



Upper Ogmore Wind Farm and Energy Storage Facility Sustainable Drainage Management Plan

Ref: 02959-001682

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Signed Electronically: 27-Sep-2018

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Signed Electronically: 27-Sep-2018

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Signed Electronically: 27-Sep-2018

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REVISION HISTORY

Issue	Date	Author	Nature And Location Of Change
01	27.09.18	Mark Crabtree	First Issue

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1 INTRODUCTION & SCOPE

1.1 Introduction

The principal objective of this document is to provide details of the proposed sustainable drainage management arrangements for Upper Ogmores Wind Farm and Energy Storage Facility hereinafter referred to as ‘the Proposed Development’.

This document provides details of the proposed sustainable drainage systems (SuDS) for the Proposed Development. This report provides details of the drainage management measures that will be implemented throughout the construction phase and operational life of the Proposed Development.

1.2 Description of the Site

The Proposed Development is being developed by RES Ltd (RES) and is located on privately owned agricultural lands to the south of the A4107 in Bridgend County between Blaengwynfi, Nantymoel and Blaengarw. The Proposed Development is centred at E29150 N19450. The site is defined by the Planning Application Boundary drawing 02959D2405, included in Annex 1.

The Proposed Development includes the installation of seven wind turbines with a maximum height to blade tip of 149.9m, an energy storage facility and associated infrastructure including; control building and substation compound, 4.3km of unbound site tracks, seven crane hardstands, electrical cables, and temporary infrastructure to facilitate the construction works. The layout of the Proposed Development is shown on drawing 029591001 Infrastructure Layout, included in Annex 2.

Track widening works to facility the wind farm component deliveries, are required to an existing NRW forestry track. The forestry track is approximately 3.6km in length. The existing track runs through commercial forestry. The extent of the proposed widening is shown on drawing 02959D2404 included in Annex 3.

1.3 Existing Hydrology

There is no formal existing drainage within the main site boundary. The section of forestry track that will be widened is served by an existing sustainable drainage system including swales, settlement ponds and undertrack pipe crossings.

The main site contains the headwaters of several small watercourses which drain down towards the Afon Gawr, Afon Afan and Ogwr Fawr.

Turbines T1 and T7 are located in the catchment of several unnamed tributaries that flow into the Afon Gawr.

Turbine T2 is located in the catchment of the Nant Ty a tributary to the Afon Afan.

Turbine T3 is located in the catchment of Nant y Moel, a tributary to the Ogwr Fawr.

Turbines T4, T5, and T6 are located in the catchment of several unnamed tributaries that flow into the Ogwr Fawr.

The forestry track widenings are within the catchment of several small watercourses which drain down towards the Afon Corrwg.

2 REFERENCES, GUIDANCE AND LEGISLATIVE REQUIREMENTS

2.1 References

This document should be read in conjunction with the following documents:

- Upper Ogmores Wind Farm Environmental Statement - Chapter 8. Hydrology and Hydrogeology.

2.2 Relevant Guidance and Legislative Requirements

All drainage relating to the Proposed Development will be constructed using best practice and in conformance with the requirements of the relevant regulatory authorities. The key legislation and guidance that will be adhered to, are as follows:

- The EU Water Framework Directive (2000/60/EC).
- Welsh Planning Policy.
- NRW Guidance for Pollution Prevention (GPPs and PPGs).
- Assessing the impact of wind farm developments on peatlands in Wales, Countryside Council for Wales.
- Control of water pollution from construction sites. CIRIA C532.
- Control of water pollution from linear construction projects. CIRIA Technical guidance C648.
- The SuDS Manual 2015. CIRIA C753.
- Guidance on the construction of SuDS. CIRIA C768.
- Drainage of development sites. CIRA X108.

3 POTENTIAL SOURCES OF POLLUTION

The following potential sources of pollution have been identified for the project:

- Suspended solids / fines laden runoff from site won / imported stone for track / hardstanding construction.
- Suspended solids / fines laden runoff from exposed excavations.
- Suspended solids / fines laden runoff from excavations in watercourses.
- Fuel / chemical spills.
- Concrete from spills / washouts.
- Foul drainage discharges from temporary and permanent welfare facilities.

The subsequent chapters outline how the risk of pollution from the identified pollution sources will be mitigated.

4 DRAINAGE MANAGEMENT PROPOSALS

4.1 Surface Water Drainage Management

The overarching aim of the SuDS design is to minimise, where possible, any change to the hydrology and groundwater conditions within the site. The SuDS will utilise a series of surface water management techniques that will mitigate any adverse impact on the hydrology of the site.

The following drawings provide details of the SuDS that will be implemented at the Proposed Development (included in Annex 4):

- 02959D3701-01 Typical Drainage Details.
- 02959D3702-01 Temporary Silt Fence Details.
- 02959D3703-01 Typical Settlement Pond Details.

4.2 Water Quality and Treatment

A treatment train will be implemented for the treatment of runoff from the site during the construction phase prior to flows entering receiving watercourses.

All temporary and permanent surface water drainage from the site will have a minimum three stages of treatment. A single stage of treatment is considered as any of the following:

- Conveyance through a swale.
- Filtration of water through filter media (e.g. check dam).
- Detention in settlement ponds / behind dam in overland breakout.
- Filtration / settlement across vegetated ground.

Clean water (groundwater, natural overland flows, watercourses, etc.) and dirty water (from tracks, hardstands and cut slopes) will be as far as practicably possible kept separate. Reducing the volume of water entering the treatment system will significantly improve the performance of the treatment system. Where appropriate, a cut off ditch will be installed to ensure that surface water runoff can be directed around areas of work and consequently reduce volumes of silt laden construction runoff.

4.3 Prevention

Potential causes of pollution will be managed at their source. The following working methods will be adopted to avoid mobilisation of pollutants:

- Areas stripped of vegetation will be kept to a minimum. Stripped vegetation will be reinstated on slopes as soon as possible after removal.
- Where necessary, biodegradable matting will be utilised on cut slopes to prevent washing of fines into the drainage network.
- Good quality stone will be used in track and hardstanding construction. Construction material will be specified in accordance with the Specification for Highway Works (SHW). SHW compliant material does not permit the use of large quantities of fine material, and therefore all material imported to site will not be heavily laden with silt / fines. Regular inspections and testing of material will ensure the construction material is compliant with the SHW.

4.4 Source Control

Potential causes of pollution will be controlled at source. Flows from excavations and new hardstanding areas will discharge into swales. Check dams will be installed in the swales at regular intervals to provide a level of attenuation, reduce water velocity, and promote settlement of suspended solids and silt.

4.5 Buffer Zones

Turbine centres are located a minimum of 50m from significant watercourses. A significant watercourse is defined as a watercourse that appears on 1:50,000 scale OS mapping.

A 10m buffer zone will be employed for all main watercourses in accordance with GPP5: Works or maintenance in or near water (2017). No dewatering or outflows will be permitted within the 10m buffer zones.

Washing out of concrete mixer lorries will be strictly controlled and limited to a designated wash area a minimum of 50m away from any watercourse. Where a potential risk is identified of an accidental concrete spillage into a watercourse, cut off ditches and diversion dams will be installed to channel potential spillages and runoff water to a suitable collection area. Residual solidified concrete within the containment area would be broken up and disposed of off-site in accordance with the pertinent regulations, prior to reinstatement of the area.

Any dewatering from excavations will be via surface silt traps, check dams, and temporary settlement ponds to reduce potential silt entering receiving watercourses.

Contaminated water will not be pumped or allowed to flow into the water environment without treatment. Collected effluent will be pumped out and disposed of off-site.

4.6 Maintenance / management of Drainage Management Measures

All drainage management measures being implemented will be checked regularly and action taken to ensure functionality. Any sign of silt laden water entering a watercourse will be reported immediately to the Site Manager, the source of the silt identified, and further remedial measures undertaken.

4.7 Emergency Pollution Procedures

The emergency pollution procedure is included in Annex 5. The emergency procedure will form part of the site management procedures adopted by the site team managing the construction works.

The procedure will remain in place throughout the operational phase of the Proposed Development.

In the unlikely event of an environmental pollution incident, there will be an emergency response procedure to address any accidental pollution incident. For example, a procedure requiring the use of spill kits to contain the material and procedures to ensure that NRW is notified on their Pollution Hotline number (0300 065300) within 30 minutes of an incident (unless unsafe to do so), will be applied.

5 CONTROLLING RUNOFF

5.1 Flow Control Measures

Surface water flows will be attenuated in swales and settlement ponds. Attenuated flows will be discharged over existing vegetation prior to discharging into receiving watercourses, as per the existing drainage regime for the site.

The rate and volume of flow will be attenuated using settlement ponds receiving runoff from newly constructed hardstand areas. Attenuation features will also reduce flow velocities and allow settlement of fines prior to discharge. Flow rates will also be reduced through the integration of swales and check dams.

Tracks and hardstand areas are to be constructed from unbound aggregate and are therefore not fully impermeable, thus helping to reduce flow rates.

Piped under track drainage, where required, will be provided with associated sumps and check dams. The under track drainage will provide a means for flows to pass from a swale on the uphill side of the track to the downhill side of the track.

In cases where the tracks run significantly downhill, transverse drains (grips) will be constructed in the surface of the tracks to divert any runoff flowing down the track into the swale.

Excavated tracks will incorporate swales with check dams to overland breakouts over vegetation.

5.2 Preserving Site Hydrology

Existing overland flow routes and channels will be maintained. Piped drainage will be provided under the tracks at all locations where existing natural flow paths pass through the proposed track alignment.

The installation of the electrical cables will be within small trenches. Where trenches are dug on steep slopes they will be dug in sections or plugs of soil may be left in place at intervals to prevent them acting as preferential drainage pathways. As indicated above, best practice cable installation means that the trenches will not remain open for long periods of time and will be restored by replacing the subsoil and topsoil removed earlier.

Floated tracks will follow the principles of minimum disturbance of the vegetated layer. Stone / geotextile will be laid directly onto existing vegetation. No swales will be constructed

alongside the track, water will runoff directly off track onto existing vegetation. Flow balancing pipes, in the form of perforated pipes will be provided at existing flush locations.

6 WATERCOURSE CROSSINGS

No significant watercourses have been identified on the site that will be affected by the construction of the development.

7 FOUL DRAINAGE / TREATED DISCHARGES

There are no public sewers in proximity to the site.

Disposal of sewerage from temporary and permanent facilities on the site will be designed by the Contractor and shall be in accordance with the methods outlined in GPP4: Treatment and disposal of sewage where no public foul sewer is available, and treatment systems will be sized in accordance with British Water Code of Practice - Flows & Loads.

7.1 Permanent Treatment Systems

Permanent welfare facilities will be located within the control building and substation compound, in the form of one toilet and two sinks.

The preferred option for treatment is via a septic tank with effluent to discharge to a soakaway.

Infiltration tests will be carried out to confirm the infiltration properties of the existing ground in the vicinity of the compound.

Prior to the installation of the sewage treatment system, any necessary agreements or licensing will be gained from the relevant third party will be gained.

7.2 Temporary Treatment Systems

At the temporary construction compound, welfare facilities will comprise of toilets and sinks. Temporary foul drainage will be installed to discharge flows into a temporary sealed cess pit. Off-site disposal from temporary cess pits will be by a licensed waste haulier / contractor.

The temporary drainage facilities will be removed on completion of construction.

8 POST CONSTRUCTION MONITORING

A post construction inspection programme will be implemented, with a walk over site visit to be undertaken on an ongoing 6-monthly basis (winter and summer preferably). Points to be considered during these inspections include, but are not limited to, the following:

- Check dams and settlement ponds will be checked twice yearly on an ongoing basis. Where stone check dams have become clogged with silt, the check dam will be cleared out.
- Further check dams will be installed within the swales along any steeper sections of the access track.
- Should there be noticeable effects of erosion at discharge points, suitable erosion protection measures such as reno-mattress or placement of large stones (>150mm) to dissipate water energy levels will be installed at the area affected.
- Any materials excavated should be placed in such a manner that any instability of excavated materials will not cause further infilling of a swale or drainage feature.
- Inlets and outlets of cross drainage pipes are to be free from silt and debris. All litter will be removed from discharge points / outlets and inlets / outlets of storage features to be operating correctly.

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- A maintenance record log will be maintained for all maintenance work carried out. Where problems persist on each six-monthly inspection, advice will be sought from the SuDS designer on an alternative drainage solution.

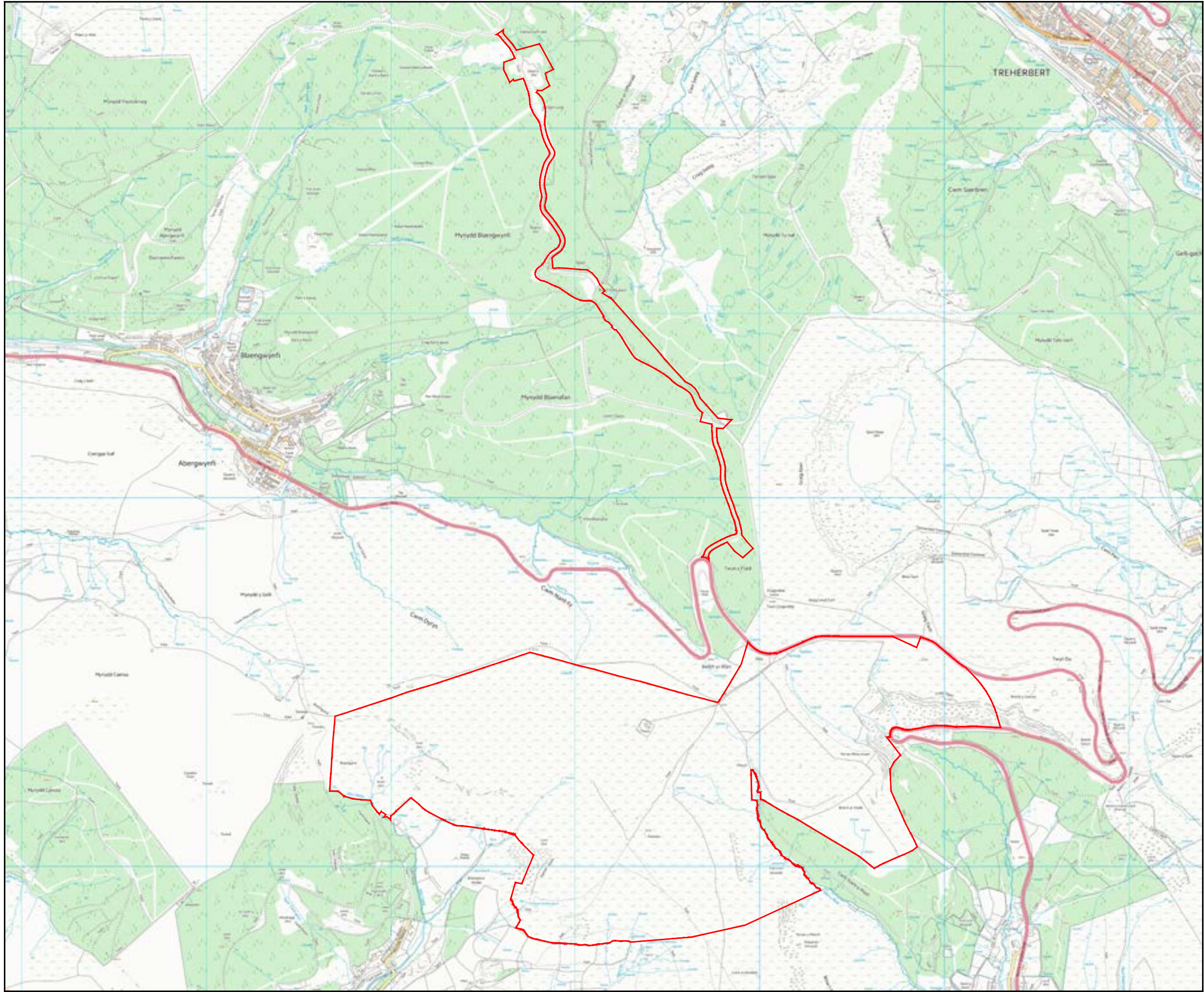
ANNEX 1. PLANNING APPLICATION BOUNDARY DRAWING

ANNEX 2. INFRASTRUCTURE LAYOUT DRAWING

ANNEX 3. FORESTRY TRACK WIDENING DRAWING

ANNEX 4. SUDS DETAILS

ANNEX 5. EMERGENCY POLLUTION PROCEDURE



**UPPER OGMORE
WIND FARM**

FIGURE 1.2

**PLANNING APPLICATION
BOUNDARY**

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2020 LICENCE NUMBER 0100031673.

KEY:

— PLANNING APPLICATION BOUNDARY



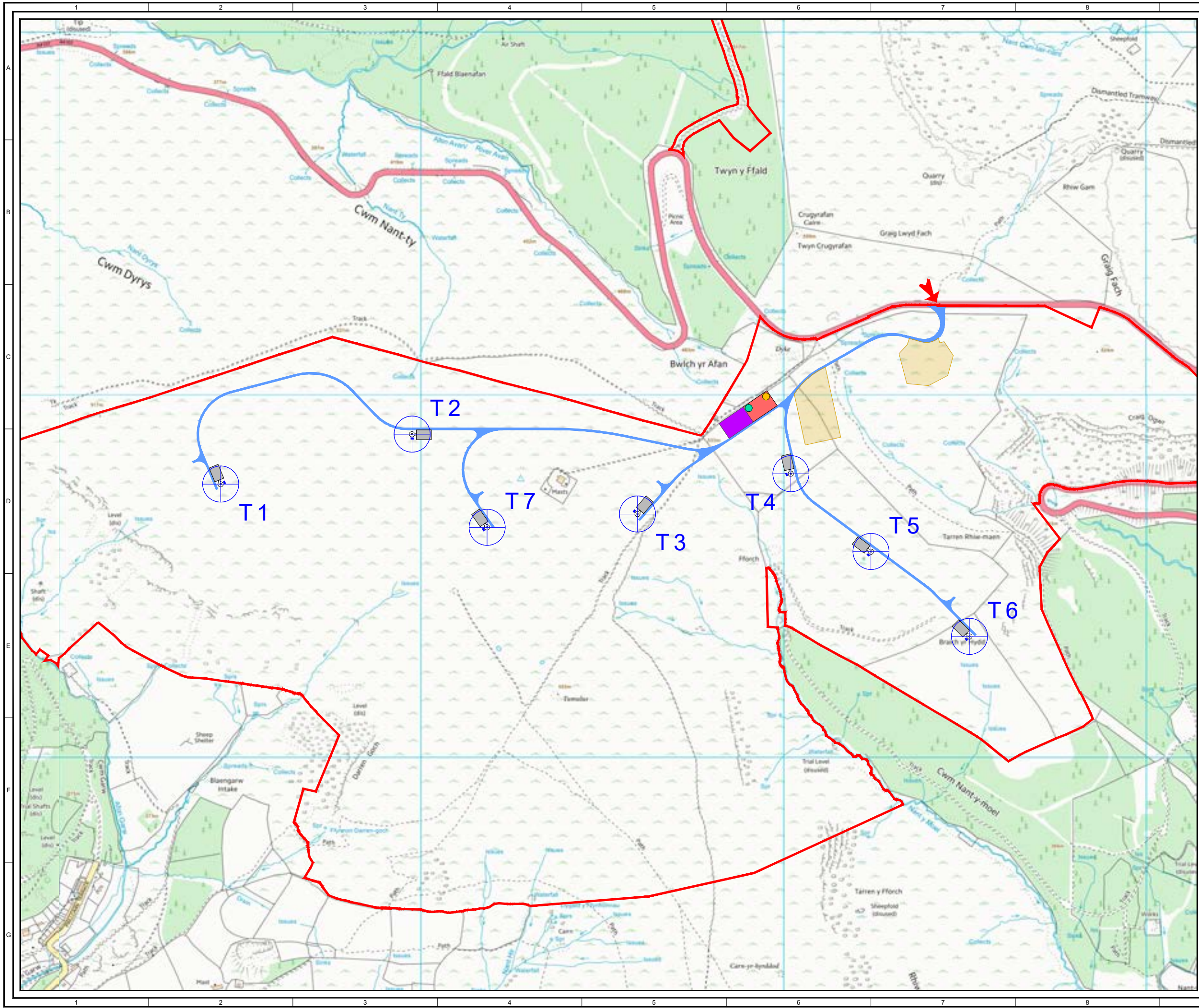
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SCALE -	1:20,000 @ A3
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- KEY:**
- PLANNING APPLICATION BOUNDARY
(TAKEN FROM RES DRAWING 02959D2405)
 - WIND TURBINE LOCATION
 - NEW SITE TRACKS
 - WATERCOURSE
 - CRANE HARDSTANDING AREA & TRANSFORMER
 - TEMPORARY CONSTRUCTION COMPOUND / ENERGY STORAGE AREA
 - CONTROL BUILDING & SUBSTATION COMPOUND WITH HARDSTANDING AREA
 - WIND FARM COMMUNICATIONS MAST
 - DNO COMMUNICATIONS MAST
 - POTENTIAL BORROW PIT
 - SITE ENTRANCE LOCATION



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01	DJK	MC	CJ	18-07-2018	FIRST ISSUE
ISSUE	DRAWN	CHKD	APPD	DATE	REVISION NOTES
LAYOUT DWG	02959D0001-08			T-LAYOUT NO.	PWALuog033

DRAWING NUMBER
02959D1001-02

COORDS UK OS

PURPOSE PLANNING

SCALE 1:10,000 ORIGINAL PLOT SIZE A3

PROJECT TITLE
UPPER OGMERE WIND FARM

DRAWING TITLE
INFRASTRUCTURE LAYOUT

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UPPER OGMORE WIND FARM

FIGURE 3.1

INFRASTRUCTURE LAYOUT

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KEY:

- PLANNING APPLICATION BOUNDARY
(TAKEN FROM RES DRAWING 02959D2405)
- WIND TURBINE LOCATION
- NEW SITE TRACKS
- WATERCOURSE
- CRANE HARDSTANDING AREA &
TRANSFORMER
- TEMPORARY CONSTRUCTION
COMPOUND / ENERGY STORAGE
AREA
- CONTROL BUILDING & SUBSTATION
COMPOUND WITH HARDSTANDING
AREA
- WIND FARM COMMUNICATIONS MAST
- DNO COMMUNICATIONS MAST
- POTENTIAL BORROW PIT
- SITE ENTRANCE LOCATION



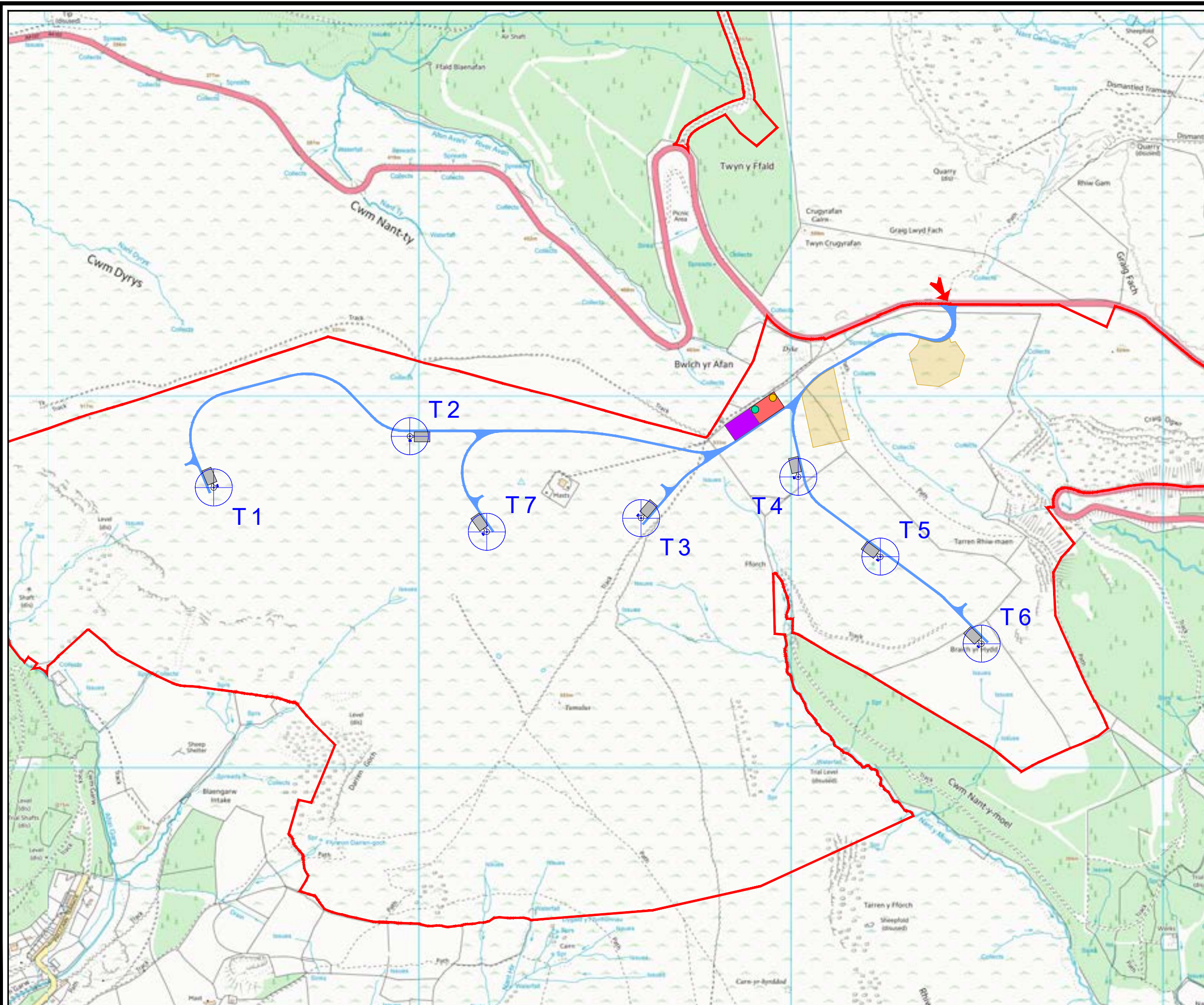
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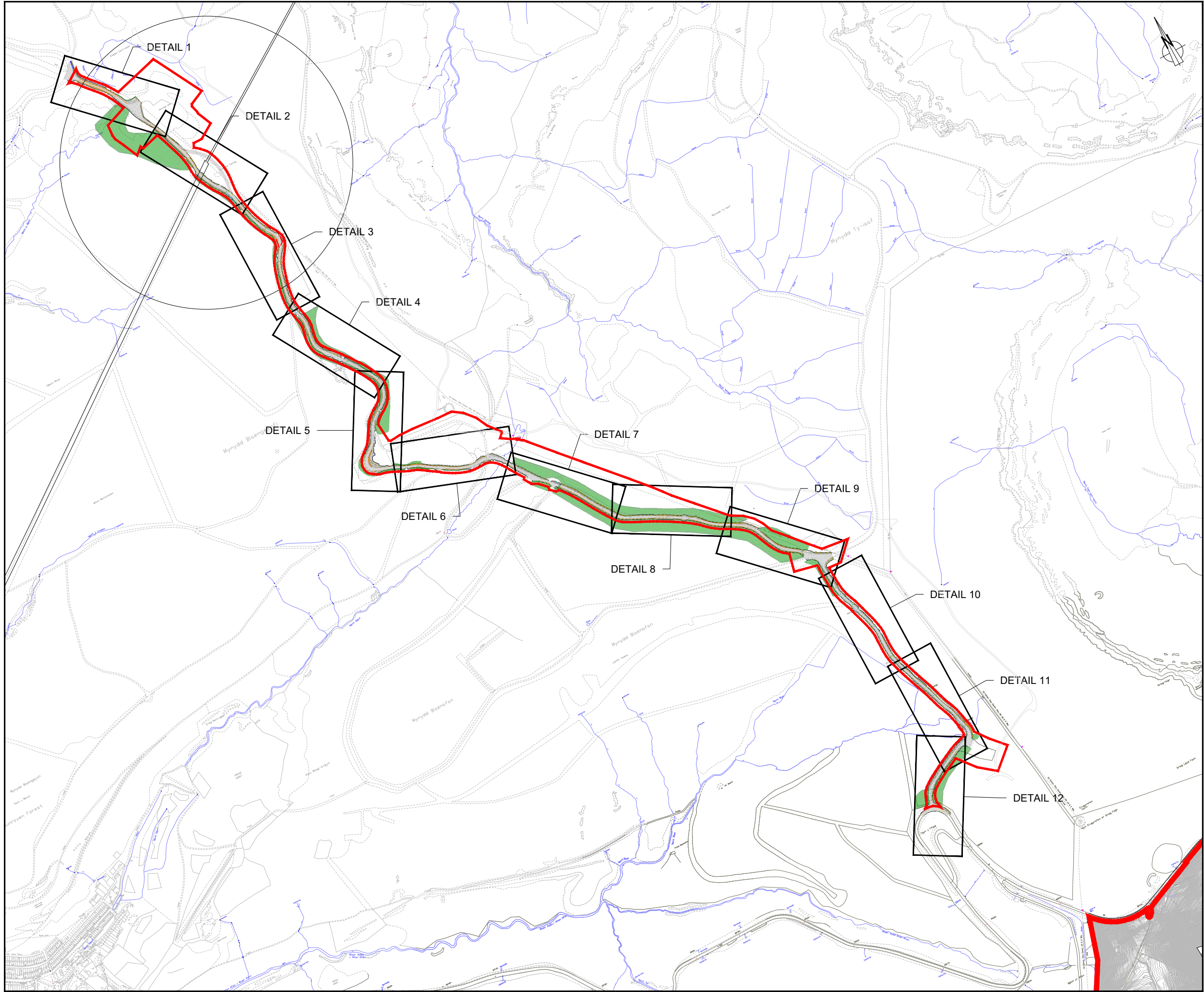
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2018**

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**UPPER OGMORE
WIND FARM**

FIGURE 9.3

**FORESTRY TRACK WIDENING
PEN Y CYMOEDD WIND FARM
TO SITE**

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KEY:
 PLANNING APPLICATION BOUNDARY

**OVERVIEW
SHEET 1 OF 7**

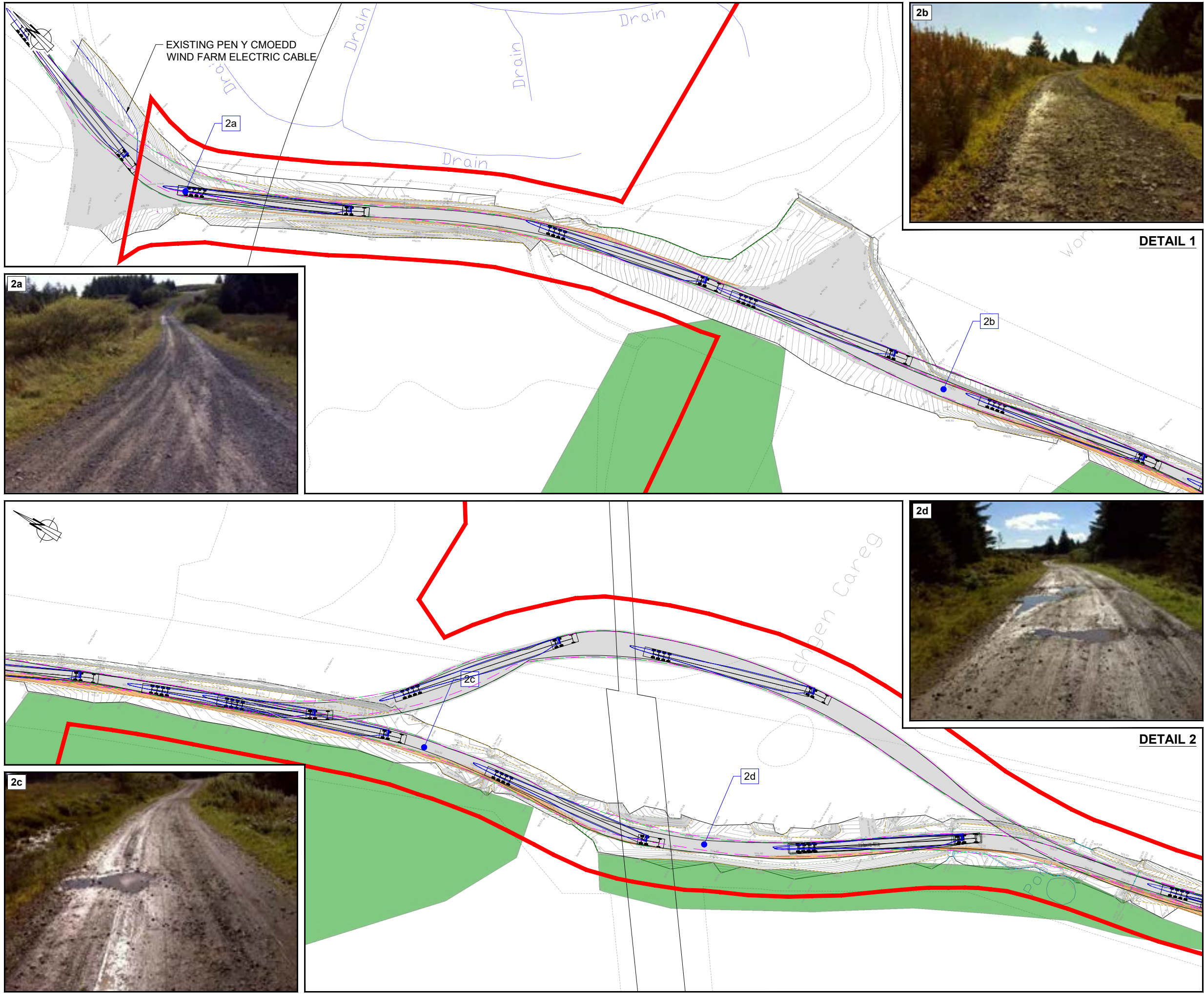
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**UPPER OGMORE
WIND FARM**

FIGURE 9.3

**FORESTRY TRACK WIDENING
PEN Y CYMOEDD WIND FARM
TO SITE**

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KEY:

- PLANNING APPLICATION BOUNDARY
- EXISTING FORESTRY TRACK
- EXISTING FORESTRY
- TOP OF BANK
- BOTTOM OF BANK
- WATERCOURSE
- EXISTING SWALE
- EXISTING CULVERT
- PROPOSED TRACK WIDENING

NOTES:

1. BASED ON "JRC" TOPOGRAPHIC SURVEY DATA; RECEIVED SEPTEMBER 2016.

VEHICLE PATH:

- WHEEL EXTENTS (BLACK)
- BODY/EXTENTS (GREEN)
- DELIVERY VEHICLE (BLACK)
- LOAD (BLUE)
- LOAD EXTENTS (MAGENTA)

ANALYSIS CARRIED OUT FOR:

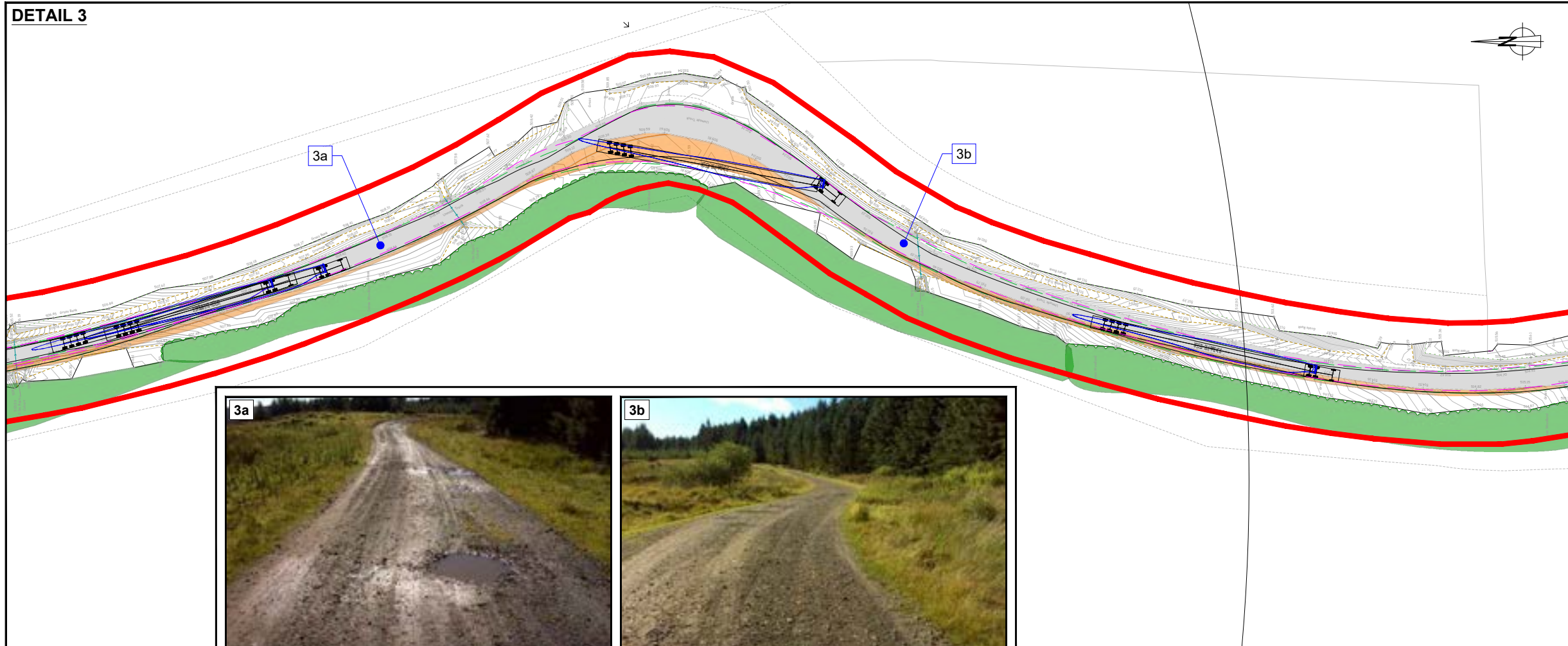
BASED ON 51.3m BLADE VEHICLE EN01-003429 WITH 50° MAXIMUM ARTICULATION ANGLE. ALL VEHICLE DIMENSIONS SHOWN ARE TYPICAL, FOR INDICATION ONLY AND SUBJECT TO CONFIRMATION FOLLOWING TURBINE AND HAULAGE COMPANY SELECTION

NOTE: REAR AXLE MANUAL OVERRIDE USED

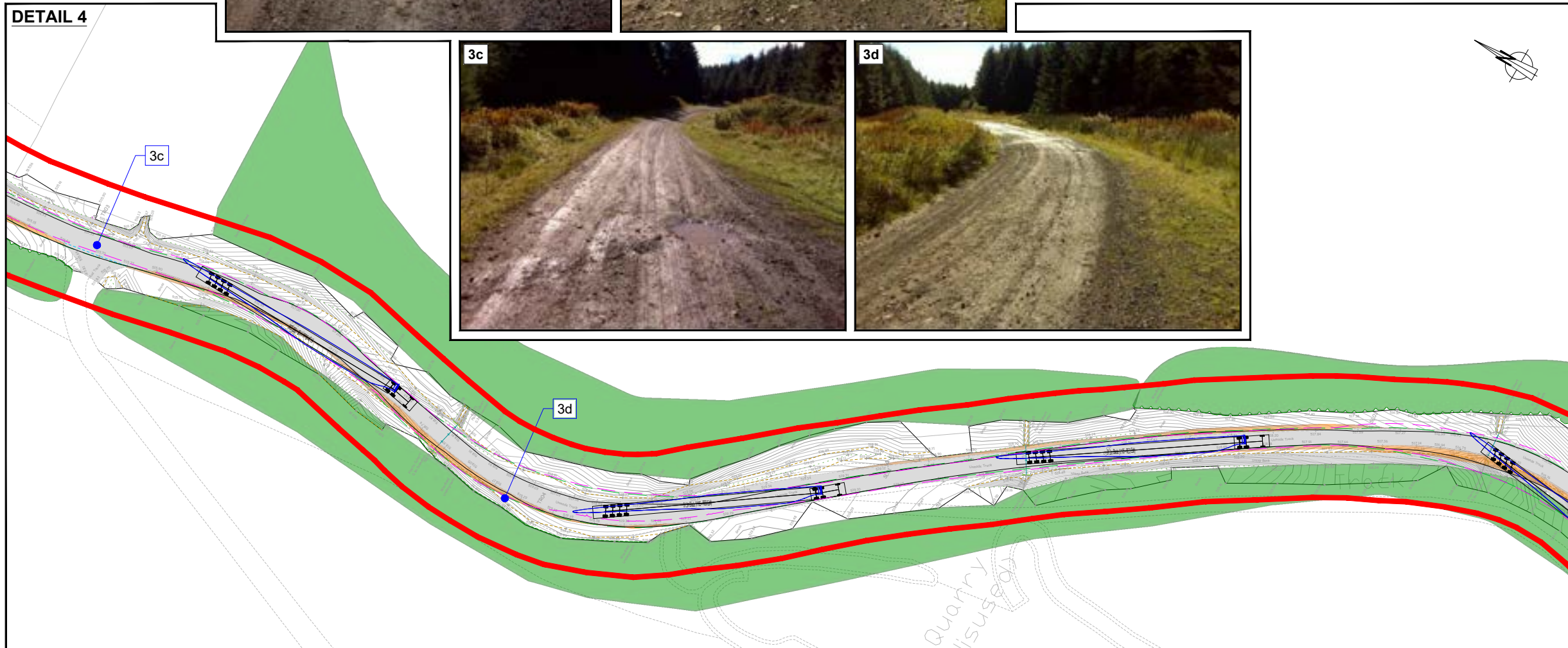
SHEET 2 OF 7

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02959D2404-03			
SCALE - 1:1,000 @ A3			
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DETAIL 3



DETAIL 4



UPPER OGMORE WIND FARM

FIGURE 9.3

FORESTRY TRACK WIDENING PEN Y CYMOEDD WIND FARM TO SITE

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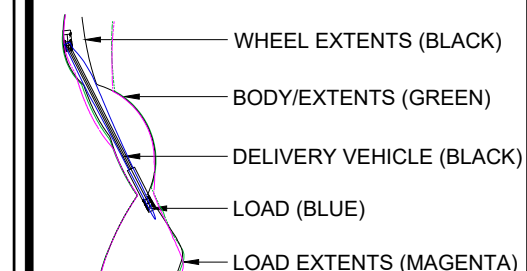
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- EXISTING SWALE
- EXISTING CULVERT
- PROPOSED TRACK WIDENING

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VEHICLE PATH:



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SHEET 3 OF 7

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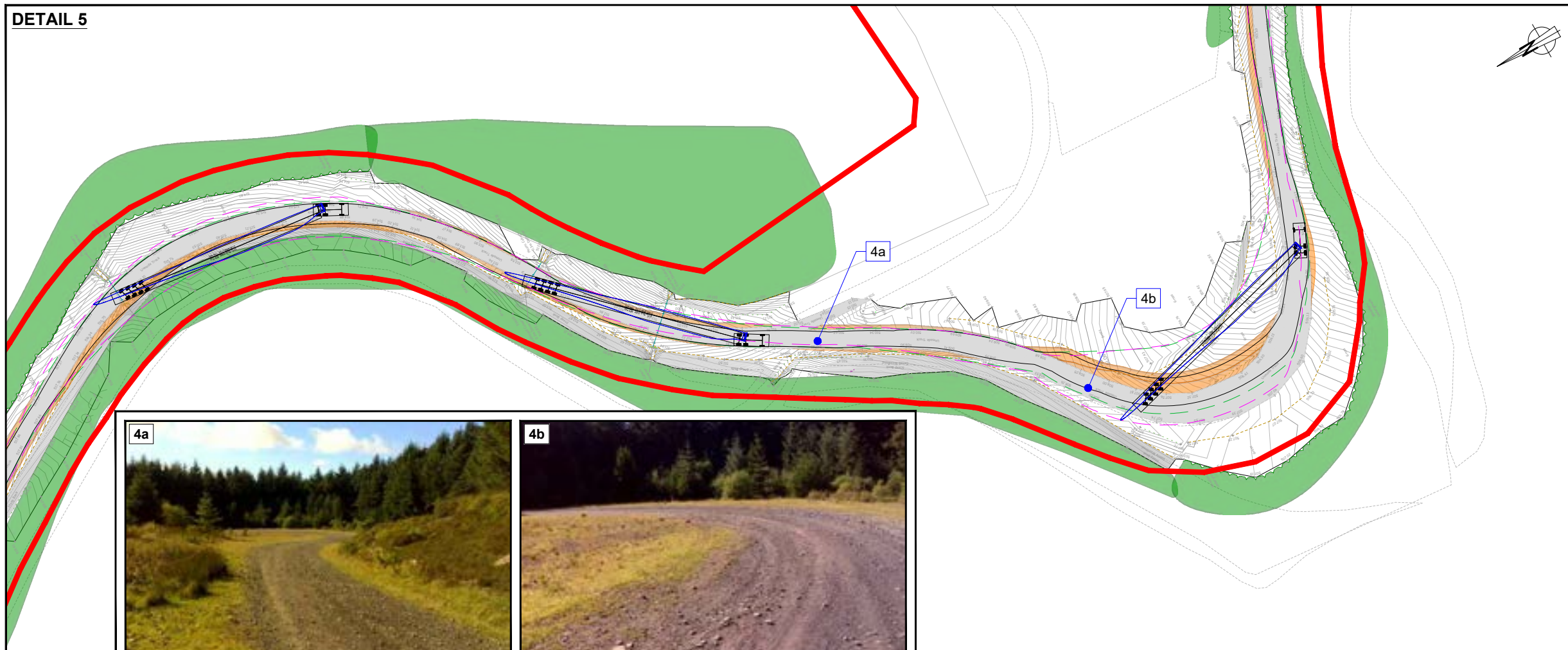
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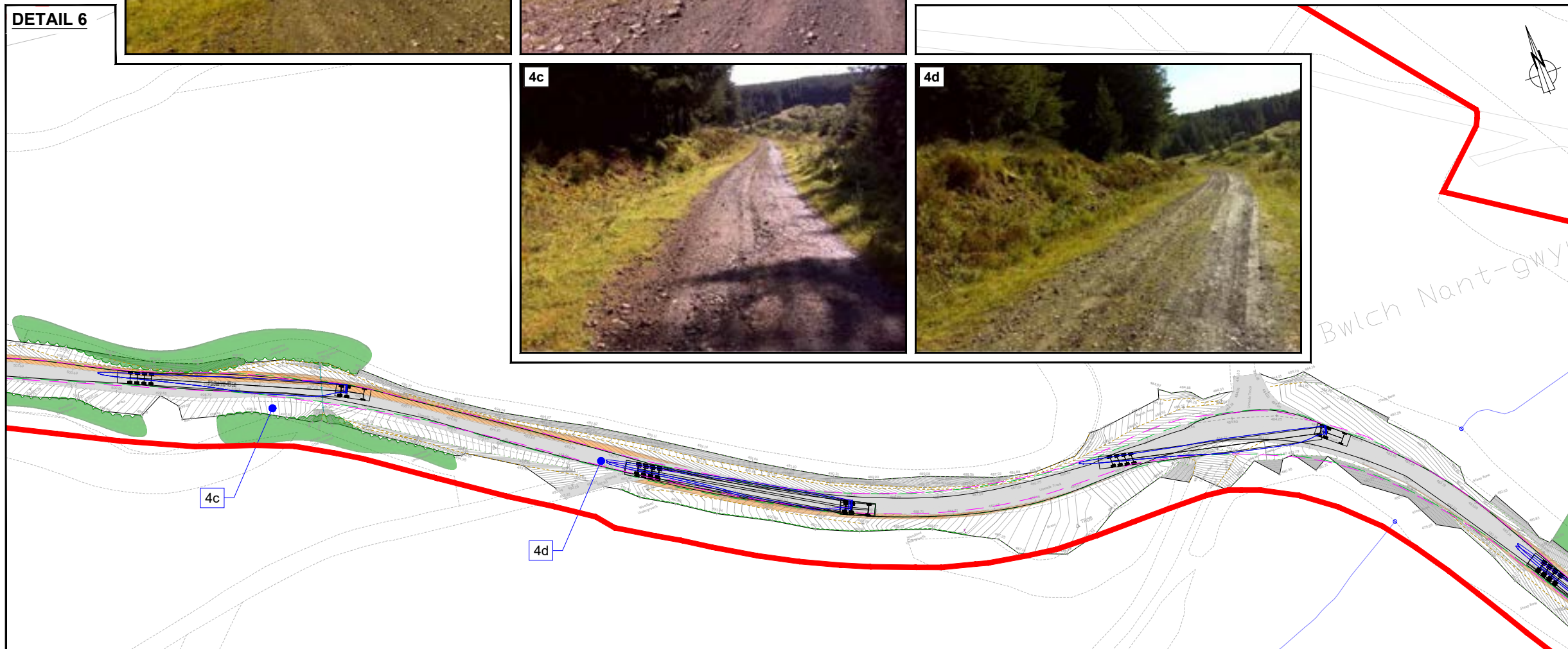
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2020**

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DETAIL 5



DETAIL 6



UPPER OGMORE WIND FARM

FIGURE 9.3

FORESTRY TRACK WIDENING PEN Y CYMOEDD WIND FARM TO SITE

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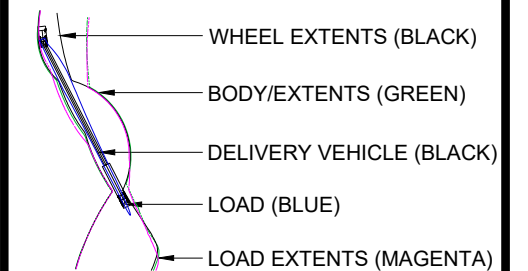
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VEHICLE PATH:



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NOTE: REAR AXLE MANUAL OVERRIDE USED

SHEET 4 OF 7

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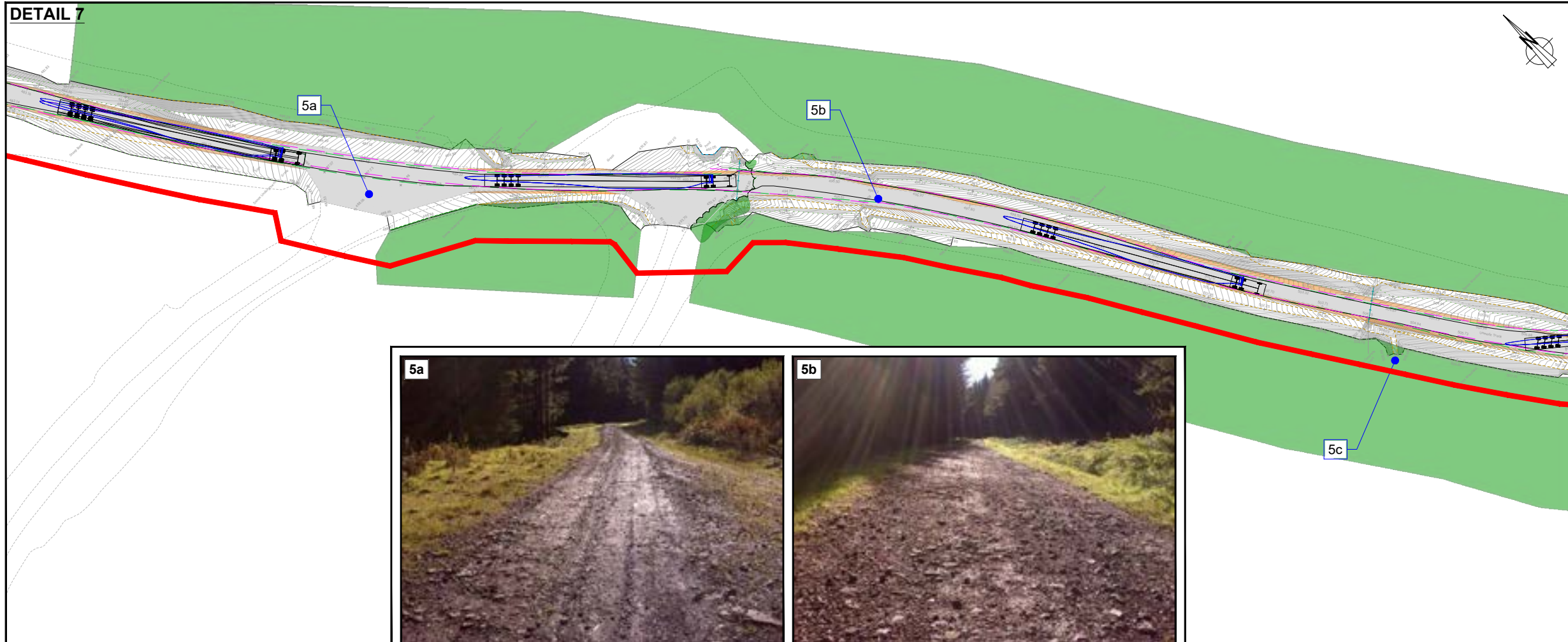
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DETAIL 7



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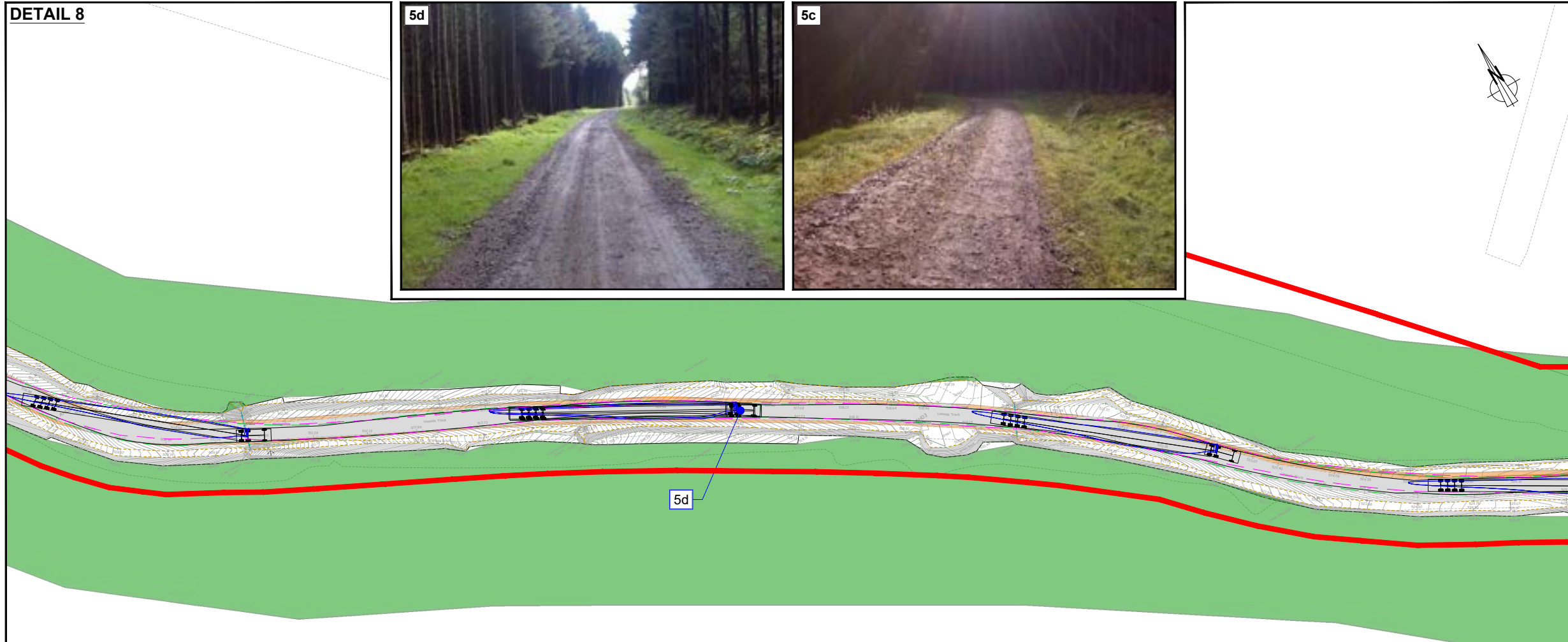


5b



5c

DETAIL 8



5d



5c



UPPER OGMORE WIND FARM

FIGURE 9.3

FORESTRY TRACK WIDENING PEN Y CYMOEDD WIND FARM TO SITE

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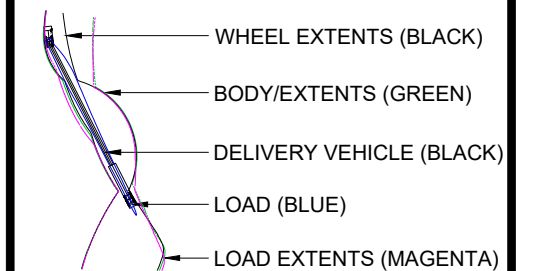
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VEHICLE PATH:



ANALYSIS CARRIED OUT FOR:

BASED ON 51.3m BLADE VEHICLE EN01-003429 WITH 50° MAXIMUM ARTICULATION ANGLE. ALL VEHICLE DIMENSIONS SHOWN ARE TYPICAL, FOR INDICATION ONLY AND SUBJECT TO CONFIRMATION FOLLOWING TURBINE AND HAULAGE COMPANY SELECTION

NOTE: REAR AXLE MANUAL OVERRIDE USED

SHEET 5 OF 7

LAYOUT DWG N/A T-LAYOUT NO. N/A

DRAWING NUMBER
02959D2404-03

SCALE - 1:1,000 @ A3

**ENVIRONMENTAL STATEMENT
2020**

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UPPER OGMORE WIND FARM

FIGURE 9.3

FORESTRY TRACK WIDENING PEN Y CYMOEDD WIND FARM TO SITE

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2018 LICENCE NUMBER 0100031673.

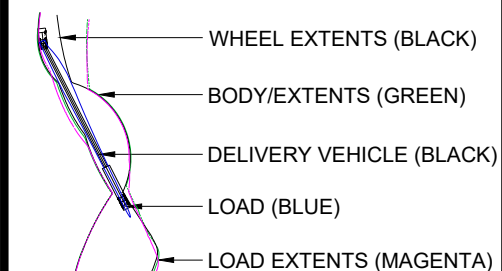
KEY:

- PLANNING APPLICATION BOUNDARY
- EXISTING FORESTRY TRACK
- EXISTING FORESTRY
- TOP OF BANK
- BOTTOM OF BANK
- WATERCOURSE
- EXISTING SWALE
- EXISTING CULVERT
- PROPOSED TRACK WIDENING

NOTES:

- BASED ON "JRC" TOPOGRAPHIC SURVEY DATA; RECEIVED SEPTEMBER 2016.

VEHICLE PATH:



ANALYSIS CARRIED OUT FOR:

BASED ON 51.3m BLADE VEHICLE EN01-003429 WITH 50° MAXIMUM ARTICULATION ANGLE. ALL VEHICLE DIMENSIONS SHOWN ARE TYPICAL, FOR INDICATION ONLY AND SUBJECT TO CONFIRMATION FOLLOWING TURBINE AND HAULAGE COMPANY SELECTION

NOTE: REAR AXLE MANUAL OVERRIDE USED

SHEET 6 OF 7

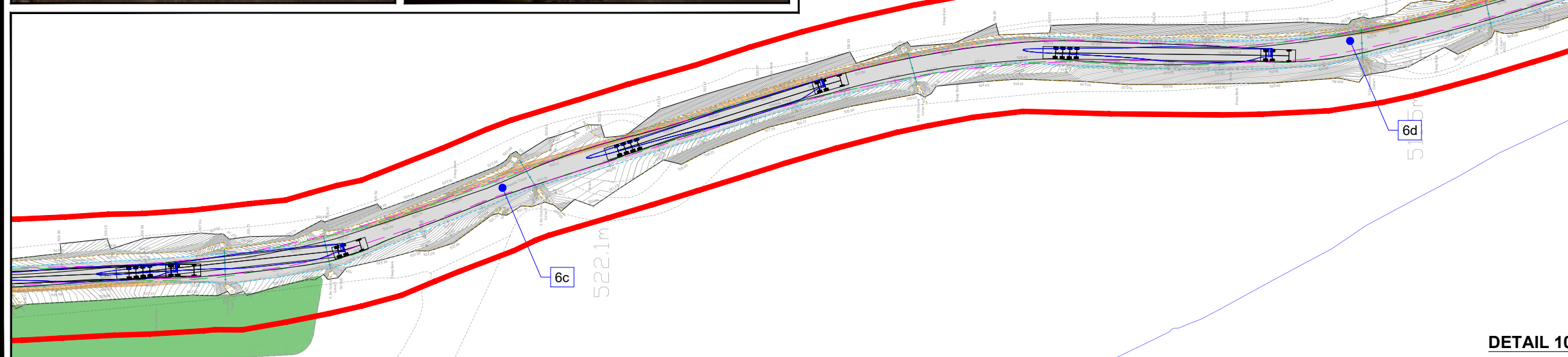
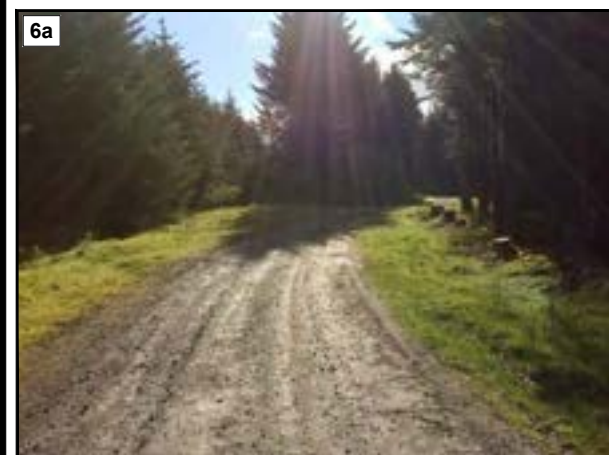
LAYOUT DWG N/A T-LAYOUT NO. N/A

DRAWING NUMBER
02959D2404-03

SCALE - 1:1,000 @ A3

**ENVIRONMENTAL STATEMENT
2020**

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UPPER OGMORE WIND FARM

FIGURE 9.3

FORESTRY TRACK WIDENING PEN Y CYMOEDD WIND FARM TO SITE

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2018 LICENCE NUMBER 0100031673.

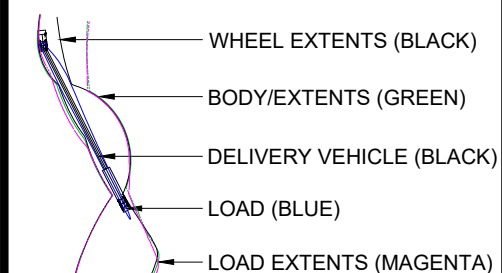
KEY:

- PLANNING APPLICATION BOUNDARY
- EXISTING FORESTRY TRACK
- EXISTING FORESTRY
- TOP OF BANK
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NOTES:

- BASED ON "JRC" TOPOGRAPHIC SURVEY DATA; RECEIVED SEPTEMBER 2016.

VEHICLE PATH:



ANALYSIS CARRIED OUT FOR:

BASED ON 51.3m BLADE VEHICLE EN01-003429
WITH 50° MAXIMUM ARTICULATION ANGLE.
ALL VEHICLE DIMENSIONS SHOWN ARE
TYPICAL, FOR INDICATION ONLY AND SUBJECT
TO CONFIRMATION FOLLOWING TURBINE AND
HAULAGE COMPANY SELECTION

NOTE: REAR AXLE MANUAL OVERRIDE USED

SHEET 7 OF 7

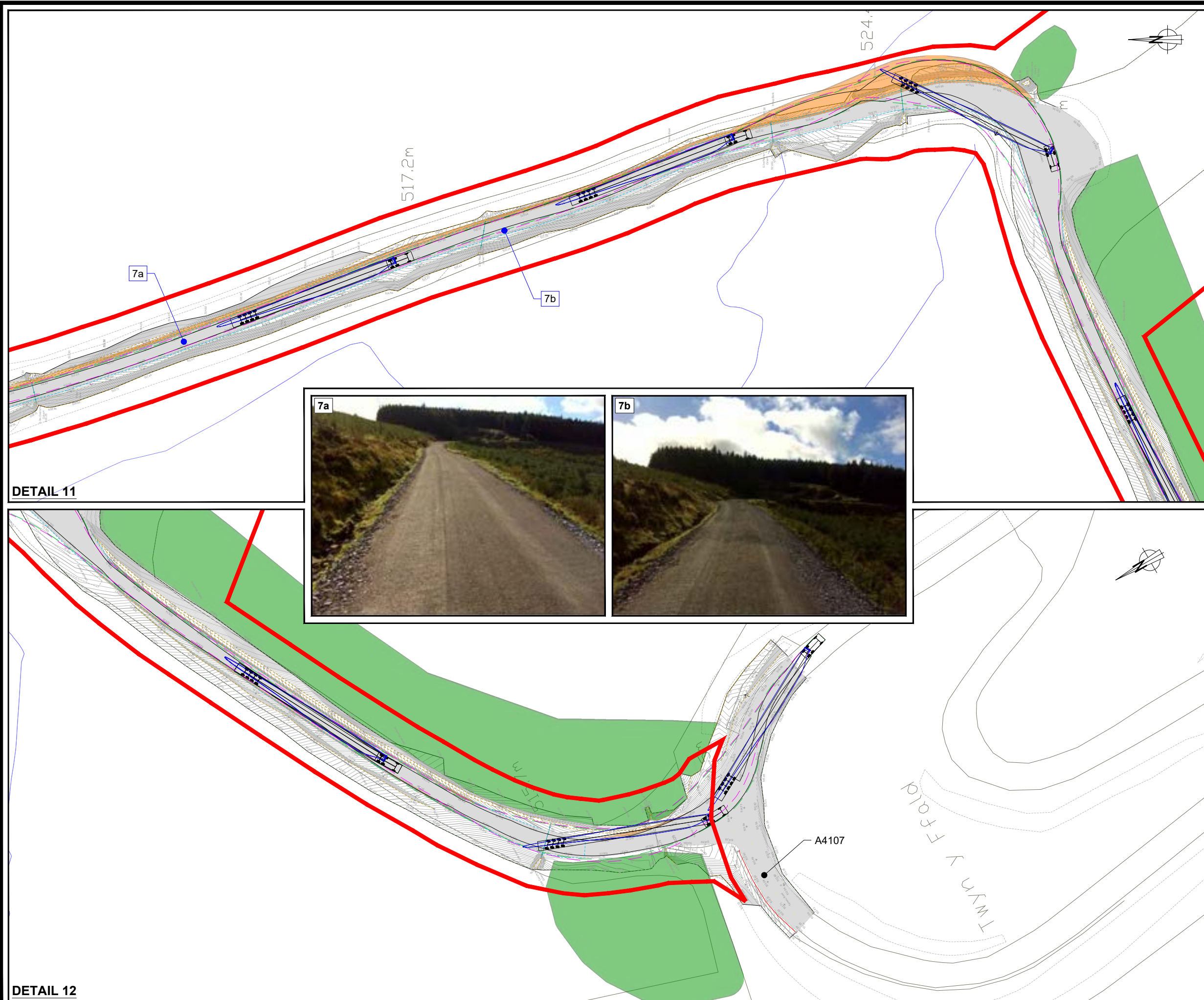
LAYOUT DWG N/A T-LAYOUT NO. N/A

DRAWING NUMBER
02959D2404-03

SCALE - 1:1,000 @ A3

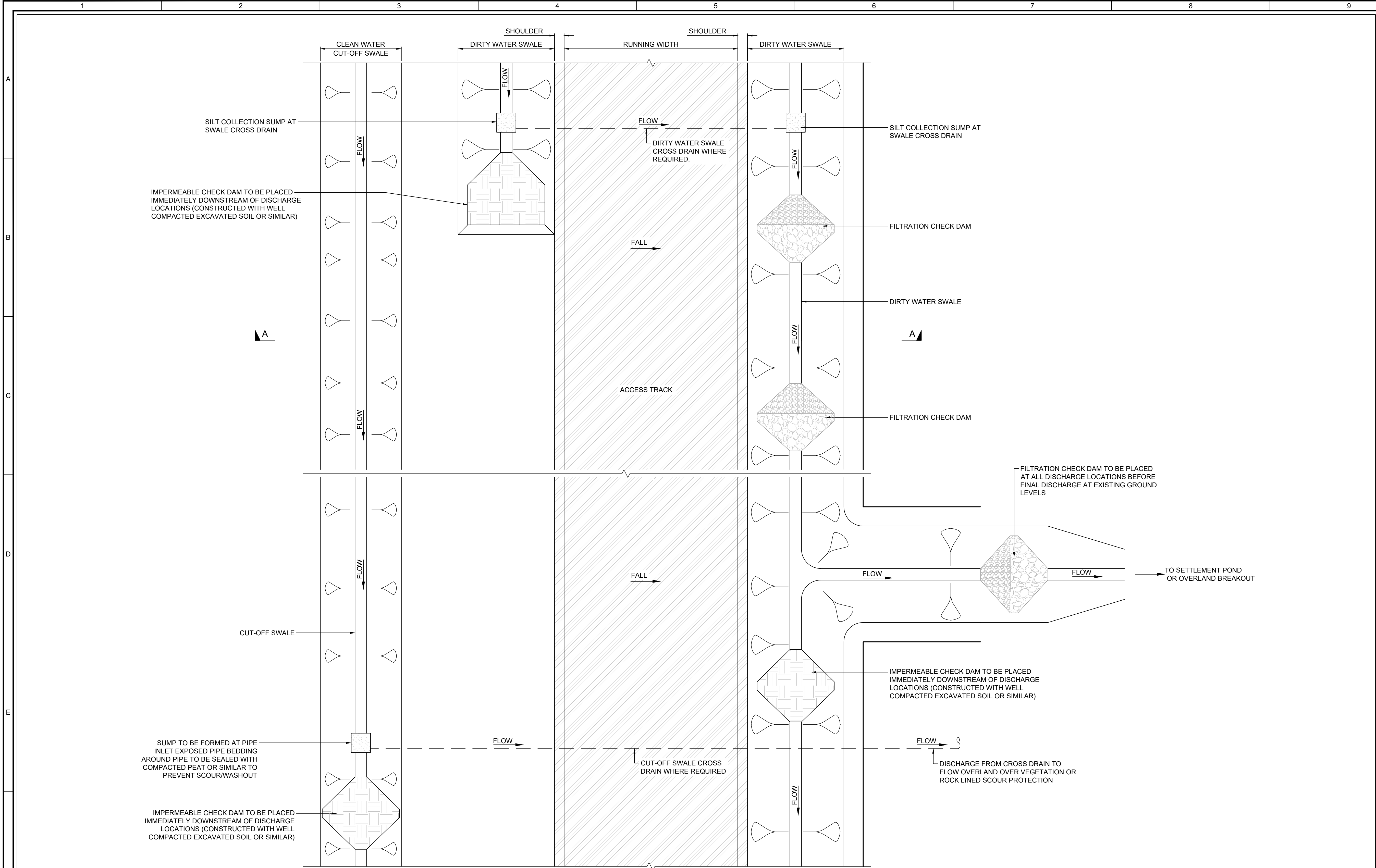
**ENVIRONMENTAL STATEMENT
2020**

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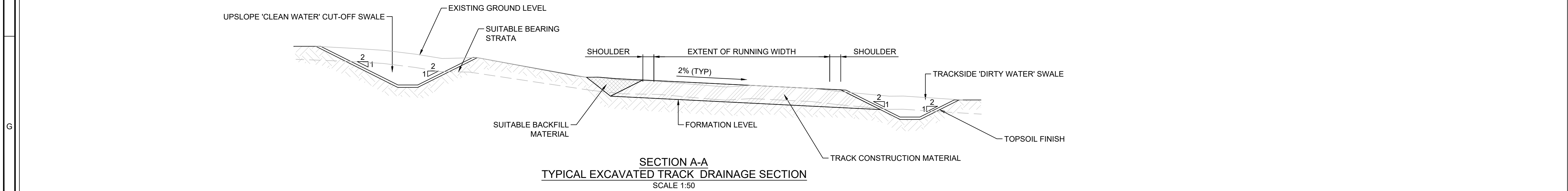


DETAIL 11

DETAIL 12






TYPICAL EXCAVATED TRACK SURFACE WATER DRAINAGE PLAN
SCALE 1:50

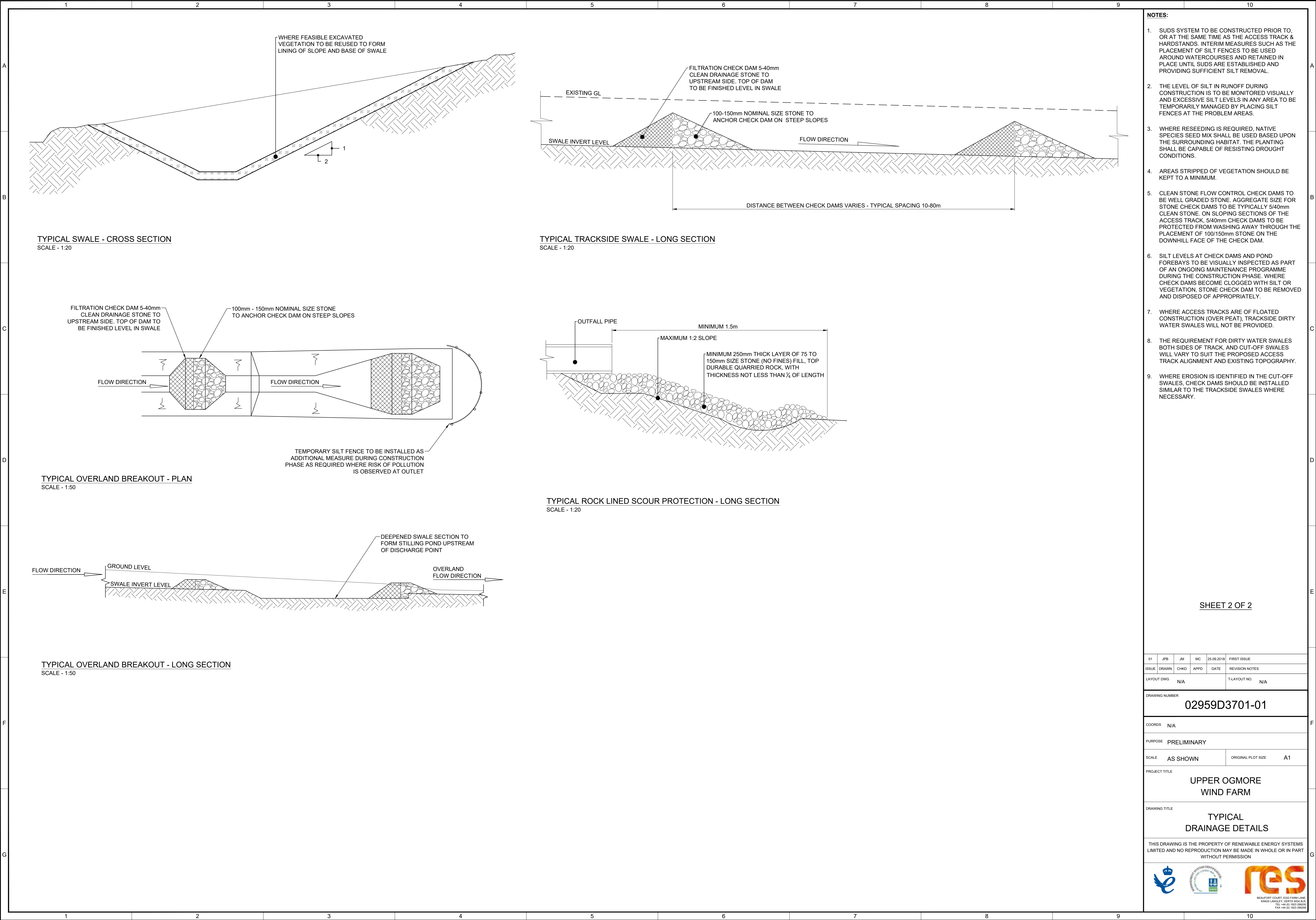


SECTION A-A
TYPICAL EXCAVATED TRACK DRAINAGE SECTION
SCALE 1:50




- NOTES:**
- SUDS SYSTEM TO BE CONSTRUCTED PRIOR TO, OR AT THE SAME TIME AS THE ACCESS TRACK & HARDSTANDS. INTERIM MEASURES SUCH AS THE PLACEMENT OF SILT FENCES TO BE USED AROUND WATERCOURSES AND RETAINED IN PLACE UNTIL SUDS ARE ESTABLISHED AND PROVIDING SUFFICIENT SILT REMOVAL.
 - THE LEVEL OF SILT IN RUNOFF DURING CONSTRUCTION IS TO BE MONITORED VISUALLY AND EXCESSIVE SILT LEVELS IN ANY AREA TO BE TEMPORARILY MANAGED BY PLACING SILT FENCES AT THE PROBLEM AREAS.
 - WHERE RESEEDING IS REQUIRED, NATIVE SPECIES SEED MIX SHALL BE USED BASED UPON THE SURROUNDING HABITAT. THE PLANTING SHALL BE CAPABLE OF RESISTING DROUGHT CONDITIONS.
 - AREAS STRIPPED OF VEGETATION SHOULD BE KEPT TO A MINIMUM.
 - CLEAN STONE FLOW CONTROL CHECK DAMS TO BE WELL GRADED STONE. AGGREGATE SIZE FOR STONE CHECK DAMS TO BE TYPICALLY 5/40mm CLEAN STONE. ON SLOPING SECTIONS OF THE ACCESS TRACK, 5/40mm CHECK DAMS TO BE PROTECTED FROM WASHING AWAY THROUGH THE PLACEMENT OF 100/150mm STONE ON THE DOWNHILL FACE OF THE CHECK DAM.
 - SILT LEVELS AT CHECK DAMS AND POND FOREBAYS TO BE VISUALLY INSPECTED AS PART OF AN ONGOING MAINTENANCE PROGRAMME DURING THE CONSTRUCTION PHASE. WHERE CHECK DAMS BECOME CLOGGED WITH SILT OR VEGETATION, STONE CHECK DAM TO BE REMOVED AND DISPOSED OF APPROPRIATELY.
 - WHERE ACCESS TRACKS ARE OF FLOATED CONSTRUCTION (OVER PEAT), TRACKSIDE DIRTY WATER SWALES WILL NOT BE PROVIDED.
 - THE REQUIREMENT FOR DIRTY WATER SWALES BOTH SIDES OF TRACK, AND CUT-OFF SWALES WILL VARY TO SUIT THE PROPOSED ACCESS TRACK ALIGNMENT AND EXISTING TOPOGRAPHY.
 - WHERE EROSION IS IDENTIFIED IN THE CUT-OFF SWALES, CHECK DAMS SHOULD BE INSTALLED SIMILAR TO THE TRACKSIDE SWALES WHERE NECESSARY.

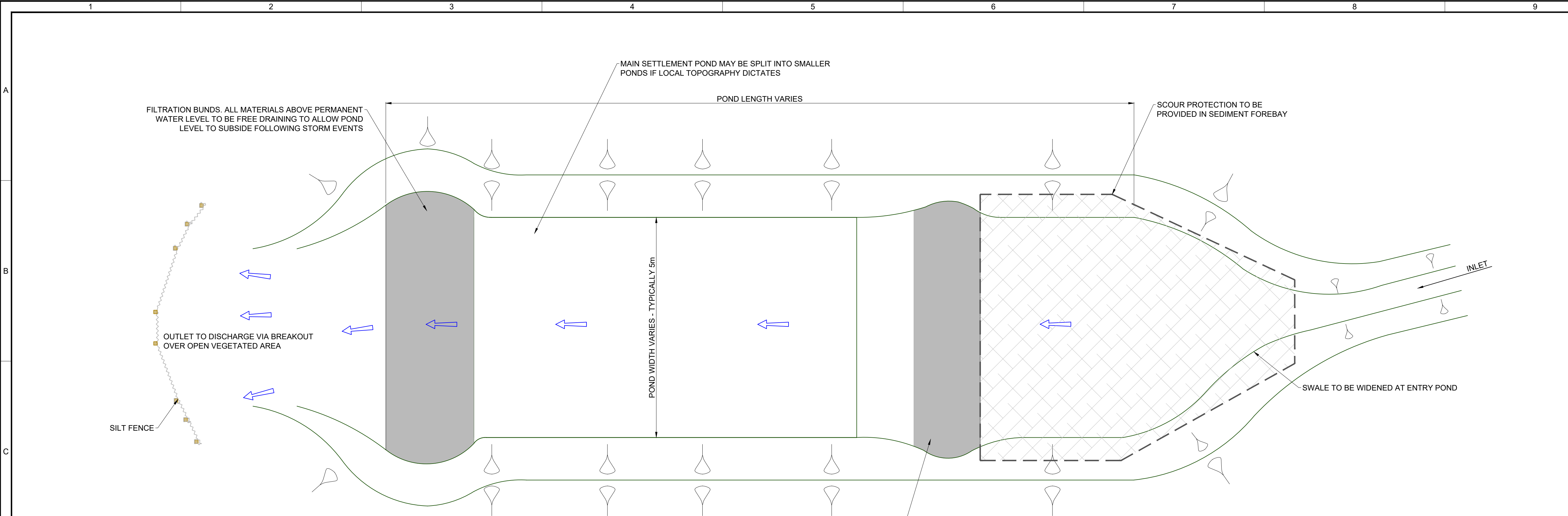
SHEET 1 OF 2

	JPB	JM	MC	25.09.2018	FIRST ISSUE
ISSUE	DRAWN	CHKD	APPD	DATE	REVISION NOTES
LAYOUT DWG	N/A			T-LAYOUT NO.	N/A
DRAWING NUMBER					
02959D3701-01					
COORDS					
N/A					
PURPOSE					
PRELIMINARY					
SCALE				ORIGINAL PLOT SIZE	A1
1:50					
PROJECT TITLE					
UPPER OGMORE WIND FARM					
DRAWING TITLE					
TYPICAL DRAINAGE DETAILS					
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BEAUFORT COURT, EGGS FARM LANE, KINGS LANGLEY, HERTS WD16 8JA TEL: +44 (0) 1825 282020 FAX: +44 (0) 1825 282024					

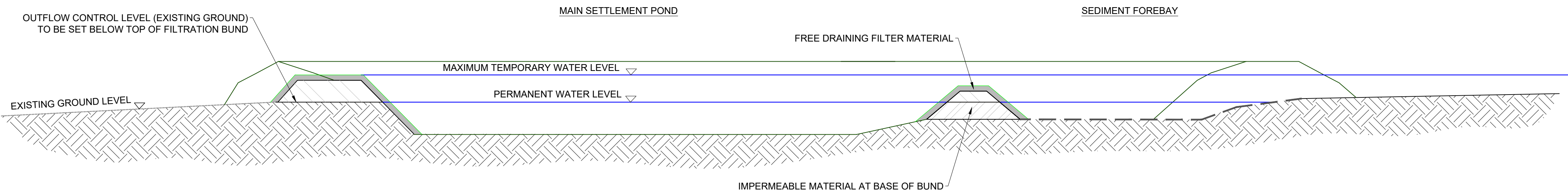


- NOTES:**
- SUDS SYSTEM TO BE CONSTRUCTED PRIOR TO, OR AT THE SAME TIME AS THE ACCESS TRACK & HARDSTANDS. INTERIM MEASURES SUCH AS THE PLACEMENT OF SILT FENCES TO BE USED AROUND WATERCOURSES AND RETAINED IN PLACE UNTIL SUDS ARE ESTABLISHED AND PROVIDING SUFFICIENT SILT REMOVAL.
 - THE LEVEL OF SILT IN RUNOFF DURING CONSTRUCTION IS TO BE MONITORED VISUALLY AND EXCESSIVE SILT LEVELS IN ANY AREA TO BE TEMPORARILY MANAGED BY PLACING SILT FENCES AT THE PROBLEM AREAS.
 - WHERE RESEEDING IS REQUIRED, NATIVE SPECIES SEED MIX SHALL BE USED BASED UPON THE SURROUNDING HABITAT. THE PLANTING SHALL BE CAPABLE OF RESISTING DROUGHT CONDITIONS.
 - AREAS STRIPPED OF VEGETATION SHOULD BE KEPT TO A MINIMUM.
 - CLEAN STONE FLOW CONTROL CHECK DAMS TO BE WELL GRADED STONE. AGGREGATE SIZE FOR STONE CHECK DAMS TO BE TYPICALLY 5/40mm CLEAN STONE. ON SLOPING SECTIONS OF THE ACCESS TRACK, 5/40mm CHECK DAMS TO BE PROTECTED FROM WASHING AWAY THROUGH THE PLACEMENT OF 100/150mm STONE ON THE DOWNHILL FACE OF THE CHECK DAM.
 - SILT LEVELS AT CHECK DAMS AND POND FOREBAYS TO BE VISUALLY INSPECTED AS PART OF AN ONGOING MAINTENANCE PROGRAMME DURING THE CONSTRUCTION PHASE. WHERE CHECK DAMS BECOME CLOGGED WITH SILT OR VEGETATION, STONE CHECK DAM TO BE REMOVED AND DISPOSED OF APPROPRIATELY.
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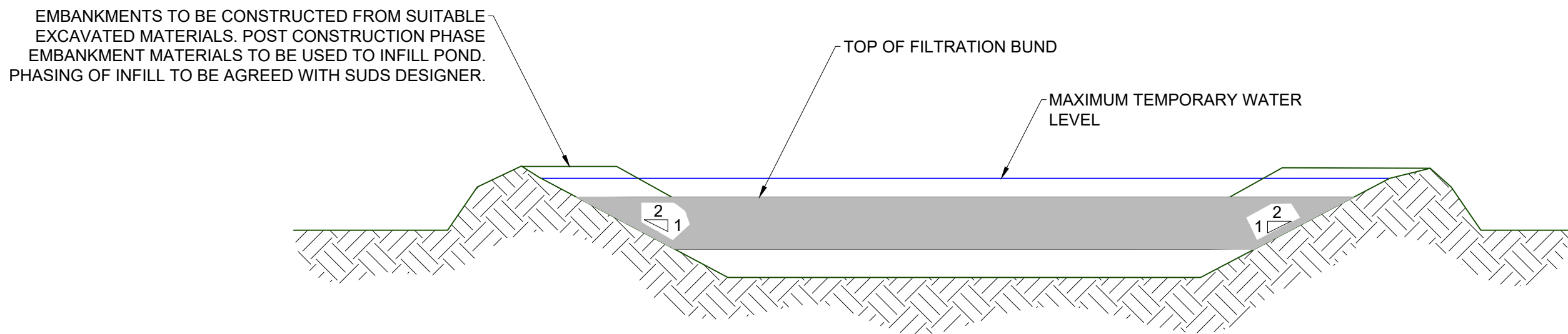
01	JPB	JM	MC	25.09.2018	FIRST ISSUE
ISSUE	DRAWN	CHKD	APPD	DATE	REVISION NOTES
LAYOUT DWG	N/A			T-LAYOUT NO.	N/A
DRAWING NUMBER					
02959D3701-01					
COORDS N/A					
PURPOSE PRELIMINARY					
SCALE	AS SHOWN			ORIGINAL PLOT SIZE	A1
PROJECT TITLE					
UPPER OGMORE WIND FARM					
DRAWING TITLE					
TYPICAL DRAINAGE DETAILS					
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TYPICAL SETTLEMENT POND DETAIL - PLAN
SCALE - 1:50



TYPICAL SETTLEMENT POND DETAIL - LONG SECTION
SCALE - 1:50



TYPICAL SETTLEMENT POND DETAIL - CROSS SECTION
SCALE - 1:50

NOTES:

1. SUDS SYSTEM TO BE CONSTRUCTED PRIOR TO, OR AT THE SAME TIME AS THE ACCESS ROAD & HARDSTANDINGS. INTERIM MEASURES SUCH AS THE PLACEMENT OF SILT FENCES TO BE USED AROUND WATERCOURSES AND RETAINED IN PLACE UNTIL SUDS ARE ESTABLISHED AND PROVIDING SUFFICIENT SILT REMOVAL.
2. SETTLEMENT PONDS TO BE CONSTRUCTED IN A MANNER WHEREBY THEY MAY BE EASILY INFILLED AT A LATER DATE (POST COMPLETION OF THE ACCESS ROAD CONSTRUCTION). ONLY SUITABLE MATERIALS EXCAVATED FROM THE POND TO BE USED TO FORM PART OF THE EMBANKMENT AROUND THE POND.
3. THE LEVEL OF SILT IN RUNOFF DURING CONSTRUCTION IS TO BE MONITORED VISUALLY AND EXCESSIVE SILT LEVELS IN ANY AREA TO BE TEMPORARILY MANAGED BY PLACING SILT FENCES AT THE PROBLEM AREAS.
4. SILT LEVELS AT CHECK DAMS AND POND FOREBAYS TO BE VISUALLY INSPECTED AS PART OF AN ONGOING MAINTENANCE PROGRAMME DURING THE CONSTRUCTION PHASE. WHERE CHECK DAMS BECOME CLOGGED WITH SILT OR VEGETATION, STONE CHECK DAM TO BE REMOVED AND DISPOSED OF APPROPRIATELY.

01	JPB	JM	MC	24.09.2018	FIRST ISSUE
ISSUE	DRAWN	CHKD	APPD	DATE	REVISION NOTES
LAYOUT DWG	N/A			T-LAYOUT NO.	N/A

DRAWING NUMBER
02959D3703-01

COORDS N/A

PURPOSE PRELIMINARY

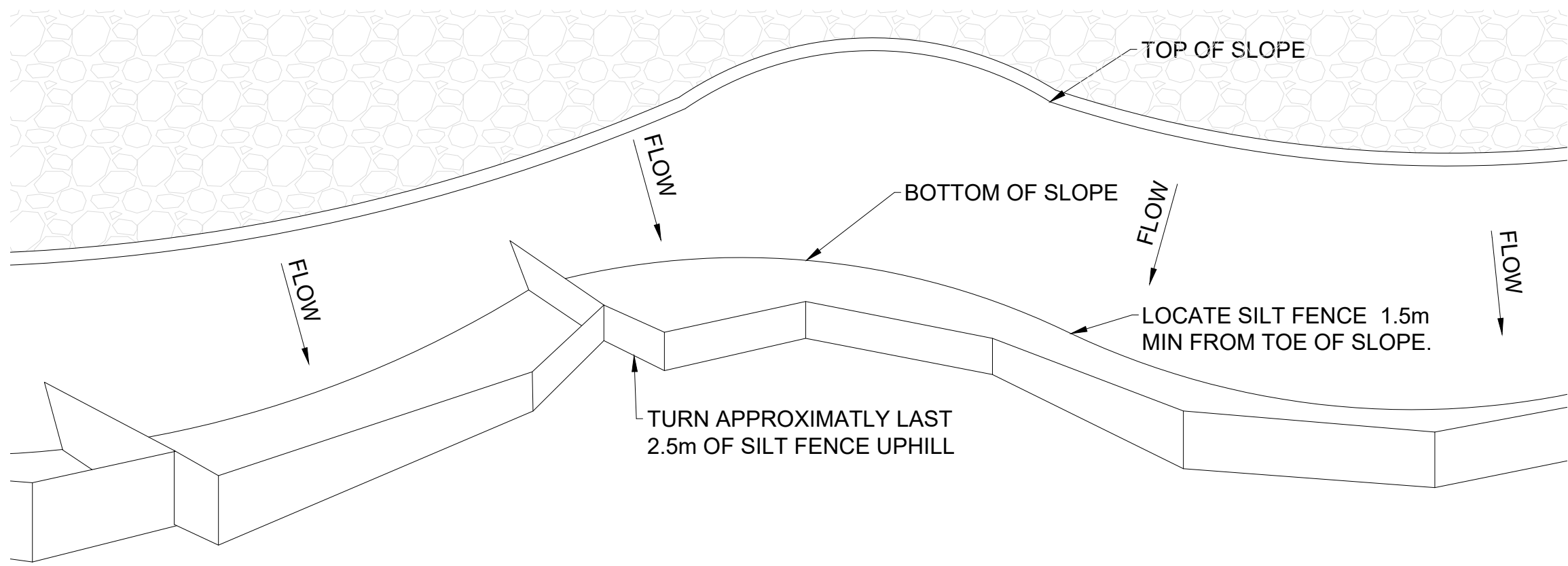
SCALE 1:50 ORIGINAL PLOT SIZE A1

PROJECT TITLE
**UPPER OGMORE
WIND FARM**

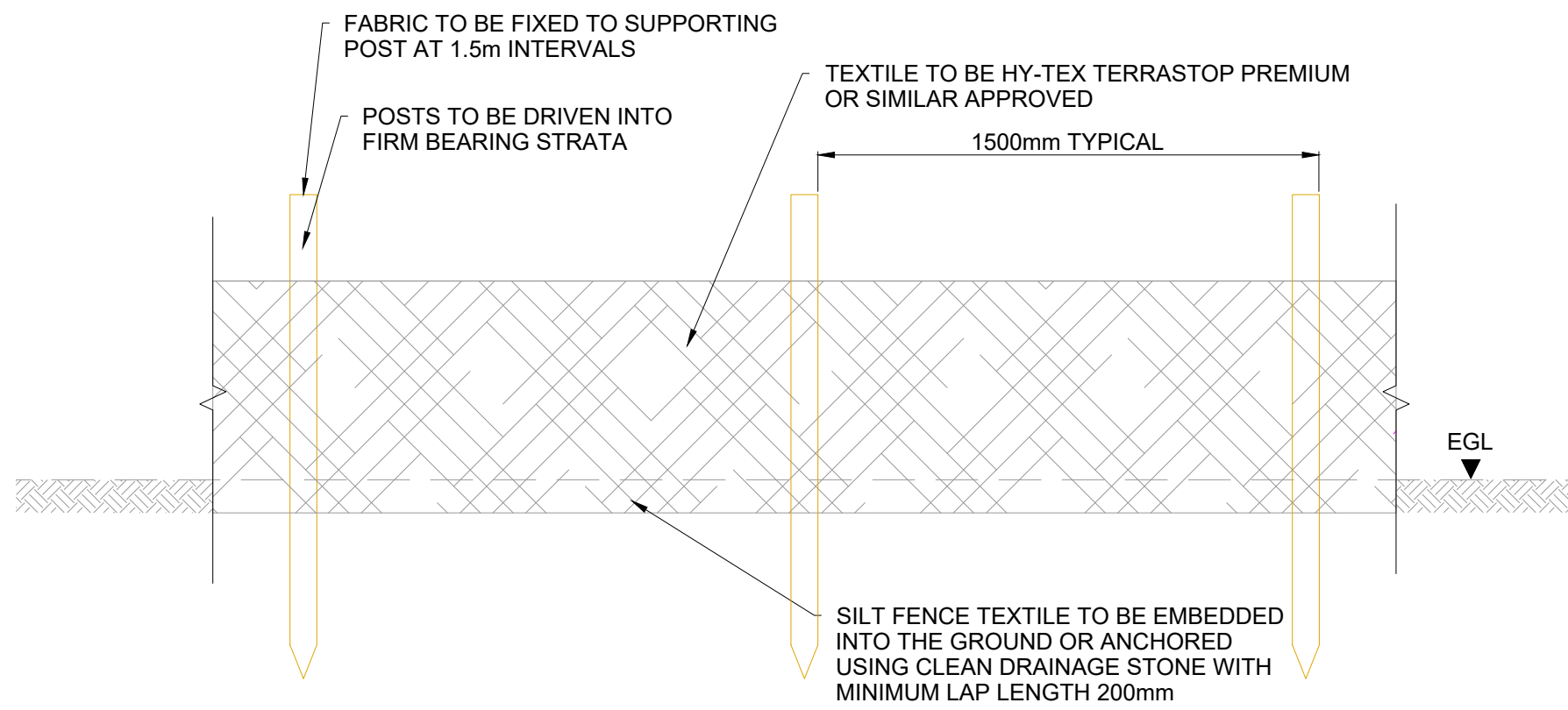
DRAWING TITLE
**TYPICAL SETTLEMENT
POND DETAILS**

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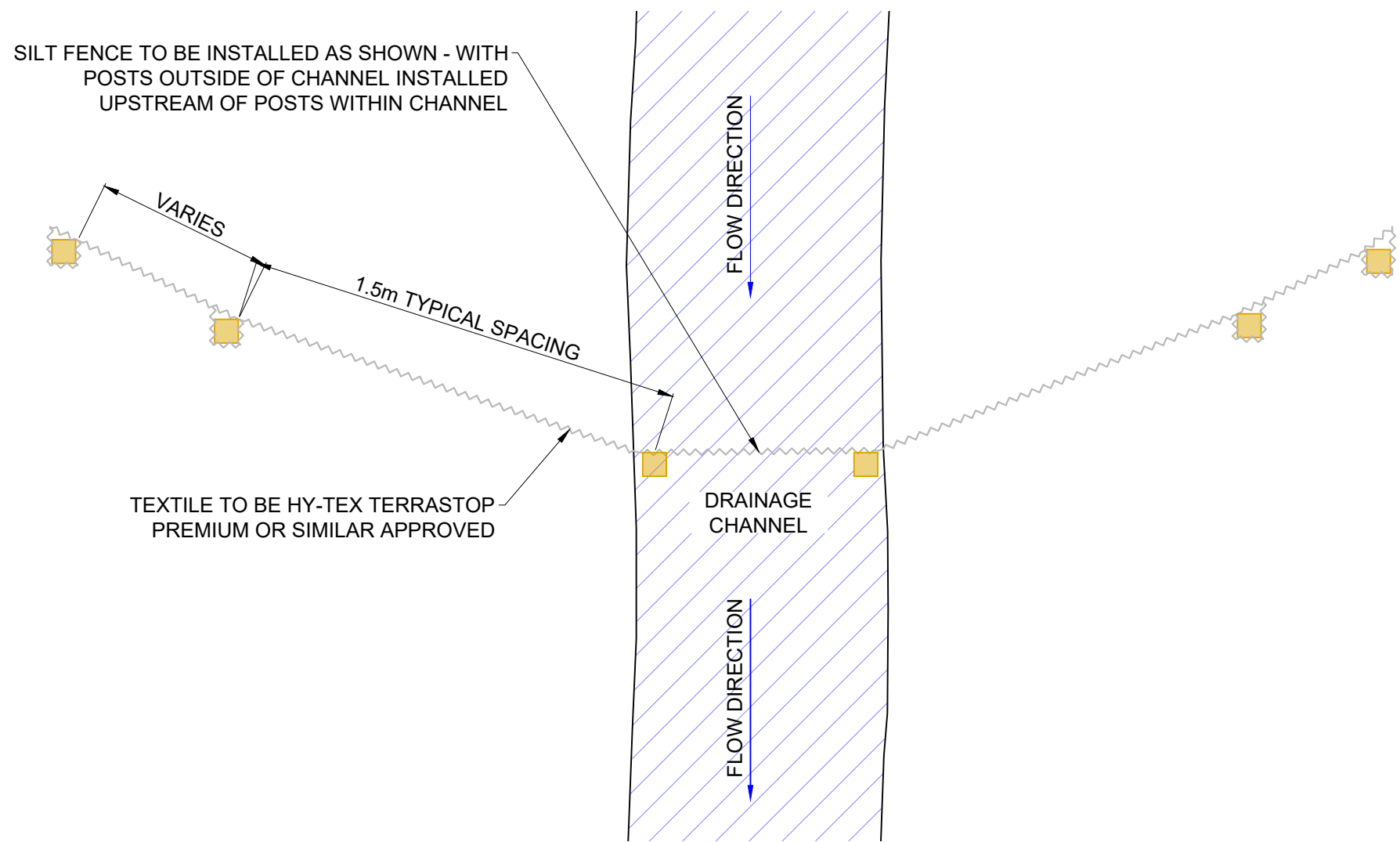




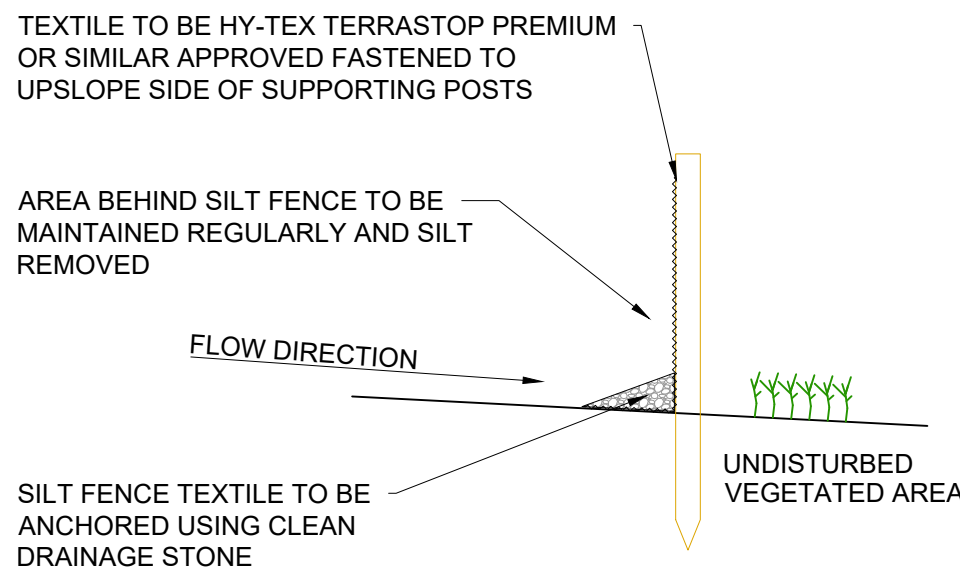
TYPICAL SILT FENCE BOTTOM OF SLOPE
SCALE - NTS



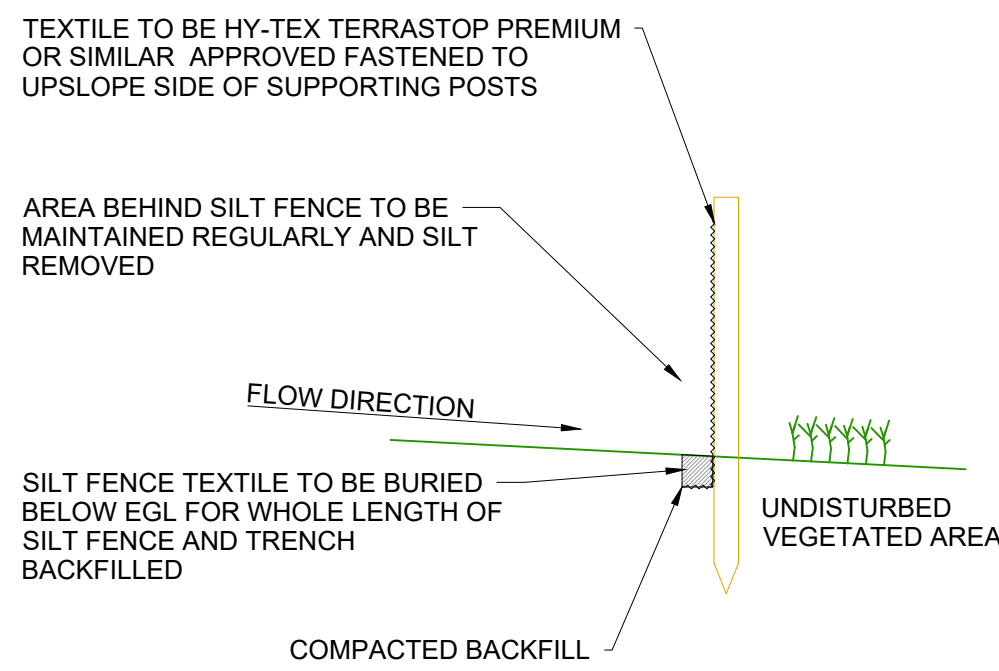
SILT FENCE TEXTILE DETAIL
SCALE 1:20



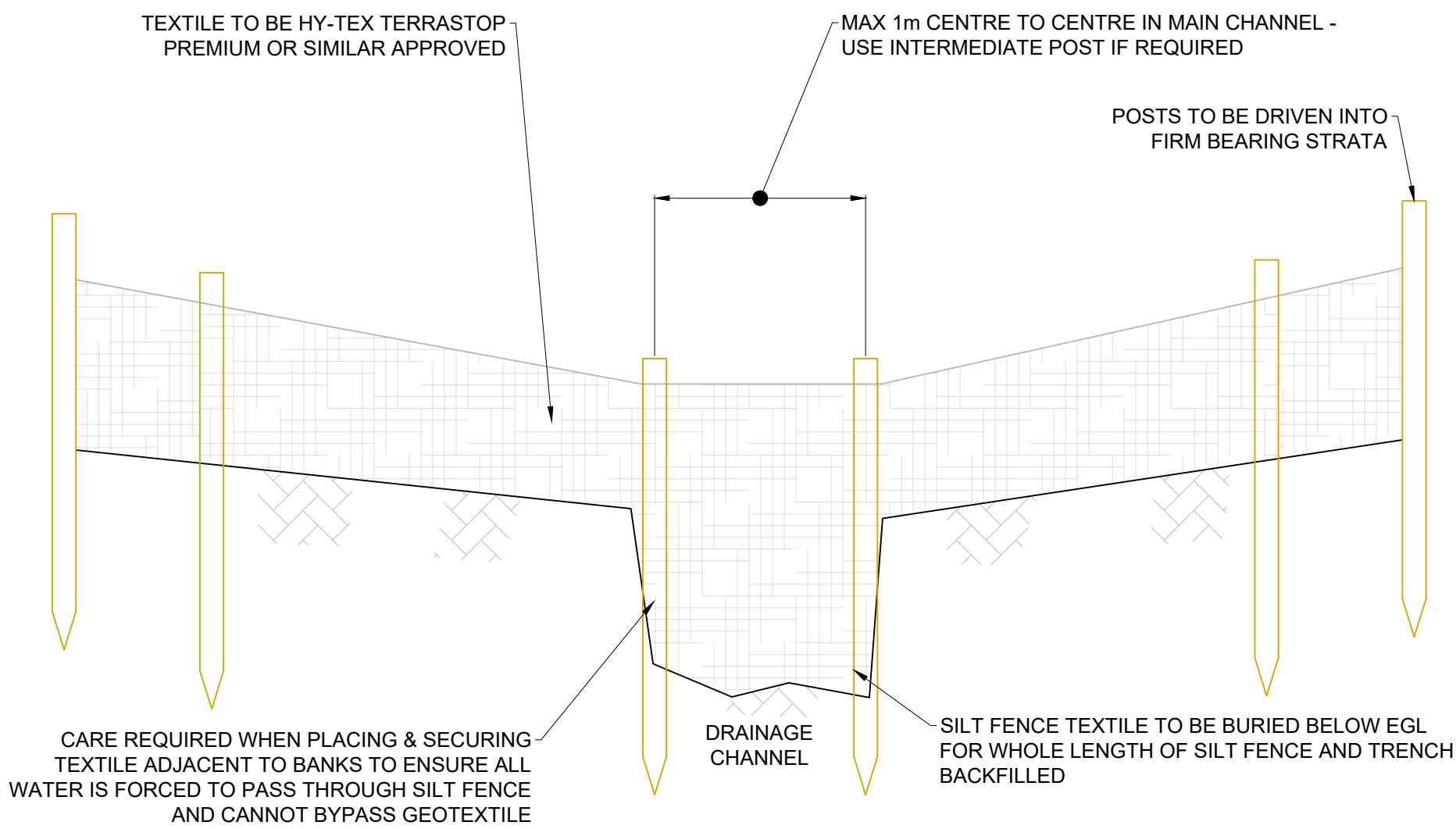
TYPICAL CHANNEL SILT FENCE PLAN
SCALE - 1:20



ANCHORED TYPE OPTION
SCALE 1:25



BURIED TYPE OPTION
SCALE 1:25



TYPICAL CHANNEL SILT FENCE ELEVATION
SCALE - 1:20

NOTES:

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- THE LEVEL OF SILT IN RUNOFF DURING CONSTRUCTION IS TO BE MONITORED VISUALLY AND EXCESSIVE SILT LEVELS IN ANY AREA TO BE TEMPORARILY MANAGED BY PLACING SILT FENCES AT THE PROBLEM AREAS.

01	JPB	JM	MC	25.09.2018	FIRST ISSUE
ISSUE	DRAWN	CHKD	APPD	DATE	REVISION NOTES
LAYOUT DWG	N/A			T-LAYOUT NO.	N/A

DRAWING NUMBER
02959D3702-01

COORDS N/A

PURPOSE PRELIMINARY

SCALE AS SHOWN ORIGINAL PLOT SIZE A1

PROJECT TITLE
UPPER OGMORE WIND FARM

DRAWING TITLE
TEMPORARY SILT FENCE DETAILS

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Emergency Procedure in the Event of a Contaminant Spillage

Report No: 01276R00001

Revision History

Issue	Date	Nature And Location Of Change
01 - 08	28/02/03 – 17/05/11	For Revision histories 01 – 08 refer to Issue 09
09	2/8/14	Reviewed and updated to reflect current RES process and changes to the IMS
10	25/8/16	Updated to amalgamate where possible

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3.1	<i>Project, Site or Office Locations</i>	<i>1</i>
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1.0 OBJECTIVES

This procedure details the emergency procedure to be followed and actions to be taken in the event of a hazardous waste spillage such as oil, fuel and chemicals, occurring on a RES managed premises or site / project in order that the environmental impacts that may be associated with a hazardous waste spillage may be mitigated.

2.0 SCOPE

This procedure covers all UK geographic locations; sites, project or offices for which RES are responsible for or manage.

3.0 PROCEDURE

3.1 Project, Site or Office Locations

		Responsibility
i)	<p>The Contractor shall provide MSDS and COSHH assessments for all substances controlled under COSHH that are to be used or stored on the site.</p> <p>Records of the supplied MSDS & CoSHH Assessments shall be maintained.</p> <p>Note: Substances with hazardous properties such as cement, concrete and curing agents are all controlled by the COSHH.</p>	C
ii)	<p>Appropriately sized spill kits shall be provided for the controlled substances that will be used or stored on the site; the contractor shall train personnel in the use of these spill kits and maintain training records.</p>	C RRM
iii)	<p>The Contractor shall provide oil spill training and awareness to their staff</p> <p>RES have subscribed to an emergency environmental call-off support service from Veolia to be used the event of a major spill, details included in Project Directory or can be provided by the HSQEM.</p>	C, HSQEM
iv)	<p>In the event of a liquid spill occurring the Contractor shall cease work in the vicinity immediately.</p> <p>If spillage is flammable, extinguish all ignition sources.</p> <p>Identify source of pollution and rectify the problem.</p> <p>The Contractor's trained personnel shall immediately deploy the spill kit in accordance with the manufacturer's instructions.</p> <p>Contractor's personnel shall don appropriate PPE and clean up the spill.</p> <p>All used spill kit materials should be disposed of in the proper manner.</p>	C

v)	<p>In the event of a concrete spillage into water channel or surface water, as the waste is highly alkaline it is regarded as Hazardous Waste. Every effort should be made to contain the movement of the liquid cement in the watercourse or drainage channel.</p> <p>Similarly in the event of a Peat / Spoil Movement / Slip into a water course; remove any peat or clay material which has entered the watercourse and transport to a location where it will no longer be a source of pollution.</p> <p>Notify the following agencies; Environmental Agency (region specific; EA, SEPA or NIEA etc), local Fisheries.</p>	RRM, C
vi)	<p>Place geotextile silt fences/stone barrages at downstream points in the river as required.</p> <p>Constant monitoring should be maintained not only of the water quality (clarity) downstream of the check dams, but also of the excavated peat or clay material.</p> <p>Consideration should also be given to the subsequent movement of the spoil / peat and any preventative / containment measures required.</p>	RRM
vii)	The Contractor shall inform the RRM of the incident as soon as possible and certainly no more than 1 hour after the spill.	C
viii)	The Contractor is responsible for replacing the used spill kits as soon as possible and no later than 24 hours after use.	C
ix)	The Contractor is responsible for ensuring that used spill kits and any other oil / fuel soaked / contaminated material e.g. rags, used during the incident are disposed of in accordance with the Environmental Waste Management Regulations in operation. These materials shall be bagged up, and disposed of at a licensed hazardous waste disposal site e.g. taken away by a licensed oil / fuel disposal / broker company.	C
x)	The Contractor shall submit copies of the receipt or waste oil certificate to the RRM within 48 hours.	C

4.0 REFERENCE DOCUMENTS

- i) IMS 20 – Emergency Incident Preparedness and Response [HSQE00-001043](#)

5.0 DEFINITIONS

Abbreviation or term		Explanation of abbreviation or term
i)	C	Contractor: Any company or person employed by RES to carry out any work on a site / project or office location
ii)	COSHH	Control of Substance Hazardous to Health Regulations 2011
iii)	H&S Plan	Health and Safety File maintained by the Site Manager
iv)	HSQE	Health, Safety, Quality & Environment
v)	HSQEM	HSQE Manager (Head of HSQE)
vi)	MSDS	Material Safety Data Sheet supplied by manufacturer
viii)	RRM	Responsible RES Manager (Construction Site – Construction Site Manager, Generation Site – Site / Asset Manager, Office Locations – Office Manager)