

Chapter 12

Traffic, Transport and Access

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12. Traffic, Transport and Access

12.1 Introduction

12.1.1 This chapter provides a preliminary assessment of the likely transport effects arising from construction, operation and maintenance and decommissioning of the Project.

12.1.2 A Transport Assessment (TA) has been incorporated into this chapter to provide a single source for the analysis of the likely transport effects of the Project. This is in line with approach undertaken in relation to other nationally significant infrastructure projects. A Construction Traffic Management Plan (CTMP) and a Construction Staff Travel Plan (CSTP) will also be prepared for and submitted with the DCO Application.

a) Objectives of the assessment

12.1.3 The objectives of the assessment were to:

- Identify the national and local legislation and policy considered relevant to the Project;
- Identify the baseline conditions of the study area, including existing movements associated with the Project Site, the local highway network and operational conditions, road safety and accessibility by sustainable modes;
- Identify the significance of effects of the Project during the construction, operational and decommissioning periods following implementation of embedded mitigation;
- Identify the additional mitigation required to prevent, reduce or offset any significant adverse effects; and
- Identify the likely residual effects and cumulative effects once these measures have been employed.

12.2 Changes since the 2014 PEIR

12.2.1 There have been changes to the design as a result of design evolution and consultation as detailed in **Chapter 3: Project and Site Description**. To aid the reader, Table 12-1 below outlines the changes to this assessment compared with the 2014 PEIR.

12.2.2 AECOM has considered the 2014 PEIR assessment which was undertaken in respect of the Project and used this as a basis to inform this chapter. Further liaison has been undertaken with the Highway Officers of the City and County of Swansea (CCS), the Local Highway Authority (LHA) to agree the scope of work required to update this assessment.

Table 12-1: A summary of changes since the 2014 PEIR to the Transport Assessment

Section	Changes since the 2014 PEIR	Section Reference
Baseline	Walking, cycling and public transport information.	Section 12.5
	Road safety.	Section 12.5

Section	Changes since the 2014 PEIR	Section Reference
Methodology	Assessment criteria in respect of pedestrian receptors.	Section 12.4
	Assessment criteria in respect of driver delay.	Section 12.4
	Assessment year.	Section 12.4
Significance of Effect	Traffic generation forecasts and corresponding effects.	Section 12.7

12.3 Legislation, Policy and Guidance

12.3.1 This section identifies and describes legislation, policy and guidance of relevance to the assessment of the potential transport impacts associated with the Project.

12.3.2 Legislation and policy has been considered on a national, regional and local level. The following is considered to be relevant to the TA as it has influenced the sensitivity of receptors and requirements for mitigation or the scope and/or methodology of the PEIR.

b) National

12.3.3 The national (UK and Wales) legislation, policy and guidance that has been consulted is as follows:

- Overarching National Policy Statement for Energy (EN-1), Department of Energy and Climate Change (July 2011) (Ref 12.1);
- Planning Policy Wales, Edition 9, Welsh Government (November 2016) (Ref 12.2);
- Technical Advice Note 18: Transport, Welsh Government (March 2007) (Ref 12.3);
- *Wales Transport Strategy*, Welsh Government (April 2008) (Ref 12.4);
- *Active Travel (Wales) Act*, Welsh Government (2013) (Ref 12.5); and
- Guidelines for the Environmental Assessment of Road Traffic, Institute of Environmental Assessment (1993).

12.3.4 Relevant provisions and policies from these documents have been identified under the following sub-sections.

i. Overarching National Policy Statement for Energy (EN-1)

12.3.5 The *Overarching National Policy Statement for Energy (EN-1)* was published in July 2011 (Ref 12.1). It sets out the national policy for energy infrastructure.

12.3.6 Section 5.13 deals with 'Traffic and Transport'. It requires projects that are likely to have significant transport implications to include a TA as part of the ES, prepared in accordance with the appropriate guidance at that time. Where appropriate, a travel plan should be prepared including demand management measures to mitigate transport impacts, and details of proposed measures to improve access by public transport, walking and cycling, to reduce the need for parking associated with the proposal and to mitigate transport impacts. Where mitigation is needed, possible

demand management measures must be considered and if feasible and operationally reasonable, required, before considering requirements for the provision of new inland transport infrastructure to deal with remaining transport impacts. Where the proposed mitigation measures are insufficient to reduce the impact on the transport infrastructure to acceptable levels, the Secretary of State should consider requirements to mitigate adverse impacts on transport networks arising from the development.

ii. Planning Policy Wales, Edition 9

12.3.7 Edition 9 of *Planning Policy Wales* (PPW) was published in November 2016 and sets out the land use planning policies of the Welsh Government (WG) (Ref 12.2). It is supported by a number of Technical Advice Notes (TANs), which provide detailed planning advice on subjects contained within PPW. *TAN 18: Transport* is considered of particular relevance to the Project and is included in this policy review. An overarching theme within PPW is the commitment of the WG to sustainability.

12.3.8 Planning policy in Wales is plan-led, with up to date Local Development Plans (LDPs) forming a fundamental part of the system. PPW states that planning applications “*must be determined in accordance with the adopted plan unless material considerations indicate otherwise*”.

iii. Technical Advice Note 18: Transport

12.3.9 TAN 18 was published in March 2007 (Ref 12.3). It describes how to integrate land use and transport planning, and explains how transport impacts should be assessed and mitigated. It supports and should be read in conjunction with PPW.

12.3.10 Paragraph 9.2 states that “developers should be required by local authorities to submit transport assessments to accompany planning applications for developments that are likely to result in significant trip generation”. A transport assessment is included as part of this PEIR.

12.3.11 TAN 18 requires a Transport Implementation Strategy (TIS). This should seek to:

- *“Identify what policy objectives and requirements are set by the development plan in terms of access to the development and movements in and around the site;*
- *Identify what access arrangements are required for a successful development (meeting the needs of the developer, end user, addressing impacts on neighbours and existing movements surrounding the site); and*
- *Specify the package of physical, management and promotional measures needed to accommodate the requirements identified above, such as physical infrastructure, the design and location of buildings, parking management, financial incentives and dedicated travel plan co-ordinators.”*

12.3.12 The requirements of a TIS are addressed in this PEIR chapter. Policy is discussed at Section 12.2. The access arrangements, embedded mitigation and package of measures are set out at **Chapter 3: Project and Site Description**.

iv. *Wales Transport Strategy*

12.3.13 The *Wales Transport Strategy* (WTS) was published in April 2008 (Ref 12.4). This seeks to ensure that transport features strongly in the WG's policy spectrum:

- *“Getting the most out of our existing transport system;*
- *Making greater use of more sustainable modes of travel; and*
- *Reducing demands on the transport system.”*

v. *Active Travel (Wales) Act*

12.3.14 The *Active Travel (Wales) Act* came in to force in Wales in November 2013 (Ref 12.5). The Act makes it a legal requirement for local authorities in Wales to map and plan for suitable routes for active travel, and to build and improve their infrastructure for walking and cycling every year. It also requires both the WG and Local Authorities to promote walking and cycling as a mode of transport.

12.3.15 The Act is accompanied by a statutory design guidance document, published in December 2014, which provides advice on the planning, design, construction and maintenance of active travel networks and infrastructure, and is to be used at all stages of the process. This is more specifically aimed at residential and employment development.

vi. *Guidelines for the Environmental Assessment of Road Traffic*

12.3.16 The *Guidelines for the Environmental Assessment of Road Traffic* (the IEA Guidelines) suggests rules-of-thumb to delimit the scale and the extent of assessment (Ref 12.6). It also identifies numerous receptors for consideration in assessment. These rule-of-thumb and receptors are discussed in further detail in Section 12.3.

c) *Regional*

12.3.17 The regional policy and guidance that has been consulted is as follows:

- *Joint Transport Plan for South West Wales 2015-2020*, South West Wales Integrated Transport Consortium (2015) (Ref 12.7).

i. *Joint Transport Plan South West Wales 2015-2020*

12.3.18 The *Joint Transport Plan South West Wales 2015-2020* sets out the vision and objectives for transport in the four Local Authorities in South West Wales, namely Carmarthenshire County Council, Neath Port Talbot County Borough Council, Pembrokeshire County Council and the City and County of Swansea (CCS) (Ref 12.7).

12.3.19 The document references a number of key issues across the South West Wales area. This includes “increased congestion on the strategic highway network, increasing journey times and reduced journey time reliability for the movement of people and goods”. Proposed actions include encouraging travel plan development, car sharing and the use of Park and Ride (P&R) sites.

12.3.20 It provides a short, medium and long term programme of interventions to work towards achieving its goals. The short-term programme sets out those schemes that are priorities for the next five years up to 2020. The medium and long term programme identifies aspirations up to 2030. The medium and long term programme lists the ‘Felindre Strategic Business Park Northern Roads Improvement’ scheme, described as “*improvements to accommodate greater levels of traffic generated by new development being established at the Felindre Strategic Business Park and a possible large residential development adjacent to it (subject to LDP approval)*”. This is relevant as the Project Site lies approximately 1.5 km to the northwest of this development area.

d) Local

12.3.21 The local policy and guidance that has been consulted is as follows:

- *Unitary Development Plan*. City and County of Swansea (2008) (Ref 12.8); and
- *Local Development Plan 2010-2025: Deposit Plan*. City and County of Swansea (2016) (Ref 12.9).

i. *Unitary Development Plan*

12.3.22 The *Unitary Development Plan* (UDP) was adopted in November 2008 (Ref 12.8). It sets out the policies and proposals to guide future development in the CCS up to 2016. It will remain the current LDP until adoption of the *Local Development Plan 2010-2015*.

12.3.23 Policy EV21 relates to non-residential development in rural areas. Part V states that schemes will be permitted where it can be demonstrated it is essential for utilities provision.

12.3.24 Policy R9 states:

“The renewal, upgrading or extension of the infrastructure of utility services providers will be supported where the development:

- *Contributes towards objectives of economic regeneration or forms part of the planned development of a wider network; and*
- *Incorporates all reasonable measures to minimise any significant adverse impact on the natural heritage, historic environment, health and communities.”*

ii. *Local Development Plan 2010-2025: Deposit Plan*

12.3.25 The CCS is currently in the process of developing a new LDP, which, when adopted, will replace the existing UDP. The latest LDP document is the *Deposit Plan*, published in July 2016 (Ref 12.9). Following a period of public consultation, this was submitted for independent examination in July 2017. Most policies relate to residential and employment developments, but there are some that are relevant to the Project, as identified in the following paragraphs.

12.3.26 Policy IO1 (Supporting Infrastructure) states that “development must be supported by appropriate infrastructure, facilities and other requirements considered necessary as part of the proposal” and “where there is a deficiency in provision or

capacity that arrangements are in place to support the development with new or improved infrastructure, facilities or other measures.”

12.3.27 Policy CV2 (Development in the Countryside) states that there is a presumption against development in the countryside, except where it is for necessary infrastructure provision.

12.3.28 Policy T1 (Transport Measures and Infrastructure) states “*development must be supported by appropriate transport measures and infrastructure*”. This includes ensuring safe and efficient access to the transport network can be achieved and that developments are served by appropriate parking provision and circulation areas. It concludes by stating that “*development that would have an unacceptable impact on the safe and efficient operation of the transport network will not be permitted*”.

12.3.29 Policy T5 (Design Principles for Transport Measures and Infrastructure) states that the design of development together with any supporting transport measures and infrastructure must allow for the safe, efficient and effective movement of vehicles.

12.3.30 Policy T6 (Parking) states that proposals must be served by appropriate parking provision, in accordance with maximum parking standards. Where parking cannot be provided on-site, provision should be made for alternative transport measures.

12.3.31 Policy T7 (Public Rights of Way and Recreational Routes) seeks to ensure the protection of Public Rights of Way (PROW) and requires an alternative route to be identified and provided where an existing route is adversely affected by a development.

12.4 Methodology

a) Scope of the Assessment

12.4.1 The scope of this assessment has been determined through a formal EIA scoping process undertaken with the SoS. Comments raised on the EIA Scoping Report have been taken into account in the development of the assessment methodology and these are detailed where relevant in this chapter. Responses to the comments raised in the EIA Scoping Opinion can be found in Appendix 4.2.

b) Consultation

12.4.2 The scope of the assessment has also been informed by ongoing consultation with statutory consultees throughout the design and assessment process. With regard to the assessments and studies carried out for this chapter, AECOM has liaised with the CCS (the LHA). The discussions were used to inform and agree an appropriate extent and methodology for carrying out the work.

12.4.3 A summary of the comments raised and responses that have informed the scope and methodology of the TA are detailed in Table 12-2.

Table 12-2: Summary of Consultation Responses

Consultee	Date	Comment	Response
SoS (paragraphs 2.49 and 2.57)	August 2014	Requirement for details of the transport routes.	Included at Section 12.4.
SoS (paragraphs 2.59)	August 2014	Requirement for details of construction traffic.	Included at Section 12.7.
SoS (paragraphs 2.60)	August 2014	Requirement for details of operational traffic.	Included at Section 12.7.
SoS (paragraphs 2.61)	August 2014	Requirement for details of decommissioning traffic.	Included at Section 12.7.
SoS (paragraphs 3.87)	August 2014	Recommendation to consult with Network Rail regarding abnormal loads.	Still to be undertaken and will be done so at appropriate stage.
Local Planning Authority	10/10/2017	Request to contact case Highway Officer direct.	Agreed and Highway Officer contacted directly.
LHA	20/10/2017	Telephone discussion with Highway Officer to scope out extent of work.	Meeting arranged.
LHA	26/10/2017	Scoping meeting with LHA.	Study area agreed and methodology for progress of work. Set out in Section 12.4.
LHA	02/11/2017	Request for Personal Injury Collision (PIC) data.	Awaiting information. See Section 12.5.
LHA	09/11/2017	Meeting/discussion on traffic data validity.	Agreed. Set out in Section 12.5.
LHA	24/11/2017	Submission of Scoping Note to LHA.	Awaiting agreement.

c) Study Area

12.4.4 Access to the Project Site will be from the B4489 approximately 1.7 km from M4 Junction 46. Traffic will utilise the existing Access Road to the Substation and Felindre Gas Compressor Station and then along a new section of the Access Road. The new Access Road is to be constructed as permanent feature of the Project and would run across agricultural land to the Generating Equipment Site. There are two options for the new Access Road that are currently being considered and these are described in detail within (**Chapter 3: Project & Site Description**), and the final route selection will be confirmed in the DCO Application. The Generating Equipment Site is approximately 1.7 km from the B4489 (measured along the existing Access Road and new Access Road).

12.4.5 The study area includes the Access Road between the Project Site and the B4489 and continues south to incorporate the M4 Junction 46 and the A48/Pant Lasau Road junction. This study area was selected to include the necessary junctions and access routes agreed with the CCS as part of the consultation process.

12.4.6 The study area remains constant between the construction, operational and decommissioning periods. The study area is shown on Figure 12.1.

d) Assessment Approach and Scenarios

i. Construction

12.4.7 For the assessment of the construction period, the methodology has been designed to assess the impact of the construction traffic generated by the Project against background traffic conditions. 2020 has been identified as the peak year of activity for traffic generation during the construction period. The Project is expected to be in operation by 2022. 2022 is likely to be the final year of construction and therefore represents the year at which background traffic will be highest prior to the opening of the Project. Therefore, to ensure a ‘worst case’ assessment, 2022 has been selected as the future assessment year and compounded with the peak construction traffic activity from 2020. The following scenarios have been assessed:

- 2017 Base Year (for establishing the existing conditions);
- 2022 Baseline (for establishing the future conditions); and
- 2022 Baseline + Project Construction Traffic (for establishing the future conditions with the addition of the Project construction traffic).

12.4.8 Information relating existing traffic patterns on local roads was obtained through commissioned traffic surveys undertaken in October 2014.

12.4.9 In order to estimate future growth in traffic flows, traffic growth factors have been obtained from TEMPro. The TEMPro program is based on the National Trip End Model (Dataset 7.2) and takes into account changes in car ownership and local planning forecasts regarding housing and employment.

12.4.10 The forecast has been based on a ‘rural’ road in the ‘Swansea 004’ TEMPro zone. An average of the factors for the ‘motorway’, ‘trunk’ and ‘principal’ road types has been taken, consistent with the road types in the study area. The factors have been derived for growth from 2014, as this was the year in which the traffic data was collected. The factors are set out in Table 12-3.

Table 12-3: TEMPro Growth Factors

Growth Period	Time Period	Growth Factor
2014-2017	Weekday AM Peak	1.0317
	Weekday PM Peak	1.0333
	Weekday 24-Hour	1.0369
2014-2022	Weekday AM Peak	1.0945
	Weekday PM Peak	1.0943

Growth Period	Time Period	Growth Factor
	Weekday 24-Hour	1.1022

12.4.11 The traffic generated by the Project during the construction period has been quantified using contractor estimates of the resources required and refined using calculations based on available information. Construction traffic will be associated with both the construction staff working on the Project Site (travelling in cars and vans) and the delivery of materials (by HGVs). There will also be a requirement for abnormal deliveries, these will be very few in number and managed outside of normal working hours, more information on abnormal loads is provided in Section 12.7. From this, an approximate construction programme has been developed and used to estimate the peak traffic generated. The traffic generation has been calculated based on the following assumptions:

- All construction staff will arrive at and depart the Project Site in private cars or vans at average vehicle occupancy of 1.6 (this value was agreed with the CCS as part of previous assessment work). Due to the limitations of public transport provision, no staff are expected to arrive or depart by public transport. The contractor will be responsible for implementing a Construction Staff Travel Plan to encourage car sharing amongst staff;
- All imports and exports of materials required for construction will be via HGVs.
- The assessment of construction has included weekdays only as the base levels of traffic were surveyed and were shown to be higher on a weekday than a Saturday. Saturdays have therefore not been considered in this assessment as weekdays present the worst case. The core working hours during construction are between 08:00 and 18:00hrs (Monday to Friday) and 08:00 and 13:00hrs (Saturdays and Bank Holidays);
- All construction staff will arrive and depart during the peak hours to ensure a robust worst case assessment. Therefore, all staff are assumed to arrive between 07:45 and 08:45hrs, and depart between 16:30 and 17:30hrs. Temporary parking spaces for staff will be made available within the Laydown Area during construction. No construction staff vehicles will be parked on any of the public roads surrounding the Project Site;
- For all imports, HGVs will arrive full and depart empty. For all exports, HGVs will arrive empty and depart full. This will ensure a robust worst case assessment. However, it is likely to be the case that HGV usage can be more efficiently optimised to ensure that HGVs arrive and depart with a full load to reduce the total number of trips on the network; and
- The import and export of materials to and from the Project Site will occur throughout the duration of the site’s operational hours. At this stage, it is not possible to estimate groupings of deliveries and therefore a flat profile of deliveries has been assumed throughout the day.

12.4.12 There are two peaks, one associated with construction staff and one associated with the delivery of materials. The two peaks have been assessed together, i.e. compounded to ensure a robust worst case assessment in the event of any changes to the construction programme. The assessment considers the likely transport effects during the weekday AM and PM peak hours, and for the weekday 24-hour period. The peak hours have been determined as 07:45-08:45hrs and 16:30-17:30hrs respectively from the traffic survey information.

ii. Operation and Maintenance

12.4.13 The impacts of the operational period have not been assessed to the same extent as the construction period as the traffic generation will be relatively minor compared to the construction period, with the increases in traffic well within both rules-of-thumb identified in the IEA Guidelines (see paragraph 12.3.14) (Ref 12.6).

iii. Decommissioning

12.4.14 Traffic forecasts for the decommissioning phase are not available, but are likely to be of a similar level to that generated during the construction period. However, traffic growth forecasts are not available to assess as far in the future as decommissioning (25 years after opening). Therefore, the impact has been assessed in detail only in terms of the traffic generated during the construction period.

e) Determining the Significance of Effect

12.4.15 The assessment has been based upon the Institute of Environmental Assessment's *Guidelines for the Environmental Assessment of Road Traffic* (the IEA Guidelines). The IEA Guidelines suggest in paragraph 3.15 that two broad rules-of-thumb be used as a screening process to delimit the scale and extent of the assessment. These are:

- “Rule 1 include highway links where traffic flows will increase by more than 30% (or the number of heavy goods vehicles will increase by more than 30%).
- Rule 2 include any other specifically sensitive areas where traffic flows have increased by 10% or more.” (Ref 12.6)

12.4.16 These rules-of-thumb form the starting point for the assessment of effects. Specifically sensitive areas under Rule 2 include accident black-spots, conservation areas, hospitals and links with high pedestrian flows.

12.4.17 The significance of the effects of the Project have been considered in respect of the following receptors based on the IEA Guidelines:

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

12.4.18 For many receptors, the IEA Guidelines do not contain simple rules or formulae which define the thresholds of significance. Therefore, there is a need to exercise professional judgement in determining the degree of the effect and whether or not an improvement is required and, if required, what the improvement should comprise. The following tables have been developed in this manner.

i. Severance, Pedestrian Delay, Pedestrian Amenity, Fear and Intimidation

12.4.19 Receptors relating to severance, pedestrian delay, pedestrian amenity, and fear and intimidation are associated primarily with the pedestrian experience. The

criteria for the sensitivity of these receptors and magnitude of change have been developed based on changes in the volume and composition of traffic. An increase in traffic volumes and HGV composition can result in difficulties for pedestrians when crossing roads and affect the pleasantness of journeys. The criteria for assessment are set out in Table 12-4.

Table 12-4: Receptor Sensitivity and Magnitude of Change Criteria – Severance, Pedestrian Delay, Pedestrian Amenity, Fear and Intimidation

Sensitivity	Criteria
Very Low	Traffic flows of less than 100 vehicles per hour or HGV flow of less than 100 HGVs per day.
Low	Traffic flows of between 100 and less than 1,000 vehicles per hour or HGV flow of between 100 and less than 1,000 HGVs per day.
Medium	Traffic flows of between 1,000 vehicles and less than 2,000 vehicles per hour or HGV flow of between 1,000 and less than 2,000 HGVs per day.
High	Traffic flows of 2,000 vehicles and greater per hour or HGV flow of 2,000 HGVs and greater per day.
Magnitude	Criteria
Very Low	Changes in traffic flows/HGV flow of less than 30%.
Low	Changes in traffic flows/HGV flow of between 30% and less than 60%.
Medium	Changes in traffic flows/HGV flow of between 60% and less than 90%.
High	Change in traffic flows/HGV flow of 90% and greater.

12.4.20 The significance of effects for these receptors have also been assessed in qualitative terms in the context of existing pedestrian infrastructure, including the quality of footways, presence of street lighting and availability and type of crossing facilities.

12.4.21 In respect of PROW, it is considered inappropriate to use this criteria given the existing PROW in the vicinity of the Project Site are not adjacent to the carriageway. As will be discussed at Section 12.4, there are PROW that cross the Project Site and, in view of the negligible existing traffic movements at these locations, it is considered appropriate to use a qualitative assessment criteria, as set out in Table 12-5.

Table 12-5: Receptor Sensitivity and Magnitude of Change Criteria – PROW

Sensitivity	Criteria
Very Low	-
Low	-
Medium	-

Sensitivity	Criteria
High	Assumed as a worst case.
Magnitude	Criteria
Very Low	Little or no hindrance to pedestrian movement.
Low	All people wishing to make pedestrian movements will be able to do so, but there will be some hindrance to movement.
Medium	Some people, particularly vulnerable user groups, are likely to be deterred from making journeys on foot. For others, pedestrian journeys will be longer or less attractive.
High	People are likely to be deterred from making pedestrian journeys to an extent sufficient to induce a reorganisation of their activities. Those who do make journeys on foot will experience considerable hindrance.

ii. Driver Delay

12.4.22 Changes in levels of delay at junctions have been used in the assessment of driver delay. The criteria for sensitivity of receptor and magnitude of change are set out in Table 12-6.

Table 12-6: Receptor Sensitivity and Magnitude of Change Criteria – Driver Delay

Sensitivity	Criteria
Very Low	Junction delay of less than 10 seconds per vehicle.
Low	Junction delay of between 10 seconds and less than 30 seconds per vehicle.
Medium	Junction delay of between 30 seconds and less than 60 seconds per vehicle.
High	Junction delay greater of 60 seconds and greater per vehicle.
Magnitude	Criteria
Very Low	Change in junction delay per vehicle of less than 30%.
Low	Change in junction delay per vehicle of between 30% and less than 60%.
Medium	Change in junction delay per vehicle of between 60% and less than 90%.
High	Change in junction delay per vehicle of 90% and greater.

12.4.23 The level of driver delay is derived from the capacity assessment of junctions in the study area network. The capacity assessment has been undertaken using the Transport Research Laboratories (TRL) software program ‘Junctions 9’. This summarises the performance for all movements/approach arms in terms of their ratio of flow to capacity (RFC), queues in vehicles and delay in seconds per vehicle. Delay is the key measurement for this receptor.

iii. Accidents and Safety

12.4.24 The number of collisions on a road is an indicator of the current road safety conditions. An analysis of PIC data has been undertaken over a five year period to identify whether there are any locations within the study area where there is an existing safety issue. Where an issue has been identified, a qualitative assessment has been undertaken to ascertain the likelihood that the Project will lead to further deterioration in safety.

iv. Interaction of Magnitude of Change and Sensitivity of Receptor

12.4.25 Effects on receptors can be beneficial, adverse or negligible, and of minor, moderate or major significance. The significance criteria are derived from the interaction of receptor sensitivity and magnitude of change of effect. A matrix of magnitude of change and sensitivity of receptor is set out in Table 12-7, and in **Chapter 4: Approach to Environmental Impact Assessment**. Major and moderate effects are considered significant, and minor and negligible effects are considered not significant.

Table 12-7: Assessment Matrix

Magnitude of Change	Sensitivity of Receptor			
	High	Medium	Low	Very Low
High	Major	Major	Moderate	Minor
Medium	Major	Moderate	Minor	Minor
Low	Moderate	Minor	Minor	Negligible
Very Low	Minor	Minor	Negligible	Negligible

12.5 Baseline Environment

12.5.1 This section describes the baseline environmental characteristics for the Project and surrounding areas with specific reference to transport.

a) Project Site Description and Context

12.5.2 The Project Site is currently used for agricultural purposes (sheep and horse grazing). The western extent of the Project Site includes parts of the Substation and the existing Access Road from the B4489 that serves the Substation and Felindre Gas Compressor Station. The level of traffic generation associated with the agricultural activities and maintenance visits to the Substation and gas compressor station is immaterial and likely to be accommodated in the daily variation of traffic flows.

b) Data Collection

12.5.3 In order to determine the baseline conditions in the study area, data was collected from numerous sources, as summarised in Table 12-8.

Table 12-8: Data Collection

Subject Area	Source
Local Highway Network	Site visit (21/11/2017) / OS mapping / online desktop review.
Highway Operational Conditions	Traffic surveys undertaken by Sky High (now Tracsis) in 2014. Growth factors have been applied to this data to represent conditions in 2017.
Walking, Cycling and Public Transport	Site visit (21/11/2017)/ online desktop review (PROW mapping obtained from the CCS, public transport timetables).
Road Safety	PIC data obtained from the CCS (Awaiting Data).

12.5.4 The data was used to determine the:

- Weekday AM and PM peak hours for use in the assessment;
- Locations of concern in terms of highway operation;
- Collision history within the study area; and
- Opportunities for sustainable travel to/from the Project Site.

i. Local Highway Network

12.5.5 The local highway network is shown on Figure 12.2.

12.5.6 The Project Site is served by a privately maintained Access Road from the B4489. The Access Road is unlit. The width of the Access Road varies along its length between 3.5 m and 7.5 m, and is generally bordered by trees. The Access Road connects to the B4489 via a simple priority junction. This is characterised by large radii on the minor arm (the Access Road) to accommodate HGV movements.

12.5.7 The B4489 routes between the village of Felindre to the north (approximately 2.3 km from the Access Road) and the M4 Junction 46 to the south (approximately 1.8 km from the Access Road). The B4489 is subject to a 40 mph speed limit at its junction with the Access Road. At this location, the road has a 5.5 m wide carriageway and is unlit. Approximately 330 m to the north of the Access Road, the B4489 becomes subject to the national speed limit. Approximately 475 m to the south of the Access Road, the B4489 is street lit. A further 75 m south from this point, the B4489 forms a three-arm roundabout with the access to the Felindre Park and Share facility.

12.5.8 The B4489 forms a dumbbell roundabout with the M4 Junction 46. The northern dumbbell roundabout junction comprises three arms; the B4489 and the eastbound on/off-slips of the M4. The southern dumbbell roundabout junction comprises six arms; the A48 (three arms), the B4489 Swansea Road, and the westbound on/off-slips of the M4. The south-eastern arm of the A48 forms a mini-roundabout junction with Pant Lasau Road approximately 90 m southeast of the southern dumbbell roundabout. These junctions are subject to a 40 mph speed limit and are lit.

ii. Highway Operational Conditions

12.5.9 An Automatic Traffic Count (ATC) survey was undertaken on the B4489 between the Access Road and the roundabout junction with the Felindre Park and Share facility. The survey was undertaken between Thursday 16th October 2014 and Wednesday 22nd October 2014. The traffic flow information for an average weekday is summarised in Table 12-9. Growth factors have been applied to the 2014 data to represent conditions in 2017.

Table 12-9: Summary Traffic Flow Information – B4489

Time Period	Direction	Total Vehicles	Number of HGVs	HGV%
Weekday AM Peak Hour (07:45-08:45)	Northbound	44	1	2%
	Southbound	88	2	2%
	Two-Way	132	2	2%
Weekday PM Peak Hour (16:30-17:30)	Northbound	55	0	0%
	Southbound	30	0	0%
	Two-Way	85	0	0%
Weekday 24-Hour	Northbound	476	4	1%
	Southbound	510	8	2%
	Two-Way	987	12	1%

Note: Summation errors due to rounding.

12.5.10 Table 12-9 shows that, on an average weekday, the B4489 carries approximately 130 vehicles during the AM peak hour, 90 vehicles during the PM peak hour, and 1,000 vehicles over the 24-hour period. HGVs account for no more than 2% of total traffic.

12.5.11 Junction Turning Count (JTC) surveys were also undertaken on Thursday 16th October 2014 at the following junctions in the study area network:

- M4 Junction 46 Northern Dumbell Roundabout;
- M4 Junction 46 Southern Dumbell Roundabout; and
- A48/Pant Lasau Road Mini-Roundabout.

12.5.12 The traffic survey data is reproduced at Appendix 12.1. The 2014 traffic flows at the surveyed locations during the weekday AM and PM peak hours are shown on Figures 12.3 and 12.4 respectively. Growth factors have been applied to represent traffic flows in 2017, as shown on Figures 12.5 and 12.6 respectively.

12.5.13 The surveyed junctions have been modelled using the TRL software program 'Junctions 9'. They have been modelled as a linked network in view of their proximity to each other. This has required the use of the lane simulation tool, which only provides outputs for queuing and delay. The capacity assessment results for 2017 during the weekday AM and PM peak hours are summarised in Table 12-10. These are shown for the entry arms to the network (clockwise from the northern

arm of the B4489) and exclude the internal links. The capacity assessment output reports are reproduced at Appendix 12.2.

Table 12-10: 2017 Capacity Assessment Results

Entry Arm	Weekday AM Peak Hour		Weekday PM Peak Hour	
	Queue (Vehicles)	Delay (Secs/ Vehicle)	Queue (Vehicles)	Delay (Secs/ Vehicle)
B4489 (North)	2	35	1	6
M4 WB Off-Slip	208	879	1	6
Pant Lasau Road	6	46	24	131
A48 (Southeast)	3	17	75	360
B4489 (South)	36	183	2	8
A48 (Southwest)	59	639	1	6
M4 EB Off-Slip	111	814	1	7

12.5.14 Table 12-10 shows that, during the AM peak hour, the highest levels of queuing and delay are experienced on the M4 eastbound and westbound off-slips, followed by the A48 (Southwest) and B4489 (South). During the PM peak hour, levels of queuing and delay are significantly lower across the junction, with Pant Lasau Road and the A48 (Southeast) experiencing the highest levels of queuing and delay.

12.5.15 On-site observations carried out by AECOM during the AM peak hour on Tuesday 21st November 2017 suggests that the M4 Junction 46 is operating well within capacity. At the time of the observational visit, it was apparent that the queues reported by the modelling were not present at that time. This is particularly the case for the M4 off-slips, which appeared to be free flowing or with minimal queuing. The modelling is therefore considered to represent a ‘worst-case’ of existing conditions at the junctions.

12.5.16 The analyses that will be carried out as part of this chapter will be based upon the previously observed traffic flows and queues and will therefore be a robust assessment of this part of the network.

iii. Road Safety

12.5.17 PIC data was requested from the CCS on 2nd November 2017 but has not yet been supplied. This section will be updated for the DCO Application once this has been received.

iv. Walking and Cycling

12.5.18 The walking and cycling facilities and PROW are shown on Figure 12.7.

12.5.19 There are no footways that serve the Project Site. The nearest footways are on the B4489, approximately 475m south of the Access Road (on the approach to the junction with the Felindre Park and Share facility. This footway continues to the M4 Junction 46. The 500 m section of the footway to the north of the M4 Junction 46 is

separated from the carriageway edge by a barrier. At the M4 Junction 46 the footways continues south along the east side of the carriageway, serving the southern arms of the southern dumbbell roundabout, with dropped kerbs and tactile paving to facilitate crossing movements across entry arms.

12.5.20 There are no formal cycling routes in the vicinity of the Project Site. Part of the B4489 is identified as an 'advisory cycling route' on the CCS's cycle map. This covers the section of the B4489 that routes north from the Access Road to Felindre and to a point approximately 475 m south of the Access Road. Due to distance from the Project Site, no assessment of cycle routes has therefore been undertaken in this chapter to cycle routes, although is discussed in **Chapter 16: Socio-economics**.

12.5.21 There are numerous PROW crossing/in the vicinity of the Project Site. Footpaths LC34 and LC117 cross the Access Road (and the new Access Road) at points approximately 350 m and 1.3 km from the B4489. Footpath LC35B passes through the northern part of the Project Site.

v. Public Transport

12.5.22 The nearest bus stop to the Project Site is the 'Lliw Reservoirs' stop located on Rhyd-y-pandy Road. This is situated to the east of Felindre and approximately 500m to the northwest of the northern extent of the Project Site boundary. There is no footway between the Project Site and this bus stop. It provides access to Service 142, which routes between Morriston and Garnswllt. This service is operated by DANSA, a community transport organisation. There are three to four services per day in each direction, although these can generally only be pre-booked.

12.5.23 Service 141 passes to the south of the Project Site, routing between Gorseinon and Morriston. The nearest stop that provides access to this service is the 'Pant Lasau Cross' stop located on Mynydd Gelli Wastad Road. It is situated approximately 750 m to the southeast of the southern extent of the Project Site boundary and can be accessed via Footpath LC117.

12.5.24 There are no railway stations in the vicinity of the Project Site. Llansamlet railway station is situated approximately 5.5 km southeast of the Project Site, accessible by car via the A48 (from M4 Junction 44 and 46). Swansea railway station is a further 7 km from the Project Site; this is a key local transport hub and is more easily accessible by public transport. Swansea railway station is managed by Arriva Trains Wales. There are four services daily from Swansea to Shrewsbury; an hourly service from Swansea to Manchester Piccadilly, which calls at Cardiff Central; and a total of two to three services hourly from Swansea to Cardiff Central. Great Western Railway also provides services from Swansea to London Paddington, calling at Bristol Parkway.

12.5.25 Overall, the opportunities to access the Project Site by public transport are limited, and it is therefore considered that, for the purposes of this assessment, no trips by construction, maintenance and permanent staff will be undertaken by these modes.

vi. Parking

12.5.26 Felindre Park and Share facility is accessed from the B4489, approximately 550 m south of the Access Road. It is located on the site of the proposed Felindre Business Park. It has capacity for 480 spaces and its use is encouraged for employees of the DVLA HQ in Clase. A shuttle bus service runs between the facility and the DVLA. There are no other parking facilities in the study area. It is not envisaged that this Felindre Park and Share facility will be available to be used by the Project, although possibilities may be explored as part of the CTMP and CSTEP.

12.6 Embedded Mitigation

12.6.1 As detailed in **Chapter 3: Project and Site Description**, a number of embedded mitigation measures have been identified through the iterative EIA process and have been incorporated into the design and construction planning of the Project.

12.6.2 As these mitigation measures have been embedded into the design, are legal requirements or are standard practices that will be implemented, the assessment of likely significant effects assumes that they are in place.

12.7 Assessment of Effects

12.7.1 This section presents the findings of the TA for the construction, operation and maintenance and decommissioning phases of the Project.

12.7.2 This section also identifies any likely significant effects that are predicted to occur and Section 12.8 highlights the additional mitigation and monitoring measures that are proposed to reduce or eliminate the identified significant effects.

a) Construction

i. Traffic Generation

Power Generation Plant

12.7.3 The construction of the Power Generation Plant is estimated to take 22 months. At its peak, it is forecast this will generate around 260 HGV movements per day. On average, it is forecast that it will generate around 100 HGV movements per day.

12.7.4 The traffic generation consists of tankers transporting foul effluent and water, delivery of materials and the export of waste/excavated materials not suitable for use on site (it is assumed that all excavated material will be unsuitable for re-use to represent the worst case).

12.7.5 The new Access Road will be constructed as part of the Power Generation Plant and is expected to take around six months regardless of the Option selected. It is forecasted that this will generate 16-18 HGV movements per day during that time period.

12.7.6 There will also be a requirement to transport some abnormal loads. The shape and scale of these loads will be refined as the construction process develops in more detail. At this stage in the assessments we have taken instruction from the current

design and from previous experience from within the Applicant team. There are expected to be two abnormal loads; these are likely to be around 5 m in width, potentially 6.5 m in height and up to around 50 m in length. The total vehicle weight could be up to 400 tonnes per vehicle. These loads will be travelling with a full complement of technical operators, mobile safety entourage and police escort. It is assumed that the heavy and large equipment will arrive via water transport to either Swansea or Port Talbot Docks. The route to the Project Site will be confined to the strategic highway network wherever possible and will take as direct a route as available given the local circumstances. The pre planning and lead up time required for the transportation of such loads will ensure that all appropriate measures are in place and relevant authorities are notified.

Gas Connection

12.7.7 The construction of the Gas Connection is estimated to take six months. This is expected to take place alongside the construction of the Power Generation Plant and Electrical Connection. It is forecast that this will generate 30 HGV movements per day.

Electrical Connection

12.7.8 The construction of the Electrical Connection is estimated to take six months. The construction of the Electrical Connection is expected to take place alongside the construction of the Power Generation Plant and Gas Connection. It is forecast that this will generate four HGV movements per day.

Project

12.7.9 The construction programme has been examined to identify peaks in construction activity. To ensure a robust assessment, the peaks in construction staff traffic and HGV traffic have been assessed together against the background traffic. The traffic generation for these peaks are shown for the weekday AM and PM peak hours and 24-hour period in Table 12-11.

Table 12-11: Project Peak Traffic Generation

Time Period	Vehicle Type	Arrivals	Departures	Total
Weekday AM Peak Hour (07:45-08:45)	Car/Van (Staff)	63	0	63
	HGVs	15	15	30
	Total	78	15	93
Weekday PM Peak Hour (16:30-17:30)	Car/Van (Staff)	0	63	63
	HGVs	15	15	30
	Total	15	78	93
Weekday 24-Hour	Car/Van (Staff)	63	63	126
	HGVs	146	146	292
	Total	209	209	418

ii. Traffic Flows

12.7.10 Growth factors have been applied to the observed traffic flows in the study area network to represent the traffic flow conditions on the study area network in 2022 (the '2022 Baseline' assessment scenario). These are shown for the weekday AM and PM peak hours on Figures 12.8 and 12.9 respectively.

12.7.11 The construction traffic flows generated by the Project have been applied to the study area network. It is assumed that all construction staff trips will route to/from the M4 Junction 46, where it has been distributed based on observed turning proportions. All HGV traffic will route to/from the M4, where it has been distributed equally between the eastbound and westbound movements. These routing arrangements will maximise the efficiency of movements to/from the Project Site given its proximity to the strategic highway network, and therefore minimise the effect of the Project on the wider highway network. These routing arrangements will form part of the CTMP.

12.7.12 The resulting Project construction traffic flows on the study area network during the weekday AM and PM peak hours are shown on Figures 12.10 and 12.11 respectively. These have been added to the '2022 Baseline' traffic flows to derive the traffic flows for the '2022 Baseline + Project Construction Traffic' scenario, as shown on Figures 12.12 and 12.13.

iii. Severance, Pedestrian Delay, Pedestrian Amenity, Fear and Intimidation

12.7.13 The assessment of severance, pedestrian delay, pedestrian amenity, and fear and intimidation has primarily been based on changes in traffic flows on the study area network. The key links are as follows:

- Link 1 – B4489, between the Access Road and the Felindre Park and Share facility;
- Link 2 – B4489, between the Felindre Park and Share facility and the M4 Junction 46;
- Link 3 – M4 eastbound on-slip;
- Link 4 – A48, between the northern and southern dumbbell roundabouts of the M4 Junction 46;
- Link 5 – M4 westbound off-slip;
- Link 6 – A48, between the M4 Junction 46 and the A48/Pant Lasau Road mini-roundabout;
- Link 7 – Pant Lasau Road;
- Link 8 – A48, southeast of the A48/Pant Lasau mini-roundabout;
- Link 9 – B4489, south of the M4 Junction 46; and
- Link 10 – A48, southwest of the M4 Junction 46.

12.7.14 These links have been identified with reference to the location of existing pedestrian infrastructure, i.e. where existing pedestrian movements can reasonably be expected to occur. Tables 12-12 and 12-13 show the two-way total link flows during the weekday AM and PM peak hours respectively. Both tables show the traffic flows in 2022 both without and with the Project construction traffic, the difference between the two and the percentage change. For each link, the

significance of effect has been determined with reference to the magnitude of change and sensitivity of the link.

Table 12-12: 2022 Two-Way Total Traffic Flows – Weekday AM Peak Hour (07:45-08:45)

Link No.	2022 Baseline	2022 Baseline + Project Construction Traffic	Difference	% Change	Magnitude of Change	Sensitivity	Significance of Effect
1	140	233	+93	+66%	Medium	Low	Minor Adverse
2	382	475	+93	+24%	Very Low	Low	Negligible
3	415	422	+8	+2%	Very Low	Low	Negligible
4	1,223	1,286	+63	+5%	Very Low	Medium	Minor Adverse
5	876	891	+15	+2%	Very Low	Low	Negligible
6	2,334	2,354	+20	+1%	Very Low	High	Minor Adverse
7	1,365	1,374	+9	+1%	Very Low	Medium	Minor Adverse
8	1,239	1,250	+11	+1%	Very Low	Medium	Minor Adverse
9	1,112	1,131	+19	+2%	Very Low	Medium	Minor Adverse
10	938	940	+2	+0%	Very Low	Low	Negligible

Table 12-13: 2022 Two-Way Total Traffic Flows – Weekday PM Peak Hour (16:30-17:30)

Link No.	2022 Baseline	2022 Baseline + Project Construction Traffic	Difference	% Change	Magnitude of Change	Sensitivity	Significance of Effect
1	90	183	+93	+103%	High	Very Low	Minor Adverse
2	242	335	+93	+38%	Low	Low	Minor Adverse
3	842	878	+36	+4%	Very Low	Low	Negligible
4	1,239	1,288	+49	+4%	Very Low	Medium	Minor Adverse
5	606	614	+8	+1%	Very Low	Low	Negligible
6	2,023	2,046	+22	+1%	Very Low	High	Minor Adverse
7	950	960	+10	+1%	Very Low	Low	Negligible

Link No.	2022 Baseline	2022 Baseline + Project Construction Traffic	Difference	% Change	Magnitude of Change	Sensitivity	Significance of Effect
8	1,221	1,233	+12	+1%	Very Low	Medium	Minor Adverse
9	1,124	1,134	+10	+1%	Very Low	Medium	Minor Adverse
10	948	948	+0	0%	Very Low	Low	Negligible

12.7.15 Tables 12-12 and 12-13 show that, in terms of total traffic flows, Links 1, 4, 6, 7, 8 and 9 will experience a minor adverse effect during the AM peak hour with the Project construction traffic. Links 1, 2, 4, 6, 8 and 9 will experience a minor adverse effect during the PM peak hour with the Project construction traffic. The remaining links in these time periods will experience a negligible effect, which is not significant.

12.7.16 In terms of HGV traffic flows, data for the existing weekday 24-hour period is only available for Links 1 (B4489, between the Access Road and the Felindre Park and Share facility) and 2 (B4489, between the Felindre Park and Share facility and the M4 Junction 46). Table 12-14 shows the two-way HGV link flows during the weekday 24-hour period in 2022 both without and with the Project construction traffic, the difference between the two and the percentage change.

Table 12-14: 2022 Two-Way HGV Traffic Flows – Weekday 24-Hour

Link No.	2022 Baseline	2022 Baseline + Project Construction Traffic	Difference	% Change	Magnitude of Change	Sensitivity	Significance of Effect
1	13	305	+292	+2,245 %	High	Very Low	Minor Adverse
2	154	446	+292	+190%	High	Low	Moderate Adverse

12.7.17 Table 12-14 shows that Link 1 will experience a minor adverse effect and Link 2 will experience a moderate adverse effect with the Project construction traffic. No pedestrian movements have been observed on Link 1; there is no footway along the majority of this link and no key destinations that pedestrians are likely to travel to. There is a short section of footway at the southern end of the link, which serves the Access Road that serves Bryn Whilach Farm. The footway is approximately 2 m wide and is of sufficient width to accommodate the limited pedestrian movements at this location. Minimal pedestrian movement has been observed on Link 2. There is a 2 m wide footway along the entirety of this link, which is separated from the carriageway edge along much of its length by a barrier. The area is also street lit.

12.7.18 The other links in the study area on which the Project construction traffic will result in an increase in HGV traffic movements are Links 3 (M4 eastbound on-slip), 4 (A48, between the northern and southern dumbbell roundabouts of the M4 Junction

46) and 5 (M4 westbound off-slip), associated with movements to/from the M4. These links are part of the strategic highway network and are designed to carry high volumes of HGV traffic. Whilst the increase in HGV traffic from the Project construction traffic will result in a deterioration of the pedestrian experience, minimal pedestrian movement has been observed at these locations, which is typical given the nature of the strategic access junction. It is also likely that any pedestrians at these locations will already be accustomed to the levels of general traffic and HGVs.

12.7.19 In respect of PROW, Footpath L35B passes through the Project Site perpendicular to the route of the Gas Connection, and Footpaths LC34 and LC117 cross the Access Road. Footpath LC34 crosses the Access Road at a point approximately 350 m from the B4489. This would be affected by works to widen the Access Road. Footpath LC117 routes adjacent to the perimeter of the Felindre Gas Compressor Station and would be affected by the construction of the new Access Road to serve the Project Site, crossing at a point approximately 1.3 km from the Access Road. The management of the PROW will be set out in the CTMP and developed in consultation with the PROW Officer at the CCS.

12.7.20 There is no recent usage data for these footpaths and therefore their sensitivity has been assessed as high to ensure a robust assessment using a worst case. The magnitude of impact is anticipated to low, as all users should still be able to make a pedestrian movement, but there will be some hindrance in doing so (e.g. due to short term closures/diversions). The significance of effect will therefore be moderate adverse, which is significant, albeit temporary.

iv. Driver Delay

12.7.21 The assessment of driver delay has been based on the capacity assessment of the junction network described at Section 12.4. Tables 12-15 and 12-16 show the driver delay at the junction network during the weekday AM and PM peak hours respectively in 2022 both without and with the Project construction traffic. The capacity assessment output reports are reproduced at Appendix 12.2.

Table 12-15: Capacity Assessment Results – Weekday AM Peak Hour (07:45-08:45)

Entry Arm	Delay (Seconds/Vehicle)			% Change	Magnitude of Change	Sensitivity	Significance of Effect
	2022 Baseline	2022 Baseline + Project Construction Traffic	Difference				
A	36	40	+4	+11%	Very Low	Medium	Minor Adverse
B	1,039	998	-41	-4%	Very Low	High	Minor Beneficial
C	55	68	+13	+24%	Very Low	Medium	Minor Adverse
D	20	24	+4	+20%	Very Low	Low	Negligible

Entry Arm	Delay (Seconds/Vehicle)			% Change	Magnitude of Change	Sensitivity	Significance of Effect
	2022 Baseline	2022 Baseline + Project Construction Traffic	Difference				
E	298	379	+81	+27%	Very Low	High	Minor Adverse
F	875	920	+45	+5%	Very Low	High	Minor Adverse
G	1,027	955	-72	-7%	Very Low	High	Minor Beneficial

Note: A = B4489 (North). B = M4 WB Off-Slip. C = Pant Lasau Road. D = A48 (Southeast). E = B4489 (South). F = A48 (Southwest). G = M4 EB Off-Slip.

Table 12-16: Capacity Assessment Results – Weekday PM Peak Hour (16:30-17:30)

Entry Arm	Delay (Seconds/Vehicle)			% Change	Magnitude of Change	Sensitivity	Significance of Effect
	2022 Baseline	2022 Baseline + Project Construction Traffic	Difference				
A	6	7	+1	+17%	Very Low	Very Low	Negligible
B	7	7	0	0%	Very Low	Very Low	Negligible
C	230	235	+5	+2%	Very Low	High	Minor Adverse
D	549	558	+9	+2%	Very Low	High	Minor Adverse
E	9	10	+1	+11%	Very Low	Very Low	Negligible
F	6	6	0	0%	Very Low	Very Low	Negligible
G	7	7	0	0%	Very Low	Very Low	Negligible

Note: A = B4489 (North). B = M4 WB Off-Slip. C = Pant Lasau Road. D = A48 (Southeast). E = B4489 (South). F = A48 (Southwest). G = M4 EB Off-Slip.

12.7.22 Table 12-15 shows that, during the AM peak hour, the entry arms of the B4489 (North and South), Pant Lasau Road and A483 (Southwest) will experience a minor adverse effect. The M4 eastbound and westbound off-slips will experience a minor beneficial effect; this is as a result of changes in the balance of traffic flows at the junction, which will result in more gaps for traffic exiting from these arms as priorities are changed. This will result in a reduction in the level of delay of the arms

benefitting from traffic flow balancing and an increase in arms which are forced to concede priority more than before flows were balanced. The A48 (Southeast) will experience a negligible effect, which is not significant.

12.7.23 Table 12-16 shows that, during the PM peak hour, the entry arms of the B4489 (North and South), A48 (Southwest) and the M4 eastbound and westbound off-slips will experience a negligible effect with the Project. Pant Lasau Road and the A48 (Southeast) will experience a minor adverse effect.

12.7.24 In summary, the Project will, at worst, have a minor adverse effect in terms of driver delay, which is not significant. This effect will be temporary in nature, and only experienced during the peak of construction traffic movements.

v. Accidents and Safety

12.7.25 This section will be completed following receipt of the PIC data from the CCS.

b) Operation and Maintenance

12.7.26 The traffic generation of the Project during the operational phase is expected to be minimal. The Project will employ up to 15 permanent staff working on a shift pattern. This will likely generate 30 movements per day (two movements per staff member). A demineralised water trailer and diesel fuel tanker will visit the Project Site periodically.

12.7.27 Maintenance periods will occur annually. During these periods, there may be up to 40 additional staff on-site for a period of one month. Based on a vehicle occupancy level of 1.6, this will equate to an additional 50 movements per day (25 arrivals during the AM peak hour, 25 departures during the PM peak hour); this is well within the peak traffic generation forecast for staff during the construction phase.

12.7.28 Overall, when assessed against the same receptors as construction and assuming the same sensitivity of each receptor, the significance of the effect of operation is anticipated to be negligible, which is not significant.

c) Decommissioning

12.7.29 The decommissioning phase for the Power Generation Plant is likely to be similar in nature to construction although some elements are expected to be left in situ. The number of construction staff will be less as the new Access Road will be constructed for the development and left in place and therefore the impacts are likely to be similar or less than those described for the construction phase. The decommissioning phase for the gas and electricity connection will generate very few vehicle movements, as it is likely that the Gas Pipeline and Electrical Connection will be capped and left in situ.

12.7.30 Overall, the impact of the Project during the decommissioning phase is expected to be lesser in nature to the construction phase as many aspects are to be left in situ. As a result, no further assessment of the decommissioning phase has been undertaken.

12.8 Mitigation and Monitoring

- 12.8.1 As a general rule, additional mitigation measures have been proposed where a significant effect is predicted to occur. Embedded mitigation measures, which have been incorporated within the design of the Project or are standard practice measures that have been committed to are summarised in Section 12.5.
- 12.8.2 The assessment has identified that the Project will, at worst, have a moderate adverse effect during the construction phase. This is restricted to one link during the 24-hour period in terms of HGV traffic flows, and the three PROW; these effects will be temporary. There will be further consultation with the PROW Officer to develop measures in respect of the PROW as part of the CTMP. Where possible, connectivity will be maintained by the use of temporary diversions and working methods to allow the PROWs to remain open for the majority of the construction period.
- 12.8.3 No additional mitigation measures are proposed or viable in view of the temporary nature of these effects. There will be ongoing monitoring of the CTMP and CSTP during the construction phase to establish the effectiveness of the measures contained within these documents.

12.9 Residual Effects

- 12.9.1 Table 12-17 presents a summary of the TA. It identifies the receptor/s likely to be impacted, the level of effect and, where the effect is deemed to be significant, includes the mitigation proposed and the resulting residual effect.
- 12.9.2 As discussed, the effects will be negligible during the operational phase and similar to construction during the decommissioning phase. Therefore, only the residual effects during the construction phase are shown. Negligible effects are not included.
- 12.9.3 Table 12-17 provides a breakdown of the effects by Project component, i.e. Power Generation Plant, Gas Connection, and Electrical Connection. It should be noted that the assessment in the tables above has been based on the Project as a whole. At this stage, detailed traffic generation forecasts are not available for the individual Project components. The available information is limited to the daily HGV traffic generation, and does not provide a breakdown of movements for the weekday AM and PM peak hours or the levels of construction staff trips for each component. In the case of the Power Generation Plant, it is considered reasonable to assume that the significance of effects identified for the Project as a whole will apply, as this will make up the vast majority of both construction staff trips and HGV trips associated with the Project.
- 12.9.4 In the case of the Gas Connection and Electrical Connection, it has been possible to determine the significance of effects on pedestrian receptors in relation to daily HGV traffic increases, but not in terms of total traffic flows during the weekday AM and PM peak hours and associated effects on driver delay. The effects of these components on these receptors will be within those identified for the Project as a whole, and will be confirmed at the DCO Application.

12.9.5 Table 12-17 shows that the effects of the Project will be significant in regard to receptors relating to the pedestrian experience (severance, pedestrian amenity, pedestrian delay, fear and intimidation) on Link 2 (B4489, between the Felindre Park and Share facility and the M4 Junction 46) and the three PROW (Footpaths LC34, LC35B and LC117). Minimal pedestrian movement has been observed on Link 2 and it has been identified that it currently benefits from a 2 m wide footway along the entirety of this link, which is separated from the carriageway edge along much of its length by a barrier. The area is also street lit. The embedded mitigation measures will seek to manage these effects and their associated risks but will not reduce the significance of effect. No additional mitigation measures are proposed or viable in view of the temporary nature of these effects. There will ongoing monitoring of the CTMP and CSTP during the construction phase to establish the effectiveness of the measures contained within these documents.

Table 12-17: Transport Summary of Effects – Construction Phase

Receptor	Description of Effect	Classification of Effect	Additional Mitigation	Classification of Residual Effect	Significance
Power Generation Plant					
Severance, Pedestrian Delay, Pedestrian, Amenity, Fear and Intimidation	Weekday AM Peak Hour – Increased total traffic on Links 1, 4, 6, 7, 8 and 9	Minor Adverse (Temporary)	None	Minor Adverse (Temporary)	Not Significant
	Weekday PM Peak Hour – Increased total traffic on Links 1, 2, 4, 6, 8, 9	Minor Adverse (Temporary)	None	Minor Adverse (Temporary)	Not Significant
	Weekday 24-Hour – Increased HGV traffic on Link 1	Minor Adverse (Temporary)	None	Minor Adverse (Temporary)	Not Significant
	Weekday 24-Hour – Increased HGV traffic on Link 2	Moderate Adverse (Temporary)	None	Moderate Adverse (Temporary)	Significant
	PROW (Footpaths L34, L35B and LC117)	Moderate Adverse (Temporary)	None	Moderate Adverse (Temporary)	Significant
Driver Delay	Weekday AM Peak Hour – Reduced delay on M4 EB and WB Off-Slips	Minor Beneficial (Temporary)	None	Minor Beneficial (Temporary)	Not Significant
	Weekday AM Peak Hour – Increased delay on BB489 (North and South), Pant Lasau Road and A48 (Southwest)	Minor Adverse (Temporary)	None	Minor Adverse (Temporary)	Not Significant

Receptor	Description of Effect	Classification of Effect	Additional Mitigation	Classification of Residual Effect	Significance
	Weekday PM Peak Hour – Increased delay on Pant Lasau Road and A48 (Southeast)	Minor Adverse (Temporary)	None	Minor Adverse (Temporary)	Not Significant
Accidents and Safety	To be confirmed in Final ES	To be confirmed in Final ES			
Gas Connection					
Severance, Pedestrian Delay, Pedestrian, Amenity, Fear and Intimidation	Weekday AM Peak Hour	To be confirmed in Final ES			
	Weekday PM Peak Hour	To be confirmed in Final ES			
	Weekday 24-Hour – Increased HGV traffic on Link 1	Minor Adverse (Temporary)	None	Minor Adverse (Temporary)	Not Significant
	PROW (Footpaths L34, L35B and LC117)	Moderate Adverse (Temporary)	None	Moderate Adverse (Temporary)	Significant
Driver Delay	Weekday AM Peak Hour	To be confirmed in Final ES			
	Weekday PM Peak Hour	To be confirmed in Final ES			
Accidents and Safety	TBC				

Receptor	Description of Effect	Classification of Effect	Additional Mitigation	Classification of Residual Effect	Significance
Electrical Connection					
Severance, Pedestrian Delay, Pedestrian, Amenity, Fear and Intimidation	Weekday AM Peak Hour	To be confirmed in Final ES			
	Weekday PM Peak Hour				
	PROW (Footpaths L34, L35B and LC117)	Moderate Adverse (Temporary)	None	Moderate Adverse (Temporary)	Significant
Driver Delay	Weekday AM Peak Hour	To be confirmed in Final ES			
	Weekday PM Peak Hour				
Accidents and Safety	To be confirmed in Final ES				

12.10 Cumulative Effects

a) Assessment of Potential Cumulative Effects – Construction and Demolition

i. Description of baseline where cumulative impacts expected

12.10.1 The following sensitive receptors have been identified which could, potentially, experience cumulative effects generated by the construction phase of the Project in combination with other schemes set out in **Chapter 4: Approach to Environmental Impact Assessment**.

- Severance;
- Pedestrian Delay;
- Pedestrian Amenity;
- Fear and Intimidation; and
- Driver Delay.

ii. Description of Impact

12.10.2 The following potential cumulative impacts on transport receptors have been identified as potentially arising as a result of construction of the Project in combination with other schemes set out in **Chapter 4: Approach to Environmental Impact Assessment**.

- Deterioration in the pedestrian experience resulting from increased vehicle movements associated with the construction of the Project, in combination with the increased vehicle movements associated with the construction/operation of cumulative development; and
- Increased driver delay at junctions resulting from increased vehicle movements associated with the construction of the Project, in combination with the increased vehicle movements associated with the construction/operation of cumulative development.

iii. Assessment of Cumulative Effect

12.10.3 The robust assessment which has been carried out and presented in Section 12.6 has been repeated to take into account the effect of cumulative development on locations where the Project will have a significant residual effect.

12.10.4 A list of the cumulative development considered as part of the PEIR is included at **Chapter 4: Approach to Environmental Impact Assessment**. From this list the developments shown in Table 12-18 have been considered suitable for inclusion in the TA.

Table 12-18: Cumulative Development included in TA

Application Reference	Site Name
2013/0795	Tyle Coch Mawr Wind Farm
2013/1835	Felindre Business Park
2015/1529 (Appeal Reference: 4369653)	Llettyr Morfil Farm

Application Reference	Site Name
2015/0308	Plot 8 Felindre Business Park
2015/1716	Land at Abergelli Farm
2016/1478	Land North of Garden Village, Swansea
2017/1822	Land West of Llangyfelach Road, Tirdeunaw

12.10.5 Other cumulative development listed in **Chapter 4: Approach to Environmental Impact Assessment** has been omitted for one or more of the following reasons:

- Construction phase will not coincide with construction of the Project (i.e. will be completed prior to commencement of the Project);
- Operational phase will involve maintenance only (such as for solar and wind farm uses), the traffic generation of which is negligible;
- An existing use or will result in a net reduction in traffic generation;
- Not yet been subject to a planning application, so no details of traffic generation are available. Where these sites are part of the LDP, it has been assumed that these have been accounted for in background traffic growth; and
- No details of traffic generation included in the planning application documentation.

12.10.6 The traffic generation and distribution of traffic associated with the included cumulative development has been derived from supporting documentation contained within the respective planning applications. The cumulative development traffic flows during the weekday AM and PM peak hours are shown on Figures 12.14 and 12.15 respectively. These have been added to the traffic flows for the '2022 Baseline + Project Construction Traffic' scenario to derive the traffic flows for the '2022 Baseline + Project Construction Traffic + Cumulative Development' scenario, as shown on Figures 12.16 and 12.17.

Severance, Pedestrian Delay, Pedestrian Amenity, Fear and Intimidation

12.10.7 In terms of total traffic flows, it has been identified that the residual effect of the Project on Links 1, 4, 6, 7, 8 and 9 will be minor adverse during the AM peak hour. During the PM peak hour, the residual effect of the Project on Links 1, 2, 4, 6, 8 is minor adverse. The effect of cumulative development on these links during the AM and PM peak hours is shown in Tables 12-19 and 12-20.

Table 12-19: 2022 Two-Way Total Traffic Flows – Weekday AM Peak Hour (07:45-08:45)

Link No.	2022 Baseline + Project Construction Traffic	2022 Baseline + Project Construction Traffic + Cumulative Development	Difference	% Change	Magnitude of Change	Sensitivity	Significance of Effect
1	140	243	+103	+73%	Medium	Low	Minor Adverse
4	1,223	1,463	+240	+20%	Very Low	Medium	Minor Adverse
6	2,334	2,442	+108	+5%	Very Low	High	Minor Adverse
7	1,365	1,422	+58	+4%	Very Low	Medium	Minor Adverse
8	1,239	1,290	+51	+4%	Very Low	Medium	Minor Adverse
9	1,112	1,340	+228	+21%	Very Low	Medium	Minor Adverse

Table 12-20: 2022 Two-Way Total Traffic Flows – Weekday PM Peak Hour (16:30-17:30)

Link No.	2022 Baseline + Project Construction Traffic	2022 Baseline + Project Construction Traffic + Cumulative Development	Difference	% Change	Magnitude of Change	Sensitivity	Significance of Effect
1	90	193	+103	+115%	High	Very Low	Minor Adverse
2	242	401	+159	+66%	Medium	Low	Minor Adverse
4	1,239	1,420	+182	+15%	Very Low	Medium	Minor Adverse
6	2,023	2,127	+103	+5%	Very Low	High	Minor Adverse
8	1,221	1,279	+57	+5%	Very Low	Medium	Minor Adverse
9	1,124	1,432	+308	+27%	Very Low	Medium	Minor Adverse

12.10.8 Tables 12-19 and 12-20 show that, in terms of total traffic flows, there will be no change in the significance of effect with the cumulative development.

12.10.9 The cumulative development will result in no change in the effect on the PROW discussed at Section 12.6.

12.10.10 In terms of HGV traffic flows, it has been identified that the residual effect of the Project on Links 1 and 2 will be moderate adverse. The effect of cumulative development on these links is shown in Table 12-21.

12.10.11 Table 12-21 shows that, in terms of HGV traffic flows, Links 1 and 6 will experience no change in the significance of effect with the cumulative development.

Driver Delay

12.10.12 Tables 12-22 and 12-23 show the driver delay at the junction network during the weekday AM and PM peak hours respectively in 2022 both without and with the Project. The capacity assessment output reports are reproduced at Appendix 12.2.

Table 12-21: 2022 Two-Way HGV Traffic Flows – Weekday 24-Hour

Link No.	2022 Baseline + Project Construction Traffic	2022 Baseline + Project Construction Traffic + Cumulative Development	Difference	% Change	Magnitude of Change	Sensitivity	Significance of Effect
1	13	331	+318	+2,445 %	High	Very Low	Minor Adverse
2	154	472	+318	+207%	High	Low	Moderate Adverse

Table 12-22: Capacity Assessment Results – Weekday AM Peak Hour (07:45-08:45)

Entry Arm	Delay (Seconds/Vehicle)			% Change	Magnitude of Change	Sensitivity	Significance of Effect
	2022 Baseline + Project Construction Traffic	2022 Baseline + Project Construction Traffic + Cumulative Development	Difference				
A	36	61	+25	+69%	Medium	Medium	Moderate Adverse
B	1,039	1,106	+67	+6%	Very Low	High	Minor Adverse
C	55	66	+11	+20%	Very Low	Medium	Minor Adverse
D	20	24	+4	+20%	Very Low	Low	Negligible
E	298	704	+406	+136%	High	High	Major Adverse
F	875	1,014	+139	+16%	Very Low	High	Minor Adverse
G	1,027	1,099	+72	+7%	Very Low	High	Minor Adverse

Note: A = B4489 (North). B = M4 WB Off-Slip. C = Pant Lasau Road. D = A48 (Southeast). E = B4489 (South). F = A48 (Southwest). G = M4 EB Off-Slip.

Table 12-23: Capacity Assessment Results – Weekday PM Peak Hour (16:30-17:30)

Entry Arm	Delay (Seconds/Vehicle)			% Change	Magnitude of Change	Sensitivity	Significance of Effect
	2022 Baseline + Project Construction Traffic	2022 Baseline + Project Construction Traffic + Cumulative Development	Difference				
A	6	8	+2	+33%	Low	Very Low	Negligible
B	7	10	+3	+43%	Low	Very Low	Negligible
C	230	305	+75	+33%	Low	High	Moderate Adverse
D	549	581	+32	+6%	Very Low	High	Minor Adverse
E	9	14	+5	+56%	Low	Very Low	Negligible
F	6	7	+1	+17%	Very Low	Very Low	Negligible
G	7	8	+1	+14%	Very Low	Very Low	Negligible

Note: A = B4489 (North). B = M4 WB Off-Slip. C = Pant Lasau Road. D = A48 (Southeast). E = B4489 (South). F = A48 (Southwest). G = M4 EB Off-Slip.

12.10.13 Table 12-22 shows that, during the AM peak hour, the additional traffic associated with cumulative development will result in changes in the significance of the effect on a number of entry arms when compared with the residual effect of the Project. On the B4489 (North), the effect will change from minor adverse to moderate adverse. On the M4 eastbound and westbound off-slips, the effect will change from minor beneficial to minor adverse. On the B4489 (South), the effect will change from minor adverse to major adverse.

12.10.14 Table 12-23 shows that, during the PM peak hour, the additional traffic associated with cumulative development will result in a change in the significance of the effect on Pant Lasau Road from minor adverse to moderate adverse.

iv. Summary

12.10.15 The cumulative assessment has identified that there will be no change in the significance of effects relating to the pedestrian experience (severance, pedestrian amenity, pedestrian delay, fear and intimidation). The residual cumulative effect will be minor to moderate adverse. Therefore, no mitigation is considered to be required.

12.10.16 In respect of driver delay, it has been identified that there will be a change in the significance of effect, primarily during the AM peak hour. There will be a minor adverse effect on the A48 (Southwest), and the M4 eastbound and westbound off-slips. There will be a moderate adverse on the B4489 (North) and a major adverse effect on the B4489 (South). During the PM peak hour, there will be a minor adverse effect on the A48 (Southwest) and a moderate adverse effect on Pant Lasau Road. Whilst these effects are significant, the contribution of the Project will be temporary in nature and does not require the delivery of mitigation measures such as capacity improvements. As identified in Section 12.4, observations in 2017 suggest that the junctions assessed are currently operating with a greater level of capacity than what has been reported based on the 2014 traffic survey data. The junctions are therefore unlikely to show the levels of delay reported in future year assessment scenarios. It should also be borne in mind that the assessments carried out in this report are robust and compound a number of peak scenarios that would not normally coincide to create a theoretical worst case scenario.

b) Assessment of Potential Cumulative Effects – Operation

12.10.17 As discussed at Section 12.6, the residual transport effects of the Project during the operational phase will be negligible. Therefore, no further assessment of the cumulative effects is required.

c) Assessment of Potential Cumulative Effects – Decommissioning

12.10.18 The residual transport effects will be as for the construction phase.

12.11 References

- Ref 12.1 Department of Energy and Climate Change. Overarching National Policy Statement for Energy (EN-1). London: The Stationery Office, 2011.
- Ref 12.2 Welsh Government. Planning Policy Wales: Edition 9. Cardiff: Welsh Government, 2016.
- Ref 12.3 Welsh Government. Technical Advice Note 18: Transport. Cardiff: Welsh Government, 2007.
- Ref 12.4 Welsh Government. Wales Transport Strategy. Cardiff: Welsh Government, 2008.
- Ref 12.5 Welsh Government. Active Travel (Wales) Act. Cardiff: Welsh Government, 2013.
- Ref 12.6 Institute of Environmental Assessment. Guidelines for the Environmental Assessment of Road Traffic. Lincoln: Institute of Environmental Assessment, 1993.
- Ref 12.7 South West Wales Integrated Transport Consortium. Joint Transport Plan for South West Wales 2015-2020. Swansea: South West Wales Integrated Transport Consortium, 2015.
- Ref 12.8 City and County of Swansea. Unitary Development Plan. Swansea: City and County of Swansea, 2008.
- Ref 12.9 City and County of Swansea. Local Development Plan 2010-2025: Deposit Plan. Swansea: City and County of Swansea, 2016.