



Geoff Beel
Consultancy

Chartered Water & Environmental Manager

44 Queens Road
Wisbech
Cambs. PE13 2PE

Tel: 01945 463867

Mobile: 07799 644538

email:geoff.beel@tiscali.co.uk

Sustainable Places Team
Environment Agency
Waterside House
Waterside North
Lincoln LN2 5HA

Our ref: GCB/ACS
Your ref: AN/2014/120800

11th February 2015

for the attention of Rob Millbank

Dear Rob

**Conversion of offices into 4 residential flats at
Spalding Business Centre, Church Street, Spalding – H16-1032-14**

I refer to your letter of objection of 31st December 2014 and subsequent telephone conversations between Emma Kirk (Flood Risk Officer) with the Architect and myself.

Please find attached Revised Flood Risk Assessment which has also been copied to South Holland District Council and the Architect

Yours sincerely

Geoff Beel

cc pnorman@sholland.gov.uk
chris@acs-architectural.co.uk

FLOOD RISK ASSESSMENT FOR PROPOSED RESIDENTIAL DEVELOPMENT AT CHURCH STREET, SPALDING, Lincs.

REVISED FINAL REPORT

GEOFF BEEL CONSULTANCY

FEBRUARY 2015

GCB/ACS ARCHITECTURAL

DISCLAIMER

This document has been prepared solely as a Flood Risk Assessment in support of a planning application for proposed Residential Development at Spalding Business Centre, Church Street, Spalding, Lincs. "Geoff Beel Consultancy" accepts no responsibility or liability whatsoever for any use made of this document other than by the client "Steve Pye & Co (Spalding) Ltd" for the purposes it was originally commissioned and prepared. All comments and opinions made are based upon information available to "Geoff Beel Consultancy" during the necessary investigative process, and the conclusions and recommendations could therefore, differ in the event of material subsequently being found erroneous, incomplete or misleading. "Geoff Beel Consultancy" therefore, accepts no liability should this prove to be the case.

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Fig 2 - Site Plan – 1:500

Fig 3 - Existing Ground & First Floor Plans –
ACS Architectural drg. no. 048/13/03A

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ACS Architectural drg. no. 048/13/04A

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ACS Architectural drg. no. 048/13/05

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Fig 7 - South Holland District Council Strategic Flood Risk
Assessment Flood Depth Map (2115)

Fig 8 - South Holland Internal Drainage Board District Plan

1.0 INTRODUCTION

- 1.1 A full planning application has been submitted by ACS Architectural Ltd on behalf of Steve Pye & Co (Spalding) Ltd for proposed residential development at Spalding Business Centre, Church Road, Spalding, Lincs.
- 1.2 Planning approval requires a Flood Risk Assessment to accompany the application to meet the requirements and general principles contained in Paragraph 9 of the Technical Guidance to the National Planning Policy Framework (NPPF) and approval by the Environment Agency.

The site is shown within Flood Zone 3 of the Environment Agency's Flood Zone Map. The latest Flood Zone Maps have been created as a tool to raise awareness of flood risk with the public and partner organisations, such as Local Authorities, Emergency Services and Drainage Authorities. The Maps do not take into account any flood defences.

The site is also shown liable to flood depths of between 0.00 – 0.50m and 0.50 – 1.00m impacting parts of the application site as shown on the South Holland District Council's Strategic Flood Risk Assessment Map in year 2115 as a result of a breach to existing flood defences and located in the South Holland Internal Drainage Board district.

- 1.2 Geoff Beel Consultancy was appointed on 25th November 2014 to undertake a Flood Risk Assessment.
- 1.3 The Environment Agency has raised an initial objection to the development due to the impact of estimated floodwater depths identified in the South Holland Strategic Flood Risk Assessment Residual Flood Depth Spalding 2115 1 in 1000 year event map.

Further consideration has been given to identify these depths of floodwaters against existing land levels and proposed floor levels of the development.

2.0 LOCATION

- 2.1 The development site is at the Spalding Business Centre, Church Road, Spalding. The National Grid Reference of the central point of the site is TF 25052245.
- 2.2 The position and extent of the site are shown on Fig 1 – Existing Location Plan at the end of the document.
- 2.3 The site, located within the South Holland Internal Drainage Board district is shown within Flood Zone 3 as detailed on the Environment Agency Flood Zone Maps and liable to flood depths of between 0.00 – 0.50m and 0.50 – 1.00m impacting parts of the application site as shown on the Council's Strategic Flood Risk Assessment Map in year 2115 as a result of a breach to existing defences.

3.0 THE SITE AND SEQUENTIAL TEST

- 3.1 The site is a former business centre.
- 3.2 The area of development is approximately 0.063 hectare with existing access to Church Street.
- 3.3 The proposed site layout consists the change of use of the business centre to 4 residential flats.
- 3.4 The Sequential Test and Exception Test will require to be applied by the Local Planning Authority but the development may be permitted as the site is protected against the 1 in 100 year fluvial event by a combination of defences, pumping stations and sluice gates meeting the requirements of NPPF.

4.0 EXISTING FLOOD ALLEVIATION MEASURES

- 4.1 The site is located within the South Holland Internal Drainage Board district with the nearest 'main drain' open watercourse, Exeter Drain-North some 700m east of the site. Existing lowest ground level at the site is at 2.91m aOD
- 4.2 The existing standard of drainage for the South Holland Internal Drainage Board is 1 in 50 years return period, compatible with the Department of the Environment, Food and Rural Affairs target level of service for rural drainage and flood defence works. Freeboard of 1.00m is provided to the lowest land levels.
- 4.3 The site and surrounding land drains via AWS Ltd sewerage to the Exeter Drain-North 650m east of the site, which eventually discharges via Clay Lake Pumping Station to the Coronation Channel.
- 4.4 Current maintenance standards within the South Holland Internal Drainage Board are generally very good.

During the operation and maintenance of its pumping stations, associated structures and channel systems, particularly those that could affect property, the Board 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. However, bank slips, blocked culverts etc may occur from time to time and these matters are usually dealt with promptly.

- 4.5 The River Welland is located some 200m west of the site whilst the fluvial Coronation Channel is located approximately 850m east of the site with a combined standard of protection of 1 in 100 years return period. The Coronation Channel is the flood bypass channel of the River Welland which with the Crowland and Cowbit Washes situated upstream offer an integrated protection to Spalding and the surrounding district.
- 4.6 Maintenance standards of the Environment Agency's main rivers and defences are well maintained and regularly inspected for their asset condition.

5.0 POTENTIAL SOURCES OF FLOODING

5.1 Five potential sources of flooding have been identified as a result of this assessment:

- a) local blockages to existing AWS Ltd and IDB drainage.
- b) storm return period of 1 in 50 years being exceeded
- c) failure of Clay Lake Pumping Station
- d) overtopping and breaching of the fluvial Coronation Channel defences
- e) overtopping and breaching of the Cowbit Bank defences

5.2 The probability of flooding from source a) is low due to the maintenance standards already achieved and managed by AWS Ltd and the IDB.

The probability of flooding from b) is also low due to the South Holland IDB main drain design standard incorporating a minimum 900mm freeboard to the lowest land level which provides adequate storage in events greater than 1 in 50 years.

5.3 Failure of Clay Lake Pumping Station may occur due to long term mechanical breakdown or power supply being disrupted. However, in these circumstances, if 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 utilising temporary pumping equipment. The probability of such an occurrence is also considered to be low.

Previous historic rainfall events of 1968 and 1978, estimated to be greater than 1 in 100 year events, caused no flooding to any residential properties at the time and the Boards policy is to provide a standard of drainage which satisfies NPPF requirements of a 1 in 100 year return period for fluvial protection inclusive of the effects of climate change and development. The Boards policy regarding the connection of future developments to the arterial system enables a flexible approach to be adopted and meet the criteria for “sustainable urban drainage”.

The probability of the site flooding from this potential source is also considered to be low.

5.4 The possible overtopping and breaching of the fluvial River Welland Coronation Channel flood defences which may affect the site under extreme conditions is also considered to be very low. The present standard of defence of 1 in 100 years would most probably have to be exceeded to create such conditions. If a breach, however, did occur, it is estimated that the floodwaters could affect the development site, and a precautionary approach should be adopted as regards proposed floor levels.

- 5.5 The Coronation Channel earth embankment has a minimum crest level of 6.00m aOD which links with upstream defences to the River Welland of vertical steel sheet piling and concrete capping beam. The lowest existing land level of the development site is at 2.905m aOD with existing floor level at 4.660m aOD.

The embankments of the Coronation Channel were constructed in the 1950's to convey river flows around Spalding. The embankments offer a standard of protection against the 1 in 100 year modelled peak flow water level of 4.68m aOD inclusive of climate change during the next 100 years compared with embankment levels of 6.00m aOD offering a minimum of 1.32 metre freeboard.

- 5.6 The South Holland Strategic Flood Risk Assessment identifies the areas of flood extent and depth of water as a result of a breach occurring to the Coronation Channel embankment.

The site is shown to be liable to flooding to flood depths of between 0.00 – 0.50m and 0.50 – 1.00mm impacting on parts of the application site as shown on the Council's Strategic Flood Risk Assessment Flood Zone maps.

The depth of floodwaters at between 0.50 – 1.00m is greatest at the rear of the existing property which would suggest a flood level of 3.91m aOD. Existing finished floor level at 4.660m aOD is therefore 0.75m above flood level.

- 5.7 The proposal is for redevelopment of the previous business centre to residential flats. Finished floor level of the ground floor flats will be as existing floor level at 4.660m aOD with flood resilient measures incorporated up to 300mm above floor level. Safe refuge is available at first and second floor level to safeguard against remote possibility of a breach or overtopping of the Coronation Channel defences.

- 5.8 a) The fluvial flood levels for the River Welland at Little London Bridge are as follows:

	Present	Present + Climate Change
1%	4.39m	4.68m
0.1%	4.40m	4.68m

- 5.9 The applicant should ensure that the eventual occupiers of the residential development are sufficiently aware of the risk of flooding, and the standard of defence. The Environment Agency provides a Flood Warning Service which includes Flood Warning Codes and uses direct warning methods where the risks and impacts of flooding are high. Indirect warnings are provided to all flood risk areas, even those at low risk of flooding. The main method is media broadcast via local radio and also by television.

In addition to direct and indirect flood warnings, the Environment Agency operates a 24 hours a day Floodline Service providing advice and information on flooding contacting 0845 988 1188. It will be a requirement for the future occupants of the residential development to register with the Floodline Direct Warnings Service to receive any future flood warnings.

6.0 EXTENT OF KNOWN FLOODING

- 6.1 During the preparation of this assessment, no evidence was discovered of the site being flooded or of any adjoining properties.

7.0 PROBABILITIES AND TRENDS OF FLOODING

- 7.1 The probability of this development flooding from localised drainage systems is very low. It is also intended to develop the ground floor flat at existing floor level with flood resistant/resilient measures incorporated up to 300mm above floor level.
- 7.2 The probability of the site flooding with water from any South Holland IDB drain system is less than 1% because of the standards of the existing flood defence systems, storage within existing drainage channels and the location of the site. Similarly the same standard is provided by the Environment Agency's main river and defences.
- 7.3 If under very extreme events, levels of floodwater from any Environment Agency or South Holland IDB drain or arterial systems rose to such an extent that the site was affected, the situation would not be sudden. It is very probable that sufficient time would be available to take precautionary actions to limit the extent and potential impact of flooding.
- 7.4 The water levels in the drainage channels will tend to rise as a result of the impacts of climate change. However the existing systems and defences together with flood resilient measures incorporated wherever practicable will be appropriate for the design life of the development (i.e. 100 years).
- 7.5 Safe refuge is available at first and second floor level of the previous business centre. Flood Zone 1 is also available in Spalding Town Centre of the South Holland Strategic Flood Risk Assessment in the year 2115.

8.0 IMPACTS OF FLOODING

- 8.1 No significant impacts of flooding are anticipated.
- 8.2 Floor levels of the ground floor flat development will be at 4.66m aOD and 1.75m above existing ground level with flood resilient construction up to 300mm above floor level offering additional protection against impacts arising from any extreme short duration localised events. Surface water drainage will be discharged to existing sewerage with Building Regulations and South Holland IDB approval.
- 8.3 The general location of the site within the catchment is such that if flooding occurred from any of the Environment Agency or South Holland IDB river and drain systems, then probably 2 to 3 days warning time would be available.
- 8.4 No displacement of water from the site will affect any adjoining properties and agricultural land.
- 8.5 Safe access and egress to and from the site will be available to Spalding town centre where land is located in Flood Zone 1.

9.0 RESIDUAL RISK – EXTREME EVENTS

- 9.1 The residual risk from extreme events remains low on this site, because of its location, within a pumped sub-catchment of the South Holland IDB area and its location from the Coronation Channel fluvial defences consisting of earth embankments to the 1 in 100 year standard of protection. The site however could be flooded to depths of between 0.00 – 0.50m and 0.50 – 1.00m impacting on parts of the development site in the extreme event causing a breach to existing defences beyond 2115.
- 9.2 Although within Flood Zone 3 according to NPPF classification, the site actually has a very low risk of flooding due to the current standards of drainage and flood defence and land levels. The site is not located within a Functional Flood Plain of any ‘main river’ or ‘main drain’. The Environment Agency Flood Zone Maps have been produced irrespective of existing flood defences and standards of protection.
- 9.3 South Holland District Council in conjunction with the Environment Agency and the local IDB’s within the Council area have carried out a Strategic Flood Risk Assessment of the whole District by appointed Consulting Engineers.

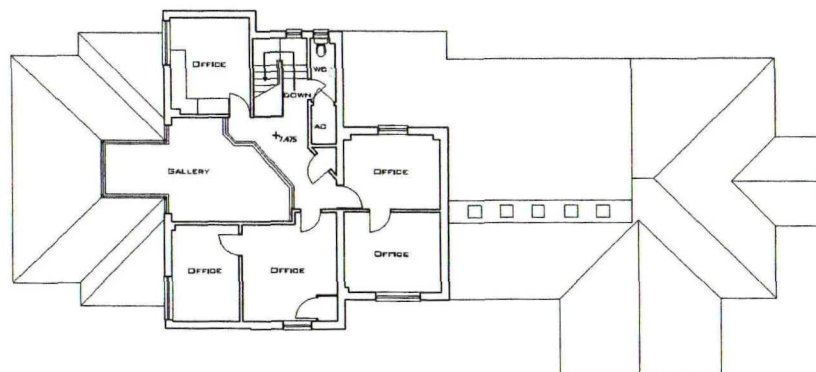
The Strategic Flood Risk Assessment has produced more definitive Flood Risk Maps than those published by the Environment Agency and at the same time has analysed flood return periods of all tidal and fluvial defences for year 2115 to account for the effects of climate change.

Breach scenarios of embankments failing and/or being overtopped have also been carried out to establish Flood Risk Zones.

10.0 CONCLUSIONS AND RECOMMENDATIONS

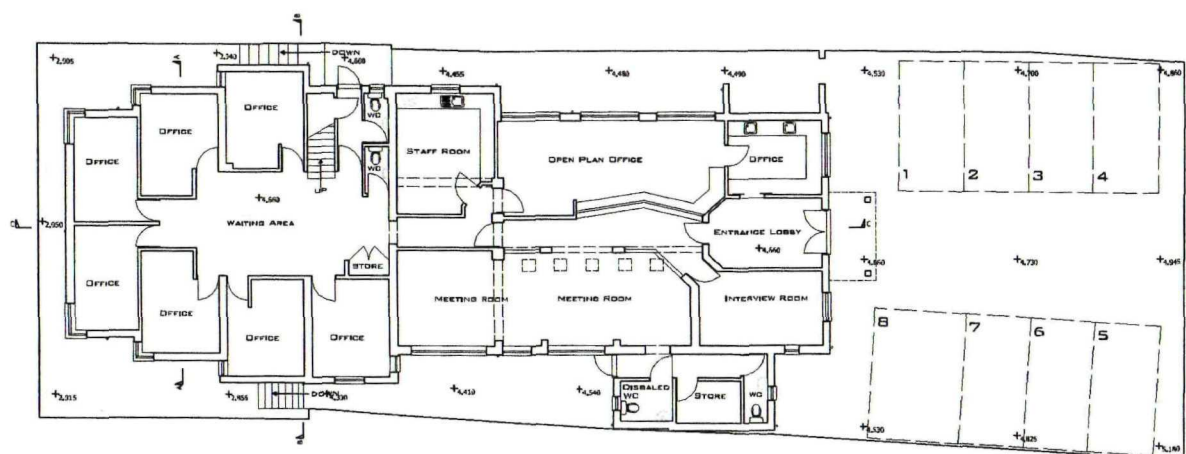
- 10.1 As a result of the assessment, the following conclusions have been reached:-
- The proposed development is not in a Functional Floodplain. It is located in the Passive Floodplain protected by the River Welland defences to a 1 in 100 year return period.
 - Although the site is in Flood Zone 3, the actual risk of the site flooding from any Environment Agency river system is very low with existing defences of the River Welland, Cowbit Washes and the Coronation Channel.
 - The site is shown as liable to flooding to a depth of the South Holland District Council’s Strategic Flood Risk Assessment as a result of a breach occurring to the Coronation Channel defences in year 2115.

- Although the site is located within an Internal Drainage District with a minimum standard of drainage of 1 in 50 years, this accords with Defra guidelines for rural development. Freeboard to design water level of 900mm to lowest land level is available for events greater than 1 in 50 years providing further storage within the drainage channels.
- Floor levels of the ground floor flat of the development will be as existing floor level at 4.66m aOD with flood resistant/resilient techniques incorporated into the design and construction up to 300mm above floor level. Finished floor level of the development shows 0.75m of freeboard above maximum estimated flood depth.
- On site surface water drainage will be discharged to existing sewerage with Building Regulations and South Holland IDB approval.



EXISTING FIRST FLOOR PLAN 1:100

ORDNANCE BENCHMARK
UPON CHURCH 4.140 DBM



EXISTING GROUND FLOOR PLAN 1:100

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Revisions:

A 10.02.15 Levels amended following gps survey.



ACS Architectural Ltd
14 Avenue Road, Harrogate, North Yorkshire, YO10 1AA
Tel: 01703 604029 Email: info@acs-architectural.co.uk

Project:

Conversion of offices into
4 residential flats
Spalding Business Centre
Church Street
Spalding

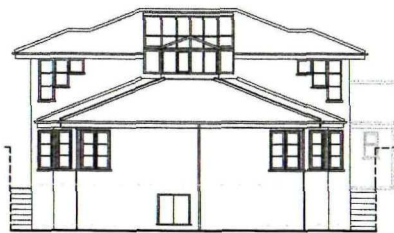
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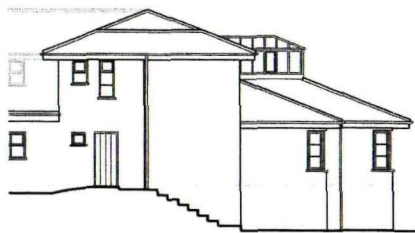
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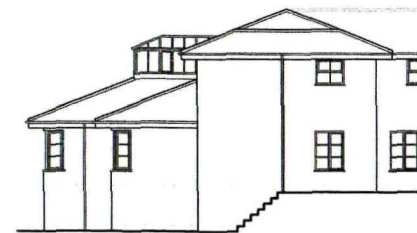
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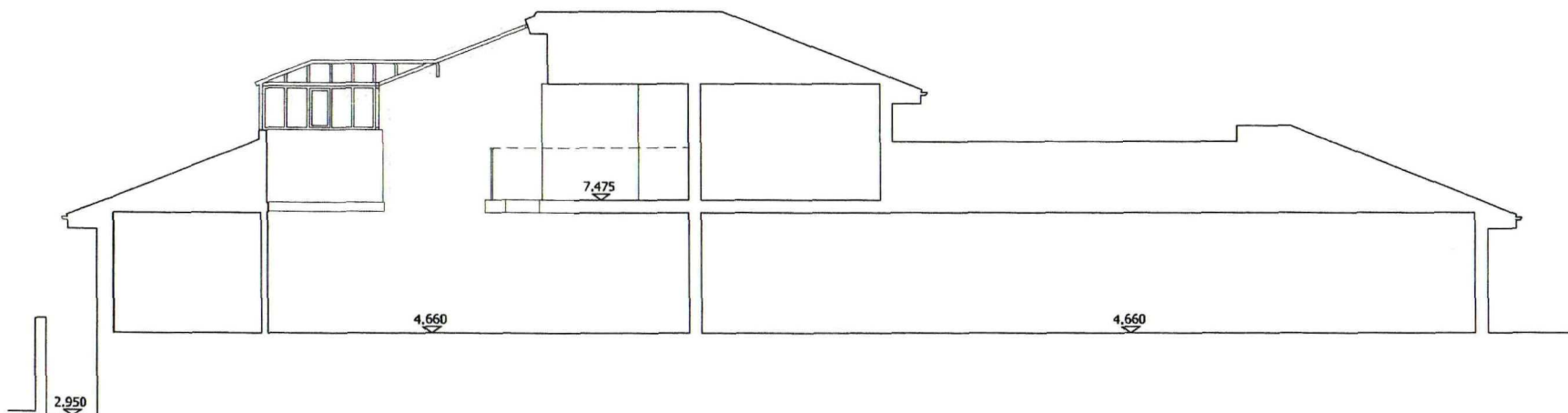
NORTH ELEVATION 1:100



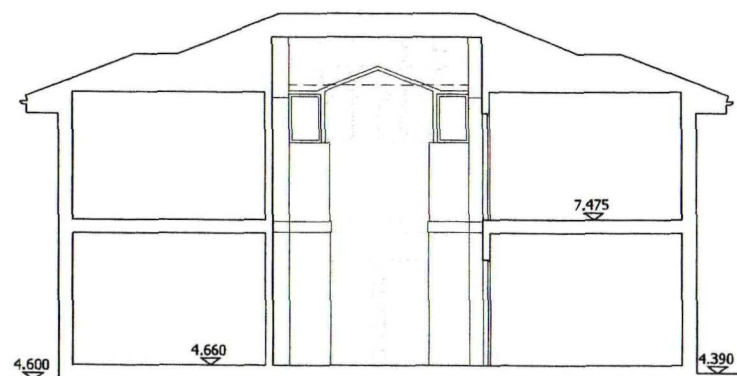
PART EAST ELEVATION



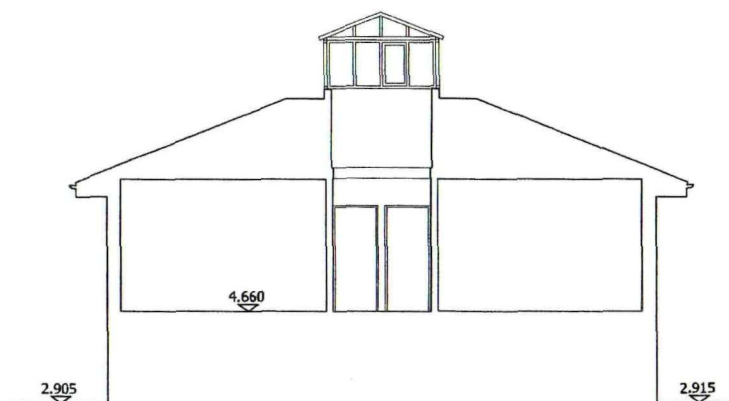
PART WEST ELEVATION



SECTION C-C 1:50



SECTION B-B 1:50



SECTION A-A 1:50

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Revisions

A 10.02.15 Levels amended following gas survey.



ACS Architectural Ltd
14 Avenue Road, 14 Avenue, Nottol, PE36 6BW.
Tel: 01603 840219 Email: info@acs-architectural.co.uk

Project

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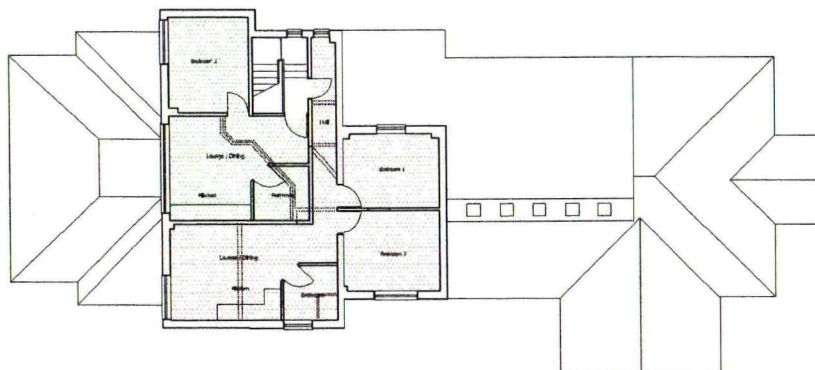
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Existing Elevations and Sections

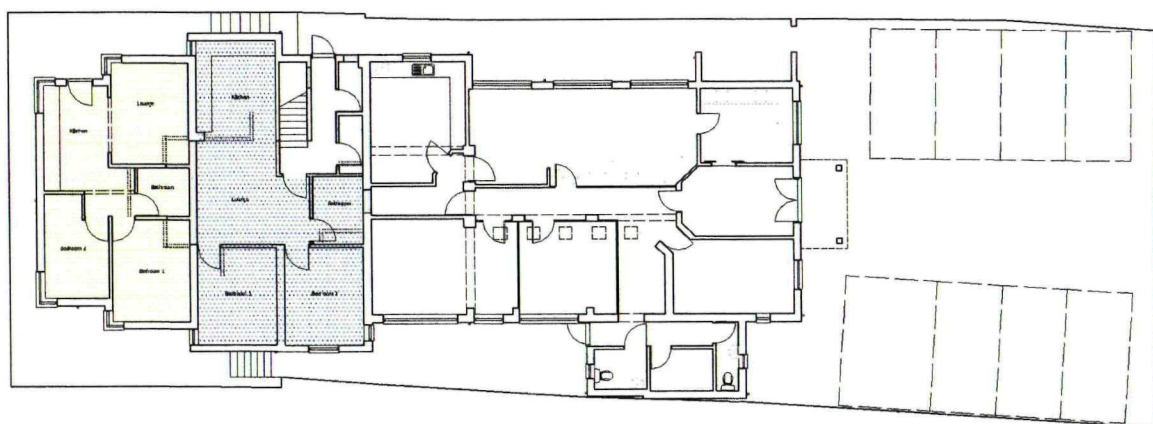
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048/13/04A



Proposed First Floor Plan 1:100



Proposed Ground Floor Plan 1:100

CHURCH STREET

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Revisions:



ACS Architectural Ltd,
14 Avenue Road, Haverham, Kent, ME36 6BW,
Tel: 01792 842291 Email: info@acs-architectural.co.uk

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Drawing Title:

Proposed Floor Plans

Scale:	1:100	DATE
Date:	November 2014	
Drawn:	RSB	

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