



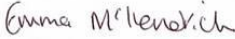

Constraints Study 1 - Site Permeability

Proposed SHD at Glounthaune, Co. Cork

Bluescape Limited

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1. Introduction

1.1 Background

AECOM were appointed by Bluescape Limited to prepare Constraints Studies in support of a Strategic Housing Development (SHD) planning application to An Bord Pleanála for a proposed residential development at Glounthaune, Co. Cork.

This report has been prepared to accompany the planning application for the proposed development. The proposed layout of the development is detailed in the planning drawings prepared by Deady Gahan Architects. This report relates specifically to pedestrian permeability constraints and how they were overcome. Constraints relating to the proposed residential layout are included in a separate report (Constraints Study 2).

1.2 Site Location

The current site comprises of a greenfield site. The site measures approximately 13.87 ha in total. The majority of the site is located to the north of The Terrace Road (L-2970-38 - known locally as 'the Terrace') with a small part of the site located to the south of 'the Terrace'. The northern part of the site is bounded by existing residential developments to the north, west and south. Agricultural land bounds the site to the east.

The public road network surrounding the site is defined by Killahora Road (L-2969) to the north, Knockraha Road (L-2968) to the west, and 'the Terrace'/ Johnstown Close to the south.

The southern part of the site is bounded by 'the Terrace' to the north, existing dwellings to the east and west and Johnstown Close to the south.

The majority of the site is located to the north of 'the Terrace' with a small part of the site located to the south of 'the Terrace'. There is a considerable variation in ground levels across the site which has been considered in developing the proposed layout. The site slopes from north to south from approximate +110 m OD Malin to +34.5 m OD Malin on 'the Terrace' to approximately +3.30 m OD Malin.

1.3 Proposed Development

The proposed development consists of the construction of a mixed-use residential development of 289 no. residential units consisting of 201 no. dwelling houses and 88 no. apartment/duplex units, a two storey creche, 4 no. ESB substations and all ancillary site development works at Lackenroe and Johnstown (townlands), Glounthaune, Co. Cork. The proposed development will be constructed on lands to the north and south of the public road, L-2970, known locally as 'the Terrace'. A portion of the site to the south of 'the Terrace' was formerly within Ashbourne Garden and is considered to be within the curtilage and attendant grounds of Ashbourne House, which is a Protected Structure (Ref 00498).

The proposed development to the north of 'the Terrace' provides for 260 no. residential units comprising of 196 no. dwelling houses, 64 no. apartment/duplex units and a two storey creche. The 196 no. dwelling houses includes 5 no. 4 bedroom detached dwellings, 44 no. 4 bedroom semi-detached dwellings, 12 no. 4 bedroom townhouses, 2 no. 3 bedroom detached dwellings, 22 no. 3 bedroom semi-detached dwellings, 47 no. 3 bedroom townhouses and 64 no. 2 bedroom townhouses. The 64 no. apartment/duplex units contains 5 no. 3 bedroom units, 32 no. 2 bedroom units and 27 no. 1 bedroom units contained in 6 no. three storey apartment buildings, with ancillary bicycle parking and bins stores.

The proposed development to the south of 'the Terrace' provides for 29 no. residential units comprising of 5 no. dwelling houses and 24 no. apartments. The 5 no. dwellings include 1 no. 3 bedroom detached dwelling, 2 no. 3 bedroom townhouses and 2 no. 2 bedroom townhouses. The proposed apartments are provided in a four-storey mixed-use building containing a ground floor community unit and a commercial unit with apartments at ground and upper floor levels comprising 3 no. 3 bedroom units, 7 no. 2 bedroom units and 14 no. 1 bedroom units with ancillary rooftop terrace, car parking, bicycle parking and bin stores.

Vehicular access to 2 no. dwellings in the lands to the north of 'the Terrace' will be provided via an upgraded entrance from 'the Terrace' with vehicular access to the remainder of dwellings in the lands to the north of 'the Terrace' via the signalised junction from the L-2968 and internal road network permitted by Cork County Council reference 17/5699 and An Bord Pleanála reference 300128-17. A separate secondary emergency access is also proposed from the L-2969 to the north.

Vehicular access to the 5 no. dwellings to the south of the 'the Terrace' will be via a new entrance from 'the Terrace' and the proposed apartment building will be accessed from Johnstown Close. The proposed development also makes provision for a pedestrian link from the proposed development north of 'the Terrace' to Johnstown Close via 'the Terrace' which will include a signalised pedestrian crossing and associated traffic calming measures on 'the Terrace'.

Ancillary site works include the demolition of 1 no. existing derelict dwelling house and associated outbuildings, landscaping and servicing proposals including the realignment of the existing pedestrian/cycle route on Johnstown Close, the undergrounding of existing overhead lines, upgrade of the storm and foul sewer network to the south and east of the subject lands along 'the Terrace' and Johnstown Close (L-3004).

Pedestrian footpaths provide connectivity between all parts of the development ensuring full pedestrian permeability. Figure 1 illustrates the extent and layout of the proposed development.



Figure 1 – Site Location and Layout

1.4 Engineering Challenges

The site presents a number of engineering challenges. These include topography, geology, physical form, and lack of pedestrian connectivity between the upper and lower lands. The site layout has been developed by the design team to work with the natural form, geology, and constraints of the site while at the same time complying with technical design standards:

- The natural topography of the site was considered. Vehicular access to the lands to the north of 'the Terrace' will be via the signalised junction from the L-2968 and internal road network permitted by Cork County Council reference 17/5699 and An Bord Pleanála reference 300128-17. The new road is an extension of the road serving Phase 1 of the wider development. The road traverses west to east across with internal roads serving the development.
- A separate secondary emergency access is proposed to the L-2969 to the north.

- A 3m wide shared pedestrian / cycle path has been incorporated to provide access from Johnstown Close to 'the Terrace' and also from 'the Terrace' to the dwellings to the north, connecting at access Road 11, between Units 187-196 and Unit 241. Given the topography of the site the minimum gradient achievable is 1 in 12. The maximum length between landings is 10m and a continuous handrail is proposed on down slope of the path. This ensures an accessible, integrated, and permeable design.
- Given the topography of the site, the proposed path takes a meandering route through the proposed development. The bends incorporated within the proposed path will encourage slow cyclists to travel at low speed when using the path. Staggered railings will be included on straighter sections of the path to deter cyclists travelling at higher speeds.
- To shorten the distance between the points of pedestrian connectivity between Johnstown Close and 'the Terrace' for non-disabled persons, 2m wide concrete steps have been incorporated into the slope. A more direct route from 'the Terrace' to the dwellings to the north, connecting at access Road 11 within the development for use by non-disabled persons is also provided. Signage will be provided at both ends of the path and where it intersects with the accessible path warning the route incorporates stairs. A cycle ramp is proposed on the stairs to allow cyclists to push their bicycle up/down the stairs.

2. Phasing Strategy

As per the Phasing strategy included in Figure 2 it is proposed to construct the 97 Units including the crèche, community facility and commercial unit as part of Phase 1. This phase also includes the construction of the development access road through the site along with the pedestrian paths which traverse the site from north to south. Developing the paths are part of Phase 1 ensures pedestrian connectivity and accessibility from the outset.

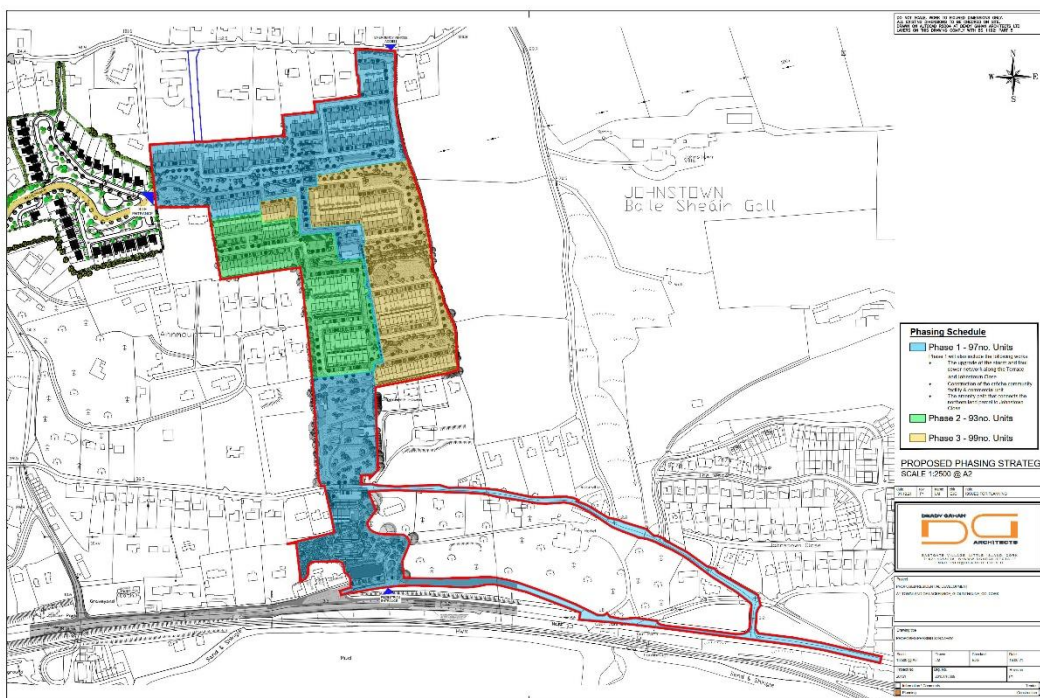


Figure 2 – Phasing Diagram

3. Topography

3.1 Site Access and Internal Road Layout

Vehicular access to the lands to the north of 'the Terrace' will be via the signalised junction from the L-2968 and internal road network. The new road is an extension of the road serving Phase 1 of the wider development. A separate secondary emergency access is proposed to the L-2969 to the north. The maximum longitudinal road gradient provided is 1 in 12 and all roads incorporate facilities for pedestrians. Refer to Constraints Study 2 for more information on the interaction between the roads and the proposed dwellings.

3.2 Pedestrian Paths

3.2.1 Pedestrian / Cycle Path from 'the Terrace' to Unit 241

It is proposed to provide a 3m width pedestrian / cycle path to link the northern part of the proposed development to 'the Terrace' and on to Johnstown Close to the south. Drawing 60592432-ACM-00-00-DR-CE-10-0650 illustrates the route of the proposed path between Unit 241 and 'the Terrace'. There is a rise of approximately 30.27m in elevation over a distance of just over 460m. The level at 'the Terrace' is 34.680m and the level at the connection to internal access road adjacent to Unit 241 is 64.950 m OD Malin. Cross sections through the proposed path are included on the following drawings:

- 60592432-ACM-00-00-DR-CE-10-0651,
- 60592432-ACM-00-00-DR-CE-10-0652,
- 60592432-ACM-00-00-DR-CE-10-0653,
- 60592432-ACM-00-00-DR-CE-10-0654,
- 60592432-ACM-00-00-DR-CE-10-0655.

As illustrated in the sections, the level of the path typically results in cut and fill not exceeding 1.5m, the exception being the path between chainages 180m and 290m where the overall depth of excavation is 2.3m and at chainage 410m to 470m where approximately 2.0m of fill material is required to tie in with the road level of 64.950 m OD Malin.

Side slopes at a gradient no steeper than 1 in 2 are proposed. Generally, the distance required to tie back into the natural ground level is circa 2m, with one exception occurring at chainage 200m where the distance is circa 7.5m.

Short lengths of retaining walls will be required, particularly where the path turns back on itself as it meanders up the slope. It is proposed that these retaining structures be generally formed with timber micrib gravity retaining wall system with small sections formed with Gabion baskets filled with rock excavated and crushed on site. The retained height throughout is typically 2m.

The 3m wide footpath will have 1m wide verges with pedestrian guard rail protection at embankment edges. The guardrail protection will also prevent people taking shortcuts between the meandering path.

A typical section is shown in Figure 3 below.

The 3m wide footpath will have 1m wide verges with pedestrian guard rail protection at embankment edges. The guardrail protection will also prevent people taking shortcuts between the meandering path.

The layout of the proposed path has been developed with the aim of retaining as many existing trees as possible. The design development of the proposed path has been informed by arborists reports on the existing trees. The Landscaping Design Rationale includes further information on tree retention, loss, and mitigation. A particular constraint associated with this part of the site is the presence of existing 23 No. Heritage Trees, 3No. of which are classified as Champion Trees. The proposed path between approximately Chainage 350 and 380 has been positioned to avoid the Root Protection Zones (RPZ) associated with Tree TR311 and Tree TR310 (both classified as Champion Trees). The layout of the proposed path/ steps has been developed to avoid impacting these in so far as possible.

A typical section is shown in Figure 4 below.

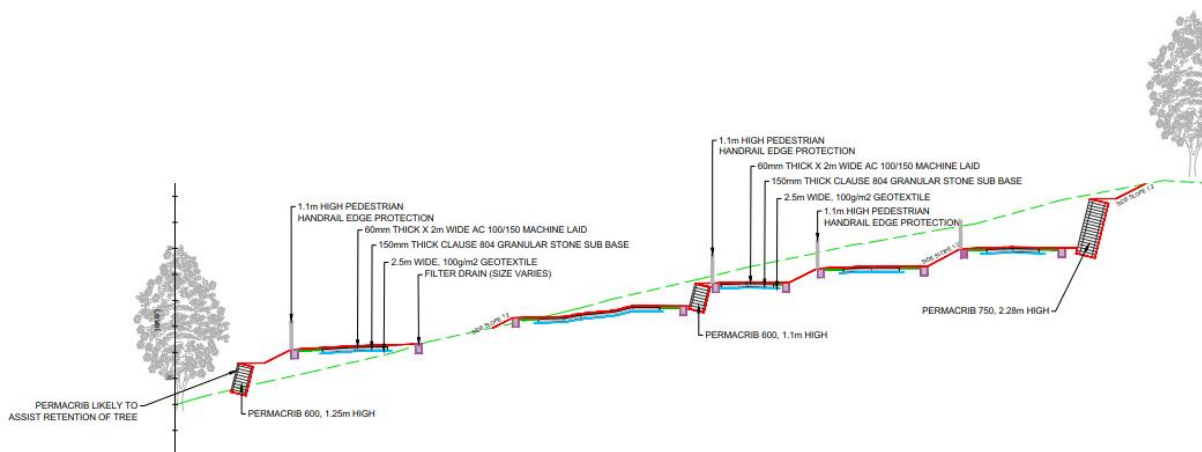


Figure 4 – Typical Section Through Southern Path

The choice of introducing embankments or retaining structures was also influenced by minimising excavation of rock and also to retain existing trees, where possible.

3.2.4 Stairs Incorporated into Footpath for Non-Disabled Johnstown Close to Terrace Road

To shorten the distance between the points of pedestrian connectivity between Johnstown Close and Terrace Road for non-disabled persons, 2m wide concrete steps have been incorporated into the proposals. The steps start at chainage 90m and re-join the path at chainage 240m. This route is shown on 60592432-ACM-00-00-DR-CE-10-0650. Steps are also provided to serve people accessing units 261 to 265 from the path at Chainage 480 m and level access from the path is provided to these units between Chainage 380 and 405 m.

It is proposed to provide a bicycle ramp at the edge of the steps to enable cyclists to wheel their bicycle up/ down the steps.

3.3 Retaining Structures

The proposed site levels will necessitate retaining walls in a number of locations to support the paths.

The layout of the paths has been optimised to minimise the height of retaining structures whilst balancing the extent of cut / fill.

It is generally proposed to use a Permicrib Retaining Wall which is a gravity retaining wall system, that uses timber header and stretcher components to form a cage which is then filled with stone. Stability is achieved through interaction of the crib components and the infill.

All Permicrib components have a Desired Service Life of 60 years.

The standard lean back for a Permicrib timber crib wall is 1H:4V (76 Degrees) as illustrated in Figure 5 below.



Figure 5 – Typical Permicrib Wall under construction

3.4 Surface Water Drainage

French drains discharging to ground are proposed to collect run-off from embankments / cuttings / retaining walls.

4. Geology

The site has been subject to a detailed ground investigation. The exploratory hole locations are shown on Figure 6. A total of 14 cable percussion boreholes were bored to depths between 1.2m and 4m below ground level (bgl) and 25 trial pits were dug to depths of between 1m and 2.6m below ground level (bgl).

No groundwater was encountered during the period of works.

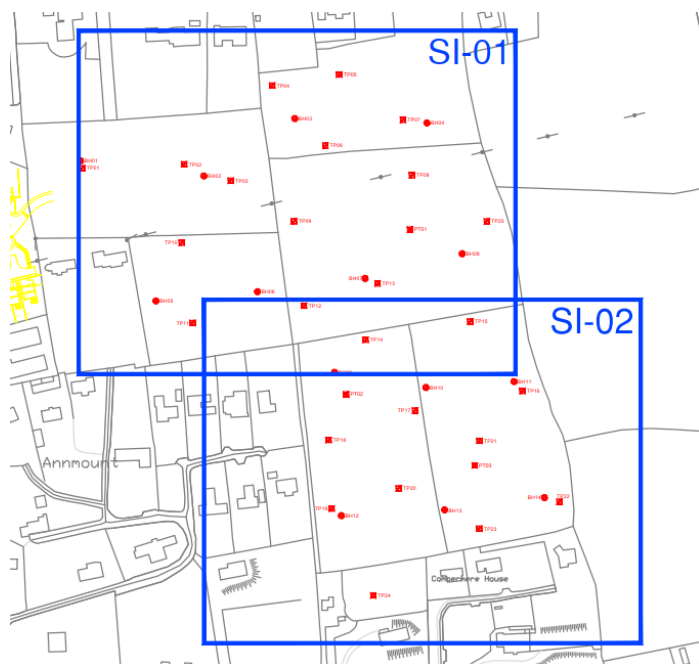


Figure 6 - Extent of Site Investigation

Topsoil encountered was 300mm to 400mm thick. Superficial glacial deposits were described as firm to stiff, slightly sandy (slightly) gravelly CLAY/ SILT with varying Cobble content 0.7m to 2.1m thick and granular deposits of (very) silty (very) sandy GRAVEL and (very) sandy (very) clayey GRAVEL with varying cobble content 0.3m to 3.0m thick persisted to depths 1.0m bgl to 4.0m bgl. Typically, the CLAY / SILT deposit transitioned to the GRAVEL overlying the bedrock. The weathered rock mass was 1.0m to 4.0m below existing ground level (bgl).

The scope of the investigation did not allow for a detailed characterisation of the bedrock, however based on GSI the bedrock is assumed SITLSTONE.

4.1 Stability of Excavations

The stability of all 24 trial pits dug was described as good and no groundwater was encountered.

4.2 Strength of Rock

A JCB backhoe excavator excavated within the upper 200mm to 500mm of the rock mass.

Consideration could also be given to using blasting or to using Dexpan or CARDOX (or similar) which is a vibration free method of 'blasting' that uses expanding gas to help remove the rock.

5. Conclusion

The proposed new development promotes the design of a sustainable new community. Through a more efficient use of land, availing of both local amenities and transportation links, the development encourages a more efficient and sustainable quality of life for its residents. Even though the topography of the site is challenging, the proposed dwellings are laid out to maximize the orientation and amenity of their setting. The landscape is designed to create a sense of community with outdoor facilities for all age groups to enjoy. The proposed scheme is compatible with its neighbouring residential uses and activities. Refer to Constraints Study 2 for more information on how constraints were overcome in the design of the residential development.

Combined, the pedestrian/ cycle paths provide connectivity between all parts of the development. Accessible footpaths link from Killahora Road to Johnstown Close and also to Knockraha Road ensuring full pedestrian permeability. Given the topography of the site, the minimum gradient achievable is 1 in 12. The maximum length between landings is 10m and a continuous handrail is proposed on down slope of the path. Non-disabled routes are also provided.

The paths typically result in cut and fill not exceeding 1.5m, the exception being the northern path between chainages 180m and 290m and the southern path between chainages 320m to 360m and chainages 240m to 310m.

Side slopes at a gradient no steeper than 1 in 2 are proposed. Generally, the distance required to tie back into the natural ground level is circa 2m, with one exception occurring at chainage 130m on the northern path where the distance is circa 7.5m.

Short lengths of retaining walls will be required, particularly where the path turns back on itself as it meanders up the slope. It is proposed that these retaining structures be generally formed with timber pericrib gravity retaining wall system with small sections formed with Gabion baskets filled with rock excavated and crushed on site. The retained height throughout is typically 2m.

The 2m wide footpath will have 1m wide verges with pedestrian guard rail protection at embankment edges. The guardrail protection will also prevent people taking shortcuts between the meandering path.

The choice of introducing embankments or retaining structures was influenced by minimising excavation of rock and also to retain existing trees, where possible.

The development as proposed has been designed to work with the natural constraints of the site and successfully overcome them to achieve an accessible, integrated, permeable site layout and design.

