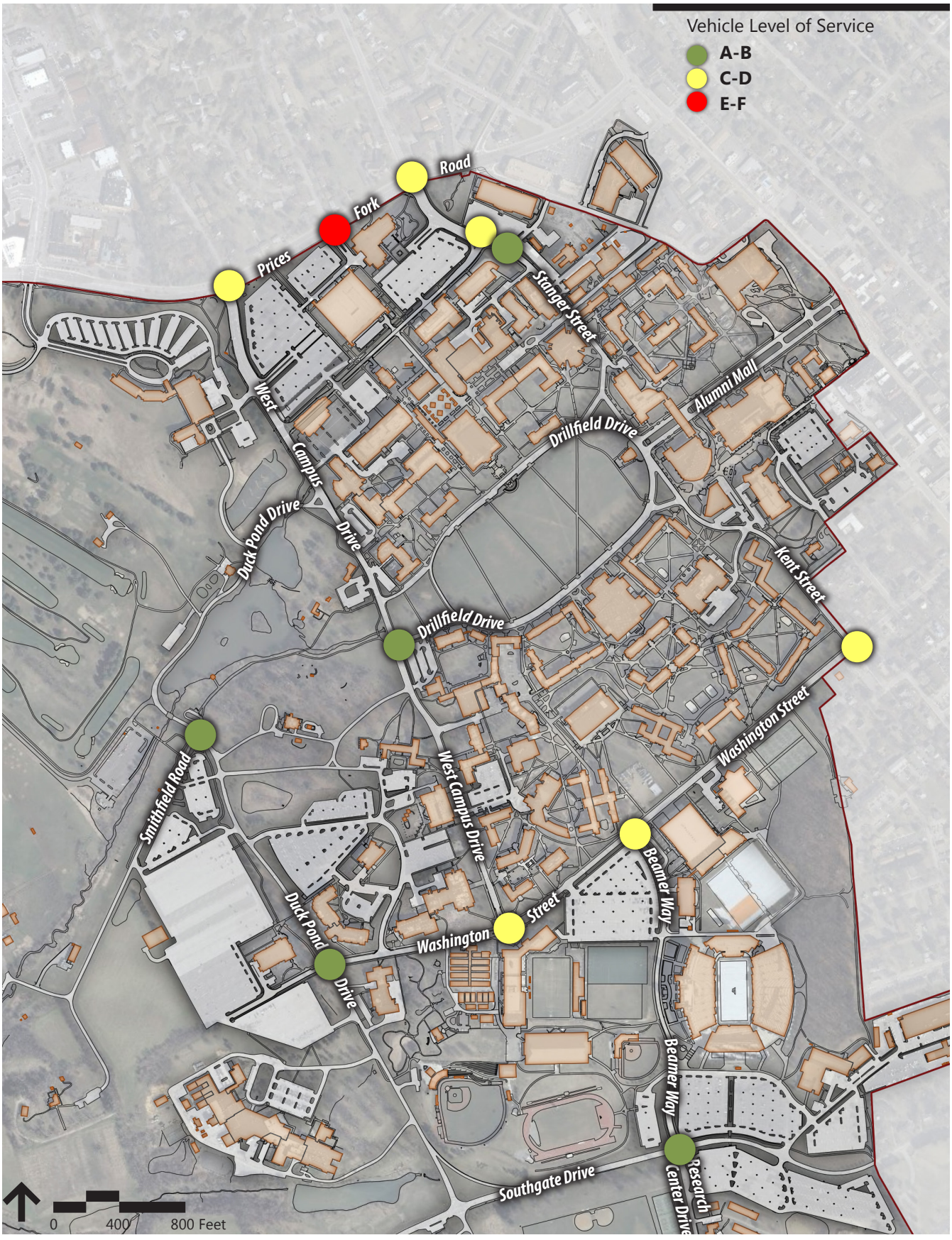


Figure 2-5. Existing Vehicle Level of Service

Current Issues

Through observations, traffic analysis, and feedback (via the interactive map on the project website), the project team identified a number of current roadway issues, with a heavy concentration in the northern area of campus as shown on the Issues Heat Map (Figure 2-6).

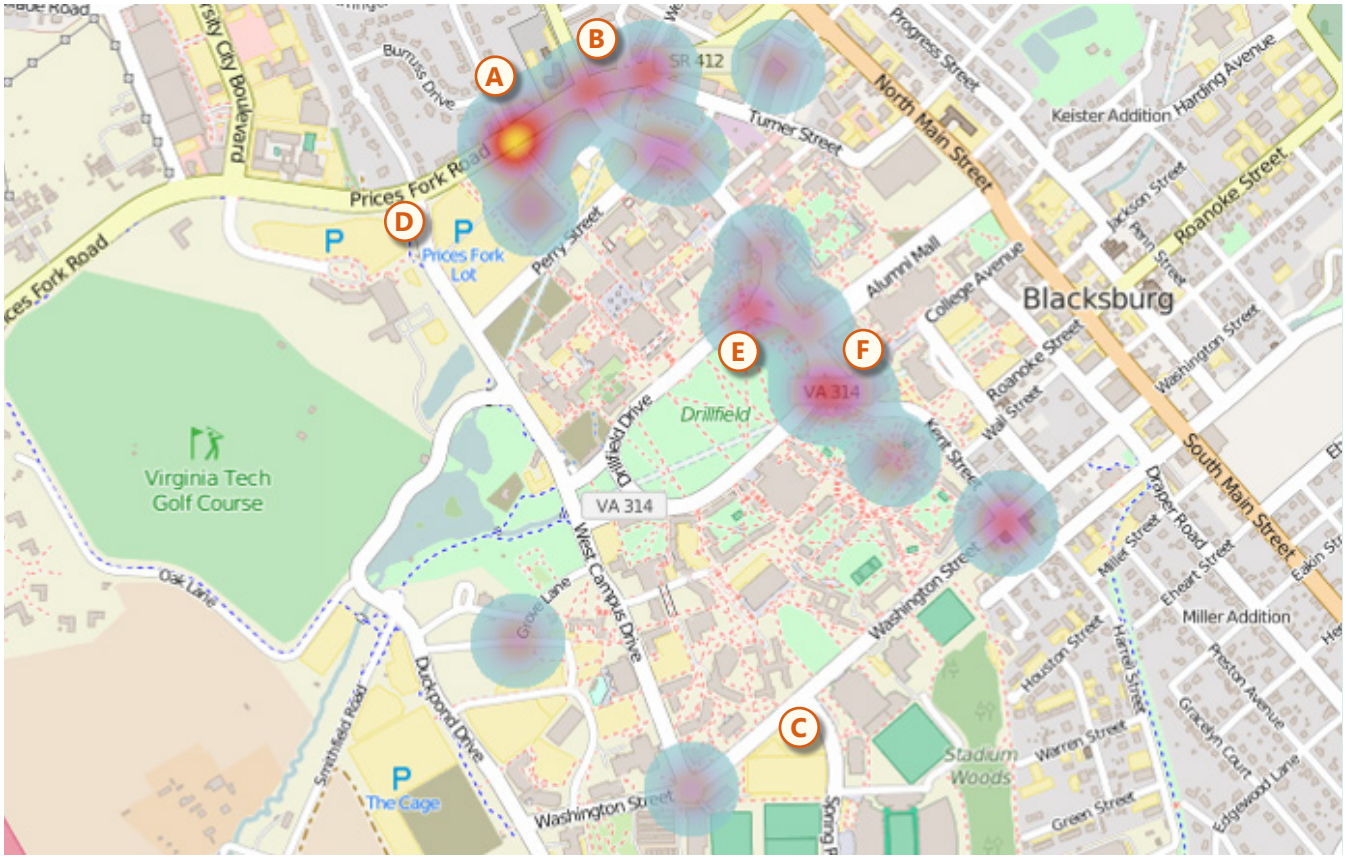


Figure 2-6. Traffic Concerns Heat Map

In summary, key intersections and corridors experience recurring congestion and safety hazards directly related to roadway configurations and conditions. Specifically, egress from campus is difficult along Prices Fork Road at the parking garage (A), as well as at Stanger Street (B). At Washington Street and Beamer Way, entering campus from the south is congested, as it is difficult to turn left from northbound Beamer Way onto Washington Street (C). West Campus Drive is congested at its intersection with Prices Fork Road (D), yet experiences higher speeds when volumes are low/during off-peak periods. High speeds are made worse by rolling hills that limit sight distances. Drillfield Drive loop road experiences a large number of conflicts between vehicles and other transportation modes, further complicated/exacerbated by frequent parking maneuvers (E, F).

Parking

Parking is vital to the Parking and Transportation Master Plan. How parking is managed and assigned plays a large role in determining how people circulate, access, and travel to the campus. Virginia Tech currently has a robust parking system that is effectively managed.

Enrollment and patterns on campus are anticipated to change substantially over the next 10 years and it is essential to develop a future parking plan that responds to future campus growth and development that reflects the transportation, sustainability, and financial goals of the University. Parking is both costly to build and maintain, and it can reduce the amount of area preserved for academic, sports, cultural, and open spaces. Thus, it is in the best interest of the University to effectively use the existing parking assets prior to constructing additional parking facilities to address anticipated campus changes.

Conversations with University staff, faculty, and students led to the development of several objectives and goals in support of the parking portion of the PTMP. Below is a list of these objectives:

- Provide adequate parking to support campus operations
- Accommodate changes in parking distribution over time
- Improve allocation and assignment of parking resources
- Improve the parking experience for campus visitors, possibly by including dedicated parking areas
- Address state vehicle parking on campus
- Provide access to parking in high turnover locations
- Encourage alternative modes of transportation by minimizing incentives for driving to campus
- Create a pricing system that is equitable and reflects best parking management practices

- Maintain and improve the financial sustainability of the parking system

Each of these issues was a point of emphasis of the parking study. The study of parking on a university campus is truly a study of relationships among people, their destinations, their trip purposes, and their modes of travel. As such, the methodology used for this study examines these issues using five sources of information; available data, field surveys, stakeholder interviews, future campus changes and general observations. It is the goal of this study to provide the University a framework to manage parking for the next 10 years.

Parking Inventory

The University has a number of parking facilities and on-street parking areas dispersed throughout the campus (Figure 2-7), serving a variety of users. The majority of the permits issued by the University are for the following users:

- Resident Students (R)
- Commuter/Graduate Students (C/G)
- Faculty and Staff (F/S)
- Visitors (V)

Parking facilities and spaces are designated for each of these user groups. There are also spaces reserved for service vehicles, preferred graduates, carpool vehicles, motorcycles, and metered spaces. To simplify the analysis, we primarily assessed the inventory and occupancy of C/G, R, and F/S spaces.

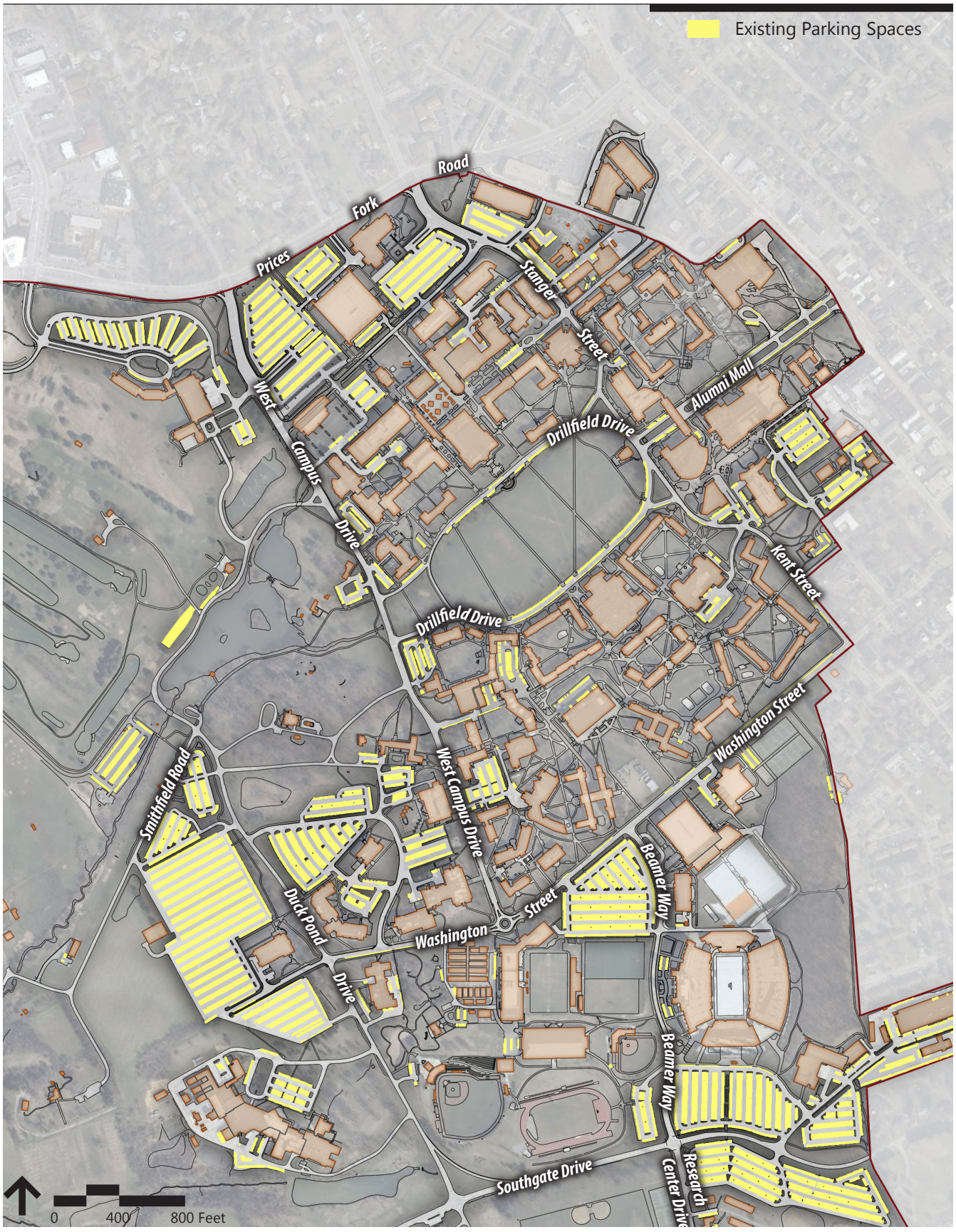


Figure 2-7. Current Parking Facilities

The study concentrated on the parking located within the core campus areas. For the purposes of assessing parking within similar areas of campus, the specific lots were grouped into, North, South, Central, and East as shown in Figure 2-8. Also illustrated within the figure is the primary user group each parking area is designated to serve and the inventory of spaces for each user group within each of the four areas.

The northern area (blue outline) consists of the Perry Street Garage, the North End Center Garage, and surrounding parking lots. This area consists mostly of parking facilities, with few University buildings. However, it is located in close proximity to academic buildings. Parking on the north part of campus is primarily designated for F/S and C/G parking.

The central area (maroon outline) includes a variety of lots adjacent to academic and residential/dining buildings. On-street parking is located along the Drillfield, Alumni Mall, Washington Street, and Kent Street. Parking in the central campus area is designated primarily for Faculty/Staff with some C/G and Service spaces.

The southern area (orange outline) has a number of large parking facilities and some parking surrounding academic, athletic and support facilities. This is the only area on campus with parking designated for Residents, which is located in the Duck Pond and Stadium Lots. There is also substantial parking for C/G and F/S. Parking facilities in the southern campus area are not considered convenient by the current university community to many campus facilities, especially buildings north and east of the Drillfield.

The eastern area (green outline) includes the Squires Lot, the Architectural Annex Lot, and parking in front of the Graduate Life Center. The majority of this parking is designated for Faculty/Staff. The Squires Lot serves a variety of users, including Commuter/Graduates. It experiences high demand and turnover as it is the only C/G parking in the area to support the Student Center, Graduate Life Center, University Bookstore and Newman Library.

Overall, a total of 12,109 spaces were considered as part of the University parking study, as shown in Figure 2-8. Note that there are other parking areas such as the Oak Lane, Virginia Tech Inn lot and remote agricultural lots that have a unique user group or are in remote location and not included within the campus parking calculations for this study. Below is a breakdown of how each of the 12,109 spaces are designated. Note that many of the smaller parking space designations (i.e. carpool, motorcycle, metered, etc.) were lumped in with the larger user groups based on either where they were located or who they primarily serve.

- 3,681 Faculty/Staff Spaces (30%)
- 4,312 Commuter/Graduate Spaces (35%)
- 3,730 Resident Spaces (31%)
- 207 Visitor Spaces (2%)
- 179 Service Spaces (2%)
- 12,109 Total Spaces in core campus study area

An inventory of the parking spaces and designations of the facilities analyzed is provided in **Appendix B.**

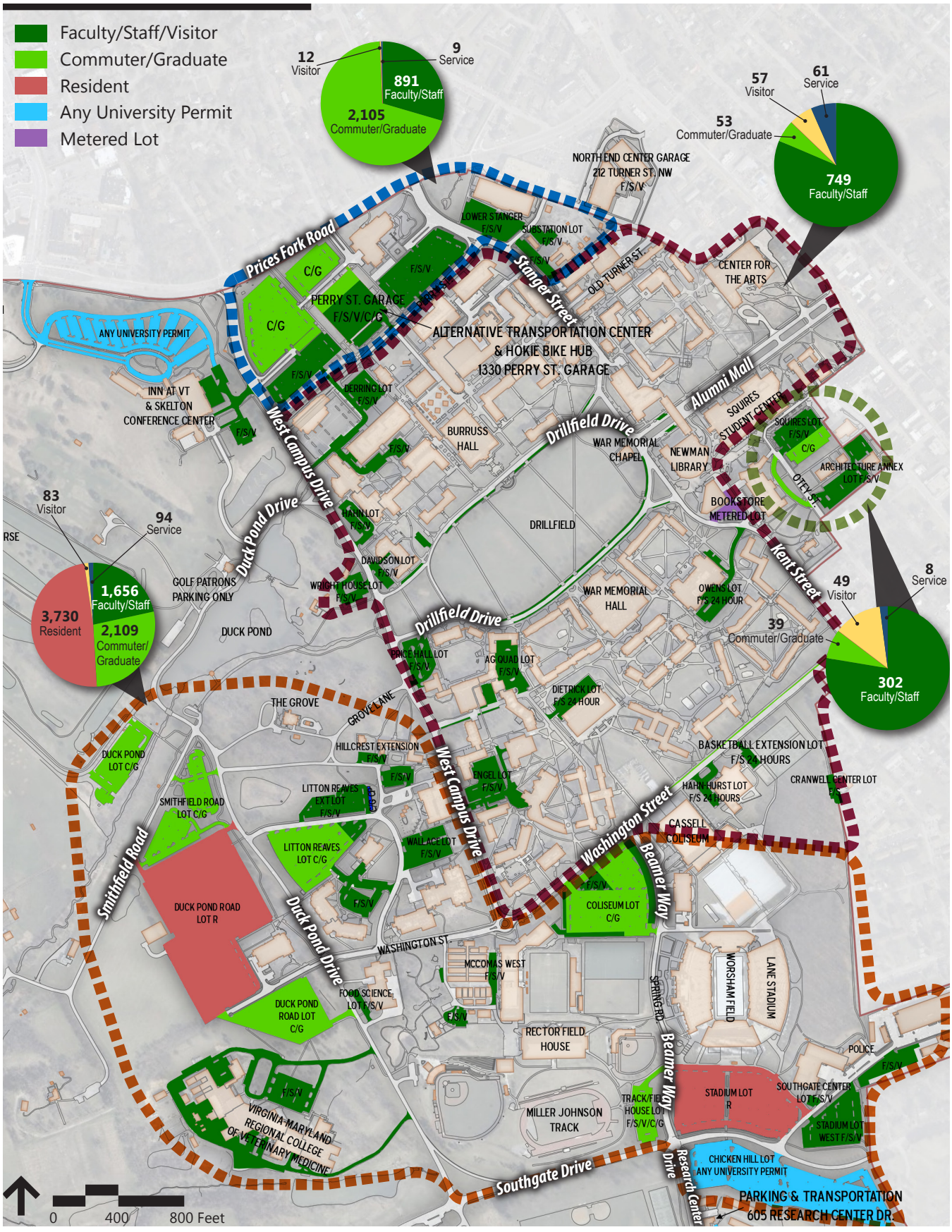


Figure 2-8. Parking Study Area and Inventory by Space Designation

Parking Utilization

Parking occupancy counts were performed on November 4, 2015 to understand how campus parking facilities are currently being utilized. This was a typical day with no large athletic events and with clear skies and temperatures in the 50's. The data indicated that the peak parking occupancy period is around noon on a weekday. Standard practice is to plan for the peak parking period on a typical weekday to avoid regular parking deficits.

Figure 2-9 shows the peak parking occupancy for the campus parking facilities located in the northern, southern and eastern campus areas. The central campus area parking was observed to be 85% occupied during the peak period with F/S and C/G parking 89% and 93% occupied, respectively. Parking in the North End Center Garage designated for F/S and C/G was 82% occupied during the peak period.

A parking facility is considered to be at practical capacity when it reaches 90% occupancy; at this point it becomes difficult to circulate and to locate an open space. This reduces the level of service and convenience for the user, and can lead to frustration.

Based on the peak period occupancy counts, the majority of the parking facilities in the central and northern areas, the Squires Lot, the Coliseum Lot, and some of the parking around the College of Veterinary Medicine operate at capacity (greater than 90%). However, there is substantial parking available at most of the large parking facilities in the southern campus area, which are currently designated for Resident parking, including the Duck Pond Drive Lot (Cage Lot), Stadium Lot, and Chicken Hill Lot.

A surplus/deficit analysis was performed to determine how much parking is available to support future growth. A 90% practical capacity factor was applied to the analysis. Based on this analysis, there is currently a surplus of 2,896 spaces within the core campus areas. Below is a breakdown of the surplus of parking for each user.

- F/S – 434 space surplus
- C/G – 448 space surplus
- R – 1,850 space surplus
- Visitor – 91 space surplus
- Service – 73 space surplus
- Total – 2,896 space surplus

The majority of the surplus parking is located in Residential parking areas. A detailed analysis of the parking utilization and existing surplus/deficit per facility and by area is provided in **Appendix B**.

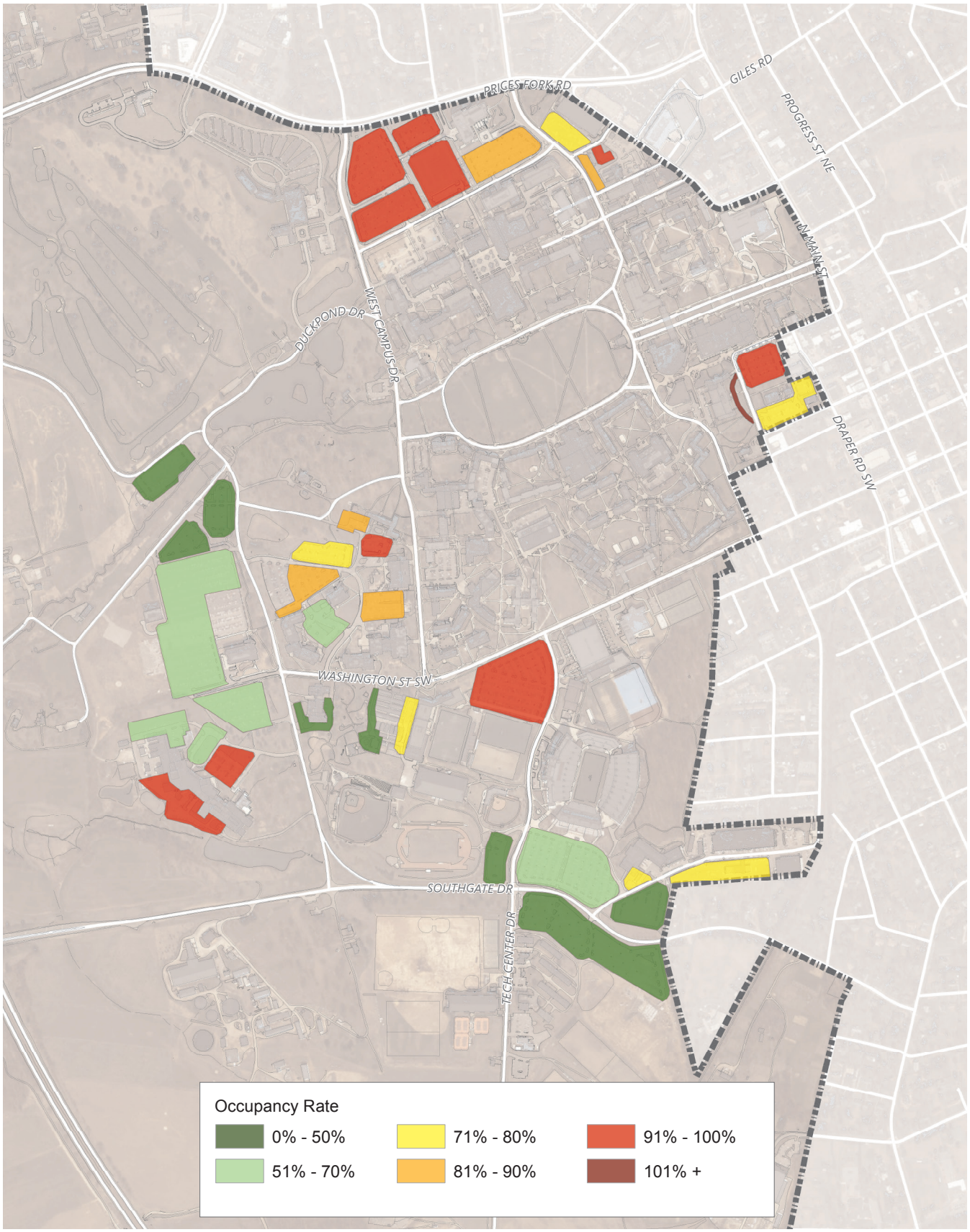


Figure 2-9. Peak Parking Occupancy per Facility, 12:00 PM

Transit

Transit service for the main campus of Virginia Tech is provided by Blacksburg Transit (BT). BT began providing service in 1983 with three routes oriented around Virginia Tech as a hub, and has grown to operate service in more of the Town of Blacksburg and areas of Christiansburg. Virginia Tech continues to be the focus with most routes originating or terminating on the campus.

To support the transit portion of the PTMP, the following objectives were developed:

- Continue to support Blacksburg Transit as an important mode of access to campus for the local community
- Facilitate transition to the Multi-Modal Transit Facility
- Develop additional shuttles to support changes to the parking system
- Balance service preferences (high frequency/high capacity) with cost and operational considerations

BT provides a range of services from traditional fixed route bus to demand response. BT provides over 3 million rides annually on 10 routes serving Blacksburg, 2 routes serving Christiansburg, and 2 routes connecting Blacksburg and Christiansburg. As shown in Figure 2-10, much of the service is oriented to connect students, as well as faculty and staff, to the main campus of Virginia Tech. Other connections include the Virginia Tech Corporate Research Center (CRC), Lewis Gale Montgomery Regional Hospital, and key shopping and entertainment destinations in Blacksburg and Christiansburg.

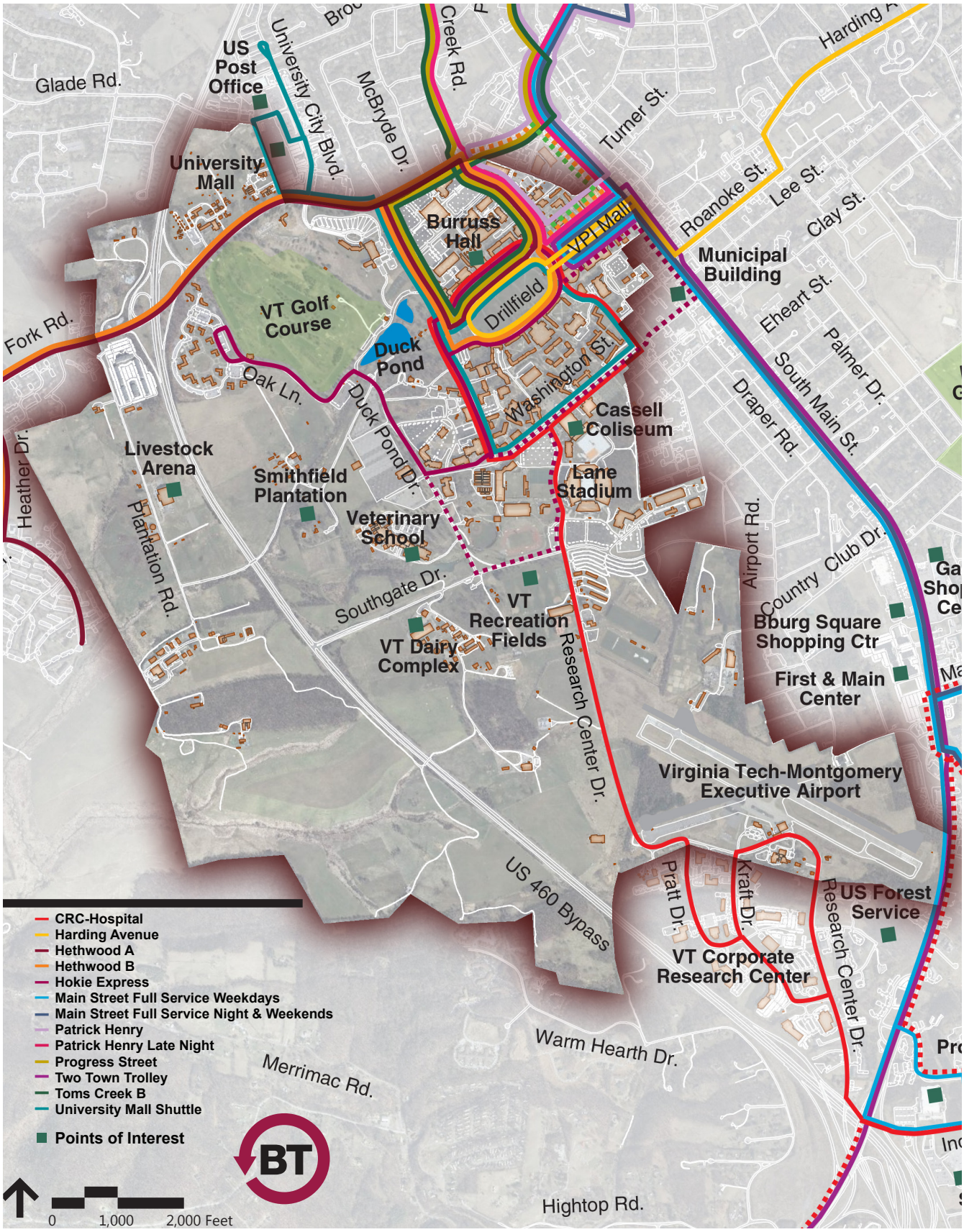


Figure 2-10. Blacksburg Transit Existing Service Map

Blacksburg Transit operates three service levels throughout the year. During the fall and spring semesters BT operates their "full service", which provides the greatest level of service to correspond with the peak demands of Virginia Tech. During the times of year Virginia Tech is on break (fall, winter, spring, and summer), BT operates their "reduced service". Service frequencies are reduced on most routes, and some routes specific to the Virginia Tech campus (i.e., Hokie Express) are not operated. There is also a "full service alternative" schedule that is operated during times school is in session, but the typical school schedule is not followed, such as during exams.

Seven of the routes providing service in Blacksburg connect the main campus to residential complexes and retail destinations in the town. During full service these routes operate on a 10-15 minute frequency during peak periods of travel from about 7:00 AM until 9:00 PM, with select routes operating past midnight. In addition to the service in the Town, there is also the Two Town Trolley that connects Blacksburg and Christiansburg. The route starts at Squires Student Center and travels up South Main to the New River Valley Mall and Walmart, stopping at Lewis Gall Montgomery Regional Hospital; this route operates Monday through Friday.

In regard to the service specifically focused on the Virginia Tech Campus, there are three routes. These routes provide both internal connections to remote areas of the main campus as well as direct connections to Virginia Tech properties off campus. The following is a description of those routes.

- Hokie Express - Provides a connection between the Oak Lane Community and the core of campus. Key stops include Burruss Hall, Torgersen Hall, Newman Library, War Memorial Gym, Litton Reaves Hall, and Oak Lane. The route operates on a 15 minute frequency from 7:00 AM until 6:00 PM, when the frequency adjusts to every 30 minutes until 12:45 AM Monday through Thursday. Friday service operates until 2:45 AM. Saturday service operates from 10:30 AM until 1:30 PM and from 5:00 PM until 2:45 AM. Sunday service operates like the Saturday service, but does not start until 11:30 AM and ends at 11:15 PM. Weekday service after 10:00 PM and Saturday and Sunday service operate an alternative route that includes Duck Pond Drive to Southgate Drive, Beamer Way, Washington Street, South Main, and Alumni Mall. There is no reduced service schedule for the Hokie Express.
- CRC Shuttle - Provides a connection between the main campus and the Corporate Research Center. Key stops include Burruss Hall, Newman Library, Lane Stadium, the Virginia Tech Airport, Edward Via College of Osteopathic Medicine, Virginia Tech Transportation Institute, and Blacksburg Transit. The route operates on a 20 minute headway from 6:45 AM to 6:30 PM, and 30 minutes from 6:30 PM to 9:30 PM during full service Monday through Friday. On non-football game Saturdays the service is transitioned to a demand response service that operates from 10:00 AM to 9:00 PM. There is no Sunday service. During the reduced schedule the CRC Shuttle route is extended to provide a connection to Lewis Gale Montgomery Hospital as well as portions of South Main Street. The route operates at a reduced 60 minute frequency from 7:00 AM to 6:20 PM Monday through Friday. There is no Saturday or Sunday service during the reduced schedule.
- University Mall Shuttle - Provides a connection between the main campus and the University Mall, which includes the Math Emporium. This route also provides service to

the Sturbridge Square Apartments outside the hours of the BT University City Boulevard route. The route operates on a 20 minute frequency from 8:45 AM until 5:35 PM Monday through Thursday. Starting at 5:45 PM the route adds service to Sturbridge Square and begins providing 15 minute service for an hour and then operates 30 minute frequency until 10:00 PM. The 15 minute frequency and service to Sturbridge Square begins earlier, at 3:30 PM, on Fridays. The Math Emporium can also be accessed using the University City Boulevard Route from 7:00 AM – 6:00 PM Monday through Thursday, and 7:00 AM - 3:30 PM on Fridays. Service after 10:00 PM and on weekends is provided less frequently by a bus that operates both the Tom's Creek B route and the University Mall Shuttle. The bus will operate each route on every other trip until about midnight Monday-Thursday, 2:00 AM on Fridays, and 11:00 PM on weekends. Reduced service is also provided, with no Sunday service during the summer.

Regional Connections

Connections to Radford, Roanoke and beyond are also made. Radford Transit has a route that connects Squires, the New River Valley Mall, and Radford University. Valley Metro, Roanoke's transit provider, operates the Smart Way Commuter Bus between the Roanoke Valley and New River Valley. The service operates Monday through Saturday, with no service to the Virginia Tech Carillion Research Institute (VTCRI) on Saturdays. The Smart Way bus has stops at the CRC and Squires Hall on Virginia Tech's Campus. Stops in Roanoke include: the airport, Hotel Roanoke, Campbell Court, and VTCRI. Virginia Tech's Fleet Services division also provides a daily shuttle between the main campus and the VTCRI. The shuttle operates eight round trips Monday through Friday from 6:30 AM to 8:45 PM. The shuttle is first-come, first served and free to anyone showing a Virginia Tech or Virginia Tech Carilion School of Medicine ID. Valley Metro also operates a route called the Smart Way Connector, providing direct bus service to Lynchburg with connections to Amtrak. Monday through Thursday the route operates between Roanoke and Lynchburg, requiring a transfer to the Smart Way Commuter bus in Roanoke. Friday, Saturday, and Sunday there are trips from Squires to Lynchburg scheduled to align with the train schedule. The New River Valley Metropolitan Planning Organization (MPO) is also in process of studying potential for Amtrak service to the New River Valley region. Service to Roanoke arrives in early 2017 and an eventual service extension to Christiansburg or adjacent area is currently being studied by the MPO.

Challenges

The following challenges were noted through discussions with University officials. While some of the challenges presented can be improved through efforts under Virginia Tech's control, others are matters that are more impactful to BT operations.

- Virginia Tech continues to grow in terms of enrollment and employment. While the pace of this growth fluctuates, the trend has been for increasing the campus population. This, combined with a trend of increased demand for transit service, has placed a strain on certain routes.
- Blacksburg Transit has difficulty finding and retaining reliable and qualified bus drivers. BT relies heavily on part-time drivers, many of whom are students. This reliance results in their workforce constantly turning over as students graduate and leave.

- The reduction in service levels during the various breaks and summer months leaves those who rely on transit for transportation with less frequency, shorter service hours, and in some cases no service. While the reduction in service is in response to a dramatic decrease in demand, those who have no other option feel stranded.
- Certain aspects of the transportation network and transit system deter individuals from using transit more often, or at all.
  - The singular loop direction of some routes results in frustration with the lack of a direct connection.
  - The service hours for some routes do not extend late enough in the evening or early enough in the morning for some students or employees, eliminating transit as an option.
  - While much of the campus is easily accessible via walking or biking, some areas of the campus can be difficult to access.
- Several stops on campus have inadequate bus stops shelters and amenities for those who use them.
- Remote areas of town and many adjacent communities are not accessible by transit.

Pedestrian Environment

Walking is the primary form of transportation on Virginia Tech's campus, as is common on any college campus. With academic and residential buildings centralized on a campus, it is expected that some people can go their whole day by only walking, while others may drive to the general area, park for the day, and then complete the majority of their daily trips on foot. While pedestrian activity may comprise a large percentage of trips within a campus setting, there is inevitable interaction between this and other travel modes. It is important that the facilities provided for pedestrian travel are safe and effective. Through this PTMP, pedestrian path and sidewalk improvements would meet the following primary objectives:

- Provide a safe and comfortable walking environment for users
- Facilitate direct connections between popular origins and destinations
- Resolve and reduce conflicts with vehicular traffic, including bicycles
- Provide accessible connections
- Link future high-use parking areas to the campus core

Improving the walking environment presents a unique set of challenges as pedestrians are less regulated and less predictable than drivers and even bicyclists. Some of these challenges include inadequate or confusing pedestrian crossing locations, conflicts with traffic, potential collisions with cyclists on the sidewalk, as well as in bike lanes when they coincide with bus boarding locations, and distracted pedestrians who may be using smart phones while walking.

There is a need to provide continuity and connectivity within the pedestrian path network, as well as efficient connections between the Duck Pond Drive parking areas and the academic core, all while maintaining facilities that are ADA compliant.

The current pedestrian network is comprised of numerous sidewalks and mixed use paths of varying widths, materials and stages of maintenance. Figure 2-11 shows a summary of pedestrian movements taken from the VT Moves smartphone application, showing the major pedestrian paths across campus. Most of the movements follow existing sidewalks along roadways, with the exception of Drillfield crossings; but more importantly this graphic summary helps define the locations where pedestrians cross roadways, creating the highest potential exposures for conflicts between pedestrians and other modes.

In addition to the VT Moves app, the project team collected volume counts at major crosswalks on the edges of campus to help determine overall travel patterns (in terms of trip origins and destinations) of pedestrian traffic (Figure 2-12). As shown in Figure 2-11, there is a clear to/from pattern of pedestrian travel in the northeast part of campus, connecting the academic core to residential areas like the Edge Apartments and the apartment complexes located along Toms Creek Road, and mixed use (commercial and institutional) development along Turner Street. Another large draw for pedestrian traffic is to and from residences southeast of campus. There is also a high demand for pedestrian facilities along Prices Fork Road and Duck Pond Drive, which access parking lots where students and faculty park their vehicles and before walking to their final destinations.

Certain interior campus streets such as Drillfield Drive and Stanger Street are slow streets with the highest concentrations of pedestrians and numerous crosswalks. As drivers enter campus from higher volume Town or State routes such as Prices Fork Road or Route 460, drivers should experience a clear change in context as they are entering a campus setting where pedestrian movement should be prioritized and safely accommodated. This is why it is critical that the pedestrian network be enhanced and new facilities be designed to clearly delineate safe pedestrian facilities while also encouraging walkers to be aware of their surroundings. This plan will help focus on areas that can benefit from immediate improvements to enhance the user experience, while also identifying high-level pedestrian travel trends to help prioritize larger scale projects such as new location paths or pedestrian crossing structures.

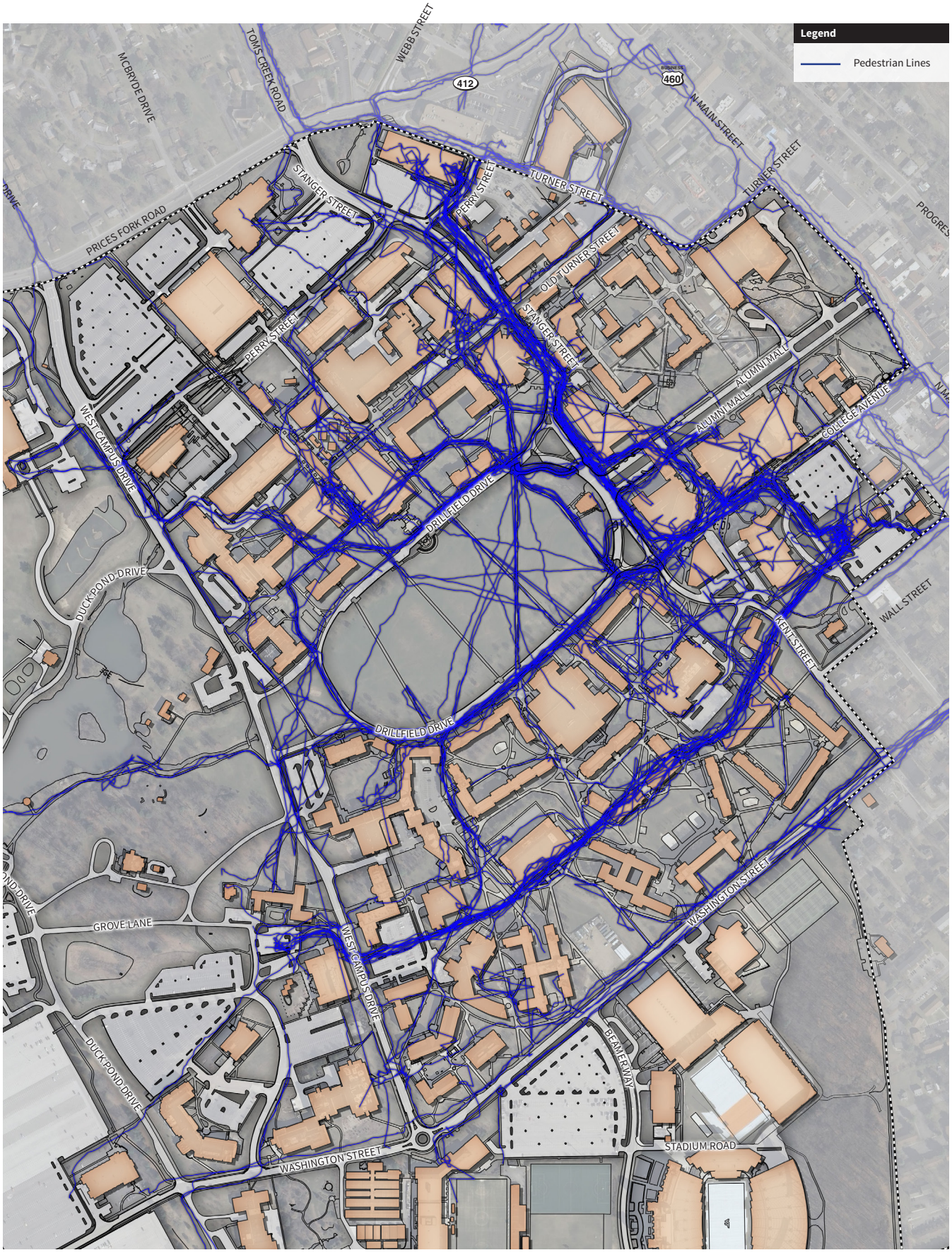


Figure 2-11. Virginia Tech MOVES – Pedestrian Routes

Figure 2-12. Pedestrian Intersection Volumes

Current Issues

Through observations as well as feedback via the interactive map on the project website, the project team identified a number of current pedestrian-related concerns, with a heavy concentration in the northern area of campus and along the path south of the Duck Pond as shown on the Issues Heat Map (Figure 2-13).

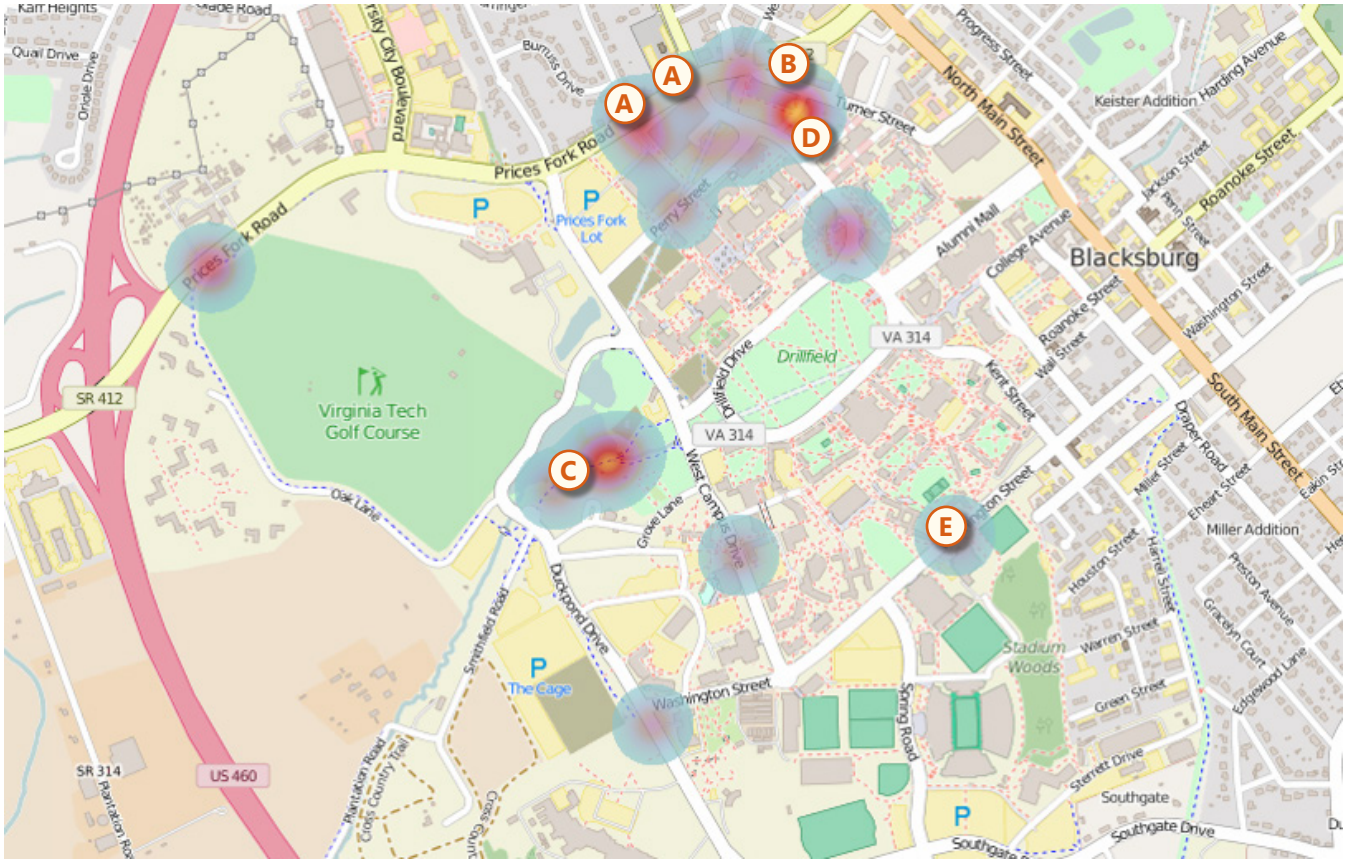


Figure 2-13. Pedestrian Concerns Heat Map

The heat map of pedestrian-related issues highlights deficiencies on the northern campus extents as individuals expressed concerns walking along or across portions of Prices Fork Road and Stanger Street (A). A specific concern with the Rectangular Rapid Flashing Beacon (RRFB) at the crosswalk located at the Turner Street/Webb Street crossing of Prices Fork Road was identified on the interactive suggestions map (B). The Town of Blacksburg recently removed this crosswalk and installed a fence in the median to prohibit crossing Prices Fork Road at this location. Other individuals expressed concerns related to the pavement conditions and lighting along the path south of the Duck Pond (C). Other pedestrian concerns include facility deficiencies along Perry Street (D) and Washington Street (E).

Bicycle Environment

Cycling is an alternative mode of transportation that is wholly embraced by Virginia Tech. Through amenities such as on-campus fix-it locations, racks on transit buses, emergency bike kit locations and a bicycle ambassador program, it is clear that Virginia Tech strongly supports the use of bikes as an essential means of transportation. Additionally, there are a number of roadways on campus that currently have marked bike lanes or sharrows, including West Campus Drive, Stanger Street, and Washington Street, as well as a number of multi-use paths like those traversing the Drillfield, and those along portions of West Campus Drive and Duck Pond Drive. More regionally, there are designated routes leading to campus such as the Huckleberry Trail from the south, Main Street from the northeast, and the Tom's Creek Basin routes also from the north. Figure 2-14 illustrates the bicycles counted at each of the study area intersections, with the highest concentrations of bicyclists counted along Stanger Street. The bicycle paths obtained from the Virginia Tech MOVES App (Figure 2-15) show that West Campus Drive, Stanger Street, Duck Pond Drive, Smithfield Road and Washington Street are the prominent cycling routes through campus. Riding amongst the buildings north and south of the Drillfield is less common due to terrain changes, pedestrian activity, and lack of bicycling facilities. Safety concerns or lack of adequate bicycling facilities were noted along portions of Stanger Street, West Campus Drive and Washington Street.

The Hokie Bike Hub serves as a bicycle maintenance and information center. The Hub provides tools for self-service repair as well as education opportunities to learn how to repair and maintain a bicycle for commuter use. Virginia Tech was awarded a bronze award from The League of American Bicyclists for their efforts to encourage and support the incorporation of bikes as a means of safe and effective transportation.

Virginia Tech requires the registration of bikes in order to deter theft, and to help notify owners of lost, stolen, or found bikes. There are also policies in place for bicycle parking and general safety advice, all conveniently available on the university's Alternative Transportation website.

This PTMP encourages bicycling as a viable alternative to driving through four main objectives:

- Provide safe and comfortable bicycling network
- Resolve and reduce conflicts with other vehicles and pedestrians
- Provide storage and support facilities at key campus locations
- Reduce the need for the campus community to have owned bicycles through bike-share programs

There are a number of challenges to meeting these objectives, including inadequate bicycle facilities, bicyclist behavioral issues, lack of sufficient bike storage facilities, and no bike-sharing program in place on campus.

Figure 2-14. Bicycle Intersection Volumes

Figure 2-15. Virginia Tech MOVES – Bicycle Routes

Current Issues

Through observations as well as feedback via the interactive map on the project website and stakeholder meetings, the project team identified a number of current bicycling-related issues which are graphically depicted in Figure 2-16.

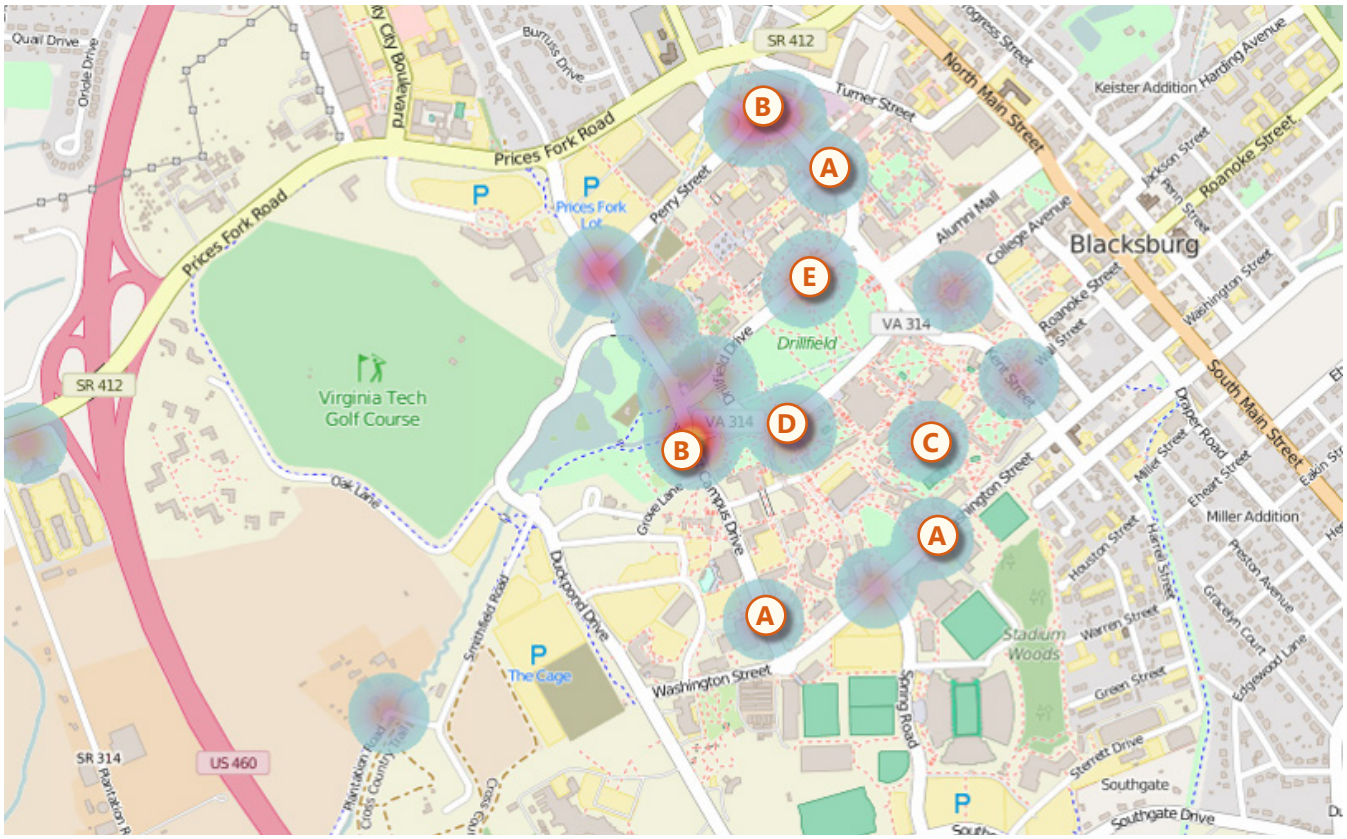


Figure 2-16. Bicycle Concerns Heat Map

The most common bicycling concerns identified by the interactive suggestions map were a lack of adequate bicycling facilities along the roadways throughout campus and cyclist safety (A, B). Lack of adequate bicycling facilities were specifically noted along portions of Stanger Street, West Campus Drive and Washington Street. Collisions were frequently reported at, but not limited to, the intersection of West Campus Drive and Drillfield Drive as well as the intersection of Perry Street and Stanger Street. In addition, difficulty bicycling through the south side of campus was identified as a concern for some cyclists (C). A lack of bicycle storage facilities and absence of a bike share program on campus were also identified as a current bicycling-related issue on the Virginia Tech Campus (D, E).

3 Future Conditions

Vehicular Environment

Over time, vehicle traffic is expected to grow slightly each year with the gradual addition of new students, faculty and staff on campus. In addition, several major planned projects will have direct effects on vehicular mobility within specific areas of campus. These planned changes include:

- Southgate Interchange
- Runway expansion
- New buildings removing parking
- New Multimodal Transit Facility (MMTF)

The Southgate Interchange project will replace the existing Route 460 and Southgate Drive intersection with a new diverging diamond interchange and modify several roadway connections on campus. The purpose of the project is to improve safety and reduce congestion associated at the current, at grade intersection. In addition, the Virginia Tech Montgomery Executive Airport is extending its runway and safety zone. The 1,000 foot extension will permit use by larger airplanes and help support the region's economic development efforts. Southgate Drive, Research Center Drive, Discovery Drive and the Huckleberry Trail will be reconstructed and/or rerouted as part of these projects.

There are several programmed building projects scheduled within the next ten years that are anticipated to displace a large number of surface lots. As a result of the loss of parking spaces, certain areas of campus may have reduced traffic volume, whereas other areas will experience higher traffic levels. The specific projects, number of spaces displaced, and reallocation of parking are discussed in greater detail in the parking section, however are accounted for when forecasting future traffic volume on campus. The net effect, however, will be increased use of the Duck Pond Drive lots by commuters resulting in considerably higher traffic volumes along Duck Pond Drive and portions of West Campus Drive and Washington Street.

The MMTF is a planned new central hub for Blacksburg Transit services on campus. The facility will be located between West Campus Drive and Stanger Street, north of Perry Street. It will include two separate bus loops with a total of 17 bus bays, with the west one accessed off of West Campus Drive via the existing Perry Street signal and the east one accessed off of Stanger Street via a new roundabout. Perry Street will be disconnected as a result of the MMTF and parking access to Stanger Street will relocate to a new driveway north of Perry Street. Construction of the MMTF is expected to begin in 2017.

Future intersection turning movement volumes were forecasted for each of the twelve study intersections, which take into account additional growth in background traffic along with shifts in traffic associated with the previously mentioned planned changes. The future "No-Build" scenario includes already scheduled and designed changes such as the Southgate Interchange, building projects, and related parking shifts. Figure 3-1 identifies the expected future lane configurations with the planned improvements in place and Figure 3-2 summarizes the projected 2025 vehicular volumes at the study area intersections. Figure 3-3 illustrates the peak hour level of service at each of the intersections. As shown in the figure, half of the intersections are expected to operate over capacity (LOS E/F) during one or more peaks, with several approaching capacity.

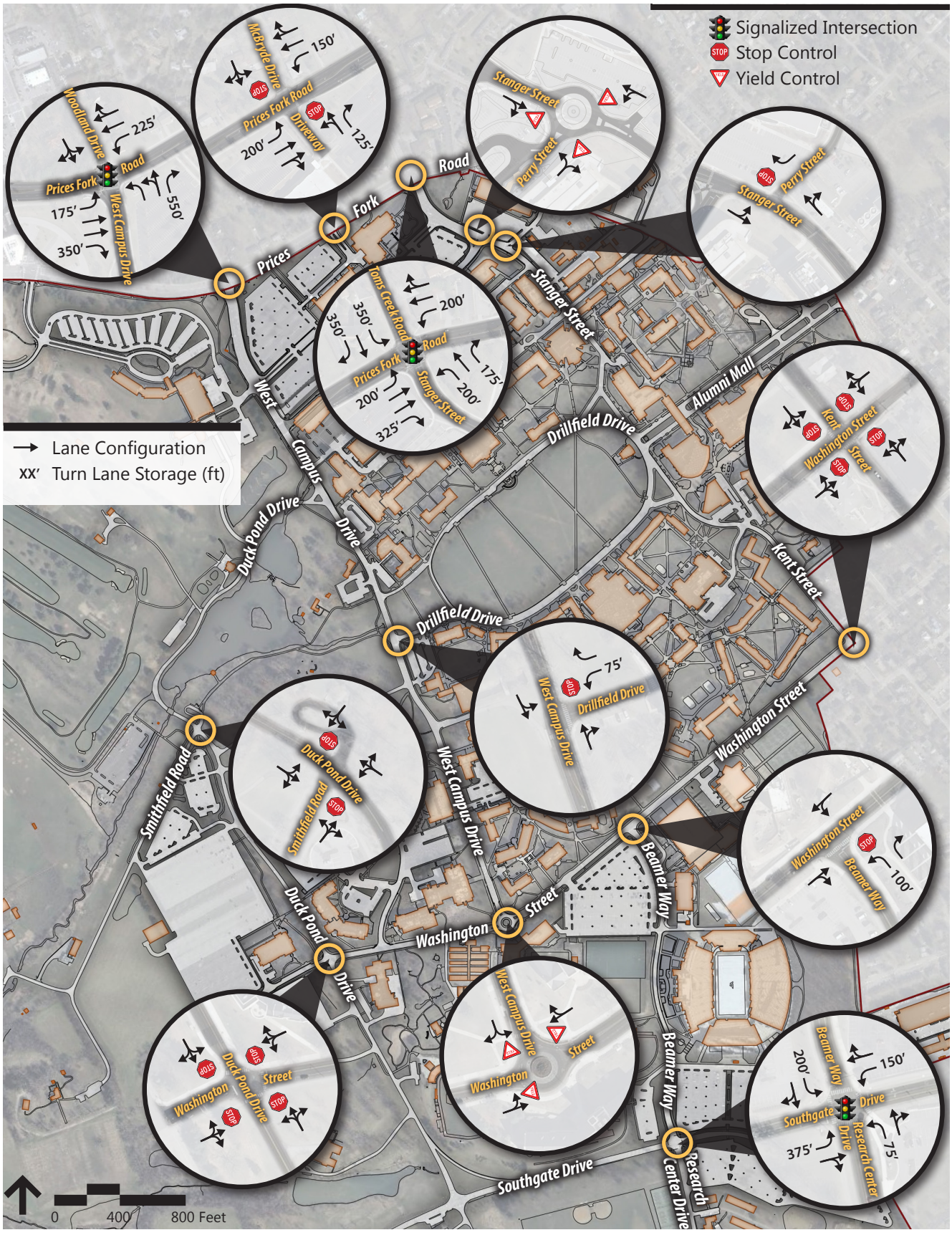


Figure 3-1. Future No-Build (2025) Intersection Lane Geometrics and Traffic Control

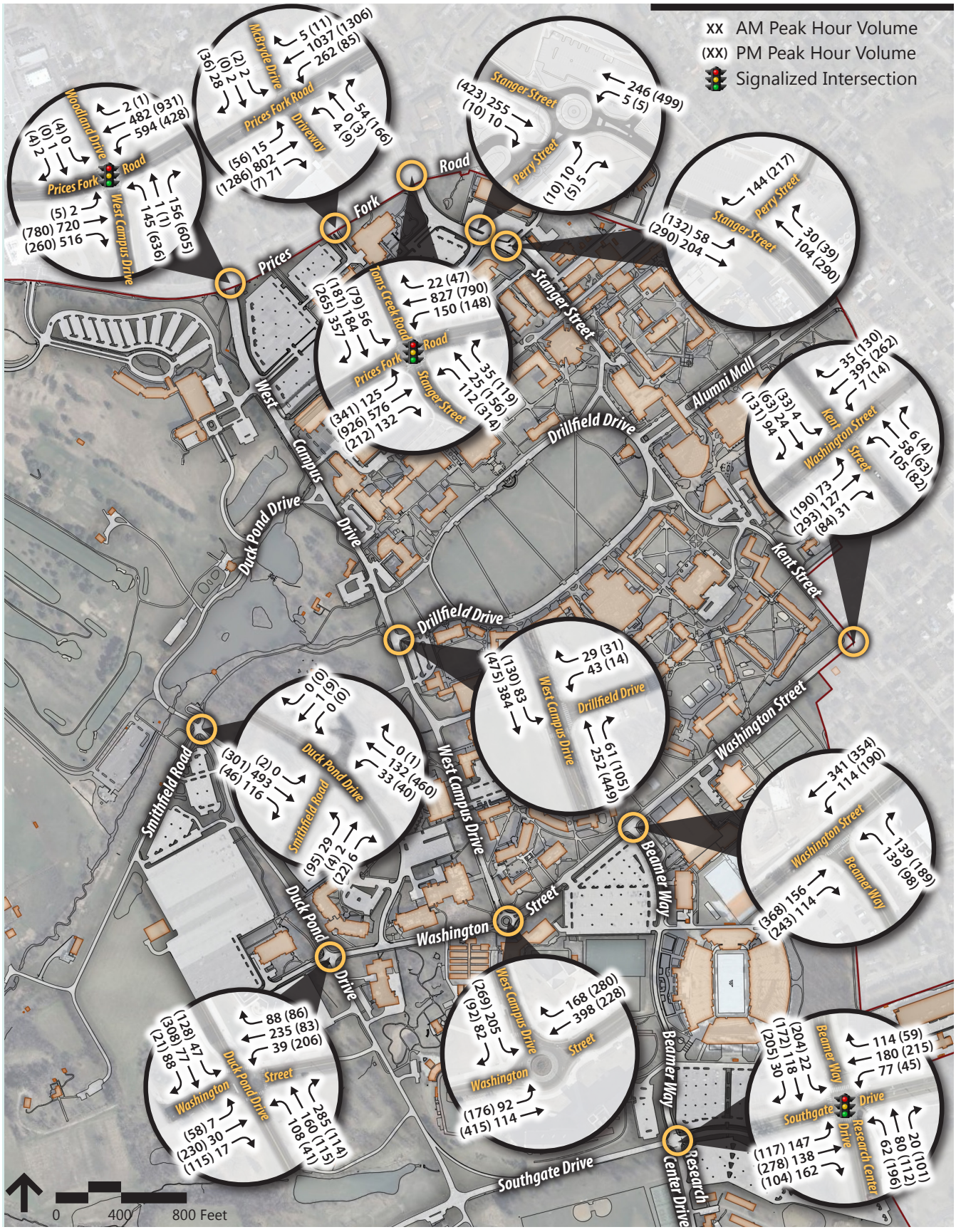


Figure 3-2. Future No-Build (2025) AM and PM Peak Hour Turning Movement Volumes

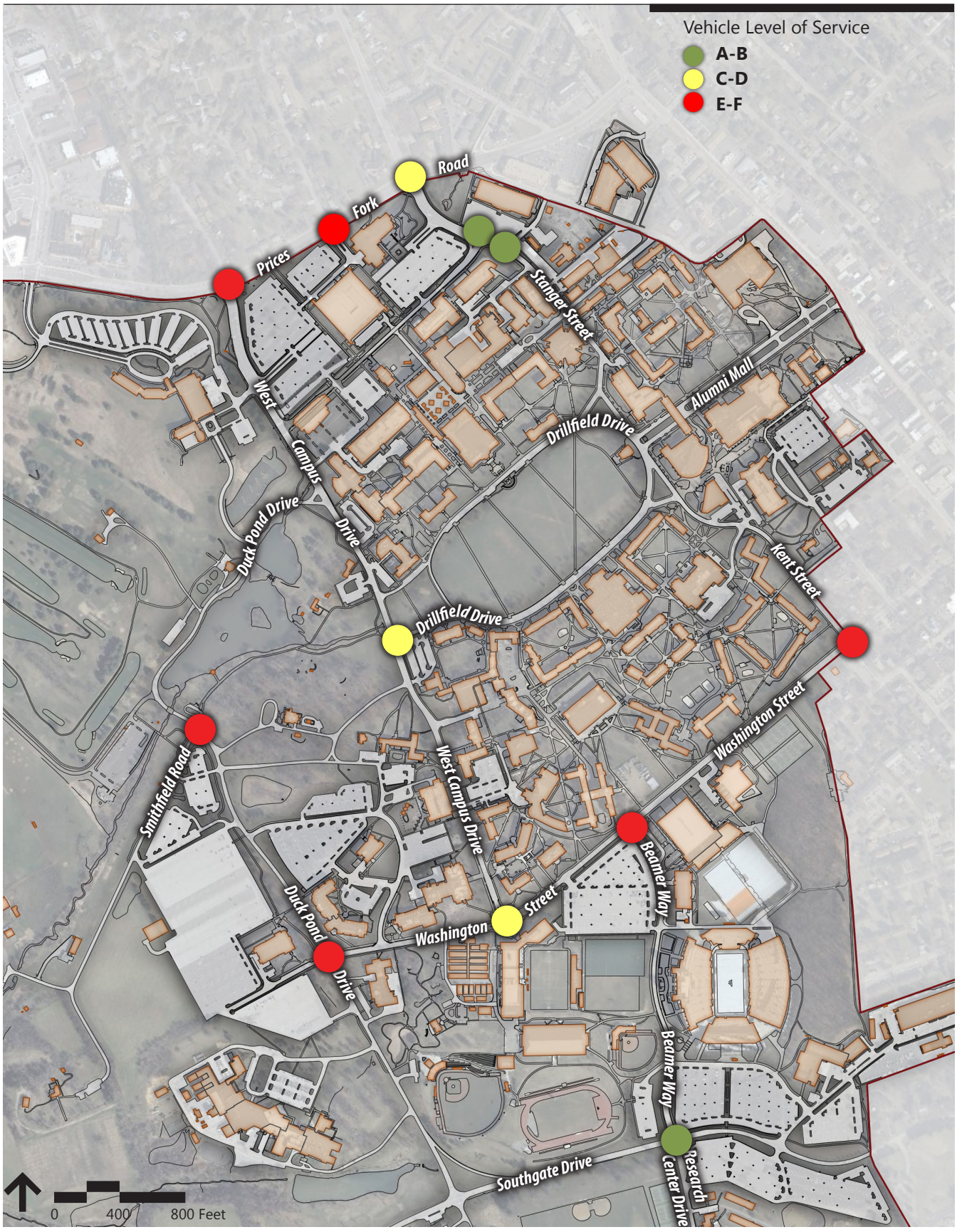


Figure 3-3. Future No-Build (2025) Vehicle Level of Service

Recommended Improvements

This plan examines the roadway network by dividing campus into five focus areas (see Figure 3-4) and proposing specific recommendations for each Focus Area. None of the proposed improvements are limited to only roadway enhancements; most involve other transportation elements such as sidewalks or mixed-use paths. The integration of those elements is discussed further in subsequent sections.

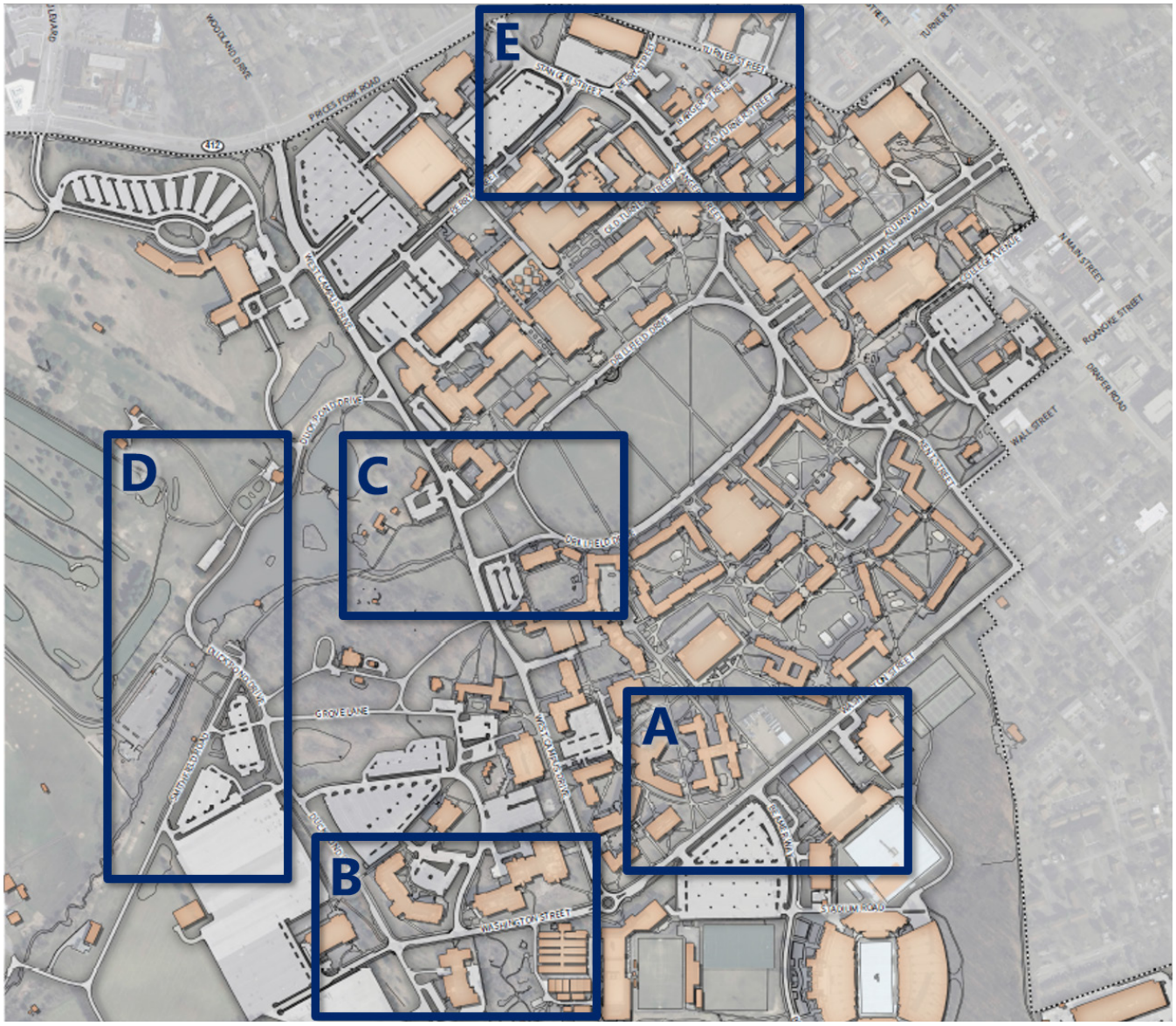


Figure 3-4. Roadway Recommendation Concentration Zones

Focus Area A addresses Washington Street at Beamer Way, an intersection that acts as a gateway to the campus from the south. This intersection is projected to operate poorly in the future, specifically for vehicles turning left from northbound Beamer Street onto Washington Street. The proposed solution for this location is to construct a roundabout to help facilitate the northbound left-turn movement. This improvement would result in operations at LOS C or better in the future during the afternoon peak, and also provide other benefits such as slowing vehicle speeds along Washington Street, improving safety, and enhancing pedestrian and bicycle mobility for certain movements through this intersection.

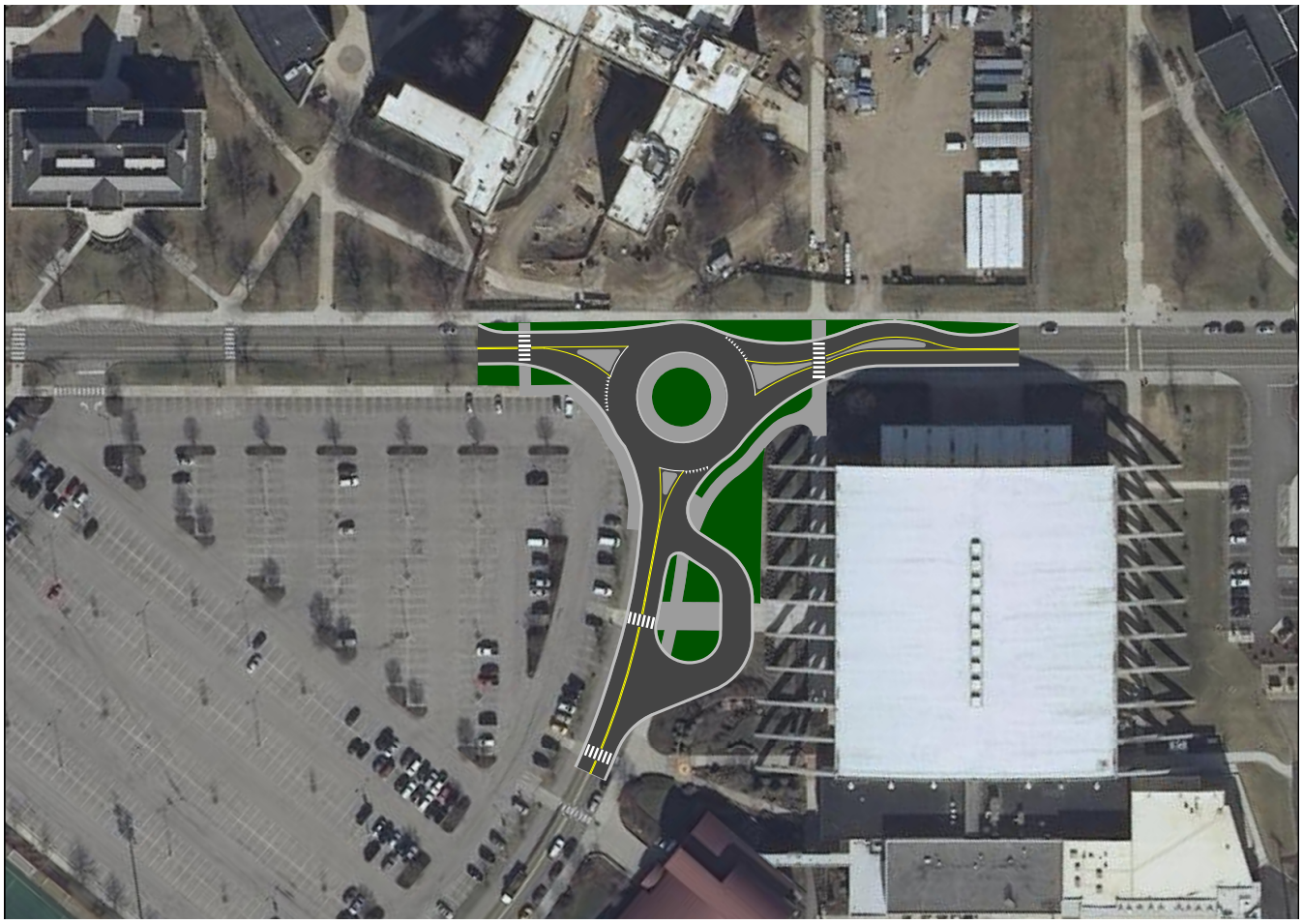


Figure 3-5. Washington Street at Beamer Way Roundabout Design

Focus Area B concentrates on a different intersection along Washington Street—Duck Pond Drive. As with the Beamer Way intersection, this intersection is a gateway to the campus, providing direct access the Life Sciences Precinct. The traffic volumes are expected to increase considerably at this intersection, particularly the eastbound approach, as high turnover commuter parking displaces the low turnover resident spaces. This intersection is projected to operate poorly in the future, specifically for vehicles turning from Duck Pond Drive onto Washington Street. The proposed solution for this location is to construct a roundabout to improve overall operations and accommodate future growth in traffic volumes (Figure 3-6). The implementation of the roundabout will also improve sight distance and reduce blind spots by flattening the hill.

Also shown in Figure 3-6 is the location of the possible Research Walk Tunnel under Duck Pond Drive. As the Life Science Precinct continues to develop on either side of Duck Pond Drive, this tunnel will reduce pedestrian-vehicle conflicts for individuals walking to buildings and parking destinations on either side of Duck Pond Drive.

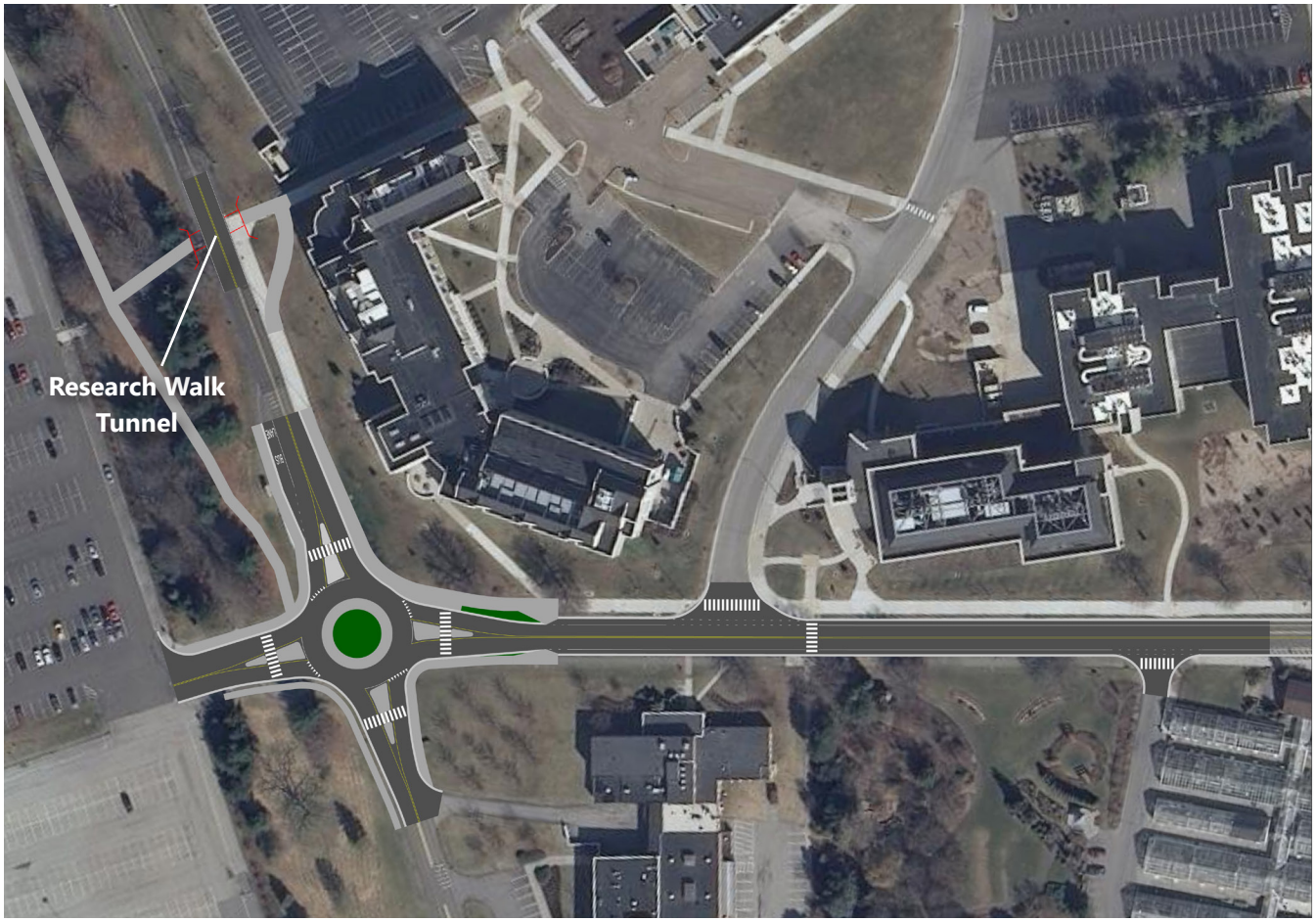


Figure 3-6. Washington Street at Duck Pond Drive Roundabout Design

Focus Area C is along West Campus Drive at Drillfield Drive. There is increasing demand on West Campus Drive as parking options are relocated to the Duck Pond Drive lots from within main campus. This increased demand is causing undue congestion at the West Campus Drive and Prices Fork Road intersection. In addition to congestion, there are safety concerns along the corridor, including poor sight distance when turning from Duck Pond Drive, the steep downhill grade when traveling toward the Drillfield, and occurrences of "right hook" bicycle crashes near the Drillfield.

To address a number of these concerns, the design option shown in Figure 3-7 is proposed. In this design, the existing driveways to and from the Drillfield are redesigned such that the northern roadway (currently egress from Drillfield only) becomes a two-way multi-use path serving non-motorized traffic. The southern connector to Drillfield Drive is converted into a two-way street along its entire length with a single-lane roundabout intersection at West Campus Drive. This design serve a number of purposes; the roundabout will naturally slow traffic through the area in spite of the steep approach grade, reduce delay for vehicles turning onto West Campus Drive, accommodate all redirected egress movements, and allows cyclists to travel through this intersection in the center of the through lane rather than next to the through lane. This is particularly important as there have been a number of "right-hook" collisions that involve vehicles turning right towards the Drillfield striking bicyclists traveling straight through the intersection towards Prices Fork Road. Additionally, this configuration will clearly separate vehicular turning movements from the multi-use path located approximately 250 feet to the north, reducing potential conflicts between modes.

Figure 3-7. West Campus Drive and Drillfield Drive Design

Working in conjunction with Focus Area C is **Focus Area D,** which concentrates on Duck Pond Drive. As with West Campus Drive, Duck Pond Drive is seeing increased demand and congestion due to relocated parking and increased commuter parking demand. The University, Montgomery County, and VDOT are in the early stages for securing funding for a proposed Western Perimeter Road parallel to West Campus Drive and Duck Pond Road to the west, essentially separating local campus traffic from vehicles destined specifically for parking along Duck Pond Drive or traveling around campus. The road specifically extends between Prices Fork Road and the realigned Southgate Drive and would provide connections to prominent destinations along the way, such as an extension of Washington Street/Duck Pond Drive lots, Smithfield Road, Oak Lane, and the Inn at Virginia Tech. The road also provides necessary access to future development within the Northwest Precinct, located adjacent to the Inn at Virginia Tech.

A possible long-term addition to this project would be several Smithfield Road (Figure 3-8). With the Western Perimeter Road in place, an improved Smithfield Road would improve connectivity with some of the more remote parts of campus such as the Livestock Arena, but would also serve residents and guests wanting to access the campus from west of US 460, relieving some demand from Prices Fork Road. A detailed evaluation of the impacts to Stroubles Creek and its floodplain, agricultural activity along Plantation Road, and historic Smithfield Plantation are necessary to fully evaluate the feasibility of paving this facility.

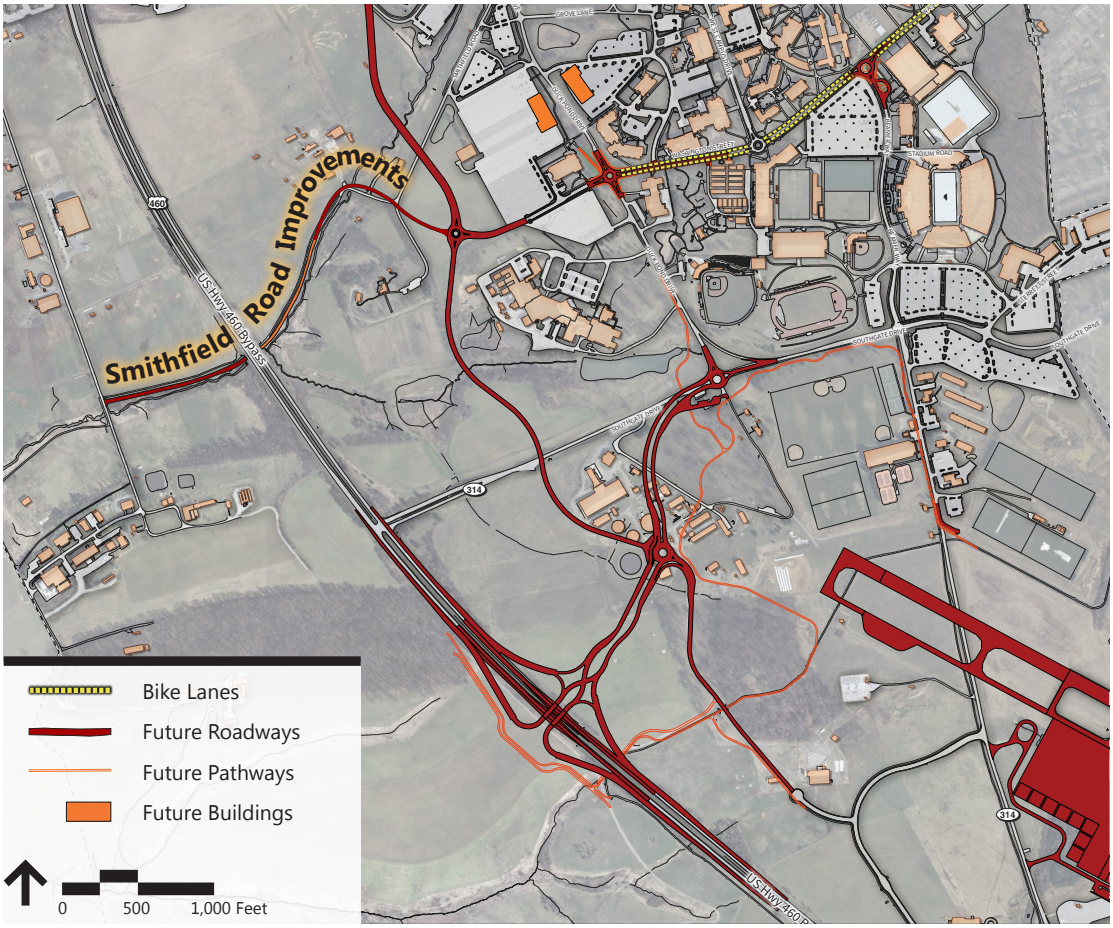


Figure 3-8. Western Perimeter Road

Focus Area E encompasses the Stanger Street at Perry Street intersections—a high-volume, high-conflict area with significant pedestrian crossings near Surge Building. The two sides of Perry Street are offset along Stanger Street, with Perry Street to the west intersecting Stanger Street approximately 150 feet north of Perry Street to the east. The northern intersection will serve the planned MMTF, since the eastern hub is accessed directly via Perry Street west of Stanger Street.

The proposed improvements at this intersection are three-pronged (Figure 3-9). First, the Town plans to enhance the crosswalks that funnel pedestrians into this part of campus from the northeast. A rectangular rapid flashing beacon was in use for a couple of years, however was removed due to safety concerns. The Town is currently evaluating alternative options to enhance safety for pedestrians crossing Prices Fork Road at Turner Street. Second, the intersection serving the MMTF will be converted to a roundabout. Finally, the PTMP suggests that Perry Street to the east would be paired with Old Turner Street to the south and converted into a one-way pair. In this configuration, Perry Street would be westbound only with no left-turn movement; instead left-turning vehicles would turn right and circulate through the roundabout to ultimately head south on Stanger Street. Old Turner Street would be re-opened as a one-way movement towards Turner Street, as shown in Figure 3-10. By converting to a one-way movement, the additional pavement can be repurposed as a bicycle lane, wider sidewalks, and/or on-street parking. Removal of the eastbound movement from the existing Stanger Street at Perry Street intersection simplifies the vehicle movements in this high pedestrian zone, improving walkability.

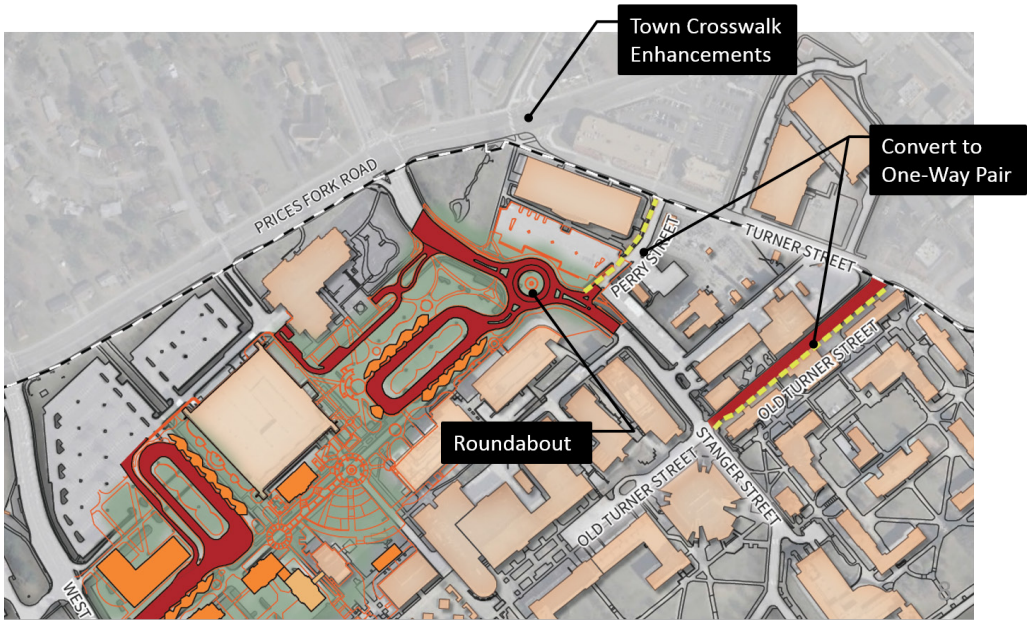


Figure 3-9. Northern Perimeter Enhancements

Figure 3-10. Perry Street and Old Turner Street One-Way Pair Illustration

All of these recommendations involve more than roadway improvements alone; most also require enhancements to other transportation elements such as sidewalks or multi-use paths. The integration of those elements is discussed further in subsequent sections.

The addition of the suggested improvements mentioned previously constitutes the future "Build" scenario, which includes new or unfunded improvements such as the Washington Street roundabouts, Western Perimeter Road, and Perry/Old Turner one-way pair. Figure 3-11 identifies the expected future lane configurations with the planned improvements in place and Figures 3-12 and 3-13 summarize the projected 2025 vehicular volumes at the study area intersections with and without Western Perimeter Road in place. Figure 3-14 illustrates the peak hour level of service at each of the intersections. As shown in the figure, all but two of the key intersections evaluated are expected to operate at LOS D or better. The Prices Fork Road at McBryde Drive intersection operates with relatively high delay on the side streets. This intersection should be considered for signalization in the future if the signal does not compromise corridor mobility or negatively affect downstream intersections. The Washington Street at Kent Street intersection operates at a LOS E in the PM peak only with relatively minor queuing.

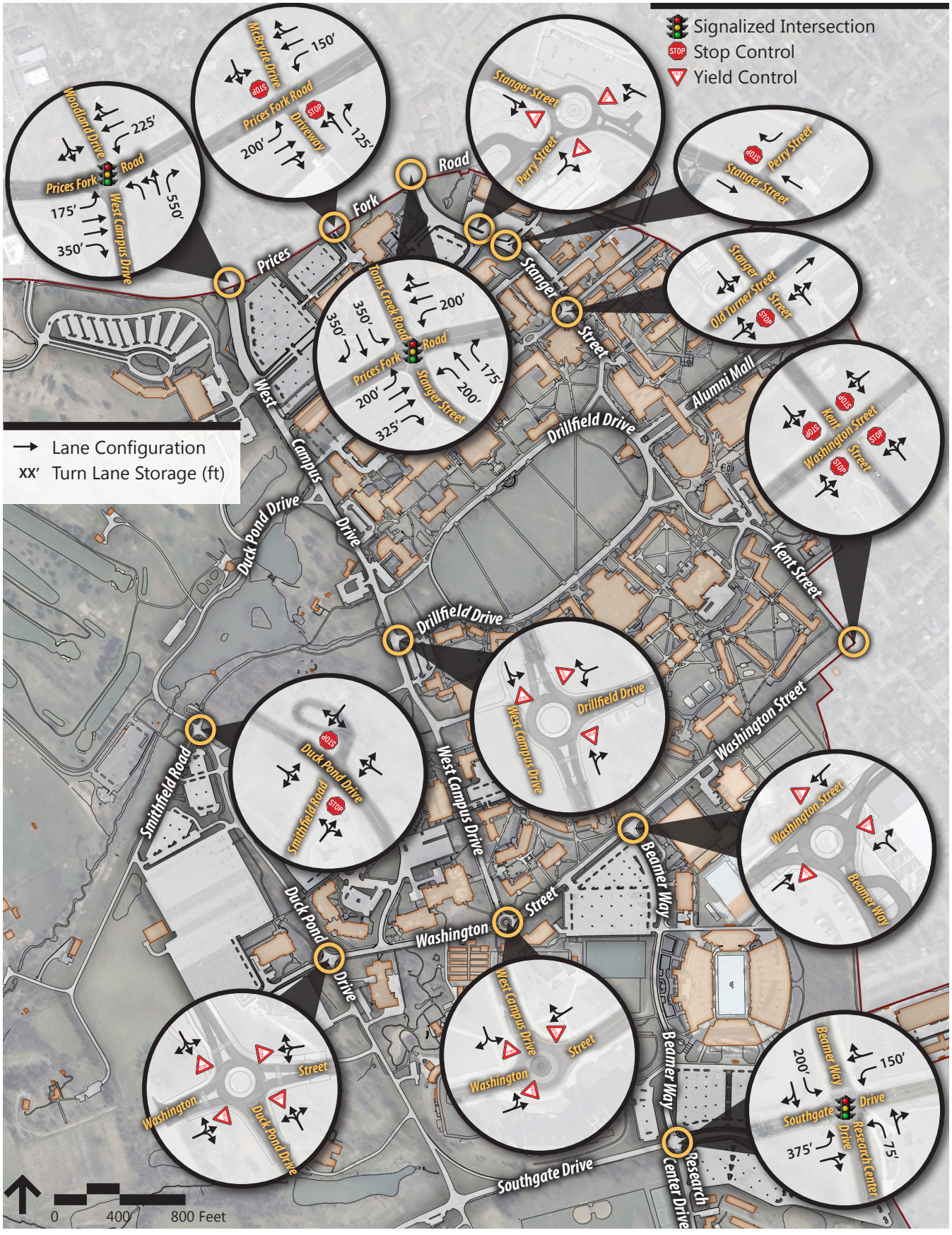


Figure 3-11. Future Build (2025) Intersection Lane Geometrics and Traffic Control

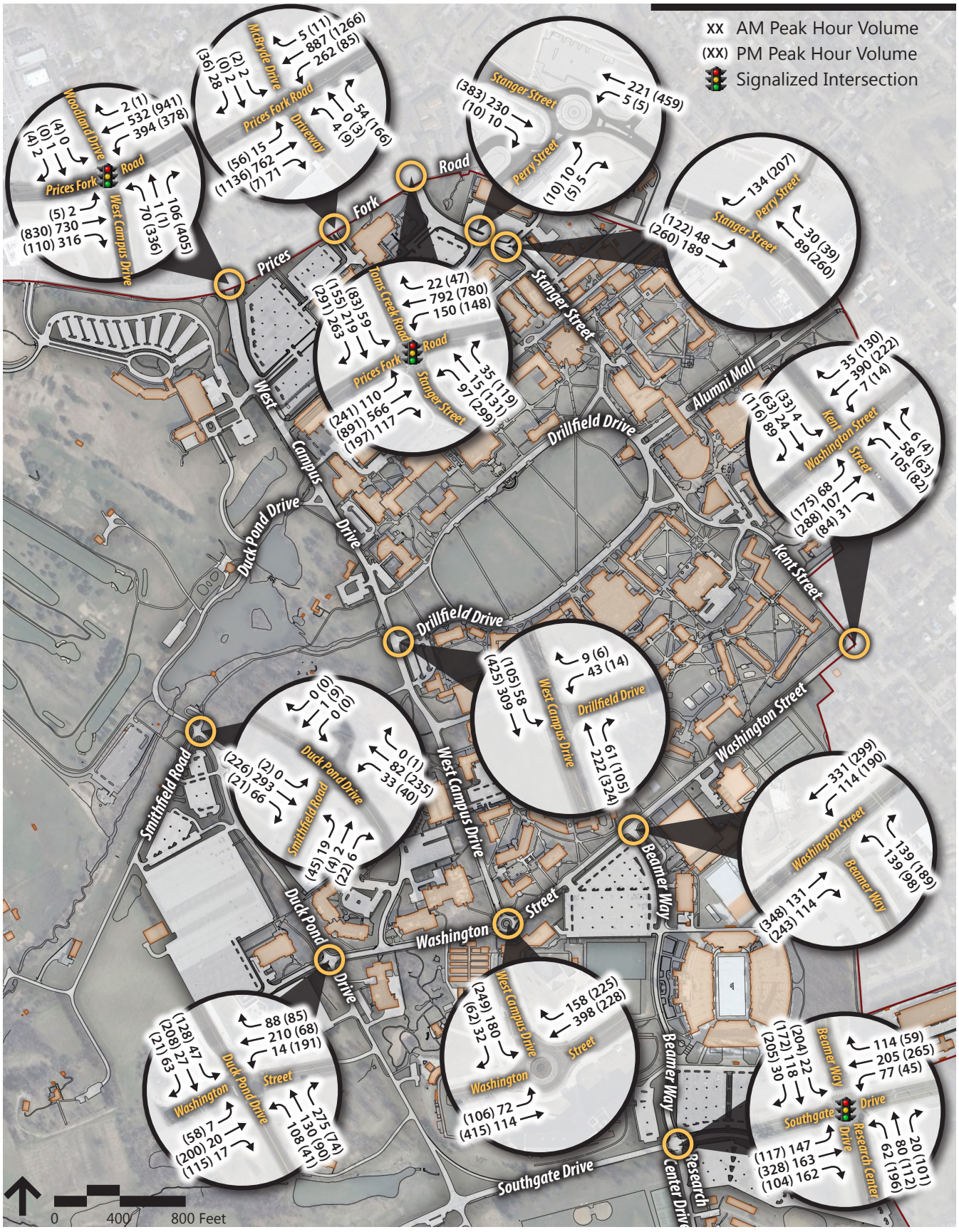


Figure 3-12. Future Build (2025) Peak Hour Volumes with Western Perimeter in Place

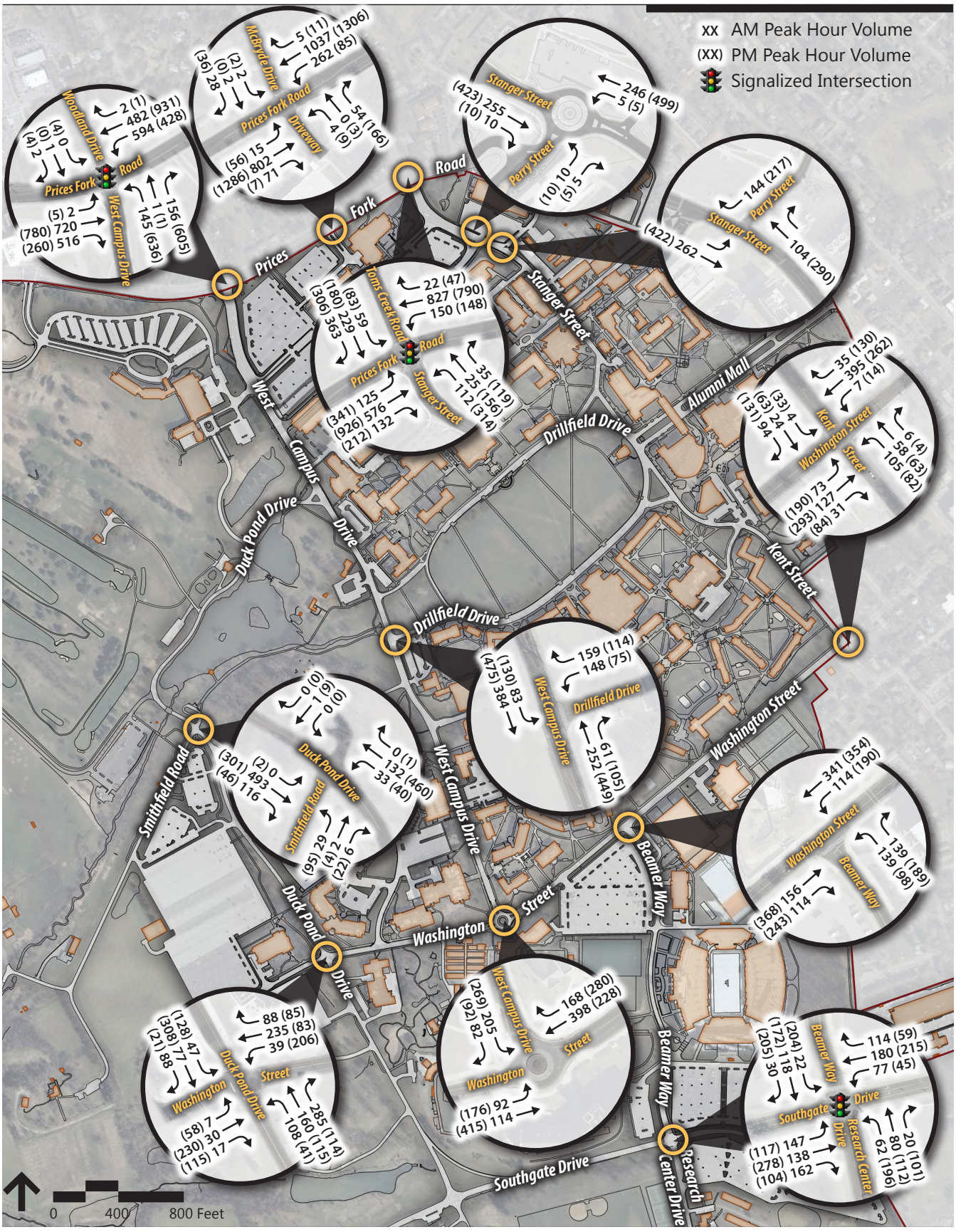


Figure 3-13. Future Build (2025) Peak Hour Volumes without Western Perimeter in Place

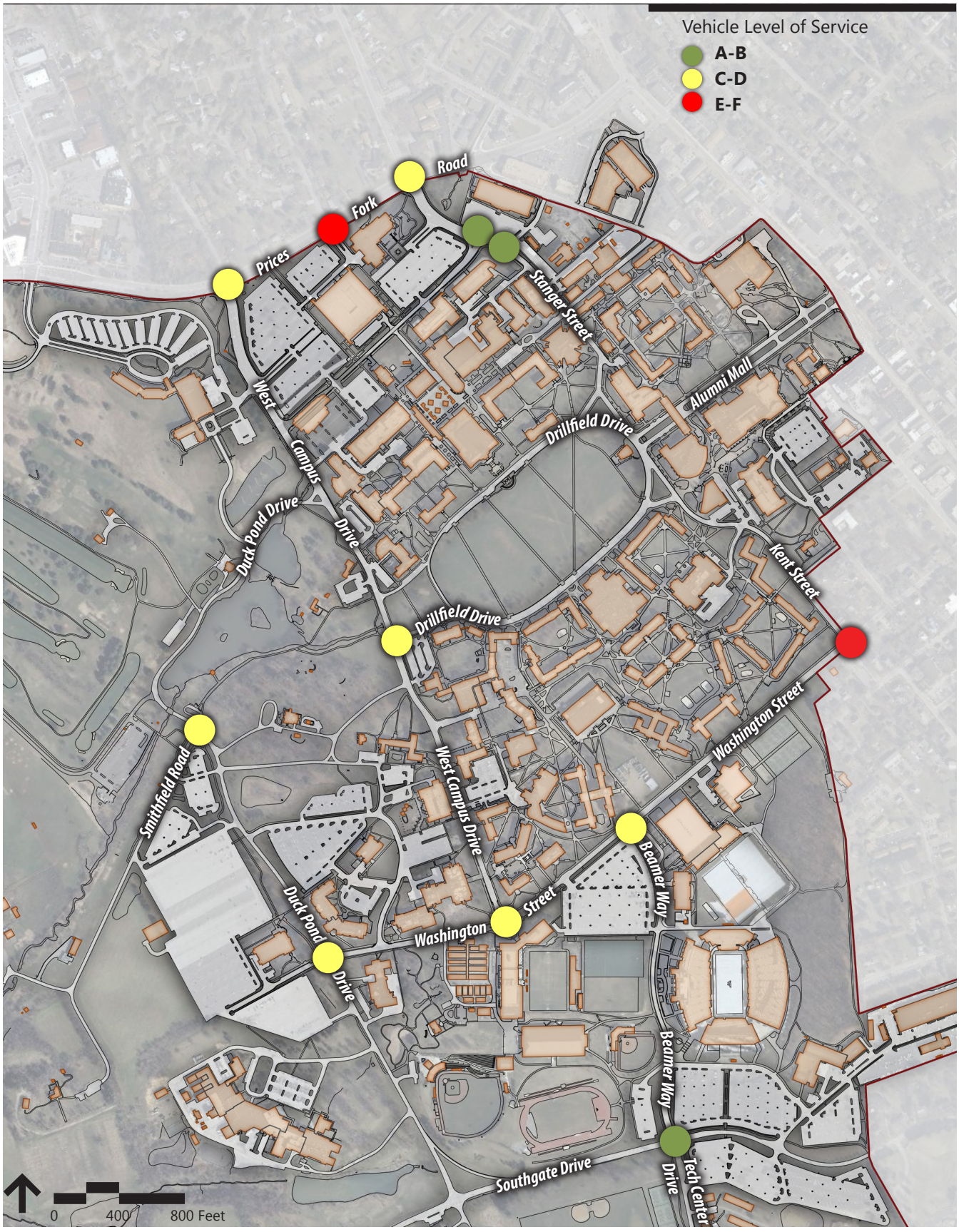


Figure 3-14. Future Build (2025) Level of Service

Parking

Parking Supply

Over the next ten years, a number of planned building projects identified by the Office of University Planning (OUP) will displace existing parking spaces on campus. These changes to the parking system need to be accounted for to accurately forecast the future parking supply/demand balance. Table 3-1 summarizes campus developments planned in the next 10 years, along with the number of spaces displaced for each user type.

Campus developments will displace a total of approximately 1,400 spaces by 2025. In the North Campus area, approximately 1,100 spaces will be displaced by the Multi-Modal Transit Facility, Undergraduate Science Lab, and Bishop Favrao Phase II building. In the South Campus area, approximately 600 spaces will be displaced by the HABB II and Nano/Geo Sciences buildings. There are plans for a Northwest Precinct development which will include academic and residential/dining buildings, as well as 305 new parking spaces. Since the Derring Lot was already displaced during the parking inventory and occupancy surveys, it is not considered in this analysis of future parking supply and demand. Thus, a total displacement of 1,282 spaces is assumed.

Table 3-1. Parking Impact of Future Campus Developments (2015 to 2025)

Year	Development	Parking Facility Impacted	Parking Impact				Total
			F/S	C/G	R	V	
2016	Derring Lot	Derring Lot 9 [1]	120				120
2020	Undergraduate Science Lab Bldg.	Perry Street Lot 1	(161)	(81)			(242)
	HABB II Building	Duck Pond Rd. Lot 20			(400)		(400)
	Multi-Modal Transit Facility [2]	Perry Street Lot 3 and half of Lot 6	(366)	(368)		(11)	(745)
2022	Nano/Geo Sciences Lab Bldg.	Litton Reaves Lot 15		(200)			(200)
2025	Bishop Favrao Phase II	Derring Lot 9	(120)				(120)
	NW Precinct	Duck Pond Rd. Lot 20			260		260
	NW Precinct	New Parking Lots	45				45
Total Displaced Parking			(602)	(649)	(140)	(11)	(1,402)

[1] This lot was already displaced from construction during surveys
[2] Assumed all of Perry Street Lot 3 and half of Lot 6 would be displaced

Transportation Demand Management Strategies

In December 2015, the Virginia Tech Center for Survey Research conducted a parking and transportation survey. More than 9,800 members of the University community responded to the survey. A general review of the survey found the following mode split:

- Vehicle: 60%
- Transit: 21%
- Walk: 11%
- Bike: 5%

These preliminary results show that 60% of the trips to campus are made by vehicle. The University should establish a vehicle trip reduction goal for the next 10 years and continue to track mode split and progress. Reducing vehicle use down to 50% would be an appropriate ten-year goal for the University.

As discussed earlier, implementing Transportation Demand Management (TDM) strategies can effectively reduce parking demand by promoting alternative modes of transportation. Several of the transit, pedestrian, and bicycle improvements suggested in the other sections of the report are critical infrastructure and service improvements to reduce single occupancy vehicle (SOV) trips. Currently, the University has a number of TDM strategies in effect, which are managed by the Alternative Transportation Office. These TDM programs include:

- Transit
  - Blacksburg Transit (free use for students and employees)
  - Smart Way Bus
  - Radford Transit
  - Megabus
  - Home Ride
- Hokie Bike Hub
  - Tools and resources for self-service bicycle repair
  - Commuter education center
  - Bicycle registration, maps, and resources
- Bicycle infrastructure improvements (i.e. covered bike racks)
- Carsharing (Zimride and ZipCar)
- Commuter Alternatives Program (CAP)
  - Carpool Programs (i.e. permits, premium carpool parking, pre-tax payroll deduction)
  - Bike, Bus, & Walk (BB&W)
- RIDE Solutions (ridesharing matching service)
- Emergency Ride Home Service

- VT Vanpool Program (vanpooling for full-time employees)
- Flexible Work Option
- Educational materials for bicyclists and pedestrians (i.e. Heads Up Hokies)
- Marketing and campus events (i.e. Active Commute Celebration)

Each of these programs helps make it more convenient and affordable for students and faculty/staff to use alternative modes of transportation, which helps limit the campus parking demand. It is important that the University continue to maintain, market and build on these existing TDM programs.

In addition to the current TDM strategies at Virginia Tech, the following programs and campus improvements will promote alternative modes of transportation:

- Bike-Share Program
- Continued Investment in Student Housing
- Campus Layout Improvements
  - Compact Building Design and Infill
  - Green Space
  - Connectivity
  - Enhanced Campus Services and Amenities (i.e. dining and safety improvements)
- Parking Pricing and Management

The Alternative Transportation Office is currently exploring the viability of implementing a campus bike-share program on campus. Bike-share would provide a great transportation option between the peripheral parking facilities and central campus. The University also has plans to develop additional student housing and campus services/amenities as part of the Northwest Precinct development project. The University is in the process of developing a Campus Master Plan, which should concentrate on environmentally sustainable campus layout improvements that promote compact building design, infill, green space, connectivity and the addition of campus amenities/services.

Parking Demand

The OUP provided preliminary future growth projections for students and faculty/staff over a 10 year period. An increase of approximately 4,800 students and 500 faculty is projected by 2025. Parking ratios were developed for F/S, C/G, and R parkers based on existing parking occupancy counts and population. Campus growth projections and these parking ratios were applied to forecast future parking demand. Based on these factors, peak period parking demand is projected to increase by approximately 1,200 vehicles through 2025, assuming no parking reductions from Transportation Demand Management (TDM) strategies. Below is a summary of the projected 2025 peak period parking demand increase per user type.

- F/S: 401 vehicles
- C/G: 548 vehicles

- R: 241 vehicles
- Visitor: 15 vehicles
- Service: 13 vehicles
- **Total: 1,218 vehicles**

Applying both the projected loss of parking supply due to future developments and the increase in parking demand resulting from campus growth, the future parking surplus/deficit by user group and area was calculated. This analysis considers a 90% practical capacity factor, which was also applied in analayzing existing conditions. A surplus of 290 spaces is forecast within the core campus area among F/S, C/G, and R spaces, without considering aggressive TDM strategies. An increased emphasis on TDM strategies could yield a surplus of nearly 1,050 spaces between F/S, C/G, and R spaces. A package of effective TDM strategies was discussed in the previous section. A summary of the estimated peak period parking surplus/deficit by user group in 2025 is provided in Table 3-2.

Table 3-2. Future (2025) Parking Surplus/Deficit with and without TDM Strategies

User Type	Parking Surplus/Deficit (2025)	
	Without TDM	With TDM
Faculty/Staff	(509)	(353)
Commuter/Graduate	(684)	(318)
Resident	1,483	1,720
Total Parking Surplus/Deficit	**290**	**1,049**

The detailed calculations of the future parking supply/demand balance for each of the main areas and users is provided in **Appendix B.**

The future surplus/deficit analysis reveals that there is adequate parking on campus overall. However, there is a projected deficit for F/S and C/G parking. The surplus of parking is located in the Residential lots.

Future Parking Allocation Strategy

As previously discussed, there are adequate parking assets currently on campus to support future demand. However, parking will need to be effectively allocated for each permit type due to the displacement of parking facilities and projected growth. Figure 3-15 shows the suggested 2025 parking facility designation by permit type. This parking space allocation does not consider the implementation of aggressive TDM strategies. However, this assessment shows generally how parking can be reallocated once development projects come online, especially the Multi-Modal Transit Facility. A successful parking allocation strategy will require the due diligence of the Parking and Transportation Department to monitor utilization and growth in each facility.

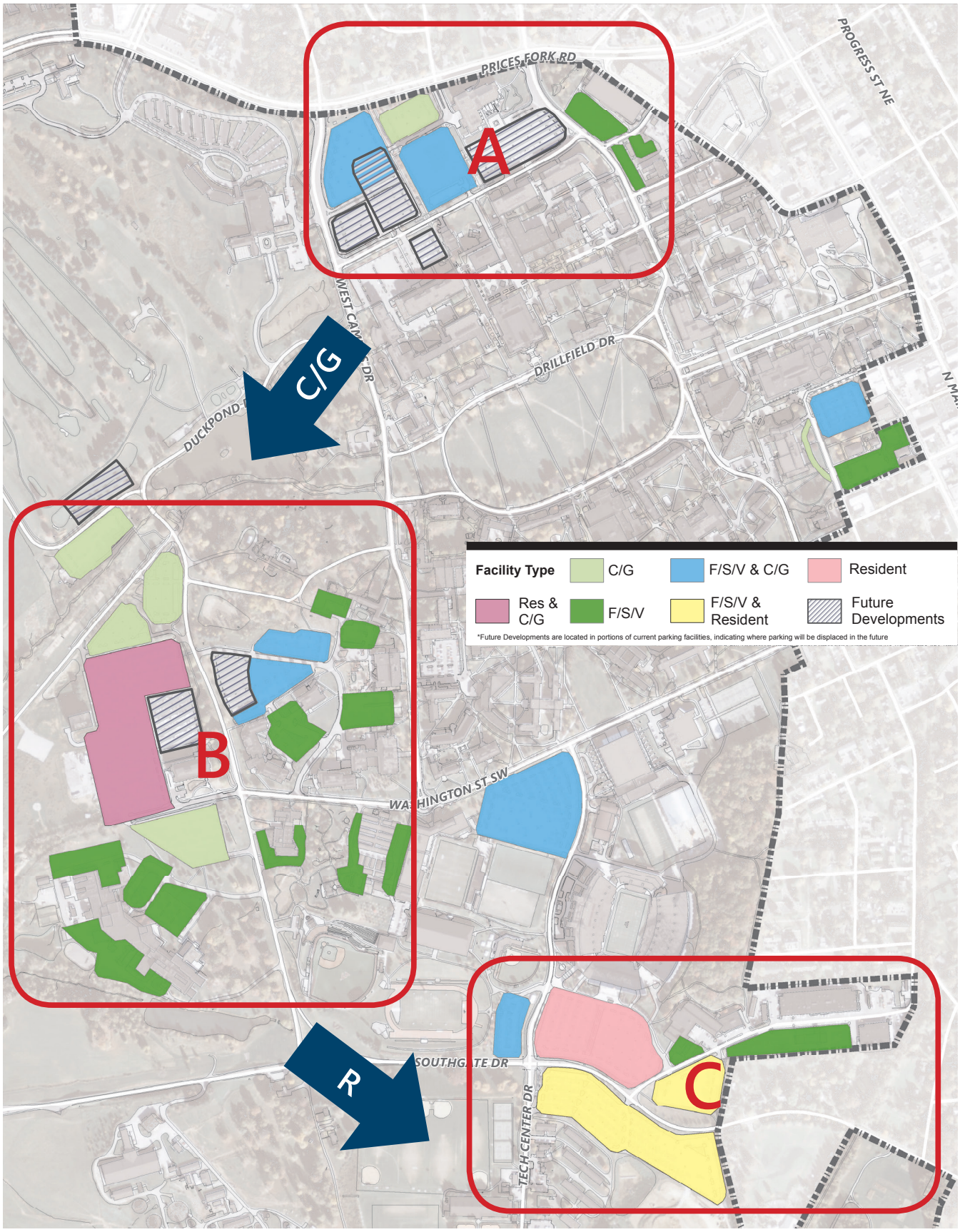


Figure 3-15. Future (2025) Parking Allocation Strategy

Below is a summary of the major parking allocation changes to support the projected 2025 campus developments and parking demand growth.

- **Area A (North Campus):**
  - 900 C/G spaces to remain (loss of 1,200 C/G spaces)
  - 1,160 F/S spaces (increase of 275 F/S spaces)
- **Area B (Duck Pond Drive Lots):**
  - Relocate displaced Area A C/G parkers to Duck Pond Drive Lots and Smithfield Road Lots (2,100 C/G spaces in Duck Pond Drive Lot)
  - 120 R spaces in Duck Pond Drive Lot (loss of 1,825 R spaces)
- **Area C (Remote Lots):**
  - Relocate displaced R parkers from Area B to Chicken Hill Lot (950 R spaces) and Stadium Lots (1,000 R spaces)

A detailed analysis of the parking space allocation and changes for each parking facility and permit type is provided in **Appendix B.**

Campus transit and pedestrian/bicycle connectivity improvements between the remote parking facilities (i.e. Duck Pond Drive Lots, Stadium Lots, Chicken Hill Lot, etc.) and the north and east ends of campus are necessary for the successful implementation of the suggested parking assignment strategy. Some specific improvements to those travel modes are detailed in other sections of this report.

Future Parking Structures

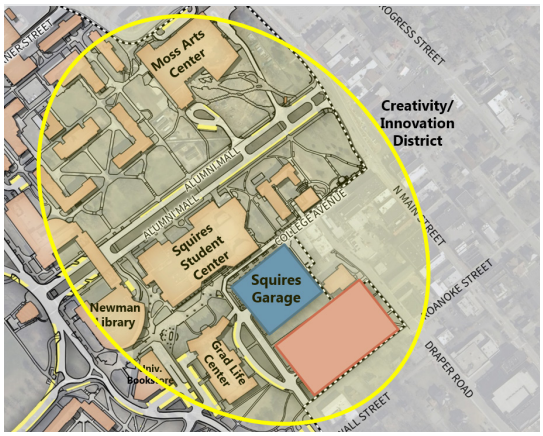
Although it was determined that there is currently adequate parking on campus to support future demand, the potential locations for additional structured parking were studied. Based on the high cost of parking structures, the presence of adequate parking on the periphery of campus, and the goal of maintaining a financially sustainable parking program, it was determined that any parking structure should be located in a high-demand, high-turnover, high-growth area where people would be more willing to pay a premium for convenient parking. Ensuring that a new garage is financially self-sufficient is a key goal.

The existing Squires Lot meets all of these qualifications. The Squires Lot has 223 spaces, consisting of a mix of F/S, C/G, metered, and service spaces. The location experiences high demand and turnover at all times of the day. It borders downtown Blacksburg and attracts parkers visiting the businesses off Main Street. Also, there are plans to develop a Creativity and Innovation District in this vicinity, potentially generating additional parking demand.

The Squires Garage, which would replace the existing Squires Lot, should be operated as a pay facility with hourly and daily public rates and higher permit rates exclusively for Faculty/Staff. A detailed market feasibility analysis should be conducted to determine the appropriate parking rates, ideal number of spaces, and financial outlook for a future parking structure at the Squires location.

Figure 3-16 shows two options for locating the parking garage: Option 1, displacing the Squires Lot, or Option 2, displacing the Architectural Annex building. Based on the footprint of the Squires Lot, the garage could support approximately 200 spaces per level. The benefits associated with Option 1 are that it would not require the demolition of the Architectural Annex building and that it is slightly closer to major campus destinations. A major drawback with Option 1 is that it is located in a floodplain and has some topography issues. Option 2 is more accessible from Draper Road and/or Roanoke Street, and this location has fewer vehicle/pedestrian conflicts. It also frees up the Squires Lot for future development. A site feasibility study should be performed to determine the preferred location between the two options.

Option 1 – Displace Squires Lot



Option 2 – Displace Architectural Annex Bldg.

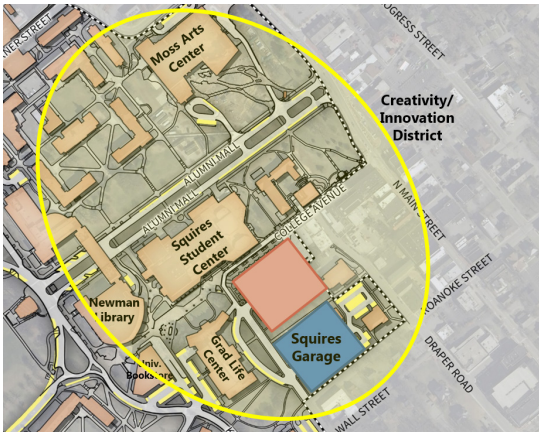


Figure 3-16. Squires Garage Options 1 and 2

Parking Management and Operations

Parking Permit Rate Structure

Parking pricing can have a substantial impact on people's mode of travel. University students and employees consider the financial impact of parking pricing on campus when choosing their mode of commuting. Based on University permit sales data, the number of Residential permits has decreased 2% annually between 2011 and 2015 (from 2,850 to 2,613 permits). This could be directly related to the cost of Residential permit pricing which has increased 12% annually over that same time period (from $225 to $350). The number of Commuter/Graduate parking permits has decreased 1% annually between 2011 and 2015, which could be directly correlated with a 6% annual permit fee increase. However, Faculty/Staff permits have increased by 1% annually with a 4% annual permit fee increase. This may show that students (C/G and R) could be more easily influenced by parking pricing increases in comparison to Faculty/Staff.

Table 3-3 shows the historical and current parking permit pricing at Virginia Tech. A benchmarking analysis was conducted to compare the pricing at Virginia Tech to other peer Universities (refer to Figure 3-17). This benchmarking analysis shows that C/G and R permit prices are about average and the F/S permit price is on the lower end of the spectrum compared to other Universities. This could help explain why there is minimal, if no, current elasticity regarding the price of F/S permit fees as the number of F/S permits issued increased even with a 4% annual permit fee increase.

Table 3-3. Historic Virginia Tech Parking Permit Fees

Permit Type	2011-2012	2012-2013	2013-2014	2014-2015
Faculty/Staff Year Fee	$225.00	$235.00	$247.00	$260.00
Faculty/Staff Semester Fee	$113.00	$118.00	$124.00	$135.00
Commuter/Graduate Year Fee	$198.00	$212.00	$230.00	$250.00
Commuter/Graduate Semester Fee	$99.00	$106.00	$115.00	$130.00
Resident Year Fee	$225.00	$235.00	$284.00	$350.00
Resident Semester Fee Fee	$113.00	$118.00	$143.00	$180.00

As shown in Figures 3-17, 3-18, and 3-19, many of the permit fees for peer Universities have a range. This is because these Universities have implemented a tiered parking rate structure, which allows students and faculty/staff to pay a premium to park in a more convenient parking facility on campus.

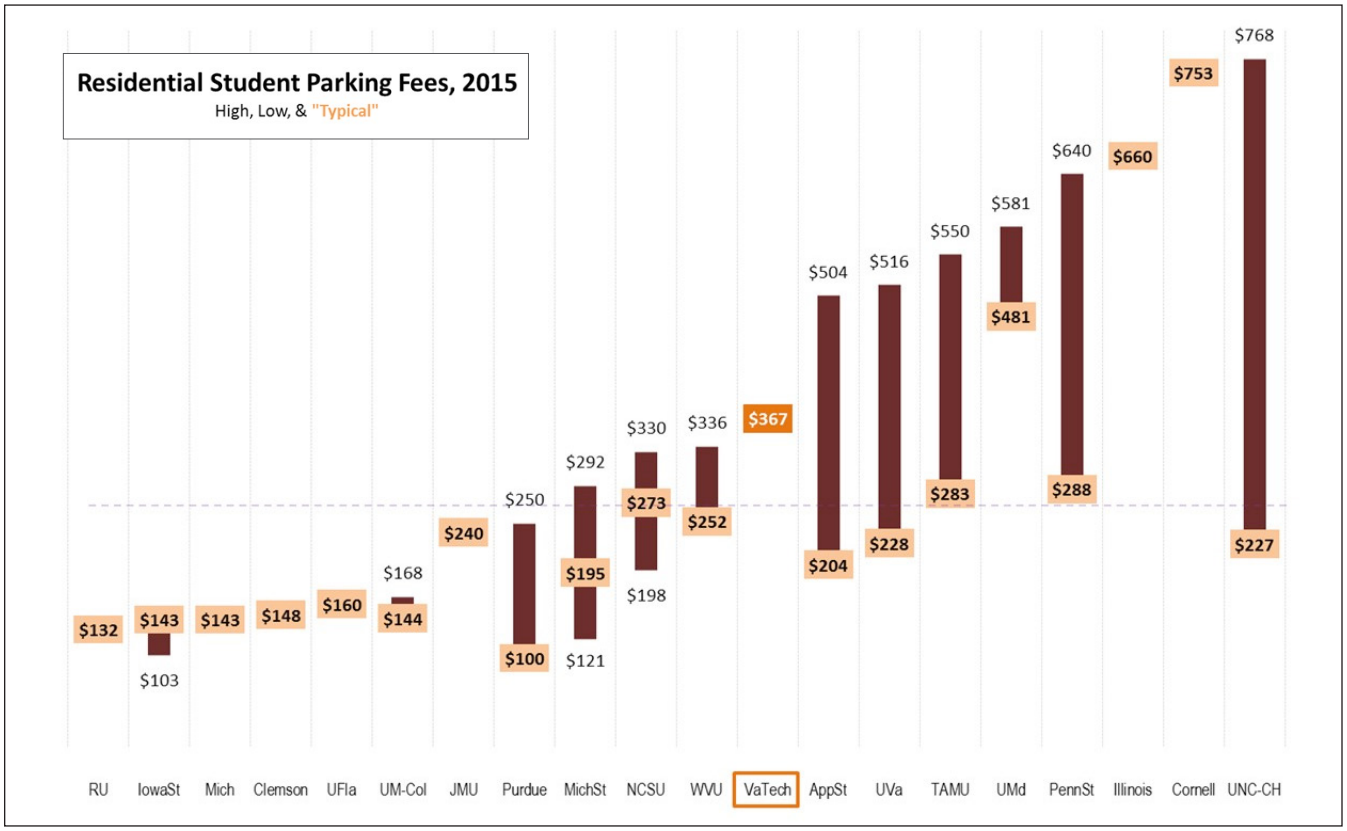


Figure 3-17. Parking Permit Pricing Benchmark Analysis – Residential Student Fees

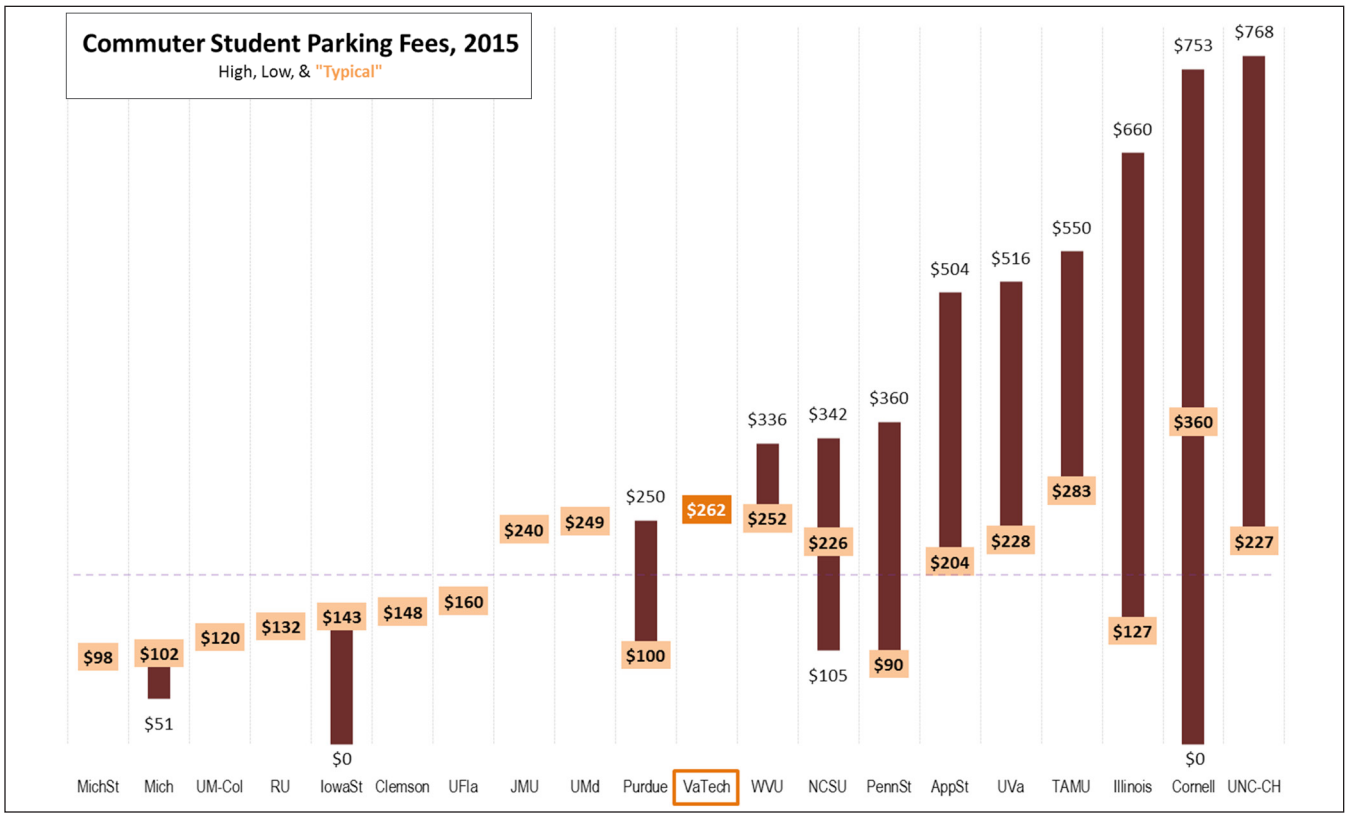


Figure 3-18. Parking Permit Pricing Benchmark Analysis – Commuter Student Fees

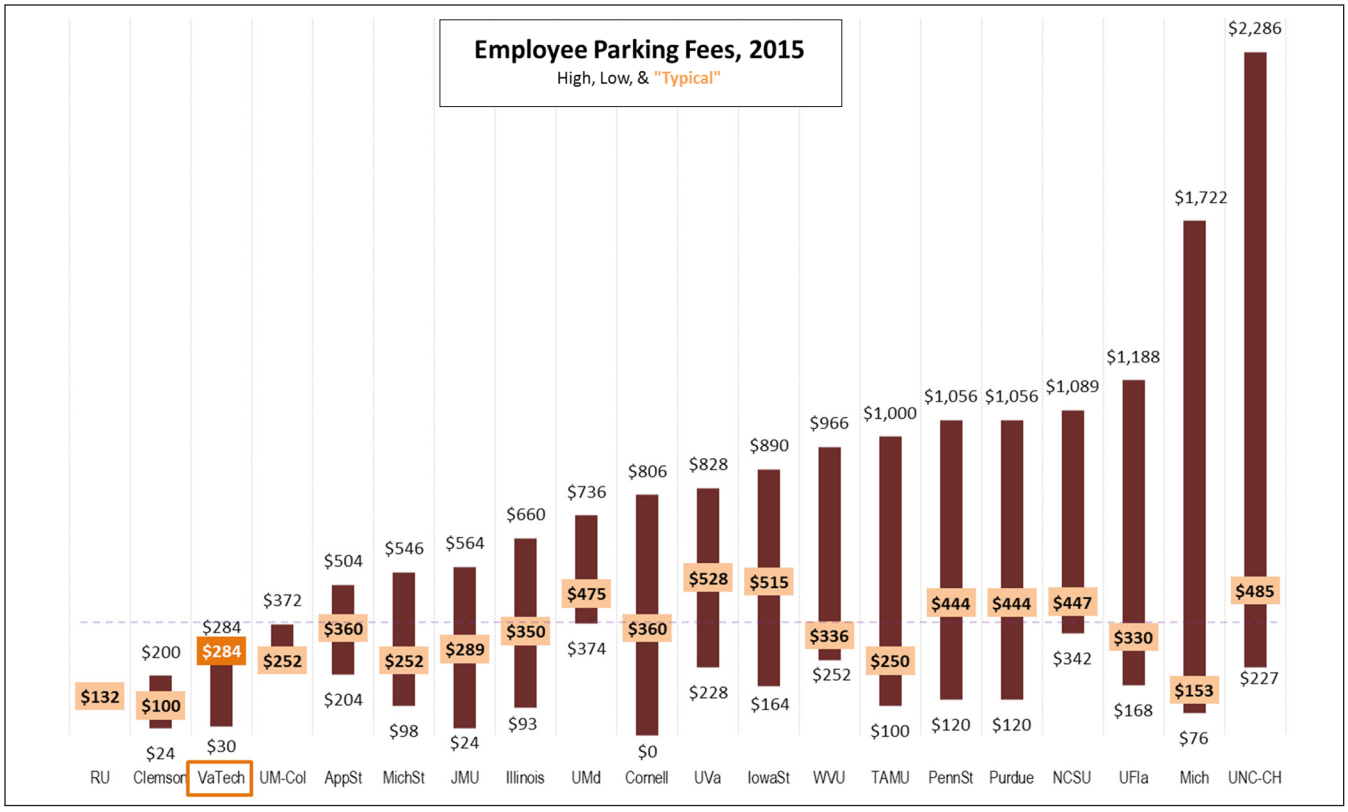


Figure 3-19. Parking Permit Pricing Benchmark Analysis – Employee Fees

A tiered parking pricing system can have many campus benefits, including:

- Reducing traffic congestion in desirable parking areas,
- Improving traffic conditions around campus by preventing 'space hunting',
- Creating a more convenient and less frustrating scenario, and
- Providing people a discounted parking option.

Currently, the University issues one type of permit for each user (i.e. F/S, C/G, and R) and allows them to hunt for an available space in any of the designated parking areas. However, as convenient parking in the North Campus area becomes displaced and much of the parking for C/G and R permits becomes assigned to periphery parking locations, allowing these parkers to hunt for a space will create traffic congestion in the convenient parking areas and frustration among parkers unable to locate a space.

C/G Parking Permits

Tiered parking pricing can be implemented to better manage the available parking assets to prevent traffic and user issues. Figure 3-20 shows the suggested tiered pricing strategy for C/G permits. The North Campus parking facilities, Litton Reaves Lots, and Coliseum Lot would be designated as proximate parking, while the Duck Pond Drive Lots, Track/Fieldhouse Lot, and Smithfield Road Lots would be considered standard parking. The number of C/G parking permits issued for the proximate parking areas should be limited to the number of designated C/G spaces with some oversell (i.e. 15% oversell). Limiting the number of permits sold for the proximate parking areas will help prevent everyone with a C/G permit from hunting for a space, which leads to traffic congestion and frustration among users. Based on observations and comments received from students and faculty/staff, this is already an issue at the northern campus parking areas.

F/S Parking Permits

A tiered parking pricing system can also be created for F/S permits. Currently, the University has implemented a pilot program to offer discounted F/S permits ($30) at the Chicken Hill Lot, which has had mixed success. These discounted permits are primarily only purchased by employees that work in a University building adjacent to the Chicken Hill Lot (i.e. Parking Services, Public Safety Building, etc.). This suggests that the current regular permit rate is agreeable since there is not a high demand for discounted parking. If this continues to be the situation, maybe only proximate parking is offered in very high demand parking areas (i.e. Drillfield Drive, Squires Garage, Perry Street Garage, etc.). There are many small F/S parking lots dispersed throughout the campus that serve specific academic buildings that should not be considered for proximate parking.

R Parking Permits

As discussed previously, Resident parking should be provided in the Duck Pond Drive Lot, Stadium Lot, and Chicken Hill Lot. None of these facilities may be viewed as any more convenient or accessible, which would limit the opportunities for tiered parking between these facilities. If this is the case only one Resident permit parking rate would be necessary. However, a select number of proximate Resident parking permits could be offered in the Coliseum Lot. The demand for Resident parking in the Coliseum Lot could be tested with a pilot program or campus survey.

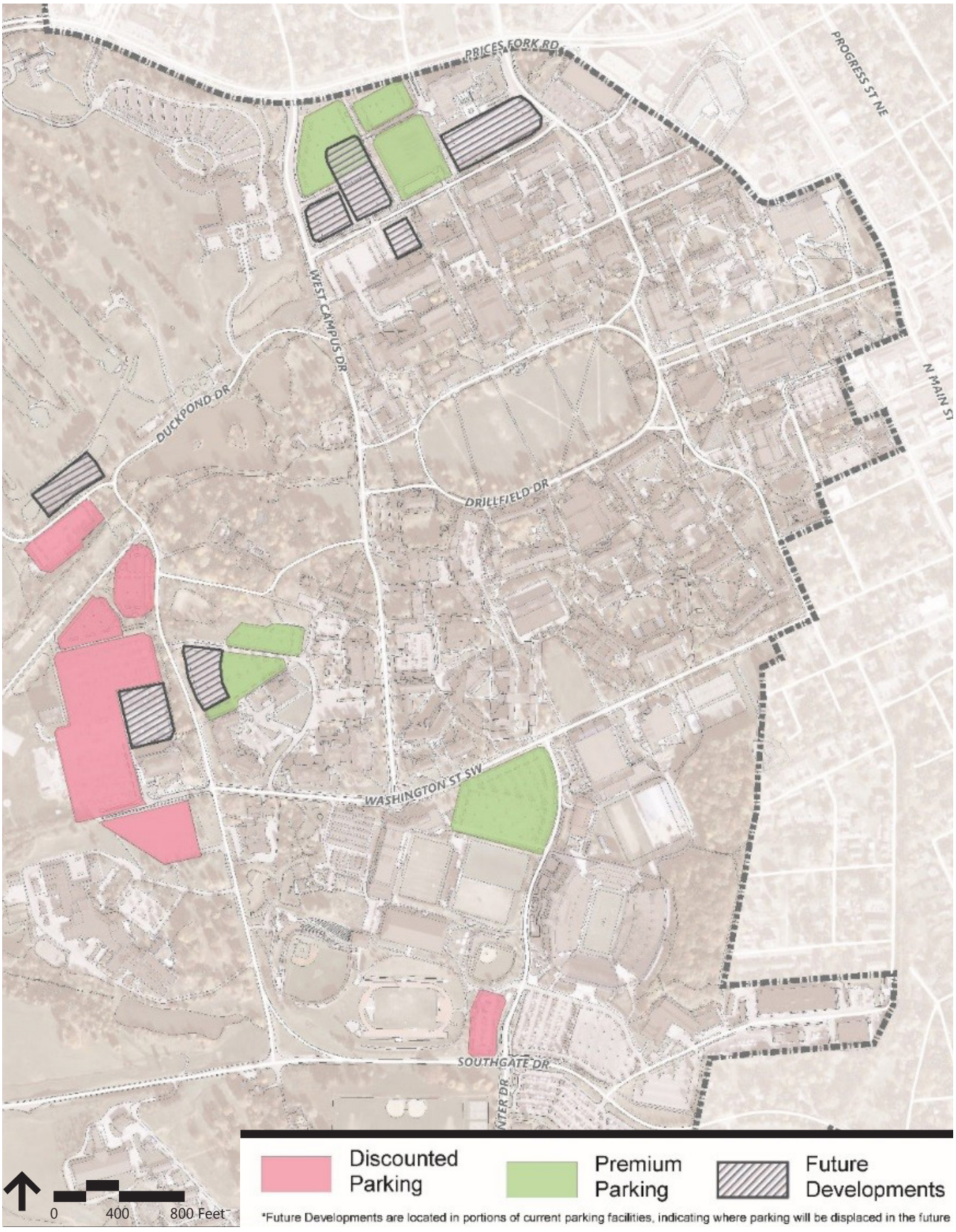


Figure 3-20. Commuter/Graduate Tiered Parking Permit Strategy

Visitor Parking

The management of visitor parking has been an ongoing issue at Virginia Tech. Visitors are currently allowed to park in any Faculty/Staff/Visitor or Student (R/C/G) parking space with a valid Visitor parking permit if the space is not restricted with signage. Unlike at many peer institutions, Virginia Tech's visitor parking permits are free and are typically picked up at the Visitor Center. A department can also email the Parking and Transportation department to request a Visitor parking permit, which would need to be picked up by the department. No Visitor parking permit is required on the weekends (Friday, 5:00 PM to Monday, 7:00 PM). There are also short-term metered parking spaces dispersed throughout campus (i.e. Drillfield Rd., Alumni Mall, University Bookstore Lot and the Squires Lot), which can be used by visitors.

The major drawbacks with the current Visitor parking permit system, include the following:

- Requires a visitor to know the parking policies prior to entering the campus,
- No on-campus signage informing visitors about the process to acquire a Visitor permit,
- Visitors have to hunt for a space and may get frustrated when there is no parking available in their preferred area, and
- Parking is free which can lead to abuse of Visitor permits and a financially unsustainable program.

Designated visitor parking areas should be established on campus to help ensure that parking is available and not fully occupied by faculty/staff and/or student parkers. Based on available visitor data, it is estimated that there are no more than 300 visitors on a typical weekday, which equates to a peak parking demand of approximately 200 vehicles. Figure 3-21 shows the suggested visitor parking areas on campus. Note that most of the spaces within these lots will remain F/S; however, a small portion of the lot will be designated for visitors only. Once designated visitor parking spaces are established, they should be monitored to determine if the number of spaces needs to be adjusted.

In addition to designated visitor parking areas, it is suggested that visitor parking is no longer free. There are two main options available regarding a pay visitor parking, which include:

1. Charging for daily Visitor permits and
2. Establishing a transient hourly and daily fee with parking payment equipment.

The first option of charging for daily Visitor permits is not a substantial change from the current operation, except that permits would no longer be free and there would be designated visitor parking areas. However, this solution does not solve the problem of requiring a visitor to know the parking policies prior to entering the campus.

Option 2 would require the installation of payment technology (i.e. pay-and-display, pay-by-space, pay-by-plate, mobile pay, etc.) adjacent to the designated visitor parking areas and continued enforcement of the visitor parking areas. License Plate Recognition (LPR) enforcement could potentially be implemented depending on the parking equipment and technology applied. Appropriate signage should be installed on campus to direct visitors to the visitor parking areas and information should be posted online. By providing on-site payment options a person would not need to stop at the Visitor Center or Parking Services. However, this option could be coupled with daily Visitor permits (Option 1) as well.

Based on the parking occupancy counts, the short-term pay meters along Alumni Mall were not in high demand. This shows that there may not currently be any need to create more metered on-street campus spaces. However, if Visitor permits are no longer free, the on-street meters on-campus may become more utilized. If paid visitor parking is implemented, the utilization of the meters along Alumni Mall should be monitored to determine if additional short-term meters would be beneficial for visitors.

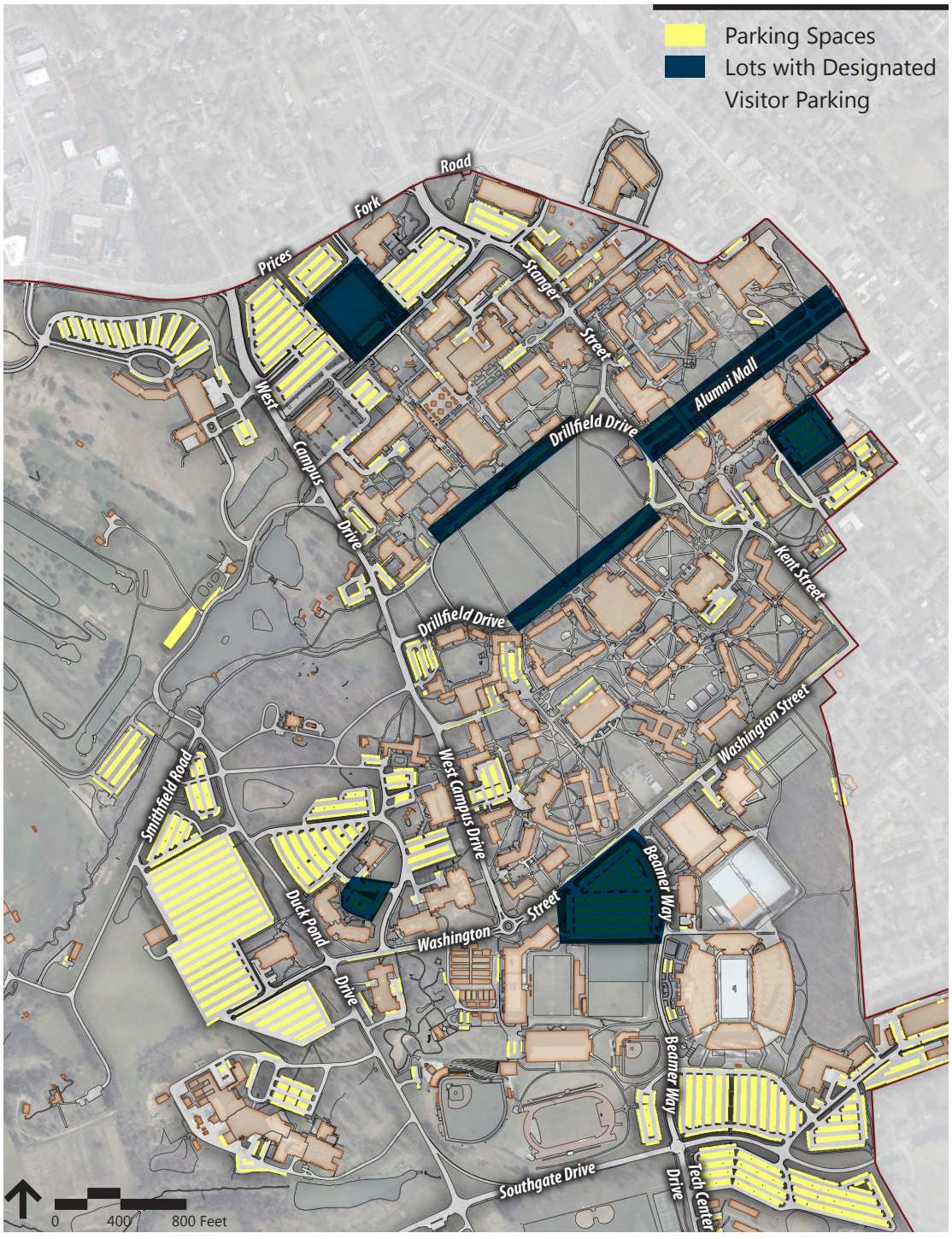


Figure 3-21. Recommended Designated Visitor Parking Areas

State Vehicle Parking

There is currently an issue where state vehicles are parking in any space on campus, even if it is designated for a specific user. This plan suggests that a few parking spaces are designated for state vehicles in most of the larger parking facilities throughout campus. Infrequently used vehicles may also be parked in remote areas on campus lots. Parking policy should be modified such that if state vehicles are found not using designated spaces, they will be ticketed and towed after three or more offenses. State vehicle parking spaces are used at other major Universities, including the University of Maryland.

Parking Demand Reduction Strategies

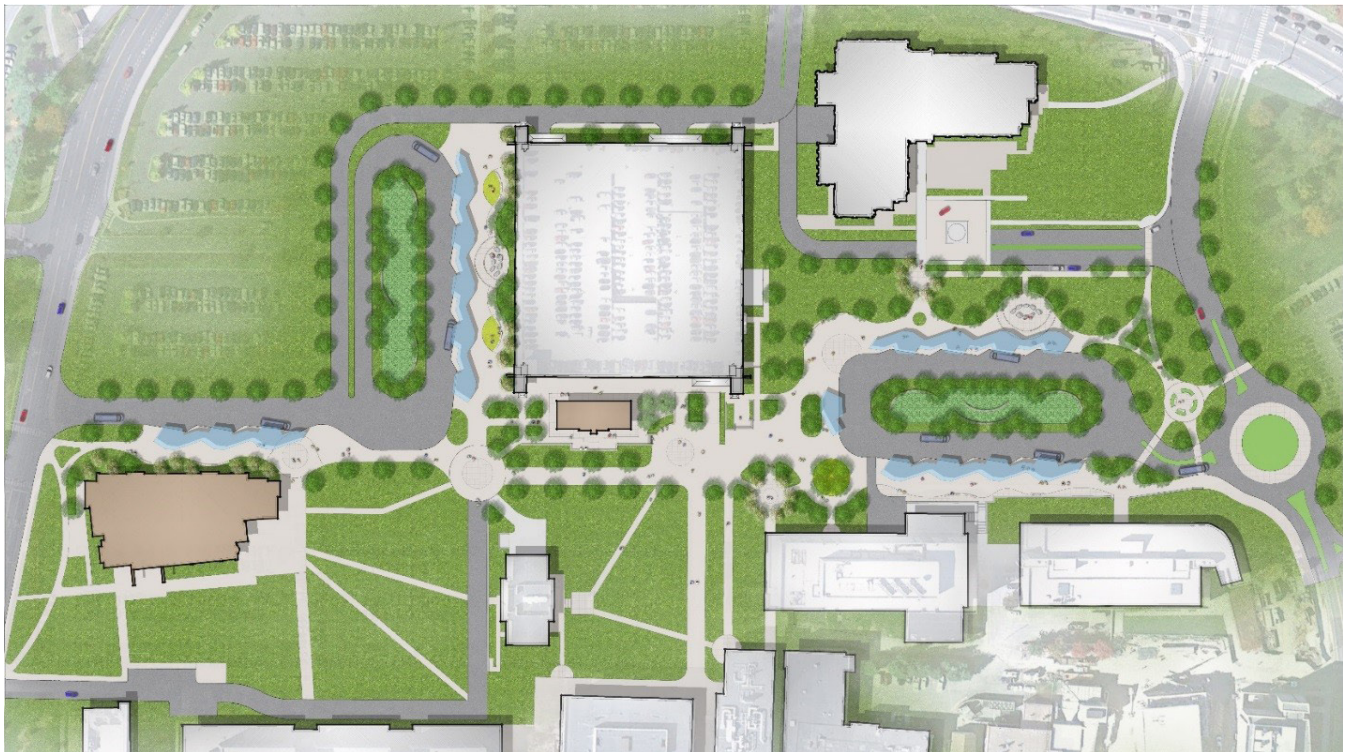
In addition to TDM strategies, there are other programs that can be implemented on campus to reduce the campus parking and transportation demand. The two main programs that were considered, include reducing the number of freshmen Residential parking permits and providing off-site parking.

Freshman Parking

Many Universities limit or do not permit freshman undergraduate students to have a vehicle on campus as a strategy to reduce parking demand. Reducing or eliminating freshmen Residential parking permits was considered at Virginia Tech to help reduce the parking demand to prevent the need to build additional future parking facilities. However, based on the future parking supply and demand analysis, it is not necessary to limit freshman Resident parking on campus through 2025. There are substantial existing parking assets that can effectively support the future (2025) freshmen Resident parking demand. Eliminating or reducing the number of Resident permits would have a negative financial impact on the University and may be poorly received by freshmen students who want to have a vehicle on campus for additional convenience or who have extenuating circumstances requiring use of a vehicle. It is suggested that Resident parkers are continued to be offered parking permits to have a vehicle on campus unless it is a strong environmental sustainability and space management goal of the University to reduce parking demand and vehicle trips.

Off-Site Parking

Off-site parking was considered as a potential option to support future parking demand. However, it was determined that additional parking resources are not necessary to support future demand, thus, off-site parking is not necessary. Also, there are potential costs associated with supporting off-site parking, which include running transit service to and from, leasing or purchasing an off-site parking area, and constructing/maintaining/operating an off-site parking facility. These are not minimal costs and can become a financial burden on the University for a parking asset that is not necessary. It is not suggested that off-site parking is provided at Virginia Tech unless it is an essential environmental sustainability and space management goal of the University to reduce parking demand and vehicle trips.



Blacksburg Transit Multi-Modal Transit Facility Site Plan

Transit

Planned Improvements

Blacksburg Transit provides public transportation to Blacksburg, Virginia Tech, and several other communities in the New River Valley. While the system has grown to cover more of the region, much of the service is still focused on connecting the region to the main campus of Virginia Tech. As one of the region's major employers and an institution of higher education with over 30,000 students, Virginia Tech is justifiably a major generator and attractor of trips. As the campus has grown, so have the number of trips associated with the university. University growth has resulted in the need for additional buildings, and the expanding building footprint has started to impact areas previously used for parking vehicles. Recent trends in the greater use of transportation alternatives by younger populations, combined with the University's increased support of transit, has led to a higher level of bus service to campus. This high level of service has impacts on traffic operations on campus, space needs associated with loading and unloading riders, and transit operations and schedules. In response to these changes, Blacksburg Transit, in partnership with Virginia Tech, is constructing a new Multi-Modal Transit Facility (MMTF) on campus. The 12,000 square foot MMTF will provide expanded amenities for BT riders, with indoor waiting areas, an expanded Hokie Bike Hub, and secure bicycle storage. The facility will also reduce the number of buses operating in the campus core, reducing congestion. Construction of the facility will result in the closure of Perry Street to vehicles and loss of surface parking in the lots between Prices Fork Road and Perry Street.

In preparing for the construction and ultimate completion of the MMTF, Blacksburg Transit completed a study in fall 2014 that proposes restructuring of routes. The plan shifts the focus

of most of BT's operations to the North Campus Precinct and removes them from the core of campus. The proposed plan retains about a half of the existing routes, or makes minor adjustments. The other seven routes are new routes, some in currently unserved areas of Blacksburg. All routes would continue to serve the main campus of Virginia Tech, either at the MMTF or at a secondary hub located along Alumni Mall at Squires Hall. This reimagined BT route structure provides access to currently unserved areas of the Town and County, and also improves both the length of service and frequency on a number of the routes.

Within the main campus the BT Route Analysis Study does propose some changes. The existing CRC Shuttle would still provide a direct connection between the main campus and Corporate Research Center, shifting from Burruss Hall to the MMTF. Instead of every trip continuing to the Blacksburg Industrial Park and VTTI, only select trips would operate this extension. Service improves from every 20 minutes to the CRC to every 12 minutes.

The current Hokie Express would be replaced by the Hokie Circulator. Instead of only connecting Oak Lane and the campus core, the Hokie Circulator would operate a one-way loop connecting the MMTF to academic and residential areas of campus. The loop would operate every 7.5 minutes, with 30 minute service extended to Oak Lane. This results in a reduction in service to the Oak Lane community from the current 15-minute service frequency provided by the Hokie Express. The proposed Hokie Circulator would operate during reduced schedule times, a service not currently provided by the Hokie Express. This enhances transit service on campus during breaks and summers.

Another new route that would serve the Clay Street corridor east of downtown Blacksburg and would travel up Washington Street and down West Campus Drive to the MMTF. This route has the potential to provide connections from the residential areas of campus to the academic core, as well as between the North Campus Precinct and the Life Sciences Precinct. The route would operate every 20 minutes on weekdays during the full service schedule.

Proposed Changes

The completion of the Multi-Modal Transit Facility will have many benefits, but will also create some new challenges in terms of moving people around the main campus. The elimination of parking in the North Precinct will result in some people having to park further away. Some of the proposed route changes also result in less service to some areas of campus. Transit can help lessen the impact of some of these changes by providing new services beyond what was identified in the BT Route Analysis Study. With these challenges in mind, the following objectives are proposed to frame transit-related improvements on the Virginia Tech campus:

- Continue to support Blacksburg Transit as an important mode of access to campus for the local community
- Facilitate transition to the Multi-Modal Transit Facility
- Develop additional shuttle routes to support changes to the parking system
- Balance service preferences (high frequency/high capacity) with cost and operational considerations

The addition of the MMTF creates challenges for parking by eliminating approximately 750

spaces from the surface lots around the Perry Street Garage. The current proposal is to reassign those vehicles to the Duck Pond Drive Lot. This change will move parkers approximately three-quarters of a mile from the existing lot, requiring at least a 15 minute walk back to the academic core. This change also impacts resident student parking, shifting those vehicles to either the Stadium Lot or Chicken Hill Lot.

In response to these changes, a Commuter Parking Shuttle is proposed, connecting those parking in satellite lots with the core of campus. This will be a new role for transit on the Virginia Tech campus. When developing parking shuttles, the following considerations are important:

- Parking shuttles require a high service frequency, especially during periods of peak demand. Peak service frequencies should be between 5 and 10 minutes, with off-peak levels around 20 minutes.
- These shuttles should provide a swift and direct connection between the parking area and desired destination. Individuals who have been shifted to remote parking already have a longer trip to make to their ultimate destination. The shuttle should operate using the most direct route with limited stops along the way.
- All parking shuttles should avoid the Drillfield and congested areas of campus to ensure the quickest, most reliable travel times. The variability in delays around the Drillfield and other congested areas would result in unpredictable shuttle schedules. On-time performance is important to all transit users, especially those who are trying to make a class schedule from a satellite parking location.
- Because of the nature of the location, parking lot shelters offering protection from the weather is key. Those waiting for the bus in a parking lot have no other option for staying dry or warm.
- Schedule information is important to those waiting for the shuttle. At the very least, a static display of the schedule should be available. Real-time information displays that show an arrival time for the next shuttle, or a map display of shuttle locations provides more useful information, enhancing user satisfaction. Other information that could be posted at bus stops includes key pedestrian routes and the destinations within a given walk. This can help users determine whether it would be faster to walk to their destination or wait for the shuttle.

The proposed shuttle route would connect commuter parking in the Duck Pond Drive Lot directly with the western MMTF, as shown in Figure 3-22. It would also provide a direct connection between the Duck Pond Drive Lot and the Life Sciences Precinct, as well as connecting the residential core with parking in the Stadium and Chicken Hill Lots. The route would have limited interaction with areas of heavy traffic or pedestrian activity, improving reliability. It is recommended that the route operate every 10 minutes during peak times (7:00 AM – 9:00 AM and 3:00 PM – 5:00 PM) and 20 minutes during off-peak times. The route should operate from 7:00 AM until 11:00 PM. The segment between the Duck Pond Drive Lot and Stadium Lot could operate on a reduced frequency (every 50 minutes) to reduce costs and respond to the lower demand for shuttle connections between the Stadium Lot and residential area of campus.

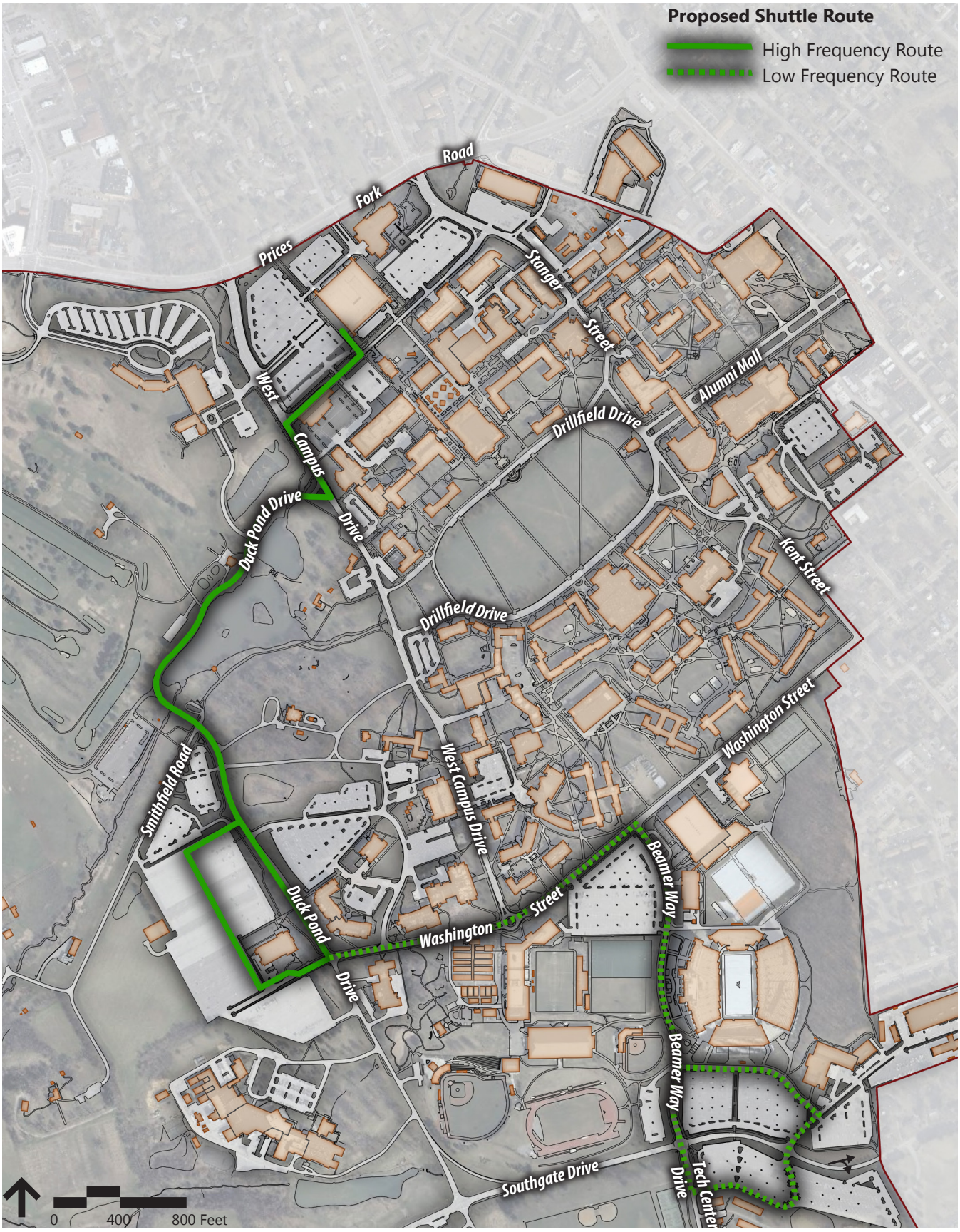


Figure 3-22. Proposed Parking Shuttle

Assuming the parking circulator is implemented as construction of the MMTF is started, but prior to the proposed route changes for BT, all primary destinations on campus would be accessible by transit as shown in Figure 3-23. The proposed Hokie Circulator would replace the existing Hokie Express and provide access to Oak Lane and destinations along West Campus Drive. It would also provide a second connection between the Duck Pond Drive Lot and the Life Sciences Precinct, as well as providing access to destinations around the Drillfield (i.e., Newman Library and Torgersen Hall) for those parking in the Duck Pond Drive Lot. The proposed CRC Shuttle would provide a second route connecting Chicken Hill and the Stadium Lot with campus, as well as providing a transit option for those living in residence halls along Washington Street to access the Drillfield.

When BT implements the proposed route changes, much of the campus and popular destinations still remain accessible via transit. The Parking Shuttle would provide the frequency connection for people parking in the Duck Pond Drive Lot and the North Precinct, with periodic connections to the Stadium Lot. The revised CRC Shuttle would provide a more frequent connection between the CRC and North Precinct. This increased frequency has been desired by those who currently use the service, because the current frequency is seen as a barrier to promoting travel between the two areas using transit. The new routing would also include a stop near the Virginia-Maryland College of Veterinary Medicine, which is currently not accessibly by transit.

The construction of the MMTF allows Virginia Tech to reduce the amount of bus traffic traveling through the interior of campus and around the Drillfield. This area becomes heavily congested during periods of class change due to the large volume of pedestrian activity traveling across campus. Removing most of the bus traffic from the Drillfield will improve both bus operations and pedestrian safety.

Currently, the accessibility around the campus is limited using transit. There is a lot of service focused around the northern end of campus and the Drillfield. The Hokie Express provides a connection between Oak Lane and the Drillfield. The proposed Hokie Circulator would replace the Hokie Express. This route serves a different purpose than either the Parking Shuttle or CRC Shuttle. This route is intended to provide coverage for the majority of campus as well as portions of downtown Blacksburg. The high frequency and longer service span is intended to allow people traveling greater distances than a reasonable walk would cover with access to those destinations. It will also function as a late night connection between the residential areas of campus and entertainment centers near Squires and downtown. Alternative concepts were explored that combined the circulator and parking shuttle purposes, but due to the different demand associated with each type of service the costs were prohibitive. One recommendation for the proposed Hokie Circulator is to eliminate the loop around the Drillfield. This change may introduce longer trips for some users, but should improve shuttle operations by avoiding the Drillfield.

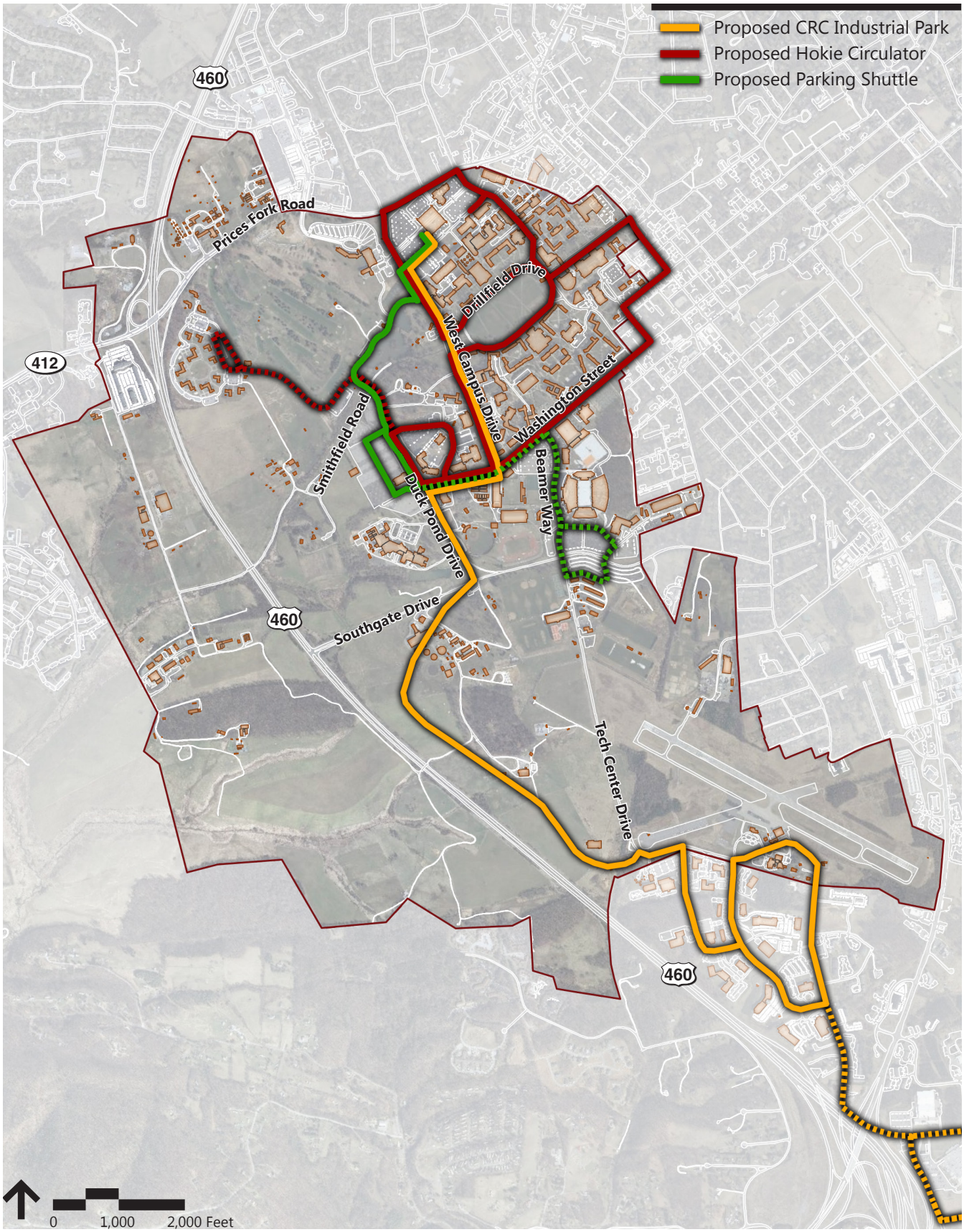


Figure 3-23. Proposed Parking Shuttle, Hokie Circulator, and CRC Shuttle.

Pedestrian Environment

A first step in improving the pedestrian environment on the Virginia Tech campus included developing a set of campus-wide crosswalk standards to be implemented at all marked pedestrian crossings. The PTMP team standards called out specifications for general crosswalks including high visibility pavement markings with Virginia Tech's new lighting standards.

The standard crosswalk illustrated in Figure 3-24 is a continental design with a 24-inch solid white crosswalk bar separated by a 24-inch gap. This type of design is more visible to drivers and also improves crosswalk detection for people with low vision and cognitive impairments. This design is the most common type of crosswalk on campus currently and would replace any of the older longitudinal crosswalks, which just include two parallel lines framing the crosswalk path. The interface between the pedestrian sidewalk and crosswalk should have a curb ramp with detectable warning domes and contrasting colors are appropriately incorporated at each location, in accordance with the latest provisions of the Americans with Disabilities Act (ADA).

The high volume crosswalk is identical to the standard crosswalk with the exception of an in pavement marker that can be installed at midblock locations. The raised "State Law Yield to Pedestrians" sign result in greater vehicle yield compliance on low speed roads. These signs should be installed at midblock crosswalk locations where daily traffic volumes exceed 500 vehicles per day.

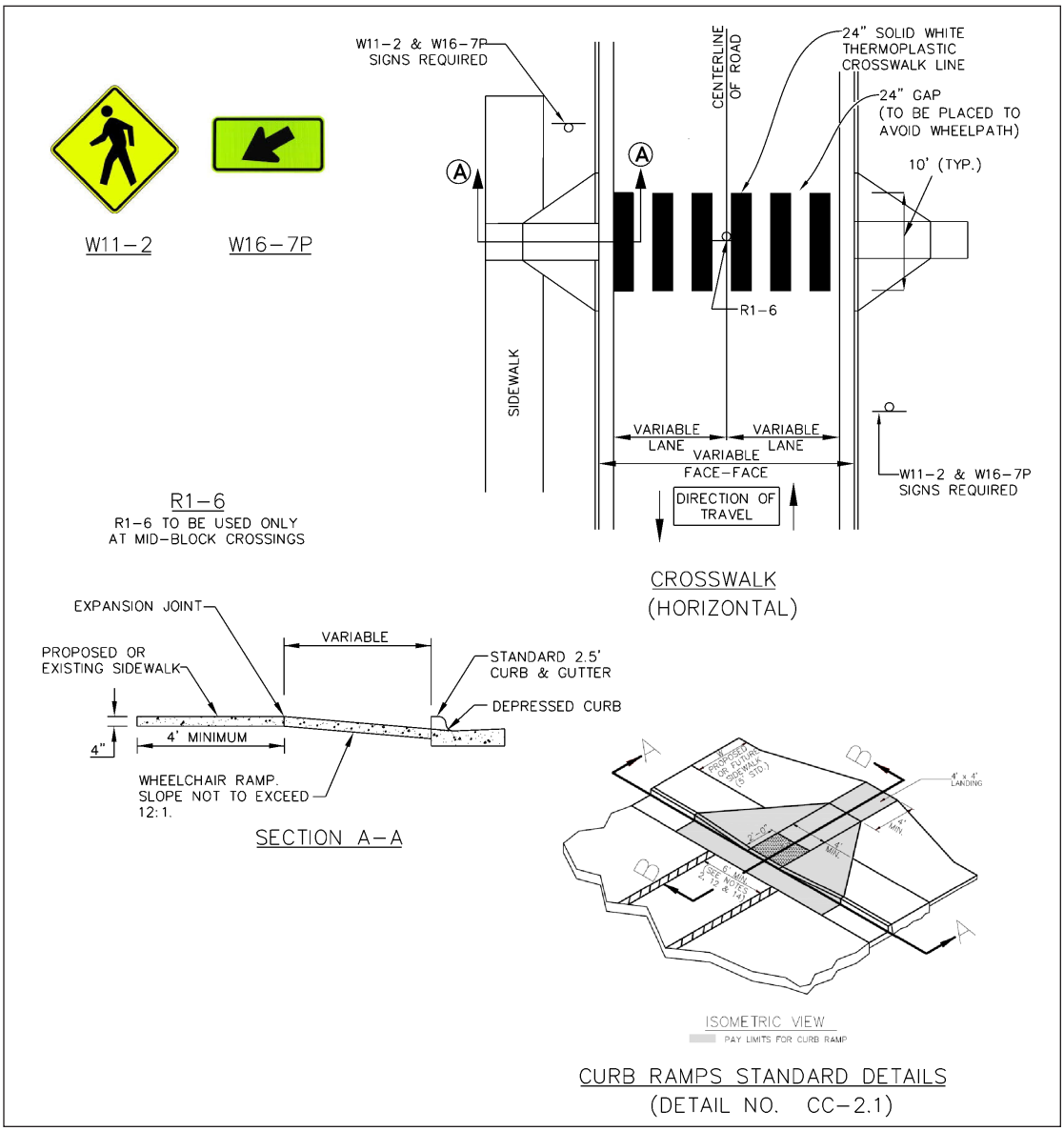


Figure 3-24. Proposed Standard Crosswalk

At high volume crossing locations where greater speed enforcement is beneficial, a third standard incorporates a raised crosswalk or speed table design. Speeds tables are similar to speed humps which have a gradual slope to slow vehicles and include a flat section on top to accommodate pedestrian crossing movement. Lower vehicle speeds improve pedestrian safety and the elevated crosswalk and accompanying pavement markings make the crossing move visible to drivers. A decorative surface material may be used to accentuate the crossing. Midblock crossing locations with the highest number of pedestrians along West Campus Drive, Washington Street and Drillfield Drive would be likely candidates for these crosswalks. The latest campus lighting standards should also be included at each crosswalk along with curb extension, median islands or other features as deemed appropriate at each location. With these standards in place, retrofitted and newly installed crosswalks will be similar to one another, creating a continuity and familiarity for both pedestrians and drivers. **Appendix C** contains additional details on each of these standards. Figure 3-25 shows how each of the three crosswalk types can be accommodated along a section of West Campus Drive.

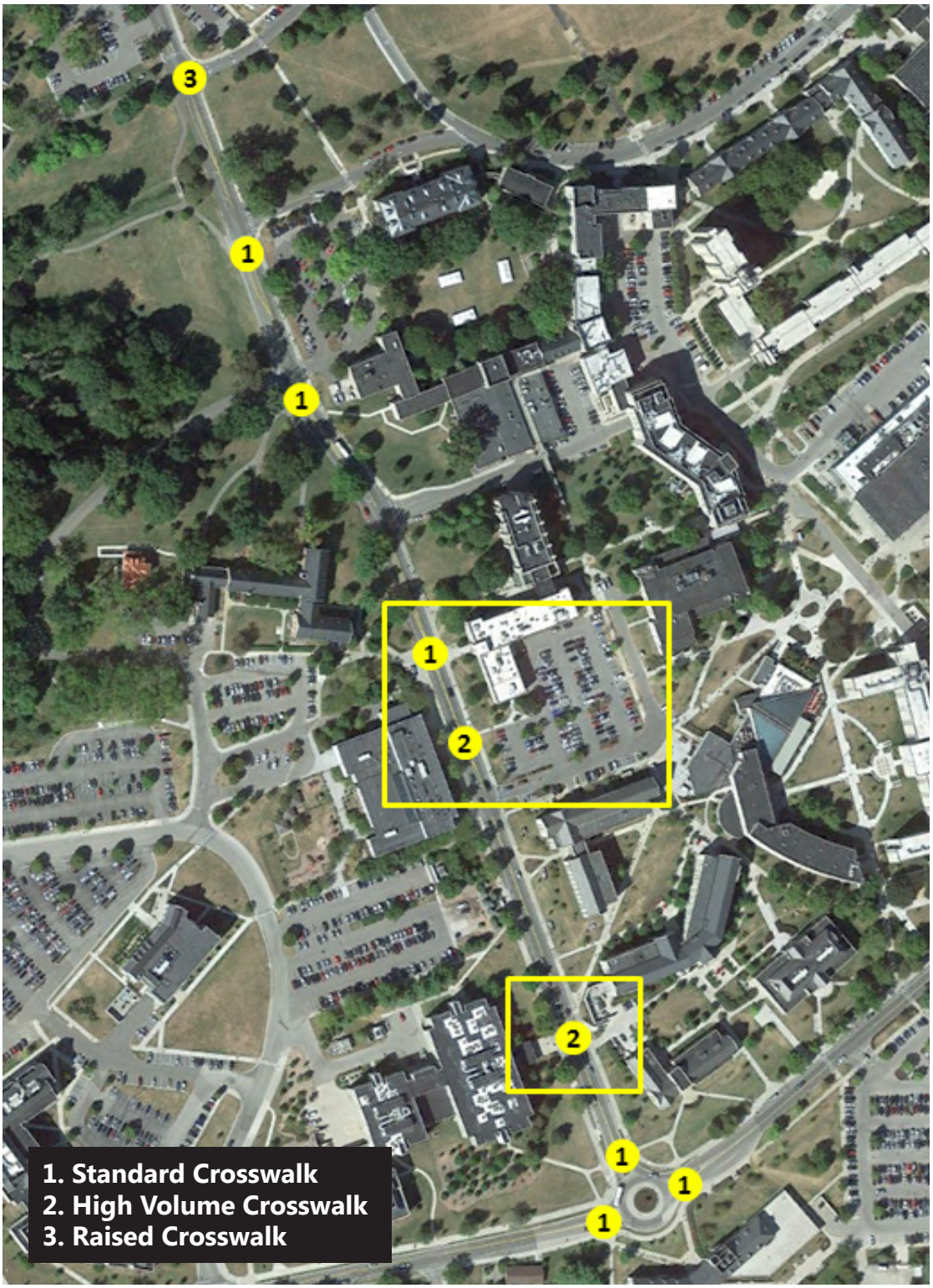


Figure 3-25. West Campus Crosswalk Suggestions

As the sidewalk network extends away from the high volume crosswalks, opportunities to further reduce vehicle conflicts should be explored. There is a high demand pedestrian path east of Wallace Hall that travels directly through the Engel Parking Lot towards Dietrick Hall and other major destinations on the residential side of campus. Figure 3-26 illustrates the heavy use of the path, as shown by the orange lines, from the MOVES app and how the parking lot could be reconfigured so that pedestrians cross only a single aisle rather than three aisles.

Figure 3-26. Modification to Engel Lot to Improve Walkability

The shift in commuter parking from the northern campus lots to the Duck Pond Drive lots result in an increase in walking between those lots and the academic core north of the Drillfield. A series of pedestrian network enhancements are suggested to address major pedestrian movement between the commuter parking on Duck Pond Drive and the North Academic Precinct, as shown in Figure 3-27.

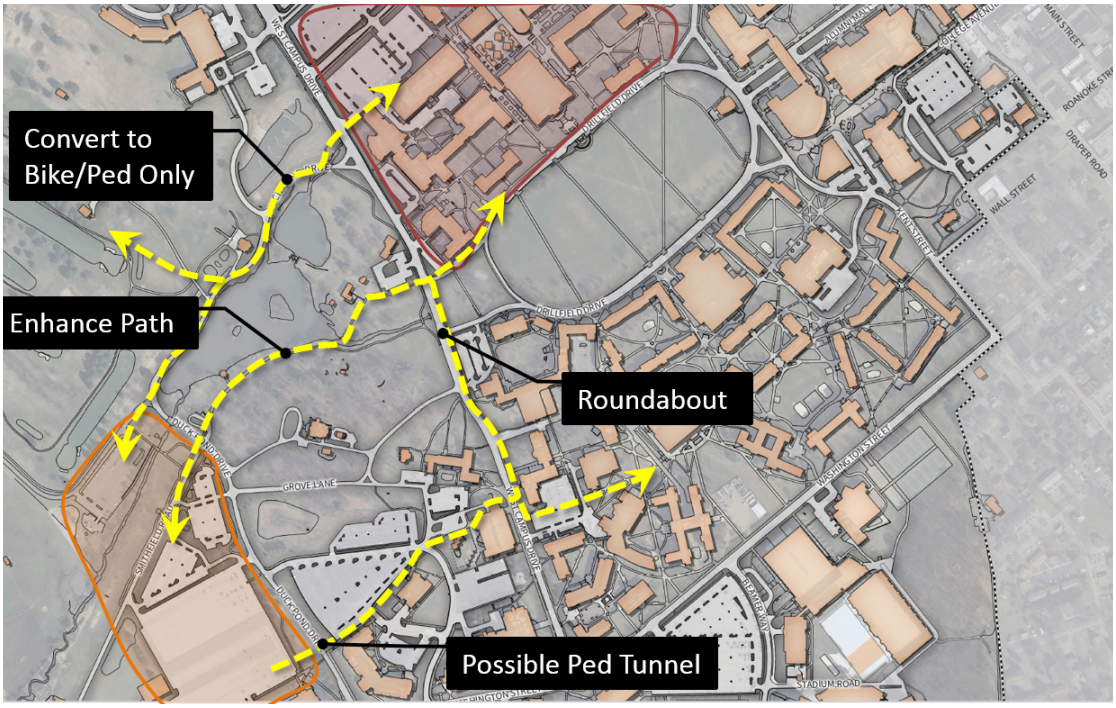


Figure 3-27. Path Connectivity between Parking to Academic Destinations

Enhancements to these existing travel paths include:

- General enhancements to the multi-use path that extends from the West Campus Drive westward to the south of Solitude and the Duck Pond, terminating at Duck Pond Drive. The PTMP team suggest a share-use path that includes a minimum ten foot bidirectional bicycle path adjacent to a minimum eight foot walking/jogging path. Additional amenities such as benches, pedestrian scale lighting, and retaining walls with space for additional seating could be incorporated along the path as depicted in Figure 3-28.
- Conversion of a portion of Duck Pond Drive to a pedestrian/bicycle only path. As discussed in the roadway improvements section, a new location roadway paralleling Duck Pond Drive to the west is proposed; once vehicle traffic is diverted to the new facility, the northern segment adjacent to the pond can be retrofitted to be a shared-use path. Pedestrians and bicyclists would therefore also have this option to the north of the pond when travelling between parking destinations west of Duck Pond Drive and the academic core.
- Drillfield Drive regularly serves all travel modes: vehicles, transit, pedestrians and cyclists. Over 8,000 students live in residence halls south of the Drillfield and need to walk or bike across it to reach the academic core; on-street parking, bus boarding, drop-offs and cut-through traffic all contribute to the heavy vehicular volumes. This leads to a high number of conflicts between travel modes. The University is presently investigating pedestrian safety enhancements such as curb extensions and additional markings and signage along Drillfield Drive to improve pedestrian safety. In addition, the University should consider managing parking on the Drillfield to limit parking turnover and "hunting" for spaces along that route. The parking restrictions around Drillfield Drive are proposed in an effort to reduce traffic on Drillfield Drive and reducing pedestrian conflicts. These conflicts are not localized to crosswalks or intersections due to the nature of the Drillfield and the circulating roadway's usage. By changing the parking allowances on this loop road, the number of circulating cars searching for parking would be reduced, resulting in fewer pedestrian conflicts.

  A concept for regulating entry and exit to Drillfield Drive through a gate was considered, as well as completely disconnecting a section of Drillfield to any vehicular traffic; however, these ideas were ultimately dropped as the negative impacts seemed to outweigh the benefits. The need for general, accessible, and visitor parking and drop-offs to central Drillfield destinations such as Burruss Hall, War Memorial Gymnasium, the April 16 Memorial were specifically identified as barriers to a gate system. The turnaround locations, gate aesthetics, and need for cross-campus road connections were also identified as negative impacts.
- In an effort to improve the pedestrian experience for all users, it is recommended that the University determine areas where individuals with disabilities are substantially rerouted due to topography and upgrade these routes to meet current ADA standards. With the numerous academic buildings north of the Drillfield, ADA compliant access to these buildings should be maintained. As part of the routine maintenance plan for pathways across campus, a program to upgrade these pathways to achieve universal access should be established. This will allow the improvements to take place over time. It is also critical to maintain accessible parking in the interior of campus. As mentioned in the parking discussion, state-licensed vehicles often park in these accessible spots since violations by these vehicles cannot be enforced, ultimately reducing the availability of accessible parking to those who need it.

Figure 3-28. Duck Pond Path Enhancements

Bicycle Environment

To support and further encourage a culture of bicycling to, from, and on campus, this Plan recommends a number of enhanced bicycle accommodations.

Washington Street

As previously described, Washington Street has a very narrow, 3-foot bike lane along part of the facility, eastbound only between Beamer Way and Kent Street. There is on-street parking in the westbound direction, which causes conflicts between riders in the westbound lane and those parking. The Plan recommends to restripe the cross section along Washington Street, from Duck Pond Drive to Kent Street, to accommodate a 7.5-foot buffered bike lane in both directions with narrowed travel lanes (11 feet). This would result in the loss of approximately 75 on-street parking spaces. Figure 3-29 illustrates this cross section.

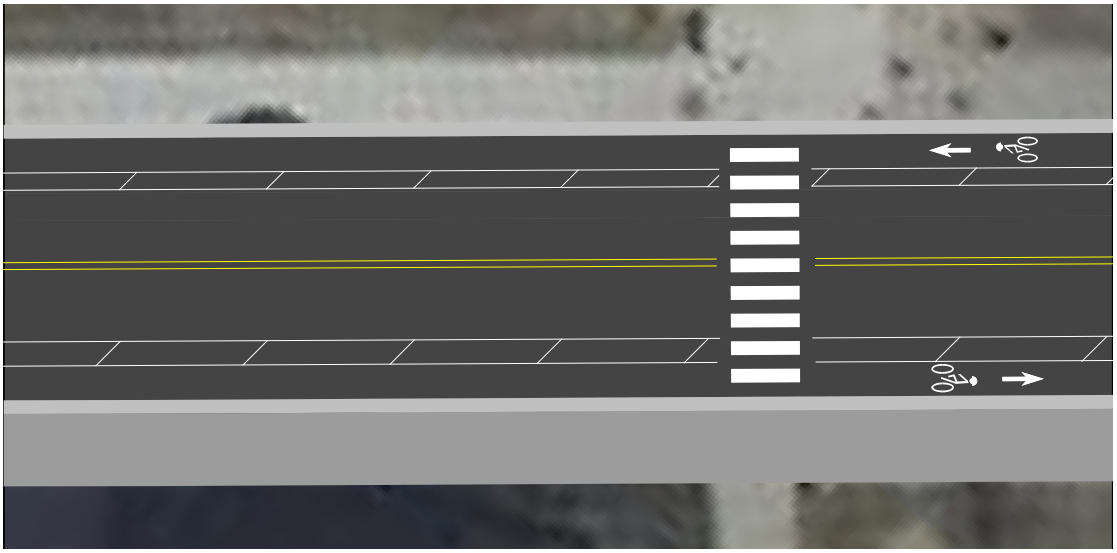
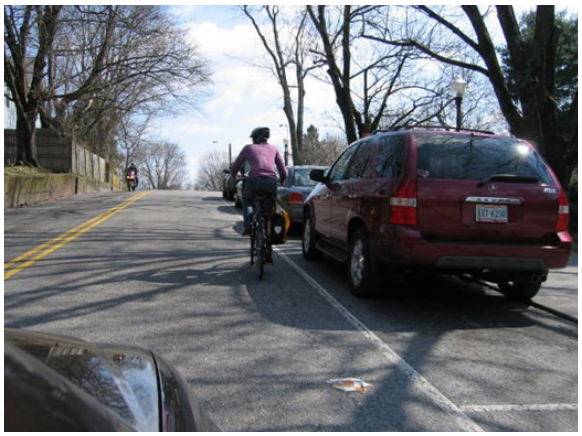


Figure 3-29. Washington Street Bicycle Lanes Illustration

West Campus Drive

This facility has marked bike lanes along much of its length; however, on-street bike lanes should be striped for the southbound section north of the Drillfield as well. The center lane hatching and left-turn lanes south of Perry Street may be removed once the Western Perimeter Road replaces Duck Pond Drive. The existing space can then be re-purposed to accommodate a southbound bicycle lane along its length and/or a median island at prominent crosswalk locations.

Kent Street



Kent Street, which runs north-south from Washington Street to Drillfield Drive, does not currently have exclusive bicycle facilities. Additionally, on-street parking, a steep grade, and narrow lanes impede cyclists, especially those climbing southbound towards Washington Street, as shown in the photo to the right. It is recommended to remove the approximately 10 on-street parking spaces between Washington Street and Wall Street and restripe that pavement to accommodate a southbound climbing lane for cyclists (Figure 3-30). This measure would separate the slower moving bikes from motor vehicles, as well as remove the risk of cyclists being hit or impeded further by vehicles attempting to parallel park, or by car doors being opened. In the northbound direction, shared use markings, or "sharrows" should be used to improve awareness of cyclists and allow high speed cyclists travelling downhill to travel in center of the through lane at normal vehicle speeds.

Figure 3-30. Kent Street Bicycle Lane Illustration

Drillfield Drive

As previously discussed, Drillfield Drive presents unique challenges for the safe interaction of vehicles, buses, pedestrians and bikes. Cyclists are often seen riding in both directions along Drillfield Drive, as well as riding on the sidewalk to avoid lengthier designated bike routes. Recommended improvements, shown in Figure 3-31 to the bicycle accommodations on Drillfield Drive have two major components. First, consider buffered bicycle lanes in the reverse direction along the inside of the Drillfield Drive loop. The buffered bike lanes give cyclists a clear indication of where to ride, increasing driver expectancy for both cyclists and motor vehicle drivers. Second, switch parking spaces to back-in angle parking along the outer edge of the loop. This parking geometry allows drivers a better view of oncoming bikes and vehicles when exiting the parking space. Finally, adjustments to trailheads at crosswalks should be made to bring awareness to the newly designated bike lanes.

Figure 3-31. Drillfield Drive Parking and Bicycle Lane Reconfiguration

Bicycle Storage

As detailed in the 2014 Virginia Tech Bike Parking Plan, one of the most common obstacles for cyclists is the lack of appropriate parking at their destination. From that report: "Adequate bicycle parking encourages people to ride, presents a more orderly appearance for buildings, prevents damage to campus infrastructure (e.g. trees and street furniture), and keeps bicycles from falling over and blocking the sidewalk. Most importantly, bicycle parking helps legitimize cycling as a viable transportation mode by providing parking opportunities equal to motorized modes." With that in mind, this Plan supports the improved bike parking to address the current issues of insufficient storage capacity, lack of sheltered storage, and old/ outdated racks.

Implementing the recommendations of the Virginia Tech Bike Parking Plan would greatly enhance the overall bicycle environment on campus. The primary accommodations to be implemented include:

- Replacing all "staple" and "triangle" storage racks with inverted U-rack designs

- Constructing additional bike parking as funding becomes available
- Prioritizing districts of campus for enhancements based on areas high use and known deficiencies, with residential buildings taking precedence
- Exploring opportunities to establish large bike parking corrals around campus

Enhanced Pavement Markings

There are opportunities as part of roadway improvements or as standalone projects to update pavement markings along designated bike facilities. These markings include:

- Green thermoplastic markings at spot locations, which are universally understood to indicate cyclist usage of a facility. Bicycle lane conflict areas, where cyclists must travel through intersections or between a through and right-turn lane, are locations where green pavement could be added between the white bicycle skip lanes. Stanger Street and West Campus Drive immediately south of Prices Fork Road are logical locations for this type of treatment.
- Bike sharrows which indicate that bikes and motor vehicles should share the center of the lane, not shifting the cyclists to the outside to allow vehicles to pass. Drillfield Drive and Kent Street are two locations where these types of markings could be added.
- Bike lane and arrow markings where exclusive bike lanes are present to improve driver awareness of the presence of cyclists on campus.

Enhanced Bicycle Pathways Through Residential Areas

Many bicyclists experience considerable difficulty riding through campus due the changes in topography and associated stairways. A close inspection of the VT MOVES bicycling activity (Figure 3-32) shows that when cyclists do travel through the residential areas, they often travel in the grass around staircases creating "goat paths" while others likely dismount and then carry their bicycles up and down stairs. The University should strive to connect all the residence halls to an established central bicycle pathway that connects to the Drillfield pathways in a relatively direct route that minimizes conflicts with pedestrians. A potential central bicycle route is illustrated in Figures 3-33. The blue circles illustrate areas where more detailed evaluations would be required to determine if each area can be re-graded to provide a more direct route rather than the "switch-back" paths indicated by a dashed line.

Figure 3-32. Bicycle Routes Through Residential Areas of Campus

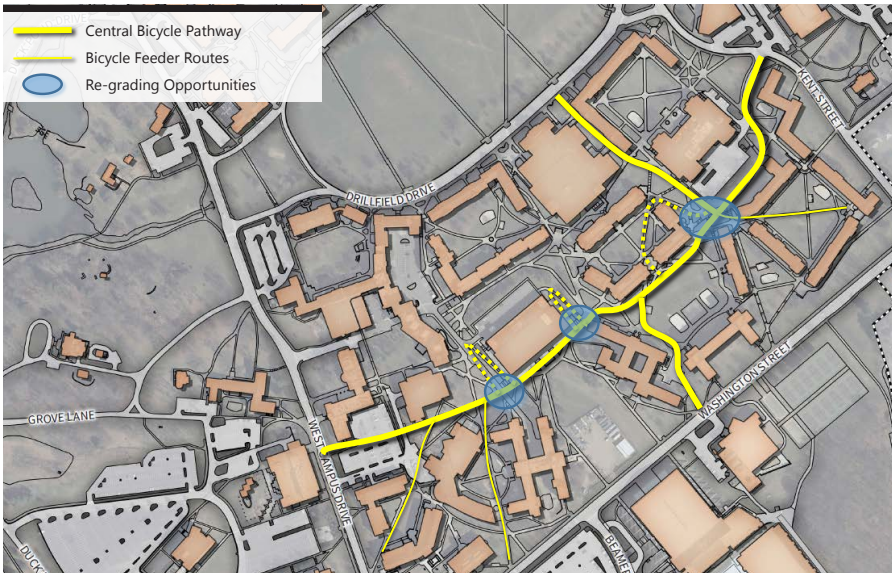


Figure 3-33. Potential Central Pathway

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4 Summary Recommendations

The Virginia Tech Parking and Transportation Master Plan serves as a powerful tool for the University for working towards an effective, safe and efficient transportation system on campus. Throughout the report, each transportation system and its specific needs has been discussed; however, as previously mentioned no single system can stand on its own and many proposed improvements span multiple travel modes, resulting in a truly integrated transportation system. This section summarizes the proposed improvements for each individual transportation system. Following the summaries, Table 4-1 provides an implementation matrix with details on several of the specific improvements including cost, priority rank and implementation timeline. Finally, Figure 4-1 illustrates several of the larger scale infrastructure improvements recommended as part of the PTMP.

Roadway Recommendations Summary

The roadway enhancements are critical in the larger PTMP as they integrate a number of various modes and often are the most visible improvements to a system. Below is a summary of the infrastructure improvements recommended for the roadway network on Virginia Tech's campus.

- **Washington Street at Beamer Way:** Convert this stop controlled intersection to a roundabout, integrating the drop off loop for Cassell Coliseum into the design.
- **Washington Street at Duck Pond Drive:** Construct a roundabout at this location to improve operations; integrate pedestrian crossings into the design.
- **West Campus Drive at Drillfield Drive:** Redesignate the existing separated ingress/egress roadways; the existing egress driveway onto West Campus Drive becomes a two-way bike path while the existing ingress driveway becomes a two-way motor vehicle roadway, tying to West Campus Drive with a new roundabout. As with the Duck Pond Drive roundabout, pedestrian crossings should be included in the design to maximize the integration of pedestrians and cars at this location.
- **Western Perimeter Road Construction:** Construct a new roadway parallel to West Campus Drive between Prices Fork Road and the Southgate Connector with appropriate peripheral improvements to facilitate connections to parking and academic hubs.
- **Stanger Street at Perry Street:** The Perry Street legs of this intersection are offset by about 150 feet along Stanger Street. The western leg is being converted into a driveway for the proposed MMTF, and the intersection with Stanger Street should be reconstructed as a roundabout. The eastern leg, which connects to Turner Street, should be paired with Old Turner Street to the south to make a one-way pair; Perry Street would operate westbound only.

Parking Recommendations Summary

The University has a robust parking system that has designated parking areas for three major user types, including Residents, Commuter/Graduates, and Faculty/Staff. It is essential to create a system that effectively supports future demand and addresses management/operation issues. Below is a summary of the analysis conclusions and parking master plan recommendations for Virginia Tech.

Existing Parking Conditions

- A total of 12,109 spaces were analyzed within the central campus area.
- Parking on campus is designated as follows: Faculty/Staff (30%), Commuter/Graduate (35%), Resident (31%), and Other (4%).
- There is currently a surplus of approximately 2,900 spaces during the typical peak parking period (noon on a weekday).

Future Parking Conditions

- Future development plans on campus will displace approximately 1,400 spaces in the next 10 years (2025).
- There is a projected increase of approximately 1,200 vehicles and a surplus of 290 spaces

in 2025 during the peak parking period, without the implementation of aggressive TDM strategies.

- Parking assignments and zones will need to be reassigned to prevent a deficit in parking for Commuter/Graduate and Faculty/Staff parkers.
- Parking needs to be reallocated to effectively support future demand.

Future Parking Allocation Strategy

- The reassignment of designated parking for each permit type (i.e. F/S, C/G, and R) should follow the current parking designation structure, which assigns the more convenient parking areas to the high demand and more parking dependent users and the less desirable parking areas to users who are less dependent on their vehicle to access and traverse campus.
- As parking on the northern end of campus becomes displaced, C/G parkers should be reassigned to the Duck Pond Drive and Smithfield Road Lots.
- As more C/G parkers are moved into the Duck Pond Drive Lot, Resident parkers should be reassigned to the Chicken Hill Lot and Stadium Lot.
- The effective reassignment of parking will require consistent monitoring of parking utilization and adjustments when future developments come online.

Future Parking Facility

- Even though additional parking is not necessary to support future demand, the University could construct a future structure that is financially sustainable and located in a high demand, high turnover area that has an hourly, daily and proximate permit parking rate structure.
- The Squires Lot or Architectural Annex site appears to be the most viable location for a future parking facility, as this area has high demand for parking, borders Downtown Blacksburg (i.e. Main Street), and may be needed to support the future location of a Creativity/Innovation District.
- Parking Market and Site Feasibility studies should be conducted for this site to determine the ideal location, size, rates, financial outlook, and management strategy for the facility.

Transportation Demand Management Strategies

- The University currently has a comprehensive TDM program in place that is managed by the Alternative Transportation Office, which should continue to be well supported with funding, planning and leadership.
- There are additional strategies that can be implemented to build on the current TDM plan, which include a bike-share program, continued investment in student housing, campus layout improvements, and parking pricing and management.
- Consider locating bike share stations at the peripheral parking facilities.

Parking Permit Rate Structure

- C/G and R permit rates are average compared to peer Universities, but the F/S permit rate is on the lower end of the spectrum.
- A tiered permit pricing system should be implemented on campus to help reduce traffic issues and frustration among users in locating an available space.
- For C/G permits the North Campus parking facilities, Litton Reaves Lots, and Coliseum Lot

would be designated as proximate parking, while the Duck Pond Lots, Track/Fieldhouse Lot, and Smithfield Road Lots would be considered standard parking.

- Based on the current parking demand for discounted F/S permits in the Chicken Hill Lot, it may make sense to only offer proximate parking in high demand areas.
- A select number of proximate Resident parking permits could be offered in the Coliseum Lot.

Visitor Parking

- The University should begin to charge for Visitor parking, and Visitor parking spaces should be designated throughout campus.
- Parking payment stations (i.e. pay-and-display, pay-by-plate, pay-by-space, and pay-by-phone) with hourly and daily rates should be provided adjacent to Visitor parking along with the option to purchase a daily visitor parking pass.
- Proper signage should be implemented around campus to direct visitors to the designated parking areas.

State Vehicle Parking

- Existing parking policy should establish that state vehicles park only in designated parking spaces, which will be provided in parking facilities throughout campus.

Parking Demand Reduction Strategies

- Based on the future parking supply/demand analysis and the negative financial implications, it is not suggested or necessary to limit the number of Resident parking permits issued or to implement off-site parking to support future demand, unless it is an essential environmental sustainability and space management goal of the University to reduce parking demand and vehicle trips.

Transit Recommendations Summary

Blacksburg Transit provides safe and reliable transit connections to multiple campus destinations from areas of Blacksburg and the surrounding region. Recent trends in the greater use of transportation alternatives by younger populations, combined with the University's growth and support of transit, has led to a higher level of bus service to campus. In response to these changes, Blacksburg Transit, in partnership with Virginia Tech, is constructing a new Multi-Modal Transit Facility (MMTF) on campus with expanded capacity and amenities for BT riders. The completion of the MMTF will have many benefits, but will also create some new challenges in terms of moving people around the main campus as a result of its displacement of parking and associated route changes. The following additional shuttle route is proposed to support changes to the parking system.

- Provide a Commuter Parking Shuttle to link the major remote parking areas to the academic core area of campus. The route will provide rapid and direct movement for commuting students traveling to the academic areas north of the Drillfield by connecting the Duck Pond Drive, Stadium and Chicken Hill Lots to the MMTF.

Pedestrian Recommendations Summary

Pedestrians are a major component of any university setting, and Virginia Tech is no exception. Providing effective and safe pedestrian amenities and delineations is very important to the wellbeing of the transportation system as a whole. The proposed improvements for the pedestrian network are summarized below.

- Develop campus-wide crosswalk standards. This task was completed as part of the PTMP effort, and creates a normalized, recognizable standard for all campus crosswalks including markings, lightings, raised crosswalk design as needed and ADA compliant ramp designs. This familiarity will help not only pedestrians recognize safe places to make crossings, but will raise driver awareness of pedestrian presence as well.
- Enhance existing multi-use path south of the Duck Pond. Provide a dedicated two-way bicycle path adjacent to a wide walking/jogging path.
- Conversion of Duck Pond Drive to a pedestrian/bicycle only path. As part of the Western Perimeter Road project, Duck Pond Drive is proposed for realignment to better connect to the Perimeter Road and serve future buildings. Once this realignment is completed, the existing Duck Pond Drive can be retrofitted into a mixed-use path, providing a new connection between Duck Pond Drive Parking areas and the academic core.
- Parking Management on Drillfield Drive. Drillfield Drive, which loops the Drillfield has regular conflict between pedestrians, vehicle and bikes as it acts as a link between academic core to the north and more residential buildings to the south. If parking was more regulated on Drillfield Drive, there would be less vehicle traffic, reducing pedestrian conflicts.
- General ADA compliance improvements. As part of routine maintenance, the University should determine areas where individuals with disabilities are substantially rerouted due to topography and upgrade these routes to meet current ADA standards.

Bicycle Recommendations Summary

Bicycling is becoming a more and more attractive travel mode on college campuses, specifically for those who live just off campus or commute to campus and must park in satellite lots. The proposed enhanced bicycle accommodations are summarized below.

- **Washington Street:** restripe the cross section along Washington Street, from Duck Pond Drive to Kent Street, to accommodate a 7.5-foot buffered bike lane in both directions with narrowed travel lanes (11-foot). While this would result in the loss of approximately 75 on-street parking spaces, there is great benefit in efficiency and safety for cyclists.
- **West Campus Drive:** complete bicycle lane network where there are existing gaps in the network.
- **Kent Street:** Remove the approximately 10 on-street parking spaces between Washington Street and Wall Street and restripe that pavement to accommodate a southbound climbing lane for cyclists.
- **Drillfield Drive:** As mentioned in the Pedestrian Recommendations section, the Drillfield presents unique challenges for the safe interaction of all travel modes. There are three

main bicycle improvements for this high volume area:

- Consider buffered bicycle lanes in the reverse direction along the inside of the Drillfield Drive loop giving cyclists a clear indication of where to ride.
- Parking geometry should be switched to back-in angle parking along the outer edge of the loop, allowing for better views by drivers when exiting the parking space.
- Adjust trailheads at crosswalks to bring awareness to the newly designated bike lanes.

- In addition to geometric changes and amenities, this plan supports the findings of the Virginia Tech Bicycle Parking Plan, which includes:
  - Replace all "staple" and "triangle" storage racks with inverted U-rack designs
  - Construct additional bike parking as funding becomes available
  - Prioritize districts of campus for enhancements based on areas high use and known deficiencies, with residential buildings taking precedence
  - Explore opportunities to establish large bike parking centers around campus
- As part of individual projects, effort should be made to update pavement markings related to bicycles including:
  - Green thermoplastic markings at spot locations
  - Bike sharrows
  - Bike lane and arrow markings where exclusive bike lanes are present
- Enhance bicycle pathways through the residential areas of campus south of the Drillfield. This includes removing stairs wherever re-grading can allow for an ADA-compliant path. Establish an east-west central accessible pathway that connects to the Drillfield in a relatively direct route that minimizes conflicts with pedestrians.

Table 4-1. Implementation Matrix

Category	Location	Type	Description	Jurisdiction	Priority	Timeframe	Approximate Construction Cost	Issues Addressed (3-High to 1-Low)			
								Traffic Operations	Safety	Bike/Ped Mobility	Livability-Aesthetics
Roadways	Washington Street at Beamer Way	Roundabout	Construct a roundabout at the intersection	Virginia Tech	**High**	**Medium**	$1,735,000	2	2	2	1
	Washington Street at Duck Pond Drive	Roundabout	Construct a roundabout at the intersection	Virginia Tech	**Medium**	**Medium**	$1,794,000	2	2	1	1
	Drillfield West End	Roundabout and widening to two-way approach	Construct a roundabout at the southern Drillfield Drive intersection	Virginia Tech	**Medium**	**Long**	$1,703,000	1	2	2	2
	Western edge of campus	Western Perimeter Road	Construction and opening of Western Perimeter Road	Virginia Tech / VDOT / Town of Blacksburg	**High**	**Long**	$34,400,000	3	2	2	1
	Smithfield Road	Paving between Plantation Road and Duck Pond Drive	Paving gravel portion of Smithfield Road between Plantation Road and Stroubles Creek	Virginia Tech	**Low**	**Long**	$1,309,000	2	1	1	1
	Stanger Street at Perry Street (north)	Roundabout	Construct a three-leg roundabout at the intersection	Virginia Tech / Blacksburg Transit	**Medium**	**Medium**	Already Funded	2	2	2	1
	Perry Street and Old Turner Street between Stanger Street and Turner Street	One-way Pair	Convert the current Perry Street and Old Turner Street into a one-way pair	Virginia Tech	**Low**	**Long**	$1,465,000	1	2	2	1
Pedestrians	Duck Pond Path	Multi-use Path	Upgrade the exsting path along Duck Pond to a multi-use facility accommodating pedestrians and bicyclists.	Virginia Tech	**High**	**Short**	$875,000	0	1	3	3
Bicycles	Washington Street (between Duck Pond Drive and Kent Street)	Bicycle Lane (each direction)	Remove non-ADA parking along Washington Street and provide a buffered bicycle lane in both directions	Virginia Tech	**Medium**	**Short**	$462,000	1	2	3	1
	Kent Street (between Wall Street and Washington Street)	Bicycle Lane (one direction)	Remove parking and provide a single climbing bicycle lane along Kent Street between Wall Street and Washington Street	Virginia Tech / Town of Blacksburg	**High**	**Short**	$39,000	1	2	2	1
	Drillfield Drive	Bicycle and Parking Accommodations	Switch vehicle parking to the outside edge of Drillfield Drive to provide a contraflow bike lane along the perimeter of the Drillfield.	Virginia Tech	**Medium**	**Medium**	$343,000	1	2	3	2

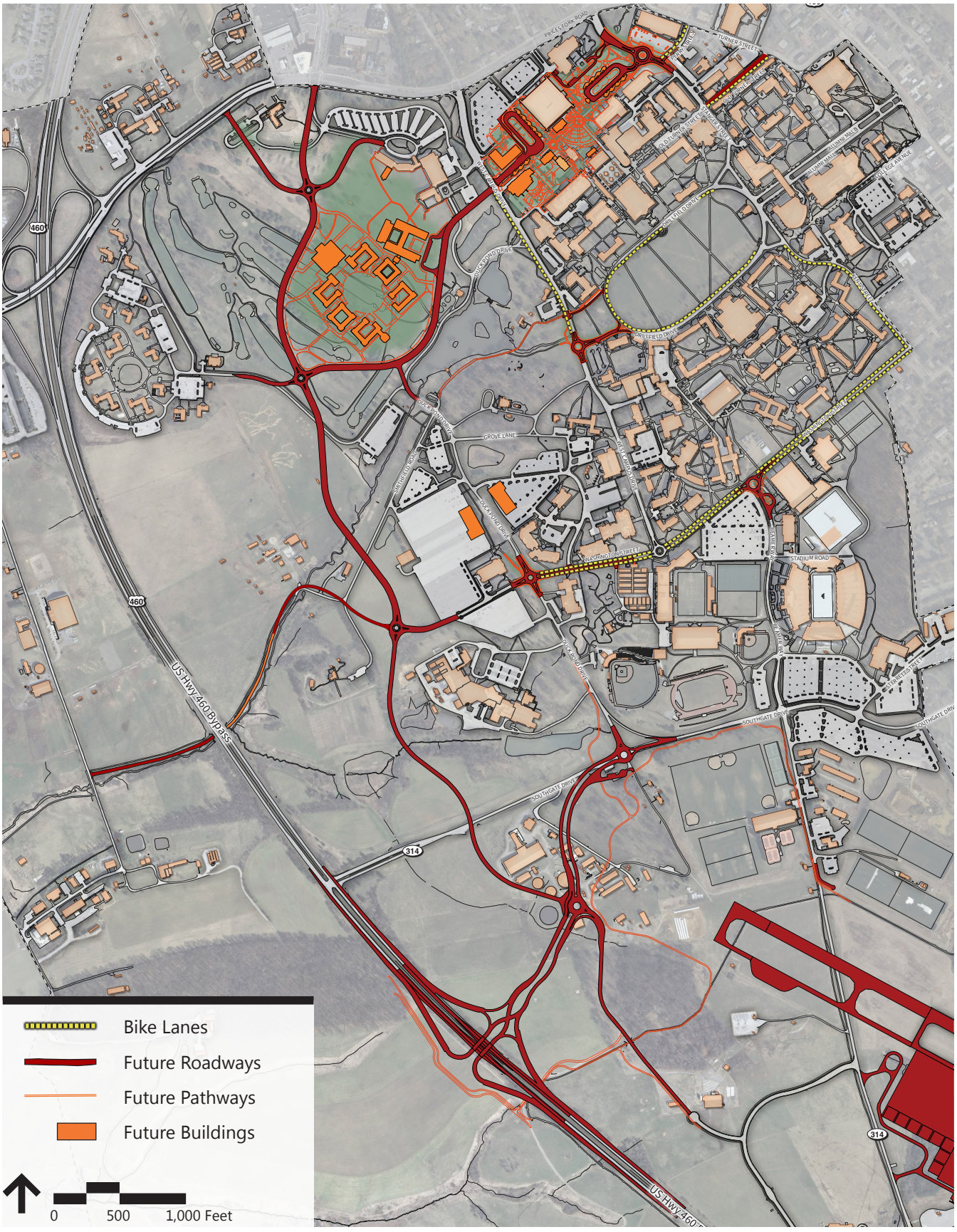


Figure 4-1. Future Infrastructure Recommendations Summary

A Appendix A – Traffic Analysis

Detailed Level of Service Results Summary

Intersection and Approach	Traffic Control	Existing (2015)		No-Build (2025) without Western Perimeter Rd		Build (2025) with Western Perimeter Rd and All Improvements	
		AM	PM	AM	PM	AM	PM
Prices Fork Rd and W Campus Dr/Woodland Dr	Signalized	**C (28.8 sec/veh)**	**D (44.1 sec/veh)**	**D (53.2 sec/veh)**	**E (79.1 sec/veh)**	**C (23.6 sec/veh)**	**D (50.9 sec/veh)**
Eastbound		C-30.4	E-77.1	E-65.8	F-104	C-32.2	F-80.1
Westbound		B-16.2	C-29	C-28.8	F-105.5	A-7.7	D-42.2
Northbound		E-57.7	C-28.2	F-88.6	C-29.5	E-55.6	C-29.1
Southbound		E-58	D-48	F-88.3	E-63.4	D-52.7	D-53.1
Prices Fork Rd and McBryde Dr/Prices Fork Garage	Unsignalized	-	-	-	-	-	-
Northbound		E-48.9	E-43.6	D-29.1	F-84	D-26.6	F-62.2
Southbound		F-80.4	E-42.1	F-80.4	F-211.1	E-48.7	F-77.6
Prices Fork Rd and Toms Creek Rd/Stanger St	Signalized	**C (33.3 sec/veh)**	**C (32.3 sec/veh)**	**D (38.2 sec/veh)**	**D (44.8 sec/veh)**	**C (27.4 sec/veh)**	**C (34.9 sec/veh)**
Eastbound		C-22.2	B-19.7	B-16.2	C-32.7	B-13.4	C-24.3
Westbound		C-31.6	D-36.5	D-38	D-52	C-27.9	D-38.8
Northbound		C-27.8	D-40.6	D-42.5	D-47.6	C-29.4	D-38.5
Southbound		D-51.2	D-47.5	E-65.4	E-60.9	D-46.6	D-50.9
Stanger St and Perry St (West)	Unsignalized/ Roundabout	-	-	**A (6.1 sec/veh)**	**A (9.4 sec/veh)**	**A (6.1 sec/veh)**	**A (9.3 sec/veh)**
Eastbound		B-10.8	C-15	A-4.8	A-5.4	A-5	A-6.1
Northbound		-	-	A-6.4	B-11	A-6.1	B-10
Southbound		-	-	A-5.8	A-7.1	A-6.2	A-8.5
Stanger St and Perry St (East)	Unsignalized	-	-	-	-	-	-
Westbound		A-9.8	B-12	A-9.8	B-12.8	A-9.6	B-12.2
Washington St and Kent St	Unsignalized	**B (11.5 sec/veh)**	**D (28.5 sec/veh)**	**C (16.1 sec/veh)**	**E (42.1 sec/veh)**	**C (15.3 sec/veh)**	**E (38.4 sec/veh)**
Eastbound		B-10.9	E-41.4	B-12.7	F-64.5	B-11.8	F-62.6
Westbound		B-12.8	C-24.5	C-20.9	D-34	C-19.4	C-24.3
Northbound		B-10.7	B-14.5	B-12.5	C-15.9	B-12.2	B-14.9
Southbound		A-9.3	C-16.8	B-10.7	C-17.9	B-10.3	C-15.7
Washington St and Beamer Way	Unsignalized/ Roundabout	-	-	-	-	**B (10.3 sec/veh)**	**C (18.8 sec/veh)**
Eastbound		-	-	-	-	A-7.5	D-26.3
Westbound		-	-	-	-	B-13	B-13.2
Northbound		B-13.2	C-23.3	C-21.5	F-58.4	A-8.4	B-13.1
Washington St and W Campus Dr	Roundabout	**A (9.9 sec/veh)**	**C (16.9 sec/veh)**	**B (14.2 sec/veh)**	**D (25.1 sec/veh)**	**B (12.6 sec/veh)**	**C (16.7 sec/veh)**
Eastbound		A-8.7	C-20	A-8	E-39.2	A-7.3	C-24.1
Westbound		B-10.5	C-15.5	C-16.3	C-17.5	B-14.9	B-12.2
Southbound		A-9.9	C-15.7	B-14.7	B-12.6	B-11.4	B-10.9
Washington St and Duck Pond Dr/Parking Lot Entrance	Unsignalized/ Roundabout	**A (9.8 sec/veh)**	**B (14.5 sec/veh)**	**E (36.5 sec/veh)**	**F (69 sec/veh)**	**B (11.6 sec/veh)**	**C (18.3 sec/veh)**
Eastbound		A-7.9	B-10.5	B-11.6	F-75.2	A-4.5	D-32.4
Westbound		A-8.9	C-15.6	C-24.5	F-75.8	B-11.4	B-11
Northbound		B-10.5	B-12.1	F-55.3	E-38.5	B-13.2	B-10.9
Southbound		A-8.6	C-16.2	B-14.4	F-76	A-8.1	B-14.8
W Campus Dr and Drillfield Dr	Unsignalized/ Roundabout	-	-	-	-	**A (8 sec/veh)**	**B (11.5 sec/veh)**
Westbound		B-10.2	B-12.9	C-16.8	C-20.2	A-5.5	A-5.7
Northbound		-	-	-	-	A-7.4	B-11.4
Southbound		-	-	-	-	A-8.7	B-11.8
Southgate Dr and Beamer Way/Tech Center Dr	Signalized	**B (13 sec/veh)**	**B (16.1 sec/veh)**	**B (12 sec/veh)**	**B (15.1 sec/veh)**	**B (12.5 sec/veh)**	**B (16.2 sec/veh)**
Eastbound		B-14	B-14.9	B-13.4	B-17.8	B-14.1	C-20.8
Westbound		B-12.7	B-12.8	B-12.3	B-14.5	B-12.9	B-15.9
Northbound		B-11.6	B-19.5	A-9.5	B-14.8	A-9.5	B-14.8
Southbound		B-12	B-16.4	A-9.8	B-13.2	A-9.8	B-13.2
Duck Pond Dr and Smithfield Rd	Unsignalized	-	-	-	-	-	-
Eastbound		B-11.4	B-12.5	C-19	E-35.5	B-12.9	B-14.7
Westbound		B-11.9	B-14.1	C-18.5	C-21.1	B-13.6	B-14.7

Existing (2015) Conditions

Intersection Capacity Analysis Results

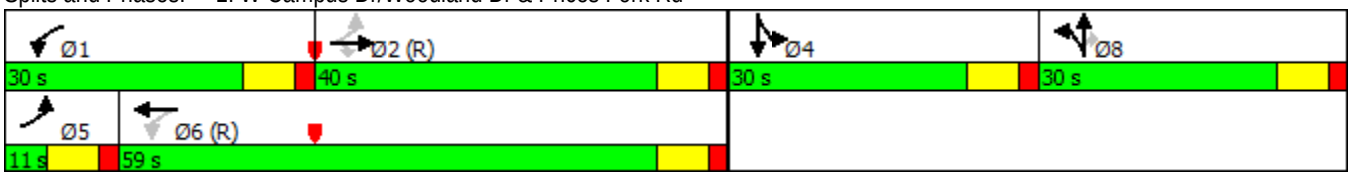
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	759	501	337	460	2	158	1	118	0	1	2
Future Volume (vph)	2	759	501	337	460	2	158	1	118	0	1	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	175		350	225		0	0		550	0		0
Storage Lanes	1		1	1		0	1		1	0		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00
Frt			0.850		0.999				0.850		0.910	
Flt Protected	0.950			0.950			0.950	0.953				
Satd. Flow (prot)	1770	3539	1583	1770	3536	0	1681	1686	1583	0	1695	0
Flt Permitted	0.463			0.208			0.950	0.953				
Satd. Flow (perm)	862	3539	1583	387	3536	0	1681	1686	1583	0	1695	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		563			713			959			530	
Travel Time (s)		12.8			16.2			21.8			12.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	2	843	557	374	511	2	176	1	131	0	1	2
Shared Lane Traffic (%)							50%					
Lane Group Flow (vph)	2	843	557	374	513	0	88	89	131	0	3	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Split	NA	Perm		NA	
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases	2		2	6					8			
Detector Phase	5	2	2	1	6		8	8	8	4	4	
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	11.0	30.0	30.0	11.0	30.0		30.0	30.0	30.0	30.0	30.0	
Total Split (s)	11.0	40.0	40.0	30.0	59.0		30.0	30.0	30.0	30.0	30.0	
Total Split (%)	8.5%	30.8%	30.8%	23.1%	45.4%		23.1%	23.1%	23.1%	23.1%	23.1%	
Maximum Green (s)	4.0	33.0	33.0	23.0	52.0		23.0	23.0	23.0	23.0	23.0	
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0		-2.0	-2.0	-2.0		-2.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0		5.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	C-Max	C-Max	None	C-Max		None	None	None	None	None	
Walk Time (s)		5.0	5.0		5.0		5.0	5.0	5.0	5.0	5.0	
Flash Dont Walk (s)		18.0	18.0		12.0		18.0	18.0	18.0	18.0	18.0	
Pedestrian Calls (#/hr)		0	0		0		0	0	0	0	0	
Act Effct Green (s)	70.7	63.1	63.1	99.1	96.6		18.2	18.2	18.2		7.9	
Actuated g/C Ratio	0.54	0.49	0.49	0.76	0.74		0.14	0.14	0.14		0.06	
v/c Ratio	0.00	0.49	0.73	0.60	0.20		0.38	0.38	0.59		0.03	
Control Delay	11.0	26.8	35.9	19.2	14.0		54.0	54.0	62.7		58.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0		0.0	
Total Delay	11.0	26.8	35.9	19.2	14.0		54.0	54.0	62.7		58.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	B	C	D	B	B		D	D	E		E	
Approach Delay		30.4			16.2			57.7			58.0	
Approach LOS		C			B			E			E	
Queue Length 50th (ft)	0	236	350	194	133		71	72	105		2	
Queue Length 95th (ft)	4	426	#789	m286	206		121	123	164		13	
Internal Link Dist (ft)		483			633			879			450	
Turn Bay Length (ft)	175		350	225					550			
Base Capacity (vph)	521	1717	768	628	2626		323	324	304		325	
Starvation Cap Reductn	0	0	0	0	0		0	0	0		0	
Spillback Cap Reductn	0	0	0	0	0		0	0	0		0	
Storage Cap Reductn	0	0	0	0	0		0	0	0		0	
Reduced v/c Ratio	0.00	0.49	0.73	0.60	0.20		0.27	0.27	0.43		0.01	

Intersection Summary

Area Type: Other
Cycle Length: 130
Actuated Cycle Length: 130
Offset: 120 (92%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 135
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.73
Intersection Signal Delay: 28.8 Intersection LOS: C
Intersection Capacity Utilization 65.5% ICU Level of Service C
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: W Campus Dr/Woodland Dr & Prices Fork Rd



Intersection

Int Delay, s/veh 5.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	14	731	144	358	758	5	6	0	75	2	2	27
Future Vol, veh/h	14	731	144	358	758	5	6	0	75	2	2	27
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	200	-	-	150	-	-	-	-	125	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	16	812	160	398	842	6	7	0	83	2	2	30

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	848	0	0	972	0	0	2141	2566	486	2078	2644	424
Stage 1	-	-	-	-	-	-	923	923	-	1641	1641	-
Stage 2	-	-	-	-	-	-	1218	1643	-	437	1003	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	785	-	-	705	-	-	28	26	527	31	23	579
Stage 1	-	-	-	-	-	-	290	347	-	104	156	-
Stage 2	-	-	-	-	-	-	191	156	-	568	318	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	785	-	-	705	-	-	12	11	527	14	10	579
Mov Cap-2 Maneuver	-	-	-	-	-	-	12	11	-	14	10	-
Stage 1	-	-	-	-	-	-	284	340	-	102	68	-
Stage 2	-	-	-	-	-	-	76	68	-	468	312	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	5.3	48.9	80.4
HCM LOS			E	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	12	527	785	-	-	705	-	-	80
HCM Lane V/C Ratio	0.556	0.158	0.02	-	-	0.564	-	-	0.431
HCM Control Delay (s)	$ 496.5	13.1	9.7	-	-	16.5	-	-	80.4
HCM Lane LOS	F	B	A	-	-	C	-	-	F
HCM 95th %tile Q(veh)	1.3	0.6	0.1	-	-	3.6	-	-	1.7

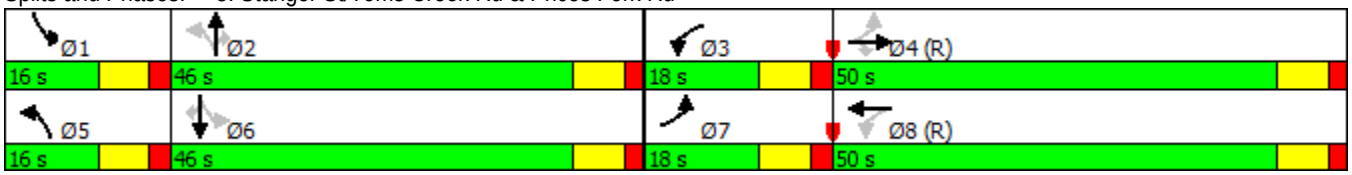
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	119	550	115	148	713	21	49	29	30	56	184	357
Future Volume (vph)	119	550	115	148	713	21	49	29	30	56	184	357
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		325	200		0	200		175	350		350
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.996				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3539	1583	1770	3525	0	1770	1863	1583	1770	1863	1583
Flt Permitted	0.215			0.318			0.516			0.736		
Satd. Flow (perm)	400	3539	1583	592	3525	0	961	1863	1583	1371	1863	1583
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		590			969			595			835	
Travel Time (s)		13.4			22.0			13.5			19.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	132	611	128	164	792	23	54	32	33	62	204	397
Shared Lane Traffic (%)												
Lane Group Flow (vph)	132	611	128	164	815	0	54	32	33	62	204	397
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8			2		2	6		6
Detector Phase	7	4	4	3	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	7.0	10.0	10.0	7.0	10.0		7.0	10.0	10.0	7.0	10.0	10.0
Minimum Split (s)	14.0	32.0	32.0	14.0	32.0		14.0	32.0	32.0	14.0	32.0	32.0
Total Split (s)	18.0	50.0	50.0	18.0	50.0		16.0	46.0	46.0	16.0	46.0	46.0
Total Split (%)	13.8%	38.5%	38.5%	13.8%	38.5%		12.3%	35.4%	35.4%	12.3%	35.4%	35.4%
Maximum Green (s)	11.0	43.0	43.0	11.0	43.0		9.0	39.0	39.0	9.0	39.0	39.0
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0		-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	None	C-Max		None	Min	Min	None	Min	Min
Walk Time (s)		7.0	7.0		7.0			7.0	7.0		7.0	7.0
Flash Dont Walk (s)		18.0	18.0		18.0			18.0	18.0		18.0	18.0
Pedestrian Calls (#/hr)		0	0		0			0	0		0	0
Act Effct Green (s)	64.3	52.5	52.5	65.2	52.9		46.4	38.0	38.0	46.1	37.8	37.8
Actuated g/C Ratio	0.49	0.40	0.40	0.50	0.41		0.36	0.29	0.29	0.35	0.29	0.29
v/c Ratio	0.41	0.43	0.20	0.40	0.57		0.13	0.06	0.07	0.12	0.38	0.86
Control Delay	24.5	22.0	20.9	20.7	33.8		22.9	31.8	32.0	23.1	38.2	62.3
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.5	22.0	20.9	20.7	33.8		22.9	31.8	32.0	23.1	38.2	62.3

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	C	C	C	C	C		C	C	C	C	D	E
Approach Delay		22.2			31.6			27.8			51.2	
Approach LOS		C			C			C			D	
Queue Length 50th (ft)	29	224	52	76	303		26	19	19	30	132	306
Queue Length 95th (ft)	108	149	77	122	378		52	44	45	58	202	#459
Internal Link Dist (ft)		510			889			515			755	
Turn Bay Length (ft)	200		325	200			200		175	350		350
Base Capacity (vph)	338	1429	639	419	1435		414	588	500	525	587	499
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.39	0.43	0.20	0.39	0.57		0.13	0.05	0.07	0.12	0.35	0.80

Intersection Summary

Area Type: Other
Cycle Length: 130
Actuated Cycle Length: 130
Offset: 128 (98%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.86
Intersection Signal Delay: 33.3 Intersection LOS: C
Intersection Capacity Utilization 60.8% ICU Level of Service B
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Stanger St/Toms Creek Rd & Prices Fork Rd



Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	17	44	93	171	186	169
Future Vol, veh/h	17	44	93	171	186	169
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	Yield
Storage Length	175	0	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	19	49	103	190	207	188

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	604	207	207	0	-	0
Stage 1	207	-	-	-	-	-
Stage 2	397	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	461	833	1364	-	-	-
Stage 1	828	-	-	-	-	-
Stage 2	679	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	422	833	1364	-	-	-
Mov Cap-2 Maneuver	422	-	-	-	-	-
Stage 1	828	-	-	-	-	-
Stage 2	622	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.8	2.8	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1364	-	422	833	-	-
HCM Lane V/C Ratio	0.076	-	0.045	0.059	-	-
HCM Control Delay (s)	7.9	0	13.9	9.6	-	-
HCM Lane LOS	A	A	B	A	-	-
HCM 95th %tile Q(veh)	0.2	-	0.1	0.2	-	-

Intersection

Int Delay, s/veh 4.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	163	99	29	77	155
Future Vol, veh/h	0	163	99	29	77	155
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	181	110	32	86	172

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	126	0	0	142	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	4.12	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	0	924	-	-	1441	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	924	-	-	1441	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.8	0	2.5
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	924	1441	-
HCM Lane V/C Ratio	-	-	0.196	0.059	-
HCM Control Delay (s)	-	-	9.8	7.7	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.7	0.2	-

Intersection	
Intersection Delay, s/veh	11.7
Intersection LOS	B

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Traffic Vol, veh/h	0	63	133	27	0	7	289	41	0	82	54	6
Future Vol, veh/h	0	63	133	27	0	7	289	41	0	82	54	6
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	70	148	30	0	8	321	46	0	91	60	7
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	11	13.1	10.7
HCM LOS	B	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	58%	28%	2%	12%
Vol Thru, %	38%	60%	86%	30%
Vol Right, %	4%	12%	12%	58%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	142	223	337	74
LT Vol	82	63	7	9
Through Vol	54	133	289	22
RT Vol	6	27	41	43
Lane Flow Rate	158	248	374	82
Geometry Grp	1	1	1	1
Degree of Util (X)	0.251	0.353	0.514	0.125
Departure Headway (Hd)	5.735	5.132	4.943	5.484
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	626	701	734	653
Service Time	3.773	3.161	2.943	3.526
HCM Lane V/C Ratio	0.252	0.354	0.51	0.126
HCM Control Delay	10.7	11	13.1	9.3
HCM Lane LOS	B	B	B	A
HCM 95th-tile Q	1	1.6	3	0.4

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Lane Configurations			↕	
Traffic Vol, veh/h	0	9	22	43
Future Vol, veh/h	0	9	22	43
Peak Hour Factor	0.90	0.90	0.90	0.90
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	10	24	48
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	9.3
HCM LOS	A

Intersection	
Int Delay, s/veh	5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	151	102	108	173	86	132
Future Vol, veh/h	151	102	108	173	86	132
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	100	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	168	113	120	192	96	147

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	281	0	656	224
Stage 1	-	-	-	-	224	-
Stage 2	-	-	-	-	432	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1282	-	430	815
Stage 1	-	-	-	-	813	-
Stage 2	-	-	-	-	655	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1282	-	385	815
Mov Cap-2 Maneuver	-	-	-	-	385	-
Stage 1	-	-	-	-	813	-
Stage 2	-	-	-	-	586	-

Approach	EB	WB	NB
HCM Control Delay, s	0	3.1	13.2
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	385	815	-	-	1282	-
HCM Lane V/C Ratio	0.248	0.18	-	-	0.094	-
HCM Control Delay (s)	17.4	10.4	-	-	8.1	0
HCM Lane LOS	C	B	-	-	A	A
HCM 95th %tile Q(veh)	1	0.7	-	-	0.3	-

Intersection	
Intersection Delay, s/veh	9.8
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Traffic Vol, veh/h	0	0	1	3	0	47	17	22	0	0	110	283
Future Vol, veh/h	0	0	1	3	0	47	17	22	0	0	110	283
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	1	3	0	52	19	24	0	0	122	314
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	7.9	8.9	10.5
HCM LOS	A	A	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	0%	0%	55%	27%
Vol Thru, %	28%	25%	20%	49%
Vol Right, %	72%	75%	26%	24%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	393	4	86	133
LT Vol	0	0	47	36
Through Vol	110	1	17	65
RT Vol	283	3	22	32
Lane Flow Rate	437	4	96	148
Geometry Grp	1	1	1	1
Degree of Util (X)	0.476	0.006	0.135	0.185
Departure Headway (Hd)	3.924	4.828	5.092	4.518
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	921	738	703	794
Service Time	1.942	2.876	3.132	2.545
HCM Lane V/C Ratio	0.474	0.005	0.137	0.186
HCM Control Delay	10.5	7.9	8.9	8.6
HCM Lane LOS	B	A	A	A
HCM 95th-tile Q	2.6	0	0.5	0.7

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Lane Configurations			↕	
Traffic Vol, veh/h	0	36	65	32
Future Vol, veh/h	0	36	65	32
Peak Hour Factor	0.90	0.90	0.90	0.90
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	40	72	36
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	8.6
HCM LOS	A

Intersection	
Int Delay, s/veh	0.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	5	281	52	73	401
Future Vol, veh/h	0	5	281	52	73	401
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	75	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	6	312	58	81	446

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	949	341	0	0	370	0
Stage 1	341	-	-	-	-	-
Stage 2	608	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	289	701	-	-	1189	-
Stage 1	720	-	-	-	-	-
Stage 2	543	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	263	701	-	-	1189	-
Mov Cap-2 Maneuver	263	-	-	-	-	-
Stage 1	720	-	-	-	-	-
Stage 2	494	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.2	0	1.3
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	-	701	1189	-
HCM Lane V/C Ratio	-	-	-	0.008	0.068	-
HCM Control Delay (s)	-	-	0	10.2	8.2	0
HCM Lane LOS	-	-	A	B	A	A
HCM 95th %tile Q(veh)	-	-	-	0	0.2	-

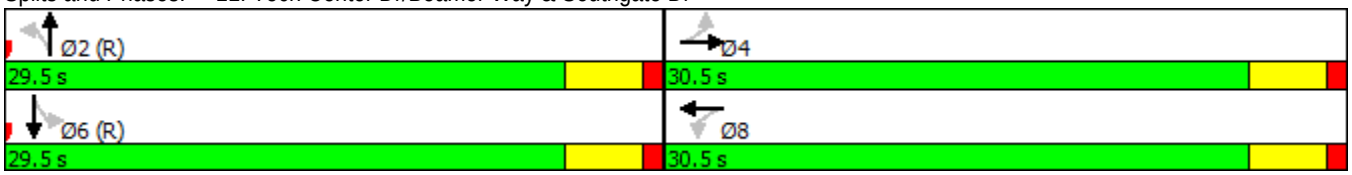
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	140	131	154	73	171	62	59	76	19	14	112	29
Future Volume (vph)	140	131	154	73	171	62	59	76	19	14	112	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	375		0	150		0	75		0	200		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.919			0.960			0.970			0.969	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1712	0	1770	1788	0	1770	1807	0	1770	1805	0
Flt Permitted	0.571			0.508			0.658			0.689		
Satd. Flow (perm)	1064	1712	0	946	1788	0	1226	1807	0	1283	1805	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		903			728			646			781	
Travel Time (s)		20.5			16.5			14.7			17.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	156	146	171	81	190	69	66	84	21	16	124	32
Shared Lane Traffic (%)												
Lane Group Flow (vph)	156	317	0	81	259	0	66	105	0	16	156	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	30.5	30.5		30.5	30.5		29.5	29.5		29.5	29.5	
Total Split (%)	50.8%	50.8%		50.8%	50.8%		49.2%	49.2%		49.2%	49.2%	
Maximum Green (s)	26.0	26.0		26.0	26.0		25.0	25.0		25.0	25.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	26.0	26.0		26.0	26.0		25.0	25.0		25.0	25.0	
Actuated g/C Ratio	0.43	0.43		0.43	0.43		0.42	0.42		0.42	0.42	
v/c Ratio	0.34	0.43		0.20	0.33		0.13	0.14		0.03	0.21	
Control Delay	13.9	14.1		12.2	12.8		11.7	11.5		10.6	12.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	13.9	14.1		12.2	12.8		11.7	11.5		10.6	12.1	
LOS	B	B		B	B		B	B		B	B	
Approach Delay		14.0			12.7			11.6			12.0	
Approach LOS		B			B			B			B	
Queue Length 50th (ft)	36	76		17	59		14	22		3	34	
Queue Length 95th (ft)	75	134		42	106		35	48		13	68	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		823			648			566			701	
Turn Bay Length (ft)	375			150			75			200		
Base Capacity (vph)	461	741		409	774		510	752		534	752	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.34	0.43		0.20	0.33		0.13	0.14		0.03	0.21	

Intersection Summary

Area Type: Other
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 45
Control Type: Pretimed
Maximum v/c Ratio: 0.43
Intersection Signal Delay: 13.0 Intersection LOS: B
Intersection Capacity Utilization 47.4% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 11: Tech Center Dr/Beamer Way & Southgate Dr



Intersection

Int Delay, s/veh 1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	15	2	5	0	1	0	21	101	0	0	210	18
Future Vol, veh/h	15	2	5	0	1	0	21	101	0	0	210	18
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	17	2	6	0	1	0	23	112	0	0	233	20

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	402	402	243	406	412	112	253	0	0	112	0	0
Stage 1	243	243	-	159	159	-	-	-	-	-	-	-
Stage 2	159	159	-	247	253	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	559	537	796	555	530	941	1312	-	-	1478	-	-
Stage 1	761	705	-	843	766	-	-	-	-	-	-	-
Stage 2	843	766	-	757	698	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	550	527	796	541	520	941	1312	-	-	1478	-	-
Mov Cap-2 Maneuver	550	527	-	541	520	-	-	-	-	-	-	-
Stage 1	747	705	-	827	751	-	-	-	-	-	-	-
Stage 2	826	751	-	749	698	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.4	11.9	1.3	0
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1312	-	-	589	520	1478	-	-
HCM Lane V/C Ratio	0.018	-	-	0.042	0.002	-	-	-
HCM Control Delay (s)	7.8	0	-	11.4	11.9	0	-	-
HCM Lane LOS	A	A	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.1	0	0	-	-

MOVEMENT SUMMARY

Site: Exist(2015)AM

Washington at West Campus
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
East: Washington St											
6	T1	168	2.0	0.464	10.5	LOS B	2.5	64.6	0.38	0.25	31.5
16	R2	210	2.0	0.464	10.5	LOS B	2.5	64.6	0.38	0.25	30.8
Approach		378	2.0	0.464	10.5	LOS B	2.5	64.6	0.38	0.25	31.1
North: W Campus Dr											
7	L2	247	2.0	0.398	9.9	LOS A	1.9	48.2	0.43	0.33	30.2
14	R2	52	2.0	0.398	9.9	LOS A	1.9	48.2	0.43	0.33	29.7
Approach		299	2.0	0.398	9.9	LOS A	1.9	48.2	0.43	0.33	30.1
West: Washington St											
5	L2	103	2.0	0.278	8.7	LOS A	1.1	28.6	0.45	0.39	31.2
2	T1	87	2.0	0.278	8.7	LOS A	1.1	28.6	0.45	0.39	31.3
Approach		190	2.0	0.278	8.7	LOS A	1.1	28.6	0.45	0.39	31.2
All Vehicles		867	2.0	0.464	9.9	LOS A	2.5	64.6	0.41	0.31	30.8

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

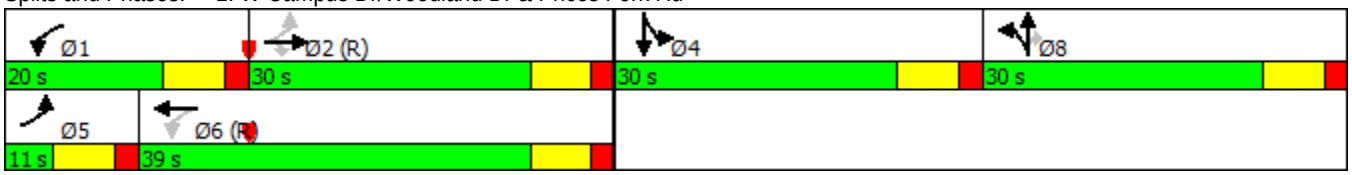
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	749	270	326	892	1	590	1	378	4	0	4
Future Volume (vph)	5	749	270	326	892	1	590	1	378	4	0	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	175		350	225		0	0		550	0		0
Storage Lanes	1		1	1		0	1		1	0		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00
Frt			0.850						0.850		0.932	
Flt Protected	0.950			0.950			0.950	0.953			0.976	
Satd. Flow (prot)	1770	3539	1583	1770	3539	0	1681	1686	1583	0	1694	0
Flt Permitted	0.207			0.165			0.950	0.953			0.976	
Satd. Flow (perm)	386	3539	1583	307	3539	0	1681	1686	1583	0	1694	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		563			713			959			530	
Travel Time (s)		12.8			16.2			21.8			12.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	6	832	300	362	991	1	656	1	420	4	0	4
Shared Lane Traffic (%)							50%					
Lane Group Flow (vph)	6	832	300	362	992	0	328	329	420	0	8	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100	20	20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0	0	0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0	0	0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Split	NA	Perm	Split	NA	
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases	2		2	6					8			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	5	2	2	1	6		8	8	8	4	4	
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	11.0	30.0	30.0	11.0	30.0		30.0	30.0	30.0	30.0	30.0	
Total Split (s)	11.0	30.0	30.0	20.0	39.0		30.0	30.0	30.0	30.0	30.0	
Total Split (%)	10.0%	27.3%	27.3%	18.2%	35.5%		27.3%	27.3%	27.3%	27.3%	27.3%	
Maximum Green (s)	4.0	23.0	23.0	13.0	32.0		23.0	23.0	23.0	23.0	23.0	
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0		-2.0	-2.0	-2.0		-2.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0		5.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	C-Max	C-Max	None	C-Max		None	None	None	None	None	
Walk Time (s)		5.0	5.0		5.0		5.0	5.0	5.0	5.0	5.0	
Flash Dont Walk (s)		18.0	18.0		12.0		18.0	18.0	18.0	18.0	18.0	
Pedestrian Calls (#/hr)		0	0		0		0	0	0	0	0	
Act Effct Green (s)	32.1	25.0	25.0	50.5	48.3		46.7	46.7	46.7		8.2	
Actuated g/C Ratio	0.29	0.23	0.23	0.46	0.44		0.42	0.42	0.42		0.07	
v/c Ratio	0.03	1.03	0.84	0.88	0.64		0.46	0.46	0.63		0.06	
Control Delay	19.0	83.1	61.6	40.9	24.6		26.4	26.4	31.1		48.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0		0.0	
Total Delay	19.0	83.1	61.6	40.9	24.6		26.4	26.4	31.1		48.0	
LOS	B	F	E	D	C		C	C	C		D	
Approach Delay		77.1			29.0			28.2			48.0	
Approach LOS		E			C			C			D	

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 56 (51%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 135
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.03
Intersection Signal Delay: 44.1 Intersection LOS: D
Intersection Capacity Utilization 74.3% ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 1: W Campus Dr/Woodland Dr & Prices Fork Rd



Intersection

Int Delay, s/veh 5.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	53	1013	26	36	1162	10	15	3	230	2	0	34
Future Vol, veh/h	53	1013	26	36	1162	10	15	3	230	2	0	34
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	200	-	-	150	-	-	-	-	125	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	59	1126	29	40	1291	11	17	3	256	2	0	38

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1302	0	0	1154	0	0	1984	2640	577	2059	2649	651
Stage 1	-	-	-	-	-	-	1258	1258	-	1377	1377	-
Stage 2	-	-	-	-	-	-	726	1382	-	682	1272	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	528	-	-	601	-	-	36	23	460	32	23	411
Stage 1	-	-	-	-	-	-	181	241	-	153	211	-
Stage 2	-	-	-	-	-	-	382	210	-	406	237	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	528	-	-	601	-	-	28	19	460	11	19	411
Mov Cap-2 Maneuver	-	-	-	-	-	-	28	19	-	11	19	-
Stage 1	-	-	-	-	-	-	161	214	-	136	197	-
Stage 2	-	-	-	-	-	-	324	196	-	158	211	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	0.3	43.6	42.1
HCM LOS			E	E

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	26	460	528	-	-	601	-	-	136
HCM Lane V/C Ratio	0.769	0.556	0.112	-	-	0.067	-	-	0.294
HCM Control Delay (s)	$ 316.5	22.2	12.7	-	-	11.4	-	-	42.1
HCM Lane LOS	F	C	B	-	-	B	-	-	E
HCM 95th %tile Q(veh)	2.4	3.3	0.4	-	-	0.2	-	-	1.1

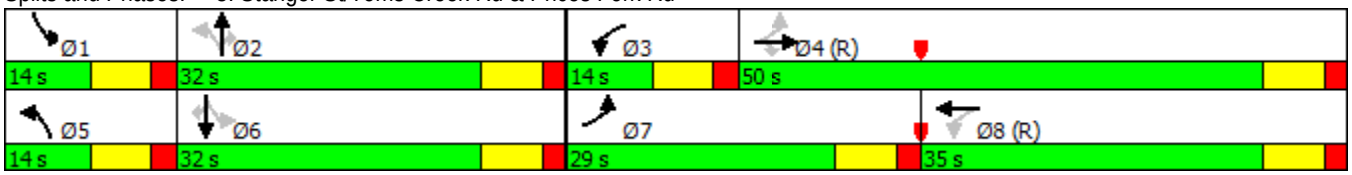
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	284	845	140	154	709	45	242	174	98	79	181	265
Future Volume (vph)	284	845	140	154	709	45	242	174	98	79	181	265
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		325	200		0	200		175	350		350
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.991				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3539	1583	1770	3507	0	1770	1863	1583	1770	1863	1583
Flt Permitted	0.129			0.224			0.475			0.553		
Satd. Flow (perm)	240	3539	1583	417	3507	0	885	1863	1583	1030	1863	1583
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		590			969			595			835	
Travel Time (s)		13.4			22.0			13.5			19.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	316	939	156	171	788	50	269	193	109	88	201	294
Shared Lane Traffic (%)												
Lane Group Flow (vph)	316	939	156	171	838	0	269	193	109	88	201	294
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100		20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0		0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0		0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6		20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8			2		2	6		6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	7.0	10.0	10.0	7.0	10.0		7.0	10.0	10.0	7.0	10.0	10.0
Minimum Split (s)	14.0	32.0	32.0	14.0	32.0		14.0	32.0	32.0	14.0	32.0	32.0
Total Split (s)	29.0	50.0	50.0	14.0	35.0		14.0	32.0	32.0	14.0	32.0	32.0
Total Split (%)	26.4%	45.5%	45.5%	12.7%	31.8%		12.7%	29.1%	29.1%	12.7%	29.1%	29.1%
Maximum Green (s)	22.0	43.0	43.0	7.0	28.0		7.0	25.0	25.0	7.0	25.0	25.0
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0		-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	None	C-Max		None	Min	Min	None	Min	Min
Walk Time (s)		7.0	7.0		7.0			7.0	7.0		7.0	7.0
Flash Dont Walk (s)		18.0	18.0		18.0			18.0	18.0		18.0	18.0
Pedestrian Calls (#/hr)		0	0		0			0	0		0	0
Act Effct Green (s)	60.6	46.4	46.4	45.5	36.0		35.0	27.8	27.8	34.0	25.0	25.0
Actuated g/C Ratio	0.55	0.42	0.42	0.41	0.33		0.32	0.25	0.25	0.31	0.23	0.23
v/c Ratio	0.77	0.63	0.23	0.59	0.73		0.76	0.41	0.27	0.23	0.48	0.82
Control Delay	30.2	17.3	12.7	25.0	38.9		44.3	38.0	35.9	25.1	40.4	59.0
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.2	17.3	12.7	25.0	38.9		44.3	38.0	35.9	25.1	40.4	59.0
LOS	C	B	B	C	D		D	D	D	C	D	E
Approach Delay		19.7			36.5			40.6			47.5	
Approach LOS		B			D			D			D	

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.82
Intersection Signal Delay: 32.3 Intersection LOS: C
Intersection Capacity Utilization 76.4% ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 3: Stanger St/Toms Creek Rd & Prices Fork Rd



Intersection	
Int Delay, s/veh	3.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	58	149	74	380	326	80
Future Vol, veh/h	58	149	74	380	326	80
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	Yield
Storage Length	175	0	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	64	166	82	422	362	89

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	949	362	362	0	-	0
Stage 1	362	-	-	-	-	-
Stage 2	587	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	289	683	1197	-	-	-
Stage 1	704	-	-	-	-	-
Stage 2	556	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	263	683	1197	-	-	-
Mov Cap-2 Maneuver	263	-	-	-	-	-
Stage 1	704	-	-	-	-	-
Stage 2	507	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15	1.3	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1197	-	263	683	-	-
HCM Lane V/C Ratio	0.069	-	0.245	0.242	-	-
HCM Control Delay (s)	8.2	0	23.1	11.9	-	-
HCM Lane LOS	A	A	C	B	-	-
HCM 95th %tile Q(veh)	0.2	-	0.9	0.9	-	-

Intersection

Int Delay, s/veh 4.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	218	239	37	185	285
Future Vol, veh/h	0	218	239	37	185	285
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	242	266	41	206	317

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	286	0	0	307	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	4.12	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	0	753	-	-	1254	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	753	-	-	1254	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12	0	3.3
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	753	1254	-
HCM Lane V/C Ratio	-	-	0.322	0.164	-
HCM Control Delay (s)	-	-	12	8.4	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	1.4	0.6	-

Intersection	
Intersection Delay, s/veh	29.8
Intersection LOS	D

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Traffic Vol, veh/h	0	142	255	65	0	13	233	127	0	72	59	4
Future Vol, veh/h	0	142	255	65	0	13	233	127	0	72	59	4
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	158	283	72	0	14	259	141	0	80	66	4
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	44	25.6	14.6
HCM LOS	E	D	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	53%	31%	3%	25%
Vol Thru, %	44%	55%	62%	26%
Vol Right, %	3%	14%	34%	48%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	135	462	373	225
LT Vol	72	142	13	57
Through Vol	59	255	233	59
RT Vol	4	65	127	109
Lane Flow Rate	150	513	414	250
Geometry Grp	1	1	1	1
Degree of Util (X)	0.325	0.909	0.74	0.493
Departure Headway (Hd)	7.8	6.378	6.425	7.103
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	459	570	564	505
Service Time	5.877	4.398	4.446	5.169
HCM Lane V/C Ratio	0.327	0.9	0.734	0.495
HCM Control Delay	14.6	44	25.6	16.9
HCM Lane LOS	B	E	D	C
HCM 95th-tile Q	1.4	11	6.3	2.7

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Lane Configurations			↕	
Traffic Vol, veh/h	0	57	59	109
Future Vol, veh/h	0	57	59	109
Peak Hour Factor	0.90	0.90	0.90	0.90
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	63	66	121
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	16.9
HCM LOS	C

Intersection	
Int Delay, s/veh	6.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	272	192	181	300	78	180
Future Vol, veh/h	272	192	181	300	78	180
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	100	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	302	213	201	333	87	200

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	516	0	1145	409
Stage 1	-	-	-	-	409	-
Stage 2	-	-	-	-	736	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1050	-	221	642
Stage 1	-	-	-	-	671	-
Stage 2	-	-	-	-	474	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1050	-	169	642
Mov Cap-2 Maneuver	-	-	-	-	169	-
Stage 1	-	-	-	-	671	-
Stage 2	-	-	-	-	363	-

Approach	EB	WB	NB
HCM Control Delay, s	0	3.5	23.3
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	169	642	-	-	1050	-
HCM Lane V/C Ratio	0.513	0.312	-	-	0.192	-
HCM Control Delay (s)	46.8	13.1	-	-	9.2	0
HCM Lane LOS	E	B	-	-	A	A
HCM 95th %tile Q(veh)	2.5	1.3	-	-	0.7	-

Intersection	
Intersection Delay, s/veh	14.5
Intersection LOS	B

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Traffic Vol, veh/h	0	12	45	23	0	222	14	62	0	8	100	116
Future Vol, veh/h	0	12	45	23	0	222	14	62	0	8	100	116
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	13	50	26	0	247	16	69	0	9	111	129
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	10.5	15.6	12.1
HCM LOS	B	C	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	4%	15%	74%	21%
Vol Thru, %	45%	56%	5%	78%
Vol Right, %	52%	29%	21%	1%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	224	80	298	329
LT Vol	8	12	222	70
Through Vol	100	45	14	255
RT Vol	116	23	62	4
Lane Flow Rate	249	89	331	366
Geometry Grp	1	1	1	1
Degree of Util (X)	0.383	0.156	0.537	0.575
Departure Headway (Hd)	5.538	6.3	5.836	5.659
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	645	572	613	632
Service Time	3.625	4.3	3.913	3.736
HCM Lane V/C Ratio	0.386	0.156	0.54	0.579
HCM Control Delay	12.1	10.5	15.6	16.2
HCM Lane LOS	B	B	C	C
HCM 95th-tile Q	1.8	0.5	3.2	3.7

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Lane Configurations			↕	
Traffic Vol, veh/h	0	70	255	4
Future Vol, veh/h	0	70	255	4
Peak Hour Factor	0.90	0.90	0.90	0.90
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	78	283	4
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	16.2
HCM LOS	C

Intersection

Int Delay, s/veh 1.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	1	22	454	66	110	552
Future Vol, veh/h	1	22	454	66	110	552
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	75	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	24	504	73	122	613

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1399	541	0	0	578	0
Stage 1	541	-	-	-	-	-
Stage 2	858	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	155	541	-	-	996	-
Stage 1	583	-	-	-	-	-
Stage 2	415	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	126	541	-	-	996	-
Mov Cap-2 Maneuver	126	-	-	-	-	-
Stage 1	583	-	-	-	-	-
Stage 2	338	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.9	0	1.5
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	126	541	996	-
HCM Lane V/C Ratio	-	-	0.009	0.045	0.123	-
HCM Control Delay (s)	-	-	33.8	12	9.1	0
HCM Lane LOS	-	-	D	B	A	A
HCM 95th %tile Q(veh)	-	-	0	0.1	0.4	-

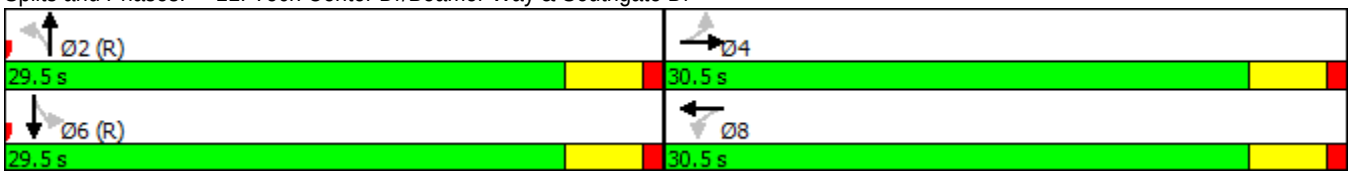
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	111	264	99	43	205	41	186	107	96	155	164	195
Future Volume (vph)	111	264	99	43	205	41	186	107	96	155	164	195
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	375		0	150		0	75		0	200		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.959			0.975			0.929			0.918	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1786	0	1770	1816	0	1770	1730	0	1770	1710	0
Flt Permitted	0.554			0.418			0.412			0.604		
Satd. Flow (perm)	1032	1786	0	779	1816	0	767	1730	0	1125	1710	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		903			728			646			781	
Travel Time (s)		20.5			16.5			14.7			17.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	123	293	110	48	228	46	207	119	107	172	182	217
Shared Lane Traffic (%)												
Lane Group Flow (vph)	123	403	0	48	274	0	207	226	0	172	399	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	30.5	30.5		30.5	30.5		29.5	29.5		29.5	29.5	
Total Split (%)	50.8%	50.8%		50.8%	50.8%		49.2%	49.2%		49.2%	49.2%	
Maximum Green (s)	26.0	26.0		26.0	26.0		25.0	25.0		25.0	25.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	26.0	26.0		26.0	26.0		25.0	25.0		25.0	25.0	
Actuated g/C Ratio	0.43	0.43		0.43	0.43		0.42	0.42		0.42	0.42	
v/c Ratio	0.28	0.52		0.14	0.35		0.65	0.31		0.37	0.56	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	13.1	15.5		11.7	13.0		26.3	13.3		15.0	17.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	13.1	15.5		11.7	13.0		26.3	13.3		15.0	17.1	
LOS	B	B		B	B		C	B		B	B	
Approach Delay		14.9			12.8			19.5			16.4	
Approach LOS		B			B			B			B	

Intersection Summary

Area Type: Other
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 50
Control Type: Pretimed
Maximum v/c Ratio: 0.65
Intersection Signal Delay: 16.1 Intersection LOS: B
Intersection Capacity Utilization 70.0% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 11: Tech Center Dr/Beamer Way & Southgate Dr



Intersection

Int Delay, s/veh 1.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	12	4	12	0	9	0	35	228	1	2	212	15
Future Vol, veh/h	12	4	12	0	9	0	35	228	1	2	212	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	13	4	13	0	10	0	39	253	1	2	236	17

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	585	580	244	589	589	254	252	0	0	254	0	0
Stage 1	248	248	-	332	332	-	-	-	-	-	-	-
Stage 2	337	332	-	257	257	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	422	426	795	420	421	785	1313	-	-	1311	-	-
Stage 1	756	701	-	681	644	-	-	-	-	-	-	-
Stage 2	677	644	-	748	695	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	402	410	795	398	405	785	1313	-	-	1311	-	-
Mov Cap-2 Maneuver	402	410	-	398	405	-	-	-	-	-	-	-
Stage 1	730	700	-	657	621	-	-	-	-	-	-	-
Stage 2	643	621	-	729	694	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.5	14.1	1	0.1
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1313	-	-	512	405	1311	-	-
HCM Lane V/C Ratio	0.03	-	-	0.061	0.025	0.002	-	-
HCM Control Delay (s)	7.8	0	-	12.5	14.1	7.8	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.2	0.1	0	-	-

MOVEMENT SUMMARY

Site: Exist(2015)PM

Washington at West Campus
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
East: Washington St											
6	T1	162	2.0	0.628	15.5	LOS C	4.6	115.9	0.58	0.47	29.4
16	R2	317	2.0	0.628	15.5	LOS C	4.6	115.9	0.58	0.47	28.8
Approach		479	2.0	0.628	15.5	LOS C	4.6	115.9	0.58	0.47	29.0
North: W Campus Dr											
7	L2	367	2.0	0.633	15.7	LOS C	4.7	118.4	0.59	0.49	28.1
14	R2	112	2.0	0.633	15.7	LOS C	4.7	118.4	0.59	0.49	27.7
Approach		479	2.0	0.633	15.7	LOS C	4.7	118.4	0.59	0.49	28.0
West: Washington St											
5	L2	157	2.0	0.650	20.0	LOS C	4.5	114.4	0.74	0.82	27.2
2	T1	227	2.0	0.650	20.0	LOS C	4.5	114.4	0.74	0.82	27.3
Approach		383	2.0	0.650	20.0	LOS C	4.5	114.4	0.74	0.82	27.2
All Vehicles		1341	2.0	0.650	16.9	LOS C	4.7	118.4	0.63	0.58	28.1

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Future No-Build (2025) Conditions
Intersection Capacity Analysis Results

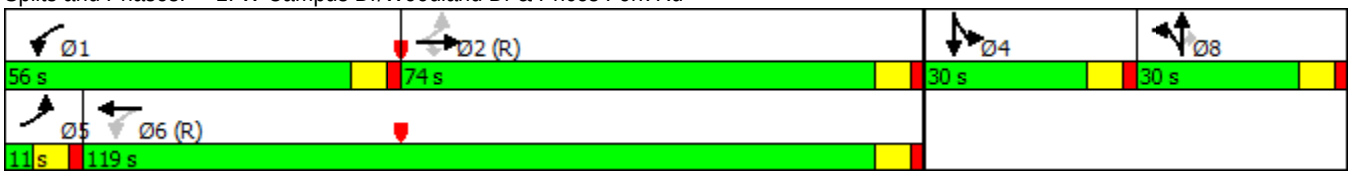
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	720	516	594	482	2	145	1	156	0	1	2
Future Volume (vph)	2	720	516	594	482	2	145	1	156	0	1	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	175		350	225		0	0		550	0		0
Storage Lanes	1		1	1		0	1		1	0		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00
Frt			0.850		0.999				0.850		0.910	
Flt Protected	0.950			0.950			0.950	0.953				
Satd. Flow (prot)	1770	3539	1583	1770	3536	0	1681	1686	1583	0	1695	0
Flt Permitted	0.452			0.161			0.950	0.953				
Satd. Flow (perm)	842	3539	1583	300	3536	0	1681	1686	1583	0	1695	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		563			713			959			530	
Travel Time (s)		12.8			16.2			21.8			12.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	2	800	573	660	536	2	161	1	173	0	1	2
Shared Lane Traffic (%)							50%					
Lane Group Flow (vph)	2	800	573	660	538	0	80	82	173	0	3	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Split	NA	Perm		NA	
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases	2		2	6					8			
Detector Phase	5	2	2	1	6		8	8	8	4	4	
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	11.0	30.0	30.0	11.0	30.0		30.0	30.0	30.0	30.0	30.0	
Total Split (s)	11.0	74.0	74.0	56.0	119.0		30.0	30.0	30.0	30.0	30.0	
Total Split (%)	5.8%	38.9%	38.9%	29.5%	62.6%		15.8%	15.8%	15.8%	15.8%	15.8%	
Maximum Green (s)	4.0	67.0	67.0	49.0	112.0		23.0	23.0	23.0	23.0	23.0	
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0		-2.0	-2.0	-2.0		-2.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0		5.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	C-Max	C-Max	None	C-Max		None	None	None	None	None	
Walk Time (s)		5.0	5.0		5.0		5.0	5.0	5.0	5.0	5.0	
Flash Dont Walk (s)		18.0	18.0		12.0		18.0	18.0	18.0	18.0	18.0	
Pedestrian Calls (#/hr)		0	0		0		0	0	0	0	0	
Act Effct Green (s)	78.6	71.0	71.0	148.2	145.7		29.0	29.0	29.0		8.0	
Actuated g/C Ratio	0.41	0.37	0.37	0.78	0.77		0.15	0.15	0.15		0.04	
v/c Ratio	0.01	0.61	0.97	0.83	0.20		0.31	0.32	0.72		0.04	
Control Delay	17.5	50.7	87.2	44.0	10.1		78.8	78.8	97.8		88.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0		0.0	
Total Delay	17.5	50.7	87.2	44.0	10.1		78.8	78.8	97.8		88.3	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	B	D	F	D	B		E	E	F		F	
Approach Delay		65.8			28.8			88.6			88.3	
Approach LOS		E			C			F			F	
Queue Length 50th (ft)	1	418	692	627	163		97	100	213		4	
Queue Length 95th (ft)	4	510	#989	#1023	262		144	146	271		17	
Internal Link Dist (ft)		483			633			879			450	
Turn Bay Length (ft)	175		350	225					550			
Base Capacity (vph)	385	1322	591	793	2711		264	265	248		223	
Starvation Cap Reductn	0	0	0	0	0		0	0	0		0	
Spillback Cap Reductn	0	0	0	0	0		0	0	0		0	
Storage Cap Reductn	0	0	0	0	0		0	0	0		0	
Reduced v/c Ratio	0.01	0.61	0.97	0.83	0.20		0.30	0.31	0.70		0.01	

Intersection Summary

Area Type: Other
Cycle Length: 190
Actuated Cycle Length: 190
Offset: 118 (62%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 145
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.97
Intersection Signal Delay: 53.2 Intersection LOS: D
Intersection Capacity Utilization 80.7% ICU Level of Service D
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: W Campus Dr/Woodland Dr & Prices Fork Rd



Intersection

Int Delay, s/veh 3.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	15	802	71	262	1037	5	4	0	74	2	2	28
Future Vol, veh/h	15	802	71	262	1037	5	4	0	74	2	2	28
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	200	-	-	150	-	-	-	-	125	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	17	891	79	291	1152	6	4	0	82	2	2	31

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1158	0	0	970	0	0	2123	2704	485	2216	2740	579
Stage 1	-	-	-	-	-	-	964	964	-	1737	1737	-
Stage 2	-	-	-	-	-	-	1159	1740	-	479	1003	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	599	-	-	706	-	-	28	21	528	24	20	458
Stage 1	-	-	-	-	-	-	274	332	-	91	140	-
Stage 2	-	-	-	-	-	-	208	140	-	537	318	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	599	-	-	706	-	-	15	12	528	13	11	458
Mov Cap-2 Maneuver	-	-	-	-	-	-	15	12	-	13	11	-
Stage 1	-	-	-	-	-	-	266	323	-	88	82	-
Stage 2	-	-	-	-	-	-	111	82	-	441	309	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	2.7	29.1	80.4
HCM LOS			D	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	15	528	599	-	-	706	-	-	81
HCM Lane V/C Ratio	0.296	0.156	0.028	-	-	0.412	-	-	0.439
HCM Control Delay (s)	$ 325.6	13.1	11.2	-	-	13.6	-	-	80.4
HCM Lane LOS	F	B	B	-	-	B	-	-	F
HCM 95th %tile Q(veh)	0.8	0.5	0.1	-	-	2	-	-	1.8

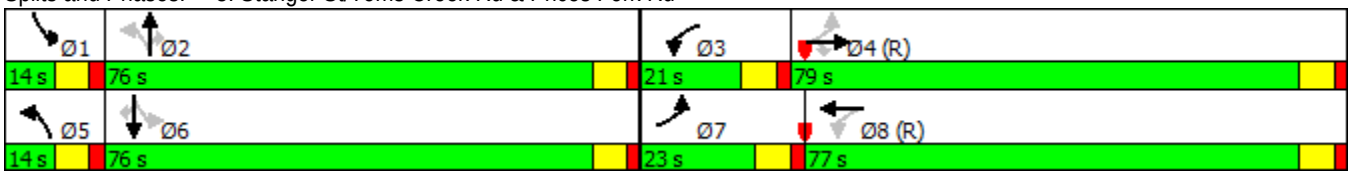
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	125	596	112	150	827	22	112	25	35	67	221	363
Future Volume (vph)	125	596	112	150	827	22	112	25	35	67	221	363
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		325	200		0	200		175	350		350
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.996				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3539	1583	1770	3525	0	1770	1863	1583	1770	1863	1583
Flt Permitted	0.191			0.310			0.438			0.739		
Satd. Flow (perm)	356	3539	1583	577	3525	0	816	1863	1583	1377	1863	1583
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		590			969			595			835	
Travel Time (s)		13.4			22.0			13.5			19.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	139	662	124	167	919	24	124	28	39	74	246	403
Shared Lane Traffic (%)												
Lane Group Flow (vph)	139	662	124	167	943	0	124	28	39	74	246	403
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8			2		2	6		6
Detector Phase	7	4	4	3	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	7.0	10.0	10.0	7.0	10.0		7.0	10.0	10.0	7.0	10.0	10.0
Minimum Split (s)	14.0	32.0	32.0	14.0	32.0		14.0	32.0	32.0	14.0	32.0	32.0
Total Split (s)	23.0	79.0	79.0	21.0	77.0		14.0	76.0	76.0	14.0	76.0	76.0
Total Split (%)	12.1%	41.6%	41.6%	11.1%	40.5%		7.4%	40.0%	40.0%	7.4%	40.0%	40.0%
Maximum Green (s)	16.0	72.0	72.0	14.0	70.0		7.0	69.0	69.0	7.0	69.0	69.0
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0		-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	None	C-Max		None	Min	Min	None	Min	Min
Walk Time (s)		7.0	7.0		7.0			7.0	7.0		7.0	7.0
Flash Dont Walk (s)		18.0	18.0		18.0			18.0	18.0		18.0	18.0
Pedestrian Calls (#/hr)		0	0		0			0	0		0	0
Act Effct Green (s)	102.7	88.3	88.3	104.2	89.0		66.5	57.5	57.5	66.5	57.5	57.5
Actuated g/C Ratio	0.54	0.46	0.46	0.55	0.47		0.35	0.30	0.30	0.35	0.30	0.30
v/c Ratio	0.46	0.40	0.17	0.41	0.57		0.37	0.05	0.08	0.15	0.44	0.84
Control Delay	10.9	17.7	14.1	24.2	40.4		41.9	43.0	44.2	37.0	54.3	77.3
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.9	17.7	14.1	24.2	40.4		41.9	43.0	44.2	37.0	54.3	77.3

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	B	B	B	C	D		D	D	D	D	D	E
Approach Delay		16.2			38.0			42.5			65.4	
Approach LOS		B			D			D			E	
Queue Length 50th (ft)	25	318	87	98	450		104	25	35	60	247	472
Queue Length 95th (ft)	m76	444	m184	166	610		142	48	63	91	307	563
Internal Link Dist (ft)		510			889			515			755	
Turn Bay Length (ft)	200		325	200			200		175	350		350
Base Capacity (vph)	333	1643	735	424	1650		331	696	591	500	696	591
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.42	0.40	0.17	0.39	0.57		0.37	0.04	0.07	0.15	0.35	0.68

Intersection Summary

Area Type: Other
Cycle Length: 190
Actuated Cycle Length: 190
Offset: 184 (97%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.84
Intersection Signal Delay: 38.2 Intersection LOS: D
Intersection Capacity Utilization 65.0% ICU Level of Service C
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Stanger St/Toms Creek Rd & Prices Fork Rd



Intersection

Int Delay, s/veh 2.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	144	104	30	0	204
Future Vol, veh/h	0	144	104	30	0	204
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	160	116	33	0	227

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	132	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	-	-
Pot Cap-1 Maneuver	0	917	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	917	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.8	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	917	-
HCM Lane V/C Ratio	-	-	0.174	-
HCM Control Delay (s)	-	-	9.8	-
HCM Lane LOS	-	-	A	-
HCM 95th %tile Q(veh)	-	-	0.6	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	73	127	31	7	395	35	105	58	6	4	24	94
Future Volume (vph)	73	127	31	7	395	35	105	58	6	4	24	94
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.982			0.989			0.995			0.896	
Flt Protected		0.984			0.999			0.970			0.999	
Satd. Flow (prot)	0	1800	0	0	1840	0	0	1798	0	0	1667	0
Flt Permitted		0.984			0.999			0.970			0.999	
Satd. Flow (perm)	0	1800	0	0	1840	0	0	1798	0	0	1667	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1726			915			320			733	
Travel Time (s)		39.2			20.8			7.3			16.7	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	81	141	34	8	439	39	117	64	7	4	27	104
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	256	0	0	486	0	0	188	0	0	135	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary

Area Type: Other
Control Type: Unsignalized
Intersection Capacity Utilization 61.8% ICU Level of Service B
Analysis Period (min) 15

Intersection	
Intersection Delay, s/veh	16.1
Intersection LOS	C

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Traffic Vol, veh/h	0	73	127	31	0	7	395	35	0	105	58	6
Future Vol, veh/h	0	73	127	31	0	7	395	35	0	105	58	6
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	81	141	34	0	8	439	39	0	117	64	7
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	12.7	20.9	12.5
HCM LOS	B	C	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	62%	32%	2%	3%
Vol Thru, %	34%	55%	90%	20%
Vol Right, %	4%	13%	8%	77%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	169	231	437	122
LT Vol	105	73	7	4
Through Vol	58	127	395	24
RT Vol	6	31	35	94
Lane Flow Rate	188	257	486	136
Geometry Grp	1	1	1	1
Degree of Util (X)	0.329	0.406	0.718	0.222
Departure Headway (Hd)	6.313	5.692	5.323	5.904
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	565	629	675	602
Service Time	4.398	3.767	3.383	3.997
HCM Lane V/C Ratio	0.333	0.409	0.72	0.226
HCM Control Delay	12.5	12.7	20.9	10.7
HCM Lane LOS	B	B	C	B
HCM 95th-tile Q	1.4	2	6.1	0.8

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Lane Configurations			↕	
Traffic Vol, veh/h	0	4	24	94
Future Vol, veh/h	0	4	24	94
Peak Hour Factor	0.90	0.90	0.90	0.90
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	4	27	104
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	10.7
HCM LOS	B

Intersection	
Int Delay, s/veh	6.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	156	114	114	341	139	139
Future Vol, veh/h	156	114	114	341	139	139
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	100	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	173	127	127	379	154	154

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	300	0	869	237
Stage 1	-	-	-	-	237	-
Stage 2	-	-	-	-	632	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1261	-	322	802
Stage 1	-	-	-	-	802	-
Stage 2	-	-	-	-	530	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1261	-	281	802
Mov Cap-2 Maneuver	-	-	-	-	281	-
Stage 1	-	-	-	-	802	-
Stage 2	-	-	-	-	462	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2	21.5
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	281	802	-	-	1261	-
HCM Lane V/C Ratio	0.55	0.193	-	-	0.1	-
HCM Control Delay (s)	32.4	10.6	-	-	8.2	0
HCM Lane LOS	D	B	-	-	A	A
HCM 95th %tile Q(veh)	3.1	0.7	-	-	0.3	-

Intersection	
Intersection Delay, s/veh	36.5
Intersection LOS	E

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Traffic Vol, veh/h	0	7	30	17	0	39	235	88	0	108	160	285
Future Vol, veh/h	0	7	30	17	0	39	235	88	0	108	160	285
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	8	33	19	0	43	261	98	0	120	178	317
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	11.6	24.5	55.3
HCM LOS	B	C	F

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	20%	13%	11%	22%
Vol Thru, %	29%	56%	65%	36%
Vol Right, %	52%	31%	24%	42%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	553	54	362	212
LT Vol	108	7	39	47
Through Vol	160	30	235	77
RT Vol	285	17	88	88
Lane Flow Rate	614	60	402	236
Geometry Grp	1	1	1	1
Degree of Util (X)	0.981	0.124	0.72	0.426
Departure Headway (Hd)	5.748	7.466	6.447	6.509
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	633	477	559	551
Service Time	3.8	5.566	4.506	4.58
HCM Lane V/C Ratio	0.97	0.126	0.719	0.428
HCM Control Delay	55.3	11.6	24.5	14.4
HCM Lane LOS	F	B	C	B
HCM 95th-tile Q	14.4	0.4	5.9	2.1

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Lane Configurations			↕	
Traffic Vol, veh/h	0	47	77	88
Future Vol, veh/h	0	47	77	88
Peak Hour Factor	0.90	0.90	0.90	0.90
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	52	86	98
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	14.4
HCM LOS	B

Intersection						
Int Delay, s/veh	2.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	43	29	252	61	83	384
Future Vol, veh/h	43	29	252	61	83	384
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	75	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	48	32	280	68	92	427

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	925	314	0	0	348	0
Stage 1	314	-	-	-	-	-
Stage 2	611	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	299	726	-	-	1211	-
Stage 1	741	-	-	-	-	-
Stage 2	542	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	269	726	-	-	1211	-
Mov Cap-2 Maneuver	269	-	-	-	-	-
Stage 1	741	-	-	-	-	-
Stage 2	488	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	16.8	0	1.5
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	269	726	1211	-
HCM Lane V/C Ratio	-	-	0.178	0.044	0.076	-
HCM Control Delay (s)	-	-	21.3	10.2	8.2	0
HCM Lane LOS	-	-	C	B	A	A
HCM 95th %tile Q(veh)	-	-	0.6	0.1	0.2	-

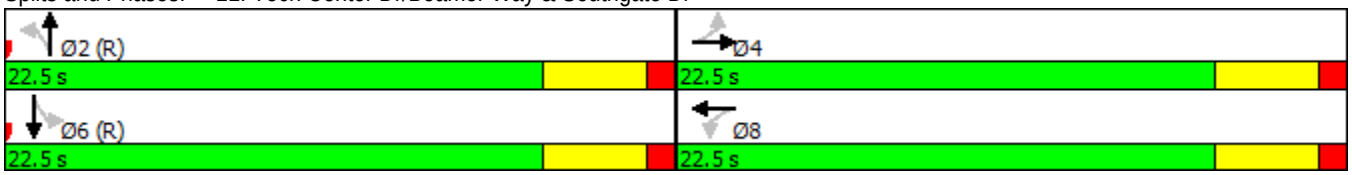
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	147	138	162	77	180	114	62	80	20	22	118	30
Future Volume (vph)	147	138	162	77	180	114	62	80	20	22	118	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	375		0	150		0	75		0	200		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.919			0.942			0.970			0.970	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1712	0	1770	1755	0	1770	1807	0	1770	1807	0
Flt Permitted	0.516			0.509			0.653			0.685		
Satd. Flow (perm)	961	1712	0	948	1755	0	1216	1807	0	1276	1807	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		903			728			646			781	
Travel Time (s)		20.5			16.5			14.7			17.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	163	153	180	86	200	127	69	89	22	24	131	33
Shared Lane Traffic (%)												
Lane Group Flow (vph)	163	333	0	86	327	0	69	111	0	24	164	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	18.0	18.0		18.0	18.0		18.0	18.0		18.0	18.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	18.0	18.0		18.0	18.0		18.0	18.0		18.0	18.0	
Actuated g/C Ratio	0.40	0.40		0.40	0.40		0.40	0.40		0.40	0.40	
v/c Ratio	0.42	0.49		0.23	0.47		0.14	0.15		0.05	0.23	
Control Delay	14.1	13.1		10.9	12.7		9.6	9.4		8.7	10.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	14.1	13.1		10.9	12.7		9.6	9.4		8.7	10.0	
LOS	B	B		B	B		A	A		A	A	
Approach Delay		13.4			12.3			9.5			9.8	
Approach LOS		B			B			A			A	
Queue Length 50th (ft)	29	61		14	58		11	17		4	26	
Queue Length 95th (ft)	69	116		37	112		29	40		14	56	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		823			648			566			701	
Turn Bay Length (ft)	375			150			75			200		
Base Capacity (vph)	384	684		379	702		486	722		510	722	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.42	0.49		0.23	0.47		0.14	0.15		0.05	0.23	

Intersection Summary

Area Type: Other
Cycle Length: 45
Actuated Cycle Length: 45
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 45
Control Type: Pretimed
Maximum v/c Ratio: 0.49
Intersection Signal Delay: 12.0 Intersection LOS: B
Intersection Capacity Utilization 51.8% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 11: Tech Center Dr/Beamer Way & Southgate Dr



Intersection

Int Delay, s/veh 1.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	29	2	6	0	1	0	33	132	0	0	493	116
Future Vol, veh/h	29	2	6	0	1	0	33	132	0	0	493	116
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	32	2	7	0	1	0	37	147	0	0	548	129

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	833	832	612	837	897	147	677	0	0	147	0	0
Stage 1	612	612	-	220	220	-	-	-	-	-	-	-
Stage 2	221	220	-	617	677	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	288	305	493	286	279	900	915	-	-	1435	-	-
Stage 1	480	484	-	782	721	-	-	-	-	-	-	-
Stage 2	781	721	-	477	452	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	277	292	493	271	267	900	915	-	-	1435	-	-
Mov Cap-2 Maneuver	277	292	-	271	267	-	-	-	-	-	-	-
Stage 1	459	484	-	748	689	-	-	-	-	-	-	-
Stage 2	745	689	-	468	452	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	19	18.5	1.8	0
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	915	-	-	299	267	1435	-	-
HCM Lane V/C Ratio	0.04	-	-	0.137	0.004	-	-	-
HCM Control Delay (s)	9.1	0	-	19	18.5	0	-	-
HCM Lane LOS	A	A	-	C	C	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.5	0	0	-	-

MOVEMENT SUMMARY

Site: NB(2025)AM - NoWPR

Stanger-Perry
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Stanger Street											
3	L2	6	2.0	0.280	6.4	LOS A	1.3	32.3	0.08	0.02	33.2
8	T1	273	2.0	0.280	6.4	LOS A	1.3	32.3	0.08	0.02	33.4
Approach		279	2.0	0.280	6.4	LOS A	1.3	32.3	0.08	0.02	33.4
North: Stanger Street											
4	T1	219	2.0	0.230	5.8	LOS A	1.0	24.8	0.05	0.01	33.7
14	R2	11	2.0	0.230	5.8	LOS A	1.0	24.8	0.05	0.01	33.0
Approach		230	2.0	0.230	5.8	LOS A	1.0	24.8	0.05	0.01	33.7
West: Perry Street											
5	L2	11	2.0	0.021	4.8	LOS A	0.1	1.8	0.33	0.20	32.7
12	R2	6	2.0	0.021	4.8	LOS A	0.1	1.8	0.33	0.20	32.1
Approach		17	2.0	0.021	4.8	LOS A	0.1	1.8	0.33	0.20	32.5
All Vehicles		526	2.0	0.280	6.1	LOS A	1.3	32.3	0.08	0.02	33.5

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: NB(2025)AM - NoWPR

Washington at West Campus
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
East: Washington St											
6	T1	442	2.0	0.700	16.3	LOS C	5.9	150.5	0.56	0.36	29.1
16	R2	187	2.0	0.700	16.3	LOS C	5.9	150.5	0.56	0.36	28.6
Approach		629	2.0	0.700	16.3	LOS C	5.9	150.5	0.56	0.36	29.0
North: W Campus Dr											
7	L2	228	2.0	0.520	14.7	LOS B	2.8	70.9	0.67	0.71	28.6
14	R2	91	2.0	0.520	14.7	LOS B	2.8	70.9	0.67	0.71	28.1
Approach		319	2.0	0.520	14.7	LOS B	2.8	70.9	0.67	0.71	28.4
West: Washington St											
5	L2	102	2.0	0.293	8.0	LOS A	1.2	31.1	0.43	0.34	31.7
2	T1	127	2.0	0.293	8.0	LOS A	1.2	31.1	0.43	0.34	31.8
Approach		229	2.0	0.293	8.0	LOS A	1.2	31.1	0.43	0.34	31.7
All Vehicles		1177	2.0	0.700	14.2	LOS B	5.9	150.5	0.56	0.45	29.3

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	780	260	428	931	1	636	1	605	4	0	4
Future Volume (vph)	5	780	260	428	931	1	636	1	605	4	0	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	175		350	225		0	0		550	0		0
Storage Lanes	1		1	1		0	1		1	0		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00
Frt			0.850						0.850		0.932	
Flt Protected	0.950			0.950			0.950	0.953			0.976	
Satd. Flow (prot)	1770	3539	1583	1770	3539	0	1681	1686	1583	0	1694	0
Flt Permitted	0.157			0.132			0.950	0.953			0.976	
Satd. Flow (perm)	292	3539	1583	246	3539	0	1681	1686	1583	0	1694	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		563			713			959			530	
Travel Time (s)		12.8			16.2			21.8			12.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	6	867	289	476	1034	1	707	1	672	4	0	4
Shared Lane Traffic (%)							50%					
Lane Group Flow (vph)	6	867	289	476	1035	0	353	355	672	0	8	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Split	NA	Perm	Split	NA	
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases	2		2	6					8			
Detector Phase	5	2	2	1	6		8	8	8	4	4	
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	11.0	30.0	30.0	11.0	30.0		30.0	30.0	30.0	30.0	30.0	
Total Split (s)	11.0	36.0	36.0	25.0	50.0		49.0	49.0	49.0	30.0	30.0	
Total Split (%)	7.9%	25.7%	25.7%	17.9%	35.7%		35.0%	35.0%	35.0%	21.4%	21.4%	
Maximum Green (s)	4.0	29.0	29.0	18.0	43.0		42.0	42.0	42.0	23.0	23.0	
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0		-2.0	-2.0	-2.0		-2.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0		5.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	C-Max	C-Max	None	C-Max		None	None	None	None	None	
Walk Time (s)		5.0	5.0		5.0		5.0	5.0	5.0	5.0	5.0	
Flash Dont Walk (s)		18.0	18.0		12.0		18.0	18.0	18.0	18.0	18.0	
Pedestrian Calls (#/hr)		0	0		0		0	0	0	0	0	
Act Effct Green (s)	37.0	31.0	31.0	56.0	53.8		71.1	71.1	71.1		8.3	
Actuated g/C Ratio	0.26	0.22	0.22	0.40	0.38		0.51	0.51	0.51		0.06	
v/c Ratio	0.04	1.11	0.83	1.51	0.76		0.41	0.41	0.84		0.08	
Control Delay	27.4	115.2	71.9	265.1	32.0		21.2	21.2	38.2		63.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0		0.0	
Total Delay	27.4	115.2	71.9	265.1	32.0		21.2	21.2	38.2		63.4	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	C	F	E	F	C		C	C	D		E	
Approach Delay		104.0			105.5			29.5			63.4	
Approach LOS		F			F			C			E	
Queue Length 50th (ft)	3	~472	253	~555	385		214	215	512		7	
Queue Length 95th (ft)	13	#606	#402	m#710	#597		360	362	#882		26	
Internal Link Dist (ft)		483			633			879			450	
Turn Bay Length (ft)	175		350	225					550			
Base Capacity (vph)	140	783	350	316	1359		853	856	803		302	
Starvation Cap Reductn	0	0	0	0	0		0	0	0		0	
Spillback Cap Reductn	0	0	0	0	0		0	0	0		0	
Storage Cap Reductn	0	0	0	0	0		0	0	0		0	
Reduced v/c Ratio	0.04	1.11	0.83	1.51	0.76		0.41	0.41	0.84		0.03	

Intersection Summary

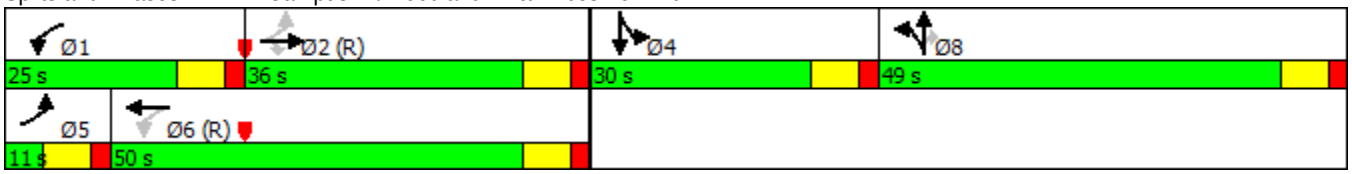
Area Type: Other
Cycle Length: 140
Actuated Cycle Length: 140
Offset: 74 (53%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 145
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.51
Intersection Signal Delay: 79.1 Intersection LOS: E
Intersection Capacity Utilization 82.1% ICU Level of Service E
Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: W Campus Dr/Woodland Dr & Prices Fork Rd



Intersection

Int Delay, s/veh 9.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	56	1286	7	85	1306	11	9	3	216	2	0	36
Future Vol, veh/h	56	1286	7	85	1306	11	9	3	216	2	0	36
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	200	-	-	150	-	-	-	-	125	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	62	1429	8	94	1451	12	10	3	240	2	0	40

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1463	0	0	1437	0	0	2471	3209	718	2487	3207	732
Stage 1	-	-	-	-	-	-	1557	1557	-	1646	1646	-
Stage 2	-	-	-	-	-	-	914	1652	-	841	1561	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	458	-	-	468	-	-	15	10	371	15	10	364
Stage 1	-	-	-	-	-	-	118	172	-	103	155	-
Stage 2	-	-	-	-	-	-	294	154	-	326	171	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	458	-	-	468	-	-	10	7	371	3	7	364
Mov Cap-2 Maneuver	-	-	-	-	-	-	10	7	-	3	7	-
Stage 1	-	-	-	-	-	-	102	149	-	89	124	-
Stage 2	-	-	-	-	-	-	209	123	-	97	148	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	0.9	84	211.1
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	9	371	458	-	-	468	-	-	50
HCM Lane V/C Ratio	1.481	0.647	0.136	-	-	0.202	-	-	0.844
HCM Control Delay (s)	$ 1041	30.8	14.1	-	-	14.6	-	-	211.1
HCM Lane LOS	F	D	B	-	-	B	-	-	F
HCM 95th %tile Q(veh)	2.5	4.3	0.5	-	-	0.7	-	-	3.5

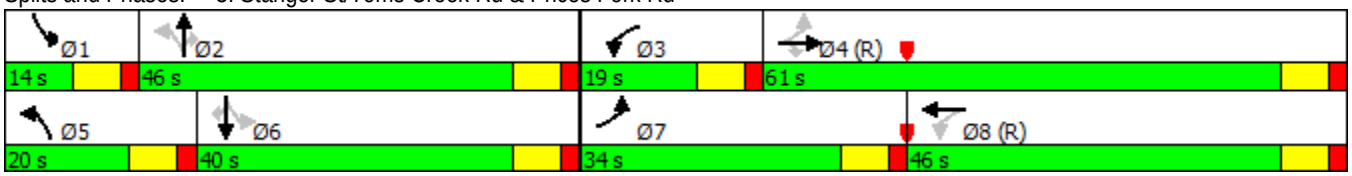
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	341	976	162	148	790	47	314	156	119	100	163	306
Future Volume (vph)	341	976	162	148	790	47	314	156	119	100	163	306
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		325	200		0	200		175	350		350
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.992				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3539	1583	1770	3511	0	1770	1863	1583	1770	1863	1583
Flt Permitted	0.083			0.155			0.445			0.648		
Satd. Flow (perm)	155	3539	1583	289	3511	0	829	1863	1583	1207	1863	1583
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		590			969			595			835	
Travel Time (s)		13.4			22.0			13.5			19.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	379	1084	180	164	878	52	349	173	132	111	181	340
Shared Lane Traffic (%)												
Lane Group Flow (vph)	379	1084	180	164	930	0	349	173	132	111	181	340
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8			2		2	6		6
Detector Phase	7	4	4	3	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	7.0	10.0	10.0	7.0	10.0		7.0	10.0	10.0	7.0	10.0	10.0
Minimum Split (s)	14.0	32.0	32.0	14.0	32.0		14.0	32.0	32.0	14.0	32.0	32.0
Total Split (s)	34.0	61.0	61.0	19.0	46.0		20.0	46.0	46.0	14.0	40.0	40.0
Total Split (%)	24.3%	43.6%	43.6%	13.6%	32.9%		14.3%	32.9%	32.9%	10.0%	28.6%	28.6%
Maximum Green (s)	27.0	54.0	54.0	12.0	39.0		13.0	39.0	39.0	7.0	33.0	33.0
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0		-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	None	C-Max		None	Min	Min	None	Min	Min
Walk Time (s)		7.0	7.0		7.0			7.0	7.0		7.0	7.0
Flash Dont Walk (s)		18.0	18.0		18.0			18.0	18.0		18.0	18.0
Pedestrian Calls (#/hr)		0	0		0			0	0		0	0
Act Effct Green (s)	76.4	58.5	58.5	56.3	43.3		53.6	39.6	39.6	42.6	33.6	33.6
Actuated g/C Ratio	0.55	0.42	0.42	0.40	0.31		0.38	0.28	0.28	0.30	0.24	0.24
v/c Ratio	0.93	0.73	0.27	0.65	0.86		0.84	0.33	0.30	0.28	0.41	0.90
Control Delay	51.5	28.1	20.5	35.3	54.9		53.2	41.3	40.9	30.6	47.5	77.9
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.5	28.1	20.5	35.3	54.9		53.2	41.3	40.9	30.6	47.5	77.9

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	D	C	C	D	D		D	D	D	C	D	E
Approach Delay		32.7			52.0			47.6			60.9	
Approach LOS		C			D			D			E	
Queue Length 50th (ft)	211	441	94	74	430		238	123	93	65	138	298
Queue Length 95th (ft)	m250	m470	m131	138	#548		#371	191	152	109	212	#467
Internal Link Dist (ft)		510			889			515			755	
Turn Bay Length (ft)	200		325	200			200		175	350		350
Base Capacity (vph)	420	1477	661	266	1087		417	545	463	403	465	395
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.90	0.73	0.27	0.62	0.86		0.84	0.32	0.29	0.28	0.39	0.86

Intersection Summary

Area Type: Other
Cycle Length: 140
Actuated Cycle Length: 140
Offset: 136 (97%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.93
Intersection Signal Delay: 44.8 Intersection LOS: D
Intersection Capacity Utilization 84.9% ICU Level of Service E
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Stanger St/Toms Creek Rd & Prices Fork Rd



Intersection

Int Delay, s/veh 3.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	217	290	39	0	290
Future Vol, veh/h	0	217	290	39	0	290
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	241	322	43	0	322

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	344	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	-	-
Pot Cap-1 Maneuver	0	699	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	699	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.8	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	699	-
HCM Lane V/C Ratio	-	-	0.345	-
HCM Control Delay (s)	-	-	12.8	-
HCM Lane LOS	-	-	B	-
HCM 95th %tile Q(veh)	-	-	1.5	-

Intersection	
Intersection Delay, s/veh	63.4
Intersection LOS	F

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Traffic Vol, veh/h	0	190	293	84	0	14	262	130	0	82	63	4
Future Vol, veh/h	0	190	293	84	0	14	262	130	0	82	63	4
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	211	326	93	0	16	291	144	0	91	70	4
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	113.7	35.3	16.6
HCM LOS	F	E	C

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	55%	34%	3%	15%
Vol Thru, %	42%	52%	65%	28%
Vol Right, %	3%	15%	32%	58%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	149	567	406	227
LT Vol	82	190	14	33
Through Vol	63	293	262	63
RT Vol	4	84	130	131
Lane Flow Rate	166	630	451	252
Geometry Grp	1	1	1	1
Degree of Util (X)	0.372	1.157	0.828	0.514
Departure Headway (Hd)	8.607	6.612	6.972	7.808
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	421	548	523	464
Service Time	6.607	4.678	4.972	5.808
HCM Lane V/C Ratio	0.394	1.15	0.862	0.543
HCM Control Delay	16.6	113.7	35.3	18.8
HCM Lane LOS	C	F	E	C
HCM 95th-tile Q	1.7	21.5	8.3	2.9

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Lane Configurations			↕	
Traffic Vol, veh/h	0	33	63	131
Future Vol, veh/h	0	33	63	131
Peak Hour Factor	0.90	0.90	0.90	0.90
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	37	70	146
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	18.8
HCM LOS	C

Intersection

Int Delay, s/veh 12.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	368	243	190	354	98	189
Future Vol, veh/h	368	243	190	354	98	189
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	100	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	409	270	211	393	109	210

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	679	0	1360	544
Stage 1	-	-	-	-	544	-
Stage 2	-	-	-	-	816	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	913	-	164	539
Stage 1	-	-	-	-	582	-
Stage 2	-	-	-	-	435	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	913	-	115	539
Mov Cap-2 Maneuver	-	-	-	-	115	-
Stage 1	-	-	-	-	582	-
Stage 2	-	-	-	-	306	-

Approach	EB	WB	NB
HCM Control Delay, s	0	3.5	58.4
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	115	539	-	-	913	-
HCM Lane V/C Ratio	0.947	0.39	-	-	0.231	-
HCM Control Delay (s)	140.5	15.9	-	-	10.1	0
HCM Lane LOS	F	C	-	-	B	A
HCM 95th %tile Q(veh)	6	1.8	-	-	0.9	-

Intersection	
Intersection Delay, s/veh	113.4
Intersection LOS	F

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Traffic Vol, veh/h	0	58	230	115	0	206	83	85	0	41	115	114
Future Vol, veh/h	0	58	230	115	0	206	83	85	0	41	115	114
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	64	256	128	0	229	92	94	0	46	128	127
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	111.7	92.6	43.1
HCM LOS	F	F	E

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	15%	14%	55%	28%
Vol Thru, %	43%	57%	22%	67%
Vol Right, %	42%	29%	23%	5%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	270	403	374	457
LT Vol	41	58	206	128
Through Vol	115	230	83	308
RT Vol	114	115	85	21
Lane Flow Rate	300	448	416	508
Geometry Grp	1	1	1	1
Degree of Util (X)	0.778	1.108	1.042	1.281
Departure Headway (Hd)	10.8	9.931	10.23	9.619
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	339	367	357	381
Service Time	8.8	7.931	8.23	7.619
HCM Lane V/C Ratio	0.885	1.221	1.165	1.333
HCM Control Delay	43.1	111.7	92.6	173.5
HCM Lane LOS	E	F	F	F
HCM 95th-tile Q	6.3	15	12.7	21.5

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Lane Configurations			↕	
Traffic Vol, veh/h	0	128	308	21
Future Vol, veh/h	0	128	308	21
Peak Hour Factor	0.90	0.90	0.90	0.90
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	142	342	23
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	173.5
HCM LOS	F

Intersection						
Int Delay, s/veh	1.8					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	14	31	449	105	130	475
Future Vol, veh/h	14	31	449	105	130	475
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	75	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	16	34	499	117	144	528

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1374	557	0	0	616	0
Stage 1	557	-	-	-	-	-
Stage 2	817	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	160	530	-	-	964	-
Stage 1	574	-	-	-	-	-
Stage 2	434	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	126	530	-	-	964	-
Mov Cap-2 Maneuver	126	-	-	-	-	-
Stage 1	574	-	-	-	-	-
Stage 2	342	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	20.2	0	2
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	126	530	964	-
HCM Lane V/C Ratio	-	-	0.123	0.065	0.15	-
HCM Control Delay (s)	-	-	37.6	12.3	9.4	0
HCM Lane LOS	-	-	E	B	A	A
HCM 95th %tile Q(veh)	-	-	0.4	0.2	0.5	-

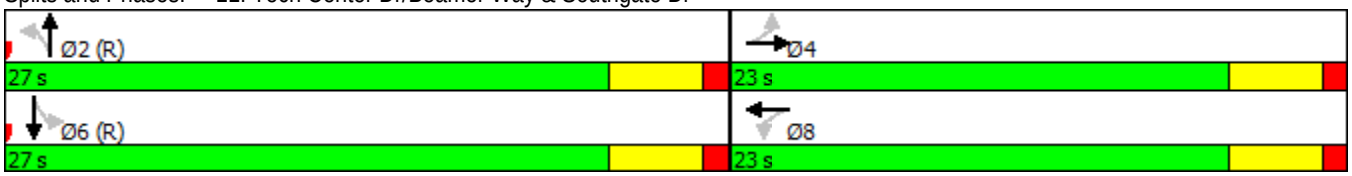
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	117	278	104	45	215	59	196	112	101	204	172	205
Future Volume (vph)	117	278	104	45	215	59	196	112	101	204	172	205
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	375		0	150		0	75		0	200		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.959			0.968			0.929			0.918	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1786	0	1770	1803	0	1770	1730	0	1770	1710	0
Flt Permitted	0.515			0.369			0.429			0.612		
Satd. Flow (perm)	959	1786	0	687	1803	0	799	1730	0	1140	1710	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		903			728			646			781	
Travel Time (s)		20.5			16.5			14.7			17.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	130	309	116	50	239	66	218	124	112	227	191	228
Shared Lane Traffic (%)												
Lane Group Flow (vph)	130	425	0	50	305	0	218	236	0	227	419	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	23.0	23.0		23.0	23.0		27.0	27.0		27.0	27.0	
Total Split (%)	46.0%	46.0%		46.0%	46.0%		54.0%	54.0%		54.0%	54.0%	
Maximum Green (s)	18.5	18.5		18.5	18.5		22.5	22.5		22.5	22.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	18.5	18.5		18.5	18.5		22.5	22.5		22.5	22.5	
Actuated g/C Ratio	0.37	0.37		0.37	0.37		0.45	0.45		0.45	0.45	
v/c Ratio	0.37	0.64		0.20	0.46		0.61	0.30		0.44	0.54	
Control Delay	15.3	18.5		13.2	14.7		19.9	10.1		12.9	13.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	15.3	18.5		13.2	14.7		19.9	10.1		12.9	13.4	
LOS	B	B		B	B		B	B		B	B	
Approach Delay		17.8			14.5			14.8			13.2	
Approach LOS		B			B			B			B	
Queue Length 50th (ft)	27	99		10	65		45	41		42	83	
Queue Length 95th (ft)	63	177		30	121		#129	79		90	151	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		823			648			566			701	
Turn Bay Length (ft)	375			150			75			200		
Base Capacity (vph)	354	660		254	667		359	778		513	769	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.37	0.64		0.20	0.46		0.61	0.30		0.44	0.54	

Intersection Summary

Area Type: Other
Cycle Length: 50
Actuated Cycle Length: 50
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 50
Control Type: Pretimed
Maximum v/c Ratio: 0.64
Intersection Signal Delay: 15.1 Intersection LOS: B
Intersection Capacity Utilization 72.6% ICU Level of Service C
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 11: Tech Center Dr/Beamer Way & Southgate Dr



Intersection

Int Delay, s/veh 4.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	95	4	22	0	9	0	40	460	1	2	301	46
Future Vol, veh/h	95	4	22	0	9	0	40	460	1	2	301	46
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	106	4	24	0	10	0	44	511	1	2	334	51

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	970	965	360	980	991	512	386	0	0	512	0	0
Stage 1	364	364	-	601	601	-	-	-	-	-	-	-
Stage 2	606	601	-	379	390	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	233	255	684	229	246	562	1172	-	-	1053	-	-
Stage 1	655	624	-	487	489	-	-	-	-	-	-	-
Stage 2	484	489	-	643	608	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	216	241	684	209	233	562	1172	-	-	1053	-	-
Mov Cap-2 Maneuver	216	241	-	209	233	-	-	-	-	-	-	-
Stage 1	621	623	-	462	464	-	-	-	-	-	-	-
Stage 2	449	464	-	614	607	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	35.5	21.1	0.7	0
HCM LOS	E	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1172	-	-	248	233	1053	-	-
HCM Lane V/C Ratio	0.038	-	-	0.542	0.043	0.002	-	-
HCM Control Delay (s)	8.2	0	-	35.5	21.1	8.4	0	-
HCM Lane LOS	A	A	-	E	C	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	2.9	0.1	0	-	-

MOVEMENT SUMMARY

Site: NB(2025)PM - NoWPR

Stanger-Perry
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Stanger Street											
3	L2	6	2.0	0.563	11.0	LOS B	4.1	103.8	0.13	0.03	31.1
8	T1	554	2.0	0.563	11.0	LOS B	4.1	103.8	0.13	0.03	31.3
Approach		560	2.0	0.563	11.0	LOS B	4.1	103.8	0.13	0.03	31.3
North: Stanger Street											
4	T1	323	2.0	0.334	7.1	LOS A	1.6	41.6	0.06	0.01	33.1
14	R2	11	2.0	0.334	7.1	LOS A	1.6	41.6	0.06	0.01	32.4
Approach		334	2.0	0.334	7.1	LOS A	1.6	41.6	0.06	0.01	33.1
West: Perry Street											
5	L2	11	2.0	0.024	5.4	LOS A	0.1	2.0	0.40	0.29	32.4
12	R2	6	2.0	0.024	5.4	LOS A	0.1	2.0	0.40	0.29	31.9
Approach		17	2.0	0.024	5.4	LOS A	0.1	2.0	0.40	0.29	32.2
All Vehicles		911	2.0	0.563	9.4	LOS A	4.1	103.8	0.11	0.03	31.9

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: NB(2025)PM - NoWPR

Washington at West Campus
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
East: Washington St											
6	T1	253	2.0	0.698	17.5	LOS C	6.1	156.0	0.68	0.61	28.7
16	R2	311	2.0	0.698	17.5	LOS C	6.1	156.0	0.68	0.61	28.1
Approach		564	2.0	0.698	17.5	LOS C	6.1	156.0	0.68	0.61	28.4
North: W Campus Dr											
7	L2	299	2.0	0.529	12.6	LOS B	3.1	77.9	0.58	0.53	29.3
14	R2	102	2.0	0.529	12.6	LOS B	3.1	77.9	0.58	0.53	28.8
Approach		401	2.0	0.529	12.6	LOS B	3.1	77.9	0.58	0.53	29.2
West: Washington St											
5	L2	196	2.0	0.912	39.2	LOS E	15.0	379.9	1.00	1.27	22.2
2	T1	461	2.0	0.912	39.2	LOS E	15.0	379.9	1.00	1.27	22.2
Approach		657	2.0	0.912	39.2	LOS E	15.0	379.9	1.00	1.27	22.2
All Vehicles		1622	2.0	0.912	25.1	LOS D	15.0	379.9	0.78	0.86	25.7

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Future Build (2025) Conditions

Intersection Capacity Analysis Results

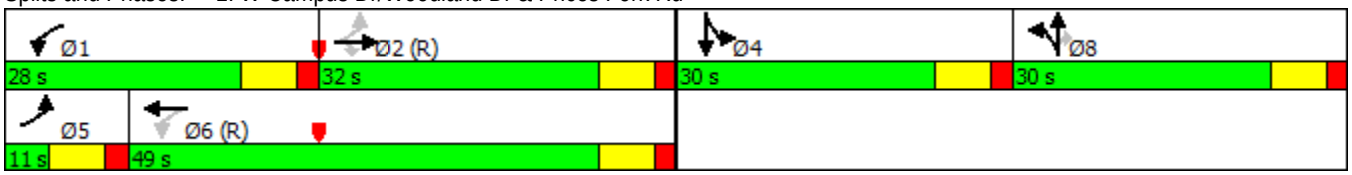
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	730	316	394	532	2	70	1	106	0	1	2
Future Volume (vph)	2	730	316	394	532	2	70	1	106	0	1	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	175		350	225		0	0		550	0		0
Storage Lanes	1		1	1		0	1		1	0		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00
Frt			0.850		0.999				0.850		0.910	
Flt Protected	0.950			0.950			0.950	0.954				
Satd. Flow (prot)	1770	3539	1583	1770	3536	0	1681	1688	1583	0	1695	0
Flt Permitted	0.428			0.173			0.950	0.954				
Satd. Flow (perm)	797	3539	1583	322	3536	0	1681	1688	1583	0	1695	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		563			713			959			530	
Travel Time (s)		12.8			16.2			21.8			12.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	2	811	351	438	591	2	78	1	118	0	1	2
Shared Lane Traffic (%)							49%					
Lane Group Flow (vph)	2	811	351	438	593	0	40	39	118	0	3	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Split	NA	Perm		NA	
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases	2		2	6					8			
Detector Phase	5	2	2	1	6		8	8	8	4	4	
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	11.0	30.0	30.0	11.0	30.0		30.0	30.0	30.0	30.0	30.0	
Total Split (s)	11.0	32.0	32.0	28.0	49.0		30.0	30.0	30.0	30.0	30.0	
Total Split (%)	9.2%	26.7%	26.7%	23.3%	40.8%		25.0%	25.0%	25.0%	25.0%	25.0%	
Maximum Green (s)	4.0	25.0	25.0	21.0	42.0		23.0	23.0	23.0	23.0	23.0	
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0		-2.0	-2.0	-2.0		-2.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0		5.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	C-Max	C-Max	None	C-Max		None	None	None	None	None	
Walk Time (s)		5.0	5.0		5.0		5.0	5.0	5.0	5.0	5.0	
Flash Dont Walk (s)		18.0	18.0		12.0		18.0	18.0	18.0	18.0	18.0	
Pedestrian Calls (#/hr)		0	0		0		0	0	0	0	0	
Act Effct Green (s)	56.0	48.5	48.5	91.1	88.5		16.2	16.2	16.2		7.8	
Actuated g/C Ratio	0.47	0.40	0.40	0.76	0.74		0.14	0.14	0.14		0.06	
v/c Ratio	0.00	0.57	0.55	0.63	0.23		0.18	0.17	0.55		0.03	
Control Delay	12.0	31.4	33.9	11.8	4.7		49.2	49.0	60.0		52.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0		0.0	
Total Delay	12.0	31.4	33.9	11.8	4.7		49.2	49.0	60.0		52.7	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	B	C	C	B	A		D	D	E		D	
Approach Delay		32.2			7.7			55.6			52.7	
Approach LOS		C			A			E			D	
Queue Length 50th (ft)	0	233	190	39	5		30	30	90		2	
Queue Length 95th (ft)	4	#451	#445	368	224		65	65	147		13	
Internal Link Dist (ft)		483			633			879			450	
Turn Bay Length (ft)	175		350	225					550			
Base Capacity (vph)	433	1429	639	698	2608		350	351	329		353	
Starvation Cap Reductn	0	0	0	0	0		0	0	0		0	
Spillback Cap Reductn	0	0	0	0	0		0	0	0		0	
Storage Cap Reductn	0	0	0	0	0		0	0	0		0	
Reduced v/c Ratio	0.00	0.57	0.55	0.63	0.23		0.11	0.11	0.36		0.01	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 102 (85%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 115
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.63
Intersection Signal Delay: 23.6 Intersection LOS: C
Intersection Capacity Utilization 63.1% ICU Level of Service B
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: W Campus Dr/Woodland Dr & Prices Fork Rd



Intersection

Int Delay, s/veh 3.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	15	762	71	262	887	5	4	0	54	2	2	28
Future Vol, veh/h	15	762	71	262	887	5	4	0	54	2	2	28
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	200	-	-	150	-	-	-	-	125	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	17	847	79	291	986	6	4	0	60	2	2	31

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	991	0	0	926	0	0	1995	2492	463	2028	2530	496
Stage 1	-	-	-	-	-	-	919	919	-	1571	1571	-
Stage 2	-	-	-	-	-	-	1076	1573	-	457	959	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	693	-	-	734	-	-	36	29	546	34	27	519
Stage 1	-	-	-	-	-	-	292	348	-	115	169	-
Stage 2	-	-	-	-	-	-	234	169	-	553	334	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	693	-	-	734	-	-	21	17	546	21	16	519
Mov Cap-2 Maneuver	-	-	-	-	-	-	21	17	-	21	16	-
Stage 1	-	-	-	-	-	-	285	339	-	112	102	-
Stage 2	-	-	-	-	-	-	130	102	-	480	326	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	3	26.6	48.7
HCM LOS			D	E

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	21	546	693	-	-	734	-	-	117
HCM Lane V/C Ratio	0.212	0.11	0.024	-	-	0.397	-	-	0.304
HCM Control Delay (s)	217.7	12.4	10.3	-	-	13.1	-	-	48.7
HCM Lane LOS	F	B	B	-	-	B	-	-	E
HCM 95th %tile Q(veh)	0.6	0.4	0.1	-	-	1.9	-	-	1.2

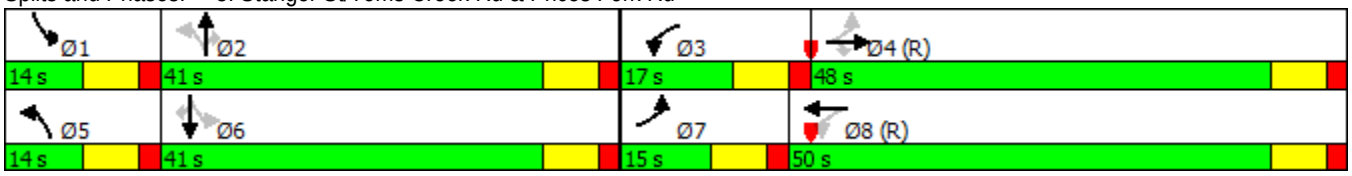
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	110	566	117	150	792	22	97	15	35	59	219	263
Future Volume (vph)	110	566	117	150	792	22	97	15	35	59	219	263
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		325	200		0	200		175	350		350
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.996				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3539	1583	1770	3525	0	1770	1863	1583	1770	1863	1583
Flt Permitted	0.193			0.309			0.411			0.746		
Satd. Flow (perm)	360	3539	1583	576	3525	0	766	1863	1583	1390	1863	1583
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		590			969			595			835	
Travel Time (s)		13.4			22.0			13.5			19.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	122	629	130	167	880	24	108	17	39	66	243	292
Shared Lane Traffic (%)												
Lane Group Flow (vph)	122	629	130	167	904	0	108	17	39	66	243	292
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8			2		2	6		6
Detector Phase	7	4	4	3	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	7.0	10.0	10.0	7.0	10.0		7.0	10.0	10.0	7.0	10.0	10.0
Minimum Split (s)	14.0	32.0	32.0	14.0	32.0		14.0	32.0	32.0	14.0	32.0	32.0
Total Split (s)	15.0	48.0	48.0	17.0	50.0		14.0	41.0	41.0	14.0	41.0	41.0
Total Split (%)	12.5%	40.0%	40.0%	14.2%	41.7%		11.7%	34.2%	34.2%	11.7%	34.2%	34.2%
Maximum Green (s)	8.0	41.0	41.0	10.0	43.0		7.0	34.0	34.0	7.0	34.0	34.0
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0		-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	None	C-Max		None	Min	Min	None	Min	Min
Walk Time (s)		7.0	7.0		7.0			7.0	7.0		7.0	7.0
Flash Dont Walk (s)		18.0	18.0		18.0			18.0	18.0		18.0	18.0
Pedestrian Calls (#/hr)		0	0		0			0	0		0	0
Act Effct Green (s)	60.3	49.7	49.7	63.2	51.2		39.2	32.0	32.0	38.2	29.2	29.2
Actuated g/C Ratio	0.50	0.41	0.41	0.53	0.43		0.33	0.27	0.27	0.32	0.24	0.24
v/c Ratio	0.40	0.43	0.20	0.39	0.60		0.33	0.03	0.09	0.14	0.54	0.76
Control Delay	15.7	13.5	11.2	17.3	29.8		27.7	31.7	33.1	24.5	43.1	54.5
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.7	13.5	11.2	17.3	29.8		27.7	31.7	33.1	24.5	43.1	54.5

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	B	B	B	B	C		C	C	C	C	D	D
Approach Delay		13.4			27.9			29.4			46.6	
Approach LOS		B			C			C			D	
Queue Length 50th (ft)	4	196	70	62	287		56	10	23	33	163	209
Queue Length 95th (ft)	70	90	29	112	381		90	27	49	60	229	291
Internal Link Dist (ft)		510			889			515			755	
Turn Bay Length (ft)	200		325	200			200		175	350		350
Base Capacity (vph)	308	1466	656	432	1503		325	558	474	471	558	474
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.40	0.43	0.20	0.39	0.60		0.33	0.03	0.08	0.14	0.44	0.62

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 12 (10%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.76
Intersection Signal Delay: 27.4 Intersection LOS: C
Intersection Capacity Utilization 62.7% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 3: Stanger St/Toms Creek Rd & Prices Fork Rd



Intersection	
Int Delay, s/veh	3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	134	89	30	0	179
Future Vol, veh/h	0	134	89	30	0	179
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	149	99	33	0	199

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	116	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	-	-
Pot Cap-1 Maneuver	0	936	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	936	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.6	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	936	-
HCM Lane V/C Ratio	-	-	0.159	-
HCM Control Delay (s)	-	-	9.6	-
HCM Lane LOS	-	-	A	-
HCM 95th %tile Q(veh)	-	-	0.6	-

Intersection	
Intersection Delay, s/veh	15.3
Intersection LOS	C

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Traffic Vol, veh/h	0	68	107	31	0	7	390	35	0	105	58	6
Future Vol, veh/h	0	68	107	31	0	7	390	35	0	105	58	6
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	76	119	34	0	8	433	39	0	117	64	7
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	11.8	19.4	12.2
HCM LOS	B	C	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	62%	33%	2%	4%
Vol Thru, %	34%	52%	90%	17%
Vol Right, %	4%	15%	8%	79%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	169	206	432	112
LT Vol	105	68	7	4
Through Vol	58	107	390	19
RT Vol	6	31	35	89
Lane Flow Rate	188	229	480	124
Geometry Grp	1	1	1	1
Degree of Util (X)	0.321	0.356	0.695	0.199
Departure Headway (Hd)	6.163	5.601	5.213	5.758
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	580	639	691	618
Service Time	4.233	3.664	3.263	3.834
HCM Lane V/C Ratio	0.324	0.358	0.695	0.201
HCM Control Delay	12.2	11.8	19.4	10.3
HCM Lane LOS	B	B	C	B
HCM 95th-tile Q	1.4	1.6	5.6	0.7

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Lane Configurations			↕	
Traffic Vol, veh/h	0	4	19	89
Future Vol, veh/h	0	4	19	89
Peak Hour Factor	0.90	0.90	0.90	0.90
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	4	21	99
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	10.3
HCM LOS	B

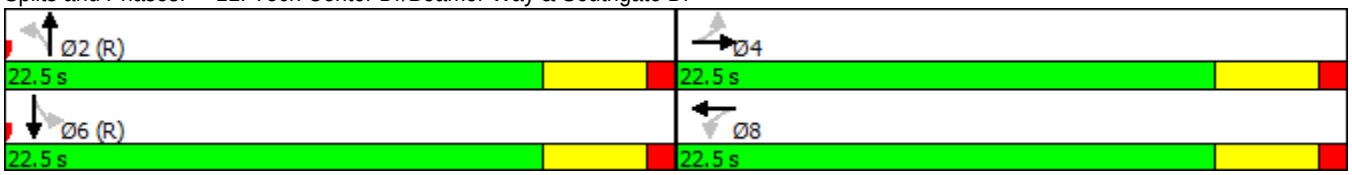
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	147	163	162	77	205	114	62	80	20	22	118	30
Future Volume (vph)	147	163	162	77	205	114	62	80	20	22	118	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	375		0	150		0	75		0	200		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.925			0.946			0.970			0.970	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1723	0	1770	1762	0	1770	1807	0	1770	1807	0
Flt Permitted	0.484			0.477			0.653			0.685		
Satd. Flow (perm)	902	1723	0	889	1762	0	1216	1807	0	1276	1807	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		903			728			646			781	
Travel Time (s)		20.5			16.5			14.7			17.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	163	181	180	86	228	127	69	89	22	24	131	33
Shared Lane Traffic (%)												
Lane Group Flow (vph)	163	361	0	86	355	0	69	111	0	24	164	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	18.0	18.0		18.0	18.0		18.0	18.0		18.0	18.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	18.0	18.0		18.0	18.0		18.0	18.0		18.0	18.0	
Actuated g/C Ratio	0.40	0.40		0.40	0.40		0.40	0.40		0.40	0.40	
v/c Ratio	0.45	0.52		0.24	0.50		0.14	0.15		0.05	0.23	
Control Delay	15.0	13.7		11.3	13.3		9.6	9.4		8.7	10.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	15.0	13.7		11.3	13.3		9.6	9.4		8.7	10.0	
LOS	B	B		B	B		A	A		A	A	
Approach Delay		14.1			12.9			9.5			9.8	
Approach LOS		B			B			A			A	
Queue Length 50th (ft)	29	67		14	65		11	17		4	26	
Queue Length 95th (ft)	71	126		38	123		29	40		14	56	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		823			648			566			701	
Turn Bay Length (ft)	375			150			75			200		
Base Capacity (vph)	360	689		355	704		486	722		510	722	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.45	0.52		0.24	0.50		0.14	0.15		0.05	0.23	

Intersection Summary

Area Type: Other
Cycle Length: 45
Actuated Cycle Length: 45
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 45
Control Type: Pretimed
Maximum v/c Ratio: 0.52
Intersection Signal Delay: 12.5 Intersection LOS: B
Intersection Capacity Utilization 53.1% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 11: Tech Center Dr/Beamer Way & Southgate Dr



Intersection

Int Delay, s/veh 1.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	19	2	6	0	1	0	33	82	0	0	293	66
Future Vol, veh/h	19	2	6	0	1	0	33	82	0	0	293	66
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	21	2	7	0	1	0	37	91	0	0	326	73

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	527	526	362	531	563	91	399	0	0	91	0	0
Stage 1	362	362	-	164	164	-	-	-	-	-	-	-
Stage 2	165	164	-	367	399	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	462	457	683	459	435	967	1160	-	-	1504	-	-
Stage 1	657	625	-	838	762	-	-	-	-	-	-	-
Stage 2	837	762	-	653	602	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	449	441	683	441	420	967	1160	-	-	1504	-	-
Mov Cap-2 Maneuver	449	441	-	441	420	-	-	-	-	-	-	-
Stage 1	635	625	-	810	736	-	-	-	-	-	-	-
Stage 2	807	736	-	644	602	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.9	13.6	2.4	0
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1160	-	-	485	420	1504	-	-
HCM Lane V/C Ratio	0.032	-	-	0.062	0.003	-	-	-
HCM Control Delay (s)	8.2	0	-	12.9	13.6	0	-	-
HCM Lane LOS	A	A	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.2	0	0	-	-

MOVEMENT SUMMARY

Site: Bld(2025)AM - WPR - All Imp

Stanger-Perry
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Stanger Street											
3	L2	6	2.0	0.252	6.1	LOS A	1.1	28.0	0.08	0.02	33.4
8	T1	246	2.0	0.252	6.1	LOS A	1.1	28.0	0.08	0.02	33.5
Approach		251	2.0	0.252	6.1	LOS A	1.1	28.0	0.08	0.02	33.5
North: Stanger Street											
4	T1	256	2.0	0.266	6.2	LOS A	1.2	30.2	0.05	0.01	33.5
14	R2	11	2.0	0.266	6.2	LOS A	1.2	30.2	0.05	0.01	32.8
Approach		267	2.0	0.266	6.2	LOS A	1.2	30.2	0.05	0.01	33.5
West: Perry Street											
5	L2	11	2.0	0.022	5.0	LOS A	0.1	1.8	0.36	0.23	32.6
12	R2	6	2.0	0.022	5.0	LOS A	0.1	1.8	0.36	0.23	32.0
Approach		17	2.0	0.022	5.0	LOS A	0.1	1.8	0.36	0.23	32.4
All Vehicles		534	2.0	0.266	6.1	LOS A	1.2	30.2	0.07	0.02	33.5

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: Bld(2025)AM - WPR - All Imp

Washington-Beamer
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Beamer Way											
3	L2	154	2.0	0.361	8.4	LOS A	1.7	42.9	0.37	0.26	31.4
18	R2	154	2.0	0.361	8.4	LOS A	1.7	42.9	0.37	0.26	30.9
Approach		309	2.0	0.361	8.4	LOS A	1.7	42.9	0.37	0.26	31.1
East: Washington Street											
1	L2	127	2.0	0.584	13.0	LOS B	3.7	93.9	0.52	0.39	29.9
6	T1	368	2.0	0.584	13.0	LOS B	3.7	93.9	0.52	0.39	30.0
Approach		494	2.0	0.584	13.0	LOS B	3.7	93.9	0.52	0.39	30.0
West: Washington Street											
2	T1	146	2.0	0.312	7.5	LOS A	1.4	35.2	0.33	0.22	32.9
12	R2	127	2.0	0.312	7.5	LOS A	1.4	35.2	0.33	0.22	32.2
Approach		272	2.0	0.312	7.5	LOS A	1.4	35.2	0.33	0.22	32.5
All Vehicles		1076	2.0	0.584	10.3	LOS B	3.7	93.9	0.43	0.31	30.9

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: Bld(2025)AM - WPR - All Imp

Washington at West Campus
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
East: Washington St											
6	T1	442	2.0	0.671	14.9	LOS B	5.5	140.5	0.47	0.28	29.7
16	R2	176	2.0	0.671	14.9	LOS B	5.5	140.5	0.47	0.28	29.1
Approach		618	2.0	0.671	14.9	LOS B	5.5	140.5	0.47	0.28	29.5
North: W Campus Dr											
7	L2	200	2.0	0.384	11.4	LOS B	1.7	42.1	0.60	0.61	29.6
14	R2	36	2.0	0.384	11.4	LOS B	1.7	42.1	0.60	0.61	29.1
Approach		236	2.0	0.384	11.4	LOS B	1.7	42.1	0.60	0.61	29.5
West: Washington St											
5	L2	80	2.0	0.257	7.3	LOS A	1.0	26.6	0.39	0.29	32.1
2	T1	127	2.0	0.257	7.3	LOS A	1.0	26.6	0.39	0.29	32.2
Approach		207	2.0	0.257	7.3	LOS A	1.0	26.6	0.39	0.29	32.2
All Vehicles		1060	2.0	0.671	12.6	LOS B	5.5	140.5	0.48	0.35	30.0

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: Bld(2025)AM - WPR - All Imp

Washington-Duck Pond
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Duck Pond Rd											
3	L2	120	2.0	0.621	13.2	LOS B	4.6	116.3	0.43	0.25	29.9
8	T1	144	2.0	0.621	13.2	LOS B	4.6	116.3	0.43	0.25	30.0
18	R2	306	2.0	0.621	13.2	LOS B	4.6	116.3	0.43	0.25	29.4
Approach		570	2.0	0.621	13.2	LOS B	4.6	116.3	0.43	0.25	29.6
East: Washington St											
1	L2	16	2.0	0.467	11.4	LOS B	2.4	60.4	0.55	0.50	30.9
6	T1	233	2.0	0.467	11.4	LOS B	2.4	60.4	0.55	0.50	31.0
16	R2	98	2.0	0.467	11.4	LOS B	2.4	60.4	0.55	0.50	30.4
Approach		347	2.0	0.467	11.4	LOS B	2.4	60.4	0.55	0.50	30.9
North: Duck Pond Rd											
7	L2	52	2.0	0.229	8.1	LOS A	0.9	21.8	0.50	0.46	31.8
4	T1	30	2.0	0.229	8.1	LOS A	0.9	21.8	0.50	0.46	31.9
14	R2	70	2.0	0.229	8.1	LOS A	0.9	21.8	0.50	0.46	31.2
Approach		152	2.0	0.229	8.1	LOS A	0.9	21.8	0.50	0.46	31.6
West: Parking Lot Entrance											
5	L2	8	2.0	0.054	4.5	LOS A	0.2	4.7	0.22	0.11	33.9
2	T1	22	2.0	0.054	4.5	LOS A	0.2	4.7	0.22	0.11	34.1
12	R2	19	2.0	0.054	4.5	LOS A	0.2	4.7	0.22	0.11	33.3
Approach		49	2.0	0.054	4.5	LOS A	0.2	4.7	0.22	0.11	33.7
All Vehicles		1118	2.0	0.621	11.6	LOS B	4.6	116.3	0.47	0.35	30.4

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: Bld(2025)AM - WPR - All Imp

West Campus-Drillfield
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: W Campus Dr											
8	T1	247	2.0	0.336	7.4	LOS A	1.6	40.4	0.24	0.12	32.9
18	R2	68	2.0	0.336	7.4	LOS A	1.6	40.4	0.24	0.12	32.2
Approach		314	2.0	0.336	7.4	LOS A	1.6	40.4	0.24	0.12	32.8
East: Drillfield Dr											
1	L2	48	2.0	0.076	5.5	LOS A	0.3	6.6	0.37	0.27	32.1
16	R2	10	2.0	0.076	5.5	LOS A	0.3	6.6	0.37	0.27	31.5
Approach		58	2.0	0.076	5.5	LOS A	0.3	6.6	0.37	0.27	32.0
North: W Campus Dr											
7	L2	64	2.0	0.427	8.7	LOS A	2.3	59.3	0.23	0.11	31.9
4	T1	343	2.0	0.427	8.7	LOS A	2.3	59.3	0.23	0.11	32.0
Approach		408	2.0	0.427	8.7	LOS A	2.3	59.3	0.23	0.11	32.0
All Vehicles		780	2.0	0.427	8.0	LOS A	2.3	59.3	0.24	0.12	32.3

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	830	110	378	941	1	336	1	405	4	0	4
Future Volume (vph)	5	830	110	378	941	1	336	1	405	4	0	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	175		350	225		0	0		550	0		0
Storage Lanes	1		1	1		0	1		1	0		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00
Frt			0.850						0.850		0.932	
Flt Protected	0.950			0.950			0.950	0.953			0.976	
Satd. Flow (prot)	1770	3539	1583	1770	3539	0	1681	1686	1583	0	1694	0
Flt Permitted	0.164			0.136			0.950	0.953			0.976	
Satd. Flow (perm)	305	3539	1583	253	3539	0	1681	1686	1583	0	1694	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		563			713			959			530	
Travel Time (s)		12.8			16.2			21.8			12.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	6	922	122	420	1046	1	373	1	450	4	0	4
Shared Lane Traffic (%)							50%					
Lane Group Flow (vph)	6	922	122	420	1047	0	186	188	450	0	8	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Split	NA	Perm	Split	NA	
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases	2		2	6					8			
Detector Phase	5	2	2	1	6		8	8	8	4	4	
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	11.0	30.0	30.0	11.0	30.0		30.0	30.0	30.0	30.0	30.0	
Total Split (s)	11.0	35.0	35.0	21.0	45.0		34.0	34.0	34.0	30.0	30.0	
Total Split (%)	9.2%	29.2%	29.2%	17.5%	37.5%		28.3%	28.3%	28.3%	25.0%	25.0%	
Maximum Green (s)	4.0	28.0	28.0	14.0	38.0		27.0	27.0	27.0	23.0	23.0	
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0		-2.0	-2.0	-2.0		-2.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0		5.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	C-Max	C-Max	None	C-Max		None	None	None	None	None	
Walk Time (s)		5.0	5.0		5.0		5.0	5.0	5.0	5.0	5.0	
Flash Dont Walk (s)		18.0	18.0		12.0		18.0	18.0	18.0	18.0	18.0	
Pedestrian Calls (#/hr)		0	0		0		0	0	0	0	0	
Act Effct Green (s)	37.0	30.0	30.0	56.6	54.4		50.5	50.5	50.5		8.2	
Actuated g/C Ratio	0.31	0.25	0.25	0.47	0.45		0.42	0.42	0.42		0.07	
v/c Ratio	0.03	1.04	0.31	1.07	0.65		0.26	0.27	0.68		0.07	
Control Delay	19.6	85.9	39.2	85.5	24.9		23.5	23.5	33.9		53.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0		0.0	
Total Delay	19.6	85.9	39.2	85.5	24.9		23.5	23.5	33.9		53.1	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	B	F	D	F	C		C	C	C		D	
Approach Delay		80.1			42.2			29.1			53.1	
Approach LOS		F			D			C			D	
Queue Length 50th (ft)	2	~406	77	239	287		102	103	281		6	
Queue Length 95th (ft)	11	#537	134	m#558	#517		174	176	435		22	
Internal Link Dist (ft)		483			633			879			450	
Turn Bay Length (ft)	175		350	225					550			
Base Capacity (vph)	179	884	395	392	1604		707	709	666		352	
Starvation Cap Reductn	0	0	0	0	0		0	0	0		0	
Spillback Cap Reductn	0	0	0	0	0		0	0	0		0	
Storage Cap Reductn	0	0	0	0	0		0	0	0		0	
Reduced v/c Ratio	0.03	1.04	0.31	1.07	0.65		0.26	0.27	0.68		0.02	

Intersection Summary

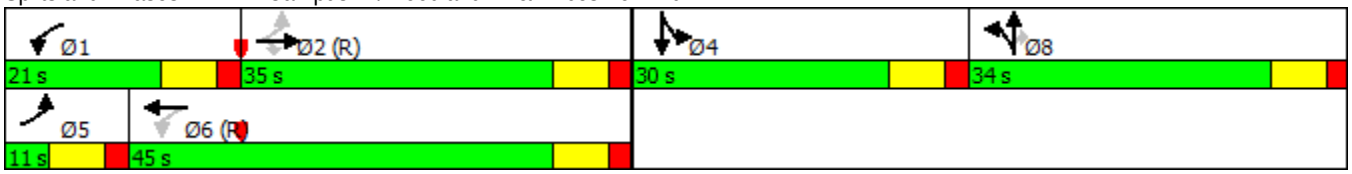
Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 98 (82%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 145
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.07
Intersection Signal Delay: 50.9 Intersection LOS: D
Intersection Capacity Utilization 72.4% ICU Level of Service C
Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: W Campus Dr/Woodland Dr & Prices Fork Rd



Intersection

Int Delay, s/veh 5.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	56	1136	7	85	1266	11	9	3	166	2	0	36
Future Vol, veh/h	56	1136	7	85	1266	11	9	3	166	2	0	36
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	200	-	-	150	-	-	-	-	125	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	62	1262	8	94	1407	12	10	3	184	2	0	40

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1419	0	0	1270	0	0	2283	2999	635	2359	2996	709
Stage 1	-	-	-	-	-	-	1391	1391	-	1602	1602	-
Stage 2	-	-	-	-	-	-	892	1608	-	757	1394	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	476	-	-	543	-	-	21	13	421	19	13	377
Stage 1	-	-	-	-	-	-	150	207	-	110	163	-
Stage 2	-	-	-	-	-	-	303	162	-	366	207	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	476	-	-	543	-	-	15	9	421	6	9	377
Mov Cap-2 Maneuver	-	-	-	-	-	-	15	9	-	6	9	-
Stage 1	-	-	-	-	-	-	130	180	-	96	135	-
Stage 2	-	-	-	-	-	-	224	134	-	176	180	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	0.8	62.2	77.6
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	13	421	476	-	-	543	-	-	89
HCM Lane V/C Ratio	1.026	0.438	0.131	-	-	0.174	-	-	0.474
HCM Control Delay (s)	$ 645.2	20.1	13.7	-	-	13	-	-	77.6
HCM Lane LOS	F	C	B	-	-	B	-	-	F
HCM 95th %tile Q(veh)	2.3	2.2	0.4	-	-	0.6	-	-	2

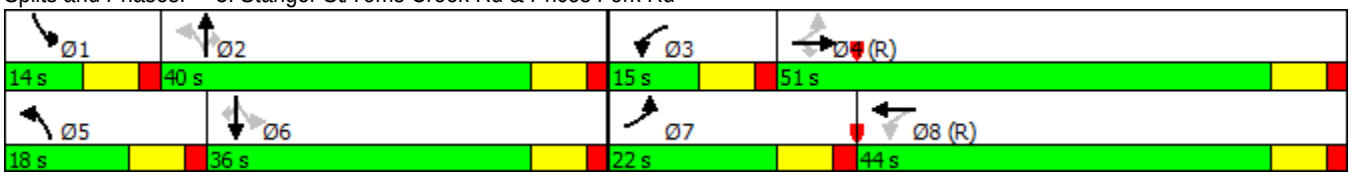
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	241	891	197	148	780	47	299	131	119	83	155	291
Future Volume (vph)	241	891	197	148	780	47	299	131	119	83	155	291
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		325	200		0	200		175	350		350
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.992				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3539	1583	1770	3511	0	1770	1863	1583	1770	1863	1583
Flt Permitted	0.117			0.163			0.478			0.664		
Satd. Flow (perm)	218	3539	1583	304	3511	0	890	1863	1583	1237	1863	1583
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		590			969			595			835	
Travel Time (s)		13.4			22.0			13.5			19.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	268	990	219	164	867	52	332	146	132	92	172	323
Shared Lane Traffic (%)												
Lane Group Flow (vph)	268	990	219	164	919	0	332	146	132	92	172	323
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8			2		2	6		6
Detector Phase	7	4	4	3	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	7.0	10.0	10.0	7.0	10.0		7.0	10.0	10.0	7.0	10.0	10.0
Minimum Split (s)	14.0	32.0	32.0	14.0	32.0		14.0	32.0	32.0	14.0	32.0	32.0
Total Split (s)	22.0	51.0	51.0	15.0	44.0		18.0	40.0	40.0	14.0	36.0	36.0
Total Split (%)	18.3%	42.5%	42.5%	12.5%	36.7%		15.0%	33.3%	33.3%	11.7%	30.0%	30.0%
Maximum Green (s)	15.0	44.0	44.0	8.0	37.0		11.0	33.0	33.0	7.0	29.0	29.0
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0		-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	None	C-Max		None	Min	Min	None	Min	Min
Walk Time (s)		7.0	7.0		7.0			7.0	7.0		7.0	7.0
Flash Dont Walk (s)		18.0	18.0		18.0			18.0	18.0		18.0	18.0
Pedestrian Calls (#/hr)		0	0		0			0	0		0	0
Act Effct Green (s)	62.9	47.7	47.7	51.8	41.5		45.9	32.9	32.9	37.9	28.9	28.9
Actuated g/C Ratio	0.52	0.40	0.40	0.43	0.35		0.38	0.27	0.27	0.32	0.24	0.24
v/c Ratio	0.81	0.70	0.35	0.64	0.76		0.76	0.29	0.30	0.21	0.38	0.85
Control Delay	38.8	22.0	16.9	29.7	40.4		40.9	35.4	36.0	24.5	40.3	64.1
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.8	22.0	16.9	29.7	40.4		40.9	35.4	36.0	24.5	40.3	64.1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	D	C	B	C	D		D	D	D	C	D	E
Approach Delay		24.3			38.8			38.5			50.9	
Approach LOS		C			D			D			D	
Queue Length 50th (ft)	84	326	90	67	341		185	87	79	44	109	234
Queue Length 95th (ft)	m121	m408	m165	#119	423		269	144	134	79	175	#375
Internal Link Dist (ft)		510			889			515			755	
Turn Bay Length (ft)	200		325	200			200		175	350		350
Base Capacity (vph)	338	1407	629	258	1213		435	543	461	430	481	408
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.79	0.70	0.35	0.64	0.76		0.76	0.27	0.29	0.21	0.36	0.79

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 30 (25%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.85
Intersection Signal Delay: 34.9 Intersection LOS: C
Intersection Capacity Utilization 78.0% ICU Level of Service D
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Stanger St/Toms Creek Rd & Prices Fork Rd



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	207	260	39	0	250
Future Volume (vph)	0	207	260	39	0	250
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.865	0.983			
Flt Protected						
Satd. Flow (prot)	0	1611	1831	0	0	1863
Flt Permitted						
Satd. Flow (perm)	0	1611	1831	0	0	1863
Link Speed (mph)	30		30			30
Link Distance (ft)	295		477			176
Travel Time (s)	6.7		10.8			4.0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	230	289	43	0	278
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	230	332	0	0	278
Sign Control	Stop		Free			Free

Intersection Summary

Area Type: Other
Control Type: Unsignalized
Intersection Capacity Utilization 35.5% ICU Level of Service A
Analysis Period (min) 15

Intersection						
Int Delay, s/veh	3.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	207	260	39	0	250
Future Vol, veh/h	0	207	260	39	0	250
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	230	289	43	0	278

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	311	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	-	-
Pot Cap-1 Maneuver	0	729	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	729	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.2	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	729	-
HCM Lane V/C Ratio	-	-	0.316	-
HCM Control Delay (s)	-	-	12.2	-
HCM Lane LOS	-	-	B	-
HCM 95th %tile Q(veh)	-	-	1.4	-

Intersection	
Intersection Delay, s/veh	46.5
Intersection LOS	E

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Traffic Vol, veh/h	0	175	288	84	0	14	222	130	0	82	63	4
Future Vol, veh/h	0	175	288	84	0	14	222	130	0	82	63	4
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	194	320	93	0	16	247	144	0	91	70	4
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	80.4	25	15.5
HCM LOS	F	C	C

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	55%	32%	4%	16%
Vol Thru, %	42%	53%	61%	26%
Vol Right, %	3%	15%	36%	57%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	149	547	366	202
LT Vol	82	175	14	33
Through Vol	63	288	222	53
RT Vol	4	84	130	116
Lane Flow Rate	166	608	407	224
Geometry Grp	1	1	1	1
Degree of Util (X)	0.357	1.063	0.723	0.447
Departure Headway (Hd)	8.052	6.296	6.61	7.421
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	450	577	549	489
Service Time	6.052	4.338	4.61	5.421
HCM Lane V/C Ratio	0.369	1.054	0.741	0.458
HCM Control Delay	15.5	80.4	25	16.3
HCM Lane LOS	C	F	C	C
HCM 95th-tile Q	1.6	17.4	6	2.3

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Lane Configurations			↕	
Traffic Vol, veh/h	0	33	53	116
Future Vol, veh/h	0	33	53	116
Peak Hour Factor	0.90	0.90	0.90	0.90
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	37	59	129
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	16.3
HCM LOS	C

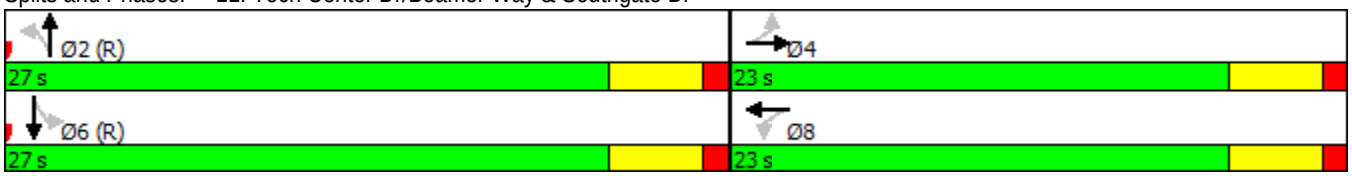
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	117	328	104	45	265	59	196	112	101	204	172	205
Future Volume (vph)	117	328	104	45	265	59	196	112	101	204	172	205
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	375		0	150		0	75		0	200		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.964			0.972			0.929			0.918	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1796	0	1770	1811	0	1770	1730	0	1770	1710	0
Flt Permitted	0.447			0.305			0.429			0.612		
Satd. Flow (perm)	833	1796	0	568	1811	0	799	1730	0	1140	1710	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		903			728			646			781	
Travel Time (s)		20.5			16.5			14.7			17.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	130	364	116	50	294	66	218	124	112	227	191	228
Shared Lane Traffic (%)												
Lane Group Flow (vph)	130	480	0	50	360	0	218	236	0	227	419	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	23.0	23.0		23.0	23.0		27.0	27.0		27.0	27.0	
Total Split (%)	46.0%	46.0%		46.0%	46.0%		54.0%	54.0%		54.0%	54.0%	
Maximum Green (s)	18.5	18.5		18.5	18.5		22.5	22.5		22.5	22.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	18.5	18.5		18.5	18.5		22.5	22.5		22.5	22.5	
Actuated g/C Ratio	0.37	0.37		0.37	0.37		0.45	0.45		0.45	0.45	
v/c Ratio	0.42	0.72		0.24	0.54		0.61	0.30		0.44	0.54	
Control Delay	17.1	21.8		14.6	16.0		19.9	10.1		12.9	13.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	17.1	21.8		14.6	16.0		19.9	10.1		12.9	13.4	
LOS	B	C		B	B		B	B		B	B	
Approach Delay		20.8			15.9			14.8			13.2	
Approach LOS		C			B			B			B	
Queue Length 50th (ft)	27	116		10	80		45	41		42	83	
Queue Length 95th (ft)	67	#240		31	145		#129	79		90	151	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		823			648			566			701	
Turn Bay Length (ft)	375			150			75			200		
Base Capacity (vph)	308	664		210	670		359	778		513	769	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.42	0.72		0.24	0.54		0.61	0.30		0.44	0.54	

Intersection Summary

Area Type: Other
Cycle Length: 50
Actuated Cycle Length: 50
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 45
Control Type: Pretimed
Maximum v/c Ratio: 0.72
Intersection Signal Delay: 16.2 Intersection LOS: B
Intersection Capacity Utilization 75.2% ICU Level of Service D
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 11: Tech Center Dr/Beamer Way & Southgate Dr



Intersection

Int Delay, s/veh 2.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	45	4	22	0	9	0	40	235	1	2	226	21
Future Vol, veh/h	45	4	22	0	9	0	40	235	1	2	226	21
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	50	4	24	0	10	0	44	261	1	2	251	23

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	623	618	263	633	630	262	274	0	0	262	0	0
Stage 1	267	267	-	351	351	-	-	-	-	-	-	-
Stage 2	356	351	-	282	279	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	398	405	776	392	399	777	1289	-	-	1302	-	-
Stage 1	738	688	-	666	632	-	-	-	-	-	-	-
Stage 2	661	632	-	725	680	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	378	388	776	364	382	777	1289	-	-	1302	-	-
Mov Cap-2 Maneuver	378	388	-	364	382	-	-	-	-	-	-	-
Stage 1	708	687	-	639	607	-	-	-	-	-	-	-
Stage 2	624	607	-	696	679	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	14.7	14.7	1.1	0.1
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1289	-	-	450	382	1302	-	-
HCM Lane V/C Ratio	0.034	-	-	0.175	0.026	0.002	-	-
HCM Control Delay (s)	7.9	0	-	14.7	14.7	7.8	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.6	0.1	0	-	-

MOVEMENT SUMMARY

Site: Bld(2025)PM - WPR - All Imp

Stanger-Perry
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Stanger Street											
3	L2	6	2.0	0.518	10.0	LOS B	3.4	87.3	0.12	0.03	31.6
8	T1	510	2.0	0.518	10.0	LOS B	3.4	87.3	0.12	0.03	31.7
Approach		516	2.0	0.518	10.0	LOS B	3.4	87.3	0.12	0.03	31.7
North: Stanger Street											
4	T1	426	2.0	0.436	8.5	LOS A	2.5	63.7	0.07	0.01	32.4
14	R2	11	2.0	0.436	8.5	LOS A	2.5	63.7	0.07	0.01	31.7
Approach		437	2.0	0.436	8.5	LOS A	2.5	63.7	0.07	0.01	32.4
West: Perry Street											
5	L2	11	2.0	0.027	6.1	LOS A	0.1	2.2	0.46	0.36	32.1
12	R2	6	2.0	0.027	6.1	LOS A	0.1	2.2	0.46	0.36	31.6
Approach		17	2.0	0.027	6.1	LOS A	0.1	2.2	0.46	0.36	31.9
All Vehicles		969	2.0	0.518	9.3	LOS A	3.4	87.3	0.10	0.03	32.0

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: Bld(2025)PM - WPR - All Imp

Washington-Beamer
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Beamer Way											
3	L2	109	2.0	0.489	13.1	LOS B	2.5	64.6	0.63	0.66	29.7
18	R2	210	2.0	0.489	13.1	LOS B	2.5	64.6	0.63	0.66	29.2
Approach		319	2.0	0.489	13.1	LOS B	2.5	64.6	0.63	0.66	29.4
East: Washington Street											
1	L2	211	2.0	0.610	13.2	LOS B	4.2	107.8	0.47	0.31	29.6
6	T1	332	2.0	0.610	13.2	LOS B	4.2	107.8	0.47	0.31	29.7
Approach		543	2.0	0.610	13.2	LOS B	4.2	107.8	0.47	0.31	29.7
West: Washington Street											
2	T1	387	2.0	0.826	26.3	LOS D	10.8	273.4	0.89	0.88	25.8
12	R2	270	2.0	0.826	26.3	LOS D	10.8	273.4	0.89	0.88	25.3
Approach		657	2.0	0.826	26.3	LOS D	10.8	273.4	0.89	0.88	25.6
All Vehicles		1519	2.0	0.826	18.8	LOS C	10.8	273.4	0.68	0.63	27.7

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: Bld(2025)PM - WPR - All Imp

Washington at West Campus
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
East: Washington St											
6	T1	253	2.0	0.570	12.2	LOS B	3.7	93.1	0.46	0.31	30.8
16	R2	250	2.0	0.570	12.2	LOS B	3.7	93.1	0.46	0.31	30.1
Approach		503	2.0	0.570	12.2	LOS B	3.7	93.1	0.46	0.31	30.5
North: W Campus Dr											
7	L2	277	2.0	0.456	10.9	LOS B	2.3	57.3	0.53	0.47	29.8
14	R2	69	2.0	0.456	10.9	LOS B	2.3	57.3	0.53	0.47	29.3
Approach		346	2.0	0.456	10.9	LOS B	2.3	57.3	0.53	0.47	29.7
West: Washington St											
5	L2	118	2.0	0.784	24.1	LOS C	8.3	210.8	0.84	0.92	26.1
2	T1	461	2.0	0.784	24.1	LOS C	8.3	210.8	0.84	0.92	26.2
Approach		579	2.0	0.784	24.1	LOS C	8.3	210.8	0.84	0.92	26.2
All Vehicles		1428	2.0	0.784	16.7	LOS C	8.3	210.8	0.63	0.59	28.4

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: Bld(2025)PM - WPR - All Imp

Washington-Duck Pond
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Duck Pond Rd											
3	L2	46	2.0	0.366	10.9	LOS B	1.5	39.0	0.58	0.59	30.8
8	T1	100	2.0	0.366	10.9	LOS B	1.5	39.0	0.58	0.59	31.0
18	R2	82	2.0	0.366	10.9	LOS B	1.5	39.0	0.58	0.59	30.3
Approach		228	2.0	0.366	10.9	LOS B	1.5	39.0	0.58	0.59	30.7
East: Washington St											
1	L2	212	2.0	0.480	11.0	LOS B	2.5	63.2	0.51	0.42	30.2
6	T1	76	2.0	0.480	11.0	LOS B	2.5	63.2	0.51	0.42	30.3
16	R2	94	2.0	0.480	11.0	LOS B	2.5	63.2	0.51	0.42	29.7
Approach		382	2.0	0.480	11.0	LOS B	2.5	63.2	0.51	0.42	30.1
North: Duck Pond Rd											
7	L2	142	2.0	0.572	14.8	LOS B	3.5	90.1	0.66	0.69	29.1
4	T1	231	2.0	0.572	14.8	LOS B	3.5	90.1	0.66	0.69	29.2
14	R2	23	2.0	0.572	14.8	LOS B	3.5	90.1	0.66	0.69	28.6
Approach		397	2.0	0.572	14.8	LOS B	3.5	90.1	0.66	0.69	29.1
West: Parking Lot Entrance											
5	L2	64	2.0	0.794	32.4	LOS D	6.4	163.7	0.87	1.06	23.9
2	T1	222	2.0	0.794	32.4	LOS D	6.4	163.7	0.87	1.06	23.9
12	R2	128	2.0	0.794	32.4	LOS D	6.4	163.7	0.87	1.06	23.5
Approach		414	2.0	0.794	32.4	LOS D	6.4	163.7	0.87	1.06	23.8
All Vehicles		1421	2.0	0.794	18.3	LOS C	6.4	163.7	0.67	0.71	27.8

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: Bld(2025)PM - WPR - All Imp

West Campus-Drillfield
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: W Campus Dr											
8	T1	360	2.0	0.539	11.4	LOS B	3.3	83.8	0.43	0.29	31.1
18	R2	117	2.0	0.539	11.4	LOS B	3.3	83.8	0.43	0.29	30.5
Approach		477	2.0	0.539	11.4	LOS B	3.3	83.8	0.43	0.29	30.9
East: Drillfield Dr											
1	L2	16	2.0	0.033	5.7	LOS A	0.1	2.7	0.43	0.32	32.2
16	R2	7	2.0	0.033	5.7	LOS A	0.1	2.7	0.43	0.32	31.7
Approach		22	2.0	0.033	5.7	LOS A	0.1	2.7	0.43	0.32	32.1
North: W Campus Dr											
7	L2	117	2.0	0.595	11.8	LOS B	4.6	116.9	0.17	0.05	30.5
4	T1	472	2.0	0.595	11.8	LOS B	4.6	116.9	0.17	0.05	30.6
Approach		589	2.0	0.595	11.8	LOS B	4.6	116.9	0.17	0.05	30.6
All Vehicles		1088	2.0	0.595	11.5	LOS B	4.6	116.9	0.29	0.16	30.8

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

B Appendix B – Parking Analysis

Existing Parking Inventory and Surplus/Deficit

Lot_Numb	Name	Type	Existing Inventory	*Practical Capacity*	12pm	Surplus/ Deficit
North Campus Area						
1	Prices Fork Lot	F/S	161	*145*	138	7
		C/G	81	*73*	81	(8)
		Total	242	*218*	219	(1)
2	Deck	F/S	120	*108*	103	5
		C/G	1,200	*1,080*	1,139	(59)
		ADA	24	*22*	0	22
		Total	1,344	*1,210*	1,242	(32)
3	Perry St Lot 3	F/S	353	*318*	297	21
		GP	55	*50*	43	7
		ADA	10	*9*	4	5
		F/S MC	3	*3*	6	(3)
		Metered	11	*10*	9	1
		Total	432	*389*	359	30
5	Price's Fork Lot 4	C/G	203	*183*	195	(12)
6	Price's Fork Lot/Car Pool	CP C/G	53	*48*	50	(2)
		T/A	30	*27*	26	1
		C/G	459	*413*	450	(37)
		Total	542	*488*	526	(38)
7	Lower Stanger	F/S	144	*130*	119	11
		ADA	6	*5*	1	4
		Service	1	*1*	0	1
		CP F/S	1	*1*	0	1
		P-15 min	1	*1*	0	1
		Total	153	*138*	120	18
8	Substation Lot	F/S	30	*27*	29	(2)
		F/S MC	2	*2*	4	(2)
		Service	2	*2*	0	2
		CP F/S	2	*2*	2	(0)
		Total	36	*32*	35	(3)
11	Upper Stanger	F/S	53	*48*	50	(2)
		ADA	4	*4*	1	3
		Res Sq	2	*2*	1	1
		F/S - 24	2	*2*	2	(0)
		Service	4	*4*	2	2
		Total	65	*59*	56	3
	North End Ctr Garage	F/S	486	*437*	398	39
		C/G	121	*109*	100	10
		Total	607	546	498	49
North Campus Area Totals			**3,624**	*3,262*	**3,250**	**12**

Lot_Numb	Name	Type	Existing Inventory	*Practical Capacity*	12pm	Surplus/ Deficit
East Campus Area						0
39	Arch Annex	F/S	153	*138*	123	15
		CP F/S	2	*2*	0	2
		Service	4	*4*	2	2
		ADA	2	*2*	0	2
		F/S MC	1	*1*	0	1
		Total	162	*146*	125	21
81	Squires Lot	F/S	124	*112*	123	(11)
		C/G	39	*35*	39	(4)
		Metered	35	*32*	23	9
		DD	1	*1*	1	(0)
		ADA	7	*6*	7	(1)
		Service	1	*1*	1	(0)
		P-1hr	14	*13*	13	(0)
		Zipcar	2	*2*	1	1
		Total	223	*201*	208	(7)
	Oley Street Loop	F/S-G	13	*12*	14	(2)
East Campus Area Totals			**398**	*358*	**347**	**11**

Lot_Numb	Name	Type	Existing Inventory	*Practical Capacity*	12pm	Surplus/ Deficit
South Campus Area						
10	Coliseum Lot	P-MC	2	*2*	1	1
		F/S	270	*243*	239	4
		C/G	511	*460*	501	(41)
		ADA	15	*14*	4	10
		Service	5	*5*	3	2
		Metered	7	*6*	1	5
		CP F/S	1	*1*	1	(0)
		CP C/G	11	*10*	11	(1)
		P-15 Min	2	*2*	2	(0)
		Total	824	*742*	763	(21)
16	Litton Reaves Ext Lot	T/A	17	*15*	14	1
		F/S	73	*66*	39	27
		C/G	90	*81*	89	(8)
		Total	180	*162*	142	20
17	Wallace Lot	P-MC	3	*3*	0	3
		Service	8	*7*	4	3
		ADA	2	*2*	0	2
		F/S	156	*140*	144	(4)
		Total	169	*152*	148	4
19	Duck Pond Overflow	C/G	223	*201*	39	162
		Service	25	*23*	6	17
		Diesel Truck	1	*1*	0	1
		Total	249	*224*	45	179
20	Duck Pond Rd, Lot A	F/S	38	*34*	23	11
		C/G	414	*373*	307	66
		Service	7	*6*	2	4
		ADA	2	*2*	0	2
		R	1,946	*1,751*	911	840
		Total	2,407	*2,166*	1,243	923
52	Southgate Center	F/S 24 HR	6	*5*	5	0
		Visitor	5	*5*	3	2
		Total	11	*10*	8	2
57	Stadium Lot R	R	836	*752*	570	182
59	Stadium Lot West	Police	9	*8*	2	6
		CP F/S	11	*10*	1	9
		F/S MC	5	*5*	0	5
		F/S	263	*237*	49	188
						0
		Total	288	*259*	52	207
62	Track/Field House	C/G	136	*122*	12	110
		ADA	2	*2*	0	2
		Total	138	*124*	12	112

Lot_Numb	Name	Type	Existing Inventory	*Practical Capacity*	12pm	Surplus/ Deficit
South Campus Area						
72	Fleet Services	CP F/S	6	*5*	5	0
		ADA	2	*2*	1	1
		Van	2	*2*	0	2
		F/S - 24 HR	39	*35*	34	1
		Cust Pkg	13	*12*	11	1
		F/S	143	*129*	101	28
		Total	205	*185*	152	33
89	Hillcrest Extension	F/S	65	*59*	61	(3)
		ADA	2	*2*	1	1
		Total	67	*60*	62	(2)
90	Hillcrest Extension	Service	1	*1*	0	1
		ADA	1	*1*	0	1
		F/S	22	*20*	21	(1)
		Total	24	*22*	21	1
15A	Litton Reaves Lot	F/S	58	*52*	37	15
		CP C/G	9	*8*	7	1
		C/G	352	*317*	328	(11)
		Total	419	*377*	372	5
15B	Litton Reaves Lot	Service	11	*10*	2	8
		ADA	5	*5*	1	4
		Metered	2	*2*	0	2
		F/S	81	*73*	64	9
		Total	99	*89*	67	22
21A	VMRCVM	F/S MC	2	*2*	0	2
		F/S	127	*114*	125	(11)
		ADA	6	*5*	0	5
		P	6	*5*	5	0
		Member/MO	1	*1*	0	1
		Service	2	*2*	2	(0)
		20 Min PU	1	*1*	0	1
		Total	145	*131*	132	(2)
21B	VMRCVM	F/S MC	4	*4*	0	4
		F/S	12	*11*	10	1
		P	15	*14*	7	7
		ADA	2	*2*	0	2
		Total	33	*30*	17	13
21C	VMRCVM	LA DO/PU	5	*5*	1	4
		Service	5	*5*	2	3
		F/S	42	*38*	28	10
		Total	52	*47*	31	16
21D	VMRCVM	Client	3	*3*	2	1
		Service	15	*14*	4	10
		F/S	82	*74*	90	(16)
		Total	100	*90*	96	(6)
37	Food Sciences Lot	ADA	1	*1*	0	1
		Cust Pkg	2	*2*	0	2
		F/S	40	*36*	19	17
		Total	43	*39*	19	20
38A	McComas West	ADA	3	*3*	0	3
		F/S	10	*9*	9	0
		Visitor	16	*14*	2	12
		P-30 MIN	1	*1*	0	1
		Service	2	*2*	1	1
		Total	32	*29*	12	17
38B	McComas West	F/S	16	*14*	12	2
		ADA	1	*1*	0	1
		Total	17	*15*	12	3
68/88	Chicken Hill Lot	R	946	*851*	26	825
		ADA	2	*2*	0	2
		F/S	44	*40*	2	38
		Total	992	*893*	28	865
78A	Smithfield Lot A	C/G	197	*177*	4	173
78B	Smithfield Lot B	C/G	147	*132*	43	89
South Campus Area Totals			**7,674**	**6,907**	**4,051**	**2,856**

Lot_Numb	Name	Type	Existing Inventory	*Practical Capacity*	12pm	Surplus/ Deficit
Central Campus Area						
23	Ag Quad	F/S	108	*97*	106	(9)
		ADA	9	*8*	5	3
		Service	4	*4*	3	1
		Total	121	*109*	114	(5)
86	Alumni Center	F/S	41	*37*	23	14
		Visitor	11	*10*	0	10
		ADA	2	*2*	2	(0)
		Total	54	*49*	25	24
12	Alumni Mall, North	F/S	12	*11*	11	(0)
		CP F/S	6	*5*	4	1
		MC	1	*1*	1	(0)
		ADA	2	*2*	2	(0)
		Service	2	*2*	1	1
		Total	23	*21*	19	2
12	Alumni Mall, South	F/S	30	*27*	28	(1)
		ADA	2	*2*	2	(0)
		Service	1	*1*	1	(0)
		Visitor	7	*6*	1	5
		Total	40	*36*	32	4
60	Bookstore	Visitor	39	*35*	11	24
87	Career Services Service Drive	Service	1	*1*	1	(0)
13	Davidson	F/S	28	*25*	23	2
		ADA	2	*2*	2	(0)
		Service	2	*2*	1	1
		Total	32	*29*	26	3
33	Drillfield North	F/S	103	*93*	102	(9)
		ADA	7	*6*	5	1
		CP F/S	2	*2*	2	(0)
		Service	7	*6*	6	0
		Visitor	3	*3*	1	2
		Total	122	*110*	116	(6)
33	Drillfield South	F/S	132	*119*	124	(5)
		ADA	9	*8*	3	5
		Total	141	*127*	127	(0)
22	Engel	F/S	119	*107*	114	(7)
		CP F/S	3	*3*	3	(0)
		MC	9	*8*	9	(1)
		ADA	8	*7*	8	(1)
		Service	6	*5*	6	(1)
		Total	145	*131*	140	(10)
41	Graduate Life Center	C/G	14	*13*	14	(1)
		MC	2	*2*	2	(0)
		ADA	5	*5*	3	2
		Service	10	*9*	7	2
		Total	31	*28*	26	2
26	Hahn	F/S	59	*53*	57	(4)
		ADA	4	*4*	2	2
		Service	2	*2*	2	(0)
			65	*59*	61	(3)
43	Hahn Pavlillion Lot	F/S	15	*14*	15	(2)
		MC	1	*1*	1	(0)
		ADA	3	*3*	1	2
		Service	3	*3*	3	(0)
		Total	22	*20*	20	(0)
66	Kent Street	F/S	24	*22*	24	(2)
42	Owens	F/S	44	*40*	44	(4)
		CP F/S	1	*1*	0	1
		ADA	6	*5*	4	1
		Service	30	*27*	23	4
			81	*73*	71	2
85	Washington St. Commuter	C/G	55	*50*	53	(4)
		ADA	4	*4*	2	2
		Total	59	*53*	55	(2)
Central Campus Area Totals			1,000	*900*	868	32

Future Parking Demand Analysis without Implementation of TDM Strategies

North Campus Area	F/S	C/G	R	Visitor	Service	Totals
Existing Inventory	891	2,105	0	12	9	3,017
Existing Demand	752	1,984	0	9	3	2,748
Inventory Changes (2025)	(602)	(449)	0	(11)	0	(1,062)
Future Inventory (2025)	289	1,657	0	1	9	1,956
Practical Inventory (2025)	260	1,491	0	1	8	1,760
Future Growth (2025) [1,2]	14%	16%	16%	16%	14%	NA
Future Demand (2025)	857	2,301	0	10	3	3,171
Surplus/Deficit (2025)	(597)	(810)	0	(9)	5	(1,411)

East Campus Area	F/S	C/G	R	Visitor	Service	Totals
Existing Inventory	302	39	0	49	8	398
Existing Demand	260	39	0	36	5	340
Inventory Changes (2025)	0	0	0	0	0	0
Future Inventory (2025)	302	39	0	49	8	398
Practical Inventory (2025)	272	35	0	44	7	358
Future Growth (2025) [1,2]	14%	16%	16%	16%	14%	NA
Future Demand (2025)	296	45	0	42	6	389
Surplus/Deficit (2025)	(24)	(10)	0	2	1	(31)

South Campus Area	F/S	C/G	R	Visitor	Service	Totals
Existing Inventory	1,656	2,109	3,730	83	94	7,672
Existing Demand	1,126	1,355	1,507	35	26	4,049
Inventory Changes (2025)	0	(200)	(140)	0	0	(340)
Future Inventory (2025)	1,656	1,909	3,590	83	94	7,332
Practical Inventory (2025)	1,490	1,718	3,231	75	85	6,599
Future Growth (2025) [1,2]	14%	16%	16%	16%	14%	NA
Future Demand (2025)	1,283	1,571	1,748	41	30	4,673
Surplus/Deficit (2025)	207	147	1,483	34	55	1,926

Central Campus	F/S	C/G	R	Visitor	Service	Totals
Existing Inventory	832	59	0	63	68	1,022
Existing Demand	741	55	0	15	54	865
% Occupied	89%	93%	0%	24%	79%	85%
Practical Inventory	749	53	0	57	61	920
Existing Surplus/Deficit	8	(2)	0	42	7	55
Future Growth (2025)	14%	16%	16%	16%	14%	NA
Future Demand (2025)	844	64	0	17	62	987
Future Surplus/Deficit (2025)	(95)	(11)	0	40	(1)	(67)

Core Campus Totals	F/S	C/G	R	Visitor	Service	Totals
Total Parking Inventory	3,681	4,312	3,730	207	179	12,109
Practical Capacity	3,313	3,881	3,357	186	161	10,898
Total Existing Demand	2,879	3,433	1,507	95	88	8,002
Total Existing Surplus/Deficit	434	448	1,850	91	73	2,896
Total Future Demand (2025)	3,280	3,981	1,748	110	101	9,220
Total Future Growth (2025)	401	548	241	15	13	1,218
Total Future Inventory (2025)	3,079	3,664	3,590	196	179	10,708
Total Surplus/Deficit without TDM (2025)	(509)	(684)	1,483	67	60	417

[1] *Assumed Visitor parking demand would grow similar to C/G*

[2] *Assumed Service parking demand would grow similar to F/S*

Future Parking Demand Analysis with Implementation of TDM Strategies

North Campus	F/S	C/G	R	Visitor	Service	Totals
Existing Inventory	891	2,105	0	12	9	3,017
Existing Demand	752	1,984	0	9	3	2,748
Inventory Changes (2025)	(602)	(449)	0	(11)	0	(1,062)
Future Inventory (2025)	289	1,657	0	1	9	1,956
Practical Inventory (2025)	260	1,491	0	1	8	1,760
Future Growth (2025) [1,2]	9%	5%	0%	5%	9%	NA
Future Demand (2025)	816	2,089	0	9	3	2,917
Surplus/Deficit (2025)	(556)	(598)	0	(8)	5	(1,157)

East Campus	F/S	C/G	R	Visitor	Service	Totals
Existing Inventory	302	39	0	49	8	398
Existing Demand	260	39	0	36	5	340
Inventory Changes (2025)	0	0	0	0	0	0
Future Inventory (2025)	302	39	0	49	8	398
Practical Inventory (2025)	272	35	0	44	7	358
Future Growth (2025) [1,2]	9%	5%	0%	5%	9%	NA
Future Demand (2025)	282	41	0	38	5	366
Surplus/Deficit (2025)	(10)	(6)	0	6	2	(8)

South Campus	F/S	C/G	R	Visitor	Service	Totals
Existing Inventory	1,656	2,109	3,730	83	94	7,672
Existing Demand	1,126	1,355	1,507	35	26	4,049
Inventory Changes (2025)	0	(200)	(140)	0	0	(340)
Future Inventory (2025)	1,656	1,909	3,590	83	94	7,332
Practical Inventory (2025)	1,490	1,718	3,231	75	85	6,599
Future Growth (2025) [1,2]	9%	5%	0%	5%	9%	NA
Future Demand (2025)	1,222	1,427	1,511	37	28	4,225
Surplus/Deficit (2025)	268	291	1,720	38	57	2,374

Central Campus	F/S	C/G	R	Visitor	Service	Totals
Existing Inventory	832	59	0	63	68	1,022
Existing Demand	741	55	0	15	54	865
% Occupied	89%	93%	0%	24%	79%	85%
Practical Inventory	749	53	0	57	61	920
Existing Surplus/Deficit	8	(2)	0	42	7	55
Future Growth (2025)	9%	5%	0%	5%	9%	NA
Future Demand (2025)	804	58	0	16	59	937
Future Surplus/Deficit (2025)	(55)	(5)	0	41	2	(17)

Central Campus Totals	F/S	C/G	R	Visitor	Service	Totals
Total Parking Inventory	3,681	4,312	3,730	207	179	12,109
Total Existing Demand	2,879	3,433	1,507	95	88	8,002
Total Existing Surplus/Deficit	434	448	1,850	91	73	2,896
Total Future Demand (2025)	3,124	3,615	1,511	100	95	8,445
Total Future Growth (2025)	245	182	4	5	7	443
Total Future Inventory (2025)	3,079	3,664	3,590	196	179	10,708
Total Surplus/Deficit with TDM	(353)	(318)	1,720	77	66	1,192

[1] *Assumed Visitor parking demand would grow similar to C/G*

[2] *Assumed Service parking demand would grow similar to F/S*

Future Parking Allocation

				Future Parking Assignment		
Lot_Numb	Name	Type	Existing Inventory	*2025 Inventory*		*Difference in Inventory*
North Campus Area						
1	Prices Fork Lot	F/S	161	*F/S*	*0*	*(161)*
		C/G	81	*C/G*	*0*	*(81)*
		Total	242	*Total*	*0*	*(242)*
2	Deck	F/S	120	*F/S*	*675*	*555*
		C/G	1,200	*C/G*	*645*	*(555)*
		ADA	24	*ADA*	*24*	*0*
		Total	1,344	*Total*	*1344*	*0*
3	Perry St Lot 3	F/S	353	*F/S*	*0*	*(353)*
		GP	55	*GP*	*0*	*(55)*
		ADA	10	*ADA*	*0*	*(10)*
		F/S MC	3	*F/S MC*	*0*	*(3)*
		Metered	11	*Metered*	*0*	*(11)*
		Total	432	*Total*	*0*	*(432)*
5	Price's Fork Lot 4	C/G	203	*C/G*	*203*	*0*
6	Price's Fork Lot/Car Pool	CP C/G	53	*CP C/G*	*27*	*(27)*
		T/A	30	*T/A*	*15*	*(15)*
		C/G	459	*F/S*	*230*	*(230)*
		Total	542	*Total*	*271*	*(271)*
7	Lower Stanger	F/S	144	*F/S*	*144*	*0*
		ADA	6	*ADA*	*6*	*0*
		Service	1	*Service*	*1*	*0*
		CP F/S	1	*CP F/S*	*1*	*0*
		P-15 min	1	*P-15 min*	*1*	*0*
		Total	153	*Total*	*153*	*0*
8	Substation Lot	F/S	30	*F/S*	*30*	*0*
		F/S MC	2	*F/S MC*	*2*	*0*
		Service	2	*Service*	*2*	*0*
		CP F/S	2	*CP F/S*	*2*	*0*
		Total	36	*Total*	*36*	*0*
11	Upper Stanger	F/S	53	*F/S*	*53*	*0*
		ADA	4	*ADA*	*4*	*0*
		Res Sq	2	*Res Sq*	*2*	*0*
		F/S - 24	2	*F/S - 24*	*2*	*0*
		Service	4	*Service*	*4*	*0*
		Total	65	*Total*	*65*	*0*
	North End Ctr Garage	F/S	486	*F/S*	*486*	*0*
		C/G	121	*C/G*	*121*	*0*
		Total	607	*Total*	*607*	*0*
North Campus Area Totals			**3,624**		**2,072**	***(1552)***

				Future Parking Assignment		
Lot_Numb	Name	Type	Existing Inventory	*2025 Inventory*		*Difference in Inventory*
East Campus Area						
39	Arch Annex	F/S	153	*F/S*	*153*	*0*
		CP F/S	2	*CP F/S*	*2*	*0*
		Service	4	*Service*	*4*	*0*
		ADA	2	*ADA*	*2*	*0*
		F/S MC	1	*F/S MC*	*1*	*0*
		Total	162	*Total*	*162*	*0*
81	Squires Lot	F/S	124	*F/S*	*124*	*0*
		C/G	39	*C/G*	*39*	*0*
		Metered	35	*Metered*	*35*	*0*
		DD	1	*DD*	*1*	*0*
		ADA	7	*ADA*	*7*	*0*
		Service	1	*Service*	*1*	*0*
		P-1hr	14	*P-1hr*	*14*	*0*
		Zipcar	2	*Zipcar*	*2*	*0*
		Total	223	*Total*	*223*	*0*
	Oley Street Loop	F/S-G	13	*F/S-G*	*13*	*0*
East Campus Area Totals			**398**		**398**	*0*

				Future Parking Assignment		
Lot_Numb	Name	Type	Existing Inventory	*2025 Inventory*		*Difference in Inventory*
South Campus Area						
10	Coliseum Lot	P-MC	2	*P-MC*	*2*	*0*
		F/S	270	*F/S*	*299*	*29*
		C/G	511	*C/G*	*482*	*(29)*
		ADA	15	*ADA*	*15*	*0*
		Service	5	*Service*	*5*	*0*
		Metered	7	*Metered*	*7*	*0*
		CP F/S	1	*CP F/S*	*1*	*0*
		CP C/G	11	*CP C/G*	*11*	*0*
		P-15 Min	2	*P-15 Min*	*2*	*0*
		Total	824		*824*	*0*
16	Litton Reaves Ext Lot	T/A	17	*T/A*	*17*	*0*
		F/S	73	*F/S*	*49*	*(24)*
		C/G	90	*C/G*	*114*	*24*
		Total	180		*180*	*0*
17	Wallace Lot	P-MC	3	*P-MC*	*3*	*0*
		Service	8	*Service*	*8*	*0*
		ADA	2	*ADA*	*2*	*0*
		F/S	156	*F/S*	*156*	*0*
		Total	169		*169*	*0*
19	Duck Pond Overflow	C/G	223	*C/G*	*223*	*0*
		Service	25	*Service*	*25*	*0*
		Diesel Truck	1	*Diesel Truck*	*1*	*0*
		Total	249		*249*	*0*
20	Duck Pond Rd, Lot A	F/S	38	*F/S*	*38*	*0*
		C/G	414	*C/G*	*2100*	*1686*
		Service	7	*Service*	*7*	*0*
		ADA	2	*ADA*	*2*	*0*
		R	1,946	*R*	*120*	*(1826)*
		Total	2,407		*2267*	*(140)*
52	Southgate Center	F/S 24 HR	6	*F/S 24 HR*	*6*	*0*
		Visitor	5	*Visitor*	*5*	*0*
		Total	11		*11*	*0*
57	Stadium Lot R	R	836	*R*	*836*	*0*
59	Stadium Lot West	Police	9	*Police*	*9*	*0*
		CP F/S	11	*CP F/S*	*11*	*0*
		F/S MC	5	*F/S MC*	*5*	*0*
		F/S	263	*F/S*	*100*	*(163)*
				R	*163*	*163*
		Total	288		*288*	*0*
62	Track/Field House	C/G	136	*C/G*	*136*	*0*
		ADA	2	*ADA*	*2*	*0*
		Total	138		*138*	*0*

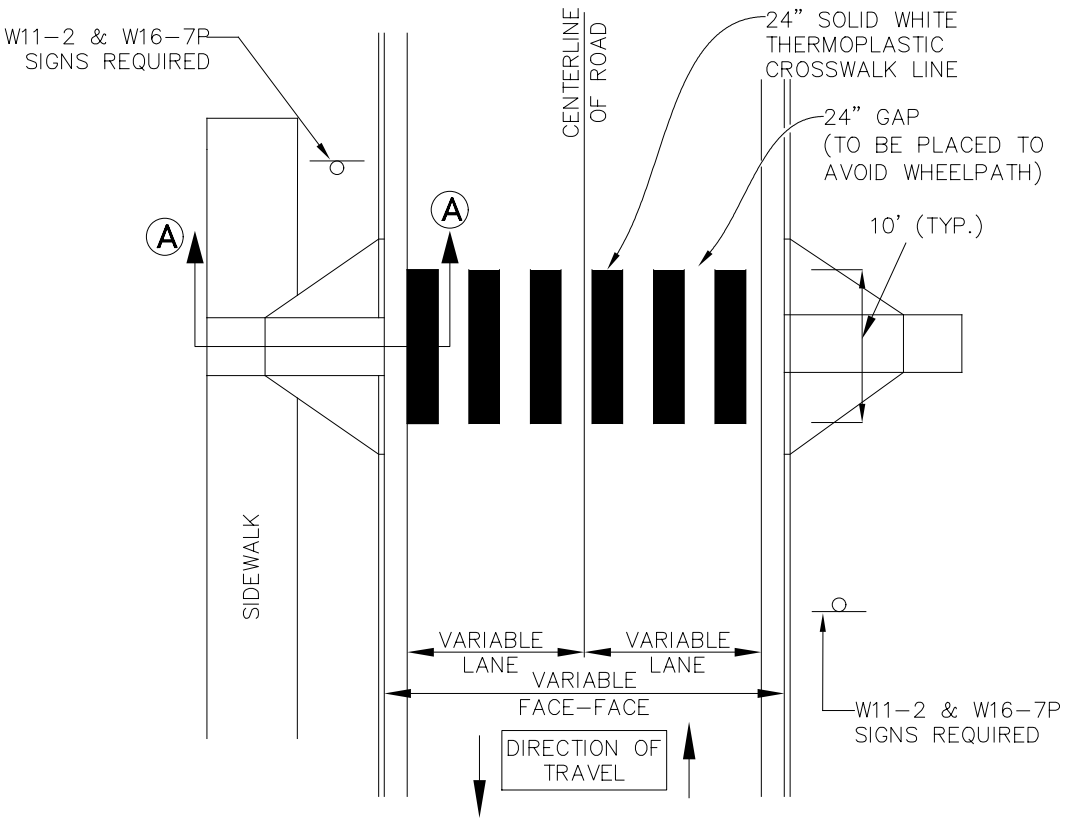
				Future Parking Assignment		
Lot_Numb	Name	Type	Existing Inventory	*2025 Inventory*		*Difference in Inventory*
South Campus Area						
72	Fleet Services	CP F/S	6	*CP F/S*	*6*	*0*
		ADA	2	*ADA*	*2*	*0*
		Van	2	*Van*	*2*	*0*
		F/S - 24 HR	39	*F/S - 24 HR*	*39*	*0*
		Cust Pkg	13	*Cust Pkg*	*13*	*0*
		F/S	143	*F/S*	*143*	*0*
		Total	205		*205*	*0*
89	Hillcrest Extension	F/S	65	*F/S*	*65*	*0*
		ADA	2	*ADA*	*2*	*0*
		Total	67		*67*	*0*
90	Hillcrest Extension	Service	1	*Service*	*1*	*0*
		ADA	1	*ADA*	*1*	*0*
		F/S	22	*F/S*	*22*	*0*
		Total	24		*24*	*0*
15A	Litton Reaves Lot	F/S	58	*F/S*	*58*	*0*
		CP C/G	9	*CP C/G*	*9*	*0*
		C/G	352	*C/G*	*152*	*(200)*
		Total	419		*219*	*(200)*
15B	Litton Reaves Lot	Service	11	*Service*	*11*	*0*
		ADA	5	*ADA*	*5*	*0*
		Metered	2	*Metered*	*2*	*0*
		F/S	81	*F/S*	*81*	*0*
		Total	99		*99*	*0*
21A	VMRCVM	F/S MC	2	*F/S MC*	*2*	*0*
		F/S	127	*F/S*	*127*	*0*
		ADA	6	*ADA*	*6*	*0*
		P	6	*P*	*6*	*0*
		Member/MO	1	*Member/MO*	*1*	*0*
		Service	2	*Service*	*2*	*0*
		20 Min PU	1	*20 Min PU*	*1*	*0*
		Total	145		*145*	*0*
21B	VMRCVM	F/S MC	4	*F/S MC*	*4*	*0*
		F/S	12	*F/S*	*12*	*0*
		P	15	*P*	*15*	*0*
		ADA	2	*ADA*	*2*	*0*
		Total	33		*33*	*0*
21C	VMRCVM	LA DO/PU	5	*LA DO/PU*	*5*	*0*
		Service	5	*Service*	*5*	*0*
		F/S	42	*F/S*	*42*	*0*
		Total	52		*52*	*0*
21D	VMRCVM	Client	3	*Client*	*3*	*0*
		Service	15	*Service*	*15*	*0*
		F/S	82	*F/S*	*82*	*0*
		Total	100		*100*	*0*
37	Food Sciences Lot	ADA	1	*ADA*	*1*	*0*
		Cust Pkg	2	*Cust Pkg*	*2*	*0*
		F/S	40	*F/S*	*40*	*0*
		Total	43		*43*	*0*
38A	McComas West	ADA	3	*ADA*	*3*	*0*
		F/S	10	*F/S*	*10*	*0*
		Visitor	16	*Visitor*	*16*	*0*
		P-30 MIN	1	*P-30 MIN*	*1*	*0*
		Service	2	*Service*	*2*	*0*
		Total	32		*32*	*0*
38B	McComas West	F/S	16	*F/S*	*16*	*0*
		ADA	1	*ADA*	*1*	*0*
		Total	17		*17*	*0*
68/88	Chicken Hill Lot	R	946	*R*	*946*	*0*
		ADA	2	*ADA*	*2*	*0*
		F/S	44	*F/S*	*44*	*0*
		Total	992		*992*	*0*
78A	Smithfield Lot A	C/G	197	*C/G*	*197*	*0*
78B	Smithfield Lot B	C/G	147	*C/G*	*147*	*0*
South Campus Area Totals			**7,674**		**7,334**	***(340)***

				Future Parking Assignment	
Lot_Numb	Name	Type	Existing Inventory	*2025 Inventory*	*Difference in Inventory*
Central Campus Area					
23	Ag Quad	F/S	108	*108*	*0*
		ADA	9	*9*	*0*
		Service	4	*4*	*0*
		Total	121	*121*	*0*
86	Alumni Center	F/S	41	*41*	*0*
		Visitor	11	*11*	*0*
		ADA	2	*2*	*0*
		Total	54	*54*	*0*
12	Alumni Mall, North	F/S	12	*12*	*0*
		CP F/S	6	*6*	*0*
		MC	1	*1*	*0*
		ADA	2	*2*	*0*
		Service	2	*2*	*0*
		Total	23	*23*	*0*
12	Alumni Mall, South	F/S	30	*30*	*0*
		ADA	2	*2*	*0*
		Service	1	*1*	*0*
		Visitor	7	*7*	*0*
		Total	40	*40*	*0*
60	Bookstore	Visitor	39	*39*	*0*
87	Career Services Service Drive	Service	1	*1*	*0*
13	Davidson	F/S	28	*28*	*0*
		ADA	2	*2*	*0*
		Service	2	*2*	*0*
		Total	32	*32*	*0*
33	Drillfield North	F/S	103	*103*	*0*
		ADA	7	*7*	*0*
		CP F/S	2	*2*	*0*
		Service	7	*7*	*0*
		Visitor	3	*3*	*0*
		Total	122	*122*	*0*
33	Drillfield South	F/S	132	*132*	*0*
		ADA	9	*9*	*0*
		Total	141	*141*	*0*
22	Engel	F/S	119	*119*	*0*
		CP F/S	3	*3*	*0*
		MC	9	*9*	*0*
		ADA	8	*8*	*0*
		Service	6	*6*	*0*
		Total	145	*145*	*0*
41	Graduate Life Center	C/G	14	*14*	*0*
		MC	2	*2*	*0*
		ADA	5	*5*	*0*
		Service	10	*10*	*0*
		Total	31	*31*	*0*
26	Hahn	F/S	59	*59*	*0*
		ADA	4	*4*	*0*
		Service	2	*2*	*0*
			65	*65*	*0*
43	Hahn Pavilillion Lot	F/S	15	*15*	*0*
		MC	1	*1*	*0*
		ADA	3	*3*	*0*
		Service	3	*3*	*0*
		Total	22	*22*	*0*
66	Kent Street	F/S	24	*24*	*0*
42	Owens	F/S	44	*44*	*0*
		CP F/S	1	*1*	*0*
		ADA	6	*6*	*0*
		Service	30	*30*	*0*
			81	*81*	*0*
85	Washington St. Commuter	C/G	55	*55*	*0*
		ADA	4	*4*	*0*
		Total	59	*59*	*0*
Central Campus Area Totals			1,000	*1000*	*0*

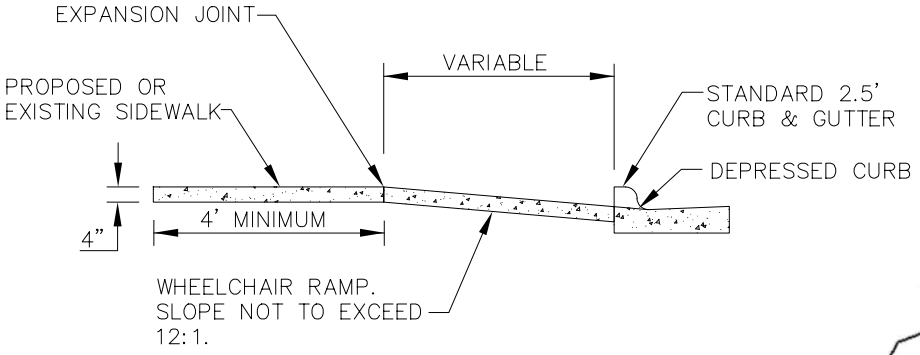
C Appendix C – Campus Crosswalk Standards

W11–2

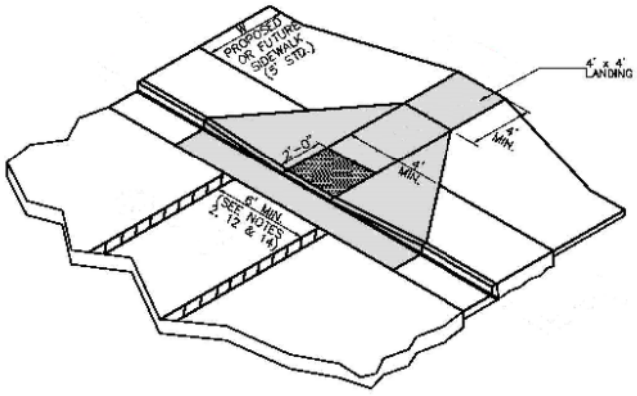
W16–7P



CROSSWALK
(HORIZONTAL)



SECTION A–A



ISOMETRIC VIEW

PAY LIMITS FOR CURB RAMP

CURB RAMPS STANDARD DETAILS

NOTE: INSTALL LAMP POST PER VIRGINIA TECH LIGHTING STANDARDS

STANDARD CROSSWALK

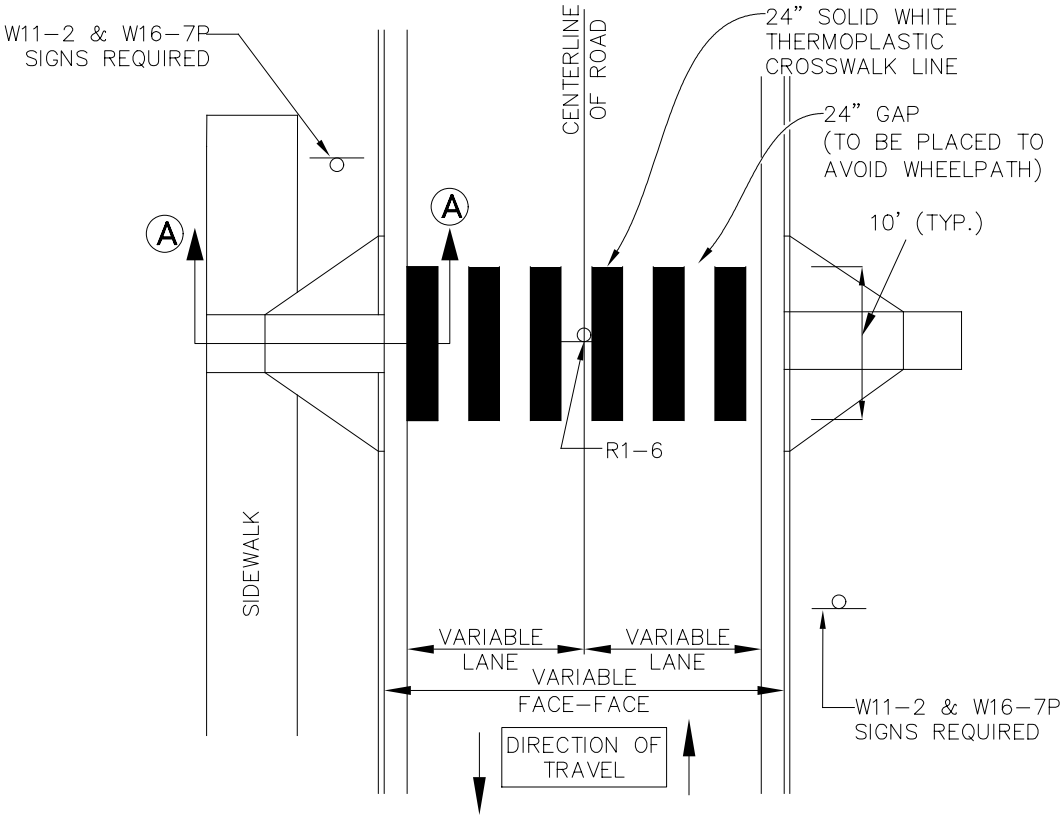
DRAWN NOT TO SCALE

W11-2

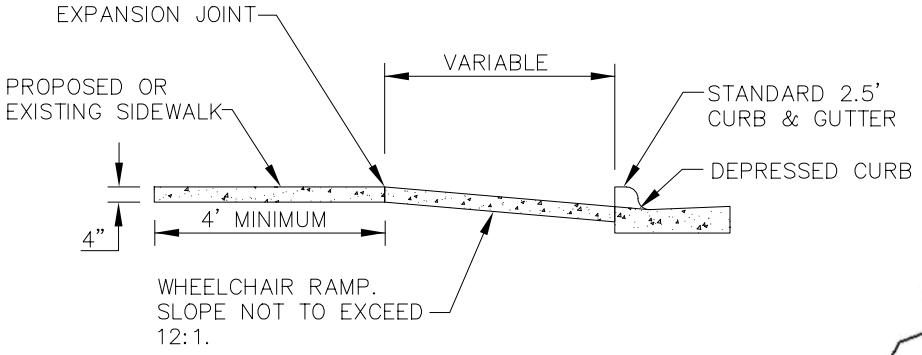
W16-7P

R1-6

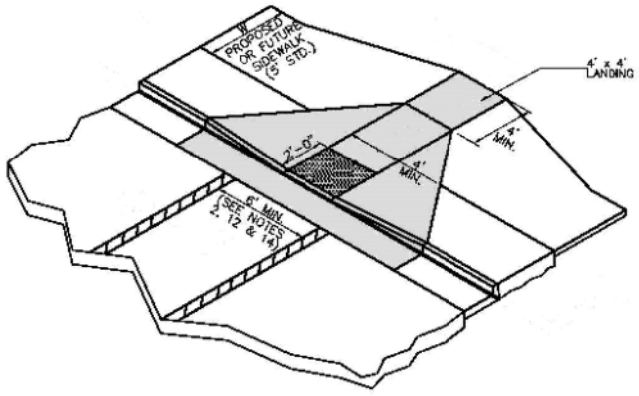
R1-6 TO BE USED ONLY
AT MID-BLOCK CROSSINGS



CROSSWALK
(HORIZONTAL)



SECTION A-A



ISOMETRIC VIEW

PAY LIMITS FOR CURB RAMP

CURB RAMPS STANDARD DETAILS

NOTE: INSTALL LAMP POST PER VIRGINIA TECH LIGHTING STANDARDS

HIGH VOLUME CROSSWALK

DRAWN NOT TO SCALE

W11–2

W16–7p

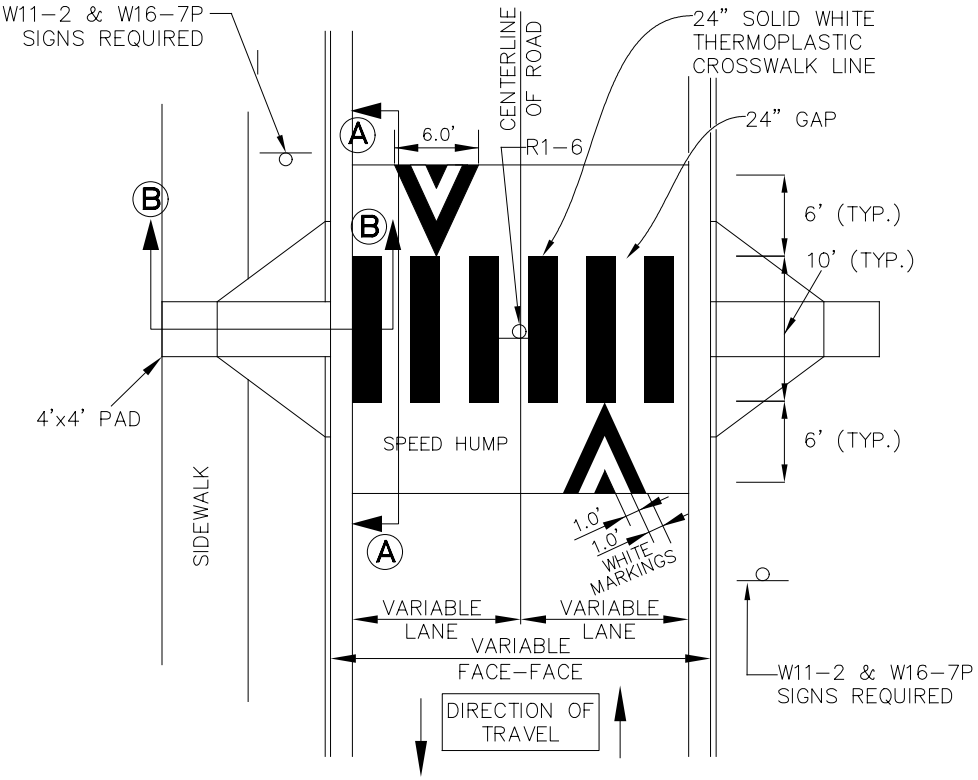
R1–6

W17–1

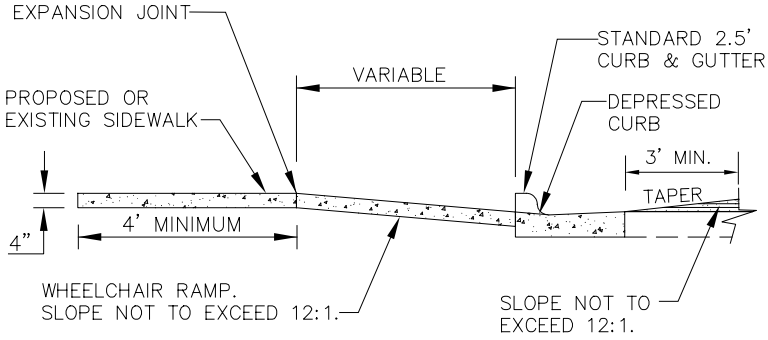
W13–1

100' IN ADVANCE (EACH APPROACH):
W17–1 "SPEED BUMP"
W13–1 "20 MPH"

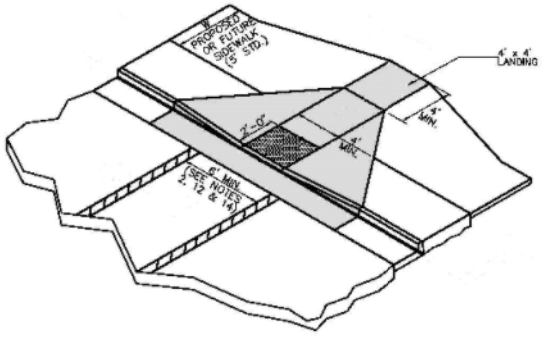
R1–6 TO BE USED ONLY AT MID–BLOCK CROSSINGS



RAISED CROSSWALK
(HORIZONTAL)

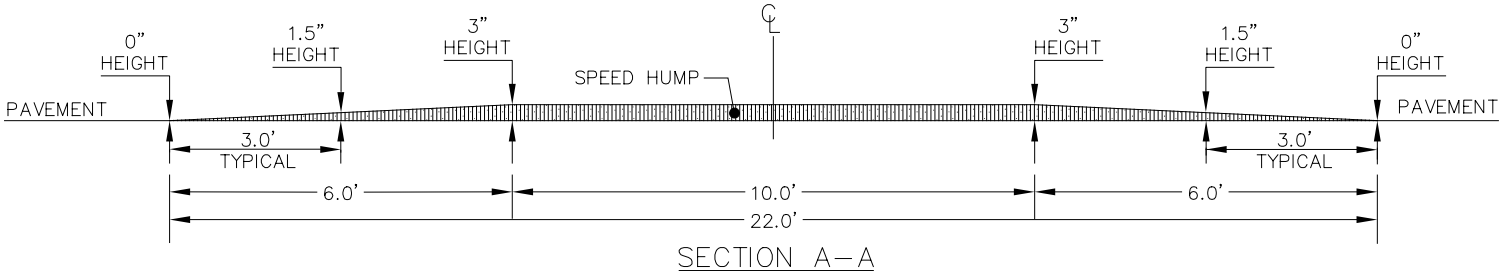


SECTION B–B



ISOMETRIC VIEW
PAY LIMITS FOR CURB RAMP

CURB RAMPS STANDARD DETAILS



SECTION A–A

NOTE: INSTALL LAMP POST PER VIRGINIA TECH LIGHTING STANDARDS

RAISED CROSSWALK

DRAWN NOT TO SCALE

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