

Westchester County Department of Public Works and Transportation

Bus Network Redesign and County Mobility Study

Task 1:

Peer Review of Bus System Redesign Projects



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Introduction & Background

This report examines how Bee-Line System peer transit agencies have gone about planning and implementing bus system redesign projects, and is intended to provide a framework for Westchester County in identifying an appropriate approach to undertaking its own redesign effort. This peer review is the result of extensive research and interviews conducted by the staff of the Planning Division of the Westchester County Department of Public Works and Transportation (WCDPW&T) with transit officials from each of the following locations:

- I. Rochester, New York
- II. Albany, New York
- III. Houston, Texas
- IV. Baltimore, Maryland
- V. Columbus, Ohio
- VI. Bronx, New York

These six case studies have assisted WCDPW&T in drawing conclusions about best practices, lessons about what didn't work, and important takeaways for consideration as WCDPW&T prepares to conduct its own redesign study.

Bus system redesign projects have become a common activity and best practice for transit agencies looking to address current trends facing transit systems. These include competition from evolving mobility options such as Transportation Network Companies (TNCs), relatively low gas prices, bike and scooter programs, and even increased telecommuting. These factors have contributed to fewer bus riders for many systems; demographic and land use changes have also altered the physical landscape of operating environments for bus networks. This has resulted in transit agencies looking for innovative solutions to redesign their bus networks to better meet mobility needs and most efficiently allocate their resources.

The transit systems studied for this report were all established 35-plus years ago and generally hadn't been holistically reassessed since their inception. Westchester County picked these six examples as case studies because each offered one or more unique characteristics that would potentially be applicable to its own redesign effort:

- Rochester's population size and demographics share some similarities with Westchester County; their development of guiding principles and outreach process were also of interest.
- Albany's Capital District Transportation Authority (CDTA) has undertaken a phased approach to conducting its system redesign, along with the development of a discounted fare product, and has the challenge of effectively serving multiple central business districts within their operating area.

- Houston METRO was one of the first transit agencies to consider a system redesign, and the way in which the system was streamlined with combined routes and rearranged stops is exemplary, along with the resulting increases in ridership and operational efficiency.
- The Maryland Transit Authority (MTA Maryland) redesign of the Baltimore bus system offered Westchester County lessons ranging from choosing software tools to rebranding the system for ridership adaptation. It also took a different approach from other agencies conducting redesigns, as it was more of an operational analysis than a “blank slate” approach.
- Columbus, Ohio, demographically and geographically similar in size to Westchester County, has bucked the trend of declining ridership. Its system was perceived as operating well prior to its redesign, but political support for transit expansion and changing development patterns drove a process that was intended to enhance rather than redraw from scratch its bus network.
- The Bronx Bus Redesign was selected given the proximity and relationship between the Bee-Line Bus network and MTA New York City Transit, including shared fare media and a high rate of transfers between Bee-Line buses and New York City Transit buses and subways.

Although most of the examples studied represent regions with one primary city center that serves as the focal point of the bus network, Westchester County’s Bee-Line service area encompasses a range of cities, towns and villages each with distinct urban, suburban and rural characteristics. The variety of development types produces complex challenges that may not exist in locations where there is a single city center with less densely populated land areas radiating out from it.

The Westchester County Bee-Line Bus System operates a fleet of 325 vehicles in a 450 square mile service area with a population of 949,113 according to the 2010 Census¹. Westchester County’s population grew an estimated 3.3% between 2010 and 2017 to 980,244 (2017 data is based on ACS data), a higher rate of growth than the New York State average of 2.4% during this period but lower than the nation’s growth at 5.5%. Bee-Line ridership peaked in 2013 with about 32.4 million passengers, and has consistently declined in subsequent years to about 27.3 million passengers in 2018.

Case Studies

I. Rochester, New York

¹ Unless otherwise noted, this report uses 2017 National Transit Database figures for population and fleet size, as reported by each specific transit operator, which better reflects the population of their operating service area versus that of a municipal jurisdiction. The most recent population data in the NTD is from the 2010 Census.

The Rochester Genesee Regional Transportation Authority (RGRTA) was established in 1969. It operates the Rochester Regional Transit Service (RTS) which was modeled on a radial hub-and-spokes design, with most of the service originating in downtown Rochester and traveling out to suburbs. According to the 2010 Census, the core RTS service area within Monroe County had a population of about 720,000; based on 2017 FTA reporting year data, its fleet included 213 fixed-route vehicles serving about 15.8 million annual passengers.

Although employment centers and demographics had shifted dramatically since its inception, Rochester's transit service had changed little until recently. Prior to 2016, minimal consideration had been given to the impact of new forms of mobility, even though they were transforming the transportation landscape in the Rochester region. The call for more direct service and higher frequency was also gaining momentum as RGRTA considered taking a more in depth look at how to transform the system to better meet the needs of current ridership. All of these factors led to the RTS Redesign, which began with a Phase I study in early 2016.

RGRTA utilized a blank slate approach in which all existing routes were prone to being redrawn. In addition to retaining a consultant, RGRTA used its internal scenario planning software with a web interface, in conjunction with scheduling software, for planning the new route network and its operations. The intention of RGRTA was for a redesigned system to be generally cost-neutral from an operations standpoint.

RGRTA's public outreach process engaged various stakeholders, elected officials and the public, and was considered a critical step for fostering the needed buy-in for redesign. A key piece of the outreach was educating the public about how and why changes would make a better transit system. The public's role in assisting with development of Goals and Guiding Principles also supported decision making. The Guiding Principles served as a driver for deliberating the choices made, such as ensuring system sustainability, and created a unique strategy for keeping outreach productive.

Rochester ended up streamlining and enhancing much of the system that was already in place to create a markedly different transit system. In contrast to the legacy system that operated 48 routes, the final recommended plan suggested that the redesigned bus system be comprised of 30 routes running seven days a week, with 10 being frequent routes (with 15 minute headways on weekdays) and 20 local routes (that connect with and supplement the frequent route network with 30 minute weekday headways). According to metrics for the new plan, 95% of current customers are within walking distance of the new fixed-route system and 64% are within walking distance of the frequent network.

For those passengers who were no longer going to be within walking distance to fixed-route bus stops, RGRTA proposed seven community mobility zones to extend the core network to specific geographic zones with the use of more cost-effective mobility options. Eleven connection hubs were also recommended to enable customers to make connections between community mobility zones and the fixed-route system.

The Service options for the community mobility zones will be further assessed in a second project phase which will identify the most efficient way to structure the alternative mobility options. Additional public outreach was also needed to ensure passengers who were losing their fixed-route service that their mobility options would be addressed through the community mobility zones.

Overall implementation will not be completed until 2020, and will include additional capital improvements such as bypass lanes and traffic signal adjustments. The current budget doesn't include capital expenses for connection hubs or alternative transit options, and RGRTA is unsure about whether it will become the provider or coordinator of the alternative services. Phase II of the study will help to address these unknown parameters.

II. Albany, New York

The Capital District Transportation Authority (CDTA) was established in 1970, serving Albany, Schenectady, Rensselaer, and Saratoga counties in Upstate New York. CDTA's service region had a 2010 Census population of just under 850,000; in the 2017 FTA reporting year, CDTA's fixed-route fleet numbered 240 vehicles, and carried about 16.4 million passengers. Capital District local and express bus routes have always served to interconnect downtowns, shopping areas, neighborhoods, universities, and key towns; the bus redesign initiative was intended to better address changing needs with an updated system and to attempt to reverse declining ridership.

Different facets of the CDTA system have been individually and incrementally taken on over the last 12 years. The intent was to plan for a new system by starting with a blank slate and building from the ground up to better reflect present ridership needs. While CDTA planned the redesign holistically, they chose to develop a timeframe that divided the overall system into manageable, phased sections for analysis, outreach, and implementation. The goal is to revisit each section for adjustment every 10 years. The bus redesign for the Capital District began in approximately 2006 with the restructuring of routes in the City of Saratoga. The biggest two parts of the restructuring took place in 2011 and 2012, with Phases 1 and 2 of the City of Albany's route restructuring initiative.

CDTA believed that survey tools and outreach were the most direct and best way to collect valuable data. Origin and destination data were collected, and meetings were conducted with drivers/operators to get them excited about a restructuring and encourage them to help solicit input from ridership.

Rather than having project specific meetings, public outreach consisted of attendance at community and neighborhood meetings where CDTA presented their study and conducted exercises to educate and collect feedback from the public to help set priorities for the redesign. Draft service plans were presented at subsequent meetings.

CDTA used scenario planning software with a web interface to explore different route options and create a "Transit Propensity Index" (TPI) to look at all four of the CDTA counties through

the lens of many different variables. They developed equations to make quantitative determinations regarding every block group relative to certain kinds of data. The TPI was then layered over the route map in outreach meetings. Using the visual overlays to justify prioritization of choices with data became a useful tool for convincing the public about why certain changes should be made.

As part of the City of Albany Phase 1 restructuring, CDTA also launched a product called the Universal Access Card. CDTA partnered with local institutions, organizations, businesses and universities, and encouraged them to purchase discounted fare cards in bulk for affiliates. The hope was for this product to attract new ridership groups and retain them for the long-term. Over time, the pilot led to contracts lasting 3 to 5 years, resulting in less demand for expensive car parking solutions as people chose transit over driving.

It has been estimated that by the end of Phase 1 of the City of Albany redesign, approximately 75% of the CDTA route network had been wiped clean; this was accomplished in a relatively cost-neutral manner from a budgetary standpoint. The CDTA redesign resulted in a more efficient system with higher ridership and improved customer satisfaction, which was achieved through improved trunk routes and a new neighborhood network that better aligns services to demand. The restructured bus network has produced an increase in frequency of transit service and faster operating speeds which has benefitted 90-95% of CDTA customers.

Alongside the route network changes, they transitioned their fleet of 30-foot with larger vehicles to support the new ridership patterns on the more frequent trunk routes. There has been an estimated 15-20% increase in ridership, and approximately 30% of total ridership is now generated by Universal Access Card arrangements. It's not possible to decipher whether increases in ridership are due to the transit restructuring or Universal Access Card arrangements – both of which took effect at the same time. In addition, a new smartcard and mobile ticketing system now offers seamless payments across the region's transportation network, including bus service, car and bike sharing, and taxi service.

The next phase in the CDTA redesign process involves further integrating alternative mobility choices into the redesigned system. Albany has already added transportation demand management opportunities such as ride-sharing, and more multi-modal options are under consideration following the recent implementation of bike sharing. A new effort to introduce CDTA-operated micro-transit service to areas where full-size buses are unable to operate is also underway with the acquisition of a software platform for micro-transit planning.

III. Houston, Texas

Houston METRO was established in the 1970s to service the Harris County and the Houston Metropolitan Area, and has grown significantly since it was established. As of the 2010 Census, the population of the METRO service area had grown to about 4.1 million people; the METRO fixed-route fleet in 2017 consisted of 1,233 buses serving about 65.9 million annual passengers. While METRO has expanded to include a light rail system, the bus transit network failed to address regional changes with appropriate service, and became a relic of the past.

METRO System Reimagining grew out of a 2011 long range planning process focused on the need for improvements to local bus service. A blank slate approach was taken, and it included consideration of how to better integrate bus and rail networks while also better aligning bus service with the region's transformation. Bus ridership was declining while the area's population was increasing, and better interconnectivity between rail and bus was seen as one way to win back ridership.

The outreach process for the system reimagining began in late 2013, targeting the community and stakeholders through workshops, surveys, and a range of other tools. Public input and an analysis of the system identified successful facets of existing service and opportunities for improvement, including whether a new system should prioritize wider coverage or more frequent service at both the route and regional levels. Goals and performance measures were developed to assess the new system, service strategies, and individual routes. Trip planning comparison software developed by a consultant was used to facilitate the process. From the outset, METRO's objective was to keep the initiative's outcome cost-neutral.

Implementation began in August 2015 with the introduction of the new route network; METRO anticipates that full implementation of all capital improvement projects will continue over a 12-year period. The resulting system transformed what was a hub-and-spoke system of bus routes into a high frequency grid with efficient connections between routes. The new system is simpler, easier to understand, and better aligned with the needs of present-day Houston; routes are no longer duplicative and, where appropriate, have been combined to increase frequency and shorten wait times. The new streamlined frequent network, which has 15-minute headways both on weekdays and weekends, was the product of eliminating long, complicated routes and reducing the number of street level freight crossings.

METRO's System Reimagining shifted resources from a 50-50 split between frequency and coverage to a system with 80% of resources dedicated to frequency and 20% for coverage. METRO estimates that 72% of ridership will have convenient access to frequent service, seven days per week, with nearly all riders within a ½ mile of service. In addition, distances between routes throughout the system now feature consistent spacing, usually about ½ mile apart from each other.

The redesign process included development of a "transit toolkit", which defined the kinds of transit services, including types and sizes of vehicles that should be offered by METRO, taking into account land use and demographic shifts. The toolkit includes the establishment of Flex Zones which will provide bus service within a defined zone to local transit centers to connect to fixed-route service. The final extent and nature of the Flex Zones is still under study.

The Houston transit redesign has resulted in a stronger network that provides more opportunities to reach more destinations, and was accomplished by only marginally increasing the existing bus fleet and operating costs. Thoughtfully integrating different modes of transportation - three new light rail lines and bus transit - led to elimination of duplicative routes and generated savings for the overall transit expansion and redesign project. Bus

ridership in Houston grew .8% from 2016 to 2017, which compares very favorably with the 2.9%² decrease in transit ridership that occurred across the United States.

IV. Baltimore, Maryland

Maryland Transit Administration (MTA) was established in 1970, coinciding with the conversion of streetcar routes to bus routes in Baltimore. The MTA's core service area covers a population of about 2.2 million based on the 2010 Census. In the 2017 FTA reporting year, MTA's fixed-route fleet included 1,057 vehicles, serving about 73.8 million passengers.

The primary catalyst for the MTA transit system redesign was the need to better integrate the bus network with Baltimore's light rail and Metro Subway, as there was little coordination among the different modes of public transportation in the Baltimore region. The hope was that integration would add greater efficiency and save money, thereby improving the overall system. Baltimore launched a "Quality and Access" Study to assess the existing transit system in March 2013. This enabled planners to identify underserved areas and pinpoint overall transit performance issues, and led to the beginning of the transit system redesign in October 2015.

Goals of the redesign that were identified as guiding principles included improving service quality and reliability, increasing frequency and transfer opportunities, enhancing connections to other modes of public transportation, and addressing land use/trip pattern changes. Though increasing ridership was not an explicit goal, the prevailing belief was that more frequent service would lead to more people using transit, and yield greater ridership.

MTA appeared to follow more of an operational analysis approach rather than a blank slate strategy, and considered capital improvements as part of their study. This approach was supported by the Governor's \$135 million allocation to fix the transit system by 2017. The initial redesign plan was developed in-house based on data from a prior study known as the B-Net project, previous customer comments and complaints, and an analysis of new land use and development patterns. The plan sought to maintain existing high ridership corridors, provide access to employment centers and incorporate a frequent transit network along the busiest routes. Special attention was paid to roadway improvements and transit priority features as a way to increase efficiency on higher speed bus routes.

In total, the redesign process encompassed three phases of outreach, with versions of the plan tweaked in response to over 1,000 comments submitted as public input. MTA also utilized the resources of the regional travel demand model of the Baltimore Metropolitan Council (BMC), the Baltimore MPO, to develop origin-destination data and inform the planning process. With the redesign, a rough estimate for Baltimore's bus transit is a 70% frequency/30% coverage split, with frequency routes defined as those with headways of 15 minutes or less. The concept of alternative mobility options such as TNC partnerships replacing fixed-route service were not studied, nor were they included in the implemented redesign.

² (Descant, 2018) <http://www.govtech.com/fs/transportation/Seattle-Houston-Buck-Declining-Bus-Ridership-Trend.html>. Retrieved February 25, 2019.

The 2017 redesigned Baltimore transit system is very different from the prior network. Rebranded as BaltimoreLink, it maximizes interconnectivity and efficiency by integrating bus, light rail, and Metro Subway. BaltimoreLink includes 12 high-frequency radial CitiLink routes coming into downtown, which carry approximately 50% of BaltimoreLink's weekday ridership; complementing CitiLink routes are 44 shorter LocalLink routes arranged to approximate a grid and facilitate access to transfers within the downtown area.

Analyzing and rearranging routes based on their frequency allowed for streamlining Baltimore's system and yielded better performance measures. Only half of MTA's bus routes had major changes. MTA believes that BaltimoreLink is bucking the national trend of declining public transit use. While ridership declined as it adapted to redesign changes in 2017, metrics now indicate that it is above the predesign level and growing. October 2018 was the first month that saw ridership levels that were higher than the previous year, with a 5% increase for weekday frequent transit use and a 3% increase for weekday, non-frequent service routes. On-time performance is another major measure of success and now stands at 68% compared to 59% prior to the system redesign³.

Since the redesign, Baltimore has developed a route report card that uses four guiding principles – safety, efficiency, reliability, and the provision of world class customer service – as the benchmark for tracking and improvements. BaltimoreLink has also adopted new technology platforms to help improve reliability based on actual performance data, rather than anecdotal, qualitative feedback.

V. Columbus, Ohio

The Central Ohio Transit Authority (COTA) is the main provider of public transportation in the Columbus metropolitan area. Established in 1974, COTA's fixed-route service area encompasses five counties covering 562 square miles, with the Ohio State University campus and the downtown central business district serving as major trip generators. The COTA service area, based on 2010 Census data, had a population of about 1.37 million. In the 2017 FTA reporting year, COTA's fleet numbered 357 fixed-route vehicles, generating about 18.4 million trips.

Population growth and changes in attitude about living in a dense urban core with public transportation alternatives fueled the desire for an expanded public transit system in the Columbus area. This was publicly supported by tax legislation passed in 1999 that permanently dedicated 0.25% of all sales tax to fund COTA. In 2007, the amount was increased to 0.5% for 10 years; this tax was extended to 2026 in a 2016 ballot initiative. This guaranteed source of funding has enabled COTA to make long-term strategic decisions, and service had expanded by approximately 45% before the Transit System Redesign (TSR) – the most recent redesign of the system - was even undertaken.

³ http://digitaledition.baltimoresun.com/tribune/article_popover.aspx?guid=43515f65-70bf-4ce4-9976-40dd134376ba. Retrieved February 25, 2019

The TSR was initiated to holistically assess COTA's transit network to guarantee that resources were being efficiently and effectively put to use as the system expanded. The redesign goals for COTA entailed analyzing five key issues. They included determining which fundamental changes to the overall route system were needed to accommodate a changing region, deciphering delivery methods to improve service performance, clarifying the best downtown route structure, defining service parameters, and identifying technology investments.

Prior to issuing an RFP for the TSR, COTA had collected significant data, performed several studies, conducted an origin/destination survey, and was in the midst of conducting onboard surveys in heavy ridership areas. Additionally, a System Performance Review assessed each COTA route quantitatively, reviewing population, employment, forecasting data and budgets. A peer review highlighted precedent research and comparisons to the Columbus Metropolitan Statistical Area, which was supplemented by a COTA Short and Long Range Transit Plan. Findings from a downtown planning study focused on retail development, parking, transit centers, and downtown transit operations were also integrated into the scope of work for the TSR.

COTA conducted three phases of public outreach during the TSR. The first was for information collection purposes and became a dataset; the second constituted an alternatives presentation where 3 different plans were shown to the public for comment that contained iterations of frequency versus coverage; the third was a final plan presentation.

Columbus used software to quickly review and assess public requests. It was also a useful tool for sharing network information with other agencies and the public. Additionally, COTA used trip planning comparison software developed by a consultant. A huge awareness campaign to publicize the system redesign during and after implementation constituted a fourth phase of outreach, with a special consultant brought in to facilitate the process. COTA also hopes to implement a satisfaction survey in the future to gauge the public's response to the redesigned bus system.

Before redesign, Columbus's transit system was a radial pattern of local and express service focused on downtown and supplemental crosstown routes facilitating other connections, including those to the Ohio State University campus. While COTA was open to new ideas and change, the goal was to maintain the most productive, high ridership corridors. A fully clean slate strategy was not pursued and, ultimately, the preferred alternative resembled a refined version of the existing network with the existing resource split of 70% frequency and 30% coverage.

Part of the redesign strategy included minimizing cycle times to attain the greatest possible operational efficiency, and using that savings to add service. As a result, operating speeds were a very important variable for fulfilling the goal of realignment and adding new hours to the network. In fact, this greater efficiency resulted in extra service hours that could be reallocated, as well as a more appropriate fleet size for the service provided.

The Transit System Redesign became the largest service change in COTA's history. As of September 2017, after TSR recommendations were implemented, COTA's fixed-route system was comprised of 40 fixed-routes, down from 75 before the redesign. As of December 2018, COTA had 19 million in total annual ridership (an increase of about 3.3% from 2017), and was able to downsize their fleet to 350 vehicles as the new network brought reduced fleet requirements. COTA anticipates increasing its annual service hours in 2019.

Looking forward, COTA NextGen is an ongoing initiative designed to identify public transportation needs and opportunities through 2050, and build off of the success of the Transit System Redesign. As Central Ohio's population grown and priorities change, COTA wants to stay ahead of the curve. COTA is conducting a household survey to assess the number of households that don't use transit and identify what changes might tip the balance; and, it is beginning to look into alternative mobility options as a solution for increased coverage. COTA is fortunate to be operating in an environment where sustainable funding has enabled it to support improvements to the system.

VI. Bronx, New York

The Bronx Bus Redesign program is part of the larger New York City initiative called *Fast Forward: The Plan to Modernize New York City Transit*, which began in 2018. Each borough is being addressed separately, with the Bronx being the second borough to begin its redesign process. Much like the rest of New York City, which has seen neighborhoods transform significantly in recent years, the Metropolitan Transportation Authority (MTA) bus network in the Bronx has remained relatively unchanged for decades, and has suffered from slow and unreliable service with frequent bus bunching and long wait times throughout the day.

The Bronx bus service area is interconnected with the entire New York City service area. The Bronx had a population of about 1.4 million based on 2010 census data. Bronx bus routes, based on MTA data, generated about 152 million passengers in 2017; there were just over 1,100 fixed-route buses based out of depots located in the Bronx.

Three categories form the foundation of the Bus Redesign - 1) Agility & Accountability, 2) Safety, Security & Resiliency, and 3) Customer Service & Communication. These categories inform goals which encompass customer-focused routes, faster/more reliable travel times, more comfortable/environmentally sustainable buses, and a bus system that is seamlessly integrated with subway and paratransit in all five boroughs. For the redesign, goals have been divided into two, five-year timeframes, and include capital improvements.

MTA, which is performing all tasks in-house, identified numerous bus network redesign objectives. Customer consultation and a travel patterns analysis will inform a blank slate approach to redrawing routes, considering alternative types of service, and reconsidering schedules accordingly. Priority routes will be chosen and targeted for corridor improvements and high frequency service.

Because the Bronx redesign initiative is at such a preliminary stage, outreach is only partially complete. Three different types of outreach were chosen – workshops, intercept surveys, and online surveys. MTA developed its own tools for the first group of workshops held throughout the Bronx. The materials covered travel patterns, improvement priorities, and tradeoffs. Intercept surveys were also a valuable source of information that allowed for feedback from both transit users and non-users. Data collection was expedited by using tablets directly fed to MTA's server from the field.

The in-person workshops, intercept surveys, and online surveys all yielded data that will be analyzed separately to determine a direction for the redesign plan. MTA has pre-existing origin/destination data that will supplement the additional data collected.

Although the Bronx bus redesign is ongoing, MTA was able to characterize some ridership priorities with data collected at the workshops. Frequency was preferred over coverage 55% of the time, and top priorities were frequent service, bus priority, real-time information, and bus stop amenities. Among the reoccurring issues experienced during daily commutes that were identified by workshop participants was “better integration/coordination” between Bronx buses and the Westchester Bee-Line System. MTA hopes to share a draft plan with the public in the next series of workshops in spring 2019.

Lessons Learned & Westchester County Implications

The case studies highlighted in this report have had varying levels of success in achieving their redesign goals. In some cases, the population and demand for transit had grown but service didn't adequately provide for the demand. In other cases, ridership was down and the redesign was used as a means to assess the specific character of the service needed.

Of the six initiatives examined, three of the systems studied are experiencing higher levels of ridership since the redesign (Houston, Columbus, Albany); one is still in the process of full implementation, and is slowly rebounding from an initial decline in ridership (Baltimore); another is in the midst of implementation and it is too early to assess its success (Rochester); and the last has just begun the process of developing a plan of action (Bronx, NY).

Although results have varied, and specific outside factors may have contributed to outcomes (such as Albany's Universal Access Card and significant increases in service in Columbus even prior to the redesign effort), there are commonalities regarding the planning process employed in each redesign initiative. While each agency may have pursued different approaches, the redesign studies all included certain themes as described below.

Blank Slate Approach vs. Incremental Approach

In most, but not all of the examples studied, a “blank slate” approach was taken to pursue a holistic redesign of the bus network, as it allows for a needs assessment without regard to constraints imposed by the existing network. It promotes creativity and spirited discussion

among stakeholders, and opportunities for transit operators to transform their systems in dramatic fashions, as was done in Rochester and Houston, and may be a potential outcome in the Bronx. Albany also pursued a blank-slate approach, but the phasing of their project by geographic area yielded a more incremental approach.

Baltimore and Columbus took more incremental approaches, shying away from wiping clean their existing system as they each sought to preserve their most productive routes and corridors as the backbone of their systems. Each had clearly defined employment centers and key transfer points, and viewed the allocation of service to be as critical of a question as routing.

In recent years, Westchester has undertaken an incremental approach toward evaluating its bus system through individual route analyses including the Routes 7 and 13 Study, completed in 2017, and the Bronx/Getty Square Study currently underway. The county could continue this approach as it is effective in identifying tangible improvements that increase service efficiency. It allows honing in on specific routes and more detailed analyses than might be covered in a system-wide review. However, it is largely piecemeal and does not look at the system holistically the way a blank slate approach does. An incremental, route by route, approach would also take longer to complete.

Another key attribute of many of the redesign studies is that they were undertaken without any preconceived notions regarding how much the system should change or how much should be left untouched. While some of a system's most productive routes may ultimately be left as is, there are clear instances of service inefficiencies and markets being covered by fixed-route bus service that perhaps could be addressed by alternative modes such as micro-transit or on-demand type services.

Data Collection

When compared to more targeted transit planning studies conducted on a route or corridor level, redesign studies generally have more significant data collection needs in order to view the system from a broad network perspective and account for current users and non-users alike to identify underserved areas or population groups.

The case studies demonstrate the importance of obtaining both qualitative and quantitative information that may not be readily available internally. Data was collected through several approaches including on-board passenger surveys, non-user surveys and origin/destination data that on-board technology is unable to measure. Web-based surveys as well as in-person intercept surveys at various locations were also used to gather data.

Outreach

While public outreach is a key element of any planning study, it is especially important for transit redesign studies, as each case study demonstrated how outreach helped to shape the

redesigned systems, obtain support from stakeholders and the public and allow the transit agencies to explain the process used as part of the redesign effort. Some systems performed their own outreach, while others relied on consultants or a combination of consultants and agency staff to design and implement an outreach plan.

In the case study examples, public outreach generally entailed up to four phases. A typical approach included initial outreach performed around the time of the redesign project kick-off. A second phase enabled the public and others to weigh in on alternative design schemes. The third phase would introduce a final design, and a fourth phase educated the public to more easily adapt to a redesigned system.

Workshops employed visualization techniques to allow participants to better understand the complex data and operational challenges that transit redesigns brought to light.

All outreach efforts needed to balance various opinions received which may not always have been consistent, as well as weigh feedback from the public with empirical data to support decision making.

This is a special challenge for Westchester County, with its many jurisdictions each with home rule and disparate transit needs. While Westchester County will have to determine the specific degree to which it wants to conduct its outreach, WCDPW&T has already begun to develop a survey targeting officials from local municipalities to obtain data and input regarding how they and their constituents perceive the Bee-Line system and their attitudes towards mobility. This effort should provide both valuable information and interest among stakeholders as the study ramps up.

Establishing Goals/Guiding Principles

One approach taken by some of the transit operators performing redesign studies was the early identification of goals and/or guiding principles that informed the entire planning process. With input from interested parties weighing in through various methods of outreach, planners establish these goals/principles to identify what redesign service characteristics should be prioritized, and apply them throughout the process as justification for making hard choices about where and when service should be expanded or reduced.

Alternative Forms of Mobility

Recent transportation and technology innovations have clearly changed the landscape of mobility, and have been incorporated into recent transit redesign studies. In most of the case studies, redesign initiatives acknowledged the widespread use of alternative forms of mobility and the need to determine how they can be integrated with public transit to counter declining public transit ridership. Many also became part of the solution for serving passengers and transit markets that would no longer have convenient access to fixed-route transit in a redesigned system.

These services, which include TNCs such as Uber & Lyft, bicycle and car sharing, can be integrated into a regional transit system with proper planning. Recently, public/private partnerships between transit operators and TNCs have begun to serve select transit markets, where population densities do not support fixed-route transit. Westchester County's 2018 First Mile/Last Mile Connections Study addressed this topic, which can be further refined as the redesign effort progresses as a possible sub-task.

Software

Transit operators conducting redesign studies have generally benefitted from the use of software tools to perform a variety of redesign tasks. Such products allow for on the fly analysis of proposed route and network scenarios, fleet deployment, schedules, demographics/population/employment data, and performance metrics related to operations. They also provide opportunities to develop innovative analytical tools, as was done in Albany where CDTA created a "Transit Propensity Index" (TPI) that allowed them to visualize data and justify how redesign decisions were prioritized. While these products may be costly, and are used as a tool to support traditional planning processes, reviews have been positive given how complex of a task and lengthy it would be if certain analyses were performed manually.

Cost/Resource Neutrality

A common approach taken by most of the transit operators assessed for this report was an early determination to aim to be cost and resource neutral in the development of redesign solutions to the fullest extent possible. By doing so, transit agencies worked within the confines of their existing fleet, assets and budgets, and aimed to achieve their redesign through streamlining - eliminating redundancies and reallocating resources to where they may be used most efficiently. Although some budgetary impacts may be inevitable, the agencies aiming to be cost-neutral were either able to achieve their goal or incurred very minor increases.

Network/Service Characteristics

A clear takeaway from the transit systems reviewed for this report was the importance given to the bus routes in each system that operated with high frequencies, whether it was maintaining such routes or creating a network of frequent routes as the core of the system. Rochester successfully reduced their total number of routes and shifted resources to a core of 10 routes with 15 minute headways; Houston's redesigned system resulted in 80% of their resources being dedicated to high-frequency routes, compared to 50% before the redesign; Baltimore's redesign was structured around 12 high-frequency routes that generate 50% of their system's ridership. And although Columbus did not change their allocation, they already had a resource split of 70% frequency compared to 30% coverage.

There was also more tolerance for longer walks to bus stops that emerged from the redesign studies; Albany and Houston both identified ½ mile walking distances to bus stops in measuring walkability in their redesigned networks.

Efficient and simple transfers between routes and modes was also a priority to complement the frequent route networks. Examples include Rochester's creation of community mobility zones, streamlined transfers in Houston and efficient connections in Baltimore between their high-frequency CitiLink buses and less frequent LocalLink buses. Transfers between Bee-Line and New York City Transit in the Bronx are already a core element of the Bee-Line network, and will likely be given attention as part of Westchester's redesign process.

Conclusion

Although no example studied in this report offers exact guidance for Westchester County, the concepts and strategies employed by other agencies are informative and relevant to the County's impending redesign. The case studies illuminated major issues to consider in establishing a strategy and preparing a scope of work suitable for a redesign of Westchester's Bee-Line System.

In almost every redesign, frequency was increased and coverage augmented with alternatives to fixed-route bus service. Routes were simplified and new land uses and employment centers were considered within a new system structure. A blank slate approach allowed the bus system to be looked at holistically with no preconceived notions about how much service should change or stay as is. Consideration of data needs and review of available software for the redesign are important aspects of the process. Establishing goals and developing a constructive public outreach plan are also crucial to ensure success.

As Westchester County's project gets underway and key decision points are reached, these examples will help WCDPW&T further identify the components of an optimal process for its redesign effort, in order to best address the mobility needs of the County.