



# AI#2 Appendix E

## Revised Borrow Pit Assessment



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#### 1.1 Introduction

- 1.1.1 Five borrow pits are proposed as the source of aggregate for construction of wind farm tracks, turbine bases, crane hard-standings, the main construction compound and auxiliary compounds, the substation compounds, and site office. The location of the proposed borrow pits is indicated on AI#2 Figure 4.1 and further details on the borrow pits are illustrated in Figure 4.12a-e of **Volume 3** of the **EIA Report 2019**.
- 1.1.2 Typically, aggregate extraction from borrow pits involves the following activities:
- Installation of perimeter drains to prevent surface water flows entering the excavated area;
  - Creation of sumps and silt traps to capture subsurface flows and rainwater from the excavated area prior to discharge into the perimeter drains. These would allow suspended materials in the water to drop out before entering the drainage system;
  - Upper layer of heather or grass (top 300mm minimum) would be turfed, rolled and located suitably near to the point of removal. Turves would be watered and maintained until reinstatement;
  - Extracted material would be separated and machined/crushed within the borrow pit (or adjacent to it) and separated into stockpiles for use as general fill, structural fill or topping material.
- 1.1.3 Extraction of the material would involve blasting of rock, the methodology for this would be contained in a Quarry Management Plan if required.
- 1.1.4 It is estimated that the construction of access tracks, hardstandings, foundations and compounds of the Proposed Development would require approximately 194,077m<sup>3</sup> of rock. **Table 1.1<sup>1</sup>** below provides a breakdown of the required rock volumes for each construction element. It is anticipated that all of the rock required would be sourced from the on-site borrow pit(s).

Table 1.1 Rock Volumes

Infrastructure	Total Rock Volume (m <sup>3</sup> )
Turbine hardstandings and foundations	50,793
Access tracks	102,804
Temporary compounds	25,200
Substation compounds	15,280
<b>Total Rock Volume</b>	<b>194,077</b>

<sup>1</sup> Also presented as Table 4.3 in the EIA Report 2019.

- 1.1.5 **Table 1.2<sup>2</sup>** provides further information about the proposed borrow pits and the indicative volume available from each borrow pit.

Table 1.2 Indicative Borrow Pit Volumes

Borrow Pit	Approx. Length (m)	Approx. Breadth (m)	Area (m <sup>2</sup> )	Estimated Area Excavated (m <sup>2</sup> )	Depth BP Floor (m)	Recovery %	Maximum Volume (m <sup>3</sup> )
<b>A</b>	260	150	36,250	9,000	12.5	0.8	90,000
<b>B</b>	100	100	10,000	3,000	12.5	0.8	30,000
<b>C</b>	205	90	19,340	6,000	12.5	0.8	60,000
<b>D</b>	200	120	23,900	7,000	12.5	0.8	70,000
<b>E</b>	175	85	14,660	6,000	10.5	0.8	50,000

- 1.1.6 **Figures 4.12a-e** show the cross section of each of the proposed borrow pits, together with their restoration profile, location and an artist's impression (elevation) of the extent of extraction and restoration profile.

## 1.2 Rationale for the Proposed Borrow Pits

### Construction Materials Requirement

- 1.2.1 The estimated volumes of rock required for the Proposed Development is set out in **Table 1.1** above. The estimated volumes of rock required from each of the borrow pits is indicated in **Table 1.2** above. The indicative borrow pit volumes are in excess of the likely required volume of rock for construction, and recognises that detailed investigations may mean a relatively higher proportion is secured from one potential borrow pit search area than from another, but captures necessary flexibility in the choice and size of each borrow pit.

### Consideration of Alternatives

#### Site Set-Up

- 1.2.2 It is anticipated that a limited amount of rock would need to be imported from existing on-island quarries for initial site set-up works and to construct the section of track leading to the first of the borrow pits (Borrow Pit A). It is expected that rock required would be sourced from one or more of the local established sources identified below:
- Marybank Quarry – Breedon
    - ▶ Location: approximately 0.3km north of the northern-most entry point to the Site from the A859.
  - IA & C Maciver at Parkend Industrial Estate

<sup>2</sup> Also presented as Table 4.2 in the EIA Report 2019.

- ▶ Location: approximately 6km east of the northern-most entry point to the Site from the A859.
- Bennadrove Quarry – Breedon
  - ▶ Location: approximately 0.3km north of the northern-most entry point to the Site from the A859.
- Ceann an Ora Quarry – Bardon Hebrides
  - ▶ Location: approximately 63km south of the centre of Stornoway.

### Main Construction Works

- 1.2.3 Rock requirements for the main construction works would be won from the on-site borrow pits due to the need to have certainty that both the quantities required and timescales for their supply can be met, particularly during times of peak demand, without causing delay to the construction programme. Currently there is limited certainty that rock quantities and supply timescales could be met by existing quarries.
- 1.2.4 The Applicant is aware that there are proposals to extend Marybank Quarry however these do not appear to have progressed beyond a Proposal of Application Notice and an EIA Screening Request and as such, the timescales for bringing the proposal forward, in addition to the extent of additional material that the extension will generate, remain unknown and do not provide the certainty that is required.

### Comparison with the Consented Scheme

- 1.2.5 The Consented Development has consent to develop seven borrow pits within the Development Site, whereas the Proposed Development proposes the use of five borrow pits. This reduction in the number of borrow pits would reduce the peat excavation extents from 124,126m<sup>3</sup> to 58,809m<sup>3</sup>. This is a substantial reduction (53%) in the loss or disturbance of peat relating to the borrow pits.

### Financial Considerations

- 1.2.6 Typically, and based on recent projects that the Applicant has been involved in, the price differential between site-won stone and stone procured from local quarries is very approximate and is as follows:
- Stone site-won at borrow pit and delivered around site costs approximately £14/m<sup>3</sup> for 6F2 crushed stone. Based on approximate rock totals of 194,077m<sup>3</sup> for the Proposed Development, this would equate to £2,717,078.
  - Quarried off-site and delivered without delay costs approximately £33/m<sup>3</sup> for 6F2 crushed stone (this is likely to increase by approximately £3/m<sup>3</sup> due to lengthy onsite delivery times which may exceed normally selected delivery times due to on-site speed limits). Based on approximate rock totals of 194,077 m<sup>3</sup> for the Proposed Development, this would equate to £6,986,772.
- 1.2.7 The use of on-site borrow pits would result in a £22/m<sup>3</sup> cost reduction which would result in cost saving to the Applicant of £4,269,694.

## Traffic and Transport

- 1.2.8 The proposed borrow pits would provide an on-site source of rock and aggregate within the Development Site. This would reduce the need to import significant volumes of construction materials for the Proposed Development. Therefore, the proposed on-site borrow pits would result in local benefits in terms of a significant reduction in the number of HGV movement (a reduction of approximately 40,000 two-way trips) during the construction of the Proposed Development including a reduction in construction traffic on the local road network.
- 1.2.9 By opening up the proposed borrow pits, the rock needed to construct the Proposed Development's infrastructure would be 'won' within the confines of the Development Site which has the associated environmental benefits as dump trucks, heavy plant and site vehicle movements would be reduced to the minimum distances of travel. Risks to the environment, such as silt from the access roads finding its way into the watercourse, would be confined to a much more condensed work area.
- 1.2.10 Compared to importing the full balance of required construction materials this would provide multiple local benefits, including reduced noise impacts from passing vehicles, reduced potential for congestion, lower air emissions and reduced diesel use during the construction phase of the Proposed Development.

## 1.3 Policy Context

- 1.3.1 The main policy consideration relating to borrow pits is contained within the SPP and LDP Policy ED5 Minerals.
- 1.3.2 Paragraph 243 of the SPP states:
- "Borrow pits should only be permitted if there are significant environmental or economic benefits compared to obtaining material from local quarries; they are time-limited; tied to a particular project and appropriate reclamation measures are in place."*
- 1.3.3 Policy ED5 Minerals of the LDP states:
- "Proposals for borrow pits will be supported to allow the extraction of minerals near to or on the site of associated development (e.g. wind farm development or infrastructure projects) provided it can be demonstrated that there are significant benefits compared to obtaining the materials from local quarries and that criteria a) to i) above are met. These consents will be time-limited, tied to the proposal and must be accompanied by full restoration proposals and aftercare."*
- 1.3.4 Criteria a – i include impacts on residential amenity, air quality, the water environment and land, the road network, the natural and historic environment; cumulative effects and securing restoration and aftercare.
- 1.3.5 The Wind Energy Development SPG also needs to be considered as it expresses the Council's commitment to Paragraph 243 of the SPP and LDP Policy ED5, and establishes the further requirements of:
- "Additionally, a map of all proposed borrow pits must be submitted along with a site specific plan of each borrow pit detailing the:*
- *Location, size, depths and dimensions of each borrow pit;*
  - *Existing water table and volumes of all dewatering;*
  - *Proposed drainage and settlement traps, turf and overburden removal and storage areas;*

- *Restoration profile, nature and volume of infill materials, and, if wetland features form part of the restoration, 25 year management proposals.”*

## 1.4 Consideration of Potential Effects

- 1.4.1 The EIA Report considers the potential effects that could result from the construction and operation of the five proposed borrow pits.

### Traffic and Transport

- 1.4.2 The **EIA report** considers the amount of traffic generated by the use of off-site aggregate sources (Option 1) and the use of on-site borrow pits (Option 2). Option 1 would result in a total of 40,806 return journeys. Option 2 would only require 5,876 return journeys through not requiring aggregate/stone trips to take place on the public road network. The use of borrow pits would therefore significantly reduce the amount of return journeys required on the public highway and gives rise to significant benefits in the context of traffic and transport receptors

### Landscape and Visual

- 1.4.3 The effects of the proposed borrow pits were considered within the landscape and visual impact assessment in Chapter 6 of the **EIA Report**. The assessment concluded that the development and operation of the borrow pits would contribute to a significant localised effect on the landscape character of the Development Site (within approximately 100-250m). In terms of visual effects, the assessment concludes that there would be very limited visibility of the borrow pit to the north of the A858 from public areas. Visibility from public areas of the other four borrow pits would be limited from small parts of the A858 and A859, elevated vantage points and a small number of properties along the A859. These effects would be temporary however as the borrow pits would only be operational during the 30 month construction period.
- 1.4.4 A detailed restoration plan would be developed, drawing upon the advice of a landscape architect and an ecologist and implemented in agreement with CnES, SNH and SEPA, to ensure that the restoration materials and techniques are suitable and that the sites blend into the surrounding topography. It is anticipated that steep faces would be graded out to fit with the surrounding topography and disturbed surfaces resurfaced with peat previously excavated from the areas. More detail is provided in Figures 4.12a-e of the **EIA Report**.

### Ecology

- 1.4.5 Chapter 9 of the **EIA Report** considers that there would be some negative effects on ecology due to a direct loss of habitats (especially blanket bog) and an indirect effect on surrounding habitats due to the disturbances created during the borrow pits' construction. The **EIA Report** proposes that a precautionary 25m disturbance zone should be created around the borrow pits in order to reduce their potential indirect effects on surrounding habitats. It also highlights that habitat re-instatement would take place within and around the borrow pit after construction in order to mitigate some of the habitat lost.

## Geology, Hydrology and Hydrogeology

- 1.4.6 With regard to Geology, Hydrology and Hydrogeology the only potentially significant effects are predicted with respect to two low value groundwater-dependent habitats on Cnoc Loch a' Leadharain. The effects are principally due to the proposed excavation of a borrow pit (the one located near to northern access) across the two habitats and their catchments. The **EIA Report** does not advocate micro-siting for this borrow pit because, when considering the effects of habitats rather than the water conditions supporting these habitats, the overriding ecology assessment is focussed instead on the wider-scale wet heath and blanket bog habitat and the adoption of a Habitat Management Plan. However, an agreed water quality 'monitoring and respond' programme is recommended.
- 1.4.7 On this basis, with both embedded and additional mitigation in place, standalone and cumulative effects of the proposed borrow pits on all water receptors are considered acceptable.

## Residential Amenity

- 1.4.8 The potential for the blasting of the borrow pits would not be known until the detailed design phase. However, given that the distance to the nearest occupied property would be more than 1km, it is considered that blasting can be sufficiently managed by good practice to avoid significant effects. A Blasting Management Plan would be designed to incorporate good practice and to minimise noise and vibration effects such that they would be not significant.
- 1.4.9 The main air quality issue that is associated with borrow pits is the generation of dust. This is because the method of extraction can sometimes involve large-scale excavation, handling and transport of potentially dry materials, which are susceptible to dust generation. Receptors can potentially be affected by dust up to 1km from the source, although any dust emissions are more likely to be deposited much closer to the dust sources, generally within 500m. A number of measures to minimise the generation of fugitive dust at the borrow pit faces would take place. This would include any drilling rigs being fitted with effective dust suppression equipment which is considered good practice. In addition, and prior to drilling and blasting taking place, the area to be blasted would be dampened down if necessary. Furthermore, given the distances of residential properties from the borrow pits and the fact that such operations would be taking place within the Development Site, the likelihood of fugitive dust leaving the Development Site perimeter would be low.
- 1.4.10 The **EIA Report** also concludes that the construction traffic from off-site aggregate sources (Option 1) or the on-site borrow pits (Option 2) would both have no significant effects on receptors due to noise.
- 1.4.11 It is therefore considered that there would be no significant adverse effects from the creation of the proposed borrow pits on nearby residents as any effects can be mitigated and conditioned appropriately.

## Other Environmental Impacts

- 1.4.12 The **EIA Report** identified significant effects on only two heritage assets - the listed Stornoway War Memorial and the Druim Dubh Scheduled stone circle. These significant effects are because of the nature of the turbines - that is tall structures. Given the nature of the borrow pits and their distance from these heritage assets, there would not be any adverse effects. The **EIA Report** acknowledges that there is potential for as yet undetected buried archaeological remains to survive within the Development Site and this may include the locations for the proposed borrow pits. In line with the Development Plan policies, these effects can be mitigated through a written scheme of archaeological works, which can be secured through condition.



## 1.5 Restoration and Aftercare

- 1.5.1 The borrow pits would be restored following construction of the wind farm. Once rock extraction has been completed, overburden (if any) from the borrow pits would be replaced in order to create a new land profile that would provide exposed crags for the upper benches, and overburden and peat profile restoration around the lower bench and quarry floor. This peat profile on the quarry floor would be gently undulating to tie in with the contours of the land on either side of each of the borrow pits. Should consent be granted, this restoration requirement would be secured by a condition on the deemed planning permission.

## 1.6 Conclusions

- 1.6.1 This Chapter has been produced for the purpose of providing an overview of the borrow pits, their potential environmental effects, and a planning assessment of the proposed borrow pits on land located with the Development Site associated with the construction of the Proposed Development as required by paragraph 243 of the SPP and Policy ED5.
- 1.6.2 This Borrow Pit Assessment draws on the environmental conclusions set out in the **EIA Report 2019**. The EIA and this assessment demonstrates the clear need for and significant benefits of the proposed borrow pits at the Development Site to support the construction of the Proposed Development. The borrow pits are located in very close proximity to the proposed construction areas, and the extraction timescales are short (approximately 36 months).
- 1.6.3 The use of on-site borrow pits would result in local benefits in terms of reducing the number of HGVs on the rural road network (i.e. from 40,804 return journeys down to 5,876 return journeys), reducing fuel and noise emissions from HGVs and sourcing stone in very close proximity to its use. The identified adverse impacts from the proposed borrow pits are all considered to be small in nature (not significant) and would not therefore result in any unacceptable impacts.
- 1.6.4 This Assessment concludes that the borrow pits are required as ancillary development to the primary development being applied for and demonstrates a clear need for their use as required by paragraph 243 of the SPP. The assessment also concludes that the borrow pits would not result in any significant effects, and where impacts are identified they can be mitigated by planning conditions and good practice. It is therefore considered that the proposed borrow pits accord with both Development Plan policy ED5 and the SPG.

## Figures

Figure 4.12a Indicative Borrow Pit A design

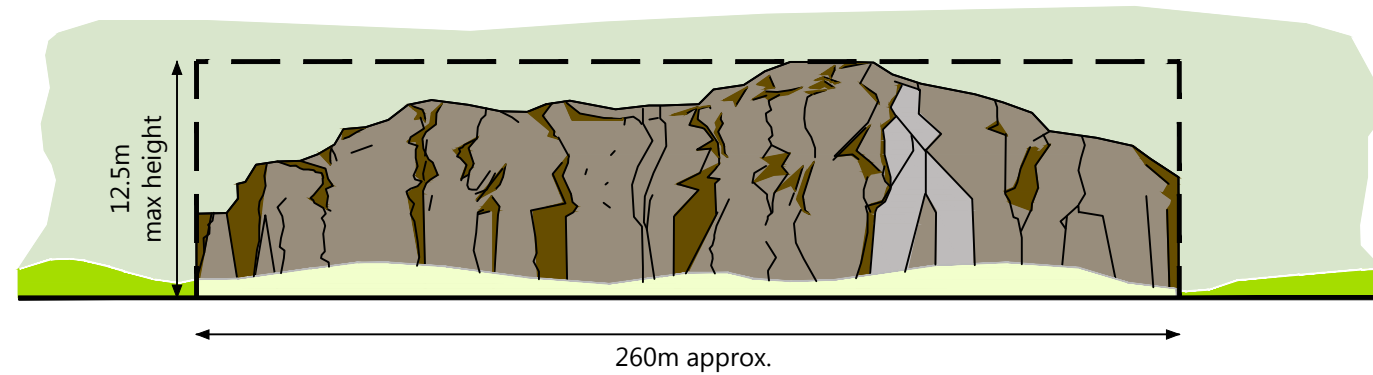
Figure 4.12b Indicative Borrow Pit B design

Figure 4.12c Indicative Borrow Pit C design

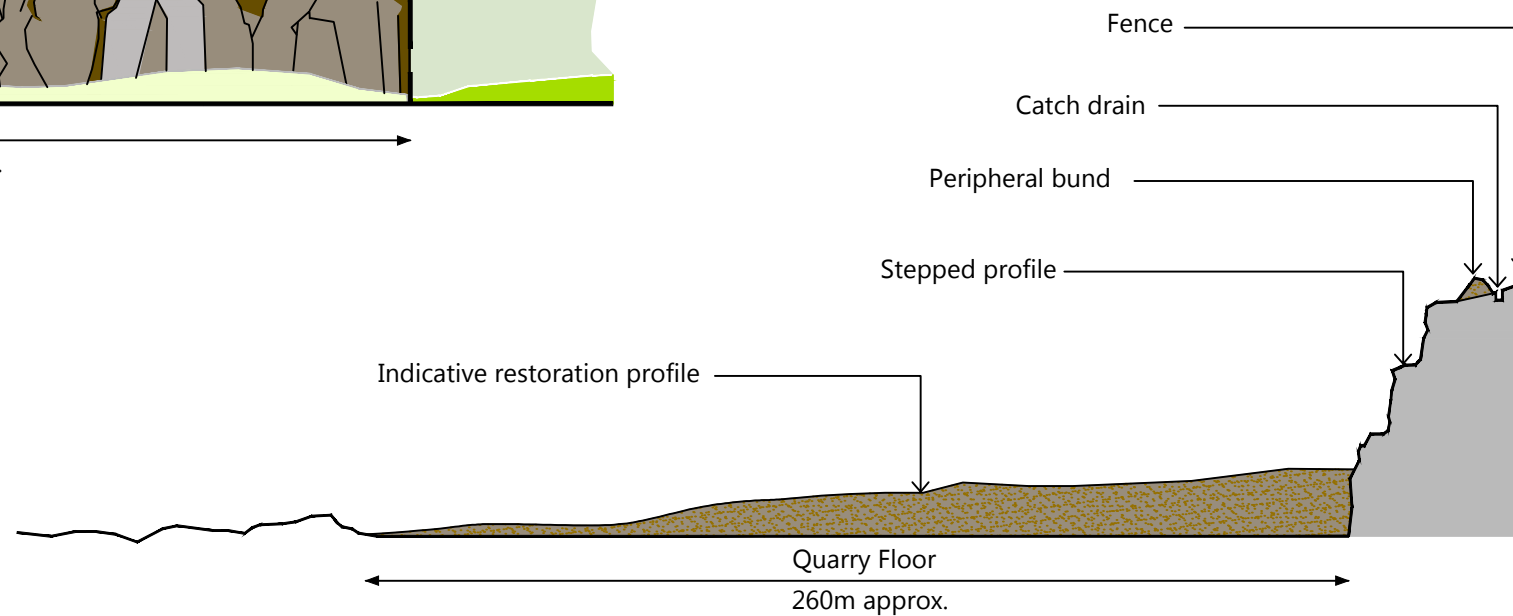
Figure 4.12d Indicative Borrow Pit D design

Figure 4.12e Indicative Borrow Pit E design

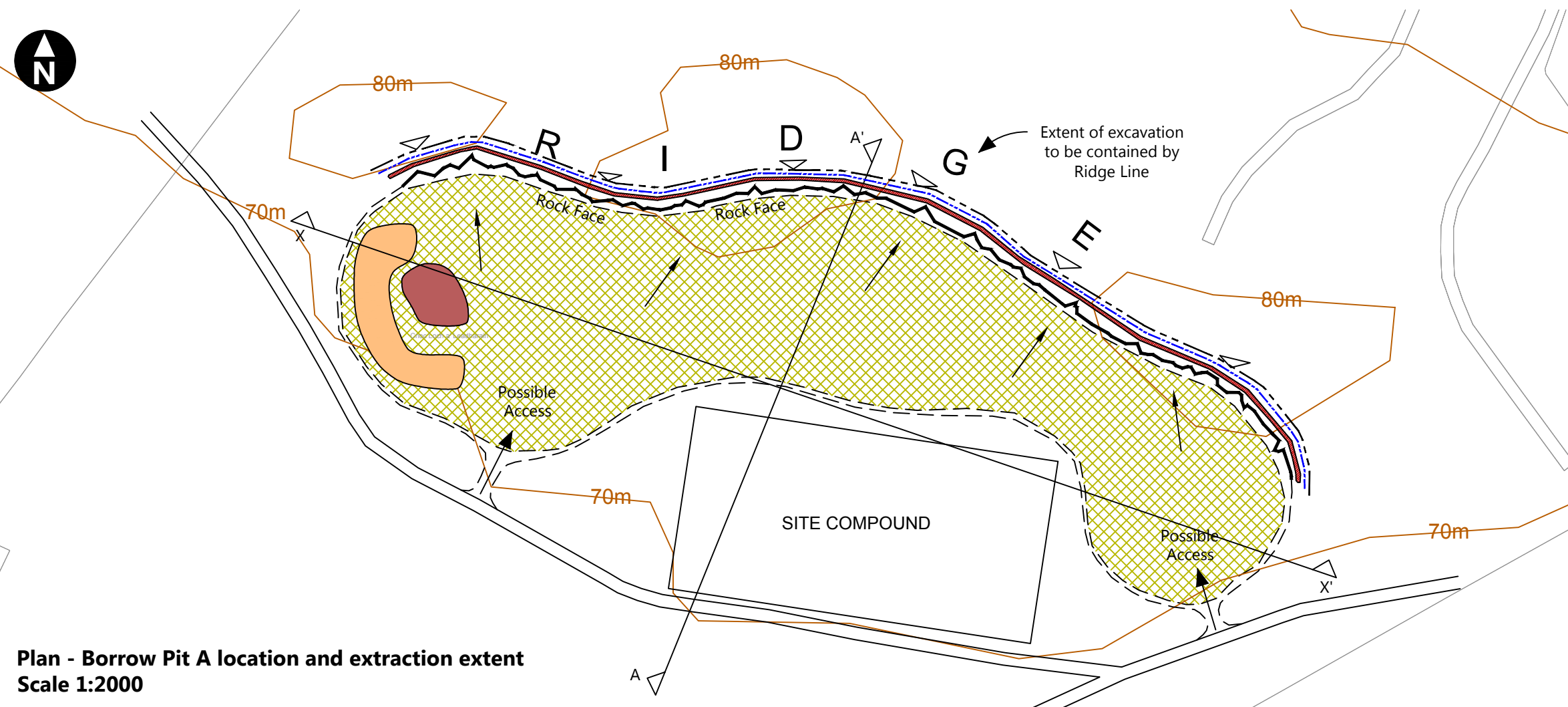
H:\Projects\40001\_GOS\_Stornoway\0400 Design\ACAD\40001-Gos375 Borrow Pit Adwg Originator: STEVE HOLFORD



**Elevation X-X' - Indicative borrow pit design**  
**Scale 1:2000 (vertical exaggeration x5)**



**Section A-A' - Indicative borrow pit design**  
**Scale 1:2000 (vertical exaggeration x5)**



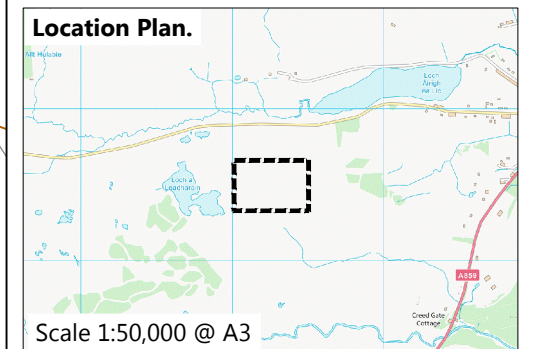
**Plan - Borrow Pit A location and extraction extent**  
**Scale 1:2000**

Key

- Borrow pit area
- Peripheral bund
- Temporary overburden storage
- Temporary soil storage mound
- General working direction
- Indicative surface water drain (diverting water to prevent ingress into borrow pit)
- Fence

Notes:

- Indicative design only. Detailed design will require ground investigation using trial pits to determine rockhead, characterise rock mass, groundwater and assess slope stability parameters and drainage.
- Indicative Borrow Pit A area 36,250m<sup>2</sup>
- Indicative Borrow Pit A dimensions 260 x 150m
- Indicative depth is 12.5m
- Indicative volume 90,000m<sup>3</sup>
- Restoration profile is indicative only.



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Client



Stornoway Wind Farm

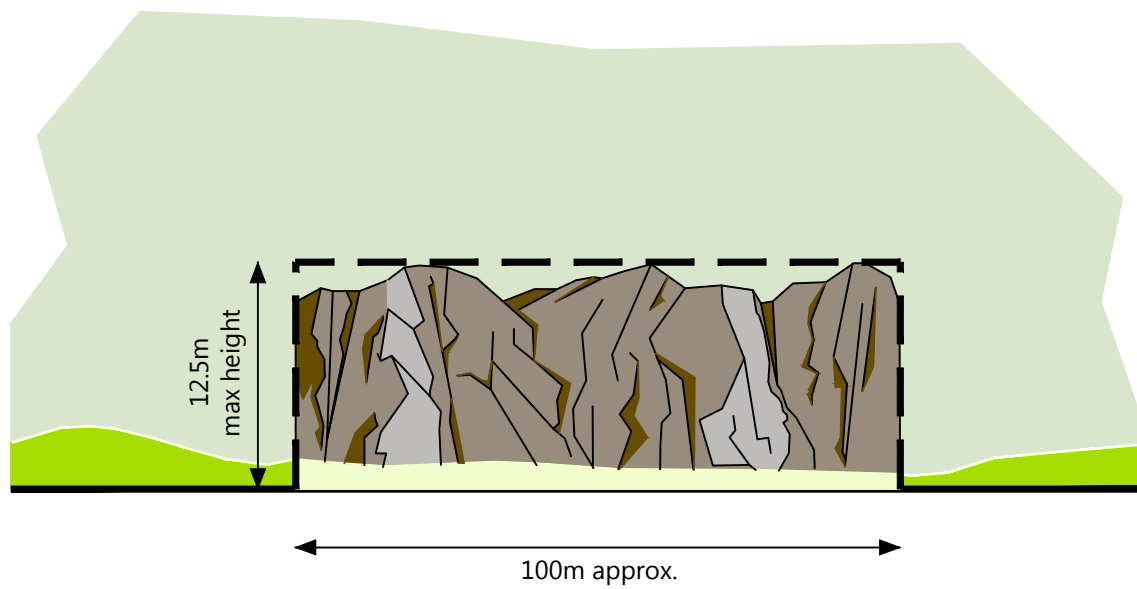
**Figure 4.12a**  
**Indicative Borrow Pit A design**

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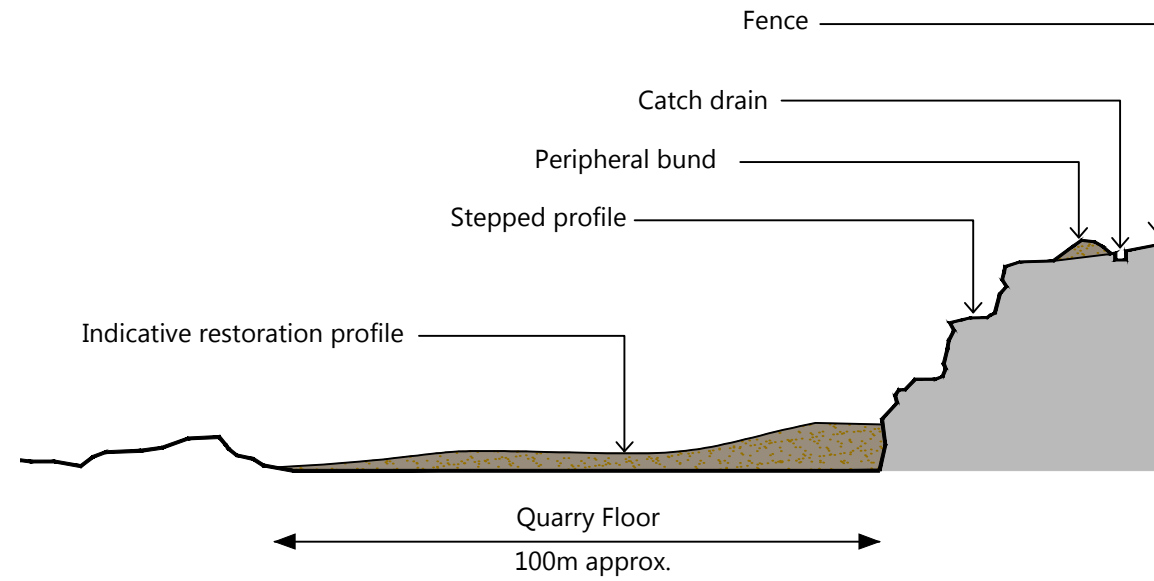


wood.

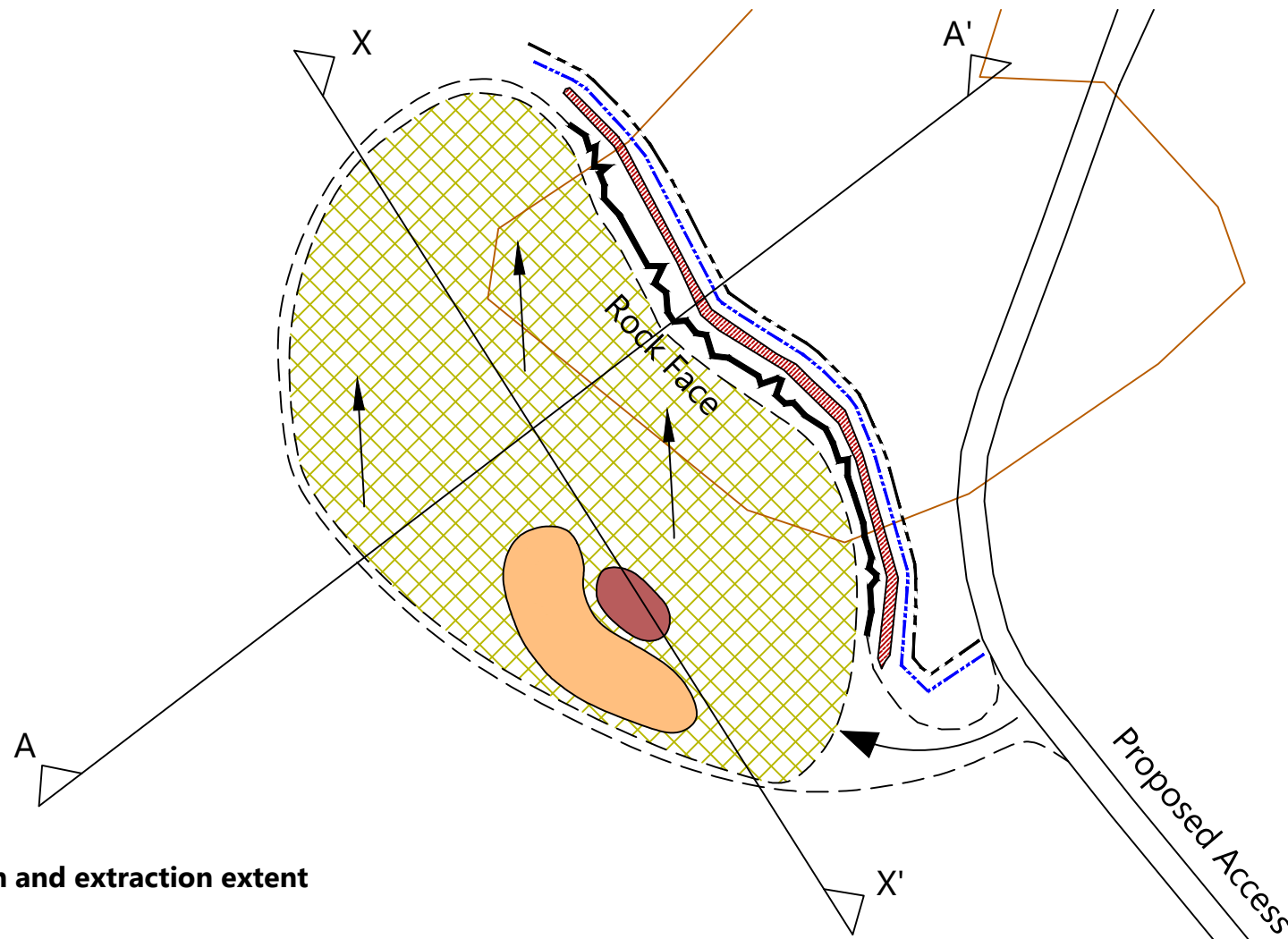
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**Elevation X-X' - Indicative borrow pit design**  
**Scale 1:1250 (vertical exaggeration x3)**



**Section A-A' - Indicative borrow pit design**  
**Scale 1:1250 (vertical exaggeration x3)**



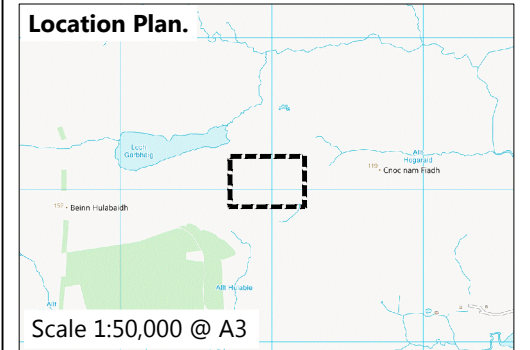
**Plan - Borrow Pit B location and extraction extent**  
**Scale 1:1250**

Key

- Borrow pit area
- Peripheral bund
- Temporary overburden storage
- Temporary soil storage mound
- General working direction
- Indicative surface water drain (diverting water to prevent ingress into borrow pit)
- Fence

Notes:

- Indicative design only. Detailed design will require ground investigation using trial pits to determine rockhead, characterise rock mass, groundwater and assess slope stability parameters and drainage.
- Indicative Borrow Pit B area 10,000m<sup>2</sup>
- Indicative Borrow Pit B dimensions 100 x 100m
- Indicative depth is 12.5m
- Indicative volume 30,000m<sup>3</sup>
6. Restoration profile is indicative only.



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Stornoway Wind Farm

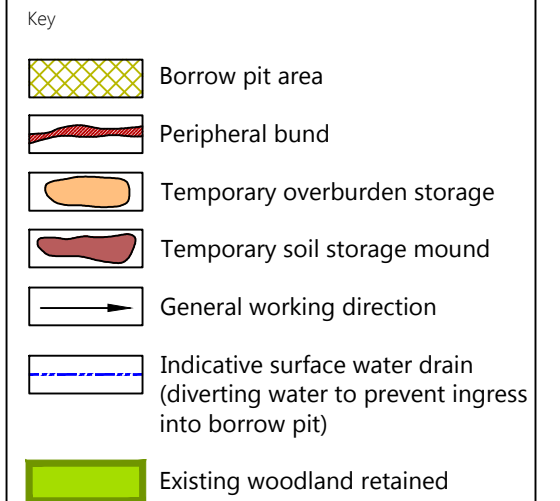
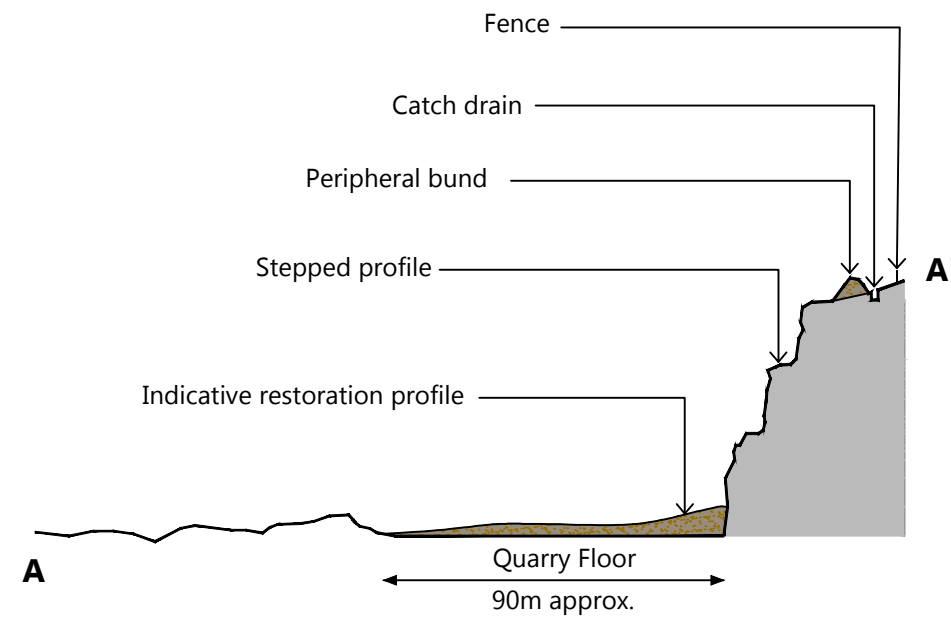
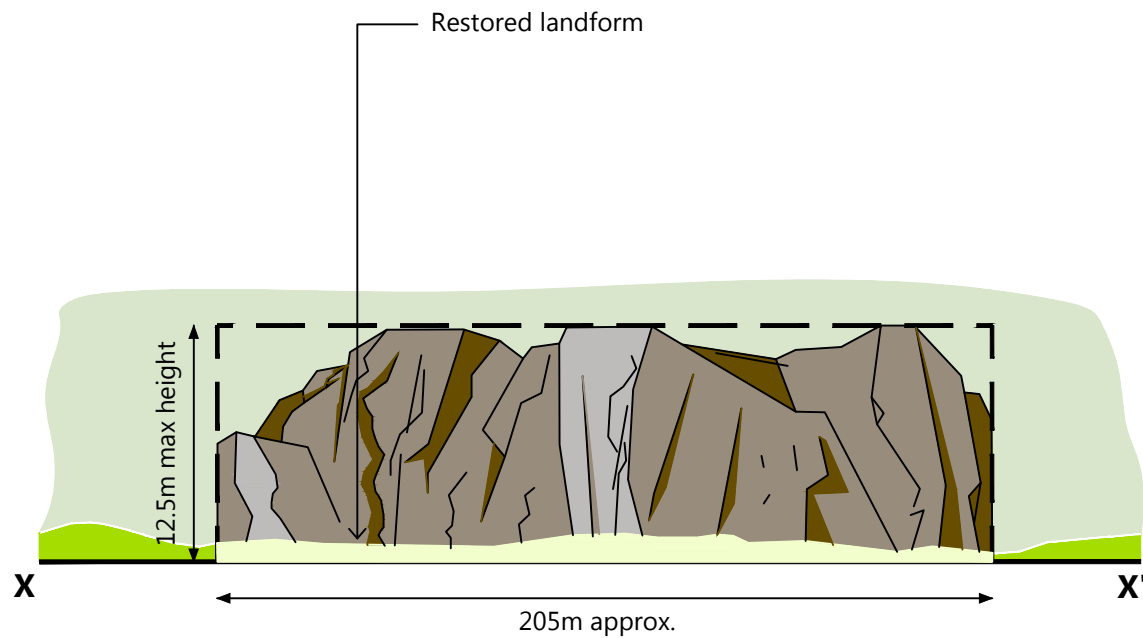
**Figure 4.12b**  
**Indicative Borrow Pit B design**

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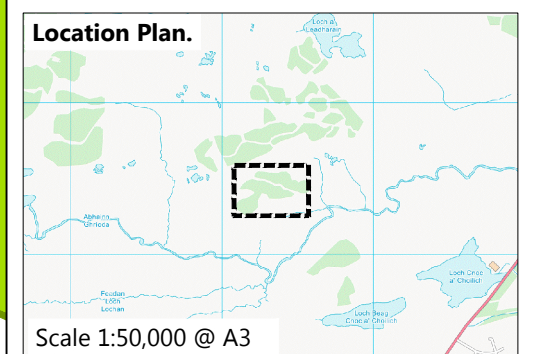


**wood.**





- Notes:
- Indicative design only. Detailed design will require ground investigation using trial pits to determine rockhead, characterise rock mass, groundwater and assess slope stability parameters and drainage.
  - Indicative Borrow Pit C area 19,340m<sup>2</sup>
  - Indicative Borrow Pit C dimensions 205 x 90m
  - Indicative depth is 12.5m
  - Indicative volume 60,000m<sup>3</sup>
  - Restoration profile is indicative only.



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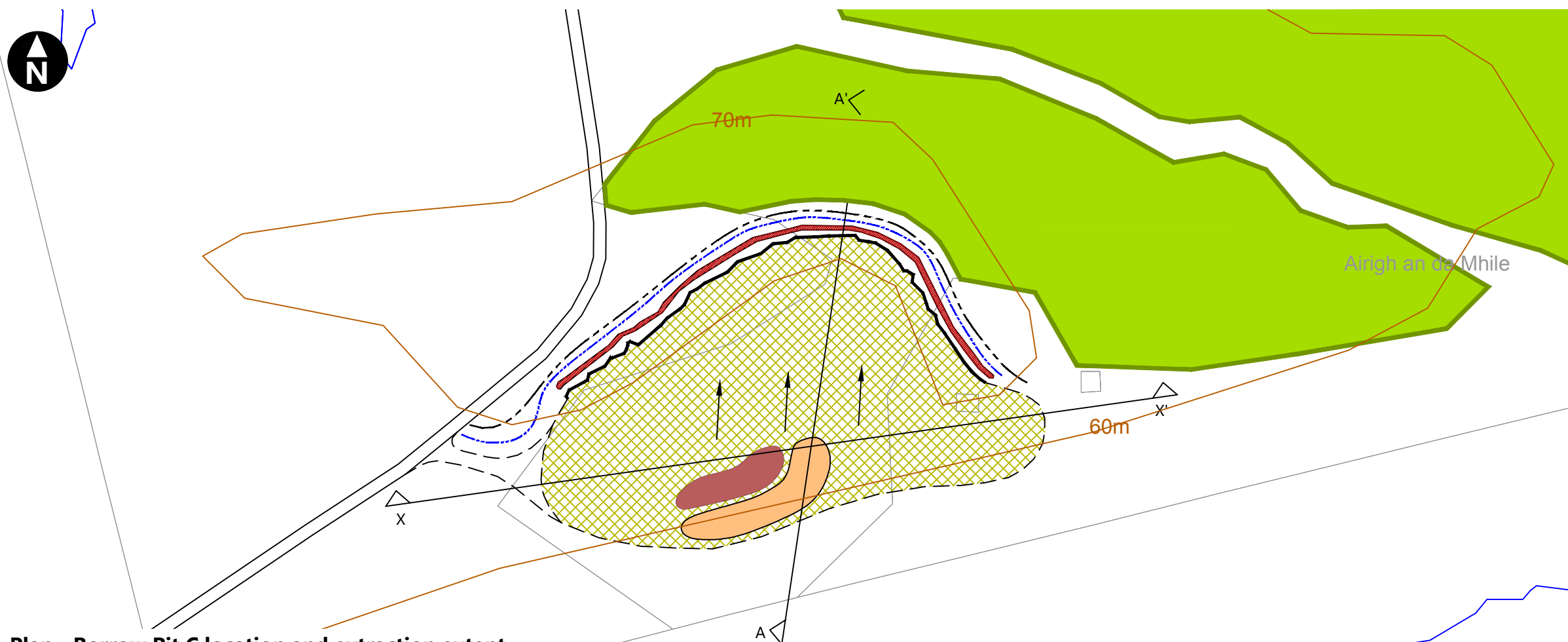
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**Lewis Wind Power**  
Cumhachd Gaoithe

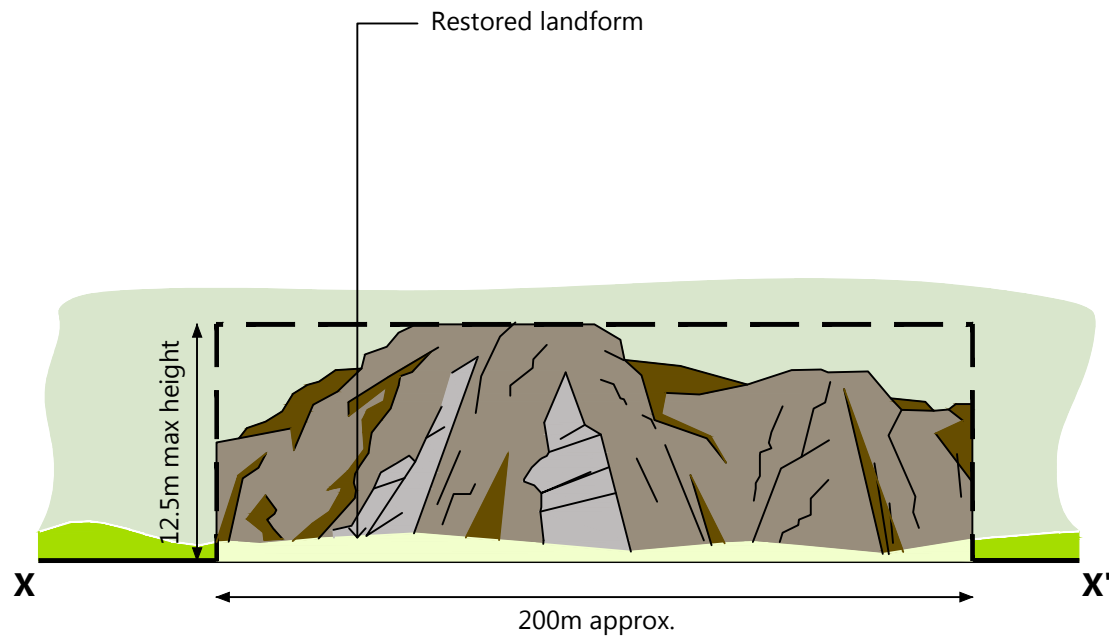
Stornoway Wind Farm

**Figure 4.12c**  
**Indicative Borrow Pit C design**

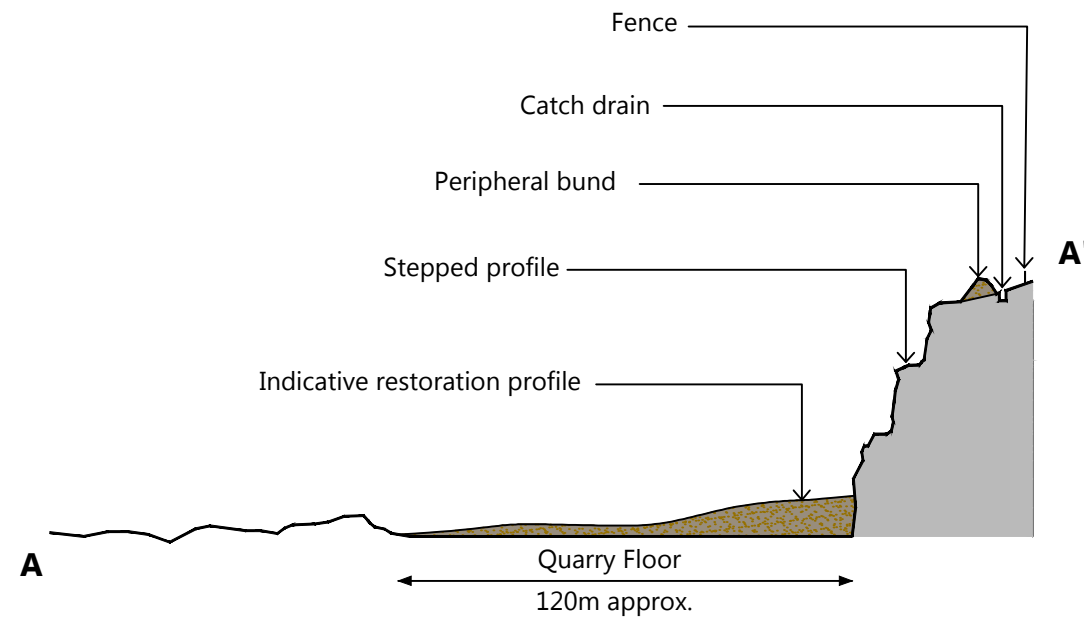
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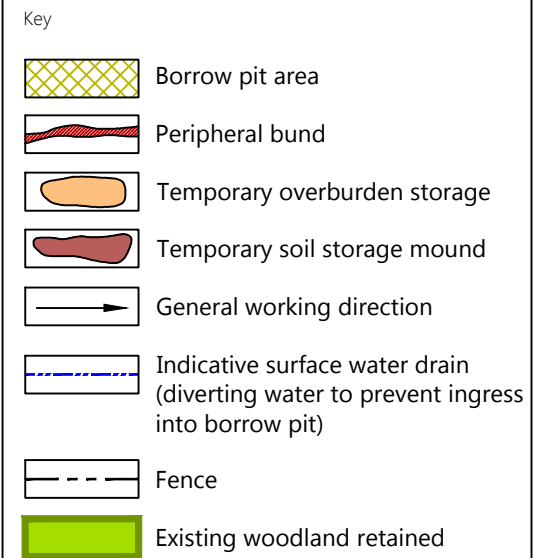
**Plan - Borrow Pit C location and extraction extent**  
Scale 1:2000



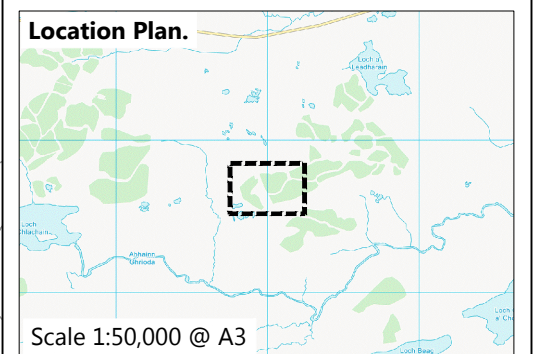
**Elevation X-X' - Indicative borrow pit design**  
**Scale 1:2000 (vertical exaggeration x5)**



**Section A-A' - Indicative borrow pit design**  
**Scale 1:2000 (vertical exaggeration x5)**



- Notes:
1. Indicative design only. Detailed design will require ground investigation using trial pits to determine rockhead, characterise rock mass, groundwater and assess slope stability parameters and drainage.
  2. Indicative Borrow Pit D area 23,900m<sup>2</sup>
  3. Indicative Borrow Pit D dimensions 200 x 120m
  4. Indicative depth is 12.5m
  5. Indicative volume 70,000m<sup>3</sup>
  6. Restoration profile is indicative only.



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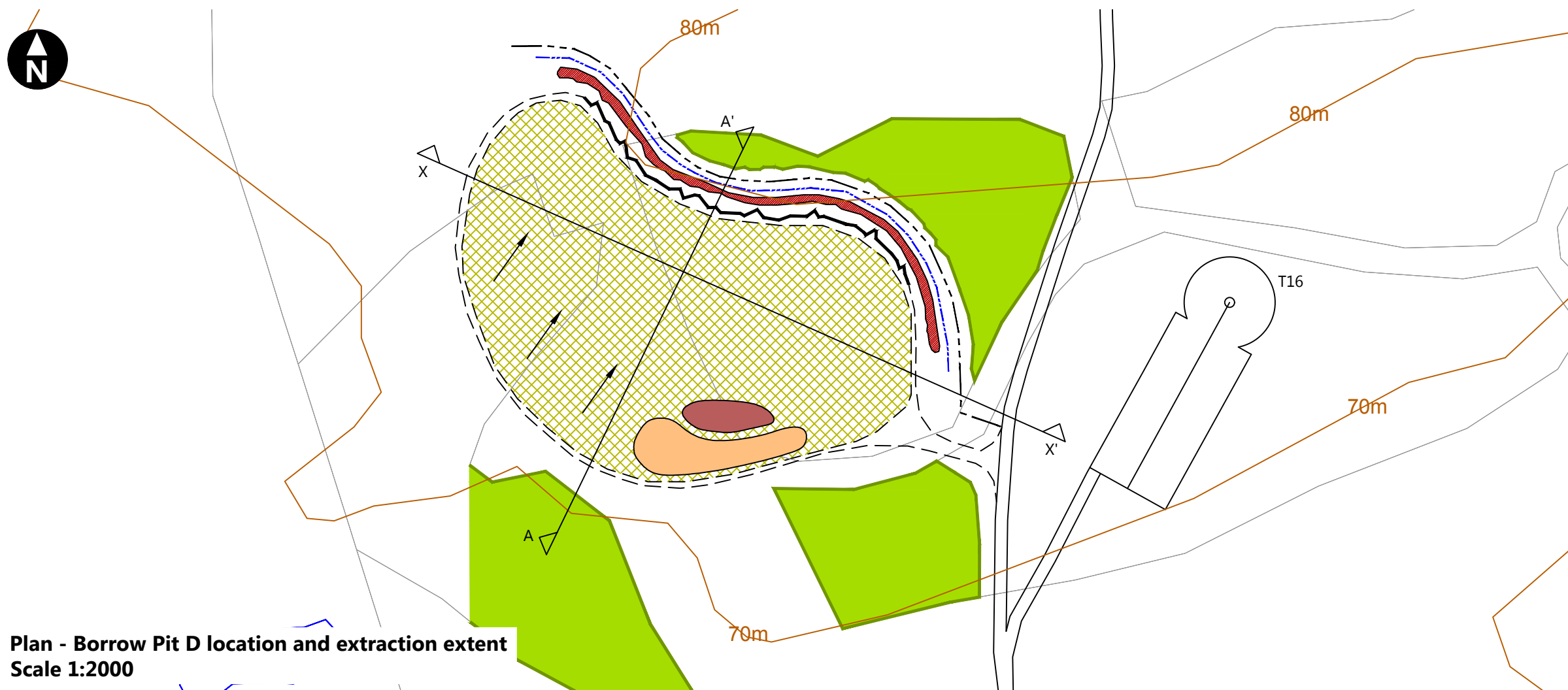
Stornoway Wind Farm

**Figure 4.12d**  
**Indicative Borrow Pit D design**

February 2018



**wood.**



**Plan - Borrow Pit D location and extraction extent**  
**Scale 1:2000**

