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FLOOD RISK ASSESSMENT
& DRAINAGE STRATEGY REPORT

RED FURLONG FARM
POUNDON
BUCKINGHAMSHIRE
OX27 9BG

JOB NO: P21-575

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CONTENTS

APPENDICES

1. INTRODUCTION

1.1 This report has been prepared by Simpson TWS to accompany a planning application for a construction plant training centre at Red Furlong Farm, Poundon.

1.2 The report assesses flood risk associated with the development proposals, closely following guidance set out in the Department for Communities and Local Government's National Planning Policy Framework (NPPF), the associated Planning Practice Guidance and Aylesbury Vale District Council Level 1 Strategic Flood Risk Assessment (SFRA) May 2017.

2. SITE LOCATION AND TOPOGRAPHY

2.1 The site is located at Red Furlong Farm, Twyford Road, Poundon as shown on *Figure 1* below. The site is centred on grid reference SP 652259 and co-ordinates X: 465251 / Y: 225911, while its postcode is OX27 9BG.

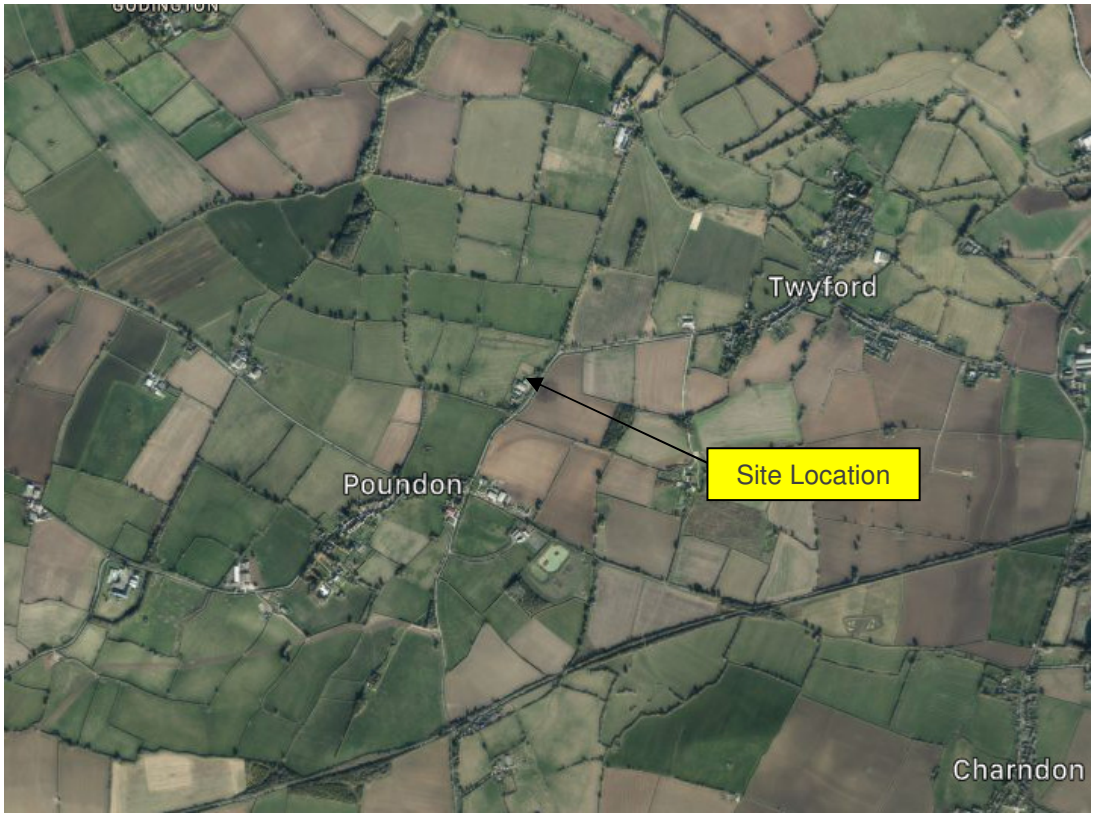

Figure 1: Site Location

2.2 The site is approximately 8.5 hectares in area and comprises of a farm with associated agricultural buildings and hard standing.

3. EXISTING GROUND CONDITIONS

3.1 The British Geological Survey online scanned records, provides free access to boreholes scans. A review of borehole scans in close proximity to the site indicates that the site is underlain by clay soils.

4. EXISTING DRAINAGE CHARACTERISTICS

4.1 There are no public sewers or a mapped courses in the immediate vicinity of the site and therefore, surface water flows generated from the farm are not positively drained and presumed to infiltrate into the ground or runoff into nearby ditches.

4.2 It is presumed that the existing habitable buildings on the site are served by an existing sewage treatment plant, with treated effluent infiltrating into the ground via a drainage field or foul water flows stored within a cesspool and tinkered away periodically.

5. PROPOSED SCHEME

5.1 The proposed development comprises a construction plant training centre, with a training area and a number temporary modular building to provide the training facilities and accommodation, with associated car parking.

5.2 A site layout plan, which shows the overall development proposals is included in *Appendix A*.

6. SOURCES OF FLOODING

6.1 Aylesbury Vale District Council website includes a list of documents, which inform the different plans and policies of the Local Development Plan. The list of documents includes a Strategic Flood Risk Assessment (SFRA), which provide an assessment of the extent and nature of flood risk in the local area to enable an examination of the likely appropriateness of developments. The following report is available via the county council's website:

- https://www.aylesburyvaledc.gov.uk/aylesbury-vale-strategic-flood-risk-assessment-2017

6.2 The flood risk associated with sources of flooding identified within this report has been reviewed under the following headings.

Fluvial Flooding

6.3 The Environment Agency (EA) has derived flood maps of England, from which it is possible to initially identify whether a site is located within an area that is at risk of tidal / fluvial flooding. The maps, which are available on the EA's website, categorise land as being within Flood Zone 1, Flood Zone 2 or Flood Zone 3, with Flood Zone 1 being all land falling outside of the floodplain and Flood Zone 2 and 3 being all land within the floodplain. Flood Zone 3 is split into two further categories, namely Flood Zone 3a and Flood Zone 3b with Flood Zone 3b considered to be the functional floodplain.

6.4 The definitions of the Flood Zones extracted from the National Planning Policy Framework (NPPF) are described below:

- Flood Zone 1 – Low probability. This zone comprises land assessed as having a less than 1 in 1,000 annual probability of river or sea flooding (<0.1%).

- Flood Zone 2 – Medium probability. This zone comprises land assessed as having between a 1 in 100 and 1 in 1,000 annual probability of river flooding (1% - 0.1%), or between a 1 in 200 and 1 in 1,000 annual probability of sea flooding (0.5% - 0.1%) in any year.

- Flood Zone 3a – High probability. This zone comprises land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%), or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year.

- Flood Zone 3b – The functional floodplain. This zone comprises land where water has to flow or be stored in times of flood. Typically, land, which would flood with an annual probability of 1 in 20 (0.5%) or greater in any year, or is designed to flood in an extreme (0.1%) flood.

6.5 The flood zone map in *Figure 2* below has been taken from the EA's website and shows the site and surrounding area to be in Flood Zone 1.

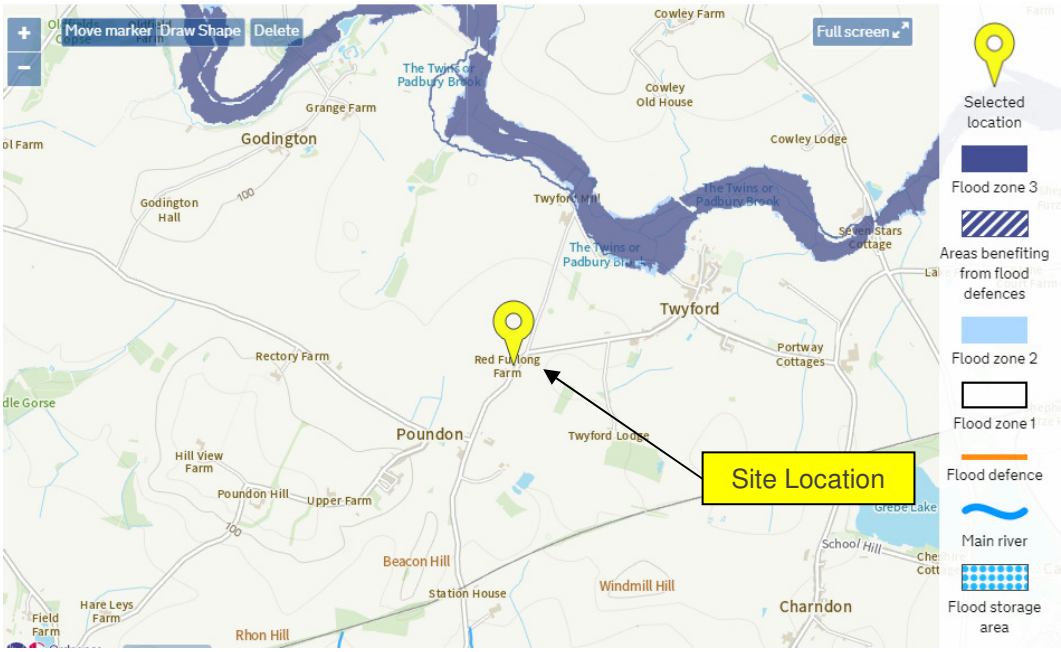

Figure 2: EA Flood Zone Map

6.6 On a similar basis to the flood zone map, the associated level of risk of river (fluvial) flooding map taken from the EA's website is shown in *Figure 3* below. The map shows the location of the proposed development to be in an area which is not considered to be at risk of fluvial flooding.

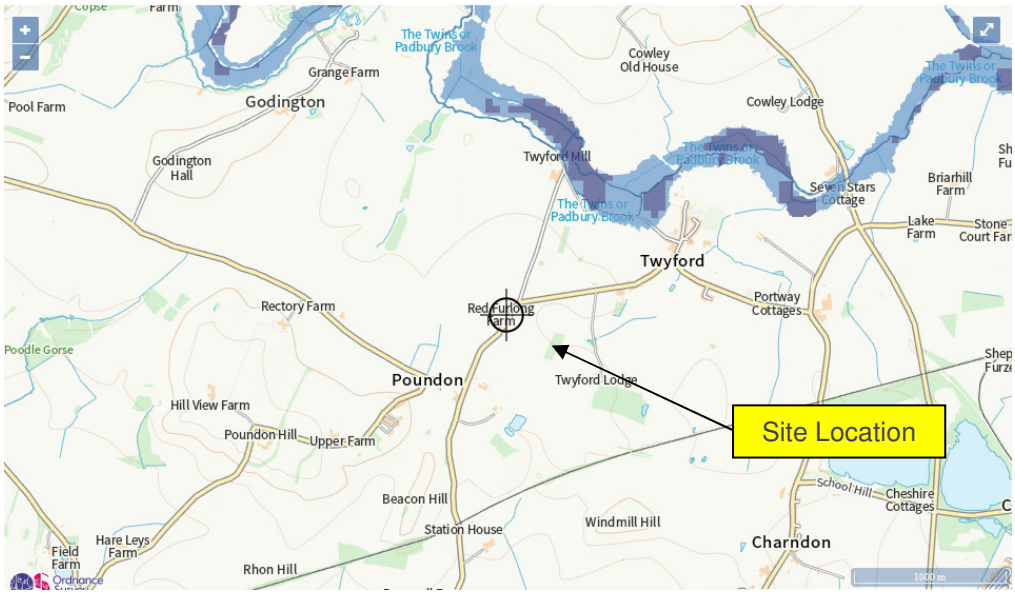

Figure 3: EA Risk of Fluvial Flooding Map

6.7 The EA's Flood Zone & Risk of Fluvial / Tidal Flooding Maps correspond with the Flood Map extracted from the SFRA, which is included in *Appendix B*.

Surface Water Flooding

6.8 The EA have modelled locations along critical flow paths and areas situated in topographic depressions, which could flood following an extreme rainfall event. *Figure 4* below shows a surface water flood risk map taken from the EA's website with the approximate location of the site identified.

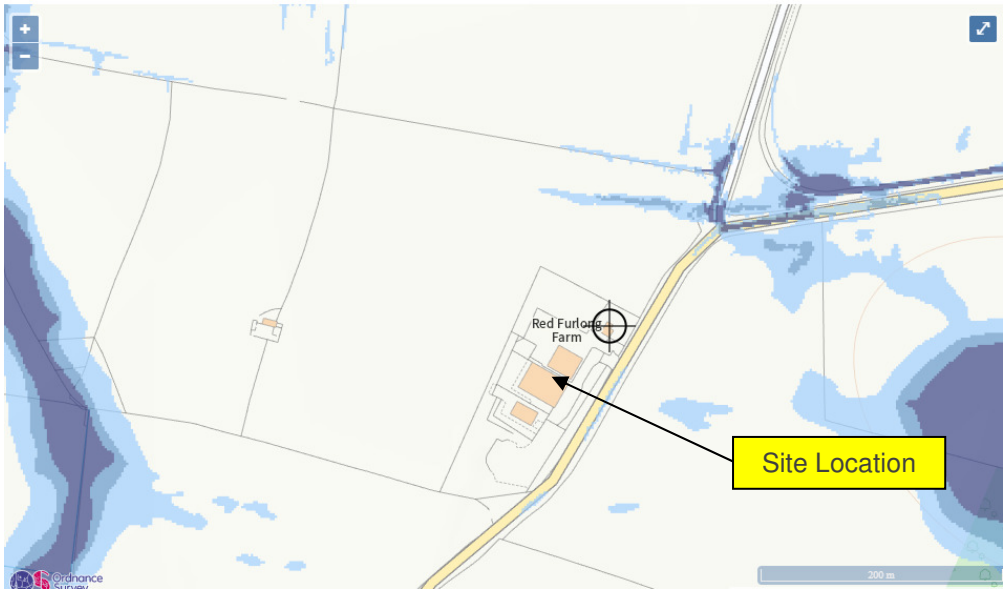

Figure 4: EA Surface Water Flood Risk Map

6.9 *Figure 4* indicates that the vast majority of the site is at very low risk of surface water flooding, with a localised area shown to be at high risk of surface water flooding, in

the proposed training area, some distance from the proposed buildings and car parking and therefore considered a very low risk to the development.

6.10 The EA's Surface Water Flood Risk Map correspond with the Flood Map extracted from the SFRA, which is included in *Appendix B*.

Groundwater Flooding

6.11 The groundwater flood map extracted from the SFRA is included in *Appendix B*, which shows the site and surrounding area to have a very low potential for groundwater flooding to occur.

6.12 Furthermore, no subterranean (basement) development is proposed, which would generally be most at risk of flooding from this source. On this basis, the development is assessed to not be at flood risk from this source.

Sewer Flooding

6.13 The historic sewer flooding record map extracted from the SFRA identifies the site to be in an area with a very low number (1-5) of recorded sewer flooding incidents.

Flooding from Artificial Sources

6.14 Flooding from artificial sources, is most likely to result from burst water mains or from infrastructure failure in an artificial watercourse or water body, i.e. canals or other water features such as reservoirs. These systems are maintained, improved and regularly inspected by the Canal and River Trust (canals), water company (water mains) and EA (water bodies). Therefore, flood risk from these sources is generally considered to be low.

6.15 Flood maps associated with large reservoirs that hold over 25,000 cubic meters of water are available on the EA website. The maps help to identify areas that could potentially be affected by reservoir flooding and display a realistic worst case scenario of the largest area that may be flooded if a reservoir were to fail and release the water it holds.

6.16 The Reservoir Flood Map in *Figure 5* below taken from the EA's website shows the site to be unaffected by reservoir flooding, therefore, the development is not considered to be at risk of flooding from this source.

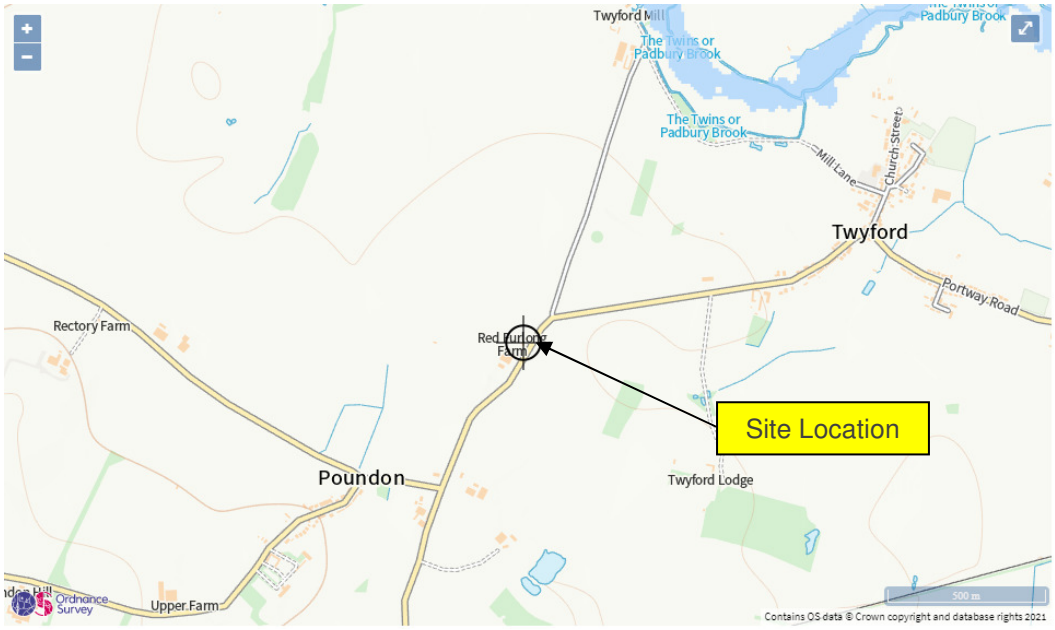

Figure 5: EA Reservoir Flood Map

6.17 The EA's Reservoir Flood Risk Map correspond with the Flood Map extracted from the SFRA, which is included in *Appendix B*.

6.18 There are no canals in the immediate surrounding area, therefore, the development is not considered to be at risk of flooding from this source.

7. THE SEQUENTIAL & EXCEPTION TEST

7.1 The National Planning Policy Framework (NPPF) encourages a sequential risk-based approach to determine the suitability of land for development in flood risk areas. It advises local planning authorities to demonstrate that there are no reasonably available sites in areas with a lower probability of flooding that would be appropriate to the type of development or land use proposed.

7.2 In areas at risk of river flooding, NPPF advises that preference be given to new development in Flood Zone 1. If there are no reasonably available sites in Flood Zone 1 the flood vulnerability of the development can be considered in locating development in Flood Zone 2 and then Flood Zone 3. Within each flood zone new development should be directed to sites at the lowest probability of flooding from all sources.

7.3 Flood mapping available on the EA's website indicates that the site lies outside of Flood Zone 2 as well as Flood Zone 3. The site is therefore deemed to fall within Flood Zone 1, where the annual probability of flooding from rivers or sea is less than 1 in 1000 in any given year (<0.1%). NPPF advises that all land uses are appropriate in Flood Zone 1. Therefore, the proposed development is considered appropriate in terms of the sequential test with it not being necessary to apply the exception test.

8. MANAGING THE RISK OF FLOODING

8.1 *Section 6* of this report identified the site to be in Flood Zone 1, with a very low risk of surface water flooding, other than a localised area across the site. However, new development can increase the volume and rate at which surface water runoff is discharged from the site, which could cause an increase in surface water flood risk both on the site and elsewhere within the catchment.

8.2 It is proposed to use Sustainable Urban Drainage Systems (SuDS) to minimise the rate of discharge, volume and environmental impact of surface water runoff. The following section of this report sets out an assessment of the use of Sustainable Drainage Systems (SuDS) and how these systems could be used to manage surface water runoff.

9. SURFACE WATER DRAINAGE STRATEGY

Surface Water Disposal

9.1 The NPPF Planning Practice Guidance advises that Sustainable Urban Drainage Systems (SuDS) should be used to control surface water runoff close to where it falls as well as to mimic natural drainage as closely as possible with surface runoff discharged as high up the following hierarchy of drainage options as reasonably practicable.

- into the ground (infiltration);
- to a surface water body;
- to a surface water sewer, highway drain, or another drainage system;
- to a combined sewer.

9.2 The methods of disposal are summarised in *Table 1* below with an assessment of each methods suitability also provided.

Table 1: Surface Water Runoff Destination Assessment

Surface Water Runoff Destination	Assessment
Into the ground (infiltration)	As identified in *Section 3*, a review of nearby borehole scans identify that the site is likely to be underlain by clay soils and as such, the effectiveness of infiltration drainage techniques are likely to be limited.
To a surface water body	There are no mapped surface water bodies located in the immediate vicinity of the site, but there are a number of ditches bordering the site which could be used in the disposal of surface water runoff
To a surface water sewer, highway drain, or another drainage system	There are no existing surface water drainage sewers in the vicinity of the site.
To a combined sewer	There are no existing sewers sewers in the vicinity of the site.

9.3 Based on the assessment in *Table 1*, it is assessed to be appropriate to discharge surface water generated in a similar manner to the existing situation, with surface

water runoff infiltrating into the ground where possible, with excess surface water flows discharging to the surrounding ditches.

Sustainable Urban Drainage Systems (SUDS)

9.4 Within the drainage strategy it is necessary to consider the use of SuDS, which encompass a wide range of drainage techniques intended to minimise the rate of discharge, volume and environmental impact of runoff and include; green roofs / rainwater harvesting; soakaways / infiltration systems; infiltration trenches and filter drains; permeable paving; swales and basins; ponds and wetlands. *Table 2* below provides an assessment of each methods suitability.

Table 2: SuDS Assessment

System	Assessment
Green Roofs	The use of green roofs is not considered appropriate for the management of surface water runoff as the building design will comprise of lightweight materials unable to support a green roof.
Rainwater Harvesting	Rainwater harvesting is unlikely to contribute to a reduction in surface water runoff volumes as the nature of the development would have no requirement for recycled rainwater. Therefore, rainwater harvesting has not been considered as part of the surface water drainage strategy for the development.
Soakaway / Infiltration Systems / Infiltration Trenches	*Section 3* of this report indicates that the site is underlain with clay soils which may limit the use of infiltration techniques, nevertheless, infiltration techniques will be used as far as practically can be achieved.
Permeable Pavements	The use of permeable surfacing may be suitable for the management of surface water runoff.
Swales, basins, ponds, wetlands and below ground attenuation tanks	The use of swale, basins and ponds areas is considered suitable for the proposed development.

9.5 *Table 2* has established that the use of combination of SuDS techniques is likely to be the most effective in the management of surface water runoff.

Exceedance

9.6 If the capacity of the surface water drainage networks were exceeded site levels will follow the sites existing topography, ensuring no increase in flood risk. Furthermore, the proposed temporary buildings will be raised above surrounding levels, therefore ensuring there would be no risk from overland flows.

10. FOUL WATER DRAINAGE STRATEGY

10.1 It is proposed that foul water runoff would be discharged to a new sewage treatment plant with treated effluent discharging to ground via a new drainage field. Alternatively, foul water effluent will be stored onsite within a cesspool and periodically tinkered away.

11. CONCLUSION

11.1 It has been established that the site is in Flood Zone 1, which is an area at low risk of tidal or fluvial flooding. It was also established that the site is generally at low risk of flooding from most sources considered in Aylesbury Vale DC Level 1 Strategic Flood Risk Assessment (SFRA) May 2017.

11.2 Regarding the sequential test, the proposed development is an appropriate form of development, as it would be in Flood Zone 1, which is considered suitable for all forms of development in terms of flood risk.

11.3 The use of Sustainable Drainage Systems (SuDS) is proposed to minimise the rate of discharge, volume and environmental impact of surface water runoff to ensure that the development can be occupied and operated safely and that there will be no increase in the level of surface water flood risk to the site or neighbouring sites because of the development.

11.4 Foul water flows would be discharged to a new sewage treatment plant with treated effluent discharging to ground via new drainage field. Alternatively, foul water effluent would be stored onsite within a cesspool and periodically tankered away

11.5 In terms of flood risk, it is concluded that the development can be occupied and operated safely and that there will be no increase in the level of flood risk to the site or neighbouring sites because of the development.