

Powells Rural Property Professionals Limited  
Singleton Court Business Park  
Wonastow Road  
Monmouth  
NP25 5JA

Our ref: TC/5101  
FoDDC Planning Ref: P/1927/21/FUL

17 February 2023

F.A.O Stuart Leaver

Dear Stuart,

RE: BROADMOOR COTTAGE, 6 STEAM MILLS ROAD, CINDERFORD GL14 3HY

### **Introduction**

Forest of Dean District Council (FoDDC) has granted consent for the construction of a new residential development at the above site. The Coal Authority (CA) have registered a "Material Concern" on account of it lying within a "Development High Risk Area". A Coal Mining Risk Assessment (previously undertaken by others) identified that site is currently at potential risk as a result of CA recorded shallow workings within the Lowery Coal Seam at 23m depth directly below the site.

In line with your instruction, this Practice has undertaken intrusive investigation to confirm the ground profile (i.e. depth and condition of the coal seam and thickness and condition of competent rock cover) to establish any safety and stability risk to the proposed development. Those findings are discussed below. It is intended that this be submitted to FoDDC in support of your planning application.

### **Objectives**

The objectives of this investigation are to:

Physically identify any potential coal mining legacy issues through intrusive investigation,

If proven, subsequently demonstrate how such coal mining legacy issues may influence the proposed development and assess any risks to the proposed development arising from the coal mining legacy, including any cumulative effects,

Demonstrate to the Local Authority that the application site either is, or can be made, safe and stable to meet the requirements of the National Planning Policy Framework with regard to development on unstable land.

### ***Background Setting***

Centred on National Grid Reference 365045, 215065 the site is located on the northwestern outskirts of Cinderford, Gloucestershire, some 1.0 km north-west of the town centre as shown on drawing 5101/1. The geology of the site is shown on the British Geological Survey (BGS) 1:10,000 scale mapping sheet SO61 SE and online, which indicates it to be underlain by bedrock of the Cinderford Member (CIFD) with a superficial covering of Head (Hd).

### ***Siteworks***

A programme of exploratory drilling was undertaken on 1-2 February 2023 by rotary open hole drilling. No buried service plans were provided however anecdotal records were acquired from the landowner and a CAT electrical service scanner was deployed at surface prior to any intrusive works; no services were encountered. Five boreholes (BH01 -BH05) were drilled vertically to 30m depth using a Klemm rotary drilling rig with water used as the flushing medium. Borehole locations were selected by this Practice in order to provide suitable coverage of the site and with regard to the proposed development layout and their positions are shown on drawing 5101/2. The borehole arisings were logged on-site by the experienced lead driller and these logs are attached as Appendix 1. Precautionary gas monitoring undertaken at each borehole did not record the presence of methane, carbon monoxide or hydrogen sulphide gases. No monitoring wells were installed or samples taken and upon completion of drilling all boreholes were backfilled to surface using a mixture of OPC and arisings.

### ***Discussion On Ground Conditions***

The boreholes have been assessed in conjunction with published British Geological Survey (BGS) geological mapping (SO61 SE) and CA records. Below a shallow surface mantle of made ground (fill) borehole findings generally concur with the expected ground profile, initially encountering undisturbed clay likely representing both superficial Hd and the upper weathered mantle of the recorded CIFD. Bedrock was encountered below depths of between 2.6m and 3.9m and consisted of interbedded mudstone and sandstone with coal seams.

The drillers logs are attached as Appendix 1 with summary findings tabulated below.

**TABLE 1: SUMMARY EXPLORATORY BOREHOLE FINDINGS**

Proven depth of (m bgl)		Borehole No.				
		BH01	BH02	BH03	BH04	BH05
Rockhead		3.4	2.6	3.9	3.0	2.6
Crow Coal Seam	Depth	10.7-11.2	12.0-12.4	13.0-13.5	14.8-15.3	11.8-12.3
	Possible Evidence of Workings	No	No	No	No	No
	Rock Cover to Seam Extraction Ratio	N/A	N/A	N/A	N/A	N/A
Twenty Coal Seam	Depth	13.5-13.7	Not proven	15.4-15.6	18.4-18.6	16.4-16.6
	Possible Evidence of Workings	No	No	No	No	No
	Rock Cover to Seam Extraction Ratio	N/A	N/A	N/A	N/A	N/A
Lowery Coal Seam	Depth	24.7-25.0	Not proven	26.9-27.0	Not proven	Not proven
	Possible Evidence of Workings	No	Yes	No	No	Yes
	Rock Cover to Seam Extraction Ratio	N/A	>12	N/A	N/A	>14

The CA had record of shallow workings within the Lowery coal seam below the site. The Lowery was notably absent in boreholes BH02, BH04 and BH05, with boreholes BH02 and BH05 instead recording the presence of both weak ground and firm drilling together with a significant loss of drilling flush. No voids were recorded and it is interpreted that these two boreholes have likely encountered workings that have since collapsed, possibly with some floor uplift having also occurred.

Considering BH04, no broken ground, voids or loss of flush was recorded and based on the shallower ground profile in this borehole it is thought that its absence is because the coal seam and/or any associated workings are locally deeper (i.e. >30m).

### **Ground Stability Risk Assessment**

When assessing potential ground stability risk associated with shallow abandoned mine workings within a particular seam, it is normal practice to require a thickness of overlying rock cover equivalent to at least ten times the thickness of the mined horizon, excluding the thickness of any superficial deposits or made ground above rockhead.

The boreholes show that whilst the Crow and Twenty coal seams underlie the site at very shallow depth they appear to remain unworked. Regarding the Lowery coal seam, although evidence of abandoned (and collapsed) workings was identified in boreholes BH02 and BH05, calculated rock cover ratios of >12 adequately exceed the requisite value of 10. On this basis it is considered

that the suspected shallow workings within the Lowery Coal seam are sufficiently deep that they do not pose a future stability risk so can be discounted.

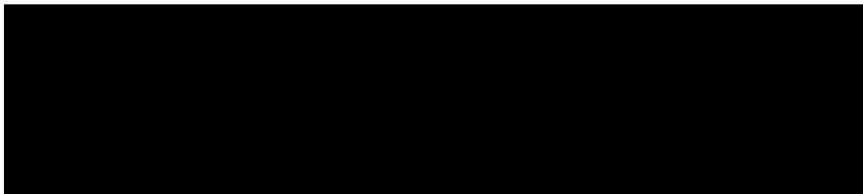
### **Conclusions**

The intrusive investigation has identified that this site does have a coal mining legacy, as suspected collapsed workings were locally identified within the Lowery coal seam. Despite the foregoing, this legacy is not considered to have any influence on the proposed development as it is considered that there is no viable risk of upward void migration from the Lowery which could pose a stability risk to the site surface.

In view of the foregoing, it is considered that the application site is safe and stable and meets the requirements of the National Planning Policy Framework with regard to development on unstable land.

The above recommendations must not be used in respect of any development differing in any way from the proposals described within this report, without reference back to this Practice or to another geotechnical specialist. This report is subject to our standard terms and conditions as attached.

Yours sincerely,

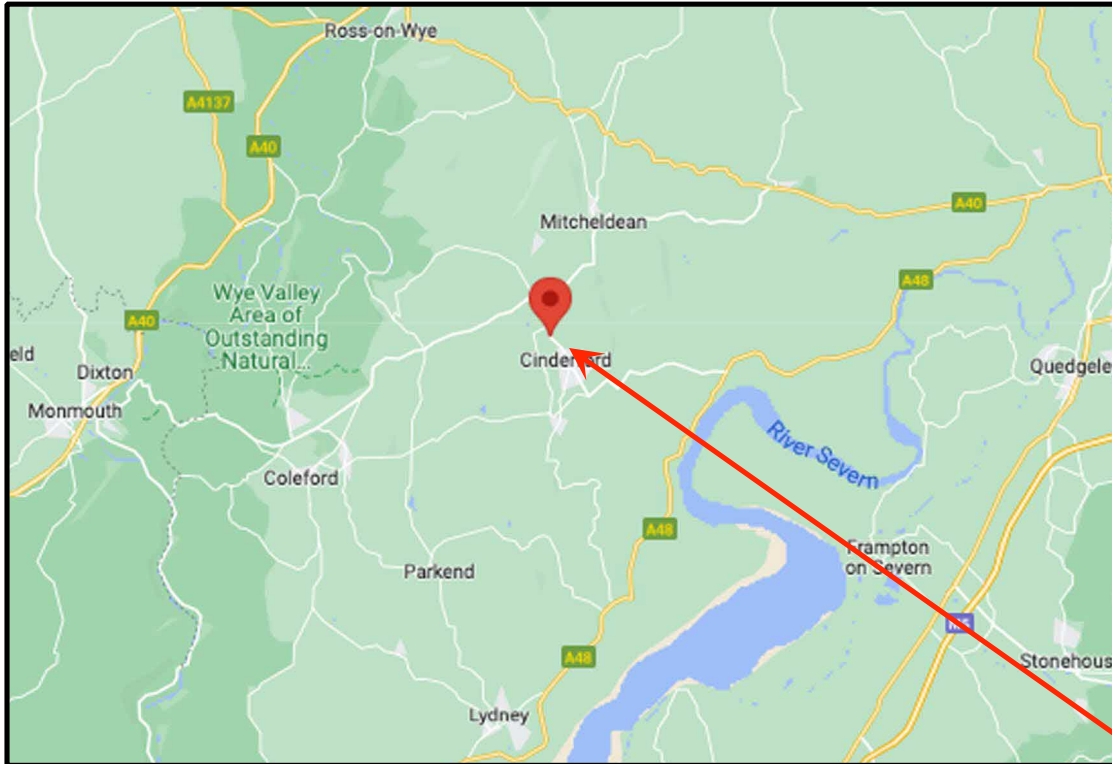


TIMOTHY D COE BSc (Hons) MSc FGS  
PRINCIPAL GEOLOGIST  
for  
WILSON ASSOCIATES (CONSULTING) LIMITED

Encl.

SITE LOCATION (based on Microsoft Bing Mapping)

Job No.	Drawing No.	Scale:	Date:
5101	5101/1	NTS	19-12-2022



THE!  
SITE



PROPOSED SITE LAYOUT SHOWING INTRUSIVE BOREHOLE LOCATIONS (based on TNR Architects drg 010.12.013, Rev A, dated 23.03.22)

Job No. 5101	Drawing No. 5101/2	Scale: 1:500 @ A4	Date: 17-02-23
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## DAILY SITE RECORD GROUND INVESTIGATION

DAY	<u>Wednesday</u>	DATE	<u>1-02-23</u>	SITE	<u>Broadmeor Cottage Cinderford</u>
CLIENT / CONTRACT					JOB No.

BH	DEPTH		CASING	FORMATION	RUN No.	DEPTH		T.C.R.	PENETRATION RATE
	FROM	TO				FROM	TO		
Bh02	GL	0 80	4 00	Fill					
	0 80	2 60		Yellow brown Clay					
	2 60	6 50		Yellow brown & Grey Mudstone & Sandstone					
	6 50	6 80		Coal					
	6 80	12 00		Grey Mudstone & Sandstone					
	12 00	12 40		Coal					
	12 40	21 30		Grey & Yellow brown Mudstone & Sandstone					
	21 30	22 50		Weak lost 100% Flush					
	22 50	26 80		Firm drilling no returns					
	26 80	30 00		Regained 20% Flush Yellow brown Mudstone returns					
Bh01	GL	0 70	4 00	Fill					
	0 70	3 40		Yellow brown clay					
	3 40	5 30		Yellow brown & Grey Mudstone & Sandstone					
	5 30	5 50		Coal					
	5 50	10 70		Yellow brown & Grey Mudstone & Sandstone					
	10 70	11 20		Coal					
	11 20	13 50		Yellow brown & Grey Mudstone					
	13 50	13 70		Coal					
	13 70	24 70		Grey & Yellow brown Mudstone & Sandstone					
	24 70	25 00		Coal					
	25 00	30 00		Grey Mudstone					

WATER LEVELS	TIME	FLUSHING MEDIUM	PLANT IN USE	<u>Klemm</u>
START OF SHIFT		AIR <input type="checkbox"/> WATER <input type="checkbox"/> <input checked="" type="checkbox"/> FOAM <input type="checkbox"/> OTHER <input type="checkbox"/>		
MID-SHIFT		LOSS OF FLUSH / EXTENT	START TIME	
END OF SHIFT			BREAK TIME	
OTHER COMMENTS		OPEN HOLE DRILLING	FINISH TIME	
FIRST STRUCK		BIT TYPE <u>Button</u>	WEATHER <u>DRY</u>	
SEEPAGES		BIT SIZE <u>70MM</u>	GAS MONITORING	
DRYING OUT		CORE DRILLING	CH <sub>4</sub> : <u>0</u> % LEL H <sub>2</sub> S : <u>0</u> PPM	
		BIT TYPE	CO : <u>0</u> PPM O <sub>2</sub> : <u>20.9</u> %	
CASING SIZE - DEPTH <u>101MM - 400M</u>		BIT SIZE	NOTES:	
		BACKFILL <u>OPC - Arising's</u>	REMARKS - VISITORS	
CORE BARREL - LINER		STANDPIPES/ PIEZOMETERS		
		INSTRUMENTATION	R.E. ....	

## DAILY SITE RECORD GROUND INVESTIGATION

DAY	<u>Wednesday</u>	DATE	<u>1-02-23</u>	SITE	<u>Broadmoor Cottage Cindeferd</u>
CLIENT / CONTRACT					JOB No.

BH	DEPTH		CASING	FORMATION	RUN No.	DEPTH		T.C.R.	PENETRATION RATE
	FROM	TO				FROM	TO		
<u>Bh03</u>	<u>GL</u>	<u>0.70</u>	<u>4.00</u>	<u>Fill</u>					
	<u>0.70</u>	<u>3.90</u>		<u>Yellow brown clay</u>					
	<u>3.90</u>	<u>8.00</u>		<u>Yellow brown &amp; Grey Mudstone &amp; Sandstone</u>					
	<u>8.00</u>	<u>8.10</u>		<u>Coal</u>					
	<u>8.10</u>	<u>13.00</u>		<u>Yellow brown &amp; Grey Mudstone &amp; Sandstone</u>					
	<u>13.00</u>	<u>13.50</u>		<u>Coal</u>					
	<u>13.50</u>	<u>15.40</u>		<u>Yellow brown &amp; Grey Mudstone</u>					
	<u>15.40</u>	<u>15.60</u>		<u>Coal</u>					
	<u>15.60</u>	<u>26.90</u>		<u>Grey &amp; Yellow brown Mudstone &amp; Sandstone</u>					
	<u>26.90</u>	<u>27.00</u>		<u>Coal</u>					
	<u>27.00</u>	<u>30.00</u>		<u>Grey Mudstone</u>					

<b>WATER LEVELS</b>	<b>TIME</b>	<b>FLUSHING MEDIUM</b>	<b>PLANT IN USE</b>	<u>Kleyn</u>
START OF SHIFT		AIR   WATER   <input checked="" type="checkbox"/> FOAM   OTHER		
MID-SHIFT		LOSS OF FLUSH / EXTENT	START TIME	
END OF SHIFT			BREAK TIME	
<b>OTHER COMMENTS</b>		<b>OPEN HOLE DRILLING</b>	FINISH TIME	
FIRST STRUCK		BIT TYPE <u>Butten</u>	WEATHER <u>DRY</u>	
SEEPAGES		BIT SIZE <u>70MM</u>	<b>GAS MONITORING</b>	
DRYING OUT		<b>CORE DRILLING</b>	CH <sub>4</sub> : <u>0</u> % LEL   H <sub>2</sub> S : <u>0</u> PPM	
		BIT TYPE	CO : <u>0</u> PPM   O <sub>2</sub> : <u>20.9</u> %	
CASING SIZE - DEPTH <u>101MM - 4.00M</u>		BIT SIZE	NOTES:	
		BACKFILL <u>OPC - Arisings</u>	<b>REMARKS - VISITORS</b>	
CORE BARREL - LINER		STANDPIPES/ PIEZOMETERS		
		INSTRUMENTATION	R.E. ....	



## DAILY SITE RECORD GROUND INVESTIGATION

DAY	<u>Thursday</u>	DATE	<u>2-02-23</u>	SITE	<u>Broadmoor Cottage Cinderford</u>
CLIENT / CONTRACT					JOB No.

BH	DEPTH		CASING	FORMATION	RUN No.	DEPTH		T.C.R.	PENETRATION RATE
	FROM	TO				FROM	TO		
Bh04	GL	0.60	4.00	Fill					
	0.60	3.00		Yellow brown clay					
	3.00	10.00		Yellow brown & Grey sandstone & Mudstone					
	10.00	10.10		Coal					
	10.10	14.80		Grey & Yellow brown Mudstone					
	14.80	15.30		Coal					
	15.30	18.40		Grey Mudstone					
	18.40	18.60		Coal					
	18.60	30.00		Grey & Yellow brown sandstone & Mudstone					
Bh05	GL	0.70	4.00	Fill					
	0.70	2.60		Yellow brown clay					
	2.60	7.90		Yellow brown & Grey sandstone & Mudstone					
	7.90	8.10		Coal					
	8.10	11.80		Grey Mudstone					
	11.80	12.30		Coal					
	12.30	16.40		Grey Mudstone					
	16.40	16.60		Coal					
	16.60	24.80		Grey Mudstone & Sandstone					
	24.80	27.40		Weak lost-100y. Flush					
	27.40	28.50		Firm drilling no returns					
	28.50	30.00		Yellow brown Sandstone regained 100y. Flush					

WATER LEVELS	TIME	FLUSHING MEDIUM	PLANT IN USE	<u>Klemm</u>
START OF SHIFT		AIR <input type="checkbox"/> WATER <input type="checkbox"/> <input checked="" type="checkbox"/> FOAM <input type="checkbox"/> OTHER <input type="checkbox"/>		
MID-SHIFT		LOSS OF FLUSH / EXTENT	START TIME	
END OF SHIFT			BREAK TIME	
OTHER COMMENTS		OPEN HOLE DRILLING	FINISH TIME	
FIRST STRUCK		BIT TYPE <u>Butten</u>	WEATHER	<u>DRY</u>
SEEPAGES		BIT SIZE <u>70MM</u>	GAS MONITORING	
DRYING OUT		CORE DRILLING	CH <sub>4</sub> : <u>0</u> % LEL H <sub>2</sub> S : <u>0</u> PPM	
		BIT TYPE	CO : <u>0</u> PPM O <sub>2</sub> : <u>20.9</u> %	
CASING SIZE - DEPTH	<u>101MM - 4.00M</u>	BIT SIZE	NOTES:	
		BACKFILL <u>OPC - Arisings</u>	REMARKS - VISITORS	
CORE BARREL - LINER		STANDPIPES/PIEZOMETERS		
		INSTRUMENTATION	R.E. ....	

## CONDITIONS OF CONTRACT - CONSULTANCY SERVICES

- 1 Wilson Associates (Consulting) Limited ("the Consultant") shall carry out the Services, including any proposal, report or other document, as detailed in any relevant correspondence, which forms part of this Agreement, for the Client with reasonable skill, care and diligence. The Consultant shall use reasonable endeavours to adhere to any agreed programme. Each instruction or acceptance of a quotation shall be deemed to be an offer to purchase the services subject to the conditions laid out in this document.
- 2 An interim invoice will normally be submitted upon completion of the site works, to include all disbursements and fees to date, and for contracts extending over a long period, monthly invoices will be submitted for payment. The final report will not be issued until payment of the first interim invoice has been received, unless agreed with this Practice beforehand. Invoices are not to be assigned to a third party without prior agreement. Should the contract be cancelled after either preparatory or fieldwork has commenced then a claim will be made for work completed to that date.
- 3 The rates quoted, are net of Value Added Tax (VAT) which will be added to invoices at the standard prevailing rate, and are valid for a period of 12 weeks from the date of the quote. The Consultant shall issue accounts monthly in respect of that part of the Services carried out in the preceding period. The Client shall make payment of accounts without discount or retention within 30 days of submission. Disputes should be raised within 10 days. In the event of non-payment of the account(s) within the specified period the Consultant reserves the right to charge, from time to time, interest on the unpaid amount at the rate of 2% per calendar month above the Bank of England base rate (at time of original invoice date).
- 4 In the event of non-payment of the account(s), the Client undertakes to pay to the Consultant all costs and expenses, on an indemnity basis, incurred by the Consultant in: (i) the recovery from the Client of money or arrears (ii) the enforcement of any of the provisions of these conditions of contract (iii) the service of any notice relating to the breach by the Client of any of their obligations under this contract whether or not the same shall result in court proceedings (iv) the cost of any bank or other charges incurred by the Consultant if any cheque written by the Client is dishonoured or if any standing order payment is withdrawn by the Client's bankers (v) compensation for the breach of any terms of this agreement.
- 5 Unless expressly stipulated to the contrary, payment of the account(s) is not dependent upon the Client achieving regulatory approval for or discharge of a planning condition relating to the project, nor is it dependent upon the Client's securing of funding for the development where this may be conditional upon the prior granting of planning or building regulations approval, nor the Client's onward sale of the site to another party. In the case of provision of services to another consultant, payment of our account is not dependent upon the prior settlement of their own account by their Client.
- 6 No work will commence until an official written order or completed Quote Acceptance form has been received by post or email. Such order will be deemed to constitute acceptance of the quotation and these terms and conditions. Where the instruction to undertake the Services may have been issued by an intermediary on behalf of the Client, full Client details including confirmation of and contact details for the person responsible for authorising payment must be provided to the Consultant. In the event that the Client defaults or otherwise fails to pay the due account, the Consultant reserves the right to pursue and recover any unpaid amount from the instructing intermediary.
- 7 Neither party shall assign any obligation or benefit under this Agreement without prior written consent of the other Party. The Client shall not be entitled to assign the report(s) or any part of it without our prior written consent. Re-assignment of reports can be provided on request, subject to liaison with our Insurers and standard administration costs. Any assignment shall exclude the Contracts (Rights of Third Parties) Act 1999. Provision of a Collateral Warranty can only be considered if it is agreed at the pre-works stage, and fees for legal advice and warranty provision agreed before the works commence.
- 8 The Client guarantees that it has the right to have the Services performed and that he has obtained all the necessary certificates, licences, permits and consents required by Statute or any order or regulation made there under or by any regulation or by-law of any authority undertaker. The Client shall indemnify and hold harmless the Consultant from and against all consequences of a failure in this respect. The Client shall arrange such rights of access to property and use of Client's facilities as described in (or reasonably to be inferred from) this Agreement. The Client shall use reasonable endeavours to supply to the Consultant, promptly and free of charge: (a) any other necessary things in accordance with this Agreement; (b) any instructions, decisions, consents and approvals; and (c) any relevant data and information in the Client's possession; all of which the Consultant may reasonably require in order to carry out the Services. The Client will indemnify the Consultant in respect of any failure by the Client under this Clause.
- 9 In line with the Construction (Design & Management) Regulations 2015 and AGS guidance, neither the Consultant nor any sub-contractor shall be held responsible for any accidental damage or the consequences of any damage to buried services such as cables, pipes, sewers, etc., the positions and nature of which have not been clearly indicated to the Consultant in writing prior to the commencement of the work, unless the locating of same is expressly part of the Services. Where necessary it is assumed that the Client will permit the use of their toilet/welfare facilities by Consultant's staff and sub-contractors, including domestic properties. We will normally undertake the role of Contractor on a ground investigation project, but may occasionally 'inherit' the role of Principal Contractor. In either case that role is restricted to the ground investigation phase ONLY and not the subsequent build.
- 10 The Consultant shall not be held responsible for any loss, damage or injury arising from actions or omissions of the Client, his agents, servants and/or independent contractors. The Client shall indemnify the Consultant from any such acts or omissions.
- 11 Each Party shall retain the copyright of its documents. Information relating to the contract will only be disclosed to those employees who require it to carry out their job. If necessary this may include subcontractors. Any other third party enquiry about the purposes of these works will be referred back to the Client. Upon completion any technical information or ground investigation data obtained as part of your commission will thereafter be archived as 'in-house' data, and may be used (without specific reference to your site) on other projects in the future; this specifically excludes any personal data.
- 12 Copyright And Non-Disclosure Notice - The contents and layout of any report produced by the Consultant are subject to copyright owned by Wilson Associates save to the extent that copyright has been legally assigned by us to another party or is used by Wilson Associates under licence. To the extent that we own the copyright of a particular report, it may not be copied or used without our prior written agreement for any purpose other than the purpose indicated in that report. The methodology (if any) contained in that report is provided to you in confidence and must not be disclosed or copied to third parties without the prior written agreement of Wilson Associates. Disclosure of such information may constitute an actionable breach of confidence or may otherwise prejudice our commercial interests. Any third party who obtains access to that report by any means will, in any event, be subject to the Third Party Disclaimer set out below.
- 13 Third Party Disclaimer - Any disclosure of our report(s) to a third party is subject to this disclaimer. Reports are prepared by Wilson Associates at the instruction of, and for use by, our client named on the front of that report. It does not in any way constitute advice to any third party who is able to access it by any means. Wilson Associates excludes to the fullest extent lawfully permitted all liability whatsoever for any loss or damage howsoever arising from reliance on the contents of that report. We do not however exclude our liability (if any) for personal injury or death resulting from our negligence, for fraud or any other matter in relation to which we cannot legally exclude liability. Legal re-assignment to another party can be arranged - see Clause 7.
- 14 The Consultant's liability under this Agreement shall be limited to £500,000 (five hundred thousand pounds). The Consultant shall maintain professional indemnity insurance in this amount providing that such insurance cover is available at commercially reasonable rates.
- 15 To comply with the General Data Protection Regulation (GDPR) 2018, we will only request contact details sufficient to complete our project with you, name/job title, address/postcode/email. Any data collected will be used only by authorised personnel in the context of that project. We are committed to ensuring that your information is secure and in order to prevent unauthorised access or disclosure, we have put in place suitable physical, electronic and managerial procedures to safeguard and secure the information we collect. We will not share your information with third parties.