Arboricultural Consultancy for Aviva

Note: This report is intended for use between the client, Environmental Services and any parties detailed within the report. It is based on the understanding at the time of visiting the property that Engineers are satisfied that damage is attributable to clay shrinkage subsidence exacerbated by vegetation.

1. Case Details

Insured	Mr Michael Epstein	Address	10 Nicholas Way, Northwood, HA6 2TS		
Client	Subsidence Management Services	Contact	Ian Domigan	Claim No.	IFS-AVI-SUB-22-0101616
ES Ref	SA-250311	Consultant	Keith Burgess	Contact No.	0330 380 1036
Report Date	16/09/2022				

Scope of Report: To survey the property and determine significant vegetation contributing to subsidence damage, make recommendation for remedial action and assess initial mitigation and recovery prospects. The survey does not make an assessment for decay or hazard evaluation.

2. Property and Damage Description

The insured structure is a 2 storey detached house. The property occupies a level site with no adverse topographical features.

We are advised that the current damage relates to the front right-hand side of the insured dwelling where cracking indicates downwards movement.

3. Technical Reports

No technical investigations are available at the time of reporting, therefore assumptions outlined in Note above apply: recommendations may be subject to change following evaluation of any investigations that may be forthcoming.

4. Action Plan

Mitigation	
Insured involved?	Yes
Local Authority involved?	No
Other third party Mitigation involved?	Yes
Recovery	
Is there a potential recovery action?	Yes

Treeworks	
Local Authority	
TPO / Conservation Area / Planning Protection Searches	Awaiting Searches from LA
Additional Comments	
Awaiting Further Instructions. A potential recovery action has been identified. Engineers should consider focusing investigations to strengthen factual evidence for disclosure to third party tree owners.	

5. Technical Synopsis

This report is based upon our understanding at the time of visiting the property that Subsidence Management Services have concluded, on a preliminary basis, that the current damage is due to differential foundation movement exacerbated by moisture abstraction from vegetation growing adjacent to the property's foundations.

We have therefore been instructed to assess the potential for vegetation to be influencing soil moisture levels beneath the foundations of the property and, if deemed appropriate provide management proposals which will return long-term stability and allow effective repairs to be undertaken.

The potential drying influence of the vegetation on site, has been considered based on an assessment of overall size, species profile and the proximity of vegetation relative to the advised area of damage.

Based on our observations on site, it is our opinion that the footings of the subject property are within the normally accepted influencing distance of vegetation on site, thereby indicating the potential for the advised damage to be the result of clay shrinkage subsidence exacerbated by the moisture abstracting influence of vegetation.

With due regards to species profile, size and proximity, T1 and H1 are considered the dominant features proximate to the focal area of movement and accordingly, where vegetation is confirmed as being causal, we have identified them as the primary cause of the current subsidence damage.

The size and proximity of the above vegetation is consistent with the advised location of damage and it is our opinion, on balance of probability, that roots from the above vegetation will be in proximity to the footings of the insured property.

Note: additional minor vegetation has been noted on site and, depending on trial-pit location may be identified within future site investigations; however, unless specifically identified within this report, these plants are not deemed material to the current claim nor pose a significant future risk.

Given the above and considering the suspected mechanism of movement, in order to mitigate the current damage thereby allowing soils beneath the property to recover to a position such that an effective engineering repair solution can be implemented, we recommend a program of vegetation management as detailed by this report.

Please refer to Section 6 for management prescriptions.

Preliminary recommendations contained within this report are prescribed on the basis that site investigations confirm vegetation to be causal; management advice is designed to offer the most reliable arboricultural solution likely to restore long-term stability and also facilitate liaison with third-party owners and/or Local Authorities where necessary.

Consequently, we have advocated the complete removal of T1 in conjunction with management, to include partial removal of a section of H1 (as detailed) as it will offer the most certain arboricultural solution likely to restore long-term stability.

Replacement planting is considered appropriate with regards mitigating the impact of the works suggested; however, species selection should be appropriate for the chosen site and consideration must be given to the ultimate size of the replacement species and any future management requirements.

We recommend the role of vegetation and the efficacy of management recommendations be qualified by means of monitoring.

Please note that the footing of the insured property fall within the anticipated rooting distance of additional vegetation which we believe presents a foreseeable risk of future damage and accordingly we have made recommendations in respect of this.

The extent / impact of vegetation management required to restore and maintain long-term stability at this property is acknowledged. However, we consider the impact on the wider public amenity from the proposed tree works is mitigated by the presence of further trees and the scope for replacement planting.

Is vegetation likely to be a contributory factor in the current damage?	Yes
Is vegetation management likely to contribute to the future stability of the property?	Yes
Is replacement planting considered appropriate?	Yes
Would DNA profiling be of assistance in this case?	No

6.0 Recommendations

6.1 Current Claim Requirements

These recommendations may be subject to review following additional site investigations.

Tree No.	Species	Age Cat	Approx. Height (m)	Distance to Building (m) *	Ownership	Action	Requirement
H1	Thuja	1	9	4.4	E - Boundary Veg (ownership to be confirmed)	Maintain as detailed	Remove the two stems closest to the property (garage) close to ground level; reduce height of remaining hedge to 5m and maintain at reduced dimensions by way of regular pruning. Distance relates to area of damage, hedge 1.2m from garage.
T1	Oak	3	12	14.9	D - Unknown	Remove	Remove close to ground level and treat stump to inhibit regrowth.
Age Cat: 1 = Younger than property; 2 = Similar age to the property; 3 = Significantly older than property							

* Estimated

6.2 Future Risk Recommendations

These recommendations may be subject to review following additional site investigations.

Tree No.	Species	Age Cat	Approx. Height (m)	Distance to Building (m) *	Ownership	Action	Requirement
C1	Wisteria	1	4	0.1	C - Insured	Action to avoid future risk	Maintain at, or below current dimensions by way of regular pruning.
H2	Cypress	1	12	4.2	E - Boundary Veg (ownership to be confirmed)	Action to avoid future risk	Maintain at, or below current dimensions by way of regular pruning.
H3	Mixed Species Hedge: including Laurel & Cypress.	1	6	1.5	C - Insured	Action to avoid future risk	Maintain at, or below current dimensions by way of regular pruning.
H4	Mixed Species Hedge: including Cypress & Laurel.	1	4	2.4	C - Insured	Action to avoid future risk	Maintain at broadly current dimensions by way of regular pruning.
SG1	Mixed species shrubs: including Forsythia, clipped Cypress & Choisya.	1	2	0.2	C - Insured	Action to avoid future risk	Maintain at, or below current dimensions by way of regular pruning.
TG1	Mixed Species Group: including Cypress, Birch & Beech.	1	12	4.5	A - Third Party	Action to avoid future risk	Maintain at, or below current dimensions by way of regular pruning.
TG2	Birch (Silver)	1	14	10.5	C - Insured	Action to avoid future risk	Maintain at broadly current dimensions by way of regular pruning.
Age Cat: 1 = Younger than property; 2 = Similar age to the property; 3 = Significantly older than property							

* Estimated

Third party property addresses should be treated as indicative only, should precise detail be required then Environmental Services can undertake Land Registry Searches

7. Site Plan

Please note that this plan is not to scale. OS Licence No. 100043218

8. Photographs

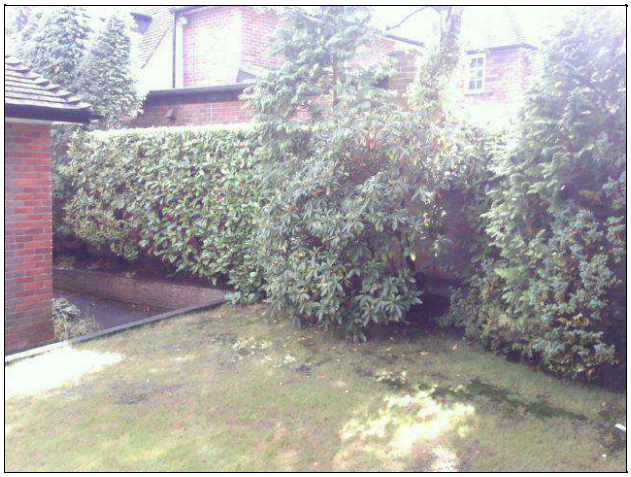
T1 - Oak

H1 - Thuja

SG1 - Mixed species shrubs

H2 - Cypress

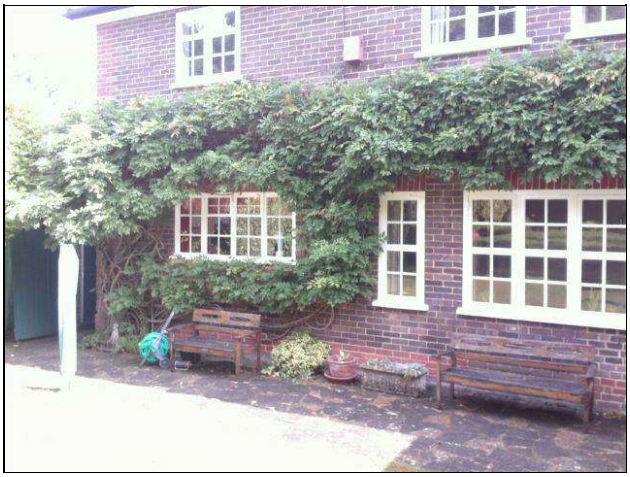
H3 - Mixed species hedge



H4 - Mixed species hedge

TG1 - Mixed species group

TG2 - Birch (Silver)



C1 - Wisteria

Date: 16/09/2022 Property: 10 Nicholas Way, Northwood, HA6 2TS

9. Tree Works Reserve - Does not include recommendations for future risk.

Insured Property Tree Works	£2750.00
Third Party Tree Works	£0.00
Provisional Sum	£0.00

- The above prices are based on works being performed as separate operations.
- The above is a reserve estimate only.
- Ownerships are assumed to be correct and as per Section 6.
- A fixed charge is made for Tree Preservation Order/Conservation Area searches unless charged by the Local Authority in which case it is cost plus 25%.
- Should tree works be prevented due to statutory protection then we will automatically proceed to seek consent for the works and Appeal to the Secretary of State if appropriate.
- All prices will be subject to V.A.T., which will be charged at the rate applying when the invoice is raised.
- Trees are removed as near as possible to ground level, stump and associated roots are not removed or included in the price.
- Where chemical application is made to stumps it cannot always be guaranteed that this will prevent future regrowth. Should this occur we would be pleased to provide advice to the insured on the best course of action available to them at that time. Where there is a risk to other trees of the same species due to root fusion, chemical control may not be appropriate.

10. Limitations

This report is an appraisal of vegetation influence on the property and is made on the understanding that that engineers suspect or have confirmed that vegetation is contributing to clay shrinkage subsidence, which is impacting upon the building. Recommendations for remedial tree works and future management are made to meet the primary objective of assisting in the restoration of stability to the property. In achieving this, it should be appreciated that recommendations may in some cases be contrary to best Arboricultural practice for tree pruning/management and is a necessary compromise between competing objectives.

Following tree surgery we recommended that the building be monitored to establish the effectiveness of the works in restoring stability.

The influence of trees on soils and building is dynamic and vegetation in close proximity to vulnerable structure should be inspected annually.

The statutory tree protection status as notified by the Local Authority was correct at the time of reporting. It should be noted however that this may be subject to change and we therefore advise that further checks with the Local Authority MUST be carried out prior to implementation of any tree works. Failure to do so can result in fines in excess of £20,000.

Our flagging of a possible recovery action is based on a broad approach that assume all third parties with vegetation contributing to the current claim have the potential for a recovery action (including domestic third parties). This way opportunities do not “fall through the net”; it is understood that domestic third parties with no prior knowledge may be difficult to recover against but that decision will be fully determined by the client.

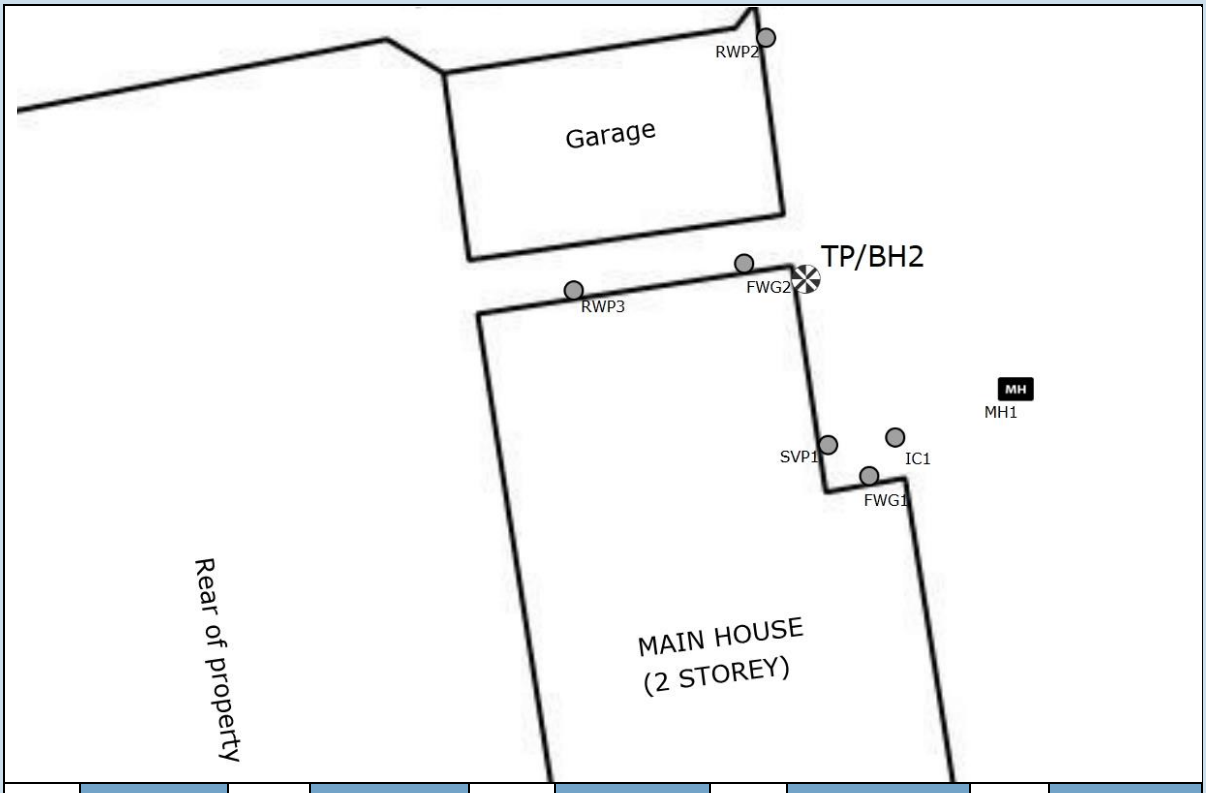
A legal Duty of Care requires that all works specified in this report should be performed by qualified, arboricultural contractors who have been competency tested to determine their suitability for such works in line with Health & Safety Executive Guidelines. Additionally all works should be carried out according to British Standard 3998:2010 *“Tree Work. Recommendations”*.

GEOTECHNICAL
for Subsidence Management Services

10 Nicholas Way, Northwood, HA6 2TS

Client:	Subsidence Management Services
Client Contact:	Ian Domigan
Client Ref:	IFS-AVI-SUB-22-0101616
Policy Holder:	Mr Michael Epstein
Report Date:	16 September 2022
Our Ref:	C65363G29865

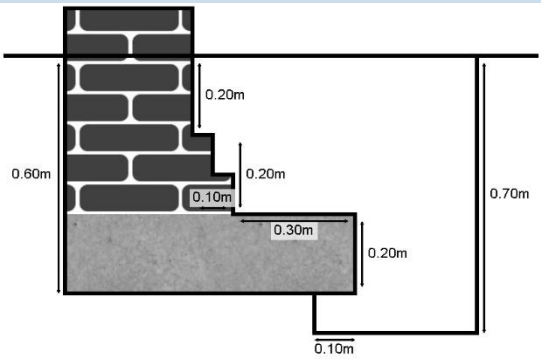
Site Plan



TP/BH2 Foundation Detail and Borehole Log

Foundation Detail

House foundation comprised of brick wall to 200mm bgl, bearing on stepped brickwork to 400mm bgl with a total projection of 100mm from the elevation, bearing on concrete to 600mm bgl with a total projection of 400mm from the elevation. Underside of foundation (USF) was exposed to 100mm back from the face of the foundation and probed 500mm back from the face of the foundation.



WS	Samples Type	Samples Depth (m)	Tests Type	Tests Depth (m)	Tests Results
	D	0.60 - 1.10	PEN	0.60	HP=4.5 (4.5,4.5,4.5,4.5,4.5)
	R	0.60 - 1.10			
	R	1.10 - 1.60	PEN	1.10	HP=4.5 (4.5,4.5,4.5,4.5,4.5)
	D	1.10 - 1.60			
	D	1.60 - 2.10	PEN	1.60	HP=4.0 (4.0,4.0,4.0,4.0,4.0)
	R	1.60 - 2.10			
	R	2.10 - 2.50	PEN	2.10	HP=4.0 (4.0,4.0,4.0,4.0,4.0)
	D	2.10 - 2.60			
	D	2.60 - 3.10	PEN	2.60	HP=4.0 (4.0,4.0,4.0,4.0,4.0)
	D	3.10 - 3.60	PEN	3.10	HP=3.5 (3.5,3.5,3.5,3.5,3.5)
	D	3.60 - 4.00	PEN	3.60	HP=3.5 (3.5,3.5,3.5,3.5,3.5)

Legend

Stratum Description and Observations

0 TARMACADAM.

...at 0.05m to 0.10m bgl no roots encountered. Extensive inspection of soil samples encountered no roots.

CONCRETE.

0.5 MADE GROUND: Hard brown sandy gravelly CLAY.

...at 0.10m to 0.60m bgl numerous roots of live appearance encountered.

Stiff brown mottled grey sandy gravelly CLAY.

...at 0.60m to 2.50m bgl occasional roots of live appearance encountered and sampled.

...at 0.60m bgl UNDERSIDE OF HOUSE FOUNDATION.

1.0

1.5

2.0

2.5 ...at 2.50m to 4.00m bgl no roots encountered. Extensive inspection of soil samples encountered no roots.

3.0

3.5

4.0 ...at 4.00m bgl target depth achieved.

-- End of borehole at 4.00m --

CONTROL: Borehole completed by mech window sampler. Borehole completed by mech window sampler. Roots encountered to 2.50m bgl. Groundwater strikes not encountered. PEN = Hand Penetrometer (kg/sq cm). Trial pit excavated to 0.70m bgl.

Site Observations

GENERAL:
Site Investigation works (TP/BH 2) undertaken on 7 September 2022 during dry weather (i.e. no rain).

HEALTH AND SAFETY:
Negative signal obtained in Radio and Genny mode, Positive signal obtained in Power mode on the Cable Avoidance Tool (CAT) (TP/BH2).
Orange cable (5mm dia) running parallel to wall (0.10m from wall) at 0.20m bgl (TP/BH 2). Suspected electricity supply.

FOUNDATIONS:
At 0.60m bgl UNDERSIDE OF HOUSE FOUNDATION in TP/BH2.

BOREHOLE:
At 4.00m bgl target depth achieved in TP/BH2.

ROOTS:
At 0.05m to 0.10m bgl no roots encountered. Extensive inspection of soil samples encountered no roots in TP/BH2.
At 0.10m to 0.60m bgl numerous roots of live appearance encountered in TP/BH2.
At 0.60m to 2.50m bgl occasional roots of live appearance encountered and sampled in TP/BH2.
At 2.50m to 4.00m bgl no roots encountered. Extensive inspection of soil samples encountered no roots in TP/BH2.

IN SITU TESTING:
Hand Penetrometer (PEN) undertaken at 0.60m bgl (TP/BH 2) within the hand excavated trial pit and thereafter in the hand auger borehole at maximum 0.50m intervals.

WATER STRIKES:
No water strikes (NWS) encountered (TP/BH 2).

Environmental Services

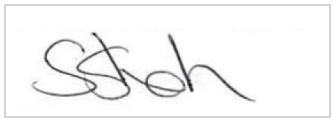
SOIL ANALYSIS

for Subsidence Management Services

10 Nicholas Way, Northwood, HA6 2TS

Client:	Subsidence Management Services
Claim Number:	10404430
Policy Holder:	Mr Michael Epstein
Report Date:	03/10/2022
Our Ref:	L23355

Compiled By:

Name	Position	Signature
Saira Dougan	Laboratory Technician	

Checked By:

Name	Position	Signature
Bob Walker	Laboratory Manager	

Date samples received:	12-Sep-22
Water Content Test Date:	21-Sep-22
Atterberg Limits Test Date:	22-Sep-22
Oedometer Test Date:	29-Sep-22

UKAS TESTING

9265

Environmental Services

Notes relating to soils testing

Unless otherwise stated, all soil testing was undertaken by Environmental Services at unit 10H Maybrook Business Park, B76 1AL for SubsNetUK of Unit 4 Linnet Court, Cawledge Business Park, Alnwick, NE66 2GD

Soil samples have been prepared in accordance with BS1377:Part 1: 2016 Section 7

Descriptions of soil samples within the laboratory have been undertaken generally in accordance with BS5930:2015. Descriptions of soil samples fall outside of the scope of UKAS accreditation and may have been shortened to remove tertiary components for ease of reference.

The graphical representation of 40% of the LL and the numerical representation of the modified plasticity index (mod. PI) fall outside of the scope of UKAS accreditation.

Following the issue of this soil analysis report, samples will be retained for at least 28 days should additional testing, or referencing, be required. It should be noted that any tests undertaken on soils retained subsequent to the issue of this report may not give an accurate indication of the in-situ conditions of the sample.

The results contained herein relate only to items tested and no others. Additionally as the laboratory is not responsible for the sampling process it takes no responsibility for the condition of the samples and all samples are tested "as received".

Where samples of the same test type are not tested on the same day, or the testing spans multiple days, the test date states the day of the final test or the test date of the final sample.

All information above the laboratory reference on the cover page of this report are as provided by the customer and the laboratory is not responsible for any errors or omissions therein.

Water Content Tests are undertaken in accordance with ISO 17892:Part 1:2014

The Liquid Limit test is undertaken in accordance with BS1377:Part 2:1990 Section 4.4 using an 80g cone with a 30° tip. Sieve percentages reported in blue denote that the sample has been sieved otherwise it has been prepared from its natural state. Sieve percentage reported in BOLD denote that the sample has been oven-dried prior to testing.
Unless otherwise specified herein, the one-point cone penetrometer method has been used with increasing water content. Atterberg results depicted in green have not been tested and are duplicates of the preceding sample, included for reference only.

The Plastic Limit test and the determination of the Plasticity Index is undertaken in accordance with BS1377:Part 2:1990. Where a plastic limit has been denoted with an asterisk (*) then it has been derived from the liquid limit and has not been tested.

The Oedometer swell/strain test method is based upon BS1377:Part 5:1990 Section 4.4 ‘Determination of swelling and collapse characteristics’ and unless otherwise stated is undertaken on a remoulded, disturbed, sample.

The Oedometer Swell/Strain Test is undertaken in a controlled environment within a temperature range of 16°C and 24°C

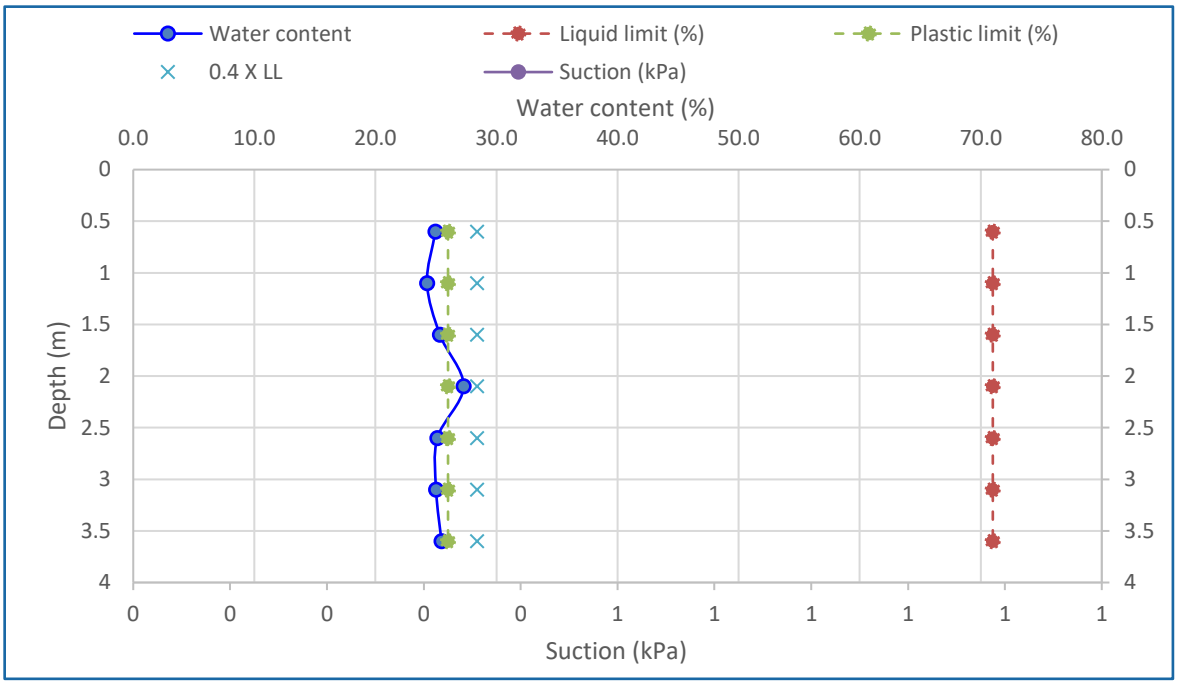
If you would like to provide feedback on this report or any laboratory services or performance, please complete the form below. All appropriate feedback will be used in the continual improvement of laboratory services.

Laboratory feedback form

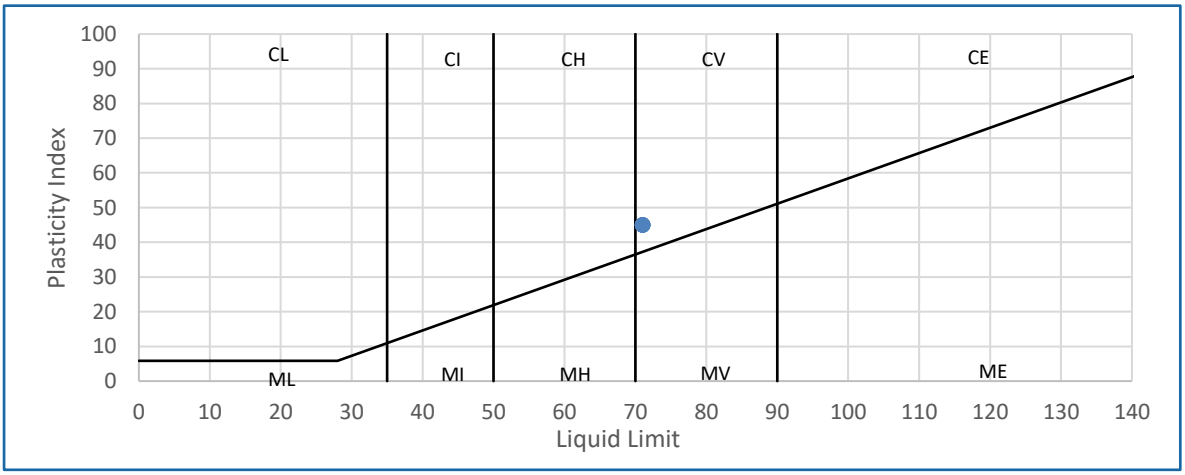
Environmental Services

Samples from BH2

Lab Ref	Depth (m)	WC (%)	LL (%)	PL (%)	PI (%)	.425 mm(%)	mod. PI (%)	Av. Suc. (kPa)	Description
1	0.6	25.0	71	26	45	98	44		Firm brown/orange-brown/grey-brown mottled CLAY with rare gravel. Gravel is fine and medium.
2	1.1	24.3	71	26	45	98	44		Firm brown/orange-brown/grey-brown mottled CLAY
3	1.6	25.3	71	26	45	98	44		Firm brown/grey-brown CLAY
4	2.1	27.3	71	26	45	98	44		Firm brown/grey-brown CLAY
5	2.6	25.1	71	26	45	98	44		Firm brown/grey-brown CLAY with rare sand
6	3.1	25.0	71	26	45	98	44		Firm brown/grey-brown CLAY
7	3.6	25.5	71	26	45	98	44		Firm brown/grey-brown CLAY



Plasticity Chart for Casagrande Classification

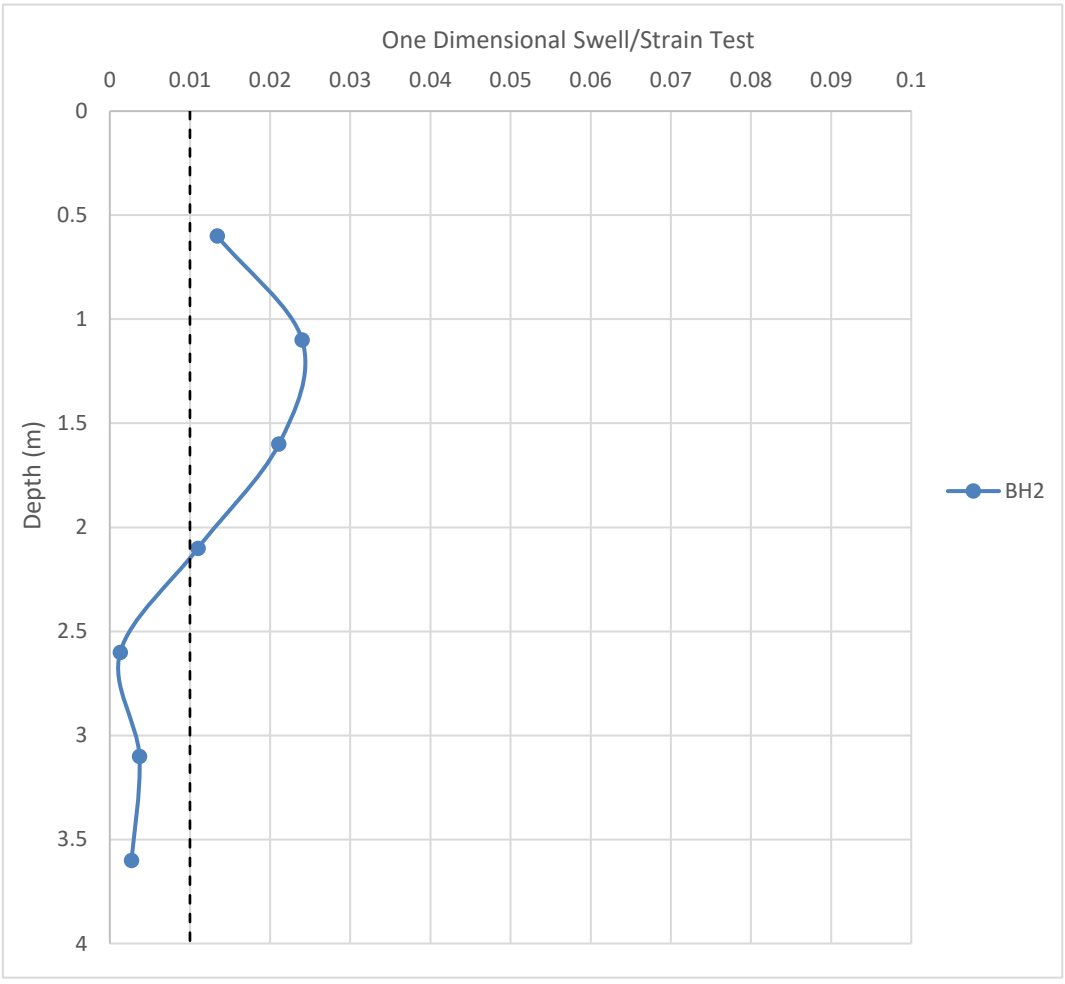


Environmental Services

Summary of Oedometer Testing for BH2

Lab Ref	Depth (m)	Strain	Heave (mm)	Remarks
1	0.6	0.0134	4	
2	1.1	0.024	6	
3	1.6	0.0211	5.3	
4	2.1	0.011	2.8	
5	2.6	0.0013	0	
6	3.1	0.0037	0	
7	3.6	0.0027	0	

BH 2 estimate of heave	18mm



Deviating Samples

The table below details any samples deviating from laboratory procedure or deviating in condition to an extent whereby the validity of results may be affected. A test denoted "I" is likely to have had testing abandoned but where a test result has been provided a non-standard procedure may have been used, details of which will be provided upon request.

LAB REF	CONDITION	WC	ATT	SUC	OED
1					
2					
3					
4					
5					
6					
7					

Key

D	Delay in sample receipt
C	Contaminated sample
B	Sample not bagged correctly
S	Sample too sandy (unsuitable for testing)
G	Sample too gravelly (unsuitable for testing)
V	Sample too soft (unsuitable for preparation)
L	Sample too silty
I	Insufficient sample
O	Too much organic content (unsuitable for testing)
N	Non-standard procedure used
H	Sample depth too shallow
X	Testing result too similar to above sample

References

The following provides a brief interpretation of the test results by comparison of the results to published classifications. The Atterberg Limit test may be used to classify the plasticity of soils; the plasticity classes defined in BS5930:2015 "Code of Practice for Site Investigations" are as follows.

CL (ML)	CLAY and CLAY/SILT of Low plasticity
CI (MI)	CLAY and CLAY/SILT of Intermediate plasticity
CH (MH)	CLAY and CLAY/SILT of High plasticity
CV (MV)	CLAY and CLAY/SILT of Very High plasticity
CE (ME)	CLAY and CLAY/SILT of Extremely High plasticity
O	The letter O is added to prefixes to symbolise a significant proportion of organic matter.
NP	Non-plastic

The Plasticity Index (PI) Result obtained from the Atterberg Limit tests may also be used to classify the potential for volume change of fine soils, in accordance with the National House Building Council's standards - Chapter 4.2 (2003) "Building Near Trees", as summarised below.

Modified PI < 10	Non Classified.
Modified PI = 10 to <20	Low volume change potential.
Modified PI = 20 to <40	Medium volume change potential.
Modified PI = 40 or greater	High volume change potential.

The 2003 edition of Chapter 4.2 also permits use of the Plasticity Index without modification. The classifications for this are grouped by soil type (soils with similar visual soils description and using unmodified Plasticity Indices.

ROOT IDENTIFICATION

for Subsidence Management Services

10 Nicholas Way, Northwood, HA6 2TS

Client:	Subsidence Management Services
Client Contact:	Ian Domigan
Claim Number:	10404430
Client Reference:	IFS-AVI-SUB-22-0101616
Policy Holder:	Mr Michael Epstein
Report Date:	13 September 2022
Our Ref:	R46348

Intec
Parc Menai, Bangor,
Gwynedd, North Wales
LL57 4FG
Tel: 01248 672652

Sub Sample	Species Identified		Root Diameter	Starch
TP/BH2:				
0.6-1.6m	*Quercus* spp.	1	3 mm	Abundant
1.6-2.5m	probably *Quercus* spp.	2	<1 mm	Absent
1.6-2.5m	broadleaved species, too decayed for positive identification	3	<1 mm	Absent

Comments:

1 - Plus 3 others also identified as *Quercus* spp.
2 - Juvenile and decayed.
3 - Plus 1 other the same. Very small and juvenile.

Quercus spp. are oaks (both deciduous and evergreen).

Signed: R J Shaw

Unless we are otherwise instructed in writing, the above sample material will normally be disposed of 6 years after the date of this report.

SubsNetUK

Drainage Investigation Report

For Subsidence Management Services

Client Mr Michael Epstein,

Risk Address: 10 Nicholas Way, Northwood, HA6 2TS

Visit Date: 8th September 2022

Client Reference: IFS-AVI-SUB-22-0101616

Our Reference: C65363 D22944

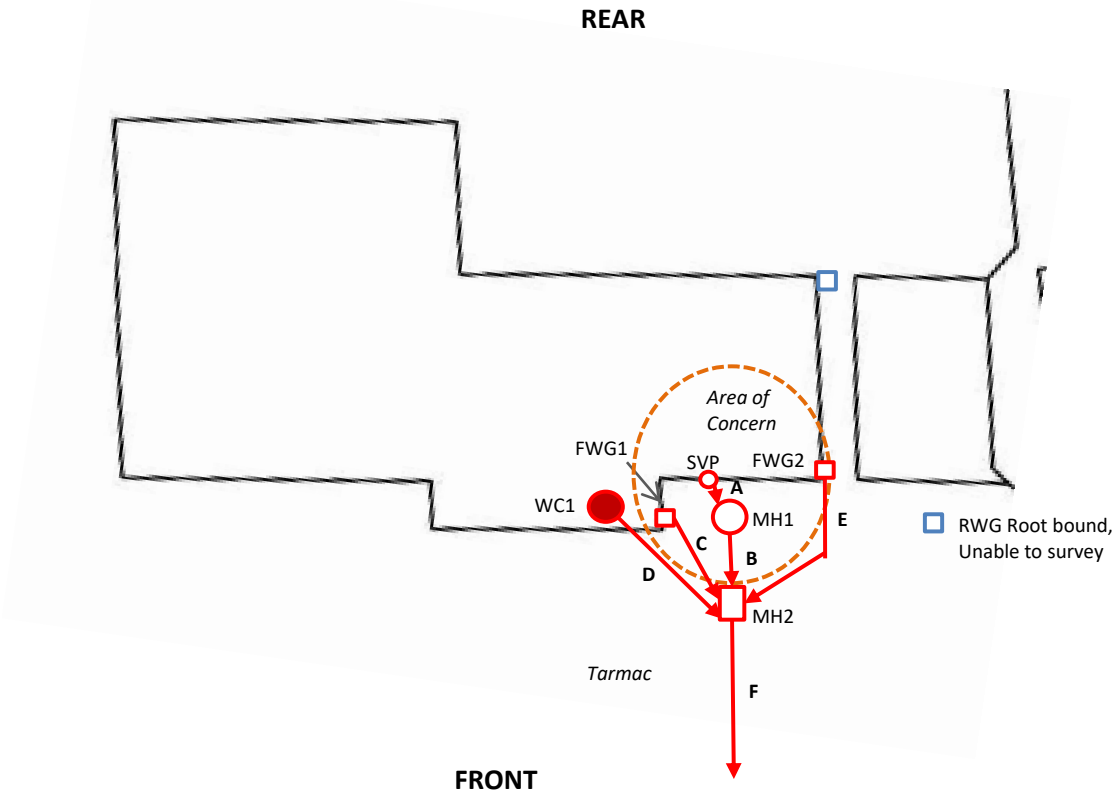
Report Date: 8th September 2022

Report Content:
Front Page
Site Plan
CCTV Coding
Drain Overview
Photographs
Quote

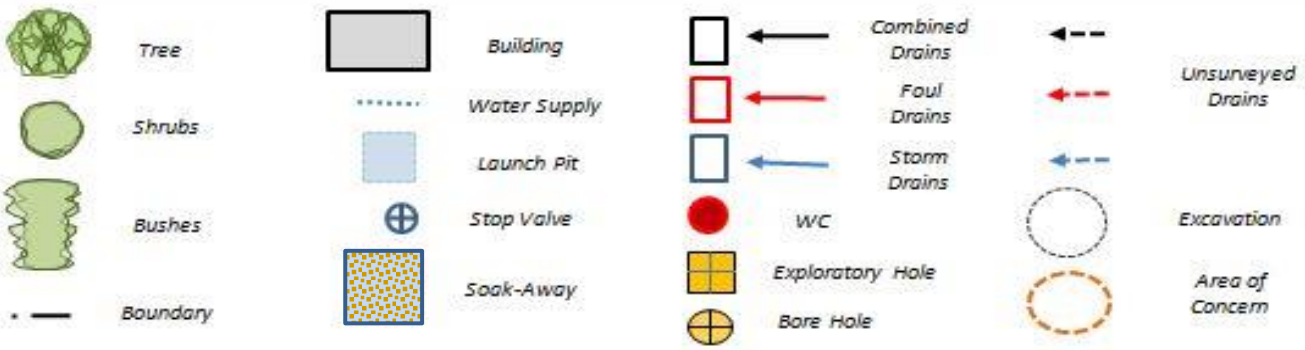
SubsNetUK

Site Plan

SubsNetUK



Key



Notes:	
Address:	10 Nicholas Way, Northwood, HA6 2TS

CCTV Survey

RUN	Start From :	MH1	Finish at :	SVP	Pipe Ø:	100mm
A	Invert Level (m):	0.6	Invert Level (m):	N/a	Material:	Clay
FOUL	Condition grade:	B	Direction:	Upstream	Responsibility:	Home Owner
Distance	*Code*	*Hydraulic Test - Not Tested*				
0.00	SN	Start Node from MH1				
0.00	WL	Water Level 0%				
0.09	JDM	Joint Displaced (Medium)				
0.48	OJM	Open Joint (medium)				
0.86	CC	Crack Circumferential				
1.15	LU	Line of drain deviates up °				
1.55	FN	Finish Node at SVP				

RUN	Start From :	MH1	Finish at :	MH2	Pipe Ø:	100mm
B	Invert Level (m):	0.6	Invert Level (m):	N/a	Material:	Clay
FOUL	Condition grade:	C	Direction:	Downstream	Responsibility:	Home Owner
Distance	*Code*	*Hydraulic Test - Fail*				
0.00	SN	Start Node from MH1				
0.00	WL	Water Level 0%				
0.19	CC	Crack Circumferential				
0.96	CC	Crack Circumferential				
1.63	FN	Finish Node at MH2				

RUN	Start From :	MH2	Finish at :	FWG1	Pipe Ø:	100mm
C	Invert Level (m):	0.73	Invert Level (m):	N/a	Material:	Clay
FOUL	Condition grade:	C	Direction:	Upstream	Responsibility:	Home Owner
Distance	*Code*	*Hydraulic Test - Fail*				
0.00	SN	Start Node from MH2				
0.00	WL	Water Level 0%				
0.09	CC	Crack Circumferential				
0.48	R	Roots - Continuous				
2.11	LU	Line of drain deviates up °				
2.40	SA	Survey Abandoned - Unable to push past bend				

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CCTV Survey

RUN	Start From :	MH2	Finish at :	WC	Pipe Ø:	100mm
D	Invert Level (m):	0.73	Invert Level (m):	N/a	Material:	Clay
FOUL	Condition grade:	C	Direction:	Upstream	Responsibility:	Home Owner
Distance	*Code*	*Hydraulic Test - Fail*				
0.00	SN	Start Node from MH2				
0.00	WL	Water Level 0%				
0.19	CC	Crack Circumferential				
0.19	R	Roots				
1.29	CC	Crack Circumferential				
1.29	R	Roots				
2.68	CC	Crack Circumferential				
3.16	R	Roots				
3.34	MC	Material of drain changes at this point to Plastic				
3.34	LL	Line of drain deviates left °				
4.03	LU	Line of drain deviates up °				
4.41	FN	Finish Node at WC				

RUN	Start From :	MH2	Finish at :	FWG2	Pipe Ø:	100mm
E	Invert Level (m):	0.73	Invert Level (m):	N/a	Material:	Clay
FOUL	Condition grade:	C	Direction:	Upstream	Responsibility:	Home Owner
Distance	*Code*	*Hydraulic Test - Fail*				
0.00	SN	Start Node from MH2				
0.00	WL	Water Level 0%				
0.57	CC	Crack Circumferential				
1.24	CC	Crack Circumferential				
3.16	OJM	Open Joint (medium)				
3.74	LL	Line of drain deviates left °				
5.08	CC	Crack Circumferential				
5.37	LU	Line of drain deviates up °				
5.85	CC	Crack Circumferential				
5.85	FN	Finish Node at FWG2				

RUN	Start From :	MH2	Finish at :	BEYOND AOC	Pipe Ø:	100mm
F	Invert Level (m):	0.73	Invert Level (m):	N/a	Material:	Clay
FOUL	Condition grade:	C	Direction:	Downstream	Responsibility:	Home Owner
Distance	*Code*	*Hydraulic Test - Fail*				
0.00	SN	Start Node from MH2				
0.00	WL	Water Level 0%				
0.09	CC	Crack Circumferential				
0.86	CC	Crack Circumferential				
1.24	CC	Crack Circumferential				
2.88	FN	Finish Node - Beyond Area of Concern				

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Drainage Overview

Following the receipt of your instruction, we attended site to carry out a CCTV survey.

The CCTV survey was undertaken in general accordance with the Manual of Sewer Classification and the WRc Drain Repair Book.

All runs were cleaned by high pressure water jetting prior to the CCTV survey.

The following presents a summary of the findings with recommendations to repair and/ or return the drains to a serviceable state, where necessary.

Drain Run A: MH1 U/S TO SVP
Pipe Diameter: 100mm
Responsibility: Home Owner
Hydraulic Pressure Test: Not Tested
CCTV Survey Result: Structural damage
Recommended Repair:
To prepare the drain line and insert 1x resin patch liner to cover defects.

Drain Run B: MH1 D/S TO MH2
Pipe Diameter: 100mm
Responsibility: Home Owner
Hydraulic Pressure Test: Fail
CCTV Survey Result: Structural damage
Recommended Repair:
To prepare the drain line and insert 2m of structural liner to cover defects.

Drain Run C: MH2 U/S TO FWG1
Pipe Diameter: 100mm
Responsibility: Home Owner
Hydraulic Pressure Test: Fail
CCTV Survey Result: Structural damage
Recommended Repair:
To excavate and replace existing gully including 3m of adjacent pipework
Bed new pipe, compact, backfill and reinstate tarmac

Drain Run D: MH2 U/S TO WC
Pipe Diameter: 100mm
Responsibility: Home Owner
Hydraulic Pressure Test: Fail
CCTV Survey Result: Structural damage
Recommended Repair:
To prepare the drain line using mechanical root cutting and insert 3m of structural liner to cover defects.

Drainage Overview 2

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Drain Run E: MH2 U/S TO FWG2
Pipe Diameter: 100mm
Responsibility: Home Owner
Hydraulic Pressure Test: Fail
CCTV Survey Result: Structural damage
Recommended Repair:
To excavate and replace existing gully including 1m of adjacent pipe work
To prepare the drain line and insert 5m of structural liner to cover defects to the manhole
Bed new pipe, compact, back fill and reinstate tarmac

Drain Run F: MH2 D/S TO BEYOND AREA OF CONCERN
Pipe Diameter: 100mm
Responsibility: Home Owner
Hydraulic Pressure Test: Fail
CCTV Survey Result: Structural damage
Recommended Repair:
To prepare the drain line and insert 3m of structural liner to cover defects.

RWG1: Engineers were unable to survey the drain due to heavy root intrusion preventing access.
Recommended Repair:
To excavate and replace existing gully including 1m of adjacent pipe work
To carry out a further look-see CCTV survey and report findings
Bed new pipe, compact, back fill and reinstate tarmac

Water Main Test	Result	Acoustic Test
	PASS	No noise could be heard which indicates that there is no leak

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Photographs

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Photographs 2

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Photographs 3

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RUN / LOCATION: SET-UP FEE

Repair Item	Description	Unit	Rate (£)	Quantity	Amount (£)
UK1133	Van pack HPWJ & CCTV in preparation of lining	nr	£148.44	1.00	£148.44
				Total (Excl VAT)	£148.44

RUN / LOCATION: RUN A

Repair Item	Description	Unit	Rate (£)	Quantity	Amount (£)
UK1180	Patch Lining. Up to 0.6m x 100mm	nr	£290.94	1.00	£290.94
UK0025	Protection Temporary works to floors, 1000 gauge polythene	m2	£1.79	2.00	£3.59
				Total (Excl VAT)	£294.52

RUN / LOCATION: RUN B

Repair Item	Description	Unit	Rate (£)	Quantity	Amount (£)
UK1135	Drain Lining - Initial Set-Up Fee (0-3.0m)	nr	£332.64	1.00	£332.64
UK0025	Protection Temporary works to floors, 1000 gauge polythene	m2	£1.79	2.00	£3.59
				Total (Excl VAT)	£336.23

RUN / LOCATION: RUN C

Repair Item	Description	Unit	Rate (£)	Quantity	Amount (£)
UK1120155	32/40mm waste pipes. Remove existing and replace with new PVCu. Fixed to masonry	m	£9.60	1.00	£9.60
UK1120165	32/40mm waste pipes. Shoes / bends.	nr	£10.81	2.00	£21.61
UK0595	Gully, 225mm x 225mm. Remove existing and replace with new PVCu item. Bed, surround and backfill	nr	£146.43	1.00	£146.43
UK0605	Excavate & remove isolated length. Replace in new 110mm PVCu. Bed, surround & backfill, n.e. 1000mm	nr	£131.47	1.00	£131.47
UK0880	Short Radius Bend. Remove existing item and replace with new 110mm PVCu	nr	£14.89	2.00	£29.78
UK0825	Excavate & remove pipework. Replace with new 110mm PVCu. Bed, surround & backfill, n.e. 1000mm	m	£81.39	2.00	£162.78
UK0025	Protection Temporary works to floors, 1000 gauge polythene	m2	£1.79	2.00	£3.59
UK8120300	Hardcore Filling to excavations over 250 mm average thick	m	£35.35	3.00	£106.06
UK2050005	Disposal by hand excavated contaminated/saturated material off site	m3	£45.30	2.00	£90.61
UK1055	Removal, disposal and reinstatement of tarmac path / hardstanding n.e 100mm thick	m2	£47.90	3.00	£143.71
				Total (Excl VAT)	£845.63

RUN / LOCATION: RUN D

Repair Item	Description	Unit	Rate (£)	Quantity	Amount (£)
UK1140	Drain Lining - 100mm. Install Structural liner into existing 100mm underground drain. 2mm Wall	m	£55.52	3.00	£166.55
UK0561	Mechanical Root Cutting	m	£4.35	3.00	£13.04
				Total (Excl VAT)	£179.59

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RUN / LOCATION: RUN E

Repair Item	Description	Unit	Rate (£)	Quantity	Amount (£)
UK1120155	32/40mm waste pipes. Remove existing and replace with new PVCu. Fixed to masonry	m	£9.60	1.00	£9.60
UK1120165	32/40mm waste pipes. Shoes / bends.	nr	£10.81	2.00	£21.61
UK0595	Gully, 225mm x 225mm. Remove existing and replace with new PVCu item. Bed, surround and backfill	nr	£146.43	1.00	£146.43
UK0605	Excavate & remove isolated length. Replace in new 110mm PVCu. Bed, surround & backfill, n.e. 1000mm	nr	£131.47	1.00	£131.47
UK0880	Short Radius Bend. Remove existing item and replace with new 110mm PVCu	nr	£14.89	2.00	£29.78
UK1140	Drain Lining - 100mm. Install Structural liner into existing 100mm underground drain. 3mm Wall	m	£55.52	5.00	£277.58
UK0025	Protection Temporary works to floors, 1000 gauge polythene	m2	£1.79	2.00	£3.59
UK8120300	Hardcore Filling to excavations over 250 mm average thick	m	£35.35	1.00	£35.35
UK2050005	Disposal by hand excavated contaminated/saturated material off site	m3	£45.30	1.00	£45.30
UK1055	Removal, disposal and reinstatement of tarmac path / hardstanding n.e 100mm thick	m2	£47.90	1.00	£47.90
				Total (Excl VAT)	£748.61

RUN / LOCATION: RUN D

Repair Item	Description	Unit	Rate (£)	Quantity	Amount (£)
UK1140	Drain Lining - 100mm. Install Structural liner into existing 100mm underground drain. 3mm Wall	m	£55.52	3.00	£166.55
UK0025	Protection Temporary works to floors, 1000 gauge polythene	m2	£1.79	2.00	£3.59
				Total (Excl VAT)	£170.13

RUN / LOCATION: RWG1

Repair Item	Description	Unit	Rate (£)	Quantity	Amount (£)
UK0010	Remove existing UPVC pipework in isolated lengths, refix with new 68mm UPVC pipework (incl. brackets)	nr	£14.25	1.00	£14.25
UK0015	Extra over for bends.	nr	£8.31	1.00	£8.31
UK0595	Gully, 225mm x 225mm. Remove existing and replace with new PVCu item. Bed, surround and backfill	nr	£146.43	1.00	£146.43
UK0605	Excavate & remove isolated length. Replace in new 110mm PVCu. Bed, surround & backfill, n.e. 1000mm	nr	£131.47	1.00	£131.47
UK0880	Short Radius Bend. Remove existing item and replace with new 110mm PVCu	nr	£14.89	2.00	£29.78
UK1055	Removal, disposal and reinstatement of tarmac path / hardstanding n.e 100mm thick	m2	£47.90	1.00	£47.90
UK0025	Protection Temporary works to floors, 1000 gauge polythene	m2	£1.79	2.00	£3.59
UK8120300	Hardcore Filling to excavations over 250 mm average thick	m	£35.35	1.00	£35.35
UK2050005	Disposal by hand excavated contaminated/saturated material off site	m3	£45.30	1.00	£45.30
	CCTV survey of underground drainage & report (where undertaken as part of other drainage works	nr	£165.00	1.00	£165.00
				Total (Excl VAT)	£627.39

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REPAIR ESTIMATE TOTALS:

Run / Location		Amount (£)
Set Up Fee		£148.44
RUN A		£294.52
RUN B		£336.23
RUN C		£845.63
RUN D		£179.59
RUN E		£748.61
RUN F		£170.13
RWG1		£627.39
	Total (Excl VAT)	**£3,350.54**

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