Bangor Transit Study Draft Interim Report (Tasks 1-4)

Prepared for Bangor Community Connector Prepared by Stantec



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1.0 SERVICE AREA REVIEW

The City of Bangor, located on the Penobscot River, boasts a homely small-town charm that accommodates a high quality of life and gives an identity to the Bangor metropolitan area and Penobscot County. The fundamentals of Bangor life include planning and promoting healthy neighborhoods in the face of a changing economic and political landscape. The Greater Bangor Area is positioning for a future that involves density and diverse land uses, contributing to a sustainable and just future for its residents.

In 2012, Bangor amended its Comprehensive Plan that included the City's goals of providing alternatives to the automobile and reducing congestion through the provision of a bus transit system and other modes. With added pressure from the residents of Bangor, a variety of travel options becomes necessary. Beyond building highways and widening roads, a fundamental shift in land use planning has been established in Bangor due to a new awareness for the importance of the natural environment and the role that transportation plays to mitigate these impacts.

Bangor Community Connector provides transit to residents of Bangor, Brewer, Orono, Old Town, Veazie, and Hampden six days a week across 10 routes for nearly 800,000 riders a year. The City of Bangor retained Stantec to assist in creating a strategic plan that aims to increase transit ridership while coming up with innovative ways to continually provide efficient transit. By reviewing current operating procedures, operating data, city demographics, conducting stakeholder outreach, and providing market scans of technology, advertising, and other best practices, Stantec that provides a strategic plan that steers the Community Connector forward with fresh and bold ideas and recommendations.

The purpose of Section 1 is to provide a performance review of Community Connector's current operations and to analyze the trends of the service area. A thorough background of Community Connector will identify shortcomings and the corresponding opportunities for improvement.

1.1 ABOUT BANGOR

The City of Bangor is home to around 33,000 residents, with the greater Bangor Metropolitan Area housing 154,000 residents. Established in the 1800s through lumber, shipbuilding, and the clustering of businesses and recreational opportunities by the waterfront, the city center is a major trip generator as well as home to Pickering Square, the transit hub of the Community Connector. Figure 1 displays the service areas, identifying the transit routes.





Figure 1: Transit Routes of Bangor Community Connector

The demographic composition of Bangor and Penobscot County is an important consideration for Community Connector to ensure the service is catered to the needs of the Greater Bangor Area. Table 1 compares the demographic statistics with those in the State and across the U.S.

Table 1: Demographic Characteristics¹

	Bangor	Penobscot County	Maine	U.S.A
Total population (2010)	33,037	153,923	1,328,361	308,745,538
Total population (2017)	32,237	152,284	1,330,158	321,004,407
Population change (2010 - 2017)	-2.48%	-1.06%	0.14%	3.97%
Demographics				
Dwellings	15,709	75,217	735,711	135,393,564
Average household size	2.13	2.27	2.25	2.61
Median household income	\$40,071	\$47,886	\$53,024	\$57,652
Unemployment rate	4.50%	4.00%	3.30%	4.10%
Labor force	16,816	78,030	697,342	162,184,325
Race				
White	94%	95%	95%	72%
Black or African American	2.30%	0.80%	1.20%	12.60%
American Indian and Alaska Native	2.30%	1.10%	0.60%	0.90%
Asian	3.30%	1.10%	1%	4.80%
Native Hawaiian & Other Pacific Islander	0%	0%	0%	0.20%
Hispanic or Latino	2%	1.3%	1.3%	N/A
Age				
Male	48.20%	49.50%	48.90%	49.20%
Female	51.80%	50.50%	51.10%	50.80%
Under 5 years	5%	5%	5%	6%
5 to 17 years	12%	14%	16%	17%
18 to 64 years	67%	65%	60%	62%
Above 65 years	16%	17%	19%	15%

¹ ACS Demographic and Housing Estimates. 2013-2017 American Community Survey

Education				
No degree	10%	9%	11%	13%
High school only	24%	34%	31%	31%
College degree	54%	31%	46%	46%
University degree	13%	17%	10%	11%
Other	0%	9%	1%	0%
Housing				
Owned	47.40%	69.70%	72%	64%
Rented	52.60%	30.30%	28%	36%
Single detached home	43%	65%	70.40%	62%
Semi-detached home	4%	2%	2.30%	6%
Apartment (2 - 19 units)	39%	17%	15.70%	17%
Apartment (20 or more units)	9%	3%	3.20%	9%
Other	5%	12%	8.40%	6%
% Spending >30% of income on housing	28%	27%	24%	43%

The City of Bangor's population has decreased by nearly 3% since the 2010 Census, while the State of Maine has seen a population increase of 0.14%. It should be noted that the percentage of individuals aged 5-19 in Bangor is also reflective of state and national averages that can be sustained by post-secondary institutions including the University of Maine, Husson University, Eastern Maine Community College, and the New England School of Communications. Through discounted fares or student pass programs, combined with lower levels of income and car ownership, post-secondary students are prime candidates for transit use.

In addition, Bangor's unemployment rate is 4.5%, which is greater than state and national averages. Household median income is \$40,071, which is less than the state and federal median. With a labor force of nearly 17,000 Bangor is economically stable; which usually bodes well for transit. In addition, 88% of Bangor residents drive to work, with 7% of the population using public transit and active transportation as their preferred mode.² Transit's proximity to workplaces is a good predictor for commuting by transit.

1.2 ABOUT COMMUNITY CONNECTOR

Bangor Community Connector operates public transit on 10 routes and carried over 800,000 riders in 2018. Service hours are from 6:15 am to 6:15 pm Monday through Friday, with frequencies of 30 or 60 minutes depending on the route, and routes within walking distance or a quarter mile of 75% of the population. Service hours on Saturdays vary

² ACS Commuting Characteristics by Sex. 2013-2017 American Community Survey

by route, with frequency throughout the day ranging from 30 to 120 minutes. The Community Connector does not offer Sunday service on any routes.

Table 2 lists the routes and provides approximate operating hours and peak and off-peak frequency.

Route	Weekday Service Hours	Weekday Frequency	Saturday Service Hours	Saturday Frequency
Orono Express	6:55 am – 9:55 pm	30 min	-	-
Brewer North/South	6:45 am – 6:22 pm	60 min	6:45 am – 6:22 pm	60 min
Capehart	6:06 am – 6:27 pm	30 min	7:06 am – 6:11 pm	30 min
Center Street	6:15 am – 6:08 pm	30 min	6:45 am – 6:08 pm	60 min
Hammond	5:53 am – 6:10 pm	30 min	9:15 am – 5:40 pm	30 min
Hampden	6:15 am – 5:15 pm	60 min	-	-
Mall Hopper	6:55 am – 6:45 pm	60 min	6:55 am – 6:45 pm	60 min
Mount Hope	6:15 am – 6:05 pm	60 min	6:15 am – 6:05 pm	60 min
Old Town	6:15 am – 5:15 pm	60 min	6:15 am – 5:15 pm	120 min
Stillwater Avenue	6:45 am – 6:35 pm	60 min	6:45 am – 6:35 pm	60 min

Table 2: Community Connector service span and frequency.

2.0 BACKGROUND INFORMATION REVIEW

The current planning process relies on an understanding of previous planning efforts, successes, and challenges. This section provides overviews of some important planning documents and plans relevant to transit, that are important to consider in the context of the Transit Study, to ensure recommendations are in support of (and will be supported by) other Bangor Area objectives.

2.1 BANGOR COMPREHENSIVE PLAN 2012

Faced with rapid development since 2000, the City of Bangor commissioned a Comprehensive Plan to guide future land use in the City with the intent of providing alternatives to automobiles and to reduce congestion in the most densely developed areas through provision of a bus transit system or other transportation modes.

The plan presented the following recommendations:

- Promote increased use of the bus transit system by increasing promotion of the system's availability and schedule.
- Maintain schedules and consistency to encourage confidence in the reliability of service.
- Stabilize costs and fares to the maximum extent possible.

- Optimize transfer convenience between various routes of the system.
- Promote bicycle use, walking, and other alternatives to the automobile.
- Adopt land use policies and requirements, including mixed use land development, that encourage pedestrian trips.
- Support urban development that compliments transit use.
- Encourage transit as a comparable travel option in terms of parking reduction and traffic mitigation measures
- Explore alternate sources of funding for transit service where it can benefit employment and retail sales.
- Consistently regulate management measures on arterial roadways.
- Integrate transit into with automobiles, pedestrians and bicycles as a multimodal surface transportation system

These recommendations provide a review of gaps in service and opportunities for improvement which can be explored through understanding travel demand and public perceptions of the Community Connector.

2.2 CITY OF BANGOR DOWNTOWN DESIGN GUIDELINES

The City of Bangor provided architectural standards for development in the waterfront area of downtown, within the downtown core area, within the Main Street downtown corridor, and within Bass Park.

Supported by shared community values, the design standards aim to:

- Build to the sidewalk
- Provide multi-tenant, pedestrian-oriented development at the street level
- Accentuate primary entrances
- Encourage the inclusion of local character
- Control on-site parking
- Utilize quality construction methods and materials
- Design buildings with human scale
- Intensify site use
- Integrate with overall Development Plan
- Appropriate lighting and signage

Regarding active transportation, the guidelines assess the issues regarding the implementation of on-site parking within the downtown core. The City aims to promote a pedestrian oriented streetscape by assessing parking availability in and around the downtown core.

2.3 COMPREHENSIVE ECONOMIC DEVELOPMENT STRATEGY 2016

The Eastern Maine Development Corporation (EMDC) provided strategies to build an economic framework for the Penobscot, Piscataguis, Waldo, and Hancock Counties of Maine to:

- Ensure growth of the region's economy to raise the median household income to greater than or equal to the national average
- Build upon forest products, tourism, education, and small business innovation and explore new opportunities in bioscience, business conferencing, and advanced manufacturing
- Invest in high quality data transmission, transportation, education, and workforce development
- Create an environment for an innovative, vibrant, and sustainable community
- Improve economic opportunity and increased wealth for the EMDC's region's communities, businesses and individuals

2.4 BANGOR AREA COMPREHENSIVE TRANSPORTATION SYSTEM LONG-RANGE PEDESTRIAN AND BICYCLE TRANSPORTATION PLAN 2019

The plan aims to promote a safe, convenient, and accessible pedestrian and bicycle network that integrates livability and sustainability, and creates a walking and cycling network as an integral part of the region-wide transportation network. The objectives of the plan are to:

- Reduce the number of bicycle and pedestrian related injuries and fatalities
- Enhance connectivity and multi-modal transportation choices
- Continue to identify and map existing and proposed facilities
- Provide for accessibility and safety of people of all ages and abilities

These goals provide a framework for active transportation to generate as a safer and more accessible pedestrian network. Improved walkability in Bangor will improve access and connectivity to transit stops.

2.5 TRANSIT HUB ALTERNATIVES ANALYSIS FOR THE CITY OF BANGOR 2014

The report was administered based on concerns of the safety and connectivity of the current Community Connector transit hub, Pickering Square. The report analyzed Community Connector ridership, transit design, alternatives for a future transit hub, and provided recommendations for the future of Pickering Square and the Community Connector transit system. The recommendations included:

- Consider a new transit hub on Water Street in the city centre or Airport Mall
- Introduce 30-minute service in both directions on a combined Center Street/Husson University/Hammond Street bus route
- Eliminate diversion to the airport and the Department of Human Services building on the Capehart route
- Add a third bus to the Old Town route to provide 30-minute headways between downtown Bangor and the University of Maine



Water Street Departures at Fifteen Minutes Past the Hour

Figure 2: Proposed Transit Terminal, 2014



Figure 3: Proposed Community Connector Bus Route, 2014

3.0 MARKET CONDITIONS

Public transit is both a business and a public service—transit needs to be financially sustainable and responsible to the taxpayers who may or may not ride transit, while also ensuring that it can provide vital transportation to residents without other means of travelling. Typically, these conflicting goals result in difficult decisions to remove service, or to serve certain neighborhoods over others, or designing routes that intend to provide coverage at the expense of ridership or productivity.

To understand the ingredients for successful and productive transit services we need to understand the market for transit. In other words, we need to understand the demographics of a city, its layout, and where people are going. Transit normally works best when it can provide fast and frequent service to a large amount of people travelling for different purposes. Nevertheless, sometimes transit must also provide access to residents who are elderly or low-income, for example, or to residents unable to drive but who still have travel needs.

This section explores some of the basic ingredients of successful transit, including density, diverse land uses, and economy.

3.1 POPULATION DENSITY

The population density of the City of Bangor is 931 persons per square mile. Regardless, population density varies by neighborhood due to history, development, and legislation.

The densest areas are in the downtown neighborhoods of Broadway Historic District and Whitney Park Historic District. Another dense neighborhood is in the City of Brewer's main center, adjacent to the Bangor downtown core on the other side of the Penobscot River. Residential density is lower in the northern side of the city, with the densest neighborhood in the north side being Bangor Gardens, a neighborhood adjacent to Husson University.

The map in Figure 4 outlines the service area of bus stops in Bangor – the areas within the gray circles are within a 0.25 mile or five-minute walk from a bus stop. Most of the densest areas of the City are within the service area, along with low-density areas north of I-95. The neighbourhood of south of I-95 and west of the Kenduskeag Stream is densely populated and is a relatively car-free neighborhood without access to a bus stop within a quarter mile. It is important to note that the data acquired relies on dissemination area data, which may not be granular enough to show the specific neighbourhoods with a high propensity of households lacking access to a vehicle.

Furthermore, the Bangor city center and surrounding areas have the necessary residential density to provide for a productive transit service. In addition, new developments described further below ought to have minimum density to support transit, as growth in the Bangor city center will further demand for future transit.



Figure 4: Residential population density

3.2 EMPLOYMENT DENSITY

Bangor Area residents commute to the City of Bangor's downtown core generally for work. Employment density is an essential ingredient for transit, and a strong predictor of transit effectiveness is whether bus stops are near places of work.

Figure 5 displays the number of jobs per square mile by census tract in the Bangor Area. The densest area for jobs is the Main Street downtown corridor, approximately from Main St./Railroad St. to State St./Hancock St., which receives the highest transit coverage and the location of the Bangor Bus Depot at Pickering Square.

Additionally, there are pockets of employment density outside of the downtown core, including Bangor Mall to the east and across the Penobscot River in downtown Brewer. Employment density is also very high at institutions such as the Bangor International Airport, the University of Maine, Husson University and UMA Bangor.

It is vital that public transit connect jobs in the downtown core and other neighborhoods in an optimal and efficient way to provide transit as a viable option for getting to work. An abundance of parking enables driving as a convenient option for travel with little incentive to take the bus.

Provided that Bangor's employment and recreational generators are located within the city center, outlying communities could benefit from increased service frequency and extended hours of transit service. In doing so, commute times will decrease and residents will have further incentive to travel to the city center. Nonetheless, a high density of housing and employment in the city center provides opportunity for short trips to be taken by transit, and can compete with the private vehicle.



Figure 5: Employment density

3.3 LAND USE DIVERSITY

The City of Bangor is located along the Penobscot River and functions as the center of a broader community that includes surrounding towns such as the Town of Hampden to the south, the City of Brewer to the southeast, and the Towns of Veazie and Orono, and the City of Old Town to the north. The Bangor Area's land use includes a mixture of uses throughout the municipal boundary, with mid and high-density developments concentrated in the city center along Main Street and surrounding neighborhoods. Southwest of downtown are industrial lands, and low-density residential to the north of the city center.

Along with population and job densities discussed above, mixed land uses are often a strong benefactor to transit use, where residential, commercial, and retail are within close proximity of each other. Additionally, low-density residential land uses are largely prevalent outside the of the city center (Figure 6), however the downtown core and the surrounding neighborhoods provide opportunity for mixed-use zoning. Currently, the Bangor Community Connector provides multiple transit stops within a 0.25 mile of mixed-use neighborhoods which allows for increased transit use for different purposes. Planning transit for different purposes can attract non-commuters to take the bus as well, ultimately lowering operating costs per passenger by creating all-day, two-way demand.

Furthermore, walkability increases with mixed-use development. Most people access transit by walking to a bus stop, and walking from the bus stop to their destination. Mixed-use areas promote walkable environments, encourage short trips, and can spur transit use through adequate pedestrian infrastructure as per the Bangor Area Comprehensive Transportation System Long-Range Pedestrian and Bicycle Transportation Plan. Over short distances, travel times by bus can approach travel times by vehicle, offering a viable option for residents who may not wish to drive or can't drive altogether.

Focusing transit services along dense, mixed-use corridors such as Main Street, and connecting residential neighborhoods to the east and west, will promote multi-purpose trips and productive transit. Mixed use areas around Pickering Square have higher off-peak productivity whereas the routes with the highest ridership, Old Town, Capehart, and Hammond cater to the outer and lower-density residential areas. Connecting outlying communities within the service area to dense, mixed-use neighborhoods allows for greater connectivity and increased ridership.

Seniors, students, people who are unable to drive, or who lack access to a vehicle are populations that tend to rely on transit more than most of the general population. Educational institutions, recreational facilities, and senior centers are therefore expected to generate many transit trips.



Figure 6: Current Zoning in Bangor



Figure 7: Transit trip generators

3.4 INCOME & CAR OWNERSHIP

A strong predictor of transit use and ridership is car ownership. Figure 8 reveals that large portions in and around the city center are car free homes. 16% of households in Bangor do not have access to a vehicle, and 42% of households have access to one vehicle.³ 74% of residents over the age of 16 in Bangor drive alone to work, with 26% of Bangor residents finding alternative means to commute to work, which provides an opportunity for transit services to grow.⁴

The median household income in Bangor in 2017 was \$40,071. Figure 9 shows that the city center and clustered neighborhoods closest to the city center have household incomes below the nation-wide poverty level. Some of these areas, located near the University of Maine and Husson University, are likely below the poverty level due to the large population of students. Further from the city center are higher income neighborhoods such as Fairmount on the west side and Little City of the northwest.

By analyzing car free homes in Figure 8 and below poverty levels in Figure 9, it can be argued that there is a relationship between income and transit use at the neighborhood level. Areas with high transit use are also areas with a larger percentage of car-free homes. This reveals that these areas are prime market for transit, and are likely the transit-dependent base of the Bangor Area.

³ 2013 – 2017 American Community Survey

⁴ 2013 – 2017 American Community Survey



Figure 8: Car Free Homes



Figure 9: Median Household Income

3.5 FUTURE DEVELOPMENTS

The following future developments are expected in Hampden:

- a 30-unit multi-family rental complex proposed on Mayo Road;
- 22 lots for sale at the Hampden Business & Commerce Park on Route 202; and
- a wholesale/warehouse approved in the business park.

These developments will lead to an increase of jobs in the Bangor Area in the short term as the developments get constructed, followed by an increase in population, which will likely be accompanied by additional job prospects in the long term. While many factors impact transit use, the City has a significant role to ensure that transit is competitive with other modes of transportation at all stages throughout a neighborhood's or office park's evolution. Furthermore, good urban form such as connected walkable streets will allow more seniors, students, and commuters to choose transit as their preferred travel option.

3.6 SUMMARY

The analysis presented in Section 3.0 demonstrates that many of the necessary ingredients for transit are present in the Bangor Area, including:

- Density of population and jobs
- Mixed land uses
- Populations with little or no other travel options
- Many common destinations and opportunities.

The areas with the largest predisposition to transit based on existing and future market conditions are areas that are expected to generate the highest transit ridership, particularly the Bangor city center and neighborhoods around the city center like Fairmount and the Broadway Historic District. Furthermore, this also highlights that the Bangor Community Connector requires collaboration with the public and municipal partners to steer transit in a positive direction.

4.0 COMMUNITY CONNECTOR BUS SERVICE

Surveying riders of Community Connector provides the opportunity to gain valuable feedback about those who are affected by changes to transit. Gaining valuable input from members of the community is essential to understanding where improvements in the transit system can be made, and are integral in providing recommendations that are grounded in the local context of the Greater Bangor Area.

Surveys were administered online and in person to understand Community Connector from a rider's perspective. In February 2019, a total of 1,184 online and 13 in-person surveys were conducted on Community Connector's services. Questions were related to service performance, trip purposes, cost, communication, and rider demographics. Additional observations were drawn from a community survey report conducted by Transportation for All, which also collected information related to rider satisfaction, transit travel patterns, respondent demographics, and business testimonials.

This section provides a summary of the survey analysis and identifies major considerations for improving the services offered by Community Connector. A minor limitation to the study is that some respondents may have skipped questions they were not sure how to answer or did not want to answer, resulting in some incomplete surveys.

4.1 ATTITUDES TOWARDS TRANSIT

Overall, 50% of survey respondents reported a good or excellent rating of Community Connector services. The indicators that received the highest percentage of satisfied or very satisfied ratings were ability to get a seat (74%), access to route information (71%), driver behavior (71%) and value for fare paid (71%), as shown in Figure 10. As identified by the survey respondents, the transit service elements with the lowest ratings of satisfied or very satisfied were time spent waiting for the bus (44%), cleanliness of the bus (54%), comfort of the bus (57%) and ability to transfer between routes (58%). Figure 10 shows that a majority of passengers are satisfied or very satisfied with service performance, but that improvements could be made to bus reliability, cleanliness, bus comfort and transfers.



Figure 10: Performance of Transit Service Elements

Furthermore, when asked about what improvements could be made to Community Connector, written responses from respondents indicated a desire for later hours, more frequency of service, and access to online resources. One resident commented:

"One of my biggest concerns is the limited hours of the bus. There needs to be some accommodation for people who need to travel after 6:00 pm. for work, to attend meetings, or for social events."

Other responses included increasing service hours, increasing bus frequency, and revisiting the flag-down stop service. These results are unsurprising, given that the ratings for reliability and directness of buses were some of the lowest rated elements.

A major component to understanding transit dependence is to find out if people have access to other modes of transportation or if riding transit is their only option. When asked how they would make their trips if Community

Connector was not available, 25% of survey respondents indicated that they would walk, followed by 20% who said they would get a lift from friends, and 15% would not make the trip (Figure 11). Only 11% of survey respondents indicated that they would drive, which is likely related to riders' limited access to personal vehicles.



Figure 11: Alternative Travel Methods

As displayed in Figure 11 above, 15% of riders can be classified as transit-dependent customers as they rely solely on Community Connector for their daily travel and would have no alternative way to make the trip if Community Connector stopped its services. There is also a large proportion of people who indicated that they would have another way of getting around if Community Connector was not available, such as walking, using rideshare, or getting a ride from others. Although Uber, Lyft and Taxi may be a possible solution for some, it is likely not a permanent solution for daily travel. For frequent transit riders, this is likely not a feasible option due to the cost of a one-way trip. A total of 34% of survey respondents would use active modes of transportation (i.e. walking or cycling) in place of Community Connector. This highlights that Community Connector should continue to provide value for fare paid or more people will choose alternative services that may be less expensive.

As shown in Figure 12, over 15% of Bangor residents do not own a personal vehicle, which explains the relatively low percentage of riders who would drive if Community Connector was not available. These individuals would not have the option to drive if transit was not available and would have to utilize alternative methods. Respondents who have at least one household vehicle may also not have the option to drive if that vehicle is being used by someone else, such as a spouse or parent. This finding is also consistent with the Census data on car ownership, which showed 16% of households do not have access to a vehicle and 42% have access to one vehicle.⁵

⁵ 2017 American Community Survey



Figure 12: Vehicles Per Household

4.2 TRIP PURPOSE

The most common trip purpose for transit is commuting to/from work (39%), which is slightly lower than the national average, where 49% of transit trips are typically to/from work.⁶ A study conducted by APTA that surveyed approximately 700,000 transit riders found that trip purpose was related to the size of the urban area, where a higher percentage of work trips were found in larger cities (50%) than in mid-size (38%) or smaller cities (26%).⁷ Although Bangor is classified as a small city with a population of less than 200,000, the percentage of commuters using transit is more akin to the average for a mid-sized city.

The next common trip purpose identified by Community Connector survey respondents is for school (14%) as well as shopping (14%). There are many local middle and high schools in Bangor and surrounding communities, as well as colleges that can be accessed by transit, such as the University of Maine and Husson University, that contribute to a high portion of trips to/from school. As shown in Figure 13, another large portion of transit trips is for personal business and healthcare.

⁶ http://www.apta.com/resources/reportsandpublications/Documents/APTA-Who-Rides-Public-Transportation-

^{2017.}pdf ⁷ http://www.apta.com/resources/reportsandpublications/Documents/APTA-Who-Rides-Public-Transportation-2017.pdf



Figure 13: Transit Trip Purpose

4.3 VALUE FOR MONEY

Over 65% of respondents were satisfied or very satisfied for the value of fare paid. The price of \$1.50 for general use (\$0.75 for seniors and students) is perceived as reasonable in a rider population where 12% of survey respondents reported a household income of over \$60,000. The total household income breakdown is shown in Figure 14.

The income of transit passengers on Community Connector is lower than the general income of Bangor's population (median income of \$50,349). Given that the high proportion of riders who identified a household income of \$20,000 or less, this population may be sensitive to significant fare increases that might make it difficult to use transit as frequently. The low household income can be partially explained by the large student and retiree population who ride the bus.

When asked whether they would be willing to pay higher fare, 72% of survey respondents agreed or strongly agreed. This identifies that a large proportion of the population is willing to pay higher fare if the bus were faster, more frequent, and running later into the evening.



Figure 14: Annual Household Income

4.4 COMMUNICATION

The City of Bangor website is the greatest source of information for users, along with route schedules that are available at City Hall and Pickering Square. Nearly 70% of survey respondents said they were satisfied or very satisfied with their ability to get route information; however, many respondents stated that it would be more convenient to plan their trip if they had access to real-time updates through a website or app.



Figure 15: Access to Route Information

4.5 ABILITY TO TRANSFER

Transferring between modes of transportation and other Community Connector buses can help agencies understand whether there are multimodal connections or amenities that can be improved within the transit network. As shown in Figure 16, 89% of survey respondents say that walking is the most common mode of transportation to Community

Connector bus stops. This is likely a product of the high degree of coverage provided by the Community Connector. Another 55% of survey respondents stated they transfer buses to get to their final destination (Figure 17), which emphasizes the importance of schedule adherence and Pickering Square as a transit hub as topics for further analysis in the Transit Study.



Figure 16: Mode Travelled to Bus Stop



Figure 17: Transfer Required for Final Destination

4.6 **RESPONDENT DEMOGRAPHICS**

The greatest proportion of survey respondents were between the ages of 35 and 44 (24%), followed by 25 to 34 (19%), 18 to 24 (20%), and ages 55 to 64 years old (14%) as seen in Figure 18. The population of survey respondents who are 65 years or older (9.7%) is less than the general Bangor population, where 15.9% of people are

65 and older. Senior citizens aged 60 and older are eligible for Community Connector ADA Paratransit which can explain why seniors may choose to use paratransit instead of fixed-route service.

It should also be noted that while 0% of survey respondents were under the age of 18, it is expected that many individuals under 18 do take Community Connector (CC). Since this population is not captured in the survey, the percentage of trips to/from school (14%) likely underestimates the actual number of school trips that are being conducted when accounting for this younger population.



Figure 18: Respondent Age

The breakdown of respondents by gender identified 51% of respondents as female, 42% as male, and 6% as other. The racial/ethnic background of the rider population consists of 89% White, 2% Latino, 2% American Indian/Alaska Native, 2% Asian/Pacific Islander, and 3% Other. The breakdown of survey respondents is largely synonymous to the overall population of Bangor and neighboring communities.

4.7 TRANSPORTATION FOR ALL – REPORT ON COMMUNITY CONNECTOR BUS SERVICE IMPREOVEMENTS

Transportation for All (TfA), a volunteer group based in in the Greater Bangor area conducted a study in order to find the most effective ways the Community Connector bus system could expand ridership by identifying the transportation needs of the community. TfA surveyed 373 people who reside in the service area with an even mix of age groups, current bus riders, non-riders, employers, and employees.

The largest need identified in the report was evening bus service and the largest obstacle identified was the limited service schedule. 47% of survey respondents preferred the extension of service hours, many indicating an extension up to 10pm, given the high proportion of planned trip services in the evening hours consisting of shopping, entertainment, and getting to/from work. Business owners responded that expanding bus hours would benefit their businesses by providing employees and customers a reliable mode of transportation and an increase of economic activity, specifically in the downtown corridor.

5.0 SURVEY RESULTS SUMMARY

Surveys were conducted to determine what riders and non-riders are satisfied with and what aspects of the bus service requires attention. Overall, 50% of respondents were satisfied or very satisfied with the performance of Community Connector. A summary of the key findings and considerations are as follows:

Communication: The City of Bangor website and Community Connector schedule pamphlets are the greatest source of information about Community Connector services and schedules. Many respondents indicated that planning trips would be more convenient if they had access to real-time updates. An effort should be made to promote their online presence.

Transfers: A majority of survey respondents travel to/from bus stops by walking. 55% of survey respondents transfer between buses to reach their final destination. Facilitating better connections between lines and a focus on on-time performance can improve the reliability and directness of buses, which were the two performance indicators that received the lowest rating.

Trip Purpose: 39% of survey respondents indicated that their most common trip purpose was commuting to/from work. Due to the number of elementary and high schools in the area, as well as several post-secondary institutions, approximately 1 out of 6 of trips is carried out for commuting to/from school. The percentage of riders taking transit for work trips is lower than the national average. Facilitating work travel can increase ridership by creating a user base that uses transit for daily and/or consistent use.

Fare Structure: Overall, riders are satisfied with the value of service for the amount paid. However, 72% of survey respondents are willing to pay a higher fare if buses are faster, more frequent, and performing on a later schedule. Keeping in mind that a high proportion of riders have a household income of \$20,000 and under, Community Connector should continue to provide value for fare paid or more people will choose alternative services that may be less expensive, such as active transportation.

Transit Performance: Synonymous to the Transportation for All report, survey respondents identified their most important needs including increasing service frequency and hours, and eliminating the flag-down stop service. Businesses in Bangor also expressed a need for transit in the evenings for customers and employees.

6.0 SYSTEM-LEVEL ANALYSIS

To start grasping the performance and ridership trends of the CC, we analyzed monthly boardings since 2013 (Figure 19). A consistent trend is noticeable—ridership peaks in the fall, decreasing in the winter and summer months and rising again somewhat in the spring. These trends are typical of many transit systems, particularly with substantial student populations who travel during school months, and seniors who tend to travel more frequently in fair weather.



Figure 19: Monthly ridership (boardings) by month, 2013-2018

A more troubling trend is the overall and generalized decline in ridership year-over-year. For instance, October 2013 and 2014 had ridership in the 80,000-85,000 range, but October 2018 recorded slightly below 65,000 boardings. This becomes apparent at the route-level too (more on this below). That most routes have experienced a generalized decrease in ridership suggests a system-wide loss, rather than a particular route becoming obsolete or plagued with operational issues.

This generalized loss in ridership is prevalent across the United States, and a ridership report⁸ by Community Connector notes that the change in ridership between 2016 and 2017 amounted to a loss of roughly 3%, which compared favorably to the national average of a 4% loss in bus ridership. A few bright spots exist, including minimal growth on the Brewer routes and on the Stillwater, although these routes have lost ridership in 2018. Some prevalent trends throughout the nation and locally that has contributed to the erosion of bus ridership include:

- Cheaper gas in more recent years, coupled with improving fuel-efficiency
- Discounted loans for vehicle leasing, increasing the ability to have a car, especially for populations who are traditionally transit-dependent (low-income, recent immigrants, etc.)
- Population loss in Bangor
- The rise of ride-sharing apps and alternatives to transit (carpooling, vanpooling, cycling, etc.)

Despite these externalities, as well as the rural nature of much of the service area, the Community Connector can still draw ridership from its base transit market—students, seniors, and residents without cars—by providing effective and useful service for these populations.

We note that decreasing despite major losses in bus ridership nationally, transit agencies in Houston and Seattle, for example, are bucking the trend by providing more effective transit service, predicated on providing frequent transit service, sometimes at the expense of coverage which asks customers to walk a bit further to reach a bus stop. It's

⁸ "Ridership Analysis Report July – Dec 2017"

interesting that Bangor has lost ridership, but this has tracked with decreasing service provision—that is, fewer revenue service hours and miles (Figure 20). In 2017, Community Connector operated 4.5% fewer revenue hours and 2.5% fewer miles. While pruning routes and service is sometimes required in the face of tight budgets, it is important for any transit agency to build upon its strengths, such as popular routes, growing with the community, and providing service where it has the greatest chance of succeeding.



Figure 20: Service operated, 2013-2017

7.0 ROUTE-LEVEL ANALYSIS

Overall, substantial ridership losses have sustained by the routes in Bangor, shedding nearly 83,000 (~14%) passenger trips since 2013. Similar losses have been experienced on the routes in the other Community Connector communities as well (Figure 21). Indeed, the largest loss in ridership as a percentage is on the Hampden route, with a loss of 25% since 2013. The Brewer routes have fared somewhat better, losing about 12% of 2013 passenger trips. Overall the ridership loss since 2013 has amounted to ~150,000 fewer passenger trips, or a loss of 16%.



Figure 21: Ridership by community, 2013-2018

To investigate the ridership fluctuations of the **Bangor routes**, which **makes up 63% of the total 2018 ridership** in the region, we examined the route-by-route annual ridership totals (Figure 22). The Capehart route (which comes in 3 main variants or patterns) comprises nearly 30% of all boardings in 2018 and have seen minimal losses since 2017.

The largest decrease in ridership has been on the Mount Hope route, losing nearly 12% of ridership since 2017. Overall, while the downward trend since 2013 has continued between 2017 and 2018, the losses have stabilized. Nevertheless, if these trends continue, Community Connector can expect to see anemic ridership across all routes.



Figure 22: Ridership by route, 2017 and 2018.

The map below (Figure 23) acts as a good surrogate for bus stop usage and thus patterns of passenger activity (boardings and alightings). The vast majority of activity occurs in the downtown or center of Bangor, as well as all along the route between Bangor and Old Town. Corridors with less activity include parts of eastern Brewer and parts of Bangor north of EMHC. The route to Hampden also sees some of the least door activity and thus passenger activity.

It should be noted that the high activity observed across the street from Eastern Maine Healthcare Center (EMHC) is primarily due to the Community Connector Office, where buses and non-revenue vehicles are stored. Transporting vehicles to and from this location, therefore, results in door open events even though passengers are not boarding or alighting here.

City of Bangor - Community Connector Door Open Events



Figure 23: Bus door events density

One of the best measures of the productivity of a bus route is the turnover of passengers or boardings per revenue hour. Essentially, this measure can provide an indication of utilization per hour of service. Service or revenue hours

depends on the length of the route, average operating speed, the frequency of service, and the service span. Altering any of these factors will impact revenue hours and thus the amount of service provided. And since an hour of service represents the major cost of providing or operating service, boardings per revenue hour provides a clear indication of ridership relative to operating costs. We note that productivity is used when measuring the goals of maximizing ridership goals, that is, not worrying about servicing all areas of a community where some routes may see little ridership, but instead provide a vital service such as the route out to Hampden—these types of routes are coverage routes.

Table 3 lists the 10 main routes in the Community Connector service area, ranked by most productive to least productive on a typical weekday. On a typical weekday, roughly 3,000 unlinked passenger trips are made on the Community Connector , with nearly 45% occurring on three services—Capehart, Old Town, and Hammond. However, by looking at the ridership relative to costs (boardings per revenue hour a.k.a. productivity), while Hammond route performs the best, Stillwater, Mt. Hope and Center routes perform relatively strongly too. The lowest performing routes are Hampden and Mall Hopper. Productivity is important for knowing which routes can benefit from service improvements, such as longer service spans, improved service frequency and reliability. Routes with low productivity, typically less than 10 boardings per revenue hour, are usually provided as coverage solutions, and with emerging transportation technologies and innovative partnerships, may benefit from alternative service delivery options beyond traditional fixed-route scheduled bus services.

	Est. weekday ridership	Weekday productivity
Hammond	321	30.8
Stillwater	286	28.6
Center St.	241	26.2
Mount Hope	256	25.6
Black Bear	276	18.4
Capehart	477	18.2
Brewer N	171	18.0
Old Town	432	16.8
Brewer S	158	15.2
Mall Hopper	123	12.3

Table 3: Route-level average weekda	y boardings and produ	ctivity, FY2018
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Only Black Bear and and Hampden are not operated on the weekends. Regarding daily ridership, on average, ridership on Saturdays is only about 56% of average weekday ridership, but this fluctuates across routes, with Old Town seeing roughly 47% of weekday ridership, but Mall Hopper seeing more ridership on Saturday. Table 4 below provides an estimate of route-level Saturday ridership.

Table 4: Route-level average Saturday boardings and productivity, FY2018.

	Est. Saturday ridership	Saturday productivity
Mount Hope	189	18.9
Old Town	205	18.6
Hammond-Center	206	17.5
Capehart	336	14.0
Brewer N	132	13.8
Brewer S	131	12.6

	Est. Saturday ridership	Saturday productivity
Mall Hopper	126	12.6

Table 5 provides approximate route start and end times, as well as service headways in minutes.

Table 5: Route-level service details.

	Weekday Start Time	Weekday End Time	Service Headway (min)	Weekend Start time	Weekend End Times	Service Headway (min)
Black Bear	6:55 AM	9:55 PM	30		No service	
Brewer N	7:15 AM	6:00 PM	60	7:15 AM	6:00 PM	60
Brewer S	6:45 AM	6:30 PM	60	6:45 AM	6:30 PM	60
Capehart	6:06 AM	6:30 PM	30	7:06 AM	6:11 PM	30
Center St.	6:15 AM	6:08 PM	30	8:45 AM	6:08 PM	60
Hammond	5:53 AM	6:10 PM	30	9:15 AM	5:40 PM	60
Hampden	6:15 AM	6:10 PM	60		No service	
Mall Hopper	6:55 AM	6:45 PM	60	6:55 AM	6:45 PM	60
Mount Hope	6:15 AM	6:05 PM	60	6:15 AM	6:05 PM	60
Old Town	5:45 AM	7:00 PM	60	6:15 AM	7:05 PM	120-180
Stillwater	6:45 AM	6:35 PM	60	6:45 AM	6:35 PM	60

Below we discuss three major elements of transit service that are critically important to customers, and as such, for growing and retaining ridership. These elements also dictate, to a large extent, the cost of operating transit service. Ensuring that resources are allocated in a rational and efficient manner requires tradeoffs to ensure that service can meet demands across a challenging terrain like the CC service area.

Service Frequency

Service frequency (and its inverse, headway between buses or transit vehicles) is perhaps the most important attribute for choosing or forgoing transit as a mode choice, particularly for people with other modes at their disposal. Frequent service, which in North America is understood as headways of 15 minutes or less, allows people in a community to travel with great freedom on transit. They can pick up and go, in many cases not bothering to check the schedule. This is similar to the best part of a personal vehicle, which is the ability to leave whenever one wishes. Headways of 15 minutes or better can help transit approach that level of convenience.

Nevertheless, increasing service frequency directly increases operating costs. While costly, analyses of route productivity and frequency from agencies across North America reveal a strong and positive relationship between the two—the greater the service frequency (shorter headways), the greater the route productivity. We caution that frequent or ridership routes must be designed with a purpose, that is, used to connect high-density activity centers (lots of people and jobs, with mixed land uses) along a relatively straight line. Hammond St. for example, would be a good candidate for a frequent route because of the markets it serves and its relatively high ridership. On the other hand, routes into Hampden, routes that serve peak demand locations like schools, are not good candidates for frequent service and can be classified as coverage routes that serve a specific purpose, operated at a lower frequency, and can be circuitous in alignment. Low productivity for coverage routes is acceptable because they are designed to serve different goals.

Overall, Community Connector's fixed routes operate at large service headways, with the most frequent routes operating at 30-minute headways—this is not frequent enough to build ridership and entice occasional or non-riders to use transit. Route deviations and multiple route variants also discourage bus ridership.

Service Span

Transit service needs to be available when people travel. Service span tells customers between what hours transit service operates. Community Connector generally operates between 6 am and 6 or 7 pm on weekdays, but that varies by route; Saturdays see shorter service spans which generally matches decreased transit demand.

However, with the increase in non-traditional work hours, typical service spans generally no longer reflect current travel patterns.

Ensuring transit is available when people need it is important but costly. Like service frequency, lengthening the service span will increase operating costs (more buses and more operators). Adjusting the service span by pruning early morning hours can help recoup costs to invest in later service hours, or longer weekend hours, although this needs to be done with caution.

Finally, service span is also important in the notion of dayparts or times of day and the frequency operated at different times of the day. This is most easily understood by discussing morning and afternoon peaks—typically, from 6-9 am, and from 4-7 pm, transit agencies increase the frequency to match peak demand. This span is important for meeting a particular need (commuting). However, in many communities like Bangor, these peaked trends are giving way to more sustained all-day demand when transit agencies, like CC, operate consistent headways throughout the day. In this case, the service frequency during the midday span may need to increase to match this demand.

Reliability

Knowing your bus will arrive as published in a schedule is an important attribute for customer satisfaction and ridership. If the bus is constantly late or early, coupled with long headways, a missed bus can lengthen travel which is a key attribute to choosing transit over other modes.

Reliability is typically measured as on-time performance at key time points, and whether the departure of the bus at the time point is within an acceptable window (this is known as schedule adherence).

With the prevalence of technology, many transit agencies have onboard technology allowing real-time bus tracking. If Community Connector were to adopt onboard technology allowing real-time tracking, Community Connector could publish its real-time GTFS to be picked up by third-party transit and trip planning apps like Transit, Moovit and Citymapper to provide customers with real-time arrival information, multimodal trip planning, all with simple and intuitive interfaces. Real-time information is crucial to winning ridership today because of the expectations of riders to provide current and reliable information.

In the following subsections we provide a summary of each of the routes operated by Community Connector.

7.1 BLACK BEAR ORONO EXPRESS ROUTE



Figure 24: Black Bear Express Route Alignment

- Provides a one-way loop between Orono and the University of Maine campus in Old Town, providing connections to the Old Town route to reach the University Mall and the Orono Research Park.
- Operates with the greatest frequency in the network and with the longest service span, until roughly 10 pm, Monday through Friday.
- Services a specialized market—students and staff of the University of Maine.

7.2 BREWER NORTH / BREWER SOUTH ROUTE



Figure 25: Brewer North / Brewer South Route Alignments

- These two routes provide the only service in Brewer and experience modest ridership including recent ridership gains while most other routes have lost ridership.
- Serve key destinations such as retail (shopping centers, Walmart), and the Cancer Center and Clanbro Facility.

7.3 CAPEHART ROUTE



Figure 26: Capehart Route Alignment

- Has the greatest average daily ridership in the network, but only modest productivity suggesting that adjustments are needed to gain more ridership for the amount of service provided.
- Offers weekend service to key places like the Airport Mall, EMHC, Job Corp and the Airport.
- One major challenge of this route is the branching or variants at the north end of the alignment that ends up spreading out service that is half-hourly along the main trunk of the route. For example, at the start of the route, Bangor Depot, service departs every 30 minutes, but in Capehart, a longer gap in service occurs between 10:06 am to 10:45 am because of the branching and variants. Branching and route variants, including complex schedules, can be a barrier to potential riders, and frustrate current riders as well. Best practice in the industry is moving away from overly complicated route variants by minimizing detours and splitting up routes rather than designing variants, servicing low demand areas of variants with on-demand microtransit solutions, and so on.

7.4 CENTER STREET ROUTE



Figure 27: Center Street Route Alignment

- Provides access to St. Joseph's Hospital, Miller Square and Bangor Gardens on some trips
- Connections with Mall Hopper (Broadway Shopping Center) and Stillwater (Bangor Mall)
- Operates during the afternoon on Saturdays
- Relatively good productivity, likely as a result of its generally direct and straight alignment, key destinations, and supportive transit market.

7.5 HAMMOND STREET / NEIGHBORHOOD LOOP ROUTE



Figure 28: Hammond St. / Neighborhood Loop Route Alignment

- The most productive route, operating as a one-way loop around the densest part of Bangor.
- Key destinations include University College, downtown, schools, and a sports complex.

7.6 HAMPDEN ROUTE



Figure 29: Hampden Route Alignment

- The least productive route in the network, but providing important service between Bangor and Hampden.
- Provides service along Main Rd., where land use is not conducive to fixed-route bus service, although some retail stores exist.
- Operates without much passenger activity between Bangor and Hampden, resulting in low passengers per revenue hour.

7.7 MALL HOPPER ROUTE



Figure 30: Mall Hopper Route Alignment

- Connects with Center route at the Broadway Shopping Center and with Capehart at the Airport Mall.
- The second least performing route, despite being the only 'east-west' route in Bangor, suggesting that this
 route is poorly used to access destinations along its alignment. We note that many of the key destinations
 are serviced by other routes.
- Deviation into 900 Broadway Buildings 2 and 5 is allowed after serving the Broadway Shopping Center.

7.8 MOUNT HOPE ROUTE



Figure 31: Mt. Hope Route Alignment

- Relatively high productivity given its hourly headways, but with key destinations including Maine Veterans Home, EMCC, Target, and Bangor Mall (connections with Stillwater and Mall Hopper).
- Detour to Evergreen Woods when classes are in session.

7.9 OLD TOWN ROUTE



Figure 32: Old Town Route Alignment

- Relatively solid productivity, despite its long alignment from Bangor to Old Town via Orono, providing connections to the Black Bear Express.
- Designed as two variants with service to the Orono Research Park during morning and afternoon peaks.

Ridgewood E Drive Target Wal-Mart C Mount Hope Stillwater Ave Bangor Mall Evergreen Woods EMCC Hopere Maine PO Veterans Acadia Aori Home Hospital DDPC + Gorland St. **Eastern Maine** В stolest **Medical Center** North Brewe **Shopping Cer** NNOINST Woshin

7.10 STILLWATER AVENUE ROUTE

Figure 33: Stillwater Route Alignment

- The second most productive route in the network, providing a relatively simple and direct alignment along Stillwater Ave.
- Serves key destinations like Walmart and Acadia Hospital, with connections at Bangor Mall to Mall Hopper and Mount Hope routes.
- Most productive route on Saturdays, seeing consistent average daily ridership.

8.0 INFRASTRUCTURE AND AMENITIES

The CC operates predominately a flag-stop service outside of downtown Bangor, meaning that customers must wave their hands to the bus operator to indicate that they wish to board the bus. This can create confusion if different operators operate on the same routes and decide to stop at different intersections, as the 'safety' of being able to stop the bus is left to the discretion of the individual operator. Consistency and clarity are key for generating ridership and customer loyalty—if customers are unsure of where they need to be to catch a bus, this may lead to frustrated and non-satisfied customers who leave the system when given the chance. Specifying stops along bus routes at consistent spacing intervals, and with appropriate pedestrian infrastructure is necessary to show customers they are valued, and encourages transit use by making customer access universal, dignified, and convenient.

Providing shelters at key bus stops where passenger activity is high is important from a customer perspective, especially in cities like Bangor where inclement weather can make waiting for buses challenging. Currently, Community Connector has 21 shelters throughout the service area. A shelter program based on passenger volume and clear standards can help Community Connector roll-out shelters through a defensible process, rather than based on vocal citizens who may request shelters for low-usage bus stops. Finally, bus shelters can be used to generate advertising revenue for the Community Connector. As illustrated in Figure 34 below, Pickering Square has a sheltered area, but additional amenities may be warranted directly at the bus loop.



Figure 34: Sheltered area (left) and bus loop (right) at Pickering Square

9.0 MAIN ISSUES AND TAKEAWAYS

- Some very low productivity routes (fewer than 15 boardings per revenue hour) as a result of low density, difficult to serve markets such as Hampden, or routes that are designed to serve one particular market such as the Mall Hopper. Opportunities exist to provide service via alternative delivery options outside of scheduled fixed-routes, as well as through the redesign of some routes to minimize redundant and unproductive service.
- Complicated route patterns or variants, particularly for the Capehart routes dilute service effectiveness and productivity. Deviations and multiple patterns should be used sparingly, and have clear and consistent signage to help with wayfinding and trip planning.

- Lack of physical bus stops for the majority of the system can be a barrier to transit use. The Community Connector should identify key areas of passenger activity and provide physical stop markers or flags, as well as work with relevant municipal and state partners to develop appropriate infrastructure (sidewalks, shelters, etc.) for key stops.
- Improving service frequency particularly along key routes such as Hammond, Center, and Stillwater could provide additional incentives for more trips from current riders, as well as entice new customers to try the Community Connector.
- Currently, it appears that the service span is too short. Namely, service ends too early on weeknights. We heard from many stakeholders that ending bus service before 7 pm is too early and leaves riders stranded because they are unable to use transit for a return (two-way) trip. This factor can act as a large impediment for potential and current customers, and negatively impact Community Connector's ridership. First, if customers use transit for a one-way trip, then Community Connector misses out on the return trip if service ends too early. Second, if customers are unsure about a return trip, they may forgo transit altogether, denying Community Connector of two passenger trips. While providing additional service will undoubtedly add to operating costs, removing poorly used services and prioritizing longer service spans on key routes, may attract sufficient ridership that can recoup enough of the operating costs.
- Lack of technology reduces Community Connector's ability to track and measure transit service provision, operations, and performance, as well as diminishes the customer experience. As evident from this transit services analysis, the Community Connector has little data beyond mileage and hours of revenue service. Additional information, particularly ridership at the route and trip level, on-time performance, loading profiles, travel times and so on are necessary performance indicators to diagnose issues, develop corrective plans, and monitor progress or corrective actions. From a customer standpoint, the lack of dynamic or real-time schedules and trip planning tools make it difficult to understand where your bus is (i.e. Did you miss the bus and now you have to wait another hour? Or is it simply running 10 minutes late?) and choose the right buses for your trip, adding to the perception of lack of customer-centric care.

10.0 PEER SYSTEM COMPARISON

By comparing Community Connector to transit agencies serving similar-sized cities and service areas, we can start to understand areas where Community Connector is performing well, where it is not performing well and how it can improve by learning from peer agencies. An analysis from 2013 to 2017 was conducted to visualize any pertinent trends.

The table below (Table 6) shows the service area population, ridership, and fleet size for a group of similar agencies, as well as larger ones, such as Portland. This analysis also includes Saint John, New Brunswick, Canada, which is the sister city of Bangor with a similar population and geography.

Table 6: Peer transit agencies

	Municipality	Service Area Population (2017)	Service Area Population (2013)	Annual Ridership (2017)	Peak Vehicle Fleet (2017)
Community Connector	Bangor, ME	55,500	55,500	821,827	14
High Point Transit	High Point, NC	112,201	100,442	857,309	19
Manchester Transit Authority	Manchester, NH	135,366	135,366	459,140	17
Greater Portland Transit District	Portland, ME	109,535	94,873	1,850,686	29
Lewiston-Auburn Transit Committee	Auburn, ME	46,052	46,052	373,798	8
Saint John Transit	Saint John, NB	108,400	122,389	2,054,643	36

All chosen cities operate transit systems and are cities with small, older urban cores and substantial suburban settlements that are similar to Bangor. No two cities or agencies are indistinguishable given demographic, historical, political, and spatial differences. Regardless, transit agencies collect data and report statistics differently (such as ridership and boardings) despite best efforts for uniform reporting by the Canadian Urban Transit Association (CUTA) and the National Transit Database (NTD). Thus, cautious comparisons have been drawn based on data provided by NTD and CUTA.

10.1 RIDERSHIP

Annual ridership in 2017 ranged from 1.85 million trips for Greater Portland Transit District to 374,000 trips for Lewiston-Auburn Transit Committee, while Community Connector reported 822,000 riders. Despite a consistent service area population from 2013 to 2017, Community Connector reported a significant 24% decrease in ridership over the same period which is the largest ridership decrease out of its peers. Greater Portland Transit District's ridership grew by 22% over the same period. Some of these gains likely resulted from an agreement with Portland Public Schools that provided each high school student with a free unlimited metro pass starting in 2015. While many post-secondary institutions also subsidize transit for students, Community Connector could look to increase ridership for public school students through transit pass arrangements.



Figure 35: Ridership and population change, 2013 to 2017

One way of examining the popularity of transit or its attractiveness is by analyzing ridership on a per capita basis; this also helps account for population changes. Rides per capita provide an indication of how much transit is used in a municipality or region.

Community Connector has experienced a decrease in riders per capita from 18 in 2013 to 13 in 2017 which is above the 2017 peer average of 12 rides per capita (Figure 36). Interestingly, while Bangor is experiencing a decrease in ridership, Community Connector has slightly more rides per capita than its peers, indicating that Community Connector is a relatively well used system compared to the peer group.



Figure 36: Rides per capita, 2013 to 2017

10.2 SERVICE PROVIDED

According to the NTD Transit Agency Profile, Community Connector operated 48,279 revenue hours in 2013 and 46,095 revenue hours in 2017, representing a 4% decrease.⁹ The peer average, however, increased by about 4% from 54,968 hours to 57,199 hours.

This decrease in service hours can be attributed the service provided to the residents of the greater Bangor area, from 0.87 hours per capita in 2013 to 0.83 hours per capita in 2017, which remains above the peer average of 0.61 hours per capita. It is a positive sign that Community Connector provides more service hours than the peer group as providing more service is necessary in building and retaining ridership through improved service frequency and longer service spans. However, the downward trend in revenue hours per capita is likely a contributor to their ridership decline.

⁹ This increase may be attributed to operational changes and/or data collection methods.



Figure 37: Revenue hours per capita, 2013 to 2017

10.3 SERVICE UTILIZATION (OR PRODUCTIVITY)

An industry measure of productivity of a public transit system results from the amount of service provided (revenue hours) and its utilization in the form of ridership or boardings. As such, rides per unit of service (revenue hours) provides a good understanding of the intensity of use of a transit system.

Compared to its peers (Figure 38), Community Connector performs above or at level with the peer agencies in 2013 and 2017, with 21 rides per hour in 2013, above the peer average of 19, and 18 riders per hour in 2017, which is the same as the peer average in 2017. This 14% drop from 2013 to 2017 suggests that due to service hours decreasing, ridership has followed the decline. This trend has been observed nationwide and across North America, as transit agencies are struggling to attract new ridership and enhance productivity.



Figure 38: Rides per revenue hour, 2013 to 2017

10.4 FINANCIAL PERFORMANCE

While one measure of an agency's performance centers on ridership and usage, another key area is financial investment and financial efficiency. Community Connector's operating cost has increased by 15%, from \$2.42 million in 2013 to \$2.8 million in 2017. Operating revenue has decreased from \$852,377 in 2013 to \$671,167 in 2017. Increasing operating costs and decreasing operating revenue can be attributed to the 19% decrease in ridership from 2013 to 2017.

By examining operating cost per unit of operation, that is, per revenue hour, we can observe the cost efficiency of a transit agency (Figure 39). Community Connector had the lowest operating cost per hour at \$50.17 in 2013 and \$60.78 in 2017, below the peer averages of \$74 (2013) and \$79 (2017). This 21% increase in operating cost per hour suggests that service hours have been provided at a reasonable cost when compared to peer agencies. It is important to note that operating costs have increased while ridership and service hours have decreased.



*Saint John Transit has been reported in \$CAD.

Figure 39: Operating cost per revenue hour, 2013 to 2017

A measure of cost effectiveness of a transit agency is the cost per rider, where a lower cost per ride is preferable (Figure 40). Community Connector's cost per ride is the second lowest in the peer group; in 2013, cost per ride was \$2.38 (peer average is \$4.27) while in 2017, it increased by 50% to 3.59 per ride (peer average is \$4.77), still being lower than most of its peers.

Taken together, this analysis reveals that Community Connector has some of the lowest operating costs per hour and per passenger in the peer group.



*Saint John Transit has been reported in \$CAD.

Figure 40: Operating cost per ride, 2013 to 2017

Another important measure of financial health of a transit agency is the average or effective fare, that is, the total fare revenue divided by annual boardings or ridership. It's important to note that this average fare accounts for the fact that not all passengers pay the full cash fare, and use discounted monthly fares, for example, as well as concession fares such as for senior and student populations.

The average fare for Community Connector remained consistent with only a 2% decrease from \$0.84 in 2013 to \$0.82 in 2017 (Figure 41). At the same time, the peer average decreased 4%, from \$1.01 in 2013 to \$0.97 in 2017. Further analysis of the fare structure and fare recommendations will be presented in subsequent tasks.



*Saint John Transit has been reported in \$CAD.

Figure 41: Fare revenue per rider, 2013 to 2017

By analyzing the amount of operating costs covered by revenue, that is, cost covered through fares and non-fare revenues (advertisements, parking, etc.), we can consider how reliant an agency is on the regional or municipal tax

base. Indeed, a substantial amount of operating cost should be recovered through transit fares, which is reflective of both service quality and usage.

Community Connector's cost recovery ratio decreased from 35% in 2013 to 23% in 2017 (Figure 42). Community Connector had the greatest decrease compared to its peers, however, this is a respectable cost recovery ratio for an agency of Community Connector's size and is within North American industry norms. In both years, Community Connector performs above the peer average, which saw a 4% decrease in cost recovery ratio.



*Saint John Transit has been reported in \$CAD.

Figure 42: Cost recovery ratio, 2013 to 2017

Finally, a large municipal and federal contribution to transit funding is typical of American transit properties and operations (Figure 43). As shown below, federal and local funds are 36% each, followed by 22.7% from fare revenue, 2.4% from state funds, and 2.6% from funds allocated as other.



Figure 43: Source of Operating Funds, 2017

Based on this analysis, Community Connector is productive compared to its peers and carries the lowest operating cost per hour and per passenger in the peer group, with \$61 per revenue hour, and \$4 per ride. Nevertheless, Community Connector has seen declining ridership despite increased revenue hours. With these factors considered, a targeted approach is necessary to help grow ridership and maintain cost recovery and ultimately the sustainability of transit in the greater Bangor area.

10.5 SUMMARY

Based on this analysis, Community Connector is productive compared to its peers and has some of the lowest operating costs per hour and per passenger in the peer group. Although Community Connector performs well compared to its peers, it has experienced the highest decrease in ridership and cost recovery ratio among the peer group. It is also important to note that while service hours have decreased, operating costs are still increasing. Taken together, a targeted approach is necessary to help grow ridership and improve cost recovery and ultimately the sustainability of transit in the Greater Bangor Area.



Design with community in mind