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CONSULTING ENGINEERS
CHARTERED CIVIL & STRUCTURAL ENGINEERS

Civil & Structural Engineering

Highways & Transportation

Flood Risk & Drainage

Project Management

Expert Witness

FLOOD RISK ASSESSMENT

FOR PROPOSED

MATERIALS RECYCLING FACILITY

AND

POND RESTORATION SCHEME

AT

PITSFORD

NORTHAMPTONSHIRE

18th December 2012
Revision A

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1.0 Introduction

1.1 Abington Consulting Engineers have been appointed to produce this Flood Risk Assessment in support of a planning application for the restoration of Pitsford Pond, associated inert recycling operations at Pitsford Quarry and further extraction of the Northampton Sand Ironstone mineral reserve at Pitsford Quarry in Northamptonshire.

2.0 Planning Policy & Methodology

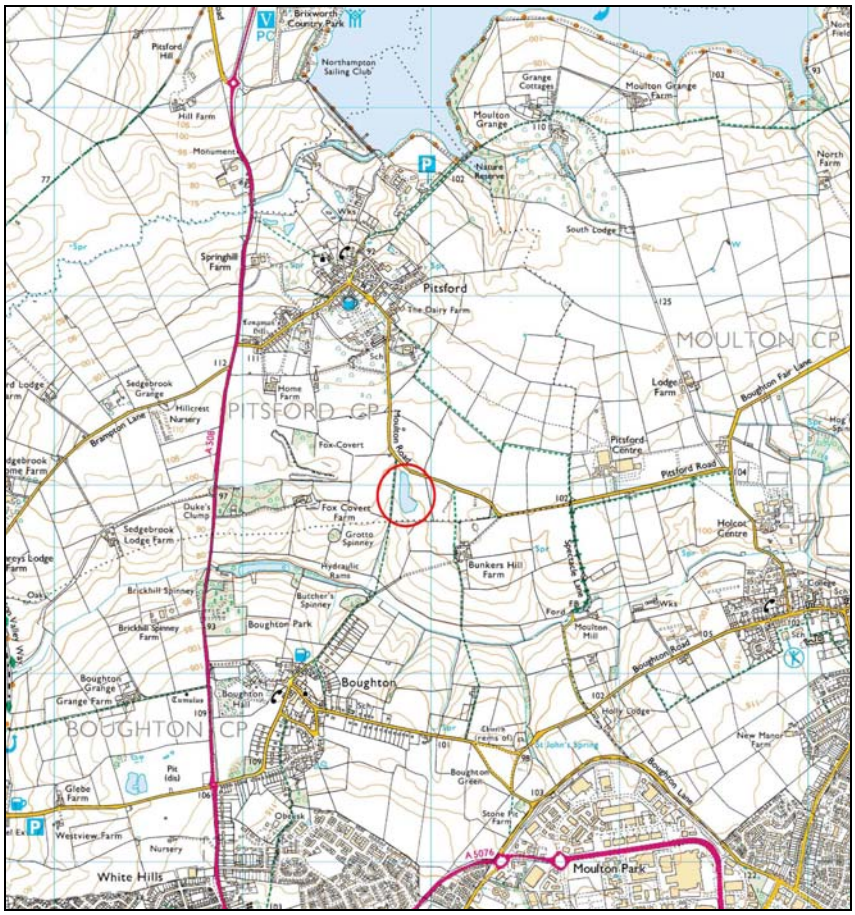
2.1 Planning policy for flood risk is set out in the National Planning Policy Framework (NPPF) technical guidance published in March 2012. The policy document sets out key planning objectives in relation to land usage and flood risk management. The development proposals are designed to be compliant with the requirements of the National Planning Policy Framework.

2.2 A Flood Risk Assessment has been carried out to assess the effects of flooding on the development and how the development might affect flood risk elsewhere.

2.3 A drainage strategy has been developed to demonstrate that the site can be adequately drained.

3.0 Development Location & Description

3.1 The site is located approximately 1km to the south of Pitsford village. Access to the main quarry is from the A508 to the west of the site and Pitsford pond is accessed from Moulton Lane to the east. A site location plan is shown below.



Location Plan

3.2 Approximately 2km to the north of the site is Pitsford Reservoir and a small stream is located approximately 800m to the south. The stream has a feeder ditch which runs due south approximately 500m west of Pitsford Pond.

3.3 The application site covers 4.8ha in area which includes an area within the existing Pitsford Quarry, the proposed haul road and Pitsford Pond as shown on Site Plan Drawing GPP-PB-PP-12-02 in Appendix 1.

3.4 Pitsford Quarry has remained unused for a number of years due to market conditions, however much of the infrastructure such as weighbridge and wheelwash remains in place for future use. Pitsford Pond was created during previous mineral workings which now contains a body of water and over the previous 30 years has operated as a local fishery.

3.5 The development will consist of the infilling and restoration of the former mineral workings at Pitsford Pond. This land will then be returned to agricultural use. In association with this proposal the applicant wishes to set up a temporary inert waste recycling activity to sort and screen imported inert material for use in the restoration of the Pitsford Pond. In addition, there will also be separate mineral excavation and extraction within the floor of Pitsford Quarry.

3.6 The recycling operations are intended to replace those currently in operation at the nearby Harlestone Quarry, for the 3 year period of the restoration of Pitsford Pond. It is expected that up to 85,000 tonnes per annum of clean mixed inert materials from construction and demolition operations will be imported into the Pitsford Quarry where it will be screened and segregated. Following this a proportion of suitable material will be recycled to produce secondary aggregates and will involve no more than 25,000 tonnes per annum to transported off-site and sold.

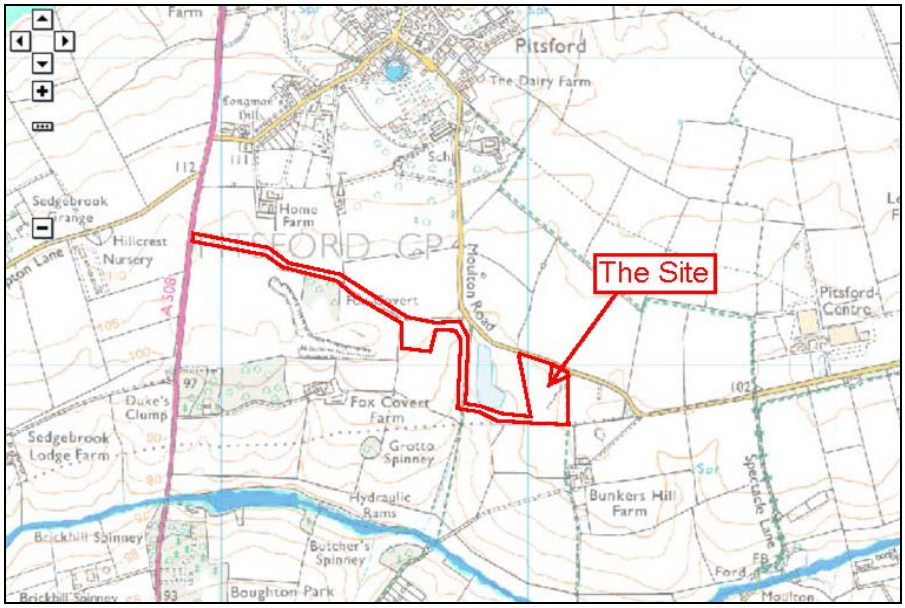
3.7 It is assumed that 60,000 tonnes per annum of inert materials used as part of the infilling of Pitsford Pond. Only clean, inert and naturally occurring soils will be used for the infilling of Pitsford Pond which will be carried out under a Waste Recovery Permit. Drawing 12043/101 presented in Appendix 1 shows the final restoration scheme for the pond.

3.8 As Pitsford Quarry will be re-opened in association with the restoration of Pitsford Pond, it therefore makes it economically viable to extract the remaining Northampton Sand Ironstone for sale at market. This stone can be processed as building stone or crushed aggregate thus enabling operations at Harlestone Quarry to be scaled down for this 3 year period. All operations would be undertaken as previously before they were shut down in favour of working at Harlestone Quarry.

4.0 Sequential Test

4.1 Table 2 in the NPPF technical guidance give waste treatment and agriculture a ‘Less Vulnerable’ classification.

4.2 The Environment Agency’s flood plain map is shown below. It shows the site falls within Flood Zone 1 which is described as having a ‘low probability’ of flooding as defined in Table 1 in the NPPF technical guidance.



Environment Agency Flood Plain Map

4.3 Using the Sequential Test set out in the NPPF, Less Vulnerable uses are permitted in Flood Zone 1 (refer to Table 3 below), and therefore the development site will comply with planning policy and pass the Sequential Test.

Table 3: Flood risk vulnerability and flood zone 'compatibility'

Flood risk vulnerability classification (see table 2)		Essential infrastructure	Water compatible	Highly vulnerable	More vulnerable	Less vulnerable
Flood zone (see table 1)	Zone 1	✓	✓	✓	✓	✓
	Zone 2	✓	✓	Exception Test required	✓	✓
	Zone 3a	Exception Test required	✓	×	Exception Test required	✓
	Zone 3b functional floodplain	Exception Test required	✓	×	×	×

Key: ✓ Development is appropriate.
× Development should not be permitted.

5.0 Potential Sources of Flooding

5.1 The following mechanisms have been identified as potential sources of flooding:

- Fluvial flooding from the nearby stream.
- Ground water.
- Surface water run-off from the development.
- Surface water run-off from areas adjacent to the site.
- Flooding from Pitsford Reservoir.

5.2 There are no public surface water sewers in the area.

6.0 Appraisal of Sources of Flooding

6.1 Fluvial flooding from the nearby stream

6.1.1 The Environment Agency's flood map in Section 4 shows the site is remote from any flood plains and therefore the development will not be at risk from fluvial flooding.

6.2 Groundwater

6.2.1 Pitsford Quarry has been operated for several years with no particular problem encountered in terms of flooding from groundwater owing to the permeable geology and low water table.

6.2.2 Pitsford Pond was originally a mineral extraction site which was partially filled with relatively impermeable inert waste. An assessment of groundwater ingress has been made in Hafren Water's hydrogeology report. They have estimated that the rate of ingress is between 0.1 l/s and 1.4 l/s which is likely to be the primary source of water to the pond other than rainwater.

6.2.3 Groundwater ingress will need to be considered when dewatering the pond.

6.3 Surface water run-off from the development

6.3.1 All surface water run-off from the quarry is contained within the base of the quarry. Surfaces are either hardcore or the natural geology and therefore any surface water collecting in the base of the quarry percolates into the ground. Pitsford Quarry has been in operation for many years and there has never been any flooding from surface water run-off.

6.3.2 At present, all surface water run-off in the pond area is contained within the pond itself as there is no outlet. Filling the pond with inert waste of an unknown composition may result in relatively high rates of run-off onto adjacent land which will need to be managed to prevent flood risk.

6.4 Surface water run-off from areas adjacent to the site

6.4.1 Pitsford Quarry has been in operation for many years and there have never been any issues with flooding associated with surface water run-off from areas adjacent to the site. Only the land to the north of the site falls towards the quarry. This is agricultural/plantation land and owing to the relatively permeable geology, most of the run-off is absorbed into the ground.

6.4.2 Land to the north of Pitsford Pond is at a higher level than the pond area but Moulton Road acts as a barrier preventing run-off from reaching the pond. The land to the east of the pond is also higher and there is a risk of run-off from this area flooding the proposed development area. In the short term during the filling of the pond, run-off may need to be managed to prevent flooding of the pond when it has been emptied. In the longer term, the run-off from the adjacent area will run over the restored pond and down to the nearby stream. As the restored pond will be used for agriculture and there will be no low points for water to collect, there is no risk of flooding from the run-off from the adjacent land.

6.5 Flooding from Pitsford Reservoir

6.5.1 Pitsford Reservoir is approximately 2km north of the site. However, the level of the reservoir is much lower than the site and therefore does not pose a flood risk.

7.0 Probability

7.1 The development site is located within a Zone 1 flood area. This is deemed to be at low risk of flooding, typically less than 1 in 1000 annual probability.

8.0 Climate Change

8.1 Table 5 in the NPPF technical guidance provides recommended allowances for increase peak rainfall intensity of 20% which should be used for any surface water drainage design.

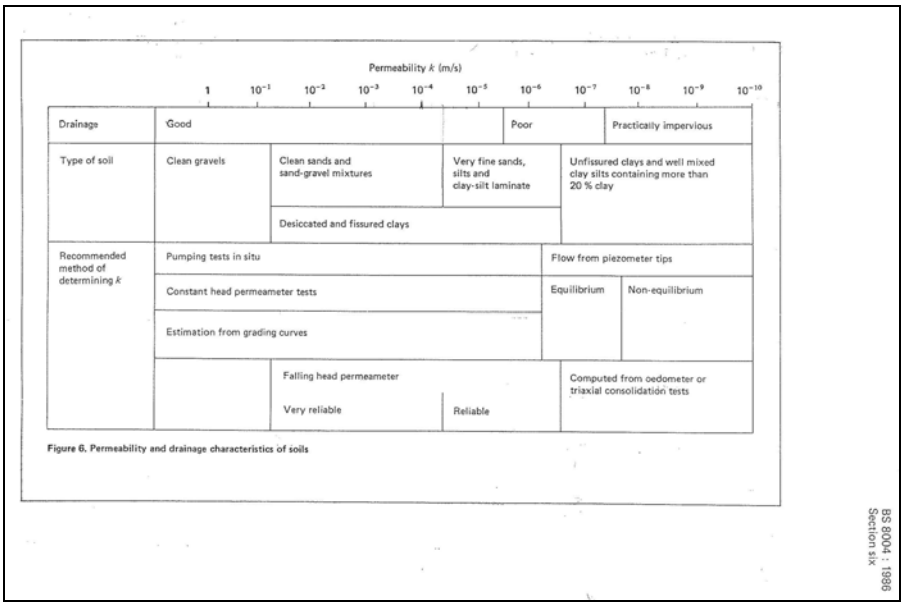
9.0 Flood Risk Management Measures

9.1 The proposed mineral extraction and materials recycling will be carried out on the base of the quarry floor. As there are no proposals to change the surface of the quarry floor, there will be no change in run-off rates and any surface water is expected to percolate into the ground as it does at present.

9.2 Prior to restoring the pond, it will need to be dewatered. This will be achieved by pumping the water out at a rate of 6.4 l/s (which is the equivalent green-field run-off rate) for a period of approximately 3 months (refer to calculations set out in Appendix 2 for volume and pumping calculations). This includes for an allowance of 1.4 l/s which is the maximum likely ingress of groundwater. Water will be discharged into an infiltration basin at the south western end of the site which will eventually be used for the restoration drainage. If the basin overflows, the water will discharge into the ditch to the west of the pond at a green-field run-off rate.

9.3 As the pond will be filled with inert waste of unknown composition, the worst case scenario would be to assume that this will be relatively impermeable material such as clay. Although the surface of the restoration will be topsoiled for the final agricultural use, the underlying fill material may result in increased surface water run-off by comparison with a green-field site. It is therefore proposed that surface water run-off from this area should be effectively managed so as not to increase run-off into the nearby receiving watercourse.

9.4 A proposed drainage scheme is shown on drawing 12043/101 in Appendix 1. The scheme consists of a ditch that will collect surface water from the restoration area which then leads to an infiltration basin. The infiltration basin has been sized to accommodate a 100 year storm event plus a 20% allowance for climate change. Although the exact rate of infiltration has not yet been established by testing, an estimate of the infiltration rate *k* of 1.0 x 10^{-4} m/s has been established using the extract from BS8004 below for sandy soils which is the geology encountered in the upper soil strata in the area. Using this rate, the require volume of the infiltration basin has been calculated to be 3151m^3 (refer to calculations set out in Appendix 2). This arrangement will ensure that there will be no increased risk of flooding to the nearby watercourse.



BS8004 Extract

10.0 Off Site Impacts and Proposed Mitigation Measures

10.1 There will be no off site impacts from the development as a result of the proposed management of surface water run-off.

11.0 Management of Residual Risks

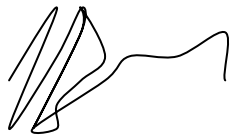
11.1 The proposed ditch and infiltration basin should be inspected annually to ensure they are free from blockages and any remedial works carried out as necessary.

12.0 Conclusions

12.1 The proposed development complies with the requirements of the Sequential Test set out in the NPPF technical guidance.

12.2 Surface water from the pond restoration scheme will drain into an infiltration basin with a capacity to accommodate a 100 year storm plus a 20% allowance for climate change.

12.3 Management of restoration drainage will ensure that run-off rates do not pose a flood risk to the nearby watercourse.



…….. 18th December 2012

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On Behalf of Abington Consulting Engineers Limited

APPENDIX 1 – Drawings