# SHEPPARD CONSULTING ENGINEERS LTD

**FLOOD RISK ASSESSMENT**

**FOR**

**PROPOSED BULK STORE No. 8**

**FOR**

**NEW HOLLAND BULK SERVICES**

**AT**

**LINCOLN CASTLE WAY, NEW HOLLAND,**

**NORTH LINCOLNSHIRE**

**Project Ref:** 22627/MCG/December 2012

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# FLOOD RISK ASSESSMENT
# FOR
# PROPOSED BULK STORE No. 8
# AT
# NEW HOLLAND BULK SERVICES LTD, LINCOLN CASTLE WAY, NORTH LINCOLNSHIRE

## INTRODUCTION

This flood risk assessment has been commissioned by New Holland Bulk Services in relation to a proposed development site off Lincoln Castle Way, New Holland.

The flood risk assessment has been prepared resulting from the publication of Planning Policy Statement 25 which ensures that flood risk assessments are carried out for new developments on flood plains of rivers, or subject to coastal flooding, as well as for developments which are in excess of one hectare in area.

This particular site is within the flood plain of the River Humber.

## THE SITE AS EXISTING

The site is currently comprises an agricultural field adjacent to previous developments by NHBS. The site is generally surrounded by other industrial premises.

A topographic survey of the site has been carried out which has revealed that levels over the site vary from approximately 2.07 up to 2.37 OD(N). The average ground level is approximately 2.28 OD(N). The levels along the highway adjacent to the site were found to vary from approximately 3.187 to 3.53 OD(N).

A copy of the topographic survey drawing is appended to this report.

The Ordnance Survey grid reference for the centre of the site is approximately 507775, 423820.

## THE PROPOSED DEVELOPMENT

It is proposed that the site be developed to provide an industrial bulk storage warehouse with associated paved areas as an extension to the recent development that has two sheds.

A copy of the proposed layout is included in Appendix E.

## POTENTIAL SOURCES OF FLOODING

The development site is located approximately 350m to the south of the River Humber, which is the main source of potential floodwater.

The highest predicted tidal level in the River Humber at New Holland is approximately 5.18m OD(N) for a 1 in 100 year event. For a 1 in 500 year event, the predicted tidal level would increase to 5.63m OD(N).

An allowance should be made for climate change resulting from global warming which is expected to result in more severe weather and increased global sea levels.

Table B.1 of Planning Policy Statement 25 gives recommendations for the anticipated sea level rise. For a residential development with a design life span of 100 years, the resultant increase in sea level in this region is 1017mm.

This would project the predicted tidal level to 6.65m OD(N).

## SEQUENTIAL TEST AND EXCEPTION TEST

Under the requirements of Planning Policy Statement 25, the Local Planning Authority are required to apply a risk-based Sequential Test to new developments, in order to direct them towards areas which are at the lowest probability of flooding.

This development is located with an area designated as Flood Zone 3a, High Probability, defined by the Environment Agency as having a 1 in 100 greater annual probability of river flooding or a 1 in 200 or greater annual probability of flooding from the sea.

From Table D.2 of Planning Policy Statement 25, the construction of storage buildings is classified as being 'Less Vulnerable'.

Table D.3 of Planning Policy Statement 25 shows that the development is appropriate.

## DRAINAGE IMPACT

The new layout will result in a larger proportion of the site becoming impermeable, which will generate an increased rate of surface water run-off.

It is proposed that the collection of rainwater from the development will be discharged into the public sewer in the adjacent highway.

In order to ensure the development does not increase the risk of flooding to other properties, it will be necessary to provide attenuation and restrict the discharge rate from the new development to that of the existing site, or to a discharge rate agreed with Anglian Water related to the capacity of the public sewer.

Storage will need to be provided within the new surface water drainage system in the form of oversized pipes or storage tanks, to accommodate rainfall from a 1 in 30 year storm.

All such work will need to be in compliance with the requirements of Anglian Water.

## FLOOD RISK ASSESSMENT

Flood protection along the bank of the River Humber at the nearest point to the site is in the form of major earthern flood banks, which are at a level adequate to provide protection to the site for a 1 in 200 year flood event.

As the river defences are higher than the predicted flood water level for the River Humber, there is no likelihood of the defences being over-topped. The only risk would be if there was a major breach of the existing defences.

Assuming that a breach occurs, we have estimated that the volume of water within three tidal cycles which would penetrate a 25m wide breach in the defences would be approximately 2,308,008$m^3$.

This is based upon the formula set out below for calculating the flow over a broad crested weir:

$Q = 1.705\ BH^{3/2}$

We have included local maps in Appendix D, which have been marked up to indicate ground levels of the surrounding area.

It can be seen from the maps that a substantial area of land to the south of the River Humber is lower than the predicted flood water level. We have estimated that this area would be in excess of 18,500,000$m^2$, which, for the volume of floodwater calculated for a breach, would equate to an average depth of floodwater of approximately 125mm.

There are numerous drainage ditches which dissect the land, into which the flood water would flow and be stored, which would reduce the volume of flood water being considered quite considerably.

With the site being some 350m from the nearest location at which a breach could occur, we consider that there should be no major impact on the development should a breach of the River Humber defences occur.

However; North Lincolnshire and North East Lincolnshire have commissioned a Strategic Flood Risk Assessment for the region, the findings of which reports that a major breach of the River Humber defences would result in flood waters reaching a level of 3.50m OD(N) over the region.

## RECOMMENDATIONS AND PROPOSALS

As a precautionary measure, we would recommend that the floor level of the new development be constructed at a minimum of 355mm above the predicted depth flood water

level at the site, which would result in a minimum floor level for the building of approximately 2.695m OD(N).

Due to the likelihood of flood waters entering the building should a major failure of the defences occur, measures will need to be taken to mitigate against damage occurring from the flood waters.

In order to minimise the impact on the development from flooding, flood resilient and resistant materials should be incorporated within the design where this can be achieved and measures incorporated to allow for ease of reconstruction should damage from flooding occur.

Electrical apparatus including the consumer unit should be kept above the predicted flood level of 3.5m to maintain operational use of the building. Any electrical circuitry located below this level should be installed for ease of replacement.

Access to or egress from the development should not be affected during a flood situation as the adjacent access road is at a sufficiently high level not to inhibit vehicle travel and therefore no requirements for evacuation of occupants of the building will need to be provided within the design of the development. No new access is proposed as part of this development.

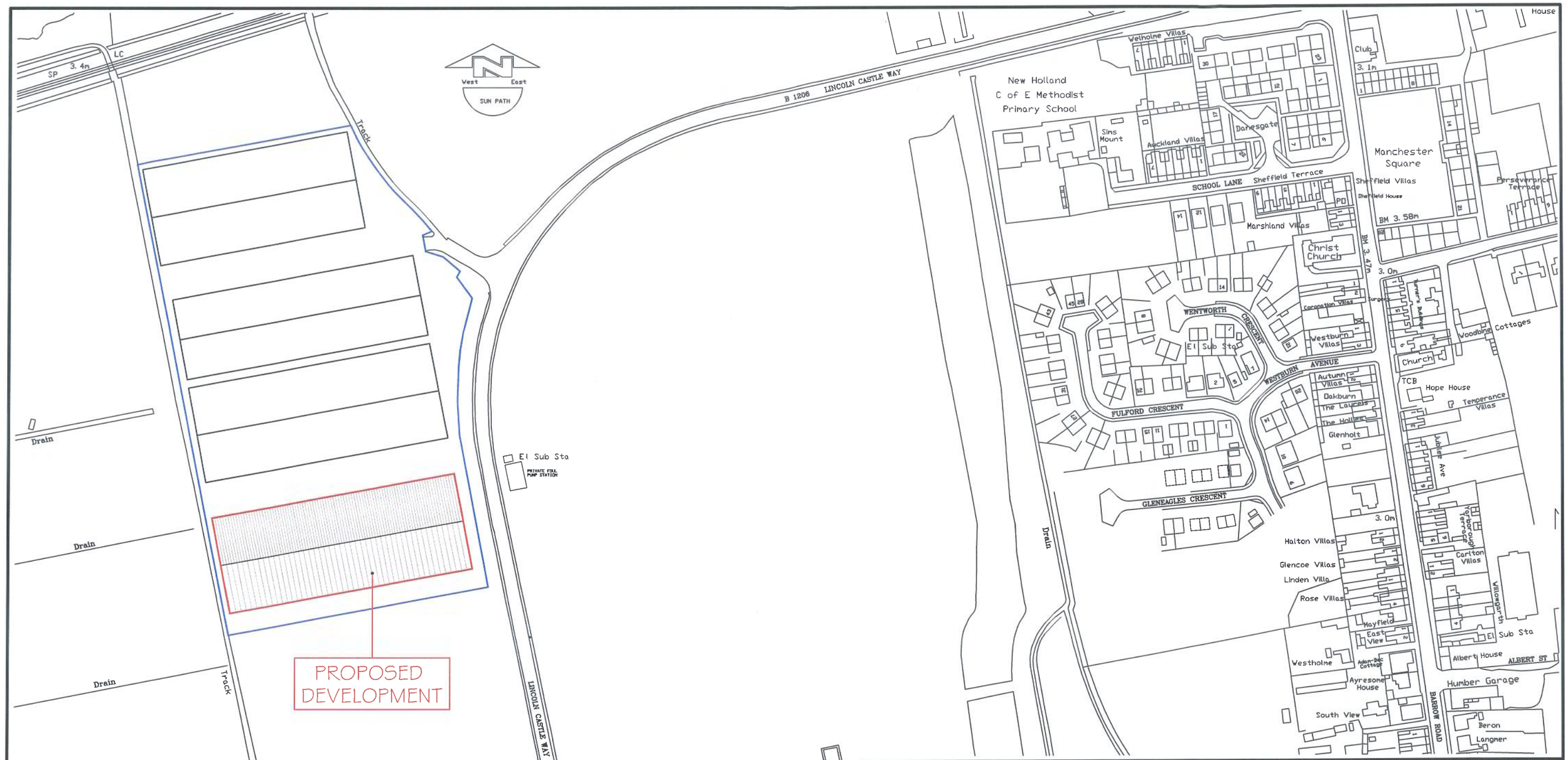
Once the building becomes occupied, it is recommended that it be connected to the Environment Agency's Warning Direct Service, which will ensure that the occupants are made aware of any likelihood of flooding and the severity of the flooding likely to be experienced.

Any appropriate measures can then be put in place including evacuation procedures in the worst case scenario.

Provided the above measures are adopted, the risk to the development from flooding should be minimal.

# APPENDIX A

## Site Location Plan




| DESCRIPTION | | | | DESCRIPTION | | | |
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| | | | | ISSUED FOR PLANNING | | | |
| REV. | DATE | DRAWN | APP'D. | REV. | DATE | DRAWN | APP'D. |
| | | | | A | 13/12/12 | PH | MG |

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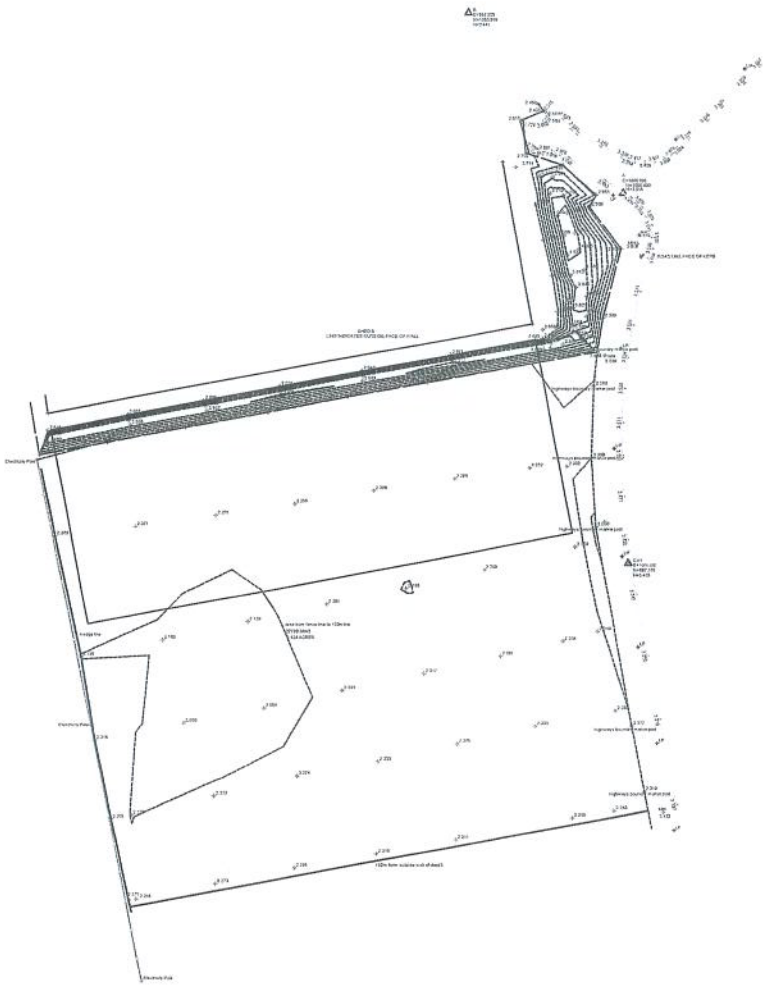
| | | | | |
|---|---|---|---|---|
| CLIENT: NEW HOLLAND BULK SERVICES | | | DRAWING TITLE: SITE LOCATION PLAN | |
| JOB TITLE: BULK STORE No. 8, LINCOLN CASTLE WAY, NEW HOLLAND | | | CHECKED: MG | APPROVED: ADS / STATUS: PLANNING |
| SCALES: 1:2500 | DATE: DEC 12' | DRAWN BY: PH | DRAWING NUMBER: 22627/103 | REVISION: A |

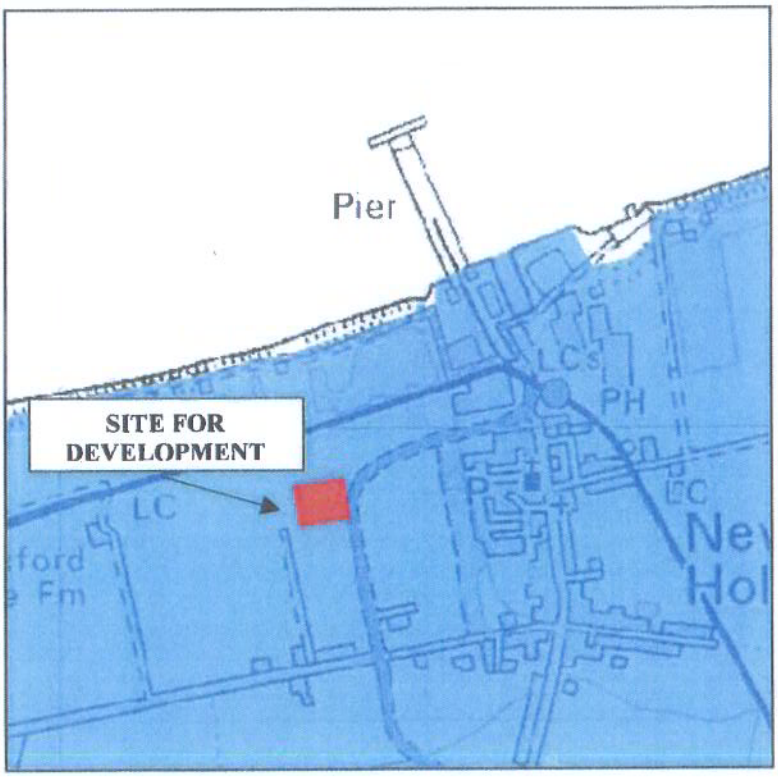
# APPENDIX B

## Topographical Survey



# APPENDIX C

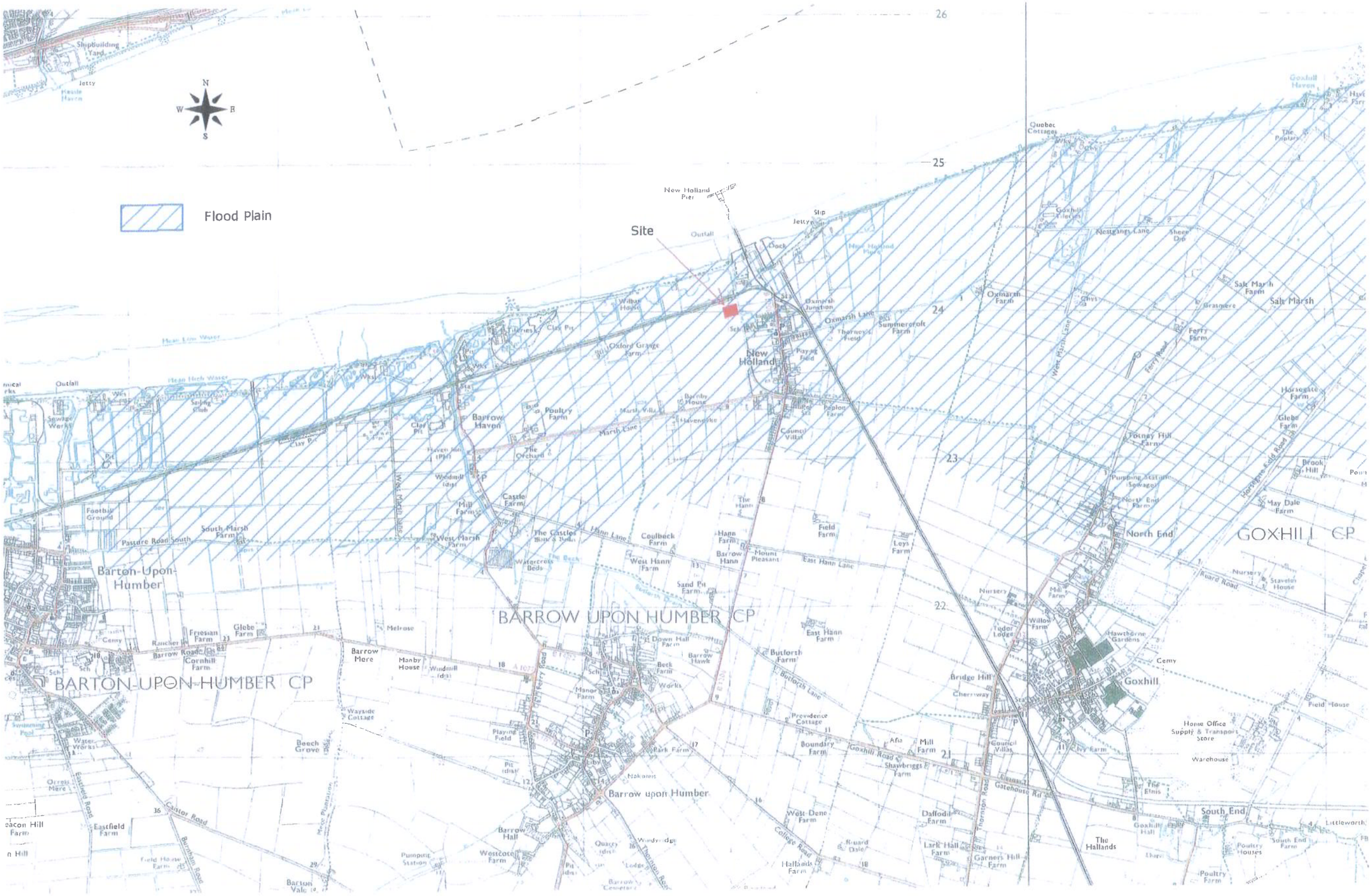
## Flood Outline Map




**FLOOD OUTLINE MAP**

# APPENDIX D

## Local Map Showing Potential Flood Plain


N
W
E
S
Flood Plain
Site
New Holland Pier
New Holland
Barrow Haven
Barton-Upon-Humber
BARTON-UPON-HUMBER CP
BARROW UPON HUMBER CP
GOXHILL CP
Barrow upon Humber
Goxhill
North End
South End
Mean Low Water
Mean High Water
Outfall
Ship Building Yard
Jetty
Hessle Haven
Goxhill Haven
Oxmarsh Farm
Salt Marsh
Salt Marsh Farm
Ferry Farm
Horsegate Farm
Glebe Farm
Tofney Hill Farm
Brook Hill
May Dale Farm
Sewage Works
Foothill Ground
South Marsh Farm
Pasture Road South
Castle Farm
West Marsh Farm
Coulbeck Farm
West Hann Farm
Barrow Hann
Hann Farm
Mount Pleasant
East Hann Farm
Field Farm
Leys Farm
Sand Pit Farm
Butforth Farm
Barrow Haven
Friesian Farm
Cornhill Farm
Barrow Mere
Manby House
Windmill
Manor Farm
Beck Farm
Park Farm
Playing Field
Wayside Cottage
Beech Grove
Eastfield Farm
Field House Farm
Barrow Hall
Westcote Farm
Barrow Vale
Providence Cottage
Boundary Farm
Shawbriggs Farm
Mill Farm
Council Villas
Daffodil Farm
Lark Hall Farm
Garners Hill Farm
Wold-Dene Farm
Halfands Farm
Bridge Hill
Cherryway
Goxhill Road
Gatehouse Rd
Thornton Road
College Road
Ruard Dale
Ruard Road
Nursery
Wilton Farm
Tudor Lodge
Hawthorne Gardens
Goxhill Hall
The Hallands
Poultry Houses
Poultry Farm
Home Office Supply & Transport Store
Warehouse
Field House
Ivy Farm
Stavelon House
Pumping Station (Sewage)
North End Farm
Heatgates Lane
Sheep Dip
Quebec Cottages
The Poplars
Oxmarsh Junction
Oxmarsh Lane
Thorney Field
Summercroft Farm
Payne Field
Peplon Farm
Council Villas
Barnby House
Marsh Villa
Marsh Lane
Haven Side
Oxford Grange Farm
Wilbar House
Clay Pit
Fisheries
Slip
Jetty
Dock
Sch
Cemy
Works
Pumping Station
Quarry
Lodge
Barrow Cemetery
Littleworth
Poultry Farm
Pond
Mere Plantation
Orrgs Mere
Eastfield Road
Castor Road
Burnham Road
Thornton Road
Beacon Hill Farm
Hill
Swimming Pool
Water Works
Playing Field
Nakaren
Wendy-dge
Pit
Lodge
Barrow Cemetery
Barrow Vale
Pumping Station
Quarry
Wendy-dge
Nakaren
Barrow upon Humber
Manor Farm
Beck Farm
Park Farm
Windmill
Manby House
Barrow Mere
Melrose
Glebe Farm
Friesian Farm
Cornhill Farm
Barrow Road
Rancher
Cemy
Sch
Works
Pumping Station
Quarry

# APPENDIX E

## Proposed Site Layout

ORIGINAL DRAWING SIZE A1 - IF IN DOUBT ASK ANY VARIANCE IN DIMENSIONS, LEVELS, SHOULD BE REPORTED PRIOR TO CONSTRUCTION


NOT FOR CONSTRUCTION

| DESCRIPTION | | | |
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| DRAWN BY PH | |
| CHECKED MG | DRAWING TITLE PROPOSED SITE PLAN |
| APPROVED ADS | |
| STATUS PLANNING | DRAWING NUMBER 22627/102 — REVISION A |