4 Traffic and Transport

4.1 Introduction

4.1.1 This chapter reports the findings of an assessment of the likely significant effects of Transport as a result of the proposed development, considering both the construction and operation phases.

4.1.2 This chapter focuses on the potential Transport impacts (defined as a change resulting from the proposed development) and effects (defined as a consequence of an impact) associated with the construction and operational phases. It considers and assesses the effects and extent of the environmental impacts arising from the proposed development on safety, capacity and the operation of the transport network within the vicinity of the site, including walking, cycling and public transport.

4.1.3 The assessment draws closely on the findings of a comprehensive Transport Assessment (TA) prepared by Arup (HDL-ARP-EZ-XX-REP-EEN-000003), which has been submitted with the planning application (see Appendix B1). In addition, Framework Travel Plans (FTPs) have been prepared for the business district (HDL-ARP-EZ-XX-REP-EEN-000004) and the railway station (HDL-ARP-EZ-XX-REP-EEN-000005) and can be found in Appendix A and B of the TA respectively.

4.2 Review of proposed development

4.2.1 The proposed development is described in detail in Chapter 3 of this ES. This section provides an outline review of the transport related proposals associated with the proposed development during construction and once operational.

Construction

4.2.2 There are several existing and proposed accesses onto the development site north of the railway line which could be utilised for site construction activities including surveys, clearance, import of materials, workforce travel and export of materials. This includes existing farm accesses into the site and the proposed vehicular site accesses detailed in Section 5.2 of the TA. A combination of these locations will likely be required during the construction programme, with these reflecting different access requirements, constraints, and phasing of activities. To provide flexibility, two scenarios have been assessed for planning:

- All construction traffic movements north of the railway line utilise the existing access north of the gas reduction station access via Heol Las on the eastern boundary of the site. As set out in Section 5.2 of the TA, this would require land in the NCC administrative area and therefore delivery is subject to agreement with NCC and acquisition of relevant land interests; and

- All construction traffic movements north of the railway line utilise the proposed secondary access at the Cypress Drive/Sandbrook Road roundabout on the western boundary of the site.

4.2.3 For both options there continues to be construction traffic movements associated with railway and station building works south of the railway line, with these accesses taken from Heol Las. These construction access routes are presented in Figure 4.1.

4.2.4 Traffic management interventions (potentially including the use of multiple banksperson and/or traffic signals) will be required to control vehicle movement on Heol Las and Fortran Road, between the junction with Cobol Lane and the site accesses. These interventions are detailed further in Section 9.6 the TA.

4.2.5 Following the delivery of the primary access road in 2023, there is potential for construction traffic to use this route to access the site. The primary access road will take access from Cypress Drive, south of the junction with Fortran Road. The alignment of this road is described in Section 5.2 of the TA and illustrated in Figure 4.5.

Operational

4.2.6 The outline access strategy for the proposed development, as detailed in the TA, seeks to maximise the proportion of journeys that are made to the proposed development by sustainable modes of transport. The strategy has been refined with reference to the Welsh Government's Sustainable Transport Hierarchy[1], which requires new development to prioritise walking, cycling and public transport ahead of private motor vehicles.

4.2.7 The access strategy for each mode of transport is set out in the TA and includes the following:

- Network of footways and cycleways within the redline boundary, with access from Hendre Lake Park, Cypress Drive, Cobol Road and Heol Las.

- Enhancement of the existing Public Right of Way (PROW) through the site which is currently not useable due to hedgerows and missing reen crossings;

- Pedestrian access from Heol Las along the alignment of the existing PROW will be secured via a sperate planning application with NCC, as detailed in the Section5.2 of the TA. Optimal works include two active travel links from Heol Las, north of the railway line. These would be subject to agreement with NCC and acquisition of relevant land interests

- Provision of a segregated cycleway within the redline boundary from the proposed railway station to the planned Cardiff Cycleway (Cycleway 2)[2] on Cypress Drive;

[1] Welsh Government (2018) Planning Policy Wales Edition 10
[2] Cardiff Council (2018) Integrated Network Map: Cycling

- Provision of cycle parking widely across the proposed development, which as a minimum, complies with Cardiff Council (CC) adopted parking standards[3];
- Creation of a Transport Interchange, including Cardiff Parkway railway station, cycle parking (up to 100 stands), up to 650 spaces of long-stay, short-stay, drop-off and accessible car parking and a taxi rank;
- Accessible bus stops with modern waiting facilities will be located so that all employment is within circa. 400m walking distance of a stop;
- Provision of a primary vehicle access into the site from Cypress Drive, south of the existing junction with Fortran Road;
- Introduction of a secondary vehicle access into the site, potentially as a bus only access, with the existing Cypress Drive/Sandbrook Road roundabout; and
- Deliver site access junctions for the north-eastern and north-western development parcels onto Cobol Road. These T-junction arrangements may require some informal on-street parking to be removed.

4.2.8 The access strategy for the proposed development is detailed further in Section 5.2 of the TA.

4.2.9 The transport interchange, including Cardiff Parkway railway station, is anticipated to result in a positive change in the travel behaviour of existing residents and employees. The station will provide a step change in the public transport accessibility of the area, with significant benefits to journey times by public transport into Cardiff, Newport and other areas of the rail and bus network.

4.3 Legislation, policy context and guidance

4.3.1 This section summarises the key transport policies at a national, regional and local level that are relevant to this proposal, including:

Legislation

- The Well-being of Future Generations (Wales) Act 2015
- Active Travel (Wales) Act 2013

National Planning Policy

- Wales Spatial Plan (2008)
- Planning Policy Wales: Edition 10 (2108)

[3] Cardiff Council (2018) Managing Transportation Impacts

- Draft National Development Framework Wales (2019)
- Technical Advice Note 18: Transport (March 2007)

Local Planning Policy

- Cardiff Local Development Plan (CLDP) (2016)
- Newport Local Development Plan (NLDP) (2015)

Legislation

The Well-being of Future Generations (Wales) Act 2015

4.3.2 The Well-being of Future Generations (Wales) Act (2015) requires public bodies in Wales to consider the long-term impacts of decision making and improve working with local communities to prevent persistent problems in Wales such as poverty, health inequalities and climate change.

4.3.3 Seven well-being goals have been identified within the Act to ensure public bodies are working towards the same goals. The act indicates that public bodies must work to achieve the following seven goals:

- A Prosperous Wales that has an innovative, productive and low carbon society which recognises the limits of the global environment and therefore uses resources efficiently and proportionately;
- A resilient Wales that maintains and enhances a biodiverse natural environment which has the capacity to adapt to change;
- A healthier Wales in which people's physical and mental well-being is maximised and in which choices and behaviours that benefit future health are understood;
- A more equal Wales where people are able to achieve their full potential regardless of their background or circumstances;
- A Wales of cohesive communities which are attractive, viable, safe and well-connected;
- A Wales of vibrant culture and Welsh language; and
- A globally responsible Wales which, when doing anything to improve the economic, social, environmental and cultural well-being of Wales, takes account of whether doing such a thing may make a positive contribution to global well-being.

Active Travel (Wales) Act 2013

4.3.4 The Active Travel (Wales) Act 2013 aims to make walking and cycling the most attractive travel option for most shorter journeys. The Act requires local authorities in Wales to produce active travel maps and deliver year on year improvements in active travel routes and facilities. Furthermore, the Act requires highways authorities in Wales to enhance pedestrian and cycle routes and facilities as part of all new road schemes.

Policy context

Wales Spatial Plan (2008)

4.3.5 The 2008 update to the Wales Spatial Plan (WSP) sets out the planning agenda at a national, strategic level. There are five guiding themes, which underpin the national vision:

- Building sustainable communities;
- Promoting a sustainable economy;
- Valuing our environment;
- Achieving sustainable accessibility; and
- Respecting distinctiveness.

4.3.6 The WSP makes clear links between sustainable development and transport, stating that development should increase access to rail and bus services where possible, and provide priority for these modes.

4.3.7 The document states that developments should aim to make better use of existing transport infrastructure to achieve sustainable access to jobs and services. This encompasses the need to ensure that communities are well connected to main public transport corridors, are provided with safe walking and cycling routes and use existing road capacity with maximum efficiency. It does not however advocate road building stating that road building in general is not a sustainable solution to the pattern of traffic growth.

Planning Policy Wales: Edition 10 (December 2018)

4.3.8 Planning Policy Wales (PPW) sets out the land use planning policies of the Welsh Government. It is supplemented by a series of Technical Advice Notes (TANs). The primary objective of the PPW is to ensure that the planning system contributes towards the delivery of sustainable development and improves the social, economic, environmental and cultural well-being of Wales.

4.3.9 Chapter 2 (People and Places: Achieving Well-being through Placemaking) indicates all development decisions should contribute towards the making of Sustainable Places and improved well-being. Five Key Principles are presented in

PPW which should be embraced to ensure planning facilitates the right development in the right place:

- Growing our economy in a sustainable manner;
- Making best use of resources;
- Facilitating accessible and healthy environments;
- Creating and sustaining communities; and
- Maximising environmental protection and limiting environmental impact.

4.3.10 Chapter 3 (Strategic and Spatial Choices) identifies five key aspects of good design. It states good design is inclusive design, placing people at the heart of the design process. It must reduce inequality of access to essential services, education and employment and design measure with design measure improving accessibility by walking, cycling and public transport.

4.3.11 Chapter 4 (Active and Social Places) discusses the *well-connected cohesive communities, components of placemaking*, covering transport, housing, retail and commercial development, community facilities and recreational spaces. With regards to transport, it states people should have access to jobs and services through more efficient and sustainable journeys, by walking, cycling and public transport.

4.3.12 Chapter 5 (Productive and Enterprising Places) considers the economic theme of place-making. It states that *the provision of sustainable transport infrastructure is essential in order to build prosperity, tackle climate change, reduce airborne pollution and to improve the social, economic, environmental and cultural well-being of Wales.*

Draft National Development Framework Wales (2019)

4.3.13 The draft National Development Framework (NDF) (2019) has been published for consultation. The NDF will replace the WSP and sets out the direction for development in Wales from 2020 to 2040. *It sets a strategy for addressing key national priorities through the planning system, including sustaining and developing a vibrant economy, decarbonisation, developing resilient ecosystems and improving the health and well-being of our communities.*

4.3.14 Policy 1 of the NDF promotes Sustainable Urban Growth. It states *urban growth should support towns and cities that are compact and orientated around urban centres and integrated public transport and active travel networks. Higher density and mixed-use development on sites with good access to urban centres and public transport hubs, including new and improved Metro stations, will be promoted and supported.*

4.3.15 Policy 7 of the NDF supports the increasing use of Ultra Low Emission Vehicles. It notes the importance to plan and deliver charging infrastructure that electric

vehicles will rely on. Policy 27 of the NDF relates to Cardiff and states key locational decisions *including for employment centres, strategic housing growth and services should focus on the most sustainable and accessible locations and seek to address congestion, reduce car-based commuting and improve air quality.*

Technical Advice Note 18: Transport (March 2007)

4.3.16 Technical Advice Note 18 (TAN18) elaborates on the relationship between land use planning and transport infrastructure by outlining a range of key principles that should be adopted in ensuring that economic development can create a basis for sustainable travel patterns. These include the following:

- Ensuring new development is located where there is, or will be, good access by public transport, walking and cycling thereby minimising the need for travel and fostering social inclusion;
- Managing parking provision;
- Ensuring that new development and major alternations to existing developments include appropriate provision for pedestrians (including those with special access and mobility requirements), cycling, public transport, and traffic management and parking/servicing;
- Encouraging the location of development near other related uses to encourage multi-purpose trips;
- Promoting cycling and walking; and
- Supporting the provision of high quality, inclusive public transport.

Local planning policy

Cardiff Local Development Plan (2016)

4.3.17 CC adopted its Local Development Plan (LDP) in 2016 for the period 2006-2026. The Cardiff Parkway site is allocated in the plan as strategic employment site H under policy KP2. The CLDP uses the name ‘South of St Mellons Business Park’ to describe the site.

4.3.18 The CLDP objectives aim to respond to the economic and social needs of Cardiff in a co-ordinated manner and set out a framework for delivering the sustainable neighbourhoods of the future. The CLDP aims to deliver sustainable development locally and improve the long term economic, social and environmental wellbeing of people and communities in Cardiff.

4.3.19 The CLDP objectives are set out under 4 main headings:

- To respond to evidenced economic needs and provide the necessary infrastructure to deliver development;
- To respond to evidenced social needs;

- To deliver economic and social needs in a co-ordinated way that respects and enhances Cardiff's environment; and

- To create sustainable neighbourhoods that form part of a sustainable city.

4.3.20 The development site is described in the CLDP as '*an important employment site which contributes to the necessary range and choice of types of employment opportunities in the city'*.

4.3.21 Policy KP2 (H): South of St Mellons Business Park sets out that land is allocated for the development of a strategic employment site south of St Mellons Business Park including:

- 44ha of business land capable of accommodating up to 90,000m^2 development;

- Provision of a transport hub including new rail station served by relief rail services connecting the city centre and services to Cardiff Airport and London via Cardiff Central;

- Provision of Park and Ride facility;

- Off-site infrastructure including bus priority measures to develop bus-based Rapid Transit Corridors and other routes within the North Eastern/Eastern Rapid Transit Corridor including services linked to the City Centre and Strategic Sites G and F;

- High quality on and off-site walking and cycling links and facilities to maximise walking and cycling access to the site from neighbouring communities;

- Retention of land to the east of Cypress Drive and Faendre Reen as green space linked with Hendre Lake Park;

- Integrating the site with local facilities in the surrounding area; and

- Effectively responding to landscape and biodiversity assets.

4.3.22 Policy KP8 Sustainable Transport has the central goal of achieving a 50:50 modal split between private car use and sustainable transport. The policy states that the location and form of developments are major determinants of the distance people travel and how they travel. To combat this, it will be necessary to integrate land use with active travel and public transport provision to avoid car dependent developments.

4.3.23 Policy T2 Strategic Transit and Bus Corridors identifies four rapid transit corridors which will provide key connections into Cardiff. The CLDP notes that further work is required to identify the preferred transport mode and precise alignment for each of the corridors.

Newport Local Development Plan (2015)

4.3.24 Newport City Council adopted its LDP in 2016 for the period 2011-2026. The vision of the NLDP seeks Newport to be a centre of regeneration that celebrates its culture and heritage, while being a focus for varied economic growth that will strengthen its contribution to the region.

4.3.25 Strategic Policy 1 (SP1) of the NLDP relates to sustainability and indicates proposals will be required to make a positive contribution to sustainable development and will be assessed as to their potential contribution to several factors including:

- Provide for traffic-free walking and cycling facilities and expansion of the network;
- Encourage the use of public transport and other modes which reduce energy consumption and pollution;
- Improve road safety;
- Provide access to new development areas which incorporate sustainable transport modes;
- Relieve traffic congestion in the long term; and
- Result in other environmental improvements, including air quality, noise reduction, sustainable drainage and enhanced biodiversity.

4.4 Scoping and consultation

Scoping

4.4.1 Transport Screening and Scoping Reports have been submitted to CC in relation to the Environmental Statement for the proposed development proposals. Comments and Reponses to both the Screening Opinion and Scoping Report are set out in Table 4.1 and Table 4.2 below.

Table 4.1: Response to screening opinion

Comments raised	Response provided in the ES/ Planning Application
The Operational Manager, Transportation, has considered the submitted Transport Scope and is of the view that there is little to add to the approach provided regarding road (inc. vehicles, peds, cycles etc) based traffic and movement the only issue which will need to be considered is the impact upon existing rail services (passenger and freight) during the station rail line construction phase. He understands that Network Rail will be in control of the process, but any fall out onto the road network should be assessed and taken into account.	The following response was provided from an Early Contractor Involvement (ECI) party: "*There will likely be a requirement for a large number of disruptive possessions to enable the works to be carried out for p-way, OLE, platforms 1 & 2/3 build, and for footbridge installation – therefore existing rail services will be affected"* As such, the impacts of construction on through passenger journey times have been assessed in this ES Chapter.

Table 4.2: Response to scoping opinion

Scoping opinion clause	Response
Proposed development would need to demonstrate the accessibility of the facility(ies) to all modes of transport and indicate that the surrounding network (vehicular, non-motorised, public transport) is both capable and suitable to cater for the prospective demand.	This assessment has been undertaken, both as part of the ES and the TA, included within Appendix B1. A detailed audit of the walking and cycling network has been undertaken and the findings are detailed in the TA. In addition, the access strategy outlines the pedestrian, cycle and bus infrastructure proposed within the redline boundary to accommodate journeys by all sustainable modes of transport, as summarised in Section 4.2. A robust highway capacity assessment has been undertaken and detailed within Chapter 7 of the TA. Junctions works have been proposed on Cypress Drive to mitigate the impacts associated with the proposed development.

Consultation

4.4.2 Following an initial scoping meeting (dated 14 May 2018) and a review of the TA scoping report by CC Highways Officers, a consultation response on the TA Scoping Note was received in September 2018. A subsequent TA Scoping meeting was held to discuss the comments and agree the scope of the assessment, dated 13th March 2019. The agreed meeting minutes can be found in Appendix D of the TA.

4.4.3 It was agreed with CC during the TA scoping discussions identified above that a series of Technical Notes and workshops would be undertaken to seek agreement on several technical matters prior to the submission of the planning application. Three workshops have been held:

- **Workshop 1** (8th May 2019): Provide an update on programme, deliverables and the TA Scoping Report;
- **Workshop 2** (12th June 2019): TA updates including Base Junction Models, Background Traffic Growth, Committed Development, and the Trip Generation and Distribution Methodology; and
- **Workshop 3** (28th August 2019): Review of Technical Notes, Access Strategy, Walking and Cycling Audit and Traffic Impact Assessment.

4.4.4 Minutes from these workshops with CC can be found in Appendix D of the TA.

4.4.5 There has been no formal pre-application consultation with NCC Highways, however as set out in the Section 4.5, the study area for this assessment extends into Newport and captures those links most impacted by the scheme.

4.5 Methodology

Overview

4.5.1 The methodology presented in this section has been prepared in accordance with the guidance provided in The Guideline for the Environmental Assessment of Road Traffic produced by the Institute of Environmental Assessment (IEA) (now Institute of Environmental Management and Assessment (IEMA)) in 1993, hereafter known as the IEMA guidelines.

4.5.2 The methodology used for this assessment is based upon a comparison of predicted traffic flows along affected roads. The impact of traffic is dependent upon a wide range of factors, including:

- Volume of traffic;
- Traffic speeds and operational characteristics; and
- Traffic composition e.g. percentage of Heavy Goods Vehicles (HGVs).

4.5.3 The methodology of this EIA transport assessment can be summarised as follows:

- Describe the assessment methodology;
- Review baseline traffic flow information;
- Detail the embedded mitigation;
- Assess the construction and operational effects of the project on the local transport network;
- Identify suitable and safe mitigation measures; and
- Assess any residual effects.

4.5.4 The methodology used for this assessment is based upon a comparison of predicted traffic flows along affected roads using the IEMA guidelines on the environmental impacts of road traffic. This assessment is structured around the consideration of potential environmental effects relating to traffic and transport, which includes the following:

- Noise and vibration;
- Visual impacts;
- Severance;
- Driver delay;
- Pedestrian delay;

- Pedestrian amenity;
- Accidents and safety;
- Hazardous loads;
- Air pollution; and
- Dust and dirt.

4.5.5 The environmental effects associated with visual amenity are addressed in Chapter 13, Chapter 8 assesses the effects associated with air quality and dust and dirt, and the effects associated with noise and vibration are assessed in Chapter 9. Hazardous loads are not considered to be relevant for this scheme and have therefore not been scoped in to the assessment.

4.5.6 A set of criteria have been defined and used as a means of determining the sensitivity of receptors which are likely to be affected by any changes in the composition of traffic, in particular the volume and movement patterns of HGVs. These criteria have been based on the IEMA guidelines and is detailed in paragraph 4.5.36 of this Chapter.

4.5.7 The proposed railway station will also impact rail service provision, including both existing and future passengers. In addition to the criteria detail in the IEMA guidelines, this assessment has therefore addressed the potential impacts of introducing a mainline railway station, both during construction and once operational. This assessment has been based on the predicted delay to passenger journey times.

Methodology for establishing baseline conditions

4.5.8 The study area for the Transport chapter of the ES broadly reflects that of the TA and will encompass all highways, walking and cycling routes that surround the site. The study area was agreed with CC as part of the scoping for TA, as set out in Appendix C of the TA.

4.5.9 To establish the baseline conditions, multi-modal traffic data was collected at the following junctions:

1. Cypress Drive/Sandbrook Road Roundabout;
2. Cypress Drive/Fortran Road Priority Junction;
3. Cypress Drive/Pascal Close Priority Junction;
4. Cypress Drive/Willowdene Way Priority Junction;
5. A48/Cypress Drive/Newport Road Roundabout;
6. A48/Marshfield Road;
7. B4487/Llaneirwg Way Roundabout;

8. B4487/Mount Pleasant Ave Traffic Signals;
9. B4487/Llanrumney Ave Traffic Signals;
10. A48/A4232 Roundabout;
11. A4232/Church Road/Heol Pontprennau Roundabout;
12. M4/A4232;
13. A48/Southern Way Partially Signalised Roundabout;
14. B4487/A4161 Newport Road/A4232 Signalised Roundabout;
15. Heol Las/St Mellons Road;
16. Rover Way/Lamby Way priority roundabout;
17. B4487 Newport Road/Ty-Mawr Road signalised junction;
18. B4487 Newport Road/Tyr Winch Road priority junction;
19. B4487 Newport Road/Wern Fawr Lane signalised junction;
20. A48 Newport Road/Coal Pit Lane priority junction;
21. B4239 Wentloog Avenue/Heol Las priority junction;
22. M4/A48(M) J29A (St Mellons Interchange); and
23. A48 Pentwyn Interchange priority roundabout.

4.5.10 The traffic count survey locations are presented in Figure 4.2.

4.5.11 In addition to the classified turning counts, Automatic Traffic Count (ATC) surveys collected data over seven days at a few key locations near the site, as detailed in Section 4.7 of the TA. The ATC survey data provides vehicle volume and speed data, as summarised in Table 4.12.

4.5.12 Using a combination of the surveyed 24-hour ATC data and Department for Transport (DfT) traffic counts, factors were developed to apply to the peak modelled flows to generate representative 24-hour Annual Average Daily Traffic (AADT) flows. AADT flows are defined as the average daily flow on a specific road or link over the course of one year. The resulting factors for major and minor roads are presented in Table 4.3 below.

Table 4.3: AADT peak hour conversion factors

Road Type	AADT (24 Hour)
Major Road	5.122
Minor Road	4.399

4.5.13 Existing journey times for through passengers between Cardiff and Newport have been extracted from the December 2019 timetable. This timetable reflects the latest rail service improvements, including those to the Great Western Railway (GWR) services to London Paddington.

Assessment methodology

4.5.14 In accordance with Section 3.1 of the Institute of IEMA guidelines, the impact of traffic is dependent upon a wide range of factors, including:

- Volume of traffic;
- Traffic speeds and operational characteristics; and
- Traffic composition (e.g. percentage of heavy goods vehicles).

4.5.15 In determining the impact of, and crucially, the significance of the above factors, the IEMA guidelines suggest that the following two basic rules are used to define the extent of the assessment:

- **Rule 1**: Include highway links where 24-hour Average Annual Daily Traffic (AADT) flows increase as a result of development by more than 30%; and
- **Rule 2**: Include any other specifically sensitive areas where AADT flows are expected to increase by 10% or more as a result of development.

4.5.16 IEMA guidelines also recommend a link should be assessed where there is a significant increase in HGV flows. As noted in paragraph 4.39 of the IEMA guidelines, a significant change would be where the HGV component of traffic flow is halved or doubled. Therefore, a link will also be assessed if the HGV component of traffic flow increases by 100%.

4.5.17 In accordance with Section 3.15 of the IEMA guidelines, the above rules have been used as the basis of defining the extent of the assessment area. The resulting extent of the network has been informed by the supporting TA.

4.5.18 With regards to the period of assessment, section 3.8 of the IEMA guidelines notes the following:

"While it may be valuable to know the environmental impact of a development at the peak hour traffic levels, it is likely that the greatest environmental impacts may occur at other times. For instance, where a development attracts a constant volume of traffic throughout the day".

4.5.19 During the construction stage, the proposed development will likely generate a regular flow of HGVs during the hours of construction activity. While the Noise and Vibration assessment (Chapter 9) is based upon 18-hour Annual Average Weekday Traffic (AAWT) flows, the Air Quality assessment (Chapter 8) is based upon the use of 24-hour AADT flows.

4.5.20 The assessment within this Chapter has been based upon a 24-hour period to gain a full and detailed understanding of the likely traffic and transportation impacts. This includes the potential effects resulting from possible weekend and overnight construction operations associated with the railway station.

4.5.21 The years of assessment are as follows:

- **Base**: 2018 surveyed traffic flows;
- **Construction 'Do Minimum' Baseline**:2022 with Committed Development. These flows form the base comparison for the future year analysis with construction traffic;
- **Do Something Construction**: 2022 with Committed Development and Construction Traffic (peak 12-month period);
- **Operational 'Do Minimum' Baseline**: 2028 with Committed Development. These flows form the base comparison for the future year analysis with operational traffic; and
- **Do Something Operational**: 2028 with Committed and Proposed Development.

4.5.22 The committed developments included in all future year assessments are detailed in Appendix E of the TA and have been agreed with CC. The Cumulative Effects Chapter of the ES (Chapter 16) details how these developments have been included in other chapters of the ES.

Methodology for determining construction effects

4.5.23 The construction phase of the proposed development is anticipated to result in an increase in the total number of vehicles and HGV component on some links within the study area. As set out in Section 4.6, it has been assumed that all HGVs will route to the site from the M4 via Junction 30 (Cardiff Gate) and a combination of the A4232, the A48 and Cypress Drive, as illustrated in Figure 4.3.

4.5.24 The routing of HGVs will be agreed with CC as part of a CTMP and a Construction Environmental Management Plan (CEMP), following the appointment of the relevant contractors. An Outline CEMP has been prepared in support of this application and included in Appendix A2 of the EIA. It is proposed for a CTMP and a full CEMP will be secured with a planning condition.

4.5.25 The estimated increase in construction traffic is set out in Section 4.6 and detailed in Appendix T of the TA. A review of the construction programme was undertaken to identify the 12-month period when construction movements would be greatest. Average weekday construction movements are estimated to peak for the period February 2022 to January 2023. In this 12-month period, the development is estimated to generate a weekday average of 151 HGVs and 264 LGVs.

4.5.26 It was proposed for the impact of additional HGV movements on the relevant links within the study area to be calculated as a percentage increase on the surveyed HGV component.

4.5.27 Works to the railway corridor may require the possession of all four lines for periods of times. This assessment will consider the potential effects of this possession with regards to existing rail journey times for through passengers.

Methodology for determining operational effects

4.5.28 Once operational, the proposed development is forecast to result in additional vehicle movements on the local highway network. To review the potential impact of the operational phase, reference has been made to the trip making assumptions presented in Chapter 6 of the TA. The peak hour generated vehicles trips used in the TA for the future year assessment scenario assume that the Park & Ride station car park (up to 650 spaces) will be fully occupied.

4.5.29 The methodology for calculating the anticipated distribution of vehicle trips associated with the proposed development has been discussed with CC. Background traffic growth factors have been derived from TEMPro and adjusted to account for the committed and proposed development.

4.5.30 The assessment of operational traffic flows was undertaken on a link basis, rather than a junction basis. The assessment is based on the estimated year when both the station is operational, and the business district is fully built-out (2028), calculating the percentage increase in traffic arising from the proposed development on the 'Do Minimum' traffic flows. This will inform the impact that the proposed development will have on traffic flows and whether this increase in traffic flow will result in significant effects.

4.5.31 The station will provide a step change in public transport accessibility for the area, with significant benefits to journey times by public transport into Cardiff, Newport and other areas of the rail and bus network. This benefit will result in several existing journeys currently made by car being transferred to rail. Outputs of the South East Wales Transport Model (SEWTM) have been used to estimate the reduction in existing traffic movements that are anticipated because of the proposed railway station and other sustainable transport interventions.

4.5.32 The addition of a new railway station (Cardiff Parkway) is anticipated to have an impact on the journey times of through passengers. To assess the impact on passenger journey times, a with-scheme timetable has been developed that incorporates the proposed stop, taking account of dwell time, acceleration and deceleration for each weekday service. The with-scheme timetable also considered the ability of each service to use the train pathing allowance time or turnaround times to accommodate the extra stop.

Significance criteria

Significance of receptors

4.5.33 In accordance with the EIA Regulations, the likely environmental effects of the project have been identified and their significance determined. Evaluation of their significance has been based upon specific criteria for each type of receptor and impact. This process considers the following:

- Impact likelihood, extent and magnitude;
- Impact nature (whether beneficial or adverse, direct or indirect, primary or secondary, permanent or temporary);
- Importance and sensitivity of the environmental receptor;
- The number of receptors that are impacted;
- Impact duration (whether short, medium or long term); and
- Whether it is a stand-alone impact or is cumulative.

4.5.34 The following terms have been used to assess significance of effects:

- High beneficial or adverse – where the proposed development is likely to cause a significant improvement or deterioration to the baseline environment;
- Medium beneficial or adverse – where the proposed development is likely to cause a noticeable improvement or deterioration to the baseline environment;
- Small beneficial or adverse – where the proposed development is likely to cause a barely perceptible improvement or deterioration to the baseline environment; and
- Negligible – no discernible improvement or deterioration to the baseline environment.

4.5.35 The significance of an effect on a receptor is defined in accordance with the magnitude of the impact and the sensitivity of the receptor. The sensitivity of a receptor can be defined by the degree by which it responds to change in its environment. In this assessment, it will predominately relate to the effect in an increase in traffic flow.

4.5.36 Paragraph 2.5 of the IEMA guidelines indicates the following groups are susceptible to changes in traffic conditions:

- People at home;
- People in work places;

- Sensitive groups including children, elderly and disabled;
- Sensitive locations, e.g. hospital, churches, schools, historical buildings;
- People walking;
- People cycling;
- Open spaces, recreational sites, shopping areas;
- Sites of ecological/nature conservation value; and
- Sites of tourist/visitor attraction.

4.5.37 The criteria that have been used to make judgements on the sensitivity of receptors within the context of the project are summarised in Table 4.4.

Table 4.4: Receptor sensitivity

Receptor Sensitivity	Receptor Type
High	Receptors of greatest sensitivity to traffic flow: schools, colleges, playground, accident blackspots, retirement homes, urban/residential roads without footways that are used by pedestrians. (Para. 2.5, IEMA Guidelines, 1993)
Medium	Traffic flow sensitive receptors including doctor surgeries, hospitals, shopping areas with roadside frontage, roads with narrow footways, un-segregated cycleways, community centres, parks, recreation facilities. Receptors include hospitals and health care centres, shops, cemeteries and parks.
Small	Receptors with some sensitivity to traffic flow: places of worship, public open space, nature conservation areas, listed buildings, tourist attractions and residential areas with adequate footway provision.
Negligible	Receptors with low sensitivity to traffic flows and those sufficiently distant from affected roads and junctions. Receptors include very small settlements and roads with no significant settlements including new strategic trunk roads or motorways.

Assessment criteria

4.5.38 The impact of the proposed development relating to a change in vehicle numbers has been measured around six key impacts, namely:

- Severance;
- Driver delay;
- Pedestrian and cycle delay;
- Pedestrian and cycle amenity;
- Fear and intimidation; and
- Accidents and safety.

Severance

4.5.39 Severance is defined in the IEMA guidelines as the perceived division that can occur within a community when it becomes separated by a major traffic artery. The guidance notes that measuring and predicting severance can be extremely difficult as the correlation between the extent of severance and the physical barrier of a road is not clear. Based on studies of major changes in traffic flow, the IEMA guidelines set out the following range of indicators:

> *"Changes in traffic flows of 30%, 60% and 90% are regarded as producing 'slight', 'moderate' and 'substantial' changes in severance, respectively.*

4.5.40 The indicators set out in the IEMA guidelines will be used to quantify the proposed developments effects on severance.

Driver delay

4.5.41 Traffic delays may occur at various points throughout the surrounding road network. To measure the impacts of development traffic, junction capacity tools have been used including Junctions 9 (ARCADY and PICADY) for priority-controlled junctions and LinSig for signal-controlled junctions. Each package estimates vehicle delay through a junction and hence, by testing each junction in the baseline and with development scenario, it is possible to estimate increased vehicle delays.

Pedestrian and cycle delay

4.5.42 The IEMA guidelines note that:

> *"… increases in traffic levels are likely to lead to greater increases in [pedestrian] delay. Delays will also depend upon the general level of pedestrian activity, visibility and general physical conditions of the site… More recent work (HFA 1990) has suggested a lower threshold of 10 seconds delay and upper threshold of 40 seconds delay which, for a link with no crossing facilities, equates to the lower threshold of a two-way flow of about 1,400 vehicles per hour."*

4.5.43 A lower threshold of a two-way traffic flow of about 1,400 vehicles per hour will be used to determine whether there is a significant impact on pedestrian delay, providing there are no existing or proposed crossing facilities.

Pedestrian and cycle amenity

4.5.44 Pedestrian and cycle amenity can best be described as the 'pleasantness' of a journey using either of these modes. High levels of amenity are generally associated with low traffic levels, separation from traffic and the composition of traffic. The IEMA guidelines note the that:

"… a tentative threshold for judging the significance of changes in pedestrian amenity would be where the traffic flow (or its lorry component) is halved or doubled."

4.5.45 The assessment of pedestrian and cycle amenity will therefore be based on the percentage change in traffic and its lorry component.

Fear and intimidation

4.5.46 The IEMA guidelines note that this impact is dependent on several variables, including:

"… the volume of traffic, its HGV composition, its proximity to people or the lack of protection caused by such factors as narrow pavement widths".

4.5.47 The suggested threshold presented in the IEMA guidelines proposes a small impact if the average HGV flow is around 1,000-2,000 vehicles and negligible if the HGV flow is below 1,000 (18-hour AAWT).

4.5.48 It advises, however, that such thresholds should be used as an approximation and other factors will need to be taken into consideration. For example, areas where high-speed sections of road are present, the location of access junctions, or areas exposed to higher than average levels of school children.

Accidents and safety

4.5.49 While the IEMA guidelines suggest using existing link road accident data, they also recommend that professional judgement be exercised to gain an understanding of the likely number of accidents following the opening of any development. Furthermore, the guidelines suggest that local circumstances or factors that may elevate or decrease levels of accidents should be taken into consideration.

Passenger journey time

4.5.50 There are no IEMA guidelines on the assessment of effects on public transport. To assess the impacts of the proposed development on rail services, the impacts on passenger through journey times will be assessed. It is proposed for passenger delay to be quantified in terms of total delay, and as a proportion of the overall journey time.

Magnitude of Impact

4.5.51 A summary of the impact thresholds which are referred to in the paragraphs above are outlined in Table 4.5.

Table 4.5: Magnitude of impact criteria

Impacts	Magnitude of Impact			
	Negligible	**Small**	**Medium**	**High**
Severance – results from the creation of new barriers such as roads combined with increased traffic flows along existing routes. Magnitude is based on IEMA Guidelines	Change in total traffic flow of <30%	Change in total traffic flow of 30% to 60%	Change of total traffic flow of 60% to 90%	Change in total traffic flow over 90%
Driver Delay – often caused by the impact of the works on the local road network, along with increase in overall traffic flow along existing routes.	To be assessed on case-by-case basis using professional judgement and the results of the junction modelling assessments.			
Pedestrian and Cycle Delay – results from increase in traffic flow, speed or composition along existing routes.	To be assessed on a case-by-case basis, with consideration given to the sensitivity and vulnerability of the receptor. It can occur on a road without crossings when the two-way flow exceeds 1,400 vehicles per hour.			
Pedestrian and Cyclist Amenity – relates to the relative pleasantness of a journey and can be affected by increase in traffic	To be assessed on case-by-case basis using professional judgement with consideration given to changes to traffic flow. Generally, where the traffic flow or lorry component is halved or doubled, the effect is deemed to be significant.			
Fear and Intimidation – a pedestrian's level of fear and indication is linked to the volume of traffic on the local road network.	To be assessed on case by case basis using professional judgement with consideration given to the increase in HGV flow, footway widths and road speeds. HGV flow below 1,000 vehicles (18-hour AAWT) is typically anticipated to have a negligible effect.			
Accidents and Safety – the impact of the proposed development through an increase in vehicles could influence the accidents and safety of the surrounding road network.	To be assessed on case by case basis using professional judgement with consideration given to road traffic collision assessment included within the Transport Assessment and the forecast increase in traffic flows resulting from the development.			
Rail Passenger Journey Times – the impact of introducing a railway station (Cardiff Parkway) on existing through passenger journey times	Bespoke assessment based on the change in journey times for through passengers as a result of Cardiff Parkway. Significance will be based on the total increase in journey time, and as a proportional increase on the existing journey times of through passengers.			

4.5.52 As a guide to inform the assessment, but not as a substitute for professional judgement, an impact significance matrix used for determining the significance of traffic related effects is set out in Table 4.6 and has been developed by combining receptor sensitivity and the magnitude of the impact.

Table 4.6: Significance of effects matrix

Receptor Sensitivity	Magnitude of Impact			
	High	**Medium**	**Small**	**Negligible**
High	Major	Major	Moderate	Minor
Medium	Major	Moderate	Minor	Negligible
Small	Moderate	Minor	Negligible	Negligible
Negligible	Minor	Negligible	Negligible	Negligible

4.5.53 Effects are considered as having a major, moderate, minor or negligible significance. Potential effects that are determined to be moderate and major are classed as 'significant' effects for the purposes of an EIA. Where an effect has

been anticipated to be of negligible to minor, these are classed as 'not significant' effects.

Effects scoped out

4.5.54 As stated in the IEMA guidelines, increases in traffic flow below 10% are generally considered to be insignificant given that daily variations in background traffic flow on any given road link can fluctuate by the same amount. As per the guidelines, changes in traffic flow levels below 10% is therefore assumed to have no discernible environmental impact.

4.6 Limitations and assumptions

Limitations

4.6.1 As noted in the IEMA guidelines, there is inherent uncertainty with traffic forecasting and accuracies greater than 10% are not considered to be achievable. Furthermore, there can be day-to-day variations in traffic on the local highway network by 10%. As such, traffic impacts below 10% can be assumed to create no discernible environmental effects and do not need to be assessed.

4.6.2 Aside from ATC data on Cypress Drive, there was no observed speed data available for the surrounding highway network. Consequently, the assessment has considered the speed limits on each of the links as an acceptable approximation of vehicle speeds. Except for Cypress Drive it is not anticipated that traffic volumes associated with the proposed development, nor any mitigation or enhancement works, would have a significant impact on link traffic speeds compared to the do-nothing scenario.

Assumptions

4.6.3 Throughout the assessment process, professional judgement and industry best practice has been applied. Where there is a gap in available data, reasonable assumptions have been applied.

4.6.4 In the future Do minimum scenarios (without the proposed development), it is assumed that the proportion of HGVs on the road will remain consistent with the surveyed (2018 baseline) proportions. This provides a robust assessment as the likely composition of additional trips generated by the committed developments will predominantly be cars and light goods vehicles.

Construction

4.6.5 To assess the traffic and transport impacts associated with the construction of the proposed development, the assumptions have been made about the following:

- Construction programme;
- Construction vehicle trip generation;
- Construction routes; and

- Construction access

4.6.6 The assumptions are outlined below and detailed in Appendix T of the TA (ref: REP/AEB/20200102).

Construction programme

4.6.7 The business district element of the proposed development will be constructed in accordance with a programme which will be influenced by market demand. Enabling works, consisting of ecological enhancement and mitigation, will be undertaken in the initial phase, alongside enabling infrastructure which will include earthworks to create flood resistant development platforms, highways and utilities. Work on Cardiff Parkway railway station will also begin as soon as the relevant permissions and agreements are secured. The subsequent phasing of the business district will be influenced by market demand.

4.6.8 For the purposes of the construction assessment, a robust timetable has been agreed which assumes that construction of the proposed development would commence in 2021, with the full proposed development, including all buildings, completed and operational by 2028. The indicative construction programme of the proposed development is summarised in Table 4.7 below.

Table 4.7: Indicative construction programme

Future Year	Programme
2021	Construction start
2023	Opening of the Transport Interchange, comprising of the Cardiff Parkway railway station and associated car parking (up to 650 spaces) Partial completion of Business District (22,500m^2)
2028	Completion of Business District (up to 90,000m^2)

4.6.9 For the purposes of assessment, it is assumed that the civil engineering works take a period of four years, starting 2021 and completing summer 2025. This is based on advice from the Arup civil engineer team and client.

4.6.10 It has been assumed that the construction of the station building, and the railway corridor works will take a period of two years. This is based on advice from the Arup rail engineering team, client, and third parties including an ECI party. For the purposes of this assessment, it is assumed that construction of the station starts May 2021.

4.6.11 For the purpose of assessment, it is assumed that the business district will be built-out over an eight-year period. This will commence in May 2021 alongside the construction of the rail works. It is not planned for any of the office buildings to be occupied until the station opens in 2023.

4.6.12 The estimated level of vehicle movements generated by the construction of the business district assumes an annual construction (GIA) of 11,250m^2 per annum. This estimate is considered a reasonable and robust assumption and has been determined in discussion with the client and property agents regarding potential take-up of office space based on data for the Cardiff Capital Region.

Construction vehicle trip generation

4.6.13 Several studies have been undertaken to estimate the number of vehicle movements that will be generated in the construction stage. These are detailed in Appendix T of the TA and have been based on several assumptions, as summarised below:

- Each element of the works is treated separately in terms of personnel/vehicle movements, although construction of these different elements will likely run as parallel processes;
- It is anticipated that the civil engineering and earthworks workforce requirements will be sourced locally. There will also be a small number of other posts that will likely utilise a local workforce e.g. site security and cleaning, as set out in Socio-economic Chapter of this ES;
- Specialist activity workforces will be sourced regionally, nationally or provided through the equipment manufacturer (e.g. directional drilling, piling);
- Vehicle movements are presented as overall estimates; and
- Vehicle movements are defined as a return journey from the vehicle's origin, to the construction site and then back to the vehicles point of origin. All movements are applied to all traffic count receptors / count locations for robustness.

4.6.14 The number of construction vehicle movements associated with the earthworks has been calculated using the amount of material considered to be required. Contractor movements have been calculated using figures from similar schemes involving earthworks and offices.

4.6.15 The number of vehicle movements that will be generated by the rail works have been calculated by the Arup Rail team using the quantum of material that is anticipated to be imported by road. The expected number of vehicle movements throughout the construction period is set out in the TA. It has been assumed that a large proportion of materials will be imported by rail, including bottom and top ballast, rails and sleepers.

4.6.16 This assumption has been tested with an ECI party and is deemed to be appropriate based on experience from similar projects. Whilst the traffic impacts from construction would be higher if more material was imported by road, this scenario is not anticipated to occur. This assumption also aligns with the overarching aim of the CTMP to reduce the impacts of construction traffic.

4.6.17 Construction vehicle movements associated with the business district have been calculated using survey data obtained from a wide range of sites within central London, varying from smaller sites (12,999m^2), medium sites (42,000m^2), and larger sites (68,000m^2) in terms of area.

4.6.18 To calculate AADT and AAWT flows, the following assumptions have been made with regards to construction working hours:

- **Civils**: it was assumed that all deliveries would be made during typical construction hours for a 5.5 days week;
- **Rail**: it was assumed that the majority of works to the railway corridor will be completed overnight, between 12am – 6am. Whereas works on the station building can largely be undertaken during normal construction hours (0800 to 1800 Monday to Friday and Saturday mornings); and
- **Business district**: it was assumed that all deliveries would be made during a 10-hour period from 0800 to 1800, Monday to Friday.

4.6.19 Table 4.8 presents the average number of construction vehicle movements anticipated to be generated for each year of the construction period. It also presents the following:

- Peak 12-month period of construction
- Average construction movements during the earthworks period; and
- Average construction movements across the full construction period.

Table 4.8: Average weekday construction vehicle movements (arrivals)

Period	Average Weekday Movements (Arrivals)	
	HGVs	LGVs
2021-2022	63	98
2022-2023	148	259
2023-2024	94	193
2024-2025	119	194
2025-2026	44	98
2026-2027	7	51
2027-2028	7	51
Peak 12-month period (Feb 2022 - Jan 2023)	151	264
Earthworks average (Feb 2021 - August 2025)	112	198
Construction period average (Feb 2021 - Dec 2028)	63	127

4.6.20 Vehicle movements associated with the construction period are expected to peak in the period February 2022 to January 2023. This 12-month period has therefore been used as the basis for the traffic, air quality and noise calculations.

4.6.21 In this period, 151 HGVs are estimated to travel to and from the site on an average weekday which equates to approximately 15 HGVs arriving and 15 HGVs departing per hour. In addition, there are anticipated to be 264 LGV movements (including contractors) generated on an average weekday. Most of the movements are expected to occur in or before the AM (arriving) and in/after the PM (departing) peak periods. This is detailed in Appendix T of the TA.

Construction vehicle routes

4.6.22 For the purposes of the ES, it has been assumed that all HGVs will route to the site from the M4 via Junction 30 (Cardiff Gate) and a combination of the A4232, the A48 and Cypress Drive, as illustrated in Figure 4.3. Analysis indicates journey times to the site are similar via J28 and J30, and therefore this assumption is appropriate.

4.6.23 The routing of HGVs via the strategic network is considered the most reasonable and logical route for HGV deliveries to the site, given suppliers will be coming from across south Wales, and the M4 is the key highway route serving this corridor. It also assigns HGVs to the most appropriate route in terms of highway capacity and physical characteristics, as well as avoiding routes used by vulnerable road users.

Construction access

4.6.24 There are several existing and proposed accesses onto the development site north of the railway line which could be utilised for site construction activities including surveys, clearance, import of materials, workforce travel and export of materials. A combination of these locations will likely be required during the construction programme, with these reflecting different access requirements, constraints, and phasing of activities. To provide flexibility, two scenarios have been assessed for planning:

- All construction traffic movements north of the railway line utilise the existing access north of the gas reduction station access via Heol Las on the eastern boundary of the site. As previously noted, this would require land in the NCC administrative area and therefore delivery is subject to agreement with NCC and acquisition of relevant land interests; and

- All construction traffic movements north of the railway line utilise the proposed secondary access at the Cypress Drive/Sandbrook Road roundabout on the western boundary of the site.

4.6.25 For both options there will be construction traffic movements associated with railway and station building works south of the railway line. These vehicles will access the site via Heol Las, south of the railway. These construction access routes are presented in Figure 4.1.

4.6.26 Traffic management interventions (potentially including banksmen and/or traffic signals) will be required to control vehicle movement on Heol Las and Fortran Road, between the junction with Cobol Lane and the site accesses. These interventions will be agreed as part of the CTMP.

4.6.27 Following the delivery of the primary access road in 2023, there is potential for construction traffic to use this route to access the site. The primary access road will take access from Cypress Drive, south of the junction with Fortran Road. The alignment of this road is presented indicatively in Chapter 5 of the TA.

Disruptions to rail services

4.6.28 The construction of the railway station is anticipated to have a temporary impact on existing rail journey times. An ECI party has advised the following:

"There will likely be a requirement for a large number of disruptive possessions to enable the works to be carried out for Cardiff Parkway This includes Overhead Line Equipment (OLE), construction of platforms 1, 2 and 3, and footbridge installation. Therefore, existing rail services will be affected."

4.6.29 Based the above, it has been assumed that the construction of the proposed railway station will have a temporary impact on existing railway journey times

Operational

4.6.30 It is anticipated that the station to be served by up to eight trains an hour between Newport and Cardiff and include direct trains to Bristol, London and the Midlands. This is deemed to be a robust assumption and has therefore formed the basis for this assessment.

4.6.31 As detailed in the TA, existing travel characteristics of employees located near the site are not deemed to be reflective of the proposed development given the proposed sustainable transport interventions such as the railway station. Several modal split assumptions have therefore been made to forecast the traffic impacts associated with the business district, as set out in Table 4.9 below.

Table 4.9: Summary of business district modal split assumptions

Mode	Modal Split Assumptions
Walking and Cycling	Census data indicates that 5.1% of people currently walk to work and 1.3% cycle. As noted above, the census data incudes the employment site located on Wentloog Avenue which is not accessible by foot or cycle. With a proposed Masterplan that prioritises suitable modes of transport over vehicle movements, it is estimated that 6% of people will walk to the Business District. With the introduction of Route 2 of the Cardiff Cycleway and the Travel Plan interventions, it is estimated that approximately 4% of employees would commute by cycle.
Motorcycle, Scooter & Moped	Census data for St Mellons indicates that 0.7% of trips are made to the site by motorcycle, scooter or moped. It has been assumed that the same proportion of commuters to the proposed Business District will arrive by this mode of transport.
Train	As noted in Chapter 6 of the TA, 31% of weekday trips to and from Cardiff Parkway are associated with the proposed Business District. This equates to both 431 arrivals and 431 departures a day. These are principally associated with commuting and will therefore occur in the morning and evening peak periods. With an arrival and departure profile obtained from TRICS, it is estimated that 239 of journeys to work are made by rail in the AM peak hour and 208 journeys are made in the PM peak hour. This equates approximately 13.4% of journeys being made by rail in the peak hours.

Mode	Modal Split Assumptions
Bus	The proposed railway station will provide connectivity benefits for the local area and increase the catchment for local bus services. Logically, it is therefore assumed that some bus services will extend into the site to benefit from this increased catchment. It is reasonable to assume these services will also be used for travel to the business district and bus stops are proposed within the site to accommodate these services. SEWTM indicated that 8.6% of journeys to the Business District would be made by bus based on indicative assumptions inputted in to the model. These assumptions included the 44/45, X5 and 64/65 bus services being extended in to the site, equating to nine services an hour in peak periods. Whilst it is envisaged that further journeys may be made by bus given the potential service improvements to the strategic residential sites including St Edeyrn's and North East Cardiff, 8.6% mode share is considered to be a suitably robust assumption.
Car Share	Census data for the area indicates that 92% of the commuters travelling by car are drivers and 8% are passengers. With the introduction of an additional 90,000m^2 of office development, there will be more employees in the St Mellons area which will increase the opportunity to car share. With the introduction of a site-wide Travel Plan that will include specific measures to encourage car sharing, it is estimated that 9% of commuters travelling by car would car share.
Car Driver	The remaining 61% of journeys made to the site are therefore estimated to be car drivers.

4.6.32 As detailed in the TA, a benchmarking exercise was undertaken which demonstrated the estimated modal split for the proposed Business District is reflective of other locations in Cardiff with a similar level of accessibility. These modal split assumptions are therefore deemed to be reasonable.

4.6.33 Based on the modal split assumptions presented above, Table 4.10 presents the multi-modal trips that are forecast to be generated by the business district.

Table 4.10: Forecast business district multi-modal trip generation

Mode	Mode Share	Weekday AM Peak Hour		Weekday PM Peak Hour		Weekday	
		In	Out	In	Out	In	Out
Car (Driver)	61.0%	1069	99	135	945	4583	4444
Car (Passenger)	6.3%	110	10	14	97	470	456
Train	13.4%	235	22	30	208	1009	978
Bus	8.6%	151	14	19	133	646	626
Bicycle	4.0%	70	6	9	62	300	291
On foot	6.0%	105	10	13	93	451	437
Motorcycle	0.7%	12	1	2	11	53	51
Total	**100.0%**	**1752**	**162**	**222**	**1548**	**7512**	**7284**

4.6.34 As set out in the table above, the business district is forecast to generate 9,027 two-way vehicle trips on an average weekday.

4.7 Baseline environment

Walking and cycling

4.7.1 A detailed walking and cycling audit of the site and the neighbouring streets has been appended to the TA. The site is bounded to the west by Cypress Drive which has a footway adjoining the western carriageway. This footpath runs south from the junction with Fortran Drive to Water Avens Close. Approximately 70m south of the junction with Fortran Drive, there is a signal-controlled pedestrian crossing on Cypress Drive from which a pedestrian footway heads directly west into residential developments of St Mellons. Just beyond this crossing the eastern footpath terminates and continues on the western side of the road. There is no existing footway on the eastern carriageway south of this crossing.

4.7.2 Several footways adjoin Cypress Drive south of Fortran Road giving access to residential developments within St Mellons, including at Sandbrook Drive, Maes-Y-Crochan and Meadow Sweet Drive.

4.7.3 North of the junction with Fortran Road, a pedestrian underpass below Cypress Drive provides access between St Mellons Business Park and Brython Drive and further residential developments in St Mellons beyond. There is a second underpass below Cypress Drive between St Pierre Close and Vaendre Lane. These are unlit, and the latter leads to an unsurfaced pedestrian link.

4.7.4 To the northwest, Cypress Drive forms a roundabout with the A48, B4487 and A48 slips. The footpath on the western carriageway of Cypress Drive resumes north of Willowdene Way and continues to this roundabout.

4.7.5 There is an uncontrolled pedestrian crossing across Cypress Drive at the entry to the roundabout. This gives pedestrian access to a footway along the south side of the A48 into Cardiff and towards Wyevale Garden Centre and residential development to the east. There is a signalised pedestrian crossing across the A48 to the east of the garden centre providing access to a bus stop on the eastbound carriageway. To the west of the Cypress Drive roundabout, footways continue along both sides of the B4487.

4.7.6 There is a PRoW that crosses the site in an east/west alignment between Cypress Drive and the St Mellons Road/Heol Las junction. It is not possible to walk this entire route owing to hedgerows and a lack of reen crossings.

4.7.7 Route 88 of the National Cycle Network follows an on-street route east from the site along St Mellons Road to Marshfield and Newport beyond. To the west of Cypress Drive there is a network of relatively flat residential streets that are conducive to cycling.

4.7.8 Based on proposals in the CC Integrated Route Map, CC are developing proposals for a cycleway, identified as Cycleway 2, between St Mellons Business Park and the city centre via the B4487 Newport Road. CC have indicated that work on this cycleway is planned to commence in the period 2020-2021.

Public transport

4.7.9 There are several bus services near the site, as summarised in Table 4.11 below. Services provide access towards central Cardiff and Newport.

4.7.10 The closest bus stops to the site are located on Willowbrook Drive, Fountain Lane and Willowdene Way. All existing bus stops are located over 400m from both the centre of the site and the proposed transport interchange serving Cardiff Parkway station, as summarised in Table 4.11.

Table 4.11: Local bus services

Service	Operator	Route	Nearest Bus Stop	Buses per hour (Mon-Fri) [4]
X5	New Adventure Travel	Ringland – Cardiff	Willowdene Way (1 km)	3
		Cardiff – Ringland	Willow Grove, Willowdene Way (1 km)	3
44/45/45B	Cardiff Bus	St Mellons – Cardiff City (loop)	Kwik Save (800 m)	8
X45	Cardiff Bus	Cardiff Bay – St Mellons	Kwik Save (800 m)	3
64/64A/65	Capital Links/ Cardiff Bus	Llanrumney and St Mellons - Pentrebane – Cardiff	Kwik Save (800 m)	Bi-hourly
30	Newport Bus/ Cardiff Bus	Newport – Cardiff	A48 (2 km)	3
		Cardiff – Newport	A48 (2 km)	3

Existing highway network

4.7.11 Cypress Drive bounds the eastern edge of the primary settlement of St Mellons and has a speed limit of 30mph. ATC data collected on Cypress Drive indicates that recorded traffic speeds exceed the posted speed limit, as set out in Table 4.12 below.

Table 4.12: ATC locations and recorded 85th percentile speeds

Site	Location	Speed Limit (mph)	Direction	Recorded 85th Percentile Speeds (mph)		
				Weekday	AM Peak Hour	PM Peak Hour
A	Cypress Drive (north of the roundabout with Sandbrook Road)	30 mph	Northbound	40.3	40.1	40.4
			Southbound	42.3	42.0	41.0
B	Cypress Drive (south of the junction with Fortran Road)	30 mph	Northbound	44.0	43.2	44.5
			Southbound	42.7	41.6	36.6
C	Cypress Drive (south of the roundabout with the A48)	30 mph	Westbound	41.5	42.4	39.7
			Eastbound	39.2	38.0	39.0

[4] Source: Traveline.cymru.co.uk (03.01.2020)

4.7.12 Adjacent to the site, there are two junctions with Cypress Drive which provide access to the existing residential development and St Mellons community centre. Sandbrook Road forms a three-arm roundabout with Cypress Drive, providing access towards Willowbrook Primary School and St Mellons community centre to the west. To the north, Maes-Y-Crochan forms a priority junction with Cypress Drive.

4.7.13 Directly northwest of the proposed development, Fortran Road forms a priority junction with Cypress Drive which provides access into St Mellons Business Park and Marshfield beyond. Cypress Drive is a single carriageway road adjacent to the site which widens to a dual carriageway directly to the north of the junction with Fortran Road. A right-turn lane is provided at this junction for traffic turning from Cypress Drive to Fortran Road.

4.7.14 Fortran Road continues through St Mellons Business Park and becomes Heol Las which bounds the site's eastern edge. Heol Las is a narrow road with no central markings, this road continues south beyond the southern site boundary. St Mellons Road forms a priority junction with Heol Las at the eastern boundary of the site and provides access towards Marshfield.

4.7.15 To the north of Fortran Road, several roads form priority junctions with Cypress Drive providing access to St Mellons Business Park and the neighbouring residential developments. Further northwest, Cypress Drive forms the southern arm of a four-arm roundabout; the other arms include the A48 to the east towards Newport, the B4487 Newport Road to the west and the A48 west facing slips to the north. Both the B4487 and A48 provide routes towards Cardiff. The A48 can also be used to travel to Junction 30 of the M4 via the A4232 Pentwyn Link Road.

4.7.16 The relative sensitivity of each of the road links included within the area of interest, has been determined utilising the receptor definition included in Table 4.4. The road link sensitivity is summarised in Table 4.13 and illustrated in Figure 4.4.

Table 4.13: Road link sensitivity

Ref	Road Link	Extent	Sensitivity	Justification
1	Heol Las	South of St Mellons Road	Negligible	No footway and has no frontage
2	St Mellons Road	East of Heol Las	Negligible	No footway and has no frontage
3	Fortran Road	North of St Mellons Road	Negligible	No frontage, offices offset from the road
4	Fortran Road	East of Cypress Drive	Negligible	No frontage, offices offset from the road
5	Cypress Drive	South of Fortran Road	Negligible	Has no frontage
6	Cypress Drive	North of Fortran Road	Negligible	No footway or frontage
7	Cypress Drive	North of Sandbrook Road	Negligible	Has no frontage
8	Sandbrook Road	West of Cypress Drive	High	Proximity to Willowbrook Primary School
9	Cypress Drive	South of Sandbrook Road	Negligible	No footway and has no frontage
10	Cypress Drive	North of Willowdene Way	Negligible	No footway and has no frontage
11	Willowdene Way	West of Cypress Drive	Negligible	Has no frontage
12	Cypress Drive	South of Willowdene Way	Negligible	No footway and has no frontage
13	A48	East Cypress Drive	Negligible	No footway and has no frontage
14	Newport Road	West of Cypress Drive	Low	Some residential frontages
15	A48(M) slips	North of Cypress Drive	Negligible	No footway and has no frontage
16	A48	East of Marshfield Road	Negligible	No footway and has no frontage
17	A48	West of Marshfield Road	Negligible	No footway and has no frontage
18	Newport Road	East of Tyr Winch Road	Low	Limited residential frontages
19	Newport Road	West of Tyr Winch Road	Low	Limited residential frontages
20	Newport Road	East of Llanrumney Avenue	High	Access to St Illtyd's Catholic High School
21	Newport Road	West of Llanrumney Avenue	Medium	Residential frontages
22	Newport Road	East of A4232 On-Off Slips	Medium	Residential frontages
23	Newport Road	West of A4232 On-Off Slips	Low	Retail frontage offset from highway
24	A4232	North of Rover Way/A4232	Negligible	No footway and has no frontage
25	Lamby Way	East of Rover Way/A4232	Negligible	No footway and has no frontage
26	Rover Way	South of Rover Way/A4232	Negligible	No footway and has no frontage
27	Rover Way	West of Rover Way/A4232	Negligible	No footway and has no frontage
28	Maes-Y-Bryn Rd	North of M4	Negligible	No footway and has no frontage
29	Cardiff Gate	South of M4	Negligible	Has no frontages
30	Pentwyn Link Rd	North of Pentwyn Link Rd	Negligible	No footway and has no frontage
31	Church Road	East of Pentwyn Link Rd	Negligible	No footway and has no frontage
32	A4232	South of Pentwyn Link Rd	Negligible	No footway and has no frontage
33	Heol Pontprennau	West of Pentwyn Link Rd	Negligible	Has no frontages
34	Capel Ederyn	West of A48	Medium	Residential area
35	Pentwyn Road	West of A48 On-Off Slips	Negligible	Has no frontages
36	Bryn Celyn Road	West of A48 On-Off Slips	High	Proximity to St David's Primary School
37	A4232	South of A48	Negligible	No footway and has no frontage
38	Round Wood Close	West of A48	Medium	Residential area

4.7.17 The baseline traffic flows for each of link are presented in Table 4.14. The baseline traffic flows have been calculated using the traffic survey data and the factors presented in Table 4.3.

Table 4.14: Estimated 24-hour AADT baseline traffic data (2018)

Ref	Road Link	Extent	Total Vehicles	HGVs	HGV Component
1	Heol Las	South of St Mellons Road	370	26	7.1%
2	St Mellons Road	East of Heol Las	2,024	9	0.4%
3	Fortran Road	North of St Mellons Road	2,340	26	1.1%
4	Fortran Road	East of Cypress Drive	6,392	57	0.9%
5	Cypress Drive	South of Fortran Road	3,585	44	1.2%
6	Cypress Drive	North of Fortran Road	7,743	79	1.0%
7	Cypress Drive	North of Sandbrook Road	3,493	57	1.6%
8	Sandbrook Road	West of Cypress Drive	3,493	26	0.8%
9	Cypress Drive	South of Sandbrook Road	1,056	48	4.6%
10	Cypress Drive	North of Willowdene Way	12,511	110	0.9%
11	Willowdene Way	West of Cypress Drive	4,030	172	4.3%
12	Cypress Drive	South of Willowdene Way	10,241	132	1.3%
13	A48	East Cypress Drive	17,839	260	1.5%
14	Newport Road	West of Cypress Drive	15,116	422	2.8%
15	A48(M) slips	North of Cypress Drive	29,426	344	1.2%
16	A48	East of Marshfield Road	16,352	464	2.8%
17	A48	West of Marshfield Road	17,456	475	2.7%
18	Newport Road	East of Tyr Winch Road	1,3268	365	2.8%
19	Newport Road	West of Tyr Winch Road	13,629	312	2.3%
20	Newport Road	East of Llanrumney Avenue	8,882	304	3.4%
21	Newport Road	West of Llanrumney Avenue	12,912	308	2.4%
22	Newport Road	East of A4232 On-Off Slips	22,709	528	2.3%
23	Newport Road	West of A4232 On-Off Slips	28,767	884	3.1%
24	A4232	North of Rover Way/A4232	23,459	1,553	6.6%
25	Lamby Way	East of Rover Way/A4232	14,293	1,638	11.5%
26	Rover Way	South of Rover Way/A4232	18,587	1,483	8.0%
27	Rover Way	West of Rover Way/A4232	10,347	889	8.6%
28	Maes-Y-Bryn Rd	North of M4	1,487	172	11.5%
29	Cardiff Gate	South of M4	13,422	229	1.7%
30	Pentwyn Link Rd	North of Pentwyn Link Rd	32,243	526	1.6%
31	Church Road	East of Pentwyn Link Rd	2,556	561	22.0%
32	A4232	South of Pentwyn Link Rd	34,149	490	1.4%
33	Heol Pontprennau	West of Pentwyn Link Rd	16,097	712	4.4%
34	Capel Ederyn	West of A48	5,952	211	3.5%
35	Pentwyn Road	West of A48 On-Off Slips	11,438	172	1.5%
36	Bryn Celyn Road	West of A48 On-Off Slips	9,907	233	2.4%
37	A4232	South of A48	47,871	1,641	3.4%
38	Round Wood Close	West of A48	34,465	3,145	9.1%

Road traffic collision analysis

4.7.18 Whilst the IEMA guidelines suggest using existing link road accident data, they also recommend that professional judgement is exercised to gain an understanding of the likely number of accidents following the opening of any development. Furthermore, the guidelines suggest that local circumstances or factors that may elevate or decrease levels of accidents should be taken into consideration.

4.7.19 Road Traffic Collision (RTC) data for the most recent available five-year period (2013 –2017) has been obtained from CC for the surrounding highway network within Cardiff, as detailed in Section 3.7 of the TA. At the time of requesting the data, this represented the most recent five-year period data was available.

4.7.20 RTC data is recorded by Police when they attend the scene of a collision and medical assistance is required by one or more parties, therefore damage only accidents are omitted.

4.7.21 An RTC is categorised according to its severity:

- Slight – medical attention was required but no hospital stay was necessary;
- Serious – medical attention involving a hospital stay was required; and
- Fatal.

4.7.22 The total collisions recorded from 2013-2017 are summarised below in Table 4.15, based on the severity of the collision and the modes of transport involved.

Table 4.15: RTC summary

Collision involving	Severity			
	Slight	Serious	Fatal	Total
Motor vehicle only (excluding 2-wheels)	50	1	3	54
2 wheeled motor vehicles	8	2	0	10
Pedal cycle	17	5	0	22
Pedestrian	6	1	0	7
Total	**81**	**9**	**3**	**93**

4.7.23 As shown in Table 4.15 a total of 93 collisions were recorded, of these the majority (87%) were slight, ten were serious and three were fatal. The TA identified several locations near the site where RTCs were recorded.

4.7.24 Three fatal collisions were recorded on links within the study area as shown in Table 4.15, none of which involved vulnerable road users. One of the fatal incidents occurred on Willowbrook Drive and involved a vehicle colliding with a nearby property under icy conditions. Another fatal incident was recorded on Cypress Drive when a vehicle travelling southbound lost control and crossed the grassed central reservation colliding with a bus travelling in the opposing direction. The recorded contributory factor was ‘aggressive driving’. The final fatal incident recorded was on the A48 east of the roundabout with Cypress Drive and involved a vehicle sliding into the opposite lane. The collision record noted ‘loss of control’ as the primary contributory factor.

4.7.25 Of the nine serious incidents recorded one involved a pedestrian, five involved cyclists and two involved motorcyclists. Three of the incidents involving cyclists occurred at the A48/Cypress Drive roundabout and all three recorded the contributory factor as the driver failing to look or judge the cyclists path/speed.

4.7.26 One of the serious incidents involving a motorcycle was recorded at 04:44 on Saturday morning. The collision involved the motorcyclist colliding with a lamppost and the recorded cause of the incident was the driver being 'careless/reckless/in a hurry'. The other serious incident involving a motorcyclist recorded on Cypress Drive occurred at the junction with Fortran Road. The incident involved a vehicle pulling out from Fortran Drive colliding with a motorcycle travelling north bound on Cypress Drive.

4.7.27 The CrashMap[5] online mapping service for collision data has been used to identify RTCs that have occurred within NCC for the most recent five-year period (2014-2018). The study area includes the A48, Marshfield Road, St Mellons Road, Heol Las and the B4239 Wentloog Avenue.

4.7.28 No RTCs were recorded on St Mellons Road, the proposed active travel route between Marshfield and the proposed development. Two slight RTCs were recorded on links within the study area, one on Marshfield Road and a second on the B4239 Wentloog Avenue.

4.7.29 The TA concludes that the majority of the RTCs at links and junctions within the study area were categorised as slight and occurred at junctions. Three fatal incidents were recorded on links; however, these were all at different locations and attributed to driver error or weather conditions. There is a small cluster of serious collisions involving cyclists at the Cypress Drive/A48 roundabout, however CC are proposing a segregated cycleway at this location.

4.8 Embedded mitigation

4.8.1 In alignment with Local and National Policy, the proposed development seeks to maximise the proportion of journeys made to and from the site by sustainable modes of transport. It is proposed to achieve this with a range of physical interventions and soft measures.

4.8.2 The proposed development will be highly accessible by active travel modes including walking and cycling. As set out in Figure 4.5, pedestrian and cycle routes are recommended through the site. Optimal works include two active travel links on to Heol Las, however these would require land in the NCC administrative area and therefore delivery is subject to agreement with NCC and acquisition of relevant land interests.

4.8.3 Appropriate pedestrian and cycle crossings are proposed within the proposed development and these will be agreed as part of the detail of the reserved matters applications. In addition, signal-controlled crossings are proposed on Cypress Drive to mitigate the potential effects caused by the forecast increase in traffic and these will be secured through Section 106 agreements.

[5] www.chrashmap.co.uk

4.8.4 As set out in Section 4.6, the modal split of journeys to the proposed development has been calculated with reference to the active travel proposals, including those detailed in this section and within Chapter 5 of the TA. For example, the proposed extension to Cycleway 2 from the redline boundary to the station will enable more journeys to be made by cycle.

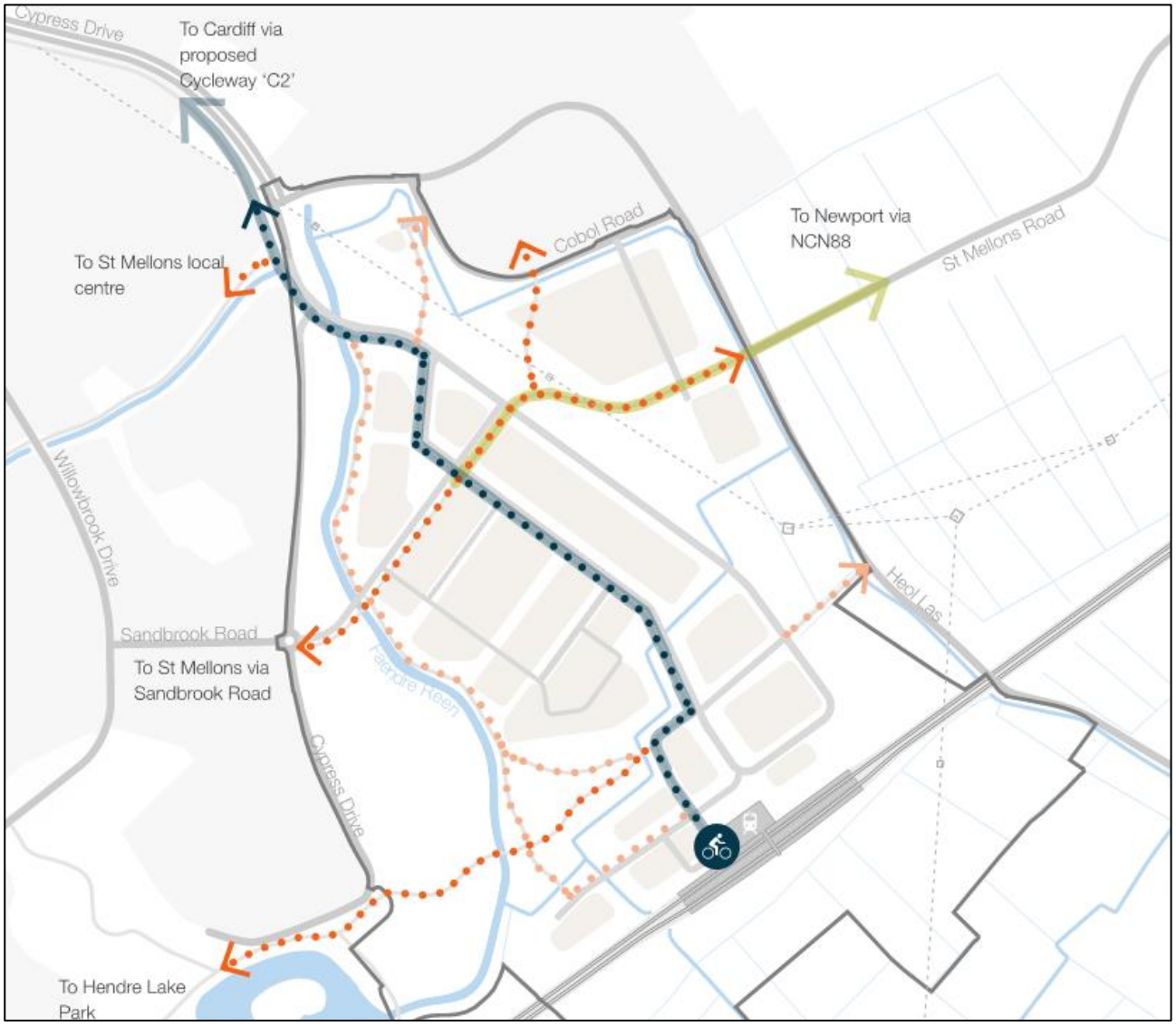

Figure 4.5: Parameter plan - active travel network

4.8.5 To maximise the potential accessibility of the site, there is an opportunity for these internal walking and cycling routes to be integrated with offsite schemes such as Cycleway 2 and Route 88 of the NCN.

4.8.6 The provision of a railway station will improve the accessibility of St Mellons by sustainable modes of transport, providing existing residents and employees in St Mellons with alternatives modes of travel to the private car. A network of footways and cycleways are proposed through the development site between the station. The proposed development therefore has the potential to reduce existing car trips on the local network.

4.8.7 To encourage journeys to be made by cycle, the potential for introducing Next Bike stations will be explored within the proposed development and within the neighbouring existing business park;

4.8.8 Traffic signals with pedestrian and toucan crossings are proposed at the Fortran Road, Pascal Close and Willowdene Way junctions with Cypress Drive, changing the characteristics of the road to be more fitting of the urban environment. ATC data recorded on this link indicates a significant amount of speeding in excess of the posted 30mph speed limit occurs, with 85th percentile speeds over 40mph. The introduction of signals will reduce traffic speeds and result in the route becoming more permeable and with improved safety with the introduction of controlled crossings for pedestrians and cyclists. These mitigation schemes are anticipated to be secured via the Section 106 agreement.

4.8.9 Traffic impacts at the A48/Cypress Drive roundabout will be mitigated through a junction improvement. The nature, extent and mechanisms for the improvements to the junction will be agreed through the determination of the planning application. As presented in the TA, this could be achieved with a signal-controlled staggered crossroads arrangement. This potential arrangement is shown to mitigate the traffic impacts associated with the proposed development and enhance pedestrian and cycle permeability and safety through the introduction of footbridge over Cypress Drive. Furthermore, the introduction of MOVA or similar traffic control systems will optimise traffic flow during the peak and non-peak hours, improving junction performance throughout the day compared to the existing roundabout junction.

4.8.10 To maximise the connectivity benefits provided by the proposed railway station, the TA identifies several opportunities that could be delivered by others, including the relevant highway authorities, operator of the railway station and the Train Operating Companies (TOC). These identified opportunities include the following:

- There is an opportunity for CC to introduce active travel routes into the site from Hendre Lake and Cypress Drive to integrate the site with St Mellons;
- Improve pedestrian infrastructure within the existing business park to provide a coherent route between the proposed station and Pascal Close. These works would require modifications to the adopted highway and private land and therefore could be undertaken by CC and the relevant body(s);
- There is an opportunity for NCC to introduce traffic calming measures on St Mellons Road to improve the existing on-road pedestrian and cycle link from Marshfield;
- Improve an existing link through Hendre Lake Park, including the provision of lighting subject to ecological constraints; and

- Whilst it is anticipated some bus routes may extend into the site to benefit from the increased catchment provided by the station, there is an opportunity for CC and the operator of the railway station to encourage more bus services into the proposed development.

4.8.11 In addition to the physical infrastructure, Travel Plans are also proposed for the business district and railway station. A Travel Plan provides a developer with the opportunity to actively commit towards creating a development that encourages modal shift towards sustainable transport. Framework Travel Plans have been prepared in support of this application and can be found in Appendix A and Appendix B of the TA.

4.9 Assessment of effects

Assessment of effects from construction

4.9.1 The construction phase of the proposed development is anticipated to result in an increase in the total number of vehicles and HGVs on the local highway network. The estimated increase in construction traffic is set out in section 4.6 and detailed in Appendix T of the TA. The routing for construction vehicles is anticipated to include M4 (Junction 30) via the A4232, A48 Pentwyn Interchange and Cypress Drive, as illustrated in Figure 4.1.

4.9.2 As detailed in Section 4.6, the specific construction access locations will be agreed in subsequent design stages. For the purposes of this assessment, two construction access strategies have been assessed, and include the following:

- **Option 1**: All construction traffic movements north of the railway line utilise the existing access north of the gas reduction station access via Heol Las on the eastern boundary of the site. This access would require land in the NCC administrative area and therefore delivery is subject to agreement with NCC and acquisition of relevant land interests; and

- **Option 2**: All construction traffic movements north of the railway line utilise the proposed secondary access at the Cypress Drive/Sandbrook Road roundabout on the western boundary of the site.

4.9.3 For both options there will be construction traffic movements associated with railway and station building works south of the railway line. These vehicles will access the site via Heol Las, south of the railway.

4.9.4 It is intended that all contractor parking will be accommodated onsite, and off highway, close to the site compound. The following predicted impacts may occur during construction:

- Traffic management on Heol Las, Fortran Road and Cobol Road, resulting in potential driver delay and temporary removal or relation of on-street car parking;

- Increased traffic movements on access roads to the proposed development during phases of construction leading to possible disruption and delays of local traffic;
- Community effects from construction traffic including severance and amenity effects; and
- Potential damage to public roads.

4.9.5 The annual number of HGV movements resulting from the construction of the proposed development is estimated to peak for the period February 2022 to January. In this 12-month period, the development is estimated to generate a weekday average of 151 HGVs and 264 LGVs.

4.9.6 Construction vehicle movements has been considered against a baseline year of 2022 to align with the indicative programme. The 2022 Do Minimum scenario includes traffic associated with committed developments.

4.9.7 Table 4.16 presents the percentage impact of construction traffic on those links within the study area that will be impacted by the two potential access options. This includes those links located closest to the site such as Heol Las (Link 1), Fortran Road (Links 3 and 4) and Cypress Drive (Links 5 and 7).

Table 4.16: Traffic impact assessment – construction access scenarios (24-hour AADT)

Ref	Road Link	Extent	Sensitivity	Traffic Impact (Total Vehicles)	Traffic Impact (HGV Component)
Option 1: Access from Heol Las					
1	Heol Las	South of St Mellons Road	Negligible	172%	421%
3	Fortran Road	North of St Mellons Road	Negligible	27%	569%
4	Fortran Road	East of Cypress Drive	Negligible	9%	305%
5	Cypress Drive	South of Fortran Road	Negligible	1%	-1%
7	Cypress Drive	North of Sandbrook Road	Negligible	2%	-2%
Option 2: Access from Cypress Drive					
1	Heol Las	South of St Mellons Road	Negligible	1%	10%
3	Fortran Road	North of St Mellons Road	Negligible	0%	6%
4	Fortran Road	East of Cypress Drive	Negligible	0%	3%
5	Cypress Drive	South of Fortran Road	Negligible	12%	434%
7	Cypress Drive	North of Sandbrook Road	Negligible	12%	387%
	Included within the assessment			Excluded from the assessment	

4.9.8 Table 4.17 presents the percentage impact of construction traffic on all other links within the study area. The impact of construction traffic on all of these links are anticipated to be the same, regardless of the construction access option being considered.

Table 4.17: Traffic impact assessment - construction (24-hour AADT)

Ref	Road Link	Extent	Sensitivity	Traffic Impact (Total Vehicles)	Traffic Impact (HGV Component)
2	St Mellons Road	East of Heol Las	Negligible	0%	0%
6	Cypress Drive	North of Fortran Road	Negligible	7%	237%
8	Sandbrook Road	West of Cypress Drive	High	2%	-2%
9	Cypress Drive	South of Sandbrook Road	Negligible	0%	0%
10	Cypress Drive	North of Willowdene Way	Negligible	4%	183%
11	Willowdene Way	West of Cypress Drive	Negligible	0%	0%
12	Cypress Drive	South of Willowdene Way	Negligible	5%	148%
13	A48	East Cypress Drive	Negligible	1%	0%
14	Newport Road	West of Cypress Drive	Low	0%	0%
15	A48(M) slips	North of Cypress Drive	Negligible	1%	59%
16	A48	East of Marshfield Road	Negligible	1%	-1%
17	A48	West of Marshfield Road	Negligible	1%	-1%
18	Newport Road	East of Tyr Winch Road	Low	0%	0%
19	Newport Road	West of Tyr Winch Road	Low	0%	0%
20	Newport Road	East of Llanrumney Avenue	High	0%	0%
21	Newport Road	West of Llanrumney Avenue	Medium	0%	0%
22	Newport Road	East of A4232 On-Off Slips	Medium	0%	0%
23	Newport Road	West of A4232 On-Off Slips	Low	0%	0%
24	A4232	North of Rover Way/A4232	Negligible	0%	0%
25	Lamby Way	East of Rover Way/A4232	Negligible	0%	0%
26	Rover Way	South of Rover Way/A4232	Negligible	0%	0%
27	Rover Way	West of Rover Way/A4232	Negligible	0%	0%
28	Maes-Y-Bryn Rd	North of M4	Negligible	0%	0%
29	Cardiff Gate	South of M4	Negligible	0%	0%
30	Pentwyn Link Rd	North of Pentwyn Link Rd	Negligible	0%	34%
31	Church Road	East of Pentwyn Link Rd	Negligible	0%	0%
32	A4232	South of Pentwyn Link Rd	Negligible	0%	39%
33	Heol Pontprennau	West of Pentwyn Link Rd	Negligible	0%	0%
34	Capel Ederyn	West of A48	Medium	0%	0%
35	Pentwyn Road	West of A48 On-Off Slips	Negligible	0%	1%
36	Bryn Celyn Road	West of A48 On-Off Slips	High	0%	0%
37	A4232	South of A48	Negligible	0%	0%
38	Round Wood Close	West of A48	Medium	0%	3%
	Included within the assessment			Excluded from the assessment	

4.9.9 This traffic impact assessment has been used to define the study area for the assessment of transport effects in the construction phase, as per the methodology set out in Section 4.5.

4.9.10 Based on the traffic impact assessment, Heol Las (Link 1), Fortran Road (Links 3 and 4) and Cypress Drive (Links 5, 6, 7, 10 and 12) are included within the study area for the construction phase. The impacts of construction traffic on all other links are deemed ‘not significant’ as per the IEMA guidelines.

4.9.11 Heol Las (Link 1) and Fortran Road (Links 3 and 4) have only been assessed if Option 1 is progressed. In a scenario where construction access is taken from Cypress Drive (Option 2), the traffic impacts on these links would not warrant further assessment. Similarly, if Option 1 was progressed, the traffic impacts on Cypress Drive (Links 5 and 7) would not warrant further assessment.

4.9.12 The impacts associated with the construction of the proposed development is based on the 12-month period when construction traffic is anticipated to will peak. Whilst construction will be for a several years, this assessment is based on a temporary 12-month period with traffic impacts reduced beyond this period.

Severance

4.9.13 Severance is defined as the perceived division that can occur within a community when it becomes separated by a major traffic artery. It can be quantified by the percentage change in traffic. An increase in traffic of 30% or less is deemed to have a negligible impact with regards to severance.

4.9.14 In the 12-month period when construction traffic is estimated to peak, the proposed development is anticipated to result in a daily average of 415 vehicles arriving and departing from the site.

4.9.15 Table 4.18 below presents the temporary percentage increase in traffic on all links within the study area for the construction phase.

Table 4.18: Percentage increase in total vehicles - construction (24-hour AADT)

Ref	Road Link	Extent	Sensitivity	Percentage Increase (Total Vehicles)
6	Cypress Drive	North of Fortran Road	Negligible	7%
10	Cypress Drive	North of Willowdene Way	Negligible	4%
12	Cypress Drive	South of Willowdene Way	Negligible	5%
Option 1: Access from Heol Las				
1	Heol Las	South of St Mellons Road	Negligible	172%
3	Fortran Road	North of St Mellons Road	Negligible	27%
4	Fortran Road	East of Cypress Drive	Negligible	9%
Option 2: Access from Cypress Drive				
5	Cypress Drive	South of Fortran Road	Negligible	12%
7	Cypress Drive	North of Sandbrook Road	Negligible	12%

4.9.16 Heol Las is classified as being of negligible environmental sensitivity given the type and minimal number of receptors along the link. In Option 1, construction traffic is anticipated to increase total traffic flow by 172% which is classified as a high impact. Given the link sensitivity is negligible, it is predicted that any environmental effects associated with severance would be **minor adverse** and therefore not significant in EIA terms.

4.9.17 The impact of construction traffic on all other links in the study area is anticipated to be below 30% and therefore the predicted environmental effects are envisaged to be **negligible** with regards to severance and therefore not significant.

Pedestrian and cycle delay

4.9.18 Pedestrian and cycle delay is predicted to occur where the two-way traffic flow exceeds 1,400 vehicles an hour, providing there are no controlled pedestrian crossings. Table 4.19 presents the two-way traffic flow on each link in the peak hours based on a 'worst-case' assessment where:

- All contractors arrive in the AM peak hour (equating to 264 vehicles);
- All contractors depart in the PM peak hour (equating to 264 vehicles); and
- 10% of all HGV movements arrive and depart in both peak periods (equating to 30 vehicles in each peak hour).

4.9.19 With the assumptions outline above, the construction of the proposed development is anticipated to generate 324 two-way vehicle trips in both the AM and PM peak hours.

Table 4.19: 2022 with construction traffic (total vehicles)

Ref	Road Link	Extent	2022 Do minimum		2022 with Construction Traffic	
			AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
6	Cypress Drive	North of Fortran Road	1,251	1,122	1,545	1,416
10	Cypress Drive	North of Willowdene Way	2,008	1,663	2,302	1,957
12	Cypress Drive	South of Willowdene Way	1,702	1,351	1,996	1,645
Scenario 1: Access from Heol Las						
1	Heol Las	South of St Mellons Road	54	47	348	341
3	Fortran Road	North of St Mellons Road	254	383	548	677
4	Fortran Road	East of Cypress Drive	1,058	854	1,352	1,148
Scenario 2: Access from Cypress Drive						
5	Cypress Drive	South of Fortran Road	529	605	823	899
7	Cypress Drive	North of Sandbrook Road	508	601	802	895

4.9.20 Excluding Cypress Drive (Links 6, 10 and 12), the forecast traffic flow is below 1,400 vehicles in both peak hours. The predicted adverse environmental effects associated with pedestrian and cycle delay would be **negligible** and therefore not significant.

4.9.21 There is an existing underpass below Cypress Drive providing a link between St Mellons and the Business Park. In addition, there is a second underpass to the north, along the alignment of a permissive route on Vaendre Lane. At grade crossings on Cypress Drive to the north of Fortran Road have pedestrian refuge islands, reducing the impacts of traffic flow on pedestrian and cycle delay.

4.9.22 The existing infrastructure described above reduces the impacts of construction traffic on pedestrian and cycle delay. Therefore, there is anticipated to be a temporary **minor adverse** effect associated with pedestrian and cycle delay and thus not significant.

Pedestrian and cycle amenity

4.9.23 The IEMA guidelines suggest that a tentative threshold for judging the significance of changes in pedestrian amenity would be where the traffic flow (or its HGV component) is halved or doubled. In addition, the guidelines indicate that pavement width and separation from traffic are also key factors.

4.9.24 In both scenarios, traffic flow and its HGV component will increase on Cypress Drive, north of the junction with Fortran Road (Links 6, 10 and 12). Traffic flow is estimated to increase by 7% and the lorry component is expected to increase from 1% to 3%. Pedestrian and cycle links along Cypress Drive are offset from the road, either on segregated footpaths or within the adjoining residential and employment developments. Therefore, in this temporary scenario there is anticipated to be a **negligible** effect associated with pedestrian and cycle amenity which is not significant.

Option 1: Access from Heol Las

4.9.25 Heol Las (Link 1) has no existing footway and limited verge for pedestrians. As set out in Table 4.16, the traffic flow in Option 1 is expected to increase by 172% and the HGV component is expected to increase from 7% to 26%. The temporary impact on pedestrian and cycle amenity is therefore high. Given the link sensitivity is negligible, it is predicted that any environmental effects associated with pedestrian and cycle amenity would be **moderate adverse** and therefore significant in EIA terms.

4.9.26 Route 88 of the National Cycle Network currently follows the eastern site boundary along Heol Las and Fortran Road (Link 2), north of the junction with St Mellons Road. This section of the route is on-road. South of the junction with Cobol Road, the speed limit of Fortran Road changes to the national speed limit where the road narrows and has no central markings. The increase in the HGV component of traffic from 1% to 27% in Scenario 1 is anticipated to have a high impact with regards to pedestrian and cycle amenity.

4.9.27 The magnitude of impact of the construction vehicles on pedestrian and cycle amenity is high. Whilst Fortran Road has a negligible sensitivity classification there is limited provision for pedestrians and cyclists. The potential adverse environmental effects with regards to pedestrian and cycle amenity are therefore envisaged to be **moderate adverse** and therefore significant.

4.9.28 Fortran Road, north of the junction with Cobol Road has footways on both sides of the road in the vicinity of the existing business park. On the south side of the road, the footway is offset from the edge of the road. The increase in the HGV component of traffic from 1% to 9% in Scenario 1 is anticipated to have a medium

impact with regards to pedestrian amenity. Given the link sensitivity is negligible, it is predicted that any environmental effects associated with pedestrian and cycle amenity would be **moderate adverse** and therefore significant.

Option 2: Access from Cypress Drive

4.9.29 Cypress Drive, south of the junction with Fortran Road (Links 5 and 7) has a footway on the west side of the road with a n approximate width of 2m. In Scenario 2, traffic flow is estimated to increase by 12% and the lorry component is expected to increase from 1% to 6%. This is anticipated to have a medium impact with regards to pedestrian amenity. Given the link sensitivity is negligible, it is predicted that any environmental effects associated with pedestrian and cycle amenity would be **moderate adverse** and therefore significant.

Fear and intimidation

4.9.30 An increase in HGV movements can have an adverse effect on pedestrian fear and intimidation. The suggested threshold presented in the IEMA guidelines proposes a small impact if the average HGV flow is around 1,000-2,000 vehicles and negligible if the HGV flow is below 1,000 (18-hour AAWT). The guidance also recommends other factors are considered such as road speed and footway width/separation.

4.9.31 Table 4.20 below presents the HGV 18-hour AAWT for the scenarios 2022 Do Minimum and 2022 with Construction.

Table 4.20: Total HGVs - construction (18-hour AAWT)

Ref	Road Link	Extent	Total HGVs	
			2022 Do Minimum	2022 with Construction
6	Cypress Drive	North of Fortran Road	92	394
10	Cypress Drive	North of Willowdene Way	176	478
12	Cypress Drive	South of Willowdene Way	115	417
Option 1: Access from Heol Las				
1	Heol Las	South of St Mellons Road	15	317
3	Fortran Road	North of St Mellons Road	27	329
4	Fortran Road	East of Cypress Drive	60	362
Option 2: Access from Cypress Drive				
5	Cypress Drive	South of Fortran Road	40	340
7	Cypress Drive	North of Sandbrook Road	45	345

4.9.32 With construction access taken from Heol Las (Option 1), the 18-hour AAWT HGV flow on Heol Las and Fortran Road (Links 1 and 3) is predicted to be significantly below 1,000 HGVs. In addition, the environment sensitivity classification of these links are negligible given the minimal number of receptors near these links. However, given the absence of a footway, the potential fear and intimidation impacts associated with the temporary increases in traffic are anticipated to be **minor adverse** and therefore not significant.

4.9.33 As set out in Table 4.20 above, the 18-hour AAWT HGV flow is anticipated to be significantly below 1,000 HGVs on all other links in both scenarios. Therefore, on these links it is predicted that any environmental effects associated with fear and intimidation would be **negligible** and not significant.

Accidents and safety

4.9.34 An analysis of the RTC data has been undertaken within the study area. As set out in the Transport Assessment, no correlations were identified between highway layout, design or condition that were considered contributory factors in the pattern of collisions. It is therefore considered that any increases in traffic resulting from the proposed development are anticipated to have a **negligible** effect with regards to accidents and safety which is not significant.

Driver delay

4.9.35 Junction capacity analysis relating to the construction phase has not been undertaken, however future baseline junction modelling indicates that the key junctions within the study area for this assessment have spare capacity to accommodate the additional traffic associated with construction without significant adverse effects.

4.9.36 The CTMP will also set out measures to reduce the impacts of construction traffic in the peak hours. This could be achieved though contractor working hours and restrictions to delivery periods.

4.9.37 In both scenarios, some HGVs will need to access the site from the west via Heol Las. Given the substandard carriageway width of Heol Las, traffic management procedures are likely to be required to control HGV movements on this road. This could include traffic signals which would have an adverse effect driver delay. The potential impacts with regards to driver delay associated with the temporary traffic management measures are anticipated to be **minor adverse** and therefore not significant.

Public transport

4.9.38 The proposed station will not be operation in the 12-month period February 2022 to January 2023 when construction traffic is estimated to be at its peak. Rail works associated with the construction of Cardiff Parkway are anticipated during this period.

4.9.39 As set out in Section 4.6, discussions with an ECI party has indicated that there is likely to be a requirement for a large number of disruptive possessions to enable the works associated with the construction of Cardiff Parkway railway station. It is anticipated that that the prolonged possession of all four lines associated with these works would therefore extend beyond scheduled rail closures over the Christmas period and bank holidays.

4.9.40 Disruptions would impact existing rail services between Cardiff Central and Newport railway stations. For this section of the route, it is anticipated that rail-replacement coach services would be provided. This is anticipated to increase journey times between Cardiff and Newport from 12 minutes to 40 minutes.

4.9.41 Construction of the proposed development is predicted to have a temporary impact on journey times for existing rail services. Given the temporary nature of the predicted disruptions, the effects on journey times for through passengers are anticipated to be **moderate adverse** and therefore significant.

4.9.42 These disruptions may result in a temporary modal shift in trips between Newport and Cardiff, with fewer journeys being made by rail and an increase in journeys made by car. As set out in the IEMA guidelines, an increase in traffic below 30% is not deemed to warrant further assessment. The temporary impacts on the highway network are therefore anticipated to be **negligible** and not signficant.

Summary

4.9.43 The temporary increase in the HGV component of traffic flow in the busiest year of construction is deemed to have a significant effect on pedestrian & cycle amenity. Minor adverse effects are also anticipated with regards to severance, pedestrian and cycle delay, fear and intimidation and driver delay.

4.9.44 It is proposed that a CTMP will be secured with a planning condition to ensure that all reasonable steps are taken to minimise and mitigate the predicted adverse effects of the construction process. In addition to the CTMP, a CEMP is also proposed to be secured with a planning condition, to add further detail to the Outline CEMP that has been prepared in support of the outline application.

4.9.45 The identified access route makes use of roads with ‘negligible’ receptor sensitivity. It is proposed that construction traffic is monitored as part of the CTMP to review compliance.

4.9.46 The construction traffic movements are anticipated to peak prior to 2023, when the transport interchange is scheduled to open. Construction vehicle movements will reduce following this date, as the earthworks are anticipated to be completed. The assessment of effects from construction is therefore based on a scenario before any part of the site is operational to include the peak average annual HGV movements. The peak in total vehicle movements is anticipated to occur when the site is fully occupied, as set out in the following section.

4.9.47 The predicted disruptions to rails services associated with the construction of Cardiff Parkway are anticipated to have a moderate adverse effect on journey times for through passengers. This temporary impact will be limited to scheduled possessions of the railway line for fixed periods of time.

Assessment of effects from operation

4.9.48 Table 4.21 presents the traffic impact of the proposed development on the local highway network. This percentage impact assessment has been used to define the study area for the assessment of transport effects associated with the operational phase, as per the methodology set out in Section 4.5.

Table 4.21: Traffic impact assessment - operational (24-hour AADT)

Ref	Road Link	Extent	Sensitivity	Traffic Impact (Total Vehicles)
1	Heol Las	South of St Mellons Road	Negligible	1%
2	St Mellons Road	East of Heol Las	Negligible	3%
3	Fortran Road	North of St Mellons Road	Negligible	3%
4	Fortran Road	East of Cypress Drive	Negligible	1%
5	Cypress Drive	South of Fortran Road	Negligible	151%
6	Cypress Drive	North of Fortran Road	Negligible	71%
7	Cypress Drive	North of Sandbrook Road	Negligible	24%
8	Sandbrook Road	West of Cypress Drive	High	24%
9	Cypress Drive	South of Sandbrook Road	Negligible	0%
10	Cypress Drive	North of Willowdene Way	Negligible	45%
11	Willowdene Way	West of Cypress Drive	Negligible	1%
12	Cypress Drive	South of Willowdene Way	Negligible	55%
13	A48	East Cypress Drive	Negligible	7%
14	Newport Road	West of Cypress Drive	Low	5%
15	A48(M) slips	North of Cypress Drive	Negligible	12%
16	A48	East of Marshfield Road	Negligible	7%
17	A48	West of Marshfield Road	Negligible	7%
18	Newport Road	East of Tyr Winch Road	Low	4%
19	Newport Road	West of Tyr Winch Road	Low	4%
20	Newport Road	East of Llanrumney Avenue	High	2%
21	Newport Road	West of Llanrumney Avenue	Medium	1%
22	Newport Road	East of A4232 On-Off Slips	Medium	0%
23	Newport Road	West of A4232 On-Off Slips	Low	0%
24	A4232	North of Rover Way/A4232	Negligible	1%
25	Lamby Way	East of Rover Way/A4232	Negligible	0%
26	Rover Way	South of Rover Way/A4232	Negligible	1%
27	Rover Way	West of Rover Way/A4232	Negligible	1%
28	Maes-Y-Bryn Rd	North of M4	Negligible	1%
29	Cardiff Gate	South of M4	Negligible	0%
30	Pentwyn Link Rd	North of Pentwyn Link Rd	Negligible	3%
31	Church Road	East of Pentwyn Link Rd	Negligible	0%
32	A4232	South of Pentwyn Link Rd	Negligible	3%
33	Heol Pontprennau	West of Pentwyn Link Rd	Negligible	1%
34	Capel Ederyn	West of A48	Medium	4%
35	Pentwyn Road	West of A48 On-Off Slips	Negligible	0%
36	Bryn Celyn Road	West of A48 On-Off Slips	High	5%
37	A4232	South of A48	Negligible	1%
38	Round Wood Close	West of A48	Medium	1%
	Included within the assessment			Excluded from the assessment

4.9.49 The development is anticipated to generate a minimal number of HGVs in the operation phase. Given the forecast increase in total vehicles, the lorry component of traffic flow is predicted to decrease on most links.

4.9.50 Based on the predicted traffic impacts of the development proposals, the study area for the operational phase includes:

- Cypress Drive (Links 5, 6, 10 and 12); and
- Sandbrook Road (Link 8)

4.9.51 The traffic impacts associated with the proposed development are deemed to reflect a worst-case. Interventions such as the Travel Plan are proposed to increase the proportion of journeys made to the site by sustainable modes of transport.

Severance

4.9.52 Severance is defined as the perceived division that can occur within a community when it becomes separated by a major traffic artery. It can be quantified by the percentage change in traffic. Table 4.22 below presents the percentage increase in traffic on all links within the study area for the operational phase.

Table 4.22: Percentage increase in total vehicles - operational (24-hour AADT)

Ref	Road Link	Extent	Sensitivity	Percentage Increase (Total Vehicles)
5	Cypress Drive	South of Fortran Road	Negligible	151%
6	Cypress Drive	North of Fortran Road	Negligible	71%
8	Sandbrook Road	West of Cypress Drive	High	24%
10	Cypress Drive	North of Willowdene Way	Negligible	45%
12	Cypress Drive	South of Willowdene Way	Negligible	55%

4.9.53 Cypress Drive has a negligible environmental sensitivity classification given the number and type of receptors. The traffic impact on Cypress Drive is anticipated to increase by 45% to 151%. This variation in traffic impact is reflective of the existing traffic flow on Cypress Drive.

4.9.54 Cypress Drive north and south of Fortran Road (Links 5 and 6) are both predicted to have an increase in traffic of 71% and 151%. Based on the assessment criteria this would have a medium and high impact, however, given the sensitivity of the receptor there is anticipated to be a **minor adverse** effect with regards to severance and thus not significant.

4.9.55 To the north and south of Willowdene Way, the traffic impact on Cypress Drive is anticipated to be 45% and 55% respectively. Based on the assessment criteria this would result in a small impact. Given the sensitivity classification (negligible), it is predicted that any environmental effects associated with severance would be **negligible** and not significant.

4.9.56 Signal-controlled pedestrian crossings are proposed on Cypress Drive at the junctions with Pascal Close, Fortran Road and the primary site access. These crossings are anticipated to reduce the environmental effects associated with severance on Cypress Drive.

4.9.57 The predicted increase in traffic on Sandbrook Road (Link 8) is 24% which would result in a negligible impact. Given the sensitivity of the receptor (high), there is anticipated to be a **minor adverse** effect with regards to severance.

Pedestrian and cycle delay

4.9.58 Pedestrian and cycle delay is predicted to occur where the two-way traffic flow exceeds 1,400 vehicles an hour, providing there are no controlled pedestrian crossings. Table 4.23 below presents the two-way traffic flow on each link in the AM and PM peak hours.

Table 4.23: 2028 with operational traffic (total vehicles)

Ref	Road Link	Extent	2028 Do Minimum		2028 with Operational Traffic	
			AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
5	Cypress Drive	South of Fortran Road	448	511	1,796	1,726
6	Cypress Drive	North of Fortran Road	1,049	960	2,258	2,071
8	Sandbrook Road	West of Cypress Drive	427	503	574	657
10	Cypress Drive	North of Willowdene Way	1,696	1,488	2,916	2,542
12	Cypress Drive	South of Willowdene Way	1,367	1,203	2,606	2,286

4.9.59 The two-way traffic flow along Cypress Drive exceeds 1,400 vehicles in both the AM and PM peak hours. As previously noted, there are existing underpasses below Cypress Drive. In addition, signal-controlled pedestrian crossings are proposed on Cypress Drive at the junctions with Pascal Close, Fortran Road and the primary site access.

4.9.60 Given the introduction of the proposed signal-controlled crossings on Cypress Drive, the predicted adverse environmental effects associated with pedestrian and cycle delay are anticipated to be **negligible** and therefore not significant.

4.9.61 A potential junction mitigation scheme has been identified at the A48/Cypress Drive roundabout which includes a footbridge over Cypress Drive. Given the existing crossing for pedestrians at this location is uncontrolled and at-grade, the introduction of a footbridge would have a **minor beneficial** effect on pedestrian and cycle delay.

4.9.62 The two-way traffic flow on Sandbrook Road is predicted to be below 1,400 vehicles in both peak hours. There is also a zebra crossing which gives priority to pedestrians over vehicles. The predicted adverse environmental effects associated with pedestrian and cycle delay are therefore anticipated to be **negligible** and therefore not significant.

4.9.63 There is a Public Right of Way (PRoW) that intersects the site in an east/west alignment between Heol Las and Cypress Drive. It is not currently possible to walk this route due to existing hedgerows and missing footbridges. It is proposed to enhance this PRoW which is predicted to have a **minor beneficial** effect on pedestrian delay. Optimal works include a cycle access at this location which is predicted to have a **minor beneficial** effect on cycle delay.

Pedestrian and cycle amenity

4.9.64 The IEMA guidelines suggest that a tentative threshold for judging the significance of changes in pedestrian amenity would be where the traffic flow (or its HGV component) is halved or doubled.

4.9.65 Traffic on Cypress Drive between the primary site access and Fortran Road (Link 5) is predicted to increase by 151%. The existing footway is segregated from the highway for part of this link. Within the site boundary, the existing footway is also proposed to be enhanced to a segregated footway/cycleway on the west side of Cypress Drive. With these improvements, there is anticipated to be a **negligible** effect with regards to pedestrian and cycle amenity which is not significant.

4.9.66 Traffic on all other links is not predicted to double or half and therefore any effects regarding pedestrian and cycle amenity are anticipated to be a **negligible** and not significant.

Fear and intimidation

4.9.67 An increase in HGV movements can have an adverse effect on pedestrian fear and intimidation. The suggested threshold presented in the IEMA guidelines proposes a small impact if the 18-hour AAWT HGV flow is around 1,000-2,000 vehicles. The proposed development is anticipated to generate a very low number of HGV movements in the operational phase, most of which would be associated with servicing, deliveries and public transport. The predicted effects with regards to fear and intimidation are anticipated to be **negligible** and not significant.

Accidents and safety

4.9.68 An analysis of the RTC data has been undertaken within the study area. As set out in the Transport Assessment, no correlations were identified between highway layout, design or condition that were considered contributory factors in the pattern of collisions. It is therefore considered that the increases in traffic resulting from the proposed development are anticipated to have a **negligible** (not significant) effect with regards to accidents and safety.

4.9.69 Traffic signals are proposed at four junctions on Cypress Drive including those with Willowdene Way, Pascal Close, Fortran Road and the primary site access. These signal-controlled junctions will replace priority T-junctions.

4.9.70 Different junction forms are expected to see different types of accidents. Priority junctions are expected to see rear-end shunts on the minor arms and T-bone collisions (resulting from turning manoeuvres) on the major arms. Signal junctions

are expected to experience rear-end shunts (resulting from a failure to stop or anticipating movement in front at the stop line) and turning collisions (particularly with opposed right turn manoeuvres).

4.9.71 The collisions expected at signal junctions should be at relatively low speeds, given that the main line traffic is stopped at the signals (as opposed to free-flowing traffic at priority junctions), which could result in reduced severity of accidents. The proposed traffic mitigation including traffic signals on Cypress Drive is therefore predicted to have a **minor beneficial** effect with regards to accidents and safety.

Driver delay

4.9.72 The impact of the proposed development on the local highway network has been assessed and described in detail in the Transport Assessment. This includes a detailed capacity assessment in Chapter 7 and where appropriate, mitigation has been identified and assessed in Chapter 8.

4.9.73 This section of ES sets out outlines the impacts of the proposed development with regards to driver delay on those links scoped in to the operational assessment. The effect of additional traffic on Cypress Drive on driver delay can be calculated by comparing the forecast delay at the relevant junction in the 2028 Baseline (Do Minimum) and 2028 Do Something scenarios.

4.9.74 Table 4.24 presents the forecast delay at the relevant junctions on Cypress Drive. The forecast delay for the 2028 Do Minimum scenario is based on the existing priority junction arrangements and therefore there is no delay forecast on Cypress Drive. The forecast delay for the 2028 Do Something scenario is based on the proposed mitigation, including the introduction of traffic signals.

Table 4.24: 2028 driver delay - operational

Ref	Road Link	Junction	Direction	Average Delay (2028 Do Minimum without mitigation)		Average Delay (2028 Do Something with mitigation)	
				AM Peak	PM Peak	AM Peak	PM Peak
5	Cypress Drive	Fortran Road	N/B	0.0	0.0	3.6	13.5
6	Cypress Drive	Fortran Road	S/B	0.0	0.0	11.1	13.9
8	Cypress Drive	Pascal Close	N/B	0.0	0.0	8.1	15.3
8	Cypress Drive	Pascal Close	S/B	0.0	0.0	16.4	7.8
10	Cypress Drive	Willowdene Way	S/B	0.0	0.0	16.9	4.6
12	Cypress Drive	Willowdene Way	N/B	0.0	0.0	17.3	38.0

4.9.75 At the junctions with Fortran Road and Pascal Close, the forecast delay on Cypress Drive (Links 5, 6 and 8) is predicted to increase by up to 15 seconds at each junction in the AM and PM peak hours. The driver delay on Cypress Drive at the junction with Willowdene Way is forecast to increase by up to 20 seconds in the AM peak hour and 40 seconds in the PM peak hour.

4.9.76 SCOOT (Split Cycle and Offset Optimisation Technique) is proposed for all the signalised junctions which will provide capacity benefits and maintain coordination along Cypress Drive. It is therefore anticipated that drivers will not

be delayed at each junction. The predicted effects associated with driver delay on Cypress Drive are anticipated to be **minor adverse** and therefore not significant.

Public transport

4.9.77 To assess the impacts of the proposed development on existing rail services, the impacts on journey times for through passengers have been estimated. Table 4.25 below presents the predicted delay for several common journeys that are anticipated to be impacted on by an additional stop at Cardiff Parkway. Existing journey times have been based on the December 2019 timetable.

Table 4.25: Average delay imposed by additional stop (Cardiff Parkway)

Journey	Frequency (weekday)	Existing Journey Length (mins)	Delay (mins)	Average Delay (%)
Cardiff Central to Newport	9 services	13 minutes	1.5 – 3.0 minutes	14%
Cardiff Central to Cwmbran	2 services	24 minutes	1.5 – 2.5 minutes	8%
Cardiff Central to Ebbw Vale Parkway	1 service	54 minutes	1.0 minute	2%
Cardiff Central to Severn Tunnel Junction	2-3 services	24 minutes	1.5 – 3.0 minutes	9%
Cardiff Central to Bristol Temple Meads	2 services	50 minutes	2.0 – 3.0 minutes	5%
Cardiff Central to Bristol Parkway	2 services	35 minutes	2.0 minutes	6%
Cardiff Central to London Paddington	2 services	115 minutes	2.0 minutes	2%

4.9.78 The introduction of an additional stop (Cardiff Parkway) is estimated to increase journey times for through passengers by up to 3 minutes. As set out in the table above, the overall impact on most journeys is below 10%. Whilst the journey time for Cardiff Central to Newport is predicted to increase by approximately 14%, this equates to under 2 minutes of delay. With the introduction of an additional stop, there is anticipated to be a **minor adverse** effect with regards to journey times for through passengers. This effect is therefore not deemed to be significant in EIA terms.

4.9.79 The proposed railway station and transport interchange will provide numerous opportunities for existing residents and existing and future employees in St Mellons to commute by sustainable modes of transport. With regards to accessibility by public transport, the proposed development is anticipated to have a **major beneficial** effect and therefore significant.

Summary

4.9.80 The review of potential effects on Sandbrook Road and Cypress Drive has established that there are unlikely to be any significant adverse effects resulting from the operation of the proposed development. It is considered that no further detailed assessment is required, and no mitigation measures are deemed necessary to alleviate specific environmental effects. Therefore, no residual adverse environmental effects with respect of traffic and access are considered likely.

4.10 Mitigation and enhancement

Mitigation of effects from construction

4.10.1 The assessment of effects arising from construction is based on the 12-month period when construction traffic is predicted to peak. The impact of construction traffic is anticipated to have a significant environmental effect with regards to pedestrian and cycle amenity.

4.10.2 To manage impacts arising from the construction of the proposed development, a CEMP will be prepared. An Outline CEMP has been prepared and is in Appendix A2 of this ES. The scope of the CEMP will be agreed in discussion with CC. It is anticipated that the CEMP will be secured with a planning condition.

4.10.3 In addition to the CEMP, a CTMP will be prepared that outlines a range of measures to minimise potential traffic impacts arising from the construction of the proposed development. It is anticipated that the CTMP will be secured with a planning condition.

4.10.4 The scope of the CTMP will be discussed and agreed with the relevant highway authorities including CC. It is anticipated that the CTMP will include details of the following:

- Designated construction traffic routes to avoid disruption on local roads;
- Temporary traffic control measures, where required, such as temporary traffic signals and banksperson;
- HGV movements will be restricted as far as reasonably possible to avoid traffic flow periods 08:00-09:00 and 16:30-18:00;
- Temporary and permanent site accesses, alongside an access management strategy to avoid potential traffic congestion in the peak hours;
- Speed limits shall be put into place on site for all vehicular movements;
- Sufficient parking and circulation will be provided within the site to avoid impacts on the neighbouring highways of nuisance car parking;
- Where appropriate, all vehicles carrying loose material shall be covered;
- A wheel wash facility shall be used for vehicles egressing the site;
- Where necessary, use of road sweepers shall be incorporated to ensure highways remain clear of dust and mud;
- Road edges and pathways shall be swept by hand and damped down as necessary;

- Stockpiles to be dampened down, enclosed or covered as appropriate, be sealed or sprayed with chemical bonding agents as required, and located away from any sensitive receptors wherever possible; and

- Neighbouring communities and businesses will be consulted and kept informed of the traffic management proposals.

4.10.5 Given the above, it is proposed that a CTMP is prepared to ensure that all reasonable steps are taken to minimise and mitigate any possible adverse effects of the construction process.

4.10.6 Monitoring of the traffic associated with the proposed development during the construction period will also be undertaken as part of the CTMP. It is anticipated that monitoring of traffic in the operational phase will be undertaken as part of the implementation of the full Travel Plans.

4.10.7 The predicted disruptions to rails services associated with the construction of Cardiff Parkway are anticipated to have a moderate adverse effect on journey times for through passengers. To reduce these temporary effects, it is proposed for rail possessions, whenever practical and reasonable, to align with any other potential planned closures and disruptions to rail services, including those over the Christmas period and bank holidays.

Mitigation of effects from operation

4.10.8 In addition to the physical measures proposed as part of the scheme, it is proposed that soft measures are adopted for the site in the form of Travel Plans. When the proposed development becomes operational, Travel Plans will be implemented to mitigate and minimise the vehicular traffic impacts of the proposed development.

4.10.9 The aim of the Travel Plans associated with the railway station and business district will be to reduce car usage and increase the use of public transport, walking and cycling by staff. It is anticipated that this will be achieved through the identification of specific proposals and mechanisms to be implemented that will maximise the accessibility of the site by means other than the private car.

4.10.10 Framework Travel Plans have been prepared in support of the application for the Business District and Railway Station and can be found in Appendix A and Appendix B of the TA respectively. The full Travel Plans are anticipated to be secured with planning conditions. A financial contribution towards the funding of a Travel Plan Co-ordinator and the monitoring of the Travel Plan may also be secured as part of the Section 106 agreement.

4.11 Residual effects

4.11.1 Residual effects are the predicted effects of a project on the environment after the proposed practicable mitigation measures have been adopted. In other words, the predicted actual effects of the project.

Residual effects from construction

4.11.2 The construction period is anticipated to result in a change in vehicular composition proportions on the local road network and these would be temporary for the duration of the works.

4.11.3 Subject to the successful implementation of the CTMP, it is considered that any residual effects associated with the construction traffic will be of a temporary nature and the magnitude will be either ‘minor’ or ‘negligible’. It is therefore considered that the residual effects of the construction phase will not be significant.

4.11.4 It is proposed for the rail contractor(s), where reasonable and practical, to align necessary possessions of the railway with other planned closures and disruptions to rail services. With this working practice, the predicted effects are anticipated to be moderate adverse and therefore significant. This temporary effect will be limited to fixed periods of the two-year construction programme for the rail works.

Residual effects from operation

4.11.5 The operational impact of the proposed development is not anticipated to have a significant adverse effect with regards to transport. The significance of effect for all receptors is either ‘minor’ or ‘negligible. Subject to the successful implementation and monitoring of the Travel Plans for both the station and business district, it is considered that residual effects associated with the operational phase could be further mitigated.

4.11.6 Several beneficial effects are identified, most of which are of minor significance, but do represent an improvement to the local pedestrian and cycle infrastructure. A significant beneficial effect has been identified in relation to the accessibility to public transport for the local communities.

4.12 Assessment summary matrix

Table 4.26: Assessment summary matrix - Construction

Potential Effect	Receptor (s)	Sensitivity of Receptor	Magnitude (prior to mitigation)	Significance (prior to mitigation)	Mitigation	Magnitude (following mitigation)	Significance (following mitigation)	Comments
Severance	Heol Las	Negligible	High	Minor adverse	CTMP Measures	Small	Negligible (not significant)	This effect will only occur if the potential construction access north of the railway is taken from Heol Las.
Pedestrian Delay	Cypress Drive	Negligible	Small	Minor adverse	CTMP Measures	Negligible	Negligible (not significant)	Where possible, the CTMP will seek to reduce construction traffic impacts in the peak hours.
Pedestrian and Cycle Amenity	Heol Las and Fortran road	Negligible	High	Moderate adverse	CTMP Measures	Medium	Minor adverse (not significant)	Effects subject to the location of the primary construction access north of the railway line
Pedestrian and Cycle Amenity	Fortran Road	Negligible	High	Moderate adverse	CTMP Measures	Medium	Minor adverse (not significant)	Effects subject to the location of the primary construction access north of the railway line
Pedestrian and Cycle Amenity	Cypress Drive	Negligible	High	Moderate adverse	CTMP Measures	Medium	Minor adverse (not significant)	Effects subject to the location of the primary construction access north of the railway line
Fear and Intimidation	Fortran Road and Heol Las	Negligible	Small	Minor adverse	CTMP Measures	Small	Minor adverse (not significant)	This effect will only occur if the potential construction access north of the railway is taken from Heol Las.
Driver Delay	Fortran Road and Heol Las	Negligible	Medium	Minor adverse	CTMP Measures	Medium	Minor adverse (not significant)	This effect will only occur if the potential construction access north of the railway is taken from Heol Las.

Rail journeys	Cardiff to Newport	Medium	Medium	Moderate adverse	Programme	Medium	Moderate adverse (not significant)	Temporary effect for fixed periods of time during construction.

Table 4.27: Assessment summary matrix - Operation

Potential Effect	Receptor (s)	Sensitivity of Receptor	Magnitude (prior to mitigation)	Significance (prior to mitigation)	Mitigation	Magnitude (following mitigation)	Significance (following mitigation)	Comments
Severance	Cypress Drive	Negligible	High	Minor adverse (not significant)				
Severance	Sandbrook Road	High	Negligible	Minor adverse (not significant)				
Pedestrian and cycle delay	Cypress Drive	Negligible	Small	Minor beneficial (not significant)				Proposed footbridge would reduce delay for pedestrians and cyclists crossing Cypress Drive
Pedestrian and cycle delay	PROW within site boundary	Negligible	Medium	Minor beneficial (not significant)				Enhancement to the existing PROW would provide benefits for pedestrians and cyclists
Accidents and safety	Cypress Drive	Negligible	Small	Minor beneficial (not significant)				Introduction of traffic signals is anticipated to reduce traffic speeds and the severity of collisions
Driver Delay	Cypress Drive	Negligible	Medium	Minor adverse (not significant)				
Rail passenger journeys	Rail journeys between Cardiff Central and Newport	Medium	Small	Minor adverse (not significant)				

Public transport accessibility	St Mellons	Medium	High	Major beneficial (Significant)				Proposed railway station and interchange will provide significant benefits with regards to public transport accessibility.