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PART VIII – DESIGN STATEMENT

Culturally Appropriate Traveller Group Housing Scheme, Circular Road, Galway.

Galway City Council & Cena Culturally Appropriate Homes Ltd.

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1.0 Introduction

This report has been prepared by desiun Architects on behalf of Galway City Council and Cena Culturally Appropriate Homes Ltd., to accompany a Stage 2, PR 04, funding submission to the Department of Housing for a Traveller Group Housing scheme on Circular Road, Galway.

Executive Summary

In July 2020 Galway City Council sought tenders for Architect Led Design Team Consultancy Services for a Traveller Group Housing Scheme on the Circular Road in Galway. Following submission through the e-tenders web portal, the bid submitted by desiun architects, and their proposed design team, was identified as compliant and the most economically advantageous by GCC. Following confirmations and collateral warranties from the other consultants, a letter of acceptance was issued by GCC on 27th November 2020.

- desiun Architects – Lead Architectural & PSDP
- Brunner Consulting Engineers – Civil & Structural Engineering
- CMD Engineering – Mechanical & Electrical Engineering
- Bolger QS – Quantity Surveying

This report will synopsise the rationale behind strategic design decisions and attempt to identify the key differences between this proposal and general housing design solutions. A number of these design decisions, for example, the inclusion of sheds, has resulted in the current proposal exceeding the Department Unit Cost Limits, however we propose that the net social benefit will justify this expenditure.

The nature, extent and implications of the proposed works are as follow:

Architectural

It is proposed to provide 5 No. culturally appropriate Traveller group housing units on land belonging to Galway City Council - Circular Road, Galway. This development will replace the existing halting site bays and include 3 No. 3-Bed dwellings, a 4-Bed dwelling, and a 2-Bed dwelling.

The brief, prepared in conjunction with Galway City Council and Cena, identified several key observations and ambitions. Following our initial kick-off meeting and subsequent site visit in Galway, a series of notes were offered, by Cena, as an elaboration of the concept of culturally appropriate housing, specific to the family living on the site. A non-exhaustive synopsis of the main points include:

- Traveller association with a nomadic identity and lifestyle.
- Importance of outdoor living and sheds.
- Preference for rear garden space over front gardens.
- Preference for single storey dwelling.
- Strong emphasis on ownership, self-determination, and traveller to traveller management model.
- Removal of the perimeter wall adjoining main road, felt to be exclusionary and hiding the development from public view.
- Significant value placed on light into the home – connection to the outdoors.
- Emphasis on the surrounds of the house.
- Interior open plan preferred.
- Kitchen to the rear with option of opening and cooking outside.

The initial brief identified a need on the site for 4 housing units, with a possible 5th unit subject to confirmation. This and additional design principals will be elaborated later in this report.

Civil/Structural

Refer to Section B of this report for Civil & Structural Report & Drawings.

Surveys and investigations conducted:
Through the design team, the following surveys have been procured and interpreted:

- Topographical Survey – Newsurveys Ltd.
- Site Investigation Survey – Site Investigations Ltd.

The site falls approximately 4m from the northernmost end to the south. While it would typically require considerable cut & fill to develop a site with this level of fall, the existing bays are terraced, and the current proposal uses, as much as possible, this topography. Some adjustment and retaining elements will be required, but these are limited to siteworks.

Existing foul and surface water drains are evident on site and coordination with local authority and Irish Water records has been undertaken. A 150mm dia combined sewer currently serves the site which offers sufficient capacity for the proposed development.

Site investigations were carried out to establish any abnormal ground conditions that may influence the foundations for the proposed works. The investigations took place in April 2021. MADE GROUND was encountered across the site at depths ranging from 0.60mbgl to 1.00mbgl, underlain with granular GRAVEL soils providing a competent bearing stratum. The MADE GROUND will need to be removed under foundations and replaced with an engineering fill or lean-mix concrete to the competent GRAVEL layers to ensure consistent bearing and avoid soft spots. Foundations will be formed by conventional reinforced concrete strips.

The superstructure will be of conventional cavity wall construction with ground bearing floor slab, timber suspended joists at first floor level, and cut timber or trussed roofs.

Preliminary layouts have been prepared for main foul and surface water routes and levels, and these tie in with the existing drainage runs on site. Roof water will be directed to soakaway pits in the rear yard of each dwelling, while surface water within each unit will be directed to ground through permeable macadam without falls. The inclusion of the soakaway and permeable pavement avoids any storm water attenuation requirement.

An existing foul drain runs in a north-south direction bisecting the sites, which appears to serve a dwelling or dwellings to the north. This run will be directly to the east of the proposed structures which may require some additional foundation works and/or diversion of this drainage run.

Irish Water:
An existing connection is in situ on site, and no additional supply requirement is anticipated.

Whilst there is an existing connection with no additional load requirements a pre-connection inquiry application will be made.

Drainage:
It is proposed that, where replaced, the site finishes will be permeable, reducing the peak outflow from the site, in accordance with Sustainable Urban Drainage principles. This approach has been discussed with Galway City Council and will be agreed prior to lodgement of a part 8 application.

Utilities/Services

Refer to Section C of this report for Mechanical & Electrical Report & Drawings
The site is currently serviced and has existing electrical, water, and drainage connections. Utility drawings for the area Are included at appendix B. **ESBN have confirmed that adequate supply to serve the number of dwellings and public lighting.**

A 90mbar gas main runs the length of the circular road. Although connection is possible, there are no low-pressure branches from this main to any other housing estate in the area.

To achieve NZEB standards and meet building regulations, a heat pump has been proposed as the space heating strategy, eliminating the need for a gas connection. The units are projected to achieve an A2 rating.

Street lighting currently in place will be replaced with LED fittings and poles compliant with current standards.

2.0 Architectural Design Report

Brief

The brief for the project had been prepared by Galway City Council in consultation with Cena Culturally Appropriate Homes Ltd., a Traveller-led organisation.

A number of the stated objectives of this brief relied heavily on a definition of 'Culturally Appropriate':

> *Housing Objectives*
> *HO1: to replace the existing halting site at Circular Road with a culturally appropriate group scheme of 5 housing units*
>
> *HO2: the accommodation of Travellers in culturally appropriate accommodation that meets their needs, and that achieves Traveller's right to a home within a sustainable community setting of their choice.*

From the very initial Project Meeting in GCC offices, on the 30th November 2020, the theme of *Culturally Appropriate Homes* has been central to the design approach and the project development. Cena have played a continually active role in commenting, reviewing, and providing hugely valuable feedback to the design team, providing a 'Traveller voice' throughout the design development process to date. Galway City Council, similarly, have provided valuable support and facilitated consultation with the various departments within the Local Authority.

A synopsis of specific briefing points has been discussed within the 'Architectural' section above.

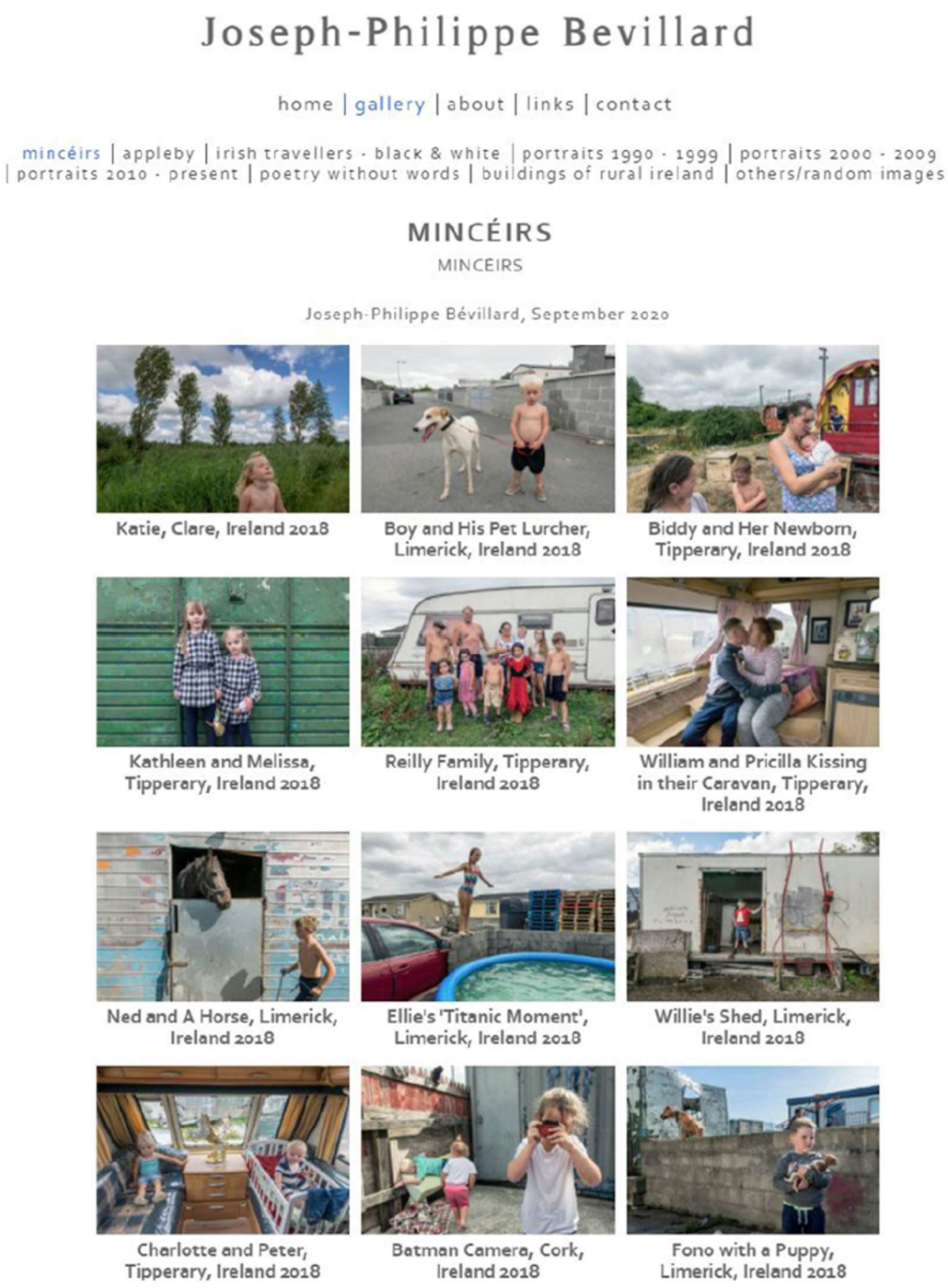
Research – Culture

A number of reference documents, publications, and guides were reviewed by the design team for this project, however insight to traveller culture within these documents is limited. To understand how a culture should inform a design response in housing, it was important to have visual cues and understanding of that culture and, more importantly, what this culture might be into the future.

Joseph Philippe Bevillard is an American-born photographer who, since 2009, has taken an extraordinary series of photographs from Traveller settlements and halting sites. In his prelude to his 2018 – 2020 collection of photographs titled 'Mincéirs', Bevillard writes:

"I am clearly not a writer … I hope my photographs portray what I could not begin to write, and captured some of the Irish Travellers Lifestyle and Culture that is steeped in traditions, full of colour, celebrations, and hardships."

A screenshot from www.jpbevillard.com below:



These photo essays provide a rare insight into some of the issues and challenges faced by travelling families but, also, a glimpse of a different cultural attitude towards space, settlement, modes of living, and relationship to the outdoors.

We presented these images and reviewed them with Cena at our initial design progress meeting. The photographs prompted fascinating discussion with the travellers present, and we received valuable feedback on cultural expression, community, and tradition.

As architects, it was immediately apparent from this feedback, and these photographs, that a large majority of life in Traveller culture happens outdoors. Most of the social space and family events are in an external setting and there appears to be a very deep connection with the outdoors.

Sleeping quarters are small and tight. Bedrooms appeared to be contained, small, spaces – an interlude to normal life outdoors.

Sheds were emphasised as an essential part of social life. The families currently living on this site for whom these units have been designed, do not keep horses – but sheds, nonetheless, were understood to fulfil a deeply important social function, as well as providing a necessary utile storage space.

One photograph held an interesting detail: a wagon, appearing in the edge of the image, was beautifully painted and clearly cared for. This contrasted to the much of the surrounding context. Margaret Casey noted that the wagons held a positive memory for Travellers, of a time when their way of life was respected by farmers and the general population – a time when the traveller's skills, craft, and casual labour was considered useful in society.

This memory became an important touchstone as we developed the design.

Images from J.P Bevillard

Statement from Cena

Please refer to Appendix A.

Site Context

The site is located on the Circular Road and is in an established suburban setting, in an established residential area. The surrounding housing typology includes traditional single and two storey semi-detached and detached dwellings with a small apartment development to the south of the site.

The site currently houses five halting sites, four of which are currently in use. The existing residents are well integrated with the local community and have expressed the desire that the wall separating the site from the surrounding neighbourhood should be removed.

Site Description

The site extends to approximately .32 hectares (0.78 acres) and gradually slopes in a north to south direction. The main access to the existing development off Circular Road and is located at the Northwest corner of the site. It is intended that this existing site entrance will remain as is.

- The site is elongated, constricting in width towards the northern end, with a frontage of 87.85m along Circular Road.
- Overhead phone wires traverse the northern end of the site. All other services are below ground.
- The site is undulating, with locally raised green areas and a perimeter blockwork wall ranging in height from 1.5m to 2.5m above ground level.
- The site is adequately connected to all main services, with the exception of natural gas, and it is observed that all services have adequate capacity for the purpose of residential development.

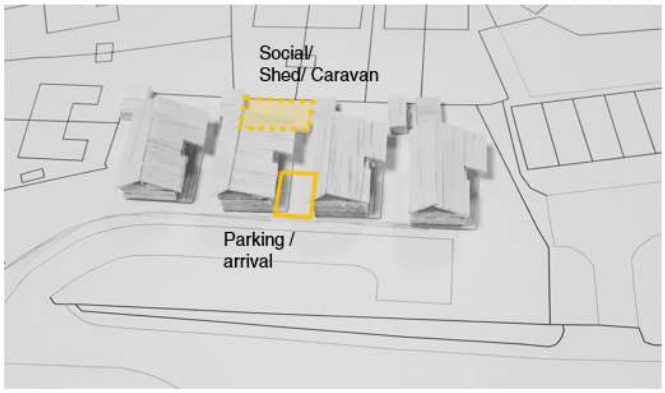
The site is zoned as an 'Residential' in the Galway City Development Plan 2017-2023.

Site Studies

Initial studies looked at the implications of providing a single storey scheme – a preference expressed in the Cena brief. We felt it important to investigate the rationale to this preference, as a single storey design would, necessarily, occupy a much greater footprint than a two-storey option.

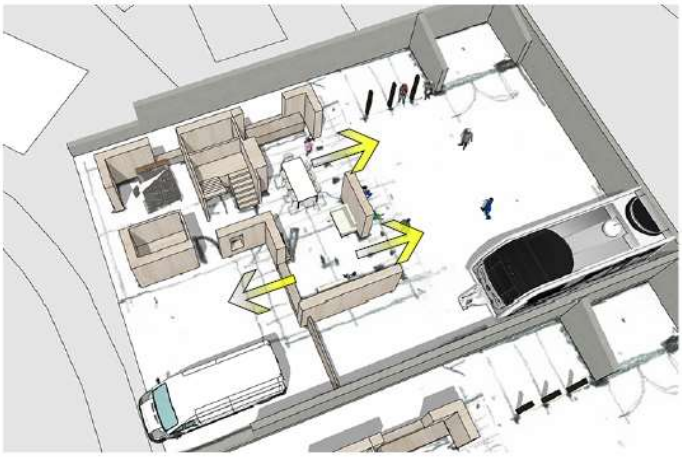
The following design studies were presented:

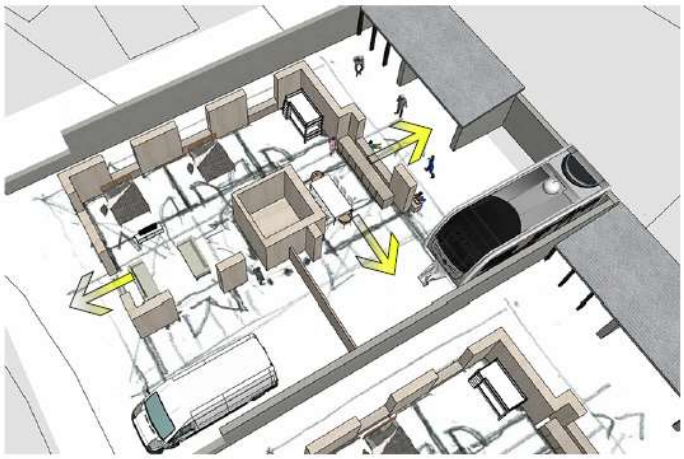
VS.



The initial concept model studies compare single, and two-storey house types on the site.

It was immediately apparent that this would have a very significant impact on the available external space: a two storey house takes half the footprint of a single-storey chalet.





Single- and two-storey options were modelled in 3D and presented to Cena (video extracts of these studies form part of this report)

A strong preference was expressed by Cena officers for the two-storey option as it gave a significantly better response to the outdoor space and offered an external environment that was inherently part of the living space of the house.
The inclusion of an upper floor, it was felt, was justified by the gain made in relation to the external space.

A strong preference was expressed by Cena officers for the two-storey option as it gave a significantly better response to the outdoor space and offered an external environment that was inherently part of the living space of the house.

The inclusion of an upper floor, it was felt, was justified by the gain made in relation to the external space.

This agreement to support a 2-storey solution positively impacted both achievable site density and likely costs per unit. A rate per sqm for single story buildings significantly exceeds that of 2-storey buildings.

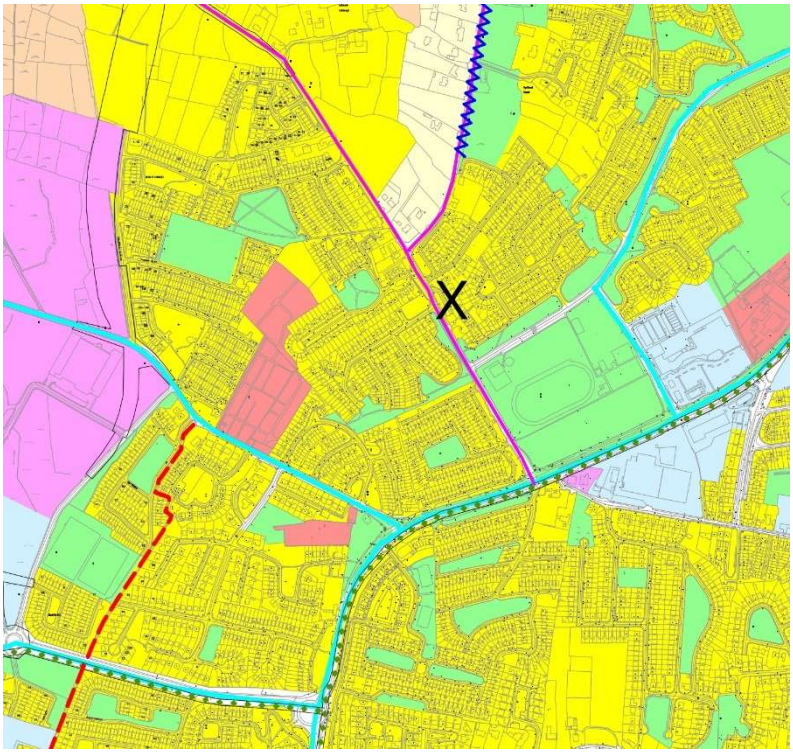
Four families currently live on the site and, initially, there was reluctance to accept a 5th unit here, however after consultation with Galway City Council allocations, it was agreed that an additional unit would be supported by the families. Cena will operate the site and the tenancies on behalf of GCC.

Despite these agreements, the nature of the development as a scheme of only 5 houses, detached two-storey units, on a site of 0.32 ha, makes meeting the unit cost limits extremely difficult. The unit density on the site is approximately 15 per ha.

The current proposal comprises: 3 No. 3-bed units, 1 No. 4-bed unit, and 1 No. 2-bed unit.

Planning Context

The site is zoned R – Residential and is located within an Established Suburb. Section 2.6 Neighbourhoods: Established Suburbs (CDP) states that new residential development will have regard to its surrounding context, provide for linkages with local facilities, a mix of house types and a layout that will provide for a high quality living environment. In addition the CDP advises that new housing development should respond to its context. The context includes the natural environment, the form of settlement, building and spaces, landscape features, contours, historical/archaeological features and local biodiversity.



Extract from Galway City Council Development Plan 2017 – 2023 – City Map; site is marked with an'X'.

It is proposed to develop 5 No. traveller group housing units, comprising of 1 No. 2-bed, 3 No. 3-Bed, and 1 No. 4 Bed houses. The existing green open space to the centre of the site will be maintained and improved with more considered landscaping. Each dwelling will have both a visual and physical connection to this space.

The perimeter wall along Circular Road will be lowered to promote a more open and inclusive approach to the development and its surroundings. As previously explained the existing residents are well integrated with the local community and have expressed the desire that the wall separating the site from the surrounding neighbourhood should be removed.

Development Plan Policy

The scheme, as developed, complies with stated objectives of the current Development Plan, specifically with regard to provision of Traveller accommodation, policy 2.3 and, particularly section 7.4 Inclusive City:

> *7.4 Inclusive City*
> *The social needs of the community are required to be addressed in the development of the built environment and public realm, in order to create sustainable and integrated communities. The policies of the Development Plan on housing, community and cultural facilities, employment, public realm and accessibility seek to encourage social inclusion. It is a requirement of the Housing Strategy to encourage a variety of house types and sizes throughout the city to cater for all including those with special needs, Travellers, older people and homeless. The delivery of community, cultural and recreational facilities and services can precipitate social interaction and engagement improving quality of life and community cohesion.*

Emphasis on integration rather than assimilation, of this scheme in its neighbouring context, and of traveller culture in general, is promoting diversity and inclusivity in the city.

Preplanning consultation

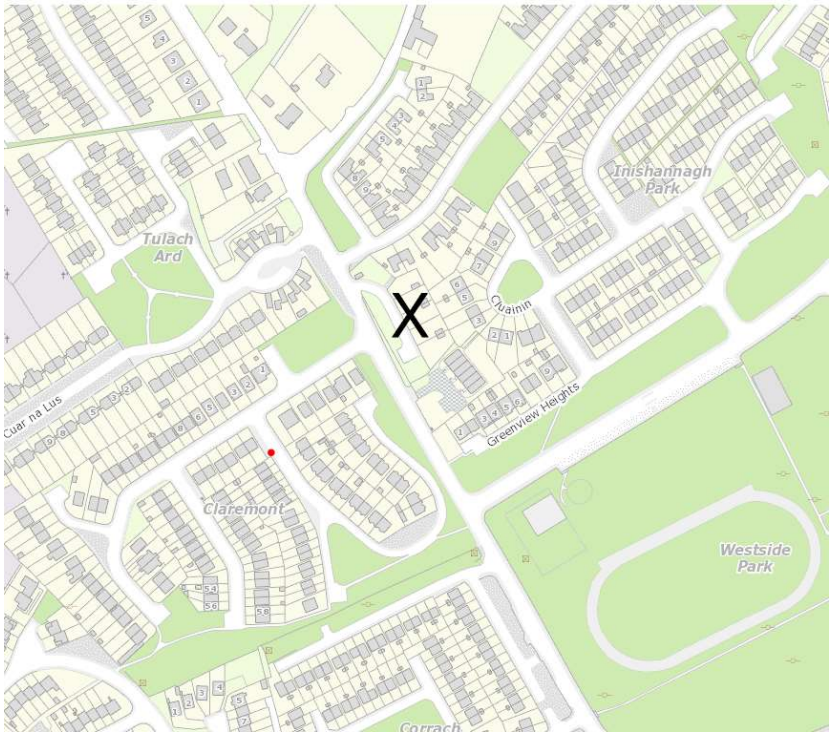
On 15th April, the design team presented the proposal to GCC planning department, roads and traffic, and parks departments.

desiun Architects gave a presentation, included at appendix 1, outlining the design and urban design response. Minutes of this meeting were circulated the following day and are included at appendix 2.

*Please refer to Section 3 - *Site Strategy* for more information.

History & Archaeology

On review of the Historic Environment Viewer on the National Monuments Service website there appears to be no evidence of archaeological implications to the proposed site.



Extract from Historic Environment Viewer; site is marked with an'X'

Areas of interest nearby are located within a housing estate opposite the development in Claremont Park. Indicated on 1st edition of OS 6-inch map as a short length of arcuate field boundary, it appears on an ASG aerial photograph as a multivallate circular enclosure (D c. 80m). No visible surface trace survives. A 'tunnel' discovered in the area in recent years may be an associated souterrain. (GBCAS Files).*

This historical feature appears to have no evidential implications for the development site in question.

*Information has been provided by the National Monuments Service.

Site Ownership

The entire site is in the possession of Galway City Council.

Site Surveys

A topographical survey of the site was carried out by Newsurveys Ltd.

The site falls approximately 4m from the northernmost end to the south. While it would typically require considerable cut & fill to develop a site with this level of fall, the existing bays are terraced, and the current proposal uses, as much as possible, this topography. Some adjustment and retaining elements will be required, but these are limited to siteworks.

Existing foul and surface water drains are evident on site and coordination with local authority and Irish Water records has been undertaken. A 150mm dia combined sewer currently serves the site which offers sufficient capacity for the proposed development.

Ground Investigation

Site Investigations

The site investigation report was carried out by Site Investigations Ltd.

As previously mentioned the site investigations were carried out to establish any abnormal ground conditions that may influence the foundations for the proposed works. The investigations took place in April 2021. MADE GROUND was encountered across the site at depths ranging from 0.60mbgl to 1.00mbgl, underlain with granular GRAVEL soils providing a competent bearing stratum. The MADE GROUND will need to be removed under foundations and replaced with an engineering fill or lean-mix concrete to the competent GRAVEL layers to ensure consistent bearing and avoid soft spots. Foundations will be formed by conventional reinforced concrete strips.

A more detailed analysis of the site investigations survey can be found in the report appended to this document.

Site Access

Vehicular access to the site is via a direct existing entrance off the circular road. Initial studies quickly discounted moving this entrance as to do so would incur very great cost and would present difficulty in achieving appropriate separation distances from other junctions. It is proposed that the vehicular entrance will remain in its current position, with only pedestrian access upgraded.

In discussion with GCC traffic planning, it was indicated that a future upgrade for the circular road would involve footpath and cycle lane improvements. A diagram indicating possible locations and likely widths of these upgrades is included in the architectural drawings appended to this report. The proposed works to the site will not interfere with future road development.

Site Services

The site is currently serviced and has existing electrical, water, and drainage connections. Utility drawings for the site are included at appendix C. ESBN have confirmed that adequate supply to serve the number of dwellings and public lighting.

A 90mbar gas main runs the length of the circular road. Although connection is possible, there are no low-pressure branches from this main to any other housing estate in the area.

Irish Water

An existing connection is in situ on site, and no additional supply requirement is anticipated.

Whilst there is an existing connection with no additional load requirements a pre-connection inquiry application will be made.

3.0 Site Strategy

Spatial Strategy

concept

The site, when viewed in the context of the surrounding urban texture is a non-sequitur. It is walled-in, and is unable to respond to the building lines and established suburban patterns of its surrounds.

Principal points of urban strategy:

- The site, when viewed in the context of the surrounding urban texture is a non-sequitur. It is walled-in and is unable to respond to the building lines and established suburban patterns of its surrounds.
- The walled-in site, as a termination of the vista along Claremont Park, is particularly abrupt – especially given that the tree planting in the public space adjacent has matured very well in the last 10 years.
- The established suburban pattern in this area includes many open green-strips of varied widths beside the distributor road. These strips enjoy many semi-mature and mature trees.
- The open space in front of Claremont Park has been greatly enhanced by tree-planting and presents a great opportunity to integrate the subject site into the surrounding neighbourhood.
- The comfortable curved form of Cuar na Luas offers a potential precedent for the subject site.
- Breaking down the high concrete block wall, which currently isolates the subject site and its residents, offers an opportunity to embrace and augment the amenity of the tree-planted Claremont open space.
- The site can then be planned to offer a visually coherent termination of the vista along Claremont Park and make a positive contribution to the established suburban character of the surrounding area.
- This site has the unique potential to offer a meaningfully diverse housing programme that is, nonetheless, integrated into the established suburban pattern of the surrounding neighbourhood.

The emphasis of the planning strategy was on successful *integration* of the scheme and families into the surrounding neighbourhood, as opposed to *assimilation* of the scheme and families into the general population and general housing stock.

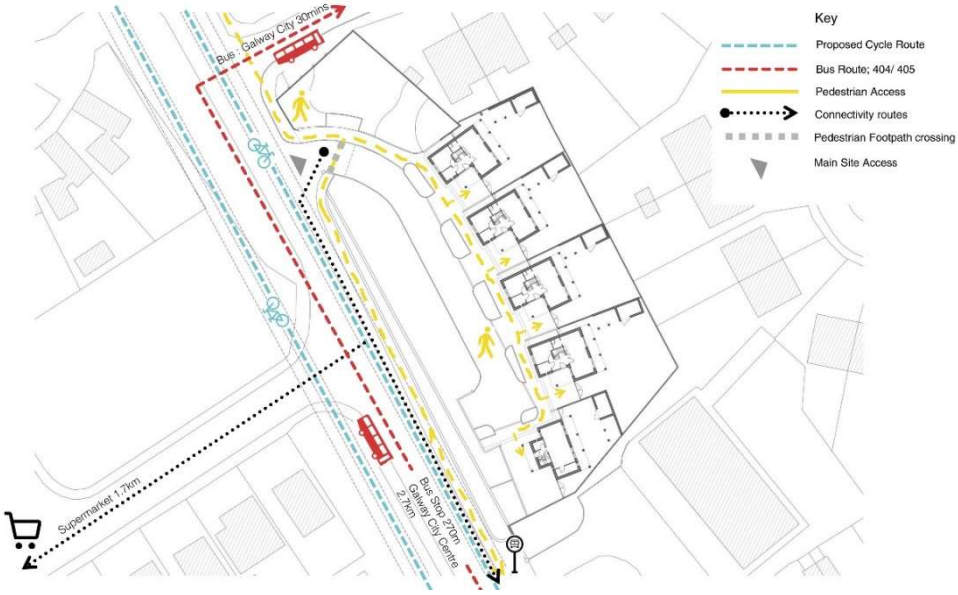
The houses are arranged in a semi-circular arc, with the tall gables facing onto a shared green space, reminiscent of a camp with wagons facing onto a green.

Response & Feedback:

The proposal was well received by the planning department. Several queries and observations were noted.

- Levels and boundaries would need to be considered in relation to overlooking of adjacent properties (note, topographical survey had been delayed due to Covid restrictions).
- Cross sections should be included to illustrate scheme within surrounding context.
- Road widening plans for circular road are in early development. It is proposed that this section will be widened to 14m – for noting.
- DMURS to be considered in final site layout. Site permeability and connectivity to local amenities.
- Public lighting design to be considered.
- Requirement for play areas – specific play areas not envisaged at present.
- Provision of shed structures queried – explained in the context of outdoor social culture.

DMURS



DMURS Diagram, Indicating primary connectivity routes: Circular Road Group Housing

The development aims to improve existing and promote new connectivity links to the site. Pedestrians, cyclists, and other road users have all been accommodated for within the proposal and the diagram above illustrates the integration with the planned 'road corridor' extension planned along Circular Road, particularly the proposed cycle route.

As per guidance listed in the 'Design Manual for Urban Roads & Streets', a new pedestrian crossing will be provided near the site entrance and improvements made to the footpath within the site's curtilage will allow those arriving on foot to navigate in and around the development easily. This will not only encourage more sustainable travel patterns, but it will also increase safety for pedestrians in and around the site.

A bus stop servicing routes to Galway City centre is located approximately 270m south of the site entrance. The nearest supermarket is located 1.7km from the development.

Designing for cyclists must also be given a high priority as trips by bicycle have the potential to replace trips by car*. The proximity of the proposed cycle lane illustrated above will provide a great facility to those occupying the site.

No significant structural changes will be made to the existing 'Local' or internal street and this will serve the proposed dwellings similar to its current configuration. Landscape improvements will be made along the street to improve the green space amenity.

**2019 Design Manual for Urban Streets*

Landscape Strategy

Extract from Landscape Proposal: Circular Road Group Housing

The landscape strategy has been prepared to retain as many trees, hedgerows, and existing vegetation as possible. The principal strategy promotes the breaking down of the high concrete block boundary wall to Circular Road, which currently isolates the subject site and its residents. This will offer an opportunity to embrace and augment the amenity of the existing tree-planted Claremont open space and provide a visually coherent termination of the vista along Claremont Park, making a positive contribution to the established suburban character of the surrounding area.

The houses, arranged in a semi-circular arc, with the tall gables facing onto a shared green space, will be reminiscent of a camp with wagons facing onto a green.

Additional boundary planting of selected native species and improved landscaping to the north of the site and along the 'internal street' will help improve the existing green space amenity.

4.0 Dwelling Design

Design Principals

Ground Floor:

The units have been designed following the early concept layouts, with kitchen and living spaces combined into an open-plan arrangement, facing east into the rear courtyard area. The 'L' shaped plan allows the living area to also face west, overlooking the entrance and parking area.

A utility area is provided off the kitchen.

A bedroom is provided on ground floor facing west onto the public realm. This is positioned adjacent to a downstairs bathroom, designing-in flexibility for aging in place and future proofing.

The external spaces off the ground floor are as important as the internal spaces. A strong visual and physical connection has been included from the main kitchen and living spaces to the rear courtyard, connecting the living spaces via the courtyard to the shed. This arrangement allows social interaction and activation, as well as passive surveillance, of the primary social space.

To further emphasise the primacy of the outdoor culture, a covered veranda has been proposed. Constructed of simple material and clad in a basic sinusoidal metal panel, it extends the living space externally into the courtyard.

The space to the front is minimised, with adequate parking for a car or van. This space is overlooked from the main living space.

Extract from initial sketch model presentation

First Floor:

The upstairs accommodation is contained in a steeply pitched roof, reminiscent of the traditional wagon. We drew on a precedent in Magheroarty called the pointy house, where the sleeping accommodation was 'contained' within an expressed roof structure. Although atypical, dealing with the sleeping accommodation in this way reduces the floor area relative to the ground floor and provides a dormer-scale development relative to the single storey houses to the north and east of the site. This proposal was also enthusiastically endorsed by Cena.

The pointy house, overlooking Magheroarty bay in Donegal.

The unusual form of the building, and strong connections to its surroundings, is reminiscent of being within an object in the landscape, as opposed to being in a box, isolated from the surrounding environment - even at first floor level.

Precedent – House in Magheroarty

Cut-away Section showing downstairs bedroom and main bedroom in the roof space.

The roof is allowed to overhang at the gable ends, to recall the form of the travellers' wagon, as they face onto the central shared green.

Dwelling Areas

The units have been designed to meet all requirements of the Quality Housing for Sustainable Communities. The overall and room areas have been designed to comply with the optimum areas indicated in section 5 of this document and these areas have been identified on the plans submitted.

Materials & Finishes

Materials proposed include simple, wet-dash render and nap plaster finishes to the ground floors, with Cedral cement fibre cladding to the upper floor gables. The roofs are proposed in Cedral cement fibre slates, or similar. These materials are standard, readily available, and durable, but are used in a way that emphasise the different programme that these houses represent.

The sheds are block-built with simply spanned timber rafters, clad with a standard profiled metal panel as a roof. The sheds are provided with sliding gates also clad in profiled metal sheeting. The veranda, similarly, is constructed from simply supported timber rafters and roofed with standard profiled metal panels.

Shutters

In recognition of the culture of nomadism, a sliding metal panel shutter has been proposed on the front elevation. This feature allows an animation to the front façades with a vernacular material, while simultaneously expressing the possibility that the house may be unoccupied for several weeks at a time while the family travels.

5.0 Development Plan Standards

While there are no development standards explicit to traveller accommodation, we have listed some of the particular metrics here:

Density

At present there are 5 bays on the site with 4 families living in the settlement. The 5 units proposed in this scheme reflect a replacement of the current facilities with permanent homes. The 5th unit will be for another traveller family, who will be housed in consultation with Cena, the existing residents, and GCC.

The site with 5 units represents a density of 15.6 units per ha. To achieve a density of 35/ha., 11 units would be required, while 16 units would be required to achieve 50/ha. Due to the size and physical constraints of the site, it would be difficult to achieve much higher densities without using apartments or duplex type units. These types of units were strongly opposed in traveller consultation.

Policy 2.9 of the development plan would appear to allow lower density development where this is regarded as the prevailing pattern:

> *Policy 2.9 Low Density Residential Areas*
> *Protect the character of these areas by ensuring new development has regard to the prevailing pattern, form and density of these areas.*
> *Protect the characteristics of these areas through development standards and guidelines*

Plot Ratio

The total build area proposed is 599m2 and includes the working sheds. Using the developable site area of 3,165m2 the current scheme proposes a plot ratio of 0.18:1. The maximum plot ratio for Established Suburbs in Galway City is 0.46:1.

Schedule of Accommodation

desiun
design · architecture

Project:	Circular Road Group Housing		Revision:		Project number:	20011
Site Area: 3,165m² / 0.315Ha			Total Units: 5		Car Parking spaces: 5	Bicycle Parking: n/a
Guidance:	*Quality Housing for Sustainable Communities DoHLG*					
Building Type	Unit Type	Area - proposed	Target Area	Storage	Private Open Space	Unit amount
3 Bed House						
2 Storeys	3-Bed	94m²	92m²	5.45m²	~120m²	1 (20%)
	3-Bed	94m²	92m²	5.45m²	~120m²	1 (20%)
	3-Bed	94m²	92m²	5.45m²	~120m²	1 (20%)
					Total Units:	3
4 Bed House						
2 Storeys	4-Bed	107m²	110m²	7.9m²	185m²	1(20%)
					Total Units:	1
2 Bed House						
2 Storeys	2-Bed	85m²	80m²	4.8m²	90m²	1 (20%)
					Total Units:	1
					Grand Total:	5

The proposal includes a mix of 4-Bed, 3-Bed and 2-Bed house units. All units have been designed in line with the DoHLG's 'Quality Housing for Sustainable Communities' guidance document.

Public Open Space

All public green spaces within the site will be maintained and further improved with the demolition of the now defunct community shed, making way for improved landscaping including boundary planting, an enhanced pedestrian footpath and additional trees throughout the site.

A total space provision of 779m² is provided for public open space equating to 24% of the developable area (3,165m²).

Private Open Space

Private Open space is provided by means of a rear yard / social space to each dwelling. The proportion of private open space provided equates to approximately 191% of the gross internal floor areas for the Type 1 dwelling (3 Bed – 120sqm); 249% of the gross internal floor area of the Type 2 dwelling (4 Bed – 185sqm)) and 190% gross internal floor area of the Type 3 dwelling (2 Bed – 90sqm).

Car Parking Provision

As per the Galway City Development Plan 2017-2023 a car parking provision of 1 on-site per dwelling and 1 grouped visitor per 3 dwellings is required. At present 1 car park space per dwelling is provided.

Cycle Parking Provision

No designated cycle parking has been provided; however, the sheds allow ample space to secure and protect bicycles within each of the dwelling's curtilage.

6.0 Statutory

Part VIII

There are no known previous planning applications submitted for this site. The proposed scheme has been reviewed at several stages throughout the design development process with Galway City Council & Cena.

The development has also been reviewed by the Engineering, Roads & Parks department and any issues raised as part of this consultation process have been notified to and addressed by the design team.

The planning department are satisfied that the current layout can proceed as the basis for a Part 8 Application.

Disability Access Certificates (DAC)

As per Article 20D (2) of *The Building Control (Amendment) Regulations 2018*, dwellings are exempted from the requirement to obtain a DAC.

Fire Safety Certificates (FSC)

Buildings used as a dwelling other than a flat, as defined in S.I 497 of 1997, are exempted from the requirement to obtain an FSC.

7.0 Conclusion

The submitted scheme is the result of a collaboration between Galway City Council, Cena Culturally Appropriate Homes, and the appointed design team. Numerous consultations and investigations into the meaning of culturally appropriate homes have been undertaken over the last six months and we submit that the current proposal is a prototype, not purely of design, but of a design process – where genuine consultation with travellers has been undertaken and a two-way engagement has been facilitated.

The units and their situation on this site have been designed to allow integration of the travelling families into the neighbourhood, but not assimilation, allowing a positive expression of a distinct culture and identity. We submit that the scheme provides an opportunity to achieve an Inclusive City, as described in section 7.4 of Galway City Development Plan, to …:

"… support the empowerment of different groups, ethnic minorities and culturally diverse people in the City."

8.0 Appendices

A. Response to Pre-statutory Approval Report: Cena

Response to Pre-Statutory Approval Report

Cena: Culturally Appropriate Homes

As is our normal practice, we have presented and discussed contents of the technical report prepared by desiun Architects with local residents, as well as with our own internal design working group (made up mostly of members or the Traveller community).

Concepts and Design

Response to proposals being put forward in the report was extremely positive, with agreement that the design presented captures very well the points that emerged from previous discussions on Traveller-appropriate accommodation. This relates in particular to:

1. While housing units differ in size, there is a welcome consistency in the way that key layout features are applied to all. Both residents and members or our own working group re-emphasised the importance of the exterior space and layout – especially to the rear of each home – seen as being of great importance socially and not just visually.
2. The balance in space allocated to each living 'function' is good, and definitely reflects well the earlier discussions that took place between Cena and the design team. There is, importantly, a good spatial balance achieved between spaces allocated to the living and sleeping functions. There was a strong consensus in previous discussions around the need for this balance to be maintained very much in favour of the social or 'living' spaces – with less room allocated to bedrooms. This has been commendably achieved in the designs presented. The clear connection between 'inside and outside' living is also well established to the rear.
3. Discussions at earlier design stages also explored some of the reasoning behind what is often reluctance of members of the Traveller community to consider two-storey or 'upstairs' living. 'Light' became a key focus of much of this discussion, and there is consensus about how the design team has very successfully incorporated windows (size shape and location) into the upstairs layout.
4. A very important part of our own discussions was about the overall site layout, and how the development is proposed to 'fit in' with the surrounding landscape and community. Feedback from these discussions is especially complementary in this respect. Residents at Circular Road have consistently and strongly put across to us their wish to be included and recognised by the wider community – not to be cut off from it. But this should not happen at the expense of denying their own very specific culture and identity. We believe that the proposals contained in t he report achieves an overall balance between these aims – recognition of diversity but not through exclusion. One of our own respondents put this very well:

> *"You shouldn't need walls and barriers to show that people are different. And you don't need to make all homes the same to create inclusion"*

Considerations on Costing

We note the fact that cost estimates are somewhat above the standard model. We feel strongly, however, that this kind of investment is both justifiable and desirable. We make this point, bearing a number of factors in mind:

1. Firstly, in very general terms, the argument in terms of long-term savings from such investment in accommodation has been already well made. One of the more recent research reports (commissioned by the BRE Trust) examines the 'Cost of Poor Housing in Ireland'. While the focus of this report is on older people, it does successfully demonstrate the adverse economic effects of under-investment in accommodation. The report estimates that this currently *"is costing Ireland some €1.25 billion a year to the health and care services, plus the distress and lost opportunities to the victims and their families".*[1]
2. Secondly, although these longer-term savings have not been specifically proven with regard to the Traveller community, Cena believes that the case to be made in cost-benefit terms is even more compelling for a number of reasons:
    a. The very high need for health and care services within the Traveller community has already been demonstrated[2] . The potential for long-term savings in provision of these services is therefore even more pronounced through investment in accommodation.
    b. Indicators of exclusion are also higher in relation to the provision of a range of other services (with persistently high rates of unemployment, lower levels of educational attainment, higher precedence of crime and engagement with the criminal justice system for the Traveller community). Consistent with the 'housing first' model, we see investment in sustainable accommodation as having the potential for long-term savings in all these services.
    c. We are all dealing with a well-acknowledged legacy of inadequate provision in relation to Traveller accommodation. A report of the European Committee on Social Rights (ECSR) pointed to what it said was a "substantial" shortfall in the amount of Traveller accommodation available, and to the quality of some of this accommodation[3].
    d. There are, we believe, also more specific short-term costs associated with failure to provide what can be seen as culturally appropriate accommodation. Most of these can be seen as the 'cost of exclusion'. Development of an environment that is not seen or 'lived in' as culturally appropriate can increase a sense of alienation, an absence of 'ownership' by residents and, ultimately, a deterioration in properties and shared areas being properly maintained – adding to both maintenance and security costs in the medium to longer term.

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[1] BRE Trust. "The Cost of Poor Housing in Ireland", January 2021

[2] All Ireland Traveller Health Study, 2011, showing exceptionally high levels of incidences of poor physical and mental health amongst the Traveller community in comparison to the general Irish population.

[3] ECSR report on Traveller Accommodation in Ireland March 2021

Overall Conclusion

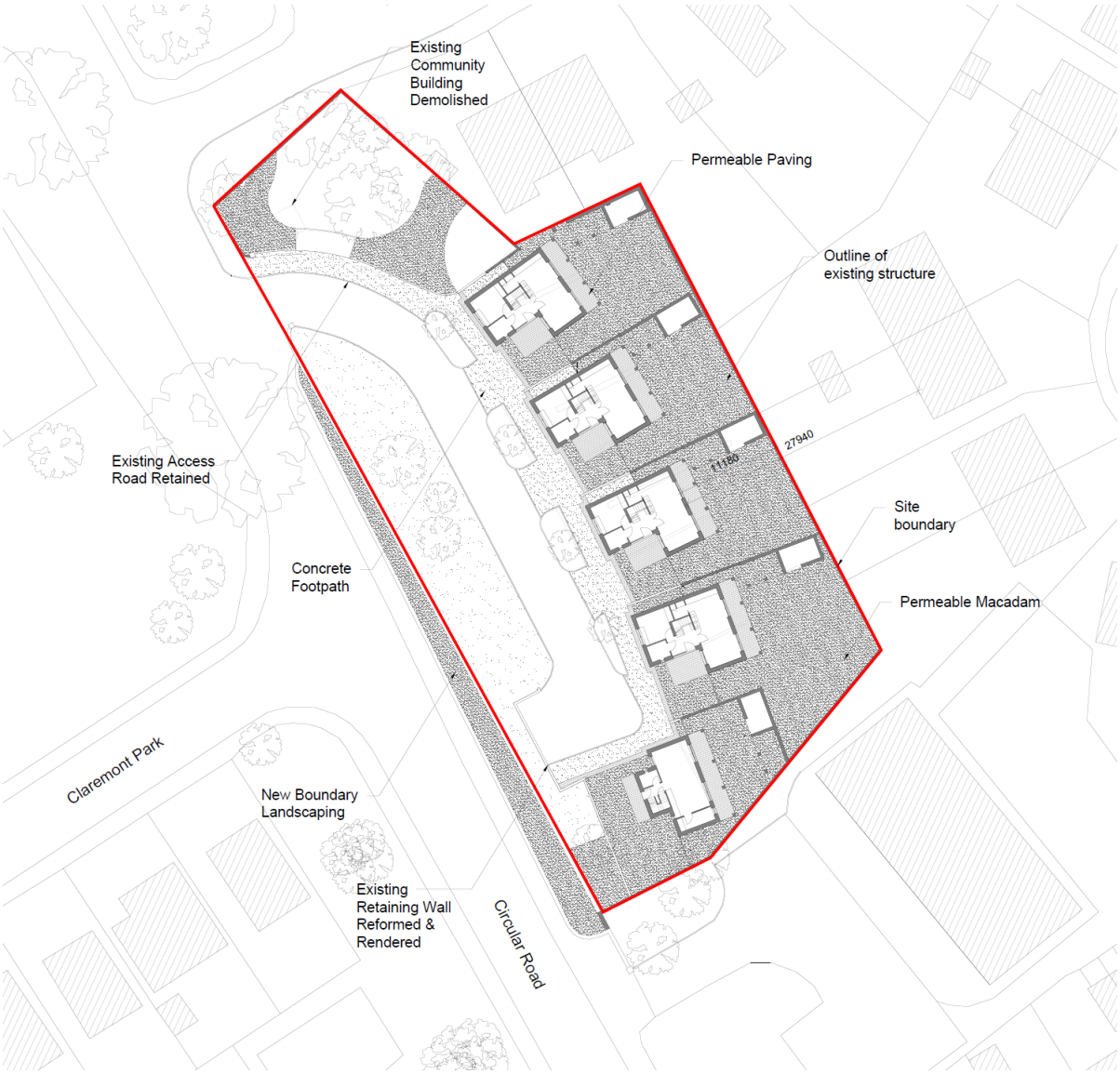
In overall terms Cena very much welcome the proposals contained in the report and we congratulate the design team for the way they have incorporated all the ideas coming from existing residents and other members of the Traveller community involved in the consultation process.

From the Cena standpoint, we see the proposals being put forward as being innovative and ground-breaking. The design proposals represent, in our view, a significant move forward in translating what have, up to now, been vague aspirations into concrete proposals when it comes to Traveller-appropriate accommodation.

We also recognise the potential for very significant gains in cost-benefit terms in the proposals being made. The very substantial costs of getting things wrong have been well-established in the past. But we believe that the savings to be made in getting this right are of even greater significance.

Cena are already sharing these ideas with members of the Traveller community we are working with elsewhere, with local authorities in other development projects and at Departmental level. Not only are we convinced that what is being proposed will go a long way to ensure an inclusive and sustainable development at Circular Road. We are also convinced that it provides a very solid platform for the dissemination of good practice across the country.

B. Structural & Civil Design Report



Project Title	Circular Road Group Housing, Galway City
Document Title	Stage 2 Engineering report
Client	Galway City Council/CENA
File No.	R39_St2_001
Author	Peter Brunner
Date	10 February 2022
Revision	A

Project:

The development will principally consist of the construction of 5 dwelling units with external sheds and recreation space on an existing site which is already serviced by roads and drainage. The site is accessed from Circular Road, Galway.

Site Investigations

Site investigations were carried out by **Site Investigations Limited** in May 2021. The fieldworks comprise a programme of cable percussive boreholes, trial pits with California Bearing Ratio tests, dynamic probes and soakaway test as follows:

· 2 No. cable percussive boreholes
· 2 No. trial pits with California Bearing Ratio tests
· 5 No. dynamic probes
· 1 No. soakaway test

MADE GROUND was encountered across the site at depths ranging from 0.60mbgl to 1.00mbgl. This is not suitable for building foundations. MADE GROUND should be removed and replaced with engineered fill which is compacted to the required standard.

The shallow ground conditions are dominated by granular GRAVEL soils which established an allowable bearing capacities of 100kN/m2 at 1.00mbgl in the GRAVEL. This material is suitable for the proposed building foundations.

No groundwater was encountered during the fieldworks. The shallow GRAVEL soils have a high permeability and therefore are well drained with a low groundwater table. Therefore, any shallow excavation will have a low risk of groundwater ingress.

The soakaway test passed the specification and recorded an f-value of **4.11x10-5m/s**. The proposed soakaways should be placed within the well-drained, high permeability GRAVEL soils.

Contamination Testing

Environmental testing was scheduled on two samples. For material to be removed from site, Suite I testing was carried out to determine if the material is hazardous or non-hazardous and then the leachate results were compared with the published waste acceptance limits to determine whether the material on the site could be accepted as 'inert material' by an Irish landfill. The Waste Classification report shows that the material tested can be classified as non-hazardous material.

Following this analysis of the solid test results, the leachate disposal suite recorded Chromium level above the Inert threshold so the results should be provided to the chosen landfill prior to any excavations completed on site.

Two samples were tested but it cannot be discounted that any localised contamination may have been missed. Any MADE GROUND excavated on site should be stockpiled separately to natural soils to avoid any potential cross contamination of the soils. Additional testing of these soils may be requested by the individual landfill before acceptance and a testing regime designed by an environmental engineer would be recommended to satisfy the landfill.

The chemical test results of the samples indicate a general pH value between 8.59 and 8.62, which is close to neutral and below the level of 9, therefore no special precautions are required on the foundation concrete mix.

Refer to Appendix A for Site Investigation report

Drainage strategy

The site is currently served by a separate surface water- & foul drain, which combine before discharging from site in a combined fashion. It is proposed to maintain these runs to facilitate the proposed development. The development does not generate an increased population equivalent and associated demand on the drainage network. We have employed sustainable urban drainage systems (Suds) in the form of soakaways for roof water drainage, which diminishes the overall discharge from site during storm events.

Surface Water

It is proposed to collect all rainwater incident on the roofs of houses and outhouses via gutters & downpipes to a soakaway, located in the rear yard area of each house. The soakaway will be formed in precast concrete rings and filled with washed stone. Site investigations have indicated that soakaways can be placed in the well-drained, high permeability **gravel** soils, below the made ground material.

By discharging roof water to ground, we have reduced the overall flow into the public system from the site by 63% by area. Storm flows during a 5 year, 60 min storm event are ***reduced by 5.7 litres per second***.

Foul Water

The foul water discharge from the proposed dwellings will utilise the existing network. The effective foul water discharge is unchanged by provision of the development as the demand as not increased or reduced.

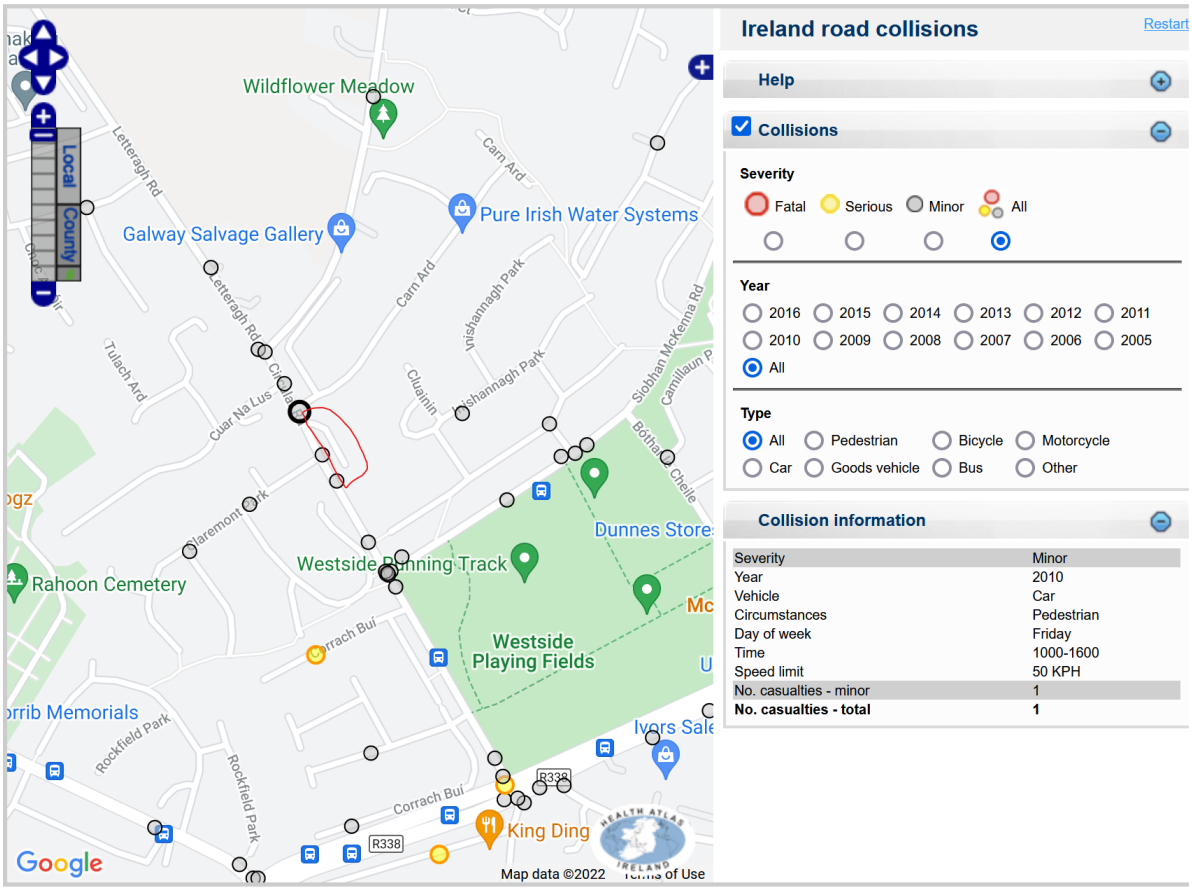
It was established that some foul drains enter the site from adjacent dwellings, which may need diversion to facilitate the construction. It was recommended to carry out a CCTV survey of the drains to specifically confirm this at the next opportunity.

Refer to Appendix B for proposed drainage strategy

Roads & Traffic

The proposed development will retain the existing entrance and internal circulation. There is no change to the number of dwelling units or total population, resulting in the same quantum of traffic entering and exiting the site. There is therefore no traffic impact on the public road network.

There are no current traffic issues on the site or on the public road. Therefore the risk profile on the road remains unchanged. We have reviewed the Road Safety Authority road collision database. There are no collision clusters directly outside the site. The only collision was minor in nature and occurred in 2010. From a road safety perspective, the road is operating well.



Road Safety Authority – Collision Map for Circular Road at applicant site.

Appendix A

Site Investigation report

S.I. Ltd Contract No: 5808

Client: Galway County Council
Engineer: Brunner Consulting Engineers
Contractor: Site Investigations Ltd

Circular Road,
Rahoon, Galway
Site Investigation Report

Prepared by:

.....
Stephen Letch

Issue Date:	03/06/2021
Status	Final
Revision	1

Contents:

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2.	Site Location	1
3.	Fieldwork	1
4.	Laboratory Testing	3
5.	Ground Conditions	4
6.	Recommendations and Conclusions	5

Appendices:

1. Cable Percussive Borehole Logs
2. Trial Pit Logs and Photographs
3. Dynamic Probe Logs
4. Soakaway Test Result and Photographs
5. Geotechnical Laboratory Test Results
6. Environmental Laboratory Test Results and Waste Classification Report
7. Survey Data

1. Introduction

On the instructions of Brunner Consulting Engineers, Site Investigations Ltd (SIL) was appointed to complete a ground investigation at Circular Road, Rahoon, Galway. The investigation was for the redevelopment of the permanent halting site and was completed on behalf of the Client, Galway County Council. The investigation was completed in April 2021.

2. Site Location

Circular Road is located to the north west of Galway city centre in the west of Ireland. The map below shows the location of the site in the city.

3. Fieldwork

The fieldworks comprise a programme of cable percussive boreholes, trial pits with California Bearing Ratio tests, dynamic probes and soakaway test. All fieldwork was carried out in accordance with BS 5930:2015, Engineers Ireland GI Specification and Related Document 2nd Edition 2016 and Eurocode 7: Geotechnical Design. The fieldworks comprised of the following:

- 2 No. cable percussive boreholes
- 2 No. trial pits with California Bearing Ratio tests
- 5 No. dynamic probes
- 1 No. soakaway test

3.1. Cable Percussive Boreholes

Cable percussion boring was undertaken at 2 No. locations using a Dando 150 rig and constructed 200mm diameter boreholes. The boreholes terminated at depths ranging from 1.50mbgl to 2.30mbgl. Bulk disturbed samples were recovered at regular intervals.

To test the strength of the stratum, Standard Penetration Tests (SPT's) were performed at 1.00m intervals in accordance with BS 1377 (1990). In soils with high gravel and cobble content it is appropriate to use a solid cone (60°) (CPT) instead of the split spoon and this was used throughout the testing. The test is completed over 450mm and the cone is driven 150mm into the stratum to ensure that the test is conducted over an undisturbed zone. The cone is then driven the remaining 300mm and the blows recorded to report the N-Value. All the tests completed on site recorded 50 blows and therefore, the test is stopped and the penetration depth is reported (e.g., BH01 at 1.00mbgl where N=50-(25 for 125mm/50 for 10mm)).

The cable percussive borehole logs are presented in Appendix 1.

3.2. Trial Pits with California Bearing Ratio Tests

2 No. trial pits were excavated using a tracked excavator. The strata were logged and photographed by SIL geotechnical engineer and groundwater ingresses and pit wall stability was also recorded. Representative disturbed bulk samples were recovered as the pits were excavated, which were returned to the laboratory for geotechnical testing.

At each location, samples were collected to complete California Bearing Ratio tests. The samples were collected at 1.00mbgl and returned to the laboratory for testing.

The trial pit logs and photographs are presented in Appendix 2 with the California Bearing Ratio tests in Appendix 5.

3.3. Dynamic Probes

At 5 No. locations, dynamic probes were completed using a track mounted Competitor 130 machine. The testing complies with the requirements of BS1377: Part 9 (1990) and Eurocode 7: Part 3. The configuration utilised standard DPH (Heavy) probing method comprising a 50kg weight, 500mm drop height and a 50mm diameter (90°) cone. The number of blows required to drive the cone each 100mm increment into the sub soil is recorded in accordance with the standards. The dynamic probe provides no information regarding soil type or groundwater conditions.

The dynamic probe results can be used to analyse the strength of the soil strata encountered by the probe. 'Proceedings of the Trinity College Dublin Symposium of Field and Laboratory

Testing of Soils for Foundations and Embankments' presents a paper by Foirbart that is most relevant to Irish soil conditions and within this paper the following equations were included:

Granular Soils: DPH N_{100} x 2.5 = SPT N value

Cohesive Soils: C_u = 15 x DPH N_{100} + 30 kN/m^2

These equations present a relationship between the probe N_{100} value and the SPT N value for granular soils and the undrained shear strength of cohesive soils.

The dynamic probe results are presented in Appendix 3.

3.4. Soakaway Test

At one location, a soakaway test was completed and logged by SIL geotechnical engineer. The soakaway test is used to identify possible areas for storm water drainage. The pit was filled with water and the level of the groundwater was recorded over time. As stipulated by BRE Special Digest 365, the pit should be filled three times and that the final cycle is used to provide the infiltration rate. The time taken for the water level to fall from 75% volume to 25% volume is required to calculate the rate of infiltration. However, if the water level does not fall at a steady rate, then the test is deemed to have failed and the area is unsuitable for storm water drainage.

The results and photographs are provided in Appendix 4.

3.5. Surveying

Following the completion of the fieldworks, a survey of the exploratory hole locations was completed using a GeoMax GPS Rover. The data is supplied on each individual log and along with a site plan in Appendix 7.

4. Laboratory Testing

Geotechnical laboratory testing has been completed on representative soil samples in accordance with BS 1377 (1990). Testing includes:

- 4 No. Particle size gradings
- 2 No. pH and sulphate content

Environmental laboratory testing was completed by Eurofins Chemtest Ltd and consisted of:

- 2 No. Suite I Analysis

The geotechnical soil laboratory test results are presented in Appendix 5 with the environmental test results and waste classification report in Appendix 6.

5. Ground Conditions

5.1. Overburden

MADE GROUND was recorded across the site to depths ranging from 0.60mgbl (BH01) to 1.00mbgl (BH02). This consisted of brown, grey and black sandy gravelly silty clay soils with medium cobble and low boulder content with inclusions of concrete, plastic and red brick fragments.

The shallow ground conditions in the boreholes and trial pits recorded are dominated by brown orange silty very sandy GRAVEL with high cobble and low boulder content although TP02 recorded a SAND rather than a GRAVEL. The locations all terminated at shallow depths and these soils are possibly weathered bedrock, GRANITE, but rotary coring would be required to confirm the presence of shallow bedrock.

The laboratory tests of the shallow cohesive soils confirm that GRAVEL soils dominate the site with the particle size distribution curves recording 47% to 58% GRAVEL content with the TP02 2.00m sample recording 61% SAND.

5.2. Groundwater

Groundwater details in the boreholes and trial pits during the fieldworks are noted on the logs in Appendices 1 and 2. No groundwater ingresses were recorded during the fieldworks period.

6. Recommendations and Conclusions

Please note the following caveats:

The recommendations given, and opinions expressed in this report are based on the findings as detailed in the exploratory hole records. Where an opinion is expressed on the material between the exploratory hole locations or below the final level of excavation, this is for guidance only and no liability can be accepted for its accuracy. No responsibility can be accepted for adjacent unexpected conditions that have not been revealed by the exploratory holes. It is further recommended that all bearing surfaces when excavated should be inspected by a suitably qualified Engineer to verify the information given in this report.

Excavated surfaces in clay strata should be kept dry to avoid softening prior to foundation placement. Foundations should always be taken to a minimum depth of 0.50mBGL to avoid the effects of frost action and possible seasonal shrinkage/swelling.

If it is intended that on-site materials are to be used as fill, then the necessary laboratory testing should be specified by the Client to confirm the suitability. Also, relevant lab testing should be specified where stability of side slopes to excavations is a concern, or where contamination may be an issue.

6.1. Shallow Foundations

Due to the unknown depth of foundation and no longer-term groundwater information, this analysis assumes the groundwater will not influence the construction or performance of these foundations.

MADE GROUND was encountered across the site at depths ranging from 0.60mbgl to 1.00mbgl. SIL do not recommend that narrow shallow foundations are placed on fill material due to the unknown compaction methods used during laying of man-made material. This unknown could result in softer spots and differential settlement once construction is completed. If shallow foundations are to be used and man-made soils are encountered below foundation level, then the soil should be removed and replaced with engineered fill which is compacted to the required standard.

The shallow ground conditions are dominated by granular GRAVEL soils and the SPT tests all recorded 50 blows across the test zones due to the presence of cobbles and boulders. The probes also refused before 1.00mbgl except for DP03 and DP05 that recorded values of 12 and 4 respectively. Therefore, using the value of 4, this indicates a SPT N-value of 10, as per Section 3.3. In granular soils, the SPT N-value can be used to calculate the allowable bearing capacity, as per Terzaghi and Peck, using the correlation of SPT N-value x 10 = ABC. Therefore, using the N_{100} value, allowable bearing capacities of 100kN/m^2 at 1.00mbgl in the GRAVEL would be anticipated.

A suitably qualified Engineer should inspect the ground at each foundation and confirm that the soils are suitable for the final foundation design.

The following assumptions were made as part of these analyses. If any of these assumptions are not in accordance with detailed design or observations made during construction these recommendations should be re-evaluated.

- Foundations are to be constructed on a level formation of uniform material type (described above).
- The bulk unit weight of the material in this stratum has a minimum density of 19kN/m^3.
- All bearing capacity calculations allow for a settlement of 25mm.

The trial pits recorded that the pit walls were stable during excavations. However, due to the granular nature of the shallow soils, inspection of temporary excavations should be completed after excavation and all slopes made safe. Temporary support should be used on any excavation that will be left open for an extended period.

6.2. Groundwater

The caveats below relating to interpretation of groundwater levels should be noted:
There is always considerable uncertainty as to the likely rates of water ingress into excavations in clayey soil sites due to the possibility of localised unforeseen sand and gravel lenses acting as permeable conduits for unknown volumes of water.

Furthermore, water levels noted on the borehole and trial pit logs do not generally give an accurate indication of the actual groundwater conditions as the borehole or trial pit is rarely left open for sufficient time for the water level to reach equilibrium.

Also, during boring procedures, a permeable stratum may have been sealed off by the borehole casing, or water may have been added to aid drilling. Therefore, an extended period of groundwater monitoring using any constructed standpipes is required to provide more accurate information regarding groundwater conditions. Finally, groundwater levels vary with time of year, rainfall, nearby construction and tides.

Pumping tests would be required to determine likely seepage rates and persistence into excavations taken below the groundwater level. Deep trial pits also aid estimation of seepage rates.

As discussed previously, no groundwater was encountered during the fieldworks. The shallow GRAVEL soils have a high permeability and therefore are well drained with a low groundwater table. Therefore, any shallow excavation will have a low risk of groundwater ingressing into them.

If groundwater is encountered during excavations then mechanical pumps will be required to remove the groundwater from sumps. Sumps should be carefully located and constructed to ensure that groundwater is efficiently removed from excavations and trenches.

6.3. Soakaway Tests

The soakaway test passed the specification and recorded an f-value of **4.11×10^{-5} m/s**. Any proposed soakaway should be placed within the well-drained, high permeability GRAVEL soils.

6.4. Pavement Design

The CBR test results indicate CBR values ranging from 14.3% to 15.6%.

The tests were completed on samples recovered from 1.00mbgl and once the exact formation levels are finalised then additional in-situ testing could be completed to assist with the detailed pavement design. Inspection of the formation strata should also be completed prior to construction of the pavement.

6.5. Contamination

Environmental testing was scheduled on two samples and the results are shown in Appendix 6. For material to be removed from site, Suite I testing was carried out to determine if the material is hazardous or non-hazardous and then the leachate results were compared with the published waste acceptance limits of BS EN 12457-2 to determine whether the material on the site could be accepted as 'inert material' by an Irish landfill.

The Waste Classification report created using HazWasteOnline™ software shows that the material tested can be classified as non-hazardous material.

Following this analysis of the solid test results, the leachate disposal suite recorded Chromium level above the Inert threshold so the results should be provided to the chosen landfill prior to any excavations completed on site.

Two samples were tested but it cannot be discounted that any localised contamination may have been missed. Any MADE GROUND excavated on site should be stockpiled separately to natural soils to avoid any potential cross contamination of the soils. Additional testing of these soils may be requested by the individual landfill before acceptance and a testing regime designed by an environmental engineer would be recommended to satisfy the landfill.

6.6. Aggressive Ground Conditions

The chemical test results in Appendix 5 indicate a general pH value between 8.59 and 8.62, which is close to neutral and below the level of 9, therefore no special precautions are required.

The maximum value obtained for water soluble sulphate was 120mg/l as SO_3. The BRE Special Digest 1:2005 – '*Concrete in Aggressive Ground'* guidelines require SO_4 values and after conversion ($SO_4 = SO_3 \times 1.2$), the maximum value of 144mg/l shows Class 1 conditions and no special precautions are required.

Appendix 1

Cable Percussive Borehole Logs

Contract No: 5808	# Cable Percussion Borehole Log				Borehole No: **BH01**
Contract:	Circular Road	Easting:	527724.924	Date Started:	14/05/2021
Location:	Rahoon, Galway	Northing:	725784.319	Date Completed:	14/05/2021
Client:	Galway County Council	Elevation:	27.53	Drilled By:	J. O'Toole
Engineer:	Brunner Consulting Engineers	Borehole Diameter:	200mm	Status:	FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples and Insitu Tests Depth	Type	Result	Water Strike	Backfill
	0.10	TOPSOIL.			27.43					
		MADE GROUND: brown sandy gravelly silty clay with some concrete and red brick fragments.								
0.5				27.0						
	0.60	Brown silty very sandy GRAVEL with high cobble content.			26.93	0.70	B	JOT01		
1.0				26.5		1.00	C	50 (25 for 125mm/50 for 10mm)		
	1.30	Obstruction - possible boulders or bedrock.			26.23	1.40	B	JOT02		
1.5	1.50	End of Borehole at 1.50m		26.0	26.03	1.50	C	50 (25 for 5mm/50 for 5mm)		
2.0				25.5						
2.5				25.0						
3.0				24.5						
3.5				24.0						
4.0				23.5						
4.5				23.0						

Chiselling: From:	To:	Time:	Water Strikes: Strike:	Rose:	Depth Sealed	Water Details: Date:	Hole Depth:	Water Depth:	Installation: From:	To:	Pipe:	Backfill: From:	To:	Type:	Remarks:
1.30	1.50	01:30				14/05	1.50	Dry				0.00	1.50	Arisings	Borehole terminated due to obstruction.

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water
C: Cone SPT
S: Split spoon SPT

Contract No: 5808	# Cable Percussion Borehole Log				Borehole No: **BH02**
Contract:	Circular Road	Easting:	527745.462	Date Started:	14/05/2021
Location:	Rahoon, Galway	Northing:	725725.736	Date Completed:	14/05/2021
Client:	Galway County Council	Elevation:	24.79	Drilled By:	J. O'Toole
Engineer:	Brunner Consulting Engineers	Borehole Diameter:	200mm	Status:	FINAL

Depth (m) Scale	Depth (m) Depth	Stratum Description	Legend	Level (mOD) Scale	Level (mOD) Depth	Samples and Insitu Tests Depth	Type	Result	Water Strike	Backfill
	0.10	TOPSOIL.			24.69					
		MADE GROUND: grey black sandy gravelly silty clay with medium cobble, low boulder and trace of concrete and red brick fragments.		24.5						
0.5										
				24.0						
1.0	1.00	Dense brown silty very sandy GRAVEL with high cobble content.			23.79	1.00 1.00	B C	JOT03 50 (7,9/50 for 175mm)		
				23.5						
1.5										
				23.0						
2.0						2.00 2.00	B C	JOT04 50 (25 for 125mm/50 for 25mm)		
	2.20	Obstruction - possible boulders or bedrock.			22.59					
	2.30	End of Borehole at 2.30m		22.5	22.49	2.30	C	50 (25 for 5mm/50 for 5mm)		
2.5										
				22.0						
3.0										
				21.5						
3.5										
				21.0						
4.0										
				20.5						
4.5										
				20.0						

Chiselling: From:	To:	Time:	Water Strikes: Strike:	Rose:	Depth Sealed	Water Details: Date:	Hole Depth:	Water Depth:	Installation: From:	To:	Pipe:	Backfill: From:	To:	Type:	Remarks:
2.20	2.30	01:30				14/05	2.30	Dry				0.00	2.30	Arisings	Borehole terminated due to obstruction.

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water
C: Cone SPT
S: Split spoon SPT

Appendix 2

Trial Pit Logs and Photographs

Contract No: 5808	**Trial Pit Log**				Trial Pit No: **TP01**
Contract:	Circular Road	Easting:	527720.398	Date:	14/05/2021
Location:	Rahoon, Galway	Northing:	725767.779	Excavator:	5T Tracked Excavator
Client:	Galway County Council	Elevation:	26.77	Logged By:	P. McGonagle
Engineer:	Brunner Consulting Engineers	Dimensions (LxWxD) (m):	3.00 x 0.30 x 2.40	Status:	FINAL

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples / Field Tests Depth	Type	Result	Water Strike
		TOPSOIL.							
	0.20	MADE GROUND: brown black slightly sandy slightly gravelly silty clay with some plastic, red brick and concrete block fragments.		26.5	26.57				
0.5						0.50	ES	PM01	
				26.0					
	0.90	Brown orange silty very sandy fine to coarse, angular to subrounded GRAVEL of granite with low cobble content. Sand is fine to coarse. Cobbles are angular to subrounded of granite.			25.87				
1.0						1.00	B	PM02	
				25.5					
	1.40	Brown orange silty very sandy fine to coarse, angular to subrounded GRAVEL of granite with high cobble and boulder content. Sand is fine to coarse. Cobbles and boulders are angular to subrounded of granite (up to 250mm diameter).			25.37				
1.5									
				25.0					
2.0						2.00	B	PM03	
				24.5					
	2.40	Obstruction - possible boulders or bedrock. **Pit terminated at 2.40m**			24.37				
2.5									
				24.0					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Obstructions - possible boulders or bedrock.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5808	**Trial Pit Log**				Trial Pit No: **TP02**
Contract:	Circular Road	Easting:	527732.670	Date:	14/05/2021
Location:	Rahoon, Galway	Northing:	725744.851	Excavator:	5T Tracked Excavator
Client:	Galway County Council	Elevation:	25.63	Logged By:	P. McGonagle
Engineer:	Brunner Consulting Engineers	Dimensions (LxWxD) (m):	3.20 x 0.30 x 2.20	Status:	FINAL

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples / Field Tests Depth	Type	Result	Water Strike
		TOPSOIL.		25.5					
	0.20	MADE GROUND: brown black slightly sandy slightly gravelly silty clay with some plastic fragments.			25.43				
0.5				25.0		0.50	ES	PM04	
	0.80	Brown orange silty very sandy fine to coarse, angular to subrounded GRAVEL of granite with low cobble and boulder content. Sand is fine to coarse. Cobbles and boulders are angular to subrounded of granite (up to 300mm diameter).			24.83				
1.0				24.5		1.00	B	PM05	
	1.20	Brown orange silty very gravelly fine to coarse SAND with high cobble and boulder content. Gravel is fine to coarse, angular to subrounded of granite. Cobbles and boulders are angular to subrounded of granite (up to 250mm diameter).			24.43				
1.5				24.0					
2.0				23.5		2.00	B	PM06	
	2.20	Obstruction - possible boulders or bedrock. **Pit terminated at 2.20m**			23.43				
2.5				23.0					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Obstructions - possible boulders or bedrock.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

TP01 Sidewall

TP01 Spoil

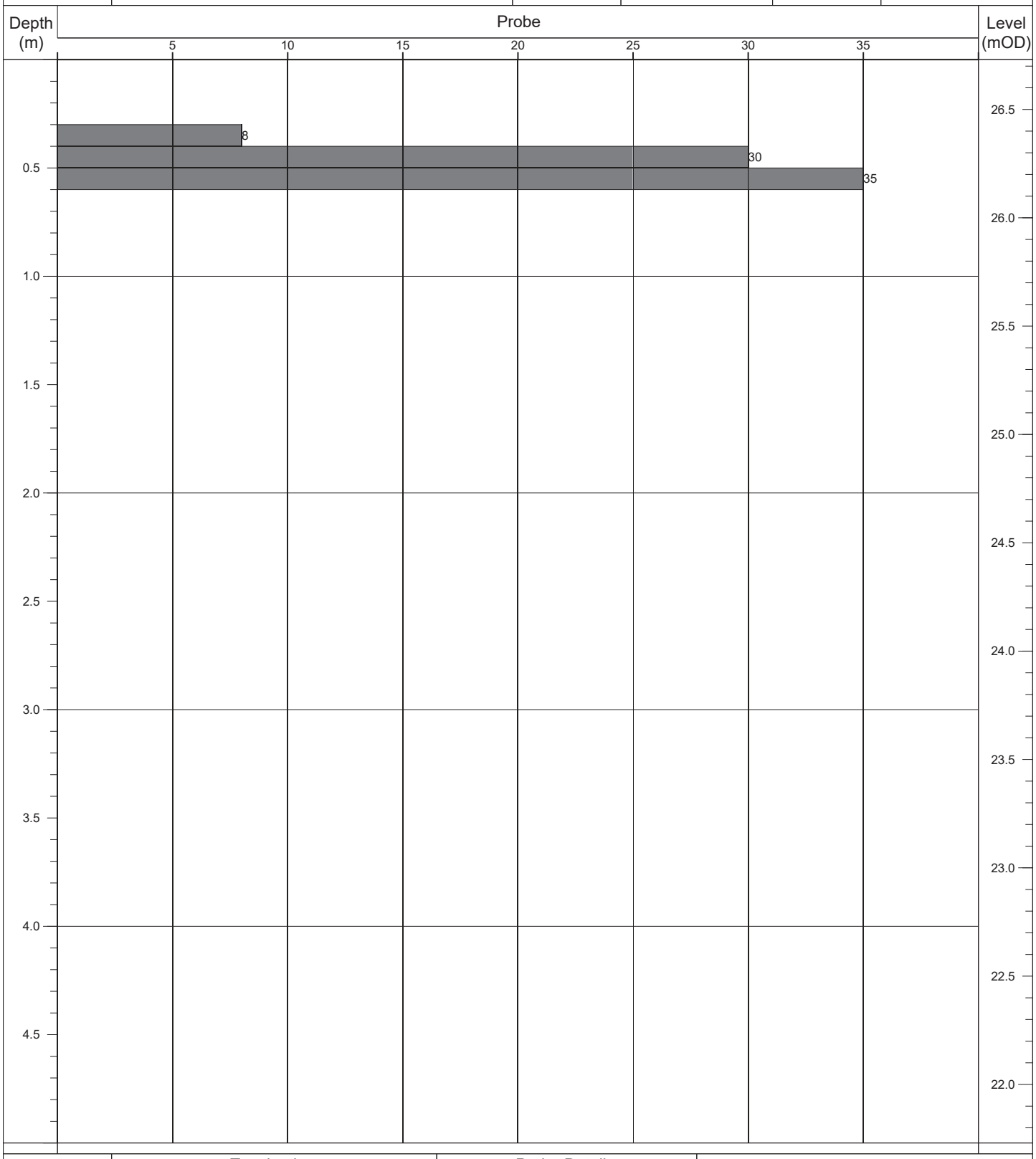
TP02 Sidewall

TP02 Spoil

Appendix 3

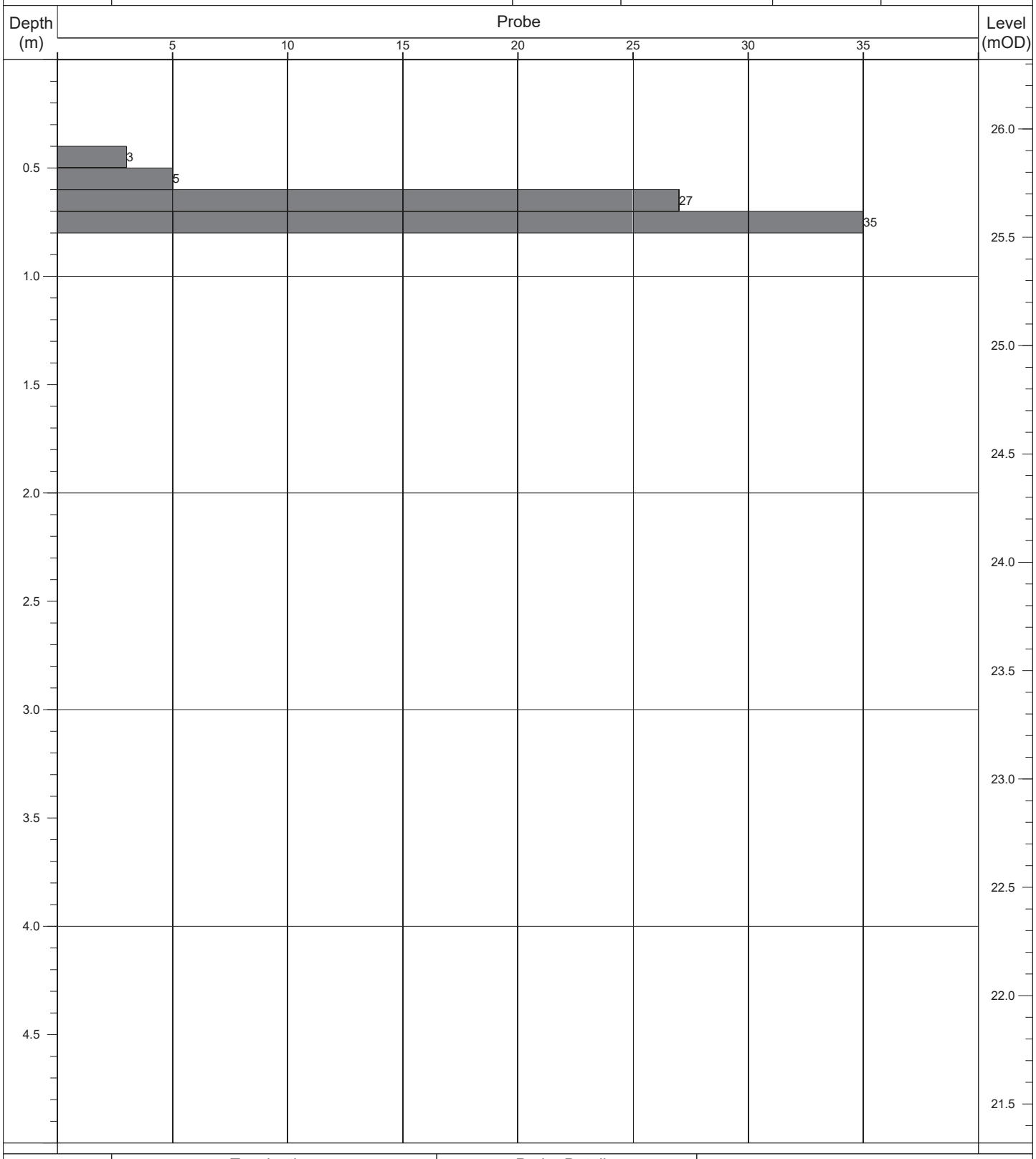
Dynamic Probe Logs

Contract No: 5808	**Dynamic Probe Log**				Probe No: **DP01**
Contract:	Circular Road	Easting:	527732.472	Date Started:	14/05/2021
Location:	Rahoon, Galway	Northing:	725783.351	Logged By:	E. Magee
Client:	Galway County Council	Elevation:	26.73	Scale:	1:25
Engineer:	Brunner Consulting Engineers	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



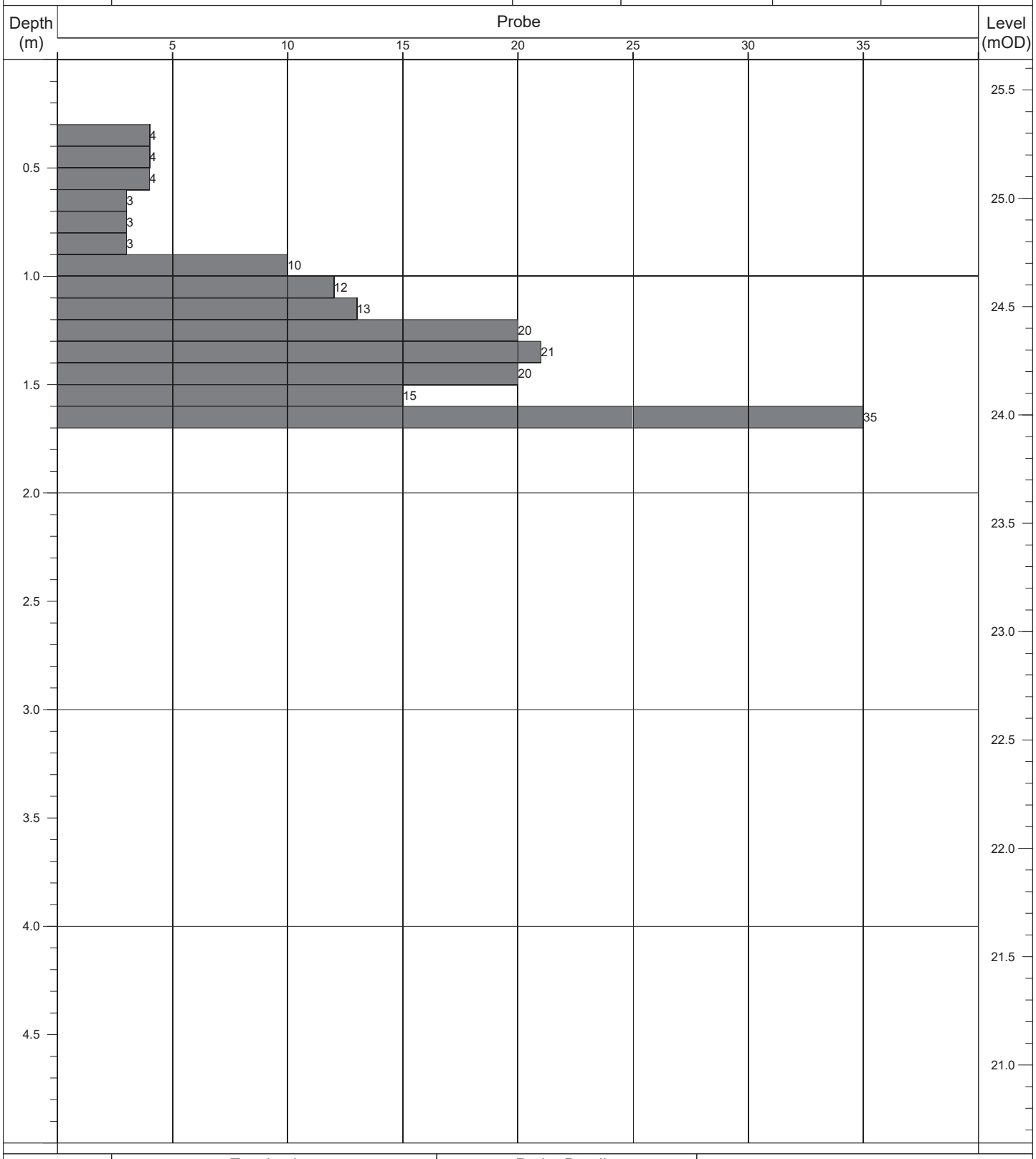
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	Concrete cored to 0.30mbgl.
0.60m	Obstructions - possible boulders or bedrock.	DPH	50kg	500mm	

Contract No: 5808	**Dynamic Probe Log**				Probe No: **DP02**
Contract:	Circular Road	Easting:	527732.299	Date Started:	14/05/2021
Location:	Rahoon, Galway	Northing:	725771.272	Logged By:	E. Magee
Client:	Galway County Council	Elevation:	26.32	Scale:	1:25
Engineer:	Brunner Consulting Engineers	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



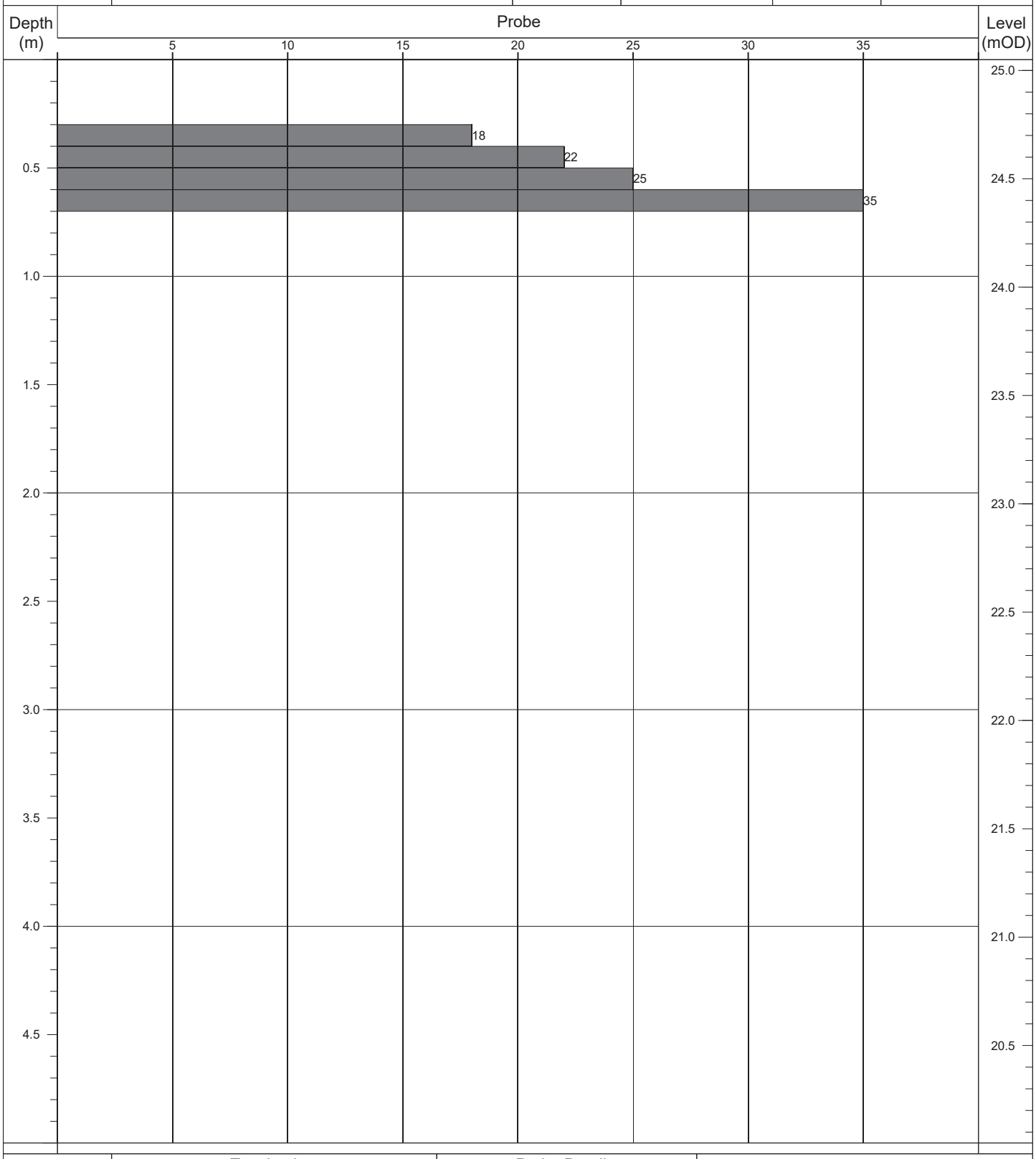
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	Concrete cored to 0.40mbgl.
0.80m	Obstructions - possible boulders or bedrock.	DPH	50kg	500mm	

Contract No: 5808	**Dynamic Probe Log**				Probe No: **DP03**
Contract:	Circular Road	Easting:	527743.757	Date Started:	14/05/2021
Location:	Rahoon, Galway	Northing:	725756.706	Logged By:	E. Magee
Client:	Galway County Council	Elevation:	25.64	Scale:	1:25
Engineer:	Brunner Consulting Engineers	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



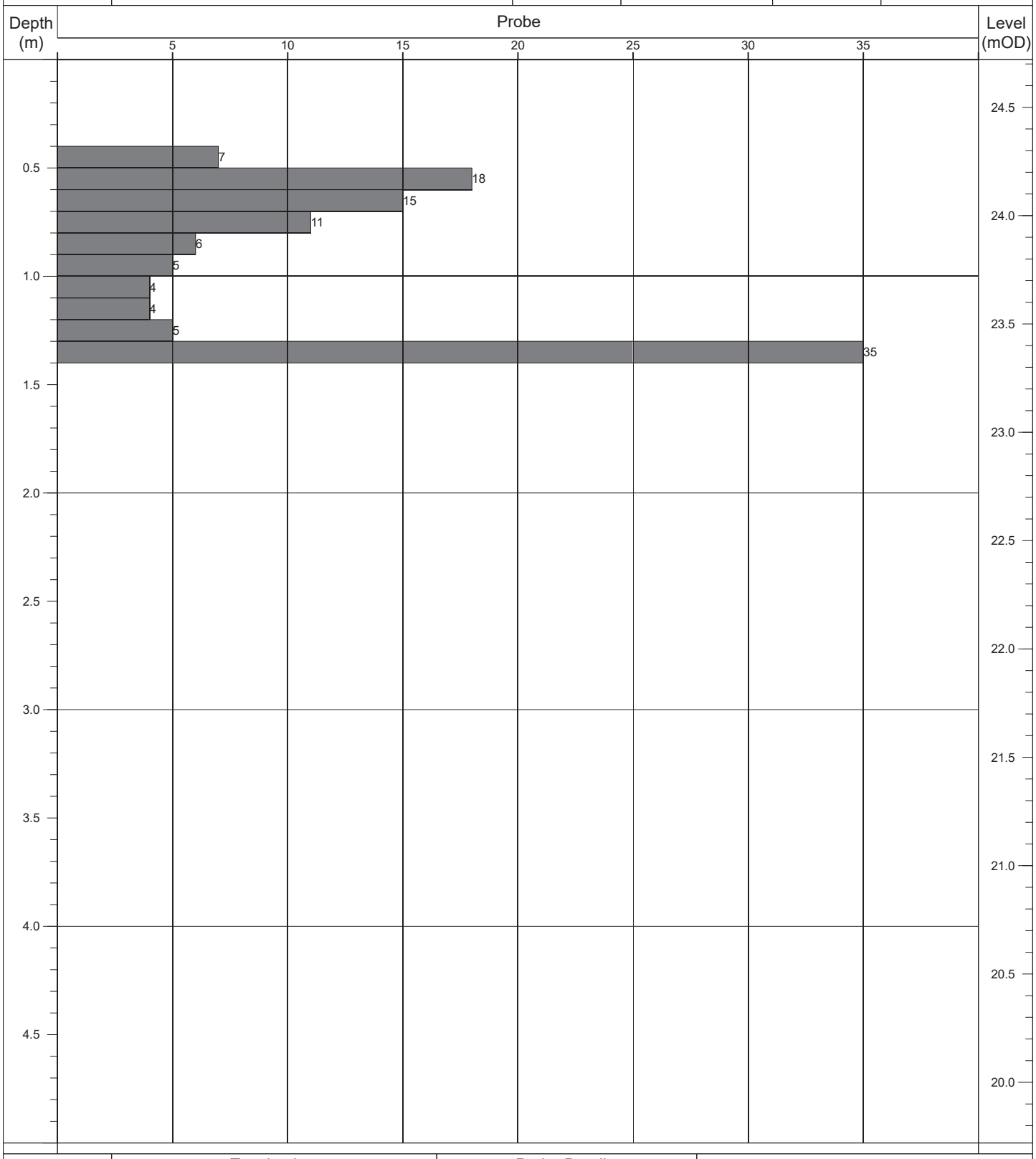
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	Concrete cored to 0.30mbgl.
1.70m	Obstructions - possible boulders or bedrock.	DPH	50kg	500mm	

Contract No: 5808	**Dynamic Probe Log**				Probe No: **DP04**
Contract:	Circular Road	Easting:	527749.244	Date Started:	14/05/2021
Location:	Rahoon, Galway	Northing:	725746.747	Logged By:	E. Magee
Client:	Galway County Council	Elevation:	25.05	Scale:	1:25
Engineer:	Brunner Consulting Engineers	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	Concrete cored to 0.30mbgl.
0.70m	Obstructions - possible boulders or bedrock.	DPH	50kg	500mm	

Contract No: 5808	**Dynamic Probe Log**				Probe No: **DP05**
Contract:	Circular Road	Easting:	527758.534	Date Started:	14/05/2021
Location:	Rahoon, Galway	Northing:	725735.103	Logged By:	E. Magee
Client:	Galway County Council	Elevation:	24.72	Scale:	1:25
Engineer:	Brunner Consulting Engineers	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	Concrete cored to 0.40mbgl.
1.40m	Obstructions - possible boulders or bedrock.	DPH	50kg	500mm	

Appendix 4

Soakaway Test Results and Photographs

SOAKAWAY TEST

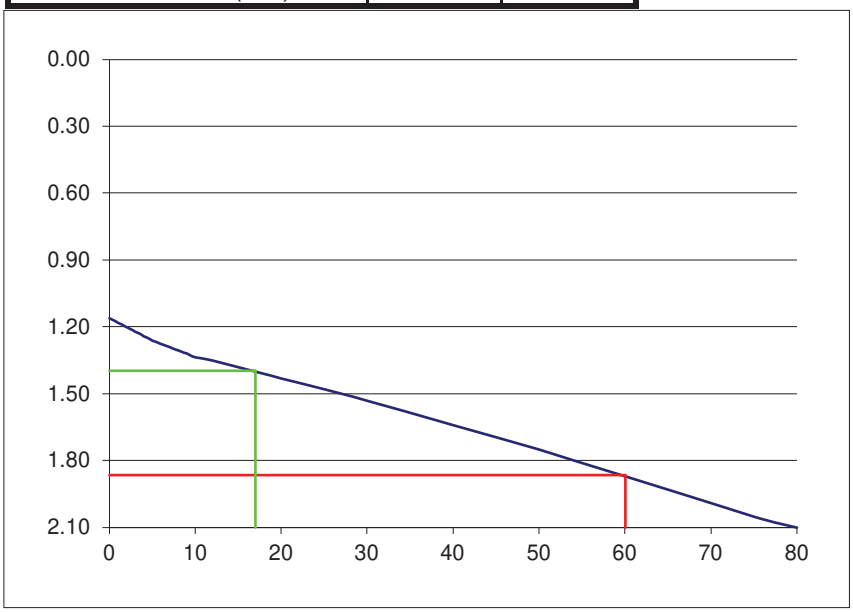
Project Reference:	5808
Contract name:	Circular Road
Location:	Rahoon, Galway
Test No:	SA01
Date:	14/05/2021

Ground Conditions

From	To	
0.00	0.10	TOPSOIL.
0.10	1.00	MADE GROUND: grey black sandy gravelly silty clay with medium cobble, low boulder and trace of concrete and red brick fragments.
1.00	1.70	Brown silty sandy GRAVEL with medium cobble content.
1.70	2.10	Brown silty sandy GRAVEL with high cobble content.

Elapsed Time (mins)	Fall of Water (m)
0	1.16
0.5	1.17
1	1.18
1.5	1.19
2	1.20
2.5	1.21
3	1.22
3.5	1.23
4	1.24
4.5	1.25
5	1.26
6	1.28
7	1.29
8	1.31
9	1.32
10	1.34
12	1.35
14	1.37
16	1.39
18	1.41
20	1.43
25	1.48
30	1.53
40	1.64
50	1.75
60	1.87
75	2.05
80	2.10

Pit Dimensions (m)		
Length (m)	3.20	m
Width (m)	0.30	m
Depth	2.10	m
Water		
Start Depth of Water	1.16	m
Depth of Water	0.94	m
75% Full	1.40	m
25% Full	1.87	m
75%-25%	0.47	m
Volume of water (75%-25%)	**0.45**	m3
Area of Drainage	**14.7**	m2
Area of Drainage (75%-25%)	**4.25**	m2
Time		
75% Full	17	min
25% Full	60	min
Time 75% to 25%	**43**	min
Time 75% to 25% (sec)	**2580**	sec



f = 0.00247 m/min or **4.11E-05** m/s

SA01 Sidewall

SA01 Spoil

Appendix 5

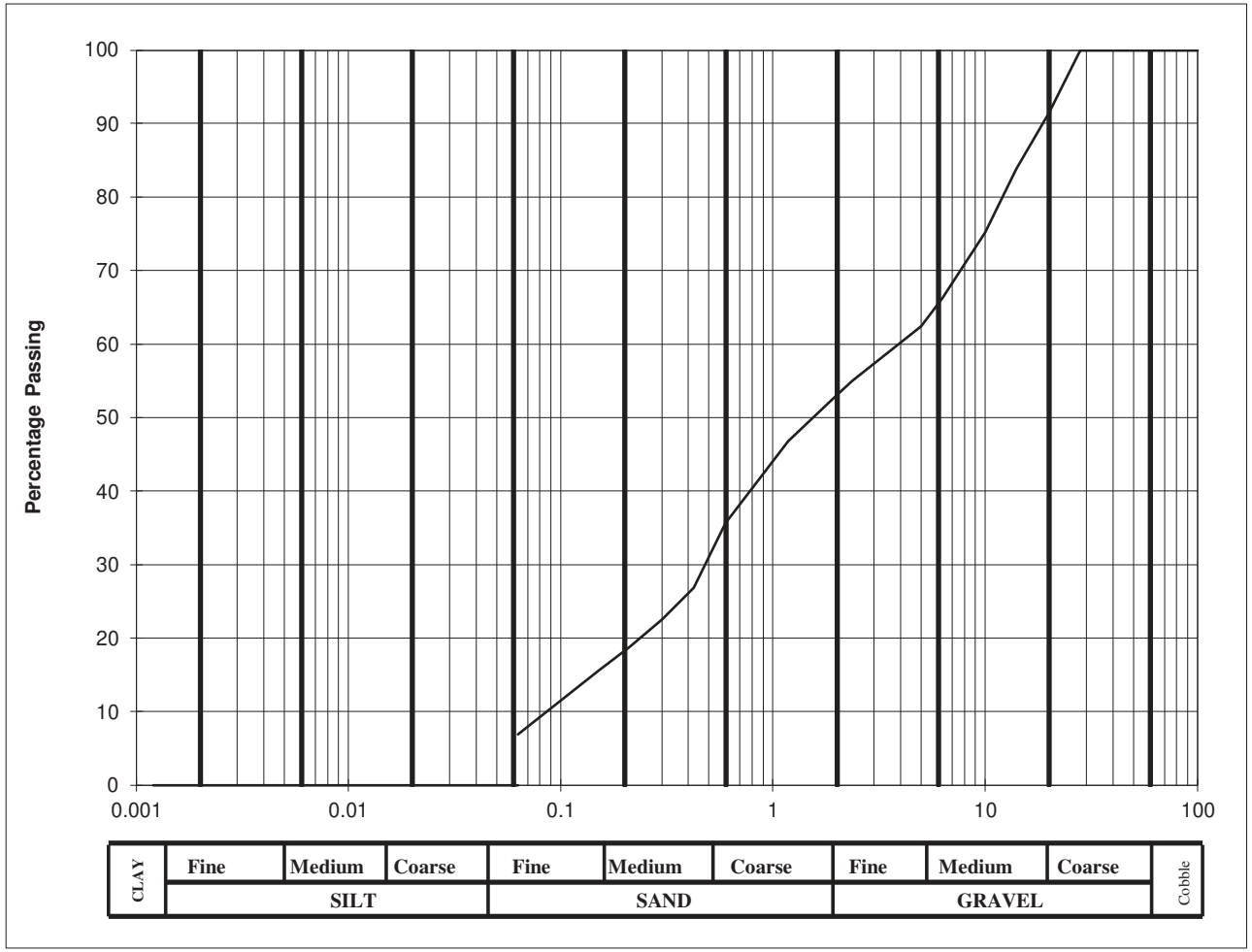
Geotechnical Laboratory Test Results

BS 1377 Particle Size Analysis

Site Investigations Limited

BS Sieve size, mm	Percent passing	Hydrometer analysis	
		Diameter, mm	% passing
100	100	**0.0630**	
90	100	**0.0200**	
75	100	**0.0060**	
63	100	**0.0020**	
50	100		
37.5	100		
28	100		
20	91.5		
14	83.8		
10	75.2		
6.3	66.2		
5.0	62.4		
2.36	55		
2.00	53		
1.18	46.8		
0.600	35.6		
0.425	26.8		
0.300	22.5		
0.212	18.8		
0.150	15.5		
0.063	7		

Cobbles, %	0
Gravel, %	47
Sand, %	46
Clay / Silt, %	7



Client :	Galway County Council	Lab. No :	21/477	Hole ID :	TP 01
Project :	Circular Road, Rahoon, Galway	Sample No :	PM02	Depth, m :	1.00

Material description :	silty very sandy GRAVEL
Remarks :	Soils with clay or silt content between 15% - 35% can be classified as clay or silt depending on the field Engineers assessment of in-situ behaviour. Where material is for re-use and therefore disturbed, only soils with clay or silt >35% are classified as clay or silt

_____Paddy McGonagle
Site Investigations Ltd

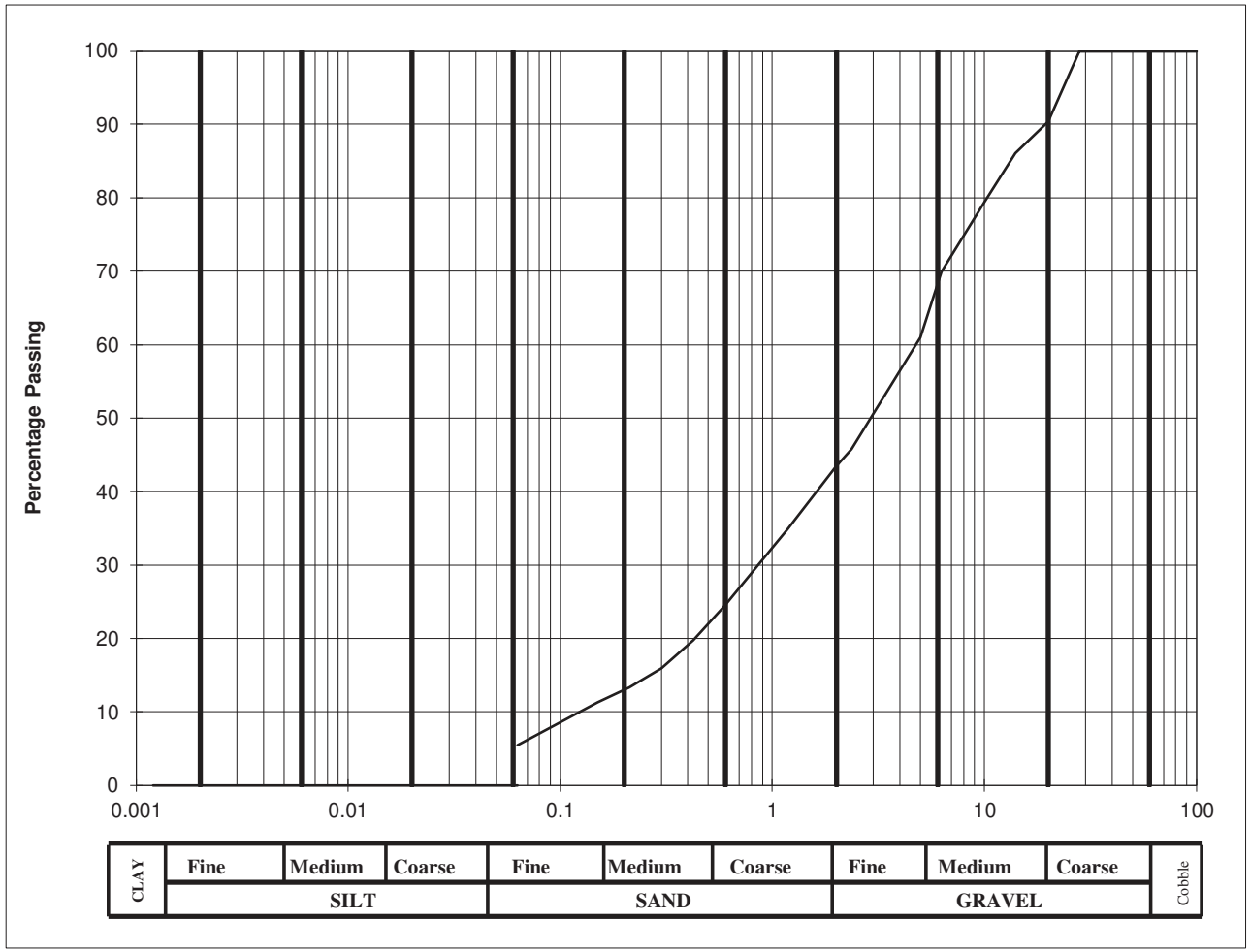
Printed 01/06/2021

BS 1377 Particle Size Analysis

Site Investigations Limited

BS Sieve size, mm	Percent passing	Hydrometer analysis	
		Diameter, mm	% passing
100	100	**0.0630**	
90	100	**0.0200**	
75	100	**0.0060**	
63	100	**0.0020**	
50	100		
37.5	100		
28	100		
20	90.4		
14	86.1		
10	79.4		
6.3	69.9		
5.0	61		
2.36	45.8		
2.00	43.4		
1.18	34.9		
0.600	24.5		
0.425	19.7		
0.300	15.9		
0.212	13.3		
0.150	11.3		
0.063	6		

Cobbles, %	0
Gravel, %	57
Sand, %	37
Clay / Silt, %	6



Client :	Galway County Council	Lab. No :	21/478	Hole ID :	TP 01
Project :	Circular Road, Rahoon, Galway	Sample No :	PM03	Depth, m :	2.00

Material description :	silty very sandy GRAVEL
Remarks :	Soils with clay or silt content between 15% - 35% can be classified as clay or silt depending on the field Engineers assessment of in-situ behaviour. Where material is for re-use and therefore disturbed, only soils with clay or silt >35% are classified as clay or silt

_____Paddy McGonagle
Site Investigations Ltd

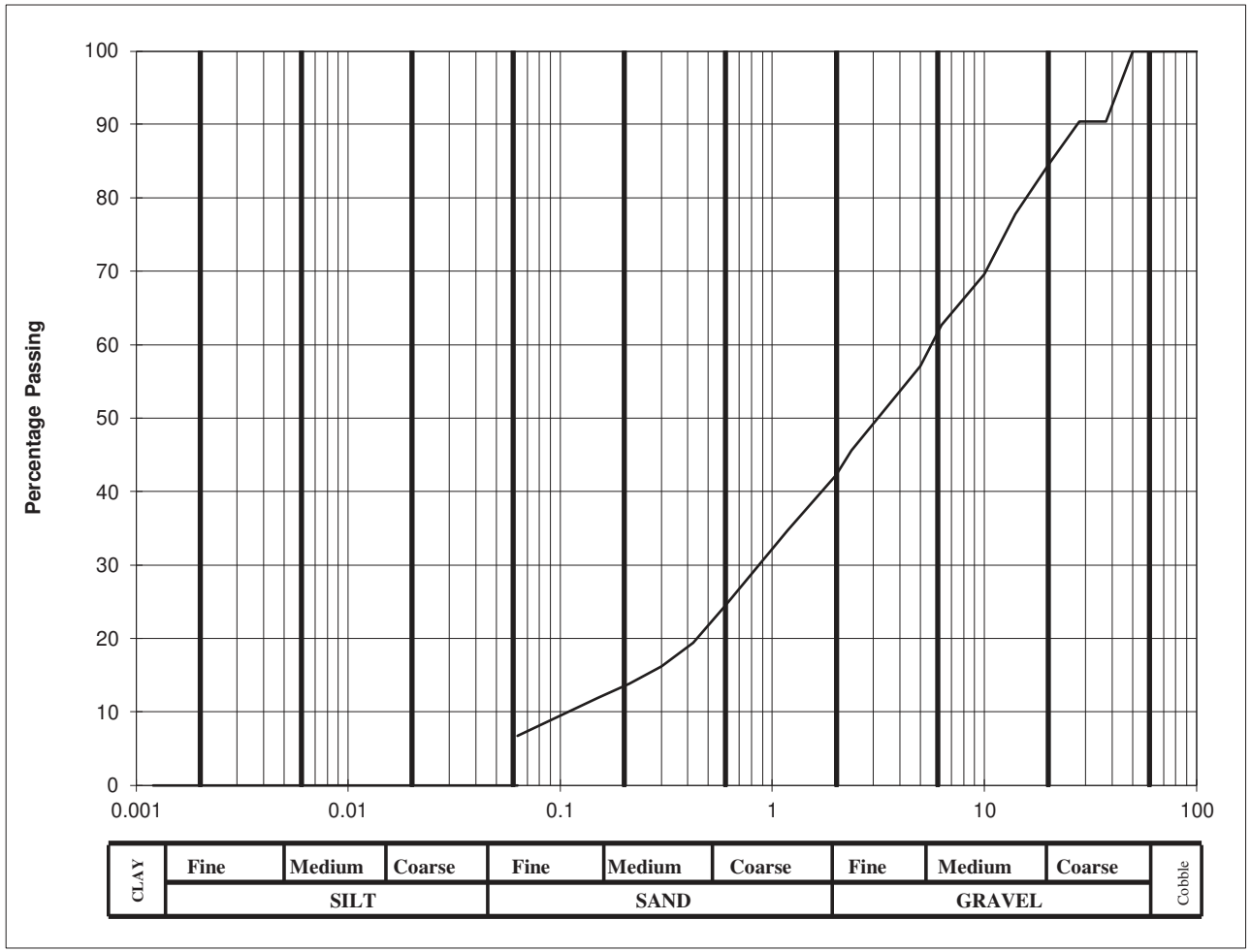
Printed 01/06/2021

BS 1377 Particle Size Analysis

Site Investigations Limited

BS Sieve size, mm	Percent passing	Hydrometer analysis	
		Diameter, mm	% passing
100	100	**0.0630**	
90	100	**0.0200**	
75	100	**0.0060**	
63	100	**0.0020**	
50	100		
37.5	90.4		
28	90.4		
20	84.5		
14	77.8		
10	69.6		
6.3	62.7		
5.0	57.1		
2.36	45.6		
2.00	42.2		
1.18	34.7		
0.600	24.4		
0.425	19.4		
0.300	16.2		
0.212	13.8		
0.150	11.9		
0.063	7		

Cobbles, %	0
Gravel, %	58
Sand, %	35
Clay / Silt, %	7



Client :	Galway County Council	Lab. No :	21/479	Hole ID :	TP 02
Project :	Circular Road, Rahoon, Galway	Sample No :	PM05	Depth, m :	1.00

Material description :	silty very sandy GRAVEL
Remarks :	Soils with clay or silt content between 15% - 35% can be classified as clay or silt depending on the field Engineers assessment of in-situ behaviour. Where material is for re-use and therefore disturbed, only soils with clay or silt >35% are classified as clay or silt

_____Paddy McGonagle
Site Investigations Ltd

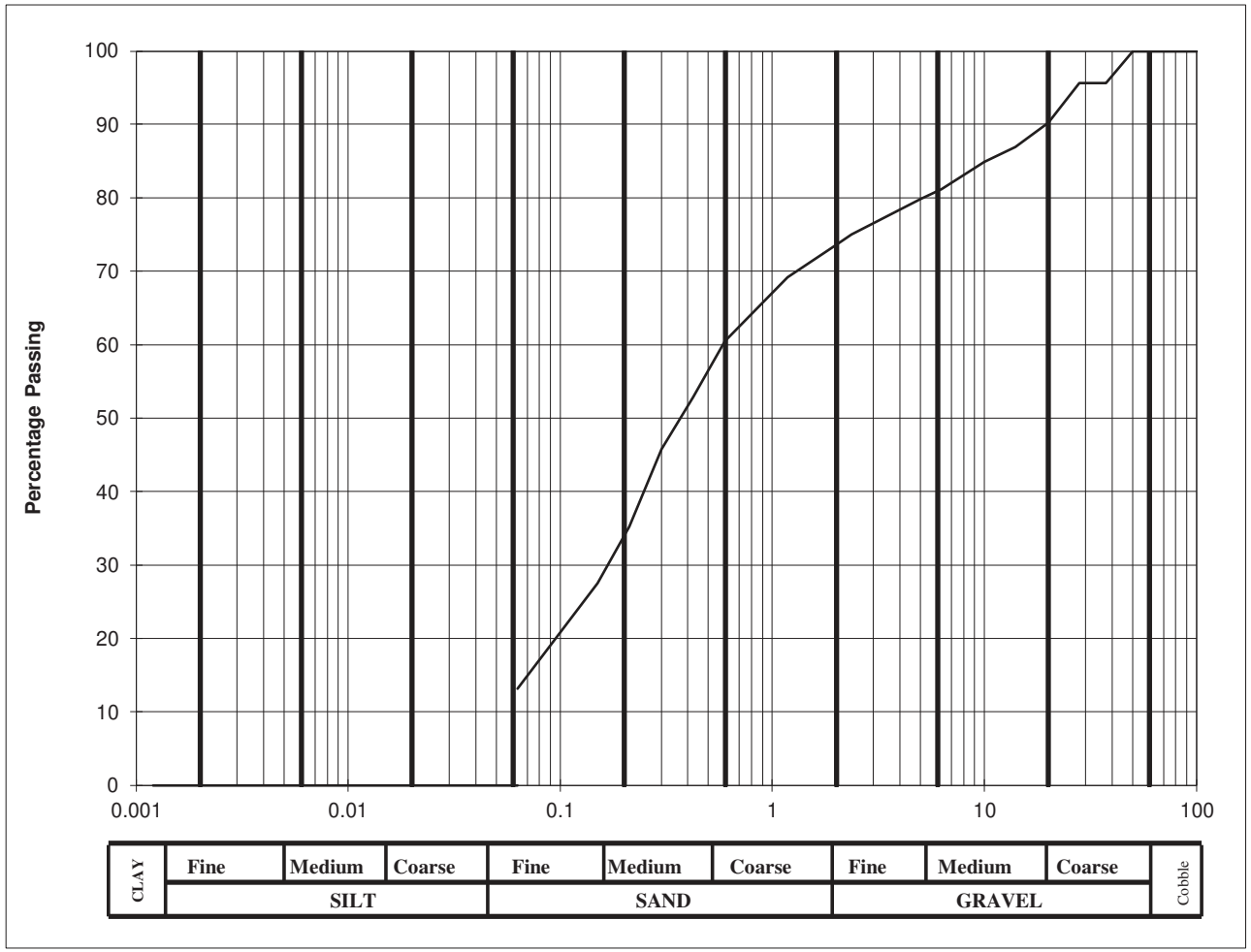
Printed 01/06/2021

BS 1377 Particle Size Analysis

Site Investigations Limited

BS Sieve size, mm	Percent passing	Hydrometer analysis	
		Diameter, mm	% passing
100	100	**0.0630**	
90	100	**0.0200**	
75	100	**0.0060**	
63	100	**0.0020**	
50	100		
37.5	95.6		
28	95.6		
20	90.2		
14	86.9		
10	84.9		
6.3	81.2		
5.0	79.8		
2.36	75		
2.00	73.6		
1.18	69.2		
0.600	60.5		
0.425	52.9		
0.300	45.8		
0.212	35.2		
0.150	27.5		
0.063	13		

Cobbles, %	0
Gravel, %	26
Sand, %	61
Clay / Silt, %	13



Client :	Galway County Council	Lab. No :	21/480	Hole ID :	TP 02
Project :	Circular Road, Rahoon, Galway	Sample No :	PM06	Depth, m :	2.00

Material description :	silty very gravelly SAND
Remarks :	Soils with clay or silt content between 15% - 35% can be classified as clay or silt depending on the field Engineers assessment of in-situ behaviour. Where material is for re-use and therefore disturbed, only soils with clay or silt >35% are classified as clay or silt

_____Paddy McGonagle
Site Investigations Ltd

Printed 01/06/2021

California Bearing Ratio (CBR) In accordance with BS1377: Part 4: Method 7

Client	Galway County Council
Site	Circular Road, Rahoon, Galway
S.I. File No	5808 / 21
Test Lab	Site Investigations Ltd., Carhugar The Grange, 12th Lock Rd., Lucan Co. Dublin. Tel (01) 6108768 Email info@siteinvestigations.ie
Report Date	31st May 2021

CBR No	Depth (mBGL)	Sample No	Sample Type	Lab Ref	Moisture Content (%)	CBR Value (%)	Location / Remarks / Soil Description
TP01	1.00	PM07	CBR	21/481	13.8	14.3	silty very sandy GRAVEL
TP02	1.00	PM08	CBR	21/482	10.0	15.6	silty very sandy GRAVEL

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_____Paddy McGonagle
Site Investigations Ltd

Chemical Testing
In accordance with BS 1377: Part 3

Client	Galway County Council
Site	Circular Road, Rahoon, Galway
S.I. File No	5808 / 21
Test Lab	Site Investigations Ltd., Carhugar The Grange, 12th Lock Rd., Lucan Co. Dublin. Tel (01) 6108768 Email:info@siteinvestigations.ie
Report Date	31st May 2021

Hole Id	Depth (mBGL)	Sample No	Lab Ref	pH Value	Water Soluble Sulphate Content (2:1 Water-soil extract) (SO_3) g/L	Water Soluble Sulphate Content (2:1 Water-soil extract) (SO_3) %	Acid Soluble Sulphate Content (2:1 Water-soil extract) (SO_3) g/L	Acid Soluble Sulphate Content (2:1 Water-soil extract) (SO_3) %	Chloride ion Content (water:soil ratio 2:1) %	% passing 2mm
TP01	1.00	PM02	21/477	8.62	0.120	0.064				53.0
TP02	1.00	PM05	21/479	8.59	0.119	0.050				42.2

Printed 01/06/2021

_____Paddy McGonagle
Site Investigations Ltd.

Appendix 6

Environmental Laboratory Test Results and Waste Classification Report

Eurofins Chemtest Ltd
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

Final Report

Report No.:	21-17403-1		
Initial Date of Issue:	02-Jun-2021		
Client	Site Investigations Ltd		
Client Address:	The Grange12th, Lock Road Lucan Co Dublin IRELAND		
Contact(s):	Stephen Letch		
Project	5808 Rahoon, Galway		
Quotation No.:		**Date Received:**	24-May-2021
Order No.:	28/A/21	**Date Instructed:**	24-May-2021
No. of Samples:	2		
Turnaround (Wkdays):	5	**Results Due:**	28-May-2021
Date Approved:	02-Jun-2021		
Approved By:			
Details:	Glynn Harvey, Technical Manager		

Results - Leachate

Project: 5808 Rahoon, Galway

Client: Site Investigations Ltd					**Chemtest Job No.:**	21-17403	21-17403
Quotation No.:					**Chemtest Sample ID.:**	1207092	1207093
					Client Sample ID.:	TP01	TP02
					Sample Type:	SOIL	SOIL
					Top Depth (m):	0.50	0.50
					Bottom Depth (m):	0.50	0.50
					Date Sampled:	18-May-2021	18-May-2021
Determinand	**Accred.**	**SOP**	**Type**	**Units**	**LOD**		
Ammonium	U	1220	10:1	mg/l	0.050	0.24	0.20
Ammonium	N	1220	10:1	mg/kg	0.10	2.6	2.1

Results - Soil

Project: 5808 Rahoon, Galway

Client: Site Investigations Ltd					**Chemtest Job No.:**	21-17403	21-17403
Quotation No.:					**Chemtest Sample ID.:**	1207092	1207093
					Client Sample ID.:	TP01	TP02
					Sample Type:	SOIL	SOIL
					Top Depth (m):	0.50	0.50
					Bottom Depth (m):	0.50	0.50
					Date Sampled:	18-May-2021	18-May-2021
					Asbestos Lab:	NEW-ASB	NEW-ASB
Determinand	**Accred.**	**SOP**	**Units**	**LOD**			
ACM Type	U	2192		N/A		-	-
Asbestos Identification	U	2192		N/A		No Asbestos Detected	No Asbestos Detected
ACM Detection Stage	U	2192		N/A		-	-
Moisture	N	2030	%	0.020		17	8.9
pH	M	2010		4.0		8.5	9.0
Boron (Hot Water Soluble)	M	2120	mg/kg	0.40		0.68	< 0.40
Sulphur (Elemental)	M	2180	mg/kg	1.0		2.2	< 1.0
Cyanide (Total)	M	2300	mg/kg	0.50		< 0.50	< 0.50
Sulphide (Easily Liberatable)	N	2325	mg/kg	0.50		2.4	1.5
Sulphate (Total)	M	2430	%	0.010		0.087	0.049
Arsenic	M	2450	mg/kg	1.0		8.0	3.2
Barium	M	2450	mg/kg	10		55	24
Cadmium	M	2450	mg/kg	0.10		0.30	0.13
Chromium	M	2450	mg/kg	1.0		8.3	7.4
Molybdenum	M	2450	mg/kg	2.0		< 2.0	< 2.0
Antimony	N	2450	mg/kg	2.0		< 2.0	< 2.0
Copper	M	2450	mg/kg	0.50		24	13
Mercury	M	2450	mg/kg	0.10		0.34	0.13
Nickel	M	2450	mg/kg	0.50		10	6.9
Lead	M	2450	mg/kg	0.50		51	25
Selenium	M	2450	mg/kg	0.20		0.67	0.57
Zinc	M	2450	mg/kg	0.50		53	36
Chromium (Trivalent)	N	2490	mg/kg	1.0		8.3	7.4
Chromium (Hexavalent)	N	2490	mg/kg	0.50		< 0.50	< 0.50
Total Organic Carbon	M	2625	%	0.20		2.4	0.72
Mineral Oil	N	2670	mg/kg	10		17	< 10
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0		< 1.0	< 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0		< 1.0	< 1.0
Aliphatic TPH >C8-C10	M	2680	mg/kg	1.0		< 1.0	6.5
Aliphatic TPH >C10-C12	M	2680	mg/kg	1.0		< 1.0	< 1.0
Aliphatic TPH >C12-C16	M	2680	mg/kg	1.0		< 1.0	< 1.0
Aliphatic TPH >C16-C21	M	2680	mg/kg	1.0		< 1.0	< 1.0
Aliphatic TPH >C21-C35	M	2680	mg/kg	1.0		< 1.0	< 1.0
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0		< 1.0	< 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0		< 5.0	6.5
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0		< 1.0	< 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0		< 1.0	< 1.0

Results - Soil

Project: 5808 Rahoon, Galway

Client: Site Investigations Ltd			**Chemtest Job No.:**		21-17403	21-17403
Quotation No.:			**Chemtest Sample ID.:**		1207092	1207093
			Client Sample ID.:		TP01	TP02
			Sample Type:		SOIL	SOIL
			Top Depth (m):		0.50	0.50
			Bottom Depth (m):		0.50	0.50
			Date Sampled:		18-May-2021	18-May-2021
			Asbestos Lab:		NEW-ASB	NEW-ASB
Determinand	**Accred.**	**SOP**	**Units**	**LOD**		
Aromatic TPH >C8-C10	M	2680	mg/kg	1.0	< 1.0	< 1.0
Aromatic TPH >C10-C12	M	2680	mg/kg	1.0	< 1.0	< 1.0
Aromatic TPH >C12-C16	M	2680	mg/kg	1.0	< 1.0	< 1.0
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0	< 1.0
Aromatic TPH >C21-C35	M	2680	mg/kg	1.0	< 1.0	< 1.0
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0	< 5.0
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	< 10	< 10
Benzene	M	2760	µg/kg	1.0	< 1.0	< 1.0
Toluene	M	2760	µg/kg	1.0	< 1.0	< 1.0
Ethylbenzene	M	2760	µg/kg	1.0	< 1.0	< 1.0
m & p-Xylene	M	2760	µg/kg	1.0	< 1.0	< 1.0
o-Xylene	M	2760	µg/kg	1.0	< 1.0	< 1.0
Methyl Tert-Butyl Ether	M	2760	µg/kg	1.0	< 1.0	< 1.0
Naphthalene	M	2800	mg/kg	0.10	< 0.10	< 0.10
Acenaphthylene	N	2800	mg/kg	0.10	< 0.10	< 0.10
Acenaphthene	M	2800	mg/kg	0.10	< 0.10	< 0.10
Fluorene	M	2800	mg/kg	0.10	< 0.10	< 0.10
Phenanthrene	M	2800	mg/kg	0.10	< 0.10	< 0.10
Anthracene	M	2800	mg/kg	0.10	< 0.10	< 0.10
Fluoranthene	M	2800	mg/kg	0.10	< 0.10	< 0.10
Pyrene	M	2800	mg/kg	0.10	< 0.10	< 0.10
Benzo[a]anthracene	M	2800	mg/kg	0.10	< 0.10	< 0.10
Chrysene	M	2800	mg/kg	0.10	< 0.10	< 0.10
Benzo[b]fluoranthene	M	2800	mg/kg	0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	M	2800	mg/kg	0.10	< 0.10	< 0.10
Benzo[a]pyrene	M	2800	mg/kg	0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	M	2800	mg/kg	0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	M	2800	mg/kg	0.10	< 0.10	< 0.10
Coronene	N	2800	mg/kg	0.10	< 0.10	< 0.10
Total Of 17 PAH's	N	2800	mg/kg	2.0	< 2.0	< 2.0
PCB 28	U	2815	mg/kg	0.010	< 0.010	< 0.010
PCB 52	U	2815	mg/kg	0.010	< 0.010	< 0.010
PCB 90+101	U	2815	mg/kg	0.010	< 0.010	< 0.010
PCB 118	U	2815	mg/kg	0.010	< 0.010	< 0.010
PCB 153	U	2815	mg/kg	0.010	< 0.010	< 0.010
PCB 138	U	2815	mg/kg	0.010	< 0.010	< 0.010

Results - Soil

Project: 5808 Rahoon, Galway

Client: Site Investigations Ltd			**Chemtest Job No.:**		21-17403	21-17403
Quotation No.:			**Chemtest Sample ID.:**		1207092	1207093
			Client Sample ID.:		TP01	TP02
			Sample Type:		SOIL	SOIL
			Top Depth (m):		0.50	0.50
			Bottom Depth (m):		0.50	0.50
			Date Sampled:		18-May-2021	18-May-2021
			Asbestos Lab:		NEW-ASB	NEW-ASB
Determinand	**Accred.**	**SOP**	**Units**	**LOD**		
PCB 180	U	2815	mg/kg	0.010	< 0.010	< 0.010
Total PCBs (7 Congeners)	U	2815	mg/kg	0.10	< 0.10	< 0.10
Total Phenols	M	2920	mg/kg	0.10	< 0.10	< 0.10

Results - Single Stage WAC

Project: 5808 Rahoon, Galway

					Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	21-17403						
Chemtest Sample ID:	1207092						
Sample Ref:							
Sample ID:	TP01						
Sample Location:							
Top Depth(m):	0.50				**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Bottom Depth(m):	0.50						
Sampling Date:	18-May-2021						
Determinand	**SOP**	**Accred.**	**Units**				
Total Organic Carbon	2625	M	%	2.4	3	5	6
Loss On Ignition	2610	M	%	5.5	--	--	10
Total BTEX	2760	M	mg/kg	< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	M	mg/kg	< 0.10	1	--	--
TPH Total WAC	2670	M	mg/kg	< 10	500	--	--
Total (Of 17) PAH's	2800	N	mg/kg	< 2.0	100	--	--
pH	2010	M		8.5	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg	0.0040	--	To evaluate	To evaluate
Eluate Analysis			**10:1 Eluate mg/l**	**10:1 Eluate mg/kg**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1455	U	0.0014	0.014	0.5	2	25
Barium	1455	U	< 0.005	< 0.0005	20	100	300
Cadmium	1455	U	< 0.00011	< 0.00011	0.04	1	5
Chromium	1455	U	0.066	0.66	0.5	10	70
Copper	1455	U	0.0041	0.041	2	50	100
Mercury	1455	U	< 0.00005	< 0.00005	0.01	0.2	2
Molybdenum	1455	U	0.0027	0.027	0.5	10	30
Nickel	1455	U	0.030	0.30	0.4	10	40
Lead	1455	U	0.0018	0.018	0.5	10	50
Antimony	1455	U	0.0041	0.041	0.06	0.7	5
Selenium	1455	U	< 0.0005	< 0.0005	0.1	0.5	7
Zinc	1455	U	< 0.003	< 0.003	4	50	200
Chloride	1220	U	< 1.0	< 10	800	15000	25000
Fluoride	1220	U	0.54	5.4	10	150	500
Sulphate	1220	U	2.6	26	1000	20000	50000
Total Dissolved Solids	1020	N	85	840	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	8.0	80	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	17

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Results - Single Stage WAC

Project: 5808 Rahoon, Galway

					Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	21-17403						
Chemtest Sample ID:	1207093						
Sample Ref:							
Sample ID:	TP02						
Sample Location:							
Top Depth(m):	0.50				**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Bottom Depth(m):	0.50						
Sampling Date:	18-May-2021						
Determinand	**SOP**	**Accred.**	**Units**				
Total Organic Carbon	2625	M	%	0.72	3	5	6
Loss On Ignition	2610	M	%	2.6	--	--	10
Total BTEX	2760	M	mg/kg	< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	M	mg/kg	< 0.10	1	--	--
TPH Total WAC	2670	M	mg/kg	< 10	500	--	--
Total (Of 17) PAH's	2800	N	mg/kg	< 2.0	100	--	--
pH	2010	M		9.0	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg	0.0030	--	To evaluate	To evaluate
Eluate Analysis			**10:1 Eluate mg/l**	**10:1 Eluate mg/kg**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1455	U	0.0003	0.0032	0.5	2	25
Barium	1455	U	< 0.005	< 0.0005	20	100	300
Cadmium	1455	U	< 0.00011	< 0.00011	0.04	1	5
Chromium	1455	U	0.079	0.79	0.5	10	70
Copper	1455	U	0.0038	0.038	2	50	100
Mercury	1455	U	< 0.00005	< 0.00005	0.01	0.2	2
Molybdenum	1455	U	0.0020	0.020	0.5	10	30
Nickel	1455	U	0.035	0.35	0.4	10	40
Lead	1455	U	0.0009	0.0093	0.5	10	50
Antimony	1455	U	< 0.0005	< 0.0005	0.06	0.7	5
Selenium	1455	U	< 0.0005	< 0.0005	0.1	0.5	7
Zinc	1455	U	< 0.003	< 0.003	4	50	200
Chloride	1220	U	2.9	29	800	15000	25000
Fluoride	1220	U	0.23	2.3	10	150	500
Sulphate	1220	U	< 1.0	< 10	1000	20000	50000
Total Dissolved Solids	1020	N	62	620	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	7.6	76	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	8.9

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Test Methods

SOP	Title	Parameters included	Method summary
1010	pH Value of Waters	pH	pH Meter
1020	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Conductivity Meter
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.
1455	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).
1610	Total/Dissolved Organic Carbon in Waters	Organic Carbon	TOC Analyser using Catalytic Oxidation
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.
2010	pH Value of Soils	pH	pH Meter
2015	Acid Neutralisation Capacity	Acid Reserve	Titration
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2180	Sulphur (Elemental) in Soils by HPLC	Sulphur	Dichloromethane extraction / HPLC with UV detection
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Allkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.
2325	Sulphide in Soils	Sulphide	Steam distillation with sulphuric acid / analysis by 'Aquakem 600' Discrete Analyser, using N,N–dimethyl-p-phenylenediamine.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2610	Loss on Ignition	loss on ignition (LOI)	Determination of the proportion by mass that is lost from a soil by ignition at 550°C.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2670	Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO*TPH C8–C40	Dichloromethane extraction / GC-FID
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane extraction / GCxGC FID detection

Test Methods

SOP	Title	Parameters included	Method summary
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.
2800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-MS	Acenaphthene*; Acenaphthylene; Anthracene*; Benzo[a]Anthracene*; Benzo[a]Pyrene*; Benzo[b]Fluoranthene*; Benzo[ghi]Perylene*; Benzo[k]Fluoranthene; Chrysene*; Dibenz[ah]Anthracene; Fluoranthene*; Fluorene*; Indeno[123cd]Pyrene*; Naphthalene*; Phenanthrene*; Pyrene*	Dichloromethane extraction / GC-MS
2815	Polychlorinated Biphenyls (PCB) ICES7Congeners in Soils by GC-MS	ICES7 PCB congeners	Acetone/Hexane extraction / GC-MS
2920	Phenols in Soils by HPLC	Phenolic compounds including Resorcinol, Phenol, Methylphenols, Dimethylphenols, 1-Naphthol and TrimethylphenolsNote: chlorophenols are excluded.	60:40 methanol/water mixture extraction, followed by HPLC determination using electrochemical detection.
640	Characterisation of Waste (Leaching C10)	Waste material including soil, sludges and granular waste	ComplianceTest for Leaching of Granular Waste Material and Sludge

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis
The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols
For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at the indicated laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 45 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com

HazWasteOnline™

Waste Classification Report

SBMUR-Y24RZ-E63RE

Job name

5808

Description/Comments

Client: Galway County Council
Engineer: Brunner Consulting Engineers

Project

Circular Road

Site

Rahoon, Galway

Related Documents

#	Name	Description
1	HWOL_21-17403-20210602 183901.hwol	.hwol file used to create the Job

Waste Stream Template

Waste Stream template not used when importing the .hwol file

WAC Results

WAC Settings: samples in this job constitute a single population.

WAC limits used to evaluate the samples in this job: "Ireland"
The WAC used in this report are the WAC defined for the inert and non-hazardous classes of landfill in the Republic of Ireland. You should check the actual acceptance criteria when the disposal site is identified as they may differ from the generic WAC used in this report.

Classified by

Name:
Stephen Letch
Date:
03 Jun 2021 11:55 GMT
Telephone:
00353 86817 9449

Company:
Site Investigations Ltd

HazWasteOnline™ Training Record:

Course	Date
Hazardous Waste Classification	09 Apr 2019
Advanced Hazardous Waste Classification	09 Oct 2019

Report

Created by: Stephen Letch
Created date: 03 Jun 2021 11:55 GMT

Job summary

#	Sample Name	Depth [m]	Classification Result	Hazard properties	WAC Results		Page
					Inert	Non Haz	
1	TP01-0.50	0.50-0.50	Non Hazardous		Fail	Pass	3
2	TP02-0.50	0.50-0.50	Non Hazardous		Fail	Pass	7

Appendices	Page
Appendix A: Classifier defined and non CLP determinands	11
Appendix B: Rationale for selection of metal species	13
Appendix C: Version	14

Classification of sample: TP01-0.50

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
TP01-0.50
Sample Depth:
0.50-0.50 m
Moisture content:
17%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 17% Wet Weight Moisture Correction applied (MC)

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		pH			PH		8.5	pH		8.5	pH	8.5 pH		
2		boron { diboron trioxide; boric oxide }	005-008-00-8	215-125-8	1303-86-2		0.68	mg/kg	3.22	1.817	mg/kg	0.000182 %	✓	
3		sulfur { sulfur }	016-094-00-1	231-722-6	7704-34-9		2.2	mg/kg		1.826	mg/kg	0.000183 %	✓	
4		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				<0.5	mg/kg	1.884	<0.942	mg/kg	<0.0000942 %		**<LOD**
5		molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		<2	mg/kg	1.5	<3	mg/kg	<0.0003 %		**<LOD**
6		antimony { antimony compounds, with the exception of the tetroxide (Sb2O4), pentoxide (Sb2O5), trisulphide (Sb2S3), pentasulphide (Sb2S5) and those specified elsewhere in this Annex }	051-003-00-9			1	<2	mg/kg		<2	mg/kg	<0.0002 %		**<LOD**
7		arsenic { arsenic }	033-001-00-X	231-148-6	7440-38-2		8	mg/kg		6.64	mg/kg	0.000664 %	✓	
8		barium { barium oxide }		215-127-9	1304-28-5		55	mg/kg	1.117	50.968	mg/kg	0.0051 %	✓	
9		cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		0.3	mg/kg	1.142	0.284	mg/kg	0.0000284 %	✓	
10		granulated copper; [particle length: from 0,9 mm to 6,0 mm; particle width: from 0,494 to 0,949 mm]	029-024-00-X	231-159-6	7440-50-8		24	mg/kg		19.92	mg/kg	0.00199 %	✓	
11		mercury { mercury }	080-001-00-0	231-106-7	7439-97-6		0.34	mg/kg		0.282	mg/kg	0.0000282 %	✓	
12		nickel { nickel(II) oxide (nickel monoxide) }	028-003-00-2	215-215-7 [1] 234-323-5 [2] - [3]	1313-99-1 [1] 11099-02-8 [2] 34492-97-2 [3]		10	mg/kg	1.273	10.563	mg/kg	0.00106 %	✓	

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
13		lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	51	mg/kg		42.33	mg/kg	0.00423 %	✓	
14		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				0.67	mg/kg	1.405	0.781	mg/kg	0.0000781 %	✓	
15		zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		53	mg/kg	1.245	54.755	mg/kg	0.00548 %	✓	
16		chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.5	mg/kg	1.923	<0.962	mg/kg	<0.0000962 %		**<LOD**
17		chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		8.3	mg/kg	1.462	10.069	mg/kg	0.00101 %	✓	
18		TPH (C6 to C40) petroleum group			TPH		<10	mg/kg		<10	mg/kg	<0.001 %		**<LOD**
19		benzene	601-020-00-8	200-753-7	71-43-2		<1	µg/kg		<0.001	mg/kg	<0.0000001 %		**<LOD**
20		toluene	601-021-00-3	203-625-9	108-88-3		<1	µg/kg		<0.001	mg/kg	<0.0000001 %		**<LOD**
21		ethylbenzene	601-023-00-4	202-849-4	100-41-4		<1	µg/kg		<0.001	mg/kg	<0.0000001 %		**<LOD**
22		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<1	µg/kg		<0.001	mg/kg	<0.0000001 %		**<LOD**
23		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
24		acenaphthylene		205-917-1	208-96-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
25		acenaphthene		201-469-6	83-32-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
26		fluorene		201-695-5	86-73-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
27		phenanthrene		201-581-5	85-01-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
28		anthracene		204-371-1	120-12-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
29		fluoranthene		205-912-4	206-44-0		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
30		pyrene		204-927-3	129-00-0		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
31		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
32		chrysene	601-048-00-0	205-923-4	218-01-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
33		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
34		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
35		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
36		indeno[123-cd]pyrene		205-893-2	193-39-5		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
37		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
38		benzo[ghi]perylene		205-883-8	191-24-2		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
39		coronene		205-881-7	191-07-1		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
40	●	monohydric phenols				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
				P1186									
41		xylene				<2	µg/kg		<0.002	mg/kg	<0.0000002 %		**<LOD**
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
42	●	polychlorobiphenyls; PCB				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		602-039-00-4	215-648-1	1336-36-3									
										Total:	0.0219 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

WAC Results for sample: TP01-0.50

WAC Settings: samples in this job constitute a single population.

WAC limits used to evaluate this sample: "Ireland"
The WAC used in this report are the WAC defined for the inert and non-hazardous classes of landfill in the Republic of Ireland. You should check the actual acceptance criteria when the disposal site is identified as they may differ from the generic WAC used in this report.

The sample FAILS the Inert (Inert waste landfill) criteria.

The sample PASSES the Non Haz (Non hazardous waste landfill) criteria.

WAC Determinands

Solid Waste Analysis				Landfill Waste Acceptance Criteria Limits	
#	Determinand		User entered data	Inert waste landfill	Non hazardous waste landfill
1	TOC (total organic carbon)	%	2.4	3	5
2	LOI (loss on ignition)	%	5.5	-	-
3	BTEX (benzene, toluene, ethylbenzene and xylenes)	mg/kg	<0.01	6	-
4	PCBs (polychlorinated biphenyls, 7 congeners)	mg/kg	<0.1	1	-
5	Mineral oil (C10 to C40)	mg/kg	<10	500	-
6	PAHs (polycyclic aromatic hydrocarbons)	mg/kg	<2	100	-
7	pH	pH	8.5	-	>6
8	ANC (acid neutralisation capacity)	mol/kg	0.004	-	-
Eluate Analysis 10:1					
9	arsenic	mg/kg	0.014	0.5	2
10	barium	mg/kg	<0.0005	20	100
11	cadmium	mg/kg	<0.0001	0.04	1
12	chromium	mg/kg	0.66	0.5	10
13	copper	mg/kg	0.041	2	50
14	mercury	mg/kg	<5.0e-05	0.01	0.2
15	molybdenum	mg/kg	0.027	0.5	10
16	nickel	mg/kg	0.3	0.4	10
17	lead	mg/kg	0.018	0.5	10
18	antimony	mg/kg	0.041	0.06	0.7
19	selenium	mg/kg	<0.0005	0.1	0.5
20	zinc	mg/kg	<0.0025	4	50
21	chloride	mg/kg	<10	800	15,000
22	fluoride	mg/kg	5.4	10	150
23	sulphate	mg/kg	26	1,000	20,000
24	phenol index	mg/kg	<0.3	1	-
25	DOC (dissolved organic carbon)	mg/kg	80	500	800
26	TDS (total dissolved solids)	mg/kg	840	4,000	60,000

Key

	User supplied data
	Inert WAC criteria fail

Classification of sample: TP02-0.50

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
TP02-0.50
Sample Depth:
0.50-0.50 m
Moisture content:
8.9%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 8.9% Wet Weight Moisture Correction applied (MC)

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		pH			PH		9	pH		9	pH	9pH		
2		boron { diboron trioxide; boric oxide }	005-008-00-8	215-125-8	1303-86-2		<0.4	mg/kg	3.22	<1.288	mg/kg	<0.000129 %		**<LOD**
3		sulfur { sulfur }	016-094-00-1	231-722-6	7704-34-9		<1	mg/kg		<1	mg/kg	<0.0001 %		**<LOD**
4		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				<0.5	mg/kg	1.884	<0.942	mg/kg	<0.0000942 %		**<LOD**
5		molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		<2	mg/kg	1.5	<3	mg/kg	<0.0003 %		**<LOD**
6		antimony { antimony compounds, with the exception of the tetroxide (Sb2O4), pentoxide (Sb2O5), trisulphide (Sb2S3), pentasulphide (Sb2S5) and those specified elsewhere in this Annex }	051-003-00-9			1	<2	mg/kg		<2	mg/kg	<0.0002 %		**<LOD**
7		arsenic { arsenic }	033-001-00-X	231-148-6	7440-38-2		3.2	mg/kg		2.915	mg/kg	0.000292 %	✓	
8		barium { barium oxide }		215-127-9	1304-28-5		24	mg/kg	1.117	24.411	mg/kg	0.00244 %	✓	
9		cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		0.13	mg/kg	1.142	0.135	mg/kg	0.0000135 %	✓	
10		granulated copper; [particle length: from 0,9 mm to 6,0 mm; particle width: from 0,494 to 0,949 mm]	029-024-00-X	231-159-6	7440-50-8		13	mg/kg		11.843	mg/kg	0.00118 %	✓	
11		mercury { mercury }	080-001-00-0	231-106-7	7439-97-6		0.13	mg/kg		0.118	mg/kg	0.0000118 %	✓	
12		nickel { nickel(II) oxide (nickel monoxide) }	028-003-00-2	215-215-7 [1] 234-323-5 [2] - [3]	1313-99-1 [1] 11099-02-8 [2] 34492-97-2 [3]		6.9	mg/kg	1.273	7.999	mg/kg	0.0008 %	✓	

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
13		lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	25	mg/kg		22.775	mg/kg	0.00228 %	✓	
14		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				0.57	mg/kg	1.405	0.73	mg/kg	0.000073 %	✓	
15		zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		36	mg/kg	1.245	40.822	mg/kg	0.00408 %	✓	
16		chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.5	mg/kg	1.923	<0.962	mg/kg	<0.0000962 %		**<LOD**
17		chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		7.4	mg/kg	1.462	9.853	mg/kg	0.000985 %	✓	
18		TPH (C6 to C40) petroleum group			TPH		<10	mg/kg		<10	mg/kg	<0.001 %		**<LOD**
19		benzene	601-020-00-8	200-753-7	71-43-2		<1	µg/kg		<0.001	mg/kg	<0.0000001 %		**<LOD**
20		toluene	601-021-00-3	203-625-9	108-88-3		<1	µg/kg		<0.001	mg/kg	<0.0000001 %		**<LOD**
21		ethylbenzene	601-023-00-4	202-849-4	100-41-4		<1	µg/kg		<0.001	mg/kg	<0.0000001 %		**<LOD**
22		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<1	µg/kg		<0.001	mg/kg	<0.0000001 %		**<LOD**
23		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
24		acenaphthylene		205-917-1	208-96-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
25		acenaphthene		201-469-6	83-32-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
26		fluorene		201-695-5	86-73-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
27		phenanthrene		201-581-5	85-01-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
28		anthracene		204-371-1	120-12-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
29		fluoranthene		205-912-4	206-44-0		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
30		pyrene		204-927-3	129-00-0		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
31		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
32		chrysene	601-048-00-0	205-923-4	218-01-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
33		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
34		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
35		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
36		indeno[123-cd]pyrene		205-893-2	193-39-5		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
37		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
38		benzo[ghi]perylene		205-883-8	191-24-2		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
39		coronene		205-881-7	191-07-1		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
40	●	monohydric phenols				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
				P1186									
41		xylene				<2	µg/kg		<0.002	mg/kg	<0.0000002 %		**<LOD**
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
42	●	polychlorobiphenyls; PCB				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		602-039-00-4	215-648-1	1336-36-3									
										Total:	0.0143 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

WAC Results for sample: TP02-0.50

WAC Settings: samples in this job constitute a single population.

WAC limits used to evaluate this sample: "Ireland"
The WAC used in this report are the WAC defined for the inert and non-hazardous classes of landfill in the Republic of Ireland. You should check the actual acceptance criteria when the disposal site is identified as they may differ from the generic WAC used in this report.

The sample FAILS the Inert (Inert waste landfill) criteria.

The sample PASSES the Non Haz (Non hazardous waste landfill) criteria.

WAC Determinands

Solid Waste Analysis				Landfill Waste Acceptance Criteria Limits	
#	Determinand		User entered data	Inert waste landfill	Non hazardous waste landfill
1	TOC (total organic carbon)	%	0.72	3	5
2	LOI (loss on ignition)	%	2.6	-	-
3	BTEX (benzene, toluene, ethylbenzene and xylenes)	mg/kg	<0.01	6	-
4	PCBs (polychlorinated biphenyls, 7 congeners)	mg/kg	<0.1	1	-
5	Mineral oil (C10 to C40)	mg/kg	<10	500	-
6	PAHs (polycyclic aromatic hydrocarbons)	mg/kg	<2	100	-
7	pH	pH	9	-	>6
8	ANC (acid neutralisation capacity)	mol/kg	0.003	-	-
Eluate Analysis 10:1					
9	arsenic	mg/kg	0.0032	0.5	2
10	barium	mg/kg	<0.0005	20	100
11	cadmium	mg/kg	<0.0001	0.04	1
12	chromium	mg/kg	0.79	0.5	10
13	copper	mg/kg	0.038	2	50
14	mercury	mg/kg	<5.0e-05	0.01	0.2
15	molybdenum	mg/kg	0.02	0.5	10
16	nickel	mg/kg	0.35	0.4	10
17	lead	mg/kg	0.0093	0.5	10
18	antimony	mg/kg	<0.0005	0.06	0.7
19	selenium	mg/kg	<0.0005	0.1	0.5
20	zinc	mg/kg	<0.0025	4	50
21	chloride	mg/kg	29	800	15,000
22	fluoride	mg/kg	2.3	10	150
23	sulphate	mg/kg	<10	1,000	20,000
24	phenol index	mg/kg	<0.3	1	-
25	DOC (dissolved organic carbon)	mg/kg	76	500	800
26	TDS (total dissolved solids)	mg/kg	620	4,000	60,000

Key

	User supplied data
	Inert WAC criteria fail

Appendix A: Classifier defined and non CLP determinands

pH (CAS Number: PH)

Description/Comments: Appendix C4
Data source: WM3 1st Edition 2015
Data source date: 25 May 2015
Hazard Statements: None.

salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex

CLP index number: 006-007-00-5
Description/Comments: Conversion factor based on a worst case compound: sodium cyanide
Data source: Commission Regulation (EC) No 790/2009 - 1st Adaptation to Technical Progress for Regulation (EC) No 1272/2008. (ATP1)
Additional Hazard Statement(s): EUH032 >= 0.2 %
Reason for additional Hazards Statement(s):
14 Dec 2015 - EUH032 >= 0.2 % hazard statement sourced from: WM3, Table C12.2

arsenic (EC Number: 231-148-6, CAS Number: 7440-38-2)

CLP index number: 033-001-00-X
Description/Comments: Worst Case: IARC considers arsenic Group 1; Carcinogenic to humans
Data source: Regulation 1272/2008/EC - Classification, labelling and packaging of substances and mixtures. (CLP)
Additional Hazard Statement(s): Carc. 1A H350
Reason for additional Hazards Statement(s):
29 Sep 2015 - Carc. 1A H350 hazard statement sourced from: IARC Group 1 (23, Sup 7, 100C) 2012

barium oxide (EC Number: 215-127-9, CAS Number: 1304-28-5)

Description/Comments: Data from ECHA's C&L Inventory Database, Sigma Aldrich SDS dated 6/2/20
Data source: https://echa.europa.eu/information-on-chemicals/cl-inventory-database/-/discli/details/88825
Data source date: 02 Apr 2020
Hazard Statements: Acute Tox. 3 H301 , Skin Corr. 1B H314 , Eye Dam. 1 H318 , Acute Tox. 1 H332

lead compounds with the exception of those specified elsewhere in this Annex

CLP index number: 082-001-00-6
Description/Comments: Least-worst case: IARC considers lead compounds Group 2A; Probably carcinogenic to humans; Lead REACH Consortium, following CLP protocols, considers many simple lead compounds to be Carcinogenic category 2
Data source: Regulation 1272/2008/EC - Classification, labelling and packaging of substances and mixtures. (CLP)
Additional Hazard Statement(s): Carc. 2 H351
Reason for additional Hazards Statement(s):
03 Jun 2015 - Carc. 2 H351 hazard statement sourced from: IARC Group 2A (Sup 7, 87) 2006; Lead REACH Consortium www.reach-lead.eu/substanceinformation.html. Review date 29/09/2015

chromium(III) oxide (EC Number: 215-160-9, CAS Number: 1308-38-9)

Description/Comments: Data from ECHA's C&L inventory database
Data source: https://echa.europa.eu/information-on-chemicals/cl-inventory-database/-/discli/details/33806
Data source date: 30 Apr 2020
Hazard Statements: Acute Tox. 4 H302 , Skin Sens. 1 H317 , Eye Irrit. 2 H319

TPH (C6 to C40) petroleum group (CAS Number: TPH)

Description/Comments: Hazard statements taken from WM3 1st Edition 2015; Risk phrases: WM2 3rd Edition 2013
Data source: WM3 1st Edition 2015
Data source date: 25 May 2015
Hazard Statements: Flam. Liq. 3 H226 , Asp. Tox. 1 H304 , STOT RE 2 H373 , Muta. 1B H340 , Carc. 1B H350 , Repr. 2 H361d , Aquatic Chronic 2 H411

ethylbenzene (EC Number: 202-849-4, CAS Number: 100-41-4)

CLP index number: 601-023-00-4
Description/Comments:
Data source: Commission Regulation (EU) No 605/2014 – 6th Adaptation to Technical Progress for Regulation (EC) No 1272/2008. (ATP6)
Additional Hazard Statement(s): Carc. 2 H351
Reason for additional Hazards Statement(s):
03 Jun 2015 - Carc. 2 H351 hazard statement sourced from: IARC Group 2B (77) 2000

- **acenaphthylene** (EC Number: 205-917-1, CAS Number: 208-96-8)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Acute Tox. 4 H302 , Acute Tox. 1 H330 , Acute Tox. 1 H310 , Eye Irrit. 2 H319 , STOT SE 3 H335 , Skin Irrit. 2 H315

- **acenaphthene** (EC Number: 201-469-6, CAS Number: 83-32-9)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Eye Irrit. 2 H319 , STOT SE 3 H335 , Skin Irrit. 2 H315 , Aquatic Acute 1 H400 , Aquatic Chronic 1 H410 , Aquatic Chronic 2 H411

- **fluorene** (EC Number: 201-695-5, CAS Number: 86-73-7)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Aquatic Acute 1 H400 , Aquatic Chronic 1 H410

- **phenanthrene** (EC Number: 201-581-5, CAS Number: 85-01-8)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Acute Tox. 4 H302 , Eye Irrit. 2 H319 , STOT SE 3 H335 , Carc. 2 H351 , Skin Sens. 1 H317 , Aquatic Acute 1 H400 , Aquatic Chronic 1 H410 , Skin Irrit. 2 H315

- **anthracene** (EC Number: 204-371-1, CAS Number: 120-12-7)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Eye Irrit. 2 H319 , STOT SE 3 H335 , Skin Irrit. 2 H315 , Skin Sens. 1 H317 , Aquatic Acute 1 H400 , Aquatic Chronic 1 H410

- **fluoranthene** (EC Number: 205-912-4, CAS Number: 206-44-0)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 21 Aug 2015
Hazard Statements: Acute Tox. 4 H302 , Aquatic Acute 1 H400 , Aquatic Chronic 1 H410

- **pyrene** (EC Number: 204-927-3, CAS Number: 129-00-0)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 2014
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 21 Aug 2015
Hazard Statements: Skin Irrit. 2 H315 , Eye Irrit. 2 H319 , STOT SE 3 H335 , Aquatic Acute 1 H400 , Aquatic Chronic 1 H410

- **indeno[123-cd]pyrene** (EC Number: 205-893-2, CAS Number: 193-39-5)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Carc. 2 H351

- **benzo[ghi]perylene** (EC Number: 205-883-8, CAS Number: 191-24-2)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 28/02/2015
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 23 Jul 2015
Hazard Statements: Aquatic Acute 1 H400 , Aquatic Chronic 1 H410

- **coronene** (EC Number: 205-881-7, CAS Number: 191-07-1)

Description/Comments: Data from C&L Inventory Database; no entries in Registered Substances or Pesticides Properties databases; SDS: Sigma Aldrich, 1907/2006 compliant, dated 2012 - no entries; IARC – Group 3, not carcinogenic.
Data source:
http://clp-inventory.echa.europa.eu/SummaryOfClassAndLabelling.aspx?SubstanceID=17010&HarmOnly=no?fc=true&lang=en
Data source date: 16 Jun 2014
Hazard Statements: STOT SE 2 H371

- **monohydric phenols** (CAS Number: P1186)

Description/Comments: Combined hazards statements from harmonised entries in CLP for phenol, cresols and xylenols (604-001-00-2, 604-004-00-9, 604-006-00-X)
Data source: CLP combined data
Data source date: 26 Mar 2019
Hazard Statements: Acute Tox. 3 H301 , Acute Tox. 3 H311 , Acute Tox. 3 H331 , Skin Corr. 1B H314 , Skin Corr. 1B H314 >= 3 %, Skin Irrit. 2 H315 1 £ conc. < 3 %, Eye Irrit. 2 H319 1 £ conc. < 3 %, Muta. 2 H341 , STOT RE 2 H373 , Aquatic Chronic 2 H411

- **polychlorobiphenyls; PCB** (EC Number: 215-648-1, CAS Number: 1336-36-3)

CLP index number: 602-039-00-4
Description/Comments: Worst Case: IARC considers PCB Group 1; Carcinogenic to humans; POP specific threshold from ATP1 (Regulation 756/2010/EU) to POPs Regulation (Regulation 850/2004/EC). Where applicable, the calculation method laid down in European standards EN 12766-1 and EN 12766-2 shall be applied.
Data source: Regulation 1272/2008/EC - Classification, labelling and packaging of substances and mixtures. (CLP)
Additional Hazard Statement(s): Carc. 1A H350
Reason for additional Hazards Statement(s):
29 Sep 2015 - Carc. 1A H350 hazard statement sourced from: IARC Group 1 (23, Sup 7, 100C) 2012

Appendix B: Rationale for selection of metal species

boron {diboron trioxide; boric oxide}

Diboron trioxide used as the most hazardous species.

sulfur {sulfur}

chemtest reports Elemental sulfur using this CAS

cyanides {salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex}

Available species

molybdenum {molybdenum(VI) oxide}

Worst case CLP species based on hazard statements/molecular weight.

antimony {antimony compounds, with the exception of the tetroxide (Sb2O4), pentoxide (Sb2O5), trisulphide (Sb2S3), pentasulphide (Sb2S5) and those specified elsewhere in this Annex}

Chromium VI at limits of detection. Antimony compounds used as the next most hazardous species. No chromate present.

arsenic {arsenic}

Worst Case Scenario

barium {barium oxide}

Chromium VII at limits of detection. Barium oxide used as the next most hazardous species. No chromate present.

cadmium {cadmium oxide}

Chromium VII at limits of detection. Cadmium oxide used as the next most hazardous species. No chromate present.

mercury {mercury}

Worst case CLP species based on hazard statements/molecular weight

nickel {nickel(II) oxide (nickel monoxide)}

Chromium VI at limits of detection. Nickel oxide used as the next most hazardous species. No chromate present.

lead {lead compounds with the exception of those specified elsewhere in this Annex}

Chromium VI at limits of detection. Lead compounds used as the next most hazardous species. No chromate present.

selenium {selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex}

Harmonised group entry used as most reasonable case. Pigment cadmium sulphoselenide not likely to be present in this soil. No evidence for the other CLP entries: sodium selenite, nickel II selenite and nickel selenide, to be present in this soil.

zinc {zinc oxide}

Chromium VI at limits of detection. Zinc oxide used as the next most hazardous species. No chromate present.

chromium in chromium(VI) compounds {chromium(VI) oxide}

Worst case CLP species based on hazard statements/molecular weight. Industrial sources include: production stainless steel, electroplating, wood preservation, anti-corrosion agents or coatings, pigments.

chromium in chromium(III) compounds {chromium(III) oxide}

Reasonable case species based on hazard statements/molecular weight. Industrial sources include: tanning, pigment in paint, inks and glass

Appendix C: Version

HazWasteOnline Classification Engine: WM3 1st Edition v1.1, May 2018
HazWasteOnline Classification Engine Version: 2021.138.4779.9121 (18 May 2021)
HazWasteOnline Database: 2021.138.4779.9121 (18 May 2021)

This classification utilises the following guidance and legislation:
WM3 v1.1 - Waste Classification - 1st Edition v1.1 - May 2018
CLP Regulation - Regulation 1272/2008/EC of 16 December 2008
1st ATP - Regulation 790/2009/EC of 10 August 2009
2nd ATP - Regulation 286/2011/EC of 10 March 2011
3rd ATP - Regulation 618/2012/EU of 10 July 2012
4th ATP - Regulation 487/2013/EU of 8 May 2013
Correction to 1st ATP - Regulation 758/2013/EU of 7 August 2013
5th ATP - Regulation 944/2013/EU of 2 October 2013
6th ATP - Regulation 605/2014/EU of 5 June 2014
WFD Annex III replacement - Regulation 1357/2014/EU of 18 December 2014
Revised List of Waste 2014 - Decision 2014/955/EU of 18 December 2014
7th ATP - Regulation 2015/1221/EU of 24 July 2015
8th ATP - Regulation (EU) 2016/918 of 19 May 2016
9th ATP - Regulation (EU) 2016/1179 of 19 July 2016
10th ATP - Regulation (EU) 2017/776 of 4 May 2017
HP14 amendment - Regulation (EU) 2017/997 of 8 June 2017
13th ATP - Regulation (EU) 2018/1480 of 4 October 2018
14th ATP - Regulation (EU) 2020/217 of 4 October 2019
15th ATP - Regulation (EU) 2020/1182 of 19 May 2020
The Chemicals (Health and Safety) and Genetically Modified Organisms (Contained Use)(Amendment etc.) (EU Exit) Regulations 2019 - UK: 2019 No. 720 of 27th March 2019
The Chemicals (Health and Safety) and Genetically Modified Organisms (Contained Use)(Amendment etc.) (EU Exit) Regulations 2020 - UK: 2020 No. 1567 of 16th December 2020
The Waste and Environmental Permitting etc. (Legislative Functions and Amendment etc.) (EU Exit) Regulations 2020 - UK: 2020 No. 1540 of 16th December 2020
POPs Regulation 2019 - Regulation (EU) 2019/1021 of 20 June 2019

Appendix 7

Survey Data

Survey Data

Location	Irish Transverse Mercator		Elevation	Irish National Grid	
	Easting	Northing		Easting	Northing
Boreholes					
BH01	527724.924	725784.319	27.53	127758.556	225755.248
BH02	527745.462	725725.736	24.79	127779.098	225696.652
Trial Pits					
TP01	527720.398	725767.779	26.77	127754.029	225738.704
TP02	527732.670	725744.851	25.63	127766.303	225715.771
Soakaway Tests					
SA01	527747.661	725728.840	24.77	127781.298	225699.757
Dynamic Probes					
DP01	527732.472	725783.351	26.73	127766.105	225754.279
DP02	527732.299	725771.272	26.32	127765.932	225742.198
DP03	527743.757	725756.706	25.64	127777.393	225727.629
DP04	527749.244	725746.747	25.05	127782.881	225717.668
DP05	527758.534	725735.103	24.72	127792.173	225706.021

Contract No:	5808	Client:	Galway County Council	Legend Key
Contract:	Circular Road	Engineer:	Brunner Consulting Engineers	Locations By Type - CP
Location:	Rahoon, Galway	Scale:	1:500	Locations By Type - DP
Title:	Site Plan	Drawn By:	SL	Locations By Type - IP

Appendix B

Drainage Strategy

Drainage strategy

The site is currently served by a separate surface water- & foul drain, which combine before discharging from site in a combined fashion. It is proposed to maintain these runs to facilitate the proposed development. The development does not generate an increased population equivalent and associated demand on the drainage network. We have employed sustainable urban drainage systems (Suds) in the form of soakaways for roofwater drainage, which diminishes the overall discharge from site during storm events.

Surface Water

It is proposed to collect all rainwater incident on the roofs of houses and outhouses via gutters & downpipes to a soakaway, located in the rear yard area of each house. The soakaway will be formed in precast concrete rings and filled with washed stone. Site investigations have indicated that soakaways can be placed in the well-drained, high permeability **gravel** soils, below the made ground material.

By discharging roofwater to ground, we have reduced the overall flow into the public system from the site by 63% by area. Storm flows during a 5 year, 60 min storm event are ***reduced by 5.7 litres per second***.

Impermeable areas	Existing	Effective existing	Proposed	Effective proposed
Roof	120 m²	120 m²	563 m²	0 m²
Hard finishes	2,062 m²	1,856 m²	808 m²	727 m²
			978 m²	
Total	2,182 m²	1,976 m²	2,282 m²	727 m²

Foul Water

The effective foul water discharge is unchanged by provision of the development as the demand as not increased or reduced.

Legend

- Foul water line
- Surface water line
- Existing combined drain/sewer
- Permeable paviour
- Permeable macadam
- Soakaway - precast stone filled chamber

THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL OTHER PROJECT DRAWINGS

NOTES:

1. ALL DRAWINGS ARE TO BE READ IN CONJUNCTION WITH ARCHITECT'S AND OTHER CONSULTANT'S DRAWINGS AND INFORMATION. SETTING OUT IS TO BE TAKEN FROM ARCHITECT'S DRAWING.
2. DO NOT SCALE THIS DRAWING. USE ONLY FIGURED DIMENSIONS.
3. CONCRETE GRADE TO BE C28/35 UNLESS SPECIFICALLY STATED OTHERWISE.
4. COVER TO REINFORCEMENT TO BE 35mm GENERALLY, 50mm FOR FOUNDATIONS.
5. ANY DISCREPENCIES BETWEEN SITE AND WHAT IS INDICATED ON THIS DRAWING IS TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER IMMEDIATELY.
6. ALL PROPRIETARY PRODUCTS TO HAVE 'CE' MARKING AND WILL ONLY BE ACCEPTED ON RECEIPT OF VALID 'DECLARATION OF PERFORMANCE'.

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CLIENT: Galway City Council/CENA

ARCHITECT: de Siun Architects

PROJECT: Circular Road Group Housing, Galway

DRAWING: Site drainage strategy layout

DRAWING No: R39-P-001

SCALE: As shown

DATE: July 21

REVISION: -

Site drainage works layout

Sc 1:150

C. Flood Risk Assessment

BRUNNER
CONSULTING ENGINEERS
Dublin | Killarney
www.brunner.ie

Project Title	Housing accommodation at Circular Road, Rahoon, Galway
Document Title	Flood Risk Assessment
Client	Galway City Council
File No.	R39_FRA_001
Author	Peter Brunner
Date	15 September 2021
Revision	S1

INTRODUCTION:

This report includes a flood risk assessment for the proposed Housing Accommodation site at Circular Road, Rahoon, Co Galway. This report should be read in conjunction with all other drawings and documents as part of the Stage 1 Approval process.

LOCATION:

The proposed development site is located in the western side of the Circular Road in Rahoon, Galway.

Fig 1 - Site location map.

FLOOD RISK ASSESSMENT:

The risk of flooding is considered under five headings as follows:

1. Coastal flooding
2. Fluvial flooding
3. Ground water flooding
4. Pluvial flooding
5. Public drainage flooding

Flood Risk Assessment maps provided by the Office of Public Works through the national Catchment Flood Risk Assessment and Management (CFRAM) programme have been used for the assessment of flood risk.

Coastal Flooding

The applicant site is located on the western side of the Circular Road in Rahoon, Galway as outlined on extracted map from the Catchment Flood Risk Assessment and Management (CFRAM) website. The map indicates that the applicant site is outside of the coastal flood risk zone for Low, Medium & High coastal flooding probabilities.

The **high** probability event is considered as a an annual exceedance probability (AEP) of 10% or a 1 in 10 chance of occurring or being exceeded in any given year.

The **medium** probability event is considered as a an annual exceedance probability (AEP) of 1% or a 1 in 100 chance of occurring or being exceeded in any given year.

The **low** probability event is considered as a an annual exceedance probability (AEP) of 0.1% or a 1 in 1000 chance of occurring or being exceeded in any given year.

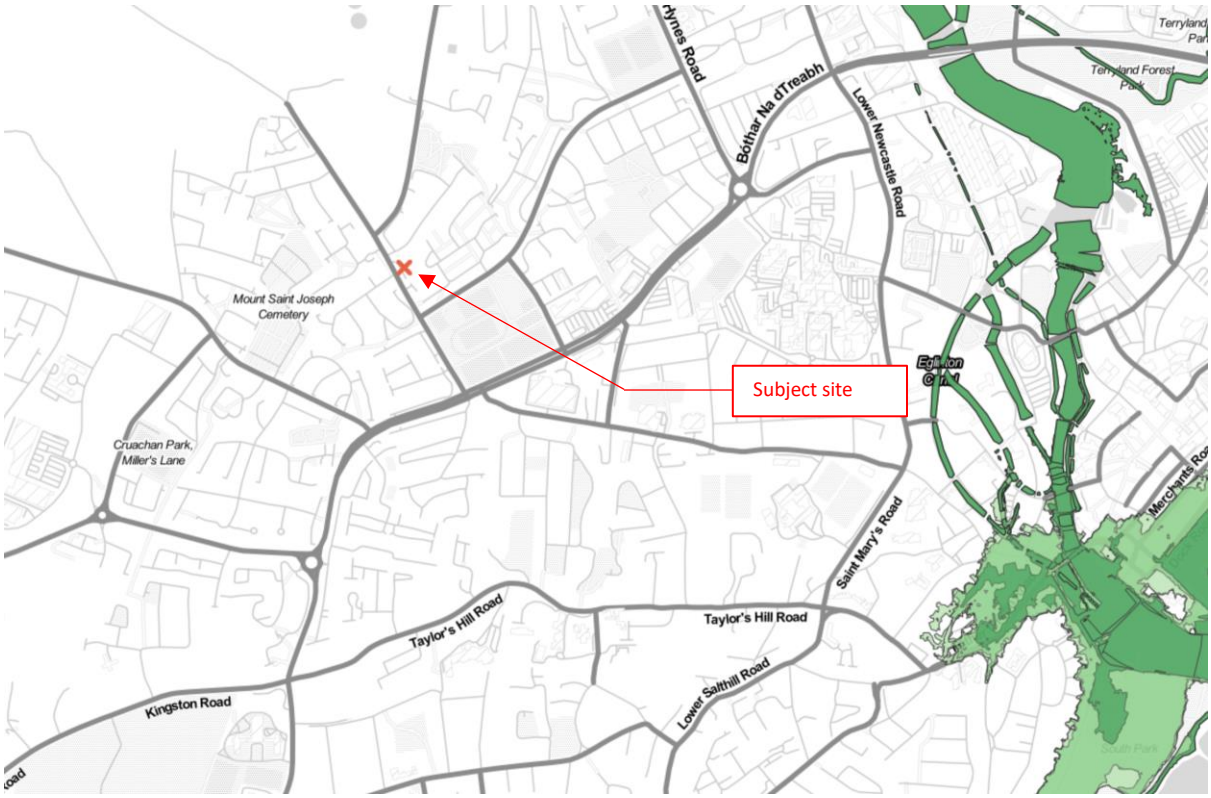


Fig. 2 Coastal Flooding extent map for Low, Medium & High Probability (courtesy of floodinfo.ie)

Fluvial Flooding

The applicant's site is not at risk of flooding from fluvial events indicated on the CFRAM maps. The CFRAM Maps indicating the 0.1% Fluvial AEP Flood area shows fluvial flooding events of low, medium and high probability being contained to the River Corrib basin, which is some 1.5km from the subject site.

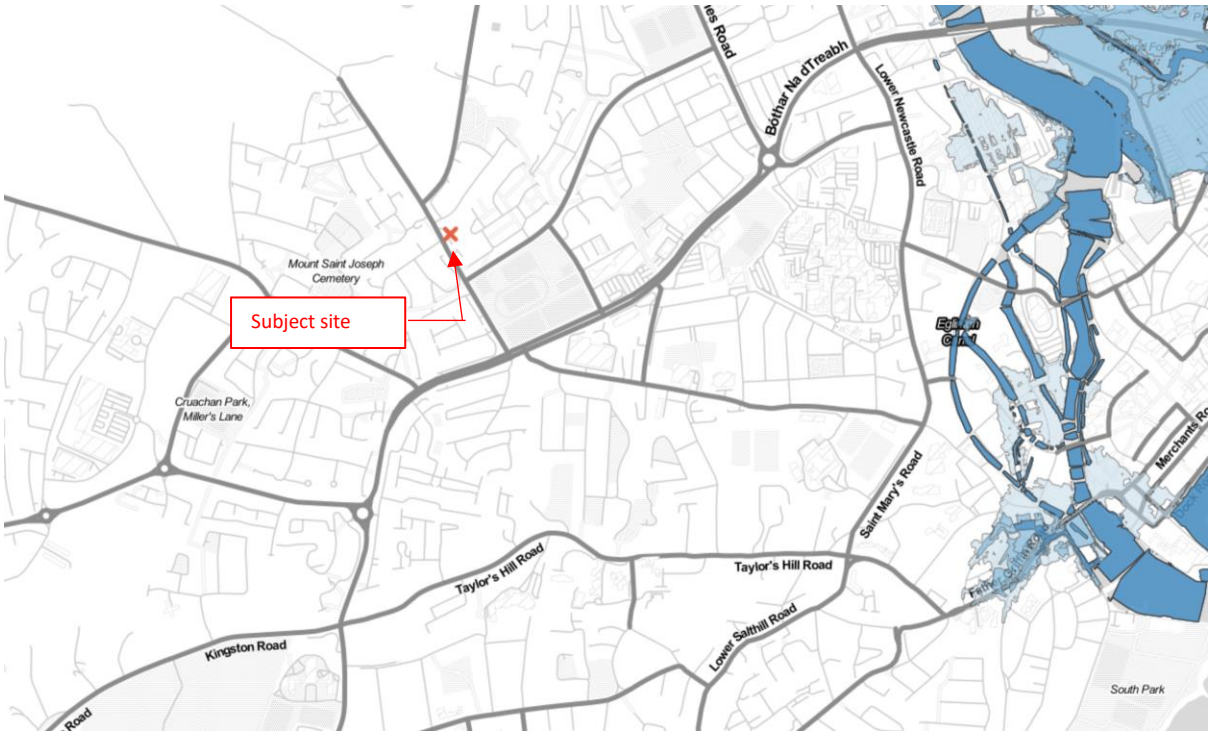


Fig. 3 Fluvial flooding extent map for Low, Medium & High Probability (courtesy of floodinfo.ie)

Ground water flooding

The Geological Survey of Ireland (GSI) database has been reviewed for information on underlying groundwater and aquifer conditions. The applicant site is underlain with Poor Aquifer - Bedrock which is generally unproductive except for Local Zones.

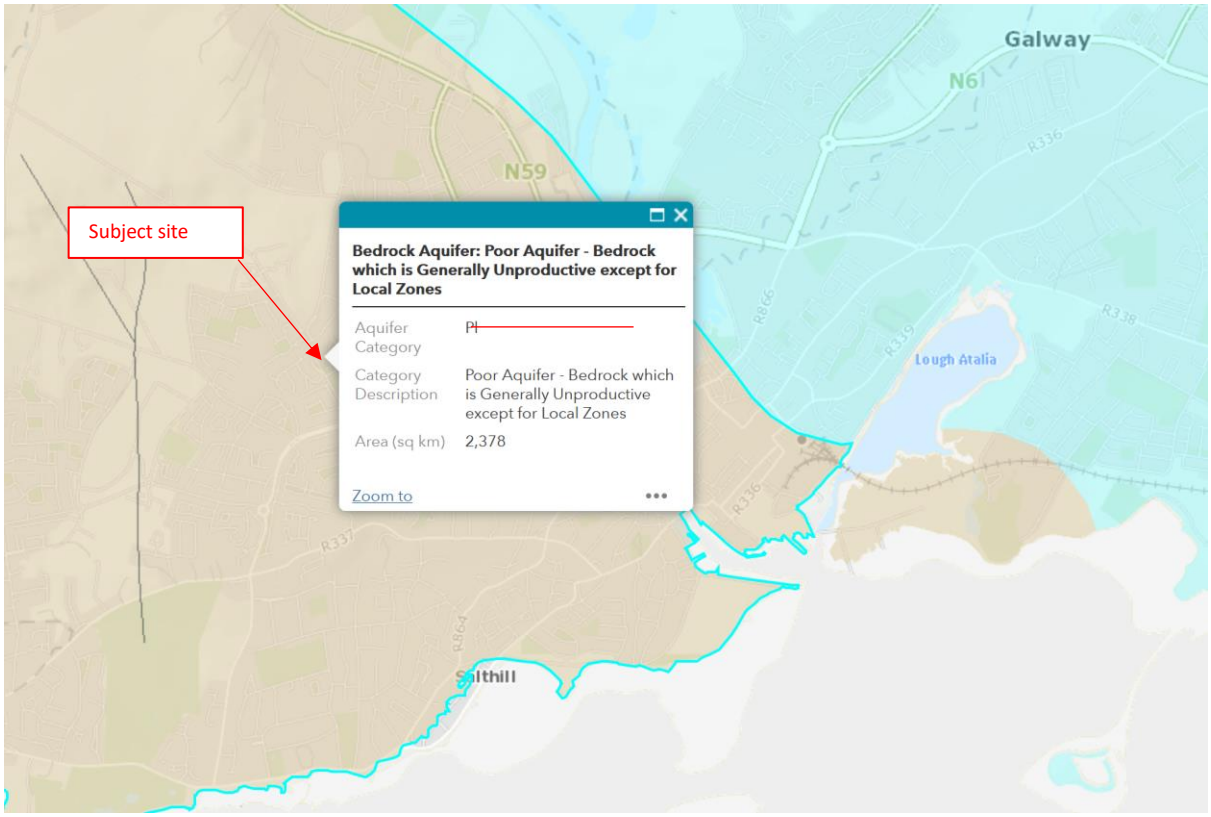


Fig. 4 GSI mapping information for "Groundwater Resources (Aquifers)"

The CFRAM maps also the ground water flooding extent which does not show any incidence for the subject site – refer to Fig 5 below.

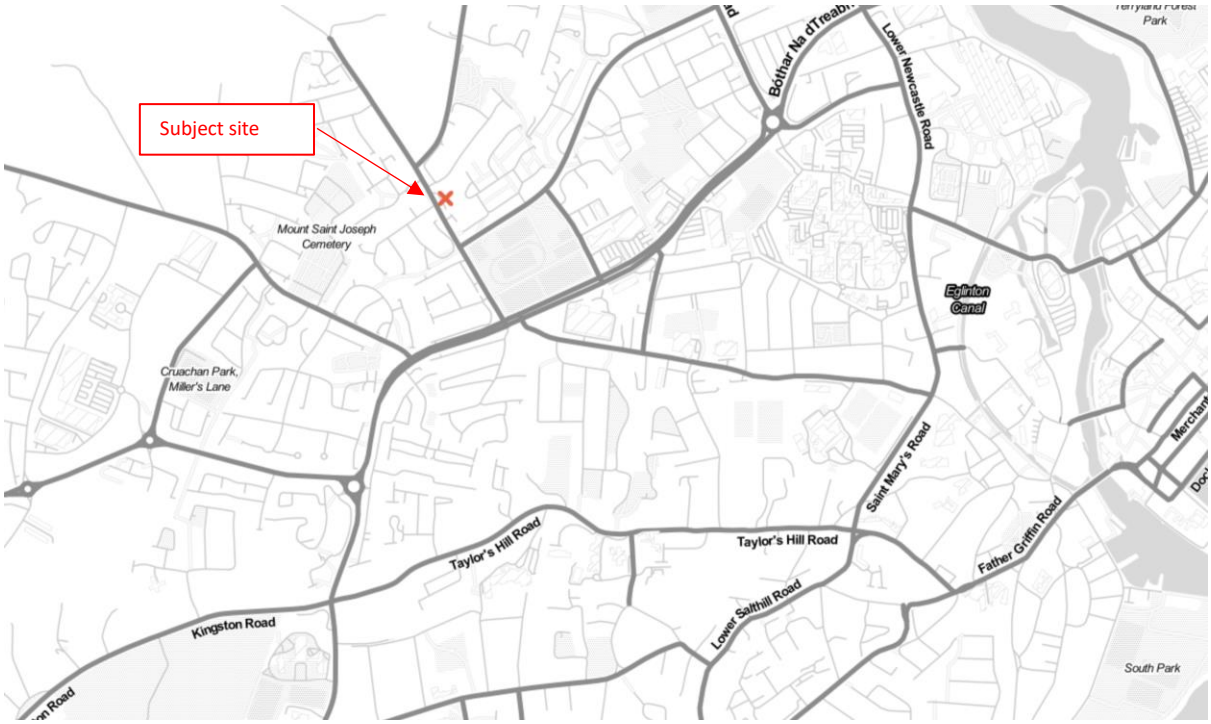


Fig. 5 Ground water flooding extent map for Low, Medium & High Probability (courtesy of floodinfo.ie)

Ground Water Vulnerability

The groundwater vulnerability assessment of the site suggests that the vulnerability is on the boundary of "High" to "Extreme".

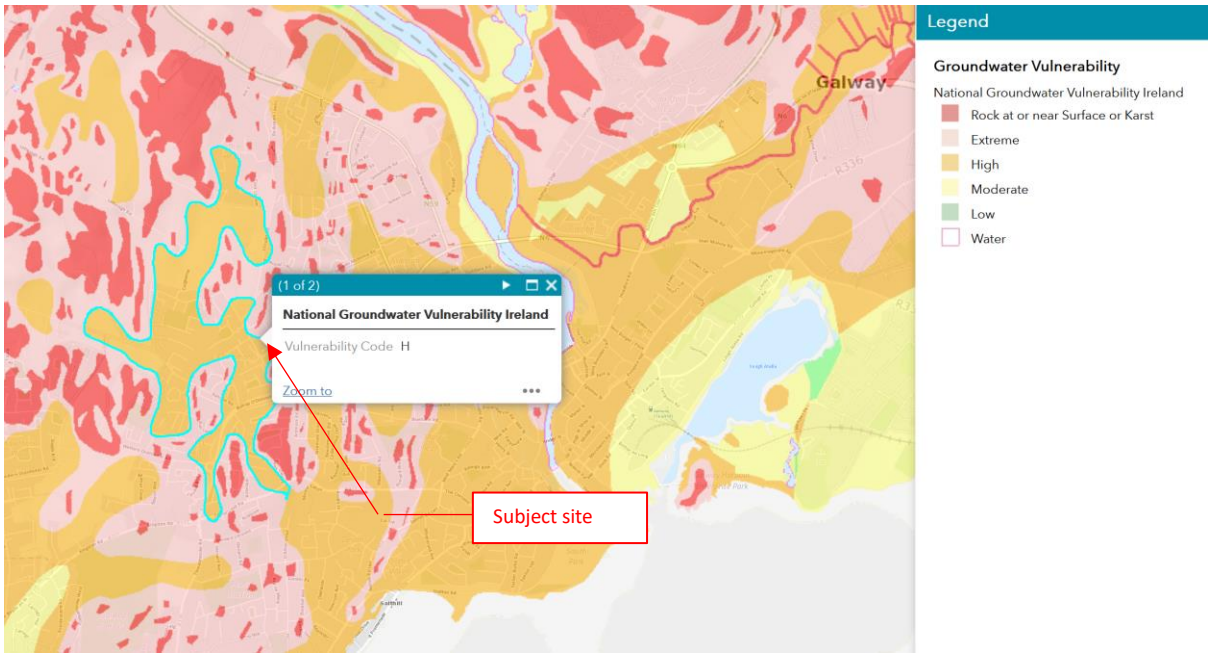


Fig. 6 GSI mapping information for "Groundwater Vulnerability"

Pluvial Flooding

Pluvial flooding arises from high intensity rainfall increasing surface water flows overland. Review of historical records on the Office of Public Works (OPW) online database www.floodinfo.ie indicates the closest events some 2km from the proposed development, at Wolfe Tone Bridge.

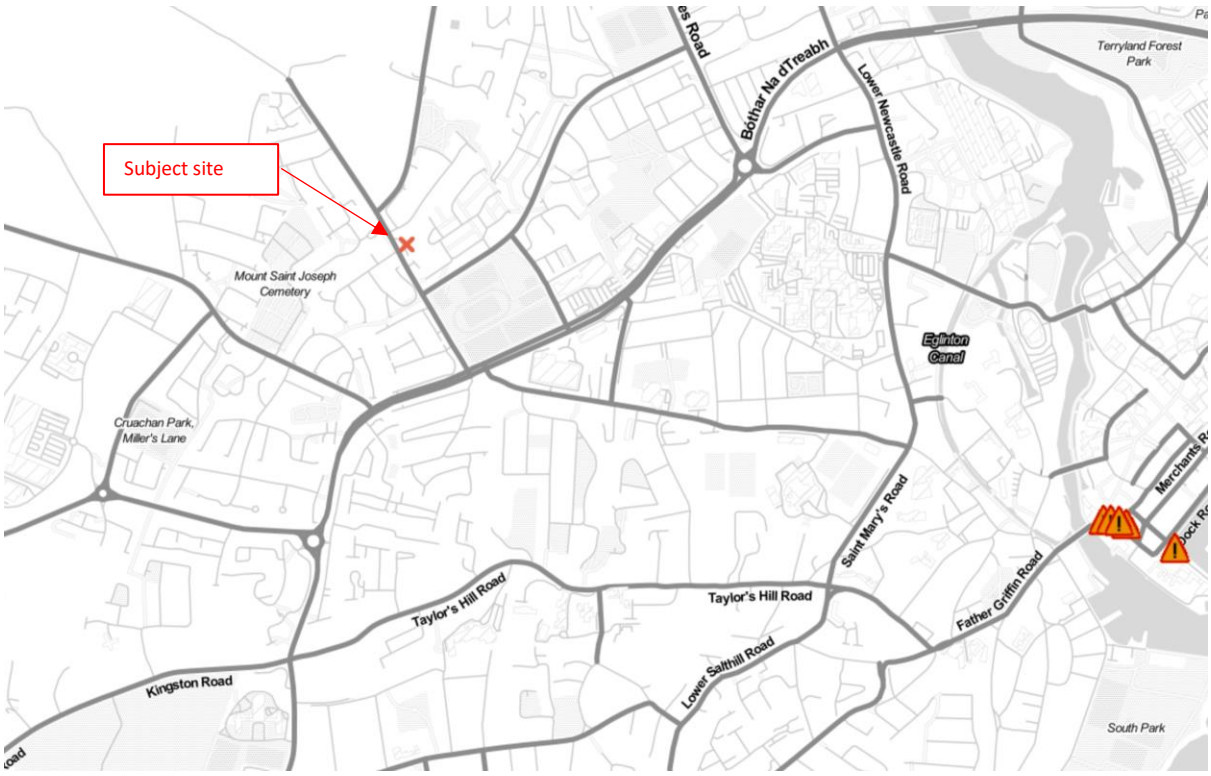


Fig. 7 Extract from 'Past Flood Events' section of CFRAM mapping (courtesy of floodinfo.ie)

Public Drainage Flooding

The site is served by a separate foul- & surface water system, which falls in an easterly direction into the Cluainin estate. The subject site is at the apex/start of the drainage run for both foul- & surface water as indicated below.

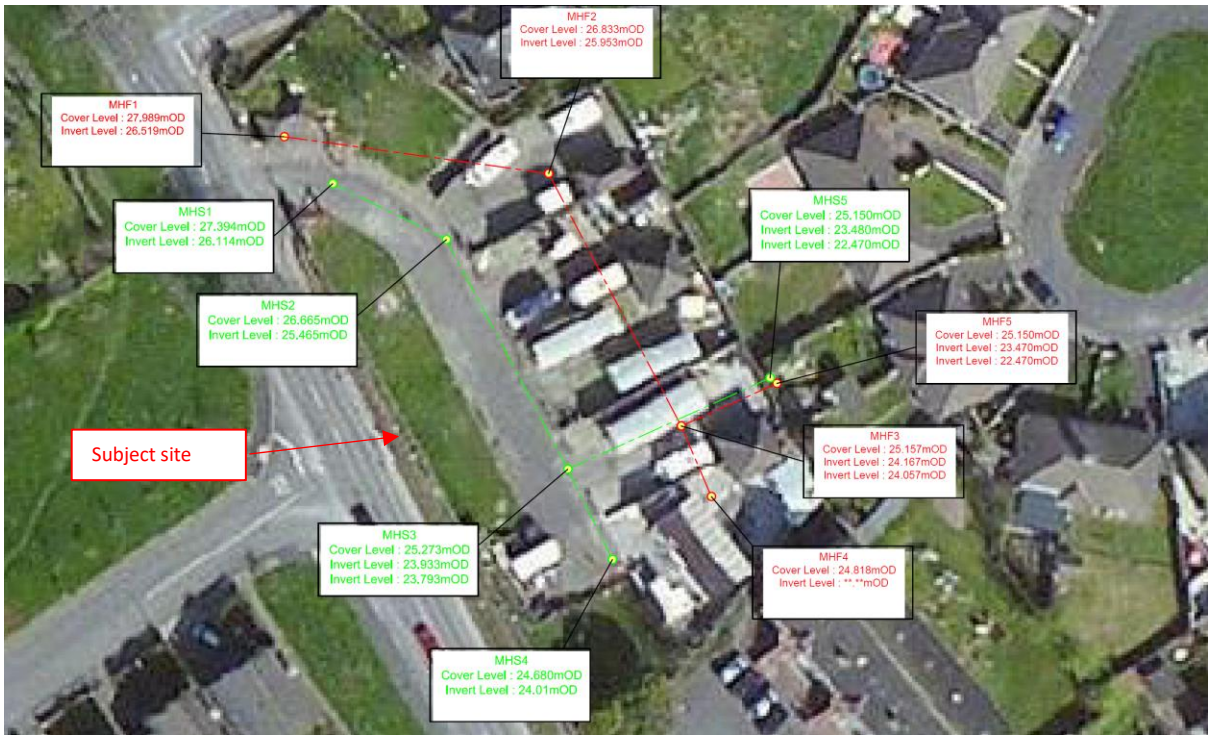


Fig. 8 Extract from CCTV survey information on foul- & surface water drainage for the subject site, discharging to the east into Cluainin estate

We have no information on the incidence of public drainage flooding in the area.

D. Utilities & Services Report

STAGE 2 TECHNICAL REPORT

of the MECHANICAL & ELECTRICAL SERVICES

at Circular Road Group Housing, Galway

Prepared by
CMD Consulting Engineers Ltd

09th August 2021.

EXISTING AND PLANNED SERVICES

The works comprise of the development of 5no. detached dormer style houses on an existing site located of the Circular Road in Galway.

The site is currently served by oil boiler in the existing dwellings, public lighting and an ESB supply.

Currently the ESB mini-Pillar is located to the rear of an existing property, we will liaise with the ESB for a relocation to the service with a new connection to mini pillar located within the site at the entrance area.
Before construction commences a disconnection will be required to each of the existing properties with a new connection application made, the application will be made by this office.

It is proposed that the heating and hot water system to the new dwellings will be located within the utility (hot water tank and central extract system), external wall mounted air-to-water system at high level, with the cold-water storage tank for each property including associated booster pumps located in the proposed sheds to the rear of the property due no attic space being available.

There is no Gas Networks main serving the site, however it is noted there is a 4bar main running the length of the Circular Road.

Best practice in sustainable design will be considered and where practical and cost effective to do so.

MECHANICAL

On reviewing of the documentation issued by the architects and Utility maps from Gas Networks the project has two options to Comply with TGD Part L 2019 which requires all currently builds to comply with NZEB.

Option1 –

An application is made to Gas Networks for a feed into the site, along with combi boilers for heating and hot water, a CMEV (Central extract) system would be required, passive wall vents and a series of Photovoltaic panels would be required to each roof to meet Part L. The cold-water storage tank and booster pump should be located in the shed to rear due to no available attic space.

Option 2 –

The installation of an air-to-water heat pump system, mounted to the rear of each property at high level, The internal heat pump unit containing the cylinder will be located in the Utility a CMEV system would be required to provide ventilation in conjunction with passive wall vents sized correctly to meet TGD Part F 2019. The cold-water storage tank and booster pump should be located in the shed to rear due to no available attic space.

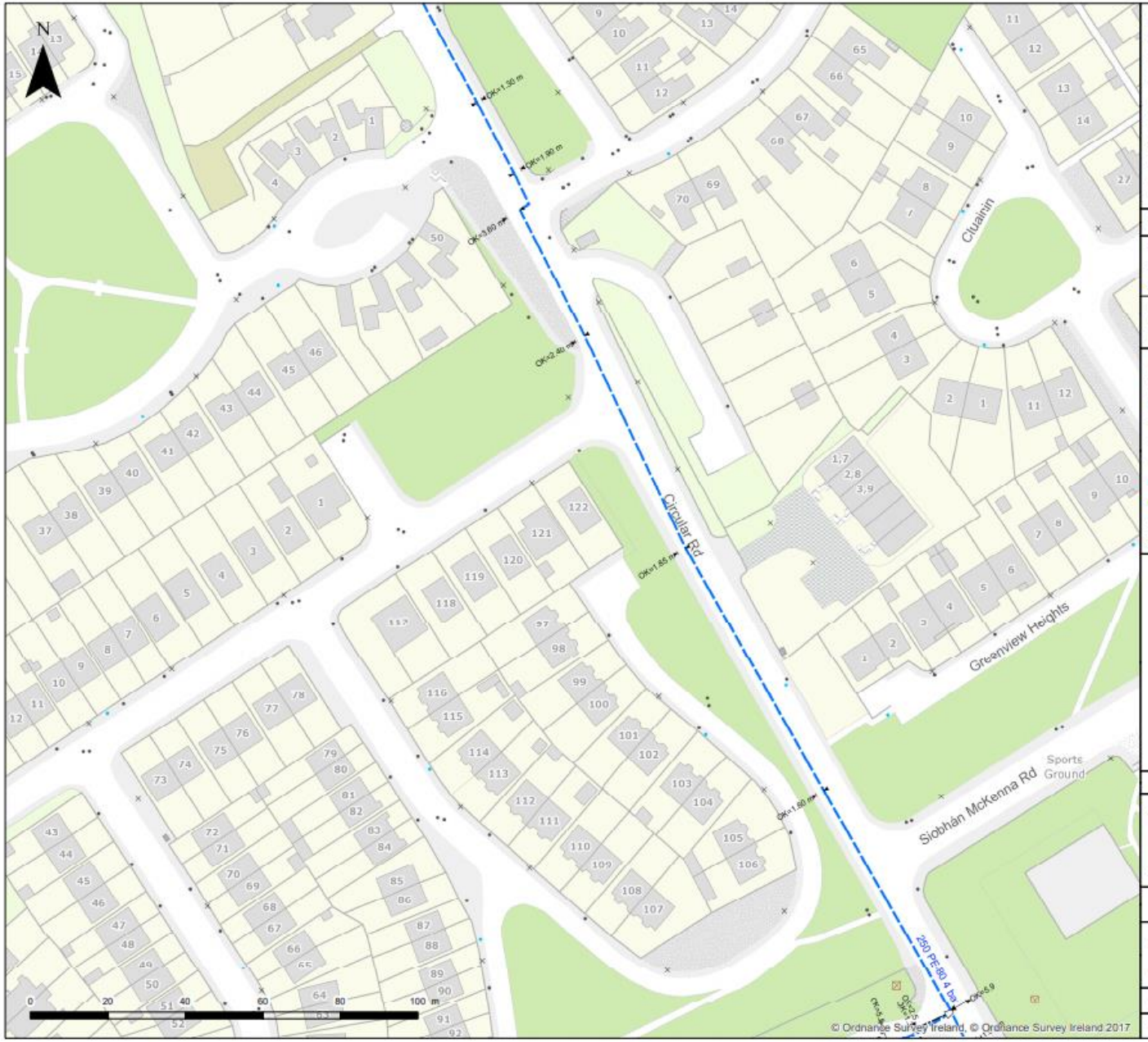
Conclusion –

As noted, the existing gas main on the circular road may not allow for tapping off by Gas Networks, it is noted on the issued layouts that no other estate currently has any service of this main.

Should Gas Networks grant a connection the installation of Photovoltaic Panels would be deemed a requirement to meet Part L, due to the slope of the proposed roof and footprint of the dwellings, the array would be substantial.

For the project to meet the requirements set out under Part L 2019, our advice would be utilised air-to-water systems as the main heating and hot water system. A CMEV system to supply extract ventilation in conjunction with passive wall vents.

The installation of such a system would reduce maintenance costs and infrastructure costs.



Important Safety Notice: Damage to gas pipelines can result in serious injury or death. Gas network information is provided as a general guide. The exact location and depth of medium or low pressure distribution gas pipes must be verified on site by carrying out necessary investigations, including, for example, hand digging trial holes along the route of the pipe. Service pipes are not generally shown but their presence should always be anticipated.

High pressure transmission pipelines are shown in red. If a transmission pipeline is identified within 15m of any intended excavations then work must not proceed before GNI has been consulted. The true location and depth of a transmission pipeline must be verified on site by a representative of GNI. Contact can be made through 1850 427 747.

All work in the vicinity of the gas network must be completed in accordance with the current edition of the Health and Safety Authority publication, 'Code of Practice For Avoiding Danger From Underground Services' which is available from the Health and Safety Authority (1890 289 389) or can be downloaded at www.hsa.ie

Legal Notice: Gas Networks Ireland (GNI) and its affiliates, accept no responsibility for the accuracy of any information contained in this document including data concerning location and technical designation of the gas distribution and transmission network (the"Information"). The Information should not be relied on for accurate distance or depth of cover measurements.

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- Aurora Telecom Duct
- Aurora Telecom Sub Duct
- Aurora Telecom Inserted Gas Pipe

Aurora TELECOM

Aurora Telecom Queries - 01-8926166 (Office Hours)
Aurora_Network_Queries@gasnetworks.ie
Aurora Telecom Emergency Only 1850 427399 / 01 2030120

- Transmission Pipe (High Pressure)
- Transmission Pipe (Construction Issue)
- Distribution Pipe (Medium Pressure)
- Distribution Pipe (Low Pressure)
- Service Pipe (Medium Pressure)
- Service Pipe (Low Pressure)
- Strategic Pipe (Medium Pressure)
- Strategic Pipe (Low Pressure)
- Inserted
- Abandoned Pipe

C=?	Cover (depth in metres)		Pressure Monitor
CP	CP Test Point		Protection (Slabbing)
	End Cap		Protection (Sleeve)
	Hot Tap		Reducer
	Installation		Service Terminator
	Valve		Tee
	Mains Verification**		Transition

**** Please contact GNI on 1850-427747 for specific information**

DIAL BEFORE YOU DIG 1850 42 77 47
In Emergency call 1850 20 50 50

Gas Networks Ireland

GAS NETWORK INFORMATION

Description:

Location: 527703,725716

Plot Date: 28/04/2021 09:04	Scale: 1000 @ A3
Plotted By: 2250	Ref ID: *2250_28042021090458*

ELECTRICAL

We have contacted the statutory bodies to determine the local areas networks and routes.

It was noted that there is an existing ESB mini-Pillar to the rear of one of the existing properties, the mini pillar appears to service the Green view apartments and the existing site.

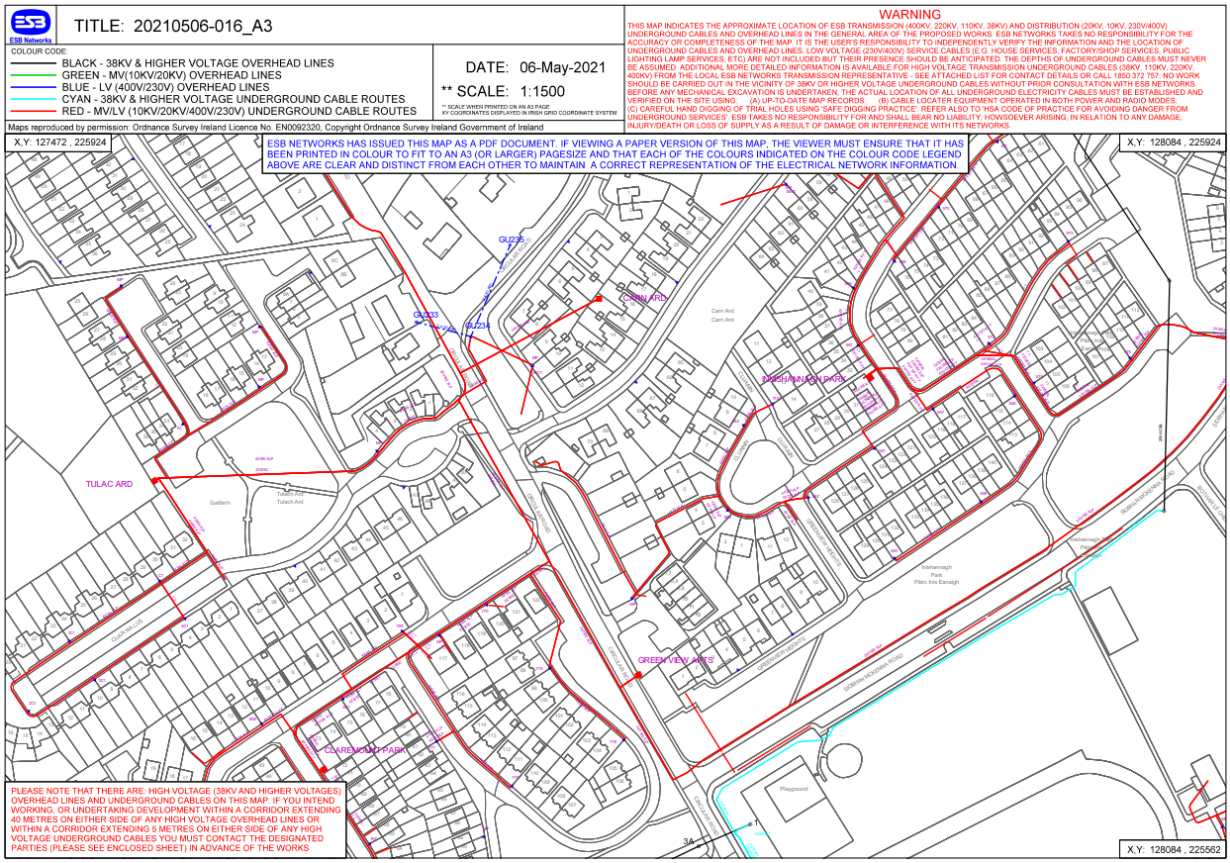
It is proposed to lodge an application to the ESB for a relocation of the existing mini pillar to the Green View Apartments and to apply for a new upgraded connection to serve the new construction with a new mini-Pillar located to the entrance of the site.

Centralised metering can be located to the entrance of the site if deemed necessary.

Public lighting for the site can remain of an existing lighting pillar located at the entrance to the site.

Before the demolition occurs the ESB will be contacted to organise a disconnection to the existing properties, an application will be made for an upgraded supply to suit the proposed dwellings.

Maps for EIR and Virgin have been requested – applications for these services will be client direct.



CONCLUSION

As outlined in the report, to ensure compliance with TGD Part L & F the use of an air-to-water heat pump system to provide heating and hot water combined with a CMEV unit (Central extract) would be advised. The proposed system can run in conjunction with under floor heating and radiators.

The site has an existing ESB supply, the supply will have to be altered to allow for a new mini pillar at the entrance, a new lighting pillar may be required.
The existing houses will require a disconnection from the ESB network before works commence, while in construction a new application will be made for an upgrade supply to each dwelling.

Other Utilities such as EIR and Virgin application must be made through the client.

Yours sincerely
Chris Dore

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for CMD Consulting Engineers

E. IAS Report

Frances Giaquinto

Ecological Research and Practice

Invasive plant survey for a proposed Traveller Group Housing Scheme, Galway

Date: 19th October 2021

FAO:
Mícheál de Siún MRIAI, Desiun, 26 Eustace Street, Temple Bar, Dublin 2
Cyril Mitchell, Senior Executive Engineer, Housing and Social Inclusion, Galway City Council

From: Dr Frances Giaquinto CEnv MCIEEM

Location of proposed Traveller Group Housing Scheme

1 Introduction

Mícheál de Siún of Desiun Architects, Temple Bar, Dublin 2, requested an invasive species survey on behalf of Galway City Council for a proposed Traveller Group Housing Scheme at Carn Ard, Circular Road, Galway. The site is 0.3 ha in size. The location of the site, as provided by Desiun Architects, is https://goo.gl/maps/KX23cZuNPTV4poMbA.

Dr Frances Giaquinto CEnv MCIEEM, a chartered environmentalist and full member of the Chartered Institute of Ecological and Environmental Management assessed the site with Nicholas Head, who trades as Knotweed Ireland Services, on the 19th October 2021.

Acronyms used in this quotation

EPA	Environment Protection Agency
IAS	Invasive Alien Species
NPWS	National Parks and Wildlife Service

1.1 Purpose of the site survey

The aim of the site survey was to:

- Identify regulated Invasive Alien Species (IAS), controlled by EC, EU and national legislation and guidelines, such as Japanese knotweed and giant hogweed.

- Identify non-regulated but nevertheless troublesome invasive species such as winter heliotrope (*Petasites fragrans*) and montbretia (*Crocosmia x crocosmiiflora*).

- Advise Galway City Council on necessary actions in the event of invasive species being present to ensure compliance with the following EU, national and regional legislation and guidelines:
  - Implementation of the Irish Government's guidelines on sustainable use of pesticides, *European Communities (Sustainable Use of Pesticides) Regulations, 2012*[1]
  - Compliance with Section 49 of the *European Communities (Birds and Natural Habitats) Regulations, 2011, S.I. No. 477*, which makes it an offence to knowingly disperse IAS.
  - Compliance with EPA and NPWS requirements with regards transport and disposal off-site of materials infested with Japanese knotweed and/or other IAS, which are regarded as hazardous waste.

- Identify environmental issues, including:
  - Ecological points of note, including proximity to conservation areas of European importance.
  - Environmental concerns, such as fly tipping, green waste, dangerous conditions associated with rubble/infill/construction materials, evidence of chemicals and toxic substances (e.g., asbestos, diesel, abandoned chemical containers).

[1] http://www.pcs.agriculture.gov.ie/

2 Survey findings

Frances Giaquinto and Nicholas Head systematically walked the site, paying particular attention to boundaries and areas that are partially concealed, such as behind the utility buildings and beneath the trees.

The site is moderately well maintained and there was no visible evidence of any invasive plants that could impact the proposed development of the site. Sycamore (*Acer pseudoplatanus*) saplings were seen to be growing against some of the walls. These can become a nuisance because their roots and branches can penetrate walls and drains and break them apart over time. However, as these are likely to be removed during enabling works there is no reason why any separate action should be taken.

There is an ash tree (*Fraxinus excelsior*) at the entrance to the site and this is showing advanced ash dieback disease caused by the invasive alien fungus *Hymenoscyphus fraxineus.* This tree will die and efforts should not be made to retain it as part of a future landscaping plan.

The site is relatively clean with only moderate amounts of rubbish scattered about. We found no evidence of any toxic material that could cause concern.

The site is within 15 km of the Galway Bay Complex Special Area of Conservation (SAC), code 000268 (https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000268.pdf). However, the site has no ecological merit and the proposed development will not impact on the conservation objectives of the Galway Bay Complex.

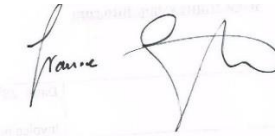
2.1 Area immediately adjacent to the site

Carn Ard is located in a residential area and we noted a raised flower bed immediately outside the site along the length of the boundary wall. This has a range of ornamental species. Some of these can become troublesome in their invasiveness although there is no legislation which requires their removal. These include montbretia (*Crocosmia x crocosmiiflora*) and dogwood (*Cornus* sp.). Although they are frequently used in landscaping plans, we strongly encourage Galway City Council to ensure that these species are not used anywhere in the city because of their rate of dispersal and because they are very difficult to eradicate once established.

3 Conclusions

In conclusion, there are no invasive species at or near the site which could represent a problem for the proposed development works.

Dr Frances Giaquinto CEnv., MCIEEM



Dr Frances Giaquinto CEnv., MCIEEM
Ecological Research and Practice
Derrynaneal, Feakle, County Clare V94 T9PV
Tel: 087 966 2935
E mail: f.giaquinto@outlook.com

Image 1 Entrance to the site

Image 2 Sycamore saplings growing against one of the block walls at the site

Image 3 Ash tree at site entrance affected by ash dieback disease

Image 4 Boundaries and corners were all checked for invasive species

Image 5 The site was relatively clean and there was no sign of any toxic materials

Image 6 Montbretia was noted in the flower bed along the outside of the site's boundary wall, and on the opposite side of the road. This can become troublesome if allowed to spread and we encourage Galway City Council to ensure there is no further planting of this species in landscaping plans.