DILLON CONSULTING

LONDON TRANSIT COMMISSION

# On Demand Transit – Innovation Park Assessment and Implementation Plan

## Final Report

September 2021

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# *1.0* Introduction

## *1.1* Purpose

The purpose of this report is to assess the feasibility and develop a service model and implementation for a new On Demand transit service to provide access to Innovation Park. This report will accomplish the following:

- Confirm a vision and guiding principles for the implementation of an On Demand transit model in the City of London;
- Select a model to be initially piloted in Innovation Park in the short-term;
- Consider integration of service in Innovation Park with adjacent employment lands along Routes 30 and 37;
- Identify and evaluate various operating models for the On Demand transit service;
- Develop an implementation plan and software requirements that:
    - Integrates the On Demand transit model with the conventional transit service already in place;
    - considers how fares will be collected, including seamless integration with the Smart Card system; and
- Identify metrics for measuring success.

## *1.2* On Demand Transit

On Demand transit is a shared-ride, demand-responsive public transit service. The service model does not follow a fixed-route or schedule. Instead, customers must pre-book trips and vehicles are routed dynamically to the passenger's pick-up and drop-off point.

Modern On Demand transit services utilize mobile app technology, which allows customers to plan, book, track and pay for their ride in real-time, all while optimizing trips to increase the number of shared rides that can be accommodated without sacrificing service quality.

The software application generates a real-time dynamic route that is optimized to provide a balance between customer convenience (e.g. travel time) and efficiency (e.g. ridesharing).

## *1.3* When is On Demand Service Appropriate?

There are three reasons to introduce On Demand transit.

1. Improve the effectiveness and customer-experience of a fixed-route service that does not meet minimum ridership thresholds;
2. Introduce service in an area or during a period that does not warrant fixed-route transit service due to low demand; and/or
3. Provide a second layer of transit service on top of fixed-route services to increase ridership.

It is important to note that the introduction of On Demand transit services is not a one-size fits all solution and is not applicable in all contexts. There are many situations where continuing to provide and enhance fixed-route service will provide the most convenient level of service for customers, and will be more cost-effective. For example, fixed-route service in dense areas still carries high numbers of customers far more efficiently than On Demand models would, and it is unlikely that this type of service should be considered along the busy London Transit corridors.

**Table 1** identifies some key factors to consider when making a decision to operate a fixed-route service or an On Demand transit service.

**Table 1: Service Level Criteria for Fixed-Route versus On Demand Transit**

| | Fixed-Route | On Demand |
|---|---|---|
| Proximity to Service | Majority of residents in close proximity to transit stops (less than 400 m walking distance). | Residents are outside of 400m walking distance of a fixed-route service. |
| Route Structure | The route is relatively direct with minimal deviations that increase travel times. | The route is fairly circuitous or has large one-way loops. |
| Headway | Route provides headways of 20 minutes or better. | Route has low headway (30 minutes or greater) |
| Key Origins and Destinations | There is a high demand for service between similar origins and destinations along the route. | There are minimal origin / destination pairs on the route that have a high demand (ridership is more scattered). |
| Productivity* | Ridership above 15 boardings per revenue vehicle hours. | Ridership below 10 - 12 boardings per revenue vehicle hour. |

**Note: The exact productivity rate is dependent on the geographic area and the operating model and cost implemented for On Demand service and should be used as a guide.*

# 2.0 Vision and Guiding Principles

A Vision and Guiding Principles were developed for On Demand transit services in London. The Vision describes London's long-term future goal for On Demand Transit, while guiding principles describe a set of values that provide direction for decision making and evaluation of alternatives. Both provide a foundation upon which all other components of the service are built. Agreement on common purpose and values helps ensure all involved parties work in unity towards achieving the desired outcomes related to the service.

The Vision and Guiding Principles outlined below were identified in a collaborative working session with London Transit conducted as part of the development of this Plan.

## 2.1 Vision

The vision for On Demand Transit in London Transit's Alternative Service Delivery is:

***"Provide a seamless and attractive mobility choice to Londoners in low demand areas as part of London Transit's family of services."***

This vision highlights the way in which an On Demand transit model should effectively coexist with other services offered by the LTC in a way that meets the needs of residents, employees, and employers in areas that have low demand for transit services.

## 2.2 Guiding Principles

A number of guiding principles were developed and grouped into themes of **Customer Experience**, **Sustainability** and **Operations**. London Transit will use these principles to ensure the selected On Demand transit model meets the fundamental vision of the agency. This should also be applied to the implementation and operation of the service.

### 2.2.1 Customer Experience

Customer experience speaks to the way in which customers perceive and interact with an organization or service. In the case of London Transit, customer experience is built on all interactions riders, both potential and actual, have with LTC's staff, infrastructure (vehicles and stops), and communication materials (online or paper). To ensure the highest quality customer experience, the selected On Demand transit model will reflect the following elements:

1. **Equity:** The service should be available to any resident, regardless of age, gender, race, ability and income.

2. **Safety and Security:** The service must be safe and secure for customers. This means:

- Stop locations are in well-lit areas, in an area that allows the vehicle to safely pull-over and the passenger to board/alight from an area separated from vehicle traffic (e.g. by a curb);
- All drivers have criminal-record checks, a safe driving record and vulnerable sector screening; and
- All vehicles that provide On Demand transit have a clearly identifiable LTC brand visible to the passenger before boarding.

3. **Accessibility:** The service should be accessible for all customers. This means:
    - Stop locations should meet LTC's minimum accessibility requirements;
    - An accessible trip must be made available to a passenger that request a trip provided by an On Demand transit service (either through the On Demand transit vehicle or using specialized transit for registered users); and
    - The mobile trip booking software (application and website) must be accessible for persons with vision loss or who are blind.
4. **Ease of Use:** The service should be easy to use, including the trip booking and fare payment structures.
5. **Access:** The service should improve access to transit in areas or periods that are difficult to service using fixed-route transit.
6. **Reliability:** The service should be consistently reliable in terms of on-time performance and available to accommodate customer's trips.
7. **Integration:** The service should provide a first-mile/last-mile connection to transit hubs and/or high frequency stops, timed to fixed-route services to minimize customer waiting time.
8. **Convenience:** The service should emphasize customer convenience when planning, booking, travelling and transferring to/from fixed-route services.

### 2.2.2 Sustainability

Sustainability refers to the ability for the selected On Demand transit model to operate successfully on an ongoing basis, providing service that is financially efficient and contributes to environmental *sustainability* goals. Sustainability also refers to the ability for the service be adaptable and flexible, able to make changes quickly in response to new opportunities and new challenges in order to maintain operations. To ensure the sustainability of the service, the selected On Demand transit model will reflect the following:

1. **Congestion Reduction:** The service should operate efficiently, minimizing non-revenue vehicle time where vehicles are contributing to traffic and GHG emissions.
2. **Fares:** Fares should be the same as other London Transit services where On Demand transit is provided as an alternative to fixed-route service during the same hours of operation.

Consideration for higher fares can be made when an On Demand transit service overlaps a fixed-route service, and offers a higher level of service than would otherwise be provided with conventional service.

3. **Scalability and Adaptability:** The service should be scalable and adaptable, with the ability to accommodate future needs as technology and customer preferences evolve.

### 2.2.3 Operations

Operations refers to the details of when, where, and how the service is delivered as well as its day-to-day functioning.

1. **Financial Sustainability:** The service should operate within cost-recovery targets noted in LTC's service guidelines. The focus should be to implement in areas/periods where it leads to a similar or improved level of service at a lower cost relative to fixed-route transit.
2. **Oversight**: The service model should minimize the amount of LTC administrative time and overhead required for oversee ongoing operations.

# 3.0 Innovation Park

## 3.1 Background

### 3.1.1 Innovation Park

Innovation Park is a four phase City-owned park located north of Highway 401, west and east of Veteran's Memorial Parkway, and south of Hamilton Road. During the COVID-19 pandemic, London's Innovation Park saw continued construction of new facilities with several expecting to open by year's end.

The majority of Innovation Park is designated "Light Industrial" as per the City of London Official Plan (2017), with a small portion of designated "Green Space" use. A wide range of multinational companies and manufacturers conduct operations from Innovation Park. Further expansion to the industrial area is anticipated by the City; the London Economic Development Corporation highlights the availability of real estate in the park as part of its Industrial Land offerings, and an additional parcel of land adjacent to the existing Park is designated by the Official Plan for "Future Industrial Growth".

A segment of the proposed service area is Advanced Manufacturing Park, a collaboration between Western University, Fanshawe College, and the City of London to provide 40 acres of manufacturing and large-scale research facilities.

There are currently 13 businesses and 1,525 employees located within Innovation Park. There is significant anticipated growth as additional properties on the site are at various points in the development process. The majority of these employers are in the manufacturing and research industries.

A combined 103.43 acres of land remain available for purchase in seven parcels of various sizes. As well, an additional six parcels are on offer, under contract, or optioned.

### 3.1.2 Route 37 Employment Area

Immediately to the north of Innovation Park is an existing employment area which consists of a variety of warehouses and manufacturing facilities between Dundas Street and Gore Road. Employers are located primarily along Sovereign Road and Neptune Crescent. This area is currently serviced by Route 37, which provides peak period weekday service every 30 minutes.

Route 37 also services Argyle Mall, a 300 sq. ft. shopping centre and the Dundas Street corridor, made up of low-rise commercial development with some single family residential units facing the street. The area along Dundas is designated "Urban Corridor" as per the 2019 London Plan, indicating future growth with average built form patterns of 2-8 storeys; however, this portion of the plan is currently under appeal.

### 3.1.3 Route 30 Employment Area

There is another large employment area located southwest of Innovation Park, bounded by Bradley Avenue to the north, Cheese Factory Road to the east, Roxburgh Road to the south and Wellington Road to the west. The land uses are largely industrial, both light and heavy. The easternmost portion of the route at Cheese Factory Road serves a number of undeveloped greenfield properties that are designated for future industrial use. The most significant growth will occur with the expansion of the Maple Leaf Foods Plant located on Wilton Grove Road. The plant is planned to begin ramping up operations in 2022, with anticipated staffing of 1,600 employees spread over several shifts between 3:00 a.m. and 1:00 a.m.

Route 30 operates through this area as a clockwise loop originating at White Oaks Mall. The mall is designated as a "Transit Village" in the London 2019 plan with a pocket of low-rise commercial development directly to the south. The route uses one bus to provide service every 40-minutes during the morning (6:30 a.m. - 11:00 a.m.) and afternoon (2:30 p.m. - 7:00 p.m.) peaks. Prior to the COVID-19 pandemic, the service also operated two evening runs between 10:30 p.m. and 11:30 p.m.

## *3.2* Input from the Engagement Session

To better understand the transit needs of Innovation Park's users, an engagement session was conducted with representatives of businesses in the area, representing approximately 1,525 current employees. Participants were asked to provide information about the industries they represent, the number of employees working on-site, whether they experienced seasonal fluctuations in employee presence, and their shift schedules and corresponding employee counts working each shift. This information informed demand projections for transit trips in Innovation Park, as well as future demand based on anticipated growth within existing businesses.

The survey responses indicated an expected growth of 50% in employees on existing Innovation Park sites within the next five years, increasing from 1,525 to 2,400. This does not take into account growth from new businesses and organizations on currently vacant sites.

The scheduling structure of manufacturing work can differ significantly from the traditional 9:00 a.m. to 5:00 p.m. that dominates the majority of planning for commute-related travel. Innovation Park hosts multiple manufacturing facilities that employ staggered shifts beginning at multiple times throughout the day (i.e. 7:00 a.m., 3:00 p.m., and 11:00 p.m.), some of which operate 6 or 7 days per week. A small number of businesses in the Park schedule employees at times that closely align with traditional office hours, while the WindEEE 35000 (part of Western University's Research and Development Centre for Advanced Manufacturing) has variable staffing schedules based on the needs of given projects being undertaken at any given time.  Shift times and existing employees per shift were requested by each participating employer and used to calculate potential demand for an On Demand transit service.

Three businesses provided additional open-ended comments, all of which indicated high interest from their respective businesses and employees in seeing transit service implemented. These comments represented over 600 employees in the area. Two comments described receiving large amounts of

inquiries from employees about transit service and noted the positive impact implementing such service would have on their workforce. One participant indicated a willingness on behalf of the organization to provide whatever assistance necessary to support bringing transit service to the area. These comments emphasize the importance of public transit in industrial employment areas to support sustainable and cost effective commute options for London's residents.

# *4.0* Service Delivery Options

On Demand transit service can be structured in a number of different ways, depending on the goals of the municipality and the market in which the service operates in. Some typical service delivery models include:

1. **Origin-to-Hub (First-Mile/Last-Mile) -** On Demand transit provides mobility to customers in lower demand areas to/from the nearest fixed-route transit stop. In this way, this service model provides first-mile/last-mile connectivity to the rest of the transit network, with the majority of a passenger's overall journey undertaken on fixed-route transit. Where possible, the connecting stop is typically a major hub/terminal, transfer point or stop that allows customers to complete their trips from a safe and accessible transfer point, connecting to multiple routes. The model is typically implemented in low density areas where fixed-route transit is uneconomical, is not offered, or to supplement an existing low-frequency fixed-route service.

2. **Origin-to-Destination -** On Demand transit vehicles provide a one-seat ride to connect any origin with any destination in the service area. This means that transfers are not required to a fixed-route service. This model is typically implemented in larger low-density geographic areas where there is no fixed-route service or in smaller geographic areas where it does not make sense to force a transfer. This model can be combined with an Origin-to-Hub model, where Origin-to-Destination is used for internal trips within an On Demand zone and Origin-to-Hub is used to connect customers outside of the On Demand zone.

3. **Flex-Route -** This is a simple form of On Demand transit which is typically implemented in low-demand areas and allows the transit agency to provide additional coverage using a limited resource. Flex routes operate on a fixed-route and fixed-schedule for certain portions of the route. However, at the request of a passenger, the driver has the ability to 'flex' off the route to pre-designated areas to pick up or drop off a passenger. The benefit of flex routes is that it allows the resource to provide coverage to a larger area that may have limited demand without the need to invest in additional service. Extra travel time would need to be included in the route schedule to allow the driver to flex off the route based on a passenger request.

### Summary

There is a significant amount of fixed-route service with connections to both the Argyle Mall and White Oaks Mall terminal, which are both in close proximity to Innovation Park. During fixed-route operating hours, it is much more cost effective to utilize existing resources for long-distance portions of the trip rather than duplicating an existing, and in many cases, frequent service with an On Demand service. Therefore, a full City-wide Origin-to-Destination model is not recommended to service Innovation Park during periods when fixed-route service is in operation.

It should be noted that a full City-Wide Origin-to-Destination model may be appropriate during periods when fixed-route service is not in operation. This would occur if there is a high demand to access shifts that start prior to the start of conventional transit service day, or end after the end of the service day. While On Demand transit may be more cost effective in these cases rather than starting or ending the fixed-route network earlier or later, extending hours of service is a system-wide decision that would also benefit other residents outside of Innovation Park and therefore should be made as part of a more holistic review of the service. Data gathered from the On Demand pilot will help to inform this decision.

A flex-route model was also not considered suitable in London. Flex-routes are appropriate when there are a high number of stops that should receive consistent service on every run and other stops that may only receive a few requests for service. Since stops in Innovation Park are highly dependent on shift-times, it was concluded that the majority of stops would likely only receive consistent activity a few times per day. Therefore, the flexibility of a pure On Demand service was found to be more beneficial. London also already operates a Flex Route with its three Community Bus services. Therefore, adopting a pure Origin-to-Hub (or Hub-to-Destination) On Demand service would also provide the London Transit Commission an opportunity to learn from the pilot and potential take lessons learned and expand it elsewhere in the City.

The most effective On Demand model for Innovation Park is an Origin-to-Hub model to connect passengers to fixed-route services at either/both the Argyle Mall transit hub or the White Oaks Mall transit hub. This could be combined with an Origin-to-Destination model to allow passengers to travel within Innovation Park without a transfer.

# *5.0* Service Design Options

Three Service Design Options were developed for Innovation Park and the surrounding employment areas using a combination of On Demand service and fixed-route service. These include the following:

1. Operate On Demand within Innovation Park from the Argyle Mall terminal, and maintain fixed-route service on Route 37 and Route 30.
2. Convert Route 37 to an On Demand service, combined with the On Demand Innovation Park service, operated from the Argyle Mall terminal. Continue to operate Route 30 as a fixed-route service.
3. Convert Route 30 and Route 37 to an On Demand service, combined with the On Demand Innovation Park service, operated from the Argyle Mall and White Oaks Mall terminal.

Each of these are assessed in more detail below:

## *5.1* Service Design Option #1 - On Demand in Innovation Park Only

This option implements a new On Demand service in Innovation Park only, with no change to Route 30 and Route 37. The service would operate from Argyle Mall terminal to allow passengers to connect to other fixed-route service. White Oaks Mall was also considered as a potential connection point, but the potential demand was too low to support connections to both terminals. Argyle Mall was ultimately selected due to its closer proximity to Innovation Park.

The recommended service area for this option is illustrated in **Figure 1** below.

The roundtrip travel time to/from Innovation Park was assumed to take 40 minutes, depending on the number of boardings and alightings that occur on each trip.

Hours of services and vehicles requires was estimated based on potential ridership demand found in **Table 2**. London Transit starts service at 6:00 a.m. and ends at 1:00 a.m. during the week. Some of the first fixed-route bus routes to arrive at Argyle Mall terminal include Route 3 at 6:17 a.m., Route 2 at 6:27 a.m., Route 17 at 6:54 a.m. and Route 5 at 7:30 a.m. Some of the last fixed-route bus routes to depart the terminal include Route 3 at 10:59 p.m., Route 5 at 11:27 p.m., Route 2 at 12:35 a.m., and Route 17 at 12:38 a.m.11:27 p.m.. These hours were used to inform the service hours when establishing On Demand hours of service due to the need to connect to other parts of the City.

The potential demand for transit service at Innovation Park was assessed based on employment data and shift times provided by a number of employers. Trips were generated for each employee using the ITE Trip Generation Manual, and a 2% transit mode share was applied to each trip to calculate transit demand. **Table 2** illustrates the potential weekday and weekend demand using this methodology.

**Figure 1: Service Design Option #1 – Innovation Park On Demand Service Area**

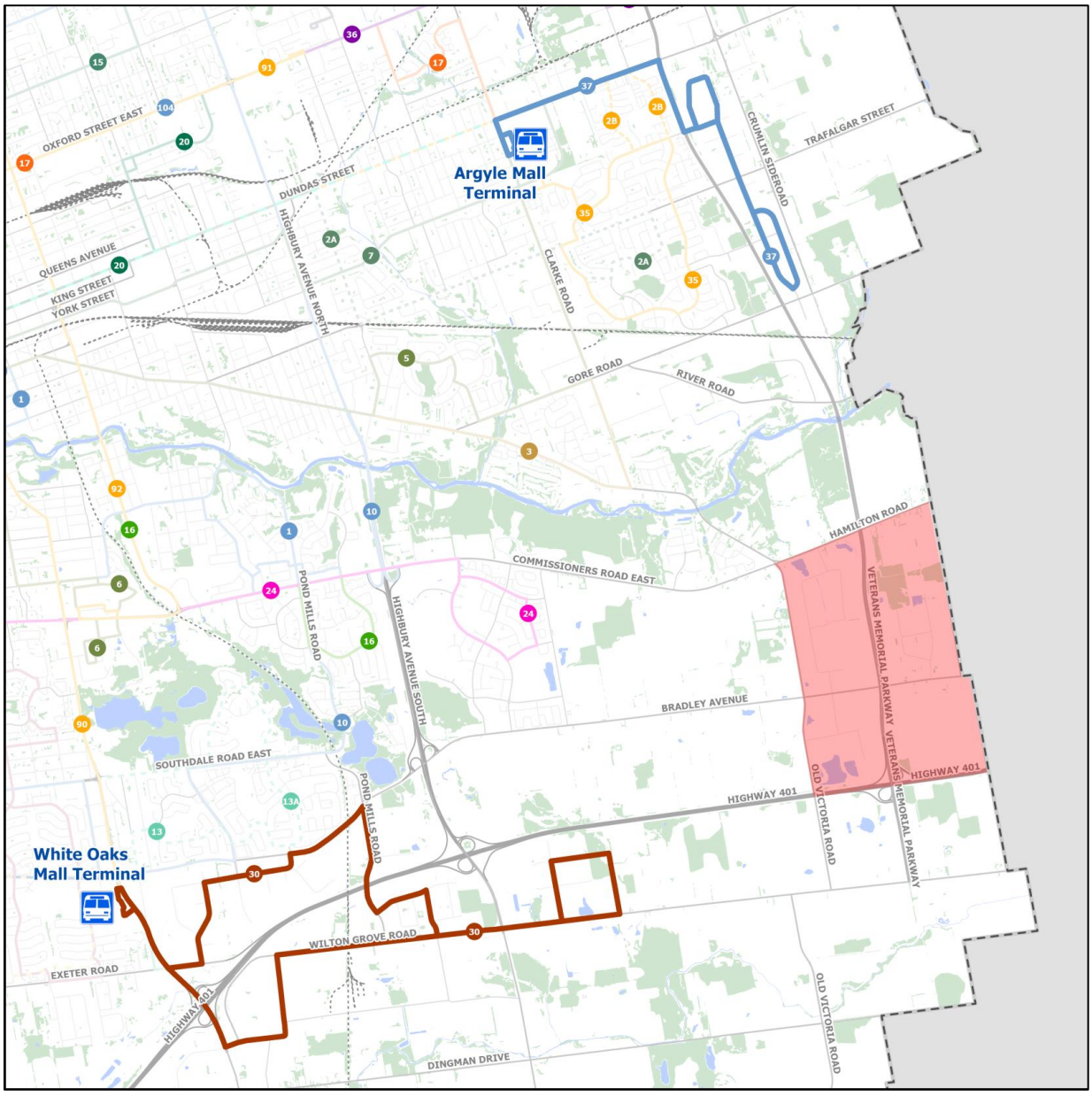


**Table 2: Potential Demand to Innovation Park**

| Start Time | Weekday | | | Saturday | | | Sunday | | |
|---|---|---|---|---|---|---|---|---|---|
| | To Work | To Home | Total | To Work | To Home | Total | To Work | To Home | Total |
| 0:00 | 1 | 1 | 2 | 1 | 1 | 2 | 0 | 1 | 1 |
| 1:00 | 1 | 2 | 3 | 1 | 2 | 3 | 0 | 1 | 1 |
| 2:00 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3:00 | 2 | 0 | 2 | 1 | 0 | 1 | 0 | 0 | 0 |
| 4:00 | 0 | 2 | 2 | 0 | 1 | 1 | 0 | 1 | 1 |
| 5:00 | 3 | 1 | 4 | 2 | 1 | 3 | 0 | 1 | 1 |
| 6:00 | 6 | 1 | 7 | 1 | 1 | 2 | 0 | 1 | 1 |
| 7:00 | 8 | 7 | 15 | 3 | 2 | 5 | 3 | 2 | 5 |
| 8:00 | 4 | 1 | 5 | 1 | 1 | 2 | 1 | 0 | 1 |
| 9:00 | 3 | 1 | 4 | 1 | 1 | 2 | 0 | 0 | 0 |
| 10:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11:00 | 1 | 0 | 1 | 1 | 1 | 2 | 1 | 1 | 2 |
| 12:00 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 |
| 13:00 | 3 | 2 | 5 | 2 | 1 | 3 | 0 | 0 | 0 |
| 14:00 | 4 | 4 | 8 | 0 | 1 | 1 | 0 | 0 | 0 |
| 15:00 | 3 | 8 | 11 | 1 | 1 | 2 | 1 | 1 | 2 |
| 16:00 | 1 | 3 | 4 | 1 | 1 | 2 | 0 | 0 | 0 |
| 17:00 | 1 | 3 | 4 | 1 | 1 | 2 | 0 | 0 | 0 |
| 18:00 | 0 | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 0 |
| 19:00 | 2 | 2 | 4 | 2 | 2 | 4 | 1 | 2 | 3 |
| 20:00 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 |
| 21:00 | 2 | 1 | 3 | 2 | 1 | 3 | 0 | 0 | 0 |
| 22:00 | 0 | 2 | 2 | 0 | 1 | 1 | 0 | 0 | 0 |
| 23:00 | 3 | 6 | 9 | 1 | 2 | 3 | 3 | 1 | 4 |

As illustrated above, demand throughout the day is fairly low. This may increase over time as the number of businesses continue to grow. Based on the above, it is recommended that service operate on weekdays only between 6:45 a.m. and 8:30 a.m. in the mornings, 1:30 p.m. and 4:10 p.m. in the afternoons and 10:00 p.m. and 11:20 p.m. in the evenings. A draft schedule was created for comparative purposes with other options below to better understand the service hours and vehicles requirements needed to service this area. Since the proposed service operates On Demand, the only part of the schedule that should be provided to an On Demand service provider is the start and end times of each operating period. The draft schedule is illustrated in **Table 3**.

**Table 3: Option #1 - Potential On Demand Departure Times from Argyle Mall Terminal**

| Bus # | Argyle Mall | Innovation Park | Argyle Mall | Travel Time | Headway | Total Veh Hrs |
|---|---|---|---|---|---|---|
| **AM Peak Period** | | | | | | |
| 1 | **6:45** | 7:05 | 7:25 | 0:40 | 0:40 | 0:40 |
| 1 | 7:25 | 7:45 | 8:05 | 0:40 | 0:40 | 1:20 |
| 1 | 8:05 | **8:30** | | 0:25 | 0:40 | 1:45 |
| **PM Peak Period** | | | | | | |
| 1 | **1:30** | 1:50 | 2:10 | 0:40 | 0:40 | 2:25 |
| 1 | 2:10 | 2:30 | 2:50 | 0:40 | 0:40 | 3:05 |
| 1 | 2:50 | 3:10 | 3:30 | 0:40 | 0:40 | 3:45 |
| 1 | 3:30 | 3:50 | **4:10** | 0:40 | 0:40 | 4:25 |
| **Evening Period** | | | | | | |
| 1 | **10:00** | 10:20 | 10:40 | 0:40 | 0:40 | 5:05 |
| 1 | 10:40 | 11:00 | **11:20** | 0:40 | 0:40 | 5:45 |

Based on the above, it is anticipated that one vehicle is required to provide the service, operating approximately 5.75 in-service hours daily.

It is anticipated that the service would carry 9.4 boardings per revenue vehicle hour, which is within the typical ridership thresholds of an On Demand service. However, given the long distances between the terminal and Innovation Park, an On Demand service with one vehicle would only be effective if it operated as a reservation-based scheduled service, where the On Demand service would include scheduled departure times from a fixed point (e.g. Argyle Mall), with all other stops being dynamic, based on passenger demand. This is done to help group trips, particularly where there are only a few vehicles operating the service.

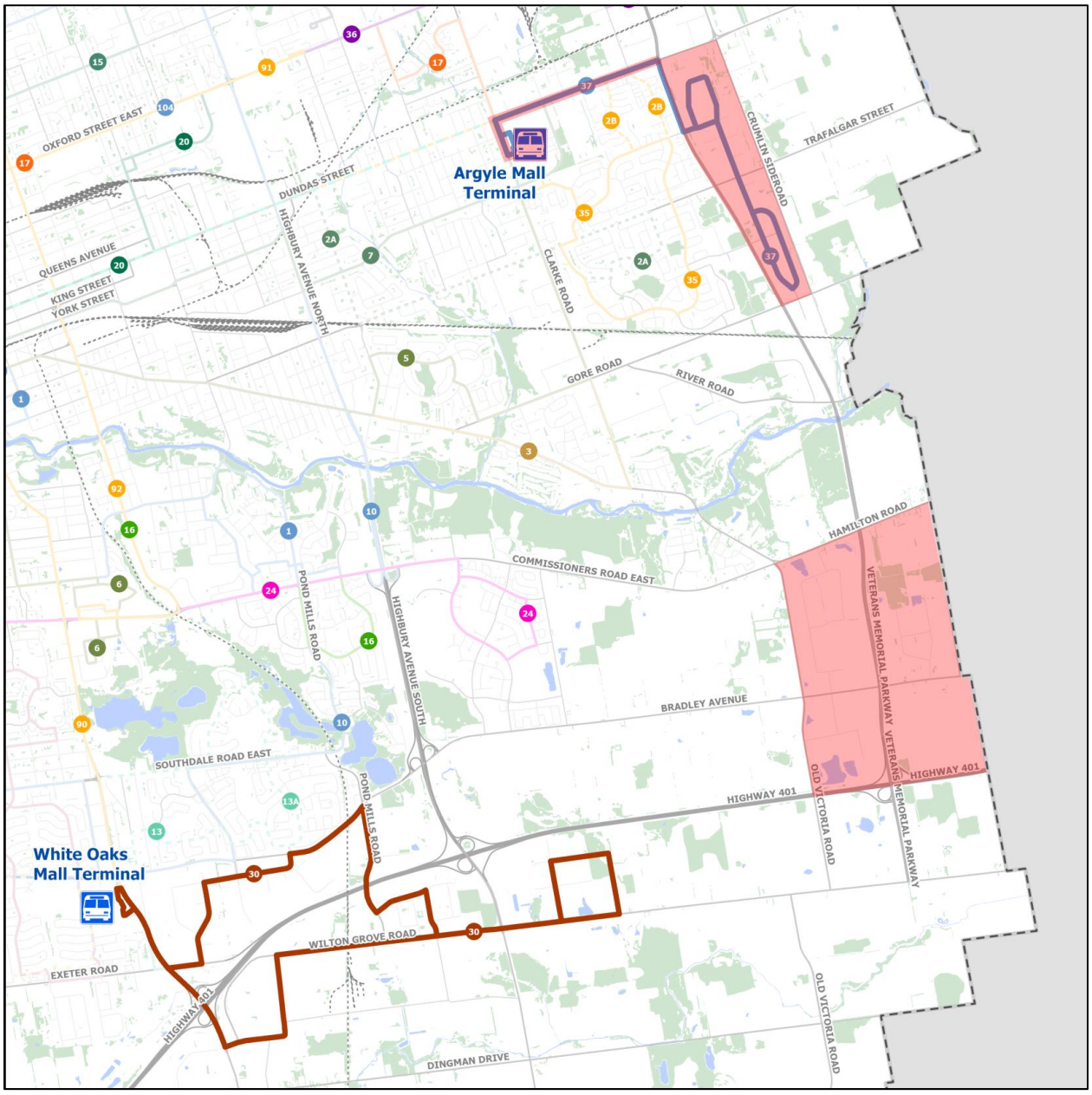
Experience from other transit systems with this model is mixed. Some technology providers have completed this successfully, while others suggests that this function may not operate as advertised, and there may be a need for more manual matching of trips. This may limit the requested trips delivered, particularly with the long deadheading distance between the Argyle Mall terminal and Innovation Park.

If this option is selected, it is recommended that a simulation be completed prior to moving forward to better understand the potential number of trips accommodated. If the technology provider is not able to group departure times, a flex-route model may be more suitable.

## *5.2* Service Design Option #2 – Innovation Park and Route 37 On Demand

This option converts Route 37 to an On Demand service and combines it with the On Demand service to Innovation Park. There is no change to existing routing for Route 30. Similar to Option #1, the service would operate from Argyle Mall terminal to allow passengers to connect to other fixed-route service. **Figure 2** illustrates the potential On Demand service area.

**Figure 2: Service Design Option #2 – Innovation Park / Route 37 On Demand Service Area**




Route 37 currently takes 30 minutes for a round-trip, including layover. The addition of Innovation Park to this route would add approximately 15 minutes to the round trip travel time. Therefore, the total roundtrip travel time to/from Innovation Park, including through the Route 37 service area was estimated to take 45 minutes, depending on the number of boardings and alightings that occur on each trip.

Hours of services and headway for Route 37 was used as a starting point to determine service hours and vehicle requirements.

Potential demand for transit service for the On Demand service area (Route 37 and Innovation Park) was combined and is illustrated in **Table 4** below. This is illustrated for weekdays only, reflecting the existing service on Route 37 and demand for service to Innovation Park (see Service Design Option #1).

**Table 4: Potential Demand to Innovation Park / Route 37**

| Start time | Route 37 Area | | | Innovation Park Area | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|
| | To Work | To Home | Total | To Work | To Home | Total | To Work | To Home | Total |
| 0:00 | N/A | N/A | N/A | 1 | 1 | 2 | 1 | 1 | 2 |
| 1:00 | N/A | N/A | N/A | 1 | 2 | 3 | 1 | 2 | 3 |
| 2:00 | N/A | N/A | N/A | 0 | 1 | 1 | 0 | 1 | 1 |
| 3:00 | N/A | N/A | N/A | 2 | 0 | 2 | 2 | 0 | 2 |
| 4:00 | N/A | N/A | N/A | 0 | 2 | 2 | 0 | 2 | 2 |
| 5:00 | N/A | N/A | N/A | 3 | 1 | 4 | 3 | 1 | 4 |
| 6:00 | 10 | 0 | 10 | 6 | 1 | 7 | 16 | 1 | 17 |
| 7:00 | 27 | 2 | 29 | 8 | 7 | 15 | 35 | 9 | 44 |
| 8:00 | 8 | 1 | 9 | 4 | 1 | 5 | 12 | 2 | 14 |
| 9:00 | N/A | N/A | N/A | 3 | 1 | 4 | 3 | 1 | 4 |
| 10:00 | N/A | N/A | N/A | 0 | 0 | 0 | 0 | 0 | 0 |
| 11:00 | N/A | N/A | N/A | 1 | 0 | 1 | 1 | 0 | 1 |
| 12:00 | N/A | N/A | N/A | 0 | 1 | 1 | 0 | 1 | 1 |
| 13:00 | N/A | N/A | N/A | 3 | 2 | 5 | 3 | 2 | 5 |
| 14:00 | N/A | N/A | N/A | 4 | 4 | 8 | 4 | 4 | 8 |
| 15:00 | 11 | 8 | 19 | 3 | 8 | 11 | 14 | 16 | 30 |
| 16:00 | 11 | 12 | 23 | 1 | 3 | 4 | 12 | 15 | 27 |
| 17:00 | 5 | 5 | 10 | 1 | 3 | 4 | 1 | 3 | 4 |
| 18:00 | N/A | N/A | N/A | 0 | 3 | 3 | 0 | 3 | 3 |
| 19:00 | N/A | N/A | N/A | 2 | 2 | 4 | 2 | 2 | 4 |
| 20:00 | N/A | N/A | N/A | 0 | 1 | 1 | 0 | 1 | 1 |
| 21:00 | N/A | N/A | N/A | 2 | 1 | 3 | 2 | 1 | 3 |
| 22:00 | N/A | N/A | N/A | 0 | 2 | 2 | 0 | 2 | 2 |
| 23:00 | N/A | N/A | N/A | 3 | 6 | 9 | 3 | 6 | 9 |

As illustrated above, ridership on Route 37 occurs around the same time as the demand for service to Innovation Park. The exception is that the demand around Innovation Park starts slightly earlier (after 1:00 p.m.) than the start of the afternoon peak Route 37 service.

Based on the above, it is recommended that the combined service operate on weekdays only between 6:45 a.m., ending in Innovation Park at approximately 8:22 a.m. in the mornings. In the afternoon, the service would start at 1:30 p.m. due to the demand at Innovation Park. This would provide an extra two hours of service through the Route 37 service area at minimal cost. The service would end at approximately 5:15 p.m., replicating Route 37. An extra hour and 30 minutes of service would be added

to the evening period from 10:00 p.m. to 11:30 p.m., adding another hour of service through the Route 37 service area at minimal cost. A draft schedule is illustrated in **Table 5** using two buses to operate the On Demand service. As noted in Option #1, this schedule was created for comparative purposes with other options below to determine hours of service and vehicle requirements, and should not reflect exact departure times to/from Argyle Mall.

**Table 5: Option #2 - Potential On Demand Departure Times from Argyle Mall Terminal**

| Bus # | Argyle Mall | Innovation Park | Argyle Mall | Travel Time | Headway | Total Veh Hours |
|---|---|---|---|---|---|---|
| **AM Peak Period** | | | | | | |
| 1 | **6:45** | 7:07 | 7:30 | 0:45 | 0:30 | 0:45 |
| 2 | **7:15** | 7:37 | 8:00 | 0:45 | 0:30 | 1:30 |
| 1 | 7:30 | 7:52 | **8:15** | 0:45 | 0:30 | 2:15 |
| 2 | 8:00 | **8:22** | | 0:22 | 0:30 | 2:37 |
| **PM Peak Period** | | | | | | |
| 1 | **1:30** | 1:52 | 2:15 | 0:45 | 0:45 | 3:22 |
| 1 | 2:15 | 2:37 | 3:00 | 0:45 | 0:45 | 4:07 |
| 1 | 3:00 | 3:22 | 3:45 | 0:45 | 0:30 | 4:52 |
| 2 | **3:30** | 3:52 | 4:15 | 0:45 | 0:30 | 5:37 |
| 1 | 3:45 | 4:07 | 4:30 | 0:45 | 0:30 | 6:22 |
| 2 | 4:15 | 4:37 | **5:00** | 0:45 | 0:30 | 7:07 |
| 1 | 4:30 | 4:52 | **5:15** | 0:45 | 0:30 | 7:52 |
| **Evening Period** | | | | | | |
| 1 | **10:00** | 10:22 | 10:45 | 0:45 | 0:45 | 8:37 |
| 1 | 10:45 | 11:07 | **11:30** | 0:45 | 0:45 | 9:22 |

Based on the above, it is anticipated that two vehicles are required to provide the service, operating approximately 9.38 hours daily. If Route 37 were removed from service (approximately 3.75 daily hours), the net increase for this option would be 1 bus and 5.63 hours of service.

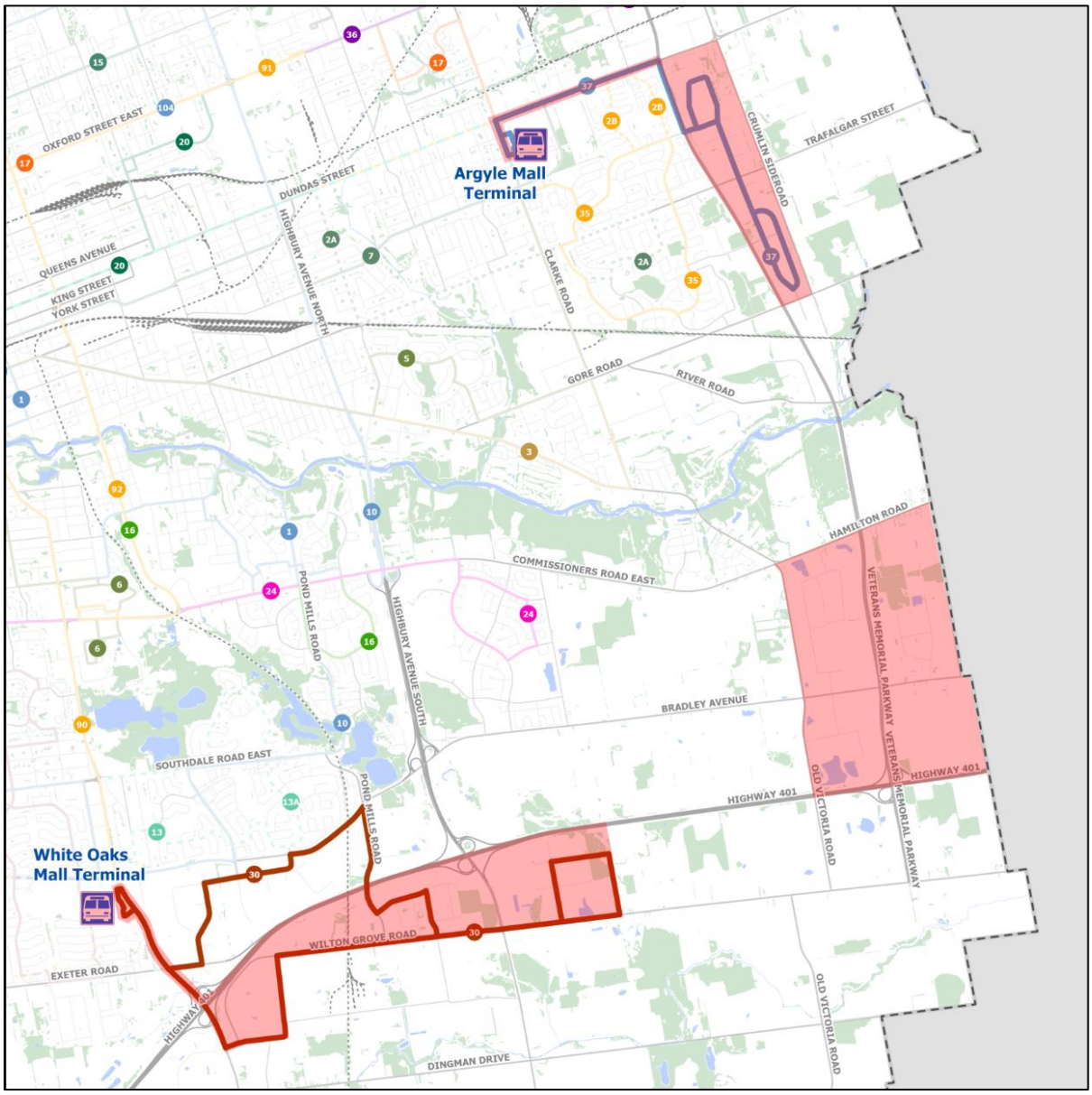
The On Demand service, as described above, is forecasted to carry 16.4 boardings per revenue vehicle hour (based on pre-pandemic ridership). This level of utilization is at the upper limit of an On Demand service. If ridership continues to recover from the COVID-19 pandemic and new employers are added to Innovation Park, consideration should be made to adding a third vehicle to operate the service during peak periods. This will help reduce passenger wait time and increase the percentage of trips accommodated.

As noted in Service Design Option #1, a reservation-based scheduled service, where the On Demand service would include scheduled departure times from a fixed point (e.g. Argyle Mall), with all other stops based on passenger demand, would be the most effective for this option given the long deadheading and high ridership during peak periods.

## *5.3* Service Design Option #3 – Innovation Park and Route 30 / Route 37 On Demand Service

This option converts Route 30 and Route 37 to an On Demand service and combines it with the On Demand service to Innovation Park. In this option, service would operate both out of the Argyle Mall and White Oaks Mall terminals. This provides a significant advantage since it has the potential to shorten travel time to employment opportunities in Innovation Park and the employment areas serviced by Routes 30 and 37 be connecting the service to two major hubs in the City. **Figure 3** below illustrates the On Demand service area.

**Figure 3: Service Design Option #3 –Innovation Park and Route 30 / Route 37 On Demand Service Area**



There are two challenges with converting Route 30 to an On Demand service combined with the Innovation Park/Route 37 area.

**1. Defining the Service Area**

The first is that the route operates as a clockwise-direction one-way loop, with the north and south side of the service area separated by Highway 401. Passengers on the northwest side of the loop have a very short travel time to their destination, but have to travel the entire length of the loop on the return trip. Conversely, passengers on the southwest side of the loop have a long travel time to their destination, and a short trip to the White Oaks terminal.

Adding this service area to the Innovation Park / Route 37 On Demand service would increase the travel time for certain customers if pick-up and/or drop-off requests were accepted along both sides of Highway 401. This would be seen as a reduction in the level of service unless additional vehicles were added to the service.

Automatic Passenger Count (APC) data from Route 30 was further explored to assess the demand along the route. The purpose of this would be to identify the potential impact of only converting the portion of the route south of Highway 401 as part of the On Demand service, and allowing passengers north of Highway 401 to use other routes in the network to access destinations previously serviced by Route 30.

Ridership was split into three categories:

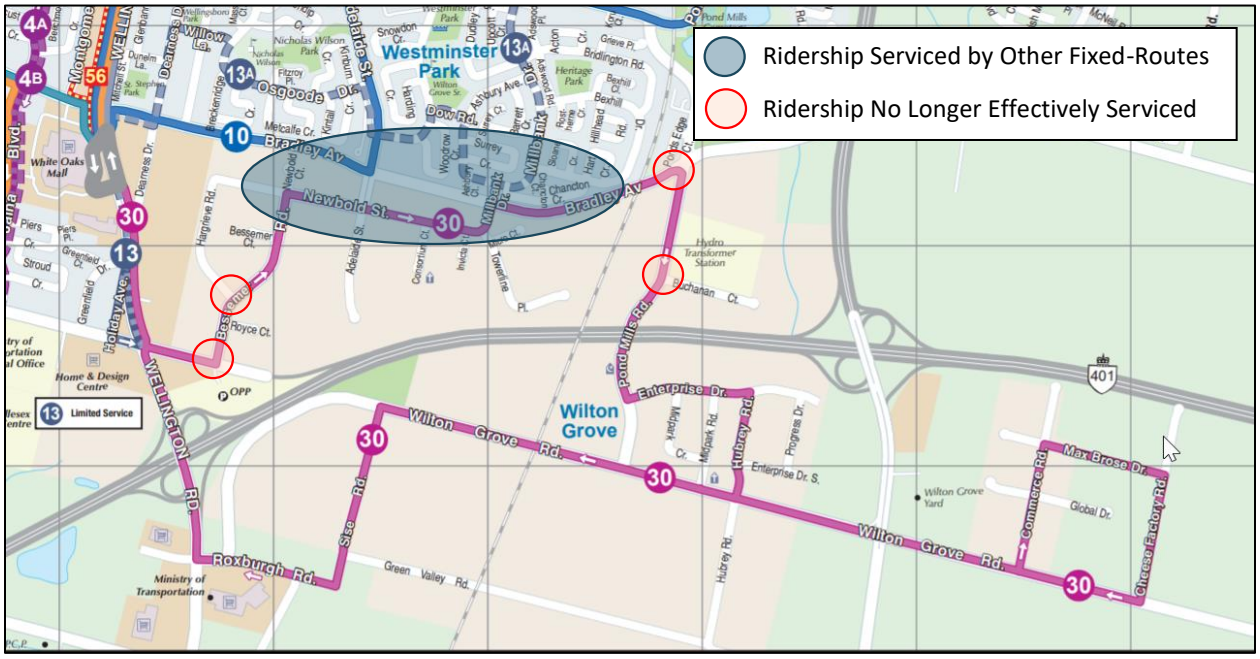
- **Ridership Serviced by On Demand**. This represents any boardings and alightings from Route 30 on Wellington Road and south of Highway 401
- **Ridership Serviced by Other Fixed-Routes**. Route 10 and Route 13A are within close proximity to stops on Newbold Street and Bradley Avenue.
- **Ridership No Longer Effectively Serviced**: Stops on Bessemer Road between Hargrieve Road and Bessemer Court and on Pond Mills Road at Buchanon Court would be just outside a reasonable walking distance, and passengers would receive a reduction in service.

**Table 6** illustrates the potential passenger impact of eliminating Route 30 and only replacing the White Oaks Mall connection and portion south of Highway 401 with an On Demand service.

**Table 6: Average Daily Passenger Boardings by Stop on Route 30**

| Ridership Category | February 2020 | | February 2021 | |
|---|---|---|---|---|
| | Daily | % | Daily | % |
| Ridership Serviced by On Demand | 237 | 93% | 125 | 91% |
| Ridership Serviced by Other Fixed-Routes | 11 | 4% | 8 | 6% |
| Ridership No Longer Effectively Serviced | 8 | 3% | 4 | 3% |
| **Total** | **256** | **100%** | **137** | **100%** |

**Figure 4: Route 30 Ridership (Stop Activity)**




As illustrated above, only 3% of trips would no longer be effectively serviced by transit if the northern portion of Route 30 was not replaced with an On Demand service. This represents approximately 4 daily passengers (assuming they take transit in both directions) prior to the COVID-19 pandemic and 2 daily passengers during the COVID-19 pandemic.

Based on the above analysis, it is recommended that the On Demand area for this service option only include Wellington Road south of White Oaks Mall and the portion of Route 30 south of Highway 401.

Route 30 currently takes 40 minutes for a round-trip, including layover. The addition of Innovation Park and the connection to Argyle Mall (through the existing Route 37 service area) is anticipated to increase

the round trip travel time to 1.5 hours, depending on the number of boardings and alightings that occur on each trip.

**2. Growth in Ridership**

The second challenge with this option is that ridership on Route 30 is anticipated to increase with the expansion of Maple Leaf Foods, which will add 1,600 employees. Ridership on the route is already high in pre-pandemic time (27.5 boardings / revenue vehicle hour). This type of ridership if more effective with a fixed-route service, and adding further ridership may result in the On Demand service not being able to guarantee trip requests without adding significant vehicles to the service. As a result, an extra bus was added to the On Demand service, focused on peak periods and in the Route 30 employment area.

Potential demand for transit service for the On Demand service area (Route 30, Route 37 and Innovation Park) was combined and is illustrated in **Table 7** below. This is illustrated for weekdays only, reflecting the existing service on Routes 30 and 37 and demand for service to Innovation Park (see Service Design Option #1).

**Table 7: Potential Demand to Innovation Park / Route 30 / Route 37**

| Start Time | Route 30 Area | | | Route 37 Area | | | Innovation Park Area | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | To Work | To Home | Total | To Work | To Home | Total | To Work | To Home | Total | To Work | To Home | Total |
| 0:00 | N/A | N/A | N/A | N/A | N/A | N/A | 1 | 1 | 2 | 1 | 1 | 2 |
| 1:00 | N/A | N/A | N/A | N/A | N/A | N/A | 1 | 2 | 3 | 1 | 2 | 3 |
| 2:00 | N/A | N/A | N/A | N/A | N/A | N/A | 0 | 1 | 1 | 0 | 1 | 1 |
| 3:00 | N/A | N/A | N/A | N/A | N/A | N/A | 2 | 0 | 2 | 2 | 0 | 2 |
| 4:00 | N/A | N/A | N/A | N/A | N/A | N/A | 0 | 2 | 2 | 0 | 2 | 2 |
| 5:00 | N/A | N/A | N/A | N/A | N/A | N/A | 3 | 1 | 4 | 3 | 1 | 4 |
| 6:00 | 24 | 2 | 26 | 10 | 0 | 10 | 6 | 1 | 7 | 40 | 3 | 43 |
| 7:00 | 59 | 6 | 65 | 27 | 2 | 29 | 8 | 7 | 15 | 94 | 15 | 109 |
| 8:00 | 19 | 1 | 20 | 8 | 1 | 9 | 4 | 1 | 5 | 31 | 3 | 34 |
| 9:00 | 12 | 1 | 13 | N/A | N/A | N/A | 3 | 1 | 4 | 15 | 2 | 17 |
| 10:00 | 7 | 3 | 10 | N/A | N/A | N/A | 0 | 0 | 0 | 7 | 3 | 10 |
| 11:00 | N/A | N/A | N/A | N/A | N/A | N/A | 1 | 0 | 1 | 1 | 0 | 1 |
| 12:00 | N/A | N/A | N/A | N/A | N/A | N/A | 0 | 1 | 1 | 0 | 1 | 1 |
| 13:00 | N/A | N/A | N/A | N/A | N/A | N/A | 3 | 2 | 5 | 3 | 2 | 5 |
| 14:00 | 18 | 4 | 22 | N/A | N/A | N/A | 4 | 4 | 8 | 22 | 8 | 30 |
| 15:00 | 17 | 12 | 29 | 11 | 8 | 19 | 3 | 8 | 11 | 31 | 28 | 59 |
| 16:00 | 18 | 17 | 35 | 11 | 12 | 23 | 1 | 3 | 4 | 30 | 32 | 62 |
| 17:00 | 17 | 7 | 24 | 5 | 5 | 10 | 1 | 3 | 4 | 18 | 10 | 28 |
| 18:00 | 4 | 9 | 13 | N/A | N/A | N/A | 0 | 3 | 3 | 4 | 12 | 16 |
| 19:00 | N/A | N/A | N/A | N/A | N/A | N/A | 2 | 2 | 4 | 2 | 2 | 4 |
| 20:00 | N/A | N/A | N/A | N/A | N/A | N/A | 0 | 1 | 1 | 0 | 1 | 1 |
| 21:00 | N/A | N/A | N/A | N/A | N/A | N/A | 2 | 1 | 3 | 2 | 1 | 3 |
| 22:00 | 8 | 2 | 10 | N/A | N/A | N/A | 0 | 2 | 2 | 8 | 4 | 12 |
| 23:00 | 3 | 2 | 5 | N/A | N/A | N/A | 3 | 6 | 9 | 6 | 8 | 14 |

As illustrated above, ridership on Route 30 occurs around the same time as the demand for service to Innovation Park. The exception is that the demand around Innovation Park starts slightly earlier (after 1:00 p.m.) than the start of the afternoon peak Route 30 and Route 37 service. The morning service on Route 30 also ends later than on Route 37 (11:00 a.m.). On Demand service was extended to this time for the Route 30 area only for comparative purposes.

Service on Route 30 also ends later than Route 37 and for the proposed service to Innovation Park in Option #1. For comparative purposes, the On Demand service for the entire area would only operate to approximately 5:15 p.m. (similar to Option #2) and extend until 7:00 p.m. in the Route 30 area (to reflect existing Route 30 service hours). One and a half hours of service was also provided in the evening to reflect the pre-pandemic service level of Route 30.

Hours of service and vehicles required to maintain the same headway and hours of service as Route 30 and 37 were calculated, adding the potential demand to/from Innovation Park as illustrated in **Table 2**.

Based on the above, it is recommended that the combined service operate on weekdays only between 6:30 a.m., ending mid-route at approximately 11:00 a.m. in the mornings. In the afternoon, the service would start at 1:30 p.m. due to the demand at Innovation Park. This would provide an extra two hours of service through the Route 37 service area and at minimal cost. The afternoon service would end at approximately 7:00 p.m., replicating Route 30. An additional bus was also added during peak periods to account for the higher ridership in the Route 30 area, particularly with the anticipated growth due to the expansion of the Maple Leaf Food Plant. A draft schedule is illustrated in **Table 8**.

With the exception of the existing bus added to accommodate demand in the Route 30 area, this schedule was created for comparative purposes with other options above and should be adjusted to better fit demand in consultation with the On Demand technology provider selected to provide the On Demand service.

Based on the above, it is anticipated that a minimum of four vehicles are required to provide the service, operating approximately 26.7 hours daily. If Route 37 and Route 30 were removed from service (approximately 3.75 and 9.33 daily hours respectively), the net increase for this option to provide service to Innovation Park would be 2 buses and 13.58 hours of service.

It should be noted that the service is anticipated to carry 16.1 boardings per revenue vehicle hour, which is at the upper limit for an On Demand service. Four buses may be suitable as an initial pilot with lower ridership due to the COVID-19 pandemic, however, as the ridership begins to rebound and the Maple Leaf Foods Plant expansion is completed, there may be a need for a fifth bus during peak periods.

**Table 8: Option #3 - Potential On Demand Departure Times from White Oaks and Argyle Mall Terminals**

| Bus # | White Oaks | Innovation Park | Argyle Mall | Innovation Park | White Oaks | Travel Time | Headway (White Oaks) | Headway (Argyle) | Total Vehicle Hours |
|---|---|---|---|---|---|---|---|---|---|
| **AM Peak Period** | | | | | | | | | |
| 1 | | | **6:50** | 7:12 | 7:35 | 0:45 | | | 0:45 |
| 2 | **6:30** | 6:52 | 7:15 | 7:37 | 8:00 | 1:30 | | 0:25 | 2:15 |
| 3 | **6:50** | 7:12 | 7:35 | 7:57 | 8:20 | 1:30 | 0:20 | 0:20 | 3:45 |
| 4 | **7:10** | 7:32 | 7:55 | 8:17 | 8:40 | 1:30 | 0:20 | 0:20 | 5:15 |
| 1 | 7:35 | 7:57 | 8:20 | 8:42 | **9:05** | 1:30 | 0:25 | 0:25 | 6:45 |
| 2 | 8:00 | 8:25 | | | 8:50 | 0:50 | 0:25 | | 7:35 |
| 3 | 8:20 | | | | 9:00 | 0:40 | 0:20 | | 8:15 |
| 4 | 8:40 | | | | 9:20 | 0:40 | 0:20 | | 8:55 |
| 3 | 9:00 | | | | 9:40 | 0:40 | 0:20 | | 9:35 |
| 4 | 9:20 | | | | **10:00** | 0:40 | 0:20 | | 10:15 |
| 3 | 9:40 | | | | 10:20 | 0:40 | 0:40 | | 10:55 |
| 3 | 10:20 | | | | **11:00** | 0:40 | 1:00 | | 11:35 |
| **PM Peak Period** | | | | | | | | | |
| 1 | | | | **2:00** | 2:30 | 0:30 | | | 12:05 |
| 1 | 2:30 | 2:52 | 3:15 | 3:37 | 4:00 | 1:30 | | | 13:35 |
| 2 | **3:05** | 3:27 | 3:50 | 4:12 | 4:35 | 1:30 | 0:35 | 0:35 | 15:05 |
| 3 | **3:25** | 3:47 | 4:10 | 4:32 | 4:55 | 1:30 | 0:20 | 0:20 | 16:35 |
| 4 | **3:45** | 4:07 | 4:30 | 4:52 | 5:15 | 1:30 | 0:20 | 0:20 | 18:05 |
| 1 | 4:00 | 4:22 | 4:45 | 5:07 | 5:30 | 1:30 | 0:15 | 0:15 | 19:35 |
| 2 | 4:35 | 4:57 | **5:20** | | | 0:45 | 0:35 | 0:35 | 20:20 |
| 3 | 4:55 | 5:20 | | | 5:45 | 0:50 | 0:20 | | 21:10 |
| 4 | 5:15 | | | | **5:55** | 0:40 | 0:20 | | 21:50 |
| 1 | 5:30 | | | | 6:10 | 0:40 | 0:15 | | 22:30 |
| 3 | 5:45 | | | | 6:25 | 0:40 | 0:15 | | 23:10 |
| 1 | 6:10 | | | | **6:50** | 0:40 | 0:25 | | 23:50 |
| 3 | 6:25 | | | | **6:55** | 0:30 | 0:15 | | 24:20 |
| **Evening Period** | | | | | | | | | |
| 1 | **9:40** | 10:02 | 10:25 | 11:10 | 11:55 | 1:30 | | | 25:50 |
| 1 | 10:20 | 10:45 | | | **11:10** | 0:50 | | | 26:40 |

## *5.4* Evaluation of Service Design Options

The advantages and disadvantages of the three service design options were evaluated against the relevant guiding principles identified by London Transit (three checkmarks are options that are most aligned while one checkmark represent options that are least aligned). This is illustrated in **Table 9**.

**Table 9: Evaluation of Service Design Options**

| Guiding Principle | Service Design Option 1 | Service Design Option 2 | Service Design Option 3 |
|---|---|---|---|
| **Customer Service** | | | |
| **Reliability:** On-time performance and available to accommodate customer's trips | Low ridership per hour should increase trips accommodated, however, long distance trips may reduce demand-responsive nature of service. ✓✓ | B/RVH on the high side of an On Demand service. However, second vehicle and linear nature of service area result in more trips being accommodated. ✓✓ | High B/RVH plus two terminal connections may reduce trips accommodated. ✓ |
| **Integration:** Provide connection to transit hubs and/or high frequency stops, timed to minimize customer waiting time | One vehicle limits connection opportunities. ✓ | Two vehicles increases connection opportunities. ✓✓ | Four vehicles increases connection opportunities. ✓✓✓ |
| **Convenience:** Emphasize customer convenience when planning, booking, travelling and transferring to/from fixed-route services | Customers can only access one terminal, increasing overall travel time. No increase in service levels to fixed-route. ✓ | Customers can only access one terminal, increasing overall travel time. Increase in frequency and service hours on Route 37. ✓✓ | Customers can access service through two terminals; Most frequent service and increase in service hours on Route 37. ✓✓✓ |
| **Operations** | | | |
| **Financial Sustainability:** Operate within cost-recovery targets noted in LTC's service guidelines | Lowest Vehicle Hour Requirements (18.8 daily hours). 3+ buses required for all service areas.* ✓✓✓ | Lowest Vehicle Hour Requirements (18.7 daily hours). 3+ buses required for all service areas.* ✓✓✓ | Highest Vehicle Hour Requirements (26.7 daily hours). 4+ buses required for all service areas.* ✓ |

** Assume operation by 40-foot buses*

# *6.0* On Demand Operating Model

There are three operating models that are typically used to deliver On Demand transit services:

1. Operated by conventional transit operators using existing fleet (LTC);
2. Contracted to a dedicated private operator; and
3. Contracted out to either a dedicated or non-dedicated operator.

## *6.1* Operating Model #1 - Operated by Conventional Transit Operators

In this model, LTC would operate the service using their existing buses and operators. LTC drivers would be paid based on the hours of operation under the terms of the existing collective agreement as they would when providing any other fixed-route services. Operating Model #2 - Contracted Dedicated Service

In this model, London Transit would contract the On Demand service to a private operator that can operate this service with accessible vehicles, based on an hourly cost model. The operator would charge LTC an hourly rate determined in the contract and supply its own vehicles. For this option, it is assumed that the operator would use smaller vehicles and operate at a lower cost per hour, which could lead to lower operating costs.

## *6.2* Operating Model #3 - Contracted Non-Dedicated Service

In this model, LTC would contract the supply of vehicles and drivers to a third-party non-dedicated operator, such as a local taxi provider or a ridesharing service (e.g. Uber, Lyft).

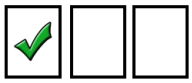
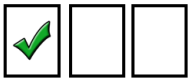
Non-dedicated contractors are typically compensated for each trip delivered based on a pre-established rate. This model is useful if demand for a service in a particular area is too low to warrant a dedicated vehicle, and if there is a supply of drivers to guarantee a trip request is delivered. For ridesharing services, citizens with their own automobiles set their own schedules and provide rides to other citizens. They have the opportunity to accept or decline a ride request. Therefore, to ensure availability of vehicles at a high level of service, pricing strategies are typically in place to ensure supply meets demand. Since this model is based on a cost-per-trip, it can be difficult to set budgets and control costs if demand grows. The level of ridesharing is also lower, which can add to costs and increase GHG emissions from vehicles when ridership demand is high.

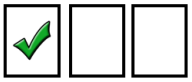
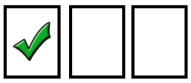
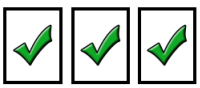
## *6.3* Evaluation of Operating Models

The advantages and disadvantages of the three operating models noted above were evaluated against relevant guiding principles identified by London Transit (three checkmarks are options that are most aligned while one checkmark representing options that are least aligned). This is illustrated in **Table 10**.

**Table 10: Evaluation of Operating Models**

| Guiding Principle | Operating Model 1: Conventional Service | Operating Model 2: Dedicated Contractor | Operating Model 3: Non-Dedicated Contractor |
|---|---|---|---|
| **Customer Service** | | | |
| **Safety and Security:** Drivers to have criminal background checks; vehicles have clearly identifiable LTC brand. | Service provided by LTC drivers and vehicles, all of which meet LTC safety and Security standards. All vehicles equipped with security cameras.  | Driver background checks can be specified in the contract and dedicated vehicles can be branded so customer knows they are boarding the right service. Security cameras can be included as a requirement of the contract.  | LTC could specify all vehicles pass minimum background and training requirements, but may not be the same as dedicated service (particularly with ride hailing services). Vehicles do not have an LTC brand, which may lead to uncertainty among passengers on whether they are boarding the right vehicle. Vehicle do not have security cameras.  |
| **Accessibility:** An accessible trip must be made available. | All LTC vehicles are fully accessible. Large 40-foot buses may not be able to travel down certain streets should a drop-off at a curb be requested.  | A requirement can be made to use smaller accessible buses. Smaller buses can better accommodate requests for drop-off at an accessible curb on narrow streets for a registered specialized transit customer.  | Only a small portion of the fleet is accessible, which may limit options for persons with disabilities. Smaller vehicles can better accommodate requests for drop-off at an accessible curb on narrow streets for a registered specialized transit customer.  |

| Guiding Principle | Operating Model 1: Conventional Service | Operating Model 2: Dedicated Contractor | Operating Model 3: Non-Dedicated Contractor |
|---|---|---|---|
| **Reliability:** On-time performance and available to accommodate customer's trips. | Larger more expensive buses would reduce the number of vehicles in service, decreasing trip accommodation and reliability.  | Could contract smaller vehicles at lower rate, which could result in more vehicles in service. On Demand service is the most reliable when there are a greater number of smaller vehicles instead of fewer larger vehicles.  | If there is no restriction on vehicles in service, reliability will be high. If taxi industry or ride hailing does not have sufficient vehicles in service at the time of the trip request, reliability could be low as drivers prioritize other more profitable trips.  |
| **Integration:** Provide connection to transit hubs and/or high frequency stops, timed to minimize customer waiting time. | All vehicles have registered fare boxes, which makes fare payment and transfers easy.  | Dedicated vehicles can be equipped with registered fare boxes, which makes fare payment and transfers easy.  | No ability to integrate fares with the Smart Card system as vehicles do not have Smart Card readers. There may be a need to find a solution to equip most of the entire non-dedicated fleet, which would be costly.  |
| **Convenience:** Emphasize customer convenience when planning, booking, travelling and transferring to/from fixed-route services. | Less frequency results in longer waiting time.  | Use of smaller vehicles at lower hourly rate could result in more vehicles in service, reducing waiting time.  | If there is no restriction on vehicles in service, waiting time will be reduced. If taxi industry or ride hailing does not have sufficient vehicles in service at the time of the trip request, waiting time may be higher.  |

| Guiding Principle | Operating Model 1: Conventional Service | Operating Model 2: Dedicated Contractor | Operating Model 3: Non-Dedicated Contractor |
|---|---|---|---|
| **Sustainability** | | | |
| **Congestion Reduction:** Minimize non-revenue vehicle time. | Highest potential for ridesharing may reduce non-revenue vehicle time.  | Smaller buses reduces vehicle capacity and potential for ridesharing, which may increase non-revenue vehicle time.  | Smaller vehicles have the lowest potential for ridesharing, which may increase non-revenue vehicle time.  |
| **Scalability and Adaptability:** Ability to accommodate future needs. | Limited ability to adjust service levels to match demand outside of board periods.  | Greater flexibility to adjust to service levels to match demand.  | Service can be adjusted in real-time to match demand.  |
| **Operations** | | | |
| **Financial Sustainability:** Operate within cost-recovery targets noted in LTC's service guidelines. | Hourly costs are typically higher than other models. Large 40-foot buses have a higher capital cost.  | Hourly costs are typically lower than in-house service. Smaller vehicles have a lower capital cost and can be included as part of the contract (reducing capital requirements).  | Per trip rate cost can be expensive with long travel distances to Innovation Park. Costs would be high when demand is high, and low when demand is low. No capital cost for vehicles.  |
| **NEW: Ease of Implementation:** Ability to implement service within a short time frame. | Easy to implement. Requires no change to vehicles.  | Requires RFP for a service operator.  | Requires RFP for a service operator.  |

# *7.0* Cost Implications

There is variability in the anticipated cost of the service, depending on the Service Design Option (**Section 5.0**) and the Operating Model (**Section 6.0**). In addition to operating costs, certain options would also have capital costs associated with the acquisition of vehicles and technology.

The following table summarizes assumptions that went into the calculation of capital and operating costs.

**Table 11: Capital and Operating Cost Assumptions**

| Assumptions | Operating Model 1: Conventional Transit | Operating Model 2: Contracted Dedicated Service | Operating Model 3: Contracted Non-Dedicated Service |
|---|---|---|---|
| **CAPITAL ASSUMPTIONS** | | | |
| Vehicle Type Used | 40-foot Bus | Accessible Vehicle | Sedan |
| Vehicle Passenger Capacity | 50 | 12 | 2 |
| Capital Cost per Vehicle | $600,000 | $225,000 | N/A |
| Vehicle Amortization (Years) | 12 years | 5-7 years | N/A |
| Accessible | Yes | Yes | No |
| Install New Fareboxes | Already in Vehicle | $15,000 | N/A |
| Portable Smart Card Readers | Already in Vehicle | $2,500 | $2,500 |
| Security Cameras (per unit) | Already in Vehicle | $4,000 | N/A |
| Onboard Tablet, Mount and Charger (per vehicle) | $1,000 | $1,000 | N/A (use mobile phone) |
| **OPERATING ASSUMPTIONS** | | | |
| Operating Cost | $109/hour | $80/hour | $17.6/trip |
| Software License Costs | $1,000 per vehicle per month | $1,000 per vehicle per month | $1,000 per vehicle per month |

For dedicated contracted services (Operating Model 2), an $80 hourly rate was assumed. Other contracted On Demand systems reviewed operate at an hourly cost between $40 and $85, depending

on the length of the contract, the market and the type of vehicle operated. Under this operating model, it was assumed that the operator would purchase the vehicle and include it in the contract.

For the non-dedicated contract (Operating Model 3), a cost per trip of $22 based on a typical taxi/ride hailing trip rate was assumed, and discounted by 20% to account for ridesharing.

A tablet was assumed to be required for each dedicated vehicle (Operating Model 1 and 2). Each tablet would need to be mounted and include a charger plugged into the vehicle. The cost of this was assumed to be $1,000 for each in service vehicle. One spare was also included in each scenario.

For non-dedicated vehicles (Operating Model 3), it was assumed the driver would be able to mount a smartphone and use the app for in-vehicle directions.

The cost of the On Demand Technology provider varies by provider. This can range anywhere from $700 to $1,500 per month, per vehicle, plus a one-time upfront set-up cost, which can range from $20,000 to $30,000. For the purposes of this report, $1,000 per month, per vehicle was assumed, plus a one-time set-up fee of $20,000.

Using the above assumptions, the ridership projections, boarding per hour, vehicle requirements and operating / capital costs for each Operating Model was calculated, by Service Design Option. This is illustrated in **Table 12.**

**It should be noted that Table 12 also includes existing costs for Route 30 and 37 to allow for a fulsome comparison of each of the Service Design Options and Operating Models. These are not considered new costs and should not be treated as such. Table 13 below illustrates the net new cost for each Service Design Option and Operating Model.**

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**Table 12: Ridership, Service Hour and Operating Cost Breakdown of Service Design Options and Operating Models**

| Service Options | Daily Riders | Operating Model 1: London Transit | | | | | Operating Model 2: Dedicated Contracted Service | | | | | Operating Model 3: Non-Dedicated Contract Service | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Bus | Daily Service Hours | B/ RVH | Annual Op Cost | $/ Pass | Bus | Daily Service Hours | B/ RVH | Annual Op Cost | $/ Pass | Annual Op Cost | $/ Pass |
| **Service Design Option 1: Innovation Park On Demand - Route 30 / 37 Fixed-Route** | | | | | | | | | | | | | |
| Innovation Park | 54 | 1 | 5.8 | 9.4 | $158,100 | $11.6 | 1 | 5.8 | 9.4 | $115,900 | $8.5 | $239,500 | $17.6 |
| Route 37* | 100 | 1 | 3.8 | 26.7 | $103,100 | $4.1 | 1 | 3.8 | 26.7 | $103,100 | $4.1 | $103,100 | $4.1 |
| Route 30* | 257 | 1 | 9.3 | 27.5 | $256,600 | $4.0 | 1 | 9.3 | 27.5 | $256,600 | $4.0 | $256,600 | $4.0 |
| **Total** | **411** | **3** | **18.8** | **21.8** | **$517,800** | **$5.0** | **3** | **17.4** | **23.6** | **$475,600** | **$4.6** | **$599,200** | **$5.8** |
| **Service Design Option 2: Innovation Park / 37 On Demand - Route 30 Fixed-Route** | | | | | | | | | | | | | |
| Innovation Park/37 | 154 | 2 | 9.4 | 16.4 | $257,700 | $6.6 | 3 | 12.0 | 12.9 | $241,600 | $6.2 | $683,000 | $17.6 |
| Route 30* | 257 | 1 | 9.3 | 27.5 | $256,600 | $4.0 | 1 | 9.3 | 27.5 | $256,600 | $4.0 | $256,600 | $4.0 |
| **Total** | **411** | **3** | **18.7** | **22.0** | **$514,300** | **$5.0** | **4** | **21.3** | **20.7** | $498,200 | **$4.8** | **$939,600** | **$9.1** |
| **Service Design Option 3: Innovation Park / Route 30 / 37 On Demand** | | | | | | | | | | | | | |
| Innovation Park/37/30 | 428 | 4 | 26.7 | 16.1 | $733,000 | $6.8 | 6 | 40.0 | 10.7 | $806,400 | $7.5 | $1,898,300 | $17.6 |

**Note: These represent existing ridership, service hours and costs and are included in this table to allow a full comparison of each of the Service Design Options in the employment areas in southeast London. The net operating cost increases for On Demand services for each option are illustrated in* ***Table 13****.*

As illustrated above, Service Design Option #1 under both dedicated operating models will achieve approximately 9.4 boardings per revenue vehicle hour. This falls within the ridership profile of an On Demand service. Is should be noted that since there is only one vehicle operating a long-distance trip, the service may not be as reliable unless there are scheduled departures from the Argyle Mall terminal, with demand responsive drop-offs and pick-ups in Innovation Park.

Service Design Option #2 is estimated to operate at a utilization of 16.4 boardings per hour using two dedicated buses, and 12.9 with the addition of a third bus. Hourly ridership for both are at the high end of an On Demand service. The third vehicle under the Dedicated Contracted Service (Operating Model 2), would be beneficial to improve reliability and increase the number of trips accommodated.

Service Design Option #3 is estimated to operate at a utilization of 16.1 boardings per hour using four vehicles, and 10.7 boardings per hour with the addition of two additional buses. Similar to Service Design Option #2, hourly ridership per vehicle is on the upper threshold for an On Demand service if operated using for vehicles (Operating Model 1). Adding additional vehicles would help improve the reliability of this service option.

**Table 13** below calculates full operating and capital costs for each Service Design Option and each Operating Model, including implementation costs as described in **Section 8.0**

**Table 13: Estimated Capital and Operating Costs by Service Design Option and Operating Model**

| | Operating Model 1: London Transit | Operating Model 2: Dedicated Contract | Operating Model 3: Non-Dedicated Contract |
|---|---|---|---|
| **Service Design Option 1: Innovation Park On Demand Only / Route 30 / 37 Fixed-Route** | | | |
| Vehicle Requirements | 3 | 3 | 8 |
| On Demand Vehicles | 1 | 1 | 8 |
| Expansion Vehicles | 1 | N/A | N/A |
| Expansion Vehicle Cost | $600,000 | $0 | $0 |
| Install Farebox | $0 | $15,000 | $0 |
| Install Cameras | $0 | $4,000 | $0 |
| Install Tablets | $2,000 | $2,000 | $0 |
| One-time Software Fees | $20,000 | $20,000 | $20,000 |
| **Total Capital Cost** | **$622,000** | **$41,000** | **$20,000** |
| Increase in Operating Cost | $158,100 | $115,900 | $239,500 |
| Software License Fees | $12,000 | $12,000 | $76,800 |
| **Total Incremental Operating Cost** | **$170,100** | **$127,900** | **$316,300** |

| | Operating Model 1: London Transit | Operating Model 2: Dedicated Contract | Operating Model 3: Non-Dedicated Contract |
|---|---|---|---|
| **Service Design Option 2: Innovation Park and Route 37 On Demand – Route 30 Fixed-Route** | | | |
| Vehicle Requirements | 3 | 4 | 10 |
| On Demand Vehicles | 2 | 3 | 10 |
| Expansion Vehicles | 1 | N/A | N/A |
| Expansion Vehicle Cost | $600,000 | $0 | $0 |
| Install Farebox | $0 | $45,000 | $0 |
| Install Cameras | $0 | $12,000 | $0 |
| Install Tablets | $3,000 | $4,000 | $0 |
| One-time Software Fees | $20,000 | $20,000 | $20,000 |
| **Total Capital Cost** | **$623,000** | **$81,000** | **$20,000** |
| Increase in Operating Cost | $154,600 | $138,500 | $579,900 |
| Software License Fees | $24,000 | $36,000 | $96,000 |
| **Total Incremental Operating Cost** | **$178,600** | **$174,500** | **$675,900** |
| **Service Design Option 3: Innovation Park / Route 37 / Route 30 On Demand** | | | |
| Vehicle Requirements | 4 | 6 | 15 |
| On Demand Vehicles | 4 | 6 | 15 |
| Expansion Vehicles | 2 | N/A | N/A |
| Expansion Vehicle Cost | $1,200,000 | N/A | $0 |
| Install Farebox | $0 | $90,000 | $0 |
| Install Cameras | $0 | $24,000 | $0 |
| Install Tablets | $5,000 | $7,000 | $0 |
| One-time Software Fees | $20,000 | $20,000 | $20,000 |
| **Total Capital Cost** | **$1,225,000** | **$141,000** | **$20,000** |
| Increase in Operating Cost | $373,300 | $446,700 | $1,538,600 |
| Software License Fees | $48,000 | $72,000 | $144,000 |
| **Total Incremental Operating Cost** | **$421,300** | **$518,700** | **$1,682,600** |

# *8.0* Implementation Plan

The following section presents a detailed plan to implement On Demand services in Innovation Park, with the potential of extending the service to replace Route 37 and/or Route 30. The implementation plan is fairly flexible and describes the steps required under each of the operating scenarios presented in **Section 6.0**. This will allow the LTC to make an informed decision on which operating model and service open to pilot.

For all options, it is recommended that the service is piloted for a minimum of a two year period to allow LTC to learn from the new service model, including how On Demand responds to potential ridership increases with post-COVID-19 pandemic recovery. This will provide some valuable lessons learned for potential expansion of the On Demand transit model to other areas of London.

## *8.1* Vehicle Requirements and Specifications

The following specifications are recommended for On Demand vehicles for operation in Innovation Park.

### 8.1.1 Operating Model 1: Operated by London Transit

All vehicles should be low-floor, fully accessible vehicles and include a fare box and Smart Card reader and onboard cameras. Existing 40-foot buses should be used for the pilot. Depending on the service's performance, in the long term, London Transit may consider the use of smaller, low-floor accessible 30-foot or cutaway vehicles. Any vehicles used should accommodate at least 12 ambulatory passengers and have space to accommodate two (2) wheelchair positions.

### 8.1.2 Operating Model 2: Contracted, Dedicated Service Provider

Vehicles specified in the contract should all be fully accessible, with a capacity of 12 ambulatory passengers, including two wheelchair positions. Vehicles should not be equipped with seatbelts, as this would require passengers travelling with infants and toddlers to bring a child seat (as required by provincial regulation). Vehicles will also need to be fit up with fare boxes and portable Smart Card readers/validator, to allow customers to pay their fare and ensure seamless integration for those transferring between fixed-route and On Demand services. Security cameras should also be added to each vehicle to enhance the perception of safety for customers.

### 8.1.3 Operating Model 3: Contracted, Non Dedicated Service Provider

Non-dedicated vehicles typically use non-accessible sedans or vans that operate other services in London. Vehicles are typically not branded as an LTC service as they provide service elsewhere. There would be a need for the mobile app to identify the licence plate of the vehicle and/or show a photo ID of

the driver. LTC could also consider a magnetic LTC decal that could be placed on the vehicle when it is being used for LTC service.

Within Innovation Park, it is anticipated that the majority of ridership will be adult ambulatory passengers. If the On Demand service expands to other areas of the City, LTC would also need to ensure accessible options are available and that vehicles can accommodate caregivers travelling with infants and toddlers. There could be a requirement that a contractor have a certain percentage of accessible vehicles in their fleet, or there is enough available capacity on the LTC Specialized Transit service to accommodate an On Demand trip request by a person that uses a mobility aid.

Passengers travelling with infants and toddlers would be required to bring a child seat if the non-dedicated operator is a ride hailing service. Ride hailing vehicles typically do not carry child seats for customers travelling with children, but legislation requires passengers to secure infants and toddlers into child seats. This would reduce the customer experience, as it would require the customer to carry a child seat with them on the full journey, including the transfer onto a fixed-route bus.

Taxi drivers are exempt from Ontario's car seat requirements for children. This, however, may raise some liability concerns with the Commission and the City, as these vehicles are not crash rated at the same standard as 40-foot buses, and being used to carry LTC customers.

Non-dedicated vehicles would also require a means to collect fare payment and validate a Smart Card. Portable Smart Card readers may be required (discussed in more detail in **Section 8.6**).

**Next Steps**

The following next steps should be completed by London Transit staff:

1. Confirm the most appropriate vehicle operator for the On Demand service.
2. If operated by London Transit (Operating Model 1):
    - Make Tablets available for On Demand service operations;
    - Train Operators on how to use the tablet and operate the On Demand service; and
    - Explore the most appropriate fleet size and mix system-wide once the pilot is complete.
3. If operated by a contracted, dedicated service provider (Operating Model 2):
    - Issue and RFP that includes vehicle specifications and select a dedicated service provider;
    - Brand vehicles to be consistent across London Transit Family of Services;
    - Install tablets, farebox, Smart Card reader and security camera on each vehicle.
4. If operated by a contracted, non-dedicated service provider (Operating Model 3):
    - Select one – or multiple- dedicated service provider;

- Identify minimum driver training and vehicle requirements (e.g. age, maintenance schedule, size);
- Identify strategy for Smart Card validation;
- Consider requirement for vehicles/drivers to be identifiable as an LTC contracted service (e.g. through the mobile app or a vehicle magnetic decal); and
- Develop communication strategy about travelling with children.

## *8.2* Terminal Requirements

On Demand vehicles require a location to pick-up and drop-off passengers as well as wait the prescribed amount of time set out in any wait time policy. This location must be at or have direct and accessible access to the fixed-route stop to provide for seamless transfers.

The following table summarizes the recommended terminal/hub for the three On Demand Service Design Options presented in **Section 5.0**, and the available capacity to accommodate this service within the existing layout.

**Table 14: Terminal Location for Recommended On Demand Service Areas**

| Service Design Option | Transfer Location | Bay Requirement and Capacity |
|---|---|---|
| Service Design Option 1: On Demand in Innovation Park Only | Argyle Mall terminal | One additional bay required. There is capacity at the terminal to dedicate a new On Demand service to its own bus bay. |
| Service Design Option 2 – Innovation Park and Route 37 On Demand | Argyle Mall terminal | The On Demand service could use the existing bus bay used by Route 37. No additional bus bays required. |
| Service Design Option 3 – Innovation Park and Route 30 / Route 37 On Demand Service | Argyle Mall and White Oaks Mall terminal | The On Demand service could use the existing bus bay used by Route 37 and Route 30. No additional bus bays required. |

It should be noted that if a non-dedicated contracted service were selected, a more detailed review would need to be undertaken regarding letting sedans and minivans enter both terminals, including potential conflicts with large 40-foot buses.

### 8.2.1 Trip Booking and Dispatching

Unlike fixed-routes, trips will need to be booked ahead of time by passengers to reserve their space. To book a ride, a passenger must download the On Demand mobile app and register for the service. Customers must have a valid credit card or debit card if they want to use the mobile fare payment option.

To book a ride, a passenger will enter their pick-up and drop-off location when they want to travel, similar to ridesharing apps which some customers may already be familiar with. Stops will be coded into the app to identify which stops a customer can travel within the On Demand zone..

The app should also provide an option to identify if a customer:

- Is travelling with more than one passenger;
- Is travelling with an attendant (and would receive a free fare);
- Is travelling with a service animal;
- Is travelling with child or infant (particularly for a non-dedicated service); and/or
- Has a wheelchair or other mobility device.

This information will help London Transit understand the passenger profile and ensure adequate space on vehicles, particularly if smaller capacity vehicles are used to deliver the service.

The app will identify the trip options available and seek to optimize the trip to encourage ridesharing. Available trip times will be provided to the customer to select. A pick-up window will be displayed, which will reduce and provide real-time information to closer the driver is to the pick-up location.

Different fare payment options would also need to be identified in the app. This should include:

- Cash fare (pay online or to the driver);
- Smart Card (see **Section 8.6** below);
- Transfer; and
- Other.

The operator should be notified to require a fare payment for every customer boarding the vehicle, unless a proof of mobile fare payment is shown when the customer is boarding the vehicle.

For customers that do not have a smartphone, the On Demand technology provider should be required to develop a website booking application that is integrated into the London Transit website. Once a trip is booked, a text message can be sent to the customer's mobile phone or the customer can print out a receipt for the ride. An option should also be provided to allow automated text messages to be received on a customer's mobile phone to alert them when the vehicle is arriving. This is useful for customers that do not have a smartphone or internet access.

Customers should also be given the option to call in to book a ride. In this case, the customer must have registered for an On Demand account and provide the customer service representative access to book on their behalf. The customer service representative would confirm the details of the trip and inform the customer of the pick-up location and time. More details on telephone booking requirements are noted **Section 8.3** below).

**Next Steps**

The following next steps should be completed by London Transit staff:

1. Identify requirements in the RFP for an On Demand technology provider to address the fare payment options, text messaging and customer identification requirements noted above.
2. Identify requirement in the RFP for an On Demand technology provider to develop a website that customers can use to register for the service any book a trip.
3. Work with On Demand provider to develop a paper receipt (taking into account the potential for fraud).

## *8.3* Customer Call Centre

In order to facilitate booking for individuals who cannot or would prefer not to use a smartphone or computer, a telephone booking option must be made available.

To facilitate this service, it is recommended that London Transit have a staff member available at least one hour before the start of the On Demand service and one hour before the end of the On Demand service to book and schedule a ride by phone. The same phone number would also be available for customers to report on any issues with their trip (e.g. the vehicle did not show up).

The required staffing is dependent on the number of bookings that require staff involvement. Experience shows that the large majority of On Demand customers use a smartphone to book a trip. While there may be a higher call volume initially, it is expected that 10 to 15% of customers will call in once the service is well established. **Table 15** illustrates the potential calls per hour by period in the short-term.

**Table 15: Potential Hourly Trip Booking Calls by Phone**

| Trips Booked | Service Design Option 1: Innovation Park | Service Design Option 2: Innovation Park / Route 37 | Service Design Option 3: Innovation Park / Route 30 / 37 |
|---|---|---|---|
| Daily Trips | 54 | 154 | 428 |
| Phone Bookings | 8 | 23 | 64 |

There are three potential alternatives for London Transit to consider for telephone booking:

1. **Alternative 1 - LTC Customer Service:** This is a general help line for London Transit passengers that operates seven days a week (6:00 a.m. to 10:00 p.m. during the week, and 8:30 a.m. – 4:30 p.m. on weekends and Holidays). The proposed hours of service for the Innovation Park On Demand service largely match this, with the potential requirement of having one staff member start a half hour earlier (5:30 a.m.) to accommodate a 6:30 a.m. start time of the service.

The number of calls is anticipated to be low, so may be completed using existing staff. In order to accomplish this, customer agents would require administrative access to On Demand software in real time, to answer questions about trips already booked (e.g. has my vehicle arrived yet?). The hours of service for one booking agent would also need to be extended to accommodate the early morning service or if On Demand service was extended to weekend evening service.

2. **Alternative 2 - Specialized Transit Call Centre:** London Specialized Transit has booking agents available seven days a week, from 7:00 a.m. to 9:00 p.m. during the week, 8:00 a.m. to 9:00 p.m. on Saturday, and 8:00 a.m. to 7:00 p.m. and on Sundays and Holidays. Based on preliminary discussions with LTC staff, existing call centre staff have limited availability to accept On Demand calls without additional support, particularly when the service is launched. This solution may require an increase in staff during certain periods. The benefit of this option is that London Specialized Transit booking agents are familiar with London and have experience booking trips. If this option were to be pursued, the hours of service for one booking agent would need to be extended to 5:30 a.m. in the morning to 10:00 p.m. to accommodate the early morning and late evening On Demand service in Innovation Park.

3. **Alternative 3 - Outsource to an External Call Centre:** Another option would be to include the requirement as part of the RFP for the On Demand technology provider. The RFP would state the hours that a live person would need to be available to book a trip, register for the account or ask questions. This could be done by either extending hours of service for Call Centre or reservation staff or outsourcing the work completely to the On Demand technology provider. This can be done for the entire duration of the On Demand service, or combined with Option 1 or 2 above, to be in place before/after standard hours only. The challenge with this option is that not all On Demand technology providers may have access to a call centre, which many limit responses if this is a requirement. Further, external Call Centre operators may be less familiar with communities and local destinations in London.

A combination of Alternative 1 and 3 would likely be the most effective, particularly during the pilot. This would allow London Transit staff to monitor the volume of On Demand-related calls and assess the resourcing needs going forward as On Demand expands across multiple service areas. If On Demand calls impact the ability to for customer agents to answer other calls, the outsourced call centre option can be extended or another call taker hired. Additional training would be required for existing Customer Service staff to support On Demand booking functions.

**Next Steps:**

The following next steps should be completed by London Transit staff:

1. Confirm that the Customer Service Call Centre has the capability to take additional calls for customers that do not have a smartphone.
2. Set up a phone number for passengers to call, linked to the Customer Service Call Centre.

3. Identify additional hours of service for the Customer Service Call Centre.
4. Identify requirement in RFP for On Demand technology provider to have a before/afterhours number for customers to book trips and answer questions.
5. Identify requirement in the RFP for the On Demand technology provider to provide technical support for customers registering or using the app.
6. Train existing Customer Service Call Centre staff on the On Demand service area, and use of the On Demand app, including how to view trips in real-time.

## *8.4* Stops and Shelters

On Demand transit service can be structured based on the traditional proximity targets of a transit system (requiring customers to walk up to 400m to the closest transit stop), or to provide more convenient service right to the curb of the customer's origin and/or destination. Some typical pick-up/drop-off models include:

1. **Bus Stop -** The On Demand service picks-up and drops-off customers at predesignated transit stops only. It is common to use pre-existing fixed-route stops (e.g. when fixed-route service is replaced by On Demand service during certain periods of the day), or to designated On Demand stops. Stops are placed so that the majority of residents are within a 400m walking distance of a stop.

2. **Corner -** Customers must walk a short distance to a street corner within 100 metres of their origin/destination to get picked-up and dropped-off by an On Demand service. This type of pick-up/drop-off point is only used by technology-based ride hailing services as stops are virtual and only visible on the mobile app. This is because the location of a corner stop can change with each trip request, as the stop is selected to minimize the travel time of the vehicle that is destined to pick-up or drop-off the next customer (e.g. the location of a corner stop may be the north-east corner of an intersection for an inbound vehicle coming from the south, or the south-west corner for an inbound vehicle coming from the north). Customers are asked to walk a short-distance to optimize the service.

3. **Curb -** Customers are picked up/dropped off directly at the curb of their origin and/or destination. This model is typically used in more rural or low-density areas with limited ridership, where consolidating pick-up and drop-off points at a common stop would not significantly increase the efficiency of the service. For origin-to-hub service models, the curb is only used for one end of the journey.

It is recommended that a Bus Stop model be used for Innovation Park, but that additional bus stops are added near the entrance of large employers where there are not suitable sidewalks that connect the stop to the employer.

This approach will ensure that all stops are accessible and will promote visibility of the transit service in a new service area. It may also be more easily understood for persons that don't have a smartphone to book a trip or have difficultly following directions to a virtual stop (as virtual stops may cause some anxiety among certain passengers regarding whether they are waiting at the correct pick-up location). Bus stops also increase the potential for ridesharing, and minimize deviations of vehicles from the most direct route.

As a next step, it is recommended that London Transit develop Service Guidelines for the On Demand service, stating that all customers within the On Demand service area should be able to access an On Demand stop within 400 metres of their employer/destination. Existing transit stops can be used as On Demand stops where they are already in place, in the case of pursuing service design Options #2 or #3. New stops can be identified in collaboration with the On Demand technology provider to ensure an appropriate balance is struck between customer access and efficient operations. The distance from the curb to the employer door should be taken into consideration in Innovation Park when selecting stop locations.

All stop, shelters, and hubs should meet the Accessible Transit Stop requirements, as described in the 2020-2025 Accessibility Plan and noted in the guiding principles (**Section 2.2**).

**Next Steps:**

The following next steps should be completed by London Transit staff:

1. Develop service guidelines (minimum walking distance) for On Demand services.
2. Work with On Demand technology provider to select stops in the On Demand zone that meet London Transit's requirements, and optimize operations.
3. Install bus stops and potential concreate pads where necessary.

## *8.5* Fare Integration with Fixed-Route Transit

A key requirement for On Demand transit is the ability for customers to seamlessly transfer between this service and a fixed-route London Transit route to complete their trip.

On Demand customers that paid an electronic cash fare will need to show the Operator either their ticket on their smartphone, via text message or a printed receipt. It will be important for all of these to have a similar format and display the same information to reduce confusion. Operators should also be instructed not to handle customer smartphones or mobile phones to avoid any liability in case of damage. Passengers who have a Smart Card would also be required to tap when boarding a London Transit vehicle (see **Section 8.6** for more detail on Smart Card integration).

On a trip starting with a fixed-route, all customers should pay the fare on the fixed-route conventional transit vehicle and request a transfer. When transferring onto an On Demand vehicle, customers with Smart Cards will show their transfer to the operator, or tap the card if boarding a vehicle equipped with a Smart Card reader.

In the event that a non-dedicated service contractor is used (Operating Model 3), than cash payment would be more difficult. Three alternatives could be considered.

1. **Alternative 1 - Require Mobile Fare Payment:** Customers paying cash may be required to use mobile fare payment when the initial boarding is on an On Demand vehicle, or select "Transfer" is the On Demand vehicle is the second leg of their journey. Customer would be required to show drivers proof of payment via their Smart Phone or a printed receipt. Transfers can be shown and collected by the On Demand operator, and reconciled by LTC before payment is made to the operator.

2. **Alternative 2 - Drivers Collect Cash:** The customer would be required to select the type of fare payment when booking their trip. If "Cash" is selected, then the operator would be informed to expect a cash fare. Fares would need to be reconciled between LTC and the operator on a regular basis before payment is made to the operator.

3. **Alternative 3 - Do Not Collect Passenger Fares on On Demand Portion of Trip:** During of the pilot, a simple approach would be to provide a free fare during the ridesharing portion of the trip. Passengers that use the service to connect to another London Transit service would still be required to pay when boarding a fixed-route vehicle. On the return portion of the trip, passengers would pay when boarding a fixed-route vehicle and receive a transfer when boarding the On Demand vehicle.

**Next Steps:**

The following next steps should be completed by London Transit staff:

1. Identify the fare payment and receipt requirements in the RFP for an On Demand technology provider.
2. Work with the selected technology provider to develop a simple receipt that can be displayed on a customer's smartphone, through text message or printed. All three should have a similar format and be easy to read, displaying the date and time of the trip and method of fare payment.
3. Train Operators to review, validate and accept the On Demand receipt.

## *8.6* Smart Card Integration

London Transit uses a stored-value Smart Card. Customers can load a monthly pass, or a stored value amount on a card (or both). Smart Cards provide automatic transfers and can be reloaded.

Smart Card readers are required to debit or validate the card and record a transaction for either stored value or passes. While units are in place on all LTC fleet vehicles today, there are no readers on London's contracted Specialized Transit vehicles. The following describes the steps required to implement Smart Card integration in each operating model type.

### 8.6.1 Operating Model 1: London Transit Operates Service

There are no additional implementation steps required for this model as each London Transit bus will be equipped with a Smart Card reader. For customers that routinely use this fare medium, the On Demand software would require a payment option titled "Smart Card". Customers who select this option would not be charged through the app, but instead would be notified to tap when they boarded the vehicle. The driver would also be notified that the customer entering the vehicle would need to pay upon boarding.

### 8.6.2 Operating Model 2 and 3: Contracted Service Provider (Dedicated & Non-Dedicated)

Two Smart Card integration alternatives were explored under these operating models:

1. **Alternative 1 - Install Smart Card Readers on all Contracted Vehicles:** This scenario would require the installation of Smart Card readers on each vehicle providing On Demand service. For dedicated vehicles, a permanent or hand-held Smart Card reader would need to be in place in each vehicle. Each hand held unit costs approximately $2,500. Discussions would need to take place with the operator about the room available in the vehicle to house these devices. From a customer perspective, this is the best alternative, but comes with the higher price-tag, which limits potential for cost savings.

   For non-dedicated vehicles, handheld readers would be more difficult as the number of vehicles that could potentially provide the service could be high, which could potentially add to the cost of the service. One solution would be to work with the contractor to only allow a sub-section of their drivers/vehicles to provide On Demand service. This model was used by Milton Transit when it contracted its specialized transit service to a taxi company. This would limit the number of Smart Card validators that would need to be purchased.

2. **Alternative 2 - Do not Collect Smart Card Fares on the On Demand Portion of Trip:** During the initial launch of this service, a simple approach would be to provide a free fare for Smart Card users during the On Demand portion of the trip. Passengers that use the service to connect to another London Transit service would still be required to validate their card when boarding the LTC fixed-route vehicle. On the return portion of the trip, passengers would validate their card when boarding an LTC vehicle and receive a transfer when boarding the On Demand vehicle. Fare loss would only occur if a customer did not transfer to a fixed-route service. This would likely be minimal since the Innovation Park pilot is targeted to an employment area.

For the purposes of this pilot stage, Alternative 1 is recommended if the service is contracted to a dedicated bus operator (Operating Model 2). There would only be a limited number of Smart Card Validators that would need to be purchased and it would ensure better integration with fixed-route services.

Alternative 2 is recommended if it is decided to contract the On Demand service to a non-dedicated operator (Operating Model 3). From an operator perspective, there is no additional capital cost for procuring and fitting up vehicles that are not owned by London Transit, which could be substantial depending on the number of vehicles required to provide the service.

In the future, it is also recommended that London Transit explore the potential to switch to an account-based Smart Card that can be integrated with a mobile fare payment option provided by the On Demand technology provider. In this scenario, customers would register their Smart Card when registering for the On Demand service. The account would be debited when purchasing a ride on the mobile app, but could still be used to tap onto a fixed-route bus. This would eliminate the need to install Smart Card readers on contracted vehicles.

**Next Steps:**

The following next steps should be completed by London Transit staff:

1. Confirm operating model and required next steps noted above.
2. If contracting the service, include in the RFP a requirement to use a Smart Card reader provided by LTC.
3. Include requirement in the On Demand technology provider RFP to be able to integrate with an account-based Smart Card (in the future).

## *8.7* Policy and Procedure Updates

In order to ensure the smooth and efficient implementation of On Demand service, seamless integration with fixed-route service, and high quality customer experience, policies will need to be put in place to govern requirements and expectations of both London Transit and customers related to On Demand transit. These policies will outline the acceptable parameters of service provision by London Transit as well as the expectations of customers using the service.

**Pick-up Window**

When a customer trip is confirmed, they will be provided with a pick-up window of up to 10 minutes. Customers are expected to be at the pre-designated stop within the entire duration of the pick-up window. This is particularly important for customers that do not have access to a smartphone. For customers with a smartphone, the pick-up window will be refined and real-time data on the vehicle arrival time will be displayed on the customers' smartphone.

Drivers can wait for a customer to arrive for up to 30 seconds if they arrive at the stop within the pick-up window. If a driver arrives at the stop early (outside the pick-up window), the driver would be required to wait to the start of the pick-up window before departing.

**No Show Policy**

Late arrivals and No Shows can add cost to the service. There is also an opportunity cost, where another passenger may have been denied a ride because the vehicle was scheduled to capacity. While late arrivals and no shows occur occasionally, a system needs to be in place to reduce the number of repeat occurrences.

On Demand vehicles and customers are expected to be at the stop within the designated pick-up window. Once the vehicle arrives, the driver can wait up to 30 seconds. If there is no sign of the passenger, the driver will note this and proceed to the next pick-up/drop-off.

Incidents of No Shows and late arrivals should be linked to a customer account where it can be tracked. If a customer is constantly late or does not show for a scheduled pick-up, a warning should be given to the customer at the next time of booking. If this continues to occur without a reasonable explanation (e.g. more than twice a month), the customer should be suspended from the service for a one month period.

**Next Steps**

The following next steps should be completed by London Transit staff:

1. Identify Booking window with the selected On Demand technology provider.
2. Develop a No Show Policy and Late Arrival Policy, including a way to track and communicate with repeat offenders.
3. Set up a dispute resolution process in case there are conflicts/disagreements with customers.

## *8.8* Trip Planning Integration

London Transit provides real-time bus info and a trip planner to customers through londontransit.ca, to help them plan trips and estimate routes arrival/departure times. In addition, a number of London Transit customers use third-party trip planning applications to identify their route and plan their trip, facilitated by the provision of GTFS data to Google. The implementation of On Demand transit should allow customers to continue to use both in-house and third-party apps to plan their complete trip, including trips that have an On Demand and fixed-route connection.

To facilitate this, the RFP for the On Demand technology provider should specify the requirement for native integration with existing London Transit trip planners and third-party trip planning applications available in London (e.g. Transit App). This would allow customers to plan their trip and proceed to booking without being required to leave the original app.

## *8.9* Level of Service and Customer Focus

In order to function as a viable part of the transit network, On Demand services needs to be able to provide service to customers without excessive wait times. While lower wait time options provide

greater customer benefits, the cost is higher as additional vehicles are required to ensure that they can provide the required coverage. As such, utilization time per vehicle will likely decrease.

As a general rule, the level of service for On Demand transit should match the conventional fixed-route service it is connecting to or replacing. Beyond customer convenience, service levels affect the overall capacity and attractiveness of the service. If demand and capacity are high, the cost of providing the service may exceed that of a fixed-route and therefore productivity gains are lost. If this is the case, an On Demand service may be the precursor to conventional fixed-route transit as demand grows.

## *8.10* Software Pricing Models

There are a number of different pricing models that London Transit should consider when implementing an On Demand service. Most On Demand technology providers charge an initial set-up fee, and then provide a monthly charge per vehicle. Others provide a charge per vehicle hour, reflecting that some vehicles may only be used for short periods of the day (e.g. evening service) while others are used all-day. This type of charge would be reflected in the operating budget of the transit system.

## *8.11* Key Performance Indicators

As the new On Demand service is implemented, ongoing monitoring must take place to evaluate its effectiveness and the extent to which it is achieving desired outcomes. To facilitate this process, London Transit should develop a Monitoring Plan which would identify key performance indicators (KPIs) as well as desired or targeted outcomes for each indicator if applicable. These KPIs should be selected based on the initial goals and intentions of the service. The monitoring plan would also identify the timing of evaluation and reporting, ensuring a balance between monitoring regularly enough to identify red flags and opportunities quickly, and allowing enough time between evaluations to effectively see the results of changes made. These KPIs can be used to inform staff, local councillors, and the public about the effectiveness of the service and should be used as a starting point for any proposed changes, including expansion to other areas of the City.

The On Demand technology provider should be able to provide the required data as set out in the Monitoring Plan. These requirements should be included as part of the RFP to ensure the selected contractor has this capability.

**Table** 16 identifies a number of potential KPIs covering a wide variety of components relating to On Demand service. Depending on the priorities and goals of London Transit relating to On Demand service, not all KPIs may be applicable.

**Table 16: Potential Key Performance Indicators**

| Evaluation | Key Performance Indicatory |
|---|---|
| **Service** | Revenue and Total Vehicle Hours (RVH and TVH) |
| | Revenue and Total Vehicle Kilometers (RVK and TVK) |
| | Ratio of Revenue to Total Vehicle Kilometres (measures non-revenue) |
| | Revenue Service Hours per Population/Employment (in On Demand area) |
| **Trip Booking** | % of Dropped Trips (Trips looked-up but not booked) |
| | Trip Cancelations (booked then cancelled, both within time parameters and late cancellations) |
| | No Shows (booked trip but passenger does not show at scheduled pick-up time) |
| | Wait Time (time between booking and trip pick-up) |
| **Ridership** | Passenger Boardings |
| | Passenger Kilometres Travelled (PKT) |
| | Linked Trips (Passengers that transfer to or from On-Demand services) |
| | Passenger Trip Duration (minutes and kilometres) |
| | Origin and Destination Data by Trip (both of which must at a minimum be tagged by postal code) |
| | Boardings by Source (e.g., booked by app, website or by phone) |
| | Boardings per Population/Employment (in On Demand area) |
| | Boardings per Revenue Vehicle Hour |
| **Fare Payment** | Fare Category and Payment Used (cash, Smart Card, U-Pass, transfer, mobile payment, promo, etc.) |
| | Fare Revenue Collected |
| | Average Fare |
| **On-time Performance** | Time of Pick-up and Drop-off (Relative to estimated and guaranteed times upon booking) |

| Evaluation | Key Performance Indicatory |
|---|---|
| **Vehicle** | Breakdowns by Vehicle and Day |
| | Chronological Vehicle manifests of Pullout from Garage, First Pick-up, All Pickup/ Drop-off Times and Locations |
| **Rating** | Driver and Trip Rating |
| | Complaints per Trip (monthly) |
| | Response to Survey Questions posted by London Transit on the Mobile App |

# *9.0* Next Steps

If London Transit is interested in implementing an On Demand service, the following next steps should be taken:

1. **Select a Service Design Option and Operator:** The report presents three service design options for Innovation Park and the surrounding area. Each have advantages and disadvantages. These should be reviewed and a service design selected to pilot. London Transit should also choose an operating model for the pilot, and take any necessary steps to move forward.

2. **Communication:** Funding should be set aside for marketing and communication, as this new model will involve some change management for both drivers and customers.

3. **Confirm with Legal and Procurement:** An On Demand model will collect data on customer information, including potential credit card data for mobile fare payment. The policies and rules in the municipality around privacy, data storage, data ownership and procurement should be known before proceeding, as it influences what is included in the RFP for a technology platform provider.

4. **Determine Potential to Operate a Call-Centre:** Not all passengers will have access to a mobile phone or computer to book a ride. Approximately 15% of passengers may still want to call a live operator to book a ride. London Transit will need to determine whether it has capacity to take on this function (potentially adding to an existing customer service agent's role) or whether it will look to contract this service out. This will influence what is included in the RFP for a technology platform provider.

5. **Write RFP and Initiate Procurement of a Technology Platform Provider:** The RFP for the technology platform provider should identify the specific service and operating model, hours of service, vehicle requirements and specifications and Key Performance Indicators. If London Transit elects to contract the operations of the service, this should be specified in the RFP, and it will be up to the proponent to find a suitable operating partner. The RFP should include the following:

    - Service hours and level of service;
    - Service area(s);
    - Service delivery model;
    - Operating model(s);
    - Length of contract;
    - Whether London Transit is providing vehicles;

- Accessibility requirements;
- Driver training requirements (if applicable);
- Cost and cost control requirements;
- Branding requirements; and
- If Specialized Transit integration is a current or future goal.

6. **Add Additional Bus Stops:** London Transit should work with the successful proponent to confirm vehicle requirements and stop locations. Additional bus stops should be implemented based on a set of 'bus stop' criteria that takes into consideration safe vehicle stopping, customer safety while waiting (e.g. segregation from traffic, lighting), proximity and accessibility.