

## Model Outputs | Addendum Report

3 November 2021  
Version 1.0  
Issue



### 1 Commission

Fore Consulting Limited (“Fore”) were appointed by Middlesbrough Council (“the client”) to extract statistics in relation to the operation of the local highway network for the area of Nunthorpe in south east Middlesbrough. The aim of the commission is to provide statistics in relation to the current and future operation of the transport network in Nunthorpe. These statistics are to be presented to the community of Nunthorpe by Middlesbrough Council and will supplement a baseline study carried out by Lichfields. The baseline study intends to provide an audit of the services, facilities and infrastructure available within the study area, of which transport is a part thereof.

Statistics have been extracted from the Middlesbrough Transport Model, which is a strategic transport model of Middlesbrough covering the entire Local Authority area. The model comprises a combination of wide-area macroscopic modelling and individual microsimulation subnetworks so that both the strategic and detailed local impacts of growth, developments and highway improvements can be properly assessed through a combination of macroscopic and microscopic modelling.

As part of this commission, the following statistics are provided:

- **Daily flow:** representing the total daily flow by link.
- **Level of Service (LoS):** representing the predicted level of service for both links and key junctions within the study area. The LoS relates to the traffic quality service.

### 2 Assessment Scenarios

For the purpose of this study, statistics relating to the 2019 base year and 2025 and 2030 do minimum future assessment year scenario have been analysed. The do minimum future assessment year scenarios include all relevant committed development that are likely to have an impact on the local highway network and background traffic growth calculated from NTM / TEMpro.

Prior to the development of the model, Middlesbrough Council provided a comprehensive list of committed development sites, as well as a detailed breakdown of the likely occupancy / build out across each future assessment year scenario.

A summary of the committed development sites included as part of the modelling are set out in Table 1, below.

**Table 1: Summary of Committed Development Sites**

Planning Application	Planning Application Reference	Development Type
Police Headquarters, Ladgate Lane, Middlesbrough	M/OUT/0173/11/P	Residential
Stainsby Hall Farm, Brookfield, Middlesbrough	M/FP/0572/11/P	Residential
Land at Stainsby Hall Farm, Middlesbrough	17/0045/FUL	Residential
Grey Towers, Nunthorpe, Middlesbrough	18_0060_FUL	Residential
Land at Hemlington Grange, Middlesbrough	M/FP/0082/16/P M/FP/0082/16/P	Residential
Clairville Road, Middlesbrough	M/FP/0977/13/P	Residential
Land to Rear of 50 - 60 Hutton Road, Middlesbrough	17/0585/OUT	Residential
Former Sports Ground, Hutton Road, Middlesbrough	18/0247/FUL	Residential
Bishopton Road, Middlesbrough	17/0895/FUL	Residential
Former Tennis World, Marton Road, Middlesbrough	17/0895/FUL	Residential
Former MTLC Complex, Cargo Fleet Lane, TS3 8PE + Land Adjacent MTLC Cargo Fleet Lane, Middlesbrough,	M/FP/0692/1/P M/FP/0174/14	Residential
Land Bounded by Ormesby Bank, Guisborough Road and Rothesay Grove, Nunthorpe, Middlesbrough	R/2016/0142/FFM	Residential
Longbank Farm, Farbank Road, Ormesby, Middlesbrough	R/2014/0816/RSM	Residential
Phase 2, Prissick Base, Brackenhoe Site, Middlesbrough	M/RG/0899/13/P	Residential
Prissick Base, Ladgate Lane, Marton Avenue, Middlesbrough	18/0477/OUT	Residential
Land off Sussex Street and Gosford Street, Middlesbrough	19/0203/FUL	Residential
Land at Roworth Road, Middlesbrough	18/0643/FUL	Residential
Plymouth Brethren, Middlesbrough,	18/0778/OUT	Residential
Acklam Gardens, Middlesbrough	M/FP/1956/04/P M/FP/1257/14/P	Residential
Land to the South of College Road, Middlesbrough	17/0347/FUL	Residential
Land West of Strait Lane	M/FP/1232/15/P	Residential
Former Acklam School Site, St Davids Way	20/0004/FUL	Residential
Residential Development at Gresham, Middlesbrough	20/0289/FUL	Residential
Residential Development at Grove Hill, Middlesbrough	20/0546/FUL	Residential

Planning Application	Planning Application Reference	Development Type
Tower Green	20/0198/FUL	Residential
Land at Hemlington Grange, Middlesbrough	M/FP/0082/16/P	Employment
Land to South of Scotts Road, Middlesbrough	16/5068/OUT	Commercial
Land at Central Gardens, Middlesbrough	17/0195/OUT	Employment
Riverside Park Industrial Estate, Ferrous Road, Middlesbrough	18/0308/FUL	Employment
Gateway Middleshaven Between A66 and Riverside Stadium, Cargo Fleet, Middlesbrough	M/FP/0773/13/P	Employment
A V Dawson, Depot Road	20/0234/FUL	Employment
Site K, Bulkhaul, Brignell Road	17/0159/FUL	Employment
Discovery Academy, Sandy Flatts	20/0566/FUL	Employment
Melrose House Office Development, Middlesbrough	20/0683/FUL	Employment
BoHo X	20/0764/FUL	Employment
Northern School of Art	19/0663/FUL	Employment
Land at South Tees Development Corporation	R/2020/0357/OOM <sup>1</sup>	Employment

## 3 Model Statistics

### 3.1 Daily Flow

Daily flow statistics have been derived for all links within the study area. These statistics have been provided in order to demonstrate the likely increase in flow compared to the 2019 base year.

The daily flow has been calculated by combining peak hour flows output from the model and factoring this by a 24-hour Annual Average Daily Traffic (AADT) factor. A sample of Automatic Traffic Counts (ATCs) and RADAR surveys (where applicable) has been used to determine the 24-hour AADT traffic growth factor. The surveys were undertaken as part of the development of the base year model and have been undertaken to the specification set out in Table 2, overleaf.

<sup>1</sup> Located in Redcar and Cleveland.

**Table 2: ATC / RADAR Survey Specification**

Date	Wednesday 8 May to Tuesday 21 May 2019
Type	Automatic Traffic Count or RADAR
Period	14 days
Classifications	Fully classified
Interval	15 minutes
Direction	Bi-directional

27 of 112 ATCs / RADAR surveys have been used to determine the AADT factor. This represents a sample size of approximately 25%. The ATCs / RADAR surveys represent a variety of road types / speeds and cover the fully modelled area.

The average daily two-way flow over a 24-hour period (covering a period of two weeks) has been extracted for cars / LGVs and HGVs. An AADT factor has then been derived by dividing the average peak hour two-way flow (AM + PM) by the average daily two-way flow over a 24-hour period. This has been undertaken separately for cars / LGVs and HGVs. The resulting AADT factors are as follows:

- 24-hour AADT factor for cars and LGVs: 7.402
- 24-hour AADT factor for HGVs: 7.856

Table 3, below, presents the daily flow by link for the 2019 base year and 2025 and 2030 future assessment year scenario. Visual daily flow statistics are also presented at Figure 1 to Figure 3.

**Table 3: Daily Flow**

Location Ref.	Link	Direction	2019	2025	2030
01	Stainton Way   West of The Fairway	Eastbound	14,181	14,539	15,516
		Westbound	16,016	15,932	16,041
02	The Fairway   South of Stainton Way	Northbound	7,207	8,103	8,594
		Southbound	4,575	5,786	5,899
03	A172 Dixons Bank   North of Stainton Way	Southbound	16,165	18,374	18,209
		Northbound	16,716	16,633	17,865
04	A172 Dixons Bank   South of Stainton Way	Southbound	16,344	18,279	18,981
		Northbound	14,502	15,161	15,645
05	Stainton Way   West of A172 Dixons Bank	Eastbound	13,323	13,731	15,186
		Westbound	12,532	12,777	13,092
06	Stainton Way   East of A172 Dixons Bank	Eastbound	9,579	10,307	10,300

Location Ref.	Link	Direction	2019	2025	2030
		Westbound	11,163	10,813	11,208
07	Stainton Way   East of Mallowdale	Westbound	6,940	6,985	7,066
		Eastbound	6,351	6,598	6,582
08	Mallowdale   South of Stainton Way	Northbound	4,536	3,829	4,098
		Southbound	3,687	3,792	3,771
09	A172 Dixons Bank   North of Guisborough Road	Southbound	16,434	18,229	18,904
		Northbound	14,183	14,714	15,162
10	A172 Dixons Bank   South of Guisborough Road	Northbound	12,701	12,330	13,176
		Southbound	11,998	12,736	12,951
11	Brass Castle Lane   West of A172 Dixons Bank	Eastbound	3,187	3,998	3,837
		Westbound	6,004	7,227	7,048
12	Guisborough Road   East of A172 Dixons Bank	Westbound	6,531	8,590	8,393
		Eastbound	6,704	8,493	9,135
13	Guisborough Road   East of Clevegate	Westbound	8,040	8,993	8,906
		Eastbound	7,794	8,696	9,265
14	Clevegate   North of Guisborough Road	Southbound	2,824	2,564	2,365
		Northbound	3,502	2,895	2,937
15	Mallowdale   West of Warcop Close	Northbound	2,874	1,617	1,852
		Southbound	2,316	1,769	1,728
16	Brass Castle Lane   South of Fulford Way	Northbound	1,225	1,390	1,798
		Southbound	1,425	1,654	1,678
17	A172 Dixons Bank   West of Poole Roundabout	Eastbound	11,284	11,874	12,008
		Westbound	12,149	11,297	11,898
18	Nunthorpe Bypass   East of Poole Roundabout	Westbound	12,791	9,888	10,022
		Eastbound	11,702	9,634	9,863
19	A172   South of Poole Roundabout	Northbound	10,617	11,730	11,903
		Southbound	10,817	12,941	13,115
20	Nunthorpe Bypass   South of Swan's Corner Roundabout	Northbound	12,687	12,199	12,915
		Southbound	11,816	10,649	10,434
21	Ormesby Bank   North of Swan's Corner Roundabout	Southbound	13,905	13,508	15,022
		Northbound	15,282	15,950	17,233
22	Middlesbrough Road   East of Swan's Corner Roundabout	Westbound	18,280	18,231	18,517
		Eastbound	20,281	20,319	20,656
23	Guisborough Road   West of Swan's Corner Roundabout	Eastbound	11,080	12,659	12,751
		Westbound	8,666	9,771	10,975

Location Ref.	Link	Direction	2019	2025	2030
24	Gypsy Lane   North of Guisborough Road	Southbound	1,524	1,581	1,995
		Northbound	2,202	2,202	2,526
25	Guisborough Road   South of Nunthorpe Train Station	Westbound	10,876	11,883	13,153
		Eastbound	12,730	14,227	14,375
26	Guisborough Road   East of The Avenue	Westbound	8,399	9,510	11,269
		Eastbound	10,540	11,934	12,097
27	Guisborough Road   West of The Avenue	Eastbound	9,776	11,542	11,961
		Westbound	8,180	9,312	9,451
28	The Avenue   North of Clarence Road	Southbound	340	326	695
		Northbound	850	871	1,431
29	Gypsy Lane   North of The Avenue	Westbound	402	421	455
		Eastbound	557	583	574

Note: green = 0 – 4,000 veh per day; orange = 4,000 – 12,000 veh per day; red = > 12,000 veh per day.

The statistics show that the daily flow is already above 12,000 vehicles on some of the key links, such as the A171, A172, A174 and A1043. Committed development-generated traffic and background traffic growth would then add to this in the future assessment year scenarios, thus increasing the daily flow further. On the more minor roads, such as Guisborough Road or Brass Castle Lane, the daily flow is generally between 4,000 and 12,000 vehicles per day, although there are some locations where future flows would be in excess of 12,000 vehicles per day. In some locations the modelling predicts a decrease in daily flow, such as along the Nunthorpe bypass. This is likely to be as a result of the strategic reassignment of trips across the network.

## 3.2 Level of Service (LoS)

LoS is a qualitative metric used to relate the traffic service quality to the occurring traffic conditions. Highway Capacity Manual (HCM) contains guidelines and procedures for computing the quality of service in various highway facilities (motorways, urban roads, junction etc.).

Six LoS categories with designated letters from A to F have been defined in HCM, and each category can be described as follows:

- **LoS A:** Free flow. Traffic flows at or above the posted speed limit and motorists have complete mobility between lanes.
- **LoS B:** Reasonably free flow. LoS A speeds are maintained, manoeuvrability within the traffic stream is slightly restricted.

- **LoS C:** Stable flow, at or near free flow. Ability to manoeuvre through lanes is noticeably restricted and lane changes require more driver awareness.
- **LoS D:** Approaching unstable flow. Speeds slightly decrease as traffic volume slightly increase.
- **LoS E:** Unstable flow. Flow becomes irregular and speed varies rapidly.
- **LoS F:** Forced or breakdown flow. Every vehicle moves in lockstep with the vehicle in front of it, with frequent slowing required.

While LoS “F” is typically defined as a failure, the definition of failure is subject to the discretion of the highway authority.

### 3.2.1 LoS for Links

Link LoS is calculated as the average speed of the link as a percentage of the free flow speed (posted speed limit). This metric can be applied to identify the quality of travel services across key corridors of the study area. Category thresholds are set out in Table 4, below.

**Table 4: Link Level of Service Categories**

Level of Service	Service Grading	Average speed (% of Speed Limit)
A	Free flow	>85%
B	Reasonably free flow	67-85%
C	Stable flow	50-67%
D	Approaching unstable flow	40-50%
E	Unstable flow, operating at capacity	30-40%
F	Forced or breakdown flow	0-30%

Link LoS has been calculated by outputting average speed statistic for all links and dividing this by the posted speed limit. This resulting percentage is used to define the link LoS. It should be noted that LoS E or F is sometimes applied to minor roads, such as residential access roads or cul-de-sacs. This occurs because vehicles are unable to travel at the posted speed limit (usually 30mph) due to the length of the link coded.

Table 5, overleaf, shows the LoS for a selection of key links across the study area for the 2019 base year and 2025 and 2030 future assessment year scenario. Visual LoS statistics for all links are also presented at Figure 4 to Figure 12.

**Table 5: Level of Service | Links**

Location Ref.	Link	Direction	2019			2025			2030		
			AM Peak	Inter-Peak	PM Peak	AM Peak	Inter-Peak	PM Peak	AM Peak	Inter-Peak	PM Peak
01	Stainton Way   West of The Fairway	Eastbound	B	B	B	B	B	B	B	B	B
		Westbound	A	A	A	A	A	A	A	A	A
02	The Fairway   South of Stainton Way	Northbound	B	A	B	B	A	B	B	A	B
		Southbound	A	A	A	A	A	A	A	A	A
03	A172 Dixons Bank   North of Stainton Way	Southbound	B	B	B	B	B	B	B	B	B
		Northbound	A	A	A	B	A	A	A	A	A
04	A172 Dixons Bank   South of Stainton Way	Southbound	A	A	A	A	A	A	B	A	A
		Northbound	A	A	A	A	A	A	A	A	A
05	Stainton Way   West of A172 Dixons Bank	Eastbound	C	D	C	D	D	C	C	D	C
		Westbound	C	B	B	B	B	B	B	B	B
06	Stainton Way   East of A172 Dixons Bank	Eastbound	A	A	A	A	A	A	A	A	A
		Westbound	A	A	A	A	A	A	A	A	A
07	Stainton Way   East of Mallowdale	Westbound	A	A	A	A	A	A	A	A	A
		Eastbound	A	A	A	A	A	A	A	A	A
08	Mallowdale   South of Stainton Way	Northbound	B	A	A	A	A	A	A	A	A
		Southbound	A	A	A	A	A	A	A	A	A
09	A172 Dixons Bank   North of Guisborough Road	Southbound	B	B	B	B	B	B	B	B	B
		Northbound	A	A	A	A	A	A	A	A	A
10	A172 Dixons Bank   South of Guisborough Road	Northbound	B	B	A	B	B	B	B	B	B
		Southbound	A	B	A	A	A	A	A	A	A
11	Brass Castle Lane   West of A172 Dixons Bank	Eastbound	F	D	E	F	E	F	F	E	F
		Westbound	A	A	A	A	A	A	A	A	A





Location Ref.	Link	Direction	2019			2025			2030		
			AM Peak	Inter-Peak	PM Peak	AM Peak	Inter-Peak	PM Peak	AM Peak	Inter-Peak	PM Peak
12	Guisborough Road   East of A172 Dixons Bank	Westbound	A	B	B	A	B	B	A	B	B
		Eastbound	A	A	A	A	A	A	A	A	A
13	Guisborough Road   East of Clevegate	Westbound	A	A	B	B	A	B	B	A	C
		Eastbound	A	A	A	A	A	A	A	A	A
14	Clevegate   North of Guisborough Road	Southbound	B	A	B	E	A	C	F	A	C
		Northbound	A	A	A	A	A	A	A	A	A
15	Mallowdale   West of Warcop Close	Northbound	A	A	A	A	A	A	A	A	A
		Southbound	A	A	A	A	A	A	A	A	A
16	Brass Castle Lane   South of Fulford Way	Northbound	B	A	A	B	A	A	B	A	B
		Southbound	A	A	A	A	A	A	A	A	A
17	A172 Dixons Bank   West of Poole Roundabout	Eastbound	C	B	C	C	C	C	C	C	C
		Westbound	A	A	A	A	A	A	A	A	A
18	Nunthorpe Bypass   East of Poole Roundabout	Westbound	C	C	C	D	C	D	D	C	D
		Eastbound	B	A	B	C	C	C	C	C	C
19	A172   South of Poole Roundabout	Northbound	C	B	C	B	B	C	B	B	C
		Southbound	A	A	A	A	A	A	A	A	A
20	Nunthorpe Bypass   South of Swan's Corner Roundabout	Northbound	F	D	F	C	C	C	C	C	C
		Southbound	A	B	A	A	B	A	A	B	A
21	Ormesby Bank   North of Swan's Corner Roundabout	Southbound	F	C	F	F	C	F	F	C	F
		Northbound	A	A	A	A	A	A	A	A	A
22	Middlesbrough Road   East of Swan's Corner Roundabout	Westbound	C	D	C	C	D	C	C	D	C
		Eastbound	A	A	A	A	A	A	A	A	A
23		Eastbound	F	B	F	F	C	F	F	C	F



Location Ref.	Link	Direction	2019			2025			2030		
			AM Peak	Inter-Peak	PM Peak	AM Peak	Inter-Peak	PM Peak	AM Peak	Inter-Peak	PM Peak
	Guisborough Road   West of Swan's Corner Roundabout	Westbound	A	A	A	A	A	A	A	A	A
24	Gypsy Lane   North of Guisborough Road	Southbound	E	D	E	E	D	E	E	D	E
		Northbound	A	A	A	A	A	A	A	A	A
25	Guisborough Road   South of Nunthorpe Train Station	Westbound	B	B	B	B	B	B	B	B	B
		Eastbound	A	A	A	A	A	A	A	A	A
26	Guisborough Road   East of The Avenue	Westbound	A	A	A	A	A	A	A	A	A
		Eastbound	A	A	A	A	A	A	A	A	A
27	Guisborough Road   West of The Avenue	Eastbound	A	A	A	A	A	A	A	A	A
		Westbound	A	A	A	A	A	B	B	A	B
28	The Avenue   North of Clarence Road	Southbound	A	A	A	A	A	A	A	A	A
		Northbound	A	A	A	A	A	A	A	A	A
29	Gypsy Lane   North of The Avenue	Westbound	A	A	A	A	A	A	A	A	A
		Eastbound	A	A	A	A	A	A	A	A	A

The majority of roads within the study area have a LoS of either A or B across the base year and both future year scenarios, which suggests that traffic flows are either at or above the speed limit or that traffic flows are reasonably free flowing. However, there are several links on approach to the Swan’s Corner roundabout that are predicted to have a LoS of F in some assessment scenarios. This is a result of the capacity of the Swan’s Corner roundabout which has a direct impact on the operation of the adjacent and approaching links. Furthermore, it is noted that Brass Castle Lane, leading onto the A172, has a LoS of up to E or F in some assessment scenarios. This is caused by vehicles being unable to merge onto the A172 due to the close interaction of the non-signalised Brass Castle Lane junction and the signalised Guisborough Road junction.

### 3.2.2 LoS for Junctions

Junction LoS uses flow-weighted delay along approaches to categorise the performance of a given junction. Category thresholds are set out in Table 6, below.

**Table 6: Junction Level of Service Categories**

Level of Service	Service Grading	Signalised Junction Delay (sec per vehicle)	Unsignalised Junction Delay (sec per vehicle)
A	Free flow	0-10	0-10
B	Reasonably free flow	10-20	10-15
C	Stable flow	20-35	15-25
D	Approaching unstable flow	35-55	25-35
E	Unstable flow, operating at capacity	55-80	35-50
F	Forced or breakdown flow	>80	>50

Junction LoS has been calculated by outputting flow and delay statistics for key links on approach to the junction and combining these to derive the total flow and total delay. The average delay has then been derived by combining these statistics and dividing this by the total flow. The LoS is then defined by the resulting average junction delay statistic. Different criteria for signalised and unsignalised junctions is used due to different accepted levels of delay.

Figure 4 to Figure 12 present the Level of Service (LoS) for the following junctions:

- A172 Dixons Bank / Stainton Way
- A172 Dixons Bank / Guisborough Road / Brass Castle Lane
- Poole Roundabout
- Swan's Corner Roundabout

- 
- Guisborough Road / The Avenue
  - Gypsy Lane / The Avenue
  - Stainton Way / Mallowdale

Table 7, overleaf, shows the LoS for the junctions set out above for the 2019 base year and 2025 and 2030 future assessment year scenario. Visual LoS statistics are also presented at Figure 4 to Figure 12.

**Table 7: Level of Service | Junctions**

Junction	2019			2025			2030		
	AM Peak	Inter-Peak	PM Peak	AM Peak	Inter-Peak	PM Peak	AM Peak	Inter-Peak	PM Peak
A172 Dixons Bank / Stainton Way	D	D	D	E	D	D	D	D	D
A172 Dixons Bank / Guisborough Road / Brass Castle Lane	D	B	B	E	B	D	F	B	E
Poole Roundabout	A	A	A	A	A	A	A	A	A
Swan's Corner Roundabout	E	B	E	E	B	E	E	B	F
Guisborough Road / The Avenue	A	A	A	A	A	A	A	A	A
Gypsy Lane / The Avenue	A	A	A	A	A	A	A	A	A
Stainton Way / Mallowdale	A	A	A	A	A	A	A	A	A

50% of the junctions are considered to have a LoS A in all assessment scenarios. Three of these junctions are generally on more minor roads away from the A172 corridor. However, the analysis also suggests that the Poole roundabout is unlikely to be significantly affected in the future assessment year scenarios assessed, with a LoS A in all future assessment year scenarios. This is because this junction is at the edge of the model and is therefore not directly affected by the link capacity of adjacent junctions.

The A172 Dixons Bank / Stainton Way junction display a LoS of between D and E suggesting that the junction operates reasonably close to capacity across most future assessment scenarios. Moreover, A172 Dixons Bank / Guisborough Road / Brass Castle Lane junction and Swans Corner roundabout both display a LoS of up to F in some assessment scenarios. This shows that these junctions would operate above capacity in at least one of the assessment scenarios. In most other assessment scenarios, a LoS of between D and E is predicted, which again suggests that the junction is reasonably congested and is operating close to capacity.

## 4 Summary

This Technical Note provides statistics in relation to the current and future operation of the transport network in Nunthorpe. These statistics are to be presented to the community of Nunthorpe by Middlesbrough Council and will supplement a baseline study carried out by Lichfields. The baseline study intends to provide an audit of the services, facilities and infrastructure available within the study area, of which transport is a part thereof.

The statistics show that:

- The level of daily flow is predicted to increase on most links in the 2025 and 2030 future assessment year scenarios. This occurs as a result of the addition of committed development-generated traffic and background traffic growth. Since there are a number of committed development sites within vicinity of Nunthorpe and the A172, traffic growth in the area is likely to be greater than in other areas of Middlesbrough.
- This increase in flow is predicted to affect the operation of some links and junctions across the study area. This is shown by a decrease in the LoS at some locations across the network, with some links and junctions predicted to experience a LoS of F in some assessment periods. However, this generally occurs at locations which already have a reasonably low LoS (for example between D and E). This suggests that these links and junctions already suffer from peak period congestion, which is further exacerbated by the addition of committed development traffic and background traffic growth.
- Notwithstanding the above, the majority of roads within the study area have a LoS of either A or B across the base year and both future year scenarios, which suggests that traffic flows are either at or above the speed limit or that traffic flows are reasonably free flowing. In addition, 50% of the junctions are considered to have a LoS A in all

assessment scenarios. Three of these junctions are generally on more minor roads away from the A172 corridor. However, the analysis also suggests that the Poole roundabout is unlikely to be significantly affected in the future assessment year scenarios assessed, with a LoS A in all future assessment year scenarios.







**Key:**

**Daily Flow (Vehicles per day)**

- 0 - 4,000
- 4,000 - 12,000
- >12,000

Nunthorpe Study Area

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Fore Consulting Limited  
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**Client:**  
 Middlesbrough Council

**Project:**  
 Nunthorpe Baseline Study Assistance

**Figure Title:**  
 2019 | Daily Flow

<b>Scale:</b> 1:10,500	<b>Figure Status:</b> Issue
<b>Job Number:</b> 2286	<b>Figure Number:</b> Figure 1



**Key:**

Daily Flow (Vehicles per day)

- 0 - 4,000
- 4,000 - 12,000
- >12,000

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**Client:**  
 Middlesbrough Council

**Project:**  
 Nunthorpe Baseline Study Assistance

**Figure Title:**  
 2025 | Daily Flow

<b>Scale:</b> 1:10,500	<b>Figure Status:</b> Issue
<b>Job Number:</b> 2286	<b>Figure Number:</b> Figure 2



**Key:**

Daily Flow (Vehicles per day)

- 0 - 4,000
- 4,000 - 12,000
- >12,000

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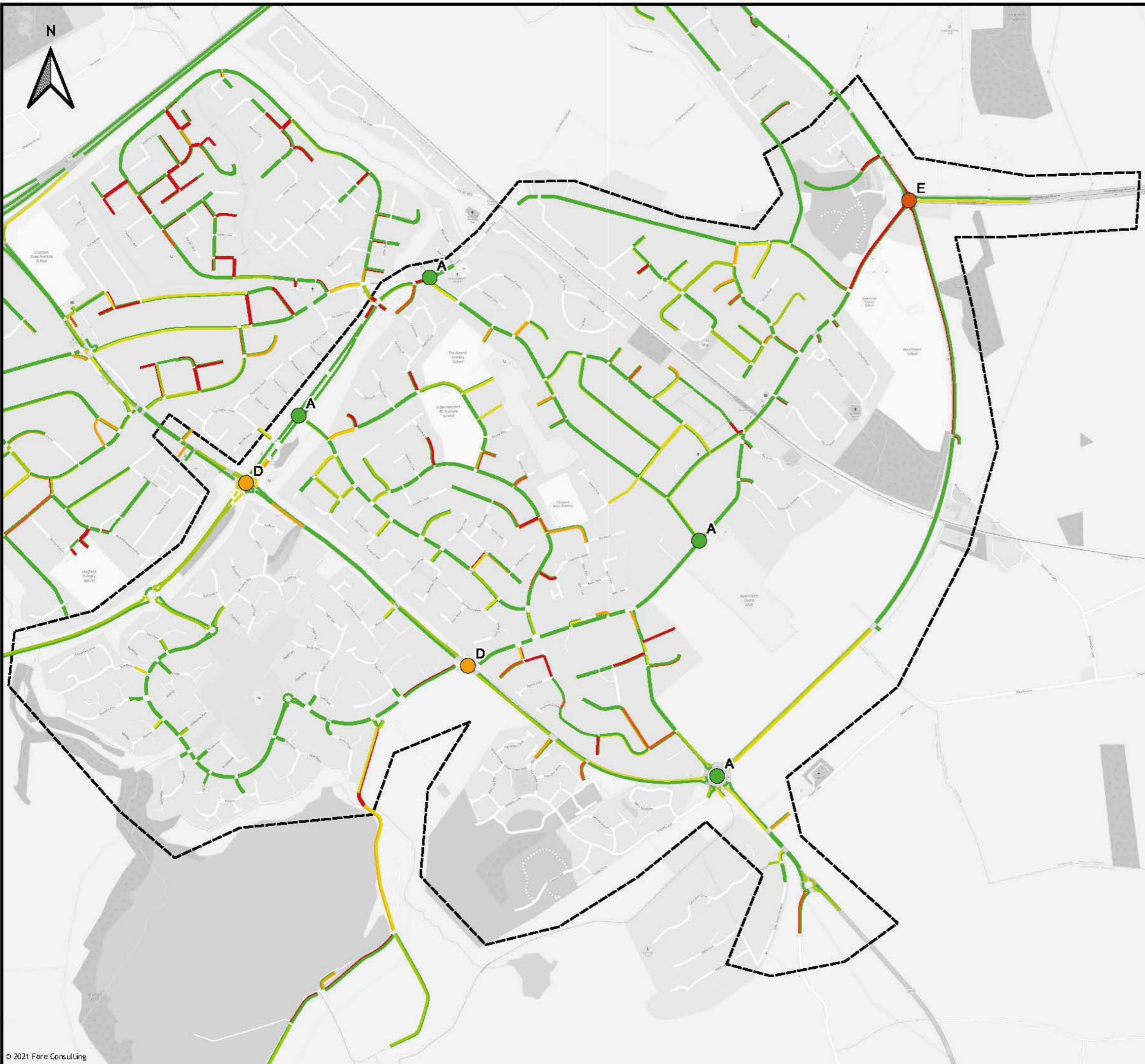


**Client:**  
 Middlesbrough Council

**Project:**  
 Nunthorpe Baseline Study Assistance

**Figure Title:**  
 2030 | Daily Flow

<b>Scale:</b> 1:10,500	<b>Figure Status:</b> Issue
<b>Job Number:</b> 2286	<b>Figure Number:</b> Figure 3



**Key:**

**Levels of Service**

**Junctions - Average Delay (seconds)**

- A: 0-10
- B: 10-20
- C: 20-35
- D: 35-55
- E: 55-80
- F: >80

**Sections - Average Speed (% of speed limit)**

- A: >85%
- B: 67-85%
- C: 50-67%
- D: 40-50%
- E: 30-40%
- F: 0-30%

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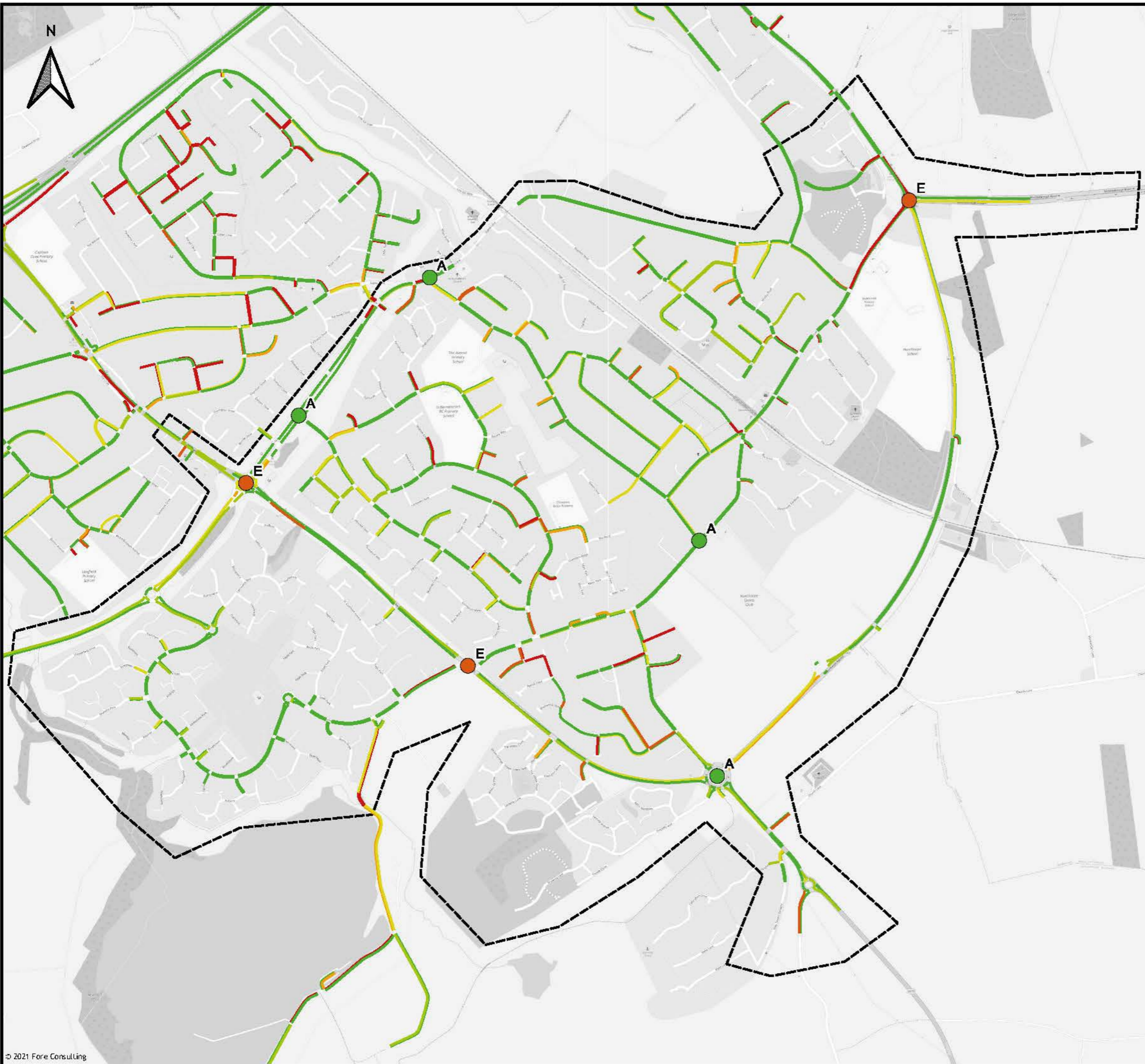


**Client:**  
 Middlesbrough Council

**Project:**  
 Nunthorpe Baseline Study Assistance

**Figure Title:**  
 2019 | Levels of Service | AM Peak

<b>Scale:</b> 1:10,500	<b>Figure Status:</b> Issue
<b>Job Number:</b> 2286	<b>Figure Number:</b> Figure 4



**Key:**

**Levels of Service**

**Junctions - Average Delay (seconds)**

- A: 0-10
- B: 10-20
- C: 20-35
- D: 35-55
- E: 55-80
- F: >80

**Sections - Average Speed (% of speed limit)**

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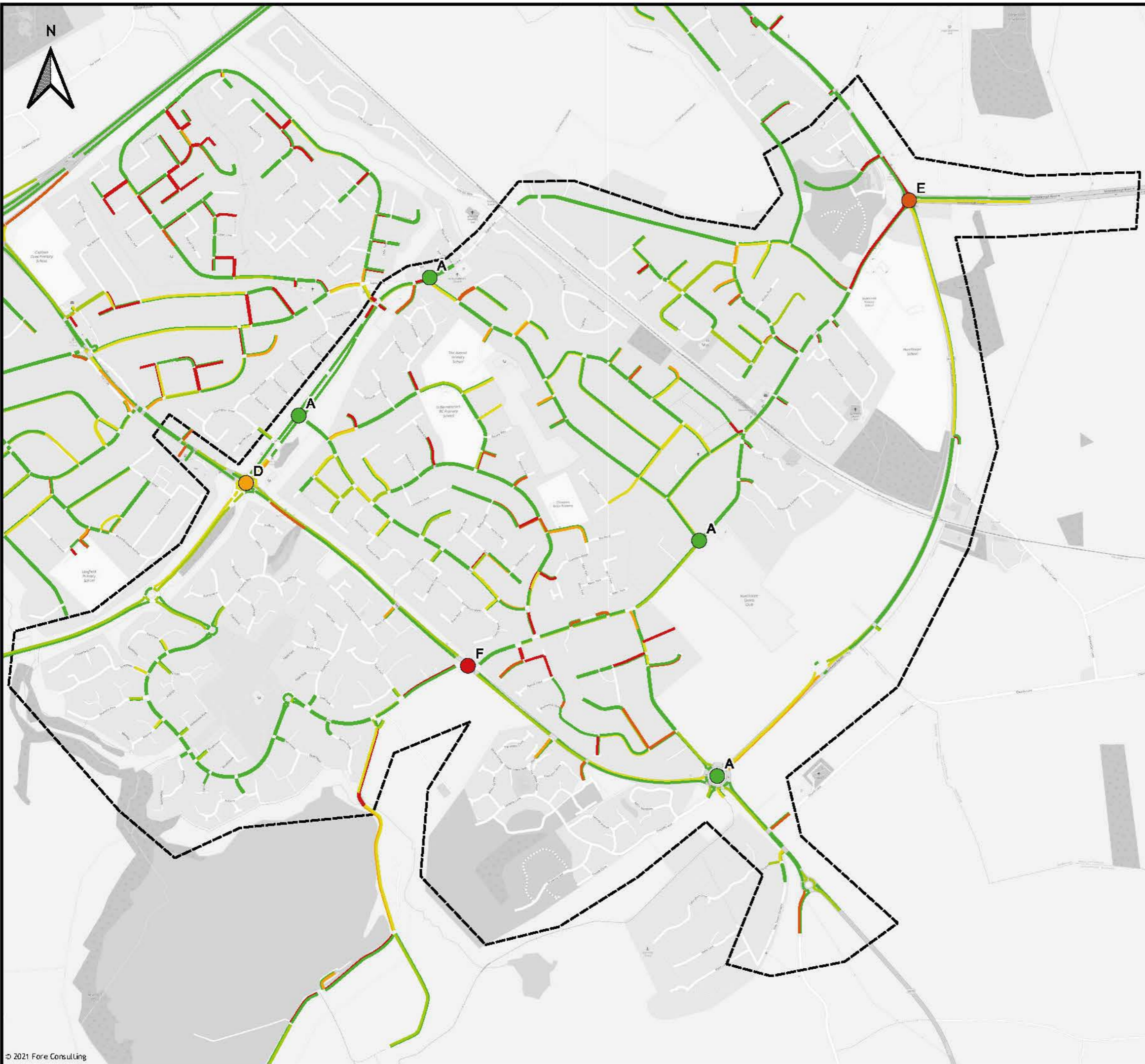


**Client:**  
 Middlesbrough Council

**Project:**  
 Nunthorpe Baseline Study Assistance

**Figure Title:**  
 2025 | Levels of Service | AM Peak

<b>Scale:</b> 1:10,500	<b>Figure Status:</b> Issue
<b>Job Number:</b> 2286	<b>Figure Number:</b> Figure 5



**Key:**

**Levels of Service**

**Junctions - Average Delay (seconds)**

- A: 0-10
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- C: 20-35
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- F: >80

**Sections - Average Speed (% of speed limit)**

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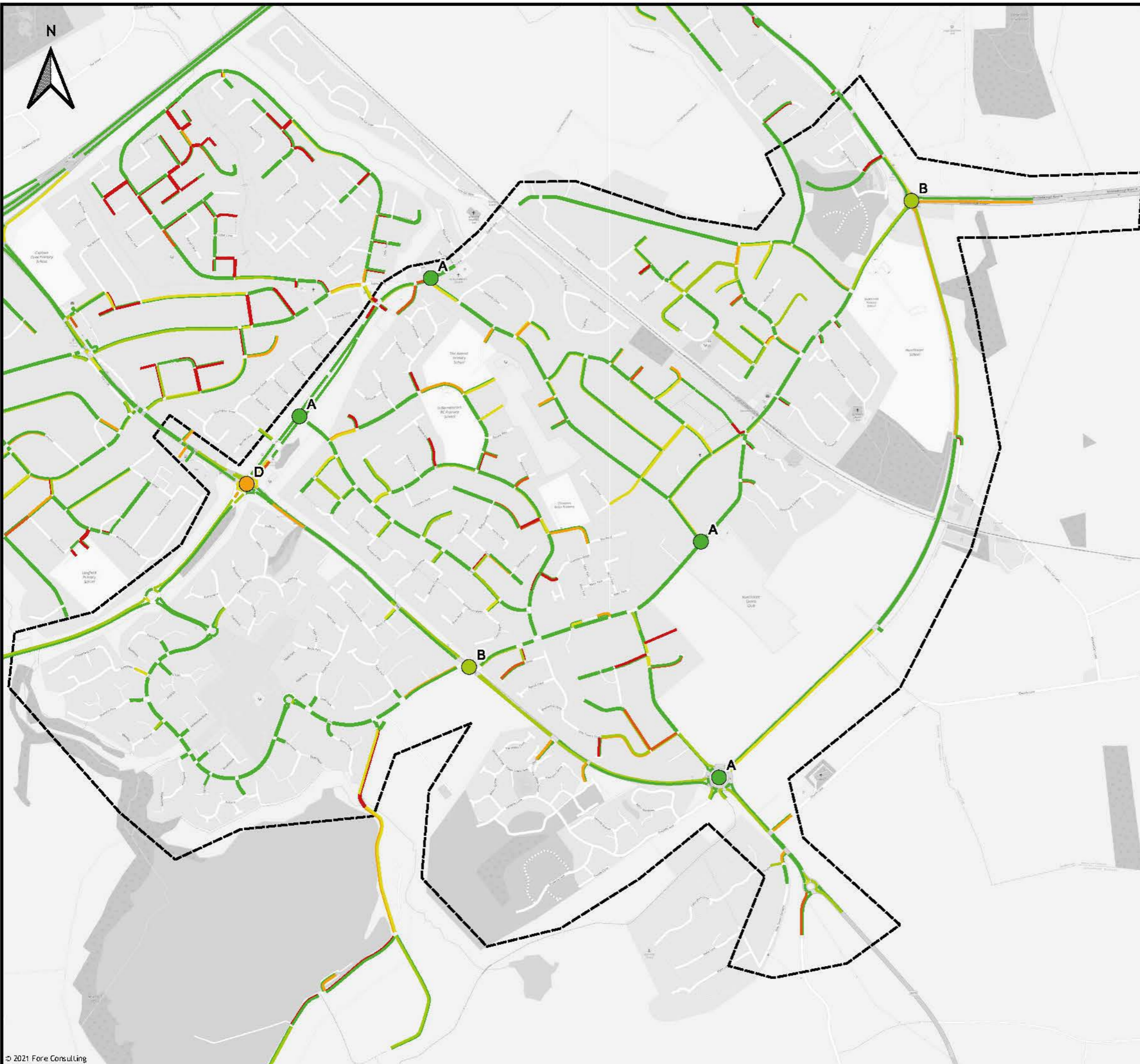


**Client:**  
 Middlesbrough Council

**Project:**  
 Nunthorpe Baseline Study Assistance

**Figure Title:**  
 2030 | Levels of Service | AM Peak

<b>Scale:</b> 1:10,500	<b>Figure Status:</b> Issue
<b>Job Number:</b> 2286	<b>Figure Number:</b> Figure 6



**Key:**

**Levels of Service**

**Junctions - Average Delay (seconds)**

- A: 0-10
- B: 10-20
- C: 20-35
- D: 35-55
- E: 55-80
- F: >80

**Sections - Average Speed (% of speed limit)**

- A: >85%
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- C: 50-67%
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- F: 0-30%

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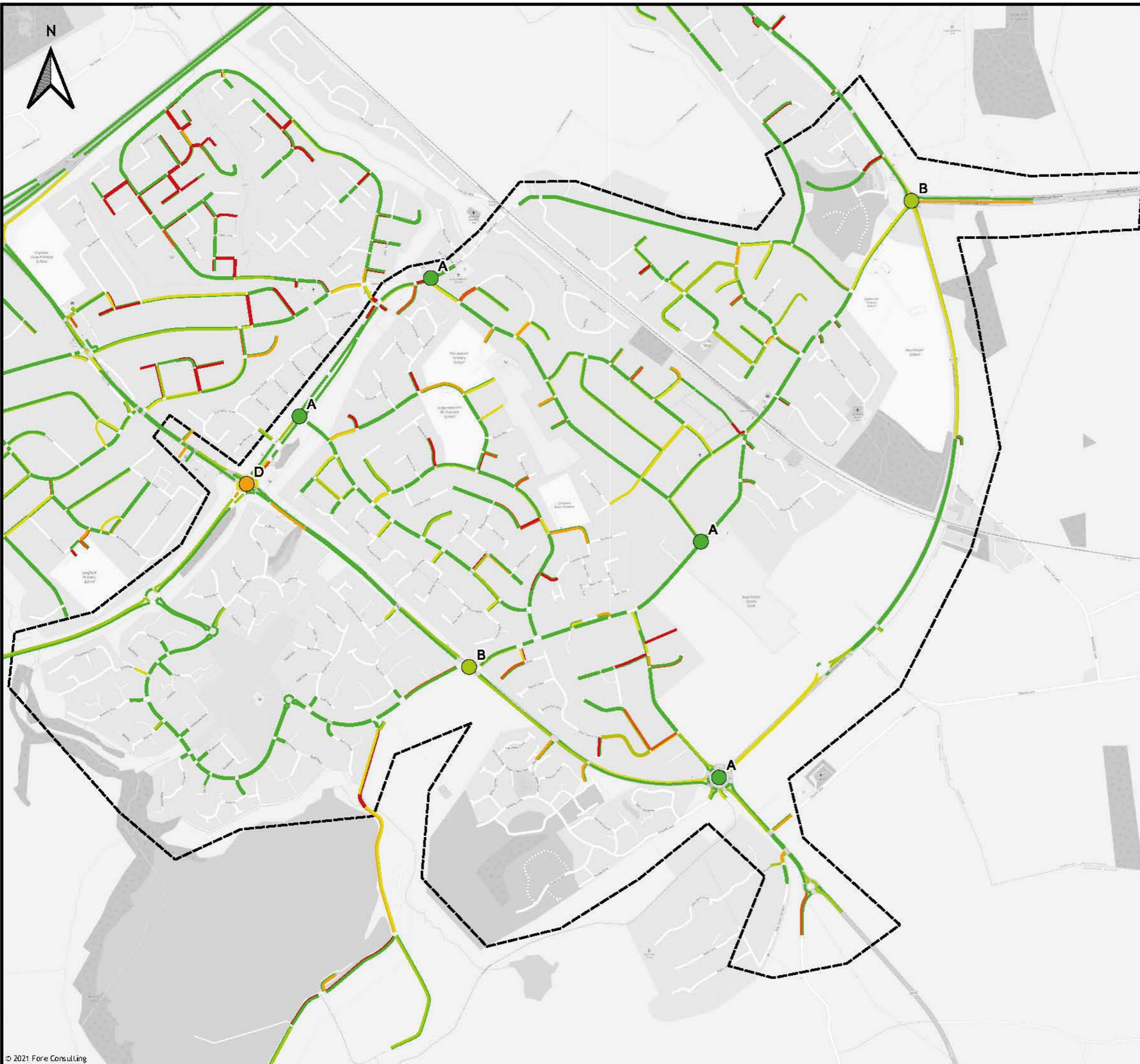


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**Figure Title:**  
 2019 | Levels of Service | Inter-Peak

<b>Scale:</b> 1:10,500	<b>Figure Status:</b> Issue
<b>Job Number:</b> 2286	<b>Figure Number:</b> Figure 7



**Key:**

**Levels of Service**

**Junctions - Average Delay (seconds)**

- A: 0-10
- B: 10-20
- C: 20-35
- D: 35-55
- E: 55-80
- F: >80

**Sections - Average Speed (% of speed limit)**

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- C: 50-67%
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- F: 0-30%

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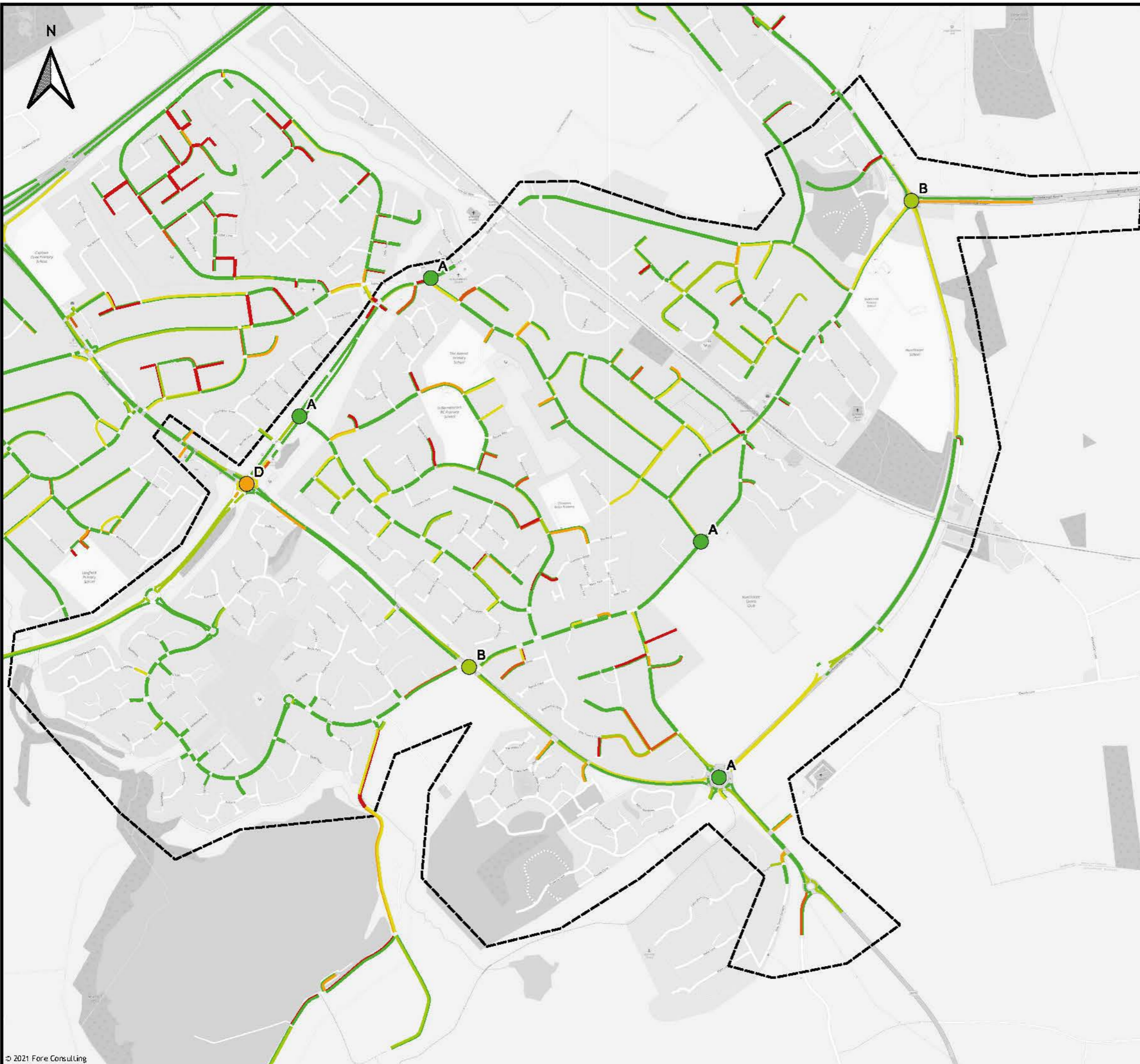
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**Project:**  
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**Figure Title:**  
 2025 | Levels of Service | Inter-Peak

<b>Scale:</b> 1:10,500	<b>Figure Status:</b> Issue
<b>Job Number:</b> 2286	<b>Figure Number:</b> Figure 8





**Key:**

**Levels of Service**

**Junctions - Average Delay (seconds)**

- A: 0-10
- B: 10-20
- C: 20-35
- D: 35-55
- E: 55-80
- F: >80

**Sections - Average Speed (% of speed limit)**

- A: >85%
- B: 67-85%
- C: 50-67%
- D: 40-50%
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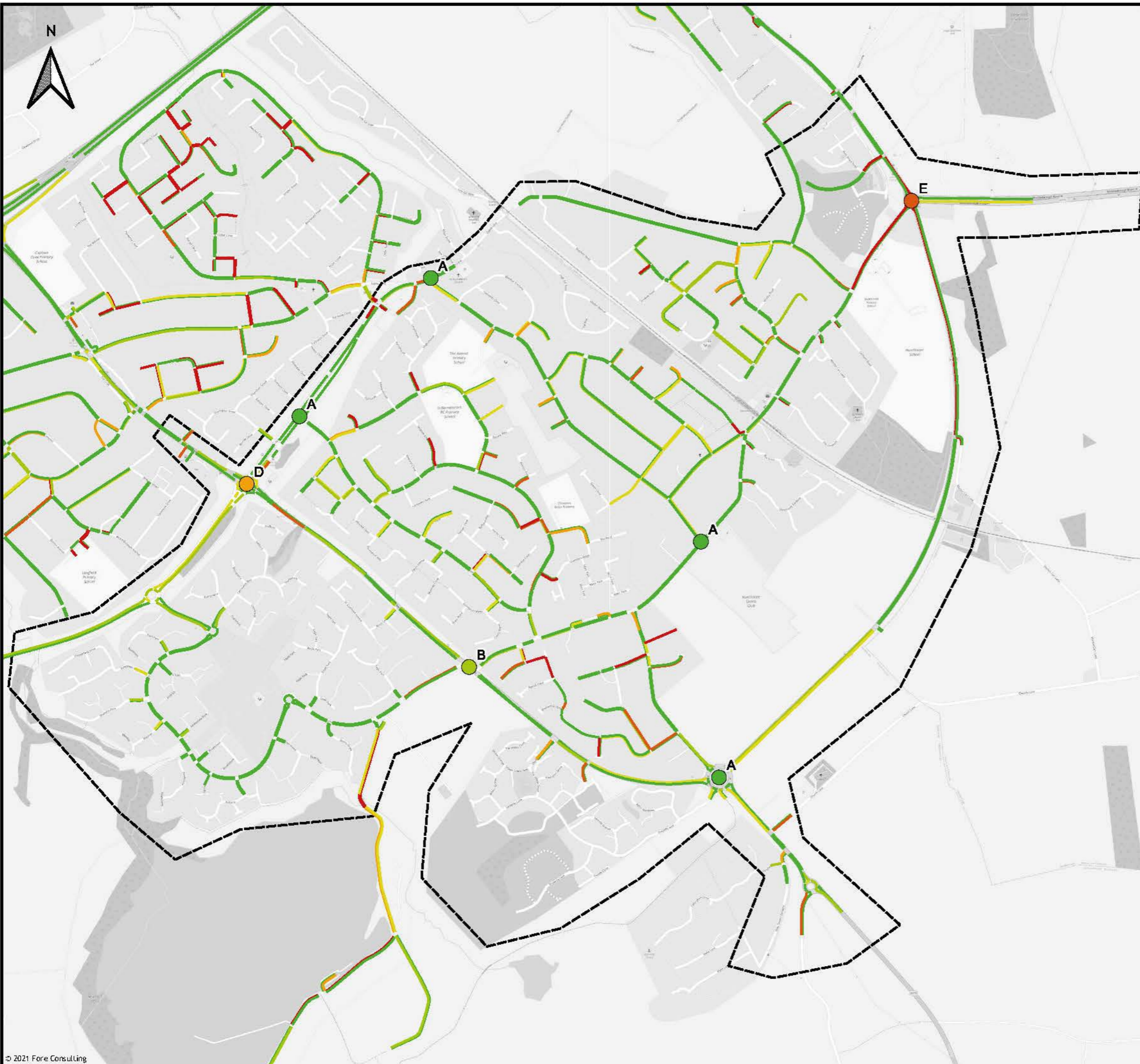


**Client:**  
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**Project:**  
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**Figure Title:**  
 2030 | Levels of Service | Inter-Peak

<b>Scale:</b> 1:10,500	<b>Figure Status:</b> Issue
<b>Job Number:</b> 2286	<b>Figure Number:</b> Figure 9



**Key:**

**Levels of Service**

**Junctions - Average Delay (seconds)**

- A: 0-10
- B: 10-20
- C: 20-35
- D: 35-55
- E: 55-80
- F: >80

**Sections - Average Speed (% of speed limit)**

- A: >85%
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- F: 0-30%

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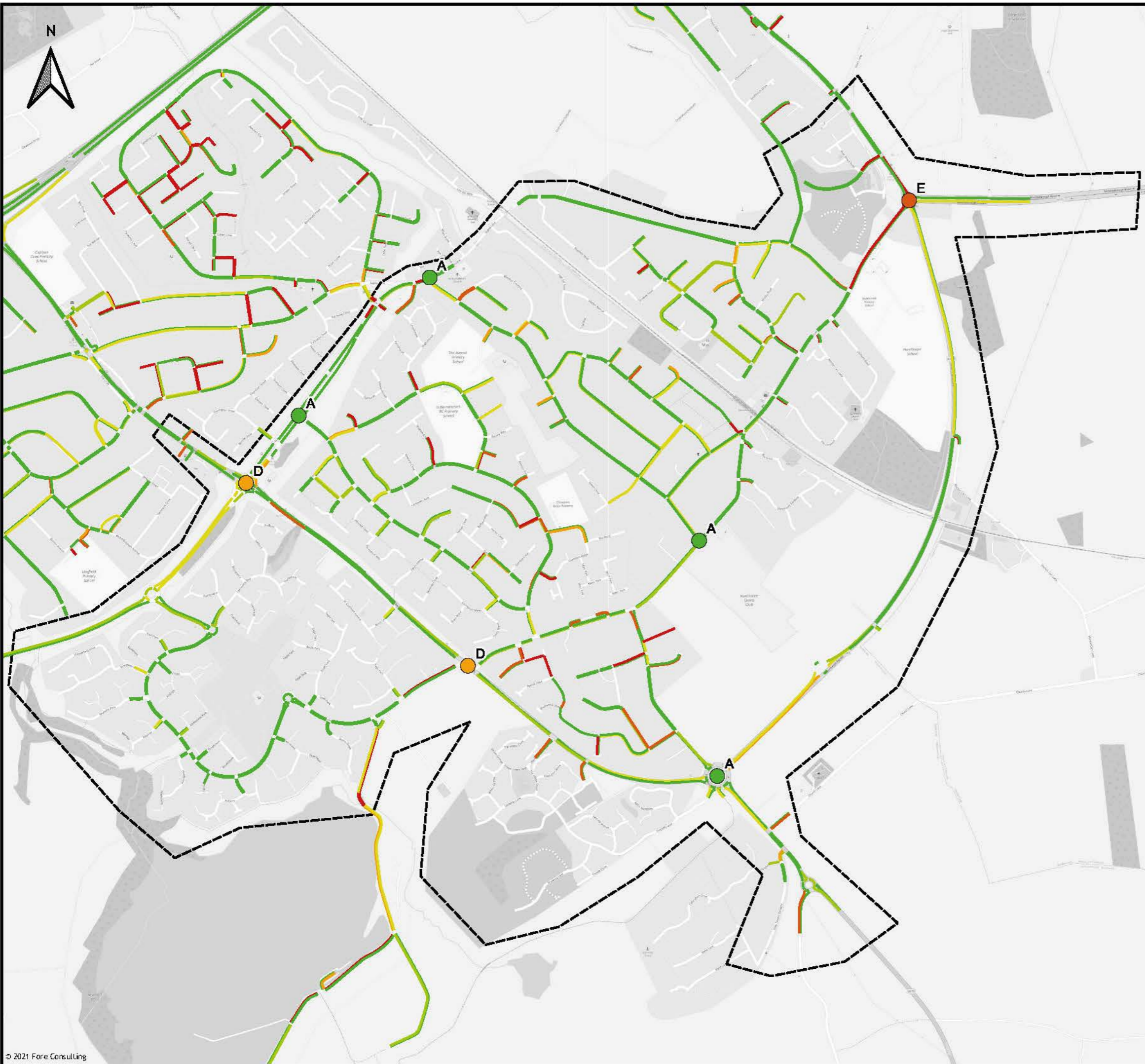


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**Project:**  
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**Figure Title:**  
 2019 | Levels of Service | PM Peak

<b>Scale:</b> 1:10,500	<b>Figure Status:</b> Issue
<b>Job Number:</b> 2286	<b>Figure Number:</b> Figure 10



**Key:**

**Levels of Service**

**Junctions - Average Delay (seconds)**

- A: 0-10
- B: 10-20
- C: 20-35
- D: 35-55
- E: 55-80
- F: >80

**Sections - Average Speed (% of speed limit)**

- A: >85%
- B: 67-85%
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- D: 40-50%
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- F: 0-30%

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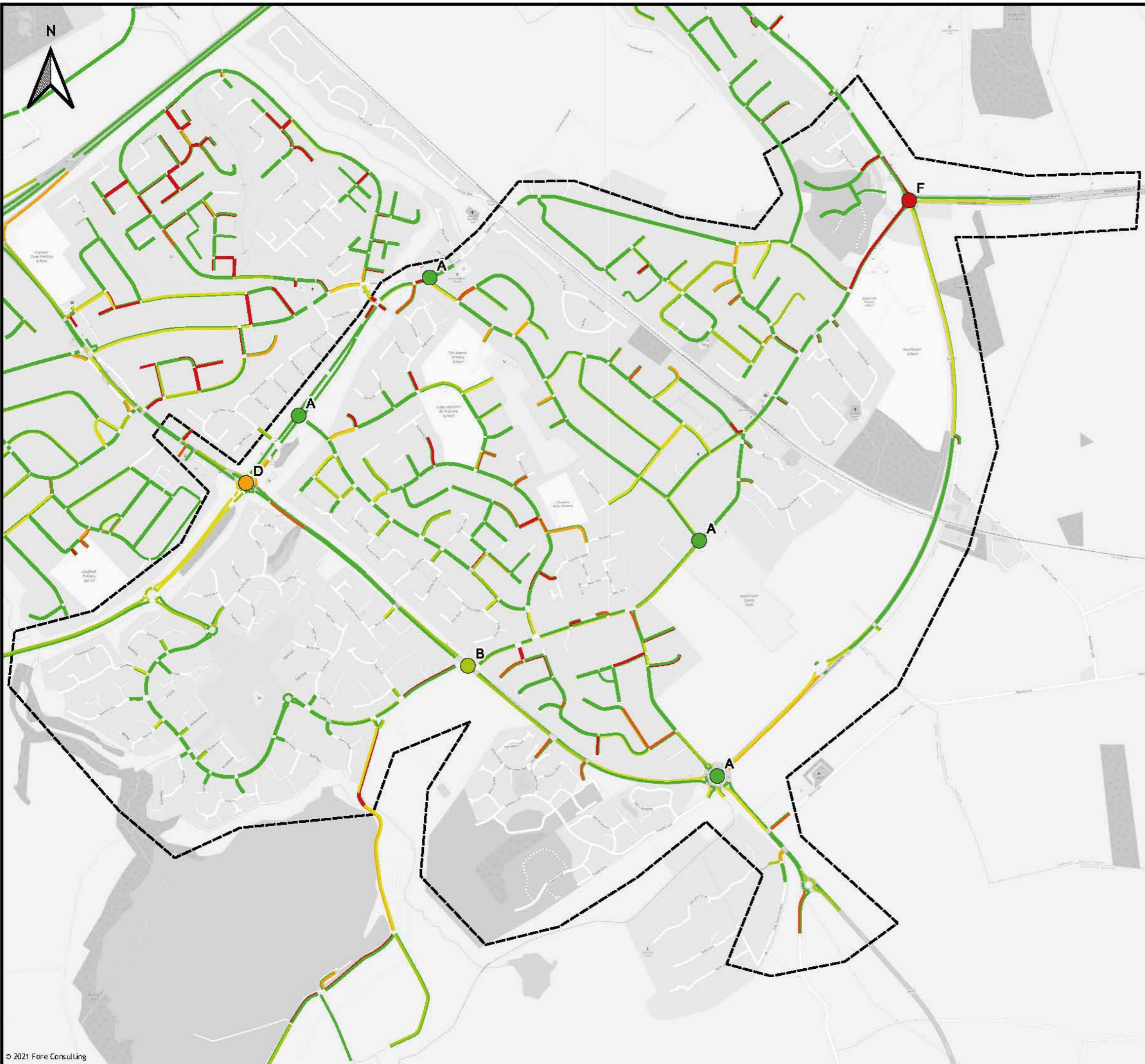


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**Project:**  
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**Figure Title:**  
 2025 | Levels of Service | PM Peak

<b>Scale:</b> 1:10,500	<b>Figure Status:</b> Issue
<b>Job Number:</b> 2286	<b>Figure Number:</b> Figure 11



**Key:**

**Levels of Service**

**Junctions - Average Delay (seconds)**

- A: 0-10
- B: 10-20
- C: 20-35
- D: 35-55
- E: 55-80
- F: >80

**Sections - Average Speed (% of speed limit)**

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**Figure Title:**  
 2030 | Levels of Service | PM Peak

<b>Scale:</b> 1:10,500	<b>Figure Status:</b> Issue
<b>Job Number:</b> 2286	<b>Figure Number:</b> Figure 12