

Route 456 – Post-Implementation Review of Service

Background

1. Transport for London (TfL) introduced new bus route 456 on 13 March 2021, running between Crews Hill and North Middlesex Hospital in the London Borough of Enfield. The service runs between approximately 06:00 and 21:00 at a frequency of 2 buses per hour (bph) on Mondays to Saturdays and 1 bph on Sundays.
2. This document sets out analysis of the operation of route 456 following the first 12-months of service. It considers usage and operation on the full length of the route. In light of concerns and suggestions raised by local residents and stakeholders it also includes reviews of operation via Farm Road in the Winchmore Hill area; operation in the Rosewood Drive area in Crews Hill; and an option to extend the service to Crews Hill Station.

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Current service

Usage and travel patterns

4. As part of the development of the proposal to introduce new route 456, TfL forecast that the new service would attract approximately 1,850 daily Monday-to-Friday trips, which is comparable to usage on other 2 buses per hour (bph) services in outer London.
5. The development of the proposal to introduce route 456 was undertaken prior to the COVID-19 pandemic. Bus usage has decreased across London as a result of the pandemic with demand not expected to return to pre-pandemic levels before 2030 owing to an increase in home-working and a change to retail and leisure travel patterns. The change in bus demand is generally greater in central and inner London and on radial bus corridors previously associated with large commuting levels of usage.
6. Figure 1 shows the difference between March 2019 and March 2022 AM peak bus boarders by London borough. As an outer London borough, Enfield retained a higher proportion of demand compared with most central and inner London boroughs with 78% of pre-pandemic usage.

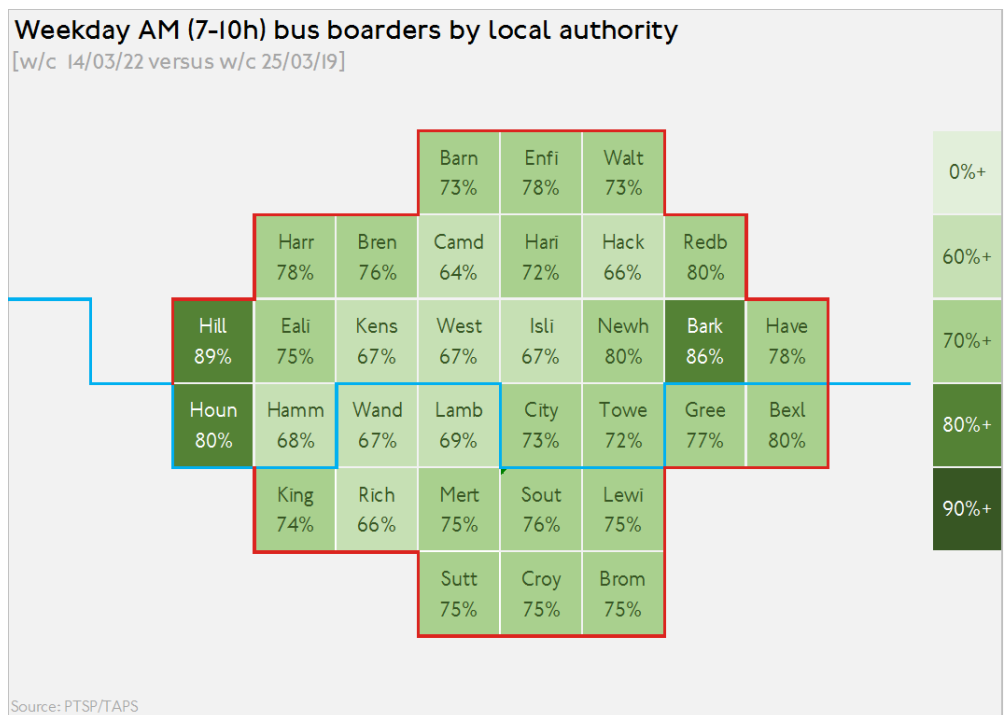


Figure 1: Bus boarders by local authority, March 2019-March 2022

7. A BODS (Bus Origin and Destination) survey was undertaken on route 456 in April 2022. The survey showed a total of approximately 1,380 daily weekday trips on the service. This represents 75% of forecast usage which is broadly in line with the difference in boarders for the London Borough of Enfield as shown in Figure 1.

8. As part of TfL's long term post-pandemic demand forecasts, bus usage in Enfield is forecast to return to approximately 89% of pre-pandemic demand by the end of 2023. This would equate to approximately 1,655 trips when applied to the original total weekday usage forecast for route 456.
9. Figure 2 shows the overall change in usage on route 456 since its introduction in March 2021 to March 2022.

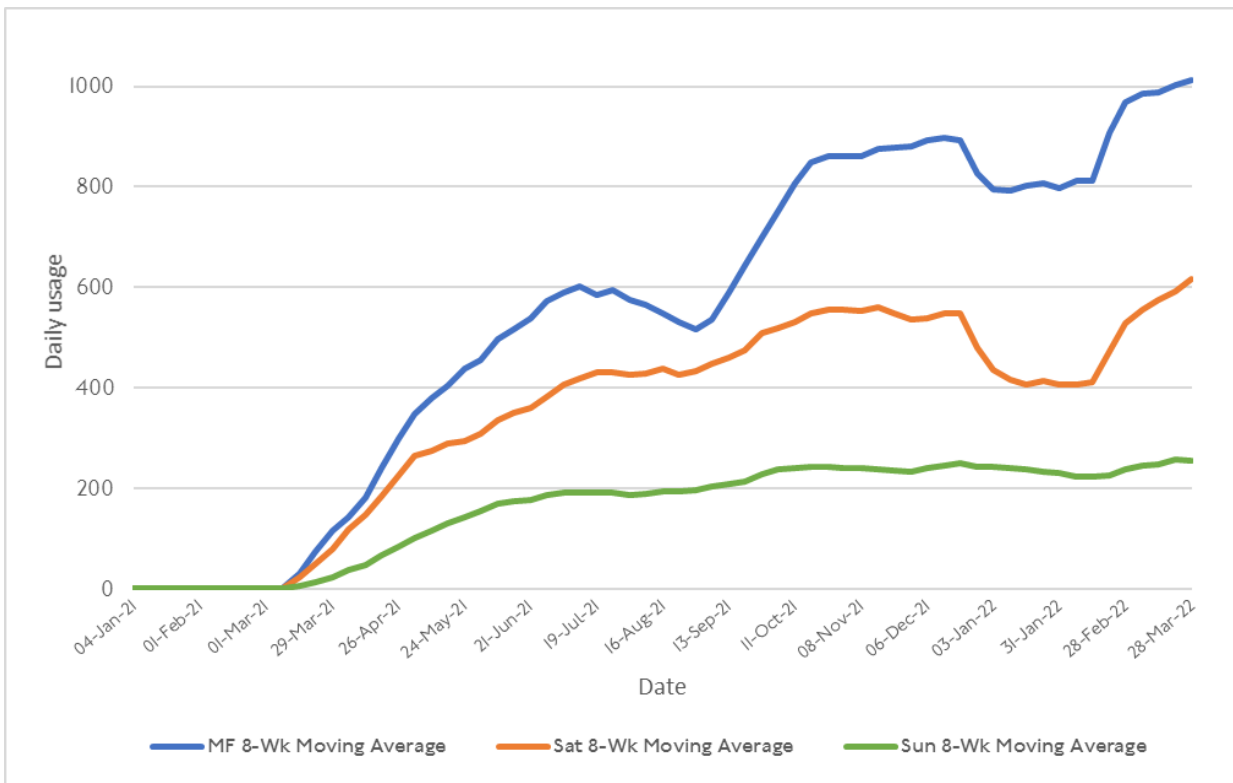


Figure 2: Daily usage on route 456 between Jan-2021 and Mar-2022

10. If usage continues to increase from an assumed 78% of pre-pandemic demand to a settled level at an assumed 89% of pre-pandemic demand, there would be approximately 1,585 trips per weekday. This would be 96% of the original weekday demand forecast after it is factored down to take account of forecast long-term pandemic changes.
11. A BODS survey was undertaken on the previous route W10 in October 2019. This showed that there were approximately 85 trips on a weekday. Figure 3 shows change in usage between March 2018 and March 2022 to demonstrate the difference in demand between route W10 and route 456.

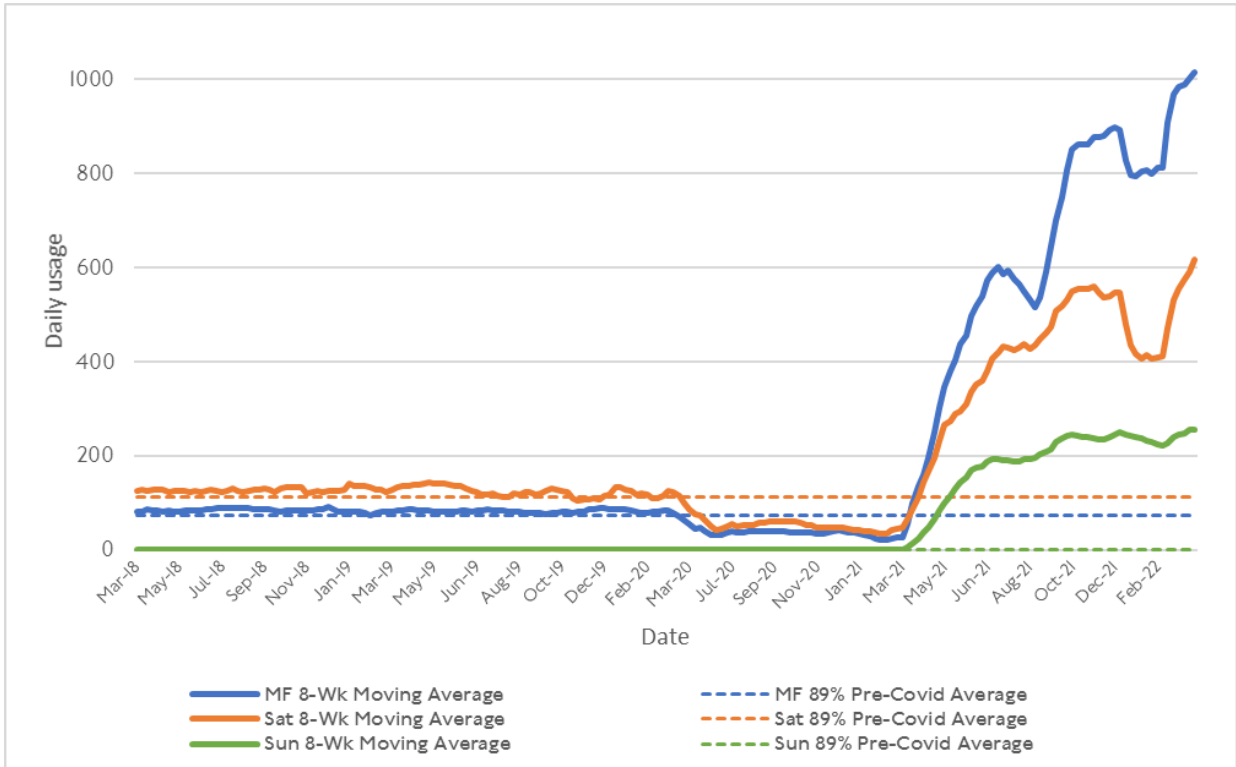


Figure 3: Daily usage on routes W10 and 456 between Mar-2018 and Mar-2022

12. BODS data for April 2022 shows that there were approximately 375 weekday trips on the section of route 456 running on the former route W10 alignment – between Crews Hill and Enfield Town. This represents an uplift of approximately 450% when compared with 2019 BODS data for route W10.
13. The BODS data for April 2022 has been distributed into trips to and from different sections of route 456. Figure 4 shows the trips to and from sections of route from the most to least number of trips per weekday (the sum of trips in Figure 4 is greater than the total number of trips owing to origin-destination pairs resulting in double counting) and those trips as a percentage of total trips. It also shows how many of the trips to and from each section are freehold – this is trips that could only be made on route 456, i.e., there is no alternative bus route providing the same link – and that figure as a percentage of the total number of trips to and from the section.

Section of route	Trips to/from	% of total	Freehold trips	% freehold trips
World's End Lane	294	21%	147	50%
Enfield Town Centre	287	21%	143	50%
Enfield Town Station	272	20%	178	65%
Willow Road	220	16%	220	100%
Farm Road/Firs Lane	212	15%	212	100%
Silver Street	206	15%	185	90%
Eversley Park Road/Church Hill	199	14%	189	95%
Rosewood estate	171	12%	171	100%
North Middlesex Hosp/Bridport Road	166	12%	165	99%
Clay Hill/Myddelton Avenue	160	12%	79	49%
Enfield Chase Station	136	10%	85	63%
Slades Hill	120	9%	52	43%
Theobalds Park Road	92	7%	92	100%
Winchmore Hill Station/The Green	74	5%	61	82%
Hedge Lane	69	5%	63	91%
Sterling Way/Gloucester Road	32	2%	31	97%

Figure 4: Route 456 April 2022 BODS trips per weekday by section

14. The largest proportion of trips by section is to and from World's End Lane with 294 trips. Route 377 runs in parallel with route 456 between World's End Lane and Enfield Town and the parallel section accounts for 50% of the 294 trips. The remaining 50% of trips are between World's End Lane and areas only served by route 456. A similar proportion of trips are made to and from Enfield Town Centre and Enfield Town Station with 50% and 65% trips on freehold sections respectively.
15. There are 220 trips to and from the Willow Road area and 212 trips to and from the Farm Road and Firs Lane area. These sections are served by route 456 exclusively and all trips are freehold. 166 trips are made to and from North Middlesex Hospital.
16. The BODS data has been distributed into origin-destination pairs by section of route. This shows how many trips per weekday are made between two areas along the length of the route. Origin-destination pairs are set out by magnitude in Figure 5.

Origin-Destination pairs	Trips
Willow Road - Enfield Town Station	75
Farm Road/Firs Lane - Silver Street	68
World's End Lane - Enfield Town Station	67
Rosewood Estate - Enfield Town Station	46
Clay Hill/Myddelton Avenue - Enfield Town Station	45
Rosewood Estate - World's End Lane	39
Eversley Park Road/Church Hill - Enfield Town Station	38
Willow Road - Enfield Town Centre	34
Clay Hill/Myddelton Avenue - Enfield Town Centre	33
Slades Hill - Enfield Town Centre	29
North Middlesex Hospital/Bridport Road - Farm Road/Firs Lane	28
North Middlesex Hospital/Bridport Road - Silver Street	28

Figure 5: Route 456 April 2022 BODS trips – origin-destination pairs

17. The largest proportion of origin-destination pairs are between the Willow Road area and Enfield Town Station (75). This is a section of route previously served exclusively by route W10, and familiarity with the service provided by the W10 is likely to be a factor behind the relatively high usage. A similar number of trips are made between the Farm Road/Firs Lane area and Silver Street (68) and between World's End Lane and Enfield Town Station (67). Farm Road and Firs Lane were previously unserved by the bus network – route 456 is the only route running through the heart of the area which is likely to be a reason for the relatively high usage. The World's End Lane – Enfield Town Station link broadly mirrors route 377. World's End Lane generates significant school related demand which contributes to demand on route 456.
18. TfL will undertake an additional BODS survey later in 2023 for further analysis of usage and demand patterns.

Operational performance

19. The performance of all London bus routes is continually reviewed to help ensure that a reliable network is provided. Route 456 is a low frequency route (low frequency routes run at a frequency of 4 bph or less). The reliability of low frequency routes is measured by the percentage of buses that arrive on time at bus stops. This can be affected by insufficient running time in a schedule and variable traffic conditions caused by congestion, road works and road traffic collisions. The percentage of buses that depart from bus stops ahead of schedule is also a measure of reliability for low frequency routes.

20. Figure 6 shows the performance of route 456 over a 12-month period based on these criteria.

Q1 2021/22		Q2 2021/22		Q3 2021/22		Q4 2021/22		Current Annual Average		Minimum Standard	
On Time (%)	Departing Early (%)	On Time (%)	Departing Early (%)	On Time (%)	Departing Early (%)	On Time (%)	Departing Early (%)	On Time (%)	Departing Early (%)	On Time (%)	Departing Early (%)
82.2	3.1	84.9	4.1	83.6	2.7	86.1	2.0	84.2	3.0	86.0	1.0

Figure 6: Route 456 – performance 2021-22

21. The target for buses arriving on time on route 456 is 86%. Over the first 12 months of operation 84.2% of buses arrived on time. However, performance has broadly improved over the first four quarters with 86.1% of buses arriving on time in Quarter 4 of 2021-22. The percentage of buses departing from bus stops early has also improved.

22. The operating company has provided details of causes of delay to the service within the first 12-months of operation. The majority of incidents relate to various road works, including road re-surfacing, bus stop and utilities works. The operator has noted that the reported incidents have not resulted in any significant delay to service. Figure 7 shows the number of occurrences by type of incident.

Cause of delay	No. of occurrences
Road works	86
Road traffic collisions	19
Emergency vehicle activity	5
Events	5
Mechanical failure - bus	2
Parking obstruction	1
Tree obstruction	1

Figure 7: Route 456 – occurrence of delay-causing incidents

23. On one occasion delays were caused as a result of a parked vehicle causing an obstruction at The Green, Winchmore Hill. On a separate occasion, vehicles were obstructed by a tree on Slades Hill. These were isolated reported incidents and did not result in significant delay.

24. Congestion issues were reported on Bincote Road in the World's End area of Enfield in advance of and during the first week of operation in March 2021. On these occasions, congestion was caused by the presence of parked vehicles on both sides of the road and a high level of traffic at school start and end times. As a result, some buses were obstructed and unable to run to schedule. It is believed traffic and parking conditions were exacerbated by the COVID-19 pandemic with a higher number of school trips being undertaken by private car. LB Enfield considered options for introducing new parking restrictions on Bincote Road to help alleviate congestion. A restriction operating at the start and end of the school day was initially introduced experimentally on alternate sides of Bincote Road. As the restriction resulted in an improvement in traffic flow, the restriction has been retained and made permanent.
25. All bus routes have scheduled recovery time at termini to help maintain reliability. Recovery time is critical for absorbing any delays encountered on previous trips and helping to ensure subsequent trips depart on time. For best reliability the minimum total recovery time on a route should be of the order of 12% of cycle time (cycle time consists of the sum of in-service realistic running times in both directions, any out-of-service running time at terminals and stand time), though this will not always be achievable or practicable. The peak cycle time on route 456 is 150 minutes, with 120 minutes at off-peak times. The target minimum recovery time is therefore 18 minutes at peak times and 14.4 minutes off-peak.
26. Figure 8 shows the typical scheduled recovery time across all days, the difference between scheduled and actual running time and the resulting actual recovery time.

Day Type	Time Period	Actual run time exceeds scheduled run time by (mins)		Typical scheduled recovery time (mins)	Recovery time with existing resource (mins)
		Towards NMH	Towards Crews Hill		
M-F	0600-1000	3.0	1.8	27	22
	1000-1500	1.5	5.4	22	15
	1500-1830	1.5	2.9	25	21
	1830-2000	-2.3	-1.5	16	20
Sat	0600-1000	-2.0	1.3	32	33
	1000-1200	-0.9	1.6	14	13
	1200-1600	0.3	1.1	32	31
	1600-2000	-2.1	2.3	22	22
Sun	0600-1000	-2.4	1.5	27	28
	1000-1200	0.3	2.3	20	17
	1200-1600	6.6	0.3	20	13
	1600-2000	-1.1	2.1	27	26

Figure 8: Route 456 – Recovery time analysis (actual running time 19/04/22-18/05/22)

27. Sufficient recovery time is provided at peak times on Mondays to Fridays and on Saturday afternoons. Recovery time is slightly less than 12% of cycle time on Saturday mornings and Sunday afternoons; however, the schedule provides sufficient recovery time overall, with an expectation that a reliable service is achievable.

Farm Road service

Passenger, resident and local stakeholder feedback

28. Between 28 October 2019 and 5 January 2020 TfL undertook public consultation on the proposal to introduce route 456. Concern was raised by residents and local stakeholders about the suitability of Farm Road for bus operation. This included the following concerns:

- Road width at north end of Farm Road across bridge
- Loss of on-street parking
- Congestion during school start and end times
- Air and noise pollution
- Vibration caused by bus operation
- Assumption of no demand for use new service in Farm Road

29. TfL addressed these concerns in response to the consultation, via correspondence, and at a meeting with local residents and their representatives on 20 November 2020. TfL also committed to undertake this review of route 456 following 12-months of operation to identify and address any ongoing concerns.

30. Following the introduction of the route, TfL has received complaints from residents and their representatives relating to the following concerns:

- **Vibration caused to properties**

Residents of Farm Road submitted complaints reporting vibration to their properties caused by buses. The London Borough of Enfield subsequently commissioned the undertaking of a vibration impact assessment on buildings and building residents in Farm Road. The assessments were undertaken in May 2022.

Vibration levels were measured for the duration of a bus approaching and passing the properties, including any time the bus was stationary within close proximity of the properties. Multiple measurements of vibration levels from bus movements were carried out at properties on Farm Road.

The results of the vibration impact assessment showed that the levels of vibration from bus movements are 'below low probability of adverse comment' with respect to impact on residents and are unlikely to cause cosmetic damage to the properties.

- **Bus speeds**

Complaints were received about buses exceeding the speed limit on Farm Road. TfL ensured that reports of excessive bus speeds were reported to the operating company. An analysis of speeding incidents for route 456 was undertaken using TfL's tool for speed compliance. This found no record of any instances of speeding on Farm Road.

TfL also undertook bus speed road-side monitoring in Farm Road in June 2022. No buses were found to exceed the speed limit of 20 miles per hour (mph) with a maximum observed bus speed of 18 mph.

- **Carriageway suitability**

Concerns were raised that Farm Road was not suitable for bus operation based on the presence of parked vehicles, traffic levels – particularly at school start and end times – and carriageway widths with the presence of a bridge at the north-west end of the road allowing vehicle movement in one direction only at any given time.

A route test was undertaken using a single-deck bus on 15 July 2019 to help ensure that all roads were suitable for bus operation. The meeting concluded that Farm Road would be suitable for route 456 and that some changes to parking and the introduction of bus stops would aid operation of the service.

During the consultation process, concerns were raised about the suitability of Farm Road specifically during the morning peak period with the presence of commuting and school traffic. To help address these concerns, TfL undertook a further route test on the morning of 26 February 2020 using a single-deck bus. TfL and London Borough of Enfield staff attended the route test and were satisfied that Farm Road is suitable for bus operation.

During the first 12-months of operation one incident was reported of a bus mounting a kerb on Farm Road adjacent to the bridge. This incident was reported to and addressed by the bus operating company. Neither TfL nor the bus operating company are aware of any subsequent incidents of a similar nature and are of the view that this was an isolated occurrence.

The bus operating company have reported one collision or near-miss in Farm Road during the first 12-months of operation in which a van made contact with the rear of a bus as the bus driver was giving way to other traffic. TfL and the operating company take the view that this incident was not caused by the operation of the bus and was not unique to the specific highway layout of Farm Road. The operating company does not have reports of any other incidents.

TfL remains satisfied that Farm Road is suitable for bus operation.

- **Hours of operation**

TfL consulted on proposals to operate route 456 between 07:00 and 19:00 on all days of the week. The proposals were revised so the new service would serve the hospital between 07:00 and 20:00 following requests received in response to the consultation for longer hours of operation to provide access to North Middlesex Hospital during visitor opening hours.

In response to notification of the revised hours of operation and during the first 12-months of operation, complaints were received about the service running earlier and later than originally proposed. It was stated that there would be no demand for the service before 07:00 or after 19:00 and that buses running earlier and later than initially planned would cause disruption to residents in Farm Road.

BODS data for April 2022 shows that there were 15 trips on a typical weekday on the first bus towards North Middlesex Hospital – 2 of which travel across Farm Road to reach the hospital. The same data shows that there were 24 trips on the first bus towards Crews Hill. It also showed that there were 4 trips on the last bus from North Middlesex Hospital. There were 9 trips on last bus from Crews Hill. While the passenger numbers of the first and last buses are limited, there is demand for the service before 07:00 and after 19:00 and trip numbers are expected to increase following the COVID-19 pandemic and with an increase in local route familiarity. North Hospital Middlesex Hospital has also expressed support for the route. TfL does not have any current plans to reduce the hours of operation.

- **Vehicle noise and type**

During the first 12-months of operation, complaints were received about excessive bus noise in Farm Road. The bus operating company investigated reports of excessive noise from brakes and confirmed that no defects relating to braking systems had been identified. On a separate occasion the operator confirmed that a vehicle was inspected, and a faulty valve (non-brake related) was discovered. The part was replaced which eliminated excess noise. The operator will investigate any further reports of excessive noise if they are received.

Complaints were also received about the type of bus used on route 456 with requests for the introduction of electric vehicles with the perception that this would reduce air and noise pollution. TfL is committed to providing a bus network that offers an attractive alternative to private car use with buses that minimise emissions and pollution on London's streets. While there is no specific timeframe for introducing electric buses to route 456, the buses currently operating meet Euro VI emission standards. This is the same emissions standard as the Mayor of London's Ultra Low Emission Zone (ULEZ). Euro VI is the latest emission standard for vehicles, reducing emissions of NOx by up to 95%. TfL will continue to roll out zero emission buses across the network with an aim of operating a fully zero emission bus fleet by 2037.

- **Bus alighting passenger between stops**

A complaint was received about a bus stopping between bus stops on the western approach to the bridge on Farm Road. The operator investigated the incident and advised that the bus stopped for an elderly/vulnerable passenger to alight.

Usage and operational performance

31. During the consultation period, concerns were raised by residents and local stakeholders that there would be no usage at bus stops on Farm Road owing to opposition to the route and local car ownership levels. BODS data from April 2022 has been analysed to show passenger demand and travel patterns: There were 54 trips to and from bus stops on Farm Road on a typical weekday with an even split by direction. This is shown in Figure 9.

Section of route	April 2022 weekday trips	% of trips
Farm Road total	54	100%
Farm Road to/from north/west	28	52%
Farm Road to/from south/east	26	48%

Figure 9: Route 456 – Farm Road trips, April 2022 BODS data

32. The most popular Farm Road links are to and from the World's End Lane area with 19 trips, and between Farm Road and the Silver Street area with 13 trips.
33. The BODS survey indicates a reasonable level of demand for route 456 in Farm Road. Usage is expected to increase as confidence in public transport continues to recover following the COVID-19 pandemic and as familiarity with route 456 grows.
34. TfL is not aware of any concerns about congestion or road conditions on Farm Road impacting bus journey times. Bus speeds have been reviewed across Farm Road in both directions based on data from 19 April to 18 May 2022. Bus speeds separated by direction and section of route across Farm Road are shown in Table 10.

Period	Winchmore Hill Stn to Farm Road speed (mph)	Farm Road to Firs Lane speed (mph)	Overall eastbound speed (mph)	Firs Lane to Farm Road speed (mph)	Farm Road to Winchmore Hill Station speed (mph)	Overall westbound speed (mph)	Average overall speed (mph)
AM Peak	11.1	12.2	11.7	10.4	10.0	10.2	10.9
Interpeak	10.7	11.7	11.2	11.3	9.9	10.6	10.9
PM Peak	10.8	12.7	11.8	12.2	8.8	10.5	11.1

Figure 10: Route 456 – Mon-Fri Farm Road bus speeds (19/04/22-18/05/22)

35. The average bus speed across Farm Road in both directions on weekdays as shown in Table 10 is approximately 11 miles per hour (mph). This is higher than the average bus speed for the London bus network as a whole, which is 9.2 mph.
36. Figure 11 shows bus speed variation via Farm Road in both directions.

Measure	Bus speed (mph)
Average	11.0
Upper quartile	12.7
Lower quartile	9.2
Interquartile range	3.4

Figure 11: Route 456 – Farm Road weekday bus speed variation (19/04/22-18/05/22)

Appraisal of alternative routeings

37. In advance of the introduction of route 456, residents and local stakeholders requested that TfL consider two alternative routeings through the Firs Lane area to avoid running on Farm Road: via the full length of Firs Lane and Green Lanes; and via Barrowell Green.
38. Suggested routeings via Firs Lane and Green Lanes and via Barrowell Green are shown in Figure 12.

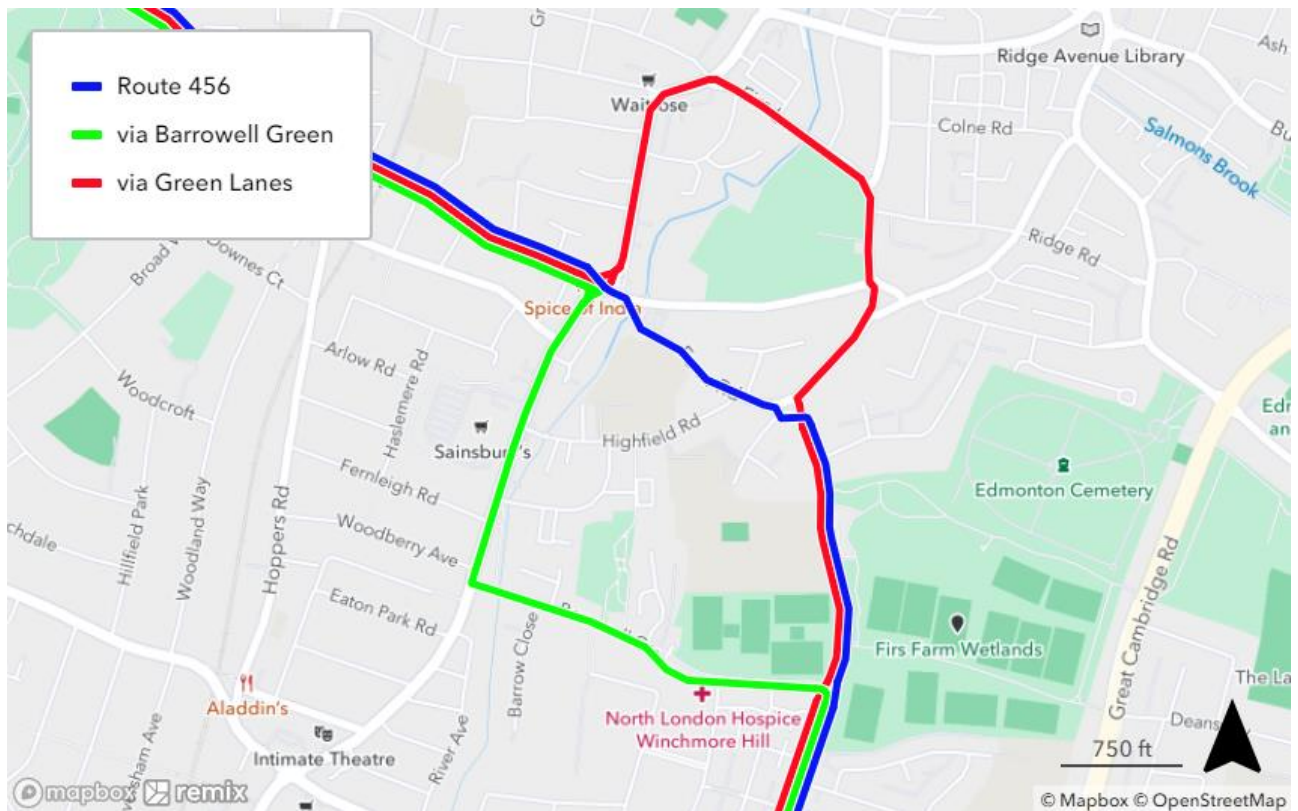


Figure 12: Route 456 – Alternative routeings through Firs Lane area

39. Prior to the introduction of the service, TfL appraised running the service via the suggested alternative routeings and determined that there would not be a business case for either routeing. Both routeings have been re-appraised following 12-months of operation and the outcome is set out below:

- **Firs Lane-Green Lanes routing analysis**

A routing via Firs Lane and Green Lanes would increase total return mileage by approximately 1.05 miles compared with the existing routing via Farm Road. As shown in Table 11, the average bus speed across Farm Road is approximately 11 mph. If a routing via Firs Lane and Green Lanes were to be undertaken at an assumed higher speed of 11.5 mph, journey time for a round trip would increase by approximately 5.5 minutes.

Figure 13 shows the recovery time based on actual running time from 19 April to 18 May 2022 and the impact on recovery time as a result of a routing via Firs Lane and Green Lanes.

Day type	Period	No. of buses in operation	Total recovery time - actual (mins)	Recovery time via Firs Lane and Green Lanes (mins)
Mon-Fri	AM Peak	5	22	17
Mon-Fri	Interpeak	4	15	10
Mon-Fri	PM Peak	5	21	15
Mon-Fri	Evening	4	20	14
Sat	AM Morning	4	33	27
Sat	AM Daytime	4	13	8
Sat	PM Peak hr	5	31	25
Sat	PM Daytime	4	13	8
Sat	Evening	4	22	16
Sun	AM Morning	2	28	22
Sun	AM Daytime	2	17	12
Sun	PM Daytime	2	13	8
Sun	Evening	2	26	21

Figure 13: Route 456 – Recovery time analysis via Firs Lane/Green Lanes

Running via Firs Lane and Green Lanes with existing resource would result in low recovery times throughout the day on Mondays-to-Fridays, Saturday daytime hours (excluding the peak hour) and Sunday daytime hours. An additional bus would need to operate at these times to maintain a reliable service and this has an estimated cost of £175,000 per annum. This is higher than the original estimate of £53,000 per annum – based on analysis prior to the introduction of route 456 – as an additional bus would need to run during both Monday-to-Friday peaks owing to lower recovery times and higher running times on the alternative routing.

The original analysis of a Firs Lane/Green Lanes assumed that there would be no trips to or from bus stops in Farm Road itself. BODS data for April 2022 shows that there were 54 trips to and from Farm Road. Re-routeing the 456 via Firs Lane and Green lanes would impact passengers who use Farm Road bus stops, with disbenefit generated as a result of increased walking distance to alternative bus stops.

New trips would be generated as a result of serving areas at the north of Firs Lane and Green Lanes. However, this would not outweigh the additional cost of re-routeing the service and the disbenefit for passengers who access bus stops on Farm Road through worsened access to the bus network and disbenefit generated as a result of increased journey time for through-passengers who travel across Farm Road in both directions. As such, running via Firs Lane and Green Lanes is not considered to be a viable option.

- **Barrowell Green routeing analysis**

A routeing via Barrowell Green would increase total return mileage by approximately 0.36 miles compared with the existing routeing via Farm Road. If a routeing via Barrowell Green were to be undertaken at a speed of 11.5 mph, journey time for a round trip would increase by approximately 2 minutes.

Figure 14 shows the recovery time based on actual running time from 19 April to 18 May 2022 and the impact on recovery time as a result of a routeing via Barrowell Green.

Day type	Period	No. of buses in operation	Total recovery time (mins)	Recovery time via Barrowell Green (mins)
Mon-Fri	AM Peak	5	22	20
Mon-Fri	Interpeak	4	15	13
Mon-Fri	PM Peak	5	21	18
Mon-Fri	Evening	4	20	18
Sat	AM Morning	4	33	31
Sat	AM Daytime	4	13	11
Sat	PM Peak hr	5	31	28
Sat	PM Daytime	4	13	11
Sat	Evening	4	22	20
Sun	AM Morning	2	28	26
Sun	AM Daytime	2	17	15
Sun	PM Daytime	2	13	11
Sun	Evening	2	26	24

Figure 14: Route 456 – Recovery time analysis via Barrowell Green

Running via Barrowell Green with existing resource would result in low recovery times in the interpeak period on Mondays-to-Fridays, Saturday daytime hours (excluding the peak hour) and on Sunday afternoons. An additional bus would need to operate at these times to maintain a reliable service which has an estimated cost of £48,000 per annum. This is higher than the original pre-route introduction estimate of £35,000 per annum as an additional bus would need to run on Sunday afternoons owing to lower recovery times; additional resource which was not forecast as a requirement for this routeing prior to implementation.

TfL aims to provide access to the bus network within 400-metres of all residential areas in London. The current 456 routeing via Firs Lane and Farm Road provides access to the bus network for households to the north and south of Firs Farm – areas which were previously remote from the network. If the service ran on Barrowell Green, it would only serve households to the south of Firs Farm and leave the northern area – approximately 325 households – remote from the bus network. Given the reduced access and additional cost, a routeing via Barrowell Green is not considered appropriate.

Rosewood Drive service

Passenger, resident and local stakeholder feedback

40. Route 456 serves housing on a number of roads accessed via Rosewood Drive at its Crews Hill terminus. The area is comprised of approximately 130 houses on Rosewood Drive, Ash Ride, Beech Avenue, Cypress Avenue, Golf Ride and Wroxham Gardens.
41. Prior to the introduction of route 456, the estate was served by route W10 which ran at a lower frequency, fewer hours of operation and provided fewer direct links than the new service. To provide access to North Middlesex Hospital during visiting hours the first bus departs from Crews Hill at 06:10 and the last bus arrives at 20:54.
42. Complaints have been received from local residents and stakeholders regarding the operation of route 456 around the Rosewood Drive area. In particular, objection has been raised about the hours of operation with reports of disturbance caused by the sound of buses running through the area in the morning and evening.
43. Route W10 had previously used a hesitation point on Golf Ride at the western end of the estate. TfL and LB Enfield intended to introduce bus stand markings on Golf Ride to help ensure that buses on route 456 had a kerbside position at which to hesitate without causing obstruction. Complaints were received from adjacent residents on Golf Ride about disturbance caused by buses waiting at this location. Subsequently, TfL and LB Enfield reviewed options for an alternative stand location. It was agreed that a new stand could be sited on Ash Ride at a location with no immediately adjacent houses. The new stand was introduced in autumn 2021.

Usage, key destinations and hours of service

44. BODS data for April 2022 shows that approximately 170 trips are made to and from the Rosewood Drive area on a typical weekday. This compares with approximately 25 trips on route W10 on a typical weekday prior to the introduction of route 456, based on BODS data for October 2019.
45. A significant proportion of Rosewood Drive area trips on route 456 are between the estate and bus stops at Enfield Town Station – approximately 45 trips on a typical weekday. These trips are made on a section of route previously served by route W10. However, a similar number of trips are made between the estate and the World's End Lane area – approximately 40 trips on a typical weekday. This represents a new direct link provided by route 456 where previously passengers would have needed to change between different bus routes.
46. BODS data for April 2022 shows that there were no trips to or from the Crews Hill terminus on the first or last bus of the day. However, there was demand for the first and last service elsewhere on the route with approximately 50 trips undertaken. Withdrawing the first or last buses would remove access to the service for these passengers. Furthermore, total usage is expected to increase as confidence in public transport continues to recover and familiarity with the service grows. TfL does not intend to remove the first or last service on route 456.

Crews Hill Station extension analysis

Passenger, resident and local stakeholder feedback

47. Crews Hill Station is located approximately 0.8 miles (via the road network) to the north of the current terminus of route 456 in the Rosewood Drive estate. The station is served and operated by Great Northern which currently provides a 2 trains per hour service to Moorgate in central London via Enfield Chase, and to Hertford North in Hertfordshire.
48. Requests have been received to extend route 456 to terminate at Crews Hill Station instead of the Rosewood Drive estate. The requested objective is to remove terminating buses from the housing estate to reduce reported disturbance caused by the sound of buses, and to provide new links to rail services at the station and access to garden centres between Rosewood Drive and the station.

Appraisal of future extension to Crews Hill Station

49. There is currently no stand or turning point at Crews Hill Station at which a bus service could safely terminate. Discussions have taken place between LB Enfield and Great Northern about the possibility of introducing a new stand and turning point for buses. However, no firm plans have been developed.
50. The option to extend route 456 to the station has been evaluated following 12-months of operation to determine whether there would be a business case for an extension should a stand and turning point be deliverable.
51. Route 456 currently serves an area of approximately 130 households on Rosewood Drive, Ash Ride, Beech Avenue, Cypress Avenue, Golf Ride and Wroxham Gardens. BODS data for April 2022 shows that approximately 170 daily trips are made on route 456 to and from the Rosewood Drive area. If the service were to run directly to the station without running via Rosewood Drive, direct access to the route would be removed for those passengers. It would also create a network hole by leaving approximately 50 of the 130 households a distance of 400-metres or greater from the bus network. To retain access to route 456, an extension to Crews Hill Station would include continuing operation via the Rosewood Drive estate in both directions.
52. Figure 15 shows how route 456 would be extended to Crews Hill Station while still serving the estate.

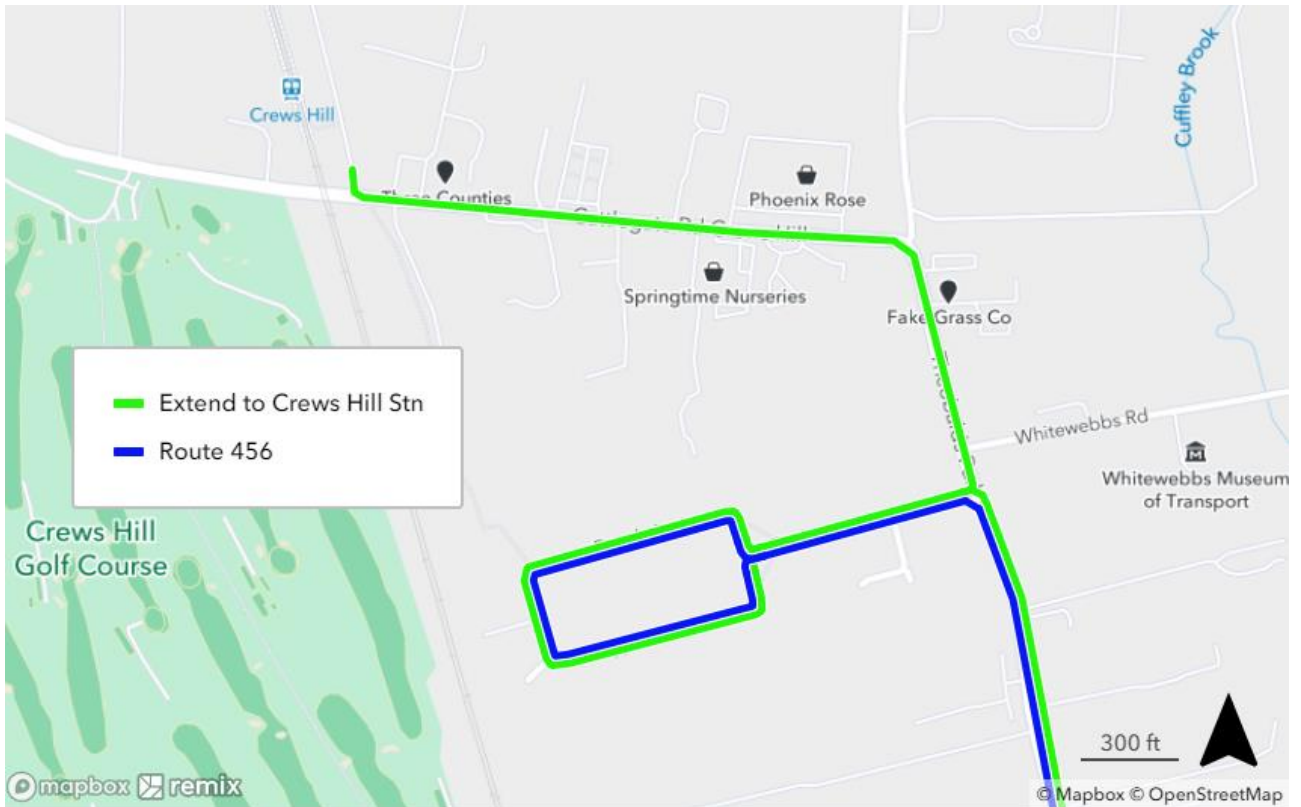


Figure 15: Route 456 – Provisional extension routeing to Crews Hill Station

53. Route 456 would run on Theobald's Park Road and Cattlegate Road between the Rosewood Drive area and Crews Hill Station. There are few houses between Rosewood Drive and Crews Hill Station; however, a number of garden centres are located on Cattlegate Road and Theobald's Park Road and these would generate some new demand.
54. Route 456 currently provides a direct link to Enfield Chase Station which is on the same rail line as Crews Hill. As such, new demand for Crews Hill Station would be limited to the northern section of the route which is relatively sparsely populated.
55. An extension to Crews Hill Station is forecast to generate approximately 180 new trips per weekday. This would be comprised of approximately 110 trips to and from Theobald's Park Road and Cattlegate Road, including access to garden centres on this section. It is forecast that there would be approximately 70 new trips to and from the station itself per weekday.
56. Extending the route would increase return running time by approximately 8-9 minutes on average. Figure 16 shows that affect this would have on recovery time.

Day type	Period	No. of buses in operation	Total recovery time (mins)	Recovery time extended to Crews Hill Stn (mins)
Mon-Fri	AM Peak	5	22	14
Mon-Fri	Interpeak PM	4	15	7
Mon-Fri	PM Peak	5	21	12
Mon-Fri	Evening	4	20	11
Sat	AM Morning	4	33	24
Sat	AM Daytime	4	13	5
Sat	PM Peak hr	5	31	22
Sat	PM Daytime	4	13	5
Sat	Evening	4	22	13
Sun	AM Morning	2	28	20
Sun	AM Daytime	2	17	9
Sun	PM Daytime	2	13	5
Sun	Evening	2	26	18

Figure 16: Route 456 – Recovery time analysis extended to Crews Hill Station

57. Extending route 456 to Crews Hill Station with existing resource would result in low recovery times on all days in all time periods with the exception of the morning and the peak hour on Saturdays and the morning and evening on Sundays. An additional bus in the schedule would need to operate at all other times to maintain a reliable service. This has an estimated cost of £180,000 per annum.
58. The forecast 180 new trips generated as a result of an extension to Crews Hill Station would not be sufficient to justify the cost associated with an extension. As such, TfL does not have current plans to extend the service.
59. Pedestrian access is provided between the Rosewood Drive area and Crews Hill Station via a 400-metre-long footpath between Beech Avenue and Cattlegate Road. Although lit, the footpath is relatively narrow and unattractive.

Summary

60. Route 456 was introduced in March 2021 at the peak of the COVID-19 pandemic. Demand for bus network across London was significantly reduced as a result of the pandemic and this impacted the number of passengers using route 456 in the first 12-months of operation. Despite the impact of the pandemic, usage on route 456 has consistently increased since its introduction and is expected to settle at a level close to original forecasts.
61. Demand is relatively well distributed across the length of the route. There is strong demand on the northern section which replaced former route W10. Usage on the new section south of Enfield town centre is expected to grow as the service continues to gain familiarity.
62. The operational performance of the route has broadly continued to improve since its introduction. Running time data suggests that existing resource is sufficient to provide a reliable service.
63. Concerns were raised about route 456 running on Farm Road prior to and during the first 12-months of operation. No significant operational concerns have been identified and TfL is satisfied that running via Farm Road remains the most appropriate routeing for the Firs Lane area. As such, there are no planned changes for the route in this area.
64. Data shows that route 456 provides an important service to the Rosewood Drive area of Crews Hill. Withdrawing the service from the Rosewood Drive area would remove access to the bus network for the approximate 130 households and leave approximately 50 remote from the network. There is also demand for the first and last buses elsewhere on the route. Given existing demand, TfL has no plans to withdraw service from Rosewood Drive or the connected residential roads.
65. Extending route 456 to Crews Hill Station would be costly. There would also be insufficient forecast demand to justify an extension. With this in mind, TfL does not intend to pursue options to extend the route at the present time.