



# Microtransit Feasibility Study

Hall County, GA

February 2019

# Table of Contents

Executive Summary .....	1
Via Overview .....	3
Firm History.....	3
Current Operations.....	3
Feasibility Study Methodology.....	4
1) Identifying Opportunities for Microtransit .....	4
2) Projecting Demand .....	4
3) Simulation Overview .....	5
Hall County Simulation Results .....	7
Scenario 1) .....	7
Scenario 2) .....	8
Scenario 3) .....	9
Scenario 4).....	10
Scenario 5).....	11
Summary of Results.....	12
Quality of Service .....	12
Microtransit Operating Model .....	13
1) Turn-key (TaaS).....	14
2) Turn-key (TaaS) with Hall County fleet .....	14
3) Licensed Software (SaaS) .....	15
Recommendations.....	15
Additional Notes .....	16
Conclusions .....	17
Appendix 1 - Ridership Data .....	19

## Executive Summary

Hall County seeks to understand how shared, on-demand transit (‘microtransit’) can play a role in its future transportation offerings. Due to the expected reclassification of Gainesville as a ‘large urbanized area’ after the 2020 census, Hall County anticipates a reduction in federal funding for public transit in the region. To ensure Hall County can continue to provide convenient and comprehensive access to transit for its residents and visitors, the County engaged Via to analyze existing demand data, develop models from simulation of microtransit services, and determine fleet requirements for a shared, on-demand transportation network that is both compelling for customers and operationally efficient. This report identifies challenges and inefficiencies in the existing fixed-route bus and dial-a-ride networks, explores opportunities for strategic deployment of microtransit technologies, and recommends next steps for Hall County.

To understand how microtransit could be most effective in Hall County, Via considered the following data as initial inputs:

- Historic Dial-A-Ride and Gainesville Connection ridership data to understand base demand and travel patterns;
- Quality of service assumptions grounded in customer expectations in Via’s other markets;
- OpenStreetMaps data including road layout, traffic speeds, and turn restrictions.

These data were analyzed and converted into inputs for Via’s proprietary simulations and analytics tools. Via simulated permutations of several scenarios, considering that microtransit could replace and upgrade the Dial-A-Ride service, the Gainesville Connection, or both. In addition to simulating base demand, Via also modeled high-demand scenarios, given that a high-quality microtransit service will effectively compete with taxis and private vehicles, resulting in a significant increase in ridership.

From these analyses, we recommend retaining Hall County’s three highest performing bus routes, and using microtransit to replace all other routes, along with the Dial-A-Ride service.

- *Recommended microtransit fleet:* 8-10 vehicles
- *Recommended fixed-route fleet:* 3 vehicles (one vehicle per route)
- *Estimated ridership:* 20% - 50% increase in ridership



## Via Overview

Via develops and operates the most powerful on-demand transport systems in the world. Our technology enables customers to share rides by dynamically routing vehicles in real-time in response to demand. Using advanced algorithms developed by elite researchers and engineers, Via optimizes the balance between maximizing fleet utilization and ensuring that each rider has a high-quality experience.

## Firm History

Via was co-founded in 2012 by Daniel Ramot and Oren Shoval in New York City, with a simple, yet highly ambitious mission -- to deliver the world's most convenient and affordable shared rides to everyone, everywhere. Ramot (Via's CEO) has a Ph.D. from Stanford in neuroscience, and Shoval (Via's CTO) has a Ph.D. in systems biology from the Weizmann Institute. Prior to Via, Ramot built supercomputers designed to discover new pharmaceutical drugs and developed avionic systems for F-15s and F-16s for the Israeli Air Force. Shoval led engineering projects for the Air Force and worked as consultant at McKinsey & Company.

Via delivered its first rides in 2013 in Manhattan, starting with just a handful of drivers. Identifying a gap in the transit network between the Upper East Side and Midtown Manhattan, Via launched as a shared, dynamic service that enabled commuters to reach work conveniently, and at a transit-comparable price. Via was the first transportation network company to offer shared, dynamic rides, and is still the most efficient and most advanced shared ride platform in the world -- we provide more shared rides in New York City, for example, than Uber and Lyft combined.

## Current Operations

Today, in 2019, Via powers microtransit services with over 30 partners, helping cities, transit agencies, and private operators seeking to improve their existing transit networks. When we partner with transit providers, we localize our on-demand transit operating system to meet the mobility needs of the communities we serve. Often, partners will plug our on-demand transit software into an existing fleet of vehicles, driven by agency-employed or agency-contracted drivers, and rely on Via to provide, maintain, and support the software that powers the system (a Software as a Service, or SaaS, solution). Via also operates consumer-facing services at scale in New York City, Chicago, Washington DC, London, Milton Keynes, and Amsterdam and operates services on behalf of public sector partners in Arlington, Texas, West Sacramento, California, and Berlin, Germany. Across our services, Via has delivered nearly 50 million rides to date. To support our growth and global operations, Via has a software team of 200 full-time professionals with deep experience in advanced algorithms, data science, digital mapping, database architecture, product management, and app development, and 250 full-time employees focused on operations, growth, member services, expansion, business development, and partner success.

# Feasibility Study Methodology

Via's feasibility study methodology consists of following main steps, 1) identifying opportunities for microtransit, 2) projecting demand, and 3) simulating scenarios to determine a microtransit configuration that meet our partner's goals.

## 1) Identifying Opportunities for Microtransit

Microtransit can achieve a number of goals for transit agencies, including:

- Providing transit in previously underserved areas (transit deserts)
- Providing suburban mobility
- Retiring under-performing fixed route services
- Providing first- and last-mile connections to fixed route services
- Mitigating traffic congestion
- Reducing parking congestion
- Upgrading a paratransit offering

Hall County have indicated two primary goals for a microtransit service, 1) upgrading the existing Dial-A-Ride service, and 2) replacing under-performing fixed route services.

## 2) Projecting Demand

For Via's simulations, demand is modeled as the **volume and distribution of ride requests** over a given period of time. For this report, historic Dial-A-Ride and fixed-route ridership was used to project demand (see Appendix 1 for more details). Real-world ridership will depend on a wide range of factors, some specific to Hall County, others dependent on operational elements like marketing budget or quality of service goals. These factors include:

- Travel patterns
- Alternative modes of travel (e.g. availability of buses, taxis, bicycles)
- Demographics (e.g. age, income, access to vehicles, mobility characteristics, mode choice)
- Pedestrian infrastructure
- Seasonality of demand (e.g. tourist season)
- Employment density
- Residential density
- Retail and entertainment density
- Fare structure
- Parking availability
- Marketing budget and effectiveness
- Weather conditions
- Congestion levels

Via benchmarks against quality of service at peak hours, when demand is highest, in order to accurately guide fleet size requirements. During off-peak hours, the full fleet would not be required.

### 3) Simulation Overview

Via's simulation engine is used by Via's operations team to shape at-scale services in international markets. The tool was developed by Via's world-class algorithm experts, many of whom have years of experience in algorithm development and hold PhDs in physics and mathematics.

The following components make up the simulation process:

1. **Set service zone**, which defines the boundaries of the microtransit service zone. The origins and destinations of all trips are limited to this zone.
2. **Generate underlying road map** by pulling data within the service zone boundaries from OpenStreetMap. Data includes all roads categorized by type, turn restrictions, and street walkability and drivability information.
3. **Determine traffic speeds** by querying Google's Maps APIs for average traffic speeds, specific to the time range of the simulation. This ensures that ETAs and trip times of the simulated service reflect real-world traffic data at the time of day for which service is being modeled.
4. **Set "terminals,"** the designated waiting areas for vehicles that do not have active ride assignments. Terminals are safe parking areas throughout the service zone. When empty, vehicles will be routed to the terminal where the system has predicted demand. This ensures that each vehicle is used efficiently, and riders will benefit from the shortest possible ETAs.
5. **Generate "virtual bus stops,"** safe places for pickups and drop-offs. By default, Via generates virtual bus stops throughout a service zone at intersections, at points where vehicles can safely park. Typically, there are hundreds or thousands of virtual bus stops in a zone. When setting up the zone, virtual bus stop generation considers unique features of the zone, such as the pedestrian walking map, no parking/standing areas, and bus stops.
6. **Set simulation parameters**, which are configured to serve our partners' service quality and rider aggregation targets. The configurations used for Hall County are outlined in the table below. These are only a few of the many algorithm parameters configurable for live services.

Parameter	Notes	Hall County Configuration
<b>Vehicle capacity</b> - Number of seats in the vehicle available to riders (excludes the driver).	In Via's experience, the ideal vehicle size balances the benefits of smaller vehicles (greater comfort, greater navigability through smaller roads) and the benefits of larger vehicles (chiefly, greater carrying capacity).	Via simulated vehicles with 6 seats. Using higher capacity vehicles will not reduce the number of vehicles or vehicle hours required.

<p><b>Maximum wait time</b> - The maximum time (in minutes) between ride request and pickup.</p>	<p>Riders will only be able to book a ride if a vehicle can pick them up in less than the maximum wait time. When a rider requests a ride, the system calculates the time it will take the best-suited vehicle to reach the requested pickup location, and displays this ‘proposal’ to the rider. In Via’s experience, user acceptance of proposals is highly correlated with proposed wait time. Users are more likely to reject a ride proposal when wait times are high. If a vehicle is unable to reach a rider within the maximum wait time, the rider is shown a preconfigured message such as “We can’t find a seat for you right now, please try again in a few minutes”. Average wait time is always significantly less than this maximum.</p>	<p>Via used a maximum wait time of 35-40 minutes. This value was chosen to ensure a consistently high quality of service for users who are offered rides while still ensuring riders further out in the County can be reached.</p>
<p><b>Maximum walk</b> - The maximum distance a customer is asked to walk to meet their vehicle or get to their final destination once dropped off.</p>	<p>Average walking distance tends to be significantly less than the maximum value.</p>	<p>Via used a maximum walk distance of 400m (~4min). However, with adequate vehicle supply, average walking distance is well below this maximum walking distance. In Gainesville, users might see longer walking distances when demand spikes or when requesting a ride from an area far from a road, such as a park or property with a long, private roadway.</p>

# Hall County Simulation Results

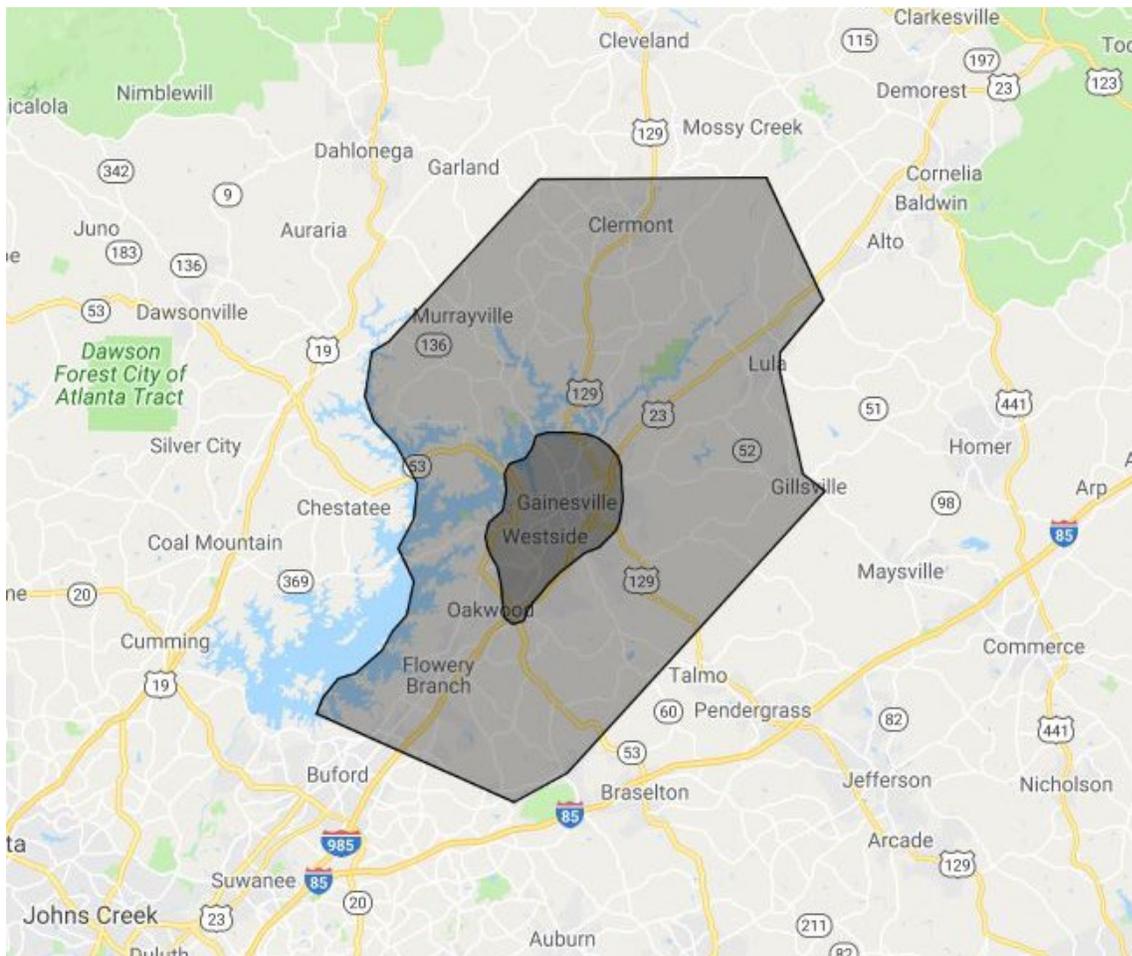
Via simulated the following 5 scenarios:

## Scenario 1) Upgrade the Dial-A-Ride service

This would be a County-wide service, replacing the existing Dial-A-Ride service, which delivers ~40 rides per day across a 400 sq. mile zone, shown below. Approximately half of Dial-A-Ride trips begin and end within the core microtransit zone, and would be served ‘on-demand’, meaning a rider can request an immediate pickup. Via recommends that the rides outside of this core zone, which currently make up about 20 rides per day, be accessed through pre-scheduling, meaning they are requested in advance. Users will be asked to indicate their pickup window (within a configurable range), allowing Via’s technology to better aggregate these longer trips.

**Microtransit vehicles required:** 5-6 vehicles

**Expected daily ridership:** 40-70 rides / day

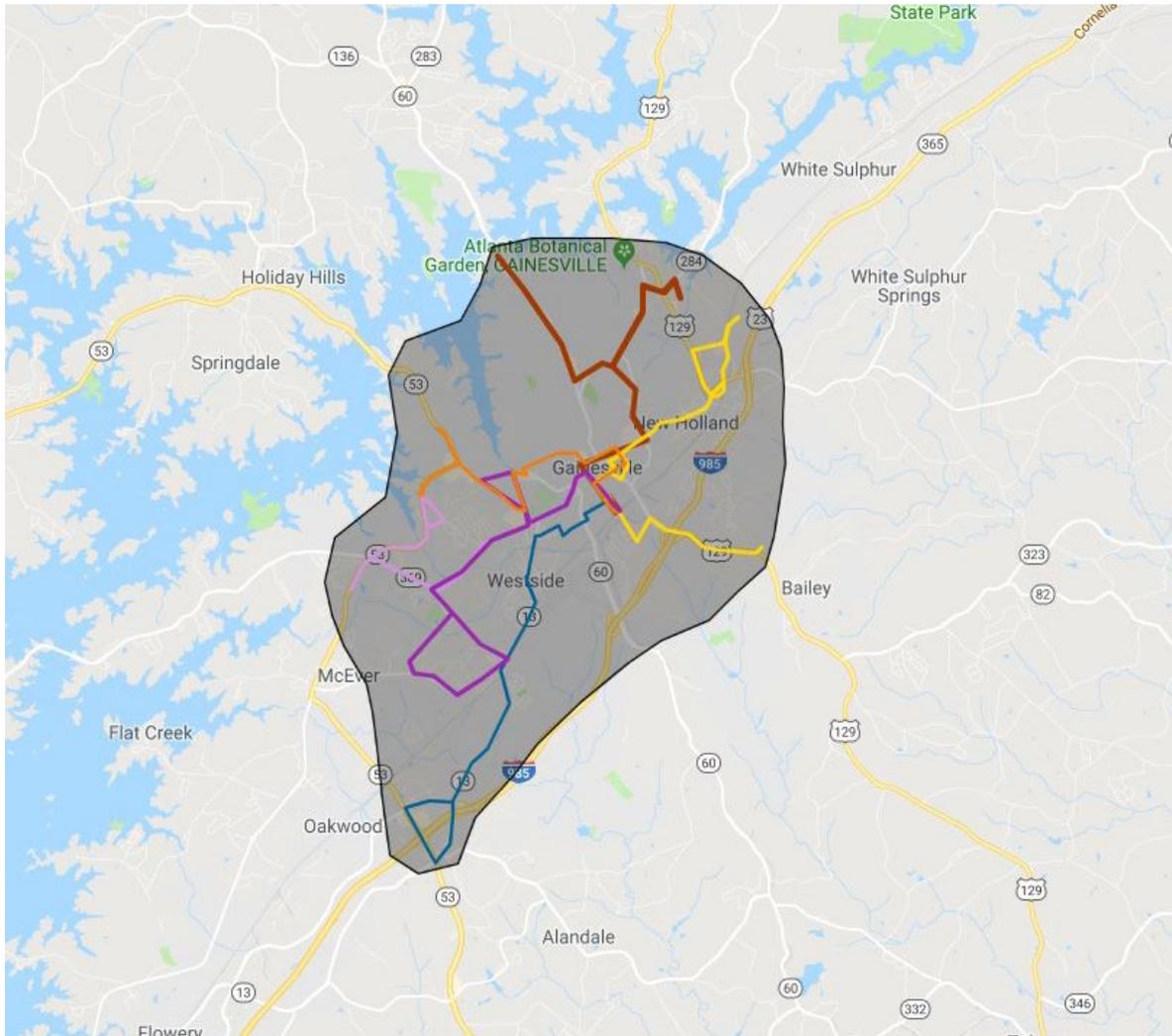


## Scenario 2) Upgrade all six Gainesville Connection (GC) routes

This service would replace the Gainesville Connection fixed-route network, which serves approximately 620 rides /day. The proposed service area is overlaid on the existing routes in the map below.

**Microtransit vehicles required:** 14-16 vehicles

**Expected Daily Ridership:** 600-900 rides / day



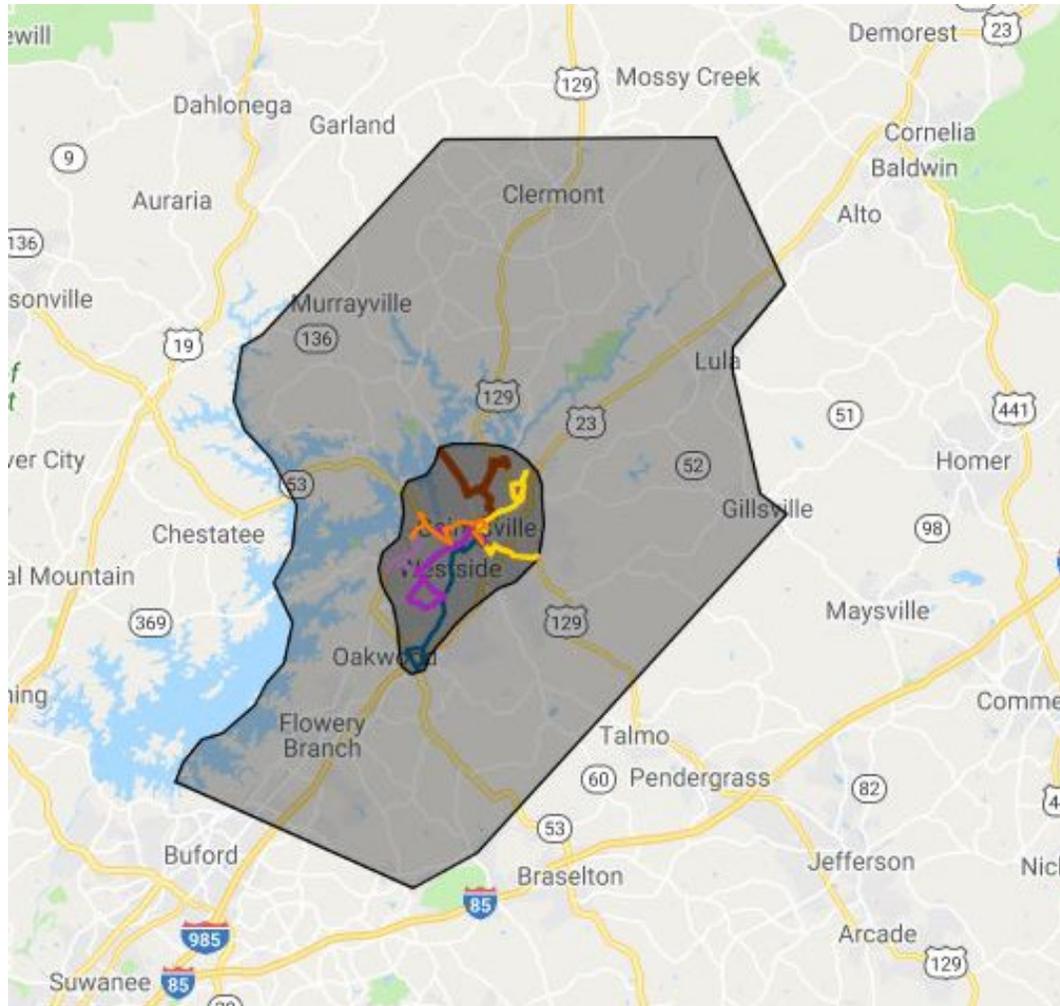


## Scenario 4) Upgrade the Dial-A-Ride and all Gainesville Connection routes -- combination of 1) and 2)

This service would replace the Dial-A-Ride service and all six Gainesville Connection routes, with a combined ridership of approximately 660 rides /day. The service area is shown in the map below.

**Microtransit vehicles required:** 16-18 vehicles

**Expected daily ridership:** 600-1000 rides / day

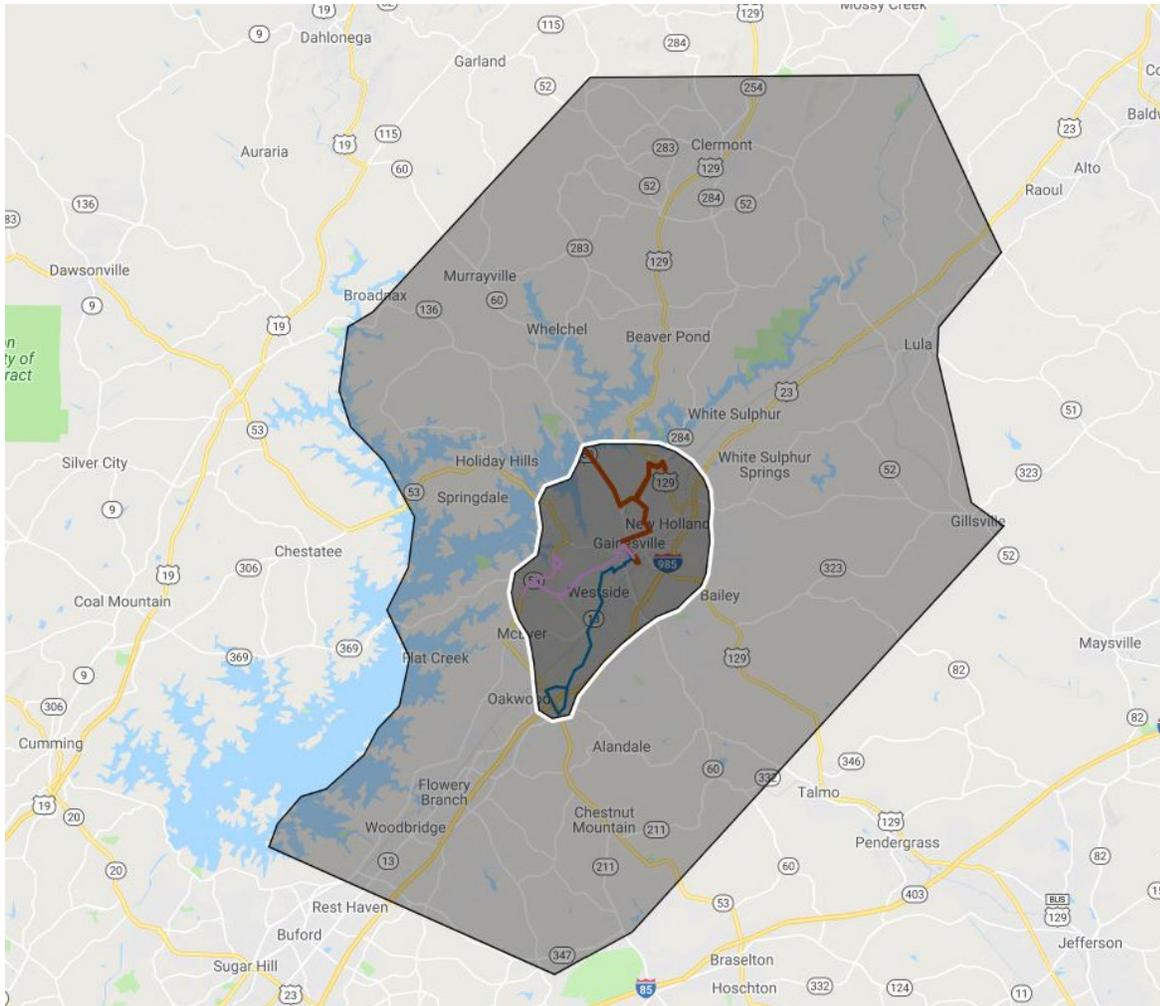


## Scenario 5) Upgrade the Dial-A-Ride and three underperforming Gainesville Connection routes -- combination of 1) and 3)

This service would replace the Dial-A-Ride service and the three underperforming Gainesville Connection routes, with a combined ridership of approximately 260 rides /day. The service area is shown in the map below.

**Microtransit vehicles required:** 9-10 vehicles

**Expected daily ridership:** 250-400 rides / day



## Summary of Results

The recommended fleet sizes for current demand are shown in the table below. In addition, Via simulated the impact of a two-fold increase in demand on vehicle requirements. Via's technology becomes more efficient as the density of ride requests increases, meaning trips are more easily aggregated. We predict that double the existing demand could be served by a ~60% larger fleet.

Scenario	Expected Trips / day	Recommended Microtransit Fleet Size	High Demand (2x existing demand) Fleet Size
1) Upgrade DAR	40 - 70	5 - 6	7 - 8
2) Upgrade 6x GC routes	600 - 900	14 - 15	21 - 24
3) Upgrade 3x underperforming GC routes	200 - 350	7 - 8	9 - 11
4) Combination of 1) and 2) - Upgrade DAR and all GC routes	600 - 1000	16 - 18	24 - 28
5) Combination of 1) and 3) - Upgrade DAR and underperforming GC routes	250 - 400	9 - 10	14 - 16

## Quality of Service

Microtransit will deliver high-quality service for Hall County residents, providing a level of convenience comparable to private cars and taxis. We expect this to lead to a significant increase in ridership and customer satisfaction.

For Dial-A-Ride customers, riders will no longer need to book trips a day or more in advance, providing a level of freedom and flexibility which will be life-changing for some individuals (riders in outer Hall County would be encouraged to book a seat in advance). Additionally, all riders will benefit from short wait times, the ability to track their vehicle as it approaches using their smartphone, automated payment processing, an intuitive booking process, and the ability to quickly access customer support in a few clicks.

The table below provides more details on the expected service quality for microtransit users in Hall County.

Parameter	Quality of Service
Average Wait Time (ETA)	15 minute average wait times (shorter for riders travelling within Gainesville city limits, and longer for riders living in communities in the outer Hall County area). Via simulated a service which reached over 98%+ riders within 35 - 40 minutes.
Average Walk Distance	Average walk of 300 - 500 feet (1-3 minutes) for ambulatory passengers, with a maximum walk of 1,200 feet. Curb-to-curb service is provided for limited mobility and wheelchair passengers.
Average Ride Duration	<ul style="list-style-type: none"> <li>● Core Zone: 5-15 minutes</li> <li>● Outer Zone: 10-25 minutes</li> </ul>
Accessibility	Via provides a fully-accessible service. Each scenario includes ~20% wheelchair accessible vehicles (WAVs) which will be prioritized for riders who require them.

Because improvements in convenience and quality of service can draw more riders into the transit network, the microtransit system may reach capacity during peak periods. Should the service prove so popular that users are turned away when requesting a ride, Via recommends a number of short-term solutions such as pricing incentives, booking eligibility restrictions, and other tools that ensure those who need the service most are prioritized, and the service is scaled in a cost-efficient way.

## Microtransit Operating Model

Hall County seeks to understand what operating model would best suit the County's current \$1.5M budget. Via has considered three alternatives:

1. **Transportation as a Service (TaaS):** In this model, the microtransit vendor provides a turnkey solution that includes microtransit technology, plus drivers, vehicles, and operations management.
2. **Transportation as a Service (TaaS) -- using Hall County vehicles:** As Hall County already has an existing fleet of vehicles, the microtransit vendor could operate a TaaS service using Hall County vehicles. For this scenario, the vendor would bear operating costs associated with the vehicles, including maintenance, fuel, cleaning, and registration.

3. **Software as a Service (SaaS):** In this model, the microtransit vendor provides the necessary microtransit technology, including the on-demand transit operating system and mobile applications, along with a full suite of tools and support services. This model is for agencies who prefer to use their own drivers, vehicles and dispatchers.

**Important Note:** To enable Hall County to solicit pricing proposals from providers, Via has included the number of vehicle hours required for each scenario, allowing comparisons across providers (based on their hourly vehicle pricing).

## 1) Turn-key (TaaS)

Via has provided indicative microtransit revenue hour requirements in the table below. Via does not recommend launching a TaaS service for fleet sizes of less than 6 vehicles due to the significant fixed costs involved in running such a service. Via recommends launching with the current service hours and, as ridership grows, Hall County can evaluate whether to extend the operating hours. The table below shows the impact different operating hours will have on annual vehicle hours requirements.

### Annual Vehicle Hours

Fleet Size	Monday - Friday 6am - 7pm (current service hours)	Monday - Friday 4am - 10pm, Saturday - Sunday 6am - 9pm
6 vehicles	~16,600	~25,000
8 vehicles	~22,200	~33,300
12 vehicles	~33,200	~50,000
15 vehicles	~41,500	~62,500

This option is recommended if Hall County believes a microtransit vendor can operate at a lower hourly cost than Hall Area Transit.

## 2) Turn-key (TaaS) with Hall County fleet

If Hall County wishes, the microtransit vendor can operate a TaaS service using Hall Area Transit vehicles, reducing the hourly vehicle cost. In this model, the vendor would provide drivers, fuel, insurance, maintenance, vehicle cleaning, and anything else required to ensure the vehicles are available and in working order each day.

This option is recommended if Hall County has a fleet of suitable vehicles and is unable to use them elsewhere in the County, or sell the vehicles for an attractive price.

### 3) Licensed Software (SaaS)

Hall County may prefer to provide all drivers and vehicles, in which case Via can provide a Software-as-a-Service offering and ongoing Customer Success services. This includes the use of the standard Via Solution, comprised of:

- Via’s fully localized dynamic vehicle routing and real-time passenger aggregation system
- iOS and Android rider and driver apps
- Backend administration tools
- Ongoing technical, operational, and marketing support
- Analytics tools and reporting

This option is recommended if Hall County can operate a microtransit service for a lower hourly cost than microtransit vendors, or if the County wishes to operate the service for other reasons.

## Recommendations

Below, Via has provided recommendations based on a combination of factors, including estimated cost, ridership, and customer value proposition.

### Scenario 1 - Upgrade Dial-A-Ride

#### **NOT RECOMMENDED**

This scenario requires 5 - 6 microtransit vehicles, in addition to those required for the Gainesville Connection. Via estimates that this option will exceed the available budget.

### Scenario 2 - Upgrade all six Gainesville Connection routes

#### **NOT RECOMMENDED**

This scenario requires 14 - 16 microtransit vehicles, in addition to those required for the Dial-A-Ride service. Via estimates that this option will exceed the available budget.

### Scenario 3 - Upgrade three underperforming Gainesville Connection routes

#### **NOT RECOMMENDED**

This scenario requires 7 - 8 microtransit vehicles, in addition to those required for the Dial-A-Ride service and remaining three Gainesville Connection routes. Via estimates that this option will exceed the available budget.

### Scenario 4 - Upgrade Dial-A-Ride and all Gainesville Connection routes

#### SECOND CHOICE

This scenario requires 16 - 18 microtransit vehicles. Via estimates this service will be within budget, however, we recommend scenario 5, which provides greater capacity for ridership growth at a lower cost.

### Scenario 5 - Upgrade Dial-A-Ride and 3 Gainesville Connection routes

#### RECOMMENDED CHOICE

This scenario requires 9 - 10 microtransit vehicles, in addition to three vehicles required for the remaining three Gainesville Connection routes. Via estimates this service will be within budget (cheaper than Scenario 4).

## Additional Notes

Via recommends choosing Scenario 5 instead of Scenario 4 for two reasons:

1. **Scenario 5 has the greatest ridership capacity.** In Scenario 5, the high performing fixed-routes will continue to move significant numbers of passengers along these regularly travelled corridors, while the majority of the County's resources can be allocated to the microtransit service, providing a vastly improved rider experience for the Dial-A-Ride and other customers.
2. **Scenario 5 has a lower cost.** Scenario 5 requires fewer vehicle hours, meaning it will have a lower cost. In addition, Hall County does not need to run the three high performing fixed-route services throughout the entire day. Instead, the agency could choose to only run this service during peak hours (for example, 4-6 hours per day) which could reduce operating costs further. Outside these hours, the microtransit service would have the capacity to transport all remaining riders.

## Conclusions

The report provides the following conclusions:

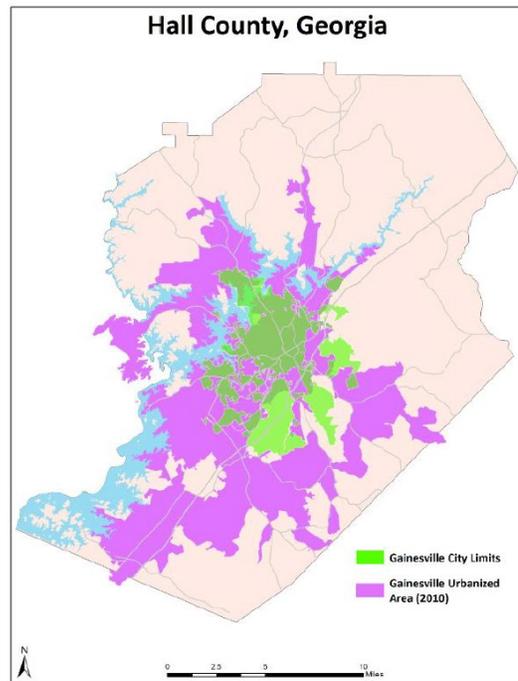
**Service Area:** Hall County seeks to understand whether microtransit should be provided throughout Hall County (400sq. mi), the urbanized area (130sq. mi) or the Gainesville City Limits (35sq. mi). Currently, Dial-A-Ride is provided across the entire county, while the Gainesville Connection runs largely within the City Limits and a small portion of the urbanized area.

Via recommends that microtransit cover the entire County, providing both a replacement for Dial-A-Ride and some fixed-route services, as well as capturing new riders such as those who currently use a taxi or their own private vehicle.

However, providing microtransit across the entire County could induce significant demand, particularly if fares are kept low. Currently, Hall County completes around 40 Dial-A-Ride trips per day. Approximately half of these trips are within the core, ‘on-demand’ zone, with the remainder extending to the outer county, which would be operated on a pre-scheduled basis. Given these outer county trips cover long distances and are geographically spread throughout the zone, a significant increase in the number of County-wide trips could result in the microtransit service reaching capacity during peak periods. If this does occur, Via recommends implementing the following tools to manage demand:

- *Limiting access to rides in outer Hall County to those who need them most:* For example, Hall County may choose to only accept bookings outside the urbanized area from elderly and disabled riders.
- *Managing demand by using dynamic pricing:* Hall County could manage demand during peak periods by increasing fares. If desired, concession holders and priority riders could be exempt from these fare increases.
- *Increasing maximum wait times:* By increasing maximum wait times, some riders may need to wait longer periods during peak periods. This will limit demand, as riders who have the option to drive may choose to do so when wait times are high.

**Hours of Operation:** Hall County seeks to understand during what hours of operation microtransit should be available. Via recommends launching the service with hours that



match the current Dial-A-Ride and fixed-route services, from 6am to 7pm, Monday to Friday. As ridership grows, Hall County can extend hours of operation based on rider demand.

**Quality of Service:** Hall County seeks to understand what quality of service metrics are appropriate for a microtransit service in the region. Via recommends designing a service with average wait times of around 15 minutes, with maximum wait times of 35 - 40 minutes.

**Financial Resources:** Hall County seeks a microtransit service which does not exceed approximately \$1.5M per year. Via recommends Scenario 5, which will provide the highest quality of service while remaining within this budget. Fare revenue will also offset some of this cost.

# Appendix 1 – Ridership Data

## Dial-A-Ride Demand Data

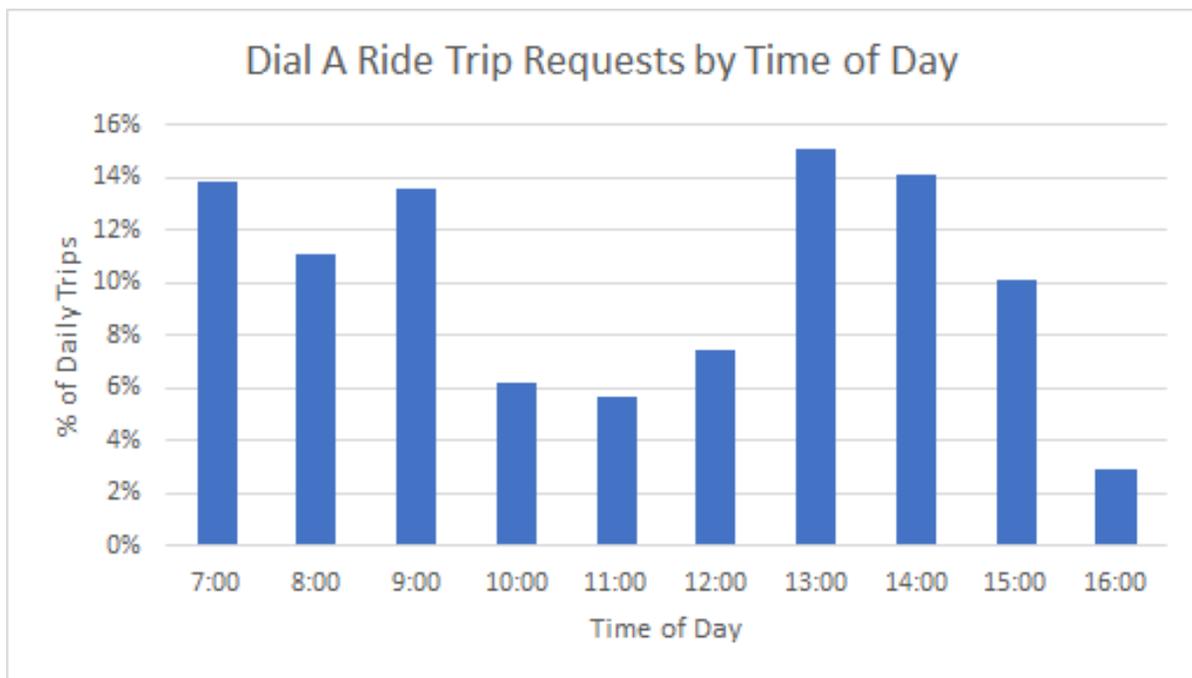
Dial-A-Ride data was provided for 10 days in October 2018. A total of 404 trips were completed in this period.

### Daily trip requirements:

- Busiest day - 51 trips
- Average day - 40 trips
- Lowest demand day - 33 trips

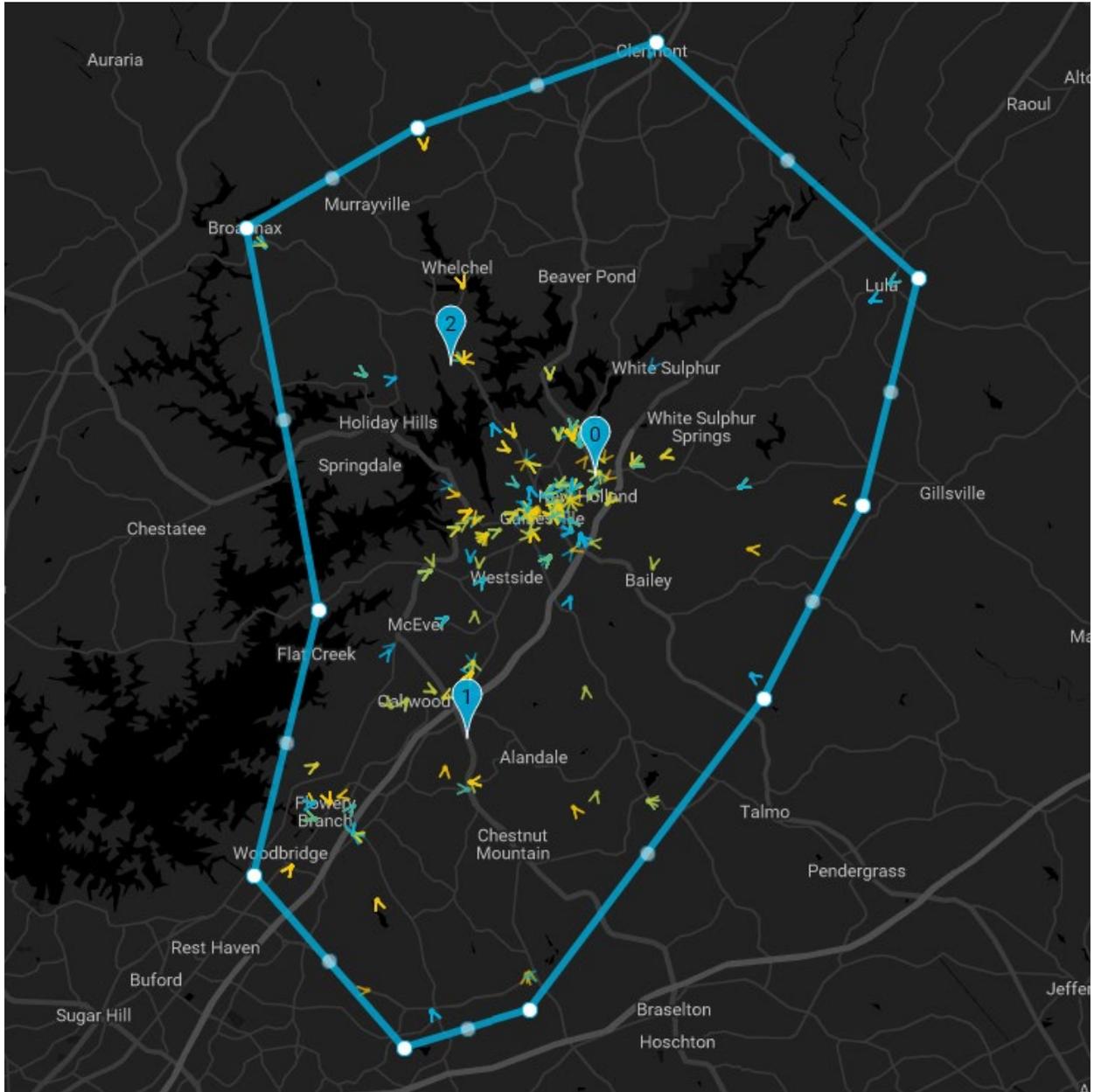
### Trips by time of day:

The busiest period is early afternoon, where 39% of daily trips fall within a 3-hour period. See the graph below for more information.



### Dial-A-Ride Trips by Origin / Destination

The image below shows trip origins (blue) and destinations (orange).



## Fixed-route Demand Data

### Daily trip requirements:

- Average day: 617 rides (October 2018 data)
- The busiest routes are Route 10, 40, and 30. Route 10 has a utilization of 13 passengers / revenue hour, Route 40 has a utilization of 11 passengers / revenue hour, and Route 30 has a utilization of 10 passengers / revenue hour.

Oct 2018 Data	Ave Riders / Day	Annual	Utilization
Route 10	150	34,036	13
Route 20	82	18,606	7
Route 30	107	24,279	10
Route 40	136	30,859	11
Route 41	46	10,438	4
Route 50	96	21,783	8
<b>Total</b>	<b>617</b>	<b>140,000</b>	<b>9</b>

### Trips by time of day:

The busiest period is mid-afternoon. 33% of trips fall within this 3 hour period. See graph below for more information.

