
Town and Country Planning Act 1990
Planning and Compulsory Purchase Act 2004

Section 78 Appeal by Low Carbon Farming 2 Ltd

Land west of Sesswick Way, Marchwiel, Wrexham, LL13 0TF

Appeal Statement

LPA Reference: P/2020/0363

March 2021

Town and Country Planning Act 1990 – Section 78

**The Town and Country Planning (Referred Applications and Appeals
Procedure) (Wales) Regulations 2017**

Land west of Sesswick Way, Marchwiel, Wrexham, LL13 0TF

**Appeal against the refusal by Wrexham County Borough Council of an
application for:**

**“Glasshouse with packing facility and office space, energy centre and
associated infrastructure, carbon dioxide recovery plant, reservoirs, car
parking and landscaping”**

Planning Appeal Statement by Barton Willmore LLP

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APPENDICIES

- A. Draft Statement of Common Ground, Barton Willmore, March 2021
- B. LDP Background Paper 5: Wrexham Industrial Estate Expansion Selection, Wrexham County Borough Council, February 2016
- C. Sustainability Statement: Delivering on UK and Welsh Government Strategy, Low Carbon Farming 2 Ltd, March 2021
- D. Transport Technical Note – TN01, Cotswold Transport Planning, March 2021
- E. Statement from Greenlight Environmental Consultancy, March 2021
- F. Letter from North Wales Councils Regional Emergency Planning Service, January 2021
- G. Flood Consequences Assessment v1.2, The Civil Engineering Practice, March 2021

1.0 INTRODUCTION

- 1.1 This Statement is in support of an Appeal against the refusal of Full Planning Permission by Wrexham County Borough Council (WCBC), for the following development in relation to land west of Sesswick Way, Marchwiell, Wrexham, LL13 0TF (the "Appeal Site"):

"Glasshouse with packing facility and office space, energy centre and associated infrastructure, carbon dioxide recovery plant, reservoirs, car parking and landscaping"

- 1.2 The Appellant contacted WCBC in January 2021 with a view to progressing a Statement of Common Ground (SoCG) in respect of this Appeal. The Welsh Government's guidance on SoCGs states that:

"...they can be extremely useful tools and their submission is encouraged where a SoCG contributes to an improvement in the quality of the evidence and a reduction in the quantity of material which needs to be considered.

SoCG can also be useful in focussing the issues which separate the parties and assisting the appointed Planning Inspector in reaching fully informed decisions expeditiously and without waste of public and industry resources...

"The responsibility for producing a SoCG lies with the appellant / applicant however, all parties are encouraged to co-operate. Appellants should ensure a SoCG is submitted at the point of notice of appeal, or prior to the start date in the case of call-in. However, SoCG may be submitted at a later time where helpful to the examining Planning Inspector, or when requested by them."

- 1.3 WCBC advised that, contrary to the above Welsh Government guidance, they would not be willing to engage with the Appellant on a SoCG until after the Appeal was formally submitted and validated. However, it remains the Appellant's intention that a SoCG with WCBC will be prepared and agreed in due course.

1.4 It is proposed that the Statement of Common Ground (SoCG) include an account of:

- Description of the site;
- Description of the area;
- Planning history of site;
- Planning policy context;
- Reasons for refusal;
- Matters of agreement – including acceptable aspects of the scheme, withdrawn reasons for refusal (where applicable) and the ‘approved plans’ and documents should permission be granted.

1.5 The draft structure of the SoCG prepared by the Appellant (and not yet reviewed by WCBC) is enclosed at **Appendix A**. For brevity, the matters incorporated within the SoCG are not repeated within this Statement. Accordingly, this Statement shall focus primarily on the Appellant’s considerations insofar as the reasons for refusal.

Scope of Statement

1.6 This Statement and attached appendices provide evidence in relation to planning matters, including aspects of planning policy, which are relevant to the determination of the Appeal. It specifically covers the following planning matters:

- A response to the reasons for refusal as set out within the decision notice; and
- Summary providing the planning balance in relation to the Appeal.

1.7 This Appeal Statement is supported by a number of appendices including submissions prepared by technical experts on behalf of the Appellant in respect of the reasons for refusal.

Procedural Matters

- 1.8 The Council issued a Screening Opinion on 23rd June 2020 in respect of the planning application confirming that the proposed development would not need to be subject to an Environmental Impact Assessment.
- 1.9 Since the refusal of planning permission Future Wales 2040: The National Plan (February 2021) and Planning Policy Wales (Edition 11, February 2021) have been issued. These are referenced in this report and in the enclosed draft SoCG.
- 1.10 The following minor amendments have been made to the proposals since the refusal of planning permission:
- The site area has reduced by circa 0.2 hectares to exclude a small area of dense scrub at the site's eastern edge. Whilst previously within the site boundary, no development was previously proposed in this area. The plans which illustrate the proposals have been updated to reflect the amended site boundary;
 - The Proposed Site Layout shows where an emergency access can be located which can be utilised for egress from the adjacent WWTW – providing them with an emergency flood free access in the event of their primary access point being flooded. No built development is proposed as part of this additional proposal, rather that it is shown illustratively to indicate where such emergency access can be obtained from the neighbouring property (to their betterment);
 - Updates to the ecological mitigation and management are proposed, as set out in Section 5 and Section 6 of this Statement.
- 1.11 On the basis that the red line area is being reduced (rather than increased) and given that no development was proposed in that area, and given that the emergency access does not propose any built form or additional hardstanding, it is considered that there is no substantial difference between what was originally applied for and the amended scheme, interested parties would not be prejudiced and the amendment would meet the 'Wheatcroft' principles (Bernard Wheatcroft Ltd v SSE [JPL 1982 P37]). Moreover, the proposed changes to the ecological mitigation would be considered acceptable if sought by a means of condition.

- 1.12 It is accordingly respectfully considered that the amended plans can be accepted on appeal and form part of an approval should the appeal be allowed through a grant of conditional permission.

2.0 REASON FOR REFUSAL 1: PRINCIPLE OF DEVELOPMENT

- 2.1 The first reason for refusal explains that the proposed development lies outside the defined settlement limits and would comprise of major development within the open countryside and that the Council consider that to allow the development would be contrary to Policies PS1, PS2 and PS4 of the adopted Wrexham Unitary Development Plan.

Development Plan

- 2.2 It is accepted by the Appellant that the site lies outside of (albeit adjacent to) the settlement boundary and is therefore in the 'open countryside' in planning policy terms. However, the reason for refusal and Officer's Report in respect of the principle of development makes no reference to UDP Policy EC3 which permits the construction of new agricultural buildings outside of settlement boundaries.
- 2.3 The Council accepts that the proposals fall within the definition of agriculture as defined by Section 336 of the Town and Country Planning Act 1990, which includes: '*horticulture [and] fruit growing*'. Policy EC3 states: "*Isolated buildings will only be permitted in exceptional circumstances where there is an essential agricultural need, and no reasonable alternative location for the development*". In this respect, an understanding of the proposal is required to appreciate the rationale behind the site's location and reference should be made to Section 2 of the Site Selection Sequential Test Report (August 2020) submitted in support of the application. The development has an essential and symbiotic relationship with the adjacent WwTW with 95% of the heat required by the proposed glasshouse will come from the adjacent existing WwTW. The Site Selection and Sequential Test Report demonstrates that there is an overriding need for the development and no suitable alternative locations for it. Whilst the report was accepted as justification for the site's location within Best and Most Versatile (BMV) land, it is considered that it equally supports the rationale for the site's location in the context of the requirements of Policy EC3.
- 2.4 The amplification text to Policy EC3 at Paragraph 5.4 states:
- "The Council is aware of the need for continuing investment in modern farm buildings, slurry stores and equipment. Farm businesses need to change and grow in response to market forces and legislation if they are to survive. Problems can arise due to proposals which are unusually large or in sensitive*

locations. Where this is the case then planning conditions may be necessary to lessen the impact, although consideration will be given to functional requirements and cost implications."

2.5 This is considered of relevance in the context of the Appeal proposals – with the UDP recognising that there is a need for modern farm buildings and that farming practices need to 'change and grow'. As set out in the amplification text, planning conditions may lessen the impact of development, which in the context of the proposal and reason for refusal 2 on landscape, could comprise the implementation and maintenance of the proposed planting, as set out in the Planting Plan submitted in support of the application.

2.6 It is accordingly considered that the proposals comply with UDP Policy EC3 and the Development Plan in respect of the principle of development.

2.7 Notwithstanding the above, given that the UDP is long out of date and is time expired, the following paragraph of the Welsh Government's Building Better Places: Placemaking and the Covid-19 recovery document is considered of relevance:

"PPW and the NDF can be used directly in the decision-making process, particularly where an LDP is silent or out-of-date on an issue. The Welsh Government will support decisions taken in this context, particularly in the short-term until an LDP is adopted."

2.8 Future Wales 2040 was published in February 2021 (following the Council's refusal of the planning permission) and states that '*we must continue to value and protect our agricultural land and ensure it can feed and support us*' and that '*there will be support for the agricultural sector and its supply chains to boost resilience through diversification*'.

2.9 Policy 5 of Future Wales supports the rural economy with the amplification stating:

"local food and drink processing of agricultural and horticultural products is a growing industry. Planning authorities should support new development and opportunities to improve or develop rural supply chains and distribution networks."

Diversification is strongly supported to help maintain a sustainable and resilient agricultural and forestry sector, particularly in the face of challenges presented by the UK's exit from the European Union...

Rural areas are the base for many innovative technology based companies and there is potential to expand this aspect of the economy. The sector includes research and development, defence and security, animal health and veterinary science, bio-technology and agri-tech, and energy."

2.10 There is clear support in Future Wales for agricultural diversification and innovative agri-tech proposals such as that proposed through this appeal.

2.11 In respect of glasshouse construction, Paragraph 6.8 of TAN 6 goes on to state:

*"Commercial glasshouses normally exceed the area for which permitted development rights are available. Glasshouses can have a significant environmental impact and, wherever practicable, new ones should be sited adjacent or close to existing ones. **It is important however that the horticultural industry is not held back by over-restrictive approaches to developments** which could be sited without detriment to the surrounding area"* (emphasis added)

2.12 In terms of emerging planning policy, examination on the Wrexham Local Development Plan 2 (LDP2) 2013 to 2028 is underway. The Officer's Report to the application states:

"...this area south of the Wrexham Industrial Estate was discounted for employment through the LDP processes, in preference to an extension to the north to provide a strategic expansion (KSS3) site of 28ha (LDP Policy SP9)."

2.13 It should be made clear that the site was not promoted via the emerging LDP for the agri-tech proposals currently being advanced. LDP Background Paper 5: Wrexham Industrial Estate Expansion Selection (appended in **Appendix B**) shows at Plan A that the site (referred to as 'Area B') was considered as one of two areas '*were considered to initially offer the best potential for a possible expansion area to Wrexham Industrial Estate*' (Para 4.1). This demonstrates that the Council considered that the site had some capacity for industrial development when compared with other land in the surrounding area. The report concludes that the '*Council considers at this stage that lower quality agricultural land in Area A offers the best potential for accommodating a new extension to Wrexham Industrial Estate*'. Since this report was prepared it has

been demonstrated that the proposals for the site have an acceptable impact on agricultural land in any event (as demonstrated by the lack of any objection or reason for refusal in this respect).

Material Considerations

Sustainability

- 2.14 When additional heating of glasshouses is required, this has traditionally been provided through the use of natural gas boilers. The proposed development incorporates a new approach to glasshouse heating, dramatically reducing carbon emissions. Heat pumps, which are an electric form of heating, will utilise low grade heat from clean, treated water which is being discharged from the nearby WWTW. The proposals therefore make best and efficient use of resources, thereby helping to decarbonise society and support the circular economy – all of which are Key Planning Principles set out within PPW (under the heading achieving the right development in the right place). The proposals provide a 'productive and enterprising linkage' between the proposed operations and the WWTW. They would moreover *'support the achievement of a more prosperous, low carbon, innovative and resource efficient Wales'* and *'maximise the use of a local energy source'* (supported in Paras 2.28 and Chapter 5 of PPW respectively).
- 2.15 The proposals use screens which cannot be utilised in traditional agricultural practices reducing the need for pesticides, water and have a lower carbon footprint compared with field farming for fresh produce. There is no water wastage as a result of water recirculation and the site would be more productive than field farming.
- 2.16 The proposal would make a major contribution towards the production of UK grown food and thus national food security (producing 4,350t of tomatoes annually which would likely otherwise be imported predominantly from Spain), whilst offsetting 10,875t of import carbon and sequestering 16,783t of carbon to enrich the growing environment.
- 2.17 Further information is available within the Sustainability Statement enclosed in **Appendix C.**

Economic Benefits

2.18 Section 5.6 of PPW supports the rural economy and states that new economic development sites "*should generally be located within or adjacent to defined settlement boundaries*" (Paragraph 5.6.4). The site accords with this description being located adjacent to the south-west of the settlement boundary which runs along Bedwell Road.

2.19 Paragraph 5.6.6 of PPW states that LPAs should support new and evolving farming practices:

*"Planning authorities **should adopt a constructive approach towards agricultural development proposals**, especially those which are designed to meet the needs of changing farming practices or are necessary to achieve compliance with new environmental, hygiene or welfare legislation."* (emphasis added)

2.20 Paragraph 5.6.10 goes on to support agricultural diversification schemes such as those proposed in this case stating that "*Planning authorities should adopt a positive approach to diversification projects in rural areas*".

2.21 TAN 6 also supports a strong rural economy and sustainable agricultural practices, such as those being advanced through this proposal with Paragraph 2.2.1 stating:

"Many rural communities can accommodate development, particularly to meet local needs. New development can help to generate wealth to support local services, ensuring that communities are sustainable in the long term...In particular, planning authorities should support developments that would help to achieve a better balance between housing and employment, encouraging people to live and work in the same locality".

2.22 Research by Grant Thornton on behalf of the Welsh Local Government Association estimates that the Flintshire and Wrexham economic area could lose £300m annually in trade¹. This excludes consequential effects upon supply chain companies as the impact of lost trade income "ripples" through them. Against this context, the proposal's economic benefits weigh heavily in favour

¹ <https://www.leaderlive.co.uk/news/19144798.flintshire-wrexham-brexit-trade-impact-see-wrexham-flintshire-economies-lose-300m-year/?ref=rss>

of the proposals. Reference should be made to the Economic Benefits Statement submitted in support of the application which sets out the following key points:

- The scheme will provide 150 direct jobs to Wrexham in an area with 16.6% youth unemployment;
- 150 'clean and green' jobs will deliver £4,079,000 per annum in salaries to the local economy, or £81,580,000 over the 20-year duration of the project;
- The Wrexham and wider North Wales economy has lost 1,906 jobs in the 8 weeks preceding the report (September 2020) with further redundancies and positions at risk since;
- The construction phase will inject circa £4,000,000 into the local economy; and
- Transition training for those losing their jobs in the local economy is in place.

2.23 In respect of job creation, Para 2.1.10 of TAN 23 states: *"Economic growth is worthwhile wherever it is located, and in the interests of economic growth the planning system should generally aim to provide land where there is demand for it."* The TAN confirms that agriculture comprises an economic land use and states that *"sustainable development is essential to building strong rural economies and vibrant communities"*.

2.24 The tangible benefits outlined above are set in the context of mass redundancies in the local economy, a period of anticipated recession and a political and societal demand for a 'clean and green' post COVID recovery, as set out in Welsh Government's Building Better Places, The Planning System Delivering Resilient and Brighter Futures: Placemaking and the Covid-19 Recovery (July 2020).

Summary

2.25 In summary, UDP Policy EC3 recognises that there is a need for modern farm buildings (such as that proposed) and that farming practices need to 'change and grow'. Support for innovative agri-tech proposals is provided through Future Wales and the proposals would contribute towards the circular economy having a productive and enterprising linkage with the adjacent WWTW (as supported by PPW and TAN6). Economic benefits weigh heavily in favour of the

proposals with 150 new direct jobs being created in the clean and green economy at a time of mass redundancies in the local economy. Accordingly, whilst it is accepted that the site lies outside of (albeit adjacent to) settlement limits, it is considered that the principle of development is sound when considered against the Development Plan and other material considerations including national planning policy guidance.

3.0 REASON FOR REFUSAL 2: LANDSCAPE

- 3.1 In responding to Reason for Refusal 2, reference should be made to the submitted Landscape and Visual Impact Assessment submitted with the planning application which confirms that the proposals accord with Policies GDP1 (a) and PS2 of the adopted UDP and there is no landscape-related reason why planning permission should not be granted.
- 3.2 Moreover, the following planning matters are considered of relevance in responding to this reason for refusal:
- 3.3 Whilst the site is located in the open countryside in planning policy terms, it is located in proximity of other utilitarian buildings. The site is not located within (or within proximity to) any landscape designations such as Areas of Outstanding National Beauty, Special Landscape Areas, Green Belt or Green Wedge. As confirmed by NRW in their response to the application, given the distances from the site, the proposal is unlikely to have an effect on the AONB.
- 3.4 UDP Policy EC3 permits the construction of new agricultural buildings where they are not "*materially detrimental in terms of its impact on the environment or surrounding landscape*". The enclosed LVIA demonstrates this to be the case.
- 3.5 Policy EC3 goes on to state that "the development should form part of an existing farm complex and take advantage of topography and other landscape features for screening". The proposals work within the topography of the site and important landscape elements such as the hedgerows will be preserved and tree cover will be enhanced as part of the proposals.
- 3.6 Policy EC3 states: "*Isolated buildings will only be permitted in exceptional circumstances where there is an essential agricultural need, and no reasonable alternative location for the development*". The site is located adjacent to Five Fords Farm and in a wider landscape context is adjacent to a WWTW to the west and Maelor Abattoir to the east (both of which by their nature have a utilitarian appearance and are of a similar scale), and is to the south-west of Wrexham Industrial Estate (which includes buildings of a greater scale). As previously stated, there is a symbiotic relationship between the WWTW and the proposed development which necessitates the proposed siting of the greenhouses.

- 3.7 Within the Council's EIA Screening Opinion Stage 2 Screening Assessment they recognised the site's location as being adjacent to existing industrial and utilitarian uses stating that:

"Whilst the majority of the site is laid to grass and in agricultural use, it is located east of the Waste Water Sewage Treatment Works and south of the Wrexham Industrial Estate. The site is not considered to be solely isolated insofar as development lies in close proximity of the site. Landscape mitigation would need to be provided as part of the proposal.

However on the basis of the surrounding development, the site location and topography of the land, I do not consider that there are areas of high landscape or scenic value in such close proximity to the site, which would be affected by the proposal, sufficient to warrant an EIA on this basis."

- 3.8 Should the development be approved, the landscaping shown on the *Soft works – tree and hedgerow planting plan, 1202-01 Rev D* illustrates how an acceptable level of landscape mitigation can be accommodated and it is respectfully suggested that a detailed landscape scheme could form a condition on any permission (if forthcoming).

- 3.9 The Landscape and Visual Impact Assessment submitted in support of the application was undertaken by a suitably qualified expert and provides a robust and proportionate assessment of the proposals. The Assessment's findings are summarised below:

- The assessment of the effects of the proposals on the larger landscape character area would be a **moderate** effect in the long-term on the landscape character, due to the intact nature of the landscape however the site relates to the industrial areas in the vicinity.
- For the site itself, the landscape effects on a limited number of receptors would be **moderate** due to the change of land use of an arable field. Important landscape elements such the hedgerows will be preserved and tree cover will be enhanced.
- With regard to the visual effects of the proposed development upon local receptors, the greatest effect is no further than 1km from the site boundaries to the west with immediate views affect to the east, as set out below:
 - *Transport:*
 - Cefn Road: **slight**;

- Sesswick Way: **slight/moderate**, reducing to **slight** with mitigation planting;
- Bridge Road South: **slight/moderate**, reducing to **slight** with mitigation planting.
- *Properties:*
 - Glanrafon Cottages (1): **moderate**, reducing to **slight** with mitigation planting;
 - Nos 1 and 2 Cefn Road (2): **slight/moderate**, reducing to **slight** with mitigation planting;
 - Little Llywn Onn (3): **slight** reducing to effectively **no change** with mitigation planting;
 - Old Llywn Onn Farm (4), Hollyhedge (5), Maelor Abattoir (10): **slight**;
 - Five Fords Sewage Works (11): **moderate/slight**, reducing to **slight/moderate** with mitigation planting;
 - Marchwiel (A) and Wrexham (D): **moderate**, reducing to **slight/moderate** with mitigation planting.
- *Footpaths:*
 - Footpath 1 (PRoW that moves through the site in parts): **substantial/moderate** reducing to **moderate/slight** with mitigation planting.
- Cumulative effects were assessed with respect to other developments in the study area. It is judged that there are **medium** cumulative landscape effects and **medium** cumulative visual effects with respect to the proposals;
- The site is within a landscape that exerts a positive character and that is in good landscape condition. However, the landscape is a working rural landscape with large areas of industrial buildings and the sewage works that the proposals will sit comfortably in. The visual effect of changes on site are barely felt beyond 1km to the west. Mitigation in the form of hedgerow and tree planting reinforcement will mitigate some changes to visual amenity. The proposals will provide horticultural opportunities in a rural location without having an impact on the wider rural landscape.

3.10 Notwithstanding all of the above, it is considered that no robust counter evidence has been provided by the Council to substantiate this reason for refusal.

Summary

3.11 For the reasons outlined above, it has been adequately demonstrated that there is a requirement for the site's location and that the proposals will have an

acceptable impact on its receiving landscape (not least with the mitigation planting proposed) and that the proposals comply with Policies GDP1 (a), PS2 and EC3 of the adopted UDP.

4.0 REASON FOR REFUSAL 3: TRAFFIC

4.1 In refusing the application, the Council considered that there was insufficient information to demonstrate that capacity exists within the local highway network to accommodate the proposed development. Accordingly, the Council found that the proposals are acceptable in highway terms with the exception of highway capacity.

4.2 The application was supported by a Transport Statement (by Cotswold Transport Planning) which concluded that the site can be suitably accessed and can be accommodated without detriment to the operational safety or capacity of the local highway network. The modelling demonstrates that the proposals create the equivalent traffic movements of 68 homes, well beneath the threshold for which a Transport Assessment would be required under the guidance in TAN 18.

4.3 The Council's reason for refusal makes reference to the Covid-19 lockdowns in place stating:

"Given the current circumstances new meaningful traffic count data cannot be obtained at this time and without this data and the assessment it is not possible to establish precisely what impact the development will have on the highway network. "

4.4 Post-determination of the application the Appellant's highways consultant has been engaging with the WCBC Highway Authority to confirm an acceptable scope of further assessment to resolve the matter in dispute (as set out in the reason for refusal).

4.5 Further assessment work has been carried out by Cotswold Transport Planning to address the reason for refusal and is documented in a Technical Note enclosed in **Appendix D**, which includes the following sections:

- Site Access Arrangements – proposed minor amendments to address comments made by the Public Rights of Way (PROW) Officer;
- Forecast Trip Generation and Distribution – sets out the agreed trip generation rates and the trip distribution and assignment methodology adopted for this further traffic impact assessment; and

- Traffic Impact Assessment – sets out the study area, forecast assessment scenarios, forecast traffic flows and summarises the results of the traffic impact assessment on the local highway network.

4.6 The Technical Note demonstrates that the proposed development would not have a detrimental impact upon the capacity of the local highway network and there are no reasonable transport or highways related reasons why the development should not be allowed.

Summary

4.7 For the reasons outlined above and with the application submission, it has been adequately demonstrated that the site can be accessed via active travel and public transport, and the proposed development can be accommodated within the capacity afforded by the existing local highway network and therefore accords with Policy GDP1 (a) of the Wrexham UDP and TAN 18.

5.0 REASON FOR REFUSAL 4: GREAT CRESTED NEWTS

- 5.1 In terms of reason for refusal 4, the decision notice explains the Council's view that the proposals would be detrimental to the maintenance of the favourable conservation status of the Great Crested Newt population at this site and that whilst the proposals show an increase in mitigation land there is no information on the mechanism which will be used to ensure its long-term management.
- 5.2 In terms of the requirement for the Appellant to demonstrate that there is 'no satisfactory alternative' to the development of the site, as previously stated, the development has an essential and symbiotic relationship with the adjacent WwTW with 95% of the heat required by the glasshouse coming from the WwTW. The Site Selection and Sequential Test Report demonstrates that there is an overriding need for the development and no suitable alternative locations for it, along with setting out the functional reasons why the building needs to be close to the adjacent WwTW. Whilst the report was accepted as justification for the site's location within Best and Most Versatile (BMV) land, it is considered that it equally supports the rationale for the site's location in the context of the 'no satisfactory alternative' test.
- 5.3 The enclosed Technical Note from Greenlight Environmental Consultancy (**Appendix E**) sets out the monitoring, management and habitat securement proposed as part of the appeal proposals (and makes reference to updated Great Crested Newt documents submitted as part of this appeal). In terms of long-term management (which comprised the core issue in the Council's reason for refusal), a Section 106 Agreement has been prepared and will be submitted as part of the appeal proposals to secure long-term management and monitoring of the proposed GCN mitigation areas for a period of circa 25 years. The terms of the legal agreement have been agreed in-principle with NRW.
- 5.4 In summary, it has been demonstrated that the proposals would not be detrimental to the maintenance of the favourable conservation status of the Great Crested Newt population at the site and that an adequate mechanism is in place to secure the long-term management of the proposed mitigation land. The proposals accordingly comply with UDP Policy EC6 and TAN 5.

6.0 REASON FOR REFUSAL 5: BREEDING BIRDS & LIGHTING

6.1 In terms of reason for refusal 5, the decision notice explains the Council's view that the application did not demonstrate that the proposed development mitigates against impacts on breeding birds with the required surveys being undertaken too late in the season. In addition, it is stated that no information on lighting is provided which would be required to demonstrate that there would not be a detrimental impact on European Protected Species.

6.2 The enclosed Technical Note from Greenlight Environmental Consultancy (**Appendix E**) sets out that:

"Although the EcIA (Greenlight Environmental Consultancy Ltd., 2021a) acknowledged that the breeding bird surveys were conducted late in the survey season, the mitigation proposed was considered to be prudent based on the survey results, and to provide adequate compensation and enhancement of habitats, with additional surveys unlikely to materially modify the mitigation proposed. Further breeding bird surveys have subsequently been commissioned between March and June 2021, comprised of one survey per month and one evening survey specifically aimed at barn owls and other crepuscular birds. This data will be provided to Wrexham Borough Council and the Planning Inspectorate once the surveys have been completed and the data analysed (expected late June 2021). Greenlight Environmental Consultancy Ltd. (2021a) consider that the impacts highlighted in the EcIA are unlikely to significantly change, with the mitigation proposed for great crested newts providing adequate compensation and enhancement of habitats for breeding birds."

6.3 The reason for refusal states that "no information on lighting is provided" and this is not the case. Indeed, the Officer's Report recognises that information on lighting was provided but describes this as being 'weak and vague'. In respect of lighting, the Council's concern is its potential to effect European Protected Species. Such species are subject to a licensing regime administered by Natural Resources Wales (NRW). It is of relevance to note that NRW did not object to the application but recommended conditions such as a bat lighting plan. Whilst the Appellant agrees with NRW's recommendation that a bat lighting plan form a condition on any forthcoming permission, the Appellant has prepared a Lighting Impact Assessment (Pope Consulting, Revision P5, March 2021) up-front for further consideration through the appeal process. Should this not be agreed as acceptable by all parties, the Appellant would be accepting of a

condition requiring further/amended lighting details to be submitted and approved before commencement of development.

- 6.4 In summary, it has been demonstrated that the proposed development mitigates against impacts on breeding birds with the required survey effort being satisfactory albeit further surveys are being undertaken for robustness and will be reported on once completed in June 2021. Sufficient information on lighting has been provided, although should further/amended details be required, the Appellant would be accepting of NRW's previous recommendation that these be conditioned. The proposals accordingly comply with UDP Policy EC6 and TAN 5.

7.0 REASON FOR REFUSAL 6: FLOOD RISK

- 7.0 In terms of reason for refusal 6, the decision notice explains the Council's view that insufficient information to evaluate the extent of the flood risk at the Cefn Road entrance had been submitted and that the proposals should not be permitted.
- 7.1 The Flood Consequences Assessment (FCA) prepared The Civil Engineering Practice submitted in support of the application outlines that the operational area of the site lies outside the flood zone; this is supported by the proposed site plan, which shows all new development to be located outside the 0.1% AEP event flood outline. The development platform is therefore raised above the expected flood extent. On this basis, NRW did not object to the application, noting that there is a flood free secondary access off Sesswick Way and recommending that the North Wales Councils Regional Emergency Planning Service (NWC-REPS) is consulted in order to provide comments relating to access and egress matters owing to the primary access being affected by Flood Risk Zone C2.
- 7.2 The secondary access and egress off Sesswick Way complies with TAN 15 A1.12 *"escape/evacuation routes are shown by the developer to be operational under all conditions"*.
- 7.3 NRW's response to the planning application confirms that they had no objection to the planning application (on the basis that all new development will be located outside the 0.1% AEP event flood outline) and recommended that the North Wales Councils' Regional Emergency Planning Service (NWC-REPS) be consulted on access and egress. The Council did not consult with NWC-REPS as part of the application process. The appellant has subsequently consulted with them and their response is enclosed at **Appendix F**. The operator of the site once complete will register with the NRW's flood warning service which will allow site management to receive automatic alerts in the event flood warning/severe flood warnings are issued. In addition, a Flood Warning and Evacuation Plan (FWEP) will be prepared to set out the procedures that site management and site staff should follow in the event a flood warning is issued.

- 7.4 The proposal now incorporates an emergency access which can be utilised for egress from the adjacent WWTW – providing them with an emergency flood free access in the event of their primary access point being flooded.
- 7.5 Flood Consequences Assessment Addendum v1.2 is enclosed in **Appendix G** which has been updated to clarify the location of the proposed secondary / emergency access and to reflect the amendments to the proposed newt habitats.
- 7.6 Paragraph 7.5 of TAN 15 states:
- "The Environment Agency [now NRW] will advise the planning authority on the consequences of flooding for the type and nature of proposal and this should enable the planning authority to arrive at a judgement on the acceptability of the flooding consequences"*
- 7.7 NRW have confirmed that they have no objection insofar as flood risk. Following the determination of the application the Appellant has consulted directly with NWC-REPS (in light of the Council failing to do so) who have not raised any objection in respect of flood risk.
- 7.8 In summary, it has been demonstrated that the site can be safely accessed and egressed and that any flood risk can be managed in accordance with TAN 15.

8.0 SUMMARY

8.1 The Appeal Statement has considered all reasons for refusal recorded on the Decision Notice and a summary of the Appellant's case is provided below:

- UDP Policy EC3 recognises that there is a need for modern farm buildings (such as that proposed) and that farming practices need to 'change and grow'. Support for innovative agri-tech proposals is provided through Future Wales and the proposals would contribute towards the circular economy having a productive and enterprising linkage with the adjacent WWTW (as supported by PPW and TAN6). Economic benefits weigh heavily in favour of the proposals with 150 new direct jobs being created in the clean and green economy at a time of mass redundancies in the local economy. Accordingly, whilst it is accepted that the site lies outside of (albeit adjacent to) settlement limits, it is considered that the principle of development is sound when considered against the Development Plan and other material considerations including national planning policy guidance;
- It has been adequately demonstrated that there is a requirement for the site's location and that the proposals will have an acceptable impact on its receiving landscape (not least with the mitigation planting proposed) and that the proposals comply with Policies GDP1 (a), PS2 and EC3 of the adopted UDP;
- It has been adequately demonstrated that the site can be accessed via active travel and public transport, and the proposed development can be accommodated within the capacity afforded by the existing local highway network and therefore accords with policy GDP1 (a) of the Wrexham UDP and TAN 18;
- it has been demonstrated that the proposals would not be detrimental to the maintenance of the favourable conservation status of the Great Crested Newt population at the site and that an adequate mechanism is in place to secure the long-term management of the proposed mitigation land. The proposals accordingly comply with UDP Policy EC6 and TAN 5;
- it has been demonstrated that the proposed development mitigates against impact on breeding birds with the required survey effort being satisfactory and further surveys having been commissioned. Sufficient information on lighting has been provided, although should further/amended details be required, the Appellant would be accepting

of NRW's previous recommendation that these be conditioned. The proposals accordingly comply with UDP Policy EC6 and TAN 5; and

- It has been demonstrated that the site can be safely accessed and egressed and that any flood risk can be managed in accordance with TAN 15.

8.2 The proposal for an innovative agri-tech use in this countryside location has policy support in principle. The benefits arising from the contribution to efficient local food production, the utilisation of a source of waste heat from a nearby water treatment works, providing a reduction in the carbon footprint of agriculture and the potential for a considerable number of jobs weigh significantly in favour of the application. In addition to the long-term employment provisions, the proposal would make a modest contribution to the local economy by way of providing jobs during the construction phase. It has been demonstrated that the proposals can be technically delivered without any undue flood risk or biodiversity impacts and any landscape harm has been demonstrated as being of very limited and falling far short outweighing the benefits the proposals provide.

8.3 It is therefore respectfully requested that full planning permission is granted, subject to conditions and a planning obligation (which will be submitted in advance of the hearing).

APPENDIX A

Draft Statement of Common Ground with WCBC, Barton Willmore, March 2021

STATEMENT OF COMMON GROUND BETWEEN APPELLANT & LPA**APPEAL REFERENCE:** TBC**LPA REFERENCE:** P/2020/0363**SITE ADDRESS:** Land west of Sesswick Way, Marchwiel, Wrexham, LL13 0TF**DESCRIPTION OF DEVELOPMENT:** Glasshouse with packing facility and office space, energy centre and associated infrastructure, carbon dioxide recovery plant, reservoirs, car parking and landscaping**APPELLANT:** Low Carbon Farming 2 Ltd**LOCAL PLANNING AUTHORITY:** Wrexham County Borough Council**DRAFT:** 24/03/21**1. Description of the site (including agreed dimensions)**

The site location is shown on the submitted drawing 00165-20-100 Rev02.

The site (Easting 336887, Northing 348031) is located approximately 3 km to the southeast of Wrexham; close to the Five Fords wastewater treatment works and SecAnim Abattoir. The site is approximately 44 ha, which is currently in agricultural use. The site is generally flat at approximately 40 m AOD (above ordnance datum).

A further 9.5 ha forms land within the Applicant's control and is shown within the blue line boundary; please refer to drawing 00165-20-133 Rev02.

The two proposed glasshouses would occupy approximately 16 ha of a 44 ha site. The development site will be accessed from the north, via an existing entrance on Cefn Road, 200 m to the north of the site. The land within the Applicant's control to the south is proposed for ecological management.

According to the NRW Development Advice Map, the area proposed for the glasshouse facility lies primarily within Flood Zone A, whereas the site access to the north (off Cefn Road) lies within Flood Zone C2.

2. Description of the area

The immediate surroundings are as follows:

- To the north – agricultural fields and Cefn Road
- To the east – agricultural fields and SecAnim abattoir
- To the south – agricultural fields with the A525 lying beyond
- To the west – Five Fords wastewater treatment works (WwTW).

The closest unconnected residential dwellings are located approximately 200 m to the south along the A525. There are no designated sites, such as National Parks, Areas of Outstanding Natural Beauty (AONB), Sites of Special Scientific Interest (SSSIs), Special Areas of Conservation, National Parks, World Heritage Sites or Scheduled Monuments within or adjacent to the proposed development area. The closest designated site to the proposed development is the Sontley Marsh SSSI which is located approximately 2.6 km to the west.

There are a number of listed buildings located within the wider area, the closest being the Grade II Pum-Rhyd approximately 310 m to the east. Figure 1 enclosed shows the location of designated sites and listed buildings within 2 km of the project.

3. Planning history of site

- P/2015/0543 – Formation of a replacement vehicular access to Cefn Road, improvement of existing site access to five fords wastewater treatment works and construction of replacement bridge and removal of existing bridge deck. Approved 02/12/2015.
- P/2014/0700 – Use of land for installation of solar panels and associated equipment to enable energy generation (equivalent power for 1500 homes) together with landscaping and habitat creation works. Approved 19/12/2014.

4. Planning Policy Context

- a. *Development plan (including relevant policies) & any draft development plan (including stage reached and weight to be attached)*

Adopted

The Wrexham Unitary Development Plan 1996 – 2011 (UDP) was adopted in 2005 and comprises the development plan for the area. The UDP is long out of date and is time expired. It therefore carried less than full weight in the determination of the appeal.

Relevant UDP policies comprise:

- E5 Employment in the countryside;
- EC12 Development and flood risk;
- EC2 Agricultural Land;
- EC3 Agricultural Buildings;
- EC4 Hedgerows, Trees and Woodland;
- EC6 Biodiversity Conservation;
- EC9 Listed buildings of special architectural or historic interest;
- GDP1 Development objectives;
- PS1 Settlement limits;
- PS2 Development and the environment;
- PS4 Settlement Pattern; and
- T8 Parking.

Emerging

Examination on the Wrexham Local Development Plan 2 (LDP2) 2013 to 2028 is underway.

The Welsh Government's Development Management Manual¹ (DMM) is clear that in making development management decisions, the weight to be attached to an emerging LDP will in general depend on the stage it has reached. The weight does not simply increase as the plan progresses towards adoption. In considering what weight to give to the specific policies in an emerging LDP that apply to a particular proposal, it is necessary to carefully consider the underlying evidence and background to the policies.

National planning policy and the evidence used to support policies in an emerging LDP can be a material consideration in the decision-making process. Although, no certainty exists in respect of the LDP until it has been adopted, it is considered given its stage in preparation that the LDP carries limited-moderate weight.

The following paragraph of the Welsh Government's Building Better Places: Placemaking and the Covid-19 recovery document is considered of relevance:

"PPW and the NDF can be used directly in the decision-making process, particularly where an LDP is silent or out-of-date on an issue. The Welsh Government will support decisions taken in this context, particularly in the short-term until an LDP is adopted."

Future Wales: the national plan 2040 forms part of the Development Plan and was published in February 2021. The following policies are considered of relevance:

- Policy 1 – Where Wales will grow (which identifies Wrexham and Deeside as a national growth area);
- Policy 5 – Supporting the rural economy;
- Policy 8 – Flooding;
- Policy 9 – Resilient Ecological Networks and Green Infrastructure;
- Policy 12 – Regional Connectivity;
- Policy 16 – Heat Networks;
- Policy 17 – Renewable and Low Carbon Energy and Associated Infrastructure;
- Regional Strategic Diagram; and
- Policy 20 - National Growth Area - Wrexham and Deeside.

b. Relevance of any supplementary planning guidance

Relevant Local Planning Guidance notes include:

- LPG 07 – Landscaping and Development,
- LPG 16 – Parking Standards,
- LPG 17 – Trees and Development,
- LPG 32 – Biodiversity and Development.

c. National Policy and Guidance

- Planning Policy Wales (Edition 11, February 2021);
- Technical Advice Note (TAN) 5: nature conservation and planning (2010);
- TAN 6: planning for sustainable rural communities (2010) – including para 6.8.1;
- TAN 8: renewable energy (2005);
- TAN 15: development and flood risk (2004);
- TAN 18: transport (2007); and
- TAN 23: economic development.

5. Reasons for Refusal

The reasons for refusal, as set out on the Decision Notice (dated 25th September 2020) comprise:

1. *The proposed development lies outside the defined settlement limits and would comprise of major development within the open countryside. To allow the development would be contrary to Policies PS1, PS2 and PS4 of the adopted Wrexham Unitary Development Plan.*
2. *The proposed development, by virtue of its siting and scale within a visually prominent location would have a significant adverse impact upon the wider landscape. Development in this exposed location would be highly conspicuous and detrimental to the wider visual amenities of the area. It does not make a positive contribution to the appearance of the nearby locality and as such would be contrary to Policies GDP1 (a) and PS2 of the adopted Wrexham Unitary Development Plan.*
3. *The submitted plans and supporting information fail to demonstrate that there is sufficient capacity within the existing local highway network to accommodate the proposed development. No baseline traffic flows or capacity assessments of the key junctions have been provided. Given the current circumstances new meaningful traffic count data cannot be obtained at this time and without this data and the assessment it is not possible to establish precisely what impact the development will have on the highway network. To allow the development in the absence of this information would have a detrimental impact upon the capacity of the local highway network, contrary to Policy GDP1 (a) of the adopted Wrexham Unitary Development Plan and Welsh Government TAN 18.*
4. *The application fails to demonstrate that the proposed development would be detrimental to the maintenance of the favourable conservation status of the Great Crested Newt population at this site. Whilst the proposals show an increase in mitigation land there is no information on the mechanism which will be used to ensure its long term management. The future management of mitigation land is fundamental to whether the proposed development will be acceptable. To allow this development without this information would have a detrimental impact, contrary to Policy EC6 of the adopted Wrexham Unitary Development Plan and Welsh Government TAN 5 Nature Conservation and Planning.*
5. *The application fails to demonstrate that the proposed development mitigates against impact on breeding birds of priority in Wales. Breeding bird surveys were undertaken too late in the season to ensure that all species were accounted for. In addition, no information on lighting is provided which is fundamental to whether the proposed development will have a detrimental impact upon wildlife including European Protected Species such as bats and otter. To allow the development without this information would have a detrimental impact, contrary to Policy EC6 of the adopted Wrexham Unitary Development Plan and Welsh Government TAN 5 Nature Conservation and Planning.*
6. *The Flood Consequences Assessment does not provide any indication as to what the potential flood depths/velocities could be for the site access. The existing site access is located in Zone C2 and Cefn Road frequently floods in this location with recent incidences of road closures. In the absence of any detailed technical investigations to evaluate the extent of the flood risk at the Cefn Road entrance, the application should not be permitted. To allow the proposed development in the absence of this information would be contrary to Policy EC12 of the adopted Wrexham Unitary Development Plan and Welsh Government TAN 15 Development and Flood Risk.*

6. Matters of Agreement

a. Acceptable Aspects of Scheme

The following aspects of the scheme are agreed to be acceptable:

- TBC based on discussions with Council

b. Withdrawn Reasons for Refusal – TBC based on discussions with Council

c. Approved Plans and Documents

Should permission be granted, it is considered that the following would comprise the 'approved plans and documents':

- TBC based on discussions with the Council

d. Core Documents List

At this stage, the following documents are considered Core Documents for the purposes of the appeal:

SECTION 1: PLANNING APPLICATION DOCUMENTS (AS SUBMITTED ORIGINALLY – SUPERSEDED DOCUMENTS IN RED)

Ref.	Document Name	Document No.	Revision
<i>Plans and Drawings</i>			
A1.	Location Plan	00165-20-100	01
A2.	Site Plan	00165-20-101	04
A3.	General Energy Centre Layout	00165-20-104	01
A4.	Cycle Storage Location	00165-20-105	01
A5.	Existing Site Levels	00165-20-106	02
A6.	Finished Site Levels	00165-20-107	02
A7.	Cut and Fill Levels	00165-20-108	02
A8.	GCN Mitigation	00165-20-109	04
A9.	Existing and Finished Site Levels	00165-20-111	01
A10.	Existing Topo with Cut and Fill	00165-20-112	01
A11.	Site Sections	114	01
A12.	Blue Line Plan	00165-20-133	01
A13.	Glass and Packhouse Elevations	00165-20-300	01
A14.	Energy Centre and Palisade Elevations	00165-20-301	01
A15.	DNO and Customer Substation Elevations	00165-20-302	01
A16.	Transformer and Air Cooler Elevations	00165-20-303	01
A17.	Water Tank Elevations	00165-20-304	01
A18.	CO2 Tank Elevations	00165-20-305	01
A19.	Heat Exchanger Building Elevations	00165-20-306	01
A20.	Extraction Pit Elevations	00165-20-307	01
A21.	Trench Section Detail	00165-20-308	01
A22.	CO2 Recovery Plant Plan View	00165-20-309	01
A23.	CO2 Recovery Plant Elevations	00165-20-310	01
A24.	Full Glasshouse Elevations (NandS)	00165-20-311	01
A25.	Full Glasshouse Elevations (EandW)	00165-20-312	01

Transport

B1.	Transport Statement	July 2020
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Landscape

C1.	Soft works – tree and hedgerow planting	1201-01	D
C2.	Landscape and Visual Impact Assessment		03
C3.	LVIA A3 Figures Volume		

Ecology

D1.	Ecological Impact Assessment		1.5
D2.	Ecological Impact Assessment Appendices Q to V		1.5

Flood Risk

E1.	Flood Consequences Assessment		1.2
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Planning & Design

F1.	Application Form		
F2.	Planning, Design and Access Statement		
F3.	Pre-application Consultation Report		

Heritage

G1.	Heritage Statement		July 2020
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Noise

H1.	Noise Impact Assessment	5826/NIA1	July 2020
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Air Quality

I1.	Air Quality Assessment	20-7816	V2
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SECTION 2: PLANNING APPLICATION DOCUMENTS (ADDITIONAL DOCUMENT AND DRAWINGS – SUPERSEDED DOCUMENTS IN RED)

Ref.	Document Name	Document No.	Revision
B2.	Transport Technical Note		September 2020
D3.	GCN Mitigation Strategy		September 2020
D4.	GCN Method Statement		September 2020
D5.	Ecological Mitigation Site Layout	SC/FFG/006A	18/09/2020
D6.	Otter Avoidance, Mitigation & Compensation Strategy		September 2020
D7.	Expression of Interest from ARC Trust		August 2020
E2.	Flood Consequences Assessment Addendum		August 2020
F4.	Economic Benefits Statement		September 2020
F5.	Annex A to Economic Benefits Statement		September 2020
F6.	Site Selection Sequential Test Report		August 2020
F7.	Agricultural Land Classification	NT15029-003	A
I2.	Air Quality Note		
J1.	Arboricultural Impact Assessment	AIA/FCR/08/20	August 2020

SECTION 3: PLANNING APPLICATION DOCUMENTS (CONSULTATION RESPONSES, OFFICER'S REPORT & DECISION NOTICE)

Ref.	Document Name	Date
K1.	CPAT Archaeologist	6 th August 2020
K2.	WCBC Contaminated Land	14 th August 2020
K3.	WCBC Drainage	4 th September 2020
K4.	WCBC Highways	20 th August 2020
K5.	WCBC Highways	18 th September 2020
K6.	HSE	3 rd August 2020
K7.	NFU Mutual	17 th August 2020
K8.	NRW	27 th August 2020
K9.	NRW	18 th September 2020
K10.	WCBC Parks, Countryside & PROW	18 th August 2020
K11.	WCBC PROW Officer	5 th August 2020
K12.	WCBC Public Protection	21 st August 2020
K13.	Wrexham Ramblers	3 rd August 2020
K14.	NRW	21 st September 2020
K15.	Welsh Government	12 th August 2020
K16.	Welsh Government	12 th August 2020
K17.	Welsh Government	27 th August 2020
K18.	Dwr Cymru Welsh Water	24 th August 2020
K19.	Wrexham Glyndwr University	5 th August 2020
K20.	Wrexham Glyndwr University	18 th September 2020
K21.	Officer's Delegated Report	25 th September 2020
K22.	Decision Notice	25 th September 2020

SECTION 4: PLANNING APPEAL DOCUMENTS (ADDITIONAL DOCUMENTS AND DRAWINGS)

Ref.	Document Name	Document No.	Revision
L1.	Appeal Statement & Appendices	32275/A3/JA	1
L2.	Appeal Form	32275/A3/JA	
A26.	Location Plan	00165-20-100	02
A27.	Site Plan	00165-20-101	07
A28.	Existing Site Levels	00165-20-106	03
A29.	Finished Site Levels	00165-20-107	03
A30.	Cut and Fill Levels	00165-20-108	03
A31.	Existing and Finished Site Levels	00165-20-111	02
A32.	Existing Topo with Cut and Fill	00165-20-112	02
A33.	Site Sections	114	B
A34.	Blue Line Plan	00165-20-133	02
D8.	Ecological Impact Assessment		1.7
D9.	Ecological Impact Assessment Appendices Q to T		1.7
D10.	Ecological Impact Assessment Appendices U to W		1.7
D11.	GCN Mitigation Strategy		March 2021
D12.	GCN Method Statement		March 2021
D13.	Ecological Mitigation Site Layout	SCFFG006	G
D14.	ARC Renewed Expression of Interest Letter		March 2021
M1.	Lighting Impact Assessment	4529	P5

7. Matters of Disagreement

The LPA and Appellant continue to disagree insofar as Reasons for Refusal **a, b and c**.

Signed on behalf of Appellant:

TBC

Date: **TBC**

Signed on behalf of Local Planning Authority:

TBC

Date: **TBC**

DRAFT

APPENDIX B

LDP Background Paper 5: Wrexham Industrial Estate Expansion Selection, Wrexham County Borough Council, February 2016

BP4: Candidate Site Assessment Methodology

housing | open space | employment | community | transport | education



Wrexham County Borough
Local Development Plan
2013 – 2028



Site Assessment Methodology

February 2016

Contents:

1. Introduction
2. Background
 - a) Wrexham Unitary Development Plan (UDP)
 - b) Technical Advice Note 1: Joint Housing Land Availability (JHLAS) Process and Employment Land Availability Study
 - c) Candidate Sites and the Site Register (February 2016)
 - d) Urban Capacity Sites (UCS)
 - e) Officer Suggested Sites (OSS)
3. Sustainability Appraisal / Strategic Environmental Assessment
4. Site Assessment Methodology:
 - a) Stage 1 Assessment
 - b) Stage 2 Assessment
 - c) Stage 3 Assessment
5. Viability and Deliverability
6. Next Stages

1 INTRODUCTION

- 1.1 The purpose of this paper is to provide information about the methodology used to assess the Candidate Sites (CS), Urban Capacity Sites (UCS) and Officer Suggested Sites (OSS) (hereafter referred to as 'the sites') as part of preparation for the Wrexham Local Development Plan (2013 – 2028). This document will be used as part of the evidence base to support the Council's approach towards the inclusion or omission of sites in the LDP. It has been developed to reflect national planning policy and guidance on the preparation of LDP's and, in particular advice that '*The LPA should apply a set of **criteria or filtering mechanism** to classify and prioritise sites as to their acceptability for further consideration. Criteria will need to address deliverability issues and reflect the integrated plan objectives so that they meet sustainability appraisal requirements*¹.
- 1.2 This paper forms part of the suite of documents prepared to provide background information on a number of elements which have fed into the Council's Preferred Strategy. It identifies how Key Strategic Site (KSS) allocations identified in the Preferred Strategy have been appraised and selected and provides a framework for identifying further proposed allocations in the forthcoming deposit Plan.

2. BACKGROUND

a. Wrexham Unitary Development Plan (1996 – 2011)

- 2.1 The Wrexham Unitary Development Plan (UDP) was adopted in February 2005. This plan made provision for 5775 new homes over the plan period including a requirement for 1900 dwellings to be delivered via the plans allocations. The UDP expired in 2011 with the total plan housing requirement delivered in 2007 – 2008². These completions include 23 out of the 29 allocations with the remaining 6 sites to be completed either with permission or under construction³. There are therefore no remaining housing allocations in the UDP to be brought forward in the LDP.
- 2.2 In respect of employment sites, the UDP makes provision for 254ha of

¹ Paragraph 5.3.4.9 Local Development Plan Manual Edition 2 August 2015
<http://gov.wales/docs/desh/publications/151007local-development-plan-manual-edition-2-en.pdf>

² 2007 -2008 JHLAS <http://gov.wales/topics/planning/planningstats/housing-land-availability-in-wales/wrexham/jhlaswrex08/?lang=en>

³ 2014 – 2015 Sites Supply Schedule (April 2015) www.wrexham.gov.uk/ldp

employment land, 114ha of which is to be delivered via 39 allocations. 8 of the allocations amounting to 16.2ha have been completed over the plan period with permission on parts of some of the other allocations. Appendices 4 and 14 of the Joint Wrexham and Flintshire Employment Land Review (ELR) October 2015⁴ provide further details in respect of how these remaining allocations could be taken forward in the emerging deposit Plan including potential de-allocation or alternative uses in accordance with TAN23: Economic Development (2014)⁵.

b. Technical Advice Note 1: Joint Housing Land Availability (JHLAS) Process and Employment Land Availability Study

2.3 In January 2015, Technical Advice Note (TAN) 1: Joint Housing Land Availability Studies was updated. These changes now mean that in the absence of an up to date development Plan that Wrexham County Borough Council are deemed to have a zero housing land supply. There is also no requirement for the Council to now produce a formal JHLAS either. The Council will however have to demonstrate that it has a 5 year housing land supply upon adoption of the LDP and until such time as the Plan is adopted, it will continue to monitor housing completions in the interim via an annual Housing Land Monitoring Statement, the most recent of which covers the period 2014 – 2015⁶.

2.4 Similarly the Council also undertakes an annual Employment Land Availability Study which identifies employment land completions in the County Borough⁷. Both the housing and employment land availability studies provide useful evidence in support of the LDP.

c. Site Register (February 2016)

2.5 In March 2012, Wrexham County Borough Council withdrew the Local Development Plan (2006 – 2021) from examination following the concerns of the Planning Inspector appointed to examine the soundness of the Plan⁸. Work identifying the evidence required to inform a new Plan commenced in the summer of 2012 with a revised Delivery Agreement (DA) approved by Welsh Government in December 2014⁹.

⁴ Joint Wrexham and Flintshire Employment Land Review (October 2015)

www.wrexham.gov.uk/ldp

⁵ <http://gov.wales/topics/planning/policy/tans/tan-23/?lang=en>

⁶ 2014 – 2015 Housing Land Monitoring Statement April 2015

⁷ Wrexham CBC Employment Land Availability & Monitoring (2015) www.wrexham.gov.uk/ldp

⁸ See Inspectors Preliminary Findings Report (ED23)

http://www.wrexham.gov.uk/english/planning_portal/plan_policy/local_development_plan.htm

⁹ www.wrexham.gov.uk/ldp

- 2.6 As part of the work for LDP2, a call for sites exercise was undertaken between 29th November 2012 and 28th February 2013. This invitation (Appendix 1) was sent to landowners, agents, developers and other interested parties identified on the original LDP database. As a result, 278 candidate sites were received, the majority of which are Greenfield sites located outside of existing settlement limits (table 1).

Site information	No of sites
Sites on Greenfield land	212
Sites on Brownfield land	49
Sites on Greenfield and Brownfield land	17
Sites wholly within settlement	23
Sites partially within settlement	21
Sites outside but adjoining settlement	126
Sites in the open countryside	108
Sites proposed for residential	209
Sites proposed for employment	6
Sites proposed for mixed use	55
Sites proposed for Gypsy and Traveller accommodation	1
Sites proposed for education	2
Sites proposed for leisure	4
Sites proposed for retail	1

Table 1: Overview of the candidate sites received as part of the call for sites process during November 2012 – February 2013

d) Urban Capacity Sites (UCS) (219 sites)

- 2.7 As part of the evidence base to support the withdrawn LDP, an assessment of the Urban Capacity of Wrexham County Borough was produced by Entec in March 2007. This study looked at the capacity for residential development on undeveloped land and previously developed vacant land and buildings within all existing settlement limits within the County Borough, taking account of existing housing allocations and permissions as contained within the Joint Housing Land Availability Study at the time. The study also included an assessment of viability issues along with phasing information.
- 2.8 Appendix H of the Entec report (Schedule of Identified Sites) lists the potential urban capacity of each settlement within the County Borough at the time and identifies the sites in both a table and map format. A key

conclusion of the study, as set out in Chapter 7 of the report¹⁰, identified a lack of capacity within existing settlement limits to support future housing growth requirements.

- 2.9 The status of the potential sites identified in the Entec Report were reviewed and updated in 2013 and 2014, including the addition of further potential sites for assessment. This involved deleting sites that had been developed out or those no longer suitable due to an identified planning constraint. Sites were also removed where feedback from the land owner indicated that the site is unlikely to be developed for residential purposes over the lifetime of the LDP. The sites are updated on an annual basis following collection of housing land completion data forming part of the JHLAS.
- 2.10 The UCS Update¹¹ identifies that a limited supply of developable land within existing settlement limits remains within the County Borough (see Appendix 1 of the Update Report). Based on an assessment of landowner intentions undertaken as part of the update (see section 5 below), the deliverable brownfield potential from UCS in the County Borough is considered to be approximately 700 dwellings out of a total brownfield potential of 1200 dwellings, as of April 2015. Section 4 in the paper explains in more detail how these sites have been assessed.

e) Officer Suggested Sites (OSS)

- 2.11 A number of sites (60) were also identified by officers in the Planning department based on their local knowledge of the area. These were referred to as Officer Suggested Sites (OSS) and again have been assessed in the same way as the CS and UCS; see section 4.
- 2.12 Collectively, the candidate sites received during the call for sites process together with the urban capacity and officer suggested sites can be found in the separate Sites Register (February 2016) which is available as part of the information accompanying the Preferred Strategy consultation. Generally, the inclusion of sites in the register is not confirmation that the Council supports these sites, and neither does it indicate that they will be developed in the future. There are however some candidate sites submitted, which, having gone through the site appraisal process (outlined in this document), that are being supported by the Council for future development. Some of these sites are included in the PS document and there is an opportunity to comment

¹⁰ Urban Capacity Study Update www.wrexham.gov.uk/ldp

¹¹ Urban Capacity Study Update www.wrexham.gov.uk/ldp

on individual sites from the register, in particular the Key Strategic Sites (KSS) which have been identified as fundamental to the delivery of the aims and objectives of the LDP (please refer to the Preferred Strategy (February 2016) consultation document which can be found on the Council website www.wrexham.gov.uk/ldp). Other smaller sites included on the register may also be suitable for allocation and will be identified as part of the Deposit LDP.

3 SUSTAINABILITY APPRAISAL / STRATEGIC ENVIRONMENTAL ASSESSMENT

- 3.1 Sustainability Appraisal (SA) / Strategic Environmental Assessment (SEA) forms an integral and iterative part of development plan preparation. The SA/ SEA accompanying the Preferred Strategy is contained in a separate document available on the Council website¹², however there is merit in mentioning the process in this paper as the Key Strategic sites identified in the PS consultation document have been tested using the SA methodology. The SA/SEA process will play an important part in demonstrating that the LDP is sound by ensuring it reflects sustainable development objectives. The process should therefore be an integral element of every stage of the plan preparation including evidence gathering, identifying issues, setting objectives, evaluating options (including sites) and consultation.
- 3.2 Options for both the proposed overall level of growth and the spatial distribution of new development have been assessed against the SA framework as part of the process.¹³

4. SITE ASSESSMENT METHODOLOGY

- 4.1 There is no prescribed methodology for assessing sites as part of the LDP process. Guidance contained the LDP Manual (2015) states, in section 5.3.4.9 that the 'LPA should apply a set of criteria or filtering mechanism to classify and prioritise sites as to their acceptability for further consideration. Criteria will need to address deliverability and reflect the integrated plan objectives so that they meet sustainability appraisal requirements, this must be a transparent, documented process and it should be clearly referenced in the SA Report'.

¹² Initial Sustainability Appraisal Report (Preferred Strategy) 2015 - <http://wrexhamldp.wrexham.gov.uk>

¹³ Initial Sustainability Appraisal Report Appendix F(PREFERRED STRATEGY) 2015
<http://wrexhamldp.wrexham.gov.uk>

4.2 In response to this, Officers have devised a detailed, three stage approach to assessing the sites based on sustainability guidance contained in National Planning Policy Wales¹⁴ and best practice. In addition to this, paragraph 9.2.8 of PPW (2016) states that, *'in identifying sites to be allocated for housing in development plans, local planning authorities should follow a **search sequence**, starting with the re-use of previously developed land and buildings within settlements, then settlement extensions and then new development around settlements with good public transport links'*.

4.3 National guidance provides clear direction in relation to the sequence of sites to be considered as housing allocations in the development plan. This has enabled Officers, alongside the assessment of individual site constraints to formulate a framework for site assessment. Figure 1 provides a broad overview of the methodology process and further details of each stage are provided below.

a) Stage 1 Assessment

4.4 The first part of this assessment involved the identification of sites and the inputting of site data onto the LDP database. Information inputted at this stage for each site included (where known):

- Site name;
- Site address;
- Site area (ha);
- Current use / Proposed use;
- Vacant / Occupied;
- Small site / large site
- Phasing
- Community
- Ward
- Interest in site

¹⁴ Planning Policy Wales (Edition 8, 2016) Chapter 4, Paragraph 4.7 and Chapter 9, paragraph 9.2.9- <http://gov.wales/docs/desh/publications/160104-.pdf>

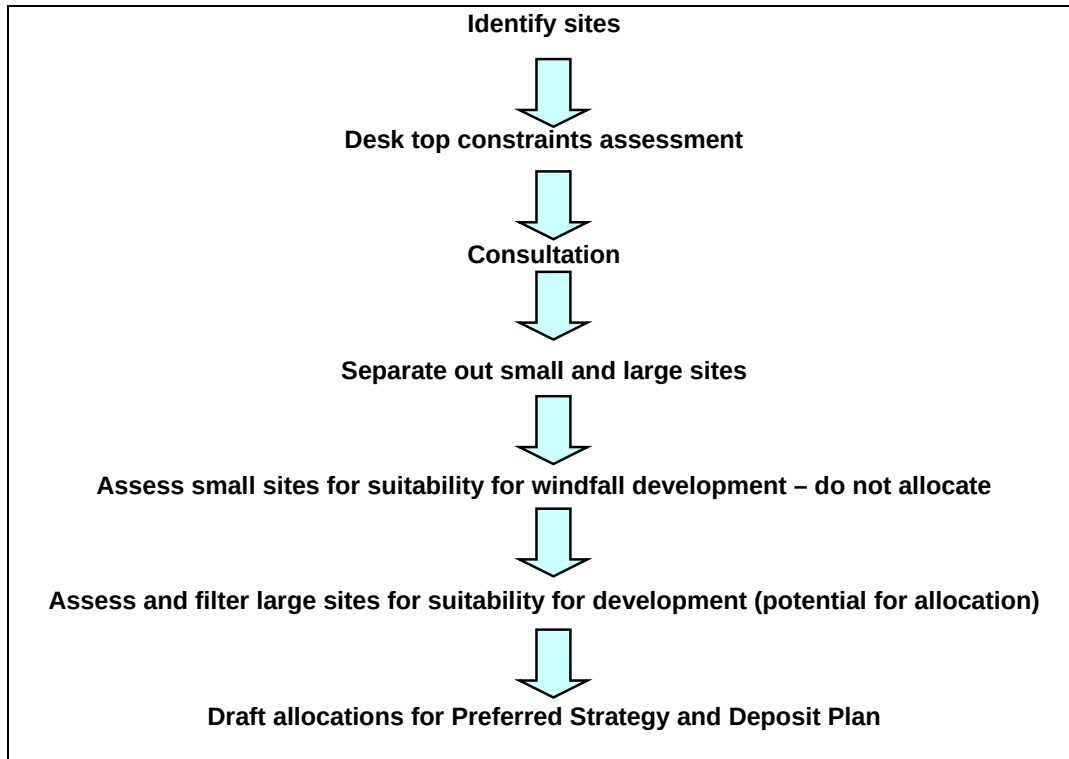


Figure 1: Overview of approach used to assess sites for inclusion in the Preferred Strategy and for the emerging Deposit Plan.

4.5 A desk top assessment of the sites was then carried out by Officers to identify the site constraints using the Council's GIS system. The constraints analysis carried out at this stage included an assessment of the constraints listed in Appendix 2 which can be grouped into the following broad categories:

- **Flood Risk:** Chapter 12 of PPW (edition 8, 2016) and TAN15 (2004) outline the approach to development and flood risk, including surface water. TAN15 identifies areas of flood risk in three zones, A, B and C with zone C split into two categories, C1 and C2. C1 relates to areas with adequate flood defences and C2 relates to areas without. The C zones are used to indicate that flooding issues should be considered as an integral part of decision making where the development is justified (section 6, TAN15, 2004) and the consequences of flooding can be accepted (section 7, TAN15, 2004). Highly vulnerable development (residential, public buildings, and especially vulnerable industrial development) should not be located in the C2 zone. Officers consulted with Natural Resources Wales (NRW) where sites were identified in a flood risk zone and any site that fell into either a C1 or C2 zone was considered at risk and were subsequently discounted. Whilst this is not strictly in

accordance with national planning policy, it was felt that adequate land could be identified to meet the anticipated level of likely growth without having to resort to allocating land in the C flood zones. In relation to surface water (section 8, TAN15, 2004), consultation was undertaken with the Authority's Flood and Water Management Resilience Officer, Welsh Water and other Water utility providers to gain a full and comprehensive understanding of local, surface and waste water flooding incidents. Where sites are known to have issues with localised waste or surface water flooding, this was noted in the database and highlights, should the site be suitable for allocation that a Drainage Impact Assessment (DIA), including an assessment of the suitability of incorporating Sustainable Urban Drainage Systems (SuDS) into the scheme would need to be considered. Section 8 of TAN15 (2004) states that new development should not create additional run off when compared to the undeveloped situation, and that redevelopment should seek to reduce run –off where possible.

The site assessment has been updated to incorporate revisions to the Development Advice Maps (DAM) released in January 2015 which supersedes those issued in 2013. Subsequent revisions to the DAM will trigger an update to the site assessment to ensure that we are making decisions based on the most up to date information.

- Built Conservation and Natural Heritage: Planning Policy Wales (para 6.4.1) requires development plans to reflect national policy for the preservation and enhancement of the historic environment. The site assessment therefore looked at whether there would be any impact on listed buildings or the character and appearance of conservation areas. Planning Policy Wales also requires development plans to reflect the outstanding international importance of World Heritage sites, emphasising the need to protect both the sites and their settings.

The Register of Landscape, Parks and Gardens of Special Historic Interest in Wales is also required to be taken into account by LPA's in preparing their development plans and plans should show the boundaries of areas of protection.

- Green Wedges & Open Countryside: The purposes of Green Wedge as set out in Planning Policy Wales¹⁵ are to:

¹⁵ Planning Policy Wales Para.4.8.3 Edition 8 (2016)
<http://gov.wales/docs/desh/publications/160104ppw-chapter-4-en.pdf>

- prevent the coalescence of large towns and cities with other settlements;
- manage urban form through controlled expansion of urban areas;
- assist in safeguarding the countryside from encroachment;
- protect the setting of an urban area; and
- assist in urban regeneration by encouraging the recycling of derelict and other urban land.

Planning Policy Wales emphasises (para.4.8.11) that Green Wedges should only be maintained where they can demonstrate that normal planning and development management policies cannot provide the necessary protection. In defining Green Wedges it is important to include only land that is strictly necessary to fulfil the purpose of the policy.

In light of the above, as part of the LDP process the existing Green Barrier designation in the existing UDP is being reviewed¹⁶. The Green Barrier (now termed Green Wedge) designation will be retained in areas where it is considered strictly necessary and where it meets the purposes referenced in PPW. Settlement limits and open countryside policies will however be retained to control development and limit expansion in some areas.

- Trees & Woodlands: In recognition of the importance of trees and woodlands, both as wildlife habitats and in terms of their contribution to landscape character and beauty planning policy Wales requires Local planning authorities to seek to protect trees, groups of trees and areas of woodland where they have natural heritage value or contribute to the character or amenity of a particular locality. The making of a Tree Preservation Order on single or groups of trees appear in the interests of amenity. Can ensure protection.
- Area of Outstanding Natural Beauty & Special Landscape Area: The primary objective for designating AONBs is the conservation and enhancement of their natural beauty and development plan policies and development management decisions affecting AONBs should favour conservation of natural beauty. It is however also appropriate to have regard to the economic and social well-being of the areas. Special Landscape Areas are non statutory designations which can be applied to areas of

¹⁶ Strategic Green Barrier Review – Stage 1 <http://wrexhamldp.wrexham.gov.uk>

substantive conservation value where there is good reason to believe that normal planning policies cannot provide the necessary protection. Such designations should not unduly restrict acceptable development. As with Green Wedge, SLA designations are being reviewed as part of the LDP preparation process.

- Sites of Special Scientific Interest (SSSIs) are designations of national importance and the Wildlife and Countryside Act, as amended by the Countryside and Rights of Way Act 2000, places a duty on all public bodies (including local planning authorities) to take reasonable steps, consistent with the proper exercise of their functions, to further the conservation and enhancement of the features by reason of which a SSSI is of special interest. SSSIs can be damaged by developments within or adjacent to their boundaries, and in some cases, by development some distance away and there is therefore a presumption against development likely to damage a SSSI.
- Habitats: The Welsh Government will ensure that its policies contribute to the conservation of the abundance and diversity of native wildlife and its habitats and will minimise the adverse effects on wildlife where conflict of interest is unavoidable. Planning Policy Wales therefore requires Local planning authorities to address biodiversity issues, insofar as they relate to land use planning, in both development plans and development management decisions. The presence of a species protected under European or UK legislation is a material consideration when a local planning authority is considering a development proposal which, if carried out, would be likely to result in disturbance or harm to the species or its habitat.
- Agricultural Land: High quality agricultural land in WCBC is generally concentrated around Wrexham, Gresford/Marford, Rossett/Burton, Holt and along the River Dee flood plain. Paragraph 4.10.1 of PPW (edition 8, 2016) states that *agricultural land of grades 1, 2 and 3a is the best and most versatile and should be conserved as a finite resource for the future*. PPW (edition 8, 2016, paragraph 4.10.1) continues to state that in development plans *'considerable weight should be given to protecting such land from development, because of its special importance. Land in grades 1, 2 and 3a should only be developed if there is an overriding need for the development, and either previously developed land or land in lower agricultural grades is unavailable, or*

available lower grade land has an environmental value recognised by a landscape, wildlife, historic or archaeological designation which outweighs the agricultural considerations. If land in grades 1, 2 or 3a does need to be developed, and there is a choice between sites of different grades, development should be directed to land of the lowest grade’.

The Agricultural Land Classification (ALC) map for Wales contained on the Council's GIS provides a broad overview of the ALC for a particular area; it is not a detailed site assessment.¹⁷ This map has been used to provide a preliminary ALC grading for individual sites for the purposes of this assessment and where known surveys of individual sites have been produced, the results of those individual site surveys have been included in the assessment providing a more definitive ALC grading. Survey information relating to a number of larger sites on the edge of Wrexham Town was provided by colleagues in the Welsh Government.

A meeting with WG officers on the 1st April 2015 resulted in further information in respect of BMVAL being made available to the Authority. This information draws on ALC survey work which has been done in the County in accordance with the Revised Guidelines and Criteria for Grading the Quality of Agricultural Land (MAFF, 1988). The GIS data provided includes predictive BMVAL layers ranging from high, medium to low probability of that resource being present on a certain site. This is a more reliable source of evidence than the ALC maps but again is not sufficient to accurately determine the precise ALC of sites without full site survey. What the information does do is allow us to determine which sites will require full ALC surveys going forward.

As a result of this additional information becoming available the Council has undertaken an update to the site assessment work in June 2015 to ensure that we are using the most up to date evidence to inform our decisions. The SA / SEA work has also been updated accordingly.

The Council understands that where sites are located on high quality agricultural land, they will need to be assessed further with the Welsh Government (WG) Department of Natural Resources to ascertain the precise ALC on a site specific basis. It would be a

¹⁷ Para 6.2.4, Technical Advice Note 6: Planning for Sustainable Rural Communities (July 2010) <http://gov.wales/topics/planning/policy/tans/tan6/?lang=en>

waste of resources to ask WG to assess all sites on high quality agricultural land, therefore only those which pass the stage 1 assessment will be considered further.

- Mineral Resources and Contamination: Planning Policy Wales edition 8 (2016)¹⁸ sets out the requirement for each Local Planning Authority to make an appropriate contribution in its development plan to meeting local, regional and UK needs for minerals. Wrexham CBC has a legacy of mining and other industrial uses, as well as identified extensive reserves of sand, gravel, clay and coal. All sites were screened for the presence of minerals and where this was identified as a constraint; expert advice was sought from the Coal Authority and colleagues in Flintshire County Council who provide specialist Minerals and Waste services. Similarly, all sites where land contamination was identified as a constraint were also sent to colleagues in Public Protection who carried out a desk top screen of the sites for contamination and identified where further information may be required prior to allocation (if suitable).
- Infrastructure: As part of the consultation for the stage 1 assessment, Officers were able to begin to identify where there are known infrastructure capacity constraints. In this context, infrastructure relates to community facilities (schools, doctors' surgeries, open space etc), transport (road, rail, public transport) and drainage / waste water treatment facilities. This has helped officers identify where there are existing infrastructure capacity constraints, what the implications of these constraints may be over the lifetime of the development Plan, how and if any site allocations could assist in alleviating infrastructure constraints as well understanding the cost implications of delivering new infrastructure. This information has been used to help inform Background Paper 2: Settlement Hierarchy and Development Potential (March 2015, Revised February 2016).

- 4.6 Based on the site constraints outlined above, Officers were able to ascertain which other relevant internal Council departments would need to provide comments on each site, as well as relevant external organisations (Appendix 3). A period of consultation followed with the responses from each internal and external consultee inputted into the database. Once this was complete, Officers were able to apply a filter to the sites, separating out the small sites capable of accommodating residential development up to and including 9 units, and large sites,

¹⁸ Planning Policy Wales Para 14.2.2 Edition 8 (2016)

capable of supporting development of 10 or more units. The separate Site Register (February 2016) identifies small and large sites and their suitability for development, and the sections that follow provide further narrative on small and large sites.

Small Sites

- 4.6 These sites will not be allocated in the LDP, however where the sites are relatively constraint free and there is a prospect of them being developed over the lifetime of the LDP (2013 – 2028), there is potential for them to contribute to the windfall supply over the Plan period. An assessment of historical windfall trends, collected from the Joint Housing Land Availability Study (JHLAS) has been used to inform housing supply figures identified in the Preferred Strategy.
- 4.8 Where small sites are located in existing settlement limits, no action needs to be taken, as these sites can come forward for development at any time provided any site specific constraint issues can be overcome and the scheme complies with the relevant development management considerations. Similarly, the sites on brownfield land in the open countryside could come forward at any time under the same proviso as those within settlement. Only those sites where the constraints can not be overcome or those on Greenfield land in the open countryside which are not proposed as rural enterprise dwellings are likely to be unsuitable for development and have been discounted. Those small sites on the edge of settlement, which are free of constraints, or where the constraints could be suitably mitigated will need to be assessed further to ascertain if a settlement extension would be feasible to facilitate small sites coming forward over the lifetime of the Plan, this is particularly important in smaller rural settlements and will be addressed further at the Deposit Stage.

Large Sites

- 4.9 Large sites are defined as those which are capable of accommodating 10 or more residential units. These sites are potentially capable of addressing a large proportion of the required housing in the County Borough over the Plan period, some of which are of such a scale they are considered to be strategically important. (See Preferred Strategy, Policy SP9).
- 4.10 Based on the assessment of site constraints and the responses received; those with constraints that can not be overcome, along with Greenfield sites in the open countryside were discounted at this stage.

Those where the site constraints could potentially be mitigated and those adjoining existing settlement limits were assessed further under the stage 2 assessment below.

b) Stage 2 Assessment

- 4.11 The stage 2 Assessment involved assessing the sites in terms of compliance with the LDP Vision, Objectives and the Preferred Spatial Strategy. Alongside determining the preferred level of growth the LDP must put forward a clear spatial strategy identifying the most sustainable pattern for accommodating growth across the County Borough. Taking account of comments received from the Issues and Options consultation, and using a tiered approach, the Preferred Spatial Strategy concentrates development in the Primary (Tier 1) Key Settlement of Wrexham Town and the Wrexham Industrial Estate, with a proportion of development also directed to settlements identified as Key Settlements (tier 2), Local Service Centres (tier 3) and to a limited number of tier 4 Minor Villages.¹⁹

c) Stage 3 Assessment

- 4.12 Alongside the Candidate Site process, there are parallel processes of considering potential sites through related assessments that are triggered by preparing a plan of the nature and scope of the LDP. These include a Strategic Environmental Assessment/Sustainability Appraisal (SEA/SA), an appraisal in accordance with the Habitats Regulations, Health Impact Assessment and also an Equalities Impact Assessment.
- 4.13 Those sites not considered as representing reasonable proposals are likely to have been dismissed earlier in the assessment process and will not be carried forward in the SEA/SA assessment. Sites which accord with the Preferred Strategy will then be assessed against sustainability criteria identified by the Council as part of the SEA/SA process. This assessment process will involve examining each site that has successfully passed through Stages 1 and 2 in terms of its likely impact (positive or negative) on each sustainability objective identified by the SEA/SA exercise.
- 4.14 It is important to note that these assessments together with other studies such as the Council's employment land review and housing

¹⁹ Background Paper 2: Settlement Hierarchy and Development Potential (Revised February 2016) <http://wrexhamldp.wrexham.gov.uk>

viability are not the sole determinants in considering the appropriateness of a site, but rather it forms an integrated approach to site selection having regards to the other stages contained in the assessment methodology.

- 4.15 The Council will use the results of the SEA/SA in order to finalise the remaining Candidate Sites as to their appropriateness for allocation within the Deposit Local Plan. This approach is underpinned by the principles of sustainable development and the SA assessment of site's merits will provide a further valuable test as part of the wide assessment methodology process.

5 VIABILITY AND DELIVERABILITY

- 5.1 In December 2014 the Joint Wrexham and Flintshire Affordable Housing and Community Infrastructure Levy Viability Study was completed. This is a high level study looking at the broad levels of development viability throughout the County Borough²⁰. These broad viability areas help identify the contribution sites could make to the overall delivery of both infrastructure and affordable housing should they come forward in the future by means of an allocation in the development plan. This work will be taken forward further at the deposit plan stage.
- 5.2 With regard to the Key Strategic Housing Sites, work has been done in relation to understanding the likely viability of those sites and there are national housebuilders with options to develop the sites, subject to planning in the future. Understanding the precise phasing and delivery of these Key Strategic Sites is an on-going dialogue with prospective developers.
- 5.3 Officers have also undertaken further work with landowners of the Urban Capacity Sites (UCS), writing to them in 2014 to understand their future development aspirations and timings for delivery. This exercise has informed the understanding of the Council that there is a potential 1197 no. of units which could be delivered in the County via brownfield allocations (Housing Topic paper: February 2016).

6 NEXT STAGES

- 6.1 All responses received during the Preferred Strategy consultation will be considered by the Council prior to the publication of the Deposit

²⁰ Joint Wrexham and Flintshire Affordable Housing and Community Infrastructure Levy and Development Viability Assessment (November 2014)<http://www.wrexhamldp.wrexham.gov.uk>

version of the Plan. All possible site allocations will be tested against the Plan's Sustainability Appraisal framework, (as outlined in the Stage 3 assessment above) and the Council's proposed allocations will be included in the Deposit Plan which will be subject to a further 6 week consultation period in late 2016.

Appendix 1: Call for sites letter and candidate site form

Head of Community Well-being and Development/Pennaeth Lles Cymunedol a Datblygu
Lawrence Isted

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Your Ref/Eich Cyf
Our Ref/Ein Cyf
Date/Dyddiad
Ask for/Gofynner am
Direct Dial/Rhif Union
E-mail/E-bost

xx November 2012
David Watson
01978 298750

david.watson @wrexham.gov.uk

Dear

Re: Wrexham Local Development Plan (LDP) – Call for Sites Submission of candidate sites for consideration for inclusion in the Wrexham LDP 2011-2028

As you may well be aware, in March this year the Council formally withdrew its Local Development Plan (LDP1) following receipt of a recommendation from the lead Planning Inspector that it should do so. This followed the Inspector suspending the Hearing Sessions into the Examination of the Plan in January due primarily to concerns about the overall level of housing proposed, the likely shortfall in the amount of affordable housing and the lack of flexibility in the overall strategy to accommodate additional housing numbers. This outcome was extremely disappointing to the Council given that work on preparing the Plan began in 2006. Nonetheless on the basis of the Inspector's decision it has been necessary to start work on preparing a new plan, known as LDP2. Discussions with officers of the Welsh Government have concluded that there is a need for work on the Plan to start again at the beginning. As such it has been necessary to draft a new timetable for the plan preparation – a summary of the proposed programme is included with the candidate site form.

In these early stages of work on the new Plan the Council is gathering fresh evidence, assessing issues and considering options for the future development of the County Borough. This includes conducting an appraisal of land available for development and as part of this process I am calling on landowners, developers and other interested stakeholders to submit sites for consideration for development. These sites are known in development plan terminology as Candidate Sites.

Sites can be submitted for all types of development; it is not known at present exactly how much land for what type of use will be required to implement the Plan's strategy. Sites do not necessarily have to be available for immediate development; the requirement is that they will be available for development at some, identified stage in the life of the Plan up to 2028. They can be located anywhere in the County Borough although the Council will follow the search sequence as set out in Planning Policy Wales, Edition 5 November 2012, of starting with the re-use of previously developed land and buildings within settlements, then settlement extensions and then new development around settlements with good public transport links.

The submission of a site does not, of course, imply that it will be considered suitable for development by the Council. An exhaustive, systematic and transparent process will be carried out in assessing the suitability of sites to meet the development needs identified as the Plan emerges, and the process will be subject to sustainability appraisal and public consultation. As such each candidate site will only be considered if it is submitted using the Candidate Site Submission Form and by submitting the detailed evidence requested in the form, including information on deliverability, viability, sustainability and phasing. Sites will need to be submitted afresh, irrespective of whether they have previously been submitted for consideration in LDP1, and supporting information will need to be comprehensive and up-to-date.

Sites and supporting information must be submitted by 28th February 2013. The submissions will be placed on the Candidate Sites Register which will be available for public scrutiny. The preferred method of submission and subsequent correspondence is by e-mail, although paper submissions will also be considered. I attach a submission form, please feel free to make additional copies as appropriate; each site will need its own form.

If you wish to discuss this or need further clarification please contact the Planning Policy team on 01978 292013 or e-mail planning_policy@wrexham.gov.uk
Further information, including an explanatory guidance note, can be found on the Council website at www.wrexham.gov.uk

I look forward to receiving your Candidate Site submissions.

Yours Sincerely

David Watson
Planning Policy Manager

CANDIDATE SITES SUBMISSION FORM

WREXHAM COUNTY BOROUGH COUNCIL LOCAL DEVELOPMENT PLAN (LDP) 2011-2028

Use this form to submit details of sites for consideration in the
Wrexham County Borough LDP 2011-2028



Office Use Only

Name

Site Ref.

Date Rec'd

Ack.

This form must be completed and returned by 28th February 2013:-

By email to planning_policy@wrexham.gov.uk

Or by post to: Planning Policy, Wrexham CBC, Lord Street, Wrexham, LL11 1LG

A separate form must be used for each site. A site plan must be included.

1 Contact Details

	Agents details if used
Name:	Name
Representor Number (if known):	Representor Number (if known)
Title:	Title:
Organisation (if applicable):	Organisation (if applicable):
Address	Address
Tel	Tel
E-mail	E-mail
What relationship does the site proposer have with the site (owner, agent, potential developer etc)?	

2 Site Details

Site Name	
Location (Street name, postcode or other identification)	
Ordnance Survey Grid Reference	
Site Area (Hectares)	
Brief description of site, current use, significant features that may constrain development (e.g. ecology, flood area, neighbouring land uses)	
Proposed Development (e.g residential/employment/mixed use)	
Please include an Ordnance Survey Plan that includes the following information; - Clearly identify in red the outline of the site - Set out land ownership details - The type and location of any existing use on the site - Proposed access points and any land ownership issues associated with potential access - Significant features	
Is the site in multiple ownership Yes ☐ No ☐ Please give details of ownership and list all of the owners with contact details if known	
Is the site vacant ☐ or occupied ☐ ? If occupied or partly occupied, will the existing use remain after development and if not what would be the timetable for the existing use to cease?	

3 Site Viability and Deliverability

Are there **viability issues** that may influence the delivery of the site for development? Yes ☐ No ☐
If yes please give details

Are you aware of any **abnormal costs** associated with bringing forward this site for development such as land stability? Contamination and remediation costs, national requirements such as Code for Sustainable Homes and local infrastructure requirements such as S106/potential CIL contributions for such issues as education, open space, highways access requirements as well as, for housing developments, the likely need to provide affordable housing, are considered to be foreseeable, normal development costs.
If so please give details

What is the developable area?

Are you aware of any areas of the site that need to be **free from development** for example, land set aside for ecological mitigation, flood zones, noise mitigation, tree protection or archaeology? If so please provide details

Are you aware of any infrastructure requirements needed to deliver the site?

If the site were considered suitable for inclusion in the LDP by the Council what would be the **timeframe** within which you consider the site would be brought forward?

If you are proposing the site for housing, **how many units** do you think could be provided and how would the supply be **phased**?

Have any discussions already taken place with utility providers such as gas, electric, telephone and water?
(Please provide copies of correspondence)

Are there other restrictions on the site e.g. covenants or any other requirements that you are aware of that would need to be satisfied to bring the site forward for development?

Has the proposed site been subject to previous planning applications? **Yes** ☐ **No:** ☐

If yes, are there any valid planning permissions on the site which have yet to be implemented? **Yes** ☐
No: ☐

If yes please give details

Please provide details of any **other matters** you consider relevant to this submission (early identification of any issues may help you, the LPA and statutory consultees to mitigate any problems):

Notes

1. Which type of land uses and sites can be submitted? All types of land use that may be required over the plan period, up to 2028, can be submitted including but not limited to the following:-

- Housing; Employment; Retail; Transportation; Recreation; Community facilities; Gypsy and traveller accommodation; Minerals and resources; Waste; Leisure; Education; Mixed use schemes.

2. Housing sites: In accordance with Planning Policy Wales Chapter 9 the following criteria will influence the allocation of housing sites in the LDP:-

- The availability of previously developed sites and empty or underused buildings and their suitability for housing use;
- the location of potential development sites and their accessibility to jobs, shops and services by modes other than the car, and the potential for improving such accessibility;
- the capacity of existing and potential infrastructure, including public transport, water and sewerage, other utilities and social infrastructure (such as schools and hospitals), to absorb further development, and the cost of adding further infrastructure;
- the scope to build sustainable communities to support new physical and social infrastructure, including consideration of the effect on the Welsh language, and to provide sufficient demand to sustain appropriate local services and facilities;
- the physical and environmental constraints on development of land, including, for example, the level of contamination, stability and flood risk, taking into account the possible increase of such risk as a result of climate change, and the location of fragile habitats and species, archaeological and historic sites and landscapes;
- the compatibility of housing with neighbouring established land uses which might be adversely affected by encroaching residential development; and
- the potential to reduce carbon emissions through co-location with other uses.

3. Assessment of candidate sites: A four stage process will be undertaken to identify strategic sites crucial to the deliverability of the Preferred Strategy and to help identify the potential acceptability and contribution of smaller sites:-

- i) LDP vision and objectives** – sites will be assessed for the contribution they can make towards delivering the Plan's vision and objectives.
- ii) Detailed site assessment** – this will look at issues such as the viability and deliverability of the site, the physical constraints and environmental impact, infrastructure and site accessibility.
- iii) Sustainability appraisal (SA)** – sites will be assessed for their sustainability through the SA process.
- iv) Other assessment processes** – Habitats Regulations and Equalities Impact Assessment.

4. Further information: More detailed information is contained in the *Assessment of Candidate Sites Guidance Note* which can be found on the Council's website: www.wrexham.gov.uk or can be requested by phoning 01978 292013 or e-mail planning_policy@wrexham.gov.uk

Officers from the LDP Team can be contacted on the above telephone number during normal office hours to discuss queries raised.

Appendix 2: Stage 1 Constraints Assessment

A2. 1 The constraints identified for this part of the assessment, based on the information contained on the Planning GIS system is as follows:

- Within C1 flood plain?
- Within C2 floodplain?
- Within Green Barrier?
- Within Special Landscape Area?
- Within SSSI?
- Within SSSI buffer?
- Within SAC?
- Within SAC buffer?
- Within SPA?
- Within SPA buffer?
- Within RAMSAR site?
- Within Local Wildlife Site?
- Affects Ecology or Habitats?
- Woodlands or trees, including TPO's?
- Grade 1 Agricultural Land?
- Grade 2 Agricultural Land?
- Grade 3 Agricultural Land?
- Within Conservation Area?
- Adjacent to Conservation Area?
- Affects Listed Building?
- Affects SAM?
- On public open space?
- Adjacent to public open space?
- Minerals resource protection?
- Contaminated land?
- Brownfield site?
- Greenfield site?
- Brownfield / Greenfield site?
- Within settlement?
- Partially within settlement?
- Adjoins settlement?
- Open countryside?
- Within World Heritage Site?
- Within World Heritage Site Buffer?
- Within Historic Park and Garden?
- Adjacent to Historic Park and Garden?
- Within AONB?
- Adjacent to AONB?
- Footpath on or adjacent to site?
- Canal?
- Within HSE consultation zone?
- Known historical flooding incidents?
- Infrastructure?
- Planning History

Appendix 3: Consultees identified for consultation on the sites

A3.1 The following consultees were consulted depending on the individual site constraints identified:

Internal Council Departments:

- Landscape Officer
- Tree Officer
- Conservation Officers
- Ecologist
- Assets and Economic Development
- Education
- Transport and Highways
- Housing
- Minerals and Waste Officers
- Contaminated Land Officers
- Flood and Water Management Resilience Officer

External Organisations:

- Natural Resources Wales
- Cadw
- Clwyd Powys Archaeological Trust
- HSE
- Dee Valley Water
- Network Rail
- Dwr Cymru/Welsh Water
- Severn Trent Water
- Welsh Government Natural Resources Division
- Glandwr Cymru
- North and Mid Wales Trunk Road Agency

APPENDIX C

Sustainability Statement: Delivering on UK and Welsh Government Strategy, Low Carbon Farming 2 Ltd, March 2021



PROPOSED GLASSHOUSE SCHEME AT FIVE FORDS, WREXHAM (P/2020/0363)

SUSTAINABILITY STATEMENT: DELIVERING ON UK AND WELSH GOVERNMENT STRATEGY

EXECUTIVE SUMMARY:

- **The proposed development delivers to Wrexham:**
 - **150 clean green jobs in an area with 16.6% youth unemployment.**
 - **Production of 4,350t of tomatoes, offsetting 10,875t of import carbon.**
 - **Sequestration of 16,783t of carbon to enrich the growing environment.**
- **The proposed development delivers to Wales:**
 - **A plan to support the Welsh Government's Climate Emergency.**
 - **Alignment with the 'Clean Air Plan for Wales' and 'Well-being for Future Generations (Wales) Act' and 'Food Policy Alliance Cymru 2021 Manifesto'.**
 - **A blueprint for post CAP sustainable and low carbon Welsh food production.**

Introduction.

1. Understanding the United Kingdom and Welsh Government strategic approach to climate change and future agri-food production has been crucial in developing and delivering Five Fords as a hub for Welsh low carbon, fresh produce production. This strategic context and understanding was brought into sharper focus in 2020 with COVID and the end of the BREXIT transition period. In January 2020, 85% of UK tomato demand came from the EU; in June, the EU still supplied 30% to UK supermarkets¹.

2. Five Fords delivers an operational solution to meet the strategic policy goals of the UK and Welsh Governments. The project increases domestic fresh produce production, up-cycles heat and CO₂ emissions from the Five Fords Waste Water Treatment Works (WWTW); creates employment, including well-paid green jobs, sets a benchmark for low carbon UK agri-food reshoring and a blueprint for sustainable commercial horticulture.

Strategic Context.

3. **Westminster Government.** The UK's departure from the European Union and post COVID recovery plans have seen the recent publishing of the Prime Minister's 'Ten Point Plan for a Green Industrial Revolution'², within which, statements on the UK 'becoming a world-leader in technology to capture and store harmful emissions away from the atmosphere'; and

¹ <https://www.bbc.co.uk/news/business-55408788>

² <https://www.gov.uk/government/news/pm-outlines-his-ten-point-plan-for-a-green-industrial-revolution-for-250000-jobs>

‘protecting and restoring our natural environment’ feature widely. The UK agriculture sector accounted for 10% of UK greenhouse emissions in 2018³.

4. **Welsh Government.**

a. The Welsh Government has devolved powers covering Climate Change, the Environment and Agriculture policy. In 2019, the Welsh Government made a climate emergency declaration following evidence from the Intergovernmental Panel on Climate Change⁴. In announcing the declaration, the Minister for Environment, Energy and Rural Affairs, Lesley Griffiths, said she believes “we have the determination and ingenuity in Wales to deliver a low carbon economy at the same time as making our society fairer and healthier”.

b. The ‘Well-being of Future Generations (Wales) Act’ has acted as a mainstay for much post-devolution Welsh Government legislation. Its aim is to ensure ‘public bodies, listed in the Act, think more about the long-term; work better with people and communities [to] prevent problems and [to] take a more joined-up approach’⁵. In the context of delivering low carbon fresh produce in Wales, the proposed development would contribute towards meeting five of the seven goals of the Act: prosperity, resilience, health, equality and global responsibility.

c. Recently the Welsh Government published its ‘Clean Air Plan for Wales’ which aims to ‘reduce the impacts of air pollution on human health, biodiversity, the natural environment and [the] economy’⁶. The plan specifically calls for ‘strengthening the control of emissions in the agricultural sector’ and notes the challenges of reducing air pollutants and particulate matter from industrial processes and power generation.

d. With the UK’s departure from the Common Agriculture Policy (CAP), the Welsh Government launched their ‘Sustainable Farming and our Land’ consultation⁷. In preparing for the White Paper replacing CAP, the Minister for Environment, Energy and Rural Affairs recognised “the important work [farmers] do in delivering environmental outcomes;” and that the White Paper would “respond to the climate emergency” and ensure that “food produced using this approach would be sustainable”. Concurrently, a taskforce, set up by the Welsh Government, seeks to ensure a green recovery from COVID, with a recommendation of boosting horticulture⁸.

5. **National Farmers Union (NFU) (Cymru).** ‘Achieving Net Zero’ published by NFU (Cymru) sets the ambitious goal of reaching a target of net zero greenhouse gas emissions across the whole of agriculture in Wales by 2040⁹. This policy is based on three broad headings: ‘improving productivity; enhancing and use to capture carbon; and boosting renewable

³ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/862887/2018_Final_greenhouse_gas_emissions_statistical_release.pdf

⁴ <https://gov.wales/welsh-government-makes-climate-emergency-declaration>

⁵ <https://www.futuregenerations.wales/wp-content/uploads/2017/02/150623-guide-to-the-fg-act-en.pdf>

⁶ <https://gov.wales/sites/default/files/publications/2020-08/clean-air-plan-for-wales-healthy-air-healthy-wales.pdf>

⁷ <https://gov.wales/sustainable-farming-remain-heart-future-welsh-agriculture-support>

⁸ <https://www.bbc.co.uk/news/uk-wales-55650274>

⁹ https://www.nfu-cymru.org.uk/nfu-cymru/documents/net-zero_12pp_cymru_eng/

energy and the wider bio-economy'. As a NFU (Cymru) Corporate Member, Low Carbon Farming (LCF) has worked extensively with the local NFU County Chairman and National President to develop the project to assist in delivering the 2040 target.

6. **Food Policy Alliance Cymru.** The Alliance's 2021 Manifesto¹⁰ sets out their priorities for a food system fit for future generations – including: 75% of vegetal consumption to be produced sustainably in Wales for Wales by 2030; setting a target for Wales to have a net zero food system by 2030; and achieving sustainable food sector jobs and livelihoods.

Five Fords – Understanding 'Strategic Context', delivering an operational solution.

7. Five Fords – Sustainability Model.

a. Low Carbon Farming ('LCF') is a global leader in designing and delivering hi-tech, low carbon glasshouses. The two glasshouses nearing completion in East Anglia¹¹, will be capable of meeting 12% of UK tomato demand: offsetting imports from Europe; delivering on the strategic priorities of the UK Government's 'clean and green' COVID recovery and 10-point plan, whilst countering the dire consequences of unchecked climate change to the UK and global agri-food system. Five Fords aims to further develop the LCF model with partner Welsh Water, to sequester heat and CO₂, the latter from the on-site anaerobic digestion (AD) plant.

b. The five components that underpin commercial glasshouse food production are: heat, CO₂, water, light and labour.

8. Low Carbon Farming's components to commercial protected agriculture.

a. Heat Model.

(1) The conventional means for heating the majority commercial glasshouses is by gas boilers, an associated mains gas connection is critical. Gas is used to heat water for onward transit through a series of pipes within the growing space. Emissions are either vented, or depending on the plant stage of growth, CO₂ is recycled to enrich the growing environment. The annual heat requirement for a hectare of tomatoes under glass is 3,800,000KWh¹², equating to 57m kWh for 15 hectares. The CO₂ generated by burning natural gas is 0.185kg/kWh¹³ or 10,545t for 15 hectares – noting that some of this could be used to enhance the growing environment.

(2) LCF uses Heat Pumps as the primary means of heating their glasshouses. This system is sustainable and extracts low grade heat from final effluent being discharged from the neighbouring WWTW. 'Decarbonising heat is seen as one of

¹⁰ https://www.foodsensewales.org.uk/pdf/FPACManifestoEnglish_091120.pdf

¹¹ <https://vimeo.com/459438153/63fe72c634>

¹² John Hall Consulting dated January 2021.

¹³ <https://www.carbonindependent.org/15.html#:~:text=The%20CO2%20generated%20by%20burning,kg%20%2F%20kWh%20%5B8%5D%20.>

the largest challenges the UK faces in reaching net-zero 2050' within the PM's 10-point plan; heat pumps are seen as a solution¹⁴.

(3) The removal of 2-3°C of low-grade heat from the final effluent ensures that treated water returns at cooler temperature to the river catchment. This has a positive ecological and environmental effect, mitigating damage caused by thermal pollution. Studies by Cardiff University indicate that freshwater species are very sensitive to temperature change, with as little as a 0.5°C increase having large effects¹⁵.

b. CO₂ Model.

(1) Owing to a combination of plant density and closed environment, CO₂ glasshouse enrichment is critical to ensure yield and produce quality. CO₂ is conventionally drawn from two sources: capture and cleaning from the combustion of gas (to heat the glasshouse) or in liquid form for on-site tank storage and use. To meet demand in Wrexham, liquid CO₂ would have to be sourced from production facilities in either Immingham or from continental Europe via Tilbury Docks (Essex). A tanker is capable of transporting 20t of liquid CO₂.

(2) Analysis undertaken by ADAS, the UK's largest independent agricultural and environmental consultancy, has calculated that tomatoes require an application rate of 370kg/ha/day. This figure is based on a 12-hour day and 270 day growing season¹⁶. ADAS's work was undertaken with the Technical Officer of the British Tomato Growers' Association and studied an unlit crop of tomatoes.

(3) Working on ADAS's calculations, the Five Fords' glasshouse could sequester 16,783t of CO₂ to enrich the growing environment. This figure equates to 62m motor miles (based on a Ford Mondeo @ 244gms¹⁷ of CO₂/mile calculated as 16,783t / 0.000269t of CO₂ = 62m).

(4) Five Fords glasshouse proposal is a world first in drawing both sustainable heat and recovered CO₂. The Five Fords AD plant produces 700m³ of biogas/hour on current feed stock rates. The breakdown of biogas is approximately 60:40 (Biomethane/CO₂); Five Fords' biomethane is injected into the National Gas Grid. The 40% CO₂ biproduct (or circa 250m³ of CO₂/hour) is vented into the atmosphere¹⁸.

(5) LCF, in conjunction with Pentair Haffmans, has the technology to clean this emitted CO₂ to food quality, to tangibly sequester it into the glasshouse to

¹⁴ <https://www.gdhv.co.uk/ten-point-plan-decarbonisation-heat#:~:text=The%20Ten%20Point%20Plan%20recognises,pumps%20a%20year%20by%202028.>

¹⁵ <https://www.cardiff.ac.uk/news/view/1506058-pollution-control-of-rivers-can-reduce-impact-of-climate-warming>

¹⁶ Gage, E (2017). Efficient CO₂ uptake and use – stimulating lower canopy photosynthesis to increase UK tomato marketable yield. ADAS.

¹⁷ <https://www.which.co.uk/reviews/new-and-used-cars/article/car-emissions/car-co2-emissions-aRVNW9t0zLu6>

¹⁸ Source: Dŵr Cymru Welsh Water

enhance growing conditions. This not only up-cycles an emission but improves air quality and the environment in line with 'Clean Air Plan for Wales'.

9. **Water Harvesting and Management.**

(1) Captured rainwater is a critical commodity to glasshouse operations. Owing to its purity, no alteration is required to soften or harden ahead of irrigation, an additional process usually needed when water is sourced from the mains or borehole. Aside from rainwater, commercial glasshouses also recycle irrigated water that is not taken up from the plants. As a consequence, there is no agriculture run-off or leaching of fertilizers or agri-chemicals into the catchment from the site.

(2) A 15-hectare glasshouse roof equates to 150,000m² capable of harvesting 117,750m³ of rainwater (Wrexham receives 785mm of rainfall/annum¹⁹) or 117.75m litres. The Five Fords' plan incorporates 100,000m³ of reservoir capacity, with a further 25,430m³ set aside to accommodate the storage volume required to meet the 100 year plus 40% climate change rainfall event.

(3) The current on-site cropping is maize silage. This is drilled in the spring and harvested in the autumn. Maize stubble and bare earth occupy the site for the winter months. Flood risk and soil erosion is exacerbated by bare earth and stubble, particularly when the soil is dormant during winter months. The capture and upcycling of 117.75 million litres of water will prevent it entering the Clywedog River Catchment, this will have a positive effect on flood risk mitigation.

10. **Local Employment.** The Five Fords' glasshouse will provide 150 direct jobs to the Wrexham area²⁰; a detailed analysis of the economic benefit of the proposed development was provided in the planning application. The unemployment rate, year ending 20 June 2020, in Wrexham was 4.8% for men and 4.3% for women aged 16 to 64; the rate increases to 16.6% for people aged 16 to 24²¹.

11. **Lighting.** The provision of artificial lighting in a glasshouse allows for an extension to the growing season and the ability for a grower to further off-set imports in the UK winter. The enclosed 'Impact Assessment on the External Lighting Installation' prepared by Pope Consulting Ltd provides further details and requirements for the lighting installation.

12. **Yield Data and Import Offset.** Five Fords' glasshouse is configured for the growing and harvesting of vining tomatoes. Yields are expected to be 29kgs/m²; Five Fords has the potential to produce 4,350t per annum. The bulk of UK imported tomatoes come from southern Spain (Almeria). Analysis by Professor Mike Berners-Lee to calculate carbon data

¹⁹ <https://en.climate-data.org/europe/united-kingdom/wales-269/#:~:text=The%20rainfall%20in%20Wrexham%20is,is%20785%20mm%20%7C%2030.9%20inch.>

²⁰ Planning Application (P/2020/363) – Economic Benefits – An analysis of Five Fords and the 'Wrexham Model' for future Sustainable, Low Carbon Food Production.

²¹ <https://stats.wales.gov.wales/Catalogue/Business-Economy-and-Labour-Market/People-and-Work/Employment/Persons-Employed/employmentrate-by-welshlocalarea-year-gender>

charts, associated with UK food imports²², indicates that tomatoes driven from Southern Spain have a carbon footprint 2.5kgs of CO₂ / Kg of produce. The re-shoring of 4,350t of vining tomatoes equates to a reduction of 10,875t of carbon given a return trip from Almeria to Wrexham is 3210 miles. The proposed development also creates an opportunity for Wales to become a net exporter of tomatoes.

Summary.

13. Five Fords offers an operational solution that understands and delivers on UK and Welsh Government strategic direction and policy to deliver a net carbon future. The 'Wrexham Model' provides the operational solution to local fresh produce production, the creation of clean and green jobs and a tangible solution to the sequestration of heat and CO₂. Collectively this places Wrexham on the vanguard of the UK 'Green Revolution', delivering opportunity to future generations and showcasing the town as an example to other towns, cities and regions to follow best practice.

Low Carbon Farming
March 2021

²² <https://www.bbc.co.uk/food/articles/carbon>

APPENDIX D

Transport Technical Note – TN01, Cotswold Transport Planning, March 2021



COTSWOLD
TRANSPORT
PLANNING

WREXHAM GLASSHOUSE

Low Carbon Farming 2 Ltd

Wrexham Glasshouse

Transport Technical Note – TN01

March 2021





1. Introduction

1.1 Cotswold Transport Planning (CTP) has been instructed by Low Carbon Farming 2 Ltd (The Appellant) to prepare a Transport Technical Note (TN) relating to the refusal by Wrexham County Borough Council (WCBC) for planning permission for the proposed development of a Commercial Glasshouse and Packing Facility (CGPF) and offices, energy centre, recovery plant and reservoirs on Land west of Sesswick Way, Marchwiel, Wrexham LL13 0TF (WCBC Planning Reference Number: P/2020/0363).

1.2 Planning permission was refused by WCBC on 25 September 2020. The Decision Notice is included at **Appendix A**. There are 6 reasons for refusal cited in the Decision Notice, of which Reason for Refusal 3 refers to transport and highways matters.

1.3 Reason for Refusal 3 states:

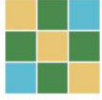
“The submitted plans and supporting information fail to demonstrate that there is sufficient capacity within the existing local highway network to accommodate the proposed development. No baseline traffic flows or capacity assessments of the key junctions have been provided. Given the current circumstances new meaningful traffic count data cannot be obtained at this time and without this data and the assessment it is not possible to establish precisely what impact the development will have on the highway network. To allow the development in the absence of this information would have a detrimental impact upon the capacity of the local highway network, contrary to Policy GDP1 (a) of the adopted Wrexham Unitary Development Plan and Welsh Government TAN 18.”

1.4 This Transport TN provides further traffic impact assessment of the proposed development on the local highway network, specifically to address Reason for Refusal 3.

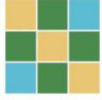
Application Background

1.5 A summary of the reports and correspondence concerning highways and transportation issues pertinent to this application is provided below for context.

1.6 The planning application was submitted to Wrexham County Borough Council in July 2020. A Transport Statement (TS) prepared by CTP dated June 2020 was submitted in support of the planning application.



- 1.7 Consultation responses were received from WCBC, as the local highway authority, dated 20 August 2020 and 18 September 2020.
- 1.8 The WCBC Highways consultation response dated 20 August 2020 requested additional information in relation to traffic impact assessments and personal injury collision data analysis and stated the following:
- “The Transport Statement does not yet demonstrate that the development can be accommodated by the highway network in terms of safety or capacity. Due to the effects of the coronavirus pandemic the collection of base traffic data in order to undertake capacity assessments has been disrupted. We would suggest the following be advised to the Developer. It is recommended that the Developer is advised to contact Consultants working on the Wrexham KS2 scheme ... and the North Wales Traffic Model... It is recommended that a wider assessment of accidents is undertaken, particularly looking at routes to the A534 and west into Wrexham”.*
- 1.9 The WCBC Highway consultation response dated 20 August 2020 is included in **Appendix B**.
- 1.10 CTP subsequently produced and submitted a Transport TN in September 2020, which provided a revised trip attraction considering a staff minibus travel scheme that would consequently reduce the forecast trip attraction – and thus the requirement for further off-site traffic assessments - whilst an extensive analysis of collisions of key junctions was also undertaken to determine any inherent, existing highway safety concerns in the vicinity of the site.
- 1.11 Following the submission of this revised information, WCBC Highways provided a further consultation response dated 18 September 2020, which identified the local ‘key’ junctions to be assessed regardless of the proposed staff minibus travel scheme, noted / welcomed the willingness to manage HGV arrival and departure times, whilst also clarifying that the staff minibus travel scheme / travel plan would need to be conditioned and regulated:
- “In order to assess the impact of the development trips on the highway network it is necessary to combine these trips with the baseline traffic flows and undertake junction assessments of the key junctions.*



It is recommended that the following junctions should be assessed:

- *The main site access junction*
- *Cefn Road/Bridge Road South/Bedwell Road/Sesswick Way roundabout*
- *Bridge Road South/ Clywedog Road South roundabout*

Without consideration of the existing traffic flows or any junction assessments, it is not possible to establish precisely what impact the development will have on the highway network or judge whether it would be acceptable. However, there is no anecdotal evidence to suggest that there are any existing significant traffic issues in the near vicinity to this site...

It is welcomed that an Operational Traffic Management Strategy is proposed by the developer to prevent HGVs from arriving or departing between 08:00 and 09:00. This document would form the basis of the proposed planning condition in respect to vehicle movements. Paragraphs 2.3 and 2.4 of the Technical Note shows that this restriction would increase the HGV headway such that HGV's would arrive every 5 minutes rather than every 8 minutes if this restriction is imposed...

It is welcomed that there is a proposal to implement a staff minibuss transport scheme and the suggested Employee Travel Plan. These measures will help to minimise traffic to the site and encourage use of sustainable travel options. This does not, however, remove the need to assess the traffic impact of the development...

We are now satisfied that a full review of the accident history has been undertaken. Conditions should be imposed that reflect:-

The Technical Note suggests that a staff minibuss transport scheme and an Employee Travel Plan will reduce the impact of staff trips. These initiatives are welcomed and encouraged."

- 1.12 The WCBC Highway consultation response dated 18 September 2020 is included in **Appendix C.**



- 1.13 The WCBC Highway consultation responses are summarised in the Officer's Delegated Report dated 25th September 2020. The Officer had concerns with regards securing by condition the proposed staff minibus travel scheme and the management of HGV arrival and departure times, which would restrict vehicle movements to/from the site during the peak hours in particular. Therefore, they wanted a full unrestrained traffic impact assessment to consider the impact of the proposed development in capacity terms on the local highway network.
- 1.14 This TN provides the traffic impact assessment of the proposed development on the local highway network, assuming no restrictions in terms of vehicle movements to/from the site and therefore represents a robust assessment of the impact of the proposed development.

Planning Policy Context

- 1.15 The planning policies referenced by WCBC in the Decision Notice specifically in relation to Reason for Refusal 3 are Policy GDP1 (a) of the adopted Wrexham Unitary Development Plan and Welsh Government TAN 18.
- 1.16 Policy GDP1 of the adopted Wrexham Unitary Development Plan sets out the Development Objectives relating to General Development Principles. Policy GDP1 (a) states that:
- "All new development should:*
- (a) Ensure that built development in its scale, design and layout, and in its use of materials and landscaping, accords with the character of the site and makes a positive contribution to the appearance of the nearby locality."*
- 1.17 Welsh Government TAN 18 is a Technical Advice Note concerned with Transport published in March 2007 which, along with other topic based TANs and other documents, supplements Planning Policy Wales 10 published in December 2018 that sets out the land use planning policies of the Welsh Government.



Scope of this Transport Technical Note

1.18 This TN specifically deals with the transport and highways matters raised by Reason for Refusal 3 and, with reference to the latest WCBC consultation response dated 18 September 2020 in respect of the scope of the traffic impact assessment, includes the following sections:

- Site Access Arrangements – proposed minor amendments to address comments made by the Public Rights of Way (PROW) Officer
- Forecast Trip Generation and Distribution – sets out the agreed trip generation rates and the trip distribution and assignment methodology adopted for this further traffic impact assessment
- Traffic Impact Assessment – sets out the study area, forecast assessment scenarios, forecast traffic flows and summarises the results of the traffic impact assessment on the local highway network.

1.19 In summary, CTP considers that this TN adequately addresses the issues raised by Reason for Refusal 3 and that the forecast trip attraction of the development proposal shall not have a detrimental or severe impact on the operational capacity and safe operation of the local highway network.

2. Site Access Arrangements

2.1 The primary access to the site for all modes of transport is from the Welsh Water Five Fords Wastewater Treatment Works (FFWTW) Access Road, which is located to the northwest / west of the site and runs in a north to south and then east to west alignment. At its northern extent, it forms the minor arm of a priority junction with Cefn Road and, at its south-western extent, it provides vehicular access to the FFWTW facility.

2.2 The primary site access is located on the outside of a bend where junction visibility is more than adequate given the FFWTW access road is subject to a 10mph speed limit. The road has an approximate carriageway width of 6.7m.

2.3 The drawings included in the Transport Statement submitted with the planning application confirm that the access is suitable to accommodate the swept path of a 16.5m maximum legal articulated HGV, the largest vehicle which will be associated with the site.



- 2.4 The two existing field accesses with Sesswick Way will be retained although will not actively serve the development. They may be used during the construction phase subject to a Construction Traffic Management Plan and will also be available for use in an emergency, if needed.
- 2.5 All visibility splays are achievable between the minor arms (i.e. the site access / egresses) and major arms (i.e. Cefn Road and Sesswick Way) and are within the extent of the adopted highway or land under the control of the appellant. Some localised trimming of hedgerows and scrub vegetation may be required to enable the visibility splays to be achieved from the Cefn Road access. From site observations (May 2020), this appears achievable although vegetation may have become overgrown due to a reduction of cutting and verge maintenance during the COVID19 pandemic.
- 2.6 Notwithstanding the above, some minor amendments are proposed to the site access arrangements. Although not specifically mentioned in or required by any of the reasons for refusal, the minor amendments are proposed to address comments made by the Public Rights of Way (PROW) Officer in their consultation response to the planning application.
- 2.7 The PROW Officer's consultation response is summarised in the Officer's Delegated Report dated 25th September 2020.
- "There may be potential for conflict between pedestrians and vehicles where the access road crosses the footpath. Recommends that signage is required on the access road either side of the footpath, warning drivers to be aware of pedestrians crossing. Some physical change to the surface of the access road at the point where the footpath crosses, would also be beneficial in helping to give the impression that footpath users have priority".*
- 2.8 Accordingly, a plan has been prepared showing provision for the PROW at the access including warning signage on the approaches to the footpath from both sides, the site access road and the FFWTW Access Road, and trimming of boundary vegetation within land in the application boundary and thus within the applicant's control. The vegetation trimming will enable pedestrians to see and be seen by vehicles when crossing the road. The plan, CTP Drawing SK01 is included at **Appendix D**.



3. Forecast Trip Attraction and Distribution

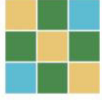
Forecast Trip Attraction

- 3.1 In order to provide a robust assessment, the original forecast trip attraction detailed in the TS (June 2020) during peak operational periods of the proposed facility has been used to inform this assessment. Thus, this does not allow for any staff minibuses which a future occupier may decide to implement. The total forecast trip attraction of the CGPF is summarised in **Table 3.1**.

Vehicle Type	Trip Type	Forecast Trip Attraction (Peak Season / Operational Periods)		
		Arrivals	Departures	Two-Way Total
HGV	HGV	45	45	90
Light	Staff Private Vehicle	143	143	286
	Staff Private Off-Site Trip	10	10	20
	Visitor Trip	5	5	10
HGV	Total	45	45	90
Light	Total	158	158	316

Table 3.1: Total forecast trip attraction of CGPF considering HGV, staff, and visitor travel.

- 3.2 The proposed CGPF is anticipated to be associated with a two-way total of 90 HGV trips and 316 staff / visitor trips during peak periods of operation.
- 3.3 Further detailed forecast trip attraction is provided in **Table 3.2** which considers all vehicle movements that are anticipated to take place during the observed AM and PM network peak hours and the anticipated AM and PM development peak hours.
- 3.4 It should be noted that the appellant is willing to commit to operational restrictions on HGVs arriving and departing the site during the observed AM and PM network peak hours; however, for assessment purposes, such vehicle trips have been included as an average of the total trips over the development operational period, in order to inform a 'worst case scenario' in terms of potential traffic impact.



Time Period	Vehicle Type	Trip Type	Forecast Trip Attraction (Peak Season / Operational Periods)		
			Arrivals	Departures	Two-Way Total
AM Dev Peak: 05:00 to 06:00	HGV	HGV	0	0	0
	Light	Staff Private Vehicle	143	0	143
		Staff Private Off-Site Trip	0	0	0
		Visitor Trip	0	0	0
	HGV	Total	0	0	0
	Light	Total	143	0	143
AM Net Peak: 0730: to 08:30	HGV	HGV	8	8	16
	Light	Staff Private Vehicle	0	0	0
		Staff Private Off-Site Trip	0	0	0
		Visitor Trip	1	1	2
	HGV	Total	8	8	16
	Light	Total	1	1	2
PM Dev Peak: 15:00 to 16:00	HGV	HGV	8	8	16
	Light	Staff Private Vehicle	0	143	143
		Staff Private Off-Site Trip	0	0	0
		Visitor Trip	1	1	2
	HGV	Total	8	8	16
	Light	Total	1	144	145
PM Net Peak: 16:30 to 17:30	HGV	HGV	0	0	0
	Light	Staff Private Vehicle	0	0	0
		Staff Private Off-Site Trip	0	0	0
		Visitor Trip	0	0	0
	HGV	Total	0	0	0
	Light	Total	0	0	0

Table 3.2: Forecast trip attraction of CGPF considering HGV, staff, and visitor travel during development and network peak periods.



- 3.5 As detailed in **Table 3.2**, the CGPF is anticipated to be associated with a two-way total of 143 trips during the AM development peak hour, 18 during the AM network peak hour (i.e. 16 HGVs and two visitors), 161 during the PM development peak hour (i.e. 16 HGVs, 143 staff, and two visitors), and zero during the PM network peak hour.
- 3.6 It should also be noted that staff are anticipated to make a small number of journeys off-site during the day (e.g. lunch breaks) and that these trips are included in the total trips in **Table 3.1** but are expected to occur outside of the peak hours detailed in **Table 3.2**.

Trip Distribution and Assignment

Staff / Visitors

- 3.7 Staff and visitor trips have been distributed at the FFWTW Access Road junction with Cefn Road on a pro rata basis using traffic survey data obtained from Traffic Wales (via Mott MacDonald) for the Cefn Road / Bridge Road South / Sesswick Roundabout, a junction turning count survey undertaken on Thursday 28th June 2018. Based on this survey data, 77% of development traffic has been distributed to/from Cefn Road west (Wrexham direction) and 23% to/from the Cefn Road / Bridge Road South / Sesswick Way roundabout junction (to the east). This was considered to be a robust approach. The alternative distribution methodology based on the 2011 Census travel to work data, considering the location of nearby settlements and thus places where future employees may reside, supported by Google Maps journey distance / times, also resulted in the majority of traffic routing to/from Cefn Road west (to/from Wrexham direction) but a significantly higher proportion due to the majority of settlements in the surrounding area being located to the west and southwest of the site. The pro rata based approach routes more traffic from the development via the Cefn Road / Bridge Road South / Sesswick Way roundabout junction, and therefore represents a robust assessment in terms of potential traffic impact at this junction.



- 3.8 The development staff and visitor traffic at the Cefn Road / Bridge Road South / Sesswick Way roundabout junction has been distributed based on the 2011 Census travel to work data distribution methodology. The nearest settlement is that of Marchwiell and is located to the southwest of the site with other settlements further afield all generally located to the west and southwest of the site. There are very few settlements located to the northeast of the site and therefore all staff and visitor trips routing through the roundabout junction have been distributed via Sesswick Way to/from the south, with no trips assigned north into Wrexham Industrial Estate.

HGV Traffic

- 3.9 Development HGV traffic to / from the site has been distributed to route 100% via the Cefn Road / Bridge Road South / Sesswick Way roundabout. There is a weight limit on Cefn Road to the west of the site towards Wrexham, which would limit HGV trips in this direction. This approach is considered to represent a robust assessment.
- 3.10 Further afield, based on the wider strategic road network located both to the north and south of the site (i.e. A534, A525, A528), the HGV traffic from the Cefn Road / Bridge Road South / Sesswick Way roundabout junction has been distributed 50% north and 50% south.
- 3.11 The distribution and assignment of traffic that informs the traffic impact assessment is contained in the Traffic Flow Diagrams provided in **Appendix E**.

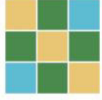
4. Traffic Impact Assessment

Introduction

- 4.1 This section summarises the traffic impact assessment on the local highway network and includes the key junctions as referred to in Reason for Refusal 3 and identified in the WCBC Highways further consultation response dated 18 September 2020. These junctions are:
- Cefn Road / FFWTW Access Road Junction;
 - Cefn Road/Bridge Road South / Sesswick Roundabout; and
 - Bridge Road South / Clywedog Road South Roundabout.



- 4.2 Full operational capacity junction assessments have been undertaken at the Cefn Road / FFWTW Access Road Junction and the Cefn Road/Bridge Road South / Sesswick Roundabout. No existing baseline survey data is available for the Bridge Road South / Clywedog Road South Roundabout and therefore a percentage impact assessment has been undertaken here; however, in view of the negligible impact as shown by the results no further assessment is considered necessary in any event.
- 4.3 The traffic impact assessment has considered a base year of 2021 and a forecast year of 2026.
- 4.4 The peak hour assessments cover both the development peak hours and the network peak hours as follows:
- Development AM Peak Hour (05:00-06:00)
 - Network AM Peak Hour (07:30–08:30)
 - Development PM Peak Hour (15:00-16:00)
 - Network PM Peak Hour (16:30-17:30)
- 4.5 The Cefn Road/Bridge Road South / Sesswick Roundabout turning count has been used to establish the baseline traffic flows at both the Cefn Road / Bridge Road South / Sesswick Roundabout and the Cefn Road / FFWTW Access Road Junction. No existing baseline survey data is available for the Bridge Road South / Clywedog Road South Roundabout.
- 4.6 The junction turning count survey at the Cefn Road/Bridge Road South / Sesswick Roundabout is a 12-hour survey from 07:00 – 19:00. The development AM peak hour 05:00 – 06:00 scenario has therefore been assessed at both the Cefn Road / FFWTW Access Road Junction and the Cefn Road/Bridge Road South / Sesswick Roundabout using 05:00 – 06:00 development traffic flows but against the background of 07:00 - 08:00 surveyed traffic flows. This is considered to be a robust assessment as it compounds the impact of development traffic at a time when existing traffic flows on the highway network are higher. Based on the June 2020 ATC on Cefn Road, weekday traffic flows during 05:00 - 06:00 are 11.5% lower than in the network AM peak hour 07:00 – 08:00.
- 4.7 The 2018 traffic count data has been factored up to the 2021 base year and 2026 forecast year using TEMPro. The TEMPro calculations are included in **Appendix F**.



- 4.8 Traffic flows for the FFWTW have been obtained from an ATC undertaken on the FFWTW Access Road in January 2021. Although the survey has been undertaken during a period of national Lockdown, the FFWTW forms part of the critical national infrastructure and has continued operation throughout this period. Therefore the results of the survey should reflect typical operation. These have been added to the baseline traffic flows derived from the Cefn Road/Bridge Road South/Sesswick Roundabout traffic survey data to establish the combined 2021 base year traffic flows at the Cefn Road / FFWTW Access Road Junction.
- 4.9 The FFWTW traffic has been distributed at the Cefn Road / FFWTW Access Road Junction based on the same distribution as the proposed development, split by light and heavy vehicles.
- 4.10 The traffic flows for each assessment scenario are contained in the Traffic Flow Diagrams provided in **Appendix E**.
- Cefn Road / FFWTW Access Junction*
- 4.11 The junction capacity assessment of the Cefn Road / FFWTW Access Road Junction has been undertaken using the PICADY module within the TRL software package Junctions 9.
- 4.12 The results of the Junctions 9 PICADY model under the loading of the 2021 and 2026 assessment year traffic flow scenarios are presented in **Table 4.1 and Table 4.2** with the full outputs contained in **Appendix G**.

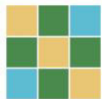


Time Period	Stream	2021 Base			2021 Base + Development		
		Ratio of Flow to Capacity (RFC)	Mean Max Queue	Delay (s)	Ratio of Flow to Capacity (RFC)	Mean Max Queue	Delay (s)
Dev AM Peak (05:00-06:00)	B-C	0.00	0.0	0.00	0.00	0.0	0.00
	B-A	0.00	0.0	0.00	0.00	0.0	0.00
	C-AB	0.01	0.0	5.13	0.26	0.6	5.37
Network AM Peak (07:30-08:30)	B-C	0.01	0.0	6.14	0.01	0.0	6.74
	B-A	0.01	0.0	9.47	0.04	0.0	13.9
	C-AB	0.05	0.1	4.47	0.05	0.1	4.48
Dev PM Peak (15:00-16:00)	B-C	0.01	0.0	6.01	0.20	0.2	6.85
	B-A	0.01	0.0	8.45	0.12	0.1	10.26
	C-AB	0.01	0.0	6.25	0.01	0.0	6.09
Network PM Peak (16:30-17:30)	B-C	0.03	0.0	6.62	0.03	0.0	6.55
	B-A	0.02	0.0	10.25	0.02	0.0	10.28
	C-AB	0.01	0.0	5.84	0.01	0.0	5.72

KEY: - Arm A = Cefn Road (E) Arm B = FFWTW Access Road Arm C = Cefn Road (W)

**Table 4.1: Summary of Cefn Road / FFWTW Access Road Junction - Junctions 9
PICADY Assessment – 2021 Assessment Year**

- 4.13 The results summarised in **Table 4.1** suggest that the Cefn Road / FFWTW Access Road Junction will operate well within capacity during both the development and network AM and PM peak hours, across all scenarios in the 2021 Base year. There is no forecast queuing (exception 1 vehicle in the Development AM peak on Cefn Road) with the addition of the proposed development, resulting in a maximum RFC of 0.26 on Cefn Road west in the development AM peak hour. The maximum delay is 13.9 seconds during the network AM peak hour for vehicles turning right from the FFWTW Access Road onto Cefn Road travelling east.
- 4.14 It is considered that the development traffic will not have a significant impact on the Cefn Road / FFWTW Access Road Junction, with minimal increases between the 2021 Base and 2021 Base + Development scenarios.



Time Period	Stream	2026 Base			2026 Base + Development		
		Ratio of Flow to Capacity (RFC)	Mean Max Queue	Delay (s)	Ratio of Flow to Capacity (RFC)	Mean Max Queue	Delay (s)
Dev AM Peak (05:00-06:00)	B-C	0.00	0.0	0.00	0.00	0.0	0.00
	B-A	0.00	0.0	0.00	0.00	0.0	0.00
	C-AB	0.01	0.0	5.05	0.27	0.6	5.33
Network AM Peak (07:30-08:30)	B-C	0.01	0.0	6.16	0.01	0.0	6.76
	B-A	0.01	0.0	9.64	0.05	0.0	14.15
	C-AB	0.06	0.1	4.42	0.06	0.1	4.42
Dev PM Peak (15:00-16:00)	B-C	0.01	0.0	6.05	0.20	0.3	6.91
	B-A	0.01	0.0	8.54	0.13	0.1	10.39
	C-AB	0.01	0.0	6.22	0.01	0.0	6.06
Network PM Peak (16:30-17:30)	B-C	0.03	0.0	6.73	0.03	0.0	6.79
	B-A	0.02	0.0	10.51	0.02	0.0	10.51
	C-AB	0.01	0.0	5.82	0.01	0.0	5.71

KEY: - Arm A = Cefn Road (E) Arm B = FFWTW Access Road Arm C = Cefn Road (W)

**Table 4.2: Summary of Cefn Road / FFWTW Access Road Junction - Junctions 9
PICADY Assessment – 2026 Assessment Year**

- 4.15 The results summarised in **Table 4.2** indicate that the Cefn Road / FFWTW Access Road Junction will operate well within capacity across all scenarios in both the development and network AM and PM peak hours. The Cefn Road / FFWTW Access Road Junction is no forecast queuing (exception 1 vehicle in the Development AM peak on Cefn Road) with a maximum RFC of 0.27 on Cefn Road west in the development AM peak hour and a maximum delay of 14.15 seconds for vehicles turning right onto Cefn Road travelling east in the network AM peak hour.
- 4.16 It is considered that the Cefn Road / FFWTW Access Road Junction is suitable to accommodate the proposed development traffic with minimal queuing and without significant delay.



Cefn Road / Bridge Road South / Sesswick Roundabout

- 4.17 The junction capacity assessment of the Cefn Road / Bridge Road South / Sesswick Roundabout has been undertaken using the ARCADY module within the TRL software package Junctions 9.
- 4.18 The results of the Junctions 9 ARCADY model under the loading of the 2021 and 2026 assessment year traffic flow scenarios are presented in **Table 4.3 and Table 4.4** with the full outputs contained in **Appendix H**.

Time Period	Arm	2021 Base			2021 + Development		
		Ratio of Flow to Capacity (RFC)	Mean Max Queue	Delay (s)	Ratio of Flow to Capacity (RFC)	Mean Max Queue	Delay (s)
Dev AM Peak (05:00-06:00)	1	0.10	0.1	2.17	0.10	0.1	2.17
	2	0.28	0.4	2.74	0.30	0.4	2.80
	3	0.35	0.5	4.42	0.35	0.5	4.42
Network AM Peak (07:30-08:30)	1	0.10	0.1	1.99	0.11	0.1	2.04
	2	0.34	0.5	2.99	0.35	0.5	3.04
	3	0.46	0.9	5.73	0.47	0.9	5.90
Dev PM Peak (15:00-16:00)	1	0.18	0.2	1.99	0.19	0.2	2.06
	2	0.13	0.1	2.56	0.13	0.2	2.63
	3	0.13	0.1	3.01	0.17	0.2	3.26
Network PM Peak (16:30-17:30)	1	0.45	0.8	2.79	0.45	0.8	2.79
	2	0.15	0.2	2.81	0.15	0.2	2.81
	3	0.16	0.2	3.01	0.16	0.2	3.01

KEY: - Arm 1 = North Approach Arm 2 = Sesswick Way Arm 3 = Cefn Road

Table 4.3: Summary of Cefn Road/Bridge Road South / Sesswick Roundabout - Junctions 9 ARCADY Assessment – 2021 Assessment Year



- 4.19 The results summarised in **Table 4.3** forecast that the Cefn Road / Bridge Road South / Sesswick Roundabout will operate well within capacity across all scenarios in both the development and network AM and PM peak hours. There is no increase in queuing between the scenarios, save for a minimal increase in the development PM peak hour. There is a maximum increase of 0.04 RFC between the 2021 Base and 2021 Base + Development scenarios on Cefn Road in the AM development peak hour.
- 4.20 It is considered that the proposed development will not have a significant impact on the safe operation of the roundabout, with minimal increases in the RFC and delay as a result of the addition of development traffic.

Time Period	Arm	2026 Base			2026 Base + Development		
		Ratio of Flow to Capacity (RFC)	Mean Max Queue	Delay (s)	Ratio of Flow to Capacity (RFC)	Mean Max Queue	Delay (s)
Dev AM Peak (05:00-06:00)	1	0.11	0.1	2.19	0.11	0.1	2.19
	2	0.29	0.4	2.81	0.31	0.5	2.87
	3	0.37	0.6	4.64	0.37	0.6	4.64
Network AM Peak (07:30-08:30)	1	0.11	0.1	2.01	0.11	0.1	2.05
	2	0.36	0.6	3.08	0.37	0.6	3.14
	3	0.50	1.0	6.19	0.51	1.0	6.37
Dev PM Peak (15:00-16:00)	1	0.19	0.2	2.02	0.20	0.3	2.09
	2	0.13	0.2	2.59	0.14	0.2	2.66
	3	0.14	0.2	3.05	0.18	0.2	3.31
Network PM Peak (16:30-17:30)	1	0.48	0.9	2.93	0.48	0.9	2.93
	2	0.17	0.2	2.88	0.17	0.2	2.88
	3	0.17	0.2	3.05	0.17	0.2	3.05

KEY: - Arm 1 = North Approach Arm 2 = Sesswick Way Arm 3 = Cefn Road

Table 4.4: Summary of Cefn Road / Bridge Road South / Sesswick Roundabout - Junctions 9 ARCADY Assessment – 2026 Assessment Year.



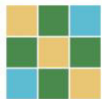
- 4.21 **Table 4.4** indicates that the Cefn Road / Bridge Road South / Sesswick Roundabout will operate well within capacity across all scenarios in both the development and network AM and PM peak hours. The roundabout is forecast to have minimal queuing across all arms with a maximum delay of 6.37 seconds for vehicles on the Cefn Road approach in the network AM peak hour with the proposed development.
- 4.22 On this basis, it is concluded that the proposed development will have a negligible impact on the existing safety and operation of the Cefn Road / Bridge Road South / Sesswick Roundabout, with minimal increases in queuing and delay as a result of the development traffic.

Bridge Road South / Clwedog Road South Roundabout Junction

- 4.23 No baseline survey data for the Bridge Road South / Clwedog Road South Roundabout Junction was available and therefore a junction capacity assessment is not possible in this instance. However, CTP has instead undertaken a percentage impact assessment of the Bridge Road South / Clwedog Road South Roundabout Junction by utilising the recorded north-eastbound and south-westbound vehicle flows from the Cefn Road / Bridge Road South / Sesswick Roundabout junction turning count data provided by Traffic Wales.
- 4.24 The percentage impact of the forecast trip attraction on the nearby Bridge Road South / Clwedog Road South Roundabout Junction for 2021 and 2026 assessment years are presented in **Table 4.5** and **Table 4.6**.

Period	% Impact Assessment of Bridge Road South / Clwedog Road South Roundabout			
	Base 2021	Base 2021 + Development Traffic	Traffic Increase (i.e. Development Traffic)	% Increase
Dev AM Peak (05:00-06:00)	942	942	0	0%
Network AM Peak (07:30-08:30)	1108	1116	8	0.72%
Dev PM Peak (15:00-16:00)	584	592	8	1.37%
Network PM Peak (16:30-17:30)	1223	1223	0	0%

Table 4.5: Percentage Impact Assessment of Bridge Road South / Clwedog Road South Roundabout Junction – 2021 Assessment Year



- 4.25 **Table 4.5** indicates that the additional traffic associated with the proposed development will result in a maximum increase in traffic flows through the junction of 1.37% during the development PM peak hour. During both the development AM peak hour and the network PM peak hour, the proposed development is not anticipated to result in any increase in traffic movements at the junction.

Period	% Impact Assessment of Bridge Road South / Clwedog Road South Roundabout			
	Base 2026	Base 2026 + Development Traffic	Traffic Increase (i.e. Development Traffic)	% Increase
Dev AM Peak (05:00-06:00)	995	995	0	0%
Network AM Peak (07:30-08:30)	1170	1178	8	0.68%
Dev PM Peak (15:00-16:00)	617	625*	8	1.30%
Network PM Peak (16:30-17:30)	1292	1292	0	0%

NOTE: - Summation subject to cumulative rounding

Table 4.6: Percentage impact assessment of Bridge Road South / Clwedog Road South Roundabout Junction – 2026 Assessment Year

- 4.26 **Table 4.6** indicates that the proposed development will not have any impact on the nearby Bridge Road South / Clwedog Road South Roundabout Junction during either the development AM peak hour or the network PM peak hour, with a maximum increase in traffic flows of 1.30% during the development PM peak hour as a result of the proposed development.

Summary

- 4.27 It is concluded that the Cefn Road / FFWTW Access Road Junction is suitable to accommodate the proposed development traffic. The junction is forecast to operate well within capacity both with and without the proposed development, with minimal queuing and without significant delay.

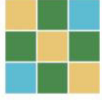


- 4.28 The Cefn Road / Bridge Road South / Sesswick Roundabout is forecast to operate well within capacity both with and without the proposed development. The proposed development will have a negligible impact on the existing safety and operation of the Cefn Road / Bridge Road South / Sesswick Roundabout, with minimal increases in queuing and delay as a result of the development traffic.
- 4.29 The proposed development is anticipated to result in a maximum increase in traffic flows through the Bridge Road South / Clwedog Road South Roundabout Junction of less than 2%. During both the development AM peak hour and the network PM peak hour, there is anticipated to be no impact at all. It is therefore considered that the proposed development will have a negligible impact on the existing safety and operation of the Bridge Road South / Clwedog Road South Roundabout Junction.
- 4.30 It is therefore concluded that there is sufficient capacity within the existing local highway network to accommodate the proposed development and that the development is not contrary to Policy GDP1 (a) of the adopted Wrexham Unitary Development Plan and Welsh Government TAN 18, as referred to in Reason for Refusal 3.

5. Summary & Conclusion

Summary

- 5.1 CTP has been instructed by Low Carbon Farming 2 Ltd to prepare a Transport Technical Note (TN) relating to the refusal by Wrexham County Borough Council (WCBC) for planning permission for the proposed development of a Commercial Glasshouse and Packing Facility (CGPF) and offices, energy centre, recovery plant and reservoirs on Land west of Sesswick Way, Marchwiel, Wrexham LL13 0TF (WCBC Planning Reference Number: P/2020/0363).
- 5.2 This Transport TN has specifically dealt with Reason for Refusal 3 as follows:
- “The submitted plans and supporting information fail to demonstrate that there is sufficient capacity within the existing local highway network to accommodate the proposed development. No baseline traffic flows or capacity assessments of the key junctions have been provided. Given the current circumstances new meaningful traffic count data cannot be obtained at this time and without this data and the assessment it is not possible to establish precisely what impact the development will have on the highway network. To allow the development in the absence of this*

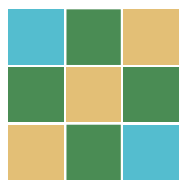


information would have a detrimental impact upon the capacity of the local highway network, contrary to Policy GDP1 (a) of the adopted Wrexham Unitary Development Plan and Welsh Government TAN 18.”

- 5.3 This Transport TN provides the traffic impact assessment of the proposed development on the local highway network, specifically to address Reason for Refusal 3.
- 5.4 Minor amendments to the site access arrangements are proposed. These are not necessary to specifically address any of the reasons for refusal but are proposed to address comments made by the Public Rights of Way (PROW) Officer in their consultation response to the planning application.
- 5.5 It has been demonstrated that there is sufficient capacity within the existing local highway network to accommodate the proposed development and that the development is not contrary to Policy GDP1 (a) of the adopted Wrexham Unitary Development Plan and Welsh Government TAN 18, as referred to in Reason for Refusal 3.

Conclusion

- 5.6 The proposed development would not have a detrimental impact upon the capacity of the local highway network and therefore is not contrary to Policy GDP1 (a) of the adopted Wrexham Unitary Development Plan and Welsh Government TAN 18, as referred to in Reason for Refusal 3.
- 5.7 It is therefore concluded that there are no reasonable transport or highways related reasons why the development should not be allowed.



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Appendix A

Decision Notice MAR P/2020/0363

In pursuance of its powers under the Acts and Orders referred to below, the County Borough Council as Local Planning Authority, hereby determines your application in accordance with the particulars and plans comprising the application

Applicant	LOW CARBON FARMING 2 LTD	Code No	MAR P/2020/0363
Agent	OASTHOUSE VENTURES MRS ELEANOR ROBERTS 8 - 9 SHIP STREET BRIGHTON BN1 1AD	Date Received	13/07/2020
		Decision Date	25/09/2020

Town and Country Planning Act, 1990

Location of application

LAND WEST OF, SESSWICK WAY, MARCHWIEL, WREXHAM, LL13 0TF

Description of application

TY GWYDR GYDA CHYFLEUSTER PACIO A SWYDDFEYDD, CANOLFAN YNNI, GWAITH ADFER A CHRONFEYDD DWR / GLASSHOUSE WITH PACKING FACILITY AND OFFICES, ENERGY CENTRE, RECOVERY PLANT AND RESERVOIRS

In reaching this decision the Council has had regard to the relevant policies in the Wrexham Unitary Development Plan which are as follows:-

E5	Employment in the countryside
EC11	Archaeology
EC12	Development and flood risk
EC2	Agricultural Land
EC3	Agricultural Buildings
EC4	Hedgerows, Trees and Woodland
EC6	Biodiversity Conservation
EC9	Listed buildings of special architectural or historic interest
GDP1	Development objectives
PS1	Settlement limits
PS2	Development and the environment
PS4	Settlement Pattern
T8	Parking

Particulars of decision that permission be REFUSED

Reason(s)

1. The proposed development lies outside the defined settlement limits and would comprise of major development within the open countryside. To allow the development would be contrary to Policies PS1, PS2 and PS4 of the adopted Wrexham Unitary Development Plan.
2. The proposed development, by virtue of its siting and scale within a visually prominent location would have a significant adverse impact upon the wider landscape. Development in this exposed location would be highly conspicuous and detrimental to the wider visual amenities of the area. It does not make a positive contribution to the appearance of the nearby locality and as such would be contrary to Policies GDP1 (a) and PS2 of the adopted Wrexham Unitary Development Plan.
3. The submitted plans and supporting information fail to demonstrate that there is sufficient capacity within the existing local highway network to accommodate the proposed development. No baseline traffic flows or capacity assessments of the key junctions have been provided. Given the current circumstances new meaningful traffic count data cannot be obtained at this time and without this data and the assessment it is not possible to establish precisely what impact the development will have on the highway network. To allow the development in the absence of this information would have a detrimental impact upon the capacity of the local highway network, contrary to Policy GDP1 (a) of the adopted Wrexham Unitary Development Plan and Welsh Government TAN 18.
4. The application fails to demonstrate that the proposed development would be detrimental to the maintenance of the favourable conservation status of the Great Crested Newt population at this site. Whilst the proposals show an increase in mitigation land there is no information on the mechanism which will be used to ensure its long term management. The future management of mitigation land is fundamental to whether the proposed development will be acceptable. To allow this development without this information would have a detrimental impact, contrary to Policy EC6 of the adopted Wrexham Unitary Development Plan and Welsh Government TAN 5 Nature Conservation and Planning.
5. The application fails to demonstrate that the proposed development mitigates against impact on breeding birds of priority in Wales. Breeding bird surveys were undertaken too late in the season to ensure that all species were accounted for. In addition, no information on lighting is provided which is fundamental to whether the proposed development will have a detrimental impact upon wildlife including European Protected Species such as bats and otter. To allow the development without this information would have a detrimental impact, contrary to Policy EC6 of the adopted Wrexham Unitary Development Plan and Welsh Government TAN 5 Nature Conservation and Planning.
6. The Flood Consequences Assessment does not provide any indication as to what the potential flood depths/velocities could be for the site access. The existing site access is located in Zone C2 and Cefn Road frequently floods in this location with recent incidences of road closures. In the absence of any detailed technical investigations to evaluate the extent of the flood risk at the Cefn Road entrance, the application should not be permitted. To allow

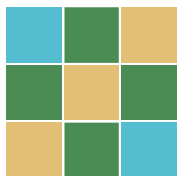
the proposed development in the absence of this information would be contrary to Policy EC12 of the adopted Wrexham Unitary Development Plan and Welsh Government TAN 15 Development and Flood Risk.

A handwritten signature in black ink, appearing to be 'L. J. Jones'.

**Officer Appointed for this purpose
Chief Officer Planning & Regulatory**

Refer to Statement of Applicant's Rights and General Information on our planning web site at:-

http://www.wrexham.gov.uk/english/planning_portal/publications/info_sheets.htm



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Appendix B

WCBC Consultation Response - August
2020

MEMORANDUM



From:	Chief Officer, Environment & Technical	To:	Chief Officer Planning & Regulatory
Our Ref:		FAO:	Mared Rees-Jones
		Your Ref:	P/2020/0363
Date:	20 th August 2020		

**Land west of Sesswick Way, Marchwiell, Wrexham.
Proposed glasshouse with packing facility and offices, energy centre, recovery plant and reservoirs**

Further to your consultation dated 03/08/2020 in respect of the above, I comment as follows:-

Trip Generation

The expected number of trips generated by both cars and HGVs have been calculated from first principles based on knowledge of other comparable sites. A robust estimate has been obtained of the likely development trip numbers. In peak period, up to 90 HGV trips and approximately 300+ car trips are expected at the site.

Traffic Assessment

ATC surveys were undertaken on Cefn Road and Sesswick Way in May 2020. Due to the national lockdown during the coronavirus pandemic, these traffic counts will be substantially lower than typical traffic and this is acknowledged in the TA. No baseline traffic flows or capacity assessments of the key junctions have been provided.

In the current circumstances new meaningful traffic count data cannot be obtained at this time, but without the data and assessments it is not possible to confirm that the development can be supported by the surrounding highway network. It may be possible to use data collected in previous years for transport assessments undertaken for nearby sites.

It is recommended that the Developer is advised to contact Consultants working on the Wrexham KS2 scheme (Mott MacDonald – claudia.currie@mottmac.com) and the North Wales Traffic Model (Jacobs -Daniel.Cornelius@jacobs.com)

Site Access

The development will use the existing access on to Cefn Road, which is shared with Welsh Water which is already used regularly by HGVs. The visibility splays at the Cefn Road and Sesswick Way access junctions have been shown to be within the Design Manual for Street requirements for a highway with speeds over 40mph. There remains concern that the swept path diagrams, shown on the OS map base, for the existing entrance to the site show HGV's driving on land not currently used as highway but as this land is included in the Redline Boundary this can be resolved through an appropriate S278 agreement.

There could be a future issued with the additional minor gated accesses if they are used at a later date to access/egress the site on a regular basis.

Accident Analysis

The Crashmap website provides an acceptable indication of the accident record in the close vicinity of the site. However, the screen shot from Crashmap used by the Developer shows no accidents for the three year period shown on Cefn Road and Sesswick Way adjacent to the site, nor on the site access junction or the Cefn Road/Bridge Road/Bedwell Road/Sesswick Way junction.

If the study area is widened slightly and five years of data are displayed, there appears to be a cluster of accidents on Cefn Road within 500m to the west of the site access junction. This includes

one fatal and one serious accident which is a concern as this route is likely to be used by staff and visitors coming from Wrexham. In addition, for Clewedog Road, on the route north towards the A534 been a number of serious accidents. This route would be used by both HGV and car traffic to the site.

It is therefore inappropriate to conclude that there are no relevant highway safety issues near the proposed site access and along the routes that the development traffic would use. Further investigation of the collision history is required on Cefn Road and Clewedog Road.

Car Parking

Parking requirements have been estimated based on the proportion of workers driving to work in this MSOA according to 2011 Travel to Work census data. It is estimated that 143 of the 180 staff are likely to drive to work. A small number of visitors to the site are also expected, producing a total parking requirement of 145 spaces at peak times.

Sustainable Transport Options

Sustainable transport options to the site are available to staff as the site is accessible by bus via the bus stop in Pentre Maelor, approximately 15 minutes walk from the site. The proposal will provide an additional bus stop closer to the site which will encourage sustainable travel option to the site.

The provision of cycle parking on site will encourage the use of Active Travel via a shared use path linking the site to Wrexham, although in places this is narrow and would benefit by improvement. There are local amenities available in Marchwiel and Wrexham which is within a reasonable cycling distance.

Bus Stop Provision

It is noted that the applicant's proposal is to provide east and westbound bus stops on Cefn Road, for bus routes that already pass the site and agree this would improve the options for employees to travel sustainably. The proposed bus stop locations appear appropriate and should be secured through Section 106 or 278 Agreements.

Internal Site Layout

A site layout plan and swept path analysis has been provided, showing that the expected HGV movements can be accommodated within the proposed site layout, with sufficient space for vehicles to wait on site if loading bays are not vacant.

Conclusion

The Transport Statement does not yet demonstrate that the development can be accommodated by the highway network in terms of safety or capacity.

Due to the effects of the coronavirus pandemic the collection of base traffic data in order to undertake capacity assessments has been disrupted. We would suggest the following be advised to the Developer:

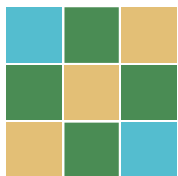
It is recommended that the Developer is advised to contact Consultants working on the Wrexham KS2 scheme (Mott MacDonald – claudia.currie@mottmac.com) and the North Wales Traffic Model (Jacobs - Daniel.Cornelius@jacobs.com)

It is recommended that a wider assessment of accidents is undertaken, particularly looking at routes to the A534 and west into Wrexham.

It should be noted that the developer has offered to contribute to the provision of the bus stops via a financial contribution or through a section 278 agreement and this agreement could also be used to secure appropriate highway access improvements to the site entrance to enable HGV's to pass more easily.

In addition, a Construction Traffic Management Plan is required for approval before any construction can take place on this site, paying particular attention to the proposed usage of all the access/egress points to the site.





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Appendix C

WCBC Consultation Response - September
2020

MEMORANDUM

From: Chief Officer, Environment & Technical **To:** Chief Officer Planning & Regulatory
FAO: Mared Rees-Jones

Our Ref: **Your Ref:** P/2020/0363

Date: 18th September 2020

**Land west of Sesswick Way, Marchwiel, Wrexham.
Proposed glasshouse with packing facility and offices, energy centre, recovery plant and reservoirs**

Further to your email / consultation dated 04/09/2020 in respect of the above, I comment as follows:-

Following my initial comments on this application a further technical note has been provided by the applicant, addressing the highways issues raised. The technical note has sought to address the following:

- Forecast trip attraction and associated impact on the local highway network;
- Personal Injury Collisions within the vicinity of the application site on the local highway network; and
- Site access arrangements / a Construction Traffic Management Plan

Trip Generation and Traffic Assessment

The Transport Statement initially submitted included a robust estimate of the daily trip numbers generated by the site, by HGVs and by cars.

In order to assess the impact of the development trips on the highway network it is necessary to combine these trips with the baseline traffic flows and undertake junction assessments of the key junctions.

It is recommended that the following junctions should be assessed:

- The main site access junction
- Cefn Road/Bridge Road South/Bedwell Road/Sesswick Way roundabout
- Bridge Road South/ Clywedog Road South roundabout

However, due to the Covid 19 lockdown it has not been possible to collect meaningful baseline traffic data. In light of this the developer was previously advised to contact the consultants working on the Wrexham KS2 scheme and the North Wales Traffic Model to obtain previously collected data. It should be noted that the common use of the peak hour to assess traffic impact reflects the fact that this is often the time when the development traffic impact will be greatest. If the impact is expected to occur at a different time of day it may be appropriate to assess that time period.

The Technical Note received in response to the previous comments asserts that as trips are likely to occur outside of the network peak hours there will be no significant impact on the highway network during the peak hours.

Without consideration of the existing traffic flows or any junction assessments, it is not possible to establish precisely what impact the development will have on the highway network or judge whether

it would be acceptable. However, there is no anecdotal evidence to suggest that there are any existing significant traffic issues in the near vicinity to this site.

The original documentation stated that the proposed hours of operation for the site will be 06:00 to 15:00 and the use of an appropriate condition requiring an enforceable Traffic Management Plan would address the issues of HGV movements during the morning peak period.

HGVs

It is welcomed that an Operational Traffic Management Strategy is proposed by the developer to prevent HGVs from arriving or departing between 08:00 and 09:00. This document would form the basis of the proposed planning condition in respect to vehicle movements. Paragraphs 2.3 and 2.4 of the Technical Note shows that this restriction would increase the HGV headway such that HGV's would arrive every 5 minutes rather than every 8 minutes if this restriction is imposed.

Staff/Visitor Travel

It is welcomed that there is a proposal to implement a staff minibus transport scheme and the suggested Employee Travel Plan. These measures will help to minimise traffic to the site and encourage use of sustainable travel options. This does not, however, remove the need to assess the traffic impact of the development.

Site Access

A potential future issue was previously identified with the minor gated accesses if they are used at a future date. The Technical Note confirms that these access points are reserved for emergencies only and the site plans show an area of grass in front of these accesses.

Accident Analysis

The previously submitted Transport Statement had a limited assessment of the collisions in the wider area surrounding the site and further collision history for Cefn Road and Clewedog Road was requested.

A detailed analysis has now been provided, which is satisfactory as it shows that there are no highway safety issues present that would need to be addressed by this developer.

Construction Traffic Management Plan

The Technical Note confirms that a Construction Traffic Management Plan shall be provided and suggests that this is dealt with in the form of a planning condition.

Conclusion

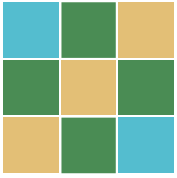
We are now satisfied that a full review of the accident history has been undertaken.

Conditions should be imposed that reflect:-

- The Technical Note suggests that a staff minibus transport scheme and an Employee Travel Plan will reduce the impact of staff trips. These initiatives are welcomed and encouraged.
- As previously stated, a Construction Traffic Management Plan is required for approval before any construction can take place on this site, paying particular attention to the proposed usage of all the access/egress points to the site.
- An Operational Traffic Management Strategy/Plan is required for approval before any operation begins on the site.

The Technical Note provided still does not provide information to demonstrate whether the development can be accommodated by the highway network in terms of capacity. However, the implementation of the Operation Traffic Management Plan will ensure the morning peak period is not affected. This plan will also need to pay particular attention to the proposed usage of all the access/egress points to the site.





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Appendix D

CTP Drawing SK01



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Appendix E

Traffic Flow Diagrams

Client: Low Carbon Farming Ltd 2
Project: Proposed Commercial Glasshouse and Packing Facility, Five Fords, Wrexham
Title: Traffic Flow Analysis
Project Code: 21-0144
Date: 03/03/2021

Traffic Flows Diagrams

TFD_01 Base 2018 Network Peak Periods
 TFD_02 Base 2018 Proposed Development Operational Peak Periods
 TFD_03 Base 2021 Network Peak Periods
 TFD_04 Base 2021 Proposed Development Operational Peak Network Periods
 TFD_05 Five Fords Wastewater Treatment Works Network Peak Periods
 TFD_06 Five Fords Wastewater Treatment Works Proposed Development Operational Peak Periods
 TFD_07 Five Fords Wastewater Treatment Works Light Traffic Distribution %
 TFD_08 Five Fords Wastewater Treatment Works HGV Traffic Distribution %
 TFD_09 Base 2021 Network Peak Periods + Five Fords Wastewater Treatment Works
 TFD_10 Base 2021 Proposed Development Operational Peak Network Periods + Five Fords Wastewater Treatment Works
 TFD_11 Base 2026 Network Peak Periods + Five Fords Wastewater Treatment Works
 TFD_12 Base 2026 Proposed Development Operational Peak Network Periods + Five Fords Wastewater Treatment Works
 TFD_13 Proposed Development Traffic Distribution %
 TFD_14 Proposed Development HGV Traffic Distribution %
 TFD_15 Proposed Development Traffic Network Peak Periods
 TFD_16 Proposed Development Traffic Operational Peak Periods
 TFD_17 Base 2021 Network Peak Periods + Proposed Development Traffic
 TFD_18 Base 2021 Proposed Development Operational Peak Network Periods + Proposed Development Traffic
 TFD_19 Base 2026 Network Peak Periods + Proposed Development Traffic
 TFD_20 Base 2026 Proposed Development Operational Peak Network Periods + Proposed Development Traffic

TEMPro Growth Rates

2018 to 2021 AM Peak: 1.0379
 2018 to 2021 Inter Peak: 1.0453
 2018 to 2021 PM Peak: 1.0378
 2021 to 2026 AM Peak: 1.0554
 2021 to 2026 Inter Peak: 1.0591
 2021 to 2026 PM Peak: 1.0567

Forecast Vehicle Trip Attraction - Development Proposal

Staff

Time Period	Arrivals	Departures	Two Way Total
05:00 to 06:00	143	0	143
07:30 to 08:30	0	0	0
15:00 to 16:00	0	143	143
16:30 to 17:30	0	0	0

HGVs

Time Period	Arrivals	Departures	Two Way Total
05:00 to 06:00	0	0	0
07:30 to 08:30	8	8	16
15:00 to 16:00	8	8	16
16:30 to 17:30	0	0	0

Visitors

Time Period	Arrivals	Departures	Two Way Total
05:00 to 06:00	0	0	0
07:30 to 08:30	1	1	2
15:00 to 16:00	1	1	2
16:30 to 17:30	0	0	0

Forecast Vehicle Trip Attraction - Five Fords Wastewater Treatment Works

ATC - Lights

Time Period	Arrivals	Departures	Two Way Total
05:00 to 06:00	3	1	4
07:30 to 08:30	12	6	18
15:00 to 16:00	5	9	14
16:30 to 17:30	4	8	12

ATC - HGVs

Time Period	Arrivals	Departures	Two Way Total
05:00 to 06:00	2	0	2
07:30 to 08:30	1	1	2
15:00 to 16:00	2	1	3
16:30 to 17:30	1	1	2

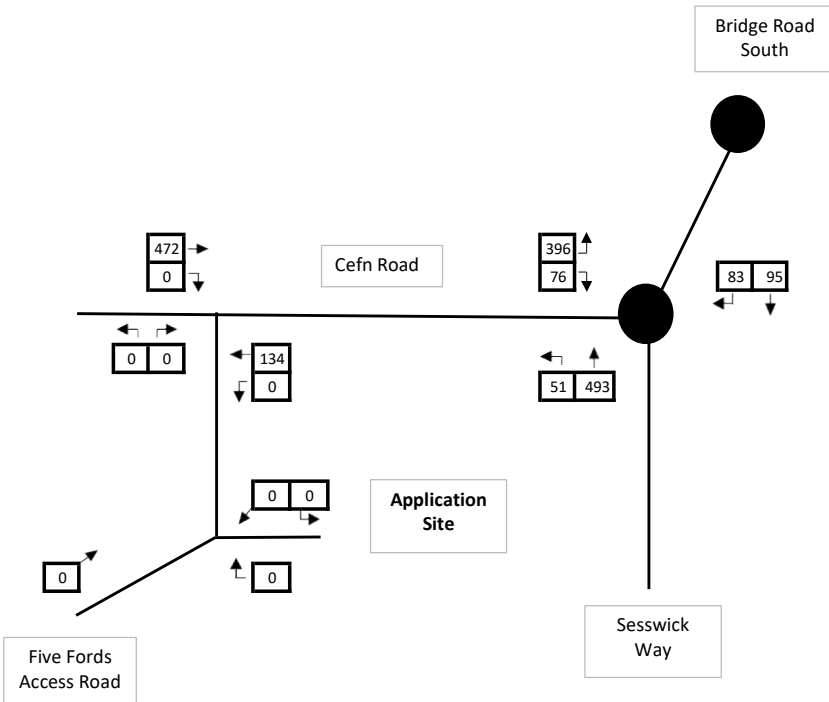
Note 1: the above trip attraction is derived from the Transport Statement supporting this application

Note 2: the above trip attraction is based on a worst-case scenario and discounts the likelihood of car sharing between members of staff

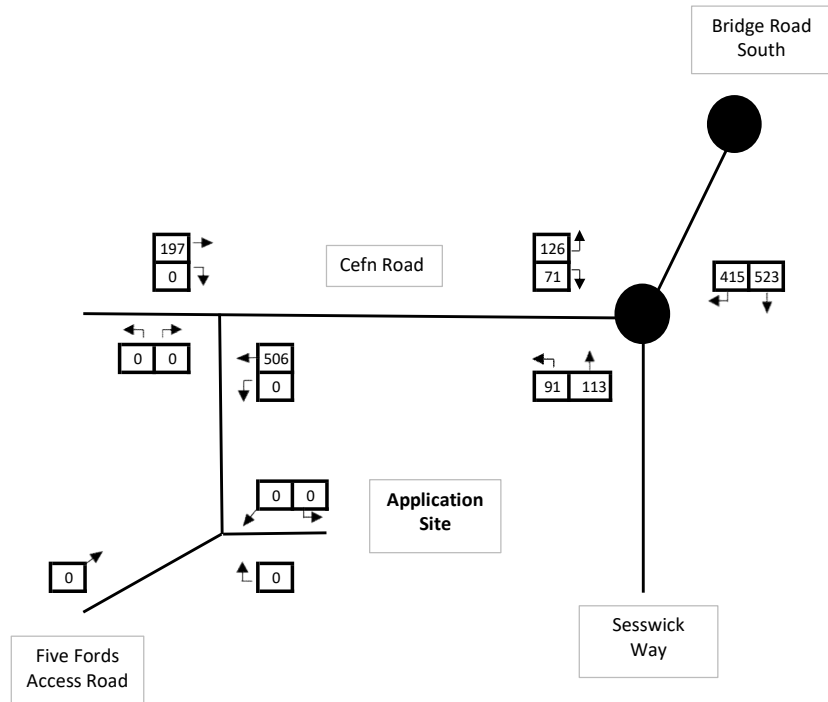
Note 3: in the absence of network flows between 05:00 and 06:00, surveyed flows from 07:00 to 08:00 have been used to inform this assessment and to provide a robust analysis

Note 4: the above trip attraction has been distributed onto the local highway network in accordance with Travel to Work Flows derived from 2011 Census Data Analysis (www.datashine.org.uk) and Google Maps in terms of the quickest route time

AM Network Peak: 07:30 to 08:30



PM Network Peak: 16:30 to 17:30



Low Carbon Farming Ltd 2

Proposed Commercial Glasshouse and Packing Facility,
Five Fords, Wrexham

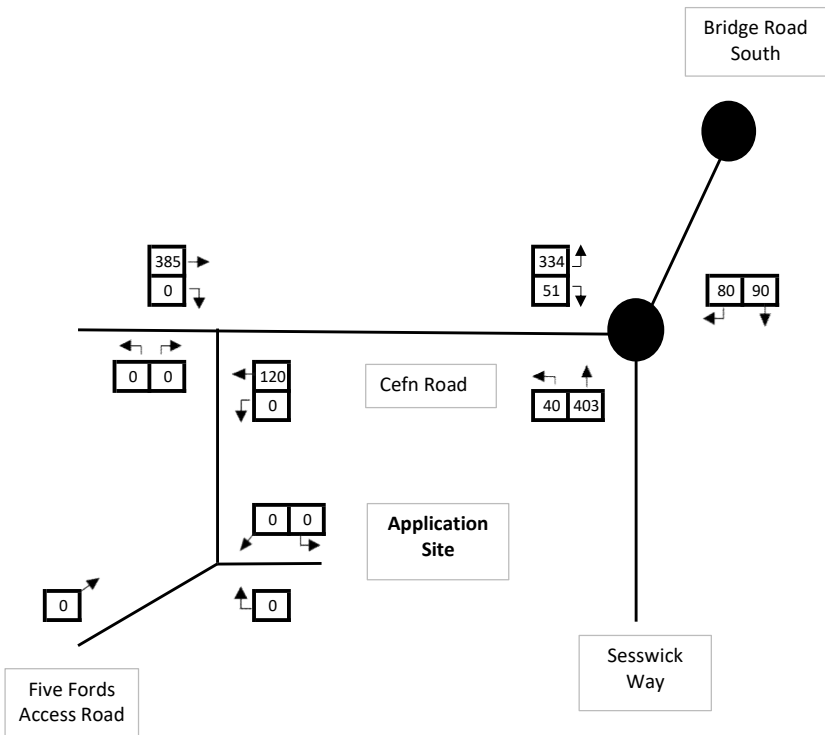
Base 2018 Network Peak Periods

21-0144

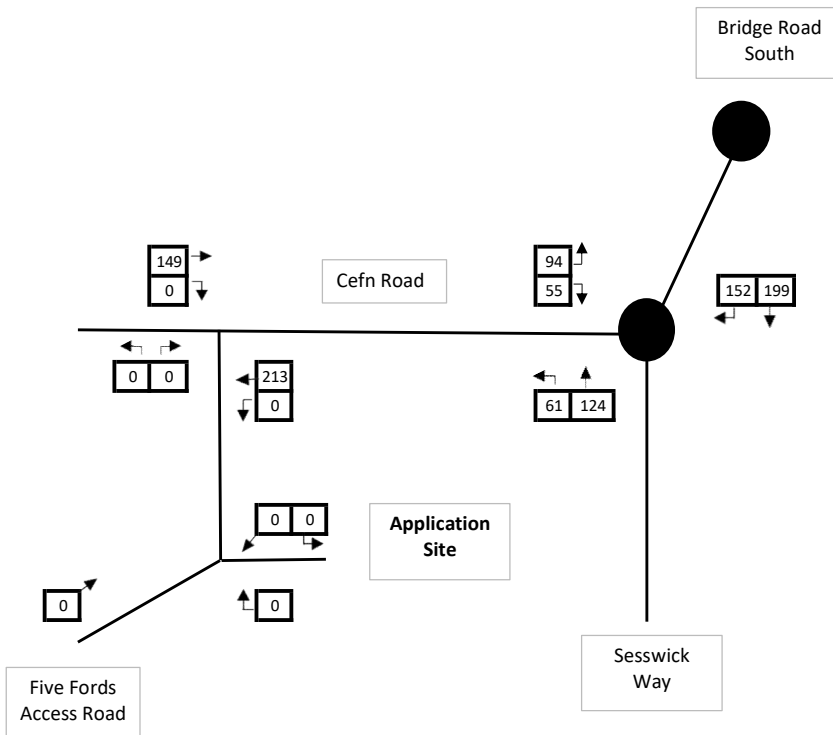
03/03/2021

TFD_01

AM Development Peak: 05:00 to 06:00 (07:00 to 08:00 used as a proxy)



PM Development Peak: 15:00 to 16:00



Low Carbon Farming Ltd 2

Proposed Commercial Glasshouse and Packing Facility,
Five Fords, Wrexham

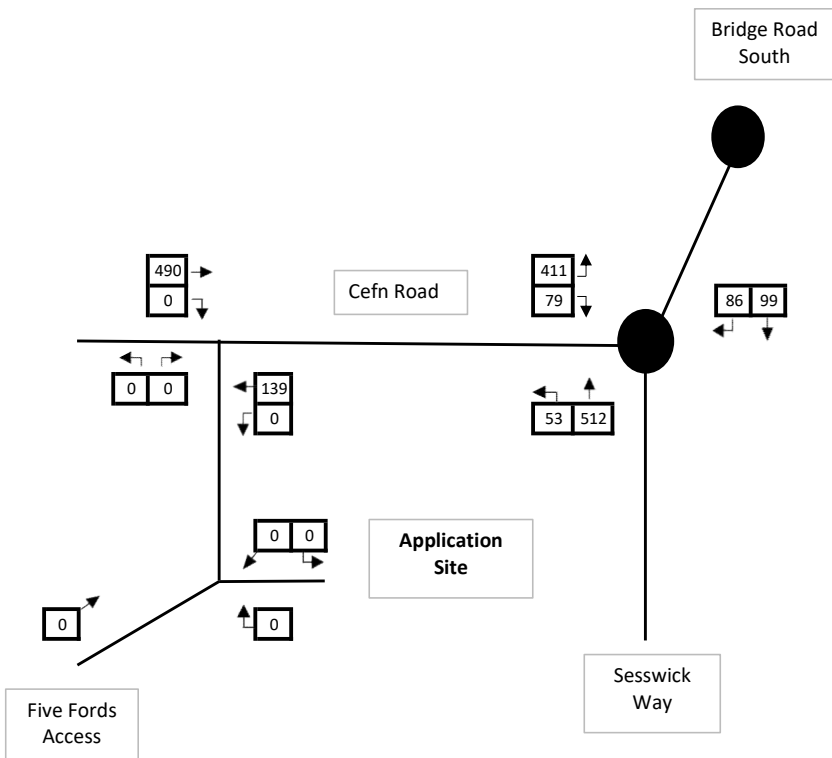
21-0144

03/03/2021

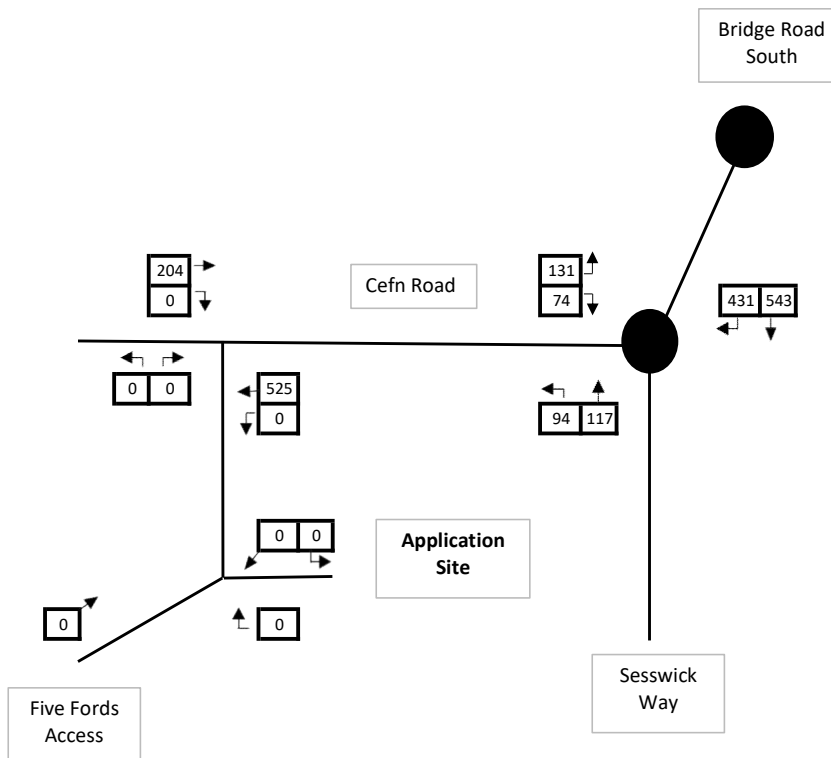
Base 2018 Proposed Development Operational Peak Periods

TFD_02

AM Network Peak: 07:30 to 08:30



PM Network Peak: 16:30 to 17:30



Low Carbon Farming Ltd 2

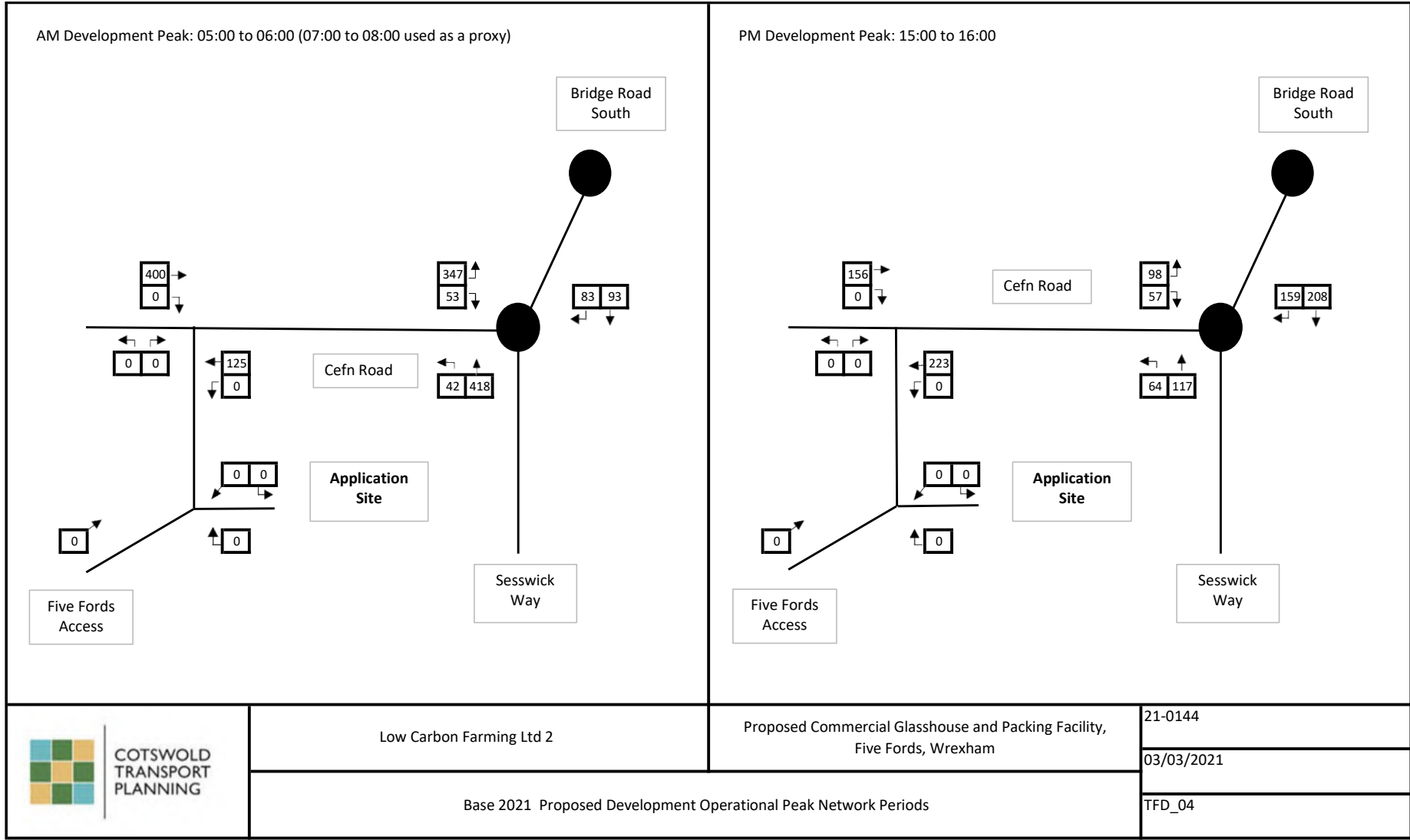
Proposed Commercial Glasshouse and Packing Facility,
Five Fords, Wrexham

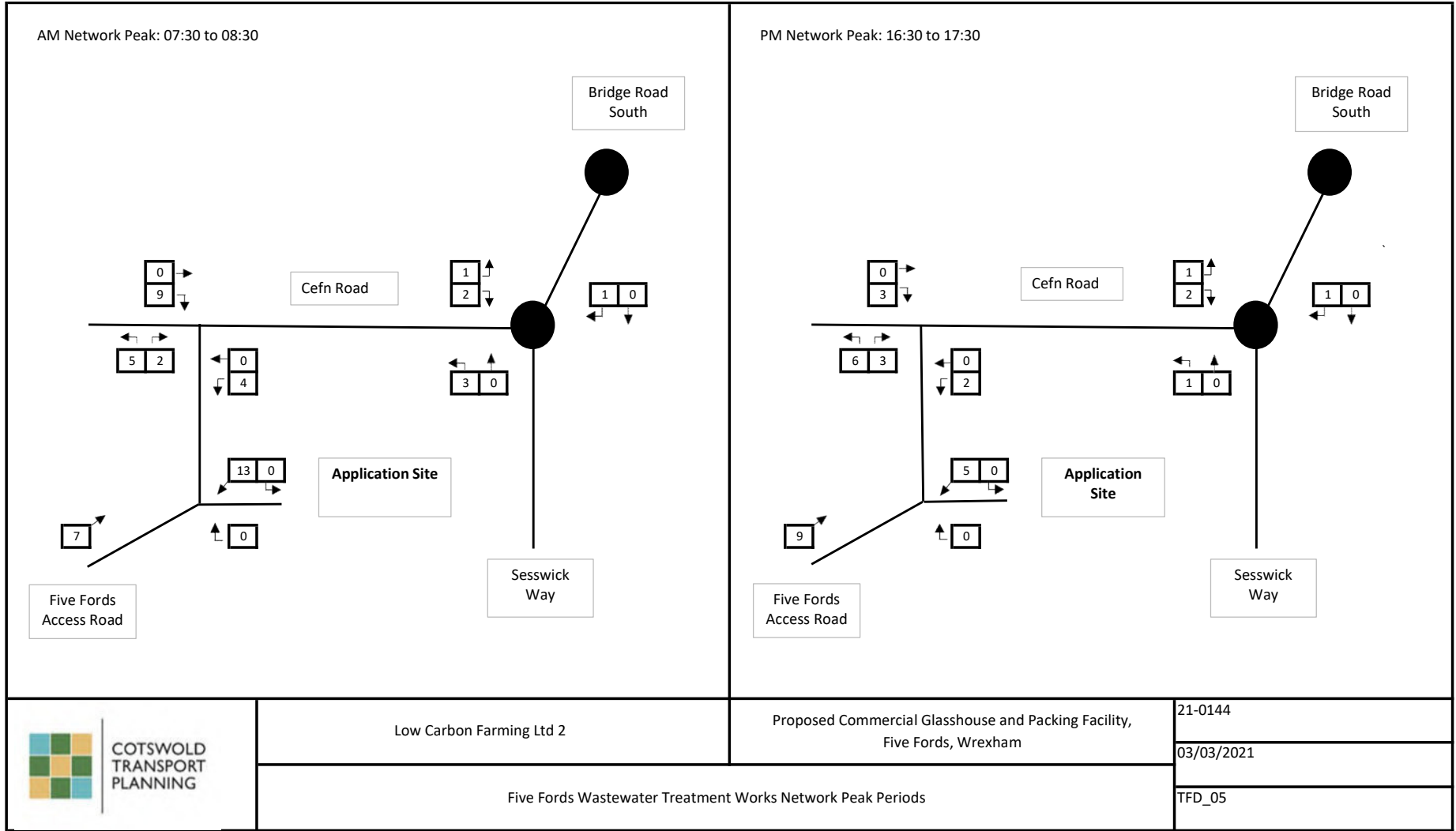
21-0144

03/03/2021

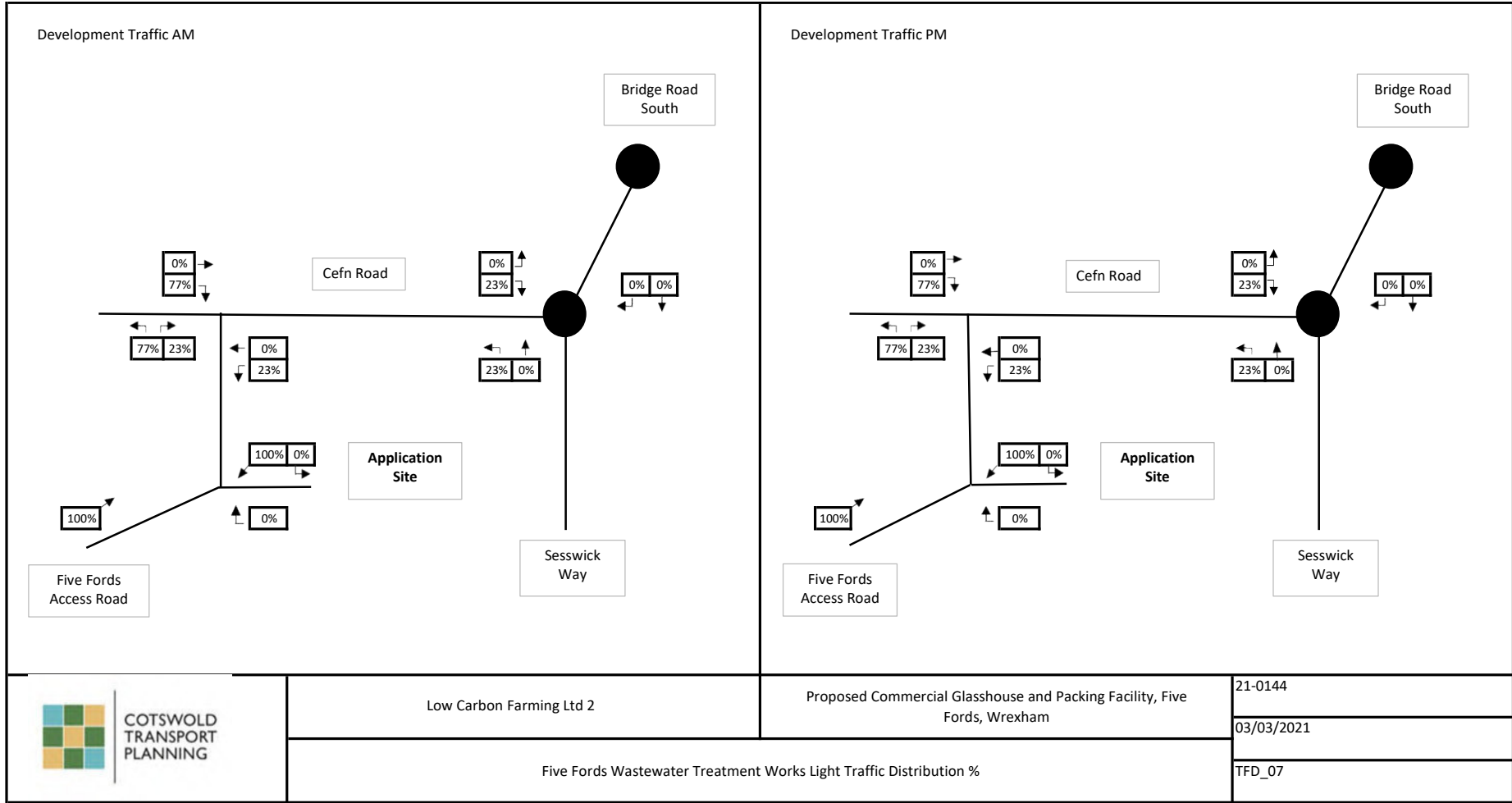
Base 2021 Network Peak Periods

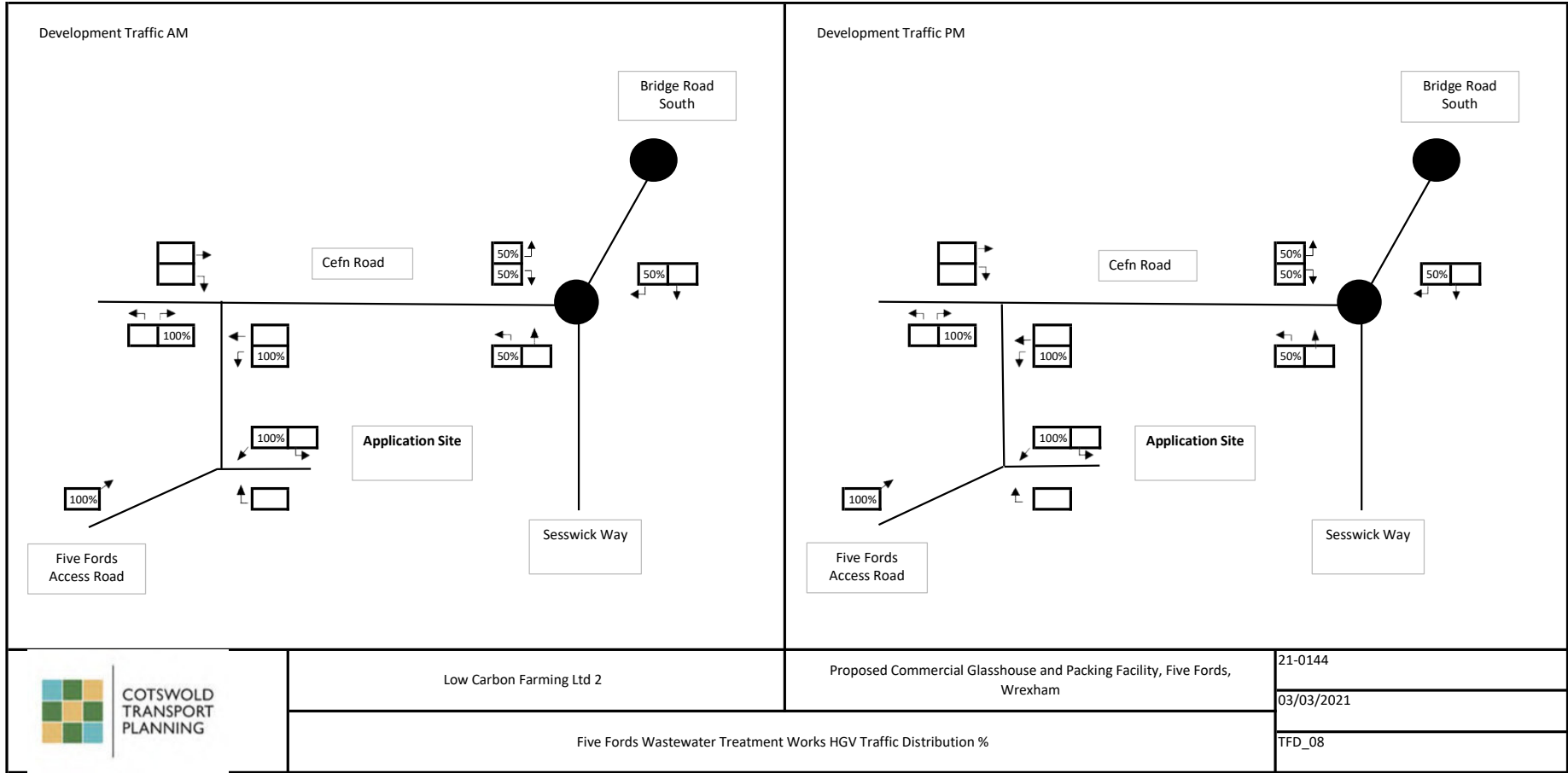
TFD_03



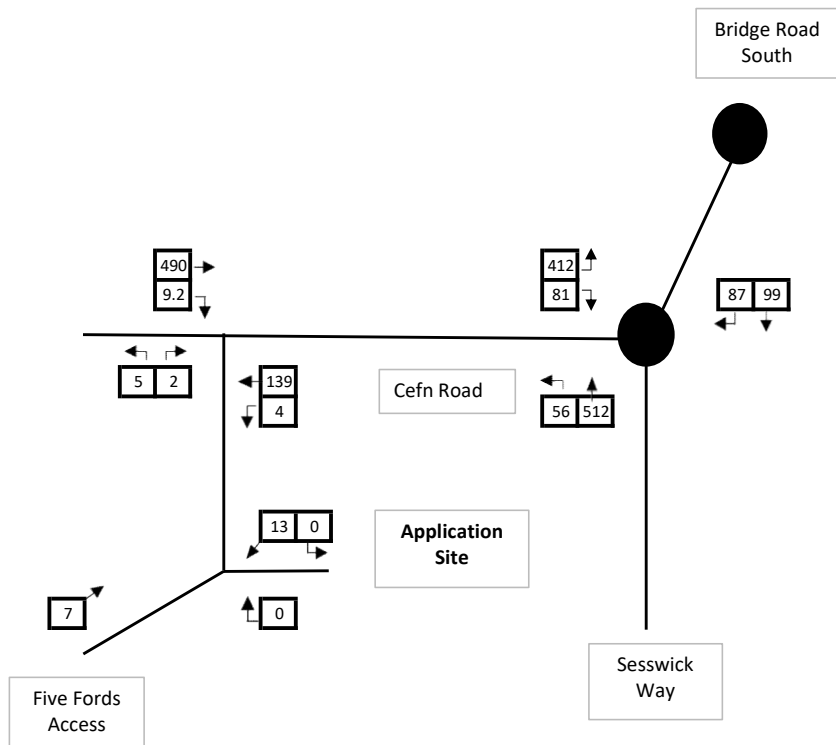


AM Development Peak: 05:00 to 06:00 (07:00 to 08:00 used as a proxy)		PM Development Peak: 15:00 to 16:00	
	Low Carbon Farming Ltd 2	Proposed Commercial Glasshouse and Packing Facility, Five Fords, Wrexham	21-0144
	Five Fords Wastewater Treatment Works Proposed Development Operational Peak Periods		03/03/2021
			TFD_06

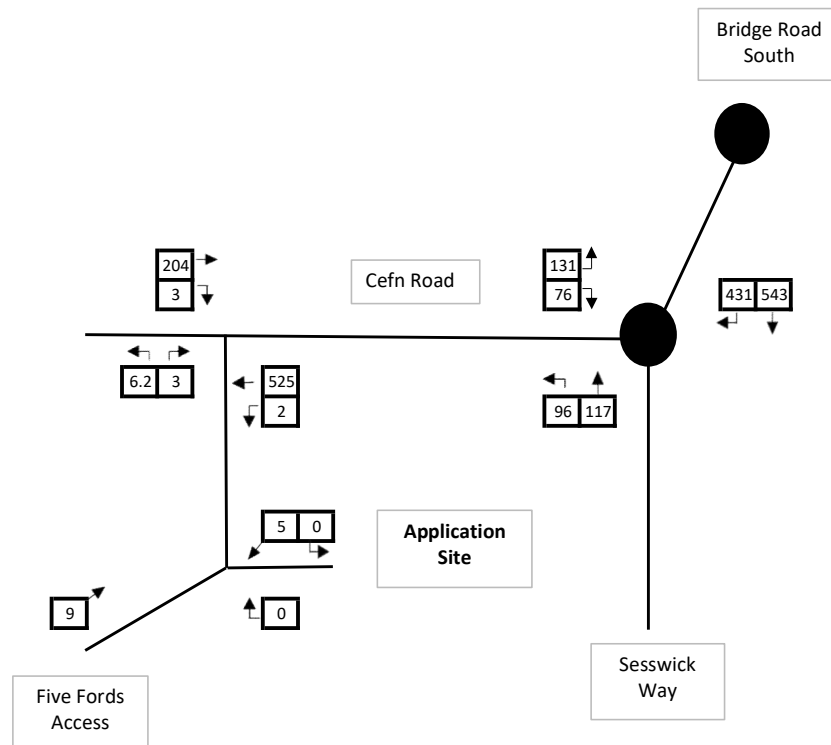




AM Network Peak: 07:30 to 08:30



PM Network Peak: 16:30 to 17:30



Low Carbon Farming Ltd 2

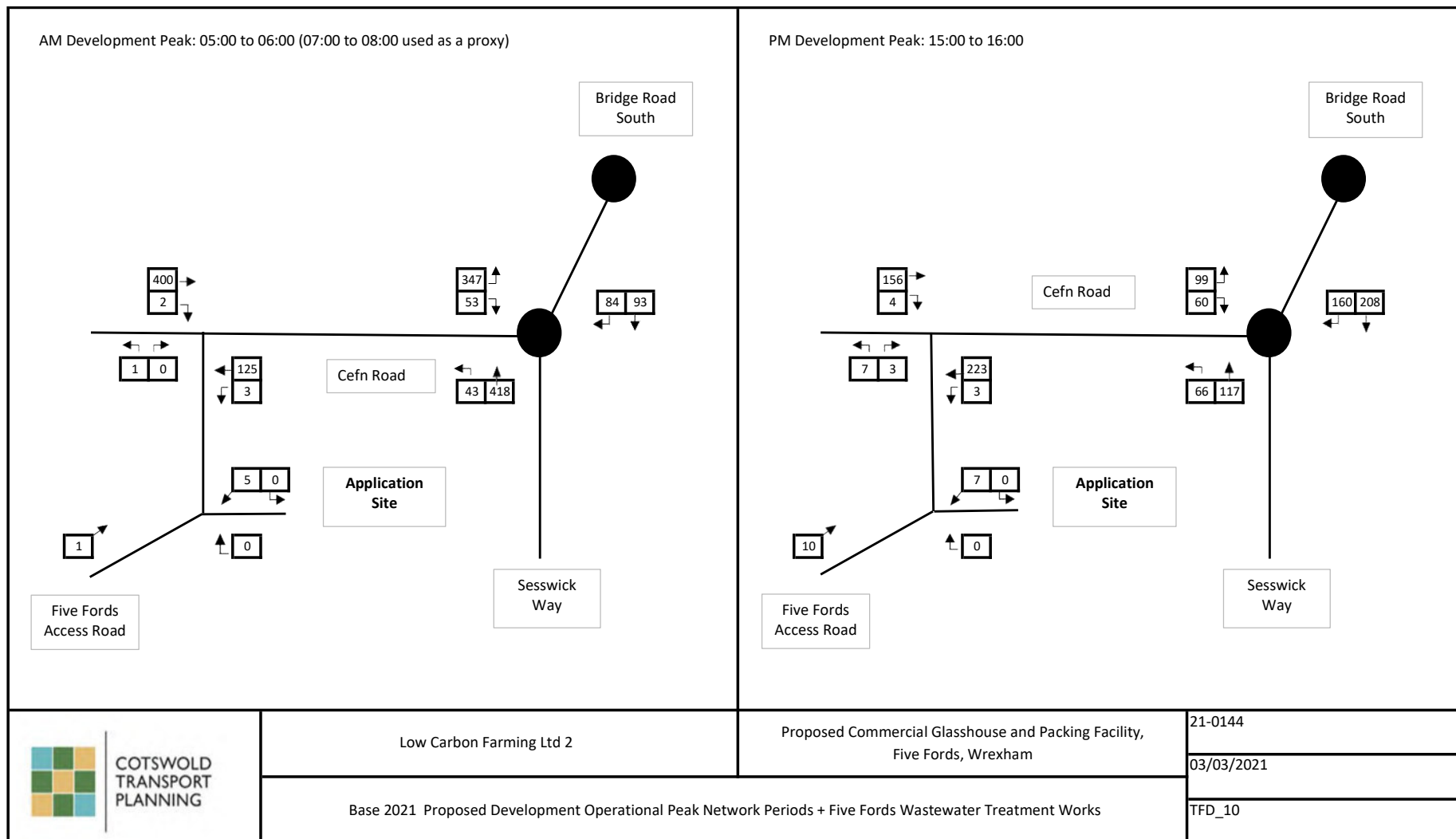
Proposed Commercial Glasshouse and Packing Facility,
Five Fords, Wrexham

Base 2021 Network Peak Periods + Five Fords Wastewater Treatment Works

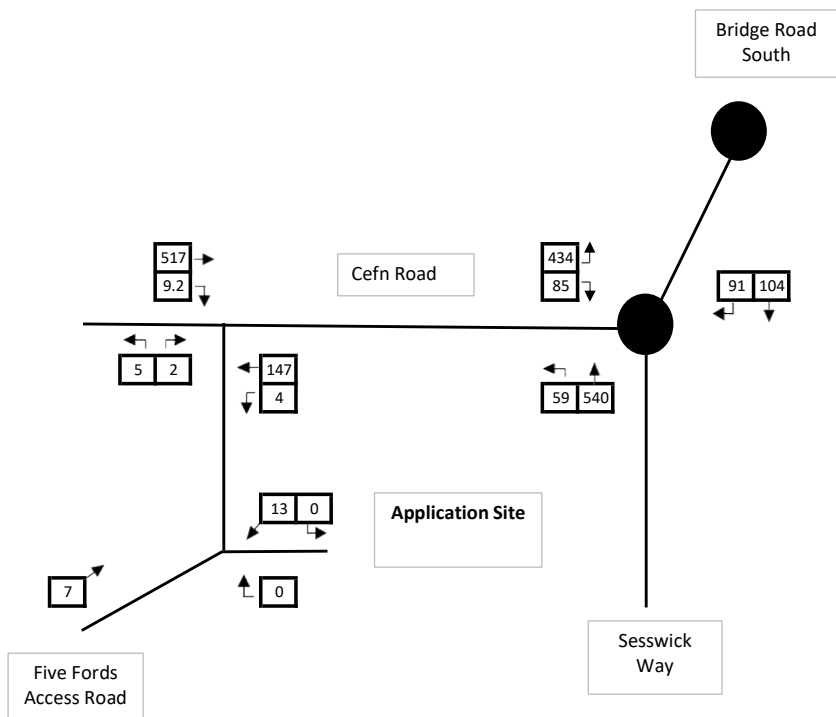
21-0144

03/03/2021

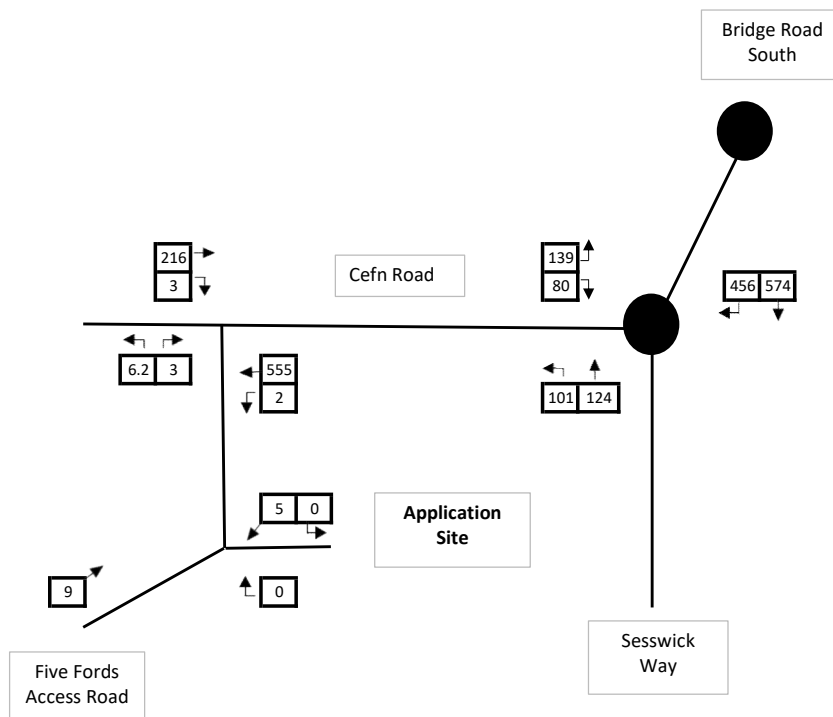
TFD_09



AM Network Peak: 07:30 to 08:30



PM Network Peak: 16:30 to 17:30



Low Carbon Farming Ltd 2

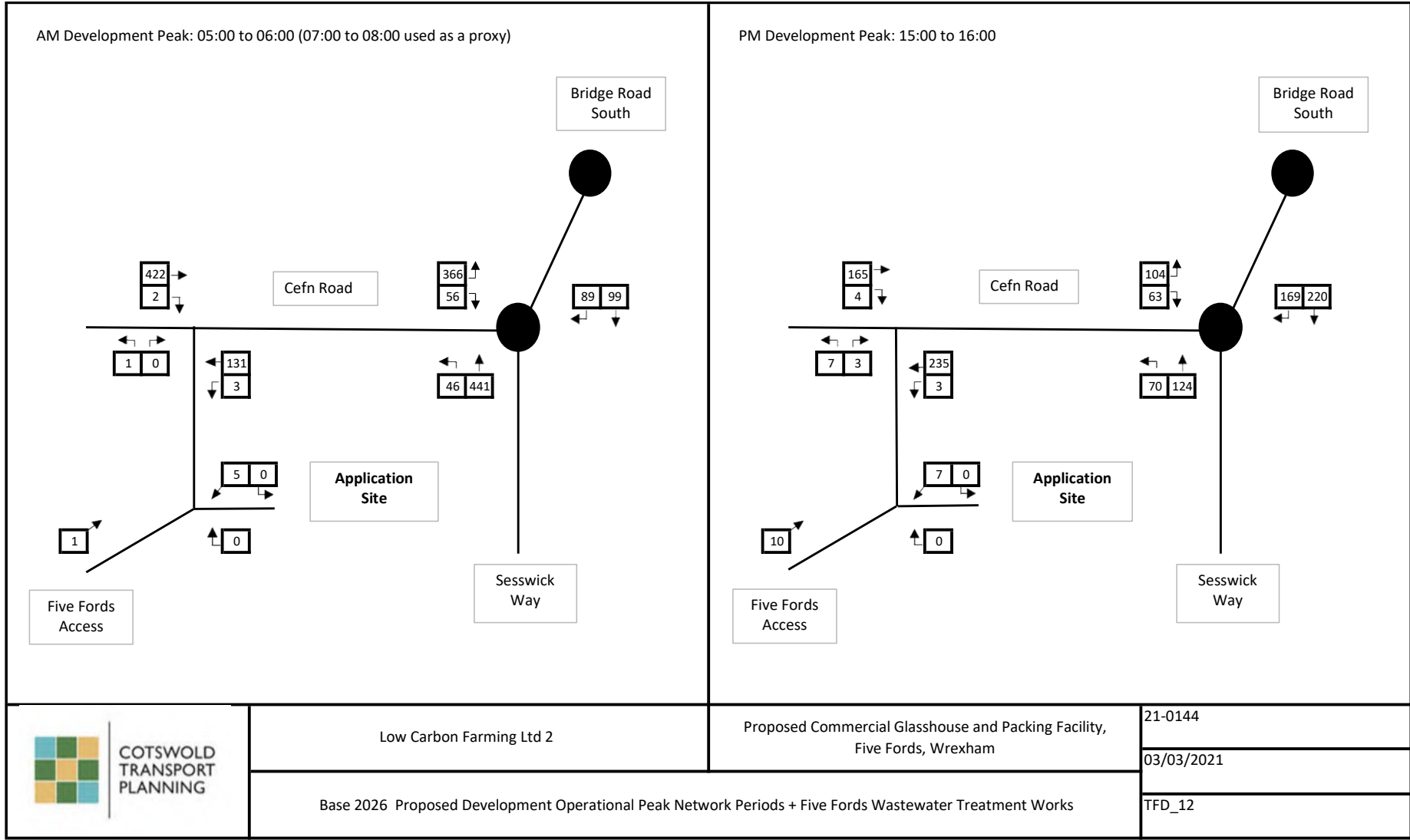
Proposed Commercial Glasshouse and Packing Facility,
Five Fords, Wrexham

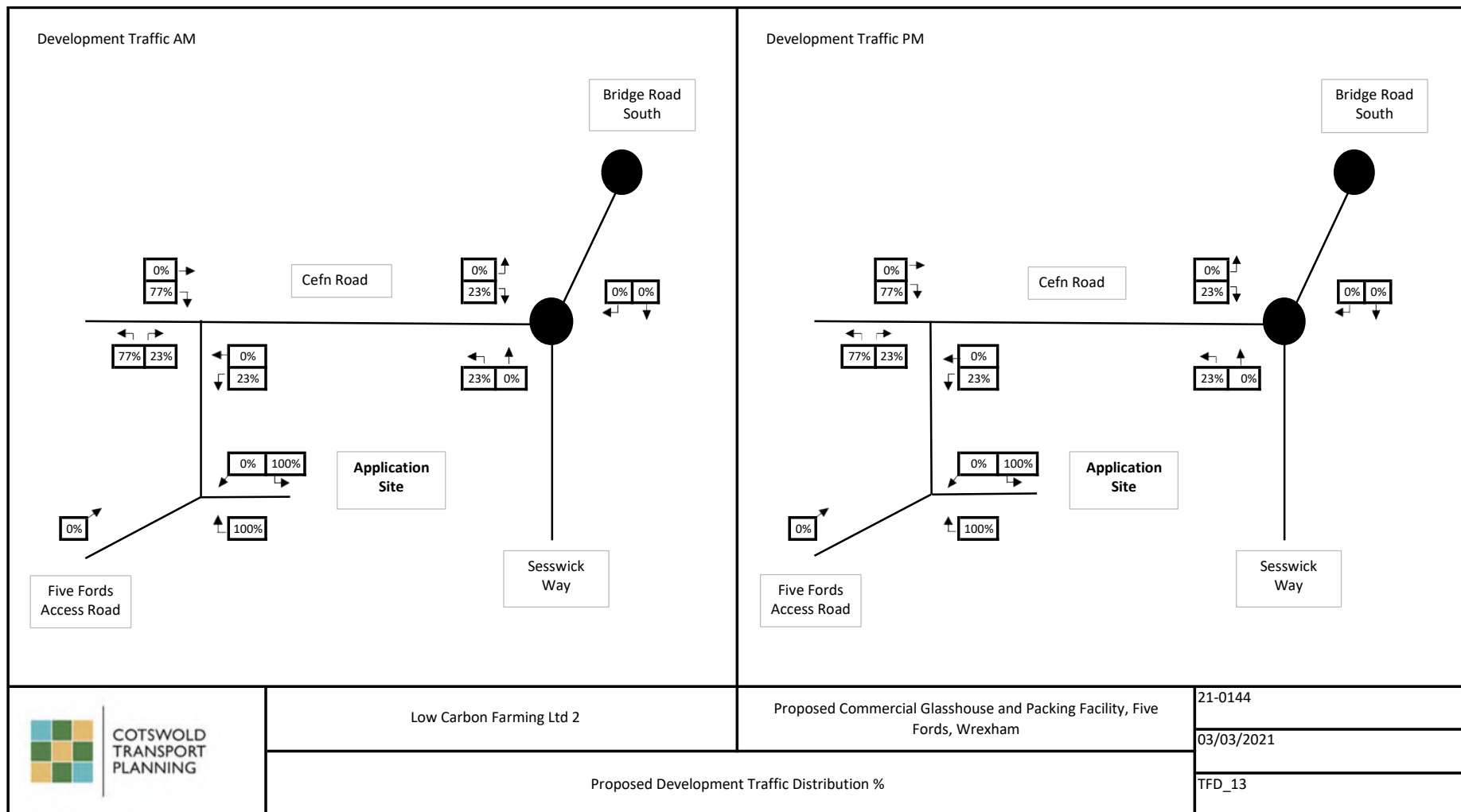
Base 2026 Network Peak Periods + Five Fords Wastewater Treatment Works

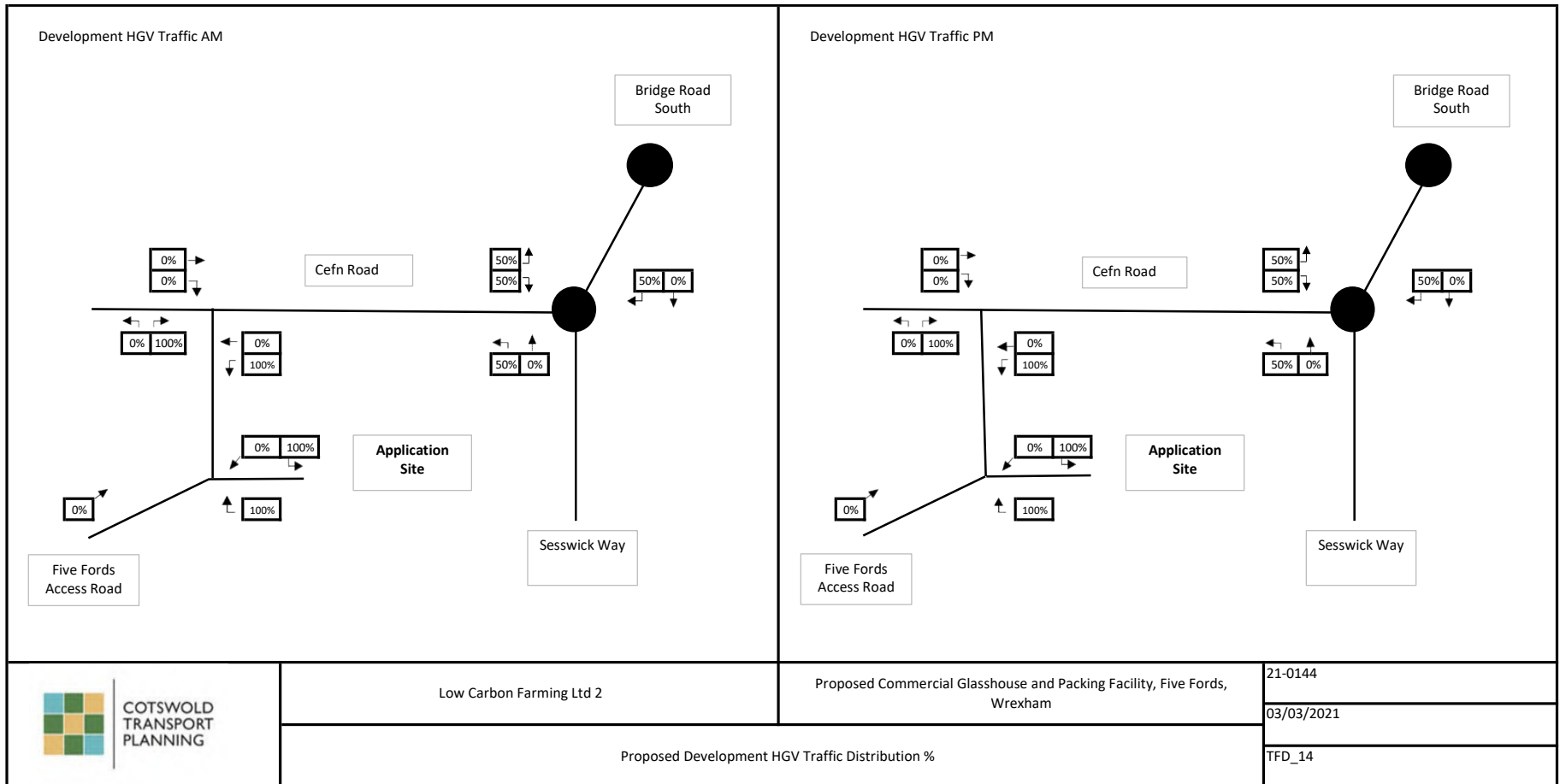
21-0144

03/03/2021

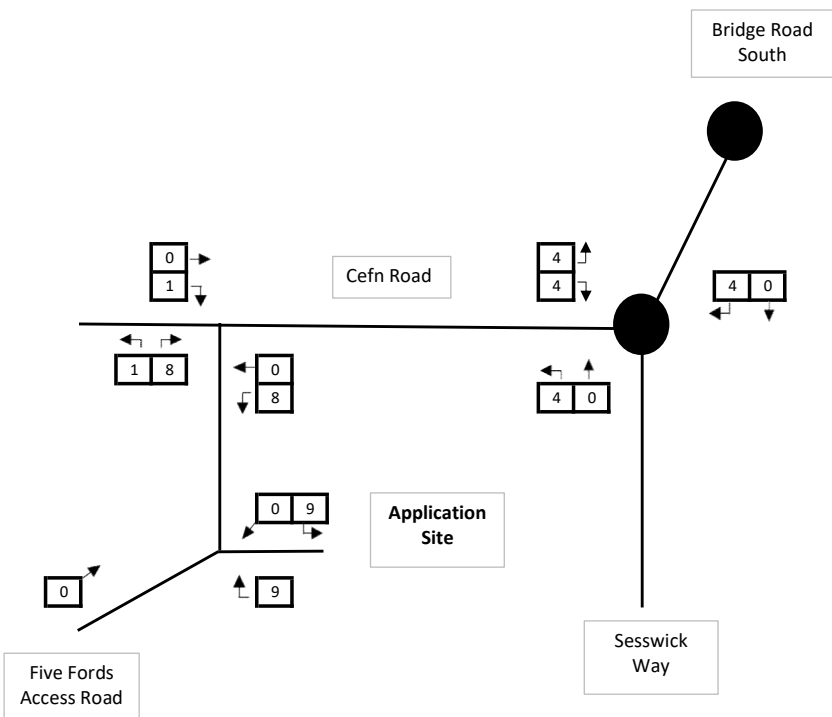
TFD TFD_11



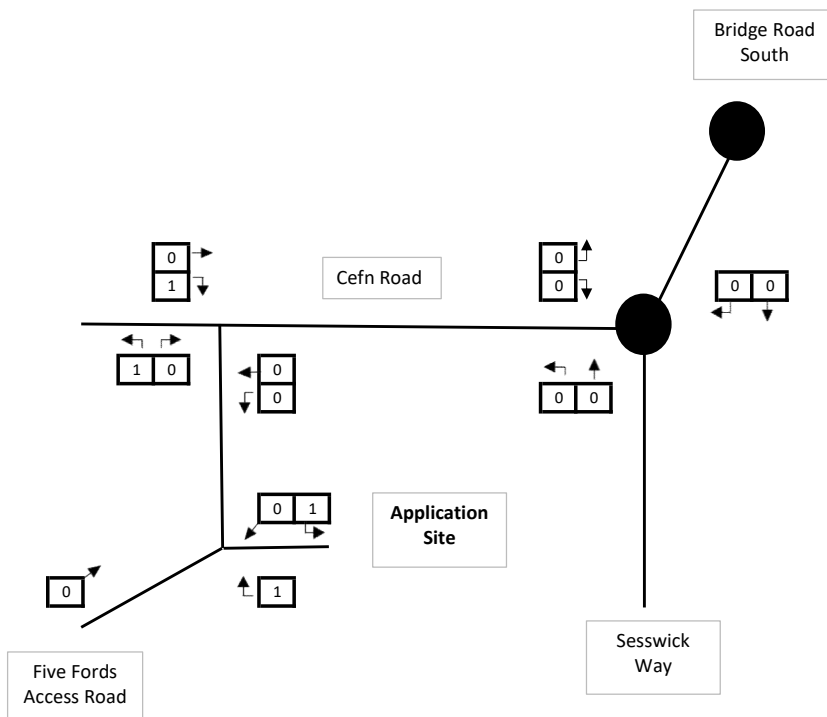




AM Network Peak: 07:30 to 08:30



PM Network Peak: 16:30 to 17:30



Low Carbon Farming Ltd 2

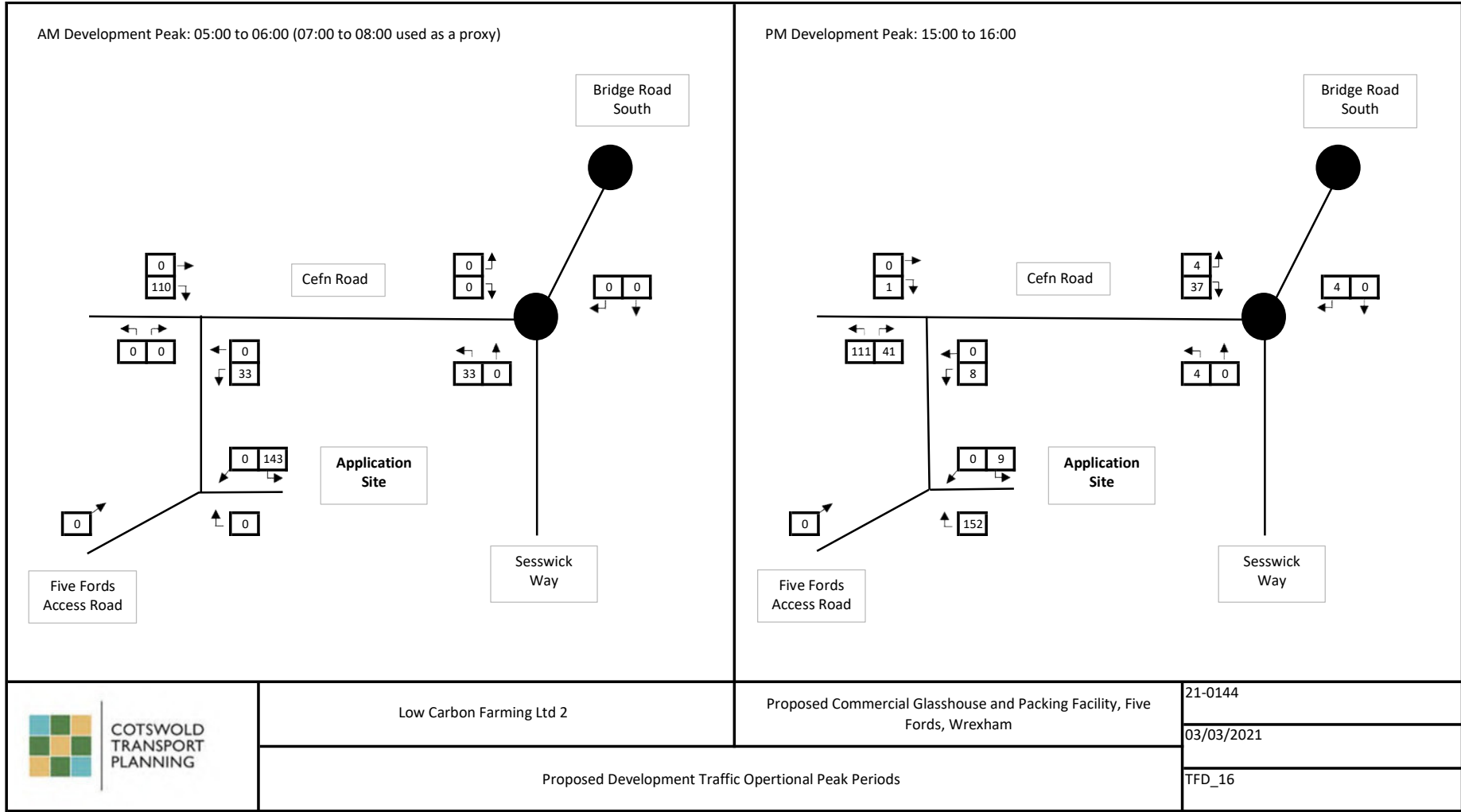
Proposed Commercial Glasshouse and Packing Facility,
Five Fords, Wrexham

21-0144

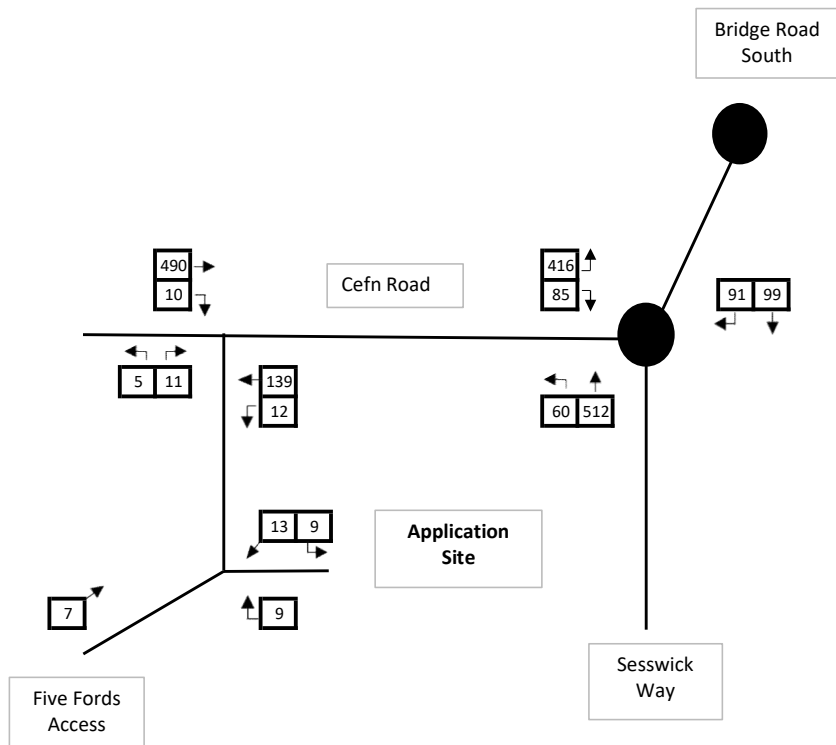
03/03/2021

Proposed Development Traffic Network Peak Periods

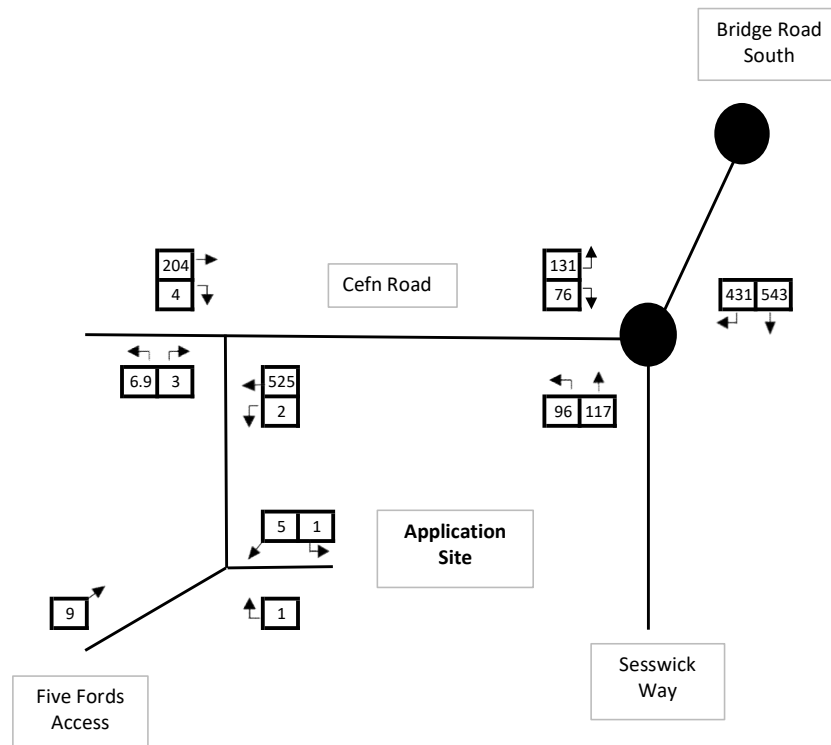
TFD_15



AM Network Peak: 07:30 to 08:30



PM Network Peak: 16:30 to 17:30



Low Carbon Farming Ltd 2

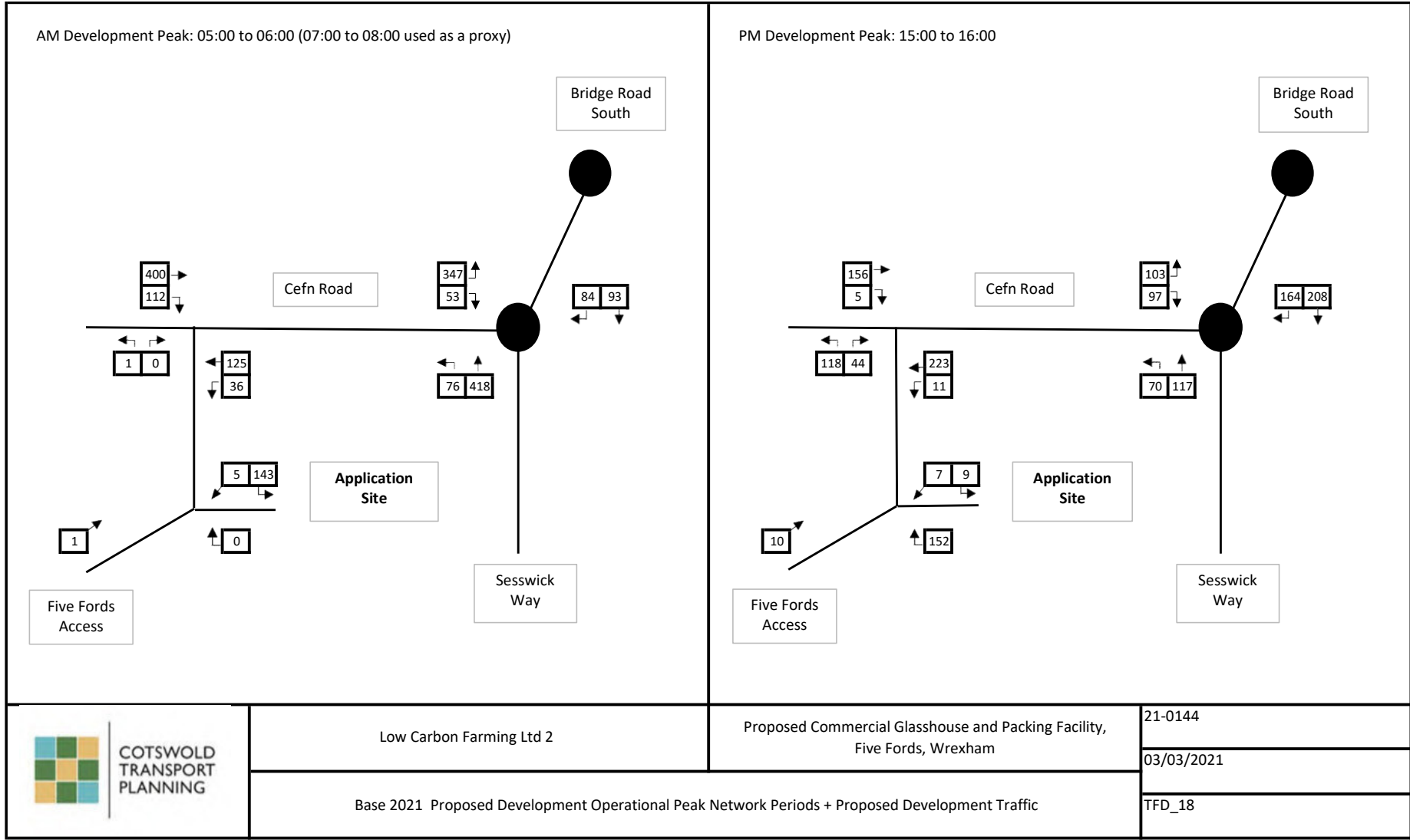
Proposed Commercial Glasshouse and Packing Facility,
Five Fords, Wrexham

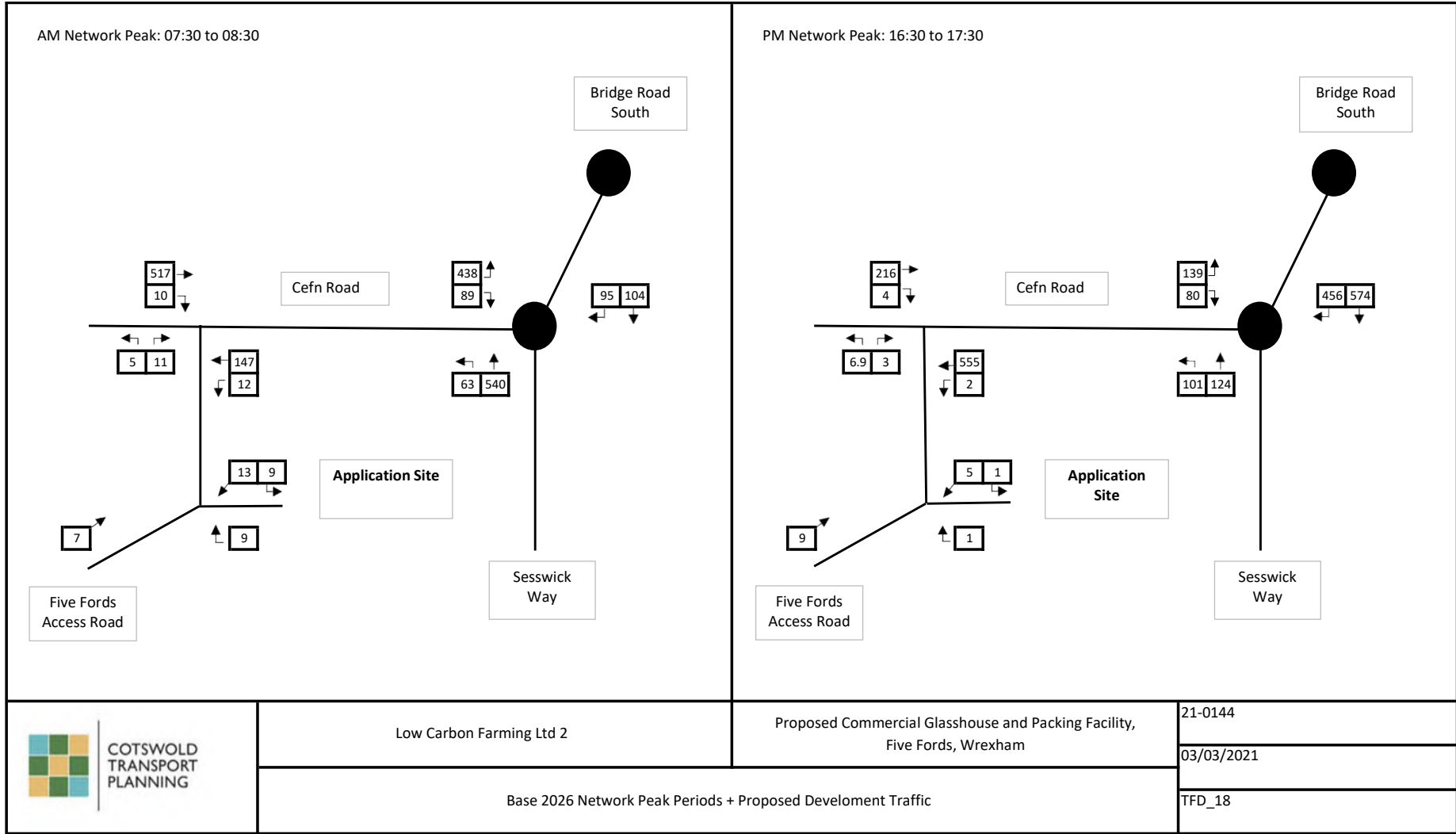
Base 2021 Network Peak Periods + Proposed Development Traffic

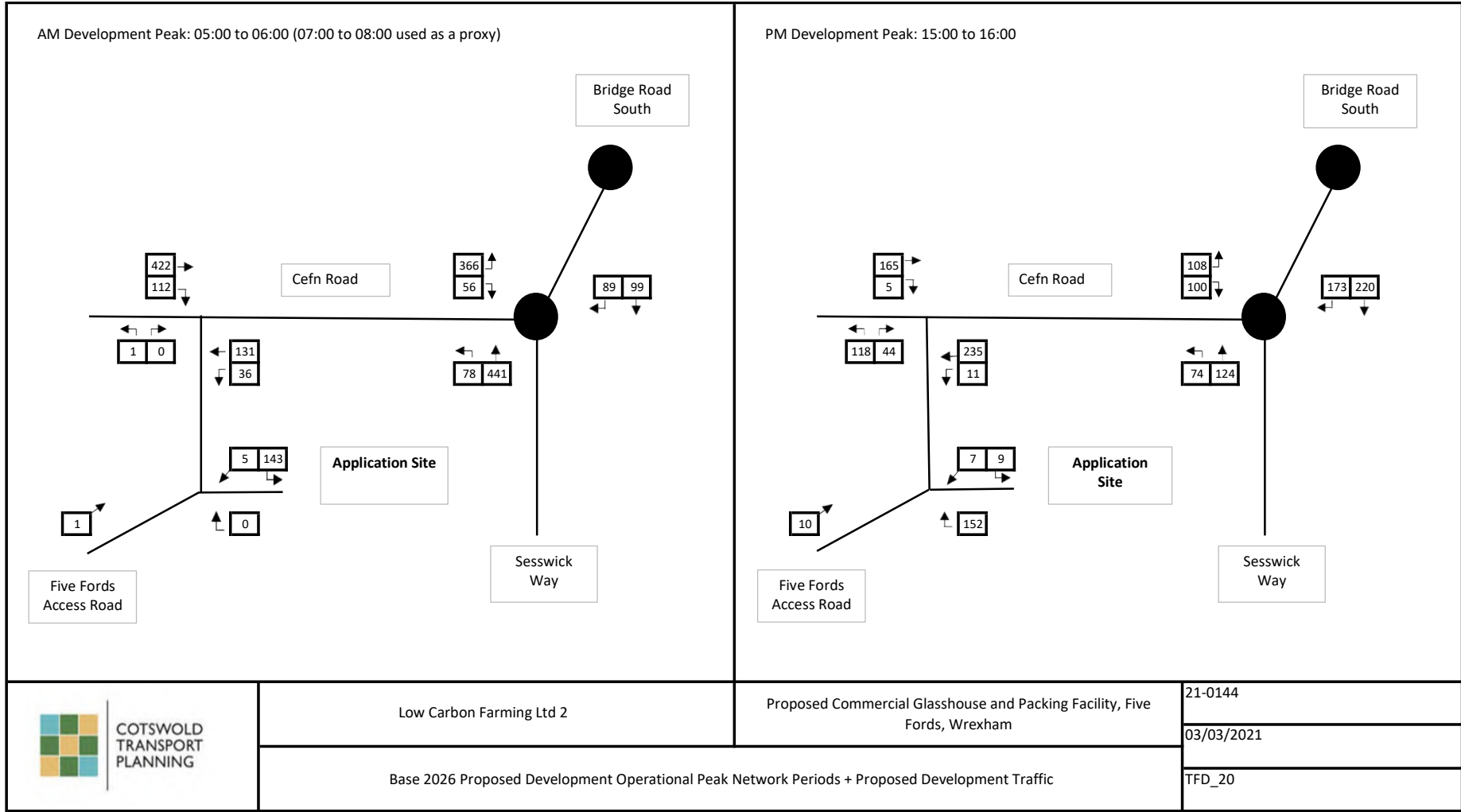
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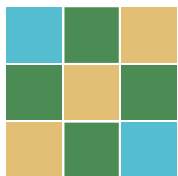
03/03/2021

TFD_17





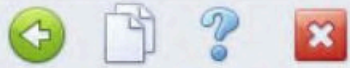




COTSWOLD TRANSPORT PLANNING

Appendix F

TEMPro Growth Rates



1: Select NTM Dataset:

NTM Dataset Description	From	To
▶ NTM AF15 Dataset	2010	2040
NTM AF09 Dataset	2003	2035
NTM AF08 Dataset	2003	2025

2: Select Areas to make up the geographic region:

☒ Wrexham 016 (W02000093)

3. Select area type:

☐ Urban

☒ Rural

☐ All

4. Select road type:

☐ Motorway

☐ Trunk

☒ Principal

☐ Minor

☐ All

5. Select which area it serves:

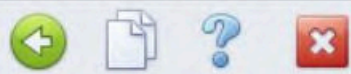
☐ Region

☐ England

Calculate the adjusted local growth figure

Results

Level	Area	Local Growth Figure
W02000093	Wrexham 016	1.0453



1: Select NTM Dataset:

NTM Dataset Description	From	To
▶ NTM AF15 Dataset	2010	2040
NTM AF09 Dataset	2003	2035
NTM AF08 Dataset	2003	2025

2: Select Areas to make up the geographic region:

☒ Wrexham 016 (W02000093)

3. Select area type:

☐ Urban

☒ Rural

☐ All

4. Select road type:

☐ Motorway

☐ Trunk

☒ Principal

☐ Minor

☐ All

5. Select which area it serves:

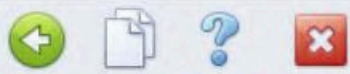
☐ Region

☐ England

Calculate the adjusted local growth figure

Results

Level	Area	Local Growth Figure
W02000093	Wrexham 016	1.0379



1: Select NTM Dataset:

NTM Dataset Description	From	To
NTM AF15 Dataset	2010	2040
NTM AF09 Dataset	2003	2035
NTM AF08 Dataset	2003	2025

2: Select Areas to make up the geographic region:

☒ Wrexham 016 (W02000093)



3. Select area type:

☐ Urban

☒ Rural

☐ All

4. Select road type:

☐ Motorway

☐ Trunk

☒ Principal

☐ Minor

☐ All

5. Select which area it serves:

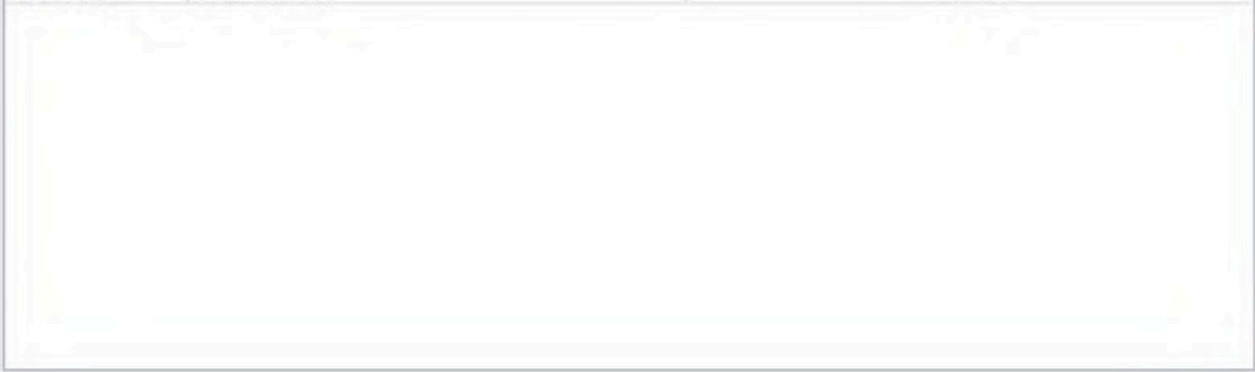
☒ Region

☐ England

Calculate the adjusted local growth figure

Results

Level	Area	Local Growth Figure
W02000093	Wrexham 016	1.0378





1: Select NTM Dataset:

NTM Dataset Description	From	To
NTM AF15 Dataset	2010	2040
NTM AF09 Dataset	2003	2035
NTM AF08 Dataset	2003	2025

2: Select Areas to make up the geographic region:

☒ Wrexham 016 (W02000093)

3. Select area type:

☐ Urban

☒ Rural

☐ All

4. Select road type:

☐ Motorway

☐ Trunk

☒ Principal

☐ Minor

☐ All

5. Select which area it serves:

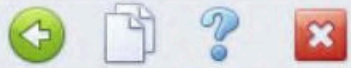
☐ Region

☐ England

Calculate the adjusted local growth figure

Results

Level	Area	Local Growth Figure
W02000093	Wrexham 016	1.0554



1: Select NTM Dataset:

NTM Dataset Description	From	To
NTM AF15 Dataset	2010	2040
NTM AF09 Dataset	2003	2035
NTM AF08 Dataset	2003	2025

2: Select Areas to make up the geographic region:

☒ Wrexham 016 (W02000093)

3. Select area type:

☐ Urban

☒ Rural

☐ All

4. Select road type:

☐ Motorway

☐ Trunk

☒ Principal

☐ Minor

☐ All

5. Select which area it serves:

☐ Region

☒ England

Calculate the adjusted local growth figure

Results

Level	Area	Local Growth Figure
W02000093	Wrexham 016	1.0591



1: Select NTM Dataset:

NTM Dataset Description	From	To
NTM AF15 Dataset	2010	2040
NTM AF09 Dataset	2003	2035
NTM AF08 Dataset	2003	2025

2: Select Areas to make up the geographic region:

☒ Wrexham 016 (W02000093)

3. Select area type:

☐ Urban

☒ Rural

☐ All

4. Select road type:

☐ Motorway

☐ Trunk

☒ Principal

☐ Minor

☐ All

5. Select which area it serves:

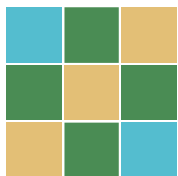
☒ Region

☐ England

Calculate the adjusted local growth figure

Results

Level	Area	Local Growth Figure
W02000093	Wrexham 016	1.0567



COTSWOLD
TRANSPORT
PLANNING

Appendix G

PICADY Output Reports

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
A		ONE HOUR	✓	127	100.000
B		ONE HOUR	✓	1	100.000
C		ONE HOUR	✓	403	100.000

Origin-Destination Data

Demand (Veh/hr)

	To			
		A	B	C
	A	0	2	125
	B	0	0	1
	C	400	3	0

Vehicle Mix

Heavy Vehicle Percentages

	To			
		A	B	C
	A	0	35	18
	B	0	0	0
	C	2	35	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
B-C	0.00	0.00	0.0	A	0	0
B-A	0.00	0.00	0.0	A	0	0
C-AB	0.01	5.13	0.0	A	6	8
C-A					364	546
A-B					2	3
A-C					115	172

Main Results for each time segment

04:45 - 05:00

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	691	0.000	0	0.0	0.0	0.000	A
B-A	0	0	525	0.000	0	0.0	0.0	0.000	A
C-AB	4	1	705	0.006	4	0.0	0.0	5.134	A
C-A	299	75			299				
A-B	2	0.38			2				
A-C	94	24			94				

05:00 - 05:15

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	686	0.000	0	0.0	0.0	0.000	A
B-A	0	0	510	0.000	0	0.0	0.0	0.000	A
C-AB	5	1	744	0.007	5	0.0	0.0	4.902	A
C-A	357	89			357				
A-B	2	0.45			2				
A-C	112	28			112				

05:15 - 05:30

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	678	0.000	0	0.0	0.0	0.000	A
B-A	0	0	488	0.000	0	0.0	0.0	0.000	A
C-AB	7	2	799	0.009	7	0.0	0.0	4.583	A
C-A	436	109			436				
A-B	2	0.55			2				
A-C	138	34			138				

05:30 - 05:45

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	678	0.000	0	0.0	0.0	0.000	A
B-A	0	0	488	0.000	0	0.0	0.0	0.000	A
C-AB	7	2	799	0.009	7	0.0	0.0	4.548	A
C-A	436	109			436				
A-B	2	0.55			2				
A-C	138	34			138				

05:45 - 06:00

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	686	0.000	0	0.0	0.0	0.000	A
B-A	0	0	510	0.000	0	0.0	0.0	0.000	A
C-AB	5	1	745	0.007	5	0.0	0.0	4.815	A
C-A	357	89			357				
A-B	2	0.45			2				
A-C	112	28			112				

06:00 - 06:15

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	691	0.000	0	0.0	0.0	0.000	A
B-A	0	0	525	0.000	0	0.0	0.0	0.000	A
C-AB	4	1	705	0.006	4	0.0	0.0	5.088	A
C-A	299	75			299				
A-B	2	0.38			2				
A-C	94	24			94				

Base 2021 (Combined), PM DEV

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	Five Fords WwTW Access Road / Cefn Road	T-Junction	Two-way		0.31	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D2	Base 2021 (Combined)	PM DEV	ONE HOUR	14:45	16:15	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
A		ONE HOUR	✓	226	100.000
B		ONE HOUR	✓	12	100.000
C		ONE HOUR	✓	160	100.000

Origin-Destination Data

Demand (Veh/hr)

	To			
	A	B	C	
From	A	0	3	223
	B	4	0	8
	C	156	4	0

Vehicle Mix

Heavy Vehicle Percentages

	To			
	A	B	C	
From	A	0	29	7
	B	12	0	12
	C	7	29	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
B-C	0.01	6.01	0.0	A	7	11
B-A	0.01	8.45	0.0	A	4	6
C-AB	0.01	6.25	0.0	A	5	7
C-A					142	213
A-B					3	4
A-C					205	307

Main Results for each time segment

14:45 - 15:00

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	6	2	628	0.010	6	0.0	0.0	5.788	A
B-A	3	0.75	457	0.007	3	0.0	0.0	7.928	A
C-AB	4	1	579	0.007	4	0.0	0.0	6.254	A
C-A	117	29			117				
A-B	2	0.56			2				
A-C	168	42			168				

15:00 - 15:15

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	7	2	619	0.012	7	0.0	0.0	5.881	A
B-A	4	1	446	0.008	4	0.0	0.0	8.140	A
C-AB	5	1	589	0.008	5	0.0	0.0	6.175	A
C-A	139	35			139				
A-B	3	0.67			3				
A-C	200	50			200				

15:15 - 15:30

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	9	2	607	0.015	9	0.0	0.0	6.015	A
B-A	4	1	430	0.010	4	0.0	0.0	8.453	A
C-AB	6	2	603	0.010	6	0.0	0.0	6.050	A
C-A	170	42			170				
A-B	3	1			3				
A-C	246	61			246				

15:30 - 15:45

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	9	2	607	0.015	9	0.0	0.0	6.015	A
B-A	4	1	430	0.010	4	0.0	0.0	8.452	A
C-AB	6	2	603	0.010	6	0.0	0.0	6.030	A
C-A	170	42			170				
A-B	3	1			3				
A-C	246	61			246				

15:45 - 16:00

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	7	2	619	0.012	7	0.0	0.0	5.882	A
B-A	4	1	446	0.008	4	0.0	0.0	8.141	A
C-AB	5	1	589	0.008	5	0.0	0.0	6.130	A
C-A	139	35			139				
A-B	3	0.67			3				
A-C	200	50			200				

16:00 - 16:15

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	6	2	628	0.010	6	0.0	0.0	5.789	A
B-A	3	0.75	457	0.007	3	0.0	0.0	7.927	A
C-AB	4	1	579	0.007	4	0.0	0.0	6.231	A
C-A	117	29			117				
A-B	2	0.56			2				
A-C	168	42			168				

Base 2026 (Combined), AM DEV

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	Five Fords WwTW Access Road / Cefn Road	T-Junction	Two-way		0.06	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D3	Base 2026 (Combined)	AM DEV	ONE HOUR	04:45	06:15	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
A		ONE HOUR	✓	133	100.000
B		ONE HOUR	✓	1	100.000
C		ONE HOUR	✓	425	100.000

Origin-Destination Data

Demand (Veh/hr)

	To			
	A	B	C	
From	A	0	2	131
	B	0	0	1
	C	422	3	0

Vehicle Mix

Heavy Vehicle Percentages

	To			
	A	B	C	
From	A	0	35	18
	B	0	0	0
	C	2	35	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
B-C	0.00	0.00	0.0	A	0	0
B-A	0.00	0.00	0.0	A	0	0
C-AB	0.01	5.05	0.0	A	6	9
C-A					384	576
A-B					2	3
A-C					120	180

Main Results for each time segment

04:45 - 05:00

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	690	0.000	0	0.0	0.0	0.000	A
B-A	0	0	521	0.000	0	0.0	0.0	0.000	A
C-AB	4	1	716	0.006	4	0.0	0.0	5.054	A
C-A	316	79			316				
A-B	2	0.38			2				
A-C	99	25			99				

05:00 - 05:15

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	684	0.000	0	0.0	0.0	0.000	A
B-A	0	0	505	0.000	0	0.0	0.0	0.000	A
C-AB	5	1	758	0.007	5	0.0	0.0	4.817	A
C-A	377	94			377				
A-B	2	0.45			2				
A-C	118	29			118				

05:15 - 05:30

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	676	0.000	0	0.0	0.0	0.000	A
B-A	0	0	482	0.000	0	0.0	0.0	0.000	A
C-AB	8	2	816	0.009	8	0.0	0.0	4.491	A
C-A	460	115			460				
A-B	2	0.55			2				
A-C	144	36			144				

05:30 - 05:45

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	676	0.000	0	0.0	0.0	0.000	A
B-A	0	0	482	0.000	0	0.0	0.0	0.000	A
C-AB	8	2	816	0.009	8	0.0	0.0	4.456	A
C-A	460	115			460				
A-B	2	0.55			2				
A-C	144	36			144				

05:45 - 06:00

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	684	0.000	0	0.0	0.0	0.000	A
B-A	0	0	505	0.000	0	0.0	0.0	0.000	A
C-AB	5	1	758	0.007	5	0.0	0.0	4.730	A
C-A	377	94			377				
A-B	2	0.45			2				
A-C	118	29			118				

06:00 - 06:15

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	690	0.000	0	0.0	0.0	0.000	A
B-A	0	0	521	0.000	0	0.0	0.0	0.000	A
C-AB	4	1	717	0.006	4	0.0	0.0	5.006	A
C-A	316	79			316				
A-B	2	0.38			2				
A-C	99	25			99				

Base 2026 (Combined), PM DEV

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	Five Fords WwTW Access Road / Cefn Road	T-Junction	Two-way		0.30	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D4	Base 2026 (Combined)	PM DEV	ONE HOUR	14:45	16:15	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
A		ONE HOUR	✓	238	100.000
B		ONE HOUR	✓	12	100.000
C		ONE HOUR	✓	169	100.000

Origin-Destination Data

Demand (Veh/hr)

	To			
	A	B	C	
From	A	0	3	235
	B	4	0	8
	C	165	4	0

Vehicle Mix

Heavy Vehicle Percentages

	To			
	A	B	C	
From	A	0	29	7
	B	12	0	12
	C	7	29	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
B-C	0.01	6.05	0.0	A	7	11
B-A	0.01	8.54	0.0	A	4	6
C-AB	0.01	6.22	0.0	A	5	7
C-A					150	225
A-B					3	4
A-C					216	323

Main Results for each time segment

14:45 - 15:00

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	6	2	626	0.010	6	0.0	0.0	5.810	A
B-A	3	0.75	454	0.007	3	0.0	0.0	7.983	A
C-AB	4	1	582	0.007	4	0.0	0.0	6.221	A
C-A	123	31			123				
A-B	2	0.56			2				
A-C	177	44			177				

15:00 - 15:15

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	7	2	616	0.012	7	0.0	0.0	5.908	A
B-A	4	1	442	0.008	4	0.0	0.0	8.208	A
C-AB	5	1	593	0.008	5	0.0	0.0	6.137	A
C-A	147	37			147				
A-B	3	0.67			3				
A-C	211	53			211				

15:15 - 15:30

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	9	2	604	0.015	9	0.0	0.0	6.049	A
B-A	4	1	426	0.010	4	0.0	0.0	8.544	A
C-AB	6	2	608	0.010	6	0.0	0.0	6.005	A
C-A	180	45			180				
A-B	3	1			3				
A-C	259	65			259				

15:30 - 15:45

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	9	2	604	0.015	9	0.0	0.0	6.049	A
B-A	4	1	426	0.010	4	0.0	0.0	8.543	A
C-AB	6	2	608	0.010	6	0.0	0.0	5.984	A
C-A	180	45			180				
A-B	3	1			3				
A-C	259	65			259				

15:45 - 16:00

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	7	2	616	0.012	7	0.0	0.0	5.911	A
B-A	4	1	442	0.008	4	0.0	0.0	8.210	A
C-AB	5	1	593	0.008	5	0.0	0.0	6.090	A
C-A	147	37			147				
A-B	3	0.67			3				
A-C	211	53			211				

16:00 - 16:15

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	6	2	625	0.010	6	0.0	0.0	5.811	A
B-A	3	0.75	454	0.007	3	0.0	0.0	7.982	A
C-AB	4	1	583	0.007	4	0.0	0.0	6.200	A
C-A	123	31			123				
A-B	2	0.56			2				
A-C	177	44			177				

Base 2021 (Combined) + Development, AM DEV

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	Five Fords WwTW Access Road / Cefn Road	T-Junction	Two-way		1.54	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D5	Base 2021 (Combined) + Development	AM DEV	ONE HOUR	04:45	06:15	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
A		ONE HOUR	✓	160	100.000
B		ONE HOUR	✓	1	100.000
C		ONE HOUR	✓	513	100.000

Origin-Destination Data

Demand (Veh/hr)

	To			
From		A	B	C
	A	0	35	125
	B	0	0	1
	C	400	113	0

Vehicle Mix

Heavy Vehicle Percentages

	To			
From		A	B	C
	A	0	3	18
	B	0	0	0
	C	2	1	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
B-C	0.00	0.00	0.0	A	0	0
B-A	0.00	0.00	0.0	A	0	0
C-AB	0.26	5.37	0.6	A	183	274
C-A					288	432
A-B					32	48
A-C					115	172

Main Results for each time segment

04:45 - 05:00

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	689	0.000	0	0.0	0.0	0.000	A
B-A	0	0	492	0.000	0	0.0	0.0	0.000	A
C-AB	133	33	836	0.159	132	0.0	0.3	5.110	A
C-A	253	63			253				
A-B	26	7			26				
A-C	94	24			94				

05:00 - 05:15

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	683	0.000	0	0.0	0.0	0.000	A
B-A	0	0	470	0.000	0	0.0	0.0	0.000	A
C-AB	174	43	868	0.200	174	0.3	0.4	5.185	A
C-A	287	72			287				
A-B	31	8			31				
A-C	112	28			112				

05:15 - 05:30

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	674	0.000	0	0.0	0.0	0.000	A
B-A	0	0	440	0.000	0	0.0	0.0	0.000	A
C-AB	241	60	913	0.264	241	0.4	0.6	5.357	A
C-A	324	81			324				
A-B	39	10			39				
A-C	138	34			138				

05:30 - 05:45

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	674	0.000	0	0.0	0.0	0.000	A
B-A	0	0	440	0.000	0	0.0	0.0	0.000	A
C-AB	242	60	913	0.265	242	0.6	0.6	5.373	A
C-A	323	81			323				
A-B	39	10			39				
A-C	138	34			138				

05:45 - 06:00

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	683	0.000	0	0.0	0.0	0.000	A
B-A	0	0	470	0.000	0	0.0	0.0	0.000	A
C-AB	174	44	869	0.201	175	0.6	0.4	5.206	A
C-A	287	72			287				
A-B	31	8			31				
A-C	112	28			112				

06:00 - 06:15

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	689	0.000	0	0.0	0.0	0.000	A
B-A	0	0	492	0.000	0	0.0	0.0	0.000	A
C-AB	134	33	836	0.160	134	0.4	0.3	5.137	A
C-A	253	63			253				
A-B	26	7			26				
A-C	94	24			94				

Base 2021 (Combined) + Development, PM DEV

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	Five Fords WwTW Access Road / Cefn Road	T-Junction	Two-way		2.35	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D6	Base 2021 (Combined) + Development	PM DEV	ONE HOUR	14:45	16:15	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
A		ONE HOUR	✓	234	100.000
B		ONE HOUR	✓	164	100.000
C		ONE HOUR	✓	161	100.000

Origin-Destination Data

Demand (Veh/hr)

	To			
	A	B	C	
From	A	0	11	223
	B	45	0	119
	C	156	5	0

Vehicle Mix

Heavy Vehicle Percentages

	To			
	A	B	C	
From	A	0	80	7
	B	19	0	1
	C	7	24	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
B-C	0.20	6.85	0.2	A	109	164
B-A	0.12	10.26	0.1	B	41	62
C-AB	0.01	6.09	0.0	A	6	9
C-A					142	213
A-B					10	15
A-C					205	307

Main Results for each time segment

14:45 - 15:00

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	90	22	687	0.130	89	0.0	0.1	6.017	A
B-A	34	8	426	0.080	34	0.0	0.1	9.165	A
C-AB	5	1	596	0.008	5	0.0	0.0	6.090	A
C-A	117	29			117				
A-B	8	2			8				
A-C	168	42			168				

15:00 - 15:15

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	107	27	674	0.159	107	0.1	0.2	6.348	A
B-A	40	10	415	0.097	40	0.1	0.1	9.599	A
C-AB	6	1	605	0.010	6	0.0	0.0	6.023	A
C-A	139	35			139				
A-B	10	2			10				
A-C	200	50			200				

15:15 - 15:30

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	131	33	656	0.200	131	0.2	0.2	6.847	A
B-A	50	12	400	0.124	49	0.1	0.1	10.257	B
C-AB	8	2	618	0.012	8	0.0	0.0	5.918	A
C-A	170	42			170				
A-B	12	3			12				
A-C	246	61			246				

15:30 - 15:45

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	131	33	656	0.200	131	0.2	0.2	6.854	A
B-A	50	12	400	0.124	50	0.1	0.1	10.260	B
C-AB	8	2	618	0.012	8	0.0	0.0	5.901	A
C-A	170	42			170				
A-B	12	3			12				
A-C	246	61			246				

15:45 - 16:00

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	107	27	674	0.159	107	0.2	0.2	6.360	A
B-A	40	10	415	0.097	41	0.1	0.1	9.610	A
C-AB	6	1	605	0.010	6	0.0	0.0	5.989	A
C-A	139	35			139				
A-B	10	2			10				
A-C	200	50			200				

16:00 - 16:15

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	90	22	686	0.131	90	0.2	0.2	6.036	A
B-A	34	8	426	0.080	34	0.1	0.1	9.181	A
C-AB	5	1	596	0.008	5	0.0	0.0	6.072	A
C-A	117	29			117				
A-B	8	2			8				
A-C	168	42			168				

Base 2026 (Combined) + Development, AM DEV

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	Five Fords WwTW Access Road / Cefn Road	T-Junction	Two-way		1.51	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D7	Base 2026 (Combined) + Development	AM DEV	ONE HOUR	04:45	06:15	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
A		ONE HOUR	✓	166	100.000
B		ONE HOUR	✓	1	100.000
C		ONE HOUR	✓	535	100.000

Origin-Destination Data

Demand (Veh/hr)

	To			
From		A	B	C
	A	0	35	131
	B	0	0	1
	C	422	113	0

Vehicle Mix

Heavy Vehicle Percentages

	To			
From		A	B	C
	A	0	3	18
	B	0	0	0
	C	2	1	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
B-C	0.00	0.00	0.0	A	0	0
B-A	0.00	0.00	0.0	A	0	0
C-AB	0.27	5.33	0.6	A	189	283
C-A					302	453
A-B					32	48
A-C					120	180

Main Results for each time segment

04:45 - 05:00

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	688	0.000	0	0.0	0.0	0.000	A
B-A	0	0	488	0.000	0	0.0	0.0	0.000	A
C-AB	136	34	845	0.161	135	0.0	0.3	5.066	A
C-A	266	67			266				
A-B	26	7			26				
A-C	99	25			99				

05:00 - 05:15

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	681	0.000	0	0.0	0.0	0.000	A
B-A	0	0	465	0.000	0	0.0	0.0	0.000	A
C-AB	179	45	880	0.204	179	0.3	0.4	5.140	A
C-A	302	75			302				
A-B	31	8			31				
A-C	118	29			118				

05:15 - 05:30

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	672	0.000	0	0.0	0.0	0.000	A
B-A	0	0	434	0.000	0	0.0	0.0	0.000	A
C-AB	250	63	927	0.270	250	0.4	0.6	5.317	A
C-A	339	85			339				
A-B	39	10			39				
A-C	144	36			144				

05:30 - 05:45

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	672	0.000	0	0.0	0.0	0.000	A
B-A	0	0	434	0.000	0	0.0	0.0	0.000	A
C-AB	251	63	928	0.270	251	0.6	0.6	5.334	A
C-A	338	85			338				
A-B	39	10			39				
A-C	144	36			144				

05:45 - 06:00

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	681	0.000	0	0.0	0.0	0.000	A
B-A	0	0	465	0.000	0	0.0	0.0	0.000	A
C-AB	180	45	880	0.204	180	0.6	0.4	5.164	A
C-A	301	75			301				
A-B	31	8			31				
A-C	118	29			118				

06:00 - 06:15

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0	0	688	0.000	0	0.0	0.0	0.000	A
B-A	0	0	488	0.000	0	0.0	0.0	0.000	A
C-AB	137	34	846	0.162	137	0.4	0.3	5.093	A
C-A	266	66			266				
A-B	26	7			26				
A-C	99	25			99				

Base 2026 (Combined) + Development, PM DEV

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	Five Fords WwTW Access Road / Cefn Road	T-Junction	Two-way		2.29	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D8	Base 2026 (Combined) + Development	PM DEV	ONE HOUR	14:45	16:15	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
A		ONE HOUR	✓	246	100.000
B		ONE HOUR	✓	164	100.000
C		ONE HOUR	✓	170	100.000

Origin-Destination Data

Demand (Veh/hr)

	To			
	A	B	C	
From	A	0	11	235
	B	45	0	119
	C	165	5	0

Vehicle Mix

Heavy Vehicle Percentages

	To			
	A	B	C	
From	A	0	80	7
	B	19	0	1
	C	7	24	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
B-C	0.20	6.91	0.3	A	109	164
B-A	0.13	10.39	0.1	B	41	62
C-AB	0.01	6.06	0.0	A	6	9
C-A					150	225
A-B					10	15
A-C					216	323

Main Results for each time segment

14:45 - 15:00

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	90	22	684	0.131	89	0.0	0.1	6.044	A
B-A	34	8	423	0.080	34	0.0	0.1	9.233	A
C-AB	5	1	599	0.008	5	0.0	0.0	6.061	A
C-A	123	31			123				
A-B	8	2			8				
A-C	177	44			177				

15:00 - 15:15

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	107	27	671	0.160	107	0.1	0.2	6.383	A
B-A	40	10	412	0.098	40	0.1	0.1	9.689	A
C-AB	6	1	608	0.010	6	0.0	0.0	5.989	A
C-A	147	37			147				
A-B	10	2			10				
A-C	211	53			211				

15:15 - 15:30

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	131	33	652	0.201	131	0.2	0.2	6.899	A
B-A	50	12	396	0.125	49	0.1	0.1	10.375	B
C-AB	8	2	622	0.013	8	0.0	0.0	5.877	A
C-A	179	45			179				
A-B	12	3			12				
A-C	259	65			259				

15:30 - 15:45

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	131	33	652	0.201	131	0.2	0.3	6.905	A
B-A	50	12	396	0.125	50	0.1	0.1	10.386	B
C-AB	8	2	622	0.013	8	0.0	0.0	5.861	A
C-A	179	45			179				
A-B	12	3			12				
A-C	259	65			259				

15:45 - 16:00

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	107	27	670	0.160	107	0.3	0.2	6.393	A
B-A	40	10	412	0.098	41	0.1	0.1	9.698	A
C-AB	6	1	608	0.010	6	0.0	0.0	5.954	A
C-A	147	37			147				
A-B	10	2			10				
A-C	211	53			211				

16:00 - 16:15

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	90	22	684	0.131	90	0.2	0.2	6.063	A
B-A	34	8	423	0.080	34	0.1	0.1	9.252	A
C-AB	5	1	599	0.008	5	0.0	0.0	6.042	A
C-A	123	31			123				
A-B	8	2			8				
A-C	177	44			177				

Junctions 9				
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Filename: Five Fords WwTW Access Road_Cefn Road - Net Peak.j9

Path: C:\Users\Owner\OneDrive\Cotswold Transport Planning Ltd\CADtest - Documents\Martin\J9

Report generation date: 26/02/2021 09:53:52

- »Base 2021 (Combined), AM NET
- »Base 2021 (Combined), PM NET
- »Base 2026 (Combined), AM NET
- »Base 2026 (Combined), PM NET
- »Base 2021 (Combined) + Development, AM NET
- »Base 2021 (Combined) + Development, PM NET
- »Base 2026 (Combined) + Development, AM NET
- »Base 2026 (Combined) + Development, PM NET

Summary of junction performance

	AM NET					PM NET				
	Set ID	Queue (Veh)	Delay (s)	RFC	LOS	Set ID	Queue (Veh)	Delay (s)	RFC	LOS
	Base 2021 (Combined)									
Stream B-C	D1	0.0	6.14	0.01	A	D2	0.0	6.62	0.03	A
Stream B-A		0.0	9.47	0.01	A		0.0	10.25	0.02	B
Stream C-AB		0.1	4.47	0.05	A		0.0	5.84	0.01	A
	Base 2026 (Combined)									
Stream B-C	D3	0.0	6.16	0.01	A	D4	0.0	6.73	0.03	A
Stream B-A		0.0	9.64	0.01	A		0.0	10.54	0.02	B
Stream C-AB		0.1	4.42	0.06	A		0.0	5.82	0.01	A
	Base 2021 (Combined) + Development									
Stream B-C	D5	0.0	6.74	0.01	A	D6	0.0	6.55	0.03	A
Stream B-A		0.0	13.90	0.04	B		0.0	10.28	0.02	B
Stream C-AB		0.1	4.48	0.05	A		0.0	5.72	0.01	A
	Base 2026 (Combined) + Development									
Stream B-C	D7	0.0	6.76	0.01	A	D8	0.0	6.79	0.03	A
Stream B-A		0.0	14.15	0.05	B		0.0	10.51	0.02	B
Stream C-AB		0.1	4.42	0.06	A		0.0	5.71	0.01	A

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

File summary

File Description

Title	Commercial Glasshouse and Packing Facility, Wrexham
Location	Five Fords WwTW Access Road / Cefn Road
Site number	
Date	12/02/2021
Version	01
Status	Issue
Identifier	
Client	Low Carbon Farming 2 Ltd
Jobnumber	CTP-20-537
Enumerator	MW
Description	

Units

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

Analysis Options

Vehicle length (m)	Calculate Queue Percentiles	Calculate detailed queueing delay	Calculate residual capacity	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
5.75				0.85	36.00	20.00

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D1	Base 2021 (Combined)	AM NET	ONE HOUR	07:15	08:45	15	✓
D2	Base 2021 (Combined)	PM NET	ONE HOUR	16:15	17:45	15	✓
D3	Base 2026 (Combined)	AM NET	ONE HOUR	07:15	08:45	15	✓
D4	Base 2026 (Combined)	PM NET	ONE HOUR	16:15	17:45	15	✓
D5	Base 2021 (Combined) + Development	AM NET	ONE HOUR	07:15	08:45	15	✓
D6	Base 2021 (Combined) + Development	PM NET	ONE HOUR	16:15	17:45	15	✓
D7	Base 2026 (Combined) + Development	AM NET	ONE HOUR	07:15	08:45	15	✓
D8	Base 2026 (Combined) + Development	PM NET	ONE HOUR	16:15	17:45	15	✓

Analysis Set Details

ID	Include in report	Network flow scaling factor (%)	Network capacity scaling factor (%)
A1	✓	100.000	100.000

Base 2021 (Combined), AM NET

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	Five Fords WwTW Access Road / Cefn Road	T-Junction	Two-way		0.34	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description	Arm type
A	Cefn Road (E)		Major
B	Five Fords WwTW Access Road		Minor
C	Cefn Road (W)		Major

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Has right turn bay	Visibility for right turn (m)	Blocks?	Blocking queue (PCU)
C	7.80			192.0	✓	0.00

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor arm type	Width at give-way (m)	Width at 5m (m)	Width at 10m (m)	Width at 15m (m)	Width at 20m (m)	Estimate flare length	Flare length (PCU)	Visibility to left (m)	Visibility to right (m)
B	One lane plus flare	10.00	9.80	6.45	4.82	4.18	✓	3.00	145	60

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Stream	Intercept (Veh/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
B-A	592	0.099	0.251	0.158	0.359
B-C	735	0.104	0.263	-	-
C-B	685	0.245	0.245	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D1	Base 2021 (Combined)	AM NET	ONE HOUR	07:15	08:45	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
A		ONE HOUR	✓	147	100.000
B		ONE HOUR	✓	7	100.000
C		ONE HOUR	✓	508	100.000

Origin-Destination Data

Demand (Veh/hr)

	To			
	A	B	C	
From	A	0	8	139
	B	3	0	4
	C	490	18	0

Vehicle Mix

Heavy Vehicle Percentages

	To			
	A	B	C	
From	A	0	10	3
	B	17	0	17
	C	11	10	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
B-C	0.01	6.14	0.0	A	4	6
B-A	0.01	9.47	0.0	A	3	4
C-AB	0.05	4.47	0.1	A	35	52
C-A					431	647
A-B					7	11
A-C					128	191

Main Results for each time segment

07:15 - 07:30

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	3	0.75	603	0.005	3	0.0	0.0	6.001	A
B-A	2	0.56	422	0.005	2	0.0	0.0	8.571	A
C-AB	24	6	830	0.029	24	0.0	0.0	4.465	A
C-A	358	90			358				
A-B	6	2			6				
A-C	105	26			105				

07:30 - 07:45

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	4	1	598	0.006	4	0.0	0.0	6.058	A
B-A	3	0.67	406	0.007	3	0.0	0.0	8.924	A
C-AB	33	8	872	0.038	33	0.0	0.1	4.287	A
C-A	424	106			424				
A-B	7	2			7				
A-C	125	31			125				

07:45 - 08:00

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	4	1	591	0.007	4	0.0	0.0	6.138	A
B-A	3	0.83	384	0.009	3	0.0	0.0	9.465	A
C-AB	47	12	930	0.051	47	0.1	0.1	4.075	A
C-A	512	128			512				
A-B	9	2			9				
A-C	153	38			153				

08:00 - 08:15

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	4	1	591	0.007	4	0.0	0.0	6.138	A
B-A	3	0.83	384	0.009	3	0.0	0.0	9.465	A
C-AB	47	12	930	0.051	47	0.1	0.1	4.077	A
C-A	512	128			512				
A-B	9	2			9				
A-C	153	38			153				

08:15 - 08:30

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	4	1	598	0.006	4	0.0	0.0	6.059	A
B-A	3	0.67	406	0.007	3	0.0	0.0	8.926	A
C-AB	33	8	872	0.038	33	0.1	0.1	4.293	A
C-A	424	106			424				
A-B	7	2			7				
A-C	125	31			125				

08:30 - 08:45

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	3	0.75	603	0.005	3	0.0	0.0	6.002	A
B-A	2	0.56	422	0.005	2	0.0	0.0	8.572	A
C-AB	24	6	830	0.029	25	0.1	0.0	4.470	A
C-A	358	89			358				
A-B	6	2			6				
A-C	105	26			105				

Base 2021 (Combined), PM NET

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	Five Fords WwTW Access Road / Cefn Road	T-Junction	Two-way		0.24	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D2	Base 2021 (Combined)	PM NET	ONE HOUR	16:15	17:45	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
A		ONE HOUR	✓	526	100.000
B		ONE HOUR	✓	20	100.000
C		ONE HOUR	✓	207	100.000

Origin-Destination Data

Demand (Veh/hr)

	To			
	A	B	C	
From	A	0	1	525
	B	5	0	15
	C	204	3	0

Vehicle Mix

Heavy Vehicle Percentages

	To			
	A	B	C	
From	A	0	14	5
	B	7	0	7
	C	5	14	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
B-C	0.03	6.62	0.0	A	14	21
B-A	0.02	10.25	0.0	B	5	7
C-AB	0.01	5.84	0.0	A	4	6
C-A					186	279
A-B					1	1
A-C					482	723

Main Results for each time segment

16:15 - 16:30

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	11	3	610	0.019	11	0.0	0.0	6.008	A
B-A	4	1	411	0.009	4	0.0	0.0	8.849	A
C-AB	3	0.75	619	0.005	3	0.0	0.0	5.838	A
C-A	153	38			153				
A-B	0.75	0.19			0.75				
A-C	395	99			395				

16:30 - 16:45

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	13	3	589	0.023	13	0.0	0.0	6.251	A
B-A	4	1	388	0.012	4	0.0	0.0	9.386	A
C-AB	4	1	625	0.006	4	0.0	0.0	5.804	A
C-A	182	46			182				
A-B	1	0.22			1				
A-C	472	118			472				

16:45 - 17:00

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	17	4	560	0.029	16	0.0	0.0	6.620	A
B-A	6	1	357	0.015	5	0.0	0.0	10.247	B
C-AB	5	1	633	0.008	5	0.0	0.0	5.740	A
C-A	223	56			223				
A-B	1	0.28			1				
A-C	578	145			578				

17:00 - 17:15

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	17	4	560	0.029	17	0.0	0.0	6.620	A
B-A	6	1	357	0.015	6	0.0	0.0	10.247	B
C-AB	5	1	634	0.008	5	0.0	0.0	5.730	A
C-A	223	56			223				
A-B	1	0.28			1				
A-C	578	145			578				

17:15 - 17:30

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	13	3	589	0.023	14	0.0	0.0	6.252	A
B-A	4	1	388	0.012	5	0.0	0.0	9.386	A
C-AB	4	1	625	0.006	4	0.0	0.0	5.780	A
C-A	182	46			182				
A-B	1	0.22			1				
A-C	472	118			472				

17:30 - 17:45

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	11	3	610	0.019	11	0.0	0.0	6.012	A
B-A	4	1	411	0.009	4	0.0	0.0	8.848	A
C-AB	3	0.75	620	0.005	3	0.0	0.0	5.826	A
C-A	153	38			153				
A-B	0.75	0.19			0.75				
A-C	395	99			395				

Base 2026 (Combined), AM NET

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	Five Fords WwTW Access Road / Cefn Road	T-Junction	Two-way		0.35	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D3	Base 2026 (Combined)	AM NET	ONE HOUR	07:15	08:45	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
A		ONE HOUR	✓	155	100.000
B		ONE HOUR	✓	7	100.000
C		ONE HOUR	✓	536	100.000

Origin-Destination Data

Demand (Veh/hr)

	To			
	A	B	C	
From	A	0	8	147
	B	3	0	4
	C	517	19	0

Vehicle Mix

Heavy Vehicle Percentages

	To			
	A	B	C	
From	A	0	10	3
	B	17	0	17
	C	11	10	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
B-C	0.01	6.16	0.0	A	4	6
B-A	0.01	9.64	0.0	A	3	4
C-AB	0.06	4.42	0.1	A	38	58
C-A					453	680
A-B					7	11
A-C					135	202

Main Results for each time segment

07:15 - 07:30

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	3	0.75	601	0.005	3	0.0	0.0	6.015	A
B-A	2	0.56	418	0.005	2	0.0	0.0	8.667	A
C-AB	27	7	842	0.032	26	0.0	0.0	4.413	A
C-A	377	94			377				
A-B	6	2			6				
A-C	111	28			111				

07:30 - 07:45

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	4	1	596	0.006	4	0.0	0.0	6.075	A
B-A	3	0.67	401	0.007	3	0.0	0.0	9.049	A
C-AB	36	9	886	0.041	36	0.0	0.1	4.232	A
C-A	446	111			446				
A-B	7	2			7				
A-C	132	33			132				

07:45 - 08:00

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	4	1	589	0.007	4	0.0	0.0	6.160	A
B-A	3	0.83	377	0.009	3	0.0	0.0	9.637	A
C-AB	53	13	948	0.055	52	0.1	0.1	4.018	A
C-A	538	134			538				
A-B	9	2			9				
A-C	162	40			162				

08:00 - 08:15

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	4	1	589	0.007	4	0.0	0.0	6.160	A
B-A	3	0.83	377	0.009	3	0.0	0.0	9.637	A
C-AB	53	13	948	0.055	53	0.1	0.1	4.022	A
C-A	538	134			538				
A-B	9	2			9				
A-C	162	40			162				

08:15 - 08:30

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	4	1	596	0.006	4	0.0	0.0	6.076	A
B-A	3	0.67	401	0.007	3	0.0	0.0	9.048	A
C-AB	36	9	886	0.041	36	0.1	0.1	4.236	A
C-A	446	111			446				
A-B	7	2			7				
A-C	132	33			132				

08:30 - 08:45

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	3	0.75	601	0.005	3	0.0	0.0	6.016	A
B-A	2	0.56	418	0.005	2	0.0	0.0	8.667	A
C-AB	27	7	842	0.032	27	0.1	0.0	4.418	A
C-A	377	94			377				
A-B	6	2			6				
A-C	111	28			111				

Base 2026 (Combined), PM NET

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	Five Fords WwTW Access Road / Cefn Road	T-Junction	Two-way		0.23	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D4	Base 2026 (Combined)	PM NET	ONE HOUR	16:15	17:45	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
A		ONE HOUR	✓	556	100.000
B		ONE HOUR	✓	20	100.000
C		ONE HOUR	✓	219	100.000

Origin-Destination Data

Demand (Veh/hr)

	To			
	A	B	C	
From	A	0	1	555
	B	5	0	15
	C	216	3	0

Vehicle Mix

Heavy Vehicle Percentages

	To			
	A	B	C	
From	A	0	14	5
	B	7	0	7
	C	5	14	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
B-C	0.03	6.73	0.0	A	14	21
B-A	0.02	10.54	0.0	B	5	7
C-AB	0.01	5.82	0.0	A	4	6
C-A					197	295
A-B					1	1
A-C					509	764

Main Results for each time segment

16:15 - 16:30

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	11	3	604	0.019	11	0.0	0.0	6.070	A
B-A	4	1	404	0.009	4	0.0	0.0	8.996	A
C-AB	3	0.76	621	0.005	3	0.0	0.0	5.823	A
C-A	162	40			162				
A-B	0.75	0.19			0.75				
A-C	418	104			418				

16:30 - 16:45

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	13	3	582	0.023	13	0.0	0.0	6.331	A
B-A	4	1	380	0.012	4	0.0	0.0	9.584	A
C-AB	4	1	627	0.006	4	0.0	0.0	5.784	A
C-A	193	48			193				
A-B	1	0.22			1				
A-C	499	125			499				

16:45 - 17:00

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	17	4	551	0.030	16	0.0	0.0	6.730	A
B-A	6	1	347	0.016	5	0.0	0.0	10.539	B
C-AB	5	1	637	0.008	5	0.0	0.0	5.713	A
C-A	236	59			236				
A-B	1	0.28			1				
A-C	611	153			611				

17:00 - 17:15

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	17	4	551	0.030	17	0.0	0.0	6.731	A
B-A	6	1	347	0.016	6	0.0	0.0	10.538	B
C-AB	5	1	637	0.008	5	0.0	0.0	5.700	A
C-A	236	59			236				
A-B	1	0.28			1				
A-C	611	153			611				

17:15 - 17:30

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	13	3	582	0.023	14	0.0	0.0	6.335	A
B-A	4	1	380	0.012	5	0.0	0.0	9.584	A
C-AB	4	1	627	0.006	4	0.0	0.0	5.757	A
C-A	193	48			193				
A-B	1	0.22			1				
A-C	499	125			499				

17:30 - 17:45

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	11	3	604	0.019	11	0.0	0.0	6.074	A
B-A	4	1	404	0.009	4	0.0	0.0	8.996	A
C-AB	3	0.77	621	0.005	3	0.0	0.0	5.812	A
C-A	162	40			162				
A-B	0.75	0.19			0.75				
A-C	418	104			418				

Base 2021 (Combined) + Development, AM NET

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	Five Fords WwTW Access Road / Cefn Road	T-Junction	Two-way		0.69	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D5	Base 2021 (Combined) + Development	AM NET	ONE HOUR	07:15	08:45	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
A		ONE HOUR	✓	155	100.000
B		ONE HOUR	✓	16	100.000
C		ONE HOUR	✓	509	100.000

Origin-Destination Data

Demand (Veh/hr)

	To			
	A	B	C	
From	A	0	16	139
	B	11	0	5
	C	490	19	0

Vehicle Mix

Heavy Vehicle Percentages

	To			
	A	B	C	
From	A	0	5	3
	B	81	0	15
	C	11	10	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
B-C	0.01	6.74	0.0	A	5	7
B-A	0.04	13.90	0.0	B	10	15
C-AB	0.05	4.48	0.1	A	37	55
C-A					430	645
A-B					15	22
A-C					128	191

Main Results for each time segment

07:15 - 07:30

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	4	1	553	0.007	4	0.0	0.0	6.554	A
B-A	8	2	299	0.028	8	0.0	0.0	12.389	B
C-AB	26	6	829	0.031	26	0.0	0.0	4.479	A
C-A	357	89			357				
A-B	12	3			12				
A-C	105	26			105				

07:30 - 07:45

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	4	1	547	0.008	4	0.0	0.0	6.630	A
B-A	10	2	287	0.034	10	0.0	0.0	12.981	B
C-AB	35	9	871	0.040	35	0.0	0.1	4.303	A
C-A	423	106			423				
A-B	14	4			14				
A-C	125	31			125				

07:45 - 08:00

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	6	1	540	0.010	5	0.0	0.0	6.737	A
B-A	12	3	271	0.045	12	0.0	0.0	13.897	B
C-AB	50	13	929	0.054	50	0.1	0.1	4.094	A
C-A	510	128			510				
A-B	18	4			18				
A-C	153	38			153				

08:00 - 08:15

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	6	1	540	0.010	6	0.0	0.0	6.738	A
B-A	12	3	271	0.045	12	0.0	0.0	13.900	B
C-AB	50	13	929	0.054	50	0.1	0.1	4.096	A
C-A	510	128			510				
A-B	18	4			18				
A-C	153	38			153				

08:15 - 08:30

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	4	1	547	0.008	5	0.0	0.0	6.634	A
B-A	10	2	287	0.034	10	0.0	0.0	12.987	B
C-AB	35	9	871	0.040	35	0.1	0.1	4.309	A
C-A	423	106			423				
A-B	14	4			14				
A-C	125	31			125				

08:30 - 08:45

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	4	1	553	0.007	4	0.0	0.0	6.559	A
B-A	8	2	299	0.028	8	0.0	0.0	12.395	B
C-AB	26	6	829	0.031	26	0.1	0.0	4.483	A
C-A	357	89			357				
A-B	12	3			12				
A-C	105	26			105				

Base 2021 (Combined) + Development, PM NET

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	Five Fords WwTW Access Road / Cefn Road	T-Junction	Two-way		0.24	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D6	Base 2021 (Combined) + Development	PM NET	ONE HOUR	16:15	17:45	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
A		ONE HOUR	✓	527	100.000
B		ONE HOUR	✓	21	100.000
C		ONE HOUR	✓	207	100.000

Origin-Destination Data

Demand (Veh/hr)

	To			
		A	B	C
	A	0	2	525
	B	5	0	16
	C	204	3	0

Vehicle Mix

Heavy Vehicle Percentages

	To			
		A	B	C
	A	0	12	5
	B	7	0	6
	C	5	11	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
B-C	0.03	6.55	0.0	A	15	22
B-A	0.02	10.28	0.0	B	5	7
C-AB	0.01	5.72	0.0	A	4	6
C-A					186	279
A-B					2	3
A-C					482	723

Main Results for each time segment

16:15 - 16:30

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	12	3	618	0.020	12	0.0	0.0	5.944	A
B-A	4	1	409	0.009	4	0.0	0.0	8.875	A
C-AB	3	0.75	632	0.005	3	0.0	0.0	5.723	A
C-A	153	38			153				
A-B	2	0.38			2				
A-C	395	99			395				

16:30 - 16:45

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	14	4	596	0.024	14	0.0	0.0	6.186	A
B-A	4	1	387	0.012	4	0.0	0.0	9.414	A
C-AB	4	1	637	0.006	4	0.0	0.0	5.693	A
C-A	182	46			182				
A-B	2	0.45			2				
A-C	472	118			472				

16:45 - 17:00

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	18	4	567	0.031	18	0.0	0.0	6.554	A
B-A	6	1	356	0.015	5	0.0	0.0	10.279	B
C-AB	5	1	644	0.008	5	0.0	0.0	5.639	A
C-A	223	56			223				
A-B	2	0.55			2				
A-C	578	145			578				

17:00 - 17:15

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	18	4	567	0.031	18	0.0	0.0	6.555	A
B-A	6	1	356	0.015	6	0.0	0.0	10.279	B
C-AB	5	1	644	0.008	5	0.0	0.0	5.631	A
C-A	223	56			223				
A-B	2	0.55			2				
A-C	578	145			578				

17:15 - 17:30

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	14	4	596	0.024	14	0.0	0.0	6.190	A
B-A	4	1	387	0.012	5	0.0	0.0	9.416	A
C-AB	4	1	637	0.006	4	0.0	0.0	5.678	A
C-A	182	46			182				
A-B	2	0.45			2				
A-C	472	118			472				

17:30 - 17:45

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	12	3	617	0.020	12	0.0	0.0	5.948	A
B-A	4	1	409	0.009	4	0.0	0.0	8.874	A
C-AB	3	0.75	632	0.005	3	0.0	0.0	5.717	A
C-A	153	38			153				
A-B	2	0.38			2				
A-C	395	99			395				

Base 2026 (Combined) + Development, AM NET

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	Five Fords WwTW Access Road / Cefn Road	T-Junction	Two-way		0.67	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D7	Base 2026 (Combined) + Development	AM NET	ONE HOUR	07:15	08:45	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
A		ONE HOUR	✓	163	100.000
B		ONE HOUR	✓	16	100.000
C		ONE HOUR	✓	536	100.000

Origin-Destination Data

Demand (Veh/hr)

	To			
	A	B	C	
From	A	0	16	147
	B	11	0	5
	C	517	19	0

Vehicle Mix

Heavy Vehicle Percentages

	To			
	A	B	C	
From	A	0	5	3
	B	81	0	15
	C	11	10	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
B-C	0.01	6.76	0.0	A	5	7
B-A	0.05	14.15	0.0	B	10	15
C-AB	0.06	4.42	0.1	A	38	58
C-A					453	680
A-B					15	22
A-C					135	202

Main Results for each time segment

07:15 - 07:30

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	4	1	552	0.007	4	0.0	0.0	6.570	A
B-A	8	2	296	0.028	8	0.0	0.0	12.523	B
C-AB	27	7	841	0.032	26	0.0	0.0	4.419	A
C-A	377	94			377				
A-B	12	3			12				
A-C	111	28			111				

07:30 - 07:45

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	4	1	546	0.008	4	0.0	0.0	6.649	A
B-A	10	2	283	0.035	10	0.0	0.0	13.157	B
C-AB	36	9	885	0.041	36	0.0	0.1	4.238	A
C-A	446	111			446				
A-B	14	4			14				
A-C	132	33			132				

07:45 - 08:00

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	6	1	538	0.010	5	0.0	0.0	6.762	A
B-A	12	3	267	0.045	12	0.0	0.0	14.145	B
C-AB	53	13	947	0.056	53	0.1	0.1	4.024	A
C-A	538	134			538				
A-B	18	4			18				
A-C	162	40			162				

08:00 - 08:15

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	6	1	538	0.010	6	0.0	0.0	6.763	A
B-A	12	3	267	0.045	12	0.0	0.0	14.148	B
C-AB	53	13	947	0.056	53	0.1	0.1	4.028	A
C-A	537	134			537				
A-B	18	4			18				
A-C	162	40			162				

08:15 - 08:30

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	4	1	546	0.008	5	0.0	0.0	6.651	A
B-A	10	2	283	0.035	10	0.0	0.0	13.166	B
C-AB	36	9	885	0.041	36	0.1	0.1	4.244	A
C-A	446	111			446				
A-B	14	4			14				
A-C	132	33			132				

08:30 - 08:45

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	4	1	551	0.007	4	0.0	0.0	6.575	A
B-A	8	2	296	0.028	8	0.0	0.0	12.532	B
C-AB	27	7	841	0.032	27	0.1	0.0	4.421	A
C-A	377	94			377				
A-B	12	3			12				
A-C	111	28			111				

Base 2026 (Combined) + Development, PM NET

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	Five Fords WwTW Access Road / Cefn Road	T-Junction	Two-way		0.25	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D8	Base 2026 (Combined) + Development	PM NET	ONE HOUR	16:15	17:45	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
A		ONE HOUR	✓	557	100.000
B		ONE HOUR	✓	22	100.000
C		ONE HOUR	✓	219	100.000

Origin-Destination Data

Demand (Veh/hr)

	To			
	A	B	C	
From	A	0	2	555
	B	6	0	16
	C	216	3	0

Vehicle Mix

Heavy Vehicle Percentages

	To			
	A	B	C	
From	A	0	12	5
	B	7	0	7
	C	5	11	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
B-C	0.03	6.79	0.0	A	15	22
B-A	0.02	10.51	0.0	B	6	8
C-AB	0.01	5.71	0.0	A	4	6
C-A					197	295
A-B					2	3
A-C					509	764

Main Results for each time segment

16:15 - 16:30

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	12	3	601	0.020	12	0.0	0.0	6.116	A
B-A	5	1	406	0.011	4	0.0	0.0	8.955	A
C-AB	3	0.76	633	0.005	3	0.0	0.0	5.709	A
C-A	162	40			162				
A-B	2	0.38			2				
A-C	418	104			418				

16:30 - 16:45

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	14	4	578	0.025	14	0.0	0.0	6.382	A
B-A	5	1	382	0.014	5	0.0	0.0	9.547	A
C-AB	4	1	639	0.006	4	0.0	0.0	5.676	A
C-A	193	48			193				
A-B	2	0.45			2				
A-C	499	125			499				

16:45 - 17:00

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	18	4	548	0.032	18	0.0	0.0	6.790	A
B-A	7	2	349	0.019	7	0.0	0.0	10.507	B
C-AB	5	1	647	0.008	5	0.0	0.0	5.615	A
C-A	236	59			236				
A-B	2	0.55			2				
A-C	611	153			611				

17:00 - 17:15

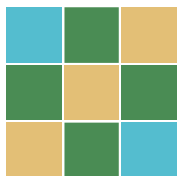
Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	18	4	548	0.032	18	0.0	0.0	6.790	A
B-A	7	2	349	0.019	7	0.0	0.0	10.507	B
C-AB	5	1	647	0.008	5	0.0	0.0	5.609	A
C-A	236	59			236				
A-B	2	0.55			2				
A-C	611	153			611				

17:15 - 17:30

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	14	4	578	0.025	14	0.0	0.0	6.386	A
B-A	5	1	382	0.014	5	0.0	0.0	9.547	A
C-AB	4	1	639	0.006	4	0.0	0.0	5.660	A
C-A	193	48			193				
A-B	2	0.45			2				
A-C	499	125			499				

17:30 - 17:45

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	12	3	600	0.020	12	0.0	0.0	6.120	A
B-A	5	1	407	0.011	5	0.0	0.0	8.955	A
C-AB	3	0.76	634	0.005	3	0.0	0.0	5.703	A
C-A	162	40			162				
A-B	2	0.38			2				
A-C	418	104			418				



COTSWOLD
TRANSPORT
PLANNING

Appendix H

ARCADY Output Reports

Junctions 9										
ARCADY 9 - Roundabout Module										
Version: 9.5.1.7462										
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Filename: Five Fords Roundabout - Net Peak.j9

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Report generation date: 26/02/2021 09:40:38

- »Base 2021 (Combined), AM NET
- »Base 2021 (Combined), PM NET
- »Base 2026 (Combined), AM NET
- »Base 2026 (Combined), PM NET
- »Base 2021 (Combined) + Development, AM NET
- »Base 2021 (Combined) + Development, PM NET
- »Base 2026 (Combined) + Development, AM NET
- »Base 2026 (Combined) + Development, PM NET

Summary of junction performance

	AM NET					PM NET				
	Set ID	Queue (Veh)	Delay (s)	RFC	LOS	Set ID	Queue (Veh)	Delay (s)	RFC	LOS
	Base 2021 (Combined)									
1 - N Approach	D1	0.1	1.99	0.10	A	D2	0.8	2.79	0.45	A
2 - Sesswick Way		0.5	2.99	0.34	A		0.2	2.81	0.15	A
3 - Cefn Road		0.9	5.73	0.46	A		0.2	3.01	0.16	A
	Base 2026 (Combined)									
1 - N Approach	D3	0.1	2.01	0.11	A	D4	0.9	2.93	0.48	A
2 - Sesswick Way		0.6	3.08	0.36	A		0.2	2.88	0.17	A
3 - Cefn Road		1.0	6.19	0.50	A		0.2	3.05	0.17	A
	Base 2021 (Combined) + Development									
1 - N Approach	D5	0.1	2.04	0.11	A	D6	0.8	2.79	0.45	A
2 - Sesswick Way		0.5	3.04	0.35	A		0.2	2.81	0.15	A
3 - Cefn Road		0.9	5.90	0.47	A		0.2	3.01	0.16	A
	Base 2026 (Combined) + Development									
1 - N Approach	D7	0.1	2.05	0.11	A	D8	0.9	2.93	0.48	A
2 - Sesswick Way		0.6	3.14	0.37	A		0.2	2.88	0.17	A
3 - Cefn Road		1.0	6.37	0.51	A		0.2	3.05	0.17	A

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

File summary

File Description

Title	Commercial Glasshouse and Packing Facility, Wrexham
Location	Five Fords Roundabout
Site number	
Date	12/02/2021
Version	01
Status	Issue
Identifier	
Client	Low carbon Farming 2 Ltd.
Jobnumber	CTP-20-537
Enumerator	MW
Description	

Units

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

Analysis Options

Vehicle length (m)	Calculate Queue Percentiles	Calculate detailed queueing delay	Calculate residual capacity	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
5.75				0.85	36.00	20.00

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D1	Base 2021 (Combined)	AM NET	ONE HOUR	07:15	08:45	15	✓
D2	Base 2021 (Combined)	PM NET	ONE HOUR	16:15	17:45	15	✓
D3	Base 2026 (Combined)	AM NET	ONE HOUR	07:15	08:45	15	✓
D4	Base 2026 (Combined)	PM NET	ONE HOUR	16:15	17:45	15	✓
D5	Base 2021 (Combined) + Development	AM NET	ONE HOUR	07:15	08:45	15	✓
D6	Base 2021 (Combined) + Development	PM NET	ONE HOUR	16:15	17:45	15	✓
D7	Base 2026 (Combined) + Development	AM NET	ONE HOUR	07:15	08:45	15	✓
D8	Base 2026 (Combined) + Development	PM NET	ONE HOUR	16:15	17:45	15	✓

Analysis Set Details

ID	Include in report	Network flow scaling factor (%)	Network capacity scaling factor (%)
A1	✓	100.000	100.000

Base 2021 (Combined), AM NET

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	Five Fords Roundabout	Standard Roundabout		1, 2, 3	3.87	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description
1	N Approach	
2	Sesswick Way	
3	Cefn Road	

Roundabout Geometry

Arm	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit only
1 - N Approach	7.61	7.61	0.0	32.2	50.0	13.0	
2 - Sesswick Way	4.72	8.55	8.5	52.9	50.4	22.0	
3 - Cefn Road	3.47	7.67	9.8	32.0	50.1	40.0	

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Final slope	Final intercept (PCU/hr)
1 - N Approach	0.779	2484
2 - Sesswick Way	0.683	2016
3 - Cefn Road	0.577	1561

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

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D1	Base 2021 (Combined)	AM NET	ONE HOUR	07:15	08:45	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - N Approach		ONE HOUR	✓	186	100.000
2 - Sesswick Way		ONE HOUR	✓	569	100.000
3 - Cefn Road		ONE HOUR	✓	493	100.000

Origin-Destination Data

Demand (Veh/hr)

	To			
		1 - N Approach	2 - Sesswick Way	3 - Cefn Road
From	1 - N Approach	0	99	87
	2 - Sesswick Way	512	0	57
	3 - Cefn Road	412	81	0

Vehicle Mix

Heavy Vehicle Percentages

	To			
		1 - N Approach	2 - Sesswick Way	3 - Cefn Road
From	1 - N Approach	0	25	14
	2 - Sesswick Way	6	0	6
	3 - Cefn Road	3	8	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
1 - N Approach	0.10	1.99	0.1	A	171	256
2 - Sesswick Way	0.34	2.99	0.5	A	522	783
3 - Cefn Road	0.46	5.73	0.9	A	452	679

Main Results for each time segment

07:15 - 07:30

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	140	35	61	2030	0.069	140	693	0.0	0.1	1.903	A
2 - Sesswick Way	428	107	65	1854	0.231	427	135	0.0	0.3	2.520	A
3 - Cefn Road	371	93	384	1277	0.291	370	108	0.0	0.4	3.959	A

07:30 - 07:45

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	167	42	73	2022	0.083	167	830	0.1	0.1	1.940	A
2 - Sesswick Way	512	128	78	1845	0.277	511	162	0.3	0.4	2.699	A
3 - Cefn Road	443	111	460	1232	0.360	443	129	0.4	0.6	4.555	A

07:45 - 08:00

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	205	51	89	2010	0.102	205	1016	0.1	0.1	1.993	A
2 - Sesswick Way	626	157	96	1832	0.342	626	198	0.4	0.5	2.983	A
3 - Cefn Road	543	136	563	1172	0.463	542	158	0.6	0.9	5.704	A

08:00 - 08:15

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	205	51	89	2010	0.102	205	1017	0.1	0.1	1.993	A
2 - Sesswick Way	626	157	96	1832	0.342	626	198	0.5	0.5	2.986	A
3 - Cefn Road	543	136	564	1171	0.463	543	159	0.9	0.9	5.727	A

08:15 - 08:30

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	167	42	73	2022	0.083	167	832	0.1	0.1	1.941	A
2 - Sesswick Way	512	128	78	1845	0.277	512	162	0.5	0.4	2.704	A
3 - Cefn Road	443	111	461	1232	0.360	444	130	0.9	0.6	4.577	A

08:30 - 08:45

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	140	35	61	2030	0.069	140	696	0.1	0.1	1.903	A
2 - Sesswick Way	428	107	66	1854	0.231	429	136	0.4	0.3	2.525	A
3 - Cefn Road	371	93	386	1276	0.291	372	108	0.6	0.4	3.982	A

Base 2021 (Combined), PM NET

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	Five Fords Roundabout	Standard Roundabout		1, 2, 3	2.82	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D2	Base 2021 (Combined)	PM NET	ONE HOUR	16:15	17:45	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - N Approach		ONE HOUR	✓	974	100.000
2 - Sesswick Way		ONE HOUR	✓	213	100.000
3 - Cefn Road		ONE HOUR	✓	207	100.000

Origin-Destination Data

Demand (Veh/hr)

	To			
		1 - N Approach	2 - Sesswick Way	3 - Cefn Road
From	1 - N Approach	0	543	431
	2 - Sesswick Way	117	0	96
	3 - Cefn Road	131	76	0

Vehicle Mix

Heavy Vehicle Percentages

	To			
		1 - N Approach	2 - Sesswick Way	3 - Cefn Road
From	1 - N Approach	0	4	0
	2 - Sesswick Way	18	0	4
	3 - Cefn Road	3	4	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
1 - N Approach	0.45	2.79	0.8	A	894	1341
2 - Sesswick Way	0.15	2.81	0.2	A	195	293
3 - Cefn Road	0.16	3.01	0.2	A	190	285

Main Results for each time segment

16:15 - 16:30

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	733	183	57	2385	0.307	732	186	0.0	0.4	2.175	A
2 - Sesswick Way	160	40	324	1607	0.100	160	465	0.0	0.1	2.487	A
3 - Cefn Road	156	39	88	1452	0.107	155	396	0.0	0.1	2.776	A

16:30 - 16:45

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	876	219	68	2376	0.369	875	223	0.4	0.6	2.398	A
2 - Sesswick Way	191	48	387	1568	0.122	191	556	0.1	0.1	2.614	A
3 - Cefn Road	186	47	105	1441	0.129	186	473	0.1	0.1	2.868	A

16:45 - 17:00

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	1072	268	84	2364	0.454	1071	273	0.6	0.8	2.784	A
2 - Sesswick Way	235	59	474	1515	0.155	234	681	0.1	0.2	2.810	A
3 - Cefn Road	228	57	129	1425	0.160	228	580	0.1	0.2	3.005	A

17:00 - 17:15

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	1072	268	84	2364	0.454	1072	273	0.8	0.8	2.786	A
2 - Sesswick Way	235	59	475	1515	0.155	235	682	0.2	0.2	2.810	A
3 - Cefn Road	228	57	129	1425	0.160	228	580	0.2	0.2	3.005	A

17:15 - 17:30

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	876	219	68	2376	0.369	877	223	0.8	0.6	2.401	A
2 - Sesswick Way	191	48	388	1568	0.122	192	557	0.2	0.1	2.617	A
3 - Cefn Road	186	47	105	1441	0.129	186	474	0.2	0.1	2.871	A

17:30 - 17:45

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	733	183	57	2385	0.307	734	187	0.6	0.4	2.180	A
2 - Sesswick Way	160	40	325	1607	0.100	160	466	0.1	0.1	2.491	A
3 - Cefn Road	156	39	88	1452	0.107	156	397	0.1	0.1	2.779	A

Base 2026 (Combined), AM NET

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	Five Fords Roundabout	Standard Roundabout		1, 2, 3	4.09	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D3	Base 2026 (Combined)	AM NET	ONE HOUR	07:15	08:45	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - N Approach		ONE HOUR	✓	196	100.000
2 - Sesswick Way		ONE HOUR	✓	600	100.000
3 - Cefn Road		ONE HOUR	✓	519	100.000

Origin-Destination Data

Demand (Veh/hr)

	To			
		1 - N Approach	2 - Sesswick Way	3 - Cefn Road
From	1 - N Approach	0	104	92
	2 - Sesswick Way	540	0	60
	3 - Cefn Road	434	85	0

Vehicle Mix

Heavy Vehicle Percentages

	To			
		1 - N Approach	2 - Sesswick Way	3 - Cefn Road
From	1 - N Approach	0	25	14
	2 - Sesswick Way	6	0	6
	3 - Cefn Road	3	8	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
1 - N Approach	0.11	2.01	0.1	A	180	270
2 - Sesswick Way	0.36	3.08	0.6	A	551	826
3 - Cefn Road	0.50	6.19	1.0	A	476	714

Main Results for each time segment

07:15 - 07:30

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	148	37	64	2028	0.073	147	731	0.0	0.1	1.912	A
2 - Sesswick Way	452	113	69	1851	0.244	450	142	0.0	0.3	2.567	A
3 - Cefn Road	391	98	405	1265	0.309	389	114	0.0	0.4	4.102	A

07:30 - 07:45

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	176	44	76	2020	0.087	176	875	0.1	0.1	1.952	A
2 - Sesswick Way	539	135	83	1841	0.293	539	170	0.3	0.4	2.764	A
3 - Cefn Road	467	117	485	1218	0.383	466	137	0.4	0.6	4.785	A

07:45 - 08:00

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	216	54	93	2008	0.107	216	1071	0.1	0.1	2.008	A
2 - Sesswick Way	661	165	101	1828	0.361	660	208	0.4	0.6	3.081	A
3 - Cefn Road	571	143	594	1153	0.495	570	167	0.6	1.0	6.155	A

08:00 - 08:15

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	216	54	94	2007	0.108	216	1072	0.1	0.1	2.008	A
2 - Sesswick Way	661	165	101	1828	0.361	661	208	0.6	0.6	3.083	A
3 - Cefn Road	571	143	595	1153	0.496	571	167	1.0	1.0	6.187	A

08:15 - 08:30

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	176	44	77	2019	0.087	176	877	0.1	0.1	1.954	A
2 - Sesswick Way	539	135	83	1841	0.293	540	170	0.6	0.4	2.767	A
3 - Cefn Road	467	117	486	1217	0.383	468	137	1.0	0.6	4.813	A

08:30 - 08:45

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	148	37	64	2028	0.073	148	734	0.1	0.1	1.913	A
2 - Sesswick Way	452	113	69	1851	0.244	452	142	0.4	0.3	2.575	A
3 - Cefn Road	391	98	407	1264	0.309	391	115	0.6	0.5	4.131	A

Base 2026 (Combined), PM NET

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	Five Fords Roundabout	Standard Roundabout		1, 2, 3	2.94	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D4	Base 2026 (Combined)	PM NET	ONE HOUR	16:15	17:45	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - N Approach		ONE HOUR	✓	1029	100.000
2 - Sesswick Way		ONE HOUR	✓	225	100.000
3 - Cefn Road		ONE HOUR	✓	219	100.000

Origin-Destination Data

Demand (Veh/hr)

	To			
		1 - N Approach	2 - Sesswick Way	3 - Cefn Road
From	1 - N Approach	0	574	455
	2 - Sesswick Way	124	0	101
	3 - Cefn Road	139	80	0

Vehicle Mix

Heavy Vehicle Percentages

	To			
		1 - N Approach	2 - Sesswick Way	3 - Cefn Road
From	1 - N Approach	0	4	0
	2 - Sesswick Way	18	0	4
	3 - Cefn Road	3	4	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
1 - N Approach	0.48	2.93	0.9	A	944	1416
2 - Sesswick Way	0.17	2.88	0.2	A	206	310
3 - Cefn Road	0.17	3.05	0.2	A	201	301

Main Results for each time segment

16:15 - 16:30

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	775	194	60	2383	0.325	773	197	0.0	0.5	2.233	A
2 - Sesswick Way	169	42	342	1596	0.106	169	491	0.0	0.1	2.523	A
3 - Cefn Road	165	41	93	1449	0.114	164	418	0.0	0.1	2.800	A

16:30 - 16:45

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	925	231	72	2373	0.390	924	236	0.5	0.6	2.483	A
2 - Sesswick Way	202	51	409	1555	0.130	202	588	0.1	0.1	2.661	A
3 - Cefn Road	197	49	111	1437	0.137	197	500	0.1	0.2	2.902	A

16:45 - 17:00

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	1133	283	88	2360	0.480	1132	289	0.6	0.9	2.927	A
2 - Sesswick Way	248	62	500	1499	0.165	248	719	0.1	0.2	2.876	A
3 - Cefn Road	241	60	136	1420	0.170	241	612	0.2	0.2	3.052	A

17:00 - 17:15

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	1133	283	88	2360	0.480	1133	290	0.9	0.9	2.932	A
2 - Sesswick Way	248	62	501	1498	0.165	248	720	0.2	0.2	2.877	A
3 - Cefn Road	241	60	137	1420	0.170	241	612	0.2	0.2	3.052	A

17:15 - 17:30

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	925	231	72	2373	0.390	926	237	0.9	0.6	2.489	A
2 - Sesswick Way	202	51	410	1554	0.130	202	589	0.2	0.2	2.662	A
3 - Cefn Road	197	49	112	1437	0.137	197	500	0.2	0.2	2.906	A

17:30 - 17:45

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	775	194	60	2382	0.325	775	198	0.6	0.5	2.240	A
2 - Sesswick Way	169	42	343	1595	0.106	170	493	0.2	0.1	2.526	A
3 - Cefn Road	165	41	93	1449	0.114	165	419	0.2	0.1	2.806	A

Base 2021 (Combined) + Development, AM NET

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	Five Fords Roundabout	Standard Roundabout		1, 2, 3	3.97	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D5	Base 2021 (Combined) + Development	AM NET	ONE HOUR	07:15	08:45	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - N Approach		ONE HOUR	✓	190	100.000
2 - Sesswick Way		ONE HOUR	✓	573	100.000
3 - Cefn Road		ONE HOUR	✓	501	100.000

Origin-Destination Data

Demand (Veh/hr)

	To			
		1 - N Approach	2 - Sesswick Way	3 - Cefn Road
From	1 - N Approach	0	99	91
	2 - Sesswick Way	512	0	61
	3 - Cefn Road	416	85	0

Vehicle Mix

Heavy Vehicle Percentages

	To			
		1 - N Approach	2 - Sesswick Way	3 - Cefn Road
From	1 - N Approach	0	25	18
	2 - Sesswick Way	6	0	12
	3 - Cefn Road	3	13	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
1 - N Approach	0.11	2.04	0.1	A	174	262
2 - Sesswick Way	0.35	3.04	0.5	A	526	789
3 - Cefn Road	0.47	5.90	0.9	A	460	690

Main Results for each time segment

07:15 - 07:30

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	143	36	64	1996	0.072	143	696	0.0	0.1	1.942	A
2 - Sesswick Way	431	108	68	1839	0.235	430	138	0.0	0.3	2.552	A
3 - Cefn Road	377	94	384	1266	0.298	375	114	0.0	0.4	4.034	A

07:30 - 07:45

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	171	43	76	1987	0.086	171	833	0.1	0.1	1.981	A
2 - Sesswick Way	515	129	82	1829	0.282	515	165	0.3	0.4	2.739	A
3 - Cefn Road	450	113	460	1222	0.369	450	137	0.4	0.6	4.656	A

07:45 - 08:00

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	209	52	93	1975	0.106	209	1020	0.1	0.1	2.038	A
2 - Sesswick Way	631	158	100	1815	0.348	630	202	0.4	0.5	3.037	A
3 - Cefn Road	552	138	563	1162	0.475	550	167	0.6	0.9	5.876	A

08:00 - 08:15

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	209	52	94	1975	0.106	209	1022	0.1	0.1	2.038	A
2 - Sesswick Way	631	158	100	1815	0.348	631	203	0.5	0.5	3.039	A
3 - Cefn Road	552	138	564	1162	0.475	552	167	0.9	0.9	5.901	A

08:15 - 08:30

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	171	43	77	1987	0.086	171	836	0.1	0.1	1.983	A
2 - Sesswick Way	515	129	82	1829	0.282	516	166	0.5	0.4	2.742	A
3 - Cefn Road	450	113	461	1222	0.369	452	137	0.9	0.6	4.683	A

08:30 - 08:45

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	143	36	64	1996	0.072	143	699	0.1	0.1	1.942	A
2 - Sesswick Way	431	108	69	1839	0.235	432	139	0.4	0.3	2.560	A
3 - Cefn Road	377	94	386	1266	0.298	378	115	0.6	0.4	4.058	A

Base 2021 (Combined) + Development, PM NET

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	Five Fords Roundabout	Standard Roundabout		1, 2, 3	2.82	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D6	Base 2021 (Combined) + Development	PM NET	ONE HOUR	16:15	17:45	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - N Approach		ONE HOUR	✓	974	100.000
2 - Sesswick Way		ONE HOUR	✓	213	100.000
3 - Cefn Road		ONE HOUR	✓	207	100.000

Origin-Destination Data

Demand (Veh/hr)

	To			
		1 - N Approach	2 - Sesswick Way	3 - Cefn Road
From	1 - N Approach	0	543	431
	2 - Sesswick Way	117	0	96
	3 - Cefn Road	131	76	0

Vehicle Mix

Heavy Vehicle Percentages

	To			
		1 - N Approach	2 - Sesswick Way	3 - Cefn Road
From	1 - N Approach	0	4	0
	2 - Sesswick Way	18	0	4
	3 - Cefn Road	3	4	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
1 - N Approach	0.45	2.79	0.8	A	894	1341
2 - Sesswick Way	0.15	2.81	0.2	A	195	293
3 - Cefn Road	0.16	3.01	0.2	A	190	285

Main Results for each time segment

16:15 - 16:30

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	733	183	57	2385	0.307	732	186	0.0	0.4	2.175	A
2 - Sesswick Way	160	40	324	1607	0.100	160	465	0.0	0.1	2.487	A
3 - Cefn Road	156	39	88	1452	0.107	155	396	0.0	0.1	2.776	A

16:30 - 16:45

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	876	219	68	2376	0.369	875	223	0.4	0.6	2.398	A
2 - Sesswick Way	191	48	387	1568	0.122	191	556	0.1	0.1	2.614	A
3 - Cefn Road	186	47	105	1441	0.129	186	473	0.1	0.1	2.868	A

16:45 - 17:00

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	1072	268	84	2364	0.454	1071	273	0.6	0.8	2.784	A
2 - Sesswick Way	235	59	474	1515	0.155	234	681	0.1	0.2	2.810	A
3 - Cefn Road	228	57	129	1425	0.160	228	580	0.1	0.2	3.005	A

17:00 - 17:15

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	1072	268	84	2364	0.454	1072	273	0.8	0.8	2.786	A
2 - Sesswick Way	235	59	475	1515	0.155	235	682	0.2	0.2	2.810	A
3 - Cefn Road	228	57	129	1425	0.160	228	580	0.2	0.2	3.005	A

17:15 - 17:30

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	876	219	68	2376	0.369	877	223	0.8	0.6	2.401	A
2 - Sesswick Way	191	48	388	1568	0.122	192	557	0.2	0.1	2.617	A
3 - Cefn Road	186	47	105	1441	0.129	186	474	0.2	0.1	2.871	A

17:30 - 17:45

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	733	183	57	2385	0.307	734	187	0.6	0.4	2.180	A
2 - Sesswick Way	160	40	325	1607	0.100	160	466	0.1	0.1	2.491	A
3 - Cefn Road	156	39	88	1452	0.107	156	397	0.1	0.1	2.779	A

Base 2026 (Combined) + Development, AM NET

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	Five Fords Roundabout	Standard Roundabout		1, 2, 3	4.19	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D7	Base 2026 (Combined) + Development	AM NET	ONE HOUR	07:15	08:45	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - N Approach		ONE HOUR	✓	200	100.000
2 - Sesswick Way		ONE HOUR	✓	604	100.000
3 - Cefn Road		ONE HOUR	✓	527	100.000

Origin-Destination Data

Demand (Veh/hr)

	To			
		1 - N Approach	2 - Sesswick Way	3 - Cefn Road
From	1 - N Approach	0	104	96
	2 - Sesswick Way	540	0	64
	3 - Cefn Road	438	89	0

Vehicle Mix

Heavy Vehicle Percentages

	To			
		1 - N Approach	2 - Sesswick Way	3 - Cefn Road
From	1 - N Approach	0	25	18
	2 - Sesswick Way	6	0	12
	3 - Cefn Road	3	12	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
1 - N Approach	0.11	2.05	0.1	A	184	275
2 - Sesswick Way	0.37	3.14	0.6	A	554	831
3 - Cefn Road	0.51	6.37	1.0	A	484	725

Main Results for each time segment

07:15 - 07:30

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	151	38	67	1995	0.075	150	734	0.0	0.1	1.951	A
2 - Sesswick Way	455	114	72	1836	0.248	453	145	0.0	0.3	2.601	A
3 - Cefn Road	397	99	405	1256	0.316	395	120	0.0	0.5	4.172	A

07:30 - 07:45

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	180	45	80	1985	0.091	180	878	0.1	0.1	1.993	A
2 - Sesswick Way	543	136	86	1826	0.297	543	173	0.3	0.4	2.806	A
3 - Cefn Road	474	118	485	1210	0.392	473	144	0.5	0.6	4.882	A

07:45 - 08:00

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	220	55	98	1972	0.112	220	1075	0.1	0.1	2.054	A
2 - Sesswick Way	665	166	106	1811	0.367	664	212	0.4	0.6	3.138	A
3 - Cefn Road	580	145	594	1146	0.506	579	176	0.6	1.0	6.332	A

08:00 - 08:15

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	220	55	98	1972	0.112	220	1077	0.1	0.1	2.054	A
2 - Sesswick Way	665	166	106	1811	0.367	665	212	0.6	0.6	3.141	A
3 - Cefn Road	580	145	595	1145	0.507	580	176	1.0	1.0	6.368	A

08:15 - 08:30

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	180	45	80	1985	0.091	180	881	0.1	0.1	1.995	A
2 - Sesswick Way	543	136	86	1826	0.297	544	174	0.6	0.4	2.809	A
3 - Cefn Road	474	118	486	1209	0.392	475	144	1.0	0.7	4.917	A

08:30 - 08:45

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	151	38	67	1994	0.076	151	737	0.1	0.1	1.952	A
2 - Sesswick Way	455	114	72	1836	0.248	455	145	0.4	0.3	2.606	A
3 - Cefn Road	397	99	407	1255	0.316	397	121	0.7	0.5	4.199	A

Base 2026 (Combined) + Development, PM NET

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	Five Fords Roundabout	Standard Roundabout		1, 2, 3	2.94	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D8	Base 2026 (Combined) + Development	PM NET	ONE HOUR	16:15	17:45	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - N Approach		ONE HOUR	✓	1029	100.000
2 - Sesswick Way		ONE HOUR	✓	225	100.000
3 - Cefn Road		ONE HOUR	✓	219	100.000

Origin-Destination Data

Demand (Veh/hr)

	To			
		1 - N Approach	2 - Sesswick Way	3 - Cefn Road
From	1 - N Approach	0	574	455
	2 - Sesswick Way	124	0	101
	3 - Cefn Road	139	80	0

Vehicle Mix

Heavy Vehicle Percentages

	To			
		1 - N Approach	2 - Sesswick Way	3 - Cefn Road
From	1 - N Approach	0	4	0
	2 - Sesswick Way	18	0	4
	3 - Cefn Road	3	4	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
1 - N Approach	0.48	2.93	0.9	A	944	1416
2 - Sesswick Way	0.17	2.88	0.2	A	206	310
3 - Cefn Road	0.17	3.05	0.2	A	201	301

Main Results for each time segment

16:15 - 16:30

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	775	194	60	2383	0.325	773	197	0.0	0.5	2.233	A
2 - Sesswick Way	169	42	342	1596	0.106	169	491	0.0	0.1	2.523	A
3 - Cefn Road	165	41	93	1449	0.114	164	418	0.0	0.1	2.800	A

16:30 - 16:45

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	925	231	72	2373	0.390	924	236	0.5	0.6	2.483	A
2 - Sesswick Way	202	51	409	1555	0.130	202	588	0.1	0.1	2.661	A
3 - Cefn Road	197	49	111	1437	0.137	197	500	0.1	0.2	2.902	A

16:45 - 17:00

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	1133	283	88	2360	0.480	1132	289	0.6	0.9	2.927	A
2 - Sesswick Way	248	62	500	1499	0.165	248	719	0.1	0.2	2.876	A
3 - Cefn Road	241	60	136	1420	0.170	241	612	0.2	0.2	3.052	A

17:00 - 17:15

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	1133	283	88	2360	0.480	1133	290	0.9	0.9	2.932	A
2 - Sesswick Way	248	62	501	1498	0.165	248	720	0.2	0.2	2.877	A
3 - Cefn Road	241	60	137	1420	0.170	241	612	0.2	0.2	3.052	A

17:15 - 17:30

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	925	231	72	2373	0.390	926	237	0.9	0.6	2.489	A
2 - Sesswick Way	202	51	410	1554	0.130	202	589	0.2	0.2	2.662	A
3 - Cefn Road	197	49	112	1437	0.137	197	500	0.2	0.2	2.906	A

17:30 - 17:45

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	775	194	60	2382	0.325	775	198	0.6	0.5	2.240	A
2 - Sesswick Way	169	42	343	1595	0.106	170	493	0.2	0.1	2.526	A
3 - Cefn Road	165	41	93	1449	0.114	165	419	0.2	0.1	2.806	A

Junctions 9										
ARCADY 9 - Roundabout Module										
Version: 9.5.1.7462										
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Filename: Five Fords Roundabout - Dev Peak.j9

Path: C:\Users\Owner\OneDrive\Cotswold Transport Planning Ltd\CADtest - Documents\Martin\J9

Report generation date: 26/02/2021 09:42:50

- »Base 2021 (Combined), AM DEV
- »Base 2021 (Combined), PM DEV
- »Base 2026 (Combined), AM DEV
- »Base 2026 (Combined), PM DEV
- »Base 2021 (Combined) + Development, AM DEV
- »Base 2021 (Combined) + Development, PM DEV
- »Base 2026 (Combined) + Development, AM DEV
- »Base 2026 (Combined) + Development, PM DEV

Summary of junction performance

	AM DEV					PM DEV				
	Set ID	Queue (Veh)	Delay (s)	RFC	LOS	Set ID	Queue (Veh)	Delay (s)	RFC	LOS
	Base 2021 (Combined)									
1 - N Approach	D1	0.1	2.17	0.10	A	D2	0.2	1.99	0.18	A
2 - Sesswick Way		0.4	2.74	0.28	A		0.1	2.56	0.13	A
3 - Cefn Road		0.5	4.42	0.35	A		0.1	3.01	0.13	A
	Base 2026 (Combined)									
1 - N Approach	D3	0.1	2.19	0.11	A	D4	0.2	2.02	0.19	A
2 - Sesswick Way		0.4	2.81	0.29	A		0.2	2.59	0.13	A
3 - Cefn Road		0.6	4.64	0.37	A		0.2	3.05	0.14	A
	Base 2021 (Combined) + Development									
1 - N Approach	D5	0.1	2.17	0.10	A	D6	0.2	2.06	0.19	A
2 - Sesswick Way		0.4	2.80	0.30	A		0.2	2.63	0.13	A
3 - Cefn Road		0.5	4.42	0.35	A		0.2	3.26	0.17	A
	Base 2026 (Combined) + Development									
1 - N Approach	D7	0.1	2.19	0.11	A	D8	0.3	2.09	0.20	A
2 - Sesswick Way		0.5	2.87	0.31	A		0.2	2.66	0.14	A
3 - Cefn Road		0.6	4.64	0.37	A		0.2	3.31	0.18	A

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

File summary

File Description

Title	Commercial Glasshouse and Packing Facility, Wrexham
Location	Five Fords Roundabout
Site number	
Date	12/02/2021
Version	01
Status	Issue
Identifier	
Client	Low carbon Farming 2 Ltd.
Jobnumber	CTP-20-537
Enumerator	MW
Description	

Units

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

Analysis Options

Vehicle length (m)	Calculate Queue Percentiles	Calculate detailed queueing delay	Calculate residual capacity	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
5.75				0.85	36.00	20.00

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D1	Base 2021 (Combined)	AM DEV	ONE HOUR	04:45	06:15	15	✓
D2	Base 2021 (Combined)	PM DEV	ONE HOUR	14:45	16:15	15	✓
D3	Base 2026 (Combined)	AM DEV	ONE HOUR	04:45	06:15	15	✓
D4	Base 2026 (Combined)	PM DEV	ONE HOUR	14:45	16:15	15	✓
D5	Base 2021 (Combined) + Development	AM DEV	ONE HOUR	04:45	06:15	15	✓
D6	Base 2021 (Combined) + Development	PM DEV	ONE HOUR	14:45	16:15	15	✓
D7	Base 2026 (Combined) + Development	AM DEV	ONE HOUR	04:45	06:15	15	✓
D8	Base 2026 (Combined) + Development	PM DEV	ONE HOUR	14:45	16:15	15	✓

Analysis Set Details

ID	Include in report	Network flow scaling factor (%)	Network capacity scaling factor (%)
A1	✓	100.000	100.000

Base 2021 (Combined), AM DEV

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	Five Fords Roundabout	Standard Roundabout		1, 2, 3	3.23	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description
1	N Approach	
2	Sesswick Way	
3	Cefn Road	

Roundabout Geometry

Arm	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit only
1 - N Approach	7.61	7.61	0.0	32.2	50.0	13.0	
2 - Sesswick Way	4.72	8.55	8.5	52.9	50.4	22.0	
3 - Cefn Road	3.47	7.67	9.8	32.0	50.1	40.0	

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Final slope	Final intercept (PCU/hr)
1 - N Approach	0.779	2484
2 - Sesswick Way	0.683	2016
3 - Cefn Road	0.577	1561

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

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D1	Base 2021 (Combined)	AM DEV	ONE HOUR	04:45	06:15	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - N Approach		ONE HOUR	✓	176	100.000
2 - Sesswick Way		ONE HOUR	✓	461	100.000
3 - Cefn Road		ONE HOUR	✓	400	100.000

Origin-Destination Data

Demand (Veh/hr)

	To			
		1 - N Approach	2 - Sesswick Way	3 - Cefn Road
From	1 - N Approach	0	93	83
	2 - Sesswick Way	418	0	43
	3 - Cefn Road	347	53	0

Vehicle Mix

Heavy Vehicle Percentages

	To			
		1 - N Approach	2 - Sesswick Way	3 - Cefn Road
From	1 - N Approach	0	42	20
	2 - Sesswick Way	6	0	13
	3 - Cefn Road	1	8	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
1 - N Approach	0.10	2.17	0.1	A	162	242
2 - Sesswick Way	0.28	2.74	0.4	A	423	635
3 - Cefn Road	0.35	4.42	0.5	A	367	551

Main Results for each time segment

04:45 - 05:00

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	133	33	40	1862	0.071	132	574	0.0	0.1	2.081	A
2 - Sesswick Way	347	87	62	1843	0.188	346	110	0.0	0.2	2.404	A
3 - Cefn Road	301	75	314	1343	0.224	300	95	0.0	0.3	3.448	A

05:00 - 05:15

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	158	40	48	1857	0.085	158	687	0.1	0.1	2.118	A
2 - Sesswick Way	414	104	75	1833	0.226	414	131	0.2	0.3	2.537	A
3 - Cefn Road	360	90	376	1306	0.275	359	113	0.3	0.4	3.802	A

05:15 - 05:30

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	194	48	58	1850	0.105	194	841	0.1	0.1	2.172	A
2 - Sesswick Way	508	127	91	1820	0.279	507	161	0.3	0.4	2.741	A
3 - Cefn Road	440	110	460	1255	0.351	440	139	0.4	0.5	4.407	A

05:30 - 05:45

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	194	48	58	1850	0.105	194	842	0.1	0.1	2.172	A
2 - Sesswick Way	508	127	91	1820	0.279	508	161	0.4	0.4	2.741	A
3 - Cefn Road	440	110	460	1255	0.351	440	139	0.5	0.5	4.417	A

05:45 - 06:00

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	158	40	48	1857	0.085	158	689	0.1	0.1	2.119	A
2 - Sesswick Way	414	104	75	1833	0.226	415	131	0.4	0.3	2.540	A
3 - Cefn Road	360	90	376	1306	0.275	360	113	0.5	0.4	3.812	A

06:00 - 06:15

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	133	33	40	1862	0.071	133	576	0.1	0.1	2.083	A
2 - Sesswick Way	347	87	63	1842	0.188	347	110	0.3	0.2	2.407	A
3 - Cefn Road	301	75	315	1342	0.224	302	95	0.4	0.3	3.458	A

Base 2021 (Combined), PM DEV

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	Five Fords Roundabout	Standard Roundabout		1, 2, 3	2.37	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D2	Base 2021 (Combined)	PM DEV	ONE HOUR	14:45	16:15	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - N Approach		ONE HOUR	✓	368	100.000
2 - Sesswick Way		ONE HOUR	✓	183	100.000
3 - Cefn Road		ONE HOUR	✓	159	100.000

Origin-Destination Data

Demand (Veh/hr)

	To			
		1 - N Approach	2 - Sesswick Way	3 - Cefn Road
From	1 - N Approach	0	208	160
	2 - Sesswick Way	117	0	66
	3 - Cefn Road	99	60	0

Vehicle Mix

Heavy Vehicle Percentages

	To			
		1 - N Approach	2 - Sesswick Way	3 - Cefn Road
From	1 - N Approach	0	13	6
	2 - Sesswick Way	23	0	8
	3 - Cefn Road	9	4	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
1 - N Approach	0.18	1.99	0.2	A	338	507
2 - Sesswick Way	0.13	2.56	0.1	A	168	252
3 - Cefn Road	0.13	3.01	0.1	A	146	219

Main Results for each time segment

14:45 - 15:00

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	277	69	45	2226	0.124	276	162	0.0	0.1	1.845	A
2 - Sesswick Way	138	34	120	1641	0.084	137	201	0.0	0.1	2.395	A
3 - Cefn Road	120	30	88	1399	0.086	119	170	0.0	0.1	2.813	A

15:00 - 15:15

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	331	83	54	2220	0.149	331	194	0.1	0.2	1.904	A
2 - Sesswick Way	165	41	144	1626	0.101	164	241	0.1	0.1	2.462	A
3 - Cefn Road	143	36	105	1388	0.103	143	203	0.1	0.1	2.891	A

15:15 - 15:30

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	405	101	66	2211	0.183	405	238	0.2	0.2	1.993	A
2 - Sesswick Way	201	50	176	1606	0.125	201	295	0.1	0.1	2.562	A
3 - Cefn Road	175	44	129	1372	0.128	175	249	0.1	0.1	3.006	A

15:30 - 15:45

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	405	101	66	2211	0.183	405	238	0.2	0.2	1.993	A
2 - Sesswick Way	201	50	176	1606	0.125	201	295	0.1	0.1	2.562	A
3 - Cefn Road	175	44	129	1372	0.128	175	249	0.1	0.1	3.007	A

15:45 - 16:00

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	331	83	54	2220	0.149	331	194	0.2	0.2	1.905	A
2 - Sesswick Way	165	41	144	1626	0.101	165	241	0.1	0.1	2.463	A
3 - Cefn Road	143	36	105	1388	0.103	143	203	0.1	0.1	2.894	A

16:00 - 16:15

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	277	69	45	2226	0.124	277	163	0.2	0.1	1.849	A
2 - Sesswick Way	138	34	121	1640	0.084	138	202	0.1	0.1	2.397	A
3 - Cefn Road	120	30	88	1399	0.086	120	170	0.1	0.1	2.813	A

Base 2026 (Combined), AM DEV

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	Five Fords Roundabout	Standard Roundabout		1, 2, 3	3.34	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D3	Base 2026 (Combined)	AM DEV	ONE HOUR	04:45	06:15	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - N Approach		ONE HOUR	✓	187	100.000
2 - Sesswick Way		ONE HOUR	✓	486	100.000
3 - Cefn Road		ONE HOUR	✓	422	100.000

Origin-Destination Data

Demand (Veh/hr)

	To			
		1 - N Approach	2 - Sesswick Way	3 - Cefn Road
From	1 - N Approach	0	99	88
	2 - Sesswick Way	441	0	45
	3 - Cefn Road	366	56	0

Vehicle Mix

Heavy Vehicle Percentages

	To			
		1 - N Approach	2 - Sesswick Way	3 - Cefn Road
From	1 - N Approach	0	42	20
	2 - Sesswick Way	6	0	13
	3 - Cefn Road	1	8	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
1 - N Approach	0.11	2.19	0.1	A	172	257
2 - Sesswick Way	0.29	2.81	0.4	A	446	669
3 - Cefn Road	0.37	4.64	0.6	A	387	581

Main Results for each time segment

04:45 - 05:00

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	141	35	42	1860	0.076	140	606	0.0	0.1	2.093	A
2 - Sesswick Way	366	91	66	1840	0.199	365	116	0.0	0.2	2.440	A
3 - Cefn Road	318	79	331	1333	0.238	316	100	0.0	0.3	3.537	A

05:00 - 05:15

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	168	42	50	1855	0.091	168	725	0.1	0.1	2.133	A
2 - Sesswick Way	437	109	79	1830	0.239	437	139	0.2	0.3	2.584	A
3 - Cefn Road	379	95	396	1294	0.293	379	120	0.3	0.4	3.934	A

05:15 - 05:30

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	206	51	62	1848	0.111	206	888	0.1	0.1	2.192	A
2 - Sesswick Way	535	134	97	1816	0.295	535	171	0.3	0.4	2.809	A
3 - Cefn Road	465	116	485	1240	0.375	464	146	0.4	0.6	4.633	A

05:30 - 05:45

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	206	51	62	1848	0.111	206	889	0.1	0.1	2.192	A
2 - Sesswick Way	535	134	97	1816	0.295	535	171	0.4	0.4	2.809	A
3 - Cefn Road	465	116	486	1240	0.375	465	146	0.6	0.6	4.642	A

05:45 - 06:00

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	168	42	50	1855	0.091	168	726	0.1	0.1	2.135	A
2 - Sesswick Way	437	109	79	1830	0.239	437	139	0.4	0.3	2.585	A
3 - Cefn Road	379	95	397	1293	0.293	380	120	0.6	0.4	3.946	A

06:00 - 06:15

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	141	35	42	1860	0.076	141	608	0.1	0.1	2.093	A
2 - Sesswick Way	366	91	66	1840	0.199	366	117	0.3	0.2	2.445	A
3 - Cefn Road	318	79	332	1332	0.239	318	100	0.4	0.3	3.551	A

Base 2026 (Combined), PM DEV

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	Five Fords Roundabout	Standard Roundabout		1, 2, 3	2.40	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D4	Base 2026 (Combined)	PM DEV	ONE HOUR	14:45	16:15	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - N Approach		ONE HOUR	✓	389	100.000
2 - Sesswick Way		ONE HOUR	✓	193	100.000
3 - Cefn Road		ONE HOUR	✓	169	100.000

Origin-Destination Data

Demand (Veh/hr)

	To			
		1 - N Approach	2 - Sesswick Way	3 - Cefn Road
From	1 - N Approach	0	220	169
	2 - Sesswick Way	124	0	69
	3 - Cefn Road	105	64	0

Vehicle Mix

Heavy Vehicle Percentages

	To			
		1 - N Approach	2 - Sesswick Way	3 - Cefn Road
From	1 - N Approach	0	13	6
	2 - Sesswick Way	23	0	8
	3 - Cefn Road	9	4	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
1 - N Approach	0.19	2.02	0.2	A	357	535
2 - Sesswick Way	0.13	2.59	0.2	A	177	266
3 - Cefn Road	0.14	3.05	0.2	A	155	233

Main Results for each time segment

14:45 - 15:00

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	293	73	48	2224	0.132	292	172	0.0	0.2	1.863	A
2 - Sesswick Way	145	36	127	1636	0.089	145	213	0.0	0.1	2.414	A
3 - Cefn Road	127	32	93	1396	0.091	127	179	0.0	0.1	2.837	A

15:00 - 15:15

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	350	87	57	2217	0.158	350	206	0.2	0.2	1.927	A
2 - Sesswick Way	174	43	152	1620	0.107	173	255	0.1	0.1	2.487	A
3 - Cefn Road	152	38	111	1384	0.110	152	214	0.1	0.1	2.922	A

15:15 - 15:30

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	428	107	70	2208	0.194	428	252	0.2	0.2	2.023	A
2 - Sesswick Way	212	53	186	1599	0.133	212	313	0.1	0.2	2.595	A
3 - Cefn Road	186	47	136	1367	0.136	186	262	0.1	0.2	3.047	A

15:30 - 15:45

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	428	107	70	2208	0.194	428	252	0.2	0.2	2.023	A
2 - Sesswick Way	212	53	186	1599	0.133	212	313	0.2	0.2	2.595	A
3 - Cefn Road	186	47	137	1367	0.136	186	262	0.2	0.2	3.047	A

15:45 - 16:00

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	350	87	58	2217	0.158	350	206	0.2	0.2	1.928	A
2 - Sesswick Way	174	43	152	1620	0.107	174	255	0.2	0.1	2.490	A
3 - Cefn Road	152	38	112	1384	0.110	152	214	0.2	0.1	2.925	A

16:00 - 16:15

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	293	73	48	2224	0.132	293	173	0.2	0.2	1.863	A
2 - Sesswick Way	145	36	127	1636	0.089	145	214	0.1	0.1	2.415	A
3 - Cefn Road	127	32	93	1396	0.091	127	179	0.1	0.1	2.840	A

Base 2021 (Combined) + Development, AM DEV

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	Five Fords Roundabout	Standard Roundabout		1, 2, 3	3.24	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D5	Base 2021 (Combined) + Development	AM DEV	ONE HOUR	04:45	06:15	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - N Approach		ONE HOUR	✓	176	100.000
2 - Sesswick Way		ONE HOUR	✓	494	100.000
3 - Cefn Road		ONE HOUR	✓	400	100.000

Origin-Destination Data

Demand (Veh/hr)

	To			
		1 - N Approach	2 - Sesswick Way	3 - Cefn Road
From	1 - N Approach	0	93	83
	2 - Sesswick Way	418	0	76
	3 - Cefn Road	347	53	0

Vehicle Mix

Heavy Vehicle Percentages

	To			
		1 - N Approach	2 - Sesswick Way	3 - Cefn Road
From	1 - N Approach	0	42	20
	2 - Sesswick Way	6	0	7
	3 - Cefn Road	1	8	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
1 - N Approach	0.10	2.17	0.1	A	162	242
2 - Sesswick Way	0.30	2.80	0.4	A	453	680
3 - Cefn Road	0.35	4.42	0.5	A	367	551

Main Results for each time segment

04:45 - 05:00

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	133	33	40	1862	0.071	132	574	0.0	0.1	2.081	A
2 - Sesswick Way	372	93	62	1851	0.201	371	110	0.0	0.3	2.431	A
3 - Cefn Road	301	75	314	1343	0.224	300	119	0.0	0.3	3.448	A

05:00 - 05:15

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	158	40	48	1857	0.085	158	687	0.1	0.1	2.118	A
2 - Sesswick Way	444	111	75	1842	0.241	444	131	0.3	0.3	2.575	A
3 - Cefn Road	360	90	376	1306	0.275	359	143	0.3	0.4	3.802	A

05:15 - 05:30

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	194	48	58	1850	0.105	194	841	0.1	0.1	2.172	A
2 - Sesswick Way	544	136	91	1829	0.297	543	161	0.3	0.4	2.801	A
3 - Cefn Road	440	110	460	1255	0.351	440	175	0.4	0.5	4.407	A

05:30 - 05:45

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	194	48	58	1850	0.105	194	842	0.1	0.1	2.172	A
2 - Sesswick Way	544	136	91	1829	0.297	544	161	0.4	0.4	2.801	A
3 - Cefn Road	440	110	460	1255	0.351	440	175	0.5	0.5	4.417	A

05:45 - 06:00

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	158	40	48	1857	0.085	158	689	0.1	0.1	2.120	A
2 - Sesswick Way	444	111	75	1842	0.241	445	131	0.4	0.3	2.576	A
3 - Cefn Road	360	90	376	1306	0.275	360	143	0.5	0.4	3.812	A

06:00 - 06:15

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	133	33	40	1862	0.071	133	576	0.1	0.1	2.081	A
2 - Sesswick Way	372	93	63	1851	0.201	372	110	0.3	0.3	2.436	A
3 - Cefn Road	301	75	315	1342	0.224	302	120	0.4	0.3	3.461	A

Base 2021 (Combined) + Development, PM DEV

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	Five Fords Roundabout	Standard Roundabout		1, 2, 3	2.52	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D6	Base 2021 (Combined) + Development	PM DEV	ONE HOUR	14:45	16:15	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - N Approach		ONE HOUR	✓	372	100.000
2 - Sesswick Way		ONE HOUR	✓	187	100.000
3 - Cefn Road		ONE HOUR	✓	200	100.000

Origin-Destination Data

Demand (Veh/hr)

	To			
		1 - N Approach	2 - Sesswick Way	3 - Cefn Road
From	1 - N Approach	0	208	164
	2 - Sesswick Way	117	0	70
	3 - Cefn Road	103	97	0

Vehicle Mix

Heavy Vehicle Percentages

	To			
		1 - N Approach	2 - Sesswick Way	3 - Cefn Road
From	1 - N Approach	0	13	8
	2 - Sesswick Way	23	0	14
	3 - Cefn Road	12	10	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
1 - N Approach	0.19	2.06	0.2	A	341	512
2 - Sesswick Way	0.13	2.63	0.2	A	172	257
3 - Cefn Road	0.17	3.26	0.2	A	184	275

Main Results for each time segment

14:45 - 15:00

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	280	70	73	2186	0.128	279	165	0.0	0.1	1.887	A
2 - Sesswick Way	141	35	123	1609	0.087	140	229	0.0	0.1	2.450	A
3 - Cefn Road	151	38	88	1350	0.112	150	176	0.0	0.1	2.998	A

15:00 - 15:15

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	334	84	87	2175	0.154	334	198	0.1	0.2	1.955	A
2 - Sesswick Way	168	42	147	1595	0.105	168	274	0.1	0.1	2.523	A
3 - Cefn Road	180	45	105	1339	0.134	180	210	0.1	0.2	3.105	A

15:15 - 15:30

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	410	102	107	2160	0.190	409	242	0.2	0.2	2.056	A
2 - Sesswick Way	206	51	180	1574	0.131	206	336	0.1	0.1	2.630	A
3 - Cefn Road	220	55	129	1324	0.166	220	257	0.2	0.2	3.261	A

15:30 - 15:45

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	410	102	107	2160	0.190	410	242	0.2	0.2	2.056	A
2 - Sesswick Way	206	51	181	1574	0.131	206	336	0.1	0.2	2.630	A
3 - Cefn Road	220	55	129	1324	0.166	220	258	0.2	0.2	3.261	A

15:45 - 16:00

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	334	84	87	2175	0.154	335	198	0.2	0.2	1.956	A
2 - Sesswick Way	168	42	148	1594	0.105	168	274	0.2	0.1	2.525	A
3 - Cefn Road	180	45	105	1339	0.134	180	211	0.2	0.2	3.109	A

16:00 - 16:15

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	280	70	73	2186	0.128	280	166	0.2	0.1	1.891	A
2 - Sesswick Way	141	35	124	1609	0.087	141	230	0.1	0.1	2.451	A
3 - Cefn Road	151	38	88	1350	0.112	151	176	0.2	0.1	3.004	A

Base 2026 (Combined) + Development, AM DEV

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	Five Fords Roundabout	Standard Roundabout		1, 2, 3	3.36	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D7	Base 2026 (Combined) + Development	AM DEV	ONE HOUR	04:45	06:15	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - N Approach		ONE HOUR	✓	187	100.000
2 - Sesswick Way		ONE HOUR	✓	519	100.000
3 - Cefn Road		ONE HOUR	✓	422	100.000

Origin-Destination Data

Demand (Veh/hr)

	To			
		1 - N Approach	2 - Sesswick Way	3 - Cefn Road
From	1 - N Approach	0	99	88
	2 - Sesswick Way	441	0	78
	3 - Cefn Road	366	56	0

Vehicle Mix

Heavy Vehicle Percentages

	To			
		1 - N Approach	2 - Sesswick Way	3 - Cefn Road
From	1 - N Approach	0	42	20
	2 - Sesswick Way	6	0	7
	3 - Cefn Road	1	8	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
1 - N Approach	0.11	2.19	0.1	A	172	257
2 - Sesswick Way	0.31	2.87	0.5	A	476	714
3 - Cefn Road	0.37	4.64	0.6	A	387	581

Main Results for each time segment

04:45 - 05:00

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	141	35	42	1860	0.076	140	606	0.0	0.1	2.093	A
2 - Sesswick Way	391	98	66	1848	0.211	390	116	0.0	0.3	2.467	A
3 - Cefn Road	318	79	331	1333	0.238	316	125	0.0	0.3	3.537	A

05:00 - 05:15

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	168	42	50	1855	0.091	168	725	0.1	0.1	2.133	A
2 - Sesswick Way	467	117	79	1838	0.254	466	139	0.3	0.3	2.623	A
3 - Cefn Road	379	95	396	1294	0.293	379	149	0.3	0.4	3.934	A

05:15 - 05:30

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	206	51	62	1848	0.111	206	888	0.1	0.1	2.192	A
2 - Sesswick Way	571	143	97	1825	0.313	571	171	0.3	0.5	2.871	A
3 - Cefn Road	465	116	485	1240	0.375	464	183	0.4	0.6	4.633	A

05:30 - 05:45

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	206	51	62	1848	0.111	206	889	0.1	0.1	2.192	A
2 - Sesswick Way	571	143	97	1825	0.313	571	171	0.5	0.5	2.872	A
3 - Cefn Road	465	116	486	1240	0.375	465	183	0.6	0.6	4.642	A

05:45 - 06:00

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	168	42	50	1855	0.091	168	726	0.1	0.1	2.134	A
2 - Sesswick Way	467	117	79	1838	0.254	467	139	0.5	0.3	2.627	A
3 - Cefn Road	379	95	397	1293	0.293	380	149	0.6	0.4	3.946	A

06:00 - 06:15

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	141	35	42	1860	0.076	141	608	0.1	0.1	2.095	A
2 - Sesswick Way	391	98	66	1848	0.211	391	117	0.3	0.3	2.470	A
3 - Cefn Road	318	79	332	1332	0.239	318	125	0.4	0.3	3.551	A

Base 2026 (Combined) + Development, PM DEV

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	Five Fords Roundabout	Standard Roundabout		1, 2, 3	2.55	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D8	Base 2026 (Combined) + Development	PM DEV	ONE HOUR	14:45	16:15	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - N Approach		ONE HOUR	✓	393	100.000
2 - Sesswick Way		ONE HOUR	✓	198	100.000
3 - Cefn Road		ONE HOUR	✓	210	100.000

Origin-Destination Data

Demand (Veh/hr)

	To			
		1 - N Approach	2 - Sesswick Way	3 - Cefn Road
From	1 - N Approach	0	220	173
	2 - Sesswick Way	124	0	74
	3 - Cefn Road	109	101	0

Vehicle Mix

Heavy Vehicle Percentages

	To			
		1 - N Approach	2 - Sesswick Way	3 - Cefn Road
From	1 - N Approach	0	13	8
	2 - Sesswick Way	23	0	13
	3 - Cefn Road	12	10	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
1 - N Approach	0.20	2.09	0.3	A	361	541
2 - Sesswick Way	0.14	2.66	0.2	A	182	273
3 - Cefn Road	0.18	3.31	0.2	A	193	289

Main Results for each time segment

14:45 - 15:00

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	296	74	76	2184	0.135	295	175	0.0	0.2	1.905	A
2 - Sesswick Way	149	37	130	1610	0.093	149	241	0.0	0.1	2.463	A
3 - Cefn Road	158	40	93	1346	0.117	158	186	0.0	0.1	3.026	A

15:00 - 15:15

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	353	88	91	2172	0.163	353	209	0.2	0.2	1.979	A
2 - Sesswick Way	178	44	155	1594	0.112	178	288	0.1	0.1	2.541	A
3 - Cefn Road	189	47	111	1335	0.141	189	222	0.1	0.2	3.141	A

15:15 - 15:30

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	433	108	111	2156	0.201	432	256	0.2	0.3	2.088	A
2 - Sesswick Way	218	55	190	1573	0.139	218	353	0.1	0.2	2.656	A
3 - Cefn Road	231	58	136	1319	0.175	231	272	0.2	0.2	3.309	A

15:30 - 15:45

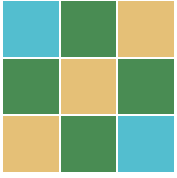
Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	433	108	111	2156	0.201	433	257	0.3	0.3	2.088	A
2 - Sesswick Way	218	55	190	1573	0.139	218	353	0.2	0.2	2.656	A
3 - Cefn Road	231	58	137	1319	0.175	231	272	0.2	0.2	3.310	A

15:45 - 16:00

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	353	88	91	2172	0.163	354	210	0.3	0.2	1.979	A
2 - Sesswick Way	178	44	156	1594	0.112	178	289	0.2	0.1	2.543	A
3 - Cefn Road	189	47	112	1335	0.141	189	222	0.2	0.2	3.144	A

16:00 - 16:15

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1 - N Approach	296	74	76	2183	0.136	296	176	0.2	0.2	1.909	A
2 - Sesswick Way	149	37	130	1610	0.093	149	242	0.1	0.1	2.465	A
3 - Cefn Road	158	40	93	1346	0.117	158	186	0.2	0.1	3.032	A



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APPENDIX E

Statement from Greenlight Environmental Consultancy, March 2021

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23 March 2021

Appeal Statement for Wrexham Glasshouse

SECTION 4 (GREAT CRESTED NEWTS - GCN)

The reason for refusal states:

“The application fails to demonstrate that the proposed development would be detrimental to the maintenance of the favourable conservation status of the Great Crested Newt population at this site. Whilst the proposals show an increase in mitigation land there is no information on the mechanism which will be used to ensure its long term management. The future management of mitigation land is fundamental to whether the proposed development will be acceptable. To allow this development without this information would have a detrimental impact, contrary to Policy EC6 of the adopted Wrexham Unitary Development Plan and Welsh Government TAN 5 Nature Conservation and Planning.”

The Ecological Impact Assessment (EclA) (Greenlight Environmental Consultancy Ltd., 2021a) acknowledges there to be a large population of great crested newts (GCN), possibly of national significance, within 250m of the proposed site and identifies intermediate negative impacts on GCN prior to mitigation.

Since the initial application, the GCN mitigation has been revised to provide a measurable net gain of 0.44ha through habitat creation and enhancement (Ecological Mitigation Site Layout Revised 16/03/2021, Drawing no.: SC/FFG/006G). The EclA (Greenlight Environmental Consultancy Ltd., 2021a), GCN survey report (Greenlight Environmental Consultancy Ltd., 2021b), Great Crested Newt Mitigation Strategy (SCALES Consultancy Ltd., 2021a) and Method Statement (SCALES Consultancy Ltd., 2021b) have been updated to provide additional information on both the long-term monitoring of the GCN population and management of the mitigation areas.

Monitoring:

Detail of the long-term monitoring of the GCN population is provided in section 7 of the EclA (Greenlight Environmental Consultancy Ltd., 2021a), section 5 of the GCN survey report (Greenlight Environmental Consultancy Ltd., 2021b) and section 6 of the Great Crested Newt Mitigation Strategy (SCALES Consultancy Ltd., 2021a). A summary of the long-term monitoring is detailed below and has already been agreed in principle with Natural Resources Wales (NRW):

- i. Monitoring of the GCN population in the 12 new mitigation ponds will be carried out annually for the management and monitoring duration of 25 years.
- ii. Monitoring will consist of egg searches and two GCN torch count visits annually.
- iii. Common species of amphibian and reptile will also be recorded.
- iv. Invasive species will be recorded and control/eradication measures implemented accordingly.
- v. An annual assessment of pond aquatic/marginal vegetation cover, fish, wildfowl and invasive species will be carried out.
- vi. An annual inspection of terrestrial habitats will be undertaken and records kept to determine management prescriptions.
- vii. The results will be entered onto the Cofnod online Wales recording system.

Management:

Detail of the long-term management of the mitigation areas is provided in section 7 of the EclA (Greenlight Environmental Consultancy Ltd., 2021a), section 5 of the GCN survey report (Greenlight Environmental Consultancy Ltd., 2021b) and section 6 of the Great Crested Newt Mitigation Strategy (SCALES Consultancy Ltd., 2021a). A summary of the long-term management is detailed below and has already been agreed in principle with NRW (who did not object to the initial planning application in any event):

Species-rich wetland meadow grassland management:

- i. Once an established sward is achieved grasslands will be trimmed to a height no lower than 75mm once annually in either April, May or September (following an ecological assessment for nesting birds). Grasslands will be cut with a mower with the cutting bar specially adjusted to be raised.
- ii. A zoned management approach will be taken to grassland management leaving some areas unmown at different times of the year to encourage structural diversity to provide habitat for nesting birds, encourage late flowering species to seed and to provide refuges for insects.

- iii. Meadows will be cut once per year with arisings being raked off and either removed from site and/or some placed on top of or near the hibernacula.
- iv. Mowing will not be undertaken within the immediate vicinity of the ponds but periodic vegetation management to facilitate access for monitoring will be undertaken.
- v. Consideration could be given to a grazing regime at an appropriately devised low stocking density.

Pond monitoring, management and maintenance:

- i. Ponds will be monitored annually in spring by inspection during the monitoring surveys or separately if not being surveyed for great crested newts that year and should any one species become dominant the spread will be controlled through hand pulling of encroaching vegetation in November -January to maintain no less than 60% open water.
- ii. The ponds will remain free of any over-shading and leaf litter.
- iii. The ponds will be fenced and secure from public interference therefore dumping of rubbish / litter will be unlikely; however, any rubbish found during annual monitoring will be removed.
- iv. In the event of the ponds not retaining water, they will be repaired.
- v. The ponds and reservoirs will be monitored for the presence of fish and invasive plant species and should they become present methods will be implemented to ensure they are safely eradicated.
- vi. In the event of fire, acute pollution or other major damage, methods will be implemented to reinstate the pond.
- vii. Fencing will be maintained around the ponds to discourage public access.

Woodland management to proposed woodland, scrub and hedgerows:

- i. Ring weed all establishing trees and shrubs with approved glyphosate herbicide applied at manufacturers recommended rates annually if required, to maintain a weed free zone within a 0.5m radius of the base of each plant. This shall include weed growth within the spirals; where weeds must be carefully removed by lifting the guard and folding the weeds out onto the ground where they can be sprayed.
- ii. Where appropriate a Controlled Droplet applicator (CDA) or Knapsack sprayer with a shield shall be used to minimise spray drift (No herbicide will be used in the vicinity of ponds).
- iii. Application will be limited to once a year in the months of April or May to ensure no terrestrial newts are adversely affected.

- iv. Should any trees die or become diseased during the aftercare phase they will be replaced with a tree of the same species and size.
- v. Selective thinning and pruning of scrub and woodland and woodland planting blocks reaching approximately 10 years will be undertaken to promote species and structural diversity.
- vi. Annual trimming of existing and established hedgerows outside of the bird nesting season.
- vii. Stock proof fencing will be erected around the woodlands and scrub and will be maintained.

Habitat securement:

A Section 106 Agreement has been prepared to secure long-term management and monitoring of the proposed GCN mitigation areas for a period of circa 25 years. It is anticipated that the core monitoring and management will be provided by The Amphibian and Reptile Conservation Trust (ARC).

ARC is a well-established charity founded in 2009 with a history of specialising the conservation of amphibians and reptiles, managing 80 reserves. ARC expressed a renewed interest in the management and monitoring of the mitigation areas in a letter dated 16/03/21 (Mandy Cartwright). The Great Crested Newt Mitigation Strategy (SCALES Consultancy Ltd., 2021a) identifies the following reporting:

- i. A report summarising the management and results of the monitoring undertaken in the preceding year will be submitted annually to Wrexham County Borough Council (WCBC) and NRW in December.
- ii. An annual meeting will be held with the management organisation, WCBC and NRW.
- iii. Management and monitoring will be reviewed every 5 years and appropriate corrective action and adjustments will be made in liaison with WCBC and NRW.

Following the proposed 25 year management/monitoring period, any change in agricultural practices or land use would be subject to any relevant legislation, planning regulations and policies in place at that time. At present, GCN and their habitat are protected by British and European law which makes it an offence to kill, injure, capture or disturb them; damage or destroy their habitat.

SECTION 5 (BIRDS):

The reason for refusal states:

“The application fails to demonstrate that the proposed development mitigates against impact on breeding birds of priority in Wales. Breeding bird surveys were undertaken too late in the season to ensure that all species were accounted for. In addition, no information on lighting is provided which is fundamental to whether the proposed development will have a detrimental impact upon wildlife including European Protected Species such as bats and otter. To allow the development without this information would have a detrimental impact, contrary to Policy EC6 of the adopted Wrexham Unitary Development Plan and Welsh Government TAN 5 Nature Conservation and Planning.”

Although the EcIA (Greenlight Environmental Consultancy Ltd., 2021a) acknowledged that the breeding bird surveys were conducted late in the survey season, the mitigation proposed was considered to be prudent based on the survey results, and to provide adequate compensation and enhancement of habitats, with additional surveys unlikely to materially modify the mitigation proposed. Further breeding bird surveys have subsequently been commissioned between March and June 2021, comprised of one survey per month and one evening survey specifically aimed at barn owls and other crepuscular birds. This data will be provided to Wrexham Borough Council and the Planning Inspectorate once the surveys have been completed and the data analysed (expected late June 2021). Greenlight Environmental Consultancy Ltd. (2021a) consider that the impacts highlighted in the EcIA are unlikely to significantly change, with the mitigation proposed for great crested newts providing adequate compensation and enhancement of habitats for breeding birds.

The EcIA (Greenlight Environmental Consultancy Ltd., 2020) outlined various measures to avoid impacts on bats from the proposed works including:

“Lighting schemes should follow guidance from the Bat Conservation Trust and CIE 150:2003. Warm-white (long wavelength) lights with UV filters should be fitted as close to the ground as possible. Lighting units should be angled below 70° and equipped with movement sensors, baffles, hoods, louvres and horizontal cut off units at 90°.”

A detailed Lighting Impact Assessment has been prepared by Pope Consulting Ltd. (Revision P5, March 2021), in accordance with this statement and following guidance from the Bat Conservation Trust and CIE 150:2003. Greenlight Environmental Consultancy endorses this report and considers that there will be negligible impacts on ecological receptors and nocturnal species, including bats and otters, from the construction and operation of the scheme.

Drafted by:

Nathan Duszynski M.Sc., B.Sc. (Hons), ACIEEM

Reviewed by:

Etienne Swarts BCompt (Hons), F.Deg.Sc, ACIEEM

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APPENDIX F

Letter from North Wales Councils Regional Emergency Planning Service, January 2021



*Stuart Magowan
The Civil Engineering
Practice
11 Tungsten Building
George Street
Fishersgate
Sussex
BN41 1RA*

Your Ref/Eich Cyf;	23380 Marchwiel
Our Ref/Ein Cyf;	NWC-REPS 23380 Marchwiel
Date/Dyddiad;	7 th January 2021
Ask For/Gofynner Am;	Helen Kilgannon
Direct Dial/ Rhif Union;	01352 702124

Dear Mr Magowan

Application No. 23380 Marchwiel – development proposal for Low Carbon Farming 2 Ltd - Land west of Sesswick Way, Marchwiel, Wrexham, LL13 0TF

Thank you for the opportunity to comment on the above document. The North Wales Councils Regional Emergency Planning Service (NWC-REPS) would like to make a number of 'Generic' Observations (applicable to all sites) regarding access and evacuation at sites considered to be at risk of flood.

Information on the registration process for Natural Resources Wales Flood Warnings and the completion of Community and Personal Flood Plans is also listed.

Please note that, whilst the North Wales Councils Regional Emergency Planning Service (together with other professional partners including Natural Resources Wales and the Emergency Services) are always willing to provide advice and guidance on Site or Property Flood Plans (i.e. Community Flood Management Plans) they will not 'Rubber Stamp' or 'Sanction' these plans as this is the legal responsibility of the Site / Property Owner and not the Local Authority.

The following Observations are made:

Working with partners in the North Wales Local Resilience Forum, NWC-REPS has very robust contingency plans in place including Severe Weather, Evacuation & Shelter, and Humanitarian Assistance.

Whilst NWC-REPS acts on behalf of the 6 North Wales Local Authorities who are a Category 1 (Main) Responder (Civil Contingencies Act 2004 refers) the Authority acts in support of the Emergency Services and responds to their requests NWC-REPS has no legal authority to instruct or advise people to evacuate.

The Police coordinate the emergency response and not the Local Authority.

County Hall, Mold CH7 6NG.
Neuadd y Sir, Yr Wyddgrug CH7 6NG.
www.flintshire.gov.uk

The Council welcomes correspondence in Welsh or English.
Mae'r Cyngor yn croesawu gohebiaeth yn y Gymraeg neu'r Saesneg

During a severe weather incident (including flooding) NWC-REPS and the Local Authorities will concentrate their efforts in supporting those individuals who are unable to protect their properties (i.e. vulnerable clients, the elderly and infirm). Able bodied house / building owners are expected to make prior arrangements to protect their properties, including the purchase of commercially available flood defence products.

Property holders who believe that their properties are likely to flood should register for free Natural Resources Wales (NRW) 'Flood Warning Service' messages. Further information on this and registration details can be found on the NRW website at the following link:

Any Community or private individual that believes they are at risk of flood is encouraged to complete a 'Community Flood Plan' or 'Personal Flood Plan' and templates and guidance instructions can be found on the NRW website at the following link:

<https://cdn.naturalresources.wales/media/1899/personal-flood-plan.pdf>

Yours sincerely

Helen Kilgannon

Helen Kilgannon
Interim Regional Manager/Rheolwr Rhanbarthol Dros Dro

APPENDIX G

**Flood Consequences Assessment v1.2, The Civil Engineering Practice,
March 2021**

Flood Consequences Assessment Addendum



The Civil Engineering Practice
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01273 424424
reception@civil.co.uk
www.civil.co.uk

Project	Five Fords, Wrexham, Wales
Project Number	23380

By Steve Doughty

Date 18 March 2021

1 Non Technical Summary

- 1.1 This Addendum has been undertaken in support of the Flood Consequences Assessment Version 1.2 dated 13 July 2020 on behalf of Low Carbon Farming 2 Ltd in support of a Planning Application for the construction of two glasshouses, four irrigation reservoirs, a packing and welfare building, energy centre building, heat store tanks and water silos together with access road, concreted service yard, and HGV loading bays and parking areas at Five Fords, Wrexham.
- 1.2 This Addendum follows the confirmation that areas of the site provide habitat for great crested newts and the layout has been updated to reflect the newt habitat and define the location of the existing access proposed to be maintained.

2 Layout alterations

- 2.1 As a result of the identification of great crested newt habitat on the site the proposed location of the irrigation reservoirs has been altered so as to provide enhance habitat for the newts and also provide the required irrigation and storm water storage volumes on a like for like basis to the planning submission proposals.
- 2.2 The submitted plans include four reservoirs as follows:
- | | | | |
|---------------|-------------------------|--------------|-----------------------------|
| • Reservoir 1 | East of Glasshouse | Surface Area | 5,304m ² |
| • Reservoir 2 | East of Glasshouse | Surface Area | 10,046m ² |
| • Reservoir 3 | South of Glasshouse | Surface Area | 11,737m ² |
| • Reservoir 4 | Northwest of Glasshouse | Surface Area | 15,311m ² |
| | | | 42,398 m² |
- 2.3 The total impermeable area of the site including the reservoirs was 23.1ha



2.4 The revised plans include two reservoirs as follows:

• Reservoir 1	South of Glasshouse	Surface Area	4,478m ²
• Reservoir 2	Northwest of Glasshouse	Surface Area	16,610m ²
			21,088m²

2.5 The total impermeable area of the site including the reservoirs now proposed is 20.9ha, 90.5% of the previous proposals.

2.6 The surface area of the reservoirs now proposed is 48% of the previous proposals.

2.7 The existing access to Sesswick Way, as noted in the Flood Consequences Report section 4.1.3 will be maintained to provide an emergency site access that can be used for the staff at this development and if required to provide emergency access to the adjacent Welsh Water Wastewater Treatment Plant should flooding of the River Clywedog prevent use of the main entrance.

2.8 The updated layout notes the existing entrance and indicates the proposed link to the 4m wide access track surrounding the proposed Glasshouse that links to the main yard and parking area and link to the existing access to the wastewater treatment plant at the northwest corner of the site. The access to Sesswick Way together with the track around the Glasshouse, yard and access to the wastewater treatment plant are all located in the main development area located within Flood Zone 1 as noted in the Flood Consequences Report. The access will be maintained and will be available at all times throughout the lifetime of the development.

2.9 Layout drawings are attached at the rear of this Addendum.

3 Hydraulic Calculations

3.1 The Flood Consequences Assessment Version 1.2 includes detailed design calculations to establish the storage volumes located above the irrigation water to accommodate a 1:100 year +40% pluvial event and to confirm that a suitable drainage solution was achievable for the site.

3.2 The detailed design calculations located in Appendix 7 of the Flood Consequences Assessment confirmed that with a restricted discharge of 42l/s to the River Clywedog a total storage volume of 28,100m³ is required.

3.3 With 1:3 side slopes this equates to the top 850mm of Reservoirs 1, 2 and 3, and the top 450mm of Reservoir 4 being used for storm water storage.

3.4 On a pro rata basis the average depth across the reservoirs required for storm water storage is 705mm.

4 Revised Storage Proposals

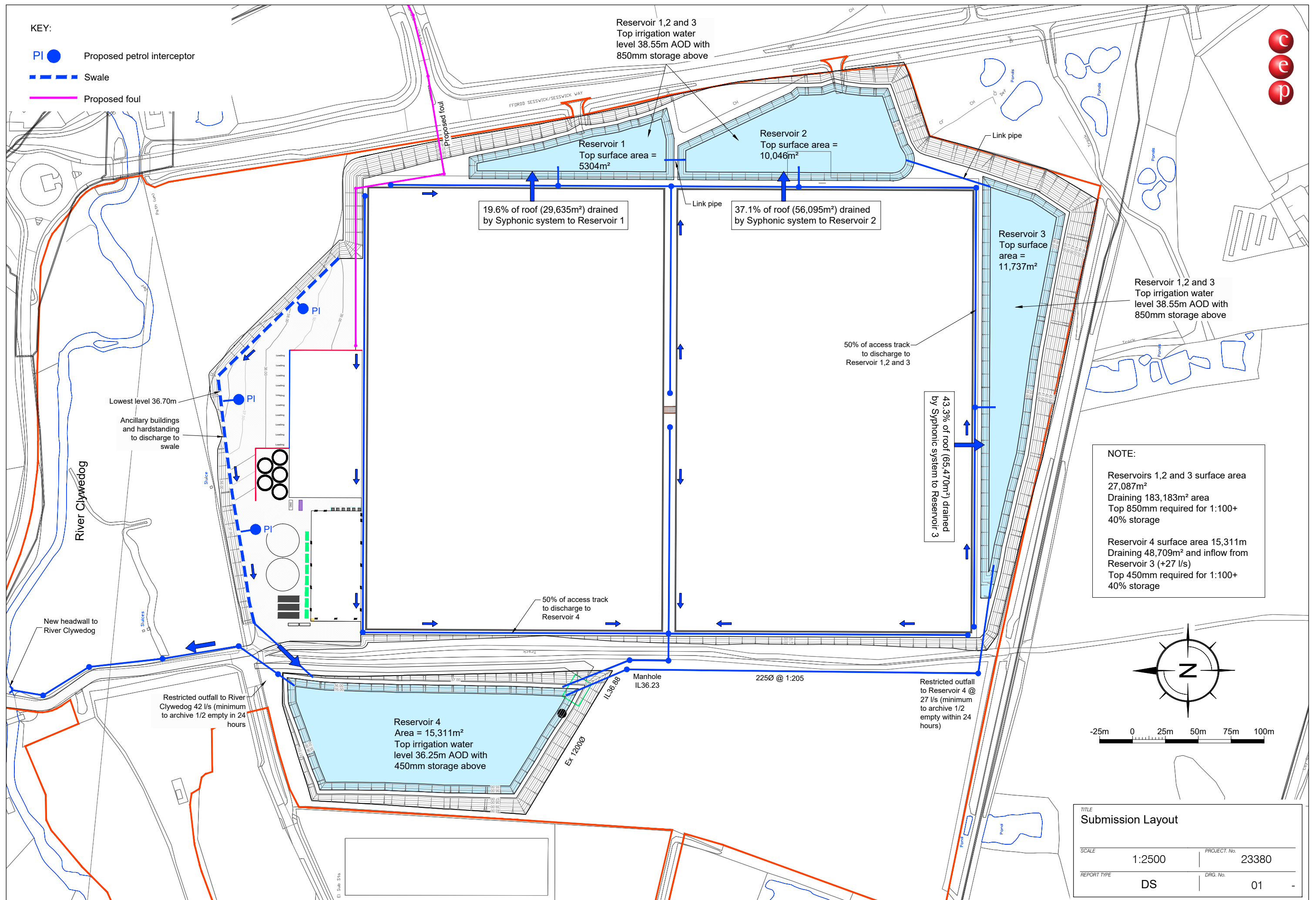
- 4.1 Due to the reduction of reservoir surface area the storm storage volume of 28,100m³ will decrease to 25,430m³.
- 4.2 A comparison of the require storage volume in relation to the surface area of the reservoirs confirms that for the revised proposals the depth of storage required above the operational irrigation water levels is approximately 1.33m.
- 4.3 The bed level of the reservoirs can be altered accordingly to provide the irrigation requirement.

5 Conclusion

- 5.1 Detailed design calculations submitted with the Flood Consequence Report confirm that sufficient storage can be provided on this site.
- 5.2 This Addendum confirms that the revised reservoirs are similarly able to accommodate the required storage volume.
- 5.3 The existing site access from Sesswick Way will be maintained as a secondary / emergency access providing a usable access within Flood Zone 1 for the lifetime of the development.

KEY:

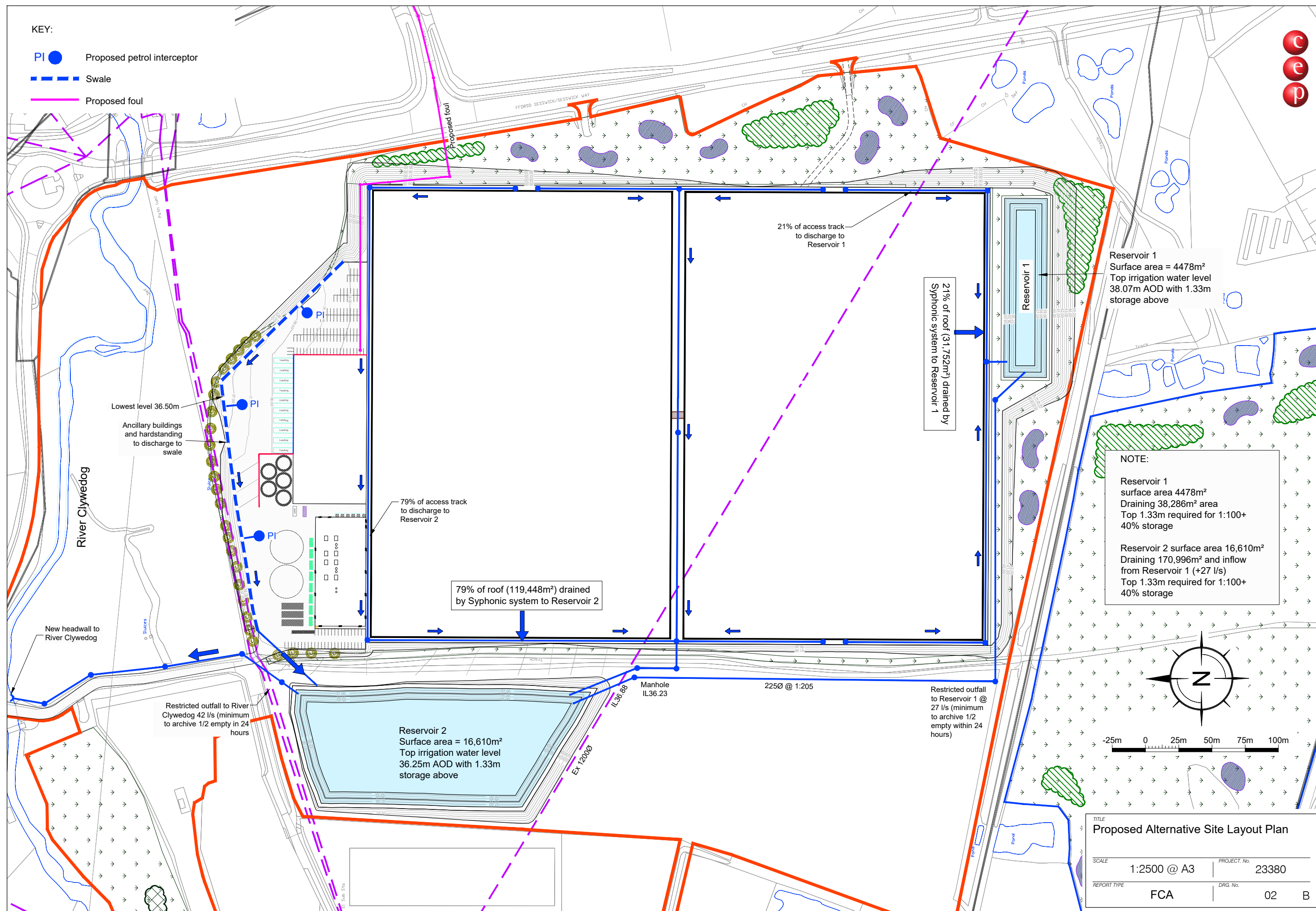
- PI ● Proposed petrol interceptor
--- Swale
--- Proposed foul



PI Proposed petrol interceptor

■ ■ ■ ■ Swale

Proposed foul



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