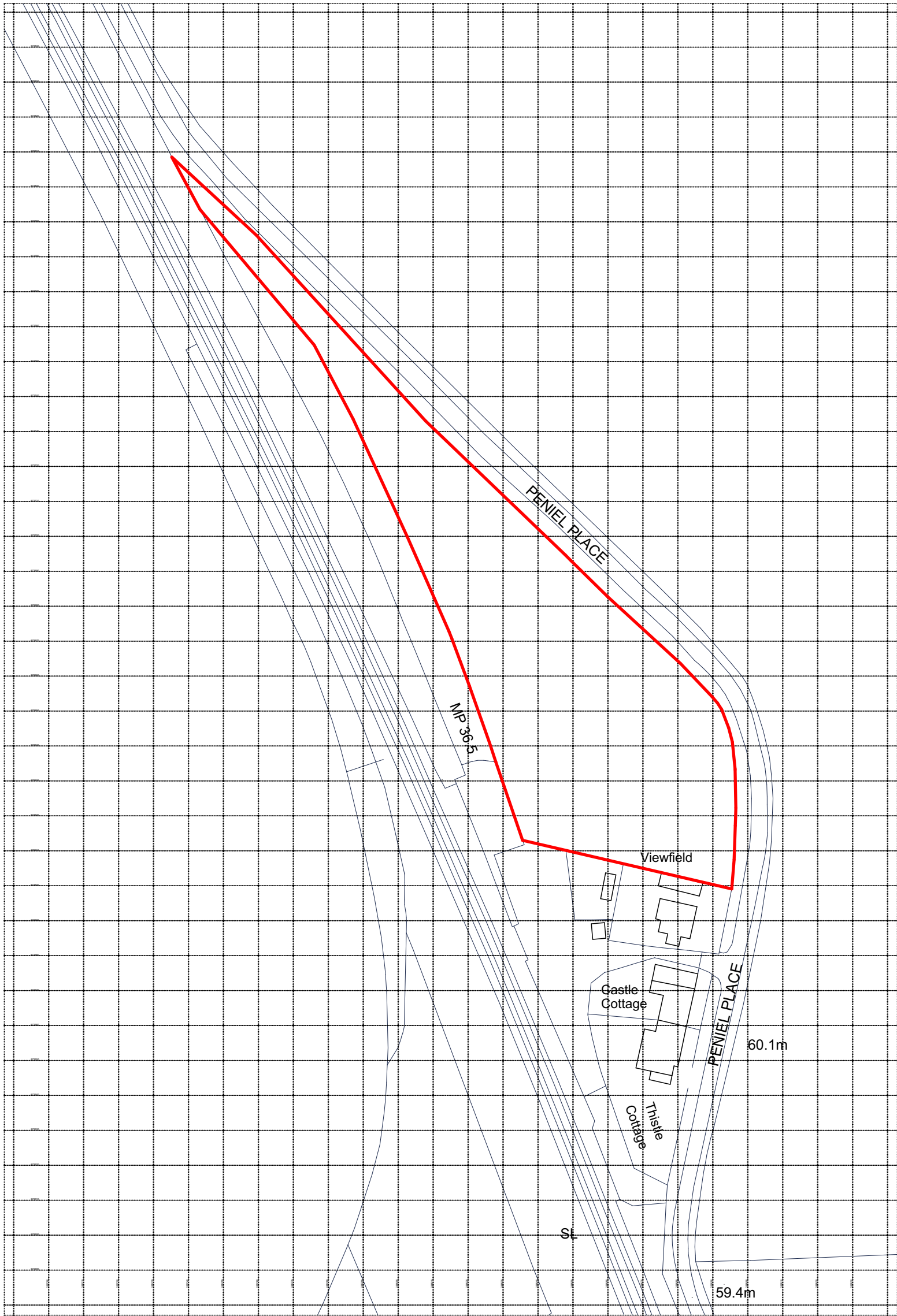
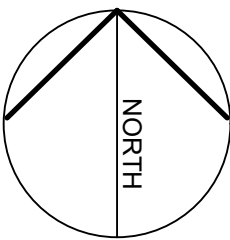


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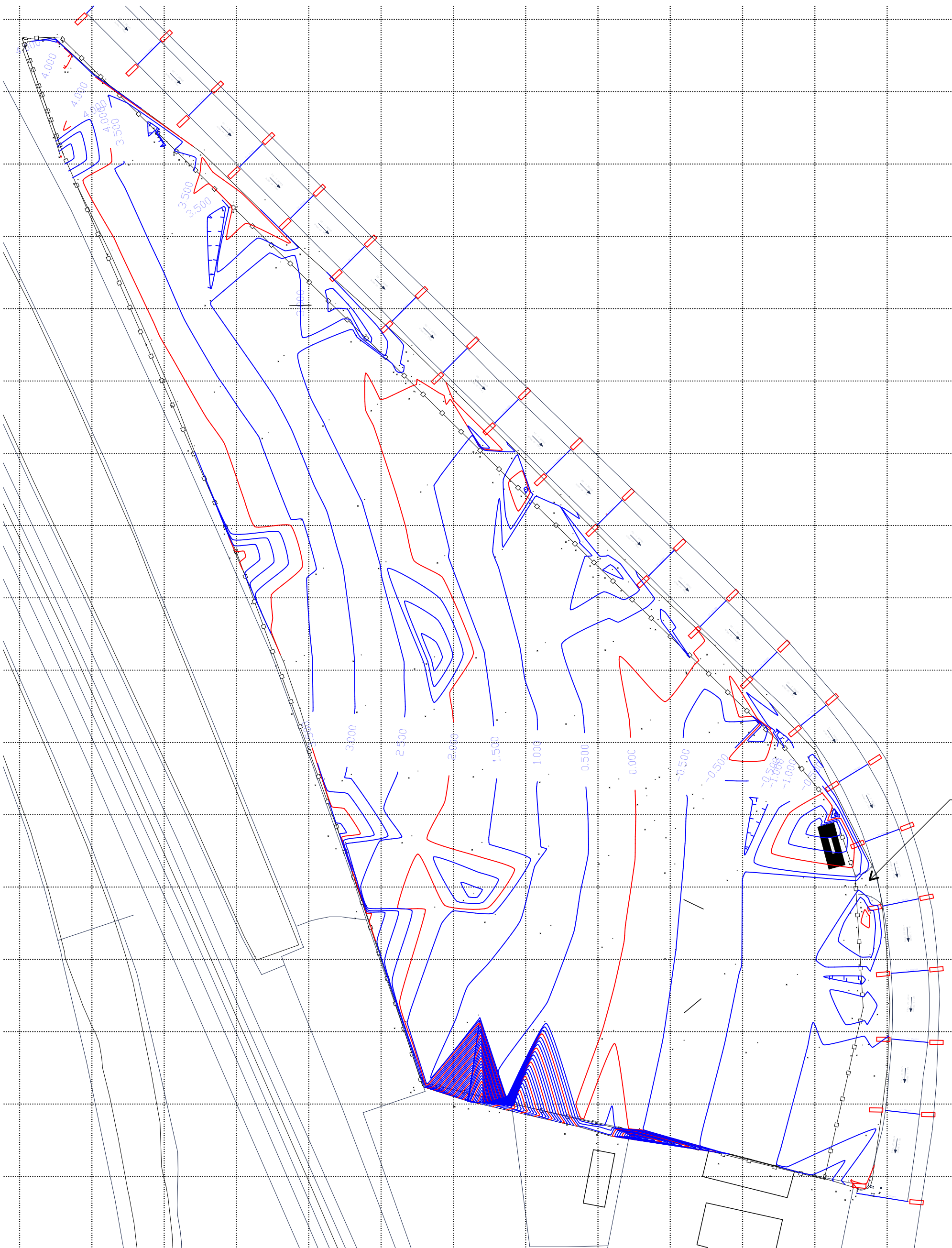
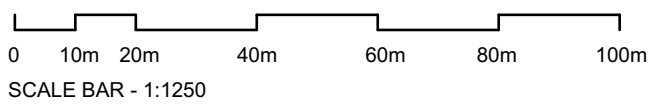
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LOCATION PLAN

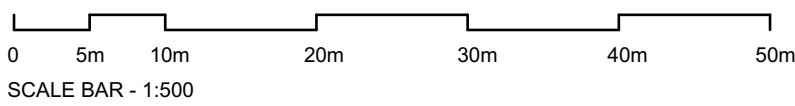
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Location of existing gate  
providing access to the  
plot.

TOPOGRAPHIC CONTOUR PLAN

1:500



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Project/Client:

NEW-BUILD DWELLING

PLOT OF LAND, BROXBURN JUNCTION

FOR MR EUAN WARDROP & MRS ABY WALLACE

Drawing:

LOCATION PLAN AND TOPOGRAPHICAL SURVEY

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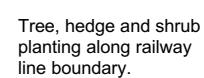
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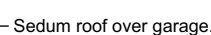


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A circle with a vertical line passing through its center, labeled 'NORTH'. Two other lines originate from the top of the circle, forming an angle with the vertical line.



1:500



1:100



## PRE-CONSTRUCTION

Project/Client:

NEW-BUILD DWELLING

PLOT OF LAND, BROXBURN JUNCTION

FOR MR EUAN WARDROP & MRS ABY WALLACE

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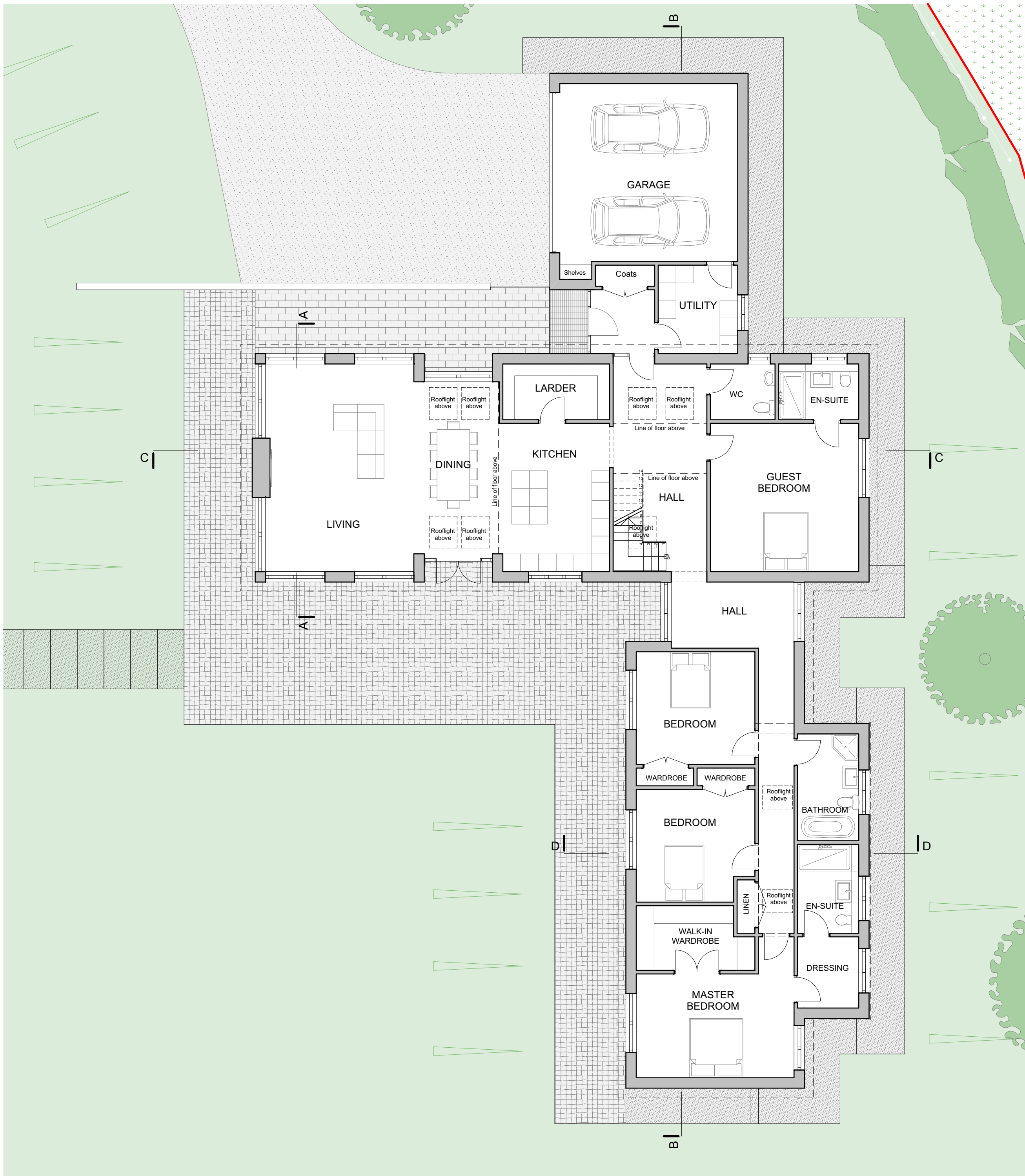
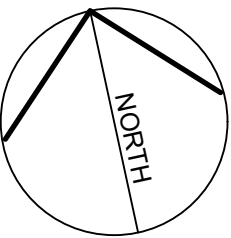
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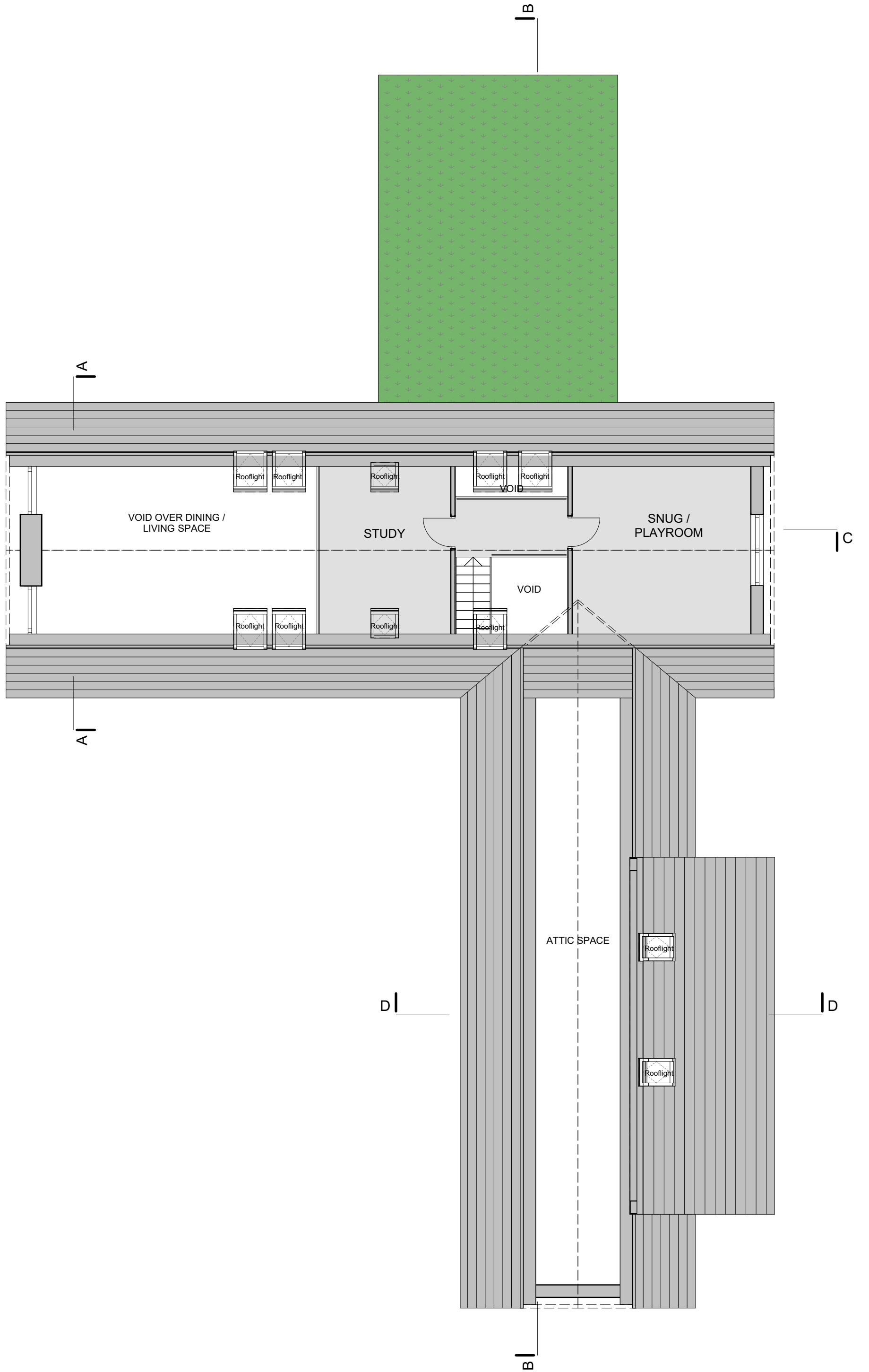
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GROUND FLOOR PLAN

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FIRST FLOOR PLAN

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FOR MR EUAN WARDROP & MRS ABY WALLACE

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FLOOR PLANS

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WEST ELEVATION

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NORTH ELEVATION

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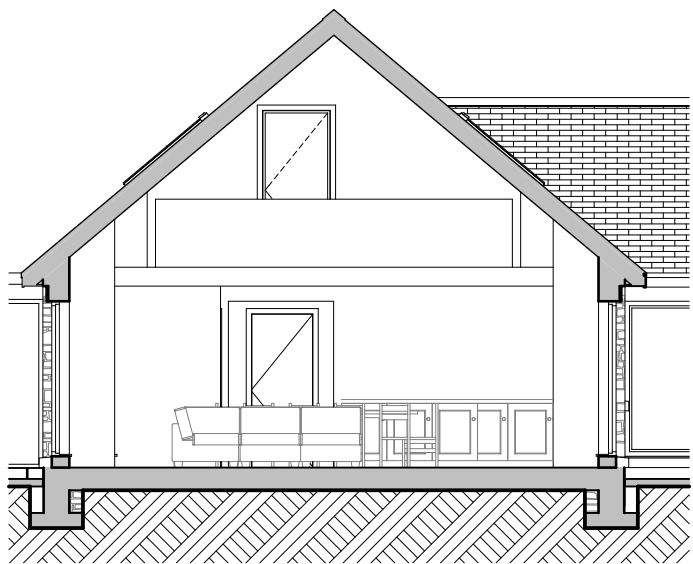
SOUTH ELEVATION

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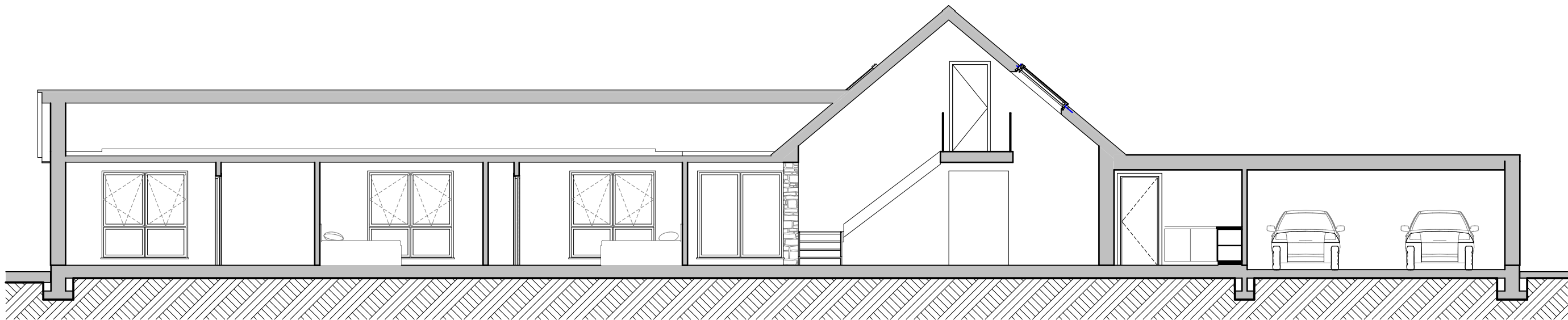
EAST ELEVATION

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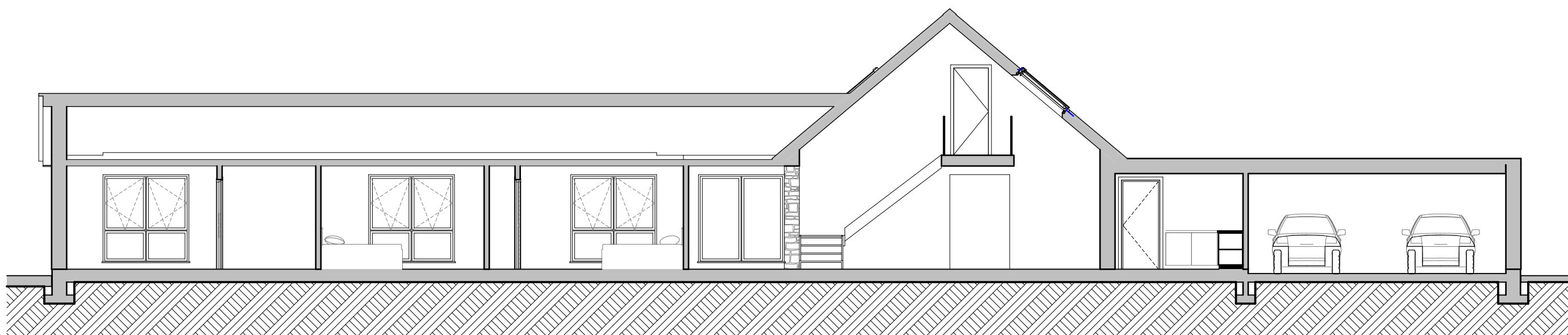
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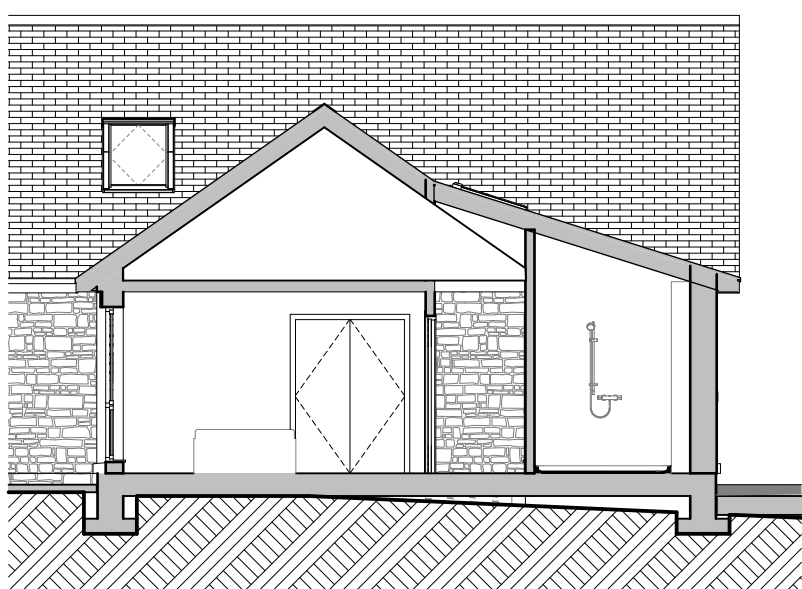
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SECTION C-C

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SECTION D-D

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PLOT OF LAND, BROXBURN JUNCTION  
FOR MR EUAN WARDROP & MRS ABY WALLACE

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**SECTIONS & ELEVATIONS**

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Image 1 - view from the driveway approaching the house.



Image 2 - view of the north-west of the house, including the driveway and garage.



Image 3 - view of the south-west of the house.



Image 4 - the house as viewed when approaching from the south on Peniel Place.



Image 5 - the house as viewed when approaching from the north on Peniel Place.

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FOR MR EUAN WARDROP & MRS ABY WALLACE

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3D VISUALISATIONS

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Land off Peniel Place, Broxburn  
Preliminary Ecological Assessment (PEA)  
*For Aby Wallace and Euan Wardrop*

27<sup>th</sup> October 2020

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## Version

VERSION	DATE	AUTHOR	REVIEWED	APPROVED
CIC v1.0	20/10/2020	Sarah Miller	Stewart Parsons	27/10/2020

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The report, and the information contained in it, is intended to be valid for a maximum of 12 months from the date of the survey, providing no significant alterations to the site have occurred.





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# 1. Executive Summary

Ellendale Environmental Limited was commissioned by Aby Wallace and Euan Wardrop to undertake a Preliminary Ecological Assessment (PEA) for an area of land at Peniel Place, Broxburn, EH52 5PY ('the site'). It is proposed to develop a single residential property on the site ('the proposed development').

Surveys undertaken at the site as part of the PEA included an Extended Phase 1 Habitat survey, a Preliminary Protected Species survey and Preliminary Roost Assessment of the trees present.

The Extended Phase 1 Habitat survey for the site was undertaken following the Phase 1 survey methodology (JNCC, 2010) to list the plant species associated with each habitat. A preliminary protected species walkover for the site was also conducted for the site and the immediate surrounding area.

The survey site is located to the east of Broxburn, accessed from Peniel Place and is approximately one hectare in size. The site comprises a semi-improved grassland field, bordered on all sides by a fence with a defunct tree boundary to the east and north, scrub beyond the western boundary and mixed trees beyond the southern boundary.

Mixed trees and scrub out with the site provide suitable nesting habitat for small passerine bird species and a number of birds were recorded during the survey. The semi-improved grassland within the site had a tall sward height at the time of survey and would be suitable for ground nesting birds. The habitat within the site may provide some foraging habitat for birds; however, the scrub beyond the western boundary provides the best foraging for birds, as bramble and hawthorn berries were abundant.





The brash pile within the site could provide hibernacula for small mammals, common amphibians and common reptiles. In addition, the tall grass within the site provides suitable cover for common reptiles.

The trees present out with the site on the eastern and southern boundaries were not suitable to support roosting bats, as no features such as cracks, crevices or dead limbs were found where bats could roost; they have therefore been identified as having Negligible Roost Potential. The trees may provide suitable habitat for foraging bats. A metal shipping container within the site also has Negligible Roost Potential.

There was no evidence of mammals, such as badger, within the site or immediate surroundings. There was evidence of rabbit activity throughout the site and rabbits were seen on the southern boundary. A fox scat was also noted at the southern boundary.

Overall, the site is assessed as providing low suitability to support protected species and no evidence was found during the survey.

Some recommendations are made within this report for modest post-construction ecological enhancements at the survey site that aim to increase the diversity of species present on the site after the completion of any future development works.



## 2. Introduction

### 2.1 Commission

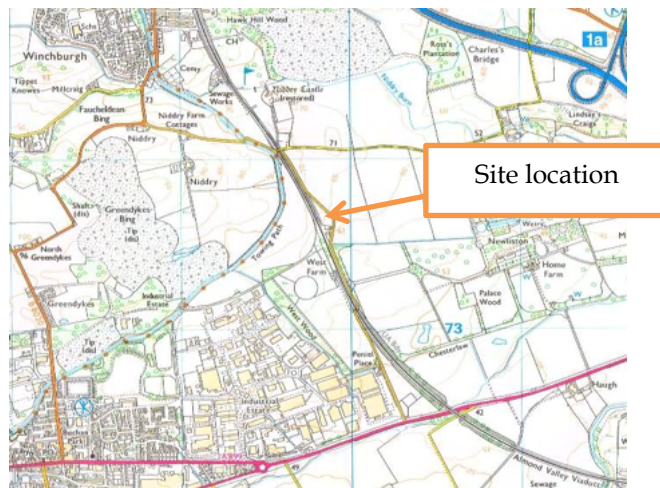
Ellendale Environmental Limited was commissioned by Aby Wallace and Euan Wardrop to undertake a Preliminary Ecological Assessment (PEA) for an area of land at Peniel Place, Broxburn, EH52 5PY ('the site'). It is proposed to develop a single residential property on the site ('the proposed development').

Surveys undertaken at the site as part of the PEA included an Extended Phase 1 Habitat survey, a Preliminary Protected Species survey and a Preliminary Roost Assessment of the trees present.

### 2.2 Site Details

The survey site is located to the west of Broxburn off Peniel Place at OS Grid Reference NT 0982 7367.

*Figure 1: Site location*



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### 2.3 Survey Objectives

On the basis of the brief provided by the client, Ellendale Environmental conducted an ecological survey to fulfil the following needs:

- ☛ Obtain baseline information on the current habitats and ecological features in and around the site;
- ☛ Identify any further specialist surveys that may be required;
- ☛ Identify the presence (or potential presence) of any protected species whose disturbance may require consent under the Wildlife and Countryside Act, 1981 (as amended); and
- ☛ Identify any species or habitats which may require special mitigation during the development of the site.



## 3. Methodology

### 3.1 Data Search

Publicly available databases, including MAGIC and the NBN Atlas, were consulted for historical evidence of:

- ☛ Statutory Land-Based Designations;
- ☛ Non-Statutory Land-Based Designations; and
- ☛ Protected Species.

The data search was conducted within a 2km radius of the site boundaries.

### 3.2 Phase 1 Habitat Survey

An Extended Phase 1 Habitat survey of the site area was undertaken, and the habitats present on the site were mapped following the Phase 1 survey methodology (JNCC, 2010), listing the plant species associated with each habitat. This methodology was an extended Phase 1 habitat survey, whereby all habitats were surveyed and recorded onto a base plan, and any habitats that were considered to be of potential interest to nature conservation were recorded through the use of target notes to annotate a Phase 1 habitat map.

The presence of any invasive weeds, such as Japanese knotweed *Fallopia japonica*, Himalayan balsam *Impatiens glandulifera* or giant hogweed *Heracleum mantegazzianum*, was also recorded through the use of target notes.

### 3.3 Preliminary Protected Species Survey

The site and immediate vicinity were examined for signs of protected species, particularly bat and nesting birds, as it was considered that the site had the greatest potential to support these species or groups of animals.





The presence/potential presence of protected or notable species of conservation concern was recorded using target notes, following the Institute of Ecological and Environmental Management guidance (IEEM, 2012).

### 3.4 Survey Area

The survey covered the entire site and areas within 30m (where accessible).

### 3.5 Survey Limitations

The aim of this survey was not to record every species present on the site, as one survey acts as a snap-shot, recording only those species which are present at the time or whose presence can be indicated through the occurrence of field signs, such as feeding remains, droppings or places used for shelter or foraging.

Evidence collected has been used to draw conclusions about the flora and fauna within the boundary of the site and to provide an assessment of their ecological and nature conservation value. Where it is suspected that species of nature conservation importance have the potential to be present, furthermore detailed surveys have been advised.

Weather was not a limiting factor to the surveys. The prevailing conditions at the time of the surveys are summarised in Table 1.

*Table 1: Survey weather conditions*

SURVEY DATE	TEMPERATURE (°C)	WIND SPEED (MPH)	CLOUD COVER / PRECIPITATION
27/09/20	12	2	30% cloud cover; dry and sunny



## 4. Results

### 4.1 Ellendale Environmental

The survey was undertaken by Sarah Miller, Ecologist at Ellendale Environmental, who is a Graduate member of CIEEM with two years' experience of undertaking ecology surveys and assessments throughout the UK.

### 4.2 Desk Study

A 2km data search for existing biological records was undertaken from publicly available databases. It was found that there are no statutory or non-statutory designated sites located within 2km of the site boundaries.

The following protected species are identified within 2km of the site boundaries by the data search:

- ☞ Badger *Meles meles*;
- ☞ Common pipistrelle bat *Pipistrellus pipistrellus*;
- ☞ Daubenton's bat *Myotis daubentonii*;
- ☞ European water vole *Avicola amphibius*;
- ☞ Otter *Lutra lutra*; and
- ☞ Soprano pipistrelle bat *Pipistrellus pygmaeus*.

Approximately 97 bird species have been recorded within 2km of the site and are shown on the NBN Atlas; however, none of the records are for birds within the site.

### 4.3 Extended Phase 1 Survey

The survey site is located to the east of Broxburn, accessed from Peniel Place and is approximately one hectare in size. The site comprises a semi-improved grassland field, bordered on all sides by a fence with a defunct tree boundary to the east and north, scrub beyond the western boundary and mixed trees beyond the southern boundary.





The semi-improved neutral grassland, which has a tall sward height, includes the species Yorkshire fog *Holcus lanatus*, tufted hair grass *Deschampsia cespitosa*, cock's-foot grass *Dactylis glomerata*, false-oat grass *Arrhenatherum elatius*, vetch *Vicia spp.*, common nettle *Urtica dioica*, cow parsley *Anthriscus sylvestris*, common hogweed *Heracleum sphondylium*, creeping thistle *Cirsium arvense*, black knapweed *Centaurea nigra*, cleavers *Galium aparine* and St John's wort *Hypericum spp.* In the centre of the field there is a pile of brash.

*Photograph 1: showing a view of the site*



Beyond the fence at the south of the site there is a boundary of mixed trees in the adjacent property with species including spruce *Picea spp.*, cherry *Prunus avium* and ash *Fraxinus excelsior*.



*Photograph 2: showing a view of the mixed trees beyond the south boundary*



Along the eastern boundary with Peniel Place there is a defunct boundary of wych elm *Ulmus glabra* trees which have been managed with some branches removed. There is an understory of dog rose *Rosa canina*, rosebay willowherb *Epilobium angustifolium* and bramble *Rubus fruticosus*.





*Photograph 3: showing the defunct tree boundary to the east*



Running alongside the western boundary, beyond a 2m tall wire fence, there is an area of dense scrub including the species willow *Salix spp.*, hawthorn *Crataegus monogyna* and bramble. Beyond the fence and scrub there is a railway line which is located within an embankment and is approximately 4-5m lower than the survey site.





*Photograph 4: showing a view of the western boundary*



#### 4.4 Preliminary Protected Species Survey

Mixed trees and scrub out with the site provide suitable nesting habitat for small passerine bird species and a number of birds were recorded during the survey. The semi-improved grassland within the site had a tall sward height at the time of survey and would be suitable for ground nesting birds. The habitat within the site may provide some foraging habitat for birds; however, the scrub beyond the western boundary provides the best foraging for birds, as bramble and hawthorn berries were abundant.

The brash pile within the site could provide hibernacula for small mammals, common amphibians and common reptiles. In addition, the tall grass within site provides suitable cover for common reptiles.



The trees present out with the site on the eastern and southern boundaries were not suitable to support roosting bats, as no features such as cracks, crevices or dead limbs were found where bats could roost; therefore, they have been identified as having Negligible Roost Potential.. The trees may provide suitable habitat for foraging bats.

A padlocked metal shipping container is present within the site. The structure has no entry or exit points or features suitable for roosting bats. In addition, metal structures do not offer constant temperatures and are prone to extremes of heat and cold which is not favourable for bats. Furthermore, there was no evidence of bats, such as droppings or urine splashes within the structure. Therefore it has been identified as having Negligible Roost Potential.

*Photograph 5: showing the metal container within the site*





There was no evidence of mammals, such as badger, within the site or immediate surroundings. There was evidence of rabbit activity throughout the site and rabbits were seen on the southern boundary. A fox scat was also noted at the south boundary.

Overall, the site is assessed as providing low suitability to support protected species and no evidence was found during the survey.





## 5. Conclusions

### 5.1 Conclusion

The survey site is located to the east of Broxburn, accessed from Peniel Place and is approximately one hectare in size. The site comprises a semi-improved grassland field, bordered on all sides by a fence with a defunct tree boundary to the east and north, scrub beyond the western boundary and mixed trees beyond the southern boundary.

Mixed trees and scrub out with the site provide suitable nesting habitat for small passerine bird species and a number of birds were recorded during the survey. The semi-improved grassland within the site had a tall sward height at the time of survey and would be suitable for ground nesting birds. The habitat within the site may provide some foraging habitat for birds, however the scrub beyond the western boundary provides the best foraging for birds as bramble and hawthorn berries were abundant.

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There was no evidence of mammals, such as badger, within the site or immediate surroundings. There was evidence of rabbit activity throughout the site and rabbits were seen on the southern boundary. A fox scat was also noted at the southern boundary.

Overall, the site is assessed as providing low suitability to support protected species and no evidence was found during the survey.

## 5.2 Main Recommendations

The following recommendations are made for modest post-construction ecological enhancements at the site that are proportionate with the low level of environmental impact from the proposed development:

- 🍂 As part of any eventual construction, it is recommended that any vegetation clearance is undertaken outside of the bird breeding season, i.e. March to July, as all nesting birds are protected under the Wildlife and Countryside Act 1981 (as amended). If nesting birds are found, these areas of the site will need to be protected from disturbance until the young have fledged naturally.
- 🍂 As part of the design and layout considered, bird nesting boxes, both small hole and open fronted, could be placed within the site if possible. This could create nesting opportunities for small bird species as part of the overall design. In addition, swift blocks could be incorporated into the building design to provide nesting habitat for swifts which are a priority species in the Edinburgh Biodiversity Action Plan.
- 🍂 As part of any eventual construction, it is recommended that if removal of the brash pile is undertaken, it is completed by hand so that any reptiles, amphibians or small mammals using it for cover can be dissuaded from the area.
- 🍂 As part of the design and layout considered, a wildflower grassland mix could be incorporated into the landscape design



which could make a contribution to the Edinburgh Living Landscape Project by providing habitat for pollinators.

- ☛ As part of the design and layout considered, native trees and hedgerows could be incorporated to increase biodiversity within the site by providing food and nesting habitat for a range of species.



## 6. Target Notes

### 6.1 Botanical Target Notes (TN)

TN1 – Site is accessed from Peniel Place through a metal gate. There is a metal shipping container just beyond the entrance.

TN2 – Site comprises semi-improved neutral grassland, which has a tall sward height, includes the species Yorkshire fog, tufted hair grass, cock's-foot grass, false-oat grass, vetch, common nettle, cow parsley, common hogweed, creeping thistle, black knapweed, cleavers and St John's wort.

TN3 – Mixed trees which are out with the site boundary, on the other side of the stock fence, which include the species spruce, cherry, and ash.

TN4 – Beyond a 2m tall wire fence on the western boundary there is an area of dense scrub including the species willow, hawthorn and bramble. Beyond the fence and scrub there is a railway line down an embankment approximately 4-5m from the survey site.

TN5 – Defunct boundary of wych elm trees which have been managed with some branches removed. There is an understory of dog rose, rosebay willowherb and bramble.

### 6.2 Animal Target Notes (AN)

AN1 – Rabbit droppings throughout the site.

AN2 – Fox scat.

AN3 – The trees present out with the site on the eastern and southern boundaries were not suitable to support roosting bats, as no features such as cracks, crevices or dead limbs were found where bats could





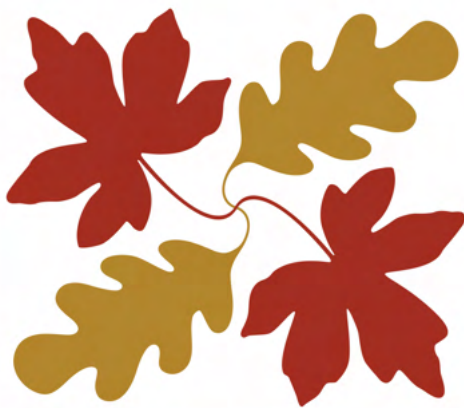
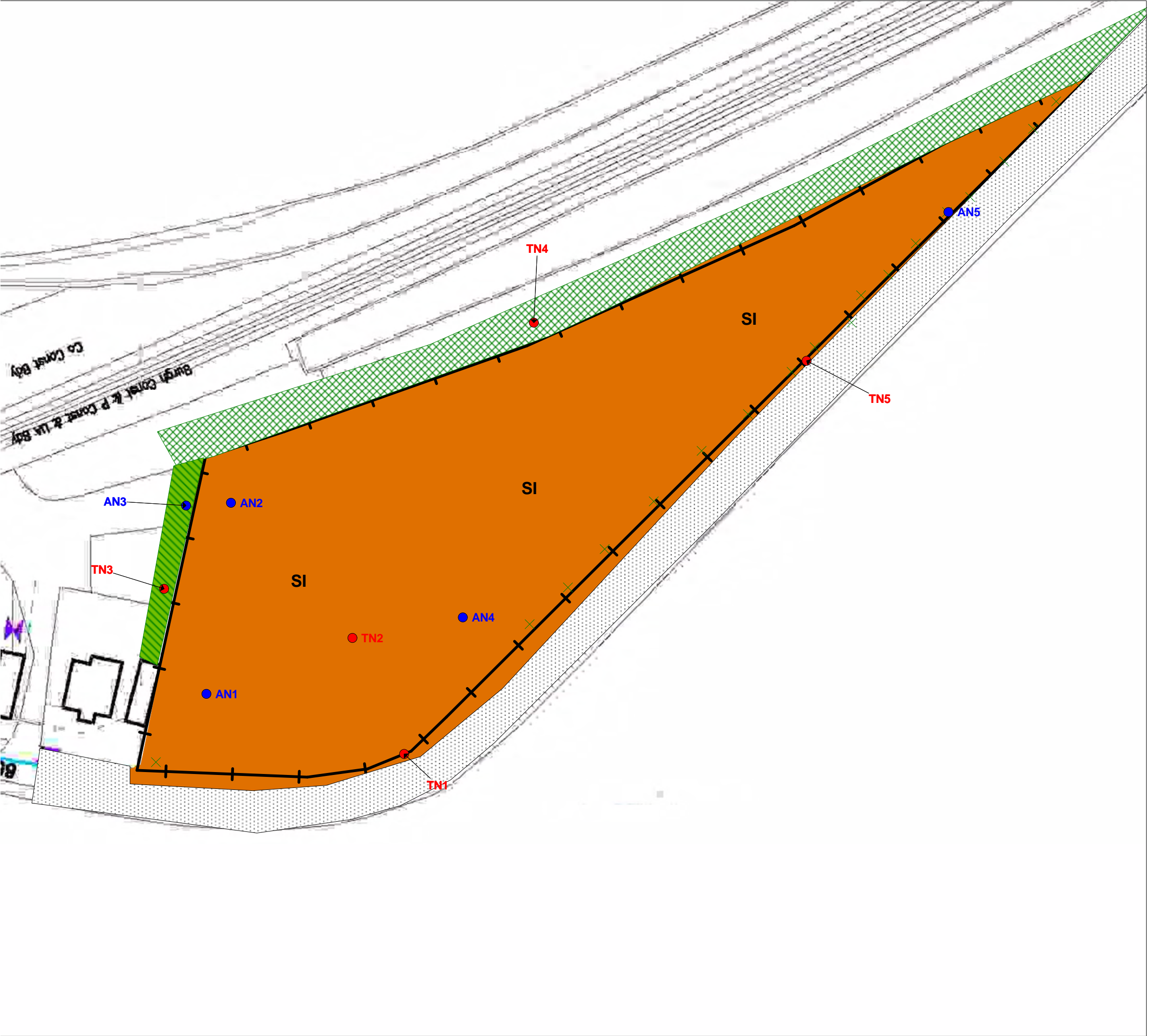
roost; they have therefore been identified as having Negligible Roost Potential.. The trees may provide suitable habitat for foraging bats.

AN4 – The brash pile within the site could provide hibernacula for small mammals, common amphibians and common reptiles.

AN5 – Trees have been managed; some branches have been removed.



## 7. Extended Phase 1 Map



ELLENDALE  
ENVIRONMENTAL

Drawing Title;  
Land off Peniel Place, Broxburn  
Extended Phase 1 Map

Client;  
Aby Wallace and Euan Wardrop

Date;  
27/10/20

Drawn By;  
SP

Project Number;  
EEL316

Version Number;  
v1.0

- Target Note
- TN
- Animal Note
- AN
- Woodland and Scrub
- Scattered Scrub
  - Dense Scrub
  - Mixed Woodland
- Built-up Area
- Fence
  - Hard Standing
- Grassland
- Semi-improved Neutral Grassland





Land off Peniel Place, Broxburn  
Environmental Noise Impact Assessment  
*For Aby Wallace and Euan Wardrop*

25<sup>th</sup> January 2021

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## Version

VERSION	DATE	AUTHOR	REVIEWED	APPROVED
1.0	29/10/20	Emma Parsons	Stewart Parsons	29/10/20
1.1	25/01/21	Emma Parsons	Stewart Parsons	25/01/21

### Disclaimer

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The report, and the information contained in it, is intended to be valid for a maximum of 12 months from the date of the survey, providing no significant alterations to the site have occurred.



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# 1. Introduction

## 1.1 Commission

Ellendale Environmental Limited has been commissioned by Aby Wallace and Euan Wardrop ('the applicants') to undertake an environmental noise impact assessment for a proposed development at land off Peniel Place in Broxburn, EH52 5PY ('the site'). This has been undertaken to support a planning application to City of Edinburgh Council (CEC) for the construction of a residential property ('the proposed development').

The purpose of this assessment has been to evaluate the site in terms of its suitability for residential use and has been undertaken with reference to the World Health Organisation (WHO) guidelines and criteria within BS8233:2014<sup>1</sup> for suitable internal resting and sleeping conditions for dwellings. The assessment has been undertaken to demonstrate that the proposed development is suitable for its intended use, in terms of road traffic and rail noise levels.

To assist the reader, a glossary of acoustic terms is provided as **Appendix A**.

---

<sup>1</sup> BS8233:2014, *Guidance on sound insulation and noise reduction for buildings* (BSI, 2014)



## 1.2 Site Details

The site is located off Peniel Place to the north-east of Broxburn. It is an area of agricultural land, but is not currently farmed, and is located on the edge of the Edinburgh city council boundary. Peniel Place is a local (unclassified) road which connects the nearby A89 to Winchburgh to the north-west. There are three existing residential properties to the south, namely Viewfield, Castle Cottage and Thistle Cottage.

The site is bounded to the north and east by Peniel Place, and by an operational railway line to the west (which is used for the main Edinburgh to Glasgow rail services, via Linlithgow and Falkirk High).

It is proposed to develop the site for residential use, with a part single and part two-storey property.

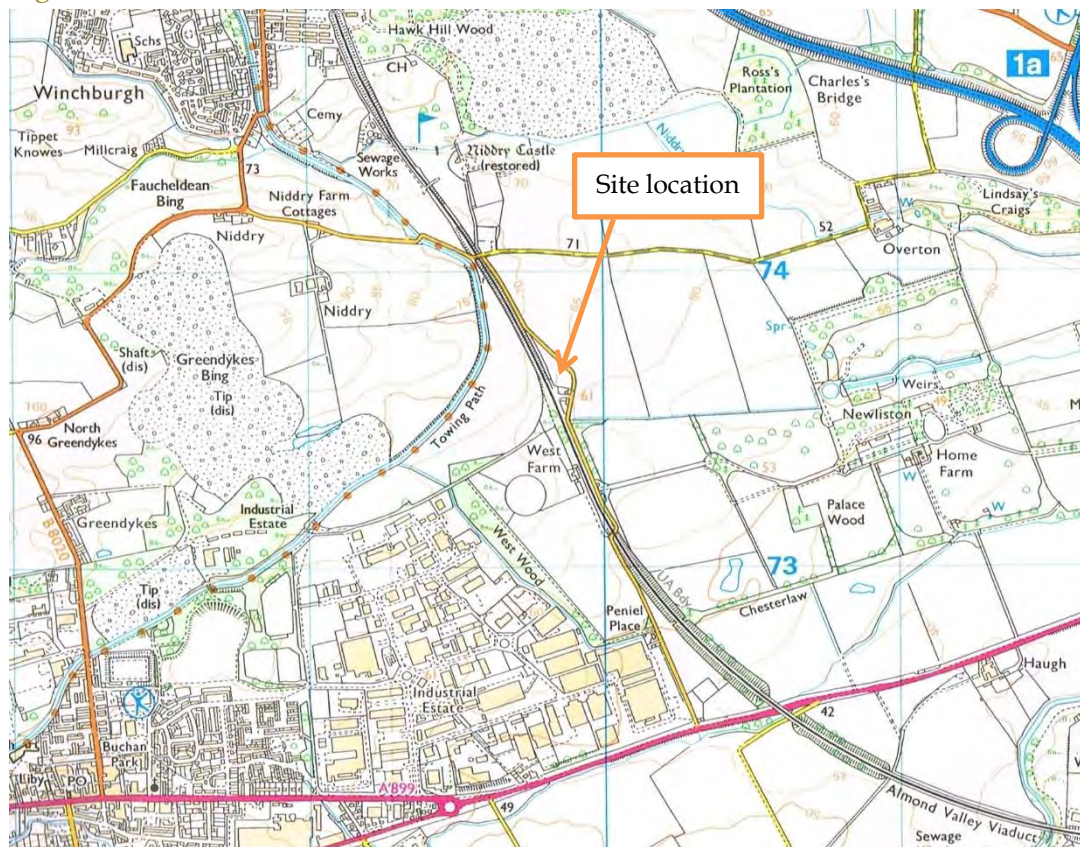
As indicated in **Appendix B**, the property would comprise an open plan living/dining room, kitchen, four bedrooms and two bathrooms. A garage would be provided, adjoining the property to the north.

The living/dining room would face west, overlooking the rear of the site and towards the railway line. This would be the same for three of the proposed bedrooms, which includes the master bedroom, and these rooms would be on the ground floor. There would be a fourth bedroom, serving as a guest bedroom only and facing east towards Peniel Place. This would be a ground floor level, with a snug/play room located above.

Amenity space would be provided as a private garden to the rear of the property, predominantly located to the south and west of the site.



Figure 1: Site location



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## 2. Consultation

Consultation was undertaken with a representative of Environmental Health at CEC in September 2020, who had previously confirmed (via pre-application advice) that the amenity of the future occupiers of the property *“should meet the standards set out in the Edinburgh Design Guidance”*. CEC also stated that *“due to the proximity of the railway line, a noise impact assessment will be required to ensure mitigation measures are in place”*. Further consultation with CEC confirmed the following requirements:

- ☞ The target criterion for transportation noise is from BS8233:2014, as well as the WHO guidelines;
- ☞ A closed window standard is accepted for transportation noise; however, open ventilators must also provide the necessary sound insulation;
- ☞ Bedrooms must achieve an indoor noise level of 30dB  $L_{Aeq,T}$  and 45dB  $L_{AFmax}$ , with living rooms achieving an indoor noise level of 35dB  $L_{Aeq,T}$ ; and
- ☞ It is desirable that the external noise level does not exceed 50dB  $L_{Aeq,T}$ , with an upper guideline value of 55dB  $L_{Aeq,T}$  which would be acceptable in noisier environments.

Due to circumstances surrounding a global health pandemic, it was discussed with CEC that direct measurement of noise levels may not yield representative results, whereby they may not be entirely representative of otherwise ‘normal’ road traffic or train pass-bys. However, CEC confirmed that field measurements would be acceptable, but with a potential correction to compensate for a reduction in rail services. CEC also confirmed that measurements should be undertaken over a number of days and nights, and that the worst-case scenario should be used.





## 3. Guidance

The proposed development must be suitable for its intended future use in terms of existing rail and road traffic noise. In this respect, the suitability of the site for residential development has been assessed with reference to the WHO guidelines and BS8233:2014 to demonstrate that suitable indoor noise levels can be achieved. Reference has also been made to the Edinburgh Design Guidance, which was published by CEC in January 2020.

### 3.1 WHO Guidelines

The *Guidelines for Community Noise* document (WHO, 1999) and the *Night Noise Guidelines for Europe* (WHO, 2009) recommend suitable noise levels for both outdoor and indoor living areas during the daytime<sup>2</sup> and night-time<sup>3</sup> periods. In this regard, the guidelines state:

- *“To avoid sleep disturbance, indoor guideline values for bedrooms are 30dB  $L_{Aeq,8h}$  for continuous noise and 45dB  $L_{AFmax}$  for single sound events; and*
- *To protect the majority of people from being seriously annoyed during the daytime, the sound pressure level on balconies, terraces and outdoor living areas should not exceed 55dB  $L_{Aeq,16h}$  for a steady, continuous noise”.*

---

<sup>2</sup> 07.00 – 23.00 hours.

<sup>3</sup> 23.00 – 07.00 hours.



### 3.2 BS8233:2014

This standard “provides guidance on the control of noise in and around buildings” and recommends appropriate internal noise levels for residential dwellings as follows:

- A daytime noise level of 35dB  $L_{Aeq,16hr}$  for ‘daytime resting’ within living rooms and bedrooms; and
- A night-time noise level of 30dB  $L_{Aeq,8hr}$  for ‘sleeping’ within bedrooms.

These internal noise levels correlate with the advice provided by the WHO with regards to suitable noise limits for residential dwellings.

Whilst it may be desirable to achieve these internal noise levels with windows open (for rapid ventilation or occupants’ choice), it is stated within BS8233:2014 that “if relying on closed windows to meet the guide values, there needs to be appropriate alternative ventilation that does not compromise the façade insulation or the resulting noise level”.

### 3.3 Edinburgh Design Guidance

The Edinburgh Design Guidance was published in January 2020 and refers to the following with respect to ‘sensitive’ developments such as those for residential use:

- ☞ “Where a proposed sensitive development is likely to be exposed to noise, developers should design the layout to minimise noise and implement the most appropriate measures to ensure amenity is protected. This could include locating noise-sensitive areas/rooms away from the parts of the site most exposed to noise or designing the building so its shape and orientation reflect noise and protect the most sensitive uses; and
- ☞ Reference should be made to industry technical guidance and British Standards when addressing relevant issues, for example BS8233:2014”.



### 3.4 Night-time Internal Maximum Noise Levels

BS8233:2014 does not provide a specific limit for maximum noise levels ( $L_{AFmax}$ ) within bedrooms; however, the previous version of BS8233 (published in 1999) stated that noise levels in bedrooms during the night-time period should not regularly exceed 45dB  $L_{AFmax}$ , and this correlates with the advice contained within the WHO guidelines.

BS8233:2014 does however state that *“a guideline value may be set in terms of  $L_{AFmax}$  depending on the character and number of events per night”*. Following this, reference is made to the advice contained within the *Professional Practice Guidance on Planning and Noise* (‘ProPG’, June 2017), whereby, with respect to night-time noise and individual noise events, it states that *“for a reasonable standard in noise-sensitive rooms (e.g. bedrooms), individual noise events should not normally exceed 45dB  $L_{AFmax}$  more than 10 times a night”*.

This therefore corresponds with the WHO guidelines and the advice given previously in BS8233:1999 but provides further clarity on an acceptable number of individual events per night. Whilst the ProPG is applicable for England and Wales, its advice on maximum noise levels at night is currently considered best practice.

### 3.5 Daytime External Noise Levels

In terms of external noise, BS8233:2014 correlates with the WHO guidance, whereby *“it is desirable that the external noise level does not exceed 50dB  $L_{Aeq,T}$  with an upper guideline value of 55dB  $L_{Aeq,T}$  which could be acceptable in noisier environments”*.

Whilst this is applicable for ‘traditional external areas that are used for amenity space’, the guidance of BS8233:2014 goes on to state that *“development should be designed to achieve the lowest practicable levels in these external amenity spaces but should not be prohibited”*.





## 4. Noise Survey

To inform the assessment of potential noise impact, a noise survey was undertaken within the site. This was undertaken in order to measure the existing daytime and night-time noise levels, due to both rail and road traffic.

The survey was undertaken from Thursday 15<sup>th</sup> to Tuesday 20<sup>th</sup> October 2020, using continuous measurements to cover a number of day and night-time periods as requested by CEC. This survey period also included a weekend period, and noise levels were logged every five minutes.

### 4.1 Survey Locations

The survey locations are shown in **Appendix C** as 'M01' and 'M02'.

M01 was positioned within the red line boundary, to the west of the site close to the railway line. This was deemed to be the most reliable location for a period of unattended monitoring, whereby the survey equipment was not clearly visible from Peniel Place and was able to be secured to a fence. As the development has been designed with the majority of sensitive rooms facing west towards the rear of the site and in the direction of the railway, M01 was also considered to represent the worst case (whereby the western façade would face the direction of the railway, not the road traffic passing on Peniel Place).

The survey equipment was positioned in the free-field and was at least 3.5m from reflecting surfaces (other than the ground). The height of the microphone was positioned between 1.2 and 1.5m above ground level. A photograph of the sound level meter in-situ at M01 is provided as **Appendix D**.



At M01, there was no direct line of sight to the railway line, as it is located within an embankment which is lower than the site; however, trains could be heard at this position and could be partially seen when looking to the south-west. There was a line of sight from M01 to Peniel Place and the passing road traffic could be seen.

A shorter period of attended monitoring was also undertaken within the site (at M02) on Tuesday 20<sup>th</sup> October 2020, which was representative of the location of the proposed development. Again, there was no direct line of sight to the railway line, but trains could also be heard at this position and could be partially seen when looking to the south-west. There was a line of sight from M02 to Peniel Place and the passing road traffic could be seen.

#### 4.2 Survey Equipment

Measurements were undertaken using a Rion NL-52 Class 1 sound level meter (serial number 00732145). The sound level meter was calibrated at the start and end of the measurements using a Rion NC-74 Class 1 calibrator (serial number 35168028) and no significant drift in calibration was observed<sup>4</sup>.

A weather-resistant outdoor case was used (for the purposes of the continuous and unattended monitoring) and included a WS-15 windshield for microphone protection from wind and rain.

#### 4.3 Survey Weather Conditions

During both the installation and collection of the survey equipment, weather conditions were deemed conducive for noise monitoring as detailed in Table 1.

---

<sup>4</sup> Calibration at start was 93.7B, calibration at end 93.8dB.



*Table 1: Weather conditions during installation and collection*

DATE	AIR TEMPERATURE (°C)	WIND SPEED (MPH)	CLOUD COVER / PRECIPITATION / OTHER
Thursday 15 <sup>th</sup> October 2020	Min: 9.9 Ave: 10.6 Max: 11.8	Min: 0 Ave: 1.7 Max: 5.3	100% cloud cover, 70% average humidity & predominantly still conditions.
Tuesday 20 <sup>th</sup> October 2020	Min: 12.5 Ave: 13.2 Max: 14.0	Min: 0 Ave: 1.0 Max: 2.7	60-70% cloud cover, with sunny intervals, 80% average humidity & predominantly still conditions.

Overall, largely similar conditions were noted during the intervening survey period as confirmed through weather forecasts and historical weather data for the area; however, it was noted that some light rain and some higher wind speeds occurred on Monday 19<sup>th</sup> October through to the early hours of Tuesday 20<sup>th</sup> October 2020.

#### 4.4 Survey Observations

The following observations were made regarding the prevailing soundscape within the site:

- ☞ There were frequent train pass-bys, with 8 trains observed between 15.20 and 16.00 hours on Thursday 15<sup>th</sup> October 2020;
- ☞ Similarly, during a period of attended monitoring between 11.00 and 12.00 on Tuesday 20<sup>th</sup> October 2020, 10 trains were observed;
- ☞ Frequent road traffic was also observed during both periods, with approximately one vehicle passing the site every minute – vehicles were noted to be travelling in both directions, but with slightly more travelling north towards Winchburgh;
- ☞ Other sources of noise included distant road traffic, assumed to be from the M8 and M9 motorways, which was continuous but at a low level;
- ☞ Noise from Edinburgh airport, including overhead aircraft, was also audible but was again perceived at a low level; and



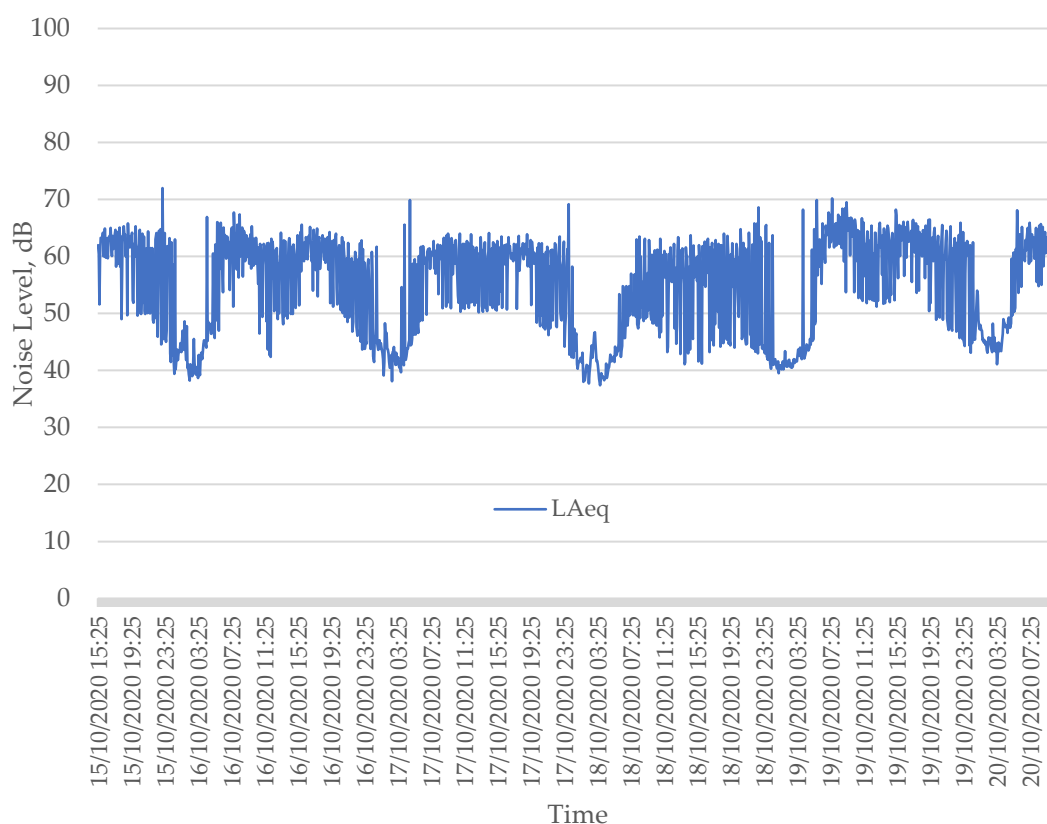


- ☞ Frequent, but intermittent, noise from birds overhead and in flight.

#### 4.5 Survey Results, $L_{Aeq}$

The results from the noise survey at M01 are provided on Figure 2 as a time history graph showing the measured  $L_{Aeq}$  noise levels.

*Figure 2: Noise survey results at M01 –  $L_{Aeq}$*



These results have been used to derive the corresponding 16-hour daytime and 8-hour night-time  $L_{Aeq}$  noise levels, as required for the assessment against suitable internal target levels. These daytime and night-time noise levels, as measured at M01, are shown in Table 2 and Table 3 respectively.



*Table 2: Daytime (16-hour) Noise Levels at M01, dB*

DATE & TIME PERIOD	L <sub>AEQ</sub>
Friday 16 <sup>th</sup> October 2020 07.00 – 23.00	61.0
Saturday 17 <sup>th</sup> October 2020 07.00 – 23.00	60.0
Sunday 18 <sup>th</sup> October 2020 07.00 – 23.00	58.7
Monday 19 <sup>th</sup> October 2020* 07.00 – 23.00	63.4

\* Light rainfall and some higher wind speeds may have contributed to the slightly higher noise levels measured during the daytime on Monday 19<sup>th</sup> October 2020.

*Table 3: Night-time (8-hour) Noise Levels at M01, dB*

DATE & TIME PERIOD	L <sub>AEQ</sub>
Thursday 15 <sup>th</sup> – Friday 16 <sup>th</sup> October 2020 23.00 – 07.00	58.4
Friday 16 <sup>th</sup> – Saturday 17 <sup>th</sup> October 2020 23.00 – 07.00	55.9
Saturday 17 <sup>th</sup> – Sunday 18 <sup>th</sup> October 2020 23.00 – 07.00	52.9
Sunday 18 <sup>th</sup> – Monday 19 <sup>th</sup> October 2020 23.00 – 07.00	57.9
Monday 19 <sup>th</sup> – Tuesday 20 <sup>th</sup> October 2020 23.00 – 07.00	57.3



It is shown that the 16-hour daytime noise levels, across a period of four days, range from 59 to 63dB  $L_{Aeq}$  and are thus comparable. With respect to the 8-hour night-time period, noise levels are shown to range from 53 to 58dB  $L_{Aeq}$  over a period of five nights and are also comparable. Generally, it is shown that higher noise levels were measured during the weekdays than during the weekend period.

#### 4.6 Analysis of Noise Levels, $L_{Aeq}$

The daytime and night-time  $L_{Aeq}$  noise levels shown in Tables 3 and 4 represent those measured at M01, a position at the western boundary of the site. These noise levels are thus higher than those which would be experienced towards the centre of the site, i.e. at the location of the proposed development, due to the proximity of the survey location to the railway line.

This is evident from the results of a period of attended monitoring, which was undertaken at M02. For comparison purposes, the noise levels measured at M01 (i.e. closer to the railway line) and at M02 (proposed development location) during the same one-hour time period are shown in Table 4.

*Table 4: Comparison of Daytime (1-hour) Noise Levels at M01 and M02, dB*

DATE & TIME PERIOD	$L_{Aeq}$
Friday 16 <sup>th</sup> October 2020 11.00 – 12.00 (M01)	59.6
Saturday 17 <sup>th</sup> October 2020 11.00 – 12.00 (M01)	59.6
Sunday 18 <sup>th</sup> October 2020 11.00 – 12.00 (M01)	58.5
Monday 19 <sup>th</sup> October 2020 11.00 – 12.00 (M01)	62.3
Tuesday 20 <sup>th</sup> October 2020 11.00 – 12.00 (M02)	53.6



Again, it is likely that a period of light rainfall and some higher wind speeds may have contributed to the slightly higher noise levels shown in Table 4 for Monday 19<sup>th</sup> October 2020; however, for the other measurements shown (with comparable weather conditions), it can be seen that noise levels at M02 are 5-6dB lower than those measured at M01, i.e. 54dB at M02, compared to 59-60dB at M01.

As such, it follows that the 16-hour daytime and 8-hour night-time  $L_{Aeq}$  noise levels measured at M01 could be reduced by (a minimum of) 5dB to give the corresponding levels at a location representative of the western façade of the proposed development.

Therefore, considering the worst case (from the highest measured noise levels), this results in:

- ☛ From Table 2, a 16-hour daytime noise level of 58dB  $L_{Aeq}$ , i.e. 63dB – 5dB; and
- ☛ From Table 3, an 8-hour night-time noise level of 53dB  $L_{Aeq}$ , i.e. 58dB – 5dB.

A correction of +3dB has then been added to these daytime and night-time noise levels to derive the equivalent façade noise levels for the purposes of the assessment (in Section 5).

Based on observations made, it is unlikely that the measured noise levels need to be further corrected (i.e. increased) to account for a reduction in rail and/or road traffic noise. It is understood that rail services (at the time of the survey) were operating at almost full capacity, with more than 90% of services in operation and with 100% of





normal capacity provided during morning and evening peak travel hours<sup>5</sup>.

With respect to Peniel Place, this was observed to be used by cyclists, motorbikes, cars, vans and lorries. It was deemed to be busy, with no observable reduction in traffic flow due to Covid-19 restrictions. In this respect, anecdotal evidence from the site indicated that it was in frequent use in both directions, with approximately one vehicle passing the site every minute.

Notwithstanding this, the proposed development has been designed with the majority of sensitive rooms/windows facing west towards the rear of the site, with only a guest bedroom on the ground floor facing east towards Peniel Place. The guest bedroom would not be in frequent use, in comparison to the main/master bedroom which is located at the southern end of the development and with its window facing west.

#### 4.7 Survey Results, $L_{AFmax}$

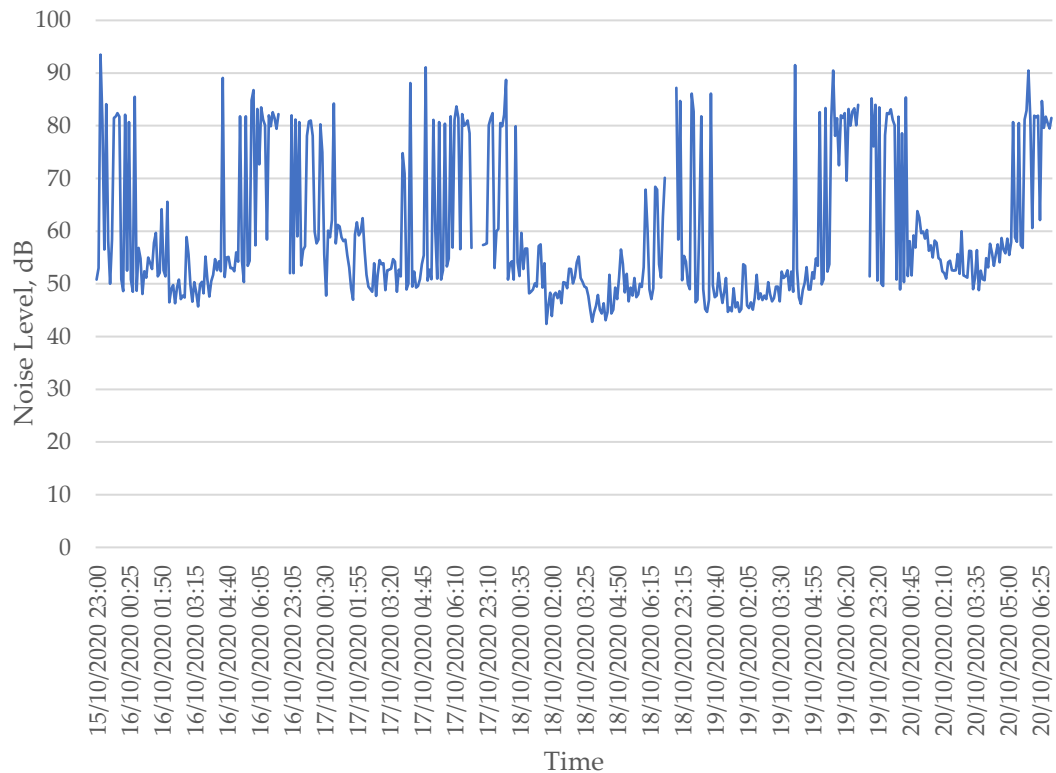
The results from the noise survey are provided on Figure 3 as a time history graph showing the measured  $L_{AFmax}$  noise levels.

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<sup>5</sup> Confirmed through information provided on the ScotRail website, October 2020.



Figure 3: Noise survey results at M01 –  $L_{AFmax}$



The following observations are made regarding the measured night-time maximum noise levels shown in Figure 3:

- ☛ Higher noise levels are generally measured between 23.00 and 00.30/01.00 on all days, coinciding with the latest train services as per the corresponding ScotRail timetable;
- ☛ For most nights, a single noise event is measured between 04.00 and 04.30, likely to be a passing train freight service; however, this did not occur on all nights, with no similar events recorded on either Sunday 18<sup>th</sup> or Tuesday 20<sup>th</sup> October 2020; and
- ☛ Noise levels tend to increase again from approximately 05.00/05.30 to 07.00, coinciding with the earliest train services and also likely with the start of increases in morning/peak road traffic on Peniel Place.



#### 4.8 Analysis of Noise Levels, $L_{AFmax}$

The range of night-time  $L_{AFmax}$  noise levels measured and logged in five minute periods are detailed in Table 5, which also provides the 90<sup>th</sup> percentile<sup>6</sup> value of the measured  $L_{AFmax}$  noise levels during each night-time period – indicating that 90% of the measured data is lower than or equal to the value shown.

*Table 5: Night-time Maximum Noise Levels at M02, dB*

DATE & TIME PERIOD	RANGE	90 <sup>TH</sup> PERCENTILE
Thursday 15 <sup>th</sup> – Friday 16 <sup>th</sup> October 2020 23.00 – 07.00	45.7 – 93.5	82.3
Friday 16 <sup>th</sup> – Saturday 17 <sup>th</sup> October 2020 23.00 – 07.00	47.0 – 91.1	81.1
Saturday 17 <sup>th</sup> – Sunday 18 <sup>th</sup> October 2020 23.00 – 07.00	42.4 – 88.7	68.2
Sunday 18 <sup>th</sup> – Monday 19 <sup>th</sup> October 2020 23.00 – 07.00	44.7 – 91.5	83.0
Monday 19 <sup>th</sup> – Tuesday 20 <sup>th</sup> October 2020 23.00 – 07.00	48.8 – 90.5	82.1

It is shown that the maximum noise levels (90<sup>th</sup> percentile), across a period of four nights, range from 81 to 83dB  $L_{AFmax}$  and are thus comparable. A lower noise level (of 68dB  $L_{AFmax}$ ) was measured during the weekend period.

---

<sup>6</sup> Based on 5-minute logging periods between 23.00 and 07.00, 96  $L_{AFmax}$  values are given for each of the 8-hour night-time measurement periods. The 90<sup>th</sup> percentile noise level shown is therefore exceeded 9.6 times within the stated time period, i.e. less than 10 times a night.



Based on the analysis of the measured noise levels in Section 4.6, it follows that the night-time  $L_{AFmax}$  noise levels measured at M01 can be reduced by a minimum of 5dB to give the corresponding levels at a location representative of the western façade of the proposed development<sup>7</sup>.

Therefore, considering the worst case and the highest  $L_{AFmax}$  noise level shown in Table 5, this results in:

☞ A maximum night-time noise level of 78dB  $L_{AFmax}$ , i.e. 83dB – 5dB.

A correction of +3dB has also been added to this night-time noise level to derive the equivalent façade noise level for the purposes of the assessment in Section 5. Again, it is unlikely that the measured night-time maximum noise levels need to be corrected further to account for a reduction in rail and/or road traffic noise.

---

<sup>7</sup>Again, the proposed development has been designed with the majority of sensitive rooms/windows facing west, with only a guest bedroom on the ground floor facing east towards Peniel Place.





## 5. Assessment of Noise Impact

The suitability of the site for residential development has been assessed with reference to the WHO guidelines and BS8233:2014 to demonstrate that the target indoor noise levels during both the daytime and night-time periods can be achieved.

This assessment has been based on the daytime and night-time noise levels detailed in Section 4 of this report, which have been referenced to the noise levels measured in October 2020.

### 5.1 Daytime – Internal Noise Level, $L_{Aeq}$

For the 16-hour daytime period (between 07.00 and 23.00 hours), BS8233:2014 recommends an internal noise level of 35dB  $L_{Aeq}$  within living rooms and bedrooms for daytime resting.

Table 6 compares the derived daytime  $L_{Aeq}$  façade noise level with this recommended internal level. The assessment has been based on closed windows (for transportation noise) and has determined the corresponding level of reduction required to achieve the internal target noise level.

*Table 6: 16-hour Daytime Assessment, dB  $L_{Aeq}$  – Closed Windows*

EXTERNAL FAÇADE NOISE LEVEL	INTERNAL NOISE TARGET	LEVEL OF ATTENUATION REQUIRED
61	35	26



As such, the windows of the proposed living room and bedrooms should provide a reduction of 26dB ( $R_w^8 + C_{tr}^9$ ) in order to achieve the required indoor noise level for daytime resting. It is understood that the glazing specification for the development would be able to provide this required level of attenuation to achieve the target indoor noise levels during the daytime period.

### 5.2 Night-time – Internal Noise Level, $L_{Aeq}$

For the 8-hour night-time period (between 23.00 and 07.00 hours) BS8233:2014 (and the WHO) recommends an internal noise level of 30dB  $L_{Aeq,8hr}$  within bedrooms for suitable sleeping conditions.

Table 7 compares the derived night-time façade  $L_{Aeq}$  noise level with this recommended internal target and assumes closed windows.

*Table 7: 8-hour Night-time Assessment, dB  $L_{Aeq}$  – Closed Windows*

EXTERNAL FAÇADE NOISE LEVEL	INTERNAL NOISE LIMIT	LEVEL OF ATTENUATION REQUIRED
56	30	26

As such, the windows of the proposed bedrooms should provide a reduction of 26dB ( $R_w + C_{tr}$ ) in order to achieve the required indoor noise level for sleeping. Again, it is understood that the glazing specification for the development would be able to provide this required level of attenuation to achieve the target indoor noise levels during the night-time period.

---

<sup>8</sup>  $R_w$  – the Weighted Sound Reduction Index is a good indicator for the level difference that would be achieved between inside and outside.

<sup>9</sup>  $C_{tr}$  – an adjustment to the  $R_w$  scale to account for low frequency noise.



### 5.3 Night-time – Internal Maximum Noise Level, $L_{AFmax}$

For the 8-hour night-time period (between 23.00 and 07.00 hours), the WHO recommends an internal noise level of 45dB  $L_{AFmax}$  within bedrooms for suitable sleeping conditions. Further to this, the ProPG states that *“individual noise events should not normally exceed 45dB  $L_{AFmax}$  more than 10 times a night”*.

Based on the reduction required for the protection of suitable internal  $L_{Aeq}$  noise levels (i.e. 26dB  $R_w+C_{tr}$ ), it can be concluded that (as a worst case) the resulting internal night-time  $L_{AFmax}$  noise levels within the bedrooms of the proposed development would exceed 45dB (i.e.  $81 - 26 = 55$ dB).

It is therefore appropriate to consider a higher glazing specification for the protection of internal night-time maximum noise levels within bedrooms. Based on the above, the required reduction for night-time would need to be increased by 10dB (to 36dB  $R_w+C_{tr}$ ).

Again, it is understood that the glazing specification for the development would be able to provide this required level of attenuation. As such, the resulting internal night-time  $L_{AFmax}$  noise levels would meet the 45dB  $L_{AFmax}$  target (i.e.  $81 - 36 = 45$ dB) and this is unlikely to be exceeded for more than 10 times during a given 8-hour night-time period.



#### 5.4 Daytime – External Noise Level, $L_{Aeq}$

For the 16-hour daytime period (between 07.00 and 23.00 hours), BS8233:2014 and the WHO recommends a maximum external noise level of 55dB  $L_{Aeq}$  within amenity areas<sup>10</sup>. Table 8 details the measured daytime noise levels within the site at M01, and the noise levels measured at M02 representative of the proposed development.

*Table 8: Comparison of Daytime  $L_{Aeq}$  Noise Levels at M01 and M02, dB*

DATE & TIME PERIOD	$L_{Aeq}$
Friday 16 <sup>th</sup> October 2020 07.00 – 23.00 (M01)	61.0
Saturday 17 <sup>th</sup> October 2020 07.00 – 23.00 (M01)	60.0
Sunday 18 <sup>th</sup> October 2020 07.00 – 23.00 (M01)	58.7
Monday 19 <sup>th</sup> October 2020 07.00 – 23.00 (M01)	63.4
Tuesday 20 <sup>th</sup> October 2020 11.00 – 12.00 (M02)	53.6

It can be seen from Table 8 that the 16-hour external daytime  $L_{Aeq}$  noise levels, measured at M01, are in excess of the recommended target for external amenity.

However, M01 represents a location at the western boundary of the site, with higher noise levels due to proximity to the railway. Lower noise levels were measured towards the centre of the site, at M02, due to increased distance from the railway.

---

<sup>10</sup> Night-time noise levels are not considered, as external amenity areas would not be used at this time, i.e. after 23.00 hours.





As shown in Table 8, noise levels measured at M02 are within the target range of 50-55dB  $L_{Aeq}$  and are representative of the daytime noise levels which would be experienced within the proposed amenity area to the rear of the proposed development.

The guidance of BS8233:2014 (Section 7.7) recognises that “*a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resource*” should be considered and that such development should not be prohibited but designed to achieve the “*lowest practicable levels in external amenity spaces*”.

### 5.5 Façade Sound Reduction

The proposed development would have a suitable façade specification, with a practical glazing solution for the windows which would be well sealed when closed and which would provide the required level of attenuation to achieve the target indoor noise levels.

It has been shown that windows capable of reducing external (night-time maximum) noise levels by 36dB  $R_w+C_{tr}$  would be required for bedroom windows to achieve the internal target night-time noise level of 45dB  $L_{AFmax}$ .

A lower specification of 26dB  $R_w+C_{tr}$  would be applicable for the living areas (for daytime resting); however, it is understood that the same glazing would be applied across the development and would be of the higher specification of 36dB  $R_w+C_{tr}$ , achieved with double or triple-glazed windows.

As such, and by default, the target noise levels of 35dB and 30dB  $L_{Aeq}$  for the 16-hour daytime and 8-hour night-time periods respectively would be achieved, as recommended by the WHO and BS8233:2014.



The target internal noise levels would be achieved when windows are closed. Therefore, alternative ventilation solutions (to an open window) would be provided to meet the required number of air flow changes within rooms, whilst also providing the required level of noise attenuation<sup>11</sup>. Ventilation systems are available that meet the sound reduction required by the glazing elements, and in this respect, +6dB should be added to the required  $R_w+C_{tr}$  to give the ventilator performance.

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<sup>11</sup> As per BS8233:2014 (Annex G), “*windows may still be openable for rapid or purge ventilation, or occupant’s choice*”.



## 6. Summary

Ellendale Environmental Limited has been commissioned by Aby Wallace and Euan Wardrop to undertake an environmental noise impact assessment for a proposed development at land off Peniel Place, to the north-east of Broxburn. This has been undertaken to support a planning application for the erection of a private residential property on the site.

The purpose of this assessment has been to evaluate the site in terms of its suitability for residential use and has been undertaken in accordance with WHO guidelines and the criteria within BS8233:2014, for suitable internal resting and sleeping conditions for dwellings.

It has been shown that a sound reduction of 36dB  $R_w+C_{tr}$  would be required for bedroom windows in order to reduce external night-time maximum noise levels. This would also achieve the target internal daytime and night-time noise levels of 35dB  $L_{Aeq}$  and 30dB  $L_{Aeq}$  respectively, as recommended by the WHO and BS8233:2014 for living rooms and bedrooms respectively.

The same glazing would be applied across the development and would meet the required specification of 36dB  $R_w+C_{tr}$ , achieved with double or triple-glazed windows for all rooms.

Alternative ventilation solutions would be provided for the required number of air flow changes within rooms, whilst also providing the required level of noise attenuation. Such ventilation systems are available that meet the sound reduction required by the glazing elements.

In summary, it is considered that noise should not pose a material constraint to the proposed development.



## Appendix A – Glossary of Terms<sup>12</sup>

Noise is measured in decibels (dB), where zero dB is the lower limit of audibility and 140dB is the level at which physical pain in the ear may be felt. Individual sensitivity to noise is highly subjective and is affected by a range of factors. As these can include non-acoustic matters, such as attitude to the noise source, sensitivity may not always relate directly to the level of noise.

- Decibel (dB) – This is the unit of measurement used for sound pressure levels and noise levels are usually quoted in decibels (dB). The decibel scale is logarithmic rather than linear.
- dB(A) – The A-weighting is applied to measured sound pressure levels so that these levels correspond more closely to the subjective response of the human ear.
- $L_{Aeq}$  – The equivalent continuous sound level is the level of a notional steady sound, which would have the same A-weighted acoustic energy as the fluctuating noise.
- $L_{AFmax}$  – The maximum A-weighted level measured during a given time period, T, with the sound meter set on Fast response.
- Façade Noise Level – A façade noise level is that determined 1m in front of the most exposed window or door in a façade. Sound is reflected from hard surfaces in a similar manner to light by a mirror and the effect is to produce a slightly higher (about 2.5dB) sound level than would occur if the building was not there. For

---

<sup>12</sup> Referenced to PAN 1/2011, *Planning and Noise* (Scottish Government, 2011)



façade levels at dwellings, the level 1m from the most exposed façade must be calculated with a reflection correction.

- Free-Field Noise Level – Noise level which is measured or calculated in the open, without any reflections from nearby surfaces.

*Table 9: Common sounds and their decibel ratings at source*

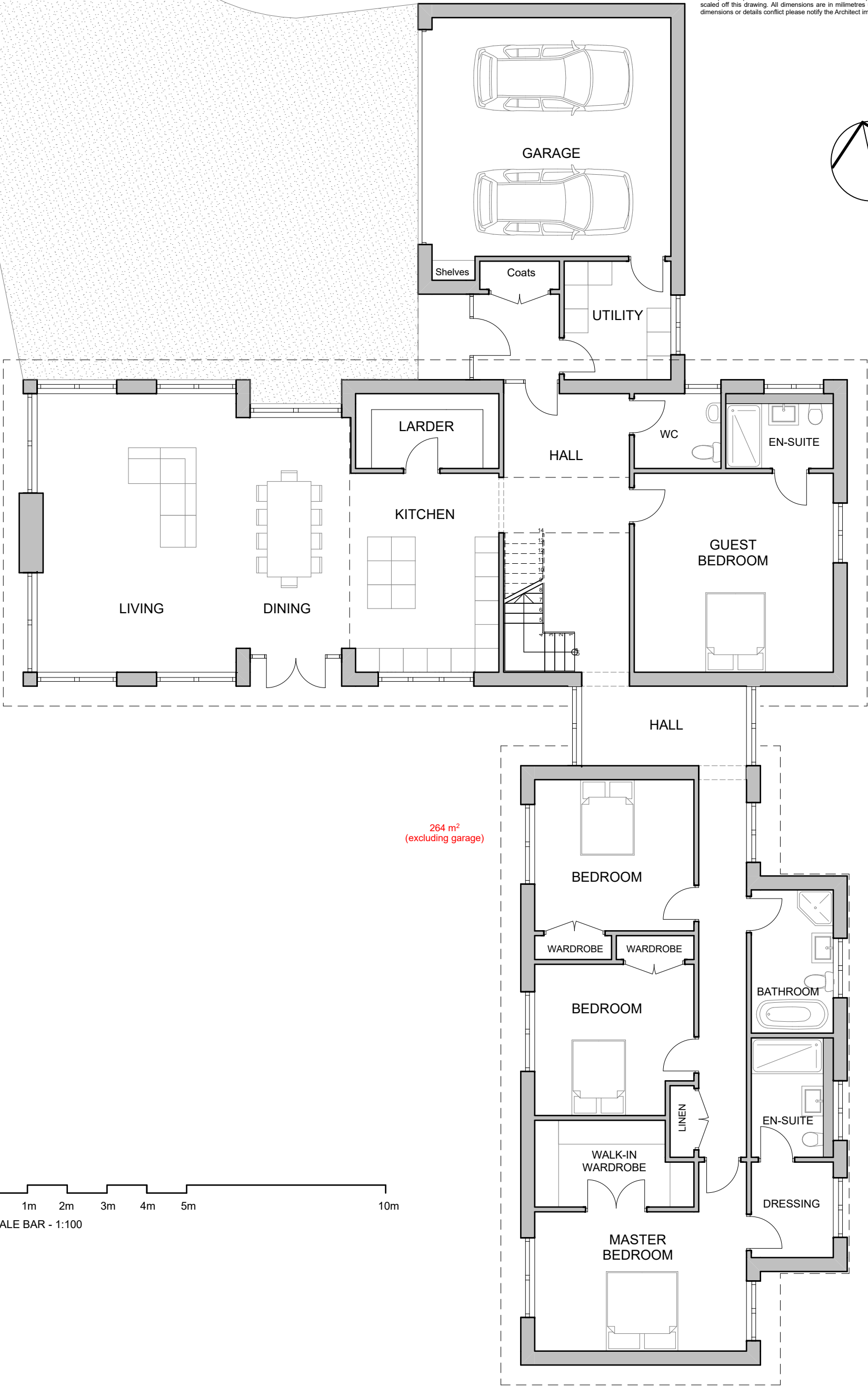
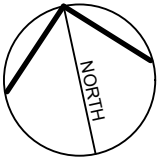
COMMON SOUNDS	DECIBEL RATING AT SOURCE
Unsilenced pneumatic drill (at 7m distance)	95dB(A)
Heavy diesel lorry (40km/h at 7m distance)	83dB(A)
Modern twin-engine jet (at take-off at 152m distance)	81dB(A)
Passenger car (60km/h at 7m distance)	70dB(A)
Office environment	60dB(A)
Ordinary conversation	50dB(A)
Quiet bedroom	35dB(A)





## Appendix B – Floor Plans

All dimensions and levels to be checked on site and the Architect to be informed of any discrepancies prior to the commencement of work. Unspecified dimensions are not to be scaled off this drawing. All dimensions are in millimetres unless otherwise specified. If any dimensions or details conflict please notify the Architect immediately.



0 1m 2m 3m 4m 5m 10m  
SCALE BAR - 1:100

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A	11/09/20	FIRST ISSUE.	SMcA	SMcA
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Project/Client:  
NEW-BUILD DWELLING  
PLOT OF LAND, BROXBURN JUNCTION  
FOR MR EUAN WARDROP & MRS ABY WALLACE

Drawing:  
GROUND FLOOR PLAN

Dwg No:  
2021 - SK04

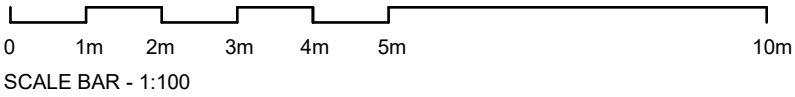
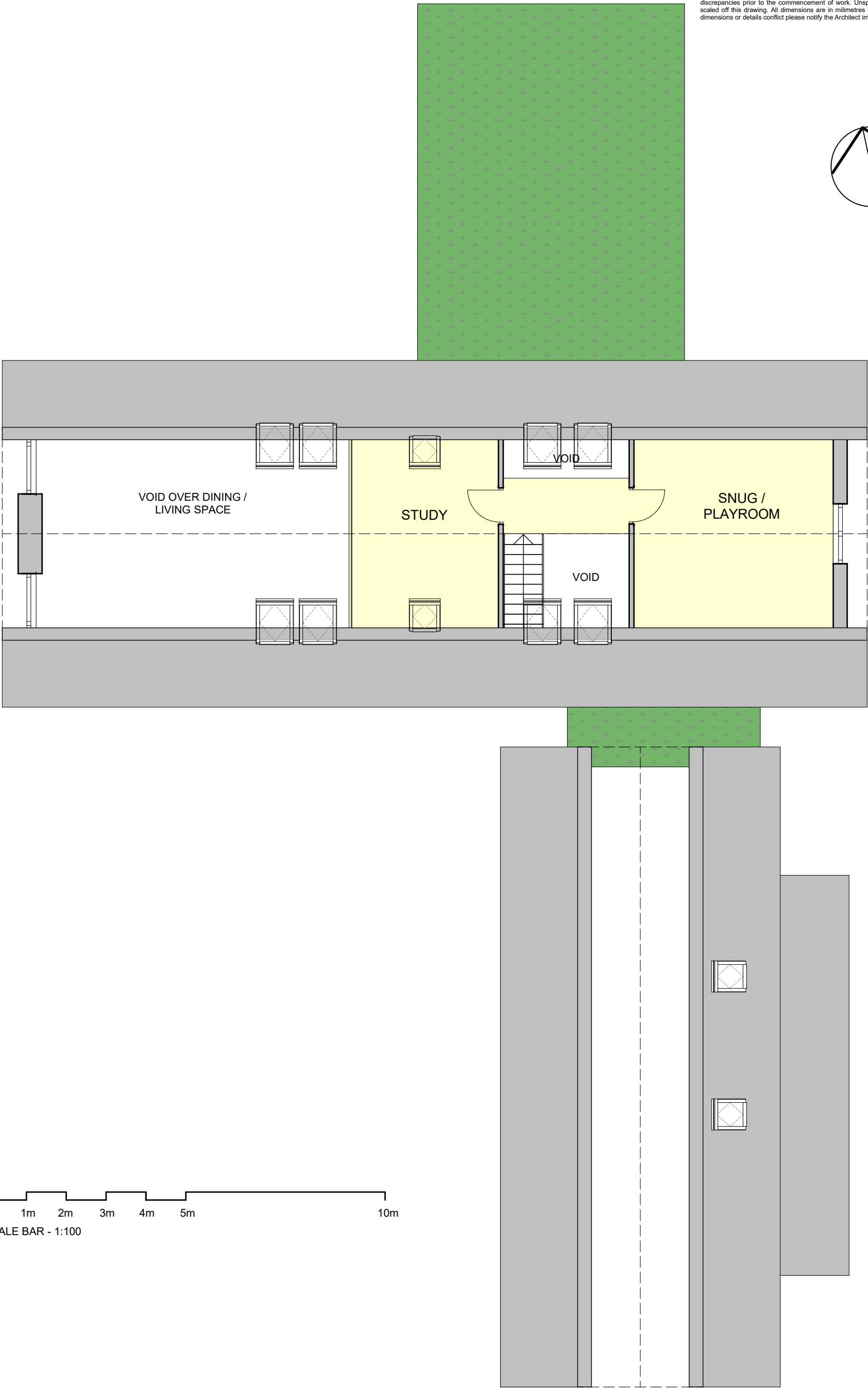
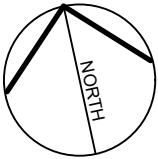
Scale:  
1:100 @A3

Rev:  
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Drawn By:  
SMcA

Date:  
11/09/20

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FOR MR EUAN WARDROP & MRS ABY WALLACE

Drawing:  
FIRST FLOOR PLAN

Dwg No:  
2021 - SK05

Scale:  
1:100 @A3

Rev:  
B

Drawn By: Date:  
SMcA 11/09/20



## Appendix C – Survey Locations



ELLENDALE  
ENVIRONMENTAL

Drawing Title;  
Land off Peniel Place, Broxburn  
Noise Survey Locations

Client;  
Aby Wallace and Euan Wardrop

Date; 07/01/21	Drawn By; SP
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Project Number; EEL316	Version Number; v1.0
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Survey Locations  
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## Appendix D – Survey Equipment

*Photograph 1: showing survey equipment at M01*



TREE SURVEY  
&  
ARBORICULTURAL REPORT  
  
FOR

Trees at Wallace Cottage,  
Peniel Place, Broxburn

Requested by: Mr Euan Wardrop  
Prepared by: Martin Langton  
Report reference: MGL  
Date: January 2021

## SUMMARY

This pre-development assessment has been carried out on behalf of Mr Euan Wardrop. The site is located at the east outskirts of Broxden, between the railway and Peniel Place. It consists of a triangular shaped field of coarse grass, with intermittent tree cover beyond the north east and west boundaries. It is bounded on the Southern side by residential property at Viewfield and yard.

All tree cover lies around the site periphery and adjacent site. Ten small multi-stemmed trees have been surveyed at the north eastern boundary (including 1 group of trees) - sited beside Peniel Place. A further 9 trees have been surveyed immediately beyond the southern site boundary. Beyond the security fence at the west of the site, is a scattered group of Hawthorn, with occasional Elder. The trees have been assessed according to their suitability for retention in relation to BS 5837:2012 *'Trees in relation to design, demolition and construction-recommendations'* in the current context and in relation to future development of the site.

The trees are of varying age and condition. Young and semi-mature Elm regrowth dominates the north eastern boundary, while 2 small linear groups of early-mature Sitka Spruce account for 8 of the 9 trees surveyed adjacent the southern boundary. These trees screen the adjacent properties and yard. Several Elm are affected by Dutch elm disease. The tree details are provided in the Tree Survey Schedule at appendix 2. Several trees exhibit arboricultural defects and general recommendations for remedial work are provided.

The above and below ground tree constraints have been plotted on the Tree Survey and Constraints plan, which accompanies this report at appendix 3. This plan has been requested to help inform layout and the design of tree protection measures. The main constraints to development are the good quality B category trees at site boundaries. I anticipate no loss of B category trees or healthy C category trees to facilitate development.

General guidelines are given regarding the limitations of architectural design and construction in relation to the retained trees as well as the protection of trees during construction. Additional information can be provided if required. Any tree removals required for development of the property should be mitigated by suitable replacement tree planting in line with the character of the area.

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3 The site	5
4 Existing trees	6
5 Tree constraints	9
6 Tree protection requirements	10
RECOMMENDATIONS	12

## Photographs

## APPENDICES

- 1 Tree Protection Measures
- 2 Tree Survey Schedule
- 3 Tree Survey and Constraints Plan
- 4 Cascade chart for tree quality assessment (BS 5837: 2012)

## ARBORICULTURAL REPORT

### 7 Peniel Place, Broxburn

Brief: I have been instructed to survey the trees on site and the significant trees adjacent to site in accordance with British Standard 5837:2012 '*Trees in relation to design, demolition and construction-recommendations*' to assess the constraints they pose, and their suitability for retention in relation to future development of the site.

The report provides outline guidance on the protection of retained trees during construction and their future integration with development.

## TREE SURVEY DETAILS

### 1 Scope of survey and report

- 1.1. This survey (and report) is concerned with the arboricultural aspects of the site only. The survey was carried out on 6<sup>th</sup> January 2021.
- 1.2. It is restricted to trees within the site or those immediately out with that may be affected by its re-development only. No other trees have been inspected.
- 1.3. The survey has been carried out following the guidelines detailed in British Standard 5837: 2012 '*Trees in relation to design, demolition and construction-recommendations*'.
- 1.4. Statutory protection: The trees are not located within a Conservation Area and there are no Tree Preservation Orders on or immediately adjacent site.
- 1.5. Only trees of significant stature have been surveyed: trees with a stem diameter less than 75mm and large shrubs have been excluded.
- 1.6. In some cases, groups of trees are discussed collectively where individual identification and separate treatment has been deemed unnecessary.
- 1.7. No plant tissue samples have been taken and no internal investigation of the tree has been carried out.
- 1.8. No soil samples have been taken and or soil analysis carried out.
- 1.9. We have no knowledge of existing or proposed underground services.
- 1.10. Tree locations have been surveyed by others and are shown plotted on plan 1, the Tree Survey and Constraints Plan.



## 2. Survey method

- 2.1 The survey has been conducted from ground level with the aid of binoculars.
- 2.2 It is based on an assessment from ground level and examination of external features only – described as the ‘Visual Tree Assessment’ method per Mattheck and Breloer - stage 1 (The Body Language of Trees, DoE booklet Research for Amenity Trees No. 4, 1994).
- 2.3 I have estimated the height of each tree visually, having measured a sample of the trees using a hypsometer.
- 2.4 Trunk diameters of single stemmed trees have been measured at 1.5m above ground level. Multi-stemmed trees have been measured immediately above the root flare.
- 2.5 The crown radii have been estimated by pacing and are given for the main compass points: north, south east and west.
- 2.6 The dimensions of trees within groups are given as an averaged figure unless otherwise stated.
- 2.7 Where access to trees was obstructed or obscured, measurements have been estimated.

### 3 The site

- 3.1 The site is located to the East of Broxburn in a rural landscape, between the railway and Peniel Road. It is bounded to the South by residential property and yard area at Peniel Road. To the east of Peniel Road are agricultural fields.
- 3.2 The site consists of a triangular area of rough grassland, with post and wire stock fence along the North east boundary by Peniel Road, and a wire mesh security fence marking the west site boundary. A variety of fences mark the southern site boundary, separating the site from residential property at Viewfield and a yard area to the west of this.
- 3.3 The tree cover lies at the site peripheries. Between the site and Peniel Road is an intermittent line of small multi-stemmed trees dominated by Elm. Beyond the security fence at the west of the site is a group of scattered Hawthorn, with occasional Elder. Adjacent the southern site boundary are 2 small linear groups of maturing Sitka Spruce, which screen the properties beyond.
- 3.4 The topography on site is relatively even, with gentle slope and tussocky grass. Soils on site appear to be primarily mineral and damp. There appear to be no major restrictions to tree rooting.

#### **Development proposal**

- 3.5 I have no knowledge of detailed layout but understand that the proposal is for a residential dwelling.

## 4 Existing trees

### **General observations**

- 4.1 Nineteen trees and one group of trees have been surveyed. The trees adjacent the north east boundary have been tagged with aluminium tags, which run from 366 to 374. Trees out-with the southern site boundary in neighbouring property are not tagged but referenced 1-9 on plan.
- 4.2 The location of the trees is shown on the Tree Survey and Constraints Plan (appendix 3). The tree details are shown on the Tree Survey Schedule, at appendix 2.
- 4.3 The trees are of varying age, condition, and species, though dominated by young Elm regrowth beside Peniel Road, and early mature Sitka Spruce immediately beyond the southern site boundary. The main areas of tree cover surveyed are as follows:-
- 4.4 T366 to 374: are predominantly multi-stemmed Elm, with at least 1 tree formed of regrowth from old rotten stump. There is one Hawthorn (T374); tag 375 represents a tight group of around 10 stems, which comprise suckering Cherry stems and a single Elm. Several Elm are dead, and others exhibit crown die-back, probably due to Dutch elm disease (Plates 1 to 3).
- 4.5 T1 to 9: Form 2 main groups immediately beyond the southern boundary fences. Eight of the 9 trees are maturing Sitka Spruce. These trees are generally of reasonable or good form, with crowns extending North towards the site and available space. See plate 4.
- 4.6 Group 1 – West of site: is a scattered group of maturing Hawthorn and occasional Elder. These trees are generally set back from the security fence, with no crown overhanging the field. See plates 5 and 6.

### **Tree condition**

- 4.7 Although the assessment of a tree's condition is a subjective process, British Standard 5837: 2012 gives clear guidance on the appropriate criteria for categorising trees and the factors that assist the arboriculturist in determining the suitability of a tree for retention.
- 4.8 I have categorised all the surveyed trees according to BS 5837: 2012 as follows. (These can be viewed in full at Table 1 of BS 5837: 2012) – see appendix 4:-

**Category U:** Trees of poor condition, such that any existing value would be lost within ten years and which, in the current context, could be removed for reasons of sound arboricultural management.

**Category A:** Trees of high quality and value: in such a condition to make a substantial contribution to amenity (a minimum of forty years is suggested).

**Category B:** Trees of moderate quality and value: those in such a condition as to make a significant contribution (a minimum of 20 years is suggested).

**Category C:** Trees of low quality and value which might remain for a minimum of 10 years, or young trees with uncertain potential.

4.9 The trees are of mixed quality and potential as summarised in table 1 below.

Locations	BS 5837 categories				Totals
	A	B	C	U	
Beside Peniel Place	0	1	6	3	10
Southern boundary	0	6	2	1	9
<b>Total</b>	<b>0</b>	<b>7</b>	<b>8</b>	<b>4</b>	<b>19</b>

Table 1: Summary of trees by tree condition category

4.10 The tree cover surveyed is of generally low and moderate quality. There are no A category trees.

4.11 The B category trees include 6 of the 8 Sitka Spruce at the southern boundary: these trees are locally prominent and provide screening. They are not native and are of short to medium term potential. Hawthorn, T374, beside Peniel Road is also assessed B category. The group of Hawthorn located west of the security fence is assessed category B2.

4.12 The 'C' category trees are generally of short term potential only. They include the multi-stemmed Elm beside Peniel Road, which are vulnerable to Dutch elm disease and generally relatively scruffy. Elm showing significant signs of disease are assessed U category.

4.13 Four category U trees have been recorded: these are:-

- T368 Elm: dead tree
- T370 Elm: dead tree
- T371 Elm: unstable regrowth from rotten stump
- T3 Sitka Spruce: dead tree

### **Tree work required**

- 4.14 The remedial arboricultural work recommended in the current context (irrespective of development) is identified in the Tree survey schedule at appendix 2.
- 4.15 Dead Elm trees T368 and T370 should be considered for removal due to probable Dutch elm disease. T371 Elm comprises unstable regrowth from an old rotten stem and could also be felled. Such work represents sound arboricultural management, irrespective of site development.
- 4.16 No further remedial tree work is recommended, although branches can be pruned back to boundaries where these provide a nuisance.



## 5 Tree constraints

- 5.1 Following my inspection of the trees, the information listed in appendix 2, the Tree Survey Schedule, has been used to provide constraints guidance based on the location of the tree, the crown spread and available rooting.
- 5.2 The Root Protection Areas (RPA's): (the area where ground disturbance must be carefully controlled) have initially been established according to the recommendations set out in table 2 and section 5 of BS 5837: 2012. In most instances these have been assessed based on the trunk diameter of the tree. In some instances, root spread and morphology is likely to differ due to ground conditions, structures, and site history (as set out in BS 5837: 2012 at sections 4.62 and 4.63).
- 5.3 Crown spreads represent the main above ground constraint to site development, but an appropriate separation distance should be maintained between the mature trees at the southern boundary and new development, for safety reasons and for shading.
- 5.4 The above and below ground constraints, as discussed above, are shown on the Tree Constraints Plan (see plan 1, appendix 3).
- 5.5 The substantial 'B' category trees adjacent site at the southern boundary represent the most significant constraint to development. Where possible, any occupied building should be located out-with falling distance of these trees.

### **New tree planting**

- 5.6 Any tree removals necessary to accommodate development of the site should be mitigated by appropriate replacement tree planting to maintain amenity, and screening. Species used in new planting should fit well with site conditions, planting conditions and future growth in relation to infrastructure. Planning should consider species habitat, future maintenance of the trees and species under threat from disease. Such planting should be in line with the character of the area. Further details can be provided.

### **Tree retention**

- 5.7 Successful tree retention for future development will depend on the effective implementation and design of tree protection measures as indicated in section 6 of this report, as well as the general layout design.
- 5.8 The good quality B category trees should be retained, wherever possible. Further advice on avoiding conflict between tree roots and infrastructure can be provided as required.