



# **Awel y Môr Offshore Wind Farm**

## **Gwynt y Môr Abnormal Indivisible Load Investigation**

### **Deadline 5**

**Date: 06 February 2023**

**Revision: A**

Document Reference: 5.5

Application Reference: N/A



REVISION	DATE	STATUS/ REASON FOR ISSUE	AUTHOR	CHECKED BY	APPROVED BY
A	February 2023	Deadline 5	Wynns	RWE	RWE

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**Abnormal Indivisible Load Investigations into the  
Proposed Gwynt y Mor Substation, St Asaphs.**

**Prepared for**

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**Status: 28<sup>th</sup> August 2006**

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**Proposed Gwynt y Mor Substation Development, St Asaphs, Denbighshire.**  
**Abnormal Indivisible Load Investigations**  
**and Route Inspection**  
**Report compiled by Wynns Ltd.**  
**for RWE Npower Renewables.**

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**Proposed Gwynt y Mor Substation Development, St Asaphs, Denbighshire.**

**Abnormal Indivisible Load Investigations  
and Route Inspection**

**Report compiled by Wynns Ltd.  
for RWE Npower Renewables.**

**1.0 Introduction**

- 1.1 Npower Renewables Limited (NRL), have contacted Wynns Ltd to carry out a visual and structural route inspection report for the assessment of possible access to the proposed St Asaphs Substation, North Wales.
- 1.2 NRL have advised that the transformers they are currently considering are of up to 200te nett transport weight. These are considered in terms of route negotiability and structural suitability of route from the A55 trunk road only. No consideration has been given in these studies to confirming the structural integrity of the road network for transformers in relation to access from a suitable port to the St Asaphs are via the motorway and trunk road network.
- 1.3 NRL advised Wynns of likely access routes that were in need of consideration for AIL deliveries to the site. These routes are described in the photographic survey included in this report.
- 1.4 No consideration has been given in these studies for government policy requirements in terms of the delivery of transformers at Special Order category, where Highways Agency policy is to direct disembarkation via the nearest suitable port.

## **2. Highways Agency Policy and Legislation**

### *2.1 Definition of Abnormal Indivisible Load (AIL)*

2.1.1 Special Order category AIL movements are authorised by the Highways Agency (HA) Abnormal Loads team, an executive agency of the Department for Transport (DfT), based in Birmingham.

2.1.2 The Department for Transport state that the strict definition of an AIL refers to a load which cannot, without undue expense or risk of damage, be divided into two or more loads for the purpose of carriage on roads and which, owing to its dimensions or weight, cannot be carried on a vehicle which complies in all respects with the ‘standard vehicle regulations’ these are:

- The Road Vehicles (Construction and Use) Regulations 1986 (as amended)
- The Road Vehicles (Authorised Weight) Regulations 1998 (as amended)
- The Road Vehicles Lighting Regulations 1989 (as amended).

2.1.3 All equipment should be stripped of their ancillaries before they are transported. Further dismantling is only likely to be acceptable to the HA where it cannot be economically achieved due to the requirement to construct to extremely high tolerances within specific factory environments.

### *2.2 Legislation*

2.2.1 Conventional heavy goods vehicles have an operating weight limit of 44 tonnes. The category known as abnormal indivisible loads covers those vehicles where the gross weight exceeds 44 tonnes. An Abnormal Load is defined as that which cannot be carried under Construction and Use (C&U) Regulations. Items which, when loaded on the load carrying vehicle exceed the weights encompassed by the C&U Regulations, but do not exceed Special Order Permission Limits, are governed by Special Types General Order (STGO) categories 1 to 3 depending on size. Where dimensions exceed 6100mm in width, 30000mm in rigid length or

- 150 tonnes gross weight, Special Order from the Highway Agency (HA), is required.
- 2.2.2 DfT (2003) have stated that heavy loads have the potential to damage roads and bridges and the low speed and physical dimensions pose problems of traffic congestion for other road users. To ensure the safety of structures each highway authority and bridge owner must be notified prior to the load being moved. Consultation with other stakeholders such as the Police Authorities on the suitability of the proposed route and whether loads need to be escorted is also an important consideration when designing the mitigation to minimise traffic disruption and ensure the safety of other road users.
- 2.2.3 The bridge structures on the road network are usually capable of carrying general haulage lorries of up to 44 tonne gross weight, which is the maximum weight permitted in the Road Vehicles (Authorised Weight) Regulations 1998. Vehicles in excess of this gross weight are permitted onto the highway subject to special authorisation procedures.
- 2.2.4 For legal purposes the transportation of abnormal loads can be divided into three broad categories. Regulations controlling the dimensions of vehicles and their loads are set out in the Road Vehicles (Construction and Use) Regulations 1986. Notification to the police is required when the load exceeds 3.0 metres in width or 18.65 metres in length. Provided the authorised weight limits are adhered to then loads of up to 30.0 metres in rigid length and up to 4.3 metres wide are permitted subject to notification to the police authorities throughout the whole route to be traversed. The fitting of specified marker boards to advise other road users of the nature of the transport arrangements is also a stipulated requirement.
- 2.2.5 Those with a requirement to transport indivisible loads at weights in excess of 44 tonnes and up to a maximum of 150 tonnes are required to provide either two or five days notification, dependent on various weight categories, in writing to each



and every highway authority and bridge owner on the proposed route. Loads in excess of 4.3 metres and up to 5 metres width are authorised subject to meeting certain conditions and for those between 5 metres and 6.1 metres an additional notification process (VR1 application) to the Highways Agency is required. This is a similar authorisation process to the requirements for Special Order movements, but without the detailed route clearance procedures necessary there. These rules are set out in the Road Vehicles (Authorisation of Special Types) (General) Order 2003. These regulations, commonly referred to as STGO regulations, were revised in August 2003.

2.2.6 AIL vehicles up to 150 tonnes gross weight are subject only to the appropriate Highway Authority(s) and Police notification. These vehicles are classified as:

- Category 1: up to 46 tonnes gross weight
- Category 2: up to 80 tonnes gross weight
- Category 3: up to 150 tonnes gross weight

2.2.7 For the loads longer than 30.0 metres, exceeding 6.1 metres in width or above 150 tonne gross weight then a separate Special Order process is carried out and is administered now by the HA. The HA co-ordinates approaches to the structural authorities throughout the route, and sanction to move is only granted once clearance is provided by the owners of structures en-route. This process requires eight weeks prior notification and is often protracted due to the need for specific bridge or other structural assessment.

2.2.8 In summary, vehicles loaded to more than 150 tonnes, 30.0 metres length or 6.1 metres width are subject to specific route planning and authorisation by the HA, whereas vehicles loaded to between 44 and 150 tonnes are subject to Highway Authority and Police notification only.

### 2.3 *DfT Policy on the movement of Special Order Category Loads.*

2.3.1 The Department for Transport has adopted a ‘water-preferred’ policy for the transport of AILs. This means that, where an application is sought for the movement of a Special Order or VR1 category load (more than 5.0m width) by road, the Department, via its executive agency, the HA, will turn down the application where it is feasible for a coastal or inland waterway route to be used instead of road.

2.3.2 The HA advise that this decision is based on a number of factors including whether the load is divisible, the availability of a suitable route, the amount of traffic congestion that is likely to be caused and the justification for the load to be moved.

2.3.3 The Highway Agency Traffic Division is the department responsible for the authorisation of Special Order AIL’s and government policy is that the closest available port of access should be used for the delivery of such oversize items.

2.3.4 The HA also highlighted that adequate planning time should be allowed for consideration of such loads and they have advised that they would encourage full consideration to all transport options as early as possible in the project process.

### **3.0 Transport Configurations**

3.1 Due to the size of the transformer it is not possible to transport them under the regulations governing Construction and Use (C&U) vehicles (44 tonne gross, 18.65 m long and 2.9m wide). It will therefore be necessary to comply with legislation regarding Special Order movements.

3.2 As stated the movement of abnormal indivisible loads is controlled by the requirements of the Department for Transport (DfT) who stipulate varying notice

procedures and notice periods dependent upon overall dimensions. The impact of current legislation is discussed in 2.2.

3.3 Two transport configurations have been constructed for presentation to the local highway authorities for consideration of their suitability to structural capacities within the region. These transport arrangements are shown in the attached drawings:

- RWEnp-GyM-01 – this shows the transportation of a 200 tonne transformer on a 20 Axle Frame Trailer
- RWEnp-GyM-02 – this shows the transportation of a 200 tonne transformer on a 14 Axle Frame Trailer

3.4 The drawings detailed in 3.3 also show important information that should be applied during the design phase for the proposed substation. Especially important is the turning circle and vertical curve information. Appropriate consideration of this detail will ensure that the site can be safely and expediently accessed during the delivery of the out of gauge equipment. With regard to the specification of the road capacity then consideration of the loads imposed by the transport arrangements should be referred to (these are included within the drawing). It should be noted however that other plant such as mobile cranes will impart lower overall loads but with possibly greater wheel loads.

#### **4.0 Port of Disembarkation**

4.1 Considerate of the government's "water preferred policy" for the movement of abnormal indivisible loads it is most likely in the event that the unit is manufactured outside of the UK (Stafford) that the disembarkation point for onward transit to site would most likely be Ellesmere Port, Mostyn or Porth Penrhyn all of which are provided with good access to the A55.

## **5.0 Road Route Structural Information.**

- 5.1 The routes as submitted to all structural authorities for consideration of future transformer deliveries from the A55 to site are as shown below. Due to the weights of the transformers being required on site being estimated at 200te nett, it is necessary to consider access on girder frame trailers, and such trailers have been forwarded to the structural agencies for consideration. The loadings are shown in the drawings provided in section 12 of this report.
- 5.2 These routes show possible access to three substation entrance points from which remedial actions and new access road construction would be needed. The requirements for on site are discussed in section 7. These routes consider egress from the A55 trunk road at two locations north and north west of St Asaph. These routes are shown on Map 1, which is adapted from that provided by Npower Renewables Limited.

### *Proposed Route 1. From A55 via The Roe*

Exit A55 onto A525 The Roe  
Continue B5381 Glascoed Road  
Turn left St Asaph Business park roundabout  
Continue to site access point to be developed

### *Proposed Route 2. From A55 via The Roe*

As route 1 to St Asaph Business park roundabout  
Continue B5381  
Turn left unclassified road  
Continue to site access point to be developed

### *Proposed Route 3. From A55 Faenol Broper*

Exit A55 onto St Asaph Business Park  
Continue south via Faenol Broper to St Asaph Business park roundabout  
Continue to site access as per route 1 or 2

5.3 The three routes from the A55 to the proposed substation location have been cleared by the following authorities.

- British Rail Property Board (Jacobs Babbie)
- British Waterways Board
- Network Rail London North Western Territory
- North Wales Trunk Road Agency (Conway Council)

5.4 The local roads that are used to access the site are all within the county of Denbighshire. Denbighshire County Council have advised (email 17.7.06) that they would prefer routes to the substation area to consider access via the St Asaph Business Park exit from the A55. This is the western of the two possible egress points and avoids the need to travel through the town centre.

5.5 Denbighshire County Council advises that they consider some culverts in the route through the town (routes 1 and 2), and retaining walls, may need to be investigated further in terms of confirming their capacity to accommodate the proposed loads. They have indicated that they would need to assess or strengthen these structures to accommodate the move along this route. Due to the weight and configuration of the load it is considered that this route is not acceptable to the council. No further information on possible assessment costs or the exact location of the problem structures has been provided by Denbighshire Council. The negotiability of this route is discussed in section 7.

5.6 The A55 trunk road is now part of the North Wales Trunk Road Agency. This is presently managed by Gwynedd County Council as the lead authority in the 6 council areas included in the North Wales Trunk Road Agency. However, in terms of AIL notifications, Conway County Council advise that they deal with notifications within the north east area, as the structures are those which were formally council structures.

- 5.7 Conway County Council advised (email 14.6.06) that they do not expect there to be any problems with exiting the A55 at these two junctions. Further approaches to the North Wales Trunk Road Agency would be required to confirm the status of the A55 to these two exit points from any potential port of delivery for transformers.
- 5.8 It was noted during site visits that the A55 exit slip road onto the A525 crosses over the River Elwy. Although this has not been highlighted as a problem to date we have sought clarification from the North Wales Trunk Road Agency that the structure is able to carry the proposed loads. This would need to be crossed should the junction be being approached from ports of delivery to the east such as Ellesmere Port or Mostyn Docks. Conway County Council advised by email dated 28.6.06 that the loads are able to cross this structure at full caution, which would require the load to move at crawl speed with no braking or stopping.
- 5.9 It was noted that there is a 7.5te weight limit on the A525 in St Asaph when accessed from the A55 to the east of the town. This route is therefore not considered suitable for AIL access.

## 6.0 Structural Summary

Responses from Structural Agencies on routes to Gwynt y Mor

Authority	Part of Route under Responsibility	Awaiting Information	Route Cleared or Failed	Notes	Date Of Last Correspondence
Network Rail North Western Territory	Entire Route	No	Cleared		14.6.06
Jacobs Babtie (BR Property Board)	Entire Route	No	Cleared		16.6.06
British Waterways Board	Entire Route	No	Cleared	Verbally advised no problems expected but written confirmation awaited.	
Denbighshire County Council	All county roads on exit from A55	No	Cleared	Prefer to avoid town centre and routes 1 and 2 where assessments would be needed before access could be permitted. No assessment costs provided. Business park roads are at present unadopted but are due to be so in future.	22.6.06
Conway Council as North Wales Trunk Road Agency	A55	No	Cleared		14.6.06
North Wales Police	Entire Route	Yes	Cleared	No major problems expected	19.7.06

## 7 Photographic Negotiability Report

Three routes off the A55 were inspected these are discussed below:

### 7.1 *Proposed Route 1. From A55 via The Roe*

7.1.1 The left turn from the A55 exit slip road onto the A525 (Picture 1) is negotiable, although 20 axle trailers would need to occupy the full road.



**Picture 1. A55 westbound exit slip road onto A525. Load comes from behind camera and turns left.**

7.1.2 The A525 then proceeds into the town and caution is required due to parked cars, although double yellow lines should prevent both sides of the road being obstructed and loads should therefore be able to pass without significant disruption to other road users.

7.1.3 Picture 2 shows the roundabout of the A525 with the B5381 Glascoed Road. This junction is probable negotiable in the usual way for 14 axle girder frame trailers, but caution with regard to 20 axle trailers is required due to the need to remove street furniture. Should this route be considered further for 20 axle trailers it is recommended that this junction is surveyed in more detail. Consideration of the survey information would determine whether or a contra flow of the feature was necessary to minimise temporary removal of street furnishings.





**Picture 2. A525 The Roe /B5381 Glascoed Road roundabout. Load moves towards camera from top left of picture. Contraflow of the island may be necessary with removal of street furniture including lamppost, keep left sign and directional signs.**

7.1.4 B5381 Glascoed Road then has a section where street parking is permitted on both sides of the carriageway on Ffordd Isaf Dinbych (Picture 3). Liaison with local residents and road users would be needed in advance of any movement to ensure that parked cars did not obscure AIL access via this route.



**Picture 3. Parked cars can be present on both sides of the road on Ffordd Isaf Dinbych. Load moves away from camera.**



**Picture 4. B5381 right hand bend. Load moves away from camera. Full road width will be required.**

7.1.5 The negotiability of the B5381 steadily becomes more difficult until full occupation of the highway will be necessary to avoid conflict with private hedgerow and the tree canopy.



**Picture 5. B5381 Glascoed Road. Note overhanging trees. Load moves away from camera.**



**Picture 6. B5381 Glascoed Road. Load moves away from camera. Note 14% incline sign. Full road width will be taken by girder frame trailers.**



**Picture 7. B5381 Glascoed Road. Load moves away from camera. 14% incline sign. Caution with overhead wires is required.**

7.1.6 As the B5381 leaves St Asaph it climbs steeply and is marked at 14%. It is therefore recommended that the requirement of a third tractor is seriously considered to ensure adequate power is available to crest this incline with ease.

7.1.7 There are overhead wires at two locations where caution is required due to height clearances. It is advisable the confirmation is sought from the owners of the lines.

7.1.8 The route then proceeds to OS Grid Reference SJ 021 739 and potential site entrance point 1. This would need to be developed to provide substation access and the requirements for this are as discussed in section 8.



**Picture 8. View from road at possible site access point 1 towards proposed substation development area.**



**Picture 9. View from road at possible site access point 1 towards proposed substation development area.**

7.1.9 It should be noted however that Denbighshire Council have, during our discussions, expressed a preference that routeing should utilise the A55 interchange at Faenol-Broper utilising the highway infrastructure developer to support the Business Park. This would mean that the site access identified in 6.1.8 would be approach from the opposite (eastbound) direction. This is further discussed in 7.3.

7.1.10 From this location a new roadway would have to be developed. The alignment of which does not appear to be hampered by difficult topography or major tree felling as once the field, shown in pictures 8 and 9, is crossed the access road could then follow the alignment of an existing hedgerow which would require treatment but could ostensibly remain intact.

7.1.11 Access off the B5381 and the layout of the junction is discussed in section 7

## 7.2 *Proposed Route 2. From A55 via The Roe*

7.2.1 The route is as route 1 to the access point discussed in section 3.1. For access to proposed site entrance point 2, the load would continue westbound to the St Asaph Business Park Roundabout and then turn left. This roundabout is shown in picture 10 and is considered negotiable.



**Picture 10. St Asaph Business Park Roundabout. Load moves away from camera. For possible site entrance 2 load turns left. For alternative access to possible site entrance 3 (see section 3.3) load continues straight over roundabout.**

- 7.2.2 The route initially identified by Npower Renewables via the St Asaph Business Park to proposed site entrance 2 is presently not accessible or available. There is no through route from the industrial estate to the proposed development area. The proposed access as shown on Map 1 is not accessible to vehicles. The route identified to Wynns Ltd. within the proposal is occupied by a secure police depot and is gated off. It is therefore considered most unlikely that permission to develop AIL or construction and Use traffic access in this vicinity would be obtained.
- 7.2.3 Immediately west of the police site on the industrial estate is an RNLI building. As with the police site, previously discussed, car parking and private areas restrict access from the public highway to the proposed development site.
- 7.2.4 For the reasons stated it is therefore recommended that site access point 2 is not considered suitable for substation site road access.

7.3 *Proposed Route 3. From A55 Faenol Broper*

7.3.1 This route exits from the A55 junction to the west of St Asaph at the dedicated business park exit. Although in terms of approaches to structural authorities consideration of this route was described as being for the potential site access point 3 only, it has been described by Denbighshire Council as the preferred access into the general area and therefore is the route best suited to enter site entrances 1, 2 or 3.

7.3.2 The exit from the A55 westbound is negotiable and is shown in picture 11.



**Picture 11. Exit from A55 to St Asaph Business Park. Load approaches from centre right of camera from A55 westbound exit slip road and turns left towards camera.**



**Picture 12. St Asaph Business Park roundabout at OS Grid Ref SJ 016 746. Load approaches from centre left of camera and turns right towards camera. Contraflow of this roundabout is recommended.**



**Picture 13. St Asaph Business Park/B5381 Glascoed Road roundabout. On route 3, loads turn right at this roundabout. For alternative access to the final substation access points already discussed in 3.1 and 3.2, loads would turn left or continue straight over respectively.**





**Picture 14. St Asaph Business Park/B5381 Glascoed Road roundabout. On route 3, loads turn right at this roundabout which for 20 axle frame trailers would be best undertaken in contraflow. Caution is required in relation to lamp posts and street furniture but the turn is considered negotiable.**

- 7.3.3 Aside from access for transformers, it should be noted that the Construction and Use traffic inclusive of construction plant vehicles associated with the substation build would, most probably be comparable to the development traffic that occurred during the construction and operation of the business park. The construction phase would however be significantly less.
- 7.3.4 To access the site via proposed entrance point 3 the transformer vehicle would follow the B5381 west from the business park area for a short section. The load would require full occupation of the highway shown in picture 15.



**Picture 15. B5381 west from the St Asaph Business Park. Load moves away from camera.**



**Picture 16. Junction of B5381 Glascoed Road/Unclassified Road at OS Ref SJ 013 739. Load turns left away from camera.**



**Picture 17. B5381 Glascoed Road/Unclassified Road at OS Ref SJ 013 739. Load moves away from camera. Note the blue weight restriction sign, which states the route is unsuitable for heavy goods vehicles.**

7.3.5 An unclassified road then exits the B5381 at OS Grid Reference SJ 013 739 which is shown in pictures 16 and 17. The road from this point on would need to be developed for both transformer transport configurations and also for Construction and Use traffic. It is recommended that should this route be identified as preferable then the access beyond this location to the proposed site should be surveyed by detailed instrument survey to determine remediation requirements. It is clear however that there would have to be significant adjustment of the junction layout to accommodate the transit of a 14 or 20 axle frame trailer inclusive of the removal of well-established trees.

7.3.6 An existing passing point is shown in picture 18. This and others of a similar nature of this section of the road could be developed as passing points for traffic in the event that substation access were to be via this route. The road width was measured as being 3m at this point. This would, ideally need to be widened to 5m, with passing points providing 7.0m road widths to allow the safe passing of heavy goods vehicles.



**Picture 18. Unclassified Road. Load moves away from camera.**

7.3.7 Pictures 19, 20 and 21 show the point where the unclassified road passes the proposed substation access route number 3, which is currently a farm track. This is the point at which new substation access roads would be required to exit the public highway to any proposed site entrance. The turn would need to be developed in line with the loading and turning circle radii shown in drawings RWEnp-GyM-01 and 02.



**Picture 19. Unclassified Road and farm track access at OS Ref SJ 0128 7365. Load turns left away from camera.**



**Picture 20. Unclassified Road and farm track access at OS Ref SJ 0128 7365. Load approaches from top left of picture and then moves away from camera.**

7.3.8 The junction is clearly not accessible in its current layout and would need significant development to enable both transformer access and Construction and Use access. Discussion with adjacent landowners may be necessary in order to confirm the most appropriate way to develop the turn. For example, should loads consider driving past the entrance point (towards the camera in picture 20) in order to reverse into any new access road via the current farm track alignment, then trailers would come into conflict with the fencing on the inside of the turn. Consideration of such is necessary as a large Oak tree is present on the inside of the turn if it was to be developed to enable the turn to be made in the usual way (see picture 21). As previously stated a full instrument survey of this area is recommended to confirm possible land acquisition to accommodate trailer oversail.



**Picture 21. Unclassified Road and farm track access at OS Ref SJ 0128 7365. Load approaches from left of picture. Note oak tree may restrict development of a left turn into the proposed access road development area.**

7.3.9 The access to the proposed substation from the unclassified road is presently a farm track. This would also need to be developed in line with both transformer and Construction and Use requirements. Pictures 22 and 23 show sections of this track the whole of which would need significant upgrading works to make it fit for purpose.



**Picture 22. Farm track access on possible site access to be developed. Note power lines, hedgerows and overhanging trees.**



**Picture 23. Farm track access on possible site access to be developed.**

#### 7.4 *Preferred Route*

- 7.4.1 Of the tree routes inspected the route that provide the scope for the least disruption and the greatest potential for ease of development was Access Point 1 but with approach from the west via the highway network off the A55 supporting the Business Park to the west of St Asaph. Access Point 2 provided little or no potential. Access Point 3 could be developed to provide approach to the proposed development but would require significant upgrading resulting in a change in the existing character of the route.

### **8 Site Access off Highway**

- 8.1 Much of the access design criteria on which the planning authorities relies upon is contained in “*Places Streets and Movement*”, a national document published in 1998. In particular this sets out the visibility standards at access onto the road network. This sight line information should be considered in conjunction with the turning radii information detailed within the transport configuration drawings RWEnp-GyM-01 and 02.

- 8.2 To enable drivers emerging from the access to see and be seen by drivers proceeding along the B5381 unobstructed visibility is needed within the proximity of the junction. The distance along the centre line of the new access from the carriageway (B5381) edge to the point where the emerging driver should be able to see a specified distance in each direction of the principal carriageway can be derived from the aforementioned documentation. It is our belief that the stand off the carriageway should be 4.5 metres with unobstructed visibility in direction of the B5381 of 120 metres (based on the B5381 being restricted to 40 mph at Access Point 1).
- 8.3 The alignment of the proposed access road at location 1 is at an acute angle to the B5381 making direct access for the transformer transport configuration approaching the site from the west disproportionately rapacious against the space requirements needed to accommodate the same vehicle entering the site access road from the east. As AIL vehicle approach to the site from the west (business park roundabout) has been indicated by Denbighshire County Council as preferable it would be advisable to consider minimising the size of the bell mouth required by considering a drive past and reverse manoeuvre when entering the site with frame type trailers. Negotiability requirements for C&U traffic from either direction can be easily accommodated within the resultant layout.
- 8.4 Where possible, to allow the use of the majority of heavy load vehicles and trailers roads providing access for abnormal loads should be 5 metres wide increased at bends, where to the change in alignment exceeds say 20 degrees, to say 6 metres wide with the inner kerb radius of any bends not being less than 30 metre. In addition a minimum clear over-sail area free from obstruction above 0.3 m (300 mm) above road level must be provided. Where traffic-calming ramps are positioned on a heavy load route, these should be no more than 150 mm high and carefully positioned so as not to coincide with high points of an undulating road.



- 8.5 The construction of the substation road should be considerate of the loadings detailed within the transport drawings. It should be also noted that the most significant wheel loadings that may have to be accommodated will most probably be those of mobile cranes where the wheel contact patch could transmit loads of circa 6 tonne.
- 8.6 At the location where the transformer(s) is to be unloaded the road should be level in both directions. The road at the unloading point and the path to the plinth should also be designed considerate of the transformer arrangements and the jacking and moving/positioning operations that will induce concentrations of load.
- 8.7 The service road layout should be designed considerate of the requirements to allow discharge of the transformer from the frame trailer and should either provide a path or passing bay to allow a tractor and bogey to return after uncoupling or alternatively an overrun area where one section of the frame trailer can be accommodated in a position where it does not interfere with other activities on the site.
- 8.8 Following discussions with NRL and the provision of OS MasterMap data a series of drawings have been compiled. Theses show the swept path of a 14 Axle Frame Trailer over the fine sections of routes 1 and 3. With regard to route 1 then two layouts showing the turn off the B5381 have been considered, the first being a normal approach and the second a drive past and reverse manoeuvre. The drawings can found in section 12 of this report. They will also be forwarded in ..dwg format for design purposes.

## **9 Conclusions**

- 9.1 Denbighshire County Council have advised that routing from the east via the A55/A525 interchange would require assessments on a number of structures before it could be advised as acceptable. It was noted that there is a 7.5te weight

- limit on the A525 in St Asaph when accessed from the A55 to the east of the town. This route is therefore not considered suitable for AIL access.
- 9.2 Of the three routes inspected the route that provides the scope for the least disruption and the greatest potential for ease of development was Access Point 1. To meet with the preferences of outlined by Denbighshire County Council then approach to this location should be from the A55 Faenol-Broper interchange that provides connection to the business park west of St Asaph.
- 9.3 Access Point 2 provided little or no potential. Access Point 3 could be developed to provide approach to the proposed development but would require significant upgrading resulting in a change in the existing character of the route.
- 9.4 The alignment of the proposed access road at location 1 is at an acute angle to the B5381 making direct access for the transformer transport configuration approaching the site from the west disproportionately rapacious against the space requirements needed to accommodate the same vehicle entering the site access road from the east. As AIL vehicle approach to the site from the west (business park roundabout) has been indicated by Denbighshire County Council as preferable it would be advisable to consider minimising the size of the bell mouth required by considering a drive past and reverse manoeuvre when entering the site with frame type trailers. Negotiability requirements for C&U traffic from either direction can be easily accommodated within the resultant layout.
- 9.5 Considerate of the governments “water preferred policy” for the movement of abnormal indivisible loads it is most likely in the event that the unit is manufactured outside of the UK (Stafford) that the disembarkation point for onward transit to site would most likely be Ellesmere Port, Mostyn or Porth Penrhyn all of which are provided with good access to the A55.

- 9.6 The acceptability of the A55 to accommodate the transport configurations discussed in this document has not been tested as this was outside of the scope of work specifically requested by Npower Renewables Limited.
- 9.7 Nothing in this report shall be construed in any way as confirming that the route has the capacity to accommodate the proposals or that agreement with governing authorities has been provided.

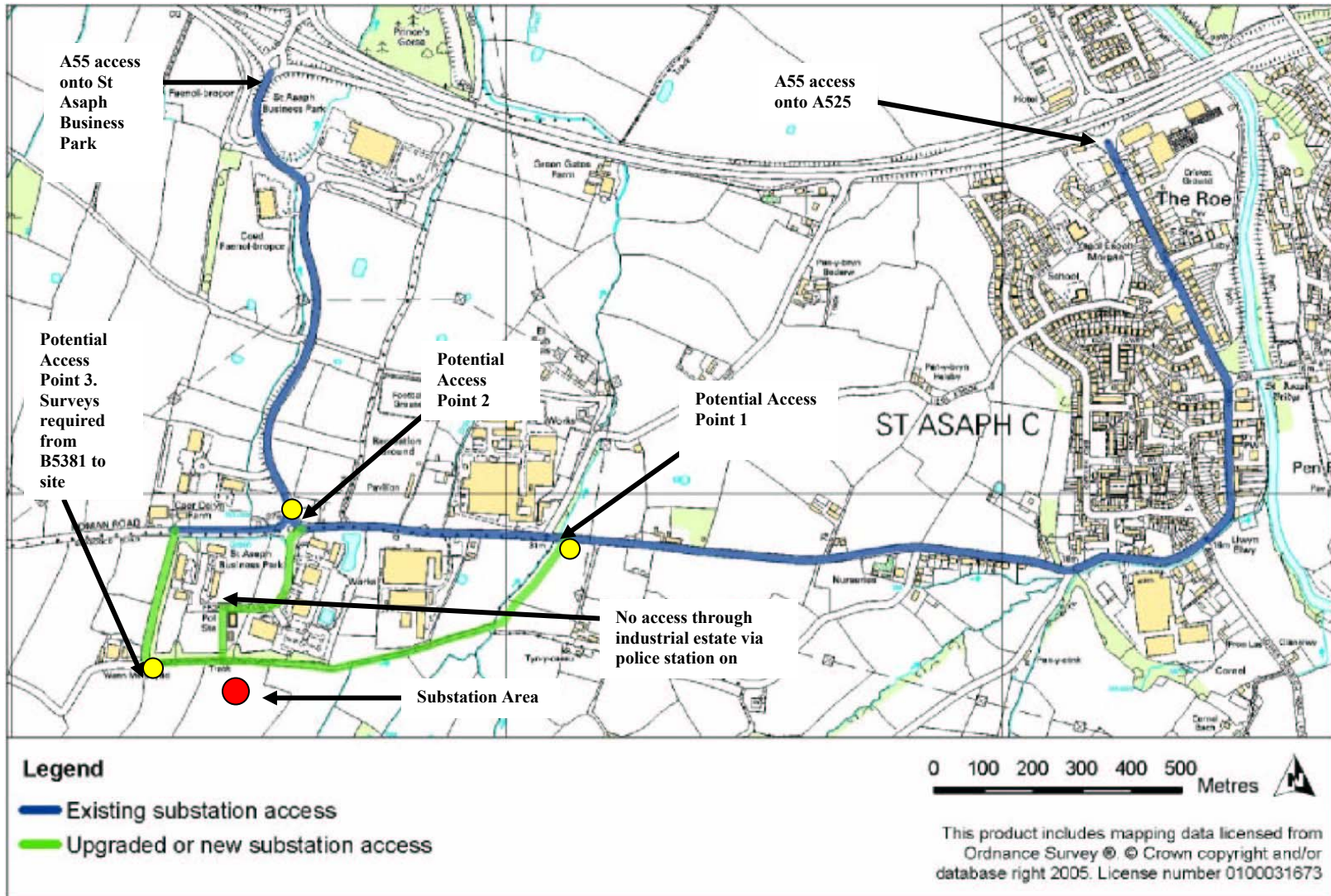
Report compiled by:

M. J. Cleary, MSc AIEMA  
Director, Planning and Environment  
2nd August 2006

## **10.0 References**

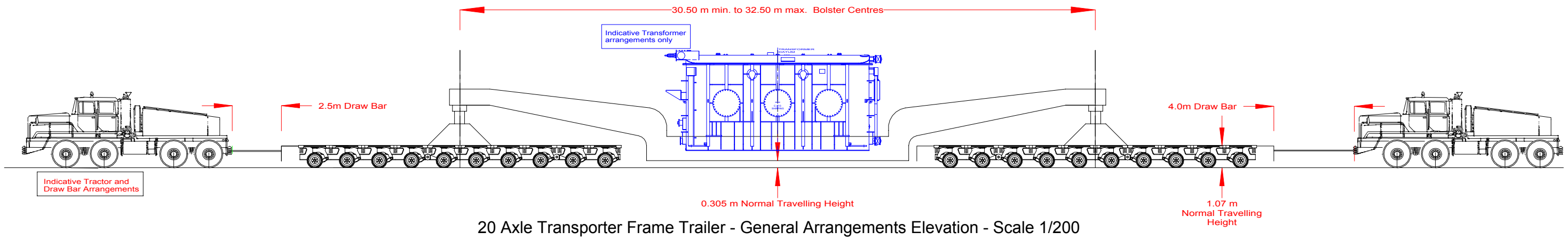
- i) SGT.14.650 Type Equipment, Modular Trailer System ,Nicolas.
- ii) Technical Guidance Note, The Transportation of Abnormal Heavy Loads, TGN(T)28, National Grid.
- iii) Vehicular Access to All-Purpose Trunk Roads, TD41/95, The Highways Agency
- iv) Places Streets and Movement: A companion guide to Design Bulletin 32, Department of Communities and Local Government.
- v) The work of the Department for Transport Agencies – Driver and Vehicle Operator Group and Highways Agency, Ninth Report of Session 2005-06, House of Commons Transport Committee.

## **11.0 Maps**

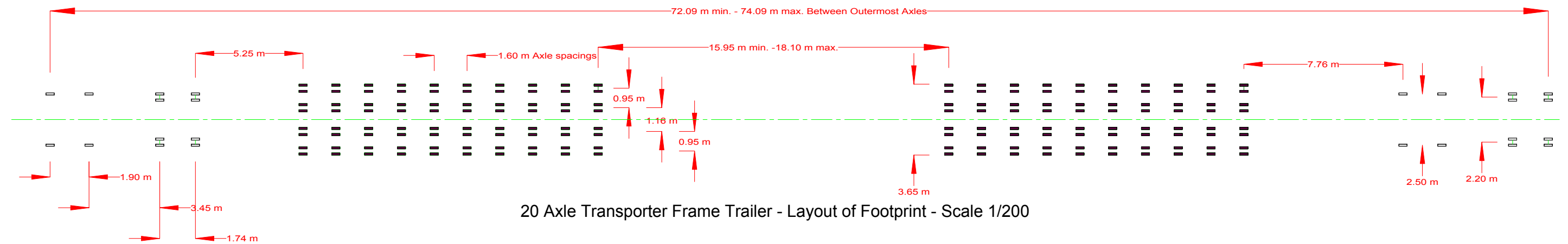


Map 1. Potential Access Routes to Gwynt y Mor Substation (Based on information provided by Npower Renewables)

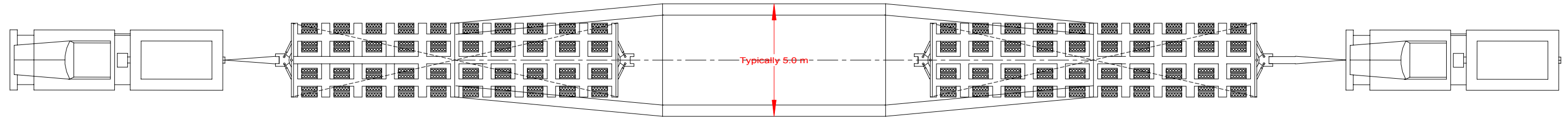
## **12.0 Drawings**



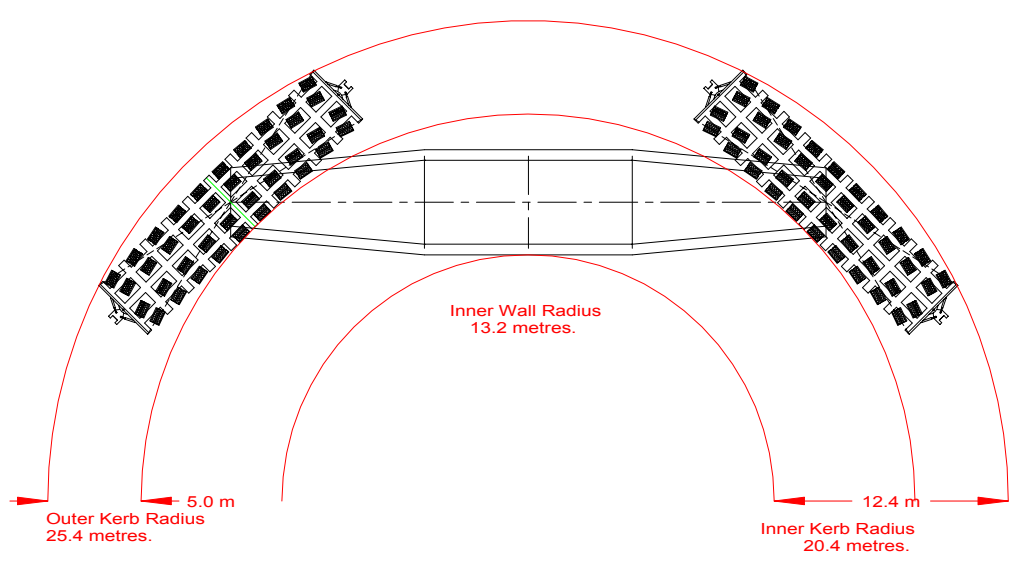
20 Axle Transporter Frame Trailer - General Arrangements Elevation - Scale 1/200



20 Axle Transporter Frame Trailer - Layout of Footprint - Scale 1/200



20 Axle Transporter Frame Trailer - General Arrangements Plan - Scale 1/200



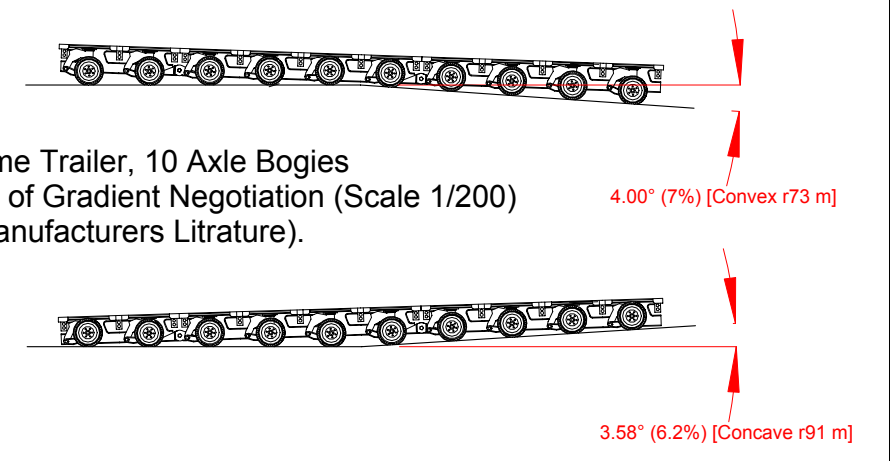
20 Axle Transporter Frame Trailer Details of Minimum Turning Radii (Scale 1/400) (Determined using 11m Beam Length and 5m Beam Width).

TRAILER SPECIFICATION	
Trailer	20 axle Frame
Deadweight	127 tonne
Aux. Steel	tonne
Load	200 tonne
Gross Load	327 tonne
Axle Load	16.35 tonne
Wheel Load	2.04 tonne
Ground Load	3.11 te/sq m

TRACTORS	
Trailer accompanied by 2 tractors 1 pulling, 1 pushing each at 48 tonne gross	
Front Axles 2 of	8 tonne each
Rear Axles 2 of	16 tonne each

Please note that the Deadweights quoted here are as advised by the relevant Haulier.

20 Axle Transporter Frame Trailer, 10 Axle Bogies  
 Details of Vertical Curve and Change of Gradient Negotiation (Scale 1/200)  
 (Determined using Manufacturers Literature).



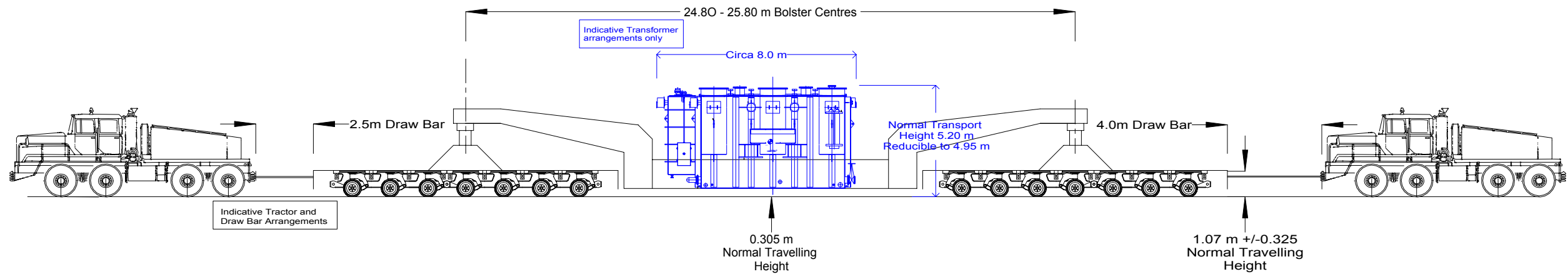
Date:	June 2006	Scale:	1/200 & 1/400 @ A3
Drawn By:	MJC	Checked By:	ARP
Client:	RWE npower	Contract:	Gwynt y Mor
		Number:	
Title:	20 Axle Frame Trailer Structural Assessment and Negotiability Study		

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 INDEPENDENT TRANSPORTATION CONSULTANTS

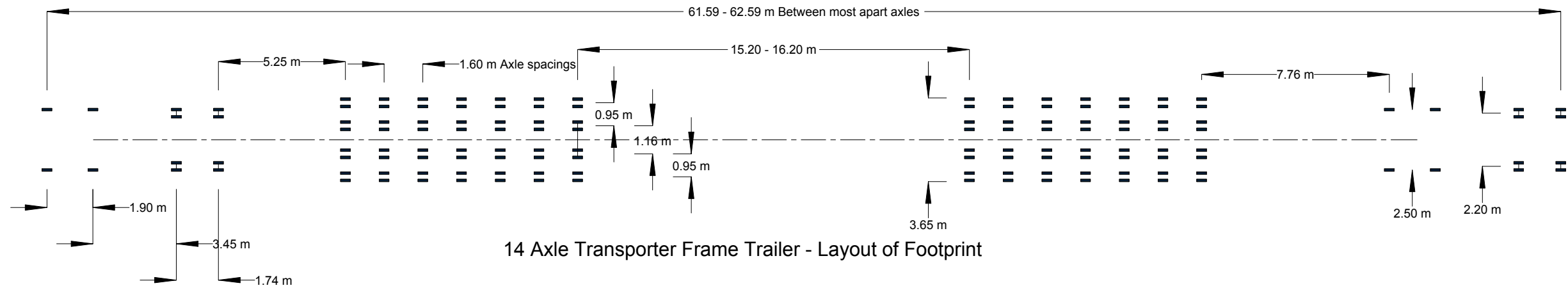
Shaftesbury House, 2 High Street, Eccleshall, Stafford, ST21 6BZ  
 Tel: (01785) 850411 Fax: (01785) 851866

Revision: Drawing No: **RWEnp-GyM-01**

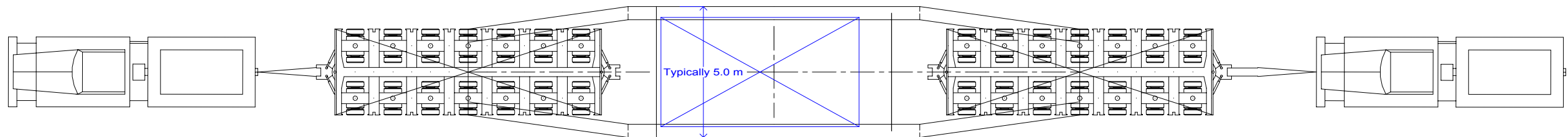
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14 Axle Transporter Frame Trailer - General Arrangements



14 Axle Transporter Frame Trailer - Layout of Footprint



14 Axle Transporter Frame Trailer - General Arrangements Plan

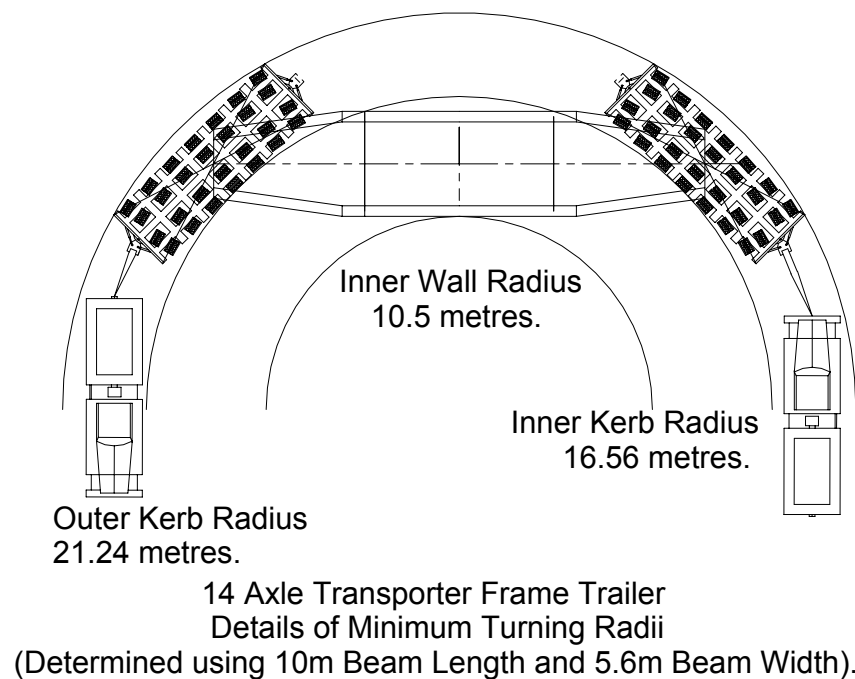
TRAILER SPECIFICATION	
Trailer	14 axle Frame
Deadweight	85 tonne
Aux. Steel	tonne
Load	200 tonne
Gross Load	285 tonne
Axle Load	20.36 tonne
Wheel Load	2.54 tonne
Ground Load	4.07 te/sq m

**TRACTORS**

Trailer accompanied by 2 tractors 1 pulling, 1 pushing each at 48 tonne gross

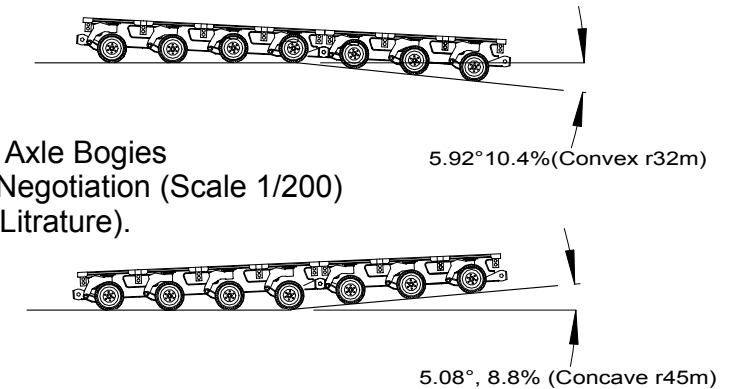
Front Axles 2 of	8 tonne each
Rear Axles 2 of	16 tonne each

Please note that the Deadweights quoted here are as advised by the relevant manufacturer or operator.



14 Axle Transporter Frame Trailer Details of Minimum Turning Radii (Determined using 10m Beam Length and 5.6m Beam Width).

14 Axle Transporter Frame Trailer, 7 Axle Bogies Details of Vertical Curve and Change of Gradient Negotiation (Scale 1/200) (Determined using Manufacturers Literture).



Date:	June 2006	Scale:	1/200 & 1/400 @ A3
Drawn By:	MJC	Checked By:	ARP
Client:	<b>RWE npower</b>	Contract:	Gwynt y Mor
		Number:	
Title:	14 Axle Frame Trailer Structural Assessment and Negotiability Study		



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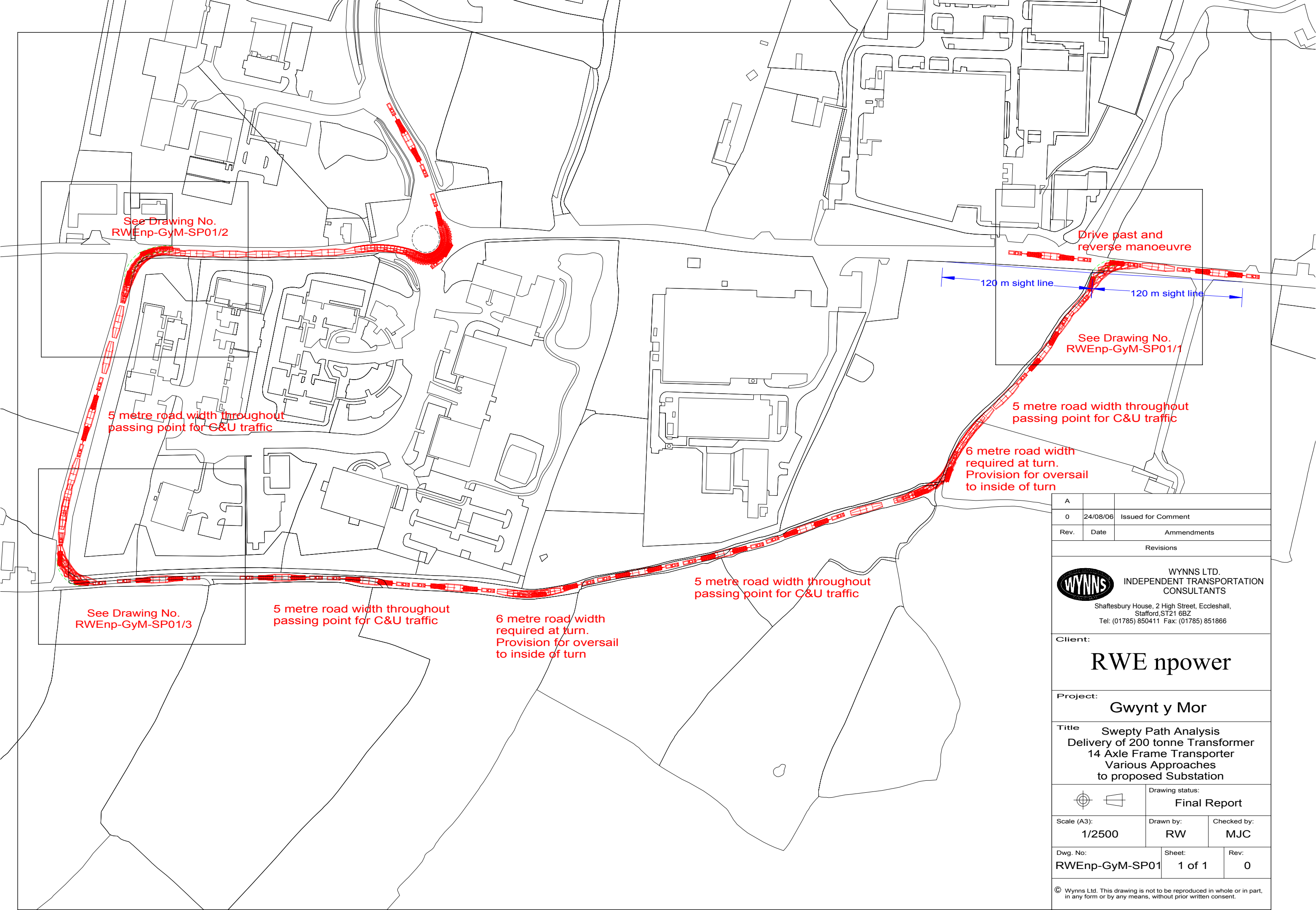
Shaftesbury House, 2 High Street, Eccleshall, Stafford, ST21 6BZ  
Tel: (01785) 850411 Fax: (01785) 851866

Revision:

Drawing No:  
**RWEnp-GyM-02**

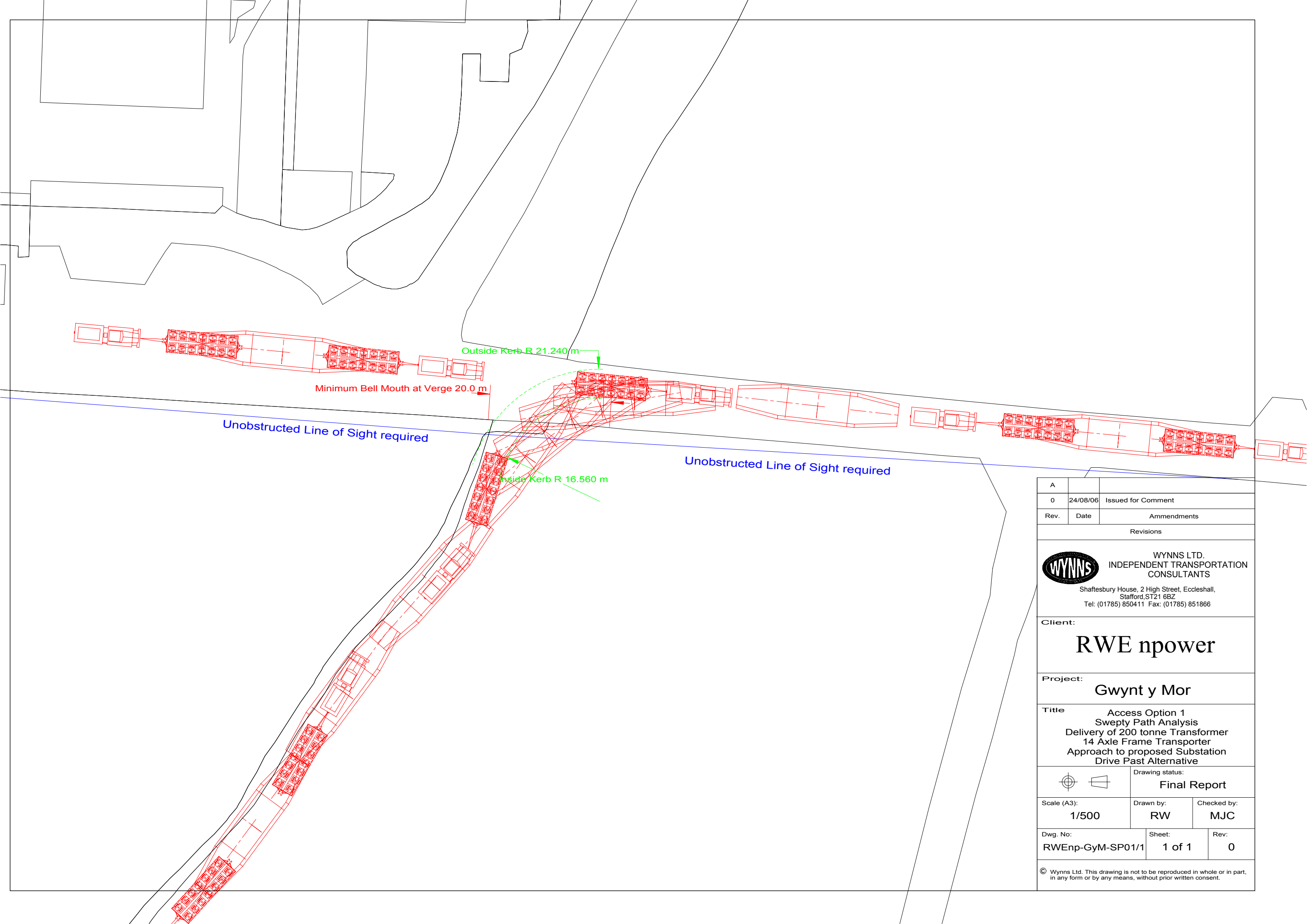
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A		
0	24/08/06	Issued for Comment
Rev.	Date	Ammdments
Revisions		
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Client:		
<b>RWE npower</b>		
Project:		
<b>Gwynt y Mor</b>		
Title		
<b>Swepty Path Analysis          Delivery of 200 tonne Transformer          14 Axle Frame Transporter          Various Approaches          to proposed Substation</b>		
		Drawing status:
<b>Final Report</b>		
Scale (A3):	Drawn by:	Checked by:
<b>1/2500</b>	<b>RW</b>	<b>MJC</b>
Dwg. No:	Sheet:	Rev:
<b>RWEnp-GyM-SP01</b>	<b>1 of 1</b>	<b>0</b>

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
Revisions


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 Stafford, ST21 6BZ  
 Tel: (01785) 850411 Fax: (01785) 851866

Client:  
**RWE npower**

Project:  
**Gwynt y Mor**

Title  
 Access Option 1  
 Swepty Path Analysis  
 Delivery of 200 tonne Transformer  
 14 Axle Frame Transporter  
 Approach to proposed Substation  
 Drive Past Alternative



 Drawing status:  
**Final Report**

Scale (A3): <b>1/500</b>	Drawn by: <b>RW</b>	Checked by: <b>MJC</b>
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Dwg. No: <b>RWEnp-GyM-SP01/1</b>	Sheet: <b>1 of 1</b>	Rev: <b>0</b>
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Track remains on existing paved surface

Trailer Over-sail 4.0 m

30.0 m Hedgerow and Tree Removal

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Stafford, ST21 6BZ  
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Client:

**RWE npower**

Project:

**Gwynt y Mor**

Title

Access Option 3  
Swept Path Analysis  
Delivery of 200 tonne Transformer  
14 Axle Frame Transporter  
Approach to proposed Substation  
Turn Off B5381



Drawing status:

**Final Report**

Scale (A3):

**1/500**

Drawn by:

**RW**

Checked by:

**MJC**

Dwg. No:

**RWEnp-GyM-SP01/2**

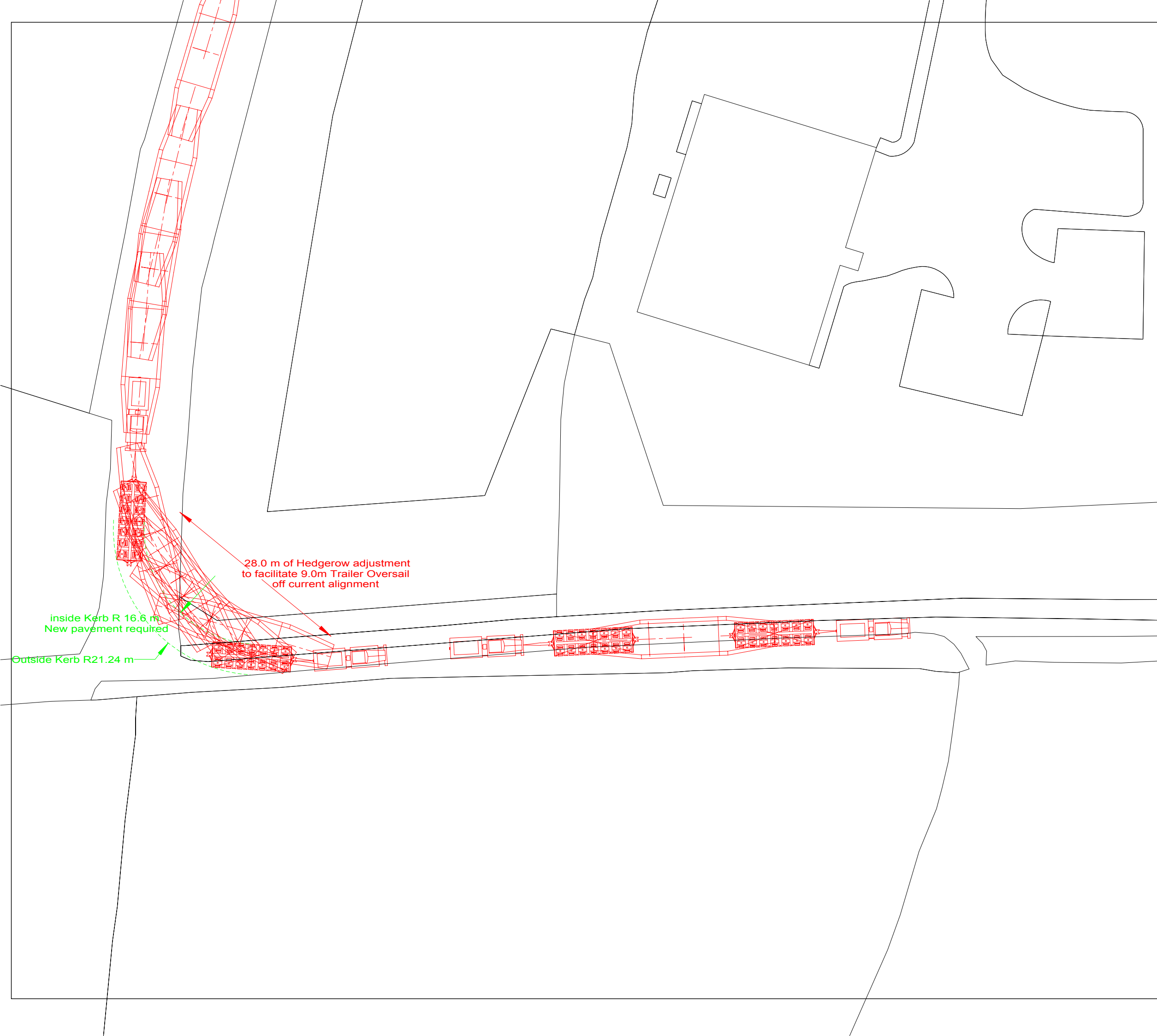
Sheet:

**1 of 1**

Rev:

**0**

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Shaftesbury House, 2 High Street, Eccleshall, Stafford, ST21 6BZ  
Tel: (01785) 850411 Fax: (01785) 851866

Client:  
**RWE npower**

Project:  
**Gwynt y Mor**

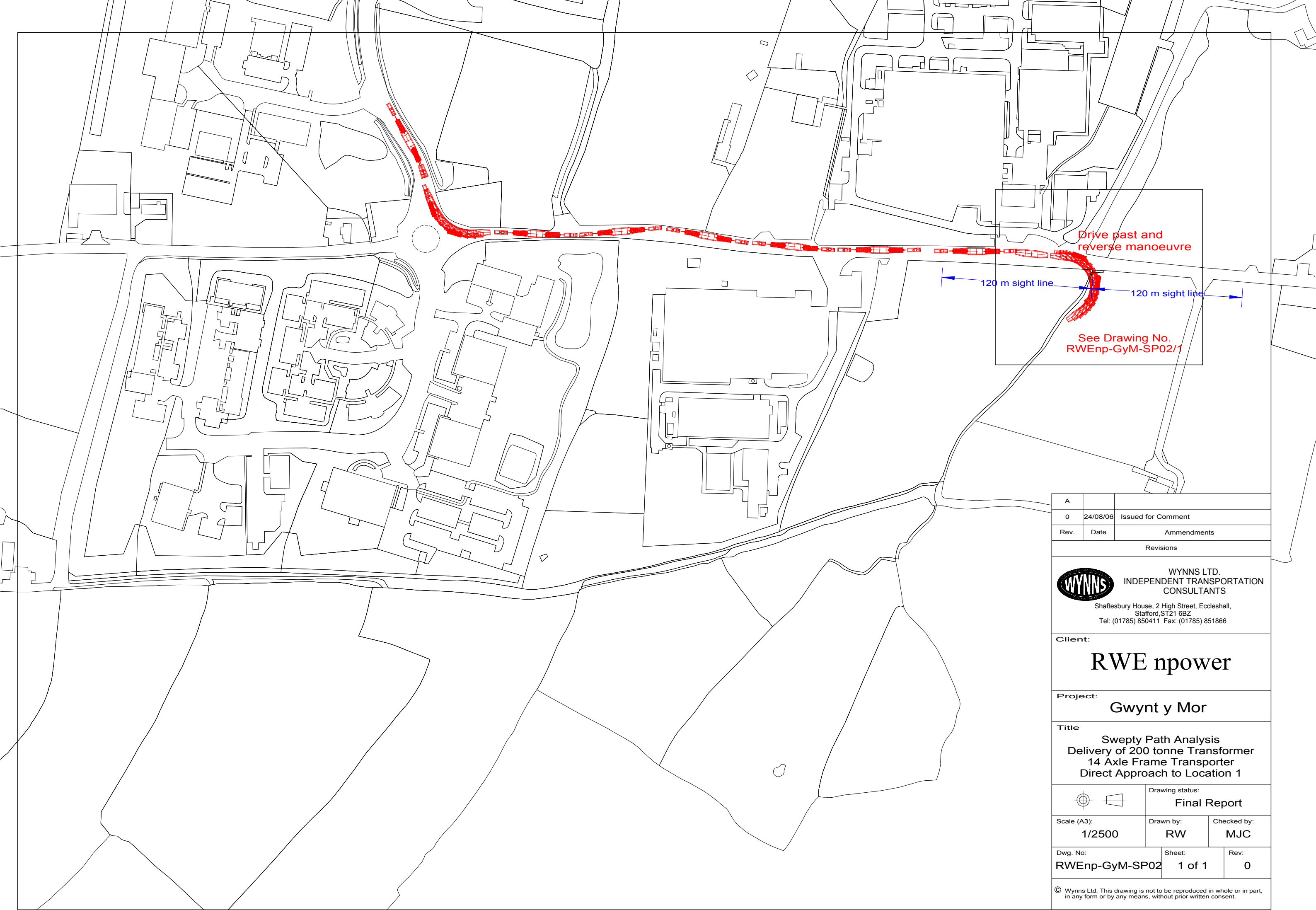
Title  
Access Option 3  
Swepty Path Analysis  
Delivery of 200 tonne Transformer  
14 Axle Frame Transporter  
Approach to proposed Substation  
Turn off Unclassified Road

Drawing status:  
**Final Report**

Scale (A3): <b>1/500</b>	Drawn by: <b>RW</b>	Checked by: <b>MJC</b>
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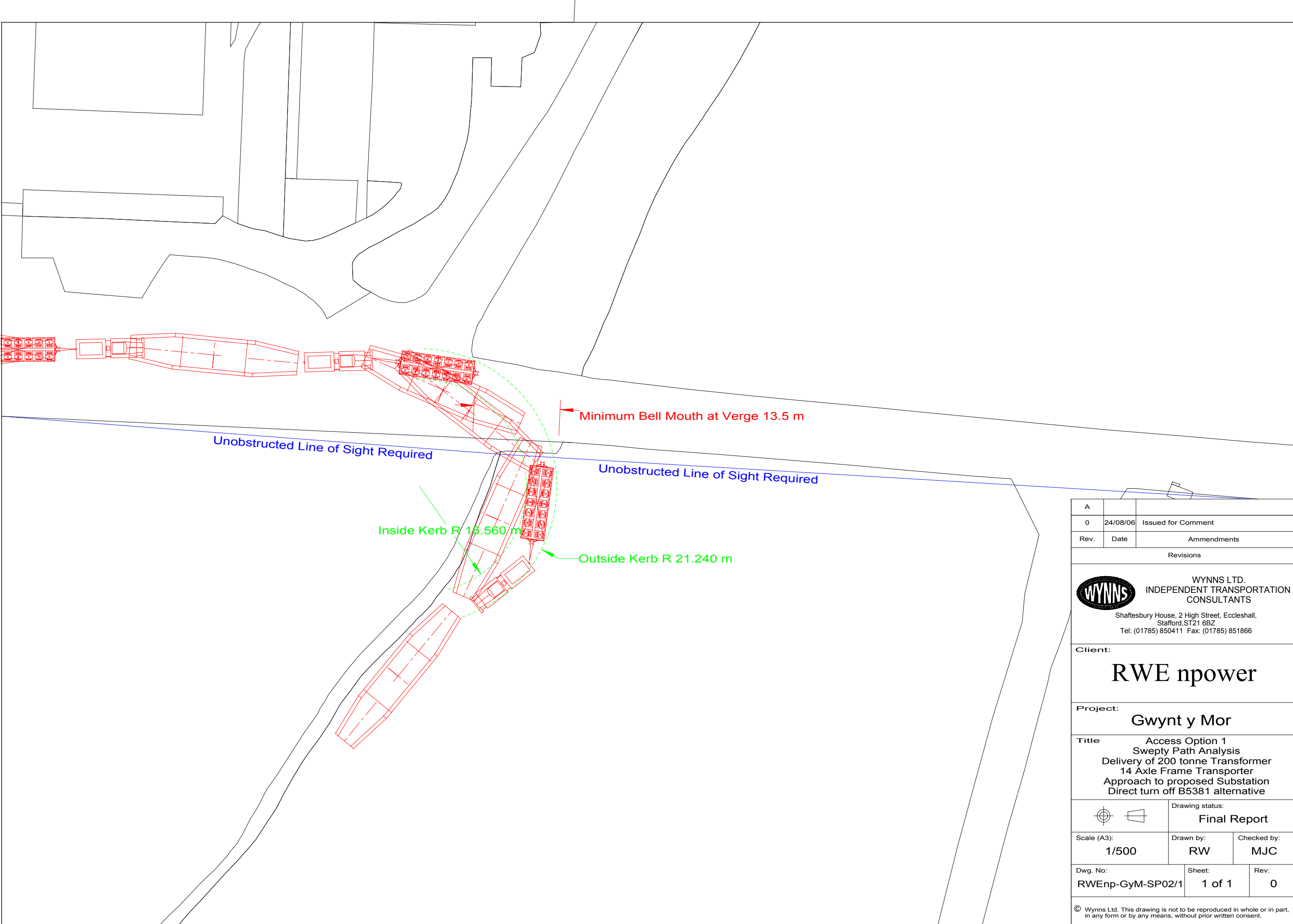
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Revisions		
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<b>Client:</b>		
<b>RWE npower</b>		
<b>Project:</b>		
<b>Gwynt y Mor</b>		
<b>Title</b>		
<b>Swepty Path Analysis</b> <b>Delivery of 200 tonne Transformer</b> <b>14 Axle Frame Transporter</b> <b>Direct Approach to Location 1</b>		
		Drawing status:
Final Report		
Scale (A3):	Drawn by:	Checked by:
1/2500	RW	MJC
Dwg. No:	Sheet:	Rev:
RWEnp-GyM-SP02	1 of 1	0

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Revisions

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CONSULTANTS

Shaftesbury House, 2 High Street, Eccleshall,  
Stafford, ST21 6BZ  
Tel: (01785) 850411 Fax: (01785) 851866

**Client:**

**RWE npower**

**Project:**

**Gwynt y Mor**

**Title**

Access Option 1  
Swepty Path Analysis  
Delivery of 200 tonne Transformer  
14 Axle Frame Transporter  
Approach to proposed Substation  
Direct turn off B5381 alternative

Drawing status:  
**Final Report**

Scale (A3): <b>1/500</b>	Drawn by: <b>RW</b>	Checked by: <b>MJC</b>
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Dwg. No: <b>RWEnp-GyM-SP02/1</b>	Sheet: <b>1 of 1</b>	Rev: <b>0</b>
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## **13.0 Correspondence**

## Andrew Pearce

---

**From:** june.jones@denbighshire.gov.uk  
**Sent:** 17 July 2006 16:27  
**To:** Andrew Pearce  
**Subject:** Re: FW: AIL access to Proposed Gwynt y Mor Substation

Hi Andrew,

Sorry for delay in replying to your email regarding proposed routes to Gwynt y Mor and Rhyl Flats Substations. As discussed on the telephone previously I now confirm the following observations on these routes.

1. AIL access to proposed Gwynt y Mor Substation near St. Asaph and 2. AIL access to Onshore Substation - Rhyl Flats Offshore Wind Farm

1. Gwynt y Mor Substation access: (Ref W/2006/AP/0158)

Proposed Routes 1 & 2 From A55 via The Roe

There are a number of structures, including retaining walls which would need assessing/strengthening to accommodate the move along this route. Due to the weight and configuration of the load it is considered that this route is not acceptable.

Proposed Route 3 From A55 Faenol Broper

This is considered a more direct route with no major structures involved and is the preferred route.

2. Rhyl Flats Offshore Wind Farm access: (Ref, W/2006/AP/0172)

Proposed Route 1 From A55 via A525, A547

This is the only route which involves travelling along County roads in Denbighshire. There are two structures along the A547 that will require reassessing but it is not envisaged there would be any problem using this route.

Proposed Routes 2,3 & 4

These routes involve travelling on the A55 Trunk Road only through Denbighshire and you are advised to contact Bryn Evans for his observations.

As you are aware Bryn Evans, Conwy CBC is responsible for A55 Trunk Road structures in Denbighshire. I note that Flintshire County Council is not included in your Circulation List. These moves will need to travel through Flintshire.

Regards,

June Jones.

June Jones  
Teitl swydd: Technegydd - Pontydd  
Job title: Technician - Bridges



**Andrew Pearce**

---

**From:** Bryn Evans [Bryn.Evans@conwy.gov.uk]  
**Sent:** 28 June 2006 10:53  
**To:** Andrew Pearce  
**Subject:** RE: AIL access to Proposed Gwynt y Mor Substation

Andy

With regard to your e-mail regarding Proposed Route 1, yes the off slip does indeed cross the river (as does the A55 main carriageway alongside).

This bridge has been designed for 45 units HB and with a full caution the movement of the proposed load will be acceptable.

Regards  
Bryn

---

**From:** Andrew Pearce [mailto:andy.pearce@wynnslimited.com]  
**Sent:** 26 June 2006 17:07  
**To:** Bryn Evans  
**Cc:** Martin Cleary  
**Subject:** RE: AIL access to Proposed Gwynt y Mor Substation

Bryn,

Further to my email of 15.6.06 we have last week undertaken preliminary assessments of the routes from the A55 to the proposed site. I noticed that as we exited the A55 slip road via our Proposed Route 1 via The Roe that the slip road passes over a structure. I am not sure from the map attached if this was the River or a road under the slip road but I presume the river. Can you confirm that this junction slip road bridge is structurally acceptable in terms of the loads previously supplied as should we look to route to this point from a port of access such as Ellesmere Port we would need to look at coming off via this slip road.

I note that you do not foresee any problems at this stage but I do just wish to check the above as we expect that in the future our client will need to consider how they get these loads to these exit points on the A55. I trust that this makes sense and look forward to your comments.

Regards

Andy

-----Original Message-----

**From:** Bryn Evans [mailto:Bryn.Evans@conwy.gov.uk]  
**Sent:** 14 June 2006 13:45  
**To:** Andrew Pearce  
**Subject:** RE: AIL access to Proposed Gwynt y Mor Substation

Andy

The roads off the A55 to the site are part of Denbighshire's county road network, therefore I am not in a position to comment but I'm sure you will receive comments from June Jones.

With regard to the Trunk Road Network, as of April 1 2006 there is only one agency in North Wales providing a service for the Welsh Assembly Government (North Wales Trunk Road Agency) but as far as notification for

abnormal loads is concerned I'm still checking movements for the area formerly known as NEWTRA but now NWTRA Area 2. This includes the A55 from the English/Welsh border to the turn off towards the Gwynt y Mor site. I don't foresee any problems but will reserve comments until such time that I receive official notification from WAG with regard to the Special Order required for the movement

Regards  
Bryn.

---

**From:** Andrew Pearce [mailto:andy.pearce@wynnslimited.com]

**Sent:** 14 June 2006 08:19

**To:** june.jones@denbighshire.gov.uk; Bryn Evans; richard.gaunt@britishwaterways.co.uk; tim.reed@networkrail.co.uk; peter.arnold@jacobs.com

**Cc:** susan.guy@nthwales.pnn.police.uk; Martin Cleary

**Subject:** AIL access to Proposed Gwynt y Mor Substation

I forgot the attachment!

Dear All,

Please see attached a heavy load route investigation that should be self explanatory for your consideration. I have emailed this due to inclusion of maps and drawings which would not be clear by fax. I look forward to hearing from you but please do not hesitate to contact me if you need any further information.

Regards

Andy Pearce

"Mae'r neges e-bost hon ac unrhyw ymgysylltiadau yn gyfrinachol, ac wedi eu bwriadu ar gyfer yr un sy'n cael ei h/enwi yn unig. Gallent gynnwys gwybodaeth freintiedig. Os yw'r neges hon wedi eich cyrraedd ar gam, ni ddylech ei chopio, ei rhannu na dangos ei chynnwys i unrhyw un. Cysylltwch efo Cyngor Bwrdeistref Sirol Conwy ar unwaith. Nid yw'r Cyngor na'r un sydd wedi anfon y neges yn derbyn unrhyw gyfrifoldeb am feirysau, a'ch cyfrifoldeb chi yw sganio unrhyw ymgysylltiadau."

"This email and any attachments are confidential and intended for the named recipient only. The content may contain privileged information. If it has reached you by mistake, you should not copy, distribute or show the content to anyone but should contact Conwy County Borough Council at once. Neither the Council nor the sender accepts any responsibility for viruses, and it is your responsibility to scan any attachments."

## **14.0 Contact List of Authorities**

## List of Authorities and Contacts

### **British Waterways Board (BWB)**

Fearn Wharf  
Neptune Street  
Leeds  
LS9 8PD

Tel: 0113 2816800  
Fax: 0113 2451880  
Contact: Richard Gaunt  
Email: [richard.gaunt@britishwaterways.co.uk](mailto:richard.gaunt@britishwaterways.co.uk)

### **British Rail Property Board (Jacobs Babbie Group Limited)**

Public Services Division  
Shire Hall  
Shinfield Park  
Reading  
RG2 9XG

Tel: 0118 9526291  
Fax: 0118 9881658  
Contact: Peter Arnold  
Email: [peter.arnold@jacobs.com](mailto:peter.arnold@jacobs.com)

### **Network Rail North Western Territory**

Structures Assessment Engineer  
Abnormal Road Loads  
Network Rail London North Western Region (LNWR)  
100 Wharfside Street  
The Mailbox  
Birmingham  
B1 1RT

Tel: 0121 3453207  
Fax: 0121 3454023  
Contact: Tim Reed  
Email: [tim.reed@networkrail.co.uk](mailto:tim.reed@networkrail.co.uk)

**Denbighshire County Council**

Transport & Infrastructure

Caledfryn

Smithfield Road

Denbighshire

LL16 3RJ

Tel: 01824 706884

Fax: 01824 706865

Contact: June Jones

Email: [june.jones@denbighshire.gov.uk](mailto:june.jones@denbighshire.gov.uk)

**North Wales Trunk Road Agency**

C/O Conwy County Borough Council

Bridges and Structures Group

Highways & Transportation Services

The Heath

Llanfairfechan

LL33 0PS

Tel: 01492 575463

Fax: 01492 575448

Contact: Bryn Evans

Email: [bryn.evans@conwy.gov.uk](mailto:bryn.evans@conwy.gov.uk)

*Note: In north Wales trunk road area each local authority is presently still needing to be advised of movements. Therefore Conway and Denbighshire both consulted.*

**North Wales Police**

Headquarters

Glan-y-Don

Colwyn Bay

LL29 8AW

Tel: 01492 511917

Fax: 01492 510043

Contact: Susan Guy

Email: [susan.guy@nthwales.pnn.police.uk](mailto:susan.guy@nthwales.pnn.police.uk)



RWE Renewables UK Swindon Limited

Windmill Hill Business Park

Whitehill Way

Swindon

Wiltshire SN5 6PB

T +44 (0)8456 720 090

**[www.rwe.com](http://www.rwe.com)**

Registered office:

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Windmill Hill Business Park

Whitehill Way

Swindon