Client:
Chevin Housing Association

Carried out for:
Residential Development, Lidget Lane, Thurnscoe

Flood Risk Assessment & Drainage Assessment

Project No: 00.13112

Date: June 2013

Issue Status	Draft/ 01 *or* Final/ A	Initial & date	Draft/ 01 *or* Final/ A	Initial & date		Initial & date
Report Author:	Draft/01	RP 26.06.13	A	NP 02.07.13		
Checked:	Draft/01	MR 26.06.13	A	MR 02.07.13		
Approved:	Draft/01	MR 26.06.13	A	MR 02.07.13		

Adept Consulting Engineers Ltd
Park Square House, Park Square, Pudsey, Leeds, LS28 7RG

Tel : 0113 2394518 Fax : 0113 2393825
Email : inbox@adeptcsce.com Web : www.adeptcsce.com

1.0 INTRODUCTION

1.1 Reason for the Report

Adept Consulting Engineers Ltd has been requested by Chevin Housing Association to prepare a Flood Risk Assessment (FRA) for the proposed residential development at Lidget Lane, Thurnscoe.

The majority of the site is currently vacant following demolition of the old terrace properties that used to occupy the site.

1.2 Objectives

The aim of this report is to present the findings of the assessment of flood risk associated with the proposed redevelopment along with considering the surface water drainage impact of the development. The objectives of this report have been undertaken in accordance with the requirements of the Technical Guidance to the National Planning Policy Framework (NPPF) which superseded Planning Policy Statement 25 (PPS25) and are as follows:

- Undertake a site visit to establish a better understanding of the existing site
- Identify and quantify the possible sources of flood risk to the site and the impact of flood risk to the surrounding area.
- Review constraints to development due to flood risk issues and liaise with the Environment Agency (EA) in determining extents of 100 year (functional Floodplain) and 1 in 200 year tidal flood zone boundaries including allowances for Climate Change.
- Assess if the proposed development is likely to increase flood risk elsewhere due to increased runoff rates and volumes from the site and loss of floodplain
- Identify any further study that maybe required and to recommend options for proceeding with the development proposals to ensure the development is safe and flood risk is appropriately managed.

1.3 Flood Risk

Flood Risk includes the statistical probability of an event occurring and the scale of the potential consequences. The risk is estimated from historical data and expressed in terms of the expected frequency (or 'return period') of a flood of a given magnitude. The 10-year, 50-year and the 100-year floods have a 10%, 2% and 1% chance, respectively, of occurring in any given year (this is termed the Annual Exceedance Probability, AEP), however over a longer period the probability of flooding is considerably greater.

For example, for the 100-year return period flood:

- There is a 1% chance of the 100-year flood occurring or being exceeded in any year;
- a 26% chance of it occurring or being exceeded in a 30-year period; and
- a 51% chance of it occurring or being exceeded in a 70-year period.

1.4 NPPF

The Technical Guidance to the National Planning Policy Framework (NPPF) which superseded Planning Policy Statement 25 (PPS25) 'Development and Flood Risk' was introduced by the Government in March 2012. NPPF sets out the Government's policy with respect to these issues and has to be taken into account by all relevant statutory bodies from regional to local authority planning departments. The aim is to ensure that flood risk is assessed at all stages of the planning process in order to avoid inappropriate development in areas that are at risk of flooding.

NPPF promotes a sequential risk-based approach to determine the suitability of land for development in flood risk areas.

NPPF assigns the level of fluvial flood risk depending upon the annual probability of flooding occurring as follows:

I. Zone 1: little or no risk (<0.1% AEP);
II. Zone 2: low to medium risk (0.1 – 1.0% AEP); and
III. Zone 3: high risk (>1.0% AEP).

1.5 CIRIA C624 – Development and Flood Risk

CIRIA C624 provides guidance on the implementation and good practice in assessing flood risk through the development process. The aim of this document is to promote developments that are sustainable with regard to flood risk. This report has been developed with this document and NPPF in mind to ensure that all aspects of flood risk have been covered.

1.6 EA Requirements

From initial consultation the site appears to lie within flood zone 1. The Environment Agency (EA) Guidance Note 1 considers the requirements for undertaking a Flood Risk Assessment for a development in Flood Zone 1. The assessment should include:

- Proposals for surface water management that aims to not increase, and where practicable reduce the rate of runoff from the site as a result of the development (in accordance with sustainable drainage principles, the Local Planning Authority's published SFRA and any guidance provided by the Lead Local Flood Authority in unitary or county councils).
- Information about the surface water disposal measures already in place and their state of maintenance.
- An assessment of the volume of surface water run-off likely to be generated from the proposed development.
- Allowance in design for how the increased frequency and intensity of rainfall that is predicted as a result of climate change will affect the proposal (see NPPF technical guidance).
- Information about other potential sources of flooding, if any, that may affect the site e.g. streams, surface water run-off, sewers, groundwater, reservoirs, canals and other artificial sources or any combination of these; including details on how these sources of flooding will be managed safely within the development proposal.
- Confirmation as to whether Environment Agency consent is needed for any aspect of the work, and whether this has been applied for or not.

A flood risk assessment should be carried out to an appropriate degree at all levels of the planning process. It should assess the risks of all forms of flooding to and from development, taking into account climate change, and should inform the application of the sequential approach if appropriate.

1.7 Sources of Information

The following sources of information have been consulted for the review;

- Environment Agency flood plain maps.
- Yorkshire Water Correspondence (yet to be received)
- Solmek Soakaway tests date June 2013

1.9 Limitations

The opinions expressed in this report and the recommendations given, are based on the information obtained from the desktop assessment.

The information, views and conclusions drawn concerning the site are based, in part, on information supplied to Adept Consulting Engineers Ltd by other parties. Adept Consulting Engineers Ltd accepts no liability for any inaccurate conclusions, assumptions or actions taken resulting from any inaccurate information supplied to Adept Consulting Engineers Ltd from others.

Adept Consulting Engineers Ltd shall not be liable for the use by any person of the document for any purpose other than that for which the same was provided by Adept Consulting Engineers Ltd. This document shall not be reproduced in whole or in part or relied upon by third parties for any use whatsoever without the express written authority of Adept Consulting Engineers Ltd.

2.0 SITE SETTING

2.1 Site Location

The site is located just of Lidget Lane, Thurnscoe. The approximate centre of the site is given by National Grid Reference: 504132,433593

The site is split into two portions by Lidget Lane, the northern portion is the largest and generally falls from the north-east to south-west. The northern site is currently vacant following demolition of the existing properties that previously occupied the site. The southern site is still occupied by existing buildings, predominantly vacant retail premises.

2.2 Existing Drainage

It is evident from Yorkshire Waters sewer record plans that the properties that previously occupied the site used to drain to the public sewerage system with some private sewers still being evident on the sewer record plans. These sewers will need to be formally closed to accommodate the new development.

2.3 Hydrological Setting

The nearest watercourse to the site is the Thurnscoe Dike located approximately 600m south of the development site. The drain appears to drain westerly towards the Carr Dike.

2.4 Topography

The site generally falls from north-east to south-west with the levels of the existing site being between 47.5m and 51.3m AOD.

3.0 PROPOSED DEVELOPMENT

3.1 Proposed Development

As discussed above it is proposed to construct 23 residential dwellings on the site. 19 properties are proposed to the north of Lidget Lane with the remaining plots on a smaller parcel of land to the south of Lidget Lane.

4.0 DEFINITION OF THE FLOOD HAZARD AND PROBABILITY

4.1 Extent of Known Flood Information

Initial consultation with the EA has established that the site is located in Floodzone 1, i.e. at little or no risk.

4.3 The Potential Sources of Flooding

4.3.1 Fluvial Flooding

When the quantity of water in a river exceeds the flow capacity, a river will flood. The speed at which this happens generally depends on the intensity of the rain, the size of the watercourse and catchment area. Consultation with the EA has established that the proposed development area of is within the **Flood Zone 1**

4.3.2 Coastal Flooding

High tides, storm surges, and wave attack can cause flooding in low-lying areas when defences may be breached or overtopped. No coastal flooding is expected on this site.

4.3.3 Flooding from the Ground

Groundwater flooding arises when the groundwater in the permeable strata (aquifer) rises or enters below ground structures. There are two hydrogeological processes that give rise to flooding events; “groundwater flooding” and “rising groundwater”.

The first, “a groundwater flood”, is an event where the flood volume is dominated by a groundwater component that unlike a fluvial source could take many weeks to subside. The second, “rising groundwater”, is much less noticeable and occurs when a rising water table increases the levels of infiltration into sewers, soakaways and underground services to reduce their capacity to remove surface water runoff. This may pose an issue during construction in dealing with groundwater within the working area.

4.3.3.1 Groundwater Flooding

There are no known incidents of groundwater flooding with the soakaway tests not hitting groundwater in the excavations. This is unlikely to cause risk to the building.

4.3.3.2 Rising Groundwater

Rising groundwater would be linked to the groundwater level and is not expected to be a risk to the site.

4.3.4 Surface and Overland Flooding

Flooding can occur when intense rainfall exceeds the infiltration capacity of the ground, or when the rainwater flowing over the ground is not intercepted by natural or man-made drainage. Given that the topography of the site and surrounding area any overland flood flows would drain south-westerley away from the site.

4.3.5 Overloading of Local Sewers

Flooding from this source can occur when the sewer network can no longer handle the volume of surface or foul water. This can occur when the sewerage network has insufficient capacity, becomes blocked, or is faced with exceptionally intense rainfall. Flooding from overloaded sewers is unexpected in the vicinity of this site. There is a large diameter combined sewer in Lidget Lane but if flooding occurred from this, overland flows would drain down Lidget Lane away from the site.

4.3.6 Flooding from Reservoirs, Canals or other Artificial Sources

During flood conditions it is likely that other water bodies will experience the affects of increased rainfall. If these assets are not able to cope during these conditions and are forced to overtop or fail, this floodwater can inundate areas downstream of the asset.

There are no reservoirs, canals or artificial water sources near the site. Flooding from these sources is not considered to be a risk for the proposed development.

4.4 Climate Change

Given the potential sources of flooding already outlined, the principal aspect of climate change likely to impact the site would be variation in rainfall patterns. The recommended national precautionary sensitivity ranges compiled by Defra suggest that peak rainfall intensities should be expected to increase by 30% by 2085 with peak river flow expected to increase by 20% by 2085.

With increased peak rainfall intensity, the risk of flooding from surface water (overland flow) would increase. This will be taken into account during the development of proposed mitigation measures.

4.5 Increased run-off from the development

Under NPPF/PPS25 it is required that the redevelopment of a site must put together proposals which manage the surface water with the aim of not increasing and if possible to reduce any risk of flooding to the site. It must also take account of climate change which is an increase of 30% for surface water run-off. Existing uses of the site categorises the northern site as “greenfield”, whereas the southern site still has buildings present and would be classified as “brownfield”. Sustainable drainage techniques should be considered as part of the detailed design process to attenuate any additional surface water run-off that is generated by the proposed development.

Increased run off from the development is the key aspect that needs to be addressed when developing the site.

4.6 Summary of Flooding Mechanisms

Considering the current flooding regime, potential flood risks, and the effects of climate change the following aspects will require appropriate mitigation:

- Increased run-off from the development.

Mitigation for the above flooding mechanisms is outlined in Section 5 of this report.

This report has been prepared on the assumption that the site passes both the sequential and if necessary exception test.

5.0 CONTROL OF FLOOD RISK

5.1 On Site Mitigation Measures

5.1.1 Increased run-off from the development – Surface Water Drainage Strategy

The site is being redeveloped with proposed residential dwellings, with driveways and access roads. Approximately 50-60% of the proposed site will be hard landscaped which will lead to an increase in surface water run-off from the site as a whole. The Environment Agency requires, that surface water run-off from the proposed development be limited to greenfield run-off rates.

We are still awaiting for confirmation from Yorkshire Water as to their requirements for the site but is envisaged that they will ask for a 30% reduction in flows from the brownfield site and greenfield flows from the other site.

The flows from the southern site are likely to be unrestricted based on an impermeable proposed area of approximately 350m2

The flows from the northern site are likely to be restricted to 5l/sec.

Both the above will need to be confirmed with Yorkshire Water.

The use of sustainable drainage systems have been investigated but the site is underlain by boulder clays and gravelly so would be unsuitable for infiltration techniques. A copy of the soakaway tests carried out on the site are appended to this report.

It is expected that the surface water flows from both sites will discharge to the public sewers in Lidget Lane.

To meet the requirements of the local authority, attenuation will be provided to accommodate the 100 year return period including a 30% allowance for climate change.. The final storage volume will be subject to detailed design. It is likely that the 30 year storage will be attenuated underground in the form of attenuation tanks with a discharge, pumped if required, to the public sewer. Storage beyond the 30 year event to the 100 year event including an allowance for climate change will be stored in additional underground pipework or low lying areas of the site.

Yorkshire Water confirmation will be required that the foul water can discharge to the public sewerage system to the south of the site.

5.1.2 Maintenance

Consideration should be given to the operational and maintenance requirements of the proposed drainage system as part of the design process to ensure that it is robust enough to prevent blockages allow ease of maintenance and reduce long term maintenance costs. Furthermore, the drainage scheme should be designed so that it could function with very minimal maintenance.

5.1.3 Climate Change

The proposed surface water drainage system will need to be designed to take climate change into consideration and as per 5.1.1

5.2 Cumulative Risks

During the design process for the proposed development's drainage network, the existing drainage system should be taken into account in the overall drainage network. This would result in no cumulative risk to the proposed development.

5.3 Residual Risks

To account for the impact of climate change upon peak rainfall intensities and more extreme events than currently designed for, consideration of exceedance flow routes must be made.

There remains a residual risk of the proposed development to be subject to flooding in extreme cases from fluvial events. However, if the suggested mitigation measures are implemented, the risks would be reduced.

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

The assessment of the flood risk associated with the proposed retail development has been produced in accordance with National Planning Policy Framework (NPPF) and the accompanying Practice Guide.

The Flood Risk Vulnerability Classification for the development as defined by NPPF Technical Guidance is "Less Vulnerable" and therefore does not require the sequential approach.

The principal flood risks to the site are:

- Increased run-off from the development.

The FRA has demonstrated that subject to the implementation of the recommended mitigation measures, the proposed construction of the development should not increase the risk of flooding elsewhere and will limit the effects of any flooding event.

6.2 Recommendations

The completion of this flood risk assessment recommends that following should be carried out:

- Run-off from the proposed site will be managed in accordance with Yorkshire Waters requirements. The southern site is likely to be restricted to 5l/s and the northern plot should be restricted to 5l/sec.

- The existing sewers on site should be closed in accordance with Yorkshire Waters requirements.

APPENDIX 1

SITE LOCATION PLAN, TOPOGRAPHICAL SURVEY AND PROPOSED DRAWINGS

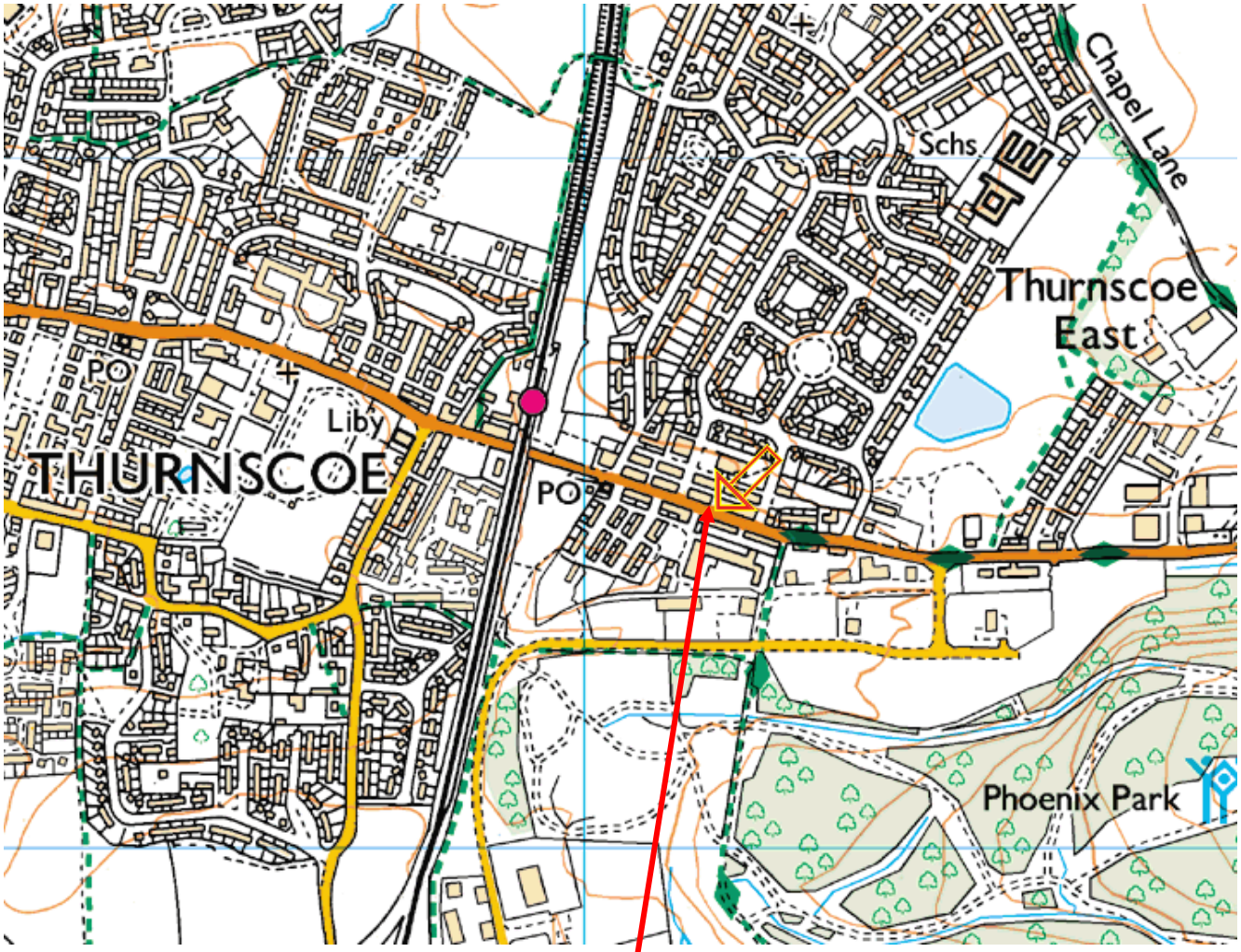


Fig A1.1 Site Location Plan

APPENDIX 2

SITE PHOTOGRAPHS



Fig A2-1



Fig A2-2 – View over northern plot



Fig A2-3 – View over southern plot



Fig A2-4 - View over southern plot

APPENDIX 3

YORKSHIRE WATER CORRESPONDENCE