TEESWORKS

# LONG ACRES ENVIRONMENTAL STATEMENT

## VOLUME 3: TECHNICAL APPENDICES
## APPENDICES TO CHAPTER C (TRANSPORT)

DECEMBER 2020

# Long Acres, South Tees
# Volume 3: Appendices

**Chapter C: Transport**

December 2020

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# Appendix C1: Transport Assessment

1.1

South Tees Development Corporation

# Long Acres

## Transport Assessment

Final | 20 January 2021



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## Appendices

# 1 Introduction

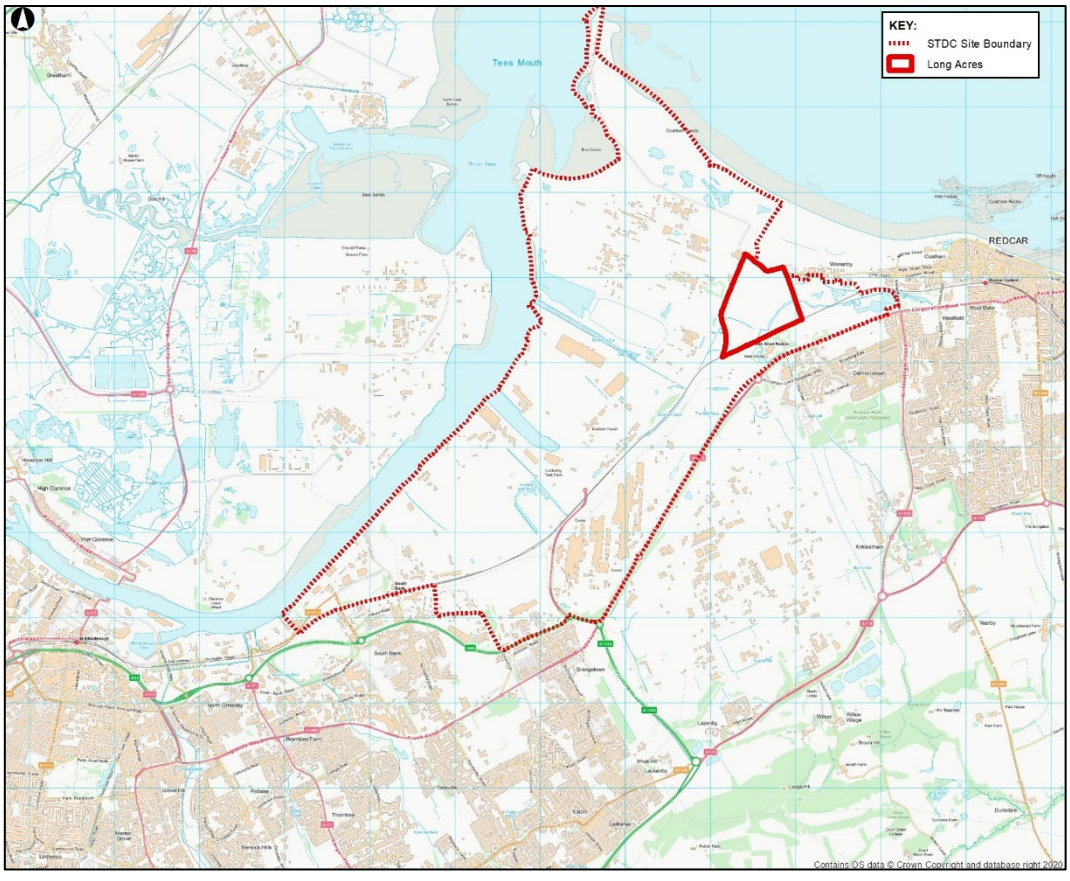
## 1.1 Background

Arup has been commissioned by the South Tees Development Corporation (STDC) to develop a Transport Assessment (TA), which incorporates a Travel Plan framework, in support of an outline planning application for the development of industrial (B2/B8) land use on the area known as Long Acres within the STDC site. The STDC site is now known as 'Teesworks'.

The application site is located in the eastern extent of the Teesworks area and the proposed maximum floorspace is just under 186,000sqm. It is proposed that the site will provide general industry (Use Class B2) and storage or distribution facilities (Use Class B8) with up to 10% ancillary office accommodation (Use Class E), HGV and car parking, works to watercourses including realignment and associated infrastructure works. The development is forecast to employ approximately 2,161 people when operational (direct and full time jobs).

The site is located on the south bank of the River Tees, approximately 2.5km to the west of Redcar town centre and 10km to the east of Middlesbrough town centre. The site location is shown in **Figure 1** and an indicative site plan is attached in **Appendix A**.

**Figure 1: Site Location**



This document sets out the purpose, methodology, findings and recommendations of the TA. Arup has also prepared the traffic and transportation assessment chapter of the Environmental Statement (ES). This TA forms Appendix C1 of the ES.

The aim of this report is to demonstrate to Redcar and Cleveland Borough Council (RCBC), the local planning and highway authority, and Highways England (HE), that the development proposals are aligned with relevant planning policy and will not have a severe impact on surrounding transport networks.

## 1.2 Scoping

A TA Scoping Report for the proposed development was shared with RCBC, Middlesbrough Council (as the neighbouring highway authority) and HE on 26th November 2020. The report aimed to agree the methodology and main parameters of the transport assessment of the proposed development and is attached in **Appendix B**.

Consultation responses to the Scoping Report are included in **Appendix B** of this TA. Some of the issues raised by the consultees have been addressed. Specifically, HE asked that the study area be extended to include the SRN and that future growth scenarios should match those applied to the South Bank development (planning application number R/2020/0357/OOM). Further information about the mode share assumptions was requested, and it was advised that traffic distributions be informed by Census data. The methodology of the assessment for traffic forecasting follows the approach used for South Bank, and Census journey to work data has been analysed to inform trip distributions. The mode share assumptions, and adjustments to car mode share forecasts to account for the provision of a bus service, are outlined in this assessment.

RCBC noted that the assessment should set out how pedestrians and cyclists will access the site from first occupation. In addition, RCBC request that further infrastructure for electric vehicles and hydrogen filling stations should be considered. The application is for outline planning and therefore these matters have not been addressed in the assessment, however, they will be subject to review at reserved matters stage.

There may be some requests from stakeholders that have not been fully addressed prior to planning submission. Arup will continue to liaise with all parties on transport matters following submission and throughout the determination of the application.

## 1.3 Context

The proposed development is one of five outline planning applications being submitted for development on the Teesworks sites in December 2020. The other development sites are at Dorman Point, Lackenby, The Foundry and Steel House. A plan is shown in **Figure 2**.

**Figure 2: Location plan of Teesworks sites**


The application follows a submission in summer 2020 for development on the South Bank site (planning application number R/2020/0357/OOM).

# 2 Planning Policy and Strategy Context

This section outlines the national, regional and local transport policy context within which the development is assessed. Planning policies and strategies relevant to the development proposal are as follows:

- National Planning Policy Framework;
- Tees Valley Combined Authority Strategic Transport Plan 2020-2030;
- Tees Valley Design Guide and Specification – Residential and Industrial Estates Development;
- Transport for the North Strategic Transport Plan;
- Redcar and Cleveland Local Plan;
- Redcar and Cleveland South Tees Area Supplementary Planning Document; and
- South Tees Regeneration Master Plan.

## 2.1 National Planning Policy

### 2.1.1 National Planning Policy Framework (2019)

*The National Planning Policy Framework (NPPF)* sets out the Government's planning policies for England and how these should be applied. It prepares a framework in which locally prepared plans for development could be produced.

Core planning principles related to sustainable transport and relevant to the proposed development are outlined below:

108. In assessing sites that may be allocated for development in plans, or specific applications for development, it should be ensured that:

    a. Appropriate opportunities to promote sustainable transport modes can be – or have been – taken up, given the type of development and its location;

    b. Safe and suitable access to the site can be achieved for all users; and

    c. Any significant impacts from the development on the transport network (in terms of capacity and congestion), or on highway safety, can be cost effectively mitigated to an acceptable degree.

109. Development should only be prevented or refused on highways grounds if there would be an unacceptable impact on highway safety, or the residual cumulative impacts on the road network would be severe.

110. Within this context, applications for development should:

    a. Give priority first to pedestrians and cycle movements, both within the scheme and with neighbouring areas; and second – so far as possible – to facilitating access to high quality public transport, with layouts that

maximise the catchment area for bus or other public transport services, and appropriate facilities that encourage public transport use;

b. Address the needs of people with disabilities and reduced mobility in relation to all modes of transport;

c. Create places that are safe, secure and attractive – which minimise the scope for conflicts between pedestrians, cyclists and vehicles, avoid unnecessary street clutter, and respond to local character and design standards;

d. Allow for the efficient delivery of goods, and access by service and emergency vehicles; and

e. Be designed to enable charging of plug-in and other ultra-low emission vehicles in safe, accessible and convenient locations.

111. All developments that will generate significant amounts of movement should be required to provide a travel plan, and the application should be supported by a transport statement or transport assessment so that the likely impacts of proposal can be assessed.

**National Planning Policy Compliance**

The application for the proposed development is accompanied by this Transport Assessment which assesses and mitigates, as far as reasonably possible, the forecast impact on the local highway network, as well as encouraging sustainable travel behaviours. The development meets these stated objectives as it will form part of the wider Teesworks site, for which a sustainable Transport Strategy is currently being developed. This TA also includes a Travel Plan framework with some initial measures that can be implemented at the development, in advance of the Transport Strategy being adopted.

The proposed development is therefore aligned with national transport policy.

## 2.2 Regional Policy

### 2.2.1 Tees Valley Combined Authority Strategic Transport Plan 2020-2030

The South Tees area is included in the Strategic Transport Plan (STP) as an area to be transformed into a hotbed of new industry and enterprise, which will help the regeneration of the area and will contribute to the delivery of sustainable, inclusive and cohesive communities.

The Strategic Transport Plan (STP) presents a package of transport improvements to transform the Tees Valley transport system and identifies the delivery of the South Tees Development Corporation Master Plan as one of the key actions towards achieving this goal.

The transport vision for Tees Valley that is set out in the STP is as follows:

*"To provide a high quality, quick, affordable, reliable, low carbon and safe transport network for people and freight to move within, to and from Tees Valley."*

The STP outlines key issues within the region such as high car mode share, despite a high majority of local residents working within the Tees Valley region. The STP therefore identifies opportunities from these issues and focuses on providing an effective transport system for local people and businesses by connecting centres, improving journey times, upgrading major roads and enhancing existing rail links.

The Plan identifies the following two core principles for the Teesworks site:

- Use the regeneration opportunity to strengthen transport connections with Redcar town centre and other urban centres, to realise improved economic and community benefits; and
- Deliver efficient connectivity across the South Tees area through enhanced on-site transport infrastructure to realise optimal functionality.

### 2.2.2 Tees Valley Design Guide and Specification – Residential and Industrial Estates Development

The Design Guide and Specification presents the standards for car parking and cycle parking provisions for residential and industrial developments in the Tees Valley area.

For industrial developments, the maximum car parking and minimum cycle parking standards are as follows:

- Sufficient operational parking and area for manoeuvring within the site;
- 1 space per 45m² gross floor area or 4 spaces per 10 employees (whichever is the greater); and
- Provision for the parking of 2 cycles per 200m² gross floor area.

The document also specifies that disabled car parking spaces should be in addition to the maximum parking standards for each site, and provision for car parks associated with employment premises and provided for employees and visitors should be as follows:

- Up to 10 spaces 1 space;
- Between 10 and 200 spaces; 5% of capacity, subject to a minimum of 2 spaces, to be reserved; and
- Over 200 spaces: 2% plus 6 spaces.

### 2.2.3 Transport for the North Strategic Transport Plan

Transport for the North (TfN) published its Strategic Transport Plan in 2019. The document sets out the priorities for transport infrastructure investment for the next 30 years. TfN's vision is of *'a thriving North of England, where world class*

*transport supports sustainable economic growth, excellent quality of life and improved opportunities for all'.*

Supporting the vision are four pan-Northern transport objectives which align with the Government's Industrial Strategy:

- Transforming economic performance;
- Increasing efficiency, reliability, integration and resilience in the transport system;
- Improving inclusivity, health and access opportunities for all; and
- Promoting and enhancing the built, historic, and natural environment.

The Investment Programme for the Transport Plan includes the following outcomes and actions which are of relevance to the proposed development and the wider South Tees site:

**Table 1: TfN Strategic Transport Plan Outcomes and Actions relevant to the Site**

| Outcome | Actions |
|---|---|
| Facilitating significant private sector investment to support economic growth and UK competitiveness | Allowing larger freight trains to access Tees Valley directly to/from the south through gauge enhancements and journey time improvements |
| Enhancing North-South strategic connections across the North to support UK competitiveness | Darlington Station Growth Hub, Northallerton to Newcastle capacity enhancements and New Tees Crossing |
| Improve connectivity and resilience to the Tees Valley City Region economic clusters, particularly the South Tees Development Corporation site | Journey time improvements on the Bishop and Saltburn railway lines, and between Middlesbrough and York<br>A66 Darlington to Teesport capacity improvements<br>A174 / A1053 Greystones Roundabout |

The proposed development is expected to benefit from future improvements to the transport network delivered through the TfN Investment Programme.

**Regional Planning Policy Compliance**

The site will include active transport measures to connect to the existing network on the local roads in the vicinity of the site. In addition, there is the opportunity for the site to seek to align with the active transport principles in accordance with the emerging wider South Tees Transport Strategy once approved. Cycle parking and associated supporting facilities in exceedance of local standards will be provided within the site. The details of these provisions will be agreed once the detailed nature of the scheme is known.

The development is located in close proximity to Redcar British Steel railway station. Services at the station have been suspended since 2019. As part of the emerging Transport Strategy for the wider site, it is expected that the station will re-open to services. The development will also benefit from new sustainable transport provisions across the wider site and improvements to existing provisions in the wider area, through the emerging Transport Strategy. The proposed development is therefore aligned with regional planning policy.

## 2.3 Local Planning Policy

### 2.3.1 Redcar and Cleveland Local Plan (2018)

The Redcar and Cleveland Local Plan was adopted in May 2018. The vision is that the Plan will ensure that by 2032 the needs and aspirations of local communities will be met through the delivery of sustainable development across the Borough.

Of particular relevance is Policy LS4: South Tees Spatial Strategy. With regards to transport, the policy seeks to:

- Improve links between South Tees and the Strategic Road Network;
- Support improvements to the road network to support economic growth;
- Deliver rail improvements to support rail freight;
- Investigate the feasibility of a new rail halt at Wilton International;
- Maintain and improve public transport connectivity;
- Support the extension of the road network to unlock the development potential of South Tees; and
- Maintain and enhance walking routes from nearby towns to the South Tees employment areas.

In March 2019, the Council agreed a motion which declared a climate emergency and made commitments to:

- Make the Borough carbon neutral by 2030 taking account of production and consumption emissions;

- Seek powers and resources from Government to make the 2030 target possible; and
- Work with other local and regional Governments (both within the UK and internationally).

The Local Plan also stresses the existing transport connectivity of the Teesworks site, which has access to a deep-water port, excellent road and rail links, access to energy and utilities. Specific policies of relevance include:

- Policy SD4 relates to the general development principles and includes the requirements for locating development on appropriate sites with compatible surroundings, ensuring development is located in a sustainable and safe location, and ensuring there is adequate infrastructure to serve the development.
- Policy LS4 includes the objective to improve the accessibility of employment sites by a range of transport methods.
- Policy TA1 relates to transport and new development and includes the requirement for new developments to encourage transport choice and non-car modes.
- Policies TA2 and TA3 relate to improving accessibility by bus across the borough and improving the walking cycling and public rights of way networks respectively.

With regards to connectivity opportunities, Policy TA2 identifies schemes for improving accessibility within and beyond the borough. One of the key actions included in the policy refers to the delivery of the South Tees Dockside Road access to the site.

**Local Planning Policy Compliance**

Junction capacity assessments have been undertaken at key junctions in the vicinity of the site, to assess the impact of the proposed development on the local and Strategic Road Network. Whilst the assessment has identified significant effects on specific junctions, it is noted that the assessment represents a worst-case scenario in terms of future mode share and potentially development vehicle traffic distribution. In reality, it is expected that the physical walking and cycling measures and the public transport improvements that will be provided as part of the sustainable transport measures of the emerging wider Transport Strategy will promote mode shift across the wider site.

The proposed development is therefore aligned with local planning policy.

## 2.4 South Tees Area Specific Documents

### 2.4.1 Redcar and Cleveland South Tees Area Supplementary Planning Document (2018)

The SPD for the South Tees area was adopted in May 2018. One of the key objectives of the SPD is delivering efficient connectivity across the South Tees Area through making the best use of existing transport infrastructure, providing new and enhanced on-site transport infrastructure and creating an integrated and safe transport network, which takes account of the needs of a variety of users and includes sustainable travel measures.

In terms of phasing of the Teesworks site, the SPD indicates that early phases for the site should be the areas where transport access/egress is presently afforded.

With regards to transport infrastructure, Development Principle STDC5 states that the Council will, in partnership with the STDC and transport operators, other stakeholders and developers, seek to improve and enhance the transport infrastructure serving the South Tees Area. The Council will not support development proposals that may adversely impact on the delivery of the Infrastructure Corridor, and will ensure that all new developments will be required to have access to adequate infrastructure to meet their transport requirements.

The SPD also identifies a list of transport infrastructure schemes that will be supported, subject to confirmation of the need for each project and the avoidance of unacceptable environmental or amenity impacts. The following are of relevance to the proposed development:

- The provision of a four-arm roundabout at South Bank, giving improved access from the A66, via Dockside Road.
- The provision of new collector and local roads, providing access across and between development zones;
- The establishment of new rail connectivity at South Bank Wharf;
- The redevelopment of South Bank Wharf to bring this important river frontage back into beneficial use; and
- The provision of new and enhanced footpath and cycleway network identified within the Transport Strategy.

The SPD states that the presence of the existing passenger railway running through the South Tees Area is a major attribute for development and a key opportunity for improving access to significant employment opportunities by public transport. The existing South Bank railway station is optimally located to serve the South Industrial Zone. The SPD supports enhancements to the South Bank station to meet the anticipated future travel demands of the development.

Also, the SPD specifies that the area wide Transport Strategy for the site will include new and enhanced footpath and cycleway networks enabling ease of movement across the industrial park by non-automated transport modes and development proposals that align with this strategy will be supported.

### 2.4.2 South Tees Regeneration Master Plan (November 2019)

The STDC Master Plan stated that ease of access to the site by all travel modes will be an essential component of a successful regeneration, also stressing the need for the site to be equipped with adequate, modern infrastructure for efficiently handling freight imports and exports. As the site will result in an increase in number and change in patterns of trips in the area, the Master Plan stresses that it is vital to ensure effective and enhanced connectivity by road, rail and bus.

Long Acres is located within the North East Industrial Zone of the Master Plan. The Master Plan refers to the highway access point for this area, which is proposed to be via the existing roundabout on the A1085 Trunk Road at Redcar Gate.

The Master Plan also notes that consideration will be given to the impact on the local highway network of the planned major increases in traffic resulting from the STDC development, so that junction capacities are not adversely impacted.

**Site-specific Policy and Strategy Compliance**

The proposed development is aligned with the site specific policies and the Master Plan for the site, as it will provide improvements to the transport network to allow access to the development by sustainable and active travel modes, including physical measures (e.g. cycle parking and associated facilities, internal walking and cycling network), as well as other measures included in the Transport Strategy for the wider site, currently being developed. Access to the site is proposed via the existing A1085 roundabout at Redcar Gate (i.e. Steel House roundabout).

This Transport Assessment assesses the impact of the proposed development on the local and Strategic Road Network, to identify the impact of the proposed development on neighbouring junctions, and provides embedded mitigation, in the form of sustainable transport initiatives from the emerging site-wide Transport Strategy.

# 3 Baseline Conditions

## 3.1 Site Description and Location

The application site, which is currently vacant, is brownfield industrial land located within the Teesworks area. The site extends to an area of approximately 67 hectares and was previously partially occupied by the Warrenby iron and steel works and in part has been previously used as a licenced landfill for the disposal of by-products from iron and steel making. The site is located on the south bank of the River Tees, approximately 2.5km to the west of Redcar town centre and 10km to the east of Middlesbrough town centre.

The site is bounded by the Darlington to Saltburn railway line to the south east, a private internal road to the north west, South Gare Road to the north and open land to the north east.

## 3.2 Sustainable Transport Networks

### 3.2.1 Walking and Cycling

Walking facilities in the vicinity of the site are currently limited. All roads have footways on at least one side of the carriageway.

The nearest National Cycle Route (NCR) is NCR1 which runs through Redcar, approximately 2km (linear distance) from the east of the site. NCR1 provides strategic connections between Saltburn, Marske, Redcar and Middlesbrough.

On-road local cycle routes are also provided through Redcar to the east of the site, (on-road signed routes in some locations and advisory routes through quiet streets in other locations).

Owing to the scale and the historic use of the site, existing access to and from the site to nearby residential areas or local transport connections on foot or by bicycle is limited. There is a Public Right of Way (PRoW) that traverses the site. This forms part of the Teesdale Way which extends from Cumbria to the east coast. Through the site it generally runs parallel to the railway corridor until Coatham Marsh where it travels north/south through the site to the coast.

An overview of active travel provisions in the wider area is shown in **Figure 3**.

**Figure 3: Active travel provisions in the vicinity of the site**


### 3.2.2 Public Transport

## Bus Services

There are currently no bus services in the immediate vicinity of the site, with the nearest bus stops located on West Coatham Lane, approximately 1.5km walking distance to the south of the site. The bus stops are served by bus services 62, 64/64A, X3 and X4. the services are shown in **Table 2**.

**Table 2: Bus Service**

| Route No. | Bus Stop | Route | Daytime frequency (minutes) per direction | |
|---|---|---|---|---|
| | | | Monday – Saturday | Sunday |
| **62** | International East Gate (West Coatham Lane) | Marske – Redcar – Dormanstown – Grangetown – Middlesbrough | Every 30 minutes | Every hour |
| **64 / 64A** | International East Gate (West | Eston – Redcar – Dormanstown – Grangetown - Bankfields – South Bank - Middlesbrough | Every 30 minutes | Every hour |

| Route No. | Bus Stop | Route | Daytime frequency (minutes) per direction | |
|---|---|---|---|---|
| | | | Monday – Saturday | Sunday |
| | Coatham Lane) | | | |
| **X3** | International East Gate (West Coatham Lane) | Lingdale – Redcar – Dormanstown – Grangetown – Middlesbrough | Every hour | n/a |
| **X4** | International East Gate (West Coatham Lane) | Whitby – Boulby – Brotton Eston – Redcar – Dormanstown – Middlesbrough | Every 30 minutes | Every hour |
| ***Only key intermediate stops noted**<br>****Services shown above reflect timetable changes due to travel restrictions during the Covid 19 pandemic**<br>**Sources: Arriva, Stagecoach** | | | | |

## Railway Services

Redcar Central railway station is located approximately 3km to the east of the site. The station is serviced by Transpennine Express and Northern, which provides hourly services between Manchester Airport, Bishop Auckland (via Darlington) and Saltburn.

South Bank railway station is located on the south-western edge of the Teesworks site and is serviced by Northern, which provides hourly services between Bishop Auckland (via Darlington) and Saltburn. Any bus services provided by the Teesworks site would connect South Bank station to the rest of the Teesworks site.

The Darlington to Saltburn Railway line, which runs along the south of the site, is an operational passenger railway line. Redcar British Steel station is located on the southern edge of the development site boundary but services at the station have been suspended since 2019. As part of the emerging Transport Strategy for the wider site, it is expected that the station will re-open to services.

# 3.3 Highway Network

## 3.3.1 Local Highway Network

The local highway network consists of the following key roads:

- Trunk Road, a four-lane dual carriageway, runs in an east-west direction to the south of the site.

### 3.3.2 Strategic Road Network

The SRN near the site consists of the following roads:

- A1053, a four-lane dual carriageway, runs in a north-south direction and connects to the A66, Tees Dock Road, and Trunk Road, which is the key corridor into Redcar town centre in the north. To the south, the A1053 connects to the A174 and B1380 High Street at the Greystones roundabout; and
- A174, a four-lane dual carriageway to the south of the site, is a key east-west corridor between Middlesbrough and Redcar, that connects to the A19 to the west and to the A1053 to the east.

## 3.4 Road Safety

Collision data covering the study area has been sourced, for the period 2015 to 2019 inclusive, from the *Crashmap* website. An overview of the collisions in the study area is provided in **Figure 4** and **Table 3**.

**Figure 4: Study Area Collision Map *(Source: https://www.crashmap.co.uk)***

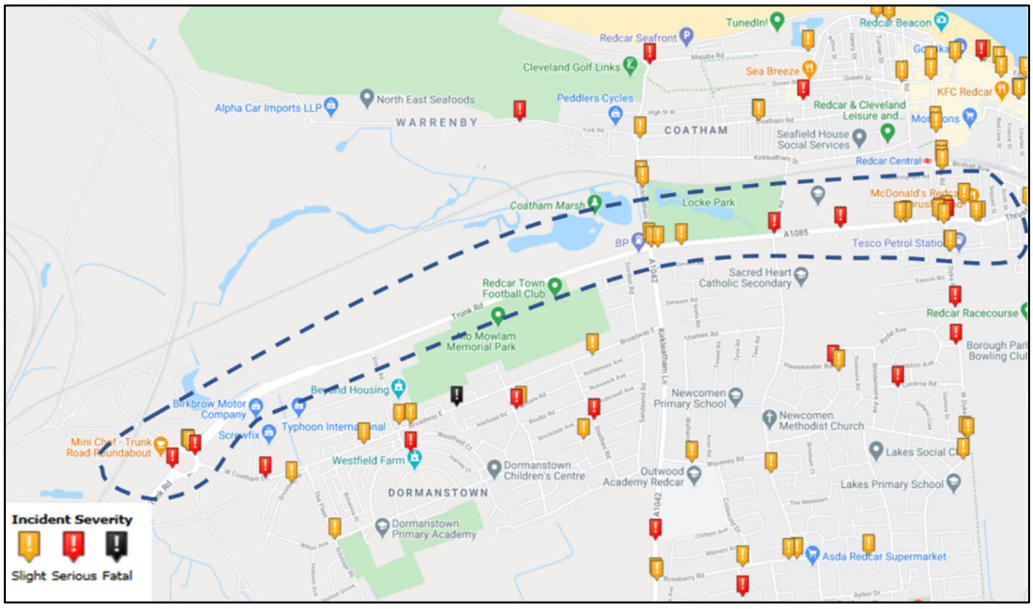



**Table 3: Study Area Collision Data (2015-2019)**

| Severity | 2015 | 2016 | 2017 | 2018 | 2019 | Total |
|---|---|---|---|---|---|---|
| **Fatal** | 0 | 0 | 0 | 0 | 0 | 0 |
| **Serious** | 1 | 0 | 2 | 1 | 1 | 5 |
| **Slight** | 6 | 2 | 5 | 3 | 2 | 18 |
| **Total** | 7 | 2 | 7 | 4 | 3 | 23 |

**Table 3** shows that 2015 and 2017 recorded the most collisions within the study area, with a total of 7 collisions during each year. 2016 recorded the least amount,

with 2 collisions recorded during this year. The most recent year of data recorded, 2019, noted a total of 3 collisions within the study area.

The following sections will provide a high-level analysis of the key junctions within the study area and detail the main collision points that must be considered.

### 3.4.1 Steel House Roundabout (Trunk Road / West Coatham Lane Roundabout)

At the Steel House roundabout, the data indicates that five collisions were recorded between 2015 and 2019, three of which resulted in slight injuries. Two incidents were classified as serious collisions, with one occurring in 2018 and the other during 2015. All incidents occurred on the roundabout rather than on approach. One collision happened in each of the years 2019, 2017 and 2015, whilst two incidents occurred in 2018. Two of the serious incidents that occurred at this roundabout during the study time period involved vulnerable road users; one collision involved a pedal cyclist and another involved a motorcyclist.

There does not appear to be any clear trends or causation factors responsible for the incidents that have occurred at this roundabout.

### 3.4.2 A1085 Trunk Road / A1042 Kirkleatham Lane

Four collisions were recorded at the A1085 Trunk Road / A1042 Kirkleatham Lane crossroads junction during the 2015-2019 study period, all of which were classified as slight. Two collisions occurred in 2015, one happened in 2017 and one further incident one took place in 2018. All collisions involved two vehicles, with a variable number of casualties per incident.

There appears to be no clear causation factors for the collisions that have occurred at this junction during the study period.

### 3.4.3 A1085 Corporation Road / Locke Road / Mersey Road

At this junction one serious incident has occurred during the study period. This was in 2017 and involved a pedal cyclist. Another collision took place in 2017, involving a pedal cyclist, to the east of the junction.

### 3.4.4 A1085 Corporation Road / Sandringham Road

A total of three incidents have taken place between 2015 and 2019 at the A1085 Corporation Road / Sandringham Road priority junction, all of which were of slight severity. One collision was in 2015, where a pedestrian casualty occurred. The other incidents happened in 2017 and 2018. All collisions had at least one casualty recorded.

There are no common causation factors for the incidents that have taken place at this junction.

### 3.4.5 A1085 Corporation Road / West Dyke Road / A1085 Thrush Road

A total of five collisions were noted between 2015 and 2019 both at and surrounding the A1085 Corporation Road / West Dyke Road / A1085 Thrush Road roundabout. Four incidents were of slight severity and one was classified as serious. One collision occurred in both 2015 and 2016, two took place in 2017 and a further one collision happened in 2019, which was of serious severity.

Two of the collisions at the roundabout involved pedal cyclists, both of which led to slight injuries.

There does not appear to be any clear trends or common causation factors in the collisions that have taken place at this roundabout.

### 3.4.6 Road Safety Summary

Based on the review of the collision data, and an assessment of the key junctions within the study area, three local junctions have been identified where geographic clusters of collisions have occurred during the assessment period:

- Steel House roundabout;
- A1085 Trunk Road / A1042 Kirkleatham Lane; and
- A1085 Corporation Road / West Dyke Road / A1085 Thrush Road.

Analysis of the *Crashmap* website has shown that there was a total of six collisions within the study area involving a pedal cyclist, three of which led to serious injuries. Furthermore, a total of three incidents throughout the study area led to pedestrian casualties, all of which were of slight severity.

No common causation factors have been identified for the collisions that have occurred throughout the highway network within the study area.

# 4 Development Proposals

## 4.1 Development Description

It is expected that the proposed outline planning application will be for the development of up to 185,806sqm (gross) of general industry (use class B2) and storage and distribution facilities (use class B8) with up to 10% ancillary office accommodation (use class E), HGV and car parking and associated works.

The site is expected to be fully operational by 2033. When fully operational, the site is expected to accommodate approximately 2,161 employees.

## 4.2 Vehicular Site Access

Access into the site will be via the internal road network to the south of the site. This can be accessed from the Trunk Road / West Coatham Lane roundabout (known as the Steel House roundabout).

## 4.3 Pedestrian and Cycling Facilities

A walking and cycling network will be provided across the site and will connect to existing facilities on the site accesses and surrounding area. The internal walking and cycling network will be developed where possible, alongside the emerging Transport Strategy for the wider STDC Master Plan site and agreed through the reserved matters application for the proposed development, or via an appropriately worded planning condition. Associated facilities such as cycle parking, showers and lockers etc will also be provided within the proposed development, the details of which will be agreed through the reserved matters application.

The Transport Strategy is currently being developed. Some of the key outcomes included in the strategy are expected to include the following:

- High quality public transport, walking and cycling routes and connections are prioritised over other transport modes;
- Cycling and walking connections to local residential centres are safer, more attractive, widely used and support local town centre regeneration;
- Transport options enable improved individual health and wellbeing and access to jobs; and
- Transport options will support the transition to zero carbon and contribute to a high-quality environment that will attract future occupiers.

It is expected that the strategy for the wider site will propose a series of measures to be implemented across the Teesworks site in order to achieve these outcomes, which is expected to include, amongst other things, limiting car parking provision, introducing mobility hubs, providing high quality cycling parking and improving public transport provision. There is an opportunity for future occupiers of the proposed development to sign up to the Transport Strategy to meet sustainability

targets (including RCBC's ambition to be carbon neutral by 2030) and will benefit from the measures introduced to enhance the accessibility of the site. This Strategy provides the opportunity to help minimise the impact of the proposed development.

## 4.4 Public Transport Facilities

The proposed development will benefit from improvements to the existing public transport facilities in the wider area and new provisions within the Teesworks site, as part of the emerging Transport Strategy for the wider site.

A dedicated bus service that will connect the local towns of Middlesbrough and Redcar to the development site. The bus service will travel into the site to provide a service that connects directly to the development.

## 4.5 Car Parking

As an outline planning application, the internal site layout has not yet been developed and therefore the level of car parking provision is expected to be agreed once the detail design of the scheme is known.

It is envisaged that the emerging Transport Strategy for the area will limit car parking within the site as far as reasonably possible, to meet sustainability targets (including RCBC's ambition to be carbon neutral by 2030). Therefore, this TA does not include a car parking assessment but assumes that car mode share is in line with baseline conditions, to assess a worst-case scenario with regards to the potential highway impact. However, it is expected that investment will be made in alternative transport provision to support the wider South Tees strategy and limit private car trips to / from the site.

The emerging Transport Strategy includes aims to prioritise public transport and active travel over other modes, ensure that the site does not feel dominated by cars and other vehicles, and the transport options provided will support the transition to zero carbon and contribute to a high-quality environment that will attract future occupiers. To achieve these outcomes, it is expected that the Strategy will propose a series of measures to limit car use to the site, such as providing centralised car parks, providing priority parking for car sharers, providing EV charging infrastructure, and enforcing car parking restrictions, amongst others.

## 4.6 Cycle Parking

The development will provide cycle parking spaces in excess of the current Tees Valley standards (*Tees Valley Design Guide and Specification – Residential and Industrial Estates Development)* in accordance with the Transport Strategy that is being developed for the wider South Tees site. The development will also provide supporting facilities for walking and cycling, such as showers and changing rooms, lockers etc, as mentioned in Section 8.

Details about the cycle parking spaces and associated facilities for the proposed development will be agreed through the reserved matters application.

# 5 Trip Generation

## 5.1 Person Trips

The development proposals are for B2/B8 industrial use, with ancillary office use (up to 10%). It has been forecast that when fully operational (2033), the development could accommodate approximately 2,161 employees.

To determine how many trips the employees would generate on a daily basis, we have derived trip rates from the TRICS database. TRICS is a recognised database widely used by transport professionals, which predicts trip rates of developments based on survey information of comparable sites.

It is difficult to find comparable sites given the scale of the proposed development, but four industrial estate type sites were identified in the TRICS database that were of similar scale and predominately B2/B8 use (with 10% office use), and with recent surveys (2017 and 2018). The trip rates per employee are shown in **Table 4** with further details contained in the TA Scoping Report (see **Appendix B**). The detailed TRICS outputs are included in **Appendix C**.

**Table 4: Industrial Estate Trip Rates**

| Trip rates/employee | AM Peak (08:00 – 09:00) | | | PM Peak (17:00 – 18:00) | | | Daily (7am – 7pm) | | |
|---|---|---|---|---|---|---|---|---|---|
| | In | Out | Total | In | Out | Total | In | Out | Total |
| **Person Trips** | 0.322 | 0.089 | 0.411 | 0.078 | 0.314 | 0.392 | 2.134 | 2.121 | 4.255 |
| **LGVs** | 0.029 | 0.022 | 0.051 | 0.01 | 0.016 | 0.026 | 0.294 | 0.287 | 0.581 |
| **HGVs** | 0.190 | 0.160 | 0.035 | 0.014 | 0.010 | 0.024 | 0.218 | 0.208 | 0.426 |

The trip rate for service and delivery vehicle trips (light goods vehicles and heavy goods vehicles) has been shown to disaggregate the overall person trip rate and determine how many trips are likely to be made by commuters, versus service vehicle trips. The trips for each mode, based on 2,161 employees, are shown in **Table 5**.

**Table 5: Total Trips**

| | AM Peak (08:00 – 09:00) | | | PM Peak (17:00 – 18:00) | | | Daily (7am – 7pm) | | |
|---|---|---|---|---|---|---|---|---|---|
| | In | Out | Total | In | Out | Total | In | Out | Total |
| **Person Trips** | 696 | 192 | 888 | 169 | 679 | 847 | 4,612 | 4,583 | 9,195 |
| **LGVs** | 63 | 48 | 110 | 22 | 35 | 56 | 635 | 620 | 1,256 |
| **HGVs** | 41 | 35 | 76 | 30 | 22 | 52 | 471 | 449 | 921 |
| **Person Trips (excluding LGVs/HGVs)** | 592 | 110 | 702 | 117 | 622 | 739 | 3,505 | 3,514 | 7,019 |

The data in **Table 5** shows that LGVs account for approximately 14% of total daily trips, with HGVs accounting for 10% of daily trips based on the surveys

from other industrial estates. Excluding servicing trips, the site is forecast to generate 7,019 two-way commuter trips on a daily basis (and in the order of 700 and 740 two-way trips in the AM and PM peak hour respectively).

## 5.2 Trips by Mode of Transport

Having established a method for calculating the number of trips generated by the proposed development, the person trips (excluding servicing) have been distributed onto transport modes using data from the 2011 UK Census Journey to Work dataset. This data records how people working in this area (Census zone E02002517) travelled to work in 2011 and the results are shown in **Table 6**.

**Table 6: 2011 Census Method of Journey to Work (Destination Zone - E02002517)**

| Mode | 2011 UK Census - Percentage |
|---|---|
| **Car Driver** | 82% |
| **Car Passenger** | 8% |
| **Bus** | 3% |
| **Bicycle** | 3% |
| **Walking** | 3% |
| **Motorcycle** | 1% |

It can be seen that 82% of trips to the South Tees area for the purpose of work were made by car in 2011. It is expected that the emerging Transport Strategy for the site will seek to reduce this mode share significantly. However, these earlier developments coming forward may not benefit from the longer-term strategy improvements proposed up to 2042.

It is however proposed that one of the earlier measures implemented be a dedicated bus service to connect the local towns of Middlesbrough and Redcar to the development site. The existing bus stops are outside a reasonable walking distance to the centre of the site, so it is proposed that a service be provided that travels into the Long Acres site. This service will be extended to serve other Teesworks developments as they come forward. If at least 5% of people who would usually travel by car could be encouraged to travel by the bus service, it would remove in the order of 36 two-way car trips in the AM peak hour. This forecast seems reasonable and would be realistic given that the bus would operate at least every 15 minutes and therefore be capable of accommodating a much higher number of passengers. It would therefore be hoped that many more would use the bus service than the conservative forecast estimates.

The provision of a bus service, alongside other travel planning measures, is therefore considered to enable at least a 5% reduction in those travelling to the site by car when these sites are operational.

It is therefore assumed that the maximum baseline car mode share for the Long Acres site will be 77%. Applying this mode share to the person trip generation (excluding servicing), results in the commuter vehicular trip generation outlined in **Table 7**.

**Table 7: Total Vehicular Trip Generation**

| | AM Peak (08:00 – 09:00) | | | PM Peak (17:00 – 18:00) | | | Daily (7am – 7pm) | | |
|---|---|---|---|---|---|---|---|---|---|
| | In | Out | Total | In | Out | Total | In | Out | Total |
| **Employee Car Trips** | 455 | 85 | 540 | 90 | 479 | 569 | 2,696 | 2,703 | 5,399 |
| **LGVs** | 63 | 48 | 110 | 22 | 35 | 56 | 635 | 620 | 1,256 |
| **HGVs** | 41 | 35 | 76 | 30 | 22 | 52 | 471 | 449 | 921 |
| **Total Vehicular Trips** | 559 | 167 | 726 | 142 | 535 | 677 | 3,803 | 3,773 | 7,575 |

## 5.3 Vehicular Trip Distribution and Assignment

The development site will be accessed from the Steel House roundabout.

Census data has been used to inform trip distribution at the development access. Travel to work data from the 2011 Census has been downloaded for those travelling to the South Tees area in 2011. In 2011 the site was operating as a steel works and whilst noting that the proposed use could alter the trip attraction of the site, the zone includes the Wilton International Site so it was likely to have a relatively mixed geographical draw in 2011. Origins with 1% of total trips or more were extracted and the most likely direction of travel to the site identified based on Google Maps directions. The detailed data is attached in **Appendix D** but to summarise, it was concluded that approximately 46% of trips would travel to the site from the east (via Trunk Road East) and 52% would travel from the west (via Trunk Road West, originated from the A174, the A66 and the A19). It has also been assumed that approximately 2% of development trips would travel via West Coatham Lane, estimated using baseline traffic flow turning proportions of similar arms of neighbouring junctions.

Traffic has been distributed on the remainder of the network using the turning proportions in the baseline traffic flow diagrams. The traffic distribution, and resultant morning and evening peak hour vehicular development trips, are shown in **Appendix E**.

# 6 Sustainable Transport Impact Assessment

## 6.1 Public Transport

A dedicated bus service will be provided to support the development, providing a service at least every 15 minutes in the peak hour between the site and neighbouring towns of Middlesbrough and Redcar.

It is expected that the emerging Transport Strategy for the South Tees Regeneration Master Plan will bring forward accessibility enhancements to encourage a greater proportion of people to travel to and from the site sustainably. In the longer term, it is therefore expected that the activity generated by the proposed development will have a positive impact on the viability of sustainable transport networks in the vicinity of the site.

## 6.2 Walking and Cycling

The proposed development will provide a series of physical measures to encourage active travel to / from the site, including an internal network of walking and cycling routes and associated facilities, such as cycle parking, showers and changing facilities. The development will also benefit from walking and cycling measures that will be provided across the wider Teesworks site. The proposed active travel and sustainable transport measures will aim to create a site that is not dominated by vehicles, but a site where trips by sustainable and active travel modes are enabled and encouraged.

# 7 Highway Impact Assessment

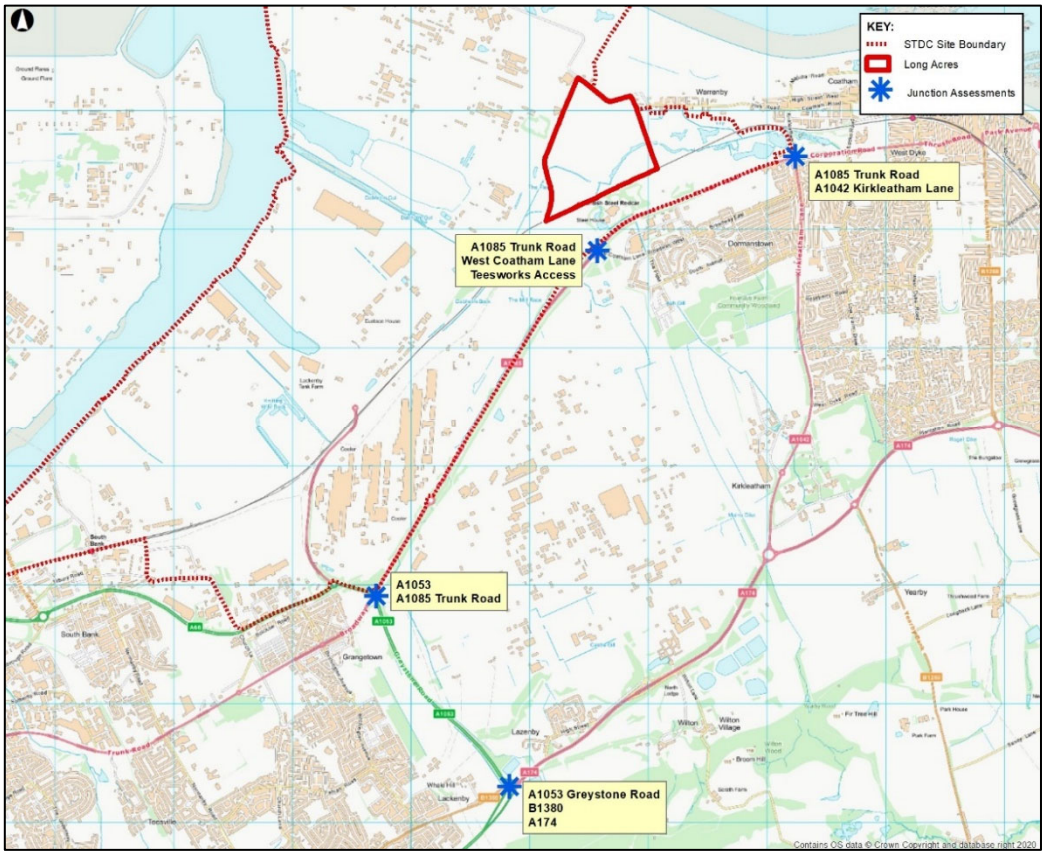
## 7.1 Assessment Scope

Based on the location of the proposed development and the current conditions at the local and SRN junctions, the impact of the development on the following junctions has been assessed:

1. A174 / A1053 Greystone Road signalised roundabout,
2. A1053 / A1085 Trunk Road signalised roundabout,
3. Steel House roundabout; and
4. A1085 Trunk Road / A1042 Kirkleatham Lane signalised junction.

The locations of the junctions to be assessed is shown in **Figure 5**.

**Figure 5: Location of junctions to be assessed**




## 7.2 Methodology and Assessment Scenarios

Due to current circumstances with the Covid-19 pandemic and lockdown measures, it is not possible for traffic surveys to be undertaken to inform the baseline condition assessment. To establish the baseline traffic flows, the following data sources have been utilised:

- Traffic data from HE North Regional Transport Model (NRTM);

- Traffic data from the Tees Valley Combined Authority (TVCA) Tees Valley Cube Model (TVM);
- Department for Transport traffic counts available online;
- WebTRIS (HE) online data;
- Traffic surveys collected on behalf of Capita in 2019 to construct a VISSIM model of the area for RCBC – permission to obtain a copy of these surveys was granted by RCBC, Capita and NETDC Ltd; and
- Survey data publicly available online from other local developments, including the planning application for the York Potash development (application number R/2013/0669/OOM).

Peak hour data from the two traffic models (NRTM and TVM) was input into two separate traffic flow diagrams for the study area. On both diagrams, any observed data was added above the links to enable a comparison to be made and determine which data source provided the most comparable base. The NRTM was found to be a comparable match against the baseline flows, and therefore the NRTM flows were predominantly used to inform the baseline, except for where observed data was available. All data has been adjusted to 2020 and 2033 (for operational year assessment) using NRTM growth.

The traffic flow diagrams are attached in **Appendix F** and the base flows are categorised to indicate which data source was used at each junction.

Based on the above, three assessment scenarios have been developed as follows:

- 2033 Base,
- 2033 Base + Proposed Development; and
- 2033 Base + all five proposed developments + South Bank development (cumulative assessment).

As requested by HE for the South Bank development, the scope of the traffic assessment will extend to include the A19 corridor. Jacobs has provided a copy of the 2015 New Tees Crossing AIMSUN Model so that the impact of trips from the Teesworks sites on the A19 can be assessed. The impact of each development site, and the cumulative scenarios, will be undertaken. It should also be noted that for the purpose of the assessment, it has been assumed that all freight traffic travels by road.

Given the inability to gather site specific baseline data, it should be noted that preparing the baseline traffic flow forecasts has relied on information provided by others and whilst all data was checked, Arup and STDC do not accept responsibility for the accuracy of such information. Arup emphasise that any forward-looking projections, forecasts, or estimates have been based upon interpretations or assessments of available information at the time of production.

## 7.3 Cumulative Impact Assessment

A cumulative assessment has been undertaken to consider the cumulative effects of all five developments on the Teesworks site, plus the South Bank development (application number R/2020/0357/OOM). This cumulative assessment of all recent planning submissions on Teesworks has been undertaken for a future year of 2033. This is known as the Tier 2 cumulative assessment within the ES.

Rather than review and extract traffic flows for the committed developments that have been identified, growth has been extracted from the NRTM. This approach is considered to be reasonable as it is underpinned by the National Trip End Model (NTEM) which informs TEMPro growth, as well as a full variable demand model, accounting for changing economic conditions and competing transport modes. Growth in the NRTM is controlled to NTEM at district level (as per TAG guidance) however individual developments are explicitly accounted for. This means that local trip end growth is calculated in a detailed way.

## 7.4 Junction Capacity Assessments

This section presents the junction modelling outputs for each assessed junction. The following non-signalised junctions have been developed using the ARCADY module of the Junctions 9 junction modelling software:

- Steel House roundabout

The remaining junctions have been developed using the LinSig signalised junction modelling software.

- A1053 / A1085 Trunk Road signalised roundabout;
- A174 / A1053 Greystone Road signalised roundabout; and
- A1085 Trunk Road / A1042 Kirkleatham Lane signalised junction.

This section summarises the modelling outputs for each junction. The detailed modelling results for each junction are included in **Appendix G**.

### 7.4.1 Steel House Roundabout

**Table 8**, **Table 9** and **Table 10** show the junction modelling results for the Steel House roundabout.

**Table 8: Steel House roundabout – '2033 Base' scenario**

| Arm | AM peak hour | | | PM peak hour | | |
|---|---|---|---|---|---|---|
| | RFC | Max Queue (PCU) | Delay (s) | RFC | Max Queue (PCU) | Delay (s) |
| West Coatham Lane | 0.39 | 1 | 4.02 | 0.19 | 1 | 3.17 |
| Industrial access road | 0.01 | 0 | 3.03 | 0.06 | 1 | 3.00 |

| Arm | AM peak hour | | | PM peak hour | | |
|---|---|---|---|---|---|---|
| | RFC | Max Queue (PCU) | Delay (s) | RFC | Max Queue (PCU) | Delay (s) |
| A1085 Trunk Road NB | 0.50 | 2 | 3.57 | 0.51 | 1 | 3.45 |
| Steel House access | 0.02 | 0 | 1.68 | 0.27 | 1 | 2.44 |
| A1085 Trunk Road SB | 0.36 | 1 | 3.03 | 0.36 | 1 | 3.77 |

The junction is forecast to operate within capacity for the '2033 Base' scenario. The highest RFC (0.51) is noted on the A1085 Trunk Road northbound arm of the roundabout for the PM peak hour scenario, which is well below its theoretical capacity (RFC=0.51<1).

**Table 9: Steel House roundabout – '2033 Base + Development' scenario**

| Arm | AM peak hour | | | PM peak hour | | |
|---|---|---|---|---|---|---|
| | RFC | Max Queue (PCU) | Delay (s) | RFC | Max Queue (PCU) | Delay (s) |
| West Coatham Lane | 0.46 | 1 | 5.23 | 0.23 | 1 | 3.82 |
| Industrial access road | 0.01 | 0 | 3.62 | 0.07 | 1 | 3.55 |
| A1085 Trunk Road NB | 0.72 | 3 | 6.96 | 0.56 | 2 | 4.03 |
| Steel House access | 0.12 | 1 | 1.97 | 0.56 | 2 | 4.28 |
| A1085 Trunk Road SB | 0.53 | 2 | 4.30 | 0.46 | 1 | 5.11 |

Based on the model outputs, the junction is forecast to operate within capacity for the '2033 Base + Development' scenario. The highest RFC (0.72) is noted on the A1085 Trunk Road northbound arm of the roundabout in the AM peak hour, which is well below its theoretical capacity (RFC=0.72<1).

**Table 10: Steel House roundabout – '2033 Cumulative Assessment' scenario**

| Arm | AM peak hour | | | PM peak hour | | |
|---|---|---|---|---|---|---|
| | RFC | Max Queue (PCU) | Delay (s) | RFC | Max Queue (PCU) | Delay (s) |
| West Coatham Lane | 0.89 | 7 | 37.22 | 0.35 | 1 | 6.37 |
| Industrial access road | 0.03 | 0 | 7.76 | 0.10 | 1 | 5.45 |
| A1085 Trunk Road NB | 1.65 | 893 | 1926.43 | 0.92 | 11 | 22.54 |

| Arm | AM peak hour | | | PM peak hour | | |
|---|---|---|---|---|---|---|
| | RFC | Max Queue (PCU) | Delay (s) | RFC | Max Queue (PCU) | Delay (s) |
| Steel House access | 0.36 | 1 | 2.61 | 1.62 | 810 | 1342.80 |
| A1085 Trunk Road SB | 1.28 | 293 | 554.82 | 0.87 | 7 | 23.59 |

The junction modelling outputs indicate that the Steel House junction is forecast to operate significantly above capacity for the '2033 Cumulative Assessment' scenario. (AM peak hour: A1085 Trunk Road northbound and southbound arms over capacity and West Coatham Lane approaching capacity. PM peak hour: Steel House access over capacity and A1085 Trunk Road northbound and southbound approaching capacity).

A mitigation scheme is likely to be required for the junction to operate efficiently with the addition of traffic associated with the proposed Teesworks sites and the committed South Bank site. Possible mitigation for the junction could include providing a third circulatory lane on the inside of the roundabout and widening of the entry arms to accommodate three lanes of traffic. A detailed optioneering, modelling and design exercise with phased build-out will need to be undertaken to establish the type and scale of the mitigation required. As with all junctions that are identified as operating above capacity, the development of mitigation should be considered alongside other measures that will be introduced as part of the emerging Transport Strategy for the wider Teesworks site to encourage sustainable and active travel in line with Regional and National policy to reduce carbon emissions from transport.

It should also be noted that the emerging Transport Strategy for the wider site has identified the opportunity for the Steel House development to be accessed by a new access junction off the Trunk Road. This is expected to reduce the cumulative development impact on the Steel House roundabout.

### 7.4.2 A1053 / A1085 Trunk Road Roundabout

**Table 11**, **Table 12** and **Table 13** show the LinSig model results for the A1053 / A1085 Trunk Road junction.

**Table 11: A1053 / A1085 Trunk Road Roundabout – '2033 Base' scenario**

| | AM peak hour | | | PM peak hour | | |
|---|---|---|---|---|---|---|
| | DoS (%) | Mean Max Queue (PCU) | Delay (PCUHr) | DoS (%) | Mean Max Queue (PCU) | Delay (PCUHr) |
| JUNCTION PRC (%) | 20.6% | | | 11.0% | | |
| Cycle time | 60 seconds | | | 60 seconds | | |
| A1085 Trunk Road NB, Left/ Ahead | 28.7% | 1 | 1 | 29.9% | 2 | 1 |

| | AM peak hour | | | PM peak hour | | |
|---|---|---|---|---|---|---|
| | DoS (%) | Mean Max Queue (PCU) | Delay (PCUHr) | DoS (%) | Mean Max Queue (PCU) | Delay (PCUHr) |
| A1085 Trunk Road NB, Ahead | 37.1% | 2 | 1 | 25.8% | 1 | 1 |
| A1053 Tees Dock Road, Left | 32.1% | 4 | 1 | 58.3% | 8 | 2 |
| A1053 Tees Dock Road, Ahead | 51.3% | 7 | 2 | 80.5% | 15 | 5 |
| A1085 Trunk Road SB, Left/ Ahead | 25.1% | 2 | 1 | 36.8% | 3 | 2 |
| A1085 Trunk Road SB, Ahead | 74.2% | 11 | 4 | 72.5% | 8 | 4 |
| A1053 Greystone Road, Ahead/ Left | 73.4% | 11 | 4 | 29.4% | 3 | 1 |
| A1053 Greystone Road, Ahead | 74.6% | 11 | 4 | 32.9% | 4 | 2 |
| Wilton site access, Ahead/ Left | 9.7% | 1 | 1 | 12.4% | 1 | 1 |
| Wilton site access, Ahead | 31.5% | 1 | 1 | 55.2% | 2 | 1 |

The modelling outputs identify that the junction is forecast to operate within its theoretical capacity for the '2033 Base' scenario in both the AM and PM peak hour (PRC>0).

**Table 12: A1053 / A1085 Trunk Road Roundabout – '2033 Base + Development' scenario**

| | AM peak hour | | | PM peak hour | | |
|---|---|---|---|---|---|---|
| | **DoS (%)** | **Mean Max Queue (PCU)** | **Delay (PCUHr)** | **DoS (%)** | **Mean Max Queue (PCU)** | **Delay (PCUHr)** |
| JUNCTION PRC (%) | 13.5% | | | 9.1% | | |
| Cycle time | 60 seconds | | | 60 seconds | | |
| A1085 Trunk Road NB, Left/ Ahead | 43.5% | 2 | 1 | 38.0% | 2 | 1 |
| A1085 Trunk Road NB, Ahead | 55.6% | 3 | 1 | 28.6% | 1 | 1 |
| A1053 Tees Dock Road, Left | 45.7% | 6 | 2 | 62.2% | 9 | 3 |
| A1053 Tees Dock Road, Ahead | 54.6% | 7 | 3 | 82.5% | 16 | 5 |
| A1085 Trunk Road SB, Left/ Ahead | 30.6% | 3 | 1 | 54.6% | 4 | 3 |
| A1085 Trunk Road SB, Ahead | 75.7% | 12 | 4 | 81.8% | 11 | 5 |
| A1053 Greystone Road, Ahead/ Left | 78.6% | 12 | 5 | 35.7% | 4 | 2 |
| A1053 Greystone Road, Ahead | 79.3% | 13 | 5 | 39.8% | 4 | 2 |
| Wilton site access, Ahead/ Left | 10.5% | 1 | 1 | 15.6% | 1 | 1 |
| Wilton site access, Ahead | 33.7% | 2 | 1 | 69.3% | 3 | 2 |

The modelling outputs identify that the junction is forecast to operate within its theoretical capacity for the '2033 Base + Development' scenario (PRC>0 and DoS<100% on all approaches).

**Table 13: A1053 / A1085 Trunk Road junction – '2033 Cumulative Assessment' scenario**

| | AM peak hour | | | PM peak hour | | |
|---|---|---|---|---|---|---|
| | DoS (%) | Mean Max Queue (PCU) | Delay (PCUHr) | DoS (%) | Mean Max Queue (PCU) | Delay (PCUHr) |
| JUNCTION PRC (%) | -57.7% | | | -49.8% | | |
| Cycle time | 60 seconds | | | 60 seconds | | |
| A1085 Trunk Road NB, Left/ Ahead | 59.0% | 3 | 2 | 60.4% | 3 | 2 |
| A1085 Trunk Road NB, Ahead | 141.9% | 75 | 63 | 43.5% | 2 | 1 |
| A1053 Tees Dock Road, Left | 94.9% | 24 | 11 | 106.8% | 69 | 54 |
| A1053 Tees Dock Road, Ahead | 75.0% | 12 | 4 | 133.3% | 235 | 219 |
| A1085 Trunk Road SB, Left/ Ahead | 49.0% | 4 | 2 | 109.5% | 62 | 54 |
| A1085 Trunk Road SB, Ahead | 138.7% | 207 | 195 | 134.8% | 159 | 151 |
| A1053 Greystone Road, Ahead/ Left | 141.9% | 211 | 202 | 57.2% | 6 | 3 |
| A1053 Greystone Road, Ahead | 136.3% | 212 | 201 | 59.0% | 6 | 3 |
| Wilton site access, Ahead/ Left | 23.8% | 1 | 0.3 | 26.4% | 1 | 1 |
| Wilton site access, Ahead | 89.8% | 5 | 3.6 | 130.2% | 23 | 19 |

The junction is expected to operate significantly above its theoretical capacity for the '2033 Cumulative Assessment' scenario in both the AM and PM peak hour (AM peak hour: A1085 Trunk Road northbound ahead, A1085 Trunk Road southbound ahead and A1053 Greystone Road movements over capacity. PM peak hour: A1053 Tees Dock Road, A1085 Trunk Road southbound and Wilton access road ahead movements over capacity).

A mitigation scheme may be required for the junction to operate efficiently for the '2033 Cumulative Assessment' scenario. Possible mitigation for the junction could be to extend the short/pocket/flared lanes on approach to the roundabout. A detailed optioneering, modelling and design exercise with phased build-out will need to be undertaken.

### 7.4.3 A174 / A1053 Greystone Road Roundabout

**Table 14**, **Table 15** and **Table 16** show the LinSig model results for the A174 / A1053 Greystone Road junction.

**Table 14: A174 / A1053 Greystone Road Roundabout – '2033 Base' scenario**

| | AM peak hour | | | PM peak hour | | |
|---|---|---|---|---|---|---|
| | DoS (%) | Mean Max Queue (PCU) | Delay (PCUHr) | DoS (%) | Mean Max Queue (PCU) | Delay (PCUHr) |
| JUNCTION PRC (%) | -5.0% | | | -19.6% | | |
| Cycle time | 90 seconds | | | 90 seconds | | |
| High Street, Left/ Ahead | 74.8% | 5 | 3 | 32.6% | 3 | 1 |
| A1053 Greystone Road, Left | 53.6% | 6 | 2 | 125.3% | 106 | 92 |
| A1053 Greystone Road, Ahead | 46.4% | 5 | 2 | 64.4% | 8 | 3 |
| A174 SB, Ahead | 66.1% | 1 | 1 | 64.5% | 1 | 1 |
| A174 SB, Ahead | 70.8% | 11 | 6 | 33.1% | 4 | 3 |
| A174 NB, Left/ Ahead | 65.3% | 13 | 4 | 78.0% | 15 | 6 |
| A174 NB, Ahead | 81.0% | 13 | 7 | 103.9% | 76 | 142 |

The junction modelling results outline that the A174 / A1053 Greystone Road roundabout is predicted to approach theoretical capacity within the AM peak hour (PRC=<0 and DoS<100% on all approaches). However, the junction is forecast to operate above capacity during the PM peak hour (A1053 Greystone Road left turning movements and A174 northbound ahead movements over capacity).

We understand that an improvement scheme has been developed by HE for the Greystones junction, to address capacity issues currently experienced at the junction. This scheme has not been included in this modelling exercise.

**Table 15: A174 / A1053 Greystone Road Roundabout – '2033 Base + Development' scenario**

| | AM peak hour | | | PM peak hour | | |
|---|---|---|---|---|---|---|
| | DoS (%) | Mean Max Queue (PCU) | Delay (PCUHr) | DoS (%) | Mean Max Queue (PCU) | Delay (PCUHr) |
| JUNCTION PRC (%) | -18.6% | | | -54.1% | | |
| Cycle time | 90 seconds | | | 90 seconds | | |
| High Street, Left/ Ahead | 106.8% | 32 | 17 | 32.7% | 3 | 1 |
| A1053 Greystone Road, Left | 57.0% | 7 | 3 | 137.9% | 167 | 132 |
| A1053 Greystone Road, Ahead | 31.8% | 3 | 2 | 41.5% | 5 | 2 |
| A174 SB, Ahead | 66.1% | 1 | 1 | 64.5% | 1 | 1 |
| A174 SB, Ahead | 71.0% | 10 | 5 | 29.1% | 4 | 2 |
| A174 NB, Left/ Ahead | 69.0% | 15 | 5 | 85.8% | 17 | 8 |
| A174 NB, Ahead | 92.1% | 26 | 11 | 138.7% | 215 | 198 |

The modelling outputs identify that the junction is forecast to operate above its theoretical capacity for the '2033 Base + Development' scenario during both the AM and PM peak hours (AM peak hour: High Street left turning and ahead movements over capacity, PM peak hour: A1053 Greystone Road left turning movements and A174 northbound ahead movements over capacity).

Mitigation measures to address the traffic impacts associated with the proposed development will be required for this junction. We understand that an improvement scheme has been developed by HE to address capacity issues currently experienced at the junction.

**Table 16: A174 / A1053 Greystone Road Roundabout- '2033 Cumulative Assessment' scenario**

| | AM peak hour | | | PM peak hour | | |
|---|---|---|---|---|---|---|
| | DoS (%) | Mean Max Queue (PCU) | Delay (PCUHr) | DoS (%) | Mean Max Queue (PCU) | Delay (PCUHr) |
| JUNCTION PRC (%) | -37.1% | | | -111.9% | | |
| Cycle time | 90 seconds | | | 90 seconds | | |
| High Street, Left/ Ahead | 122.9% | 51 | 40 | 25.9% | 2 | 1 |
| A1053 Greystone Road, Left | 76.6% | 12 | 5 | 190.7% | 431 | 367 |
| A1053 Greystone Road, Ahead | 44.3% | 5 | 3 | 59.6% | 7 | 3 |
| A174 SB, Ahead | 66.1% | 1 | 1 | 62.6% | 1 | 1 |
| A174 SB, Ahead | 123.4% | 213 | 189 | 164.9% | 125 | 131 |
| A174 NB, Left/ Ahead | 106.4% | 58 | 43 | 157.8% | 166 | 156 |
| A174 NB, Ahead | 106.2% | 73 | 56 | 189.6% | 345 | 331 |

The junction is forecast to operate significantly above capacity for the '2033 Cumulative Assessment' scenario in both the AM and PM peak hour (AM peak hour: High Street, A174 southbound ahead movements and A174 northbound all movements expected to operate above capacity. PM peak hour: A1053 Greystone Road left turning movements, A174 southbound ahead movements and A174 northbound all movements expected to operate above capacity).

As stated above, it is understood that HE is looking at an improvement scheme to assess capacity. The need or otherwise for additional mitigation measures will be discussed with HE during the determination of this outline planning application.

### 7.4.4 A1085 Trunk Road / A1042 Kirkleatham Lane Junction

**Table 17**, **Table 18** and **Table 19** show the LinSig model results for the A1085 Trunk Road / A1042 Kirkleatham Lane junction.

**Table 17: A1085 Trunk Road / A1042 Kirkleatham Lane junction – '2033 Base' scenario**

| | AM peak hour | | | PM peak hour | | |
|---|---|---|---|---|---|---|
| | DoS (%) | Mean Max Queue (PCU) | Delay (PCUHr) | DoS (%) | Mean Max Queue (PCU) | Delay (PCUHr) |
| JUNCTION PRC (%) | -27.6% | | | -11.7% | | |
| Cycle time | 116 seconds | | | 116 seconds | | |
| Kirkleatham Lane SB, Left/ Ahead | 29.4% | 5 | 2 | 41.4% | 7 | 3 |
| Kirkleatham Lane SB, Right | 114.8% | 31 | 26 | 99.0% | 15 | 11 |
| Trunk Road WB, Right/ Left/ Ahead | 113.5% | 50 | 42 | 100.5% | 26 | 17 |
| Kirkleatham Lane NB, Ahead/ Left | 113.0% | 39 | 32 | 99.4% | 18 | 13 |
| Kirkleatham Lane NB, Right | 56.4% | 7 | 3 | 36.5% | 4 | 2 |
| Trunk Road EB, Left | 36.3% | 6 | 2 | 67.9% | 12 | 5 |
| Trunk Rd EB, Ahead/ Right | 54.3% | 10 | 4 | 94.9% | 25 | 13 |

The modelling outputs indicate that the junction is predicted to operate above theoretical capacity for the '2033 Base' scenario during both the AM and PM peak hour (AM peak hour: Kirkleatham Lane southbound right turning movements, Trunk Road westbound movements and Kirkleatham Lane northbound ahead and left turning movements over capacity. PM peak hour: Trunk Road westbound movements over capacity).

**Table 18: A1085 Trunk Road / A1042 Kirkleatham Lane junction – '2033 Base + Development' scenario**

| | AM peak hour | | | PM peak hour | | |
|---|---|---|---|---|---|---|
| | DoS (%) | Mean Max Queue (PCU) | Delay (PCUHr) | DoS (%) | Mean Max Queue (PCU) | Delay (PCUHr) |
| JUNCTION PRC (%) | -61.7% | | | -26.6% | | |
| Cycle time | 116 seconds | | | 116 seconds | | |
| Kirkleatham Lane SB, Left/ Ahead | 30.1% | 5 | 2 | 43.6% | 8 | 3 |
| Kirkleatham Lane SB, Right | 145.5% | 76 | 70 | 112.7% | 28 | 24 |
| Trunk Road WB, Right/ Left/ Ahead | 140.7% | 118 | 110 | 101.8% | 30 | 20 |
| Kirkleatham Lane NB, Ahead/ Left | 138.1% | 76 | 69 | 113.9% | 34 | 29 |
| Kirkleatham Lane NB, Right | 62.3% | 7 | 4 | 40.8% | 4 | 2 |
| Trunk Road EB, Left | 41.7% | 7 | 3 | 81.6% | 17 | 7 |

| | AM peak hour | | | PM peak hour | | |
|---|---|---|---|---|---|---|
| | DoS (%) | Mean Max Queue (PCU) | Delay (PCUHr) | DoS (%) | Mean Max Queue (PCU) | Delay (PCUHr) |
| Trunk Rd EB, Ahead/ Right | 62.4% | 12 | 5 | 114.0% | 76 | 62 |

The modelling outputs identify that the junction is forecast to operate above theoretical capacity for the '2033 Base + Development' scenario for both the AM and PM peak hour (AM peak hour: Kirkleatham Lane southbound right turning movements, Trunk Road westbound and Kirkleatham Lane northbound ahead and left turning movements over capacity. PM peak hour: the same movements as per AM peak, with the addition of Trunk Road eastbound ahead and right turning movements are forecast to be over capacity).

**Table 19: A1085 Trunk Road / A1042 Kirkleatham Lane junction – '2033 Cumulative Assessment' scenario**

| | AM peak hour | | | PM peak hour | | |
|---|---|---|---|---|---|---|
| | DoS (%) | Mean Max Queue (PCU) | Delay (PCUHr) | DoS (%) | Mean Max Queue (PCU) | Delay (PCUHr) |
| JUNCTION PRC (%) | -195.7% | | | -112.4% | | |
| Cycle time | 116 seconds | | | 116 seconds | | |
| Kirkleatham Lane SB, Left/ Ahead | 31.7% | 5 | 2 | 50.5% | 8 | 4 |
| Kirkleatham Lane SB, Right | 260.9% | 295 | 284 | 180.8% | 119 | 113 |
| Trunk Road WB, Right/ Left/ Ahead | 257.9% | 454 | 438 | 135.9% | 120 | 111 |
| Kirkleatham Lane NB, Ahead/ Left | 266.1% | 215 | 209 | 181.8% | 96 | 92 |
| Kirkleatham Lane NB, Right | 84.6% | 9 | 6 | 57.8% | 5 | 3 |
| Trunk Road EB, Left | 68.0% | 12 | 5 | 136.9% | 163 | 148 |
| Trunk Rd EB, Ahead/ Right | 101.8% | 38 | 24 | 191.2% | 399 | 383 |

The junction modelling results indicate that the junction is forecast to significantly exceed its theoretical capacity for the '2033 Cumulative Assessment' scenario in both the AM and PM peak hour, with the majority of movements expected to operate significantly above capacity.

A review of the traffic signal operation will need to be undertaken to ascertain if there are improvements that could be made with the existing infrastructure. Additional mitigation may be required for the junction to operate efficiently for the both the '2033 Base + Development' and the '2033 Cumulative Assessment' scenario. A detailed optioneering, modelling and design exercise with phased build-out will need to be undertaken. It should also be noted that the A1085 Trunk Road / A1042 Kirkleatham Lane is a local junction and there is therefore

particular scope for travel planning measures to help mitigate development impact at the junction.

### 7.4.5 Junction Assessment Summary

The **Steel House roundabout** is forecast to operate within capacity for both the '2033 Base' and the '2033 Base + Development' scenario. For the '2033 Cumulative Assessment' scenario, the junction is forecast to operate significantly above capacity. Possible mitigation for the junction could include providing a third circulatory lane on the inside of the roundabout and widening of the entry arms to accommodate three lanes of traffic. It is also possible that an additional access into the Steel House area of the Teesworks site could be provided directly off the A1085 Trunk Road, which would reduce traffic at the roundabout. A detailed optioneering, modelling and design exercise taking these aspects into account, along with a phased build-out, needs to be undertaken.

The **A1053 / A1085 Trunk Road roundabout** is forecast to operate within capacity for both the '2033 Base' and the '2033 Base + Development' scenario. The junction is forecast to significantly exceed capacity for the '2033 Cumulative Assessment' scenario. Possible mitigation for the junction could be to extend the short/pocket/flared lanes on approach to the roundabout. As with the other junctions operating over capacity, a detailed optioneering, modelling and design exercise with phased build-out will need to be undertaken to ascertain if changes to the highway infrastructure are required following the introduction of other transport measures.

The **A174 / A1053 Greystone Road roundabout** is forecast to operate above capacity for the '2033 Base' PM peak hour scenario (and approach capacity in the AM peak hour). This is exacerbated with the addition of the proposed development, and the junction is forecast to exceed its theoretical capacity further. The junction is forecast to operate significantly above capacity for the '2033 Cumulative Assessment' scenario in both the AM and PM peak hour. We understand that a HE scheme is being developed to improve the current operation of the junction. An updated modelling exercise will need to be undertaken to assess whether the cumulative development impact can be accommodated at the improved junction, based on the HE scheme.

The **A1085 Trunk Road / A1042 Kirkleatham Lane junction** is expected to operate above capacity for the '2033 Base' scenario. This is exacerbated with the addition of the proposed development, and the junction is forecast to exceed its theoretical capacity further. For the '2033 Cumulative Assessment' scenario the junction is likely to operate significantly above capacity. A review of the traffic signal operation will need to be undertaken to ascertain if there are improvements that could be made with the existing infrastructure. As it will also be predominantly local trips using this junction, further consideration should be given to what travel planning measures can achieve before additional highway capacity is provided.

Mitigation measures for the assessed junctions should take account of other measures that will be introduced as part of the emerging Transport Strategy for

the wider Teesworks site to encourage sustainable and active travel in line with Regional and National policy to reduce carbon emissions from transport.

## 7.5 Strategic Road Network Impact Assessment

Jacobs have developed a microsimulation model of the A19 and A66 to support their work for the New Tees Crossing scheme (2015 New Tees Crossing AIMSUN Model). Since this is a calibrated and validated model, Jacobs have provided Arup with a copy of the model so that an impact of development trips on the A19 could be assessed. The New Tees Crossing, which would provide additional capacity on the A19 corridor, could be operational by 2027. However, as a worst-case scenario, the assessment for this development has been undertaken on the 2027 base model, i.e. without the New Tees Crossing in place.

The model reports journey times with and without the development traffic added. The specific routes where journey time results have been extracted from the model for this assessment are shown in **Appendix H**.

The results include a 30-minute warm up and 30-minute cool down period for both the AM and PM peak hour, to ensure that a robust assessment for the impact of the Teesworks sites on the strategic road network has been undertaken. Traffic flows for the warm-up and cool-down period have been estimated using the TRICS trip rate profiles for the South Bank development and are shown in **Table 20** and **Table 21**.

**Table 20: AM Peak Period Traffic Profile**

| | % of AM peak hour traffic |
|---|---|
| 07:00-08:00 | 94% |
| 09:00-10:00 | 82% |

**Table 21: PM Peak Period Traffic Profile**

| | % of PM peak hour traffic |
|---|---|
| 16:00-17:00 | 94% |
| 18:00-19:00 | 63% |

The change in journey times on the A19 is shown in **Table 22** for the AM peak period and in **Table 23** for the PM peak period.

**Table 22: AM Peak Journey Times from AIMSUN Model - Long Acres Scenario**

| Time Period | Route | Do Minimum | With Development | Change |
|---|---|---|---|---|
| **08:00 – 08:15** | A19 North - A66 EB | 01:53 | 01:56 | 00:04 |
| | A19 South - A66 EB | 02:36 | 02:48 | 00:12 |
| **08:15 – 08:30** | A19 North - A66 EB | 02:30 | 02:35 | 00:05 |
| | A19 South - A66 EB | 04:23 | 04:53 | 00:30 |
| **08:30 – 08:45** | A19 North - A66 EB | 01:59 | 02:39 | 00:41 |

| Time Period | Route | Do Minimum | With Development | Change |
|---|---|---|---|---|
| | A19 South - A66 EB | 05:04 | 06:26 | 01:22 |
| **08:45 – 09:00** | A19 North - A66 EB | 01:34 | 02:06 | 00:32 |
| | A19 South - A66 EB | 04:11 | 07:05 | 02:54 |
| ***08:00 – 09:00 Average*** | *A19 North - A66 EB* | *01:59* | *02:19* | *00:21* |
| | *A19 South - A66 EB* | *04:04* | *05:18* | *01:15* |

The results of the AM peak hour assessment show that the greatest change in journey time is in the 08:45-09:00 period, when the journey time for those travelling on the A19 South to the A66 eastbound is forecast to increase by 2 minutes and 54 seconds. Across the morning peak hour, the average change in journey time on this section is 1 minute and 15 seconds with the addition of development traffic.

**Table 23: PM Peak Journey Times from AIMSUN Model - Long Acres Scenario**

| Time Period | Route | Do Minimum | With Development | Change |
|---|---|---|---|---|
| **17:00 – 17:15** | A66 WB - A19 North | 02:36 | 02:35 | -00:01 |
| | A66 WB - A19 South | 01:14 | 01:14 | 00:00 |
| **17:15 – 17:30** | A66 WB - A19 North | 02:52 | 02:52 | 00:00 |
| | A66 WB - A19 South | 01:14 | 01:15 | 00:01 |
| **17:30 – 17:45** | A66 WB - A19 North | 02:12 | 02:25 | 00:14 |
| | A66 WB - A19 South | 01:12 | 01:12 | 00:00 |
| **17:45 – 18:00** | A66 WB - A19 North | 01:19 | 01:18 | -00:01 |
| | A66 WB - A19 South | 01:20 | 01:22 | 00:02 |
| ***17:00 – 18:00 Average*** | *A19 North - A66 EB* | *02:15* | *02:18* | *00:03* |
| | *A19 South - A66 EB* | *01:15* | *01:16* | *00:01* |

Due to existing congestion at Newport Road Interchange, it is difficult to assess the impact of the proposed development on the journey times on the A19. This congestion restricts traffic flow on the A66 mainline, and therefore reduces the number of vehicles that can progress towards the A19. Unlike the AM peak, where journey times increase as more traffic is added to the model, the PM 'with development' scenario journey times are similar to those in the base scenario due to this area of congestion restricting onward traffic through the network.

**Table 24** and **Table 25** show the change in journey times on the A19 as a result of the cumulative impact of all traffic associated with the Teesworks and South Bank sites (in addition to the Long Acres site traffic), in the AM and PM peak hour respectively.

**Table 24: AM Peak Journey Times from AIMSUN Model – Cumulative Assessment Scenario**

| Time Period | Route | Do Minimum | With Cumulative Development | Difference |
|---|---|---|---|---|
| **08:00 – 08:15** | A19 North - A66 EB | 01:53 | 02:34 | 00:41 |
| | A19 South - A66 EB | 02:36 | 04:27 | 01:51 |
| **08:15 – 08:30** | A19 North - A66 EB | 02:30 | 04:47 | 02:17 |
| | A19 South - A66 EB | 04:23 | 08:33 | 04:10 |
| **08:30 – 08:45** | A19 North - A66 EB | 01:59 | 06:28 | 04:29 |
| | A19 South - A66 EB | 05:04 | 10:18 | 05:13 |
| **08:45 – 09:00** | A19 North - A66 EB | 01:34 | 06:23 | 04:49 |
| | A19 South - A66 EB | 04:11 | 10:40 | 06:29 |
| ***08:00 – 09:00 Average*** | *A19 North - A66 EB* | *01:59* | *05:03* | *03:04* |
| | *A19 South - A66 EB* | *04:04* | *08:29* | *04:26* |

The AM peak hour results for the Cumulative Assessment scenario show that the greatest change in journey time is in the 08:45-09:00 period when the journey time for those travelling on the A19 South to the A66 eastbound is forecast to increase by 6 minutes and 29 seconds. Across the morning peak hour, the average change in journey time on this section is 4 minutes and 26 seconds with the addition of the five Teesworks sites and South Bank site traffic.

**Table 25: PM Peak Journey Times from AIMSUN Model – Cumulative Assessment scenario**

| Time Period | Route | Do Minimum | With Cumulative Development | Difference |
|---|---|---|---|---|
| **17:00 – 17:15** | A66 WB - A19 North | 02:36 | 02:29 | -00:07 |
| | A66 WB - A19 South | 01:14 | 01:14 | 00:00 |
| **17:15 – 17:30** | A66 WB - A19 North | 02:52 | 02:18 | -00:34 |
| | A66 WB - A19 South | 01:14 | 01:12 | -00:02 |
| **17:30 – 17:45** | A66 WB - A19 North | 02:12 | 01:31 | -00:41 |
| | A66 WB - A19 South | 01:12 | 01:11 | -00:01 |
| **17:45 – 18:00** | A66 WB - A19 North | 01:19 | 01:16 | -00:03 |
| | A66 WB - A19 South | 01:20 | 01:12 | -00:08 |
| ***17:00 – 18:00 Average*** | *A19 North - A66 EB* | *02:15* | *01:53* | *-00:22* |
| | *A19 South - A66 EB* | *01:15* | *01:12* | *-00:03* |

As for the individual development assessment, the PM peak cannot be adequately assessed due to the existing congestion at Newport Road Interchange, and therefore the resultant journey times are similar to the base.

It should be noted that once the New Tees Crossing is open, traffic conditions will improve on the A19. Vehicles however will still need to use the A66, across Newport Road Interchange, to access the A19 from the east. Therefore, further testing could be undertaken in the Aimsun model, with the New Tees Crossing in place, to understand the betterment gained from the re-routing of development traffic as a result of the new crossing.

## 7.6 Additional Mitigation

The junction modelling has identified that two of the assessed junctions (A174 / A1053 Greystone Road roundabout and A1085 Trunk Road / A1042 Kirkleatham Lane junction) are forecast to exceed capacity with the addition of the proposed development traffic, however, noting that both junctions are already forecast to exceed capacity for the '2033 Base' scenario. It is also expected that the cumulative impact of the Teesworks and South Bank sites will be significant on all assessed junctions. Section 7.4 provided indicative suggestions for potential mitigation measures for the assessed junctions, noting that a detailed optioneering, modelling and design exercise with phased build-out will need to be undertaken. However, it should also be noted that sustainable and active travel measures should be implemented, in alignment with the emerging Transport Strategy for the site where possible, to effectively mitigate the impact of the Teesworks sites on the surrounding highway network. STDC and Arup will engage with HE throughout the determination of the outline planning application to discuss these options further.

The Transport Strategy for the wider Teesworks site, currently in development, will set out the vision for the wider site to become an exemplar, world class industrial park that is renowned as a destination for manufacturing excellence. To achieve the vision, the emerging Transport Strategy has agreed eight outcomes with the Transport Steering Group that the Teesworks site should aim to deliver where possible. The outcomes are:

- A range of high-quality transport options, which are all inclusive, accessible, fast, frequent, convenient, affordable, reliable, safe and resilient;
- High quality public transport, walking and cycling routes and connections are prioritised over other transport modes;
- The site should not be dominated by cars and other vehicles or severed from local areas by transport infrastructure;
- Transport connections with local, inter-regional, national and international transport networks for people and goods are seamless and will attract developers / investors to the site;
- Cycling and walking connections to local residential centres are safer, more attractive, widely used and support local town centre regeneration;
- Transport options enable improved individual health and wellbeing and access to jobs;
- Transport options will support the transition to zero carbon and contribute to a high-quality environment that will attract future occupiers; and

- Transport infrastructure can adapt to market demand, new transport technology and market disruptors, attracting developers / investors to the site.

The emerging Strategy will develop a delivery plan of interventions to meet the outcomes, which is expected to include, amongst other things, measures such as limiting car parking provision, introducing mobility hubs, providing high quality cycle parking and improving public transport provision. It is expected that the Teesworks sites would also consolidate freight movements; at this stage no consideration has been made of the potential to discount trips due to consolidating servicing and delivery trips. Similarly, there is potential for the quayside to be developed providing the opportunity for freight movement by sea. This would reduce freight movements in and out of the site via the highway network. However, for the purpose of the assessment, it has been assumed that all freight traffic travels by road. As above, discussions will take place with HE to understand the opportunities the emerging Transport Strategy brings to this development site.

# 8 Travel Plan Framework

A Transport Strategy is currently being developed for the wider Teesworks site, which will include a series of outcomes and measures as agreed with the South Tees Transport Steering Group.

It is expected that a Teesworks site-wide Travel Plan will be implemented based on the core principles outlined in this framework and to meet with the objectives of the emerging Transport Strategy. The site-wide Travel Plan could also be hosted online. An online Interactive Travel Plan would provide interactive maps with sustainable transport routing and timetable information, active travel routes and walking times etc. Such a Travel Plan would make sustainable and active travel information easy to use and update, whilst helping promote the Travel Plan objectives and vision.

This framework identifies a list of measures for the proposed development that could be applied in advance of wider strategy initiatives coming forward, and also outlines how the site will be incorporated into the wider Master Plan in due course.

Details about the Travel Plan management and monitoring processes will be identified as part of the emerging Transport Strategy.

## 8.1 Travel Plan Measures

### 8.1.1 Facilitating Public Transport Use

This framework proposes a list of measures to help promote the use of sustainable transport for trips to / from the site including:

- Providing a dedicated bus service for the Teesworks site. This is imperative to establishing sustainable travel patterns and to ensure the site is fully accessible to those who want to work at Teesworks. Given the size of the site, the majority of end destinations are currently outside a desirable walking distance from a public transport connection. By providing a dedicated service, it will be possible for the route to travel into the site and stop close to building entrances. When initially introduced, it is expected that the service will provide a connection every 15 minutes to / from Middlesbrough and Redcar; from these central locations it will be possible to connect to the wider bus and rail network. In the longer term, it is hoped that the service will become commercially viable and/or one of the existing public bus services will be diverted through the site.
- Briefing staff on sustainable transport provisions to / from the site and providing information in employee starter packs. Personalised help and support will also be provided to individuals requiring further help with travel. Information on the internal public transport provisions within the wider Teesworks site will also be provided, when the Transport Strategy for the wider site is adopted;

- Displaying up to date public transport information, including timetables, maps, fare information and available ticket deals for buses and train services within staff common areas, as well as on the occupier's website; and
- Exploring the opportunities for corporate public transport ticketing, by liaising with transport operators.

### 8.1.2 Facilitating Walking and Cycling

This section provides a list of physical and promotional measures to enable and encourage walking and cycling to / from the proposed development.

- Providing secure, well located cycle parking spaces on the site in exceedance of local cycle parking requirements. The occupiers will also be encouraged to provide supporting facilities for walking and cycling, such as shower and changing facilities, safe storage / lockers for bicycle gear / shoes / umbrellas etc. The potential for providing pool bikes / cycle hire facilities / cycle hubs across the site will also be explored as part of the emerging Transport Strategy for the wider site;
- Ensuring footway and cycleway connections are provided to connect the development both to other Teesworks developments but also to the external network;
- Briefing staff on walking / cycling opportunities to travel to / from the site and providing information on provisions within the site as well as in the wider area in employee starter packs. Personalised help and support will also be provided to individuals requiring further help with travel;
- Providing information on walking and cycling routes in the vicinity as well as within the site, and on the health benefits of walking and cycling, on noticeboards in staff common areas, as well as on the occupier's website;
- Encouraging those who walk to join a "Walking Buddy" scheme so employees can walk together rather than alone;
- Developing partnerships with local cycle shops to organise Bike Doctor events for the occupier, for employees to bring bicycles in for servicing and minor repairs;
- Enabling efficient cycle purchase by participating in the Cycle to Work scheme;
- Promoting National Travel Awareness Days including Walk to Work Week, World Environment Day, European Mobility Week etc; and
- Working with RCBC and TVCA to promote their travel awareness initiatives and brands such as 'Let's Go Tees Valley', alongside initiatives run by other stakeholders such as Sustrans.

### 8.1.3 Reducing Car Dependency

In addition to the measures to encourage travel by sustainable modes, it is important that a series of measures to reduce dependency on the private car is also implemented at the proposed development:

- Providing an appropriate number of car parking spaces for the proposed development, in agreement with the wider Transport Strategy, which is currently being developed. The details on car parking provision for the proposed development will be agreed through a reserved matters application;
- Developing and enforcing a car parking management strategy / plan, which is expected to be conditioned, to allow adequate parking for those who need it, whilst encouraging the use of sustainable transport;
- Promoting opportunities for car sharing to employees (e.g. publicising car sharing websites such as liftshare.com) and the benefits of car sharing on building noticeboards and the occupier's website. It should also be ensured that employees are provided with a guaranteed lift home in the event of an emergency;
- Providing dedicated car parking spaces for car sharers;
- Liaising with neighbouring businesses to promote car sharing; and
- Providing information on noticeboards and on the official occupier's website on car club opportunities (or similar) provided at the wider Teesworks site, as and when these come forward.

### 8.1.4 Managing Delivery and Servicing Trips

- Consolidating servicing, where possible, will be encouraged across the wider Teesworks site. More information on managing servicing and delivery trips to the site will be provided within the emerging Transport Strategy; and
- There is potential for the quayside to be developed providing the opportunity for freight movement by sea. This would reduce freight movements in and out of the site via the highway network.

### 8.1.5 Implementation Timescales

The measures outlined in this section will be implemented as follows:

- **Physical measures**: implemented during construction at the same time as the proposed development, in time for opening;
- **Promotional measures**: implemented prior to occupation during the marketing of the development and staff interviews/induction, and on a continuous basis with specific initiatives on at least an annual frequency; and
- **Other site-wide measures**: This section has referred to some potential measures that will be developed to promote active and sustainable transport and manage vehicular trips, as part of the emerging wider site Transport

Strategy. These measures, among others, will be implemented when the site wide Transport Strategy gets adopted.

## 8.2 Travel Plan Management, Production and Monitoring

A site-wide Travel Plan Coordinator(s) will be appointed to develop a marketing strategy for the site-wide Travel Plan, to ensure and oversee its implementation, and monitor and review its effectiveness. More details on the role of the Coordinator(s) will be included within the emerging Transport Strategy and the site-wide Travel Plan. The TP Coordinator(s) will also be responsible for the implementation of the initial Travel Plan measures that have been developed for the proposed development.

If the Travel Plan is hosted online, it would have clear benefits compared to a traditional Travel Plan, such as the following, among others:

- The User Interface can display data in an engaging format and link to other online client resources, making the Travel Plan information easy to use and helping maintain the momentum of the Travel Plan;
- Clear and customisable graphics can provide and combine sustainable and active travel information, recommended routes, walking and journey times, making the information easy to find, customise and use;
- Maintenance of the Interface can be undertaken remotely and therefore the information can be updated more easily than static plans or noticeboards;
- The Interface can provide links to online feedback or travel surveys and present results; and
- Can help incorporate and promote current and future technologies, such as micro mobility services, MaaS platforms etc.

Regular monitoring of the site-wide Travel Plan will be undertaken to review its targets and the effectiveness of its measures, and it will be updated accordingly.

# 9 Summary and Conclusions

Arup has been commissioned by the South Tees Development Corporation to develop a Transport Assessment in support of a planning application for the development of industrial (B2/B8) land-use at the Long Acres site on Teesworks.

## 9.1 Summary of Assessment

The key findings of the Transport Assessment are summarised below:

- Current walking and cycling provisions in the vicinity of the site are limited. All matters are reserved at this stage of the planning application, however the layout of the proposed development will provide an internal network of walking and cycling routes, along with cycle parking spaces and associated facilities. The development will also benefit from additional measures to encourage active travel to / from the site, as part of the emerging Transport Strategy for the wider Teesworks site, which is currently in development;
- There are no bus services in the immediate vicinity of the site. It is proposed that a dedicated bus service be provided for the Teesworks site. By providing a dedicated service, it will be possible for the route to travel into the site and stop close to building entrances. Such a service is expected to provide a connection every 15 minutes to / from Middlesbrough and Redcar, when initially introduced. In the longer term, it is hoped that the service will become commercially viable and / or one of the existing public bus services will be diverted through the site. It is therefore expected that the activity generated by the proposed development will have a positive impact on the viability of future sustainable transport networks in the vicinity of the site;
- The A174 / A1053 Greystone Road and A1085 Trunk Road / A1042 Kirkleatham Lane junctions are forecast to exceed capacity for the '2033 Base' scenario. This is exacerbated by the addition of the proposed development traffic, with the junctions forecast to exceed capacity further. Steel House roundabout and the A1053 / A1085 Trunk Road junction are forecast to operate within capacity with the addition of the proposed development and exceed capacity with the addition of the other Teesworks and South Bank sites;
- It is forecast that the cumulative impact of the five Teesworks sites, plus South Bank development, will have a significant adverse effect on the operation of the junctions on the local highway network. A detailed optioneering, modelling and design exercise, with phased build-out, will need to be undertaken to determine when mitigation measures are required;
- Similarly, an assessment of the Strategic Road Network has indicated that there would be an increase in journey times as a result of the proposed development, but further work is required to ascertain the impact if the New Tees Crossing infrastructure is in place;
- However, the design and implementation of any mitigation scheme for the junctions must take into account active and sustainable infrastructure measures which should be implemented to reduce vehicle trips and ensure that the forecasts of a worst-case assessment are not realised. This is in alignment with

the developing Transport Strategy for the wider Teesworks site. These measures will help to mitigate, to some extent, the impact of the development on the highway network. The emerging Transport Strategy measures will aim to promote sustainable transport and active travel patterns to / from the site, and substantially reduce the commuter car mode share. This should therefore reduce the volume of traffic generated by the proposed development; and

- It is expected that a site-wide Travel Plan will be developed for the Teesworks site based on the emerging Transport Strategy. However, if the Long Acres site is developed in advance of the Transport Strategy being adopted, this Transport Assessment identifies a list of initial measures and a Framework for a Travel Plan that could be applied in advance of the wider strategy coming forward, also outlining how the development will be incorporated into the wider Master Plan in due course.

## 9.2 Conclusions

To conclude, the proposed development is in compliance with local, regional and national policy as it contributes towards the regeneration of the Teesworks site and brings back into use former industrial land-use.

The development is one of several phases of the Master Plan which will be incorporated into the emerging Transport Strategy for the wider Teesworks site, where possible, which will continue to work with stakeholders to minimise the cumulative impact of Teesworks on the highway network. At the outset, the Long Acres development is committed to providing a bus service to ensure there is an alternative travel choice to the car, for those who live too far away to walk or cycle to the site. The proposed development will also develop a Travel Plan based upon the proposed Framework and / or will be incorporated into an interactive site wide Travel Plan (whichever comes first).

To account for the bus service, the highway impact assessment has assumed only a minor reduction in car mode share and is based on traffic increasing in the forecast future year of 2033. No discount in trip generation has been made to account for trips generated by previous uses, or the likelihood of some efficiencies being achieved in vehicular trips, particularly future goods and delivery trips which are expected to be subject to some extent of consolidation.

This robust assessment approach has identified locations on the highway network where additional capacity is anticipated to be required, and the assessment has indicated what amendments could be implemented to provide that additional capacity. However, the requirement to provide the additional highway capacity needs to be considered alongside the development of the wider site and the implementation of the emerging Transport Strategy, and the impact of national and local government policy initiatives to decarbonise the transport network.

On review, the assessment concludes that subject to agreeing and providing any highway mitigation considered to be essential, there would be no transport related reasons why this development should not be granted planning consent and its commitment to providing sustainable travel choices should have a long-term positive impact on the regeneration of the former industrial site and local area.

# Appendix A

Indicative Site Plan

Long Acres - Development Parameters

| Development Parameter | Amount / Use |
|---|---|
| Use Class | B2 (General Industry )<br>B8 (Storage or Distribution )<br>E (Office )(maximum of 10% of overall floorspace ) |
| Maximum Floorspace | 185,806 m² / 1999,999 sqf |
| Maximum Building Height | 36m |
| Finished Floor Level | Minimum 5.2m AOD |
| Maximum Development Height | 43.5m AOD |
| Access | Access is reserved and details will be submitted at the Reserved Matter stage of the planning process. An indicative location is shown on the Parameters Plan |


KEY

- Total Site Area: 67.05 ha / 165.68 acres
- Potential Development Area
- Potential Access Area



| REV | BY | DATE | NOTE |
|---|---|---|---|
| A | LC | 19/11/20 | ACCESS ADDED, NOTES AMENDED |

TOFFEE FACTORY | NEWCASTLE-UPON-TYNE | NE1 2DF | 0191 495 7700 | INFO@PODNEWCASTLE.CO.UK

PROJECT:
SOUTH TEES, REDCAR
LONG ACRES

DRAWING TITLE:
PROPOSED PARAMETER PLAN

| CLIENT: | STATUS: |
|---|---|
| STDC | PLANNING |

| SCALE: | SHEET SIZE: | DATE: | DRAWN BY: | CHECKED BY: |
|---|---|---|---|---|
| 1:2500 | A1 | 11:20 | LC | MEC |

| PROJECT NO: | DRAWING NO: | REVISION: |
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# Appendix B

## TA Scoping Report and Consultation Responses

# B1 Scoping Report

# South Tees Development Corporation

## Teesworks

# Transport Assessments - Scoping Report

001

Issue | 26 November 2020



Job number 602669-41

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# Contents

# 1 Introduction

## 1.1 Purpose of the Scoping Report

Arup has been commissioned by the South Tees Development Corporation (STDC) to develop a Transport Assessment (TA) and Framework Travel Plan in support of five separate outline planning applications for development on the South Tees Development Corporation (STDC) site, known as 'Teesworks'.

An outline planning application for each of the five sites will be submitted separately and there will be five TA's produced. However, rather than producing five Scoping Reports, this document provides details of all five sites and outlines the key principles of the assessments.

Arup will also undertake the traffic and transportation assessment of the Environmental Impact Assessment.

The purpose of this scoping report is to agree the methodology and main parameters of the assessment with Redcar and Cleveland Borough Council (RCBC), the local planning and highway authority, and Highways England (HE). A copy will also be sent to the neighbouring highway authority, Middlesbrough Council (MC).

| |
|---|
| Decision points throughout the document are provided in a text box |

## 1.2 Development Sites

The five development sites are as follows:

**Dorman Point**

The development site is located in the south-western part of the Teesworks area and the proposed maximum floorspace is just under 140,000sqm. It is largely free of active use, although the former Torpedo Ladle Workshop is present in the southern part of the site. It is proposed that the site will provide general industrial (B2) use and storage and distribution facilities (B8), with ancillary office accommodation. The development is forecast to employ approximately 1,620 people when operational.

**Lackenby**

The development site is located in the southern part of the Teesworks area and lies between Dorman Point and the British Steel area. It provides just under 93,000sqm of floorspace and is currently occupied by buildings and structures associated with the former steelmaking facilities. It is proposed that the site will provide general industrial (B2) use and storage and distribution facilities (B8), with ancillary office accommodation. The development is forecast to employ approximately 1,080 people when operational.

## The Foundry

The development site, providing a maximum floorspace of 464,515sqm, is located in the northern part of the Teesworks area and is largely vacant industrial land, sparsely occupied by building and structures associated with the former steel making complex. The development proposals for the site are that it will provide general industrial (B2) use and storage and distribution facilities (B8), with ancillary office accommodation. It is forecast that the site could employ approximately 5,401 people when operational.

## Long Acres

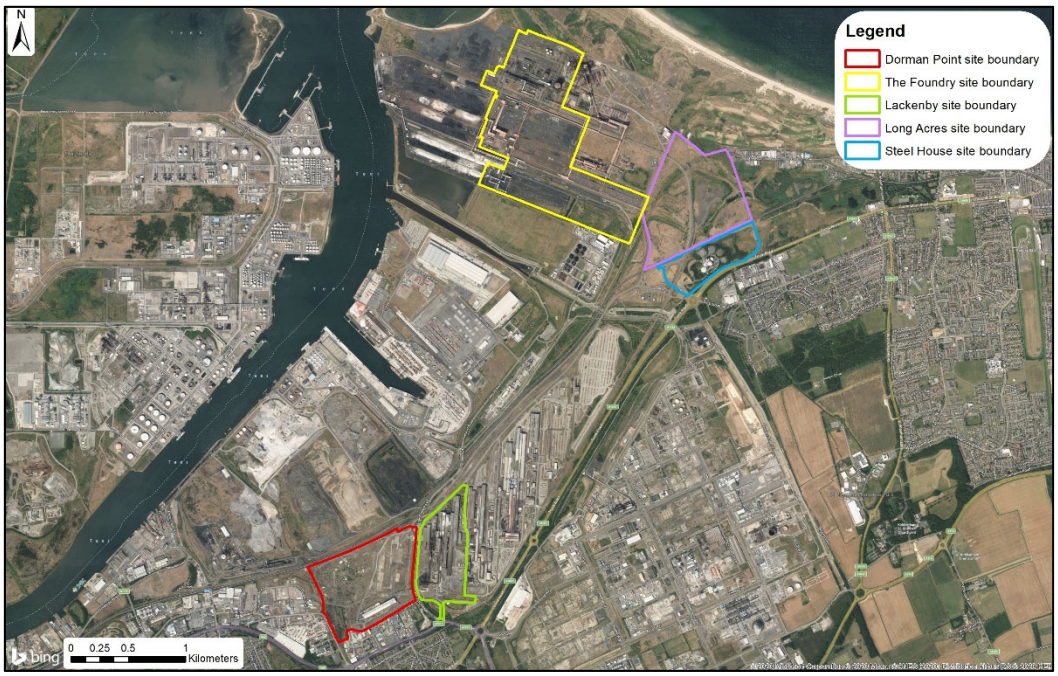
The development site is located between Steel House to the south and the Foundry to the north and provides just under 186,000sqm of floorspace. It is proposed that the site will provide general industrial (B2) use and storage and distribution facilities (B8), with ancillary office accommodation. The development is forecast to employ approximately 2,161 people when operational.

## Steel House

The development site is bound to the south by the A1085 Trunk Road and is currently occupied by the Steel House office complex. It is proposed that the floor area, of around 16,000sqm, provides office and incubator space (use class E). It is forecast that the site could employ approximately 1,128 people when operational.

The location of the five sites is shown in **Figure 1**. The construction of the development sites will be phased, and all are expected to be operational by 2033.

**Figure 1 Site Locations**



# 2 Planning Policy Review

## 2.1 Literature Review

The TA for each of the five sites will address the relevant transport related policy documents as follows:

- National Planning Policy Framework (NPPF) 2019;
- Tees Valley Combined Authority Strategic Transport Plan 2020 - 2030;
- Redcar and Cleveland Local Plan 2018;
- Redcar and Cleveland Local Transport Plan 2011-2021;
- South Tees Regeneration Masterplan 2019; and
- South Tees Area Supplementary Planning Document (SPD) 2018.

It is proposed that the development considers relevant transport policies from the policy and guidance documents listed above. RCBC to advise if any other documents should be considered.

# 3 Baseline Conditions

The scope of each TA will include a full audit of available transport modes following the methodology outlined in this section.

## 3.1 Site Description and Location

This section of each TA will provide a high-level description of the characteristics of the site and the surrounding area.

## 3.2 Sustainable Transport Networks

A desktop audit of existing facilities and routes will be provided in this section of the TA. Information such as bus and rail routes, destinations and example journey times will be provided. For scheduled services, information such as frequencies and service times will be included.

## 3.3 Highway Network

This section of each TA will provide an overview of the main local roads and Strategic Road Network connecting the site to the wider area.

Due to current circumstances with the Covid 19 pandemic and lockdown measures, it is not possible for traffic surveys to be undertaken to inform the baseline condition assessment. To establish the baseline traffic flows, the following data sources have been utilised:

- Traffic data from HE North Regional Transport Model (NRTM);
- Traffic data from the Tees Valley Combined Authority (TVCA) Tees Valley Cube Model (TVM);
- Department for Transport traffic counts available online;
- WebTRIS (HE) online data;
- Traffic surveys collected on behalf of Capita in 2019 to construct a VISSIM model of the area for RCBC – permission to obtain a copy of these surveys was granted by RCBC, Capita and NETDC Ltd; and
- Survey data publicly available online from other local developments, including the planning application for the York Potash development (application number R/2013/0669/OOM).

Peak hour data from the two traffic models (NRTM and TVM) was input into two separate traffic flow diagrams for the study area. On both diagrams, any observed data was added above the links to enable a comparison to be made and determine which data source provided the most comparable base. The NRTM was found to be a comparable match against the baseline flows, and therefore the NRTM flows were predominantly used to inform the baseline, except for where observed data was available. All data has been adjusted to 2020 and 2033 (for operational year assessment) using NRTM growth.

The methodology described above was also used on application number R/2020/0357/OOM for development on the South Industrial Zone of the Teesworks site (referred to as 'South Bank').

## 3.4 Road Safety Analysis

To inform road safety considerations associated with the development proposals, a high-level review of five years' worth of accident data on the roads within the vicinity of each site will be undertaken.

Should any common factors pertaining to road traffic accidents be identified, suitable mitigation features may be considered as part of the development proposal.

This section seeks agreement that:

- The scope of the transport networks audit is acceptable;
- The methodology for establishing baseline traffic flows is acceptable; and
- The scope of the accident appraisal is adequate.

# 4 Development Proposals

This section of each TA will provide an overview of the proposed development, including details about site accesses and proposed transport provisions for the site.

## 4.1 Vehicular Access

The TA for each development site will provide details about the site access arrangements. It is anticipated at this stage that the development sites will be accessed as follows:

**Dorman Point**

The parameter plan shows four indicative access points into the Dorman Point site:

- One via a new roundabout junction on Eston Road, the works for which have planning permission (application number R/2020/0270/FFM);
- One at the north east corner of the site where an existing Teesworks internal road enters the site;
- One at the south east corner where an existing Teesworks internal road enters the site; and
- One potentially to be provided at the south west corner of the site at the Bessemer Gate entrance into the Bolckow Industrial Estate.

For the purpose of the assessment, the main vehicular access will be the new roundabout junction on Eston Road with all trips generated by the site using the roundabout to access the wider highway network.

**Lackenby**

It is proposed that the main vehicular access into the Lackenby site will be via a new fourth arm provided on the A66/Tees Dock Road roundabout into the site. All development trips will be assigned to this main access for the purpose of junction impact assessments. Access is expected to also be permitted via the internal Teesworks road network that connects to Dorman Point.

**Long Acres, Foundary and Steel House**

It is proposed that these sites access the public highway network via the Trunk Road Roundabout (also known as Steel House Roundabout).

## 4.2 Walking and Cycling Facilities

The TA for each of the five sites will provide information about the proposed walking and cycling facilities for each development and how these connect to the external network.

## 4.3 Public Transport Facilities

Details of existing public transport connections will be provided in each of the TA's.

## 4.4 Cycle Parking

High quality cycle parking is expected to be provided, in excess of the usual standards, in support of a more sustainable travel policy for the site.

## 4.5 Car Parking

As all five applications will be in outline, the internal site layouts have not yet been developed, and therefore the level of car parking provision is unknown. A transport strategy for the wider Teesworks site is currently in development but will limit car parking within the site to meet sustainability targets (including RCBC's ambition to be carbon neutral by 2030). It is subsequently anticipated that the internal layout, when developed, will support the strategy and limit car parking as far as reasonably possible.

This section seeks agreement on the transport proposals for the proposed development.

# 5 Trip Generation

## 5.1 Person Trips

The approach to trip generation will follow the same methodology as that agreed for the South Bank development (planning application number R/2020/0357/OOM). The methodology applies trip rates from the TRICS database based on employee numbers. TRICS is a recognised database widely used by transport professionals which predicts trip rates of developments based on survey information of comparable sites.

The industrial trip rates used in the South Bank assessment are shown in **Table 1**.

**Table 1: Industrial Trip Rates**

| Trip rates/employee | AM Peak (08:00 – 09:00) | | | PM Peak (17:00 – 18:00) | | | Daily (7am – 7pm) | | |
|---|---|---|---|---|---|---|---|---|---|
| | In | Out | Total | In | Out | Total | In | Out | Total |
| **Person Trips** | 0.322 | 0.089 | 0.411 | 0.078 | 0.314 | 0.392 | 2.134 | 2.121 | 4.255 |
| **LGVs** | 0.029 | 0.022 | 0.051 | 0.01 | 0.016 | 0.026 | 0.294 | 0.287 | 0.581 |
| **HGVs** | 0.19 | 0.16 | 0.035 | 0.014 | 0.01 | 0.024 | 0.218 | 0.208 | 0.426 |

These were identified and agreed as comparable trip rates to apply to large scale industrial sites and will therefore be applied at Long Acres and the Foundry. However, during the consultation process for the South Bank planning application, Middlesbrough Council indicated that the trip rates that were applied on the TeesAMP development (planning application number 18/0308/FUL) should be applied at the Teesworks site. The TeesAMP trip rates are more applicable to smaller sized industrial sites and therefore could be applicable at both Dorman Point and Lackenby. These trip rates are shown in **Table 2** and will be applied at Dorman Point and Lackenby.

**Table 2: TeesAMP Industrial Person Trip Rates**

| Trip rates/employee | AM Peak (08:00 – 09:00) | | | PM Peak (17:00 – 18:00) | | | Daily (7am – 7pm) | | |
|---|---|---|---|---|---|---|---|---|---|
| | In | Out | Total | In | Out | Total | In | Out | Total |
| **Trip Rates** | 0.475 | 0.245 | 0.720 | 0.175 | 0.425 | 0.60 | 3.434 | 3.435 | 6.869 |

The Steel House site is proposed for office type use (use class E) and therefore office trip rates have been obtained from TRICS and these are shown in **Table 3**.

**Table 3: Office Trip Rates**

| Trip rates/employee | AM Peak (08:00 – 09:00) | | | PM Peak (17:00 – 18:00) | | | Daily (7am – 7pm) | | |
|---|---|---|---|---|---|---|---|---|---|
| | In | Out | Total | In | Out | Total | In | Out | Total |
| **Person Trips** | 0.317 | 0.023 | 0.340 | 0.025 | 0.317 | 0.342 | 1.370 | 1.311 | 2.681 |
| **LGVs** | 0.003 | 0.002 | 0.005 | 0 | 0.001 | 0.001 | 0.029 | 0.029 | 0.058 |
| **HGVs** | 0.001 | 0.001 | 0.002 | 0 | 0 | 0 | 0.002 | 0.002 | 0.004 |

The trip rate for service and delivery vehicle trips (light goods vehicles and heavy goods vehicles) has been shown to disaggregate the overall person trip rate and determine how many trips are likely to be made by commuters, versus service vehicle trips. No information is provided in the TeesAMP Transport Assessment regarding service vehicle trip rates. It is useful to distinguish service trips, particularly HGVs, to assist assessments into noise and air quality. Therefore, the proportion of LGV and HGV trips from the TRICS analysis will be applied to the trip rates from the TeesAmp assessment to distinguish service vehicle trips.

The resultant person trips for each site, excluding LGVs and HGVs, is summarised in **Table 4**.

**Table 4: Person Trips by Site**

| Trip rates/employee | AM Peak (08:00 – 09:00) | | | PM Peak (17:00 – 18:00) | | | Daily (7am – 7pm) | | |
|---|---|---|---|---|---|---|---|---|---|
| | In | Out | Total | In | Out | Total | In | Out | Total |
| **Dorman Point** | 654 | 226 | 921 | 196 | 633 | 846 | 4,228 | 4,229 | 8,457 |
| **Lackenby** | 436 | 151 | 614 | 130 | 422 | 564 | 2,819 | 2,819 | 5,638 |
| **The Foundry** | 1,480 | 275 | 1,755 | 292 | 1,555 | 1,847 | 8,760 | 8,782 | 17,542 |
| **Long Acres** | 592 | 110 | 702 | 117 | 622 | 739 | 3,505 | 3,514 | 7,019 |
| **Steel House** | 353 | 23 | 376 | 28 | 356 | 385 | 1,510 | 1,444 | 2,954 |

All sites were previously occupied. However, as the development sites are currently vacant, it is proposed that the trip generation does not take into account previous or permitted uses and therefore the overall trip generation will not be discounted; all trips will be added to the network as new trips.

## 5.2 Trips by Mode

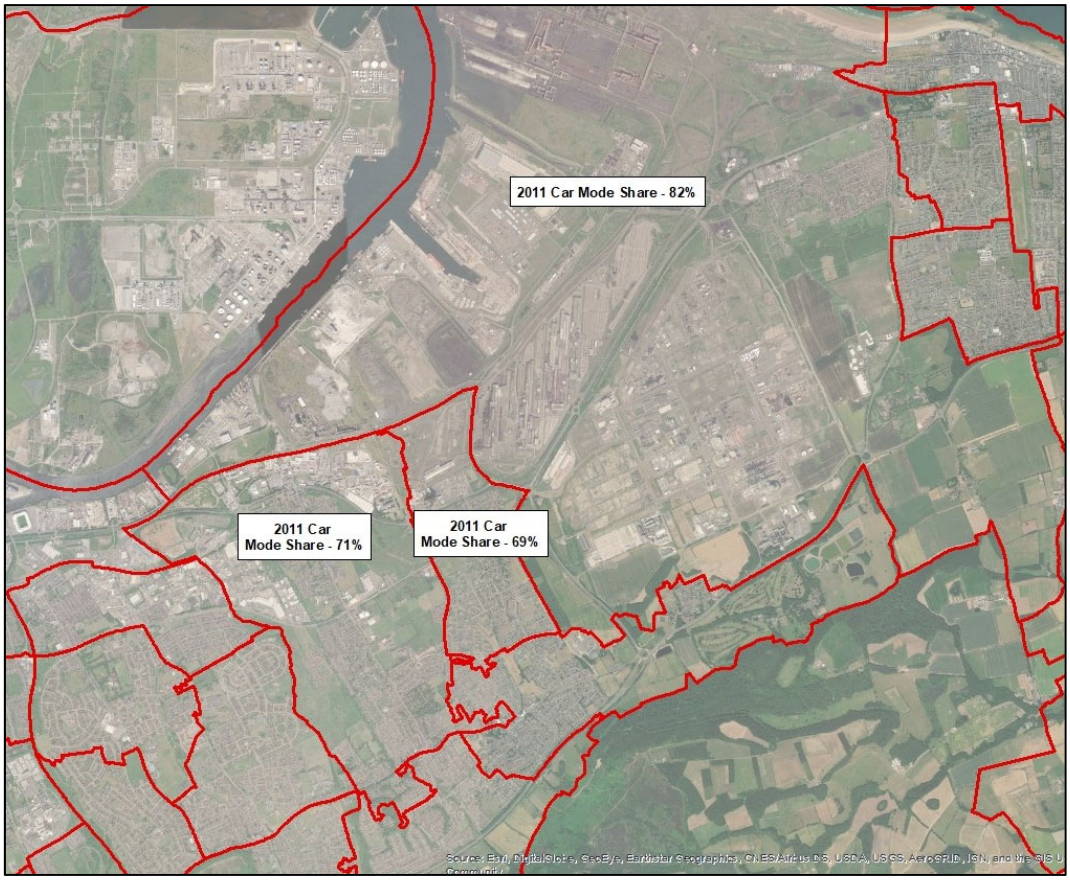
Having established a method for calculating the number of trips, the mode of transport for commuters has been informed by reviewing data from the 2011 UK Census Journey to Work dataset. The Teesworks area is split across two travel to work areas, Census zone E02002517 to the north and E02002523 to the south. Data regarding how people working in these areas travelled to work in 2011 is shown in **Table 5**.

**Table 5 2011 Census Method of Journey to Work**

| Mode | 2011 UK Census Northern Zone % | 2011 UK Census Southern Zone % |
|---|---|---|
| **Car Driver** | 82% | 69% |
| **Car Passenger** | 8% | 8% |
| **Bus** | 3% | 5% |
| **Bicycle** | 3% | 2% |
| **Walking** | 3% | 13% |
| **Motorcycle** | 1% | 0% |
| **Taxi** | 0% | 2% |

It can be seen that car mode share in 2011 varied between 82% and 69% and the areas this applies to is shown in **Figure 2**. The Dorman Point and Lackenby sites are located in the area where car mode share, in 2011, was 69% and the other sites are located to the north where travel to work, by car, was the higher 82% in 2011.

**Figure 2 2011 Census Data – Car Mode Share**




The transport strategy for the site will seek to reduce car mode share significantly. However, these earlier developments coming forward may not benefit from the longer-term strategy improvements proposed up to 2042.

It is proposed that measures will be implemented to support sustainable accessibility to the site, including a dedicated bus service that will connect the

local towns of Middlesbrough and Redcar to the development sites. The bus service, funded initially by the Teesworks development, will travel into the site to provide a service that connects directly to each of the five development sites. The provision of a bus service, alongside other travel planning measures, is considered to enable at least a 5% reduction in those travelling to the site by car when these sites are operational. It is therefore assumed that the maximum car mode share for Dorman Point and Lackenby be 64%, with the other sites having a car mode share of 77%. **Table 6** shows how the base and adjusted car mode share equates to commuter car trips in the AM peak hour for each site.

**Table 6 Car Trips**

| | Base Car Mode Share | | | Adjusted Mode Share (-5%) | | |
|---|---|---|---|---|---|---|
| **Site** | AM In | AM Out | Total | AM In | AM Out | Total |
| **Dorman Point** | 451 | 156 | 635 | 419 (-33) | 145 (-11) | 590 (-46) |
| **Lackenby** | 301 | 104 | 424 | 279 (-22) | 97 (-8) | 393 (-31) |
| **The Foundry** | 1,214 | 226 | 1,439 | 1,138 (-76) | 212 (-14) | 1,350 (-88) |
| **Long Acres** | 485 | 90 | 576 | 455 (-30) | 85 (-5) | 540 (-35) |
| **Steel House** | 289 | 19 | 308 | 272 (-18) | 17 (-2) | 289 (-19) |
| **Total** | 2,741 | 595 | 3,382 | 2,562 (-178) | 555 (-40) | 3,164 (-218) |

It can be seen from **Table 6** that the travel planning measures must aim to remove around 200 trips from private cars in the morning peak hour onto more sustainable modes to achieve a 5% car mode share reduction.

## 5.3 Trip Distribution

Feedback received on the South Bank planning application (application number R/2020/0357/OOM) from HE indicated that consideration should be given to journey to work data from the UK Census (which indicates the origin and destination trips for commuters), as well as existing turning proportions on the highway network, to assign development traffic to the highway network.

For all five sites the trip distribution at the main access will be informed by Census data. It is proposed to distribute traffic on the remainder of the highway network using the turning proportions in the baseline traffic flow diagrams.

Traffic will be distributed as far west to the A19 corridor, south to the A174 corridor and east to the Trunk Road / Kirkleatham Lane junction. The site is bound by the River Tees to the north.

## 5.4 Cumulative Assessment and Future Growth

A cumulative assessment will be undertaken to consider the cumulative effects of all five developments, plus the South Bank development. This cumulative assessment of all STDC sites will be undertaken for a future year of 2033. Rather than review and extract traffic flows for the committed developments that have been identified, it is proposed to extract growth from Highways England's North Regional Transport Model (NRTM). This approach is considered to be

reasonable as it is underpinned by the National Trip End Model (NTEM) which informs TEMPro growth, as well as a full variable demand model, accounting for changing economic conditions and competing transport modes. Growth in the NRTM is controlled to NTEM at district level (as per TAG guidance) however individual developments are explicitly accounted for. This means that local trip end growth is calculated in a detailed way.

This scoping report seeks agreement on:

- The employee trip rate approach which applies large industrial site trip rates to the Long Acres and Foundry sites, and the TeesAMP trip rates to the Dorman Point and Lackenby sites. Office trip rates will be applied to the Steel House development;
- Applying 2011 Census mode share proportions to determine trips by mode, but reducing car mode by 5% to account for trips transferred onto the proposed bus service and other sustainable travel initiatives. This results in the assumed car mode share at Dorman Point and Lackenby of 64% and 77% at the other three sites;
- The approach to vehicular trip distribution; and
- The approach to use NRTM forecasts to growth traffic to 2033 which will be used to both assess the impact of each development in 2033, but also to assess the cumulative impact of all five sites being operational by 2033. The cumulative assessment will also include trips from the South Bank development.

# 6 Development Impact Assessment

## 6.1 Scope of Highway Impact Assessment

### 6.1.1 Local Junction Assessments

A number of junctions have been identified on the surrounding network where the development trips could have an impact. **Table 7** lists the junctions that will be assessed for each development.

**Table 7 Junctions Impact Assessments**

| Site | Type | Dorman Point | Lackenby | Foundry | Long Acres | Steel House |
|---|---|---|---|---|---|---|
| **A66/Old Station Road roundabout** | ARCADY | X | X | | | |
| **A66/Eston Road** | LINSIG | X | X | | | |
| **A66/Normanby Road** | LINSIG | X | X | | | |
| **A66/Tees Dock Road roundabout** | ARCADY | X | X | | | |
| **A66/Trunk Road/A1053 Greystones Road** | LINSIG | X | X | X | X | X |
| **Eston Road roundabout** | ARCADY | X | X | | | |
| **Greystones roundabout** | LINSIG | X | X | X | X | X |
| **Steel House roundabout** | ARCADY | | | X | X | X |
| **Trunk Road/Kirkleatham Lane** | LINSIG | | | X | X | X |

The junction assessments will be undertaken for the following scenarios for both the AM and PM peak hour:

- 2033 Base;
- 2033 Base + 1 development site (x5);
- 2033 Base + all five developments + South Bank development (cumulative assessment).

### 6.1.2 Strategic Highway Assessment

As requested by HE for the South Bank development, the scope of the traffic assessment will extend to include the A19 corridor. Jacobs has provided a copy of the 2015 New Tees Crossing AIMSUN Model so that the impact of trips from

the Teesworks sites on the A19 can be assessed. The impact of each development site, and the cumulative scenarios, will be undertaken.

## 6.2 Environmental Impact Assessment

A traffic and transportation assessment will be included in the Environmental Statement (ES) for each development. The Environmental Impact Assessment (EIA) will be carried out in accordance with the EIA Regulations and guidance contained in relevant publications including:

- Environmental Impact Assessment: A Guide to Procedures (Department of the Environment, Transport and the Regions (DETR), 2000); and
- Guidelines for Environmental Impact Assessment (Institute of Environmental Management & Assessment (IEMA), 2004).

In accordance with the IEMA Guidelines, it is proposed that the following conditions on the transport network within the study area be assessed during the operational phase (2033 with development) for each site:

- Severance (change in traffic flows);
- Driver and bus user delay (derived from the junction assessments);
- Pedestrian and cyclist amenity (change in traffic flows on local routes used by pedestrians and cyclists); and
- Accidents and safety (following a review of existing conditions, a judgement will be made as to whether the proposed development will result in any changes to highway safety).

Construction details are not yet finalised and as such, construction traffic will not be included in the scope of the traffic and transportation assessment of the EIA. A framework Construction Environmental Management Plan (CEMP) will be prepared and will form part of the embedded mitigation of the development. The CEMP will identify that a Construction Traffic Management Plan (CTMP) will be implemented either at site level or for each development phase. The CTMP will identify any necessary mitigation to minimise the impact of construction traffic on the transport networks.

This section of the scoping report seeks agreement on:

- The scope of the junction impact assessments for the TA's;
- The junction assessment scenarios; and
- The scope of the EIA assessment.

# 7 Travel Plan

## 7.1 Overview

All of the proposed developments are located within the Teesworks site and subsequently will be encompassed into the Transport Strategy and benefit from the measures that will be delivered to serve the wider site. The Transport Strategy is still under development but is expected to include ambitious targets to reduce car use and recommend measures that significantly improve the accessibility of the site by public transport, walking and cycling.

However, as these sites will be developed in advance of the strategy being adopted, a Travel Plan Framework for each site will be outlined in the TA, detailing measures that will be applied in advance of the wider strategy coming forward, but also outlining how the site will be incorporated into the wider masterplan in due course.

## 7.2 Bus Service

A key recommendation arising from the Transport Strategy is the need to provide a bus service that travels within the site. The scale of the site means that the location of the public bus stops are well outside the generally accepted 400m walking distance between a bus stop and a destination.

It is therefore anticipated that the TA's will recommend that to provide an attractive alternative to private car travel to the site, a bus service will be required. Further details of this will be provided in the Travel Plan Framework.

RCBC to confirm that this application can be incorporated into the wider STDC Transport Strategy and that a Travel Plan Framework, which outlines the measures that occupiers could introduce prior to more wide-ranging measures coming forward, will be sufficient to support each planning application.

# 8 Conclusions and Next Steps

This Scoping Report has considered the potential impact of five proposed development sites on the Teesworks site. It has outlined what is proposed to be covered by the Transport Assessment and Environmental Statement that will be submitted as part of the planning application for each of the proposed developments.

Arup would be grateful if RCBC, MC and HE could respond in writing to confirm that the methodology proposed in this report is acceptable. Should there be any significant issues with regards to the scope, an online meeting is requested at the earliest convenience.

# B2 Highways England Feedback

# South Tees Development Corporation: Teesworks – Response to "Transport Assessments – Scoping Report"

| | |
|---|---|
| PREPARED FOR: | Chris Bell / Sunny Ali (Highways England) |
| PREPARED BY: | Gavin Nicholson (CH2M) |
| DATE: | 14th December 2020 |
| PROJECT NUMBER: | 679066.AA.20.18.12 |
| SITE/ DOCUMENT REF: | DevTV0062/TM001 |
| REVIEWED / APPROVED BY: | Jonathan Parsons (CH2M) |

## Introduction

CH2M has been commissioned by Highways England to provide a review of the document titled "South Tees Development Corporation: Teesworks, Transport Assessments – Scoping Report" prepared by Arup on behalf of the South Tees Development Corporation and dated 26th November 2020 [the Scoping Report].

The single Scoping Report seeks to set the scope for five separate Transport Assessments [TAs] which will support the five outline planning applications for development within the South Tees Development Corporation [STDC] site.

The STDC site is located on the south bank of the River Tees, between Redcar town centre to the east and Middlesbrough town centre to the west. The site location, indicating each of the five sites that will require a TA, is shown in Figure 1, extracted from the Scoping Report.

The consultation with Highways England at this stage of the process should be welcomed as early engagement enables the assessment to be aligned to Highways England's requirements. A summary and conclusion are provided at the end of this Technical Memorandum [TM].

Figure 1 – Location of application sites


*(Extract from the Scoping Report)*

According to the Scoping Report, it is expected that the proposed outline planning applications will be for the level of development identified in Table 1.

Table 1 – Application sites information

| Application site | Floorspace (sqm) | Land Use | Approximate operational jobs |
|---|---|---|---|
| Dorman Point | 140,000 | B2 / B8 with ancillary office | 1,620 |
| Lackenby | 93,000 | B2 / B8 with ancillary office | 1,080 |
| The Foundry | 464,515 | B2 / B8 with ancillary office | 5,401 |
| Long Acres | 186,000 | B2 / B8 with ancillary office | 2,161 |
| Steel House | 16,000 | Office and incubator space (use class E) | 1,128 |
| **Total** | **899,515** | **-** | **11,390** |

All of the development sites are expected to be operational by 2033.

# Background

For background, it is important to note that Highways England has recently been consulted on an application for an initial element of development within the STDC site – the Southern Industrial Zone. This development (located north of the Dorna Point site (indicated by the red boundary in Figure 1 above) was for a plot of approximately 418,000sqm of B2 / B8 floorspace with ancillary office development, expecting to accommodate 3,870 employees. Highways England were able to accept the development following a period of dialogue and provision of appropriate assessment at the SRN.

# Technical Memorandum structure

This TM:

- Firstly, considers the technical elements of the Scoping Note in order to enable a response to be made to that; and
- Then considers the fit of these development aspirations with the wider strategy for the site (Local Plan policy, SPD, Masterplan) to ensure that the sites are being brought forward in a manner that fits this wider context.

# Scoping Report review

This TM mirrors the structure of the Scoping Report and specifically aims to focus on the elements of the Scoping Report that are of interest to Highways England and seeks to provide a response to all the decision points identified by Arup.

## Baseline conditions

**Highway network**

The Scoping Report sets out that the TAs will provide an overview of the local road and the SRN connecting the site to the wider area. It is identified that due to current (Covid-19) conditions, it is not possible for traffic surveys to be undertaken to inform the baseline assessment. This situation is recognised by CH2M.

As with the Southern Industrial Zone scoping, the elements of the SRN that are required to be assessed should be informed by the trip assignment analysis and with a view to the absolute level of impact (noting that percentage impacts will not be considered as an indicator). Information in relation to the full assignment of trips should be presented early in the process (prior to completion of the TAs), in order for agreement to the study area to be reached and to inform other elements of the TAs. Highways England consider that the starting point to identifying the need for assessment is based on an impact exceeding 30 two-way trips at a junction on the SRN.

Upon definition of the study area (based on the impact analysis), CH2M recommend that a fully defined approach of reflecting typical traffic conditions is established including sourcing all available traffic data (traffic count companies and Highways England).

With regard to growth and future operational scenarios, CH2M recommend that scenarios mirroring those ultimately agreed as part of the Southern Industrial Zone assessment would be reasonable.

**Road safety analysis**

The Scoping Report proposes that a high-level review of five years' worth of accident data within the vicinity of the site is to be undertaken.

This approach is accepted but the review will also need to cover any SRN geography that is needed to be included in the study area.

## Development proposals

**Vehicular access points**

The Scoping Report identifies that each TA will provide details about the site access arrangements. While these access points will all be located on the local road network and subject to local highway authority review, information should be available to ensure that Highways England can be satisfied that:

- The trip distribution and assignment analyses pay appropriate cognisance to the access points and the routes which vehicles would traverse the networks; and
- Any operational consequences at the local road network that have the potential to cause subsequent operational issues at the SRN are fully detailed.

**Car parking**

It is identified that, given the five applications will be in outline form, the level of parking provision is unknown at this stage. While the scale of parking is generally a matter for the local highway authority to satisfy itself with, the level of parking has the potential to influence the trip generation and the sustainability credentials of the site, Highways England will need to be subject to consultation on the reserved matters applications that seek to define the level of parking.

## Trip generation

**Person trips**

The Scoping Report identifies that the trip rates are based on:

- For the large scale industrial sites (Long Acres and the Foundry) the application of the trip rates used in the South Industrial Zone assessment;
- For the smaller sized industrial sites (Dorman Point and Lackenby), the application of trip rates from the TeesAMP development (application ref 18/0308/FUL); and
- For the office based site (Steel House), office trip rates from TRICS have been used.

CH2M has undertaken a review of this information and make the following comments (on the basis that the planning application will be specific in relation to the scale and mix of development proposed):

- Long Acres and the Foundry

  It can be confirmed that the trip rates utilised are those agreed as part of the Southern Industrial Zone assessment and these can therefore be accepted.

- Dorman Point and Lackenby

  The use of the TeesAMP trip rates for these elements of the development are accepted.

- Steel House

  The TRICS assessment and parameters used have not been provided to enable validation of the office trip rates and these should be provided to enable these to be agreed.

**Trips by mode**

Journey to Work data has been used to infer the proportion of highway trips based on Census zones E02002517 and E02002523 for the northern and southern parts of the site respectively. This is considered a reasonable approach by CH2M.

It is identified that it is proposed that measures will be implemented to support sustainable accessibility to the site. On the basis of these measures, it is identified in the Scoping Report that this will enable at least a 5% reduction in travel to the site by car and therefore it is assumed that the number of car trips could be reduced by 5%.

The Scoping Reports does not suggest whether the base car mode share trips or the adjusted (-5%) car trips will be utilised within the operational assessments in the TAs. Should it be proposed that the latter, there will be a requirement for:

1) Clarification in relation to how the measures being proposed transpire into the defined 5% reduction – how has the 5% reduction been quantified;

2) A detailed commitment to the identified initiatives, secured through appropriate planning conditions requiring measures to be in place prior to occupation; and

3) Potential need for consideration of fallback positions within the Travel Plan in the event that the sustainable measure targets have not been achieved.

**Vehicular trip distribution**

The Scoping Report proposes that vehicular trip distribution is to be based on (i) at the site access, journey to work distribution trips from the Census data and (ii) existing turning proportions on the highway network.

As discussed through the Southern Industrial Zone application, the use of existing turning proportions to distribute development traffic is not considered acceptable. CH2M therefore recommends that the trip distribution analysis is founded on Census data and that the analysis be provided in spreadsheet form to enable checking and validation.

While initial extents of the trip distribution analysis are provided, noting that Highways England consider that the starting point to identifying the need for assessment is based on an impact exceeding 30 two-way trips at a junction, the trip distribution analysis should extend to cover all potential elements fitting this criteria.

**Cumulative Assessment and Future Growth**

The Scoping Report identifies that a cumulative assessment of all five proposed developments alongside the Southern Industrial Zone will be undertaken. This assessment is welcomed by CH2M.

With a view to consideration of other committed developments and other background growth calculations, CH2M consider that the forecasts utilised as part of the ultimately agreed analysis for the Southern Industrial Zone is utilised rather than create a variant set of analyses that require further development, checking and validation.

The provision of the information in spreadsheet form (including all component elements) will enable a review to be undertaken.

## Development Impact Assessment

**Scope of Highway Impact Assessment**

With regards to the SRN, it is identified in the Scoping Report that elements of the network that will be assessed will mirror those ultimately assessed as part of the agreed Southern Industrial Zone assessments. As identified above, the study area will need to be agreed on the basis of the trip assignments determined from the earlier elements of the analysis.

At this time, it is not possible to validate the areas of the network that require assessment (Highways England consider that the starting point to identifying the need for assessment is based on an impact exceeding 30 two-way trips at a junction) and these should be clarified prior to the undertaking of any operational assessment.

In addition, the assessment of a 2033 future year assessment is welcomed by CH2M, although it will need to be ensured that validated base models are utilised in assessments.

**Environmental Impact Assessment**

Given the scale of development, there is the potential that there could be significant construction impacts. It may be necessary for the Construction Traffic Management Plan [CTMP] to be conditioned until a clear view on construction impacts (construction trip impacts and potential abnormal loads) is known.

## Travel Plan

The Scoping Report outlines that a Travel Plan framework for each site will be prepared. Whilst it would have been welcomed for the transport strategy for the wider STDC site to have set the strategic sustainable transport framework for the site, in terms of the Travel Plans, as discussed earlier, it will need to be considered that:

1) Clarification in relation to how the measures being proposed transpire into the defined 5% reduction – how has the 5% reduction been quantified;
2) A detailed commitment to the identified initiatives, secured through appropriate planning conditions requiring measures to be in place prior to occupation; and
3) Potential need for consideration of fallback positions within the Travel Plan in the event that the sustainable measure targets have not been achieved.

CH2M would welcome these points being considered as the assessment moves forward.

# Fit of sites with wider strategies

The site forms parts of the wider STDC site. Whilst reference to the STDC Transport Strategy is made, it is fully recognised that these sites are coming forward in advance of the Transport Strategy having been completed:

- The Scoping Report acknowledges:
  - Within section 4.5 (relating to car parking) that *"A transport strategy for the wider Teesworks site is currently in development but will limit car parking within the site to meet sustainability targets) … It is subsequently anticipated that the internal layout, when developed, will support the strategy and limit car parking as far as reasonably possible."*
  - Within section 5.2 (relating to trips by mode) that *"The transport strategy for the site will seek to reduce car mode share significantly. However, these earlier developments coming forward may not benefit from the longer-term strategy improvements proposed up to 2042."*
- As part of discussions relating to the Southern Industrial Zone site, Arup identified *"The transport strategy for the wider STDC site will be looking at a longer-term horizon in terms of future year assessments. The impact of the wider STDC site up to a final year scenario, expected to be circa 2040, will be assessed by undertaking strategic modelling of the surrounding highway network."*

Bringing such a scale of site forward in advance of a fully defined Transport Strategy is considered by CH2M to be somewhat of a concern to Highways England as this restricts the ability to bring them forward in a strategically-planned manner.

Rewinding a little back to the Local Plan, the Supplementary Planning Document [SPD], the site Masterplan and the Transport Strategy, the following summary is provided with a view to the current position:

## Redcar and Cleveland Local Plan (Adopted May 2018)

**Local Plan provisions**

In relation to development:

- Policy LS4 (South Tees Spatial Strategy) (which includes the STDC) identifies that Redcar and Cleveland Council [the Council] will:
  - (p) "support improvements to the strategic and local road network to support economic growth"

  - Para 3.27 identifies that a Master Plan is being prepared and this will help guide development of this area, including infrastructure improvements.

- Policy ED6 (Promoting Economic Growth) identifies that:
  - Land and buildings within existing industrial estates and business parks, as shown on the policies map, will continue to be developed and safeguarded for employment uses."
  - Specialist uses, such as heavy processing industries and port logistics, will be focussed in the following areas, with 405 hectares of additional land available over the plan period. In these areas proposals falling within Use Classes B1, B2, B8 and suitable employment related sui-generis uses will be supported.
    - ED6.2 Land at South Tees 184 hectares.
    - ED6.4 South Tees Industrial Estates and Business Parks 3.5 hectares

In relation to Infrastructure:

- Para 1.112 identifies that the Council will work with organisations to ensure the infrastructure is delivered when required.
- Para 1.113 identifies the Tees Valley Strategic Infrastructure Plan as setting out the current barriers to growth and priorities for improving infrastructure across Tees Valley.
- Para 1.114 identifies that there are plans to deliver improvements to rail and road infrastructure.
- Para 1.124 identifies that it is important to ensure that the borough's road infrastructure will have the capacity to cope with the expected increase in traffic levels over the life of the Local Plan.
- Para 1.125 states that "Improving transport links will require continued, proactive joint working with …the Highways Agency … with the overall aim of establishing a high quality, safe, secure and reliable network …"

In relation to Transport:

- Para 9.7 identifies the key objectives of the transport strategy component of the Local Plan, including - improve access and connectivity to and from Teesport and the surrounding South Tees area
- Policy TA1 (Transport and New Development) identifies:
  - The Council and its partners will ensure that the transport requirements of new development, commensurate to the scale and type of development, are taken into account…
- Para 9.8 recognises the borough has particular congestion hotspots at the SRN including the A19, A174 and A66 and that new infrastructure may be needed to tackle these congested areas.
- Para 9.17 indicates that the Council follows the requirements of the Guidance on Transport Assessment as the standards for when TS, TA and TPs are required.
- Policy TA2 (Improving Accessibility Within and Beyond the Borough) identifies that the Council will work together with …. Developers and transport providers. This will include:
  - (f) working with Highways England to improve capacity to the A66, A1053 and A174, particularly Greystones roundabout.
  - (k) working with the Tees Valley Combined Authority and Highways England to deliver capacity improvements to the Strategic Road Network including across the sub-region including improvements to the A19, A1085 and A689 to improve access to key development sites, all providing indirect benefits to Redcar and Cleveland;

  - (m) supporting proposals being prepared by Tees Valley Combined Authority and Highways England to deliver improvements to the A66 and A174 road links to the A19 and beyond to the A1/A1(M), providing appropriate access to the strategic highway network from South Tees, to reduce bottlenecks and maintain highway capacity;
  - Where necessary, developers may be required to fund transport improvement schemes through Section 106 agreements where infrastructure provision and capacity would be affected or could constrain new development.

- Para 9.25 states that Redcar and Cleveland benefits from good highways provision catering for heavy vehicles and industrial uses. Linkages between the South Tees, Greater Eston and Redcar and the strategic highway network on the A66, A174 and A19 make the area highly accessible and attractive to industry, business and commuters. It is imperative that this operational benefit over other areas, where capacity is more limited, is not detrimentally affected by any development proposals. It will be essential that improvements and enhancements to the borough's infrastructure continue in order to facilitate local economic development and growth. The Council will continue to work strategically with its neighbouring local authorities and the LEP to maximise on funding opportunities via the Government. The Local Plan is being developed in parallel with the sub-regional Strategic Economic Plan and the Local Growth Fund and is ensuring consistency of objectives. We will also work proactively with the private sector to secure developer contributions to ensure the highway network advantage is maintained and enhanced wherever possible.

The development principles establish that:

- Policy SD4 (General Development Principles) identifies that in assessing suitability, development will be permitted where it:
  - a) meets the requirements of the locational policy and accords with other Local Plan policies and designations
  - g) will have access to adequate infrastructure … to serve the development
  - p) provide suitable and safe vehicular access
- Policy SD5 (Developer Contributions) identifies that the Council may secure developer contributions in order to fund necessary infrastructure.

**Highways England position**

The joint position statement between Highways England and the Council noted that the development in the Local Plan is unlikely to have a significant impact on the SRN and the package of measures proposed are acceptable to both Highways England and the Council in ensuring that the SRN can support the growth aspirations identified in the Local Plan.

The proposed schemes are promoted through the Local Plan in Policy TA3 and the supporting Infrastructure Delivery Plan, specifically identifying improvements to the A19, A1053, A66 and A174; while recognising that further work is required to specifically identify the phasing of the improvements and the quantum of development that can be accommodated on the SRN prior to the improvements being required.

It was noted that applications for development will be managed on an individual basis.

## South Tees Area Supplementary Planning Document [SPD] (Adopted May 2018)

During the consultation on the SPD, Highways England noted general support, but that it should be delivered in accordance with Local Plan Policy TA2 and the Infrastructure Delivery Plan and that there

was a need to ensure that the implications at the SRN are understood and addressed in line with the package of SRN improvements detailed within the Local Plan and Tees Valley AAP.

In summary, the SPD:

- Seeks to guide and inform future planning applications in the area and used as a material consideration in determining planning applications.
- Identifies requirements and provides a broad strategy to deliver supporting infrastructure.
- Commits to the development of a Transport Strategy.
- Seeks the creation of up to 20,000 new jobs.
- Contributions relevant to the nature and scale of the development may be sought, including … in order to fund necessary infrastructure … required as a consequence of development and in accordance with Local Plan policy SD5.
- Seek to improve and enhance the transport infrastructure serving the South Tees Area, as supported by Local Plan Policy LS4.
- All new development proposals shall be in accordance with Local Plan Policies SD4 and TA1 and will be required to have access to adequate infrastructure to meet their transport requirements.
- Other highways infrastructure proposals will be delivered in line with emerging development priorities and funding availability and will be identified through the Transport Strategy for the Area.
- The Council, working in partnership with the STDC, the Tees Valley Combined Authority and other infrastructure providers will actively seek public sector funding to support infrastructure development in line with the SPD. Necessary off-site infrastructure contributions would be sought through Section 106 planning obligations or through the use of 'Grampian' planning conditions. Obligations could include physical works or contributions towards highway measures to mitigate the transport impacts of the development.
- It is intended that the SPD will be reviewed with a view to the preparation of the technical supporting documents (including the transport strategy).

## South Tees Regeneration Master Plan (November 2019)

The South Tees Regeneration Masterplan identifies:

- The Tees Valley's key road transport assets include the strategic growth corridor of the A19, the A1(M), linking North and South, and the A66, providing Trans-Pennine East to West connectivity. Few areas of the UK are better served by road services.
- Centrally placed within the Tees Valley, the STDC area has excellent road transport connections. The A66 East-West route commences at the STDC boundary, and the nearby A174 Parkway provides direct access to the A19. Both the A66 and A19 provide direct connectivity to the A1(M) North-South route, which in turn affords access to the M62 strategic Trans-Pennine road corridor.
- To support the proposed major development of South Tees, coupled with the ambitions of TVCA in it's delivery of the Strategic Economic Plan, there will be a need to improve the area's transport connectivity.
- Notwithstanding the STDC's excellent transport connections, there are some wider connectivity barriers, including significant pressure points on the A19 and on the road network accessing the A1(M) and A19.
- The future redevelopment of the STDC area for industrial use will need to consider and address Transport infrastructure requirements.

- Consideration will be given to the impact on the local highway network of the planned major increases in development traffic that will ensue as the proposals for the regeneration programme begin to be realised, so that junction capacities are not adversely impacted and that the current favourable position the South Tees area benefits from is not compromised. The requirements for Transport Appraisals to assess transport impacts, particularly highways, will be given due attention as the development proposals begin to be fleshed-out.
- Next steps: STDC will continue to develop key thematic delivery strategies, as discussed within the South Tees Area SPD, including Transport.

## Transport Strategy

Highways England has engaged in the process of the transport strategy development with the last dialogue in April 2020. A Phase 1 Report was produced outlining modelling to be undertaken in Phase 2, but Phase 2 has not been forthcoming to date.

As part of work in reviewing the STDC South Industrial Zone application, it was identified that the next Steering Group meeting would be being arranged in due course.

As part of the initial review of that application scoping, CH2M identified *"The South Tees Regeneration Master Plan states that "consideration will be given to the impact on the local highway network of the planned major increases in development traffic that will ensue as the proposals for the regeneration programme begin to be realised, so that junction capacities are not adversely impacted and the current favourable position the South Tees area benefits from is not compromised. The requirements for Transport Appraisals to assess transport impacts, particularly highways, will be given due attention as the development proposals begin to be fleshed-out".* With this in mind, CH2M recommend that a view of the full site impacts is provided, either in the Scoping Report itself or alongside it, so that a view can be gained.

## Wider Strategies - considerations

The Scoping Report acknowledges:

- Within section 4.5 (relating to car parking) that *"A transport strategy for the wider Teesworks site is currently in development but will limit car parking within the site to meet sustainability targets) … It is subsequently anticipated that the internal layout, when developed, will support the strategy and limit car parking as far as reasonably possible."*
- Within section 5.2 (relating to trips by mode) that *"The transport strategy for the site will seek to reduce car mode share significantly. However, these earlier developments coming forward may not benefit from the longer-term strategy improvements proposed up to 2042."*

As part of discussions relating to the Southern Industrial Zone site, Arup identified *"The transport strategy for the wider STDC site will be looking at a longer-term horizon in terms of future year assessments. The impact of the wider STDC site up to a final year scenario, expected to be circa 2040, will be assessed by undertaking strategic modelling of the surrounding highway network."*

With a view to this, the following comments are made:

- The requirement for consideration of the impact on infrastructure, and the need to work with Highways England in relation to the SRN, is clear throughout the documents.
- The very fact that there is a location-specific SPD, a Masterplan, and a requirement for a Transport Strategy, highlights the need for a strategic approach to this site. It is disappointing that this is not flowing through the work undertaken. Dealing with the sites on an application by application basis may lead to a point whereby later applications on the site / other developments in the area may need infrastructure measures to enable them, due to these developments having consumed the available capacity. Similarly, the competitive advantage that the area has with regard to the

strategic connectivity may be diminished if the impacts are not considered in a more strategic manner.

- The SPD has committed to the production of the Transport Strategy, but this is still forthcoming. Priorities and funding availability for highways infrastructure is suggested as being identified through the Transport Strategy.
- The SPD points towards the creation of 20,000 jobs. The five applications under current consideration, along with the Southern Industrial Zone application, amount to an estimated 15,260 jobs. This is a significant (over 75%) proportion of the sites' aspirations that are coming forward in the absence of any form of strategic approach to transport.
- The SPD identifies that it would be reviewed 12-18 months post adoption to take account of the various technical documents including the Transport Strategy. Having been adopted in mid-2018 this review being informed by the Transport Strategy (amongst others) would have been expected to have happened by now.
- The Masterplan identifies that there is a need to improve the area's transport connectivity to support the proposed major development in South Tees.

# Summary and Conclusion

The following table lists all the items that were highlighted in the Scoping Report as decision points and Highways England's response.

Table 2 – Scoping Report Decision Points

| Scoping Report Section | Decision point (as defined in Scoping Report) | Highways England response | Suggested Action |
|---|---|---|---|
| **2. Planning Policy Review** | Documents proposed for planning review | Acceptable | No action |
| **3. Baseline Conditions** | Scope of transport networks | Comments made | Definition of the study area, based on the SRN criteria, should be provided early in the process to provide clarity of network to be assessed.<br>At this point the establishment of the baseline position at the SRN should be confirmed.<br>Growth and future operational scenarios should match that considered during the review of the Southern Industrial Zone. |
| | Methodology for establishing baseline traffic flows | Comments made | At the point of having established the study area, the baseline position at the SRN should be confirmed.<br>Growth and future operational scenarios should match that considered during the review of the Southern Industrial Zone. |

| Scoping Report Section | Decision point (as defined in Scoping Report) | Highways England response | Suggested Action |
|---|---|---|---|
| | Scope of the accident appraisal | Comments made | Needs to cover extents of SRN geography. |
| **4. Development Proposals** | Transport Proposals | Comments made | Access points will need to be considered in as far as they influence definition of SRN impacts. |
| **5. Trip Generation** | Trip rates | Comments made | Information supporting the derivation of the office trip rates is required in order to verify their use. |
| | Mode share proportions | Comments made | The use of Census data is supported.<br>Further information in relation to a proposed 5% reduction would be required in order for this to be accepted. |
| | Proposed trip distribution | Comments made | Census data distribution is accepted, but assessment using existing turning proportions is not accepted.<br>The analysis should extend as far as is required to ensure appropriate consideration of the SRN. |
| | Approach to growth forecast | Comments made | The approach should mirror that ultimately used in the Southern Industrial Zone assessment. |
| **6. Development Impact Assessment** | Scope of highways impact assessment | Comments made | The starting point for identifying the need of assessment at the SRN is based on an impact exceeding 30 two way trips at a junction |
| | Junction assessment scenarios | Acceptable | |
| | Scope of the EIA | Acceptable | The CTMP will need to be conditioned until a clear view on construction impacts is known. |

In the wider sense, an update on the Transport Strategy and how the intentions of the wider policies are being secured needs to be questioned. While Highways England need to respond to these planning applications on their own merits, the strategies were put in a place for a reason and without them, a significant proportion of this large employment site is likely to come forward in a manner that is not consistent with the ambitions of the wider strategies.

Finally, with regard the applications currently subject to review, CH2M would promote that these are progressed through proactive collaboration between the parties. While noting that all development applications have time pressures with a view to gaining approval, the discussions allied with the Southern Industrial Zone application involved significant pressure to get things resolved. These timescales did not seem to fit with (i) the scale of development being proposed or (ii) the lack of initial

appetite to give appropriate consideration to the SRN. This should be avoided as part of these applications, which themselves are of a significant nature.

# B3 Redcar & Cleveland Borough Council Feedback

**From:**
**To:**
**Subject:** [External] RE: TA Scoping Report for Teesworks
**Date:** 30 November 2020 14:54:27

Thanks for sharing the draft scoping report.
Collective thoughts from Tony & myself are below.
Please do get in touch if anything needed.
Thanks

Comments so far.

- The Local Transport Plan has been partially replaced by the Tees Valley Strategic Transport Plan and will be fully replaced when the Local Implementation Plan is adopted in 2021.
- Focus should also include how pedestrians, cyclists and public transport users will access each site upon first occupation (we recommend footway & cycleway links on both sides of each internal road from 3m shared surfaces on minor roads up to 2m+2m segregated facilities on the major links). But connectivity may not be along the same alignments as general road access & will connect directly to adjacent residential areas &
- early (temporary) internal connectivity between sites before the masterplan infrastructure is in place needs to be resolved before first occupation. The operation of financially viable and attractive bus services for users will be difficult if the sites are effectively served by a series of dead end roads from the A66 or A1085.
- Dorman Point site – access direct to Tees Dock Road should also be considered for this site. Possibly via the Grangetown Station Road corridor?
- Re-opening of Redcar British Steel Railway Station should be programmed at first occupation of Foundry, Long Acres & Steel House sites.
- Charging point infrastructure for electric vehicles needs to be integral to each car park/or distributed through each site. Solar farms using building roofs should be considered.
- Hydrogen filling stations will be initially provided at Eston Road and Teesport by TVCA, but more hydrogen infrastructure may be required.
- A Teesworks wide travel plan should be developed based on the evidence contained in the Transport Study & best practice. This should establish core principles/actions that developers will be required to sign up to with additional measures introduced as required by each business. Appointing a Travel Plan Co-ordinator for the Teesworks site with a delivery budget before first occupation would be preferable.

Transport Strategy Manager
Redcar & Cleveland Borough Council
Redcar & Cleveland House
Kirkleatham Street
Redcar
TS10 1RT

# Appendix C

TRICS Outputs

Filtering Summary

| | | |
|---|---|---|
| Land Use | 02/D | EMPLOYMENT/INDUSTRIAL ESTATE |
| Selected Trip Rate Calculation Parameter Range | 477-1665 EMPLOY | |
| Actual Trip Rate Calculation Parameter Range | 477-1665 EMPLOY | |
| Date Range | Minimum: 01/01/12 | Maximum: 27/06/18 |
| Parking Spaces Range | All Surveys Included | |
| Days of the week selected | Tuesday<br>Wednesday | 2<br>2 |
| Main Location Types selected | Edge of Town | 4 |
| Population <1 Mile ranges selected | 5,001 to 10,000<br>10,001 to 15,000 | 3<br>1 |
| Population <5 Mile ranges selected | 25,001 to 50,000<br>75,001 to 100,000 | 2<br>2 |
| Car Ownership <5 Mile ranges selected | 1.1 to 1.5 | 4 |
| PTAL Rating | No PTAL Present | 4 |

Calculation Reference: AUDIT-701007-200617-0625

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 02 - EMPLOYMENT
Category : D - INDUSTRIAL ESTATE
MULTI-MODAL VEHICLES

*Selected regions and areas:*

| | | | |
|---|---|---|---|
| 06 | WEST MIDLANDS | | |
| | WK | WARWICKSHIRE | 2 days |
| | WO | WORCESTERSHIRE | 1 days |
| 11 | SCOTLAND | | |
| | AG | ANGUS | 1 days |

*This section displays the number of survey days per TRICS® sub-region in the selected set*

Primary Filtering selection:

*This data displays the chosen trip rate parameter and its selected range. Only sites that fall within the parameter range are included in the trip rate calculation.*

Parameter: No of Employees
Actual Range: 477 to 1665 (units: )
Range Selected by User: 477 to 1665 (units: )

Parking Spaces Range: All Surveys Included

Public Transport Provision:
Selection by: Include all surveys

Date Range: 01/01/12 to 27/06/18

*This data displays the range of survey dates selected. Only surveys that were conducted within this date range are included in the trip rate calculation.*

*Selected survey days:*

| | |
|---|---|
| Tuesday | 2 days |
| Wednesday | 2 days |

*This data displays the number of selected surveys by day of the week.*

*Selected survey types:*

| | |
|---|---|
| Manual count | 4 days |
| Directional ATC Count | 0 days |

*This data displays the number of manual classified surveys and the number of unclassified ATC surveys, the total adding up to the overall number of surveys in the selected set. Manual surveys are undertaken using staff, whilst ATC surveys are undertaking using machines.*

*Selected Locations:*

| | |
|---|---|
| Edge of Town | 4 |

*This data displays the number of surveys per main location category within the selected set. The main location categories consist of Free Standing, Edge of Town, Suburban Area, Neighbourhood Centre, Edge of Town Centre, Town Centre and Not Known.*

*Selected Location Sub Categories:*

| | |
|---|---|
| Industrial Zone | 2 |
| Out of Town | 1 |
| No Sub Category | 1 |

*This data displays the number of surveys per location sub-category within the selected set. The location sub-categories consist of Commercial Zone, Industrial Zone, Development Zone, Residential Zone, Retail Zone, Built-Up Zone, Village, Out of Town, High Street and No Sub Category.*

Secondary Filtering selection:

*Use Class:*

| | |
|---|---|
| Not Known | 2 days |
| B1 | 1 days |
| B8 | 1 days |

*This data displays the number of surveys per Use Class classification within the selected set. The Use Classes Order 2005 has been used for this purpose, which can be found within the Library module of TRICS®.*

Secondary Filtering selection (Cont.):

*Population within 1 mile:*

| | |
|---|---|
| 5,001 to 10,000 | 3 days |
| 10,001 to 15,000 | 1 days |

*This data displays the number of selected surveys within stated 1-mile radii of population.*

*Population within 5 miles:*

| | |
|---|---|
| 25,001 to 50,000 | 2 days |
| 75,001 to 100,000 | 2 days |

*This data displays the number of selected surveys within stated 5-mile radii of population.*

*Car ownership within 5 miles:*

| | |
|---|---|
| 1.1 to 1.5 | 4 days |

*This data displays the number of selected surveys within stated ranges of average cars owned per residential dwelling, within a radius of 5-miles of selected survey sites.*

*Travel Plan:*

| | |
|---|---|
| No | 4 days |

*This data displays the number of surveys within the selected set that were undertaken at sites with Travel Plans in place, and the number of surveys that were undertaken at sites without Travel Plans.*

*PTAL Rating:*

| | |
|---|---|
| No PTAL Present | 4 days |

*This data displays the number of selected surveys with PTAL Ratings.*

*LIST OF SITES relevant to selection parameters*

| | | | |
|---|---|---|---|
| Site(1): | AG-02-D-02 | Site area: | 30.07 hect |
| Development Name: | INDUSTRIAL ESTATE | Gross floor area: | 78500 sqm |
| Location: | ARBROATH | Parking spaces: | 1270 |
| Postcode: | DD11 2NJ | No of Employees: | 875 |
| Main Location Type: | Edge of Town | Survey Date: | 25/04/17 |
| Sub-Location Type: | No Sub Category | Survey Day: | Tuesday |
| PTAL: | n/a | | |

| | | | |
|---|---|---|---|
| Site(2): | WK-02-D-01 | Site area: | 35.43 hect |
| Development Name: | INDUSTRIAL ESTATE | Gross floor area: | 150564 sqm |
| Location: | RUGBY | Parking spaces: | 1473 |
| Postcode: | CV23 0WA | No of Employees: | 477 |
| Main Location Type: | Edge of Town | Survey Date: | 27/06/18 |
| Sub-Location Type: | Industrial Zone | Survey Day: | Wednesday |
| PTAL: | n/a | | |

| | | | |
|---|---|---|---|
| Site(3): | WK-02-D-02 | Site area: | 25.00 hect |
| Development Name: | INDUSTRIAL ESTATE | Gross floor area: | 974258 sqm |
| Location: | RUGBY | Parking spaces: | 1873 |
| Postcode: | CV23 0WE | No of Employees: | 1665 |
| Main Location Type: | Edge of Town | Survey Date: | 27/06/18 |
| Sub-Location Type: | Industrial Zone | Survey Day: | Wednesday |
| PTAL: | n/a | | |

| | | | |
|---|---|---|---|
| Site(4): | WO-02-D-03 | Site area: | 27.00 hect |
| Development Name: | INDUSTRIAL ESTATE | Gross floor area: | 84575 sqm |
| Location: | EVESHAM | Parking spaces: | 1744 |
| Postcode: | WR11 1GR | No of Employees: | 1499 |
| Main Location Type: | Edge of Town | Survey Date: | 26/06/18 |
| Sub-Location Type: | Out of Town | Survey Day: | Tuesday |
| PTAL: | n/a | | |

TRIP RATE for Land Use 02 - EMPLOYMENT/D - INDUSTRIAL ESTATE
MULTI-MODAL VEHICLES
Calculation factor: 1 EMPLOY
BOLD print indicates peak (busiest) period

| | ARRIVALS | | | DEPARTURES | | | TOTALS | | |
|---|---|---|---|---|---|---|---|---|---|
| Time Range | No. Days | Ave. EMPLOY | Trip Rate | No. Days | Ave. EMPLOY | Trip Rate | No. Days | Ave. EMPLOY | Trip Rate |
| 00:00 - 01:00 | | | | | | | | | |
| 01:00 - 02:00 | | | | | | | | | |
| 02:00 - 03:00 | | | | | | | | | |
| 03:00 - 04:00 | | | | | | | | | |
| 04:00 - 05:00 | | | | | | | | | |
| 05:00 - 06:00 | | | | | | | | | |
| 06:00 - 07:00 | | | | | | | | | |
| 07:00 - 08:00 | 4 | 1129 | 0.200 | 4 | 1129 | 0.065 | 4 | 1129 | 0.265 |
| 08:00 - 09:00 | 4 | 1129 | 0.210 | 4 | 1129 | 0.074 | 4 | 1129 | 0.284 |
| 09:00 - 10:00 | 4 | 1129 | 0.154 | 4 | 1129 | 0.081 | 4 | 1129 | 0.235 |
| 10:00 - 11:00 | 4 | 1129 | 0.118 | 4 | 1129 | 0.089 | 4 | 1129 | 0.207 |
| 11:00 - 12:00 | 4 | 1129 | 0.113 | 4 | 1129 | 0.094 | 4 | 1129 | 0.207 |
| 12:00 - 13:00 | 4 | 1129 | 0.121 | 4 | 1129 | 0.140 | 4 | 1129 | 0.261 |
| 13:00 - 14:00 | 4 | 1129 | 0.174 | 4 | 1129 | 0.132 | 4 | 1129 | 0.306 |
| 14:00 - 15:00 | 4 | 1129 | 0.100 | 4 | 1129 | 0.157 | 4 | 1129 | 0.257 |
| 15:00 - 16:00 | 4 | 1129 | 0.092 | 4 | 1129 | 0.165 | 4 | 1129 | 0.257 |
| 16:00 - 17:00 | 4 | 1129 | 0.072 | 4 | 1129 | 0.180 | 4 | 1129 | 0.252 |
| 17:00 - 18:00 | 4 | 1129 | 0.053 | 4 | 1129 | 0.204 | 4 | 1129 | 0.257 |
| 18:00 - 19:00 | 4 | 1129 | 0.059 | 4 | 1129 | 0.091 | 4 | 1129 | 0.150 |
| 19:00 - 20:00 | | | | | | | | | |
| 20:00 - 21:00 | | | | | | | | | |
| 21:00 - 22:00 | | | | | | | | | |
| 22:00 - 23:00 | | | | | | | | | |
| 23:00 - 24:00 | | | | | | | | | |
| Total Rates: | | | 1.466 | | | 1.472 | | | 2.938 |

*This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.*

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Parameter summary

| | |
|---|---|
| Trip rate parameter range selected: | 477 - 1665 (units: ) |
| Survey date date range: | 01/01/12 - 27/06/18 |
| Number of weekdays (Monday-Friday): | 4 |
| Number of Saturdays: | 0 |
| Number of Sundays: | 0 |
| Surveys automatically removed from selection: | 0 |
| Surveys manually removed from selection: | 0 |

*This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.*

TRIP RATE for Land Use 02 - EMPLOYMENT/D - INDUSTRIAL ESTATE
MULTI-MODAL TAXIS
Calculation factor: 1 EMPLOY
BOLD print indicates peak (busiest) period

| | ARRIVALS | | | DEPARTURES | | | TOTALS | | |
|---|---|---|---|---|---|---|---|---|---|
| Time Range | No. Days | Ave. EMPLOY | Trip Rate | No. Days | Ave. EMPLOY | Trip Rate | No. Days | Ave. EMPLOY | Trip Rate |
| 00:00 - 01:00 | | | | | | | | | |
| 01:00 - 02:00 | | | | | | | | | |
| 02:00 - 03:00 | | | | | | | | | |
| 03:00 - 04:00 | | | | | | | | | |
| 04:00 - 05:00 | | | | | | | | | |
| 05:00 - 06:00 | | | | | | | | | |
| 06:00 - 07:00 | | | | | | | | | |
| 07:00 - 08:00 | 4 | 1129 | 0.000 | 4 | 1129 | 0.000 | 4 | 1129 | 0.000 |
| 08:00 - 09:00 | 4 | 1129 | 0.001 | 4 | 1129 | 0.000 | 4 | 1129 | 0.001 |
| 09:00 - 10:00 | 4 | 1129 | 0.000 | 4 | 1129 | 0.001 | 4 | 1129 | 0.001 |
| 10:00 - 11:00 | 4 | 1129 | 0.000 | 4 | 1129 | 0.000 | 4 | 1129 | 0.000 |
| 11:00 - 12:00 | 4 | 1129 | 0.000 | 4 | 1129 | 0.000 | 4 | 1129 | 0.000 |
| 12:00 - 13:00 | 4 | 1129 | 0.000 | 4 | 1129 | 0.000 | 4 | 1129 | 0.000 |
| 13:00 - 14:00 | 4 | 1129 | 0.000 | 4 | 1129 | 0.000 | 4 | 1129 | 0.000 |
| 14:00 - 15:00 | 4 | 1129 | 0.000 | 4 | 1129 | 0.000 | 4 | 1129 | 0.000 |
| 15:00 - 16:00 | 4 | 1129 | 0.000 | 4 | 1129 | 0.000 | 4 | 1129 | 0.000 |
| 16:00 - 17:00 | 4 | 1129 | 0.000 | 4 | 1129 | 0.000 | 4 | 1129 | 0.000 |
| 17:00 - 18:00 | 4 | 1129 | 0.000 | 4 | 1129 | 0.000 | 4 | 1129 | 0.000 |
| 18:00 - 19:00 | 4 | 1129 | 0.000 | 4 | 1129 | 0.000 | 4 | 1129 | 0.000 |
| 19:00 - 20:00 | | | | | | | | | |
| 20:00 - 21:00 | | | | | | | | | |
| 21:00 - 22:00 | | | | | | | | | |
| 22:00 - 23:00 | | | | | | | | | |
| 23:00 - 24:00 | | | | | | | | | |
| Total Rates: | | | 0.001 | | | 0.001 | | | 0.002 |

*This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.*

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

TRIP RATE for Land Use 02 - EMPLOYMENT/D - INDUSTRIAL ESTATE
MULTI-MODAL OGVS
Calculation factor: 1 EMPLOY
BOLD print indicates peak (busiest) period

| | ARRIVALS | | | DEPARTURES | | | TOTALS | | |
|---|---|---|---|---|---|---|---|---|---|
| Time Range | No. Days | Ave. EMPLOY | Trip Rate | No. Days | Ave. EMPLOY | Trip Rate | No. Days | Ave. EMPLOY | Trip Rate |
| 00:00 - 01:00 | | | | | | | | | |
| 01:00 - 02:00 | | | | | | | | | |
| 02:00 - 03:00 | | | | | | | | | |
| 03:00 - 04:00 | | | | | | | | | |
| 04:00 - 05:00 | | | | | | | | | |
| 05:00 - 06:00 | | | | | | | | | |
| 06:00 - 07:00 | | | | | | | | | |
| 07:00 - 08:00 | 4 | 1129 | 0.016 | 4 | 1129 | 0.011 | 4 | 1129 | 0.027 |
| 08:00 - 09:00 | 4 | 1129 | 0.019 | 4 | 1129 | 0.016 | 4 | 1129 | 0.035 |
| 09:00 - 10:00 | 4 | 1129 | 0.026 | 4 | 1129 | 0.017 | 4 | 1129 | 0.043 |
| 10:00 - 11:00 | 4 | 1129 | 0.020 | 4 | 1129 | 0.021 | 4 | 1129 | 0.041 |
| 11:00 - 12:00 | 4 | 1129 | 0.017 | 4 | 1129 | 0.020 | 4 | 1129 | 0.037 |
| 12:00 - 13:00 | 4 | 1129 | 0.025 | 4 | 1129 | 0.021 | 4 | 1129 | 0.046 |
| 13:00 - 14:00 | 4 | 1129 | 0.018 | 4 | 1129 | 0.021 | 4 | 1129 | 0.039 |
| 14:00 - 15:00 | 4 | 1129 | 0.019 | 4 | 1129 | 0.019 | 4 | 1129 | 0.038 |
| 15:00 - 16:00 | 4 | 1129 | 0.021 | 4 | 1129 | 0.021 | 4 | 1129 | 0.042 |
| 16:00 - 17:00 | 4 | 1129 | 0.013 | 4 | 1129 | 0.019 | 4 | 1129 | 0.032 |
| 17:00 - 18:00 | 4 | 1129 | 0.014 | 4 | 1129 | 0.010 | 4 | 1129 | 0.024 |
| 18:00 - 19:00 | 4 | 1129 | 0.010 | 4 | 1129 | 0.012 | 4 | 1129 | 0.022 |
| 19:00 - 20:00 | | | | | | | | | |
| 20:00 - 21:00 | | | | | | | | | |
| 21:00 - 22:00 | | | | | | | | | |
| 22:00 - 23:00 | | | | | | | | | |
| 23:00 - 24:00 | | | | | | | | | |
| Total Rates: | | | 0.218 | | | 0.208 | | | 0.426 |

*This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.*

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

TRIP RATE for Land Use 02 - EMPLOYMENT/D - INDUSTRIAL ESTATE
MULTI-MODAL PSVS
Calculation factor: 1 EMPLOY
BOLD print indicates peak (busiest) period

| | ARRIVALS | | | DEPARTURES | | | TOTALS | | |
|---|---|---|---|---|---|---|---|---|---|
| Time Range | No. Days | Ave. EMPLOY | Trip Rate | No. Days | Ave. EMPLOY | Trip Rate | No. Days | Ave. EMPLOY | Trip Rate |
| 00:00 - 01:00 | | | | | | | | | |
| 01:00 - 02:00 | | | | | | | | | |
| 02:00 - 03:00 | | | | | | | | | |
| 03:00 - 04:00 | | | | | | | | | |
| 04:00 - 05:00 | | | | | | | | | |
| 05:00 - 06:00 | | | | | | | | | |
| 06:00 - 07:00 | | | | | | | | | |
| 07:00 - 08:00 | 4 | 1129 | 0.000 | 4 | 1129 | 0.004 | 4 | 1129 | 0.004 |
| 08:00 - 09:00 | 4 | 1129 | 0.000 | 4 | 1129 | 0.001 | 4 | 1129 | 0.001 |
| 09:00 - 10:00 | 4 | 1129 | 0.002 | 4 | 1129 | 0.000 | 4 | 1129 | 0.002 |
| 10:00 - 11:00 | 4 | 1129 | 0.001 | 4 | 1129 | 0.001 | 4 | 1129 | 0.002 |
| 11:00 - 12:00 | 4 | 1129 | 0.001 | 4 | 1129 | 0.001 | 4 | 1129 | 0.002 |
| 12:00 - 13:00 | 4 | 1129 | 0.002 | 4 | 1129 | 0.001 | 4 | 1129 | 0.003 |
| 13:00 - 14:00 | 4 | 1129 | 0.001 | 4 | 1129 | 0.000 | 4 | 1129 | 0.001 |
| 14:00 - 15:00 | 4 | 1129 | 0.000 | 4 | 1129 | 0.002 | 4 | 1129 | 0.002 |
| 15:00 - 16:00 | 4 | 1129 | 0.001 | 4 | 1129 | 0.001 | 4 | 1129 | 0.002 |
| 16:00 - 17:00 | 4 | 1129 | 0.001 | 4 | 1129 | 0.000 | 4 | 1129 | 0.001 |
| 17:00 - 18:00 | 4 | 1129 | 0.001 | 4 | 1129 | 0.001 | 4 | 1129 | 0.002 |
| 18:00 - 19:00 | 4 | 1129 | 0.003 | 4 | 1129 | 0.000 | 4 | 1129 | 0.003 |
| 19:00 - 20:00 | | | | | | | | | |
| 20:00 - 21:00 | | | | | | | | | |
| 21:00 - 22:00 | | | | | | | | | |
| 22:00 - 23:00 | | | | | | | | | |
| 23:00 - 24:00 | | | | | | | | | |
| Total Rates: | | | 0.013 | | | 0.012 | | | 0.025 |

*This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.*

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

TRIP RATE for Land Use 02 - EMPLOYMENT/D - INDUSTRIAL ESTATE
MULTI-MODAL CYCLISTS
Calculation factor: 1 EMPLOY
BOLD print indicates peak (busiest) period

| | ARRIVALS | | | DEPARTURES | | | TOTALS | | |
|---|---|---|---|---|---|---|---|---|---|
| Time Range | No. Days | Ave. EMPLOY | Trip Rate | No. Days | Ave. EMPLOY | Trip Rate | No. Days | Ave. EMPLOY | Trip Rate |
| 00:00 - 01:00 | | | | | | | | | |
| 01:00 - 02:00 | | | | | | | | | |
| 02:00 - 03:00 | | | | | | | | | |
| 03:00 - 04:00 | | | | | | | | | |
| 04:00 - 05:00 | | | | | | | | | |
| 05:00 - 06:00 | | | | | | | | | |
| 06:00 - 07:00 | | | | | | | | | |
| 07:00 - 08:00 | 4 | 1129 | 0.005 | 4 | 1129 | 0.002 | 4 | 1129 | 0.007 |
| 08:00 - 09:00 | 4 | 1129 | 0.006 | 4 | 1129 | 0.000 | 4 | 1129 | 0.006 |
| 09:00 - 10:00 | 4 | 1129 | 0.001 | 4 | 1129 | 0.001 | 4 | 1129 | 0.002 |
| 10:00 - 11:00 | 4 | 1129 | 0.000 | 4 | 1129 | 0.001 | 4 | 1129 | 0.001 |
| 11:00 - 12:00 | 4 | 1129 | 0.000 | 4 | 1129 | 0.001 | 4 | 1129 | 0.001 |
| 12:00 - 13:00 | 4 | 1129 | 0.001 | 4 | 1129 | 0.000 | 4 | 1129 | 0.001 |
| 13:00 - 14:00 | 4 | 1129 | 0.003 | 4 | 1129 | 0.002 | 4 | 1129 | 0.005 |
| 14:00 - 15:00 | 4 | 1129 | 0.003 | 4 | 1129 | 0.004 | 4 | 1129 | 0.007 |
| 15:00 - 16:00 | 4 | 1129 | 0.001 | 4 | 1129 | 0.007 | 4 | 1129 | 0.008 |
| 16:00 - 17:00 | 4 | 1129 | 0.001 | 4 | 1129 | 0.003 | 4 | 1129 | 0.004 |
| 17:00 - 18:00 | 4 | 1129 | 0.001 | 4 | 1129 | 0.006 | 4 | 1129 | 0.007 |
| 18:00 - 19:00 | 4 | 1129 | 0.004 | 4 | 1129 | 0.001 | 4 | 1129 | 0.005 |
| 19:00 - 20:00 | | | | | | | | | |
| 20:00 - 21:00 | | | | | | | | | |
| 21:00 - 22:00 | | | | | | | | | |
| 22:00 - 23:00 | | | | | | | | | |
| 23:00 - 24:00 | | | | | | | | | |
| Total Rates: | | | 0.026 | | | 0.028 | | | 0.054 |

*This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.*

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

TRIP RATE for Land Use 02 - EMPLOYMENT/D - INDUSTRIAL ESTATE
MULTI-MODAL VEHICLE OCCUPANTS
Calculation factor: 1 EMPLOY
BOLD print indicates peak (busiest) period

| | ARRIVALS | | | DEPARTURES | | | TOTALS | | |
|---|---|---|---|---|---|---|---|---|---|
| Time Range | No. Days | Ave. EMPLOY | Trip Rate | No. Days | Ave. EMPLOY | Trip Rate | No. Days | Ave. EMPLOY | Trip Rate |
| 00:00 - 01:00 | | | | | | | | | |
| 01:00 - 02:00 | | | | | | | | | |
| 02:00 - 03:00 | | | | | | | | | |
| 03:00 - 04:00 | | | | | | | | | |
| 04:00 - 05:00 | | | | | | | | | |
| 05:00 - 06:00 | | | | | | | | | |
| 06:00 - 07:00 | | | | | | | | | |
| 07:00 - 08:00 | 4 | 1129 | 0.281 | 4 | 1129 | 0.068 | 4 | 1129 | 0.349 |
| 08:00 - 09:00 | 4 | 1129 | 0.302 | 4 | 1129 | 0.085 | 4 | 1129 | 0.387 |
| 09:00 - 10:00 | 4 | 1129 | 0.219 | 4 | 1129 | 0.095 | 4 | 1129 | 0.314 |
| 10:00 - 11:00 | 4 | 1129 | 0.163 | 4 | 1129 | 0.109 | 4 | 1129 | 0.272 |
| 11:00 - 12:00 | 4 | 1129 | 0.142 | 4 | 1129 | 0.124 | 4 | 1129 | 0.266 |
| 12:00 - 13:00 | 4 | 1129 | 0.154 | 4 | 1129 | 0.177 | 4 | 1129 | 0.331 |
| 13:00 - 14:00 | 4 | 1129 | 0.223 | 4 | 1129 | 0.170 | 4 | 1129 | 0.393 |
| 14:00 - 15:00 | 4 | 1129 | 0.135 | 4 | 1129 | 0.233 | 4 | 1129 | 0.368 |
| 15:00 - 16:00 | 4 | 1129 | 0.119 | 4 | 1129 | 0.240 | 4 | 1129 | 0.359 |
| 16:00 - 17:00 | 4 | 1129 | 0.097 | 4 | 1129 | 0.247 | 4 | 1129 | 0.344 |
| 17:00 - 18:00 | 4 | 1129 | 0.074 | 4 | 1129 | 0.297 | 4 | 1129 | 0.371 |
| 18:00 - 19:00 | 4 | 1129 | 0.086 | 4 | 1129 | 0.143 | 4 | 1129 | 0.229 |
| 19:00 - 20:00 | | | | | | | | | |
| 20:00 - 21:00 | | | | | | | | | |
| 21:00 - 22:00 | | | | | | | | | |
| 22:00 - 23:00 | | | | | | | | | |
| 23:00 - 24:00 | | | | | | | | | |
| Total Rates: | | | 1.995 | | | 1.988 | | | 3.983 |

*This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.*

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

TRIP RATE for Land Use 02 - EMPLOYMENT/D - INDUSTRIAL ESTATE
MULTI-MODAL PEDESTRIANS
Calculation factor: 1 EMPLOY
BOLD print indicates peak (busiest) period

| | ARRIVALS | | | DEPARTURES | | | TOTALS | | |
|---|---|---|---|---|---|---|---|---|---|
| Time Range | No. Days | Ave. EMPLOY | Trip Rate | No. Days | Ave. EMPLOY | Trip Rate | No. Days | Ave. EMPLOY | Trip Rate |
| 00:00 - 01:00 | | | | | | | | | |
| 01:00 - 02:00 | | | | | | | | | |
| 02:00 - 03:00 | | | | | | | | | |
| 03:00 - 04:00 | | | | | | | | | |
| 04:00 - 05:00 | | | | | | | | | |
| 05:00 - 06:00 | | | | | | | | | |
| 06:00 - 07:00 | | | | | | | | | |
| 07:00 - 08:00 | 4 | 1129 | 0.005 | 4 | 1129 | 0.003 | 4 | 1129 | 0.008 |
| 08:00 - 09:00 | 4 | 1129 | 0.004 | 4 | 1129 | 0.001 | 4 | 1129 | 0.005 |
| 09:00 - 10:00 | 4 | 1129 | 0.002 | 4 | 1129 | 0.000 | 4 | 1129 | 0.002 |
| 10:00 - 11:00 | 4 | 1129 | 0.001 | 4 | 1129 | 0.001 | 4 | 1129 | 0.002 |
| 11:00 - 12:00 | 4 | 1129 | 0.001 | 4 | 1129 | 0.002 | 4 | 1129 | 0.003 |
| 12:00 - 13:00 | 4 | 1129 | 0.004 | 4 | 1129 | 0.004 | 4 | 1129 | 0.008 |
| 13:00 - 14:00 | 4 | 1129 | 0.008 | 4 | 1129 | 0.004 | 4 | 1129 | 0.012 |
| 14:00 - 15:00 | 4 | 1129 | 0.003 | 4 | 1129 | 0.004 | 4 | 1129 | 0.007 |
| 15:00 - 16:00 | 4 | 1129 | 0.002 | 4 | 1129 | 0.004 | 4 | 1129 | 0.006 |
| 16:00 - 17:00 | 4 | 1129 | 0.001 | 4 | 1129 | 0.003 | 4 | 1129 | 0.004 |
| 17:00 - 18:00 | 4 | 1129 | 0.001 | 4 | 1129 | 0.004 | 4 | 1129 | 0.005 |
| 18:00 - 19:00 | 4 | 1129 | 0.002 | 4 | 1129 | 0.002 | 4 | 1129 | 0.004 |
| 19:00 - 20:00 | | | | | | | | | |
| 20:00 - 21:00 | | | | | | | | | |
| 21:00 - 22:00 | | | | | | | | | |
| 22:00 - 23:00 | | | | | | | | | |
| 23:00 - 24:00 | | | | | | | | | |
| Total Rates: | | | 0.034 | | | 0.032 | | | 0.066 |

*This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.*

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

TRIP RATE for Land Use 02 - EMPLOYMENT/D - INDUSTRIAL ESTATE
MULTI-MODAL BUS/TRAM PASSENGERS
Calculation factor: 1 EMPLOY
BOLD print indicates peak (busiest) period

| | ARRIVALS | | | DEPARTURES | | | TOTALS | | |
|---|---|---|---|---|---|---|---|---|---|
| Time Range | No. Days | Ave. EMPLOY | Trip Rate | No. Days | Ave. EMPLOY | Trip Rate | No. Days | Ave. EMPLOY | Trip Rate |
| 00:00 - 01:00 | | | | | | | | | |
| 01:00 - 02:00 | | | | | | | | | |
| 02:00 - 03:00 | | | | | | | | | |
| 03:00 - 04:00 | | | | | | | | | |
| 04:00 - 05:00 | | | | | | | | | |
| 05:00 - 06:00 | | | | | | | | | |
| 06:00 - 07:00 | | | | | | | | | |
| 07:00 - 08:00 | 4 | 1129 | 0.017 | 4 | 1129 | 0.003 | 4 | 1129 | 0.020 |
| 08:00 - 09:00 | 4 | 1129 | 0.009 | 4 | 1129 | 0.000 | 4 | 1129 | 0.009 |
| 09:00 - 10:00 | 4 | 1129 | 0.005 | 4 | 1129 | 0.001 | 4 | 1129 | 0.006 |
| 10:00 - 11:00 | 4 | 1129 | 0.001 | 4 | 1129 | 0.001 | 4 | 1129 | 0.002 |
| 11:00 - 12:00 | 4 | 1129 | 0.002 | 4 | 1129 | 0.002 | 4 | 1129 | 0.004 |
| 12:00 - 13:00 | 4 | 1129 | 0.003 | 4 | 1129 | 0.005 | 4 | 1129 | 0.008 |
| 13:00 - 14:00 | 4 | 1129 | 0.016 | 4 | 1129 | 0.004 | 4 | 1129 | 0.020 |
| 14:00 - 15:00 | 4 | 1129 | 0.004 | 4 | 1129 | 0.016 | 4 | 1129 | 0.020 |
| 15:00 - 16:00 | 4 | 1129 | 0.002 | 4 | 1129 | 0.016 | 4 | 1129 | 0.018 |
| 16:00 - 17:00 | 4 | 1129 | 0.002 | 4 | 1129 | 0.004 | 4 | 1129 | 0.006 |
| 17:00 - 18:00 | 4 | 1129 | 0.001 | 4 | 1129 | 0.006 | 4 | 1129 | 0.007 |
| 18:00 - 19:00 | 4 | 1129 | 0.001 | 4 | 1129 | 0.002 | 4 | 1129 | 0.003 |
| 19:00 - 20:00 | | | | | | | | | |
| 20:00 - 21:00 | | | | | | | | | |
| 21:00 - 22:00 | | | | | | | | | |
| 22:00 - 23:00 | | | | | | | | | |
| 23:00 - 24:00 | | | | | | | | | |
| Total Rates: | | | 0.063 | | | 0.060 | | | 0.123 |

*This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.*

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

TRIP RATE for Land Use 02 - EMPLOYMENT/D - INDUSTRIAL ESTATE
MULTI-MODAL TOTAL RAIL PASSENGERS
Calculation factor: 1 EMPLOY
BOLD print indicates peak (busiest) period

| | ARRIVALS | | | DEPARTURES | | | TOTALS | | |
|---|---|---|---|---|---|---|---|---|---|
| Time Range | No. Days | Ave. EMPLOY | Trip Rate | No. Days | Ave. EMPLOY | Trip Rate | No. Days | Ave. EMPLOY | Trip Rate |
| 00:00 - 01:00 | | | | | | | | | |
| 01:00 - 02:00 | | | | | | | | | |
| 02:00 - 03:00 | | | | | | | | | |
| 03:00 - 04:00 | | | | | | | | | |
| 04:00 - 05:00 | | | | | | | | | |
| 05:00 - 06:00 | | | | | | | | | |
| 06:00 - 07:00 | | | | | | | | | |
| 07:00 - 08:00 | 4 | 1129 | 0.000 | 4 | 1129 | 0.000 | 4 | 1129 | 0.000 |
| 08:00 - 09:00 | 4 | 1129 | 0.001 | 4 | 1129 | 0.000 | 4 | 1129 | 0.001 |
| 09:00 - 10:00 | 4 | 1129 | 0.000 | 4 | 1129 | 0.000 | 4 | 1129 | 0.000 |
| 10:00 - 11:00 | 4 | 1129 | 0.000 | 4 | 1129 | 0.000 | 4 | 1129 | 0.000 |
| 11:00 - 12:00 | 4 | 1129 | 0.000 | 4 | 1129 | 0.000 | 4 | 1129 | 0.000 |
| 12:00 - 13:00 | 4 | 1129 | 0.000 | 4 | 1129 | 0.000 | 4 | 1129 | 0.000 |
| 13:00 - 14:00 | 4 | 1129 | 0.000 | 4 | 1129 | 0.000 | 4 | 1129 | 0.000 |
| 14:00 - 15:00 | 4 | 1129 | 0.000 | 4 | 1129 | 0.001 | 4 | 1129 | 0.001 |
| 15:00 - 16:00 | 4 | 1129 | 0.000 | 4 | 1129 | 0.000 | 4 | 1129 | 0.000 |
| 16:00 - 17:00 | 4 | 1129 | 0.000 | 4 | 1129 | 0.000 | 4 | 1129 | 0.000 |
| 17:00 - 18:00 | 4 | 1129 | 0.000 | 4 | 1129 | 0.001 | 4 | 1129 | 0.001 |
| 18:00 - 19:00 | 4 | 1129 | 0.000 | 4 | 1129 | 0.000 | 4 | 1129 | 0.000 |
| 19:00 - 20:00 | | | | | | | | | |
| 20:00 - 21:00 | | | | | | | | | |
| 21:00 - 22:00 | | | | | | | | | |
| 22:00 - 23:00 | | | | | | | | | |
| 23:00 - 24:00 | | | | | | | | | |
| Total Rates: | | | 0.001 | | | 0.002 | | | 0.003 |

*This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.*

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

TRIP RATE for Land Use 02 - EMPLOYMENT/D - INDUSTRIAL ESTATE
MULTI-MODAL COACH PASSENGERS
Calculation factor: 1 EMPLOY
BOLD print indicates peak (busiest) period

| | ARRIVALS | | | DEPARTURES | | | TOTALS | | |
|---|---|---|---|---|---|---|---|---|---|
| Time Range | No. Days | Ave. EMPLOY | Trip Rate | No. Days | Ave. EMPLOY | Trip Rate | No. Days | Ave. EMPLOY | Trip Rate |
| 00:00 - 01:00 | | | | | | | | | |
| 01:00 - 02:00 | | | | | | | | | |
| 02:00 - 03:00 | | | | | | | | | |
| 03:00 - 04:00 | | | | | | | | | |
| 04:00 - 05:00 | | | | | | | | | |
| 05:00 - 06:00 | | | | | | | | | |
| 06:00 - 07:00 | | | | | | | | | |
| 07:00 - 08:00 | 4 | 1129 | 0.000 | 4 | 1129 | 0.004 | 4 | 1129 | 0.004 |
| 08:00 - 09:00 | 4 | 1129 | 0.000 | 4 | 1129 | 0.001 | 4 | 1129 | 0.001 |
| 09:00 - 10:00 | 4 | 1129 | 0.001 | 4 | 1129 | 0.000 | 4 | 1129 | 0.001 |
| 10:00 - 11:00 | 4 | 1129 | 0.000 | 4 | 1129 | 0.001 | 4 | 1129 | 0.001 |
| 11:00 - 12:00 | 4 | 1129 | 0.001 | 4 | 1129 | 0.001 | 4 | 1129 | 0.002 |
| 12:00 - 13:00 | 4 | 1129 | 0.001 | 4 | 1129 | 0.001 | 4 | 1129 | 0.002 |
| 13:00 - 14:00 | 4 | 1129 | 0.001 | 4 | 1129 | 0.000 | 4 | 1129 | 0.001 |
| 14:00 - 15:00 | 4 | 1129 | 0.000 | 4 | 1129 | 0.001 | 4 | 1129 | 0.001 |
| 15:00 - 16:00 | 4 | 1129 | 0.001 | 4 | 1129 | 0.001 | 4 | 1129 | 0.002 |
| 16:00 - 17:00 | 4 | 1129 | 0.001 | 4 | 1129 | 0.000 | 4 | 1129 | 0.001 |
| 17:00 - 18:00 | 4 | 1129 | 0.001 | 4 | 1129 | 0.000 | 4 | 1129 | 0.001 |
| 18:00 - 19:00 | 4 | 1129 | 0.004 | 4 | 1129 | 0.000 | 4 | 1129 | 0.004 |
| 19:00 - 20:00 | | | | | | | | | |
| 20:00 - 21:00 | | | | | | | | | |
| 21:00 - 22:00 | | | | | | | | | |
| 22:00 - 23:00 | | | | | | | | | |
| 23:00 - 24:00 | | | | | | | | | |
| Total Rates: | | | 0.011 | | | 0.010 | | | 0.021 |

*This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.*

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

TRIP RATE for Land Use 02 - EMPLOYMENT/D - INDUSTRIAL ESTATE
MULTI-MODAL PUBLIC TRANSPORT USERS
Calculation factor: 1 EMPLOY
BOLD print indicates peak (busiest) period

| | ARRIVALS | | | DEPARTURES | | | TOTALS | | |
|---|---|---|---|---|---|---|---|---|---|
| Time Range | No. Days | Ave. EMPLOY | Trip Rate | No. Days | Ave. EMPLOY | Trip Rate | No. Days | Ave. EMPLOY | Trip Rate |
| 00:00 - 01:00 | | | | | | | | | |
| 01:00 - 02:00 | | | | | | | | | |
| 02:00 - 03:00 | | | | | | | | | |
| 03:00 - 04:00 | | | | | | | | | |
| 04:00 - 05:00 | | | | | | | | | |
| 05:00 - 06:00 | | | | | | | | | |
| 06:00 - 07:00 | | | | | | | | | |
| 07:00 - 08:00 | 4 | 1129 | 0.018 | 4 | 1129 | 0.007 | 4 | 1129 | 0.025 |
| 08:00 - 09:00 | 4 | 1129 | 0.010 | 4 | 1129 | 0.002 | 4 | 1129 | 0.012 |
| 09:00 - 10:00 | 4 | 1129 | 0.006 | 4 | 1129 | 0.001 | 4 | 1129 | 0.007 |
| 10:00 - 11:00 | 4 | 1129 | 0.002 | 4 | 1129 | 0.002 | 4 | 1129 | 0.004 |
| 11:00 - 12:00 | 4 | 1129 | 0.003 | 4 | 1129 | 0.003 | 4 | 1129 | 0.006 |
| 12:00 - 13:00 | 4 | 1129 | 0.004 | 4 | 1129 | 0.006 | 4 | 1129 | 0.010 |
| 13:00 - 14:00 | 4 | 1129 | 0.017 | 4 | 1129 | 0.004 | 4 | 1129 | 0.021 |
| 14:00 - 15:00 | 4 | 1129 | 0.004 | 4 | 1129 | 0.018 | 4 | 1129 | 0.022 |
| 15:00 - 16:00 | 4 | 1129 | 0.003 | 4 | 1129 | 0.018 | 4 | 1129 | 0.021 |
| 16:00 - 17:00 | 4 | 1129 | 0.003 | 4 | 1129 | 0.005 | 4 | 1129 | 0.008 |
| 17:00 - 18:00 | 4 | 1129 | 0.002 | 4 | 1129 | 0.007 | 4 | 1129 | 0.009 |
| 18:00 - 19:00 | 4 | 1129 | 0.005 | 4 | 1129 | 0.003 | 4 | 1129 | 0.008 |
| 19:00 - 20:00 | | | | | | | | | |
| 20:00 - 21:00 | | | | | | | | | |
| 21:00 - 22:00 | | | | | | | | | |
| 22:00 - 23:00 | | | | | | | | | |
| 23:00 - 24:00 | | | | | | | | | |
| Total Rates: | | | 0.077 | | | 0.076 | | | 0.153 |

*This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.*

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

TRIP RATE for Land Use 02 - EMPLOYMENT/D - INDUSTRIAL ESTATE
MULTI-MODAL TOTAL PEOPLE
Calculation factor: 1 EMPLOY
BOLD print indicates peak (busiest) period

| | ARRIVALS | | | DEPARTURES | | | TOTALS | | |
|---|---|---|---|---|---|---|---|---|---|
| Time Range | No. Days | Ave. EMPLOY | Trip Rate | No. Days | Ave. EMPLOY | Trip Rate | No. Days | Ave. EMPLOY | Trip Rate |
| 00:00 - 01:00 | | | | | | | | | |
| 01:00 - 02:00 | | | | | | | | | |
| 02:00 - 03:00 | | | | | | | | | |
| 03:00 - 04:00 | | | | | | | | | |
| 04:00 - 05:00 | | | | | | | | | |
| 05:00 - 06:00 | | | | | | | | | |
| 06:00 - 07:00 | | | | | | | | | |
| 07:00 - 08:00 | 4 | 1129 | 0.310 | 4 | 1129 | 0.080 | 4 | 1129 | 0.390 |
| 08:00 - 09:00 | 4 | 1129 | 0.322 | 4 | 1129 | 0.089 | 4 | 1129 | 0.411 |
| 09:00 - 10:00 | 4 | 1129 | 0.228 | 4 | 1129 | 0.097 | 4 | 1129 | 0.325 |
| 10:00 - 11:00 | 4 | 1129 | 0.165 | 4 | 1129 | 0.112 | 4 | 1129 | 0.277 |
| 11:00 - 12:00 | 4 | 1129 | 0.147 | 4 | 1129 | 0.129 | 4 | 1129 | 0.276 |
| 12:00 - 13:00 | 4 | 1129 | 0.163 | 4 | 1129 | 0.187 | 4 | 1129 | 0.350 |
| 13:00 - 14:00 | 4 | 1129 | 0.252 | 4 | 1129 | 0.180 | 4 | 1129 | 0.432 |
| 14:00 - 15:00 | 4 | 1129 | 0.145 | 4 | 1129 | 0.258 | 4 | 1129 | 0.403 |
| 15:00 - 16:00 | 4 | 1129 | 0.125 | 4 | 1129 | 0.268 | 4 | 1129 | 0.393 |
| 16:00 - 17:00 | 4 | 1129 | 0.102 | 4 | 1129 | 0.258 | 4 | 1129 | 0.360 |
| 17:00 - 18:00 | 4 | 1129 | 0.078 | 4 | 1129 | 0.314 | 4 | 1129 | 0.392 |
| 18:00 - 19:00 | 4 | 1129 | 0.097 | 4 | 1129 | 0.149 | 4 | 1129 | 0.246 |
| 19:00 - 20:00 | | | | | | | | | |
| 20:00 - 21:00 | | | | | | | | | |
| 21:00 - 22:00 | | | | | | | | | |
| 22:00 - 23:00 | | | | | | | | | |
| 23:00 - 24:00 | | | | | | | | | |
| Total Rates: | | | 2.134 | | | 2.121 | | | 4.255 |

*This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.*

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

TRIP RATE for Land Use 02 - EMPLOYMENT/D - INDUSTRIAL ESTATE
MULTI-MODAL CARS
Calculation factor: 1 EMPLOY
BOLD print indicates peak (busiest) period

| | ARRIVALS | | | DEPARTURES | | | TOTALS | | |
|---|---|---|---|---|---|---|---|---|---|
| Time Range | No. Days | Ave. EMPLOY | Trip Rate | No. Days | Ave. EMPLOY | Trip Rate | No. Days | Ave. EMPLOY | Trip Rate |
| 00:00 - 01:00 | | | | | | | | | |
| 01:00 - 02:00 | | | | | | | | | |
| 02:00 - 03:00 | | | | | | | | | |
| 03:00 - 04:00 | | | | | | | | | |
| 04:00 - 05:00 | | | | | | | | | |
| 05:00 - 06:00 | | | | | | | | | |
| 06:00 - 07:00 | | | | | | | | | |
| 07:00 - 08:00 | 4 | 1129 | 0.157 | 4 | 1129 | 0.036 | 4 | 1129 | 0.193 |
| 08:00 - 09:00 | 4 | 1129 | 0.159 | 4 | 1129 | 0.035 | 4 | 1129 | 0.194 |
| 09:00 - 10:00 | 4 | 1129 | 0.094 | 4 | 1129 | 0.033 | 4 | 1129 | 0.127 |
| 10:00 - 11:00 | 4 | 1129 | 0.063 | 4 | 1129 | 0.039 | 4 | 1129 | 0.102 |
| 11:00 - 12:00 | 4 | 1129 | 0.068 | 4 | 1129 | 0.049 | 4 | 1129 | 0.117 |
| 12:00 - 13:00 | 4 | 1129 | 0.066 | 4 | 1129 | 0.089 | 4 | 1129 | 0.155 |
| 13:00 - 14:00 | 4 | 1129 | 0.118 | 4 | 1129 | 0.081 | 4 | 1129 | 0.199 |
| 14:00 - 15:00 | 4 | 1129 | 0.054 | 4 | 1129 | 0.106 | 4 | 1129 | 0.160 |
| 15:00 - 16:00 | 4 | 1129 | 0.045 | 4 | 1129 | 0.107 | 4 | 1129 | 0.152 |
| 16:00 - 17:00 | 4 | 1129 | 0.037 | 4 | 1129 | 0.134 | 4 | 1129 | 0.171 |
| 17:00 - 18:00 | 4 | 1129 | 0.028 | 4 | 1129 | 0.175 | 4 | 1129 | 0.203 |
| 18:00 - 19:00 | 4 | 1129 | 0.042 | 4 | 1129 | 0.072 | 4 | 1129 | 0.114 |
| 19:00 - 20:00 | | | | | | | | | |
| 20:00 - 21:00 | | | | | | | | | |
| 21:00 - 22:00 | | | | | | | | | |
| 22:00 - 23:00 | | | | | | | | | |
| 23:00 - 24:00 | | | | | | | | | |
| Total Rates: | | | 0.931 | | | 0.956 | | | 1.887 |

*This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.*

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

TRIP RATE for Land Use 02 - EMPLOYMENT/D - INDUSTRIAL ESTATE
MULTI-MODAL LGVS
Calculation factor: 1 EMPLOY
BOLD print indicates peak (busiest) period

| | ARRIVALS | | | DEPARTURES | | | TOTALS | | |
|---|---|---|---|---|---|---|---|---|---|
| Time Range | No. Days | Ave. EMPLOY | Trip Rate | No. Days | Ave. EMPLOY | Trip Rate | No. Days | Ave. EMPLOY | Trip Rate |
| 00:00 - 01:00 | | | | | | | | | |
| 01:00 - 02:00 | | | | | | | | | |
| 02:00 - 03:00 | | | | | | | | | |
| 03:00 - 04:00 | | | | | | | | | |
| 04:00 - 05:00 | | | | | | | | | |
| 05:00 - 06:00 | | | | | | | | | |
| 06:00 - 07:00 | | | | | | | | | |
| 07:00 - 08:00 | 4 | 1129 | 0.025 | 4 | 1129 | 0.013 | 4 | 1129 | 0.038 |
| 08:00 - 09:00 | 4 | 1129 | 0.029 | 4 | 1129 | 0.022 | 4 | 1129 | 0.051 |
| 09:00 - 10:00 | 4 | 1129 | 0.031 | 4 | 1129 | 0.030 | 4 | 1129 | 0.061 |
| 10:00 - 11:00 | 4 | 1129 | 0.034 | 4 | 1129 | 0.028 | 4 | 1129 | 0.062 |
| 11:00 - 12:00 | 4 | 1129 | 0.027 | 4 | 1129 | 0.025 | 4 | 1129 | 0.052 |
| 12:00 - 13:00 | 4 | 1129 | 0.028 | 4 | 1129 | 0.028 | 4 | 1129 | 0.056 |
| 13:00 - 14:00 | 4 | 1129 | 0.036 | 4 | 1129 | 0.029 | 4 | 1129 | 0.065 |
| 14:00 - 15:00 | 4 | 1129 | 0.026 | 4 | 1129 | 0.029 | 4 | 1129 | 0.055 |
| 15:00 - 16:00 | 4 | 1129 | 0.025 | 4 | 1129 | 0.035 | 4 | 1129 | 0.060 |
| 16:00 - 17:00 | 4 | 1129 | 0.020 | 4 | 1129 | 0.026 | 4 | 1129 | 0.046 |
| 17:00 - 18:00 | 4 | 1129 | 0.010 | 4 | 1129 | 0.016 | 4 | 1129 | 0.026 |
| 18:00 - 19:00 | 4 | 1129 | 0.003 | 4 | 1129 | 0.006 | 4 | 1129 | 0.009 |
| 19:00 - 20:00 | | | | | | | | | |
| 20:00 - 21:00 | | | | | | | | | |
| 21:00 - 22:00 | | | | | | | | | |
| 22:00 - 23:00 | | | | | | | | | |
| 23:00 - 24:00 | | | | | | | | | |
| Total Rates: | | | 0.294 | | | 0.287 | | | 0.581 |

*This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.*

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

TRIP RATE for Land Use 02 - EMPLOYMENT/D - INDUSTRIAL ESTATE
MULTI-MODAL MOTOR CYCLES
Calculation factor: 1 EMPLOY
BOLD print indicates peak (busiest) period

| | ARRIVALS | | | DEPARTURES | | | TOTALS | | |
|---|---|---|---|---|---|---|---|---|---|
| Time Range | No. Days | Ave. EMPLOY | Trip Rate | No. Days | Ave. EMPLOY | Trip Rate | No. Days | Ave. EMPLOY | Trip Rate |
| 00:00 - 01:00 | | | | | | | | | |
| 01:00 - 02:00 | | | | | | | | | |
| 02:00 - 03:00 | | | | | | | | | |
| 03:00 - 04:00 | | | | | | | | | |
| 04:00 - 05:00 | | | | | | | | | |
| 05:00 - 06:00 | | | | | | | | | |
| 06:00 - 07:00 | | | | | | | | | |
| 07:00 - 08:00 | 4 | 1129 | 0.001 | 4 | 1129 | 0.000 | 4 | 1129 | 0.001 |
| 08:00 - 09:00 | 4 | 1129 | 0.002 | 4 | 1129 | 0.000 | 4 | 1129 | 0.002 |
| 09:00 - 10:00 | 4 | 1129 | 0.001 | 4 | 1129 | 0.000 | 4 | 1129 | 0.001 |
| 10:00 - 11:00 | 4 | 1129 | 0.000 | 4 | 1129 | 0.000 | 4 | 1129 | 0.000 |
| 11:00 - 12:00 | 4 | 1129 | 0.000 | 4 | 1129 | 0.000 | 4 | 1129 | 0.000 |
| 12:00 - 13:00 | 4 | 1129 | 0.000 | 4 | 1129 | 0.001 | 4 | 1129 | 0.001 |
| 13:00 - 14:00 | 4 | 1129 | 0.001 | 4 | 1129 | 0.000 | 4 | 1129 | 0.001 |
| 14:00 - 15:00 | 4 | 1129 | 0.000 | 4 | 1129 | 0.001 | 4 | 1129 | 0.001 |
| 15:00 - 16:00 | 4 | 1129 | 0.000 | 4 | 1129 | 0.001 | 4 | 1129 | 0.001 |
| 16:00 - 17:00 | 4 | 1129 | 0.000 | 4 | 1129 | 0.000 | 4 | 1129 | 0.000 |
| 17:00 - 18:00 | 4 | 1129 | 0.000 | 4 | 1129 | 0.002 | 4 | 1129 | 0.002 |
| 18:00 - 19:00 | 4 | 1129 | 0.000 | 4 | 1129 | 0.001 | 4 | 1129 | 0.001 |
| 19:00 - 20:00 | | | | | | | | | |
| 20:00 - 21:00 | | | | | | | | | |
| 21:00 - 22:00 | | | | | | | | | |
| 22:00 - 23:00 | | | | | | | | | |
| 23:00 - 24:00 | | | | | | | | | |
| Total Rates: | | | 0.005 | | | 0.006 | | | 0.011 |

*This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.*

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

TRIP RATE for Land Use 02 - EMPLOYMENT/D - INDUSTRIAL ESTATE
MULTI-MODAL Servicing Vehicles
Calculation factor: 1 EMPLOY
BOLD print indicates peak (busiest) period

| | ARRIVALS | | | DEPARTURES | | | TOTALS | | |
|---|---|---|---|---|---|---|---|---|---|
| Time Range | No. Days | Ave. EMPLOY | Trip Rate | No. Days | Ave. EMPLOY | Trip Rate | No. Days | Ave. EMPLOY | Trip Rate |
| 00:00 - 01:00 | | | | | | | | | |
| 01:00 - 02:00 | | | | | | | | | |
| 02:00 - 03:00 | | | | | | | | | |
| 03:00 - 04:00 | | | | | | | | | |
| 04:00 - 05:00 | | | | | | | | | |
| 05:00 - 06:00 | | | | | | | | | |
| 06:00 - 07:00 | | | | | | | | | |
| 07:00 - 08:00 | 4 | 1129 | 0.010 | 4 | 1129 | 0.006 | 4 | 1129 | 0.016 |
| 08:00 - 09:00 | 4 | 1129 | 0.009 | 4 | 1129 | 0.011 | 4 | 1129 | 0.020 |
| 09:00 - 10:00 | 4 | 1129 | 0.011 | 4 | 1129 | 0.013 | 4 | 1129 | 0.024 |
| 10:00 - 11:00 | 4 | 1129 | 0.012 | 4 | 1129 | 0.014 | 4 | 1129 | 0.026 |
| 11:00 - 12:00 | 4 | 1129 | 0.010 | 4 | 1129 | 0.011 | 4 | 1129 | 0.021 |
| 12:00 - 13:00 | 4 | 1129 | 0.012 | 4 | 1129 | 0.012 | 4 | 1129 | 0.024 |
| 13:00 - 14:00 | 4 | 1129 | 0.016 | 4 | 1129 | 0.010 | 4 | 1129 | 0.026 |
| 14:00 - 15:00 | 4 | 1129 | 0.012 | 4 | 1129 | 0.012 | 4 | 1129 | 0.024 |
| 15:00 - 16:00 | 4 | 1129 | 0.012 | 4 | 1129 | 0.013 | 4 | 1129 | 0.025 |
| 16:00 - 17:00 | 4 | 1129 | 0.008 | 4 | 1129 | 0.009 | 4 | 1129 | 0.017 |
| 17:00 - 18:00 | 4 | 1129 | 0.004 | 4 | 1129 | 0.004 | 4 | 1129 | 0.008 |
| 18:00 - 19:00 | 4 | 1129 | 0.000 | 4 | 1129 | 0.000 | 4 | 1129 | 0.000 |
| 19:00 - 20:00 | | | | | | | | | |
| 20:00 - 21:00 | | | | | | | | | |
| 21:00 - 22:00 | | | | | | | | | |
| 22:00 - 23:00 | | | | | | | | | |
| 23:00 - 24:00 | | | | | | | | | |
| Total Rates: | | | 0.116 | | | 0.115 | | | 0.231 |

*This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.*

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

# Appendix D

## 2011 Census Journey to Work Data

# D1 Journey to Work Data

## D1.1 Introduction

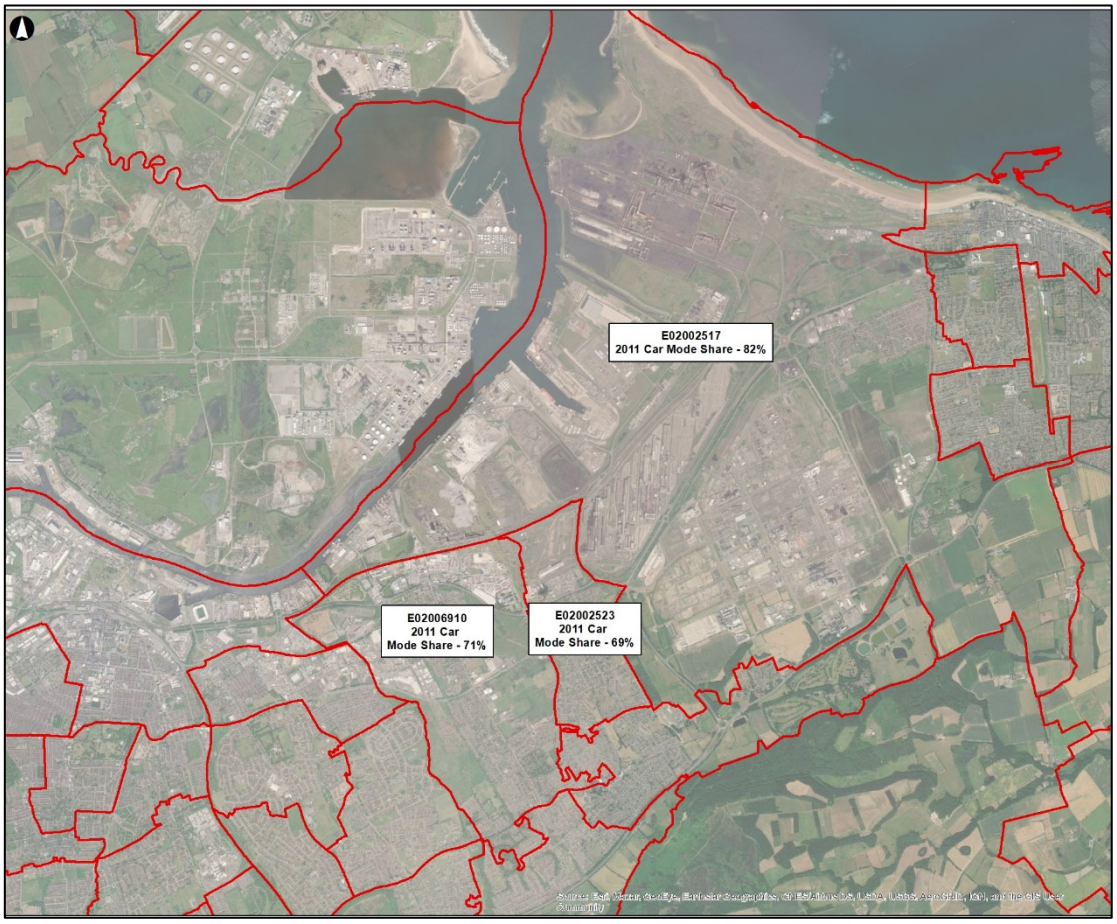
This section provides further details about the 2011 UK Census journey to work data. The data has been used to inform the distribution of development traffic on the highway network.

## D1.2 Methodology

Travel to work data from the 2011 Census has been downloaded for those travelling to the area where the site is located (primarily Census Middle Layer Super Output Area (MSOA) E02002517). The travel to work area, and neighbouring areas, is shown in Figure D1. Some of the STDC site falls within the neighbouring MSOA of E02002523.

In 2011 the site was operating as a steel works and whilst noting that the proposed use could alter the trip attraction of the site, the MSOA includes the Wilton International Site and therefore in 2011 it was probable that the area had a relatively wide distribution of employee home locations.

**Figure D1: Census Boundaries**



Origins with 1% of total trips or more to the study area in 2011 were extracted from the Census data and the most likely main route to/from the site access identified based on directions given in Google Maps. This data is presented in Table D1. The assignment of this traffic on the network is shown in **Appendix E**.

**Table D1: Travel to Work Origins and Assigned Routes**

| Destination | Origin | Origin Description* | Steel House R'about | Kirkleatham Lane | A1085/ A1053 R'about | All Trips | % of Trips |
|---|---|---|---|---|---|---|---|
| **E02002517** | E02002518 | Redcar Lane / Coast | Trunk Road east | A1085 east | NA | 557 | 7% |
| **E02002517** | E02002520 | Marske | Trunk Road east | A1085 east | NA | 540 | 7% |
| **E02002517** | E02002517 | Same as Site | NA | NA | NA | 349 | 4% |
| **E02002517** | E02002519 | South central Redcar | Trunk Road east | A1085 east | NA | 319 | 4% |
| **E02002517** | E02002515 | Redcar town centre | Trunk Road east | A1085 east | NA | 311 | 4% |
| **E02002517** | E02006910 | South Bank | Trunk Road west | NA | A1053 North | 301 | 4% |
| **E02002517** | E02002525 | Lazenby/ Lackenby | Trunk Road west | NA | A1053 South | 289 | 4% |
| **E02002517** | E02002516 | North central Redcar | Trunk Road east | Kirkleatham Lane North | NA | 273 | 3% |
| **E02002517** | E02002526 | Skelton | Trunk Road east | A1085 east | NA | 253 | 3% |
| **E02002517** | E02002557 | Eaglescliffe | Trunk Road west | NA | A1053 North | 194 | 2% |
| **E02002517** | E02002534 | East Guisborough | Trunk Road east | Kirkleatham Lane South | NA | 186 | 2% |
| **E02002517** | E02002523 | Grangetown | Trunk Road west | NA | Broadway | 177 | 2% |
| **E02002517** | E02002524 | Brotton | Trunk Road east | A1085 east | NA | 176 | 2% |
| **E02002517** | E02002529 | Eston | Trunk Road west | NA | A1053 South | 172 | 2% |
| **E02002517** | E02006811 | Nunthorpe | Trunk Road west | NA | A1053 South | 171 | 2% |
| **E02002517** | E02002514 | Hemlington | Trunk Road west | NA | A1053 South | 159 | 2% |
| **E02002517** | E02002533 | Pinchinthorpe | Trunk Road east | Kirkleatham Lane South | NA | 150 | 2% |
| **E02002517** | E02006812 | Ormesby | Trunk Road west | NA | A1053 North | 147 | 2% |

| Destination | Origin | Origin Description* | Steel House R'about | Kirkleatham Lane | A1085/ A1053 R'about | All Trips | % of Trips |
|---|---|---|---|---|---|---|---|
| **E02002517** | E02002521 | Saltburn | Trunk Road east | A1085 east | NA | 142 | 2% |
| **E02002517** | E02002532 | West Guisborough | Trunk Road east | Kirkleatham Lane South | NA | 130 | 2% |
| **E02002517** | E02002530 | Lingdale/Easington | Trunk Road east | A1085 east | NA | 123 | 2% |
| **E02002517** | E02002556 | Ingleby Barwick | Trunk Road west | NA | A1053 South | 109 | 1% |
| **E02002517** | E02002502 | Cargo Fleet Lane area | Trunk Road west | NA | Broadway | 98 | 1% |
| **E02002517** | E02002504 | Linthorpe | Trunk Road west | NA | A1053 North | 95 | 1% |
| **E02002517** | E02005750 | Stokesley | Trunk Road west | NA | A1053 South | 95 | 1% |
| **E02002517** | E02002512 | Marton | Trunk Road west | NA | A1053 South | 94 | 1% |
| **E02002517** | E02002558 | Yarm | Trunk Road west | NA | A1053 South | 94 | 1% |
| **E02002517** | E02002527 | Loftus/ Skinningrove | Trunk Road east | A1085 east | NA | 90 | 1% |
| **E02002517** | E02002513 | Stainton | Trunk Road west | NA | A1053 South | 89 | 1% |
| **E02002517** | E02002501 | Grove Hill | Trunk Road west | NA | Broadway | 83 | 1% |
| **E02002517** | E02002555 | Eaglescliffe | Trunk Road west | NA | A1053 North | 81 | 1% |
| **E02002517** | E02005751 | Hutton Rudby | Trunk Road west | NA | A1053 South | 78 | 1% |
| **E02002517** | E02002500 | Linthorpe | Trunk Road west | NA | Broadway | 72 | 1% |
| **E02002517** | E02002496 | Central Middlesbrough | Trunk Road west | NA | A1053 North | 69 | 1% |
| **E02002517** | E02002507 | Acklam | Trunk Road west | NA | A1053 South | 68 | 1% |
| **E02002517** | E02002498 | Central Middlesbrough | Trunk Road west | NA | A1053 North | 64 | 1% |
| **E02002517** | E02002508 | Acklam | Trunk Road west | NA | A1053 South | 63 | 1% |
| **E02002517** | E02002499 | Berwick Hills | Trunk Road west | NA | Broadway | 62 | 1% |
| **E02002517** | E02002509 | Easterside | Trunk Road west | NA | A1053 South | 62 | 1% |

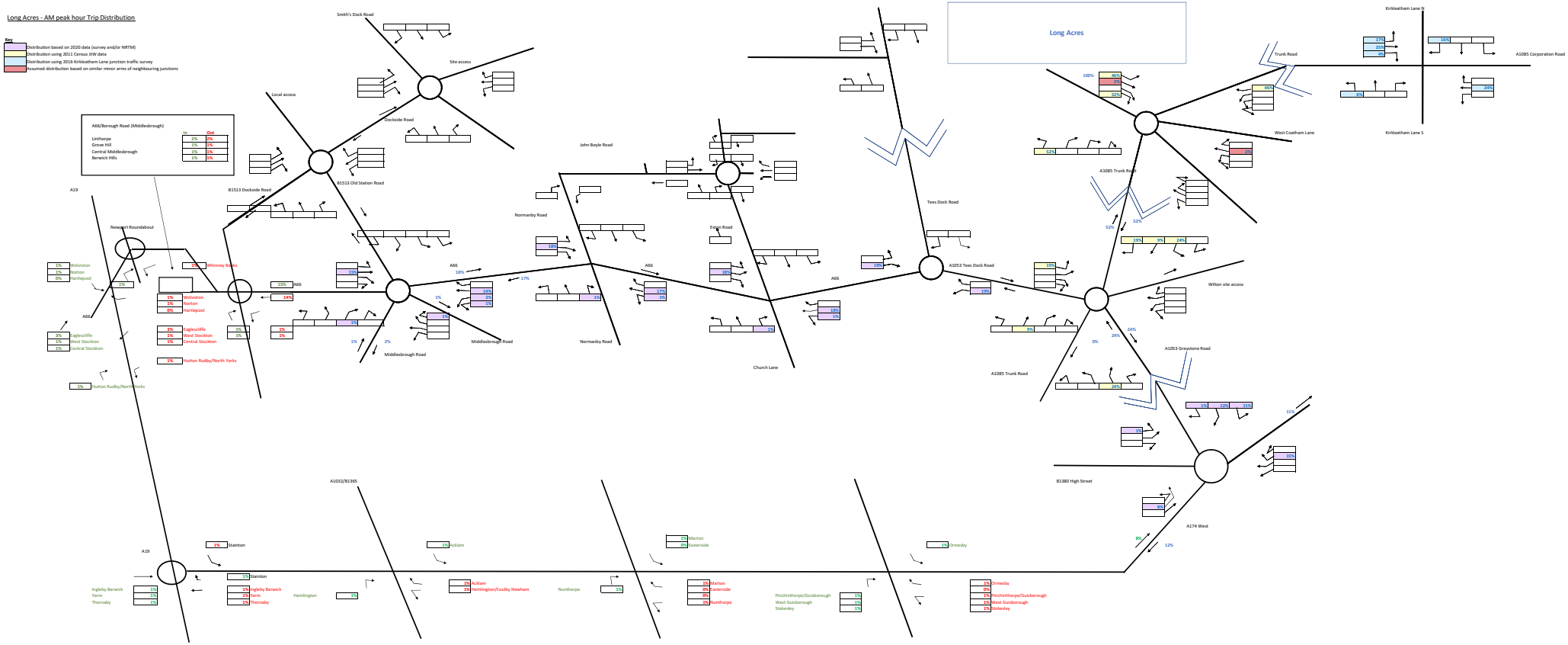
| Destination | Origin | Origin Description* | Steel House R'about | Kirkleatham Lane | A1085/ A1053 R'about | All Trips | % of Trips |
|---|---|---|---|---|---|---|---|
| **E02002517** | E02002505 | Berwick Hills | Trunk Road west | NA | Broadway | 60 | 1% |
| **E02002517** | E02002497 | North Ormesby | Trunk Road west | NA | Broadway | 58 | 1% |
| **E02002517** | E02002535 | Wolviston | Trunk Road west | NA | A1053 North | 57 | 1% |
| **E02002517** | E02002539 | West Stockton | Trunk Road west | NA | A1053 North | 55 | 1% |
| **E02002517** | E02002553 | Thornaby | Trunk Road west | NA | A1053 South | 54 | 1% |
| **E02002517** | E02002503 | Whinney Banks | Trunk Road west | NA | A1053 North | 53 | 1% |
| **E02002517** | E02002510 | Acklam | Trunk Road west | NA | A1053 South | 53 | 1% |
| **E02002517** | E02002552 | Thornaby | Trunk Road west | NA | A1053 South | 52 | 1% |
| **E02002517** | E02002549 | West Stockton | Trunk Road west | NA | A1053 North | 49 | 1% |
| **E02002517** | E02002540 | Norton | Trunk Road west | NA | A1053 North | 46 | 1% |
| **E02002517** | E02002541 | Norton | Trunk Road west | NA | A1053 North | 44 | 1% |
| **E02002517** | E02006909 | Hartlepool | Trunk Road west | NA | A1053 North | 44 | 1% |
| **E02002517** | E02002544 | Stockton central | Trunk Road west | NA | A1053 North | 43 | 1% |
| **E02002517** | E02002548 | Stockton central | Trunk Road west | NA | A1053 North | 43 | 1% |

**'Origin Description' identified based on nearest residential area / known location. Some zones have the same description as they cover the same broad area.*

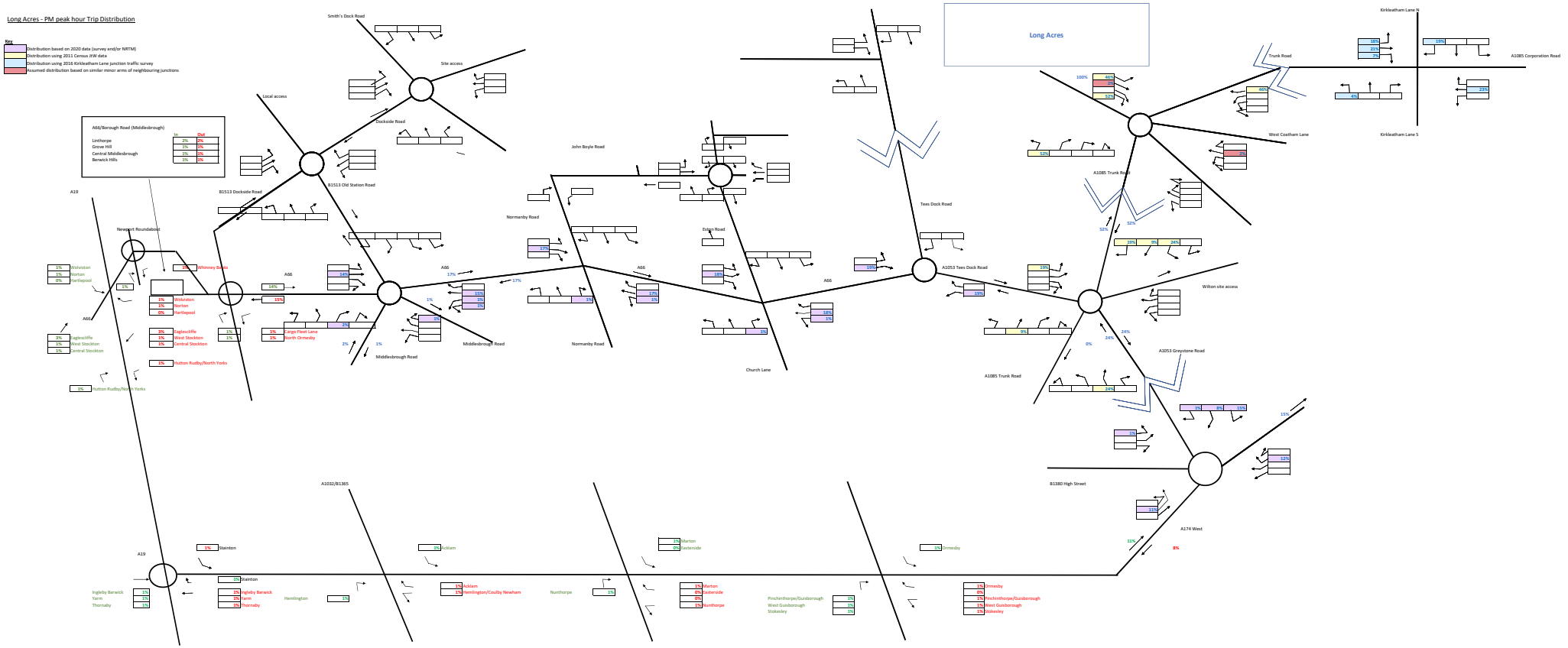
# Appendix E

Proposed Development Trip Distribution and Assignment

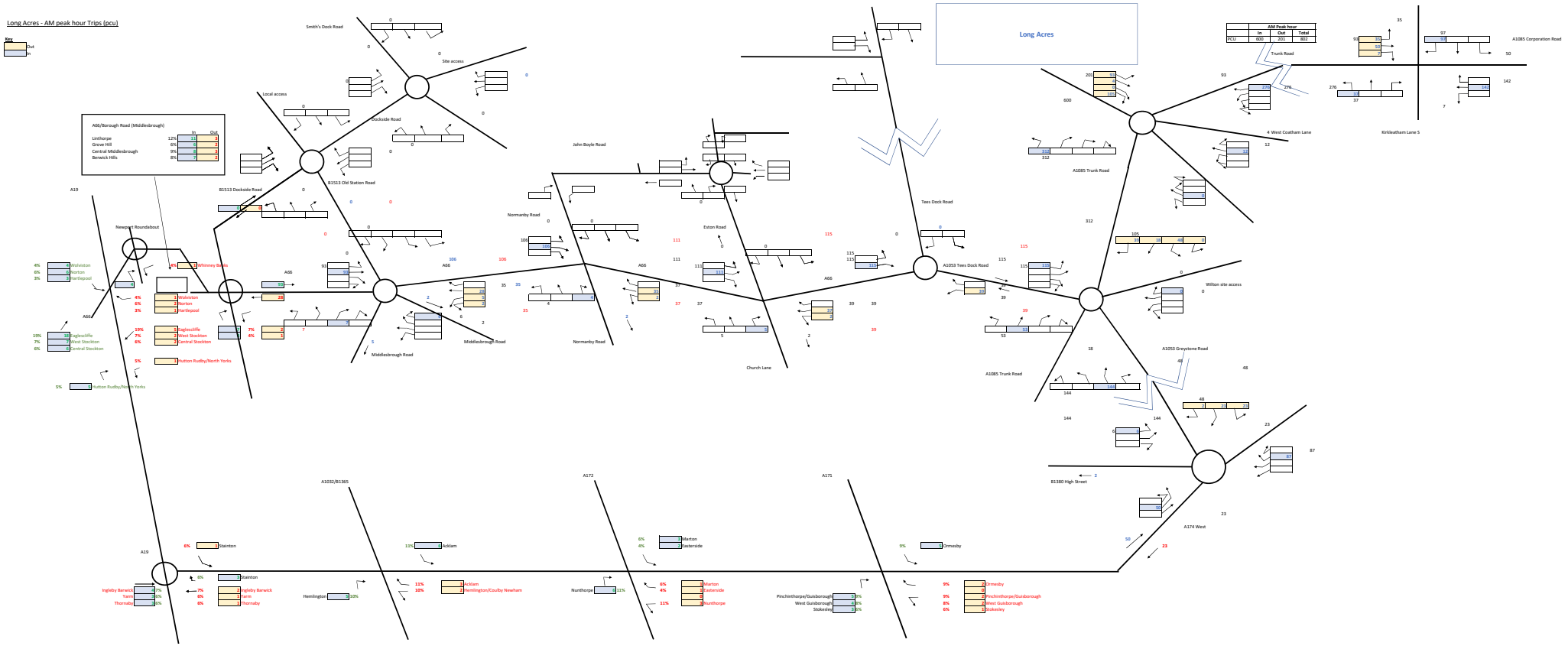
# Long Acres - AM peak hour Trip Distribution



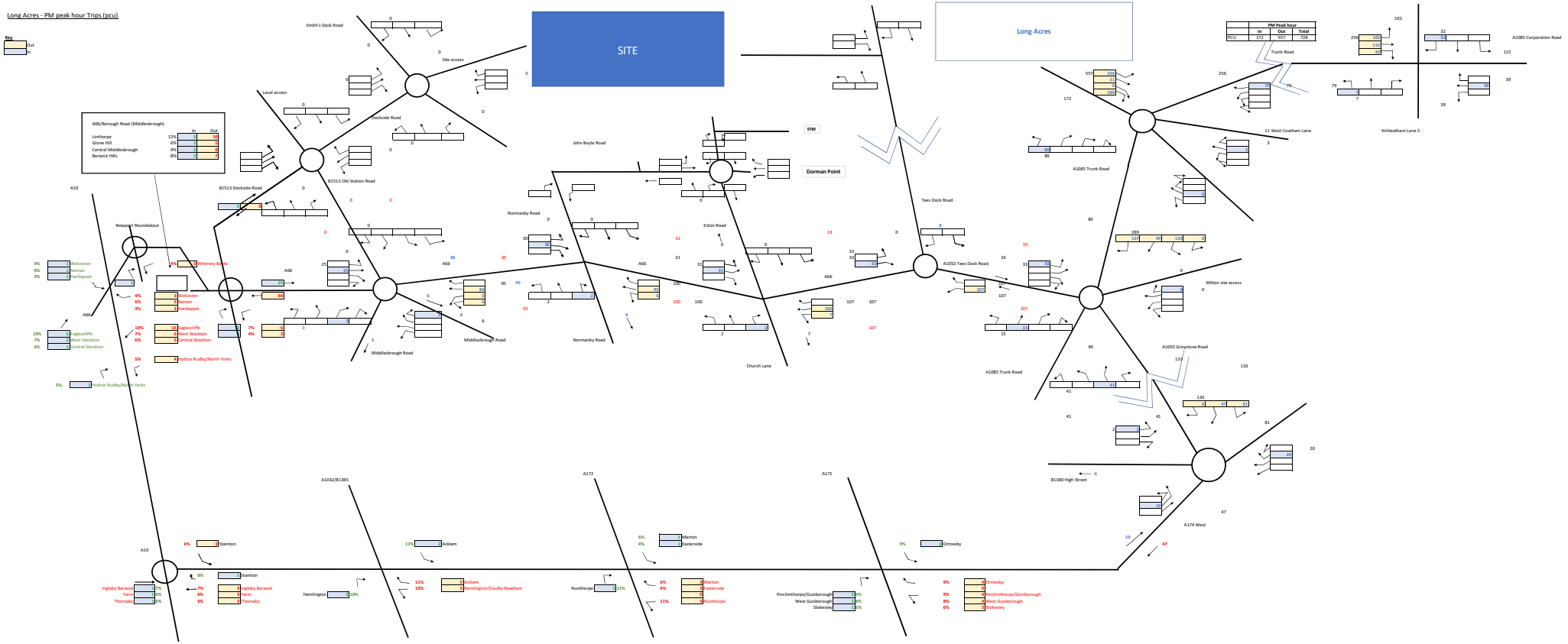
Long Acres - PM peak hour Trip Distribution



Long Acres - AM peak hour Trips (pcu)



Long Acres - PM peak hour Trips (pcu)



# Appendix F

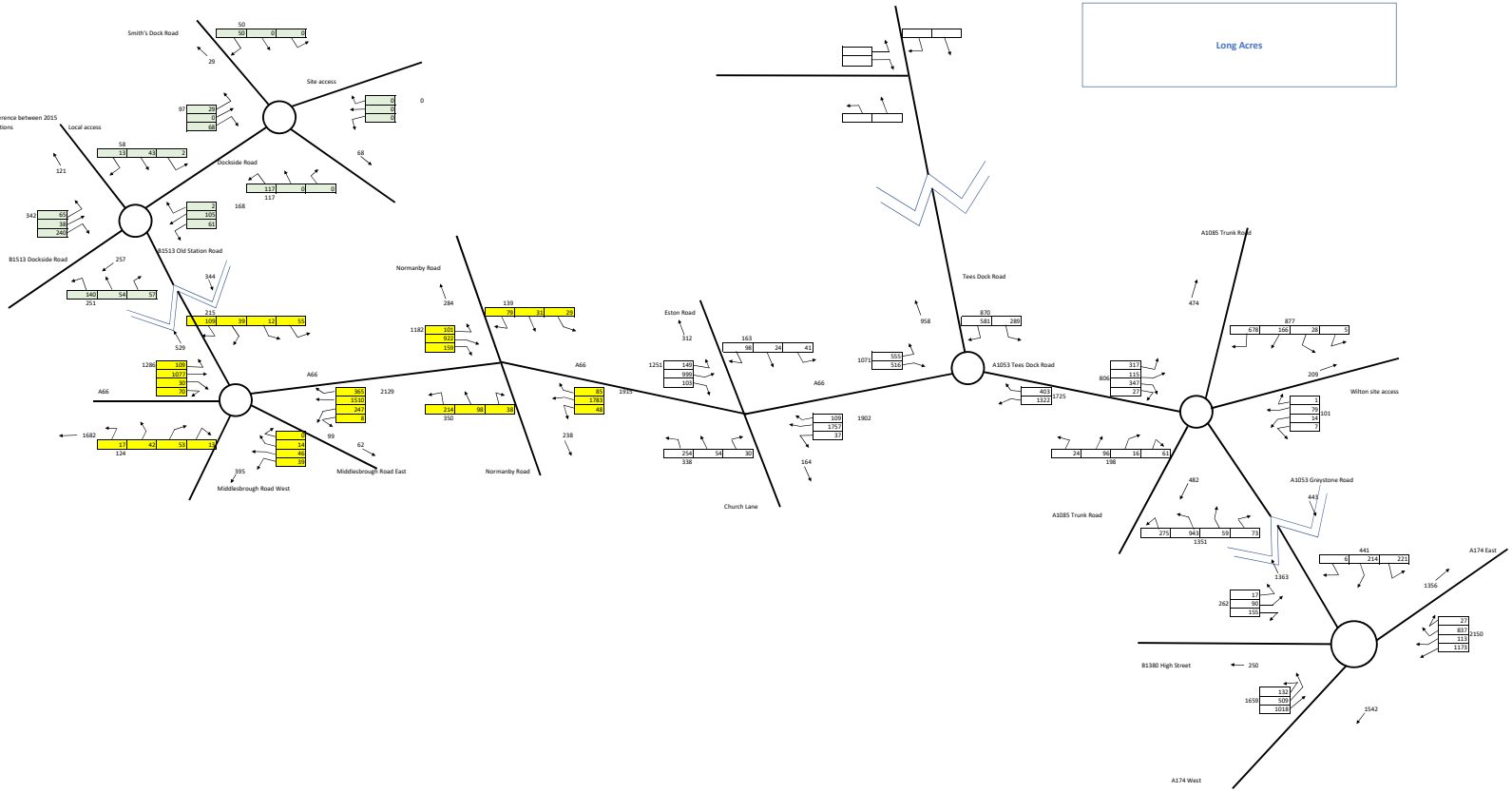
Traffic Flow Diagrams

**2020 Base AM Peak Hour Trips (pcu)**

**Key**

- 2021 NRTM data adjusted for 2020
- 2016 survey data (from TA for the South Bank site access junction), adjusted using calculated difference between 2015 NRTM data and 2019 survey data on Old Station Rd, distributed using 2016 survey turning proportions
- 2019 Middlesbrough Rd junction and Normanby Rd junction traffic surveys

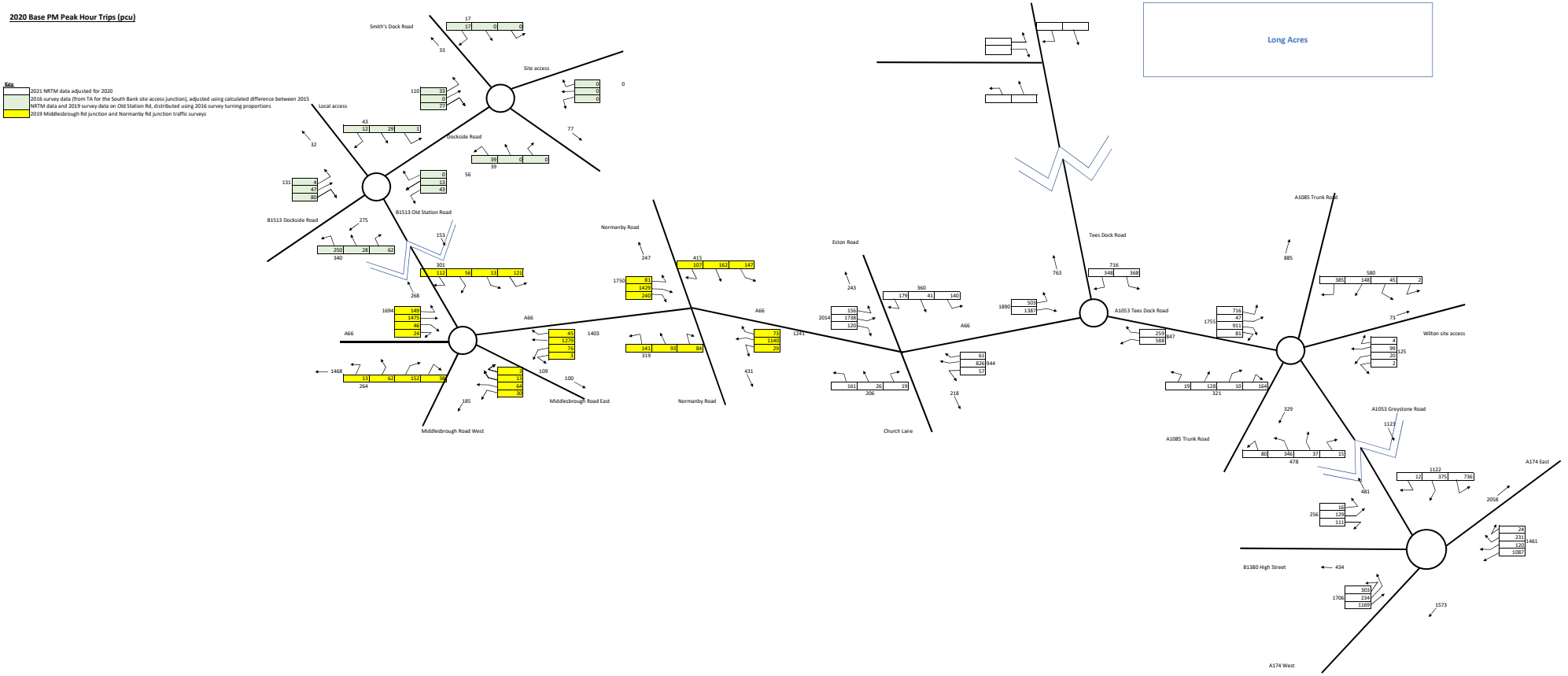
Long Acres



**2020 Base PM Peak Hour Trips (pcu)**

Key

- 2021 NRTM data adjusted for 2020
- 2016 survey data (from TA for the South Bank site access junction), adjusted using calculated difference between 2015 NRTM data and 2019 survey data on Old Station Rd, distributed using 2016 survey turning proportions
- 2019 Middlesbrough Rd junction and Normanby Rd junction traffic surveys



# 2033 Base AM Peak Hour Trips (pcu)

Key

2033 flows estimated using 2012 survey data from Marske Estate TA. Traffic flows were growthed to 2016 using TEMPro factors (2012-2016 TEMPRo database estimated reduction in traffic) and to 2033 using NRTM forecasts. PCU estimated using 6%HGV on similar arms of neighbouring junctions.

Estimated trip generation associated with existing educational facility (TRICS trip rates from similar Land Use 04 - EDUCATION/F - COMMUNITY EDUCATION sites).

2016 traffic survey data (from 2016 Kirkleatham Lane TA), growthed to 2033 using NRTM forecasts for A1085 Trunk Road north of the A1053

Long Acres

Kirkleatham Lane N

Kirkleatham Lane S

Trunk Road

360 West Coatham Lane

A1085 Trunk Road

A1085 Corporation Road

B1513 Old Station Road

B1513 Dockside Road

Middlesbrough Road East

Middlesbrough Road West

John Boyle Road

Middlesbrough Road E

New Eston Road

Dorman Point access

Eston Road

Church Lane

A66

Tees Dock Road

A1053 Tees Dock Road

Wilton site access

A1053 Greystone Road

A1085 Trunk Road

B1380 High Street

A174 West

# 2033 Base PM Peak Hour Trips (pcu)

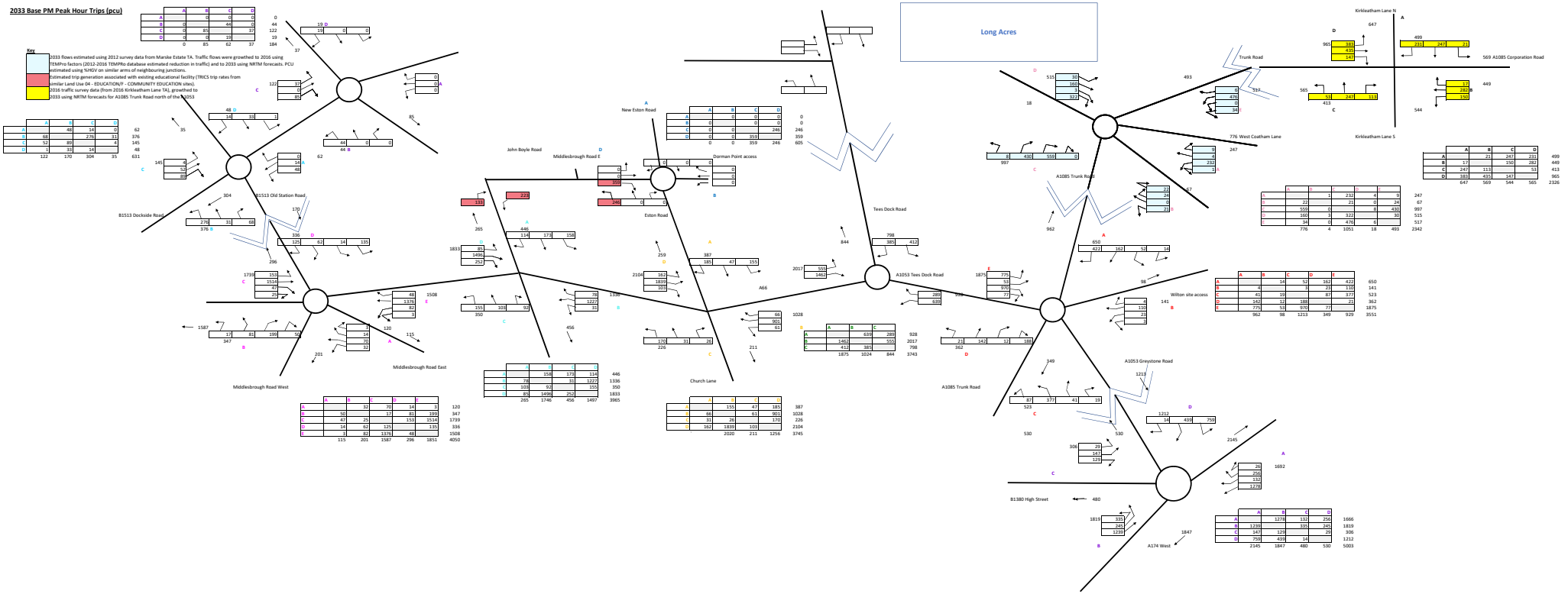
Key

2033 flows estimated using 2012 survey data from Marske Estate TA. Traffic flows were growthed to 2016 using TEMPro factors (2012-2016 TEMPRo database estimated reduction in traffic) and to 2033 using NRTM forecasts. PCU estimated using %HGV on similar arms of neighbouring junctions.

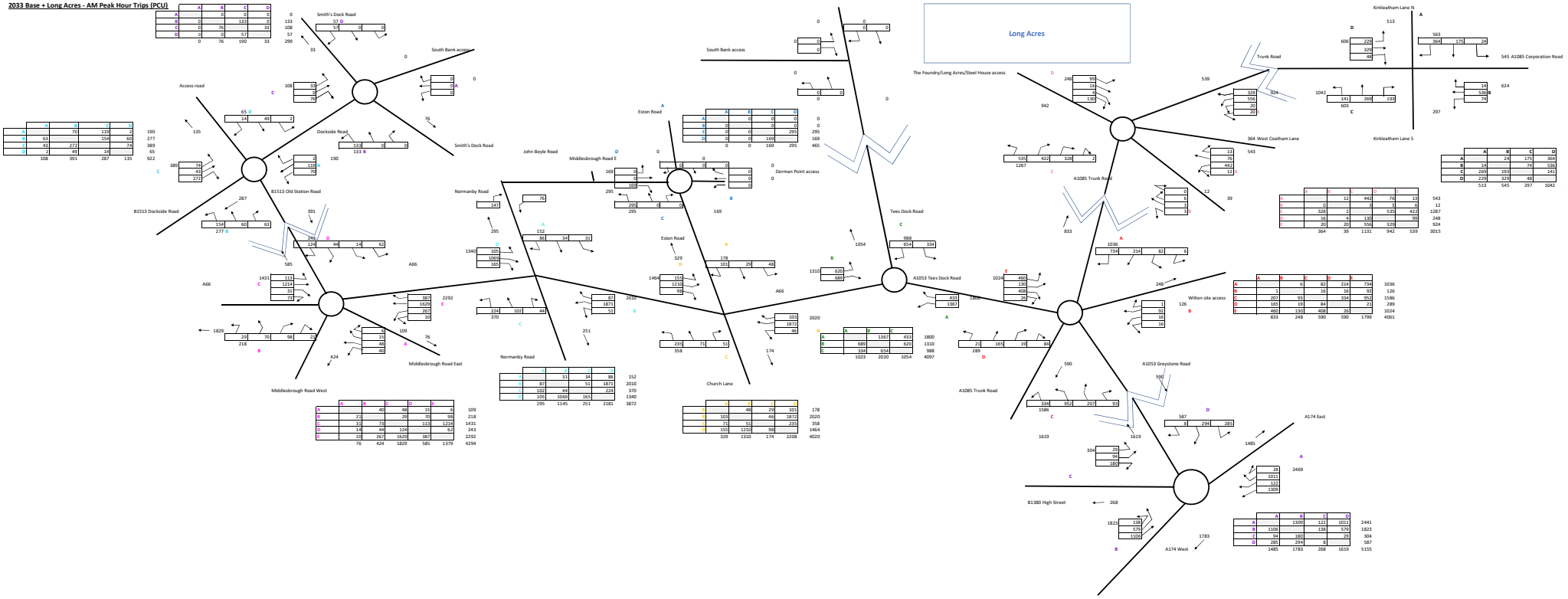
Estimated trip generation associated with existing educational facility (TRICS trip rates from similar Land Use 04 - EDUCATION/F - COMMUNITY EDUCATION sites).

2016 traffic survey data (from 2016 Kirkleatham Lane TA), growthed to 2033 using NRTM forecasts for A1085 Trunk Road north of the A1053

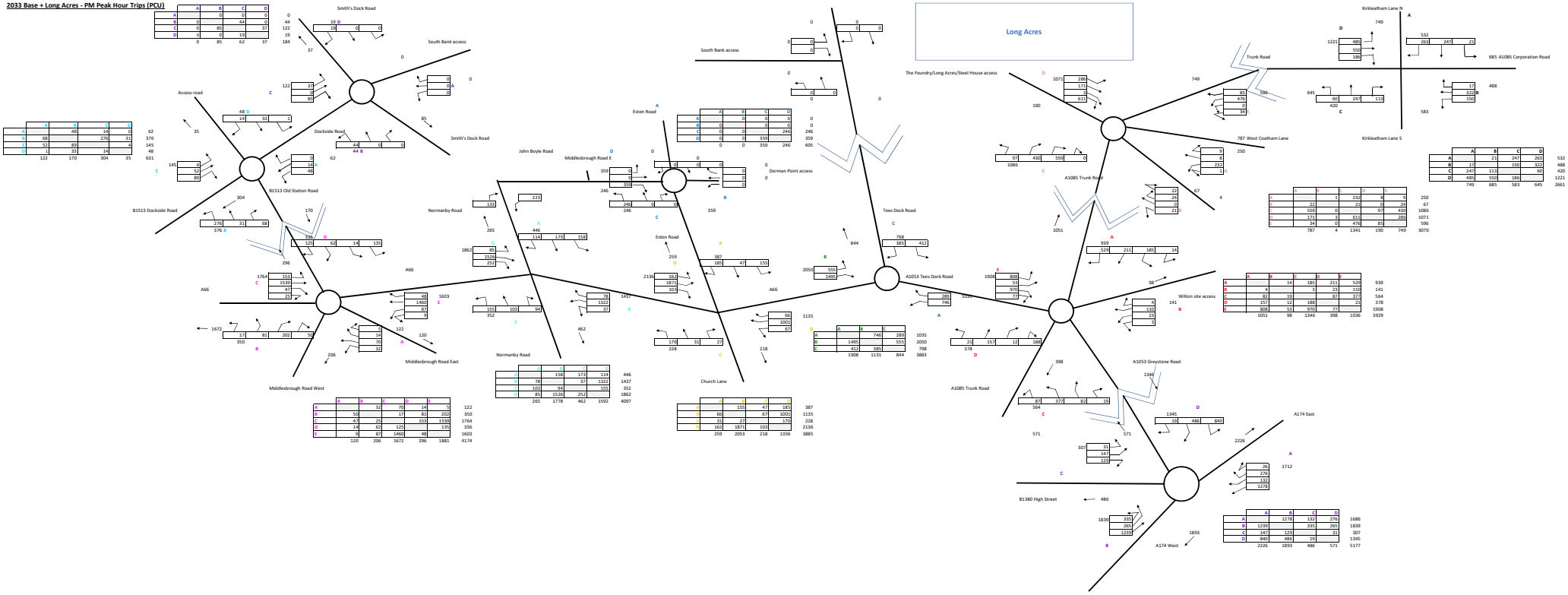
Long Acres



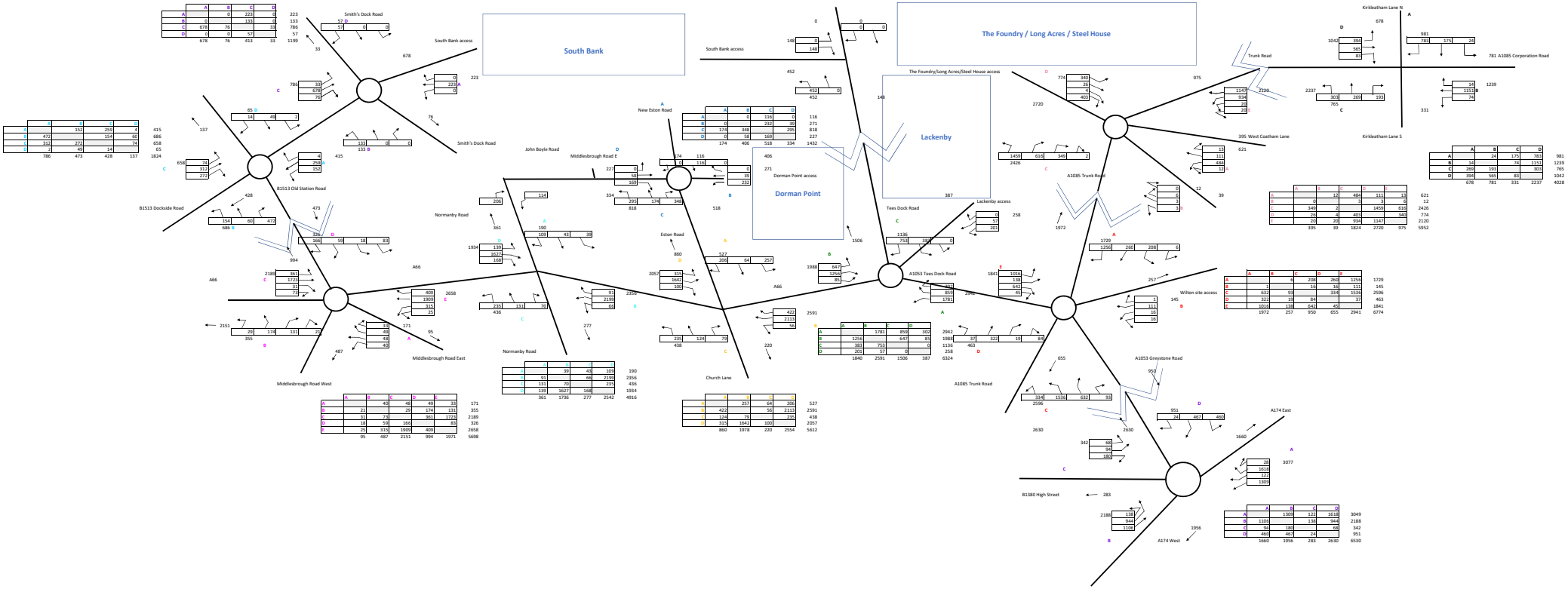
**2033 Base + Long Acres - AM Peak Hour Trips (PCU)**



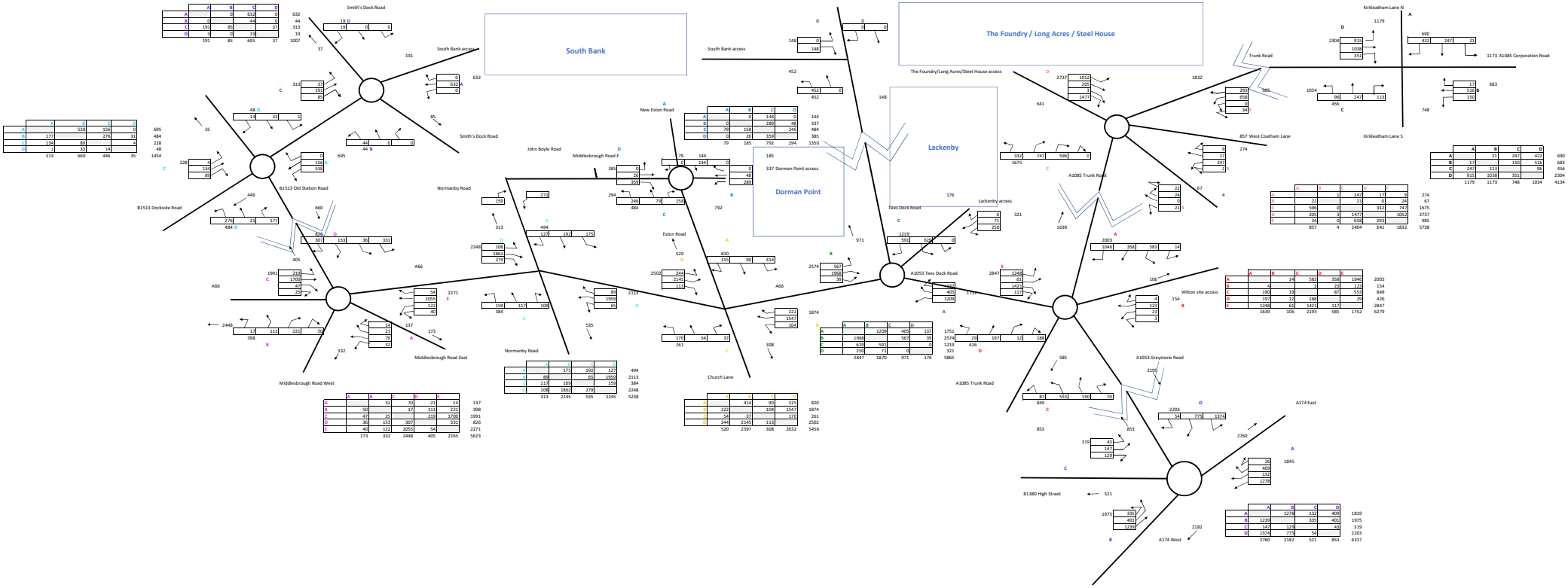
**2033 Base + Long Acres - PM Peak Hour Trips (PCU)**



# 2033 Cumulative Assessment - AM Peak Hour Trips (PCU)



**2033 Cumulative Assessment - PM Peak Hour Trips (PCU)**



# Appendix G

Junction Model Outputs

# Junctions 9

## ARCADY 9 - Roundabout Module

Version: 9.5.0.6896


For sales and distribution information, program advice and maintenance, contact TRL:
+44 (0)1344 379777 software@trl.co.uk www.trlsoftware.co.uk



**Filename:** Steel House roundabout.j9
**Report generation date:** 11/12/2020 10:01:55

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### Summary of junction performance

| | AM peak | | | | PM peak | | | |
|---|---|---|---|---|---|---|---|---|
| | Queue (PCU) | Delay (s) | RFC | LOS | Queue (PCU) | Delay (s) | RFC | LOS |
| **2033 Base** | | | | | | | | |
| Arm 1 | 0.7 | 4.02 | 0.39 | A | 0.2 | 3.17 | 0.19 | A |
| Arm 2 | 0.0 | 3.03 | 0.01 | A | 0.1 | 3.00 | 0.06 | A |
| Arm 3 | 1.1 | 3.57 | 0.50 | A | 1.0 | 3.45 | 0.51 | A |
| Arm 4 | 0.0 | 1.68 | 0.02 | A | 0.4 | 2.44 | 0.27 | A |
| Arm 5 | 0.6 | 3.03 | 0.36 | A | 0.6 | 3.77 | 0.36 | A |
| **2033 Base+Long Acres** | | | | | | | | |
| Arm 1 | 0.9 | 5.23 | 0.46 | A | 0.3 | 3.82 | 0.23 | A |
| Arm 2 | 0.0 | 3.62 | 0.01 | A | 0.1 | 3.55 | 0.07 | A |
| Arm 3 | 2.7 | 6.96 | 0.72 | A | 1.3 | 4.03 | 0.56 | A |
| Arm 4 | 0.1 | 1.97 | 0.12 | A | 1.4 | 4.28 | 0.56 | A |
| Arm 5 | 1.2 | 4.30 | 0.53 | A | 0.9 | 5.11 | 0.46 | A |
| **2033 Cumulative Assessment** | | | | | | | | |
| Arm 1 | 6.6 | 37.22 | 0.89 | E | 0.5 | 6.37 | 0.35 | A |
| Arm 2 | 0.0 | 7.76 | 0.03 | A | 0.1 | 5.45 | 0.10 | A |
| Arm 3 | 892.5 | 1926.43 | 1.65 | F | 10.9 | 22.54 | 0.92 | C |
| Arm 4 | 0.6 | 2.61 | 0.36 | A | 809.2 | 1342.80 | 1.62 | F |
| Arm 5 | 292.7 | 554.82 | 1.28 | F | 6.7 | 23.59 | 0.87 | C |

*Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle.*

### File summary

**File Description**

| | |
|---|---|
| **Title** | Steel House roundabout |
| **Location** | |
| **Site number** | |
| **Date** | 11/12/2020 |
| **Version** | |
| **Status** | |
| **Identifier** | |
| **Client** | |
| **Jobnumber** | |
| **Enumerator** | |
| **Description** | |

### Units

| Distance units | Speed units | Traffic units input | Traffic units results | Flow units | Average delay units | Total delay units | Rate of delay units |
|---|---|---|---|---|---|---|---|
| m | kph | PCU | PCU | perHour | s | -Min | perMin |

### Analysis Options

| Calculate Queue Percentiles | Calculate residual capacity | RFC Threshold | Average Delay threshold (s) | Queue threshold (PCU) |
|---|---|---|---|---|
| | | 0.85 | 36.00 | 20.00 |

### Demand Set Summary

| ID | Scenario name | Time Period name | Traffic profile type | Start time (HH:mm) | Finish time (HH:mm) | Time segment length (min) |
|---|---|---|---|---|---|---|
| **D1** | 2033 Base | AM peak | ONE HOUR | 07:45 | 09:15 | 15 |
| **D2** | 2033 Base | PM peak | ONE HOUR | 16:45 | 18:15 | 15 |
| **D5** | 2033 Base+Long Acres | AM peak | ONE HOUR | 07:45 | 09:15 | 15 |
| **D6** | 2033 Base+Long Acres | PM peak | ONE HOUR | 16:45 | 18:15 | 15 |
| **D9** | 2033 Cumulative Assessment | AM peak | ONE HOUR | 07:45 | 09:15 | 15 |
| **D10** | 2033 Cumulative Assessment | PM peak | ONE HOUR | 16:45 | 18:15 | 15 |

### Analysis Set Details

| ID | Network flow scaling factor (%) |
|---|---|
| **A1** | 100.000 |

# 2033 Base, AM peak

### Data Errors and Warnings

*No errors or warnings*

## Junction Network

### Junctions

| Junction | Name | Junction type | Use circulating lanes | Arm order | Junction Delay (s) | Junction LOS |
|---|---|---|---|---|---|---|
| **1** | untitled | Standard Roundabout | | 1, 2, 3, 4, 5 | 3.47 | A |

### Junction Network Options

| Driving side | Lighting |
|---|---|
| Left | Normal/unknown |

# Arms

## Arms

| Arm | Name | Description |
|---|---|---|
| 1 | West Coatham Lane | |
| 2 | Industrial access road | |
| 3 | A1085 Trunk Road | |
| 4 | Steel House access | |
| 5 | Trunk Road | |

## Roundabout Geometry

| Arm | V - Approach road half-width (m) | E - Entry width (m) | l' - Effective flare length (m) | R - Entry radius (m) | D - Inscribed circle diameter (m) | PHI - Conflict (entry) angle (deg) | Exit only |
|---|---|---|---|---|---|---|---|
| 1 | 4.40 | 7.00 | 15.0 | 18.0 | 100.0 | 32.0 | |
| 2 | 4.00 | 7.00 | 30.0 | 20.0 | 100.0 | 38.0 | |
| 3 | 6.20 | 7.50 | 30.0 | 25.0 | 100.0 | 35.0 | |
| 4 | 7.50 | 10.00 | 30.0 | 20.0 | 100.0 | 40.0 | |
| 5 | 5.80 | 7.80 | 14.3 | 21.0 | 100.0 | 28.0 | |

## Slope / Intercept / Capacity

### Roundabout Slope and Intercept used in model

| Arm | Final slope | Final intercept (PCU/hr) |
|---|---|---|
| 1 | 0.463 | 1817 |
| 2 | 0.464 | 1848 |
| 3 | 0.519 | 2208 |
| 4 | 0.592 | 2771 |
| 5 | 0.521 | 2196 |

*The slope and intercept shown above include any corrections and adjustments.*

# Traffic Demand

## Demand Set Details

| ID | Scenario name | Time Period name | Traffic profile type | Start time (HH:mm) | Finish time (HH:mm) | Time segment length (min) |
|---|---|---|---|---|---|---|
| D1 | 2033 Base | AM peak | ONE HOUR | 07:45 | 09:15 | 15 |

| Vehicle mix source | PCU Factor for a HV (PCU) |
|---|---|
| HV Percentages | 2.00 |

## Demand overview (Traffic)

| Arm | Linked arm | Use O-D data | Average Demand (PCU/hr) | Scaling Factor (%) |
|---|---|---|---|---|
| 1 | | ✓ | 531 | 100.000 |
| 2 | | ✓ | 12 | 100.000 |
| 3 | | ✓ | 975 | 100.000 |
| 4 | | ✓ | 47 | 100.000 |
| 5 | | ✓ | 649 | 100.000 |

# Origin-Destination Data

### Demand (PCU/hr)

| | | To | | | | |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| From | 1 | 0 | 12 | 442 | 64 | 13 |
| | 2 | 0 | 0 | 3 | 3 | 6 |
| | 3 | 328 | 2 | 0 | 223 | 422 |
| | 4 | 12 | 4 | 25 | 0 | 6 |
| | 5 | 20 | 20 | 556 | 53 | 0 |

# Vehicle Mix

### Heavy Vehicle Percentages

| | | To | | | | |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| From | 1 | 0 | 0 | 0 | 0 | 0 |
| | 2 | 0 | 0 | 5 | 5 | 5 |
| | 3 | 0 | 7 | 0 | 7 | 7 |
| | 4 | 0 | 5 | 5 | 0 | 5 |
| | 5 | 0 | 7 | 7 | 7 | 0 |

# Results

## Results Summary for whole modelled period

| Arm | Max RFC | Max Delay (s) | Max Queue (PCU) | Max LOS |
|---|---|---|---|---|
| 1 | 0.39 | 4.02 | 0.7 | A |
| 2 | 0.01 | 3.03 | 0.0 | A |
| 3 | 0.50 | 3.57 | 1.1 | A |
| 4 | 0.02 | 1.68 | 0.0 | A |
| 5 | 0.36 | 3.03 | 0.6 | A |

## Main Results for each time segment

### 07:45 - 08:00

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| 1 | 400 | 496 | 1588 | 0.252 | 398 | 0.3 | 3.025 | A |
| 2 | 9 | 865 | 1446 | 0.006 | 9 | 0.0 | 2.630 | A |
| 3 | 734 | 104 | 2154 | 0.341 | 732 | 0.5 | 2.644 | A |
| 4 | 35 | 579 | 2428 | 0.015 | 35 | 0.0 | 1.559 | A |
| 5 | 489 | 279 | 2051 | 0.238 | 487 | 0.3 | 2.455 | A |

### 08:00 - 08:15

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| 1 | 477 | 593 | 1542 | 0.309 | 477 | 0.4 | 3.376 | A |
| 2 | 11 | 1036 | 1367 | 0.008 | 11 | 0.0 | 2.786 | A |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **3** | 877 | 125 | 2143 | 0.409 | 876 | 0.7 | 2.968 | A |
| **4** | 42 | 693 | 2361 | 0.018 | 42 | 0.0 | 1.608 | A |
| **5** | 583 | 333 | 2023 | 0.288 | 583 | 0.4 | 2.670 | A |

**08:15 - 08:30**

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| **1** | 585 | 726 | 1481 | 0.395 | 584 | 0.6 | 4.010 | A |
| **2** | 13 | 1268 | 1259 | 0.010 | 13 | 0.0 | 3.033 | A |
| **3** | 1073 | 153 | 2128 | 0.504 | 1072 | 1.1 | 3.558 | A |
| **4** | 52 | 848 | 2269 | 0.023 | 52 | 0.0 | 1.682 | A |
| **5** | 715 | 408 | 1984 | 0.360 | 714 | 0.6 | 3.025 | A |

**08:30 - 08:45**

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| **1** | 585 | 727 | 1480 | 0.395 | 585 | 0.7 | 4.018 | A |
| **2** | 13 | 1269 | 1258 | 0.011 | 13 | 0.0 | 3.035 | A |
| **3** | 1073 | 153 | 2128 | 0.504 | 1073 | 1.1 | 3.567 | A |
| **4** | 52 | 849 | 2268 | 0.023 | 52 | 0.0 | 1.683 | A |
| **5** | 715 | 408 | 1983 | 0.360 | 715 | 0.6 | 3.028 | A |

**08:45 - 09:00**

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| **1** | 477 | 594 | 1542 | 0.310 | 478 | 0.5 | 3.388 | A |
| **2** | 11 | 1038 | 1366 | 0.008 | 11 | 0.0 | 2.791 | A |
| **3** | 877 | 125 | 2143 | 0.409 | 878 | 0.7 | 2.977 | A |
| **4** | 42 | 694 | 2360 | 0.018 | 42 | 0.0 | 1.609 | A |
| **5** | 583 | 334 | 2022 | 0.289 | 584 | 0.4 | 2.675 | A |

**09:00 - 09:15**

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| **1** | 400 | 497 | 1587 | 0.252 | 400 | 0.3 | 3.036 | A |
| **2** | 9 | 869 | 1444 | 0.006 | 9 | 0.0 | 2.635 | A |
| **3** | 734 | 105 | 2153 | 0.341 | 735 | 0.5 | 2.655 | A |
| **4** | 35 | 581 | 2427 | 0.015 | 35 | 0.0 | 1.559 | A |
| **5** | 489 | 280 | 2051 | 0.238 | 489 | 0.3 | 2.461 | A |

# 2033 Base, PM peak

### Data Errors and Warnings

*No errors or warnings*

## Junction Network

### Junctions

| Junction | Name | Junction type | Use circulating lanes | Arm order | Junction Delay (s) | Junction LOS |
|---|---|---|---|---|---|---|
| **1** | untitled | Standard Roundabout | | 1, 2, 3, 4, 5 | 3.26 | A |

### Junction Network Options

| Driving side | Lighting |
|---|---|
| Left | Normal/unknown |

# Traffic Demand

## Demand Set Details

| ID | Scenario name | Time Period name | Traffic profile type | Start time (HH:mm) | Finish time (HH:mm) | Time segment length (min) |
|---|---|---|---|---|---|---|
| D2 | 2033 Base | PM peak | ONE HOUR | 16:45 | 18:15 | 15 |

| Vehicle mix source | PCU Factor for a HV (PCU) |
|---|---|
| HV Percentages | 2.00 |

## Demand overview (Traffic)

| Arm | Linked arm | Use O-D data | Average Demand (PCU/hr) | Scaling Factor (%) |
|---|---|---|---|---|
| 1 | | ✓ | 246 | 100.000 |
| 2 | | ✓ | 67 | 100.000 |
| 3 | | ✓ | 997 | 100.000 |
| 4 | | ✓ | 515 | 100.000 |
| 5 | | ✓ | 516 | 100.000 |

# Origin-Destination Data

### Demand (PCU/hr)

| | | To | | | | |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| From | 1 | 0 | 1 | 232 | 4 | 9 |
| | 2 | 22 | 0 | 21 | 0 | 24 |
| | 3 | 559 | 0 | 0 | 8 | 430 |
| | 4 | 160 | 3 | 322 | 0 | 30 |
| | 5 | 34 | 0 | 476 | 6 | 0 |

# Vehicle Mix

### Heavy Vehicle Percentages

| | | To | | | | |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| From | 1 | 0 | 0 | 0 | 0 | 0 |
| | 2 | 0 | 0 | 5 | 5 | 5 |
| | 3 | 0 | 7 | 0 | 7 | 7 |
| | 4 | 0 | 5 | 5 | 0 | 5 |
| | 5 | 0 | 7 | 7 | 7 | 0 |

# Results

## Results Summary for whole modelled period

| Arm | Max RFC | Max Delay (s) | Max Queue (PCU) | Max LOS |
|---|---|---|---|---|
| 1 | 0.19 | 3.17 | 0.2 | A |
| 2 | 0.06 | 3.00 | 0.1 | A |
| 3 | 0.51 | 3.45 | 1.0 | A |
| 4 | 0.27 | 2.44 | 0.4 | A |
| 5 | 0.36 | 3.77 | 0.6 | A |

## Main Results for each time segment

### 16:45 - 17:00

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| 1 | 185 | 606 | 1536 | 0.121 | 185 | 0.1 | 2.661 | A |
| 2 | 50 | 788 | 1482 | 0.034 | 50 | 0.0 | 2.597 | A |
| 3 | 751 | 49 | 2182 | 0.344 | 748 | 0.5 | 2.582 | A |
| 4 | 388 | 784 | 2307 | 0.168 | 387 | 0.2 | 1.937 | A |
| 5 | 388 | 801 | 1779 | 0.218 | 387 | 0.3 | 2.752 | A |

### 17:00 - 17:15

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| 1 | 221 | 725 | 1481 | 0.149 | 221 | 0.2 | 2.856 | A |
| 2 | 60 | 942 | 1410 | 0.043 | 60 | 0.0 | 2.754 | A |
| 3 | 896 | 58 | 2177 | 0.412 | 896 | 0.7 | 2.890 | A |
| 4 | 463 | 938 | 2216 | 0.209 | 463 | 0.3 | 2.123 | A |
| 5 | 464 | 958 | 1697 | 0.273 | 463 | 0.4 | 3.108 | A |

### 17:15 - 17:30

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| 1 | 271 | 888 | 1406 | 0.193 | 271 | 0.2 | 3.171 | A |
| 2 | 74 | 1154 | 1312 | 0.056 | 74 | 0.1 | 3.002 | A |
| 3 | 1098 | 72 | 2171 | 0.506 | 1096 | 1.0 | 3.445 | A |
| 4 | 567 | 1148 | 2091 | 0.271 | 567 | 0.4 | 2.441 | A |
| 5 | 568 | 1173 | 1585 | 0.358 | 567 | 0.6 | 3.765 | A |

### 17:30 - 17:45

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| 1 | 271 | 889 | 1405 | 0.193 | 271 | 0.2 | 3.172 | A |
| 2 | 74 | 1155 | 1311 | 0.056 | 74 | 0.1 | 3.004 | A |
| 3 | 1098 | 72 | 2171 | 0.506 | 1098 | 1.0 | 3.454 | A |
| 4 | 567 | 1149 | 2090 | 0.271 | 567 | 0.4 | 2.443 | A |
| 5 | 568 | 1174 | 1585 | 0.359 | 568 | 0.6 | 3.770 | A |

### 17:45 - 18:00

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| 1 | 221 | 726 | 1481 | 0.149 | 221 | 0.2 | 2.859 | A |
| 2 | 60 | 944 | 1409 | 0.043 | 60 | 0.0 | 2.756 | A |
| 3 | 896 | 58 | 2177 | 0.412 | 898 | 0.7 | 2.898 | A |
| 4 | 463 | 940 | 2214 | 0.209 | 463 | 0.3 | 2.125 | A |
| 5 | 464 | 959 | 1696 | 0.273 | 465 | 0.4 | 3.114 | A |

### 18:00 - 18:15

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| 1 | 185 | 608 | 1535 | 0.121 | 185 | 0.1 | 2.666 | A |
| 2 | 50 | 790 | 1481 | 0.034 | 50 | 0.0 | 2.601 | A |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **3** | 751 | 49 | 2182 | 0.344 | 751 | 0.5 | 2.593 | A |
| **4** | 388 | 787 | 2305 | 0.168 | 388 | 0.2 | 1.943 | A |
| **5** | 388 | 803 | 1778 | 0.219 | 389 | 0.3 | 2.761 | A |

# 2033 Base+Long Acres, AM peak

### Data Errors and Warnings

*No errors or warnings*

## Junction Network

### Junctions

| Junction | Name | Junction type | Use circulating lanes | Arm order | Junction Delay (s) | Junction LOS |
|---|---|---|---|---|---|---|
| **1** | untitled | Standard Roundabout | | 1, 2, 3, 4, 5 | 5.41 | A |

### Junction Network Options

| Driving side | Lighting |
|---|---|
| Left | Normal/unknown |

## Traffic Demand

### Demand Set Details

| ID | Scenario name | Time Period name | Traffic profile type | Start time (HH:mm) | Finish time (HH:mm) | Time segment length (min) |
|---|---|---|---|---|---|---|
| **D5** | 2033 Base+Long Acres | AM peak | ONE HOUR | 07:45 | 09:15 | 15 |

| Vehicle mix source | PCU Factor for a HV (PCU) |
|---|---|
| HV Percentages | 2.00 |

### Demand overview (Traffic)

| Arm | Linked arm | Use O-D data | Average Demand (PCU/hr) | Scaling Factor (%) |
|---|---|---|---|---|
| **1** | | ✓ | 543 | 100.000 |
| **2** | | ✓ | 12 | 100.000 |
| **3** | | ✓ | 1287 | 100.000 |
| **4** | | ✓ | 249 | 100.000 |
| **5** | | ✓ | 925 | 100.000 |

## Origin-Destination Data

#### Demand (PCU/hr)

| | | To | | | | |
|---|---|---|---|---|---|---|
| | | **1** | **2** | **3** | **4** | **5** |
| **From** | **1** | 0 | 12 | 442 | 76 | 13 |
| | **2** | 0 | 0 | 3 | 3 | 6 |
| | **3** | 328 | 2 | 0 | 535 | 422 |
| | **4** | 16 | 4 | 130 | 0 | 99 |
| | **5** | 20 | 20 | 556 | 329 | 0 |

# Vehicle Mix

### Heavy Vehicle Percentages

| | | To | | | | |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| From | 1 | 0 | 0 | 0 | 0 | 0 |
| | 2 | 0 | 0 | 5 | 5 | 5 |
| | 3 | 0 | 7 | 0 | 8 | 8 |
| | 4 | 0 | 5 | 10 | 0 | 10 |
| | 5 | 0 | 7 | 8 | 8 | 0 |

# Results

## Results Summary for whole modelled period

| Arm | Max RFC | Max Delay (s) | Max Queue (PCU) | Max LOS |
|---|---|---|---|---|
| 1 | 0.46 | 5.23 | 0.9 | A |
| 2 | 0.01 | 3.62 | 0.0 | A |
| 3 | 0.72 | 6.96 | 2.7 | A |
| 4 | 0.12 | 1.97 | 0.1 | A |
| 5 | 0.53 | 4.30 | 1.2 | A |

## Main Results for each time segment

### 07:45 - 08:00

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| 1 | 409 | 781 | 1455 | 0.281 | 407 | 0.4 | 3.431 | A |
| 2 | 9 | 1160 | 1309 | 0.007 | 9 | 0.0 | 2.906 | A |
| 3 | 969 | 320 | 2041 | 0.475 | 965 | 0.9 | 3.529 | A |
| 4 | 187 | 578 | 2429 | 0.077 | 187 | 0.1 | 1.753 | A |
| 5 | 696 | 360 | 2009 | 0.347 | 694 | 0.6 | 2.947 | A |

### 08:00 - 08:15

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| 1 | 488 | 935 | 1384 | 0.353 | 488 | 0.5 | 4.014 | A |
| 2 | 11 | 1388 | 1203 | 0.009 | 11 | 0.0 | 3.169 | A |
| 3 | 1157 | 383 | 2009 | 0.576 | 1155 | 1.4 | 4.454 | A |
| 4 | 224 | 692 | 2361 | 0.095 | 224 | 0.1 | 1.838 | A |
| 5 | 832 | 431 | 1972 | 0.422 | 831 | 0.8 | 3.400 | A |

### 08:15 - 08:30

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| 1 | 598 | 1144 | 1287 | 0.465 | 597 | 0.9 | 5.206 | A |
| 2 | 13 | 1699 | 1059 | 0.012 | 13 | 0.0 | 3.614 | A |
| 3 | 1417 | 469 | 1964 | 0.721 | 1412 | 2.7 | 6.837 | A |
| 4 | 274 | 846 | 2270 | 0.121 | 274 | 0.1 | 1.969 | A |
| 5 | 1018 | 527 | 1922 | 0.530 | 1017 | 1.2 | 4.281 | A |

**08:30 - 08:45**

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| 1 | 598 | 1146 | 1286 | 0.465 | 598 | 0.9 | 5.230 | A |
| 2 | 13 | 1702 | 1057 | 0.013 | 13 | 0.0 | 3.619 | A |
| 3 | 1417 | 470 | 1964 | 0.722 | 1417 | 2.7 | 6.963 | A |
| 4 | 274 | 849 | 2268 | 0.121 | 274 | 0.1 | 1.971 | A |
| 5 | 1018 | 528 | 1921 | 0.530 | 1018 | 1.2 | 4.299 | A |

**08:45 - 09:00**

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| 1 | 488 | 938 | 1383 | 0.353 | 489 | 0.5 | 4.037 | A |
| 2 | 11 | 1393 | 1201 | 0.009 | 11 | 0.0 | 3.177 | A |
| 3 | 1157 | 385 | 2008 | 0.576 | 1162 | 1.5 | 4.529 | A |
| 4 | 224 | 696 | 2359 | 0.095 | 224 | 0.1 | 1.843 | A |
| 5 | 832 | 433 | 1971 | 0.422 | 833 | 0.8 | 3.415 | A |

**09:00 - 09:15**

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| 1 | 409 | 785 | 1454 | 0.281 | 409 | 0.4 | 3.449 | A |
| 2 | 9 | 1165 | 1307 | 0.007 | 9 | 0.0 | 2.914 | A |
| 3 | 969 | 322 | 2041 | 0.475 | 971 | 1.0 | 3.570 | A |
| 4 | 187 | 582 | 2427 | 0.077 | 188 | 0.1 | 1.757 | A |
| 5 | 696 | 362 | 2008 | 0.347 | 697 | 0.6 | 2.962 | A |

# 2033 Base+Long Acres, PM peak

### Data Errors and Warnings

*No errors or warnings*

## Junction Network

### Junctions

| Junction | Name | Junction type | Use circulating lanes | Arm order | Junction Delay (s) | Junction LOS |
|---|---|---|---|---|---|---|
| 1 | untitled | Standard Roundabout | | 1, 2, 3, 4, 5 | 4.30 | A |

### Junction Network Options

| Driving side | Lighting |
|---|---|
| Left | Normal/unknown |

## Traffic Demand

### Demand Set Details

| ID | Scenario name | Time Period name | Traffic profile type | Start time (HH:mm) | Finish time (HH:mm) | Time segment length (min) |
|---|---|---|---|---|---|---|
| D6 | 2033 Base+Long Acres | PM peak | ONE HOUR | 16:45 | 18:15 | 15 |

| Vehicle mix source | PCU Factor for a HV (PCU) |
|---|---|
| HV Percentages | 2.00 |

### Demand overview (Traffic)

| Arm | Linked arm | Use O-D data | Average Demand (PCU/hr) | Scaling Factor (%) |
|---|---|---|---|---|
| 1 | | ✓ | 250 | 100.000 |
| 2 | | ✓ | 67 | 100.000 |
| 3 | | ✓ | 1086 | 100.000 |
| 4 | | ✓ | 1071 | 100.000 |
| 5 | | ✓ | 595 | 100.000 |

## Origin-Destination Data

### Demand (PCU/hr)

| | | To | | | | |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| From | 1 | 0 | 1 | 232 | 8 | 9 |
| | 2 | 22 | 0 | 21 | 0 | 24 |
| | 3 | 559 | 0 | 0 | 97 | 430 |
| | 4 | 171 | 3 | 611 | 0 | 286 |
| | 5 | 34 | 0 | 476 | 85 | 0 |

## Vehicle Mix

### Heavy Vehicle Percentages

| | | To | | | | |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| From | 1 | 0 | 0 | 0 | 0 | 0 |
| | 2 | 0 | 0 | 5 | 5 | 5 |
| | 3 | 0 | 7 | 0 | 8 | 8 |
| | 4 | 0 | 5 | 10 | 0 | 10 |
| | 5 | 0 | 7 | 8 | 8 | 0 |

## Results

### Results Summary for whole modelled period

| Arm | Max RFC | Max Delay (s) | Max Queue (PCU) | Max LOS |
|---|---|---|---|---|
| 1 | 0.23 | 3.82 | 0.3 | A |
| 2 | 0.07 | 3.55 | 0.1 | A |
| 3 | 0.56 | 4.03 | 1.3 | A |
| 4 | 0.56 | 4.28 | 1.4 | A |
| 5 | 0.46 | 5.11 | 0.9 | A |

### Main Results for each time segment

#### 16:45 - 17:00

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1 | 188 | 882 | 1409 | 0.134 | 188 | 0.2 | 2.947 | A |
| 2 | 50 | 1066 | 1353 | 0.037 | 50 | 0.0 | 2.855 | A |
| 3 | 818 | 111 | 2150 | 0.380 | 815 | 0.6 | 2.793 | A |
| 4 | 806 | 784 | 2307 | 0.350 | 804 | 0.6 | 2.590 | A |
| 5 | 448 | 1025 | 1662 | 0.270 | 446 | 0.4 | 3.179 | A |

**17:00 - 17:15**

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| 1 | 225 | 1055 | 1328 | 0.169 | 225 | 0.2 | 3.261 | A |
| 2 | 60 | 1276 | 1255 | 0.048 | 60 | 0.1 | 3.111 | A |
| 3 | 976 | 133 | 2139 | 0.456 | 975 | 0.9 | 3.206 | A |
| 4 | 963 | 938 | 2216 | 0.435 | 962 | 0.8 | 3.104 | A |
| 5 | 535 | 1227 | 1557 | 0.344 | 534 | 0.6 | 3.782 | A |

**17:15 - 17:30**

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| 1 | 275 | 1291 | 1219 | 0.226 | 275 | 0.3 | 3.814 | A |
| 2 | 74 | 1562 | 1123 | 0.066 | 74 | 0.1 | 3.544 | A |
| 3 | 1196 | 163 | 2123 | 0.563 | 1194 | 1.3 | 4.009 | A |
| 4 | 1179 | 1148 | 2091 | 0.564 | 1177 | 1.4 | 4.252 | A |
| 5 | 655 | 1501 | 1414 | 0.463 | 654 | 0.9 | 5.081 | A |

**17:30 - 17:45**

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| 1 | 275 | 1294 | 1218 | 0.226 | 275 | 0.3 | 3.819 | A |
| 2 | 74 | 1565 | 1121 | 0.066 | 74 | 0.1 | 3.549 | A |
| 3 | 1196 | 163 | 2123 | 0.563 | 1196 | 1.3 | 4.026 | A |
| 4 | 1179 | 1149 | 2090 | 0.564 | 1179 | 1.4 | 4.276 | A |
| 5 | 655 | 1504 | 1413 | 0.464 | 655 | 0.9 | 5.108 | A |

**17:45 - 18:00**

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| 1 | 225 | 1059 | 1326 | 0.169 | 225 | 0.2 | 3.271 | A |
| 2 | 60 | 1280 | 1253 | 0.048 | 60 | 0.1 | 3.119 | A |
| 3 | 976 | 133 | 2138 | 0.457 | 978 | 0.9 | 3.222 | A |
| 4 | 963 | 940 | 2214 | 0.435 | 965 | 0.8 | 3.127 | A |
| 5 | 535 | 1231 | 1555 | 0.344 | 536 | 0.6 | 3.803 | A |

**18:00 - 18:15**

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| 1 | 188 | 886 | 1407 | 0.134 | 188 | 0.2 | 2.957 | A |
| 2 | 50 | 1071 | 1350 | 0.037 | 50 | 0.0 | 2.860 | A |
| 3 | 818 | 112 | 2150 | 0.380 | 819 | 0.6 | 2.808 | A |
| 4 | 806 | 787 | 2305 | 0.350 | 807 | 0.6 | 2.605 | A |
| 5 | 448 | 1030 | 1660 | 0.270 | 449 | 0.4 | 3.196 | A |

# 2033 Cumulative Assessment, AM peak

## Data Errors and Warnings

*No errors or warnings*

# Junction Network

## Junctions

| Junction | Name | Junction type | Use circulating lanes | Arm order | Junction Delay (s) | Junction LOS |
|---|---|---|---|---|---|---|
| 1 | untitled | Standard Roundabout | | 1, 2, 3, 4, 5 | 987.14 | F |

## Junction Network Options

| Driving side | Lighting |
|---|---|
| Left | Normal/unknown |

# Traffic Demand

## Demand Set Details

| ID | Scenario name | Time Period name | Traffic profile type | Start time (HH:mm) | Finish time (HH:mm) | Time segment length (min) |
|---|---|---|---|---|---|---|
| D9 | 2033 Cumulative Assessment | AM peak | ONE HOUR | 07:45 | 09:15 | 15 |

| Vehicle mix source | PCU Factor for a HV (PCU) |
|---|---|
| HV Percentages | 2.00 |

## Demand overview (Traffic)

| Arm | Linked arm | Use O-D data | Average Demand (PCU/hr) | Scaling Factor (%) |
|---|---|---|---|---|
| 1 | | ✓ | 620 | 100.000 |
| 2 | | ✓ | 12 | 100.000 |
| 3 | | ✓ | 2426 | 100.000 |
| 4 | | ✓ | 773 | 100.000 |
| 5 | | ✓ | 2121 | 100.000 |

# Origin-Destination Data

### Demand (PCU/hr)

| | | To | | | | |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| From | 1 | 0 | 12 | 484 | 111 | 13 |
| | 2 | 0 | 0 | 3 | 3 | 6 |
| | 3 | 349 | 2 | 0 | 1459 | 616 |
| | 4 | 26 | 4 | 403 | 0 | 340 |
| | 5 | 20 | 20 | 934 | 1147 | 0 |

# Vehicle Mix

### Heavy Vehicle Percentages

| | | To | | | | |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| From | 1 | 0 | 0 | 0 | 0 | 0 |
| | 2 | 0 | 0 | 5 | 5 | 5 |
| | 3 | 0 | 7 | 0 | 9 | 9 |
| | 4 | 0 | 5 | 11 | 0 | 11 |
| | 5 | 0 | 7 | 10 | 10 | 0 |

# Results

## Results Summary for whole modelled period

| Arm | Max RFC | Max Delay (s) | Max Queue (PCU) | Max LOS |
|---|---|---|---|---|
| 1 | 0.89 | 37.22 | 6.6 | E |
| 2 | 0.03 | 7.76 | 0.0 | A |
| 3 | 1.65 | 1926.43 | 892.5 | F |
| 4 | 0.36 | 2.61 | 0.6 | A |
| 5 | 1.28 | 554.82 | 292.7 | F |

## Main Results for each time segment

### 07:45 - 08:00

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| 1 | 467 | 1868 | 952 | 0.490 | 463 | 0.9 | 7.313 | A |
| 2 | 9 | 2302 | 778 | 0.012 | 9 | 0.0 | 4.912 | A |
| 3 | 1826 | 951 | 1714 | 1.066 | 1668 | 39.5 | 51.712 | F |
| 4 | 582 | 679 | 2369 | 0.246 | 581 | 0.4 | 2.223 | A |
| 5 | 1597 | 567 | 1901 | 0.840 | 1576 | 5.3 | 11.497 | B |

### 08:00 - 08:15

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| 1 | 557 | 2165 | 814 | 0.685 | 553 | 2.1 | 13.562 | B |
| 2 | 11 | 2685 | 601 | 0.018 | 11 | 0.0 | 6.406 | A |
| 3 | 2181 | 1100 | 1637 | 1.333 | 1636 | 175.8 | 243.883 | F |
| 4 | 695 | 669 | 2375 | 0.293 | 695 | 0.5 | 2.368 | A |
| 5 | 1907 | 626 | 1870 | 1.020 | 1815 | 28.2 | 43.225 | E |

### 08:15 - 08:30

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| 1 | 683 | 2256 | 772 | 0.885 | 667 | 5.9 | 30.714 | D |
| 2 | 13 | 2887 | 507 | 0.026 | 13 | 0.0 | 7.655 | A |
| 3 | 2671 | 1130 | 1621 | 1.647 | 1621 | 438.3 | 686.033 | F |
| 4 | 851 | 667 | 2376 | 0.358 | 850 | 0.6 | 2.607 | A |
| 5 | 2335 | 711 | 1826 | 1.279 | 1824 | 156.1 | 188.574 | F |

### 08:30 - 08:45

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| 1 | 683 | 2258 | 771 | 0.886 | 680 | 6.6 | 37.225 | E |
| 2 | 13 | 2902 | 500 | 0.026 | 13 | 0.0 | 7.760 | A |
| 3 | 2671 | 1133 | 1620 | 1.649 | 1620 | 701.1 | 1269.582 | F |
| 4 | 851 | 666 | 2376 | 0.358 | 851 | 0.6 | 2.608 | A |
| 5 | 2335 | 711 | 1826 | 1.279 | 1826 | 283.5 | 434.383 | F |

### 08:45 - 09:00

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| 1 | 557 | 2220 | 788 | 0.707 | 574 | 2.5 | 17.870 | C |
| 2 | 11 | 2760 | 566 | 0.019 | 11 | 0.0 | 6.808 | A |
| 3 | 2181 | 1134 | 1619 | 1.347 | 1619 | 841.6 | 1716.337 | F |
| 4 | 695 | 663 | 2379 | 0.292 | 696 | 0.5 | 2.365 | A |
| 5 | 1907 | 624 | 1871 | 1.019 | 1870 | 292.7 | 554.818 | F |

**09:00 - 09:15**

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| 1 | 467 | 2187 | 804 | 0.581 | 471 | 1.4 | 10.969 | B |
| 2 | 9 | 2627 | 628 | 0.014 | 9 | 0.0 | 6.110 | A |
| 3 | 1826 | 1127 | 1623 | 1.125 | 1623 | 892.5 | 1926.431 | F |
| 4 | 582 | 661 | 2379 | 0.245 | 582 | 0.4 | 2.216 | A |
| 5 | 1597 | 561 | 1904 | 0.839 | 1897 | 217.7 | 484.787 | F |

# 2033 Cumulative Assessment, PM peak

### Data Errors and Warnings

*No errors or warnings*

## Junction Network

### Junctions

| Junction | Name | Junction type | Use circulating lanes | Arm order | Junction Delay (s) | Junction LOS |
|---|---|---|---|---|---|---|
| 1 | untitled | Standard Roundabout | | 1, 2, 3, 4, 5 | 651.51 | F |

### Junction Network Options

| Driving side | Lighting |
|---|---|
| Left | Normal/unknown |

## Traffic Demand

### Demand Set Details

| ID | Scenario name | Time Period name | Traffic profile type | Start time (HH:mm) | Finish time (HH:mm) | Time segment length (min) |
|---|---|---|---|---|---|---|
| D10 | 2033 Cumulative Assessment | PM peak | ONE HOUR | 16:45 | 18:15 | 15 |

| Vehicle mix source | PCU Factor for a HV (PCU) |
|---|---|
| HV Percentages | 2.00 |

### Demand overview (Traffic)

| Arm | Linked arm | Use O-D data | Average Demand (PCU/hr) | Scaling Factor (%) |
|---|---|---|---|---|
| 1 | | ✓ | 274 | 100.000 |
| 2 | | ✓ | 67 | 100.000 |
| 3 | | ✓ | 1675 | 100.000 |
| 4 | | ✓ | 2737 | 100.000 |
| 5 | | ✓ | 985 | 100.000 |

# Origin-Destination Data

### Demand (PCU/hr)

| | | To | | | | |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| From | 1 | 0 | 1 | 247 | 17 | 9 |
| | 2 | 22 | 0 | 21 | 0 | 24 |
| | 3 | 596 | 0 | 0 | 332 | 747 |
| | 4 | 205 | 3 | 1477 | 0 | 1052 |
| | 5 | 34 | 0 | 658 | 293 | 0 |

# Vehicle Mix

### Heavy Vehicle Percentages

| | | To | | | | |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| From | 1 | 0 | 0 | 0 | 0 | 0 |
| | 2 | 0 | 0 | 5 | 5 | 5 |
| | 3 | 0 | 7 | 0 | 9 | 9 |
| | 4 | 0 | 5 | 11 | 0 | 11 |
| | 5 | 0 | 7 | 10 | 10 | 0 |

# Results

## Results Summary for whole modelled period

| Arm | Max RFC | Max Delay (s) | Max Queue (PCU) | Max LOS |
|---|---|---|---|---|
| 1 | 0.35 | 6.37 | 0.5 | A |
| 2 | 0.10 | 5.45 | 0.1 | A |
| 3 | 0.92 | 22.54 | 10.9 | C |
| 4 | 1.62 | 1342.80 | 809.2 | F |
| 5 | 0.87 | 23.59 | 6.7 | C |

## Main Results for each time segment

### 16:45 - 17:00

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| 1 | 206 | 1793 | 986 | 0.209 | 205 | 0.3 | 4.604 | A |
| 2 | 50 | 1995 | 921 | 0.055 | 50 | 0.1 | 4.268 | A |
| 3 | 1261 | 273 | 2066 | 0.610 | 1254 | 1.6 | 4.648 | A |
| 4 | 2061 | 1047 | 2151 | 0.958 | 2002 | 14.7 | 21.496 | C |
| 5 | 742 | 1695 | 1313 | 0.565 | 736 | 1.4 | 6.775 | A |

### 17:00 - 17:15

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **1** | 246 | 1945 | 916 | 0.269 | 246 | 0.4 | 5.370 | A |
| **2** | 60 | 2188 | 832 | 0.072 | 60 | 0.1 | 4.820 | A |
| **3** | 1506 | 327 | 2038 | 0.739 | 1501 | 2.9 | 7.007 | A |
| **4** | 2461 | 1253 | 2029 | 1.213 | 2024 | 123.9 | 132.430 | F |
| **5** | 885 | 1800 | 1258 | 0.704 | 881 | 2.5 | 10.334 | B |

**17:15 - 17:30**

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| **1** | 302 | 2045 | 869 | 0.347 | 301 | 0.5 | 6.327 | A |
| **2** | 74 | 2343 | 760 | 0.097 | 74 | 0.1 | 5.421 | A |
| **3** | 1844 | 397 | 2001 | 0.921 | 1817 | 9.8 | 18.349 | C |
| **4** | 3013 | 1517 | 1873 | 1.609 | 1873 | 409.1 | 517.468 | F |
| **5** | 1085 | 1823 | 1246 | 0.870 | 1069 | 6.3 | 20.740 | C |

**17:30 - 17:45**

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| **1** | 302 | 2052 | 866 | 0.348 | 302 | 0.5 | 6.375 | A |
| **2** | 74 | 2350 | 756 | 0.098 | 74 | 0.1 | 5.448 | A |
| **3** | 1844 | 401 | 1999 | 0.922 | 1840 | 10.9 | 22.538 | C |
| **4** | 3013 | 1536 | 1862 | 1.619 | 1862 | 697.1 | 1022.926 | F |
| **5** | 1085 | 1825 | 1245 | 0.871 | 1083 | 6.7 | 23.590 | C |

**17:45 - 18:00**

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| **1** | 246 | 1958 | 910 | 0.271 | 247 | 0.4 | 5.439 | A |
| **2** | 60 | 2202 | 825 | 0.073 | 60 | 0.1 | 4.863 | A |
| **3** | 1506 | 333 | 2035 | 0.740 | 1537 | 3.1 | 8.085 | A |
| **4** | 2461 | 1282 | 2012 | 1.223 | 2012 | 809.2 | 1322.248 | F |
| **5** | 885 | 1805 | 1256 | 0.705 | 902 | 2.7 | 11.613 | B |

**18:00 - 18:15**

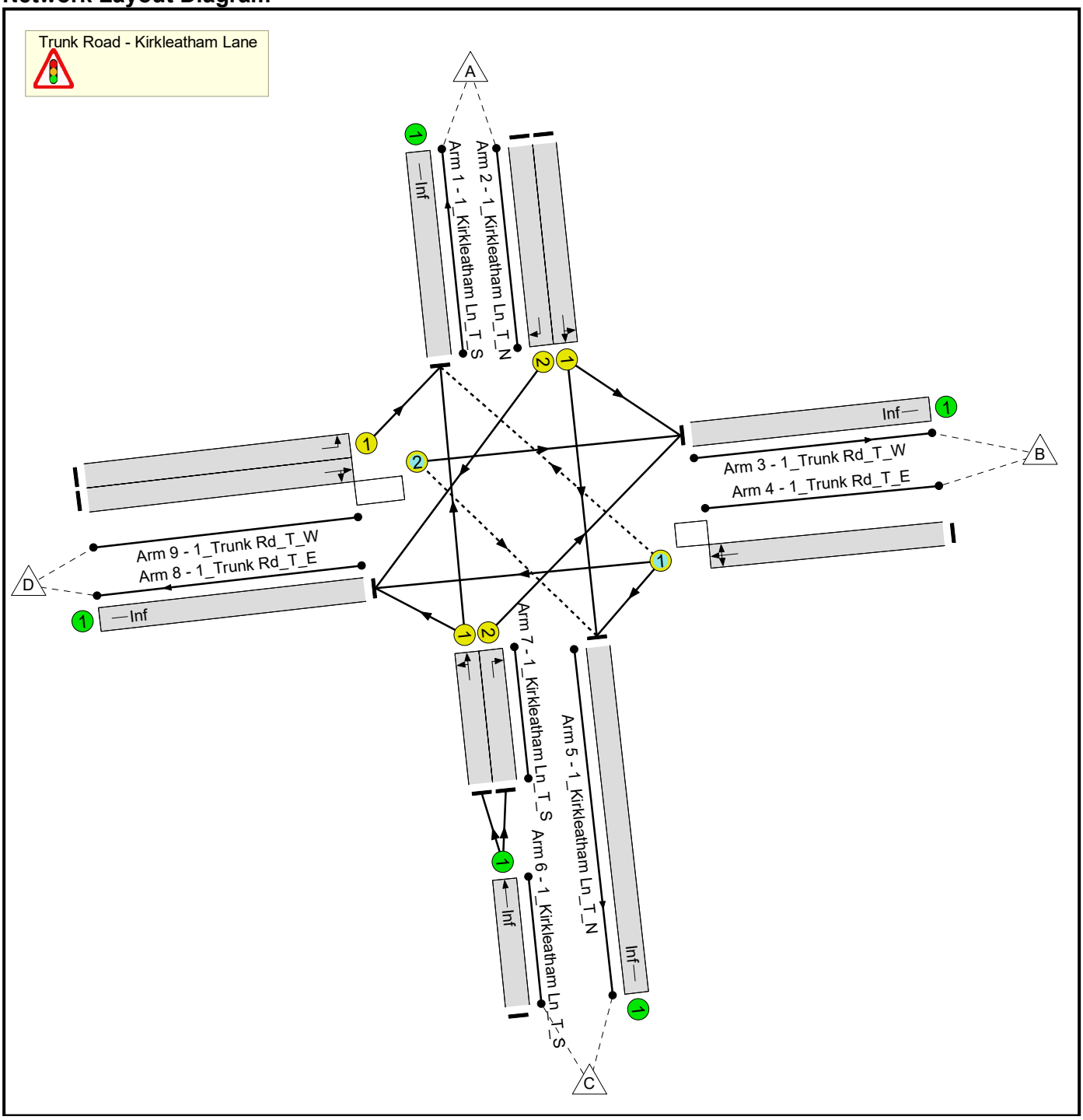
| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| **1** | 206 | 1879 | 947 | 0.218 | 207 | 0.3 | 4.869 | A |
| **2** | 50 | 2082 | 881 | 0.057 | 51 | 0.1 | 4.481 | A |
| **3** | 1261 | 276 | 2064 | 0.611 | 1267 | 1.7 | 4.799 | A |
| **4** | 2061 | 1057 | 2145 | 0.961 | 2142 | 788.8 | 1342.801 | F |
| **5** | 742 | 1786 | 1266 | 0.586 | 746 | 1.6 | 7.660 | A |

# Basic Results Summary

## User and Project Details

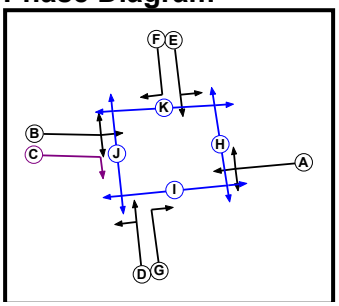
| | |
|---|---|
| **Project:** | **Teesworks** |
| **Title:** | **Trunk Road / Kirkleatham Lane** |

## Network Layout Diagram

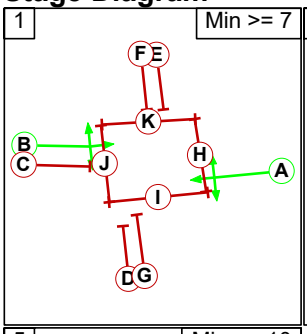


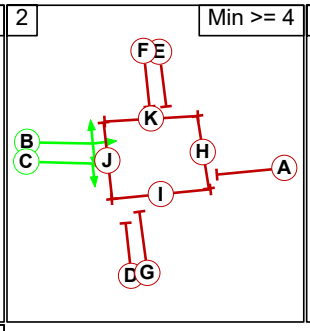
Basic Results Summary

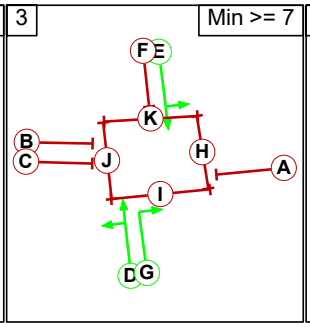
## Phase Diagram

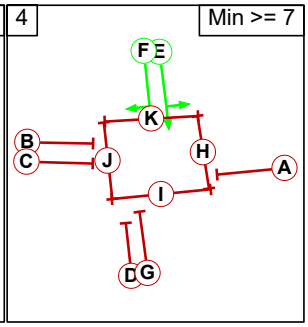


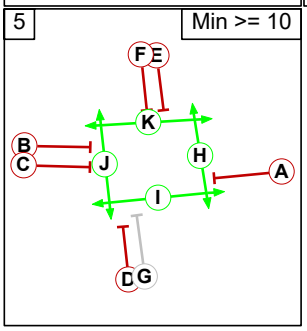

## Stage Diagram



Basic Results Summary

## Phase Intergreens Matrix

| Terminating Phase | Starting Phase | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | A | B | C | D | E | F | G | H | I | J | K |
| | A | - | - | 6 | 6 | 6 | 6 | 6 | 9 | 9 | 9 | 9 |
| | B | - | - | - | 6 | 6 | 6 | 6 | - | 9 | 9 | 9 |
| | C | 6 | - | - | 6 | 6 | 6 | 6 | 9 | 9 | 9 | 9 |
| | D | 7 | 7 | 0 | - | - | 7 | - | 9 | 9 | 9 | 9 |
| | E | 7 | 7 | 7 | - | - | - | - | 9 | 9 | 9 | 9 |
| | F | 7 | 7 | 7 | 7 | - | - | 7 | - | - | 11 | 9 |
| | G | 7 | 7 | 7 | - | - | 7 | - | - | - | - | - |
| | H | 10 | - | 10 | 10 | 10 | - | - | - | - | - | - |
| | I | 12 | 12 | 12 | 12 | 12 | - | - | - | - | - | - |
| | J | 14 | 14 | 14 | 14 | 14 | 14 | - | - | - | - | - |
| | K | 11 | 11 | 11 | 11 | 11 | 11 | - | - | - | - | - |

**Scenario 1: '2033 AM Do Min'** (FG1: '2033 AM Do Min', Plan 1: 'Network Control Plan 1')

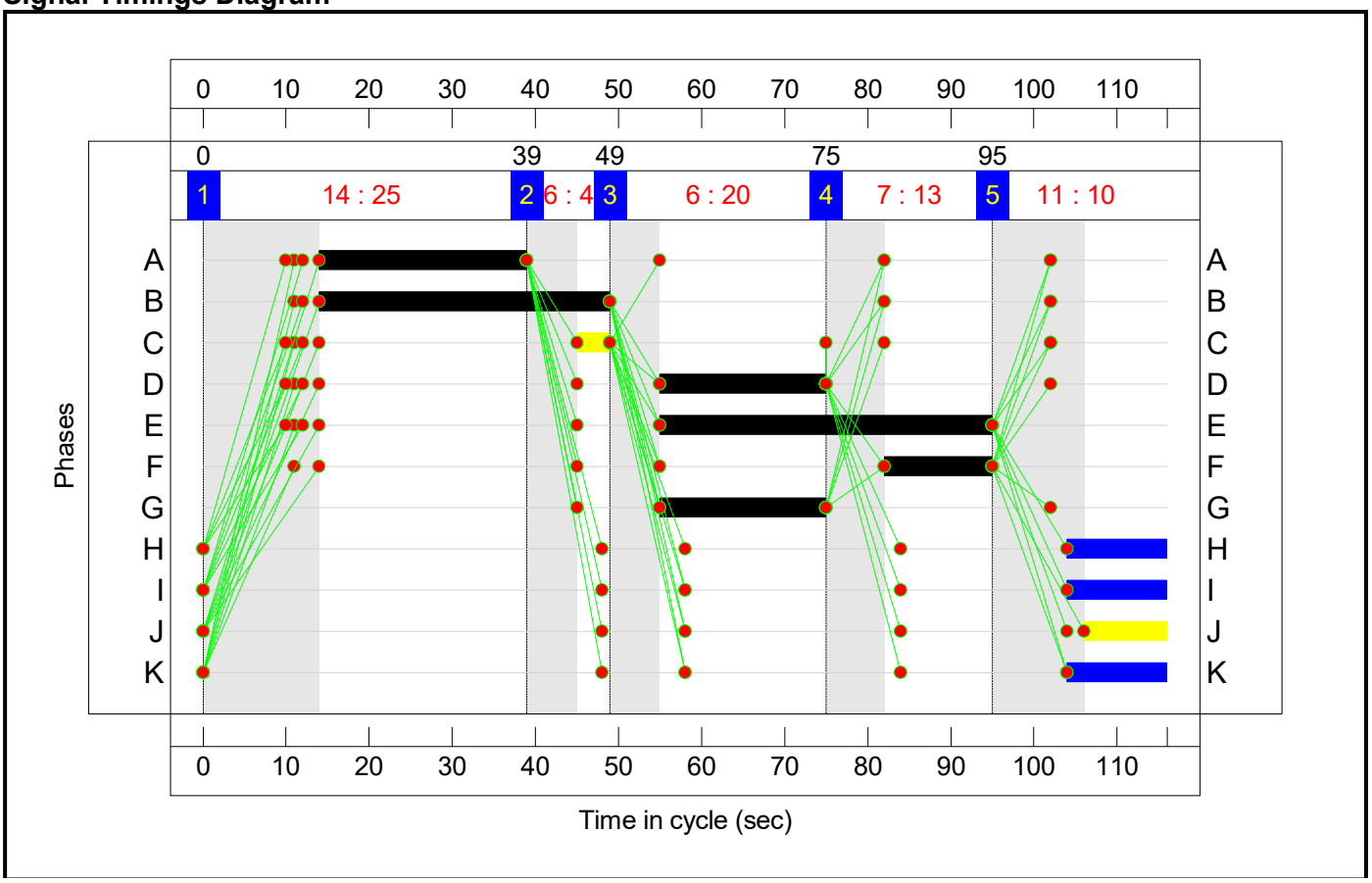
## Traffic Flows, Actual

**Actual Flow :**

| | Destination | | | | | |
|---|---|---|---|---|---|---|
| Origin | | A | B | C | D | Tot. |
| | A | 0 | 24 | 175 | 268 | 467 |
| | B | 14 | 0 | 74 | 394 | 482 |
| | C | 269 | 193 | 0 | 104 | 566 |
| | D | 194 | 278 | 41 | 0 | 513 |
| | Tot. | 477 | 495 | 290 | 766 | 2028 |

Basic Results Summary

## Signal Timings Diagram

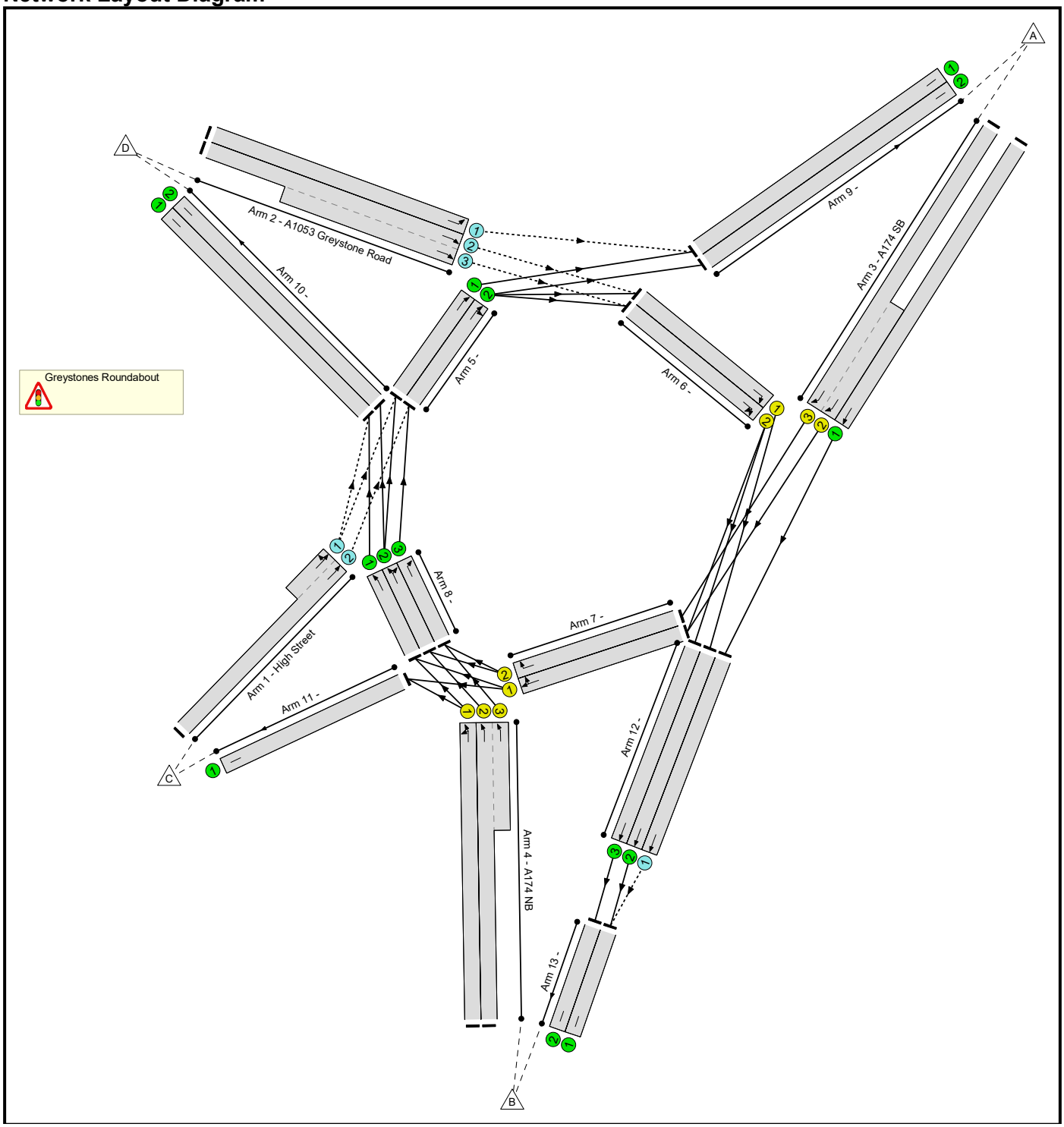


# Basic Results Summary

## User and Project Details

| | |
|---|---|
| **Project:** | **Greystones Roundabout** |
| **Title:** | **As Existing** |

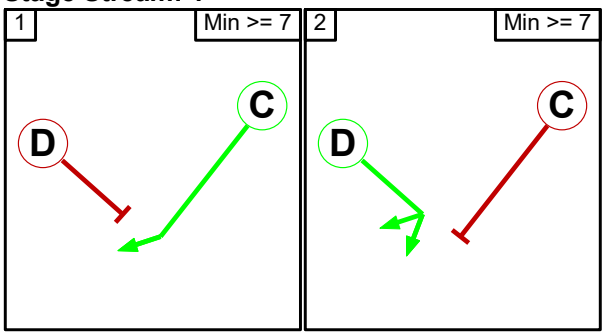
## Network Layout Diagram



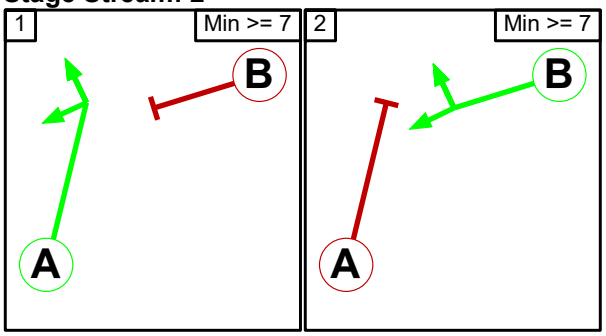
Basic Results Summary

## Stage Diagram

### Stage Stream: 1



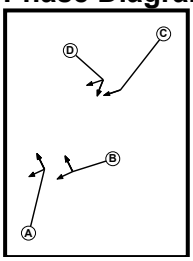

### Stage Stream: 2




## Phase Intergreens Matrix

| Terminating Phase \ Starting Phase | A | B | C | D |
|---|---|---|---|---|
| A | - | 5 | - | - |
| B | 5 | - | - | - |
| C | - | - | - | 5 |
| D | - | - | 5 | - |

## Phase Diagram



Full Input Data And Results

## Traffic Flow Groups

| Flow Group | Start Time | End Time | Duration | Formula |
|---|---|---|---|---|
| 7: '2033 AM Base' | 08:00 | 09:00 | 01:00 | |

**Scenario 7: '2033 AM Base'** (FG7: '2033 AM Base', Plan 1: 'Network Control Plan 1')

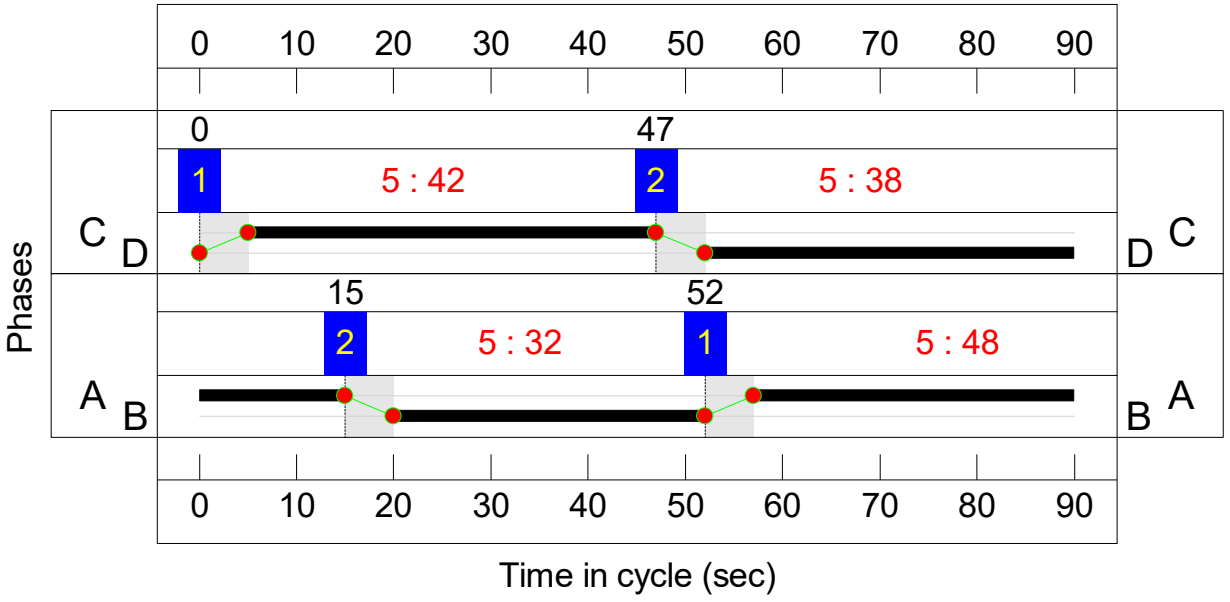
## Traffic Flows, Desired

**Desired Flow :**

| | Destination | | | | | |
|---|---|---|---|---|---|---|
| Origin | | A | B | C | D | Tot. |
| | A | 0 | 1309 | 122 | 923 | 2354 |
| | B | 1106 | 0 | 138 | 529 | 1773 |
| | C | 94 | 180 | 0 | 23 | 297 |
| | D | 262 | 270 | 6 | 0 | 538 |
| | Tot. | 1462 | 1759 | 266 | 1475 | 4962 |

Full Input Data And Results

**Signal Timings Diagram**



Basic Results Summary

## Network Results

| Item | Lane Description | Lane Type | Full Phase | Arrow Phase | Total Green (s) | Arrow Green (s) | Demand Flow (pcu) | Sat Flow (pcu/Hr) | Deg Sat (%) | Mean Max Queue (pcu) | Capacity (pcu) | Turners In Gaps (pcu) | Turners When Unopposed (pcu) | Turners In Intergreen (pcu) | Total Delay (pcuHr) | Av. Delay Per PCU (s/pcu) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Network: As Existing** | **-** | **-** | **-** | | **-** | **-** | **-** | **-** | **94.5%** | **-** | **-** | **2717** | **0** | **0** | **40.2** | **-** |
| 1/2+1/1 | High Street Ahead Left | O | - | | - | - | 297 | 2015:1956 | 74.8 : 74.8% | 4.8 | 366+31 | 594 | 0 | 0 | 2.2 | 27.2 |
| 2/1 | A1053 Greystone Road Left | O | - | | - | - | 262 | 1975 | 53.6% | 5.3 | 489 | 262 | 0 | 0 | 1.9 | 26.3 |
| 2/2+2/3 | A1053 Greystone Road Ahead | O | - | | - | - | 276 | 1961:1902 | 46.4 : 46.4% | 4.4 | 106+489 | 552 | 0 | 0 | 1.7 | 22.4 |
| 3/1 | A174 SB Ahead | U | - | | - | - | 1309 | 1980 | 66.1% | 1.0 | 1980 | - | - | - | 1.0 | 2.7 |
| 3/3+3/2 | A174 SB Ahead | U | C | | 46 | - | 1045 | 1985:1985 | 70.8 : 70.8% | 10.1 | 711+766 | - | - | - | 5.3 | 18.1 |
| 4/1 | A174 NB Ahead Left | U | A | | 48 | - | 667 | 1876 | 65.3% | 12.6 | 1021 | - | - | - | 3.6 | 19.5 |
| 4/2+4/3 | A174 NB Ahead | U | A | | 48 | - | 1106 | 1903:1923 | 81.0 : 81.0% | 12.7 | 750+615 | - | - | - | 6.2 | 20.1 |
| 5/1 | Ahead | U | - | | - | - | 608 | 1800 | 33.8% | 0.3 | 1800 | - | - | - | 0.3 | 1.5 |
| 5/2 | Right Ahead | U | - | | - | - | 772 | 1800 | 42.9% | 0.4 | 1800 | - | - | - | 0.4 | 1.7 |
| 6/1 | Right | U | D | | 34 | - | 49 | 1800 | 7.0% | 1.0 | 700 | - | - | - | 0.2 | 16.4 |
| 6/2 | Right Right2 | U | D | | 34 | - | 407 | 1800 | 58.1% | 9.8 | 700 | - | - | - | 2.6 | 22.8 |
| 7/1 | Right Ahead | U | B | | 32 | - | 548 | 2015 | 74.2% | 13.4 | 739 | - | - | - | 3.2 | 20.8 |
| 7/2 | Right | U | B | | 32 | - | 503 | 2015 | 68.1% | 11.7 | 739 | - | - | - | 2.5 | 18.2 |
| 8/1 | Ahead | U | - | | - | - | 949 | 1800 | 52.7% | 0.6 | 1800 | - | - | - | 0.6 | 2.1 |
| 8/2 | Right Ahead | U | - | | - | - | 1111 | 1800 | 61.7% | 10.0 | 1800 | - | - | - | 0.9 | 2.9 |
| 8/3 | Right | U | - | | - | - | 498 | 1800 | 27.7% | 5.9 | 1800 | - | - | - | 0.2 | 1.5 |
| 12/1 | Ahead | O | - | | - | - | 1309 | 1940 | 94.5% | 20.3 | 1386 | 1309 | 0 | 0 | 7.4 | 20.3 |
| 12/2 | Ahead | U | - | | - | - | 49 | 1940 | 2.5% | 0.0 | 1940 | - | - | - | 0.0 | 1.0 |
| 12/3 | Ahead | U | - | | - | - | 401 | 1940 | 20.7% | 0.1 | 1940 | - | - | - | 0.1 | 1.2 |

## Basic Results Summary

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| C1 | Stream: 1 | PRC for Signalled Lanes (%): | 27.2 | Total Delay for Signalled Lanes (pcuHr): | 8.06 | Cycle Time (s): | 90 |
| C1 | Stream: 2 | PRC for Signalled Lanes (%): | 11.1 | Total Delay for Signalled Lanes (pcuHr): | 15.50 | Cycle Time (s): | 90 |
| | | PRC Over All Lanes (%): | -5.0 | Total Delay Over All Lanes(pcuHr): | 40.24 | | |

Full Input Data And Results

## Traffic Flow Groups

| Flow Group | Start Time | End Time | Duration | Formula |
|---|---|---|---|---|
| 8: '2033 PM Base' | 17:00 | 18:00 | 01:00 | |

**Scenario 8: '2033 PM Base'** (FG8: '2033 PM Base', Plan 1: 'Network Control Plan 1')

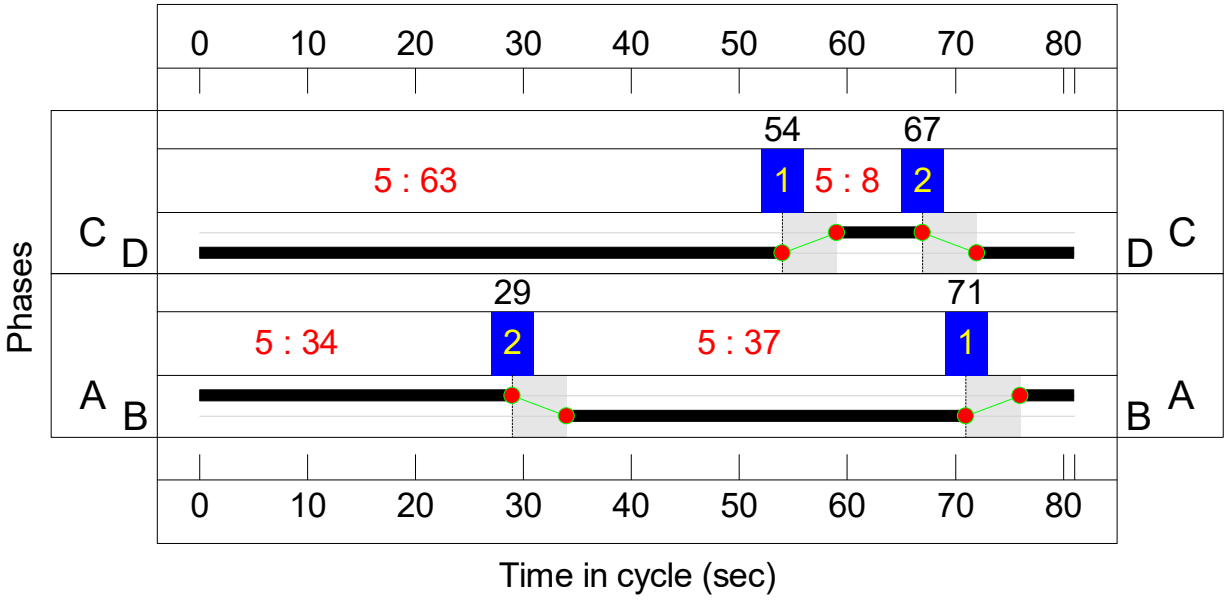
## Traffic Flows, Desired

**Desired Flow :**

| | Destination | | | | | |
|---|---|---|---|---|---|---|
| Origin | | A | B | C | D | Tot. |
| | A | 0 | 1278 | 132 | 256 | 1666 |
| | B | 1239 | 0 | 335 | 245 | 1819 |
| | C | 147 | 129 | 0 | 29 | 305 |
| | D | 759 | 439 | 14 | 0 | 1212 |
| | Tot. | 2145 | 1846 | 481 | 530 | 5002 |

Full Input Data And Results

**Signal Timings Diagram**



Basic Results Summary

## Network Results

| Item | Lane Description | Lane Type | Full Phase | Arrow Phase | Total Green (s) | Arrow Green (s) | Demand Flow (pcu) | Sat Flow (pcu/Hr) | Deg Sat (%) | Mean Max Queue (pcu) | Capacity (pcu) | Turners In Gaps (pcu) | Turners When Unopposed (pcu) | Turners In Intergreen (pcu) | Total Delay (pcuHr) | Av. Delay Per PCU (s/pcu) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Network: As Existing** | **-** | **-** | **-** | | **-** | **-** | **-** | **-** | **125.3%** | **-** | **-** | **3400** | **0** | **0** | **255.7** | **-** |
| 1/2+1/1 | High Street Ahead Left | O | - | | - | - | 305 | 2015:1956 | 32.6 : 32.6% | 2.8 | 848+89 | 610 | 0 | 0 | 0.5 | 5.9 |
| 2/1 | A1053 Greystone Road Left | O | - | | - | - | 759 | 1975 | 125.3% | 106.0 | 606 | 606 | 0 | 0 | 91.7 | 134.9 |
| 2/2+2/3 | A1053 Greystone Road Ahead | O | - | | - | - | 453 | 1961:1902 | 64.4 : 64.4% | 7.7 | 98+606 | 906 | 0 | 0 | 2.7 | 21.1 |
| 3/1 | A174 SB Ahead | U | - | | - | - | 1278 | 1980 | 64.5% | 0.9 | 1980 | - | - | - | 0.9 | 2.6 |
| 3/3+3/2 | A174 SB Ahead | U | C | | 32 | - | 388 | 1985:1985 | 33.1 : 33.1% | 3.7 | 569+605 | - | - | - | 2.4 | 22.3 |
| 4/1 | A174 NB Ahead Left | U | A | | 35 | - | 580 | 1860 | 78.0% | 14.3 | 744 | - | - | - | 5.5 | 34.3 |
| 4/2+4/3 | A174 NB Ahead | U | A | | 35 | - | 1239 | 1903:1923 | 103.9 : 103.9% | 75.9 | 626+375 | - | - | - | 142.0 | 112.7 |
| 5/1 | Ahead | U | - | | - | - | 775 | 1800 | 34.8% | 0.3 | 1800 | - | - | - | 0.3 | 1.5 |
| 5/2 | Right Ahead | U | - | | - | - | 740 | 1800 | 36.1% | 3.8 | 1800 | - | - | - | 0.3 | 1.6 |
| 6/1 | Right | U | D | | 48 | - | 63 | 1800 | 6.4% | 0.2 | 980 | - | - | - | 0.0 | 2.7 |
| 6/2 | Right Right2 | U | D | | 48 | - | 519 | 1800 | 53.0% | 4.2 | 980 | - | - | - | 0.9 | 6.2 |
| 7/1 | Right Ahead | U | B | | 45 | - | 214 | 2015 | 20.8% | 4.6 | 1030 | - | - | - | 0.8 | 13.0 |
| 7/2 | Right | U | B | | 45 | - | 188 | 2015 | 18.3% | 4.2 | 1030 | - | - | - | 0.7 | 12.8 |
| 8/1 | Ahead | U | - | | - | - | 313 | 1800 | 17.4% | 0.1 | 1800 | - | - | - | 0.1 | 1.2 |
| 8/2 | Right Ahead | U | - | | - | - | 963 | 1800 | 45.2% | 8.4 | 1800 | - | - | - | 0.4 | 1.9 |
| 8/3 | Right | U | - | | - | - | 464 | 1800 | 20.8% | 4.2 | 1800 | - | - | - | 0.1 | 1.3 |
| 12/1 | Ahead | O | - | | - | - | 1278 | 1940 | 93.3% | 16.4 | 1370 | 1278 | 0 | 0 | 6.2 | 17.5 |
| 12/2 | Ahead | U | - | | - | - | 63 | 1940 | 3.2% | 0.0 | 1940 | - | - | - | 0.0 | 1.0 |
| 12/3 | Ahead | U | - | | - | - | 505 | 1940 | 26.0% | 0.2 | 1940 | - | - | - | 0.2 | 1.3 |

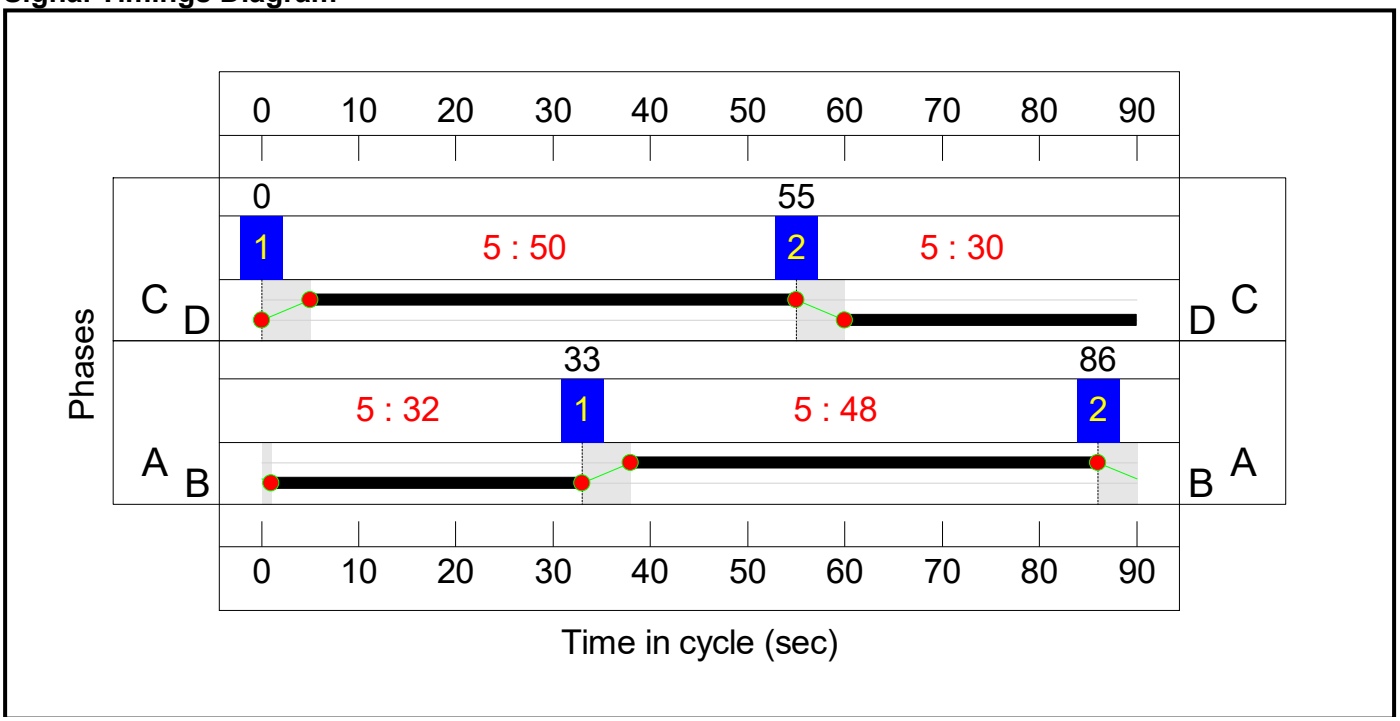
## Basic Results Summary

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| C1 | Stream: 1 | PRC for Signalled Lanes (%): | 69.9 | Total Delay for Signalled Lanes (pcuHr): | 3.35 | Cycle Time (s): | 90 |
| C1 | Stream: 2 | PRC for Signalled Lanes (%): | -19.6 | Total Delay for Signalled Lanes (pcuHr): | 99.01 | Cycle Time (s): | 90 |
| | | PRC Over All Lanes (%): | -19.6 | Total Delay Over All Lanes(pcuHr): | 99.75 | | |

Basic Results Summary
**Scenario 9: '2033 AM Long Acres'** (FG9: '2033 AM Long Acres', Plan 1: 'Network Control Plan 1')
## Traffic Flows, Actual
**Actual Flow :**

| | | Destination | | | | |
|---|---|---|---|---|---|---|
| | | A | B | C | D | Tot. |
| Origin | A | 0 | 1309 | 122 | 1011 | 2442 |
| | B | 1106 | 0 | 138 | 579 | 1823 |
| | C | 94 | 180 | 0 | 29 | 303 |
| | D | 285 | 294 | 8 | 0 | 587 |
| | Tot. | 1485 | 1783 | 268 | 1619 | 5155 |

## Signal Timings Diagram



Basic Results Summary

| Item | Lane Description | Lane Type | Full Phase | Arrow Phase | Total Green (s) | Arrow Green (s) | Demand Flow (pcu) | Sat Flow (pcu/Hr) | Deg Sat (%) | Mean Max Queue (pcu) | Capacity (pcu) | Turners In Gaps (pcu) | Turners When Unopposed (pcu) | Turners In Intergreen (pcu) | Total Delay (pcuHr) | Av. Delay Per PCU (s/pcu) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Network: As Existing** | - | - | - | | - | - | - | - | **106.8%** | - | - | **2686** | **0** | **0** | **111.3** | - |
| **Greystones Roundabout** | - | - | - | | - | - | - | - | **106.8%** | - | - | **2686** | **0** | **0** | **111.3** | - |
| 1/2+1/1 | High Street Ahead Left | O | - | | - | - | 303 | 2015:1956 | 106.8 : 106.8% | 31.6 | 257+27 | 571 | 0 | 0 | 16.8 | 200.1 |
| 2/1 | A1053 Greystone Road Left | O | - | | - | - | 285 | 1908 | 57.0% | 6.2 | 500 | 285 | 0 | 0 | 2.3 | 29.7 |
| 2/2+2/3 | A1053 Greystone Road Ahead | O | - | | - | - | 302 | 1935:1940 | 28.6 : 31.8% | 3.0 | 500+500 | 604 | 0 | 0 | 1.8 | 21.1 |
| 3/1 | A174 SB Ahead | U | - | | - | - | 1309 | 1980 | 66.1% | 1.0 | 1980 | - | - | - | 1.0 | 2.7 |
| 3/3+3/2 | A174 SB Ahead | U | C | | 50 | - | 1133 | 1985:1985 | 71.0 : 71.0% | 9.8 | 801+794 | - | - | - | 4.9 | 15.7 |
| 4/1 | A174 NB Ahead Left | U | A | | 48 | - | 717 | 1908 | 69.0% | 14.1 | 1039 | - | - | - | 4.1 | 20.5 |
| 4/2+4/3 | A174 NB Ahead | U | A | | 48 | - | 1106 | 1921:1937 | 92.1 : 92.1% | 25.6 | 860+341 | - | - | - | 10.2 | 33.1 |
| 5/1 | Ahead | U | - | | - | - | 792 | 1800 | 44.0% | 0.4 | 1800 | - | - | - | 0.4 | 1.8 |
| 5/2 | Right Ahead | U | - | | - | - | 588 | 1800 | 31.7% | 4.8 | 1800 | - | - | - | 0.3 | 1.7 |
| 6/1 | Right | U | D | | 30 | - | 241 | 1800 | 37.9% | 6.0 | 620 | - | - | - | 2.5 | 38.7 |
| 6/2 | Right Right2 | U | D | | 30 | - | 241 | 1800 | 38.0% | 6.1 | 620 | - | - | - | 2.6 | 39.1 |
| 7/1 | Right Ahead | U | B | | 32 | - | 572 | 2015 | 77.4% | 6.2 | 739 | - | - | - | 4.0 | 25.1 |
| 7/2 | Right | U | B | | 32 | - | 569 | 2015 | 77.0% | 6.0 | 739 | - | - | - | 3.9 | 24.8 |
| 8/1 | Ahead | U | - | | - | - | 1021 | 1800 | 56.7% | 0.7 | 1800 | - | - | - | 0.7 | 2.3 |
| 8/2 | Right Ahead | U | - | | - | - | 1361 | 1800 | 75.6% | 10.5 | 1800 | - | - | - | 1.6 | 4.2 |
| 8/3 | Right | U | - | | - | - | 314 | 1800 | 17.4% | 2.2 | 1800 | - | - | - | 0.1 | 1.2 |
| 12/1 | Ahead | O | - | | - | - | 1309 | 1940 | 106.8% | 121.7 | 1226 | 1226 | 0 | 0 | 54.1 | 148.7 |
| 12/2 | Ahead | U | - | | - | - | 241 | 1940 | 12.1% | 0.1 | 1940 | - | - | - | 0.1 | 1.1 |
| 12/3 | Ahead | U | - | | - | - | 233 | 1940 | 11.7% | 0.1 | 1940 | - | - | - | 0.1 | 1.1 |

## Basic Results Summary

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| C1 | Stream: 1 | PRC for Signalled Lanes (%): | 26.7 | Total Delay for Signalled Lanes (pcuHr): | 10.03 | Cycle Time (s): | 90 |
| C1 | Stream: 2 | PRC for Signalled Lanes (%): | -2.4 | Total Delay for Signalled Lanes (pcuHr): | 22.15 | Cycle Time (s): | 90 |
| | | PRC Over All Lanes (%): | -18.6 | Total Delay Over All Lanes(pcuHr): | 111.32 | | |

Basic Results Summary

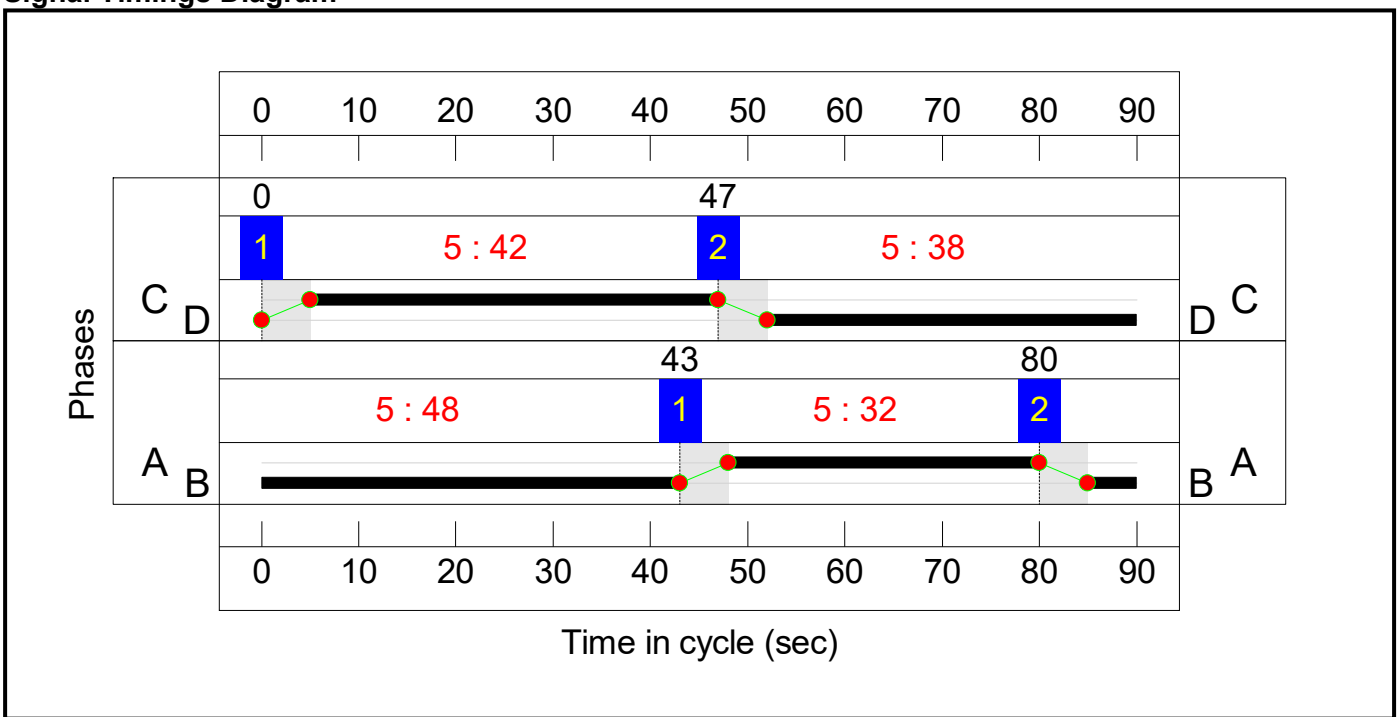
**Scenario 10: '2033 PM Long Acres'** (FG10: '2033 PM Long Acres', Plan 1: 'Network Control Plan 1')

## Traffic Flows, Actual

**Actual Flow :**

| | Destination | | | | | |
|---|---|---|---|---|---|---|
| Origin | | A | B | C | D | Tot. |
| | A | 0 | 1278 | 132 | 276 | 1686 |
| | B | 1239 | 0 | 335 | 265 | 1839 |
| | C | 147 | 129 | 0 | 31 | 307 |
| | D | 840 | 486 | 19 | 0 | 1345 |
| | Tot. | 2226 | 1893 | 486 | 572 | 5177 |

## Signal Timings Diagram



Basic Results Summary

| Item | Lane Description | Lane Type | Full Phase | Arrow Phase | Total Green (s) | Arrow Green (s) | Demand Flow (pcu) | Sat Flow (pcu/Hr) | Deg Sat (%) | Mean Max Queue (pcu) | Capacity (pcu) | Turners In Gaps (pcu) | Turners When Unopposed (pcu) | Turners In Intergreen (pcu) | Total Delay (pcuHr) | Av. Delay Per PCU (s/pcu) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Network: As Existing** | **-** | **-** | **-** | | **-** | **-** | **-** | **-** | **138.7%** | **-** | **-** | **3393** | **0** | **0** | **421.4** | **-** |
| **Greystones Roundabout** | **-** | **-** | **-** | | **-** | **-** | **-** | **-** | **138.7%** | **-** | **-** | **3393** | **0** | **0** | **421.4** | **-** |
| 1/2+1/1 | High Street Ahead Left | O | - | | - | - | 307 | 2015:1956 | 32.7 : 32.7% | 2.9 | 844+95 | 614 | 0 | 0 | 0.6 | 6.6 |
| 2/1 | A1053 Greystone Road Left | O | - | | - | - | 840 | 1908 | 137.9% | 166.3 | 609 | 609 | 0 | 0 | 131.4 | 563.0 |
| 2/2+2/3 | A1053 Greystone Road Ahead | O | - | | - | - | 505 | 1935:1940 | 41.5 : 41.4% | 4.1 | 609+609 | 1010 | 0 | 0 | 2.0 | 14.5 |
| 3/1 | A174 SB Ahead | U | - | | - | - | 1278 | 1980 | 64.5% | 0.9 | 1980 | - | - | - | 0.9 | 2.6 |
| 3/3+3/2 | A174 SB Ahead | U | C | | 42 | - | 408 | 1985:1985 | 29.1 : 29.1% | 3.2 | 717+683 | - | - | - | 1.8 | 15.5 |
| 4/1 | A174 NB Ahead Left | U | A | | 32 | - | 600 | 1908 | 85.8% | 16.7 | 700 | - | - | - | 7.2 | 43.4 |
| 4/2+4/3 | A174 NB Ahead | U | A | | 32 | - | 1239 | 1921:1937 | 138.7 : 138.7% | 215.0 | 602+291 | - | - | - | 197.9 | 575.1 |
| 5/1 | Ahead | U | - | | - | - | 835 | 1800 | 33.4% | 0.3 | 1800 | - | - | - | 0.3 | 1.5 |
| 5/2 | Right Ahead | U | - | | - | - | 680 | 1800 | 31.5% | 2.2 | 1800 | - | - | - | 0.2 | 1.5 |
| 6/1 | Right | U | D | | 38 | - | 317 | 1800 | 40.6% | 8.1 | 780 | - | - | - | 2.7 | 30.8 |
| 6/2 | Right Right2 | U | D | | 38 | - | 317 | 1800 | 40.6% | 8.1 | 780 | - | - | - | 2.7 | 31.0 |
| 7/1 | Right Ahead | U | B | | 48 | - | 218 | 2015 | 19.9% | 1.1 | 1097 | - | - | - | 0.4 | 7.4 |
| 7/2 | Right | U | B | | 48 | - | 209 | 2015 | 19.1% | 0.7 | 1097 | - | - | - | 0.3 | 5.9 |
| 8/1 | Ahead | U | - | | - | - | 332 | 1800 | 18.4% | 0.1 | 1800 | - | - | - | 0.1 | 1.2 |
| 8/2 | Right Ahead | U | - | | - | - | 1044 | 1800 | 45.1% | 8.5 | 1800 | - | - | - | 0.4 | 2.0 |
| 8/3 | Right | U | - | | - | - | 404 | 1800 | 16.2% | 3.2 | 1800 | - | - | - | 0.1 | 1.3 |
| 12/1 | Ahead | O | - | | - | - | 1278 | 1940 | 110.2% | 138.5 | 1160 | 1160 | 0 | 0 | 72.1 | 203.0 |
| 12/2 | Ahead | U | - | | - | - | 317 | 1940 | 16.3% | 0.1 | 1940 | - | - | - | 0.1 | 1.1 |
| 12/3 | Ahead | U | - | | - | - | 298 | 1940 | 15.4% | 0.1 | 1940 | - | - | - | 0.1 | 1.1 |

## Basic Results Summary

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| C1 | Stream: 1 | PRC for Signalled Lanes (%): | 121.5 | Total Delay for Signalled Lanes (pcuHr): | 7.20 | Cycle Time (s): | 90 |
| C1 | Stream: 2 | PRC for Signalled Lanes (%): | -54.1 | Total Delay for Signalled Lanes (pcuHr): | 205.97 | Cycle Time (s): | 90 |
| | | PRC Over All Lanes (%): | -54.1 | Total Delay Over All Lanes(pcuHr): | 421.43 | | |

Basic Results Summary

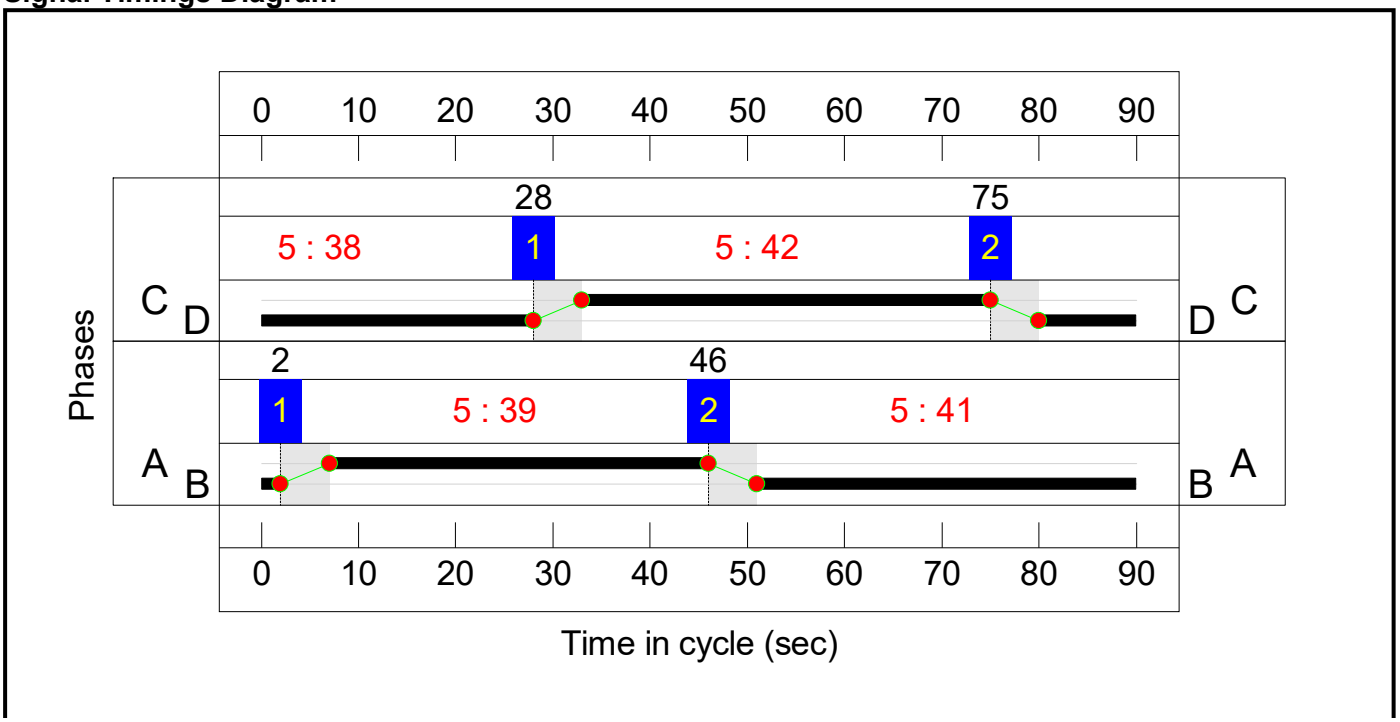
**Scenario 7: '2033 AM Cumulative'** (FG7: '2033 AM Cumulative', Plan 1: 'Network Control Plan 1')

## Traffic Flows, Actual

**Actual Flow :**

| Origin | Destination | | | | | |
|---|---|---|---|---|---|---|
| | | A | B | C | D | Tot. |
| | A | 0 | 1309 | 122 | 1618 | 3049 |
| | B | 1106 | 0 | 138 | 944 | 2188 |
| | C | 94 | 180 | 0 | 68 | 342 |
| | D | 460 | 467 | 24 | 0 | 951 |
| | Tot. | 1660 | 1956 | 284 | 2630 | 6530 |

## Signal Timings Diagram



Basic Results Summary

| Item | Lane Description | Lane Type | Full Phase | Arrow Phase | Total Green (s) | Arrow Green (s) | Demand Flow (pcu) | Sat Flow (pcu/Hr) | Deg Sat (%) | Mean Max Queue (pcu) | Capacity (pcu) | Turners In Gaps (pcu) | Turners When Unopposed (pcu) | Turners In Intergreen (pcu) | Total Delay (pcuHr) | Av. Delay Per PCU (s/pcu) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Network: As Existing** | **-** | **-** | **-** | | **-** | **-** | **-** | **-** | **123.4%** | **-** | **-** | **3212** | **0** | **0** | **424.6** | **-** |
| **Greystones Roundabout** | **-** | **-** | **-** | | **-** | **-** | **-** | **-** | **123.4%** | **-** | **-** | **3212** | **0** | **0** | **424.6** | **-** |
| 1/2+1/1 | High Street Ahead Left | O | - | | - | - | 342 | 2015:1965 | 122.9 : 122.9% | 50.5 | 216+62 | 585 | 0 | 0 | 40.0 | 421.3 |
| 2/1 | A1053 Greystone Road Left | O | - | | - | - | 460 | 1908 | 76.6% | 11.1 | 601 | 460 | 0 | 0 | 4.1 | 32.2 |
| 2/2+2/3 | A1053 Greystone Road Ahead | O | - | | - | - | 491 | 1935:1940 | 44.3 : 38.7% | 4.9 | 601+581 | 982 | 0 | 0 | 2.4 | 18.0 |
| 3/1 | A174 SB Ahead | U | - | | - | - | 1309 | 1980 | 66.1% | 1.0 | 1980 | - | - | - | 1.0 | 2.7 |
| 3/3+3/2 | A174 SB Ahead | U | C | | 42 | - | 1740 | 1985:1985 | 123.4 : 123.4% | 212.5 | 715+695 | - | - | - | 188.8 | 390.7 |
| 4/1 | A174 NB Ahead Left | U | A | | 39 | - | 902 | 1908 | 106.4% | 57.6 | 848 | - | - | - | 42.2 | 168.5 |
| 4/2+4/3 | A174 NB Ahead | U | A | | 39 | - | 1286 | 1921:1937 | 106.2 : 106.2% | 72.8 | 574+637 | - | - | - | 55.6 | 155.5 |
| 5/1 | Ahead | U | - | | - | - | 441 | 1800 | 23.1% | 0.2 | 1800 | - | - | - | 0.2 | 1.3 |
| 5/2 | Right Ahead | U | - | | - | - | 942 | 1800 | 47.4% | 13.6 | 1800 | - | - | - | 0.7 | 2.8 |
| 6/1 | Right | U | D | | 38 | - | 267 | 1800 | 34.2% | 5.4 | 780 | - | - | - | 0.8 | 10.9 |
| 6/2 | Right Right2 | U | D | | 38 | - | 407 | 1800 | 47.8% | 5.2 | 780 | - | - | - | 1.2 | 11.1 |
| 7/1 | Right Ahead | U | B | | 41 | - | 885 | 2015 | 76.8% | 19.2 | 940 | - | - | - | 3.9 | 19.2 |
| 7/2 | Right | U | B | | 41 | - | 882 | 2015 | 76.0% | 19.3 | 940 | - | - | - | 3.7 | 18.5 |
| 8/1 | Ahead | U | - | | - | - | 1503 | 1800 | 73.2% | 1.4 | 1800 | - | - | - | 1.4 | 3.7 |
| 8/2 | Right Ahead | U | - | | - | - | 1492 | 1800 | 71.6% | 17.5 | 1800 | - | - | - | 1.5 | 4.3 |
| 8/3 | Right | U | - | | - | - | 676 | 1800 | 35.4% | 9.4 | 1800 | - | - | - | 0.3 | 1.8 |
| 12/1 | Ahead | O | - | | - | - | 1309 | 1940 | 110.5% | 165.1 | 1185 | 1185 | 0 | 0 | 76.7 | 211.0 |
| 12/2 | Ahead | U | - | | - | - | 267 | 1940 | 13.8% | 0.1 | 1940 | - | - | - | 0.1 | 1.1 |

Basic Results Summary

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 12/3 | Ahead | U | - | | - | - | 380 | 1940 | 17.9% | 0.1 | 1940 | - | - | - | 0.1 | 1.1 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| C1 | Stream: 1 PRC for Signalled Lanes (%): | -37.1 | Total Delay for Signalled Lanes (pcuHr): | 190.81 | Cycle Time (s): | 90 |
| C1 | Stream: 2 PRC for Signalled Lanes (%): | -18.2 | Total Delay for Signalled Lanes (pcuHr): | 105.31 | Cycle Time (s): | 90 |
| | PRC Over All Lanes (%): | -37.1 | Total Delay Over All Lanes(pcuHr): | 424.62 | | |

Basic Results Summary

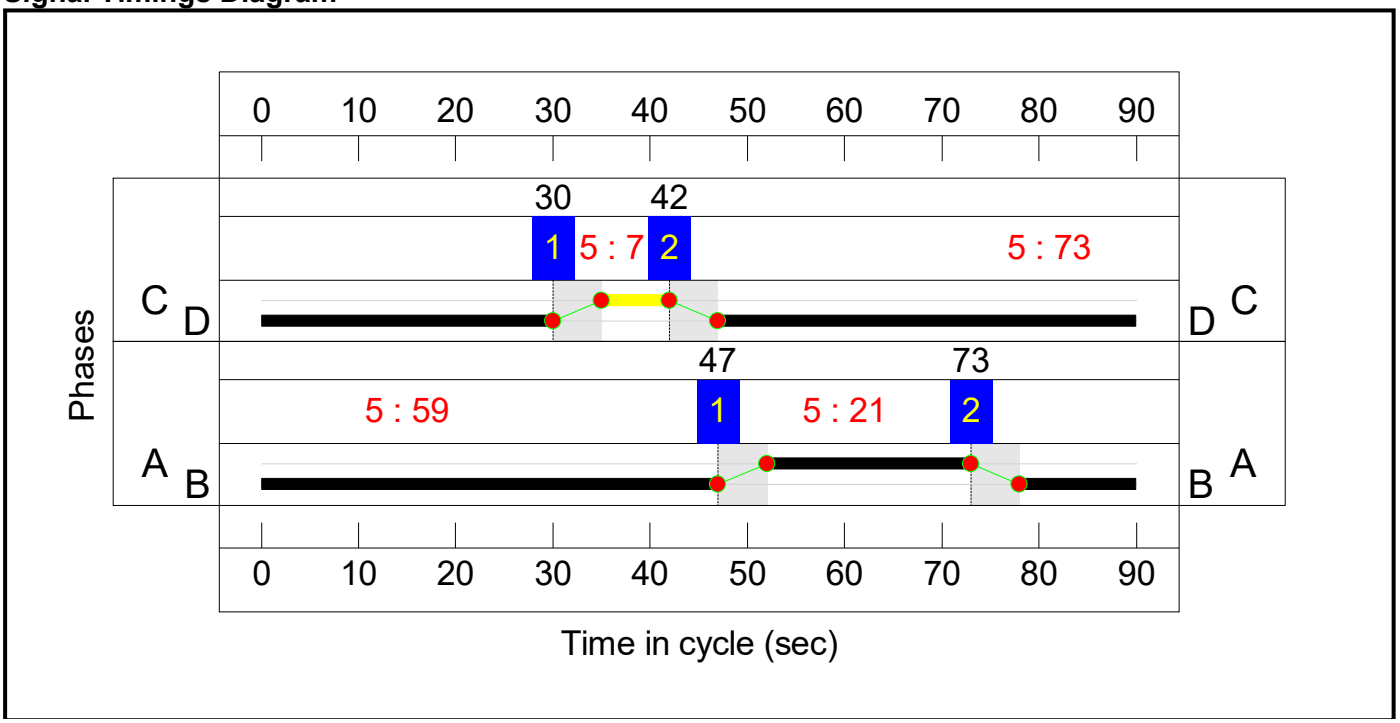
**Scenario 8: '2033 PM Cumulative'** (FG8: '2033 PM Cumulative', Plan 1: 'Network Control Plan 1')

## Traffic Flows, Actual

**Actual Flow :**

| | | Destination | | | | |
|---|---|---|---|---|---|---|
| | | A | B | C | D | Tot. |
| Origin | A | 0 | 1278 | 132 | 409 | 1819 |
| | B | 1239 | 0 | 335 | 401 | 1975 |
| | C | 147 | 129 | 0 | 43 | 319 |
| | D | 1374 | 775 | 54 | 0 | 2203 |
| | Tot. | 2760 | 2182 | 521 | 853 | 6316 |

## Signal Timings Diagram



Basic Results Summary

| Item | Lane Description | Lane Type | Full Phase | Arrow Phase | Total Green (s) | Arrow Green (s) | Demand Flow (pcu) | Sat Flow (pcu/Hr) | Deg Sat (%) | Mean Max Queue (pcu) | Capacity (pcu) | Turners In Gaps (pcu) | Turners When Unopposed (pcu) | Turners In Intergreen (pcu) | Total Delay (pcuHr) | Av. Delay Per PCU (s/pcu) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Network: As Existing** | **-** | **-** | **-** | | **-** | **-** | **-** | **-** | **190.7%** | **-** | **-** | **3991** | **0** | **0** | **1141.7** | **-** |
| **Greystones Roundabout** | **-** | **-** | **-** | | **-** | **-** | **-** | **-** | **190.7%** | **-** | **-** | **3991** | **0** | **0** | **1141.7** | **-** |
| 1/2+1/1 | High Street Ahead Left | O | - | | - | - | 319 | 2015:1985 | 25.9 : 25.9% | 2.0 | 900+332 | 638 | 0 | 0 | 0.5 | 5.9 |
| 2/1 | A1053 Greystone Road Left | O | - | | - | - | 1374 | 1908 | 190.7% | 430.9 | 720 | 720 | 0 | 0 | 366.8 | 961.1 |
| 2/2+2/3 | A1053 Greystone Road Ahead | O | - | | - | - | 829 | 1935:1940 | 59.6 : 55.5% | 6.6 | 720+720 | 1658 | 0 | 0 | 2.4 | 10.6 |
| 3/1 | A174 SB Ahead | U | - | | - | - | 1239 | 1980 | 62.6% | 0.8 | 1980 | - | - | - | 0.8 | 2.4 |
| 3/3+3/2 | A174 SB Ahead | U | C | | 7 | - | 580 | 1985:1985 | 163.8 : 164.9% | 125.0 | 176+176 | - | - | - | 130.2 | 808.3 |
| 4/1 | A174 NB Ahead Left | U | A | | 21 | - | 736 | 1908 | 157.8% | 165.2 | 466 | - | - | - | 155.6 | 761.2 |
| 4/2+4/3 | A174 NB Ahead | U | A | | 21 | - | 1239 | 1921:1937 | 189.6 : 189.6% | 344.5 | 444+210 | - | - | - | 330.7 | 960.7 |
| 5/1 | Ahead | U | - | | - | - | 884 | 1800 | 27.0% | 0.2 | 1800 | - | - | - | 0.2 | 1.4 |
| 5/2 | Right Ahead | U | - | | - | - | 707 | 1800 | 27.2% | 2.2 | 1800 | - | - | - | 0.2 | 1.4 |
| 6/1 | Right | U | D | | 73 | - | 434 | 1800 | 29.3% | 2.8 | 1480 | - | - | - | 0.4 | 3.7 |
| 6/2 | Right Right2 | U | D | | 73 | - | 600 | 1800 | 38.5% | 3.5 | 1480 | - | - | - | 0.6 | 3.9 |
| 7/1 | Right Ahead | U | B | | 59 | - | 382 | 2015 | 18.8% | 1.6 | 1343 | - | - | - | 0.4 | 6.3 |
| 7/2 | Right | U | B | | 59 | - | 289 | 2015 | 13.1% | 0.5 | 1343 | - | - | - | 0.2 | 4.4 |
| 8/1 | Ahead | U | - | | - | - | 597 | 1800 | 20.7% | 0.1 | 1800 | - | - | - | 0.1 | 1.3 |
| 8/2 | Right Ahead | U | - | | - | - | 1054 | 1800 | 31.9% | 8.8 | 1800 | - | - | - | 0.3 | 1.7 |
| 8/3 | Right | U | - | | - | - | 474 | 1800 | 14.2% | 3.2 | 1800 | - | - | - | 0.1 | 1.2 |
| 12/1 | Ahead | O | - | | - | - | 1239 | 1940 | 127.1% | 223.5 | 975 | 975 | 0 | 0 | 151.6 | 440.5 |
| 12/2 | Ahead | U | - | | - | - | 434 | 1940 | 22.4% | 0.1 | 1940 | - | - | - | 0.1 | 1.2 |

Basic Results Summary

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 12/3 | Ahead | U | - | | - | - | 509 | 1940 | 25.5% | 0.2 | 1940 | - | - | - | 0.2 | 1.2 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| C1 | Stream: 1 | PRC for Signalled Lanes (%): | -83.2 | Total Delay for Signalled Lanes (pcuHr): | 131.29 | Cycle Time (s): | 90 |
| C1 | Stream: 2 | PRC for Signalled Lanes (%): | -110.7 | Total Delay for Signalled Lanes (pcuHr): | 486.94 | Cycle Time (s): | 90 |
| | | PRC Over All Lanes (%): | -111.9 | Total Delay Over All Lanes(pcuHr): | 1141.66 | | |

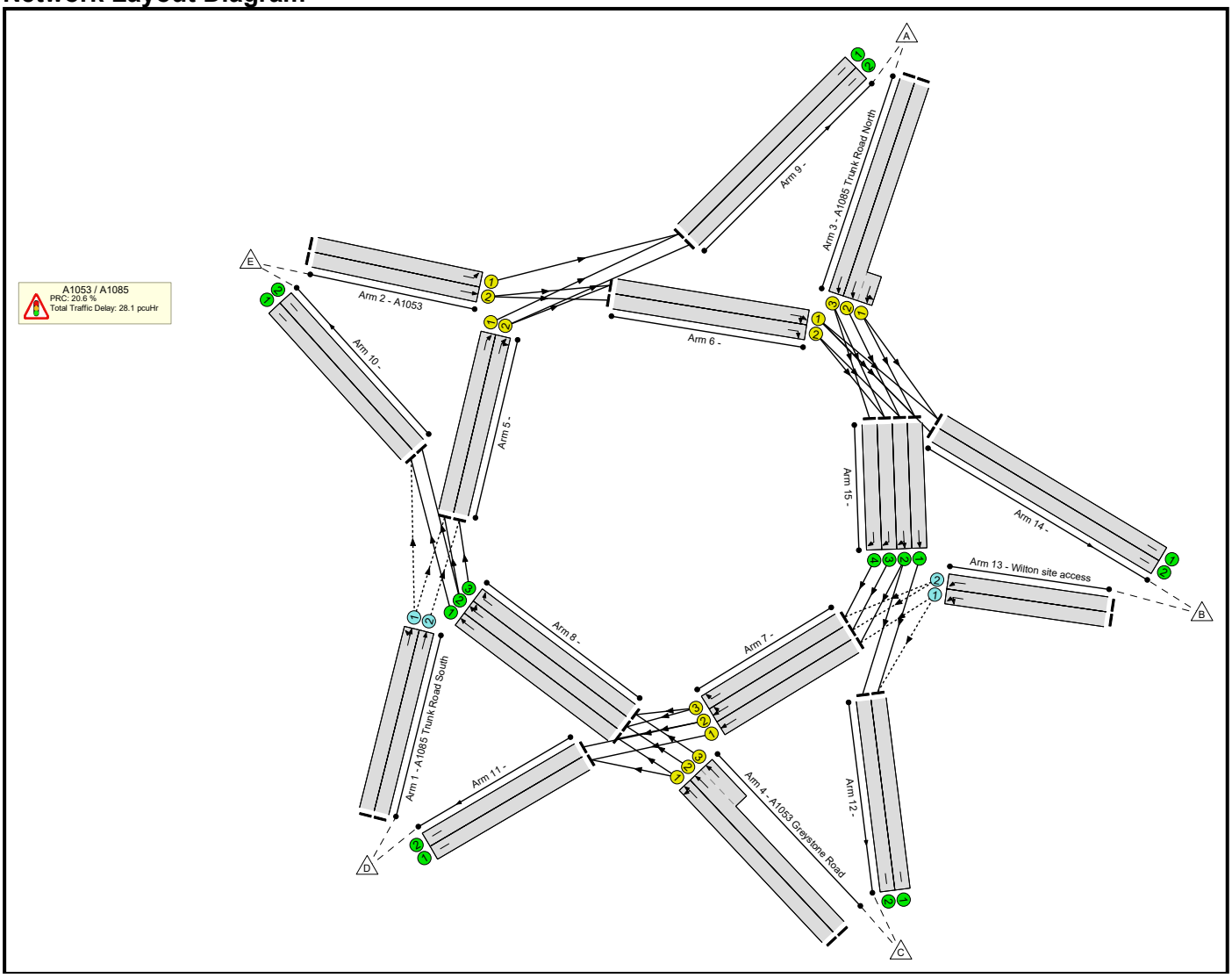
# Basic Results Summary

## User and Project Details

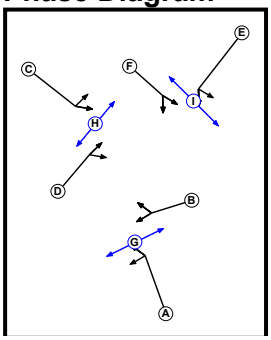
| | |
|---|---|
| **Project:** | **Teesworks** |
| **Title:** | **A1053 / A1085 Trunk Road Roundabout** |

**Scenario 1: '2033 AM Base'** (FG1: '2033 AM Base', Plan 1: 'Network Control Plan 1')

## Network Layout Diagram



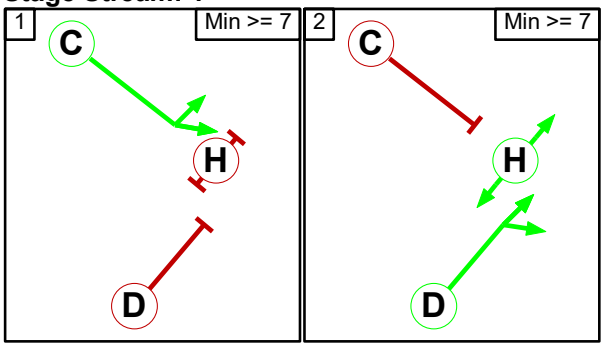

## Phase Diagram



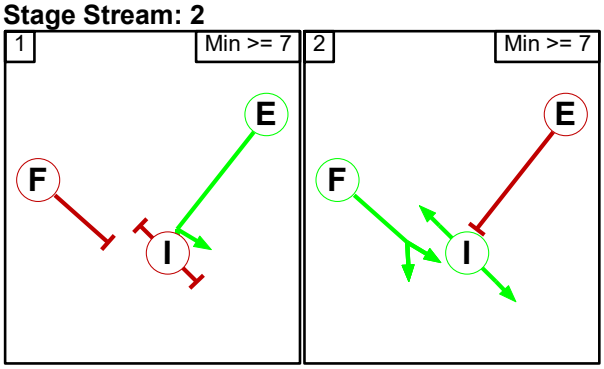
Basic Results Summary

## Stage Diagram

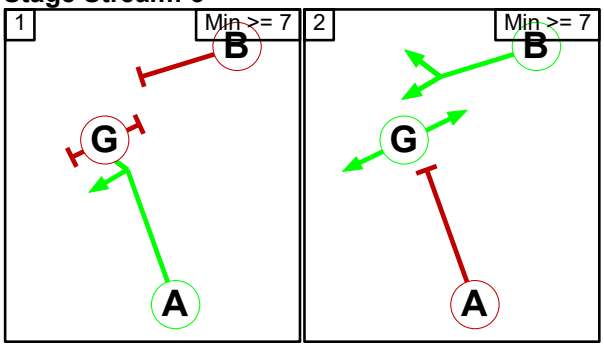
### Stage Stream: 1




### Stage Stream: 2




### Stage Stream: 3

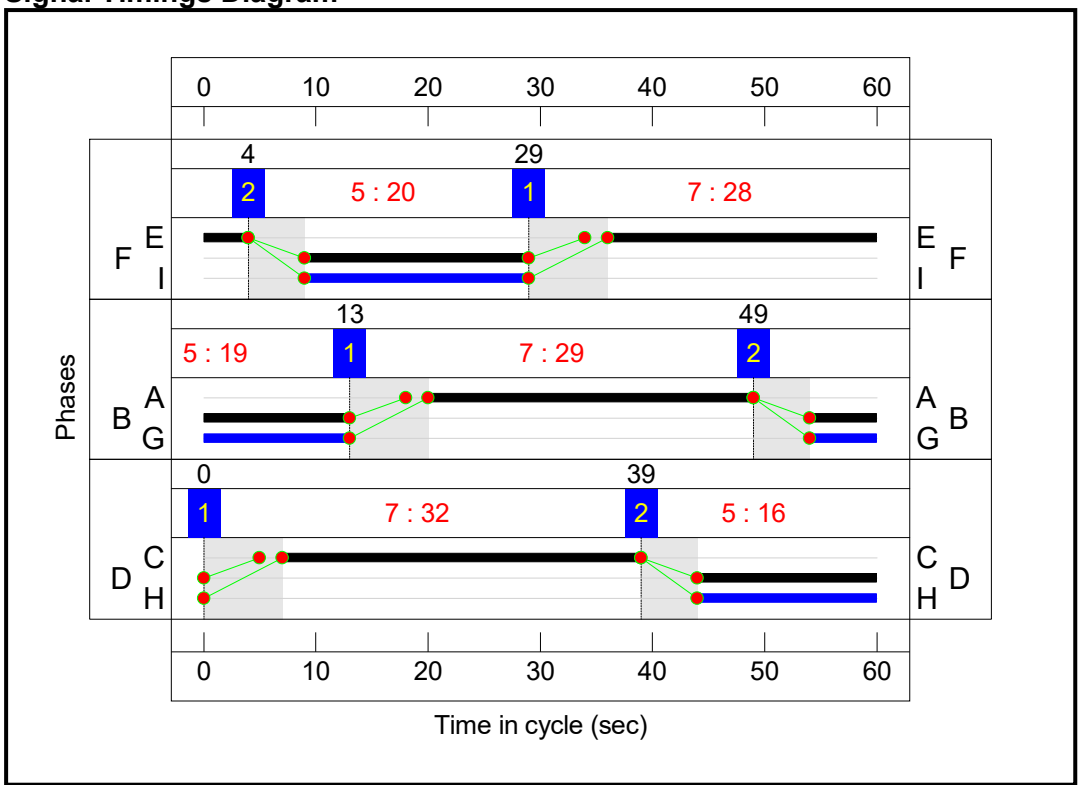


Basic Results Summary

## Phase Intergreens Matrix

| Terminating Phase \ Starting Phase | A | B | C | D | E | F | G | H | I |
|---|---|---|---|---|---|---|---|---|---|
| A | - | 5 | - | - | - | - | 5 | - | - |
| B | 5 | - | - | - | - | - | - | - | - |
| C | - | - | - | 5 | - | - | - | 5 | - |
| D | - | - | 5 | - | - | - | - | - | - |
| E | - | - | - | - | - | 5 | - | - | 5 |
| F | - | - | - | - | 5 | - | - | - | - |
| G | 7 | - | - | - | - | - | - | - | - |
| H | - | - | 7 | - | - | - | - | - | - |
| I | - | - | - | - | 7 | - | - | - | - |

## Signal Timings Diagram



Basic Results Summary

## Traffic Flows, Actual

**Actual Flow :**

| | Destination | | | | | | |
|---|---|---|---|---|---|---|---|
| | | A | B | C | D | E | Tot. |
| Origin | A | 0 | 6 | 34 | 196 | 696 | 932 |
| | B | 1 | 0 | 16 | 16 | 92 | 125 |
| | C | 63 | 93 | 0 | 334 | 952 | 1442 |
| | D | 112 | 19 | 84 | 0 | 21 | 236 |
| | E | 344 | 130 | 408 | 26 | 0 | 908 |
| | Tot. | 520 | 248 | 542 | 572 | 1761 | 3643 |

Basic Results Summary

| Item | Lane Description | Lane Type | Full Phase | Arrow Phase | Total Green (s) | Arrow Green (s) | Demand Flow (pcu) | Sat Flow (pcu/Hr) | Deg Sat (%) | Mean Max Queue (pcu) | Capacity (pcu) | Turners In Gaps (pcu) | Turners When Unopposed (pcu) | Turners In Intergreen (pcu) | Total Delay (pcuHr) | Av. Delay Per PCU (s/pcu) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Network** | - | - | - | | - | - | - | - | **74.6%** | - | - | **361** | **0** | **0** | **28.1** | - |
| **A1053 / A1085** | - | - | - | | - | - | - | - | **74.6%** | - | - | **361** | **0** | **0** | **28.1** | - |
| 1/1 | A1085 Trunk Road South Ahead Left | O | - | | - | - | 58 | 1972 | 28.7% | 0.7 | 202 | 58 | 0 | 0 | 0.3 | 20.6 |
| 1/2 | A1085 Trunk Road South Ahead | O | - | | - | - | 178 | 2015 | 37.1% | 1.2 | 480 | 178 | 0 | 0 | 0.5 | 9.5 |
| 2/1 | A1053 Left | U | C | | 32 | - | 344 | 1947 | 32.1% | 3.3 | 1071 | - | - | - | 0.9 | 9.9 |
| 2/2 | A1053 Ahead | U | C | | 32 | - | 564 | 2000 | 51.3% | 6.3 | 1100 | - | - | - | 1.9 | 11.8 |
| 3/2+3/1 | A1085 Trunk Road North Left Ahead | U | E | | 28 | - | 236 | 1955:1600 | 25.1 : 25.1% | 2.0 | 780+159 | - | - | - | 0.7 | 11.4 |
| 3/3 | A1085 Trunk Road North Ahead | U | E | | 28 | - | 696 | 1940 | 74.2% | 10.7 | 938 | - | - | - | 3.8 | 19.9 |
| 4/1 | A1053 Greystone Road Ahead Left | U | A | | 29 | - | 680 | 1854 | 73.4% | 10.2 | 927 | - | - | - | 3.6 | 19.1 |
| 4/2+4/3 | A1053 Greystone Road Ahead | U | A | | 29 | - | 762 | 1940:1950 | 74.6 : 74.6% | 10.5 | 897+125 | - | - | - | 3.8 | 18.2 |
| 5/1 | Ahead | U | D | | 16 | - | 101 | 1800 | 19.8% | 1.2 | 510 | - | - | - | 0.4 | 12.9 |
| 5/2 | Right Ahead | U | D | | 16 | - | 271 | 1800 | 53.1% | 3.8 | 510 | - | - | - | 1.6 | 20.9 |
| 6/1 | Ahead Right | U | F | | 20 | - | 381 | 1800 | 60.5% | 5.9 | 630 | - | - | - | 2.2 | 20.9 |
| 6/2 | Right | U | F | | 20 | - | 379 | 1800 | 60.2% | 2.5 | 630 | - | - | - | 1.7 | 16.2 |
| 7/1 | Ahead | U | B | | 19 | - | 238 | 1800 | 39.7% | 3.4 | 600 | - | - | - | 0.9 | 14.2 |
| 7/2 | Right Ahead | U | B | | 19 | - | 430 | 1800 | 71.7% | 7.0 | 600 | - | - | - | 2.1 | 17.2 |
| 7/3 | Right | U | B | | 19 | - | 359 | 1700 | 63.4% | 5.4 | 567 | - | - | - | 1.4 | 14.2 |
| 8/1 | Ahead | U | - | | - | - | 776 | 1800 | 43.1% | 0.4 | 1800 | - | - | - | 0.4 | 1.8 |
| 8/2 | Right Ahead | U | - | | - | - | 1028 | 1800 | 57.1% | 6.7 | 1800 | - | - | - | 0.7 | 2.4 |

Basic Results Summary

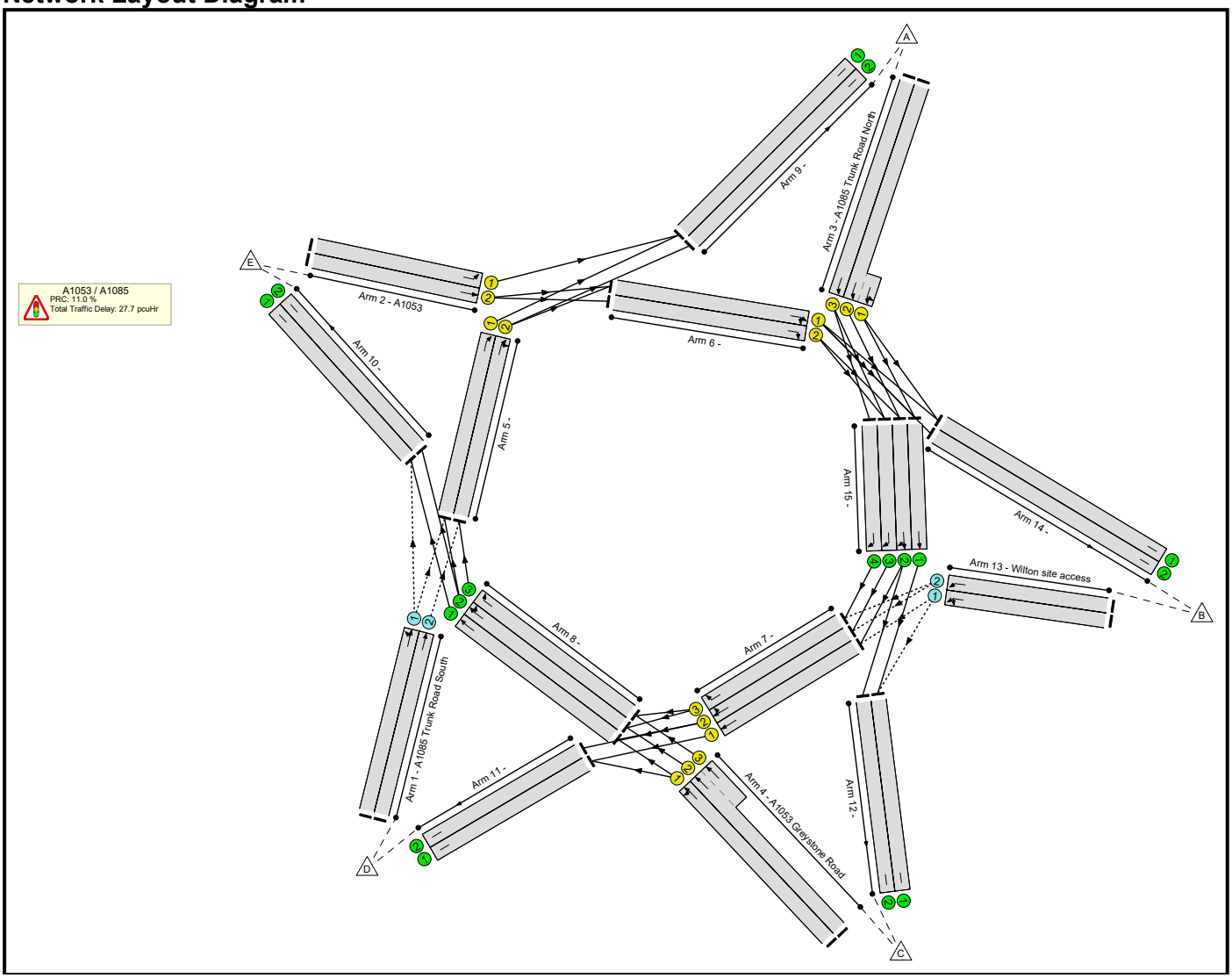
| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8/3 | Right | U | - | | - | - | 93 | 1800 | 5.2% | 0.0 | 1800 | - | - | - | 0.0 | 1.1 |
| 13/1 | Wilton site access Ahead Left | O | - | | - | - | 32 | 1925 | 9.7% | 0.2 | 331 | 32 | 0 | 0 | 0.1 | 11.8 |
| 13/2 | Wilton site access Ahead | O | - | | - | - | 93 | 2015 | 31.5% | 1.0 | 296 | 93 | 0 | 0 | 0.4 | 16.3 |
| 15/1 | Ahead | U | - | | - | - | 173 | 1600 | 10.8% | 0.1 | 1600 | - | - | - | 0.1 | 1.3 |
| 15/2 | Right Ahead | U | - | | - | - | 575 | 1600 | 35.9% | 0.3 | 1600 | - | - | - | 0.3 | 1.8 |
| 15/3 | Right | U | - | | - | - | 367 | 1600 | 22.9% | 0.1 | 1600 | - | - | - | 0.1 | 1.5 |
| 15/4 | Right | U | - | | - | - | 329 | 1600 | 20.6% | 0.1 | 1600 | - | - | - | 0.1 | 1.4 |

| | | | | | |
|---|---|---|---|---|---|
| C1 | Stream: 1 PRC for Signalled Lanes (%): | 69.4 | Total Delay for Signalled Lanes (pcuHr): | 4.73 | Cycle Time (s): 60 |
| C1 | Stream: 2 PRC for Signalled Lanes (%): | 21.3 | Total Delay for Signalled Lanes (pcuHr): | 8.51 | Cycle Time (s): 60 |
| C1 | Stream: 3 PRC for Signalled Lanes (%): | 20.6 | Total Delay for Signalled Lanes (pcuHr): | 11.85 | Cycle Time (s): 60 |
| | PRC Over All Lanes (%): | 20.6 | Total Delay Over All Lanes(pcuHr): | 28.12 | |

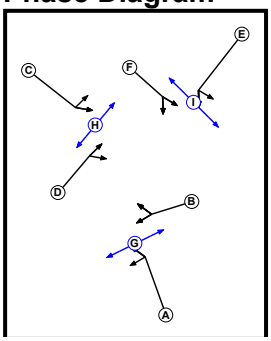
Basic Results Summary

**Scenario 2: '2033 PM Base'** (FG2: '2033 PM Base', Plan 1: 'Network Control Plan 1')

## Network Layout Diagram



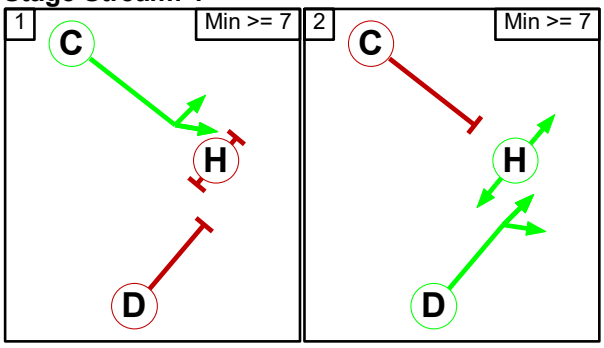

## Phase Diagram



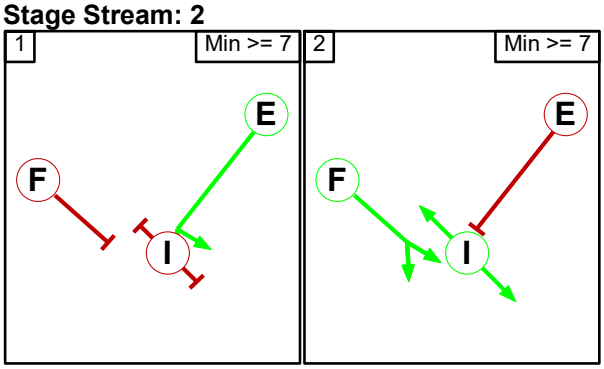
Basic Results Summary

## Stage Diagram

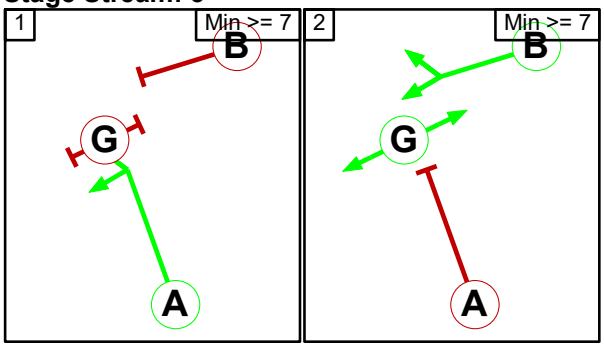
### Stage Stream: 1




### Stage Stream: 2




### Stage Stream: 3

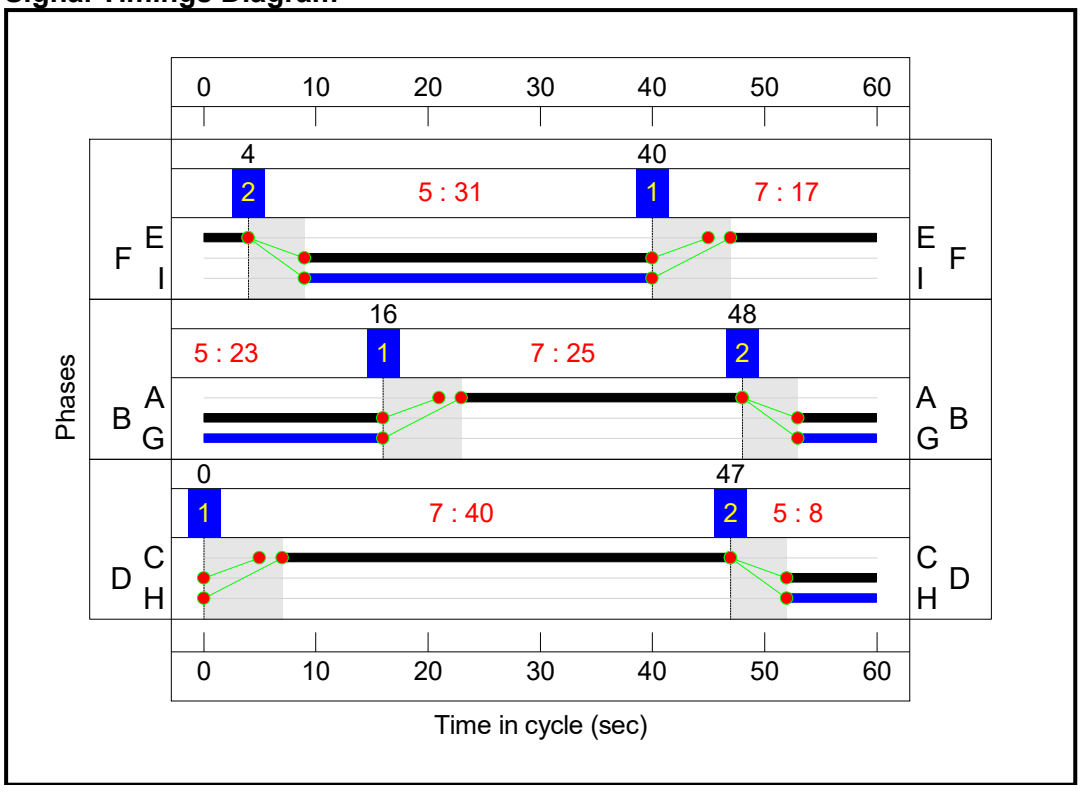


Basic Results Summary

## Phase Intergreens Matrix

| Terminating Phase \ Starting Phase | A | B | C | D | E | F | G | H | I |
|---|---|---|---|---|---|---|---|---|---|
| A | - | 5 | - | - | - | - | 5 | - | - |
| B | 5 | - | - | - | - | - | - | - | - |
| C | - | - | - | 5 | - | - | - | 5 | - |
| D | - | - | 5 | - | - | - | - | - | - |
| E | - | - | - | - | - | 5 | - | - | 5 |
| F | - | - | - | - | 5 | - | - | - | - |
| G | 7 | - | - | - | - | - | - | - | - |
| H | - | - | 7 | - | - | - | - | - | - |
| I | - | - | - | - | 7 | - | - | - | - |

## Signal Timings Diagram



Basic Results Summary

## Traffic Flows, Actual

**Actual Flow :**

| | Destination | | | | | | |
|---|---|---|---|---|---|---|---|
| | | A | B | C | D | E | Tot. |
| Origin | A | 0 | 14 | 52 | 162 | 422 | 650 |
| | B | 4 | 0 | 3 | 23 | 110 | 140 |
| | C | 41 | 19 | 0 | 87 | 377 | 524 |
| | D | 142 | 12 | 188 | 0 | 21 | 363 |
| | E | 775 | 53 | 970 | 77 | 0 | 1875 |
| | Tot. | 962 | 98 | 1213 | 349 | 930 | 3552 |

Basic Results Summary

| Item | Lane Description | Lane Type | Full Phase | Arrow Phase | Total Green (s) | Arrow Green (s) | Demand Flow (pcu) | Sat Flow (pcu/Hr) | Deg Sat (%) | Mean Max Queue (pcu) | Capacity (pcu) | Turners In Gaps (pcu) | Turners When Unopposed (pcu) | Turners In Intergreen (pcu) | Total Delay (pcuHr) | Av. Delay Per PCU (s/pcu) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Network** | - | - | - | | - | - | - | - | **81.1%** | - | - | **503** | **0** | **0** | **27.7** | - |
| **A1053 / A1085** | - | - | - | | - | - | - | - | **81.1%** | - | - | **503** | **0** | **0** | **27.7** | - |
| 1/1 | A1085 Trunk Road South Ahead Left | O | - | | - | - | 163 | 2000 | 29.9% | 1.2 | 544 | 163 | 0 | 0 | 0.4 | 7.8 |
| 1/2 | A1085 Trunk Road South Ahead | O | - | | - | - | 200 | 2015 | 25.8% | 0.7 | 776 | 200 | 0 | 0 | 0.2 | 3.7 |
| 2/1 | A1053 Left | U | C | | 40 | - | 775 | 1947 | 58.3% | 7.4 | 1330 | - | - | - | 1.8 | 8.2 |
| 2/2 | A1053 Ahead | U | C | | 40 | - | 1100 | 2000 | 80.5% | 14.9 | 1367 | - | - | - | 4.1 | 13.3 |
| 3/2+3/1 | A1085 Trunk Road North Left Ahead | U | E | | 17 | - | 228 | 1955:1600 | 36.8 : 36.8% | 2.3 | 443+177 | - | - | - | 1.3 | 20.4 |
| 3/3 | A1085 Trunk Road North Ahead | U | E | | 17 | - | 422 | 1940 | 72.5% | 7.5 | 582 | - | - | - | 3.5 | 29.9 |
| 4/1 | A1053 Greystone Road Ahead Left | U | A | | 25 | - | 237 | 1860 | 29.4% | 2.7 | 806 | - | - | - | 0.9 | 14.2 |
| 4/2+4/3 | A1053 Greystone Road Ahead | U | A | | 25 | - | 287 | 1940:1950 | 32.9 : 32.9% | 3.1 | 813+58 | - | - | - | 1.1 | 14.2 |
| 5/1 | Ahead | U | D | | 8 | - | 187 | 1800 | 69.3% | 4.0 | 270 | - | - | - | 2.1 | 41.3 |
| 5/2 | Right Ahead | U | D | | 8 | - | 219 | 1800 | 81.1% | 5.5 | 270 | - | - | - | 3.4 | 56.2 |
| 6/1 | Ahead Right | U | F | | 31 | - | 652 | 1800 | 67.9% | 8.6 | 960 | - | - | - | 2.6 | 14.5 |
| 6/2 | Right | U | F | | 31 | - | 667 | 1800 | 69.5% | 4.3 | 960 | - | - | - | 2.1 | 11.6 |
| 7/1 | Ahead | U | B | | 23 | - | 243 | 1800 | 33.8% | 1.5 | 720 | - | - | - | 0.6 | 9.1 |
| 7/2 | Right Ahead | U | B | | 23 | - | 387 | 1800 | 53.8% | 1.7 | 720 | - | - | - | 0.8 | 7.5 |
| 7/3 | Right | U | B | | 23 | - | 168 | 1700 | 24.7% | 0.3 | 680 | - | - | - | 0.2 | 4.2 |
| 8/1 | Ahead | U | - | | - | - | 518 | 1800 | 28.8% | 0.2 | 1800 | - | - | - | 0.2 | 1.4 |
| 8/2 | Right Ahead | U | - | | - | - | 436 | 1800 | 24.2% | 0.2 | 1800 | - | - | - | 0.2 | 1.3 |

Basic Results Summary

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8/3 | Right | U | - | | - | - | 19 | 1800 | 1.1% | 0.0 | 1800 | - | - | - | 0.0 | 1.0 |
| 13/1 | Wilton site access Ahead Left | O | - | | - | - | 26 | 1993 | 12.4% | 0.3 | 210 | 26 | 0 | 0 | 0.1 | 19.9 |
| 13/2 | Wilton site access Ahead | O | - | | - | - | 114 | 2015 | 55.2% | 1.7 | 206 | 114 | 0 | 0 | 1.0 | 30.8 |
| 15/1 | Ahead | U | - | | - | - | 619 | 1600 | 38.7% | 0.3 | 1600 | - | - | - | 0.3 | 1.8 |
| 15/2 | Right Ahead | U | - | | - | - | 811 | 1600 | 50.7% | 0.5 | 1600 | - | - | - | 0.5 | 2.3 |
| 15/3 | Right | U | - | | - | - | 291 | 1600 | 18.2% | 0.1 | 1600 | - | - | - | 0.1 | 1.4 |
| 15/4 | Right | U | - | | - | - | 150 | 1600 | 9.4% | 0.1 | 1600 | - | - | - | 0.1 | 1.2 |

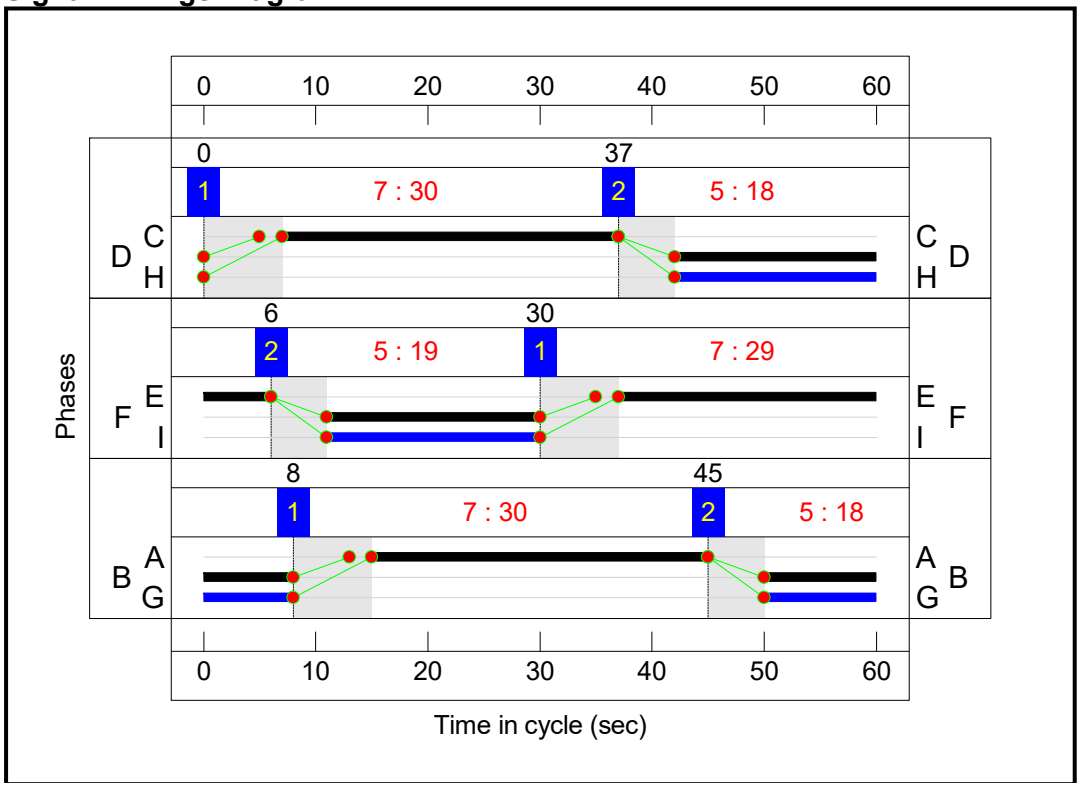
| | | | | | |
|---|---|---|---|---|---|
| C1 | Stream: 1 PRC for Signalled Lanes (%): | 11.0 | Total Delay for Signalled Lanes (pcuHr): | 11.41 | Cycle Time (s): 60 |
| C1 | Stream: 2 PRC for Signalled Lanes (%): | 24.1 | Total Delay for Signalled Lanes (pcuHr): | 9.57 | Cycle Time (s): 60 |
| C1 | Stream: 3 PRC for Signalled Lanes (%): | 67.4 | Total Delay for Signalled Lanes (pcuHr): | 3.68 | Cycle Time (s): 60 |
| | PRC Over All Lanes (%): | 11.0 | Total Delay Over All Lanes(pcuHr): | 27.69 | |

Basic Results Summary
**Scenario 9: '2033 AM Long Acres'** (FG9: '2033 AM Long Acres', Plan 1: 'Network Control Plan 1')
## Traffic Flows, Actual
**Actual Flow :**

| | Destination | | | | | | |
|---|---|---|---|---|---|---|---|
| | | A | B | C | D | E | Tot. |
| Origin | A | 0 | 6 | 82 | 214 | 734 | 1036 |
| | B | 1 | 0 | 16 | 16 | 92 | 125 |
| | C | 207 | 93 | 0 | 334 | 952 | 1586 |
| | D | 165 | 19 | 84 | 0 | 21 | 289 |
| | E | 460 | 130 | 408 | 26 | 0 | 1024 |
| | Tot. | 833 | 248 | 590 | 590 | 1799 | 4060 |

Basic Results Summary

**Signal Timings Diagram**



Basic Results Summary

| Item | Lane Description | Lane Type | Full Phase | Arrow Phase | Total Green (s) | Arrow Green (s) | Demand Flow (pcu) | Sat Flow (pcu/Hr) | Deg Sat (%) | Mean Max Queue (pcu) | Capacity (pcu) | Turners In Gaps (pcu) | Turners When Unopposed (pcu) | Turners In Intergreen (pcu) | Total Delay (pcuHr) | Av. Delay Per PCU (s/pcu) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Network: A1053 / A1085 Trunk Road Roundabout** | - | - | - | | - | - | - | - | **79.3%** | - | - | **414** | **0** | **0** | **34.8** | - |
| **A1053 / A1085** | - | - | - | | - | - | - | - | **79.3%** | - | - | **414** | **0** | **0** | **34.8** | - |
| 1/1 | A1085 Trunk Road South Ahead Left | O | - | | - | - | 68 | 1978 | 43.5% | 1.4 | 156 | 68 | 0 | 0 | 0.6 | 32.1 |
| 1/2 | A1085 Trunk Road South Ahead | O | - | | - | - | 221 | 2015 | 55.6% | 2.2 | 398 | 221 | 0 | 0 | 1.0 | 16.3 |
| 2/1 | A1053 Left | U | C | | 30 | - | 460 | 1947 | 45.7% | 5.1 | 1006 | - | - | - | 1.6 | 12.5 |
| 2/2 | A1053 Ahead | U | C | | 30 | - | 564 | 2000 | 54.6% | 6.9 | 1033 | - | - | - | 2.1 | 13.6 |
| 3/2+3/1 | A1085 Trunk Road North Left Ahead | U | E | | 29 | - | 302 | 1955:1600 | 30.6 : 30.6% | 2.2 | 700+288 | - | - | - | 0.9 | 10.9 |
| 3/3 | A1085 Trunk Road North Ahead | U | E | | 29 | - | 734 | 1940 | 75.7% | 11.3 | 970 | - | - | - | 4.0 | 19.6 |
| 4/1 | A1053 Greystone Road Ahead Left | U | A | | 30 | - | 754 | 1856 | 78.6% | 11.9 | 959 | - | - | - | 4.3 | 20.4 |
| 4/2+4/3 | A1053 Greystone Road Ahead | U | A | | 30 | - | 832 | 1940:1950 | 79.3 : 79.3% | 12.3 | 932+117 | - | - | - | 4.5 | 19.4 |
| 5/1 | Ahead | U | D | | 18 | - | 255 | 1800 | 44.7% | 3.7 | 570 | - | - | - | 1.1 | 14.8 |
| 5/2 | Right Ahead | U | D | | 18 | - | 314 | 1800 | 55.1% | 4.0 | 570 | - | - | - | 1.7 | 19.0 |
| 6/1 | Ahead Right | U | F | | 19 | - | 384 | 1800 | 64.0% | 6.4 | 600 | - | - | - | 2.5 | 23.2 |
| 6/2 | Right | U | F | | 19 | - | 376 | 1800 | 62.7% | 2.9 | 600 | - | - | - | 1.7 | 16.0 |
| 7/1 | Ahead | U | B | | 18 | - | 256 | 1800 | 44.9% | 3.8 | 570 | - | - | - | 1.2 | 16.6 |
| 7/2 | Right Ahead | U | B | | 18 | - | 442 | 1800 | 77.5% | 7.4 | 570 | - | - | - | 2.9 | 24.0 |
| 7/3 | Right | U | B | | 18 | - | 385 | 1700 | 71.5% | 5.6 | 538 | - | - | - | 2.2 | 20.8 |

Basic Results Summary

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8/1 | Ahead | U | - | | - | - | 862 | 1800 | 47.9% | 1.0 | 1800 | - | - | - | 0.5 | 1.9 |
| 8/2 | Right Ahead | U | - | | - | - | 1124 | 1800 | 62.4% | 8.3 | 1800 | - | - | - | 0.9 | 2.7 |
| 8/3 | Right | U | - | | - | - | 93 | 1800 | 5.2% | 0.0 | 1800 | - | - | - | 0.0 | 1.1 |
| 13/1 | Wilton site access Ahead Left | O | - | | - | - | 32 | 1925 | 10.5% | 0.3 | 306 | 32 | 0 | 0 | 0.1 | 12.9 |
| 13/2 | Wilton site access Ahead | O | - | | - | - | 93 | 2015 | 33.7% | 1.1 | 276 | 93 | 0 | 0 | 0.5 | 18.3 |
| 15/1 | Ahead | U | - | | - | - | 224 | 1600 | 14.0% | 0.1 | 1600 | - | - | - | 0.1 | 1.3 |
| 15/2 | Right Ahead | U | - | | - | - | 590 | 1600 | 36.9% | 0.3 | 1600 | - | - | - | 0.3 | 1.8 |
| 15/3 | Right | U | - | | - | - | 386 | 1600 | 24.1% | 0.2 | 1600 | - | - | - | 0.2 | 1.5 |
| 15/4 | Right | U | - | | - | - | 348 | 1600 | 21.8% | 0.1 | 1600 | - | - | - | 0.1 | 1.4 |

| | | | | | |
|---|---|---|---|---|---|
| C1 | Stream: 1 PRC for Signalled Lanes (%): | 63.4 | Total Delay for Signalled Lanes (pcuHr): | 6.43 | Cycle Time (s): 60 |
| C1 | Stream: 2 PRC for Signalled Lanes (%): | 18.9 | Total Delay for Signalled Lanes (pcuHr): | 9.06 | Cycle Time (s): 60 |
| C1 | Stream: 3 PRC for Signalled Lanes (%): | 13.5 | Total Delay for Signalled Lanes (pcuHr): | 15.11 | Cycle Time (s): 60 |
| | PRC Over All Lanes (%): | 13.5 | Total Delay Over All Lanes(pcuHr): | 34.81 | |

Basic Results Summary

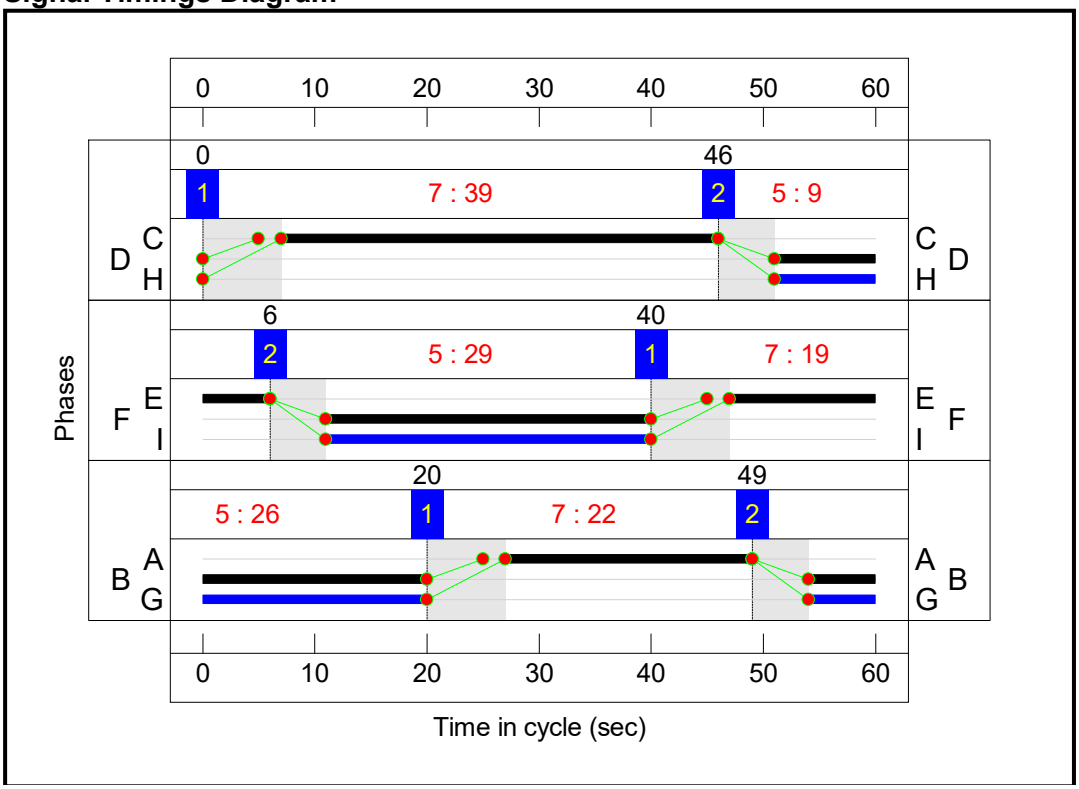
**Scenario 10: '2033 PM Long Acres'** (FG10: '2033 PM Long Acres', Plan 1: 'Network Control Plan 1')

## Traffic Flows, Actual

**Actual Flow :**

| | | Destination | | | | | |
|---|---|---|---|---|---|---|---|
| | | A | B | C | D | E | Tot. |
| Origin | A | 0 | 14 | 185 | 211 | 529 | 939 |
| | B | 4 | 0 | 3 | 23 | 110 | 140 |
| | C | 82 | 19 | 0 | 87 | 377 | 565 |
| | D | 157 | 12 | 188 | 0 | 21 | 378 |
| | E | 808 | 53 | 970 | 77 | 0 | 1908 |
| | Tot. | 1051 | 98 | 1346 | 398 | 1037 | 3930 |

## Signal Timings Diagram



Basic Results Summary

| Item | Lane Description | Lane Type | Full Phase | Arrow Phase | Total Green (s) | Arrow Green (s) | Demand Flow (pcu) | Sat Flow (pcu/Hr) | Deg Sat (%) | Mean Max Queue (pcu) | Capacity (pcu) | Turners In Gaps (pcu) | Turners When Unopposed (pcu) | Turners In Intergreen (pcu) | Total Delay (pcu Hr) | Av. Delay Per PCU (s/pcu) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Network: A1053 / A1085 Trunk Road Roundabout** | - | - | - | | - | - | - | - | **82.5 %** | - | - | **518** | **0** | **0** | **33.6** | - |
| **A1053 / A1085** | - | - | - | | - | - | - | - | **82.5 %** | - | - | **518** | **0** | **0** | **33.6** | - |
| 1/1 | A1085 Trunk Road South Ahead Left | O | - | | - | - | 175 | 2001 | 38.0 % | 1.6 | 460 | 175 | 0 | 0 | 0.6 | 11.6 |
| 1/2 | A1085 Trunk Road South Ahead | O | - | | - | - | 203 | 2015 | 28.6 % | 0.9 | 709 | 203 | 0 | 0 | 0.3 | 4.6 |
| 2/1 | A1053 Left | U | C | | 39 | - | 808 | 1947 | 62.2 % | 8.5 | 1298 | - | - | - | 2.1 | 9.4 |
| 2/2 | A1053 Ahead | U | C | | 39 | - | 1100 | 2000 | 82.5 % | 15.8 | 1333 | - | - | - | 4.6 | 15.0 |
| 3/2+3/1 | A1085 Trunk Road North Left Ahead | U | E | | 19 | - | 410 | 1955:1600 | 54.6 : 54.6 % | 3.3 | 401+350 | - | - | - | 2.3 | 20.4 |
| 3/3 | A1085 Trunk Road North Ahead | U | E | | 19 | - | 529 | 1940 | 81.8 % | 10.1 | 647 | - | - | - | 4.9 | 33.1 |
| 4/1 | A1053 Greyston e Road Ahead Left | U | A | | 22 | - | 255 | 1861 | 35.7 % | 3.3 | 713 | - | - | - | 1.2 | 17.1 |
| 4/2+4/3 | A1053 Greyston e Road Ahead | U | A | | 22 | - | 310 | 1940:1950 | 39.8 : 39.8 % | 3.7 | 716+63 | - | - | - | 1.5 | 17.1 |
| 5/1 | Ahead | U | D | | 9 | - | 233 | 1800 | 77.7 % | 5.4 | 300 | - | - | - | 2.7 | 42.3 |
| 5/2 | Right Ahead | U | D | | 9 | - | 229 | 1800 | 76.3 % | 5.2 | 300 | - | - | - | 2.9 | 46.1 |
| 6/1 | Ahead Right | U | F | | 29 | - | 635 | 1800 | 70.6 % | 8.9 | 900 | - | - | - | 3.0 | 16.8 |
| 6/2 | Right | U | F | | 29 | - | 684 | 1800 | 76.0 % | 6.2 | 900 | - | - | - | 2.7 | 14.1 |
| 7/1 | Ahead | U | B | | 26 | - | 297 | 1800 | 36.7 % | 1.6 | 810 | - | - | - | 0.7 | 7.9 |
| 7/2 | Right Ahead | U | B | | 26 | - | 408 | 1800 | 50.4 % | 1.3 | 810 | - | - | - | 0.6 | 5.7 |

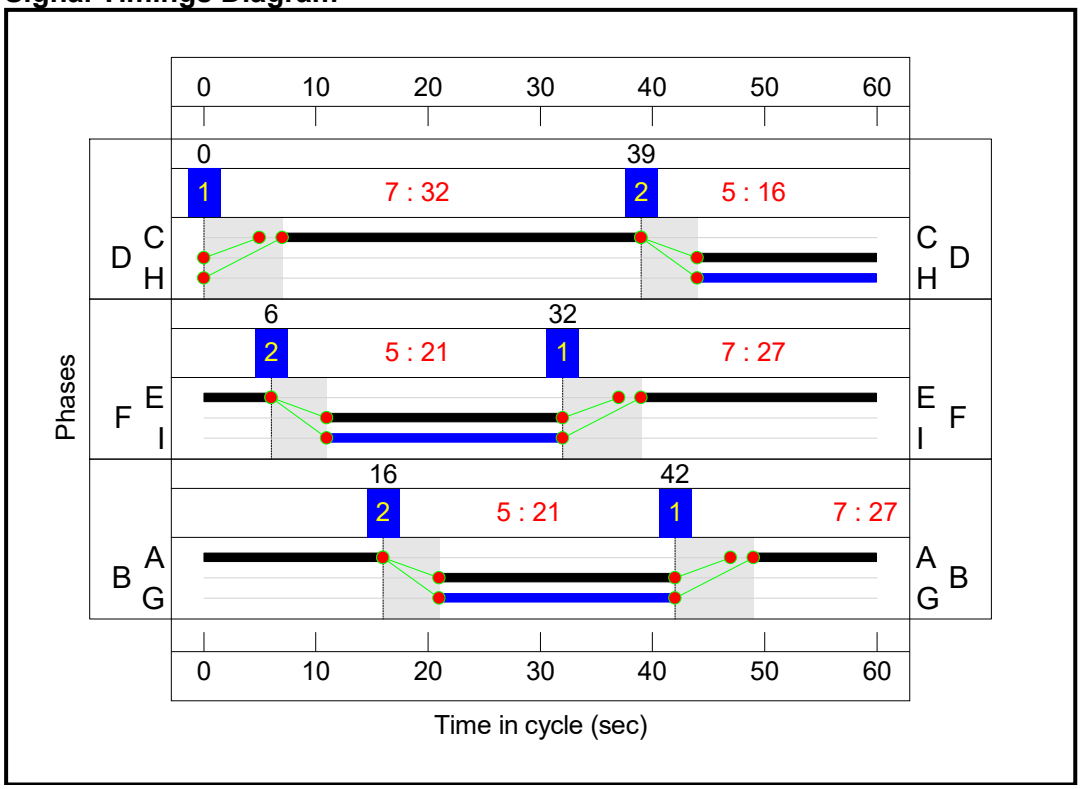
Basic Results Summary

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7/3 | Right | U | B | | 26 | - | 249 | 1700 | 32.5 % | 0.5 | 765 | - | - | - | 0.3 | 4.0 |
| 8/1 | Ahead | U | - | | - | - | 562 | 1800 | 31.2 % | 0.2 | 1800 | - | - | - | 0.2 | 1.5 |
| 8/2 | Right Ahead | U | - | | - | - | 533 | 1800 | 29.6 % | 0.7 | 1800 | - | - | - | 0.2 | 1.4 |
| 8/3 | Right | U | - | | - | - | 26 | 1800 | 1.4 % | 0.0 | 1800 | - | - | - | 0.0 | 1.0 |
| 13/1 | Wilton site access Ahead Left | O | - | | - | - | 26 | 1993 | 15.6 % | 0.3 | 167 | 26 | 0 | 0 | 0.2 | 23.5 |
| 13/2 | Wilton site access Ahead | O | - | | - | - | 114 | 2015 | 69.3 % | 2.2 | 164 | 114 | 0 | 0 | 1.5 | 46.5 |
| 15/1 | Ahead | U | - | | - | - | 728 | 1600 | 45.5 % | 0.4 | 1600 | - | - | - | 0.4 | 2.1 |
| 15/2 | Right Ahead | U | - | | - | - | 889 | 1600 | 55.6 % | 3.3 | 1600 | - | - | - | 0.6 | 2.6 |
| 15/3 | Right | U | - | | - | - | 339 | 1600 | 21.2 % | 0.1 | 1600 | - | - | - | 0.1 | 1.4 |
| 15/4 | Right | U | - | | - | - | 204 | 1600 | 12.8 % | 0.1 | 1600 | - | - | - | 0.1 | 1.3 |

C1 Stream: 1 PRC for Signalled Lanes (%): 9.1 Total Delay for Signalled Lanes (pcuHr): 12.34
Cycle Time (s): 60
C1 Stream: 2 PRC for Signalled Lanes (%): 10.0 Total Delay for Signalled Lanes (pcuHr): 12.83
Cycle Time (s): 60
C1 Stream: 3 PRC for Signalled Lanes (%): 78.7 Total Delay for Signalled Lanes (pcuHr): 4.26
Cycle Time (s): 60
PRC Over All Lanes (%): 9.1 Total Delay Over All Lanes(pcuHr): 33.59

Basic Results Summary
**Scenario 7: '2033 AM Cumulative'** (FG7: '2033 AM Cumulative', Plan 1: 'Network Control Plan 1')

## Signal Timings Diagram




## Traffic Flows, Actual

**Actual Flow :**

| | | Destination | | | | | |
|---|---|---|---|---|---|---|---|
| | | A | B | C | D | E | Tot. |
| Origin | A | 0 | 6 | 208 | 260 | 1256 | 1730 |
| | B | 1 | 0 | 16 | 16 | 111 | 144 |
| | C | 632 | 93 | 0 | 334 | 1536 | 2595 |
| | D | 322 | 19 | 84 | 0 | 37 | 462 |
| | E | 1016 | 138 | 642 | 45 | 0 | 1841 |
| | Tot. | 1971 | 256 | 950 | 655 | 2940 | 6772 |

Basic Results Summary

| Item | Lane Description | Lane Type | Full Phase | Arrow Phase | Total Green (s) | Arrow Green (s) | Demand Flow (pcu) | Sat Flow (pcu/Hr) | Deg Sat (%) | Mean Max Queue (pcu) | Capacity (pcu) | Turners In Gaps (pcu) | Turners When Unopposed (pcu) | Turners In Intergreen (pcu) | Total Delay (pcuHr) | Av. Delay Per PCU (s/pcu) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Network** | **-** | **-** | **-** | | **-** | **-** | **-** | **-** | **141.9%** | **-** | **-** | **497** | **0** | **0** | **715.8** | **-** |
| **A1053 / A1085** | **-** | **-** | **-** | | **-** | **-** | **-** | **-** | **141.9%** | **-** | **-** | **497** | **0** | **0** | **715.8** | **-** |
| 1/1 | A1085 Trunk Road South Ahead Left | O | - | | - | - | 92 | 1968 | 59.0% | 2.1 | 156 | 92 | 0 | 0 | 1.3 | 51.2 |
| 1/2 | A1085 Trunk Road South Ahead | O | - | | - | - | 370 | 2015 | 141.9% | 74.8 | 261 | 261 | 0 | 0 | 62.4 | 607.3 |
| 2/1 | A1053 Left | U | C | | 32 | - | 1016 | 1947 | 94.9% | 23.1 | 1071 | - | - | - | 10.9 | 38.6 |
| 2/2 | A1053 Ahead | U | C | | 32 | - | 825 | 2000 | 75.0% | 11.8 | 1100 | - | - | - | 3.9 | 16.8 |
| 3/2+3/1 | A1085 Trunk Road North Left Ahead | U | E | | 27 | - | 474 | 1955:1600 | 49.0 : 49.0% | 3.3 | 557+410 | - | - | - | 1.8 | 13.5 |
| 3/3 | A1085 Trunk Road North Ahead | U | E | | 27 | - | 1256 | 1940 | 138.7% | 206.6 | 905 | - | - | - | 194.9 | 558.7 |
| 4/1 | A1053 Greystone Road Ahead Left | U | A | | 27 | - | 1235 | 1865 | 141.9% | 210.7 | 870 | - | - | - | 201.2 | 586.5 |
| 4/2+4/3 | A1053 Greystone Road Ahead | U | A | | 27 | - | 1360 | 1940:1950 | 136.3 : 136.3% | 211.8 | 782+216 | - | - | - | 200.3 | 530.3 |
| 5/1 | Ahead | U | D | | 16 | - | 486 | 1800 | 72.8% | 6.9 | 510 | - | - | - | 4.2 | 40.5 |
| 5/2 | Right Ahead | U | D | | 16 | - | 665 | 1800 | 93.6% | 11.0 | 510 | - | - | - | 8.4 | 63.0 |
| 6/1 | Ahead Right | U | F | | 21 | - | 584 | 1800 | 80.1% | 8.6 | 660 | - | - | - | 3.6 | 24.8 |
| 6/2 | Right | U | F | | 21 | - | 437 | 1800 | 66.2% | 3.5 | 660 | - | - | - | 2.0 | 16.2 |
| 7/1 | Ahead | U | B | | 21 | - | 321 | 1800 | 48.6% | 5.4 | 660 | - | - | - | 2.6 | 28.6 |
| 7/2 | Right Ahead | U | B | | 21 | - | 705 | 1800 | 79.4% | 10.6 | 660 | - | - | - | 5.8 | 39.7 |
| 7/3 | Right | U | B | | 21 | - | 663 | 1700 | 79.1% | 10.1 | 623 | - | - | - | 5.5 | 40.3 |
| 8/1 | Ahead | U | - | | - | - | 1606 | 1800 | 64.4% | 6.9 | 1800 | - | - | - | 0.9 | 2.8 |
| 8/2 | Right Ahead | U | - | | - | - | 1728 | 1800 | 70.8% | 5.3 | 1800 | - | - | - | 1.2 | 3.4 |

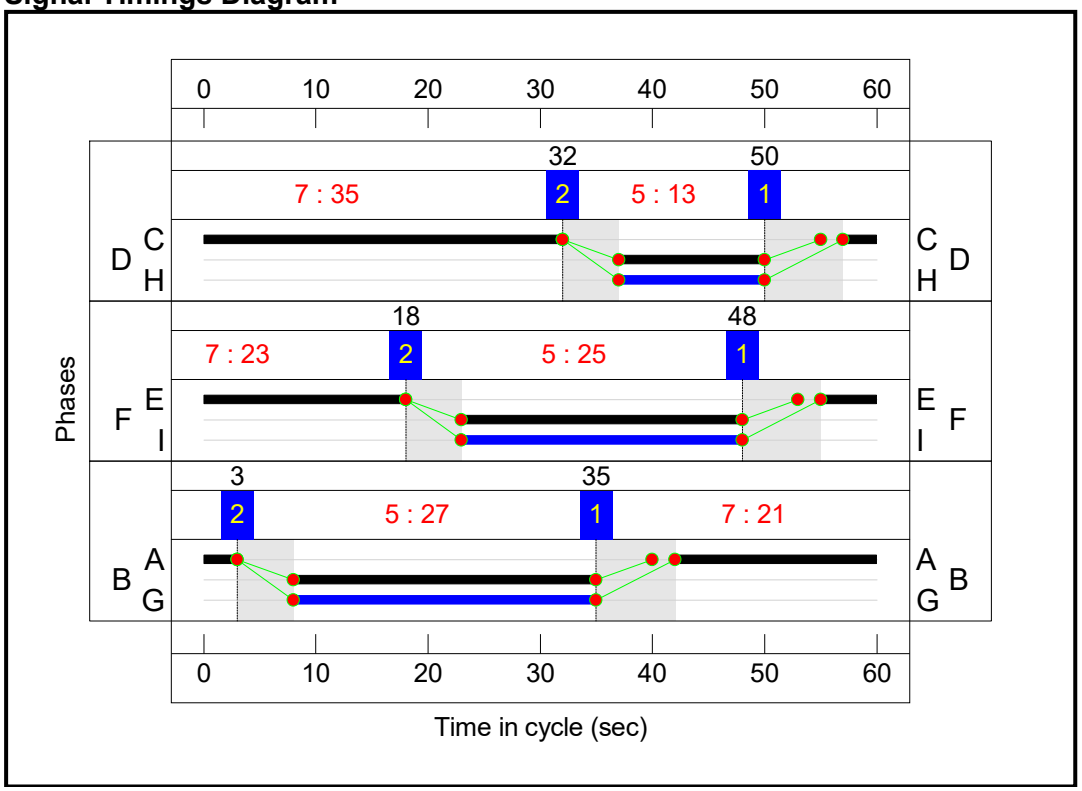
Basic Results Summary

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8/3 | Right | U | - | | - | - | 295 | 1800 | 12.0% | 0.1 | 1800 | - | - | - | 0.1 | 1.1 |
| 13/1 | Wilton site access Ahead Left | O | - | | - | - | 32 | 1925 | 23.8% | 0.4 | 134 | 32 | 0 | 0 | 0.3 | 29.1 |
| 13/2 | Wilton site access Ahead | O | - | | - | - | 112 | 2015 | 89.8% | 4.8 | 125 | 112 | 0 | 0 | 3.6 | 116.8 |
| 15/1 | Ahead | U | - | | - | - | 529 | 1600 | 31.5% | 0.2 | 1600 | - | - | - | 0.2 | 1.6 |
| 15/2 | Right Ahead | U | - | | - | - | 710 | 1600 | 44.4% | 0.9 | 1600 | - | - | - | 0.4 | 2.0 |
| 15/3 | Right | U | - | | - | - | 648 | 1600 | 29.2% | 0.2 | 1600 | - | - | - | 0.2 | 1.6 |
| 15/4 | Right | U | - | | - | - | 608 | 1600 | 27.4% | 0.2 | 1600 | - | - | - | 0.2 | 1.5 |

| | | | | | |
|---|---|---|---|---|---|
| C1 | Stream: 1 PRC for Signalled Lanes (%): | -5.4 | Total Delay for Signalled Lanes (pcuHr): | 27.28 | Cycle Time (s): 60 |
| C1 | Stream: 2 PRC for Signalled Lanes (%): | -54.1 | Total Delay for Signalled Lanes (pcuHr): | 202.31 | Cycle Time (s): 60 |
| C1 | Stream: 3 PRC for Signalled Lanes (%): | -57.7 | Total Delay for Signalled Lanes (pcuHr): | 415.39 | Cycle Time (s): 60 |
| | PRC Over All Lanes (%): | -57.7 | Total Delay Over All Lanes(pcuHr): | 715.81 | |

Basic Results Summary
**Scenario 8: '2033 PM Cumulative'** (FG8: '2033 PM Cumulative', Plan 1: 'Network Control Plan 1')

## Signal Timings Diagram




## Traffic Flows, Actual

**Actual Flow :**

| | Destination | | | | | | |
|---|---|---|---|---|---|---|---|
| | | A | B | C | D | E | Tot. |
| Origin | A | 0 | 14 | 583 | 358 | 1046 | 2001 |
| | B | 4 | 0 | 3 | 23 | 123 | 153 |
| | C | 190 | 19 | 0 | 87 | 553 | 849 |
| | D | 197 | 12 | 188 | 0 | 29 | 426 |
| | E | 1248 | 61 | 1421 | 117 | 0 | 2847 |
| | Tot. | 1639 | 106 | 2195 | 585 | 1751 | 6276 |

Basic Results Summary

| Item | Lane Description | Lane Type | Full Phase | Arrow Phase | Total Green (s) | Arrow Green (s) | Demand Flow (pcu) | Sat Flow (pcu/Hr) | Deg Sat (%) | Mean Max Queue (pcu) | Capacity (pcu) | Turners In Gaps (pcu) | Turners When Unopposed (pcu) | Turners In Intergreen (pcu) | Total Delay (pcuHr) | Av. Delay Per PCU (s/pcu) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Network** | - | - | - | | - | - | - | - | **134.8%** | - | - | **550** | **0** | **0** | **533.2** | - |
| **A1053 / A1085** | - | - | - | | - | - | - | - | **134.8%** | - | - | **550** | **0** | **0** | **533.2** | - |
| 1/1 | A1085 Trunk Road South Ahead Left | O | - | | - | - | 193 | 1997 | 60.4% | 2.3 | 320 | 193 | 0 | 0 | 1.2 | 22.1 |
| 1/2 | A1085 Trunk Road South Ahead | O | - | | - | - | 233 | 2015 | 43.5% | 1.9 | 535 | 233 | 0 | 0 | 0.7 | 10.5 |
| 2/1 | A1053 Left | U | C | | 35 | - | 1248 | 1947 | 106.8% | 68.7 | 1168 | - | - | - | 53.1 | 153.0 |
| 2/2 | A1053 Ahead | U | C | | 35 | - | 1599 | 2000 | 133.3% | 234.8 | 1200 | - | - | - | 218.3 | 491.4 |
| 3/2+3/1 | A1085 Trunk Road North Left Ahead | U | E | | 23 | - | 955 | 1955:1600 | 109.5 : 109.5% | 61.8 | 450+422 | - | - | - | 53.4 | 201.3 |
| 3/3 | A1085 Trunk Road North Ahead | U | E | | 23 | - | 1046 | 1940 | 134.8% | 158.8 | 776 | - | - | - | 150.5 | 518.0 |
| 4/1 | A1053 Greystone Road Ahead Left | U | A | | 21 | - | 392 | 1868 | 57.2% | 5.9 | 685 | - | - | - | 2.3 | 21.3 |
| 4/2+4/3 | A1053 Greystone Road Ahead | U | A | | 21 | - | 457 | 1940:1950 | 59.0 : 59.0% | 5.8 | 656+119 | - | - | - | 2.6 | 20.3 |
| 5/1 | Ahead | U | D | | 13 | - | 306 | 1800 | 72.7% | 5.9 | 420 | - | - | - | 3.5 | 41.5 |
| 5/2 | Right Ahead | U | D | | 13 | - | 304 | 1800 | 72.3% | 5.8 | 420 | - | - | - | 3.2 | 38.4 |
| 6/1 | Ahead Right | U | F | | 25 | - | 954 | 1800 | 98.8% | 23.9 | 780 | - | - | - | 15.0 | 70.2 |
| 6/2 | Right | U | F | | 25 | - | 864 | 1800 | 83.1% | 13.2 | 780 | - | - | - | 4.6 | 25.3 |
| 7/1 | Ahead | U | B | | 27 | - | 498 | 1800 | 52.1% | 4.8 | 840 | - | - | - | 1.2 | 10.2 |
| 7/2 | Right Ahead | U | B | | 27 | - | 598 | 1800 | 53.0% | 3.2 | 840 | - | - | - | 0.7 | 5.7 |
| 7/3 | Right | U | B | | 27 | - | 575 | 1700 | 54.0% | 3.6 | 793 | - | - | - | 0.8 | 6.4 |
| 8/1 | Ahead | U | - | | - | - | 903 | 1800 | 41.7% | 0.4 | 1800 | - | - | - | 0.4 | 1.7 |
| 8/2 | Right Ahead | U | - | | - | - | 961 | 1800 | 45.3% | 2.9 | 1800 | - | - | - | 0.4 | 1.8 |

Basic Results Summary

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8/3 | Right | U | - | | - | - | 71 | 1800 | 3.9% | 0.0 | 1800 | - | - | - | 0.0 | 1.0 |
| 13/1 | Wilton site access Ahead Left | O | - | | - | - | 26 | 1993 | 26.4% | 0.4 | 98 | 26 | 0 | 0 | 0.3 | 37.1 |
| 13/2 | Wilton site access Ahead | O | - | | - | - | 127 | 2015 | 130.2% | 22.8 | 98 | 98 | 0 | 0 | 18.5 | 523.1 |
| 15/1 | Ahead | U | - | | - | - | 1310 | 1600 | 68.9% | 9.1 | 1600 | - | - | - | 1.1 | 3.7 |
| 15/2 | Right Ahead | U | - | | - | - | 1357 | 1600 | 68.7% | 10.0 | 1600 | - | - | - | 1.2 | 4.0 |
| 15/3 | Right | U | - | | - | - | 544 | 1600 | 25.2% | 0.2 | 1600 | - | - | - | 0.2 | 1.5 |
| 15/4 | Right | U | - | | - | - | 502 | 1600 | 23.3% | 0.2 | 1600 | - | - | - | 0.2 | 1.5 |

| | | | | | |
|---|---|---|---|---|---|
| C1 | Stream: 1 PRC for Signalled Lanes (%): | -48.1 | Total Delay for Signalled Lanes (pcuHr): | 278.09 | Cycle Time (s): 60 |
| C1 | Stream: 2 PRC for Signalled Lanes (%): | -49.8 | Total Delay for Signalled Lanes (pcuHr): | 223.50 | Cycle Time (s): 60 |
| C1 | Stream: 3 PRC for Signalled Lanes (%): | 52.6 | Total Delay for Signalled Lanes (pcuHr): | 7.61 | Cycle Time (s): 60 |
| | PRC Over All Lanes (%): | -49.8 | Total Delay Over All Lanes(pcuHr): | 533.25 | |

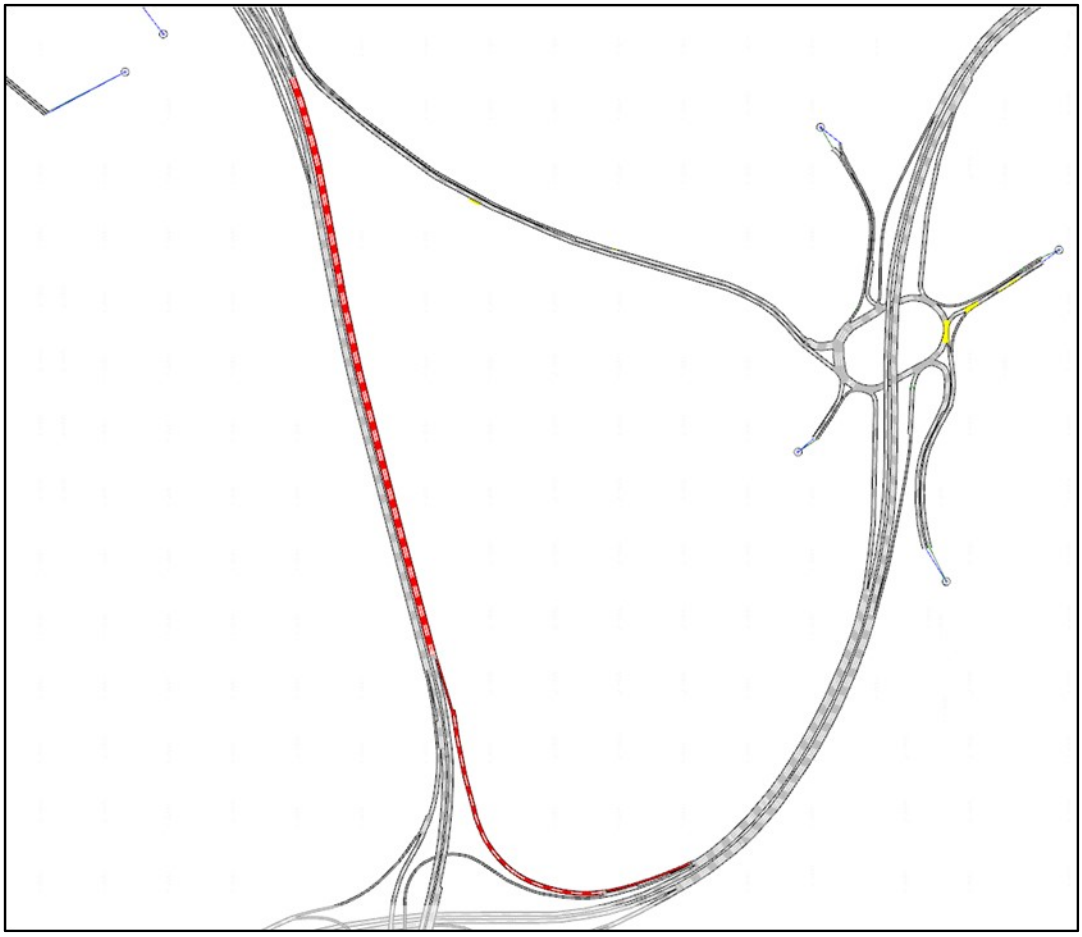
# Appendix H

A19 Journey Time Routes

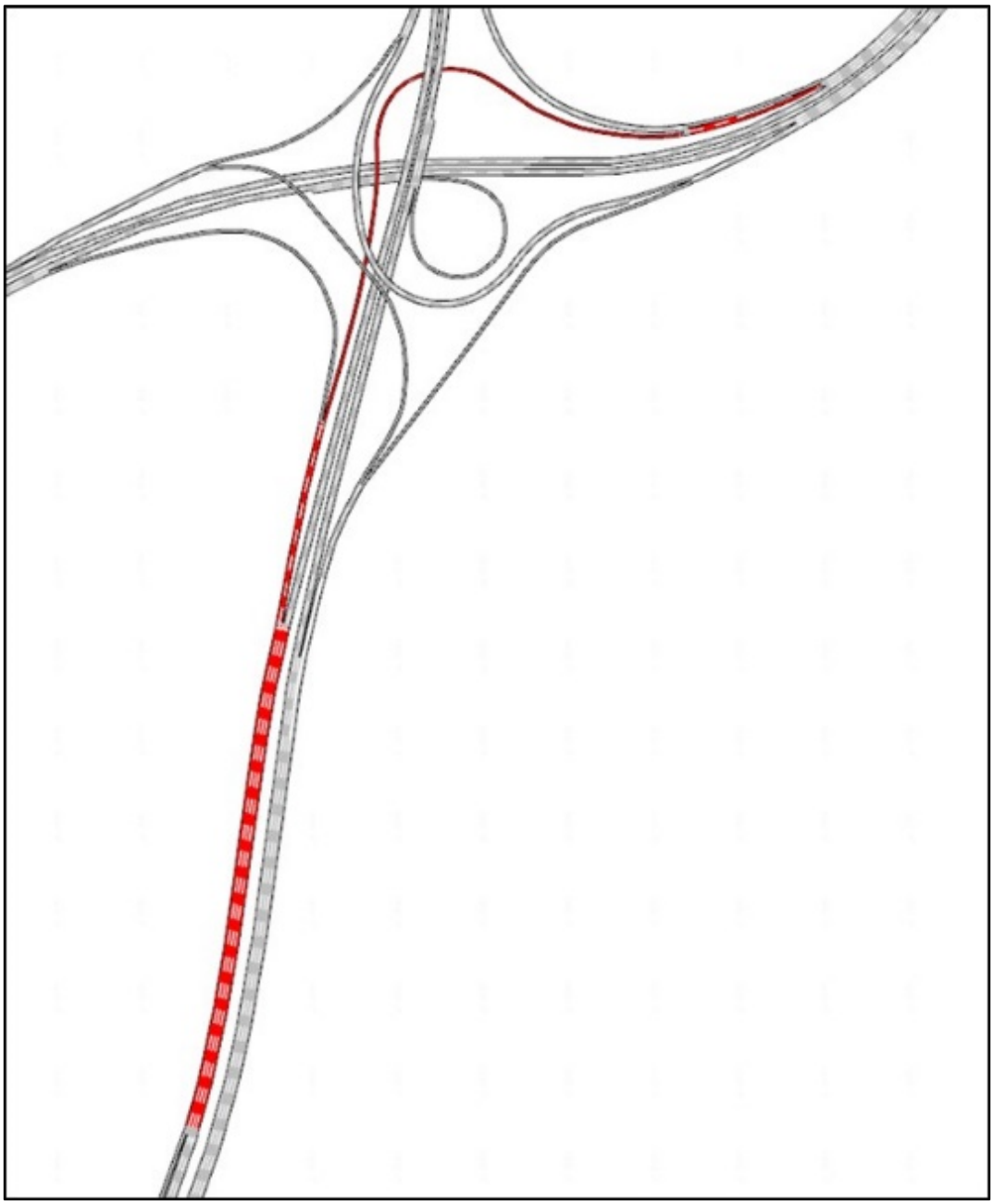
# H1 A19 Corridor

The images in this appendix show the routes where journey time results have been extracted from Jacobs 2015 New Tees Crossing AIMSUN Model.

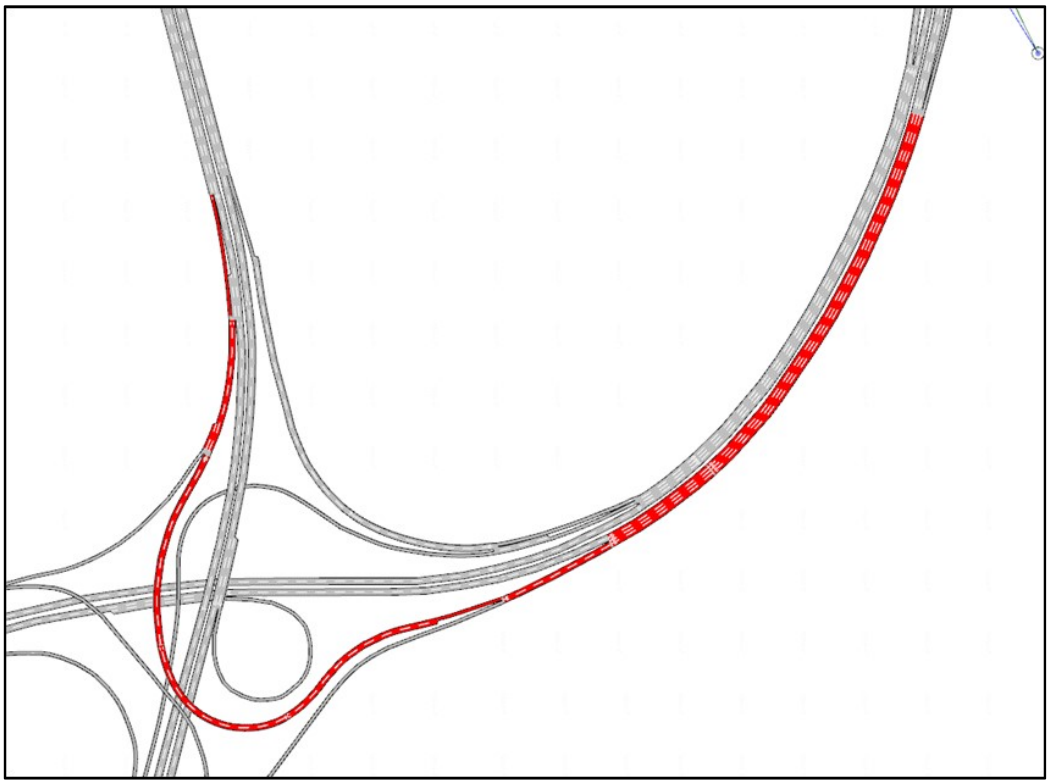
**Figure H1: A19 North to A66 Eastbound**



## Figure H2: A19 South to A66 Eastbound



## Figure H3: A66 Westbound to A19 North



## Figure H4: A66 Westbound to A19 South

# Appendix C2: Transport Assessment Scoping Note

2.1

# South Tees Development Corporation

## Teesworks

# Transport Assessments - Scoping Report

001

Issue | 26 November 2020



Job number 602669-41

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# Contents

# 1 Introduction

## 1.1 Purpose of the Scoping Report

Arup has been commissioned by the South Tees Development Corporation (STDC) to develop a Transport Assessment (TA) and Framework Travel Plan in support of five separate outline planning applications for development on the South Tees Development Corporation (STDC) site, known as 'Teesworks'.

An outline planning application for each of the five sites will be submitted separately and there will be five TA's produced. However, rather than producing five Scoping Reports, this document provides details of all five sites and outlines the key principles of the assessments.

Arup will also undertake the traffic and transportation assessment of the Environmental Impact Assessment.

The purpose of this scoping report is to agree the methodology and main parameters of the assessment with Redcar and Cleveland Borough Council (RCBC), the local planning and highway authority, and Highways England (HE). A copy will also be sent to the neighbouring highway authority, Middlesbrough Council (MC).

| |
|---|
| Decision points throughout the document are provided in a text box |

## 1.2 Development Sites

The five development sites are as follows:

**Dorman Point**

The development site is located in the south-western part of the Teesworks area and the proposed maximum floorspace is just under 140,000sqm. It is largely free of active use, although the former Torpedo Ladle Workshop is present in the southern part of the site. It is proposed that the site will provide general industrial (B2) use and storage and distribution facilities (B8), with ancillary office accommodation. The development is forecast to employ approximately 1,620 people when operational.

**Lackenby**

The development site is located in the southern part of the Teesworks area and lies between Dorman Point and the British Steel area. It provides just under 93,000sqm of floorspace and is currently occupied by buildings and structures associated with the former steelmaking facilities. It is proposed that the site will provide general industrial (B2) use and storage and distribution facilities (B8), with ancillary office accommodation. The development is forecast to employ approximately 1,080 people when operational.

## The Foundry

The development site, providing a maximum floorspace of 464,515sqm, is located in the northern part of the Teesworks area and is largely vacant industrial land, sparsely occupied by building and structures associated with the former steel making complex. The development proposals for the site are that it will provide general industrial (B2) use and storage and distribution facilities (B8), with ancillary office accommodation. It is forecast that the site could employ approximately 5,401 people when operational.

## Long Acres

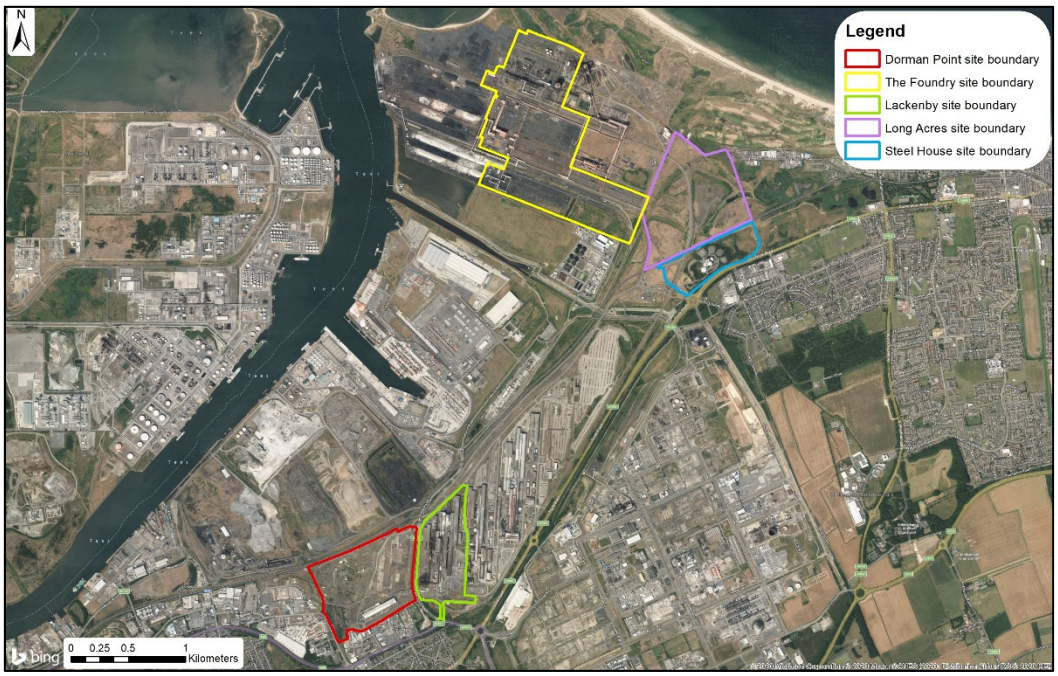
The development site is located between Steel House to the south and the Foundry to the north and provides just under 186,000sqm of floorspace. It is proposed that the site will provide general industrial (B2) use and storage and distribution facilities (B8), with ancillary office accommodation. The development is forecast to employ approximately 2,161 people when operational.

## Steel House

The development site is bound to the south by the A1085 Trunk Road and is currently occupied by the Steel House office complex. It is proposed that the floor area, of around 16,000sqm, provides office and incubator space (use class E). It is forecast that the site could employ approximately 1,128 people when operational.

The location of the five sites is shown in **Figure 1**. The construction of the development sites will be phased, and all are expected to be operational by 2033.

**Figure 1 Site Locations**



# 2 Planning Policy Review

## 2.1 Literature Review

The TA for each of the five sites will address the relevant transport related policy documents as follows:

- National Planning Policy Framework (NPPF) 2019;
- Tees Valley Combined Authority Strategic Transport Plan 2020 - 2030;
- Redcar and Cleveland Local Plan 2018;
- Redcar and Cleveland Local Transport Plan 2011-2021;
- South Tees Regeneration Masterplan 2019; and
- South Tees Area Supplementary Planning Document (SPD) 2018.

It is proposed that the development considers relevant transport policies from the policy and guidance documents listed above. RCBC to advise if any other documents should be considered.

# 3 Baseline Conditions

The scope of each TA will include a full audit of available transport modes following the methodology outlined in this section.

## 3.1 Site Description and Location

This section of each TA will provide a high-level description of the characteristics of the site and the surrounding area.

## 3.2 Sustainable Transport Networks

A desktop audit of existing facilities and routes will be provided in this section of the TA. Information such as bus and rail routes, destinations and example journey times will be provided. For scheduled services, information such as frequencies and service times will be included.

## 3.3 Highway Network

This section of each TA will provide an overview of the main local roads and Strategic Road Network connecting the site to the wider area.

Due to current circumstances with the Covid 19 pandemic and lockdown measures, it is not possible for traffic surveys to be undertaken to inform the baseline condition assessment. To establish the baseline traffic flows, the following data sources have been utilised:

- Traffic data from HE North Regional Transport Model (NRTM);
- Traffic data from the Tees Valley Combined Authority (TVCA) Tees Valley Cube Model (TVM);
- Department for Transport traffic counts available online;
- WebTRIS (HE) online data;
- Traffic surveys collected on behalf of Capita in 2019 to construct a VISSIM model of the area for RCBC – permission to obtain a copy of these surveys was granted by RCBC, Capita and NETDC Ltd; and
- Survey data publicly available online from other local developments, including the planning application for the York Potash development (application number R/2013/0669/OOM).

Peak hour data from the two traffic models (NRTM and TVM) was input into two separate traffic flow diagrams for the study area. On both diagrams, any observed data was added above the links to enable a comparison to be made and determine which data source provided the most comparable base. The NRTM was found to be a comparable match against the baseline flows, and therefore the NRTM flows were predominantly used to inform the baseline, except for where observed data was available. All data has been adjusted to 2020 and 2033 (for operational year assessment) using NRTM growth.

The methodology described above was also used on application number R/2020/0357/OOM for development on the South Industrial Zone of the Teesworks site (referred to as 'South Bank').

## 3.4 Road Safety Analysis

To inform road safety considerations associated with the development proposals, a high-level review of five years' worth of accident data on the roads within the vicinity of each site will be undertaken.

Should any common factors pertaining to road traffic accidents be identified, suitable mitigation features may be considered as part of the development proposal.

This section seeks agreement that:

- The scope of the transport networks audit is acceptable;
- The methodology for establishing baseline traffic flows is acceptable; and
- The scope of the accident appraisal is adequate.

# 4 Development Proposals

This section of each TA will provide an overview of the proposed development, including details about site accesses and proposed transport provisions for the site.

## 4.1 Vehicular Access

The TA for each development site will provide details about the site access arrangements. It is anticipated at this stage that the development sites will be accessed as follows:

**Dorman Point**

The parameter plan shows four indicative access points into the Dorman Point site:

- One via a new roundabout junction on Eston Road, the works for which have planning permission (application number R/2020/0270/FFM);
- One at the north east corner of the site where an existing Teesworks internal road enters the site;
- One at the south east corner where an existing Teesworks internal road enters the site; and
- One potentially to be provided at the south west corner of the site at the Bessemer Gate entrance into the Bolckow Industrial Estate.

For the purpose of the assessment, the main vehicular access will be the new roundabout junction on Eston Road with all trips generated by the site using the roundabout to access the wider highway network.

**Lackenby**

It is proposed that the main vehicular access into the Lackenby site will be via a new fourth arm provided on the A66/Tees Dock Road roundabout into the site. All development trips will be assigned to this main access for the purpose of junction impact assessments. Access is expected to also be permitted via the internal Teesworks road network that connects to Dorman Point.

**Long Acres, Foundary and Steel House**

It is proposed that these sites access the public highway network via the Trunk Road Roundabout (also known as Steel House Roundabout).

## 4.2 Walking and Cycling Facilities

The TA for each of the five sites will provide information about the proposed walking and cycling facilities for each development and how these connect to the external network.

## 4.3 Public Transport Facilities

Details of existing public transport connections will be provided in each of the TA's.

## 4.4 Cycle Parking

High quality cycle parking is expected to be provided, in excess of the usual standards, in support of a more sustainable travel policy for the site.

## 4.5 Car Parking

As all five applications will be in outline, the internal site layouts have not yet been developed, and therefore the level of car parking provision is unknown. A transport strategy for the wider Teesworks site is currently in development but will limit car parking within the site to meet sustainability targets (including RCBC's ambition to be carbon neutral by 2030). It is subsequently anticipated that the internal layout, when developed, will support the strategy and limit car parking as far as reasonably possible.

This section seeks agreement on the transport proposals for the proposed development.

# 5 Trip Generation

## 5.1 Person Trips

The approach to trip generation will follow the same methodology as that agreed for the South Bank development (planning application number R/2020/0357/OOM). The methodology applies trip rates from the TRICS database based on employee numbers. TRICS is a recognised database widely used by transport professionals which predicts trip rates of developments based on survey information of comparable sites.

The industrial trip rates used in the South Bank assessment are shown in **Table 1**.

**Table 1: Industrial Trip Rates**

| Trip rates/employee | AM Peak (08:00 – 09:00) | | | PM Peak (17:00 – 18:00) | | | Daily (7am – 7pm) | | |
|---|---|---|---|---|---|---|---|---|---|
| | In | Out | Total | In | Out | Total | In | Out | Total |
| **Person Trips** | 0.322 | 0.089 | 0.411 | 0.078 | 0.314 | 0.392 | 2.134 | 2.121 | 4.255 |
| **LGVs** | 0.029 | 0.022 | 0.051 | 0.01 | 0.016 | 0.026 | 0.294 | 0.287 | 0.581 |
| **HGVs** | 0.19 | 0.16 | 0.035 | 0.014 | 0.01 | 0.024 | 0.218 | 0.208 | 0.426 |

These were identified and agreed as comparable trip rates to apply to large scale industrial sites and will therefore be applied at Long Acres and the Foundry. However, during the consultation process for the South Bank planning application, Middlesbrough Council indicated that the trip rates that were applied on the TeesAMP development (planning application number 18/0308/FUL) should be applied at the Teesworks site. The TeesAMP trip rates are more applicable to smaller sized industrial sites and therefore could be applicable at both Dorman Point and Lackenby. These trip rates are shown in **Table 2** and will be applied at Dorman Point and Lackenby.

**Table 2: TeesAMP Industrial Person Trip Rates**

| Trip rates/employee | AM Peak (08:00 – 09:00) | | | PM Peak (17:00 – 18:00) | | | Daily (7am – 7pm) | | |
|---|---|---|---|---|---|---|---|---|---|
| | In | Out | Total | In | Out | Total | In | Out | Total |
| **Trip Rates** | 0.475 | 0.245 | 0.720 | 0.175 | 0.425 | 0.60 | 3.434 | 3.435 | 6.869 |

The Steel House site is proposed for office type use (use class E) and therefore office trip rates have been obtained from TRICS and these are shown in **Table 3**.

**Table 3: Office Trip Rates**

| Trip rates/employee | AM Peak (08:00 – 09:00) | | | PM Peak (17:00 – 18:00) | | | Daily (7am – 7pm) | | |
|---|---|---|---|---|---|---|---|---|---|
| | In | Out | Total | In | Out | Total | In | Out | Total |
| **Person Trips** | 0.317 | 0.023 | 0.340 | 0.025 | 0.317 | 0.342 | 1.370 | 1.311 | 2.681 |
| **LGVs** | 0.003 | 0.002 | 0.005 | 0 | 0.001 | 0.001 | 0.029 | 0.029 | 0.058 |
| **HGVs** | 0.001 | 0.001 | 0.002 | 0 | 0 | 0 | 0.002 | 0.002 | 0.004 |

The trip rate for service and delivery vehicle trips (light goods vehicles and heavy goods vehicles) has been shown to disaggregate the overall person trip rate and determine how many trips are likely to be made by commuters, versus service vehicle trips. No information is provided in the TeesAMP Transport Assessment regarding service vehicle trip rates. It is useful to distinguish service trips, particularly HGVs, to assist assessments into noise and air quality. Therefore, the proportion of LGV and HGV trips from the TRICS analysis will be applied to the trip rates from the TeesAmp assessment to distinguish service vehicle trips.

The resultant person trips for each site, excluding LGVs and HGVs, is summarised in **Table 4**.

**Table 4: Person Trips by Site**

| Trip rates/employee | AM Peak (08:00 – 09:00) | | | PM Peak (17:00 – 18:00) | | | Daily (7am – 7pm) | | |
|---|---|---|---|---|---|---|---|---|---|
| | In | Out | Total | In | Out | Total | In | Out | Total |
| **Dorman Point** | 654 | 226 | 921 | 196 | 633 | 846 | 4,228 | 4,229 | 8,457 |
| **Lackenby** | 436 | 151 | 614 | 130 | 422 | 564 | 2,819 | 2,819 | 5,638 |
| **The Foundry** | 1,480 | 275 | 1,755 | 292 | 1,555 | 1,847 | 8,760 | 8,782 | 17,542 |
| **Long Acres** | 592 | 110 | 702 | 117 | 622 | 739 | 3,505 | 3,514 | 7,019 |
| **Steel House** | 353 | 23 | 376 | 28 | 356 | 385 | 1,510 | 1,444 | 2,954 |

All sites were previously occupied. However, as the development sites are currently vacant, it is proposed that the trip generation does not take into account previous or permitted uses and therefore the overall trip generation will not be discounted; all trips will be added to the network as new trips.

## 5.2 Trips by Mode

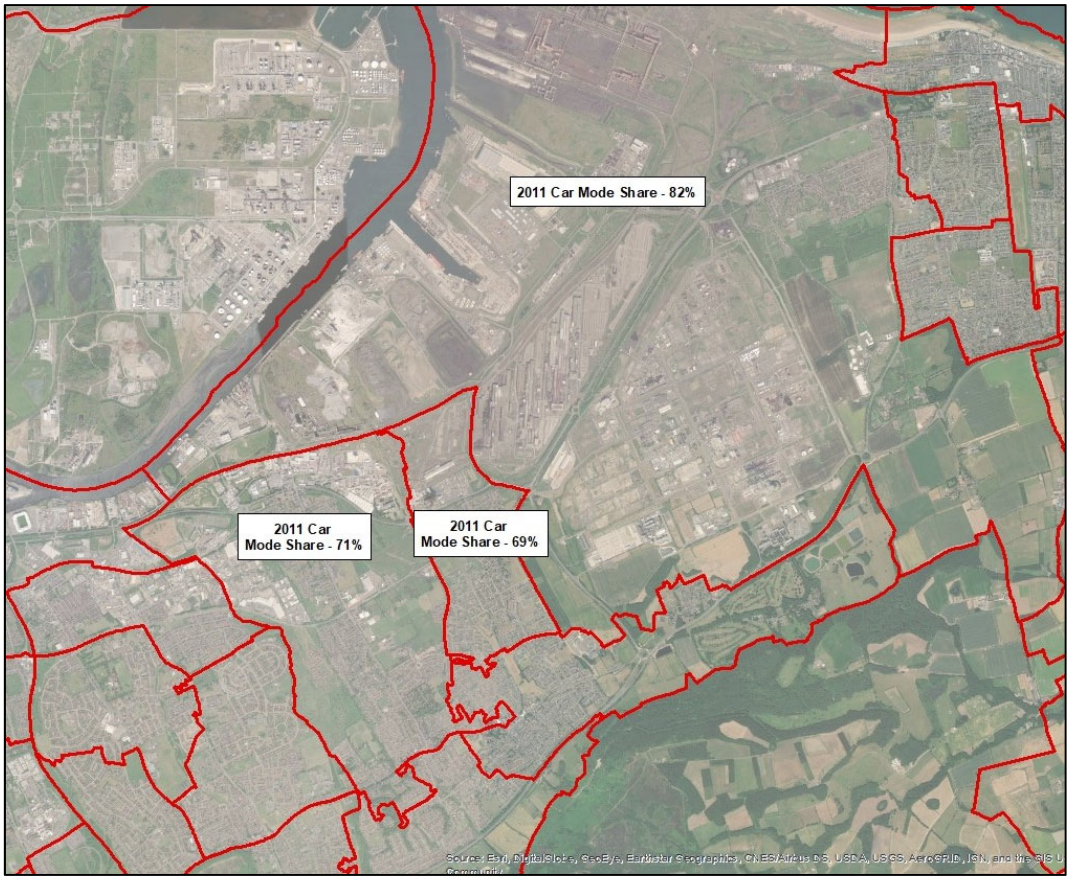
Having established a method for calculating the number of trips, the mode of transport for commuters has been informed by reviewing data from the 2011 UK Census Journey to Work dataset. The Teesworks area is split across two travel to work areas, Census zone E02002517 to the north and E02002523 to the south. Data regarding how people working in these areas travelled to work in 2011 is shown in **Table 5**.

**Table 5 2011 Census Method of Journey to Work**

| Mode | 2011 UK Census Northern Zone % | 2011 UK Census Southern Zone % |
|---|---|---|
| **Car Driver** | 82% | 69% |
| **Car Passenger** | 8% | 8% |
| **Bus** | 3% | 5% |
| **Bicycle** | 3% | 2% |
| **Walking** | 3% | 13% |
| **Motorcycle** | 1% | 0% |
| **Taxi** | 0% | 2% |

It can be seen that car mode share in 2011 varied between 82% and 69% and the areas this applies to is shown in **Figure 2**. The Dorman Point and Lackenby sites are located in the area where car mode share, in 2011, was 69% and the other sites are located to the north where travel to work, by car, was the higher 82% in 2011.

**Figure 2 2011 Census Data – Car Mode Share**




The transport strategy for the site will seek to reduce car mode share significantly. However, these earlier developments coming forward may not benefit from the longer-term strategy improvements proposed up to 2042.

It is proposed that measures will be implemented to support sustainable accessibility to the site, including a dedicated bus service that will connect the

local towns of Middlesbrough and Redcar to the development sites. The bus service, funded initially by the Teesworks development, will travel into the site to provide a service that connects directly to each of the five development sites. The provision of a bus service, alongside other travel planning measures, is considered to enable at least a 5% reduction in those travelling to the site by car when these sites are operational. It is therefore assumed that the maximum car mode share for Dorman Point and Lackenby be 64%, with the other sites having a car mode share of 77%. **Table 6** shows how the base and adjusted car mode share equates to commuter car trips in the AM peak hour for each site.

**Table 6 Car Trips**

| | Base Car Mode Share | | | Adjusted Mode Share (-5%) | | |
|---|---|---|---|---|---|---|
| **Site** | AM In | AM Out | Total | AM In | AM Out | Total |
| **Dorman Point** | 451 | 156 | 635 | 419 (-33) | 145 (-11) | 590 (-46) |
| **Lackenby** | 301 | 104 | 424 | 279 (-22) | 97 (-8) | 393 (-31) |
| **The Foundry** | 1,214 | 226 | 1,439 | 1,138 (-76) | 212 (-14) | 1,350 (-88) |
| **Long Acres** | 485 | 90 | 576 | 455 (-30) | 85 (-5) | 540 (-35) |
| **Steel House** | 289 | 19 | 308 | 272 (-18) | 17 (-2) | 289 (-19) |
| **Total** | 2,741 | 595 | 3,382 | 2,562 (-178) | 555 (-40) | 3,164 (-218) |

It can be seen from **Table 6** that the travel planning measures must aim to remove around 200 trips from private cars in the morning peak hour onto more sustainable modes to achieve a 5% car mode share reduction.

## 5.3 Trip Distribution

Feedback received on the South Bank planning application (application number R/2020/0357/OOM) from HE indicated that consideration should be given to journey to work data from the UK Census (which indicates the origin and destination trips for commuters), as well as existing turning proportions on the highway network, to assign development traffic to the highway network.

For all five sites the trip distribution at the main access will be informed by Census data. It is proposed to distribute traffic on the remainder of the highway network using the turning proportions in the baseline traffic flow diagrams.

Traffic will be distributed as far west to the A19 corridor, south to the A174 corridor and east to the Trunk Road / Kirkleatham Lane junction. The site is bound by the River Tees to the north.

## 5.4 Cumulative Assessment and Future Growth

A cumulative assessment will be undertaken to consider the cumulative effects of all five developments, plus the South Bank development. This cumulative assessment of all STDC sites will be undertaken for a future year of 2033. Rather than review and extract traffic flows for the committed developments that have been identified, it is proposed to extract growth from Highways England's North Regional Transport Model (NRTM). This approach is considered to be

reasonable as it is underpinned by the National Trip End Model (NTEM) which informs TEMPro growth, as well as a full variable demand model, accounting for changing economic conditions and competing transport modes. Growth in the NRTM is controlled to NTEM at district level (as per TAG guidance) however individual developments are explicitly accounted for. This means that local trip end growth is calculated in a detailed way.

This scoping report seeks agreement on:

- The employee trip rate approach which applies large industrial site trip rates to the Long Acres and Foundry sites, and the TeesAMP trip rates to the Dorman Point and Lackenby sites. Office trip rates will be applied to the Steel House development;
- Applying 2011 Census mode share proportions to determine trips by mode, but reducing car mode by 5% to account for trips transferred onto the proposed bus service and other sustainable travel initiatives. This results in the assumed car mode share at Dorman Point and Lackenby of 64% and 77% at the other three sites;
- The approach to vehicular trip distribution; and
- The approach to use NRTM forecasts to growth traffic to 2033 which will be used to both assess the impact of each development in 2033, but also to assess the cumulative impact of all five sites being operational by 2033. The cumulative assessment will also include trips from the South Bank development.

# 6 Development Impact Assessment

## 6.1 Scope of Highway Impact Assessment

### 6.1.1 Local Junction Assessments

A number of junctions have been identified on the surrounding network where the development trips could have an impact. **Table 7** lists the junctions that will be assessed for each development.

**Table 7 Junctions Impact Assessments**

| Site | Type | Dorman Point | Lackenby | Foundry | Long Acres | Steel House |
|---|---|---|---|---|---|---|
| **A66/Old Station Road roundabout** | ARCADY | X | X | | | |
| **A66/Eston Road** | LINSIG | X | X | | | |
| **A66/Normanby Road** | LINSIG | X | X | | | |
| **A66/Tees Dock Road roundabout** | ARCADY | X | X | | | |
| **A66/Trunk Road/A1053 Greystones Road** | LINSIG | X | X | X | X | X |
| **Eston Road roundabout** | ARCADY | X | X | | | |
| **Greystones roundabout** | LINSIG | X | X | X | X | X |
| **Steel House roundabout** | ARCADY | | | X | X | X |
| **Trunk Road/Kirkleatham Lane** | LINSIG | | | X | X | X |

The junction assessments will be undertaken for the following scenarios for both the AM and PM peak hour:

- 2033 Base;
- 2033 Base + 1 development site (x5);
- 2033 Base + all five developments + South Bank development (cumulative assessment).

### 6.1.2 Strategic Highway Assessment

As requested by HE for the South Bank development, the scope of the traffic assessment will extend to include the A19 corridor. Jacobs has provided a copy of the 2015 New Tees Crossing AIMSUN Model so that the impact of trips from

the Teesworks sites on the A19 can be assessed. The impact of each development site, and the cumulative scenarios, will be undertaken.

## 6.2 Environmental Impact Assessment

A traffic and transportation assessment will be included in the Environmental Statement (ES) for each development. The Environmental Impact Assessment (EIA) will be carried out in accordance with the EIA Regulations and guidance contained in relevant publications including:

- Environmental Impact Assessment: A Guide to Procedures (Department of the Environment, Transport and the Regions (DETR), 2000); and
- Guidelines for Environmental Impact Assessment (Institute of Environmental Management & Assessment (IEMA), 2004).

In accordance with the IEMA Guidelines, it is proposed that the following conditions on the transport network within the study area be assessed during the operational phase (2033 with development) for each site:

- Severance (change in traffic flows);
- Driver and bus user delay (derived from the junction assessments);
- Pedestrian and cyclist amenity (change in traffic flows on local routes used by pedestrians and cyclists); and
- Accidents and safety (following a review of existing conditions, a judgement will be made as to whether the proposed development will result in any changes to highway safety).

Construction details are not yet finalised and as such, construction traffic will not be included in the scope of the traffic and transportation assessment of the EIA. A framework Construction Environmental Management Plan (CEMP) will be prepared and will form part of the embedded mitigation of the development. The CEMP will identify that a Construction Traffic Management Plan (CTMP) will be implemented either at site level or for each development phase. The CTMP will identify any necessary mitigation to minimise the impact of construction traffic on the transport networks.

This section of the scoping report seeks agreement on:

- The scope of the junction impact assessments for the TA's;
- The junction assessment scenarios; and
- The scope of the EIA assessment.

# 7 Travel Plan

## 7.1 Overview

All of the proposed developments are located within the Teesworks site and subsequently will be encompassed into the Transport Strategy and benefit from the measures that will be delivered to serve the wider site. The Transport Strategy is still under development but is expected to include ambitious targets to reduce car use and recommend measures that significantly improve the accessibility of the site by public transport, walking and cycling.

However, as these sites will be developed in advance of the strategy being adopted, a Travel Plan Framework for each site will be outlined in the TA, detailing measures that will be applied in advance of the wider strategy coming forward, but also outlining how the site will be incorporated into the wider masterplan in due course.

## 7.2 Bus Service

A key recommendation arising from the Transport Strategy is the need to provide a bus service that travels within the site. The scale of the site means that the location of the public bus stops are well outside the generally accepted 400m walking distance between a bus stop and a destination.

It is therefore anticipated that the TA's will recommend that to provide an attractive alternative to private car travel to the site, a bus service will be required. Further details of this will be provided in the Travel Plan Framework.

RCBC to confirm that this application can be incorporated into the wider STDC Transport Strategy and that a Travel Plan Framework, which outlines the measures that occupiers could introduce prior to more wide-ranging measures coming forward, will be sufficient to support each planning application.

# 8 Conclusions and Next Steps

This Scoping Report has considered the potential impact of five proposed development sites on the Teesworks site. It has outlined what is proposed to be covered by the Transport Assessment and Environmental Statement that will be submitted as part of the planning application for each of the proposed developments.

Arup would be grateful if RCBC, MC and HE could respond in writing to confirm that the methodology proposed in this report is acceptable. Should there be any significant issues with regards to the scope, an online meeting is requested at the earliest convenience.

# Appendix C3: Consultation Responses

# South Tees Development Corporation: Teesworks – Response to "Transport Assessments – Scoping Report"

| | |
|---|---|
| PREPARED FOR: | Chris Bell / Sunny Ali (Highways England) |
| PREPARED BY: | Gavin Nicholson (CH2M) |
| DATE: | 14th December 2020 |
| PROJECT NUMBER: | 679066.AA.20.18.12 |
| SITE/ DOCUMENT REF: | DevTV0062/TM001 |
| REVIEWED / APPROVED BY: | Jonathan Parsons (CH2M) |

## Introduction

CH2M has been commissioned by Highways England to provide a review of the document titled "South Tees Development Corporation: Teesworks, Transport Assessments – Scoping Report" prepared by Arup on behalf of the South Tees Development Corporation and dated 26th November 2020 [the Scoping Report].

The single Scoping Report seeks to set the scope for five separate Transport Assessments [TAs] which will support the five outline planning applications for development within the South Tees Development Corporation [STDC] site.

The STDC site is located on the south bank of the River Tees, between Redcar town centre to the east and Middlesbrough town centre to the west. The site location, indicating each of the five sites that will require a TA, is shown in Figure 1, extracted from the Scoping Report.

The consultation with Highways England at this stage of the process should be welcomed as early engagement enables the assessment to be aligned to Highways England's requirements. A summary and conclusion are provided at the end of this Technical Memorandum [TM].

Figure 1 – Location of application sites


*(Extract from the Scoping Report)*

According to the Scoping Report, it is expected that the proposed outline planning applications will be for the level of development identified in Table 1.

Table 1 – Application sites information

| Application site | Floorspace (sqm) | Land Use | Approximate operational jobs |
|---|---|---|---|
| Dorman Point | 140,000 | B2 / B8 with ancillary office | 1,620 |
| Lackenby | 93,000 | B2 / B8 with ancillary office | 1,080 |
| The Foundry | 464,515 | B2 / B8 with ancillary office | 5,401 |
| Long Acres | 186,000 | B2 / B8 with ancillary office | 2,161 |
| Steel House | 16,000 | Office and incubator space (use class E) | 1,128 |
| **Total** | **899,515** | **-** | **11,390** |

All of the development sites are expected to be operational by 2033.

# Background

For background, it is important to note that Highways England has recently been consulted on an application for an initial element of development within the STDC site – the Southern Industrial Zone. This development (located north of the Dorna Point site (indicated by the red boundary in Figure 1 above) was for a plot of approximately 418,000sqm of B2 / B8 floorspace with ancillary office development, expecting to accommodate 3,870 employees. Highways England were able to accept the development following a period of dialogue and provision of appropriate assessment at the SRN.

# Technical Memorandum structure

This TM:

- Firstly, considers the technical elements of the Scoping Note in order to enable a response to be made to that; and
- Then considers the fit of these development aspirations with the wider strategy for the site (Local Plan policy, SPD, Masterplan) to ensure that the sites are being brought forward in a manner that fits this wider context.

# Scoping Report review

This TM mirrors the structure of the Scoping Report and specifically aims to focus on the elements of the Scoping Report that are of interest to Highways England and seeks to provide a response to all the decision points identified by Arup.

## Baseline conditions

**Highway network**

The Scoping Report sets out that the TAs will provide an overview of the local road and the SRN connecting the site to the wider area. It is identified that due to current (Covid-19) conditions, it is not possible for traffic surveys to be undertaken to inform the baseline assessment. This situation is recognised by CH2M.

As with the Southern Industrial Zone scoping, the elements of the SRN that are required to be assessed should be informed by the trip assignment analysis and with a view to the absolute level of impact (noting that percentage impacts will not be considered as an indicator). Information in relation to the full assignment of trips should be presented early in the process (prior to completion of the TAs), in order for agreement to the study area to be reached and to inform other elements of the TAs. Highways England consider that the starting point to identifying the need for assessment is based on an impact exceeding 30 two-way trips at a junction on the SRN.

Upon definition of the study area (based on the impact analysis), CH2M recommend that a fully defined approach of reflecting typical traffic conditions is established including sourcing all available traffic data (traffic count companies and Highways England).

With regard to growth and future operational scenarios, CH2M recommend that scenarios mirroring those ultimately agreed as part of the Southern Industrial Zone assessment would be reasonable.

**Road safety analysis**

The Scoping Report proposes that a high-level review of five years' worth of accident data within the vicinity of the site is to be undertaken.

This approach is accepted but the review will also need to cover any SRN geography that is needed to be included in the study area.

## Development proposals

**Vehicular access points**

The Scoping Report identifies that each TA will provide details about the site access arrangements. While these access points will all be located on the local road network and subject to local highway authority review, information should be available to ensure that Highways England can be satisfied that:

- The trip distribution and assignment analyses pay appropriate cognisance to the access points and the routes which vehicles would traverse the networks; and
- Any operational consequences at the local road network that have the potential to cause subsequent operational issues at the SRN are fully detailed.

**Car parking**

It is identified that, given the five applications will be in outline form, the level of parking provision is unknown at this stage. While the scale of parking is generally a matter for the local highway authority to satisfy itself with, the level of parking has the potential to influence the trip generation and the sustainability credentials of the site, Highways England will need to be subject to consultation on the reserved matters applications that seek to define the level of parking.

## Trip generation

**Person trips**

The Scoping Report identifies that the trip rates are based on:

- For the large scale industrial sites (Long Acres and the Foundry) the application of the trip rates used in the South Industrial Zone assessment;
- For the smaller sized industrial sites (Dorman Point and Lackenby), the application of trip rates from the TeesAMP development (application ref 18/0308/FUL); and
- For the office based site (Steel House), office trip rates from TRICS have been used.

CH2M has undertaken a review of this information and make the following comments (on the basis that the planning application will be specific in relation to the scale and mix of development proposed):

- Long Acres and the Foundry

  It can be confirmed that the trip rates utilised are those agreed as part of the Southern Industrial Zone assessment and these can therefore be accepted.

- Dorman Point and Lackenby

  The use of the TeesAMP trip rates for these elements of the development are accepted.

- Steel House

  The TRICS assessment and parameters used have not been provided to enable validation of the office trip rates and these should be provided to enable these to be agreed.

**Trips by mode**

Journey to Work data has been used to infer the proportion of highway trips based on Census zones E02002517 and E02002523 for the northern and southern parts of the site respectively. This is considered a reasonable approach by CH2M.

It is identified that it is proposed that measures will be implemented to support sustainable accessibility to the site. On the basis of these measures, it is identified in the Scoping Report that this will enable at least a 5% reduction in travel to the site by car and therefore it is assumed that the number of car trips could be reduced by 5%.

The Scoping Reports does not suggest whether the base car mode share trips or the adjusted (-5%) car trips will be utilised within the operational assessments in the TAs. Should it be proposed that the latter, there will be a requirement for:

1) Clarification in relation to how the measures being proposed transpire into the defined 5% reduction – how has the 5% reduction been quantified;

2) A detailed commitment to the identified initiatives, secured through appropriate planning conditions requiring measures to be in place prior to occupation; and

3) Potential need for consideration of fallback positions within the Travel Plan in the event that the sustainable measure targets have not been achieved.

**Vehicular trip distribution**

The Scoping Report proposes that vehicular trip distribution is to be based on (i) at the site access, journey to work distribution trips from the Census data and (ii) existing turning proportions on the highway network.

As discussed through the Southern Industrial Zone application, the use of existing turning proportions to distribute development traffic is not considered acceptable. CH2M therefore recommends that the trip distribution analysis is founded on Census data and that the analysis be provided in spreadsheet form to enable checking and validation.

While initial extents of the trip distribution analysis are provided, noting that Highways England consider that the starting point to identifying the need for assessment is based on an impact exceeding 30 two-way trips at a junction, the trip distribution analysis should extend to cover all potential elements fitting this criteria.

**Cumulative Assessment and Future Growth**

The Scoping Report identifies that a cumulative assessment of all five proposed developments alongside the Southern Industrial Zone will be undertaken. This assessment is welcomed by CH2M.

With a view to consideration of other committed developments and other background growth calculations, CH2M consider that the forecasts utilised as part of the ultimately agreed analysis for the Southern Industrial Zone is utilised rather than create a variant set of analyses that require further development, checking and validation.

The provision of the information in spreadsheet form (including all component elements) will enable a review to be undertaken.

## Development Impact Assessment

**Scope of Highway Impact Assessment**

With regards to the SRN, it is identified in the Scoping Report that elements of the network that will be assessed will mirror those ultimately assessed as part of the agreed Southern Industrial Zone assessments. As identified above, the study area will need to be agreed on the basis of the trip assignments determined from the earlier elements of the analysis.

At this time, it is not possible to validate the areas of the network that require assessment (Highways England consider that the starting point to identifying the need for assessment is based on an impact exceeding 30 two-way trips at a junction) and these should be clarified prior to the undertaking of any operational assessment.

In addition, the assessment of a 2033 future year assessment is welcomed by CH2M, although it will need to be ensured that validated base models are utilised in assessments.

**Environmental Impact Assessment**

Given the scale of development, there is the potential that there could be significant construction impacts. It may be necessary for the Construction Traffic Management Plan [CTMP] to be conditioned until a clear view on construction impacts (construction trip impacts and potential abnormal loads) is known.

## Travel Plan

The Scoping Report outlines that a Travel Plan framework for each site will be prepared. Whilst it would have been welcomed for the transport strategy for the wider STDC site to have set the strategic sustainable transport framework for the site, in terms of the Travel Plans, as discussed earlier, it will need to be considered that:

1) Clarification in relation to how the measures being proposed transpire into the defined 5% reduction – how has the 5% reduction been quantified;
2) A detailed commitment to the identified initiatives, secured through appropriate planning conditions requiring measures to be in place prior to occupation; and
3) Potential need for consideration of fallback positions within the Travel Plan in the event that the sustainable measure targets have not been achieved.

CH2M would welcome these points being considered as the assessment moves forward.

# Fit of sites with wider strategies

The site forms parts of the wider STDC site. Whilst reference to the STDC Transport Strategy is made, it is fully recognised that these sites are coming forward in advance of the Transport Strategy having been completed:

- The Scoping Report acknowledges:
  - Within section 4.5 (relating to car parking) that *"A transport strategy for the wider Teesworks site is currently in development but will limit car parking within the site to meet sustainability targets) … It is subsequently anticipated that the internal layout, when developed, will support the strategy and limit car parking as far as reasonably possible."*
  - Within section 5.2 (relating to trips by mode) that *"The transport strategy for the site will seek to reduce car mode share significantly. However, these earlier developments coming forward may not benefit from the longer-term strategy improvements proposed up to 2042."*
- As part of discussions relating to the Southern Industrial Zone site, Arup identified *"The transport strategy for the wider STDC site will be looking at a longer-term horizon in terms of future year assessments. The impact of the wider STDC site up to a final year scenario, expected to be circa 2040, will be assessed by undertaking strategic modelling of the surrounding highway network."*

Bringing such a scale of site forward in advance of a fully defined Transport Strategy is considered by CH2M to be somewhat of a concern to Highways England as this restricts the ability to bring them forward in a strategically-planned manner.

Rewinding a little back to the Local Plan, the Supplementary Planning Document [SPD], the site Masterplan and the Transport Strategy, the following summary is provided with a view to the current position:

## Redcar and Cleveland Local Plan (Adopted May 2018)

**Local Plan provisions**

In relation to development:

- Policy LS4 (South Tees Spatial Strategy) (which includes the STDC) identifies that Redcar and Cleveland Council [the Council] will:
  - (p) "support improvements to the strategic and local road network to support economic growth"

  - Para 3.27 identifies that a Master Plan is being prepared and this will help guide development of this area, including infrastructure improvements.

- Policy ED6 (Promoting Economic Growth) identifies that:
  - Land and buildings within existing industrial estates and business parks, as shown on the policies map, will continue to be developed and safeguarded for employment uses."
  - Specialist uses, such as heavy processing industries and port logistics, will be focussed in the following areas, with 405 hectares of additional land available over the plan period. In these areas proposals falling within Use Classes B1, B2, B8 and suitable employment related sui-generis uses will be supported.
    - ED6.2 Land at South Tees 184 hectares.
    - ED6.4 South Tees Industrial Estates and Business Parks 3.5 hectares

In relation to Infrastructure:

- Para 1.112 identifies that the Council will work with organisations to ensure the infrastructure is delivered when required.
- Para 1.113 identifies the Tees Valley Strategic Infrastructure Plan as setting out the current barriers to growth and priorities for improving infrastructure across Tees Valley.
- Para 1.114 identifies that there are plans to deliver improvements to rail and road infrastructure.
- Para 1.124 identifies that it is important to ensure that the borough's road infrastructure will have the capacity to cope with the expected increase in traffic levels over the life of the Local Plan.
- Para 1.125 states that "Improving transport links will require continued, proactive joint working with …the Highways Agency … with the overall aim of establishing a high quality, safe, secure and reliable network …"

In relation to Transport:

- Para 9.7 identifies the key objectives of the transport strategy component of the Local Plan, including - improve access and connectivity to and from Teesport and the surrounding South Tees area
- Policy TA1 (Transport and New Development) identifies:
  - The Council and its partners will ensure that the transport requirements of new development, commensurate to the scale and type of development, are taken into account…
- Para 9.8 recognises the borough has particular congestion hotspots at the SRN including the A19, A174 and A66 and that new infrastructure may be needed to tackle these congested areas.
- Para 9.17 indicates that the Council follows the requirements of the Guidance on Transport Assessment as the standards for when TS, TA and TPs are required.
- Policy TA2 (Improving Accessibility Within and Beyond the Borough) identifies that the Council will work together with …. Developers and transport providers. This will include:
  - (f) working with Highways England to improve capacity to the A66, A1053 and A174, particularly Greystones roundabout.
  - (k) working with the Tees Valley Combined Authority and Highways England to deliver capacity improvements to the Strategic Road Network including across the sub-region including improvements to the A19, A1085 and A689 to improve access to key development sites, all providing indirect benefits to Redcar and Cleveland;

  - (m) supporting proposals being prepared by Tees Valley Combined Authority and Highways England to deliver improvements to the A66 and A174 road links to the A19 and beyond to the A1/A1(M), providing appropriate access to the strategic highway network from South Tees, to reduce bottlenecks and maintain highway capacity;
  - Where necessary, developers may be required to fund transport improvement schemes through Section 106 agreements where infrastructure provision and capacity would be affected or could constrain new development.

- Para 9.25 states that Redcar and Cleveland benefits from good highways provision catering for heavy vehicles and industrial uses. Linkages between the South Tees, Greater Eston and Redcar and the strategic highway network on the A66, A174 and A19 make the area highly accessible and attractive to industry, business and commuters. It is imperative that this operational benefit over other areas, where capacity is more limited, is not detrimentally affected by any development proposals. It will be essential that improvements and enhancements to the borough's infrastructure continue in order to facilitate local economic development and growth. The Council will continue to work strategically with its neighbouring local authorities and the LEP to maximise on funding opportunities via the Government. The Local Plan is being developed in parallel with the sub-regional Strategic Economic Plan and the Local Growth Fund and is ensuring consistency of objectives. We will also work proactively with the private sector to secure developer contributions to ensure the highway network advantage is maintained and enhanced wherever possible.

The development principles establish that:

- Policy SD4 (General Development Principles) identifies that in assessing suitability, development will be permitted where it:
  - a) meets the requirements of the locational policy and accords with other Local Plan policies and designations
  - g) will have access to adequate infrastructure … to serve the development
  - p) provide suitable and safe vehicular access
- Policy SD5 (Developer Contributions) identifies that the Council may secure developer contributions in order to fund necessary infrastructure.

**Highways England position**

The joint position statement between Highways England and the Council noted that the development in the Local Plan is unlikely to have a significant impact on the SRN and the package of measures proposed are acceptable to both Highways England and the Council in ensuring that the SRN can support the growth aspirations identified in the Local Plan.

The proposed schemes are promoted through the Local Plan in Policy TA3 and the supporting Infrastructure Delivery Plan, specifically identifying improvements to the A19, A1053, A66 and A174; while recognising that further work is required to specifically identify the phasing of the improvements and the quantum of development that can be accommodated on the SRN prior to the improvements being required.

It was noted that applications for development will be managed on an individual basis.

## South Tees Area Supplementary Planning Document [SPD] (Adopted May 2018)

During the consultation on the SPD, Highways England noted general support, but that it should be delivered in accordance with Local Plan Policy TA2 and the Infrastructure Delivery Plan and that there

was a need to ensure that the implications at the SRN are understood and addressed in line with the package of SRN improvements detailed within the Local Plan and Tees Valley AAP.

In summary, the SPD:

- Seeks to guide and inform future planning applications in the area and used as a material consideration in determining planning applications.
- Identifies requirements and provides a broad strategy to deliver supporting infrastructure.
- Commits to the development of a Transport Strategy.
- Seeks the creation of up to 20,000 new jobs.
- Contributions relevant to the nature and scale of the development may be sought, including … in order to fund necessary infrastructure … required as a consequence of development and in accordance with Local Plan policy SD5.
- Seek to improve and enhance the transport infrastructure serving the South Tees Area, as supported by Local Plan Policy LS4.
- All new development proposals shall be in accordance with Local Plan Policies SD4 and TA1 and will be required to have access to adequate infrastructure to meet their transport requirements.
- Other highways infrastructure proposals will be delivered in line with emerging development priorities and funding availability and will be identified through the Transport Strategy for the Area.
- The Council, working in partnership with the STDC, the Tees Valley Combined Authority and other infrastructure providers will actively seek public sector funding to support infrastructure development in line with the SPD. Necessary off-site infrastructure contributions would be sought through Section 106 planning obligations or through the use of 'Grampian' planning conditions. Obligations could include physical works or contributions towards highway measures to mitigate the transport impacts of the development.
- It is intended that the SPD will be reviewed with a view to the preparation of the technical supporting documents (including the transport strategy).

## South Tees Regeneration Master Plan (November 2019)

The South Tees Regeneration Masterplan identifies:

- The Tees Valley's key road transport assets include the strategic growth corridor of the A19, the A1(M), linking North and South, and the A66, providing Trans-Pennine East to West connectivity. Few areas of the UK are better served by road services.
- Centrally placed within the Tees Valley, the STDC area has excellent road transport connections. The A66 East-West route commences at the STDC boundary, and the nearby A174 Parkway provides direct access to the A19. Both the A66 and A19 provide direct connectivity to the A1(M) North-South route, which in turn affords access to the M62 strategic Trans-Pennine road corridor.
- To support the proposed major development of South Tees, coupled with the ambitions of TVCA in it's delivery of the Strategic Economic Plan, there will be a need to improve the area's transport connectivity.
- Notwithstanding the STDC's excellent transport connections, there are some wider connectivity barriers, including significant pressure points on the A19 and on the road network accessing the A1(M) and A19.
- The future redevelopment of the STDC area for industrial use will need to consider and address Transport infrastructure requirements.

- Consideration will be given to the impact on the local highway network of the planned major increases in development traffic that will ensue as the proposals for the regeneration programme begin to be realised, so that junction capacities are not adversely impacted and that the current favourable position the South Tees area benefits from is not compromised. The requirements for Transport Appraisals to assess transport impacts, particularly highways, will be given due attention as the development proposals begin to be fleshed-out.
- Next steps: STDC will continue to develop key thematic delivery strategies, as discussed within the South Tees Area SPD, including Transport.

## Transport Strategy

Highways England has engaged in the process of the transport strategy development with the last dialogue in April 2020. A Phase 1 Report was produced outlining modelling to be undertaken in Phase 2, but Phase 2 has not been forthcoming to date.

As part of work in reviewing the STDC South Industrial Zone application, it was identified that the next Steering Group meeting would be being arranged in due course.

As part of the initial review of that application scoping, CH2M identified *"The South Tees Regeneration Master Plan states that "consideration will be given to the impact on the local highway network of the planned major increases in development traffic that will ensue as the proposals for the regeneration programme begin to be realised, so that junction capacities are not adversely impacted and the current favourable position the South Tees area benefits from is not compromised. The requirements for Transport Appraisals to assess transport impacts, particularly highways, will be given due attention as the development proposals begin to be fleshed-out".* With this in mind, CH2M recommend that a view of the full site impacts is provided, either in the Scoping Report itself or alongside it, so that a view can be gained.

## Wider Strategies - considerations

The Scoping Report acknowledges:

- Within section 4.5 (relating to car parking) that *"A transport strategy for the wider Teesworks site is currently in development but will limit car parking within the site to meet sustainability targets) … It is subsequently anticipated that the internal layout, when developed, will support the strategy and limit car parking as far as reasonably possible."*
- Within section 5.2 (relating to trips by mode) that *"The transport strategy for the site will seek to reduce car mode share significantly. However, these earlier developments coming forward may not benefit from the longer-term strategy improvements proposed up to 2042."*

As part of discussions relating to the Southern Industrial Zone site, Arup identified *"The transport strategy for the wider STDC site will be looking at a longer-term horizon in terms of future year assessments. The impact of the wider STDC site up to a final year scenario, expected to be circa 2040, will be assessed by undertaking strategic modelling of the surrounding highway network."*

With a view to this, the following comments are made:

- The requirement for consideration of the impact on infrastructure, and the need to work with Highways England in relation to the SRN, is clear throughout the documents.
- The very fact that there is a location-specific SPD, a Masterplan, and a requirement for a Transport Strategy, highlights the need for a strategic approach to this site. It is disappointing that this is not flowing through the work undertaken. Dealing with the sites on an application by application basis may lead to a point whereby later applications on the site / other developments in the area may need infrastructure measures to enable them, due to these developments having consumed the available capacity. Similarly, the competitive advantage that the area has with regard to the

strategic connectivity may be diminished if the impacts are not considered in a more strategic manner.

- The SPD has committed to the production of the Transport Strategy, but this is still forthcoming. Priorities and funding availability for highways infrastructure is suggested as being identified through the Transport Strategy.
- The SPD points towards the creation of 20,000 jobs. The five applications under current consideration, along with the Southern Industrial Zone application, amount to an estimated 15,260 jobs. This is a significant (over 75%) proportion of the sites' aspirations that are coming forward in the absence of any form of strategic approach to transport.
- The SPD identifies that it would be reviewed 12-18 months post adoption to take account of the various technical documents including the Transport Strategy. Having been adopted in mid-2018 this review being informed by the Transport Strategy (amongst others) would have been expected to have happened by now.
- The Masterplan identifies that there is a need to improve the area's transport connectivity to support the proposed major development in South Tees.

# Summary and Conclusion

The following table lists all the items that were highlighted in the Scoping Report as decision points and Highways England's response.

Table 2 – Scoping Report Decision Points

| Scoping Report Section | Decision point (as defined in Scoping Report) | Highways England response | Suggested Action |
|---|---|---|---|
| **2. Planning Policy Review** | Documents proposed for planning review | Acceptable | No action |
| **3. Baseline Conditions** | Scope of transport networks | Comments made | Definition of the study area, based on the SRN criteria, should be provided early in the process to provide clarity of network to be assessed.<br>At this point the establishment of the baseline position at the SRN should be confirmed.<br>Growth and future operational scenarios should match that considered during the review of the Southern Industrial Zone. |
| | Methodology for establishing baseline traffic flows | Comments made | At the point of having established the study area, the baseline position at the SRN should be confirmed.<br>Growth and future operational scenarios should match that considered during the review of the Southern Industrial Zone. |

| Scoping Report Section | Decision point (as defined in Scoping Report) | Highways England response | Suggested Action |
|---|---|---|---|
| | Scope of the accident appraisal | Comments made | Needs to cover extents of SRN geography. |
| **4. Development Proposals** | Transport Proposals | Comments made | Access points will need to be considered in as far as they influence definition of SRN impacts. |
| **5. Trip Generation** | Trip rates | Comments made | Information supporting the derivation of the office trip rates is required in order to verify their use. |
| | Mode share proportions | Comments made | The use of Census data is supported.<br>Further information in relation to a proposed 5% reduction would be required in order for this to be accepted. |
| | Proposed trip distribution | Comments made | Census data distribution is accepted, but assessment using existing turning proportions is not accepted.<br>The analysis should extend as far as is required to ensure appropriate consideration of the SRN. |
| | Approach to growth forecast | Comments made | The approach should mirror that ultimately used in the Southern Industrial Zone assessment. |
| **6. Development Impact Assessment** | Scope of highways impact assessment | Comments made | The starting point for identifying the need of assessment at the SRN is based on an impact exceeding 30 two way trips at a junction |
| | Junction assessment scenarios | Acceptable | |
| | Scope of the EIA | Acceptable | The CTMP will need to be conditioned until a clear view on construction impacts is known. |

In the wider sense, an update on the Transport Strategy and how the intentions of the wider policies are being secured needs to be questioned. While Highways England need to respond to these planning applications on their own merits, the strategies were put in a place for a reason and without them, a significant proportion of this large employment site is likely to come forward in a manner that is not consistent with the ambitions of the wider strategies.

Finally, with regard the applications currently subject to review, CH2M would promote that these are progressed through proactive collaboration between the parties. While noting that all development applications have time pressures with a view to gaining approval, the discussions allied with the Southern Industrial Zone application involved significant pressure to get things resolved. These timescales did not seem to fit with (i) the scale of development being proposed or (ii) the lack of initial

appetite to give appropriate consideration to the SRN. This should be avoided as part of these applications, which themselves are of a significant nature.

**From:**
**To:**
**Subject:** [External] RE: TA Scoping Report for Teesworks
**Date:** 30 November 2020 14:54:27

Thanks for sharing the draft scoping report.
Collective thoughts from Tony & myself are below.
Please do get in touch if anything needed.
Thanks

Comments so far.

- The Local Transport Plan has been partially replaced by the Tees Valley Strategic Transport Plan and will be fully replaced when the Local Implementation Plan is adopted in 2021.
- Focus should also include how pedestrians, cyclists and public transport users will access each site upon first occupation (we recommend footway & cycleway links on both sides of each internal road from 3m shared surfaces on minor roads up to 2m+2m segregated facilities on the major links). But connectivity may not be along the same alignments as general road access & will connect directly to adjacent residential areas &
- early (temporary) internal connectivity between sites before the masterplan infrastructure is in place needs to be resolved before first occupation. The operation of financially viable and attractive bus services for users will be difficult if the sites are effectively served by a series of dead end roads from the A66 or A1085.
- Dorman Point site – access direct to Tees Dock Road should also be considered for this site. Possibly via the Grangetown Station Road corridor?
- Re-opening of Redcar British Steel Railway Station should be programmed at first occupation of Foundry, Long Acres & Steel House sites.
- Charging point infrastructure for electric vehicles needs to be integral to each car park/or distributed through each site. Solar farms using building roofs should be considered.
- Hydrogen filling stations will be initially provided at Eston Road and Teesport by TVCA, but more hydrogen infrastructure may be required.
- A Teesworks wide travel plan should be developed based on the evidence contained in the Transport Study & best practice. This should establish core principles/actions that developers will be required to sign up to with additional measures introduced as required by each business. Appointing a Travel Plan Co-ordinator for the Teesworks site with a delivery budget before first occupation would be preferable.

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