FLOOD RISK ASSESSMENT
FOR RESIDENTIAL DEVELOPMENT AT
WEST STREET, CROWLAND

FINAL REPORT

ECL1637/RTK

DATE NOVEMBER 2025

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CONTENTS

1.0 INTRODUCTION

This Flood Risk Assessment has been prepared in accordance with National Planning Policy Framework (NPPF) and supporting planning practice guidance (PPG) on Flood Risk and Coastal Change.

In areas at risk of flooding or for sites of 1 hectare or more, developers are required to undertake a site-specific Flood Risk Assessment to accompany an application for planning permission. This Flood Risk Assessment has been produced on behalf of Mr D Smith in respect of a development that consists of one residential dwelling at West Street, Crowland.

A planning application for the proposed development is to be submitted by RTK.

2.0 SITE LOCATION AND DESCRIPTION

2.1 Site Location

The site is located on land to the rear of 53 West Street, Crowland, Lincolnshire, PE6 0EE. The National Grid Reference of the site is 52367/31029.

The location of the site is shown in Figure 1.

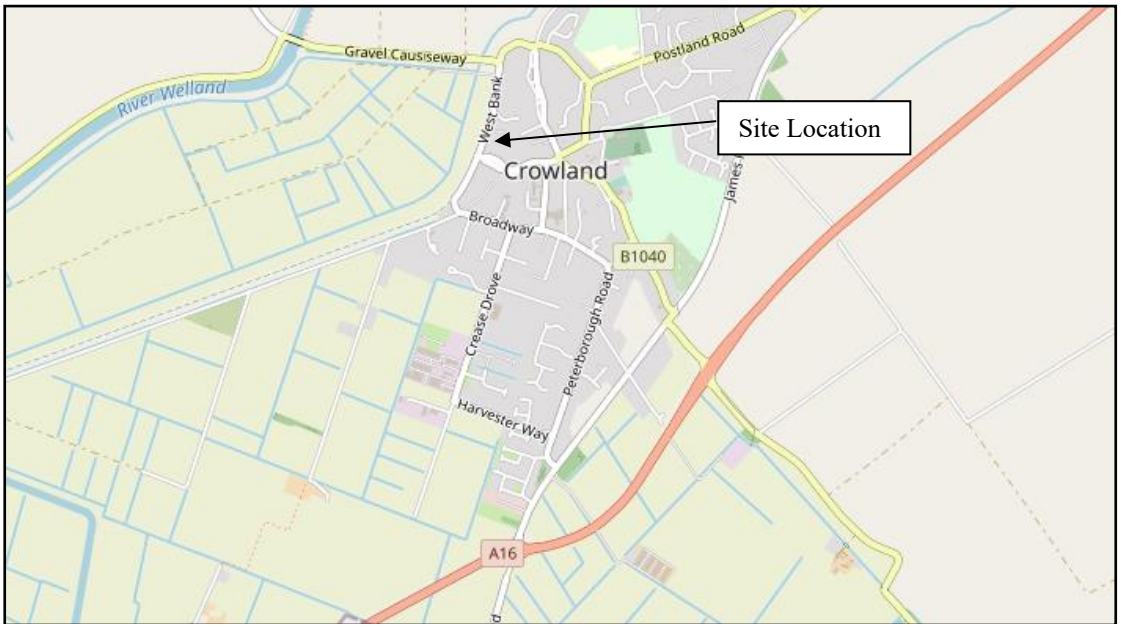

Figure 1 – Location Plan (© OpenStreetMap contributors)

2.2 Existing Site

The site is the northern side of West Street. The site is within the curtilage of 53 West Street, a detached dwelling. The site consists of land to the west on the western side of the house and part of the garden to the north. The western boundary of the site is formed by West Bank and there are dwellings to the east of the site. The area of development is approximately 0.15 hectares.

A topographic survey has been undertaken and is included in Attachment 1. Ground levels within the site typically range between +3.0m OD and +3.7m OD. In the area of the proposed dwelling ground levels are between +3.1m OD and +3.3m OD.

The site is in the North Level Internal Drainage Board (IDB) district. Surface water at the site would naturally drain through soakaway and hence to the IDB drainage system. The nearest IDB Main Drain is Greenbank Drain approximately 750m south east of the site.

The online British Geological Survey maps indicate that the site is likely to be underlain by Oxford Clay Formation mudstone. The bedrock is shown to be overlain with superficial deposits of Abbey Sand and Gravel.

2.3 Proposed Development

The proposed development consists of a dwelling. The dwelling will have two storeys. A Site Plan is provided in Attachment 1.

2.4 Local Development Documents

The South East Lincolnshire Local Plan 2011 – 2036, adopted in March 2019, is the Local Plan for the district. Policy 4: Approach to Flood Risk states the requirements for flood risk reduction.

The South East Lincolnshire Level 1 and Level 2 Strategic Flood Risk Assessment (SFRA) was prepared in June 2017.

The Joint Lincolnshire Flood Risk and Drainage Management Strategy has been prepared by Lincolnshire County Council as the Lead Local Flood Authority. The purpose of the Strategy is to increase the safety of people across Lincolnshire by reducing the number of people at risk of flooding, increasing the resilience of local communities, and reducing the impact of flooding.

2.5 Flood Zones

An extract from the Environment Agency Flood Map for Planning is shown in Figure 2. The site is located within Flood Zone 1, an area with a low probability of flooding.

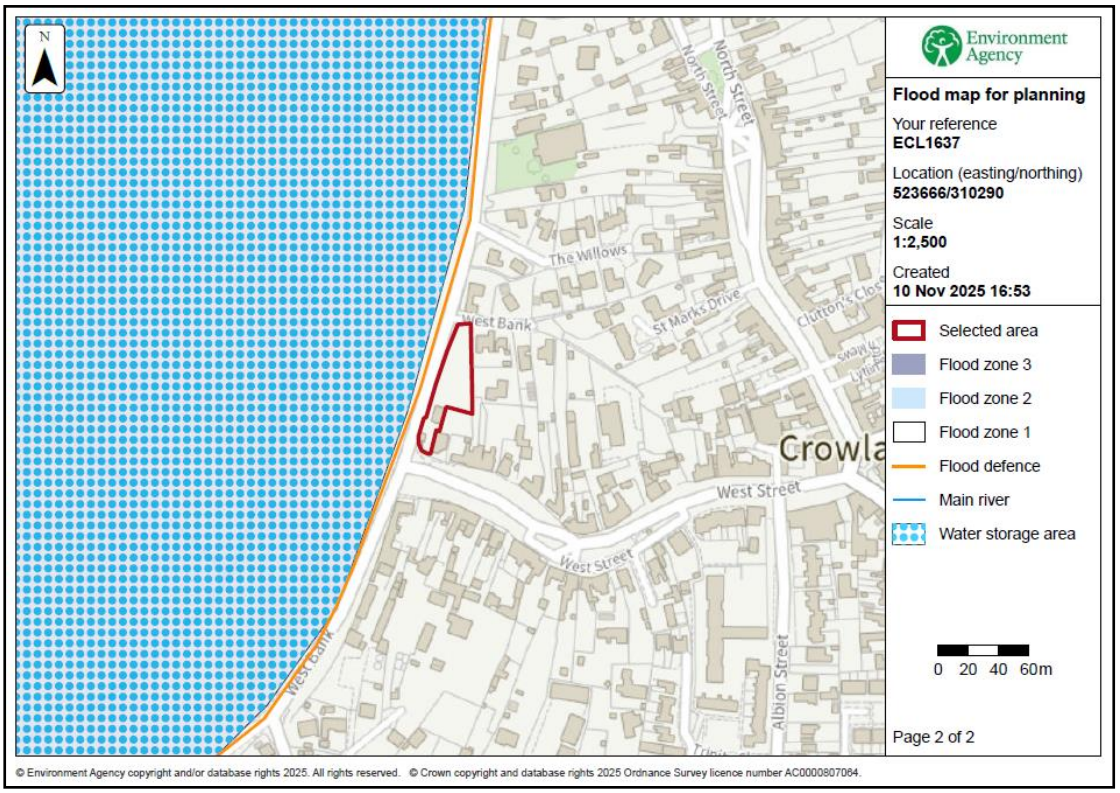

Figure 2 – Environment Agency Flood Map for Planning

The Environment Agency Long Term Flood Risk maps provide an indication of the risk from the primary sources of flooding. The details provided with these maps are summarised in Table 1. The depth of flooding identified is the maximum depth that occurs during a low chance (between 0.1% and 1% chance each year) event.

	Present Day		2050 Epoch	
	Chance of Flooding	**Depth (Low chance)**	**Chance of Flooding**	**Depth (Low chance)**
Rivers and the Sea	The site is outside of the area with a low chance (less than 0.1% chance each year)	No data available	No data available	No data available
Surface Water	Part of the site has a high chance (more than 3.3% chance each year)	To 0.3m	Part of the site has a high chance (more than 3.3% chance each year)	Not at risk
Reservoir	The site is outside of the area at risk.			

Table 1 – Environment Agency Long Term Flood Risk Maps

Table 2 shows the level of risk at the site within the South East Lincolnshire SFRA.

SFRA Map	Present Day	2116
Residual Flood Hazard Map for the 1% fluvial and 0.5% tidal event	The site is in the 'Danger for Most' area.	The site is in the 'Danger for All' area.
Residual Peak Depth Map for the 1% fluvial and 0.5% tidal event	The peak flood depth is between 0.5m and 1.0m.	The peak flood depth is between 1.0m and 2.0m.

Table 2 – Flood Risk within SFRA Maps

3.0 FLOOD RISK VULNERABILITY

3.1 The Sequential and Exception Test

The NPPF requires the application of a Sequential Test to ensure that new development is in areas with the lowest probability of flooding.

The Exception Test is a method to demonstrate and help ensure that flood risk to people and property will be managed, while allowing necessary development to go ahead in situations where suitable sites at lower risk of flooding are not available.

3.2 Vulnerability Classification

Table 2 of the PPG Flood Risk and Coastal Change categorises different types of uses and development according to their vulnerability to flood risk. The proposed development is covered by the description of buildings used for dwellings and is classified as 'More Vulnerable'.

Table 3 of the PPG Flood Risk and Coastal Change sets out Flood Risk Vulnerability and flood zone 'compatibility'. The site is in Flood Zone 1 and the development is 'More Vulnerable' therefore it is not necessary to complete the Exception Test.

PPG Flood Risk and Coastal Change defines that the lifetime of the development in terms of flood risk and coastal change is 100 years.

3.3 Application of the Sequential Test

It is for the Local Planning Authority, using the evidence provided and taking advice from the Environment Agency as appropriate, to consider whether an application passes the Sequential Test.

The site is located in Flood Zone 1 and therefore it is therefore not possible to undertake the development at an alternative site that is in a flood zone with a lower probability of flooding.

When compared to the allocated sites within Crowland the subject site has a comparable level of residual risk. For example, Cro036 includes significant areas that have a hazard of 'Danger for All'. Based upon the level of risk associated with the allocated sites it can be concluded that the availability of sites with lower levels of risk are limited.

The site is considered to pass the Sequential Test.

4.0 SITE SPECIFIC FLOOD RISK

4.1 Local Flood Assets

The site is 800m east of the River Welland. Crowland Washes provides floodplain storage for the River Welland. The village of Crowland is protected from the River Welland by the Corporation Bank which is on the eastern side of the site.

There is a long-term strategy for the maintenance of the Environment Agency defences which is reviewed and updated periodically.

There is an extensive local drainage network managed by North Level Internal Drainage Board. There nearest IDB Main Drain, Greenbank Drain approximately 750m south east of the site, discharges to the New South Eau and then into the North Level main Drain. The North Level Main Drain outfalls to the River Nene via Tydd Pumping Station.

During the operation and maintenance of its pumping stations, associated structures, and channel systems, the IDB seeks to maintain a general standard capable of providing flood protection to its district. A routine maintenance programme is in place to ensure that the Boards assets are commensurate with the standard of protection that is sought.

Current maintenance standards of the North Level Internal Drainage Board and the Environment Agency are generally good.

4.2 Sources of Flooding

A summary of the sources of flooding is provided in Table 3.

Source of Flooding	Level of Risk
Drainage Network Flooding	This risk is assessed in Section 4.3.
Surface Water Flooding	Based upon the EA maps the risk of surface water flooding is high with depths to 0.3m.
Fluvial Flooding	This risk is assessed in Section 4.3 & 4.5.
Tidal Flooding	The site is not at risk of tidal flooding.
Reservoir Flooding	Based upon the SFRA maps the site is not at risk of flooding from reservoirs.
Groundwater Flooding	There is no evidence to suggest the site is at risk of groundwater flooding.

Table 3 – Sources of Flooding

4.3 Probability of Flooding

The probability of flooding associated with blockages in the North Level IDB drainage system is low due to the maintenance standards achieved and managed by the IDB.

Through the operation and maintenance of the pumping stations and the channel system the Board seek to maintain a general standard capable to providing flood protection to agricultural land and developed areas of 1 in 20 years and 1 in 100 years, respectively. The risk associated with flood events that exceed the standard of protection provided is lowered due to the North Level IDB main drains incorporating freeboard. This freeboard provides storage during the exceedance events.

The Corporation Bank provides protection against the 1% annual probability (1 in 100 chance each year) event. The defence falls within the Reservoirs Act 1975 legislation. As such it is inspected annually by a Supervising Engineer who will assess its structural integrity to provide protection to people and property.

4.4 Historic Flooding

During the preparation of this assessment, no evidence was discovered of the site being flooded.

4.5 Climate Change

Climate change is likely to impact the site through increased rainfall intensity and duration affecting the local drainage network and increased flood levels. The Corporation Bank provides protection against the 1% annual probability (1 in 100 chance each year) event including climate change.

4.6 Residual Risk

There is a residual risk of flooding at the site should a breach occur. The South East Lincolnshire SFRA includes maps demonstrating the impact of a breach in 2116. These show that when the climate change allowances are applied to the combination of a 1% annual probability (1 in 100 chance each year) fluvial event and a 0.5% annual probability (1 in 200 chance each year) tidal event the site is at risk with depths between 1m and 2m. An extract from this map is shown in Figure 3 below.

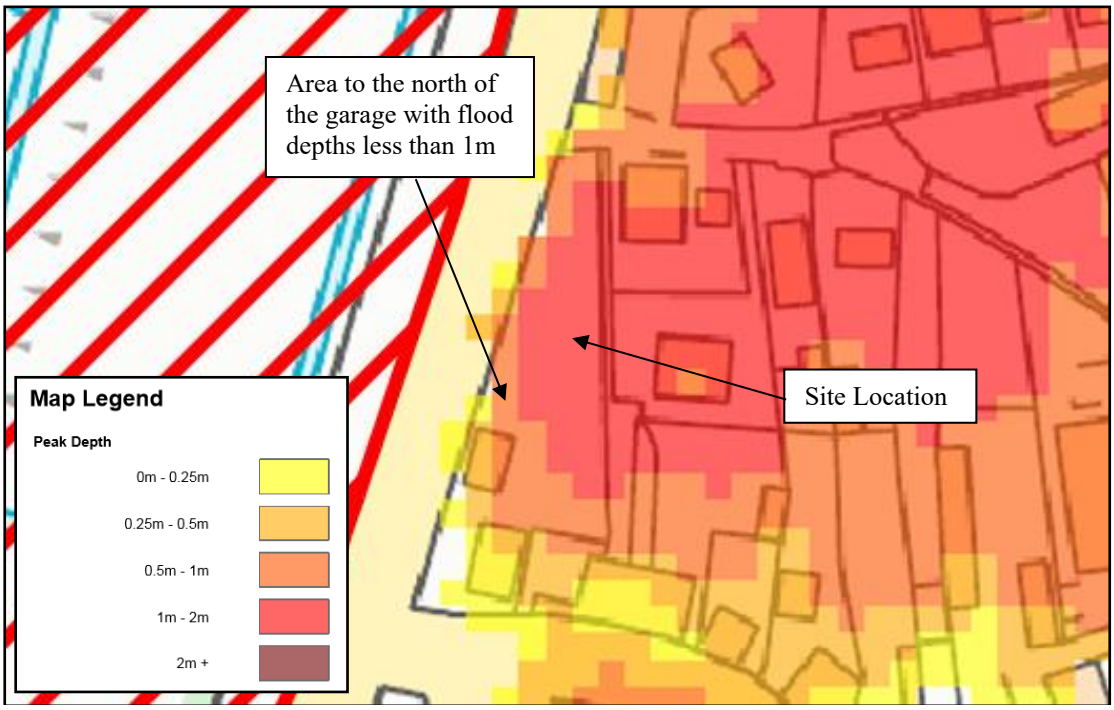

Figure 3 – SFRA 2116 Residual Peak Depth Map

The topographic survey and extent and depth of flooding in Figure 3 has been used to estimate the flood level during a breach. The land to the north of the garage where breach depths are less than 1m has ground levels greater than 3.5m OD. The flood level can therefore be estimated to be +4.5m OD. Based upon the approach used to estimate the flood level a flood level of +4.6m OD has been used within this assessment. This is a flood depth up to 1.5m.

The hazard maps have been developed based upon breaches occurring at specific locations along the defence. Adjacent to the site, as a consequence of the carriageway of West Bank being on top of the defence, the crest width of the defence is typically 10m. As a consequence of the width of the embankment the risk of a breach occurring adjacent to the site is considered to be very low.

5.0 FLOOD RISK MITIGATION

5.1 Summary of Risks

The probability of this development flooding from localised drainage systems is low. Failure of Tydd Pumping Station could lead to an increased level of risk at the site.

The probability of the site flooding from any Environment Agency system is less than 1% annual probability (1 in 100 chance each year) because of the standards of the existing flood defences. Over time there will be a gradual increase in risk to the site due to climate change. During the design life of the development it is not anticipated that the site would flood.

The SFRA considers the residual risk associated with a breach in the defences. The residual flood depth during a 1% annual probability (1 in 100 chance each year) fluvial event in 2115 is between 1m and 2m. A conservative estimate of the flood level is +4.6m OD, between 1.3m and 1.5m above ground levels in the area of the proposed dwelling.

The proposed development increases the impermeable area and therefore has the potential to increase the rate of surface water runoff from the site.

5.2 Mitigation Measures

The mitigation measures proposed are in accordance with the South East Lincolnshire Standing Advice. Based upon the information available during the preparation of this flood risk assessment, to mitigate against the remote risk of flooding it is proposed that:

- the finished floor level of the dwelling is +4.315 (1.0m above the highest existing ground levels within the footprint of the proposed dwelling);
- demountable defences 0.6m above finished floor level; and
- flood resilient (recoverability) construction to +4.9m OD.

The risk of flooding is lowered as the proposed dwelling has 2 storeys with all sleeping accommodation on the first floor.

The developer should ensure that the eventual occupier of the dwelling is sufficiently aware of the risk of flooding, and the standard of the existing defences. The Environment Agency operates a flood warning system for properties at risk of flooding to enable householders to protect life or take actions to manage the effect of flooding on property. Floodline Warnings Service is a national system run by the Environment Agency for broadcasting flooding warnings. The occupier of the dwelling should register to receive flood warnings.

Should there be a failure of Tydd Pumping Station and conditions were such to put properties and land at risk of flooding, the Internal Drainage Board would take

emergency action to maintain the drainage level of service by using temporary pumping equipment.

It is recommended that surface water run-off is managed so that stormwater from the development will not affect any adjoining properties or increase the flood risk elsewhere.

6.0 CONCLUSIONS

As a result of the assessment, the following conclusions have been reached.

- The proposed development consists of one 2 storey dwelling on land to the rear of 53 West Street, Crowland.

- The site is located within an Internal Drainage Board catchment and through the operation and maintenance of the pumping stations and the channel system the Board seek to maintain a general standard capable to providing flood protection to agricultural land and developed areas of 1 in 20 and 1 in 100 years, respectively.

- The site is in Flood Zone 1. The Corporation Bank provides protection against the 1% annual probability (1 in 100 chance each year) event including climate change in the River Welland.

- During the life of the development, a flood level of +4.6m OD, depth up to 1.5m, could occur at the site should there be a breach of the Corporation Bank.

- It is proposed that the floor level of the dwellings is at +4.315m OD, there is 0.6m of demountable defences above floor level, and there is flood resilient construction to +4.9m OD.

- The development passes the Sequential Test and is therefore suitable for the proposed location.

ATTACHMENT 1

TOPOGRAPHIC SURVEY

PROPOSED SITE PLAN
(DWG 1888 01 A)

LEGEND

ABBREVIATIONS (WHERE APPLICABLE)

AIR VALVE	AV
BED LEVEL	BL
BELISHA BEACON	BB
BOLLARD	B
BOTTOM OF BANK	BB
BRITISH TELECOM BOX	BTB
BRITISH TELECOM MANHOLE	BT
BRICKWORK	BKWK
BUS STOP	BS
CABLE TV	CATV
COVER LEVEL	CL
CABLE MARKER	CM
CONCRETE POST	CP
DOWN PIPE	DP
EAVES LEVEL	EAV
ELECTRICITY CABLE PIT	ELCP
ELECTRICITY CONTROL BOX	ECB
ELECTRICITY POLE	EP
EARTH ROD	ER
FIRE ASSEMBLEY POINT	FAP
FLOWER BED	FB
FOOTPATH	FP
FLOOR LEVEL	FL
FLAG STAFF	FS
GATE	GA
GULLY	G
GULLY OUTLET	GO
GATE STOP	GS
INSPECTION COVER	IC
INVERT LEVEL	IL
LAMP POST	LP
LETTER BOX	LB
MANHOLE	MH
MARKER	MKR
NOTICE BOARD	NB
NAME PLATE	NP
OVERHEAD WIRES	OHW
PARKING METER	PM
RIDGE LEVEL	RID
ROAD SIGN	RS
RODDING EYE	RE
RETAINING WALL	RTW
SLUICE VALVE	SV
STOP COCK	SC
SOFFIT LEVEL	SOF
STEEL BOLLARD	SB
TREE STUMP	ST
TELECOMS	TC
TELEGRAPH POLE	TP
TELEPHONE CALL BOX	TCB
TOP OF KERB	TK
TURNSTILE	TS
TRAFFIC LIGHT	TL
TOP OF BANK	TB
TOP OF WALL	TW
UNDERGROUND	UG
UNABLE TO LIFT	UTL
UNABLE TO SURVEY	UTS
VENT PIPE	VP
WATER METER	WM
WATER LEVEL	WL
WASH OUT	WO
WASTE PIPE	WP
WATER VALVE	WV

FENCES

BARBED WIRE FENCE	BWF
CORRUGATED IRON FENCE	CIF
CLOSE BOARD FENCE	CBF
CHAIN LINK FENCE	CLF
CHESTNUT PALING FENCE	CPF
FENCE POST	FPO
HERAS FENCE	HF
INTERWOVEN FENCE	IWF
IRON RAILING FENCE	IRF
LARCH LAP FENCE	LLF
POST AND CHAIN FENCE	PCF
POST AND RAIL FENCE	PRF
POST AND WIRE	PWF
STEEL PEDESTRAIN FENCE	SPF
STEEL PALISADE SECURITY FENCE	SPSF
TUBULAR STEEL RAIL	TSRF

TREES

Species / 3T / 0.2

No of Trunks | Dia of Bole

Ridge 9.306
GARAGE
Ric
11.
N
+5.725
+5.574
+5.089
+4.506
+4.167
+5.717
PRF
GA
GA GA
+4.021
+3.711
+5.688
G
+3.888
SPF
BB
+3.373
PRF
H 1M
+3.282
+5.731
HDG
+3.561
+5.720
+3.168
+3.383
+3.198
+3.483
+3.282
+5.7
TK
+3.441
+3.163
+5.738
+3.001
+3.228
+3.481
+3.125
+3.027
+3.010
+5.797
+3.253
+5.761
+3.517
+3.130
BB
+3.043
LAWNED
GARDEN
+3.295
+2.987
+3.552
SPF
+3.153
+3.092
+5.728
HDG
+5.764
+3.406
+3.027
+3.670
+3.215
+3.510
+3.878
+5.719
+5.701
+3.367
4T/0.17
3T/0.20
3T/0.37
3T/0.10
+3.734
Eaves
6.650
+4.027
+3.345
+3.273
SPF
1T/0.07
Dead
+3.284
3T/0.15
Ridge
8.192
+3.585
HDG
BB
+4.099
1T/0.14
1T/0.10
1T/0.10
+5.711
+5.700
+4.255
+3.244
MH
CL - 4.200
Heating
WALL
+3.533
1T/0.15
LAWNED
GARDEN
G
Eaves
6.697
PRF
H 1M
+3.411
+4.161
MH
CL - 4.175
TK
1T/0.12
9T/0.70
WALL
1T/0.08
+4.157
MH
CL - 4.480
IL - 3.830
+4.186
+4.263
+5.674
+5.715
+4.731
CBF
PATIO
PEBBLE
DRIVEWAY
Eaves
6.969
+3.600
MH
CL - 4.495
IL - 3.755
WALL
+4.316
CBF
H 2M
+4.346
Ridge
9.129
+5.734
+5.776
+4.371
+4.356
PEBBLE
DRIVEWAY
Ridge
8.564
Eaves
6.970
MH
CL - 4.525
IL - 3.655
+5.696
Eaves
6.910
Eaves
9.640
+4.441
+4.398
Ridge
11.319
+4.353
WALL
+4.352
WALL
MH
CL - 4.500
IL - 3.501
+5.860
TK
GRASS
+5.459
+4.779
+5.759
GRASS
BT
CL - 3.366
+4.408
+4.635
TK
+5.325
+4.367
+4.797
Ridge 8.029
Conservatory
Eaves 6.181
Ridge 6.667
Ridge 10.107
Eaves 6.191
Eaves 5.879
Ridge 7.628
Eaves 5.861
Ridge 7.650
Ridge 7.628
Eaves 5.862

All measurements in metres.

Grid and heights relate to Ordnance Survey (GPS) datum.

Do not scale from this documents, all dimensions to be checked on site.

We are not tree specialisits.

Client :
Dennis Smith

Project :
78 West Street,
Crowland,
Peterborough,
PE6 0EE

Scale : 1-200 @ A2
Job Number : 274
Date : 14/06/2025
Revision - 0

Newman Surveying
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N.E. Lincs, DN35 0FF
T - 07918 998 015
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RTK

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RIBA Chartered Practice
RICS

Revision/Issue Notes:

Rev:	Notes:	Issue Date:	By:
A	Scheme developed for Planning	17.10.2025	NF

Visual Scale 1:50

Project Name:
Single New Build Dwelling

Project Address:
Land to Rear of 53 West Street, Crowland, PE6 0EE

Client:
Mr M Woodrofe

Project:	Drg No:	Revision:
1888	01	A

Drawing Title:
Proposed Site Plan

Scale:	Paper size:
1:100/1:200	@A1

Drawn:	Checked:
NF	NF

Issue:
FOR COMMENT