FLOOD RISK ASSESSMENT
FOR RECREATIONAL DEVELOPMENT AT
CROWLAND TOWN BOWLS CLUB

FINAL REPORT

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– Working Drawing (Dwg CTBC6/1)

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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 David Hartley Associates in respect of a development that consists of a replacement clubhouse at Crowland Town Bowls Club, Crowland.

A planning application for the proposed development is to be submitted by David Hartley Associates.

2.0 SITE LOCATION AND DESCRIPTION

2.1 Site Location

The site is located at Crowland Town Bowls Club, Thorney Road, Crowland, Lincolnshire, PE6 0AL. The National Grid Reference of the site is 523417/31016.

The location of the site is shown in Figure 1.



Figure 1 – Location Plan (© OpenStreetMap contributors)

2.2 Existing Site

The site is on the eastern side of Thorney Road and adjacent to Snowden Sports Field. The site consists of a bowling green, club house and changing room. The area of development is approximately 0.18 hectares.

Spot levels taken at the site are shown in Attachment 1. These show that the floor level of the existing club house is 0.46m higher than the ground level on its northern side and 0.7m higher than the bowling green and surrounding ground level.

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 50m north 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 replacement clubhouse. Details of the proposed development are 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 predominantly located within Flood Zone 1, an area with a low probability of flooding, and the south east corner of the site is in Flood Zone 2.

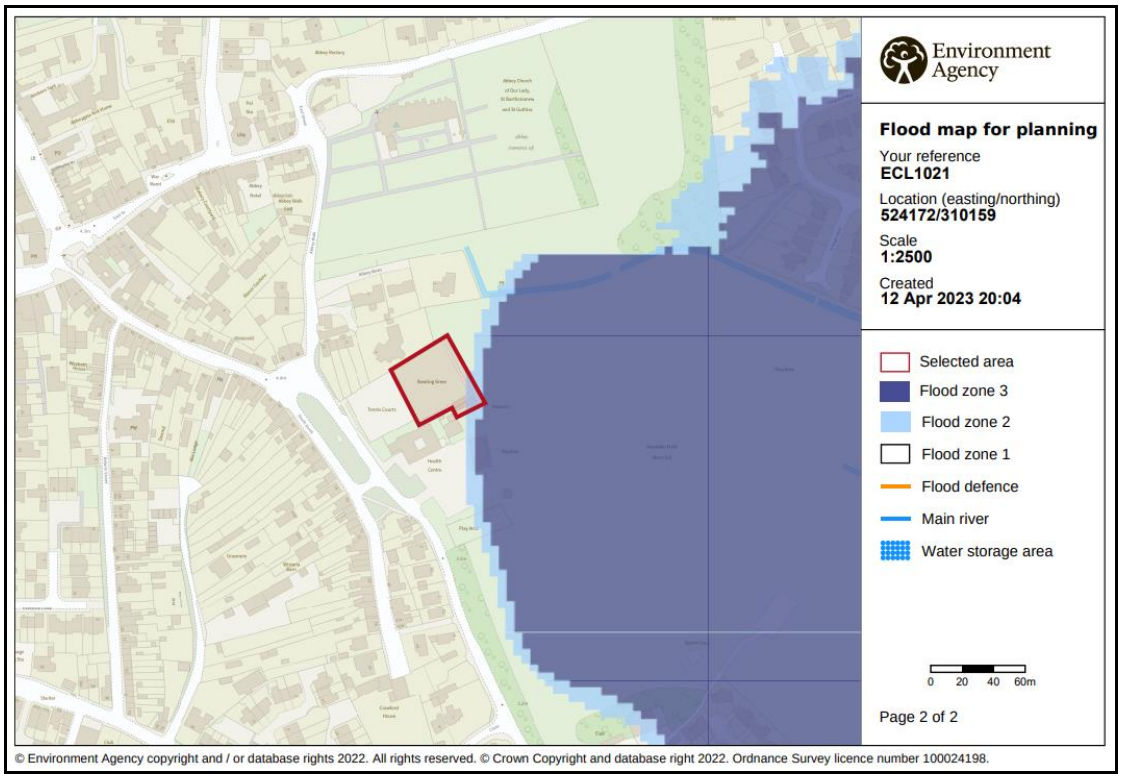


Figure 2 – Environment Agency Flood Map for Planning

The Environment Agency Long Term Flood Risk maps show that:

- the site has a very low risk of flooding from rivers or the sea (annual probability less than 0.1%);
- the site has a very low risk of surface water flooding (annual probability less than 0.1%); and
- the site is within an area at risk of reservoir flooding when there is also flooding from rivers.

Table 1 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 outside the 'Low Hazard' area	The site is in the 'Low Hazard' area
Residual Peak Depth Map for the 1% fluvial and 0.5% tidal event	The site is outside the area at risk	The peak flood depth is between 0.0m and 0.25m.

Table 1 – 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 leisure and is classified as 'Less 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 2 and the development is 'Less 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 proposed club house is a replacement for the existing club house. As the development is a replacement building it is not necessary to apply the Sequential Test.

4.0 SITE SPECIFIC FLOOD RISK

4.1 Local Flood Assets

The site is 1.3km 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 approximately 550m west 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, approximately 50m north 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 2.

Source of Flooding	Level of Risk
Drainage Network Flooding	The risk is assessed in Section 4.3.
Surface Water Flooding	Based upon the EA maps the risk is very low.
Fluvial Flooding	The risk is assessed in Section 4.3.
Tidal Flooding	The site is not at risk of tidal flooding.
Reservoir Flooding	The residual risk from the Crowland Washes is assessed in Section 4.6.
Groundwater Flooding	There is no evidence to suggest the site is at risk of groundwater flooding.

Table 2 – 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.

Failure of Tydd Pumping Station could increase the level of flood risk within the IDB catchment.

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 0.0m and 0.25m. An extract from this map is shown in Figure 3 below.

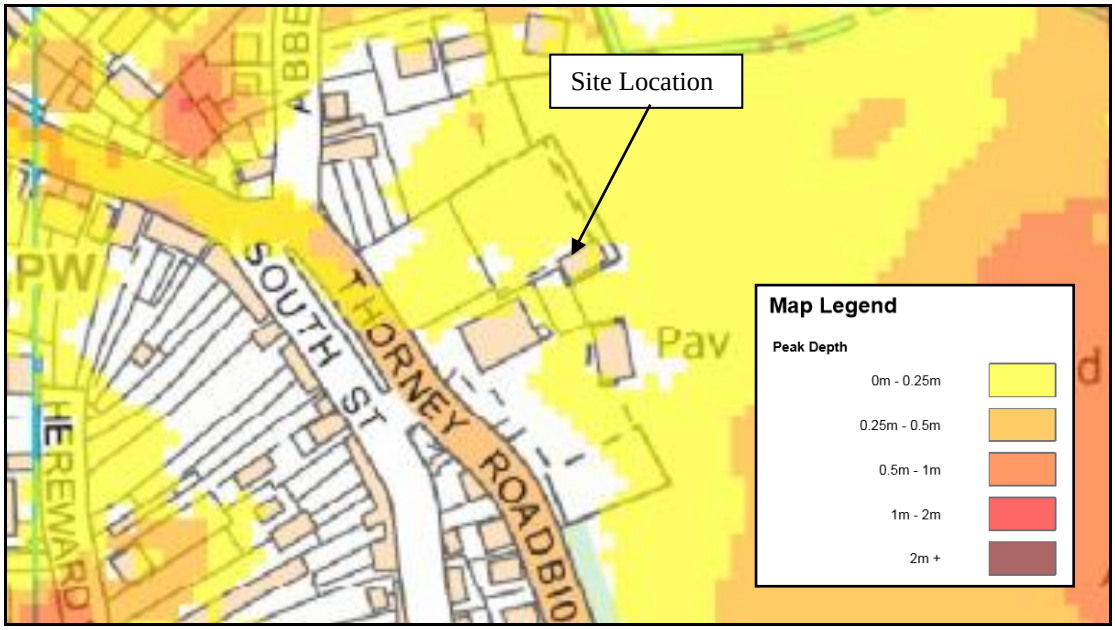


Figure 3 – SFRA 2116 Residual Peak Depth Map

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 and a 0.5% annual probability (1 in 200 chance each year) tidal event in 2116 is between 0.0m and 0.25m.

The proposed arrangement increases the impermeable area and therefore there will be an increased volume of surface water that has the potential to increase flood risk.

5.2 Mitigation Measures

It is proposed that the finished floor level of the club house is between 0.20m and 0.25m above the surrounding ground level. Based upon the information available during the preparation of this flood risk assessment, it is recommended that there is 0.3m of flood resilient construction above finished floor level.

The developer should ensure that the users of the club house are 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 users of the club house 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 a replacement club house at Crowland Town Bowls Club, Thorney Road, 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.

- Part of the site is in Flood Zone 2 and the majority of 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 depth between 0.0m and 0.25m could occur at the site should there be a breach of the Corporation Bank.

- It is proposed that the finished floor level of the club house is between 0.20m and 0.25m above the surrounding ground level and it is recommended that there is 0.3m of flood resilient construction above finished floor level.

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

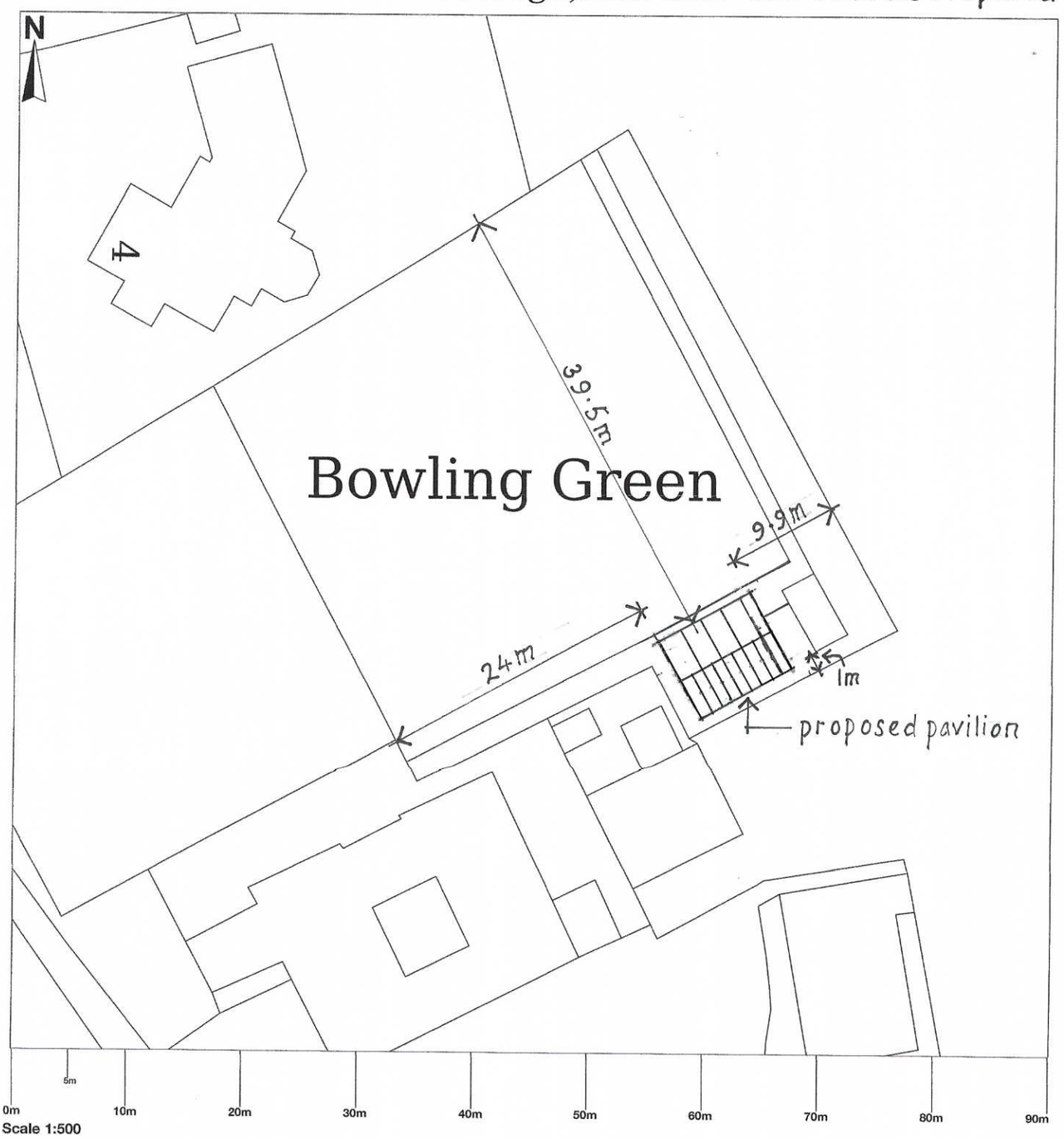
ATTACHMENT 1

SITE PLAN AS PROPOSED

WORKING DRAWING
(DWG CTBC6/1)

UK Planning Maps

Crowland Town Bowls Club, Thorney Road, Crowland, Peterborough, PE6 0AL Site Plan As Proposed

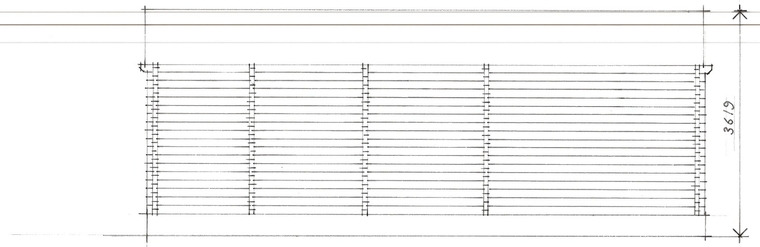


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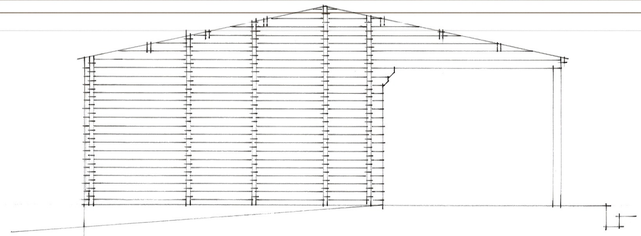
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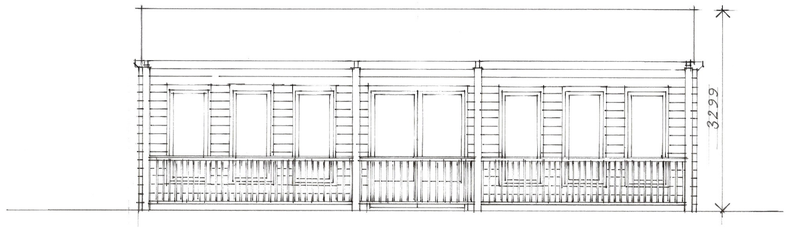
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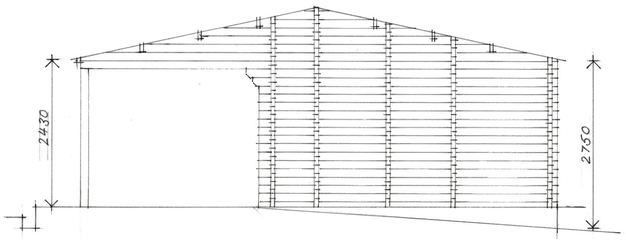
South East Elevation As Proposed



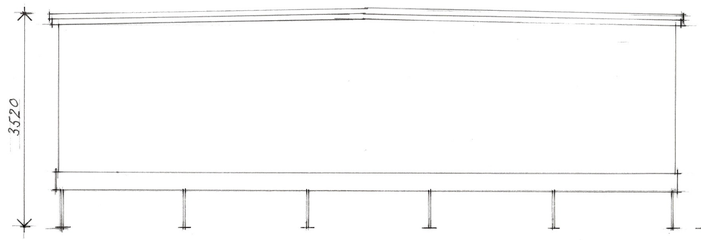
North East Elevation As Proposed



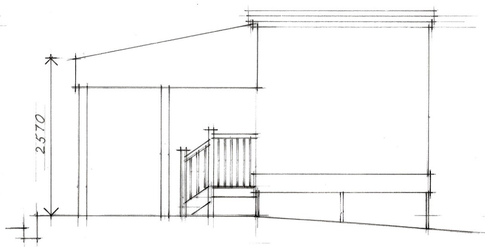
North West Elevation As Proposed



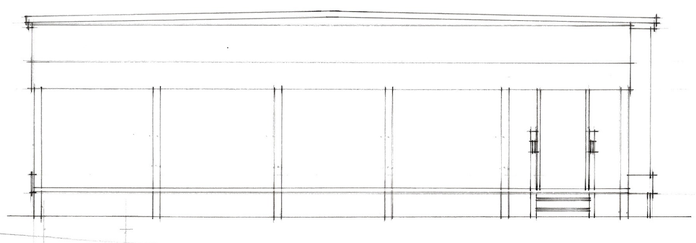
South West Elevation As Proposed



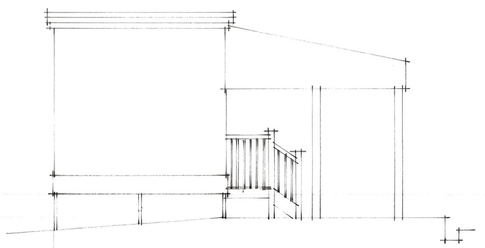
South East Elevation As Existing



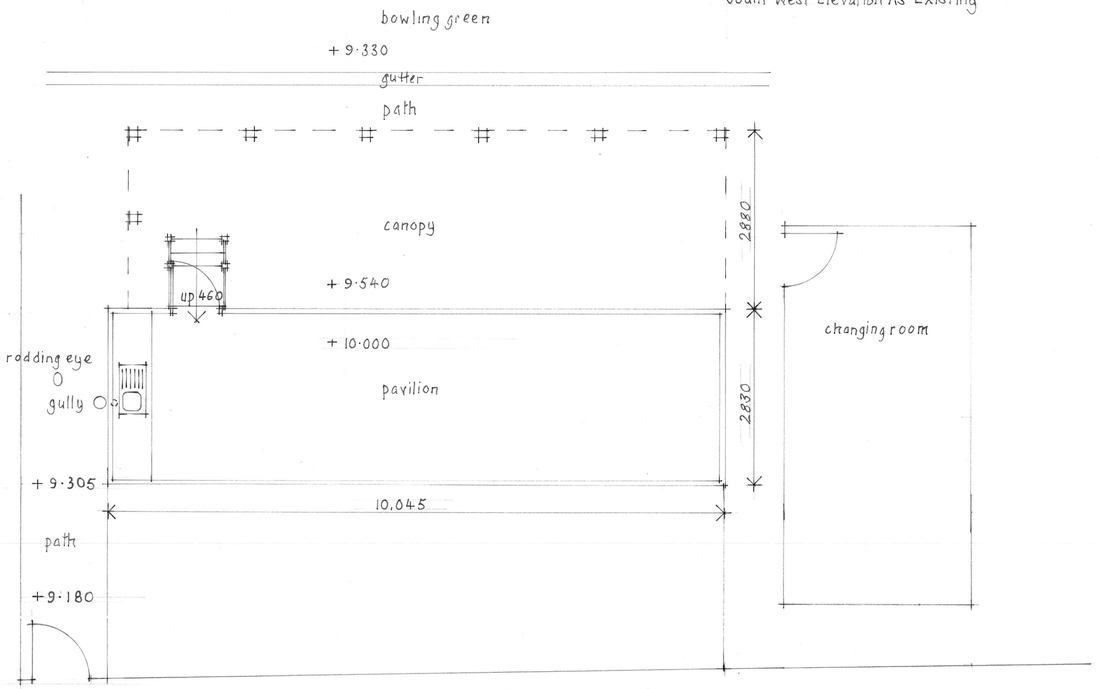
South West Elevation As Existing



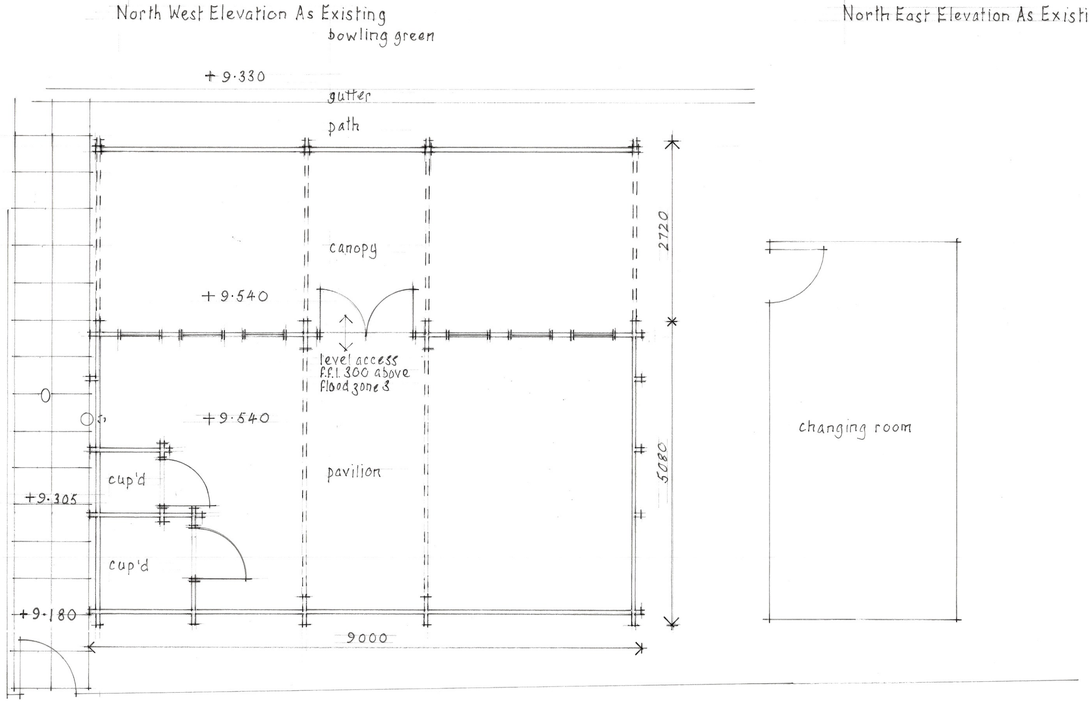
North West Elevation As Existing



North East Elevation As Existing



Plan As Existing



Plan As Proposed

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client:
Crowland Town Bowls Club
Snowden Sports Field
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Crowland
PE6 0AL

Proposed replacement club house.

drawing:

Working Drawing

scale: 1:50
date: 28·03·2023
drawn by:
drawing no.: CTBC6/1

0 1 2
metres