

**FLOOD RISK ASSESSMENT**

**for**

**MR MICHAEL REILLY**

**PROPOSED COOKERY SCHOOL**

**at**

**THORNEYHOLME HALL**

**DUNSOP BRIDGE**



**INFRASTRUCTURE**

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## **APPENDICES**

- A Existing site plan
- B Site layout plan
- C Local topography and flood zones

# 1. INTRODUCTION

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- 1.1 This flood risk assessment has been produced on behalf of Mr Michael Reilly in support of a Detailed Planning Application for a cookery school at Thorneyholme Hall, Dunsop Bridge. An existing site plan is included within Appendix A.
- 1.2 This Flood Risk Assessment is compliant with the requirements set out in the National Planning Policy Framework (NPPF) and the Planning Practice Guidance (PPG) in relation to Flood Risk and Coastal Change, which was updated in April 2015, and describes the existing site conditions and proposed development. It assesses the potential sources of flooding to the site from tidal, fluvial, groundwater, surface water and other sources, taking a risk based approach in accordance with National Policy.

## Site summary

Site Name	Land at Thorneyholme Hall
Location	Dunsop Bridge
NGR (approx.)	SD663499
Application site area	135m <sup>2</sup> (approx.)
Development type	Educational establishment
Vulnerability	More Vulnerable
EA Indicative Flood Zones	Flood Zone 3a
EA Development Control Area	Cumbria and Lancashire
Local Planning Authority	Ribble Valley Borough Council

## 2. DESCRIPTION OF THE SITE

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### Existing site

- 2.1 The proposal relates to land (approx. 135m<sup>2</sup>) to the south of Thorneyholme Hall, Dunsop Bridge.
- 2.2 Access to the site is via the private access to the Hall from the main road running through Dunsop Bridge and crosses the River Hodder via Thorneyholme Bridge.
- 2.3 The site lies within the grounds of Thorneyholme Hall and is located on a small part of the existing car parking and surrounding footpath.
- 2.4 The River Hodder runs along the northern boundary of the estate. The River Dunsop flows into the River Hodder adjacent to the estate's northwest corner.
- 2.5 Thorneyholme Hall and its grounds are on land that is elevated above the surrounding land.

### Proposed development

- 2.6 It is proposed that the development site will comprise an extension to the existing garage to provide additional space to allow the formation of a cookery school. The extension has an area approx. 135m<sup>2</sup>.
- 2.7 The site layout plan is included within Appendix B.
- 2.8 It is proposed that access into the developed site will be as existing, from the main road that runs through Dunsop Bridge, crossing the River Hodder via Thorneyholme Bridge.

### 3. SCOPE OF THE ASSESSMENT

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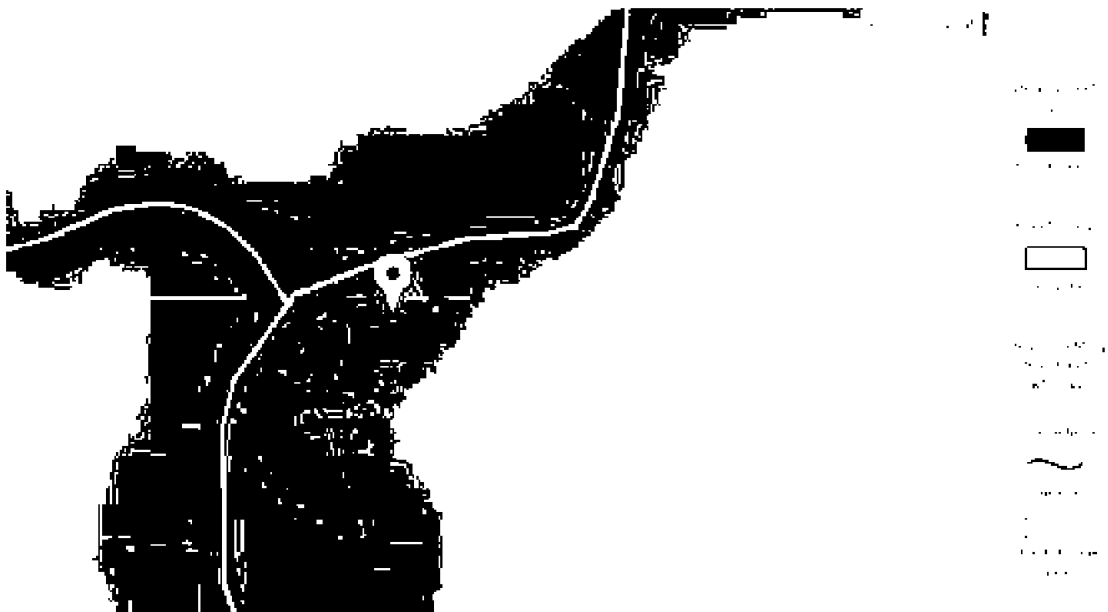
#### **Flood risk planning policy**

- 3.1 The National Planning Policy Framework (NPPF) sets out the Government's national policies on different aspects of land use planning in England in relation to flood risk. Supporting Planning Practice Guidance is also available.
- 3.2 The NPPF sets out the vulnerability to flooding of different land uses. It encourages development to be located in areas of lower flood risk where possible, and stresses the importance of preventing increases in flood risk offsite to the wider catchment area.
- 3.3 The NPPF also states that alternative sources of flooding, other than fluvial (river flooding), should also be considered when preparing a Flood Risk Assessment.
- 3.4 As set out in NPPF, local planning authorities should only consider development in flood risk areas appropriate where informed by a site specific Flood Risk Assessment. This document will identify and assess the risk associated with all forms of flooding to and from the development. Where necessary it will demonstrate how these flood risks will be managed so that the development remains safe throughout its lifetime, taking climate change into account.
- 3.5 This Flood Risk Assessment is written in accordance with the NPPF and the Planning Practice Guidance in relation to Flood Risk and Coastal Change.

#### **Flood zones**

- 3.6 The site is identified on the Environment Agency's flood mapping as lying within Flood Zone 3a. The flood risk is fluvial flooding from the River Hodder, which is Main River.
- 3.7 Flood Zone 3a is land assessed as having between a 1 in 100 and 1 in 30 annual probability of river flooding (1% – 3.3%) in any year.

3.8 An extract from the Environment Agency's Flood Zone Map for Planning is shown below.



3.9 As already stated Thorneyholme Hall and its grounds are on land that is elevated above the surrounding land. A site visit has been undertaken to carry out a review of the existing site levels local to the site to demonstrate that the site does not lie within Flood Zone 3a. The description below should be read in conjunction with the figure and photographs within Appendix C.

3.10 The Environment Agency mapping identifies the boundary of the Flood Zone 3a area entering Thorneyholme Hall and its grounds at its north east corner and crossing the site towards its south west corner. This is not possible. The existing ground level within Thorneyholme Hall and its grounds are at the same level as the ground level at the site's north east corner i.e. the Flood Zone 2 level. This level is maintained across the site. In addition there is a brick wall along the site's northern boundary to the Thorneyholme Bridge crossing the River Hodder and along the site's eastern boundary that protects the site from a 1 in 100 year event and prevents flood water entering the grounds.

3.11 Immediately after crossing the bridge over the River Hodder, an access drops from the site level into Thorneyholme Farm, which is at a lower level to Thorneyholme Hall and its grounds. The ground level within Thorneyholme Hall and its grounds, which includes the development site, is maintained along the

western boundary of the site between the Hall and the Farm by a one metre high stone retaining wall. This height difference is maintained to the south of the site as a raised embankment until it meets with the Flood Zone 2 boundary approx. 250 metres to the south of the site, and thus provides flood protection to the site's western and southern boundaries from a 1 in 100 year event.

- 3.12 This whole area, as identified on the figure included within Appendix C, lies outside of the Flood Zone 3a area. Flood water from a 1 in 100 year event would remain in the river channel past the site and is prevented from entering the site by the retaining wall and earth embankment to the west and south. The site would be unaffected by the 1 in 100 year event. The site therefore lies within Flood Zone 2, which is land assessed as having between a 1 in 100 and 1 in 1000 annual probability of river flooding (1% – 0.1%) in any year.

### **Strategic Flood Risk Assessment**

- 3.13 The site is within the area covered by the Ribble Valley Borough Council, Strategic Flood Risk Assessment, Level 1, May 2010.
- 3.14 The SFRA makes reference to Dunsop Bridge as follows:
- It identifies that Dunsop Bridge has no flood defence identified within the National Flood and Coastal Defence Database.
  - Bowland Fell Policy Option P6 Preferred Policy is to take action with others to store water or manage run off in locations that provide overall flood risk reduction or environmental benefits, locally or elsewhere in the catchment. The policy was chosen to deliver benefits to villages such as Dunsop Bridge and further downstream.

### **Sequential Test**

- 3.15 A requirement of NPPF is that developers considering submitting a planning application should consult with the Local Planning Authority at all stages of development to ensure that the Sequential Test is applied at all stages of the planning process. The purpose of the test is to direct new development to areas with the lowest probability of flooding.

- 3.16 Strategic Flood Risk Assessments (SFRA) refine information on the probability of flooding, taking other sources of flooding and the impacts of climate change into account. They provide the basis for applying the Sequential Test, on the basis of the flood zones in PPG Table 1.
- 3.17 The flood zones are the starting point for this sequential approach. As already stated, the Environment Agency's flood mapping identifies the site as lying within Flood Zone 3a.
- 3.18 However, Thorneyholme Hall and its grounds are on land that is elevated above the surrounding land, which lifts it out of the Flood Zone 3a area. The site therefore lies within Flood Zone 2. This agrees with the flood zone classification of the site provided by Ribble Valley Borough Council.
- 3.19 The current development proposals are classified as "More Vulnerable". Table 3 within PPG indicates Flood Risk Vulnerability and Flood Zone 'compatibility'. Using Zone 2 and the "More Vulnerable" classification for an educational establishment use, PPG considers that a development of this type would be deemed appropriate for development within Flood Zone 2.
- 3.20 Subject to the suitable assessment of flood risk, PPG considers that a development of this type would be deemed appropriate for this location.



## 4. CONSULTATIONS AND DATA ACQUISITIONS

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### **Environment Agency**

- 4.1 The site is identified on the Environment Agency's flood mapping as lying within Flood Zone 3a. The flood risk is fluvial flooding from the River Hodder, which is Main River.
- 4.2 Flood Zone 3a is land assessed as having between a 1 in 100 and 1 in 30 annual probability of river flooding (1% – 3.3%) in any year.
- 4.3 The Environment Agency has been consulted with regards the availability of EA Product Data 4 for the Site. The information is not available.

### **Ribble Valley Borough Council**

- 4.4 Ribble Valley Borough Council has stated that Thorneyholme Hall lies within Flood Zones 1 and 2.

### **United Utilities**

- 4.5 United Utilities has confirmed there are no public sewers within the vicinity of the site.

### **Historic flooding**

- 4.6 Other than the defined flood zones, there is no record of historical flooding occurring on the site

### **Topographical Survey**

- 4.7 A topographical survey has been carried out for this site and is shown on the existing site plan in Appendix A.

### **Site Investigation**

- 4.8 Research has identified that the geology encountered will be loamy and clayey floodplain soils with naturally high groundwater.

## **Site Inspections**

- 4.9 A site visit was made to examine site conditions and levels as well as any significant visible features that would affect the flood characteristics of the site. Such inspections are limited to areas that could readily and safely be accessed and no intrusive investigations or surveys were carried out.

## 5. SOURCES OF FLOOD RISK

### Potential Sources of Flood Risk

5.1 The table below identifies the potential sources of flood risk to the site. The significance of these sources is investigated further in Section 6.

Flood Source	Potential Risk				Description
	High	Medium	Low	None	
Fluvial			x		The River Hodder runs along the northern boundary of the estate.
Tidal				x	No tidal impact.
Groundwater				x	No issues recorded.
Canals, reservoirs and other artificial sources				x	None within the vicinity of the site.
Sewers				x	There are no sewers within the development area.
Pluvial runoff			x		Potential risk from adjacent land.
Development Drainage			x		No additional hard surfacing is planned with the development.

#### *Fluvial flooding*

- 5.2 The River Hodder runs along the northern boundary of the estate. The River Dunsop flows into the River Hodder adjacent to the estate's northwest corner.
- 5.3 The access to the site bridges the River Hodder with the Thorneyholme Bridge. The bridge allows a clear span of the river.
- 5.4 The site is identified on the Environment Agency's flood mapping as lying within Flood Zone 3a. The flood risk is fluvial flooding from the River Hodder, which is Main River.
- 5.5 However, Thorneyholme Hall and its grounds are on land that is elevated above the surrounding land, which lifts it out of the Flood Zone 3a area. The site

therefore lies within Flood Zone 2, which is land assessed as having between a 1 in 100 and 1 in 1000 annual probability of river flooding (1% – 0.1%) in any year. This agrees with the flood zone classification of the site provided by Ribble Valley Borough Council.

#### *Tidal flooding*

- 5.6 The site is a significant distance from the nearest tidal estuary and is, therefore, not at risk of flooding from the sea. The site is not identified as being at risk of flooding from the sea by any Environment Agency Flood Zone maps or within the SFRA for the area.

#### *Groundwater*

- 5.7 Groundwater flooding tends to occur after much longer periods of sustained high rainfall. The areas that are at risk tend to be those low-lying areas where the water table is shallow. Flooding tends to occur in areas that are underlain by major aquifers, although groundwater flooding is also noted in localised floodplain sands and gravels. The main causes of groundwater flooding are:

- Natural groundwater rising due to tidal influence, or exceptionally wet periods leading to rapid recharge;
- Groundwater rebound due to cessation of abstraction and mine dewatering;
- Existence of confined aquifers and springs.

- 5.8 There are no recorded incidents of flooding associated with groundwater levels within the site.

#### *Canals, reservoirs and other artificial sources*

- 5.9 There are no canals or other artificial sources within the vicinity of the site.
- 5.10 The Environment Agency's risk of flooding from reservoirs mapping identifies risk of flooding from the Stocks Reservoir, which is owned by United Utilities.

### *Sewers*

- 5.11 Flooding from a drainage system occurs when flow entering a system exceeds its discharge capacity, the system becomes blocked or, in the case of surface water sewers, it cannot discharge due to high water level in the receiving watercourse. Sewer flooding is often caused by surface water discharging into the combined sewerage system, sewer capacity is exceeded in large rainfall events causing backing up of flood waters within properties or discharging through manholes.
- 5.12 Surface water (including the risk of sewers and culverted watercourses surcharging) poses the highest risk of more frequent flooding. Surface water drainage from new developments is critical in reducing the risk of localised flooding.
- 5.13 Where possible the preference for dealing with surface water runoff from the developed site is for it to infiltrate back into the ground or alternatively to a watercourse. Only if it is not possible for either of these options is surface water from the development to be allowed into the public sewers.
- 5.14 United Utilities has confirmed there are no public sewers within the vicinity of the site.

### *Pluvial runoff*

- 5.15 The Environment Agency Risk of Flooding from Surface Water map indicates the site is at a very low risk of surface water flooding.
- 5.16 It should be noted that surface water flooding can be difficult to predict as it is hard to forecast exactly where or how much rain will fall in any storm.

### *Development drainage*

- 5.17 Surface water (including the risk of sewers and culverted watercourses surcharging) poses the highest risk of more frequent flooding. Surface water drainage from new developments is critical in reducing the risk of localised flooding.

- 5.18 If surface water runoff is not managed appropriately, there may be an increased risk presented elsewhere from development drainage, and the aim should be to implement appropriate sustainable drainage systems (SuDS) to treat and contain flows and mimic the existing conditions.
- 5.19 Where possible the preference for dealing with surface water runoff from the developed site is for it to infiltrate back into the ground or alternatively to a watercourse. Only if it is not possible for either of these options is surface water from the development to be allowed into public sewers.
- 5.20 The area of impermeable surfaces on site will not be increased due to the addition of the development.

## 6. FLOOD RISK ASSESSMENT

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6.1 This section of the Flood Risk Assessment looks at the flood risk to the site before any mitigation measures are put into place and hence identifies where mitigation will be required. Section 7 continues to explain the mitigation measures proposed and the residual risk following implementation of any proposed mitigation.

### **Risk of Flooding to Proposed Development**

#### *Fluvial Flood Risk*

6.2 The River Hodder runs along the northern boundary of the estate. The River Dunsop flows into the River Hodder adjacent to the estate's northwest corner.

6.3 As previously demonstrated, Thorneyholme Hall and its grounds are on land that is elevated above the surrounding land, which lifts it out of the Flood Zone 3a area. The site therefore lies within Flood Zone 2 and as such, the risk of fluvial flooding to the proposed development is medium.

#### *Canals, reservoirs and other artificial sources*

6.4 There are no canals or reservoirs local to the development site. The Environment Agency's risk of flooding from reservoirs mapping identifies risk of flooding from the Stocks Reservoir, which is owned by United Utilities. The flooding shown is a worst case scenario and it is unlikely that any actual flood would be as shown on the mapping.

6.5 The EA has not yet determined the risk designation should flooding occur and states that flooding from reservoirs is extremely unlikely to happen. As such the risk of flooding is low.

#### *Groundwater*

6.6 The site is not underlain by a major aquifer. There are no recorded incidents of flooding associated with groundwater levels within the site and due to the nature of the underlying strata the flood risk from groundwater is low

### *Sewer Flooding and Pluvial Runoff*

- 6.7 There are no public sewers within the vicinity of the site. There is no record of any sewer flooding. The risk from sewer flooding is therefore low.
- 6.8 There is no record of any flooding on the site after heavy rainfall. In addition, as Thorneyholme Hall and its grounds are on land that is elevated above the surrounding land the risk from pluvial runoff is low.

### **Effect of the Development on the Wider Catchment**

#### *Development Drainage*

- 6.9 The area of impermeable surfaces on site will not be increased due to the addition of the development. There is, therefore, no change to the surface water runoff regime of the site and no adverse effect on flood risk elsewhere in the wider catchment.
- 6.10 It is intended that surface water runoff from the new buildings and hardstandings will discharge to the private drainage as the current scenario.
- 6.11 As such there will be no change to the flood risk upstream or downstream of this location.
- 6.12 The risk of flooding from the development drainage is low.



## 7. PREDICTED IMPACTS AND MITIGATION

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- 7.1 This section of the FRA sets out the mitigation measures recommended to reduce the risk of flooding to the proposed development and outlines any residual impacts.

### **Site arrangements**

#### *Upstream and downstream effects*

- 7.2 As there is no development within Flood Zone 3a, there is no material effect on the floodplain due to the proposed development.
- 7.3 It is intended that surface water runoff will be discharged to the private drainage system as the existing scenario. As such there will be no additional risk to upstream or downstream properties and the flood risk is low.

#### *Finished floor levels and future proofing against flooding*

- 7.4 The finished floor level of the proposed cookery school will match that of the existing garage as it is an extension to the existing garage that is to be built. Flood proofing measures are to be implemented to ensure future occupants are not at an unacceptable level of flood risk.
- 7.5 Measures to future proof against future flood events can include the use of solid floors, provision of flood barriers on ground floor doors, windows and access points and bringing in electrical services into the building at a high level so that plugs are located above possible flood levels.

#### *Safe access and egress*

- 7.6 Access to the site is from the main road that runs through Dunsop Bridge, crossing the River Hodder via Thorneyholme Bridge.
- 7.7 The site does not lie within an area benefitting from the Environment Agency's flood warning service.

- 7.8 As the site is not within a flood warning area it is proposed that a simple warning device can be installed at a suitable location by the river with telemetry links to the school to warn of a flood event.
- 7.9 This will notify designated persons at the school responsible for warning and evacuation during a flood. It is advised that a flood warning and evacuation plan should be produced prior to occupation of the school.

## 8. CONCLUSIONS

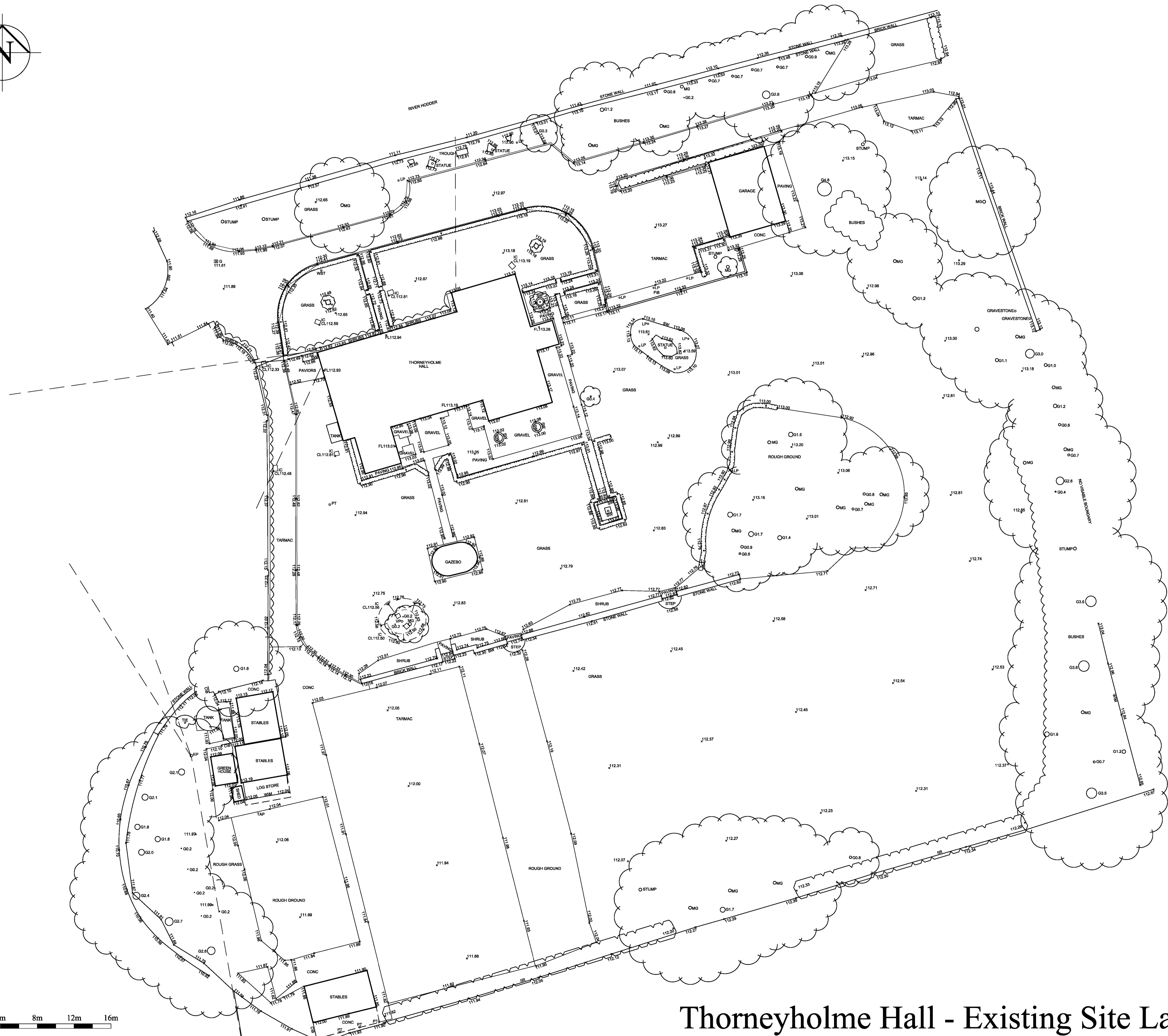
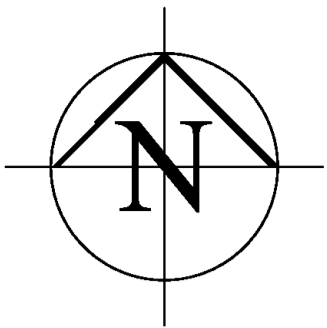
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- 8.1 This flood risk assessment has been produced on behalf of Mr Michael Reilly in support of an Outline Planning Application for the development of land at Thorneyholme Hall, Dunsop Bridge for a cookery school.
- 8.2 The risk of fluvial flooding to the proposed development is medium.
- 8.3 The risk of flooding from canals, reservoirs and other artificial sources is low.
- 8.4 The flood risk from groundwater is low.
- 8.5 The risk from sewer flooding and pluvial runoff is low.
- 8.6 It is intended that surface water runoff from the new buildings and hardstandings will discharge to the private drainage system as the current scenario. As such there will be no change to the flood risk upstream or downstream of this location and the flood risk is low.

<b>Client:</b>	Mr Michael Reilly		
<b>Project Name:</b>	Thorneyholme Hall, Dunsop Bridge		
<b>Project Number:</b>	2017-C-237		
<b>Report Title:</b>	Flood Risk Assessment		
<b>Created by:</b>	[REDACTED]	<b>Date:</b>	April 2017
<b>Proofed By:</b>		<b>Date:</b>	April 2017
<b>Approved by:</b>		<b>Date:</b>	April 2017

## **APPENDIX A**

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Project  
Proposed Development at  
Thorneyholme Hall, Dunsop Bridge

Title  
Existing Site Layout

**PWL**  
ARCHITECTURE

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Tel 01772 467404 E Mail info@pwlarchitecture.com

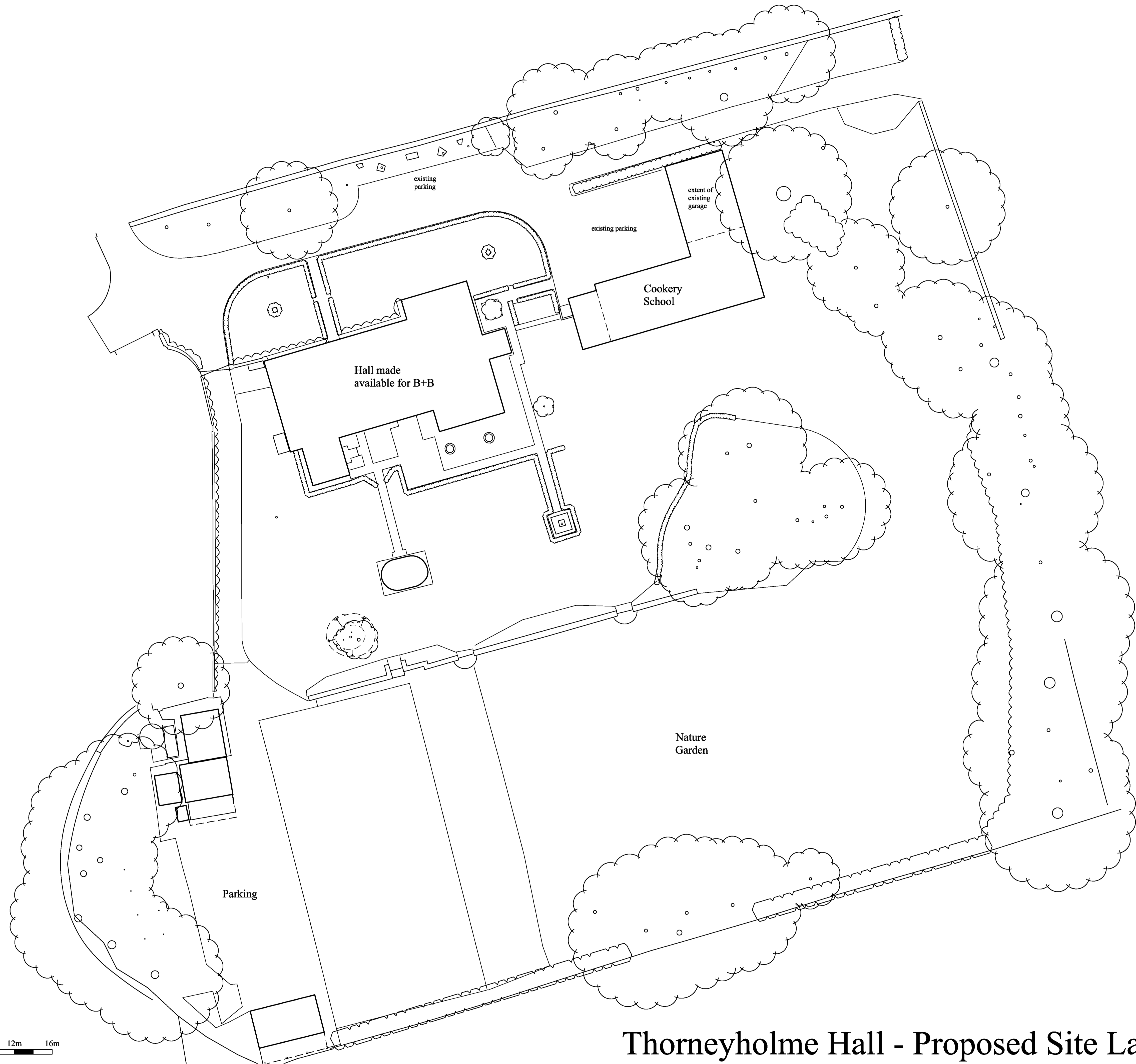
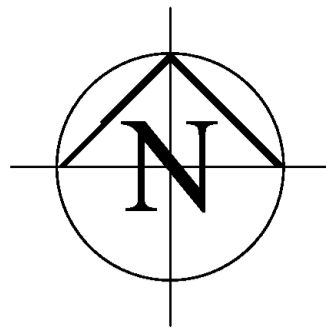
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1:200@A1	March 2017

Drawn	Drwg No
PL	1178-PL-20

# Thorneyholme Hall - Existing Site Layout

## **APPENDIX B**

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Project  
Proposed Development at  
Thorneyholme Hall, Dunsop Bridge

Title  
Proposed Site Layout

**PWL**

ARCHITECTURE

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Scale 1:200@A1	Date March 2017
Drawn PL	Drwg No 1178-PL-22






# Thorneyholme Hall - Proposed Site Layout



## **APPENDIX C**

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-  EA FLOOD ZONE 3 LINE
-  EA FLOOD ZONE 2 LINE
-  LINE OF RAISED EMBANKMENT
-  WALL
-  AREA TAKEN OUT FROM FLOOD ZONE 3 - NOW FLOOD ZONE 2



Photograph 1 – Outside northeast corner of the site looking south along boundary



Photograph 2 – Outside northeast corner of the site looking east



Photograph 3 – Outside northeast boundary of the site looking east along wall on northern boundary



Photograph 4 – Wall at Thorneyholme Bridge over River Hodder at northwest corner of the site



Photograph 5 – Western boundary retaining wall at development site



Photograph 6 – Raised embankment continuing boundary protection to the south