Technical Appendix 9.3
Borrow Pit Appraisal

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Technical Appendix 9.3 Borrow Pit Assessment

Hagshaw Hill III Energy Park

Hagshaw Hill 3 Ltd

Prepared by:

SLR Consulting Limited

SLR Project No.: 405.065521.00001

19 March 2026

Revision: 2

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Annex A Aggregate Assessment

1.0 Introduction

SLR Consulting Ltd (SLR) was commissioned by Hagshaw Hill 3 Ltd (the 'Applicant'), to undertake a Borrow Pit Assessment (BPA) for the proposed Hagshaw Hill III Energy Park (the 'Proposed Development').

The Applicant is proposing to submit a Section 36 application to construct a mixed renewable energy development comprising of up to eight wind turbines, solar farm and an on-site Long Duration Electricity Storage (LDES).

There has been substantial work undertaken to date at the Proposed Development to inform the proposed borrow pits, including site reconnaissance visits and peat probing which are detailed within **Technical Appendix 10.2: Peat Auger Summary.**

The principal objective of this report is to provide an initial assessment of the aggregate requirements for the Proposed Development and identify potential borrow pits suitable for providing this aggregate.

There are three potential search areas for borrow pits that have been identified and reviewed by an SLR geologists and civil engineer during a site walkover.

The proposed borrow pit search areas have been predominantly selected due to their location, where mapping indicates bedrock is likely to occur close to surface. Other factors included environmental impacts such as sensitive habitats and peat depth, morphology, and orientation. Limited superficial soils are expected at these locations. The borrow pit locations are located a minimum of 50 m from watercourses.

2.0 Desk Based Review

This assessment has been completed through a largely desk-based review of soil and geological maps and OS contour data with site reconnaissance undertaken by a geologist and civil engineer, to cross-check the geological desk-based review.

2.1 Land Use and Topography

The Proposed Development site adjoins an established cluster of wind farms around Hagshaw Hill (known as the 'Hagshaw Energy Cluster'), situated approximately 1.8 km west of Douglas and approximately 3.1 km south of Coalburn. The approximate centre of the site is at British National Grid (BNG) reference 281008, 630424.

The site comprises an area of approximately 336 hectares (ha) of primarily moorland and areas of agricultural grazing. The site elevation ranges from 270 m Above Ordnance Datum (AOD) in the south to 397 m AOD at the summit of Windrow Hill in the north-west of the site. The site broadly slopes up from south-east to north-west, peaking at the summits of Windrow Hill, Rob's Hill and Arkney Hill.

2.2 Superficial Geology

British Geological Survey (BGS) GeoIndex[1] shows superficial deposit generally comprise glacial till with isolated areas of peat and alluvium. Hilltops and slopes in the north-west of the site are shown to be absent of any superficial deposits.

Chapter 9, Figure 9.3 shows the superficial geology BGS mapping and the Proposed Development.

2.3 Bedrock Geology

BGS GeoIndex shows that most of the site is underlain by sedimentary bedrock of the Glenbuck Group and Monks Water Group, comprising undifferentiated sandstone, conglomerate and argillaceous rock. The Hagshaw Group, comprising mudstone siltstone and sandstone, and the Hareshaw Conglomerate Formation, comprising conglomerate, is mapped in the centre of the site. The Greywacke Conglomerate Formation, comprising conglomerate, is mapped in the south of the site.

The centre of the site has been intruded by the Palaeogene age North Britain Palaeogene Dyke Suite.

Chapter 9, Figure 9.4 shows the bedrock geology BGS mapping and the Proposed Development.

[1] BGS Online Viewer, available at [https://mapapps2.bgs.ac.uk/geoindex/home.html?_ga=2.133433804.376188765.1646739904-1030004651.1646739904]

2.3.1 Structural Geology

There are two inferred faults present that bound the mapped Hagshaw Group on the site.

2.4 Hydrogeology

The BGS 1:625,000 scale Hydrogeological Map of Scotland and 1:100,000 scale Aquifer Productivity and Groundwater Vulnerability datasets confirms that the majority of the site is underlain by Silurian and Ordovician sedimentary rocks which have been classified by BGS as low productivity aquifer whereby limited amounts of groundwater may be present within the near surface weathered zone and secondary faults or fractures.

The southern boundary of the site is shown to be underlain by Old Red Sandstone sedimentary rocks which have been classified by BGS as a moderate productivity aquifer which is described as a regionally important aquifer of which can yields up to 12 l/s.

The alluvial deposits within the site have been classified as a moderate to high aquifer whereby groundwater flow is dominated by intergranular flow. The sand and gravel horizons within the alluvial deposits can store groundwater and permit groundwater movement however, their limited extent can hinder their ability to provide reliable groundwater yields. Local differences in thickness, material type and sorting can also cause a considerable range in hydraulic conductivity. Given the proximity of these deposits with nearby watercourses, the groundwater within these deposits is likely to be shallow and in hydraulic conductivity with these watercourses.

3.0 Borrow Pit Assessment

This section of the report provides an assessment of the three potential borrow pit search area locations with an evaluation of their potential to meet the Proposed Development's aggregate requirements.

The assessment has been completed through a desk-based review of geological maps and memoirs and is supported by several site visits from SLR geologists and a civil engineer. Potential borrow pit locations were inspected visually with a view to assess ground conditions and help determine the borrow pit's suitability for use during construction of the Proposed Development.

In exploring the three potential borrow pit search area locations, consideration has been given to the practical aspects of each borrow pit. The main aspects to consider are as follows:

- ease of access;
- rock type;
- overburden thickness;
- topography;
- current and historical uses;
- proximity to construction activities;
- visual impact; and
- impact on environmentally sensitive areas.

Steeper topography is preferable for quarrying, where peat and soils coverage will be limited. Careful consideration was given to landscape and visual impacts, and other considerations included proximity to watercourses and places of interest. The proposed borrow pits are in areas where peat is absent and aggregate reserves are expected to occur near the surface.

3.1 Aggregate Requirements

The proposed turbine locations and their subsequent maintenance would require the construction of a purpose-built network of access tracks. These tracks would be single track with occasional passing places, un-metalled and would be constructed to the turbine suppliers' specifications conforming to the Specification for Highway Works (SHW)[2].

The indicative volumes of aggregate required for site infrastructure is approximately 133,449 m^3, summarised in

2 Highways Agency, Manual of Contract Documents for Highway Works Volume 1 Specification for Highway Works, Series 600 Earthworks, Published February 2017.

Table 3-1, based on the materials calculator provided in **Annex A**.

The aggregate requirements below have been calculated based on an estimate of aggregate volumes required.

Table 3-1: Aggregate Requirement Summary

Infrastructure Element	Volume of Aggregate Required (m^3)
Access Tracks on site (Excavated)	23,010
Existing Tracks (Upgraded)	744
Turning Head	1,080
Turbine Bases - formation only	2,500
Fill above Turbine Bases	4,000
Permanent Hardstandings	25,600
Temporary Hardstandings	27,200
Substation	9,000
Temporary Construction Compound A	8,000
Temporary Construction Compound B	5,000
Long Duration Electricity Storage	31,115
Temporary Construction Compound C	4,200
Total	**141,449**

It has been estimated that approximately 141,449 m^3 of suitable quality rock would be required to construct the Proposed Development. This includes SHW[2] classes 6F2, 6N/6P and concrete aggregate. If rock quality is not suitable for each of these engineered materials, then there may be a requirement for imported materials.

No account has been taken in the calculations for the fortuitous 'winning' of rock during the construction phase for example during infrastructure excavations. If such rock was available, the amount extracted from the borrow pits could be reduced.

3.2 Borrow Pit Assessment

This section of the report provides an assessment of the three borrow pit search areas together with an evaluation of their potential to meet the Proposed Development's aggregate requirements. The approximate extent of each borrow pit is detailed within **Figure 9.3.1**.

All borrow pits could be extended or reduced in size depending on review of aggregate requirements and/or ground investigation data.

The geology encountered within the Proposed Development is supported by BGS geological maps for the Proposed Development. Dimensions of the borrow pits, volume of superficial material to be removed and volumes of site won rock for each borrow pit have been estimated based on an assumption of likely overburden. These are required to be confirmed by future intrusive ground investigation works.

The calculations provided in this report assume a worst-case scenario and where no other rock or materials would be found on site during construction. In the event that such rock was available the amount extracted from the borrow pits could be reduced.

3.2.1 Borrow Pit 01

Borrow Pit 01 is located in the north of the Proposed Development, northeast of T01. The approximate National Grid Reference (NGR)281258, 631489.

Photograph 3-1: BP01



Table 3-2: Borrow Pit 01

Borrow Pit 01	
Superficial Geology	East of borrow pit is partially located on till superficial deposits, with no superficial deposits mapped in the west. Probing survey confirms absence of peat.
Bedrock Geology	Glenbuck Group and Monks Water Group
Approximate Dimensions	120 m x 80 m x 20 m
Gradient	Slope increasing to the west
Details of Extraction	Combination of drilling and blasting
Estimated Excavation Area	9,600 m^2
Estimated Excavation Volume	76,800 m^3

3.2.2 Borrow Pit 02

Borrow Pit 02 is located in the east of the Proposed Development, west of the Long Duration Energy Storage (LDES), the approximate National Grid Reference (NGR) 281603, 630437.

Photograph 3-2: BP02



Table 3-3: Borrow Pit 02

Borrow Pit 02	
Superficial Geology	Till, probing survey confirms absence of peat.
Bedrock Geology	Glenbuck Group A and Monks Water Group
Approximate Dimensions	120 m x 80 m x 16 m
Gradient	Slope increasing steeply towards the west
Details of Extraction	Combination of drilling and blasting
Estimated Excavation Area	9,600 m^2
Estimated Excavation Volume	61,440 m^3

3.2.3 Borrow Pit 03

Borrow Pit 03 is located in the southwest of the Proposed Development to the north of T07 at the approximate National Grid Reference (NGR) 280462, 629807.

Photograph 3-2: BP03



Table 3-4: Borrow Pit 03

Borrow Pit 03	
Superficial Geology	Till, probing survey confirms absence of peat.
Bedrock Geology	Glenbuck Group and Monks Water Group
Approximate Dimensions	120 m x 80 m x 19 m
Gradient	Slope increasing steeply towards the north
Details of Extraction	Combination of drilling and blasting
Estimated Excavation Area	9,600 m^2
Estimated Excavation Volume	72,960 m^3

4.0 Indicative Borrow Pit Design

The indicative borrow pit volumes are presented in **Table 3-2** to **Table 3-4**. The design of the borrow pits anticipates extracting a net stone volume suitable for the requirements of the Proposed Development, excluding imported top surface dressing which would require importing. This target capacity has been determined based on the estimated requirements for construction materials together with additional allowances for overburden material. It is envisaged that overburden/soils together with processed materials would be carefully stored adjacent to the excavation void for eventual use in the restoration process.

4.1 Marking Out and Overburden Stripping

The permitted extents of the borrow pit would be marked out with pegs, and overburden, including topsoil, subsoil and weathered rock horizons, would be stripped from within this delineated area.

The overburden and weathered rock horizons would be stripped using a combination of crawler tractor dozers and backtrackers with the material loaded by loading shovels. The overburden (including surface vegetation turves) would be carefully stripped and stored as a series of separate turves, topsoil, subsoil and weathered rock storage mounds to be used for reinstatement purposes.

4.2 Excavations within Rock

Once overburden and weathered rock horizons have been stripped, and stored, a suitably qualified geotechnical engineer/blasting engineer would assess the nature of the underlying solid rock strata. The engineer would provide advice on suitable extraction techniques including; extraction method, bench and cut face design parameters, and blasting design (if required).

If blasting is required, blasting would be undertaken in accordance with the Quarries Regulations 1999[3] and Annex D PAN 50[4].

A combination of digging, ripping and blasting would be utilised to excavate rock (subject to the nature of the material encountered, depth of weathering and level of fracturing) which would be processed using a mobile crushing and screening plant, which would be sited within the base of the working borrow pit.

4.3 Stockpiling of Materials

The initial overburden strip would be stored within temporary screening mounds around the perimeter of the borrow pit. The screening mounds would be at least 1.5 m in height.

The remaining unsuitable materials (weathered/unsuitable rock horizons) would be stockpiled within the base of the working borrow pit. The stockpiles would have a maximum height of 5.0 m, with maximum side-slope gradients of 1(Vertical (V)) in 2.5(Horizontal (H)) and be in full compliance with the Quarries Regulations 1999[3] and Quarries National Joint Advisory Committee (QNJAC) Guidelines[5]. This material would be used as part of the restoration profiling on the cut faces.

3 Health and Safety Executive (2014), Health and Safety at Quarries, Quarries Regulations 1999, Approved Code of Practice and Guidance (Second Edition).

4 Scottish Government (2000), PAN 50 Annex D: Controlling the Environmental Effects of Surface Mineral Works.

5 Quarries National Joint Advisory Committee (2020), Available at: http://qnjac.co.uk/what-is-qnjac/.

4.4 Access Tracks/Haulage Routes

The proposed access tracks to the borrow pit(s) would include suitable roadside drainage ditches, with soakaways located, where appropriate.

The tracks (haulage routes) within the borrow pit(s) would have a gradient of no steeper than 1(V) in 10(H).

4.5 Water Management/Drainage

The borrow pit(s) would feature a perimeter surface drain, which would aim to prevent water in-flow into the borrow pit. The water collected within the surface drains would be discharged either into the surrounding vegetation, or into suitably located settlement lagoons.

Where necessary, surface settlement lagoons would be constructed within the borrow pit. These would be constructed with the aim of containing any surface water collection within the excavation voids, and from collection of water from the perimeter surface drains. The lagoons would be contained within a bunded area at the base of the borrow pit, with suitable pumping systems installed allowing water to be pumped to soakaways as required.

4.6 Restoration

The borrow pits will be reinstated using stored soils and suitable organic materials to create a stable, gently graded surface that supports vegetation regrowth and prevents erosion. The fill material would be used to soften the profile of the benched excavations, providing a gentle slope, with suitable gradient on the borrow pit floor to prevent ponding.

The stripped vegetated turves and topsoils would be used as the surface dressing layer, suitable for seeding and planting as appropriate.

An Ecological Clerk of Works (ECoW) would be in place to monitor the restoration and aftercare of the borrow pit.

The formulation of a detailed construction method statement undertaken pre-construction shall incorporate construction design and sequencing for the proposed restoration of borrow pit areas. These plans shall draw on detailed site investigation information gathered as part of the preconstruction phase of works. The final design of borrow pit floor levels and restoration profiles shall depend on the depth of superficial deposits and the quality of rock recorded across the proposed borrow pit locations.

5.0 Conclusion

In summary, three borrow pit search areas have been assessed as being capable of supplying the aggregate required for the Proposed Development. The locations and methods of working would be managed to cause minimal impact to the ground conditions and water environment. The borrow pit design and recommended methods of operation are in line with the Quarries Regulations, Approved Code of Practice, 1999 (as amended)[6] to provide a safe working environment and minimise risk of instability.

An approximate volume of excavated materials has been calculated for each of the proposed borrow pit locations within the borrow pit search areas, these volumes are based on initial calculations based on assumptions for the Proposed Development. These calculations would be verified by detailed intrusive investigation at the proposed locations, post-consent. Calculations do not take into consideration the 'winning' of materials along the route. Each of the proposed borrow pits selected could be increased or decreased in size, depending on the aggregate requirements or following an assessment of the suitability of aggregate materials following detailed ground investigation.

The quality of rock anticipated on-site is inferred from a visual assessment of rock outcrops and published information. An intrusive ground investigation, sampling and material laboratory testing will be required to confirm ground condition and suitability.

Prior to the construction of the Proposed Development, design and best practices, and any required mitigation measures, will be set out in full within a Construction Environmental Management Plan (CEMP) and can be secured by an appropriately worded pre-development planning condition.

6 Health and Safety Executive (2014), Health and Safety at Quarries, Quarries Regulations 1999, Approved Code of Practice and Guidance (Second Edition).

Figures

Technical Appendix 9.3 Borrow Pit Assessment

Hagshaw Hill III Energy Park

Hagshaw Hill 3 Ltd

SLR Project No.: 405.065521.00001

279000 280000 281000 282000 283000

632000 631000 630000

LEGEND

- Site Boundary
- Turbine Location (180 m Tip Height)
- Turbine Location (200 m Tip Height)
- Permanent Crane Hardstanding
- Temporary Crane Hardstanding
- Long Duration Electricity Storage (LDES)
- Development Substation
- Borrow Pit (BP) Search Area
- Temporary Construction Compound

Solar

- Photovoltaic (PV) Module
- Inverter
- Perimeter Fence

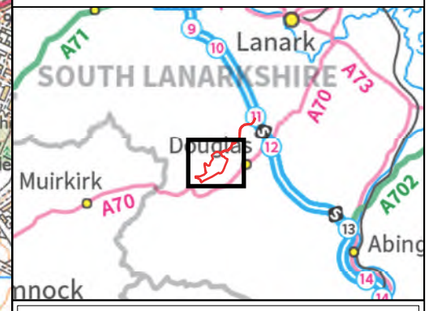
Watercourse Crossings

- Existing to be Upgraded
- New

Access Tracks

- Existing
- Existing to be Upgraded
- New

Note: The OS mapping does not reflect the current cumulative turbine positions on the ground. All point features are not drawn to scale in the map



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BORROW PIT APPRAISAL

TA 9.3 - FIGURE 9.3.1a

Scale 1:15,000 @ A3

Date APRIL 2026

0 0.5 1 Kilometres

425.066596.00001.0094.0 BPL Cover

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281100 281200 281300 281400 281500

631700 631600 631500 631400 425.066596.00001.0078.0 Borrow Pit Location

2555 2530 2505 2471 2445 2578 1648

BP1

A

N

0 50 100

Metres

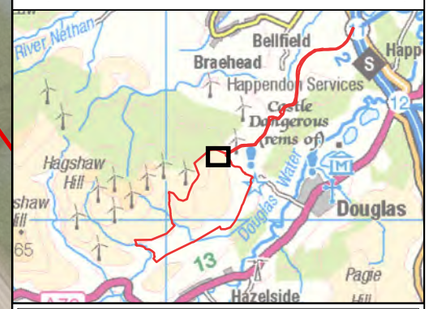
LEGEND

- Site Boundary
- Temporary Crane Hardstanding
- Borrow Pit (BP) Search Area
- Temporary Construction Compound

Access Tracks

- Existing
- New

Note: The OS mapping does not reflect the current cumulative turbine positions on the ground. All point features are not drawn to scale in the map



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BORROW PIT APPRAISAL

TA 9.3 - FIGURE 9.3.1b

Scale 1:1,500 @ A3

Date APRIL 2026

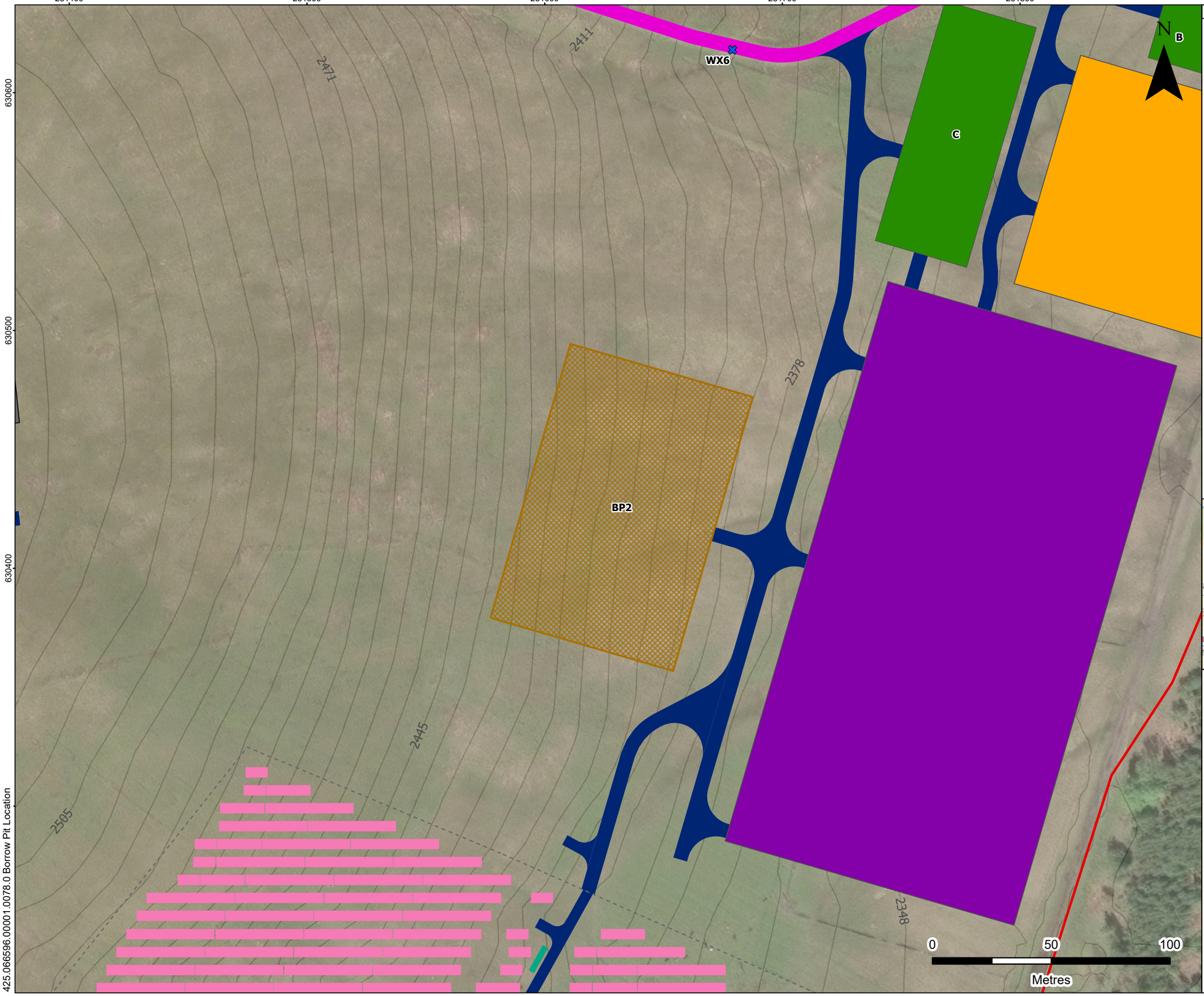
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281400 281500 281600 281700 281800

630600 630500 630400

425.066596.00001.0078.0 Borrow Pit Location



LEGEND

- Site Boundary
- Permanent Crane Hardstanding
- Long Duration Electricity Storage (LDES)
- Development Substation
- Borrow Pit (BP) Search Area
- Temporary Construction Compound

Solar

- Photovoltaic (PV) Module
- Inverter
- Perimeter Fence

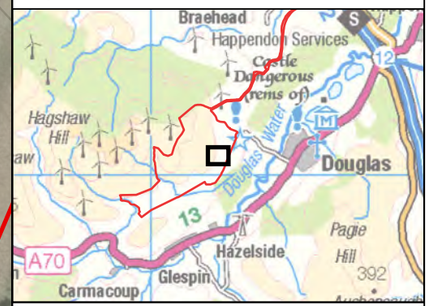
Watercourse Crossings

- Existing to be Upgraded

Access Tracks

- Existing to be Upgraded
- New

Note: The OS mapping does not reflect the current cumulative turbine positions on the ground. All point features are not drawn to scale in the map



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BORROW PIT APPRAISAL

TA 9.3 - FIGURE 9.3.1c

Scale	Date
1:1,500 @ A3	APRIL 2026

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280300 280400 280500 280600 280700

630000 629900 629800 425,066596.00001,0078.0 Borrow Pit Location '00

2578 2555 2530 2505 2471 2445 2411 2411 2378

BP3

T7

0 50 100 Metres

N

LEGEND

- Site Boundary
- Turbine Location (200 m Tip Height)
- Permanent Crane Hardstanding
- Temporary Crane Hardstanding
- Borrow Pit (BP) Search Area

Solar

- Photovoltaic (PV) Module
- Perimeter Fence

Watercourse Crossings

- New

Access Tracks

- New

Note: The OS mapping does not reflect the current cumulative turbine positions on the ground. All point features are not drawn to scale in the map



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BORROW PIT APPRAISAL

TA 9.3 - FIGURE 9.3.1d

Scale	Date
1:1,500 @ A3	APRIL 2026

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Annex A Aggregate Assessment

Technical Appendix 9.3 Borrow Pit Assessment

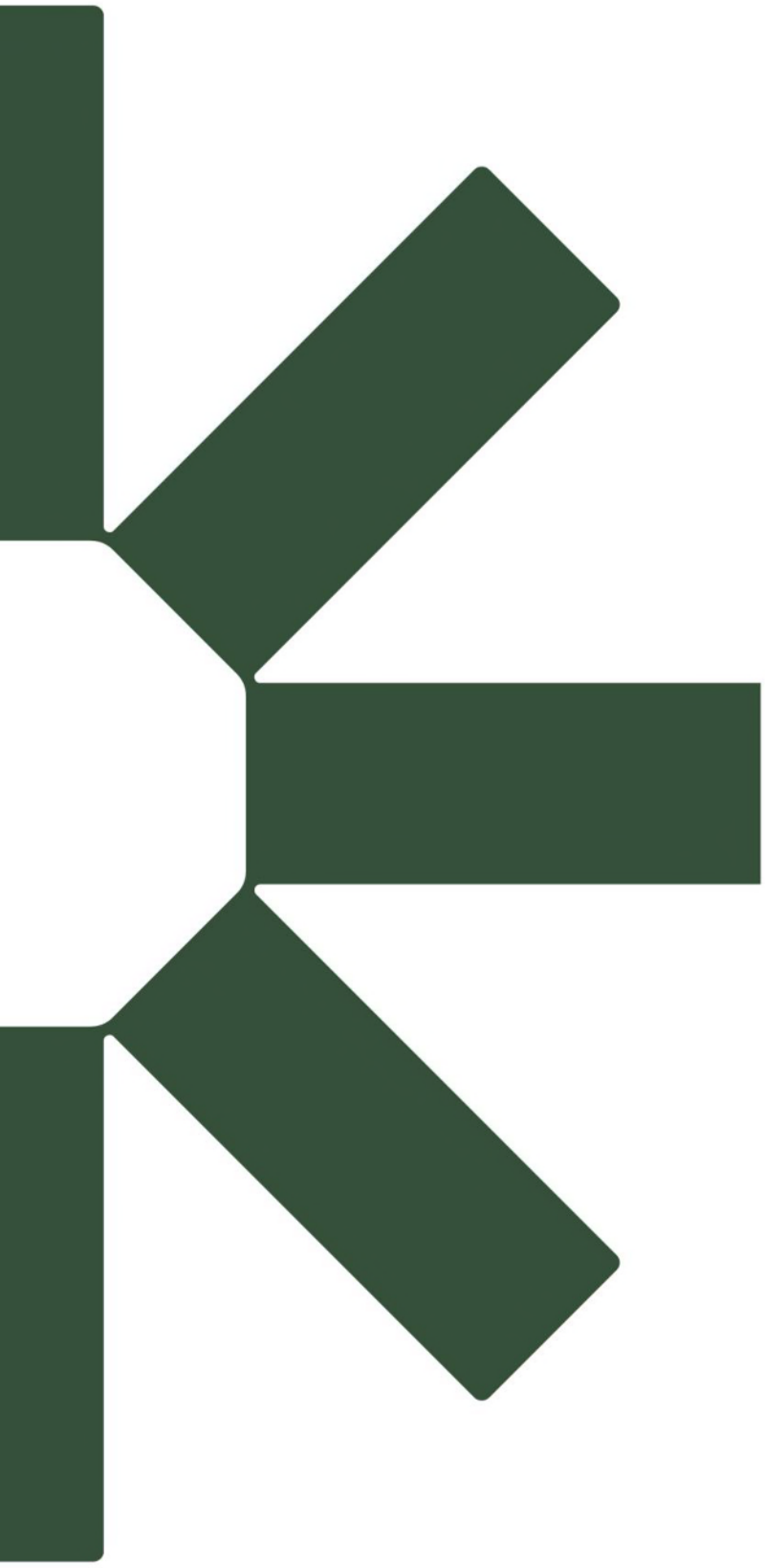
Hagshaw Hill III Energy Park

Hagshaw Hill 3 Ltd

SLR Project No.: 405.065521.00001

Infrastructure	Length m	As built surface width m	As built area m2	Depth m	Number	Volume m3	Final Volume m3
Access Tracks on site (Excavated)	7080	6.5	46020	0.5	1	23010	23010
Existing Tracks (Upgraded)	744	2	1488	0.5	1	744	744
Turning Head	-	-	450	0.4	6	1080	1080
Turbine Bases - formation only	25	25	490.8738521	0.5	8	2500	2500
Fill above Turbine Bases	25	25	490.8738521	2	8	10000	4000
Permenant Hardstanding	80	40	3200	1	8	25600	25600
Temporary Hardstanding			3400	1	8	27200	27200
Substation	100	90	9000	1	1	9000	9000
Substation Construction Compound	80	62.5	5000	1	1	5000	5000
Battery Storage	245	127	31115	1	1	31115	31115
Battery Storage Construction Compound	105	40	4200	1	1	4200	4200
TOTAL REQUIREMENT						139449	133449
Potential Volume of Rock to be sourced on site							
BP1							76,800
BP2							61,440
BP3							72,960
Total Volume from Site							211,200
Import requirements (shortfall)							-77751
Total import							-77751
plus 10% contingency							-85526

* All volumes are indicative and subject to detailed design and assessment



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