

Proposed Solar Farm
Land at Craig Y Perchych, Glais, Swansea
Transport Statement

Contents

1.0	INTRODUCTION.....	1
1.1	Appointment of Connect Consultants.....	1
1.2	Site Location.....	1
1.3	Development Proposals	2
1.4	Proposed Access Arrangements	2
1.5	Planning Policy Wales.....	3
1.6	Local Planning History	5
1.7	Pre-Application Advice.....	5
1.8	Report Overview	7
2.0	SITE TRANSPORT CONTEXT	8
2.1	Introduction	8
2.2	Highways Access.....	8
3.0	PROPOSED DEVELOPMENT.....	11
3.1	Introduction	11
3.2	Built Form	11
3.3	Proposed Site Access Arrangements.....	11
3.4	Servicing / HGV Access.....	12
3.5	Car Parking Policy / Standards	13
3.6	Section Conclusion	13
4.0	TRAFFIC ASSESSMENT	15
4.1	Introduction	15
4.2	Construction Phase Traffic	15
4.3	Operational Phase Traffic	18
4.4	Decommissioning Phase	19
4.5	Section Conclusions.....	19
5.0	JUNCTION CAPACITY AND COLLISION ANALYSIS	20
5.1	Introduction	20
6.0	SUMMARY AND CONCLUSIONS.....	21
6.1	Summary.....	21
6.2	Conclusions	21

List of Tables

Table 4.1 – Indicative Vehicle Deliveries during Construction Phase	16
Table 4.2 – Indicative Vehicle Deliveries to Remote Set Down Area	17

List of Figures

Figure 1.1 – Site Location Plan	1
Figure 1.2 – Site in its Local Context	2
Figure 2.1 – Graig Y Pal	8
Figure 2.2 – Ynys Y Mond Road	9
Figure 3.1 – M4 to Graig Y Pal	12

List of Appendices

Appendix 1 – Site Layout
Appendix 2 – Swept Path Analysis

1.0 INTRODUCTION

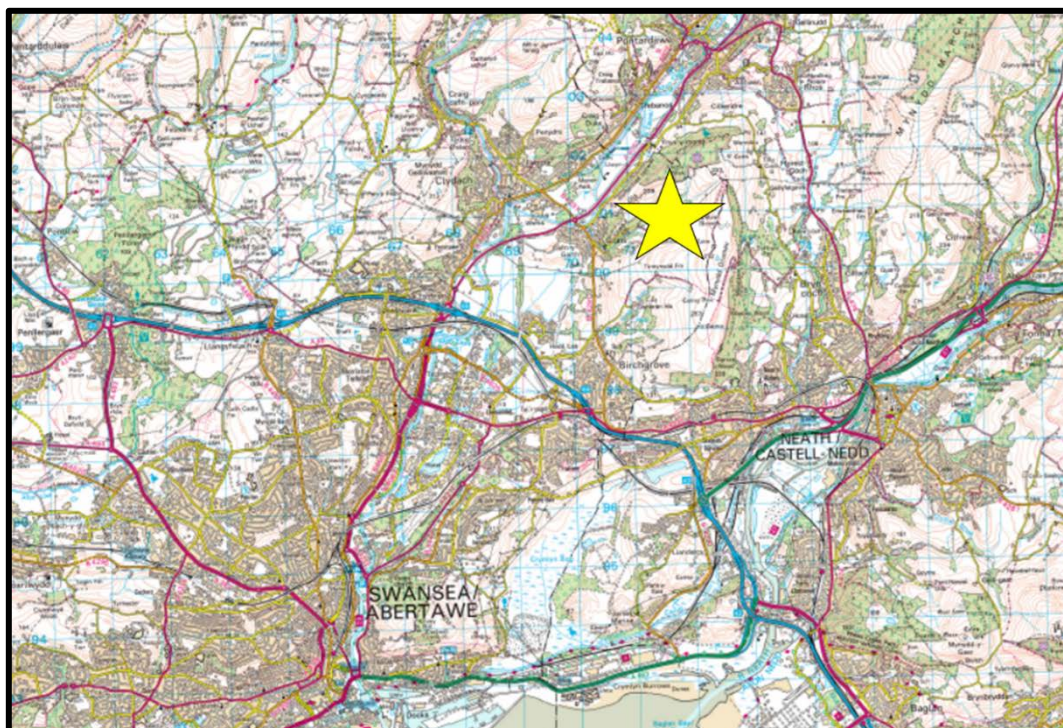
1.1 Appointment of Connect Consultants

- 1.1.1 Connect Consultants Limited is a firm of transport planning and highway design consultants that have been instructed by Sirius Planning on behalf of CYP Solar to produce a Transport Statement for a proposed Solar Farm on land at Craig Y Perchych, Glais, Swansea.

1.2 Site Location

- 1.2.1 The proposal site covers an area of approximately 67 hectares of grazing land that is situated on an elevated plateau, c600m to the northeast of the village Glais and c2km to the east of the village Clydach, to the northeast of Swansea.
- 1.2.2 The proposed site and surrounding areas are rural in nature, characterised by farmland used for grazing, scrub land and woodland.
- 1.2.3 The location of the proposal site, in the context of the wider area, is presented at Figure 1.1 below.

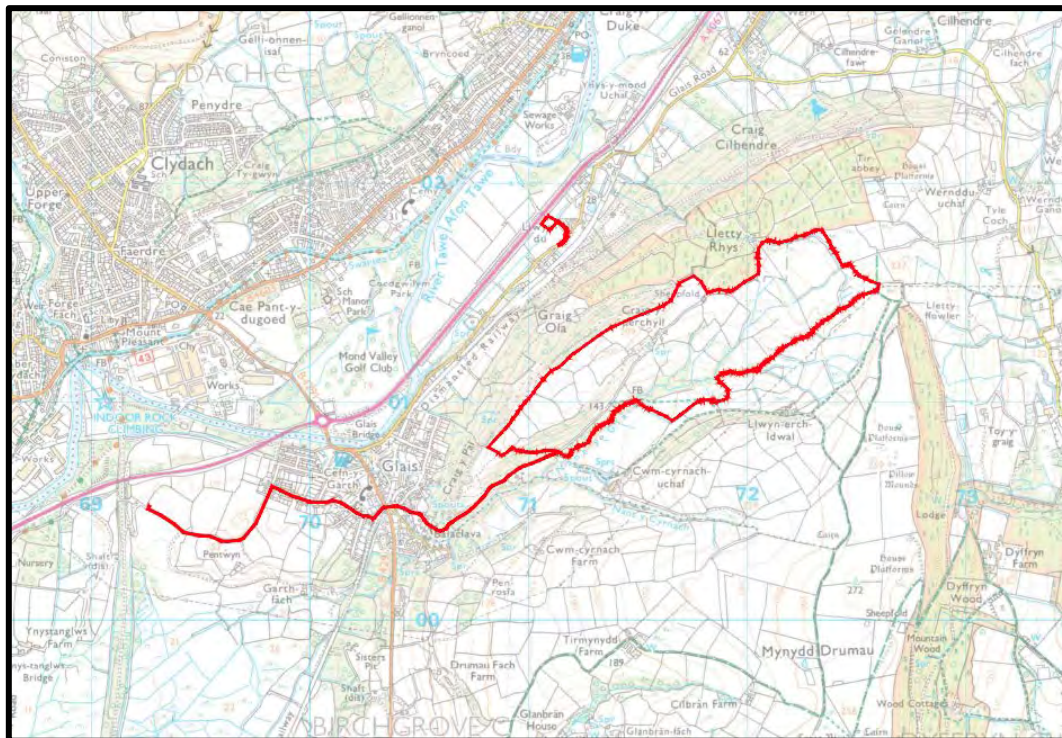
Figure 1.1 – Site Location Plan



Source: Bing / Ordnance Survey. Approximate site location indicated by the yellow star.

- 1.2.4 Figure 1.2 below identifies the context of the site in relation to the local area.

Figure 1.2 – Site in its Local Context



Source: Ordnance Survey. N.B. Red: Proposal Site

1.3 Development Proposals

- 1.3.1 CYP Solar are seeking to develop a solar farm across the 67 hectares of land at Craig Y Perchych. The solar farm will generate up to 20MW of electricity, enough to power over 5,300 homes per year.
- 1.3.2 The solar panels will be distributed at a ratio of between 40% to 60% (ground cover ratio), and will connect into an existing overhead cable located approximately 1.6km to the south west of the site.
- 1.3.3 The proposed site layout is shown at Appendix 1, with full details of the proposals provided at Section 3.0.
- 1.3.4 The main traffic and transport related effects of the proposal will be associated with the movement of vehicles to and from the site during the construction and decommissioning of the on-site set up phase of the development, as opposed to when the development is operational. The anticipated construction programme is expected to take 4 months to complete.
- 1.3.5 The solar farm will have a lifespan of 40 years, after which all equipment will be removed from the site and the land will continue to be used for agriculture and biodiversity.

1.4 Proposed Access Arrangements

- 1.4.1 As detailed above, the site is accessible by Graig Y Pal, a single-track road accessed via Graigola Road approximately 500m southeast of the site, in the village of Glais.
- 1.4.2 Graigola Road connects to the B4291 c40m west of the junction with Graig Y Pal. Graigola Road between the B4291 and Graig Y Pal is between approximately 5.5m and 6m in width.

- 1.4.3 The B4291 has a carriageway width of approximately 7.5m and provides a route to the village of Clydach and A4067 to the north and to M4 Junction 44 to the south.
- 1.4.4 The critical part of the access route is on Graig Y Pal. Due to its narrow width, a topographical survey and swept path analysis has been undertaken, with full details in Section 3.0. The swept path analysis shows that Graig Y Pal is unsuitable for large HGV's.
- 1.4.5 As the solar panels are likely to be delivered by large HGV's, it is proposed that a remote set down area located on Ynys Y Mond Road will be used to transfer goods onto smaller vehicles.

1.5 Planning Policy Wales

- 1.5.1 This report section provides a brief overview of the Welsh planning policy context and objectives: -

Planning Policy Wales, Edition 11, February 2021

- 1.5.2 Planning Policy Wales (PPW) sets out the land use planning policies of the Welsh Government. It is supplemented by a series of Technical Advice Notes (TANs), Welsh Government Circulars, and policy clarification letters, which together with PPW provide the national planning policy for Wales.
- 1.5.3 The primary objective of PPW is to ensure that the planning system contributes towards the delivery of sustainable development and improves the social, economic, environmental and cultural well-being of Wales, as required by the Planning (Wales) Act 2015, the Well-being of Future Generations (Wales) Act 2015 and other key legislation and resultant duties such as the Socio-economic Duty.

- 1.5.4 Chapter 4 of the PPW *Active and Social Plans* sets out at paragraph 4.1.9 that,

"The Welsh Government is committed to reducing reliance on the private car and supporting a modal shift to walking, cycling and public transport. Delivering this objective will make an important contribution to decarbonisation, improving air quality, increasing physical activity, improving the health of the nation and realising the goals of the Well-being of Future Generations Act."

- 1.5.5 Paragraph 4.1.52 states: -

"Local authorities will need to ensure that their parking standards reflect local transport provision, are adopted by individual authorities as supplementary planning guidance, and are kept under review. Parking standards should be applied flexibly and allow for the provision of lower levels of parking and the creation of high-quality places."

- 1.5.6 Paragraph 4.1.55 relates to the production of Transport Assessments: -

"Transport Assessments are an important mechanism for setting out the scale of anticipated impacts a proposed development, or redevelopment, is likely to have. They assist in helping to anticipate the impacts of development so that they can be understood and catered for appropriately."

Planning applications for developments, including changes of use, falling into the categories identified in TAN 18: Transport must be accompanied by a Transport Assessment. In addition, in areas where the transport network is particularly sensitive, planning authorities should consider requiring Transport Assessments for developments which fall outside of the thresholds set out in TAN 18. Transport Assessments can be required for any proposed development if the planning authority considers that there is a justification or specific need. Transport Assessments provide the basis for negotiation on scheme details, including the level of parking, and measures to improve walking, cycling, and public transport access, as well as measures to limit or reduce levels of air and noise pollution. They should cover the transport impacts during the construction phase of the development, as well as when built and in use. Transport Assessments also provide an important basis for the preparation of Travel Plans. Further guidance on Transport Assessments and Travel Plans is contained in TAN 18."

- 1.5.7 In relation to the proposed development Chapter 5 *Productive & Enterprising Place* sets out the following at paragraph 4.1.9: -

"Diversification can also include renewable energy proposals such as anaerobic digestion facilities or solar and wind installations, which will help to increase the viability of rural enterprises by reducing their operating costs. These schemes should be supported where there is no detrimental impact on the environment and local amenity."

Planning Policy Wales, Technical Advice Note (TAN) 18: Transport, March 2007

- 1.5.8 TAN18 states the following in relation to traffic management at Paragraph 5.15 (this is relevant to the Construction Traffic Management Plan): -

"Well designed and implemented traffic management measures can help to secure planning objectives in a number of ways, including:

- reducing community severance, noise, local air pollution and traffic accidents;*
- promoting safe walking, cycling and public transport;*
- improving the attractiveness of urban areas by helping to avoid or manage congestion;*
- controlling on street parking (including resident parking schemes) in areas of high parking demand;*
- promoting safer road conditions leading to improved opportunity for children's safety and play; and*
- promoting safer road conditions in rural areas and reducing the impact of roads on the environment whilst maintaining access for rural businesses."*

Swansea Local Development Plan (LDP) 2010-2025, adopted 28th February 2019

- 1.5.9 The Swansea Local Development Plan (LDP) represents the overarching strategy for development in Swansea up until 2025.
- 1.5.10 Policy EU1: Renewable and Low Carbon Energy Proposals states: -

"Proposals for renewable or low carbon energy development will be permitted subject to the following criteria:

ii) Local Search Areas (LSAs) - Within the LSAs, proposals for solar PV between 5 – 50 MW will be permitted subject to criteria iii to v. All other proposals for renewable and low carbon energy development will only be permitted where they can demonstrate they would not prejudice the purpose of the LSA.

iii) Proposals for all types of renewable and low carbon energy development and associated infrastructure, either on their own, cumulatively or in combination with existing, approved or proposed development, should comply with all other relevant policies in the Plan and should not have a significant adverse effect on:

a. The characteristics and features of the proposed location as a result of the siting, design, layout, type of installation and materials used;

b. Public amenity or public accessibility to the area;

c. Radar, Aircraft Operations or Telecommunications;

d. Carbon sinks, unless it can be demonstrated that on-site loss can be adequately mitigated;

iii) Satisfactory mitigation should be in place to reduce the impact of the proposal and its associated infrastructure; and in the case of solar proposals must mitigate against any impacts of glint and glare. Proposals shall make provision for the restoration and after-care of the land for its beneficial re-use. This will be agreed with the LPA prior to the development being carried out."

1.6 Local Planning History

- 1.6.1 The proposal site is not subject to any historic planning permissions relevant to the proposed development.
- 1.6.2 There are also no other solar farms permitted, under construction or constructed within the immediate vicinity of the site.

1.7 Pre-Application Advice

- 1.7.1 A pre-application request was submitted by Sirius Planning to Swansea Council on 23rd July 2021. It set out the proposals and intention to submit a forthcoming planning application for a proposed solar farm at land at Craig Y Perchych, Glais, Swansea.
- 1.7.2 Pre-application advice was received from Swansea Council dated 14th February 2022.
- 1.7.3 The following advice was provided in relation to highways and transport: -

"T1 Transport Measures and Infrastructure:

Development must be supported by appropriate transport measures and infrastructure and dependant the nature, scale and siting of the proposal, meet specified requirements. Development that would have an unacceptable impact on the safe and efficient operation of the transport network will not be permitted.

T5 Design Principles for Transport Measures and Infrastructure:

Provides design criteria that the design of the new development, including supporting transport measures/infrastructure must adhere to.

T6 Parking:

Proposals must be served by appropriate parking provision, in accordance with maximum parking standards, and consider the requirements for cycles, cars, motorcycles and service vehicles. In those instances where adequate parking cannot be provided on site, or is judged not to be appropriate, the developer will be required to provide a financial contribution towards alternative transport measures where appropriate. The provision of secure cycle parking and associated facilities will be sought in all major development schemes."

1.7.4 The pre-application advice concluded with this passage from the Local Highway Authority: -

"There is not enough information at this stage to provide full comments on the proposals however it is recognised that the initial construction stage is temporary and that this type of development, once the construction phase is over, results in minimal traffic on the highway network with periodic maintenance being carried out by smaller vehicles.

The development is large scale and is remote from major arterial routes such as the M4 and the highway network in general. It is presumed that the construction phase will require large vehicles on a frequent basis which will be travelling through the village of Glais and narrow rural roads and full details on how the construction phase will be managed, the scale of the development, travel routes, construction traffic type and intensity of movements will be required to be submitted with any subsequent applications."

1.7.5 A pre-app TEAMS meeting was held between Connect, Sirius Planning and Swansea Council on 20th July 2022 to discuss the highway proposals. A summary of the meeting is provided below (a copy was also emailed to Swansea Council following the meeting): -

- It was confirmed that Swansea Council have received and reviewed both the Preliminary Construction Traffic Management Plan produced by Connect dated 10th December 2021 and TN01 which provides Swept Path Analysis dated 26th April 2022.
- There is some work needed to the reports prior to the full submission, however these are not showstoppers to the application or access proposals.
- It was confirmed that access to the remote set down area as proposed in the above reports via Ynys Y Mond Road using a 16.5m articulated vehicle is acceptable. Width constraints have been identified and intervisible passing opportunities are available along the route.
- It was acknowledged that Connect have been upfront in identifying the width restraints on Graig Y Pal leading up to the proposed solar farm.
- The proposed traffic management for Graig Y Pal is welcomed, however Swansea Council would be looking for some more comfort that the vehicles proposed can access the site via Graig Y Pal given the pinch points identified.
- It was agreed that the pinch points identified on Graig Y Pal in TN01 will be explored in greater detail including more detailed drawings, investigations into the highway boundary and on-site investigations.
- Swansea Council are to provide any specific comments on the Construction Traffic Management Plan as well as supply their guidance document / template.

- 1.7.6 Swansea Council confirmed the following, *"I'm content that the notes sent through by Rachel accurately reflect our discussions to date, and identify the next step,"* in relation to the above summary in an email dated 3rd August 2022. A copy of the guidance note was also received from Swansea within the 3rd August email.
- 1.7.7 This Transport Statement (TS) has been produced to satisfy the above requests and has been produced based on the agreed steps. A separate Construction Traffic Management Plan (CTMP) and Swept Path Analysis Report (TN01) accompanies this TS.
- 1.7.8 Comments in relation to the TS were also received from Neath Port Talbot County Borough Council in their response dated 17th February 2023. This TS takes account of the comments. A construction vehicle routing plan will be provided as part of the detailed design.

1.8 Report Overview

- 1.8.1 The remainder of this report is divided into five further sections, which are as follows: -
Section 2.0 Site Transport Context
- 1.8.2 This section of the report provides details of the site context, including its accessibility by all relevant transport modes.
Section 3.0 Proposed Development
- 1.8.3 The various components of the development proposal, including the site access arrangements and parking provision, are described within this section of the report.
Section 4.0 Traffic Assessment
- 1.8.4 This report section provides an assessment of the vehicular attraction of the proposed development and its traffic effects.
Section 5.0 Junction Capacity and Collision Analysis
- 1.8.5 The results of the traffic assessment have been used to inform junction capacity and collision analysis, and the methodology and results are outlined in this section of the report.
Section 6.0 Summary & Conclusions
- 1.8.6 A summary and the conclusions of the report are provided in this section.

2.0 SITE TRANSPORT CONTEXT

2.1 Introduction

- 2.1.1 This section of the report considers the accessibility of the site in terms of a range of transport modes.
- 2.1.2 As detailed above, the main traffic and transport related effects of the proposal will be associated with the movement of vehicles to and from the site during the construction and decommissioning of the on-site set up phase of the development, and the end-of-life decommissioning, as opposed to when the development is operational.
- 2.1.3 The construction programme is expected to take 4 months to complete, details of which are provided in the CTMP.
- 2.1.4 The solar farm will then have a lifespan of 40 years, after which all equipment will be removed from the site.
- 2.1.5 During the operational phase, there will be no site-based staff and only the requirement for routine inspections/maintenance by car/van.
- 2.1.6 It is envisaged that staff will be from both local and regional contractors who will use shared transport such as crew cab transit vans to access the site via Graig Y Pal.
- 2.1.7 Based on the above, access by foot, cycle and public transport have not been considered specifically.

2.2 Highways Access

- 2.2.1 As detailed above, the proposal site will be accessed from Graig Y Pal, which is a rural road varying in width between 2.6m and 5.5m, which is flanked on both sides of the road by mature hedges and trees, as shown at Figure 2.1 below.

Figure 2.1 – Graig Y Pal



- 2.2.2 Graig Y Pal is a lightly trafficked single-track road accessed via Graigola Road approximately 500m southeast of the site, in the village of Glais. Graigola Road connects to the B4291 c40m west of the junction with Graig Y Pal. Graigola Road between the B4291 and Graig Y Pal is between approximately 5.5m and 6m in width.
- 2.2.3 The B4291 has a carriageway width of approximately 7.5m and provides a route to the village of Clydach and A4067 to the north and to M4 Junction 44 to the south.
- 2.2.4 Graig Y Pal is subject to national speed limit, however due to the geometry and alignment of the road, topography and high hedges, speeds are likely to be substantially lower. It does not include any fixed overhead structures such as bridges, however there are some overhead power lines and overhanging trees. The height of these will be measured prior to the start of construction to establish whether the intended vehicles can pass under and/or what remedial measures are required.
- 2.2.5 The proposed remote set down area will be accessed via Ynys Y Mond Road, which varies between 3.8m and 7.7m in width, and is mostly flanked by hedges and trees on both sides, with some residential houses along the road. Figure 2.2 below shows an image of Ynys Y Mond Road.

Figure 2.2 – Ynys Y Mond Road



Source: Google Earth

- 2.2.6 It is a lightly traffic route connecting with the village of Alltwn to the north, and Glais to the south. Ynys Y Mond Road can be accessed via the B4291 Birchgrove Road. Access to the M4 is via the B4291 and A4067, approximately 2.9km from the B4291 Birchgrove Road / Ynys Y Mond Road junction.

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- 2.2.7 Crashmap, an online database of collision data, shows that for the most recent five years of data 2017-2021, no collisions have occurred at the site access junction or on Graig Y Pal. On Ynys Y Mond Road, one collision occurred on the 13th April 2019, involving one vehicle and one casualty, which resulted in a 'slight' injury. The location of the single collision was approximately 1.1km east from the B4291 Birchgrove Road / Ynys Y Mond Road junction.
- 2.2.8 Overall, the site is accessible in relation to the local road network.

3.0 PROPOSED DEVELOPMENT

3.1 Introduction

3.1.1 This section of the report details the development proposals.

3.2 Built Form

3.2.1 CYP Solar Limited are seeking to develop a solar farm across 67 hectares of land at Craig y Perchych, Glais, Swansea. The solar farm will have a generating capacity of up to 20MW of electricity, enough to power over 5,300 homes per year.

3.2.2 The solar panels will be installed at a ratio of between 40% to 60% (ground cover ratio) and will connect into an existing overhead cable located approximately 1.6km to the south west of the site.

3.2.3 The proposal will comprise of the following as shown on the plan at Appendix 1: -

- Photovoltaic (PV) panels;
- Mounting frames – matt finished small section metal structure;
- Scheme of landscaping and biodiversity enhancement;
- Inverters and transformers and associated cabling (largely below ground);
- Distribution Network Operator (DNO) substation and customer cabins;
- Telecoms mast;
- Deer fencing, sympathetic to the area, and infra-red CCTV (CCTV cameras would operate using motion sensors and would be positioned inward only to ensure privacy to neighbouring land and property);
- Temporary set down area;
- Internal service roads; and
- Site access for the construction, operational and decommissioning phases.

3.3 Proposed Site Access Arrangements

3.3.1 As detailed above, the proposal site will be accessed via Graig Y Pal to the south west of the site. Graig Y Pal is a single-track road accessed via Graigola Road approximately 500m southwest of the site, in the village of Glais. It is a lightly trafficked route, providing no through function, just access to the proposal site and a handful of residential dwellings.

3.3.2 The single-track road varies between 2.6m and 5.5m in width, and is flanked on both sides by hedges / trees. Due to its narrow width, some vehicles e.g. large HGVs may not be able to access the site via Graig Y Pal, and so construction traffic will need to be managed both in terms of vehicle sizes and traffic movements generally.

3.3.3 Swept path analysis detailed at Section 3.4 below and provided at Appendix 2 shows that the above access road is restricted in width with only cars, vans and small HGV's able to use Graig Y Pal.

3.3.4 As the solar panels are likely to be delivered by large HGV's, as detailed above, it is proposed that a remote set down area will be used to transfer goods from vehicles which are too large to access the site via Graig Y Pal to small vehicles that can access the site via Graig Y Pal.

3.3.5 A construction vehicle routing plan will be provided as part of the detailed design.

3.4 Servicing / HGV Access

3.4.1 Figure 3.1 below details the proposed route for construction, staff and maintenance vehicles to access the site from the M4 via the A4067, the B4291, Graigola Road and Graig Y Pal. A full construction vehicle routing plan will be provided as part of the detailed design.

3.4.2 As both the A4067 and B4291 have multiple lanes at widths of 3m or more they can comfortably accommodate HGV's. The the most critical part of the access route is therefore Ynys Y Mon Road (to and from the remote set down area) and Graig Y Pal.

Figure 3.1 – M4 to Graig Y Pal



Source: Google Earth.

3.4.3 A topographical survey was undertaken on both Ynys Y Mon Road and Graig Y Pal in February 2022, followed by swept-path analysis presented in Connect TN01 dated 26th April 2022.

3.4.4 Connect TN01 details that access to the remote set down area located on Ynys Y Mond Road has been tracked using an FTA Design 16.48m articulated HGV. The swept path analysis within TN01 shows the FTA articulated vehicle travelling north on Ynys Y Mond Road into the remote set down area alongside an estate car travelling south on Ynys Y Mond Road.

3.4.5 The tracking confirms that Ynys Y Mond Road is not wide enough along all sections of the route for a car and an HGV to pass. Along the c1.2km route there are twelve 'red' sections of road, of up to c200m in length, where the AutoTrack software shows there is less than 0.25m clearance between the FTA articulated vehicle and estate car. Given the predominantly straight nature of Ynys Y Mond Road, the wider sections of the road are likely to be intervisible. Investigations into forward visibility along the route show that with the exception of one location drivers will be able to see to the far end of the section of restricted width allowing opposing vehicles to stop and wait for the car or FTA articulated HGV to pass. At the above location, an escort vehicle may need to travel ahead of the FTA articulated HGV to make sure opposing vehicles wait before the narrowing, for the HGV to pass.

- 3.4.6 Based on the above, the AutoTrack software shows an FTA articulated vehicle will be able to access the remote set down area and pass 'estate' sized cars along the route to and from the B4291.
- 3.4.7 The AutoTrack software also indicates that two FTA articulated vehicles will be unlikely to pass on Ynys Y Mond Road, and so traffic management will be needed to control HGV traffic to prevent delivery vehicles using it in opposing directions at the same time. However, no widening to Ynys Y Mond Road is envisaged based on the tracking.
- 3.4.8 The set down will have sufficient space onsite for turning, loading and storage of materials to ensure that the operation does not impede traffic on the highway. It also will have room within the site for vehicles to wait to avoid any backing up on the highway.
- 3.4.9 Access to and from the proposal site via Graig Y Pal has been tracked using an FTA Design LG 7.17m rigid vehicle. Full details of the tracking are provided in Connect TN01.
- 3.4.10 The AutoTrack software shows that the vehicle will be able to access Graig Y Pal via the Graig Y Pal / Graigola Road access junction. The AutoTrack software also shows that Graig Y Pal is wide enough along the majority of the route for the FTA 7.17m rigid vehicle to travel within the carriageway as identified by the topographical survey. As detailed in TN01, there are a few locations where the FTA 7.17m rigid vehicle is not fully contained within the carriageway however on investigation (shown on the plan at Appendix 2) the constrained areas might also accommodate the FTA 7.17m rigid vehicle (Appendix 3) subject to investigations into the actual position of the road edge on-site as well as an on-site vehicle test using the specific vehicle to be used.
- 3.4.11 Tracking using an FTA Design 13/18 Tonne 10m rigid vehicle is also provided in Connect TN01. The AutoTrack software indicates that the vehicle tracking can be accommodated along some sections of the route, however there are a number of sections where the vehicle tracking is shown to not be contained within the carriageway as indicated by the topographical survey. Investigations set out in TN01 indicate that where the tracking exceeds the edge of carriageway there appears to be space for the extra width to be accommodated possibly with some minor road widening, however on-site investigation including into the extent of the highway would be needed to establish validity before an FTA 10m rigid vehicle is driven along the route.

3.5 Car Parking Policy / Standards

- 3.5.1 Swansea Council do not provide any specific parking standards for solar farm developments.
- 3.5.2 Adequate vehicle parking for staff and delivery vehicles will be provided within the temporary construction compound at the development site. There will therefore be no parking on the local highway network.

3.6 Section Conclusion

- 3.6.1 Vehicle access to the proposed development will be provided via Graig Y Pal. Swept Path analysis shows that the road is not wide enough to accommodate a 16.48m FTA articulated vehicle. However, vehicles up to a 7.17m LG rigid vehicle can access the proposal site.
- 3.6.2 To accommodate deliveries made by larger vehicles including articulated HGVs, a remote set down area on Ynys Y Mond Road is proposed. The topographical survey and swept path analysis on Ynys Y Mond Road indicates that it can accommodate 16.48m articulated HGVs.
- 3.6.3 Full details of the construction access arrangements and traffic management is provided in the CTMP, including a detailed plan.

3.6.4 Adequate vehicle parking for staff and delivery vehicles will be provided within the development site and at the remote set down area.

4.0 TRAFFIC ASSESSMENT

4.1 Introduction

- 4.1.1 Details of the potential traffic flows that could arise from the proposed development will be considered within this section of the report.
- 4.1.2 As detailed above, the main traffic and transport related effects of the proposal will be associated with the movement of vehicles to and from the site during the construction and decommissioning of the on-site set up phase of the development, and end-of-life decommissioning, as opposed to when the development is operational.

4.2 Construction Phase Traffic

- 4.2.1 The construction of the solar farm is expected to take 4 months and is envisaged to start in 2024. During this period, there will be journeys associated with the arrival and departure of site staff and the delivery of equipment and construction materials.

Staff Trips – Directly to Site

- 4.2.2 During the construction period up to 50 staff will be on-site, depending on the phase of the development.
- 4.2.3 It is envisaged that staff will be from both local and regional contractors who will use shared transport such as crew cab transit vans to access the site via Graig Y Pal. The swept path analysis confirms that a crew cab transit van will be able to access the site as this is smaller than a 7.17m rigid HGV.
- 4.2.4 All vehicle parking will be provided within the temporary construction compound at the development site. There will therefore be no parking on the local highway network.
- 4.2.5 As part of the CTMP the contractor will aim to manage staff movements at the start / end of shifts to ensure that all vehicles are not released onto Graig Y Pal at the same time. This could involve releasing a small number of vehicles in five-minute intervals and asking drivers to arrive in five-minute intervals at the start of the day. It will also be assumed that most staff are likely arrive before the operating hours of the site (before 08:00) and depart after the sites close each day (after 18:00).

Construction Vehicle Movements – Directly to Site

- 4.2.6 Only small HGV's will be able to access the site directly, without using the remote set down area.
- 4.2.7 During month one of construction, it is envisaged that 10 small HGV's (likely to be less than 7.17m rigid vehicles) will deliver plant, equipment and materials to the site via Graig Y Pal. This equates to less than one vehicle per day (based on 25 working days).
- 4.2.8 During month two of construction, it is envisaged that 25 small HGV's (again likely to be less than 7.17m rigid vehicles)) will deliver further plant, equipment and materials, the security fencing and construction compound to site via Graig Y Pal. This equates to one vehicle per day.
- 4.2.9 During month three, it is envisaged that 5 small HGV's (again likely to be less than 7.17m rigid vehicles) will deliver further plant, equipment and materials to site via Graig Y Pal. This equates to less than one vehicle per day.
- 4.2.10 During month four, it is envisaged that 7 small HGV's (again likely to be less than 7.17m rigid vehicles) will again deliver further plant, equipment and materials and transformer & control equipment to site via Graig Y Pal. This equates to less than one vehicle per day.

- 4.2.11 During month five, it is envisaged that 5 small HGV's (again likely to be less than 7.17m rigid vehicles) will deliver transformer & control equipment to site via Graig Y Pal. This equates to less than one vehicle per day.
- 4.2.12 During months five, six, seven and 8 no deliveries are expected to site via Graig Y Pal.
- 4.2.13 During the final month of construction, month nine, it is envisaged that 8 small HGV's (likely to be less than 7.17m rigid vehicles) will remove on-site plant and facilities via Graig Y Pal. This also equates to less than one vehicle per day.
- 4.2.14 Based on the above, month two will be the busiest for small HGV's delivering directly to site with one delivery every day. An overview of the deliveries / collections to site are detailed at Table 4.1 below.

Table 4.1 – Indicative Vehicle Deliveries during Construction Phase

Construction Activity (indicative delivery vehicles)	Month									
	1	2	3	4	5	6	7	8	9	Total
Delivery of plant, equipment and materials (Likely to be a 7.17m rigid or less)	10	10	5	2						27
Erection of security fencing and construction compound (likely to be a 7.17m rigid or less)		15								15
Delivery of transformer & control equipment (Likely to be a 7.17m rigid or less)				5	5					10
Removal of plant and equipment (Likely to be a 7.17m rigid or less)									8	8
Total	10	25	5	7	5	0	0	0	8	60

Construction Vehicle Movements – To Remote Set Down Area

- 4.2.15 Deliveries on larger HGV's e.g., those of 16.48m in length will utilise the remote set down area oppose to accessing the site directly via Graig Y Pal.
- 4.2.16 During month one of construction, it is envisaged that 10 large HGV's (e.g those of 16.5m in length) will deliver plant, equipment and materials to the remote set down area. This equates to less than one delivery per day.
- 4.2.17 During month two of construction, it is again envisaged that 10 large HGV's (e.g those of 16.5m in length) will deliver plant, equipment and materials to the remote set down area. This equates to less than one delivery per day.
- 4.2.18 During month three of construction, it is envisaged that 10 large HGV's (e.g. those of 16.5m in length) will deliver further plant, equipment and materials, and cabling to the remote set down area. This equates to less than one delivery per day.
- 4.2.19 During the month four of construction, it is envisaged that 38 large HGV's (e.g. those of 16.5m in length) will deliver further plant, equipment and materials, frames & support posts, and solar panels to the remote set down area. This equates to three vehicles every two days during month four.

- 4.2.20 During the month five of construction, it is envisaged that 35 large HGV's (e.g. those of 16.5m in length) will deliver frames & support posts, and solar panels to the remote set down area. This equates to less than three vehicles every two days.
- 4.2.21 During the month six of construction, it is envisaged that 20 large HGV's (e.g. those of 16.5m in length) will deliver solar panels to the remote set down area. This equates to less than one vehicle per day.
- 4.2.22 During the month seven of construction, it is envisaged that 40 large HGV's (e.g. those of 16.5m in length) will deliver solar panels to the remote set down area. This equates to less than two vehicles per day.
- 4.2.23 During the month eight of construction, it is envisaged that 20 large HGV's (e.g. those of 16.5m in length) will deliver solar panels to the remote set down area. This equates to less than one vehicle per day.
- 4.2.24 During the month nine of construction, the final month, it is envisaged that 7 large HGV's (e.g. those of 16.5m in length) will remove on-site plant and facilities from the remote set down area. This equates to less than one vehicle per day.
- 4.2.25 Based on the above, month seven will be the busiest for large HGV's delivering / collecting from the remote set down area, with less than two deliveries each day. An overview of the deliveries to the remote set down area are detailed at Table 4.2 below.

Table 4.2 – Indicative Vehicle Deliveries to Remote Set Down Area

Construction Activity (indicative delivery vehicles)	Month									Total
	1	2	3	4	5	6	7	8	9	
Delivery of plant, equipment and materials (16.5m artic)	10	10	5	3						28
Cabling on site (16.5m artic)			5							5
Delivery of frames & support posts (16.1m artic)				15	15					30
Delivery of solar panels (16.5m artic)				20	20	20	40	20		120
Removal of plant and equipment (16.5m artic)									7	7
Total	10	10	10	38	35	20	40	20	7	190

- 4.2.26 For simplicity, at this stage it is assumed that one delivery to the remote set down area will equate to two deliveries to site, equating to a total of 380 shuttle deliveries across the nine-month construction period. When combined with the 60 direct deliveries this equates to 440 across the nine months.
- 4.2.27 The 440 deliveries equate to an average of approximately two per day during the nine-month period. As detailed above however, months two, four and seven are busier than the other months.

Proposed Construction Vehicle Movements – Typical Day

- 4.2.28 A breakdown of expected HGV movements on a typical day is provided below. It is based on the expected trip generation for month four, which is expected to be the busiest months (when the remote set down and on-site trips are combined).
- 4.2.29 Based on a 6-day working week during the construction phase (Monday-Saturday), there will be up to c25 working days per month.
- 4.2.30 Assuming that construction vehicles will avoid school drop up and pickups at 08:15-09:15 and 15:00-16:00, realistically, on a typical weekday there are seven hours (09:30-14:30 and 16:00-18:00) when construction vehicle movements can take place. On a Saturday there is an eight-hour window with no restriction, however in order to consider each working day similarly, the calculations to follow consider a seven-hour working day.
- 4.2.31 Based on the above, the predicted number of HGV trips to the remote set down area is shown below: -
- 38 deliveries, 76 movements in month four.
 - 25 working days in a month (Monday-Saturday) = Three movements per day (approximately).
 - Seven-hour day each working day = One movement every 138 minutes approximately.
- 4.2.32 The predicted number of HGV trips from the remote set down area to the site is shown below: -
- 152 movements in month four.
 - 25 working days in a month (Monday-Saturday) = Six movements per day (approx.)
 - Seven-hour day each working day = One movement every 69 minutes approximately.
- 4.2.33 The predicted number of HGV trips directly to the site is shown below: -
- 7 deliveries, 14 movements in month four.
 - 25 working days in a month (Monday-Saturday) = Just over one movement every two days (approx.)
 - Seven-hour day each working day = One movement every 750 minutes approximately.
- 4.2.34 When the direct deliveries and shuttle deliveries are combined there are 242 movements in month four, nine and a half per day, one approximately every 43 minutes.

4.3 Operational Phase Traffic

- 4.3.1 The solar farm will have a lifespan of 40 years.
- 4.3.2 During the operational phase, there will be no site-based staff and only the requirement for routine inspections/maintenance by car/van approximately once a month. Any HGV's bringing replacement parts would be very infrequent.

4.4 Decommissioning Phase

- 4.4.1 After 40 years all equipment will be removed from the site and the land will continue to be used for agriculture and biodiversity.
- 4.4.2 The traffic associated with this phase will be similar to that of the construction phase with the decommissioning phase also lasting 6 months.

4.5 Section Conclusions

- 4.5.1 Based on the above, even during the busiest time (month four of construction), there will be a negligible increase in traffic as a result of the solar farm.
- 4.5.2 The increase in HGV's will be managed via the CTMP.
- 4.5.3 During the operational phase the site will attract approximately one vehicle per month.

5.0 JUNCTION CAPACITY AND COLLISION ANALYSIS

5.1 Introduction

- 5.1.1 The assessment in Section 4.0 identifies that the net traffic effect of the proposed development is negligible.
- 5.1.2 Therefore, no detailed assessment of junction capacity or collision analysis has been undertaken.
- 5.1.3 As detailed above, Crashmap an online database of collision data shows that for the most recent five years of data 2017-2021, no collisions have occurred on the access junction or on Graig Y Pal. On Ynys Y Mond Road, one collision occurred on the 13th April 2019, involving one vehicle and one casualty, which resulted in a 'slight' injury.

6.0 SUMMARY AND CONCLUSIONS

6.1 Summary

6.1.1 Connect Consultants Limited is a firm of transport planning and highway design consultants that have been instructed by Sirius Planning on behalf of CYP Solar to produce a Transport Statement for a proposed Solar Farm on land at Craig Y Perchych, Glais, Swansea.

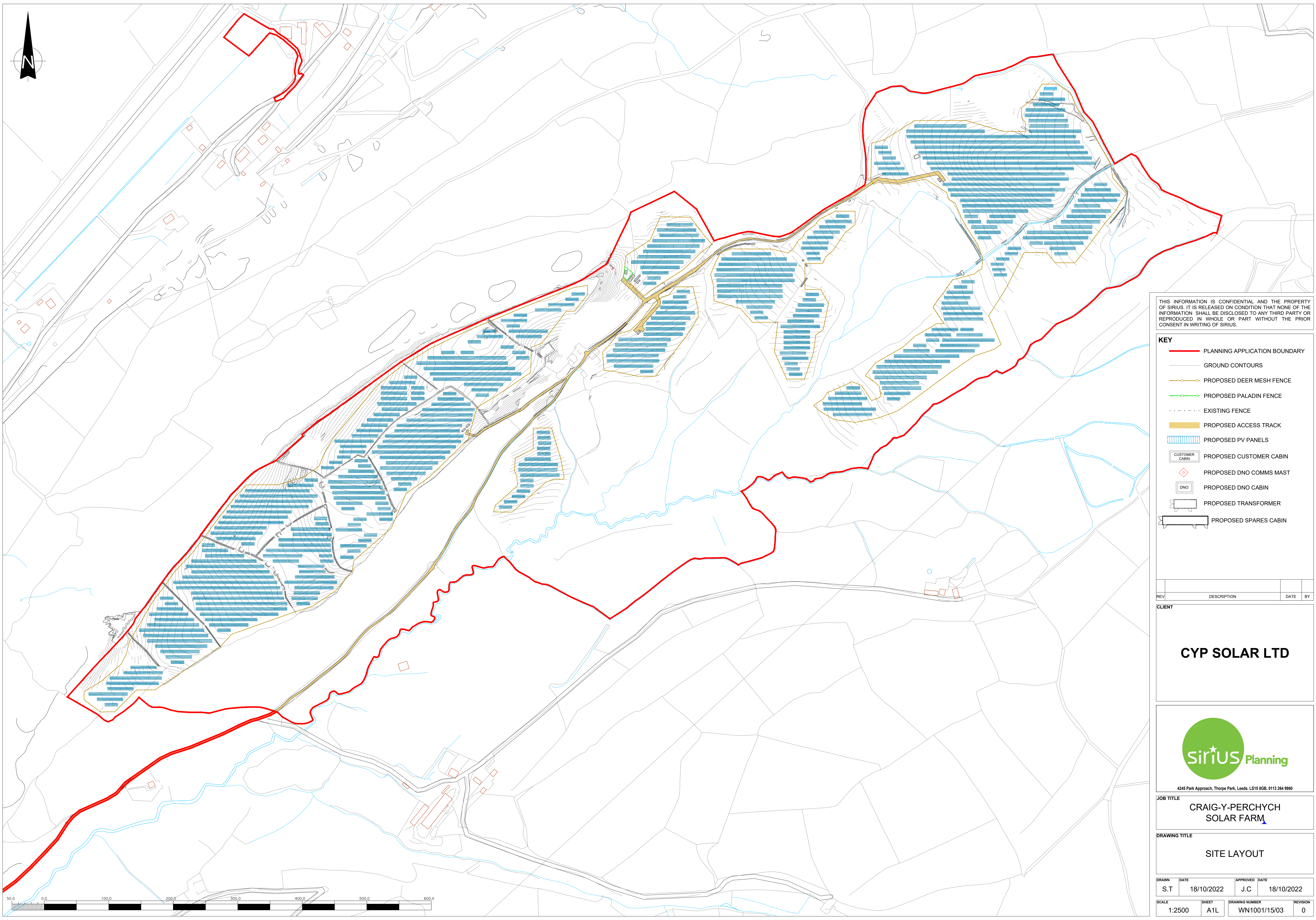
6.1.2 The report is summarised as follows: -

- This TS has been produced to accompany a planning application for the above solar farm as requested by Swansea Council. It is accompanied by a Construction Traffic Management Plan (CTMP) and swept path analysis report (TN01).
- Given the site's rural location, which is a functional need for this type of development, it is expected that the majority of arrival / departure trips will be undertaken by car, van and HGV.
- The main traffic and transport related effects of the proposal will be associated with the movement of vehicles to and from the site during the construction / decommissioning phases of the development, as opposed to when the development is operational.
- Swept path analysis shows that a 16.48m articulated vehicle can access the remote set down area and a 7.17m rigid vehicle the proposal site via Graig Y Pal. Traffic management will be provided as detailed in the CTMP.
- Adequate vehicle parking for staff and delivery vehicles will be provided within the development site.
- The traffic assessment included in this report is based on a realistic traffic impact scenario and demonstrates the development traffic effects will be negligible.
- No collisions have occurred at the proposed site access location in the last five years.

6.2 Conclusions

6.2.1 The results of this assessment highlight that the proposed development is acceptable from a transport perspective.

APPENDIX 1 – SITE LAYOUT



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- KEY**
- PLANNING APPLICATION BOUNDARY
 - GROUND CONTOURS
 - PROPOSED DEER MESH FENCE
 - PROPOSED PALADIN FENCE
 - EXISTING FENCE
 - PROPOSED ACCESS TRACK
 - PROPOSED PV PANELS
 - CUSTOMER CABIN
 - PROPOSED CUSTOMER CABIN
 - PROPOSED DNO COMMS MAST
 - DNO
 - PROPOSED DNO CABIN
 - PROPOSED TRANSFORMER
 - PROPOSED SPARES CABIN

REV	DESCRIPTION	DATE	BY
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CLIENT

CYP SOLAR LTD



JOB TITLE

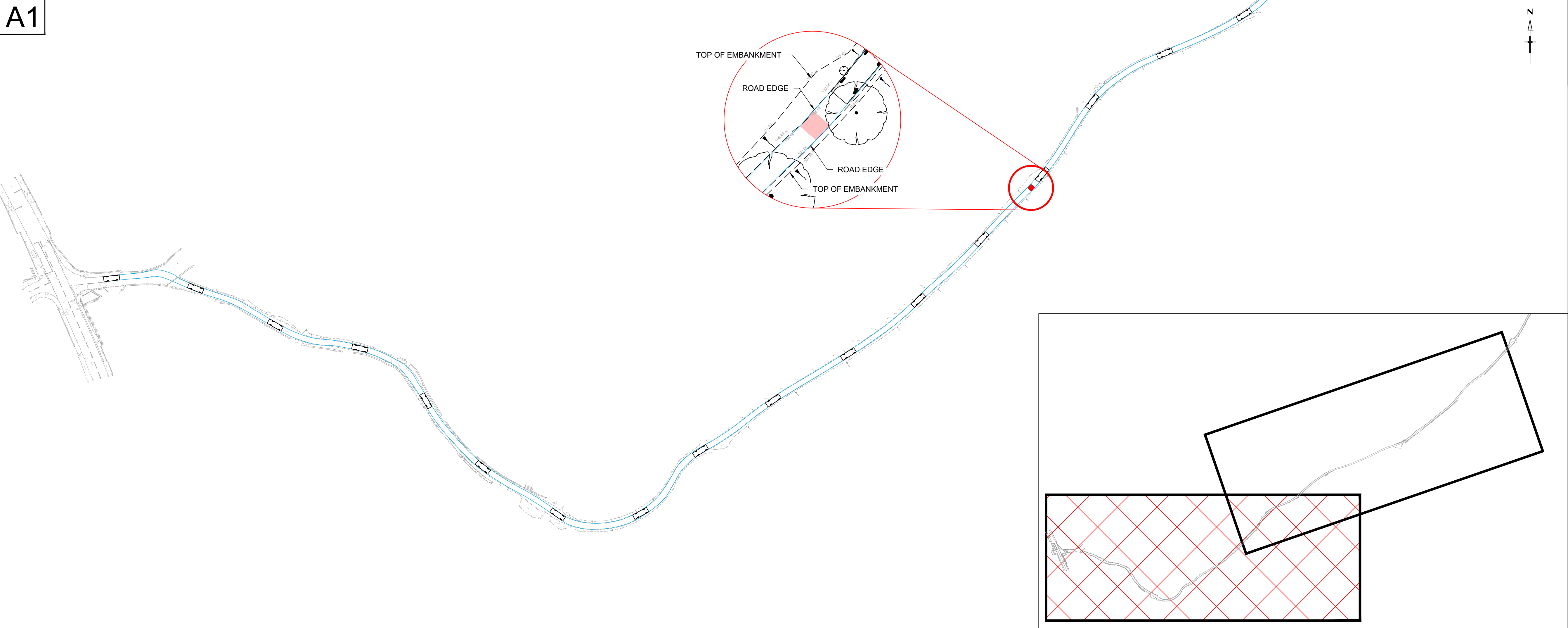
**CRAIG-Y-PERCHYCH
SOLAR FARM**

DRAWING TITLE

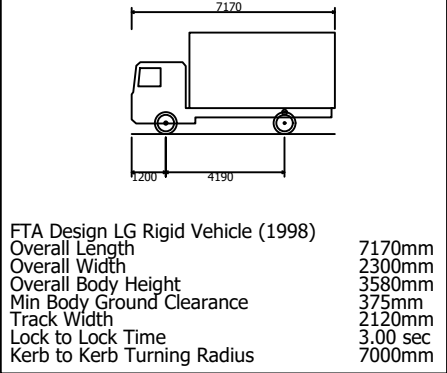
SITE LAYOUT

DRAWN	DATE	APPROVED	DATE
S.T	18/10/2022	J.C	18/10/2022
SCALE	SHEET	DRAWING NUMBER	REVISION
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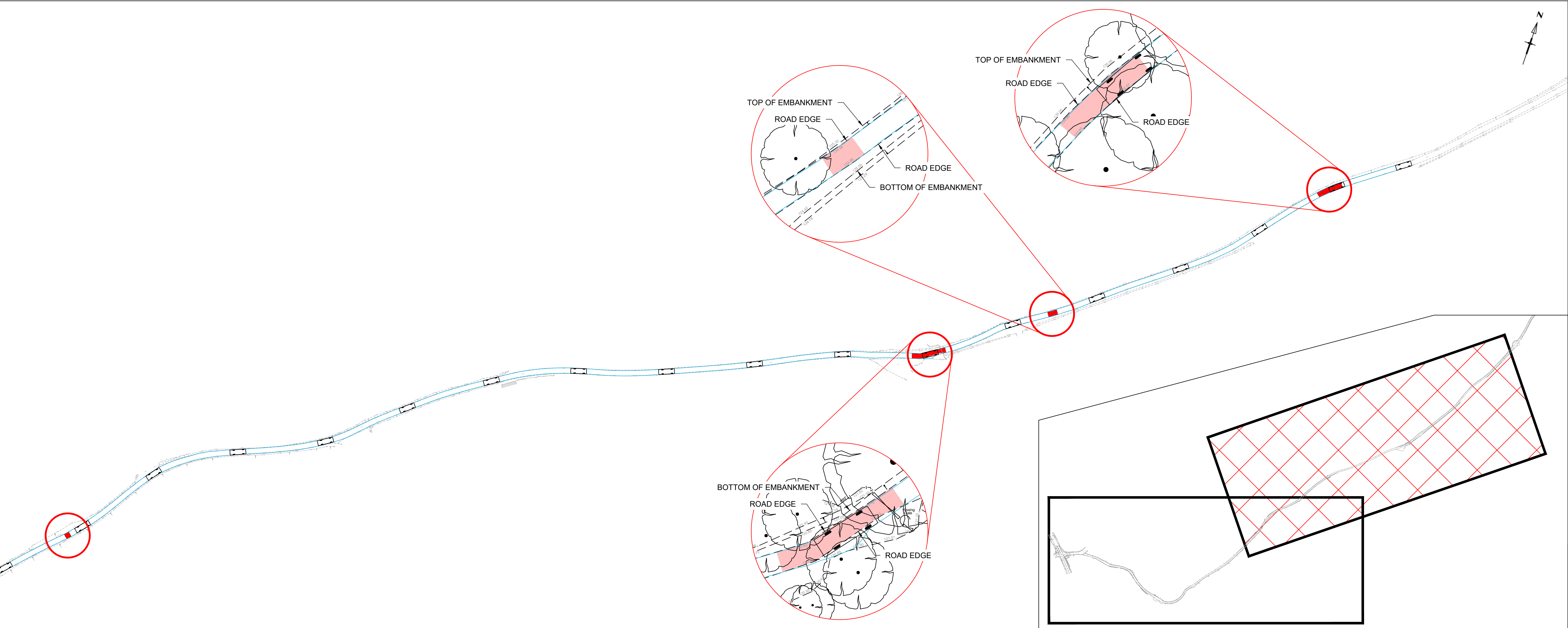
APPENDIX 2 – SWEPT PATH ANALYSIS



EASTBOUND - FTA DESIGN 7M RIGID VEHICLE



AREA OF CARRIAGEWAY TOO NARROW TO ACCOMMODATE VEHICLE



rev.	amendment	by	date
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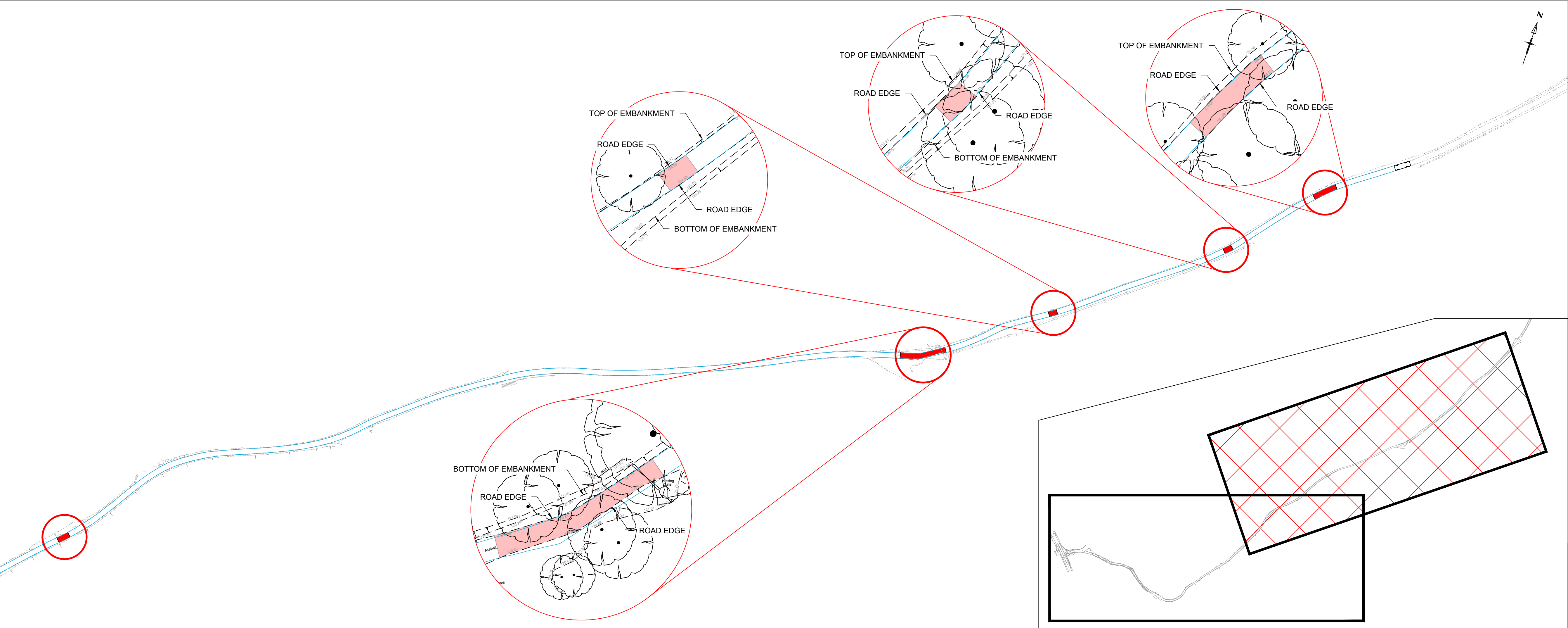
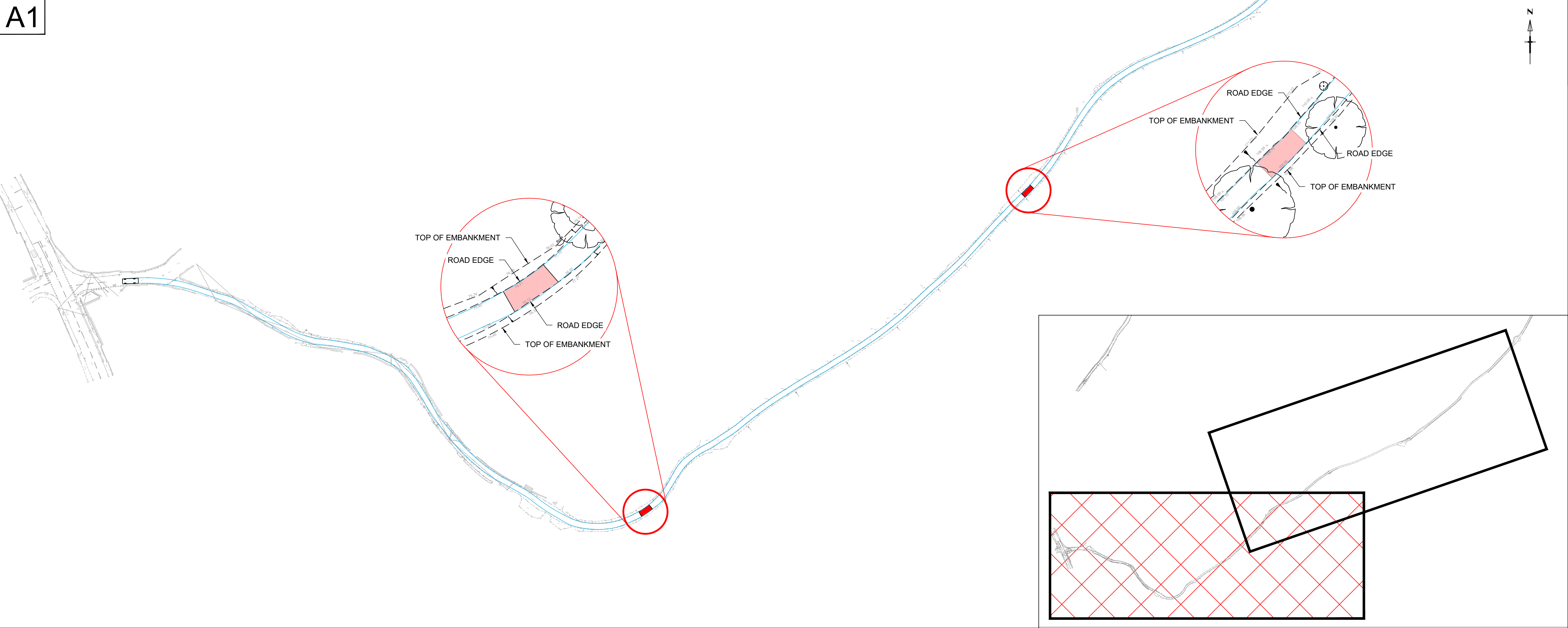


client
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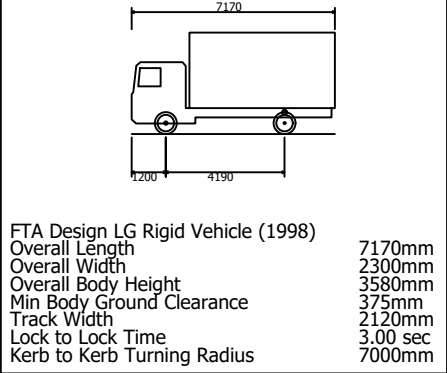
project
**SWANSEA
LAND AT CRAIG Y PERCHYCH**

title
**SWEEP PATH ANALYSIS
GRAIGYPAL ROAD**

scale 1:1000	drawn by T.A.S	checked by R.H.L
date APRIL 2022	status PLANNING	
drawing number 21163 - SK220419.1		rev.



WESTBOUND - FTA DESIGN 7M RIGID VEHICLE



AREA OF CARRIAGEWAY TOO NARROW TO ACCOMMODATE VEHICLE

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project
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LAND AT CRAIG Y PERCHYCH

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GRAIGYPAL ROAD

scale 1:1000	drawn by T.A.S	checked by R.H.L
date APRIL 2022		status PLANNING
drawing number 21163 - SK220419.2		rev.

CYP SOLAR

PROPOSED SOLAR FARM, GLAIS, SWANSEA

TN01-A – SWEPT PATH ANALYSIS OF GRAIG Y PAL AND YNYS Y MOND ROAD

2ND DECEMBER 2022

1.0 Appointment of Connect Consultants

- 1.1 Connect Consultants Limited is a firm of transport planning and highway design consultants that have been instructed by Sirius Planning on behalf of CYP Solar in relation to their proposed Solar Farm on land at Craig Y Perchych, Glais, Swansea.

2.0 Proposed Development Overview

- 2.1 CYP Solar are seeking to develop a solar farm across the 67-hectare site.
- 2.2 The main traffic and transport related effects of the proposal will be associated with the movement of vehicles to and from the site during the construction and decommissioning of the on-site set up phase of the development, as opposed to when the solar farm is operational. The anticipated construction programme is expected to take 4 months to complete.
- 2.3 The site is accessible by Graig Y Pal, a single-track road accessed via Graigola Road approximately 500m southeast of the site, in the village of Glais.
- 2.4 As the solar panels are likely to be delivered by large HGV's, it is proposed that a remote set down area will be used such that the HGV's which are too large to access the site via Graig Y Pal will deliver materials to the set down area, which will then be transported to the site using smaller vehicles that can negotiate Graig Y Pal.
- 2.5 The location of the remote set down area has yet to be finalised, however a potential remote set down area under consideration is located off Ynys Y Mond Road to the northwest of the proposal site.

3.0 Construction Management Plan

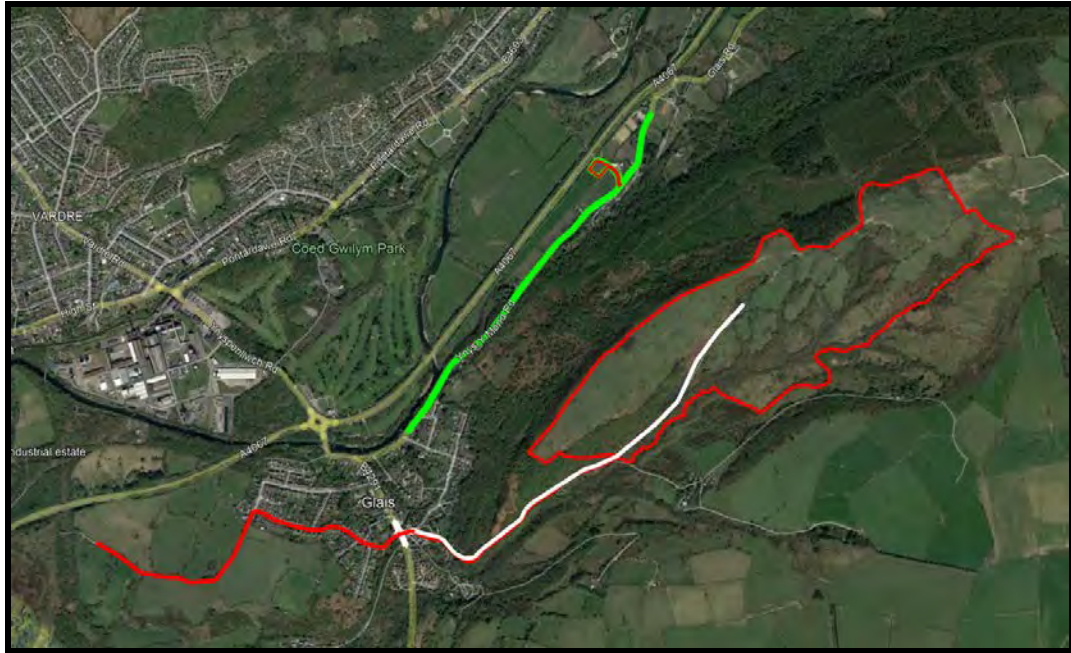
- 3.1 A Preliminary Construction Traffic Management Plan (CTMP) was produced by Connect dated 10th December 2021. It provided details of the access to the proposed solar farm, the potential remote set down area, proposed delivery vehicle time periods, construction vehicle numbers and types, details of public engagement, traffic management and mitigation measures.
- 3.2 It detailed at paragraph 4.6 that, as part of the development process, a topographical survey of Graig Y Pal will be undertaken to determine road widths along the c1.6km road. Swept path analysis will then determine the size of vehicles which can access the site via Graig Y Pal. A topographical survey was also required for the access route to the remote set down area.
- 3.3 It was identified that the CTMP would be refined as the proposals develop and also to incorporate any responses or suggestions from Swansea Council.
- 3.4 Comments were received from Swansea Council in relation to the Connect CTMP in January 2022. They also identified that swept path analysis of the access routes were required including Graig Y Pal and Ynys Y Mond Road.

3.5 This Technical Note (TN01) provides swept path analysis of the above routes.

4.0 Topographical Survey

4.1 A topographical survey of Graig Y Pal and Ynys Y Mond Road (as shown at Figure 1 below) was undertaken by Berry Geomatics in February 2022.

Figure 1 – Topographical Survey Area



N.B. Red = Site, White = Topo of Graig Y Pal, Green = Topo of Ynys Y Mond Road

4.2 The topographical survey identifies features such as the edge of the asphalt road, walls, trees, rocks, gates etc. It forms the basis of the swept path analysis undertaken by Connect, alongside the use of on-site photos, videos and Google Earth imagery.

5.0 Highway Boundary Information

5.1 The extent of the adopted highway on Graig Y Pal and Ynys Y Mond Road can be obtained from the Swansea Council 'online adopted highway viewer' provided here https://adoptedroads.swansea.gov.uk/web-apps/adopted_roads/. Higher resolution plans can also be obtained from Swansea Council.

5.2 The online plans show that both Graig Y Pal and Ynys Y Mond Road are adopted by Swansea Council.

5.3 It has however not been possible to align the topographical survey with the highway boundary plans to show the extent of the highway boundary on the swept path drawings.

5.4 If alterations to the carriageway outside of the site ownership is needed, it is likely Swansea Council will have to visit the site to establish the precise extent of the highway boundary.

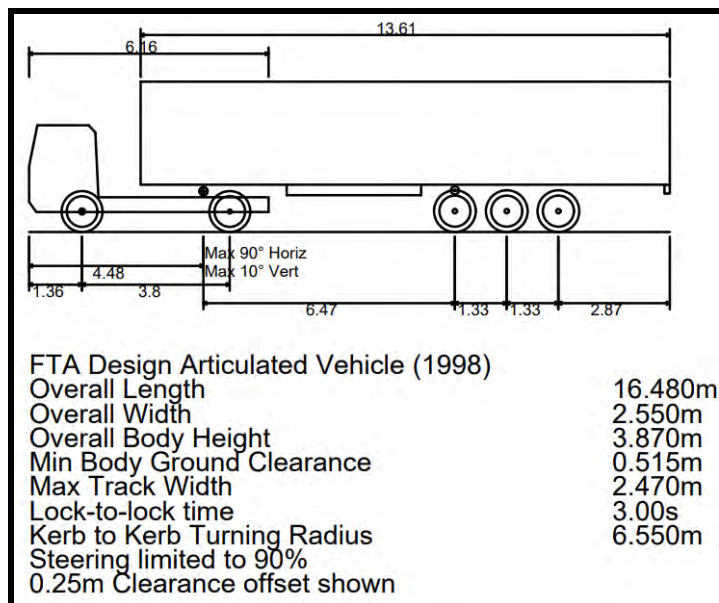
6.0 Swept Path Analysis Overview

- 6.1 Swept path analysis of both Graig Y Pal and Ynys Y Mond Road has been undertaken using the industry standard AutoTrack software to help determine the size of vehicles that can access the proposal site and remote set down area.
- 6.2 AutoTrack is a vehicle swept path analysis software program which is used for analysing the movements of vehicles including cars and HGV's, based on information such as vehicle length, width and turning radius. It provides details of the space required for a specified vehicle to travel along a specified route.
- 6.3 The AutoTrack software does however have limitations which should be considered when interpreting the swept path drawings, as detailed below: -
- The vehicle tracking is based on details of specific vehicles, the ones actually used may have different lengths, widths and turning properties. The precise vehicles intended to be used should be tracked as the project evolves.
 - Driver behaviour / ability will impact how the vehicle is actually driven and so may alter the vehicle tracking. The vehicle tracking does also not take into account driver error for example.
 - The tracking is two dimensional and so does not take into account the height of vehicles and for example overhanging trees.
 - Connect have no means by which to confirm the accuracy of the software.

7.0 Swept Path Analysis – Ynys Y Mond Road

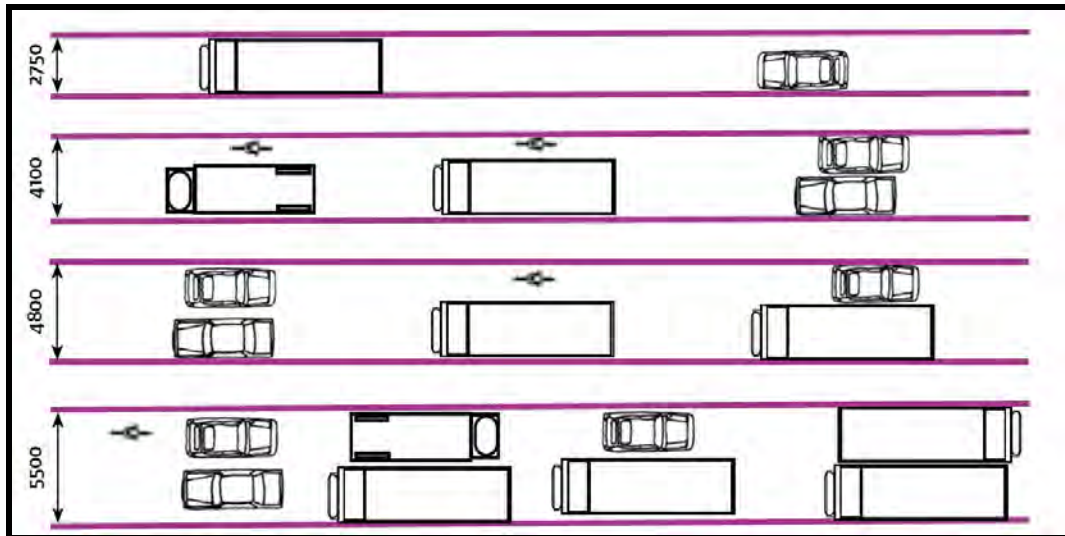
- 7.1 Access to the remote set down area located on Ynys Y Mond Road has been tracked using an FTA Design 16.48m articulated HGV detailed at Figure 2 below.

Figure 2 – FTA Design 16.48m Articulated HGV



- 7.2 The swept path analysis tracks the green route shown at Figure 1 above, from near to the B4291, northbound on Ynys Y Mond Road into the potential remote set down area.
- 7.3 The topographical survey indicates that road width along Ynys Y Mond Road varies between 3.8m and 7.7m.
- 7.3.1 Figure 3 below, taken from Manual for Streets 2 (MfS2), illustrates the different vehicles various carriageway widths can accommodate.

Figure 3 – MfS2 Passing Widths



- 7.4 The above figure and AutoTrack software indicate that Ynys Y Mond Road is wide enough for the FTA articulated vehicle to access the remote set down area from the B4291 (to the south). It can also enter and turn at the site of the remote set down area enabling it to leave and travel back to the B4291 on Ynys Y Mond Road.
- 7.5 The swept path analysis at Appendix 1 shows the FTA articulated vehicle travelling north on Ynys Y Mond Road into the remote set down area alongside an estate car travelling south on Ynys Y Mond Road.
- 7.6 The vehicle tracking of both the FTA articulated vehicle and estate car is based on 0.25m clearance from the edge of the carriageway (indicated by the Topo) on the nearside.
- 7.7 As shown at Appendix 1, Ynys Y Mond Road is not wide enough along all sections of the route for a car and an HGV to pass. The areas highlighted red indicate where there is not 0.25m clearance between the FTA articulated vehicle and estate car (less than 0.25m includes where there is nil clearance or where they overlap).
- 7.8 Along the c1.2km route there are twelve 'red' sections of road, of up to c200m in length, where the AutoTrack software shows there is less than 0.25m clearance between the FTA articulated vehicle and estate car. Between these sections, the FTA articulated vehicle and estate car have 0.25m or more clearance between them.

- 7.9 DMRB guidance presented at 'Appendix A - HS2 Rural Road Design Criteria of the Design Approach Statement – Roads' document dated July 2021 states that "*Inter-visible passing places should be provided on single-track roads at a maximum spacing of 200 metres.*" Therefore, along Ynys Y Mond Road at intervals of up to c200m, oncoming cars will have areas to wait / or room to pass the FTA articulated HGV.
- 7.10 Given the predominantly straight nature of Ynys Y Mond Road, the wider sections of the road are also likely to be intervisible. Investigations into forward visibility along the route show that with the exception of one location drivers will be able to see to the far end of the section of restricted width allowing opposing vehicles to stop and wait for the car or FTA articulated HGV to pass.
- 7.11 The only location where the widening of the road is not visible from at the previously wide section is the c200m stretch of road to the north of house number 54. Given the bend in the road and hill at this location (shown at Figures 4 and 5 below), drivers will not be able to see oncoming vehicles.

Figure 4 – View north on Ynys Y Mond Road (towards Hill and bend in road)



Figure 5 – View south on Ynys Y Mond Road (from Hill and bend in road)

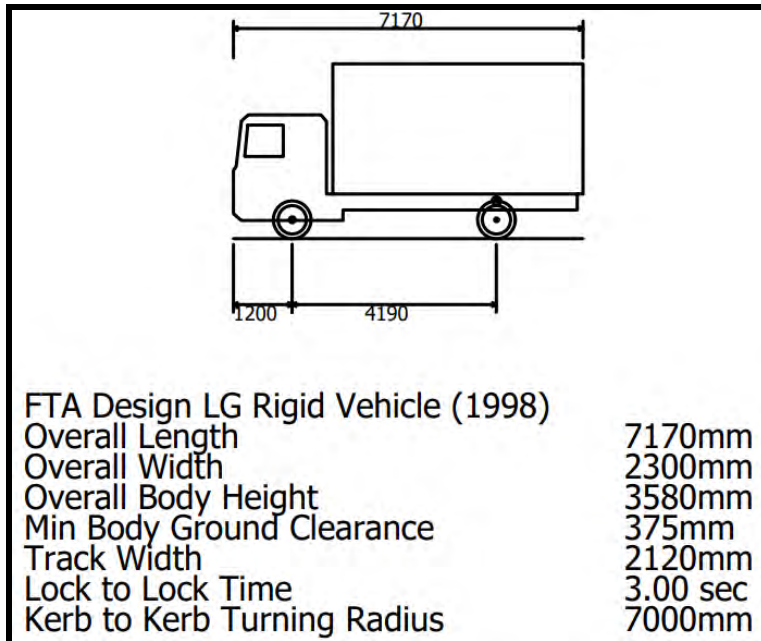


- 7.12 The walled driveway (shown at Figure 5) is located around half way along the narrow road section and could be used for a car travelling southbound to pass an HGV travelling northbound, however this is not intervisible.
- 7.13 At the above location, an escort vehicle may need to travel ahead of the FTA articulated HGV to make sure opposing vehicles wait before the narrowing, for the HGV to pass.
- 7.14 Based on the above, the AutoTrack software shows an FTA articulated vehicle will be able to access the remote set down area and pass 'estate' sized cars along the route to and from the B4291.
- 7.15 Given the above, the AutoTrack software indicates that two FTA articulated vehicles will be unlikely to pass on Ynys Y Mond Road, and so traffic management will be needed to control HGV traffic to prevent delivery vehicles using it in opposing directions at the same time. However, no widening to Ynys Y Mond Road is envisaged based on the tracking.

8.0 Swept Path Analysis – Graig Y Pal

- 8.1 Access to and from the proposal site located off Graig Y Pal has been initially tracked using an FTA Design LG 7.17m rigid vehicle as detailed at Figure 6 below.

Figure 6 – FTA Design LG 7.17m Rigid



- 8.2 The swept path analysis tracks the white route shown at Figure 1 above, from Graigola Road to land within the client's control (at the gate past the fork in the road c900m from the junction with Graigola Road).
- 8.3 The topographical survey indicates that road width along Graig Y Pal varies between 2.6m and 5.5m.
- 8.4 The swept path analysis shown at Appendix 2 shows the FTA 7.17m rigid vehicle travelling east and west on Graig Y Pal to / from the proposal site / land within the client's control. The swept path analysis is based on the FTA 7.17m rigid vehicle having 0.25m clearance from the edge of the carriageway (indicated by the topographical survey) on the nearside when travelling east and 0.25m clearance from its offside when travelling west. In both cases the 0.25m offset is on the northern side so that, in both directions, any pinch points are highlighted on the southern side.
- 8.5 A summary of the highlighting shown at Appendix 2 is provided below: -
- Green = 0.25m clearance achievable on both sides of the vehicle.
 - Yellow = 0.25m clearance is achievable on the north side of the vehicle but less than 0.25m clearance is achievable on the southern side. The vehicle can pass within the carriageway.
 - Red = 0.25m clearance is achievable on the north side of the vehicle but it is unable to pass within the carriageway on the southern side. The vehicle may be able to pass if 0.25m clearance to the north is not allowed for.

- 8.6 The red sections have been re-examined and tracked without the 0.25 clearance on the north side, on the basis that the lorry is contained within the carriageway with whatever clearance is available. Where the lorry can pass within the carriageway, these sections have been reclassified as orange as shown on the drawing at Appendix 3.
- 8.7 Therefore, the green sections on Appendix 2 are where the lorry can pass with at least 0.5m of clearance, yellow on Appendix 2 is where the lorry can pass with at least 0.25m of clearance, orange on Appendix 3 is where the lorry can pass but with less than 0.25m of clearance, and red on Appendix 3 is where the carriageway is too narrow for the FTA 7.17m rigid vehicle to pass.
- 8.8 As shown at Appendix 2 and 3, the AutoTrack software shows that Graig Y Pal is wide enough along the majority of the route for the FTA 7.17m rigid vehicle to travel within the carriageway as identified by the topographical survey. There are a few locations (highlighted red at Appendix 3) where the FTA 7.17m rigid vehicle is not contained within the carriageway, an overview of which is provided below: -

Eastbound

1. Approximately 500m along Graig Y Pal there is a 2m long section in which the AutoTrack software shows the vehicle tracking of the 7.17m rigid vehicle very marginally breaching (by around 2cm) the northern and southern carriageway edge (as detailed by the Topo).

The topographical survey shows that there are no obstacles directly bordering the carriageway (e.g rocks or trees) along the 2m long section and so the 7.17m rigid vehicle may be able to pass given the marginal breach, possibly with some minor road widening (subject to the highway boundary).

Figure 7 below shows the location, which lies to the north of the most prominent tree trunk, based on Google Earth imagery.

Figure 7 – Graig Y Pal Eastbound – c500m from junction with Graigola Road



2. At the kissing gate c875m along Graig Y Pal there is a c15m long section in which the AutoTrack software shows the vehicle tracking of the 7.17m rigid vehicle breaching the northern and southern carriageway edge (as detailed by the Topo). However, Google Earth and on-site photos show gravel at the sides of the carriageway (asphalt) that could be used by the FTA 7.17m rigid vehicle when manoeuvring as shown below at Figure 8 below.

Similar to the above location, a site review, including reviewing the highway boundary at this point should be undertaken to identify if use of the space adjoining the asphalt carriageway is possible.

Figure 8 – Graig Y Pal Fork in the Road / Gate



3. Beyond the fork in the road / gate (which is land within the client's control) the AutoTrack software indicates that the vehicle tracking of the FTA 7.17m rigid vehicle cannot be accommodated within the asphalt carriageway at some points. An onsite photo of the road beyond the gate is shown at Figure 9 below.

Figure 9 – Graig Y Pal North of Fork in the Road / Gate



Based on the above, improvements should be able to be made by the client to widen the useable carriageway beyond the gate if needed.

Westbound

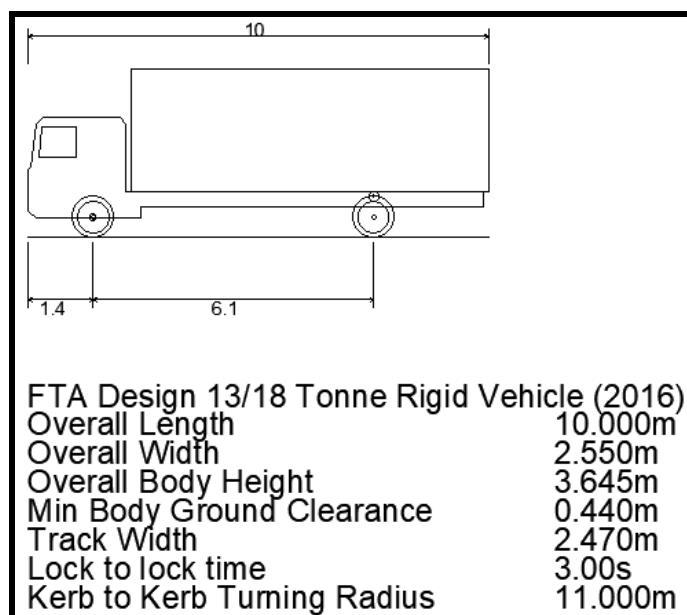
1. As detailed above, when travelling west the AutoTrack software also shows that the vehicle tracking of the FTA 7.17m rigid vehicle breaches the edge of carriageway to the east of the fork in the road and near to the kissing gate.
2. The westbound vehicle tracking also identifies the same 2m long section as being constrained.
4. An additional location is also shown to not contain the vehicle tracking of the FTA 7.17m rigid vehicle within the carriageway when travelling westbound. This location is c250m east of the junction with Graigola Road with the software showing the vehicle tracking very marginally breaching (by up to 10cm on either side) the northern and southern carriageway edge for 5m (as detailed by the Topo).

The topographical survey does however show no obstacles directly bordering the carriageway (e.g rocks or trees) along the 5m long section and so it is plausible that the 7.17m rigid vehicle will be able to pass given the marginal breach.

A site review, including reviewing the highway boundary should be undertaken at this location to confirm if some minor road widening may be required (subject to the extent of highway).

- 8.9 Based on the above, the AutoTrack software indicates that the vehicle tracking of the FTA 7.17m rigid vehicle can be accommodate along the majority of the access route. The constrained areas may also accommodate the FTA 7.17m rigid vehicle subject to further investigations including establishing the highway boundary location and some possible minor improvement works.
- 8.10 Access to and from the proposal site located off Graig Y Pal has been subsequently been tracked using an FTA Design 13/18 Tonne 10m Rigid Vehicle as shown at Figure 10 below.

Figure 10 – FTA Design 13/18 Tonne Rigid Vehicle

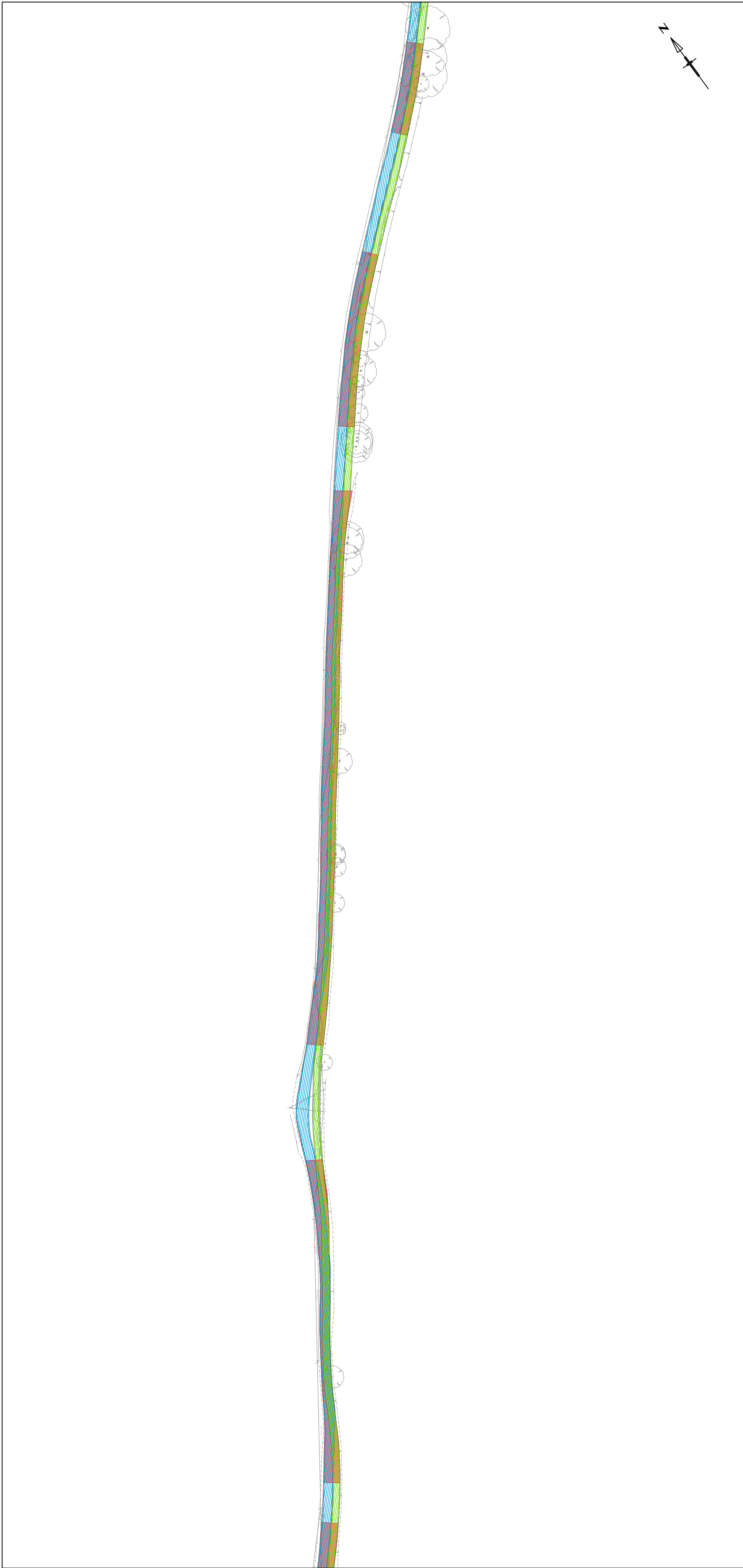
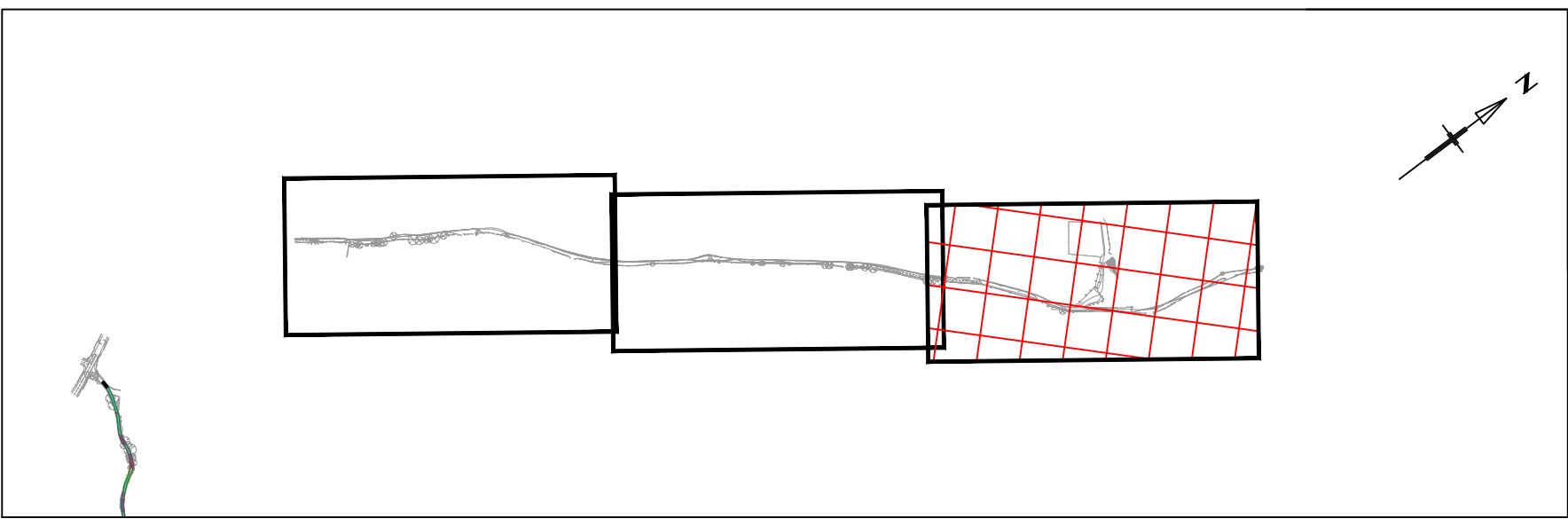
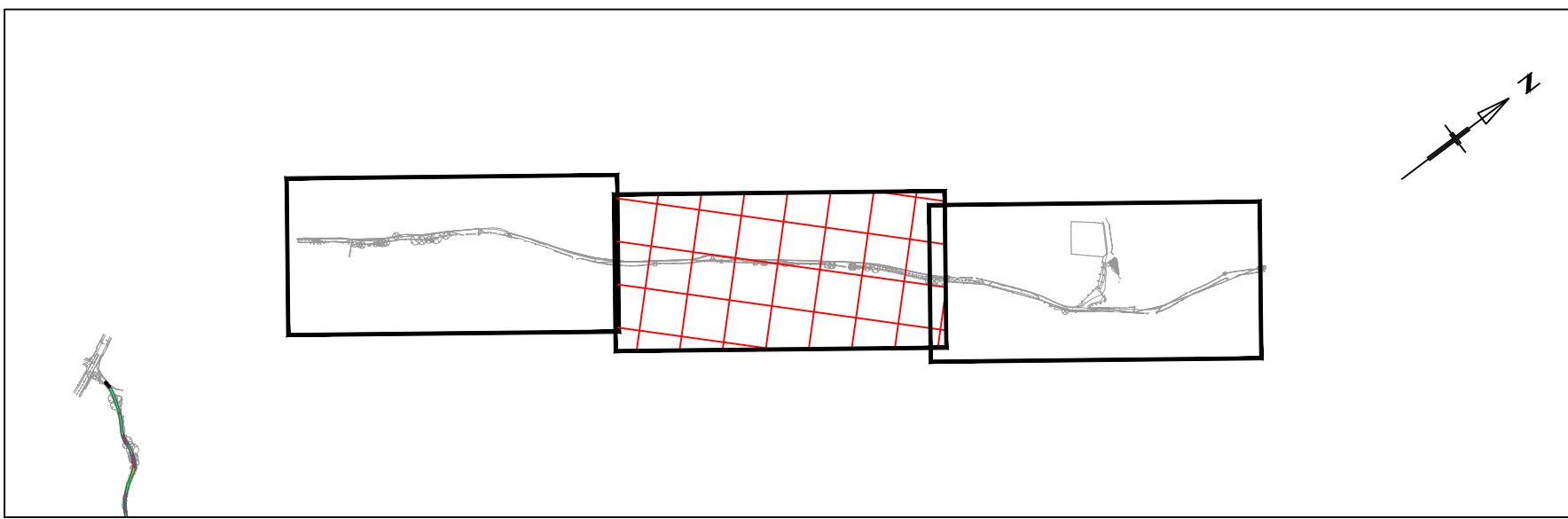
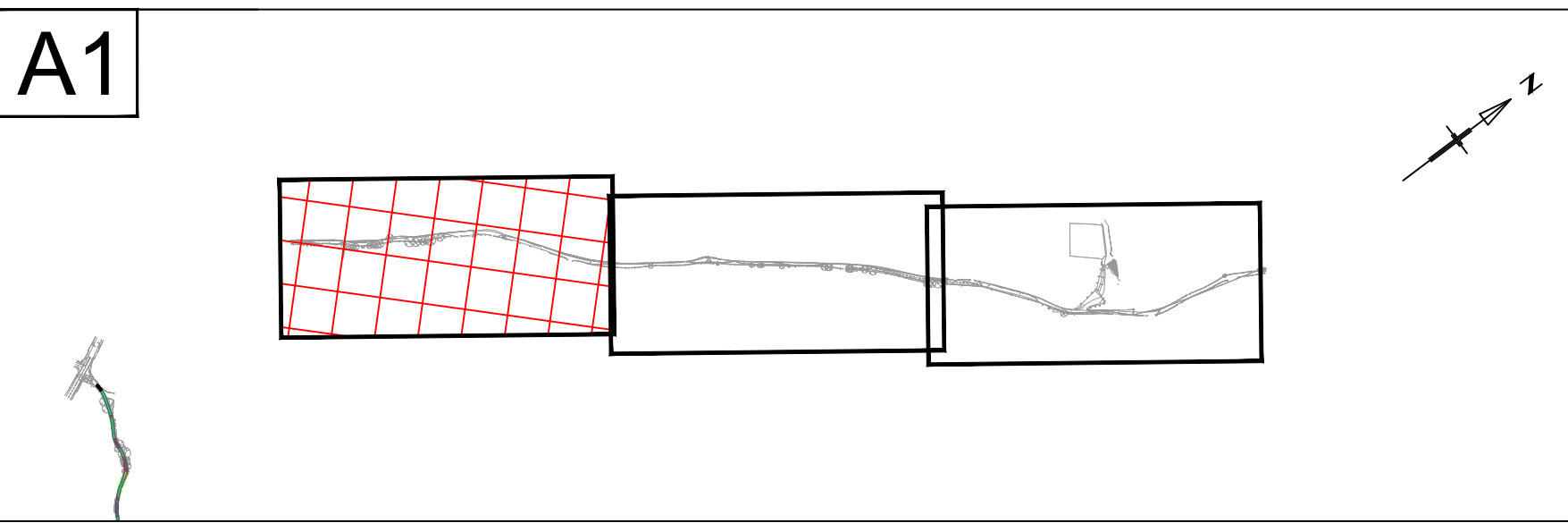


- 8.11 The swept path analysis shown at Appendix 4 shows the FTA 10m rigid vehicle travelling east on Graig Y Pal to the proposal site / land within the client's control. The swept path analysis is again based on the FTA 10m rigid vehicle having 0.25m clearance from the edge of the carriageway (indicated by the topographical survey) on the nearside with the same green, yellow, red key presented as presented at Paragraph 8.5 above.
- 8.12 The red sections have also been re-examined and tracked without the 0.25m clearance on the north side, on the basis that the lorry is contained within the carriageway with whatever clearance is available. Where the lorry can pass within the carriageway, these sections have been reclassified as orange as shown on the drawing at Appendix 5.
- 8.13 As shown at Appendix 5, the AutoTrack software shows that some sections of Graig Y Pal are not wide enough for the FTA 10m rigid vehicle to travel within the carriageway as identified by the topographical survey.
- 8.14 An overview of the red highlighted sections where the FTA 10m rigid vehicle is not contained within the carriageway is provided below: -
1. The AutoTrack software shows that the vehicle tracking marginally breaches (by up to approximately 20cm) the northern edge of carriageway (as indicated by the topographical survey) c120m to the east of the junction with Graigola Road. The topographical survey shows that there is a telegraph and electricity pole located near to the carriageway in this location however the vehicle tracking does not interact with these features. From Google Earth there appears to be room on either side of the asphalt to accommodate the vehicle tracking subject to the verge being highway and possible minor road widening.
 2. 15m further along Graig Y Pal the vehicle tracking is shown to marginally breach (by up to 20cm in each direction) the northern and southern edge of carriageway (as indicated by the topographical survey). The survey shows an electricity pole, trees and a garden wall located near to the carriageway in this location however the vehicle tracking does not interact with these features. Again, an onsite review should be undertaken to confirm if there is room for the 10m vehicle to pass possibly with some minor road widening.
 3. Adjacent to residential dwelling Number 12 the vehicle tracking is shown to marginally breach (by up to 10 cm) the northern edge of carriageway (as indicated by the topographical survey). The survey shows a wall adjacent to the northern edge of the carriageway and a small gate adjacent to the southern edge. From Google Earth there does appear to be room on the southern side of the road to accommodate the 10cm extra however an on-site review should be undertaken to establish this and whether any minor road widening is required/possible.

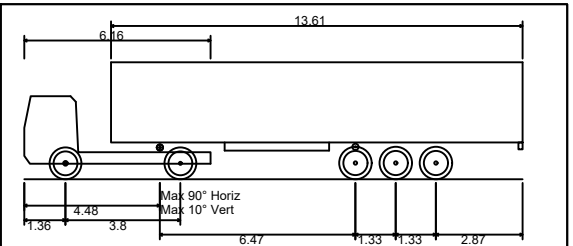
4. Between the end of the residential dwellings and the kissing gate on Graig Y Pal there are eight sections of red of up to 150m in length where the vehicle tracking is shown to marginally breach (by up to 10cm in each direction) the northern and / or southern edge of carriageway (as indicated by the topographical survey). The vehicle tracking at these locations is shown to interact with any obstacles shown on the survey near to the carriageway, including the trunks of overhanging trees however this should however be confirmed on-site. Again, some marginal road widening might be required subject to the extent of highway.
 5. The AutoTrack software shows that the vehicle tracking breaches the edge of carriageway to the north and south near to the gate, however Google Earth and on-site photos show gravel at the sides of the carriageway that could be used by the FTA 10m rigid vehicle (as above), subject to it being highway.
 6. Beyond the fork in the road / gate (which lies within the client's control) the AutoTrack software indicates that the vehicle tracking of the FTA 10m rigid vehicle cannot be accommodated within the carriageway however improvements may be able to be made by the client to widen the useable carriageway as detailed above.
- 8.15 Based on the above, the AutoTrack software indicates that the vehicle tracking of the FTA 10m rigid vehicle can be accommodated along some sections of the route, however there are a number of sections where the vehicle tracking is shown to not be contained within the carriageway as indicated by the topographical survey. The investigations above indicate that where the tracking exceeds the edge of carriageway there appears to be space for the extra width to be accommodated possibly with some minor road widening, however on-site investigation including into the extent of the highway would be needed to establish validity before an FTA 10m rigid vehicle is driven along the route.

**APPENDIX 1 - YNYS Y MOND ROAD SWEPT PATH
ANALYSIS (ARTICULATED HGV)**

A1

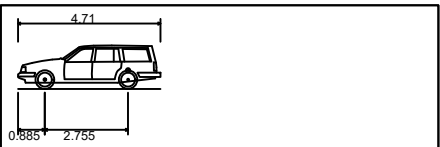


NORTHBOUND - FTA DESIGN 16.5M ARTICULATED VEHICLE



FTA Design Articulated Vehicle (1998)	16.480m
Overall Length	2.550m
Overall Width	3.870m
Overall Body Height	0.215m
Min Body Ground Clearance	2.470m
Max Track Width	3.05s
Lock-to-lock time	6.550m
Kerb to Kerb Turning Radius	
Steering limited to 90°	
0.25m Clearance offset shown	

SOUTHBOUND - ESTATE CAR



Estate Car (2006)	4.710m
Overall Length	1.804m
Overall Width	1.442m
Overall Body Height	0.207m
Min Body Ground Clearance	1.756m
Max Track Width	4.00s
Lock to lock time	5.950m
Kerb to Kerb Turning Radius	

AREA OF CARRIAGEWAY WHERE 0.25M CLEARANCE BETWEEN OPPOSING VEHICLE IS NOT ACHIEVABLE

rev.	amendment	by	date

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client
SIRIUS PLANNING

project
**SWANSEA
LAND AT CRAIG Y PERCHYCH**

title
**SWEPT PATH ANALYSIS
YNYSYMOND ROAD**

scale 1:1000	drawn by T.A.S	checked by R.H.L
date MARCH 2022	status PLANNING	rev.
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