

To: London Transit Commission
From: Jacob Terry, Dillon Consulting Limited
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Subject: Operating Model Evaluation Memo
Our File: 26-3563

Introduction

The London Transit Commission (London Transit) is implementing an alternative service delivery (ASD) pilot that focuses on adding on-demand service, connected to the broader transit network, to two general areas of London:

- Northwest London, including the Fox Hollow neighbourhood and other areas west of the Medway Valley Heritage Forest and north of Fanshawe Park Road; and
- Southwest London, including parts of Byron, Talbot, and Lambeth that fall outside of the existing or proposed fixed-route network.

The goal of the pilot is to provide a flexible transit solution in new growth areas where there has been expressed demand for new service, but where fixed-route service may not yet be feasible. London Transit looks to refine the zones based on passenger feedback and work toward commingling service with specialized transit as the on-demand service develops. This memo considers a variety of service delivery options for the pilot and recommends an approach appropriate for these specific service areas.

Service Design Review

When designing an on-demand transit service, there are a number of components that can be adapted to best meet the needs of the community and the goals of the service. Because these options involve key trade-offs, the guiding principles defined in Phase 2 provide a framework for evaluating which of the following options are most appropriate for the pilot service areas.

Operating Model and Stop Types

On-demand transit services generally rely on one of three operating models, each balancing rider convenience against operational efficiency:

- Curb-to-curb service allows riders to select their preferred location for pick-up and drop-off, and the transit service will operate between the curbs at those locations providing customized service for each passenger. This eliminates the need for passengers to travel beyond the

driveway of their origin or destination to access the vehicle, making it a highly accessible option. However, due to the ability for each passenger to select a unique pick-up and drop-off location, there is little centralization of passengers, and the vehicle may make frequent stops in close proximity and/or face maneuvering challenges on narrow or dead-end streets that would not normally be considered for transit service.

- Stop-to-stop service improves efficiency and vehicle productivity by requiring riders to walk a short distance to designated bus stops, allowing transit agencies to pool multiple riders together when possible and increase average vehicle speeds by reducing the number of stops. While this type of service would not have defined routing, identifying stops along specific roadways can also reduce the number of more complex streets to navigate. Stop-to-stop service is also easier to transition to fixed-route service as demand increases, because passengers would already be accustomed to walking to the nearest standard bus stop.
- Corner-to-corner service acts as a middle ground between the two by dynamically grouping passengers travelling at the same time to a virtual stop (typically a street corner) within walking distance of their origin or destination. Virtual stops are demand-responsive and do not have any physical infrastructure but rather would be in-app locations centrally positioned between the requested pick-up or drop-off locations of all passengers travelling to a similar area, meaning that it would change depending on the passengers travelling. The walking distance to a virtual stop tends to be shorter compared to a fixed stop.

It is recommended to launch the ASD zones using a stop-to-stop service with designated stops aligned with future fixed routing for general riders, building the expectation among the passenger base that this is an extension of fixed-route service with similar characteristics. If the pilot proves successful, London Transit should maintain the on-demand service in areas with mild ridership, and use the resulting ridership data to transition to fixed-route service in areas with higher ridership.

Transit Hubs

Transit hubs serve as the connection points between local on-demand zones and London Transit's broader fixed-route network. While on-demand vehicles handle local neighborhood trips, hubs provide safe, comfortable, and accessible locations for passengers to transfer to regular bus routes. It is recommended that London Transit locate a hub near each zone at existing transfer points, commercial areas, or key destinations.

Stops that are conveniently located but not major transfer hubs were also recommended to balance prioritizing use of the fixed-route network while allowing stops at important local destinations near where the vehicle would already be travelling. Examples include local grocery stores and other concentrated commercial locations where errands may require an additional transfer onto a fixed-route

service for only a few stops, which would be onerous enough to reduce transit use to these locations altogether.

Depending on the layout of an intersection or destination, a transit hub may consist of multiple bus stops rather than a single boarding point. Multi-stop hubs are often necessary to accommodate different travel directions and provide dedicated layover areas for on-demand vehicles awaiting connecting passengers without blocking conventional buses or impeding roadway traffic. This is particularly important as on-demand services can occupy the space longer than conventional vehicles as they await connecting passengers. As with all stops, these locations should be safe for passengers of all abilities to access. Where transfers require passengers to travel between adjacent stops at an intersection, pedestrian pathways must connect all boarding points and should be clear, unobstructed, and accessible.

To support high-quality passenger experiences at these transfer points, transit hubs should feature at least one stop with an upgraded standard of infrastructure where feasible. In alignment with the project's customer experience guiding principles, at least one stop at a hub should include protective shelters, comfortable seating, and real-time departure and arrival information for connecting routes. Where space and neighborhood context permit, hubs may also integrate bicycle or micromobility racks and self-serve fare kiosks.

Service Hours

When establishing the operating schedule, the primary tradeoff to evaluate is whether to launch the pilot with reduced, peak-focused service hours or full daily operating spans. Introducing a reduced service model lowers initial operating costs but restricts riders to only a subset of their daily trips. This forces residents to maintain alternative transportation options, such as personal vehicles, which can entrench car ownership and make long-term transit adoption much harder as these neighbourhoods grow. Providing full-service hours enables new residents moving into these developing areas to rely on transit for all their daily travel needs from day one.

To foster long-term transit habits and align with the service hours of the rest of the network, it is recommended that these zones align with the same minimum service standards outlined in the London Transit Service Plan for local service.

Fare Payment Options

The specialized transit system currently uses handheld smart card readers, and drivers hold onto paper tickets and cash until the end of their shift. Like specialized transit, on-demand services are generally managed through a digital booking platform. These platforms often include fare payment options, which can add new ways for passengers to pay for their transit service. Digital in-app payment is often

used in other on-demand transit services and would speed up boarding times, simplify driver duties, and minimize barriers for new passengers to use on-demand transit.

It is recommended to adopt a hybrid fare policy that encourages digital in-app payment while also using the current fare payment systems and on-board payment systems used for specialized transit, balancing the advantages of advance payment that in-app payment can provide while allowing traditional fare payment on board that is compatible with the existing specialized payment process. This fare policy would minimize barriers to commingling both services in the future, when commingling is a viable option.

Booking Period

While passengers can ride anytime during the operating hours defined above, the service design must address whether trips can be requested immediately for same-day travel, reserved in advance, or both. The timeframe during which passengers are permitted to reserve a trip is referred to as the booking period.

Longer booking periods (e.g., 1–7 days in advance) offer passengers greater predictability for planned trips, but they risk locking up vehicle capacity early and leaving few spots for same-day travel. Shorter periods reverse this dynamic, maximizing capacity for spontaneous, same-day requests while reducing advance planning options. As on-demand services mature, transit agencies often shorten their booking windows to protect real-time availability as overall demand rises.

For this pilot, launching with a 3-day advance booking window strikes the right balance between same-day flexibility and advance planning for general public riders. This window would also align with the one used for specialized transit, simplifying the advance booking process for passengers.

Appropriate policies should also be put in place to maintain system efficiency and encourage fair use of the service. It is also recommended to:

- Restrict duplicate booking requests from the same origin and destination.
- Prioritize digital in-app booking and account-based access to on-demand transit service, to manage late cancellations and no-shows.

Vehicle Selection

Selecting the appropriate fleet for the on-demand pilot requires balancing vehicle maneuverability and capital costs against passenger accessibility and vehicle capacity. Some additional considerations include the availability of a spare fleet, benefits of maintaining consistency of vehicle type, and the potential fuel type options. A range of potential vehicle options and associated costs is summarized in **Table 1**.

Table 1: Vehicle Comparison

Vehicle Type	Approximate Size	Typical Vehicle Capacity	Approximate Cost
Conventional bus	12 metres	up to 75 ambulatory passengers plus 2 wheelchair	\$1,000,000 to \$1,300,000
Minibus	8 metres	up to 25 ambulatory passengers (up to 5 wheelchair)	\$150,000 to \$500,000
Van	5 to 6 metres	up to 10 ambulatory passengers or up to 4 wheelchair	\$110,000 to \$180,000

Peer agencies use conventional buses for on-demand when they repurpose existing vehicles. While this provides the advantage of not requiring additional fleet, conventional buses are typically not well suited for on-demand transit since they cannot navigate smaller turns as easily and are generally oversized for the amount of peak passengers that would be expected using on-demand transit.

The primary fleet decision therefore involves choosing between smaller vehicles like vans and minibuses (i.e., “cutaways”). Smaller vans offer lower initial procurement costs, superior fuel economy, and tighter turning radii, making them well-suited for navigating narrow residential streets and suburban cul-de-sacs. However, their limited seating capacity can cause service bottlenecks during peak demand periods. Conversely, minibuses provide higher passenger capacity, particularly for passengers requiring the use of mobility aids, and better winter performance, but come with higher capital costs, increased fuel consumption, and greater spatial constraints when operating in confined residential areas.

The estimated ridership and the maximum boardings per hour that can be managed by the service should be considered when selecting the size of the vehicle to ensure that the vehicle has enough capacity to manage any peak service times. Larger service areas with long average trip distances can result in a lower number of grouped trips making a smaller van more appropriate for service whereas small zones where many passengers could be making similar trips would support larger capacity vehicles. In this case, the pilot zones are quite small and as the service transitions to more stop-to-stop travel it is expected that grouped trips will continue to increase, making higher capacity midsized vehicles the preferred option.

For the initial pilot deployment, maximizing operational efficiency while controlling costs and maintaining the scalability of the service is key. London Transit relies on a third-party operator to provide and operate the vehicles used in the specialized transit fleet. The existing specialized transit

fleet is currently made up of minibuses, and utilizing the same vehicle models once the services are commingled would meet the capacity needs and is the most practical option operationally.

- If London Transit uses the same contractor to provide on-demand transit service, London Transit should explore the use of the same vehicles being used for specialized transit. This approach allows the pilot to draw from current spare ratios, utilize established parts inventories, and avoid specialized technician or driver training. Introducing a mixed fleet or unfamiliar vehicle class during a pilot may add unnecessary maintenance overhead and risk service reliability during routine vehicle servicing.
- If London Transit relies on a separate contractor to provide vehicles to operate on-demand transit during the pilot phase, wheelchair-accessible smaller vans could be explored that are well-suited for on-demand travel, and are common in peer agencies.

In the future, alternative fuel propulsion systems, such as battery-electric or hybrid vehicles, should be considered to support long-term municipal decarbonization goals.

In addition to the cost of the vehicles, there are additional costs associated with on-demand software:

- An initial capital cost of setting up on-demand software, if a different software is used than for specialized transit
- Adding tablets and mounting hardware to the vehicles to support the software, if the existing on-board systems cannot support the addition of the on-demand software application
- An annual software maintenance and support fee

These costs, while generally an order of magnitude lower than the capital cost of a vehicle, should be considered and may be either part of the contract for providing on-demand service or borne by London Transit directly.

Accessibility and Securement

Because the operating model guarantees door-to-door service for specialized transit riders alongside general public stop-to-stop service, vehicle accessibility is crucial. Whether procuring a van or minibus, passengers should be able to board the vehicle from the curb. Low-floor vehicles generally allow passengers with higher mobility needs to board quicker than vehicles that make use of lifts, making them the preferred option for maintaining operational efficiency in a commingled service.

The size and type of vehicle often also dictates the options for passenger securement. Some vehicles will come equipped with seatbelts, which passengers would be required to use, while others are designed to be used without seatbelts. Wheelchair spaces should follow the same securement policies as are used for specialized transit, including the use of Q'straints.

Recommended Service

The following outlines the recommended service for each of the two proposed pilot service areas based on recommended service elements outlined above.

Northwest London

The Northwest London pilot area covers a developing residential area north of Fanshawe Park Road and west of the Medway Valley Heritage Forest. Because the residences are fairly evenly distributed across the neighborhood and because it has a well-connected street grid, a single contiguous on-demand zone is recommended. **Figure 1** outlines the boundaries defined for this area and identifies proposed stops that could be used for this stop-to-stop service. Most of these stops are located on Buroak Drive, Tokala Trail, or Wonderland Road; in alignment with the proposed Route 32 identified in the London Transit Service Plan. These stops are positioned at key intersections with stop spacing consistent with fixed-route stops. Including only stops along the previously proposed fixed-route would result in parts of the service area remaining outside the standard walking distance; therefore, additional stops were added along other major roads in the area to allow passengers in these areas to request service in closer proximity to them. Amenities should be installed at hubs where it is feasible to do so.

The stop-to-stop service in this zone would allow residents to request a trip between any two stops within the zone, and between the zone and any of the three proposed transit hubs located outside of the service area (**Figure 2**):

- **Seagull at Hyde Park:** A single stop on the north side of Seagull (connecting to Routes 19 and 31) can serve as the hub for on-demand transfers. Passengers travelling in the opposite direction on Route 19 can use accessible infrastructure to cross to the other stop.
- **Fanshawe at Wonderland:** The primary draw to this transit hub is anticipated to be No Frills and the other adjacent local destinations in the same plaza. If the vehicle is able to navigate the parking lot access in the No Frills plaza, then stops 2516 and 2517 would be viable stopping points allowing easy access to the plaza and connections to other routes at this intersection. If the vehicle cannot navigate the plaza, then these stops would add substantial deadhead time for short trips. Stop 2983 would also be a viable stopping point for this service, depending on the direction of travel for the vehicle.
- **Masonville Place:** This location is a major terminal with connections for passengers across multiple routes. There is no capacity in the primary mall terminal space for an on-demand vehicle to stop, so stop 2831 on Fanshawe Park Road would need to be used as a pick-up and drop-off location. This stop is on the same side of the road as the terminal, and is used for other London Transit and regional bus routes that are unable to stop in the terminal.

Figure 1: Proposed ASD Stops within Northwest London Zone

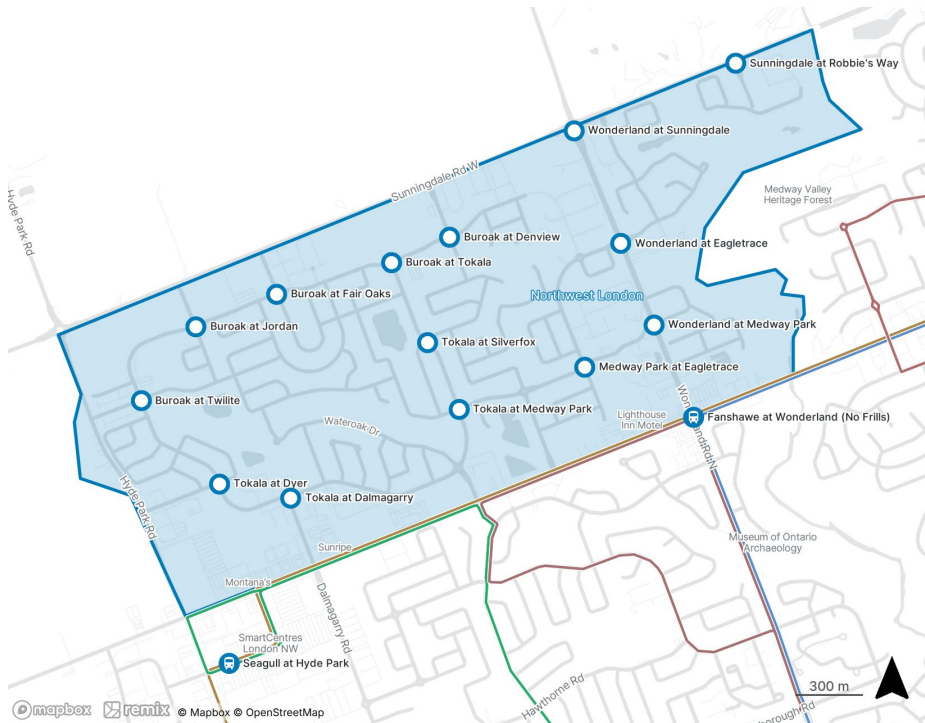
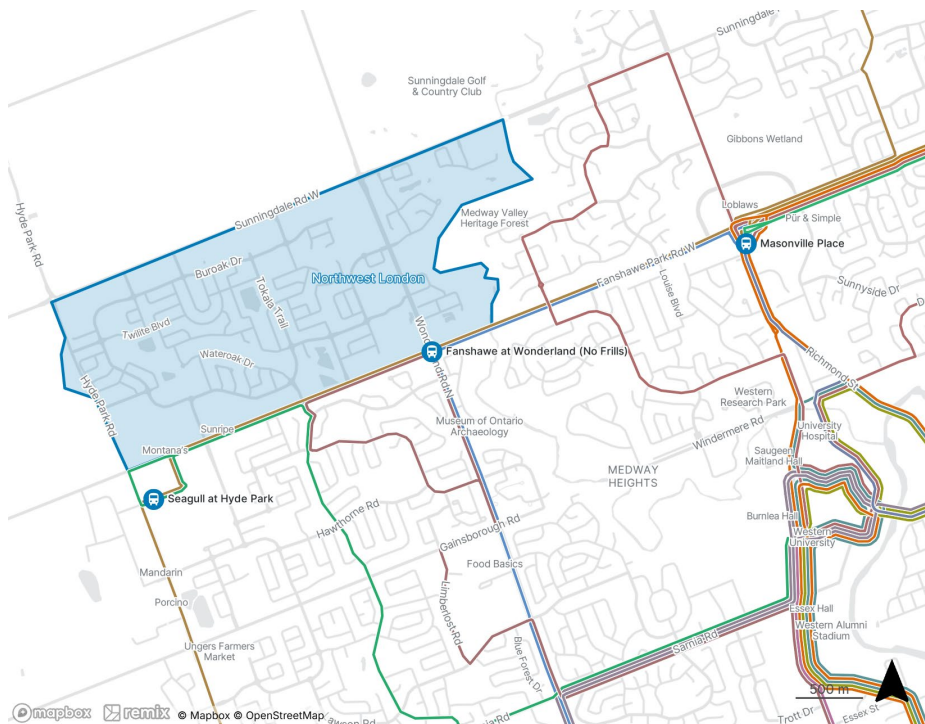


Figure 2: Proposed Transit Hubs for Northwest London Zone



These transit hubs should be comfortable and accessible as passengers may wait for a connection at these locations. The infrastructure outlined in the transit hubs section, including seating and shelter, should be installed in at least one of the stops at each intersection in cases where there are not already passenger amenities and it is feasible to have them installed. In some cases, passengers will need to traverse between stops at the intersection to make the connection to or from fixed-route services, and therefore the adjacent stops should continue to be easy to reach via an unobstructed accessible sidewalk to allow passengers to easily connect between them.

Southwest London

The Southwest London pilot addresses a lower-density growth area that includes the communities of Byron, Talbot, and Lambeth. The goal of the on-demand service in this area is to provide a first-mile/last-mile connection to the fixed-route network, and allow travel to local destinations for residents in these areas.

Unlike in Northwest London, Southwest London has multiple discrete communities that are smaller and at the periphery of the transit network. For simplicity, these are described and visualized as three subareas as depicted in **Figure 3**:

- **West Byron:** Serves the growing communities at the west end of Byron Baseline Road, and between Ironwood Road and Wickerson Road (**Figure 4**)
- **Griffith:** Serves the residential subdivisions east of Griffith Street that fall outside of the existing transit coverage area (**Figure 5**)
- **Talbot:** Serves the communities north of the existing Lambeth route along Colonel Talbot Road and Pack Road (**Figure 6**)

The area is served by Route 5, Route 17, Route 28 and the proposed Route 24 extension that will eventually bisect the geographic area, which is also depicted in **Figure 3**.

The proposed on-demand stops for these zones are also included in the identified figures and have been placed along streets with fixed-route service potential, considering both the spacing guidelines for conventional transit and the potential to maximize the number of residents who would be within the walkshed of the stop. As with the Northwest London zone, amenities should be installed at hubs where it is feasible to do so.

Similar to Northwest London, the stop-to-stop service in this area would allow passengers in any one of these zones to request a trip between any two stops in a zone or one of the transit hubs. In this area, the transit hubs have been located to connect the passengers in the zone to a broader range of key destinations nearby including schools, balancing the interest in good fixed-route connections while stopping at locations between the subareas where people have a likely interest in local connections. The following are recommendations for hubs specific to this zone:

- **Oxford at Hyde Park:** Serves as a key retail destination and transfer hub at the northern edge of the on-demand service area with connections to Routes 17 and 19. Stop 1030 is proposed because vehicles can move out of the traffic lane and connect passengers to both transit routes, and due to the existing passenger infrastructure at this location.
- **St. Thomas Aquinas Secondary School:** Serves a specific high demand travel pattern of student travel. The bus bay at the school (stop 1634) is an appropriate location as it has a dedicated curbside stop directly adjacent to the school entrance, providing safe, off-arterial loading and unloading without impeding school bus traffic or local commuter flow.
- **Commissioners at Halls Mills:** This location is the southernmost point where both variants of Route 17 operate and provides a connection to Route 5. It is also located at the public library and community centre and is only a short walk from the local Metro, making it a destination for many residents of this community. Utilizing the stop on Halls Mills (stop 843) or at the Metro (stop 2213) would allow the vehicle to exit the flow of traffic creating the safest location for the on-demand vehicle to serve and both are currently equipped with shelters reducing the need for significant infrastructure upgrades.
- **Boler at Byron Baseline:** This stop has connections to Routes 5, 17, and the proposed extension of Route 24, and has potential as a local commercial destination of interest for residents in the nearby subareas.
- **Westmount Shopping Centre:** This terminal anchors many of the routes serving Southwest London. Therefore, including it as an anchor in the on-demand network for this area provides the highest level of connectivity for the service. On-demand vehicles should make use of a single bay in the existing terminal loop, either by assigning it its own bay behind stop 5 or by sharing one of the marked bays with the fixed-routes.
- **Southdale at Colonel Talbot:** This stop is located next to a No Frills, and is likely to be a destination of interest for residents in the nearby subareas. Stop 2619 should be used in the short-term for connections, but as Route 24 is extended further west on Southdale, stops on Southdale would likely be better located for an on-demand vehicle to provide service.
- **Wonderland at Southdale:** This stop provides a connection between the on-demand service area and the commercial plazas at the Wonderland and Southdale intersection. It is recommended that the on-demand service utilize stops 1713 and/or 2128 for their central location and connections to fixed-route stops. It should be determined if an on-demand vehicle is able to stop at either location for a longer period of time, as it is likely there would be high traffic on both Southdale Road and Wonderland Road and neither stop has a bay.
- **Wharncliffe at Campbell:** This hub allows passengers to connect to Route 28 and to access ServiceOntario and the local Foodland. There is currently only one stop in this area which is accessible (stop 2518). Therefore, it is recommended that either this stop be used, or that an accessible bus stop be added at stop 2522 that includes additional space for a vehicle to wait

longer without impeding traffic. Stop 2522 requires the installation of a city sidewalk in order to be accessible.

Figure 3: Proposed Transit Hubs for Southwest London Zone

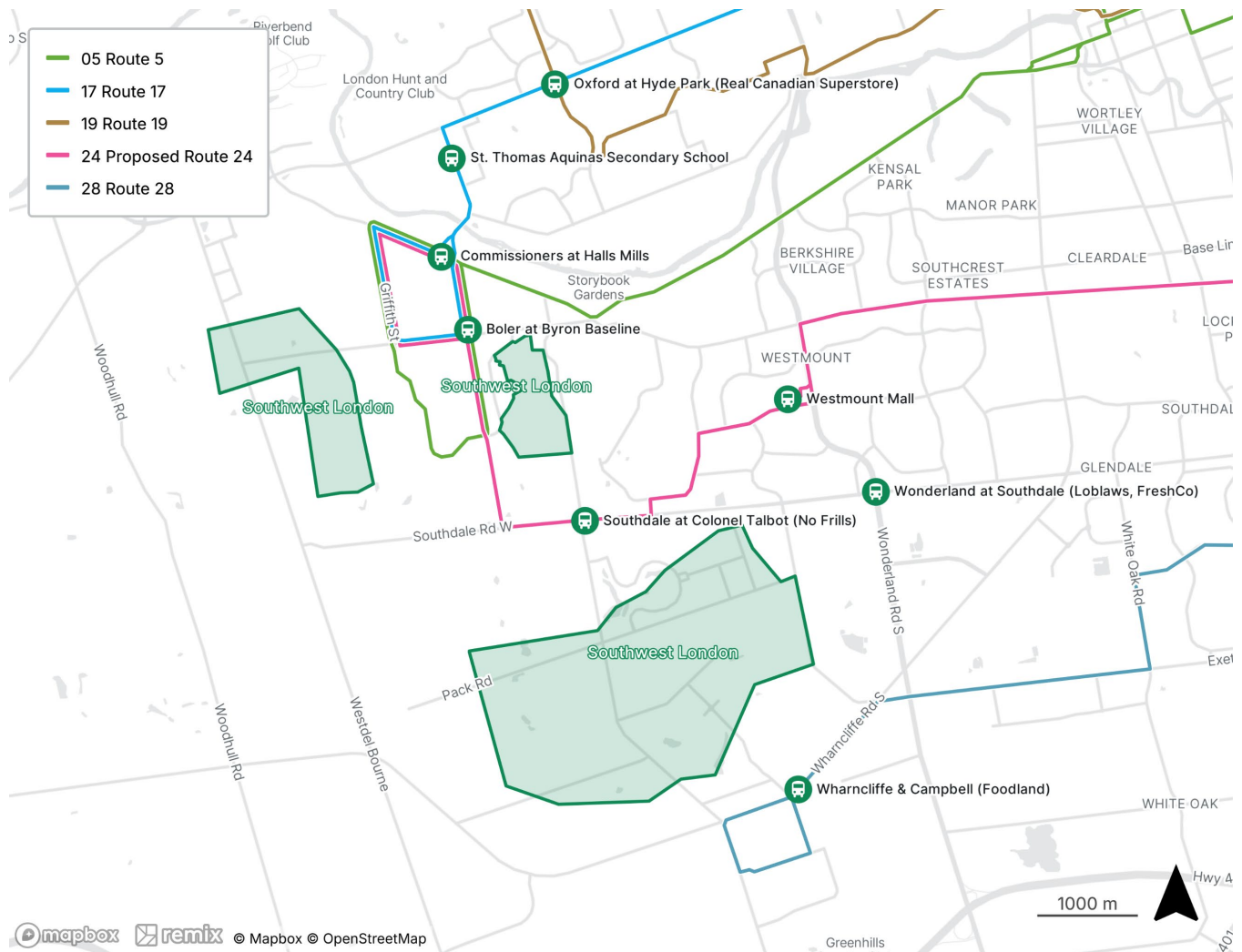


Figure 4: ASD Stops in Southwest London (West Byron)



Figure 5: ASD Stops in Southwest London (Griffith)



Figure 6: ASD Stops in Southwest London (Talbot)



Ridership Estimate

Expected ridership was estimated using the assumption that between 1.5% and 3% of residents in the service area would make on average one trip per week. These figures are consistent with industry-wide assumptions for other agencies operating new on-demand services. **Table 2** outlines the ridership estimates for the service in each of the zones based on this assumption.

Table 2: Ridership Estimate

Service Zone	Population	Weekly Trips	Low Annual Boardings	High Annual Boardings
Northwest London	13,466	201-403	10,503	21,007
Southwest London	8,254	124-248	6,438	12,876

The service hours for each service are outlined in **Table 3**, mirroring the service standards identified for local service in the London Transit Service Plan. Passengers would be able to make bookings during these hours for trips up to three days in advance.

Table 3: Service Hours Calculation

Day Type	Start Time	End Time	Daily Service Hours	Vehicles	Annual Service Hours
Weekday	6:00 a.m.	1:00 a.m.	19	1	4,769
Saturday	6:00 a.m.	1:00 a.m.	19	1	988
Sunday & Public Holiday	7:00 a.m.	11:00 p.m.	16	1	992
Total	N/A	N/A	N/A	N/A	6,749

The ridership and service hours can be used together to estimate the productivity of each route (**Table 4**). Based on the population of the Northwest London zone, the productivity is expected to be as high as three boardings per service hour, and in the Southwest London zone, is expected to be as high as two boardings per service hour.

Table 4: Boardings per Service Hour Estimate

Service Zone	Annual Service Hours	Low Annual Boardings	Low Boardings/ Service Hour	High Annual Boardings	High Boardings/ Service Hour
Northwest London	6,749	10,503	1.6	21,007	3.1
Southwest London	6,749	6,438	1.0	12,876	1.9

Based on a peer review of similarly sized agencies in Canada, the productivity of each zone is consistent with what reviewed peer agencies experienced in terms of ridership from on-demand services in new areas.

The number of vehicles required to operate service is dependent on the anticipated demand, the operating pattern of the vehicle, and the desired service level (i.e., wait time). Peer agencies identified a maximum capacity of six boardings per service hour for on-demand service, with lower capacities for zones where there is longer deadheading time or less sharing. The Northwest London zone is more compact and contiguous, so likely would be able to get closer to peer capacity than the Southwest London zone, where more time would be spent going between subareas. Using a more conservative upper limit of three to four boardings per service hour:

- The Northwest London zone would approach the realistic service capacity of a vehicle in the high demand scenario, but in the low demand scenario would likely have excess capacity.
- The Southwest London zone would likely have excess capacity in either scenario, depending on how much deadhead time is needed between pick-ups and drop-offs.

It should be noted that demand may be lower in off-peak periods, and higher during peak periods, depending on the attractiveness of service at those times. In a low demand scenario, both zones combined would likely approach the demand for one vehicle. Because of the time required to travel between zones, and the variability in future demand, it is recommended to start with two vehicles, with one vehicle in each zone, and add additional vehicles if needed to meet passenger demands if they are higher than anticipated.

This demand could potentially also be met in part by commingling service with specialized transit. Preparing the on-demand service in a way that mimics how the specialized service operates would ease the transition to commingling both services once that is a viable option, allowing London Transit to pool resources as needed to whichever service has higher demands at any given time.

Next Steps

As London Transit finalizes the proposed operating model, Dillon and London Transit will work together to identify implementation steps and timelines, including:

- Procurement processes, including writing an RFP and selecting vehicles and providers
- Call centre and dispatch requirements
- Fare integration needs
- Steps to market the new service
- Changes to policies and procedures to use the on-demand transit service
- Any potential staging required to update stops for on-demand service
- Ongoing reporting needs and monitoring