

WHAT IS THE PULSE BRT SYSTEM?

- 7.6-mile bus rapid transit (BRT) route in Richmond, Virginia, with 14 stations connecting residential areas, healthcare providers and downtown businesses that opened for service in 2018.
- BRT runs in mixed traffic, dedicated center running and business access and transit (BAT) lanes.
- Buses arrive every 10 to 15 minutes, with an average of over 7,000 riders every weekday.
- Pulse BRT received the American Association of State Highway and Transportation Officials (AASHTO) Quality of Life Award.



WHAT WAS THE GOAL OF THE TOUR?

- Experience a dedicated guideway BRT route similar to the planned Rush Line BRT Project.
- Meet staff and officials from local agencies involved in the Pulse BRT project, as well as community members and business representatives along the corridor.
- Gather lessons learned about BRT project development, which can be applied to Rush Line decision-making.

WHO ATTENDED THE TOUR?

• Representatives from the Rush Line BRT Project Policy, Technical and Community Advisory Committees, along with partner agencies and Rush Line BRT Project staff.



WHO DID WE MEET WITH ON THE TOUR?

 Over the course of two days (October 3 and 4, 2019), we met with representatives from the Greater Richmond Transit Company (GRTC), Virginia Department of Rail and Public Transportation, Virginia Department of Transportation, City of Richmond, Henrico County, Virginia Commonweath University, local businesses and community organizations.

WHAT WERE SOME OF THE KEY TAKEAWAYS FROM THE TOUR?

Attendees learned pertinent and valuable information by riding the Pulse BRT, listening to project staff presentations and participating in panel discussions. Several of the key takeaways are noted below.

- Approach the BRT line as an opportunity to improve service and efficiency from a regional perspective.
- Dedicated lanes for BRT are essential from a service reliability and travel time perspective.
- Open and inviting station designs attract and maintain riders.
- Level boarding and off-board fare payment make buses more accessible and speed the boarding process.
- Pulse BRT has stimulated the regional economy and population growth and made downtown Richmond more attractive.
- The city is striving to make the Pulse BRT corridor its own place, with the guiding principles of being compact and mixed, connected and viable.
- Important to consider improving multi-modal connections and providing pedestrian and bike facilities to make access to stations safer and more convenient.



- Business engagement throughout the planning process was critical to the success of the Pulse BRT. Transit accessibility is an important consideration for businesses relocating to Richmond.
- An open, transparent and diverse engagement process throughout the planning, design and construction process is essential to project success.
- Training of bus operators is important to efficiently use the level boarding design.
- The supporting bus network was redesigned to coincide with the Pulse BRT opening, which allowed for more seamless bus connections and has contributed to overall system ridership increases of 17 percent.

HOW WILL THE RUSH LINE BRT PROJECT USE THE INFORMATION FROM THE TOUR?

- A detailed summary of the information shared throughout the two days of meeting with Pulse BRT partners and stakeholders has been prepared and will be shared with the Rush Line BRT Project advisory committees.
- Additionally, a video will be prepared that summarizes trip activities and lessons learned through the peer review. When completed, this video will be posted on the Rush Line website for easy access.
- Lessons learned through the peer review will be important considerations as the Rush Line BRT Project advances through the planning, environmental, design and construction process.

GRTC PULSE BRT TOUR

SESSION NOTES



NOTES

Date:October 3-4, 2019Location:Richmond, Virginia

THURSDAY, OCTOBER 3, 2019

Welcome Remarks

Victoria Reinhardt, Ramsey County Commissioner and Chair of the Rush Line Corridor Task

• Commissioner Reinhardt welcomed the group, noting that the Rush Line is a key part of the East Metro's success. 100,000 people live within one-half mile of the route and represent a diverse population. In addition, there are 100,000 jobs and 50 medical facilities within one-half mile, and they need workers. This will be a great opportunity to learn from the Greater Richmond Transit Company's (GRTC) success. She thanked the group for taking the time to participate.

Julie Tim, CEO Greater Richmond Transit Company (GRTC)

• This is pivotal time for growth in Richmond. They are at the dynamic edge of something amazing, and Pulse BRT is a key part of that as it serves regional growth. Passion for overcoming obstacles resulted in a key asset.

Overview of Regional Transit in Central Virginia – History, Funding and Vision

Jennifer Mitchell, Director, Virginia Department of Rail and Public Transportation

- Overview of state's role:
 - Separate state agency from Department of Transportation.
 - Sit on Governors Council.
 - Dedicated funding source for transit \$892 million for transit and rail (agency also covers freight rail).
- Department prepares planning feasibility studies, project development, operations.
- Includes Washington DC transportation system.
- Capital program generally focused on maintaining state of good repair. Pulse BRT was one of the largest expenditures proposed.
- Timeline 2008-2017:
 - 2010 Broad Street Study.
 - 2014 Environmental Assessment.
 - 2017 transit system redesign (re-evaluated routes and service city-wide responding to Pulse BRT).
- Richmond is transit oriented in that its land use pattern still reflects historic modes of transit. City well positioned for an integrated multi-modal transportation system.

- Received a \$24.9 million Transportation Investment Generating Economic Recovery (TIGER) grant for BRT in 2014. To achieve success in the TIGER program, the state believed they should only submit one to two projects and prioritized the Pulse BRT. This project aligned with the US Department of Transportation's Ladders of Opportunity by serving previously unconnected job centers.
- Opened to service in 2018. Total construction cost was \$65.4 million. The Virginia Department of Transportation (VDOT) was the construction manager. The city, county and state also participated and supplemented TIGER funding.
- Received the American Association of State Highway and Transportation Officials Quality of Life Award and was the subject of a Transportation Research Board scan, which is a program intended to facilitate technology transfer and innovation among state departments of transportation and others through personal contact.
- Moving forward, a second phase of the regional vision completed in 2019 will continue to look at expanding transit into Chesterfield County.

Sheryl Adams, Chief Operating Officer, GRTC

- GRTC was founded in 1973.
- In the 1880s horse-drawn service ran down Broad Street.
- In 1888 the first electric transit service in the world was initiated on Broad Street. In 1949 streetcars were replaced by buses. GRTC was one of the last systems to move into public ownership in 1973.
- Hiring bus operators is a challenge. GRTC desires 280 operators but has 265. However, they do meet pull out every day.
- GRTC is advancing reloadable smart cards to allow for easier fare payment.
- Revenue sources for the mass transit fund include fuel tax, sales tax and vehicle registration tax. Vehicle rental fees provide another source.
- The GRTC board has six appointed members three from the city of Richmond and three from Chesterfield County.
- Obstacles to Phase Two:
 - Differing needs for intercity versus suburban service is one of the biggest obstacles.
 - Funding is also a challenge. The city of Richmond does not have tax revenue dedicated to transit and a lot of in-migration is happening in the city with more development happening downtown.
 - Today, there is congestion at suburban interchanges but not downtown. They anticipate that will change in 10 to 15 years.
- GRTC did not have major construction experience so felt VDOT would be in a better position to lead. GRTC was the decision-maker and thought VDOT did a great job with construction administration.

Overview of GRTC Pulse BRT and Richmond Transit Network Plan Redesign

Jennifer DeBruhl, Chief of Public Transportation, Virginial Department of Rail and Public Transportation

- "The Great Richmond Reroute" planning for Pulse BRT spawned a system-wide reexamination of routes. It was previously a hub and spoke system, and now Pulse BRT is the spine of service. Process began in 2016 with a one-year public process to shape the new route system.
 - Phase one examined tradeoffs with the public.
 - Walking versus waiting.
 - Ridership versus coverage.
 - Peak service versus all day/all week.
 - Phase two input on network concept.
 - Phase three draft network.
 - Phase four final network.
- 70 percent frequency/30 percent coverage was the final balance.
- Implemented the new system on a single day. More of the region had access to frequent (10 to 15 minute) service as a result. Prepared public well in advance that change was coming and that the change was good.
- Benefits to businesses recognizing access improvements for current and potential employees as well as visitors and customers.
- Transit ridership statewide went up 1 percent with implementation of Pulse BRT and the system redesign, which is remarkable since that includes the Washington DC area. The two systems in the state that did system redesigns increased their ridership by double digits.
- The redesign effort focused on the city of Richmond but had benefits for Henrico County as well.

Carrie Rose Pace, Director of Communications, GRTC

- Carrie began the presentation with a video introducing Pulse BRT. She was hired to communicate the system change.
- She noted that boarding (getting on the bus) and alighting (getting off the bus) in the middle of the street for some stations was initially uncomfortable, but riders shortly acclimated.
- Station design reflects materials of historic Richmond red brick, steel, cedar. The stations include "totems" large visible station signs with graphic lighting that provide a 5-minute countdown to bus arrival.
- Docking on the system is all operator skill no mechanical assist.
- Station construction also prompted improvements to pedestrian crossings and compliance with the Americans with Disabilities Act (ADA).
- Pulse BRT has approximately 7,000 daily riders.
- Prior to Pulse BRT and the system redesign, there was minimal/no frequent service now there are 43 miles of frequent service.

- Transit signal priority (TSP) provides benefits to cars as well as buses. Operating speed is 12-13 miles per hour on average.
- GRTC decided on a medium level of fare enforcement that balances fare compliance with customer service.
- Wind screen at stations provides a system map as well as QR codes with neighborhood information, events, weather conditions and historic information about the area. The QR code allows for info attached to be easily changed, which creates timely information that is more beneficial to the user. About 80 percent of riders have smart phones.
- Emergency call buttons need to be ADA accessible, but there have been some issues with backpacks hitting them and triggering false alarms.
- Front bike racks accommodate three bikes instead of two. This creates an additional obstacle on the front of the bus, but drivers have accommodated it. GRTC decided to put bike storage on the outside of the bus instead of losing four seats inside.
- Decision to use unarmed inspectors instead of police was based on pay rate as well as perception wanted to emphasize customer service not policing. GRTC knew there would be a learning curve with the new payment system. They also lowered the penalties violators are asked to exit the bus at the next stop and pay the fare, then they can re-board. Riders are banned from service if they are caught and refuse to pay five times.
- The system redesign focused on reducing the downtown transfers common in GRTC's previous hub and spoke system.
- Fares are \$1.50 (last fare increase was in 2004 and changed from \$1.25 to \$1.50).
- GRTC has found that bus-only lanes are essential to the service, and the middle of the street is best operationally. The July 4th service after fireworks at Rocketts Landing is a great example – Pulse BRT was able to move freely in the bus-only lanes, while the traffic lanes were backed up for a substantial amount of time.
- No right-of-way was purchased for the bus-only lanes converted vehicle lanes or parking. Taking away lanes on Broad Street has really calmed traffic. It used to operate like a highway bisecting downtown and is now a much more pedestrian-friendly environment.

Pulse BRT Corridor Plan, Land Use and Redevelopment

Mark Olinger, Director, Department of Planning and Development Review, City of Richmond

- Initial goal was to enhance property tax assessment by \$1.0 million they have gone way past that.
- Richmond's population has grown by 30,000 people since the year 2000 35 percent of the land was covered in surface parking and 29 percent of the land was tax exempt.
- The vision was to have the corridor be its own place not an edge but a center onto itself. The guiding principles for the corridor include the following:
 - Compact and mixed: Development around stations has a rich mix of uses and is compact, sustainable and high quality.
 - Connected: Pedestrians and cyclists can access homes, jobs entertainment, every day needs and transit in a safe, pleasant and interesting public realm.

- Viable: Transit-oriented development benefits the corridor and the city by adding housing for all income levels and jobs for all skill levels. Increased development in this area increases property values, supports ridership and generations over \$1 billion in additional assessed value over the next 20 years.
- People wanted to know: What will it look like? Where? What are the tools?
- To accomplish the vision, Richmond rewrote its land use classifications from traditional singleuse districts and implemented transit-oriented development principals. Mark recommended not to overdo design guidelines – they kept their guidelines to six standards only.
 - Hold the corridor.
 - Setbacks and stepbacks.
 - Entrance on the street.
 - Transparency.
 - Façade articulation.
 - Screened parking/services.
- Eliminated conditional use permits for residential uses made them "by right" in all districts including industrial mixed use. This made the process easy for developers who wanted to "do the right thing" by reducing the need for additional process, public hearings or negotiations. This eliminated the time barrier of the conditional use permit process to encourage development.
- Height density is directed toward Broad Street with stepbacks toward the neighborhood.
- One example is the Children's/Science Museum, which is moving from surface to structured parking to create an 8-acre park.

Betty-Anne Teter, Business Attraction and Retention Program Administrator, Department of Economic Development, City of Richmond

- Richmond is landlocked.
- Pulse BRT was an important element to economic development.
- Walkability score is valued by developers, and Pulse BRT improved walkability.
- Pulse BRT has proved to be a stimulus for the regional economy and population growth as well as the attractiveness of downtown. Pulse BRT is part of the toolkit that has attracted the attention of national companies.

Richmond Bikeshare, Complete Streets and Multimodal Connections

Mike Sawyer, City Transportation Engineer, City of Richmond

- Vision was to change the built environment and the safety culture. The federal government has mandated safety initiatives, but this bottom-up effort was voluntary.
- Steps to Vision Zero:
 - Established commission.
 - Modal emphasis.
 - Range of multi-modal centers.
 - Intersection of 12/4 buffer range by job density and housing per acre.

- Identified modal priority by stop (e.g., auto more critical at Willow Lawn; peds the highest priority at Virginia Commonwealth University).
- Left turn priority.
- Planning efforts for the Pulse BRT corridor plan, city bike/pedestrian plan and better streets plan were coordinated.
- State funded program facilitated pedestrian improvements.
- Safety improvements resulting from Pulse BRT:
 - Better speed management.
 - Removal of two general purpose lanes.
 - Dedicated left turn phases.
- Severe crash rate is down 40 percent and at a three-year low just one year after BRT implementation.

Jake Hemboldt, Pedestrian, Bicycle and Trails Coordinator, City of Richmond

- City is transitioning bike fleet to electric powered bikes.
- Providing multiple modes required compromise.
 - Looked to parallel corridors to serve competing interests.
 - Do not sever bike/pedestrian facilities for transit.
 - Bikes can coexist in bus-only lanes when buses are in curb running lanes.
 - Provide linkages between modes.
 - Co-locate bike share with stations.
- Complete streets is a balancing act use parallel routes to support all modes (e.g., Franklin Street cycle track is bi-directional and has striping/bollards to separate from vehicle traffic).
- Trail connections to BRT are valued.

Public Advocacy Discussion

Levar Stoney, Mayor, City of Richmond

- Urban core is expanding. Changes in land use are required.
- Plan to shift the prioritization of modes of travel, not just focused on people in cars. Shifting importance on transit, bike, pedestrians.
- During the planning for the Pulse BRT, decision was made to re-do the overall transit system to make it more accessible and feed into the BRT route. While this was challenging, it has really been beneficial from an accessibility and increased ridership perspective.
- Adjacent development has also increased demand for transit.
- Lots of development in Scott's Addition, including development near the sports stadium.
- The south end of the Pulse BRT route is limited by topography so the city tries not to overburden this area.
- Fulton Yard at the southern end of the corridor has a 20-acre mixed-use development coming soon.

Reverend Ben Campbell, Board Member, GRTC and RVA Rapid Transit

- Transit used to stop at the city boundary, and 80 percent of jobs used to be outside city limits, underscoring racial segregation and inequities in services/accessibility. The Pulse BRT project was pursued not only to improve transit accessibility but also to address social inequities that had been longstanding in the Richmond area.
- Pulse BRT has provided a vehicle to better integrate the overall Richmond area.
- RVA Rapid Transit is an advocacy group started by minsters. They used a simplified map of the new system that is easier to understand.
- Advocates had the voice to say things that others couldn't and gather the constituency.

Jami Bohdan, Owner, The Savory Grain Restaurant

- The Savory Grain will be open for seven years in February.
- Initially, they heard that Pulse BRT would be taking all the parking away, so they were concerned for their business. Jami worked with the project team to put some of the parking back.
- She now believes it is awesome to have the Pulse BRT out front of her restaurant. They are using social media to connect with other entertainment businesses and put together events connected by Pulse BRT (e.g., a brewery for appetizers, The Savory Grain for dinner, then see a show in the Arts District).
- Some of The Savory Grain's employees use Pulse BRT, but most live in neighborhood and walk or bike.
- Jami would advocate for a park-and-ride at either end of the line.
- The two years of construction was hard, but now business at the restaurant is growing again.

Regional Transit Vision

Tim Foster, Deputy County Manager for Community Operations, Henrico County

- In Virginia, cities and counties are independent the cities are outside of county jurisdiction.
- Used to have 63 miles of electric trolley, but this system was dismantled in the 1940s.
- There are 190,000 employees who live in Henrico County. The median income is \$64,300 and 35 percent have college degrees both higher than national averages.
- Bus lines into the county are not plentiful have focused transit in the areas of highest population density.
- Henrico is one of two counties in the state that maintain their own transit systems otherwise led by cities or the state. 111,000 residents and 100,000 employees are served within one-half mile of the system.

Todd Eure, Assistant Director of Public Works, Henrico County

- Frist phase:
 - Linked four local routes to Willow Lawn Pulse BRT station (separate from city reroute effort) through a transit development plan.
 - 30-minute service to Willow Lawn (previously only had commuter express).

- Would like to connect to the airport on the east side eventually.
- Second phase:
 - Extended service to county line.
 - Added service on three other routes.
 - Highlighted connection to the Pulse BRT.
 - Evening and weekend service added.
- Result:
 - 76 percent increase in ridership across all routes.
 - 21 percent increase in ridership on expanded service on W Broad Street.
 - 1,900 daily boardings/alightings at Willow Lawn BRT station.
- Need to work on pedestrian safety next (currently crossing six vehicle lanes to connecting service) and addressing mid-block station locations.
- Looking at accessibility at bus stops (currently have some curbside stops with no sidewalks) and pedestrian access into auto-oriented developments and retail areas. Pedestrian facilities within these developments are lacking.
- Before the 1990s the county was rural in character with no sidewalks and no streetlights, but those are now expected. The county is retrofitting streets to have better walking and biking facilities as well as transit services.
- Hide-and-ride parking (parking in non-park-and-ride areas near stations for the purpose of boarding transit) has been an issue in residential areas adjacent to Willow Lawn. The county had an informal agreement for a parking location, but it fell through so they are working on identifying a new site.
- There is less ridership on the Rocketts Landing end of the line due to less development. A 500+ acre mixed-use development is in the planning stage expect more transit use when that develops.
- Trying to get more development better oriented toward transit old mall is redeveloping to mixed use. Developers are now understanding transit dynamics.
- County sidewalk planning has been initiated have 150 miles of sidewalks. Four to five years ago the county didn't know where its sidewalks were. They now have a sidewalk inventory and are identifying where there are gaps connecting to Pulse BRT and other transit service.
- Lessons learned:
 - Plan more focus on the routes and the adjacent infrastructure.
 - Importance of good marketing free week got people out and using the system.
 - One size does not fit all empty buses at end of the line created public perception concerns, but the same buses were full several stops in.

GRTC and Virginia Commonwealth University Partnership

Richard Sliwoski, Associate Vice President for Facilities, Virginia Commonwealth University (VCU)

• VCU's mission speaks to supporting and contributing to the health and vitality of the region.

- Transportation is a foundation:
 - 31,000 students.
 - Two campuses that are 1 mile apart 173 acres.
 - 45 percent minority and many first-generation college attendees.
 - Largest employer in Richmond.
- VCU had a parking problem so looked to GRTC for partnership. VCU pays for every faculty member, student and staff person to ride the system for free. VCU has found that this is most important to the Pell grant students.
- Since Pulse BRT opened, GRTC ridership is up 30 percent and 23 percent comes from VCU systems. People are getting away from cars and find Pulse BRT more convenient and more social.
- Usage is about a 50/50 split between students and employees. VCU ridership is tracked through the separate VCU pass, and they are working on an app.
- VCU was able to eliminate their campus connector.
- VCU is monitoring the impact on parking and is still working on incentives to switch to transit. VCU does not provide a parking incentive.
- VCU sees Pulse BRT as a benefit to their hospitals since low income patients can use Pulse BRT to access medical services.

Richmond Business Community Perspectives on the Pulse and Multimodal Investments

Brian Anderson, President and CEO, ChamberRVA John Easter, Senior Vice President, Government and Community Affairs, ChamberRVA

- 1.2 million residents in the region.
- The two highest interests of the chamber are transportation and workforce development. Pulse BRT is critical to talent attraction and retention, provides mobility and environmental benefits and reduces congestion.
- Richmond has changed a lot over the last 10 years. There are now many breweries and restaurants, and Pulse BRT was part of that.
- In the 1970s Richmond experienced segregation issues and white flight. The counties were not very transit focused, but Pulse BRT presents the opportunity to turn that around.
- The chamber was an advocate for both Pulse BRT and the system redesign. At the 11th hour, final approval of the Pulse BRT project was still not certain. The chamber mobilized and reinforced how the system was critical to workforce issues.
- Major activities along the corridor have included:
 - Rocketts Landing Stone Brewing (San Diego based) was attracted by the city to this area.
 - Main Street Station multimodal connection with opportunities for improvement. The main Amtrak station to DC is in a suburban location, would like to have here but would require a significant rail investment to connect.
 - Sauer Center (new Whole Foods development).

- Scott's Addition 15-20 years ago this was an underutilized warehouse area, now home to residences, breweries and eateries.
- Navy Hill proposed \$1.5 billion development on a 10 block area that is now home to an old coliseum, old armory, parking decks and bus transfer station; developers are proposing a new auditorium (with double the seating capacity), Armory reuse with hotel, 25,000 multi-family units (10 percent affordable), 1 million square feet of office and a new transit center with retail on the second floor and additional development above.
- Ridership increases have altered county discussions around transit, which now focus on increasing service frequencies and coverage in a zero-sum budget.
- Business community reacts to data and sees the return on investment. They see tourists on the Pulse BRT regularly, particularly from hotels to Scott's Addition. Business engagement was critical to success chamber participation was pivotal at a critical time when support was needed; project staff invested a lot of time with business owners to ensure their questions and needs were addressed.
- Also felt that aligning comprehensive planning with transit-oriented development principals was critical need to get zoning primed for development.
- The success of Pulse BRT has changed the minds of business owners young people want to live close to the line; Mercedes Benz and State Farm Insurance expressed that access to transit was a key element in identifying potential headquarter locations.
- "Change the mindsets first, then the economic development follows."

FRIDAY, OCTOBER 4, 2019

Welcome Remarks

Jo Emerson, Mayor of White Bear Lake, Chair of Policy Advisory Committee

• Mayor Emerson welcomed the group for the Friday morning sessions. As chair of the Policy Advisory Committee, she thanked participants for traveling to Richmond and summarized that the tour of the Pulse BRT has been helpful, informative and productive. She thanked the local participants for their insight and sharing their story and experiences.

GRTC Pulse BRT System Design and Construction Panel Discussion

Jenna Simandl, GRTC Pulse BRT Consultant Project Engineer, Kimley Horn (Moderator) Scott Fisher, GRTC Pulse BRT Construction Project Manager, VDOT Stephen McNally, Director of Engineering and Construction, GRTC Ashley Lickliter, GRTC Pulse BRT Consultant Project Manager, Kimley-Horn

- What drove the decision to use a combination of median-running bus lanes with in-lane stops and curb-running lanes/stops?
 - The decision was inherited from a five-year programming study and made sense because of land use and density of development and future use. The project was cost-

restricted from any acquisition or street expansion. Broad Street is wide on the west end so that drove the decision.

- Exclusive lanes in curbside area were already there from previous bus service.
- How did GRTC decide to separate stops for BRT routes and local service instead of using shared stations?
 - TIGER grant application restricted travel times; didn't want connection with adjacent service to delay the route.
- Tell us about designing and constructing BRT with multiple partners.
 - Stations had nice design, not overly complex. Coordination with stakeholders was key, unique because city project team got everyone in an auditorium to get everyone on the same page. However, construction manager needed full control as multiple directions mix things up.
 - Some leadership change occurred during construction, but everyone was committed to the governor's established schedule. Need one single point of contact for each stakeholder not too many cooks in the kitchen.
 - At 30 percent design, there was some conflict within the city about the vision for what Broad Street should be (walkable vs. moving traffic), so they pulled everyone in and had a 3-day design charrette, creating transparent efforts to accommodate both needs.
 - During construction, held weekly meetings with the staff and monthly meetings with the Mayor to keep everyone informed.
- How was the decision to use level boarding made?
 - Inherited from a five-year programming study, which drew inspiration from trains. Wanted to keep it as fast as we could, level boarding thought to reduce dwell time. We think it worked out pretty well.
- What was vehicle procurement like and why did you decide to use 40-foot vehicles?
 - 40-foot buses make up the majority of the fleet, kept this standard from a maintenance standpoint. Now switching to compressed natural gas – have two bays at maintenance facility. The extra seating in the larger buses was not worth the extra vehicle cost for us.
 - Made decision to secure vehicles early.
 - What approach was used to deliver the project?
 - Used design-build approach. Replaced fiber in Broad Street first. Utilities will be the biggest hurdle if you can move early, do so. Used cluster approach built stations in clusters. Repetitious design helped but be mindful of cross slopes years of asphalt build-up resulted in up to 7 percent cross slope. Maintenance of traffic was huge to reduce business impacts; contractor did a great job being flexible. If they hit a problem in one location, could move to another location, which helped avoid delays. Keep decisions simple. Should have treated platforms more like beefed up sidewalks. Glass wind screen panels were difficult to construct; they required special glass printing and were heavy. Found we didn't need foundation walls.

- Thought about Construction Manager at Risk (CMAR) and bid it out, got one response from a small contractor that didn't have urban experience, so changed to design-build.
- What process was used to determine signal timing and priority?
 - Had a change in city traffic engineer during the project very different philosophies.
 First was more concerned about throughput, second was more pedestrian focused.
 Difficult to keep traffic moving during construction. Signal timing started at 30 percent, continually adjusted through construction and to prioritize modes.
 - When contract went to design-build, contractor was obligated to achieve 10 percent travel time savings; required lots of traffic modeling and signal timing to achieve performance measure.
- What were the unforeseen challenges during construction?
 - Always find things in urban environments, found some abandoned sewer and significant voids city was responsive to filling voids, Verizon vaults that were unanticipated could have been a four- to six-month delay. Contractor was not experienced with tying in new systems and old systems, Kimley-Horn stepped in to fill that skill gap. Make sure you have wide enough lanes to ensure maintenance of traffic needed to bring in panels and trusses, wide materials, cranes. Sometimes pedestrians crossed the construction site. Had a bad tropical storm and upgraded system but didn't give correct plans to design team, so we found a deeply buried tunnel that had zero tolerance for load and had to build an unplanned foundation around it, but in the end it didn't cost a lot. Only about \$250,000 overruns on project.
- Why design-build?
 - We were looking for a method to expedite the construction. Didn't have CMAR interested in project. Timelines moved from Small Starts to TIGER, which accelerated the project.
 - Governor had three priority projects for transit at the time, and the other two projects died so the governor wanted to see this last project delivered during his administration.
- Did you tie up the entire corridor for two years or did you "chunk it"?
 - We did chunk it, but when specialty subs worked on the entire corridor, strict segmentation wasn't realistic. Aggressive schedule to get done in two years. Don't think we impacted businesses as much as they think we did, but don't promise businesses what you can't deliver. Don't promise to compensate for lost business.
- Anything you wish would have done differently?
 - Have construction delivery discussion early and have conversations with construction community with interest in different approaches. We lost time and significant effort to get teams up to speed.
 - Make station decisions as early as possible so that you can identify utilities early. Do a good job at keeping public informed. Engage broker to identify park-and-ride sites at terminal location because you will need it.

- Get training facility built early to work out operator kinks. In hindsight would not have built knee walls or set them back 12 inches. Also extend rub rail and restrict parking before station to allow driver space to line up.
- Training platform was key to get operators used to driving conditions.

Public Outreach During Design and Construction

Carrie Rose Pace, Director of Communications, GRTC Ashley Mason, Pulse BRT Communications Specialist, GRTC

- Design phase preliminary through 30 percent design.
 - Form stakeholder groups to ensure they are engaged, get businesses informed early, and ensure they can stay engaged throughout the process. Be up front about the tradeoff – constrained right-of-way looked at modal priority (cross section) section by section – lay-person friendly graphics to help them see impacts. Can't please everyone but be sensitive to everyone's needs. Sauer example: Whole Foods wanted left-turn lanes more than parking, allowed Savory Grain to get the parking.
 - Be clear about the cost estimates, budget and contingency fund. Opponents argued that delivery cost was insufficient.
 - Break down discussions by interested groups small groups focused on topics force individuals to listen to each other.
 - Ashley was hired through a grant went door to door to talk to business owners. Needed to combat misinformation with good information. Left-hand turns and median closures were a significant issue. At VCU, parking is at a premium but needed to remove parking at station locations, so we identified a cross street that could be converted to a one way with parking. Started showing maps two blocks back identifying areas of "close parking" – not just on Broad Street.
 - Know that people need information in different ways talking, visuals businesses couldn't visualize architecture renderings, so we made visualizations showing stations in business areas and to address sight lines to signage.
 - Station design had to go through multiple design committees.
 - Have some fun participated in Christmas parade with a new bus and had a great time!
- Construction.
 - People hated the orange barrels.
 - VDOT was good at communicating schedule, gave themselves padding in the schedule so as not to overpromise.
 - There was a lot of fear on the corridor, so did a lot of boots on the ground, kept on meeting with those impacted, supported businesses by helping with promotion, letting the public know that they were open during construction.
 - Friday updates were important for staff to communicate about the next week. Having a consistent staff person for the public to contact with questions and concerns was key.

- City did not provide compensation for lost business, but the city did decide to do some sidewalk improvements with the project. Social media was key to support businesses. Quarterly open houses were provided by the contractor. There was a 24/7 help line. Used all media to communicate about impacts.
- Always had contractor present during quarterly meetings and showed construction pictures.
- Important to get construction pictures approved by the contractor so as not to disclose secure information.
- Made simple maps to communicate activities on the corridor. Also had construction camera (live feed) to keep public informed on activities.
- There was night work for stations challenging, but short term.
- Pre-launch.
 - Drum up hype for service did two months before and two and a half months after. Communication about bus-only lanes was critical. Offered free rides during launch – only had budget for one week, IndyGo BRT in Indianapolis did for several months. Gave out goodie bags at launch – filled by volunteer efforts – insulated grocery bag, lunch bag, ear buds. These went a long way to build public support.
- What happened at the final approval what was the issue?
 - Opponents latched onto the cost why spend public money on this when there were
 other needs like education or broader system investments. End vote was 7-1-1 by the
 city council. Opponents' statements were primarily fear based and related to budget,
 schedule and construction issues. Some fear issues about increased burglary etc.
 Needed to address concerns over the unknown.
- What does sponsorship of the line mean?
 - Two hospitals are sponsors. The pay \$425,000 annually, which contributes to
 operations of Pulse BRT and keeps stations looking nice. The have advertising space
 inside the bus, making a connection between public health and transportation. Life
 expectancy difference is large between affluent and disconnected neighborhoods so
 saw this as a social justice issue as well.

System Operations and Maintenance Panel Discussion

David Capparuccini, GRTC Pulse BRT Consultant Project Engineer, Kimley Horn (Moderator) Timothy Barhan, Chief of Transit Operations, GRTC Adrienne Torres, Assistant Director and Planning and Scheduling, GRTC Anthony Carter, Director of Risk Management, GRTC Ray Delgadillo, Director of Maintenance, GRTC

- Describe how hours/frequencies were determined?
 - Initial study prior to Pulse BRT, already had Broad Street transit service to 3:30 a.m.; with Pulse BRT trunk line, added service to 1:30 a.m. VCU requested 10-minute frequency during midday as well as peak.

- One week of free rides people treated it like an amusement ride. A lot of folks continued to use the service after the first week, and ridership is continuing to grow. Some stations have 55-60 people waiting. Have talked about articulated buses, sometimes sneak an extra bus into the schedule, have nine buses out during peak. Looking at increasing headways in the future. We're not seeing drop off at midday or weekends. At recreational activity locations, still very busy at those times.
- Buses are required to stop at every station regardless of passengers waiting at station or call for a stop.
- Who owns/maintains the BRT right-of-way?
 - City is responsible.
 - Only BRT vehicles and emergency vehicles are allowed to use center-running dedicated lanes. There are some enforcement issues – bikes, skateboards. We monitor stations by camera, especially to identify skateboard trick riders. Bicyclists are allowed in curbside lanes.
- Do bikes affect bus travel times?
 - Not really. Conflicting interests need conversation, collaboration.
 - Have one block between 3rd and 4th Streets where buses have to leave the bus lane due to parking and unloading at the Convention Center West station. Challenge with mixed traffic in the evening rush hour, traffic coming out of government center gets prioritized over buses, which has been a big headache.
- Who has responsibility to maintain station areas?
 - Have a city GRTC crew who maintains. Don't have bathrooms but do need to maintain green areas. Crew of three with supervisor. Pressure steam wash the stations. Operators do have layovers at the end of each line. Have contracted with business at corridor ends for restrooms.
 - Ticket vending machines have added more at some stations, maintenance has been more on the IT side, customers are pretty good about notifying GRTC about issues. Not maintenance issues so much but vandalism – people putting food into credit card slot, pennies into machine, etc. – but security cameras monitor so we are catching those individuals.
 - Have had issues with the call button, which is linked to 911 dispatch. Individuals unknowingly push button, resulting in false calls. Have to keep it easily accessible to comply with ADA but continue to coordinate between GRTC and police. It is a priority to ensure that there is a response when needed.
- What has been experience with level boarding? Training?
 - Getting drivers to hit rub rail took some training and getting used to. The problem is that some platforms are a little off, crown of road may cause the bus to lean in or away. Have found the training platform very helpful.
- When there is a gap, do you deploy the ramp?
 - We went to Grand Rapids, Michigan to look at their issues with ice and snow, but here we haven't needed to deploy a ramp or bridge plate. Early on, drivers were damaging

the buses, especially the back, so we knocked out a few walls to resolve the issue. Height of the bus is very important, in Minnesota you will have an additional challenge with snow. Every month we check the level of each bus to ensure continuity.

- Fare collection and enforcement?
 - We have a security agency that we've contracted out. Have officers out depending on ridership check during high periods of ridership. Use scanners to check the tickets. Try to enforce fare but keep bus moving as efficiently as possible. Don't want to create intimidating environment due to security presence. Only fine or penalty, must exit at the next stop. Looking at stronger penalties but don't want to create legal liabilities we don't want to deal with. Try to avoid stopping operations but sometimes just need to do it. Feel that our number of fare violations is high, but you have to decide what you want to do to get the number lower. Consider if you really are going to increase revenue (cost of enforcement versus additional fare collected) and not decrease service and goodwill, increase liability and see declining ridership due to atmosphere.



Transit-Oriented Development: The Pulse Corridor Plan Adopted September 25, 2017









Station Areas & ½ Mile Walksheds





Demographics





Walkshed Characteristics

transmit Care of Becomment

The Corridor is its own place. Not an edge, but a center in its own right...





COMPACT AND MIXED

Development around Pulse stations has a rich mix of uses and is compact, sustainable, and high-quality.

CONNECTED

Pedestrians and cyclists can access homes, jobs, entertainment, every day needs, and transit in a safe, pleasant, and interesting public realm.

VIABLE

TOD benefits the corridor and the city by adding housing for all income levels and jobs for all skill levels, increased development in this area increases property values, supports **Pulse** idenship, and generates over \$1 billion in additional assessed value over the next 20 years.



Pulse Corridor Guiding Principles



Question 1: Where is Future Development Going to Occur?

Question 2: What Will that Future Development Look Like?

Question 3: What are the Best Tools to get There?











CHMOND



Hold the Corner



Appropriate Setbacks/Stepbacks



Entrances Face the Street



Transparency



Façade Articulation



Screened Parking/Services



Transit-Oriented Design Principles





Station Priority Matrix



STATION AREA

The Cleveland Station area unifies two vibrant, distinct, pedestrianoriented neighborhoods by maximizing the potential of underutilized parcels and supporting new forms of development that are walkable, dense, and mixeduse.



Cleveland – Vision and Future Land Use

11





Scott's Addition Pre- & Post-Rezoning









Streetscape Improvements (Under Design)





Infill Development Consistent with Plan



Thank You For Your Attention!

For More Information on the Pulse Corridor Plan:

http://www.richmondgov.com/PlanningAndDevelopmentReview/PulseCorridorPlan.aspx

Mark A. Olinger, Director of Planning & Development Review Mark.olinger@richmondgov.com

For More Information on the Richmond 300 Plan:

www.Richmond300.com Maritza Pechin, Project Manager Maritza.Pechin@richmondgov.com





Regional Transit Vision Henrico County Perspective

Tim Foster - Deputy County Manager for Community Operations

Todd Eure - Assistant Director of Department of Public Works

Henrico County



Richmond-Ashland Electric Line, 1938







Henrico County

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Henrico County







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Henrico County 2018 Transit Initiatives (Two Phases)

- June 2018: Budget Neutral
 - Linked 4 routes to BRT at Willow Lawn (western end of Pulse)
 - Began 30-minute service on W. Broad Street connecting to the Pulse
 - Connected primary eastern route to Richmond International Airport
 - Simplified schedules

September 2018: FY18-FY19 Budget Supplement

- Extended service on W. Broad Street to Short Pump
- Extended hours of service on 3 major routes to add evening and weekends

Henrico County







Evening and Weekend Local Service



Henrico Results to Date

- 76% Ridership Increase across All Local Routes (April 18 vs April 19)
- **44%** Ridership Increase on Express Routes (April 18 vs April 19)
- 21% Ridership Increase for the Expanded Service on W. Broad Street (over 1st 11 months of operation)
- **410** Boardings/Alightings per day at Rocketts Landing BRT Station
- **1,900** Boardings/Alightings per day at Willow Lawn BRT Station



Local Route Connection to the Pulse Station at Willow Lawn



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Short Term Focus & Needs

- Enhanced Bicycle & Pedestrian Safety
- Better Accessibility
- More Amenities
- Dedicated Parking
- Continue to Grow Ridership
- Better Connectivity



Growing Focus on Improving Bicycle and Pedestrian Safety



Better Accessibility - Within the Right-of-Way







Better Accessibility - Within the Right-of-Way and Beyond



Henrico County



Prioritize and Install Transit Stop Amenities



Provide Dedicated Parking for the Pulse





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Longer Term Focus & Needs

- Regional Transit Vision Plan
 Phase I & Phase II
- Incremental Expansion
- Coordination with the Development Community
- More Pedestrian & Bicycle Accommodations













Henrico County

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Eastern Henrico County Looking West towards Rocketts Landing



Partner with the Development Community to Incorporate Transit Improvements



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Continued Focus on Bicycle and Pedestrian Safety



Henrico County



Sidewalk Planning Initiative



Henrico County



Sidewalk Project under Construction in Short Pump

Henrico County's Lessons Learned

- Plan Public Input Plan More Build It Repeat
- The Importance of Good Marketing
- One Size Does Not Fit All





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Any Questions?







VCU and GRTC Partnership



Richard Sliwoski

Associate Vice President VCU Facilities Management

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About VCU



About VCU

- 86% of students are Virginia residents
- 45% minority students
- VCU educates and graduates more first-generation, Pell-eligible students than our Virginia peer institutions combined
- 24,058 students are undergraduates
- 173 acres of campus in downtown Richmond on two main campuses
- VCU Medical Center #1 hospital in Richmond
- Largest employer in Richmond



2



Background

- ONE VCU Master Plan and GRTC Pulse converge
- ONE VCU Master Plan cites need to reduce parking demand and improve connectivity
- VCU-GRTC pilot partnership (2018-19)
- Ridership increases on GRTC and decreases on VCU transit during pilot year
- Pilot-year survey shows support for partnership



Impact

- Increased ridership for GRTC and reduction in headways
- VCU students and employees have greater access to all parts of the City
- VCU is able to eliminate redundant services
- Reduces greenhouse gases
- Improves pedestrian safety, parking and traffic congestion
- A community partnership that supports services and infrastructure for everyone







Rocketts Landing

400+ residences 700,000 sq ft offices 200,000 sq ft retail Marina Capital Trail



Stone Brewing

200,000 sq. ft. Tasting room





Main Street Station

Multi-Modal Connection





The Sauer Center

Whole Foods Car Max





Scott's Addition

3500 residents Breweries Restaurants/bars



Navy Hill

Proposed \$1.5 Billion Downtown Mixed Use Project

Arena 17,500 seat Hotel 525 room

Multi-Family Residential 2500 units 280 affordable

Office / Commercial / Adminis

Transit Center

Transit Center

Greater Washington Partnership Transportation Report

ITDP Bronze Award for Pulse

Only 7 U. S. cities have earned bronze or higher

GRTC RIDERSHIP FOR JULY THROUGH APRIL IN 2017, 2018, AND 2019

MONTH	FISCAL YEAR 2017 ¹⁶	FISCAL YEAR 2018	FISCAL YEAR 2019	% CHANGE 2018-2019
July	733,963	641,316	641,421	0%
August	711,460	675,734	718,693	6%
September	689,778	642,455	666,351	4%
October	699,294	647,438	784,569	21%
November	661,684	596,306	708,693	19%
December	622,117	562,301	652,369	16%
January	620,235	559,548	706,619	26%
February	623,225	556,125	688,236	24%
March	657,111	591,696	736,536	24%
April	615,225	574,313	772,979	35%
Total July–April	6,634,092	6,047,232	7,076,466	17%

SYSTEMWIDE, PULSE, AND HENRICO GRTC RIDERSHIP LEVELS FOR JULY 2018 THROUGH APRIL 2019

	AVERAGE WEEKLY RIDERSHIP 7-1-2018 THROUGH 9-15-2018	AVERAGE WEEKLY RIDERSHIP 9-16-2018 THROUGH 4-21-2019	PERCENT CHANGE
Systemwide	151,196	165,808	10%
Pulse BRT	31,112	38,832	25%
All Henrico County routes	16,202	22,218	37%
Henrico County routes with expanded service*	10,755	16,771	56%

*These include lines 18, 19, 7A, 7B, and 91

GRTC PULSE Opened June 24, 2018

October 4, 2019 Rush Line BRT Peer Visit Public Outreach Overview by:

Carrie Rose Pace Director of Communications Greater Richmond Transit Company

GRTC PULSE | PUBLIC OUTREACH: DESIGN

- Form stakeholder groups to participate in 30% design
- Be up front about trade-offs between parking, left-turns, median/lane widths, and bus only lanes.
- Have cost estimates for stations and vehicles
- Explain budget and contingency fund plans

Sponsored by

Bon Secours @VCUHealth.

GRTC PULSE | PUBLIC OUTREACH: DESIGN

VCUHealth

GRTC PULSE | PUBLIC OUTREACH: DESIGN

Bon Secours @VCUHealth. 🖓 📶

GRTC PULSE | PUBLIC OUTREACH: DESIGN

WBon Secours **WCU**Health

GRTC PULSE | **PUBLIC OUTREACH**: **DESIGN**

Wealth Bon Secours **WCU**Health.

GRTC PULSE | **PUBLIC OUTREACH**

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GRTC PULSE | PUBLIC OUTREACH: CONSTRUCTION

- · Give yourself extra pad in projected launch date. It's always better to open earlier than expected!
- Go door-to-door with outreach specialist to prepare people for impacts
- Post weekly look-ahead for construction activities
- Share pictures of construction often on social media and online
- Have at least quarterly public information meetings with contractors
- Create a 24/7 on-call line for help
- Partner with impacted businesses to increase awareness about them
- Always preserve access to a business or residence minimize impacts!
- Advertise key construction and safety messages (TV, digital, radio)

GRTC PULSE | PUBLIC OUTREACH: CONSTRUCTION

Sponsored by

WBon Secours **WCU**Health.

GRTC PULSE PUBLIC OUTREACH: CONSTRUCTION

During construction, the public continues to have access to businesses, organizations & services. #PulsePoint

2:57 PM - Sep 15, 2016 - Twitter Web Client

♥Bon Secours @VCUHealth. →

GRTC PULSE PUBLIC OUTREACH: CONSTRUCTION

GRTC Pulse

Here's a look at the utility work happening today at DMV Drive on WB Broad St. Traffic is moving around work zone. ridegrtc.com/news-initiativ...

3:29 PM - Oct 10, 2016 - Twitter Web Client

GRTC Pulse

NEW construction info for next 2 weeks: station construction & permanent inside lane closures b/t Thompson & Foushee ridegrtc.com/brt/constructi...

5:26 PM - Dec 2, 2016 - Twitter Web Client

Sponsored by:

GRTC PULSE PUBLIC OUTREACH: CONSTRUCTION

Coming soon! A live view of construction from @LeesFamousChick! #PulsePoint

10:52 AM - Dec 7, 2016 from Lee's Famous Reope Fried Chicken - Twitter for

GRTC PULSE | PUBLIC OUTREACH: CONSTRUCTION

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VCUHealth.

WBon Secours **WCU**Health

GRTC PULSE | **PRE-LAUNCH**/LAUNCH

- Begin marketing blast at least one month before launch and sustain at least a month after launch
- Create "How To" educational content
 (video, pictures, digital/flyers) and air PSAs
- Budget for free rides during launch week (or longer, if you can afford it!)
- Celebrate!
- Give away goodie bags to passengers at launch

For more information contact:

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Ashley Mason Marketing & PR Specialist 804-474-9364 Ashley.mason@rideGRTC.com

