

12523/RAH/RevA

8th October 2020

CJ Construction (Wales) Ltd
The Builders Yard,
Somerset Lane,
Taibach,
Port Talbot,
SA13 1UA

For the attention of Mr Alex Holland

Dear Sirs,

Melyn Close, Neath - Supplementary Site Investigation

Following our recent supplementary site investigation works at Melyn Close, Neath we are now in a position to summarise our findings and recommendations.

This report (including all appendices to it and any subsequent addendums or correspondence) has been prepared for the sole benefit, use and information of CJ Construction (Wales) Ltd and no third party is entitled or permitted to rely upon it. This report may not be used, reproduced or circulated (in whole or part) for any purpose without the written consent of Intégral Géotechnique (Wales) Limited. Intégral Géotechnique (Wales) Limited shall not be liable to any third party who does not have such express written permission to rely on the report for any losses they may suffer.

This report should be read alongside the Supplementary Site Investigation report ref. 12523/LP/19/SI/RevA dated March 2020.

Background

The site is located in Melyn Close in Neath approximately 1km southwest of Neath at a National Grid Reference of 274480, 196170, see Figure 1.

The site is proposed for residential development (affordable housing) comprising two blocks of flats (Block A and Block B). Reference has been made to Drawing No. R509/200B dated April 2020.

The site is roughly rectangular in shape and occupies an area of approximately 0.22 hectares.

The boundaries of the site are defined by existing residential properties with associated car parking and landscaped areas to the southwest, an existing access lane to the southeast, properties off Helen's Road to the northeast and the rear of properties off the A474 to the northwest.

A Supplementary Site Investigation Report was completed by Intégral Géotechnique (Wales) Ltd report reference 12523/LP/19/SI/RevA which should be read in conjunction with this report in order to gain a greater understanding of the site.

At the time of the previous intrusive site investigation, a five storey block of flats was present in the centre of the site, therefore the underlying ground conditions beneath the floor slabs could not be confirmed. Accordingly, the report recommended that supplementary trial pits be excavated across the site area following the demolition of the former building to obtain samples of made ground and confirm the ground conditions including depths to bedrock.

Scope of Works

Intégral Géotechnique were instructed to undertake a supplementary investigation to confirm the ground conditions and enable contamination sampling beneath a former block of flats. The previous site investigation was undertaken by dynamic windowless sampling which refused on suspected sandstone bedrock, therefore this investigation was also designed to confirm depth to weathered bedrock.

Limitations

It should be noted that vertical and lateral changes in ground conditions may be present between exploratory hole locations.

Fieldworks

This supplementary investigation comprised the following:

- 5 No. trial pits
 - Two shallow trial pits for contamination sampling
 - Three deeper trial pits to confirm ground conditions and depth to bedrock
- Sampling of soils for laboratory chemical testing

Exploratory hole locations were positioned to cover previously inaccessible areas of the site and provide a lateral spread of information.

The shallow trial pits were excavated to between 0.4m and 0.6mbgl and the deeper trial pits were excavated to depths of between 2.3m and 2.4mbgl using a 13 tonne tracked excavator provided by the client. In all locations spalling of the made ground was observed.

Representative soil samples were taken and sent to the laboratories of i2 Analytical for chemical analysis.

Exploratory hole locations are presented on Figure 2.

Ground Conditions

At the time of the investigation, the previous building had been demolished and the investigation surfaced by made ground generally comprising a dark grey slightly ashy gravelly sand.

The ground conditions encountered within the supplementary trial pits typically comprised a layer of made ground to between 1.0m and 1.3mbgl, underlain by superficial deposits overlying weathered bedrock strata.

Made Ground

Made ground was generally consistent in all five trial pit locations, encountered from ground level to depths of between 1.1m and 1.3mbgl, although the base was not proven in the locations of shallow trial pits TP02 and TP04.

Typically, a layer of dark grey to black slightly silty/clayey ashy sand/gravel with cobbles was encountered to circa 0.45m/0.6mbgl overlying a layer of made ground/reworked soils comprising slightly silty gravelly sand. The materials contained various anthropogenic materials such as glass shards, clay pipe fragments, scrap plastic and scrap metal (cans). Gravel comprised fine to coarse sandstone, brick, concrete, slate, coal and limestone and cobbles were of predominantly sandstone, concrete and brick. Occasional boulders of concrete were noted in the footprint of the former buildings, up to 1.0m x 0.4m x 0.15m.

Superficial Deposits

In the deeper trial pit locations TP01, TP03 and TP05, superficial deposits were found to be variable in nature.

In TP01, firm sandy gravelly clay with high cobble content was encountered beneath the made ground to 1.4mbgl overlying medium dense sandy gravel with high cobble content to 1.8mbgl.

In TP03, soft to firm sandy slightly gravelly clay was encountered beneath the made ground to 1.5mbgl overlying superficial deposits/weathered bedrock of medium dense silty clayey gravel of sandstone and mudstone.

In TP05, loose to medium dense slightly gravelly becoming gravelly sand with low cobble content was encountered beneath the made ground to 2.3mbgl.

The relative density of granular soils should be regarded as an estimate owing to the investigation technique (trial pitting) whereby in-situ density cannot be accurately confirmed.

Weathered Bedrock

In TP01, suspected weathered bedrock comprising medium dense gravel of angular to sub-angular sandstone was encountered from 1.8m to 2.3m. This was overlying in-situ very weak brown closely fractured sandstone.

In TP03 and TP05, excavations were terminated at 2.3mbgl on sandstone bedrock, interpreted to be weak to medium strong. Sandstone is grey and fine to medium grained. The excavator was scratching at the base of the trial pits with no progress.

The findings of the supplementary investigation largely accord with the ground conditions encountered during the previous intrusive site investigation, however depth to weathered bedrock has been confirmed at approximately 2.3m in the supplemental locations.

During the preliminary site investigation, BH05 encountered possible bedrock/a sandstone boulder at 0.5mbgl. The supplemental trial pits have consistently encountered the bedrock at greater depths (circa 2.3mbgl), and the findings indicate that the 'refusal' within the preliminary boreholes is likely to be attributed to sandstone cobbles/boulders rather than in-situ bedrock. However, the presence of an exposed rockface in this part of the site may suggest that rockhead is shallower in this part of the site compared to elsewhere.

The trial pit logs are presented in Appendix A.

Groundwater

Groundwater was not encountered in any of the previous dynamic windowless sampling borehole locations or the supplemental trial pit locations to a maximum depth of 2.4mbgl.

It should be noted that groundwater conditions are based on observations made at the time of the fieldwork and groundwater levels may vary due to seasonal and other effects.

Supplementary Contamination Testing

Four samples of made ground collected from depths between 0.1m and 0.4mbgl across the site have been subjected to chemical analysis for a range of contaminants. All chemical test results are included in Appendix B and the results from 2019 and 2020 have been summarized in Appendix C.

The results of the soil contamination testing have been screened against appropriate soil criteria for a proposed residential without homegrown produce end use. The results have been screened against the Suitable 4 Use Levels (S4ULs) derived by LQM in the first instance and CS4L values (or SGVs) adopted where necessary.

The results indicate total organic carbon percentages between 1.7% and 6.1%, therefore indicating equivalent soil organic matter (SOM) percentages between 2.9% and 10.5%. As such, the results have been screening against S4UL thresholds for 2.5% SOM.

The results of the laboratory testing indicate that most of the analysed chemical elements or compounds are present at concentrations below the appropriate thresholds, however exceedances of several contaminants have been identified as follows.

Elevated arsenic concentrations have been identified in four samples, ranging between 44mg/kg and 53mg/kg compared with the screening threshold of 40mg/kg.

Elevated lead concentrations have also been identified in four samples, ranging between 350mg/kg and 810mg/kg compared with the screening threshold of 310mg/kg.

Elevated PAHs have been recorded in four samples, specifically benzo(a)pyrene and benzo(b)fluoranthene in a sample from BH04 at 0.5m only and dibenzo(ah)anthracene in BH04, BH03, TP02 and TP03.

No further exceedances have been identified and no asbestos was detected in any of the samples during the preliminary or supplementary investigation.

The exceedances have been consistent during both the preliminary and the supplementary intrusive investigations, therefore the results are considered to be representative of the made ground underlying the site.

Accordingly, appropriate mitigation measures are required in this area in order to protect site end users from the made ground. These are summarized below in Remedial Mitigation Measures.

Remedial Mitigation Measures

Protection of Construction Workers

In order to protect site workers during construction, the following measures should be maintained:

- Minimum handling of materials;

- Washing of hands prior to all meal breaks, which should be taken in a designated clean area; and
- Appropriate PPE to be worn by all workers.

In dry weather, inhalation of dust and gases should be avoided preferably by the use of dust suppression techniques to minimise fugitive emissions and minimisation of exposed materials at any particular time.

Additionally, a system should be established by which any ‘unusual’ materials that may be encountered are reported rapidly to the site management, so that the appropriate action may be taken, following specialist advice if necessary. An unusual material may be identified on site by colour, odour or physical nature.

Asbestos or asbestos containing materials have not been encountered during the investigation. In the event that potentially asbestos containing materials are encountered, all works to be carried out in accordance with an appropriate risk assessment and managed in accordance with the requirements of the Control of Asbestos Regulations 2012.

Reference should be made to the Health and Safety Executive document “Protection of Workers and the General Public during the development of contaminated land” for detailed guidance on these matters.

Protection of Site End Users

It is considered that a potential risk to human health (site end users) may exist via the following relevant pollutant linkages:

- Dermal contact;
- Ingestion of soil; and
- Inhalation of soil borne dust.

The inhalation of vapours pathways (indoor and outdoor air) are not considered to be active since the contaminants of concern identified are not sufficiently volatile.

It is therefore considered necessary to protect end users from the elevated concentrations of PAH, arsenic and lead in the shallow made ground by breaking the above listed relevant pollutant linkages in order to remove the potential risk.

It is recommended that a capping layer, of a minimum thickness of 600mm, of clean imported subsoil and topsoil is placed in all areas of soft landscaping on top of a geotextile separation membrane. This would break all the above listed relevant pollutant linkages removing the potential risk to future end users.

Alternatively, if all made ground was removed within garden / soft landscaped areas, then the requirement to place the 600mm capping layer would be unnecessary. As such, consideration can be given to removal of the made ground in its entirety from beneath soft landscaped areas. The viability of this option is likely to be dependent on proposed site levels.

Risks to Vegetation

To ensure viable landscape areas by preventing upward migration of contaminants into the overlying soils, and in order to promote plant growth, any landscaped areas will require the provision of a minimum 600mm thick capping layer of clean, inert subsoil and topsoil materials, placed on top of a geotextile separation membrane.

Risks to Controlled Waters

Whilst a thickness of made ground has been encountered across the site, the chemical test results do not indicate significantly elevated contaminant concentrations which are considered potentially leachable.

The proposed capping works and/or made ground encapsulation works alongside the construction of residential apartments with hard standing areas, access roads and managed drainage systems will also greatly reduce the potential for rainwater percolation into the made ground and therefore the generation of any leachate.

Furthermore, soil infiltration testing indicated that the underlying in situ natural soils are of negligible permeability and thus the transmission of any made ground sourced leachate would be limited.

Based on the above, the risks to controlled waters are therefore considered to be low.

Ground Gas Risk

During the supplementary investigation, made ground thickness has been confirmed to be largely the same as the preliminary investigation, recorded to a maximum depth of 1.3mbgl. Accordingly, the findings of the supplementary works have not identified a change in the risk of ground gas migration to the site end use, which remains as low.

Radon protective measures are not required for the site.

Remediation Strategy

An Outline Remediation Strategy is due to be issued alongside this report. Reference should be made to the remediation strategy report to ensure that the above recommended mitigation measures are implemented as part of the site redevelopment.

Engineering Considerations and Recommendations

The following recommendations are based on an understanding that the site levels are to remain largely as per the ground levels at the time of the investigation. The recommendations below should be reviewed and revised where necessary if development levels are to be amended.

The site investigation report recommended that strip/trench fill foundations are adopted for the proposed buildings. The supplemental investigation has confirmed that this will be a viable foundation solution for the proposed development, noting that the supplementary trial pits encountered greater depths to sandstone bedrock, thus indicating that deeper trench fill foundations are likely to be required.

In order to minimise the potential for differential settlement, it is considered that trench fill foundations should extend through the superficial deposits and be founded within the weathered sandstone bedrock. An allowable bearing pressure of 150kN/m² can be used for foundations within the weathered bedrock.

At the above depths and loadings, the total settlements should not exceed 25mm, and any angular distortions caused by differential movements should be less than 1:600.

All foundations should penetrate the above founding stratum by at least 200mm.

During the preliminary investigation, BH05, located in the north of the site, encountered an obstruction at 0.5mbgl. The supplemental investigation has encountered a consistent rockhead level across the site (circa 2.3mbgl) including in TP05 located approximately 15m south of BH05. It is considered likely that the depth to bedrock shallows towards the north, however probably not as dramatically as from 2.3m to 0.5mbgl. Foundations should be appropriately stepped to deal with potentially variable depths to weathered bedrock across Block A.

The results of Atterberg testing of the in-situ natural materials indicates that they exhibit a low shrinkage potential which would indicate a minimum founding depth of 0.75mbgl, however, the requirement to place footings within bedrock indicates that this is not considered relevant.

All foundations should be constructed within uniform strata in order to minimise the potential for any differential settlement. Where foundations span differing founding materials, appropriate reinforcement should be incorporated within the footings, top and bottom.

The presence of made ground consistently greater than 600mm thickness indicates a requirement for suspended floor slabs in the new buildings.

Radon protective measures are not required within the floor slabs at the site.

We trust the above and enclosed are to your satisfaction. However, if you have any queries, or require any further information, please do not hesitate to contact us.

Yours faithfully,



Rebecca Hitt
For
Intégral Géotechnique (Wales) Limited

Enc.

Appendix A – Trial Pit Logs

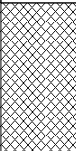
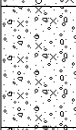
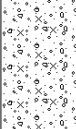
Appendix B – Chemical Test Results

Appendix C – Chemical testing summary sheets - Made Ground (2019 and 2020 Results)

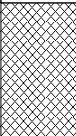
Figures

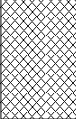
APPENDIX A

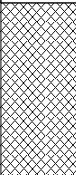
TRIAL PIT LOGS

 Intégral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com			Project Name: Melyn Close			Project No.: 12523		Trial Pit No.: TP01 Sheet 1 of 1	
Location: Neath			Client: Tai Tarian			Logged By: RAH		Scale 1:25	
Equipment: 13 tonne tracked excavator			Coordinates:			Dimensions Depth : 2.40m 2.00m			
Date Excavated: 24/09/2020			Level:						
Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description			
Depth (m)	Type	Results							
0.30	ES		0.50			MADE GROUND: (Loose) Dark grey to black slightly silty/clayey gravelly ash SAND with medium to high cobble content. Contains occasional plastic fragments, ceramic fragments, whole bricks and glass shards. Gravel comprises fine to coarse sub-angular sandstone, concrete, brick and slate. Cobbles are of sub-angular sandstone and concrete. Extends to between 0.4m and 0.5mbgl.			
		MADE GROUND: (Loose to medium dense) Brown to dark grey silty/clayey gravelly SAND. Locally black and ashy and containing occasional glass shard. Gravel comprises predominantly fine to coarse sub-angular sandstone with occasional brick.							
		<i>Redundant yellow gas pipe through eastern edge of TP. Trending N-S.</i>							
1.00			1.40			Firm light grey mottled orange and grey sandy gravelly silty CLAY with high cobble content. Gravel and cobbles are of fine to coarse sub-angular sandstone.			
1.80			2.30			(Medium dense) Grey brown slightly silty/clayey very sandy GRAVEL with high cobble content. Gravel and cobbles comprise fine to coarse angular to sub-rounded sandstone.			
2.40			2.40			(Medium dense to dense) Brown/grey brown slightly silty sandy GRAVEL with high cobble content. Gravel and cobbles comprise fine to coarse sub-angular to angular sandstone. (Weathered Hughes Member) Possible closely fractured sandstone in-situ, no clear structure in TP sides.			
Remarks: Trial pit terminated at 2.4mbgl on suspected sandstone bedrock.			Groundwater: No groundwater encountered.			Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample W - Water sample			
			Stability: Some spalling observed.						

Intégral Géotechnique Intégral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com			Project Name: Melyn Close			Project No.: 12523		Trial Pit No.: TP02 Sheet 1 of 1	
Location: Neath			Client: Tai Tarian			Logged By: RAH		Scale 1:25	
Equipment: 13 tonne tracked excavator			Coordinates:			Dimensions 0.80m			
Date Excavated: 24/09/2020			Level:			Depth : 0.60m 1.20m			
Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description			
Depth (m)	Type	Results							
0.10	ES		0.60			MADE GROUND: (Loose to medium dense) Dark grey to black slightly silty gravelly ashly SAND with high cobble content and low to medium boulder content. Contains occasional clay pipe fragments, timber fragments, scrap plastic and whole bricks. Gravel comprises fine to coarse angular to sub-rounded sandstone, concrete, brick slate and limestone. Cobbles are of sub-angular sandstone and concrete and boulders are concrete up to 1.0m x 0.4m x 0.15m. ...Becoming brown below 0.4mbgl. ----- End of Trialpit at 0.60 m			
Remarks: Trial pit terminated at 0.6mbgl - Contamination sample obtained.			Groundwater: No groundwater encountered.			Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample W - Water sample		AGS	
			Stability: Some spalling observed.						

 Intégral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com			Project Name: Melyn Close			Project No.: 12523		Trial Pit No.: TP03 Sheet 1 of 1	
Location: Neath			Client: Tai Tarian			Logged By: RAH		Scale 1:25	
Equipment: 13 tonne tracked excavator			Coordinates:			Dimensions Depth : 2.30m 2.40m			
Date Excavated: 24/09/2020			Level:			Depth : 2.30m 1.20m			
Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description			
Depth (m)	Type	Results							
0.30	ES		0.45			MADE GROUND: (Loose) Dark grey to black slightly silty/clayey gravelly ashy SAND with low cobble content. Contains scrap plastic, metal (cans), glass shards and whole bricks. Gravel comprises fine to coarse angular to sub-rounded sandstone, brick, concrete and slate. Cobbles are of sub-angular to angular concrete, brick and sandstone. Extends to between 0.3m and 0.45mbgl.			
						MADE GROUND: (Loose) Grey brown to dark grey slightly sandy slightly silty/clayey gravelly SAND with low cobble content. Contains occasional glass shard, coal fragments and slag gravel. Gravel and cobbles comprise sub-rounded to angular concrete, sandstone, brick and slate.			
						Soft to firm brown, orange brown and light brown fine sandy slightly gravelly silty CLAY with low cobble content. Gravel and cobbles comprise sub-rounded to sub-angular sandstone.			
						Firm to stiff mottled light grey and light brown slightly sandy very gravelly silty CLAY with low cobble content. Gravel and cobbles comprise sub-angular to angular mudstone and sandstone.			
						(Medium dense) mottled light grey and brown silty clayey GRAVEL of fine to coarse angular to sub-rounded mudstone and sandstone with low cobble content. Very locally tending to stiff gravelly clay - Up to coarse gravel/small cobble sized lenses recovered. Extends to between 2.1m and 2.3mbgl.			
			2.30			Weak to medium strong grey fine to medium grained SANDSTONE. (Weathered Hughes Member) Recovered as occasional sub-angular cobbles of broken sandstone.			
			2.30			...Below 2.0m is not tending to clay.			
Remarks: Trial pit terminated at 2.1/2.3mbgl on sandstone bedrock.			Groundwater: No groundwater encountered.			Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample W - Water sample			
			Stability: Some spalling observed.						

 Integral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com			Project Name: Melyn Close			Project No.: 12523		Trial Pit No.: TP04 Sheet 1 of 1	
Location: Neath			Client: Tai Tarian			Logged By: RAH		Scale 1:25	
Equipment: 13 tonne tracked excavator			Coordinates:			Dimensions 0.80m			
Date Excavated: 24/09/2020			Level:			Depth : 0.40m 1.20m			
Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description			
Depth (m)	Type	Results							
0.40	ES		0.40			MADE GROUND: (Loose to medium dense) Grey brown mottled brown and dark grey silty/ clayey sandy GRAVEL with medium cobble content. Contains occasional glass shards, plastic fragments ceramic fragments and whole bricks. Gravel comprises fine to coarse sub-rounded to angular sandstone, concrete, brick and slate.			
						End of Trialpit at 0.40 m			
						1			
						2			
						3			
						4			
						5			
Remarks: Trial pit terminated at 0.6mbgl - Contamination sample obtained.			Groundwater: No groundwater encountered.			Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample W - Water sample			
			Stability: Some spalling observed.						

 Intégral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com			Project Name: Melyn Close			Project No.: 12523		Trial Pit No.: TP05 Sheet 1 of 1	
Location: Neath			Client: Tai Tarian			Logged By: RAH		Scale 1:25	
Equipment: 13 tonne tracked excavator			Coordinates:			Dimensions Depth : 2.30m 2.40m			
Date Excavated: 24/09/2020			Level:			Depth : 2.30m 1.20m			
Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description			
Depth (m)	Type	Results							
0.40	ES		0.60			MADE GROUND: (Loose to medium dense) Grey brown slightly silty/clayey SAND and GRAVEL with high cobble content and occasional boulder of concrete. Contains occasional plastic fragments, whole bricks, scrap rebar and rootlets. Gravel and cobbles comprise fine to coarse sub-angular to rounded sandstone, concrete and occasional clinker.			
						MADE GROUND: (Loose to medium dense) Brown locally grey slightly silty gravelly SAND. Gravel comprises sub-angular to rounded sandstone with occasional concrete and brick. (Reworked Soils)			
						(Loose to medium dense) Brown slightly silty slightly gravelly becoming gravelly fine to coarse SAND with low cobble content. Gravel and cobbles comprise fine to coarse sub-rounded to sub-angular sandstone.			
						Suspected weak to medium strong grey medium grained SANDSTONE. (Weathered Hughes Member) Recovered as occasional gravel of sub-angular broken sandstone.			
Remarks: Trial pit terminated at 2.3mbgl on sandstone bedrock.			Groundwater: No groundwater encountered.			Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample W - Water sample			
			Stability: Some spalling observed.						

APPENDIX B

CHEMICAL TEST RESULTS



Rebecca Hitt
Integral Geotechnique
Integral House
7 Beddau Way
Castlegate Business Park
CF83 2AX

t: 02920807991
f: 02920862176
e: rebecca@integralgeotec.com

i2 Analytical Ltd.
7 Woodshots Meadow,
Croxley Green
Business Park,
Watford,
Herts,
WD18 8YS

t: 01923 225404
f: 01923 237404
e: reception@i2analytical.com

Analytical Report Number : 20-32333

Project / Site name:	Melyn Close	Samples received on:	28/09/2020
Your job number:	12523	Samples instructed on/ Analysis started on:	28/09/2020
Your order number:	12523	Analysis completed by:	06/10/2020
Report Issue Number:	1	Report issued on:	06/10/2020
Samples Analysed:	4 soil samples		

Signed: *Karolina Marek*

Karolina Marek
PL Head of Reporting Team
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
leachates - 2 weeks from reporting
waters - 2 weeks from reporting
asbestos - 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 20-32333

Project / Site name: Melyn Close

Your Order No: 12523

Lab Sample Number		1632187	1632188	1632189	1632190
Sample Reference		TP02	TP03	TP04	TP05
Sample Number		None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)		0.10	0.30	0.40	0.40
Date Sampled		24/09/2020	24/09/2020	24/09/2020	24/09/2020
Time Taken		0900	0915	0930	1015
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status		

Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	17	13	11	8
Total mass of sample received	kg	0.001	NONE	1.3	1.3	1.3	1.3

Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected
------------------	------	-----	-----------	--------------	--------------	--------------	--------------

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	7.7	9.2	9.6	10.8
Total Cyanide	mg/kg	1	MCERTS	< 1	2	< 1	< 1
Total Sulphate as SO ₄	mg/kg	50	MCERTS	2100	2900	3900	4500
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.4	0.29	0.77	1
Sulphide	mg/kg	1	MCERTS	6.7	10	4.4	140
Total Sulphur	mg/kg	50	MCERTS	990	1200	1100	2100
Total Organic Carbon (TOC)	%	0.1	MCERTS	5.1	5.2	2.4	1.7
Loss on Ignition @ 450oC	%	0.2	MCERTS	15.1	16.7	7.4	4.7

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
----------------------------	-------	---	--------	-------	-------	-------	-------

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	0.25	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	0.22	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	1.6	1.7	1.4	1.3
Anthracene	mg/kg	0.05	MCERTS	0.34	0.35	0.32	0.27
Fluoranthene	mg/kg	0.05	MCERTS	4.3	3.6	2.4	3
Pyrene	mg/kg	0.05	MCERTS	3.7	3	2.1	2.4
Benzo(a)anthracene	mg/kg	0.05	MCERTS	2.7	2.4	1.4	1.6
Chrysene	mg/kg	0.05	MCERTS	2.6	2.4	1.2	1.5
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	2.8	4	1.9	1.7
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	2.4	1	0.59	0.76
Benzo(a)pyrene	mg/kg	0.05	MCERTS	3	2.4	1.3	1.3
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	1.2	1.4	0.66	0.63
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.35	0.58	0.21	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	1.3	1.5	0.74	0.7

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	26.2	24.6	14.3	15.2
-----------------------------	-------	-----	--------	------	------	------	------



Analytical Report Number: 20-32333

Project / Site name: Melyn Close

Your Order No: 12523

Lab Sample Number	1632187	1632188	1632189	1632190
Sample Reference	TP02	TP03	TP04	TP05
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)	0.10	0.30	0.40	0.40
Date Sampled	24/09/2020	24/09/2020	24/09/2020	24/09/2020
Time Taken	0900	0915	0930	1015
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status	

Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	50	44	32	21
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	1.6	1.4	0.72	0.6
Boron (water soluble)	mg/kg	0.2	MCERTS	0.8	0.7	0.4	0.3
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	2	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	22	27	20	20
Copper (aqua regia extractable)	mg/kg	1	MCERTS	280	230	120	65
Lead (aqua regia extractable)	mg/kg	1	MCERTS	540	500	180	62
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	0.4	0.8	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	42	53	27	22
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	1.6	1.2	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	40	38	26	22
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	550	900	270	130

U/S = Unsuitable Sample I/S = Insufficient Sample



Analytical Report Number : 20-32333
Project / Site name: Melyn Close

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
1632187	TP02	None Supplied	0.1	Brown loam and sand with gravel and vegetation.
1632188	TP03	None Supplied	0.3	Brown loam and sand with gravel.
1632189	TP04	None Supplied	0.4	Brown loam and sand with gravel.
1632190	TP05	None Supplied	0.4	Brown loam and sand with gravel and vegetation.



Analytical Report Number : 20-32333

Project / Site name: Melyn Close

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazine followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Loss on ignition of soil @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace.	In house method.	L047-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Sulphide in soil	Determination of sulphide in soil by acidification and heating to liberate hydrogen sulphide, trapped in an alkaline solution then assayed by ion selective electrode.	In-house method	L010-PL	D	MCERTS
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS



Analytical Report Number : 20-32333
Project / Site name: Melyn Close

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
----------------------	-------------------------------	-----------------------------	---------------	--------------------	----------------------

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
 For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
 Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

APPENDIX C

CHEMICAL TESTING SUMMARY SHEETS - MADE GROUND (2019 AND 2020 RESULTS)

SUMMARY OF LABORATORY SOIL TEST RESULTS

METALS AND SEMI-METALS

Job No.: 12523
 Site: Melyn Close, Neath
 Soil Type: Made Ground
 Soil Organic Matter: 2.5%

No.	Location	Depth (m)	Arsenic (mg/kg)	Boron (mg/kg)	Beryllium (mg/kg)	Cadmium (mg/kg)	Chromium (mg/kg)	Chromium (VI) (mg/kg)	Copper (mg/kg)	Lead (mg/kg)	Mercury (Elemental) (mg/kg)	Nickel (mg/kg)	Selenium (mg/kg)	Vanadium (mg/kg)	Zinc (mg/kg)
Preliminary Site Investigation															
1	BH1	0.20	45	0.3	0.81	< 0.2	19	< 4.0	120	110	< 0.3	23	2.6	28	150
2	BH4	0.50	53	0.2	1.5	1.4	33	< 4.0	550	810	0.9	55	< 1.0	35	970
3	BH3	0.30	37	0.3	1.0	1.0	27	< 4.0	240	350	< 0.3	31	< 1.0	36	530
Supplementary Site Investigation															
4	TP02	0.10	50	0.8	1.6	< 0.2	22	< 4.0	280	540	0.4	42	< 1.0	40	550
5	TP03	0.30	44	0.7	1.4	2	27	< 4.0	230	500	0.8	53	1.6	38	900
6	TP04	0.40	32	0.4	0.72	< 0.2	20	< 4.0	120	180	< 0.3	27	1.2	26	270
7	TP05	0.40	21	0.3	0.6	< 0.2	20	< 4.0	65	62	< 0.3	22	< 1.0	22	130
Screening Criteria Value			40.0	11000.0	1.7	85.0	-	6.0	7100.0	310.0	1.2	180.0	430.0	1200.0	40000.0
Source of Screening Criteria Value			S4UL	S4UL	S4UL	S4UL	-	S4UL	S4UL	C4SL	S4UL	S4UL	S4UL	S4UL	S4UL

SUMMARY OF LABORATORY SOIL TEST RESULTS

INORGANIC CHEMICALS & OTHERS

Job No.: 12523
Site: Melyn Close, Neath
Soil Type: Made Ground
Soil Organic Matter: 2.5%

No.	Location	Depth (m)	Cyanide (mg/kg)	Loss on ignition, dried solids (%)	Moisture content at 30 C (%)	Phenol (mg/kg)	pH (pH units)	Water Soluble Sulphate (g/l)	Sulphate Total as SO4 (mg/kg)	Sulphide (mg/kg)	Total Sulphur (mg/kg)	TOC by Ignition in O2 (%)	Equivalent SOM (%)	Asbestos in Soil	Asbestos Quantification (%)
Preliminary Site Investigation															
1	BH1	0.20	< 1	8.9	16	< 1.0	8.1	0.015	630	< 1.0	370	3.6	6.19	Not-detected	-
2	BH4	0.50	2	17.8	18	< 1.0	7.7	0.026	820	< 1.0	740	6.1	10.49	Not-detected	-
3	BH3	0.30	< 1	10.0	18	< 1.0	7.9	0.033	820	< 1.0	560	3.6	6.19	Not-detected	-
Supplementary Site Investigation															
4	TP02	0.10	< 1	15.10	17.00	< 1.0	7.70	0.40	2100	6.70	990.00	5.10	8.77	Not-detected	-
5	TP03	0.30	2.00	16.70	13.00	< 1.0	9.20	0.29	2900	10.00	1200.00	5.20	8.94	Not-detected	-
6	TP04	0.40	< 1	7.40	11.00	< 1.0	9.60	0.77	3900	4.40	1100.00	2.40	4.13	Not-detected	-
7	TP05	0.40	< 1	4.70	8.00	< 1.0	10.80	1.00	4500.00	140.00	2100.00	1.70	2.92	Not-detected	-
Screening Criteria Value			34.0	-	-	1300.0	-	-	-	-	-	-	-	-	0.001
Source of Screening Criteria Value			ATRISK	-	-	S4UL	-	-	-	-	-	-	-	-	IOM

SUMMARY OF LABORATORY SOIL TEST RESULTS

POLYAROMATIC HYDROCARBONS (PAH)

Job No.: 12523
Site: Melyn Close, Neath
Soil Type: Made Ground
Soil Organic Matter: 2.5%

No.	Location	Depth (m)	Acenaphthene (mg/kg)	Acenaphthylene (mg/kg)	Anthracene (mg/kg)	Benzo(a)anthracene (mg/kg)	Benzo(a)pyrene (mg/kg)	Benzo(b)fluoranthene (mg/kg)	Benzo(ghi)perylene (mg/kg)	Benzo(k)fluoranthene (mg/kg)	Chrysene (mg/kg)	Dibenzo(ah)anthracene (mg/kg)	Fluoranthene (mg/kg)	Fluorene (mg/kg)	Indeno(123cd)pyrene (mg/kg)	Naphthalene (mg/kg)	Phenanthrene (mg/kg)	Pyrene (mg/kg)
Preliminary Site Investigation																		
1	BH1	0.20	< 0.05	< 0.05	< 0.05	0.93	0.86	1.2	0.74	0.67	1.2	< 0.05	1.4	< 0.05	0.50	< 0.05	0.50	1.3
2	BH4	0.50	0.27	0.39	0.90	7.6	6.7	8.7	5.3	4.0	8.3	1.2	16	0.45	4.2	0.39	6.9	13
3	BH3	0.30	< 0.05	0.23	0.38	2.6	2.6	3.8	2.1	1.7	3.1	0.63	4.5	< 0.05	1.8	0.51	1.9	3.7
Supplementary Site Investigation																		
4	TP02	0.10	< 0.05	< 0.05	0.34	2.7	3	2.8	1.3	2.4	2.6	0.35	4.3	< 0.05	1.2	< 0.05	1.6	3.7
5	TP03	0.30	< 0.05	0.25	0.35	2.4	2.4	4	1.5	1	2.4	0.58	3.6	0.22	1.4	< 0.05	1.7	3
6	TP04	0.40	< 0.05	< 0.05	0.32	1.4	1.3	1.9	0.74	0.59	1.2	0.21	2.4	< 0.05	0.66	< 0.05	1.4	2.1
7	TP05	0.40	< 0.05	< 0.05	0.27	1.6	1.3	1.7	0.7	0.76	1.5	< 0.05	3	< 0.05	0.63	< 0.05	1.3	2.4
Screening Criteria Value			4700.0	4600.0	35000.0	14.0	3.2	4.0	360.0	110.0	31.0	0.3	1600.0	3600.0	46.0	5.6	1500.0	3800.0
Source of Screening Criteria Value			S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL

SUMMARY OF LABORATORY SOIL TEST RESULTS

PETROLEUM HYDROCARBONS

Job No.: 12523
Site: Melyn Close, Neath
Soil Type: Made Ground
Soil Organic Matter: 2.5%

No.	Location	Depth (m)	Aliphatic C5-C6 (mg/kg)	Aliphatic C6-C8 (mg/kg)	Aliphatic C8-C10 (mg/kg)	Aliphatic C10- C12 EPH (mg/kg)	Aliphatic C12- C16 EPH (mg/kg)	Aliphatic C16-C35 EPH (mg/kg)	Aliphatic C35- C44 EPH (mg/kg)	Aromatic C5-C7 (mg/kg)	Aromatic C7-C8 (mg/kg)	Aromatic C8-C10 (mg/kg)	Aromatic C10- C12 EPH (mg/kg)	Aromatic C12- C16 EPH (mg/kg)	Aromatic C16- C21 EPH (mg/kg)	Aromatic C21- C35 EPH (mg/kg)	Aromatic C35- C40 EPH (mg/kg)
1	BH1	0.20	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 8.4	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	25	< 8.4
2	BH4	0.50	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 8.4	< 0.001	< 0.001	< 0.001	4.6	12	100	280	78
3	BH3	0.30	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 8.4	< 0.001	< 0.001	< 0.001	6.1	12	37	130	29
Screening Criteria Value			78.0	230.0	65.0	330.0	2400.0	92000.0	92000.0	0.7	1900.0	110.0	590.0	2300.0	1900.0	1900.0	1900.0
Source of Screening Criteria Value			S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL

FIGURES



NORTH

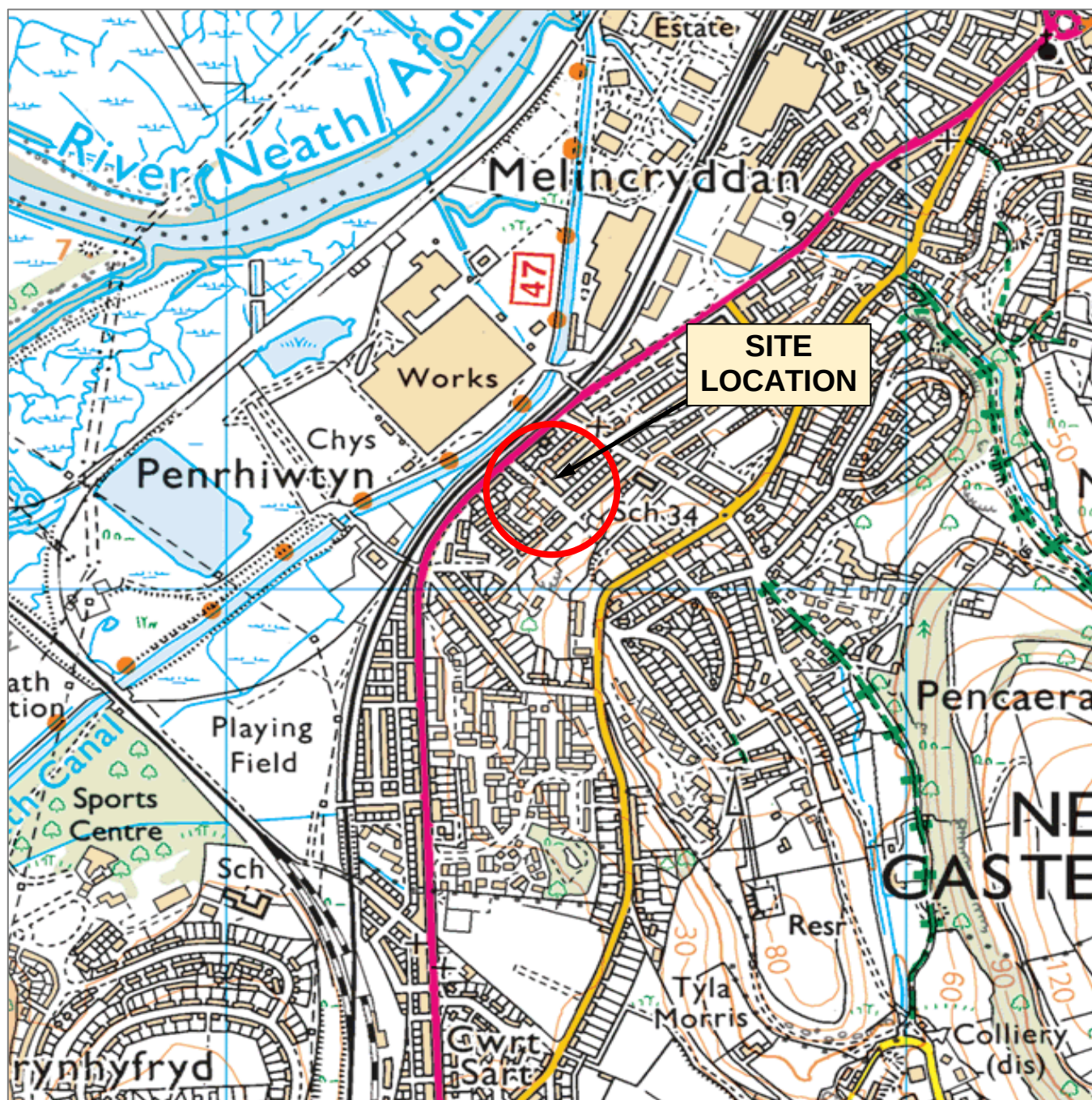


Figure 1: Site Location Plan

12523: Melyn Close, Neath

Intégral
Géotechnique

Intégral House
7 Beddau Way
Castlegate Business Park
Caerphilly
CF83 2AX
Tel: 029 2080 7991
Fax: 029 2086 2176



Figure 2: Site Plan

Project: Melyn Close, Neath

Client: CJ Construction

Job no.: 12523

Scale: 1:500 at A4

Intégral
Géotechnique

Integral House,
7 Beddau Way,
Castlegate Business Park,
Caerphilly,
CF83 2AX.
Tel: 029 2080 7991