Marshall Yards Development Company Limited

Residential Zone Lands at Gortnahomna, Castlemartyr, Co. Cork

Drainage Impact Assessment

(Planning Submission)

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1 Executive Summary

Donnachadh O'Brien & Associates Consulting Engineers Ltd. (DOBA) have been instructed by the Client, Marshall Yards Development Company Limited, to prepare a Drainage Impact Assessment (DIA) to accompany a Planning Application to Cork County Council (CCC) for the proposed Large Scale Residential Development (LRD) on lands at Gortnahomna, Castlemartyr, Co. Cork. This DIA addresses the surface water infrastructure pertaining to this development in accordance with Table 2 of the County Development Plan 2022, Advice Note 1, Surface Water Management.

This report has been structured as follows;

- **Section 2** summarises the proposed development,
- **Section 3** summarises the existing site including topography, ground conditions and existing drainage,
- **Section 4** describes the extents of the existing surface water network adjacent to the site and summarises the surveys undertaken by the Applicant to confirm the extents and condition of the network,
- **Section 5** outlines the analysis for the proposed surface water network serving the new development and confirms the capacity of the existing surface water network to receive proposed surface water flows whilst also reducing flood risk downstream, and finally,
- **Section 6** summarises the proposed SuDS features included in the proposed surface water design including maintenance procedures

2 Proposed Development

The proposed LRD development is to be located on an existing 6.88Ha (17 Acre) greenfield site of which 4.0Ha is developable area, as illustrated in **Figure 1** below and is bound to the south and east by agricultural land, to the west by residential development, and to the north by Killeagh Road (N25) and existing residential development. The existing site is illustrated on **Engineering drawing C-0001.**

Figure 1 Site location (highlighted in red) Source: Google Maps

The proposed large-scale residential development (LRD) is located at Gortnahomna, Castlemartyr, Co. Cork. The proposed development will include 150 residential units as follows:

- 4 no. two-bed bungalows;
- 56 no. two-bed townhouses;
- 43 no. three-bed townhouses;
- 39 no. three-bed semi-detached;
- 1 no. four-bed townhouse; and
- 7 no. four-bed semi-detached houses.

The proposed development includes a crèche facility for 68 child spaces, 2 no. ESB substations and all related site development works including car and bicycle parking, bin and bicycle storage, landscaping/amenity areas, public lighting and all other necessary services. Assess to the site will be via a new entrance from the existing N25. The proposed development layout is included in **Figure 2** below.

Figure 2 Proposed Development Source: (DGA)

3 Existing Site

3.1 Site Topography

The existing site topography, as illustrated on DOBA Engineering drawing C-0001, is relatively steep in the southern portion of the application lands with levels ranging from +22mOD at the south-west corner to +11.0mOD at an average gradient of approx. 1 in 12 in places. The northern portion of the application lands are generally gently sloping. The finished road levels of the N25 to the north of the site vary from +15.30mOD to 11.80mOD. The existing site is illustrated on **Engineering drawing C-0001** and a topography heat map is shown in **Figure 3** below.

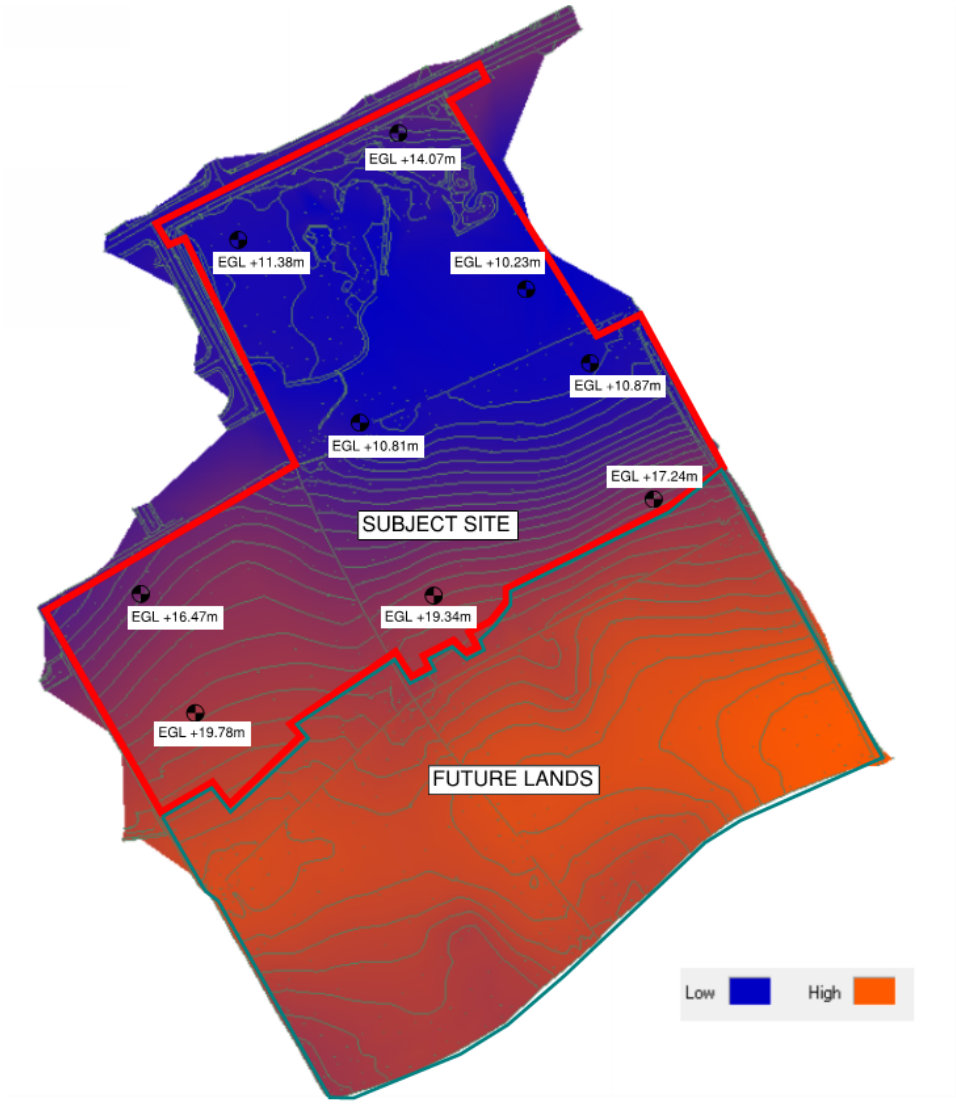

Figure 3 Topography Heat Map Site Investigations

Ground investigations have been completed on the site which includes the following;

- Cable Percussive Boreholes
- Trial Pits
- BRE365 soakaway tests
- Plate Bearing (CBR) Tests
- Ground Water Monitoring
- Geotechnical Laboratory Testing
- Geo-environmental Testing (WAC & RILTA Suites)
- Geophysical survey

The ground investigations (GI) generally indicate firm to stiff orange brown to reddish brown sandy gravelly CLAY / SILT. TP02 identified localised gravelly SAND horizons. Made ground was identified to depths up to 2.70m below ground level in BH05, TP08, TP09 and TP10 in the northern lands which appears to have been a construction compound in the recent past.

Infiltration testing yielded moderate to poor infiltration, f, rates across the site. As such, the use of infiltration SuDS measures will be limited on the site.

Groundwater was encountered at between 3.00m to 5.40m below existing ground level on the site during the site investigations. Groundwater monitoring stand pipes have been installed and the monitoring will include a winter and summer season. The GI report is included in **Appendix A**.

A geophysical survey was carried out by Minerex Geophysics Ltd on the application site to investigate the ground conditions and identify the potential for karst features. The report concludes that a large amount of karst is evident across the site and that a general risk of karst exists for the entire site. Supplementary rotary core holes and other geotechnical investigations will be carried out prior to commencement to test for karst. The Geophysical report is included in **Appendix B**.

3.2 Overland Flow

The current overland flow path follows the natural site topography towards the northern lands to an existing drain / channel along the northwest boundary of the site. The existing runoff appears to pond in this low-lying area prior to discharging to ground or evaporating. **Figure 4** below, is an illustration of the existing overland flows.

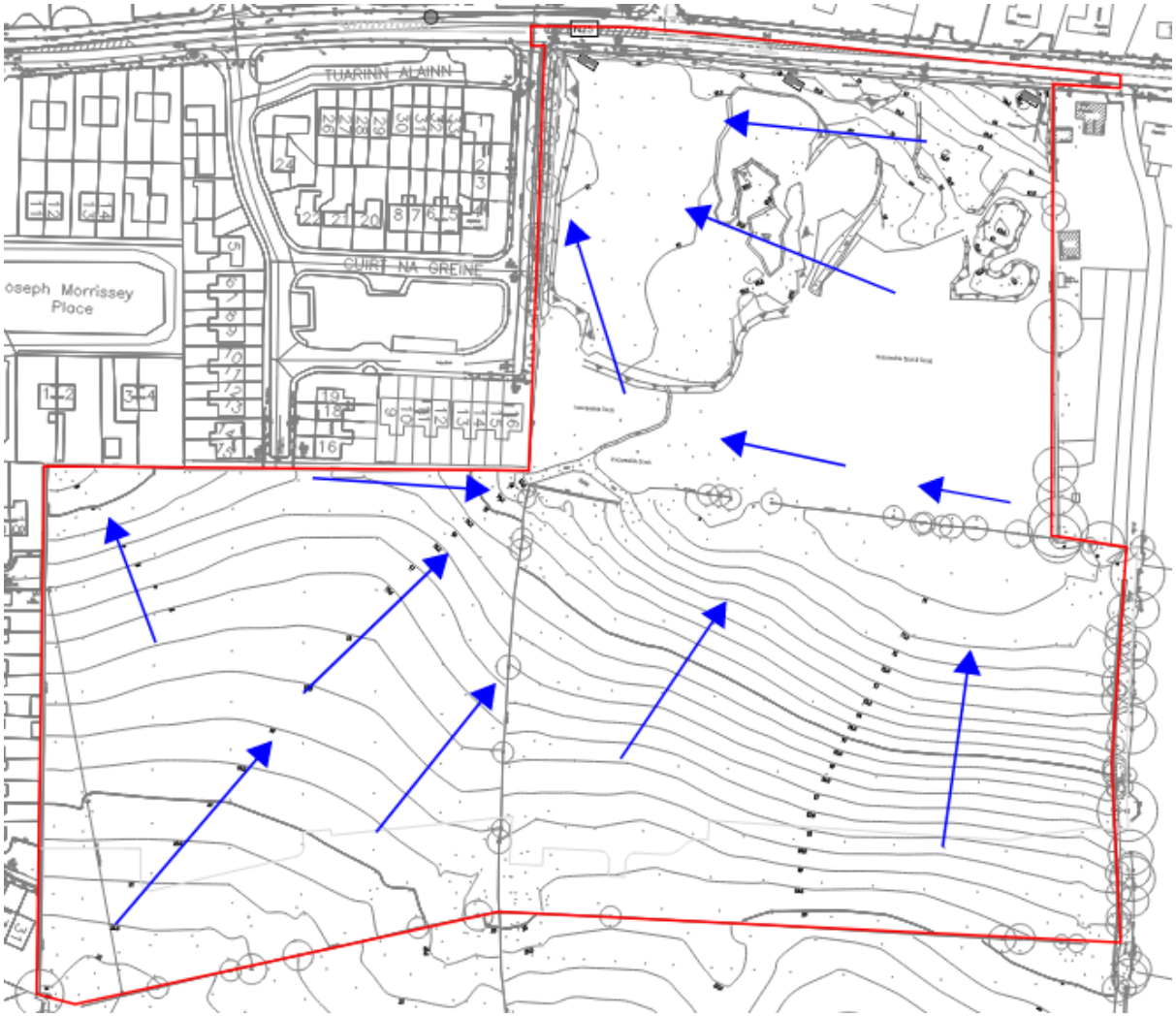

Figure 4 Existing Overland Flowpath

3.3 Existing Site Hydrology

A review of Historical Ordinance Survey Ireland information was carried out to determine if the maps indicated historic water courses / surface water features within the application lands. The maps do not indicate any record of a formal water course on the lands.

JBA Consulting have prepared a Flood Risk Assessment (FRA) for the proposed development which identifies the existing wwatercourses in the vicinity of the lands. **Figure 5** below is an extract from the FRA which illustrates the location of the existing watercourses relative to the application lands.

Figure 5 Site Hydrological features (Source – JBA FRA)

3.4 Existing Services

The public surface water network maps do not indicate an existing surface water network along the N25 to the north of the application lands. The applicant commissioned topographical and Gound Penetrating Radar (GPR) surveys to identify the extents of any existing networks along the N25. The surveys confirmed the location and extents of an existing 300mm / 600mm diameter surface water network along the N25 adjacent to the site and discharging to the Kiltha River to the west of the lands as indicated in **Figure 6** below. The extents of the existing surface water network are illustrated on the topographical and GPR survey drawings and also on the DOB&A existing services drawings (**DOBA C-0010 & C-0011**).

The applicant also commissioned Oak Enviro to carry out a Closed-Circuit Television (CCTV) survey of the existing surface water network in order to confirm the condition and extents of the existing network. The surface water CCTV survey report is included in **Appendix D**.

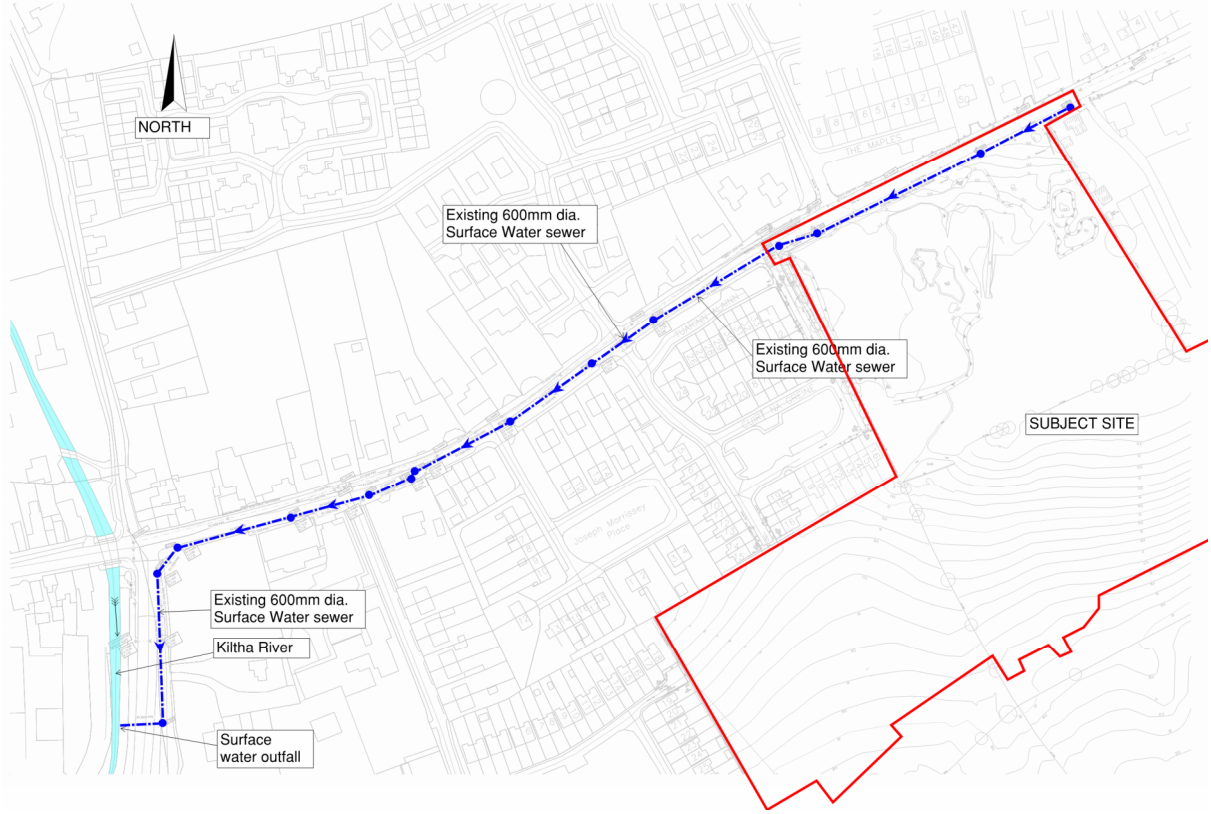

Figure 6 Existing Surface Water network extents

4 Existing Surface Water Network Analysis

The applicant was requested to assess the capacity of the existing surface water network along the N25 by CCC WSD following feedback from the S.247 meeting.

DOBA have carried out an assessment of the existing flows discharging through the existing 300mm diameter surface water sewer located in the footpath along the northern boundary of the site. The applicant is proposing to divert these existing flows into the proposed development surface water network in order to restrict the discharge from the application site to less than the current flows – in order to reduce the flood risk downstream. The catchment area discharging to the existing 300mm diameter pipe is highlighted in red in **Figure 7** below. This catchment has been calculated as 0.288 Ha.

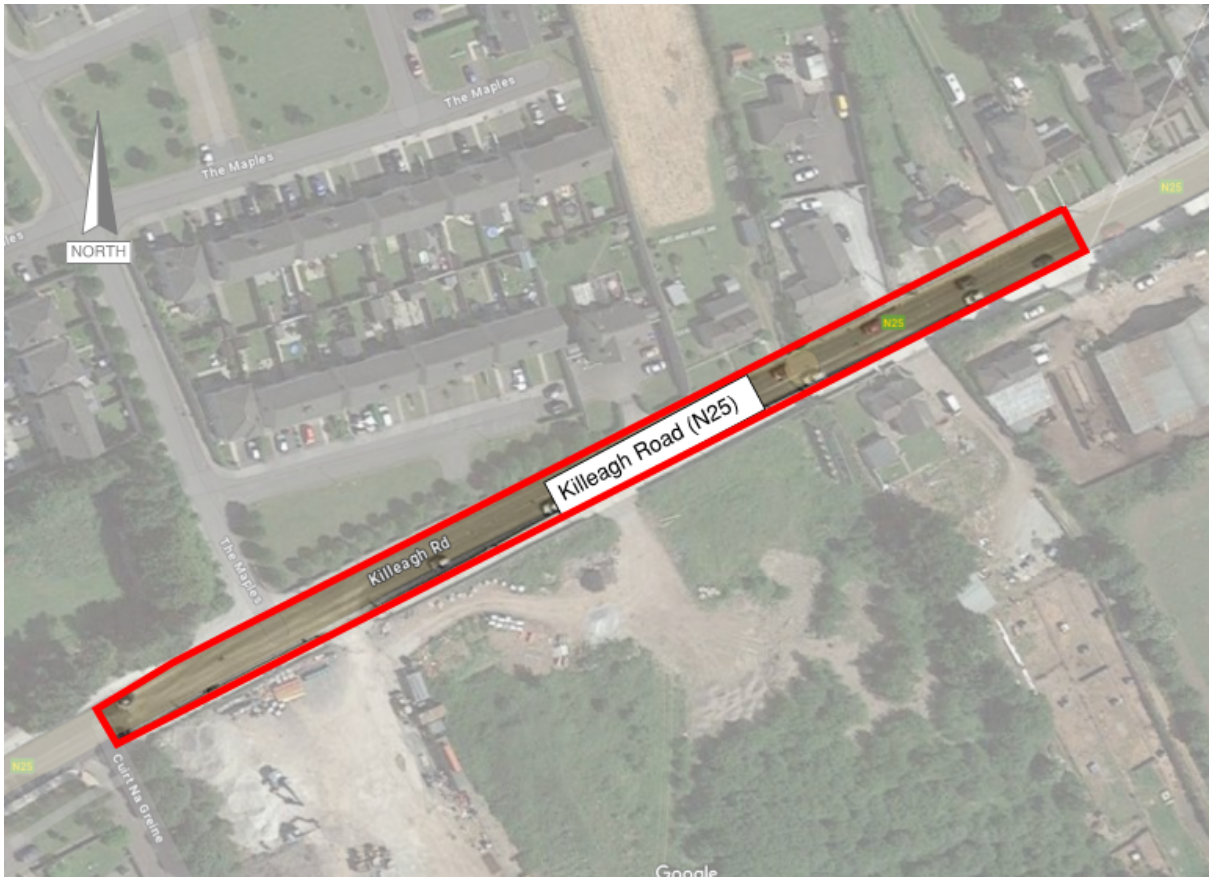

Figure 7 Area of hardstanding discharging to the existing 300mm diameter SW pipe along the N25

The assessment has been carried out using the Infodrainage software and the parameters used to determine the existing flows are outlined below.

Surface water drainage design method	Modified Rational Method
Storm Return period (years)	1 year
Standard Annual Average Rainfall (SAAR) (mm)	1057

Maximum Rainfall	50mm/hr
M5-60 rainfall depth (mm)	15.9
Ratio, r	0.206
Allowance for Climate Change (%)	0%
Pipe roughness (mm)	0.6
Run-off coefficients	100%

The existing theoretical unrestricted flows during a 1-year storm event discharging through the 300mm pipe and thus discharging downstream to the 600mm sewer has been calculated as **22.6 l/s** as shown in **Figure 8** below.

Connection	Storm Event	Connection Type	From	To	Upstream Cover Elevation (m)	Max. US Water Elevation (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
SMH(01)-SMH(12)	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	SMH (01)	SMH(12)	11.890	10.525	0.063	13.134	2.1	0.1	22.6	OK
SMH(02)-SMH(03)	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	SMH (02)	SMH(03)	15.358	13.937	0.071	6.891	1.1	0.08	14.1	OK
SMH(03)-SMH(01)	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	SMH (03)	SMH(01)	14.063	12.565	0.075	13.218	1.8	0.16	24.9	OK
SMH(12)-SMH(15)	FSR: 1 years: +0 %: 30 mins: Winter	Pipe	SMH (12)	SMH(15)	11.670	9.258	0.136	18.946	0.4	0.11	20.7	OK

Figure 8 Surface Water flows in Existing Pipes along N25

In summary, the applicant is proposing to reduce the existing flows entering the surface water network by intercepting and attenuating existing runoff from the N25 and also the proposed flows from the development to less than the existing 22.6 l/s.

5 Proposed Surface Water

The design and management of surface water for the proposed development will comply with the requirements of the Greater Dublin Strategic Drainage Study (GDSDS), the Cork County Development Plan 2022 – 2028 and CIRIA report C753 The SuDS Manual-v6. The design of the surface water network and SuDS measures within the application site shall include a 20% climate change factor in accordance and the Cork Co. Co. Water Services requirements.

5.1 Principle Design Considerations

Surface water from the proposed residential development will be managed via a surface water network that includes Sustainable Drainage Systems (SuDS) which are discussed further in **Section 6** below. The surface water will be attenuated and controlled on-site before being discharged at a rate lower than the existing run-off rate (as noted in **Section 4** above). The 600mm diameter public stormwater system along the N25 will serve as the discharge point (refer to **DOBA Engineering drawing C-0200** for details).

The development has been split into 6 no. sub-catchment areas for the surface water attenuation design in order to reduce flows within the site as shown in **Figure 9** below. The Surface water drainage layout is illustrated on **Engineering drawing C-0200.**

The discharge rates will be regulated using vortex flow control devices (Hydrobrakes) and attenuation will be provided using reinforced concrete attenuation tanks (due to the karst risk in the area). The discharge from the site will also pass through a bypass petrol/oil separator, which is sized according to the allowable discharge rate.

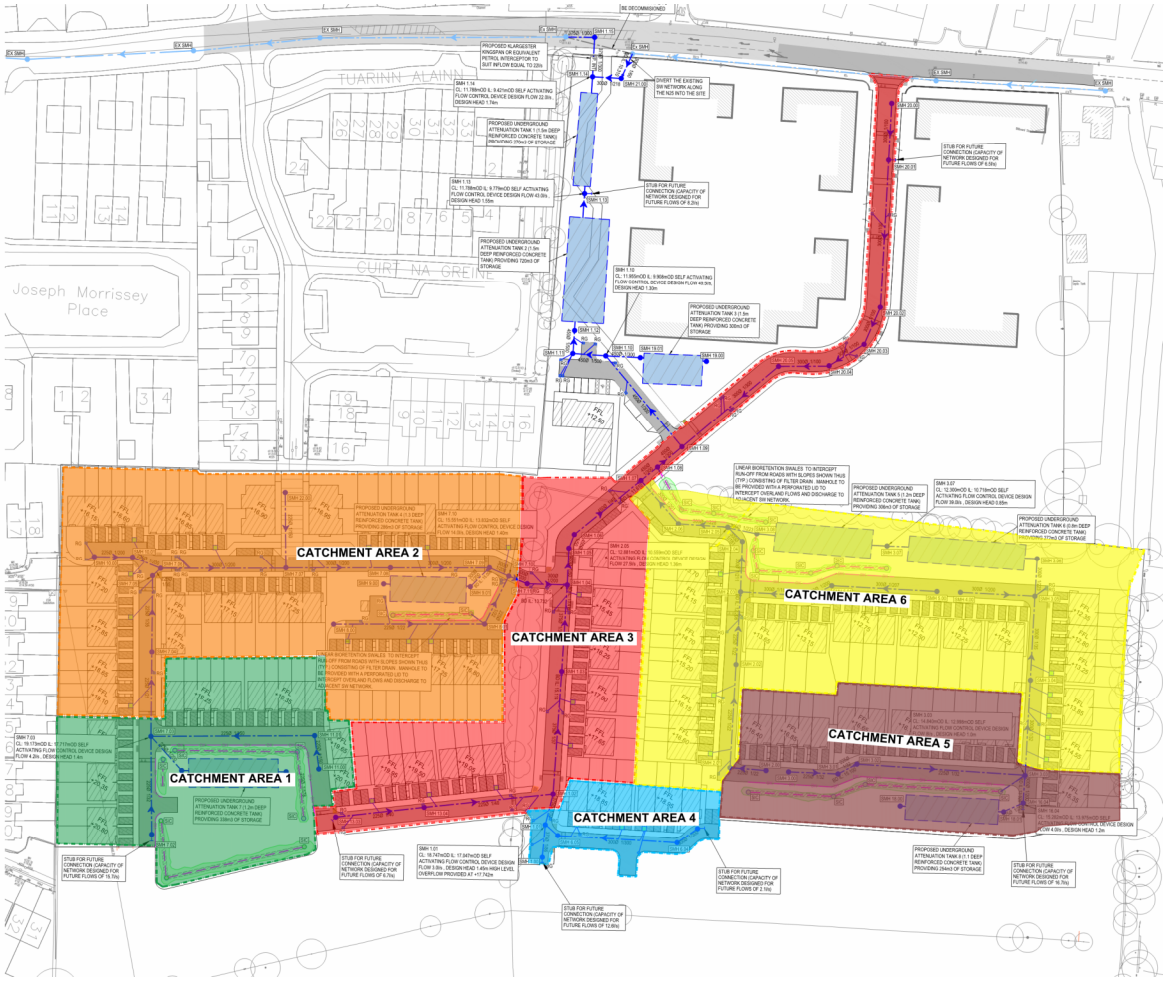

Figure 9 Proposed Surface Water Drainage Catchments

5.2 Design Criteria

The surface water piped network and associated attenuation design calculations have been prepared using Infodrainage Network Design Computer software by Innovyze. The proposed surface water drainage system has been designed in accordance with I.S. EN 12056: 2000 'Gravity Drainage Systems inside Buildings', I.S. EN 752: 2017 'Drain & Sewer Systems outside Buildings', 'The Greater Dublin Region Code of Practice for Drainage Works', the recommendations of the 'Greater Dublin Strategic Drainage Study', (GDSDS) and the Building Regulations Technical Guidance Document Part H applying the following parameters.

Surface water drainage design method	Modified Rational Method
Storm Return period (years)	1 in 5 year
Allowable outflow (l/s)	22.0 l/s (less than the existing network flows)
Flooding Period	1 in 30 Year and Up to and including a 1 in 100 Year + 20% CC

Standard Annual Average Rainfall (SAAR) (mm)	1057
M5-60 rainfall depth (mm)	15.9
Ratio, r	0.206
Allowance for Climate Change (%)	20%
Minimum self-cleansing velocity (m/s)	0.75
Pipe roughness (mm)	0.6
Run-off coefficients	
Soft landscaped areas	37.5% (50% Soil type 2 and 50% Soil Type 4)
External hardstanding	80%
Roof Areas	95%

Refer to **DOBA Engineering drawings 2411-DOB-XX-SI-DR-C-0200 series** relating the proposed development's surface water drainage network. The storm sewer network calculations are included in **Appendix C**.

5.3 Estimation of Proposed Greenfield Runoff Rate

In accordance with the IH24 method, the greenfield runoff for existing undeveloped sites measuring less than 50Ha can be estimated adopting the following formula and the total permissible outflow has been calculated in **Table 1** and **Table 2** below based on a 50% Soil Type 2 and 50% Soil Type 4 in accordance with TII DN-DNG-03064 Table 5/1, where $Qbar_{rural}(m^3/s)=0.00108x(Area)^{0.89}(SAAR)^{1.17}(SOIL)^{2.17}$

Table 1 Qbar calculation (Subject Site – Red Line)

Standard Average Annual Rainfall (SAAR)	1057	mm
Soil Index	0.375	
Total Drained Area	6.88	Hectares (ha)
Storm Return Period	100	Years
Permissible Outflow per hectare, QBAR	4.8	l/s/ha
*** Total Permissible Outflow**	32.96	l/s

Table 2 Qbar calculation (Subject Site + Future Lands)

Standard Average Annual Rainfall (SAAR)	1057	mm
Soil Index	0.375	
Total Drained Area	13.359	Hectares (ha)
Storm Return Period	100	Years
Permissible Outflow per hectare, QBAR	4.8	l/s/ha
*** Total Permissible Outflow**	63.99	l/s

As noted above, the applicant was requested to assess the capacity of the existing surface water network along the N25 by CCC WSD during the s247 meeting. The existing flows in the 300mm diameter pipe to the north of the site has been calculated as 22.6 l/s which is less than the Qbar for the site. In summary, the applicant is proposing to reduce the existing flows entering the surface water network by intercepting and attenuating existing runoff from the N25 and also the proposed flows from the development (and future development).

5.4 Post Development flow route

The post-development overland flow route is illustrated in **Figure 10** below. The post-development flow route reflects the pre-development flow route (included in **Figure 4** above) with overland flows following the proposed road network towards the landscaped areas at the natural low points of the site. Any excess water is effectively channeled away from critical infrastructure and buildings.

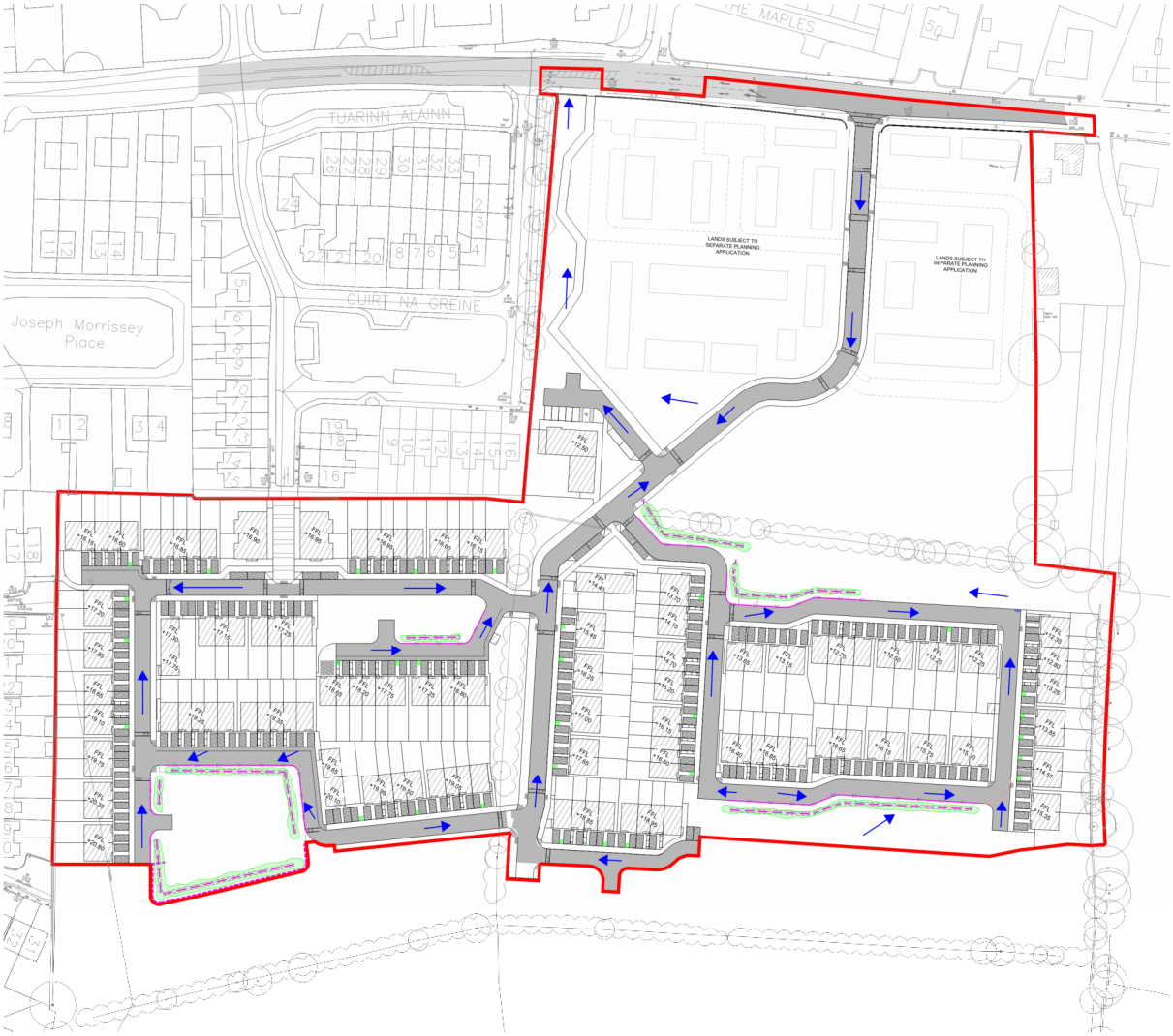

Figure 10 Post Development overland flow path

5.5 Site Specific Flood Risk Assessment

As mentioned in section 3.3 of this report, JBA Consulting have prepared a site-specific flood risk assessment (FRA) including the subject site. The FRA concludes that the development site is located in Flood Zone C. The FRA by JBA is included with the planning application documents.

6 SuDS

6.1 Cork County Council SuDS Hierarchy

The SuDS hierarchy outlined in **Table 3** below has been considered for this site in accordance with the Cork County Council SuDS selection hierarchy for LRD developments.

Table 3 Cork County Council SuDS Selection Hierarchy Sheet

Table 4 **Cork County Council SuDS Selection Hierarchy Sheet for Large-Scale Development and Agricultural Development**				
SuDS Measures	**Measures to be used on site**	**Rational for selecting/ not selecting measure**	**Area of Feature**	**Attenuation volume of feature (m^3)**
Source Control Providing storage at source				
Swales	Yes	Roads shall either discharge surface water run-off directly to bio-retention swales or to tree pits	Refer to Drawing 2411-DOB-XX-SI-DR-C-0200 and **Appendix C** (Surface water calculations)	
Integrated constructed tree pits	Yes			
Rainwater Butts	No	Rainwater from roofs at rear of units shall discharge to downpipe planters with an over-flow to the local underground network where it shall discharge to the permeable paving located beneath the private car spaces to the front of the units. Rainwater from the roofs to the front of units shall discharge directly to the permeable paving beneath the private car parking spaces.		
Downpipe Planters	Yes	To be provided to the rear of units		
Rainwater Harvesting	Yes	To be provided to the Creche		
Soakaways	No	BRE365 tests did not return favourable rates,		
Infiltration trenches	No	BRE365 tests did not return favourable rates,		
Permeable pavement (Grass Crete, Block	Yes	Permeable paving is to be provided to all private in curtilage car parking		

Paving, Porous Asphalt, etc.)		spaces. It is not proposed to provide permeable paving to public car parking spaces which are to be Taken In Charge	
Green Roofs	No	Not suitable for pitched roofs	
Green Wall	No	Not suitable for private residential units	
Filter Strips	No	Not suitable to provide loose stone at surface level in a residential development	
Bio-retention systems/ Raingardens	Yes	Roads shall either discharge surface water run-off directly to bio-retention swales or to tree pits	
Blue Roofs	No	Not suitable for pitched roofs	
Filter Drain	Yes	To be provided in conjunction with tree pits and bio-retention swales	
Site Control			
Detention Basins	Yes	Detention basins to be provided over attenuation tanks to provide storage for 1:100 Year events plus 20% Climate Change	
Retention Basins	No	Detention basin proposed in lieu of a retention basin	
Regional Control			
Ponds	No	Not possible on this site given the steeply sloping nature of the proposed development. Area required to constructed a pond will be considerably larger given slopes of open space.	
Wetlands	No	Not possible on this site given the steeply sloping nature of the proposed development. Area required to constructed a wetland will be considerably larger given slopes of open space.	
Other			
Petrol/ Oil Interceptor/ Grit Trap	Yes	Provided on network prior to discharge to the public system.	
Attenuation tank – only as a last resort where other	Yes	Reinforced concrete attenuation tanks are proposed on this	Refer to Drawing 2411-DOB-XX-SI-DR-C-0200 and **Appendix C** (Surface water

measures are not feasible		development due to the risk of karst associated with the site.	calculations)	
Oversized pipes – only as a last resort where other measures are not feasible	No	Not proposed to provide over-sized pipes.		
Other	N/A			

6.2 Greater Dublin Strategic Drainage Study (GDSDS) Compliance

The design of sustainable drainage systems, as per Chapter 6 of the Greater Dublin Strategic Drainage Study (GDSDS), is set out below and describes the performance of the proposed surface water drainage system when measured against the relevant GDSDS drainage criterion, namely

- Criterion 1 – River Quality Protection
- Criterion 2 – River Regime Protection
- Criterion 3 – Level of Service (flooding) for the Site
- Criterion 4 – River Flood Protection

The requirements of SuDS are typically addressed through the provision of

- Interception Storage
- Treatment Storage *(not required if interception storage is provided)*
- Attenuation Storage
- Long Term Storage *(not required if growth factors are not applied to Q_{bar} when designing attenuation storage)*

6.2.1 Proposed Treatment Strategy

Figure 11 below illustrates the minimum 2 stage treatment strategy proposed for the development and associated SuDS hierarchy.

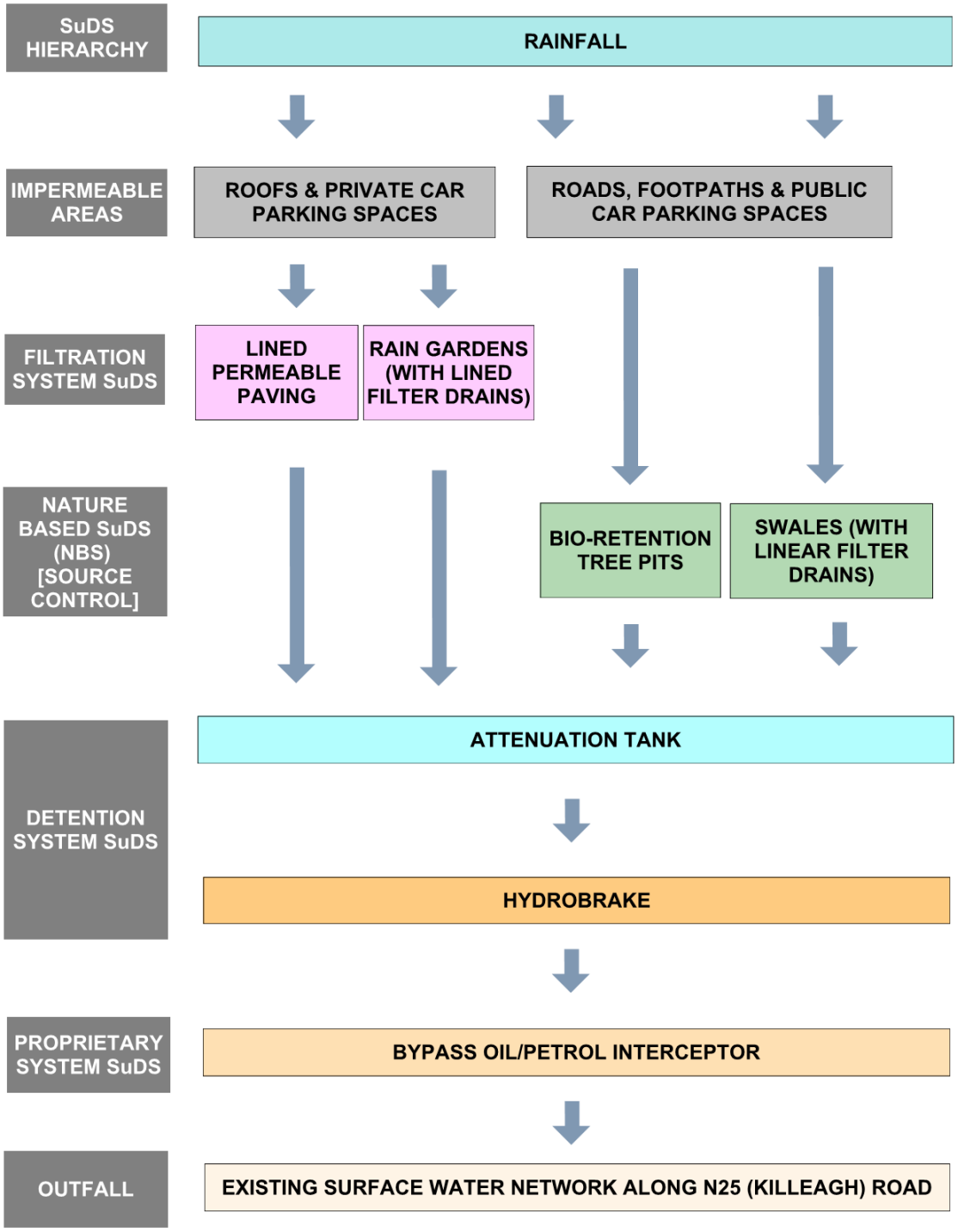

Figure 11 Proposed Treatment Train

6.2.2 River Quality Protection

6.2.2.1 Objective

Interception storage of at least 5mm, and preferably 10mm, of rainfall where run-off to the receiving water can be prevented.

6.2.2.2 Proposal

The 10mm rainfall event on site will be intercepted without discharging to the public system. **Table 4** is a summary of the required and provided interception volumes in each of the sub-catchments.

Table 4 Summary of interception volumes per sub-catchment

Sub-Catchment Reference	Interception required (m^3)	Interception provided (m^3)
1	56	84
2	114	149
3	78	79
4	13	50
5	50	69
6	108	143

The detailed interception calculations are provided within **Appendix C**.

6.2.3 River Regime Protection

6.2.3.1 Objectives

2.1 Discharge rate equal to 1-year Greenfield site peak runoff rate or 2 l/s/Ha, whichever, is the greater. Site critical duration storm to be used to assess attenuation volume.
2. 2 Discharge rate equal to 1 in 100-year Greenfield site peak run off rate. Site critical duration storm to be used to assess attenuation storage volume.

6.2.3.2 Proposals

The surface water network has been designed to comply with these sub-criteria and prior to discharging to the existing surface water network along the N25, the surface water runoff will be reduced to less than the existing flows entering the piped network by intercepting the existing surface water runoff from the N25 along the northern boundary of the site, as noted in section 3.1 of this report. The existing runoff entering the existing surface water network has been calculated as **22.60 l/s.** The proposed reduced discharge from the development site to the existing network is **22.0 l/s.** This represents a 3% decrease in the existing flows in the existing surface water network and reduces

the flooding risk downstream. In order to achieve this, it is proposed to limit the surface water runoff entering the existing surface water network via a proposed hydro brake flow control device fitted to the discharge manhole.

6.2.4 Level of Service (flooding) for the Site

6.2.4.1 Objectives

- *No flooding on site except where specifically planned flooding is approved. Summer design storm of 15 or 30 minutes are normally critical.*
- *No internal property flooding. Planned flood routing and temporary flood storage accommodation on site for short high intensity storms. Site critical duration events.*
- *No internal property flooding. Floor levels at least 500mm above Maximum River level and adjacent on-site storage retention.*
- *No flooding of adjacent urban areas. Overland flooding managed within the development.*

6.2.4.2 Proposal

Engineering calculations included in **Appendix C** demonstrate that no pluvial out-of-manhole flooding of the proposed surface network occurs for storms up to and including a 1 in 100 Year plus 20% Climate Change. Therefore, no flooding of the site, internal properties or adjacent urban areas occurs. Pipe sizes and gradients have been designed so as to achieve self-cleansing velocities as per the requirements of the Building Regulations Part 'H'. The lowest proposed floor level is set at 500mm above the highest water level in the attenuation tank within each sub-catchment. In the event of a storm exceeding a 1:100 Year plus 20% Climate Change and the outfall becoming block, a high-level overflow is to be installed on the outfalls.

6.3 SuDS Appraisal

The SUDS selection process used for this site is in accordance with SUDS selection flow chart, Volume 3, Section 6.5, Figure 48 of the GDSDS. The characteristics of the site are utilised to select the various SUDS techniques that would be applicable.

The following methodologies are being implemented as part of a SuDS treatment train approach:

6.3.1 Permeable Pavement

Permeable paving will be used on parking areas to significantly reduce runoff. By allowing rainwater to permeate through the paving layers into the underlying drainage system, this will provide a direct form of source control. Permeable paving minimizes the amount of surface water that needs to be managed downstream, helping to prevent flooding and mimic natural drainage processes.

This paving system will also act as a natural filter for runoff, trapping sediments and pollutants before the water enters the local drainage network.

The inclusion of permeable paving ensures that the development benefits from reduced peak flows during rainfall events and enhances groundwater recharge where appropriate, all while maintaining

surface stability and environmental sustainability. Permeable pavement reduces the overall impermeable area of the hard-standing area, which will reduce the impact of the discharge and improve the quality of the effluent from the proposed development.

6.3.2 Filter Drain

Filter drains are proposed as an effective solution for managing and treating runoff from pathways where possible. These drains consist of trenches filled with permeable aggregate, along with a perforated pipe at the base to collect and convey water. Filter drains will provide temporary storage for small rainfall events and also reduce surface runoff by allowing water to evaporate and adsorb into the surrounding soil. Filter drains will also enhance the overall performance of the drainage network by reducing the volume of runoff reaching downstream systems during moderate rainfall events.

6.3.3 Tree Pits

Tree pits and planters will be designed to collect and attenuate runoff by providing additional storage within the underlying structure. The soils around trees can also be used to filter out pollutants from runoff directly. Tree pits are proposed to be in green space areas to treat and control runoff, while at the same time providing amenity value to adjacent pedestrian, and residential zones. It is also proposed, where possible to fit tree pits along the estate road to drain and treat surface water runoff from the road network. This will allow for treatment of first flush and low flows while high flows will discharge into the surface water network during extreme rainfall events. Rain water gullies will still be provided downstream of any tree pit to drain runoff during an extreme rainfall event.

6.3.4 Attenuation Tanks

The proposed attenuation system attenuates surface water to restrict the outflow to the equivalent of the existing greenfield runoff. This ensures the development will not give rise to any impact downstream of the site. It is proposed to use reinforced concrete attenuation tanks. These systems will be impermeable (tanked) and no infiltration of the runoff to the ground is proposed to avoid washing out the overburden beneath the tanks due to the risk of karst on the site. Further geotechnical investigations will be carried out prior to construction to further determine the risk of karst. The tanks will be used under the large open spaces within the development. They will be wrapped in a non-woven geotextile or specified liner which will prevent root invasion. With adequate soil cover, trees can be planted and play equipment installed in these open spaces.

6.3.5 Flow Control Device

It is proposed to provide a hydro brake, at the outfall of the surface water catchment to restrict the outflow of water from the subject site. The hydro-brakes will be fitted with a pull cord bypass and a penstock valve installed on the inlet to the manhole for maintenance purposes.

6.3.6 Petrol Interceptor

It is proposed to provide a petrol interceptor before discharging into the existing network to ensure that any remaining hydro-carbons or pollutants within the runoff from trafficked areas are treated prior to outfall to the existing surface water network. It is proposed to provide a Kingspan Bypass petrol interceptor or similar approved.

In conclusion the water quality from this catchment should be of a high quality due to the above-mentioned measures, which are applied in a treatment train to treat the water before discharge at a restricted rate to the local network.

The above measures ensure a suitable management train is provided.

6.3.7 Swales

Swales are shallow, grass-covered channels that slow down and filter rainwater. They can also absorb some water into the ground, promoting biodiversity. Positioned near roads and hard surfaces, these swales help manage water runoff before it reaches the main drainage system.

6.3.8 Management Train

The management train begins with source control through permeable paving where possible and rainwater butts in rear gardens, reducing water consumption per housing unit. Localised tree pits aid in reducing peak runoff rates. The second stage, site control, involves hydrocarbon interceptors and swales, providing pre-attenuation treatment. The third stage, regional control, uses attenuation tanks to slow stormwater discharge and remove additional silts.

These measures collectively ensure high water quality from the catchment, applying a treatment train approach to manage and treat water before its restricted discharge to the local network.

6.3.9 Four Pillars of SuDS

The key principles for consideration in SuDS as illustrated in **Figure 12** below design are:

i. Water Quality

ii. Water Quantity

iii. Amenity

iv. Biodiversity

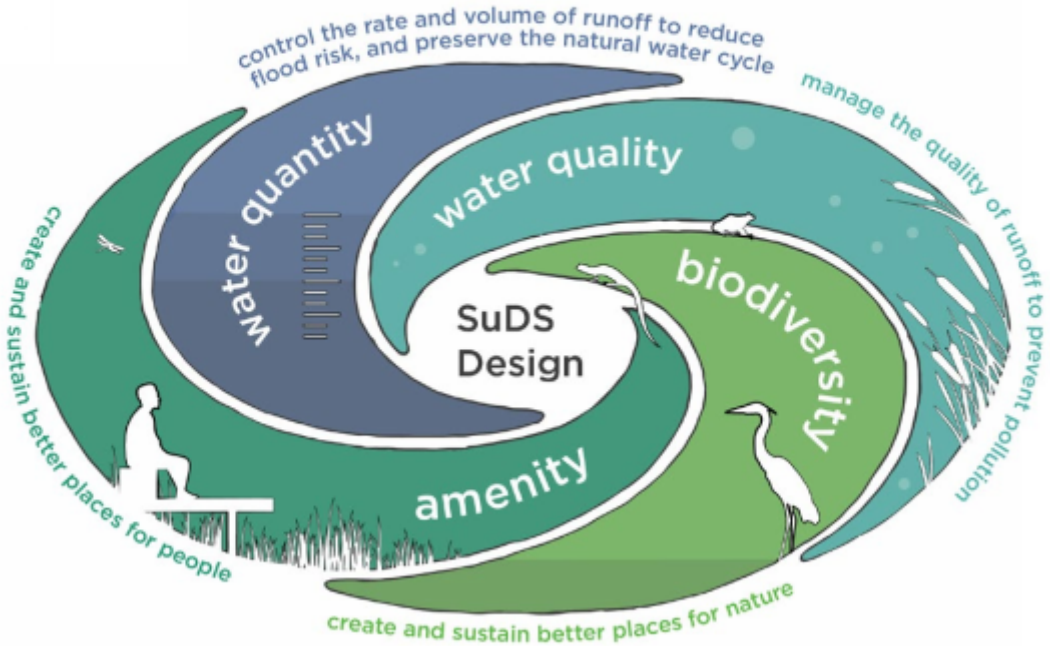

Figure 12 The Four Pillars of SuDS (Source: SDCC SuDS Explanatory, Design and Evaluation Guide.)

Table 4 below shows how these criteria have been considered:

Table 4 The Four Pillars of SuDS

Criteria	Component	Description
Water Quantity	Collection run-off	Individual dwelling downpipes to rain gardens. Individual Dwelling permeable paving hardstanding to intercept direct rainfall to site surface water network.
	Interception	Infiltration of >10mm for all surfaces Filter drains at specific locations
	Storage	Pavement sub-base Swales Attenuation Tanks
	Exceedance	Raised road crossings allowing extra storage
Water Quality	Ground water discharge	Permeable paving, tree pits, swales and filter drains to act as interception and treatment of runoff
Amenity	Swales	Water Supply to support vegetation and biodiversity habitat
Biodiversity	Landscaping + Swales	Enhance tree numbers and providing habitat and function

6.4 Maintenance Regime for SuDS Services

6.4.1 Permeable Paving

TABLE 20.15 Operation and maintenance requirements for pervious pavements

Maintenance schedule	Required action	Typical frequency
Regular maintenance	Brushing and vacuuming (standard cosmetic sweep over whole surface)	Once a year, after autumn leaf fall, or reduced frequency as required, based on site-specific observations of clogging or manufacturer's recommendations – pay particular attention to areas where water runs onto pervious surface from adjacent impermeable areas as this area is most likely to collect the most sediment
Occasional maintenance	Stabilise and mow contributing and adjacent areas	As required
	Removal of weeds or management using glyphosate applied directly into the weeds by an applicator rather than spraying	As required – once per year on less frequently used pavements
Remedial Actions	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50 mm of the level of the paving	As required
	Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users, and replace lost jointing material	As required
	Rehabilitation of surface and upper substructure by remedial sweeping	Every 10 to 15 years or as required (if infiltration performance is reduced due to significant clogging)
Monitoring	Initial inspection	Monthly for three months after installation
	Inspect for evidence of poor operation and/or weed growth – if required, take remedial action	Three-monthly, 48 h after large storms in first six months
	Inspect silt accumulation rates and establish appropriate brushing frequencies	Annually
	Monitor inspection chambers	Annually

6.4.2 Filter Drains

TABLE 16.1 Operation and maintenance requirements for filter drains

Maintenance schedule	Required action	Typical frequency
Regular maintenance	Remove litter (including leaf litter) and debris from filter drain surface, access chambers and pre-treatment devices	Monthly (or as required)
	Inspect filter drain surface, inlet/outlet pipework and control systems for blockages, clogging, standing water and structural damage	Monthly
	Inspect pre-treatment systems, inlets and perforated pipework for silt accumulation, and establish appropriate silt removal frequencies	Six monthly
	Remove sediment from pre-treatment devices	Six monthly, or as required
Occasional maintenance	Remove or control tree roots where they are encroaching the sides of the filter drain, using recommended methods (eg NJUG, 2007 or BS 3998:2010)	As required
	At locations with high pollution loads, remove surface geotextile and replace, and wash or replace overlying filter medium	Five yearly, or as required
	Clear perforated pipework of blockages	As required

6.4.3 Tree Pits

TABLE 19.3 Operation and maintenance requirements for trees (after CRWA, 2009)

Maintenance schedule	Required action	Typical frequency
Regular maintenance	Remove litter and debris	Monthly (or as required)
	Manage other vegetation and remove nuisance plants	Monthly (at start, then as required)
	Inspect inlets and outlets	Inspect monthly
Occasional maintenance	Check tree health and manage tree appropriately	Annually
	Remove silt build-up from inlets and surface and replace mulch as necessary	Annually, or as required
	Water	As required (in periods of drought)
Monitoring	Inspect silt accumulation rates and establish appropriate removal frequencies	Half yearly

6.4.4 Attenuation Tanks

TABLE 21.3 Operation and maintenance requirements for attenuation storage tanks

Maintenance schedule	Required action	Typical frequency
Regular maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action	Monthly for 3 months, then annually
	Remove debris from the catchment surface (where it may cause risks to performance)	Monthly
	For systems where rainfall infiltrates into the tank from above, check surface of filter for blockage by sediment, algae or other matter; remove and replace surface infiltration medium as necessary.	Annually
	Remove sediment from pre-treatment structures and/ or internal forebays	Annually, or as required
Remedial actions	Repair/rehabilitate inlets, outlet, overflows and vents	As required
Monitoring	Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed	Annually
	Survey inside of tank for sediment build-up and remove if necessary	Every 5 years or as required

6.4.5 Flow Control Device

Normally, little maintenance is required as there are no moving parts within a hydrobrake, however, after installation, hydrobrakes should be inspected to ensure the hydrobrake orifice is not blocked on a monthly basis for three months and thereafter at six monthly intervals and hosed down if required. Remove rubbish or debris from the hydrobrake if present. Hydro-Brake Flow Controls are fitted with a pivoting by-pass door, which allows the manhole chamber to be drained down should blockages occur.

6.4.6 Petrol Interceptor

TABLE 14.2 An example of operation and maintenance requirements for a proprietary treatment system

Maintenance schedule	Required action	Typical frequency
Routine maintenance	Remove litter and debris and inspect for sediment, oil and grease accumulation	Six monthly
	Change the filter media	As recommended by manufacturer
	Remove sediment, oil, grease and floatables	As necessary – indicated by system inspections or immediately following significant spill
Remedial actions	Replace malfunctioning parts or structures	As required
Monitoring	Inspect for evidence of poor operation	Six monthly
	Inspect filter media and establish appropriate replacement frequencies	Six monthly
	Inspect sediment accumulation rates and establish appropriate removal frequencies	Monthly during first half year of operation, then every six months

6.4.7 Swales

TABLE 17.1 Operation and maintenance requirements for swales

Maintenance schedule	Required action	Typical frequency
Regular maintenance	Remove litter and debris	Monthly, or as required
	Cut grass – to retain grass height within specified design range	Monthly (during growing season), or as required
	Manage other vegetation and remove nuisance plants	Monthly at start, then as required
	Inspect inlets, outlets and overflows for blockages, and clear if required	Monthly
	Inspect infiltration surfaces for ponding, compaction, silt accumulation, record areas where water is ponding for > 48 hours	Monthly, or when required
	Inspect vegetation coverage	Monthly for 6 months, quarterly for 2 years, then half yearly
	Inspect inlets and facility surface for silt accumulation, establish appropriate silt removal frequencies	Half yearly
Occasional maintenance	Reseed areas of poor vegetation growth, alter plant types to better suit conditions, if required	As required or if bare soil is exposed over 10% or more of the swale treatment area
Remedial actions	Repair erosion or other damage by re-turfing or reseeding	As required
	Relevel uneven surfaces and reinstate design levels	As required
	Scarify and spike topsoil layer to improve infiltration performance, break up silt deposits and prevent compaction of the soil surface	As required
	Remove build-up of sediment on upstream gravel trench, flow spreader or at top of filter strip	As required
	Remove and dispose of oils or petrol residues using safe standard practices	As required

TABLE 18.3 Operation and maintenance requirements for bioretention systems

Maintenance schedule	Required action	Typical frequency
Regular inspections	Inspect infiltration surfaces for silting and ponding, record de-watering time of the facility and assess standing water levels in underdrain (if appropriate) to determine if maintenance is necessary	Quarterly
	Check operation of underdrains by inspection of flows after rain	Annually
	Assess plants for disease infection, poor growth, invasive species etc and replace as necessary	Quarterly
	Inspect inlets and outlets for blockage	Quarterly
Regular maintenance	Remove litter and surface debris and weeds	Quarterly (or more frequently for tidiness or aesthetic reasons)
	Replace any plants, to maintain planting density	As required
	Remove sediment, litter and debris build-up from around inlets or from forebays	Quarterly to biannually
Occasional maintenance	Infill any holes or scour in the filter medium, improve erosion protection if required	As required
	Repair minor accumulations of silt by raking away surface mulch, scarifying surface of medium and replacing mulch	As required
Remedial actions	Remove and replace filter medium and vegetation above	As required but likely to be > 20 years

Appendix A Geotechnical Investigations Report

IGSL Ltd

Castlemartyr, County Cork

Ground Investigation & Geotechnical Report

Project No. 25387

October 2024

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FOREWORD
The following conditions and notes on the geotechnical site investigation procedures should be read in conjunction with this report.

Standards
The ground investigation works for this project (**Castlemartyr, County Cork**) have been carried out by IGSL in accordance with Eurocode 7 - Part 2: Ground Investigation & Testing (EN 1997-2:2007). This has been used together with complementary documents such as Engineers Ireland Specification for Ground Investigation (2nd Ed, 2016), BS 5930 (2015+A1:2020) and BS 1377 (Parts 1 to 9) and the following European Norms:

- EN 1997-2 Eurocode 7: 2007 – Geotechnical Design – Part 2: Ground Investigation & Testing
- EN ISO 22475-1:2006 Geotechnical Investigation and Sampling – Sampling Methods & Groundwater Measurements
- EN ISO 14688-1:2017 Geotechnical Investigation and Testing – Identification and Classification of Soil, Part 1: Identification and Description
- EN ISO 14688-2:2017 Geotechnical Investigation and Testing – Identification and Classification of Soil, Part 2: Principles for a classification
- EN ISO 14689-1:2017 Geotechnical Investigation and Testing – Identification, description & classification of rock

The Eurocode 7, Part 2 – Ground Investigation and Testing GI specification shall be read in conjunction with the Specification and Related Documents for Ground Investigation in Ireland, 2nd Edition, published by Engineers Ireland in 2016.

Reporting
No responsibility can be held by IGSL Ltd for ground conditions between exploratory hole locations. The engineering logs (refer to the factual reports referenced in the bibliography) provide ground profiles and configuration of strata relevant to the investigation depths achieved and caution should be taken when extrapolating between exploratory points. No liability is accepted for ground conditions extraneous to the investigation points. Unless specifically stated, no account has been taken of possible subsidence due to mineral extraction, mining works or karstification below or close to the site.

This report has been prepared for Donnachadh O'Brien & Associates (DOBA) and the information should not be used without their prior written permission. IGSL Ltd accepts no responsibility or liability for this document being used other than for the purposes for which it was intended.

Boring Procedures
Where required, 'shell and auger' or cable percussive boring technique is employed as defined by Section 6.3 of IS EN ISO 22475-1:2006. The boring operations, sampling and in-situ testing meet with the recommendations set out in IS EN 1997-2:2007 and BS 1377:1990 and EN ISO 22476-3:2005. The shell and auger boring technique allows for continuous sampling in clay and silt above the water table and sand and gravel below the water table (Table 2 of IS EN ISO 22475-1:2006).

It is highlighted that some disturbance and variation is unavoidable in particular ground (e.g. blowing sands, gravel / cobble dominant glacial deposits etc.). Attention is drawn to this condition, whenever it is suspected. Where cobbles and boulders are recorded, no conclusion should be drawn concerning the size, presence, lithological nature, or numbers per unit volume of ground.

In-Situ Testing
Where required, Standard Penetration Tests (SPT's) are conducted strictly in accordance with Section 4.6 of IS EN 1997-2:2007. The SPT equipment (hammer energy test) has been calibrated

in accordance with EN ISO 22476-3:2005 and the Energy Ratio (E_r). A calibration certificate is available upon request. The E_r is defined as the ratio of the actual energy E_{meas} (measured energy during calibration) delivered to the drive weight assembly into the drive rod below the anvil, to the theoretical energy (E_{theor}) as calculated from the drive weight assembly. The measured number of blows (N) reported on the engineering logs are uncorrected. In sands, the energy losses due to rod length and the effect of the overburden pressure should be taken into account (see IS EN ISO 22476-3:2005).

Soil Sampling

Three categories of sampling methods are outlined in EN ISO 22475-1:2006. The categories are referenced A, B and C for any given ground conditions and are shown in Tables 1 and 2 of EN ISO 22475-1:2006. Reference should be made to EN 1997-2:2002 for guidelines on sample class and quality for strength and compressibility testing. Samples of quality classes 1 or 2 can only be obtained by using Category A sampling methods.

Class 1 thin wall undisturbed tube samples (UT100) were obtained in fine grained soils and strictly meet the requirements of EN 1997-2:2002 and EN ISO 22475-1:2006. Soil samples for laboratory tests are divided into five classes with respect to the soil properties that are assumed to remain unchanged during sampling, handling transport and storage. The minimum sample quality required for testing purposes to Eurocode 7 compatibility (EN 1997-2:2002) is shown in Table A.

Table A – Details of Sample Quality Requirements

EN 1997 Clause	Test	Minimum Sample Quality Class
5.5.3	Water Content	3
5.5.4	Bulk Density	2
5.5.5	Particle Density	N/S
5.5.6	Particle Size Analysis	N/S
5.5.7	Consistency Limits	4
5.5.8	Density Index	N/S
5.5.9	Soil Dispersivity	N/S
5.5.10	Frost Susceptibility	N/S
5.6.2	Organic Content	4
5.6.3	Carbonate Content	3
5.6.4	Sulphate Content	3
5.6.5	pH	3
5.6.6	Chloride Content	3
5.7	Strength Index	1
5.8	Strength Tests	1
5.9	Compressibility Tests	1
5.10	Compaction Tests	N/S
5.11	Permeability	2

N/S – not stated. Presume a representative sample of appropriate size.

Samples recovered from trial pits or trenches meet the requirements of IS EN ISO 22475-1. It is highlighted that unforeseen circumstances such as variations in geological strata may lead to lower quality sample classes being obtained.

Groundwater

The depth of entry of any influx of groundwater is recorded during the course of boring operations. However, the normal rate of boring does not usually permit the recording of an equilibrium level for any one water strike. Where possible, drilling is suspended for a period of twenty minutes to monitor the subsequent rise in water level. Groundwater conditions observed in the borings or pits are those appertaining to the period of investigation. It should be noted however, that groundwater levels are

subject to diurnal, seasonal and climatic variations and can also be affected by drainage conditions, tidal variations etc.

Engineering Logging

Soil and rock identification has been based on the examination of the samples recovered and conforms with IS EN ISO 14688-1:2017 and IS EN ISO 14688-2:2017. Rock weathering classification conforms to IS EN ISO 14689-1:2017 along with discontinuities (bedding planes, joints, cleavages, faults etc) as classified in Section 6.4 of IS EN ISO 14689-1:2017 and Annex C of same. Rock mechanical indices (TCR, SCR, RQD) are defined in accordance with IS EN ISO 22475-1:2006.

Where peat has been encountered, samples have been logged in accordance with the Von Post Classification (ref. Von Post, L. 1992. Sveriges Gologiska Undersoknings torvinventering och nogra av dess hittils vunna resultat (SGU peat inventory and some preliminary results) Svenska Mosskulturforeningens Tidskrift, Jonkoping, Swedden, 36, 1-37 and Hobbs N. B. Mire morphology and the properties of some British and foreign peats. QJEG, Vol. 19, 1986.

Retention of Samples

After satisfactory completion of all the scheduled laboratory tests on any sample, the remaining material will be discarded. Unless a period of retention of samples is agreed, it is our normal practice to discard all soil samples one month after submission of our final report.

1. INTRODUCTION

IGSL Limited has undertaken a programme of geotechnical site investigation works at a greenfield site extending across the townland of Gortnahomna More on the eastern outskirts of the town of Castlemartyr, Co. Cork. The site is located in three large, roughly square fields, the total area being approximately 6.8 hectares. The N25 national primary road runs along the northern boundary of the site. The field along the N25 has seen some phased historic infilling as well as use as a site compound (See Figures 1, 2 & 3). It should be noted that not all of this northern field falls into the study area. The two fields to the rear (south) of the site are currently in arable use. Mature hedgelines are found marking field boundaries. The works were undertaken for Donnachadh O;'Brien & Assocaties [DOBA] on behalf of their client, Marshall Yards Development Company Limited.

The site investigation was undertaken to determine the soil conditions for the purposes of foundation design for a new large residential development (LRD) and to determine the percolation characteristics of the ground for surface water disposal.

Figure 1 – Site Location Plan (intrusive GI locations plotted)

Fig 1 reproduced from Google Earth Professional 6/2018

The investigation comprised cable percussion boring, trial pitting, plate bearing testing (CBR) and soakaway testing to BRE365. The investigations were executed in accordance with BS 5930, Code of Practice for Site Investigations (BS 5930:2015 +A1:2020) and EN 1997-2 Eurocode 7 Part 2 Ground Investigation & Testing and supervised by an IGSL geotechnical engineer.

Geotechnical, chemical and environmental laboratory testing was scheduled on a range of soil samples. The geotechnical soil testing included moisture contents, Atterberg Limits, particle size distribution [PSD] testing in addition to quick undrained triaxial testing. Suites of both chemical testing and environmental testing were undertaken on soils.

This report presents an evaluation of the ground and groundwater conditions and an assessment of the key geotechnical issues. A number of cross sections are drafted to assist in profiling the stratigraphy across the site (Appendix 10).

2. FIELDWORKS

2.1 General

The geotechnical investigation fieldworks were carried out during May and June 2024 and comprised the following:

- Cable Percussion Boring (8 No.[i])
- Trial Pits (10 No.)
- Plate Bearing Tests (9 No.)
- Soakaway Tests (10 No.)
- Surveying of Exploratory Hole Locations

[i] Re-bores were conducted at locations BH02A and BH04A following shallow refusal in both BH02 and BH04

2.2 Cable Percussion Boreholes

Cable percussion boring (200mm diameter) methods were specified at six locations [BH_] at the Castlemartyr site using a Dando 2000 rig. Ultimately, eight bores were constructed after shallow obstructions were encountered at both locations BH02 and BH04 thereby necessitating additional setups (BH02A & BH04A). The boreholes extended to depths of between 1.20m and 10.0m. At all locations, boring commenced through hand-dug service inspection pits. Disturbed bulk samples were recovered at 1m intervals or change of strata during boring and these are denoted 'B' on the engineering logs. An undisturbed U100 sample was taken at 3.0m in BH05.

Standard Penetration Tests (SPT's) were performed in the boreholes and given the nature of the soils, a solid cone was used. It is noted that the SPT N-Values reported are the number of blows for 300mm increment penetration (e.g. BH01 at 2.0m where N=33). These exclude the seating blow values, which represent the initial 150mm depth of penetration. Where partial penetration was achieved during testing, the number of blows is shown for the actual penetration depth achieved (e.g. BH02A at 3.0m where N=50/150mm). In accordance with Eurocode 7, the SPT hammer has been calibrated and the energy ratio (Er) value is incorporated on the engineering logs. A calibration certificate for the SPT hammer (presented in Appendix 1) can be cross-referenced using the assigned hammer code noted on the individual driller logs. It is highlighted that the SPT N-Values reported on the engineering logs are uncorrected for energy ratio.

Descriptions of the soils encountered, in-situ tests undertaken and samples recovered are presented on the borehole records in Appendix 1. Details of groundwater strikes and hard strata boring (i.e. chiselling) are also presented on the aforementioned records.

Groundwater monitoring standpipes were installed in five of the boreholes upon completion (BH01, BH02A, BH03, BH05 & BH06). The standpipes consisted of 50mm diameter HDPE pipework with proprietary 1mm slots and incorporated a pea gravel filter pack and cement / bentonite grout seal. Protective metal headwork covers were concreted in place.

2.3 Trial Pits

Trial pitting was performed at ten locations across the site. The trial pits were excavated, logged and sampled under the direction of an IGSL geotechnical engineer in accordance with BS 5930 (2015+A1:2020). Bulk samples (B) (typically 20 to 30kg) were taken as the pits progressed.

The bulk samples were placed in heavy-duty polyethylene bags. The trial pits were backfilled with the as-dug arisings and reinstated to the satisfaction of IGSL's site geotechnical engineer. The trial pit logs and photos are presented in Appendix 2 and include descriptions of the soils encountered, groundwater conditions and stability of the pit sidewalls.

2.4 Plate Bearing Tests

Plate load tests were caried out at nine locations at a consistent depth of 0.40m below ground level [bgl]. The plate testing was undertaken to evaluate the modulus of sub-grade reaction (Ks) and equivalent CBR value. A 450mm diameter plate was used for the tests with kentledge provided by a mechanical excavator. Two load cycle tests were performed and the load / settlement plots, Ks and equivalent CBR values are presented in Appendix 3.

2.5 Soakaway Tests (to BRE 365)

Ten number infiltration tests were performed to assess the suitability of the sub-soils for dispersion of storm water through a soakaway system. The infiltration tests were each performed in accordance with BRE Digest 365 'Soakaway Design'. To obtain a measure of the infiltration rate of the sub-soils, water was poured into each test pit, with records taken of the fall in water level against time. Following the first soak cycle, the procedure was repeated to ensure saturation of the sub-soils. The infiltration rate is the volume of water dispersed per unit of exposed area per unit of time, and is generally expressed as metres / minute or metres / second. Designs are based on the slowest infiltration rate, which is generally calculated from the final soak cycle. The soakaway design logs are presented in Appendix 4.

2.6 Groundwater Monitoring / Data Loggers

Groundwater monitoring was undertaken following installation of standpipes in the five cable percussion boreholes. The response zones at each well are presented in Table 1.

Table 1 – Well installations at the Castlemartyr site noting standpipe (SP) diameter and gravel response zones

		Response Zone	
Location (Installation Date)	**SP diameter**	**From (m)**	**To (m)**
BH01 (17-05-24)	50mm	1.0	7.20
BH02A (20-05-24)	50mm	1.0	3.20
BH03 (22-05-24)	50mm	1.0	4.80
BH05 (15-05-24)	50mm	4.0	10.0
BH06 (14-05-24) (BL)	50mm	1.0	9.50

BL = Barologger

Data loggers were installed in five designated wells across the project. One barologger was also positioned on site (BH06) to record fluctuations in barometric pressure over the long term. The groundwater data loggers were installed on 30-07-24. The information to hand at the time of this report issue, in the form of summary graphs, is included in Appendix 5 (downloaded data up to 03-10-24). Note that the long-term downloaded raw data (in excel format) is provided as a separate file and does not feature in this report. Dips taken on the day of download are also noted in Appendix 5.

2.7 Surveying of Exploratory Hole Locations

Following completion of the exploratory works, surveying was carried out using GPS techniques. Co-ordinates (x, y) were measured to Irish Transverse Mercator and ground levels (z) established to Malin Head. The co-ordinates and ground levels are shown on the exploratory hole logs with locations shown on the exploratory hole plans in Appendix 9.

3. LABORATORY TESTING

Geotechnical laboratory testing was performed at IGSL's INAB-accredited laboratory in accordance with the methods set out in BS1377; British Standard Methods of Test for Soils for Civil Engineering Purposes; British Standards Institute:1990. The laboratory applies best practice management systems as per International Standard IS EN ISO/IEC 17025. The geotechnical testing included moisture contents, Atterberg Limits, particle size distribution [PSD] and quick undrained triaxial testing. The results from geotechnical testing on selected trial pit and borehole soil samples are presented in Appendix 6.

Chemical analysis to BRE SD1 Greenfield Site (Suite B) was scheduled on six recovered soil samples. The chemical results are presented in Appendix 7. Soil samples were selected from pits and boreholes for specialist geo-environmental assessment using the *Rilta* Suite of environmental testing. The results are also presented in the Chemtest report in the aforementioned Appendix 7. The geoenvironmental results formed the basis of a waste classification assessment which was undertaken by O'Callaghan Moran & Associates [OCM] in accordance with the Environmental Protection Agency (EPA) Guidelines on the Classification of Waste (2015). This report is presented separately in Appendix 8.

4. DESK STUDY

Reference to the OSI Irish Townland and Historical Map Viewer shows the site to be relatively undisturbed up to the year 2000. In the 1996-2000 aerial orthophotograph, the field to the front (north) of the site is as yet undeveloped with the houses of Joseph Morrissey Place the furthest housing estate east of the town on the Youghal Road (N25).

The 2001-2005 orthophotograph illustrates sprawling development east of the town. A new junction on the N25 feeds traffic northwards into the newly developed Gort an Óir housing estate of The Willows and The Maples. To the south of the N25, additional housing units of Tuarainn Álainn and Cúirt na Gréine are built immediately west of the site. It appears that topsoil stripping has occurred on the site with stockpile mounds present in the northeastern corner of the site.

By May 2009, housing development has continued apace in both neighbouring estates of Tuarainn Álainn and Cúirt na Gréine. Soil is being tipped in the eastern portion of the front field – this area did not form part of the intrusive investigation.

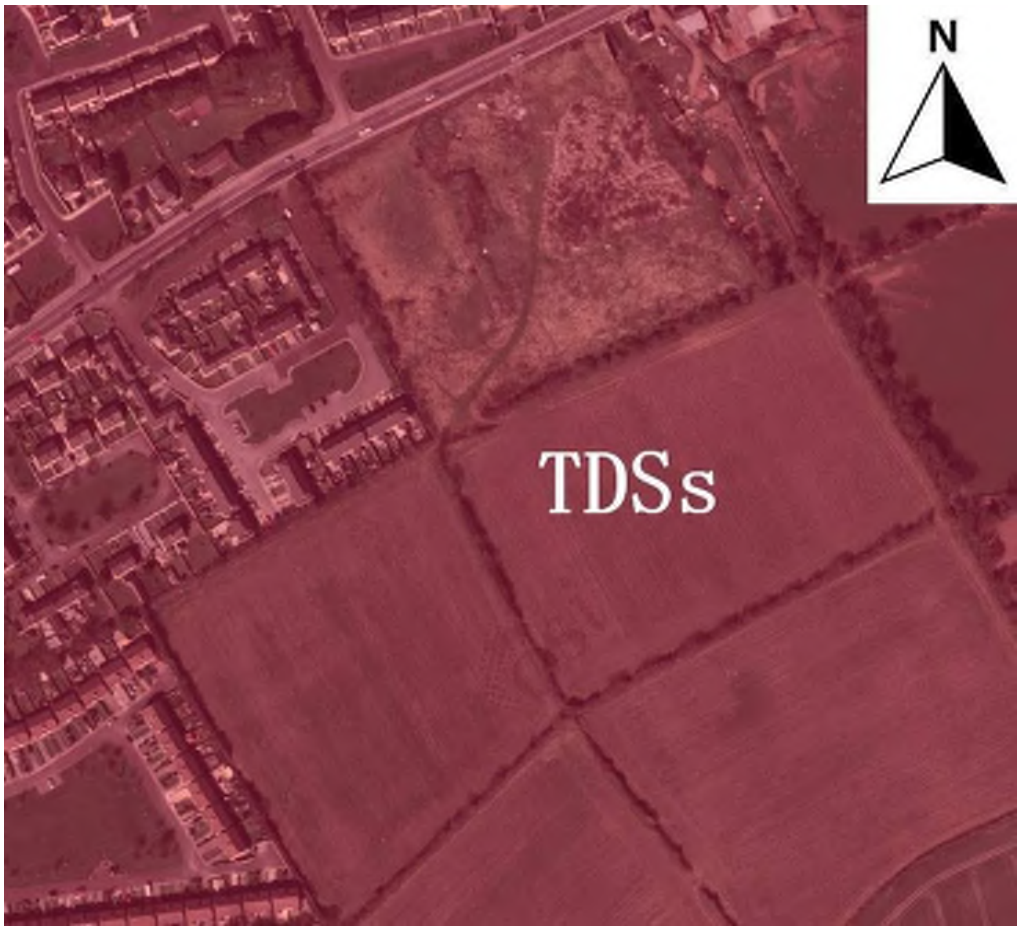
The June 2018 aerial image retrieved from Google Earth Professional shows the existence of a contractor yard space on the western portion of the front field. This can be viewed in Google Street View (See Figure 3). The site was later reinstated with a drape of soil used as surficial cover.

Figure 2A-2D – Aerial images from OSI Townland and Historical Map Viewer (MapGenie Imagery dated (1996-2005)) **and Google Earth Professional images** (5/2009 & 6/2018).

Figure 3 – Screenshot from Google Streetview looking from the N25 south across the front field. Contractor yardspace present.

The Quaternary Soils plot for the area (Figure 4 - retrieved from GSI website) reaffirms the findings of the investigation and highlights the widespread nature of glacial till derived from the Devonian Period red sandstones particular to the area.

Figure 4 – Quaternary Soils Plot for the Castlemartyr Site



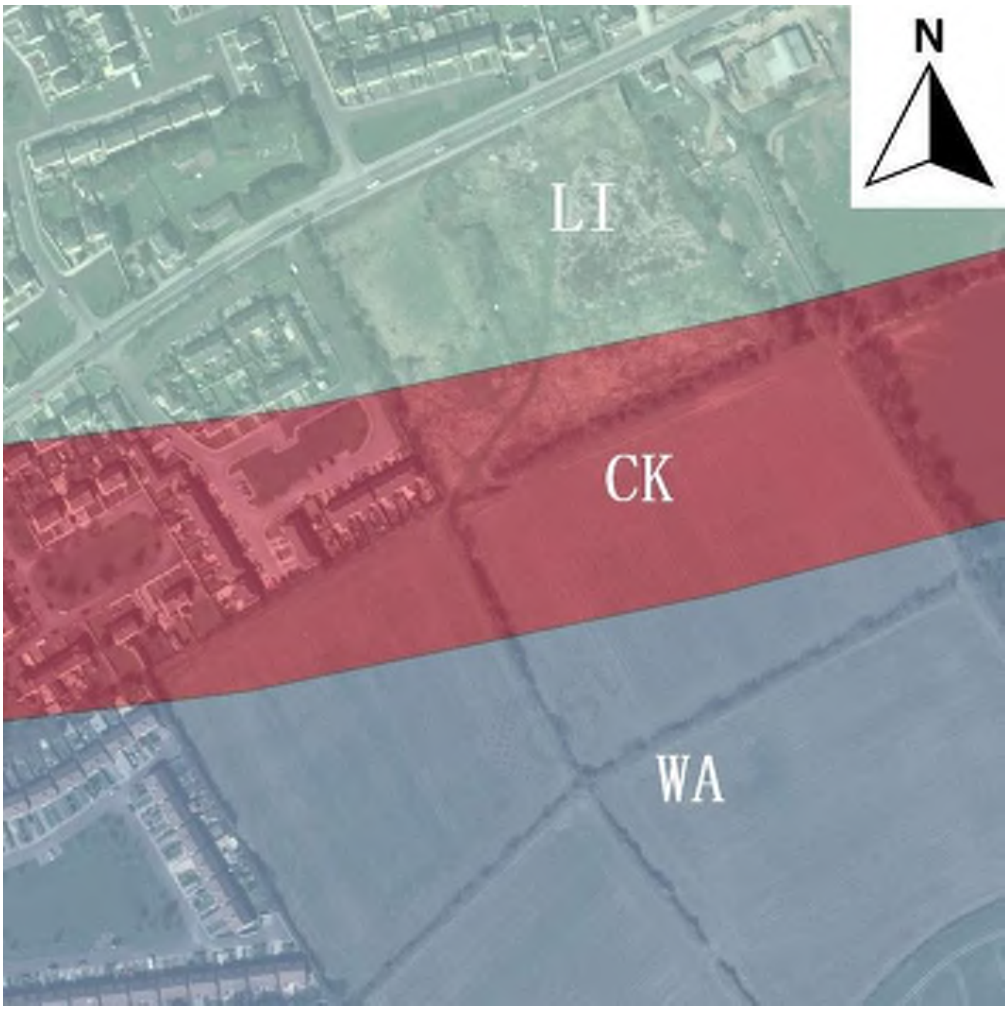
Map Key **TDSs** - Till derived from Devonian sandstones

Reference to the GSI map for the area (Figure 5, 1:100,000 Solid Geology series) shows that the site is underlain by a range of Lower Carboniferous, Dinantian-aged rock formations, namely the Little Island Formation, the Cork Red Marble Formation and Waulsortian Limestones.

The Little Island Formation (LI) is described as a massive and crinoidal fine limestone; the Cork Red Marble Formation as a red brecciated calcilutite limestone and the Waulsortian Limestones as massive unbedded lime-mudstone.

The Waulsortian Limestone (WA) largely consists of calcareous mudstones, wackestones and packstones many of them containing original cavities (including stromatactis) filled with internal sediments and fibrous and blocky sparry cements (Sevastopulo 1982). The very fine-grained carbonate lithology typical of the Waulsortian Limestones is also relatively pure and, in the right circumstances, amenable to dissolution and karst development. Waulsortian Limestone is also susceptible to Magnesium replacement and dolomitisation, which can further enhance permeability.

Figure 4 - Bedrock Geological Map for the Castlemartyr Site (retrieved from the GSI website)



Key:			
	LI	=	Little Island Formation
	CK	=	Cork Red Marble Formation
	WA	=	Waulsortian Limestones

To the south of the site, there are karst-features noted on the karst landform layer as displayed on the Geological Survey of Ireland (GSI) online viewer. There are two 'enclosed depressions' in the fields immediately to the south of the site and Poulnahorka Cave lies ca. 350m southeast of the southern field boundary of the site amidst a wooded enclosure. There are no karst landforms plotted on the study site (See Figure 6).

Figure 6 – Karst landforms plotted in fields to the south of the Gortnahomna More site

Key:

= Southern Boundary of Site

= Enclosed Depression

= Spring

5. GROUND CONDITIONS & GROUNDWATER

5.1 Ground Profile – Superficial Deposits

The following is a summary of the ground conditions encountered across the site.

MADE GROUND

- The extent of Made Ground cover was restricted to one area of the site, in the field fronting onto the N25. Recent occupation of the site in 2018 saw much of the corner site covered in what was presumably hardcore stone fill. By 2021, the works site was apparently returned to an 'as-found' condition with topsoil spread over the entirety of the former temporary yard space.

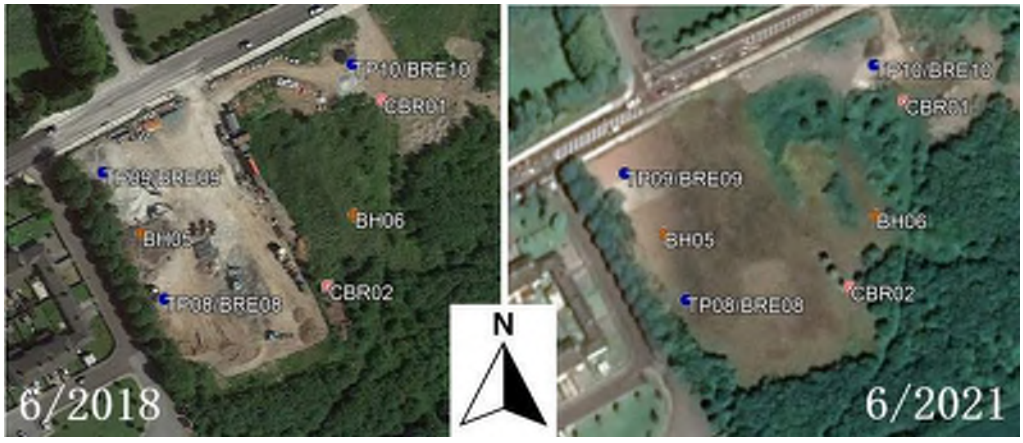
- Pits TP08 and TP09 in addition to BH05 were located along the western flank of the front field (See Figure 7). Made Ground was identified to depths of 1.80m (11.54m OD) and 2.70m (9.65m OD) in both trial pits. Between the two pit locations, borehole BH05 encountered a 2.30m cover of Made Ground.

- Trial pit TP08 revealed a top cover of soft to firm light brown sandy gravelly CLAY, presumably a placed topsoil. From 0.40m, this was found to be underlain by a firm dark brown slightly sandy slightly gravelly CLAY with pieces of fabric and plastic. This soil continued to a depth of 1.80m where a natural firm orange brown CLAY was met.

- At TP09, towards the front (north) of the site, topsoil was remarked from ground level to 200mm bgl. This was underlain by two distinctive strata, both classed as Made Ground - based on anthropogenic content. The upper layer from 0.20m to 1.20m comprised a firm light brown slightly silty gravelly CLAY with cobbles and boulders and fragments of rubber, metal, plastic and tarmacadam. From 1.20m (11.15m OD), the soil was described as a firm grey brown slightly sandy slightly gravelly CLAY with rare fragments of plastic. At its base of 2.70m, it was found to lie on firm to stiff mottled yellowish grey very slightly sandy CLAY.

- Borehole BH05, located between the two pits found brown slightly gravelly CLAY (MADE GROUND) with anthropogenic material to a depth of 2.30m (8.65m OD). An indigenous light brown slightly gravelly CLAY was found from 2.30m.

Figure 7 – Contractor yard space covering the site (6/2018) followed by reinstatement of the front field (6/2021) with the use of topsoil. Source: Google Earth Professional imagery



- Natural site levels rise markedly towards the northeast of the site with trial pit TP10 sitting at a ground elevation of 17.45m OD. Made Ground totaling 300mm thick was found at TP10. It comprised a grey brown clayey slightly sandy Gravel. It was found to be placed on a stiff light brown SILT/CLAY.

- Borehole BH06 was the only location to the front of the site where Made Ground was noted absent in logs. However, no topsoil was logged at this location, rather a firm brown sandy gravelly CLAY with cobbles to 2.50m. This may suggest placed ground. Ground levels at BH06 mirror those at BH05, ie., ca. 10.50-11m OD.

Figure 8A & 8B – Sidewall profiles pictured in the northern (front) field. Fig 8A Clay MADE GROUND sidewalls in TP08 reported from ground level to 1.80m (11.54m OD). A firm orange brown slightly sandy gravelly CLAY was encountered at 1.80m to a pit end depth of 2.80m (10.54m OD). **Fig 8B** MADE GROUND soils in TP09 with concrete boulders (up to 1400mm) to a depth of 1.20m, underlain by firm grey brown CLAY with rare plastic to 2.70m. Pit ended at 3.0m.

Fig 8A

Fig 8B

TOPSOIL

- No topsoil was found in the exploratory holes in the front field (MADE GROUND area / Figure 7)

- Where topsoil was encountered in the two fields to the rear or south of the site, it was found to be vary broadly between 0.10m and 0.50m thick. The thickest accumulation of topsoil was in TP01 (0.50m) with the thinnest in TP05 (0.10m) towards the southwest of the site.

SUBSOIL (Glacial Till)

- With the exception of TP02, across the site the subsoil was largely found to consist of a fine deposit comprising firm and firm to stiff orange brown to reddish brown sandy gravelly CLAY/SILT. At ca. 1.50-2.0m depth, the CLAY/SILT soils were often remarked as stiff. Occasionally, the stiff soils were found higher in the stratigraphy. For example at TP07, they were logged from 0.90m bgl (17.88m OD).

- The exception at TP02, and to a certain extent at TP01 where gravelly sand horizons were present in the SILT/CLAY from 0.50m to 2.20m, was the appearance of a (medium dense to dense) light brown silty/clayey gravelly SAND with cobbles from 0.30m to 1.40m. At depth in TP06, beneath Clay overburden, a (dense) mottled grey orange brown clayey very gravelly SAND was logged from 2.30m to pit base at 2.60m bgl (17.51m OD).

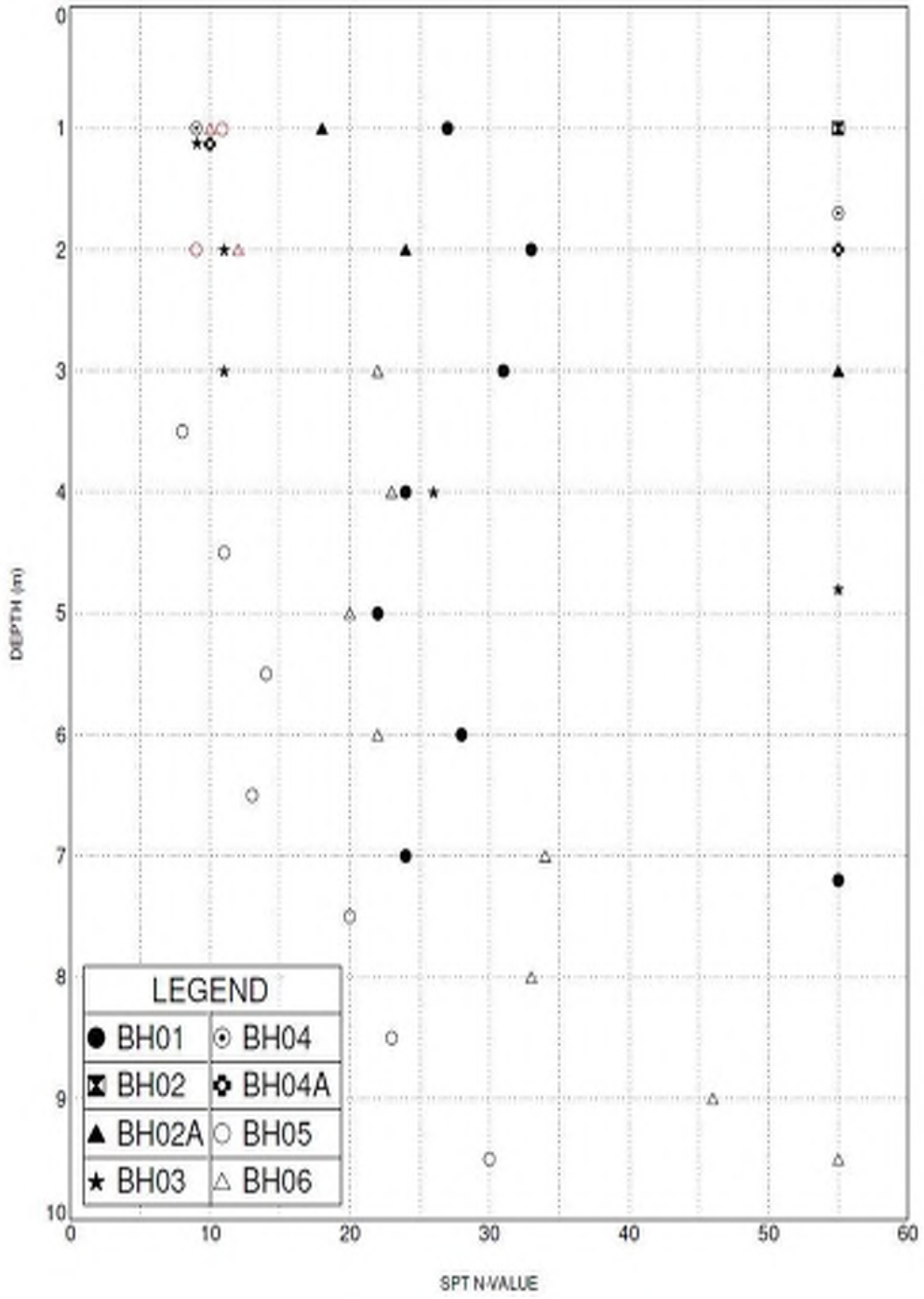
- In the front field, nearing the N25 roadside, a (medium dense to dense) light brown clayey/silty gravelly SAND with cobbles was logged in the base of TP10 from 2.0m to 3.0m (14.45m OD).

- Both boreholes, BH01 and BH02, encountered a sequence of shallow buried medium dense to dense brown to grey brown silty/clayey sandy GRAVEL from 0.90m and 1.30m respectively. In BH01, the granular soils extended to 3.40m where a stiff to very stiff over-consolidated CLAY till was met. No such CLAY was recorded in BH02A as the borehole ended on an obstruction at 3.20m in a layer reportedly of GRAVEL and COBBLES.

- Overall, based on SPT testing conducted in boreholes at 1m bgl, the shallow soils were typically firm and soft to firm.

As mentioned, in-situ testing was undertaken during the construction of the boreholes. The standard penetration test [SPT] allows for an appraisal of the ground stiffness. An SPT data plot showing N-values against depth is shown in Figure 9. It highlights the presence, both in Made Ground and in the upper soils, of soft to firm and firm deposits. There was a general absence of 'low strength' deposits on site, ie., those where N values of <10 blows are present. With depth, aside from fine sand-prone deposits in BH05, SPT testing established medium to high strength soils with N-values typically in the range 20-30 and higher.

Figure 9 – SPT Plot versus Depth for Cable Percussion Boreholes



Note: Red marker = Test in Made Ground

Figure 10A – 10D – Natural sidewall profiles pictured in the southern two fields. Fig 10A Reported from 0.50m (base topsoil), sidewalls of firm/stiff sl sandy sl gravelly SILT/CLAY in TP01. Stiff reddish brown SILT to pit base at 3.0m (9.06m OD). **Fig 10B** Topsoil in TP04 over firm to stiff orange brown very sandy gravelly CLAY, later from 2.0m, sandy very gravelly CLAY with cobbles. Pit ended at 3.0m. **Fig 10C** Firm to stiff orange brown sandy gravelly CLAY to 2.30m in TP06 underlain by very gravelly SAND to 2.60m (base). Possible bedrock / boulder obstruction at 2.60m bgl. **Fig 10D** Firm to stiff light brown to orange brown sl sandy sl gravelly CLAY to TP07 base at 3.0m (15.78m OD).

Fig 10A

Fig 10B

Fig 10C

Fig 10D

5.2 Bedrock

As referenced earlier in Section 4, the GSI rock map for the area (Figure 4, 1:100,000 Solid Geology series) shows that a range of limestone-dominant Carboniferous-aged formations underlie the site. The formations are typically comprised of pure limestones, with presumably a marbleised structure present in the case of the Cork Red Marble Formaiton. Additionally, in the case of the Waulsortian Limestones, they can be prone to karstic dissolution. Rotary core drilling of bedrock was not specified as part of the scope.

5.3 Groundwater

Apart from a perched water seepage in Made Ground at TP09 (1.20m), water strikes were absent in all of the trial pits final depths ranging from 1.60 to 3.0m bgl. Water was added to borehole BH06 to promote removal in dry sandy gravel. No strikes were observed in the boreholes. Neither was water observed in bores when dipped immediately following their construction.

Wells were installed in bores BH01, 02A, 03, 05 & 06 to permit longer term monitoring. Table 2 lists the dip measurements in each of the five wells. Data loggers were installed in the wells with continuous monitoring commencing in July 2024. The records are presented in graph format along with dips taken on the date of downloading in Appendix 5.

The potential does exist for there to be seasonal changes in groundwater level. Additionally, a consistent groundwater level may take time to re-establish.

Table 2 – Groundwater dips at boreholes 01, 02A, 03, 05 & 06 (July-October)

Exploratory Hole Number	Ground Water dip range (m bgl)	Ground Water dip range (m OD)
BH01	3.0-4.0m	7.40-6.40m OD
BH02A	Dry	Base = 13.45
BH03	Dry	Base = 15.47
BH05	5.26-5.40m	5.69-5.55m OD
BH06	5.24-5.32m	5.54-5.46m OD

BH02A & BH03 dry during monitoring period (July-October 2024)

6. GROUND ASSESSMENT & ENGINEERING RECOMMENDATIONS

6.1 General

In light of the ground investigation findings, the following geotechnical issues are developed and discussed:

- Foundations
- Ground Bearing Slab
- Groundwater / Infiltration
- Slopes / Batters
- Pavement Construction
- Buried Concrete
- Waste Acceptance Criteria [WAC] & Environmental Testing - *Soils destined for Landfill*
- Additional Ground Investigations

6.2 Foundations

The findings from both trial pit excavations and boreholes flag an area of Made Ground to the northwest of the site. In this area, the Made Ground extends to levels of 8.65m OD (BH05), corresponding to a maximum depth of 2.70m bgl (TP09). The Made Ground generally consists of brown gravelly silty CLAY with cobbles and boulders (occasionally large boulders of concrete – up to 1400mm) along with fragments of fabric, rubber, metal, plastic and tarmacadam. It appears to overlie indigenous soft to firm and firm light brown slightly gravelly cobbly CLAY underlain by more extensive gravelly SAND, as proven in boreholes.

Outside of the northern part of the site, with its Made Ground cover, the site rises to ca. 20m OD nearing its southern boundary. The pits and bores positioned at the lower reaches contain a mixture of silty/clayey gravelly SAND but generally firm to stiff slightly sandy slightly gravelly CLAY/SILT. Pits and bores at the topographically higher end of the site ended at shallow depths ranging 2.50m to 3.20m (BH02A & TP03). This termination depth may represent shallow rockhead. However, this was not proven since rock coring did not form part of the scope. The rise in ground levels to the south of the site mirror the appearance of Waulsortian Limestone in the bedrock map (Figure 4).

As Made Ground was found towards the N25 section of the site, the foundation type chosen in this area would have to either penetrate the existing placed soils and found in the underlying soils or, alternatively, the Made Ground soils could be re-engineered to generate a consistently stiffened subgrade despite compositional variations.

Conventional Foundations – Brownfield Areas

Should loadings be distributable on conventional foundations it is likely that strips or pads positioned on the glacial till at depths of approximately 1.50m to 2.70m bgl should provide a safe bearing capacity of 75 to 100kPa. However, this would require an assessment of the exposed formation by a suitably experienced engineering geologist / geotechnical engineer. Conducting plate load tests on this reduced level would also assist in determining the strength of the bearing stratum. At bearing pressures of 75 to 100 kPa settlement (immediate elastic and long-term consolidation) would be expected to be <20mm. It is imperative that foundations are not placed on Made Ground soils or soft / low strength soils. Where any such soils are present, these should be excavated and replaced with low grade C20 lean-mix concrete. The use of dig and replace methods will necessitate excavation for strip footings where load bearing walls are also being considered.

Controlled Modulus Columns

An alternative to the dig and replace method, would be to install controlled modulus columns (CMC's) to support the load bearing structures and floor slabs. CMC spacings of ca. 2 to 2.5m are envisaged with column depths of the order of 5 to 6m.

Piles
A third option would be to transfer the structural loads to depth using piling methods. Installing either small diameter tubular steel piles (225mm) or CFA piles (350mm diameter) founded in the medium dense SAND/GRAVEL to depths of 6m to 7m or to refusal depths could be considered. In light of the mixed surface soils, a suspended floor slab would be advised.

Conventional Foundations – Greenfield Areas
With regard to the areas of the site where Made Ground was not found in exploratory holes, the greenfield sections of the site saw initially firm soils, becoming firm to stiff with depth. There are instances of granular soils also appearing in stratigraphic profiles (TP02 - 0.30-1.40m), with deeper buried granular deposits in both TP06 and BH02A.

Where firm CLAY consistently exists, a bearing capacity of 75 to 100kPa should be attainable in the upper material. Plate bearing tests (600mm diameter) could be performed on the soil at shallow depths to ascertain settlement induced under loading. Should greater capacities be required, it is thought that a stiffer CLAY generally at depths ranging 1.50m to 2.0m should provide an allowable or safe bearing capacity of ca. 150kPa.

Where the overburden is deemed soft to firm, additional localised digging will be required. Should greater capacities be required, as mentioned, founding with conventional strip footings in deeper buried, progressively more over-consolidated CLAY or in some cases the medium dense SAND and/or GRAVEL will allow capacities of ca. 150Pa be achieved.

At bearing pressures of this magnitude, settlement (immediate elastic and long-term consolidation) would be expected to be small and <10mm. If there is any doubt over the strength of the soil formation once excavated, attendance and inspection by a competent geotechnical engineer / engineering geologist is advised to ensure the formation can support the design bearing pressures. As mentioned above, conducting plate tests on any suspect soils would allow for an assessment of possible settlement experienced under sequential loading.

It is vital that degradation of the shallow soil deposits does not occur during strip trench / pad excavation. Exposure of the clay-dominant tills may lead to softening through rainwater ponding / poor onsite drainage. This will likely result in a reduction in soil shear strength. Prevention of such an occurrence is extremely important as poor earthworks management would render the fine soils unsuitable and may result in the need for excessive over-digging and replacement with low grade C20 concrete. Timely blinding of the exposed dig area should negate the need for such actions.

Imported granular fill 'hardcore' used in any foundation application or under concrete slabs at the site should meet the requirements of Annex E of SR 21;2014+A1;2016. It is recommended that T0 Struc is used in conjunction with T1 Struc. The T0 and T1 hardcore fills should be rigorously tested (independent of the quarry source) to ensure that they meet the physical, durability, chemical and mineralogical characteristics as set out in the aforementioned Annex E of SR 21;2014+A1;2016.

Compaction / Placement of imported granular fill or hardcore will need to achieve a low air voids (<5%) and ensure that settlement is not an issue. In the case of layer thickness, number of roller passes and mass per metre and width of roll should meet the guidelines in I.S. 888:2016. Layer thickness should not exceed 200mm using a smooth drum roller with a mass per metre of roll of not less than 5400 kg.

6.3 Ground Bearing Slab
Where suspended floor slabs are not utilised (outside of Made Ground areas to the front of the site), in order to support conventionally loaded ground bearing slabs, it is recommended that a firm (medium strength) formation is reached (i.e. CBR of at least 3%). It will therefore be necessary to remove any soft / low strength upper soils / Made Ground before placement of the hardcore layers.

It is recommended that T0 Struc hardcore be used in conjunction with T1 hardcore. These should meet the requirements of Annex E SR21:2014+A1:2016. Proof rolling the formation (static rolling with roller having a mass per metre width of roll of not less 5400 kg) is advised to counteract disturbance or loosening due to the bulk excavation works. Under no circumstance should vibratory or dynamic rolling be used on the formation soils as this may lead to dilation where silt-dominant soils are present, producing characteristic 'cow-bellying'.

Imported granular fill 'hardcore' used in any foundation application or under concrete floor slabs should meet the requirements of Annex E of SR 21:2014+A1:2016. Both T0 and T1 hardcore fills should be rigorously tested (independent of the quarry source) to ensure that they meet the physical, durability, chemical and mineralogical characteristics as set out in the aforementioned Annex E of SR 21:2014+A1:2016. Independent testing on samples of the proposed source hardcore is strongly recommended in advance of the material being used on the site. As a minimum, particle size gradings, chemical tests (total sulphur and acid soluble sulphate) and simplified petrology are advised to screen the material and independently assess compliance with Annex E, SR21;2014+A1;2016.

Should existing hardcore be found present on site (TP10) there is the potential that it may contain mudrock or argillaceous limestone and therefore present a risk for pyrite oxidation and swelling. In this case, it would be recommended to remove this material and stockpile separately for either disposal from site or for use as general Class 1 fill. If testing shows the material presents a risk of pyrite / sulphide oxidation, it should be carefully managed and not used under concrete floors or backfill / build-up in any foundations.

6.4 Groundwater / Infiltration

As noted in Section 5.3, shallow groundwater strikes were absent from open pits and, in the case of borehole installations, found at depths of between approximately 5.50m and 7.50m OD, equivalent to 3.0m to 5.40m bgl. Two of the five shallow bores were reported as dry throughout the July – October 2024 monitoring period. However, both bores were positioned at the topographically high (south) point of the site and both consisted of relatively shallow well installations (3.20m & 4.80m deep wells).

Only a single groundwater seepage was witnessed in pitting on the site and that as a perched seepage in TP09. Pits were not left open long enough for an examination of groundwater re-equilibration.

In relation to shallow temporary excavation, the dearth of groundwater seepages / slow water ingress should generally see an absence of water ingress in natural deposits. The presence of water in well installations points to water at depth beneath the site in the region 3.0m to 5.40m bgl. This may change seasonally but any such variation should be identified in future downloads from on-site dataloggers.

Should water be encountered during deeper digs / excavations it is likely that de-watering will be required through a combination of strategic sump pumping and / or perimeter drains. As mentioned in Section 5.3, the potential does exist for there to be seasonal changes in groundwater level. The works were carried out during summer 2024. It may be the case that the various waterbodies at depth are subject to seasonal variations. Again, this should be easily proven using ongoing data logger recordings.

Ten soakaway tests were conducted on the site. The tests were carried out in the overburden soils within open excavations. Aside from TP08 and TP09, the test pits were excavated into the indigenous brown sandy gravelly CLAY/SILT with cobbles. The largely impermeable nature of the soils may account for the negligible to non-existent infiltration rates obtained. The placed Clay MADE GROUND soils in TP08 and TP09 exhibited no infiltration over the course of their respective test durations.

It is likely that such soils would not be suitable for conventional soakaways being classified as offering only low to practically impermeable infiltration (Table 2). Localised infiltration may be offered where more gravelly strata are present. TP03, which recorded the most perceptible infiltration rates, was logged as very gravelly and very sandy from 0.80m.

Table 2 – Measured infiltration rates (f) expressed as exposed area (metre) per unit time (minute)

Soakaway Test No.	Depth of Test (m bgl)	*f* (m/min)	*f* (m/sec)
BRE01 (TP01)	1.40	0.00031 m/min	5.174E-06 m/sec
BRE02 (TP02)	1.40	0.00023 m/min	3.862E-06 m/sec
BRE03 (TP03)	1.10	0.556 m/min	9.266E-04 m/sec
BRE04 (TP04)	1.20	0.00032 m/min	5.308E-06 m/sec
BRE05 (TP05)	1.40	0.00061 m/min	1.017E-05 m/sec
BRE06 (TP06)	1.30	0.000094 m/min	1.573E-06 m/sec
BRE07 (TP07)	1.50	0.000036 m/min	5.993E-07 m/sec
BRE08 (TP08)*	1.80	0.0 m/min	0.0 m/sec
BRE09 (TP09)*	1.60	0.0 m/min	0.0 m/sec
BRE10 (TP10)	1.50	0.0 m/min	0.0 m/sec

**Conducted in MADE GROUND soils*

6.5 Slopes / Batters

Instability was noted during pitting at TP01, TP03, TP04 and TP10 often associated with the gravelly silt-dominant soils. A maximum temporary slope angle of 1V to 1.5H (33º) is anticipated for batters constructed within the upper medium strength fine grained soils. A slope angle of 1V to 2H (26°) should be appropriate for long term batters in the same soils.

Where groundworks encounter a perched / higher groundwater table or "moist" upper soils, there is likely to be inherent instability resulting in sidewall collapse. Where deep excavation works are required in the superficial deposits, the use of trench box support is advised. In addition, the uppermost fine subsoils will be susceptible to softening and degradation and surface water or groundwater ingress can lead to a significant reduction in shear strength. Perched water can exist locally and this should be considered in risk assessments for excavations.

Site operatives or personnel should not enter unsupported excavations and should be informed of potential risks. Where site operatives or engineering staff work in close proximity to temporary slopes or batters, these should be inspected and approved by a suitably experienced civil engineer, preferably with geotechnical experience. Where there is a risk of spalling of battered slopes, the use of a geogrid is recommended. The geogrid should be anchored at the top and bottom of the ridge face to contain particles such as gravel, cobbles and / or boulders, anthropogenic materials that may become dislodged.

6.6 Pavement Construction

Nine plate load tests were conducted on the shallow subsoils at depths of 0.40m bgl. The plate load test permits an assessment of the in-situ stiffness of the upper soil. The test results are reported in Appendix 3 of the report and are summarised below in Table 3. Equivalent CBR values 0.4 to 3.0% were determined on the initial loading cycles (Cycle 1) with values of 1.0 and 6.2% on the reload cycles (Cycle 2). It should be noted that each plate load test was conducted on light brown sandy gravelly cobbly CLAY soils.

Table 3 – Equivalent CBR % Values obtained in Plate Bearing Testing

Test No.	Depth	CBR at Load Cycle (%)	CBR at Re-Load (%)
CBR 01	0.40	0.7	1.8
CBR 02	0.40	0.8	3.1
CBR 03	0.40	0.5	1.9
CBR 04	0.40	3.0	6.2
CBR 05	0.40	1.4	2.1
CBR 06	0.40	0.8	1.0
CBR 07	0.40	1.0	2.0
CBR 08	0.40	0.4	1.2
CBR 09	0.40	1.4	2.3

Based on the plate load test results, and in accordance with the Design Guidance for Road Pavement (HD 25-26/10:2010), a CBR design value of <2% is recommended for the near surface soils in their current state. Ahead of road construction, and following static compaction of the soils, a further set of plate testing (450 or 600mm diameter) should be undertaken to assess the improvement in stiffness of the formation - a dynamic compactive effort will likely promote dilatancy in any silt-dominant soils. It should be noted that should a deeper stratum be selected for road formation, there may be a marked improvement registered in subgrade quality, ie., a higher CBR value obtained in plate testing.

Assuming a design CBR value of 2% for the upper soils then a minimum 6F capping thickness of 500 to 600mm and a sub-base thickness (UGM) of 150mm is recommended to support the road pavements.

If or where very low strength subgrade occurs (CBR <1%) either geogrid reinforcement or the use of starter material (Class 6A / 6B) could be considered to provide a suitable foundation layer especially for access or haul / spine roads if they traverse low strength subgrades. Such a mechanically (geogrid) stabilised layer could consist of a layer of geogrid with 500 to 600mm of granular fill (well graded aggregate with maximum particle size of 75mm). Where geogrid is not utilized then approximately 500mm build-up of Class 6A / 6B 'starter layer' material could be considered in conjunction with a 'capping layer' (Class 6F capping in line with Series 600 of TII SRW). This should provide a satisfactory foundation layer to adequately support the subbase / pavement (150mm of unbound granular material (UGM) in accordance with Table 2.1 of CC-SPW-00800 (TII August 2022). The aforementioned Class 6A / 6B material could be used in conjunction with ca. 300mm of 6F capping material. This should provide a robust foundation layer.

The time of year will play a role in sub-grade strength especially during winter or early spring where heavy rainfall would cause degradation / wash-out of the formation. Oppositely, in summer, the performance of the soil subgrade may be significantly improved dependent on moisture content levels in the upper soil. If there are particular concerns regarding the condition of the formation soils, then additional plate bearing tests should be considered during construction to verify or validate the stiffness / density of the formation soils and adequate capping thickness.

The durability of the capping material should be confirmed as capping will be exposed to the elements (especially if the works are undertaken during the winter / spring period). It is important that argillaceous sedimentary rocks (i.e. muddy limestone, calcareous mudstone, shale, etc.) are not used as capping or as a starter layer. These have high potential to give rise to degradation (i.e. poor durability and soundness) and slaking and therefore would not be suitable.

All granular fills / unbound granular mixtures (UGM) used in pavement construction should be tested and approved in advance of being used in pavement construction. They should meet the compositional, chemical and soundness requirements as prescribed in the TII publication entitled Road Pavements – Unbound and Hydraulically Bound Mixtures (CC-SPW-00800 – dated August 2022).

Compaction / Placement of imported granular fill or hardcore will need to achieve low air voids (<5%) and ensure that settlement is not an issue. The number of roller passes and mass per metre and width of roll should meet the guidelines in I.S. 888:2016 Annex B: Compaction requirements for unbound mixtures Table B.1. It is recommended to use a smooth drum roller (without vibration) with a mass per metre of roll of not less than 5400kg. Unbound mixtures should not be laid in layers greater than 150mm if using this compaction method.

6.7 Buried Concrete

The chemical analysis tests on natural soil samples (BRE SD1 analysis suite) show pH (2.5:1) values ranging from 7.3 to 8.1. The sulphate aqueous extract (SO_4) results from trial pit and borehole samples determined values of <10mg/l to 89mg/l. This would suggest the 'as-received' soil samples tested could be categorised as BRE Class DS-1.

Table C1 ACEC for greenfield sites in BRE SD 1 (2005) can be used in the selection and design of concrete. If mobile groundwater conditions prevail at the site and given the pH values obtained from the testing, then ACEC class AC-1^d would be expected to be appropriate for buried concrete in the soils. In line with I.S. EN 206-1:2013, concrete could be manufactured to Class XA1 where founded or positioned in the upper soils (Class XA1 being ≥ 2000 and ≤ 3000 SO_4^{2-} mg/kg).

6.8 Waste Acceptance Criteria [WAC] & Environmental Testing

Soil samples were taken across a range of depths from trial pits (TP02-TP10) and borehole BH05. Samples were analysed for their compliance to the criteria set out in the 2002 European Council Decision (2003/33/EC). O'Callaghan Moran & Associates conducted a waste characterisation assessment of the samples in accordance with the Environmental Protection Agency (EPA) Guidelines on the Classification of Waste (2015). This report, together with conclusions and recommendations, is presented in Appendix 8.

6.9 Additional Ground Investigations

Although shallow bedrock was not proven on site, preparing the sloped site for construction may involve excavation which could intercept same. It would be prudent to have some indication as to depth to and quality of bedrock should dig levels descend to rockhead in the more elevated areas, ie., to the south of the site. It is anticipated that either or both rotary coring methods combined with geophysical methods (seismic refraction and electrical resistivity tomography) would assist in the mapping of rockhead under the site as well as determining the extent, if any, of potential karst dissolution manifest in the bedrock.

Future phases of investigation would likely see a series of dynamic probes throughout the site to ascertain the local stiffness / density properties of the overburden. Plate testing would also be of benefit where sand-dominant soils are found under housing units.

BIBLIOGRAPHY

1.0 BS 5930 (2015 + A1:2020) Code of Practice for Site Investigation, British Standards Institution (BSI).

2.0 BS 1377 (1990). Methods of Testing of Soils for Civil Engineering Purposes, BSI.

3.0 CEN (2018A). Geotechnical Investigation and Testing – Identification and classification of soil – Part 1: Identification and description (ISO 14688-1:2017)

4.0 CEN (2018B). Geotechnical Investigation and Testing – Identification and classification of soil – Part 2: Principles for a classification (ISO 14688-2:2017)

5.0 CEN (2018C). Geotechnical Investigation and Testing – Identification, description & classification of rock (EN ISO 14689-1:2017)

6.0 EN 1997-2 (2007). Eurocode 7: Geotechnical design. Part 2: Ground Investigation & Testing

7.0 EPA (2020, January). Guidance on waste acceptance criteria at authorized soil recovery facilities. Wexford, Environmental Protection Agency

8.0 Irish Standard IS 888:2016, NSAI (Published in March 2016)

9.0 Sevastopulo, G.D. (1982). The age and depositional setting of Waulsortian Limestones in Ireland. In: Le Mone, D.V. (ed.) Symposium on the paleoenvironmental setting and distribution of the Waulsortian Facies. University of Texas at El Paso and El Paso Geological Society. 65-79.

10.0 Site Investigation Practice: Assessing BS 5930 (1986), Geological Society Special Publication, No. 2.

11.0 Sowers, G.F. (1962) Shallow Foundations, Foundation Engineering, McGraw Hill

12.0 SR21:2014+A1:2016 Guidance on the use of IS EN 13242+A1:2007

13.0 Terzaghi, K., Peck, R.B., & Mesri, G. (1996). Soil Mechanics in Engineering, 3rd Edition. New York, Wiley.

Appendix 1

Cable Percussion Borehole Logs

SPT Er Calibration Certificate

GEOTECHNICAL BORING RECORD

REPORT NUMBER 25387

CONTRACT	Lands at Gortnahomna More, Castlemartyr	**BOREHOLE NO.**	**BH01**
		SHEET	Sheet 1 of 1
CO-ORDINATES	596,887.04 E 573,395.88 N	**RIG TYPE**	Dando 2000
		BOREHOLE DIAMETER (mm)	200
GROUND LEVEL (mOD)	10.40	**BOREHOLE DEPTH (m)**	7.20
		DATE COMMENCED	16/05/2024
		DATE COMPLETED	17/05/2024
CLIENT	Marshall Yards Dev. Co. Ltd	**SPT HAMMER REF. NO.**	SA2
		BORED BY	JC
ENGINEER	DOBA	**ENERGY RATIO (%)**	72.81
		PROCESSED BY	FC

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples: Ref. Number	Sample Type	Depth (m)	Recovery	Field Test Results	Standpipe Details
0	TOPSOIL		10.20	0.20						
	Firm brown sandy SILT/CLAY		9.50	0.90						
1	Medium dense to dense grey/brown sandy GRAVEL with occasional cobbles				AA210217	B	1.00		N = 27 (2, 5, 7, 5, 8, 7)	
2					AA210218	B	2.00		N = 33 (5, 5, 7, 8, 9, 9)	
3			7.00	3.40	AA210219	B	3.00		N = 31 (5, 5, 6, 8, 8, 9)	
	Stiff to very stiff brown sandy gravelly SILT with occasional cobbles									
4					AA210220	B	4.00		N = 24 (4, 5, 5, 6, 6, 7)	
5					AA210221	B	5.00		N = 22 (5, 5, 4, 6, 6, 6)	
6					AA210222	B	6.00		N = 28 (6, 5, 6, 7, 8, 7)	
7			3.20	7.20	AA210223	B	7.00		N = 24 (6, 6, 5, 5, 7, 7)	
	Obstruction End of Borehole at 7.20 m								N = 50/150 mm (25, 25, 25)	
8										
9										
10										

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (h)	Comments
1.30	1.50	0.75	
2.40	2.50	0.5	
7.10	7.20	1.5	

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
					No water strike

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type
17-05-24	7.20	1.00	7.20	50mm SP

REMARKS Location scanned using CAT (Cable Avoidance Tool) detector with hand dug inspection pit carried out.

Sample Legend
D - Small Disturbed (tub)
B - Bulk Disturbed
LB - Large Bulk Disturbed
Env - Environmental Sample (Jar + Vial + Tub)
UT - Undisturbed 100mm Diameter Sample
P - Undisturbed Piston Sample
W - Water Sample

IGSL BH LOG 25387.GPJ IGSL.GDT 8/10/24

GEOTECHNICAL BORING RECORD

REPORT NUMBER 25387

CONTRACT	Lands at Gortnahomna More, Castlemartyr	**BOREHOLE NO.**	**BH02**
		SHEET	Sheet 1 of 1
CO-ORDINATES	596,927.05 E 573,322.13 N	**RIG TYPE**	Dando 2000
		BOREHOLE DIAMETER (mm)	200
GROUND LEVEL (mOD)	16.65	**BOREHOLE DEPTH (m)**	1.20
		DATE COMMENCED	17/05/2024
		DATE COMPLETED	17/05/2024
CLIENT	Marshall Yards Dev. Co. Ltd	**SPT HAMMER REF. NO.**	SA2
ENGINEER	DOBA	**ENERGY RATIO (%)**	72.81
		BORED BY	JC
		PROCESSED BY	FC

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples: Ref. Number	Samples: Sample Type	Samples: Depth (m)	Samples: Recovery	Field Test Results	Standpipe Details
0	TOPSOIL		16.45	0.20						
	Firm brown sandy slightly gravelly SILT/CLAY									
1			15.45	1.20	AA211709	B	1.00		N = 54/225 mm (3, 4, 4, 25, 25)	
	Obstruction End of Borehole at 1.20 m									
2										
3										
4										
5										
6										
7										
8										
9										
10										

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (h)	Comments
1.20	1.20	1	

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
					No water strike

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type

REMARKS Location scanned using CAT (Cable Avoidance Tool) detector with hand dug inspection pit carried out. Obstruction encountered. Moved 3m to BH02A with rebore attempted.

Sample Legend
D - Small Disturbed (tub)
B - Bulk Disturbed
LB - Large Bulk Disturbed
Env - Environmental Sample (Jar + Vial + Tub)
UT - Undisturbed 100mm Diameter Sample
P - Undisturbed Piston Sample
W - Water Sample

IGSL BH LOG 25387.GPJ IGSL.GDT 8/10/24

GEOTECHNICAL BORING RECORD

REPORT NUMBER 25387

CONTRACT	Lands at Gortnahomna More, Castlemartyr	**BOREHOLE NO.**	**BH02A**
		SHEET	Sheet 1 of 1
CO-ORDINATES	596,927.05 E 573,322.13 N	**RIG TYPE**	Dando 2000
		BOREHOLE DIAMETER (mm)	200
GROUND LEVEL (mOD)	16.65	**BOREHOLE DEPTH (m)**	3.20
		DATE COMMENCED	20/05/2024
		DATE COMPLETED	20/05/2024
CLIENT	Marshall Yards Dev. Co. Ltd	**SPT HAMMER REF. NO.**	SA2
ENGINEER	DOBA	**ENERGY RATIO (%)**	72.81
		BORED BY	JC
		PROCESSED BY	FC

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples: Ref. Number	Samples: Sample Type	Samples: Depth (m)	Samples: Recovery	Field Test Results	Standpipe Details
0	TOPSOIL		16.45	0.20						
	Firm brown sandy slightly gravelly SILT									
1			15.35	1.30	AA210225	B	1.00		N = 18 (2, 3, 3, 5, 5, 5)	
	Medium dense brown clayey/silty sandy GRAVEL with occasional cobbles									
2			13.95	2.70	AA210226	B	2.00		N = 24 (5, 6, 5, 7, 6, 6)	
	Dense angular GRAVEL and COBBLES									
3			13.45	3.20	AA210227	B	3.00		N = 50/150 mm (10, 11, 25, 25)	
	Obstruction End of Borehole at 3.20 m									
4										
5										
6										
7										
8										
9										
10										

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (h)	Comments
1.30	1.50	0.75	
3.10	3.20	1.5	

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
					No water strike

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type
20-05-24	3.20	1.00	3.20	50mm SP

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

REMARKS Location scanned using CAT (Cable Avoidance Tool) detector with hand dug inspection pit carried out.

Sample Legend
D - Small Disturbed (tub)
B - Bulk Disturbed
LB - Large Bulk Disturbed
Env - Environmental Sample (Jar + Vial + Tub)
UT - Undisturbed 100mm Diameter Sample
P - Undisturbed Piston Sample
W - Water Sample

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GEOTECHNICAL BORING RECORD

REPORT NUMBER 25387

CONTRACT	Lands at Gortnahomna More, Castlemartyr	**BOREHOLE NO.**	**BH03**
		SHEET	Sheet 1 of 1
CO-ORDINATES	596,742.18 E 573,205.33 N	**RIG TYPE**	Dando 2000
		BOREHOLE DIAMETER (mm)	200
GROUND LEVEL (mOD)	20.27	**BOREHOLE DEPTH (m)**	4.80
		DATE COMMENCED	21/05/2024
		DATE COMPLETED	22/05/2024
CLIENT	Marshall Yards Dev. Co. Ltd	**SPT HAMMER REF. NO.**	SA2
ENGINEER	DOBA	**ENERGY RATIO (%)**	72.81
		BORED BY	JC
		PROCESSED BY	FC

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples: Ref. Number	Sample Type	Depth (m)	Recovery	Field Test Results	Standpipe Details
0	TOPSOIL		20.07	0.20						
1	Soft to firm brown slighlty gravelly SILT/CLAY. Gravel is fine.		18.97	1.30	AA210231	B	1.00		N = 9 (1, 2, 2, 2, 3, 2)	
2	Firm brown sandy gravelly SILT				AA210232	B	2.00		N = 11 (2, 2, 3, 2, 3, 3)	
3					AA210233	B	3.00		N = 11 (3, 2, 2, 3, 3, 3)	
4			16.47	3.80						
	Very stiff brown gravelly CLAY with some angular cobbles				AA210234	B	4.00		N = 26 (3, 4, 5, 5, 6, 10)	
5	Obstruction End of Borehole at 4.80 m		15.47	4.80					N = 50/150 mm (25, 25, 25)	
6										
7										
8										
9										
10										

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (h)	Comments
4.70	4.80	1.5	

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
					No water strike

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type
22-05-24	4.80	1.00	4.80	50mm SP

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

REMARKS Location scanned using CAT (Cable Avoidance Tool) detector with hand dug inspection pit carried out.

Sample Legend
D - Small Disturbed (tub)
B - Bulk Disturbed
LB - Large Bulk Disturbed
Env - Environmental Sample (Jar + Vial + Tub)
UT - Undisturbed 100mm Diameter Sample
P - Undisturbed Piston Sample
W - Water Sample

IGSL BH LOG 25387.GPJ IGSLGDT 8/10/24

GEOTECHNICAL BORING RECORD

REPORT NUMBER 25387

CONTRACT	Lands at Gortnahomna More, Castlemartyr	**BOREHOLE NO.**	**BH04**
		SHEET	Sheet 1 of 1
CO-ORDINATES	596,741.06 E 573,291.65 N	**RIG TYPE**	Dando 2000
		BOREHOLE DIAMETER (mm)	200
GROUND LEVEL (mOD)	17.74	**BOREHOLE DEPTH (m)**	1.70
		DATE COMMENCED	21/05/2024
		DATE COMPLETED	21/05/2024
CLIENT	Marshall Yards Dev. Co. Ltd	**SPT HAMMER REF. NO.**	SA2
		BORED BY	JC
ENGINEER	DOBA	**ENERGY RATIO (%)**	72.81
		PROCESSED BY	FC

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples: Ref. Number	Samples: Sample Type	Samples: Depth (m)	Samples: Recovery	Field Test Results	Standpipe Details
0	TOPSOIL		17.54	0.20						
	Soft to firm brown sandy slightly gravelly SILT/CLAY. Gravel is fine.				AA218228	B	1.00		N = 9 (1, 2, 2, 2, 3, 2)	
			16.04	1.70					N = 50/150 mm (25, 25, 25)	
2	Obstruction End of Borehole at 1.70 m									

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (h)	Comments
1.60	1.70	1.5	

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
					No water strike

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type

REMARKS Location scanned using CAT (Cable Avoidance Tool) detector with hand dug inspection pit carried out. Obstruction encountered. Moved 3m to BH04A with rebore attempted.

Sample Legend
D - Small Disturbed (tub)
B - Bulk Disturbed
LB - Large Bulk Disturbed
Env - Environmental Sample (Jar + Vial + Tub)
UT - Undisturbed 100mm Diameter Sample
P - Undisturbed Piston Sample
W - Water Sample

IGSL BH LOG 25387.GPJ IGSL.GDT 8/10/24

GEOTECHNICAL BORING RECORD

REPORT NUMBER 25387

CONTRACT	Lands at Gortnahomna More, Castlemartyr	**BOREHOLE NO.**	**BH04A**
		SHEET	Sheet 1 of 1
CO-ORDINATES	596,741.06 E 573,291.65 N	**RIG TYPE**	Dando 2000
		BOREHOLE DIAMETER (mm)	200
GROUND LEVEL (mOD)	17.74	**BOREHOLE DEPTH (m)**	2.00
		DATE COMMENCED	21/05/2024
		DATE COMPLETED	21/05/2024
CLIENT	Marshall Yards Dev. Co. Ltd	**SPT HAMMER REF. NO.**	SA2
		BORED BY	JC
ENGINEER	DOBA	**ENERGY RATIO (%)**	72.81
		PROCESSED BY	FC

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples: Ref. Number	Samples: Sample Type	Samples: Depth (m)	Samples: Recovery	Field Test Results	Standpipe Details
0	TOPSOIL		17.54	0.20						
	Soft becoming firm brown sandy gravelly SILT				AA218229	B	1.00		N = 10 (1, 3, 2, 3, 2, 3)	
1			16.24	1.50						
	Stiff brown gravelly CLAY with angular cobbles		15.74	2.00	AA218230	B	2.00		N = 50/150 mm (25, 25, 25)	
2	Obstruction End of Borehole at 2.00 m									
3										
4										
5										
6										
7										
8										
9										
10										

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (h)	Comments
1.90	2.00	1.5	

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
					No water strike

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type

REMARKS Location scanned using CAT (Cable Avoidance Tool) detector with hand dug inspection pit carried out.

Sample Legend
D - Small Disturbed (tub)
B - Bulk Disturbed
LB - Large Bulk Disturbed
Env - Environmental Sample (Jar + Vial + Tub)
UT - Undisturbed 100mm Diameter Sample
P - Undisturbed Piston Sample
W - Water Sample

IGSL BH LOG 25387.GPJ IGSL.GDT 8/10/24

GEOTECHNICAL BORING RECORD

REPORT NUMBER 25387

CONTRACT	Lands at Gortnahomna More, Castlemartyr	**BOREHOLE NO.**	**BH05**
		SHEET	Sheet 1 of 1
CO-ORDINATES	596,737.08 E 573,454.14 N	**RIG TYPE**	Dando 2000
		BOREHOLE DIAMETER (mm)	200
GROUND LEVEL (mOD)	10.95	**BOREHOLE DEPTH (m)**	10.00
		DATE COMMENCED	14/05/2024
		DATE COMPLETED	15/05/2024
CLIENT	Marshall Yards Dev. Co. Ltd	**SPT HAMMER REF. NO.**	SA2
		BORED BY	JC
ENGINEER	DOBA	**ENERGY RATIO (%)**	72.81
		PROCESSED BY	FC

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples: Ref. Number	Sample Type	Depth (m)	Recovery	Field Test Results	Standpipe Details
0	TOPSOIL (MADE GROUND)		10.75	0.20						
	MADE GROUND comprising brown slightly gravelly Clay with anthropogenic material				AA218706	B	1.00		N = 10 (3, 2, 2, 2, 3, 3)	
2			8.65	2.30	AA218707	B	2.00		N = 9 (2, 2, 3, 2, 2, 2)	
	Soft light brown slightly gravelly CLAY. Gravel is angular.				AA218708	B	3.00			
3			7.55	3.40	AA218709	U	3.00	80%rec		
	Loose to medium dense brown clayey/silty gravelly SAND. Gravel is fine.				AA218710	B	4.00		N = 8 (2, 2, 1, 2, 2, 3)	
4										
									N = 11 (1, 2, 2, 3, 3, 3)	
5					AA218711	B	5.00			
									N = 14 (2, 2, 3, 4, 3, 4)	
6					AA218712	B	6.00			
			4.15	6.80					N = 13 (1, 2, 2, 2, 4, 5)	
	Medium dense to dense grey slightly clayey/silty sandy angular GRAVEL with a cobble content.				AA218713	B	7.00			
7									N = 20 (3, 4, 4, 5, 5, 6)	
					AA218714	B	8.00			
8									N = 23 (3, 3, 4, 5, 7, 7)	
					AA218715	B	9.00			
9										
									N = 30 (4, 5, 6, 7, 9, 8)	
			0.95	10.00						
10	End of Borehole at 10.00 m				AA218716	B	10.00			

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (h)	Comments
2.90	3.00	1.5	

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
					No water strike

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type
15-05-24	10.00	4.00	10.00	50mm SP

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

REMARKS Location scanned using CAT (Cable Avoidance Tool) detector with hand dug inspection pit carried out.

Sample Legend
D - Small Disturbed (tub)
B - Bulk Disturbed
LB - Large Bulk Disturbed
Env - Environmental Sample (Jar + Vial + Tub)
UT - Undisturbed 100mm Diameter Sample
P - Undisturbed Piston Sample
W - Water Sample

IGSL BH LOG 25387.GPJ IGSLGDT 8/10/24

GEOTECHNICAL BORING RECORD

REPORT NUMBER 25387

CONTRACT	Lands at Gortnahomna More, Castlemartyr	**BOREHOLE NO.**	**BH06**
		SHEET	Sheet 1 of 1
CO-ORDINATES	596,811.38 E 573,460.59 N	**RIG TYPE**	Dando 2000
		BOREHOLE DIAMETER (mm)	200
GROUND LEVEL (mOD)	10.78	**BOREHOLE DEPTH (m)**	9.50
		DATE COMMENCED	10/05/2024
		DATE COMPLETED	14/05/2024
CLIENT	Marshall Yards Dev. Co. Ltd	**SPT HAMMER REF. NO.**	SA2
		BORED BY	JC
ENGINEER	DOBA	**ENERGY RATIO (%)**	72.81
		PROCESSED BY	FC

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples: Ref. Number	Sample Type	Depth (m)	Recovery	Field Test Results	Standpipe Details
0	Firm brown gravelly SILT/CLAY with occasional cobbles									
1					AA206797	B	1.00		N = 10 (8, 4, 3, 2, 2, 3)	
2					AA206798	B	2.00		N = 12 (2, 2, 3, 2, 3, 4)	
			8.28	2.50						
3	Medium dense to dense grey slightly clayey/silty very sandy GRAVEL with angular cobbles				AA206799	B	3.00		N = 22 (4, 6, 7, 5, 5, 5)	
4					AA206800	B	4.00		N = 23 (4, 5, 5, 7, 6, 5)	
5					AA206801	B	5.00		N = 20 (3, 5, 5, 4, 5, 6)	
6					AA206802	B	6.00		N = 22 (4, 5, 5, 6, 6, 5)	
7					AA206803	B	7.00		N = 34 (4, 6, 8, 9, 9, 8)	
8					AA206804	B	8.00		N = 33 (4, 6, 8, 9, 8, 8)	
			2.08	8.70						
9	Very stiff brown very gravelly CLAY with some cobbles				AA206805	B	9.00		N = 46 (7, 8, 10, 10, 12, 14)	
			1.28	9.50					N = 50/150 mm (25, 25, 25)	
10	Obstruction End of Borehole at 9.50 m									

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (h)	Comments
0.80	1.00	0.5	
9.40	9.50	1.5	

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
					No water strike

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type
14-05-24	9.50	1.00	9.50	50mm SP

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

REMARKS Location scanned using CAT (Cable Avoidance Tool) detector with hand dug inspection pit carried out.

Sample Legend
D - Small Disturbed (tub)
B - Bulk Disturbed
LB - Large Bulk Disturbed
Env - Environmental Sample (Jar + Vial + Tub)
UT - Undisturbed 100mm Diameter Sample
P - Undisturbed Piston Sample
W - Water Sample

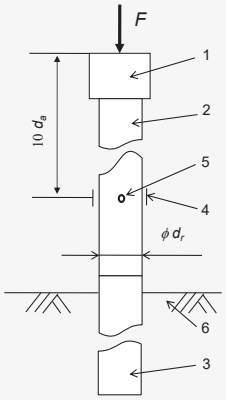
IGSL BH LOG 25387.GPJ IGSL.GDT 8/10/24

SPT Calibration Report

Hammer Energy Measurement Report

Type of Hammer		SPT HAMMER
Test No		EQU2024_29
Client		IGSL
Test Depth (m)		9.10
Mass of hammer	m =	63.5kg
Falling height	h =	0.76m
E_{theor} =	$m \times g \times h$ =	473J

Characteristics of the instrumented rod



Key

1 Anvil
2 Part of instrumented rod
3 Drive Rod
4 Strain Gauge
5 Accelerometer
6 Ground

F Force
d_r Diameter of rod

Fig. B.1 and B.2
BS EN ISO 22476-3 : 2005 + A1 : 2011

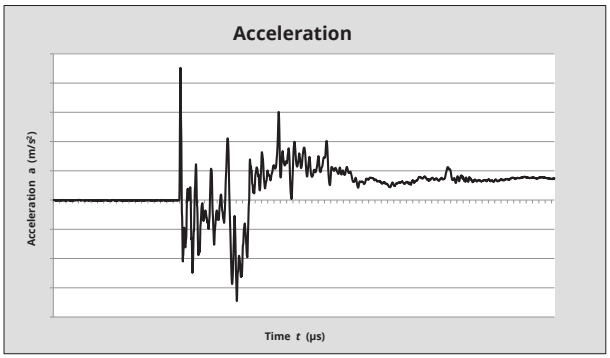
Diameter	d_r =	0.052 m
Length of instrumented rod		0.558 m
Area	A =	11.61 cm²
Modulus	E_a =	206843 MPa

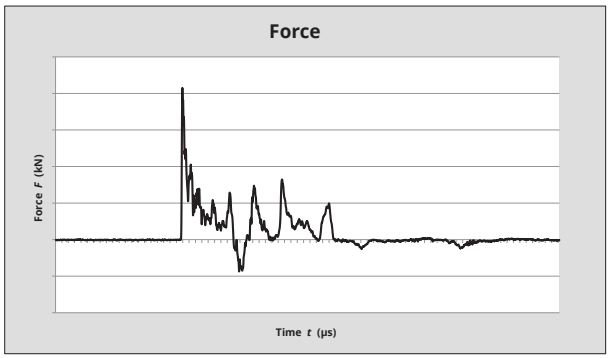
E_{meas} = **0.344** kN-m

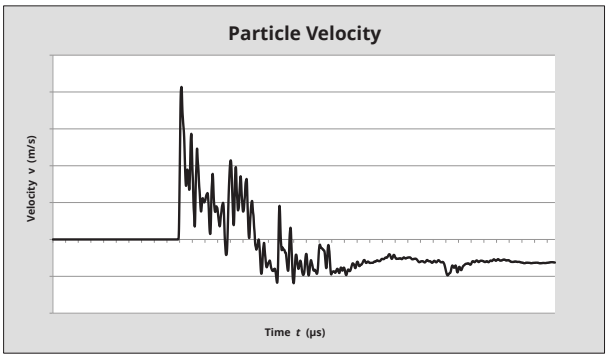
E_{theor} = **0.473** kN-m

Comments

DATE OF TEST	VALID UNTIL	HAMMER ID
11/03/2024	11/03/2025	SAZ







Energy Ratio (Er) = $\frac{E_{meas}}{E_{theor}}$ **72.81%**

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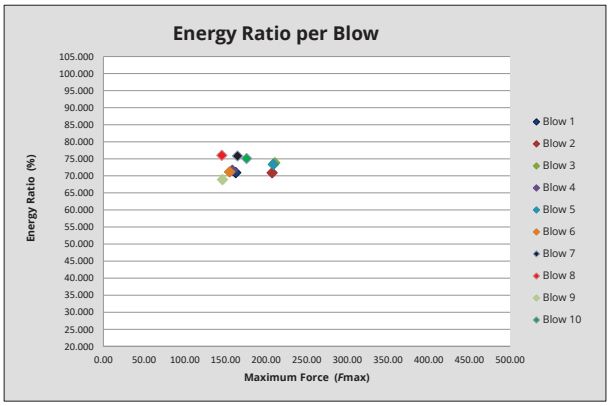

Equipe SPT Analyzer Operator	Certificate prepared by	Certificate checked by	Certificate date
JL			21/03/2024

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Tel: +44 (0)1295 670990 Fax: +44 (0)1295 678232 Email: info@equipegroup.com

Appendix 2

Trial Pit Records & Photographs

TRIAL PIT RECORD

REPORT NUMBER 25387

CONTRACT	Lands at Gortnahomna More, Castlemartyr	**TRIAL PIT NO.**	**TP01**
		SHEET	Sheet 1 of 1
LOGGED BY	AR	**CO-ORDINATES**	596,849.68 E 573,376.13 N
		DATE STARTED	11/06/2024
		DATE COMPLETED	11/06/2024
CLIENT	Marshall Yards Dev. Co. Ltd	**GROUND LEVEL (m)**	12.06
ENGINEER	DOBA	**EXCAVATION METHOD**	8.5t excavator

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 TOPSOIL									
Firm to stiff slightly sandy slightly gravelly SILT/CLAY with gravelly Sand horizons. Gravel is subangular to subrounded fine to coarse. Sand is fine to coarse.		0.50	11.56						
1.0					AA231517	B	1.00-1.00		
2.0					AA231518	B	2.00-2.00		
Stiff light reddish brown slightly sandy slightly gravelly SILT. Gravel is subangular to subrounded fine to coarse. Sand is fine to medium.		2.20	9.86						
3.0 End of Trial Pit at 3.00m		3.00	9.06		AA231519	B	3.00-3.00		

Groundwater Conditions
Dry

Stability
Partial collapse at 2.0m

General Remarks
Location CAT (Cable Avoidance Tool) scanned prior to excavation. BRE01 soakaway test preformed adjacent to trial pit (sample ref = AA231520).

TRIAL PIT RECORD

REPORT NUMBER 25387

CONTRACT	Lands at Gortnahomna More, Castlemartyr	**TRIAL PIT NO.**	**TP02**
		SHEET	Sheet 1 of 1
LOGGED BY	AR	**CO-ORDINATES**	596,906.64 E 573,407.23 N
		DATE STARTED	11/06/2024
		DATE COMPLETED	11/06/2024
CLIENT	Marshall Yards Dev. Co. Ltd	**GROUND LEVEL (m)**	9.62
ENGINEER	DOBA	**EXCAVATION METHOD**	8.5t excavator

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 TOPSOIL									
(Medium dense to dense) Light brown silty/clayey gravelly SAND with a low cobble content. Cobbles are subangular to subrounded. Gravel is subangular to subrounded fine to coarse. Sand is fine to coarse.		0.30	9.32						
1.0					AA231521	B	1.00-1.00		
Firm to stiff slightly sandy gravelly SILT/CLAY with cobbles. Cobbles are subangular to rounded of limestone. Gravel is subrounded to rounded fine to coarse. Sand is fine to coarse.		1.40	8.22						
2.0					AA231522	B	2.00-2.00		
					AA231523	B	2.70-2.70		
3.0 End of Trial Pit at 3.00m		3.00	6.62						

Groundwater Conditions
Dry

Stability
Good

General Remarks
Location CAT scanned prior to excavation

TRIAL PIT RECORD

REPORT NUMBER 25387

CONTRACT	Lands at Gortnahomna More, Castlemartyr	**TRIAL PIT NO.**	**TP03**
		SHEET	Sheet 1 of 1
LOGGED BY	AR	**CO-ORDINATES**	596,958.38 E 573,344.33 N
		DATE STARTED	12/06/2024
		DATE COMPLETED	12/06/2024
CLIENT	Marshall Yards Dev. Co. Ltd	**GROUND LEVEL (m)**	17.21
ENGINEER	DOBA	**EXCAVATION METHOD**	8.5t excavator

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 TOPSOIL		0.15	17.06						
Firm orange brown gravelly slightly silty very sandy CLAY with cobbles. Cobbles subangular to subrounded. Gravels are subrounded to rounded fine to coarse. Sand is fine to coarse.					AA231524	B	0.40-0.40		
		0.80	16.41						
1.0 Firm to stiff dark brown to orange brown very gravelly very sandy SILT with a high cobble and boulder content. Boulders (up to 450mm) are angular. Cobbles are subangular to well-rounded. Gravels are subangular to subrounded fine to coarse.									
2.0					AA231525	B	2.00-2.00		
Possible rockhead / boulder obstruction End of Trial Pit at 2.50m		2.50	14.71						
3.0									

Groundwater Conditions
Dry

Stability
Collapse at 1.2m

General Remarks
Location CAT (Cable Avoidance Tool) scanned prior to excavation. Pit terminated at 2.50m due to possible bedrock / boulder obstruction.
BRE03 soakaway test preformed adjacent to trial pit (sample ref = AA231528).

TRIAL PIT RECORD

REPORT NUMBER 25387

CONTRACT	Lands at Gortnahomna More, Castlemartyr	**TRIAL PIT NO.**	**TP04**
		SHEET	Sheet 1 of 1
LOGGED BY	AR	**CO-ORDINATES**	596,910.05 E 573,270.68 N
		DATE STARTED	12/06/2024
		DATE COMPLETED	12/06/2024
CLIENT	Marshall Yards Dev. Co. Ltd	**GROUND LEVEL (m)**	20.22
ENGINEER	DOBA	**EXCAVATION METHOD**	8.5t excavator

	Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples			Vane Test (KPa)	Hand Penetrometer (KPa)
						Sample Ref	Type	Depth		
0.0	TOPSOIL									
	Firm to stiff orange brown very sandy gravelly CLAY. Gravel is subangular to subrounded fine to coarse. Sand is fine to coarse.		0.20	20.02						
1.0						AA231526	B	1.00-1.00		
2.0	Firm to stiff orange brown sandy very gravelly cobbly CLAY. Cobbles are angular to subrounded. Gravel is subangular to subrounded fine to coarse. Sand is fine to coarse.		2.00	18.22						
						AA231527	B	2.50-2.50		
3.0	End of Trial Pit at 3.00m		3.00	17.22						

Groundwater Conditions
Dry

Stability
Collapse between 1.30m and 1.80m

General Remarks
Location CAT (Cable Avoidance Tool) scanned prior to excavation. BRE04 soakaway test preformed adjacent to trial pit (sample ref = AA231529).

TRIAL PIT RECORD

REPORT NUMBER 25387

CONTRACT	Lands at Gortnahomna More, Castlemartyr	**TRIAL PIT NO.**	**TP05**
		SHEET	Sheet 1 of 1
LOGGED BY	AR	**CO-ORDINATES**	596,742.99 E 573,228.63 N
		DATE STARTED	13/06/2024
		DATE COMPLETED	13/06/2024
CLIENT	Marshall Yards Dev. Co. Ltd	**GROUND LEVEL (m)**	19.99
ENGINEER	DOBA	**EXCAVATION METHOD**	8.5t excavator

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 TOPSOIL		0.10	19.89						
Firm orange brown sandy gravelly CLAY with a low boulder content. Boulders (up to 300mm) are angular to subangular. Gravel is angular to subrounded fine to coarse.					AA231530	B	0.40-0.40		
1.0 Firm orange brown sandy gravelly CLAY with a high cobble and boulder content. Boulders (up to 1000mm) are angular to subangular. Cobbles are angular to subangular. Gravel is angular to subrounded fine to coarse.		0.80	19.19						
End of Trial Pit at 1.60m		1.60	18.39		AA231531	B	1.60-1.60		
2.0									
3.0									

Groundwater Conditions
Dry

Stability
Good

General Remarks
Location CAT (Cable Avoidance Tool) scanned prior to excavation. Pit terminated at 1.60m due to possible bedrock / boulder obstruction.
BRE05 soakaway test preformed adjacent to trial pit (sample ref = AA231537).

TRIAL PIT RECORD

REPORT NUMBER 25387

CONTRACT	Lands at Gortnahomna More, Castlemartyr	**TRIAL PIT NO.**	**TP06**
		SHEET	Sheet 1 of 1
LOGGED BY	AR	**CO-ORDINATES**	596,718.12 E 573,208.70 N
		DATE STARTED	13/06/2024
		DATE COMPLETED	13/06/2024
CLIENT	Marshall Yards Dev. Co. Ltd	**GROUND LEVEL (m)**	20.11
ENGINEER	DOBA	**EXCAVATION METHOD**	8.5t excavator

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 TOPSOIL									
Firm to stiff orange brown sandy gravelly CLAY with a low cobble and boulder content. Boulders (up to 300mm) are angular. Cobbles are angular to subangular. Gravel is angular to subrounded fine to coarse.		0.20	19.91						
1.0					AA231532	B	1.00-1.00		
2.0									
(Dense) Mottled grey orange brown clayey very gravelly SAND with a medium cobble content. Cobbles are angular. Gravel is angular to subangular fine to coarse.		2.30	17.81						
End of Trial Pit at 2.60m		2.60	17.51		AA231533	B	2.60-2.60		
3.0									

Groundwater Conditions
Dry

Stability
Good

General Remarks
Location CAT (Cable Avoidance Tool) scanned prior to excavation. Pit terminated at 2.60m due to possible bedrock / boulder obstruction.
BRE06 soakaway test preformed adjacent to trial pit (sample ref = AA231538).

TRIAL PIT RECORD

REPORT NUMBER 25387

CONTRACT	Lands at Gortnahomna More, Castlemartyr	**TRIAL PIT NO.**	**TP07**
		SHEET	Sheet 1 of 1
LOGGED BY	AR	**CO-ORDINATES**	596,759.00 E 573,300.74 N
		DATE STARTED	13/06/2024
		DATE COMPLETED	13/06/2024
CLIENT	Marshall Yards Dev. Co. Ltd	**GROUND LEVEL (m)**	18.78
ENGINEER	DOBA	**EXCAVATION METHOD**	8.5t excavator

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 TOPSOIL									
Firm to stiff light brown slightly silty gravelly CLAY. Gravel is subangular to subrounded fine to coarse.		0.40	18.38		AA231534	B	0.60-0.60		
Stiff orange brown slightly sandy gravelly CLAY. Gravel is subangular to subrounded fine to coarse.		0.90	17.88		AA231535	B	1.10-1.10		
Stiff light brown slightly sandy slightly gravelly CLAY. Gravel is subangular fine to medium.		1.50	17.28						
3.0 End of Trial Pit at 3.00m		3.00	15.78		AA231536	B	3.00-3.00		

Groundwater Conditions
Dry

Stability
Good

General Remarks
Location CAT (Cable Avoidance Tool) scanned prior to excavation. BRE07 soakaway test preformed adjacent to trial pit (sample reference = AA231539).

TRIAL PIT RECORD

REPORT NUMBER 25387

CONTRACT	Lands at Gortnahomna More, Castlemartyr	**TRIAL PIT NO.**	**TP08**
		SHEET	Sheet 1 of 1
LOGGED BY	AR	**CO-ORDINATES**	596,744.76 E 573,431.25 N
		DATE STARTED	11/06/2024
		DATE COMPLETED	11/06/2024
CLIENT	Marshall Yards Dev. Co. Ltd	**GROUND LEVEL (m)**	13.34
ENGINEER	DOBA	**EXCAVATION METHOD**	8.5t excavator

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 Soft to firm light brown sandy gravelly CLAY with a low cobble content. Cobbles are of limestone and concrete. Gravel is subangular to subrounded fine to coarse. (MADE GROUND)									
		0.40	12.94		AA231513	B	0.40-0.40		
Firm dark brown slightly sandy slightly gravelly Clay with rare pieces of plastic and fabric and a low cobble and boulder content. Boulders are angular (up to 275mm) of concrete. Cobbles are subangular to rounded. Gravel is subangular to subrounded fine to coarse. Sand is fine to medium. (MADE GROUND)									
1.0					AA231514	B	1.00-1.00		
		1.80	11.54						
Firm orange brown slightly sandy gravelly CLAY with a low cobble content. Cobbles are subangular to subrounded of limestone. Gravel is rounded fine to coarse. Sand is fine to coarse.									
2.0									
		2.80	10.54		AA231515	B	2.80-2.80		
End of Trial Pit at 2.80m									
3.0									

Groundwater Conditions
Dry

Stability
Good

General Remarks
Location CAT (Cable Avoidance Tool) scanned prior to excavation. BRE08 soakaway test preformed adjacent to trial pit (sample reference = AA231516).

TRIAL PIT RECORD

REPORT NUMBER 25387

CONTRACT	Lands at Gortnahomna More, Castlemartyr	**TRIAL PIT NO.**	**TP09**
		SHEET	Sheet 1 of 1
LOGGED BY	AR	**CO-ORDINATES**	596,723.28 E 573,475.58 N
		DATE STARTED	11/06/2024
		DATE COMPLETED	11/06/2024
CLIENT	Marshall Yards Dev. Co. Ltd	**GROUND LEVEL (m)**	12.35
ENGINEER	DOBA	**EXCAVATION METHOD**	8.5t excavator

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 TOPSOIL (MADE GROUND)									
		0.20	12.15						
Firm light brown slightly silty gravelly CLAY with a medium cobble and boulder content and fragments of rubber, metal, plastic, and tarmac. Boulders (up to 1400mm) are angular of concrete. Gravel is subangular to subrounded fine to coarse. (MADE GROUND)									
1.0					AA231509	B	1.00-1.00		
		1.20	11.15						
Firm greyish brown slightly sandy slightly gravelly Clay with a low cobble content and rare fragments of plastic. Cobbles are subangular to subrounded. (MADE GROUND)									
2.0					AA231510	B	2.00-2.00		
		2.70	9.65						
Firm to stiff mottled yellowish grey very slightly sandy CLAY									
		3.00	9.35						
3.0 End of Trial Pit at 3.00m					AA231511	B	3.00-3.00		

Groundwater Conditions
Slow Seepage at 1.20m

Stability
Good

General Remarks
Location CAT (Cable Avoidance Tool) scanned prior to excavation. BRE09 soakaway test preformed adjacent to trial pit (sample ref = AA231512).

IGSL TP LOG 25387.GPJ IGSL.GDT 9/10/24

TRIAL PIT RECORD

REPORT NUMBER 25387

CONTRACT	Lands at Gortnahomna More, Castlemartyr	**TRIAL PIT NO.**	**TP10**
		SHEET	Sheet 1 of 1
LOGGED BY	AR	**CO-ORDINATES**	596,810.57 E 573,513.42 N
		DATE STARTED	11/06/2024
		DATE COMPLETED	11/06/2024
CLIENT	Marshall Yards Dev. Co. Ltd	**GROUND LEVEL (m)**	17.45
ENGINEER	DOBA	**EXCAVATION METHOD**	8.5t excavator

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 Greyish brown clayey slightly sandy Gravel with a low cobble content. Cobbles are angular to subangular. Gravel is angular to subangular fine to coarse. (MADE GROUND									
Stiff light brown slightly sandy slightly gravelly SILT/CLAY.		0.30	17.15		AA231505	B	0.50-0.50		
1.0									
					AA231506	B	1.70-1.70		
2.0 (Medium dense to dense) Light brown clayey/silty gravelly SAND with cobbles. Cobbles are subangular to subrounded. Gravel is subangular to subrounded fine to coarse.		2.00	15.45						
2.0m Subrounded boulder (up to 350mm)									
3.0 End of Trial Pit at 3.00m		3.00	14.45		AA231507	B	3.00-3.00		

Groundwater Conditions
Dry

Stability
Collapse at 1.10m

General Remarks
Location CAT (Cable Avoidance Tool) scanned prior to excavation. BRE10 soakaway test preformed adjacent to trial pit (sample reference = AA231508).

TP01 – 1 of 4

TP01 – 2 of 4

TP01 – 3 of 4

TP01 – 4 of 4

TP02 – 1 of 4

TP02 – 2 of 4

TP02 – 3 of 4

TP02 – 4 of 4

TP03 – 1 of 4

TP03 – 2 of 4

TP03 – 3 of 4

TP03 – 4 of 4

TP04 – 1 of 4

TP04 – 2 of 4

TP04 - 3 of 4

TP04 - 4 of 4

TP05 – 1 of 4

TP05 – 2 of 4

TP05 – 3 of 4

TP05 – 4 of 4

TP06 – 1 of 3

TP06 – 2 of 3

TP06 – 3 of 3

TP07 – 1 of 3

TP07 – 2 of 3

TP07 – 3 of 3

TP08 – 1 of 4

TP08 – 2 of 4

TP08 – 3 of 4

TP08 – 4 of 4

TP09 – 1 of 4

TP09 – 2 of 4

TP09 – 3 of 4

TP09 – 4 of 4

TP10 – 1 of 4

TP10 – 2 of 2

TP10 – 3 of 3

Appendix 3

Plate Bearing Test Records

ITM Coordinates

CBR01	596821.5	573500.5	11.904
CBR02	596802.4	573435.4	11.044
CBR03	596790.2	573341.1	14.973
CBR04	596858.8	573331.1	15.329
CBR05	596951.6	573377.9	13.419
CBR06	596796	573312	16.546
CBR07	596802.2	573241.8	19.613
CBR08	596732.7	573167.1	21.23
CBR09	596703.6	573210.2	19.574

PLATE TEST REPORT SHEET (F3.1)

Applied Pressure/Settlement Curve

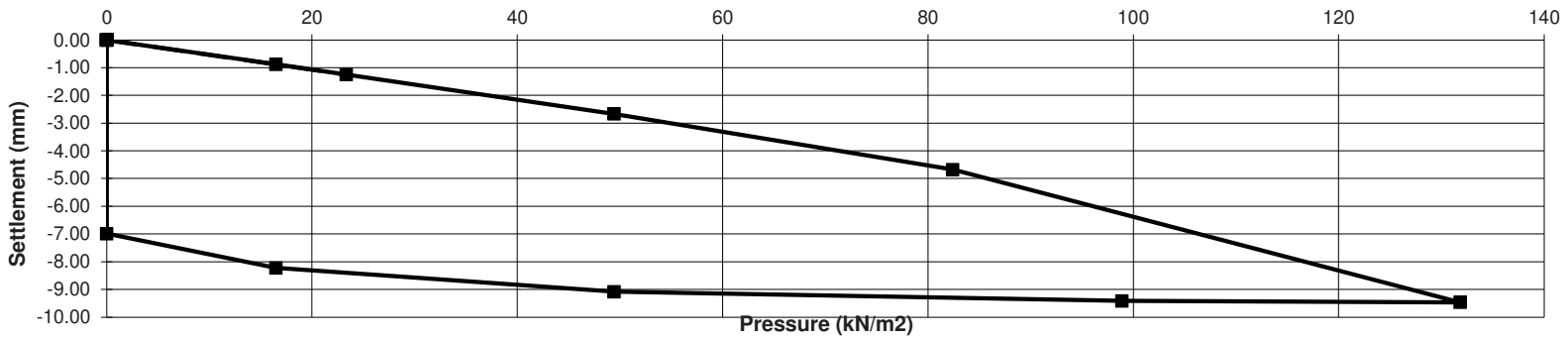
Reference No.	R158320
Contract	25387 Castlemartyr Co Cork
Test No.	PBT01 Load
Location	See Site Map
Depth	0.40
Client	DOBA
Plate Diameter:	450 mm
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test
Technician	A. Rynne
Authorised by	
Date	12/06/2024

Description of soil under test
(natural soil, placed fill, sub-base)

Light brown sandy gravelly CLAY

Sample Ref No. N/A

Depth 0.00 m bgl



Gradient at 1.25 mm settlement intersection = 19

Modulus of subgrade reaction = 12 MPa/m

Correction factor applied = 0.64 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 0.7 %

PLATE TEST REPORT SHEET (F3.1)

Applied Pressure/Settlement Curve

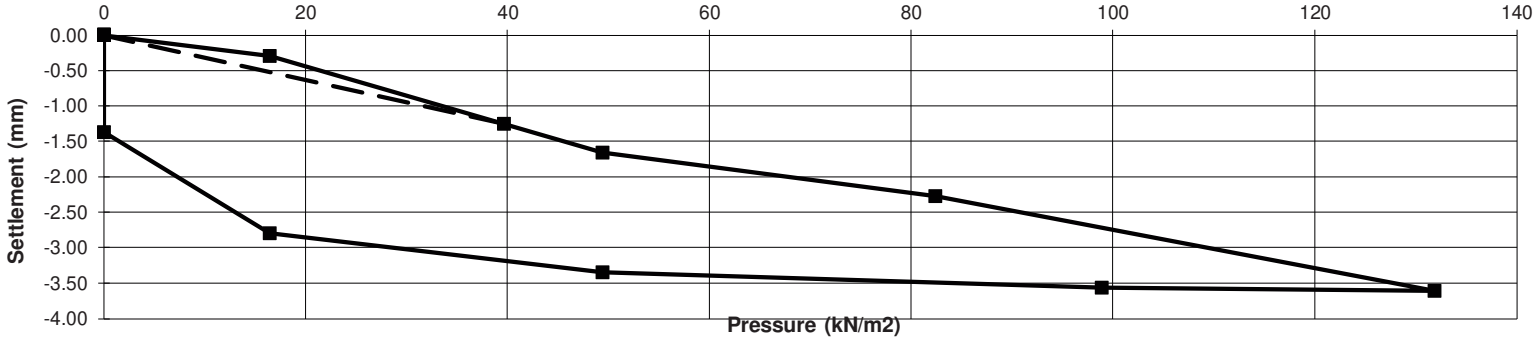
Reference No.	R158320
Contract	25387 Castlemartyr Co Cork
Test No.	PBT01 Reload
Location	See Site Map
Depth	0.40
Client	DOBA
Plate Diameter:	450 mm
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test
Technician	A. Rynne
Authorised by	
Date	12/06/2024

Description of soil under test
(natural soil, placed fill, sub-base)

Light brown sandy gravelly CLAY

Sample Ref No. N/A

Depth 0.00 m bgl



Gradient at 1.25 mm settlement intersection = 32
Modulus of subgrade reaction = 20 MPa/m
Correction factor applied = 0.64 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 1.8 %

PLATE TEST REPORT SHEET (F3.1)

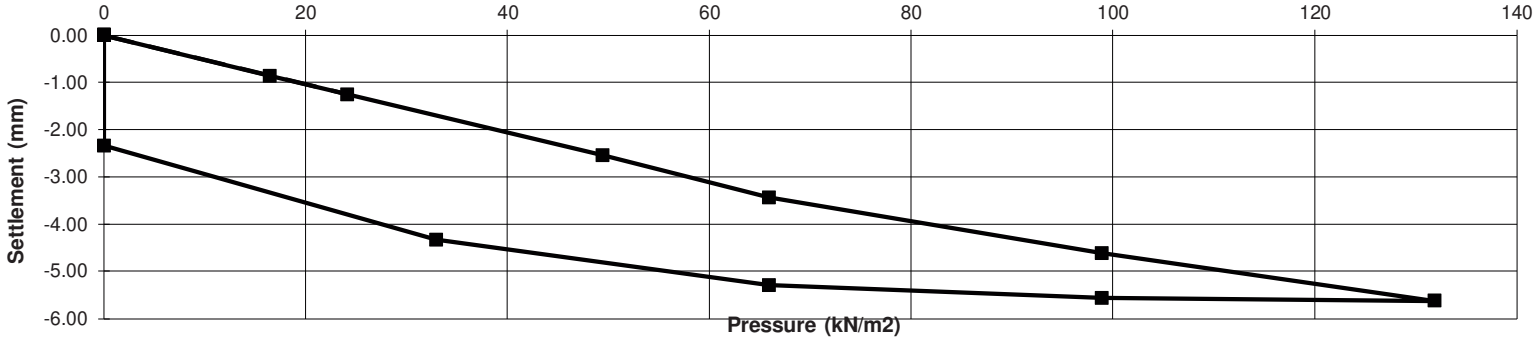
Applied Pressure/Settlement Curve

Reference No.	R158321
Contract	25387 Castlemartyr Co Cork
Test No.	PBT02 Load
Location	See Site Map
Depth	0.40
Client	DOBA
Plate Diameter:	450 mm
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test
Technician	A. Rynne
Authorised by	
Date	12/06/2024

Description of soil under test
(natural soil, placed fill, sub-base)

Light brown sandy gravelly CLAY

Sample Ref No. N/A
Depth 0.00 m bgl



Gradient at 1.25 mm settlement intersection = 19
Modulus of subgrade reaction = 12 MPa/m
Correction factor applied = 0.64 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 0.8 %

PLATE TEST REPORT SHEET (F3.1)

Applied Pressure/Settlement Curve

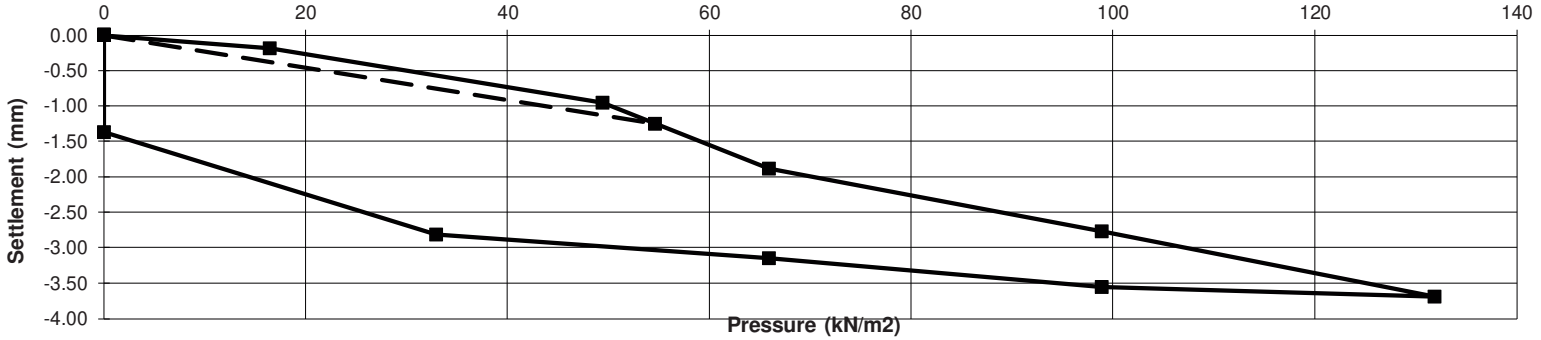
Reference No.	R158321
Contract	25387 Castlemartyr Co Cork
Test No.	PBT02 Reload
Location	See Site Map
Depth	0.40
Client	DOBA
Plate Diameter:	450 mm
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test
Technician	A. Rynne
Authorised by	
Date	12/06/2024

Description of soil under test
(natural soil, placed fill, sub-base)

Light brown sandy gravelly CLAY with low cobble cont

Sample Ref No. N/A

Depth 0.00 m bgl



Gradient at 1.25 mm settlement intersection = 44

Modulus of subgrade reaction = 28 MPa/m

Correction factor applied = 0.64 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 3.1 %

PLATE TEST REPORT SHEET (F3.1)

Applied Pressure/Settlement Curve

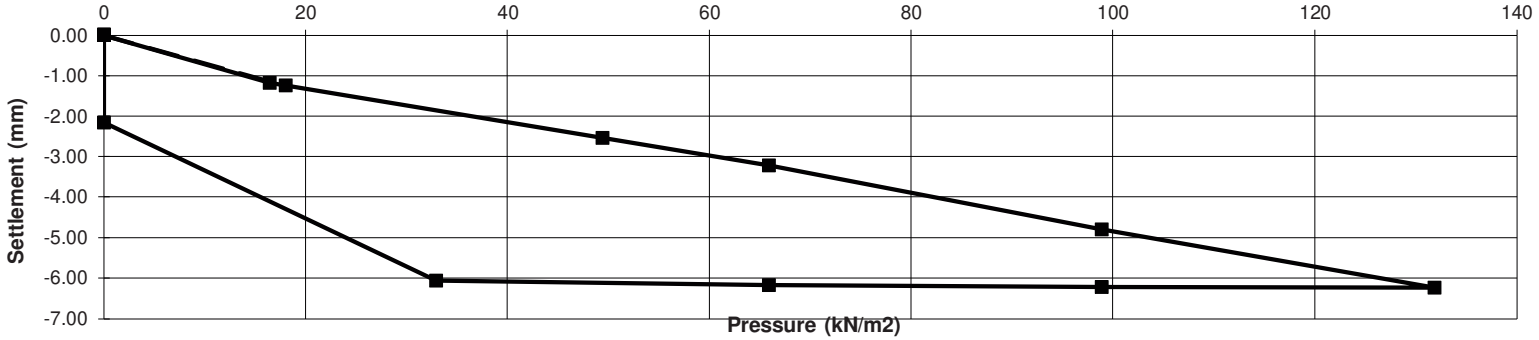
Reference No.	R158322
Contract	25387 Castlemartyr Co Cork
Test No.	PBT03 Load
Location	See Site Map
Depth	0.40
Client	DOBA
Plate Diameter:	450 mm
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test
Technician	A. Rynne
Authorised by	
Date	12/06/2024

Description of soil under test
(natural soil, placed fill, sub-base)

Light brown sandy gravelly CLAY

Sample Ref No. N/A

Depth 0.00 m bgl



Gradient at 1.25 mm settlement intersection = 14

Modulus of subgrade reaction = 9 MPa/m

Correction factor applied = 0.64 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 0.5 %

PLATE TEST REPORT SHEET (F3.1)

Applied Pressure/Settlement Curve

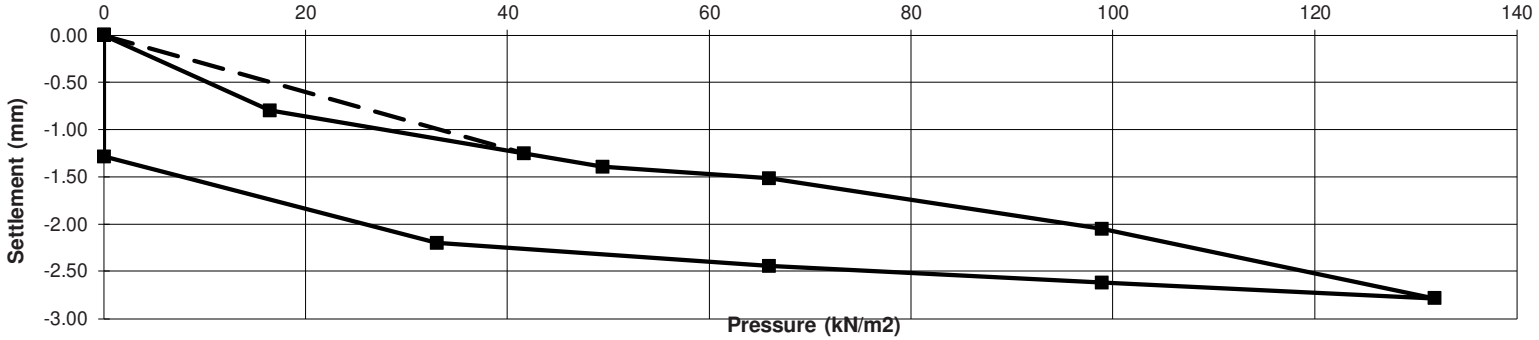
Reference No.	R158322
Contract	25387 Castlemartyr Co Cork
Test No.	PBT03 Reload
Location	See Site Map
Depth	0.40
Client	DOBA
Plate Diameter:	450 mm
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test
Technician	A. Rynne
Authorised by	
Date	12/06/2024

Description of soil under test
(natural soil, placed fill, sub-base)

Light brown sandy gravelly CLAY with low cobble cont

Sample Ref No. N/A

Depth 0.00 m bgl



Gradient at 1.25 mm settlement intersection = 33

Modulus of subgrade reaction = 21 MPa/m

Correction factor applied = 0.64 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 1.9 %

PLATE TEST REPORT SHEET (F3.1)

Applied Pressure/Settlement Curve

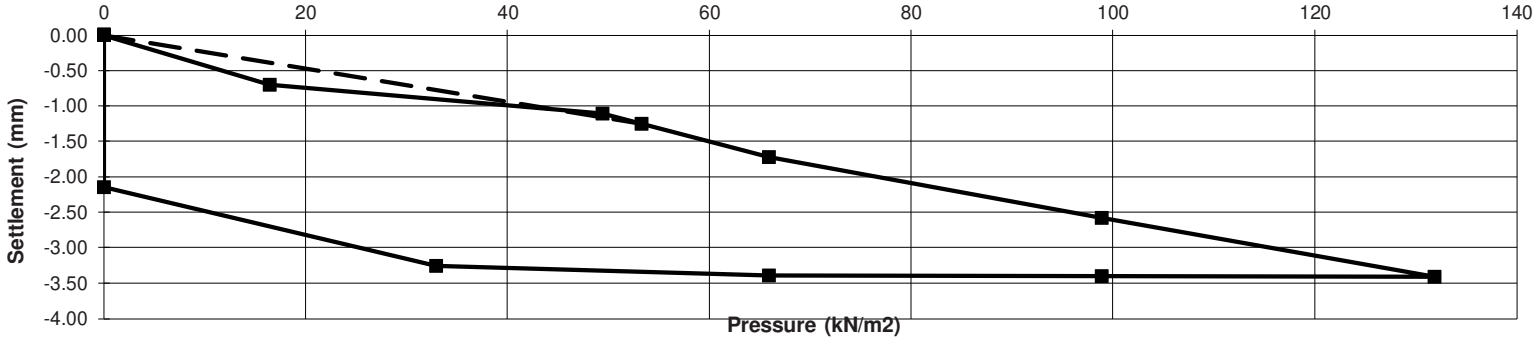
Reference No.	R158323
Contract	25387 Castlemartyr Co Cork
Test No.	PBT04 Load
Location	See Site Map
Depth	0.40
Client	DOBA
Plate Diameter:	450 mm
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test
Technician	A. Rynne
Authorised by	
Date	12/06/2024

Description of soil under test
(natural soil, placed fill, sub-base)

Dark brown sandy gravelly CLAY

Sample Ref No. N/A

Depth 0.00 m bgl



Gradient at 1.25 mm settlement intersection = 43

Modulus of subgrade reaction = 27 MPa/m

Correction factor applied = 0.64 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 3.0 %

PLATE TEST REPORT SHEET (F3.1)

Applied Pressure/Settlement Curve

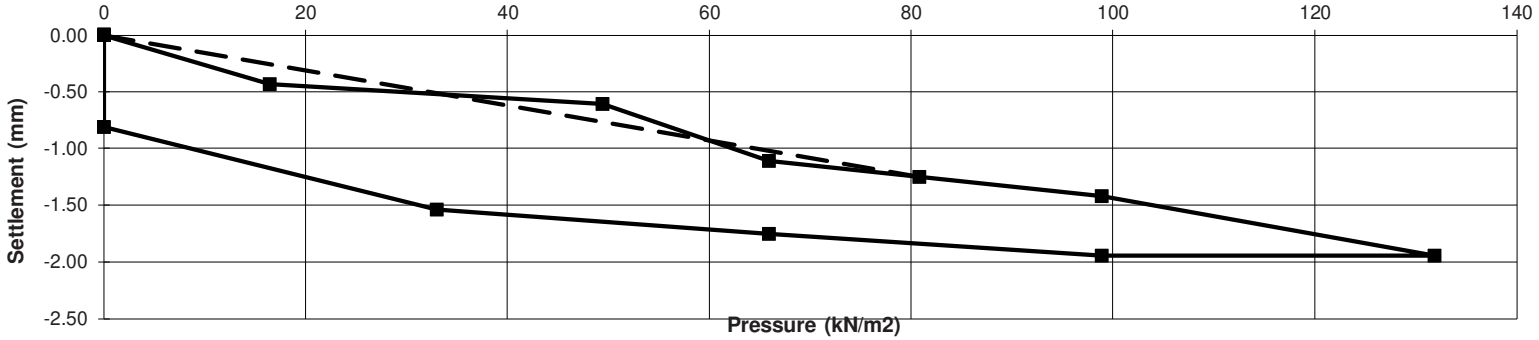
Reference No.	R158323
Contract	25387 Castlemartyr Co Cork
Test No.	PBT04 Reload
Location	See Site Map
Depth	0.40
Client	DOBA
Plate Diameter:	450 mm
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test
Technician	A. Rynne
Authorised by	
Date	12/06/2024

Description of soil under test
(natural soil, placed fill, sub-base)

Light brown sandy gravelly CLAY with low cobble cont

Sample Ref No. N/A

Depth 0.00 m bgl



Gradient at 1.25 mm settlement intersection = 65

Modulus of subgrade reaction = 42 MPa/m

Correction factor applied = 0.64 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 6.2 %

PLATE TEST REPORT SHEET (F3.1)

Applied Pressure/Settlement Curve

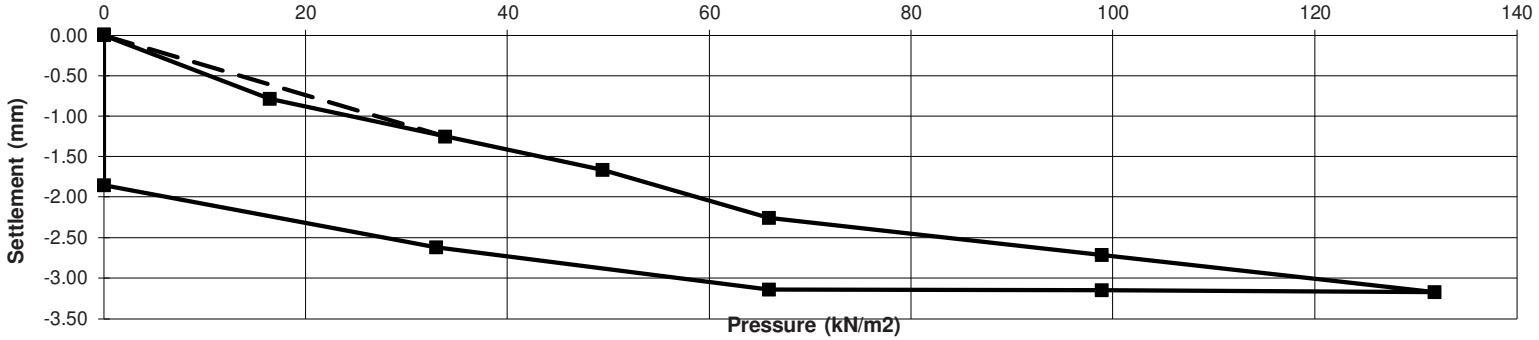
Reference No.	R158324
Contract	25387 Castlemartyr Co Cork
Test No.	PBT05 Load
Location	See Site Map
Depth	0.40
Client	DOBA
Plate Diameter:	450 mm
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test
Technician	A. Rynne
Authorised by	
Date	12/06/2024

Description of soil under test
(natural soil, placed fill, sub-base)

Light brown sandy gravelly CLAY

Sample Ref No. N/A
Depth 0.00 m bgl

Pressure / Settlement



Gradient at 1.25 mm settlement intersection = 27
Modulus of subgrade reaction = 17 MPa/m
Correction factor applied = 0.64 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 1.4 %

PLATE TEST REPORT SHEET (F3.1)

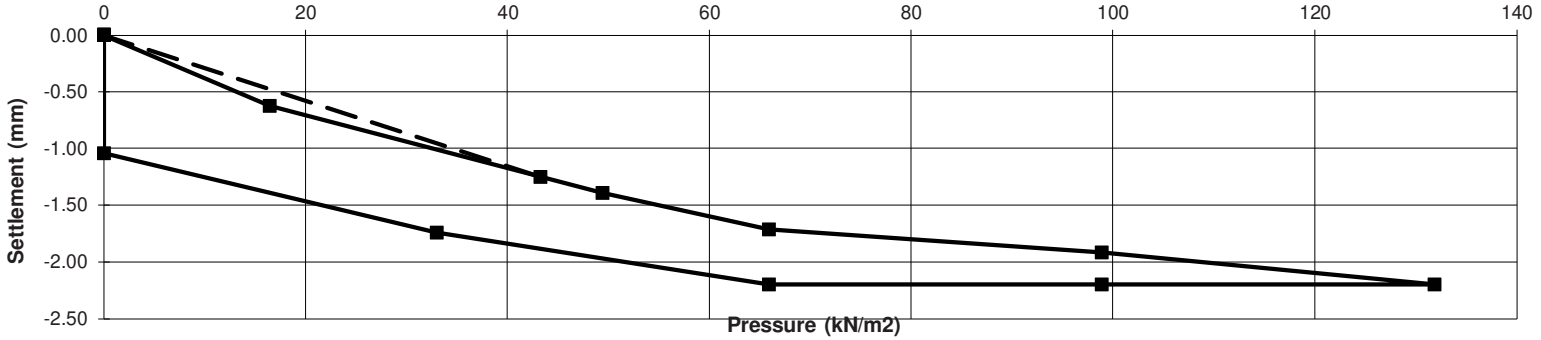
Applied Pressure/Settlement Curve

Reference No.	R158324
Contract	25387 Castlemartyr Co Cork
Test No.	PBT05 Reload
Location	See Site Map
Depth	0.40
Client	DOBA
Plate Diameter:	450 mm
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test
Technician	A. Rynne
Authorised by	
Date	12/06/2024

Description of soil under test
(natural soil, placed fill, sub-base)

Light brown sandy gravelly CLAY

Sample Ref No. N/A
Depth 0.00 m bgl



Gradient at 1.25 mm settlement intersection = 35
Modulus of subgrade reaction = 22 MPa/m
Correction factor applied = 0.64 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 2.1 %

PLATE TEST REPORT SHEET (F3.1)

Applied Pressure/Settlement Curve

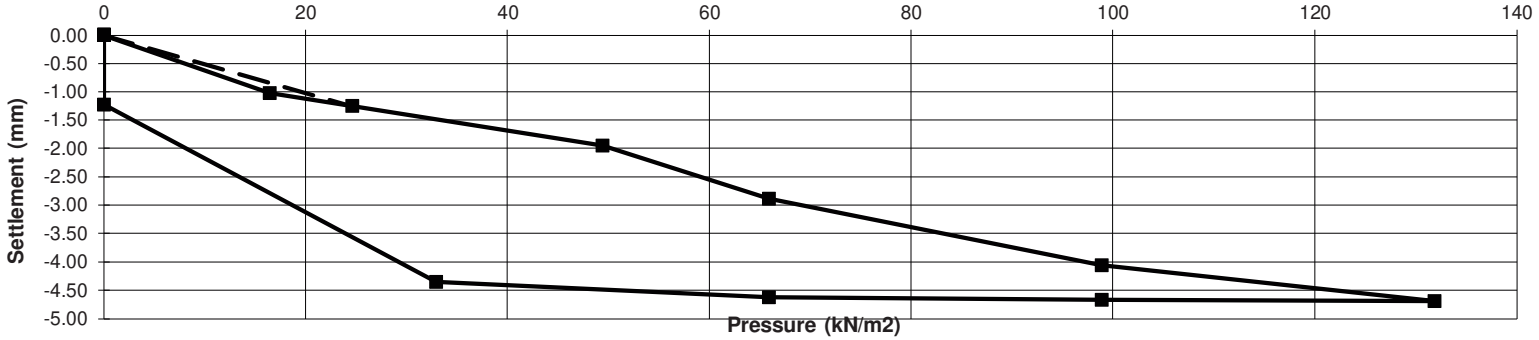
Reference No.	R158325
Contract	25387 Castlemartyr Co Cork
Test No.	PBT06 Load
Location	See Site Map
Depth	0.40
Client	DOBA
Plate Diameter:	450 mm
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test
Technician	A. Rynne
Authorised by	
Date	13/06/2024

Description of soil under test
(natural soil, placed fill, sub-base)

Dark brown slightly sandy slightly gravelly CLAY

Sample Ref No. N/A
Depth 0.00 m bgl

Pressure / Settlement



Gradient at 1.25 mm settlement intersection = 20
Modulus of subgrade reaction = 13 MPa/m
Correction factor applied = 0.64 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 0.8 %

PLATE TEST REPORT SHEET (F3.1)

Applied Pressure/Settlement Curve

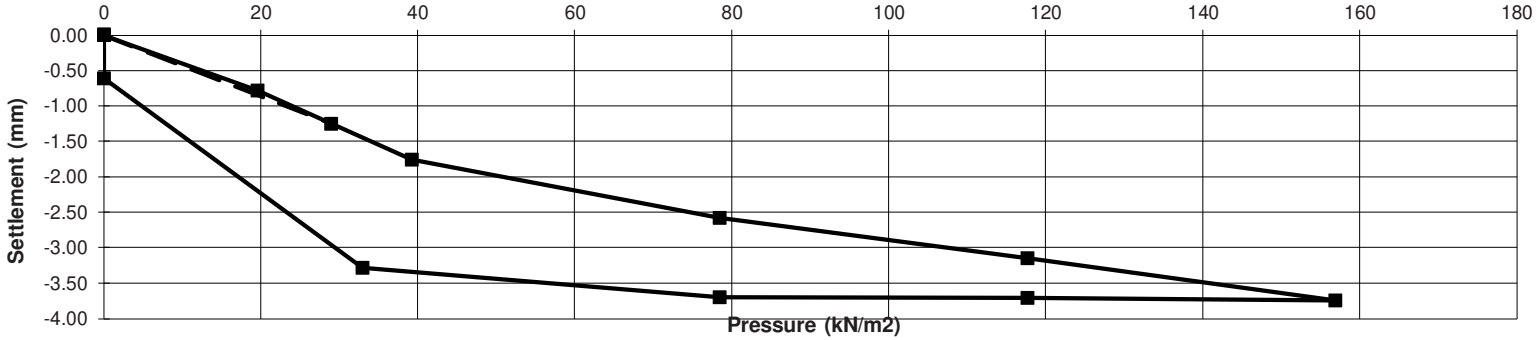
Reference No.	R158325
Contract	25387 Castlemartyr Co Cork
Test No.	PBT06 Reload
Location	See Site Map
Depth	0.40
Client	DOBA
Plate Diameter:	450 mm
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test
Technician	A. Rynne
Authorised by	
Date	13/06/2024

Description of soil under test
(natural soil, placed fill, sub-base)

Dark brown slightly sandy slightly gravelly CLAY

Sample Ref No. N/A
Depth 0.00 m bgl

Pressure / Settlement



Gradient at 1.25 mm settlement intersection = 23
Modulus of subgrade reaction = 15 MPa/m
Correction factor applied = 0.64 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 1.0 %

PLATE TEST REPORT SHEET (F3.1)

Applied Pressure/Settlement Curve

Reference No.	R158326
Contract	25387 Castlemartyr Co Cork
Test No.	PBT07 Load
Location	See Site Map
Depth	0.40
Client	DOBA
Plate Diameter:	450 mm
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test
Technician	A. Rynne
Authorised by	
Date	13/06/2024

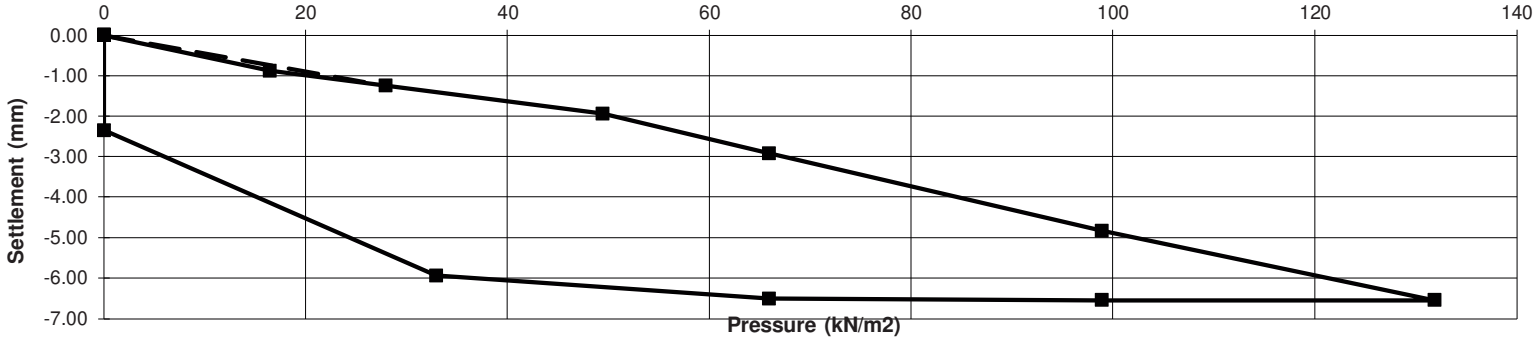
Description of soil under test
(natural soil, placed fill, sub-base)

Dark brown slightly sandy gravelly CLAY

Sample Ref No. N/A

Depth 0.00 m bgl

Pressure / Settlement



Gradient at 1.25 mm settlement intersection = 22

Modulus of subgrade reaction = 14 MPa/m

Correction factor applied = 0.64 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 1.0 %

PLATE TEST REPORT SHEET (F3.1)

Applied Pressure/Settlement Curve

Reference No.	R158326
Contract	25387 Castlemartyr Co Cork
Test No.	PBT07 Reload
Location	See Site Map
Depth	0.40
Client	DOBA
Plate Diameter:	450 mm
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test
Technician	A. Rynne
Authorised by	
Date	13/06/2024

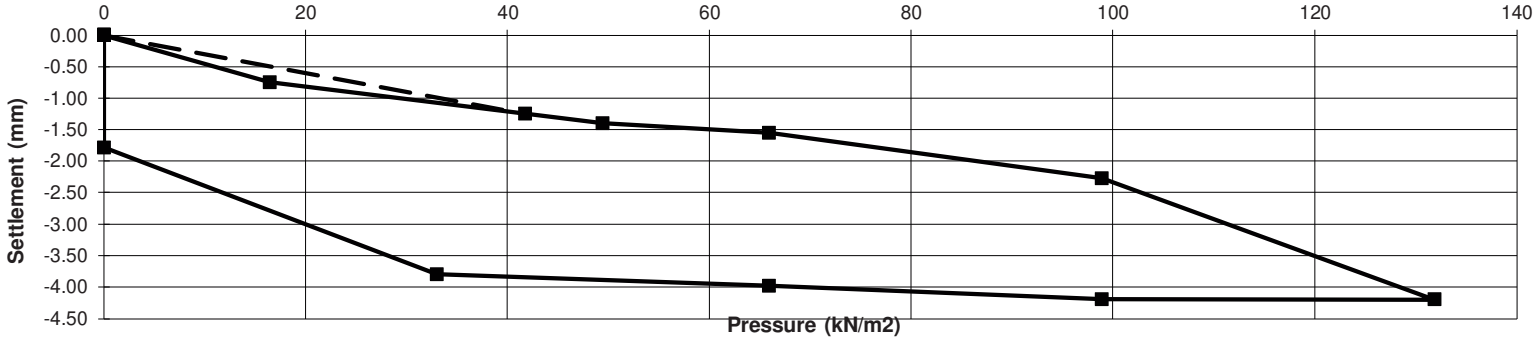
Description of soil under test
(natural soil, placed fill, sub-base)

Dark brown slightly sandy gravelly CLAY

Sample Ref No. N/A

Depth 0.00 m bgl

Pressure / Settlement



Gradient at 1.25 mm settlement intersection = 33

Modulus of subgrade reaction = 21 MPa/m

Correction factor applied = 0.64 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 2.0 %

PLATE TEST REPORT SHEET (F3.1)

Applied Pressure/Settlement Curve

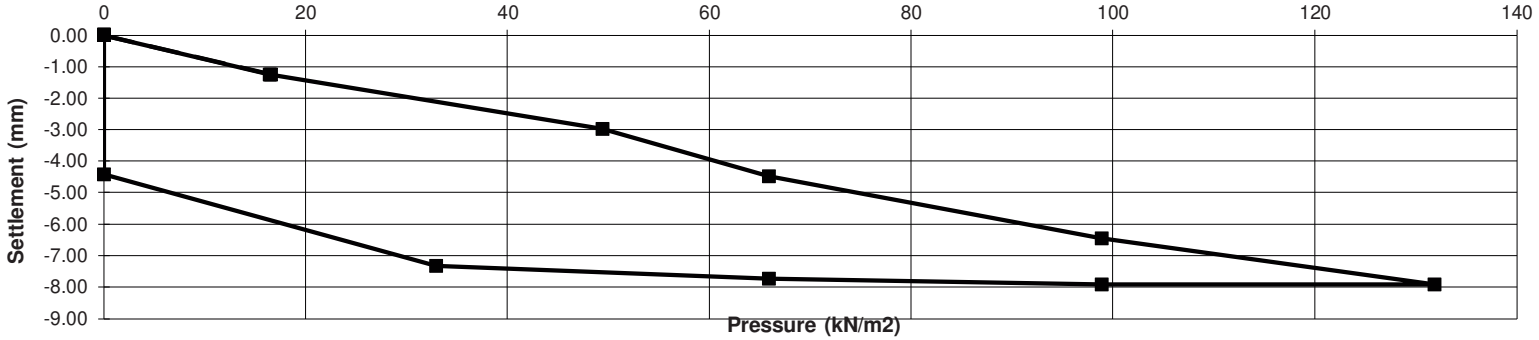
Reference No.	R158327
Contract	25387 Castlemartyr Co Cork
Test No.	PBT08 Load
Location	See Site Map
Depth	0.40
Client	DOBA
Plate Diameter:	450 mm
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test
Technician	A. Rynne
Authorised by	
Date	14/06/2024

Description of soil under test
(natural soil, placed fill, sub-base)

Dark brown slightly sandy gravelly CLAY

Sample Ref No. N/A
Depth 0.00 m bgl

Pressure / Settlement



Gradient at 1.25 mm settlement intersection = 13
Modulus of subgrade reaction = 9 MPa/m
Correction factor applied = 0.64 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 0.4 %

PLATE TEST REPORT SHEET (F3.1)

Applied Pressure/Settlement Curve

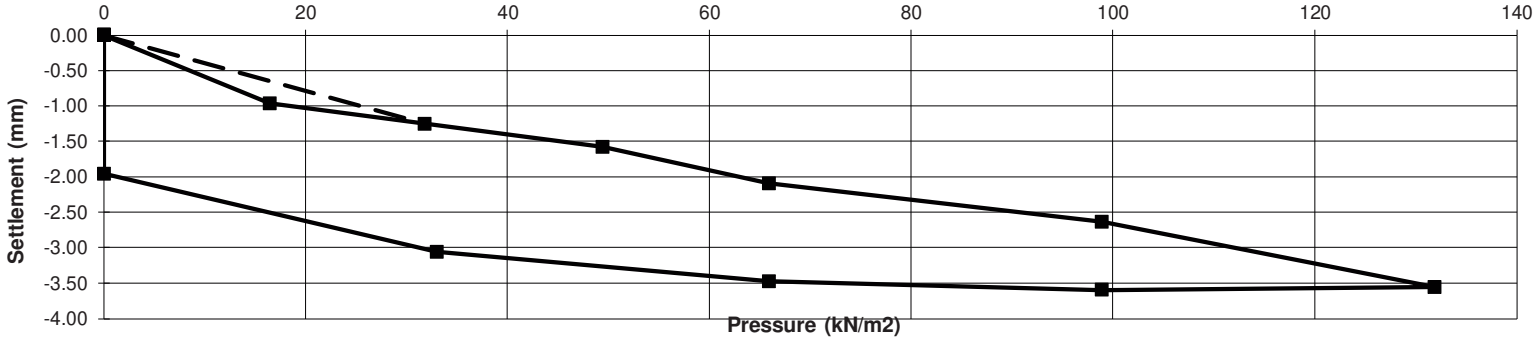
Reference No.	R158327
Contract	25387 Castlemartyr Co Cork
Test No.	PBT08 Reload
Location	See Site Map
Depth	0.40
Client	DOBA
Plate Diameter:	450 mm
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test
Technician	A. Rynne
Authorised by	
Date	14/06/2024

Description of soil under test
(natural soil, placed fill, sub-base)

Dark brown slightly sandy gravelly CLAY

Sample Ref No. N/A
Depth 0.00 m bgl

Pressure / Settlement



Gradient at 1.25 mm settlement intersection = 25
Modulus of subgrade reaction = 16 MPa/m
Correction factor applied = 0.64 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 1.2 %

PLATE TEST REPORT SHEET (F3.1)

Applied Pressure/Settlement Curve

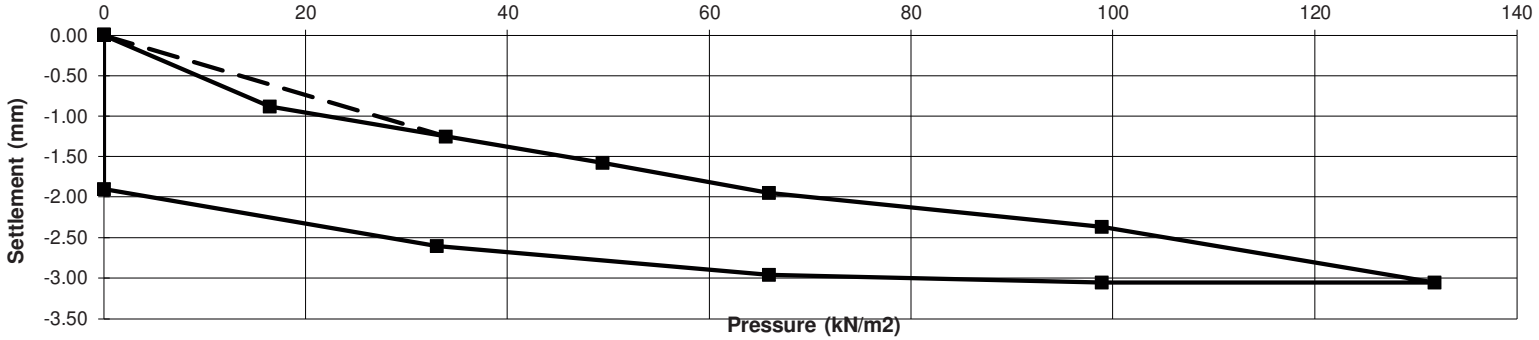
Reference No.	R158328
Contract	25387 Castlemartyr Co Cork
Test No.	PBT09 Load
Location	See Site Map
Depth	0.40
Client	DOBA
Plate Diameter:	450 mm
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test
Technician	A. Rynne
Authorised by	
Date	14/06/2024

Description of soil under test
(natural soil, placed fill, sub-base)

Dark brown slightly sandy gravelly CLAY

Sample Ref No. N/A
Depth 0.00 m bgl

Pressure / Settlement



Gradient at 1.25 mm settlement intersection = 27
Modulus of subgrade reaction = 17 MPa/m
Correction factor applied = 0.64 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 1.4 %

PLATE TEST REPORT SHEET (F3.1)

Applied Pressure/Settlement Curve

Reference No.	R158328
Contract	25387 Castlemartyr Co Cork
Test No.	PBT09 Reload
Location	See Site Map
Depth	0.40
Client	DOBA
Plate Diameter:	450 mm
Test Method	BS 1377: Part 9: 1990 Test4 - Incremental Loading Test
Technician	A. Rynne
Authorised by	
Date	14/06/2024

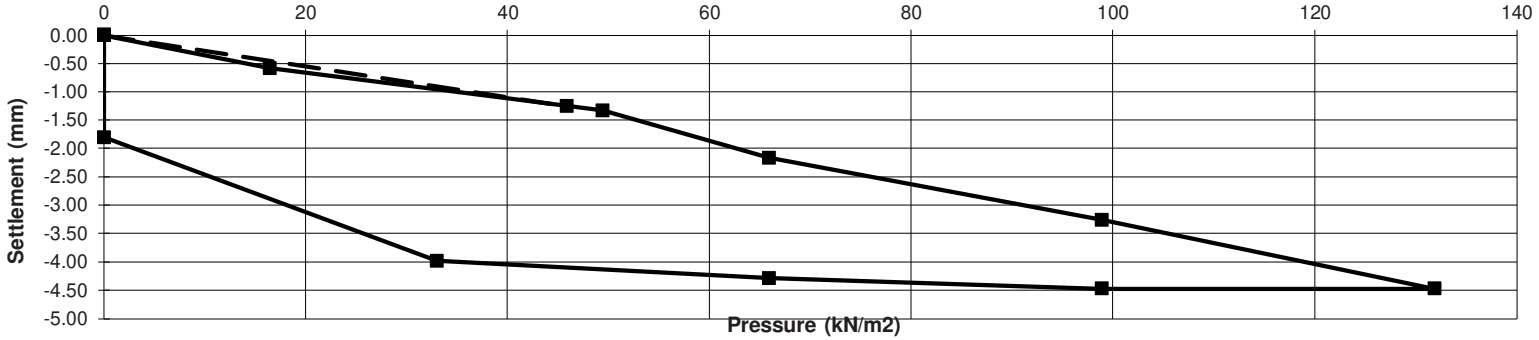
Description of soil under test
(natural soil, placed fill, sub-base)

Dark brown slightly sandy gravelly CLAY

Sample Ref No. N/A

Depth 0.00 m bgl

Pressure / Settlement



Gradient at 1.25 mm settlement intersection = 37

Modulus of subgrade reaction = 24 MPa/m

Correction factor applied = 0.64 as per HD 25-26/10

Equivalent CBR value in accordance with NRA HD25-26/10 2.3 %

Appendix 4

Soakaway Test Records

Soakaway Design f -value from field tests

(F2C) IGSL

Contract:	Lands at Gortnahomna More, Castlemartyr	Contract No.	25387
Test No.	BRE01	Easting	596849.678
Client	Marshall Yards Development Company Limited	Northing	573376.127
Date:	11/06/2024	Elevation	12.062

Summary of ground conditions

from	to	Description	Ground water
0.00	0.50	TOPSOIL	
0.40	1.40	Firm to stiff slightly sandy slightly gravelly SILT/CLAY with gravelly Sand horizons	Dry

Notes: Bulk sample reference = AA231520 (1.0m)
Sidewalls partially collapsed at 1m

Field Data

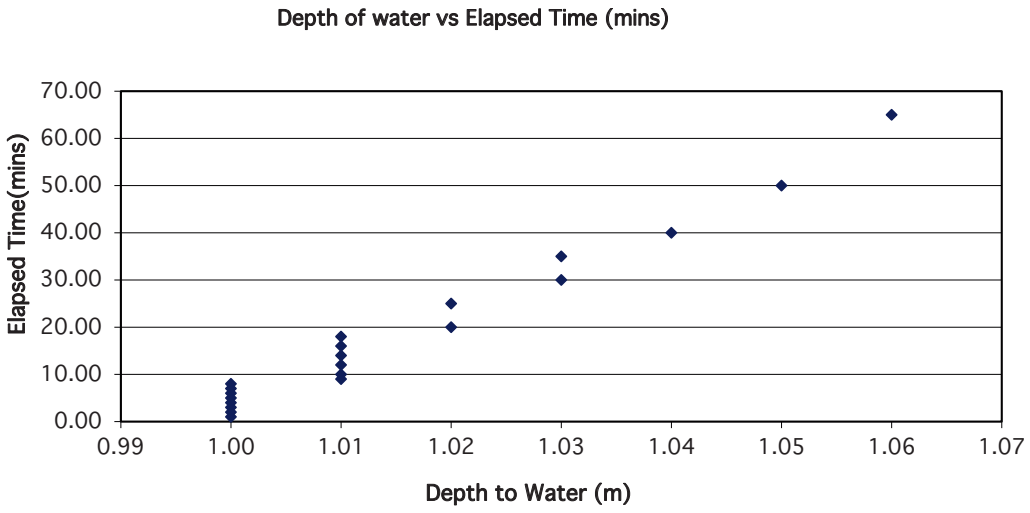
Depth to Water (m)	Elapsed Time (min)
1.00	1.00
1.00	2.00
1.00	3.00
1.00	4.00
1.00	5.00
1.00	6.00
1.00	7.00
1.00	8.00
1.01	9.00
1.01	10.00
1.01	12.00
1.01	14.00
1.01	16.00
1.01	18.00
1.02	20.00
1.02	25.00
1.03	30.00
1.03	35.00
1.04	40.00
1.05	50.00
1.06	65.00

Field Test

Depth of Pit (D)	1.40	m
Width of Pit (B)	0.60	m
Length of Pit (L)	1.00	m
Initial depth to Water =	1.00	m
Final depth to water =	1.06	m
Elapsed time (mins)=	65.00	
Top of permeable soil		m
Base of permeable soil		m
Base area=	0.6	m2
*Av. side area of permeable stratum over test perio	1.184	m2
Total Exposed area =	1.784	m2

Infiltration rate (f) = Volume of water used/unit exposed area / unit time

f= 0.00031 m/min or 5.174E-06 m/sec



Soakaway Design f -value from field tests

(F2C) IGSL

Contract:	Lands at Gortnahomna More, Castlemartyr	Contract No.	25387
Test No.	BRE02	Easting	596906.635
Client	Marshall Yards Development Company Limited	Northing	573407.228
Date:	11/06/2024	Elevation	9.615

Summary of ground conditions

from	to	Description	Ground water
0.00	0.30	TOPSOIL	
0.30	1.40	Light brown slightly gravelly very clayey SAND	Dry

Notes:
Sidewalls partially collapsed at 1m

Field Data

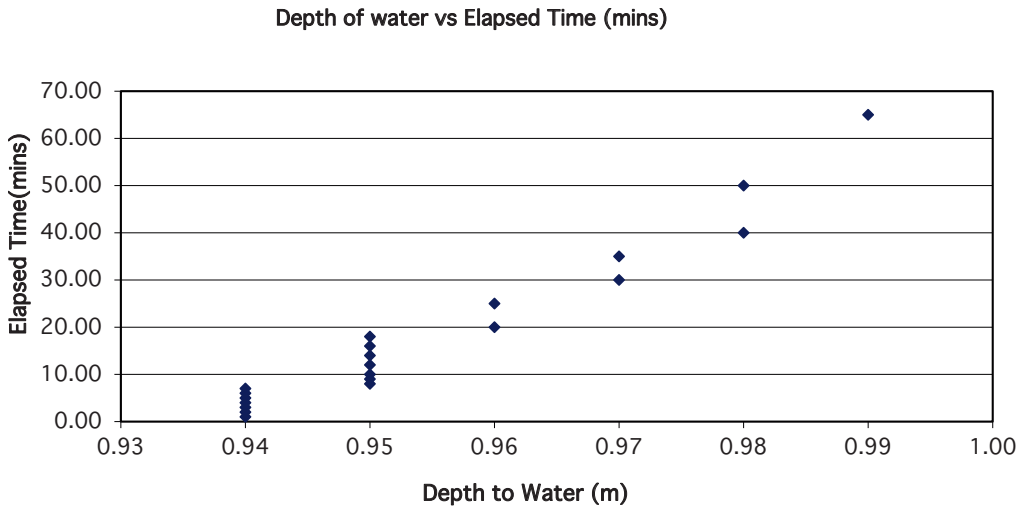
Depth to Water (m)	Elapsed Time (min)
0.94	1.00
0.94	2.00
0.94	3.00
0.94	4.00
0.94	5.00
0.94	6.00
0.94	7.00
0.95	8.00
0.95	9.00
0.95	10.00
0.95	12.00
0.95	14.00
0.95	16.00
0.95	18.00
0.96	20.00
0.96	25.00
0.97	30.00
0.97	35.00
0.98	40.00
0.98	50.00
0.99	65.00

Field Test

Depth of Pit (D)	1.40	m
Width of Pit (B)	0.60	m
Length of Pit (L)	1.00	m
Initial depth to Water =	0.94	m
Final depth to water =	0.99	m
Elapsed time (mins)=	65.00	
Top of permeable soil		m
Base of permeable soil		m
Base area=	0.6	m2
*Av. side area of permeable stratum over test period	1.392	m2
Total Exposed area =	1.992	m2

Infiltration rate (f) = Volume of water used/unit exposed area / unit time

f= 0.00023 m/min or 3.862E-06 m/sec



Soakaway Design f -value from field tests (F2C) IGSL

Contract:	Lands at Gortnahomna More, Castlemartyr	Contract No.	25387
Test No.	BRE03	Easting	596958.383
Client	Marshall Yards Development Company Limited	Northing	573344.328
Date:	11/06/2024	Elevation	17.209

Summary of ground conditions

from	to	Description	Ground water
0.00	0.15	TOPSOIL	
0.15	0.80	Firm orange brown gravelly slightly silty very sandy CLAY with	Dry
0.80	1.10	Firm to stiff dark brown to orange brown very gravelly very sandy SILT with a high cobble and boulder content	

Notes: Bulk sample reference = AA231528 (1.10m)
Drained fully within 2 minutes. Second (repeat) cycle obtained the same result.

Field Data

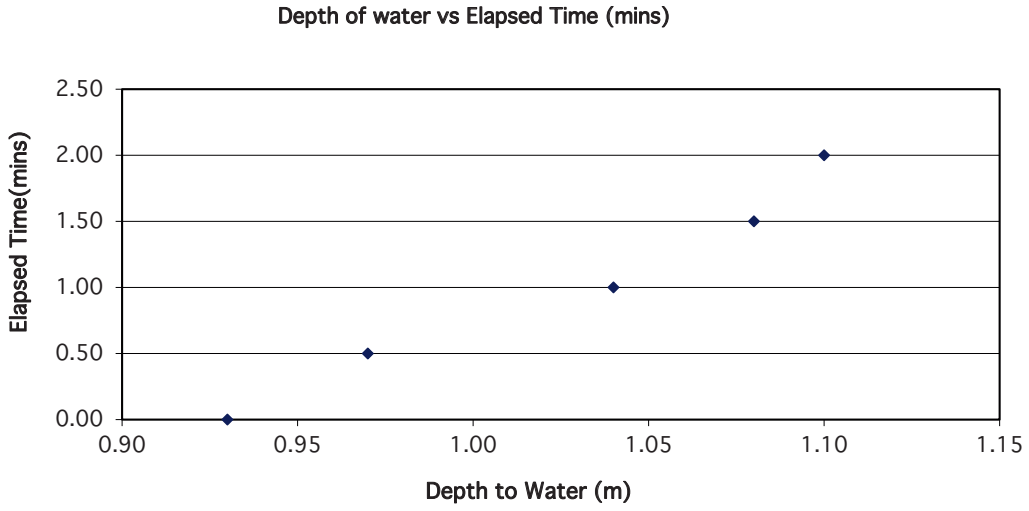
Depth to Water (m)	Elapsed Time (min)
0.93	0.00
0.97	0.50
1.04	1.00
1.08	1.50
1.10	2.00

Field Test

Depth of Pit (D)	1.10	m
Width of Pit (B)	0.50	m
Length of Pit (L)	0.90	m
Initial depth to Water =	0.93	m
Final depth to water =	1.10	m
Elapsed time (mins)=	2.00	
Top of permeable soil		m
Base of permeable soil		m
Base area=	0.45	m2
*Av. side area of permeable stratum over test period	0.238	m2
Total Exposed area =	0.688	m2

Infiltration rate (f) = Volume of water used/unit exposed area / unit time

f= 0.0556 m/min or 0.0009266 m/sec



Soakaway Design f -value from field tests

(F2C) IGSL

Contract:	Lands at Gortnahomna More, Castlemartyr	Contract No.	25387
Test No.	BRE04	Easting	596910.045
Client	Marshall Yards Development Company Limited	Northing	573270.675
Date:	12/06/2024	Elevation	20.22

Summary of ground conditions

from	to	Description	Ground water
0.00	0.20	TOPSOIL	
0.20	1.20	Firm to stiff orange brown very sandy gravelly CLAY	Dry

Notes: Bulk sample reference = AA231529 (1.20m)
Sidewalls partially collapsed

Field Data

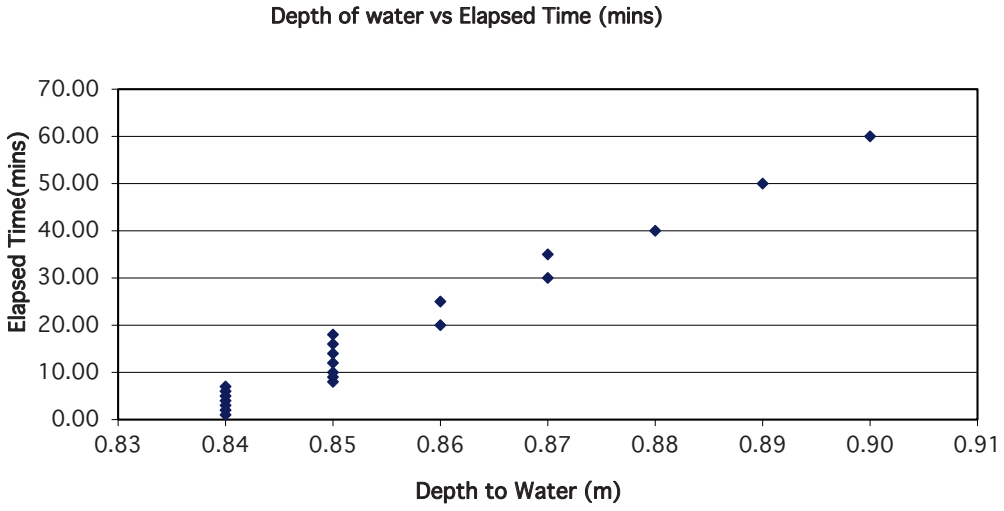
Depth to Water (m)	Elapsed Time (min)
0.84	1.00
0.84	2.00
0.84	3.00
0.84	4.00
0.84	5.00
0.84	6.00
0.84	7.00
0.85	8.00
0.85	9.00
0.85	10.00
0.85	12.00
0.85	14.00
0.85	16.00
0.85	18.00
0.86	20.00
0.86	25.00
0.87	30.00
0.87	35.00
0.88	40.00
0.89	50.00
0.90	60.00

Field Test

Depth of Pit (D)	1.20	m
Width of Pit (B)	0.40	m
Length of Pit (L)	0.90	m
Initial depth to Water =	0.84	m
Final depth to water =	0.90	m
Elapsed time (mins)=	60.00	
Top of permeable soil		m
Base of permeable soil		m
Base area=	0.36	m2
*Av. side area of permeable stratum over test period	0.8645	m2
Total Exposed area =	1.2245	m2

Infiltration rate (f) = Volume of water used/unit exposed area / unit time

f= 0.00032 m/min or 5.308E-06 m/sec



Soakaway Design f -value from field tests (F2C) IGSL

Contract:	Lands at Gortnahomna More, Castlemartyr	Contract No.	25387
Test No.	BRE05	Easting	596742.985
Client	Marshall Yards Development Company Limited	Northing	573228.628
Date:	13/06/2024	Elevation	19.991

Summary of ground conditions

from	to	Description	Ground water
0.00	0.10	TOPSOIL	
0.10	1.40	Firm orange brown sandy gravelly CLAY with cobbles and boulders	Dry

Notes: Bulk sample reference = AA231537 (1.40m)

Field Data

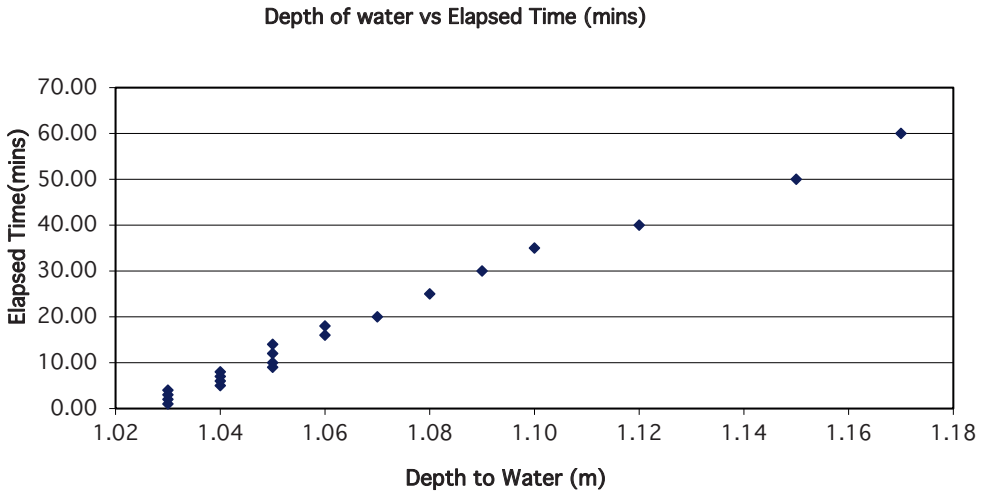
Depth to Water (m)	Elapsed Time (min)
1.03	1.00
1.03	2.00
1.03	3.00
1.03	4.00
1.04	5.00
1.04	6.00
1.04	7.00
1.04	8.00
1.05	9.00
1.05	10.00
1.05	12.00
1.05	14.00
1.06	16.00
1.06	18.00
1.07	20.00
1.08	25.00
1.09	30.00
1.10	35.00
1.12	40.00
1.15	50.00
1.17	60.00
1.19	75.00
1.20	90.00

Field Test

Depth of Pit (D)	1.40	m
Width of Pit (B)	0.40	m
Length of Pit (L)	0.85	m
Initial depth to Water =	1.03	m
Final depth to water =	1.20	m
Elapsed time (mins)=	90.00	
Top of permeable soil		m
Base of permeable soil		m
Base area=	0.34	m2
*Av. side area of permeable stratum over test perio	0.7125	m2
Total Exposed area =	1.0525	m2

Infiltration rate (f) = Volume of water used/unit exposed area / unit time

f= 0.00061 m/min or 1.017E-05 m/sec



Soakaway Design f -value from field tests

(F2C) IGSL

Contract:	Lands at Gortnahomna More, Castlemartyr	Contract No.	25387
Test No.	BRE06	Easting	596718.117
Client	Marshall Yards Development Company Limited	Northing	573208.699
Date:	13/06/2024	Elevation	20.106

Summary of ground conditions

from	to	Description	Ground water
0.00	0.20	TOPSOIL	
0.20	1.30	Firm to stiff orange brown sandy gravelly CLAY with a low cobble and boulder content	Dry

Notes: Bulk sample reference = AA231538 (1.30m)

Field Data

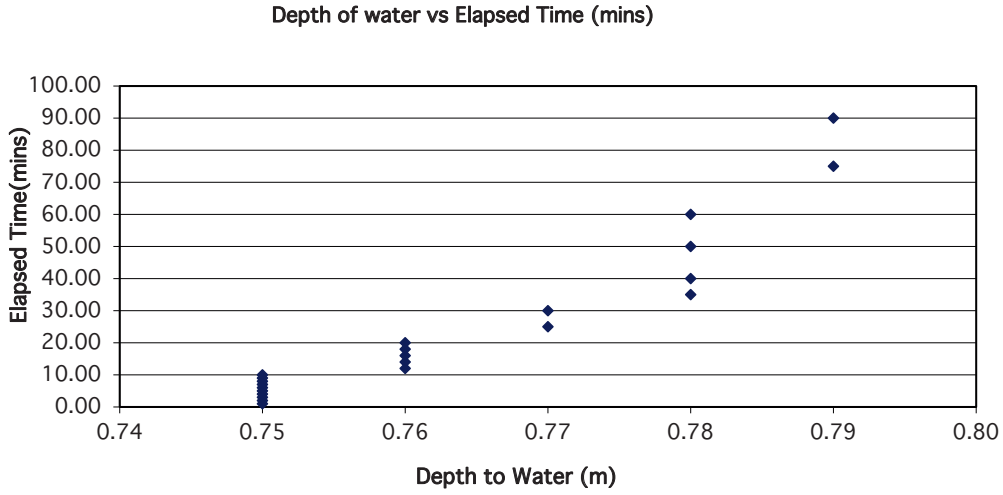
Depth to Water (m)	Elapsed Time (min)
0.75	1.00
0.75	2.00
0.75	3.00
0.75	4.00
0.75	5.00
0.75	6.00
0.75	7.00
0.75	8.00
0.75	9.00
0.75	10.00
0.76	12.00
0.76	14.00
0.76	16.00
0.76	18.00
0.76	20.00
0.77	25.00
0.77	30.00
0.78	35.00
0.78	40.00
0.78	50.00
0.78	60.00
0.79	75.00
0.79	90.00

Field Test

Depth of Pit (D)	1.30	m
Width of Pit (B)	0.40	m
Length of Pit (L)	1.00	m
Initial depth to Water =	0.75	m
Final depth to water =	0.79	m
Elapsed time (mins)=	90.00	
Top of permeable soil		m
Base of permeable soil		m
Base area=	0.4	m2
*Av. side area of permeable stratum over test perio	1.484	m2
Total Exposed area =	1.884	m2

Infiltration rate (f) = Volume of water used/unit exposed area / unit time

f= 9.4E-05 m/min or 1.573E-06 m/sec



Soakaway Design f -value from field tests

(F2C) IGSL

Contract:	Lands at Gortnahomna More, Castlemartyr	Contract No.	25387
Test No.	BRE07	Easting	596759.003
Client	Marshall Yards Development Company Limited	Northing	573300.738
Date:	13/06/2024	Elevation	18.783

Summary of ground conditions

from	to	Description	Ground water
0.00	0.40	TOPSOIL	
0.40	0.90	Firm to stiff light brown slightly silty sandy CLAY	Dry
0.90	1.50	Stiff orange brown very slightly sandy slightly gravelly CLAY	

Notes: Bulk sample reference = AA231539 (1.35m)

Field Data

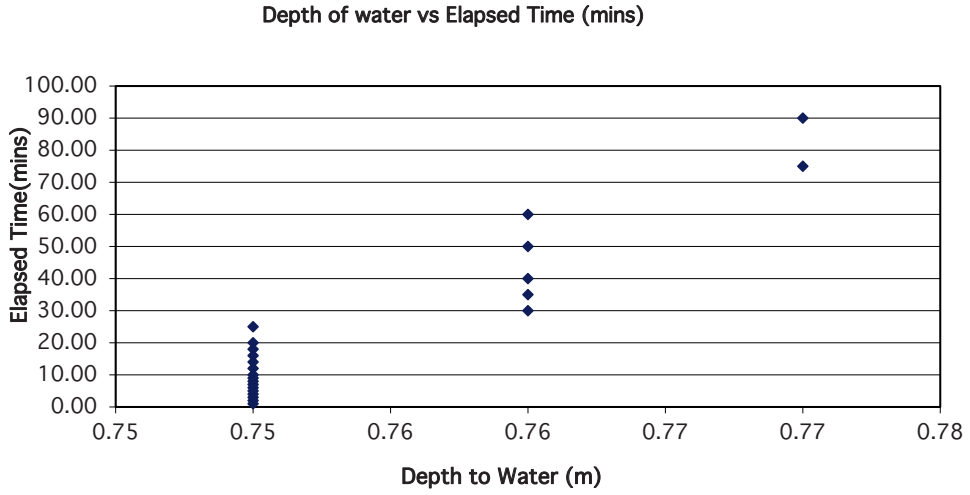
Depth to Water (m)	Elapsed Time (min)
0.75	1.00
0.75	2.00
0.75	3.00
0.75	4.00
0.75	5.00
0.75	6.00
0.75	7.00
0.75	8.00
0.75	9.00
0.75	10.00
0.75	12.00
0.75	14.00
0.75	16.00
0.75	18.00
0.75	20.00
0.75	25.00
0.76	30.00
0.76	35.00
0.76	40.00
0.76	50.00
0.76	60.00
0.77	75.00
0.77	90.00

Field Test

Depth of Pit (D)	1.50	m
Width of Pit (B)	0.40	m
Length of Pit (L)	1.00	m
Initial depth to Water =	0.75	m
Final depth to water =	0.77	m
Elapsed time (mins)=	90.00	
Top of permeable soil		m
Base of permeable soil		m
Base area=	0.4	m2
*Av. side area of permeable stratum over test perio	2.072	m2
Total Exposed area =	2.472	m2

Infiltration rate (f) = Volume of water used/unit exposed area / unit time

f= 3.6E-05 m/min or 5.993E-07 m/sec



Soakaway Design f -value from field tests

(F2C) IGSL

Contract:	Lands at Gortnahomna More, Castlemartyr	Contract No.	25387
Test No.	BRE08	Easting	596744.758
Client	Marshall Yards Development Company Limited	Northing	573431.247
Date:	13/06/2024	Elevation	13.343

Summary of ground conditions

from	to	Description	Ground water
0.00	0.40	TOPSOIL	
0.40	1.80	MADE GROUND comprising firm, dark brown, slightly sandy slightly gravelly CLAY with cobbles and rare pieces of plastic and fabric	Dry

Notes: Bulk Sample Reference = AA231516 (1.80m)
MADE GROUND
Good Stability

Field Data

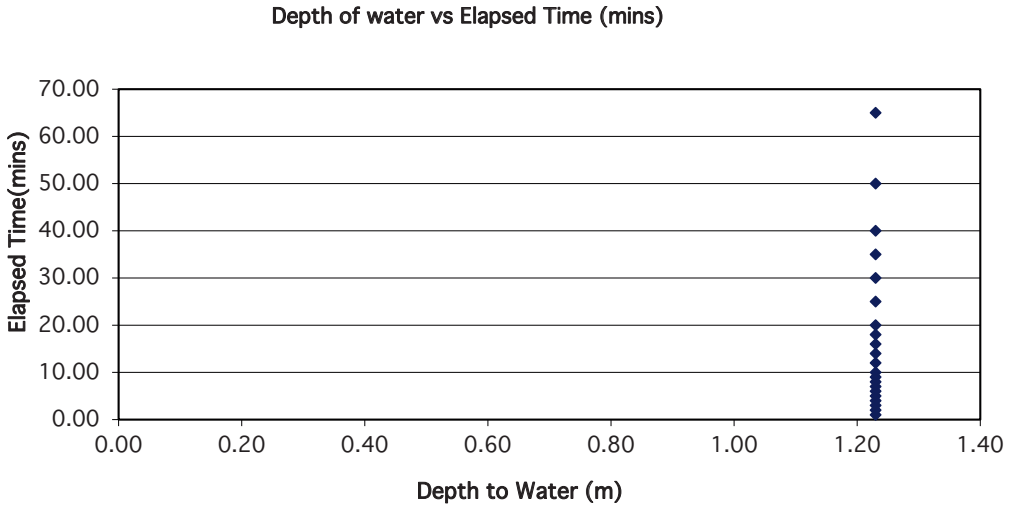
Depth to Water (m)	Elapsed Time (min)
1.23	1.00
1.23	2.00
1.23	3.00
1.23	4.00
1.23	5.00
1.23	6.00
1.23	7.00
1.23	8.00
1.23	9.00
1.23	10.00
1.23	12.00
1.23	14.00
1.23	16.00
1.23	18.00
1.23	20.00
1.23	25.00
1.23	30.00
1.23	35.00
1.23	40.00
1.23	50.00
1.23	65.00

Field Test

Depth of Pit (D)	1.80	m
Width of Pit (B)	0.60	m
Length of Pit (L)	1.00	m
Initial depth to Water =	1.23	m
Final depth to water =	1.23	m
Elapsed time (mins)=	65.00	
Top of permeable soil		m
Base of permeable soil		m
Base area=	0.6	m2
*Av. side area of permeable stratum over test perio	1.824	m2
Total Exposed area =	2.424	m2

Infiltration rate (f) = Volume of water used/unit exposed area / unit time

f= 0 m/min or 0 m/sec



Soakaway Design f -value from field tests (F2C) IGSL

Contract:	Lands at Gortnahomna More, Castlemartyr	Contract No.	25387
Test No.	BRE09	Easting	596723.276
Client	Marshall Yards Development Company Limited	Northing	573475.58
Date:	11/06/2024	Elevation	12.352

Summary of ground conditions

from	to	Description	Ground water
0.00	0.20	TOPSOIL	Seepage at 1.20m
0.20	1.20	MADE GROUND comprising firm light brown sandy gravelly CLAY with boulders	
1.20	1.60	MADE GROUND comprising firm grey brown sl sandy sl gravelly CLAY with a low cobble content and rare pieces of plastic	

Notes: Bulk sample reference = AA231512 (1.60m)
MADE GROUND
Good Stability

Field Data

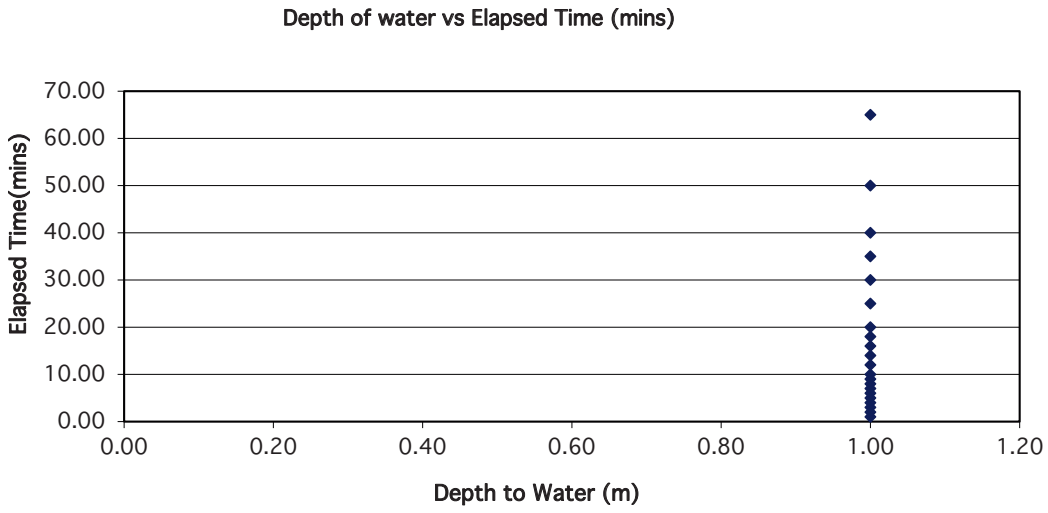
Depth to Water (m)	Elapsed Time (min)
1.00	1.00
1.00	2.00
1.00	3.00
1.00	4.00
1.00	5.00
1.00	6.00
1.00	7.00
1.00	8.00
1.00	9.00
1.00	10.00
1.00	12.00
1.00	14.00
1.00	16.00
1.00	18.00
1.00	20.00
1.00	25.00
1.00	30.00
1.00	35.00
1.00	40.00
1.00	50.00
1.00	65.00

Field Test

Depth of Pit (D)	1.60	m
Width of Pit (B)	0.60	m
Length of Pit (L)	1.00	m
Initial depth to Water =	1.00	m
Final depth to water =	1.00	m
Elapsed time (mins)=	65.00	
Top of permeable soil		m
Base of permeable soil		m
Base area=	0.6	m2
*Av. side area of permeable stratum over test period	1.92	m2
Total Exposed area =	2.52	m2

Infiltration rate (f) = Volume of water used/unit exposed area / unit time

f= 0 m/min or 0 m/sec



Soakaway Design f -value from field tests

(F2C) IGSL

Contract:	Lands at Gortnahomna More, Castlemartyr	Contract No.	25387
Test No.	BRE10	Easting	596810.571
Client	Marshall Yards Development Company Limited	Northing	573513.422
Date:	11/06/2024	Elevation	17.454

Summary of ground conditions

from	to	Description	Ground water
0.00	0.30	MADE GROUND comprising grey brown slightly sandy clayey Gravel with cobbles	Dry
0.30	1.10	Stiff light brown slightly sandy slightly gravely CLAY	
1.10	1.50	Stiff brown very sandy very gravelly CLAY with cobbles and boulders	

Notes: Bulk sample reference = AA231508 (1.50m)
Made Ground from 0 to 0.30m
Sidewalls collapsed at 1.10m

Field Data

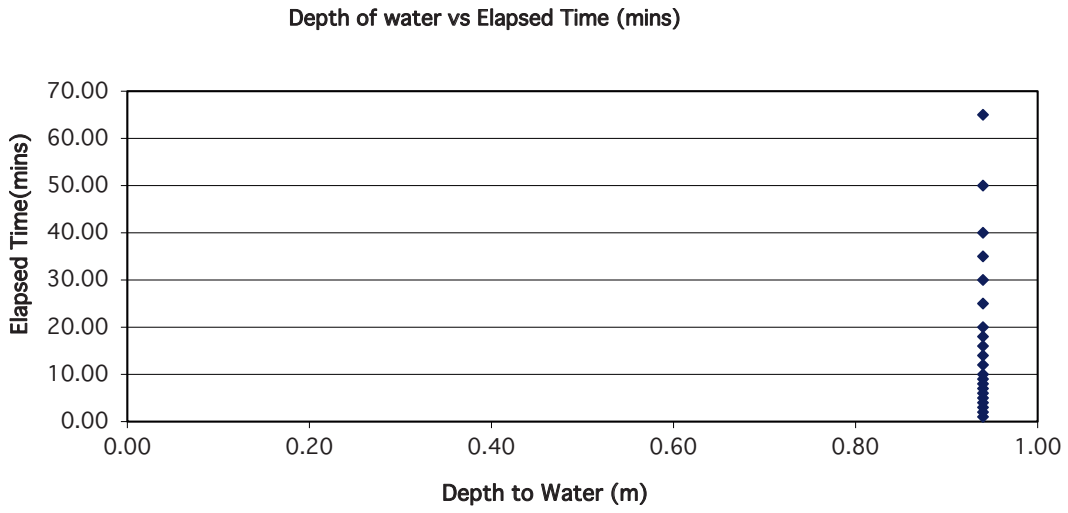
Depth to Water (m)	Elapsed Time (min)
0.94	1.00
0.94	2.00
0.94	3.00
0.94	4.00
0.94	5.00
0.94	6.00
0.94	7.00
0.94	8.00
0.94	9.00
0.94	10.00
0.94	12.00
0.94	14.00
0.94	16.00
0.94	18.00
0.94	20.00
0.94	25.00
0.94	30.00
0.94	35.00
0.94	40.00
0.94	50.00
0.94	65.00

Field Test

Depth of Pit (D)	1.50	m
Width of Pit (B)	0.60	m
Length of Pit (L)	1.10	m
Initial depth to Water =	0.94	m
Final depth to water =	0.94	m
Elapsed time (mins)=	65.00	
Top of permeable soil		m
Base of permeable soil		m
Base area=	0.66	m2
*Av. side area of permeable stratum over test period	1.904	m2
Total Exposed area =	2.564	m2

Infiltration rate (f) = Volume of water used/unit exposed area / unit time

f= 0 m/min or 0 m/sec



Appendix 5

Water Monitoring

Data Logger Records

Well Number	Download Period 1	Download Period 2
BH01	30-07-24 to 08-08-24	07-08-24 to 03-10-24
BH02	30-07-24 to 08-08-24	07-08-24 to 03-10-24
BH03	30-07-24 to 08-08-24	07-08-24 to 03-10-24
BH05	30-07-24 to 08-08-24	07-08-24 to 03-10-24
BH06	30-07-24 to 08-08-24	07-08-24 to 03-10-24

Project No.
25387

GROUNDWATER MONITORING DATA SHEET

Project: Castlemartyr LRD, Cork

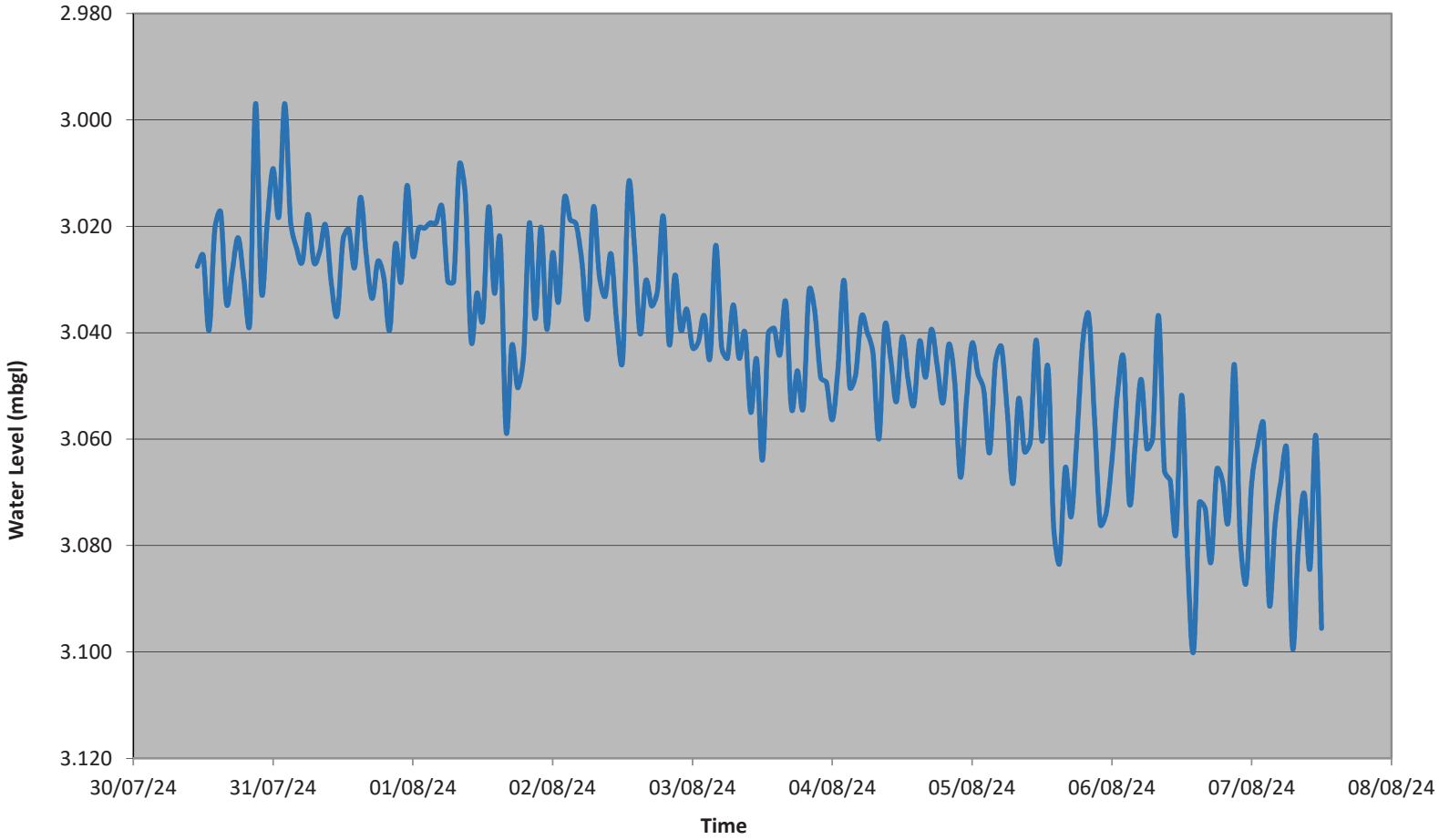
Engineer: DOBA

Exploratory Hole No.	Hole Depth (m bgl)	Elevation (m OD)	Response Zone		Groundwater level 30/07/2024		Groundwater level 07/08/2024		Groundwater level 03/10/2024		Groundwater level		Groundwater level	
			Top (m bgl)	Base (m bgl)	m bgl	m OD	m bgl	m OD	m bgl	m OD	m bgl	m OD	m bgl	m OD
BH01	7.20	10.40	1.00	7.20	3.00	7.40	3.09	7.31	4.00	6.40				
BH02A	3.20	16.65	1.00	3.20	Dry	13.45	Dry	13.45	Dry	13.45				
BH03	4.80	20.27	1.00	4.80	Dry	15.47	Dry	15.47	Dry	15.47				
BH05	10.00	10.95	4.00	10.00	5.26	5.69	5.31	5.64	5.40	5.55				
BH06	9.50	10.78	1.00	9.50	5.24	5.54	5.27	5.51	5.32	5.46				

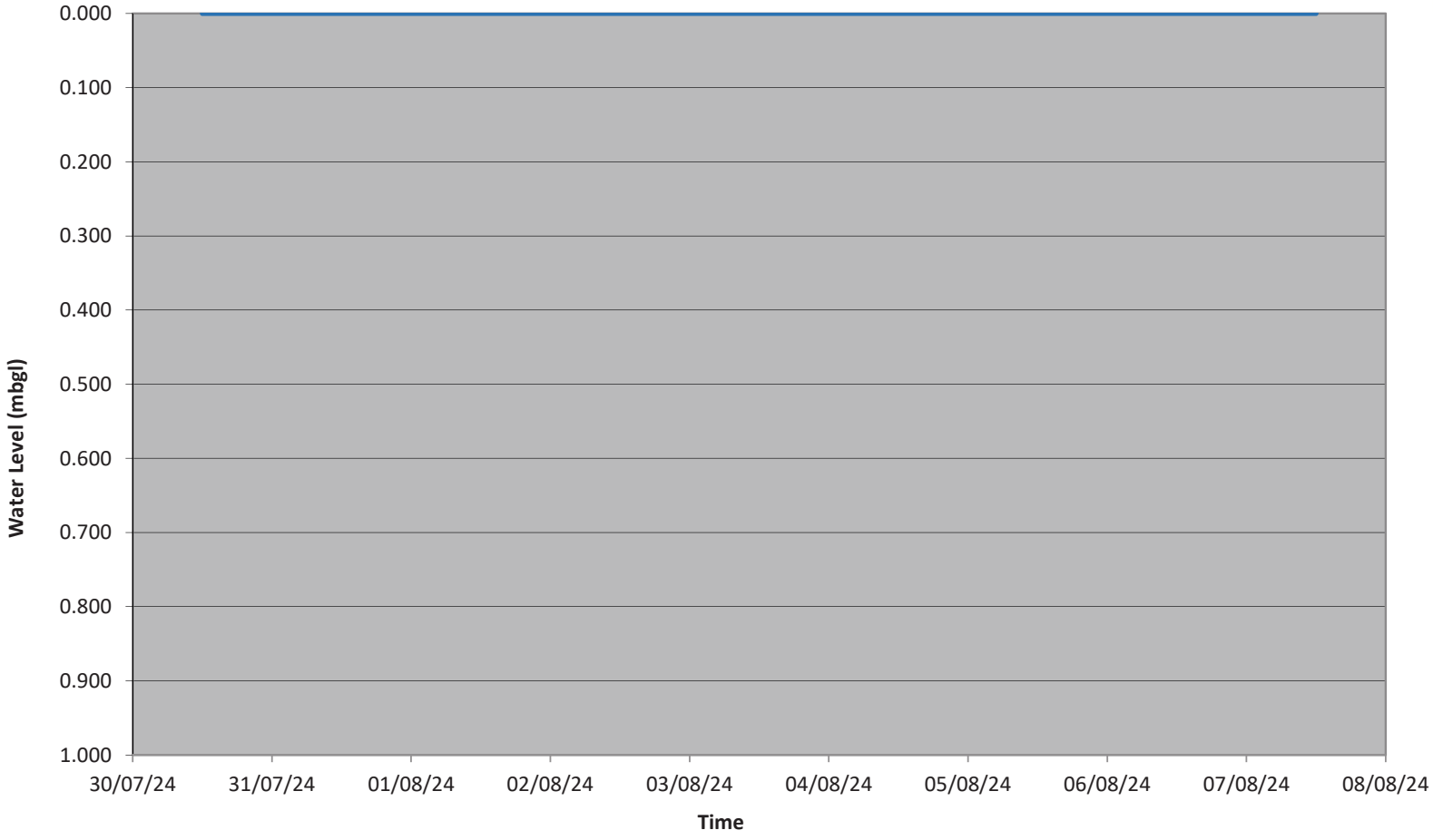
Remarks: Water levels measured using electric dipmeter

BASE DEPTH - DRY WELL

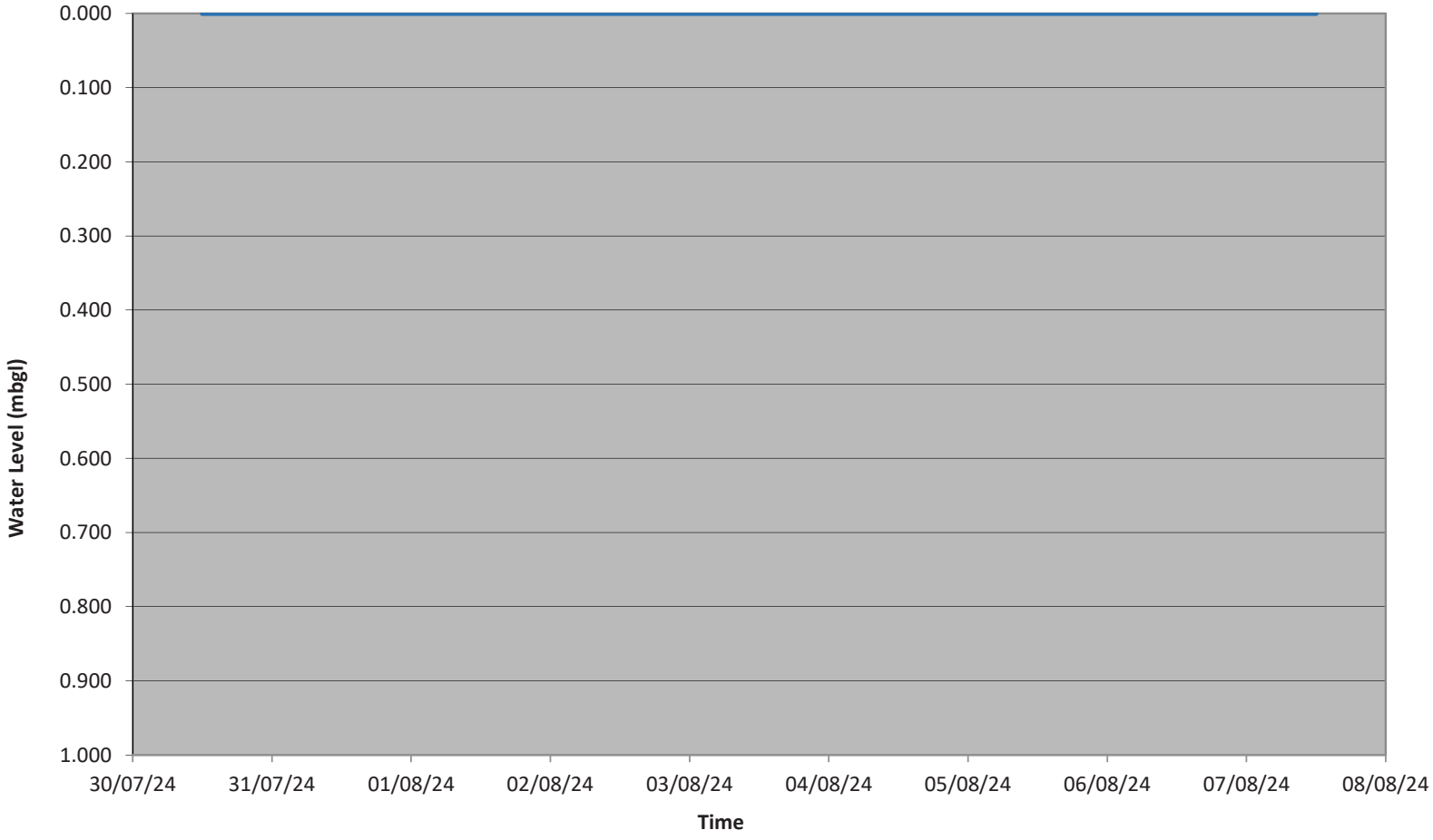
24775 - BH01 Castlemartyr LRD, Cork



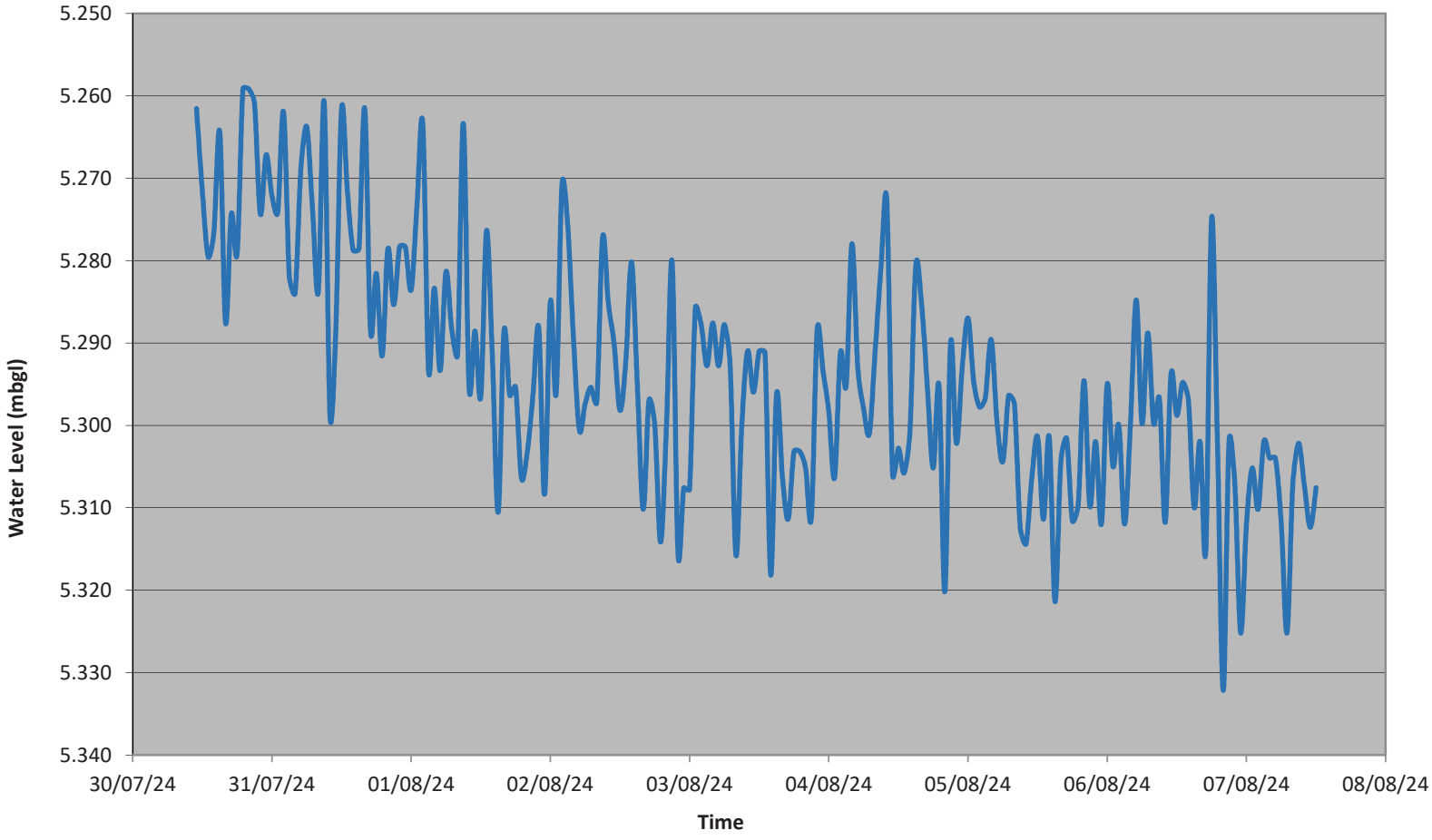
24775 - BH02 Castlemartyr LRD, Cork



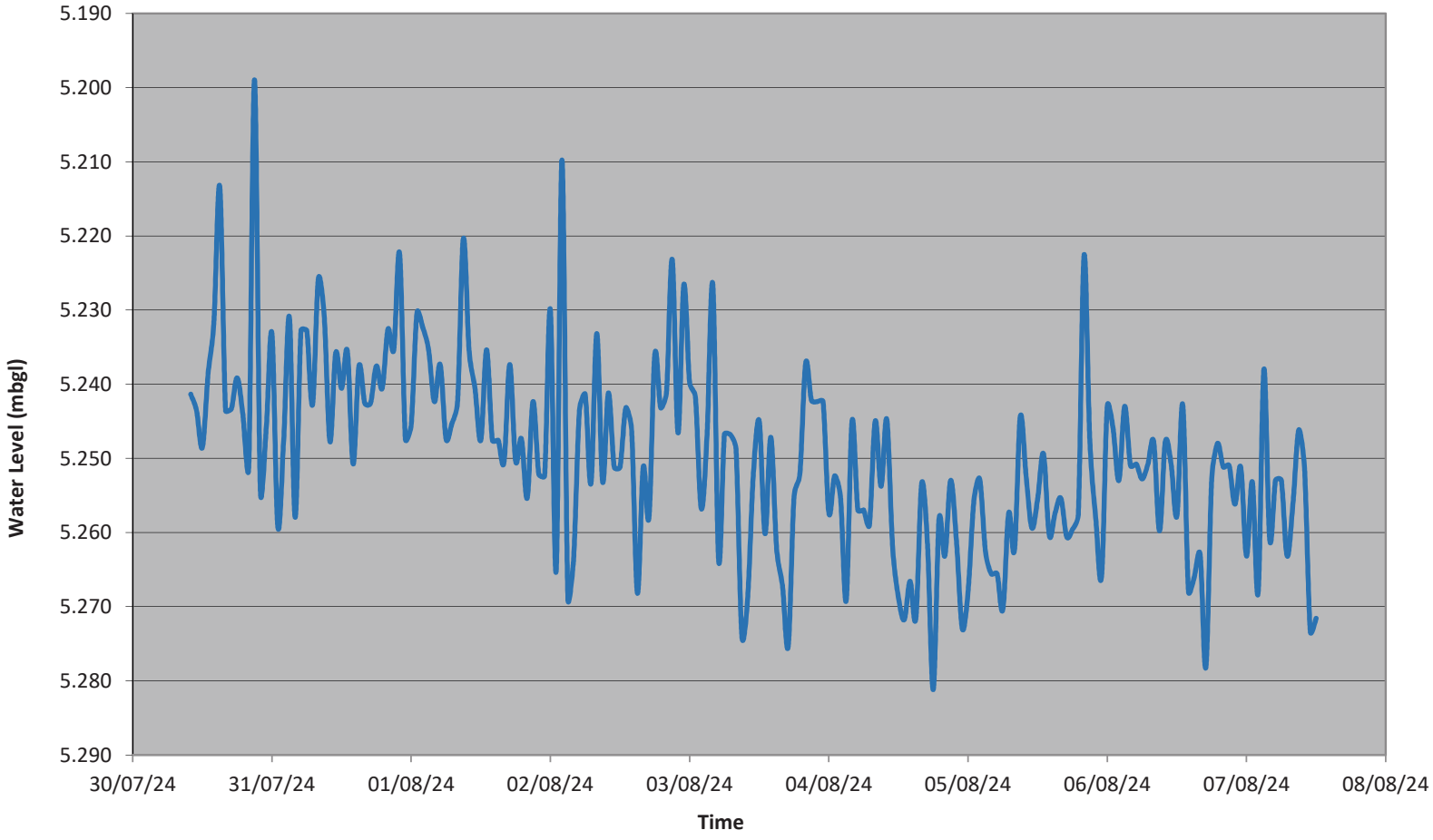
24775 - BH03 Castlemartyr LRD, Cork



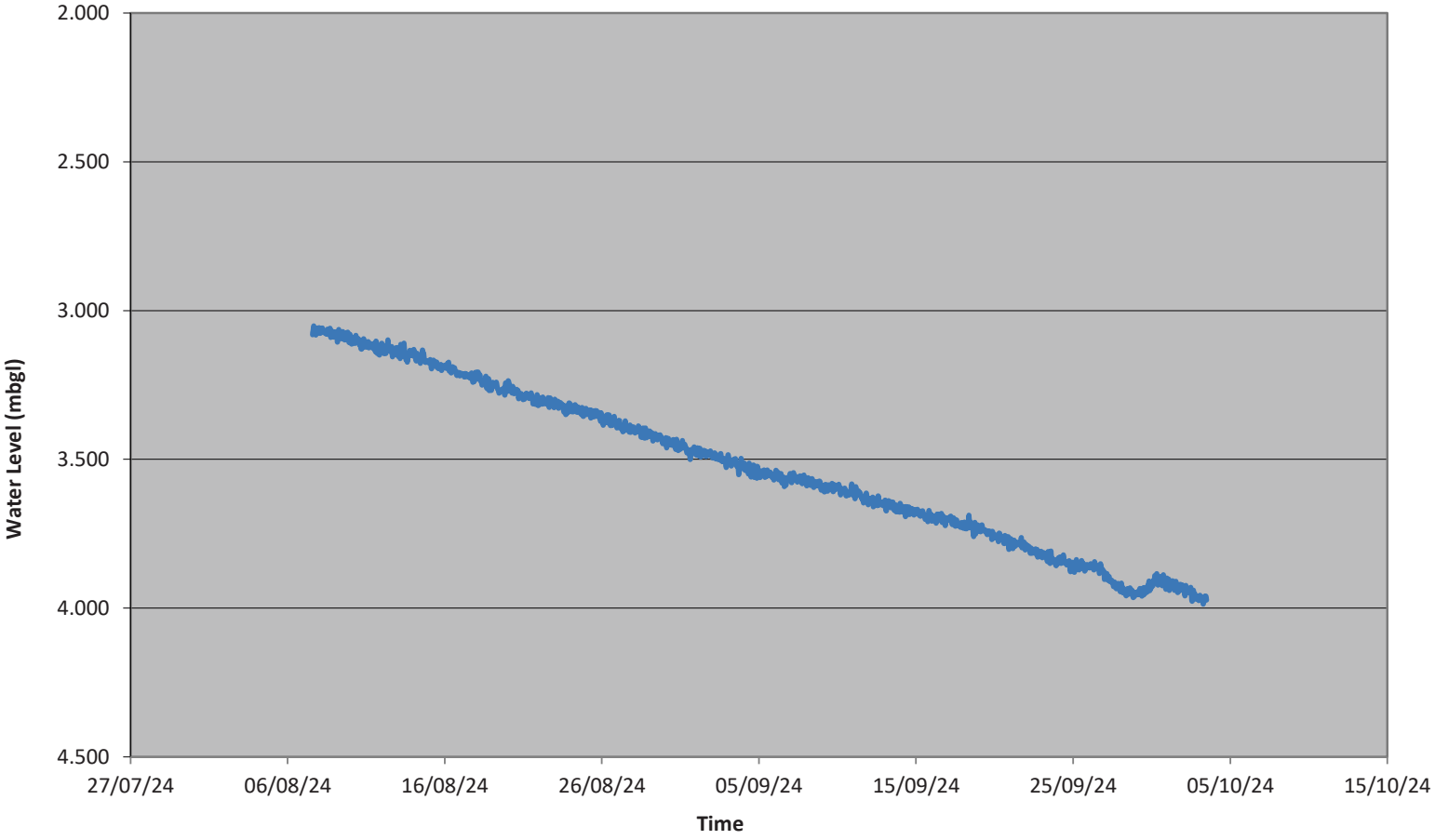
24775 - BH05 Castlemartyr LRD, Cork

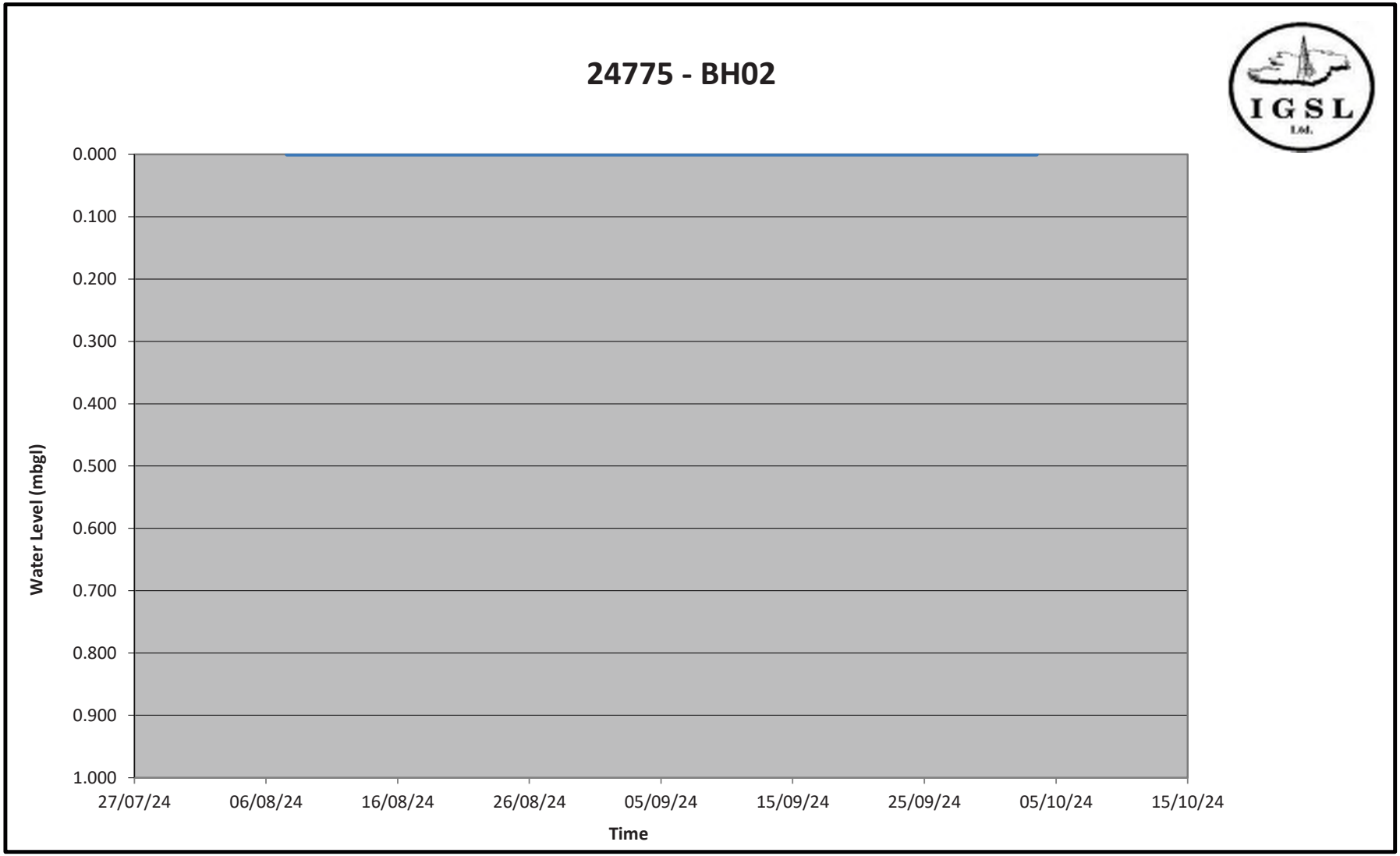


24775 - BH06 Castlemartyr LRD, Cork

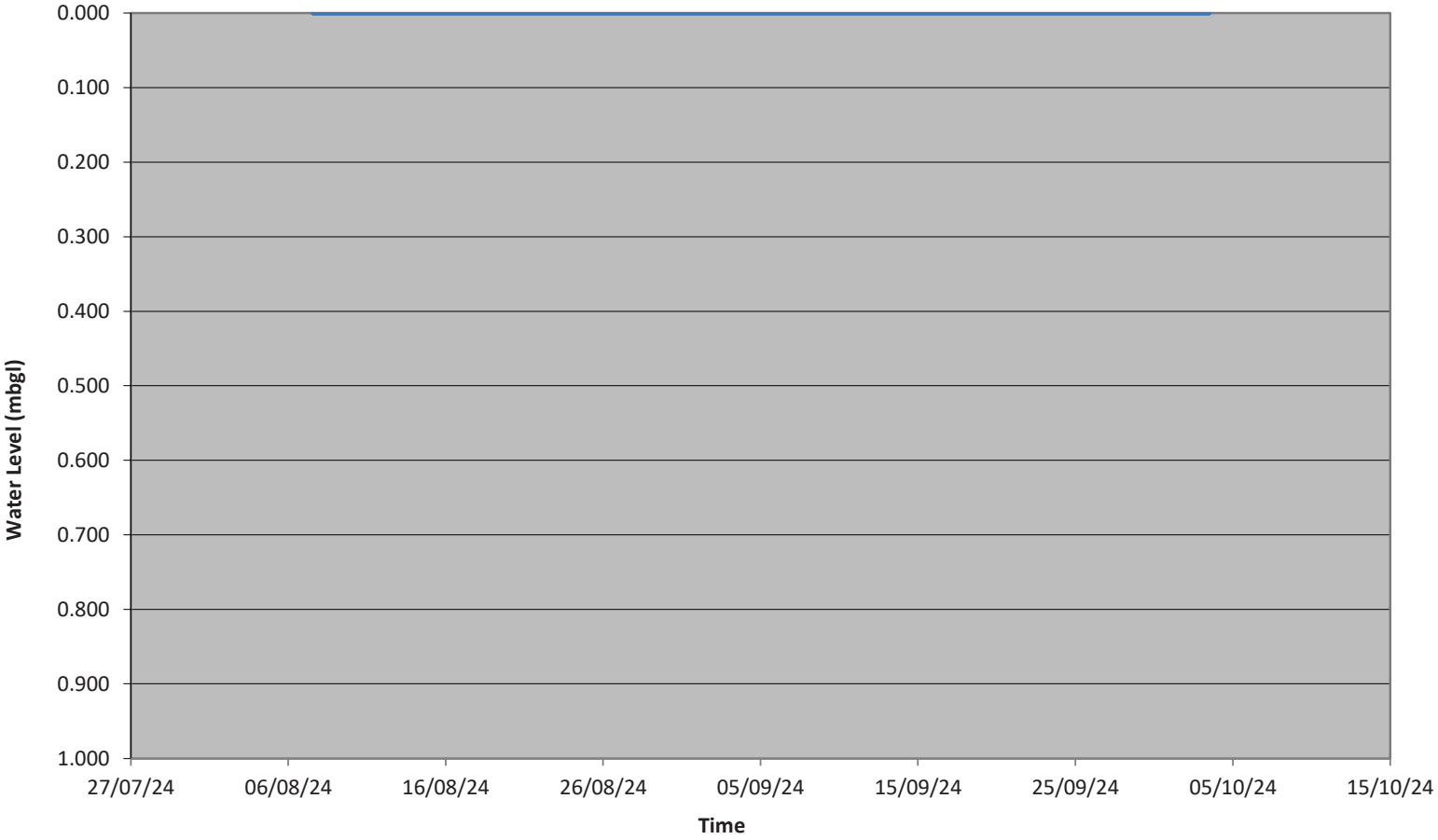


24775 - BH01

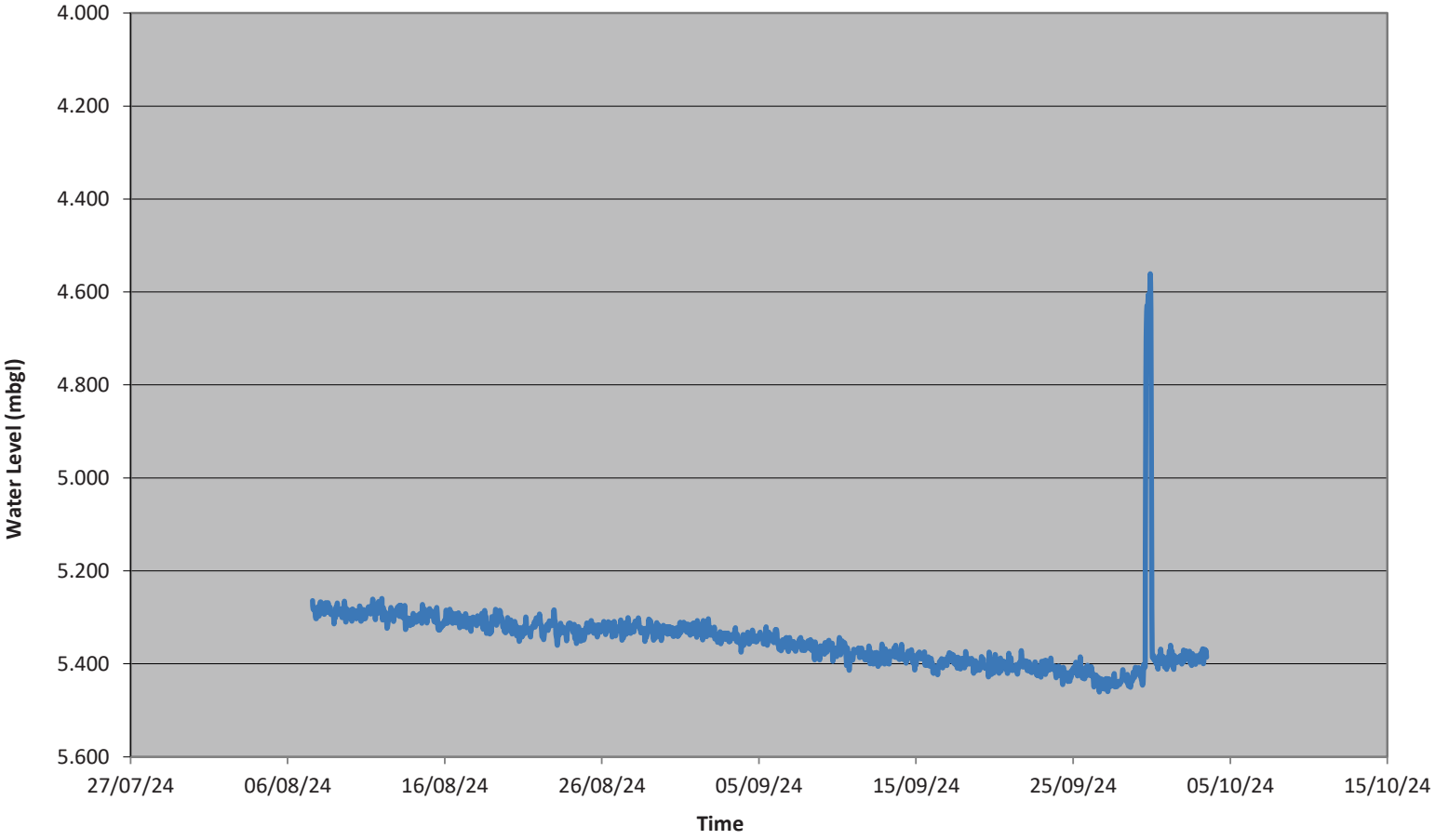

2.000
2.500
3.000
3.500
4.000
4.500
Water Level (mbgl)
27/07/24
06/08/24
16/08/24
26/08/24
05/09/24
15/09/24
25/09/24
05/10/24
15/10/24
Time


24775 - BH02
IGSL
Ltd.
0.000
0.100
0.200
0.300
0.400
0.500
0.600
0.700
0.800
0.900
1.000
Water Level (mbgl)
27/07/24
06/08/24
16/08/24
26/08/24
05/09/24
15/09/24
25/09/24
05/10/24
15/10/24
Time

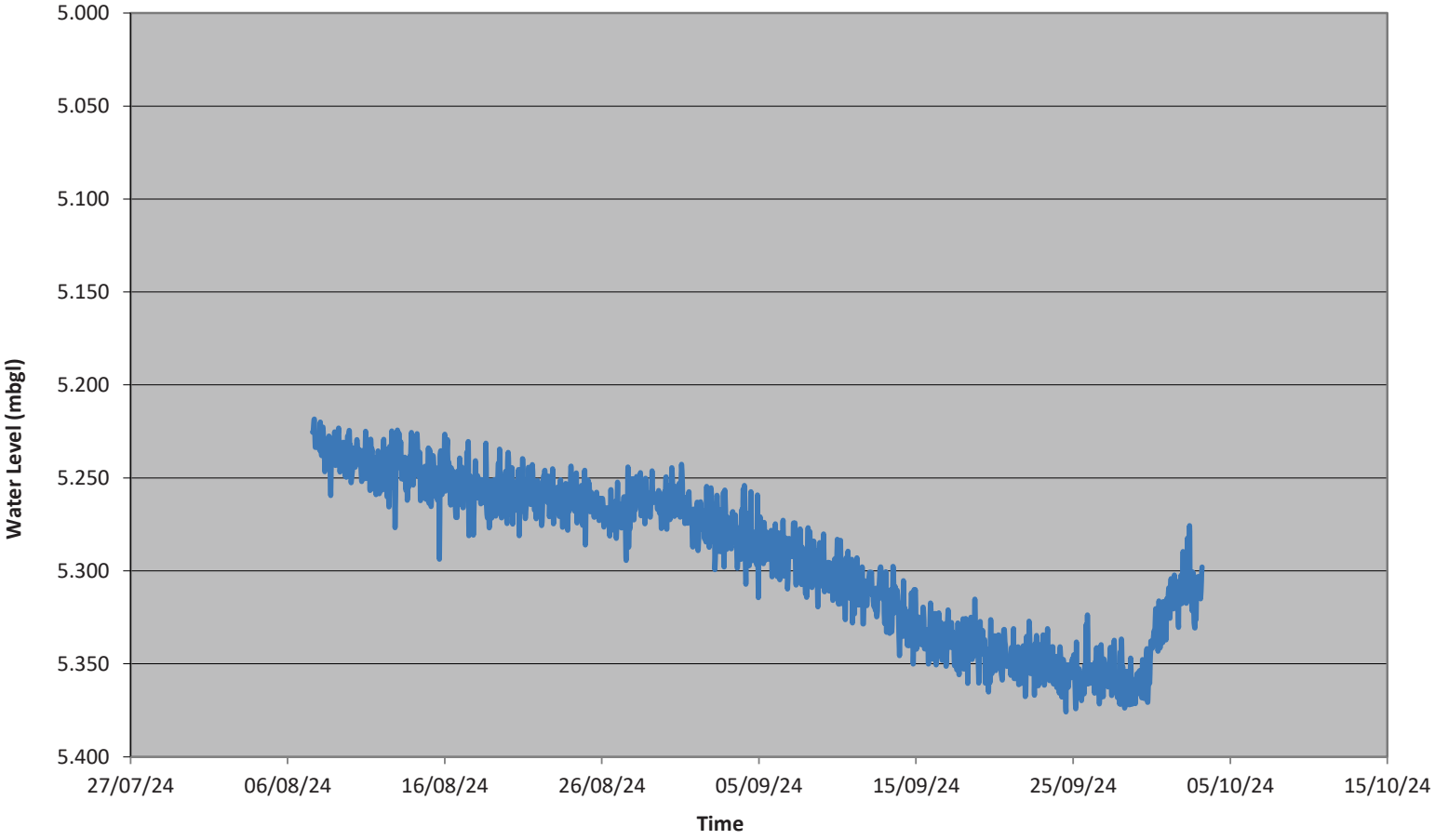
24775 - BH03


0.000
0.100
0.200
0.300
0.400
0.500
0.600
0.700
0.800
0.900
1.000
Water Level (mbgl)
27/07/24
06/08/24
16/08/24
26/08/24
05/09/24
15/09/24
25/09/24
05/10/24
15/10/24
Time

24775 - BH05


4.000
4.200
4.400
4.600
4.800
5.000
5.200
5.400
5.600
Water Level (mbgl)
27/07/24
06/08/24
16/08/24
26/08/24
05/09/24
15/09/24
25/09/24
05/10/24
15/10/24
Time

24775 - BH06


5.000
5.050
5.100
5.150
5.200
5.250
5.300
5.350
5.400
Water Level (mbgl)
27/07/24
06/08/24
16/08/24
26/08/24
05/09/24
15/09/24
25/09/24
05/10/24
15/10/24
Time

Appendix 6

Geotechnical Laboratory Results (Soil)

IGSL Ltd
Materials Laboratory
Unit J5, M7 Business Park
Newhall, Naas
Co. Kildare
045 846176

Test Report

Determination of Moisture Content, Liquid & Plastic Limits

Tested in accordance with BS1377:Part 2:1990, clauses 3.2, 4.3, 4.4 & 5.3**

Report No. **R158842** Contract No. 25387 Contract Name: Castlemartyr Cork

Customer DOBA

Samples Received: 27/06/24 Date Tested: 27/06/24

BH/TP*	Sample No.	Depth* (m)	Lab. Ref	Sample Type*	Moisture Content %	Liquid Limit %	Plastic Limit %	Plasticity Index	% <425µm	Preparation	Liquid Limit Clause	Classification (BS5930)	Description
TP01	AA231519	3.0	A24/2855	B	26	30	NP	NP	99	WS	4.4		Red/Brown SILT
TP03	AA231525	2.0	A24/2857	B	20	26	NP	NP	45	WS	4.4		Brown sandy gravelly SILT
TP07	AA231536	3.0	A24/2858	B	23	61	23	38	65	WS	4.4	C H	Brown slightly sandy, slightly gravelly, CLAY
TP08	AA231515	2.8	A24/2859	B	15	37	18	19	53	WS	4.4	C I	Brown sandy gravelly CLAY
BH01	AA210220	4.0	A24/2862	B	13	29	NP	NP	52	WS	4.4		Brown sandy gravelly SILT
BH02A	AA210225	1.0	A24/2863	B	17	34	NP	NP	77	WS	4.4		Brown sandy gravelly SILT
BH03	AA210232	2.0	A24/2865	B	17	33	NP	NP	70	WS	4.4		Brown sandy gravelly SILT
BH04A	AA218229	1.0	A24/2866	B	19	33	NP	NP	67	WS	4.4		Brown sandy gravelly SILT
BH05	AA218709	3.0	A24/2867	B	19	31	16	15	86	WS	4.4	C L	Brown sandy gravelly CLAY

Preparation: WS - Wet sieved
AR - As received
NP - Non plastic

Liquid Limit Clause: 4.3 Cone Penetrometer definitive method
4.4 Cone Penetrometer one point method

Sample Type: B - Bulk Disturbed
U - Undisturbed

Remarks:
Results relate only to the specimen tested,in as received condition unless otherwise noted.
NOTE: **These clauses have been superceded by EN 17892-1 and EN17892-12.
Opinions and interpretations are outside the scope of accreditation. * denotes Customer supplied information.
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IGSL Ltd Materials Laboratory

Persons authorized to approve reports
H Byrne (Laboratory Manager)

Approved by | Date: 24/07/24 | Page: 1 of 1

TEST REPORT
Determination of Particle Size Distribution

Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5**

(note: Sedimentation stage not accredited)

ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO.1331

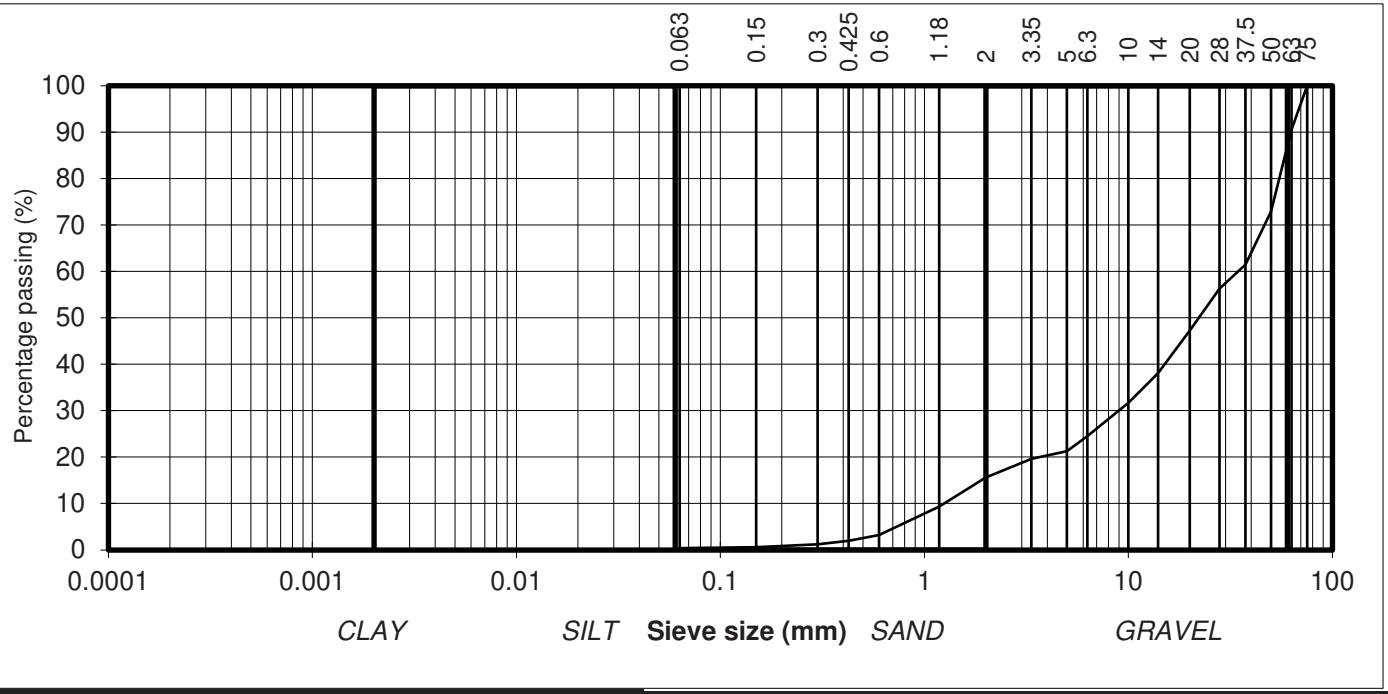
particle size	% passing	
75	100	COBBLES
63	91	
50	73	GRAVEL
37.5	61	
28	56	
20	47	
14	38	
10	32	
6.3	25	
5	21	
3.35	20	
2	16	
1.18	9	SAND
0.6	3	
0.425	2	
0.3	1	
0.15	1	
0.063	0	SILT/CLAY

Contract No.	25387	Report No.	R158807	
Contract Name :	Castlemartyr Cork			
BH/TP No.	BH1			
Sample No.*	AA210218	Lab. Sample No.		A24/2861
Sample Type:	B			
Depth* (m)	1.00	Customer:	DOBA	
Date Received	27/06/2024	Date Testing started		27/06/2024
Description:	Brown sandy, GRAVEL with some cobbles			

Results relate only to the specimen tested in as received condition unless otherwise noted. * denotes Customer supplied information. Opinions and interpretations are outside the scope of accreditation.

This report shall not be reproduced except in full without the written approval of the Laboratory.

Remarks Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 .



IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
H Byrne	08/07/24	1 of 1

Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

TEST REPORT
Determination of Particle Size Distribution

Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5**

(note: Sedimentation stage not accredited)

ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO.1331

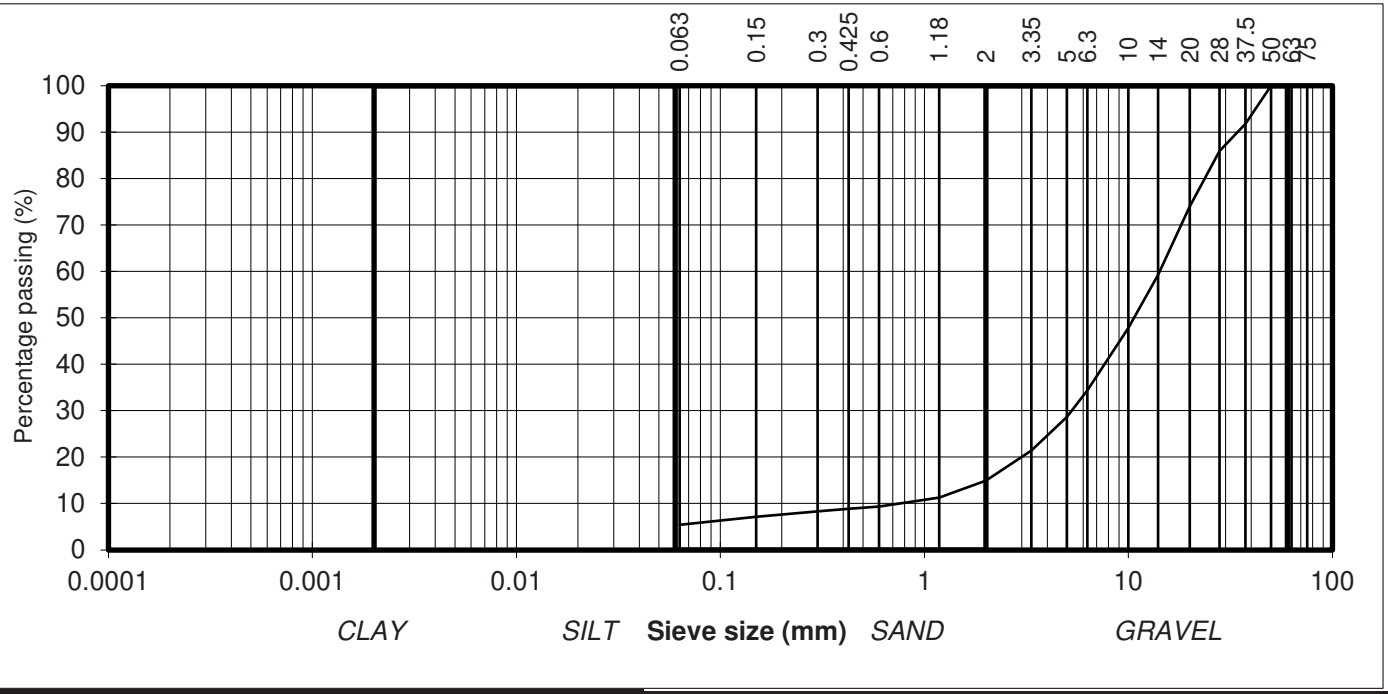
particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	92	
28	86	
20	74	
14	59	
10	48	
6.3	34	
5	29	
3.35	21	
2	15	
1.18	11	SAND
0.6	9	
0.425	9	
0.3	8	
0.15	7	
0.063	5	SILT/CLAY

Contract No.	25387	Report No.	R158808	
Contract Name :	Castlemartyr Cork			
BH/TP No.	BH2A			
Sample No.*	AA210226	Lab. Sample No.		A24/2864
Sample Type:	B			
Depth* (m)	2.00	Customer:	DOBA	
Date Received	28/06/2024	Date Testing started		28/06/2024
Description:	Red/Brown clayey/silty, sandy, GRAVEL			

Results relate only to the specimen tested in as received condition unless otherwise noted. * denotes Customer supplied information. Opinions and interpretations are outside the scope of accreditation.

This report shall not be reproduced except in full without the written approval of the Laboratory.

Remarks: Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 .



IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
H Byrne	08/07/24	1 of 1

Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

TEST REPORT
Determination of Particle Size Distribution

Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5**

(note: Sedimentation stage not accredited)

ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO.1331

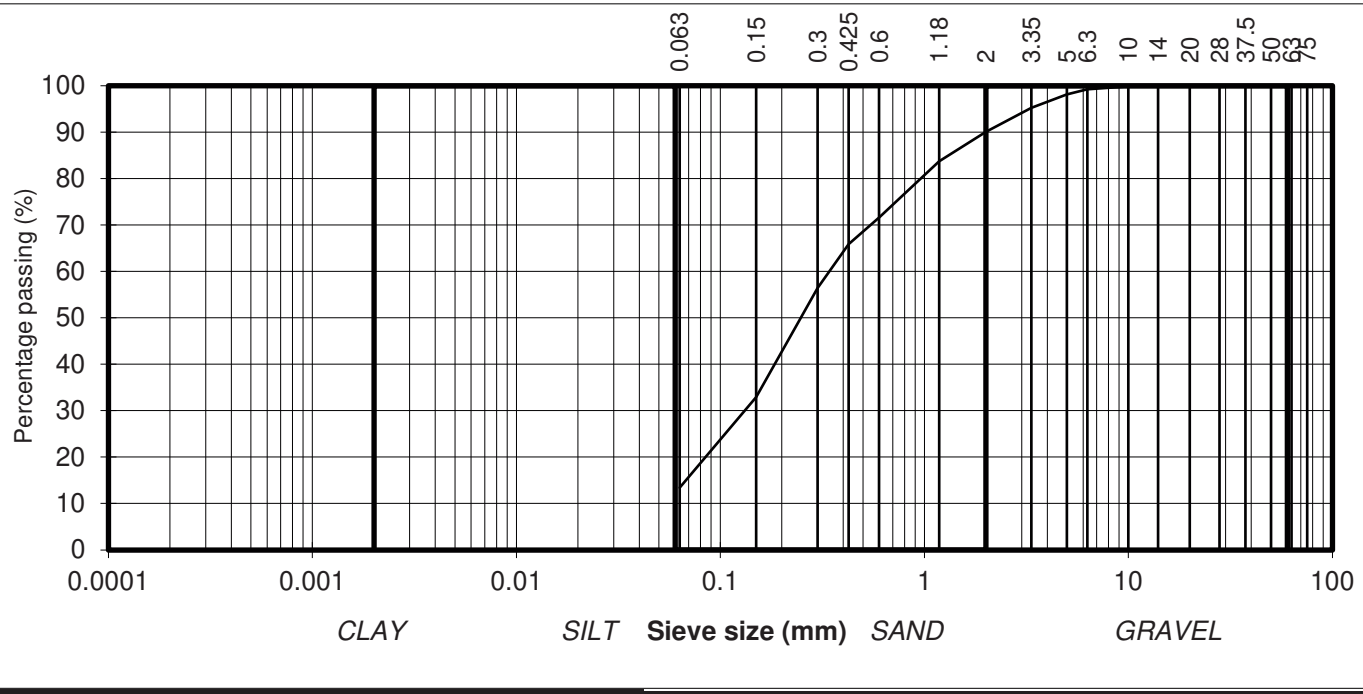
particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	100	
28	100	
20	100	
14	100	
10	100	
6.3	99	
5	98	
3.35	95	
2	90	
1.18	84	SAND
0.6	72	
0.425	66	
0.3	56	
0.15	33	
0.063	13	SILT/CLAY

Contract No.	25387	Report No.	R158809	
Contract Name :	Castlemartyr Cork			
BH/TP No.	BH5			
Sample No.*	AA218711	Lab. Sample No.		A24/2868
Sample Type:	B			
Depth* (m)	5.00	Customer:	DOBA	
Date Received	27/06/2024	Date Testing started		27/06/2024
Description:	Brown clayey/silty, gravelly, SAND			

Results relate only to the specimen tested in as received condition unless otherwise noted. * denotes Customer supplied information. Opinions and interpretations are outside the scope of accreditation.

This report shall not be reproduced except in full without the written approval of the Laboratory.

Remarks Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 .



IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
H Byrne	08/07/24	1 of 1

Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

TEST REPORT
Determination of Particle Size Distribution

Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5**

(note: Sedimentation stage not accredited)

ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO.1331

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	91	
28	75	
20	64	
14	56	
10	49	
6.3	39	
5	35	
3.35	27	
2	21	
1.18	16	SAND
0.6	11	
0.425	9	
0.3	7	
0.15	4	
0.063	2	SILT/CLAY

Contract No.	25387	Report No.	R158810	
Contract Name :	Castlemartyr Cork			
BH/TP No.	BH5			
Sample No.*	AA218714	Lab. Sample No.		A24/2869
Sample Type:	B			
Depth* (m)	8.00	Customer:	DOBA	
Date Received	27/06/2024	Date Testing started		27/06/2024
Description:	Brown slightly clayey/silty, sandy, GRAVEL			

Results relate only to the specimen tested in as received condition unless otherwise noted. * denotes Customer supplied information. Opinions and interpretations are outside the scope of accreditation.

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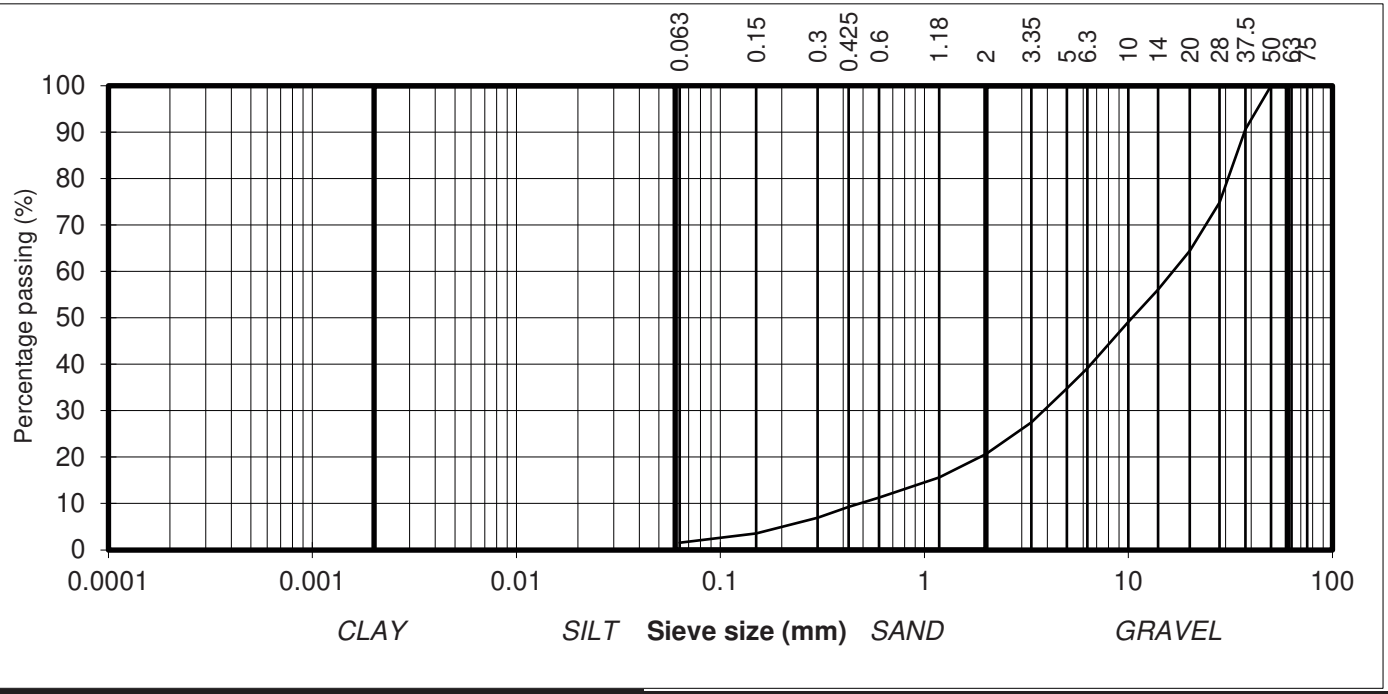
Remarks Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 .



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H Byrne	08/07/24	1 of 1

Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

TEST REPORT
Determination of Particle Size Distribution

Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5**

(note: Sedimentation stage not accredited)

ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO.1331

particle size	% passing	
75	100	COBBLES
63	100	
50	80	GRAVEL
37.5	67	
28	63	
20	54	
14	47	
10	40	
6.3	34	
5	32	
3.35	28	
2	22	
1.18	13	SAND
0.6	5	
0.425	4	
0.3	2	
0.15	1	
0.063	1	SILT/CLAY

Contract No.	25387	Report No.	R158811	
Contract Name :	Castlemartyr Cork			
BH/TP No.	BH6			
Sample No.*	AA206800	Lab. Sample No.		A24/2871
Sample Type:	B			
Depth* (m)	4.00	Customer:	DOBA	
Date Received	27/06/2024	Date Testing started		27/06/2024
Description:	Brown slightly clayey/silty, very sandy, GRAVEL			

Remarks Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 .

Results relate only to the specimen tested in as received condition unless otherwise noted. * denotes Customer supplied information. Opinions and interpretations are outside the scope of accreditation.

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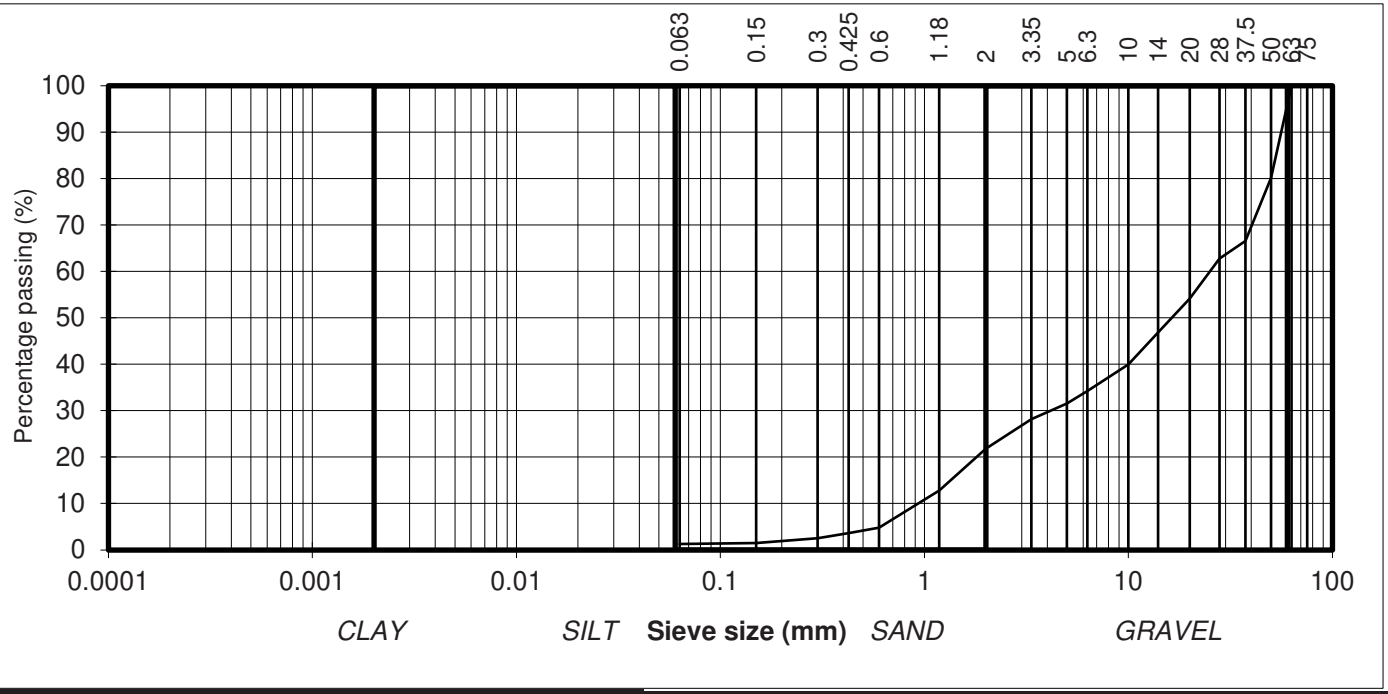

IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
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Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

TEST REPORT
Determination of Particle Size Distribution

Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5**

(note: Sedimentation stage not accredited)

ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO.1331

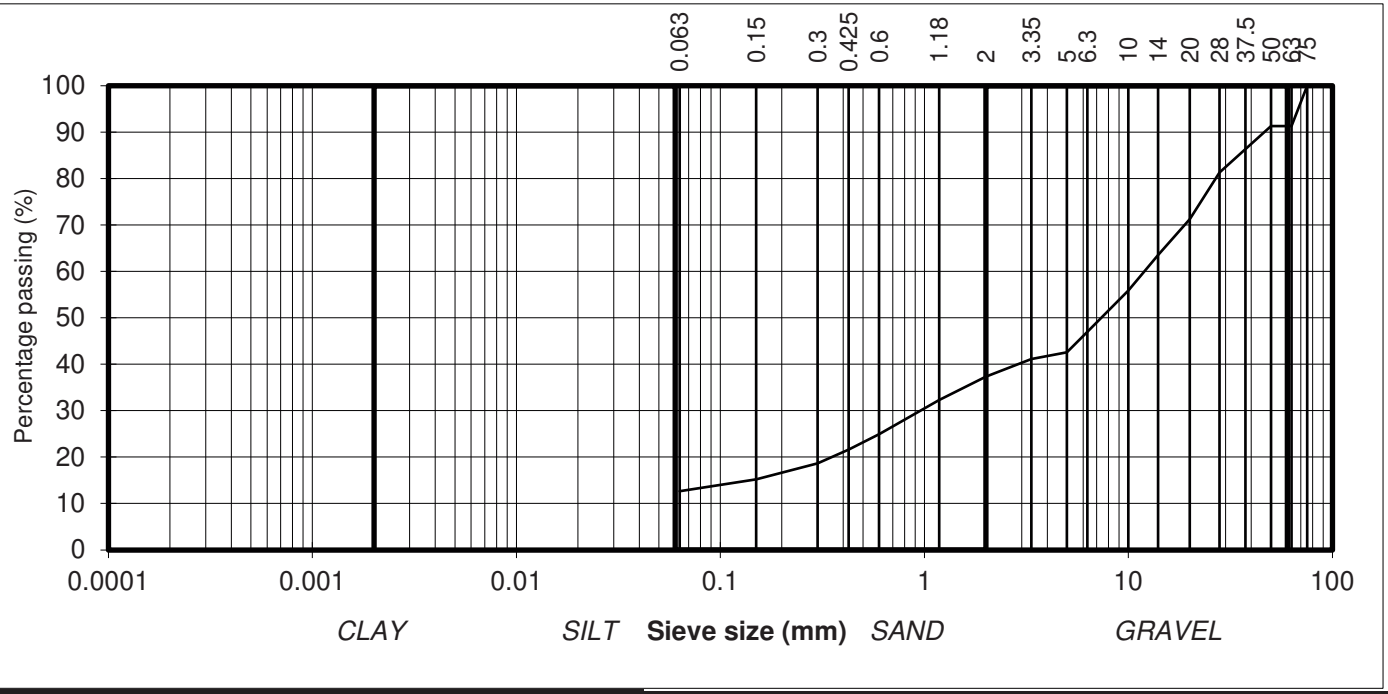
particle size	% passing	
75	100	COBBLES
63	91	
50	91	GRAVEL
37.5	86	
28	81	
20	71	
14	64	
10	56	
6.3	47	
5	43	
3.35	41	
2	37	
1.18	32	SAND
0.6	25	
0.425	22	
0.3	19	
0.15	15	
0.063	13	SILT/CLAY

Contract No.	25387	Report No.	R158812	
Contract Name :	Castlemartyr Cork			
BH/TP No.	BH6			
Sample No.*	AA206803	Lab. Sample No.		A24/2872
Sample Type:	B			
Depth* (m)	7.00	Customer:	DOBA	
Date Received	27/06/2024	Date Testing started		27/06/2024
Description:	Brown clayey/silty, very sandy, GRAVEL with some cobbles			

Results relate only to the specimen tested in as received condition unless otherwise noted. * denotes Customer supplied information. Opinions and interpretations are outside the scope of accreditation.

This report shall not be reproduced except in full without the written approval of the Laboratory.

Remarks: Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 .



IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
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Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

TEST REPORT
Determination of Particle Size Distribution

Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5**

(note: Sedimentation stage not accredited)

ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO.1331

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	100	
28	100	
20	99	
14	97	
10	95	
6.3	93	
5	92	
3.35	91	
2	89	
1.18	87	SAND
0.6	82	
0.425	80	
0.3	77	
0.15	71	
0.063	57	SILT/CLAY

Contract No.	25387	Report No.	R158813	
Contract Name :	Castlemartyr Cork			
BH/TP No.	TP1			
Sample No.*	AA231517	Lab. Sample No.		A24/2854
Sample Type:	B			
Depth* (m)	1.00	Customer:	DOBA	
Date Received	27/06/2024	Date Testing started		27/06/2024
Description:	Brown slightly sandy, slightly gravelly, SILT/CLAY			

Results relate only to the specimen tested in as received condition unless otherwise noted. * denotes Customer supplied information. Opinions and interpretations are outside the scope of accreditation.

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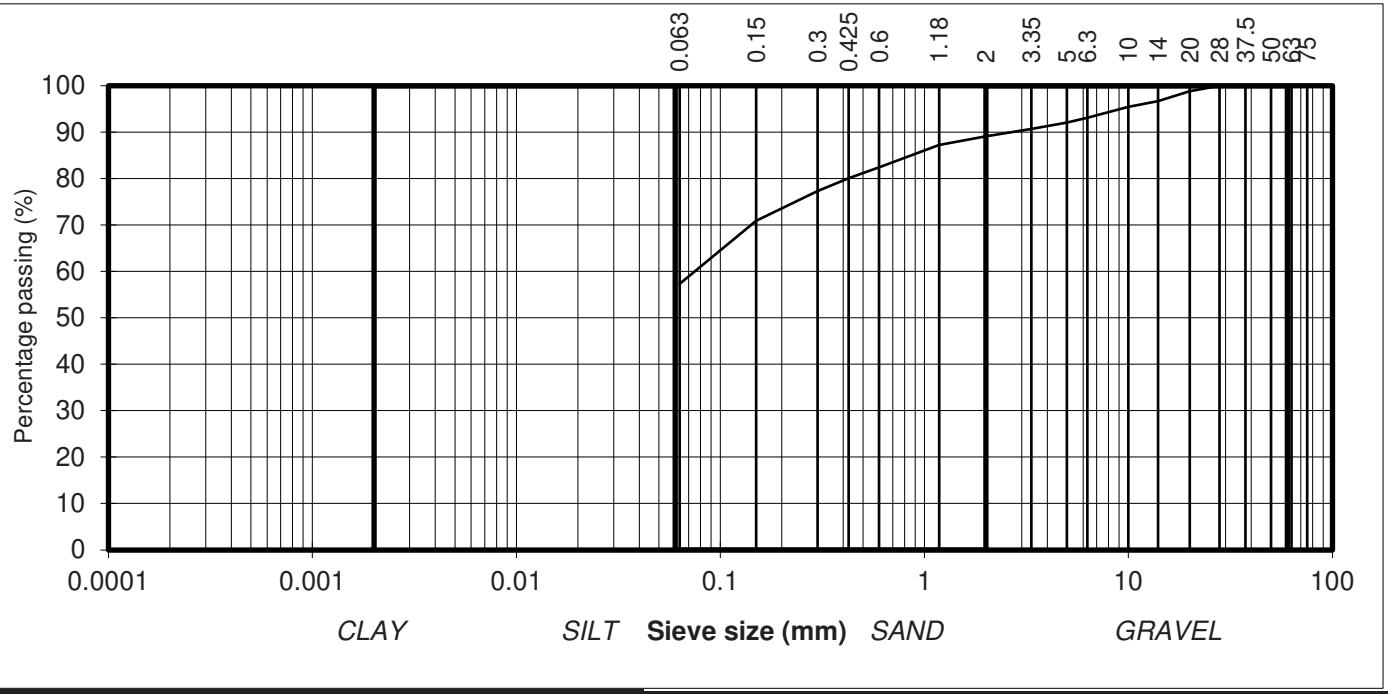
Remarks Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 .



IGSL Ltd Materials Laboratory

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Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

TEST REPORT
Determination of Particle Size Distribution
Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5**
(note: Sedimentation stage not accredited)

ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO.1331

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	100	
28	95	
20	87	
14	82	
10	78	
6.3	73	
5	71	
3.35	69	
2	65	
1.18	61	SAND
0.6	54	
0.425	52	
0.3	49	
0.15	43	
0.063	33	SILT/CLAY

Contract No.	25387	Report No.	R158840	
Contract Name :	Castlemartyr Cork			
BH/TP No.	TP2			
Sample No.*	AA231522	Lab. Sample No.		A24/2856
Sample Type:	B			
Depth* (m)	2.00	Customer:	DOBA	
Date Received	27/06/2024	Date Testing started		27/06/2024
Description:	Brown slightly sandy, gravelly, SILT/CLAY			

Results relate only to the specimen tested in as received condition unless otherwise noted. * denotes Customer supplied information. Opinions and interpretations are outside the scope of accreditation.

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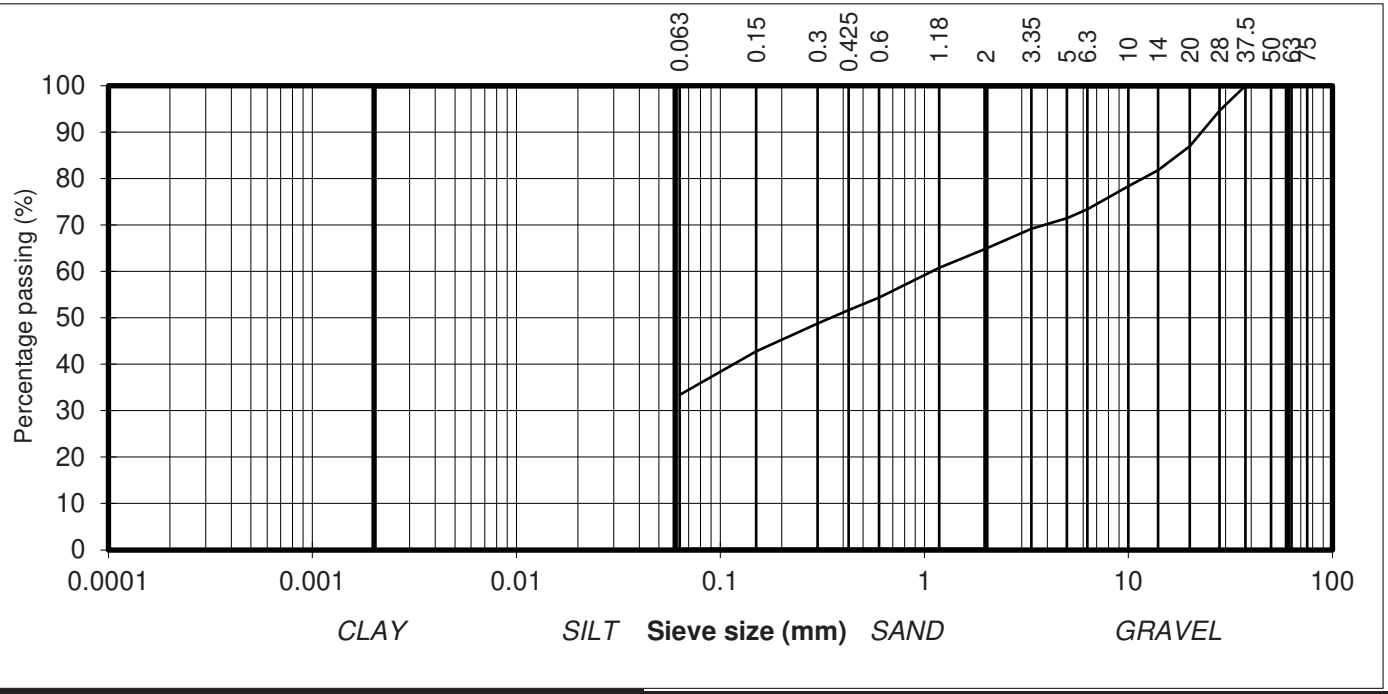
Remarks Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 .



IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
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Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

TEST REPORT
Determination of Particle Size Distribution

Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5**

(note: Sedimentation stage not accredited)

ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO.1331

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	91	
28	91	
20	90	
14	89	
10	88	
6.3	86	
5	85	
3.35	84	
2	82	
1.18	81	SAND
0.6	79	
0.425	79	
0.3	77	
0.15	74	
0.063	69	SILT/CLAY
0.040	63	
0.028	55	
0.018	49	
0.011	38	
0.008	32	
0.005	27	
0.002	15	

Contract No.	25387	Report No.	R158841	
Contract Name :	Castlemartyr Cork			
BH/TP No.	TP7			
Sample No.*	AA231536	Lab. Sample No.		A24/2858
Sample Type:	B			
Depth* (m)	3.00	Customer:	DOBA	
Date Received	27/06/2024	Date Testing started		27/06/2024
Description:	Brown slightly sandy, slightly gravelly, CLAY			

Remarks Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 .

Results relate only to the specimen tested in as received condition unless otherwise noted. * denotes Customer supplied information. Opinions and interpretations are outside the scope of accreditation.

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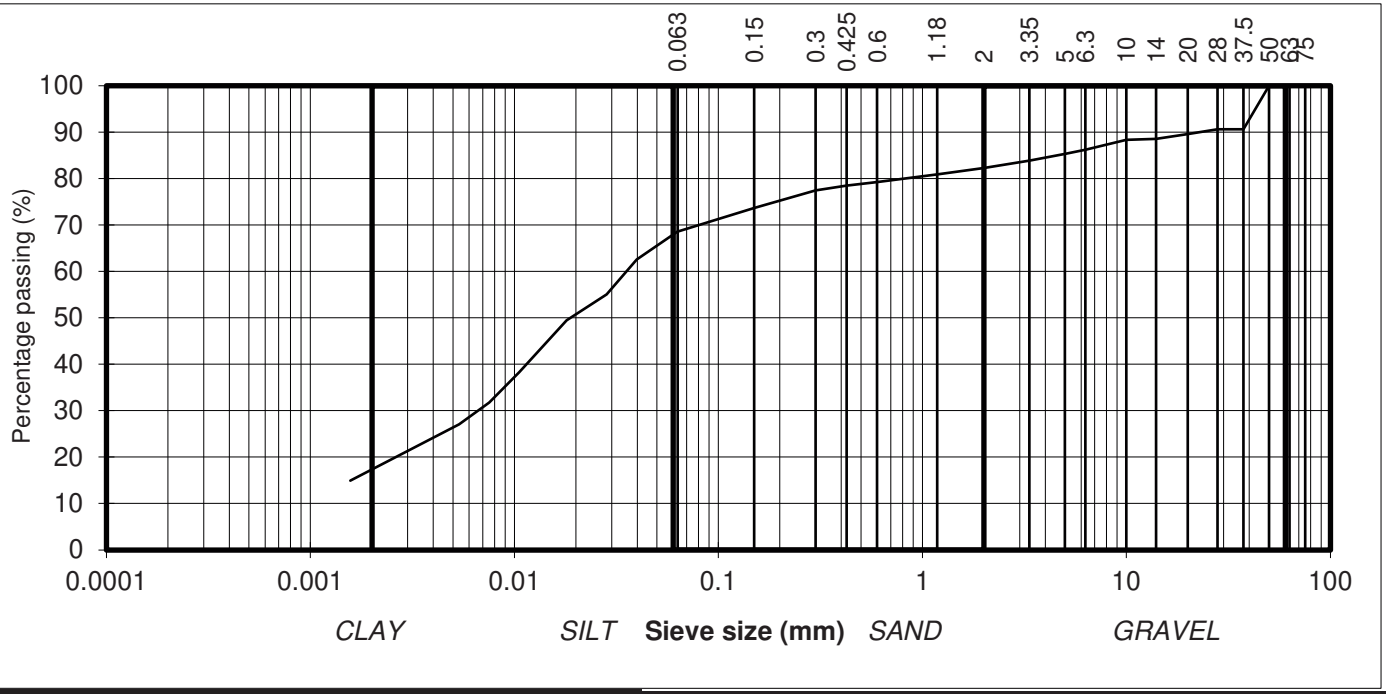

IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
H Byrne	08/07/24	1 of 1

Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

TEST REPORT
Determination of Particle Size Distribution

Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5**

(note: Sedimentation stage not accredited)

ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO.1331

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	100	
28	100	
20	99	
14	99	
10	99	
6.3	99	
5	99	
3.35	98	
2	98	
1.18	98	SAND
0.6	97	
0.425	96	
0.3	95	
0.15	89	
0.063	73	SILT/CLAY

Contract No.	25387	Report No.	R158952	
Contract Name :	Castlemartyr Cork			
BH/TP No.	TP10			
Sample No.*	AA231506	Lab. Sample No.		A24/2860
Sample Type:	B			
Depth* (m)	1.70	Customer:	DOBA	
Date Received	28/06/2024	Date Testing started		28/06/2024
Description:	Brown slightly sandy, slightly gravelly, SILT/CLAY			

Remarks Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 .

Results relate only to the specimen tested in as received condition unless otherwise noted. * denotes Customer supplied information. Opinions and interpretations are outside the scope of accreditation.

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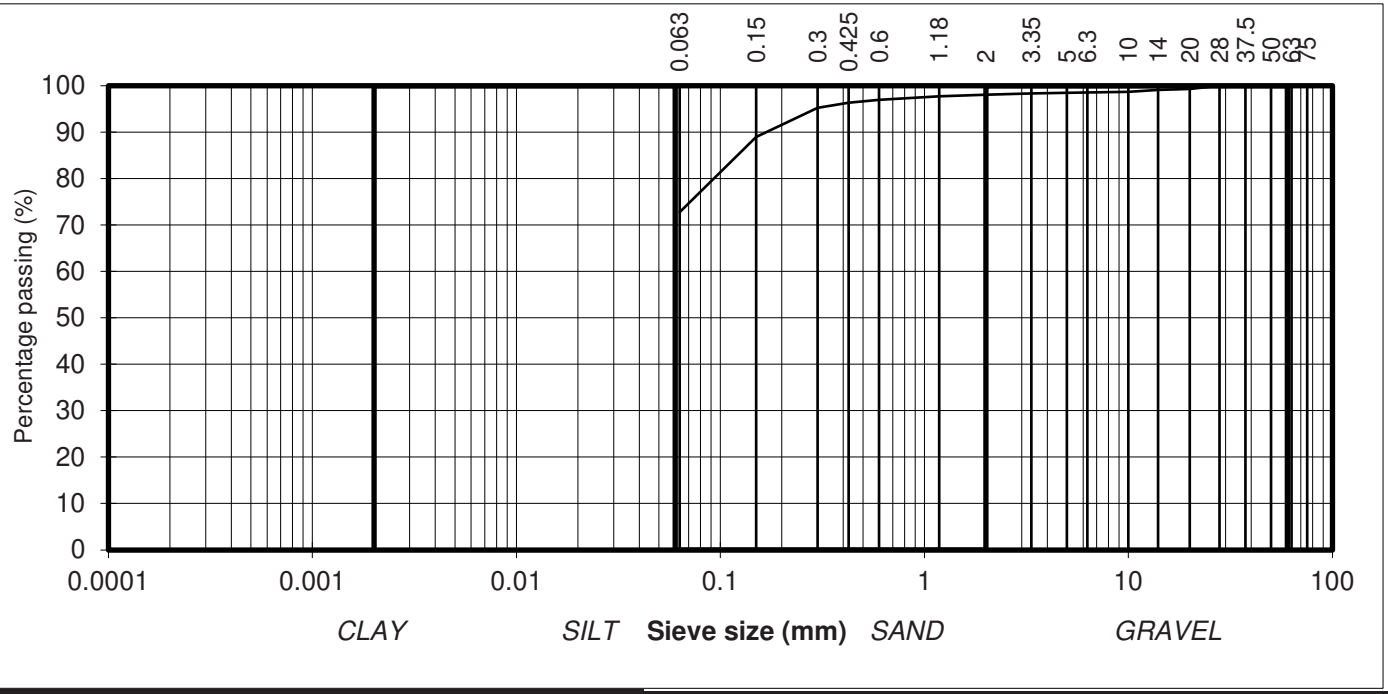

IGSL Ltd Materials Laboratory

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Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

IGSL Ltd
Materials Laboratory
Unit F, M7 Business Park
Naas
Co. Kildare

045-899324

Test Report

Undrained shear strength in triaxial compression
(without pore pressure measurement)

Tested in accordance with BS1377:Part 7:1990 clause 8
(definitive method)**

ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO.1331

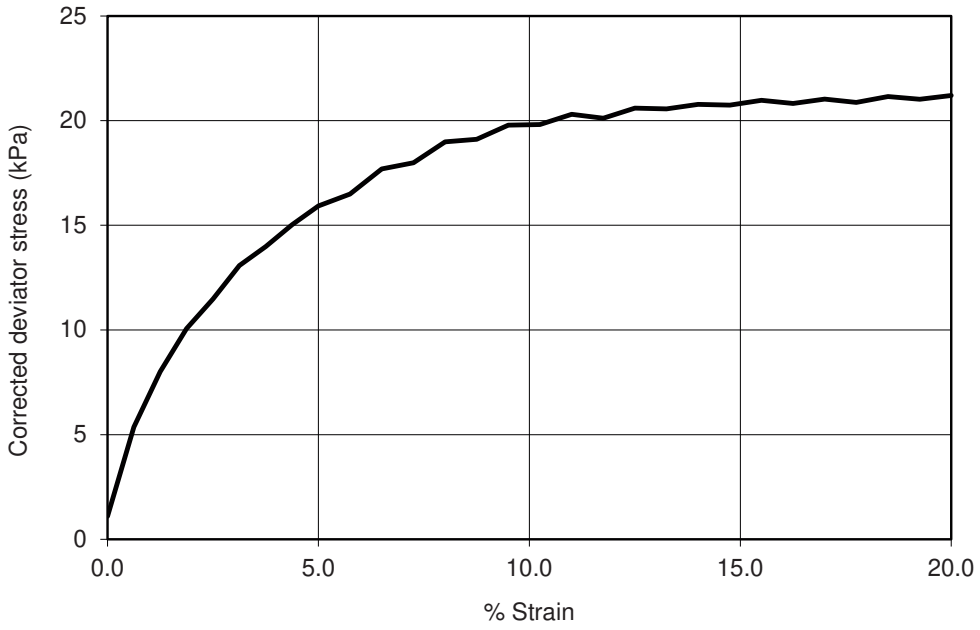
Report no: R157782

Contract Name:	Castlemartyr Cork	Contract No:	25387
Location*:	BH05 3.0m	Sample No*.	218709

Description: Brown slightly sandy slightly gravelly SILT/CLAY

Customer: Glenveagh Developments

Height (mm)	200	Diameter	103	Cell pressure(kPa)	60
Moisture Content %	19	Bulk density (Mg/m^3)	2.12	Dry density (Mg/m^3)	1.79



Strain at failure %	20	Cohesion C_u (kPa) (Undrained shear strength kPa)	11
Rate of strain (%/minute)	2.0		
Thickness of membrane	0.5	Membrane correction (at failure)	1.99
Date received	-	Date tested	25/06/24

Results relate only to the specimen tested, in as received condition unless otherwise noted. Opinions and interpretations are outside the scope of accreditation.

* denotes Customer supplied information

This report shall not be reproduced except in full without written approval from the Laboratory

**This Standard has been superceded by ISO17892-8:2018

Person authorised to approve report: J Barrett (Quality Manager)

	Approved by	Date	Page
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Appendix 7

Chemical & Environmental Test Records (Soil)

24-21214

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

Final Report

Report No.:	24-21214-1
Initial Date of Issue:	22-Jul-2024
Re-Issue Details:	
Client	IGSL
Client Address:	M7 Business Park Naas County Kildare Ireland
Contact(s):	Darren Keogh
Project	25387 Cashemartyr Cork

Quotation No.:		**Date Received:**	04-Jul-2024
Order No.:		**Date Instructed:**	04-Jul-2024
No. of Samples:	17		
Turnaround (Wkdays):	7	**Results Due:**	12-Jul-2024
Date Approved:	22-Jul-2024		

Approved By:

Details: Simon Wicks, Specialist Chemist

For details about application of accreditation to specific matrix types, please refer to the Table at the back of this report

Results - Leachate

Project: 25387 Cashemartyr Cork

Client: IGSL						**Chemtest Job No.:**	24-21214	24-21214	24-21214	24-21214	24-21214	24-21214	24-21214	24-21214	24-21214	24-21214	24-21214
Quotation No.:						**Chemtest Sample ID.:**	1830178	1830181	1830182	1830183	1830184	1830185	1830186	1830187	1830188	1830189	1830191
Order No.:						Client Sample Ref.:	BH05	TP02	TP03	TP04	TP05	TP06	TP07	TP08	TP09	TP09	TP10
						Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
						Top Depth (m):	1.00	1.00	0.40	1.00	0.40	1.00	0.60	0.40	1.00	2.00	0.50
						Date Sampled:	02-Jul-2024	02-Jul-2024	02-Jul-2024	02-Jul-2024	02-Jul-2024	02-Jul-2024	02-Jul-2024	02-Jul-2024	02-Jul-2024	02-Jul-2024	02-Jul-2024
Determinand	**Accred.**	**SOP**	**Type**	**Units**	**LOD**												
Ammonium	U	1220	10:1	mg/l	0.050		0.061	0.072	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Ammonium	N	1220	10:1	mg/kg	0.10		0.65	0.75	0.46	0.29	0.40	0.22	0.31	0.26	0.23	0.11	0.27

Results - Soil

Project: 25387 Cashemartyr Cork

Client: IGSL						**Chemtest Job No.:**	24-21214	24-21214	24-21214	24-21214	24-21214	24-21214	24-21214	24-21214
Quotation No.:						**Chemtest Sample ID.:**	1830177	1830178	1830179	1830180	1830181	1830182	1830183	1830184
Order No.:						Client Sample Ref.:	BH04A	BH05	BH05	BH06	TP02	TP03	TP04	TP05
						Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
						Top Depth (m):	1.00	1.00	3.00	2.00	1.00	0.40	1.00	0.40
						Date Sampled:	02-Jul-2024	02-Jul-2024	02-Jul-2024	02-Jul-2024	02-Jul-2024	02-Jul-2024	02-Jul-2024	02-Jul-2024
						Asbestos Lab:		DURHAM			DURHAM	DURHAM	DURHAM	DURHAM
Determinand	**HWOL Code**	**Accred.**	**SOP**	**Units**	**LOD**									
ACM Type		U	2192		N/A		-			-	-	-	-
Asbestos Identification		U	2192		N/A		No Asbestos Detected			No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Moisture		N	2030	%	0.020	20	18	17	13	14	12	9.7	16
Soil Colour		N	2040		N/A	Brown	Brown	Brown	Brown	Brown	Brown	Brown	Brown
Other Material		N	2040		N/A	Stones	Stones and Roots	Stones	Stones	Stones	Stones	Stones	Stones and Roots
Soil Texture		N	2040		N/A	Clay	Clay	Clay	Clay	Clay	Loam	Loam	Loam
pH (2.5:1) at 20C		N	2010		4.0	7.3		7.5	7.8				
Boron (Hot Water Soluble)		M	2120	mg/kg	0.40		0.69			0.42	0.43	< 0.40	0.48
Magnesium (Water Soluble)		N	2120	g/l	0.010	< 0.010		< 0.010	< 0.010				
Sulphate (2:1 Water Soluble) as SO4		M	2120	g/l	0.010	0.015		0.054	0.022				
Total Sulphur		U	2175	%	0.010	< 0.010		< 0.010	< 0.010				
Sulphur (Elemental)		M	2180	mg/kg	1.0		13			< 1.0	< 1.0	39	180
Chloride (Water Soluble)		M	2220	g/l	0.010	< 0.010		< 0.010	< 0.010				
Nitrate (Water Soluble)		N	2220	g/l	0.010	0.013		< 0.010	< 0.010				
Cyanide (Total)		M	2300	mg/kg	0.50		< 0.50			< 0.50	< 0.50	< 0.50	< 0.50
Sulphide (Easily Liberatable)		N	2325	mg/kg	0.50		3.5			12	6.4	3.5	7.0
Ammonium (Water Soluble)		M	2220	g/l	0.01	< 0.01		< 0.01	< 0.01				
Sulphate (Total)		U	2430	%	0.010		0.17			< 0.010	< 0.010	< 0.010	0.011
Sulphate (Acid Soluble)		U	2430	%	0.010	< 0.010		< 0.010	< 0.010				
Arsenic		M	2455	mg/kg	0.5		< 0.5			< 0.5	< 0.5	< 0.5	4.7
Barium		M	2455	mg/kg	0.5		44			12	22	26	31
Cadmium		M	2455	mg/kg	0.10		0.39			< 0.10	0.12	0.14	0.70
Chromium		M	2455	mg/kg	0.5		24			13	13	20	13
Molybdenum		M	2455	mg/kg	0.5		< 0.5			< 0.5	< 0.5	< 0.5	< 0.5
Antimony		N	2455	mg/kg	2.0		< 2.0			< 2.0	< 2.0	< 2.0	< 2.0
Copper		M	2455	mg/kg	0.50		20			6.6	10	12	21
Mercury		M	2455	mg/kg	0.05		0.08			< 0.05	< 0.05	< 0.05	0.05
Nickel		M	2455	mg/kg	0.50		33			16	21	28	69
Lead		M	2455	mg/kg	0.50		35			6.9	16	26	31
Selenium		M	2455	mg/kg	0.25		< 0.25			< 0.25	< 0.25	< 0.25	< 0.25
Zinc		M	2455	mg/kg	0.50		100			29	45	57	67
Chromium (Trivalent)		N	2490	mg/kg	1.0		24			13	13	20	13
Chromium (Hexavalent)		N	2490	mg/kg	0.50		< 0.50			< 0.50	< 0.50	< 0.50	< 0.50
Aliphatic VPH >C5-C6	HS_2D_AL	U	2780	mg/kg	0.05		< 0.05			< 0.05	< 0.05	< 0.05	< 0.05
Aliphatic VPH >C6-C7	HS_2D_AL	U	2780	mg/kg	0.05		< 0.05			< 0.05	< 0.05	< 0.05	< 0.05
Aliphatic VPH >C7-C8	HS_2D_AL	U	2780	mg/kg	0.05		< 0.05			< 0.05	< 0.05	< 0.05	< 0.05
Aliphatic VPH >C8-C10	HS_2D_AL	U	2780	mg/kg	0.05		< 0.05			< 0.05	< 0.05	< 0.05	< 0.05

Results - Soil

Project: 25387 Cashemartyr Cork

Client: IGSL				**Chemtest Job No.:**		24-21214	24-21214	24-21214	24-21214	24-21214	24-21214	24-21214	24-21214
Quotation No.:				**Chemtest Sample ID.:**		1830177	1830178	1830179	1830180	1830181	1830182	1830183	1830184
Order No.:				Client Sample Ref.:		BH04A	BH05	BH05	BH06	TP02	TP03	TP04	TP05
				Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):		1.00	1.00	3.00	2.00	1.00	0.40	1.00	0.40
				Date Sampled:		02-Jul-2024	02-Jul-2024	02-Jul-2024	02-Jul-2024	02-Jul-2024	02-Jul-2024	02-Jul-2024	02-Jul-2024
				Asbestos Lab:			DURHAM			DURHAM	DURHAM	DURHAM	DURHAM
Determinand	**HWOL Code**	**Accred.**	**SOP**	**Units**	**LOD**								
Total Aliphatic VPH >C5-C10	HS_2D_AL	U	2780	mg/kg	0.25		< 0.25			< 0.25	< 0.25	< 0.25	< 0.25
Aliphatic EPH >C10-C12 MC	EH_2D_AL_#1	M	2690	mg/kg	2.00		11			7.3	7.6	6.9	8.9
Aliphatic EPH >C12-C16 MC	EH_2D_AL_#1	M	2690	mg/kg	1.00		19			1.5	2.1	1.4	1.4
Aliphatic EPH >C16-C21 MC	EH_2D_AL_#1	M	2690	mg/kg	2.00		16			< 2.0	< 2.0	< 2.0	< 2.0
Aliphatic EPH >C21-C35 MC	EH_2D_AL_#1	M	2690	mg/kg	3.00		15			15	11	9.6	13
Aliphatic EPH >C35-C40 MC	EH_2D_AL_#1	N	2690	mg/kg	10.00		18			14	12	14	16
Total Aliphatic EPH >C10-C35 MC	EH_2D_AL_#1	M	2690	mg/kg	5.00		61			24	21	18	23
Aromatic VPH >C5-C7	HS_2D_AR	U	2780	mg/kg	0.05		< 0.05			< 0.05	< 0.05	< 0.05	< 0.05
Aromatic VPH >C7-C8	HS_2D_AR	U	2780	mg/kg	0.05		< 0.05			< 0.05	< 0.05	< 0.05	< 0.05
Aromatic VPH >C8-C10	HS_2D_AR	U	2780	mg/kg	0.05		< 0.05			< 0.05	< 0.05	< 0.05	< 0.05
Total Aromatic VPH >C5-C10	HS_2D_AR	U	2780	mg/kg	0.25		< 0.25			< 0.25	< 0.25	< 0.25	< 0.25
Aromatic EPH >C10-C12 MC	EH_2D_AR_#1	U	2690	mg/kg	1.00		< 1.0			< 1.0	< 1.0	< 1.0	< 1.0
Aromatic EPH >C12-C16 MC	EH_2D_AR_#1	U	2690	mg/kg	1.00		< 1.0			< 1.0	< 1.0	< 1.0	< 1.0
Aromatic EPH >C16-C21 MC	EH_2D_AR_#1	U	2690	mg/kg	2.00		< 2.0			< 2.0	< 2.0	< 2.0	< 2.0
Aromatic EPH >C21-C35 MC	EH_2D_AR_#1	U	2690	mg/kg	2.00		< 2.0			< 2.0	< 2.0	< 2.0	2.3
Aromatic EPH >C35-C40 MC	EH_2D_AR_#1	N	2690	mg/kg	1.00		8.9			4.8	4.8	3.9	5.6
Total Aromatic EPH >C10-C35 MC	EH_2D_AR_#1	U	2690	mg/kg	5.00		< 5.0			< 5.0	< 5.0	< 5.0	< 5.0
Total VPH >C5-C10	HS_2D_Total	U	2780	mg/kg	0.50		< 0.50			< 0.50	< 0.50	< 0.50	< 0.50
Total EPH >C10-C35 MC	EH_2D_Total_#1	U	2690	mg/kg	10.00		63			26	22	20	27
Mineral Oil EPH		N	2670	mg/kg	10		61			24	21	18	23
Benzene		M	2760	µg/kg	1.0		< 1.0			< 1.0	< 1.0	< 1.0	< 1.0
Toluene		M	2760	µg/kg	1.0		< 1.0			< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene		M	2760	µg/kg	1.0		< 1.0			< 1.0	< 1.0	< 1.0	< 1.0
m & p-Xylene		M	2760	µg/kg	1.0		< 1.0			< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene		M	2760	µg/kg	1.0		< 1.0			< 1.0	< 1.0	< 1.0	< 1.0
Methyl Tert-Butyl Ether		M	2760	µg/kg	1.0		< 1.0			< 1.0	< 1.0	< 1.0	< 1.0
Naphthalene		M	2800	mg/kg	0.10		< 0.10			< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene		N	2800	mg/kg	0.10		< 0.10			< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene		M	2800	mg/kg	0.10		< 0.10			< 0.10	< 0.10	< 0.10	< 0.10
Fluorene		M	2800	mg/kg	0.10		< 0.10			< 0.10	< 0.10	< 0.10	< 0.10
Phenanthrene		M	2800	mg/kg	0.10		< 0.10			< 0.10	< 0.10	< 0.10	< 0.10
Anthracene		M	2800	mg/kg	0.10		< 0.10			< 0.10	< 0.10	< 0.10	< 0.10
Fluoranthene		M	2800	mg/kg	0.10		< 0.10			< 0.10	< 0.10	< 0.10	< 0.10
Pyrene		M	2800	mg/kg	0.10		< 0.10			< 0.10	< 0.10	< 0.10	< 0.10
Benzo[a]anthracene		M	2800	mg/kg	0.10		< 0.10			< 0.10	< 0.10	< 0.10	< 0.10
Chrysene		M	2800	mg/kg	0.10		< 0.10			< 0.10	< 0.10	< 0.10	< 0.10
Benzo[b]fluoranthene		M	2800	mg/kg	0.10		< 0.10			< 0.10	< 0.10	< 0.10	< 0.10
Benzo[k]fluoranthene		M	2800	mg/kg	0.10		< 0.10			< 0.10	< 0.10	< 0.10	< 0.10
Benzo[a]pyrene		M	2800	mg/kg	0.10		< 0.10			< 0.10	< 0.10	< 0.10	< 0.10

Results - Soil

Project: 25387 Cashemartyr Cork

Client: IGSL						**Chemtest Job No.:**	24-21214	24-21214	24-21214	24-21214	24-21214	24-21214	24-21214	24-21214
Quotation No.:						**Chemtest Sample ID.:**	1830177	1830178	1830179	1830180	1830181	1830182	1830183	1830184
Order No.:						Client Sample Ref.:	BH04A	BH05	BH05	BH06	TP02	TP03	TP04	TP05
						Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
						Top Depth (m):	1.00	1.00	3.00	2.00	1.00	0.40	1.00	0.40
						Date Sampled:	02-Jul-2024	02-Jul-2024	02-Jul-2024	02-Jul-2024	02-Jul-2024	02-Jul-2024	02-Jul-2024	02-Jul-2024
						Asbestos Lab:		DURHAM			DURHAM	DURHAM	DURHAM	DURHAM
Determinand	**HWOL Code**	**Accred.**	**SOP**	**Units**	**LOD**									
Indeno(1,2,3-c,d)Pyrene		M	2800	mg/kg	0.10		< 0.10			< 0.10	< 0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene		N	2800	mg/kg	0.10		< 0.10			< 0.10	< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene		M	2800	mg/kg	0.10		< 0.10			< 0.10	< 0.10	< 0.10	< 0.10
Coronene		N	2800	mg/kg	0.10		< 0.10			< 0.10	< 0.10	< 0.10	< 0.10
PCB 28		U	2815	mg/kg	0.010		< 0.010			< 0.010	< 0.010	< 0.010	< 0.010
PCB 52		U	2815	mg/kg	0.010		< 0.010			< 0.010	< 0.010	< 0.010	< 0.010
PCB 101		U	2815	mg/kg	0.010		< 0.010			< 0.010	< 0.010	< 0.010	< 0.010
PCB 118		U	2815	mg/kg	0.010		< 0.010			< 0.010	< 0.010	< 0.010	< 0.010
PCB 153		U	2815	mg/kg	0.010		< 0.010			< 0.010	< 0.010	< 0.010	< 0.010
PCB 138		U	2815	mg/kg	0.010		< 0.010			< 0.010	< 0.010	< 0.010	< 0.010
PCB 180		U	2815	mg/kg	0.010		< 0.010			< 0.010	< 0.010	< 0.010	< 0.010
Total PCBs (7 Congeners)		N	2815	mg/kg	0.10		< 0.10			< 0.10	< 0.10	< 0.10	< 0.10
Total Phenols		M	2920	mg/kg	0.10		< 0.10			< 0.10	< 0.10	< 0.10	< 0.10

Results - Soil

Project: 25387 Cashemartyr Cork

Client: IGSL				**Chemtest Job No.:**		24-21214	24-21214	24-21214	24-21214	24-21214	24-21214	24-21214	24-21214
Quotation No.:				**Chemtest Sample ID.:**		1830185	1830186	1830187	1830188	1830189	1830190	1830191	1830192
Order No.:				Client Sample Ref.:		TP06	TP07	TP08	TP09	TP09	TP09	TP10	BH2A
				Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):		1.00	0.60	0.40	1.00	2.00	3.00	0.50	1.00
				Date Sampled:		02-Jul-2024	02-Jul-2024	02-Jul-2024	02-Jul-2024	02-Jul-2024	02-Jul-2024	02-Jul-2024	02-Jul-2024
				Asbestos Lab:		DURHAM	DURHAM	DURHAM	DURHAM	DURHAM		DURHAM	
Determinand	**HWOL Code**	**Accred.**	**SOP**	**Units**	**LOD**								
ACM Type		U	2192		N/A	-	-	-	-	-		-	
Asbestos Identification		U	2192		N/A	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected		No Asbestos Detected	
Moisture		N	2030	%	0.020	9.7	14	16	11	15	17	15	8.7
Soil Colour		N	2040		N/A	Brown	Brown	Brown	Brown	Brown	Brown	Brown	Brown
Other Material		N	2040		N/A	Stones	Stones	Stones and Roots	Stones and Roots	Stones and Roots	Stones	Stones and Roots	Stones
Soil Texture		N	2040		N/A	Clay	Clay	Clay	Loam	Clay	Clay	Clay	Gravel
pH (2.5:1) at 20C		N	2010		4.0						7.9		8.1
Boron (Hot Water Soluble)		M	2120	mg/kg	0.40	< 0.40	0.43	0.45	0.58	0.47		0.48	
Magnesium (Water Soluble)		N	2120	g/l	0.010						< 0.010		< 0.010
Sulphate (2:1 Water Soluble) as SO4		M	2120	g/l	0.010						0.089		< 0.010
Total Sulphur		U	2175	%	0.010						< 0.010		< 0.010
Sulphur (Elemental)		M	2180	mg/kg	1.0	1.1	< 1.0	39	1.0	6.5		4.4	
Chloride (Water Soluble)		M	2220	g/l	0.010						< 0.010		< 0.010
Nitrate (Water Soluble)		N	2220	g/l	0.010						< 0.010		0.023
Cyanide (Total)		M	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50		< 0.50	
Sulphide (Easily Liberatable)		N	2325	mg/kg	0.50	5.2	4.3	11	2.9	3.5		7.3	
Ammonium (Water Soluble)		M	2220	g/l	0.01						< 0.01		< 0.01
Sulphate (Total)		U	2430	%	0.010	< 0.010	< 0.010	0.031	0.032	0.093		0.076	
Sulphate (Acid Soluble)		U	2430	%	0.010						0.011		< 0.010
Arsenic		M	2455	mg/kg	0.5	0.9	< 0.5	< 0.5	< 0.5	< 0.5		< 0.5	
Barium		M	2455	mg/kg	0.5	46	23	33	55	47		33	
Cadmium		M	2455	mg/kg	0.10	< 0.10	< 0.10	0.10	0.26	0.20		< 0.10	
Chromium		M	2455	mg/kg	0.5	30	19	19	17	29		21	
Molybdenum		M	2455	mg/kg	0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5		< 0.5	
Antimony		N	2455	mg/kg	2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0		< 2.0	
Copper		M	2455	mg/kg	0.50	27	14	15	13	22		16	
Mercury		M	2455	mg/kg	0.05	< 0.05	< 0.05	0.05	< 0.05	0.07		0.05	
Nickel		M	2455	mg/kg	0.50	51	23	25	24	39		27	
Lead		M	2455	mg/kg	0.50	33	21	23	29	38		27	
Selenium		M	2455	mg/kg	0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25		< 0.25	
Zinc		M	2455	mg/kg	0.50	99	55	58	68	98		67	
Chromium (Trivalent)		N	2490	mg/kg	1.0	30	19	19	17	29		21	
Chromium (Hexavalent)		N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50		< 0.50	
Aliphatic VPH >C5-C6	HS_2D_AL	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05	
Aliphatic VPH >C6-C7	HS_2D_AL	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05	
Aliphatic VPH >C7-C8	HS_2D_AL	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05	
Aliphatic VPH >C8-C10	HS_2D_AL	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05	

Results - Soil

Project: 25387 Cashemartyr Cork

Client: IGSL				**Chemtest Job No.:**		24-21214	24-21214	24-21214	24-21214	24-21214	24-21214	24-21214	24-21214
Quotation No.:				**Chemtest Sample ID.:**		1830185	1830186	1830187	1830188	1830189	1830190	1830191	1830192
Order No.:				Client Sample Ref.:		TP06	TP07	TP08	TP09	TP09	TP09	TP10	BH2A
				Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):		1.00	0.60	0.40	1.00	2.00	3.00	0.50	1.00
				Date Sampled:		02-Jul-2024	02-Jul-2024	02-Jul-2024	02-Jul-2024	02-Jul-2024	02-Jul-2024	02-Jul-2024	02-Jul-2024
				Asbestos Lab:		DURHAM	DURHAM	DURHAM	DURHAM	DURHAM		DURHAM	
Determinand	**HWOL Code**	**Accred.**	**SOP**	**Units**	**LOD**								
Total Aliphatic VPH >C5-C10	HS_2D_AL	U	2780	mg/kg	0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25		< 0.25	
Aliphatic EPH >C10-C12 MC	EH_2D_AL_#1	M	2690	mg/kg	2.00	7.7	7.8	7.3	6.3	8.1		9.6	
Aliphatic EPH >C12-C16 MC	EH_2D_AL_#1	M	2690	mg/kg	1.00	2.1	< 1.0	1.4	1.3	1.9		4.3	
Aliphatic EPH >C16-C21 MC	EH_2D_AL_#1	M	2690	mg/kg	2.00	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0		2.6	
Aliphatic EPH >C21-C35 MC	EH_2D_AL_#1	M	2690	mg/kg	3.00	9.3	11	12	8.7	3.9		10	
Aliphatic EPH >C35-C40 MC	EH_2D_AL_#1	N	2690	mg/kg	10.00	11	14	15	16	14		19	
Total Aliphatic EPH >C10-C35 MC	EH_2D_AL_#1	M	2690	mg/kg	5.00	19	19	20	16	14		27	
Aromatic VPH >C5-C7	HS_2D_AR	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05	
Aromatic VPH >C7-C8	HS_2D_AR	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05	
Aromatic VPH >C8-C10	HS_2D_AR	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05	
Total Aromatic VPH >C5-C10	HS_2D_AR	U	2780	mg/kg	0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25		< 0.25	
Aromatic EPH >C10-C12 MC	EH_2D_AR_#1	U	2690	mg/kg	1.00	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0		< 1.0	
Aromatic EPH >C12-C16 MC	EH_2D_AR_#1	U	2690	mg/kg	1.00	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0		< 1.0	
Aromatic EPH >C16-C21 MC	EH_2D_AR_#1	U	2690	mg/kg	2.00	< 2.0	2.1	< 2.0	3.6	4.4		< 2.0	
Aromatic EPH >C21-C35 MC	EH_2D_AR_#1	U	2690	mg/kg	2.00	< 2.0	< 2.0	3.2	5.8	6.8		4.2	
Aromatic EPH >C35-C40 MC	EH_2D_AR_#1	N	2690	mg/kg	1.00	32	3.6	6.4	7.9	11		8.4	
Total Aromatic EPH >C10-C35 MC	EH_2D_AR_#1	U	2690	mg/kg	5.00	< 5.0	< 5.0	< 5.0	9.4	11		5.4	
Total VPH >C5-C10	HS_2D_Total	U	2780	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50		< 0.50	
Total EPH >C10-C35 MC	EH_2D_Total_#1	U	2690	mg/kg	10.00	21	21	25	26	25		32	
Mineral Oil EPH		N	2670	mg/kg	10	19	19	20	16	14		27	
Benzene		M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0		< 1.0	
Toluene		M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0		< 1.0	
Ethylbenzene		M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0		< 1.0	
m & p-Xylene		M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0		< 1.0	
o-Xylene		M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0		< 1.0	
Methyl Tert-Butyl Ether		M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0		< 1.0	
Naphthalene		M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		< 0.10	
Acenaphthylene		N	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		< 0.10	
Acenaphthene		M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		< 0.10	
Fluorene		M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		< 0.10	
Phenanthrene		M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	0.46	0.13		< 0.10	
Anthracene		M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	0.16	< 0.10		< 0.10	
Fluoranthene		M	2800	mg/kg	0.10	< 0.10	< 0.10	0.17	1.5	0.34		0.32	
Pyrene		M	2800	mg/kg	0.10	< 0.10	< 0.10	0.17	1.3	0.34		0.26	
Benzo[a]anthracene		M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	0.68	0.16		< 0.10	
Chrysene		M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	0.72	0.19		< 0.10	
Benzo[b]fluoranthene		M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	1.2	0.26		< 0.10	
Benzo[k]fluoranthene		M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	0.34	< 0.10		< 0.10	
Benzo[a]pyrene		M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	0.81	0.20		< 0.10	

Results - Soil

Project: 25387 Cashemartyr Cork

Client: IGSL				**Chemtest Job No.:**		24-21214	24-21214	24-21214	24-21214	24-21214	24-21214	24-21214	24-21214
Quotation No.:				**Chemtest Sample ID.:**		1830185	1830186	1830187	1830188	1830189	1830190	1830191	1830192
Order No.:				Client Sample Ref.:		TP06	TP07	TP08	TP09	TP09	TP09	TP10	BH2A
				Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):		1.00	0.60	0.40	1.00	2.00	3.00	0.50	1.00
				Date Sampled:		02-Jul-2024	02-Jul-2024	02-Jul-2024	02-Jul-2024	02-Jul-2024	02-Jul-2024	02-Jul-2024	02-Jul-2024
				Asbestos Lab:		DURHAM	DURHAM	DURHAM	DURHAM	DURHAM		DURHAM	
Determinand	**HWOL Code**	**Accred.**	**SOP**	**Units**	**LOD**								
Indeno(1,2,3-c,d)Pyrene		M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	0.65	0.15		< 0.10	
Dibenz(a,h)Anthracene		N	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	0.13	< 0.10		< 0.10	
Benzo[g,h,i]perylene		M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	0.63	0.13		< 0.10	
Coronene		N	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		< 0.10	
PCB 28		U	2815	mg/kg	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010		< 0.010	
PCB 52		U	2815	mg/kg	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010		< 0.010	
PCB 101		U	2815	mg/kg	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010		< 0.010	
PCB 118		U	2815	mg/kg	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010		< 0.010	
PCB 153		U	2815	mg/kg	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010		< 0.010	
PCB 138		U	2815	mg/kg	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010		< 0.010	
PCB 180		U	2815	mg/kg	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010		< 0.010	
Total PCBs (7 Congeners)		N	2815	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		< 0.10	
Total Phenols		M	2920	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		< 0.10	

Results - Soil

Project: 25387 Cashemartyr Cork

Client: IGSL				**Chemtest Job No.:**		24-21214
Quotation No.:				**Chemtest Sample ID.:**		1830193
Order No.:				Client Sample Ref.:		BH03
				Sample Type:		SOIL
				Top Depth (m):		2.00
				Date Sampled:		02-Jul-2024
				Asbestos Lab:		
Determinand	**HWOL Code**	**Accred.**	**SOP**	**Units**	**LOD**	
ACM Type		U	2192		N/A	
Asbestos Identification		U	2192		N/A	
Moisture		N	2030	%	0.020	15
Soil Colour		N	2040		N/A	Brown
Other Material		N	2040		N/A	Stones
Soil Texture		N	2040		N/A	Clay
pH (2.5:1) at 20C		N	2010		4.0	8.0
Boron (Hot Water Soluble)		M	2120	mg/kg	0.40	
Magnesium (Water Soluble)		N	2120	g/l	0.010	< 0.010
Sulphate (2:1 Water Soluble) as SO4		M	2120	g/l	0.010	0.016
Total Sulphur		U	2175	%	0.010	< 0.010
Sulphur (Elemental)		M	2180	mg/kg	1.0	
Chloride (Water Soluble)		M	2220	g/l	0.010	< 0.010
Nitrate (Water Soluble)		N	2220	g/l	0.010	0.011
Cyanide (Total)		M	2300	mg/kg	0.50	
Sulphide (Easily Liberatable)		N	2325	mg/kg	0.50	
Ammonium (Water Soluble)		M	2220	g/l	0.01	< 0.01
Sulphate (Total)		U	2430	%	0.010	
Sulphate (Acid Soluble)		U	2430	%	0.010	< 0.010
Arsenic		M	2455	mg/kg	0.5	
Barium		M	2455	mg/kg	0.5	
Cadmium		M	2455	mg/kg	0.10	
Chromium		M	2455	mg/kg	0.5	
Molybdenum		M	2455	mg/kg	0.5	
Antimony		N	2455	mg/kg	2.0	
Copper		M	2455	mg/kg	0.50	
Mercury		M	2455	mg/kg	0.05	
Nickel		M	2455	mg/kg	0.50	
Lead		M	2455	mg/kg	0.50	
Selenium		M	2455	mg/kg	0.25	
Zinc		M	2455	mg/kg	0.50	
Chromium (Trivalent)		N	2490	mg/kg	1.0	
Chromium (Hexavalent)		N	2490	mg/kg	0.50	
Aliphatic VPH >C5-C6	HS_2D_AL	U	2780	mg/kg	0.05	
Aliphatic VPH >C6-C7	HS_2D_AL	U	2780	mg/kg	0.05	
Aliphatic VPH >C7-C8	HS_2D_AL	U	2780	mg/kg	0.05	
Aliphatic VPH >C8-C10	HS_2D_AL	U	2780	mg/kg	0.05	

Results - Soil

Project: 25387 Cashemartyr Cork

Client: IGSL				**Chemtest Job No.:**		24-21214
Quotation No.:				**Chemtest Sample ID.:**		1830193
Order No.:				Client Sample Ref.:		BH03
				Sample Type:		SOIL
				Top Depth (m):		2.00
				Date Sampled:		02-Jul-2024
				Asbestos Lab:		
Determinand	**HWOL Code**	**Accred.**	**SOP**	**Units**	**LOD**	
Total Aliphatic VPH >C5-C10	HS_2D_AL	U	2780	mg/kg	0.25	
Aliphatic EPH >C10-C12 MC	EH_2D_AL_#1	M	2690	mg/kg	2.00	
Aliphatic EPH >C12-C16 MC	EH_2D_AL_#1	M	2690	mg/kg	1.00	
Aliphatic EPH >C16-C21 MC	EH_2D_AL_#1	M	2690	mg/kg	2.00	
Aliphatic EPH >C21-C35 MC	EH_2D_AL_#1	M	2690	mg/kg	3.00	
Aliphatic EPH >C35-C40 MC	EH_2D_AL_#1	N	2690	mg/kg	10.00	
Total Aliphatic EPH >C10-C35 MC	EH_2D_AL_#1	M	2690	mg/kg	5.00	
Aromatic VPH >C5-C7	HS_2D_AR	U	2780	mg/kg	0.05	
Aromatic VPH >C7-C8	HS_2D_AR	U	2780	mg/kg	0.05	
Aromatic VPH >C8-C10	HS_2D_AR	U	2780	mg/kg	0.05	
Total Aromatic VPH >C5-C10	HS_2D_AR	U	2780	mg/kg	0.25	
Aromatic EPH >C10-C12 MC	EH_2D_AR_#1	U	2690	mg/kg	1.00	
Aromatic EPH >C12-C16 MC	EH_2D_AR_#1	U	2690	mg/kg	1.00	
Aromatic EPH >C16-C21 MC	EH_2D_AR_#1	U	2690	mg/kg	2.00	
Aromatic EPH >C21-C35 MC	EH_2D_AR_#1	U	2690	mg/kg	2.00	
Aromatic EPH >C35-C40 MC	EH_2D_AR_#1	N	2690	mg/kg	1.00	
Total Aromatic EPH >C10-C35 MC	EH_2D_AR_#1	U	2690	mg/kg	5.00	
Total VPH >C5-C10	HS_2D_Total	U	2780	mg/kg	0.50	
Total EPH >C10-C35 MC	EH_2D_Total_#1	U	2690	mg/kg	10.00	
Mineral Oil EPH		N	2670	mg/kg	10	
Benzene		M	2760	µg/kg	1.0	
Toluene		M	2760	µg/kg	1.0	
Ethylbenzene		M	2760	µg/kg	1.0	
m & p-Xylene		M	2760	µg/kg	1.0	
o-Xylene		M	2760	µg/kg	1.0	
Methyl Tert-Butyl Ether		M	2760	µg/kg	1.0	
Naphthalene		M	2800	mg/kg	0.10	
Acenaphthylene		N	2800	mg/kg	0.10	
Acenaphthene		M	2800	mg/kg	0.10	
Fluorene		M	2800	mg/kg	0.10	
Phenanthrene		M	2800	mg/kg	0.10	
Anthracene		M	2800	mg/kg	0.10	
Fluoranthene		M	2800	mg/kg	0.10	
Pyrene		M	2800	mg/kg	0.10	
Benzo[a]anthracene		M	2800	mg/kg	0.10	
Chrysene		M	2800	mg/kg	0.10	
Benzo[b]fluoranthene		M	2800	mg/kg	0.10	
Benzo[k]fluoranthene		M	2800	mg/kg	0.10	
Benzo[a]pyrene		M	2800	mg/kg	0.10	

Results - Soil

Project: 25387 Cashemartyr Cork

Client: IGSL				**Chemtest Job No.:**		24-21214
Quotation No.:				**Chemtest Sample ID.:**		1830193
Order No.:				Client Sample Ref.:		BH03
				Sample Type:		SOIL
				Top Depth (m):		2.00
				Date Sampled:		02-Jul-2024
				Asbestos Lab:		
Determinand	**HWOL Code**	**Accred.**	**SOP**	**Units**	**LOD**	
Indeno(1,2,3-c,d)Pyrene		M	2800	mg/kg	0.10	
Dibenz(a,h)Anthracene		N	2800	mg/kg	0.10	
Benzo[g,h,i]perylene		M	2800	mg/kg	0.10	
Coronene		N	2800	mg/kg	0.10	
PCB 28		U	2815	mg/kg	0.010	
PCB 52		U	2815	mg/kg	0.010	
PCB 101		U	2815	mg/kg	0.010	
PCB 118		U	2815	mg/kg	0.010	
PCB 153		U	2815	mg/kg	0.010	
PCB 138		U	2815	mg/kg	0.010	
PCB 180		U	2815	mg/kg	0.010	
Total PCBs (7 Congeners)		N	2815	mg/kg	0.10	
Total Phenols		M	2920	mg/kg	0.10	

Results - Single Stage WAC

Project: 25387 Cashemartyr Cork

						Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	24-21214							
Chemtest Sample ID:	1830178							
Sample Ref:	BH05							
Sample ID:								
Sample Location:								
Top Depth(m):	1.00							
Bottom Depth(m):								
Sampling Date:	02-Jul-2024					**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Determinand	**SOP**	**HWOL Code**	**Accred.**	**Units**				
Total Organic Carbon	2625		M	%	1.4	3	5	6
Loss On Ignition	2610		M	%	3.7	--	--	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	EH_CU_1D_Total	M	mg/kg	< 10	500	--	--
Total Of 17 PAHs Lower	2800		N	mg/kg	< 1.0	100	--	--
pH at 20C	2010		M		8.4	--	>6	--
Acid Neutralisation Capacity	2015		N	mol/kg	0.011	--	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	0.0006	0.0064	0.5	2	25
Barium	1455		U	0.008	0.076	20	100	300
Cadmium	1455		U	< 0.00011	< 0.0011	0.04	1	5
Chromium	1455		U	0.0009	0.0086	0.5	10	70
Copper	1455		U	0.0024	0.024	2	50	100
Mercury	1455		U	< 0.00005	< 0.00050	0.01	0.2	2
Molybdenum	1455		U	0.0013	0.013	0.5	10	30
Nickel	1455		U	0.0016	0.016	0.4	10	40
Lead	1455		U	< 0.0005	< 0.0050	0.5	10	50
Antimony	1455		U	< 0.0005	< 0.0050	0.06	0.7	5
Selenium	1455		U	< 0.0005	< 0.0050	0.1	0.5	7
Zinc	1455		U	0.008	0.080	4	50	200
Chloride	1220		U	2.3	23	800	15000	25000
Fluoride	1220		U	0.20	2.0	10	150	500
Sulphate	1220		U	61	610	1000	20000	50000
Total Dissolved Solids	1020		N	150	1500	4000	60000	100000
Phenol Index	1920		U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610		U	5.0	< 50	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	18

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: 25387 Cashemartyr Cork

						Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	24-21214							
Chemtest Sample ID:	1830181							
Sample Ref:	TP02							
Sample ID:								
Sample Location:								
Top Depth(m):	1.00							
Bottom Depth(m):								
Sampling Date:	02-Jul-2024							
Determinand	**SOP**	**HWOL Code**	**Accred.**	**Units**		**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625		M	%	< 0.20	3	5	6
Loss On Ignition	2610		M	%	1.9	--	--	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	EH_CU_1D_Total	M	mg/kg	< 10	500	--	--
Total Of 17 PAHs Lower	2800		N	mg/kg	< 1.0	100	--	--
pH at 20C	2010		M		8.5	--	>6	--
Acid Neutralisation Capacity	2015		N	mol/kg	0.0070	--	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	0.0004	0.0044	0.5	2	25
Barium	1455		U	< 0.005	< 0.050	20	100	300
Cadmium	1455		U	< 0.00011	< 0.0011	0.04	1	5
Chromium	1455		U	0.0010	0.0099	0.5	10	70
Copper	1455		U	0.0012	0.012	2	50	100
Mercury	1455		U	< 0.00005	< 0.00050	0.01	0.2	2
Molybdenum	1455		U	0.0003	0.0034	0.5	10	30
Nickel	1455		U	0.0009	0.0093	0.4	10	40
Lead	1455		U	0.0006	0.0055	0.5	10	50
Antimony	1455		U	< 0.0005	< 0.0050	0.06	0.7	5
Selenium	1455		U	0.0008	0.0083	0.1	0.5	7
Zinc	1455		U	0.007	0.067	4	50	200
Chloride	1220		U	2.0	20	800	15000	25000
Fluoride	1220		U	0.14	1.4	10	150	500
Sulphate	1220		U	1.2	12	1000	20000	50000
Total Dissolved Solids	1020		N	31	310	4000	60000	100000
Phenol Index	1920		U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610		U	4.1	< 50	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	14

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: 25387 Cashemartyr Cork

						Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	24-21214							
Chemtest Sample ID:	1830182							
Sample Ref:	TP03							
Sample ID:								
Sample Location:								
Top Depth(m):	0.40							
Bottom Depth(m):								
Sampling Date:	02-Jul-2024							
Determinand	**SOP**	**HWOL Code**	**Accred.**	**Units**		**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625		M	%	< 0.20	3	5	6
Loss On Ignition	2610		M	%	2.7	--	--	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	EH_CU_1D_Total	M	mg/kg	< 10	500	--	--
Total Of 17 PAHs Lower	2800		N	mg/kg	< 1.0	100	--	--
pH at 20C	2010		M		8.6	--	>6	--
Acid Neutralisation Capacity	2015		N	mol/kg	0.0070	--	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	0.0005	0.0046	0.5	2	25
Barium	1455		U	< 0.005	< 0.050	20	100	300
Cadmium	1455		U	< 0.00011	< 0.0011	0.04	1	5
Chromium	1455		U	0.0006	0.0061	0.5	10	70
Copper	1455		U	0.0013	0.013	2	50	100
Mercury	1455		U	< 0.00005	< 0.00050	0.01	0.2	2
Molybdenum	1455		U	0.0006	0.0055	0.5	10	30
Nickel	1455		U	0.0010	0.0095	0.4	10	40
Lead	1455		U	< 0.0005	< 0.0050	0.5	10	50
Antimony	1455		U	< 0.0005	< 0.0050	0.06	0.7	5
Selenium	1455		U	< 0.0005	< 0.0050	0.1	0.5	7
Zinc	1455		U	0.017	0.17	4	50	200
Chloride	1220		U	< 1.0	< 10	800	15000	25000
Fluoride	1220		U	0.20	2.0	10	150	500
Sulphate	1220		U	< 1.0	< 10	1000	20000	50000
Total Dissolved Solids	1020		N	41	410	4000	60000	100000
Phenol Index	1920		U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610		U	3.4	< 50	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	12

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: 25387 Cashemartyr Cork

						Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	24-21214							
Chemtest Sample ID:	1830183							
Sample Ref:	TP04							
Sample ID:								
Sample Location:								
Top Depth(m):	1.00							
Bottom Depth(m):								
Sampling Date:	02-Jul-2024					**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Determinand	**SOP**	**HWOL Code**	**Accred.**	**Units**				
Total Organic Carbon	2625		M	%	< 0.20	3	5	6
Loss On Ignition	2610		M	%	1.8	--	--	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	EH_CU_1D_Total	M	mg/kg	< 10	500	--	--
Total Of 17 PAHs Lower	2800		N	mg/kg	< 1.0	100	--	--
pH at 20C	2010		M		8.1	--	>6	--
Acid Neutralisation Capacity	2015		N	mol/kg	0.0060	--	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	< 0.0002	< 0.0020	0.5	2	25
Barium	1455		U	< 0.005	< 0.050	20	100	300
Cadmium	1455		U	< 0.00011	< 0.0011	0.04	1	5
Chromium	1455		U	0.0008	0.0075	0.5	10	70
Copper	1455		U	< 0.0005	< 0.0050	2	50	100
Mercury	1455		U	< 0.00005	< 0.00050	0.01	0.2	2
Molybdenum	1455		U	0.0003	0.0028	0.5	10	30
Nickel	1455		U	< 0.0005	< 0.0050	0.4	10	40
Lead	1455		U	< 0.0005	< 0.0050	0.5	10	50
Antimony	1455		U	< 0.0005	< 0.0050	0.06	0.7	5
Selenium	1455		U	< 0.0005	< 0.0050	0.1	0.5	7
Zinc	1455		U	0.004	0.040	4	50	200
Chloride	1220		U	< 1.0	< 10	800	15000	25000
Fluoride	1220		U	0.13	1.3	10	150	500
Sulphate	1220		U	< 1.0	< 10	1000	20000	50000
Total Dissolved Solids	1020		N	26	260	4000	60000	100000
Phenol Index	1920		U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610		U	< 2.5	< 50	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	9.7

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: 25387 Cashemartyr Cork

						Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	24-21214							
Chemtest Sample ID:	1830184							
Sample Ref:	TP05							
Sample ID:								
Sample Location:								
Top Depth(m):	0.40							
Bottom Depth(m):								
Sampling Date:	02-Jul-2024							
Determinand	**SOP**	**HWOL Code**	**Accred.**	**Units**		**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625		M	%	0.36	3	5	6
Loss On Ignition	2610		M	%	1.8	--	--	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	EH_CU_1D_Total	M	mg/kg	< 10	500	--	--
Total Of 17 PAHs Lower	2800		N	mg/kg	< 1.0	100	--	--
pH at 20C	2010		M		8.2	--	>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	0.0006	0.0057	0.5	2	25
Barium	1455		U	< 0.005	< 0.050	20	100	300
Cadmium	1455		U	< 0.00011	< 0.0011	0.04	1	5
Chromium	1455		U	0.0008	0.0076	0.5	10	70
Copper	1455		U	0.0009	0.0091	2	50	100
Mercury	1455		U	< 0.00005	< 0.00050	0.01	0.2	2
Molybdenum	1455		U	0.0005	0.0053	0.5	10	30
Nickel	1455		U	< 0.0005	< 0.0050	0.4	10	40
Lead	1455		U	< 0.0005	< 0.0050	0.5	10	50
Antimony	1455		U	< 0.0005	< 0.0050	0.06	0.7	5
Selenium	1455		U	< 0.0005	< 0.0050	0.1	0.5	7
Zinc	1455		U	0.012	0.12	4	50	200
Chloride	1220		U	< 1.0	< 10	800	15000	25000
Fluoride	1220		U	0.29	2.9	10	150	500
Sulphate	1220		U	< 1.0	< 10	1000	20000	50000
Total Dissolved Solids	1020		N	39	390	4000	60000	100000
Phenol Index	1920		U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610		U	3.0	< 50	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	16

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: 25387 Cashemartyr Cork

						Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	24-21214							
Chemtest Sample ID:	1830185							
Sample Ref:	TP06							
Sample ID:								
Sample Location:								
Top Depth(m):	1.00							
Bottom Depth(m):								
Sampling Date:	02-Jul-2024							
Determinand	**SOP**	**HWOL Code**	**Accred.**	**Units**		**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625		M	%	0.26	3	5	6
Loss On Ignition	2610		M	%	2.0	--	--	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	EH_CU_1D_Total	M	mg/kg	< 10	500	--	--
Total Of 17 PAHs Lower	2800		N	mg/kg	< 1.0	100	--	--
pH at 20C	2010		M		8.3	--	>6	--
Acid Neutralisation Capacity	2015		N	mol/kg	0.0060	--	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	0.0030	0.5	2	25
Barium	1455		U	< 0.005	< 0.050	20	100	300
Cadmium	1455		U	< 0.00011	< 0.0011	0.04	1	5
Chromium	1455		U	0.0012	0.012	0.5	10	70
Copper	1455		U	< 0.0005	< 0.0050	2	50	100
Mercury	1455		U	< 0.00005	< 0.00050	0.01	0.2	2
Molybdenum	1455		U	< 0.0002	< 0.0020	0.5	10	30
Nickel	1455		U	0.0009	0.0092	0.4	10	40
Lead	1455		U	< 0.0005	< 0.0050	0.5	10	50
Antimony	1455		U	< 0.0005	< 0.0050	0.06	0.7	5
Selenium	1455		U	< 0.0005	< 0.0050	0.1	0.5	7
Zinc	1455		U	0.007	0.068	4	50	200
Chloride	1220		U	< 1.0	< 10	800	15000	25000
Fluoride	1220		U	0.12	1.2	10	150	500
Sulphate	1220		U	< 1.0	< 10	1000	20000	50000
Total Dissolved Solids	1020		N	18	180	4000	60000	100000
Phenol Index	1920		U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610		U	5.8	58	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	9.7

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: 25387 Cashemartyr Cork

						Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	24-21214							
Chemtest Sample ID:	1830186							
Sample Ref:	TP07							
Sample ID:								
Sample Location:								
Top Depth(m):	0.60							
Bottom Depth(m):								
Sampling Date:	02-Jul-2024							
Determinand	**SOP**	**HWOL Code**	**Accred.**	**Units**		**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625		M	%	0.60	3	5	6
Loss On Ignition	2610		M	%	1.5	--	--	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	EH_CU_1D_Total	M	mg/kg	< 10	500	--	--
Total Of 17 PAHs Lower	2800		N	mg/kg	< 1.0	100	--	--
pH at 20C	2010		M		7.8	--	>6	--
Acid Neutralisation Capacity	2015		N	mol/kg	0.0070	--	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	< 0.0002	< 0.0020	0.5	2	25
Barium	1455		U	< 0.005	< 0.050	20	100	300
Cadmium	1455		U	< 0.00011	< 0.0011	0.04	1	5
Chromium	1455		U	0.0036	0.036	0.5	10	70
Copper	1455		U	0.0005	0.0051	2	50	100
Mercury	1455		U	< 0.00005	< 0.00050	0.01	0.2	2
Molybdenum	1455		U	< 0.0002	< 0.0020	0.5	10	30
Nickel	1455		U	0.0036	0.036	0.4	10	40
Lead	1455		U	< 0.0005	< 0.0050	0.5	10	50
Antimony	1455		U	0.0010	0.0095	0.06	0.7	5
Selenium	1455		U	< 0.0005	< 0.0050	0.1	0.5	7
Zinc	1455		U	0.004	0.040	4	50	200
Chloride	1220		U	< 1.0	< 10	800	15000	25000
Fluoride	1220		U	0.11	1.1	10	150	500
Sulphate	1220		U	2.2	22	1000	20000	50000
Total Dissolved Solids	1020		N	22	220	4000	60000	100000
Phenol Index	1920		U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610		U	< 2.5	< 50	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	14

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: 25387 Cashemartyr Cork

						Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	24-21214							
Chemtest Sample ID:	1830187							
Sample Ref:	TP08							
Sample ID:								
Sample Location:								
Top Depth(m):	0.40							
Bottom Depth(m):								
Sampling Date:	02-Jul-2024					**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Determinand	**SOP**	**HWOL Code**	**Accred.**	**Units**				
Total Organic Carbon	2625		M	%	0.55	3	5	6
Loss On Ignition	2610		M	%	2.4	--	--	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	EH_CU_1D_Total	M	mg/kg	< 10	500	--	--
Total Of 17 PAHs Lower	2800		N	mg/kg	< 1.0	100	--	--
pH at 20C	2010		M		8.0	--	>6	--
Acid Neutralisation Capacity	2015		N	mol/kg	0.0050	--	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	0.0011	0.011	0.5	2	25
Barium	1455		U	< 0.005	< 0.050	20	100	300
Cadmium	1455		U	< 0.00011	< 0.0011	0.04	1	5
Chromium	1455		U	0.0010	0.010	0.5	10	70
Copper	1455		U	0.0022	0.022	2	50	100
Mercury	1455		U	< 0.00005	< 0.00050	0.01	0.2	2
Molybdenum	1455		U	0.0013	0.013	0.5	10	30
Nickel	1455		U	0.0009	0.0087	0.4	10	40
Lead	1455		U	< 0.0005	< 0.0050	0.5	10	50
Antimony	1455		U	0.0007	0.0072	0.06	0.7	5
Selenium	1455		U	0.0006	0.0061	0.1	0.5	7
Zinc	1455		U	0.004	0.043	4	50	200
Chloride	1220		U	< 1.0	< 10	800	15000	25000
Fluoride	1220		U	0.19	1.9	10	150	500
Sulphate	1220		U	23	230	1000	20000	50000
Total Dissolved Solids	1020		N	87	870	4000	60000	100000
Phenol Index	1920		U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610		U	4.8	< 50	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	16

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: 25387 Cashemartyr Cork

						Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	24-21214							
Chemtest Sample ID:	1830188							
Sample Ref:	TP09							
Sample ID:								
Sample Location:								
Top Depth(m):	1.00							
Bottom Depth(m):								
Sampling Date:	02-Jul-2024					**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Determinand	**SOP**	**HWOL Code**	**Accred.**	**Units**				
Total Organic Carbon	2625		M	%	1.3	3	5	6
Loss On Ignition	2610		M	%	2.5	--	--	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	EH_CU_1D_Total	M	mg/kg	340	500	--	--
Total Of 17 PAHs Lower	2800		N	mg/kg	8.6	100	--	--
pH at 20C	2010		M		8.1	--	>6	--
Acid Neutralisation Capacity	2015		N	mol/kg	0.0070	--	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	0.0013	0.013	0.5	2	25
Barium	1455		U	0.006	0.060	20	100	300
Cadmium	1455		U	< 0.00011	< 0.0011	0.04	1	5
Chromium	1455		U	0.0010	0.010	0.5	10	70
Copper	1455		U	0.0024	0.024	2	50	100
Mercury	1455		U	< 0.00005	< 0.00050	0.01	0.2	2
Molybdenum	1455		U	0.0013	0.013	0.5	10	30
Nickel	1455		U	< 0.0005	< 0.0050	0.4	10	40
Lead	1455		U	< 0.0005	< 0.0050	0.5	10	50
Antimony	1455		U	< 0.0005	< 0.0050	0.06	0.7	5
Selenium	1455		U	< 0.0005	< 0.0050	0.1	0.5	7
Zinc	1455		U	0.004	0.045	4	50	200
Chloride	1220		U	< 1.0	< 10	800	15000	25000
Fluoride	1220		U	0.12	1.2	10	150	500
Sulphate	1220		U	2.2	22	1000	20000	50000
Total Dissolved Solids	1020		N	58	580	4000	60000	100000
Phenol Index	1920		U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610		U	5.2	52	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	11

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: 25387 Cashemartyr Cork

						Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	24-21214							
Chemtest Sample ID:	1830189							
Sample Ref:	TP09							
Sample ID:								
Sample Location:								
Top Depth(m):	2.00							
Bottom Depth(m):								
Sampling Date:	02-Jul-2024					**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Determinand	**SOP**	**HWOL Code**	**Accred.**	**Units**				
Total Organic Carbon	2625		M	%	0.72	3	5	6
Loss On Ignition	2610		M	%	2.7	--	--	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	EH_CU_1D_Total	M	mg/kg	< 10	500	--	--
Total Of 17 PAHs Lower	2800		N	mg/kg	1.9	100	--	--
pH at 20C	2010		M		8.2	--	>6	--
Acid Neutralisation Capacity	2015		N	mol/kg	0.0090	--	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	0.0005	0.0049	0.5	2	25
Barium	1455		U	< 0.005	< 0.050	20	100	300
Cadmium	1455		U	< 0.00011	< 0.0011	0.04	1	5
Chromium	1455		U	0.0013	0.013	0.5	10	70
Copper	1455		U	0.0021	0.022	2	50	100
Mercury	1455		U	< 0.00005	< 0.00050	0.01	0.2	2
Molybdenum	1455		U	0.0011	0.011	0.5	10	30
Nickel	1455		U	0.0011	0.011	0.4	10	40
Lead	1455		U	< 0.0005	< 0.0050	0.5	10	50
Antimony	1455		U	< 0.0005	< 0.0050	0.06	0.7	5
Selenium	1455		U	< 0.0005	< 0.0050	0.1	0.5	7
Zinc	1455		U	0.007	0.074	4	50	200
Chloride	1220		U	< 1.0	< 10	800	15000	25000
Fluoride	1220		U	0.18	1.8	10	150	500
Sulphate	1220		U	38	380	1000	20000	50000
Total Dissolved Solids	1020		N	120	1200	4000	60000	100000
Phenol Index	1920		U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610		U	4.0	< 50	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	15

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: 25387 Cashemartyr Cork

						Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	24-21214							
Chemtest Sample ID:	1830191							
Sample Ref:	TP10							
Sample ID:								
Sample Location:								
Top Depth(m):	0.50							
Bottom Depth(m):								
Sampling Date:	02-Jul-2024					**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Determinand	**SOP**	**HWOL Code**	**Accred.**	**Units**				
Total Organic Carbon	2625		M	%	0.89	3	5	6
Loss On Ignition	2610		M	%	2.7	--	--	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	EH_CU_1D_Total	M	mg/kg	1700	500	--	--
Total Of 17 PAHs Lower	2800		N	mg/kg	< 1.0	100	--	--
pH at 20C	2010		M		8.3	--	>6	--
Acid Neutralisation Capacity	2015		N	mol/kg	0.0070	--	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	0.0007	0.0071	0.5	2	25
Barium	1455		U	< 0.005	< 0.050	20	100	300
Cadmium	1455		U	< 0.00011	< 0.0011	0.04	1	5
Chromium	1455		U	0.0009	0.0095	0.5	10	70
Copper	1455		U	0.0023	0.023	2	50	100
Mercury	1455		U	< 0.00005	< 0.00050	0.01	0.2	2
Molybdenum	1455		U	0.0009	0.0094	0.5	10	30
Nickel	1455		U	0.0009	0.0087	0.4	10	40
Lead	1455		U	< 0.0005	< 0.0050	0.5	10	50
Antimony	1455		U	< 0.0005	< 0.0050	0.06	0.7	5
Selenium	1455		U	< 0.0005	< 0.0050	0.1	0.5	7
Zinc	1455		U	0.006	0.058	4	50	200
Chloride	1220		U	< 1.0	< 10	800	15000	25000
Fluoride	1220		U	0.17	1.7	10	150	500
Sulphate	1220		U	29	290	1000	20000	50000
Total Dissolved Solids	1020		N	89	880	4000	60000	100000
Phenol Index	1920		U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610		U	4.9	< 50	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	15

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	Water Accred.
1010	pH Value of Waters	pH at 20°C	pH Meter	
1020	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Electrical Conductivity at 25°C 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 at 20°C	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 <30°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	
2175	Total Sulphur in Soils	Total Sulphur	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.	
2180	Sulphur (Elemental) in Soils by HPLC	Sulphur	Dichloromethane extraction / HPLC with UV detection	
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry	
2220	Water soluble Chloride in Soils	Chloride	Aqueous extraction and measuremernt by 'Aquakem 600' Discrete Analyser using ferric nitrate / mercuric thiocyanate.	
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.	
2455	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	

Test Methods

SOP	Title	Parameters included	Method summary	Water Accred.
2690	EPH A/A Split	Aliphatics: >C10–C12, >C12–C16, >C16–C21, >C21– C35, >C35– C40 Aromatics: >C10–C12, >C12–C16, >C16–C21, >C21– C35, >C35– C40	Acetone/Heptane extraction / GCxGC FID detection	
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.	
2780	VPH A/A Split	Aliphatics: >C5–C6, >C6–C7,>C7–C8,>C8-C10 Aromatics: >C5–C7,>C7-C8,>C8–C10	Water extraction / Headspace GCxGC FID detection	
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. Reported PCB 101 results may contain contributions from PCB 90 due to inseparable chromatography.	
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

This report shall not be reproduced except in full, and only with the prior approval of the laboratory.
Any comments or interpretations are outside the scope of UKAS accreditation.
The Laboratory is not accredited for any sampling activities and reported results relate to the samples 'as received' at the laboratory.
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 EPH, VPH, TPH, BTEX, VOCs, SVOCs, PCBs, Phenols.

For all other tests the samples were dried at ≤ 30°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 30 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.

Water Sample Category Key for Accreditation

DW - Drinking Water
GW - Ground Water
LE - Land Leachate
NA - Not Applicable

Report Information

PL - Prepared Leachate
PW - Processed Water
RE - Recreational Water
SA - Saline Water
SW - Surface Water
TE - Treated Effluent
TS - Treated Sewage
UL - Unspecified Liquid

Clean Up Codes

NC - No Clean Up
MC - Mathematical Clean Up
FC - Florisil Clean Up

HWOL Acronym System

HS - Headspace analysis
EH - Extractable hydrocarbons – i.e. everything extracted by the solvent
CU - Clean-up – e.g. by Florisil, silica gel
1D - GC – Single coil gas chromatography
Total - Aliphatics & Aromatics
AL - Aliphatics only
AR - Aromatic only
2D - GC-GC – Double coil gas chromatography
#1 - EH_2D_Total but with humics mathematically subtracted
#2 - EH_2D_Total but with fatty acids mathematically subtracted
+ - Operator to indicate cumulative e.g. EH+EH_Total or EH_CU+HS_Total

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

Appendix 8

O'Callaghan Moran Waste Characterisation Assessment

Unit 15
Melbourne Business Park
Model Farm Road
Cork T12 WR89

T: 021 434 5366
E:admin@ocallaghanmoran.com
www.ocallaghanmoran.com

Waste Characterisation Assessment

Gortnahomna More

Castlemartyr

County Cork

Prepared For: -

IGSL Limited
Unit F
M7 Business Park
Naas
County Kildare

Prepared By: -

O'Callaghan Moran & Associates
Unit 15 Melbourne Business Park
Model Farm Road
Cork

July 2024

Project	Waste Characterisation: Castlemartyr, Co. Cork			
Client	IGSL Limited			
Report No	Date	Status	Prepared By	Reviewed By
240013901	30/07/2024	Final	Austin Hynes PGeo MSc	Sean Moran B.Sc. MSc

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APPENDIX 2 - Laboratory Results

APPENDIX 3 - Waste Classification Report

1 INTRODUCTION

IGSL Limited requested O'Callaghan Moran & Associates (OCM) to undertake a waste characterisation assessment of eleven (11 No.) samples of made ground and natural ground collected from nine (9 No.) trial pits and one (1 No.) cable percussion borehole from a site at Gortnahomna More, Castlemartyr, County Cork.

1.1 Methodology

IGSL provided a description of the ground conditions and collected samples of the soils from the borehole and trial pit locations. The samples were analysed at an accredited laboratory and the results formed the basis for a waste classification assessment, which was undertaken by OCM in accordance with the Environmental Protection Agency (EPA) Guidelines on the Classification of Waste (2015).

2 WASTE CLASSIFICATION ASSESSMENT

2.1 Soil Sampling and Laboratory Analysis

2.1.1 *Site Investigation*

The site investigation was undertaken in June 2024 and included the collection of eleven (11 No.) samples of made ground and natural ground collected from nine (9 No.) trial pits and one (1 No.) cable percussion borehole. The location of the samples is shown on Drawing No. 2411-DOB-XX-SI-SK-C-0001. The logs are in Appendix 1.

There is Topsoil at the surface of all locations with the exception TP08 and TP10 which have Made Ground at the surface.

The subsurface of BH05 comprises Made Ground underlain by Natural Ground. The Made Ground is composed of brown, gravelly CLAY to 2.30 mbgl. This is underlain by Natural Ground comprising soft, slightly gravelly CLAY to 3.40 mbgl. Loose to medium dense, silty slightly sandy GRAVEL was encountered to 6.80 mbgl.

Made Ground was also encountered at TP08, TP09 and TP10. The Made Ground is composed of sandy gravelly CLAY and extends to 1.80 mbgl (TP08), 2.70 mbgl (TP09) and 1.10 mbgl (TP10).

Non-natural material including rare fragments of plastic, fabric, concrete, rubber, metal and bitumen <2% of the soil matrix were encountered in TP08 and TP09.

A hydrocarbon odour was noted in TP09 between 0.20-1.20 mbgl.

At TP01, Natural Ground composed of medium dense, clayey gravelly SAND was encountered to 2.20 mbgl. This is underlain by stiff, sandy gravelly SILT to 3.00 mbgl.

At TP02, medium dense, clayey gravelly SAND was encountered to 3.00 mbgl.

At all other locations, the subsurface is composed of Natural Ground comprising firm to stiff, sandy gravelly CLAY to between 2.50-3.00 mbgl.

2.1.2 *Sample Collection*

IGSL collected the samples and placed them in laboratory prepared containers that were stored in coolers prior to shipment to Chemtest Ltd.

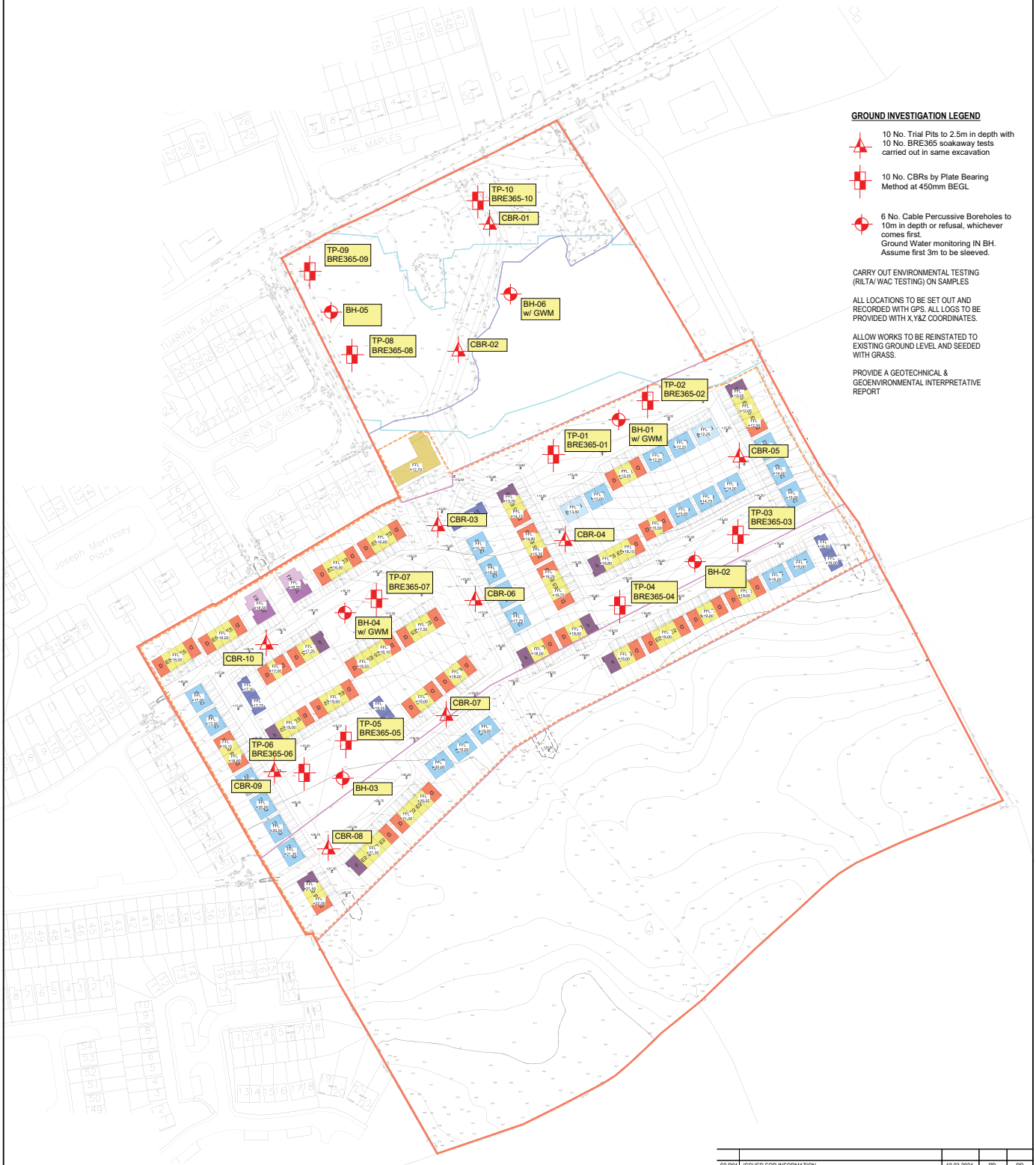
2.1.3 *Laboratory Analysis*

The samples were tested for, metals (arsenic, barium, cadmium, chromium, copper, mercury, molybdenum, nickel, lead, antimony, selenium and zinc, total organic carbon (TOC), BTEX (benzene, toluene, ethylbenzene and xylene) aliphatic and aromatic hydrocarbons, polychlorinated biphenyls (PCB), mineral oil, polyaromatic hydrocarbons (PAH) and asbestos. Leachate generated from the samples was tested for arsenic, barium, cadmium, chromium, copper, mercury, molybdenum, nickel, lead, antimony, selenium and zinc, chloride, fluoride, soluble sulphate, phenols, dissolved organic carbon (DOC), total dissolved solids (TDS).

This parameter range facilitates an assessment of the hazardous properties of the waste, and also allows a determination of appropriate off-site management options based on the Waste Acceptance Criteria (WAC) applied by landfill operators.

The analytical methods were all ISO/CEN approved and the method detection limits were below the relevant guidance/threshold values. The full laboratory report is in Appendix 2.

DO NOT SCALE: CONTRACTOR TO CHECK ALL DIMENSIONS AND REPORT ANY ERRORS OR OMISSIONS



GROUND INVESTIGATION LEGEND

10 No. Trial Pits to 2.5m in depth with 10 No. BRE365 soakaway tests carried out in same excavation

10 No. CBRs by Plate Bearing Method at 450mm BEGL

6 No. Cable Percussive Boreholes to 10m in depth or refusal, whichever comes first.
Ground Water monitoring IN BH.
Assume first 3m to be sleeved.

CARRY OUT ENVIRONMENTAL TESTING (RILTA/ WAC TESTING) ON SAMPLES

ALL LOCATIONS TO BE SET OUT AND RECORDED WITH GPS. ALL LOGS TO BE PROVIDED WITH X,Y&Z COORDINATES.

ALLOW WORKS TO BE REINSTATED TO EXISTING GROUND LEVEL AND SEEDED WITH GRASS.

PROVIDE A GEOTECHNICAL & GEOENVIRONMENTAL INTERPRETATIVE REPORT

Rev.	Note	Date	Drawn	Check
S2.P01	ISSUED FOR INFORMATION	12.03.2024	PD	PD

DONNACHADH O'BRIEN & ASSOCIATES CONSULTING ENGINEERS

Client:	MARSHALL YARDS DEVELOPMENT COMPANY LIMITED
Architect:	DEADY GAHAN ARCHITECTS
Project:	LANDS AT GORTNAHOMNA MORE, CASTLEMARTYR, Co. CORK
Drawing Title:	PROPOSED GROUND INVESTIGATIONS

Drawn By:	Checked By:	Approved By:	Date:	Scale:	Sheet Size:
PD	PD	DOB	MAR '23	1:100	A1

Project Number:	Drawing Number:	Revision Number:
DOBA2411	2411-DOB-XX-SI-SK-C-0001	S2.P01

2.2 Waste Classification

The Haz Waste Online Classification Engine, developed in the UK by One Touch Data Ltd, was used to determine the waste classification. This tool was developed specifically to establish whether waste is non-hazardous or hazardous and has been approved for use in Ireland by the Environmental Protection Agency. The full Waste Classification Report is in Appendix 3 and the results are summarised in Table 2.1.

Table 2.1 Waste Classification

Sample No.	Depth	Classification	LoW Code
BH05	1.00	Non-Hazardous	17 05 04
TP02	1.00	Non-Hazardous	17 05 04
TP03	0.40	Non-Hazardous	17 05 04
TP04	1.00	Non-Hazardous	17 05 04
TP05	0.40	Non-Hazardous	17 05 04
TP06	1.00	Non-Hazardous	17 05 04
TP07	0.60	Non-Hazardous	17 05 04
TP08	0.40	Non-Hazardous	17 05 04
TP09	1.00	Non-Hazardous	17 05 04
TP09	2.00	Non-Hazardous	17 05 04
TP10	0.50	Non-Hazardous	17 05 04

Asbestos was not detected in any of the samples tested.

All samples are classified as non-hazardous and the appropriate List of Waste Code is 17 05 04 (Soil and Stone other than those mentioned in 17 05 03*).

2.3 Waste Acceptance Criteria

The results of the WAC testing are presented in Table 2.2, which includes for comparative purposes the WAC for Inert, Non Hazardous and Hazardous Waste Landfills pursuant to Article 16 of the EU Landfill Directive 1999/31/EC Annex II which establishes criteria and procedures for the acceptance of waste at landfills.

All samples meet the inert WAC.

Table 2.2 WAC Results

Parameter	Unit	BH05	TP02	TP03	TP04	TP05	TP06	TP07	TP08	TP09	TP09	TP10	Inert Landfill	Inert Landfill Increased Limits	Non-Hazardous Landfill	Hazardous Landfill
Depth	**m**	**1.00**	**1.00**	**0.40**	**1.00**	**0.40**	**1.00**	**0.60**	**0.40**	**1.00**	**2.00**	**0.50**				
Antimony	mg/kg	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	0.0095	0.0072	< 0.0050	< 0.0050	< 0.0050	0.06	0.18	0.7	5
Arsenic	mg/kg	0.0064	0.0044	0.0046	< 0.0020	0.0057	0.0030	< 0.0020	0.011	0.013	0.0049	0.0071	0.5	1.5	2	25
Barium	mg/kg	0.076	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	0.060	< 0.050	< 0.050	20	20	100	300
Cadmium	mg/kg	< 0.0011	< 0.0011	< 0.0011	< 0.0011	< 0.0011	< 0.0011	< 0.0011	< 0.0011	< 0.0011	< 0.0011	< 0.0011	0.04	0.04	1	5
Chromium	mg/kg	0.0086	0.0099	0.0061	0.0075	0.0076	0.012	0.036	0.010	0.010	0.013	0.0095	0.5	0.5	10	70
Copper	mg/kg	0.024	0.012	0.013	< 0.0050	0.0091	< 0.0050	0.0051	0.022	0.024	0.022	0.023	2	2	50	100
Lead	mg/kg	< 0.0050	0.0055	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	0.5	0.5	10	50
Molybdenum	mg/kg	0.013	0.0034	0.0055	0.0028	0.0053	< 0.0020	< 0.0020	0.013	0.013	0.011	0.0094	0.5	1.5	10	30
Nickel	mg/kg	0.016	0.0093	0.0095	< 0.0050	< 0.0050	0.0092	0.036	0.0087	< 0.0050	0.011	0.0087	0.4	0.4	10	40
Selenium	mg/kg	< 0.0050	0.0083	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	0.0061	< 0.0050	< 0.0050	< 0.0050	0.1	0.3	0.5	7
Zinc	mg/kg	0.080	0.067	0.17	0.040	0.12	0.068	0.040	0.043	0.045	0.074	0.058	4	4	50	200
Mercury	mg/kg	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	0.01	0.01	0.2	2
Phenol	mg/kg	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	1	1	NE	NE
Fluoride	mg/kg	2.0	1.4	2.0	1.3	2.9	1.2	1.1	1.9	1.2	1.8	1.7	10	10	150	500
Chloride	mg/kg	23	20	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	800	2,400	15,000	25,000
Sulphate	mg/kg	610	12	< 10	< 10	< 10	< 10	22	230	22	380	290	1000*	3,000	20000*	50,000
DOC **	mg/kg	< 50	< 50	< 50	< 50	< 50	58	< 50	< 50	52	< 50	< 50	500	500	800	1,000
pH	pH units	8.4	8.5	8.6	8.1	8.2	8.3	7.8	8.0	8.1	8.2	8.3	NE	NE	NE	NE
TDS ***	mg/kg	1500	310	410	260	390	180	220	870	580	1200	880	4,000	12,000	60,000	100,000
TOC	%	1.4	< 0.20	< 0.20	< 0.20	0.36	0.26	0.60	0.55	1.3	0.72	0.89	3	6	NE	6
Benzene	mg/kg	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	6	6	NE	NE
Toluene	mg/kg	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	6	6	NE	NE
Ethylbenzene	mg/kg	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	6	6	NE	NE
m/p-Xylene	mg/kg	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	6	6	NE	NE
o-Xylene	mg/kg	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	6	6	NE	NE
PCB Total of 7	mg/kg	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	1	1	NE	NE
Total 17 PAH's	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	8.6	1.9	< 1.0	NE	100	NE	NE
Mineral Oil	mg/kg	61	24	21	18	23	19	19	20	16	14	27	500	500	NE	NE
Asbestos	% mass	NAD	NAD	NAD	NAD	NAD	NAD	NAD	NAD	NAD	NAD	NAD	NE	NE	NE	NE

NAD denotes No Asbestos Detected

* denotes sulphate level exceeding inert waste limit may be considered as complying if the TDS value does not exceed 6,000mg/kg at L/S = 10l/kg.

** denotes a higher limit may be accepted provided the DOC alternative values of 500mg/kg is achieved

*** denotes TDS. The values for TDS can be used to sulphate and chloride.

PAH over 1mg/kg and Mineral Oil over 50 mg/kg exceeds limit at soil recovery site in Ireland

2.4 Waste Management Options

The EPA has issued guidance on acceptance criteria for a range of parameters for soil recovery sites. This includes;

- Metals (solid conc. not leachability) in soil and stone (including As, Cd, Cr, Cu, Hg, Ni, Pub, Zn);
- Total organic carbon in soil and stone;
- Total BTEX (benzene, toluene, ethylbenzene, xylenes) in soil and stone;
- Mineral oil in soil and stone;
- Polycyclic aromatic hydrocarbons (PAHs) in soil and stone;
- Polychlorinated Biphenyls (PCBs) in soil and stone;
- Asbestos fibres in soil and stone.

The guidance requires that soils from brownfield sites should not exceed the limits for the parameters specified in Table 2.3 and 2.4. For metals limits have been specified for a range of soil types nationally separated into six domain areas.

Table 2.3 Soil Recovery Site Criteria

Parameter	Limit for Soil Recovery Sites
Total BTEX	0.05 mg/kg
Mineral Oil	50 mg/kg
Total PAHs	1 mg/kg
Total PCBs	0.05 mg/kg

The samples from BH05 and TP09 which meet the inert WAC exceed the soil recovery criteria for Total PAH's or Mineral Oil. These samples have been classified as (B-1) suitable for inert landfill.

The soil and stone cannot be sent to soil recovery sites if the trigger levels for a particular domain are exceeded. There is however some flexibility in applying the limits. A derogation applies where up to three parameters can exceed the limit for a sample provided the concentration in the samples is no more than 1.5 times the trigger level. The site which is subject to this investigation is located in Domain 4 and the trigger levels are listed in Table 2.4.

Table 2.4 Soil Recovery Trigger Levels

		Domain 4 Trigger Level	1.5 times Trigger Level
Arsenic	**mg/kg**	32.3	48.45
Cadmium	**mg/kg**	0.97	1.455
Chromium	**mg/kg**	51.7	77.55
Copper	**mg/kg**	80.4	120.6
Mercury	**mg/kg**	0.285	0.4275
Nickel	**mg/kg**	50.3	75.45
Lead	**mg/kg**	91.4	137.1
Zinc	**mg/kg**	155	232.5

All samples meet the soil recovery criteria for metal concentrations.

Waste management options are summarised on Table 2.5. All are subject to approval of the waste management facility operators. Class A material is suitable for removal to a soil recovery facility. Class B-1 wastes are suitable for disposal to inert landfill.

Table 2.5 Waste Management Options

Sample No.	Depth	Classification	LoW Code	Category
BH05	1.00	Non-Hazardous	17 05 04	B-1
TP02	1.00	Non-Hazardous	17 05 04	A
TP03	0.40	Non-Hazardous	17 05 04	A
TP04	1.00	Non-Hazardous	17 05 04	A
TP05	0.40	Non-Hazardous	17 05 04	A
TP06	1.00	Non-Hazardous	17 05 04	A
TP07	0.60	Non-Hazardous	17 05 04	A
TP08	0.40	Non-Hazardous	17 05 04	A
TP09	1.00	Non-Hazardous	17 05 04	B-1
TP09	2.00	Non-Hazardous	17 05 04	B-1
TP10	0.50	Non-Hazardous	17 05 04	A

A	Meets Soil Recovery Criteria
B-1	Suitable for disposal/recovery to Inert Landfill

3 CONCLUSIONS AND RECOMMENDATIONS

3.1 Conclusions

3.1.1 *Waste Classification*

Asbestos was not detected in any of the samples tested.

All samples are classified as non-hazardous and the appropriate List of Waste Code is 17 05 04 (Soil and Stone other than those mentioned in 17 05 03*).

If the soils have to be removed from the site the disposal options are outlined in Section 2.4.

3.2 Recommendations

OCM recommend that a copy of this report be provided in full to the relevant waste management facilities to which the made ground and subsoils will be consigned to confirm its suitability for acceptance.

Appendix 1

Trial Pit Logs

TRIAL PIT RECORD

REPORT NUMBER 25387

CONTRACT	Castlemartyr LRD, Cork	**TRIAL PIT NO.**	**TP01**
		SHEET	Sheet 1 of 1
LOGGED BY	AR	**CO-ORDINATES**	
		DATE STARTED	11/06/2011
		DATE COMPLETED	11/06/2011
CLIENT	Glenveagh Developments Ltd	**GROUND LEVEL (m)**	
ENGINEER	DOBA	**EXCAVATION METHOD**	8.5 tonne digger

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 Topsoil									
Medium dense light brown gravelly silty clayey SAND. Gravels were fine to coarse in size, sub-angular to sub-rounded in shape. Sand was fine to coarse.		0.50			AA231517	B	1.00-1.00		
					AA231518	B	2.00-2.00		
Stiff light brown slightly gravelly slightly sandy slightly clayey SILT.Gravels fine to coarse, sub-angular to sub-rounded. Sand fine to coarse.		2.20							
End of Trial Pit at 3.10m		3.00			AA231519	B	3.00-3.00		

Groundwater Conditions
DRY

Stability
good

General Remarks

TRIAL PIT RECORD

REPORT NUMBER 25387

CONTRACT	Castlemartyr LRD, Cork	**TRIAL PIT NO.**	**TP02**
		SHEET	Sheet 1 of 1
LOGGED BY	AR	**CO-ORDINATES**	
		DATE STARTED	11/06/2024
		DATE COMPLETED	11/06/2024
CLIENT	Glenveagh Developments Ltd	**GROUND LEVEL (m)**	
ENGINEER	DOBA	**EXCAVATION METHOD**	8.5 tonne digger

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 Topsoil		0.30							
Medium dense light brown gravelly silty clayey SAND. Low cobble content, cobbles up to 200mm made of limestone. Gravels were fine to coarse in size, sub-angular to sub-rounded in shape. Sand was fine to coarse.					AA231521	B	1.00-1.00		
1.0 Medium dense clayey very gravelly SAND. Gravels fine to coarse, sub-angular to sub-rounded. Sand fine to coarse.		1.40							
2.0					AA231522	B	2.00-2.00		
3.0					AA231523	B	2.70-2.70		
End of Trial Pit at 3.00m		3.00							
4.0									

Groundwater Conditions
DRY

Stability
good

General Remarks

TRIAL PIT RECORD

REPORT NUMBER 25387

CONTRACT	Castlemartyr LRD, Cork	**TRIAL PIT NO.**	**TP03**
		SHEET	Sheet 1 of 1
LOGGED BY	AR	**CO-ORDINATES**	
		DATE STARTED	12/06/2024
		DATE COMPLETED	12/06/2024
CLIENT	Glenveagh Developments Ltd	**GROUND LEVEL (m)**	
ENGINEER	DOBA	**EXCAVATION METHOD**	8.5 tonne digger

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 Topsoil		0.15							
Loose to firm orangey brown slightly silty gravelly very sandy CLAY. Gravels were fine to coarse and sub-angular to sub-rounded. Sand was fine to coarse.					AA231524	B	0.40-0.40		
Firm orangey brown very gravelly very sandy CLAY with a high boulder and cobble content. Poor sidewall stability at 1.2m. Boulders up to 450mm and angular in shape. Cobbles up to 250mm and sub-angular to well-rounded in shape. Gravels were fine to coarse and sub-angular to well-rounded in shape. Sand was fine to coarse. Pit terminated due to likely bedrock at 2.5m.		0.80							
1.0									
2.0					AA231525	B	2.00-2.00		
End of Trial Pit at 2.50m		2.50							
3.0									
4.0									

Groundwater Conditions
DRY

Stability
collapsed at 1.2m

General Remarks
Terminated at 2.5m due to likely bedrock

TRIAL PIT RECORD

REPORT NUMBER 25387

CONTRACT	Castlemartyr LRD, Cork	**TRIAL PIT NO.**	**TP04**
		SHEET	Sheet 1 of 1
LOGGED BY	AR	**CO-ORDINATES**	
		DATE STARTED	12/06/2024
		DATE COMPLETED	12/06/2024
CLIENT	Glenveagh Developments Ltd	**GROUND LEVEL (m)**	
ENGINEER	DOBA	**EXCAVATION METHOD**	8.5 tonne digger

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 Topsoil		0.15							
Firm to stiff orangey brown gravelly very sandy CLAY. Gravels fine to coarse, sub-angular to sub-rounded. Sand fine to coarse.					AA231526	B	1.00-1.00		
2.0 Firm to stiff orangey brown very gravelly sandy CLAY, with a low cobble content. Cobbles up to 200mm in size, angular to sub-rounded in shape. Gravels fine to coarse, sub-angular to sub-rounded. Sand fine to coarse.		2.00			AA231527	B	2.50-2.50		
3.0 End of Trial Pit at 3.00m		3.00							
4.0									

Groundwater Conditions
DRY

Stability
collapsed between 1.3m - 1.8m

General Remarks

TRIAL PIT RECORD

REPORT NUMBER 25387

CONTRACT	Castlemartyr LRD, Cork	**TRIAL PIT NO.**	**TP05**
		SHEET	Sheet 1 of 1
LOGGED BY	AR	**CO-ORDINATES**	
		DATE STARTED	13/06/2024
		DATE COMPLETED	13/06/2024
CLIENT	Glenveagh Developments Ltd	**GROUND LEVEL (m)**	
ENGINEER	DOBA	**EXCAVATION METHOD**	8.5 tonne digger

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 Topsoil		0.10							
Firm orangey brown sandy gravelly CLAY with low boulder and cobble content. Boulders up to 300mm wide, angular to sub-angular in shape. Cobbles up to 250mm, angular to sub-angular in shape. Gravels fine to coarse, angular to sub-rounded in shape, sand fine to coarse.					AA231530	B	0.40-0.40		
Firm orangey brown sandy gravelly CLAY with high cobble and boulder content, Pit terminated at 1.6m due to likely bedrock. Boulders 1m wide, angular to sub-angular. Cobbles up to 200mm sub-angular to sub-rounded. Gravels fine to coarse, sub-angular to sub-rounded.		0.80							
1.0									
End of Trial Pit at 1.60m		1.60			AA231531	B	1.60-1.60		
2.0									
3.0									
4.0									

Groundwater Conditions
DRY

Stability
good

General Remarks
Terminated at 1.6m due to likely bedrock

TRIAL PIT RECORD

REPORT NUMBER 25387

CONTRACT	Castlemartyr LRD, Cork	**TRIAL PIT NO.**	**TP06**
		SHEET	Sheet 1 of 1
LOGGED BY	AR	**CO-ORDINATES**	
		DATE STARTED	13/06/2024
		DATE COMPLETED	13/06/2024
CLIENT	Glenveagh Developments Ltd	**GROUND LEVEL (m)**	
ENGINEER	DOBA	**EXCAVATION METHOD**	8.5 tonne digger

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 Topsoil		0.20							
Firm to Stiff orangey brown sandy gravelly CLAY with low boulder and cobble content. Boulders up to 300mmand angular in shape. Cobbles up to 250mm and angular to sub-angular in shape. Gravels fine to coarse, sub-angular to sub-rounded. Sand fine to coarse.					AA231532	B	1.00-1.00		
2.0 Dense mottled greyish orangey brown clayey very gravelly SAND. Medium to high cobble content. Cobbles up to 150mm and angular to sub-angular. Gravels fine to coarse, angular to sub-angular. Sand is fine to coarse.		2.30							
End of Trial Pit at 2.60m		2.60			AA231533	B	2.60-2.60		
3.0									
4.0									

Groundwater Conditions
DRY

Stability
Good

General Remarks
Terminated at 2.6m due to likely bedrock

TRIAL PIT RECORD

REPORT NUMBER 25387

CONTRACT	Castlemartyr LRD, Cork	**TRIAL PIT NO.**	**TP07**
		SHEET	Sheet 1 of 1
LOGGED BY	AR	**CO-ORDINATES**	
		DATE STARTED	13/06/2024
		DATE COMPLETED	13/06/2024
CLIENT	Glenveagh Developments Ltd	**GROUND LEVEL (m)**	
ENGINEER	DOBA	**EXCAVATION METHOD**	8.5 tonne digger

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 Topsoil		0.40							
Stiff light brown slightly silty gravelly clay. Gravels fine to coarse, sub-angular to sub-rounded.		0.90			AA231534	B	0.60-0.60		
1.0 Stiff orangey brown slightly sandy gravelly CLAY. Gravels fine to coarse, sub-angular to sub-rounded. Sand fine to coarse.		1.50			AA231535	B	1.10-1.10		
Stiff to very stiff light brown very slightly gravelly CLAY. Gravels fine to medium grained, sub-angular shape.		3.00			AA231536	B	3.00-3.00		
2.0 3.0 End of Trial Pit at 3.00m									
4.0									

Groundwater Conditions
DRY

Stability
Good

General Remarks

TRIAL PIT RECORD

REPORT NUMBER 25387

CONTRACT	Castlemartyr LRD, Cork	**TRIAL PIT NO.**	**TP08**
		SHEET	Sheet 1 of 1
LOGGED BY	AR	**CO-ORDINATES**	
		DATE STARTED	11/06/2024
		DATE COMPLETED	11/06/2024
CLIENT	Glenveagh Developments Ltd	**GROUND LEVEL (m)**	
ENGINEER	DOBA	**EXCAVATION METHOD**	8.5 tonne digger

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0									
Made ground. Soft to firm light brown sandy gravelly CLAY with low cobble content. Cobbles were up to 200mm, angular to rounded, made of limestone and concrete. Gravels were fine to coarse, sub-angular to sub-rounded.		0.40			AA231513	B	0.40-0.40		
Made ground. Firm dark brown slightly sandy slightly gravelly CLAY with rare pieces of plastic and fabric. Low boulder and cobble content. Boulders up to 260mm, angular, made of concrete. Cobbles up to 150mm, sub-angular to rounded. Gravels fine to coarse, sub-angular to sub-rounded. Sand fine to mediu.					AA231514	B	1.00-1.00		
1.0									
Firm orangey brown slightly sandy gravelly CLAY with a low cobble content. Cobbles up to 200mm, sub-angular to sub-rounded, made of limestone. Sand fine to coarse.		1.80							
2.0									
End of Trial Pit at 2.80m		2.80			AA231515	B	2.80-2.80		
3.0									
4.0									

Groundwater Conditions
DRY

Stability
Good

General Remarks

TRIAL PIT RECORD

REPORT NUMBER 25387

CONTRACT	Castlemartyr LRD, Cork	**TRIAL PIT NO.**	**TP09**
		SHEET	Sheet 1 of 1
LOGGED BY	AR	**CO-ORDINATES**	
		DATE STARTED	11/06/2024
		DATE COMPLETED	11/06/2024
CLIENT	Glenveagh Developments Ltd	**GROUND LEVEL (m)**	
ENGINEER	DOBA	**EXCAVATION METHOD**	8.5 tonne digger

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 Topsoil		0.20							
Made ground. Firm light brown sandy gravelly CLAY with high boulder and cobble content. Rare pieces of plastic, rubber, metal and tarmc. Hydrocarbon odor observed. Groundwater seepage at 1.2m. Boulders up to 1.4m wide, angular, made of concrete. Gravels fine to coarse, sub-angular to sub-rounded. Sand fine to coarse.				1 (Seepage)	AA231509	B	1.00-1.00		
1.0 Made ground. Firm greyish brown slightly sandy slightly gravelly CLAY with low cobble content. Rare pieces of plastic. Cobbles up to 200mm, sub-angular to sub-rounded. Gravels fine to coarse, sub-angular to sub-rounded. Sand fine to coarse.		1.20							
2.0					AA231510	B	2.00-2.00		
Firm to stiff mottled greyish yellow slightly sandy CLAY.		2.70							
3.0 End of Trial Pit at 3.00m		3.00			AA231511	B	3.00-3.00		
4.0									

Groundwater Conditions
Seepage at 1.2m

Stability
good

General Remarks

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TRIAL PIT RECORD

REPORT NUMBER 25387

CONTRACT	Castlemartyr LRD, Cork	**TRIAL PIT NO.**	**TP10**
		SHEET	Sheet 1 of 1
LOGGED BY	AR	**CO-ORDINATES**	
		DATE STARTED	11/06/2024
		DATE COMPLETED	11/06/2024
CLIENT	Glenveagh Developments Ltd	**GROUND LEVEL (m)**	
ENGINEER	DOBA	**EXCAVATION METHOD**	8.5 tonne digger

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0									
Made ground. Loose greyish brown slightly sandy clayey GRAVEL with low to medium cobble content.Cobbles up to 125mm, angular to sub-angular. Gravels fine to coarse, angular to sub-angular. Sand is fine to coarse.		0.30							
Stiff light brown slightly sandy slightly gravelly CLAY. Gravel fine to coarse sub-angular sub-rounded.					AA231505	B	0.50-0.50		
1.0									
Stiff light brown very gravelly clayey SAND with low cobble and boulder content. Boulders up to 350mm, sub-rounded. Cobbles up to 250mm sub-angular to sub-rounded. Gravels fine to coarse, sub-angular to sub-rounded. Sand fine to coarse.		1.10							
2.0					AA231506	B	1.70-1.70		
3.0		3.00							
End of Trial Pit at 3.00m					AA231507	B	3.00-3.00		
4.0									

Groundwater Conditions
DRY

Stability
collapsed at 1.1m

General Remarks

GEOTECHNICAL BORING RECORD

REPORT NUMBER 25387

CONTRACT	Castlemartyr LRD , Co.Cork	**BOREHOLE NO.**	**BH01**
		SHEET	Sheet 1 of 1
CO-ORDINATES		**RIG TYPE**	Dando 2000
		BOREHOLE DIAMETER (mm)	200
GROUND LEVEL (m AOD)		**BOREHOLE DEPTH (m)**	7.20
		DATE COMMENCED	16/05/2024
		DATE COMPLETED	17/05/2024
CLIENT	Glenveagh Developments Ltd	**SPT HAMMER REF. NO.**	
ENGINEER	DOBA	**ENERGY RATIO (%)**	
		BORED BY	J.Cosgrove
		PROCESSED BY	F.C

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples: Ref. Number	Sample Type	Depth (m)	Recovery	Field Test Results	Standpipe Details
0	TOPSOIL			0.20						
	Firmbrown sandy SILT/CLAY			0.90						
1	Medium dense to dense grey/brown sandy GRAVEL with occasional cobbles				AA210217	B	1.00		N = 27 (2, 5, 7, 5, 8, 7)	
2					AA210218	B	2.00		N = 33 (5, 5, 7, 8, 9, 9)	
3				3.40	AA210219	B	3.00		N = 31 (5, 5, 6, 8, 8, 9)	
	Stiff to very stiff brown gravelly SILT/CLAY with occasional cobbles									
4					AA210220	B	4.00		N = 24 (4, 5, 5, 6, 6, 7)	
5					AA210221	B	5.00		N = 22 (5, 5, 4, 6, 6, 6)	
6					AA210222	B	6.00		N = 28 (6, 5, 6, 7, 8, 7)	
7				7.20	AA210223	B	7.00		N = 24 (6, 6, 5, 5, 7, 7)	
	Obstruction End of Borehole at 7.20 m								N = 50/150 mm (25, 25, 25)	
8										
9										

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (h)	Comments
1.3	1.5	0.75	
2.4	2.5	0.5	
7.1	7.2	1.5	

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
					No water strike

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type
17-05-24	7.20	1.00	7.20	50mm SP

REMARKS CAT scanned location and hand dug inspection pit was carried out.

Sample Legend
D - Small Disturbed (tub)
B - Bulk Disturbed
LB - Large Bulk Disturbed
Env - Environmental Sample (Jar + Vial + Tub)
UT - Undisturbed 100mm Diameter Sample
P - Undisturbed Piston Sample
W - Water Sample

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GEOTECHNICAL BORING RECORD

REPORT NUMBER 25387

CONTRACT	Castlemartyr LRD , Co.Cork	**BOREHOLE NO.**	**BH02**
		SHEET	Sheet 1 of 1
CO-ORDINATES		**RIG TYPE**	Dando 2000
		BOREHOLE DIAMETER (mm)	200
GROUND LEVEL (m AOD)		**BOREHOLE DEPTH (m)**	1.20
		DATE COMMENCED	17/05/2024
		DATE COMPLETED	17/05/2024
CLIENT	Glenveagh Developments Ltd	**SPT HAMMER REF. NO.**	
ENGINEER	DOBA	**ENERGY RATIO (%)**	
		BORED BY	J.Cosgrove
		PROCESSED BY	F.C

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples: Ref. Number	Samples: Sample Type	Samples: Depth (m)	Samples: Recovery	Field Test Results	Standpipe Details
0	TOPSOIL			0.20						
	Firm brown sandy SILT/CLAY with occasional gravel									
1				1.20	AA211709	B	1.00		N = 54/225 mm (3, 4, 4, 25, 25)	
	Obstruction End of Borehole at 1.20 m									
2										
3										
4										
5										
6										
7										
8										
9										

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (h)	Comments
1.2	1.2	1	

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
					No water strike

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type

REMARKS CAT scanned location and hand dug inspection pit was carried out. Obstruction encountered . Moved 3m to BH02A and attempted rebore .

Sample Legend
D - Small Disturbed (tub)
B - Bulk Disturbed
LB - Large Bulk Disturbed
Env - Environmental Sample (Jar + Vial + Tub)
UT - Undisturbed 100mm Diameter Sample
P - Undisturbed Piston Sample
W - Water Sample

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GEOTECHNICAL BORING RECORD

REPORT NUMBER 25387

CONTRACT	Castlemartyr LRD , Co.Cork	**BOREHOLE NO.**	**BH02A**
		SHEET	Sheet 1 of 1
CO-ORDINATES		**RIG TYPE**	Dando 2000
		BOREHOLE DIAMETER (mm)	200
GROUND LEVEL (m AOD)		**BOREHOLE DEPTH (m)**	3.20
		DATE COMMENCED	20/05/2024
		DATE COMPLETED	20/05/2024
CLIENT	Glenveagh Developments Ltd	**SPT HAMMER REF. NO.**	
ENGINEER	DOBA	**ENERGY RATIO (%)**	
		BORED BY	J.Cosgrove
		PROCESSED BY	F.C

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples: Ref. Number	Samples: Sample Type	Samples: Depth (m)	Samples: Recovery	Field Test Results	Standpipe Details
0	TOPSOIL			0.20						
	Firm brown sandy SILT/CLAY with occasional gravel			1.10	AA210225	B	1.00		N = 18 (2, 3, 3, 5, 5, 5)	
1	Medium dense brown sandy GRAVEL with occasional cobbles				AA210226	B	2.00		N = 24 (5, 6, 5, 7, 6, 6)	
2				2.70						
	Dense angular GRAVEL and COBBLES			3.20	AA210227	B	3.00		N = 50/150 mm (10, 11, 25, 25)	
3	Obstruction End of Borehole at 3.20 m									
4										
5										
6										
7										
8										
9										

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (h)	Comments
1.3	1.5	0.75	
3.1	3.2	1.5	

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
					No water strike

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type
20-05-24	3.20	1.00	3.20	50mm SP

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

REMARKS CAT scanned location and hand dug inspection pit was carried out. Obstruction encountered . Moved 3m to BH02A and attempted rebore .

Sample Legend
D - Small Disturbed (tub)
B - Bulk Disturbed
LB - Large Bulk Disturbed
Env - Environmental Sample (Jar + Vial + Tub)
UT - Undisturbed 100mm Diameter Sample
P - Undisturbed Piston Sample
W - Water Sample

IGSL BH LOG 25387BH.GPJ IGSL.GDT 20/6/24

GEOTECHNICAL BORING RECORD

REPORT NUMBER 25387

CONTRACT	Castlemartyr LRD , Co.Cork	**BOREHOLE NO.**	**BH03**
		SHEET	Sheet 1 of 1
CO-ORDINATES		**RIG TYPE**	Dando 2000
		BOREHOLE DIAMETER (mm)	200
GROUND LEVEL (m AOD)		**BOREHOLE DEPTH (m)**	4.80
		DATE COMMENCED	21/05/2024
		DATE COMPLETED	22/05/2024
CLIENT	Glenveagh Developments Ltd	**SPT HAMMER REF. NO.**	
ENGINEER	DOBA	**ENERGY RATIO (%)**	
		BORED BY	J.Cosgrove
		PROCESSED BY	F.C

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples: Ref. Number	Samples: Sample Type	Samples: Depth (m)	Samples: Recovery	Field Test Results	Standpipe Details
0	TOPSOIL			0.20						
	Soft to firm brown SILT/CLAY with occasional fine gravel									
1				1.30	AA210231	B	1.00		N = 9 (1, 2, 2, 2, 3, 2)	
	Firm brown sandy SILT (Possibly silty Sand) with some gravel									
2					AA210232	B	2.00		N = 11 (2, 2, 3, 2, 3, 3)	
3					AA210233	B	3.00		N = 11 (3, 2, 2, 3, 3, 3)	
				3.80						
4	Very stiff brown gravelly CLAY with some angular cobbles				AA210234	B	4.00		N = 26 (3, 4, 5, 5, 6, 10)	
				4.80						
5	Obstruction End of Borehole at 4.80 m								N = 50/150 mm (25, 25, 25)	
6										
7										
8										
9										

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (h)	Comments
4.7	4.8	1.5	

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
					No water strike

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type

REMARKS CAT scanned location and hand dug inspection pit was carried out.

Sample Legend
D - Small Disturbed (tub)
B - Bulk Disturbed
LB - Large Bulk Disturbed
Env - Environmental Sample (Jar + Vial + Tub)
UT - Undisturbed 100mm Diameter Sample
P - Undisturbed Piston Sample
W - Water Sample

IGSL BH LOG 25387BH.GPJ IGSL.GDT 20/6/24

GEOTECHNICAL BORING RECORD

REPORT NUMBER 25387

CONTRACT	Castlemartyr LRD , Co.Cork	**BOREHOLE NO.**	**BH04**
		SHEET	Sheet 1 of 1
CO-ORDINATES		**RIG TYPE**	Dando 2000
		BOREHOLE DIAMETER (mm)	200
GROUND LEVEL (m AOD)		**BOREHOLE DEPTH (m)**	1.70
		DATE COMMENCED	21/05/2024
		DATE COMPLETED	21/05/2024
CLIENT	Glenveagh Developments Ltd	**SPT HAMMER REF. NO.**	
ENGINEER	DOBA	**ENERGY RATIO (%)**	
		BORED BY	J.Cosgrove
		PROCESSED BY	F.C

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples: Ref. Number	Samples: Sample Type	Samples: Depth (m)	Samples: Recovery	Field Test Results	Standpipe Details
0	TOPSOIL			0.20						
	Soft brown sandy SILT/CLAY with occasional fine gravel				AA218228	B	1.00		N = 9 (1, 2, 2, 2, 3, 2)	
1				1.70						
	Obstruction								N = 50/150 mm (25, 25, 25)	
2	End of Borehole at 1.70 m									
3										
4										
5										
6										
7										
8										
9										

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (h)	Comments
1.6	1.7	1.5	

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
					No water strike

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type

REMARKS CAT scanned location and hand dug inspection pit was carried out. Obstruction encountered . Moved 3m to BH04A and attempted rebore .

Sample Legend
D - Small Disturbed (tub)
B - Bulk Disturbed
LB - Large Bulk Disturbed
Env - Environmental Sample (Jar + Vial + Tub)
UT - Undisturbed 100mm Diameter Sample
P - Undisturbed Piston Sample
W - Water Sample

IGSL BH LOG 25387BH.GPJ IGSL.GDT 20/6/24

GEOTECHNICAL BORING RECORD

REPORT NUMBER 25387

CONTRACT	Castlemartyr LRD , Co.Cork	**BOREHOLE NO.**	**BH04A**
		SHEET	Sheet 1 of 1
CO-ORDINATES		**RIG TYPE**	Dando 2000
		BOREHOLE DIAMETER (mm)	200
GROUND LEVEL (m AOD)		**BOREHOLE DEPTH (m)**	2.00
		DATE COMMENCED	21/05/2024
		DATE COMPLETED	21/05/2024
CLIENT	Glenveagh Developments Ltd	**SPT HAMMER REF. NO.**	
ENGINEER	DOBA	**ENERGY RATIO (%)**	
		BORED BY	J.Cosgrove
		PROCESSED BY	F.C

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples: Ref. Number	Samples: Sample Type	Samples: Depth (m)	Samples: Recovery	Field Test Results	Standpipe Details
0	TOPSOIL			0.20						
	Soft brown sandy SILT/CLAY with occasional gravel				AA218229	B	1.00		N = 10 (1, 3, 2, 3, 2, 3)	
1				1.50						
	Stiff brown CLAY with angular gravel and cobbles			2.00	AA218230	B	2.00		N = 50/150 mm (25, 25, 25)	
2	Obstruction End of Borehole at 2.00 m									
3										
4										
5										
6										
7										
8										
9										

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (h)	Comments
1.9	2	1.5	

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
					No water strike

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type

REMARKS CAT scanned location and hand dug inspection pit was carried out.

Sample Legend
D - Small Disturbed (tub)
B - Bulk Disturbed
LB - Large Bulk Disturbed
Env - Environmental Sample (Jar + Vial + Tub)
UT - Undisturbed 100mm Diameter Sample
P - Undisturbed Piston Sample
W - Water Sample

IGSL BH LOG 25387BH.GPJ IGSL.GDT 20/6/24

GEOTECHNICAL BORING RECORD

REPORT NUMBER 25387

CONTRACT	Castlemartyr LRD , Co.Cork	**BOREHOLE NO.**	**BH05**
		SHEET	Sheet 1 of 2
CO-ORDINATES		**RIG TYPE**	Dando 2000
		BOREHOLE DIAMETER (mm)	200
GROUND LEVEL (m AOD)		**BOREHOLE DEPTH (m)**	3.00
		DATE COMMENCED	14/05/2024
		DATE COMPLETED	15/05/2024
CLIENT	Glenveagh Developments Ltd	**SPT HAMMER REF. NO.**	
ENGINEER	DOBA	**ENERGY RATIO (%)**	
		BORED BY	J.Cosgrove
		PROCESSED BY	F.C

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples: Ref. Number	Sample Type	Depth (m)	Recovery	Field Test Results	Standpipe Details
0	TOPSOIL			0.20						
	MADE GROUND (Comprised of brown slightly gravelly clay with fill material)									
1					AA218706	B	1.00		N = 10 (3, 2, 2, 2, 3, 3)	
2				2.30	AA218707	B	2.00		N = 9 (2, 2, 3, 2, 2, 2)	
	Soft light brown SILT/CLAY with occasional angular gravel									
3					AA218708	B	3.00			
					AA218709	U	3.00	80%rec		
				3.40						
	Loose to medium dense brown silty SAND with occasional fine gravel								N = 8 (2, 2, 1, 2, 2, 3)	
4					AA218710	B	4.00			
									N = 11 (1, 2, 2, 3, 3, 3)	
5					AA218711	B	5.00			
									N = 14 (2, 2, 3, 4, 3, 4)	
6					AA218712	B	6.00			
				6.80					N = 13 (1, 2, 2, 2, 4, 5)	
	Medium dense to dense grey sandy angular GRAVEL with frequent cobbles									
7					AA218713	B	7.00			
									N = 20 (3, 4, 4, 5, 5, 6)	
8					AA218714	B	8.00			
									N = 23 (3, 3, 4, 5, 7, 7)	
9					AA218715	B	9.00			
				10.00					N = 30 (4, 5, 6, 7, 9, 8)	

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (h)	Comments
2.9	3	1.5	

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
					No water strike

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type
15-05-24	10.00	4.00	10.00	50mm SP

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

REMARKS CAT scanned location and hand dug inspection pit was carried out.

Sample Legend
D - Small Disturbed (tub)
B - Bulk Disturbed
LB - Large Bulk Disturbed
Env - Environmental Sample (Jar + Vial + Tub)
UT - Undisturbed 100mm Diameter Sample
P - Undisturbed Piston Sample
W - Water Sample

IGSL BH LOG 25387BH.GPJ IGSL.GDT 20/6/24

GEOTECHNICAL BORING RECORD

REPORT NUMBER 25387

CONTRACT	Castlemartyr LRD , Co.Cork	**BOREHOLE NO.**	**BH05**
		SHEET	Sheet 2 of 2
CO-ORDINATES		**RIG TYPE**	Dando 2000
		BOREHOLE DIAMETER (mm)	200
GROUND LEVEL (m AOD)		**BOREHOLE DEPTH (m)**	3.00
		DATE COMMENCED	14/05/2024
		DATE COMPLETED	15/05/2024
CLIENT	Glenveagh Developments Ltd	**SPT HAMMER REF. NO.**	
ENGINEER	DOBA	**ENERGY RATIO (%)**	
		BORED BY	J.Cosgrove
		PROCESSED BY	F.C

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples: Ref. Number	Samples: Sample Type	Samples: Depth (m)	Samples: Recovery	Field Test Results	Standpipe Details
10					AA218716	B	10.00			
11										
12										
13										
14										
15										
16										
17										
18										
19										

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (h)	Comments
2.9	3	1.5	

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
					No water strike

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type
15-05-24	10.00	4.00	10.00	50mm SP

REMARKS CAT scanned location and hand dug inspection pit was carried out.

Sample Legend
D - Small Disturbed (tub)
B - Bulk Disturbed
LB - Large Bulk Disturbed
Env - Environmental Sample (Jar + Vial + Tub)
UT - Undisturbed 100mm Diameter Sample
P - Undisturbed Piston Sample
W - Water Sample

IGSL BH LOG 25387BH.GPJ IGSL.GDT 20/6/24

GEOTECHNICAL BORING RECORD

REPORT NUMBER 25387

CONTRACT	Castlemartyr LRD , Co.Cork	**BOREHOLE NO.**	**BH06**
		SHEET	Sheet 1 of 1
CO-ORDINATES		**RIG TYPE**	Dando 2000
		BOREHOLE DIAMETER (mm)	200
GROUND LEVEL (m AOD)		**BOREHOLE DEPTH (m)**	7.50
		DATE COMMENCED	10/05/2024
		DATE COMPLETED	14/05/2024
CLIENT	Glenveagh Developments Ltd	**SPT HAMMER REF. NO.**	
ENGINEER	DOBA	**ENERGY RATIO (%)**	
		BORED BY	J.Cosgrove
		PROCESSED BY	F.C

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples: Ref. Number	Sample Type	Depth (m)	Recovery	Field Test Results	Standpipe Details
0	Soft brown sandy SILT/CLAY with occasional gravel									
				1.10	AA206797	B	1.00		N = 10 (8, 4, 3, 2, 2, 3)	
1	Firm brown gravelly SILT/CLAY with occasional cobbles									
					AA206798	B	2.00		N = 12 (2, 2, 3, 2, 3, 4)	
2				2.50						
	Medium dense to dense grey sandy GRAVEL with angular cobbles				AA206799	B	3.00		N = 22 (4, 6, 7, 5, 5, 5)	
3					AA206800	B	4.00		N = 23 (4, 5, 5, 7, 6, 5)	
4					AA206801	B	5.00		N = 20 (3, 5, 5, 4, 5, 6)	
5					AA206802	B	6.00		N = 22 (4, 5, 5, 6, 6, 5)	
6					AA206803	B	7.00		N = 34 (4, 6, 8, 9, 9, 8)	
7					AA206804	B	8.00		N = 33 (4, 6, 8, 9, 8, 8)	
8				8.70						
	Very stiff brown very gravelly CLAY with some cobbles				AA206805	B	9.00		N = 46 (7, 8, 10, 10, 12, 14)	
9				9.50						
	Obstruction End of Borehole at 7.50 m								N = 50/150 mm (25, 25, 25)	

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (h)	Comments
0.8	1	0.5	
9.4	9.5	1.5	

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
					No water strike

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type
14-05-24	9.50	1.00	9.50	50mm SP

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

REMARKS CAT scanned location and hand dug inspection pit was carried out.

Sample Legend
D - Small Disturbed (tub)
B - Bulk Disturbed
LB - Large Bulk Disturbed
Env - Environmental Sample (Jar + Vial + Tub)
UT - Undisturbed 100mm Diameter Sample
P - Undisturbed Piston Sample
W - Water Sample

IGSL BH LOG 25387BH.GPJ IGSL.GDT 20/6/24

Appendix 2

Laboratory Report

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

Final Report

Report No.:	24-21214-1
Initial Date of Issue:	22-Jul-2024
Re-Issue Details:	
Client	IGSL
Client Address:	M7 Business Park Naas County Kildare Ireland
Contact(s):	Darren Keogh
Project	25387 Cashemartyr Cork

Quotation No.:		**Date Received:**	04-Jul-2024
Order No.:		**Date Instructed:**	04-Jul-2024
No. of Samples:	17		
Turnaround (Wkdays):	7	**Results Due:**	12-Jul-2024
Date Approved:	22-Jul-2024		

Approved By:

Details: Simon Wicks, Specialist Chemist

For details about application of accreditation to specific matrix types, please refer to the Table at the back of this report

Results - Leachate

Project: 25387 Cashemartyr Cork

Client: IGSL						**Chemtest Job No.:**	24-21214	24-21214	24-21214	24-21214	24-21214	24-21214	24-21214	24-21214	24-21214	24-21214	24-21214
Quotation No.:						**Chemtest Sample ID.:**	1830178	1830181	1830182	1830183	1830184	1830185	1830186	1830187	1830188	1830189	1830191
Order No.:						Client Sample Ref.:	BH05	TP02	TP03	TP04	TP05	TP06	TP07	TP08	TP09	TP09	TP10
						Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
						Top Depth (m):	1.00	1.00	0.40	1.00	0.40	1.00	0.60	0.40	1.00	2.00	0.50
						Date Sampled:	02-Jul-2024	02-Jul-2024	02-Jul-2024	02-Jul-2024	02-Jul-2024	02-Jul-2024	02-Jul-2024	02-Jul-2024	02-Jul-2024	02-Jul-2024	02-Jul-2024
Determinand	**Accred.**	**SOP**	**Type**	**Units**	**LOD**												
Ammonium	U	1220	10:1	mg/l	0.050		0.061	0.072	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Ammonium	N	1220	10:1	mg/kg	0.10		0.65	0.75	0.46	0.29	0.40	0.22	0.31	0.26	0.23	0.11	0.27

Results - Soil

Project: 25387 Cashemartyr Cork

Client: IGSL						**Chemtest Job No.:**	24-21214	24-21214	24-21214	24-21214	24-21214	24-21214	24-21214	24-21214
Quotation No.:						**Chemtest Sample ID.:**	1830177	1830178	1830179	1830180	1830181	1830182	1830183	1830184
Order No.:						Client Sample Ref.:	BH04A	BH05	BH05	BH06	TP02	TP03	TP04	TP05
						Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
						Top Depth (m):	1.00	1.00	3.00	2.00	1.00	0.40	1.00	0.40
						Date Sampled:	02-Jul-2024	02-Jul-2024	02-Jul-2024	02-Jul-2024	02-Jul-2024	02-Jul-2024	02-Jul-2024	02-Jul-2024
						Asbestos Lab:		DURHAM			DURHAM	DURHAM	DURHAM	DURHAM
Determinand	**HWOL Code**	**Accred.**	**SOP**	**Units**	**LOD**									
ACM Type		U	2192		N/A		-			-	-	-	-
Asbestos Identification		U	2192		N/A		No Asbestos Detected			No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Moisture		N	2030	%	0.020	20	18	17	13	14	12	9.7	16
Soil Colour		N	2040		N/A	Brown	Brown	Brown	Brown	Brown	Brown	Brown	Brown
Other Material		N	2040		N/A	Stones	Stones and Roots	Stones	Stones	Stones	Stones	Stones	Stones and Roots
Soil Texture		N	2040		N/A	Clay	Clay	Clay	Clay	Clay	Loam	Loam	Loam
pH (2.5:1) at 20C		N	2010		4.0	7.3		7.5	7.8				
Boron (Hot Water Soluble)		M	2120	mg/kg	0.40		0.69			0.42	0.43	< 0.40	0.48
Magnesium (Water Soluble)		N	2120	g/l	0.010	< 0.010		< 0.010	< 0.010				
Sulphate (2:1 Water Soluble) as SO4		M	2120	g/l	0.010	0.015		0.054	0.022				
Total Sulphur		U	2175	%	0.010	< 0.010		< 0.010	< 0.010				
Sulphur (Elemental)		M	2180	mg/kg	1.0		13			< 1.0	< 1.0	39	180
Chloride (Water Soluble)		M	2220	g/l	0.010	< 0.010		< 0.010	< 0.010				
Nitrate (Water Soluble)		N	2220	g/l	0.010	0.013		< 0.010	< 0.010				
Cyanide (Total)		M	2300	mg/kg	0.50		< 0.50			< 0.50	< 0.50	< 0.50	< 0.50
Sulphide (Easily Liberatable)		N	2325	mg/kg	0.50		3.5			12	6.4	3.5	7.0
Ammonium (Water Soluble)		M	2220	g/l	0.01	< 0.01		< 0.01	< 0.01				
Sulphate (Total)		U	2430	%	0.010		0.17			< 0.010	< 0.010	< 0.010	0.011
Sulphate (Acid Soluble)		U	2430	%	0.010	< 0.010		< 0.010	< 0.010				
Arsenic		M	2455	mg/kg	0.5		< 0.5			< 0.5	< 0.5	< 0.5	4.7
Barium		M	2455	mg/kg	0.5		44			12	22	26	31
Cadmium		M	2455	mg/kg	0.10		0.39			< 0.10	0.12	0.14	0.70
Chromium		M	2455	mg/kg	0.5		24			13	13	20	13
Molybdenum		M	2455	mg/kg	0.5		< 0.5			< 0.5	< 0.5	< 0.5	< 0.5
Antimony		N	2455	mg/kg	2.0		< 2.0			< 2.0	< 2.0	< 2.0	< 2.0
Copper		M	2455	mg/kg	0.50		20			6.6	10	12	21
Mercury		M	2455	mg/kg	0.05		0.08			< 0.05	< 0.05	< 0.05	0.05
Nickel		M	2455	mg/kg	0.50		33			16	21	28	69
Lead		M	2455	mg/kg	0.50		35			6.9	16	26	31
Selenium		M	2455	mg/kg	0.25		< 0.25			< 0.25	< 0.25	< 0.25	< 0.25
Zinc		M	2455	mg/kg	0.50		100			29	45	57	67
Chromium (Trivalent)		N	2490	mg/kg	1.0		24			13	13	20	13
Chromium (Hexavalent)		N	2490	mg/kg	0.50		< 0.50			< 0.50	< 0.50	< 0.50	< 0.50
Aliphatic VPH >C5-C6	HS_2D_AL	U	2780	mg/kg	0.05		< 0.05			< 0.05	< 0.05	< 0.05	< 0.05
Aliphatic VPH >C6-C7	HS_2D_AL	U	2780	mg/kg	0.05		< 0.05			< 0.05	< 0.05	< 0.05	< 0.05
Aliphatic VPH >C7-C8	HS_2D_AL	U	2780	mg/kg	0.05		< 0.05			< 0.05	< 0.05	< 0.05	< 0.05
Aliphatic VPH >C8-C10	HS_2D_AL	U	2780	mg/kg	0.05		< 0.05			< 0.05	< 0.05	< 0.05	< 0.05

Results - Soil

Project: 25387 Cashemartyr Cork

Client: IGSL				**Chemtest Job No.:**		24-21214	24-21214	24-21214	24-21214	24-21214	24-21214	24-21214	24-21214
Quotation No.:				**Chemtest Sample ID.:**		1830177	1830178	1830179	1830180	1830181	1830182	1830183	1830184
Order No.:				Client Sample Ref.:		BH04A	BH05	BH05	BH06	TP02	TP03	TP04	TP05
				Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):		1.00	1.00	3.00	2.00	1.00	0.40	1.00	0.40
				Date Sampled:		02-Jul-2024	02-Jul-2024	02-Jul-2024	02-Jul-2024	02-Jul-2024	02-Jul-2024	02-Jul-2024	02-Jul-2024
				Asbestos Lab:			DURHAM			DURHAM	DURHAM	DURHAM	DURHAM
Determinand	**HWOL Code**	**Accred.**	**SOP**	**Units**	**LOD**								
Total Aliphatic VPH >C5-C10	HS_2D_AL	U	2780	mg/kg	0.25		< 0.25			< 0.25	< 0.25	< 0.25	< 0.25
Aliphatic EPH >C10-C12 MC	EH_2D_AL_#1	M	2690	mg/kg	2.00		11			7.3	7.6	6.9	8.9
Aliphatic EPH >C12-C16 MC	EH_2D_AL_#1	M	2690	mg/kg	1.00		19			1.5	2.1	1.4	1.4
Aliphatic EPH >C16-C21 MC	EH_2D_AL_#1	M	2690	mg/kg	2.00		16			< 2.0	< 2.0	< 2.0	< 2.0
Aliphatic EPH >C21-C35 MC	EH_2D_AL_#1	M	2690	mg/kg	3.00		15			15	11	9.6	13
Aliphatic EPH >C35-C40 MC	EH_2D_AL_#1	N	2690	mg/kg	10.00		18			14	12	14	16
Total Aliphatic EPH >C10-C35 MC	EH_2D_AL_#1	M	2690	mg/kg	5.00		61			24	21	18	23
Aromatic VPH >C5-C7	HS_2D_AR	U	2780	mg/kg	0.05		< 0.05			< 0.05	< 0.05	< 0.05	< 0.05
Aromatic VPH >C7-C8	HS_2D_AR	U	2780	mg/kg	0.05		< 0.05			< 0.05	< 0.05	< 0.05	< 0.05
Aromatic VPH >C8-C10	HS_2D_AR	U	2780	mg/kg	0.05		< 0.05			< 0.05	< 0.05	< 0.05	< 0.05
Total Aromatic VPH >C5-C10	HS_2D_AR	U	2780	mg/kg	0.25		< 0.25			< 0.25	< 0.25	< 0.25	< 0.25
Aromatic EPH >C10-C12 MC	EH_2D_AR_#1	U	2690	mg/kg	1.00		< 1.0			< 1.0	< 1.0	< 1.0	< 1.0
Aromatic EPH >C12-C16 MC	EH_2D_AR_#1	U	2690	mg/kg	1.00		< 1.0			< 1.0	< 1.0	< 1.0	< 1.0
Aromatic EPH >C16-C21 MC	EH_2D_AR_#1	U	2690	mg/kg	2.00		< 2.0			< 2.0	< 2.0	< 2.0	< 2.0
Aromatic EPH >C21-C35 MC	EH_2D_AR_#1	U	2690	mg/kg	2.00		< 2.0			< 2.0	< 2.0	< 2.0	2.3
Aromatic EPH >C35-C40 MC	EH_2D_AR_#1	N	2690	mg/kg	1.00		8.9			4.8	4.8	3.9	5.6
Total Aromatic EPH >C10-C35 MC	EH_2D_AR_#1	U	2690	mg/kg	5.00		< 5.0			< 5.0	< 5.0	< 5.0	< 5.0
Total VPH >C5-C10	HS_2D_Total	U	2780	mg/kg	0.50		< 0.50			< 0.50	< 0.50	< 0.50	< 0.50
Total EPH >C10-C35 MC	EH_2D_Total_#1	U	2690	mg/kg	10.00		63			26	22	20	27
Mineral Oil EPH		N	2670	mg/kg	10		61			24	21	18	23
Benzene		M	2760	µg/kg	1.0		< 1.0			< 1.0	< 1.0	< 1.0	< 1.0
Toluene		M	2760	µg/kg	1.0		< 1.0			< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene		M	2760	µg/kg	1.0		< 1.0			< 1.0	< 1.0	< 1.0	< 1.0
m & p-Xylene		M	2760	µg/kg	1.0		< 1.0			< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene		M	2760	µg/kg	1.0		< 1.0			< 1.0	< 1.0	< 1.0	< 1.0
Methyl Tert-Butyl Ether		M	2760	µg/kg	1.0		< 1.0			< 1.0	< 1.0	< 1.0	< 1.0
Naphthalene		M	2800	mg/kg	0.10		< 0.10			< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene		N	2800	mg/kg	0.10		< 0.10			< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene		M	2800	mg/kg	0.10		< 0.10			< 0.10	< 0.10	< 0.10	< 0.10
Fluorene		M	2800	mg/kg	0.10		< 0.10			< 0.10	< 0.10	< 0.10	< 0.10
Phenanthrene		M	2800	mg/kg	0.10		< 0.10			< 0.10	< 0.10	< 0.10	< 0.10
Anthracene		M	2800	mg/kg	0.10		< 0.10			< 0.10	< 0.10	< 0.10	< 0.10
Fluoranthene		M	2800	mg/kg	0.10		< 0.10			< 0.10	< 0.10	< 0.10	< 0.10
Pyrene		M	2800	mg/kg	0.10		< 0.10			< 0.10	< 0.10	< 0.10	< 0.10
Benzo[a]anthracene		M	2800	mg/kg	0.10		< 0.10			< 0.10	< 0.10	< 0.10	< 0.10
Chrysene		M	2800	mg/kg	0.10		< 0.10			< 0.10	< 0.10	< 0.10	< 0.10
Benzo[b]fluoranthene		M	2800	mg/kg	0.10		< 0.10			< 0.10	< 0.10	< 0.10	< 0.10
Benzo[k]fluoranthene		M	2800	mg/kg	0.10		< 0.10			< 0.10	< 0.10	< 0.10	< 0.10
Benzo[a]pyrene		M	2800	mg/kg	0.10		< 0.10			< 0.10	< 0.10	< 0.10	< 0.10

Results - Soil

Project: 25387 Cashemartyr Cork

Client: IGSL						**Chemtest Job No.:**	24-21214	24-21214	24-21214	24-21214	24-21214	24-21214	24-21214	24-21214
Quotation No.:						**Chemtest Sample ID.:**	1830177	1830178	1830179	1830180	1830181	1830182	1830183	1830184
Order No.:						Client Sample Ref.:	BH04A	BH05	BH05	BH06	TP02	TP03	TP04	TP05
						Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
						Top Depth (m):	1.00	1.00	3.00	2.00	1.00	0.40	1.00	0.40
						Date Sampled:	02-Jul-2024	02-Jul-2024	02-Jul-2024	02-Jul-2024	02-Jul-2024	02-Jul-2024	02-Jul-2024	02-Jul-2024
						Asbestos Lab:		DURHAM			DURHAM	DURHAM	DURHAM	DURHAM
Determinand	**HWOL Code**	**Accred.**	**SOP**	**Units**	**LOD**									
Indeno(1,2,3-c,d)Pyrene		M	2800	mg/kg	0.10		< 0.10			< 0.10	< 0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene		N	2800	mg/kg	0.10		< 0.10			< 0.10	< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene		M	2800	mg/kg	0.10		< 0.10			< 0.10	< 0.10	< 0.10	< 0.10
Coronene		N	2800	mg/kg	0.10		< 0.10			< 0.10	< 0.10	< 0.10	< 0.10
PCB 28		U	2815	mg/kg	0.010		< 0.010			< 0.010	< 0.010	< 0.010	< 0.010
PCB 52		U	2815	mg/kg	0.010		< 0.010			< 0.010	< 0.010	< 0.010	< 0.010
PCB 101		U	2815	mg/kg	0.010		< 0.010			< 0.010	< 0.010	< 0.010	< 0.010
PCB 118		U	2815	mg/kg	0.010		< 0.010			< 0.010	< 0.010	< 0.010	< 0.010
PCB 153		U	2815	mg/kg	0.010		< 0.010			< 0.010	< 0.010	< 0.010	< 0.010
PCB 138		U	2815	mg/kg	0.010		< 0.010			< 0.010	< 0.010	< 0.010	< 0.010
PCB 180		U	2815	mg/kg	0.010		< 0.010			< 0.010	< 0.010	< 0.010	< 0.010
Total PCBs (7 Congeners)		N	2815	mg/kg	0.10		< 0.10			< 0.10	< 0.10	< 0.10	< 0.10
Total Phenols		M	2920	mg/kg	0.10		< 0.10			< 0.10	< 0.10	< 0.10	< 0.10

Results - Soil

Project: 25387 Cashemartyr Cork

Client: IGSL				**Chemtest Job No.:**		24-21214	24-21214	24-21214	24-21214	24-21214	24-21214	24-21214	24-21214
Quotation No.:				**Chemtest Sample ID.:**		1830185	1830186	1830187	1830188	1830189	1830190	1830191	1830192
Order No.:				Client Sample Ref.:		TP06	TP07	TP08	TP09	TP09	TP09	TP10	BH2A
				Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):		1.00	0.60	0.40	1.00	2.00	3.00	0.50	1.00
				Date Sampled:		02-Jul-2024	02-Jul-2024	02-Jul-2024	02-Jul-2024	02-Jul-2024	02-Jul-2024	02-Jul-2024	02-Jul-2024
				Asbestos Lab:		DURHAM	DURHAM	DURHAM	DURHAM	DURHAM		DURHAM	
Determinand	**HWOL Code**	**Accred.**	**SOP**	**Units**	**LOD**								
ACM Type		U	2192		N/A	-	-	-	-	-		-	
Asbestos Identification		U	2192		N/A	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected		No Asbestos Detected	
Moisture		N	2030	%	0.020	9.7	14	16	11	15	17	15	8.7
Soil Colour		N	2040		N/A	Brown	Brown	Brown	Brown	Brown	Brown	Brown	Brown
Other Material		N	2040		N/A	Stones	Stones	Stones and Roots	Stones and Roots	Stones and Roots	Stones	Stones and Roots	Stones
Soil Texture		N	2040		N/A	Clay	Clay	Clay	Loam	Clay	Clay	Clay	Gravel
pH (2.5:1) at 20C		N	2010		4.0						7.9		8.1
Boron (Hot Water Soluble)		M	2120	mg/kg	0.40	< 0.40	0.43	0.45	0.58	0.47		0.48	
Magnesium (Water Soluble)		N	2120	g/l	0.010						< 0.010		< 0.010
Sulphate (2:1 Water Soluble) as SO4		M	2120	g/l	0.010						0.089		< 0.010
Total Sulphur		U	2175	%	0.010						< 0.010		< 0.010
Sulphur (Elemental)		M	2180	mg/kg	1.0	1.1	< 1.0	39	1.0	6.5		4.4	
Chloride (Water Soluble)		M	2220	g/l	0.010						< 0.010		< 0.010
Nitrate (Water Soluble)		N	2220	g/l	0.010						< 0.010		0.023
Cyanide (Total)		M	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50		< 0.50	
Sulphide (Easily Liberatable)		N	2325	mg/kg	0.50	5.2	4.3	11	2.9	3.5		7.3	
Ammonium (Water Soluble)		M	2220	g/l	0.01						< 0.01		< 0.01
Sulphate (Total)		U	2430	%	0.010	< 0.010	< 0.010	0.031	0.032	0.093		0.076	
Sulphate (Acid Soluble)		U	2430	%	0.010						0.011		< 0.010
Arsenic		M	2455	mg/kg	0.5	0.9	< 0.5	< 0.5	< 0.5	< 0.5		< 0.5	
Barium		M	2455	mg/kg	0.5	46	23	33	55	47		33	
Cadmium		M	2455	mg/kg	0.10	< 0.10	< 0.10	0.10	0.26	0.20		< 0.10	
Chromium		M	2455	mg/kg	0.5	30	19	19	17	29		21	
Molybdenum		M	2455	mg/kg	0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5		< 0.5	
Antimony		N	2455	mg/kg	2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0		< 2.0	
Copper		M	2455	mg/kg	0.50	27	14	15	13	22		16	
Mercury		M	2455	mg/kg	0.05	< 0.05	< 0.05	0.05	< 0.05	0.07		0.05	
Nickel		M	2455	mg/kg	0.50	51	23	25	24	39		27	
Lead		M	2455	mg/kg	0.50	33	21	23	29	38		27	
Selenium		M	2455	mg/kg	0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25		< 0.25	
Zinc		M	2455	mg/kg	0.50	99	55	58	68	98		67	
Chromium (Trivalent)		N	2490	mg/kg	1.0	30	19	19	17	29		21	
Chromium (Hexavalent)		N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50		< 0.50	
Aliphatic VPH >C5-C6	HS_2D_AL	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05	
Aliphatic VPH >C6-C7	HS_2D_AL	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05	
Aliphatic VPH >C7-C8	HS_2D_AL	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05	
Aliphatic VPH >C8-C10	HS_2D_AL	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05	

Results - Soil

Project: 25387 Cashemartyr Cork

Client: IGSL				**Chemtest Job No.:**		24-21214	24-21214	24-21214	24-21214	24-21214	24-21214	24-21214	24-21214
Quotation No.:				**Chemtest Sample ID.:**		1830185	1830186	1830187	1830188	1830189	1830190	1830191	1830192
Order No.:				Client Sample Ref.:		TP06	TP07	TP08	TP09	TP09	TP09	TP10	BH2A
				Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):		1.00	0.60	0.40	1.00	2.00	3.00	0.50	1.00
				Date Sampled:		02-Jul-2024	02-Jul-2024	02-Jul-2024	02-Jul-2024	02-Jul-2024	02-Jul-2024	02-Jul-2024	02-Jul-2024
				Asbestos Lab:		DURHAM	DURHAM	DURHAM	DURHAM	DURHAM		DURHAM	
Determinand	**HWOL Code**	**Accred.**	**SOP**	**Units**	**LOD**								
Total Aliphatic VPH >C5-C10	HS_2D_AL	U	2780	mg/kg	0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25		< 0.25	
Aliphatic EPH >C10-C12 MC	EH_2D_AL_#1	M	2690	mg/kg	2.00	7.7	7.8	7.3	6.3	8.1		9.6	
Aliphatic EPH >C12-C16 MC	EH_2D_AL_#1	M	2690	mg/kg	1.00	2.1	< 1.0	1.4	1.3	1.9		4.3	
Aliphatic EPH >C16-C21 MC	EH_2D_AL_#1	M	2690	mg/kg	2.00	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0		2.6	
Aliphatic EPH >C21-C35 MC	EH_2D_AL_#1	M	2690	mg/kg	3.00	9.3	11	12	8.7	3.9		10	
Aliphatic EPH >C35-C40 MC	EH_2D_AL_#1	N	2690	mg/kg	10.00	11	14	15	16	14		19	
Total Aliphatic EPH >C10-C35 MC	EH_2D_AL_#1	M	2690	mg/kg	5.00	19	19	20	16	14		27	
Aromatic VPH >C5-C7	HS_2D_AR	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05	
Aromatic VPH >C7-C8	HS_2D_AR	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05	
Aromatic VPH >C8-C10	HS_2D_AR	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05	
Total Aromatic VPH >C5-C10	HS_2D_AR	U	2780	mg/kg	0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25		< 0.25	
Aromatic EPH >C10-C12 MC	EH_2D_AR_#1	U	2690	mg/kg	1.00	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0		< 1.0	
Aromatic EPH >C12-C16 MC	EH_2D_AR_#1	U	2690	mg/kg	1.00	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0		< 1.0	
Aromatic EPH >C16-C21 MC	EH_2D_AR_#1	U	2690	mg/kg	2.00	< 2.0	2.1	< 2.0	3.6	4.4		< 2.0	
Aromatic EPH >C21-C35 MC	EH_2D_AR_#1	U	2690	mg/kg	2.00	< 2.0	< 2.0	3.2	5.8	6.8		4.2	
Aromatic EPH >C35-C40 MC	EH_2D_AR_#1	N	2690	mg/kg	1.00	32	3.6	6.4	7.9	11		8.4	
Total Aromatic EPH >C10-C35 MC	EH_2D_AR_#1	U	2690	mg/kg	5.00	< 5.0	< 5.0	< 5.0	9.4	11		5.4	
Total VPH >C5-C10	HS_2D_Total	U	2780	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50		< 0.50	
Total EPH >C10-C35 MC	EH_2D_Total_#1	U	2690	mg/kg	10.00	21	21	25	26	25		32	
Mineral Oil EPH		N	2670	mg/kg	10	19	19	20	16	14		27	
Benzene		M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0		< 1.0	
Toluene		M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0		< 1.0	
Ethylbenzene		M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0		< 1.0	
m & p-Xylene		M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0		< 1.0	
o-Xylene		M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0		< 1.0	
Methyl Tert-Butyl Ether		M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0		< 1.0	
Naphthalene		M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		< 0.10	
Acenaphthylene		N	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		< 0.10	
Acenaphthene		M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		< 0.10	
Fluorene		M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		< 0.10	
Phenanthrene		M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	0.46	0.13		< 0.10	
Anthracene		M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	0.16	< 0.10		< 0.10	
Fluoranthene		M	2800	mg/kg	0.10	< 0.10	< 0.10	0.17	1.5	0.34		0.32	
Pyrene		M	2800	mg/kg	0.10	< 0.10	< 0.10	0.17	1.3	0.34		0.26	
Benzo[a]anthracene		M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	0.68	0.16		< 0.10	
Chrysene		M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	0.72	0.19		< 0.10	
Benzo[b]fluoranthene		M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	1.2	0.26		< 0.10	
Benzo[k]fluoranthene		M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	0.34	< 0.10		< 0.10	
Benzo[a]pyrene		M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	0.81	0.20		< 0.10	

Results - Soil

Project: 25387 Cashemartyr Cork

Client: IGSL				**Chemtest Job No.:**		24-21214	24-21214	24-21214	24-21214	24-21214	24-21214	24-21214	24-21214
Quotation No.:				**Chemtest Sample ID.:**		1830185	1830186	1830187	1830188	1830189	1830190	1830191	1830192
Order No.:				Client Sample Ref.:		TP06	TP07	TP08	TP09	TP09	TP09	TP10	BH2A
				Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):		1.00	0.60	0.40	1.00	2.00	3.00	0.50	1.00
				Date Sampled:		02-Jul-2024	02-Jul-2024	02-Jul-2024	02-Jul-2024	02-Jul-2024	02-Jul-2024	02-Jul-2024	02-Jul-2024
				Asbestos Lab:		DURHAM	DURHAM	DURHAM	DURHAM	DURHAM		DURHAM	
Determinand	**HWOL Code**	**Accred.**	**SOP**	**Units**	**LOD**								
Indeno(1,2,3-c,d)Pyrene		M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	0.65	0.15		< 0.10	
Dibenz(a,h)Anthracene		N	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	0.13	< 0.10		< 0.10	
Benzo[g,h,i]perylene		M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	0.63	0.13		< 0.10	
Coronene		N	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		< 0.10	
PCB 28		U	2815	mg/kg	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010		< 0.010	
PCB 52		U	2815	mg/kg	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010		< 0.010	
PCB 101		U	2815	mg/kg	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010		< 0.010	
PCB 118		U	2815	mg/kg	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010		< 0.010	
PCB 153		U	2815	mg/kg	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010		< 0.010	
PCB 138		U	2815	mg/kg	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010		< 0.010	
PCB 180		U	2815	mg/kg	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010		< 0.010	
Total PCBs (7 Congeners)		N	2815	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		< 0.10	
Total Phenols		M	2920	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		< 0.10	

Results - Soil

Project: 25387 Cashemartyr Cork

Client: IGSL				**Chemtest Job No.:**		24-21214
Quotation No.:				**Chemtest Sample ID.:**		1830193
Order No.:				Client Sample Ref.:		BH03
				Sample Type:		SOIL
				Top Depth (m):		2.00
				Date Sampled:		02-Jul-2024
				Asbestos Lab:		
Determinand	**HWOL Code**	**Accred.**	**SOP**	**Units**	**LOD**	
ACM Type		U	2192		N/A	
Asbestos Identification		U	2192		N/A	
Moisture		N	2030	%	0.020	15
Soil Colour		N	2040		N/A	Brown
Other Material		N	2040		N/A	Stones
Soil Texture		N	2040		N/A	Clay
pH (2.5:1) at 20C		N	2010		4.0	8.0
Boron (Hot Water Soluble)		M	2120	mg/kg	0.40	
Magnesium (Water Soluble)		N	2120	g/l	0.010	< 0.010
Sulphate (2:1 Water Soluble) as SO4		M	2120	g/l	0.010	0.016
Total Sulphur		U	2175	%	0.010	< 0.010
Sulphur (Elemental)		M	2180	mg/kg	1.0	
Chloride (Water Soluble)		M	2220	g/l	0.010	< 0.010
Nitrate (Water Soluble)		N	2220	g/l	0.010	0.011
Cyanide (Total)		M	2300	mg/kg	0.50	
Sulphide (Easily Liberatable)		N	2325	mg/kg	0.50	
Ammonium (Water Soluble)		M	2220	g/l	0.01	< 0.01
Sulphate (Total)		U	2430	%	0.010	
Sulphate (Acid Soluble)		U	2430	%	0.010	< 0.010
Arsenic		M	2455	mg/kg	0.5	
Barium		M	2455	mg/kg	0.5	
Cadmium		M	2455	mg/kg	0.10	
Chromium		M	2455	mg/kg	0.5	
Molybdenum		M	2455	mg/kg	0.5	
Antimony		N	2455	mg/kg	2.0	
Copper		M	2455	mg/kg	0.50	
Mercury		M	2455	mg/kg	0.05	
Nickel		M	2455	mg/kg	0.50	
Lead		M	2455	mg/kg	0.50	
Selenium		M	2455	mg/kg	0.25	
Zinc		M	2455	mg/kg	0.50	
Chromium (Trivalent)		N	2490	mg/kg	1.0	
Chromium (Hexavalent)		N	2490	mg/kg	0.50	
Aliphatic VPH >C5-C6	HS_2D_AL	U	2780	mg/kg	0.05	
Aliphatic VPH >C6-C7	HS_2D_AL	U	2780	mg/kg	0.05	
Aliphatic VPH >C7-C8	HS_2D_AL	U	2780	mg/kg	0.05	
Aliphatic VPH >C8-C10	HS_2D_AL	U	2780	mg/kg	0.05	

Results - Soil

Project: 25387 Cashemartyr Cork

Client: IGSL				**Chemtest Job No.:**		24-21214
Quotation No.:				**Chemtest Sample ID.:**		1830193
Order No.:				Client Sample Ref.:		BH03
				Sample Type:		SOIL
				Top Depth (m):		2.00
				Date Sampled:		02-Jul-2024
				Asbestos Lab:		
Determinand	**HWOL Code**	**Accred.**	**SOP**	**Units**	**LOD**	
Total Aliphatic VPH >C5-C10	HS_2D_AL	U	2780	mg/kg	0.25	
Aliphatic EPH >C10-C12 MC	EH_2D_AL_#1	M	2690	mg/kg	2.00	
Aliphatic EPH >C12-C16 MC	EH_2D_AL_#1	M	2690	mg/kg	1.00	
Aliphatic EPH >C16-C21 MC	EH_2D_AL_#1	M	2690	mg/kg	2.00	
Aliphatic EPH >C21-C35 MC	EH_2D_AL_#1	M	2690	mg/kg	3.00	
Aliphatic EPH >C35-C40 MC	EH_2D_AL_#1	N	2690	mg/kg	10.00	
Total Aliphatic EPH >C10-C35 MC	EH_2D_AL_#1	M	2690	mg/kg	5.00	
Aromatic VPH >C5-C7	HS_2D_AR	U	2780	mg/kg	0.05	
Aromatic VPH >C7-C8	HS_2D_AR	U	2780	mg/kg	0.05	
Aromatic VPH >C8-C10	HS_2D_AR	U	2780	mg/kg	0.05	
Total Aromatic VPH >C5-C10	HS_2D_AR	U	2780	mg/kg	0.25	
Aromatic EPH >C10-C12 MC	EH_2D_AR_#1	U	2690	mg/kg	1.00	
Aromatic EPH >C12-C16 MC	EH_2D_AR_#1	U	2690	mg/kg	1.00	
Aromatic EPH >C16-C21 MC	EH_2D_AR_#1	U	2690	mg/kg	2.00	
Aromatic EPH >C21-C35 MC	EH_2D_AR_#1	U	2690	mg/kg	2.00	
Aromatic EPH >C35-C40 MC	EH_2D_AR_#1	N	2690	mg/kg	1.00	
Total Aromatic EPH >C10-C35 MC	EH_2D_AR_#1	U	2690	mg/kg	5.00	
Total VPH >C5-C10	HS_2D_Total	U	2780	mg/kg	0.50	
Total EPH >C10-C35 MC	EH_2D_Total_#1	U	2690	mg/kg	10.00	
Mineral Oil EPH		N	2670	mg/kg	10	
Benzene		M	2760	µg/kg	1.0	
Toluene		M	2760	µg/kg	1.0	
Ethylbenzene		M	2760	µg/kg	1.0	
m & p-Xylene		M	2760	µg/kg	1.0	
o-Xylene		M	2760	µg/kg	1.0	
Methyl Tert-Butyl Ether		M	2760	µg/kg	1.0	
Naphthalene		M	2800	mg/kg	0.10	
Acenaphthylene		N	2800	mg/kg	0.10	
Acenaphthene		M	2800	mg/kg	0.10	
Fluorene		M	2800	mg/kg	0.10	
Phenanthrene		M	2800	mg/kg	0.10	
Anthracene		M	2800	mg/kg	0.10	
Fluoranthene		M	2800	mg/kg	0.10	
Pyrene		M	2800	mg/kg	0.10	
Benzo[a]anthracene		M	2800	mg/kg	0.10	
Chrysene		M	2800	mg/kg	0.10	
Benzo[b]fluoranthene		M	2800	mg/kg	0.10	
Benzo[k]fluoranthene		M	2800	mg/kg	0.10	
Benzo[a]pyrene		M	2800	mg/kg	0.10	

Results - Soil

Project: 25387 Cashemartyr Cork

Client: IGSL				**Chemtest Job No.:**		24-21214
Quotation No.:				**Chemtest Sample ID.:**		1830193
Order No.:				Client Sample Ref.:		BH03
				Sample Type:		SOIL
				Top Depth (m):		2.00
				Date Sampled:		02-Jul-2024
				Asbestos Lab:		
Determinand	**HWOL Code**	**Accred.**	**SOP**	**Units**	**LOD**	
Indeno(1,2,3-c,d)Pyrene		M	2800	mg/kg	0.10	
Dibenz(a,h)Anthracene		N	2800	mg/kg	0.10	
Benzo[g,h,i]perylene		M	2800	mg/kg	0.10	
Coronene		N	2800	mg/kg	0.10	
PCB 28		U	2815	mg/kg	0.010	
PCB 52		U	2815	mg/kg	0.010	
PCB 101		U	2815	mg/kg	0.010	
PCB 118		U	2815	mg/kg	0.010	
PCB 153		U	2815	mg/kg	0.010	
PCB 138		U	2815	mg/kg	0.010	
PCB 180		U	2815	mg/kg	0.010	
Total PCBs (7 Congeners)		N	2815	mg/kg	0.10	
Total Phenols		M	2920	mg/kg	0.10	

Results - Single Stage WAC

Project: 25387 Cashemartyr Cork

						Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	24-21214							
Chemtest Sample ID:	1830178							
Sample Ref:	BH05							
Sample ID:								
Sample Location:								
Top Depth(m):	1.00							
Bottom Depth(m):								
Sampling Date:	02-Jul-2024					**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Determinand	**SOP**	**HWOL Code**	**Accred.**	**Units**				
Total Organic Carbon	2625		M	%	1.4	3	5	6
Loss On Ignition	2610		M	%	3.7	--	--	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	EH_CU_1D_Total	M	mg/kg	< 10	500	--	--
Total Of 17 PAHs Lower	2800		N	mg/kg	< 1.0	100	--	--
pH at 20C	2010		M		8.4	--	>6	--
Acid Neutralisation Capacity	2015		N	mol/kg	0.011	--	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	0.0006	0.0064	0.5	2	25
Barium	1455		U	0.008	0.076	20	100	300
Cadmium	1455		U	< 0.00011	< 0.0011	0.04	1	5
Chromium	1455		U	0.0009	0.0086	0.5	10	70
Copper	1455		U	0.0024	0.024	2	50	100
Mercury	1455		U	< 0.00005	< 0.00050	0.01	0.2	2
Molybdenum	1455		U	0.0013	0.013	0.5	10	30
Nickel	1455		U	0.0016	0.016	0.4	10	40
Lead	1455		U	< 0.0005	< 0.0050	0.5	10	50
Antimony	1455		U	< 0.0005	< 0.0050	0.06	0.7	5
Selenium	1455		U	< 0.0005	< 0.0050	0.1	0.5	7
Zinc	1455		U	0.008	0.080	4	50	200
Chloride	1220		U	2.3	23	800	15000	25000
Fluoride	1220		U	0.20	2.0	10	150	500
Sulphate	1220		U	61	610	1000	20000	50000
Total Dissolved Solids	1020		N	150	1500	4000	60000	100000
Phenol Index	1920		U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610		U	5.0	< 50	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	18

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: 25387 Cashemartyr Cork

						Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	24-21214							
Chemtest Sample ID:	1830181							
Sample Ref:	TP02							
Sample ID:								
Sample Location:								
Top Depth(m):	1.00							
Bottom Depth(m):								
Sampling Date:	02-Jul-2024							
Determinand	**SOP**	**HWOL Code**	**Accred.**	**Units**		**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625		M	%	< 0.20	3	5	6
Loss On Ignition	2610		M	%	1.9	--	--	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	EH_CU_1D_Total	M	mg/kg	< 10	500	--	--
Total Of 17 PAHs Lower	2800		N	mg/kg	< 1.0	100	--	--
pH at 20C	2010		M		8.5	--	>6	--
Acid Neutralisation Capacity	2015		N	mol/kg	0.0070	--	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	0.0004	0.0044	0.5	2	25
Barium	1455		U	< 0.005	< 0.050	20	100	300
Cadmium	1455		U	< 0.00011	< 0.0011	0.04	1	5
Chromium	1455		U	0.0010	0.0099	0.5	10	70
Copper	1455		U	0.0012	0.012	2	50	100
Mercury	1455		U	< 0.00005	< 0.00050	0.01	0.2	2
Molybdenum	1455		U	0.0003	0.0034	0.5	10	30
Nickel	1455		U	0.0009	0.0093	0.4	10	40
Lead	1455		U	0.0006	0.0055	0.5	10	50
Antimony	1455		U	< 0.0005	< 0.0050	0.06	0.7	5
Selenium	1455		U	0.0008	0.0083	0.1	0.5	7
Zinc	1455		U	0.007	0.067	4	50	200
Chloride	1220		U	2.0	20	800	15000	25000
Fluoride	1220		U	0.14	1.4	10	150	500
Sulphate	1220		U	1.2	12	1000	20000	50000
Total Dissolved Solids	1020		N	31	310	4000	60000	100000
Phenol Index	1920		U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610		U	4.1	< 50	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	14

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: 25387 Cashemartyr Cork

						Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	24-21214							
Chemtest Sample ID:	1830182							
Sample Ref:	TP03							
Sample ID:								
Sample Location:								
Top Depth(m):	0.40							
Bottom Depth(m):								
Sampling Date:	02-Jul-2024							
Determinand	**SOP**	**HWOL Code**	**Accred.**	**Units**		**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625		M	%	< 0.20	3	5	6
Loss On Ignition	2610		M	%	2.7	--	--	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	EH_CU_1D_Total	M	mg/kg	< 10	500	--	--
Total Of 17 PAHs Lower	2800		N	mg/kg	< 1.0	100	--	--
pH at 20C	2010		M		8.6	--	>6	--
Acid Neutralisation Capacity	2015		N	mol/kg	0.0070	--	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	0.0005	0.0046	0.5	2	25
Barium	1455		U	< 0.005	< 0.050	20	100	300
Cadmium	1455		U	< 0.00011	< 0.0011	0.04	1	5
Chromium	1455		U	0.0006	0.0061	0.5	10	70
Copper	1455		U	0.0013	0.013	2	50	100
Mercury	1455		U	< 0.00005	< 0.00050	0.01	0.2	2
Molybdenum	1455		U	0.0006	0.0055	0.5	10	30
Nickel	1455		U	0.0010	0.0095	0.4	10	40
Lead	1455		U	< 0.0005	< 0.0050	0.5	10	50
Antimony	1455		U	< 0.0005	< 0.0050	0.06	0.7	5
Selenium	1455		U	< 0.0005	< 0.0050	0.1	0.5	7
Zinc	1455		U	0.017	0.17	4	50	200
Chloride	1220		U	< 1.0	< 10	800	15000	25000
Fluoride	1220		U	0.20	2.0	10	150	500
Sulphate	1220		U	< 1.0	< 10	1000	20000	50000
Total Dissolved Solids	1020		N	41	410	4000	60000	100000
Phenol Index	1920		U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610		U	3.4	< 50	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	12

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: 25387 Cashemartyr Cork

						Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	24-21214							
Chemtest Sample ID:	1830183							
Sample Ref:	TP04							
Sample ID:								
Sample Location:								
Top Depth(m):	1.00							
Bottom Depth(m):								
Sampling Date:	02-Jul-2024					**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Determinand	**SOP**	**HWOL Code**	**Accred.**	**Units**				
Total Organic Carbon	2625		M	%	< 0.20	3	5	6
Loss On Ignition	2610		M	%	1.8	--	--	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	EH_CU_1D_Total	M	mg/kg	< 10	500	--	--
Total Of 17 PAHs Lower	2800		N	mg/kg	< 1.0	100	--	--
pH at 20C	2010		M		8.1	--	>6	--
Acid Neutralisation Capacity	2015		N	mol/kg	0.0060	--	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	< 0.0002	< 0.0020	0.5	2	25
Barium	1455		U	< 0.005	< 0.050	20	100	300
Cadmium	1455		U	< 0.00011	< 0.0011	0.04	1	5
Chromium	1455		U	0.0008	0.0075	0.5	10	70
Copper	1455		U	< 0.0005	< 0.0050	2	50	100
Mercury	1455		U	< 0.00005	< 0.00050	0.01	0.2	2
Molybdenum	1455		U	0.0003	0.0028	0.5	10	30
Nickel	1455		U	< 0.0005	< 0.0050	0.4	10	40
Lead	1455		U	< 0.0005	< 0.0050	0.5	10	50
Antimony	1455		U	< 0.0005	< 0.0050	0.06	0.7	5
Selenium	1455		U	< 0.0005	< 0.0050	0.1	0.5	7
Zinc	1455		U	0.004	0.040	4	50	200
Chloride	1220		U	< 1.0	< 10	800	15000	25000
Fluoride	1220		U	0.13	1.3	10	150	500
Sulphate	1220		U	< 1.0	< 10	1000	20000	50000
Total Dissolved Solids	1020		N	26	260	4000	60000	100000
Phenol Index	1920		U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610		U	< 2.5	< 50	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	9.7

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: 25387 Cashemartyr Cork

						Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	24-21214							
Chemtest Sample ID:	1830184							
Sample Ref:	TP05							
Sample ID:								
Sample Location:								
Top Depth(m):	0.40							
Bottom Depth(m):								
Sampling Date:	02-Jul-2024							
Determinand	**SOP**	**HWOL Code**	**Accred.**	**Units**		**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625		M	%	0.36	3	5	6
Loss On Ignition	2610		M	%	1.8	--	--	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	EH_CU_1D_Total	M	mg/kg	< 10	500	--	--
Total Of 17 PAHs Lower	2800		N	mg/kg	< 1.0	100	--	--
pH at 20C	2010		M		8.2	--	>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	0.0006	0.0057	0.5	2	25
Barium	1455		U	< 0.005	< 0.050	20	100	300
Cadmium	1455		U	< 0.00011	< 0.0011	0.04	1	5
Chromium	1455		U	0.0008	0.0076	0.5	10	70
Copper	1455		U	0.0009	0.0091	2	50	100
Mercury	1455		U	< 0.00005	< 0.00050	0.01	0.2	2
Molybdenum	1455		U	0.0005	0.0053	0.5	10	30
Nickel	1455		U	< 0.0005	< 0.0050	0.4	10	40
Lead	1455		U	< 0.0005	< 0.0050	0.5	10	50
Antimony	1455		U	< 0.0005	< 0.0050	0.06	0.7	5
Selenium	1455		U	< 0.0005	< 0.0050	0.1	0.5	7
Zinc	1455		U	0.012	0.12	4	50	200
Chloride	1220		U	< 1.0	< 10	800	15000	25000
Fluoride	1220		U	0.29	2.9	10	150	500
Sulphate	1220		U	< 1.0	< 10	1000	20000	50000
Total Dissolved Solids	1020		N	39	390	4000	60000	100000
Phenol Index	1920		U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610		U	3.0	< 50	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	16

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: 25387 Cashemartyr Cork

						Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	24-21214							
Chemtest Sample ID:	1830185							
Sample Ref:	TP06							
Sample ID:								
Sample Location:								
Top Depth(m):	1.00							
Bottom Depth(m):								
Sampling Date:	02-Jul-2024							
Determinand	**SOP**	**HWOL Code**	**Accred.**	**Units**		**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625		M	%	0.26	3	5	6
Loss On Ignition	2610		M	%	2.0	--	--	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	EH_CU_1D_Total	M	mg/kg	< 10	500	--	--
Total Of 17 PAHs Lower	2800		N	mg/kg	< 1.0	100	--	--
pH at 20C	2010		M		8.3	--	>6	--
Acid Neutralisation Capacity	2015		N	mol/kg	0.0060	--	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	0.0030	0.5	2	25
Barium	1455		U	< 0.005	< 0.050	20	100	300
Cadmium	1455		U	< 0.00011	< 0.0011	0.04	1	5
Chromium	1455		U	0.0012	0.012	0.5	10	70
Copper	1455		U	< 0.0005	< 0.0050	2	50	100
Mercury	1455		U	< 0.00005	< 0.00050	0.01	0.2	2
Molybdenum	1455		U	< 0.0002	< 0.0020	0.5	10	30
Nickel	1455		U	0.0009	0.0092	0.4	10	40
Lead	1455		U	< 0.0005	< 0.0050	0.5	10	50
Antimony	1455		U	< 0.0005	< 0.0050	0.06	0.7	5
Selenium	1455		U	< 0.0005	< 0.0050	0.1	0.5	7
Zinc	1455		U	0.007	0.068	4	50	200
Chloride	1220		U	< 1.0	< 10	800	15000	25000
Fluoride	1220		U	0.12	1.2	10	150	500
Sulphate	1220		U	< 1.0	< 10	1000	20000	50000
Total Dissolved Solids	1020		N	18	180	4000	60000	100000
Phenol Index	1920		U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610		U	5.8	58	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	9.7

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: 25387 Cashemartyr Cork

						Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	24-21214							
Chemtest Sample ID:	1830186							
Sample Ref:	TP07							
Sample ID:								
Sample Location:								
Top Depth(m):	0.60							
Bottom Depth(m):								
Sampling Date:	02-Jul-2024							
Determinand	**SOP**	**HWOL Code**	**Accred.**	**Units**		**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625		M	%	0.60	3	5	6
Loss On Ignition	2610		M	%	1.5	--	--	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	EH_CU_1D_Total	M	mg/kg	< 10	500	--	--
Total Of 17 PAHs Lower	2800		N	mg/kg	< 1.0	100	--	--
pH at 20C	2010		M		7.8	--	>6	--
Acid Neutralisation Capacity	2015		N	mol/kg	0.0070	--	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	< 0.0002	< 0.0020	0.5	2	25
Barium	1455		U	< 0.005	< 0.050	20	100	300
Cadmium	1455		U	< 0.00011	< 0.0011	0.04	1	5
Chromium	1455		U	0.0036	0.036	0.5	10	70
Copper	1455		U	0.0005	0.0051	2	50	100
Mercury	1455		U	< 0.00005	< 0.00050	0.01	0.2	2
Molybdenum	1455		U	< 0.0002	< 0.0020	0.5	10	30
Nickel	1455		U	0.0036	0.036	0.4	10	40
Lead	1455		U	< 0.0005	< 0.0050	0.5	10	50
Antimony	1455		U	0.0010	0.0095	0.06	0.7	5
Selenium	1455		U	< 0.0005	< 0.0050	0.1	0.5	7
Zinc	1455		U	0.004	0.040	4	50	200
Chloride	1220		U	< 1.0	< 10	800	15000	25000
Fluoride	1220		U	0.11	1.1	10	150	500
Sulphate	1220		U	2.2	22	1000	20000	50000
Total Dissolved Solids	1020		N	22	220	4000	60000	100000
Phenol Index	1920		U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610		U	< 2.5	< 50	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	14

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: 25387 Cashemartyr Cork

						Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	24-21214							
Chemtest Sample ID:	1830187							
Sample Ref:	TP08							
Sample ID:								
Sample Location:								
Top Depth(m):	0.40							
Bottom Depth(m):								
Sampling Date:	02-Jul-2024					**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Determinand	**SOP**	**HWOL Code**	**Accred.**	**Units**				
Total Organic Carbon	2625		M	%	0.55	3	5	6
Loss On Ignition	2610		M	%	2.4	--	--	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	EH_CU_1D_Total	M	mg/kg	< 10	500	--	--
Total Of 17 PAHs Lower	2800		N	mg/kg	< 1.0	100	--	--
pH at 20C	2010		M		8.0	--	>6	--
Acid Neutralisation Capacity	2015		N	mol/kg	0.0050	--	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	0.0011	0.011	0.5	2	25
Barium	1455		U	< 0.005	< 0.050	20	100	300
Cadmium	1455		U	< 0.00011	< 0.0011	0.04	1	5
Chromium	1455		U	0.0010	0.010	0.5	10	70
Copper	1455		U	0.0022	0.022	2	50	100
Mercury	1455		U	< 0.00005	< 0.00050	0.01	0.2	2
Molybdenum	1455		U	0.0013	0.013	0.5	10	30
Nickel	1455		U	0.0009	0.0087	0.4	10	40
Lead	1455		U	< 0.0005	< 0.0050	0.5	10	50
Antimony	1455		U	0.0007	0.0072	0.06	0.7	5
Selenium	1455		U	0.0006	0.0061	0.1	0.5	7
Zinc	1455		U	0.004	0.043	4	50	200
Chloride	1220		U	< 1.0	< 10	800	15000	25000
Fluoride	1220		U	0.19	1.9	10	150	500
Sulphate	1220		U	23	230	1000	20000	50000
Total Dissolved Solids	1020		N	87	870	4000	60000	100000
Phenol Index	1920		U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610		U	4.8	< 50	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	16

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: 25387 Cashemartyr Cork

						Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	24-21214							
Chemtest Sample ID:	1830188							
Sample Ref:	TP09							
Sample ID:								
Sample Location:								
Top Depth(m):	1.00							
Bottom Depth(m):								
Sampling Date:	02-Jul-2024					**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Determinand	**SOP**	**HWOL Code**	**Accred.**	**Units**				
Total Organic Carbon	2625		M	%	1.3	3	5	6
Loss On Ignition	2610		M	%	2.5	--	--	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	EH_CU_1D_Total	M	mg/kg	340	500	--	--
Total Of 17 PAHs Lower	2800		N	mg/kg	8.6	100	--	--
pH at 20C	2010		M		8.1	--	>6	--
Acid Neutralisation Capacity	2015		N	mol/kg	0.0070	--	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	0.0013	0.013	0.5	2	25
Barium	1455		U	0.006	0.060	20	100	300
Cadmium	1455		U	< 0.00011	< 0.0011	0.04	1	5
Chromium	1455		U	0.0010	0.010	0.5	10	70
Copper	1455		U	0.0024	0.024	2	50	100
Mercury	1455		U	< 0.00005	< 0.00050	0.01	0.2	2
Molybdenum	1455		U	0.0013	0.013	0.5	10	30
Nickel	1455		U	< 0.0005	< 0.0050	0.4	10	40
Lead	1455		U	< 0.0005	< 0.0050	0.5	10	50
Antimony	1455		U	< 0.0005	< 0.0050	0.06	0.7	5
Selenium	1455		U	< 0.0005	< 0.0050	0.1	0.5	7
Zinc	1455		U	0.004	0.045	4	50	200
Chloride	1220		U	< 1.0	< 10	800	15000	25000
Fluoride	1220		U	0.12	1.2	10	150	500
Sulphate	1220		U	2.2	22	1000	20000	50000
Total Dissolved Solids	1020		N	58	580	4000	60000	100000
Phenol Index	1920		U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610		U	5.2	52	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	11

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: 25387 Cashemartyr Cork

						Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	24-21214							
Chemtest Sample ID:	1830189							
Sample Ref:	TP09							
Sample ID:								
Sample Location:								
Top Depth(m):	2.00							
Bottom Depth(m):								
Sampling Date:	02-Jul-2024					**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Determinand	**SOP**	**HWOL Code**	**Accred.**	**Units**				
Total Organic Carbon	2625		M	%	0.72	3	5	6
Loss On Ignition	2610		M	%	2.7	--	--	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	EH_CU_1D_Total	M	mg/kg	< 10	500	--	--
Total Of 17 PAHs Lower	2800		N	mg/kg	1.9	100	--	--
pH at 20C	2010		M		8.2	--	>6	--
Acid Neutralisation Capacity	2015		N	mol/kg	0.0090	--	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	0.0005	0.0049	0.5	2	25
Barium	1455		U	< 0.005	< 0.050	20	100	300
Cadmium	1455		U	< 0.00011	< 0.0011	0.04	1	5
Chromium	1455		U	0.0013	0.013	0.5	10	70
Copper	1455		U	0.0021	0.022	2	50	100
Mercury	1455		U	< 0.00005	< 0.00050	0.01	0.2	2
Molybdenum	1455		U	0.0011	0.011	0.5	10	30
Nickel	1455		U	0.0011	0.011	0.4	10	40
Lead	1455		U	< 0.0005	< 0.0050	0.5	10	50
Antimony	1455		U	< 0.0005	< 0.0050	0.06	0.7	5
Selenium	1455		U	< 0.0005	< 0.0050	0.1	0.5	7
Zinc	1455		U	0.007	0.074	4	50	200
Chloride	1220		U	< 1.0	< 10	800	15000	25000
Fluoride	1220		U	0.18	1.8	10	150	500
Sulphate	1220		U	38	380	1000	20000	50000
Total Dissolved Solids	1020		N	120	1200	4000	60000	100000
Phenol Index	1920		U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610		U	4.0	< 50	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	15

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: 25387 Cashemartyr Cork

						Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	24-21214							
Chemtest Sample ID:	1830191							
Sample Ref:	TP10							
Sample ID:								
Sample Location:								
Top Depth(m):	0.50							
Bottom Depth(m):								
Sampling Date:	02-Jul-2024					**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Determinand	**SOP**	**HWOL Code**	**Accred.**	**Units**				
Total Organic Carbon	2625		M	%	0.89	3	5	6
Loss On Ignition	2610		M	%	2.7	--	--	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	EH_CU_1D_Total	M	mg/kg	1700	500	--	--
Total Of 17 PAHs Lower	2800		N	mg/kg	< 1.0	100	--	--
pH at 20C	2010		M		8.3	--	>6	--
Acid Neutralisation Capacity	2015		N	mol/kg	0.0070	--	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	0.0007	0.0071	0.5	2	25
Barium	1455		U	< 0.005	< 0.050	20	100	300
Cadmium	1455		U	< 0.00011	< 0.0011	0.04	1	5
Chromium	1455		U	0.0009	0.0095	0.5	10	70
Copper	1455		U	0.0023	0.023	2	50	100
Mercury	1455		U	< 0.00005	< 0.00050	0.01	0.2	2
Molybdenum	1455		U	0.0009	0.0094	0.5	10	30
Nickel	1455		U	0.0009	0.0087	0.4	10	40
Lead	1455		U	< 0.0005	< 0.0050	0.5	10	50
Antimony	1455		U	< 0.0005	< 0.0050	0.06	0.7	5
Selenium	1455		U	< 0.0005	< 0.0050	0.1	0.5	7
Zinc	1455		U	0.006	0.058	4	50	200
Chloride	1220		U	< 1.0	< 10	800	15000	25000
Fluoride	1220		U	0.17	1.7	10	150	500
Sulphate	1220		U	29	290	1000	20000	50000
Total Dissolved Solids	1020		N	89	880	4000	60000	100000
Phenol Index	1920		U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610		U	4.9	< 50	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	15

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	Water Accred.
1010	pH Value of Waters	pH at 20°C	pH Meter	
1020	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Electrical Conductivity at 25°C 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 at 20°C	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 <30°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	
2175	Total Sulphur in Soils	Total Sulphur	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.	
2180	Sulphur (Elemental) in Soils by HPLC	Sulphur	Dichloromethane extraction / HPLC with UV detection	
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry	
2220	Water soluble Chloride in Soils	Chloride	Aqueous extraction and measuremernt by 'Aquakem 600' Discrete Analyser using ferric nitrate / mercuric thiocyanate.	
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.	
2455	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	

Test Methods

SOP	Title	Parameters included	Method summary	Water Accred.
2690	EPH A/A Split	Aliphatics: >C10–C12, >C12–C16, >C16–C21, >C21– C35, >C35– C40 Aromatics: >C10–C12, >C12–C16, >C16–C21, >C21– C35, >C35– C40	Acetone/Heptane extraction / GCxGC FID detection	
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.	
2780	VPH A/A Split	Aliphatics: >C5–C6, >C6–C7,>C7–C8,>C8-C10 Aromatics: >C5–C7,>C7-C8,>C8–C10	Water extraction / Headspace GCxGC FID detection	
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. Reported PCB 101 results may contain contributions from PCB 90 due to inseparable chromatography.	
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

This report shall not be reproduced except in full, and only with the prior approval of the laboratory.
Any comments or interpretations are outside the scope of UKAS accreditation.
The Laboratory is not accredited for any sampling activities and reported results relate to the samples 'as received' at the laboratory.
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 EPH, VPH, TPH, BTEX, VOCs, SVOCs, PCBs, Phenols.

For all other tests the samples were dried at ≤ 30°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 30 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.

Water Sample Category Key for Accreditation

DW - Drinking Water
GW - Ground Water
LE - Land Leachate
NA - Not Applicable

Report Information

PL - Prepared Leachate
PW - Processed Water
RE - Recreational Water
SA - Saline Water
SW - Surface Water
TE - Treated Effluent
TS - Treated Sewage
UL - Unspecified Liquid

Clean Up Codes

NC - No Clean Up
MC - Mathematical Clean Up
FC - Florisil Clean Up

HWOL Acronym System

HS - Headspace analysis
EH - Extractable hydrocarbons – i.e. everything extracted by the solvent
CU - Clean-up – e.g. by Florisil, silica gel
1D - GC – Single coil gas chromatography
Total - Aliphatics & Aromatics
AL - Aliphatics only
AR - Aromatic only
2D - GC-GC – Double coil gas chromatography
#1 - EH_2D_Total but with humics mathematically subtracted
#2 - EH_2D_Total but with fatty acids mathematically subtracted
+ - Operator to indicate cumulative e.g. EH+EH_Total or EH_CU+HS_Total

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

Appendix 3

Waste Classification Report

HazWasteOnline™

Waste Classification Report

HazWasteOnline™ classifies waste as either **hazardous** or **non-hazardous** based on its chemical composition, related legislation and the rules and data defined in the current UK or EU technical guidance (Appendix C) (note that HP 9 Infectious is not assessed). It is the responsibility of the classifier named below to:

a) understand the origin of the waste
b) select the correct List of Waste code(s)
c) confirm that the list of determinands, results and sampling plan are fit for purpose
d) select and justify the chosen metal species (Appendix B)
e) correctly apply moisture correction and other available corrections
f) add the meta data for their user-defined substances (Appendix A)
g) check that the classification engine is suitable with respect to the national destination of the waste (Appendix C)

To aid the reviewer, the laboratory results, assumptions and justifications managed by the classifier are highlighted in pale yellow.

03N39-MHD4F-S5FEQ

Job name

24-001-39 Castlemartyr

Description/Comments

11 No. Composite Samples from 10 No. Trial Pits and 1 No. Cable Percussion Borehole.

Project

24-001-39

Site

Castlemartyr

Classified by

Name:
Austin Hynes
Date:
30 Jul 2024 11:09 GMT
Telephone:
+353 (0)21 4345366

Company:
O'Callaghan Moran & Associates
Unit 15 Melbourne Business Park,
Model Farm Road
Cork

HazWasteOnline™ provides a two day, hazardous waste classification course that covers the use of the software and both basic and advanced waste classification techniques. Certification has to be renewed every 3 years.

HazWasteOnline™ Certification: **CERTIFIED**

Course	Date
Hazardous Waste Classification	06 Oct 2022

Next 3 year Refresher due by Oct 2025

Purpose of classification

7 - Disposal of Waste

Address of the waste

Gortnahomna More, Castlemartyr, Co. Cork **Post Code** NA

Description of industry/producer giving rise to the waste

Site Investigation

Description of the specific process, sub-process and/or activity that created the waste

Excavation

Description of the waste

Soil and Stone

Job summary

#	Sample name	Depth [m]	Classification Result	Hazard properties	Page
1	BH05	1.00	Non Hazardous		3
2	TP02	1.00	Non Hazardous		6
3	TP03	0.40	Non Hazardous		9
4	TP04	1.00	Non Hazardous		12
5	TP05	0.40	Non Hazardous		15
6	TP06	1.00	Non Hazardous		18
7	TP07	0.60	Non Hazardous		21
8	TP08	0.40	Non Hazardous		24
9	TP09	1.00	Non Hazardous		27
10	TP09[2]	2.00	Non Hazardous		30
11	TP10	0.50	Non Hazardous		33

Related documents

#	Name	Description
1	OCM Hazwaste 2024	waste stream template used to create this Job

Report

Created by: Austin Hynes

Created date: 30 Jul 2024 11:09 GMT

Appendices	Page
Appendix A: Classifier defined and non EU CLP determinands	36
Appendix B: Rationale for selection of metal species	37
Appendix C: Version	38

Classification of sample: BH05

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

Sample details

Sample name:
BH05
Sample Depth:
1.00 m
Moisture content:
18%
(no 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: 18% No Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		<2 mg/kg	1.197	<2.394 mg/kg	<0.000239 %		<**LOD**
2	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		<0.5 mg/kg	1.32	<0.66 mg/kg	<0.000066 %		<**LOD**
3	boron { diboron trioxide }	005-008-00-8	215-125-8	1303-86-2	11	0.69 mg/kg	3.22	2.222 mg/kg	0.000222 %		
4	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		0.39 mg/kg	1.142	0.446 mg/kg	0.0000446 %		
5	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		24 mg/kg	1.462	35.077 mg/kg	0.00351 %		
6	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }	024-017-00-8				<0.5 mg/kg	2.27	<1.135 mg/kg	<0.000113 %		<**LOD**
7	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		20 mg/kg	1.126	22.518 mg/kg	0.00225 %		
8	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	35 mg/kg	1.56	54.594 mg/kg	0.0035 %		
9	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		0.08 mg/kg	1.353	0.108 mg/kg	0.0000108 %		
10	molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		<0.5 mg/kg	1.5	<0.75 mg/kg	<0.000075 %		<**LOD**
11	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		33 mg/kg	2.976	98.217 mg/kg	0.00982 %		
12	selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		<0.25 mg/kg	2.554	<0.638 mg/kg	<0.0000638 %		<**LOD**
13	zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9		100 mg/kg	2.774	277.415 mg/kg	0.0277 %		
14	TPH (C6 to C40) petroleum group			TPH		63 mg/kg		63 mg/kg	0.0063 %		
15	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.001 mg/kg		<0.001 mg/kg	<0.0000001 %		<**LOD**

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
16		benzene				<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<**LOD**
		601-020-00-8	200-753-7	71-43-2									
17		toluene				<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<**LOD**
		601-021-00-3	203-625-9	108-88-3									
18		ethylbenzene				<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<**LOD**
		601-023-00-4	202-849-4	100-41-4									
19		xylene				<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<**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]									
20		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 }				<0.5	mg/kg	1.884	<0.942	mg/kg	<0.0000942 %		<**LOD**
		006-007-00-5											
21		naphthalene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-052-00-2	202-049-5	91-20-3									
22		acenaphthylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			205-917-1	208-96-8									
23		acenaphthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			201-469-6	83-32-9									
24		fluorene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			201-695-5	86-73-7									
25		phenanthrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			201-581-5	85-01-8									
26		anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			204-371-1	120-12-7									
27		fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			205-912-4	206-44-0									
28		pyrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			204-927-3	129-00-0									
29		benzo[a]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-033-00-9	200-280-6	56-55-3									
30		chrysene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-048-00-0	205-923-4	218-01-9									
31		benzo[b]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-034-00-4	205-911-9	205-99-2									
32		benzo[k]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-036-00-5	205-916-6	207-08-9									
33		benzo[a]pyrene; benzo[def]chrysene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-032-00-3	200-028-5	50-32-8									
34		indeno[123-cd]pyrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			205-893-2	193-39-5									
35		dibenz[a,h]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-041-00-2	200-181-8	53-70-3									
36		benzo[ghi]perylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			205-883-8	191-24-2									
37		phenol				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		604-001-00-2	203-632-7	108-95-2									
38		polychlorobiphenyls; PCB				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		602-039-00-4	215-648-1	1336-36-3									
										Total:	0.0542 %		

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
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because Can be discounted as this is a solid waste without a free draining liquid phase.

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.0063%)

Classification of sample: TP02

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

Sample details

Sample name:
TP02
Sample Depth:
1.00 m
Moisture content:
14%
(no 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: 14% No Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		<2 mg/kg	1.197	<2.394 mg/kg	<0.000239 %		<**LOD**
2	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		<0.5 mg/kg	1.32	<0.66 mg/kg	<0.000066 %		<**LOD**
3	boron { diboron trioxide }	005-008-00-8	215-125-8	1303-86-2	11	0.42 mg/kg	3.22	1.352 mg/kg	0.000135 %		
4	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		<0.1 mg/kg	1.142	<0.114 mg/kg	<0.0000114 %		<**LOD**
5	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		13 mg/kg	1.462	19 mg/kg	0.0019 %		
6	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }	024-017-00-8				<0.5 mg/kg	2.27	<1.135 mg/kg	<0.000113 %		<**LOD**
7	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		6.6 mg/kg	1.126	7.431 mg/kg	0.000743 %		
8	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	6.9 mg/kg	1.56	10.763 mg/kg	0.00069 %		
9	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.05 mg/kg	1.353	<0.0677 mg/kg	<0.00000677 %		<**LOD**
10	molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		<0.5 mg/kg	1.5	<0.75 mg/kg	<0.000075 %		<**LOD**
11	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		16 mg/kg	2.976	47.62 mg/kg	0.00476 %		
12	selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		<0.25 mg/kg	2.554	<0.638 mg/kg	<0.0000638 %		<**LOD**
13	zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9		29 mg/kg	2.774	80.45 mg/kg	0.00805 %		
14	TPH (C6 to C40) petroleum group			TPH		26 mg/kg		26 mg/kg	0.0026 %		
15	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.001 mg/kg		<0.001 mg/kg	<0.0000001 %		<**LOD**

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
16		benzene				<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<**LOD**
		601-020-00-8	200-753-7	71-43-2									
17		toluene				<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<**LOD**
		601-021-00-3	203-625-9	108-88-3									
18		ethylbenzene				<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<**LOD**
		601-023-00-4	202-849-4	100-41-4									
19		xylene				<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<**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]									
20		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 }				<0.5	mg/kg	1.884	<0.942	mg/kg	<0.0000942 %		<**LOD**
		006-007-00-5											
21		naphthalene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-052-00-2	202-049-5	91-20-3									
22		acenaphthylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			205-917-1	208-96-8									
23		acenaphthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			201-469-6	83-32-9									
24		fluorene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			201-695-5	86-73-7									
25		phenanthrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			201-581-5	85-01-8									
26		anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			204-371-1	120-12-7									
27		fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			205-912-4	206-44-0									
28		pyrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			204-927-3	129-00-0									
29		benzo[a]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-033-00-9	200-280-6	56-55-3									
30		chrysene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-048-00-0	205-923-4	218-01-9									
31		benzo[b]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-034-00-4	205-911-9	205-99-2									
32		benzo[k]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-036-00-5	205-916-6	207-08-9									
33		benzo[a]pyrene; benzo[def]chrysene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-032-00-3	200-028-5	50-32-8									
34		indeno[123-cd]pyrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			205-893-2	193-39-5									
35		dibenz[a,h]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-041-00-2	200-181-8	53-70-3									
36		benzo[ghi]perylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			205-883-8	191-24-2									
37		phenol				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		604-001-00-2	203-632-7	108-95-2									
38		polychlorobiphenyls; PCB				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		602-039-00-4	215-648-1	1336-36-3									
										Total:	0.0197 %		

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
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because Can be discounted as this is a solid waste without a free draining liquid phase.

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.0026%)

Classification of sample: TP03

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

Sample details

Sample name:
TP03
Sample Depth:
0.40 m
Moisture content:
12%
(no 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: 12% No Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		<2 mg/kg	1.197	<2.394 mg/kg	<0.000239 %		<**LOD**
2	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		<0.5 mg/kg	1.32	<0.66 mg/kg	<0.000066 %		<**LOD**
3	boron { diboron trioxide }	005-008-00-8	215-125-8	1303-86-2	11	0.43 mg/kg	3.22	1.385 mg/kg	0.000138 %		
4	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		0.12 mg/kg	1.142	0.137 mg/kg	0.0000137 %		
5	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		13 mg/kg	1.462	19 mg/kg	0.0019 %		
6	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }	024-017-00-8				<0.5 mg/kg	2.27	<1.135 mg/kg	<0.000113 %		<**LOD**
7	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		10 mg/kg	1.126	11.259 mg/kg	0.00113 %		
8	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	16 mg/kg	1.56	24.957 mg/kg	0.0016 %		
9	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.05 mg/kg	1.353	<0.0677 mg/kg	<0.00000677 %		<**LOD**
10	molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		<0.5 mg/kg	1.5	<0.75 mg/kg	<0.000075 %		<**LOD**
11	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		21 mg/kg	2.976	62.502 mg/kg	0.00625 %		
12	selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		<0.25 mg/kg	2.554	<0.638 mg/kg	<0.0000638 %		<**LOD**
13	zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9		45 mg/kg	2.774	124.837 mg/kg	0.0125 %		
14	TPH (C6 to C40) petroleum group			TPH		22 mg/kg		22 mg/kg	0.0022 %		
15	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.001 mg/kg		<0.001 mg/kg	<0.0000001 %		<**LOD**

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
16		benzene				<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<**LOD**
		601-020-00-8	200-753-7	71-43-2									
17		toluene				<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<**LOD**
		601-021-00-3	203-625-9	108-88-3									
18		ethylbenzene				<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<**LOD**
		601-023-00-4	202-849-4	100-41-4									
19		xylene				<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<**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]									
20		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 }				<0.5	mg/kg	1.884	<0.942	mg/kg	<0.0000942 %		<**LOD**
		006-007-00-5											
21		naphthalene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-052-00-2	202-049-5	91-20-3									
22		acenaphthylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			205-917-1	208-96-8									
23		acenaphthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			201-469-6	83-32-9									
24		fluorene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			201-695-5	86-73-7									
25		phenanthrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			201-581-5	85-01-8									
26		anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			204-371-1	120-12-7									
27		fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			205-912-4	206-44-0									
28		pyrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			204-927-3	129-00-0									
29		benzo[a]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-033-00-9	200-280-6	56-55-3									
30		chrysene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-048-00-0	205-923-4	218-01-9									
31		benzo[b]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-034-00-4	205-911-9	205-99-2									
32		benzo[k]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-036-00-5	205-916-6	207-08-9									
33		benzo[a]pyrene; benzo[def]chrysene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-032-00-3	200-028-5	50-32-8									
34		indeno[123-cd]pyrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			205-893-2	193-39-5									
35		dibenz[a,h]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-041-00-2	200-181-8	53-70-3									
36		benzo[ghi]perylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			205-883-8	191-24-2									
37		phenol				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		604-001-00-2	203-632-7	108-95-2									
38		polychlorobiphenyls; PCB				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		602-039-00-4	215-648-1	1336-36-3									
										Total:	0.0266 %		

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
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because Can be discounted as this is a solid waste without a free draining liquid phase.

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.0022%)

Classification of sample: TP04

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

Sample details

Sample name:
TP04
Sample Depth:
1.00 m
Moisture content:
9.7%
(no 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: 9.7% No Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		<2 mg/kg	1.197	<2.394 mg/kg	<0.000239 %		<**LOD**
2	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		<0.5 mg/kg	1.32	<0.66 mg/kg	<0.000066 %		<**LOD**
3	boron { diboron trioxide }	005-008-00-8	215-125-8	1303-86-2	11	<0.4 mg/kg	3.22	<1.288 mg/kg	<0.000129 %		<**LOD**
4	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		0.14 mg/kg	1.142	0.16 mg/kg	0.000016 %		
5	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		20 mg/kg	1.462	29.231 mg/kg	0.00292 %		
6	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }	024-017-00-8				<0.5 mg/kg	2.27	<1.135 mg/kg	<0.000113 %		<**LOD**
7	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		12 mg/kg	1.126	13.511 mg/kg	0.00135 %		
8	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	26 mg/kg	1.56	40.555 mg/kg	0.0026 %		
9	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.05 mg/kg	1.353	<0.0677 mg/kg	<0.00000677 %		<**LOD**
10	molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		<0.5 mg/kg	1.5	<0.75 mg/kg	<0.000075 %		<**LOD**
11	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		28 mg/kg	2.976	83.335 mg/kg	0.00833 %		
12	selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		<0.25 mg/kg	2.554	<0.638 mg/kg	<0.0000638 %		<**LOD**
13	zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9		57 mg/kg	2.774	158.126 mg/kg	0.0158 %		
14	TPH (C6 to C40) petroleum group			TPH		20 mg/kg		20 mg/kg	0.002 %		
15	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.001 mg/kg		<0.001 mg/kg	<0.0000001 %		<**LOD**

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
16		benzene				<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
		601-020-00-8	200-753-7	71-43-2									
17		toluene				<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
		601-021-00-3	203-625-9	108-88-3									
18		ethylbenzene				<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
		601-023-00-4	202-849-4	100-41-4									
19		xylene				<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<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]									
20		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 }				<0.5	mg/kg	1.884	<0.942	mg/kg	<0.0000942 %		<LOD
		006-007-00-5											
21		naphthalene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		601-052-00-2	202-049-5	91-20-3									
22		acenaphthylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
			205-917-1	208-96-8									
23		acenaphthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
			201-469-6	83-32-9									
24		fluorene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
			201-695-5	86-73-7									
25		phenanthrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
			201-581-5	85-01-8									
26		anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
			204-371-1	120-12-7									
27		fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
			205-912-4	206-44-0									
28		pyrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
			204-927-3	129-00-0									
29		benzo[a]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		601-033-00-9	200-280-6	56-55-3									
30		chrysene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		601-048-00-0	205-923-4	218-01-9									
31		benzo[b]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		601-034-00-4	205-911-9	205-99-2									
32		benzo[k]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		601-036-00-5	205-916-6	207-08-9									
33		benzo[a]pyrene; benzo[def]chrysene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		601-032-00-3	200-028-5	50-32-8									
34		indeno[123-cd]pyrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
			205-893-2	193-39-5									
35		dibenz[a,h]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		601-041-00-2	200-181-8	53-70-3									
36		benzo[ghi]perylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
			205-883-8	191-24-2									
37		phenol				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		604-001-00-2	203-632-7	108-95-2									
38		polychlorobiphenyls; PCB				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		602-039-00-4	215-648-1	1336-36-3									
										Total:	0.034 %		

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
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because Can be discounted as this is a solid waste without a free draining liquid phase.

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.002%)

Classification of sample: TP05

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

Sample details

Sample name:
TP05
Sample Depth:
0.40 m
Moisture content:
16%
(no 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: 16% No Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		<2 mg/kg	1.197	<2.394 mg/kg	<0.000239 %		<**LOD**
2	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		4.7 mg/kg	1.32	6.206 mg/kg	0.000621 %		
3	boron { diboron trioxide }	005-008-00-8	215-125-8	1303-86-2	11	0.48 mg/kg	3.22	1.546 mg/kg	0.000155 %		
4	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		0.7 mg/kg	1.142	0.8 mg/kg	0.00008 %		
5	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		13 mg/kg	1.462	19 mg/kg	0.0019 %		
6	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }	024-017-00-8				<0.5 mg/kg	2.27	<1.135 mg/kg	<0.000113 %		<**LOD**
7	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		21 mg/kg	1.126	23.644 mg/kg	0.00236 %		
8	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	31 mg/kg	1.56	48.354 mg/kg	0.0031 %		
9	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		0.05 mg/kg	1.353	0.0677 mg/kg	0.00000677 %		
10	molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		<0.5 mg/kg	1.5	<0.75 mg/kg	<0.000075 %		<**LOD**
11	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		69 mg/kg	2.976	205.362 mg/kg	0.0205 %		
12	selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		<0.25 mg/kg	2.554	<0.638 mg/kg	<0.0000638 %		<**LOD**
13	zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9		67 mg/kg	2.774	185.868 mg/kg	0.0186 %		
14	TPH (C6 to C40) petroleum group			TPH		27 mg/kg		27 mg/kg	0.0027 %		
15	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.001 mg/kg		<0.001 mg/kg	<0.0000001 %		<**LOD**

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
16		benzene				<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<**LOD**
		601-020-00-8	200-753-7	71-43-2									
17		toluene				<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<**LOD**
		601-021-00-3	203-625-9	108-88-3									
18		ethylbenzene				<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<**LOD**
		601-023-00-4	202-849-4	100-41-4									
19		xylene				<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<**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]									
20		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 }				<0.5	mg/kg	1.884	<0.942	mg/kg	<0.0000942 %		<**LOD**
		006-007-00-5											
21		naphthalene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-052-00-2	202-049-5	91-20-3									
22		acenaphthylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			205-917-1	208-96-8									
23		acenaphthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			201-469-6	83-32-9									
24		fluorene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			201-695-5	86-73-7									
25		phenanthrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			201-581-5	85-01-8									
26		anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			204-371-1	120-12-7									
27		fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			205-912-4	206-44-0									
28		pyrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			204-927-3	129-00-0									
29		benzo[a]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-033-00-9	200-280-6	56-55-3									
30		chrysene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-048-00-0	205-923-4	218-01-9									
31		benzo[b]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-034-00-4	205-911-9	205-99-2									
32		benzo[k]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-036-00-5	205-916-6	207-08-9									
33		benzo[a]pyrene; benzo[def]chrysene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-032-00-3	200-028-5	50-32-8									
34		indeno[123-cd]pyrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			205-893-2	193-39-5									
35		dibenz[a,h]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-041-00-2	200-181-8	53-70-3									
36		benzo[ghi]perylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			205-883-8	191-24-2									
37		phenol				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		604-001-00-2	203-632-7	108-95-2									
38		polychlorobiphenyls; PCB				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		602-039-00-4	215-648-1	1336-36-3									
										Total:	0.0508 %		

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
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because Can be discounted as this is a solid waste without a free draining liquid phase.

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.0027%)

Classification of sample: TP06

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

Sample details

Sample name:
TP06
Sample Depth:
1.00 m
Moisture content:
9.7%
(no 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: 9.7% No Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		<2 mg/kg	1.197	<2.394 mg/kg	<0.000239 %		<**LOD**
2	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		0.9 mg/kg	1.32	1.188 mg/kg	0.000119 %		
3	boron { diboron trioxide }	005-008-00-8	215-125-8	1303-86-2	11	<0.4 mg/kg	3.22	<1.288 mg/kg	<0.000129 %		<**LOD**
4	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		<0.1 mg/kg	1.142	<0.114 mg/kg	<0.0000114 %		<**LOD**
5	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		30 mg/kg	1.462	43.847 mg/kg	0.00438 %		
6	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }	024-017-00-8				<0.5 mg/kg	2.27	<1.135 mg/kg	<0.000113 %		<**LOD**
7	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		27 mg/kg	1.126	30.399 mg/kg	0.00304 %		
8	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	33 mg/kg	1.56	51.474 mg/kg	0.0033 %		
9	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.05 mg/kg	1.353	<0.0677 mg/kg	<0.00000677 %		<**LOD**
10	molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		<0.5 mg/kg	1.5	<0.75 mg/kg	<0.000075 %		<**LOD**
11	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		51 mg/kg	2.976	151.79 mg/kg	0.0152 %		
12	selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		<0.25 mg/kg	2.554	<0.638 mg/kg	<0.0000638 %		<**LOD**
13	zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9		99 mg/kg	2.774	274.641 mg/kg	0.0275 %		
14	TPH (C6 to C40) petroleum group			TPH		21 mg/kg		21 mg/kg	0.0021 %		
15	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.001 mg/kg		<0.001 mg/kg	<0.0000001 %		<**LOD**

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
16		benzene				<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<**LOD**
		601-020-00-8	200-753-7	71-43-2									
17		toluene				<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<**LOD**
		601-021-00-3	203-625-9	108-88-3									
18		ethylbenzene				<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<**LOD**
		601-023-00-4	202-849-4	100-41-4									
19		xylene				<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<**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]									
20		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 }				<0.5	mg/kg	1.884	<0.942	mg/kg	<0.0000942 %		<**LOD**
		006-007-00-5											
21		naphthalene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-052-00-2	202-049-5	91-20-3									
22		acenaphthylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			205-917-1	208-96-8									
23		acenaphthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			201-469-6	83-32-9									
24		fluorene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			201-695-5	86-73-7									
25		phenanthrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			201-581-5	85-01-8									
26		anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			204-371-1	120-12-7									
27		fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			205-912-4	206-44-0									
28		pyrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			204-927-3	129-00-0									
29		benzo[a]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-033-00-9	200-280-6	56-55-3									
30		chrysene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-048-00-0	205-923-4	218-01-9									
31		benzo[b]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-034-00-4	205-911-9	205-99-2									
32		benzo[k]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-036-00-5	205-916-6	207-08-9									
33		benzo[a]pyrene; benzo[def]chrysene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-032-00-3	200-028-5	50-32-8									
34		indeno[123-cd]pyrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			205-893-2	193-39-5									
35		dibenz[a,h]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-041-00-2	200-181-8	53-70-3									
36		benzo[ghi]perylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			205-883-8	191-24-2									
37		phenol				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		604-001-00-2	203-632-7	108-95-2									
38		polychlorobiphenyls; PCB				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		602-039-00-4	215-648-1	1336-36-3									
										Total:	0.0565 %		

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
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because Can be discounted as this is a solid waste without a free draining liquid phase.

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.0021%)

Classification of sample: TP07

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

Sample details

Sample name:
TP07
Sample Depth:
0.60 m
Moisture content:
14%
(no 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: 14% No Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		<2 mg/kg	1.197	<2.394 mg/kg	<0.000239 %		<**LOD**
2	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		<0.5 mg/kg	1.32	<0.66 mg/kg	<0.000066 %		<**LOD**
3	boron { diboron trioxide }	005-008-00-8	215-125-8	1303-86-2	11	0.43 mg/kg	3.22	1.385 mg/kg	0.000138 %		
4	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		<0.1 mg/kg	1.142	<0.114 mg/kg	<0.0000114 %		<**LOD**
5	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		19 mg/kg	1.462	27.77 mg/kg	0.00278 %		
6	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }	024-017-00-8				<0.5 mg/kg	2.27	<1.135 mg/kg	<0.000113 %		<**LOD**
7	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		14 mg/kg	1.126	15.762 mg/kg	0.00158 %		
8	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	21 mg/kg	1.56	32.756 mg/kg	0.0021 %		
9	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.05 mg/kg	1.353	<0.0677 mg/kg	<0.00000677 %		<**LOD**
10	molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		<0.5 mg/kg	1.5	<0.75 mg/kg	<0.000075 %		<**LOD**
11	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		23 mg/kg	2.976	68.454 mg/kg	0.00685 %		
12	selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		<0.25 mg/kg	2.554	<0.638 mg/kg	<0.0000638 %		<**LOD**
13	zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9		55 mg/kg	2.774	152.578 mg/kg	0.0153 %		
14	TPH (C6 to C40) petroleum group			TPH		21 mg/kg		21 mg/kg	0.0021 %		
15	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.001 mg/kg		<0.001 mg/kg	<0.0000001 %		<**LOD**

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
16		benzene				<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<**LOD**
		601-020-00-8	200-753-7	71-43-2									
17		toluene				<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<**LOD**
		601-021-00-3	203-625-9	108-88-3									
18		ethylbenzene				<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<**LOD**
		601-023-00-4	202-849-4	100-41-4									
19		xylene				<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<**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]									
20		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 }				<0.5	mg/kg	1.884	<0.942	mg/kg	<0.0000942 %		<**LOD**
		006-007-00-5											
21		naphthalene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-052-00-2	202-049-5	91-20-3									
22		acenaphthylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			205-917-1	208-96-8									
23		acenaphthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			201-469-6	83-32-9									
24		fluorene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			201-695-5	86-73-7									
25		phenanthrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			201-581-5	85-01-8									
26		anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			204-371-1	120-12-7									
27		fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			205-912-4	206-44-0									
28		pyrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			204-927-3	129-00-0									
29		benzo[a]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-033-00-9	200-280-6	56-55-3									
30		chrysene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-048-00-0	205-923-4	218-01-9									
31		benzo[b]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-034-00-4	205-911-9	205-99-2									
32		benzo[k]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-036-00-5	205-916-6	207-08-9									
33		benzo[a]pyrene; benzo[def]chrysene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-032-00-3	200-028-5	50-32-8									
34		indeno[123-cd]pyrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			205-893-2	193-39-5									
35		dibenz[a,h]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-041-00-2	200-181-8	53-70-3									
36		benzo[ghi]perylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			205-883-8	191-24-2									
37		phenol				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		604-001-00-2	203-632-7	108-95-2									
38		polychlorobiphenyls; PCB				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		602-039-00-4	215-648-1	1336-36-3									
										Total:	0.0316 %		

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
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because Can be discounted as this is a solid waste without a free draining liquid phase.

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.0021%)

Classification of sample: TP08

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

Sample details

Sample name:
TP08
Sample Depth:
0.40 m
Moisture content:
16%
(no 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: 16% No Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		<2 mg/kg	1.197	<2.394 mg/kg	<0.000239 %		<**LOD**
2	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		<0.5 mg/kg	1.32	<0.66 mg/kg	<0.000066 %		<**LOD**
3	boron { diboron trioxide }	005-008-00-8	215-125-8	1303-86-2	11	0.45 mg/kg	3.22	1.449 mg/kg	0.000145 %		
4	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		0.1 mg/kg	1.142	0.114 mg/kg	0.0000114 %		
5	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		19 mg/kg	1.462	27.77 mg/kg	0.00278 %		
6	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }	024-017-00-8				<0.5 mg/kg	2.27	<1.135 mg/kg	<0.000113 %		<**LOD**
7	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		15 mg/kg	1.126	16.888 mg/kg	0.00169 %		
8	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	23 mg/kg	1.56	35.876 mg/kg	0.0023 %		
9	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		0.05 mg/kg	1.353	0.0677 mg/kg	0.00000677 %		
10	molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		<0.5 mg/kg	1.5	<0.75 mg/kg	<0.000075 %		<**LOD**
11	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		25 mg/kg	2.976	74.407 mg/kg	0.00744 %		
12	selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		<0.25 mg/kg	2.554	<0.638 mg/kg	<0.0000638 %		<**LOD**
13	zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9		58 mg/kg	2.774	160.9 mg/kg	0.0161 %		
14	TPH (C6 to C40) petroleum group			TPH		25 mg/kg		25 mg/kg	0.0025 %		
15	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.001 mg/kg		<0.001 mg/kg	<0.0000001 %		<**LOD**

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
16		benzene				<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<**LOD**
		601-020-00-8	200-753-7	71-43-2									
17		toluene				<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<**LOD**
		601-021-00-3	203-625-9	108-88-3									
18		ethylbenzene				<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<**LOD**
		601-023-00-4	202-849-4	100-41-4									
19		xylene				<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<**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]									
20		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 }				<0.5	mg/kg	1.884	<0.942	mg/kg	<0.0000942 %		<**LOD**
		006-007-00-5											
21		naphthalene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-052-00-2	202-049-5	91-20-3									
22		acenaphthylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			205-917-1	208-96-8									
23		acenaphthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			201-469-6	83-32-9									
24		fluorene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			201-695-5	86-73-7									
25		phenanthrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			201-581-5	85-01-8									
26		anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			204-371-1	120-12-7									
27		fluoranthene				0.17	mg/kg		0.17	mg/kg	0.000017 %		
			205-912-4	206-44-0									
28		pyrene				0.17	mg/kg		0.17	mg/kg	0.000017 %		
			204-927-3	129-00-0									
29		benzo[a]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-033-00-9	200-280-6	56-55-3									
30		chrysene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-048-00-0	205-923-4	218-01-9									
31		benzo[b]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-034-00-4	205-911-9	205-99-2									
32		benzo[k]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-036-00-5	205-916-6	207-08-9									
33		benzo[a]pyrene; benzo[def]chrysene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-032-00-3	200-028-5	50-32-8									
34		indeno[123-cd]pyrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			205-893-2	193-39-5									
35		dibenz[a,h]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-041-00-2	200-181-8	53-70-3									
36		benzo[ghi]perylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			205-883-8	191-24-2									
37		phenol				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		604-001-00-2	203-632-7	108-95-2									
38		polychlorobiphenyls; PCB				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		602-039-00-4	215-648-1	1336-36-3									
										Total:	0.0338 %		

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
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because Can be discounted as this is a solid waste without a free draining liquid phase.

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.0025%)

Classification of sample: TP09

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

Sample details

Sample name:
TP09
Sample Depth:
1.00 m
Moisture content:
11%
(no 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: 11% No Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1	antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		<2	mg/kg	1.197	<2.394	mg/kg	<0.000239 %		<**LOD**
2	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		<0.5	mg/kg	1.32	<0.66	mg/kg	<0.000066 %		<**LOD**
3	boron { diboron trioxide }	005-008-00-8	215-125-8	1303-86-2	11	0.58	mg/kg	3.22	1.868	mg/kg	0.000187 %		
4	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		0.26	mg/kg	1.142	0.297	mg/kg	0.0000297 %		
5	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		17	mg/kg	1.462	24.846	mg/kg	0.00248 %		
6	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }	024-017-00-8				<0.5	mg/kg	2.27	<1.135	mg/kg	<0.000113 %		<**LOD**
7	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		13	mg/kg	1.126	14.637	mg/kg	0.00146 %		
8	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	29	mg/kg	1.56	45.235	mg/kg	0.0029 %		
9	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.05	mg/kg	1.353	<0.0677	mg/kg	<0.00000677 %		<**LOD**
10	molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		<0.5	mg/kg	1.5	<0.75	mg/kg	<0.000075 %		<**LOD**
11	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		24	mg/kg	2.976	71.43	mg/kg	0.00714 %		
12	selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		<0.25	mg/kg	2.554	<0.638	mg/kg	<0.0000638 %		<**LOD**
13	zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9		68	mg/kg	2.774	188.642	mg/kg	0.0189 %		
14	TPH (C6 to C40) petroleum group			TPH		26	mg/kg		26	mg/kg	0.0026 %		
15	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<**LOD**

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
16		benzene				<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<**LOD**
		601-020-00-8	200-753-7	71-43-2									
17		toluene				<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<**LOD**
		601-021-00-3	203-625-9	108-88-3									
18		ethylbenzene				<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<**LOD**
		601-023-00-4	202-849-4	100-41-4									
19		xylene				<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<**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]									
20		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 }				<0.5	mg/kg	1.884	<0.942	mg/kg	<0.0000942 %		<**LOD**
		006-007-00-5											
21		naphthalene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-052-00-2	202-049-5	91-20-3									
22		acenaphthylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			205-917-1	208-96-8									
23		acenaphthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			201-469-6	83-32-9									
24		fluorene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			201-695-5	86-73-7									
25		phenanthrene				0.46	mg/kg		0.46	mg/kg	0.000046 %		
			201-581-5	85-01-8									
26		anthracene				0.16	mg/kg		0.16	mg/kg	0.000016 %		
			204-371-1	120-12-7									
27		fluoranthene				1.5	mg/kg		1.5	mg/kg	0.00015 %		
			205-912-4	206-44-0									
28		pyrene				1.3	mg/kg		1.3	mg/kg	0.00013 %		
			204-927-3	129-00-0									
29		benzo[a]anthracene				0.68	mg/kg		0.68	mg/kg	0.000068 %		
		601-033-00-9	200-280-6	56-55-3									
30		chrysene				0.72	mg/kg		0.72	mg/kg	0.000072 %		
		601-048-00-0	205-923-4	218-01-9									
31		benzo[b]fluoranthene				1.2	mg/kg		1.2	mg/kg	0.00012 %		
		601-034-00-4	205-911-9	205-99-2									
32		benzo[k]fluoranthene				0.34	mg/kg		0.34	mg/kg	0.000034 %		
		601-036-00-5	205-916-6	207-08-9									
33		benzo[a]pyrene; benzo[def]chrysene				0.81	mg/kg		0.81	mg/kg	0.000081 %		
		601-032-00-3	200-028-5	50-32-8									
34		indeno[123-cd]pyrene				0.65	mg/kg		0.65	mg/kg	0.000065 %		
			205-893-2	193-39-5									
35		dibenz[a,h]anthracene				0.13	mg/kg		0.13	mg/kg	0.000013 %		
		601-041-00-2	200-181-8	53-70-3									
36		benzo[ghi]perylene				0.63	mg/kg		0.63	mg/kg	0.000063 %		
			205-883-8	191-24-2									
37		phenol				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		604-001-00-2	203-632-7	108-95-2									
38		polychlorobiphenyls; PCB				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		602-039-00-4	215-648-1	1336-36-3									
										Total:	0.0372 %		

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
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because Can be discounted as this is a solid waste without a free draining liquid phase.

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.0026%)

Classification of sample: TP09[2]

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

Sample details

Sample name:
TP09[2]
Sample Depth:
2.00 m
Moisture content:
15%
(no 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: 15% No Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		<2 mg/kg	1.197	<2.394 mg/kg	<0.000239 %		<**LOD**
2	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		<0.5 mg/kg	1.32	<0.66 mg/kg	<0.000066 %		<**LOD**
3	boron { diboron trioxide }	005-008-00-8	215-125-8	1303-86-2	11	0.47 mg/kg	3.22	1.513 mg/kg	0.000151 %		
4	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		0.2 mg/kg	1.142	0.228 mg/kg	0.0000228 %		
5	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		29 mg/kg	1.462	42.385 mg/kg	0.00424 %		
6	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }	024-017-00-8				<0.5 mg/kg	2.27	<1.135 mg/kg	<0.000113 %		<**LOD**
7	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		22 mg/kg	1.126	24.77 mg/kg	0.00248 %		
8	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	38 mg/kg	1.56	59.273 mg/kg	0.0038 %		
9	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		0.07 mg/kg	1.353	0.0947 mg/kg	0.00000947 %		
10	molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		<0.5 mg/kg	1.5	<0.75 mg/kg	<0.000075 %		<**LOD**
11	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		39 mg/kg	2.976	116.074 mg/kg	0.0116 %		
12	selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		<0.25 mg/kg	2.554	<0.638 mg/kg	<0.0000638 %		<**LOD**
13	zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9		98 mg/kg	2.774	271.866 mg/kg	0.0272 %		
14	TPH (C6 to C40) petroleum group			TPH		25 mg/kg		25 mg/kg	0.0025 %		
15	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.001 mg/kg		<0.001 mg/kg	<0.0000001 %		<**LOD**

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
16		benzene				<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<**LOD**
		601-020-00-8	200-753-7	71-43-2									
17		toluene				<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<**LOD**
		601-021-00-3	203-625-9	108-88-3									
18		ethylbenzene				<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<**LOD**
		601-023-00-4	202-849-4	100-41-4									
19		xylene				<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<**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]									
20		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 }				<0.5	mg/kg	1.884	<0.942	mg/kg	<0.0000942 %		<**LOD**
		006-007-00-5											
21		naphthalene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-052-00-2	202-049-5	91-20-3									
22		acenaphthylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			205-917-1	208-96-8									
23		acenaphthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			201-469-6	83-32-9									
24		fluorene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			201-695-5	86-73-7									
25		phenanthrene				0.13	mg/kg		0.13	mg/kg	0.000013 %		
			201-581-5	85-01-8									
26		anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			204-371-1	120-12-7									
27		fluoranthene				0.34	mg/kg		0.34	mg/kg	0.000034 %		
			205-912-4	206-44-0									
28		pyrene				0.34	mg/kg		0.34	mg/kg	0.000034 %		
			204-927-3	129-00-0									
29		benzo[a]anthracene				0.16	mg/kg		0.16	mg/kg	0.000016 %		
		601-033-00-9	200-280-6	56-55-3									
30		chrysene				0.19	mg/kg		0.19	mg/kg	0.000019 %		
		601-048-00-0	205-923-4	218-01-9									
31		benzo[b]fluoranthene				0.26	mg/kg		0.26	mg/kg	0.000026 %		
		601-034-00-4	205-911-9	205-99-2									
32		benzo[k]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-036-00-5	205-916-6	207-08-9									
33		benzo[a]pyrene; benzo[def]chrysene				0.2	mg/kg		0.2	mg/kg	0.00002 %		
		601-032-00-3	200-028-5	50-32-8									
34		indeno[123-cd]pyrene				0.15	mg/kg		0.15	mg/kg	0.000015 %		
			205-893-2	193-39-5									
35		dibenz[a,h]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-041-00-2	200-181-8	53-70-3									
36		benzo[ghi]perylene				0.13	mg/kg		0.13	mg/kg	0.000013 %		
			205-883-8	191-24-2									
37		phenol				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		604-001-00-2	203-632-7	108-95-2									
38		polychlorobiphenyls; PCB				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		602-039-00-4	215-648-1	1336-36-3									
										Total:	0.0529 %		

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
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because Can be discounted as this is a solid waste without a free draining liquid phase.

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.0025%)

Classification of sample: TP10

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

Sample details

Sample name:
TP10
Sample Depth:
0.50 m
Moisture content:
15%
(no 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: 15% No Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		<2 mg/kg	1.197	<2.394 mg/kg	<0.000239 %		<**LOD**
2	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		<0.5 mg/kg	1.32	<0.66 mg/kg	<0.000066 %		<**LOD**
3	boron { diboron trioxide }	005-008-00-8	215-125-8	1303-86-2	11	0.48 mg/kg	3.22	1.546 mg/kg	0.000155 %		
4	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		<0.1 mg/kg	1.142	<0.114 mg/kg	<0.0000114 %		<**LOD**
5	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		21 mg/kg	1.462	30.693 mg/kg	0.00307 %		
6	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }	024-017-00-8				<0.5 mg/kg	2.27	<1.135 mg/kg	<0.000113 %		<**LOD**
7	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		16 mg/kg	1.126	18.014 mg/kg	0.0018 %		
8	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	27 mg/kg	1.56	42.115 mg/kg	0.0027 %		
9	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		0.05 mg/kg	1.353	0.0677 mg/kg	0.00000677 %		
10	molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		<0.5 mg/kg	1.5	<0.75 mg/kg	<0.000075 %		<**LOD**
11	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		27 mg/kg	2.976	80.359 mg/kg	0.00804 %		
12	selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		<0.25 mg/kg	2.554	<0.638 mg/kg	<0.0000638 %		<**LOD**
13	zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9		67 mg/kg	2.774	185.868 mg/kg	0.0186 %		
14	TPH (C6 to C40) petroleum group			TPH		32 mg/kg		32 mg/kg	0.0032 %		
15	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.001 mg/kg		<0.001 mg/kg	<0.0000001 %		<**LOD**

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
16		benzene				<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<**LOD**
		601-020-00-8	200-753-7	71-43-2									
17		toluene				<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<**LOD**
		601-021-00-3	203-625-9	108-88-3									
18		ethylbenzene				<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<**LOD**
		601-023-00-4	202-849-4	100-41-4									
19		xylene				<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<**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]									
20		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 }				<0.5	mg/kg	1.884	<0.942	mg/kg	<0.0000942 %		<**LOD**
		006-007-00-5											
21		naphthalene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-052-00-2	202-049-5	91-20-3									
22		acenaphthylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			205-917-1	208-96-8									
23		acenaphthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			201-469-6	83-32-9									
24		fluorene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			201-695-5	86-73-7									
25		phenanthrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			201-581-5	85-01-8									
26		anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			204-371-1	120-12-7									
27		fluoranthene				0.32	mg/kg		0.32	mg/kg	0.000032 %		
			205-912-4	206-44-0									
28		pyrene				0.26	mg/kg		0.26	mg/kg	0.000026 %		
			204-927-3	129-00-0									
29		benzo[a]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-033-00-9	200-280-6	56-55-3									
30		chrysene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-048-00-0	205-923-4	218-01-9									
31		benzo[b]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-034-00-4	205-911-9	205-99-2									
32		benzo[k]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-036-00-5	205-916-6	207-08-9									
33		benzo[a]pyrene; benzo[def]chrysene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-032-00-3	200-028-5	50-32-8									
34		indeno[123-cd]pyrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			205-893-2	193-39-5									
35		dibenz[a,h]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-041-00-2	200-181-8	53-70-3									
36		benzo[ghi]perylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			205-883-8	191-24-2									
37		phenol				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		604-001-00-2	203-632-7	108-95-2									
38		polychlorobiphenyls; PCB				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		602-039-00-4	215-648-1	1336-36-3									
										Total:	0.0384 %		

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
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because Can be discounted as this is a solid waste without a free draining liquid phase.

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.0032%)

Appendix A: Classifier defined and non EU CLP determinands

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

Description/Comments: Data from C&L Inventory Database
Data source: https://echa.europa.eu/information-on-chemicals/cl-inventory-database/-/discli/details/33806
Data source date: 17 Jul 2015
Hazard Statements: Acute Tox. 4; H332 , Acute Tox. 4; H302 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Resp. Sens. 1; H334 , Skin Sens. 1; H317 , Repr. 1B; H360FD , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

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)

EU CLP index number: 601-023-00-4
Description/Comments:
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

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

EU CLP index number: 006-007-00-5
Description/Comments: Conversion factor based on a worst case compound: sodium cyanide
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

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

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

EU 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.
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

antimony {antimony trioxide}

Worst case CLP species based on hazard statements/molecular weight and low solubility. Industrial sources include: flame retardants in electrical apparatus, textiles and coatings (edit as required)

arsenic {arsenic trioxide}

Reasonable case CLP species based on hazard statements/molecular weight and most common (stable) oxide of arsenic. Industrial sources include: smelting; main precursor to other arsenic compounds (edit as required)

boron {diboron trioxide}

Reasonable case CLP species based on hazard statements/ molecular weight, physical form and low solubility. Industrial sources include: fluxing agent for glass/enamels; additive for fibre optics, borosilicate glass (edit as required)

cadmium {cadmium oxide}

Reasonable case CLP species based on hazard statements/molecular weight, very low solubility in water. Industrial sources include: electroplating baths, electrodes for storage batteries, catalysts, ceramic glazes, phosphors, pigments and nematocides. (edit as required) Worst case compounds in CLP: cadmium sulphate, chloride, fluoride & iodide not expected as either very soluble and/or compound's industrial usage not related to site history (edit as required)

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

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

chromium in chromium(VI) compounds {chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex}

Worst case species based on hazard statements/molecular weight (edit as required)

copper {dicopper oxide; copper (I) oxide}

Reasonable case CLP species based on hazard statements/molecular weight and insolubility in water. Industrial sources include: oxidised copper metal, brake pads, pigments, antifouling paints, fungicide. (edit as required) Worse case copper sulphate is very soluble and likely to have been leached away if ever present and/or not enough soluble sulphate detected. (edit as required)

lead {lead chromate}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

mercury {mercury dichloride}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

molybdenum {molybdenum(VI) oxide}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

nickel {nickel chromate}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

selenium {nickel selenate}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

zinc {zinc chromate}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

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}

Harmonised group entry used as most reasonable case as complex cyanides and those specified elsewhere in the annex are not likely to be present in this soil: [Note conversion factor based on a worst case compound: sodium cyanide] (edit as required)

Appendix C: Version

HazWasteOnline Classification Engine: EU WM3 1st Edition v1.1.NI using the EU LoW
HazWasteOnline Classification Engine Version: 2024.158.6092.11254 (06 Jun 2024)
HazWasteOnline Database: 2024.158.6092.11254 (06 Jun 2024)

This classification utilises the following guidance and legislation:
WM3 v1.1.NI - Waste Classification - 1st Edition v1.1.NI - Jan 2021
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 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
17th ATP - Regulation (EU) 2021/849 of 11 March 2021
18th ATP - Regulation (EU) 2022/692 of 16 February 2022
POPs Amendment 2022 - Regulation (EU) 2022/2400 of 23 November 2022
19th ATP - Regulation (EU) 2023/1434 of 25 April 2023
20th ATP - Regulation (EU) 2023/1435 of 2 May 2023
21st ATP - Regulation (EU) 2024/197 of 19 October 2023

Appendix 9

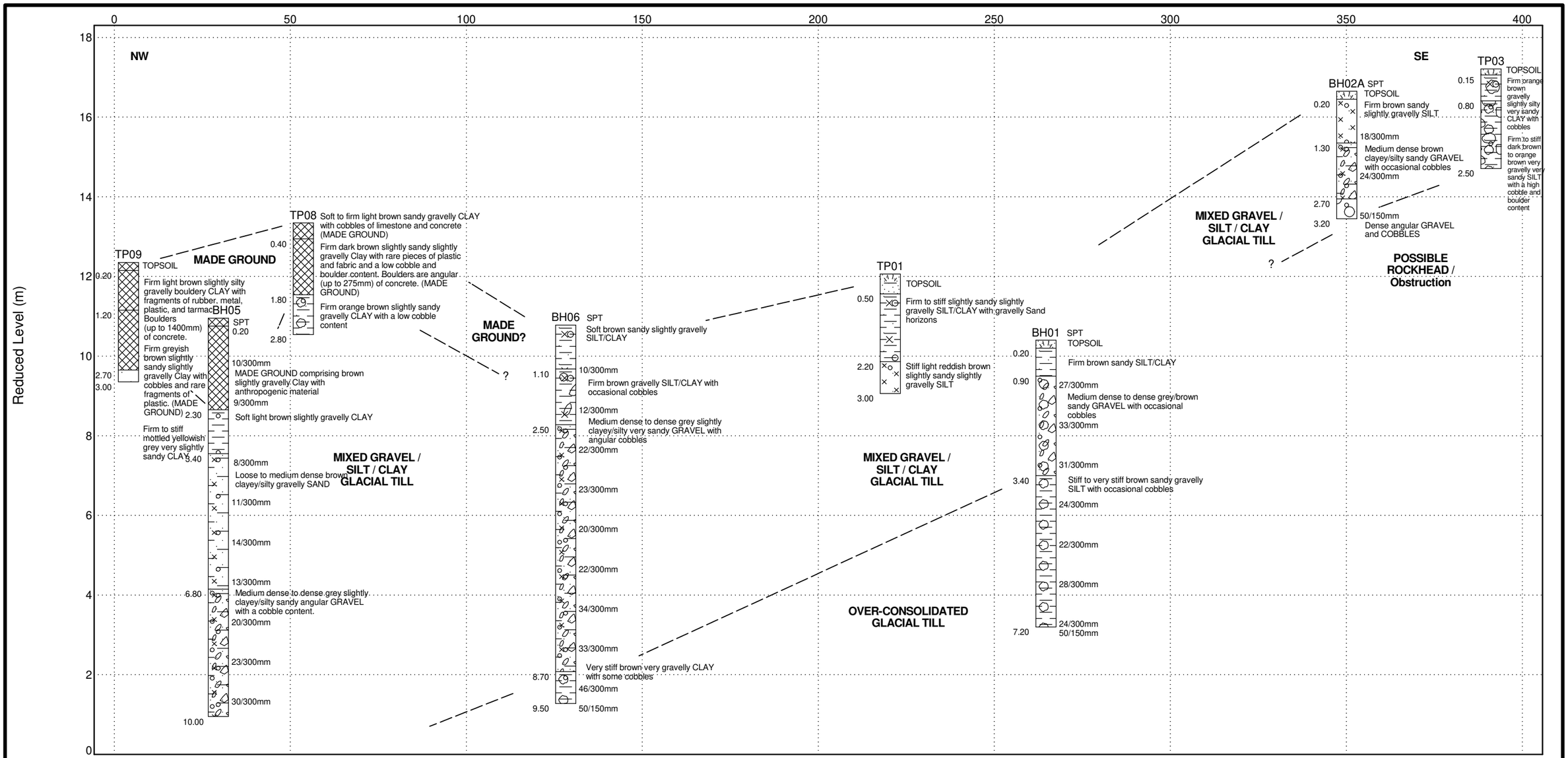
Exploratory Hole Location Plan

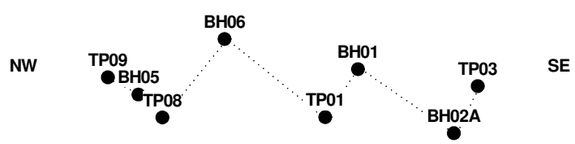
25387 - Lands at Gortnahomna More, Castlemartyr

Exploratory Hole Location Plan

Appendix 10

Stratigraphic Cross Sections





LITHOLOGY GRAPHICS

- TOPSOIL
- Silty sandy CLAY
- Sandy cobbly GRAVEL
- Silty cobbly CLAY
- Sandy gravelly SILT
- Clayey silty sandy cobbly GRAVEL
- Gravelly COBBLES
- MADE GROUND
- Gravelly CLAY
- Clayey silty gravelly SAND
- Sandy gravelly silty CLAY
- Gravelly silty clay with cobbles
- Gravelly cobbly CLAY
- Sandy gravelly silty CLAY with cobbles
- Sandy gravelly cobbly bouldery CLAY

IGSL

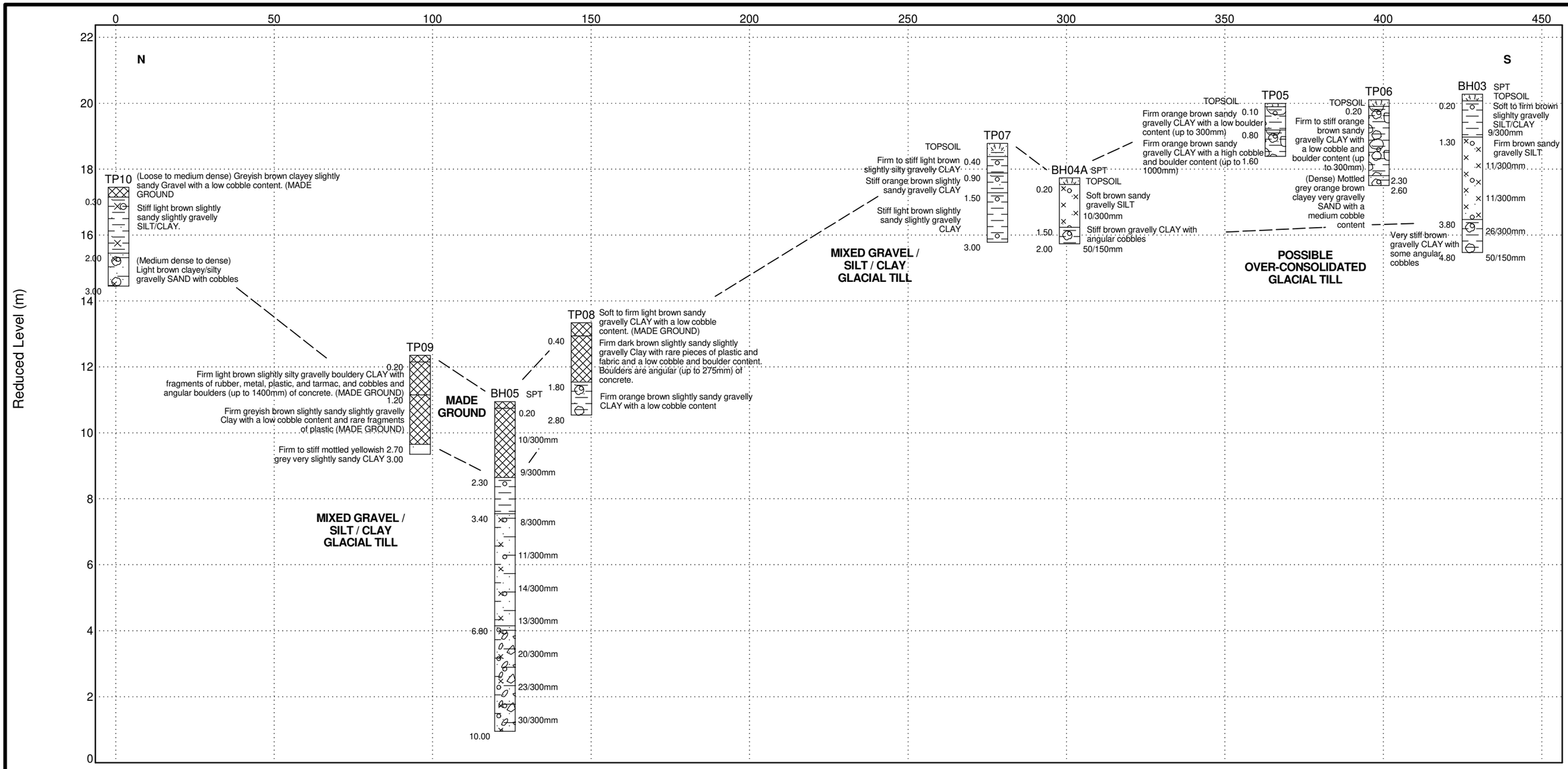
SUBSURFACE SECTION NW - SE

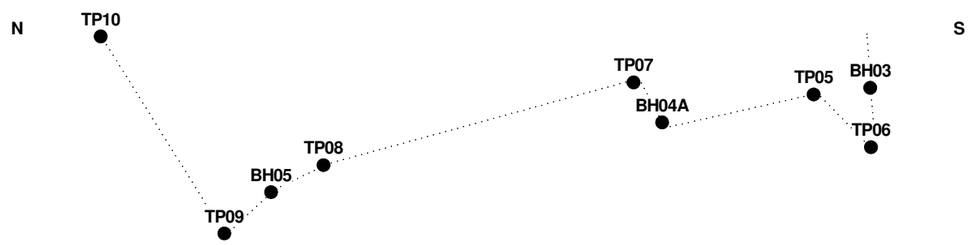
Client: Marshall Yards Dev. Co. Ltd

Project: Lands at Gortnahomna More, Castlemartyr

Number: 25387

FENCE BH AND PROBE 25387.GPJ IGSL.GDT 7/10/24





LITHOLOGY GRAPHICS

- TOPSOIL
- Silty gravelly CLAY
- Sandy gravelly SILT
- Gravelly cobbly CLAY
- MADE GROUND
- Gravelly CLAY
- Clayey silty gravelly SAND
- Clayey silty sandy cobbly GRAVEL
- Sandy gravelly bouldery CLAY
- Sandy gravelly cobbly bouldery CLAY
- Clayey gravelly cobbly SAND
- Sandy gravelly CLAY
- Sandy gravelly cobbly CLAY
- Sandy CLAY
- Sandy gravelly silty CLAY

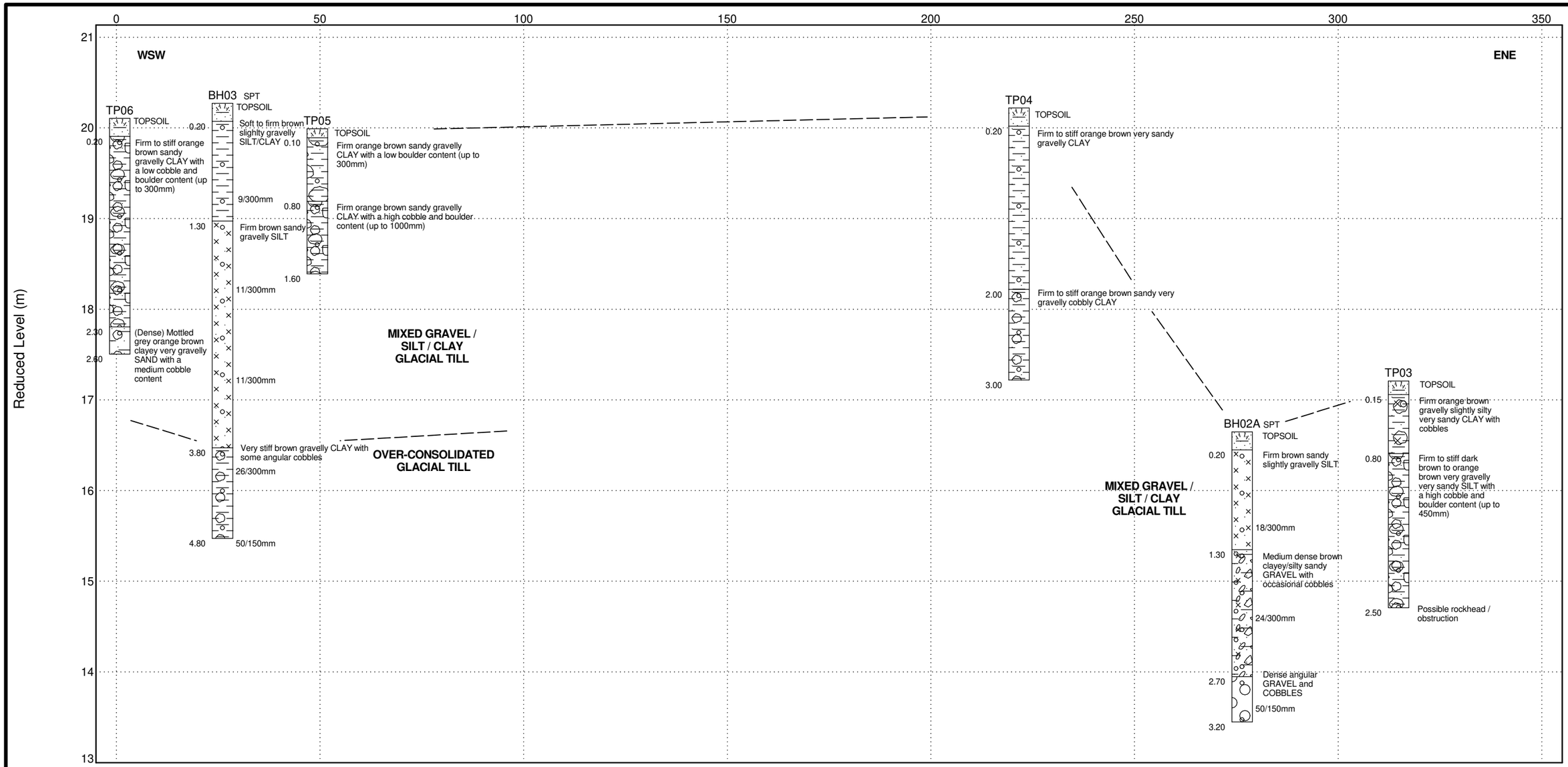
SUBSURFACE SECTION N - S

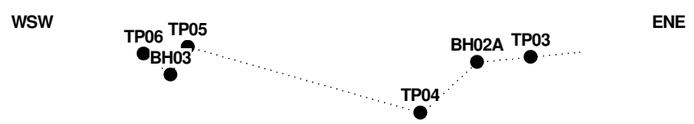
Client: Marshall Yards Dev. Co. Ltd

Project: Lands at Gortnahomna More, Castlemartyr

Number: 25387

FENCE BH AND PROBE 25387.GPJ IGSL.GDT 7/10/24





LITHOLOGY GRAPHICS

- TOPSOIL
- Sandy gravelly SILT
- Clayey silty sandy cobbly GRAVEL
- Gravelly COBBLES
- Silty gravelly CLAY
- Gravelly cobbly CLAY
- Sandy gravelly silty CLAY with cobbles
- Sandy gravelly cobbly bouldery CLAY
- Sandy gravelly CLAY
- Sandy gravelly cobbly CLAY
- Sandy gravelly bouldery CLAY
- Clayey gravelly cobbly SAND

SUBSURFACE SECTION WSW - ENE

Client: Marshall Yards Dev. Co. Ltd

Project: Lands at Gortnahomna More, Castlemartyr

Number: 25387

FENCE BH AND PROBE 25387.GPJ IGSL.GDT 7/10/24

Appendix B Geophysical Report

Castlemartyr LRD

Castlemartyr, Co. Cork

Geophysical Survey

Report Status: Final

MGX Project Number: 6811

MGX File Reference: 6811f-005.doc

8th October 2024

Confidential Report To:

Glenveagh Homes
Block C
Maynooth Business Campus
Maynooth
Co. Kildare

Donnachadh O'Brien
Unit 5C
Elm House
Millenium Park
Naas, Co. Kildare

Report submitted by:
Minerex Geophysics Limited

Unit F4, Maynooth Business Campus
Maynooth, Co. Kildare, W23X7Y5
Ireland
Tel.: 01-6510030
Email: info@mgx.ie

Issued by:

Author: John Connaughton (Geophysicist)

Reviewer: Hartmut Krahn (Senior Geophysicist)

Minerex Geophysics Limited

Subsurface Geophysical Investigations

EXECUTIVE SUMMARY

1. Minerex Geophysics Ltd. (MGX) carried out a geophysical survey consisting of EM31 Ground Conductivity, 2D-Resistivity (ERT) and seismic refraction (p-wave) surveying for the ground investigation for the proposed residential development in Castlemartyr, County Cork.
2. The main objective of the survey was to identify potential karstified rock under the site.
3. The EM31 ground conductivity survey provided a good coverage of the geological variations across the site and matches well with the interpretation for the other methods.
4. The 2D-Resistivity and seismic refraction data was interpreted with a total of six layers (1a – 3b).
5. Layers 1 is interpreted as soft to firm sandy gravelly clay or silt (Layer 1a) or loose to medium dense sand and gravel (Layer 1b). These layers have a thickness of 0.8 – 8m.
6. Layer 2a is interpreted as clay infilled highly karstified limestone or very stiff sandy gravelly clay and silt. This layer extends to depths of over 15m below ground level (bgl) in the south of the site and is present to shallower depths in places in the north of the site as well.
7. Layer 2b is present above areas of clean limestone and is described as poor very weathered limestone.
8. Layer 3a is interpreted as karstified limestone. These features typically occur within the good to very good clean limestone (Layer 3b).
9. Map 3 shows areas where rock is interpreted as shallow (<5m bgl), clean Limestone (Zone A) and deep (>5m bgl) or karstified Limestone (Zone B).
10. Two possible karst features interpreted in the south are likely related to enclosed depressions shown on the online GSI geology map in the fields to the south of the site (Map 3).
11. There is a general risk of karst throughout the entire survey area.
12. Cable Percussive Boreholes tie in well with the interpreted zones on Map 3. In order to test for karst targeted rotary core holes could be drilled.

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1. INTRODUCTION

1.1 Background

Minerex Geophysics Ltd. (MGX) carried out a geophysical survey for a large-scale residential development (LRD) on a site in Castlemartyr, Co. Cork. The survey consisted of EM31 ground conductivity, 2D-Resistivity (ERT) and seismic refraction (p-wave) measurements. The survey was commissioned by Donnachadh O'Brien acting on behalf of Glenveagh Homes.

This survey utilized various complementary geophysical methods to improve final interpretations. The role of geophysics as a non-destructive fast method is to provide a geological interpretation over a wide area to complement direct ground investigations at specific locations. The direct ground investigation results can be used to improve the initial geophysical results and interpretation.

The survey was aimed both at investigating the ground conditions under the site and assessing the risk of karstification.

1.2 Objectives

The main objectives of the geophysical survey were:

- To determine the ground conditions under the site
- To determine the depth to rock and the overburden thickness
- To estimate the strength or stiffness or compaction of overburden materials and the rock quality
- To determine the type of overburden and rock
- To detect lateral changes within the geological layers
- To detect possible karstified zones within the rock or karst features

1.3 Site Description

The site is located in the town of Castlemartyr, Co. Cork and contains three fields with a total size of approx. 7.8ha. The field closest to the N25 in the north is partly overgrown with willow trees and these areas are not accessible for surveying. The other two fields are used for agriculture. A topography survey of the site has been provided and shows the land rising to the south. The survey area is surrounded by houses to the north and west. To the south and east there are agricultural fields.

1.4 Geology

Online geological maps of Ireland (GSI, 2024) give the following information:

The overburden geology consists of till derived from Devonian sandstones.

In terms of rock, the survey area is underlain by the Little Island formation, described as massive and crinoidal fine limestone in the north, a band of Cork Red Marble Formation in the middle of the site described as red brecciated calcilutite limestone and Waulsortian limestone in the south described as massive unbedded lime-mudstone. There are two enclosed depressions (Karst Features) in the field immediately to the south of the site.

Image 1: Geological Bedrock Geology 100k, GSI

1.5 Report

This report includes the results and interpretation of the geophysical survey. Maps, figures and tables are included to illustrate the results of the survey. More detailed descriptions of geophysical methods and measurements can be found in GSEG (2002), Milsom (1989) and Reynolds (1997).

The description of soil, rock and the use of geotechnical terms (soft, stiff, dense etc) follows Eurocode (2007) and BSI (2020) standards. The terms are defined in the standards and the physical parameters are related from experience. This geophysical survey has been acquired, processed, interpreted and reported in accordance with these guidelines.

The client provided map of the site and the digital version was used as the background map in this report. Elevations were surveyed on site and are used in the vertical sections.

The interpretative nature and the non-invasive survey methods must be taken into account when considering the results of this survey and Minerex Geophysics Limited, while using appropriate practice to execute, interpret and present the data, give no guarantees in relation to the existing subsurface.

2. GEOPHYSICAL SURVEY

2.1 Methodology

The methodology consisted of using EM31 Ground Conductivity measurements across the site, followed up by 2D-Resistivity and targeted Seismic Refraction surveying.

Across the whole site, a total of 1194m of 2D-Resistivity and 702m of seismic refraction was surveyed. The EM31 Ground Conductivity survey was done over 6.73 ha.

The survey locations are indicated on Map 1. The lines and parameters are tabulated in Table 1.

Table 1: Geophysical Survey Locations and Acquisition Parameters

Resistivity Line	**Electrode Spacing/m**	**Number of Electrodes**	**Line Length/m**
R1	3	39	114
R2	3	96	285
R3	3	122	363
R4	3	122	363
R5	3	24	69
SUM			**1194**
Seismic Line	**Geophone Spacing/m**	**Number of Geophones**	**Line Length/m**
S1	3	24	69
S2	3	24	69
S3	3	48	141
S4	3	24	69
S5	3	48	141
S6	3	72	213
SUM			**702**

2.2 EM31 Ground Conductivity

The EM31 ground resistivity survey was carried out over the area indicated in Map 1 on lines nominally 10m apart. The area in the NE was not accessible for the EM31 ground conductivity survey. Along each line a reading of ground resistivity was taken every second while walking along, thereby resulting in a survey grid of nominally 10 x 2m. The locations were measured with a Carlson NR3 RTK-GPS sub-meter accuracy SERES DGPS system attached to the EM31 and all data was jointly stored in a data logger. The conductivity meter was a GEONICS EM31 with Archer2 data logger and NAV31 data acquisition software. The instrument was compared to base station readings and no EM drift was recorded.

EM31 ground conductivity determines the bulk conductivity of the subsurface over a typical depth between 0 and 6m below ground level (bgl). and over a radius of approx. 5m around the instrument. When looking for clay, silt and water infill within rock occurring at relatively shallow depth the EM31 can find anomalous rock zones with a vertical extent of approx. 3m. The measurements are disturbed by metal and other conductive objects in close proximity to the instrument, and therefore no geological interpretations can be made in the vicinity of such man-made objects. Either readings were not taken near sources of interference, or notes were taken by the surveyor in order to remove these during processing or to account for these in the interpretation.

2.3 2D-Resistivity (ERT)

2D-Resistivity lines were surveyed with electrode spacing of 3m, up to 64 electrodes per set-up and a maximum length of 189m per set-up. The readings were taken with a Tigre Resistivity Meter, Imager Cables, stainless steel electrodes and a laptop with ImagerPro acquisition software.

The data along lines R2, R3 & R4 was acquired in the roll-along mode to achieve continuous coverage to a depth of 15m between the ends of the lines

During 2D-Resistivity surveying, data is acquired in the form of linear arrays using a suite of metal electrodes. A current is induced into the ground via a pair of electrodes whilst a potential difference is measured across a second pair of electrodes. This allows for the recording of the apparent resistivity in a two-dimensional arrangement below the line. The data is inverted after the survey to obtain a model of subsurface resistivities. The generated model resistivity values and their spatial distribution can then be related to typical values for different geological materials.

The penetration depth of a resistivity set-up increases towards the centre where it reaches an approx. value of $1/6^{th}$ of the array length.

2D-Resistivity has previously proven zones of anomalous or karstified rock with lateral extents of 5m and more.

2.4 Seismic Refraction

Seismic refraction lines were surveyed with geophone spacing of 3m and 24 geophones per set-up resulting in a 69m length per set-up. Lines were located to primarily target possible karst areas across the site as well as determining variations in rock depth and quality. The recording equipment consisted of a 24 Channel GEOMETRICS ES-3000 engineering seismograph with 4.5Hz vertical geophones. The seismic energy source consisted of a hammer and plate. A zero-delay trigger was used to start the recording. Normally 7 shot points per p-wave set-up were used.

Set-ups were acquired in longer continuous lines using common shot points between set-ups and concatenating into longer lines at the processing stage.

The seismic refraction survey method focuses on propagating p-waves travelling through the subsurface, which are generated by a seismic source. As the wave propagates through the subsurface, its velocity varies as it travels through overburden, rock with different elastic properties, and along geological boundaries. Velocity data is recorded via the surveying equipment, which is then processed, allowing geological layer thicknesses and boundaries to be established.

Seismic Refraction generally determines the depth to horizontal or near horizontal layers where the compaction or strength or rock quality changes with an accuracy of around 20% of the depth to that layer. Where the layers are shallower than the geophone spacing depth deviations of +- 1m to top of layers can occur. Where low velocity layers or shadow zones are present (e.g., below solid ground surface) or where layers dip with more than 20 degrees angles the accuracy becomes much less.

The seismic refraction set-ups with 69m individual length have a reasonable penetration depth of around 15m. An internationally accepted maximum depth estimate for a seismic refraction set-up is 1/6 of the set-up length including offshots. The depth penetration varies according to the velocity structure of the subsurface. In this report we used a depth of 15m bgl. where the seismic modelling was ended as deeper modelling becomes less meaningful.

2.5 Site Work

The data acquisition was carried out between the 16th and 19th of September 2024. The weather conditions were fair throughout the acquisition period. Health and safety standards were adhered to at all times. The locations and elevations were surveyed with a Carlson NR3 RTK-GPS to accuracy < 0.05m.

3. RESULTS AND INTERPRETATION

The interpretation of geophysical data was executed utilizing the known response of geophysical measurements, typical physical parameters for subsurface features that may underlay the site, and the experience of the authors.

Cable Percussive boreholes and trial pit results were provided after the survey and the abbreviated borehole logs for BH1 and BH6, which were carried out close to survey lines are indicated on the sections. The overburden was abbreviated as clay, silt, and gravel. The small size of a borehole only represents a very small volume of ground while the geophysical survey on the other end of the scale averages over a large volume of ground.

The six borehole locations are shown on the maps. On Map 3, BH2, BH2a and BH4 all of which fall within the clean shallow limestone area and refuse at depths of 1.2m, 3.2m and 1.7m respectively.

BH1, BH3, BH5 and BH6 are shown in the karstified or deep limestone areas. These boreholes refuse at depths of 7.2m, 4.8m, 10m and 9.5m bgl.

3.1 EM31 Ground Conductivity

The EM31 ground conductivity values were merged into one data file for the survey area and contoured and gridded with the SURFER contouring package. The contours are created by gridding and interpolation and care must be taken when using the data. The contour map is overlaid over the location and base map (Map 2) and the values in milliSiemens/metre (mS/m) are indicated on the colour scale bar.

The conductivity is typical for certain geological material types. Dry and clean Sand and Gravel and most rock types (clean Limestone) have relatively low conductivities whist clay and clay-rich rock types (mudstone, shale) have high conductivities.

Low conductivities indicate either shallow bedrock or dry sandy and gravely overburden while higher conductivities indicate deeper bedrock, zones of bedrock karstification and clay-rich overburden. Very high or ‘negative’ conductivities indicate noise from man-made metal objects and are ignored in the interpretation.

The range of conductivities on site varies between 0 to 10 mS/m. Low conductivities (<4mS/m) indicate shallow (less than 5m) and clean Limestone or a clean sand and gravel. The central, north and south-west sides of the survey area have conductivities above 4mS/m and it is interpreted as deeper (more than 5m) rock, or weathered, karstified Limestone. The single very high or very low conductivity spots indicate noise from man-made metal object and are ignored in the interpretation such as in the west corner of the southern field.

Map 3 shows the interpretation of shallower and deeper or karstified rock areas.

Table 2: Summary of Interpretation (Conductivity only)

Layer	General Conductivity Range (mS/m)	Interpretation
A	<4	Area of shallow (<5m), clean Limestone
B	>4	Area of karstified or deep (>5m) Limestone

3.2 2D-Resistivity (ERT)

The 2D-Resistivity data was positioned and inverted with the RES2DINV inversion package. Lines using the roll-along method were concatenated for a joint inversion. The programme uses a smoothness constrained least-squares inversion method to produce a 2D model of the subsurface resistivities from the recorded apparent resistivity values. Three variations of the least squares method are available and for this project the Jacobian Matrix was recalculated for the first three iterations, then a Quasi-Newton approximation was used for subsequent iterations. Each dataset was inverted using seven iterations resulting in a typical RMS error of <3.0%. The resulting models were colour contoured with the same resistivity scale for all lines and they are displayed as cross sections (Figure 1).

Resistivities are characteristic for certain overburden and rock types. If there is a high content of clay minerals (which are electrically conductive) then the overburden resistivity will be lower than as if there is a high content of clastic grains like sand or gravel. The purer the clay and the lower the sand and gravel content, the lower the resistivity. Water content in overburden layers can influence the resistivities, but generally clay content has a more dominating effect.

Within bedrock types like clean limestone high resistivities indicate a fresh, strong, unweathered rock. As the weathering in the rock increases the resistivity gets lower because of weathering products, remineralisation of rock and infill of cracks, faults and voids with clay and water. Weathering within rock is typically indicated by lower resistivity values in the cross sections.

In limestone areas karstified rock is defined in this report as a formerly intact clean limestone rock, liable to karstification, that has been partially dissolved by water over long geological time scales and where the cavities and voids have either remained empty (filled by air) or became filled by overburden sediment (clay, silt, sand), weathering product of the broken rock itself or water. This process would lead to a reduction of the resistivity of the overall rock and therefore karstified rock has a lower resistivity than intact clean limestone rock. This is generally indicated by lower resistivities embedded within high resistivity at depth.

The resistivities cover a range typical for materials from clay rich overburden (low resistivities) to fresh strong unweathered bedrock (high resistivities). The ranges have been taken into the consideration for the interpretation. Low resistivity values (<500 Ohmm) within the overburden indicate a sandy gravelly clay and

silt. Medium to high values (>500 Ohmm) are interpreted as a clean sand and gravel overburden. Within the rock, low to medium resistivities (<1000 Ohmm) are interpreted as weathered or karstified limestone while high resistivities (>1000 Ohmm) indicate a clean limestone bedrock.

3.3 Seismic Refraction

The seismic refraction data was positioned and processed with the SEISIMAGER software package to give a layered model of the subsurface. The number of layers has been determined by analysing the seismic traces and 3 layers were used in the models. All seismic lines were subject to a standardised processing sequence which consisted of a topographic correction which was based on integrated elevation data, first break picking, tomographic inversion, travel-time computation via ray-tracing and velocity modelling. Residual deviations of typically 0.4 to 1.8 msec RMS have been obtained for each line. Following each processing stage QC procedures were adhered to. The resulting layer boundaries are shown as thick lines overlaid on the 2D-Resistivity cross sections (Figure 1). The average seismic velocities obtained within the layers are annotated on the sections as bold black numbers.

The p-wave seismic velocity is closely linked to the density of subsurface materials and to parameters like compaction, stiffness, strength and rock quality. The higher the density of the subsurface materials the higher the seismic velocity. More compacted, stiffer, denser and stronger material will have a higher seismic velocity. For rock, the seismic velocity is higher when the rock is stronger, less weathered and has a higher quality. If the rock is more weathered, broken, fractured, fissured or karstified then the seismic velocity will be reduced compared to that of intact fresh rock.

Because of the above relationship, the seismic refraction method and seismic velocities are suitable to investigate ground where the layers get denser, more compacted and stronger with depth. A disadvantage is that some materials may have the same seismic velocity.

The modelled seismic data has created the following layered ground model:

Layer 1 has a thickness of 0.8 - 8m and seismic velocities of 200 - 600m/s. This overburden would have a soft to firm or loose to medium dense stiffness or compaction.

Layer 2 was modelled with a velocity range of 1900 - 2000m/s. The thickness of this layer is between 1 and 8.5m in the south and extends to over 15m bgl in the north. The velocity indicates overburden material with very stiff or very dense strength or compaction or highly karstified or very weathered rock.

Layer 3 velocities of 3500 - 4000m/s indicate the top of rock layer with good to very good rock quality. The top of this rock varies between 3 and >15m bgl depth and is shallowest in the south.

3.4 Interpretation of Resistivity and Seismic Refraction

Table 3 summarises the interpretation. The stiffness or compaction of overburden and the rock strength or quality have been estimated from the seismic velocity. The estimation of the excavatability for the bedrock has been made according to the caterpillar chart published in Reynolds (1997). The geotechnical assessment for rippability will have to take factors like rock type and jointing into account and the estimation in this report is solely based on the seismic velocities.

Interpreted cross sections are shown in Figure 2. The interpretation has been made from all available information. For overburden layers and the top of the rock the seismic refraction data has been used as seismic refraction is the best method to delineate layer boundaries (denoted by numbers in the following table). The resistivity model values have been used to delineate overburden material and rock types (denoted by letters in the following table). Resistivities also indicate overburden layers and rock head where no seismic refraction data was acquired. Resistivity data is better suited to show overburden material, rock types and features within the rock while seismic refraction velocities are indicating the change of compaction, stiffness or rock quality with depth.

Table 3: Summary of Interpretation

Layer	General Seismic Velocity Range (m/sec)	General Resistivity Range (Ohmm)	Stiffness or Compaction of Overburden	Interpretation	Estimated Excavation Method
1a	200-600	<500	Soft to firm	Sandy gravelly Clay and Silt	Diggable
1b	200-600	>500	Loose to medium dense	Sand and Gravel	Diggable
2a	1900 - 2000	<1000	Very stiff	Overburden (sandy gravelly Clay and Silt) or Clay infilled highly karstified Limestone	Diggable
2b	1900 - 2000	>1000	Poor Rock	Very weathered Limestone	Rippable to marginal rippable
3a	3500 - 4000	<1000	N/A	Karstified Limestone	Breaking & Blasting
3b	3500 - 4000	>1000	Good to very good Rock	Clean Limestone	Breaking & Blasting

4. CONCLUSIONS AND RECOMMENDATIONS

The following conclusions and recommendations are made:

- The geophysical surveys carried out at the LRD site in Castlemartyr, Co. Cork consisted of EM31 ground conductivity, 2D-Resistivity (ERT) and seismic refraction (p-wave).
- At all locations there was a strong correlation between all geophysical survey methods, EM31 ground conductivity, 2D-Resistivity and seismic refraction. The lowest conductivities relate to the shallowest high resistivity layers.
- The seismic refraction data was modelled with 3 layers and all layers were divided using the resistivities resulting in a total of six interpretation layers (1a, 1b, 2a, 2b, 3a, 3b).
- The top layer has a thickness of 0.8 - 8m and is interpreted as sandy gravelly clay and silt with a soft to firm stiffness (Layer 1a), or sand and gravel with a loose to medium compaction (Layer 1b).
- Layer 2a is interpreted as very stiff sandy gravelly clay and silt or clay infilled highly karstified limestone and Layer 2b is described as poor very weathered limestone. These layers reach depths of between 3 and >15m bgl.
- Layer 3 is interpreted as a rock layer and is divided into karstified Limestone (Layer 3a) or good to very good clean limestone (Layer 3b) based on resistivity.
- Map 3 shows areas interpreted as shallow, clean Limestone (Zone A) and deep (>5m bgl) or karstified Limestone (Zone B) using the results from the EM31 ground conductivity survey as well as the results from the other methods.
- Within Zone B, Layer 2a (very stiff sandy gravelly clay and silt or clay infilled highly karstified limestone) extends to over 15m bgl in the north and between 5 – 20 in the SW.
- Considering the large extent of karst there is a general risk of karst for the entire site.
- There is a sharp change in the depth to rock from north to south across the site with no good to very good limestone (Later 3b) being interpreted to depths of 15m bgl across the north of the site.
- Within the shallow rock areas in the south there is also some karstification noted such as along R3 at Ch140 and Ch245.
- Both of these features may be related to the karst features noted on the online GSI website. The features at Ch140 may extend to the enclosed depression in the SE while the features at Ch245 is very likely part of the enclosed depression just north of that location.
- The existence of karstified rock could lead to subsidence of overburden, especially if the water drainage regime is altered. In order to test for karst targeted rotary core holes could be drilled.

- While the Cable Percussive Boreholes do not prove the depth to rock, the refusal depths tie in well with the interpretation map indicating deep and shallow rock areas.

5. REFERENCES

1. **BSI, 2020.** BS5930: 2015+A1:2020, Code of Practice for Ground Investigations, British Standards Institute 2020

2. **Eurocode, 2007.** EN 1997-2:2007. Eurocode 7. Part 2 Ground Investigation and Testing 2007

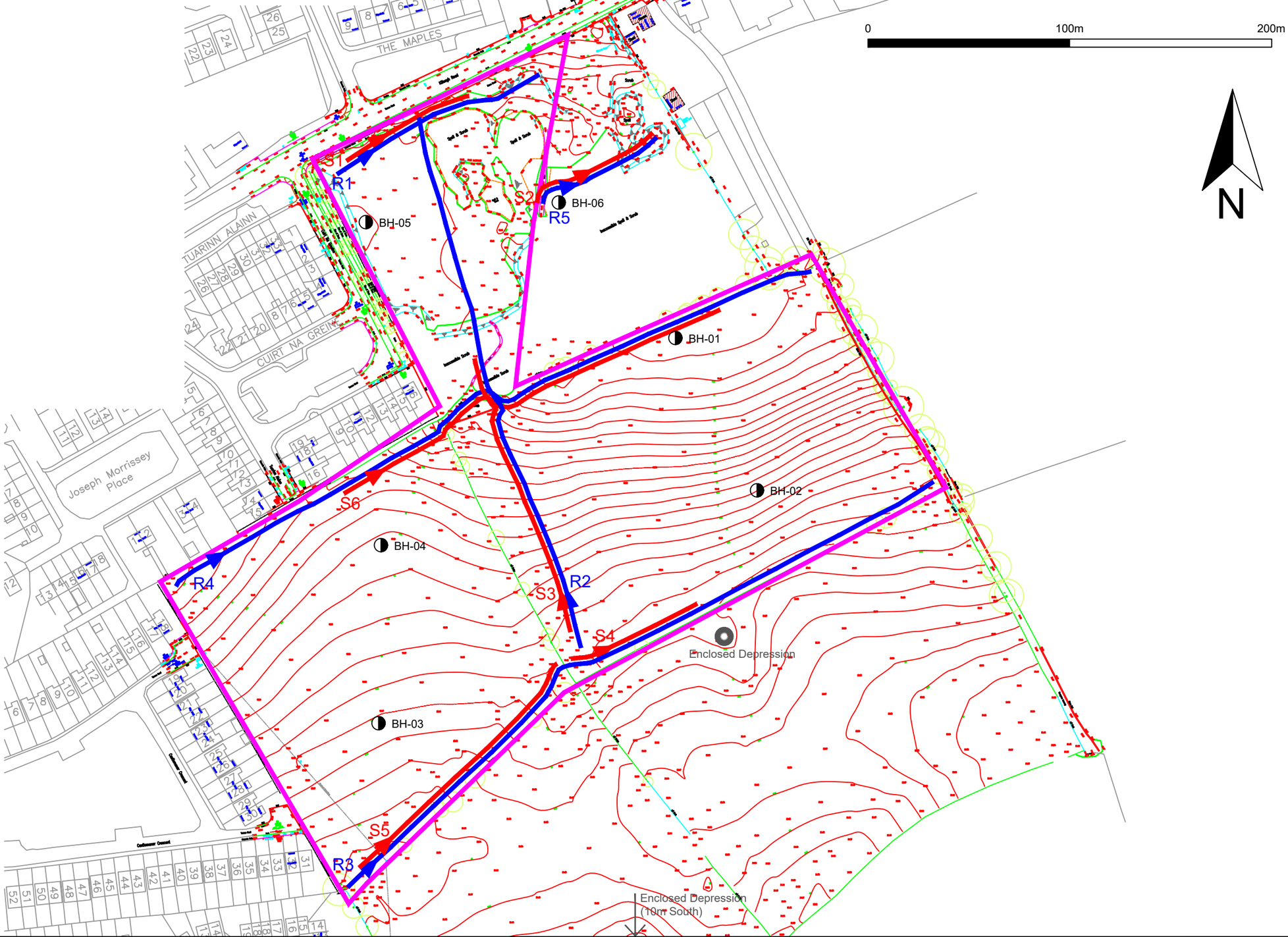
3. **GSEG, 2002.** Geophysics in Engineering Investigations. Geological Society Engineering Geology Special Publication 19, London, 2002

4. **GSI, 2024.** Online Geological Map of Ireland. Geological Survey of Ireland 2024

5. **Milsom, 1989.** Field Geophysics. John Wiley and Sons, 1989

6. **Reynolds, 1997.** An Introduction to Applied and Environmental Geophysics. John Wiley and Son, 1997

7. **Weaver, 1975.** Geological Factors significant in the Assessment of Rippability, 1975



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CLIENT	Glenveagh Homes Donnachadh O'Brien
PROJECT	Castlemartyr LRD, County Cork Geophysical Survey
TITLE	Map 1: Geophysical Survey Location Map

SCALE:	1:2000 @ A3
PROJECT:	6811
DRAWN:	JS
DATE:	23/09/2024
MGX FILE:	6811f_Drawings.dwg
STATUS:	Final

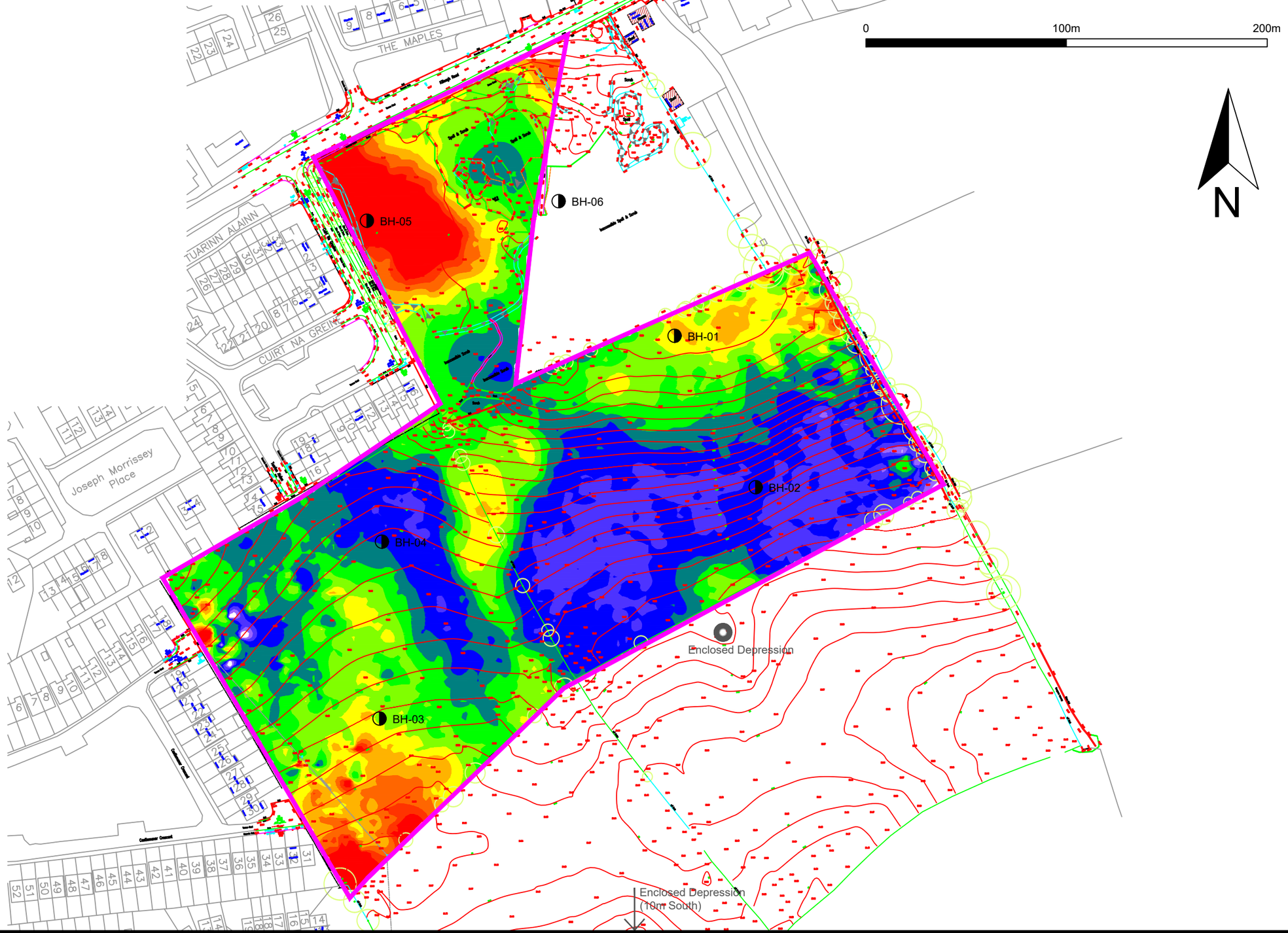
Geophysical Survey Locations:

- R2 — 2D-Resistivity Line
- S1 — Seismic Refraction Line
- EM31 Survey Area

Locations are in Irish Transverse Mercator (ITM), Elevations are in mOD (Malin Head)

Direct Ground Investigation Locations:

- BH-01 — Cable Percussive Borehole



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CLIENT	Glenveagh Homes Donnachadh O'Brien
PROJECT	Castlemartyr LRD, County Cork Geophysical Survey
TITLE	Map 2: EM31 Ground Conductivity Contour Map

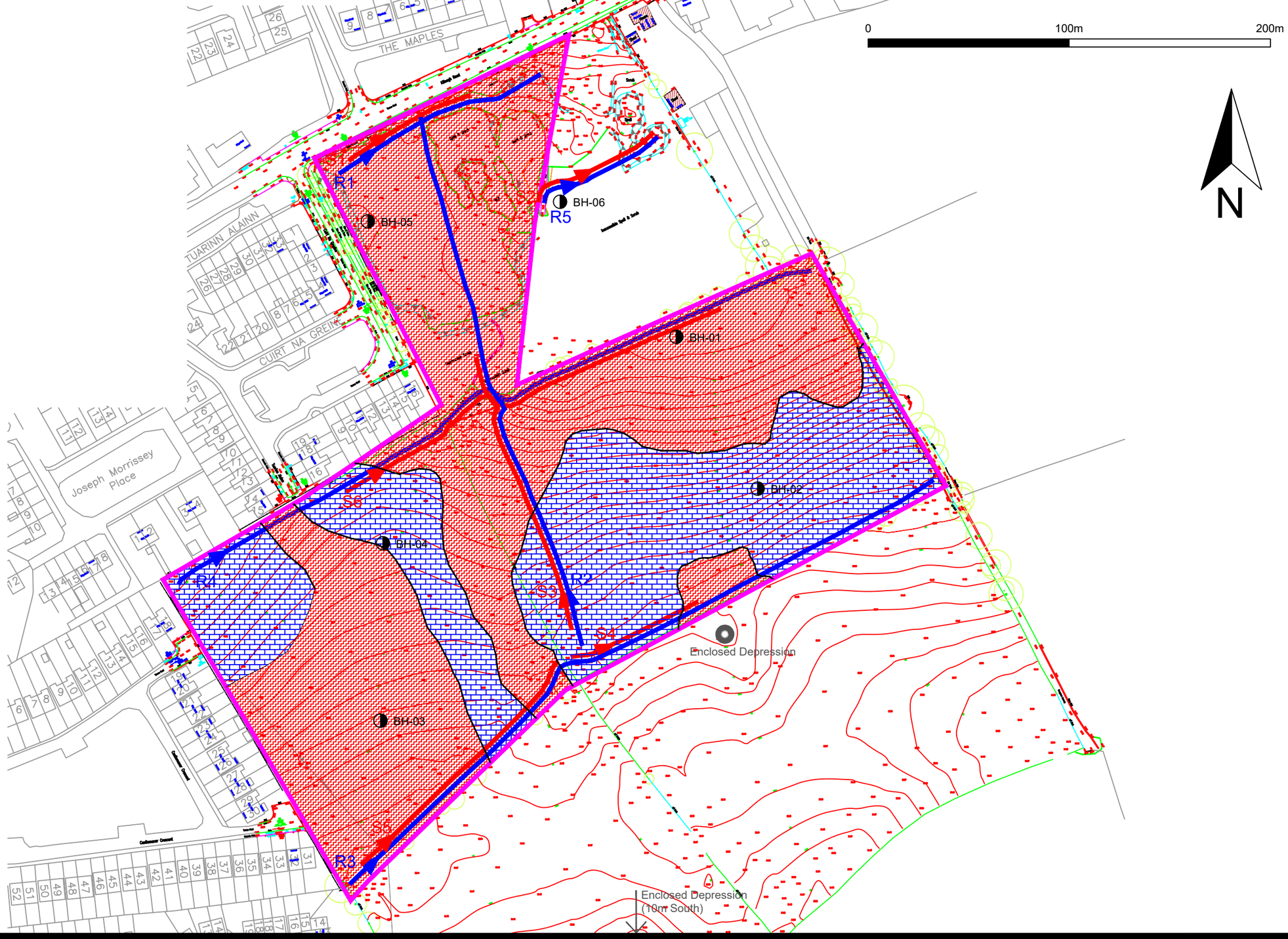
SCALE:	1:2000 @ A3
PROJECT:	6811
DRAWN:	JS
DATE:	25/09/2024
MGX FILE:	6811f_Drawings.dwg
STATUS:	Final

EM31 Ground Conductivity Values:

Ground Conductivity in mS/m

0 1 2 3 4 5 6 7 8 9 10

The map shows the EM31 ground conductivity contours in mS/m. The low (blue) conductivities indicate shallow rock or clean sand and gravel. The middle range (green) values indicates deeper rock and areas of karstified limestone. The high (red) values indicate clay and silt rich overburden.



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CLIENT	Glenveagh Homes Donnachadh O'Brien
PROJECT	Castlemartyr LRD, County Cork Geophysical Survey
TITLE	Map 3: Geophysical Survey Interpretation Map

SCALE:	1:2000 @ A3
PROJECT:	6811
DRAWN:	JS
DATE:	25/09/2024
MGX FILE:	6811f_Drawings.dwg
STATUS:	Final

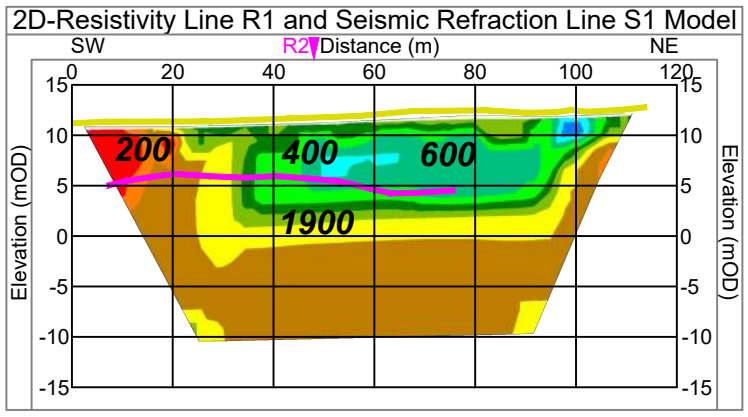
Interpretation:

A Clean, shallow Limestone (< 5m)
B Karstified or deep (> 5m) Limestone

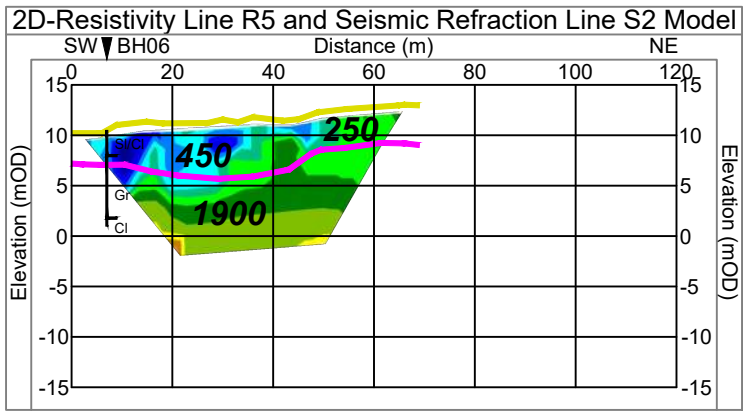
Direct Ground Investigation Locations:

BH-01 Cable Percussive Borehole

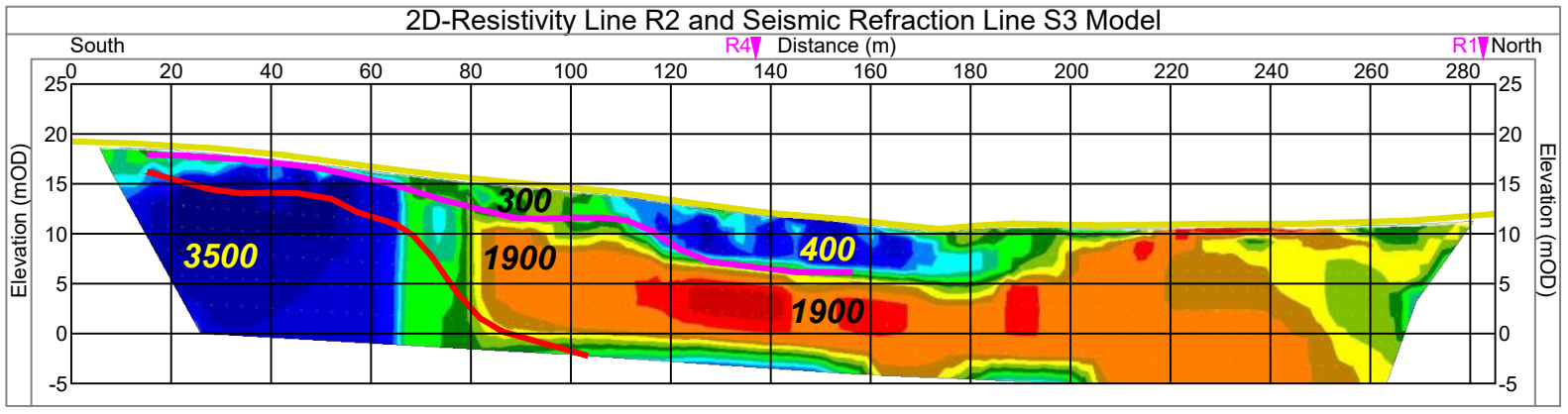
2D-Resistivity Line R1 and Seismic Refraction Line S1 Model



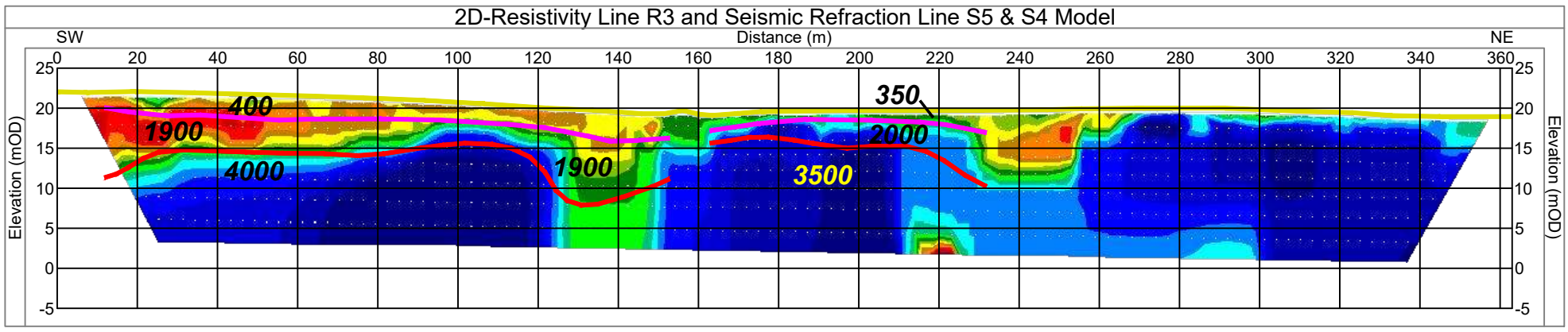
2D-Resistivity Line R5 and Seismic Refraction Line S2 Model



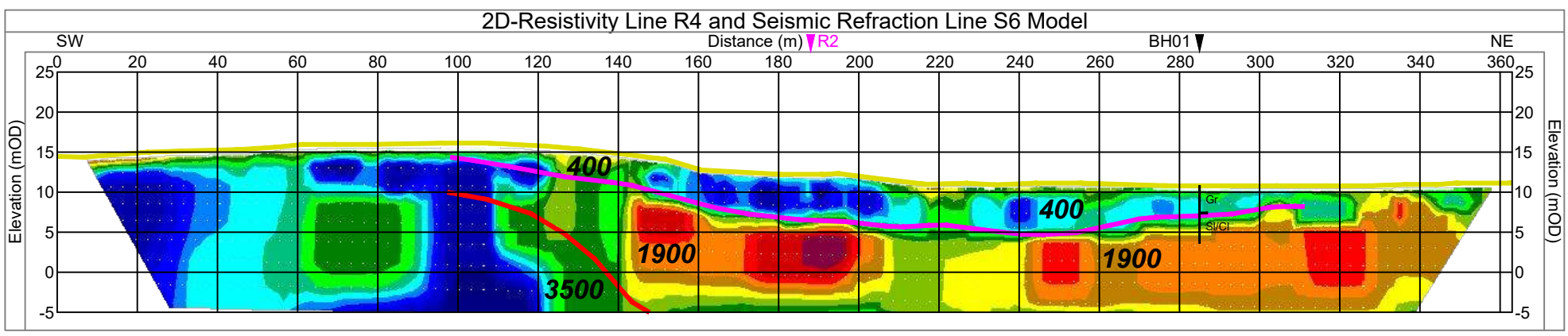
2D-Resistivity Line R2 and Seismic Refraction Line S3 Model



2D-Resistivity Line R3 and Seismic Refraction Line S5 & S4 Model



2D-Resistivity Line R4 and Seismic Refraction Line S6 Model



Abbreviated GI Logs:

BH01	Borehole Name and Location
Cl	Clay
Gr	Gravel
Sl	Silt

Minerex Geophysics Limited

Unit F4, Maynooth Business Campus
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Email: info@mgx.ie
Web: www.mgx.ie

CLIENT	Glenveagh Homes Donnachadh O'Brien
PROJECT	Castlemartyr LRD, County Cork Geophysical Survey
TITLE	Figure 1: Models of Geophysical Survey

SCALE:	1:1500 @ A3, VE x 2
PROJECT:	6811
DRAWN:	JS
DATE:	25/09/2024
MGX FILE:	6811f_Drawings.dwg
STATUS:	Final

Layers from Seismic Refraction Model:

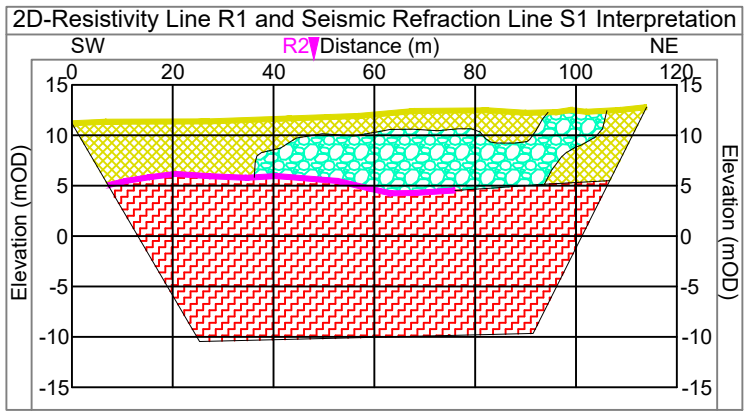
- Ground Surface/Top of Layer 1 (200 - 600 m/s)
- Top of Layer 2 (1900 - 2000 m/s)
- Top of Layer 3 (3500 - 4000 m/s)
- **1900** Seismic Velocity in m/s

2D-Resistivity Model Values:

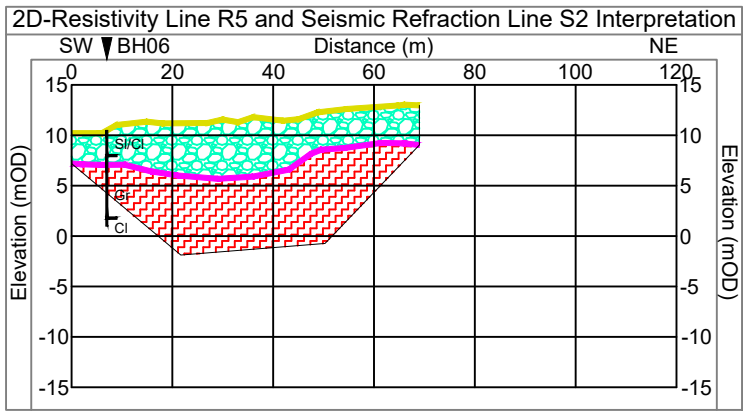
Resistivities (Ohmm)

31.2 62.5 125 250 500 1000 2000 4000

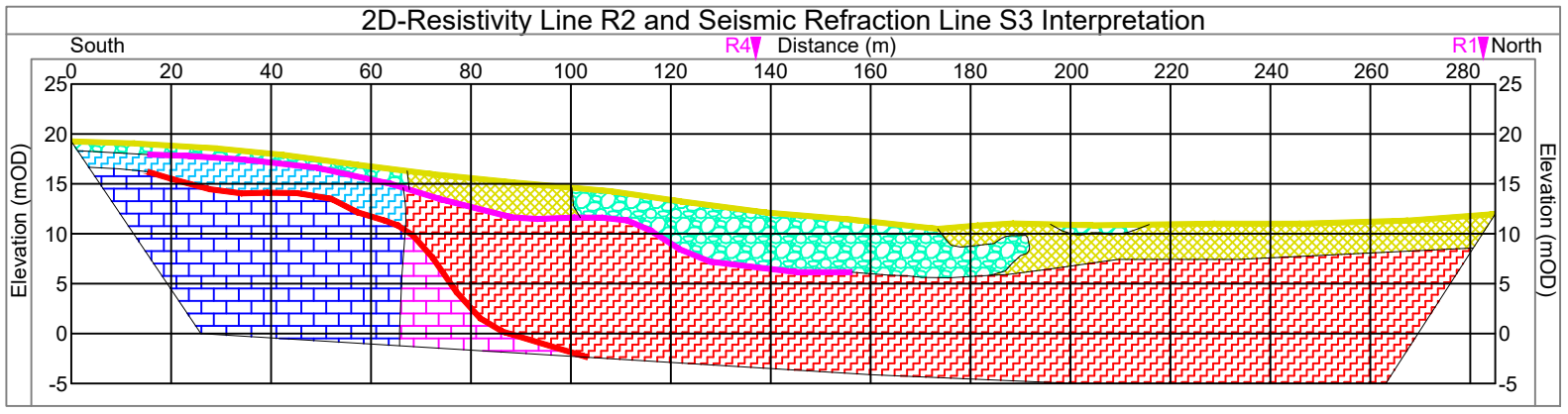
2D-Resistivity Line R1 and Seismic Refraction Line S1 Interpretation



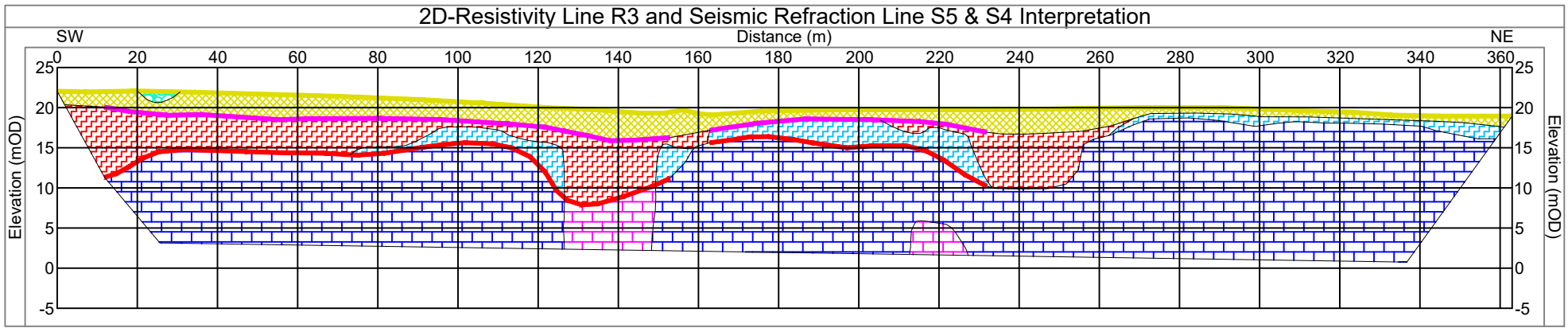
2D-Resistivity Line R5 and Seismic Refraction Line S2 Interpretation



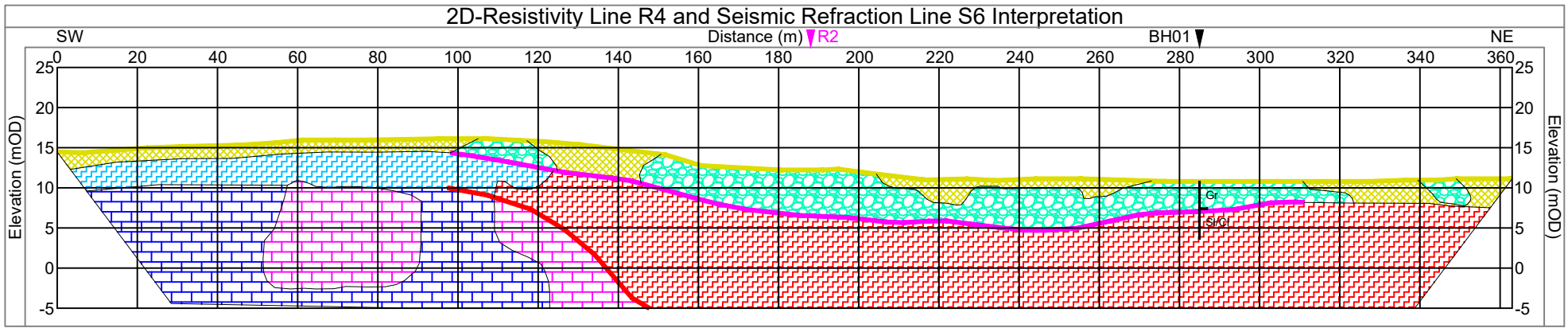
2D-Resistivity Line R2 and Seismic Refraction Line S3 Interpretation



2D-Resistivity Line R3 and Seismic Refraction Line S5 & S4 Interpretation



2D-Resistivity Line R4 and Seismic Refraction Line S6 Interpretation



Abbreviated GI Logs:

BH01	Borehole Name and Location
Cl	Clay
Gr	Gravel
Sl	Silt

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CLIENT	Glenveagh Homes Donnachadh O'Brien
PROJECT	Castlemartyr LRD, County Cork Geophysical Survey
TITLE	Figure 2: Interpretation of Geophysical Survey

SCALE:	1:1500 @ A3, VE x 2
PROJECT:	6811
DRAWN:	JS
DATE:	25/09/2024
MGX FILE:	6811f_Drawings.dwg
STATUS:	Final

Interpretation:

- 1a Soft to firm sandy gravelly Clay and Silt
- 1b Loose to medium dense Sand and Gravel
- 2a Very stiff sandy gravelly Clay or Silt or Clay infilled highly karstified Limestone
- 2b Poor very weathered Limestone
- 3a Karstified Limestone
- 3b Good to very good clean Limestone

Appendix C Surface Water Calculations

Project	Residential Zone Lands at Gortnahomna, Castlemartyr, Co. Cork
Project No.	DOBA2411
Calculation	Interception Calculations

DONNACHADH O'BRIEN & ASSOCIATES CONSULTING ENGINEERS

Sub-Catchment		**1**	
Interception Storage required			
Interception Storage required	=	Sub-Catchment area x min. rainfall	
Sub-Catchment Area	=	5559	m^2
Minimum Rainfall	=	10	mm
Total required	=	**56**	**m^3**
Interception Storage Provided			
Area Type		SuDS Feature Interception Volume	
Tree Pit	=	0.0	m^3
Rain gardens	=	12.9	m^3
Permeable Paving	=	35.9	m^3
Bioretention Areas	=	18.0	m^3
Attenuation Tank	=	15.8	m^3
Total provided	=	**83**	**m^3**
Interception Storage Provided	**>**	**Interception Storage Required**	

Interception Calculation		
Tree Pit		
Length	2.0	m
Width	2.0	m
Depth of stone below invert	0.75	m
Void ratio	0.4	
Volume	1.2	m^3
No. Tree Pits	0	nr
Interception Volume	0.0	m^3

Rain gardens		
Area	323.0	m^2
Depth of stone below invert	0.1	m
Voids Ratio	0.4	
Interception Volume	12.9	m^3

Permeable Paving		
Area	299.5	m^2
Depth of stone below invert	0.3	m
Voids Ratio	0.4	
Interception Volume	35.9	m^3

Bioretention Areas		
Area	449.0	m^2
Depth of stone below invert	0.1	m
Voids Ratio	0.4	
Interception Volume	18.0	m^3

Attenuation Tank		
Length	22.0	m
Width	12.0	m
Depth of Stone below invert	0.2	m
Void Ratio	0.4	
Interception Volume	15.8	m^3

Total Interception Storage Provided	82.7	m^3

Project Residential Zone Lands at Gortnahomna, Castlemartyr, Co. Cork
Project No. DOBA2411
Calculation Interception Calculations

DONNACHADH O'BRIEN & ASSOCIATES CONSULTING ENGINEERS

Sub-Catchment		**2**	
Interception Storage required			
Interception Storage required	=	Sub-Catchment area x min. rainfall	
Sub-Catchment Area	=	11448	m^2
Minimum Rainfall	=	10	mm
Total required	=	**114**	**m^3**
Interception Storage Provided			
Area Type		SuDS Feature Interception Volume	
Tree Pit	=	13.2	m^3
Rain gardens	=	32.0	m^3
Permeable Paving	=	91.2	m^3
Bioretention Areas	=	3.3	m^3
Attenuation Tank	=	9.0	m^3
Total provided	**=**	**149**	**m^3**
Interception Storage Provided	**>**	**Interception Storage Required**	

Interception Calculation		
Tree Pit		
Length	2.0	m
Width	2.0	m
Depth of stone below invert	0.75	m
Void ratio	0.4	
Volume	1.2	m^3
No. Tree Pits	11	nr
Interception Volume	13.2	m^3

Rain gardens		
Area	800.8	m^2
Depth of stone below invert	0.1	m
Voids Ratio	0.4	
Interception Volume	32.0	m^3

Permeable Paving		
Area	760.3	m^2
Depth of stone below invert	0.3	m
Voids Ratio	0.4	
Interception Volume	91.2	m^3

Bioretention Areas		
Area	83.0	m^2
Depth of stone below invert	0.1	m
Voids Ratio	0.4	
Interception Volume	3.3	m^3

Attenuation Tank		
Length	18.8	m
Width	8.0	m
Depth of Stone below invert	0.2	m
Void Ratio	0.4	
Interception Volume	9.0	m^3

Total Interception Storage Provided	148.8	m^3

Project Residential Zone Lands at Gortnahomna, Castlemartyr, Co. Cork
Project No. DOBA2411
Calculation Interception Calculations

DONNACHADH O'BRIEN & ASSOCIATES CONSULTING ENGINEERS

Sub-Catchment		**3**	
Interception Storage required			
Interception Storage required	=	Sub-Catchment area x min. rainfall	
Sub-Catchment Area	=	7818	m^2
Minimum Rainfall	=	10	mm
Total required	=	**78**	**m^3**
Interception Storage Provided			
Area Type		SuDS Feature Interception Volume	
Tree Pit	=	8.4	m^3
Rain gardens	=	14.9	m^3
Permeable Paving	=	56.2	m^3
Bioretention Areas	=	0.0	m^3
Attenuation Tank	=	0.0	m^3
Total provided	**=**	**79**	**m^3**
Interception Storage Provided	**>**	**Interception Storage Required**	

Interception Calculation		
Tree Pit		
Length	2.0	m
Width	2.0	m
Depth of stone below invert	0.75	m
Void ratio	0.4	
Volume	1.2	m^3
No. Tree Pits	7	nr
Interception Volume	8.4	m^3

Rain gardens		
Area	372.0	m^2
Depth of stone below invert	0.1	m
Voids Ratio	0.4	
Interception Volume	14.9	m^3

Permeable Paving		
Area	468.0	m^2
Depth of stone below invert	0.3	m
Voids Ratio	0.4	
Interception Volume	56.2	m^3

Bioretention Areas		
Area	0.0	m^2
Depth of stone below invert	0.1	m
Voids Ratio	0.4	
Interception Volume	0.0	m^3

Attenuation Tank		
Length	0.0	m
Width	0.0	m
Depth of Stone below invert	0.2	m
Void Ratio	0.4	
Interception Volume	0.0	m^3

Total Interception Storage Provided	79.4	m^3

Project	Residential Zone Lands at Gortnahomna, Castlemartyr, Co. Cork
Project No.	DOBA2411
Calculation	Interception Calculations

DONNACHADH O'BRIEN & ASSOCIATES CONSULTING ENGINEERS

Sub-Catchment		**4**	
Interception Storage required			
Interception Storage required	=	Sub-Catchment area x min. rainfall	
Sub-Catchment Area	=	1272	m^2
Minimum Rainfall	=	10	mm
Total required	=	**13**	**m^3**
Interception Storage Provided			
Area Type		SuDS Feature Interception Volume	
Tree Pit	=	3.6	m^3
Rain gardens	=	4.9	m^3
Permeable Paving	=	13.8	m^3
Bioretention Areas	=	0.0	m^3
Attenuation Tank	=	27.3	m^3
Total provided	**=**	**50**	**m^3**
Interception Storage Provided	**>**	**Interception Storage Required**	

Interception Calculation		
Tree Pit		
Length	2.0	m
Width	2.0	m
Depth of stone below invert	0.75	m
Void ratio	0.4	
Volume	1.2	m^3
No. Tree Pits	3	nr
Interception Volume	3.6	m^3

Rain gardens		
Area	123.2	m^2
Depth of stone below invert	0.1	m
Voids Ratio	0.4	
Interception Volume	4.9	m^3

Permeable Paving		
Area	115.2	m^2
Depth of stone below invert	0.3	m
Voids Ratio	0.4	
Interception Volume	13.8	m^3

Bioretention Areas		
Area	0.0	m^2
Depth of stone below invert	0.1	m
Voids Ratio	0.4	
Interception Volume	0.0	m^3

Attenuation Tank		
Length	33.0	m
Width	13.8	m
Depth of Stone below invert	0.2	m
Void Ratio	0.4	
Interception Volume	27.3	m^3

Total Interception Storage Provided	49.7	m^3

Project Residential Zone Lands at Gortnahomna, Castlemartyr, Co. Cork
Project No. DOBA2411
Calculation Interception Calculations

DONNACHADH O'BRIEN & ASSOCIATES CONSULTING ENGINEERS

Sub-Catchment		**5**	
Interception Storage required			
Interception Storage required	=	Sub-Catchment area x min. rainfall	
Sub-Catchment Area	=	5041	m^2
Minimum Rainfall	=	10	mm
Total required	=	**50**	**m^3**
Interception Storage Provided			
Area Type		SuDS Feature Interception Volume	
Tree Pit	=	0.0	m^3
Rain gardens	=	8.6	m^3
Permeable Paving	=	34.6	m^3
Bioretention Areas	=	8.5	m^3
Attenuation Tank	=	15.9	m^3
Total provided	=	**68**	**m^3**
Interception Storage Provided	>	**Interception Storage Required**	

Interception Calculation		
Tree Pit		
Length	2.0	m
Width	2.0	m
Depth of stone below invert	0.75	m
Void ratio	0.4	
Volume	1.2	m^3
No. Tree Pits	0	nr
Interception Volume	0.0	m^3

Rain gardens		
Area	215.6	m^2
Depth of stone below invert	0.1	m
Voids Ratio	0.4	
Interception Volume	8.6	m^3

Permeable Paving		
Area	288.0	m^2
Depth of stone below invert	0.3	m
Voids Ratio	0.4	
Interception Volume	34.6	m^3

Bioretention Areas		
Area	213.0	m^2
Depth of stone below invert	0.1	m
Voids Ratio	0.4	
Interception Volume	8.5	m^3

Attenuation Tank		
Length	23.0	m
Width	11.5	m
Depth of Stone below invert	0.2	m
Void Ratio	0.4	
Interception Volume	15.9	m^3

Total Interception Storage Provided	67.6	m^3

Project Residential Zone Lands at Gortnahomna, Castlemartyr, Co. Cork
Project No. DOBA2411
Calculation Interception Calculations

DONNACHADH O'BRIEN & ASSOCIATES CONSULTING ENGINEERS

Sub-Catchment		**6**	
Interception Storage required			
Interception Storage required	=	Sub-Catchment area x min. rainfall	
Sub-Catchment Area	=	11309	m^2
Minimum Rainfall	=	10	mm
Total required	=	**113**	**m^3**
Interception Storage Provided			
Area Type		SuDS Feature Interception Volume	
Tree Pit	=	9.6	m^3
Rain gardens	=	22.8	m^3
Permeable Paving	=	84.3	m^3
Bioretention Areas	=	10.3	m^3
Attenuation Tank	=	15.6	m^3
Total provided	=	**143**	**m^3**
Interception Storage Provided	>	**Interception Storage Required**	

Interception Calculation		
Tree Pit		
Length	2.0	m
Width	2.0	m
Depth of stone below invert	0.75	m
Void ratio	0.4	
Volume	1.2	m^3
No. Tree Pits	8	nr
Interception Volume	9.6	m^3

Rain gardens		
Area	569.8	m^2
Depth of stone below invert	0.1	m
Voids Ratio	0.4	
Interception Volume	22.8	m^3

Permeable Paving		
Area	702.7	m^2
Depth of stone below invert	0.3	m
Voids Ratio	0.4	
Interception Volume	84.3	m^3

Bioretention Areas		
Area	258.0	m^2
Depth of stone below invert	0.1	m
Voids Ratio	0.4	
Interception Volume	10.3	m^3

Attenuation Tank		
Length	24.0	m
Width	10.8	m
Depth of Stone below invert	0.2	m
Void Ratio	0.4	
Interception Volume	15.6	m^3

Total Interception Storage Provided	142.6	m^3

SURFACE WATER NETWORK CALCULATIONS TABLE OF CONTENTS

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MANHOLE DETAILS

DOBA 2411:	Date:		
Lands at Gortnahomna, Castlemartyr, Co Cork Surface Water Calculations	17/10/2024		
	Designed by:	Checked by:	Approved By:
	EC	AL	AL
Report Details: Type: Junctions Storm Phase: Surface Network 1	Company Address:		

Name	Junction Type	Easting (m)	Northing (m)	Cover Elevation (m)	Depth (m)	Invert Elevation (m)	Chamber Shape	Diameter (m)
Ex SMH(12)	Manhole	596702.482	573485.324	11.670	2.550	9.120	Circular	1.500
eX SMH(01)	Manhole	596724.634	573492.084	11.890	1.430	10.460	Circular	1.350
EX SMH(02)	Manhole	596867.192	573563.451	15.358	1.478	13.880	Circular	1.350
EX SMH(03)	Manhole	596816.725	573536.968	14.063	1.583	12.480	Circular	1.350
EX SMH(15)	Manhole	596631.773	573442.445	11.710	2.650	9.060	Circular	1.500
SMH 14.00	Manhole	596742.334	573144.676	22.336	1.946	20.389	Circular	1.350
SMH 14.01	Manhole	596732.943	573160.931	21.640	1.745	19.895	Circular	1.200
SMH 7.01	Manhole	596733.009	573168.368	21.386	1.528	19.858	Circular	1.350
SMH 7.02	Manhole	596725.197	573176.382	20.859	2.103	18.756	Circular	1.200
SMH 7.03	Manhole	596703.875	573212.056	19.173	1.456	17.717	Circular	1.200
SMH 7.05	Manhole	596676.408	573258.812	16.789	1.672	15.117	Circular	1.200
SMH 7.06	Manhole	596677.429	573262.358	16.687	1.789	14.898	Circular	1.200
SMH 7.07	Manhole	596713.489	573284.211	16.833	2.146	14.687	Circular	1.200
SMH 7.09	Manhole	596772.176	573319.466	15.847	1.979	13.868	Circular	1.350
SMH 7.10	Manhole	596779.214	573320.400	15.551	1.719	13.832	Circular	1.200
SMH 7.11	Manhole	596785.830	573321.384	15.246	1.447	13.799	Circular	1.350
SMH 1.04	Manhole	596797.603	573327.986	15.039	2.495	12.544	Circular	1.200
SMH 1.05	Manhole	596791.663	573338.974	14.447	2.153	12.294	Circular	1.200
SMH 1.07	Manhole	596800.720	573370.871	13.070	2.679	10.391	Circular	1.200
SMH 1.08	Manhole	596803.220	573377.616	12.693	2.325	10.368	Circular	1.200
SMH 1.09	Manhole	596806.756	573387.641	12.247	1.915	10.333	Circular	1.200
SMH 1.11	Manhole	596759.198	573395.756	11.860	1.974	9.886	Circular	1.350
SMH 1.13	Manhole	596734.930	573443.612	11.788	2.009	9.779	Circular	1.350
SMH 1.14	Manhole	596716.955	573478.765	11.788	2.367	9.421	Circular	1.200
SMH 1.15	Manhole	596710.811	573490.194	11.761	2.384	9.377	Circular	1.200
SMH 7.00	Manhole	596740.495	573174.737	21.436	1.529	19.907	Circular	1.350
SMH 11.00	Manhole	596757.909	573231.810	19.644	1.485	18.159	Circular	1.200
SMH 11.01	Manhole	596750.953	573240.625	19.366	1.282	18.084	Circular	1.350
SMH 13.00	Manhole	596743.738	573177.844	21.408	1.425	19.983	Circular	1.200
SMH 13.01	Manhole	596773.240	573207.209	20.444	1.502	18.942	Circular	1.350
SMH 13.02	Manhole	596769.409	573214.697	20.212	1.480	18.732	Circular	1.350
SMH 13.03	Manhole	596771.041	573220.949	20.077	1.507	18.570	Circular	1.200
SMH 13.04	Manhole	596794.863	573239.069	19.341	1.519	17.822	Circular	1.200
SMH 1.02	Manhole	596829.965	573265.393	18.394	2.165	16.229	Circular	1.200
SMH 1.03	Manhole	596811.010	573302.055	16.348	2.140	14.208	Circular	1.200
SMH 12.01	Manhole	596718.613	573207.588	19.505	1.711	17.794	Circular	1.200
SMH 12.00	Manhole	596748.952	573225.352	19.500	1.700	17.800	Circular	1.200
SMH 10.00	Manhole	596656.304	573254.255	16.050	1.037	15.013	Circular	1.350
SMH 10.01	Manhole	596667.390	573260.766	16.462	1.513	14.949	Circular	1.350
SMH 22.00	Manhole	596700.258	573305.788	16.700	1.425	15.275	Circular	1.350
SMH 8.00	Manhole	596737.029	573276.187	18.530	1.568	16.962	Circular	1.200
SMH 8.01	Manhole	596780.545	573302.388	16.179	1.526	14.653	Circular	1.200
SMH 9.00	Manhole	596745.259	573296.759	17.100	3.000	14.100	Circular	1.200
SMH 9.01	Manhole	596770.192	573310.693	16.750	2.750	14.000	Circular	1.350
SMH 1.00	Manhole	596837.627	573245.092	19.063	1.888	17.175	Circular	1.200
SMH 1.01	Manhole	596832.810	573255.034	18.667	1.620	17.047	Circular	1.350
SMH 15.00	Manhole	596860.081	573254.630	19.439	2.189	17.250	Circular	1.200
SMH 15.01	Manhole	596843.563	573245.825	19.384	2.184	17.200	Circular	1.200
SMH 6.00	Manhole	596920.205	573302.445	18.477	1.180	17.297	Circular	1.350
SMH 6.01	Manhole	596915.037	573299.762	18.512	1.240	17.272	Circular	1.350
SMH 6.02	Manhole	596910.742	573298.655	18.514	1.262	17.253	Circular	1.350
SMH 6.03	Manhole	596877.105	573280.602	18.751	1.524	17.227	Circular	1.350
SMH 6.04	Manhole	596873.196	573272.482	18.800	1.603	17.197	Circular	1.200
SMH 17.00	Manhole	596927.508	573306.275	18.499	1.498	17.001	Circular	1.350
SMH 17.01	Manhole	596943.409	573314.662	18.589	1.678	16.911	Circular	1.200
SMH 17.02	Manhole	596946.093	573317.165	18.582	1.690	16.892	Circular	1.200
SMH 17.03	Manhole	596969.521	573329.483	18.425	1.665	16.760	Circular	1.200

SMH 16.03	Manhole	596976.257	573335.127	18.266	3.626	14.640	Circular	1.200
SMH 16.04	Manhole	596967.704	573342.574	15.282	1.307	13.975	Circular	1.200
SMH 3.03	Manhole	596962.462	573353.007	14.840	1.842	12.998	Circular	1.200
SMH 3.05	Manhole	596934.415	573405.739	12.142	1.242	10.900	Circular	1.350
SMH 5.01	Manhole	596874.036	573373.576	12.797	1.951	10.846	Circular	1.200
SMH 5.02	Manhole	596869.895	573367.006	12.926	2.119	10.807	Circular	1.200
SMH 2.03	Manhole	596848.786	573355.965	13.898	3.220	10.678	Circular	1.200
SMH 2.04	Manhole	596840.497	573370.968	13.106	2.509	10.597	Circular	1.200
SMH 2.05	Manhole	596833.826	573372.537	12.927	2.368	10.559	Circular	1.200
SMH 2.06	Manhole	596818.997	573365.002	12.812	2.326	10.486	Circular	1.200
SMH 2.00	Manhole	596887.119	573308.862	16.968	1.425	15.543	Circular	1.200
SMH 2.01	Manhole	596876.257	573303.418	16.626	1.728	14.898	Circular	1.200
SMH 3.00	Manhole	596893.857	573312.387	17.037	1.525	15.512	Circular	1.200
SMH 3.01	Manhole	596908.458	573320.351	16.750	1.758	14.992	Circular	1.350
SMH 3.02	Manhole	596912.203	573326.437	16.539	1.770	14.769	Circular	1.200
SMH 16.00	Manhole	597004.457	573333.998	18.696	2.061	16.634	Circular	1.350
SMH 16.01	Manhole	596997.696	573347.180	18.013	1.450	16.563	Circular	1.350
SMH 16.02	Manhole	596979.852	573338.310	18.182	1.718	16.464	Circular	1.350
SMH 18.00	Manhole	596931.902	573321.940	16.500	2.315	14.185	Circular	1.200
SMH 18.01	Manhole	596962.765	573338.202	16.500	2.490	14.010	Circular	1.200
SMH 3.07	Manhole	596883.073	573394.754	12.300	1.582	10.718	Circular	1.350
SMH 3.08	Manhole	596843.344	573375.729	12.400	1.796	10.604	Circular	1.200
SMH 5.00	Manhole	596900.261	573387.412	12.400	1.377	11.023	Circular	1.350
SMH 7.04	Manhole	596689.443	573236.688	17.833	1.494	16.339	Circular	1.200
SMH 2.02	Manhole	596860.088	573334.228	14.974	1.666	13.308	Circular	1.200
SMH 3.04	Manhole	596947.717	573380.726	13.301	1.303	11.998	Circular	1.200
SMH 20.00	Manhole	596807.842	573522.863	13.229	1.626	11.603	Circular	1.350
SMH 20.02	Manhole	596839.903	573462.187	12.456	1.539	10.917	Circular	1.350
SMH 20.03	Manhole	596841.660	573448.821	12.315	1.533	10.782	Circular	1.350
SMH 23.00	Manhole	596744.925	573447.076	11.788	1.765	10.023	Circular	1.350
SMH 1.10	Manhole	596769.118	573400.652	11.960	2.052	9.908	Circular	1.200
SMH 1.12	Manhole	596755.475	573402.768	11.788	1.917	9.871	Circular	1.200
SMH 20.05	Manhole	596820.693	573427.573	12.080	1.606	10.474	Circular	1.200
SMH 20.04	Manhole	596835.155	573436.512	12.169	1.525	10.644	Circular	1.200
SMH 1.06	Manhole	596790.845	573343.856	14.205	2.010	12.195	Circular	1.200
SMH 21.00	Manhole	596725.561	573483.113	11.780	2.036	9.744	Circular	1.200
SMH 19.00	Manhole	596798.445	573416.019	12.100	1.801	10.299	Circular	1.200
SMH 19.01	Manhole	596779.578	573406.169	12.100	1.873	10.227	Circular	1.200
SMH 7.08	Manhole	596742.952	573302.026	16.904	2.358	14.546	Circular	1.200
SMH 4.00	Manhole	596908.747	573391.960	12.257	1.001	11.256	Circular	1.200
SMH 3.06	Manhole	596928.308	573416.843	12.150	1.282	10.868	Circular	1.200
SMH 20.01	Manhole	596816.901	573505.717	13.011	1.602	11.409	Circular	1.200
SMH 24.00	Manhole	596823.093	573508.675	13.020	1.550	11.470	Circular	1.200
SMH 6.05	Manhole	596838.313	573254.077	18.717	1.653	17.064	Circular	1.200

Name	Lock
Ex SMH(12)	Elevations
eX SMH(01)	Elevations
EX SMH(02)	Elevations
EX SMH(03)	Elevations
EX SMH(15)	Elevations
SMH 14.00	Elevations
SMH 14.01	Elevations
SMH 7.01	Elevations
SMH 7.02	Elevations
SMH 7.03	Elevations
SMH 7.05	Elevations
SMH 7.06	Elevations

SMH 7.07	Elevations
SMH 7.09	Elevations
SMH 7.10	Elevations
SMH 7.11	Elevations
SMH 1.04	Elevations
SMH 1.05	Elevations
SMH 1.07	Elevations
SMH 1.08	Elevations
SMH 1.09	Elevations
SMH 1.11	Elevations
SMH 1.13	Elevations
SMH 1.14	Elevations
SMH 1.15	Elevations
SMH 7.00	Elevations
SMH 11.00	Elevations
SMH 11.01	Elevations
SMH 13.00	Elevations
SMH 13.01	Elevations
SMH 13.02	Elevations
SMH 13.03	Elevations
SMH 13.04	Elevations
SMH 1.02	Elevations
SMH 1.03	Elevations
SMH 12.01	Elevations
SMH 12.00	Elevations
SMH 10.00	Elevations
SMH 10.01	Elevations
SMH 22.00	Elevations
SMH 8.00	Elevations
SMH 8.01	Elevations
SMH 9.00	Elevations
SMH 9.01	Elevations
SMH 1.00	Elevations
SMH 1.01	Elevations
SMH 15.00	Elevations
SMH 15.01	Elevations
SMH 6.00	Elevations
SMH 6.01	Elevations
SMH 6.02	Elevations
SMH 6.03	Elevations
SMH 6.04	Elevations
SMH 17.00	Elevations
SMH 17.01	Elevations
SMH 17.02	Elevations
SMH 17.03	Elevations
SMH 16.03	Elevations
SMH 16.04	Elevations
SMH 3.03	Elevations
SMH 3.05	Elevations
SMH 5.01	Elevations
SMH 5.02	Elevations
SMH 2.03	Elevations
SMH 2.04	Elevations
SMH 2.05	Elevations
SMH 2.06	Elevations
SMH 2.00	Elevations
SMH 2.01	Elevations
SMH 3.00	Elevations
SMH 3.01	Elevations
SMH 3.02	Elevations

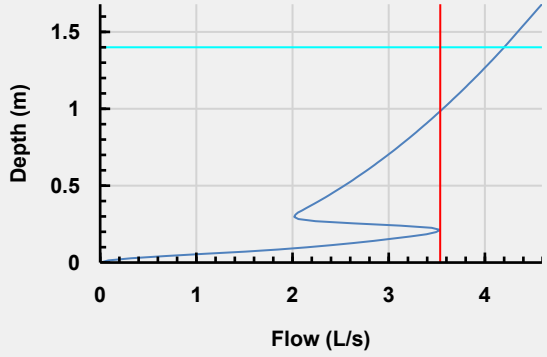
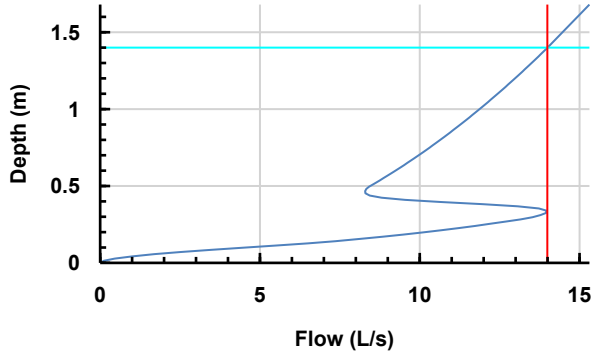
SMH 16.00	Elevations
SMH 16.01	Elevations
SMH 16.02	Elevations
SMH 18.00	Elevations
SMH 18.01	Elevations
SMH 3.07	Elevations
SMH 3.08	Elevations
SMH 5.00	Elevations
SMH 7.04	Elevations
SMH 2.02	Elevations
SMH 3.04	Elevations
SMH 20.00	Elevations
SMH 20.02	Elevations
SMH 20.03	Elevations
SMH 23.00	Elevations
SMH 1.10	Elevations
SMH 1.12	Elevations
SMH 20.05	Elevations
SMH 20.04	Elevations
SMH 1.06	Elevations
SMH 21.00	Elevations
SMH 19.00	Elevations
SMH 19.01	None
SMH 7.08	None
SMH 4.00	None
SMH 3.06	None
SMH 20.01	None
SMH 24.00	None
SMH 6.05	None

Outlets

Junction	Outlet Name	Outgoing Connection	Outlet Type
Ex SMH(12)	Outlet	Ex SMH(12)-EX SMH(15)	Free Discharge
eX SMH(01)	Outlet	eX SMH(01)-Ex SMH(12)	Free Discharge
EX SMH(02)	Outlet	EX SMH(02)-EX SMH(03)	Free Discharge
EX SMH(03)	Outlet	EX SMH(03)-eX SMH(01)	Free Discharge
SMH 14.00	Outlet	SMH 12.00-SMH 12.01	Free Discharge
SMH 14.01	Outlet	SMH 12.01-SMH 7.01	Free Discharge
SMH 7.01	Outlet	SMH 7.01-SMH 7.02	Free Discharge
SMH 7.02	Outlet	SMH 7.02-SMH 7.03	Free Discharge
	Outlet	SMH 7.03-SMH 7.04	Hydro-Brake®

INLET & HYDROBRAKE DETAILS

DOBA 2411:	Date:		
Lands at Gortnahomna, Castlemartyr, Co Cork Surface Water Calculations	17/10/2024		
	Designed by:	Checked by:	Approved By:
	EC	AL	AL
Report Details: Type: Junctions Storm Phase: Surface Network 1	Company Address:		

Junction	Outlet Name	Outgoing Connection	Outlet Type
SMH 7.03	Invert Elevation (m)	17.717	
	Design Depth (m)	1.400	
	Design Flow (L/s)	4.2	
	Objective	Minimize Upstream Storage Requirements	
	Application	Surface Water Only	
	Sump Available	☐	
	Unit Reference	CHE-0086-4200-1400-4200	
			
SMH 7.05	Outlet	SMH 7.05-SMH 7.06	Free Discharge
SMH 7.06	Outlet	SMH 7.06-SMH 7.07	Free Discharge
SMH 7.07	Outlet	SMH 7.07-SMH 7.08	Free Discharge
SMH 7.09	Outlet	SMH 7.09-SMH 7.10	Free Discharge
SMH 7.10	Outlet	SMH 7.10-SMH 7.11	Hydro-Brake®
	Invert Elevation (m)	13.832	
	Design Depth (m)	1.400	
	Design Flow (L/s)	14.0	
	Objective	Minimize Upstream Storage Requirements	
	Application	Surface Water Only	
	Sump Available	☐	
	Unit Reference	CHE-0154-1400-1400-1400	
			
SMH 7.11	Outlet	SMH 7.11-SMH 1.04	Free Discharge
SMH 1.04	Outlet	SMH 1.04-SMH 1.05	Free Discharge
SMH 1.05	Outlet	SMH 1.05-SMH 1.06	Free Discharge
SMH 1.07	Outlet	SMH 1.06-SMH 1.07	Free Discharge
SMH 1.08	Outlet	SMH 1.07-SMH 1.08	Free Discharge
SMH 1.09	Outlet	SMH 1.08-SMH 1.09	Free Discharge
SMH 1.11	Outlet	SMH 1.09-SMH 1.10	Free Discharge
	Outlet	SMH 1.10-SMH 1.11	Hydro-Brake®

DOBA 2411:	Date:		
Lands at Gortnahomna, Castlemartyr, Co Cork Surface Water Calculations	17/10/2024		
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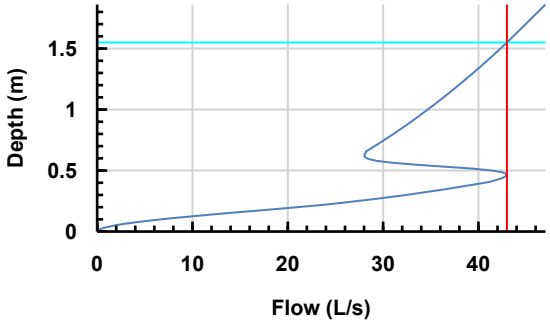
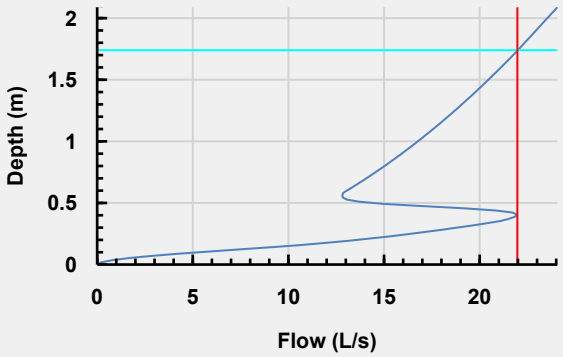
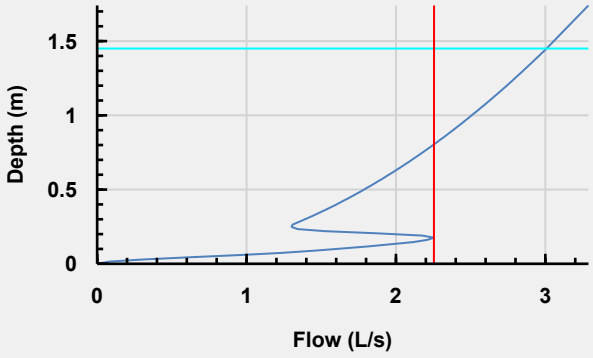
	EC	AL	AL
Report Details: Type: Junctions Storm Phase: Surface Network 1	Company Address:		

Junction	Outlet Name	Outgoing Connection	Outlet Type
SMH 1.13	Invert Elevation (m)	9.779	
	Design Depth (m)	1.550	
	Design Flow (L/s)	43.0	
	Objective	Minimize Upstream Storage Requirements	
	Application	Surface Water Only	
	Sump Available	☐	
	Unit Reference	CHE-0252-4300-1550-4300	
			
SMH 1.14	Outlet	SMH 1.11-SMH 1.12	Hydro-Brake®
	Invert Elevation (m)	9.529	
	Design Depth (m)	1.740	
	Design Flow (L/s)	22.0	
	Objective	Minimize Upstream Storage Requirements	
	Application	Surface Water Only	
	Sump Available	☐	
	Unit Reference	CHE-0184-2200-1740-2200	
			
SMH 1.15	Outlet	SMH 1.12-Ex SMH(12)	Free Discharge
SMH 7.00	Outlet	SMH 7.00-SMH 7.01	Free Discharge
SMH 11.00	Outlet	SMH 11.00-SMH 11.01	Free Discharge
SMH 11.01	Outlet	SMH 11.01-SMH 7.03	Free Discharge
SMH 13.00	Outlet	SMH 13.00-SMH 13.01	Free Discharge
SMH 13.01	Outlet	SMH 13.01-SMH 13.02	Free Discharge
SMH 13.02	Outlet	SMH 13.02-SMH 13.03	Free Discharge
SMH 13.03	Outlet	SMH 13.03-SMH 13.04	Free Discharge
SMH 13.04	Outlet	SMH 13.04-SMH 1.02	Free Discharge
SMH 1.02	Outlet	SMH 1.02-SMH 1.03	Free Discharge
SMH 1.03	Outlet	SMH 1.03-SMH 1.04	Free Discharge
SMH 12.01	Outlet	SMH 18.01-SMH 7.03	Free Discharge
SMH 12.00	Outlet	SMH 18.00-SMH 18.01	Free Discharge
SMH 10.00	Outlet	SMH 10.00-SMH 10.01	Free Discharge
SMH 10.01	Outlet	SMH 10.01-SMH 7.06	Free Discharge
SMH 22.00	Outlet	SMH 9.00-SMH 7.07	Free Discharge

DOBA 2411:	Date:		
Lands at Gortnahomna, Castlemartyr, Co Cork Surface Water Calculations	17/10/2024		
	Designed by:	Checked by:	Approved By:
	EC	AL	AL
Report Details: Type: Junctions Storm Phase: Surface Network 1	Company Address:		

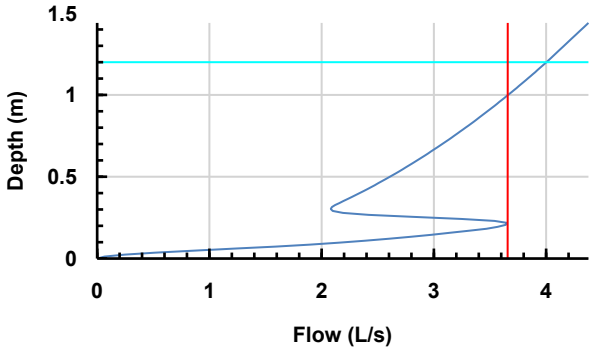
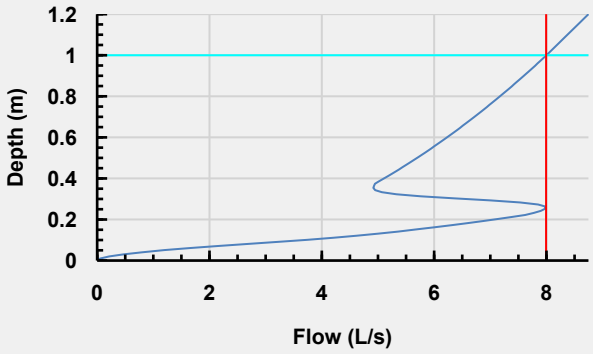
Junction	Outlet Name	Outgoing Connection	Outlet Type
SMH 8.00	Outlet	SMH 8.00-SMH 8.01	Free Discharge
SMH 8.01	Outlet	SMH 8.01-SMH 7.10	Free Discharge
SMH 9.00	Outlet	SMH 17.00-SMH 17.01	Free Discharge
SMH 9.01	Outlet	SMH 17.01-SMH 7.09	Free Discharge
SMH 1.00	Outlet	SMH 1.00-SMH 1.01	Free Discharge
SMH 1.01	Outlet	SMH 1.01-SMH 1.02	Hydro-Brake®

Invert Elevation (m)	17.047
Design Depth (m)	1.450
Design Flow (L/s)	3.0
Objective	Minimize Upstream Storage Requirements
Application	Surface Water Only
Sump Available	☐
Unit Reference	CHE-0072-3000-1450-3000

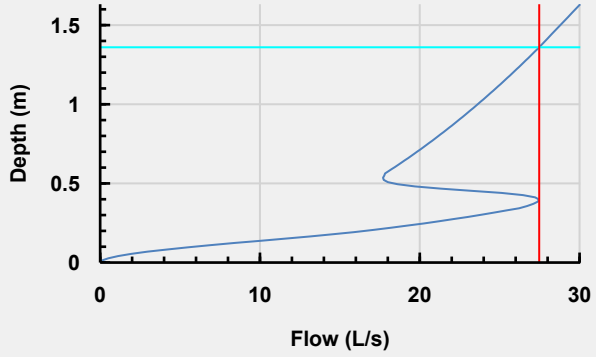
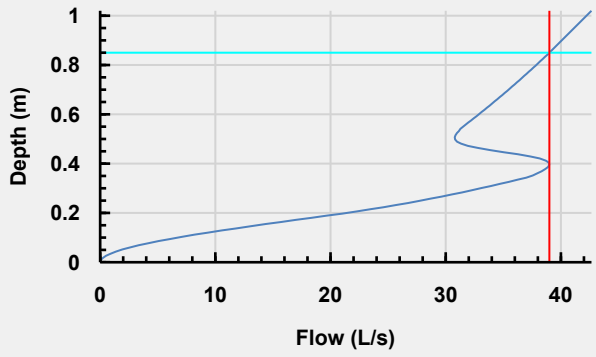


SMH 15.00	Outlet	SMH 16.00-SMH 16.01	Free Discharge
SMH 15.01	Outlet	SMH 16.01-SMH 1.01	Free Discharge
SMH 6.00	Outlet	SMH 6.00-SMH 6.01	Free Discharge
SMH 6.01	Outlet	SMH 6.01-SMH 6.02	Free Discharge
SMH 6.02	Outlet	SMH 6.02-SMH 6.03	Free Discharge
SMH 6.03	Outlet	SMH 6.03-SMH 6.04	Free Discharge
SMH 6.04	Outlet	SMH 6.04-SMH 1.01	Free Discharge
SMH 17.00	Outlet	SMH 5.00-SMH 5.01	Free Discharge
SMH 17.01	Outlet	SMH 5.01-SMH 5.02	Free Discharge
SMH 17.02	Outlet	SMH 5.02-SMH 5.03	Free Discharge
SMH 17.03	Outlet	SMH 5.03-SMH 4.03	Free Discharge
SMH 16.03	Outlet	SMH 4.03-SMH 4.04	Free Discharge
	Outlet	SMH 4.04-SMH 3.03	Hydro-Brake®

DOBA 2411: Lands at Gortnahomna, Castlemartyr, Co Cork Surface Water Calculations	Date: 17/10/2024		
	Designed by: EC	Checked by: AL	Approved By: AL
Report Details: Type: Junctions Storm Phase: Surface Network 1	Company Address:		

Junction	Outlet Name	Outgoing Connection	Outlet Type
SMH 16.04	Invert Elevation (m)	13.975	
	Design Depth (m)	1.200	
	Design Flow (L/s)	4.0	
	Objective	Minimize Upstream Storage Requirements	
	Application	Surface Water Only	
	Sump Available	☐	
	Unit Reference	CHE-0087-4000-1200-4000	
			
SMH 3.03	Outlet	SMH 3.04-S1	Hydro-Brake®
	Invert Elevation (m)	12.998	
	Design Depth (m)	1.000	
	Design Flow (L/s)	8.0	
	Objective	Minimize Upstream Storage Requirements	
	Application	Surface Water Only	
	Sump Available	☐	
	Unit Reference	CHE-0125-8000-1000-8000	
			
SMH 3.05	Outlet	Pipe (12)	Free Discharge
SMH 5.01	Outlet	SMH 3.07-SMH 3.08	Free Discharge
SMH 5.02	Outlet	SMH 3.08-SMH 2.03	Free Discharge
SMH 2.03	Outlet	SMH 2.03-SMH 2.04	Free Discharge
SMH 2.04	Outlet	SMH 2.04-SMH 2.05	Free Discharge
	Outlet	SMH 2.05-SMH 2.06	Hydro-Brake®

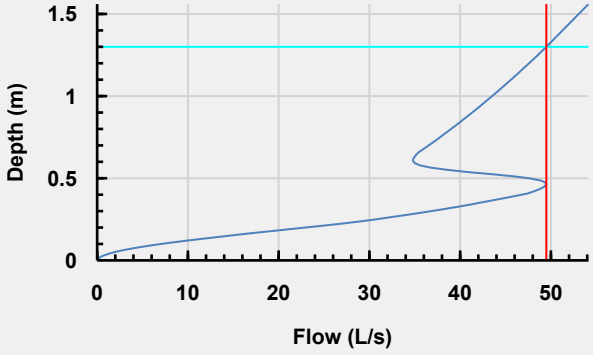
DOBA 2411:	Date:		
Lands at Gortnahomna, Castlemartyr, Co Cork Surface Water Calculations	17/10/2024		
	Designed by:	Checked by:	Approved By:
	EC	AL	AL
Report Details: Type: Junctions Storm Phase: Surface Network 1	Company Address:		

Junction	Outlet Name	Outgoing Connection	Outlet Type
SMH 2.05	Invert Elevation (m)	10.559	
	Design Depth (m)	1.360	
	Design Flow (L/s)	27.5	
	Objective	Minimize Upstream Storage Requirements	
	Application	Surface Water Only	
	Sump Available	☐	
	Unit Reference	CHE-0210-2750-1360-2750	
			
SMH 2.06	Outlet	SMH 2.06-SMH 1.06	Free Discharge
SMH 2.00	Outlet	SMH 2.00-SMH 2.01	Free Discharge
SMH 2.01	Outlet	SMH 2.01-SMH 2.02	Free Discharge
SMH 3.00	Outlet	SMH 3.00-SMH 3.01	Free Discharge
SMH 3.01	Outlet	SMH 3.01-SMH 3.02	Free Discharge
SMH 3.02	Outlet	SMH 3.02-SMH 3.03	Free Discharge
SMH 16.00	Outlet	SMH 4.00-SMH 4.01	Free Discharge
SMH 16.01	Outlet	SMH 4.01-SMH 4.02	Free Discharge
SMH 16.02	Outlet	SMH 4.02-SMH 4.03	Free Discharge
SMH 18.00	Outlet	SMH 15.00-SMH 15.01	Free Discharge
SMH 18.01	Outlet	SMH 15.01-SMH 4.04	Free Discharge
SMH 3.07	Outlet	SIC 33-SIC 34	Hydro-Brake®
	Invert Elevation (m)	10.718	
	Design Depth (m)	0.850	
	Design Flow (L/s)	39.0	
	Objective	Minimize Upstream Storage Requirements	
	Application	Surface Water Only	
	Sump Available	☐	
	Unit Reference	CHE-0256-3900-0850-3900	
			
SMH 3.08	Outlet	SIC 34-SMH 2.05	Free Discharge
SMH 5.00	Outlet	SMH 3.06-SMH 3.07	Free Discharge
SMH 7.04	Outlet	SMH 7.04-SMH 7.05	Free Discharge
SMH 2.02	Outlet	SMH 2.02-SMH 2.03	Free Discharge
SMH 3.04	Outlet	S1-SMH 3.05	Free Discharge

DOBA 2411:	Date:		
Lands at Gortnahomna, Castlemartyr, Co Cork Surface Water Calculations	17/10/2024		
	Designed by:	Checked by:	Approved By:
	EC	AL	AL
Report Details: Type: Junctions Storm Phase: Surface Network 1	Company Address:		

Junction	Outlet Name	Outgoing Connection	Outlet Type
SMH 20.00	Outlet	Pipe (10)	Free Discharge
SMH 20.02	Outlet	SMH 22.01-SMH 22.02	Free Discharge
SMH 20.03	Outlet	Pipe (6)	Free Discharge
SMH 23.00	Outlet	SMH 22.03-SMH 1.09	Free Discharge
SMH 1.10	Outlet	SMH 1.08-SMH 1.09 (1)	Hydro-Brake®
SMH 1.12	Outlet	Pipe (17)	Free Discharge
SMH 20.05	Outlet	Pipe (8)	Free Discharge
SMH 20.04	Outlet	Pipe (7)	Free Discharge
SMH 1.06	Outlet	SMH 1.05-SMH 1.06 (1)	Free Discharge
SMH 21.00	Outlet	eX SMH(01)-Ex SMH(12) (1)	Free Discharge
SMH 19.00	Outlet	Pipe (8) (1)	Free Discharge
SMH 19.01	Outlet	Pipe (9) (1)	Free Discharge
SMH 7.08	Outlet	SMH 7.07-SMH 7.08 (1)	Free Discharge
SMH 4.00	Outlet	Pipe (13)	Free Discharge
SMH 3.06	Outlet	Pipe (12) (1)	Free Discharge
SMH 20.01	Outlet	Pipe (10) (1)	Free Discharge
SMH 24.00	Outlet	Pipe (11)	Free Discharge
SMH 6.05	Outlet	SMH 6.04-SMH 1.01 (1)	Free Discharge

Invert Elevation (m)	9.908
Design Depth (m)	1.300
Design Flow (L/s)	49.5
Objective	Minimize Upstream Storage Requirements
Application	Surface Water Only
Sump Available	☐
Unit Reference	CHE-0274-4950-1300-4950



STORMWATER CONTROLS - TREE PITS

DOBA 2411:	Date:		
Lands at Gortnahomna, Castlemartyr, Co Cork Surface Water Calculations	17/10/2024		
	Designed by:	Checked by:	Approved By:
	EC	AL	AL
Report Details: Type: Stormwater Controls Storm Phase: Surface Network 1	Company Address:		

TP 1

Type : Bioretention

Ponding Area

Exceedance Elevation (m)	22.400
Depth (m)	0.050
Base Elevation (m)	22.350
Top Area (m²)	4.00
Side Slope (1:x)	0.00
Base Area (m²)	4.00
Freeboard (mm)	0
Porosity (%)	100
Length (m)	2.000
Long. Slope (1:x)	1000.00
Filtration Rate (m/hr)	500.0
Friction Scheme	Manning's n
n	0.012
Total Volume (m³)	2.621

Filter Area

Base Elevation (m)	20.850

Under Drain

Height Above Base (m)	0.050
Diameter (mm)	150
No. of Barrels	1
Friction Scheme	Manning's n
n	0.015
Release Height (m)	0.000

Filtration Layers

Use	Name	Filtration Layer Depth (mm)	Porosity (%)	Conductivity (m/hr)	Soil Type
☐	Soil	0	0	0.0	Soil Type
	Storage	1500	40	500.0	

Advanced

Ponding Area

Base Perimeter (m)	8.000
Top Perimeter (m)	8.000

STORMWATER CONTROLS - RAIN GARDENS

DOBA 2411:	Date:		
Lands at Gortnahomna, Castlemartyr, Co Cork Surface Water Calculations	17/10/2024		
	Designed by:	Checked by:	Approved By:
	EC	AL	AL
Report Details: Type: Stormwater Controls Storm Phase: Surface Network 1	Company Address:		

RG 1

Type : Bioretention

Ponding Area

Exceedance Elevation (m)	12.350
Depth (m)	0.050
Base Elevation (m)	12.300
Top Area (m²)	15.40
Side Slope (1:x)	0.00
Base Area (m²)	15.40
Freeboard (mm)	0
Porosity (%)	100
Length (m)	6.000
Long. Slope (1:x)	500.00
Filtration Rate (m/hr)	500.0
Friction Scheme	Manning's n
n	0.012
Total Volume (m³)	5.424

Filter Area

Base Elevation (m)	11.550

Under Drain

Height Above Base (m)	0.050
Diameter (mm)	110
No. of Barrels	1
Friction Scheme	Manning's n
n	0.015
Release Height (m)	0.000

Filtration Layers

Use	Name	Filtration Layer Depth (mm)	Porosity (%)	Conductivity (m/hr)	Soil Type
☐	Soil	500	40	500.0	Soil Type
	Storage	750	40	500.0	

Advanced

Ponding Area

Base Perimeter (m)	17.133
Top Perimeter (m)	17.133

STORMWATER CONTROLS - UNDERGROUND ATTENUATION TANKS

DOBA 2411:	Date:		
Lands at Gortnahomna, Castlemartyr, Co Cork Surface Water Calculations	17/10/2024		
	Designed by:	Checked by:	Approved By:
	EC	AL	AL
Report Details: Type: Stormwater Controls Storm Phase: Surface Network 1	Company Address:		

Tank 7

Type : Tank

Dimensions

Exceedance Elevation (m)	19.600
Depth (m)	1.805
Base Elevation (m)	17.795
Freeboard (mm)	0
Initial Depth (m)	0.000
Porosity (%)	100
Average Slope (1:x)	-7.876
Total Volume (m³)	338.457

Depth (m)	Area (m²)	Volume (m³)
0.000	281.700	0.000
1.199	281.700	337.758
1.200	0.001	337.852

Advanced

Perimeter	Circular
Length (m)	31.434

Tank 9

Type : Tank

Dimensions

Exceedance Elevation (m)	19.380
Depth (m)	2.155
Base Elevation (m)	17.225
Freeboard (mm)	0
Initial Depth (m)	0.000
Porosity (%)	100
Average Slope (1:x)	-4.683
Total Volume (m³)	340.322

Depth (m)	Area (m²)	Volume (m³)
0.000	200.000	0.000
1.699	200.000	339.800
1.700	0.001	339.867

Advanced

Perimeter	Circular
Length (m)	15.694

Tank 8

Type : Tank

Dimensions

Exceedance Elevation (m)	17.000
Depth (m)	2.990
Base Elevation (m)	14.010
Freeboard (mm)	0
Initial Depth (m)	0.000
Porosity (%)	100
Average Slope (1:x)	-7.762
Total Volume (m³)	254.737

Depth (m)	Area (m²)	Volume (m³)
0.000	230.000	0.000
1.099	230.000	252.770
1.100	0.001	252.847

Advanced

Perimeter	Circular
Length (m)	31.308

Tank 5

Type : Tank

Dimensions

Exceedance Elevation (m)	12.300
Depth (m)	1.650
Base Elevation (m)	10.650
Freeboard (mm)	0
Initial Depth (m)	0.000
Porosity (%)	100
Average Slope (1:x)	-7.461
Total Volume (m³)	306.281

Depth (m)	Area (m²)	Volume (m³)
0.000	255.00	0.000
1.199	255.00	305.745
1.200	0.01	305.831

Advanced

Perimeter	Circular
Length (m)	29.339

Tank 4

Type : Tank

Dimensions

Exceedance Elevation (m)	16.750
Depth (m)	2.700
Base Elevation (m)	14.050
Freeboard (mm)	0
Initial Depth (m)	0.000
Porosity (%)	100
Average Slope (1:x)	-6.415
Total Volume (m³)	286.539

Depth (m)	Area (m²)	Volume (m³)
0.000	219.400	0.000
1.299	219.500	285.066
1.300	0.001	285.139

Advanced

Perimeter	Circular
Length (m)	25.291

Tank 1

Type : Tank

Dimensions

Exceedance Elevation (m)	11.788
Depth (m)	2.126
Base Elevation (m)	9.662
Freeboard (mm)	0
Initial Depth (m)	0.000
Porosity (%)	100
Average Slope (1:x)	-5.009
Total Volume (m³)	270.506

Depth (m)	Area (m²)	Volume (m³)
0.000	180.00	0.000
1.499	180.00	269.820
1.500	0.01	269.880

Advanced

Perimeter	Circular
Length (m)	33.776

Tank 2

Type : Tank

Dimensions

Exceedance Elevation (m)	11.788
Depth (m)	1.998
Base Elevation (m)	9.790
Freeboard (mm)	0
Initial Depth (m)	0.000
Porosity (%)	100
Average Slope (1:x)	-8.203
Total Volume (m³)	720.179

Depth (m)	Area (m²)	Volume (m³)
0.000	480.00	0.000
1.499	480.00	719.520
1.500	0.01	719.681

Advanced

Perimeter	Circular
Length (m)	37.888

Tank 3

Type : Tank

Dimensions

Exceedance Elevation (m)	12.100
Depth (m)	1.945
Base Elevation (m)	10.155
Freeboard (mm)	0
Initial Depth (m)	0.000
Porosity (%)	100
Average Slope (1:x)	-5.282
Total Volume (m³)	300.312

Depth (m)	Area (m²)	Volume (m³)
0.000	200.00	0.000
1.499	200.00	299.800
1.500	0.01	299.867

Advanced

Perimeter	Circular
Length (m)	19.674

DOBA 2411:	Date:		
Lands at Gortnahomna, Castlemartyr, Co Cork Surface Water Calculations	17/10/2024		
	Designed by:	Checked by:	Approved By:
	EC	AL	AL
Report Details: Type: Stormwater Controls Storm Phase: Surface Network 1	Company Address:		

Tank 6

Type : Tank

Dimensions

Exceedance Elevation (m)	12.100
Depth (m)	1.300
Base Elevation (m)	10.800
Freeboard (mm)	0
Initial Depth (m)	0.000
Porosity (%)	100
Average Slope (1:x)	-12.933
Total Volume (m³)	272.274

Depth (m)	Area (m²)	Volume (m³)
0.000	340.00	0.000
0.799	340.00	271.660
0.800	0.01	271.774

Advanced

Perimeter	Circular
Length (m)	34.459

STORMWATER CONTROLS - POROUS PAVING

DOBA 2411:	Date:		
Lands at Gortnahomna, Castlemartyr, Co Cork Surface Water Calculations	17/10/2024		
	Designed by:	Checked by:	Approved By:
	EC	AL	AL
Report Details: Type: Stormwater Controls Storm Phase: Surface Network 1	Company Address:		

PP 1

Type : Porous Paving

Dimensions

Exceedance Elevation (m)	22.400
Depth (m)	0.555
Base Elevation (m)	21.845
Paving Layer Depth (mm)	80
Membrane Percolation (m/hr)	1000.0
Porosity (%)	40
Length (m)	4.800
Long. Slope (1:x)	1000.00
Width (m)	2.400
Total Volume (m³)	2.240

Under Drain

Height Above Base (m)	0.050
Diameter (mm)	150
No. of Barrels	1
Release Height (m)	0.000
Friction Scheme	Manning's n
n	0.015

Advanced

Conductivity (m/hr)	500.0

PP 2

Type : Porous Paving

Dimensions

Exceedance Elevation (m)	22.400
Depth (m)	0.555
Base Elevation (m)	21.845
Paving Layer Depth (mm)	80
Membrane Percolation (m/hr)	1000.0
Porosity (%)	40
Length (m)	4.800
Long. Slope (1:x)	1000.00
Width (m)	2.400
Total Volume (m³)	2.240

Under Drain

Height Above Base (m)	0.050
Diameter (mm)	150
No. of Barrels	1
Release Height (m)	0.000
Friction Scheme	Manning's n
n	0.015

Advanced

Conductivity (m/hr)	500.0

STORMWATER CONTROLS - SWALES

DOBA 2411:	Date:		
Lands at Gortnahomna, Castlemartyr, Co Cork Surface Water Calculations	17/10/2024		
	Designed by:	Checked by:	Approved By:
	EC	AL	AL
Report Details: Type: Stormwater Controls Storm Phase: Surface Network 1	Company Address:		

Swale 2

Type : Swale

Swale

Exceedance Elevation (m)	19.900
Depth (m)	0.200
Base Elevation (m)	19.700
Top Width (m)	5.240
Side Slope (1:x)	4.00
Base Width (m)	3.640
Freeboard (mm)	0
Length (m)	54.393
Long. Slope (1:x)	1000.00
Filtration Rate (m/hr)	500.0
Friction Scheme	Manning's n
n	0.012
Total Volume (m³)	128.081

Trench

Trench Depth (m)	1.000
Trench Porosity (%)	40

Under Drain

Height Above Base (m)	0.050
Diameter (mm)	150
No. of Barrels	1
Release Height (m)	0.000
Friction Scheme	Manning's n
n	0.015

Advanced

Swale

Porosity (%)	100

Trench

Trench Conductivity (m/hr)	500.0

INFLOWS SUMMARY

DOBA 2411:	Date:		
Lands at Gortnahomna, Castlemartyr, Co Cork Surface Water Calculations	17/10/2024		
	Designed by:	Checked by:	Approved By:
	EC	AL	AL
Report Details: Type: Inflow Summary Storm Phase: Surface Network 1	Company Address:		

Inflow Label	Connected To	Flow (L/s)	Runoff Method	Area (ha)	Percentage Impervious (%)	Urban Creep (%)	Adjusted Percentage Impervious (%)	Area Analyzed (ha)
22.00m - 6.000	RG 110		Time of Concentration	0.002	95.0	0	95.0	0.002
22.04m - 14.002	RG 77		Time of Concentration	0.002	95.0	0	95.0	0.002
22.04m - 14.002	RG 79		Time of Concentration	0.002	95.0	0	95.0	0.002
22.04m - 14.002	RG 78		Time of Concentration	0.002	95.0	0	95.0	0.002
22.04m - 17.009	RG 9		Time of Concentration	0.002	95.0	0	95.0	0.002
22.04m - 17.009	RG 8		Time of Concentration	0.002	95.0	0	95.0	0.002
22.04m - 20.000	RG 73		Time of Concentration	0.002	95.0	0	95.0	0.002
22.04m - 20.000	RG 74		Time of Concentration	0.002	95.0	0	95.0	0.002
22.11m - 12.000	RG 125		Time of Concentration	0.002	95.0	0	95.0	0.002
22.11m - 12.000	RG 130		Time of Concentration	0.002	95.0	0	95.0	0.002
22.11m - 12.000	RG 129		Time of Concentration	0.002	95.0	0	95.0	0.002
22.12m - 12.000	RG 124		Time of Concentration	0.002	95.0	0	95.0	0.002
22.12m - 12.000	RG 128		Time of Concentration	0.002	95.0	0	95.0	0.002
22.13m - 6.000	RG 109		Time of Concentration	0.002	95.0	0	95.0	0.002
22.13m - 12.000	RG 123		Time of Concentration	0.002	95.0	0	95.0	0.002
22.14m - 22.000	RG 25		Time of Concentration	0.002	95.0	0	95.0	0.002
22.14m - 22.001	RG 22		Time of Concentration	0.002	95.0	0	95.0	0.002
22.14m - 23.000	RG 28		Time of Concentration	0.002	95.0	0	95.0	0.002
22.15m - 22.000	RG 27		Time of Concentration	0.002	95.0	0	95.0	0.002
22.15m - 22.000	RG 26		Time of Concentration	0.002	95.0	0	95.0	0.002
22.26m - 13.000	RG 108		Time of Concentration	0.002	95.0	0	95.0	0.002
22.30m - 12.000	RG 131		Time of Concentration	0.002	95.0	0	95.0	0.002
22.31m - 13.000	RG 102		Time of Concentration	0.002	95.0	0	95.0	0.002
22.31m - 13.000	RG 101		Time of Concentration	0.002	95.0	0	95.0	0.002
22.39m - 13.000	RG 107		Time of Concentration	0.002	95.0	0	95.0	0.002
22.44m - 13.000	RG 103		Time of Concentration	0.002	95.0	0	95.0	0.002
22.44m - 13.000	RG 100		Time of Concentration	0.002	95.0	0	95.0	0.002
22.50m - 4.000	RG 154		Time of Concentration	0.002	95.0	0	95.0	0.002
22.50m - 4.000	RG 153		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 1.005	RG 166		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 1.005	PP 25		Time of Concentration	0.002	37.5	0	37.5	0.001
22.51m - 1.005	RG 165		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 1.005	PP 24		Time of Concentration	0.002	95.0	0	95.0	0.002

22.51m - 1.008	RG 178		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 1.008	PP 42		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 1.008	RG 179		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 1.008	PP 43		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 1.008	RG 180		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 1.008	PP 44		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 1.008	PP 68		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 1.008	RG 148		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 1.008	PP 72		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 1.009	PP 73		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 1.009	RG 144		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 1.010	RG 187		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 1.010	PP 53		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 1.010	RG 188		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 1.010	PP 54		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 1.010	RG 189		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 1.010	PP 56		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 1.010	RG 192		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 1.010	PP 60		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 1.010	RG 193		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 1.010	RG 194		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 1.011	PP 61		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 1.011	PP 62		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 7.001	RG 141		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 7.001	PP 90		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 7.001	RG 140		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 7.001	RG 139		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 7.001	PP 91		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 7.001	PP 92		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 7.001	RG 136		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 7.001	PP 96		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 7.001	RG 135		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 7.001	PP 98		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 7.001	PP 97		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 7.001	RG 134		Time of Concentration	0.002	95.0	0	95.0	0.002

22.51m - 8.000	PP 37		Time of Concentration	0.002	80.0	0	80.0	0.002
22.51m - 8.000	RG 175		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 8.000	PP 38		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 13.003	PP 104		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 13.003	RG 117		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 13.003	PP 105		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 13.003 (1)	RG 118		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 13.004	RG 114		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 13.004	PP 110		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 13.004	PP 109		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 13.004	RG 113		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 14.002	RG 83		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 14.002	PP 146		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 14.002	PP 147		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 14.002	RG 82		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 14.003	RG 91		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 14.003	PP 144		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 14.003	PP 145		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 14.004	RG 88		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 14.004	PP 140		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 14.004	RG 87		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 14.004	PP 141		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 14.004	RG 90		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 17.007	PP 192		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 17.007	RG 31		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 17.007	PP 191		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 17.007	RG 32		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 17.007	PP 190		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 17.007	RG 33		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 17.007	PP 189		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 17.007	RG 34		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 17.012	RG 42		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 17.012	RG 43		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 17.012	PP 221		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 17.012	PP 222		Time of Concentration	0.002	95.0	0	95.0	0.002

22.51m - 20.000	RG 70		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 20.001	PP 163		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 20.001	PP 162		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 20.001	RG 69		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 23.001	RG 50		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 23.001	PP 231		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 23.001	RG 51		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 23.001	PP 232		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 23.001	RG 52		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 23.001	PP 233		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 23.002	RG 46		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 23.002	PP 226		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 23.002	RG 47		Time of Concentration	0.002	95.0	0	95.0	0.002
22.51m - 23.002	PP 227		Time of Concentration	0.002	95.0	0	95.0	0.002
22.52m - 1.008	RG 145		Time of Concentration	0.002	95.0	0	95.0	0.002
22.52m - 4.000	PP 4		Time of Concentration	0.002	95.0	0	95.0	0.002
22.52m - 4.000	PP 3		Time of Concentration	0.002	95.0	0	95.0	0.002
22.57m - 13.000	PP 120		Time of Concentration	0.002	95.0	0	95.0	0.002
22.57m - 13.000	PP 123		Time of Concentration	0.002	95.0	0	95.0	0.002
22.70m - 13.000	PP 121		Time of Concentration	0.002	95.0	0	95.0	0.002
22.70m - 13.000	PP 122		Time of Concentration	0.002	95.0	0	95.0	0.002
22.71m - 12.000	PP 77		Time of Concentration	0.002	95.0	0	95.0	0.002
22.75m - 13.000	PP 115		Time of Concentration	0.002	95.0	0	95.0	0.002
22.75m - 13.000 (1)	PP 114		Time of Concentration	0.002	95.0	0	95.0	0.002
22.75m - 13.000 (2)	PP 116		Time of Concentration	0.002	95.0	0	95.0	0.002
22.87m - 22.000	PP 239		Time of Concentration	0.002	95.0	0	95.0	0.002
22.87m - 22.001	PP 243		Time of Concentration	0.002	95.0	0	95.0	0.002
22.87m - 23.000	PP 236		Time of Concentration	0.002	95.0	0	95.0	0.002
22.88m - 12.000	PP 86		Time of Concentration	0.002	95.0	0	95.0	0.002
22.88m - 22.000	PP 237		Time of Concentration	0.002	95.0	0	95.0	0.002
22.88m - 22.000	PP 238		Time of Concentration	0.002	95.0	0	95.0	0.002
22.89m - 12.000	PP 85		Time of Concentration	0.002	95.0	0	95.0	0.002
22.89m - 12.000	PP 80		Time of Concentration	0.002	95.0	0	95.0	0.002
22.89m - 12.000 (1)	PP 84		Time of Concentration	0.002	95.0	0	95.0	0.002
22.90m - 12.000	PP 79		Time of Concentration	0.002	95.0	0	95.0	0.002

22.91m - 12.000	PP 78		Time of Concentration	0.002	95.0	0	95.0	0.002
22.97m - 14.002	PP 153		Time of Concentration	0.002	95.0	0	95.0	0.002
22.97m - 14.002	PP 152		Time of Concentration	0.002	95.0	0	95.0	0.002
22.97m - 14.002	PP 151		Time of Concentration	0.002	95.0	0	95.0	0.002
22.97m - 17.009	PP 209		Time of Concentration	0.002	95.0	0	95.0	0.002
22.97m - 17.009	PP 208		Time of Concentration	0.002	95.0	0	95.0	0.002
22.97m - 20.000	PP 158		Time of Concentration	0.002	95.0	0	95.0	0.002
22.97m - 20.000	PP 157		Time of Concentration	0.002	95.0	0	95.0	0.002
23.01m - 6.000	PP 113		Time of Concentration	0.002	95.0	0	95.0	0.002
27.87m - 22.002	RG 21		Time of Concentration	0.003	95.0	0	95.0	0.003
28.05m - 14.000	RG 75		Time of Concentration	0.003	95.0	0	95.0	0.003
28.05m - 14.002	RG 76		Time of Concentration	0.003	95.0	0	95.0	0.003
28.05m - 17.009	RG 10		Time of Concentration	0.003	95.0	0	95.0	0.003
28.05m - 17.009	RG 7		Time of Concentration	0.003	95.0	0	95.0	0.003
28.05m - 20.000	RG 72		Time of Concentration	0.003	95.0	0	95.0	0.003
28.13m - 12.000	RG 126		Time of Concentration	0.003	95.0	0	95.0	0.003
28.17m - 12.000	RG 132		Time of Concentration	0.003	95.0	0	95.0	0.003
28.17m - 12.000	RG 127		Time of Concentration	0.003	95.0	0	95.0	0.003
28.17m - 12.000	RG 122		Time of Concentration	0.003	95.0	0	95.0	0.003
28.17m - 14.002	RG 80		Time of Concentration	0.003	95.0	0	95.0	0.003
28.18m - 22.000	RG 24		Time of Concentration	0.003	95.0	0	95.0	0.003
28.19m - 22.001	RG 23		Time of Concentration	0.003	95.0	0	95.0	0.003
28.56m - 13.000	RG 106		Time of Concentration	0.003	95.0	0	95.0	0.003
28.63m - 4.000	RG 152		Time of Concentration	0.003	95.0	0	95.0	0.003
28.64m - 1.005	RG 167		Time of Concentration	0.003	95.0	0	95.0	0.003
28.64m - 1.005	PP 26		Time of Concentration	0.003	95.0	0	95.0	0.003
28.64m - 1.005	RG 164		Time of Concentration	0.003	95.0	0	95.0	0.003
28.64m - 1.005	PP 23		Time of Concentration	0.003	95.0	0	95.0	0.003
28.64m - 1.008	PP 42		Time of Concentration	0.003	95.0	0	95.0	0.003
28.64m - 1.008	RG 181		Time of Concentration	0.003	95.0	0	95.0	0.003
28.64m - 1.008	PP 46		Time of Concentration	0.003	95.0	0	95.0	0.003
28.64m - 1.008	PP 67		Time of Concentration	0.003	95.0	0	95.0	0.003
28.64m - 1.008	RG 149		Time of Concentration	0.003	95.0	0	95.0	0.003
28.64m - 1.008	PP 68		Time of Concentration	0.003	95.0	0	95.0	0.003
28.64m - 1.008	RG 147		Time of Concentration	0.003	95.0	0	95.0	0.003

28.64m - 1.008	PP 71		Time of Concentration	0.003	95.0	0	95.0	0.003
28.64m - 1.008	RG 146		Time of Concentration	0.003	95.0	0	95.0	0.003
28.64m - 1.009	RG 186		Time of Concentration	0.003	95.0	0	95.0	0.003
28.64m - 1.010	PP 52		Time of Concentration	0.003	95.0	0	95.0	0.003
28.64m - 1.010	RG 190		Time of Concentration	0.003	95.0	0	95.0	0.003
28.64m - 1.010	TP 10		Time of Concentration	0.003	95.0	0	95.0	0.003
28.64m - 1.010	RG 191		Time of Concentration	0.003	95.0	0	95.0	0.003
28.64m - 1.010	PP 59		Time of Concentration	0.003	95.0	0	95.0	0.003
28.64m - 1.011	RG 195		Time of Concentration	0.003	95.0	0	95.0	0.003
28.64m - 1.011	PP 63		Time of Concentration	0.003	95.0	0	95.0	0.003
28.64m - 7.001	PP 92		Time of Concentration	0.003	95.0	0	95.0	0.003
28.64m - 7.001	RG 138		Time of Concentration	0.003	95.0	0	95.0	0.003
28.64m - 7.001	RG 137		Time of Concentration	0.003	95.0	0	95.0	0.003
28.64m - 7.001	PP 95		Time of Concentration	0.003	95.0	0	95.0	0.003
28.64m - 7.001	RG 133		Time of Concentration	0.003	95.0	0	95.0	0.003
28.64m - 7.001	PP 98		Time of Concentration	0.003	95.0	0	95.0	0.003
28.64m - 8.000	RG 176		Time of Concentration	0.003	95.0	0	95.0	0.003
28.64m - 8.000	PP 39		Time of Concentration	0.003	80.0	0	80.0	0.002
28.64m - 8.001	RG 177		Time of Concentration	0.003	95.0	0	95.0	0.003
28.64m - 13.000	PP 120		Time of Concentration	0.003	95.0	0	95.0	0.003
28.64m - 13.000	RG 104		Time of Concentration	0.003	95.0	0	95.0	0.003
28.64m - 13.000	PP 124		Time of Concentration	0.003	95.0	0	95.0	0.003
28.64m - 13.000	RG 99		Time of Concentration	0.003	95.0	0	95.0	0.003
28.64m - 13.003	PP 103		Time of Concentration	0.003	95.0	0	95.0	0.003
28.64m - 13.003	RG 119		Time of Concentration	0.003	95.0	0	95.0	0.003
28.64m - 13.004	PP 111		Time of Concentration	0.003	95.0	0	95.0	0.003
28.64m - 13.004	RG 116		Time of Concentration	0.003	95.0	0	95.0	0.003
28.64m - 13.004	PP 106		Time of Concentration	0.003	95.0	0	95.0	0.003
28.64m - 13.004	RG 115		Time of Concentration	0.003	95.0	0	95.0	0.003
28.64m - 13.004	PP 108		Time of Concentration	0.003	95.0	0	95.0	0.003
28.64m - 13.004	RG 112		Time of Concentration	0.003	95.0	0	95.0	0.003
28.64m - 14.002	PP 147		Time of Concentration	0.003	95.0	0	95.0	0.003
28.64m - 14.002	RG 81		Time of Concentration	0.003	95.0	0	95.0	0.003
28.64m - 14.004	RG 86		Time of Concentration	0.003	95.0	0	95.0	0.003
28.64m - 14.004	PP 141		Time of Concentration	0.003	95.0	0	95.0	0.003

28.64m - 14.004	RG 85		Time of Concentration	0.003	95.0	0	95.0	0.003
28.64m - 14.004	PP 143		Time of Concentration	0.003	95.0	0	95.0	0.003
28.64m - 17.006	PP 188		Time of Concentration	0.003	95.0	0	95.0	0.003
28.64m - 17.006	RG 35		Time of Concentration	0.003	95.0	0	95.0	0.003
28.64m - 20.000	PP 161		Time of Concentration	0.003	95.0	0	95.0	0.003
28.64m - 20.000	RG 71		Time of Concentration	0.003	37.5	0	37.5	0.001
28.64m - 20.001	PP 163		Time of Concentration	0.003	95.0	0	95.0	0.003
28.64m - 20.001	RG 68		Time of Concentration	0.003	95.0	0	95.0	0.003
28.64m - 23.001	RG 48		Time of Concentration	0.003	95.0	0	95.0	0.003
28.64m - 23.001	PP 227		Time of Concentration	0.003	95.0	0	95.0	0.003
28.64m - 23.001	RG 49		Time of Concentration	0.003	95.0	0	95.0	0.003
28.64m - 23.001	PP 230		Time of Concentration	0.003	95.0	0	95.0	0.003
28.64m - 23.001	RG 53		Time of Concentration	0.003	95.0	0	95.0	0.003
28.64m - 23.001	PP 233		Time of Concentration	0.003	95.0	0	95.0	0.003
28.64m - 23.002	RG 44		Time of Concentration	0.003	95.0	0	95.0	0.003
28.64m - 23.002	RG 45		Time of Concentration	0.003	95.0	0	95.0	0.003
28.64m - 23.002	PP 222		Time of Concentration	0.003	95.0	0	95.0	0.003
28.64m - 23.002	PP 225		Time of Concentration	0.003	95.0	0	95.0	0.003
28.67m - 4.000	PP 2		Time of Concentration	0.003	95.0	0	95.0	0.003
28.73m - 13.000	PP 117		Time of Concentration	0.003	95.0	0	95.0	0.003
29.11m - 12.000	PP 86		Time of Concentration	0.003	95.0	0	95.0	0.003
29.11m - 22.000	PP 240		Time of Concentration	0.003	95.0	0	95.0	0.003
29.11m - 22.002	PP 244		Time of Concentration	0.003	95.0	0	95.0	0.003
29.12m - 12.000	PP 81		Time of Concentration	0.003	95.0	0	95.0	0.003
29.12m - 14.002	PP 150		Time of Concentration	0.003	95.0	0	95.0	0.003
29.12m - 22.001	PP 243		Time of Concentration	0.003	95.0	0	95.0	0.003
29.14m - 12.000	TP 12		Time of Concentration	0.003	95.0	0	95.0	0.003
29.16m - 12.000	PP 83		Time of Concentration	0.003	95.0	0	95.0	0.003
29.24m - 14.000	PP 156		Time of Concentration	0.003	95.0	0	95.0	0.003
29.24m - 14.002	PP 153		Time of Concentration	0.003	95.0	0	95.0	0.003
29.24m - 17.009	PP 209		Time of Concentration	0.003	95.0	0	95.0	0.003
29.24m - 17.009	PP 207		Time of Concentration	0.003	95.0	0	95.0	0.003
29.24m - 20.000	PP 158		Time of Concentration	0.003	95.0	0	95.0	0.003
30.85m - 17.008	PP 199		Time of Concentration	0.003	95.0	0	95.0	0.003
30.85m - 17.009	PP 203		Time of Concentration	0.003	95.0	0	95.0	0.003

30.85m - 17.011	PP 216		Time of Concentration	0.003	95.0	0	95.0	0.003
30.85m - 17.011	PP 212		Time of Concentration	0.003	95.0	0	95.0	0.003
30.85m - 22.002	PP 247		Time of Concentration	0.003	95.0	0	95.0	0.003
30.85m - 22.002	PP 251		Time of Concentration	0.003	95.0	0	95.0	0.003
30.85m - 22.002	PP 255		Time of Concentration	0.003	95.0	0	95.0	0.003
30.92m - 17.008	PP 200		Time of Concentration	0.003	95.0	0	95.0	0.003
30.92m - 17.009	PP 204		Time of Concentration	0.003	95.0	0	95.0	0.003
30.92m - 17.011	PP 217		Time of Concentration	0.003	95.0	0	95.0	0.003
30.92m - 17.011	PP 213		Time of Concentration	0.003	95.0	0	95.0	0.003
30.92m - 22.002	PP 248		Time of Concentration	0.003	95.0	0	95.0	0.003
30.92m - 22.002	PP 252		Time of Concentration	0.003	95.0	0	95.0	0.003
30.92m - 22.002	PP 256		Time of Concentration	0.003	95.0	0	95.0	0.003
30.93m - 4.000	RG 155		Time of Concentration	0.003	95.0	0	95.0	0.003
30.94m - 4.003	PP 15		Time of Concentration	0.003	95.0	0	95.0	0.003
30.94m - 14.003	RG 84		Time of Concentration	0.003	95.0	0	95.0	0.003
30.94m - 14.004	RG 89		Time of Concentration	0.003	95.0	0	95.0	0.003
30.94m - 17.012	RG 198		Time of Concentration	0.003	95.0	0	95.0	0.003
30.95m - 1.009	RG 143		Time of Concentration	0.003	95.0	0	95.0	0.003
30.95m - 6.000	RG 111		Time of Concentration	0.003	95.0	0	95.0	0.003
30.95m - 14.003	RG 92		Time of Concentration	0.003	95.0	0	95.0	0.003
30.95m - 17.007	RG 30		Time of Concentration	0.003	95.0	0	95.0	0.003
30.95m - 23.000	RG 29		Time of Concentration	0.003	95.0	0	95.0	0.003
30.96m - 1.005	RG 163		Time of Concentration	0.003	95.0	0	95.0	0.003
30.96m - 1.005	SMH 7.03		Time of Concentration	0.003	95.0	0	95.0	0.003
30.96m - 1.006	RG 171		Time of Concentration	0.003	95.0	0	95.0	0.003
30.96m - 1.006	PP 34		Time of Concentration	0.003	95.0	0	95.0	0.003
30.96m - 1.006	RG 170		Time of Concentration	0.003	95.0	0	95.0	0.003
30.96m - 1.006	PP 32		Time of Concentration	0.003	95.0	0	95.0	0.003
30.96m - 1.006	RG 169		Time of Concentration	0.003	95.0	0	95.0	0.003
30.96m - 1.006	TP 5		Time of Concentration	0.003	95.0	0	95.0	0.003
30.96m - 1.006	RG 168		Time of Concentration	0.003	95.0	0	95.0	0.003
30.96m - 1.006	PP 28		Time of Concentration	0.003	95.0	0	95.0	0.003
30.96m - 4.003	RG 162		Time of Concentration	0.003	95.0	0	95.0	0.003
30.96m - 4.003	PP 19		Time of Concentration	0.003	95.0	0	95.0	0.003
30.96m - 4.003	RG 159		Time of Concentration	0.003	95.0	0	95.0	0.003

30.96m - 4.003	TP 3		Time of Concentration	0.003	95.0	0	95.0	0.003
30.96m - 4.003	PP 10		Time of Concentration	0.003	95.0	0	95.0	0.003
30.96m - 4.003	RG 161		Time of Concentration	0.003	95.0	0	95.0	0.003
30.96m - 4.003	PP 17		Time of Concentration	0.003	95.0	0	95.0	0.003
30.96m - 4.003	RG 157		Time of Concentration	0.003	95.0	0	95.0	0.003
30.96m - 4.003	PP 8		Time of Concentration	0.003	95.0	0	95.0	0.003
30.96m - 4.003	RG 156		Time of Concentration	0.003	95.0	0	95.0	0.003
30.96m - 4.003	PP 7		Time of Concentration	0.003	95.0	0	95.0	0.003
30.96m - 4.003 (1)	RG 158		Time of Concentration	0.003	95.0	0	95.0	0.003
30.96m - 13.003	PP 127		Time of Concentration	0.003	95.0	0	95.0	0.003
30.96m - 13.003	PP 128		Time of Concentration	0.003	95.0	0	95.0	0.003
30.96m - 13.003	RG 97		Time of Concentration	0.003	95.0	0	95.0	0.003
30.96m - 13.003	PP 131		Time of Concentration	0.003	95.0	0	95.0	0.003
30.96m - 13.003	PP 133		Time of Concentration	0.003	95.0	0	95.0	0.003
30.96m - 13.004	PP 135		Time of Concentration	0.003	95.0	0	95.0	0.003
30.96m - 13.004	PP 136		Time of Concentration	0.003	95.0	0	95.0	0.003
30.96m - 13.005	PP 264		Time of Concentration	0.003	95.0	0	95.0	0.003
30.96m - 13.005	RG 57		Time of Concentration	0.003	95.0	0	95.0	0.003
30.96m - 13.005	PP 263		Time of Concentration	0.003	95.0	0	95.0	0.003
30.96m - 13.005	RG 56		Time of Concentration	0.003	95.0	0	95.0	0.003
30.96m - 13.005	PP 260		Time of Concentration	0.003	95.0	0	95.0	0.003
30.96m - 13.005	RG 55		Time of Concentration	0.003	95.0	0	95.0	0.003
30.96m - 13.005	PP 259		Time of Concentration	0.003	95.0	0	95.0	0.003
30.96m - 13.005	RG 54		Time of Concentration	0.003	95.0	0	95.0	0.003
30.96m - 13.006	TP 21		Time of Concentration	0.003	95.0	0	95.0	0.003
30.96m - 13.006	RG 61		Time of Concentration	0.003	95.0	0	95.0	0.003
30.96m - 13.006	PP 271		Time of Concentration	0.003	95.0	0	95.0	0.003
30.96m - 13.006	RG 60		Time of Concentration	0.003	95.0	0	95.0	0.003
30.96m - 13.006	PP 268		Time of Concentration	0.003	95.0	0	95.0	0.003
30.96m - 13.006	RG 59		Time of Concentration	0.003	95.0	0	95.0	0.003
30.96m - 13.006	PP 267		Time of Concentration	0.003	95.0	0	95.0	0.003
30.96m - 13.006	RG 58		Time of Concentration	0.003	95.0	0	95.0	0.003
30.96m - 17.004	PP 178		Time of Concentration	0.003	95.0	0	95.0	0.003
30.96m - 17.004	RG 40		Time of Concentration	0.003	95.0	0	95.0	0.003
30.96m - 17.004	PP 176		Time of Concentration	0.003	80.0	0	80.0	0.002

30.96m - 17.004	RG 41		Time of Concentration	0.003	95.0	0	95.0	0.003
30.96m - 17.006	PP 185		Time of Concentration	0.003	80.0	0	80.0	0.002
30.96m - 17.006	RG 36		Time of Concentration	0.003	95.0	0	95.0	0.003
30.96m - 17.006	PP 183		Time of Concentration	0.003	80.0	0	80.0	0.002
30.96m - 17.006	RG 37		Time of Concentration	0.003	95.0	0	95.0	0.003
30.96m - 17.006	PP 181		Time of Concentration	0.003	95.0	0	95.0	0.003
30.96m - 17.006	RG 38		Time of Concentration	0.003	95.0	0	95.0	0.003
30.96m - 17.006	PP 180		Time of Concentration	0.003	95.0	0	95.0	0.003
30.96m - 17.006	RG 39		Time of Concentration	0.003	95.0	0	95.0	0.003
30.96m - 17.008	PP 196		Time of Concentration	0.003	95.0	0	95.0	0.003
30.96m - 17.008	RG 2		Time of Concentration	0.003	95.0	0	95.0	0.003
30.96m - 17.008	PP 195		Time of Concentration	0.003	95.0	0	95.0	0.003
30.96m - 17.008	RG 1		Time of Concentration	0.003	95.0	0	95.0	0.003
30.96m - 20.002	RG 65		Time of Concentration	0.003	95.0	0	95.0	0.003
30.96m - 20.002	PP 167		Time of Concentration	0.003	95.0	0	95.0	0.003
30.96m - 20.002	RG 66		Time of Concentration	0.003	95.0	0	95.0	0.003
30.96m - 20.002	PP 166		Time of Concentration	0.003	95.0	0	95.0	0.003
30.96m - 20.002	RG 67		Time of Concentration	0.003	95.0	0	95.0	0.003
30.96m - 20.003	PP 171		Time of Concentration	0.003	95.0	0	95.0	0.003
30.96m - 20.003	RG 64		Time of Concentration	0.003	95.0	0	95.0	0.003
30.96m - 20.003 (1)	PP 170		Time of Concentration	0.003	95.0	0	95.0	0.003
30.97m - 4.003	RG 160		Time of Concentration	0.003	95.0	0	95.0	0.003
30.97m - 7.001	RG 142		Time of Concentration	0.003	95.0	0	95.0	0.003
30.98m - 13.003	RG 98		Time of Concentration	0.003	95.0	0	95.0	0.003
30.98m - 13.003	RG 96		Time of Concentration	0.003	95.0	0	95.0	0.003
30.98m - 13.003	RG 95		Time of Concentration	0.003	95.0	0	95.0	0.003
30.98m - 13.004	RG 94		Time of Concentration	0.003	95.0	0	95.0	0.003
30.98m - 13.004	RG 93		Time of Concentration	0.003	95.0	0	95.0	0.003
30.99m - 17.008	RG 4		Time of Concentration	0.003	95.0	0	95.0	0.003
30.99m - 17.009	RG 6		Time of Concentration	0.003	95.0	0	95.0	0.003
30.99m - 17.011	RG 14		Time of Concentration	0.003	95.0	0	95.0	0.003
30.99m - 17.011	RG 12		Time of Concentration	0.003	95.0	0	95.0	0.003
30.99m - 22.002	RG 19		Time of Concentration	0.003	95.0	0	95.0	0.003
30.99m - 22.002	RG 17		Time of Concentration	0.003	95.0	0	95.0	0.003
31.06m - 17.008	RG 3		Time of Concentration	0.003	95.0	0	95.0	0.003

31.06m - 17.009	RG 5		Time of Concentration	0.003	95.0	0	95.0	0.003
31.06m - 17.011	RG 13		Time of Concentration	0.003	95.0	0	95.0	0.003
31.06m - 17.011	RG 11		Time of Concentration	0.003	95.0	0	95.0	0.003
31.06m - 22.002	RG 20		Time of Concentration	0.003	95.0	0	95.0	0.003
31.06m - 22.002	RG 18		Time of Concentration	0.003	95.0	0	95.0	0.003
31.06m - 22.002	RG 16		Time of Concentration	0.003	95.0	0	95.0	0.003
31.06m - 22.002 (1)	RG 15		Time of Concentration	0.003	95.0	0	95.0	0.003
31.09m - 1.006	RG 151		Time of Concentration	0.003	95.0	0	95.0	0.003
31.23m - 7.000	Swale 3		Time of Concentration	0.003	95.0	0	95.0	0.003
31.37m - 1.015	PP 275		Time of Concentration	0.003	95.0	0	95.0	0.003
31.66m - 1.015	RG 63		Time of Concentration	0.003	95.0	0	95.0	0.003
31.66m - 1.015	RG 62		Time of Concentration	0.003	95.0	0	95.0	0.003
31.66m - 21.000	PP 174		Time of Concentration	0.003	95.0	0	95.0	0.003
31.66m - 21.000	RG 196		Time of Concentration	0.003	95.0	0	95.0	0.003
31.80m - 7.000	RG 120		Time of Concentration	0.003	95.0	0	95.0	0.003
32.09m - 1.006	RG 150		Time of Concentration	0.003	95.0	0	95.0	0.003
32.88m - 1.009	PP 73		Time of Concentration	0.003	95.0	0	95.0	0.003
32.89m - 7.001	PP 89		Time of Concentration	0.003	95.0	0	95.0	0.003
32.90m - 17.007	RG 30		Time of Concentration	0.003	95.0	0	95.0	0.003
32.92m - 4.000	PP 5		Time of Concentration	0.003	95.0	0	95.0	0.003
32.92m - 14.003	PP 145		Time of Concentration	0.003	95.0	0	95.0	0.003
32.92m - 14.004	PP 139		Time of Concentration	0.003	95.0	0	95.0	0.003
32.92m - 17.012	PP 220		Time of Concentration	0.003	95.0	0	95.0	0.003
32.92m - 23.000	PP 236		Time of Concentration	0.003	95.0	0	95.0	0.003
32.93m - 14.002	PP 146		Time of Concentration	0.003	95.0	0	95.0	0.003
32.99m - 6.000	PP 113		Time of Concentration	0.003	95.0	0	95.0	0.003
33.83m - 1.006	RG 150		Time of Concentration	0.003	95.0	0	95.0	0.003
33.83m - 21.000	RG 197		Time of Concentration	0.003	95.0	0	95.0	0.003
34.12m - 7.000	Swale 3		Time of Concentration	0.003	95.0	0	95.0	0.003
34.25m - 7.000	RG 121		Time of Concentration	0.003	95.0	0	95.0	0.003
34.26m - 1.015	PP 274		Time of Concentration	0.003	95.0	0	95.0	0.003
34.26m - 21.000	PP 174		Time of Concentration	0.003	95.0	0	95.0	0.003
34.40m - 1.006	RG 151		Time of Concentration	0.003	95.0	0	95.0	0.003
735.00m - 28.000	EX SMH(02)		Time of Concentration	0.074	80.0	0	80.0	0.059
1053.12m - 28.000	EX SMH(02)		Time of Concentration	0.105	80.0	0	80.0	0.084

1807.10m - 28.001	EX SMH(03)		Time of Concentration	0.181	80.0	0	80.0	0.145
Catchment Area	PP 34		Time of Concentration	0.013	37.5	0	37.5	0.005
Catchment Area (1)	PP 37		Time of Concentration	0.003	37.5	0	37.5	0.001
Catchment Area (2)	TP 7		Time of Concentration	0.002	37.5	0	37.5	0.001
Catchment Area (3)	PP 40		Time of Concentration	0.004	37.5	0	37.5	0.001
Catchment Area (4)	PP 41		Time of Concentration	0.004	80.0	0	80.0	0.003
Catchment Area (5)	PP 42		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (6)	PP 43		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (7)	PP 44		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (8)	PP 45		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (9)	PP 46		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (10)	PP 47		Time of Concentration	0.005	37.5	0	37.5	0.002
Catchment Area (11)	PP 48		Time of Concentration	0.005	80.0	0	80.0	0.004
Catchment Area (12)	TP 9		Time of Concentration	0.029	80.0	0	80.0	0.023
Catchment Area (13)	PP 49		Time of Concentration	0.003	80.0	0	80.0	0.002
Catchment Area (14)	PP 50		Time of Concentration	0.003	80.0	0	80.0	0.002
Catchment Area (15)	TP 9		Time of Concentration	0.003	80.0	0	80.0	0.002
Catchment Area (16)	PP 51		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (17)	PP 52		Time of Concentration	0.002	80.0	0	80.0	0.001
Catchment Area (18)	PP 53		Time of Concentration	0.002	80.0	0	80.0	0.001
Catchment Area (19)	PP 54		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (20)	PP 54		Time of Concentration	0.004	80.0	0	80.0	0.003
Catchment Area (21)	PP 57		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (22)	PP 58		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (23)	PP 59		Time of Concentration	0.002	80.0	0	80.0	0.001
Catchment Area (24)	PP 60		Time of Concentration	0.002	80.0	0	80.0	0.001
Catchment Area (25)	PP 60		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (26)	PP 61		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (27)	PP 62		Time of Concentration	0.002	80.0	0	80.0	0.001
Catchment Area (28)	PP 63		Time of Concentration	0.005	80.0	0	80.0	0.004
Catchment Area (29)	PP 74		Time of Concentration	0.006	80.0	0	80.0	0.005
Catchment Area (30)	PP 73		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (31)	PP 72		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (32)	PP 71		Time of Concentration	0.002	37.5	0	37.5	0.001
Catchment Area (33)	PP 70		Time of Concentration	0.002	80.0	0	80.0	0.002

Catchment Area (34)	PP 69		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (35)	PP 68		Time of Concentration	0.002	80.0	0	80.0	0.001
Catchment Area (36)	PP 68		Time of Concentration	0.002	80.0	0	80.0	0.001
Catchment Area (37)	PP 67		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (38)	PP 66		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (39)	PP 65		Time of Concentration	0.004	80.0	0	80.0	0.003
Catchment Area (40)	PP 64		Time of Concentration	0.005	80.0	0	80.0	0.004
Catchment Area (41)	PP 33		Time of Concentration	0.003	80.0	0	80.0	0.002
Catchment Area (42)	PP 33		Time of Concentration	0.001	80.0	0	80.0	0.001
Catchment Area (43)	PP 32		Time of Concentration	0.002	80.0	0	80.0	0.001
Catchment Area (44)	PP 31		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (45)	PP 30		Time of Concentration	0.002	80.0	0	80.0	0.001
Catchment Area (46)	PP 29		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (47)	PP 28		Time of Concentration	0.003	80.0	0	80.0	0.002
Catchment Area (48)	PP 27		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (49)	PP 25		Time of Concentration	0.001	37.5	0	37.5	0.001
Catchment Area (50)	PP 25		Time of Concentration	0.004	37.5	0	37.5	0.001
Catchment Area (51)	PP 24		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (52)	PP 23		Time of Concentration	0.003	80.0	0	80.0	0.002
Catchment Area (53)	PP 22		Time of Concentration	0.001	80.0	0	80.0	0.001
Catchment Area (54)	PP 21		Time of Concentration	0.002	80.0	0	80.0	0.001
Catchment Area (55)	PP 20		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (56)	PP 19		Time of Concentration	0.003	80.0	0	80.0	0.002
Catchment Area (57)	PP 18		Time of Concentration	0.002	80.0	0	80.0	0.001
Catchment Area (58)	PP 16		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (59)	PP 16		Time of Concentration	0.002	80.0	0	80.0	0.001
Catchment Area (60)	PP 14		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (61)	PP 13		Time of Concentration	0.002	80.0	0	80.0	0.001
Catchment Area (62)	PP 13		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (63)	PP 12		Time of Concentration	0.002	80.0	0	80.0	0.001
Catchment Area (64)	PP 11		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (65)	PP 10		Time of Concentration	0.002	80.0	0	80.0	0.001
Catchment Area (66)	PP 9		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (67)	TP 2		Time of Concentration	0.002	80.0	0	80.0	0.001
Catchment Area (68)	PP 6		Time of Concentration	0.002	80.0	0	80.0	0.002

Catchment Area (69)	PP 6		Time of Concentration	0.004	80.0	0	80.0	0.003
Catchment Area (70)	Swale 2		Time of Concentration	0.011	80.0	0	80.0	0.009
Catchment Area (71)	PP 5		Time of Concentration	0.003	80.0	0	80.0	0.002
Catchment Area (72)	PP 4		Time of Concentration	0.004	80.0	0	80.0	0.003
Catchment Area (73)	PP 3		Time of Concentration	0.003	80.0	0	80.0	0.002
Catchment Area (74)	PP 2		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (75)	PP 1		Time of Concentration	0.001	80.0	0	80.0	0.001
Catchment Area (76)	SMH 14.00		Time of Concentration	0.015	80.0	0	80.0	0.012
Catchment Area (77)	Swale 1		Time of Concentration	0.004	80.0	0	80.0	0.003
Catchment Area (78)	PP 88		Time of Concentration	0.003	80.0	0	80.0	0.002
Catchment Area (79)	PP 89		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (80)	PP 90		Time of Concentration	0.002	80.0	0	80.0	0.001
Catchment Area (81)	PP 90		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (82)	PP 91		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (83)	PP 92		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (84)	PP 93		Time of Concentration	0.002	80.0	0	80.0	0.001
Catchment Area (85)	PP 94		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (86)	PP 95		Time of Concentration	0.001	80.0	0	80.0	0.001
Catchment Area (87)	PP 96		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (88)	PP 97		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (89)	PP 97		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (90)	PP 98		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (91)	PP 99		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (92)	PP 112		Time of Concentration	0.004	80.0	0	80.0	0.003
Catchment Area (93)	PP 113		Time of Concentration	0.003	80.0	0	80.0	0.003
Catchment Area (94)	PP 114		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (95)	PP 115		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (96)	PP 115		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (97)	PP 116		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (98)	PP 118		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (99)	PP 118		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (100)	PP 119		Time of Concentration	0.003	80.0	0	80.0	0.003
Catchment Area (101)	PP 121		Time of Concentration	0.003	80.0	0	80.0	0.002
Catchment Area (102)	PP 122		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (103)	PP 123		Time of Concentration	0.002	80.0	0	80.0	0.002

Catchment Area (104)	PP 124		Time of Concentration	0.003	80.0	0	80.0	0.002
Catchment Area (105)	PP 125		Time of Concentration	0.003	80.0	0	80.0	0.003
Catchment Area (106)	PP 126		Time of Concentration	0.006	80.0	0	80.0	0.004
Catchment Area (107)	Swale 2		Time of Concentration	0.005	80.0	0	80.0	0.004
Catchment Area (108)	PP 127		Time of Concentration	0.005	80.0	0	80.0	0.004
Catchment Area (109)	PP 129		Time of Concentration	0.004	80.0	0	80.0	0.003
Catchment Area (110)	PP 130		Time of Concentration	0.004	80.0	0	80.0	0.003
Catchment Area (111)	PP 131		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (112)	PP 132		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (113)	PP 133		Time of Concentration	0.004	80.0	0	80.0	0.003
Catchment Area (114)	PP 134		Time of Concentration	0.004	80.0	0	80.0	0.003
Catchment Area (115)	PP 135		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (116)	PP 136		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (117)	PP 137		Time of Concentration	0.006	80.0	0	80.0	0.004
Catchment Area (118)	Swale 3		Time of Concentration	0.004	80.0	0	80.0	0.003
Catchment Area (119)	PP 100		Time of Concentration	0.004	80.0	0	80.0	0.003
Catchment Area (120)	PP 101		Time of Concentration	0.004	80.0	0	80.0	0.003
Catchment Area (121)	PP 102		Time of Concentration	0.003	80.0	0	80.0	0.002
Catchment Area (122)	PP 103		Time of Concentration	0.002	80.0	0	80.0	0.001
Catchment Area (123)	PP 104		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (124)	PP 105		Time of Concentration	0.003	80.0	0	80.0	0.002
Catchment Area (125)	PP 106		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (126)	PP 107		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (127)	PP 108		Time of Concentration	0.002	80.0	0	80.0	0.001
Catchment Area (128)	PP 109		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (129)	PP 110		Time of Concentration	0.003	80.0	0	80.0	0.002
Catchment Area (130)	PP 111		Time of Concentration	0.003	80.0	0	80.0	0.003
Catchment Area (131)	PP 75		Time of Concentration	0.002	80.0	0	80.0	0.001
Catchment Area (132)	PP 76		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (133)	PP 77		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (134)	PP 78		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (135)	PP 79		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (136)	TP 13		Time of Concentration	0.003	80.0	0	80.0	0.002
Catchment Area (137)	PP 81		Time of Concentration	0.003	80.0	0	80.0	0.002
Catchment Area (138)	PP 82		Time of Concentration	0.002	80.0	0	80.0	0.002

Catchment Area (139)	TP 14		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (140)	PP 84		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (141)	PP 85		Time of Concentration	0.002	80.0	0	80.0	0.001
Catchment Area (142)	PP 86		Time of Concentration	0.002	80.0	0	80.0	0.001
Catchment Area (143)	PP 86		Time of Concentration	0.002	80.0	0	80.0	0.001
Catchment Area (144)	PP 87		Time of Concentration	0.004	80.0	0	80.0	0.003
Catchment Area (145)	PP 275		Time of Concentration	0.004	80.0	0	80.0	0.003
Catchment Area (146)	PP 273		Time of Concentration	0.003	80.0	0	80.0	0.002
Catchment Area (147)	PP 274		Time of Concentration	0.009	80.0	0	80.0	0.007
Catchment Area (148)	PP 275		Time of Concentration	0.003	80.0	0	80.0	0.002
Catchment Area (149)	PP 273		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (150)	PP 272		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (151)	PP 271		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (152)	PP 270		Time of Concentration	0.002	80.0	0	80.0	0.001
Catchment Area (153)	PP 269		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (154)	PP 268		Time of Concentration	0.002	80.0	0	80.0	0.001
Catchment Area (155)	PP 267		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (156)	PP 266		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (157)	PP 265		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (158)	PP 264		Time of Concentration	0.002	80.0	0	80.0	0.001
Catchment Area (159)	PP 263		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (160)	PP 262		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (161)	PP 261		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (162)	PP 260		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (163)	PP 259		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (164)	PP 258		Time of Concentration	0.002	80.0	0	80.0	0.001
Catchment Area (165)	SMH 1.01		Time of Concentration	0.004	80.0	0	80.0	0.004
Catchment Area (166)	PP 138		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (167)	PP 139		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (168)	PP 140		Time of Concentration	0.002	80.0	0	80.0	0.001
Catchment Area (169)	PP 141		Time of Concentration	0.004	80.0	0	80.0	0.003
Catchment Area (170)	PP 142		Time of Concentration	0.003	80.0	0	80.0	0.003
Catchment Area (171)	PP 144		Time of Concentration	0.003	80.0	0	80.0	0.003
Catchment Area (172)	PP 144		Time of Concentration	0.003	80.0	0	80.0	0.003
Catchment Area (173)	SMH 6.03		Time of Concentration	0.007	80.0	0	80.0	0.005

Catchment Area (174)	SMH 15.00		Time of Concentration	0.009	80.0	0	80.0	0.007
Catchment Area (175)	PP 147		Time of Concentration	0.004	80.0	0	80.0	0.003
Catchment Area (176)	PP 148		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (177)	PP 149		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (178)	PP 150		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (179)	PP 151		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (180)	PP 152		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (181)	PP 153		Time of Concentration	0.003	80.0	0	80.0	0.002
Catchment Area (182)	PP 154		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (183)	PP 155		Time of Concentration	0.003	80.0	0	80.0	0.002
Catchment Area (184)	PP 156		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (185)	PP 157		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (186)	PP 158		Time of Concentration	0.003	80.0	0	80.0	0.002
Catchment Area (187)	PP 159		Time of Concentration	0.003	80.0	0	80.0	0.002
Catchment Area (188)	PP 160		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (189)	PP 161		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (190)	PP 162		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (191)	PP 163		Time of Concentration	0.003	80.0	0	80.0	0.002
Catchment Area (192)	PP 164		Time of Concentration	0.003	80.0	0	80.0	0.002
Catchment Area (193)	PP 165		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (194)	PP 166		Time of Concentration	0.002	80.0	0	80.0	0.001
Catchment Area (195)	PP 167		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (196)	PP 168		Time of Concentration	0.002	80.0	0	80.0	0.001
Catchment Area (197)	PP 169		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (198)	PP 170		Time of Concentration	0.002	80.0	0	80.0	0.001
Catchment Area (199)	PP 171		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (200)	PP 172		Time of Concentration	0.002	80.0	0	80.0	0.001
Catchment Area (201)	PP 173		Time of Concentration	0.005	80.0	0	80.0	0.004
Catchment Area (202)	PP 174		Time of Concentration	0.011	80.0	0	80.0	0.009
Catchment Area (203)	PP 219		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (204)	PP 220		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (205)	PP 221		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (206)	PP 222		Time of Concentration	0.003	80.0	0	80.0	0.003
Catchment Area (207)	PP 223		Time of Concentration	0.002	80.0	0	80.0	0.001
Catchment Area (208)	PP 224		Time of Concentration	0.002	80.0	0	80.0	0.002

Catchment Area (209)	PP 225		Time of Concentration	0.002	80.0	0	80.0	0.001
Catchment Area (210)	PP 225		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (211)	PP 226		Time of Concentration	0.004	80.0	0	80.0	0.003
Catchment Area (212)	PP 228		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (213)	PP 229		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (214)	PP 230		Time of Concentration	0.002	80.0	0	80.0	0.001
Catchment Area (215)	PP 231		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (216)	PP 232		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (217)	PP 233		Time of Concentration	0.003	80.0	0	80.0	0.002
Catchment Area (218)	PP 234		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (219)	PP 235		Time of Concentration	0.002	80.0	0	80.0	0.001
Catchment Area (220)	PP 235		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (221)	PP 236		Time of Concentration	0.003	80.0	0	80.0	0.002
Catchment Area (222)	PP 237		Time of Concentration	0.003	80.0	0	80.0	0.002
Catchment Area (223)	PP 238		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (224)	PP 239		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (225)	PP 240		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (226)	PP 241		Time of Concentration	0.004	80.0	0	80.0	0.003
Catchment Area (227)	PP 242		Time of Concentration	0.003	80.0	0	80.0	0.002
Catchment Area (228)	PP 243		Time of Concentration	0.004	80.0	0	80.0	0.003
Catchment Area (229)	PP 244		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (230)	PP 245		Time of Concentration	0.002	80.0	0	80.0	0.001
Catchment Area (231)	PP 246		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (232)	PP 247		Time of Concentration	0.002	80.0	0	80.0	0.001
Catchment Area (233)	TP 28		Time of Concentration	0.003	80.0	0	80.0	0.002
Catchment Area (234)	PP 249		Time of Concentration	0.002	80.0	0	80.0	0.001
Catchment Area (235)	PP 250		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (236)	PP 251		Time of Concentration	0.002	80.0	0	80.0	0.001
Catchment Area (237)	PP 251		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (238)	PP 253		Time of Concentration	0.002	80.0	0	80.0	0.001
Catchment Area (239)	PP 254		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (240)	TP 34		Time of Concentration	0.002	80.0	0	80.0	0.001
Catchment Area (241)	PP 255		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (242)	PP 257		Time of Concentration	0.003	80.0	0	80.0	0.003
Catchment Area (243)	PP 175		Time of Concentration	0.004	80.0	0	80.0	0.003

Catchment Area (244)	PP 176		Time of Concentration	0.001	80.0	0	80.0	0.001
Catchment Area (245)	PP 177		Time of Concentration	0.002	80.0	0	80.0	0.001
Catchment Area (246)	PP 178		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (247)	PP 179		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (248)	PP 180		Time of Concentration	0.002	80.0	0	80.0	0.001
Catchment Area (249)	PP 181		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (250)	PP 182		Time of Concentration	0.002	37.5	0	37.5	0.001
Catchment Area (251)	PP 183		Time of Concentration	0.002	37.5	0	37.5	0.001
Catchment Area (252)	PP 184		Time of Concentration	0.001	37.5	0	37.5	0.000
Catchment Area (253)	PP 185		Time of Concentration	0.002	37.5	0	37.5	0.001
Catchment Area (254)	PP 186		Time of Concentration	0.002	37.5	0	37.5	0.001
Catchment Area (255)	PP 187		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (256)	PP 188		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (257)	PP 189		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (258)	PP 190		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (259)	PP 191		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (260)	PP 192		Time of Concentration	0.003	80.0	0	80.0	0.003
Catchment Area (261)	PP 193		Time of Concentration	0.004	80.0	0	80.0	0.003
Catchment Area (262)	PP 218		Time of Concentration	0.005	80.0	0	80.0	0.004
Catchment Area (263)	PP 217		Time of Concentration	0.002	80.0	0	80.0	0.001
Catchment Area (264)	PP 216		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (265)	PP 215		Time of Concentration	0.002	80.0	0	80.0	0.001
Catchment Area (266)	PP 214		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (267)	PP 213		Time of Concentration	0.002	80.0	0	80.0	0.001
Catchment Area (268)	PP 211		Time of Concentration	0.004	80.0	0	80.0	0.003
Catchment Area (269)	PP 210		Time of Concentration	0.003	80.0	0	80.0	0.002
Catchment Area (270)	PP 209		Time of Concentration	0.004	80.0	0	80.0	0.003
Catchment Area (271)	PP 208		Time of Concentration	0.003	80.0	0	80.0	0.002
Catchment Area (272)	PP 207		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (273)	PP 206		Time of Concentration	0.002	80.0	0	80.0	0.001
Catchment Area (274)	PP 205		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (275)	PP 204		Time of Concentration	0.002	80.0	0	80.0	0.001
Catchment Area (276)	PP 203		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (277)	PP 202		Time of Concentration	0.002	80.0	0	80.0	0.001
Catchment Area (278)	PP 201		Time of Concentration	0.002	80.0	0	80.0	0.002

Catchment Area (279)	PP 199		Time of Concentration	0.002	80.0	0	80.0	0.001
Catchment Area (280)	PP 199		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (281)	PP 198		Time of Concentration	0.002	80.0	0	80.0	0.001
Catchment Area (282)	PP 197		Time of Concentration	0.002	80.0	0	80.0	0.002
Catchment Area (283)	PP 196		Time of Concentration	0.002	80.0	0	80.0	0.001
Catchment Area (284)	PP 195		Time of Concentration	0.002	80.0	0	80.0	0.001
Catchment Area (285)	PP 194		Time of Concentration	0.003	80.0	0	80.0	0.003
Catchment Area (286)	PP 276		Time of Concentration	0.038	37.5	0	37.5	0.014
Catchment Area (287)	PP 276		Time of Concentration	0.014	80.0	0	80.0	0.011
Catchment Area (288)	Swale 7		Time of Concentration	0.019	80.0	0	80.0	0.015
Catchment Area (289)	PP 275		Time of Concentration	0.018	80.0	0	80.0	0.014
Catchment Area (290)	SMH 1.05		Time of Concentration	0.007	80.0	0	80.0	0.005
Catchment Area (291)	TP 21		Time of Concentration	0.026	80.0	0	80.0	0.020
Catchment Area (292)	TP 20		Time of Concentration	0.021	80.0	0	80.0	0.017
Catchment Area (293)	TP 19		Time of Concentration	0.008	80.0	0	80.0	0.007
Catchment Area (294)	TP 18		Time of Concentration	0.016	80.0	0	80.0	0.013
Catchment Area (295)	SMH 1.01		Time of Concentration	0.021	80.0	0	80.0	0.017
Catchment Area (296)	SMH 1.00		Time of Concentration	0.021	80.0	0	80.0	0.017
Catchment Area (297)	PP 276		Time of Concentration	0.003	80.0	0	80.0	0.003
Catchment Area (298)	TP 11		Time of Concentration	0.019	80.0	0	80.0	0.015
Catchment Area (299)	Swale 4		Time of Concentration	0.021	80.0	0	80.0	0.017
Catchment Area (300)	Swale 4		Time of Concentration	0.026	80.0	0	80.0	0.021
Catchment Area (301)	TP 8		Time of Concentration	0.017	80.0	0	80.0	0.013
Catchment Area (301) (1)	Swale 4		Time of Concentration	0.026	80.0	0	80.0	0.021
Catchment Area (302)	PP 34		Time of Concentration	0.014	80.0	0	80.0	0.011
Catchment Area (303)	TP 6		Time of Concentration	0.019	80.0	0	80.0	0.015
Catchment Area (304)	TP 5		Time of Concentration	0.018	80.0	0	80.0	0.015
Catchment Area (305)	Swale 3		Time of Concentration	0.017	80.0	0	80.0	0.013
Catchment Area (306)	Swale 2		Time of Concentration	0.020	80.0	0	80.0	0.016
Catchment Area (307)	Swale 2		Time of Concentration	0.009	80.0	0	80.0	0.007
Catchment Area (308)	Swale 2		Time of Concentration	0.018	80.0	0	80.0	0.014
Catchment Area (309)	Swale 2		Time of Concentration	0.025	80.0	0	80.0	0.020
Catchment Area (310)	Swale 2		Time of Concentration	0.018	80.0	0	80.0	0.015
Catchment Area (311)	Swale 3		Time of Concentration	0.024	80.0	0	80.0	0.020

Catchment Area (312)	Swale 3		Time of Concentration	0.032	80.0	0	80.0	0.025
Catchment Area (313)	TP 17		Time of Concentration	0.020	80.0	0	80.0	0.016
Catchment Area (314)	TP 16		Time of Concentration	0.020	80.0	0	80.0	0.016
Catchment Area (315)	TP 15		Time of Concentration	0.021	80.0	0	80.0	0.016
Catchment Area (316)	Swale 4		Time of Concentration	0.014	80.0	0	80.0	0.011
Catchment Area (317)	Swale 4		Time of Concentration	0.009	80.0	0	80.0	0.007
Catchment Area (318)	Swale 4		Time of Concentration	0.012	80.0	0	80.0	0.010
Catchment Area (319)	Swale 4		Time of Concentration	0.014	80.0	0	80.0	0.011
Catchment Area (320)	Swale 9		Time of Concentration	0.011	80.0	0	80.0	0.009
Catchment Area (321)	Swale 9		Time of Concentration	0.011	80.0	0	80.0	0.009
Catchment Area (322)	Swale 9		Time of Concentration	0.005	80.0	0	80.0	0.004
Catchment Area (323)	TP 22		Time of Concentration	0.016	80.0	0	80.0	0.013
Catchment Area (324)	TP 23		Time of Concentration	0.025	80.0	0	80.0	0.020
Catchment Area (325)	TP 24		Time of Concentration	0.033	80.0	0	80.0	0.026
Catchment Area (326)	Swale 6		Time of Concentration	0.024	80.0	0	80.0	0.019
Catchment Area (327)	Swale 6		Time of Concentration	0.009	80.0	0	80.0	0.007
Catchment Area (328)	Swale 6		Time of Concentration	0.019	80.0	0	80.0	0.015
Catchment Area (329)	Swale 10		Time of Concentration	0.016	80.0	0	80.0	0.013
Catchment Area (330)	Swale 10		Time of Concentration	0.019	80.0	0	80.0	0.015
Catchment Area (331)	TP 29		Time of Concentration	0.004	80.0	0	80.0	0.003
Catchment Area (332	TP 31		Time of Concentration	0.006	80.0	0	80.0	0.005
Catchment Area (332 (1)	TP 30		Time of Concentration	0.006	80.0	0	80.0	0.004
Catchment Area (332)	TP 32		Time of Concentration	0.006	80.0	0	80.0	0.005
Catchment Area (333)	TP 33		Time of Concentration	0.016	80.0	0	80.0	0.013
Catchment Area (334)	SMH 3.04		Time of Concentration	0.013	80.0	0	80.0	0.011
Catchment Area (335)	Swale 8		Time of Concentration	0.018	80.0	0	80.0	0.014
Catchment Area (336)	Swale 8		Time of Concentration	0.015	80.0	0	80.0	0.012
Catchment Area (337)	Swale 8		Time of Concentration	0.015	80.0	0	80.0	0.012
Catchment Area (338)	Swale 8		Time of Concentration	0.012	80.0	0	80.0	0.010
Catchment Area (339)	Swale 8		Time of Concentration	0.011	80.0	0	80.0	0.009
Catchment Area (340)	TP 25		Time of Concentration	0.011	80.0	0	80.0	0.009
Catchment Area (341)	TP 26		Time of Concentration	0.009	80.0	0	80.0	0.007
Catchment Area (342)	TP 27		Time of Concentration	0.014	80.0	0	80.0	0.011
Catchment Area (343)	Swale 5		Time of Concentration	0.019	80.0	0	80.0	0.015
Catchment Area (344)	Swale 5		Time of Concentration	0.016	80.0	0	80.0	0.013

Catchment Area (345)	Swale 5		Time of Concentration	0.014	80.0	0	80.0	0.012
Catchment Area (346)	Swale 5		Time of Concentration	0.015	80.0	0	80.0	0.012
Catchment Area (347)	Swale 5		Time of Concentration	0.014	80.0	0	80.0	0.011
Catchment Area (348)	Swale 5		Time of Concentration	0.019	80.0	0	80.0	0.015
Catchment Area (349)	Swale 5		Time of Concentration	0.006	80.0	0	80.0	0.005
Catchment Area (350)	Swale 5		Time of Concentration	0.010	80.0	0	80.0	0.008
Catchment Area (351)	RG 172		Time of Concentration	0.011	37.5	0	37.5	0.004
Catchment Area (352)	RG 173		Time of Concentration	0.005	37.5	0	37.5	0.002
Catchment Area (353)	RG 174		Time of Concentration	0.005	37.5	0	37.5	0.002
Catchment Area (354)	RG 175		Time of Concentration	0.005	37.5	0	37.5	0.002
Catchment Area (355)	RG 176		Time of Concentration	0.008	37.5	0	37.5	0.003
Catchment Area (356)	RG 177		Time of Concentration	0.009	37.5	0	37.5	0.003
Catchment Area (357)	RG 178		Time of Concentration	0.005	37.5	0	37.5	0.002
Catchment Area (358)	RG 179		Time of Concentration	0.005	37.5	0	37.5	0.002
Catchment Area (359)	RG 180		Time of Concentration	0.005	37.5	0	37.5	0.002
Catchment Area (360)	RG 181		Time of Concentration	0.009	37.5	0	37.5	0.003
Catchment Area (361)	RG 182		Time of Concentration	0.012	37.5	0	37.5	0.004
Catchment Area (362)	RG 183		Time of Concentration	0.005	37.5	0	37.5	0.002
Catchment Area (363)	RG 185		Time of Concentration	0.012	37.5	0	37.5	0.004
Catchment Area (364)	RG 184		Time of Concentration	0.005	37.5	0	37.5	0.002
Catchment Area (365)	RG 186		Time of Concentration	0.009	37.5	0	37.5	0.003
Catchment Area (366)	RG 187		Time of Concentration	0.005	37.5	0	37.5	0.002
Catchment Area (367)	RG 188		Time of Concentration	0.005	37.5	0	37.5	0.002
Catchment Area (368)	RG 189		Time of Concentration	0.005	37.5	0	37.5	0.002
Catchment Area (369)	RG 190		Time of Concentration	0.009	37.5	0	37.5	0.003
Catchment Area (370)	RG 191		Time of Concentration	0.009	37.5	0	37.5	0.003
Catchment Area (371)	RG 192		Time of Concentration	0.005	37.5	0	37.5	0.002
Catchment Area (372)	RG 193		Time of Concentration	0.005	37.5	0	37.5	0.002
Catchment Area (373)	RG 194		Time of Concentration	0.005	37.5	0	37.5	0.002
Catchment Area (374)	RG 195		Time of Concentration	0.008	37.5	0	37.5	0.003
Catchment Area (375)	PP 63		Time of Concentration	0.041	37.5	0	37.5	0.015
Catchment Area (376)	Swale 4		Time of Concentration	0.015	37.5	0	37.5	0.006
Catchment Area (377)	Swale 4		Time of Concentration	0.027	37.5	0	37.5	0.010
Catchment Area (378)	Swale 4		Time of Concentration	0.024	37.5	0	37.5	0.009
Catchment Area (379)	Swale 4		Time of Concentration	0.023	37.5	0	37.5	0.009

Catchment Area (380)	Swale 4		Time of Concentration	0.041	37.5	0	37.5	0.015
Catchment Area (381)	SMH 1.02		Time of Concentration	0.042	37.5	0	37.5	0.016
Catchment Area (382)	SMH 1.01		Time of Concentration	0.037	37.5	0	37.5	0.014
Catchment Area (383)	SMH 15.00		Time of Concentration	0.032	37.5	0	37.5	0.012
Catchment Area (384)	SMH 15.00		Time of Concentration	0.053	37.5	0	37.5	0.020
Catchment Area (385)	RG 171		Time of Concentration	0.006	37.5	0	37.5	0.002
Catchment Area (386)	RG 170		Time of Concentration	0.008	37.5	0	37.5	0.003
Catchment Area (387)	RG 169		Time of Concentration	0.008	37.5	0	37.5	0.003
Catchment Area (388)	RG 168		Time of Concentration	0.008	37.5	0	37.5	0.003
Catchment Area (389)	RG 167		Time of Concentration	0.008	37.5	0	37.5	0.003
Catchment Area (390)	RG 166		Time of Concentration	0.004	37.5	0	37.5	0.002
Catchment Area (391)	RG 165		Time of Concentration	0.005	37.5	0	37.5	0.002
Catchment Area (392)	TP 4		Time of Concentration	0.008	37.5	0	37.5	0.003
Catchment Area (393)	RG 163		Time of Concentration	0.008	37.5	0	37.5	0.003
Catchment Area (394)	RG 162		Time of Concentration	0.009	37.5	0	37.5	0.003
Catchment Area (395)	RG 161		Time of Concentration	0.009	37.5	0	37.5	0.003
Catchment Area (396)	RG 160		Time of Concentration	0.009	37.5	0	37.5	0.003
Catchment Area (397)	RG 159		Time of Concentration	0.009	37.5	0	37.5	0.003
Catchment Area (398)	RG 158		Time of Concentration	0.009	37.5	0	37.5	0.003
Catchment Area (399)	RG 157		Time of Concentration	0.009	37.5	0	37.5	0.003
Catchment Area (400)	RG 156		Time of Concentration	0.014	37.5	0	37.5	0.005
Catchment Area (401)	RG 155		Time of Concentration	0.006	37.5	0	37.5	0.002
Catchment Area (402)	RG 154		Time of Concentration	0.005	37.5	0	37.5	0.002
Catchment Area (403)	RG 153		Time of Concentration	0.005	37.5	0	37.5	0.002
Catchment Area (404)	RG 152		Time of Concentration	0.025	37.5	0	37.5	0.009
Catchment Area (405)	TP 1		Time of Concentration	0.004	37.5	0	37.5	0.001
Catchment Area (406)	TP 1		Time of Concentration	0.003	37.5	0	37.5	0.001
Catchment Area (407)	Swale 1		Time of Concentration	0.015	37.5	0	37.5	0.006
Catchment Area (408)	RG 111		Time of Concentration	0.006	37.5	0	37.5	0.002
Catchment Area (409)	RG 110		Time of Concentration	0.004	37.5	0	37.5	0.002
Catchment Area (410)	RG 109		Time of Concentration	0.004	37.5	0	37.5	0.002
Catchment Area (411)	RG 108		Time of Concentration	0.004	37.5	0	37.5	0.002
Catchment Area (412)	RG 107		Time of Concentration	0.004	37.5	0	37.5	0.002
Catchment Area (413)	RG 106		Time of Concentration	0.007	37.5	0	37.5	0.003
Catchment Area (414)	RG 104		Time of Concentration	0.007	37.5	0	37.5	0.003

Catchment Area (415)	RG 103		Time of Concentration	0.004	37.5	0	37.5	0.002
Catchment Area (416)	RG 102		Time of Concentration	0.004	37.5	0	37.5	0.002
Catchment Area (417)	RG 101		Time of Concentration	0.004	37.5	0	37.5	0.002
Catchment Area (418)	RG 100		Time of Concentration	0.004	37.5	0	37.5	0.002
Catchment Area (419)	RG 99		Time of Concentration	0.008	37.5	0	37.5	0.003
Catchment Area (420)	RG 98		Time of Concentration	0.012	37.5	0	37.5	0.004
Catchment Area (421)	RG 97		Time of Concentration	0.014	37.5	0	37.5	0.005
Catchment Area (422)	RG 96		Time of Concentration	0.013	37.5	0	37.5	0.005
Catchment Area (423)	RG 95		Time of Concentration	0.013	37.5	0	37.5	0.005
Catchment Area (424)	RG 94		Time of Concentration	0.012	37.5	0	37.5	0.004
Catchment Area (425)	RG 93		Time of Concentration	0.010	37.5	0	37.5	0.004
Catchment Area (426)	RG 151		Time of Concentration	0.005	37.5	0	37.5	0.002
Catchment Area (427)	RG 150		Time of Concentration	0.007	37.5	0	37.5	0.003
Catchment Area (428)	RG 149		Time of Concentration	0.009	37.5	0	37.5	0.003
Catchment Area (429)	RG 148		Time of Concentration	0.005	37.5	0	37.5	0.002
Catchment Area (430)	RG 147		Time of Concentration	0.009	37.5	0	37.5	0.003
Catchment Area (431)	RG 146		Time of Concentration	0.009	37.5	0	37.5	0.003
Catchment Area (432)	RG 145		Time of Concentration	0.005	37.5	0	37.5	0.002
Catchment Area (433)	RG 144		Time of Concentration	0.005	37.5	0	37.5	0.002
Catchment Area (434)	RG 143		Time of Concentration	0.009	37.5	0	37.5	0.003
Catchment Area (435)	RG 142		Time of Concentration	0.005	37.5	0	37.5	0.002
Catchment Area (436)	RG 141		Time of Concentration	0.004	37.5	0	37.5	0.001
Catchment Area (437)	RG 140		Time of Concentration	0.004	37.5	0	37.5	0.001
Catchment Area (438)	RG 139		Time of Concentration	0.004	37.5	0	37.5	0.001
Catchment Area (439)	RG 138		Time of Concentration	0.007	37.5	0	37.5	0.002
Catchment Area (440)	RG 137		Time of Concentration	0.007	37.5	0	37.5	0.002
Catchment Area (441)	RG 136		Time of Concentration	0.004	37.5	0	37.5	0.001
Catchment Area (442)	RG 135		Time of Concentration	0.004	37.5	0	37.5	0.001
Catchment Area (443)	RG 134		Time of Concentration	0.004	37.5	0	37.5	0.001
Catchment Area (444)	RG 133		Time of Concentration	0.007	37.5	0	37.5	0.002
Catchment Area (445)	RG 132		Time of Concentration	0.009	37.5	0	37.5	0.003
Catchment Area (446)	RG 131		Time of Concentration	0.005	37.5	0	37.5	0.002
Catchment Area (447)	RG 130		Time of Concentration	0.005	37.5	0	37.5	0.002
Catchment Area (448)	RG 129		Time of Concentration	0.005	37.5	0	37.5	0.002
Catchment Area (449)	RG 128		Time of Concentration	0.005	37.5	0	37.5	0.002

Catchment Area (450)	RG 127		Time of Concentration	0.010	37.5	0	37.5	0.004
Catchment Area (451)	RG 126		Time of Concentration	0.010	37.5	0	37.5	0.004
Catchment Area (452)	RG 125		Time of Concentration	0.005	37.5	0	37.5	0.002
Catchment Area (453)	RG 124		Time of Concentration	0.005	37.5	0	37.5	0.002
Catchment Area (454)	RG 123		Time of Concentration	0.005	37.5	0	37.5	0.002
Catchment Area (455)	RG 122		Time of Concentration	0.009	37.5	0	37.5	0.003
Catchment Area (456)	RG 120		Time of Concentration	0.008	37.5	0	37.5	0.003
Catchment Area (457)	RG 121		Time of Concentration	0.005	37.5	0	37.5	0.002
Catchment Area (458)	RG 119		Time of Concentration	0.010	37.5	0	37.5	0.004
Catchment Area (459)	RG 118		Time of Concentration	0.005	37.5	0	37.5	0.002
Catchment Area (460)	RG 117		Time of Concentration	0.005	37.5	0	37.5	0.002
Catchment Area (461)	RG 116		Time of Concentration	0.008	37.5	0	37.5	0.003
Catchment Area (462)	RG 115		Time of Concentration	0.008	37.5	0	37.5	0.003
Catchment Area (463)	RG 114		Time of Concentration	0.004	37.5	0	37.5	0.002
Catchment Area (464)	RG 113		Time of Concentration	0.004	37.5	0	37.5	0.001
Catchment Area (465)	RG 112		Time of Concentration	0.006	37.5	0	37.5	0.002
Catchment Area (466)	Swale 3		Time of Concentration	0.067	37.5	0	37.5	0.025
Catchment Area (467)	Swale 2		Time of Concentration	0.075	37.5	0	37.5	0.028
Catchment Area (468)	Swale 2		Time of Concentration	0.083	37.5	0	37.5	0.031
Catchment Area (469)	PP 275		Time of Concentration	0.011	37.5	0	37.5	0.004
Catchment Area (470)	PP 276		Time of Concentration	0.010	37.5	0	37.5	0.004
Catchment Area (471)	Swale 9		Time of Concentration	0.043	37.5	0	37.5	0.016
Catchment Area (472)	Swale 7		Time of Concentration	0.088	37.5	0	37.5	0.033
Catchment Area (473)	Swale 8		Time of Concentration	0.036	37.5	0	37.5	0.014
Catchment Area (474)	Swale 8		Time of Concentration	0.043	37.5	0	37.5	0.016
Catchment Area (475)	Swale 8		Time of Concentration	0.050	37.5	0	37.5	0.019
Catchment Area (476)	Swale 9		Time of Concentration	0.024	37.5	0	37.5	0.009
Catchment Area (477)	Swale 6		Time of Concentration	0.027	37.5	0	37.5	0.010
Catchment Area (478)	Swale 6		Time of Concentration	0.056	37.5	0	37.5	0.021
Catchment Area (479)	Swale 6		Time of Concentration	0.074	37.5	0	37.5	0.028
Catchment Area (480)	Swale 5		Time of Concentration	0.019	37.5	0	37.5	0.007
Catchment Area (481)	Swale 10		Time of Concentration	0.010	37.5	0	37.5	0.004
Catchment Area (482)	Swale 5		Time of Concentration	0.015	37.5	0	37.5	0.006
Catchment Area (483)	Swale 5		Time of Concentration	0.017	37.5	0	37.5	0.006
Catchment Area (484)	RG 30		Time of Concentration	0.008	37.5	0	37.5	0.003

Catchment Area (485)	RG 31		Time of Concentration	0.004	37.5	0	37.5	0.002
Catchment Area (486)	RG 32		Time of Concentration	0.004	37.5	0	37.5	0.002
Catchment Area (487)	RG 33		Time of Concentration	0.004	37.5	0	37.5	0.002
Catchment Area (488)	RG 34		Time of Concentration	0.004	37.5	0	37.5	0.002
Catchment Area (489)	RG 35		Time of Concentration	0.007	37.5	0	37.5	0.003
Catchment Area (490)	RG 36		Time of Concentration	0.008	37.5	0	37.5	0.003
Catchment Area (491)	RG 37		Time of Concentration	0.008	37.5	0	37.5	0.003
Catchment Area (492)	RG 38		Time of Concentration	0.008	37.5	0	37.5	0.003
Catchment Area (493)	RG 39		Time of Concentration	0.008	37.5	0	37.5	0.003
Catchment Area (494)	RG 40		Time of Concentration	0.009	37.5	0	37.5	0.003
Catchment Area (495)	RG 41		Time of Concentration	0.008	37.5	0	37.5	0.003
Catchment Area (496)	RG 84		Time of Concentration	0.006	37.5	0	37.5	0.002
Catchment Area (497)	RG 83		Time of Concentration	0.005	37.5	0	37.5	0.002
Catchment Area (498)	RG 82		Time of Concentration	0.005	37.5	0	37.5	0.002
Catchment Area (499)	RG 81		Time of Concentration	0.008	37.5	0	37.5	0.003
Catchment Area (500)	RG 80		Time of Concentration	0.008	37.5	0	37.5	0.003
Catchment Area (501)	RG 79		Time of Concentration	0.005	37.5	0	37.5	0.002
Catchment Area (502)	RG 78		Time of Concentration	0.005	37.5	0	37.5	0.002
Catchment Area (503)	RG 77		Time of Concentration	0.005	37.5	0	37.5	0.002
Catchment Area (504)	RG 76		Time of Concentration	0.008	37.5	0	37.5	0.003
Catchment Area (505)	RG 75		Time of Concentration	0.008	37.5	0	37.5	0.003
Catchment Area (506)	RG 74		Time of Concentration	0.005	37.5	0	37.5	0.002
Catchment Area (507)	RG 73		Time of Concentration	0.005	37.5	0	37.5	0.002
Catchment Area (508)	RG 72		Time of Concentration	0.008	37.5	0	37.5	0.003
Catchment Area (509)	RG 71		Time of Concentration	0.008	37.5	0	37.5	0.003
Catchment Area (510)	RG 70		Time of Concentration	0.005	37.5	0	37.5	0.002
Catchment Area (511)	RG 69		Time of Concentration	0.005	37.5	0	37.5	0.002
Catchment Area (512)	RG 68		Time of Concentration	0.008	37.5	0	37.5	0.003
Catchment Area (513)	RG 67		Time of Concentration	0.008	37.5	0	37.5	0.003
Catchment Area (514)	RG 66		Time of Concentration	0.008	37.5	0	37.5	0.003
Catchment Area (515)	RG 65		Time of Concentration	0.008	37.5	0	37.5	0.003
Catchment Area (516)	RG 64		Time of Concentration	0.008	37.5	0	37.5	0.003
Catchment Area (517)	RG 197		Time of Concentration	0.005	37.5	0	37.5	0.002
Catchment Area (518)	RG 196		Time of Concentration	0.010	37.5	0	37.5	0.004
Catchment Area (519)	RG 89		Time of Concentration	0.005	37.5	0	37.5	0.002

Catchment Area (520)	RG 88		Time of Concentration	0.004	37.5	0	37.5	0.001
Catchment Area (521)	RG 87		Time of Concentration	0.004	37.5	0	37.5	0.001
Catchment Area (522)	RG 86		Time of Concentration	0.007	37.5	0	37.5	0.002
Catchment Area (523)	RG 85		Time of Concentration	0.007	37.5	0	37.5	0.002
Catchment Area (524)	RG 90		Time of Concentration	0.004	37.5	0	37.5	0.001
Catchment Area (525)	RG 91		Time of Concentration	0.004	37.5	0	37.5	0.001
Catchment Area (526)	RG 92		Time of Concentration	0.005	37.5	0	37.5	0.002
Catchment Area (527)	RG 63		Time of Concentration	0.006	37.5	0	37.5	0.002
Catchment Area (528)	RG 61		Time of Concentration	0.007	37.5	0	37.5	0.003
Catchment Area (529)	RG 62		Time of Concentration	0.007	37.5	0	37.5	0.003
Catchment Area (530)	RG 60		Time of Concentration	0.007	37.5	0	37.5	0.003
Catchment Area (531)	RG 59		Time of Concentration	0.007	37.5	0	37.5	0.003
Catchment Area (532)	RG 58		Time of Concentration	0.007	37.5	0	37.5	0.003
Catchment Area (533)	RG 57		Time of Concentration	0.007	37.5	0	37.5	0.003
Catchment Area (534)	RG 56		Time of Concentration	0.007	37.5	0	37.5	0.003
Catchment Area (535)	RG 55		Time of Concentration	0.007	37.5	0	37.5	0.003
Catchment Area (536)	RG 54		Time of Concentration	0.007	37.5	0	37.5	0.003
Catchment Area (537)	RG 198		Time of Concentration	0.005	37.5	0	37.5	0.002
Catchment Area (538)	RG 42		Time of Concentration	0.004	37.5	0	37.5	0.001
Catchment Area (539)	RG 43		Time of Concentration	0.004	37.5	0	37.5	0.001
Catchment Area (540)	RG 44		Time of Concentration	0.007	37.5	0	37.5	0.002
Catchment Area (541)	RG 45		Time of Concentration	0.007	37.5	0	37.5	0.002
Catchment Area (542)	RG 46		Time of Concentration	0.004	37.5	0	37.5	0.001
Catchment Area (543)	RG 47		Time of Concentration	0.004	37.5	0	37.5	0.001
Catchment Area (544)	RG 48		Time of Concentration	0.007	37.5	0	37.5	0.002
Catchment Area (545)	RG 49		Time of Concentration	0.007	37.5	0	37.5	0.002
Catchment Area (546)	RG 50		Time of Concentration	0.004	37.5	0	37.5	0.001
Catchment Area (547)	RG 51		Time of Concentration	0.004	37.5	0	37.5	0.001
Catchment Area (548)	RG 52		Time of Concentration	0.004	37.5	0	37.5	0.001
Catchment Area (549)	RG 53		Time of Concentration	0.007	37.5	0	37.5	0.002
Catchment Area (550)	RG 14		Time of Concentration	0.008	37.5	0	37.5	0.003
Catchment Area (551)	RG 13		Time of Concentration	0.011	37.5	0	37.5	0.004
Catchment Area (552)	RG 12		Time of Concentration	0.011	37.5	0	37.5	0.004
Catchment Area (553)	RG 11		Time of Concentration	0.014	37.5	0	37.5	0.005
Catchment Area (554)	RG 10		Time of Concentration	0.008	37.5	0	37.5	0.003

Catchment Area (555)	RG 9		Time of Concentration	0.006	37.5	0	37.5	0.002
Catchment Area (556)	RG 8		Time of Concentration	0.006	37.5	0	37.5	0.002
Catchment Area (557)	RG 7		Time of Concentration	0.010	37.5	0	37.5	0.004
Catchment Area (558)	RG 6		Time of Concentration	0.011	37.5	0	37.5	0.004
Catchment Area (559)	RG 5		Time of Concentration	0.011	37.5	0	37.5	0.004
Catchment Area (560)	RG 4		Time of Concentration	0.011	37.5	0	37.5	0.004
Catchment Area (561)	RG 3		Time of Concentration	0.011	37.5	0	37.5	0.004
Catchment Area (562)	RG 2		Time of Concentration	0.011	37.5	0	37.5	0.004
Catchment Area (563)	RG 1		Time of Concentration	0.008	37.5	0	37.5	0.003
Catchment Area (564)	RG 29		Time of Concentration	0.005	37.5	0	37.5	0.002
Catchment Area (565)	RG 28		Time of Concentration	0.004	37.5	0	37.5	0.001
Catchment Area (566)	RG 27		Time of Concentration	0.004	37.5	0	37.5	0.001
Catchment Area (567)	RG 26		Time of Concentration	0.004	37.5	0	37.5	0.001
Catchment Area (568)	RG 25		Time of Concentration	0.004	37.5	0	37.5	0.001
Catchment Area (569)	RG 24		Time of Concentration	0.006	37.5	0	37.5	0.002
Catchment Area (570)	RG 23		Time of Concentration	0.007	37.5	0	37.5	0.003
Catchment Area (571)	RG 22		Time of Concentration	0.004	37.5	0	37.5	0.001
Catchment Area (572)	RG 21		Time of Concentration	0.007	37.5	0	37.5	0.003
Catchment Area (573)	RG 20		Time of Concentration	0.007	37.5	0	37.5	0.003
Catchment Area (574)	RG 19		Time of Concentration	0.007	37.5	0	37.5	0.003
Catchment Area (575)	RG 18		Time of Concentration	0.007	37.5	0	37.5	0.003
Catchment Area (576)	RG 17		Time of Concentration	0.007	37.5	0	37.5	0.003
Catchment Area (577)	RG 16		Time of Concentration	0.007	37.5	0	37.5	0.003
Catchment Area (578)	RG 15		Time of Concentration	0.006	37.5	0	37.5	0.002
Catchment Area (579)	PP 276		Time of Concentration	0.009	37.5	0	37.5	0.003
Catchment Area (580)	PP 276		Time of Concentration	0.041	37.5	0	37.5	0.015
Catchment Area (581)	PP 279		Time of Concentration	0.013	95.0	0	95.0	0.013
Catchment Area (582)	PP 282		Time of Concentration	0.116	37.5	0	37.5	0.043
Catchment Area (583)	PP 276		Time of Concentration	0.091	37.5	0	37.5	0.034
Catchment Area (584)	Swale 7		Time of Concentration	0.061	37.5	0	37.5	0.023
Catchment Area (585)	Swale 7		Time of Concentration	0.064	37.5	0	37.5	0.024
Catchment Area (586)	Swale 7		Time of Concentration	0.046	37.5	0	37.5	0.017
Catchment Area (587)	Swale 7		Time of Concentration	0.165	37.5	0	37.5	0.062
Catchment Area (588)	PP 288		Time of Concentration	0.049	37.5	0	37.5	0.018
Catchment Area (589)	PP 289		Time of Concentration	0.022	37.5	0	37.5	0.008

Catchment Area (590)	PP 289		Time of Concentration	0.031	37.5	0	37.5	0.012
Catchment Area (591)	PP 281		Time of Concentration	0.013	37.5	0	37.5	0.005
Catchment Area (592)	TP 43		Time of Concentration	0.017	37.5	0	37.5	0.007
Catchment Area (593)	PP 289		Time of Concentration	0.015	37.5	0	37.5	0.006
Catchment Area (594)	TP 43		Time of Concentration	0.021	37.5	0	37.5	0.008
Catchment Area (595)	PP 278		Time of Concentration	0.031	37.5	0	37.5	0.012
Catchment Area (596)	PP 278		Time of Concentration	0.032	37.5	0	37.5	0.012
Catchment Area (597)	PP 278		Time of Concentration	0.031	37.5	0	37.5	0.012
Catchment Area (598)	TP 39		Time of Concentration	0.013	37.5	0	37.5	0.005
Catchment Area (599)	PP 284		Time of Concentration	0.019	37.5	0	37.5	0.007
Catchment Area (600)	PP 286		Time of Concentration	0.024	37.5	0	37.5	0.009
Catchment Area (601)	PP 280		Time of Concentration	0.021	37.5	0	37.5	0.008
Catchment Area (602)	PP 288		Time of Concentration	0.014	37.5	0	37.5	0.005
Catchment Area (603)	PP 287		Time of Concentration	0.024	37.5	0	37.5	0.009
Catchment Area (604)	PP 287		Time of Concentration	0.017	37.5	0	37.5	0.006
Catchment Area (605)	PP 287		Time of Concentration	0.019	37.5	0	37.5	0.007
Catchment Area (606)	PP 287		Time of Concentration	0.018	37.5	0	37.5	0.007
Catchment Area (607)	PP 278		Time of Concentration	0.103	37.5	0	37.5	0.039
Catchment Area (608)	PP 278		Time of Concentration	0.029	80.0	0	80.0	0.023
Catchment Area (609)	PP 283		Time of Concentration	0.049	80.0	0	80.0	0.039
Catchment Area (610)	PP 283		Time of Concentration	0.052	80.0	0	80.0	0.042
Catchment Area (611)	PP 290		Time of Concentration	0.071	80.0	0	80.0	0.057
Catchment Area (612)	TP 38		Time of Concentration	0.045	80.0	0	80.0	0.036
Catchment Area (613)	PP 279		Time of Concentration	0.044	37.5	0	37.5	0.016
Catchment Area (614)	PP 286		Time of Concentration	0.055	37.5	0	37.5	0.021
Catchment Area (615)	TP 40		Time of Concentration	0.049	80.0	0	80.0	0.039
Catchment Area (616)	PP 288		Time of Concentration	0.077	80.0	0	80.0	0.062
Catchment Area (617)	Swale 7		Time of Concentration	0.037	80.0	0	80.0	0.029
Catchment Area (618)	Swale 7		Time of Concentration	0.053	80.0	0	80.0	0.042
Catchment Area (619)	TP 41		Time of Concentration	0.066	80.0	0	80.0	0.053
Catchment Area (620)	PP 284		Time of Concentration	0.057	80.0	0	80.0	0.045
Catchment Area (621)	Swale 7		Time of Concentration	0.036	37.5	0	37.5	0.013
Catchment Area (622)	Swale 7		Time of Concentration	0.069	37.5	0	37.5	0.026
Catchment Area (623)	PP 289		Time of Concentration	0.028	80.0	0	80.0	0.022
Catchment Area (624)	PP 289		Time of Concentration	0.030	80.0	0	80.0	0.024

Catchment Area (625)	SMH 23.00		Time of Concentration	0.013	95.0	0	95.0	0.012
Catchment Area (626)	PP 278		Time of Concentration	0.013	95.0	0	95.0	0.012
Catchment Area (627)	PP 290		Time of Concentration	0.013	95.0	0	95.0	0.012
Catchment Area (628)	PP 283		Time of Concentration	0.013	95.0	0	95.0	0.012
Catchment Area (629)	PP 278		Time of Concentration	0.013	95.0	0	95.0	0.012
Catchment Area (630)	PP 278		Time of Concentration	0.013	95.0	0	95.0	0.012
Catchment Area (631)	PP 278		Time of Concentration	0.020	95.0	0	95.0	0.019
Catchment Area (632)	TP 39		Time of Concentration	0.013	95.0	0	95.0	0.012
Catchment Area (633)	PP 284		Time of Concentration	0.013	95.0	0	95.0	0.012
Catchment Area (634)	PP 285		Time of Concentration	0.007	95.0	0	95.0	0.006
Catchment Area (635)	PP 277		Time of Concentration	0.011	95.0	0	95.0	0.011
Catchment Area (636)	PP 277		Time of Concentration	0.015	95.0	0	95.0	0.014
Catchment Area (637)	PP 281		Time of Concentration	0.015	95.0	0	95.0	0.015
Catchment Area (638)	PP 281		Time of Concentration	0.020	95.0	0	95.0	0.019
Catchment Area (639)	PP 289		Time of Concentration	0.012	95.0	0	95.0	0.012
Catchment Area (640)	TP 44		Time of Concentration	0.012	95.0	0	95.0	0.012
Catchment Area (641)	Swale 7		Time of Concentration	0.012	95.0	0	95.0	0.012
Catchment Area (642)	PP 281		Time of Concentration	0.016	95.0	0	95.0	0.016
Catchment Area (643)	PP 279		Time of Concentration	0.013	95.0	0	95.0	0.012
Catchment Area (644)	TP 40		Time of Concentration	0.013	95.0	0	95.0	0.013
Catchment Area (645)			Time of Concentration	0.025	95.0	0	95.0	0.024
Catchment Area (646)	PP 287		Time of Concentration	0.025	95.0	0	95.0	0.024
Catchment Area (647)	PP 280		Time of Concentration	0.020	95.0	0	95.0	0.019
Catchment Area (648)	PP 287		Time of Concentration	0.016	95.0	0	95.0	0.015
Catchment Area (649)	Swale 7		Time of Concentration	0.021	95.0	0	95.0	0.020
Catchment Area (650)	Swale 7		Time of Concentration	0.016	95.0	0	95.0	0.016
Catchment Area (651)	TP 35		Time of Concentration	0.017	80.0	0	80.0	0.014
Catchment Area (652)	TP 36		Time of Concentration	0.011	80.0	0	80.0	0.008
Catchment Area (653)	SMH 16.00		Time of Concentration	1.742	60.0	0	60.0	1.045
Catchment Area 653	SMH 1.00		Time of Concentration	1.769	60.0	0	60.0	1.061
Catchment Area653	SMH 14.00		Time of Concentration	1.915	60.0	0	60.0	1.149
R1	RG 182		Time of Concentration	0.008	95.0	0	95.0	0.008
R2	RG 183		Time of Concentration	0.009	95.0	0	95.0	0.009
R3	RG 185		Time of Concentration	0.008	95.0	0	95.0	0.008
R4	RG 184		Time of Concentration	0.009	95.0	0	95.0	0.009

R5	PP 276		Time of Concentration	0.018	95.0	0	95.0	0.017
R6	PP 276		Time of Concentration	0.011	95.0	0	95.0	0.010
R7	RG 172		Time of Concentration	0.003	95.0	0	95.0	0.003
R8	PP 35		Time of Concentration	0.003	80.0	0	80.0	0.002
R9	RG 173		Time of Concentration	0.002	95.0	0	95.0	0.002
R10	PP 36		Time of Concentration	0.002	95.0	0	95.0	0.002
R11	RG 174		Time of Concentration	0.002	95.0	0	95.0	0.002
TOTAL		**0.0**		**13.661**				**8.424**

NETWORK DESIGN DETAILS

DOBA 2411:	Date:		
Lands at Gortnahomna, Castlemartyr, Co Cork Surface Water Calculations	17/10/2024		
	Designed by:	Checked by:	Approved By:
	EC	AL	AL
Report Details: Type: Network Design Criteria Storm Phase: Surface Network 1	Company Address:		

Flow Options

Peak Flow Calculation	(UK) Modified Rational Method
Min. Time of Entry (mins)	5
Max. Travel Time (mins)	30

Pipe Options

Lock Slope Options	None
Design Options	Minimize Excavation
Design Level	Level Crowns
Min. Cover Depth (m)	1.200
Min. Slope (1:x)	1000.00
Max. Slope (1:x)	40.00
Min. Velocity (m/s)	1.0
Max. Velocity (m/s)	3.0
Use Flow Restriction	☑
Reduce Channel Depths	☑

Manhole Options

Apply Offset	☐

Manhole Size Library

Default

Diameter / Width

Connection (mm)	Diameter / Length (m)	Width (m)
0	1.200	0.000
375	1.350	0.000
500	1.500	0.000
0	0.000	0.000

Additional Sizing

Connection (mm)	900
Diameter / Length (m)	0.900
Width (m)	0.000

Depth

Depth (m)	Diameter / Length (m)	Width (m)
0.000	1.050	0.000
1.500	1.200	0.000

Benching Requirements

Landing Width (mm)	500
Benching Width (mm)	225

RAINFALL ANALYSIS CRITERIA

DOBA 2411:	Date:		
Lands at Gortnahomna, Castlemartyr, Co Cork Surface Water Calculations	17/10/2024		
	Designed by:	Checked by:	Approved By:
	EC	AL	AL
Report Title:	Company Address:		
Rainfall Analysis Criteria			

Runoff Type	Dynamic
Output Interval (mins)	5
Time Step	Default
Urban Creep	Use Catchment Values
Junction Flood Risk Margin (mm)	200
Perform No Discharge Analysis	☐

Rainfall

FSR

Type: FSR

Region	Scotland and Ireland
M5-60 (mm)	15.9
Ratio R	0.206
Summer	☑
Winter	☑

Return Period

Return Period (years)	Increase Rainfall (%)
100.0	20.000

Storm Durations

Duration (mins)	Run Time (mins)
15	30
30	60
60	120
120	240
180	360
240	480
360	720
480	960
600	1200
720	1440
960	1920
1440	2880
2160	4320
2880	5760
4320	8640
5760	11520
7200	14400
8640	17280
10080	20160

CRITICAL STORM- MANHOLE MAX. DEPTH

DOBA 2411:	Date:		
Lands at Gortnahomna, Castlemartyr, Co Cork Surface Water Calculations	17/10/2024		
	Designed by: EC	Checked by: AL	Approved By: AL
Report Details: Type: Junctions Summary Storm Phase: Surface Network 1	Company Address:		

Critical Storm Per Item: Rank By: Max. Depth

Junction	Storm Event	Cover Elevation (m)	Invert Elevation (m)	Max. Elevation (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status	
Ex SMH(12)	FSR: 100 years: +20 %: 180 mins: Summer	11.670	9.120	9.262	0.142	22.0	0.251	0.000	22.0	291.366	OK	
eX SMH(01)	FSR: 100 years: +20 %: 2160 mins: Winter	11.890	10.460	11.218	0.758	6.8	1.085	0.000	6.7	342.411	Surcharged	
EX SMH (02)	FSR: 100 years: +20 %: 15 mins: Winter	15.358	13.880	13.987	0.107	48.9	0.153	0.000	47.5	22.592	OK	
EX SMH (03)	FSR: 100 years: +20 %: 15 mins: Winter	14.063	12.480	12.658	0.178	96.9	0.255	0.000	89.3	45.383	OK	
EX SMH (15)	FSR: 100 years: +20 %: 180 mins: Summer	11.710	9.060	9.199	0.139	22.0	0.000	0.000	22.0	291.366	OK	
SMH 14.00	FSR: 100 years: +20 %: 60 mins: Winter	22.336	20.389	20.460	0.071	9.1	0.101	0.000	8.9	12.744	OK	
SMH 14.01	FSR: 100 years: +20 %: 60 mins: Winter	21.640	19.895	19.980	0.084	10.6	0.095	0.000	10.5	15.029	OK	
SMH 7.01	FSR: 100 years: +20 %: 30 mins: Winter	21.386	19.858	19.955	0.097	16.1	0.139	0.000	15.7	14.159	OK	FUTURE FLOW
SMH 7.02	FSR: 100 years: +20 %: 30 mins: Winter	20.859	18.756	18.848	0.092	23.6	0.104	0.000	23.7	20.357	OK	
SMH 7.03	FSR: 100 years: +20 %: 60 mins: Summer	19.173	17.717	18.870	1.153	42.1	1.162	0.000	3.5	50.852	Surcharged	
SMH 7.05	FSR: 100 years: +20 %: 30 mins: Winter	16.789	15.117	15.188	0.072	23.4	0.081	0.000	23.3	23.593	OK	
SMH 7.06	FSR: 100 years: +20 %: 30 mins: Winter	16.687	14.898	15.060	0.162	37.1	0.183	0.000	36.4	37.658	OK	
SMH 7.07	FSR: 100 years: +20 %: 720 mins: Winter	16.833	14.687	15.030	0.343	20.5	0.388	0.000	20.5	447.833	Surcharged	
SMH 7.09	FSR: 100 years: +20 %: 720 mins: Winter	15.847	13.868	15.249	1.381	26.9	1.656	0.000	19.3	739.722	Surcharged	
SMH 7.10	FSR: 100 years: +20 %: 720 mins: Winter	15.551	13.832	15.249	1.417	19.3	1.418	0.000	14.0	695.594	Surcharged	
SMH 7.11	FSR: 100 years: +20 %: 1440 mins: Summer	15.246	13.799	13.889	0.090	14.0	0.129	0.000	14.0	858.227	OK	
SMH 1.04	FSR: 100 years: +20 %: 30 mins: Winter	15.039	12.544	12.681	0.137	74.7	0.155	0.000	74.4	88.525	OK	
SMH 1.05	FSR: 100 years: +20 %: 30 mins: Winter	14.447	12.294	12.451	0.157	82.1	0.178	0.000	81.7	95.065	OK	
SMH 1.07	FSR: 100 years: +20 %: 2160 mins: Winter	13.070	10.391	11.599	1.208	32.6	1.366	0.000	32.4	3019.232	Surcharged	
SMH 1.08	FSR: 100 years: +20 %: 2160 mins: Winter	12.693	10.368	11.599	1.230	35.5	1.392	0.000	35.4	3205.633	Surcharged	

SMH 1.09	FSR: 100 years: +20 %: 2160 mins: Winter	12.247	10.333	11.598	1.265	43.2	1.431	0.000	42.6	3688.958	Surcharged
SMH 1.11	FSR: 100 years: +20 %: 2160 mins: Winter	11.860	9.886	11.414	1.528	33.9	2.187	0.000	33.8	3674.614	Surcharged
SMH 1.13	FSR: 100 years: +20 %: 2160 mins: Winter	11.788	9.779	11.412	1.633	21.2	2.337	0.000	21.2	3753.786	Surcharged
SMH 1.14	FSR: 100 years: +20 %: 2160 mins: Winter	11.788	9.421	11.218	1.797	22.0	2.032	0.000	22.0	4092.013	Surcharged
SMH 1.15	FSR: 100 years: +20 %: 480 mins: Winter	11.761	9.377	9.478	0.101	22.0	0.114	0.000	22.0	869.865	OK
SMH 7.00	FSR: 100 years: +20 %: 30 mins: Winter	21.436	19.907	19.972	0.065	6.0	0.093	0.000	5.9	4.432	OK
SMH 11.00	FSR: 100 years: +20 %: 60 mins: Summer	19.644	18.159	18.583	0.424	1.2	0.480	0.000	3.4	1.003	Surcharged
SMH 11.01	FSR: 100 years: +20 %: 60 mins: Summer	19.366	18.084	18.573	0.489	9.8	0.700	0.000	17.3	11.874	Surcharged
SMH 13.00	FSR: 100 years: +20 %: 60 mins: Summer	21.408	19.983	20.021	0.038	5.3	0.043	0.000	5.2	5.397	OK
SMH 13.01	FSR: 100 years: +20 %: 60 mins: Summer	20.444	18.942	18.984	0.042	6.9	0.060	0.000	6.8	7.120	OK
SMH 13.02	FSR: 100 years: +20 %: 60 mins: Summer	20.212	18.732	18.913	0.181	6.8	0.260	0.000	6.7	6.867	OK
SMH 13.03	FSR: 100 years: +20 %: 60 mins: Summer	20.077	18.570	18.661	0.091	19.8	0.103	0.000	19.4	24.008	OK
SMH 13.04	FSR: 100 years: +20 %: 30 mins: Winter	19.341	17.822	17.936	0.114	38.1	0.129	0.000	37.2	32.769	OK
SMH 1.02	FSR: 100 years: +20 %: 60 mins: Summer	18.394	16.229	16.331	0.102	51.2	0.115	0.000	50.7	69.072	OK
SMH 1.03	FSR: 100 years: +20 %: 60 mins: Summer	16.348	14.208	14.375	0.167	66.9	0.189	0.000	66.0	86.159	OK
SMH 12.01	FSR: 100 years: +20 %: 60 mins: Summer	19.505	17.794	18.869	1.075	41.3	1.169	0.000	2.5	39.499	Surcharged
SMH 12.00	FSR: 100 years: +20 %: 2160 mins: Winter	19.500	17.800	18.869	1.069	0.2	1.105	0.000	0.2	9.005	Surcharged
SMH 10.00	FSR: 100 years: +20 %: 60 mins: Winter	16.050	15.013	15.064	0.051	2.4	0.073	0.000	2.4	3.192	OK
SMH 10.01	FSR: 100 years: +20 %: 30 mins: Winter	16.462	14.949	15.061	0.112	2.6	0.160	0.000	3.1	2.727	OK
SMH 22.00	FSR: 100 years: +20 %: 120 mins: Summer	16.700	15.275	15.294	0.019	0.7	0.028	0.000	0.7	1.355	OK
SMH 8.00	FSR: 100 years: +20 %: 30 mins: Winter	18.530	16.962	16.995	0.033	5.0	0.037	0.000	5.0	3.787	OK
SMH 8.01	FSR: 100 years: +20 %: 720 mins: Winter	16.179	14.653	15.025	0.372	10.2	0.421	0.000	10.2	173.656	Surcharged
SMH 9.00	FSR: 100 years: +20 %: 720 mins: Winter	17.100	14.100	15.249	1.149	0.1	1.208	0.000	0.2	1.125	Surcharged

FUTURE FLOW

SMH 9.01	FSR: 100 years: +20 %: 720 mins: Winter	16.750	14.000	15.249	1.249	28.0	1.467	0.000	24.7	433.002	Surcharged	
SMH 1.00	FSR: 100 years: +20 %: 2160 mins: Winter	19.063	17.175	17.825	0.650	3.8	0.735	0.000	1.7	156.549	OK	
SMH 1.01	FSR: 100 years: +20 %: 2160 mins: Winter	18.667	17.047	17.825	0.778	5.1	1.114	0.000	2.3	309.010	Surcharged	
SMH 15.00	FSR: 100 years: +20 %: 2160 mins: Winter	19.439	17.250	18.625	1.375	0.9	1.445	0.000	0.9	45.867	Surcharged	
SMH 15.01	FSR: 100 years: +20 %: 2160 mins: Winter	19.384	17.200	18.625	1.425	3.7	1.488	0.000	12.6	151.812	Surcharged	FUTURE FLOW
SMH 6.00	FSR: 100 years: +20 %: 2160 mins: Winter	18.477	17.297	17.826	0.529	0.5	0.757	0.000	0.5	21.360	Surcharged	
SMH 6.01	FSR: 100 years: +20 %: 2160 mins: Winter	18.512	17.272	17.826	0.554	0.7	0.792	0.000	0.7	32.864	Surcharged	
SMH 6.02	FSR: 100 years: +20 %: 2160 mins: Winter	18.514	17.253	17.825	0.573	2.0	0.819	0.000	2.1	93.269	Surcharged	
SMH 6.03	FSR: 100 years: +20 %: 2160 mins: Winter	18.751	17.227	17.826	0.599	2.4	0.857	0.000	2.4	107.989	Surcharged	FUTURE FLOW
SMH 6.04	FSR: 100 years: +20 %: 2160 mins: Winter	18.800	17.197	17.826	0.629	5.3	0.711	0.000	4.3	193.702	Surcharged	
SMH 17.00	FSR: 100 years: +20 %: 60 mins: Summer	18.499	17.001	17.050	0.049	3.9	0.070	0.000	3.9	4.116	OK	
SMH 17.01	FSR: 100 years: +20 %: 60 mins: Summer	18.589	16.911	16.979	0.068	4.8	0.077	0.000	4.7	5.022	OK	
SMH 17.02	FSR: 100 years: +20 %: 60 mins: Summer	18.582	16.892	16.972	0.080	8.9	0.090	0.000	8.7	9.584	OK	
SMH 17.03	FSR: 100 years: +20 %: 60 mins: Summer	18.425	16.760	16.791	0.031	10.7	0.035	0.000	10.7	11.786	OK	
SMH 16.03	FSR: 100 years: +20 %: 60 mins: Summer	18.266	14.640	14.705	0.066	16.9	0.074	0.000	16.7	19.013	OK	FUTURE FLOW
SMH 16.04	FSR: 100 years: +20 %: 720 mins: Winter	15.282	13.975	15.032	1.057	6.5	1.060	0.000	3.6	219.700	Surcharged	
SMH 3.03	FSR: 100 years: +20 %: 60 mins: Winter	14.840	12.998	14.237	1.239	14.2	1.401	0.000	8.7	38.158	Surcharged	
SMH 3.05	FSR: 100 years: +20 %: 2160 mins: Winter	12.142	10.900	11.761	0.861	10.8	1.233	0.000	10.6	624.658	Surcharged	
SMH 5.01	FSR: 100 years: +20 %: 2160 mins: Winter	12.797	10.846	11.691	0.845	1.9	0.956	0.000	1.7	79.731	Surcharged	
SMH 5.02	FSR: 100 years: +20 %: 2160 mins: Winter	12.926	10.807	11.691	0.884	2.7	1.000	0.000	2.6	123.516	Surcharged	
SMH 2.03	FSR: 100 years: +20 %: 2160 mins: Winter	13.898	10.678	11.691	1.013	6.8	1.146	0.000	6.8	319.892	Surcharged	
SMH 2.04	FSR: 100 years: +20 %: 2160 mins: Winter	13.106	10.597	11.691	1.094	6.8	1.237	0.000	6.7	319.881	Surcharged	
SMH 2.05	FSR: 100 years: +20 %: 2160 mins: Winter	12.927	10.559	11.691	1.132	10.5	1.280	0.000	10.5	1166.720	Surcharged	

SMH 2.06	FSR: 100 years: +20 %: 2160 mins: Winter	12.812	10.486	11.599	1.113	10.8	1.259	0.000	10.5	1080.929	Surcharged
SMH 2.00	FSR: 100 years: +20 %: 30 mins: Winter	16.968	15.543	15.569	0.026	3.5	0.030	0.000	3.5	2.577	OK
SMH 2.01	FSR: 100 years: +20 %: 60 mins: Summer	16.626	14.898	14.966	0.068	18.6	0.077	0.000	18.5	18.445	OK
SMH 3.00	FSR: 100 years: +20 %: 30 mins: Winter	17.037	15.512	15.546	0.034	3.9	0.039	0.000	3.8	2.709	OK
SMH 3.01	FSR: 100 years: +20 %: 30 mins: Winter	16.750	14.992	15.143	0.151	4.2	0.217	0.000	4.2	2.803	OK
SMH 3.02	FSR: 100 years: +20 %: 30 mins: Winter	16.539	14.769	14.826	0.057	11.0	0.064	0.000	10.8	7.931	OK
SMH 16.00	FSR: 100 years: +20 %: 30 mins: Winter	18.696	16.634	16.663	0.029	1.6	0.041	0.000	1.6	1.208	OK
SMH 16.01	FSR: 100 years: +20 %: 60 mins: Summer	18.013	16.563	16.623	0.059	6.5	0.085	0.000	6.4	7.250	OK
SMH 16.02	FSR: 100 years: +20 %: 60 mins: Summer	18.182	16.464	16.521	0.057	6.4	0.082	0.000	6.2	7.237	OK
SMH 18.00	FSR: 100 years: +20 %: 720 mins: Winter	16.500	14.185	15.032	0.847	8.0	0.922	0.000	8.2	109.395	Surcharged
SMH 18.01	FSR: 100 years: +20 %: 720 mins: Winter	16.500	14.010	15.032	1.022	4.3	1.078	0.000	3.6	151.308	Surcharged
SMH 3.07	FSR: 100 years: +20 %: 2160 mins: Winter	12.300	10.718	11.761	1.043	5.3	1.493	0.000	5.3	620.918	Surcharged
SMH 3.08	FSR: 100 years: +20 %: 2160 mins: Winter	12.400	10.604	11.691	1.087	8.4	1.229	0.000	8.4	993.314	Surcharged
SMH 5.00	FSR: 100 years: +20 %: 2160 mins: Winter	12.400	11.023	11.691	0.668	1.5	0.956	0.000	1.5	63.917	Surcharged
SMH 7.04	FSR: 100 years: +20 %: 30 mins: Winter	17.833	16.339	16.395	0.056	18.7	0.063	0.000	18.7	19.559	OK
SMH 2.02	FSR: 100 years: +20 %: 60 mins: Summer	14.974	13.308	13.385	0.077	22.7	0.087	0.000	22.6	23.126	OK
SMH 3.04	FSR: 100 years: +20 %: 60 mins: Summer	13.301	11.998	12.054	0.056	15.8	0.063	0.000	15.7	45.129	OK
SMH 20.00	FSR: 100 years: +20 %: 30 mins: Winter	13.229	11.603	11.721	0.118	32.0	0.169	0.000	31.8	39.620	OK
SMH 20.02	FSR: 100 years: +20 %: 2160 mins: Winter	12.456	10.917	11.598	0.681	7.2	0.975	0.000	7.2	362.437	Surcharged
SMH 20.03	FSR: 100 years: +20 %: 2160 mins: Winter	12.315	10.782	11.598	0.816	8.5	1.168	0.000	8.4	426.054	Surcharged
SMH 23.00	FSR: 100 years: +20 %: 2160 mins: Winter	11.788	10.023	11.413	1.389	2.4	1.988	0.000	8.2	122.070	Surcharged
SMH 1.10	FSR: 100 years: +20 %: 2160 mins: Winter	11.960	9.908	11.596	1.688	42.6	1.909	0.000	33.9	3969.133	Surcharged
SMH 1.12	FSR: 100 years: +20 %: 2160 mins: Winter	11.788	9.871	11.413	1.542	33.8	1.744	0.000	33.7	3674.723	Surcharged

FUTURE FLOW

SMH 20.05	FSR: 100 years: +20 %: 2160 mins: Winter	12.080	10.474	11.598	1.124	9.4	1.271	0.000	9.3	484.023	Surcharged
SMH 20.04	FSR: 100 years: +20 %: 2160 mins: Winter	12.169	10.644	11.598	0.954	8.8	1.079	0.000	8.6	442.164	Surcharged
SMH 1.06	FSR: 100 years: +20 %: 30 mins: Winter	14.205	12.195	12.331	0.136	81.7	0.154	0.000	80.6	94.732	OK
SMH 21.00	FSR: 100 years: +20 %: 2160 mins: Winter	11.780	9.744	11.218	1.474	6.7	1.667	0.000	6.6	342.422	Surcharged
SMH 19.00	FSR: 100 years: +20 %: 2160 mins: Winter	12.100	10.299	11.595	1.297	0.1	1.467	0.000	0.0	1.711	Surcharged
SMH 19.01	FSR: 100 years: +20 %: 2160 mins: Winter	12.100	10.227	11.596	1.369	8.6	1.548	0.000	4.8	571.519	Surcharged
SMH 7.08	FSR: 100 years: +20 %: 720 mins: Winter	16.904	14.546	15.027	0.482	22.5	0.545	0.000	22.4	479.965	Surcharged
SMH 4.00	FSR: 100 years: +20 %: 2160 mins: Winter	12.257	11.256	11.761	0.505	0.1	0.571	0.000	0.2	0.979	Surcharged
SMH 3.06	FSR: 100 years: +20 %: 2160 mins: Winter	12.150	10.868	11.761	0.893	10.6	1.010	0.000	10.5	623.666	Surcharged
SMH 20.01	FSR: 100 years: +20 %: 2160 mins: Winter	13.011	11.409	11.598	0.189	6.0	0.214	0.000	6.0	301.111	OK
SMH 24.00	FSR: 100 years: +20 %: 2160 mins: Winter	13.020	11.470	11.598	0.128	1.9	0.145	0.000	6.5	80.047	OK
SMH 6.05	FSR: 100 years: +20 %: 2160 mins: Winter	18.717	17.064	17.825	0.761	4.3	0.861	0.000	4.3	193.651	Surcharged

FUTURE FLOW

CRITICAL STORM - SUDS MAX. DEPTH

DOBA 2411:	Date:		
Lands at Gortnahomna, Castlemartyr, Co Cork Surface Water Calculations	17/10/2024		
	Designed by:	Checked by:	Approved By:
	EC	AL	AL
Report Details:	Company Address:		
Type: Stormwater Controls Summary Storm Phase: Surface Network 1			

Critical Storm Per Item: Rank By: Max. Avg. Depth

Stormwater Control	Storm Event	Max. Avg. Elevation (m)	Max. Avg. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
PP 1	FSR: 100 years: +20 %: 60 mins: Winter	21.947	0.102	2.1	0.470	0.000	2.1	2.372	79.027	OK
Tank 7	FSR: 100 years: +20 %: 2160 mins: Winter	18.870	1.075	5.7	302.262	0.000	3.3	314.325	7.004	OK
Tank 9	FSR: 100 years: +20 %: 2160 mins: Winter	18.625	1.602	4.6	321.062	0.000	1.7	318.256	9.211	OK
Tank 8	FSR: 100 years: +20 %: 720 mins: Winter	15.032	1.022	12.1	327.041	0.000	3.6	329.201	7.091	OK
Tank 5	FSR: 100 years: +20 %: 2160 mins: Winter	11.691	1.041	7.6	265.440	0.000	8.0	765.218	13.334	OK
Tank 4	FSR: 100 years: +20 %: 720 mins: Winter	15.249	1.199	25.4	263.779	0.000	28.0	268.350	7.769	OK
Tank 1	FSR: 100 years: +20 %: 2160 mins: Winter	11.218	1.556	21.1	269.936	0.000	21.8	3750.078	0.211	OK
PP 2	FSR: 100 years: +20 %: 30 mins: Winter	21.926	0.081	1.1	0.372	0.000	1.1	0.761	83.374	OK
PP 3	FSR: 100 years: +20 %: 60 mins: Summer	21.538	0.093	1.8	0.430	0.000	1.7	1.813	80.782	OK
PP 4	FSR: 100 years: +20 %: 60 mins: Winter	21.423	0.078	1.1	0.720	0.000	0.9	1.193	83.751	OK
PP 5	FSR: 100 years: +20 %: 30 mins: Winter	21.430	0.085	1.4	0.392	0.000	1.3	1.007	82.490	OK
PP 6	FSR: 100 years: +20 %: 120 mins: Summer	20.639	0.094	1.6	0.431	0.000	1.6	3.175	80.737	OK
PP 7	FSR: 100 years: +20 %: 30 mins: Winter	20.618	0.073	0.7	0.336	0.000	0.6	0.438	84.982	OK
PP 8	FSR: 100 years: +20 %: 240 mins: Winter	20.621	0.076	0.6	0.350	0.000	0.6	2.713	84.391	OK

PP 9	FSR: 100 years: +20 %: 60 mins: Winter	20.609	0.064	0.3	0.294	0.000	0.3	0.303	86.859	OK
PP 10	FSR: 100 years: +20 %: 30 mins: Winter	19.928	0.083	1.1	0.384	0.000	1.1	0.779	82.853	OK
PP 11	FSR: 100 years: +20 %: 60 mins: Winter	19.909	0.064	0.3	0.295	0.000	0.3	0.309	86.851	OK
PP 12	FSR: 100 years: +20 %: 180 mins: Winter	19.921	0.076	0.6	0.350	0.000	0.6	1.774	84.368	OK
PP 13	FSR: 100 years: +20 %: 30 mins: Winter	19.924	0.079	0.8	0.362	0.000	0.8	0.497	83.849	OK
PP 14	FSR: 100 years: +20 %: 240 mins: Winter	19.521	0.076	0.6	0.351	0.000	0.6	2.289	84.352	OK
PP 15	FSR: 100 years: +20 %: 30 mins: Winter	19.518	0.073	0.7	0.336	0.000	0.6	0.438	84.982	OK
PP 16	FSR: 100 years: +20 %: 240 mins: Winter	19.524	0.079	0.7	0.363	0.000	0.7	3.036	83.806	OK
PP 17	FSR: 100 years: +20 %: 30 mins: Winter	19.518	0.073	0.7	0.336	0.000	0.6	0.438	84.982	OK
PP 18	FSR: 100 years: +20 %: 180 mins: Winter	19.020	0.075	0.6	0.348	0.000	0.6	1.692	84.480	OK
PP 19	FSR: 100 years: +20 %: 30 mins: Winter	19.029	0.084	1.3	0.386	0.000	1.3	0.929	82.784	OK
PP 20	FSR: 100 years: +20 %: 180 mins: Winter	19.021	0.076	0.6	0.348	0.000	0.6	1.763	84.447	OK
PP 21	FSR: 100 years: +20 %: 60 mins: Winter	19.007	0.062	0.3	0.288	0.000	0.2	0.249	87.164	OK
PP 22	FSR: 100 years: +20 %: 1440 mins: Winter	18.704	0.059	0.1	0.272	0.000	0.1	1.883	87.875	OK
PP 23	FSR: 100 years: +20 %: 30 mins: Winter	18.728	0.083	1.2	0.382	0.000	1.2	0.881	82.952	OK
PP 24	FSR: 100 years: +20 %: 30 mins: Winter	18.724	0.079	1.0	0.366	0.000	1.0	0.701	83.666	OK
PP 25	FSR: 100 years: +20 %: 2160 mins: Winter	18.268	0.123	0.2	1.136	0.000	0.2	7.398	74.354	OK

PP 26	FSR: 100 years: +20 %: 2160 mins: Winter	18.268	0.123	0.2	1.135	0.000	0.2	7.849	74.365	OK
PP 27	FSR: 100 years: +20 %: 60 mins: Winter	17.108	0.063	0.3	0.289	0.000	0.2	0.261	87.097	OK
PP 28	FSR: 100 years: +20 %: 30 mins: Winter	17.129	0.084	1.3	0.386	0.000	1.3	0.929	82.783	OK
PP 29	FSR: 100 years: +20 %: 240 mins: Winter	17.120	0.075	0.6	0.346	0.000	0.6	2.156	84.547	OK
PP 30	FSR: 100 years: +20 %: 60 mins: Winter	17.107	0.062	0.3	0.288	0.000	0.2	0.249	87.162	OK
PP 31	FSR: 100 years: +20 %: 60 mins: Winter	16.409	0.064	0.3	0.294	0.000	0.3	0.297	86.865	OK
PP 32	FSR: 100 years: +20 %: 30 mins: Winter	16.445	0.100	2.3	0.461	0.000	2.1	1.783	79.394	OK
PP 33	FSR: 100 years: +20 %: 30 mins: Winter	16.423	0.078	0.8	0.360	0.000	0.8	0.527	83.912	OK
PP 34	FSR: 100 years: +20 %: 15 mins: Winter	16.482	0.137	6.5	0.631	0.000	5.7	2.720	71.839	OK
PP 35	FSR: 100 years: +20 %: 60 mins: Summer	15.714	0.069	0.5	0.316	0.000	0.4	0.423	88.284	OK
PP 36	FSR: 100 years: +20 %: 120 mins: Summer	15.832	0.087	1.3	0.803	0.000	1.2	2.061	81.865	OK
PP 37	FSR: 100 years: +20 %: 30 mins: Winter	15.919	0.074	0.8	0.343	0.000	0.7	0.486	84.688	OK
PP 38	FSR: 100 years: +20 %: 60 mins: Winter	15.912	0.067	0.4	0.310	0.000	0.4	0.447	86.172	OK
PP 39	FSR: 100 years: +20 %: 60 mins: Summer	15.914	0.069	0.5	0.317	0.000	0.4	0.423	85.869	OK
PP 40	FSR: 100 years: +20 %: 240 mins: Winter	15.918	0.073	0.5	0.338	0.000	0.5	1.844	84.889	OK
PP 41	FSR: 100 years: +20 %: 30 mins: Winter	16.019	0.074	0.8	0.341	0.000	0.7	0.468	84.799	OK
PP 42	FSR: 100 years: +20 %: 60 mins: Summer	16.081	0.086	1.5	0.789	0.000	1.4	1.445	82.185	OK

PP 43	FSR: 100 years: +20 %: 30 mins: Winter	16.079	0.079	1.0	0.365	0.000	1.0	0.695	83.704	OK
PP 44	FSR: 100 years: +20 %: 30 mins: Winter	16.074	0.079	1.0	0.365	0.000	1.0	0.695	83.699	OK
PP 45	FSR: 100 years: +20 %: 360 mins: Winter	16.068	0.073	0.5	0.334	0.000	0.5	2.472	85.070	OK
PP 46	FSR: 100 years: +20 %: 30 mins: Winter	16.077	0.082	1.1	0.376	0.000	1.1	0.803	83.228	OK
PP 47	FSR: 100 years: +20 %: 180 mins: Summer	16.258	0.113	2.9	1.084	0.000	3.0	6.598	76.498	OK
PP 48	FSR: 100 years: +20 %: 60 mins: Winter	16.215	0.070	0.7	0.672	0.000	0.5	0.671	85.430	OK
PP 49	FSR: 100 years: +20 %: 120 mins: Winter	16.258	0.063	0.4	0.605	0.000	0.2	0.571	86.886	OK
PP 50	FSR: 100 years: +20 %: 60 mins: Summer	16.324	0.129	4.8	1.235	0.000	4.2	5.287	73.226	OK
PP 51	FSR: 100 years: +20 %: 120 mins: Summer	16.261	0.066	0.3	0.302	0.000	0.3	0.488	86.517	OK
PP 52	FSR: 100 years: +20 %: 30 mins: Winter	16.275	0.080	1.0	0.369	0.000	1.0	0.731	83.514	OK
PP 53	FSR: 100 years: +20 %: 30 mins: Winter	16.272	0.077	0.9	0.355	0.000	0.9	0.593	84.146	OK
PP 54	FSR: 100 years: +20 %: 15 mins: Winter	16.291	0.096	2.4	0.442	0.000	1.8	0.855	80.276	OK
PP 56	FSR: 100 years: +20 %: 600 mins: Winter	16.260	0.065	0.2	0.601	0.000	0.2	2.374	86.425	OK
PP 57	FSR: 100 years: +20 %: 240 mins: Winter	16.270	0.075	0.6	0.346	0.000	0.6	2.222	84.551	OK
PP 58	FSR: 100 years: +20 %: 120 mins: Summer	21.810	0.065	0.3	0.301	0.000	0.3	0.482	86.577	OK
PP 59	FSR: 100 years: +20 %: 30 mins: Winter	21.825	0.080	1.0	0.369	0.000	1.0	0.731	83.514	OK
PP 60	FSR: 100 years: +20 %: 30 mins: Winter	21.833	0.088	1.4	0.405	0.000	1.4	1.036	81.927	OK

PP 61	FSR: 100 years: +20 %: 30 mins: Winter	21.824	0.079	1.0	0.366	0.000	1.0	0.701	83.662	OK
PP 62	FSR: 100 years: +20 %: 60 mins: Winter	21.814	0.069	0.7	0.640	0.000	0.5	0.631	85.554	OK
PP 63	FSR: 100 years: +20 %: 15 mins: Winter	21.891	0.146	7.5	0.675	0.000	6.6	3.202	69.876	OK
PP 64	FSR: 100 years: +20 %: 120 mins: Winter	16.347	0.102	2.2	0.981	0.000	2.2	4.846	78.733	OK
PP 65	FSR: 100 years: +20 %: 120 mins: Summer	16.213	0.068	0.6	0.651	0.000	0.4	0.769	85.881	OK
PP 66	FSR: 100 years: +20 %: 180 mins: Winter	16.220	0.075	0.6	0.348	0.000	0.6	1.745	84.475	OK
PP 67	FSR: 100 years: +20 %: 30 mins: Winter	16.226	0.081	1.1	0.375	0.000	1.1	0.797	83.260	OK
PP 68	FSR: 100 years: +20 %: 30 mins: Winter	16.237	0.092	1.9	0.847	0.000	1.7	1.281	80.878	OK
PP 69	FSR: 100 years: +20 %: 60 mins: Winter	16.208	0.063	0.3	0.292	0.000	0.2	0.279	86.960	OK
PP 70	FSR: 100 years: +20 %: 180 mins: Winter	16.221	0.076	0.6	0.348	0.000	0.6	1.759	84.447	OK
PP 71	FSR: 100 years: +20 %: 30 mins: Winter	16.221	0.076	0.8	0.350	0.000	0.8	0.539	84.382	OK
PP 72	FSR: 100 years: +20 %: 30 mins: Winter	16.224	0.079	1.0	0.366	0.000	1.0	0.701	83.662	OK
PP 73	FSR: 100 years: +20 %: 30 mins: Winter	16.236	0.091	1.8	0.834	0.000	1.6	1.173	81.166	OK
PP 74	FSR: 100 years: +20 %: 30 mins: Winter	16.227	0.082	1.1	0.377	0.000	1.1	0.815	83.191	OK
PP 75	FSR: 100 years: +20 %: 360 mins: Winter	17.916	0.071	0.4	0.328	0.000	0.4	2.205	85.340	OK
PP 76	FSR: 100 years: +20 %: 60 mins: Winter	17.910	0.065	0.4	0.298	0.000	0.3	0.339	86.695	OK
PP 77	FSR: 100 years: +20 %: 30 mins: Winter	17.925	0.080	1.0	0.367	0.000	1.0	0.707	83.625	OK

PP 78	FSR: 100 years: +20 %: 30 mins: Winter	17.525	0.080	1.0	0.367	0.000	1.0	0.707	83.625	OK
PP 79	FSR: 100 years: +20 %: 30 mins: Winter	17.528	0.083	1.0	0.383	0.000	1.0	0.706	82.923	OK
PP 80	FSR: 100 years: +20 %: 240 mins: Winter	16.983	0.088	0.2	0.808	0.000	0.2	0.966	81.750	OK
PP 81	FSR: 100 years: +20 %: 30 mins: Winter	16.997	0.102	1.2	0.469	0.000	1.2	0.812	79.053	OK
PP 82	FSR: 100 years: +20 %: 240 mins: Winter	16.521	0.076	0.6	0.350	0.000	0.6	2.265	84.375	OK
PP 83	FSR: 100 years: +20 %: 60 mins: Summer	16.517	0.072	0.6	0.332	0.000	0.6	0.549	85.197	OK
PP 84	FSR: 100 years: +20 %: 30 mins: Winter	16.224	0.079	1.0	0.366	0.000	1.0	0.701	83.662	OK
PP 85	FSR: 100 years: +20 %: 30 mins: Winter	16.122	0.077	0.9	0.357	0.000	0.9	0.605	84.065	OK
PP 86	FSR: 100 years: +20 %: 30 mins: Winter	16.137	0.092	1.9	0.848	0.000	1.7	1.299	80.846	OK
PP 87	FSR: 100 years: +20 %: 30 mins: Winter	16.019	0.074	0.8	0.342	0.000	0.7	0.474	84.745	OK
PP 88	FSR: 100 years: +20 %: 30 mins: Winter	18.612	0.067	0.5	0.307	0.000	0.4	0.234	86.296	OK
PP 89	FSR: 100 years: +20 %: 30 mins: Winter	18.628	0.083	1.2	0.381	0.000	1.2	0.869	83.015	OK
PP 90	FSR: 100 years: +20 %: 30 mins: Winter	18.633	0.088	1.4	0.405	0.000	1.4	1.036	81.927	OK
PP 91	FSR: 100 years: +20 %: 30 mins: Winter	18.624	0.079	1.0	0.366	0.000	1.0	0.701	83.662	OK
PP 92	FSR: 100 years: +20 %: 60 mins: Summer	18.629	0.084	1.5	0.778	0.000	1.3	1.361	82.429	OK
PP 93	FSR: 100 years: +20 %: 360 mins: Winter	18.616	0.071	0.4	0.326	0.000	0.4	2.075	85.434	OK
PP 94	FSR: 100 years: +20 %: 30 mins: Winter	18.610	0.065	0.5	0.302	0.000	0.3	0.204	86.533	OK

PP 95	FSR: 100 years: +20 %: 30 mins: Winter	18.623	0.078	0.9	0.360	0.000	0.9	0.629	83.943	OK
PP 96	FSR: 100 years: +20 %: 30 mins: Winter	18.624	0.079	1.0	0.366	0.000	1.0	0.701	83.662	OK
PP 97	FSR: 100 years: +20 %: 30 mins: Winter	18.634	0.089	1.5	0.412	0.000	1.5	1.144	81.588	OK
PP 98	FSR: 100 years: +20 %: 60 mins: Summer	18.629	0.084	1.5	0.778	0.000	1.3	1.361	82.429	OK
PP 99	FSR: 100 years: +20 %: 360 mins: Winter	18.616	0.071	0.4	0.328	0.000	0.4	2.323	85.338	OK
PP 100	FSR: 100 years: +20 %: 240 mins: Winter	19.322	0.077	0.7	0.738	0.000	0.7	2.779	83.985	OK
PP 101	FSR: 100 years: +20 %: 360 mins: Winter	19.318	0.073	0.5	0.701	0.000	0.5	3.241	84.795	OK
PP 102	FSR: 100 years: +20 %: 360 mins: Winter	19.017	0.072	0.5	0.333	0.000	0.5	2.671	85.115	OK
PP 103	FSR: 100 years: +20 %: 30 mins: Winter	19.025	0.080	1.1	0.369	0.000	1.0	0.731	83.516	OK
PP 104	FSR: 100 years: +20 %: 30 mins: Winter	19.024	0.079	1.0	0.366	0.000	1.0	0.701	83.662	OK
PP 105	FSR: 100 years: +20 %: 60 mins: Winter	18.820	0.075	0.9	0.690	0.000	0.8	1.039	84.429	OK
PP 106	FSR: 100 years: +20 %: 180 mins: Summer	18.831	0.086	1.2	0.395	0.000	1.2	3.149	82.361	OK
PP 108	FSR: 100 years: +20 %: 30 mins: Winter	18.328	0.083	1.1	0.380	0.000	1.0	0.731	83.011	OK
PP 109	FSR: 100 years: +20 %: 30 mins: Winter	18.324	0.079	1.0	0.366	0.000	1.0	0.701	83.662	OK
PP 110	FSR: 100 years: +20 %: 120 mins: Summer	18.320	0.075	0.8	0.689	0.000	0.7	1.273	84.444	OK
PP 111	FSR: 100 years: +20 %: 30 mins: Winter	18.330	0.085	1.3	0.391	0.000	1.3	0.989	82.553	OK
PP 107	FSR: 100 years: +20 %: 120 mins: Summer	18.310	0.065	0.3	0.300	0.000	0.3	0.476	86.589	OK

PP 112	FSR: 100 years: +20 %: 30 mins: Winter	20.872	0.077	0.9	0.353	0.000	0.8	0.570	84.244	OK
PP 113	FSR: 100 years: +20 %: 30 mins: Winter	20.886	0.091	2.0	0.841	0.000	1.7	1.339	81.115	OK
PP 114	FSR: 100 years: +20 %: 30 mins: Winter	20.874	0.079	1.0	0.365	0.000	1.0	0.689	83.706	OK
PP 115	FSR: 100 years: +20 %: 30 mins: Winter	20.884	0.089	1.5	0.412	0.000	1.5	1.144	81.604	OK
PP 116	FSR: 100 years: +20 %: 30 mins: Winter	20.874	0.079	1.0	0.366	0.000	1.0	0.701	83.667	OK
PP 117	FSR: 100 years: +20 %: 60 mins: Summer	20.867	0.072	0.6	0.331	0.000	0.6	0.543	85.208	OK
PP 118	FSR: 100 years: +20 %: 30 mins: Winter	20.873	0.078	0.8	0.359	0.000	0.8	0.479	83.945	OK
PP 119	FSR: 100 years: +20 %: 240 mins: Winter	20.519	0.074	0.5	0.341	0.000	0.5	2.401	84.749	OK
PP 120	FSR: 100 years: +20 %: 60 mins: Winter	20.521	0.076	1.0	0.706	0.000	0.8	1.083	84.142	OK
PP 121	FSR: 100 years: +20 %: 30 mins: Winter	20.526	0.081	1.1	0.375	0.000	1.1	0.797	83.265	OK
PP 122	FSR: 100 years: +20 %: 30 mins: Winter	20.029	0.084	1.0	0.387	0.000	0.9	0.707	82.717	OK
PP 123	FSR: 100 years: +20 %: 30 mins: Winter	20.027	0.082	0.9	0.378	0.000	0.8	0.600	83.139	OK
PP 124	FSR: 100 years: +20 %: 30 mins: Winter	20.029	0.084	1.3	0.386	0.000	1.3	0.935	82.753	OK
PP 125	FSR: 100 years: +20 %: 60 mins: Summer	20.016	0.071	0.6	0.329	0.000	0.6	0.525	85.312	OK
PP 126	FSR: 100 years: +20 %: 60 mins: Winter	19.339	0.094	1.7	0.434	0.000	1.7	2.280	80.640	OK
PP 127	FSR: 100 years: +20 %: 30 mins: Winter	19.335	0.090	1.7	0.416	0.000	1.7	1.330	81.407	OK
PP 128	FSR: 100 years: +20 %: 60 mins: Winter	19.340	0.095	1.6	0.438	0.000	1.7	2.063	80.433	OK

PP 129	FSR: 100 years: +20 %: 30 mins: Winter	19.320	0.075	0.8	0.347	0.000	0.8	0.516	84.524	OK
PP 130	FSR: 100 years: +20 %: 30 mins: Winter	18.870	0.075	0.8	0.344	0.000	0.7	0.498	84.626	OK
PP 131	FSR: 100 years: +20 %: 60 mins: Winter	18.896	0.101	2.3	0.464	0.000	2.1	2.898	79.292	OK
PP 132	FSR: 100 years: +20 %: 180 mins: Summer	18.881	0.086	1.1	0.398	0.000	1.1	2.481	82.232	OK
PP 133	FSR: 100 years: +20 %: 30 mins: Winter	18.883	0.088	1.5	0.405	0.000	1.5	1.180	81.920	OK
PP 134	FSR: 100 years: +20 %: 60 mins: Winter	18.536	0.091	1.5	0.422	0.000	1.5	1.890	81.176	OK
PP 135	FSR: 100 years: +20 %: 30 mins: Winter	18.528	0.083	1.2	0.383	0.000	1.2	0.887	82.917	OK
PP 136	FSR: 100 years: +20 %: 30 mins: Winter	18.528	0.083	1.2	0.382	0.000	1.2	0.881	82.950	OK
PP 137	FSR: 100 years: +20 %: 30 mins: Winter	18.526	0.081	1.1	0.373	0.000	1.1	0.779	83.333	OK
TP 1	FSR: 100 years: +20 %: 15 mins: Winter	20.925	0.075	0.9	0.121	0.000	0.8	0.330	95.396	OK
TP 2	FSR: 100 years: +20 %: 30 mins: Winter	19.616	0.066	0.4	0.106	0.000	0.4	0.263	95.964	OK
TP 3	FSR: 100 years: +20 %: 15 mins: Winter	18.928	0.078	1.0	0.124	0.000	0.9	0.384	95.267	OK
TP 4	FSR: 100 years: +20 %: 2160 mins: Winter	18.270	0.620	0.1	0.992	0.000	0.4	4.620	62.172	OK
TP 5	FSR: 100 years: +20 %: 30 mins: Winter	16.403	0.353	4.4	0.565	0.000	4.4	3.586	78.463	OK
TP 6	FSR: 100 years: +20 %: 30 mins: Winter	16.400	1.050	3.7	1.680	0.000	3.7	1.805	35.895	OK
TP 7	FSR: 100 years: +20 %: 960 mins: Winter	15.031	0.481	0.0	0.769	0.000	0.2	0.652	75.192	OK
TP 8	FSR: 100 years: +20 %: 30 mins: Winter	15.079	0.129	3.3	0.206	0.000	3.2	2.986	92.153	OK

PP 138	FSR: 100 years: +20 %: 60 mins: Winter	18.309	0.064	0.3	0.293	0.000	0.2	0.285	86.911	OK
PP 139	FSR: 100 years: +20 %: 30 mins: Winter	18.329	0.084	1.3	0.387	0.000	1.3	0.935	82.747	OK
PP 140	FSR: 100 years: +20 %: 30 mins: Winter	18.322	0.077	0.9	0.354	0.000	0.8	0.581	84.192	OK
PP 141	FSR: 100 years: +20 %: 30 mins: Winter	18.336	0.091	2.0	0.837	0.000	1.7	1.341	81.095	OK
PP 142	FSR: 100 years: +20 %: 360 mins: Winter	18.317	0.072	0.5	0.334	0.000	0.5	2.827	85.109	OK
PP 143	FSR: 100 years: +20 %: 360 mins: Winter	18.318	0.073	0.5	0.335	0.000	0.5	2.972	85.063	OK
PP 144	FSR: 100 years: +20 %: 30 mins: Winter	18.334	0.089	1.9	0.824	0.000	1.6	1.276	81.386	OK
PP 145	FSR: 100 years: +20 %: 30 mins: Winter	18.329	0.084	1.3	0.389	0.000	1.3	0.977	82.614	OK
PP 146	FSR: 100 years: +20 %: 60 mins: Summer	18.245	0.100	2.2	0.461	0.000	2.1	2.414	79.435	OK
PP 147	FSR: 100 years: +20 %: 30 mins: Winter	18.237	0.092	2.0	0.844	0.000	1.8	1.383	80.946	OK
PP 148	FSR: 100 years: +20 %: 480 mins: Winter	18.215	0.070	0.3	0.321	0.000	0.3	2.607	85.668	OK
PP 149	FSR: 100 years: +20 %: 480 mins: Winter	18.214	0.069	0.3	0.320	0.000	0.3	2.525	85.704	OK
PP 150	FSR: 100 years: +20 %: 30 mins: Winter	18.127	0.082	1.2	0.378	0.000	1.1	0.839	83.118	OK
PP 151	FSR: 100 years: +20 %: 30 mins: Winter	18.025	0.080	1.0	0.367	0.000	1.0	0.707	83.625	OK
PP 152	FSR: 100 years: +20 %: 30 mins: Winter	18.024	0.079	1.0	0.366	0.000	1.0	0.701	83.661	OK
PP 153	FSR: 100 years: +20 %: 60 mins: Summer	18.032	0.087	1.6	0.799	0.000	1.5	1.505	81.966	OK
PP 154	FSR: 100 years: +20 %: 60 mins: Summer	18.038	0.093	1.6	0.429	0.000	1.5	1.512	80.838	OK

PP 155	FSR: 100 years: +20 %: 60 mins: Winter	18.012	0.067	0.4	0.308	0.000	0.4	0.429	86.268	OK
PP 156	FSR: 100 years: +20 %: 120 mins: Winter	18.030	0.085	1.2	0.393	0.000	1.1	2.920	82.437	OK
PP 157	FSR: 100 years: +20 %: 30 mins: Winter	18.024	0.079	1.0	0.366	0.000	1.0	0.701	83.661	OK
PP 158	FSR: 100 years: +20 %: 60 mins: Summer	18.032	0.087	1.6	0.799	0.000	1.5	1.505	81.964	OK
PP 159	FSR: 100 years: +20 %: 60 mins: Winter	18.012	0.067	0.4	0.309	0.000	0.4	0.435	86.206	OK
PP 160	FSR: 100 years: +20 %: 60 mins: Winter	21.809	0.064	0.3	0.293	0.000	0.2	0.291	86.900	OK
PP 161	FSR: 100 years: +20 %: 30 mins: Winter	18.127	0.082	1.1	0.377	0.000	1.1	0.827	83.154	OK
PP 162	FSR: 100 years: +20 %: 30 mins: Winter	18.124	0.079	1.0	0.365	0.000	1.0	0.695	83.698	OK
PP 163	FSR: 100 years: +20 %: 60 mins: Summer	18.131	0.086	1.6	0.794	0.000	1.4	1.469	82.079	OK
PP 164	FSR: 100 years: +20 %: 60 mins: Winter	18.112	0.067	0.4	0.309	0.000	0.4	0.435	86.206	OK
PP 165	FSR: 100 years: +20 %: 60 mins: Winter	18.109	0.064	0.3	0.294	0.000	0.3	0.297	86.865	OK
PP 166	FSR: 100 years: +20 %: 30 mins: Winter	18.126	0.081	1.1	0.373	0.000	1.1	0.773	83.366	OK
PP 167	FSR: 100 years: +20 %: 30 mins: Winter	18.127	0.082	1.1	0.377	0.000	1.1	0.821	83.188	OK
PP 168	FSR: 100 years: +20 %: 60 mins: Winter	18.107	0.062	0.3	0.288	0.000	0.2	0.249	87.161	OK
PP 169	FSR: 100 years: +20 %: 240 mins: Winter	17.920	0.075	0.6	0.347	0.000	0.6	2.179	84.498	OK
PP 170	FSR: 100 years: +20 %: 30 mins: Winter	17.926	0.081	1.1	0.373	0.000	1.1	0.773	83.366	OK
PP 171	FSR: 100 years: +20 %: 30 mins: Winter	17.927	0.082	1.1	0.377	0.000	1.1	0.827	83.154	OK

PP 172	FSR: 100 years: +20 %: 120 mins: Winter	17.905	0.060	0.2	0.277	0.000	0.1	0.296	87.648	OK
PP 173	FSR: 100 years: +20 %: 60 mins: Winter	17.539	0.094	1.9	0.868	0.000	1.7	2.169	80.406	OK
PP 174	FSR: 100 years: +20 %: 30 mins: Winter	17.561	0.116	3.8	1.068	0.000	3.7	3.030	75.883	OK
PP 175	FSR: 100 years: +20 %: 60 mins: Summer	14.818	0.073	0.7	0.335	0.000	0.6	0.597	85.032	OK
PP 176	FSR: 100 years: +20 %: 180 mins: Winter	14.823	0.078	0.7	0.358	0.000	0.7	2.608	84.034	OK
PP 177	FSR: 100 years: +20 %: 240 mins: Winter	14.821	0.076	0.6	0.349	0.000	0.6	2.128	84.427	OK
PP 178	FSR: 100 years: +20 %: 30 mins: Winter	14.828	0.083	1.2	0.382	0.000	1.2	0.881	82.950	OK
PP 179	FSR: 100 years: +20 %: 240 mins: Winter	13.943	0.148	0.2	0.680	0.000	0.3	0.805	69.617	OK
PP 180	FSR: 100 years: +20 %: 240 mins: Winter	14.036	0.241	0.7	1.112	0.000	1.0	2.911	50.352	OK
PP 181	FSR: 100 years: +20 %: 240 mins: Winter	14.052	0.257	0.7	1.186	0.000	1.1	3.266	47.027	OK
PP 182	FSR: 100 years: +20 %: 600 mins: Winter	13.783	0.088	0.0	0.404	0.000	0.2	0.273	81.966	OK
PP 183	FSR: 100 years: +20 %: 600 mins: Winter	13.566	0.421	0.2	1.942	0.000	0.5	2.340	13.296	OK
PP 184	FSR: 100 years: +20 %: 2160 mins: Summer	13.419	0.374	0.5	1.725	0.000	1.2	4.632	22.966	OK
PP 185	FSR: 100 years: +20 %: 960 mins: Winter	13.558	0.413	0.1	1.903	0.000	0.5	2.869	15.040	OK
PP 186	FSR: 100 years: +20 %: 2160 mins: Summer	13.449	0.354	0.5	1.631	0.000	1.2	4.585	27.180	OK
PP 187	FSR: 100 years: +20 %: 120 mins: Summer	12.510	0.065	0.3	0.301	0.000	0.3	0.482	86.578	OK
PP 188	FSR: 100 years: +20 %: 30 mins: Winter	12.525	0.080	1.1	0.370	0.000	1.0	0.737	83.480	OK

PP 189	FSR: 100 years: +20 %: 30 mins: Winter	12.524	0.079	1.0	0.365	0.000	1.0	0.695	83.700	OK
PP 190	FSR: 100 years: +20 %: 60 mins: Summer	12.052	0.107	0.9	0.495	0.000	0.8	0.762	77.885	OK
PP 191	FSR: 100 years: +20 %: 60 mins: Summer	12.052	0.107	0.9	0.495	0.000	0.8	0.762	77.885	OK
PP 192	FSR: 100 years: +20 %: 240 mins: Winter	12.044	0.249	0.7	2.296	0.000	0.7	2.017	48.144	OK
PP 193	FSR: 100 years: +20 %: 240 mins: Winter	12.044	0.299	0.3	1.378	0.000	0.3	0.661	38.477	OK
PP 194	FSR: 100 years: +20 %: 240 mins: Winter	11.872	0.077	0.7	0.354	0.000	0.7	2.773	84.191	OK
PP 195	FSR: 100 years: +20 %: 30 mins: Winter	11.878	0.083	1.1	0.381	0.000	1.1	0.749	82.981	OK
PP 196	FSR: 100 years: +20 %: 30 mins: Winter	11.876	0.081	1.1	0.372	0.000	1.1	0.773	83.369	OK
PP 197	FSR: 100 years: +20 %: 120 mins: Winter	11.878	0.083	1.0	0.383	0.000	1.0	1.915	82.882	OK
PP 198	FSR: 100 years: +20 %: 120 mins: Summer	11.857	0.062	0.3	0.286	0.000	0.2	0.326	87.235	OK
PP 199	FSR: 100 years: +20 %: 120 mins: Winter	11.886	0.091	1.5	0.419	0.000	1.4	3.721	81.311	OK
PP 200	FSR: 100 years: +20 %: 30 mins: Winter	11.868	0.073	0.7	0.336	0.000	0.6	0.438	84.981	OK
PP 201	FSR: 100 years: +20 %: 120 mins: Winter	11.878	0.083	0.9	0.384	0.000	1.0	1.917	82.869	OK
PP 202	FSR: 100 years: +20 %: 120 mins: Summer	11.907	0.062	0.3	0.286	0.000	0.2	0.326	87.235	OK
PP 203	FSR: 100 years: +20 %: 180 mins: Winter	11.929	0.084	1.1	0.387	0.000	1.0	3.629	82.727	OK
PP 204	FSR: 100 years: +20 %: 30 mins: Winter	11.926	0.081	1.1	0.372	0.000	1.1	0.773	83.369	OK
PP 205	FSR: 100 years: +20 %: 180 mins: Winter	11.972	0.077	0.6	0.355	0.000	0.6	1.882	84.162	OK

PP 206	FSR: 100 years: +20 %: 120 mins: Summer	12.107	0.062	0.3	0.286	0.000	0.2	0.326	87.235	OK
PP 207	FSR: 100 years: +20 %: 30 mins: Winter	12.126	0.081	1.1	0.373	0.000	1.1	0.779	83.334	OK
PP 208	FSR: 100 years: +20 %: 30 mins: Winter	12.127	0.082	1.1	0.376	0.000	1.1	0.809	83.227	OK
PP 209	FSR: 100 years: +20 %: 30 mins: Winter	12.135	0.090	1.9	0.830	0.000	1.7	1.305	81.270	OK
PP 210	FSR: 100 years: +20 %: 240 mins: Winter	12.120	0.075	0.6	0.347	0.000	0.6	2.348	84.513	OK
PP 211	FSR: 100 years: +20 %: 60 mins: Summer	12.447	0.102	2.3	0.472	0.000	2.2	2.351	78.943	OK
PP 212	FSR: 100 years: +20 %: 30 mins: Winter	12.418	0.073	0.7	0.336	0.000	0.6	0.438	84.981	OK
PP 213	FSR: 100 years: +20 %: 30 mins: Winter	12.430	0.085	1.1	0.392	0.000	1.1	0.778	82.500	OK
PP 214	FSR: 100 years: +20 %: 60 mins: Winter	12.439	0.094	1.7	0.432	0.000	1.6	1.985	80.727	OK
PP 215	FSR: 100 years: +20 %: 120 mins: Summer	12.930	0.085	1.1	0.394	0.000	1.1	1.707	82.415	OK
PP 216	FSR: 100 years: +20 %: 30 mins: Winter	12.927	0.082	1.1	0.376	0.000	1.1	0.821	83.191	OK
PP 217	FSR: 100 years: +20 %: 30 mins: Winter	12.926	0.081	1.1	0.373	0.000	1.1	0.779	83.334	OK
PP 218	FSR: 100 years: +20 %: 30 mins: Winter	12.925	0.080	1.0	0.368	0.000	1.0	0.725	83.553	OK
PP 219	FSR: 100 years: +20 %: 60 mins: Winter	12.958	0.063	0.3	0.292	0.000	0.2	0.279	86.964	OK
PP 220	FSR: 100 years: +20 %: 30 mins: Winter	12.979	0.084	1.3	0.385	0.000	1.3	0.929	82.786	OK
PP 221	FSR: 100 years: +20 %: 30 mins: Winter	12.974	0.079	1.0	0.366	0.000	1.0	0.701	83.668	OK
PP 222	FSR: 100 years: +20 %: 30 mins: Winter	13.434	0.089	1.9	0.821	0.000	1.6	1.252	81.472	OK

PP 223	FSR: 100 years: +20 %: 360 mins: Winter	13.416	0.071	0.4	0.326	0.000	0.4	2.070	85.460	OK
PP 224	FSR: 100 years: +20 %: 60 mins: Winter	14.008	0.063	0.3	0.289	0.000	0.2	0.261	87.099	OK
PP 225	FSR: 100 years: +20 %: 30 mins: Winter	14.035	0.090	1.5	0.413	0.000	1.5	1.144	81.568	OK
PP 226	FSR: 100 years: +20 %: 30 mins: Winter	14.029	0.084	1.3	0.386	0.000	1.3	0.941	82.753	OK
PP 227	FSR: 100 years: +20 %: 1440 mins: Winter	14.922	0.377	0.1	3.474	0.000	0.2	1.952	21.566	OK
PP 228	FSR: 100 years: +20 %: 2160 mins: Winter	14.919	0.374	0.2	1.722	0.000	0.2	2.958	23.077	OK
PP 229	FSR: 100 years: +20 %: 360 mins: Winter	15.316	0.071	0.4	0.329	0.000	0.4	2.422	85.299	OK
PP 230	FSR: 100 years: +20 %: 30 mins: Winter	15.325	0.080	1.0	0.369	0.000	1.0	0.731	83.520	OK
PP 231	FSR: 100 years: +20 %: 30 mins: Winter	15.324	0.079	1.0	0.366	0.000	1.0	0.701	83.668	OK
PP 232	FSR: 100 years: +20 %: 30 mins: Winter	15.924	0.079	1.0	0.365	0.000	1.0	0.702	83.666	OK
PP 233	FSR: 100 years: +20 %: 30 mins: Winter	15.933	0.088	1.8	0.810	0.000	1.5	1.198	81.707	OK
PP 234	FSR: 100 years: +20 %: 360 mins: Winter	15.916	0.071	0.4	0.329	0.000	0.4	2.391	85.305	OK
PP 235	FSR: 100 years: +20 %: 30 mins: Winter	16.419	0.074	0.8	0.341	0.000	0.7	0.468	84.799	OK
PP 236	FSR: 100 years: +20 %: 30 mins: Winter	16.435	0.090	1.9	0.829	0.000	1.7	1.300	81.275	OK
PP 237	FSR: 100 years: +20 %: 30 mins: Winter	16.427	0.082	1.1	0.376	0.000	1.1	0.815	83.196	OK
PP 238	FSR: 100 years: +20 %: 30 mins: Winter	16.425	0.080	1.0	0.367	0.000	1.0	0.707	83.631	OK
PP 239	FSR: 100 years: +20 %: 30 mins: Winter	16.425	0.080	1.0	0.367	0.000	1.0	0.707	83.631	OK

PP 240	FSR: 100 years: +20 %: 30 mins: Winter	16.426	0.081	1.1	0.373	0.000	1.1	0.773	83.339	OK
PP 241	FSR: 100 years: +20 %: 30 mins: Winter	16.421	0.076	0.8	0.349	0.000	0.8	0.528	84.439	OK
PP 242	FSR: 100 years: +20 %: 360 mins: Winter	15.917	0.072	0.5	0.333	0.000	0.5	2.759	85.156	OK
PP 243	FSR: 100 years: +20 %: 30 mins: Winter	15.936	0.091	2.0	0.839	0.000	1.7	1.353	81.059	OK
PP 244	FSR: 100 years: +20 %: 30 mins: Winter	15.926	0.081	1.1	0.373	0.000	1.1	0.785	83.335	OK
PP 245	FSR: 100 years: +20 %: 600 mins: Winter	15.912	0.067	0.3	0.309	0.000	0.3	2.228	86.214	OK
PP 246	FSR: 100 years: +20 %: 240 mins: Winter	15.418	0.073	0.5	0.338	0.000	0.5	1.928	84.924	OK
PP 247	FSR: 100 years: +20 %: 30 mins: Winter	15.425	0.080	1.1	0.370	0.000	1.0	0.743	83.482	OK
PP 248	FSR: 100 years: +20 %: 30 mins: Winter	15.418	0.073	0.7	0.336	0.000	0.6	0.438	84.984	OK
PP 249	FSR: 100 years: +20 %: 120 mins: Winter	15.405	0.060	0.2	0.277	0.000	0.1	0.296	87.653	OK
PP 250	FSR: 100 years: +20 %: 60 mins: Winter	14.909	0.064	0.4	0.296	0.000	0.3	0.321	86.777	OK
PP 251	FSR: 100 years: +20 %: 30 mins: Winter	14.933	0.088	1.5	0.404	0.000	1.5	1.168	81.956	OK
PP 252	FSR: 100 years: +20 %: 30 mins: Winter	14.918	0.073	0.7	0.336	0.000	0.6	0.438	84.984	OK
PP 253	FSR: 100 years: +20 %: 240 mins: Winter	14.918	0.073	0.5	0.337	0.000	0.5	1.816	84.967	OK
PP 254	FSR: 100 years: +20 %: 2160 mins: Winter	14.792	0.347	0.0	1.597	0.000	0.1	1.100	28.688	OK
PP 255	FSR: 100 years: +20 %: 240 mins: Winter	14.807	0.362	0.4	1.668	0.000	0.4	1.055	25.539	OK
PP 256	FSR: 100 years: +20 %: 600 mins: Winter	14.799	0.354	0.2	1.632	0.000	0.2	1.404	27.161	OK

PP 257	FSR: 100 years: +20 %: 60 mins: Summer	14.316	0.071	0.6	0.326	0.000	0.5	0.495	85.445	OK
PP 258	FSR: 100 years: +20 %: 240 mins: Winter	16.917	0.072	0.4	0.333	0.000	0.4	1.653	85.129	OK
PP 259	FSR: 100 years: +20 %: 30 mins: Winter	16.927	0.082	1.2	0.377	0.000	1.1	0.827	83.159	OK
PP 260	FSR: 100 years: +20 %: 30 mins: Winter	16.927	0.082	1.1	0.376	0.000	1.1	0.809	83.196	OK
PP 261	FSR: 100 years: +20 %: 240 mins: Winter	16.918	0.073	0.5	0.337	0.000	0.5	1.922	84.968	OK
PP 262	FSR: 100 years: +20 %: 60 mins: Winter	16.709	0.064	0.4	0.296	0.000	0.3	0.321	86.776	OK
PP 263	FSR: 100 years: +20 %: 30 mins: Winter	16.527	0.082	1.2	0.377	0.000	1.1	0.827	83.159	OK
PP 264	FSR: 100 years: +20 %: 30 mins: Winter	16.525	0.080	1.0	0.368	0.000	1.0	0.719	83.590	OK
PP 265	FSR: 100 years: +20 %: 60 mins: Summer	16.238	0.093	1.6	0.429	0.000	1.5	1.518	80.862	OK
PP 266	FSR: 100 years: +20 %: 60 mins: Winter	16.208	0.063	0.3	0.289	0.000	0.2	0.261	87.098	OK
PP 267	FSR: 100 years: +20 %: 30 mins: Winter	15.547	0.102	2.4	0.471	0.000	2.3	1.744	78.950	OK
PP 268	FSR: 100 years: +20 %: 30 mins: Winter	15.526	0.081	1.1	0.372	0.000	1.1	0.773	83.370	OK
PP 269	FSR: 100 years: +20 %: 240 mins: Winter	15.518	0.073	0.5	0.337	0.000	0.5	1.922	84.968	OK
PP 270	FSR: 100 years: +20 %: 180 mins: Summer	15.005	0.060	0.2	0.279	0.000	0.2	0.345	87.555	OK
PP 271	FSR: 100 years: +20 %: 30 mins: Winter	14.727	0.082	1.1	0.376	0.000	1.1	0.809	83.196	OK
PP 272	FSR: 100 years: +20 %: 240 mins: Winter	14.718	0.073	0.5	0.337	0.000	0.5	1.922	84.968	OK
PP 273	FSR: 100 years: +20 %: 30 mins: Winter	14.724	0.079	1.0	0.363	0.000	1.0	0.659	83.790	OK

PP 275	FSR: 100 years: +20 %: 30 mins: Winter	13.391	0.146	6.5	1.458	0.000	6.4	5.477	69.645	OK
PP 274	FSR: 100 years: +20 %: 30 mins: Winter	12.561	0.116	3.9	1.156	0.000	3.5	2.851	75.922	OK
PP 276	FSR: 100 years: +20 %: 30 mins: Winter	12.044	0.299	28.1	10.353	0.000	19.2	23.596	37.209	OK
TP 9	FSR: 100 years: +20 %: 15 mins: Winter	15.363	0.163	8.7	0.261	0.000	8.4	3.933	90.047	OK
TP 10	FSR: 100 years: +20 %: 15 mins: Winter	15.276	0.076	0.9	0.122	0.000	0.9	0.348	95.352	OK
TP 11	FSR: 100 years: +20 %: 15 mins: Winter	20.579	0.129	5.1	0.206	0.000	4.9	2.276	92.137	OK
TP 12	FSR: 100 years: +20 %: 15 mins: Winter	20.526	0.076	0.9	0.122	0.000	0.9	0.354	95.332	OK
TP 13	FSR: 100 years: +20 %: 2160 mins: Summer	16.979	1.079	0.1	1.727	0.000	0.4	2.059	34.124	OK
TP 14	FSR: 100 years: +20 %: 15 mins: Winter	15.520	0.070	0.6	0.113	0.000	0.6	0.222	95.706	OK
TP 15	FSR: 100 years: +20 %: 30 mins: Winter	17.942	0.692	4.1	1.107	0.000	4.0	2.841	57.753	OK
TP 16	FSR: 100 years: +20 %: 30 mins: Winter	17.940	0.190	4.0	0.304	0.000	3.9	3.540	88.386	OK
TP 17	FSR: 100 years: +20 %: 60 mins: Summer	18.666	0.416	3.7	0.665	0.000	3.6	4.088	74.624	OK
TP 18	FSR: 100 years: +20 %: 30 mins: Winter	16.334	0.484	3.3	0.775	0.000	3.2	2.387	70.452	OK
TP 19	FSR: 100 years: +20 %: 60 mins: Summer	16.331	0.681	1.5	1.090	0.000	1.4	0.934	58.426	OK
TP 20	FSR: 100 years: +20 %: 15 mins: Winter	14.586	0.136	5.8	0.218	0.000	5.6	2.603	91.697	OK
TP 21	FSR: 100 years: +20 %: 30 mins: Winter	14.389	1.239	5.8	1.982	0.000	5.6	3.638	42.071	OK
TP 22	FSR: 100 years: +20 %: 15 mins: Winter	12.021	0.121	4.4	0.194	0.000	4.2	1.935	92.616	OK

TP 23	FSR: 100 years: +20 %: 60 mins: Summer	14.975	1.925	4.5	3.080	0.000	4.5	2.727	9.975	OK
TP 24	FSR: 100 years: +20 %: 15 mins: Winter	15.023	0.173	9.0	0.276	0.000	8.6	4.045	89.458	OK
TP 25	FSR: 100 years: +20 %: 2160 mins: Winter	17.825	0.575	0.2	0.919	0.000	0.6	11.431	64.924	OK
TP 26	FSR: 100 years: +20 %: 2160 mins: Winter	17.825	0.575	0.2	0.919	0.000	0.5	8.867	64.926	OK
TP 27	FSR: 100 years: +20 %: 2160 mins: Winter	17.825	0.575	0.3	0.920	0.000	0.6	14.135	64.916	OK
TP 28	FSR: 100 years: +20 %: 240 mins: Winter	14.808	0.458	0.2	0.734	0.000	0.2	0.554	72.015	OK
TP 29	FSR: 100 years: +20 %: 960 mins: Winter	13.812	1.512	0.1	2.419	0.000	0.5	2.487	29.305	OK
TP 30	FSR: 100 years: +20 %: 240 mins: Winter	14.046	1.246	0.4	1.994	0.000	0.4	2.052	23.925	OK
TP 31	FSR: 100 years: +20 %: 2160 mins: Winter	13.139	1.589	0.1	5.086	0.000	0.2	1.659	25.440	OK
TP 32	FSR: 100 years: +20 %: 2160 mins: Winter	13.127	1.577	0.1	5.047	0.000	0.2	1.377	26.016	OK
TP 33	FSR: 100 years: +20 %: 30 mins: Winter	12.057	1.107	3.2	1.771	0.000	3.2	1.241	48.239	OK
Swale 2	FSR: 100 years: +20 %: 2160 mins: Winter	19.787	1.087	3.4	98.140	0.000	0.3	12.373	23.377	OK
Swale 3	FSR: 100 years: +20 %: 2160 mins: Winter	19.174	1.524	2.2	68.860	0.000	0.2	8.679	29.019	OK
Swale 1	FSR: 100 years: +20 %: 30 mins: Winter	20.548	0.098	2.2	0.905	0.000	2.0	1.519	94.582	OK
Swale 4	FSR: 100 years: +20 %: 30 mins: Winter	15.331	0.681	36.4	4.999	0.000	33.0	33.161	78.719	OK
Swale 5	FSR: 100 years: +20 %: 60 mins: Winter	15.375	0.275	22.1	12.688	0.000	11.5	21.821	90.596	OK
Swale 6	FSR: 100 years: +20 %: 60 mins: Winter	14.561	0.311	21.3	12.272	0.000	14.4	30.375	88.605	OK

Swale 8	FSR: 100 years: +20 %: 2160 mins: Winter	11.671	1.071	2.5	24.233	0.000	2.0	125.180	57.237	OK
Swale 9	FSR: 100 years: +20 %: 2160 mins: Winter	11.578	0.878	1.1	19.794	0.000	1.0	55.634	66.270	OK
TP 34	FSR: 100 years: +20 %: 2160 mins: Winter	14.630	1.180	0.0	1.888	0.000	0.0	0.000	27.981	OK
TP 35	FSR: 100 years: +20 %: 30 mins: Winter	16.399	0.349	3.4	0.558	0.000	3.3	2.620	78.695	OK
TP 36	FSR: 100 years: +20 %: 15 mins: Winter	15.954	0.104	2.9	0.166	0.000	2.8	1.255	93.650	OK
Tank 2	FSR: 100 years: +20 %: 2160 mins: Winter	11.413	1.623	33.7	719.803	0.000	20.8	3631.933	0.052	OK
Tank 3	FSR: 100 years: +20 %: 2160 mins: Winter	11.596	1.441	8.5	288.147	0.000	4.8	278.751	4.051	OK
Swale 10	FSR: 100 years: +20 %: 360 mins: Winter	13.917	1.017	2.3	15.289	0.000	1.9	17.437	63.672	OK
TP 38	FSR: 100 years: +20 %: 15 mins: Winter	11.772	0.722	12.2	1.154	0.000	11.4	4.704	66.261	OK
TP 39	FSR: 100 years: +20 %: 2160 mins: Winter	11.597	0.247	0.4	0.395	0.000	0.7	20.795	84.920	OK
TP 40	FSR: 100 years: +20 %: 15 mins: Winter	11.708	0.958	17.9	1.533	0.000	16.5	7.081	55.197	OK
TP 41	FSR: 100 years: +20 %: 2160 mins: Winter	11.597	1.047	1.2	1.676	0.000	1.2	63.102	51.024	OK
TP 42	FSR: 100 years: +20 %: 15 mins: Summer	10.450	0.000	0.0	0.000	0.000	0.0	0.000	100.000	OK
TP 43	FSR: 100 years: +20 %: 2160 mins: Winter	11.597	1.347	0.3	2.155	0.000	0.7	18.446	37.005	OK
TP 44	FSR: 100 years: +20 %: 2160 mins: Winter	11.597	1.447	0.3	2.315	0.000	0.9	15.305	32.329	OK
RG 1	FSR: 100 years: +20 %: 240 mins: Winter	11.877	0.327	0.6	2.017	0.000	0.5	1.524	62.816	OK
RG 2	FSR: 100 years: +20 %: 120 mins: Winter	11.885	0.285	1.0	1.755	0.000	0.8	1.466	67.641	OK

RG 3	FSR: 100 years: +20 %: 120 mins: Winter	11.892	0.292	1.0	1.798	0.000	0.8	1.448	66.855	OK
RG 4	FSR: 100 years: +20 %: 120 mins: Winter	11.885	0.285	1.0	1.756	0.000	0.8	1.460	67.630	OK
RG 5	FSR: 100 years: +20 %: 180 mins: Winter	11.934	0.334	0.8	2.061	0.000	0.6	1.646	62.012	OK
RG 6	FSR: 100 years: +20 %: 180 mins: Winter	11.978	0.378	0.8	2.329	0.000	0.5	1.335	57.061	OK
RG 7	FSR: 100 years: +20 %: 600 mins: Winter	12.122	0.522	0.4	3.215	0.000	0.3	2.011	40.720	OK
RG 8	FSR: 100 years: +20 %: 720 mins: Winter	12.116	0.416	0.2	2.563	0.000	0.2	1.259	52.744	OK
RG 9	FSR: 100 years: +20 %: 720 mins: Winter	12.117	0.417	0.2	2.567	0.000	0.1	1.248	52.670	OK
RG 10	FSR: 100 years: +20 %: 240 mins: Winter	12.126	0.326	0.6	2.008	0.000	0.4	1.386	62.987	OK
RG 11	FSR: 100 years: +20 %: 60 mins: Summer	12.457	0.157	1.8	0.966	0.000	1.6	1.684	82.188	OK
RG 12	FSR: 100 years: +20 %: 60 mins: Winter	12.446	0.146	1.4	0.902	0.000	1.3	1.635	83.363	OK
RG 13	FSR: 100 years: +20 %: 120 mins: Summer	12.938	0.238	1.3	1.465	0.000	0.9	1.465	72.998	OK
RG 14	FSR: 100 years: +20 %: 360 mins: Winter	12.924	0.424	0.5	2.612	0.000	0.3	1.480	51.838	OK
RG 15	FSR: 100 years: +20 %: 1440 mins: Winter	14.793	0.593	0.2	3.656	0.000	0.2	2.143	32.592	OK
RG 16	FSR: 100 years: +20 %: 1440 mins: Winter	14.794	0.594	0.2	3.657	0.000	0.2	2.527	32.589	OK
RG 17	FSR: 100 years: +20 %: 240 mins: Winter	14.924	0.324	0.5	1.995	0.000	0.4	1.320	63.216	OK
RG 18	FSR: 100 years: +20 %: 240 mins: Winter	14.929	0.329	0.5	2.027	0.000	0.4	1.318	62.640	OK
RG 19	FSR: 100 years: +20 %: 1440 mins: Winter	15.414	0.614	0.2	3.785	0.000	0.2	2.381	30.227	OK

RG 20	FSR: 100 years: +20 %: 240 mins: Winter	15.424	0.324	0.5	1.996	0.000	0.4	1.319	63.197	OK
RG 21	FSR: 100 years: +20 %: 600 mins: Winter	15.917	0.417	0.3	2.569	0.000	0.2	1.583	52.631	OK
RG 22	FSR: 100 years: +20 %: 1440 mins: Winter	15.912	0.412	0.1	2.539	0.000	0.1	1.411	53.191	OK
RG 23	FSR: 100 years: +20 %: 360 mins: Winter	15.922	0.322	0.4	1.986	0.000	0.3	1.513	63.381	OK
RG 24	FSR: 100 years: +20 %: 360 mins: Winter	16.423	0.323	0.4	1.987	0.000	0.3	1.414	63.368	OK
RG 25	FSR: 100 years: +20 %: 720 mins: Winter	16.415	0.315	0.2	1.942	0.000	0.2	1.163	64.193	OK
RG 26	FSR: 100 years: +20 %: 720 mins: Winter	16.415	0.315	0.2	1.941	0.000	0.2	1.159	64.217	OK
RG 27	FSR: 100 years: +20 %: 720 mins: Winter	16.415	0.315	0.2	1.943	0.000	0.2	1.162	64.184	OK
RG 28	FSR: 100 years: +20 %: 1440 mins: Winter	16.417	0.417	0.1	2.570	0.000	0.2	1.395	52.628	OK
RG 29	FSR: 100 years: +20 %: 600 mins: Winter	16.420	0.420	0.3	2.584	0.000	0.2	1.389	52.353	OK
RG 30	FSR: 100 years: +20 %: 240 mins: Winter	12.041	0.591	0.9	3.642	0.000	0.5	1.407	32.862	OK
RG 31	FSR: 100 years: +20 %: 2160 mins: Winter	12.023	0.623	0.1	3.837	0.000	0.1	1.131	29.260	OK
RG 32	FSR: 100 years: +20 %: 1440 mins: Winter	12.037	0.337	0.1	2.077	0.000	0.2	2.165	61.701	OK
RG 33	FSR: 100 years: +20 %: 1440 mins: Winter	12.037	0.337	0.1	2.077	0.000	0.2	2.157	61.701	OK
RG 34	FSR: 100 years: +20 %: 720 mins: Winter	12.516	0.316	0.2	1.946	0.000	0.2	1.238	64.120	OK
RG 35	FSR: 100 years: +20 %: 240 mins: Winter	12.526	0.326	0.5	2.008	0.000	0.4	1.222	62.990	OK
RG 36	FSR: 100 years: +20 %: 2160 mins: Summer	13.445	0.645	0.2	3.977	0.000	0.5	4.379	26.689	OK

RG 37	FSR: 100 years: +20 %: 2160 mins: Summer	13.416	0.616	0.2	3.795	0.000	0.5	4.746	30.042	OK
RG 38	FSR: 100 years: +20 %: 360 mins: Winter	13.951	0.501	0.4	3.084	0.000	0.4	1.416	43.135	OK
RG 39	FSR: 100 years: +20 %: 360 mins: Winter	13.956	0.506	0.5	3.117	0.000	0.4	1.463	42.543	OK
RG 40	FSR: 100 years: +20 %: 240 mins: Winter	14.827	0.327	0.6	2.013	0.000	0.5	1.596	62.892	OK
RG 41	FSR: 100 years: +20 %: 180 mins: Winter	14.828	0.328	0.7	2.020	0.000	0.4	1.145	62.755	OK
RG 42	FSR: 100 years: +20 %: 960 mins: Winter	12.963	0.363	0.1	2.235	0.000	0.1	1.095	58.788	OK
RG 43	FSR: 100 years: +20 %: 720 mins: Winter	13.416	0.316	0.2	1.947	0.000	0.1	1.100	64.107	OK
RG 44	FSR: 100 years: +20 %: 360 mins: Winter	13.421	0.321	0.4	1.979	0.000	0.3	1.515	63.521	OK
RG 45	FSR: 100 years: +20 %: 360 mins: Winter	14.027	0.327	0.4	2.016	0.000	0.3	1.518	62.836	OK
RG 46	FSR: 100 years: +20 %: 720 mins: Winter	14.016	0.316	0.2	1.945	0.000	0.2	1.137	64.137	OK
RG 47	FSR: 100 years: +20 %: 2160 mins: Winter	14.715	0.715	0.1	4.404	0.000	0.0	0.000	18.817	OK
RG 48	FSR: 100 years: +20 %: 2160 mins: Winter	14.916	0.716	0.1	4.408	0.000	0.2	2.051	18.732	OK
RG 49	FSR: 100 years: +20 %: 360 mins: Winter	15.322	0.322	0.4	1.983	0.000	0.3	1.513	63.447	OK
RG 50	FSR: 100 years: +20 %: 720 mins: Winter	15.315	0.315	0.2	1.940	0.000	0.1	1.107	64.234	OK
RG 51	FSR: 100 years: +20 %: 720 mins: Winter	15.915	0.315	0.2	1.939	0.000	0.1	1.114	64.253	OK
RG 52	FSR: 100 years: +20 %: 720 mins: Winter	15.916	0.316	0.2	1.946	0.000	0.1	1.093	64.119	OK
RG 53	FSR: 100 years: +20 %: 360 mins: Winter	15.922	0.322	0.4	1.983	0.000	0.3	1.514	63.450	OK

RG 54	FSR: 100 years: +20 %: 240 mins: Winter	16.923	0.323	0.5	1.990	0.000	0.4	1.228	63.318	OK
RG 55	FSR: 100 years: +20 %: 240 mins: Winter	16.924	0.324	0.5	1.994	0.000	0.4	1.238	63.242	OK
RG 56	FSR: 100 years: +20 %: 240 mins: Winter	16.527	0.327	0.5	2.012	0.000	0.4	1.237	62.907	OK
RG 57	FSR: 100 years: +20 %: 30 mins: Winter	16.288	0.088	1.4	0.545	0.000	1.3	0.957	89.952	OK
RG 58	FSR: 100 years: +20 %: 30 mins: Winter	15.988	0.088	1.4	0.545	0.000	1.3	0.957	89.952	OK
RG 59	FSR: 100 years: +20 %: 240 mins: Winter	15.524	0.324	0.5	1.994	0.000	0.4	1.238	63.242	OK
RG 60	FSR: 100 years: +20 %: 240 mins: Winter	14.727	0.327	0.5	2.012	0.000	0.4	1.236	62.913	OK
RG 61	FSR: 100 years: +20 %: 240 mins: Winter	14.724	0.324	0.5	1.994	0.000	0.4	1.238	63.242	OK
RG 62	FSR: 100 years: +20 %: 30 mins: Winter	13.090	0.090	1.4	0.552	0.000	1.3	1.011	89.825	OK
RG 63	FSR: 100 years: +20 %: 360 mins: Winter	13.343	0.343	0.4	2.112	0.000	0.3	1.552	61.071	OK
RG 64	FSR: 100 years: +20 %: 240 mins: Winter	17.930	0.330	0.6	2.030	0.000	0.5	1.537	62.570	OK
RG 65	FSR: 100 years: +20 %: 240 mins: Winter	17.926	0.326	0.6	2.009	0.000	0.5	1.523	62.956	OK
RG 66	FSR: 100 years: +20 %: 360 mins: Winter	18.124	0.424	0.5	2.613	0.000	0.3	1.472	51.823	OK
RG 67	FSR: 100 years: +20 %: 360 mins: Winter	18.123	0.423	0.4	2.608	0.000	0.3	1.395	51.922	OK
RG 68	FSR: 100 years: +20 %: 360 mins: Winter	18.124	0.424	0.4	2.610	0.000	0.3	1.358	51.889	OK
RG 69	FSR: 100 years: +20 %: 2160 mins: Summer	18.113	0.413	0.1	2.544	0.000	0.2	2.158	53.108	OK
RG 70	FSR: 100 years: +20 %: 2160 mins: Summer	18.113	0.413	0.1	2.546	0.000	0.1	2.162	53.070	OK

RG 71	FSR: 100 years: +20 %: 5760 mins: Winter	18.575	1.025	0.1	6.542	0.000	0.0	0.000	6.061	OK
RG 72	FSR: 100 years: +20 %: 240 mins: Winter	18.028	0.328	0.5	2.023	0.000	0.4	1.295	62.699	OK
RG 73	FSR: 100 years: +20 %: 600 mins: Winter	18.025	0.325	0.2	2.001	0.000	0.2	1.148	63.117	OK
RG 83	FSR: 100 years: +20 %: 600 mins: Winter	18.219	0.319	0.2	1.964	0.000	0.2	1.176	63.798	OK
RG 74	FSR: 100 years: +20 %: 600 mins: Winter	18.017	0.317	0.2	1.951	0.000	0.2	1.152	64.025	OK
RG 75	FSR: 100 years: +20 %: 120 mins: Winter	18.035	0.235	0.8	1.451	0.000	0.6	1.203	73.253	OK
RG 76	FSR: 100 years: +20 %: 30 mins: Winter	18.289	0.089	1.4	0.548	0.000	1.3	0.981	89.899	OK
RG 77	FSR: 100 years: +20 %: 240 mins: Winter	18.025	0.225	0.4	1.385	0.000	0.3	0.940	74.475	OK
RG 78	FSR: 100 years: +20 %: 240 mins: Winter	18.023	0.223	0.4	1.374	0.000	0.3	0.940	74.669	OK
RG 79	FSR: 100 years: +20 %: 240 mins: Winter	18.023	0.223	0.4	1.374	0.000	0.3	0.940	74.669	OK
RG 80	FSR: 100 years: +20 %: 480 mins: Winter	18.220	0.420	0.4	2.586	0.000	0.3	1.631	52.323	OK
RG 81	FSR: 100 years: +20 %: 480 mins: Winter	18.220	0.420	0.4	2.587	0.000	0.3	1.636	52.303	OK
RG 82	FSR: 100 years: +20 %: 2160 mins: Summer	18.218	0.418	0.1	2.578	0.000	0.2	2.175	52.475	OK
RG 84	FSR: 100 years: +20 %: 60 mins: Summer	18.254	0.104	1.2	0.643	0.000	1.0	1.176	88.146	OK
RG 89	FSR: 100 years: +20 %: 360 mins: Winter	18.323	0.323	0.4	1.990	0.000	0.3	1.263	63.311	OK
RG 88	FSR: 100 years: +20 %: 720 mins: Winter	18.314	0.314	0.2	1.937	0.000	0.2	1.110	64.287	OK
RG 87	FSR: 100 years: +20 %: 720 mins: Winter	18.316	0.316	0.2	1.950	0.000	0.2	1.094	64.058	OK

RG 86	FSR: 100 years: +20 %: 360 mins: Winter	18.323	0.323	0.4	1.987	0.000	0.3	1.518	63.363	OK
RG 85	FSR: 100 years: +20 %: 360 mins: Winter	18.323	0.323	0.4	1.988	0.000	0.3	1.523	63.342	OK
RG 90	FSR: 100 years: +20 %: 720 mins: Winter	18.316	0.316	0.2	1.948	0.000	0.2	1.095	64.095	OK
RG 91	FSR: 100 years: +20 %: 720 mins: Winter	18.316	0.316	0.2	1.946	0.000	0.1	1.115	64.128	OK
RG 92	FSR: 100 years: +20 %: 30 mins: Winter	18.084	0.084	1.2	0.517	0.000	1.0	0.778	90.463	OK
RG 93	FSR: 100 years: +20 %: 180 mins: Winter	18.532	0.332	0.7	2.048	0.000	0.5	1.392	62.245	OK
RG 94	FSR: 100 years: +20 %: 60 mins: Winter	18.543	0.243	1.5	1.500	0.000	1.0	1.115	72.350	OK
RG 95	FSR: 100 years: +20 %: 180 mins: Summer	18.888	0.288	1.1	1.777	0.000	0.9	1.884	67.237	OK
RG 96	FSR: 100 years: +20 %: 60 mins: Winter	18.903	0.203	1.6	1.251	0.000	1.3	1.591	76.933	OK
RG 97	FSR: 100 years: +20 %: 60 mins: Winter	19.348	0.248	1.7	1.528	0.000	1.2	1.378	71.837	OK
RG 98	FSR: 100 years: +20 %: 60 mins: Winter	19.346	0.246	1.5	1.513	0.000	1.0	1.121	72.103	OK
RG 99	FSR: 100 years: +20 %: 240 mins: Winter	20.029	0.329	0.6	2.026	0.000	0.4	1.408	62.656	OK
RG 100	FSR: 100 years: +20 %: 720 mins: Winter	20.015	0.315	0.2	1.940	0.000	0.2	1.235	64.226	OK
RG 101	FSR: 100 years: +20 %: 720 mins: Winter	20.015	0.315	0.2	1.942	0.000	0.1	1.231	64.204	OK
RG 102	FSR: 100 years: +20 %: 1440 mins: Winter	20.512	0.412	0.1	2.540	0.000	0.2	1.534	53.176	OK
RG 103	FSR: 100 years: +20 %: 1440 mins: Winter	20.511	0.411	0.1	2.531	0.000	0.1	1.562	53.336	OK
RG 104	FSR: 100 years: +20 %: 240 mins: Winter	20.524	0.324	0.5	1.999	0.000	0.4	1.228	63.150	OK

RG 106	FSR: 100 years: +20 %: 360 mins: Winter	20.872	0.372	0.4	2.292	0.000	0.3	1.425	57.751	OK
RG 107	FSR: 100 years: +20 %: 960 mins: Winter	20.863	0.363	0.1	2.239	0.000	0.1	1.231	58.721	OK
RG 108	FSR: 100 years: +20 %: 960 mins: Winter	20.866	0.366	0.1	2.256	0.000	0.2	1.222	58.413	OK
RG 109	FSR: 100 years: +20 %: 2160 mins: Summer	20.863	0.363	0.1	2.238	0.000	0.2	2.212	58.741	OK
RG 110	FSR: 100 years: +20 %: 2160 mins: Summer	20.864	0.364	0.1	2.245	0.000	0.1	2.211	58.603	OK
RG 111	FSR: 100 years: +20 %: 480 mins: Winter	20.870	0.370	0.3	2.282	0.000	0.2	1.442	57.938	OK
RG 112	FSR: 100 years: +20 %: 720 mins: Winter	18.319	0.419	0.2	2.580	0.000	0.2	1.594	52.431	OK
RG 113	FSR: 100 years: +20 %: 1440 mins: Winter	18.310	0.410	0.1	2.526	0.000	0.1	1.446	53.425	OK
RG 114	FSR: 100 years: +20 %: 1440 mins: Winter	18.312	0.412	0.1	2.538	0.000	0.2	1.530	53.201	OK
RG 115	FSR: 100 years: +20 %: 480 mins: Winter	18.322	0.422	0.4	2.602	0.000	0.3	1.531	52.024	OK
RG 116	FSR: 100 years: +20 %: 180 mins: Summer	18.836	0.236	0.9	1.454	0.000	0.6	1.377	73.200	OK
RG 117	FSR: 100 years: +20 %: 240 mins: Winter	18.824	0.224	0.4	1.377	0.000	0.3	1.042	74.610	OK
RG 120	FSR: 100 years: +20 %: 180 mins: Winter	19.327	0.327	0.7	2.014	0.000	0.5	1.252	62.862	OK
RG 121	FSR: 100 years: +20 %: 360 mins: Winter	19.323	0.323	0.4	1.987	0.000	0.3	1.613	63.366	OK
RG 119	FSR: 100 years: +20 %: 360 mins: Winter	19.023	0.423	0.5	2.605	0.000	0.3	1.620	51.978	OK
RG 118	FSR: 100 years: +20 %: 2160 mins: Summer	19.014	0.414	0.1	2.552	0.000	0.2	2.522	52.944	OK
RG 122	FSR: 100 years: +20 %: 240 mins: Winter	16.132	0.332	0.6	2.047	0.000	0.4	1.510	62.270	OK

RG 123	FSR: 100 years: +20 %: 480 mins: Winter	16.118	0.318	0.3	1.960	0.000	0.2	1.140	63.865	OK
RG 125	FSR: 100 years: +20 %: 2160 mins: Winter	16.508	0.608	0.1	3.745	0.000	0.1	1.638	30.949	OK
RG 124	FSR: 100 years: +20 %: 2160 mins: Summer	16.215	0.415	0.1	2.554	0.000	0.2	2.656	52.907	OK
RG 129	FSR: 100 years: +20 %: 480 mins: Winter	17.520	0.320	0.3	1.974	0.000	0.2	1.139	63.616	OK
RG 128	FSR: 100 years: +20 %: 480 mins: Winter	16.979	0.329	0.3	2.029	0.000	0.2	1.021	62.592	OK
RG 127	FSR: 100 years: +20 %: 180 mins: Winter	16.987	0.337	0.7	2.078	0.000	0.5	1.154	61.699	OK
RG 126	FSR: 100 years: +20 %: 240 mins: Winter	16.527	0.327	0.6	2.014	0.000	0.5	1.611	62.869	OK
RG 132	FSR: 100 years: +20 %: 360 mins: Winter	17.922	0.422	0.5	2.599	0.000	0.3	1.533	52.091	OK
RG 131	FSR: 100 years: +20 %: 2160 mins: Winter	17.904	0.704	0.1	4.336	0.000	0.1	1.085	20.061	OK
RG 130	FSR: 100 years: +20 %: 480 mins: Winter	17.519	0.319	0.3	1.962	0.000	0.2	1.136	63.823	OK
RG 142	FSR: 100 years: +20 %: 360 mins: Winter	18.623	0.323	0.4	1.989	0.000	0.3	1.268	63.322	OK
RG 141	FSR: 100 years: +20 %: 720 mins: Winter	18.618	0.318	0.2	1.957	0.000	0.2	1.112	63.917	OK
RG 140	FSR: 100 years: +20 %: 720 mins: Winter	18.615	0.315	0.2	1.940	0.000	0.2	1.112	64.241	OK
RG 139	FSR: 100 years: +20 %: 720 mins: Winter	18.615	0.315	0.2	1.942	0.000	0.2	1.094	64.189	OK
RG 138	FSR: 100 years: +20 %: 360 mins: Winter	18.621	0.321	0.4	1.979	0.000	0.3	1.523	63.509	OK
RG 137	FSR: 100 years: +20 %: 360 mins: Winter	18.624	0.324	0.4	1.995	0.000	0.3	1.520	63.228	OK
RG 136	FSR: 100 years: +20 %: 720 mins: Winter	18.615	0.315	0.2	1.940	0.000	0.2	1.112	64.241	OK

RG 135	FSR: 100 years: +20 %: 720 mins: Winter	18.618	0.318	0.2	1.959	0.000	0.2	1.108	63.888	OK
RG 134	FSR: 100 years: +20 %: 720 mins: Winter	18.615	0.315	0.2	1.942	0.000	0.2	1.093	64.189	OK
RG 133	FSR: 100 years: +20 %: 360 mins: Winter	18.622	0.322	0.4	1.982	0.000	0.3	1.513	63.466	OK
RG 152	FSR: 100 years: +20 %: 120 mins: Summer	21.959	0.309	2.1	1.904	0.000	2.0	3.009	64.890	OK
RG 151	FSR: 100 years: +20 %: 120 mins: Winter	16.354	0.354	1.2	2.179	0.000	0.8	1.637	59.835	OK
RG 150	FSR: 100 years: +20 %: 120 mins: Winter	16.354	0.354	1.3	2.180	0.000	0.9	1.955	59.806	OK
RG 149	FSR: 100 years: +20 %: 180 mins: Winter	16.226	0.326	0.7	2.010	0.000	0.4	1.207	62.942	OK
RG 148	FSR: 100 years: +20 %: 480 mins: Winter	16.219	0.319	0.3	1.963	0.000	0.2	1.100	63.811	OK
RG 147	FSR: 100 years: +20 %: 180 mins: Winter	16.233	0.333	0.7	2.051	0.000	0.5	1.239	62.188	OK
RG 146	FSR: 100 years: +20 %: 240 mins: Winter	16.227	0.327	0.6	2.012	0.000	0.5	1.585	62.916	OK
RG 145	FSR: 100 years: +20 %: 480 mins: Winter	16.218	0.318	0.3	1.957	0.000	0.2	1.107	63.912	OK
RG 144	FSR: 100 years: +20 %: 480 mins: Winter	16.218	0.318	0.3	1.962	0.000	0.2	1.105	63.837	OK
RG 143	FSR: 100 years: +20 %: 180 mins: Winter	16.233	0.333	0.7	2.054	0.000	0.5	1.294	62.133	OK
RG 153	FSR: 100 years: +20 %: 60 mins: Summer	21.578	0.078	0.9	0.482	0.000	0.8	0.792	91.105	OK
RG 154	FSR: 100 years: +20 %: 600 mins: Winter	21.417	0.317	0.2	1.950	0.000	0.2	1.217	64.050	OK
RG 155	FSR: 100 years: +20 %: 240 mins: Winter	21.426	0.326	0.5	2.010	0.000	0.3	1.131	62.936	OK
RG 156	FSR: 100 years: +20 %: 120 mins: Summer	20.645	0.295	1.4	1.817	0.000	1.0	1.522	66.493	OK

RG 157	FSR: 100 years: +20 %: 240 mins: Winter	20.626	0.376	0.6	2.319	0.000	0.4	1.370	57.255	OK
RG 158	FSR: 100 years: +20 %: 180 mins: Winter	19.932	0.332	0.7	2.046	0.000	0.5	1.313	62.278	OK
RG 159	FSR: 100 years: +20 %: 180 mins: Winter	19.927	0.327	0.7	2.015	0.000	0.5	1.295	62.858	OK
RG 161	FSR: 100 years: +20 %: 240 mins: Winter	19.530	0.330	0.6	2.032	0.000	0.5	1.580	62.536	OK
RG 160	FSR: 100 years: +20 %: 240 mins: Winter	19.527	0.327	0.6	2.015	0.000	0.5	1.626	62.854	OK
RG 163	FSR: 100 years: +20 %: 180 mins: Winter	19.026	0.326	0.7	2.011	0.000	0.5	1.197	62.920	OK
RG 162	FSR: 100 years: +20 %: 180 mins: Winter	19.026	0.326	0.7	2.011	0.000	0.5	1.212	62.933	OK
RG 171	FSR: 100 years: +20 %: 360 mins: Winter	16.424	0.324	0.4	1.998	0.000	0.3	1.525	63.164	OK
RG 170	FSR: 100 years: +20 %: 60 mins: Summer	16.457	0.107	1.3	0.658	0.000	1.2	1.365	83.068	OK
RG 169	FSR: 100 years: +20 %: 240 mins: Winter	17.126	0.326	0.6	2.008	0.000	0.4	1.492	62.982	OK
RG 168	FSR: 100 years: +20 %: 180 mins: Winter	17.130	0.330	0.7	2.031	0.000	0.5	1.168	62.553	OK
RG 167	FSR: 100 years: +20 %: 2160 mins: Winter	18.265	0.365	0.1	2.247	0.000	0.2	5.236	58.569	OK
RG 166	FSR: 100 years: +20 %: 60 mins: Summer	18.478	0.078	0.9	0.483	0.000	0.8	0.798	91.099	OK
RG 165	FSR: 100 years: +20 %: 600 mins: Winter	18.717	0.317	0.2	1.952	0.000	0.2	1.183	64.010	OK
RG 164	FSR: 100 years: +20 %: 1440 mins: Winter	18.707	0.307	0.1	1.890	0.000	0.1	1.133	65.147	OK
RG 172	FSR: 100 years: +20 %: 60 mins: Winter	15.839	0.189	1.4	1.164	0.000	1.0	1.307	78.544	OK
RG 173	FSR: 100 years: +20 %: 2160 mins: Summer	15.913	0.413	0.1	2.543	0.000	0.2	2.215	53.120	OK

RG 174	FSR: 100 years: +20 %: 2160 mins: Summer	15.912	0.412	0.1	2.537	0.000	0.2	2.215	53.236	OK
RG 175	FSR: 100 years: +20 %: 2160 mins: Summer	15.911	0.411	0.1	2.534	0.000	0.2	2.152	53.282	OK
RG 176	FSR: 100 years: +20 %: 240 mins: Winter	15.924	0.324	0.5	1.998	0.000	0.4	1.351	63.174	OK
RG 177	FSR: 100 years: +20 %: 240 mins: Winter	16.078	0.378	0.6	2.328	0.000	0.4	1.289	57.090	OK
RG 178	FSR: 100 years: +20 %: 720 mins: Winter	16.075	0.375	0.2	2.308	0.000	0.1	1.366	57.447	OK
RG 179	FSR: 100 years: +20 %: 720 mins: Winter	16.071	0.371	0.2	2.288	0.000	0.2	1.347	57.817	OK
RG 181	FSR: 100 years: +20 %: 360 mins: Winter	16.073	0.373	0.4	2.299	0.000	0.4	1.728	57.614	OK
RG 180	FSR: 100 years: +20 %: 720 mins: Winter	16.066	0.366	0.2	2.256	0.000	0.2	1.301	58.412	OK
RG 183	FSR: 100 years: +20 %: 120 mins: Winter	16.266	0.366	1.5	2.258	0.000	1.3	2.650	58.377	OK
RG 182	FSR: 100 years: +20 %: 120 mins: Winter	16.267	0.367	1.7	2.264	0.000	1.5	3.249	58.270	OK
RG 185	FSR: 100 years: +20 %: 60 mins: Summer	16.339	0.189	2.7	1.166	0.000	2.3	2.780	78.500	OK
RG 184	FSR: 100 years: +20 %: 60 mins: Summer	16.337	0.187	2.4	1.151	0.000	2.0	2.377	78.781	OK
RG 186	FSR: 100 years: +20 %: 240 mins: Winter	16.278	0.328	0.6	2.023	0.000	0.4	1.481	62.695	OK
RG 187	FSR: 100 years: +20 %: 600 mins: Winter	16.267	0.317	0.2	1.954	0.000	0.2	1.273	63.969	OK
RG 188	FSR: 100 years: +20 %: 600 mins: Winter	16.272	0.322	0.2	1.984	0.000	0.2	1.276	63.419	OK
RG 190	FSR: 100 years: +20 %: 240 mins: Winter	16.276	0.326	0.6	2.007	0.000	0.4	1.456	62.995	OK
RG 189	FSR: 100 years: +20 %: 600 mins: Winter	16.264	0.314	0.2	1.935	0.000	0.2	1.268	64.330	OK

RG 191	FSR: 100 years: +20 %: 240 mins: Winter	21.828	0.328	0.6	2.022	0.000	0.4	1.457	62.715	OK
RG 192	FSR: 100 years: +20 %: 600 mins: Winter	21.820	0.320	0.2	1.973	0.000	0.2	1.273	63.621	OK
RG 193	FSR: 100 years: +20 %: 600 mins: Winter	21.818	0.318	0.2	1.957	0.000	0.2	1.272	63.922	OK
RG 195	FSR: 100 years: +20 %: 240 mins: Winter	21.841	0.341	0.5	2.101	0.000	0.4	1.260	61.275	OK
RG 194	FSR: 100 years: +20 %: 720 mins: Winter	21.815	0.315	0.2	1.943	0.000	0.2	1.523	64.178	OK
RG 196	FSR: 100 years: +20 %: 30 mins: Winter	17.794	0.094	1.7	0.579	0.000	1.6	1.215	89.320	OK
RG 197	FSR: 100 years: +20 %: 30 mins: Winter	17.687	0.087	1.3	0.535	0.000	1.2	0.892	90.131	OK
RG 198	FSR: 100 years: +20 %: 480 mins: Winter	12.970	0.370	0.3	2.282	0.000	0.2	1.278	57.930	OK
PP 278	FSR: 100 years: +20 %: 30 mins: Winter	13.142	0.397	38.1	15.266	0.000	23.9	32.340	16.532	OK
PP 279	FSR: 100 years: +20 %: 60 mins: Winter	12.895	0.150	8.4	6.416	0.000	6.1	10.416	69.189	OK
PP 280	FSR: 100 years: +20 %: 60 mins: Winter	12.158	0.113	5.6	4.942	0.000	3.5	6.237	76.287	OK
PP 277	FSR: 100 years: +20 %: 30 mins: Winter	11.637	0.142	6.2	1.301	0.000	6.2	5.279	70.338	OK
Swale 7	FSR: 100 years: +20 %: 60 mins: Winter	11.117	0.817	67.6	44.843	0.000	13.9	20.190	70.027	OK
PP 281	FSR: 100 years: +20 %: 30 mins: Winter	11.740	0.195	13.6	4.433	0.000	12.0	11.179	59.239	OK
Tank 6	FSR: 100 years: +20 %: 2160 mins: Winter	11.761	0.961	10.5	271.935	0.000	5.3	620.953	0.125	OK
PP 282	FSR: 100 years: +20 %: 60 mins: Summer	11.598	0.153	9.8	5.182	0.000	7.3	10.417	67.946	OK
PP 283	FSR: 100 years: +20 %: 60 mins: Winter	11.660	0.215	18.8	12.462	0.000	13.9	25.826	54.726	OK

PP 284	FSR: 100 years: +20 %: 60 mins: Winter	11.923	0.178	13.2	8.885	0.000	10.1	17.624	62.667	OK
PP 285	FSR: 100 years: +20 %: 180 mins: Winter	12.112	0.067	0.7	1.892	0.000	0.4	1.668	86.017	OK
PP 286	FSR: 100 years: +20 %: 60 mins: Winter	12.774	0.129	6.1	3.781	0.000	4.9	7.879	72.979	OK
PP 287	FSR: 100 years: +20 %: 60 mins: Winter	12.118	0.173	13.8	10.669	0.000	9.6	17.837	63.571	OK
PP 288	FSR: 100 years: +20 %: 60 mins: Winter	12.661	0.216	17.3	9.447	0.000	13.9	24.431	54.681	OK
PP 289	FSR: 100 years: +20 %: 60 mins: Winter	11.748	0.203	17.0	10.997	0.000	12.9	23.153	57.307	OK
PP 290	FSR: 100 years: +20 %: 30 mins: Winter	12.781	0.236	17.1	4.325	0.000	15.5	14.757	50.403	OK

Appendix D CCTV survey Report

Oak Enviro
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Project

Project Name: DOB - Castlemartyr - Storm Line

Project Date: 09/07/2024

Inspection Standard: MSCC5 Sewers & Drainage GB (SRM5 Scoring)

DONNACHADH O'BRIEN
& ASSOCIATES CONSULTING ENGINEERS

Oak Enviro
Convent Lands, Carrickmacross
Tel. 087 352 1366
lee@oakenviro.ie

Project Information

Project Name	Project Number	Project Date
DOB - Castlemartyr - Storm Line		09/07/2024

Client

Company: Donnachadh O`Brien
Description: Consulting Engineers
Street: Millennium Park
Town or City: Naas
County: Kildare
Post Code: W91P9P8
Phone: 045984042

Manager

Company: DOB
Description: Consulting Engineering
Town or City: Castlemartyr
County: Cork

Contractor

Company: Oak Enviro
Contact: Lee Conlon
Street: Convent Lands
Town or City: Carrickmacross
County: Monaghan
Post Code: A81 RY92
Phone: 087 352 1366
Mobile: 087 352 1366
Email: lee@oakenviro.ie

Oak Enviro
Convent Lands, Carrickmacross
Tel. 087 352 1366
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Section Summary

Project Name	Project Number	Project Date
DOB - Castlemartyr - Storm Line		09/07/2024

Number of sections	13
Total length of sections	557.56 m
Total length of inspected sections	557.56 m
Total length of not inspected sections	0.00 m
Total abandoned inspections	0
Number of section inspection photos	80
Number of section inspection videos	14
Number of section inspection scans	0
Number of section inclination measurements	0

PLR:	SMH1X	**Upstream Node:**	SMH1
Inspection Direction:	Upstream	**Downstream Node:**	SMH1.1
Inspected Length:	22.30 m	**Dia/Height:**	300 mm
Total Length:	22.30 m	**Material:**	Polyvinyl chloride

No.	m+	Code	Observation
1	0.00	MH	Start node, manhole, reference: SMH1.1
2	0.00	WL	Water level, 5% of the vertical dimension
3	0.00	CN	Connection other than junction at 12 o'clock, 150mm dia
4	16.82	LL	Line deviates left
5	22.30	MHF	Finish node, manhole, reference: SMH1

PLR:	SMH1.2X	**Upstream Node:**	SMH1.2
Inspection Direction:	Upstream	**Downstream Node:**	SMH1.1
Inspected Length:	101.16 m	**Dia/Height:**	300 mm
Total Length:	101.16 m	**Material:**	Polyvinyl chloride

No.	m+	Code	Observation
1	0.00	MH	Start node, manhole, reference: SMH1
2	0.00	WL	Water level, 5% of the vertical dimension
3	20.75	CN	Connection other than junction at 10 o'clock, 150mm dia
4	21.93	CN	Connection other than junction at 10 o'clock, 150mm dia
5	63.13	CN	Connection other than junction at 10 o'clock, 150mm dia
6	64.09	CN	Connection other than junction at 10 o'clock, 150mm dia
7	101.16	MHF	Finish node, manhole, reference: SMH1.2

PLR:	SMH 1X	**Upstream Node:**	SMH 1
Inspection Direction:	Downstream	**Downstream Node:**	SMH 2
Inspected Length:	79.60 m	**Dia/Height:**	600 mm
Total Length:	79.60 m	**Material:**	Concrete

Oak Enviro
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Section Summary

Project Name	Project Number	Project Date
DOB - Castlemartyr - Storm Line		09/07/2024

No.	m+	Code	Observation
1	0.00	MH	Start node, manhole, reference: SMH 1
2	0.00	WL	Water level, 5% of the vertical dimension
3	52.82	CN	Connection other than junction at 12 o'clock, 100mm dia
4	54.00	CN	Connection other than junction at 12 o'clock, 100mm dia
5	79.60	MHF	Finish node, manhole, reference: SMH 2

PLR:	SMH 2X	**Upstream Node:**	SMH 2
Inspection Direction:	Downstream	**Downstream Node:**	SMH 3
Inspected Length:	41.00 m	**Dia/Height:**	600 mm
Total Length:	41.00 m	**Material:**	Concrete

No.	m+	Code	Observation
1	0.00	MH	Start node, manhole, reference: SMH 2
2	0.00	WL	Water level, 5% of the vertical dimension
3	12.14	CN	Connection other than junction at 12 o'clock, 100mm dia
4	12.79	CN	Connection other than junction at 12 o'clock, 100mm dia
5	40.20	DES	Settled deposits, fine, 20% cross-sectional area loss
6	41.00	MHF	Finish node, manhole, reference: SMH 3

PLR:	SMH 3X	**Upstream Node:**	SMH 3
Inspection Direction:	Downstream	**Downstream Node:**	SMH 4
Inspected Length:	52.43 m	**Dia/Height:**	600 mm
Total Length:	52.43 m	**Material:**	Concrete

No.	m+	Code	Observation
1	0.00	MH	Start node, manhole, reference: SMH 3
2	0.00	WL	Water level, 5% of the vertical dimension
3	22.08	CN	Connection other than junction at 12 o'clock, 100mm dia
4	23.55	CN	Connection other than junction at 12 o'clock, 100mm dia
5	37.31	WL	Water level, 10% of the vertical dimension
6	52.43	MHF	Finish node, manhole, reference: SMH 4

PLR:	SMH 4X	**Upstream Node:**	SMH 4
Inspection Direction:	Downstream	**Downstream Node:**	SMH 5
Inspected Length:	58.55 m	**Dia/Height:**	600 mm
Total Length:	58.55 m	**Material:**	Concrete

No.	m+	Code	Observation
1	0.00	MH	Start node, manhole, reference: SMH 4
2	0.00	WL	Water level, 5% of the vertical dimension
3	40.03	CN	Connection other than junction at 12 o'clock, 100mm dia
4	40.12	FL	Fracture, longitudinal at 12 o'clock
5	58.55	MHF	Finish node, manhole, reference: SMH 5

PLR:	SMH 5X	**Upstream Node:**	SMH 5
Inspection Direction:	Downstream	**Downstream Node:**	SMH 6
Inspected Length:	2.36 m	**Dia/Height:**	600 mm
Total Length:	2.36 m	**Material:**	Concrete

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Section Summary

Project Name	Project Number	Project Date
DOB - Castlemartyr - Storm Line		09/07/2024

No.	m+	Code	Observation
1	0.00	MH	Start node, manhole, reference: SMH 5
2	1.02	DES	Settled deposits, fine, 15% cross-sectional area loss
3	2.36	MHF	Finish node, manhole, reference: SMH 6

PLR:	SMH 6Y	**Upstream Node:**	SMH 6
Inspection Direction:	Downstream	**Downstream Node:**	SMH 7
Inspected Length:	23.47 m	**Dia/Height:**	300 mm
Total Length:	23.47 m	**Material:**	Concrete

No.	m+	Code	Observation
1	0.00	MH	Start node, manhole, reference: FMH 6
2	0.00	WL	Water level, 5% of the vertical dimension
3	5.81	FCJ	Fracture, circumferential at joint from 10 o'clock to 2 o'clock
4	6.24	CN	Connection other than junction at 12 o'clock, 100mm dia
5	19.95	CN	Connection other than junction at 12 o'clock, 100mm dia
6	23.47	MHF	Finish node, manhole, reference: FMH 7

PLR:	SMH 7X	**Upstream Node:**	SMH 7
Inspection Direction:	Downstream	**Downstream Node:**	SMH 8
Inspected Length:	35.32 m	**Dia/Height:**	300 mm
Total Length:	35.32 m	**Material:**	Concrete

No.	m+	Code	Observation
1	0.00	MH	Start node, manhole, reference: FMH 7
2	0.00	WL	Water level, 5% of the vertical dimension
3	11.46	CN	Connection other than junction at 12 o'clock, 100mm dia
4	21.02	CN	Connection other than junction at 12 o'clock, 100mm dia
5	28.56	CN	Connection other than junction at 12 o'clock, 100mm dia
6	35.32	MHF	Finish node, manhole, reference: FMH 8

PLR:	SMH 9X	**Upstream Node:**	SMH 9
Inspection Direction:	Downstream	**Downstream Node:**	SMH 10
Inspected Length:	15.95 m	**Dia/Height:**	600 mm
Total Length:	15.95 m	**Material:**	Concrete

No.	m+	Code	Observation
1	0.00	MH	Start node, manhole, reference: SMH 9
2	0.00	WL	Water level, 5% of the vertical dimension
3	14.01	REM	General remark
4	15.95	MHF	Finish node, manhole, reference: SMH 10

PLR:	SMH 8X	**Upstream Node:**	SMH 8
Inspection Direction:	Downstream	**Downstream Node:**	SMH 9
Inspected Length:	71.82 m	**Dia/Height:**	600 mm
Total Length:	71.82 m	**Material:**	Concrete

No.	m+	Code	Observation
1	0.00	MH	Start node, manhole, reference: SMH 8
2	3.39	FL	Fracture, longitudinal at 12 o'clock
3	22.68	CN	Connection other than junction at 3 o'clock, 100mm dia

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Section Summary

Project Name	Project Number	Project Date
DOB - Castlemartyr - Storm Line		09/07/2024

No.	m+	Code	Observation
4	65.07	CN	Connection other than junction at 3 o'clock, 100mm dia
5	66.72	CN	Connection other than junction at 3 o'clock, 100mm dia
6	67.53	CN	Connection other than junction at 3 o'clock, 100mm dia
7	69.60	CN	Connection other than junction at 3 o'clock, 100mm dia
8	71.82	MHF	Finish node, manhole, reference: SMH 9

PLR:	SMH 11X	**Upstream Node:**	SMH 11
Inspection Direction:	Downstream	**Downstream Node:**	Outfall
Inspected Length:	24.02 m	**Dia/Height:**	600 mm
Total Length:	24.02 m	**Material:**	Concrete

No.	m+	Code	Observation
1	0.00	MH	Start node, manhole, reference: SMH 11
2	0.00	WL	Water level, 5% of the vertical dimension
3	23.53	REM	General remark
4	24.02	OFF	Finish node, outfall, reference: Outfall

PLR:	BSMH 10.1X	**Upstream Node:**	BSMH 10.1
Inspection Direction:	Upstream	**Downstream Node:**	SMH 11
Inspected Length:	29.58 m	**Dia/Height:**	600 mm
Total Length:	29.58 m	**Material:**	Concrete

No.	m+	Code	Observation
1	0.00	MH	Start node, manhole, reference: SMH 11
2	0.00	WL	Water level, 5% of the vertical dimension
3	28.78	REM	General remark
4	29.58	MHF	Finish node, manhole, reference: BSMH 10.1

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Section Inspection - 08/07/2024 - SMH1X

Item No.	Insp. No.	Date	Time	Client`s Job Ref	Weather	Pre Cleaned	PLR
1	1	08/07/24	13:40	Not Specified	No Rain Or Snow	Yes	SMH1X

Operator	Vehicle	Camera	Preset Length	Legal Status	Alternative ID
Lee	Not Specified	Not Specified	Not Specified	Not Specified	Not Specified

Town or Village:	Castlemartyr	**Inspection Direction:**	Upstream	**Upstream Node:**	SMH1
Road:		**Inspected Length:**	22.30 m	**Upstream Pipe Depth:**	
Location:		**Total Length:**	22.30 m	**Downstream Node:**	SMH1.1
Surface Type:		**Joint Length:**		**Downstream Pipe Depth:**	

Use:	Surface water	**Pipe Shape:**	Circular
Type of Pipe:		**Dia/Height:**	300 mm
Flow Control:	No flow control	**Material:**	Polyvinyl chloride
Year Constructed:	Not Specified	**Lining Type:**	No Lining
Inspection Purpose:		**Lining Material:**	No Lining

Comments:
Recommendations:

Scale: 1:194

Position [m]	Code	Observation	MPEG	Photo	Grade
0.00	MH	Start node, manhole, reference: SMH1.1	00:00:00	SMH1X_0d2a503c-ea41-4716-	
0.00	WL	Water level, 5% of the vertical dimension	00:00:09		
0.00	CN	Connection other than junction at 12 o'clock, 150mm dia	00:00:09	SMH1X_252e21ce-18bc-494e-	
16.82	LL	Line deviates left	00:01:51	SMH1X_722354cb-1832-40f9-9	
22.30	MHF	Finish node, manhole, reference: SMH1	00:02:22	SMH1X_0f33cd61-3fa7-4747-a	

Construction Features					Miscellaneous Features				
Structural Defects					Service & Operational Observations				
STR No. Def	STR Peak	STR Mean	STR Total	STR Grade	SER No. Def	SER Peak	SER Mean	SER Total	SER Grade
0	0.0	0.0	0.0	1.0	0	0.0	0.0	0.0	1.0

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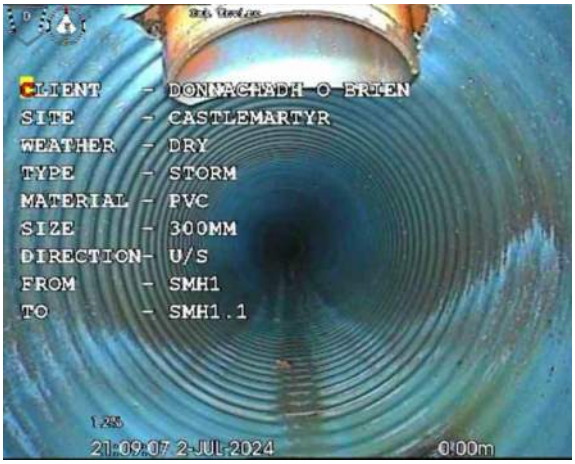
Section Pictures - 08/07/2024 - SMH1X

Item No.	Inspection Direction	PLR	Client`s Job Ref	Contractor`s Job Ref
1	Upstream	SMH1X		



SMH1X_0d2a503c-ea41-4716-a9a5-85138fdf69ee_20240709_121322_518.jpg, 00:00:00, 0.00 m
Start node, manhole, reference: SMH1.1

SMH1X_252e21ce-18bc-494e-96c3-a4508defc783_20240709_121345_420.jpg, 00:00:09, 0.00 m
Connection other than junction at 12 o'clock, 150mm dia

SMH1X_8ec440d7-1261-40c3-b4de-759c472a49a9_20240709_121409_204.jpg, 00:00:09, 0.00 m
Connection other than junction at 12 o'clock, 150mm dia

SMH1X_722354cb-1832-40f9-9eba-800ddc123e52_20240709_121451_000.jpg, 00:01:51, 16.82 m
Line deviates left

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Section Pictures - 08/07/2024 - SMH1X

Item No.	Inspection Direction	PLR	Client`s Job Ref	Contractor`s Job Ref
1	Upstream	SMH1X		

SMH1X_0f33cd61-3fa7-4747-a5b9-2f8bd2fcc692_20240709_121513_638.jpg, 00:02:22, 22.30 m
Finish node, manhole, reference: SMH1

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Section Inspection - 08/07/2024 - SMH1.2X

Item No.	Insp. No.	Date	Time	Client`s Job Ref	Weather	Pre Cleaned	PLR
2	1	08/07/24	13:43	Not Specified	No Rain Or Snow	Yes	SMH1.2X

Operator	Vehicle	Camera	Preset Length	Legal Status	Alternative ID
Lee	Not Specified	Not Specified	Not Specified	Not Specified	Not Specified

Town or Village:	Castlemartyr	**Inspection Direction:**	Upstream	**Upstream Node:**	SMH1.2
Road:		**Inspected Length:**	101.16 m	**Upstream Pipe Depth:**	
Location:		**Total Length:**	101.16 m	**Downstream Node:**	SMH1.1
Surface Type:		**Joint Length:**		**Downstream Pipe Depth:**	

Use:	Surface water	**Pipe Shape:**	Circular
Type of Pipe:		**Dia/Height:**	300 mm
Flow Control:	No flow control	**Material:**	Polyvinyl chloride
Year Constructed:	Not Specified	**Lining Type:**	No Lining
Inspection Purpose:		**Lining Material:**	No Lining

Comments:
Recommendations:

Scale: 1:876

Depth: m
SMH1.1

Position [m]	Code	Observation	MPEG	Photo	Grade
0.00	MH	Start node, manhole, reference: SMH1	00:00:00	SMH1.2X_69890040-3901-407a	
0.00	WL	Water level, 5% of the vertical dimension	00:00:13	SMH1.2X_122a7de5-eb26-4eb5	
20.75	CN	Connection other than junction at 10 o'clock, 150mm dia	00:02:16	SMH1.2X_be5a0b68-fe8d-45ee-	
21.93	CN	Connection other than junction at 10 o'clock, 150mm dia	00:02:37	SMH1.2X_8b4fb7b6-5493-4ad4	
63.13	CN	Connection other than junction at 10 o'clock, 150mm dia	00:06:55	SMH1.2X_c56e5b81-1d30-46fe-	
64.09	CN	Connection other than junction at 10 o'clock, 150mm dia	00:07:07	SMH1.2X_9f3b2d5a-2e2e-42a4	
101.16	MHF	Finish node, manhole, reference: SMH1.2	00:10:32	SMH1.2X_61d1b874-0a99-4cc3	

SMH1.2
Depth: m

Construction Features					Miscellaneous Features				
Structural Defects					Service & Operational Observations				
STR No. Def	**STR Peak**	**STR Mean**	**STR Total**	**STR Grade**	**SER No. Def**	**SER Peak**	**SER Mean**	**SER Total**	**SER Grade**
0	0.0	0.0	0.0	1.0	0	0.0	0.0	0.0	1.0

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Section Pictures - 08/07/2024 - SMH1.2X

Item No.	Inspection Direction	PLR	Client`s Job Ref	Contractor`s Job Ref
2	Upstream	SMH1.2X		

SMH1.2X_69890040-3901-407a-b4d0-1bdc599dbf3e_20240709_121707_768.jpg, 00:00:00, 0.00 m
Start node, manhole, reference: SMH1

SMH1.2X_122a7de5-eb26-4eb5-baa1-58fc6821ae51_20240709_121727_524.jpg, 00:00:13, 0.00 m
Water level, 5% of the vertical dimension

SMH1.2X_be5a0b68-fe8d-45ee-bba8-3f7b4c870f96_20240709_121822_054.jpg, 00:02:16, 20.75 m
Connection other than junction at 10 o'clock, 150mm dia

SMH1.2X_2bf4d0ed-7c47-4309-b911-5ccac2903481_20240709_121833_100.jpg, 00:02:16, 20.75 m
Connection other than junction at 10 o'clock, 150mm dia

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Section Pictures - 08/07/2024 - SMH1.2X

Item No.	Inspection Direction	PLR	Client`s Job Ref	Contractor`s Job Ref
2	Upstream	SMH1.2X		

SMH1.2X_8b4fb7b6-5493-4ad4-964f-99907cf65c9c_20240709_121846_620.jpg, 00:02:37, 21.93 m
Connection other than junction at 10 o'clock, 150mm dia

SMH1.2X_9d4140cd-82f5-4211-b96a-1a85f52089da_20240709_121902_683.jpg, 00:02:37, 21.93 m
Connection other than junction at 10 o'clock, 150mm dia

SMH1.2X_c56e5b81-1d30-46fe-af7f-5847f012e20b_20240709_122036_336.jpg, 00:06:55, 63.13 m
Connection other than junction at 10 o'clock, 150mm dia

SMH1.2X_4467700f-63c6-46a4-b538-918991b68370_20240709_122044_937.jpg, 00:06:55, 63.13 m
Connection other than junction at 10 o'clock, 150mm dia

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Section Pictures - 08/07/2024 - SMH1.2X

Item No.	Inspection Direction	PLR	Client`s Job Ref	Contractor`s Job Ref
2	Upstream	SMH1.2X		

SMH1.2X_9f3b2d5a-2e2e-42a4-ab7b-0096f5e8d57b_20240709_122318_856.jpg, 00:07:07, 64.09 m
Connection other than junction at 10 o'clock, 150mm dia

SMH1.2X_3d433eec-d2ff-4dbb-9fc9-866bfad3b1fe_20240709_122326_279.jpg, 00:07:07, 64.09 m
Connection other than junction at 10 o'clock, 150mm dia

SMH1.2X_61d1b874-0a99-4cc3-9448-dda49ae1295d_20240709_122445_221.jpg, 00:10:32, 101.16 m
Finish node, manhole, reference: SMH1.2

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Section Inspection - 08/07/2024 - SMH 1X

Item No.	Insp. No.	Date	Time	Client`s Job Ref	Weather	Pre Cleaned	PLR
4	1	08/07/24	13:49	Not Specified	No Rain Or Snow	Yes	SMH 1X

Operator	Vehicle	Camera	Preset Length	Legal Status	Alternative ID
Lee	Not Specified	Not Specified	Not Specified	Not Specified	Not Specified

Town or Village:	Castlemartyr	**Inspection Direction:**	Downstream	**Upstream Node:**	SMH 1
Road:		**Inspected Length:**	79.60 m	**Upstream Pipe Depth:**	
Location:		**Total Length:**	79.60 m	**Downstream Node:**	SMH 2
Surface Type:		**Joint Length:**		**Downstream Pipe Depth:**	

Use:	Surface water	**Pipe Shape:**	Circular
Type of Pipe:		**Dia/Height:**	600 mm
Flow Control:	No flow control	**Material:**	Concrete
Year Constructed:	Not Specified	**Lining Type:**	No Lining
Inspection Purpose:		**Lining Material:**	No Lining

Comments:
Recommendations:

Scale: 1:690

Position [m]	Code	Observation	MPEG	Photo	Grade
0.00	MH	Start node, manhole, reference: SMH 1	00:00:00	SMH 1X_c6d8ff 1d-4191-4	
0.00	WL	Water level, 5% of the vertical dimension	00:00:12	SMH 1X_0c856 9a4-aebf-4	
52.82	CN	Connection other than junction at 12 o'clock, 100mm dia	00:03:27	SMH 1X_65874f 6c-4e1d-4	
54.00	CN	Connection other than junction at 12 o'clock, 100mm dia	00:03:41	SMH 1X_8dd91 bac-39ec-	
79.60	MHF	Finish node, manhole, reference: SMH 2	00:05:23	SMH 1X_9de6c 334-50d5-	

Construction Features					Miscellaneous Features				
Structural Defects					Service & Operational Observations				
STR No. Def	**STR Peak**	**STR Mean**	**STR Total**	**STR Grade**	**SER No. Def**	**SER Peak**	**SER Mean**	**SER Total**	**SER Grade**
0	0.0	0.0	0.0	1.0	0	0.0	0.0	0.0	1.0

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Section Pictures - 08/07/2024 - SMH 1X

Item No.	Inspection Direction	PLR	Client`s Job Ref	Contractor`s Job Ref
4	Downstream	SMH 1X		

SMH
1X_c6d8ff1d-4191-472f-893b-d057afde83e7_20240709_130154_093.jpg, 00:00:00, 0.00 m
Start node, manhole, reference: SMH 1

SMH
1X_0c8569a4-aebf-4131-b59c-b2c631d73df0_20240709_130204_934.jpg, 00:00:12, 0.00 m
Water level, 5% of the vertical dimension

SMH
1X_65874f6c-4e1d-41d0-9426-6c94471201c9_20240709_130419_163.jpg, 00:03:27, 52.82 m
Connection other than junction at 12 o'clock, 100mm dia

SMH
1X_8dd91bac-39ec-4e87-a1ce-da9091ffce12_20240709_130447_917.jpg, 00:03:41, 54.00 m
Connection other than junction at 12 o'clock, 100mm dia

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Section Pictures - 08/07/2024 - SMH 1X

Item No.	Inspection Direction	PLR	Client`s Job Ref	Contractor`s Job Ref
4	Downstream	SMH 1X		

SMH
1X_9de6c334-50d5-4177-a3e0-231b4604df3c_20240709_130536_505.jpg, 00:05:23, 79.60 m
Finish node, manhole, reference: SMH 2

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Section Inspection - 04/07/2024 - SMH 2X

Item No.	Insp. No.	Date	Time	Client`s Job Ref	Weather	Pre Cleaned	PLR
5	1	04/07/24	14:28	Not Specified	No Rain Or Snow	Yes	SMH 2X

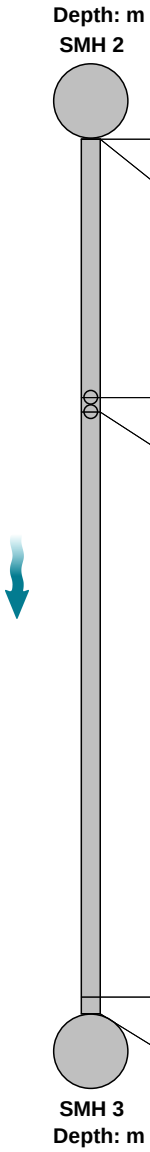
Operator	Vehicle	Camera	Preset Length	Legal Status	Alternative ID
Lee	Not Specified	Not Specified	Not Specified	Not Specified	Not Specified

Town or Village:	Castlemartyr	**Inspection Direction:**	Downstream	**Upstream Node:**	SMH 2
Road:		**Inspected Length:**	41.00 m	**Upstream Pipe Depth:**	
Location:		**Total Length:**	41.00 m	**Downstream Node:**	SMH 3
Surface Type:		**Joint Length:**		**Downstream Pipe Depth:**	

Use:	Surface water	**Pipe Shape:**	Circular
Type of Pipe:		**Dia/Height:**	600 mm
Flow Control:	No flow control	**Material:**	Concrete
Year Constructed:	Not Specified	**Lining Type:**	No Lining
Inspection Purpose:		**Lining Material:**	No Lining

Comments:
Recommendations:

Scale: 1:355



Position [m]	Code	Observation	MPEG	Photo	Grade
0.00	MH	Start node, manhole, reference: SMH 2	00:00:00	SMH 2X_7eb5931a-d160-	
0.00	WL	Water level, 5% of the vertical dimension	00:00:10	SMH 2X_5e3669b4-001e-	
12.14	CN	Connection other than junction at 12 o'clock, 100mm dia	00:00:51	SMH 2X_7e265b8e-15e8-	
12.79	CN	Connection other than junction at 12 o'clock, 100mm dia	00:00:57	SMH 2X_331130d1-4272-	
40.20	DES	Settled deposits, fine, 20% cross-sectional area loss	00:02:28	SMH 2X_bc86b266-5416-	4
41.00	MHF	Finish node, manhole, reference: SMH 3	00:02:32	SMH 2X_7b0d52c3-340d-	

Construction Features					Miscellaneous Features				
Structural Defects					Service & Operational Observations				
STR No. Def	**STR Peak**	**STR Mean**	**STR Total**	**STR Grade**	**SER No. Def**	**SER Peak**	**SER Mean**	**SER Total**	**SER Grade**
0	0.0	0.0	0.0	1.0	1	5.0	0.1	5.0	4.0

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Section Pictures - 04/07/2024 - SMH 2X

Item No.	Inspection Direction	PLR	Client`s Job Ref	Contractor`s Job Ref
5	Downstream	SMH 2X		

SMH
2X_7eb5931a-d160-484a-b227-12f578aad744_20240709_130850_343.jpg, 00:00:00, 0.00 m
Start node, manhole, reference: SMH 2

SMH
2X_5e3669b4-001e-45bf-957c-8280832368da_20240709_130901_733.jpg, 00:00:10, 0.00 m
Water level, 5% of the vertical dimension

SMH
2X_7e265b8e-15e8-4523-9ee1-0f7368d67e89_20240709_130925_437.jpg, 00:00:51, 12.14 m
Connection other than junction at 12 o'clock, 100mm dia

SMH
2X_331130d1-4272-4ba1-83b7-7f21f4a595df_20240709_130941_308.jpg, 00:00:57, 12.79 m
Connection other than junction at 12 o'clock, 100mm dia

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Section Pictures - 04/07/2024 - SMH 2X

Item No.	Inspection Direction	PLR	Client`s Job Ref	Contractor`s Job Ref
5	Downstream	SMH 2X		

SMH
2X_bc86b266-5416-41f0-a42b-0783ec58e13f_20240709_131245_192.jpg, 00:02:28, 40.20 m
Settled deposits, fine, 20% cross-sectional area loss

SMH
2X_7b0d52c3-340d-4b6a-9f29-96af2b512d05_20240709_131301_349.jpg, 00:02:32, 41.00 m
Finish node, manhole, reference: SMH 3

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Section Inspection - 04/07/2024 - SMH 3X

Item No.	Insp. No.	Date	Time	Client`s Job Ref	Weather	Pre Cleaned	PLR
8	1	04/07/24	13:55	Not Specified	No Rain Or Snow	Yes	SMH 3X

Operator	Vehicle	Camera	Preset Length	Legal Status	Alternative ID
Lee	Not Specified	Not Specified	Not Specified	Not Specified	Not Specified

Town or Village:	Castlemartyr	**Inspection Direction:**	Downstream	**Upstream Node:**	SMH 3
Road:		**Inspected Length:**	52.43 m	**Upstream Pipe Depth:**	
Location:		**Total Length:**	52.43 m	**Downstream Node:**	SMH 4
Surface Type:		**Joint Length:**		**Downstream Pipe Depth:**	

Use:	Surface water	**Pipe Shape:**	Circular
Type of Pipe:		**Dia/Height:**	600 mm
Flow Control:	No flow control	**Material:**	Concrete
Year Constructed:	Not Specified	**Lining Type:**	No Lining
Inspection Purpose:		**Lining Material:**	No Lining

Comments:
Recommendations:

Scale: 1:454

Position [m]	Code	Observation	MPEG	Photo	Grade
0.00	MH	Start node, manhole, reference: SMH 3	00:00:00	SMH 3X_c73d1 6a7-023e-	
0.00	WL	Water level, 5% of the vertical dimension	00:00:11		
22.08	CN	Connection other than junction at 12 o'clock, 100mm dia	00:01:24	SMH 3X_31b77 81b-35e9-	
23.55	CN	Connection other than junction at 12 o'clock, 100mm dia	00:01:36	SMH 3X_15316 858-733d-	
37.31	WL	Water level, 10% of the vertical dimension	00:02:44	SMH 3X_6c5de 57f-490c-4	
52.43	MHF	Finish node, manhole, reference: SMH 4	00:03:47	SMH 3X_ad822 e44-d73d-	

Construction Features					Miscellaneous Features				
Structural Defects					Service & Operational Observations				
STR No. Def	STR Peak	STR Mean	STR Total	STR Grade	SER No. Def	SER Peak	SER Mean	SER Total	SER Grade
0	0.0	0.0	0.0	1.0	0	0.0	0.0	0.0	1.0

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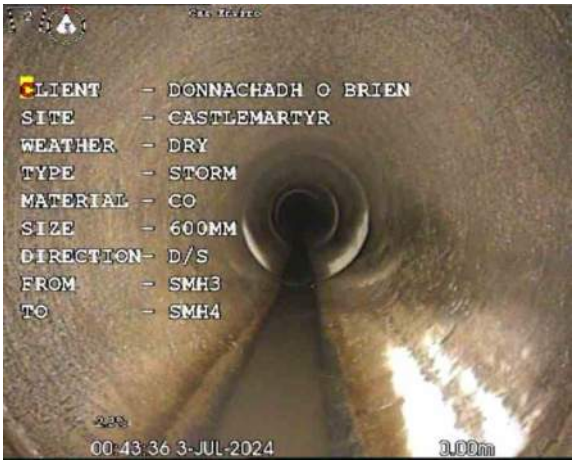
Section Pictures - 04/07/2024 - SMH 3X

Item No.	Inspection Direction	PLR	Client`s Job Ref	Contractor`s Job Ref
8	Downstream	SMH 3X		



SMH
3X_c73d16a7-023e-48a2-8557-fb13327dddf5_20240709_132829_082.jpg, 00:00:00, 0.00 m
Start node, manhole, reference: SMH 3

SMH
3X_31b7781b-35e9-4c80-a3a4-0fab8d4d03b4_20240709_133057_483.jpg, 00:01:24, 22.08 m
Connection other than junction at 12 o'clock, 100mm dia

SMH
3X_bed44963-5a98-4ba3-912e-e3e9f279f89e_20240709_133104_978.jpg, 00:01:24, 22.08 m
Connection other than junction at 12 o'clock, 100mm dia

SMH
3X_15316858-733d-4901-af8f-f4021d0e0b25_20240709_133115_080.jpg, 00:01:36, 23.55 m
Connection other than junction at 12 o'clock, 100mm dia

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Section Pictures - 04/07/2024 - SMH 3X

Item No.	Inspection Direction	PLR	Client`s Job Ref	Contractor`s Job Ref
8	Downstream	SMH 3X		

SMH
3X_6c5de57f-490c-43ce-ad2f-a4899ce67420_20240709_133137_989.jpg, 00:02:44, 37.31 m
Water level, 10% of the vertical dimension

SMH
3X_ad822e44-d73d-48e2-b36f-16574ec35ce6_20240709_133206_745.jpg, 00:03:47, 52.43 m
Finish node, manhole, reference: SMH 4

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Section Inspection - 04/07/2024 - SMH 4X

Item No.	Insp. No.	Date	Time	Client`s Job Ref	Weather	Pre Cleaned	PLR
9	1	04/07/24	13:55	Not Specified	No Rain Or Snow	Yes	SMH 4X

Operator	Vehicle	Camera	Preset Length	Legal Status	Alternative ID
Lee	Not Specified	Not Specified	Not Specified	Not Specified	Not Specified

Town or Village:	Castlemartyr	**Inspection Direction:**	Downstream	**Upstream Node:**	SMH 4
Road:		**Inspected Length:**	58.55 m	**Upstream Pipe Depth:**	
Location:		**Total Length:**	58.55 m	**Downstream Node:**	SMH 5
Surface Type:		**Joint Length:**		**Downstream Pipe Depth:**	

Use:	Surface water	**Pipe Shape:**	Circular
Type of Pipe:		**Dia/Height:**	600 mm
Flow Control:	No flow control	**Material:**	Concrete
Year Constructed:	Not Specified	**Lining Type:**	No Lining
Inspection Purpose:		**Lining Material:**	No Lining

Comments:
Recommendations:

Scale: 1:507

Position [m]	Code	Observation	MPEG	Photo	Grade
0.00	MH	Start node, manhole, reference: SMH 4	00:00:00	SMH 4X_0caef72a-d455-4	
0.00	WL	Water level, 5% of the vertical dimension	00:00:00	SMH 4X_e7bbf5f9-9ae8-44	
40.03	CN	Connection other than junction at 12 o'clock, 100mm dia	00:02:40	SMH 4X_28903c6e-a766-	
40.12	FL	Fracture, longitudinal at 12 o'clock: Fracture after connection	00:02:44	SMH 4X_7067059 2-fb35-4	3 / 2
58.55	MHF	Finish node, manhole, reference: SMH 5	00:03:51	SMH 4X_7c99ba72-18a9-	

Construction Features					Miscellaneous Features				
Structural Defects					Service & Operational Observations				
STR No. Def	**STR Peak**	**STR Mean**	**STR Total**	**STR Grade**	**SER No. Def**	**SER Peak**	**SER Mean**	**SER Total**	**SER Grade**
1	40.0	0.7	40.0	3.0	1	1.0	0.0	1.0	2.0

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Section Pictures - 04/07/2024 - SMH 4X

Item No.	Inspection Direction	PLR	Client`s Job Ref	Contractor`s Job Ref
9	Downstream	SMH 4X		

SMH
4X_0caef72a-d455-4350-9927-1b7d7a5416f4_20240709_133449_720.jpg, 00:00:00, 0.00 m
Start node, manhole, reference: SMH 4

SMH
4X_e7bbf5f9-9ae8-4486-9bdc-f1eca913473a_20240709_133502_946.jpg, 00:00:00, 0.00 m
Water level, 5% of the vertical dimension

SMH
4X_28903c6e-a766-487b-a08c-e4dae43b4c03_20240709_133656_731.jpg, 00:02:40, 40.03 m
Connection other than junction at 12 o'clock, 100mm dia

SMH
4X_70670592-fb35-43b8-9e02-72519c53db88_20240709_133735_483.jpg, 00:02:44, 40.12 m
Fracture, longitudinal at 12 o'clock, Fracture after connection

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Section Pictures - 04/07/2024 - SMH 4X

Item No.	Inspection Direction	PLR	Client`s Job Ref	Contractor`s Job Ref
9	Downstream	SMH 4X		

SMH
4X_7c99ba72-18a9-4dea-8a3a-8b7a05590bc9_20240709_133815_253.jpg, 00:03:51, 58.55 m
Finish node, manhole, reference: SMH 5

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Section Inspection - 04/07/2024 - SMH 5X

Item No.	Insp. No.	Date	Time	Client`s Job Ref	Weather	Pre Cleaned	PLR
10	1	04/07/24	13:59	Not Specified	No Rain Or Snow	Yes	SMH 5X

Operator	Vehicle	Camera	Preset Length	Legal Status	Alternative ID
Lee	Not Specified	Not Specified	Not Specified	Not Specified	Not Specified

Town or Village:	Castlemartyr	**Inspection Direction:**	Downstream	**Upstream Node:**	SMH 5
Road:		**Inspected Length:**	2.36 m	**Upstream Pipe Depth:**	
Location:		**Total Length:**	2.36 m	**Downstream Node:**	SMH 6
Surface Type:		**Joint Length:**		**Downstream Pipe Depth:**	

Use:	Surface water	**Pipe Shape:**	Circular
Type of Pipe:		**Dia/Height:**	600 mm
Flow Control:	No flow control	**Material:**	Concrete
Year Constructed:	Not Specified	**Lining Type:**	No Lining
Inspection Purpose:		**Lining Material:**	No Lining

Comments:
Recommendations:

Scale: 1:50	Position [m]	Code	Observation	MPEG	Photo	Grade
Depth: m SMH 5						
	0.00	MH	Start node, manhole, reference: SMH 5	00:00:00	SMH 5X_5e0aeb23-ce36-	
	1.02	DES	Settled deposits, fine, 15% cross-sectional area loss: Before and After cleaning	00:00:10	SMH 5X_9f690d82-82fc-4d	3
	2.36	MHF	Finish node, manhole, reference: SMH 6	00:00:19	SMH 5X_101ee12f-d696-4	
SMH 6 Depth: m						

Construction Features					Miscellaneous Features				
Structural Defects					Service & Operational Observations				
STR No. Def	**STR Peak**	**STR Mean**	**STR Total**	**STR Grade**	**SER No. Def**	**SER Peak**	**SER Mean**	**SER Total**	**SER Grade**
0	0.0	0.0	0.0	1.0	1	2.0	0.8	2.0	3.0

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Section Pictures - 04/07/2024 - SMH 5X

Item No.	Inspection Direction	PLR	Client`s Job Ref	Contractor`s Job Ref
10	Downstream	SMH 5X		

SMH
5X_5e0aeb23-ce36-49d6-996d-861efce6687e_20240709_133948_523.jpg, 00:00:00, 0.00 m
Start node, manhole, reference: SMH 5

SMH
5X_9f690d82-82fc-4dc2-9b30-d6c542f07b86_20240709_134011_993.jpg, 00:00:10, 1.02 m
Settled deposits, fine, 15% cross-sectional area loss, Before and After cleaning

SMH
5X_ddbc68e5-329e-4581-9a0c-699c2df61af1_20240709_134304_507.jpg, 00:00:10, 1.02 m
Settled deposits, fine, 15% cross-sectional area loss, Before and After cleaning

SMH
5X_101ee12f-d696-47fa-a6db-af78022cc177_20240709_134024_556.jpg, 00:00:19, 2.36 m
Finish node, manhole, reference: SMH 6

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Section Pictures - 04/07/2024 - SMH 5X

Item No.	Inspection Direction	PLR	Client`s Job Ref	Contractor`s Job Ref
10	Downstream	SMH 5X		

SMH
5X_f7e37b0e-bf4e-487b-8e4a-06c49b54d8ff_20240709_134344_873.jpg, 00:00:19, 2.36 m
Finish node, manhole, reference: SMH 6

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Section Inspection - 04/07/2024 - SMH 6Y

Item No.	Insp. No.	Date	Time	Client`s Job Ref	Weather	Pre Cleaned	PLR
11	1	04/07/24	14:03	Not Specified	No Rain Or Snow	Yes	SMH 6Y

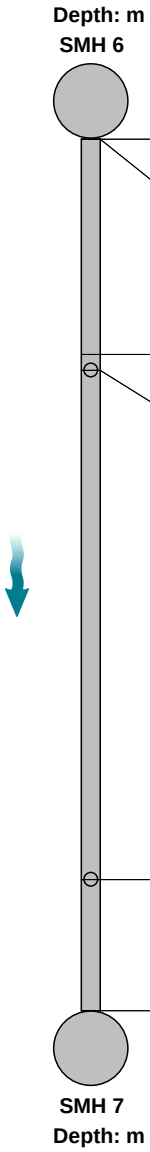
Operator	Vehicle	Camera	Preset Length	Legal Status	Alternative ID
Lee	Not Specified	Not Specified	Not Specified	Not Specified	Not Specified

Town or Village:	Castlemartyr	**Inspection Direction:**	Downstream	**Upstream Node:**	SMH 6
Road:		**Inspected Length:**	23.47 m	**Upstream Pipe Depth:**	
Location:		**Total Length:**	23.47 m	**Downstream Node:**	SMH 7
Surface Type:		**Joint Length:**		**Downstream Pipe Depth:**	

Use:	Surface water	**Pipe Shape:**	Circular
Type of Pipe:		**Dia/Height:**	300 mm
Flow Control:	No flow control	**Material:**	Concrete
Year Constructed:	Not Specified	**Lining Type:**	No Lining
Inspection Purpose:		**Lining Material:**	No Lining

Comments:
Recommendations:

Scale: 1:204



Position [m]	Code	Observation	MPEG	Photo	Grade
0.00	MH	Start node, manhole, reference: FMH 6	00:00:00	FMH 6Y_c9b28 80d-3a7b-	
0.00	WL	Water level, 5% of the vertical dimension	00:00:09	FMH 6Y_737c0 9fd-6d29-4	
5.81	FCJ	Fracture, circumferential at joint from 10 o'clock to 2 o'clock	00:00:29	FMH 6Y_92cc2 981-eecf-4	3 / 2
6.24	CN	Connection other than junction at 12 o'clock, 100mm dia	00:00:36	FMH 6Y_43dee 889-0db5-	
19.95	CN	Connection other than junction at 12 o'clock, 100mm dia	00:01:31	FMH 6Y_d92fd6 f9-85fb-4e	
23.47	MHF	Finish node, manhole, reference: FMH 7	00:01:47	FMH 6Y_58542 4ed-8ee1-	

Construction Features					Miscellaneous Features				
Structural Defects					Service & Operational Observations				
STR No. Def	**STR Peak**	**STR Mean**	**STR Total**	**STR Grade**	**SER No. Def**	**SER Peak**	**SER Mean**	**SER Total**	**SER Grade**
1	40.0	1.7	40.0	3.0	1	1.0	0.0	1.0	2.0

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Section Pictures - 04/07/2024 - SMH 6Y

Item No.	Inspection Direction	PLR	Client`s Job Ref	Contractor`s Job Ref
11	Downstream	SMH 6Y		

FMH
6Y_c9b2880d-3a7b-4653-bb2e-7770a3a0f68c_20240709_134618_347.jpg, 00:00:00, 0.00 m
Start node, manhole, reference: FMH 6

FMH
6Y_737c09fd-6d29-40a5-9186-0cc24ac5868a_20240709_134635_511.jpg, 00:00:09, 0.00 m
Water level, 5% of the vertical dimension

FMH
6Y_92cc2981-eecf-4e41-95f2-f3719d91c487_20240709_134715_336.jpg, 00:00:29, 5.81 m
Fracture, circumferential at joint from 10 o'clock to 2 o'clock

FMH
6Y_e16ecfc9-e31a-49c9-abcb-6e2597ecc629_20240709_134737_705.jpg, 00:00:29, 5.81 m
Fracture, circumferential at joint from 10 o'clock to 2 o'clock

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Section Pictures - 04/07/2024 - SMH 6Y

Item No.	Inspection Direction	PLR	Client`s Job Ref	Contractor`s Job Ref
11	Downstream	SMH 6Y		

FMH
6Y_43dee889-0db5-4c5f-b802-f73c3bae4de1_20240709_134657_654.jpg, 00:00:36, 6.24 m
Connection other than junction at 12 o'clock, 100mm dia

FMH
6Y_d92fd6f9-85fb-4e86-b490-d0b101f64650_20240709_134804_086.jpg, 00:01:31, 19.95 m
Connection other than junction at 12 o'clock, 100mm dia

FMH
6Y_585424ed-8ee1-4465-87c3-146a58bad05c_20240709_134822_207.jpg, 00:01:47, 23.47 m
Finish node, manhole, reference: FMH 7

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Section Inspection - 04/07/2024 - SMH 7X

Item No.	Insp. No.	Date	Time	Client`s Job Ref	Weather	Pre Cleaned	PLR
12	1	04/07/24	14:03	Not Specified	No Rain Or Snow	Yes	SMH 7X

Operator	Vehicle	Camera	Preset Length	Legal Status	Alternative ID
Lee	Not Specified	Not Specified	Not Specified	Not Specified	Not Specified

Town or Village:	Castlemartyr	**Inspection Direction:**	Downstream	**Upstream Node:**	SMH 7
Road:		**Inspected Length:**	35.32 m	**Upstream Pipe Depth:**	
Location:		**Total Length:**	35.32 m	**Downstream Node:**	SMH 8
Surface Type:		**Joint Length:**		**Downstream Pipe Depth:**	

Use:	Surface water	**Pipe Shape:**	Circular
Type of Pipe:		**Dia/Height:**	300 mm
Flow Control:	No flow control	**Material:**	Concrete
Year Constructed:	Not Specified	**Lining Type:**	No Lining
Inspection Purpose:		**Lining Material:**	No Lining

Comments:
Recommendations:

Scale: 1:306

Position [m]	Code	Observation	MPEG	Photo	Grade
0.00	MH	Start node, manhole, reference: FMH 7	00:00:00	FMH 7X_818ac 705-684f-4	
0.00	WL	Water level, 5% of the vertical dimension	00:00:09	FMH 7X_7276b b6c-2617-	
11.46	CN	Connection other than junction at 12 o'clock, 100mm dia	00:00:56	FMH 7X_95149 70f-c091-4	
21.02	CN	Connection other than junction at 12 o'clock, 100mm dia	00:01:35	FMH 7X_57124 64e-ecad-	
28.56	CN	Connection other than junction at 12 o'clock, 100mm dia	00:02:02	FMH 7X_f807f9 56-1ca7-4	
35.32	MHF	Finish node, manhole, reference: FMH 8	00:02:33	FMH 7X_c0921 cc4-321b-	

Construction Features					Miscellaneous Features				
Structural Defects					Service & Operational Observations				
STR No. Def	**STR Peak**	**STR Mean**	**STR Total**	**STR Grade**	**SER No. Def**	**SER Peak**	**SER Mean**	**SER Total**	**SER Grade**
0	0.0	0.0	0.0	1.0	0	0.0	0.0	0.0	1.0

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Section Pictures - 04/07/2024 - SMH 7X

Item No.	Inspection Direction	PLR	Client`s Job Ref	Contractor`s Job Ref
12	Downstream	SMH 7X		

FMH
7X_818ac705-684f-4388-b3ec-b7f38d84d60f_20240709_140749_178.jpg, 00:00:00, 0.00 m
Start node, manhole, reference: FMH 7

FMH
7X_7276bb6c-2617-4a97-9b5b-696284bac673_20240709_141027_375.jpg, 00:00:09, 0.00 m
Water level, 5% of the vertical dimension

FMH
7X_9514970f-c091-497c-a849-1d839b7ec99b_20240709_141102_908.jpg, 00:00:56, 11.46 m
Connection other than junction at 12 o'clock, 100mm dia

FMH
7X_5712464e-ecad-4190-aded-2015937f5b0b_20240709_141550_370.jpg, 00:01:35, 21.02 m
Connection other than junction at 12 o'clock, 100mm dia

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Section Pictures - 04/07/2024 - SMH 7X

Item No.	Inspection Direction	PLR	Client`s Job Ref	Contractor`s Job Ref
12	Downstream	SMH 7X		

FMH
7X_f807f956-1ca7-405c-8875-e6444f9b5716_20240709_141935_452.jpg, 00:02:02, 28.56 m
Connection other than junction at 12 o'clock, 100mm dia

FMH
7X_a995ae0f-f7e9-45e1-90b4-4540501e266e_20240709_141943_524.jpg, 00:02:02, 28.56 m
Connection other than junction at 12 o'clock, 100mm dia

FMH
7X_c0921cc4-321b-467f-b16f-19bc091c3bb1_20240709_142002_796.jpg, 00:02:33, 35.32 m
Finish node, manhole, reference: FMH 8

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Section Inspection - 04/07/2024 - SMH 9X

Item No.	Insp. No.	Date	Time	Client`s Job Ref	Weather	Pre Cleaned	PLR
13	1	04/07/24	14:04	Not Specified	No Rain Or Snow	Yes	SMH 9X

Operator	Vehicle	Camera	Preset Length	Legal Status	Alternative ID
Lee	Not Specified	Not Specified	Not Specified	Not Specified	Not Specified

Town or Village:	Castlemartyr	**Inspection Direction:**	Downstream	**Upstream Node:**	SMH 9
Road:		**Inspected Length:**	15.95 m	**Upstream Pipe Depth:**	
Location:		**Total Length:**	15.95 m	**Downstream Node:**	SMH 10
Surface Type:		**Joint Length:**		**Downstream Pipe Depth:**	

Use:	Surface water	**Pipe Shape:**	Circular
Type of Pipe:		**Dia/Height:**	600 mm
Flow Control:	No flow control	**Material:**	Concrete
Year Constructed:	Not Specified	**Lining Type:**	No Lining
Inspection Purpose:		**Lining Material:**	No Lining

Comments:
Recommendations:

Scale: 1:139

Position [m]	Code	Observation	MPEG	Photo	Grade
0.00	MH	Start node, manhole, reference: SMH 9	00:00:00	SMH 9X_95b19 c46-bd11-	
0.00	WL	Water level, 5% of the vertical dimension	00:00:11	SMH 9X_8c6a1 857-78b8-	
14.01	REM	General remark: Vacumn cleaning	00:01:02	SMH 9X_de9e9 d39-aa0e-	
15.95	MHF	Finish node, manhole, reference: SMH 10	00:01:10	SMH 9X_07503 d82-bffa-4	

Construction Features					Miscellaneous Features				
Structural Defects					Service & Operational Observations				
STR No. Def	**STR Peak**	**STR Mean**	**STR Total**	**STR Grade**	**SER No. Def**	**SER Peak**	**SER Mean**	**SER Total**	**SER Grade**
0	0.0	0.0	0.0	1.0	0	0.0	0.0	0.0	1.0

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Section Pictures - 04/07/2024 - SMH 9X

Item No.	Inspection Direction	PLR	Client`s Job Ref	Contractor`s Job Ref
13	Downstream	SMH 9X		

SMH
9X_95b19c46-bd11-4412-9381-72f7f9c8e9b7_20240709_142100_127.jpg, 00:00:00, 0.00 m
Start node, manhole, reference: SMH 9

SMH
9X_8c6a1857-78b8-4f91-887e-b5cb0f803c6e_20240709_142108_181.jpg, 00:00:11, 0.00 m
Water level, 5% of the vertical dimension

SMH
9X_de9e9d39-aa0e-436f-8012-a39a05de0a0e_20240709_142340_864.jpg, 00:01:02, 14.01 m
General remark, Vacumn cleaning

SMH
9X_07503d82-bffa-489b-ad08-f68fd358763d_20240709_142406_363.jpg, 00:01:10, 15.95 m
Finish node, manhole, reference: SMH 10

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Section Inspection - 04/07/2024 - SMH 8X

Item No.	Insp. No.	Date	Time	Client`s Job Ref	Weather	Pre Cleaned	PLR
14	1	04/07/24	14:05	Not Specified	No Rain Or Snow	Yes	SMH 8X

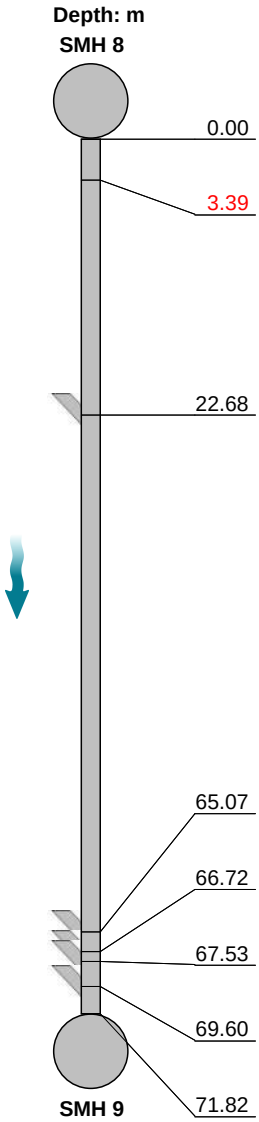
Operator	Vehicle	Camera	Preset Length	Legal Status	Alternative ID
Lee	Not Specified	Not Specified	Not Specified	Not Specified	Not Specified

Town or Village:	Castlemartyr	**Inspection Direction:**	Downstream	**Upstream Node:**	SMH 8
Road:		**Inspected Length:**	71.82 m	**Upstream Pipe Depth:**	
Location:		**Total Length:**	71.82 m	**Downstream Node:**	SMH 9
Surface Type:		**Joint Length:**		**Downstream Pipe Depth:**	

Use:	Surface water	**Pipe Shape:**	Circular
Type of Pipe:		**Dia/Height:**	600 mm
Flow Control:	No flow control	**Material:**	Concrete
Year Constructed:	Not Specified	**Lining Type:**	No Lining
Inspection Purpose:		**Lining Material:**	No Lining

Comments:
Recommendations:

Scale: 1:622



Position [m]	Code	Observation	MPEG	Photo	Grade
0.00	MH	Start node, manhole, reference: SMH 8	00:00:00	SMH 8X_57cbcbda-d9d5-	
3.39	FL	Fracture, longitudinal at 12 o'clock	00:00:22	SMH 8X_a67db1b5-5cec-	3 / 2
22.68	CN	Connection other than junction at 3 o'clock, 100mm dia: 12, and 3 O'clock connections	00:01:22	SMH 8X_eb508c9d-f611-4	
65.07	CN	Connection other than junction at 3 o'clock, 100mm dia	00:04:01	SMH 8X_c1094e54-c5a2-	
66.72	CN	Connection other than junction at 3 o'clock, 100mm dia	00:04:23	SMH 8X_450ddddde-b28c-	
67.53	CN	Connection other than junction at 3 o'clock, 100mm dia	00:04:28	SMH 8X_821a187a-2a89-	
69.60	CN	Connection other than junction at 3 o'clock, 100mm dia	00:04:40	SMH 8X_9f9ff2e0-b708-4e	
71.82	MHF	Finish node, manhole, reference: SMH 9	00:04:57	SMH 8X_f28c7512-c162-4f	

Construction Features					Miscellaneous Features				
Structural Defects					Service & Operational Observations				
STR No. Def	**STR Peak**	**STR Mean**	**STR Total**	**STR Grade**	**SER No. Def**	**SER Peak**	**SER Mean**	**SER Total**	**SER Grade**
1	40.0	0.6	40.0	3.0	1	1.0	0.0	1.0	2.0

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Section Pictures - 04/07/2024 - SMH 8X

Item No.	Inspection Direction	PLR	Client`s Job Ref	Contractor`s Job Ref
14	Downstream	SMH 8X		

SMH
8X_57cbcbda-d9d5-4450-ba42-0e8239d7336c_20240709_142726_814.jpg, 00:00:00, 0.00 m
Start node, manhole, reference: SMH 8

SMH
8X_a67db1b5-5cec-4dcd-b95a-cb8a8335611b_20240709_142818_192.jpg, 00:00:22, 3.39 m
Fracture, longitudinal at 12 o'clock

SMH
8X_eb508c9d-f611-4d8a-9aba-5d698c13c7da_20240709_142904_024.jpg, 00:01:22, 22.68 m
Connection other than junction at 3 o'clock, 100mm dia, 12, and 3 O'clock connections

SMH
8X_c1094e54-c5a2-4e82-b3f1-9f564ea21bfa_20240709_143044_730.jpg, 00:04:01, 65.07 m
Connection other than junction at 3 o'clock, 100mm dia

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Section Pictures - 04/07/2024 - SMH 8X

Item No.	Inspection Direction	PLR	Client`s Job Ref	Contractor`s Job Ref
14	Downstream	SMH 8X		

SMH
8X_46a7cd86-3e25-4a19-98a2-2b897b77bc70_20240709_143054_181.jpg, 00:04:01, 65.07 m
Connection other than junction at 3 o'clock, 100mm dia

SMH
8X_450dddde-b28c-4ede-ba13-1616115e5b45_20240709_143109_203.jpg, 00:04:23, 66.72 m
Connection other than junction at 3 o'clock, 100mm dia

SMH
8X_fa3201ac-132b-4e5c-b52d-90763f13e353_20240709_143120_803.jpg, 00:04:23, 66.72 m
Connection other than junction at 3 o'clock, 100mm dia

SMH
8X_821a187a-2a89-49c5-afcb-823024f000a0_20240709_143131_620.jpg, 00:04:28, 67.53 m
Connection other than junction at 3 o'clock, 100mm dia

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Section Pictures - 04/07/2024 - SMH 8X

Item No.	Inspection Direction	PLR	Client`s Job Ref	Contractor`s Job Ref
14	Downstream	SMH 8X		

SMH
8X_9f9ff2e0-b708-4e53-8f5c-c8579cf8c7f3_20240709_143152_701.jpg, 00:04:40, 69.60 m
Connection other than junction at 3 o'clock, 100mm dia

SMH
8X_f28c7512-c162-4fa1-8d10-e91ed6b33e01_20240709_143230_407.jpg, 00:04:57, 71.82 m
Finish node, manhole, reference: SMH 9

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Section Inspection - 04/07/2024 - SMH 11X

Item No.	Insp. No.	Date	Time	Client`s Job Ref	Weather	Pre Cleaned	PLR
15	1	04/07/24	14:11	Not Specified	No Rain Or Snow	Yes	SMH 11X

Operator	Vehicle	Camera	Preset Length	Legal Status	Alternative ID
Lee	Not Specified	Not Specified	Not Specified	Not Specified	Not Specified

Town or Village:	Castlemartyr	**Inspection Direction:**	Downstream	**Upstream Node:**	SMH 11
Road:		**Inspected Length:**	24.02 m	**Upstream Pipe Depth:**	
Location:		**Total Length:**	24.02 m	**Downstream Node:**	OUTFALL
Surface Type:		**Joint Length:**		**Downstream Pipe Depth:**	

Use:	Surface water	**Pipe Shape:**	Circular
Type of Pipe:		**Dia/Height:**	600 mm
Flow Control:	No flow control	**Material:**	Concrete
Year Constructed:	Not Specified	**Lining Type:**	No Lining
Inspection Purpose:		**Lining Material:**	No Lining

Comments:
Recommendations:

Scale: 1:208

Position [m]	Code	Observation	MPEG	Photo	Grade
		Depth: m			
		SMH 11			
0.00	MH	Start node, manhole, reference: SMH 11	00:00:00	SMH 11X_91c5 b5f5-d8e1-	
0.00	WL	Water level, 5% of the vertical dimension	00:00:10	SMH 11X_ceb8 003f-05e0-	
23.53	REM	General remark: Outfall view	00:01:46	SMH 11X_2426 709c-000e	
24.02	OFF	Finish node, outfall, reference: Outfall	00:01:53	SMH 11X_f4c19 5e7-bc6f-4	
		Outfall			
		Depth: m			

Construction Features					Miscellaneous Features				
Structural Defects					Service & Operational Observations				
STR No. Def	**STR Peak**	**STR Mean**	**STR Total**	**STR Grade**	**SER No. Def**	**SER Peak**	**SER Mean**	**SER Total**	**SER Grade**
0	0.0	0.0	0.0	1.0	0	0.0	0.0	0.0	1.0

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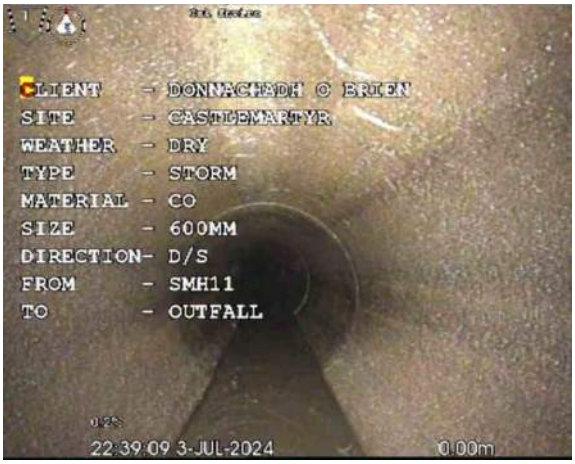
Section Pictures - 04/07/2024 - SMH 11X

Item No.	Inspection Direction	PLR	Client`s Job Ref	Contractor`s Job Ref
15	Downstream	SMH 11X		



SMH
11X_91c5b5f5-d8e1-43d3-8135-b739c6a2e57d_20240709_143338_078.jpg, 00:00:00, 0.00 m
Start node, manhole, reference: SMH 11

SMH
11X_ceb8003f-05e0-4d0a-9c20-bee75946160c_20240709_143346_208.jpg, 00:00:10, 0.00 m
Water level, 5% of the vertical dimension

SMH
11X_2426709c-000e-4054-9fdc-0ed27131d1f6_20240709_143433_860.jpg, 00:01:46, 23.53 m
General remark, Outfall view

SMH
11X_f4c195e7-bc6f-4d68-a75a-88972057342e_20240709_143452_792.jpg, 00:01:53, 24.02 m
Finish node, outfall, reference: Outfall

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Section Pictures - 04/07/2024 - SMH 11X

Item No.	Inspection Direction	PLR	Client`s Job Ref	Contractor`s Job Ref
15	Downstream	SMH 11X		

SMH 11X_9d7f758f-958f-472c-a1c3-7a168931b092_20240709_145016_094.jpg, 00:01:53, 24.02 m
Finish node, outfall, reference: Outfall

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Section Inspection - 04/07/2024 - BSMH 10.1X

Item No.	Insp. No.	Date	Time	Client`s Job Ref	Weather	Pre Cleaned	PLR
16	1	04/07/24	14:12	Not Specified	No Rain Or Snow	Yes	BSMH 10.1X

Operator	Vehicle	Camera	Preset Length	Legal Status	Alternative ID
Lee	Not Specified	Not Specified	Not Specified	Not Specified	Not Specified

Town or Village:	Castlemartyr	**Inspection Direction:**	Upstream	**Upstream Node:**	BSMH 10.1
Road:		**Inspected Length:**	29.58 m	**Upstream Pipe Depth:**	
Location:		**Total Length:**	29.58 m	**Downstream Node:**	SMH 11
Surface Type:		**Joint Length:**		**Downstream Pipe Depth:**	

Use:	Surface water	**Pipe Shape:**	Circular
Type of Pipe:		**Dia/Height:**	600 mm
Flow Control:	No flow control	**Material:**	Concrete
Year Constructed:	Not Specified	**Lining Type:**	No Lining
Inspection Purpose:		**Lining Material:**	No Lining

Comments:
Recommendations:

Scale: 1:257

Position [m]	Code	Observation	MPEG	Photo	Grade
0.00	MH	Start node, manhole, reference: SMH 11	00:00:00	BSMH 10.1X_a4b a4e8d-c6b	
0.00	WL	Water level, 5% of the vertical dimension	00:00:12	BSMH 10.1X_275 28dbc-007	
28.78	REM	General remark: Bottom view of MH	00:01:57	BSMH 10.1X_c43 6339a-e04	
29.58	MHF	Finish node, manhole, reference: BSMH 10.1	00:02:08	BSMH 10.1X_3d0 adeb4-809	

Construction Features					Miscellaneous Features				
Structural Defects					Service & Operational Observations				
STR No. Def	STR Peak	STR Mean	STR Total	STR Grade	SER No. Def	SER Peak	SER Mean	SER Total	SER Grade
0	0.0	0.0	0.0	1.0	0	0.0	0.0	0.0	1.0

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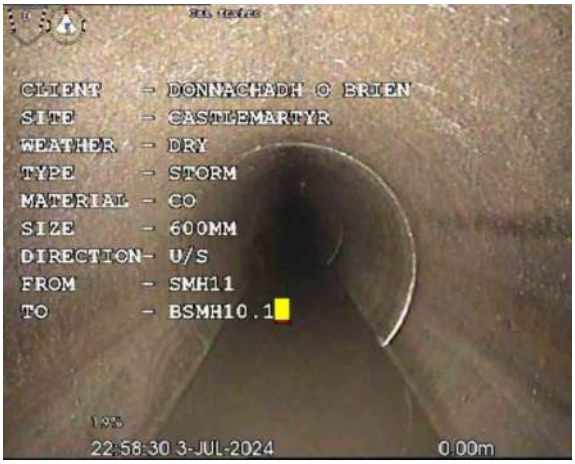
Section Pictures - 04/07/2024 - BSMH 10.1X

Item No.	Inspection Direction	PLR	Client`s Job Ref	Contractor`s Job Ref
16	Upstream	BSMH 10.1X		



BSMH
10.1X_a4ba4e8d-c6bb-4751-af7f-64897aeff298_20240709_145146_344.jpg, 00:00:00, 0.00 m
Start node, manhole, reference: SMH 11

BSMH
10.1X_27528dbc-0076-4499-b36c-d764fea082ee_20240709_145208_394.jpg, 00:00:12, 0.00 m
Water level, 5% of the vertical dimension

BSMH
10.1X_c436339a-e04d-42ef-8a27-0e31c3722b1e_20240709_145302_278.jpg, 00:01:57, 28.78 m
General remark, Bottom view of MH

BSMH
10.1X_3d0adeb4-8096-4dee-ad97-b9ddf1a77752_20240709_145324_125.jpg, 00:02:08, 29.58 m
Finish node, manhole, reference: BSMH 10.1