

**Proposed Multi-Use Hardstanding Pad,
MIRA Technology Park
A5 Watling Street,
Nuneaton,
Warwickshire,
CV10 0TU**

Client: HORIBA MIRA Ltd

Project Reference: 7045-BCL-XX-ZZ-RP-C-0001

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1.0 Introduction

- 1.1 This report comprises a Flood Risk Assessment to accompany a planning application for the provision of multi-use hardstanding pad to provide a flexible area to support testing operations within the MIRA site. The proposed site referred to as plot NW8 is located within the MIRA Technology Park (MTP) on land off the A5 near Nuneaton, as shown in **Appendix A**.
- 1.2 The site has previously been partly plateaued and forms a serviced and undeveloped site with access road and drain connections provided in an earlier phase.
- 1.3 The proposed development will provide a fenced concrete pad area with drainage and utility connection points able to support a range of testing operations. The general arrangement of the area is shown on the drawings contained within **Appendix B**.
- 1.4 The objective of this report is to provide the Planning Authority, Lead Local Flood Authority (LLFA) and Environment Agency (EA) with sufficient information to consider flood risk in the planning process. This report is written generally in line with the guidance set out in the National Planning Policy Framework (NPPF) document and the associated National Planning Policy Framework Technical Guidance (NPPFTG).

2.0 Development Description and Location

2.1 Site Location and Existing Use

2.1.1 The wider MIRA Technology Park has been developed on the re-purposed RAF Lindley WW2 airfield and is located within Leicestershire, on the Warwickshire border approximately 5km north of Nuneaton and 6.5km west of Hinkley. The main campus access is located adjacent to the A5 trunk road with plot NW8 accessed through the private internal roads.



2.1.2 The proposed NW8 development area is located within the north western part of the MTP development. The NW8 development plot comprises an area of approximately 0.97ha and is currently formed as an undeveloped plateau.

2.1.3 The site is currently unpaved/permeable and there are no water courses/water bodies located within the plot, however an existing drainage ditch runs along the eastern boundary. The access road and drain connections were provided in an earlier phase.

2.1.4 The position of plot NW8 is shown on the location plan enclosed in **Appendix A**.

2.2 Site Background and History

- 2.2.1 The proposed development occupies Plot NW8 on the MIRA technology park (MTP).
- 2.2.2 Historically the land in the area of Plot NW8 was within the confines of an earlier outline planning permission (ref. 11/00360/OUT) approved in March 2012 which set out the principles of development of the wider MTP area. Plot NW8 previously gained planning consent for development via the NW7 and NW8 application (ref. 17/00242/FUL) granted on 20th October 2017.
- 2.2.3 Subsequently the area to the south has been developed as plot NW7 (planning ref 18/00679/FUL) and the area to the north west as a further testing area (the TIC-IT site planning ref 18/00425/FUL). Both NW7 and the TIC-IT area have subsequently been constructed and are in operation.
- 2.2.4 A cut and fill operation was carried out to plateau the plot to take advantage of the economies of the wider earthmoving and soil reuse strategy and to form the attenuation pond facility to the north east, Drainage outfalls were constructed across the east edge of the plot to serve NW7 and the TIC test area and outfall connections provided for NW8. These works were carried out in 2019 and 2020. Details of the drainage provision in the NW8 area including outfalls shown on the drawings contained within **Appendix C**.
- 2.2.5 All parts of the infrastructure, both roads and drains remain private and under the management of the site owner.
- 2.2.6 The existing MIRA NW7/8 and TIC south drainage system was designed in accordance with the flood risk management requirements current at the time and provides centralised attenuation of surface water drainage flows in a pond to the NE of plot NW8 discharging at a controlled rate to the ditch watercourse to the east of the development. The individual plots have unrestricted surface water discharge to the drainage system upstream of the pond.
- 2.2.7 Significant work has been carried out by others in connection with the MTP Masterplan, NW7 and TIC-IT projects, and this report builds on and refers back to this information as appropriate.

2.3 Site Constraints

- 2.3.1 Site constraints relating to drainage and flood risk mainly comprise land form, topographic and geological water features and drainage infrastructure.
- 2.3.2 Prior to plateauing the landform fell broadly SW to NE with overland flows collected in the eastern ditch and NE natural pond. These features can be seen on the original topographical survey carried out prior to plateauing and contained in **Appendix D**. The pond and ditch are retained as wildlife habitat whilst also forming part of the wider site drainage system.
- 2.3.3 As the landform is changed following the plateauing a new topographical survey has established the pre-development levels of the site (also contained in **Appendix D**). General falls remain SW – NE and the toe of the plateaued area can be seen to stop short of the existing ditch and wildlife ponds. The new works are not intended to extend beyond the current worked area to the East.
- 2.3.4 The previously completed infrastructure has established the attenuation pond and provided both surface water (SW) and foul water (FW) connection locations the levels of which constrain proposed site levels when achieving a gravity drainage solution. Site access will be achieved from the NW7/TIC-IT Access road which also helps to set levels for the site. These features can be seen on the aerial imagery contained in **Appendix D**.
- 2.3.5 Levels of the proposed hardstandings will be set to suit the topography whilst meeting the connection constraints identified above. Overland flow routes will also be considered in the detailed design.
- 2.3.6 This report is based on a review of available historical, geotechnical, geological and hydrogeological information together with information provided by the client, design team and planning authorities.

2.4 Proposed Development

- 2.4.1 Horiba-MIRA propose to develop the HW8 site to provide a multi-functional and flexible space in association with the testing operations. The proposed development will provide a fenced concrete pad area with drainage and utility connection points able to support a range of testing operations. The general arrangement of the area is shown on the drawings contained within **Appendix B**.
- 2.4.2 The proposed total impermeable area is approximately 6860m² (0.686ha).

2.5 Design Basis

- 2.5.1 The drainage strategy has been prepared with due regard to both Warwickshire and Leicestershire County Council's Flood Risk and Planning Guidance', together with national guidance and industry best practice. In addition the drainage follows the established strategy for the NW7/8 and TIC-IT areas. The drainage strategy is summarised below based on this.
- 2.5.2 The existing infrastructure constructed in 2020 is designed to accommodate a drained area of approximately 1.9Ha from plot HW8.
- 2.5.3 The on-plot drainage system has been designed to connect to the stub provided in the infrastructure and uses the industry standard Causeway Flow computer software together with the FEH data for 60+min storms and FSR data for 15 & 30min storms and takes account of the latest published guidance for climate change allowance. The site has a typical expected design life of 25 years for an industrial unit, which equates to a lifetime up to 2060 and therefore the recommended minimum climate change allowance of 20% has been incorporated. Allowance for urban creep is not required as the site is for commercial uses and is fully developed leaving minimal scope for additional future drained areas.

3.0 Planning Policy

- 3.1.1 This section of the report will consider current National Planning Policy relating to flooding / flood risk and surface water drainage.

3.2 Flood Risk

- 3.2.1 The current national planning policies are set out within the National Planning Policy Framework (2021) and National Planning Policy Guidance.
- 3.2.2 Section 14 of the NPPF states that “inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk (whether existing or future).
- 3.2.3 PPG, Paragraph 19 states that the aim of a Sequential Test is to steer development to areas with the lowest probability of flooding i.e., Flood Zone 1 (FZ1).

3.3 Vulnerability Classification

- 3.3.1 The proposed new development as ‘...general industry, storage and distribution. Car parks...’ is classified as ‘Less Vulnerable’ within Table 2: Flood Risk Vulnerability Classification set out in PPG, Paragraph 66.

3.4 Sequential Test

- 3.4.1 Flood Maps enclosed in **Appendix E** confirm the site to be situated in Flood Zone 1.
- 3.4.2 PPG, Paragraph 67 states that all types of development are considered an appropriate land use within Flood Zone 1 and therefore the proposed development type is appropriate.

3.5 Exception Test

- 3.5.1 There is no requirement in the current National Planning Policy to provide an exception test for a development site situated in Flood Zone 1.

3.6 Drainage

- 3.6.1 Planning Policy regarding drainage was updated by a written statement from the House of Commons HCWS161 dated 18/12/14 which stated that ‘...we expect local planning policies and decisions on planning applications relating to major development...to ensure that sustainable drainage systems for the management of run-off are put in place...’
- 3.6.2 Under the town and country planning order 2010 ‘major development’ (in the context of this proposal) means development involving the provision of a building or buildings where the floor space to be created by the development is 1,000m² or more or the site area exceeds 1Ha.
- 3.6.3 The total application site area comprises 0.97Ha (see location plans in **Appendix A**), it is therefore not classed as a major application and is not required to comply with the national guidance contained within the ‘sustainable drainage systems: non-statutory technical standards’, however as far as practicable and in the interest of best practice the development will comply with these, together with the local planning guidance provided by Warwickshire and Leicestershire County Councils as LLFA and Drainage Authority.

4.0 Existing drainage and ground conditions

4.1 Watercourses

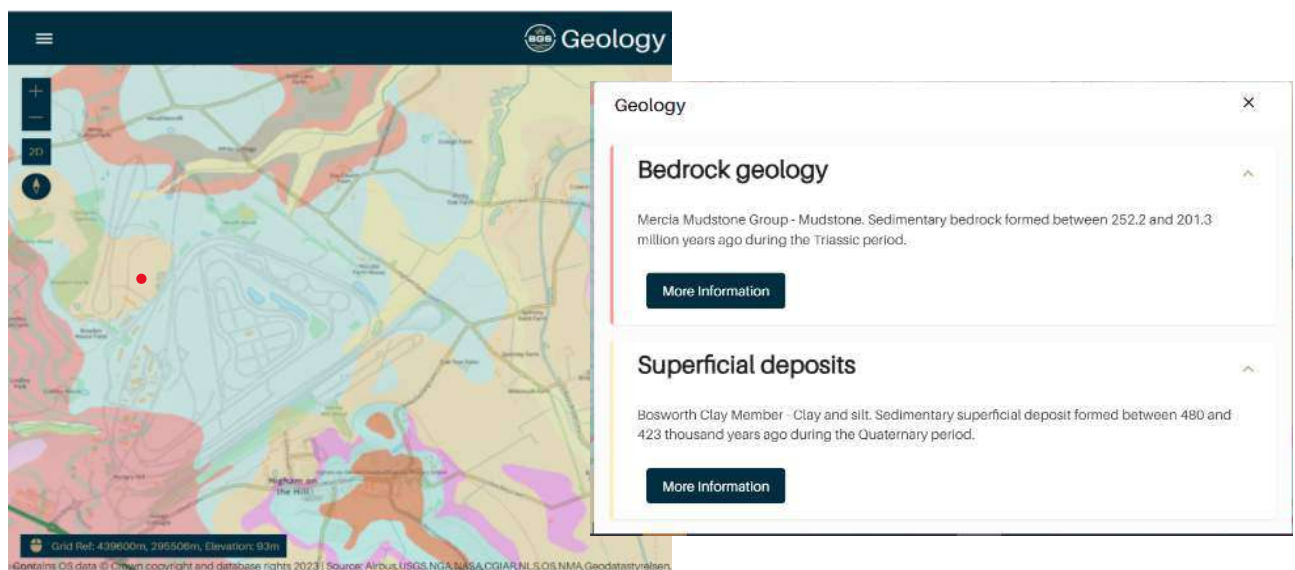
- 4.1.1 There are no watercourses or drainage features within the development plot. The nearest significant watercourse and main river is the River Anker located approximately 2km to the South West and 25m lower than the site. There is however an existing drainage ditch and pond to the immediate east of the plot. The MIRA site is on raised ground and likely forms part of a local watershed, whilst the full linkage of the various ditches is not fully resolved from inspection of the ordnance survey (OS) mapping it is likely that water from this ditch may link north and west through a variety of brooks before draining through the River Sence near Atherstone and into the R. Anker.

4.2 Sewers

- 4.2.1 There are no public sewers located within the MIRA site or its immediate environs, however the MIRA site contains an extensive network of private drains. A sw drain links through the east edge of the plot draining both NW7 and the TIC-IT to the attenuation facility. A fw spur is provided into the site.

4.3 Geology of the Area

- 4.3.1 A range of geological studies have been carried out on the MIRA site and these together with the published British Geological Survey mapping have been used to inform this assessment.
- 4.3.2 In summary the expected ground conditions would consist of approximately 300mm of topsoil on Boulder Clay over the Mercia Mudstone bedrock geology.



4.4 Ground Conditions

- 4.4.1 An intrusive ground investigation was carried out for the NW7 site. The ground conditions reflect those expected by the BGS information and comprise varying total thickness (typically 300mm) of topsoil/cultivated/ploughed clay on Glacial Clay (typically 0.9m to 1.6m) over the Mercia Mudstone bedrock geology. Extracts from the ground investigation are contained in **Appendix F**.
- 4.4.2 The ground investigation did not record any ground water strikes within the trial excavations
- 4.4.3 The proposed development plot has subsequently been partly plateaued by earthworks operations raising levels to the NE.
- 4.4.4 The fill materials/made ground and natural ground strata are not suitable for infiltration drainage, the boulder clay being generally impermeable and the made ground is not suitable for infiltration due to the risk of generating ground movements by erosion of fines or ‘collapse inundation’ of the filled ground.

4.5 Existing discharge from the Site

- 4.5.1 The existing site would be considered to be hydrologically ‘greenfield’ with run off following the natural gradient of the ground. The plateauing operation carried out in 2020 retained a slight fall ensuring overland run-off would continue to drain north east and would ultimately drain to the pond/ditch on the E and NE boundary.

5.0 Proposed Drainage Strategy

5.1 Drainage Constraints

- 5.1.1 The multi-use pad arrangement should not generally place significant constraints on the proposed drainage system. If used for vehicle parking/storage or for general service yard type uses then oil contamination risks persist, and appropriate measures can be incorporated to address these in order to protect the water and wider environment.
- 5.1.2 The wider NW7/8 and TIC-IT development area has been designed to accommodate the development of the proposed NW8 plot and the drainage infrastructure provided is sized to receive the runoff from the development plot. Attenuation of the surface water flows is accommodated centrally in an open pond to the NE of the development plot before discharge to the watercourse, this water storage facility will be maintained as part of the wider MIRA estate site infrastructure. The wider foul drainage transports foul flows across the site via a mixed gravity and pumped system to connect to the public sewer system at the far west of the MIRA estate adjacent to the A5.

5.2 SUDS Assessment

- 5.2.1 An assessment of suitable SuDs techniques has been carried out for the site and is enclosed within **Appendix G**.
- 5.2.2 As identified above the site is not suitable for direct infiltration due to both fill materials and unsuitable strata. Taking account of all the above points the use of direct infiltration is not proposed within the site.
- 5.2.3 The development itself requires a simple positively drained flat slab and to maximise flexibility of use to comply with the development brief this is proposed to be positively drained to a simple channel system.
- 5.2.4 Outside the individual development plot the wider site drainage utilises a pond that will attenuate flows and also provide biodiversity and water quality benefits.

5.3 Ground Water / Land Drainage

- 5.3.1 Based on the ground investigation ground water is not expected to be a significant consideration on this site.

5.4 Surface Water Drainage

- 5.4.1 The SUDS drainage hierarchy has been considered and guided the drainage strategy, as follows:
- Infiltration to ground - considered unviable due to ground conditions (impermeable strata and unsuitable fill material see 4.3 and 4.4 above).
 - Discharge to watercourse – The wider MTP drainage utilised this option ultimately discharging attenuated surface water to the ditch systems within the MIRA .
 - Discharge to sewer – Although ultimately clean surface water discharges to a watercourse the direct runoff from the plot is to a private SW drain provided as part of the advance infrastructure.
- 5.4.2 It is proposed to provide the site with a positive surface water drainage system. The system will collect surface water from the hardstanding and discharge the water using a piped system into the existing pond located to the north east of the site.
- 5.4.3 The wider MTP site infrastructure for plots NW7, NW8 and the TIC-IT was constructed in 2020 and provides attenuation of flows to a standard of 1/100 years + climate change utilising FEH design parameters and limits flows down to the QBar greenfield equivalent of 4.4l/s/Ha. The proposed area to drain off Plot NW8 ph1 is 6,400m² which is less than the 1.9Ha (As NW7) allowed for and hence no further consideration of the wider site is required. Utilisation of the existing attenuation facility for the proposed site ensures that development of the plot will not present an unacceptable risk of flooding downstream. Details of the wider site drainage are included in **Appendix C**.
- 5.4.4 The on plot drainage follows the established methodology for the wider MTP site and has been analysed for the 0.1% annual probability event with due allowance for climate change. Drawing and calculations are enclosed in **Appendices H and J** demonstrating the adequacy of the system and showing that no on plot flooding occurs in the design events.
- 5.4.5 It is noted that the access roadway at the west of the pad will not connect to the positive drainage and this area of less than 460m² will be allowed to run-off and discharge onto the undeveloped plot area. This will be drained into a future ph2 drainage system should further development involving extension of this roadway be required. Whilst this may result in some localised ponding it will not be detrimental to operations of the facility. This area is identified on the strategy drawing in **Appendix H**.

- 5.4.6 Pollution prevention will be managed within the surface water drainage for car parking and hardstanding's with the inclusion of an oil separator to address potentially larger spills to the yard area. Ultimately the owner/enduser is responsible for pollution control and will risk assess usage and incorporate further measures such as spill kits etc as appropriate to any specific use of the pad.
- 5.4.7 It is concluded that discharge of surface water to the wider site drainage system remains an appropriate solution for drainage of the proposed development. (See **Appendix H** for drainage strategy and **Appendix J** for calculations).

5.5 Foul Water Drainage

- 5.5.1 There are no public foul sewers on the site, however the wider MIRA site private foul drainage transports foul flows across the site via a mixed gravity and pumped system to connect to the public sewer system at the far west of the MIRA estate adjacent to the A5.
- 5.5.2 During development of the wider development area confirmation was obtained that the public foul system could accommodate the previously proposed foul flows (see **Appendix N**). The multi-use pad has provision for foul connection but flow requirements are unknown. It is anticipated that temporary provision for welfare provision may be needed and as this is likely to be less than previous options that capacity is unlikely to be a concern.

5.6 Exceedance Events

- 5.6.1 There is always the potential for the capacity of the proposed on-site drainage systems to be exceeded whether due to rainfall in excess of the design criteria, accidental blockage or failure of the drainage system, lack of or inadequate maintenance, overland flow from upstream sites, or other unexpected event.
- 5.6.2 In an exceedance event flooding could occur from manhole chambers, channel drains, roof gutters or even simply from overland flow onto the site. The site layout, levels and falls will be laid out to ensure that these exceedance flows can be routed safely across the site without risking inundation of buildings nor damage to plant and equipment.
- 5.6.3 Excess water would flow east-across the pad discharging off the site into the existing ditch. See the drainage strategies in **Appendix C** and **H** for details of overland flow routes etc.

6.0 Drainage Maintenance

- 6.1.1 It is important that maintenance responsibility for all drainage elements and assets is clearly defined, and a maintenance plan is in place as inadequate maintenance will increase the risk of flooding due to failure.
- 6.1.2 It is proposed that long term all elements of the private on-site drainage system are to be maintained by the client/owner. The off plot elements, pipes network, foul pump station and attenuation pond will be maintained as part of the wider MTP maintenance responsibility.
- 6.1.3 There will be a suitable maintenance regime in place for the site. As site operations may generate silt and oil spills the maintenance regime relating to collection and clearance of this from gully pots , catchpits and oil separators will be flexible and tailored to the site-specific requirements.
- 6.1.4 Generally maintenance will consist of;
- The onsite gullies, drainage channels and catchpits are to be cleaned regularly for the lifetime of the development.
 - Pipes, manholes, drainage channels and silt pits should be inspected at minimum 6 monthly intervals and cleaned out at minimum 12 monthly intervals or such interval as determined.
 - Maintenance checks and identified work should be carried out every six months and in accordance with the manufacturer's recommendations for the oil separators and any other specific drainage elements.
 - Refer also to specialist drainage channel manufacturer's information and maintenance requirements.
 - In all instances, inspection and cleaning should be carried out only by a specialist contractor and in accordance with the guidelines given in "Safe Working in Sewers and at Sewage Works" published by National Joint Health and Safety Committee for the Water Services
 - A full CCTV survey of the drainage system should also be carried out at 10 yearly intervals.

7.0 Definition of Flood Hazard

7.1 Flooding from Rivers

- 7.1.1 The nearest watercourse to the site designated 'main river' is the River Anker located approximately 2km to the south west of the site and approximately 25m lower than the site. As noted in 4.1.1 above the site is likely part of a local watershed, and water from the development may flow north into the River Sence catchment. The main watercourses can be seen on the map extract from the Hinckley and Bosworth Borough Strategic Flood Risk Assessment contained in **Appendix K**. The site is not shown to be in an area susceptible to river flooding.
- 7.1.2 The site is shown to be within Flood Zone 1 as detailed on the Environment Agency's website Indicative Flood Map for Planning obtained July 2023, a copy is enclosed in **Appendix E**.
- 7.1.3 From the above information the site is within Flood Zone 1. Flood Zone 1 has a predicted annual probability of flooding of less than 1 in 1000. River flooding is therefore not considered to present an unreasonable risk of flooding to the development.

7.2 Flooding from the Sea

- 7.2.1 The site is located inland a significant distance from the coast with a minimum elevation of approximately 97mAODN. We therefore do not consider flooding from the sea to be a potential source of flooding for the proposed development site.

7.3 Flooding from Land

- 7.3.1 There is always a risk of potential flooding from overland surface water flows during an exceptional rainfall/storm event. We are not aware of any previous overland surface water flooding on the site.
- 7.3.2 The development site will be designed to ensure appropriate management of overland surface water flows to ensure water is not channelled into buildings etc.

7.4 Flooding from Groundwater

- 7.4.1 The superficial and bedrock deposits below the site are considered unproductive strata and are unlikely to contain significant groundwater. Groundwater was not encountered in the intrusive investigation of plot NW7 adjacent and ground levels being relatively flat with minimal batters also limit opportunities for groundwater emergence.
- 7.4.2 Whilst there is a risk that the site could experience groundwater flooding due to the emergence of groundwater at the surface based on the above the risk of this is considered very low. Nonetheless the design of the development site with appropriate overland flow routes for management of surface water flows would ensure any groundwater was managed if it did occur.
- 7.4.3 Groundwater inundation therefore does not present an unreasonable risk of flooding to the site.

7.5 Flooding from Sewers

- 7.5.1 There are no sewers on or immediately adjacent to the site, it is therefore considered that flooding from local sewers is unlikely to be a potential source of flooding for the site.

7.6 Flooding from Surface Water

- 7.6.1 The site is not shown to be at risk of flooding from Surface Water on the Environment Agency's website mapping. A copy of the plan extracted in July 2023 is enclosed in **Appendix L**.

7.7 Flooding from Artificial Sources

- 7.7.1 The site is not shown to be at risk of flooding from reservoirs on the Environment Agency's website mapping. A copy of the plan extracted in July 2023 is enclosed in **Appendix M**.

8.0 Management of Residual Risks

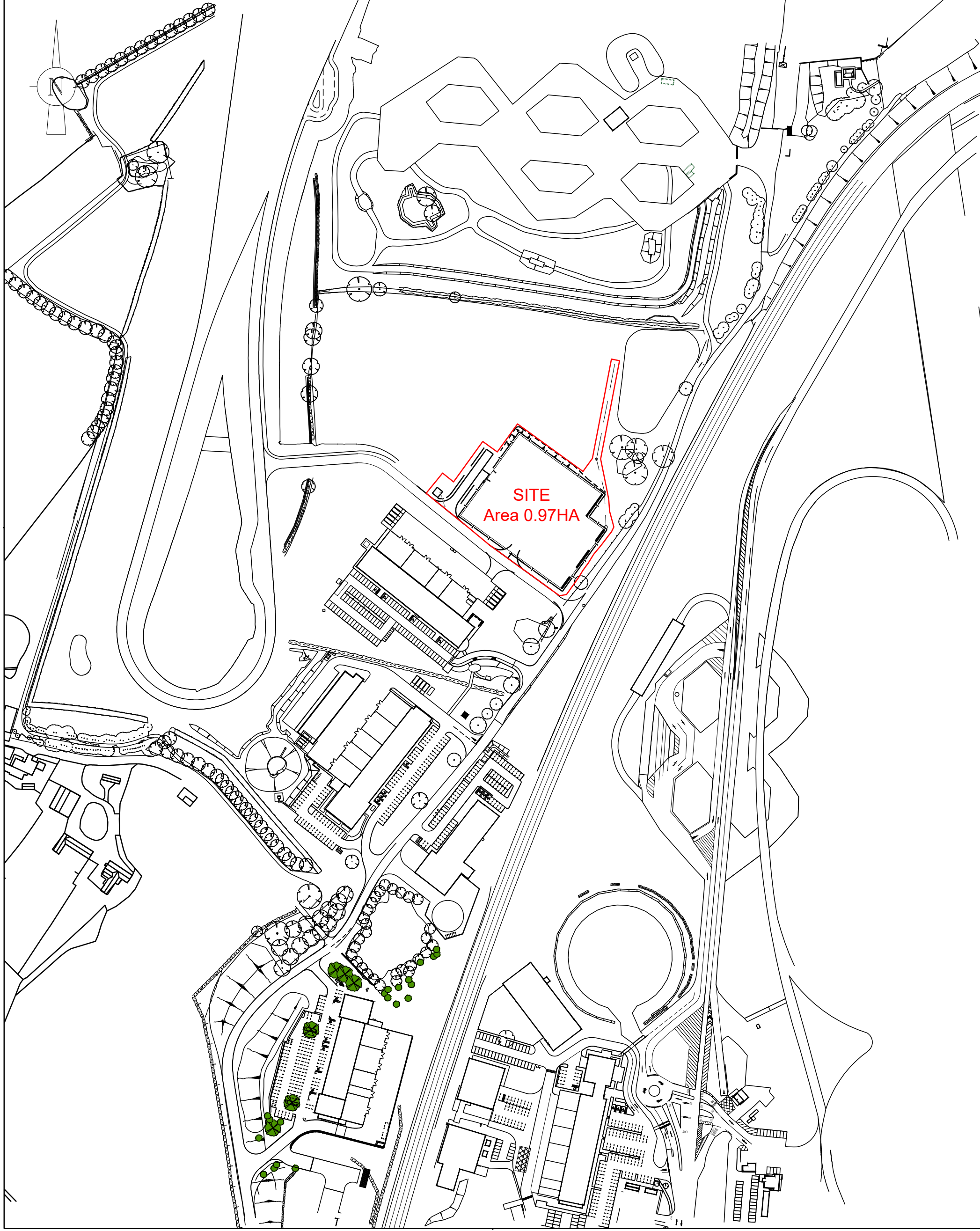
- 8.1 There will always be a residual risk of overland flooding if the surface water drains are not maintained sufficiently or during an exceptional storm event when the surface water drainage system is unable to cope with the rate or volume of rainfall. Normal maintenance will be required to the on and off site drainage systems. If flooding occurs due to lack of maintenance or during an exceptional storm event, overland flows should control and route excess water and should not endanger human life.
- 8.2 The proposed development will complete a normal maintenance regime to ensure that on site drainage is adequately maintained for the life time of the redevelopment.
- 8.3 The detailed level design of the pad and surrounding ground levels ensure that water will be routed appropriately in the exceedance event.
- 8.4 As the proposed development will not increase the rate of surface water runoff to the natural watercourses in the design events, the risk of flooding to downstream neighbours should not increase as a result of the proposed development.

9.0 Conclusions

- 9.1 The existing NW8 site comprises approximately 0.97ha and is currently an undeveloped plateau within the NW area of the existing MIRA Technology Park commercial development.
- 9.2 The site to be developed has no known history of flooding.
- 9.3 The site is in Flood Zone 1 – Low probability as set out in NPPFTG. The proposed commercial development complies with the type of development permitted in NPPFTG, for Flood Zone 1.
- 9.4 A SUDS assessment has been carried out of the site and the ground conditions are not suitable for the use of infiltration. The existing attenuation pond will provide biodiversity and water quality benefits.
- 9.5 Surface water from the development will discharge to the existing site drainage infrastructure constructed in an earlier phase and sized to accommodate the development plot. The balancing pond will attenuate flows to ensure there is no increase in discharge rate downstream.
- 9.6 Pollution prevention features have been incorporated into the strategy to protect the drainage system and wider environment.
- 9.7 Foul drainage from the plot will discharge to the existing internal site foul infrastructure and will discharge via both pumped and gravity systems to the public sewer to the SW of the wider site. Capacity has been confirmed in earlier feasibility investigations.
- 9.8 Flood risk to the site from all sources has been assessed and no unacceptable flood risks have been identified.
- 9.9 There will always be a residual risk of overland flooding if the surface water drains are not maintained or an exceedance event occurs. The development will complete a normal maintenance regime to ensure that on site drainage is adequately maintained for the life time of the development and overland flow routes will be retained.
- 9.10 It is clear from the information provided above that the proposed development can be accomplished without presenting an unacceptable flood risk to occupiers, without increasing flood risk elsewhere and without detriment to the existing drainage infrastructure

Appendix A

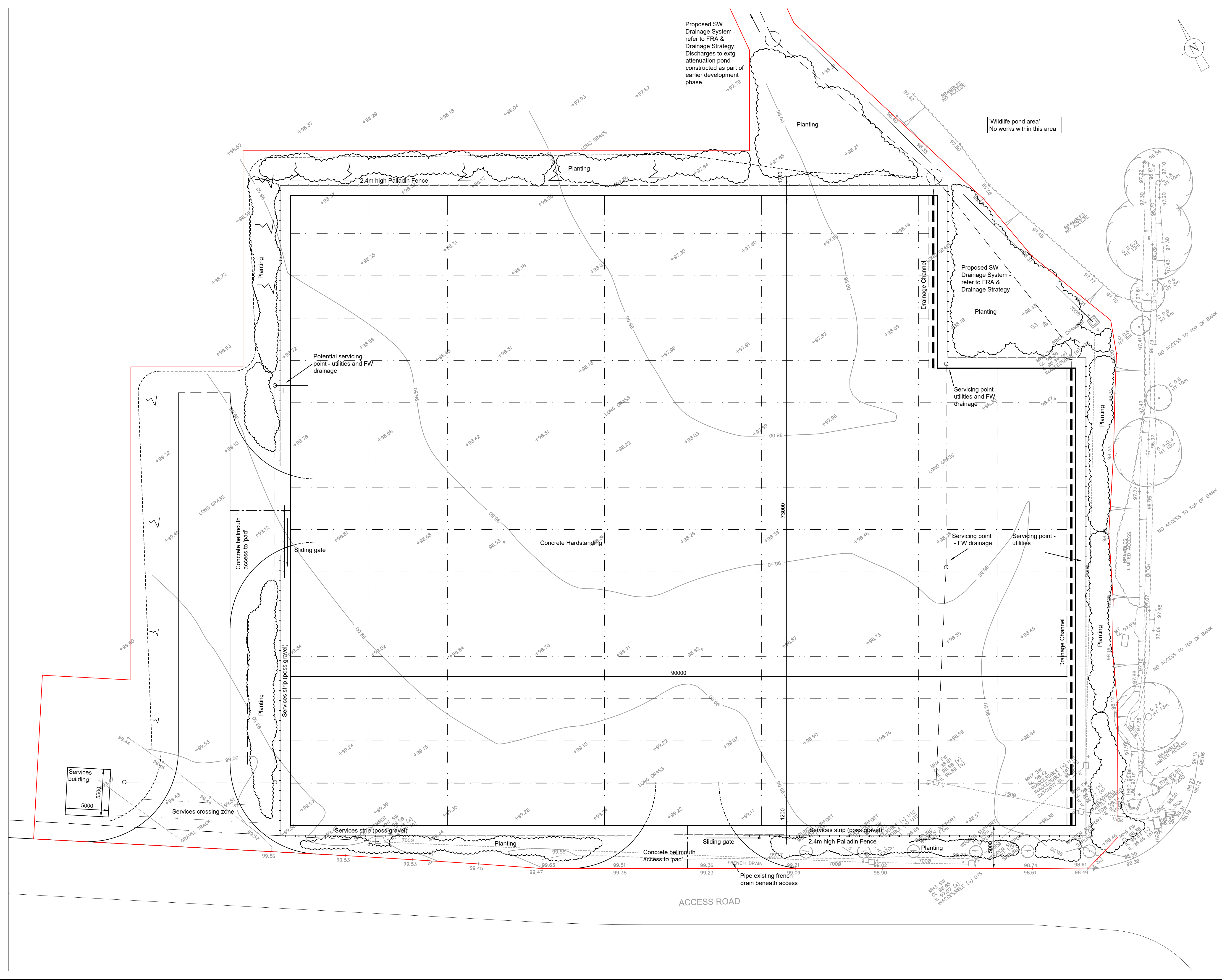
Location Plans



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NOTES			
Refer also to Drawings			
No	Description	Date	By
Revisions to this Drawing			
Dn:	BPK	Date: 06/07/2023	Chk: MB
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Client			
Horiba - MIRA			
Project			
Multi-Use Pad			
Dwg. Title			
Site Location Plan			
Scales @ A3		Drawing No.	Rev
1/2500		7045-XX-MW08-XX-DR-X01	P1
Status		PRELIMINARY	

Appendix B

Proposed Site Plan



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NOTES

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Tel: 01533 440024 Web: www.bcal.co.uk

Client

Horiba - MIRA

Project

NW8
Multi-Use Pad

Dwg. Title

General Arrangement

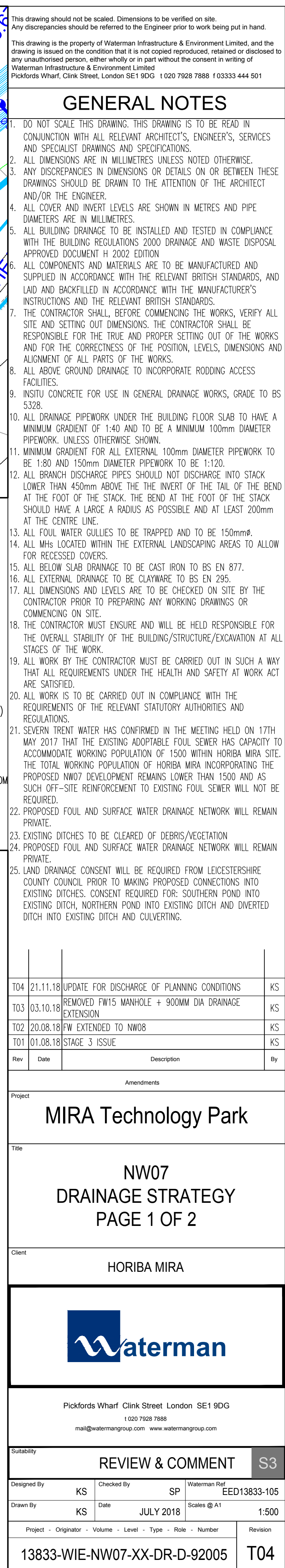
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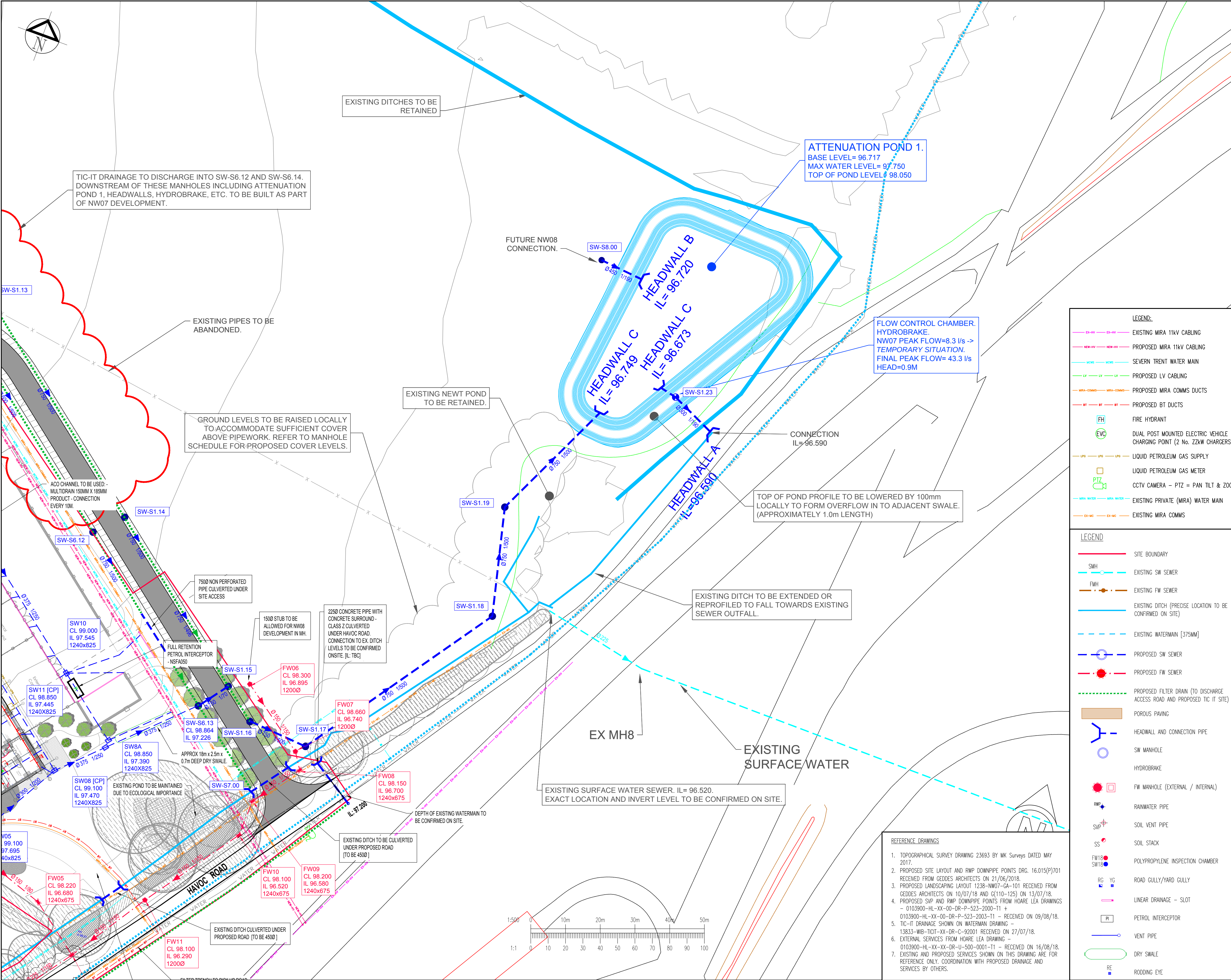
Status

PRELIMINARY

Appendix C

Existing Road/Drainage Infrastructure and Plateau





This drawing should not be scaled. Dimensions to be verified on site.
Any discrepancies should be referred to the Engineer prior to work being put in hand.

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GENERAL NOTES

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 - ANY DISCREPANCIES IN DIMENSIONS OR DETAILS ON OR BETWEEN THESE DRAWINGS SHOULD BE DRAWN TO THE ATTENTION OF THE ARCHITECT AND/OR THE ENGINEER.
 - ALL COVER AND INVERT LEVELS ARE SHOWN IN METRES AND PIPE DIAMETERS ARE IN MILLIMETRES.
 - ALL BUILDING DRAINAGE TO BE INSTALLED AND TESTED IN COMPLIANCE WITH THE BUILDING REGULATIONS 2000 DRAINAGE AND WASTE DISPOSAL APPROVED DOCUMENT H 2002 EDITION
 - ALL COMPONENTS AND MATERIALS ARE TO BE MANUFACTURED AND SUPPLIED IN ACCORDANCE WITH THE RELEVANT BRITISH STANDARDS, AND LAID AND BACKFILLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS AND THE RELEVANT BRITISH STANDARDS.
 - THE CONTRACTOR SHALL, BEFORE COMMENCING THE WORKS, VERIFY ALL SITE AND SETTING OUT DIMENSIONS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE TRUE AND PROPER SETTING OUT OF THE WORKS AND FOR THE CORRECTNESS OF THE POSITION, LEVELS, DIMENSIONS AND ALIGNMENT OF ALL PARTS OF THE WORKS.
 - ALL ABOVE GROUND DRAINAGE TO INCORPORATE RODDING ACCESS FACILITIES.
 - INSITU CONCRETE FOR USE IN GENERAL DRAINAGE WORKS, GRADE TO BS 5328.
 - ALL DRAINAGE PIPEWORK UNDER THE BUILDING FLOOR SLAB TO HAVE A MINIMUM GRADIENT OF 1:40 AND TO BE A MINIMUM 100mm DIAMETER PIPEWORK, UNLESS OTHERWISE SHOWN.
 - MINIMUM GRADIENT FOR ALL EXTERNAL 100mm DIAMETER PIPEWORK TO BE 1:80 AND 150mm DIAMETER PIPEWORK TO BE 1:120.
 - ALL BRANCH DISCHARGE PIPES SHOULD NOT DISCHARGE INTO STACK LOWER THAN 450mm ABOVE THE INVERT OF THE TAIL OF THE BEND AT THE FOOT OF THE STACK. THE BEND AT THE FOOT OF THE STACK SHOULD HAVE A LARGE A RADIUS AS POSSIBLE AND AT LEAST 200mm AT THE CENTRE LINE.
 - ALL FOUL WATER GULLIES TO BE TRAPPED AND TO BE 150mmØ.
 - ALL MHS LOCATED WITHIN THE EXTERNAL LANDSCAPING AREAS TO ALLOW FOR RECESSED COVERS.
 - ALL BELOW SLAB DRAINAGE TO BE CAST IRON TO BS EN 877.
 - ALL EXTERNAL DRAINAGE TO BE CLAYWARE TO BS EN 295.
 - ALL DIMENSIONS AND LEVELS ARE TO BE CHECKED ON SITE BY THE CONTRACTOR PRIOR TO PREPARING ANY WORKING DRAWINGS OR COMMENCING ON SITE.
 - THE CONTRACTOR MUST ENSURE AND WILL BE HELD RESPONSIBLE FOR THE OVERALL STABILITY OF THE BUILDING/STRUCTURE/EXCAVATION AT ALL STAGES OF THE WORK.
 - ALL WORK BY THE CONTRACTOR MUST BE CARRIED OUT IN SUCH A WAY THAT ALL REQUIREMENTS UNDER THE HEALTH AND SAFETY AT WORK ACT ARE SATISFIED.
 - ALL WORK IS TO BE CARRIED OUT IN COMPLIANCE WITH THE REQUIREMENTS OF THE RELEVANT STATUTORY AUTHORITIES AND REGULATIONS.
 - SEVERN TRENT WATER HAS CONFIRMED IN THE MEETING HELD ON 17TH MAY 2017 THAT THE EXISTING ADAPTABLE FOUL SEWER HAS CAPACITY TO ACCOMMODATE WORKING POPULATION OF 1500 WITHIN HORIBA MIRA SITE. THE TOTAL WORKING POPULATION OF HORIBA MIRA INCORPORATING THE PROPOSED NW07 DEVELOPMENT REMAINS LOWER THAN 1500 AND AS SUCH OFF-SITE REINFORCEMENT TO EXISTING FOUL SEWER WILL NOT BE REQUIRED.
 - PROPOSED FOUL AND SURFACE WATER DRAINAGE NETWORK WILL REMAIN PRIVATE.
 - EXISTING DITCHES TO BE CLEARED OF DEBRIS/VEGETATION
 - LAND DRAINAGE CONSENT WILL BE REQUIRED FROM LEICESTERSHIRE COUNTY COUNCIL PRIOR TO MAKING PROPOSED CONNECTIONS INTO EXISTING DITCHES. CONSENT REQUIRED FOR: SOUTHERN POND INTO EXISTING DITCH, NORTHERN POND INTO EXISTING DITCH AND DIVERTED DITCH INTO EXISTING DITCH AND CULVERTING.
 - ATTENUATION PONDS AND FILTER DRAINS ARE TO BE LINED WITH IMPERMEABLE MEMBRANE IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATION. ATTENUATION VOLUMES ARE PROVIDED FOR REFERENCE AND COORDINATION PURPOSES ONLY AND ARE SUBJECT TO DESIGN DEVELOPMENT.
 - GROUND RAISING WILL BE REQUIRED TO LOCALISED LANDSCAPED AREAS (AS INDICATED ON THE DRAWING) IN ORDER TO PROVIDE SUFFICIENT COVER ABOVE PIPEWORK.
- | Rev | Date | Description | By |
|-----|----------|--|----|
| T04 | 21.11.18 | UPDATED FOR DISCHARGE OF PLANNING CONDITIONS | KS |
| T03 | 31.08.18 | UPDATED LOCATION | KS |
| T02 | 20.08.18 | FW EXTENDED TO NW08 | KS |
| T01 | 01.08.18 | STAGE 3 ISSUE | KS |

LEGEND:

- EX-HV - EX-HV - EX-HV EXISTING MIRA 11kV CABLING
- NEW-HV - NEW-HV - NEW-HV PROPOSED MIRA 11kV CABLING
- MOWS - MOWS - MOWS SEVERN TRENT WATER MAIN
- LV - LV - LV PROPOSED LV CABLING
- MIRA-COMMS - MIRA-COMMS - MIRA-COMMS PROPOSED MIRA COMMS DUCTS
- BT - BT - BT PROPOSED BT DUCTS
- FH FIRE HYDRANT
- EVC DUAL POST MOUNTED ELECTRIC VEHICLE CHARGING POINT (2 No. ZZW CHARGERS)
- LPG - LPG - LPG LIQUID PETROLEUM GAS SUPPLY
- LPG LIQUID PETROLEUM GAS METER
- PTZ CCTV CAMERA - PTZ = PAN TILT & ZOOM
- MIRA-WATER - MIRA-WATER - MIRA-WATER EXISTING PRIVATE (MIRA) WATER MAIN
- EX-MC - EX-MC - EX-MC EXISTING MIRA COMMS

LEGEND

- SITE BOUNDARY
- SMH EXISTING SW SEWER
- FWH EXISTING FW SEWER
- EXISTING DITCH (PRECISE LOCATION TO BE CONFIRMED ON SITE)
- EXISTING WATERMAIN [375MM]
- PROPOSED SW SEWER
- PROPOSED FW SEWER
- PROPOSED FILTER DRAIN (TO DISCHARGE ACCESS ROAD AND PROPOSED TIC IT SITE)
- POROUS PAVING
- HEADWALL AND CONNECTION PIPE
- SW MANHOLE
- HYDROBRAKE
- FW MANHOLE (EXTERNAL / INTERNAL)
- RWP RAINWATER PIPE
- SVP SOIL VENT PIPE
- SS SOIL STACK
- FW18/SW18 POLYPROPYLENE INSPECTION CHAMBER
- RG YG ROAD GULLY/YARD GULLY
- LINEAR DRAINAGE - SLOT
- PETROL INTERCEPTOR
- VENT PIPE
- DRY SWALE
- RODDING EYE

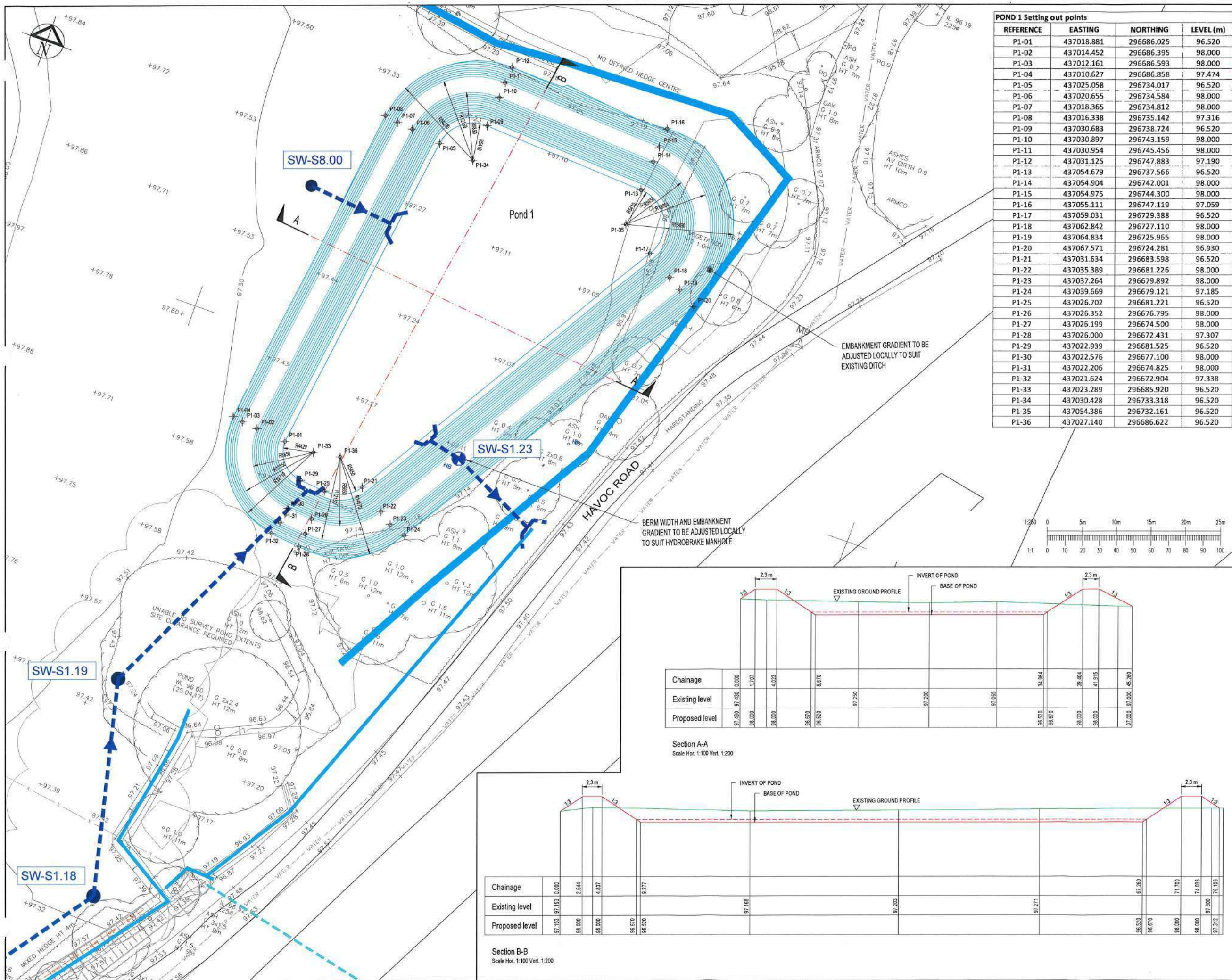
- REFERENCE DRAWINGS
- TOPOGRAPHICAL SURVEY DRAWING 23693 BY MK Surveys DATED MAY 2017.
 - PROPOSED SITE LAYOUT AND RWP DOWNPIPE POINTS DRG. 16.015(P)701 RECEIVED FROM GEDDES ARCHITECTS ON 21/06/2018.
 - PROPOSED LANDSCAPING LAYOUT 1238-NW07-GA-101 RECEIVED FROM GEDDES ARCHITECTS ON 10/07/18 AND G(110-125) ON 13/07/18.
 - PROPOSED SVP AND RWP DOWNPIPE POINTS FROM HOARE LEA DRAWINGS - 0103900-HL-XX-00-DR-P-523-2000-T1 + 0103900-HL-XX-00-DR-P-523-2003-T1 - RECEIVED ON 09/08/18.
 - 13833-WIB-TICIT-XX-DR-C-92001 RECEIVED ON 27/07/18.
 - EXTERNAL SERVICES FROM HOARE LEA DRAWING - 0103900-HL-XX-XX-DR-U-500-0001-T1 - RECEIVED ON 16/08/18.
 - EXISTING AND PROPOSED SERVICES SHOWN ON THIS DRAWING ARE FOR REFERENCE ONLY. COORDINATION WITH PROPOSED DRAINAGE AND SERVICES BY OTHERS.

Amendments

Project	MIRA Technology Park		
Title	NW07 DRAINAGE STRATEGY PAGE 2 OF 2		
Client	HORIBA MIRA		

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mail@watermangroup.com www.watermangroup.com

Suitability		TENDER		D2
Designed By	KS	Checked By	SP	Waterman Ref
Drawn By	KS	Date	JULY 2018	EED13833-105
Project - Originator - Volume - Level - Type - Role - Number				Revision
13833-WIE-NW07-XX-DR-D-92006				T04



POND 1 Setting out points			
REFERENCE	EASTING	NORTHING	LEVEL (m)
P1-01	437018.881	296686.025	96.520
P1-02	437014.452	296686.395	98.000
P1-03	437012.161	296686.593	98.000
P1-04	437010.627	296686.858	97.474
P1-05	437025.058	296734.017	96.520
P1-06	437020.655	296734.584	98.000
P1-07	437018.365	296743.812	98.000
P1-08	437016.338	296735.142	97.316
P1-09	437030.683	296738.724	96.520
P1-10	437030.897	296743.159	98.000
P1-11	437030.954	296745.456	98.000
P1-12	437031.125	296747.883	97.190
P1-13	437054.679	296737.566	96.520
P1-14	437054.904	296742.001	98.000
P1-15	437054.975	296744.300	98.000
P1-16	437055.111	296747.119	97.059
P1-17	437059.031	296729.388	96.520
P1-18	437062.842	296727.110	98.000
P1-19	437064.834	296725.965	98.000
P1-20	437067.571	296724.281	96.930
P1-21	437031.634	296683.598	96.520
P1-22	437035.389	296681.226	98.000
P1-23	437037.264	296679.892	98.000
P1-24	437039.669	296679.121	97.185
P1-25	437026.702	296681.221	96.520
P1-26	437026.352	296676.795	98.000
P1-27	437026.199	296674.500	98.000
P1-28	437026.000	296672.431	97.307
P1-29	437022.939	296681.525	96.520
P1-30	437022.576	296677.100	98.000
P1-31	437022.206	296674.825	98.000
P1-32	437021.624	296672.904	97.338
P1-33	437023.289	296685.920	96.520
P1-34	437030.428	296733.318	96.520
P1-35	437054.386	296732.161	96.520
P1-36	437027.140	296686.622	96.520

This drawing should not be scaled. Dimensions to be verified on site. Any discrepancies should be referred to the Engineer prior to work being put in hand.

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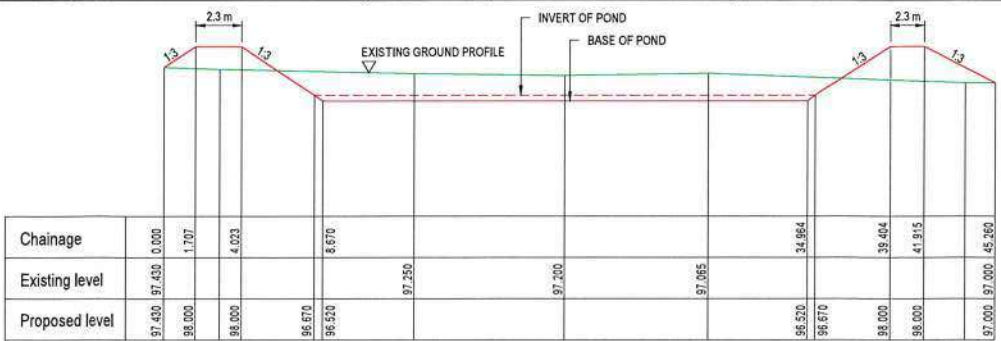
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- BASE OF POND TO REMAIN 150mm DEEPER THAN INVERT OF OUTGOING PIPE TO ALLOW DEBRIS TO BE SETTLED AT THE BASE OF THE POND.
- COORDINATES ARE GIVEN FOR REFERENCE ONLY. PRECISE ALIGNMENT OF POND TO BE DETERMINED ON SITE CONSIDERING EXISTING DITCHES.
- FOR EXTERNAL SERVICES REFER TO DRAWING 0103900-HL-XX-XX-DR-U-500-0001-T1 FROM HOARE LEA.
- DRAWING TO BE READ IN CONJUNCTION WITH DRAINAGE LAYOUTS 13833-WIE-NW07-XX-DR-C-92001, 13833-WIE-NW07-XX-DR-D-92005 & 92006 AND OTHER ENGINEERING AND ARCHITECTS DRAWINGS.

REFERENCE DRAWINGS

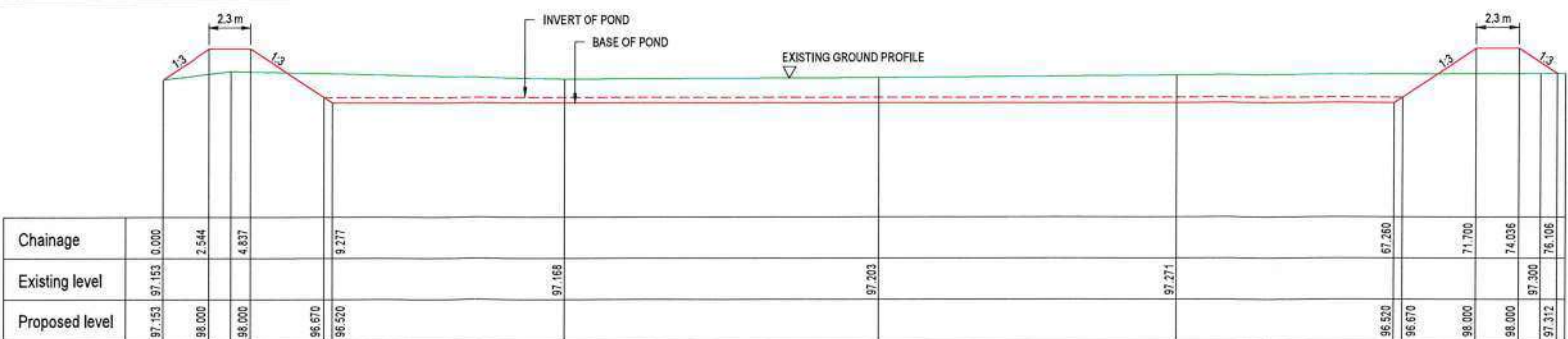
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- EXTERNAL SERVICES FROM HOARE LEA DRAWING - 0103900-HL-XX-XX-DR-U-500-0001-T1 - RECEIVED ON 16/08/18.

LEGEND

- EXISTING DITCH (PRECISE LOCATION TO BE CONFIRMED ON SITE)
- EXISTING WATERMAIN [375MM]
- PROPOSED SW SEWER
- HEADWALL AND CONNECTION PIPE
- SW MANHOLE



Section A-A
Scale Hor. 1:100 Vert. 1:200



Section B-B
Scale Hor. 1:100 Vert. 1:200

Rev	Date	Description	By
F01	04.09.19	FINAL CONSTRUCTION - AS PER EMAIL RECEIVED 3/09/19 BY SALV MARTELLO AT B+K CONSTRUCTION THAT WORKS HAVE BEEN INSTALLED AS PER THE CONSTRUCTION ISSUE DRAWINGS.	KS
001	30.11.18	CONSTRUCTION ISSUE	SDH

Amendments

MIRA Technology Park

NW07 POND 1 SETTING OUT

Client: **HORIBA MIRA**

Waterman

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mail@watermangroup.com www.watermangroup.com

Subsidiary: **MANUFACTURE/PROCUREMENT** D4

Designed By: KS Checked By: SP Waterman Ref: EED13833-105
Drawn By: KS Date: JULY 2018 Scale: @ A1 1:250

Project - Originator - Volume - Level - Type - Role - Number

13833-WIE-NW07-XX-DR-D-92030 F01

Appendix D

Existing Topographic Surveys

Appendix E

Environment Agency Indicative Flood Map for Planning

Contains Environment Agency information © Environment Agency and database right

Flood map for planning

Your reference
7045 MIRA NW8

Location (easting/northing)
436929/296664

Created
13 Jul 2023 16:08

Your selected location is in flood zone 1, an area with a low probability of flooding.

You will need to do a flood risk assessment if your site is **any of the following:**

- bigger than 1 hectare (ha)
- In an area with critical drainage problems as notified by the Environment Agency
- identified as being at increased flood risk in future by the local authority's strategic flood risk assessment
- at risk from other sources of flooding (such as surface water or reservoirs) and its development would increase the vulnerability of its use (such as constructing an office on an undeveloped site or converting a shop to a dwelling)

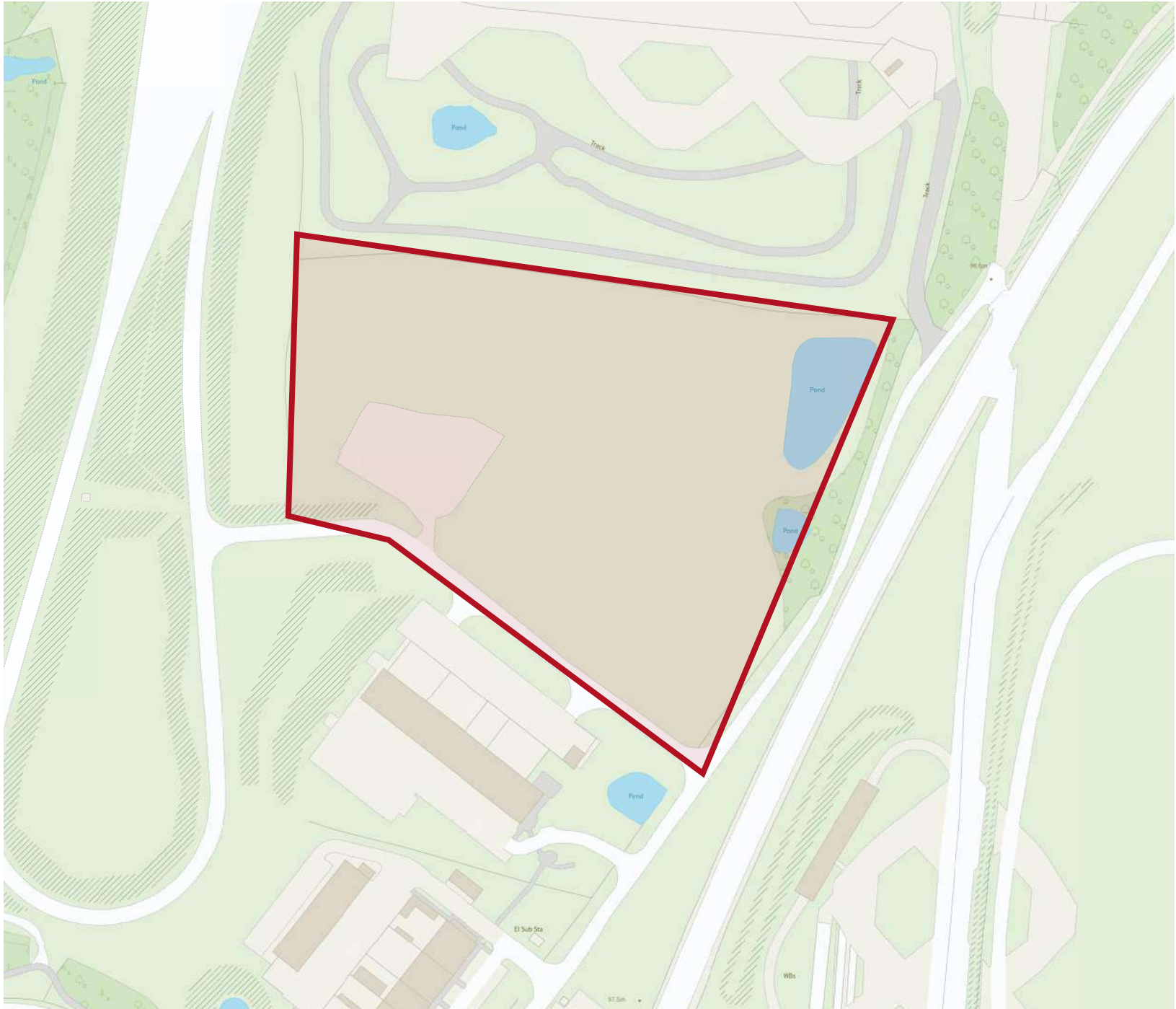
Notes

The flood map for planning shows river and sea flooding data only. It doesn't include other sources of flooding. It is for use in development planning and flood risk assessments.

This information relates to the selected location and is not specific to any property within it. The map is updated regularly and is correct at the time of printing.

Flood risk data is covered by the Open Government Licence **which** sets out the terms and conditions for using government data. <https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/>

Use of the address and mapping data is subject to Ordnance Survey public viewing terms under Crown copyright and database rights 2022 OS 100024198. <https://flood-map-for-planning.service.gov.uk/os-terms>



7045 MIRA NW8

436929/296664

1:2500

13 Jul 2023 16:08



Appendix F

Geotechnical Information

GROUND INVESTIGATION REPORT

PROPOSED DEVELOPMENT:

NW7 PLOT, MIRA TECHNOLOGY PARK, NUNEATON CV10 0TU



Client: SWANVALE DEVELOPMENTS LTD
6 Denne Close
Stratford upon Avon
Warwickshire
CV37 6XL

Consultants: WATERMAN STRUCTURES LTD
Pickfords Wharf, Clink Street,
London SE1 9DG

Report ref: 9925B/KOG/OT

Date: 02 August 2018 (Rev 0)

GROUND INVESTIGATION REPORT

PROPOSED DEVELOPMENT:

NW7 PLOT, MIRA TECHNOLOGY PARK, NUNEATON CV10 0TU

DOCUMENT ISSUE STATUS:

Issue	Date	Description	Author	Checked / approved
Rev 0	02 August 2018	First issue DRAFT	Keith Gibbs BSc, MSc, FGS	Opher Tolkovsky BSc, DIC MSc, FGS, CGeol

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General Information, Limitations and Exceptions

APPENDIX

Fieldwork, in-situ testing and monitoring

- ✚ Foreword
- ✚ Dynamic sampler borehole records
- ✚ Standard Penetration Test results
- ✚ SPT hammer calibration certificate
- ✚ Trial pit records
- ✚ CBR test results
- ✚ TRL test results

Laboratory testing

- ✚ Index property testing
- ✚ Plasticity charts
- ✚ Sulphate/pH suites

Ground profiles

- ✚ Graph of moisture content versus depth
- ✚ Graph of hand vane versus depth

Plans and drawings

- ✚ Proposed development plans
- ✚ Site Plan
- ✚ Location maps

1.0 INTRODUCTION

Consideration is being given to the construction of a new training and workshop building and associated external service areas within the designated NW7 plot of the MIRA Technology Park.

In connection with the proposed works, Soil Consultants Ltd (SCL) was commissioned by the Engineer (Waterman Structures Ltd) on behalf of the Client (Swanvale Developments Ltd) to carry out a Geotechnical investigation.

A Phase 1 Geotechnical desk study has been previously published in 2017 (Ref 9925A/JW/KOG), whilst a separate environmental assessment is being carried out by Waterman Infrastructure and Environment. These separate reports should be consulted in conjunction with this document.

This report includes the following:

-  Identification of ground/groundwater condition
-  Geotechnical assessment for the design of foundations, floor slabs and hardstanding/road pavement.

2.0 SITE DESCRIPTION

Located within the grounds of the MIRA Technology Park, Plot NW7 forms the southern part of a larger undeveloped field with its centre at approximate NGR 436850E 296550N. The site is roughly rectangular in shape with overall dimensions of about 60m x 150m.

At the time of our investigation, the southern boundary of the site was marked by a hawthorn hedge which separates the site from an adjacent workshop and training facility. The northern and western site perimeters were unmarked by any physical feature. Along the eastern boundary was a dense screen of mature deciduous trees (including oak, ash and sycamore) together with a small ditch (dry at the time of our fieldwork) which contained a small pond. Beyond the tree-lined boundary was an existing access road (Havoc Road) of the technology park and the main test track area beyond.

The ground surface of the site was mainly grassed and sensibly flat. The Architects Site Plan which shows the proposed scheme outline (Ref.16.015 (P) 701) indicates a shallow slope is present, with ground levels falling from about +100.5mOD along the western side to about +98.0mOD along the eastern side.

3.0 EXPLORATORY WORK AND LABORATORY TESTING

The ground investigation was carried out on the 4th and 5th July 2018. The work comprised the following elements.

3.1 Trial pits

Eleven trial pits (TP1 to TP11) were machine excavated to depths of up to 1.50m below ground level at locations specified by the Engineer to provide an assessment of the ground conditions, facilitate CBR testing (see below) and to obtain samples for geotechnical and environmental testing.

3.2 Dynamic sampler boreholes

Four boreholes (BH1 to BH4) were completed using tracked drilling equipment under the supervision of an experienced geotechnical engineer. In situ Standard Penetration Tests (SPT) and hand shear vane/pocket penetrometer strength tests were carried out at regular intervals and where appropriate. Representative soil samples were taken for geotechnical and environmental testing. Monitoring pipes (35mm ID) were installed in two of the boreholes upon their completion. The hammer Energy Ratio (E_r) for the equipment used was 69%; the relevant test certificate is appended.

3.3 In-situ CBR testing

California Bearing ratio (CBR) testing to provide data for pavement design was undertaken at eleven locations (CBR1 to CBR11) at the trial pit locations, as specified by the Engineer. The testing was carried out with plunger type CBR testing apparatus and supplemented with a TRL dynamic cone penetrometer (DCP).

3.4 Geotechnical laboratory testing

The following geotechnical/chemical laboratory testing was completed:

-  Moisture content determinations
-  Index properties tests (Atterberg Limits)
-  Soluble sulphate/sulphur/pH analyses (tested by DETS Ltd)

The borehole and trial pit records along with the in-situ and laboratory test results are included in the Appendix.

4.0 GROUND CONDITIONS

Published BGS information (1:50,000 and 1:10,000 scale maps) indicates that the site is directly underlain by superficial Glacial deposits (Bosworth Clay and Thrussington Member – Diamicton) overlying the Mercia Mudstone bedrock. Below a surface layer of topsoil/formerly cultivated soil this anticipated sequence was confirmed. The sequence met is summarised as follows with more detailed descriptions presented on the borehole and trial pit records in the Appendix.

Stratum	Depth to base	Thickness
Topsoil/cultivated layer/made ground	Varies between 0.30m and 0.60m	Up to 0.60m
Glacial clay (undisturbed)	Varies between 0.30m and 1.60m	Up to 1.30m
Mercia Mudstone	4.50 maximum reached (base not met)	>3.50m

4.1 Topsoil/Cultivated soil/Made ground

A surface layer of topsoil was noted in all of the exploratory locations attaining a thickness of between 0.10m and 0.15m. In BH4, a layer of made ground comprising silty clay with some ash pockets was noted to a depth of 0.60m.

4.2 Glacial clay

Met below the topsoil (and the local made ground in BH4) in all of the boreholes and trial pits to depths ranging from 0.90m to 1.60m below ground level, these natural superficial soils generally comprised orange brown, yellow brown and light grey mottled slightly sandy silty clay containing occasional coarse rounded sandstone and siltstone gravel and cobbles. Occasional bands and lenses of clayey sand were also noted as in TP7 between 0.90m and 1.25m depth.

The upper parts of the Glacial clay above say 0.30m to 0.45m may represent a formerly cultivated or ploughed zone and were generally desiccated and friable with a stiff to very stiff consistency. Below this upper layer, the in-situ SPTs and hand vane tests indicated the Glacial clay to be generally of low to medium strength with a firm consistency, but with some variation due to desiccation effects and natural variability; this is discussed in Section 6.1 below.

Atterberg limits tests confirm PI values of between 15% and 38% corresponding to a low to high plasticity (BS 5930) and Low to medium volume change potential according to the NHBC Standards (Chapter 4.1 'Building near trees').

During our fieldwork, no obvious signs of significant desiccation below the seasonal zone described above were noted within the Glacial clay, although some rootlets were occasionally identified. Within the field away from the tree-lined boundaries these roots we assume are largely associated with the surface vegetation.

4.3 Mercia Mudstone Group

The Mercia Mudstone was met in all of the boreholes and trial pits and initially comprised a weathered zone comprising red-brown stained/mottled pale green grey, silty clay which grades with increasing depth into a more obvious thinly or closely bedded structured clay or weathered mudstone. Initially this clay generally had a firm or firm to stiff consistency which became stiff and then very stiff with increasing depth. The clay contained fine to coarse gravel sized fragments of mudstone lithorelicts, which generally increases in proportion with depth. Below about 3.5m depth the effects of weathering were significantly reduced and a more intact very weak mudstone was present. Penetration into this very weak rock layer became impractical and the boreholes were terminated following the SPT test refusals ($N > 50$) at 4m depth.

Atterberg limits tests confirm PI values of between 14% and 29% corresponding to a low to intermediate plasticity clay classification and a low to medium volume change potential. It should be noted that the mudstone lithorelicts within the clay are unavoidably crushed during laboratory preparation and testing and any mitigating effect the presence of this fraction (> 425 micron) would normally have on the on the NHBC classification (i.e. the reduction in the “corrected” PI value) is not therefore represented in our testing results.

During our fieldwork or subsequent laboratory testing no obvious signs of desiccation were noted within the Mercia Mudstone over the area of the proposed building footprint.

4.4 Groundwater

Groundwater was not met in either the boreholes or trial pits during the fieldwork. Groundwater levels can of course vary seasonally and with prevailing weather conditions. Standpipes have been installed in two of the boreholes to allow future monitoring.

4.5 Environmental observations

No obvious olfactory or visual signs of soil contamination were encountered during our fieldwork. Environmental assessment is undertaken by Waterman Infrastructure and Environment, and are reported separately.

5.0 GEOTECHNICAL ASSESSMENT

The proposed scheme is to construct a long, rectangular two storey workshop/office building (approximately 96m long x 17m-23m wide in plan) in the central part of the site, with the long axis trending in an approximate NW to SE direction. The surrounding areas are to form mainly hard standing (car parking and service areas) with some landscaped verges. Part of a new access road (for future development plots to the west) is also to be constructed along the north-eastern boundary.

Our investigation has revealed that beneath the surface layers of topsoil, Glacial clay is present resting upon the Mercia Mudstone Group, the latter of which is present across the site to the full depth investigated (at least 4.5m depth). Groundwater was not encountered during our investigation.

The natural strata are relatively competent and the use of spread foundations to support the structural loads should be feasible for low to moderate loads. The soils are shrinkable, however, and due consideration will need to be given to root action/desiccation effects associated with current and historical vegetation; this is discussed in the following sections.

5.1 Desiccation

This entire site area was formerly part of a cultivated field and there are mature trees along the south-eastern boundary. In the central area of the site, outside the zone of influence of any existing trees, scattered partially decayed roots and rootlets were noted in all of the exploratory locations, mainly up to about 1.00m [locally up to 1.2m/1.3m], which we assume are associated with the existing grass or former vegetation.

Although trees are not considered to be present within an influential distance of the proposed building footprint (>25 to 30m distant), this should be verified at detailed design stage and we recommend that the design of such foundations must, in the first instance, be in accordance with the current version of NHBC Chapter 4.2 "Building near trees" (the industry standard in this respect). The design must also be consistent with the findings of our investigation.

Profiling of the soils using hand shear vane, pocket penetrometer values and moisture contents has been undertaken and graphs showing these variations are included in the Appendix. Using the results of the profiles and taking into account visual observations during the investigation, we assess that the Glacial clay over the whole site generally exhibits an obvious desiccated or 'dried out' and friable near-surface layer up to about 0.45m depth, below which a seasonal zone of moisture deficit can be identified to about 1m below ground level. From our laboratory testing, the shallow soils are classified as medium volume change potential, and the corresponding minimum foundation depths for such soils, required to bypass the zone of seasonal moisture variation (and significant desiccation), given by NHBC, is 0.90m, which is a similar depth to our field observations of significant desiccation.

5.2 Spread foundations

Foundations designed to support the new building should bypass the topsoil/made ground and extend into either the Glacial clay or the Mercia Mudstone.

A minimum foundation depth of 0.90m is required by NHBC for medium volume-change-potential clays, to account for seasonal variations in moisture content (in areas not affected by vegetation).

At the time of compilation of our report, foundations loads were unknown. Given the two-storey office workshop design of the proposed structure, the potential loads are unlikely to be relatively high.

For preliminary assessment of the feasibility and sizing of foundations, we envisage that a bearing resistance of 100kN/m² would be achievable within the Glacial clay at a minimum depth of 0.90m. For foundations extended to wholly found within the Mercia Mudstone clay at depths of below 1.50m, our boreholes indicate that a bearing pressure of up to 125kN/m² may be adopted increasing to 175kN/m² at 2.00m depth. These pressures would be applicable to moderate sized strip or pad foundations, say up to 2.0m width. As required by EC7, the design engineer must ensure that the correct comparisons are made between Design Actions and Design Resistances after the application of appropriate partial factors and using the final base geometry. For ULS design, both drained and undrained bearing resistances should be determined to calculate the degree of utilisation of the foundation (limit state GEO). SLS checks should be carried out using appropriate methods in accordance with current practice.

We recommend that all foundation excavations are inspected prior to concrete pour and additional local deepening undertaken if soft or desiccated clay soil/disturbed/root-infested soils are identified. The formation must be kept dry and blinded (or concrete poured) immediately following excavation to avoid deterioration/softening/drying out.

Foundation/service trenches should generally remain stable for a short period but may require support to prevent potential localised instability and also where personnel entry is required. Based on our observations, although groundwater control measures are unlikely to be necessary, there is a risk of water seepages associated with sandy lenses with the Glacial clay and some allowance for protection of the formation should be made. Standpipes have been installed and it is recommended that these are monitored to verify water levels prior to the excavation for foundations.

5.3 Floor slabs

The proposed building is remote from the presence of trees (nearest being those along the south-eastern boundary between about 25m and 30m distant from the north-eastern corner of the proposed building). Near surface layers of friable topsoil with roots were noted in our boreholes. These roots we attribute to the existing mixed grasses and shrubs present over the proposed building footprint.

NHBC guidance requires the use of suspended slabs incorporating a void or void former below the underside of the slab and supporting beams where ground floor construction is undertaken when surface soils are desiccated (i.e. during summer and autumn). Outside these times of year, the floor slab, although supported by the foundations, may be cast directly upon the natural ground following removal of any topsoil and made ground.

The use of suspended/voided floor slabs is not considered to be feasible with this type of development. Therefore if a direct bearing floor slab is to be constructed during the summer and autumn months, some additional preparation of the formation will be required. An alternative approach which would be in accordance with NHBC standards, would be to replace the seasonally root affected soil with compacted granular fill, or treatment with lime/cement stabilisation (subject to specialist advice).

We understand the current proposals assume a ground bearing concrete floor slab with a design live loading of say 37.5kN/m². To ensure that any potentially desiccated topsoil, made ground or clay is removed below this slab an excavation depth of 0.90m below existing ground level has been specified by the Engineer. This soil will be replaced with suitably engineered Type 1 granular fill upon which the floor slab will be formed. In any event we recommend that the formation is carefully inspected and any identified areas of root infested/desiccated clays or low strength clays are removed/replaced with compacted granular fill.

5.4 Soakaways

Given the presence of relatively impermeable Glacial clay and Mercia Mudstone beneath the site, we do not anticipate that traditional soakaways would be a practicable option at this site for the discharge surface water.

5.5 Road pavement design

New external hard standing is to be constructed. Although the results of the in situ plunger CBR tests and TRL profiling may be used in the first instance for the design of this new surfacing, it should be noted that these tests were largely undertaken within the seasonally affected zone following a prolonged period of dry summer weather, thus higher CBR values were likely obtained compared to those which would be obtained on rewetting.

In this situation and after considering the results of laboratory classification tests therefore, for preliminary design purposes we consider that following suitable preparation, a CBR value of 4% may be adopted for the Glacial clay. Following an initial proof rolling and inspection the preparation should include the

replacement any soft/hard spots with suitably compacted granular fill. It may be prudent to use a flexible paving solution in areas likely to be affected by future ground movement as a result of desiccation and seasonal variations in moisture content through growth of vegetation. Alternatively lime stabilisation techniques could be deployed to treat any upper desiccated zone. We recommend that following the site strip, a programme of validation testing of the formation is undertaken.

5.6 Foundation concrete

Low levels of soluble sulphates were measured in selected soil samples (maximum of 77mg/l) with slightly alkaline to near neutral pH levels. The site characteristic value falls into Site Design Class DS-1 of Table C2 given in BRE Special Digest 1 (2005). We assess the site as having static groundwater (groundwater not met during our fieldwork) and recommend that for preliminary design purposes, buried concrete is designed in accordance with ACEC Site Class AC-1s. This preliminary recommendation should be reviewed following assessment of the results from the samples tested by Waterman Infrastructure and Environment as part of the environmental investigation.

Consideration should also be given to the potential oxidation of pyritic soils. Following the procedure recommended in the BRE digest, the amount of oxidisable sulphides is seen to be <0.3% in all of the samples, suggesting that pyrite is not present and thus no adjustment of the Site Design Class is required.

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APPENDIX

Fieldwork, in-situ testing and monitoring

- ✚ Foreword
- ✚ Dynamic sampler borehole records
- ✚ Standard Penetration Test results
- ✚ SPT hammer calibration certificate
- ✚ Trial pit records
- ✚ CBR test results
- ✚ TRL test results

Laboratory testing

- ✚ Index property testing
- ✚ Plasticity charts
- ✚ Sulphate/pH suites

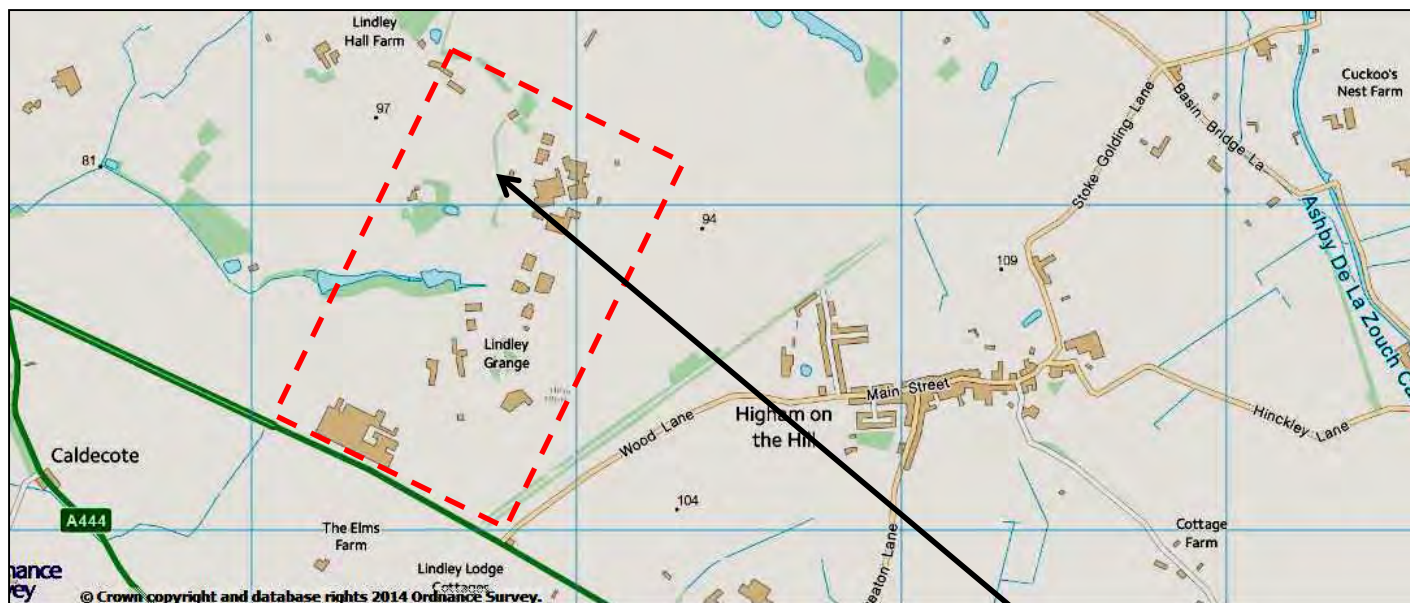
Ground profiles

- ✚ Graph of moisture content versus depth
- ✚ Graph of hand vane versus depth

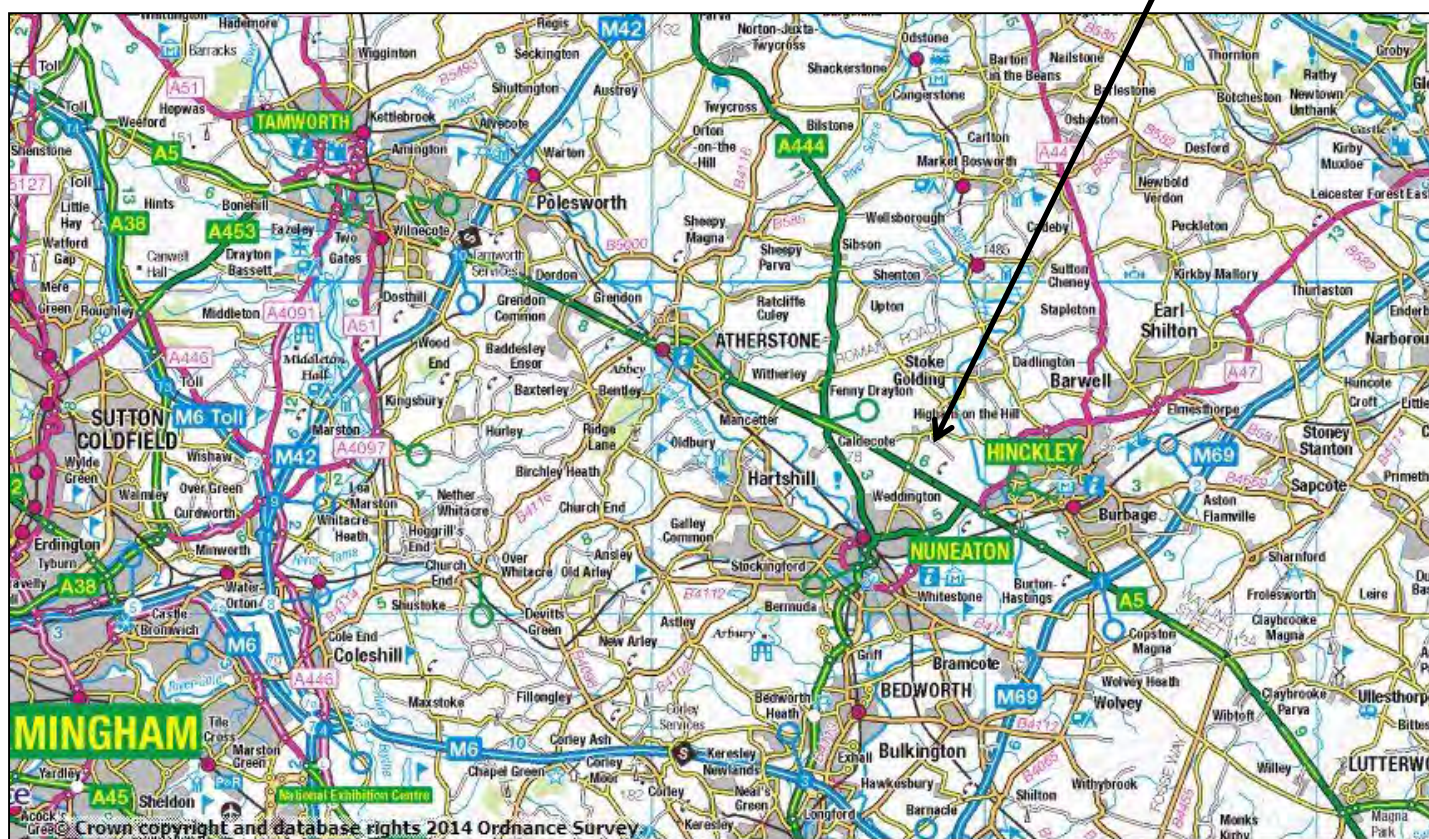
Plans and drawings

- ✚ Proposed development plans
- ✚ Site Plan
- ✚ Location maps

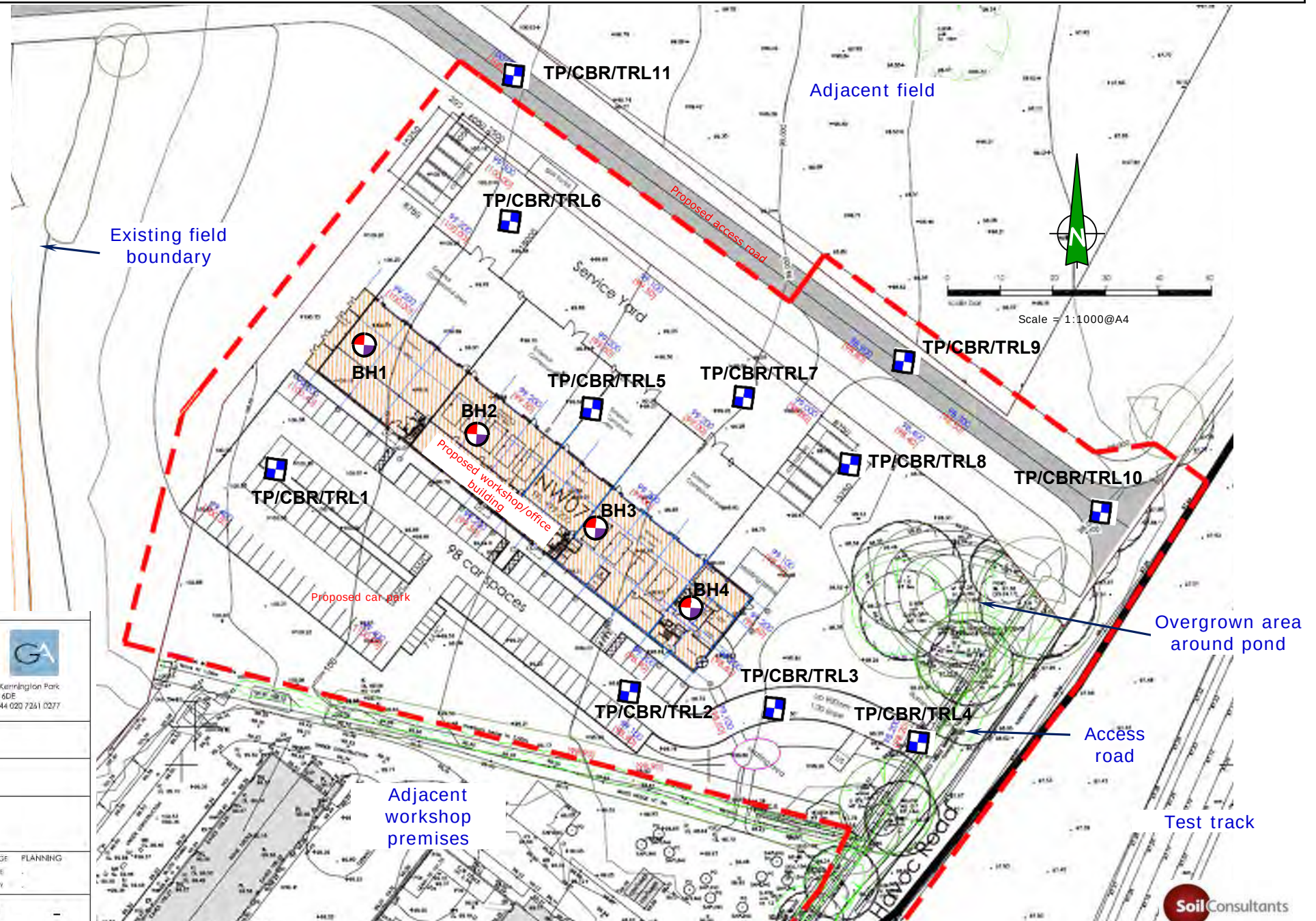
Location Maps



THE SITE



Site Plan (showing proposed development scheme)



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Client: Horiba - Mira Ltd

Project: NW07

Title: SITE PLAN

DATE	20.05.2018	CHECK STAGE	PLANNING
DRAWN	SM	CHECK DATE	
SCALE	1:750 @ A3	CHECKED BY	

16.015 (P)701

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Site & Location: Plot NW7 MIRA Technology Park, Nuneaton, CV10 0TU							Borehole No: BH3		
Client: Swanvale Developments Ltd					Coordinates: 436870E, 296545N		Sheet 1 of 1		
Engineer: Waterman Structures Ltd					Ground Level: +99.20mOD		Report No: 9925B/KOG		
Progress & Observations	Samples & Tests		Field Test Results	Strata		Legend	Strata Descriptions	Backfill / Installation	
	Type	Depth (m)		Depth (m)	Level (m)				
BH commenced: 03/06/18				0.10	99.10		Grass over Topsoil (Desiccated)		
BH diameter 90mm and reducing with depth	PP	0.20	>6.0				Very stiff friable pale yellow brown silty CLAY with occasional rounded siltstone and sandstone gravel (Desiccated former cultivated soil)		
	D	0.30		0.30	98.90				
	PP	0.40	>6.0				Very stiff brown mottled grey slightly sandy silty CLAY with rare rounded siltstone/sandstone gravel. Occasional to many live rootlets. (Desiccated)		
	PID	0.40	0.5						
	D	0.55		0.55	98.65		Stiff red brown mottled light green grey silty CLAY with rare coarse gravel sized mudstone lithorelicts. (Partially desiccated)		
	HV	0.60	90						
	PP	0.60	3.6				Firm becoming firm to stiff red brown mottled light grey silty CLAY with rare coarse gravel sized mudstone lithorelicts		
	D	0.80							
	PP	0.80	4.4						
	PID	0.80	0.3						
	HV	0.85	110	1.00	98.20			1	
	PP	0.95	5.8						
	SPT/S	1.00	N=12						
	D	1.20							
	PP	1.20	5.0						
	PP	1.40	2.5						
	D	1.50							
	PID	1.50	0.4						
	HV	1.60	70						
	PP	1.60	2.8						
	D	1.80							
	HV	1.80	70						
	PP	1.85	5.8						
	SPT/S	2.00	N=26	2.00	97.20		2		
							Stiff becoming very stiff red brown mottled light green grey thinly bedded and fissured silty CLAY with scattered to frequent coarse gravel sized mudstone lithorelicts		
	D	2.20							
	PP	2.20	4.0						
	PP	2.40	2.8						
	D	2.50							
	PID	2.50	0.4						
	PP	2.65	4.4						
D	2.80								
PP	2.90	>6.0							
SPT/S	3.00	N=38	3.00	96.20		3			
						Very stiff red brown mottled light green grey thinly bedded and fissured silty CLAY with scattered to frequent coarse gravel sized mudstone lithorelicts			
D	3.20								
PP	3.20	>6.0							
D	3.50								
PP	3.50	>6.0							
PID	3.50	0.3							
D	3.80								
PP	3.90	>6.0							
SPT/S	4.00	N>50*				4			
BH complete: 03/06/18 BH depth: 4.37m Water depth: dry				4.37	94.83		End of hole at 4.37m		
Key: U = Undisturbed B = Bulk D = Small disturbed W = Water ES = glass jar & plastic tub E = glass jar SPT/S = split spoon SPT/C = solid cone PP = Pocket Penetrometer [kg/cm²] HV = Hand Vane [kPa] PID = Photo Ionisation Detector [ppm - Isobutylene Equivalent, PhoCheck Tiger, 10.6eV lamp] * = full SPT penetration not achieved - see summary sheet							Borehole type: Windowless Sample		
Remarks: Coordinates and ground levels interpolated from Architects plan							Borehole No: BH3		

Site & Location	Plot NW7, MIRA Technology Park, Nuneaton, CV10 0TU		Trial Pit No TP9
Client	Swanvale Developments Ltd	Coords: 436930E, 296580N	Report No. 9925B/KOG
Engineer	Waterman Structures Ltd	Level: +98.5mOD	

Depth (m)	Strata Description	Samples / Tests		
		Depth (m)	Type	Results
GL - 0.15	TOPSOIL			
0.15 - 0.30	Very stiff friable pale orange and yellow brown slightly gravelly silty sandy CLAY with occasional cobbles. Cobbles and fine to coarse gravel are rounded sandstone and siltstone. Containing frequent roots (Former cultivated soil)	0.20	V	>140
0.30 - 1.00	Firm to stiff red brown mottled pale grey slightly gravelly slightly sandy silty CLAY. Gravel is fine to coarse rounded siltstone and sandstone. Containing rootlets	0.50	D V	80
1.00 - 1.50	Firm red brown slightly gravelly slightly sandy silty CLAY. Gravel is fine to coarse rounded siltstone and sandstone. Seams of very sandy clay	1.00	D	60
		1.50	D	

PHOTOGRAPHS OF TRIAL PIT



Date:	4 th July 2018	Groundwater details No groundwater met, dry
Equipment:	Machine excavated	
Stability:	Sides stable during excavation and remained upright	
Remarks	CBR test (plunger and TRL) undertaken at 0.50m	

D = small disturbed sample, B- large/bulk disturbed sample, PID – Headspace screening ppm, HV = hand shear vane test [kPa], pp = pocket penetrometer [kg/cm²]

Site & Location	Plot NW7, MIRA Technology Park, Nuneaton, CV10 0TU		Trial Pit No TP10
Client	Swanvale Developments Ltd	Coords: 436975E, 296550N	Report No. 9925B/KOG
Engineer	Waterman Structures Ltd	Level: +98.0mOD	

Depth (m)	Strata Description	Samples / Tests		
		Depth (m)	Type	Results
GL - 0.10	TOPSOIL			
0.10 - 0.30	Very stiff friable pale orange and yellow brown slightly gravelly silty sandy CLAY with occasional cobbles. Cobbles and fine to coarse gravel are rounded sandstone and siltstone. Containing frequent roots (Former cultivated soil)	0.20	V	>140
0.40 - 1.00		0.50	D V	>140
1.00 - 1.50	Firm red brown mottled pale grey slightly gravelly slightly sandy silty CLAY. Gravel is fine to coarse rounded siltstone and sandstone.	1.00	D V	70
		1.50	D	

PHOTOGRAPHS OF TRIAL PIT



Date:	4 th July 2018	Groundwater details No groundwater met, dry
Equipment:	Machine excavated	
Stability:	Sides stable during excavation and remained upright	
Remarks	CBR test (plunger and TRL) undertaken at 0.50m	

D = small disturbed sample, B- large/bulk disturbed sample, PID – Headspace screening ppm, HV = hand shear vane test [kPa], pp = pocket penetrometer [kg/cm²]

Site & Location	Plot NW7, MIRA Technology Park, Nuneaton, CV10 0TU		Trial Pit No TP11
Client	Swanvale Developments Ltd	Coords: 436850E, 296605N	Report No. 9925B/KOG
Engineer	Waterman Structures Ltd	Level: +100.0mOD	

Depth (m)	Strata Description	Samples / Tests		
		Depth (m)	Type	Results
GL - 0.10	TOPSOIL			
0.10 - 0.30	Very stiff friable pale orange and yellow brown slightly gravelly silty sandy CLAY with occasional cobbles. Cobbles and fine to coarse gravel are rounded sandstone and siltstone. Containing frequent roots (Former cultivated soil)	0.20	V	>140
0.40 - 1.20		0.50 1.00	D D	70
1.20 - 1.50	Firm red brown and pale green grey mottled silty CLAY with occasional thin bands of sand and very weakly cemented siltstone	1.20	V	50
		1.50	D V	60

PHOTOGRAPHS OF TRIAL PIT



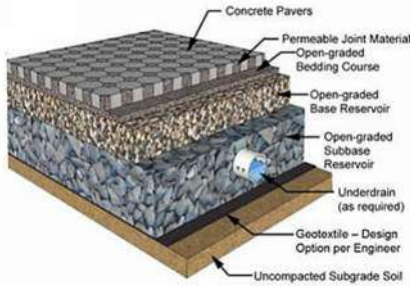
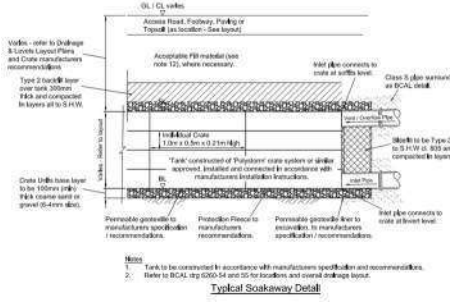
Date:	4 th July 2018	Groundwater details • No groundwater met, dry
Equipment:	Machine excavated	
Stability:	Sides stable during excavation and remained upright	
Remarks	CBR test (plunger and TRL) undertaken at 0.50m	

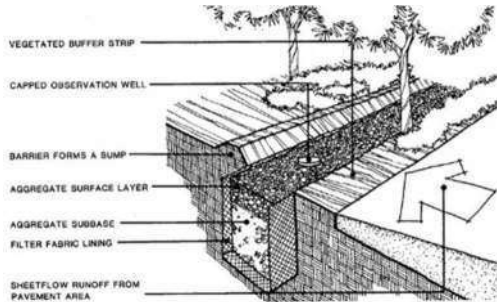
D = small disturbed sample, B- large/bulk disturbed sample, PID – Headspace screening ppm, HV = hand shear vane test [kPa], pp = pocket penetrometer [kg/cm²]

Appendix G

SUDS Assessment

SuDS Category	Feature	Image	Description	Advantages	Disadvantages	Maintenance Requirements	Suitability Assessment
Retention	Balancing Pond		Both attenuation & treatment is provided for stormwater. Runoff for each rain event is retained & treated in the pond. The natural retention time promotes pollutant removal through sedimentation.	• Good natural way of removing pollutants • Can be used where ground water source is potentially vulnerable to contamination • Well received by the community • High ecological and amenity benefits	• Negligible reduction in runoff volumes • Land take up may prohibitively high on confined site • May present a potential health & safety risk for sensitive environments such as schools	• Routine inspection including checking of inlets, outlets, control features & overflows • Litter, silt, sediment & debris removal • Vegetation management including grass cutting, weeding & re-turfing/reseeding • Replacement or repair of inlets	✗ Not a suitable option due to limited space on the development for a pond to be located. Note – ✓ Already available/used in site wide infrastructure
	Subsurface Attenuation Tank		Below ground storage systems can be created using proprietary interlocking modular geocellular products, tanks & oversized drainage pipes.	• Modular & flexible solution terms of buildability • Can offer dual usage – infiltration & storage • High void ratios mean high capacity • High strength capability of modular systems means they can be installed beneath trafficked area	• No inherent water quality treatment • Some proprietary products can be perceived as having limited effective access for maintenance	• Routine inspection including checking of inlets, outlets, control features & overflows • Cleaning requires jetting & suction techniques	✓ Yes, can be effectively utilised on this site in a number of potential locations, whilst maintaining a gravity only surface water drainage system – BUT not needed as POND provided.

	Porous Paving/Hardstanding		Porous paving (tarmac, block paving etc.) with subsurface storage.	• Reduces the rate of runoff • Effective pollutant removal • Contributes to groundwater recharge • Can offer dual usage – infiltration & storage	• Requires appropriate pre-treatment • Porous basins require large, relatively flat areas • Must be offset from building foundations • Not suitable for heavily loaded or heavily trafficked areas.	• Inspect & repair damaged pavements • Clogged or damaged geotextiles need replacement	✗ No, not suitable for this site, loadings and use of pad not suitable.
Infiltration	Trench Basins Dry Swales Soakaway		Surface water runoff from buildings and areas of external landscaping can be discharged directly into the ground via natural infiltration by use of soakaways, granular-filled trenches & basins. Requires ground water levels & ground conditions are both appropriate to receive quality & quantity of water generated.	• Reduces the rate of runoff • Effective pollutant removal • Contributes to groundwater recharge • Simple, cost-effective & natural way to dispose of surface water from the site • Easy performance observation & relatively low maintenance	• Requires appropriate pre-treatment • Must be offset from building foundations • Viability dictated by ground conditions	• Routine inspection including checking of inlets, outlets, control features & overflows • Litter, silt, sediment & debris removal • Vegetation management including trimming roots • Replacement or repair of damaged inlets, outlets, banks & overflows • Clogged or damaged geotextiles need replacement	✗ There is poor infiltration and the presence of existing fill material both of which render the site unsuitable for infiltration.

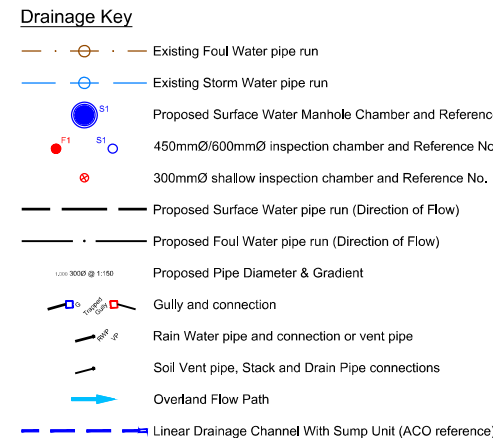
Wetland	Shallow Wetland Extended Detention Wetland Pond Wetland Pocket Wetland Submerged Gravel Wetland Wetland Channel		Wetlands provide natural stormwater attenuation & treatment. They comprise shallow ponds & marshy areas covered in aquatic vegetation. Wetlands detain flows for an extended period, allowing sediments to consolidate & remove contaminants. They can be of significant ecological benefit.	• Good, natural pollutant removal • Lined systems can be used where groundwater is vulnerable • Well received by the community • High ecological and amenity benefits	• Land take up is potentially very high • Little reduction in runoff volumes • Requires baseflow • Requires appropriate pre-treatment • Only really suitable on relatively flat sites	• Routine inspection including checking of inlets, outlets, control features & overflows • Litter, silt, sediment & debris removal • High degree of wetland management including level reinstatement & replacement of topsoil • Replacement or repair of damaged inlets, outlets, banks & overflows	✗ Unsuitable for proposed development due to the limited size of the site with insufficient space for wetlands to be accommodated.
Filtration	Raingarden Filter Swale Bioretention system		Strips of land featuring vegetation designed to accept runoff between a hard-surfaced area and receiving system	• Good, natural pollutant removal • Flexible – can be relatively limited & extensive in size • Modest ecological and amenity benefits • Good retrofit capabilities	• Requires landscape management • Steep sites can be problematic • No significant benefit to attenuation or flow volume reduction	• Routine inspection including checking of inlets, outlets, control features & overflows • Litter, silt, sediment & debris removal • Vegetation management including grass cutting & weeding	✗ Seen as a token gesture towards SuDS & unlikely to offer an effective amount of attenuation to be feasible on this site.
	Filter Trench		Shallow excavations filled with no-fines material that create a temporary subsurface storage or infiltration of stormwater runoff. Receive lateral inflow from adjacent impermeable surface.	• Trenches can be well incorporated into landscaped sites • Good, natural pollutant removal • Modest ecological and amenity benefits	• High clogging potential without effective pre-treatment • Limited to small catchments • High cost of replacing filter material • Natural infiltration option dictated by ground conditions	• Routine inspection including checking of inlets, outlets, control features & overflows • Litter, silt, & debris removal • Veg management including weed control • Replacement of geotextile & filter material	✓ (limited opportunities) This may have a limited role in collecting runoff NE of the building but is unlikely to be a suitable option for most of this site due to the ground conditions,

	Surface Sand Filter Subsurface Sand Filter Perimeter Sand Filter		Structures designed to treat surface water runoff through filtration using a sand bed filter medium. The filters can be designed with or without infiltration. Temporary storage of runoff is achieved through ponding above the filter layer. They are used where particularly high pollutant removal is required.	• Good, natural pollutant removal • Well suited as retrofit in tightly constrained urban locations	• Not for high sediment content • Slow detention times can promote algae growth • Requires min. hydraulic head of 1.2m • High capital & maintenance costs	• Routine inspection including checking of inlets, outlets, control features & overflows • Litter, silt, sediment & debris removal • Vegetation management including grass cutting & weed control • Replacement inlets, outlets & overflows • Level reinstatement	✗ This is unlikely to be a suitable option for this site due to the ground conditions and operational requirements
Conveyance	Conveyance Swales Rills		Formal linear drainage features in which surface water runoff can be stored or conveyed. They can be incorporated with other water features such as ponds & waterfalls.	• Replaces underground pipework • Limited attenuation capacity • Potential for reduction in water volumes via infiltration & plant uptake	• Similar to balancing ponds • Potential trip hazard • Disabled access issues	• Routine inspection including checking of inlets, outlets, control features & overflows • Litter, silt, sediment & debris removal	✗ Not a conducive SUDs feature for this site due to the limited space available.
Source Control	Green Roofs		Multi-layered system that covers the roof of a building with vegetation cover/landscaping over a drainage layer. Designed to intercept and retain precipitation, reducing the volume of runoff & modest attenuation of peak flows.	• Good, natural pollutant removal • Mimics greenfield state of building footprints • Ecological benefits • Benefits to insulation & sound attenuation	• Additional weight not conducive to steep roof inclines • High maintenance of vegetation & roofing system • Additional weight requires additional structural support requirements	• Routine inspection including checking of inlets, outlets, control features & overflows • Litter, silt, sediment & debris removal • Irrigation during establishment • Replacement of topsoil & vegetation	✗ Not suitable – no buildings proposed.

	Blue Roofs	
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Appendix H

Drainage Strategy Drawing



- ## Notes
1. Drawing based on:
 - Current Topographical Survey.
 - Historic Topo Survey Information
 - As Built NW7 & TCT-TI Information
 - OS base information
 2. Drawing prepared for Drainage Strategy only.
 3. An overland flow route is to be provided to ensure excess surface water is routed around buildings.
 4. All private drainage is to be constructed in accordance with the Building Regulations as current at construction.
 5. Side connections to SW to be 1:100 @ 1:100 gradient and to FW to be 1:100 @ 1:40 unless stated otherwise.
 6. Refer to Architect / M&E details for above ground to below ground drainage pipe positions.
 7. All pipes to enter manhole with soffits level.
 8. Maintenance: Sewers, manholes, drainage channels and silt pits should be inspected at 6 monthly intervals and cleaned out at 12 monthly intervals or as necessary. A full CCTV survey should also be carried out at 10 yearly intervals. Refer also to specialist drainage channel and petro interceptor manufacturer's information and maintenance requirements. In all instances, inspection and cleaning should be carried out only by a specialist contractor and in accordance with the guidelines given in "Safe Working in Sewers and at Sewage Works" published by National Joint Health and Safety Committee for the Water Services.

Refer also to Drawings

No	Description	Date	By	Chk
Revisions to this Drawing				
Dwn: BK	Date: July 2023	Chk: MB		



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Tel: 01933 440024 Web: www.bcal.co.uk

Client

HORIBA MIRA Ltd

Project

NW8
Multi-Use Pad

Dwg. Title

Drainage Strategy

Scales @ A1	Drawing No.	Rev
-------------	-------------	-----

1/250 7045-XX-NW08-XX-XX-X-20 P1

Status	PRELIMINARY
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Appendix J

Surface Water Drainage Calcs

Appendix J-1

SW Calculations

FEH 60min + 1:100 yr with Climate Change

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	2	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.400	Preferred Cover Depth (m)	1.200
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	4.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
S1	0.490	4.00	98.250	1500	437004.494	296604.723	1.100
S2	0.150	4.00	98.515	1500	437003.374	296630.221	1.430
S3			98.000	1500	436997.547	296654.117	0.980
S4 - Extg			98.000	1500	437010.808	296723.244	1.255
Outfall			98.000	1500	437023.453	296721.604	1.330

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	S1	S2	25.523	0.600	97.150	97.085	0.065	392.7	500	4.39	50.0
1.001	S2	S3	24.596	0.600	97.085	97.020	0.065	378.4	500	4.76	50.0
1.002	S3	S4 - Extg	70.387	0.600	97.020	96.845	0.175	402.2	500	5.85	50.0
1.003	S4 - Extg	Outfall	12.751	0.600	96.745	96.670	0.075	170.0	600	5.96	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	1.090	214.0	66.4	0.600	0.930	0.490	0.0	191	0.967
1.001	1.110	218.0	86.7	0.930	0.480	0.640	0.0	219	1.050
1.002	1.077	211.4	86.7	0.480	0.655	0.640	0.0	223	1.026
1.003	1.864	527.2	86.7	0.655	0.730	0.640	0.0	163	1.394

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
S1	437004.494	296604.723	98.250	1.100	1500				
						0	1.000	97.150	500
S2	437003.374	296630.221	98.515	1.430	1500		1	1.000	97.085
						0	1.001	97.085	500
S3	436997.547	296654.117	98.000	0.980	1500		1	1.001	97.020
						0	1.002	97.020	500

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
S4 - Extg	437010.808	296723.244	98.000	1.255	1500	1 	1.002	96.845	500
						0 	1.003	96.745	600
Outfall	437023.453	296721.604	98.000	1.330	1500	1 	1.003	96.670	600

Simulation Settings

Rainfall Methodology	FEH-99	E (1km)	0.308	Skip Steady State	x
C (1km)	-0.027	F (1km)	2.394	Drain Down Time (mins)	240
D1 (1km)	0.368	Summer CV	0.750	Additional Storage (m³/ha)	20.0
D2 (1km)	0.308	Winter CV	0.840	Check Discharge Rate(s)	x
D3 (1km)	0.245	Analysis Speed	Normal	Check Discharge Volume	x

Storm Durations

60 | 120 | 180 | 240 | 360 | 480 | 600 | 720 | 960 | 1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
2	0	0	0
30	0	0	0
100	20	0	0

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)	Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
2 year 60 minute summer	46.417	12.267	30 year 120 minute summer	71.217	18.821
2 year 60 minute winter	30.838	12.267	30 year 120 minute winter	47.315	18.821
2 year 120 minute summer	29.747	7.861	30 year 180 minute summer	54.545	14.036
2 year 120 minute winter	19.763	7.861	30 year 180 minute winter	35.456	14.036
2 year 180 minute summer	23.549	6.060	30 year 240 minute summer	43.135	11.399
2 year 180 minute winter	15.307	6.060	30 year 240 minute winter	28.658	11.399
2 year 240 minute summer	19.064	5.038	30 year 360 minute summer	33.037	8.502
2 year 240 minute winter	12.666	5.038	30 year 360 minute winter	21.475	8.502
2 year 360 minute summer	15.092	3.884	30 year 480 minute summer	26.126	6.904
2 year 360 minute winter	9.810	3.884	30 year 480 minute winter	17.357	6.904
2 year 480 minute summer	12.218	3.229	30 year 600 minute summer	21.479	5.875
2 year 480 minute winter	8.117	3.229	30 year 600 minute winter	14.676	5.875
2 year 600 minute summer	10.229	2.798	30 year 720 minute summer	19.213	5.149
2 year 600 minute winter	6.989	2.798	30 year 720 minute winter	12.912	5.149
2 year 720 minute summer	9.287	2.489	30 year 960 minute summer	15.609	4.110
2 year 720 minute winter	6.241	2.489	30 year 960 minute winter	10.340	4.110
2 year 960 minute summer	7.724	2.034	30 year 1440 minute summer	11.163	2.992
2 year 960 minute winter	5.116	2.034	30 year 1440 minute winter	7.502	2.992
2 year 1440 minute summer	5.709	1.530	100 year +20% CC 60 minute summer	205.193	54.226
2 year 1440 minute winter	3.837	1.530	100 year +20% CC 60 minute winter	136.325	54.226
30 year 60 minute summer	117.583	31.074	100 year +20% CC 120 minute summer	121.485	32.105
30 year 60 minute winter	78.119	31.074	100 year +20% CC 120 minute winter	80.712	32.105

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)	Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
100 year +20% CC 180 minute summer	91.815	23.627	100 year +20% CC 600 minute summer	34.755	9.506
100 year +20% CC 180 minute winter	59.682	23.627	100 year +20% CC 600 minute winter	23.746	9.506
100 year +20% CC 240 minute summer	71.925	19.008	100 year +20% CC 720 minute summer	30.901	8.282
100 year +20% CC 240 minute winter	47.785	19.008	100 year +20% CC 720 minute winter	20.768	8.282
100 year +20% CC 360 minute summer	54.359	13.988	100 year +20% CC 960 minute summer	24.869	6.549
100 year +20% CC 360 minute winter	35.335	13.988	100 year +20% CC 960 minute winter	16.474	6.549
100 year +20% CC 480 minute summer	42.584	11.254	100 year +20% CC 1440 minute summer	17.550	4.704
100 year +20% CC 480 minute winter	28.291	11.254	100 year +20% CC 1440 minute winter	11.795	4.704

Results for 2 year Critical Storm Duration. Lowest mass balance: 99.97%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute summer	S1	33	97.314	0.164	44.2	1.7489	0.0000	OK
60 minute summer	S2	33	97.269	0.184	56.7	0.7096	0.0000	OK
60 minute summer	S3	34	97.198	0.178	56.6	0.3139	0.0000	OK
60 minute summer	S4 - Extg	34	96.886	0.141	55.3	0.2496	0.0000	OK
60 minute summer	Outfall	34	96.798	0.128	55.3	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
60 minute summer	S1	1.000	S2	43.4	0.724	0.203	1.5416	
60 minute summer	S2	1.001	S3	56.6	0.907	0.260	1.5550	
60 minute summer	S3	1.002	S4 - Extg	55.3	0.966	0.262	4.0358	
60 minute summer	S4 - Extg	1.003	Outfall	55.3	1.170	0.105	0.6031	58.9

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.97%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute summer	S1	33	97.450	0.300	112.0	3.2076	0.0000	OK
60 minute summer	S2	33	97.408	0.323	143.5	1.2471	0.0000	OK
60 minute summer	S3	33	97.324	0.304	142.4	0.5367	0.0000	OK
60 minute summer	S4 - Extg	34	96.980	0.235	140.7	0.4152	0.0000	OK
60 minute summer	Outfall	34	96.877	0.207	140.9	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
60 minute summer	S1	1.000	S2	109.2	0.864	0.510	3.2711	
60 minute summer	S2	1.001	S3	142.4	1.123	0.653	3.1721	
60 minute summer	S3	1.002	S4 - Extg	140.7	1.254	0.665	7.8935	
60 minute summer	S4 - Extg	1.003	Outfall	140.9	1.497	0.267	1.2004	149.1

Results for 100 year +20% CC Critical Storm Duration. Lowest mass balance: 99.97%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute summer	S1	33	97.663	0.513	195.4	5.4818	0.0000	SURCHARGED
60 minute summer	S2	33	97.593	0.508	246.5	1.9637	0.0000	SURCHARGED
60 minute summer	S3	33	97.480	0.460	245.5	0.8132	0.0000	OK
60 minute summer	S4 - Extg	34	97.067	0.322	241.3	0.5681	0.0000	OK
60 minute summer	Outfall	34	96.948	0.278	241.7	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
60 minute summer	S1	1.000	S2	188.2	0.962	0.879	4.9925	
60 minute summer	S2	1.001	S3	245.5	1.280	1.126	4.7228	
60 minute summer	S3	1.002	S4 - Extg	241.3	1.443	1.141	11.5690	
60 minute summer	S4 - Extg	1.003	Outfall	241.7	1.719	0.459	1.7935	260.1

Appendix J - 2

SW Calculations

FSR 15 & 30min 1:100 yr with Climate Change

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	2	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.400	Preferred Cover Depth (m)	1.200
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	4.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
S1	0.490	4.00	98.250	1500	437004.494	296604.723	1.100
S2	0.150	4.00	98.515	1500	437003.374	296630.221	1.430
S3			98.000	1500	436997.547	296654.117	0.980
S4 - Extg			98.000	1500	437010.808	296723.244	1.255
Outfall			98.000	1500	437023.453	296721.604	1.330

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	S1	S2	25.523	0.600	97.150	97.085	0.065	392.7	500	4.39	50.0
1.001	S2	S3	24.596	0.600	97.085	97.020	0.065	378.4	500	4.76	50.0
1.002	S3	S4 - Extg	70.387	0.600	97.020	96.845	0.175	402.2	500	5.85	50.0
1.003	S4 - Extg	Outfall	12.751	0.600	96.745	96.670	0.075	170.0	600	5.96	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	1.090	214.0	66.4	0.600	0.930	0.490	0.0	191	0.967
1.001	1.110	218.0	86.7	0.930	0.480	0.640	0.0	219	1.050
1.002	1.077	211.4	86.7	0.480	0.655	0.640	0.0	223	1.026
1.003	1.864	527.2	86.7	0.655	0.730	0.640	0.0	163	1.394

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	25.523	392.7	500	Circular	98.250	97.150	0.600	98.515	97.085	0.930
1.001	24.596	378.4	500	Circular	98.515	97.085	0.930	98.000	97.020	0.480
1.002	70.387	402.2	500	Circular	98.000	97.020	0.480	98.000	96.845	0.655
1.003	12.751	170.0	600	Circular	98.000	96.745	0.655	98.000	96.670	0.730

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	S1	1500	Manhole	Adoptable	S2	1500	Manhole	Adoptable
1.001	S2	1500	Manhole	Adoptable	S3	1500	Manhole	Adoptable
1.002	S3	1500	Manhole	Adoptable	S4 - Extg	1500	Manhole	Adoptable
1.003	S4 - Extg	1500	Manhole	Adoptable	Outfall	1500	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
S1	437004.494	296604.723	98.250	1.100	1500		0	1.000	97.150	500
S2	437003.374	296630.221	98.515	1.430	1500		1	1.000	97.085	500
S3	436997.547	296654.117	98.000	0.980	1500		0	1.001	97.085	500
S4 - Extg	437010.808	296723.244	98.000	1.255	1500		1	1.001	97.020	500
Outfall	437023.453	296721.604	98.000	1.330	1500		0	1.002	97.020	500
							1	1.002	96.845	500
							0	1.003	96.745	600
							1	1.003	96.670	600

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Fast
FSR Region	England and Wales	Skip Steady State	x
M5-60 (mm)	20.000	Drain Down Time (mins)	240
Ratio-R	0.400	Additional Storage (m³/ha)	20.0
Summer CV	0.750	Check Discharge Rate(s)	x
Winter CV	0.840	Check Discharge Volume	x

Storm Durations

15 | 30

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
2	0	0	0
30	0	0	0
100	20	0	0

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)	Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
2 year 15 minute summer	141.566	40.058	30 year 30 minute summer	174.929	49.499
2 year 15 minute winter	99.345	40.058	30 year 30 minute winter	122.757	49.499
2 year 30 minute summer	91.753	25.963	100 year +20% CC 15 minute summer	418.486	118.417
2 year 30 minute winter	64.388	25.963	100 year +20% CC 15 minute winter	293.674	118.417
30 year 15 minute summer	268.706	76.035	100 year +20% CC 30 minute summer	274.758	77.747
30 year 15 minute winter	188.566	76.035	100 year +20% CC 30 minute winter	192.813	77.747

Results for 2 year Critical Storm Duration. Lowest mass balance: 99.81%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S1	10	97.414	0.264	94.5	2.8138	0.0000	OK
15 minute winter	S2	10	97.367	0.282	121.7	1.0903	0.0000	OK
15 minute winter	S3	11	97.290	0.270	118.8	0.4773	0.0000	OK
15 minute winter	S4 - Extg	11	96.955	0.210	114.8	0.3712	0.0000	OK
15 minute winter	Outfall	11	96.856	0.186	114.4	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	S1	1.000	S2	92.8	0.860	0.433	2.7866	
15 minute winter	S2	1.001	S3	118.8	1.127	0.545	2.7068	
15 minute winter	S3	1.002	S4 - Extg	114.8	1.187	0.543	6.8665	
15 minute winter	S4 - Extg	1.003	Outfall	114.4	1.418	0.217	1.0322	53.7

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.81%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S1	10	97.586	0.436	179.2	4.6548	0.0000	OK
15 minute winter	S2	10	97.531	0.446	227.9	1.7228	0.0000	OK
15 minute winter	S3	11	97.437	0.417	222.5	0.7367	0.0000	OK
15 minute winter	S4 - Extg	11	97.047	0.302	216.6	0.5332	0.0000	OK
15 minute winter	Outfall	11	96.931	0.261	216.5	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	S1	1.000	S2	173.1	0.968	0.809	4.6616	
15 minute winter	S2	1.001	S3	222.5	1.288	1.020	4.4014	
15 minute winter	S3	1.002	S4 - Extg	216.6	1.404	1.025	10.7745	
15 minute winter	S4 - Extg	1.003	Outfall	216.5	1.669	0.411	1.6546	102.0

Results for 100 year +20% CC Critical Storm Duration. Lowest mass balance: 99.81%

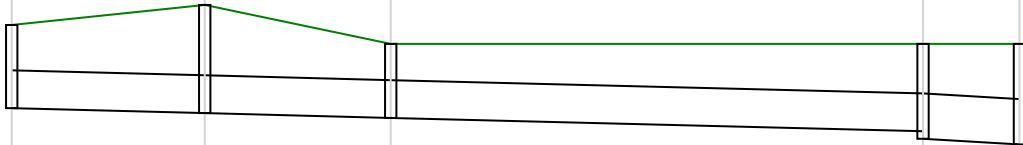
Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S1	11	98.071	0.921	279.1	9.8339	0.0000	FLOOD RISK
15 minute winter	S2	11	97.942	0.857	339.7	3.3107	0.0000	SURCHARGED
15 minute winter	S3	11	97.725	0.705	331.9	1.2461	0.0000	FLOOD RISK
15 minute winter	S4 - Extg	11	97.140	0.395	334.9	0.6979	0.0000	OK
15 minute winter	Outfall	11	97.008	0.337	335.2	0.0000	0.0000	OK

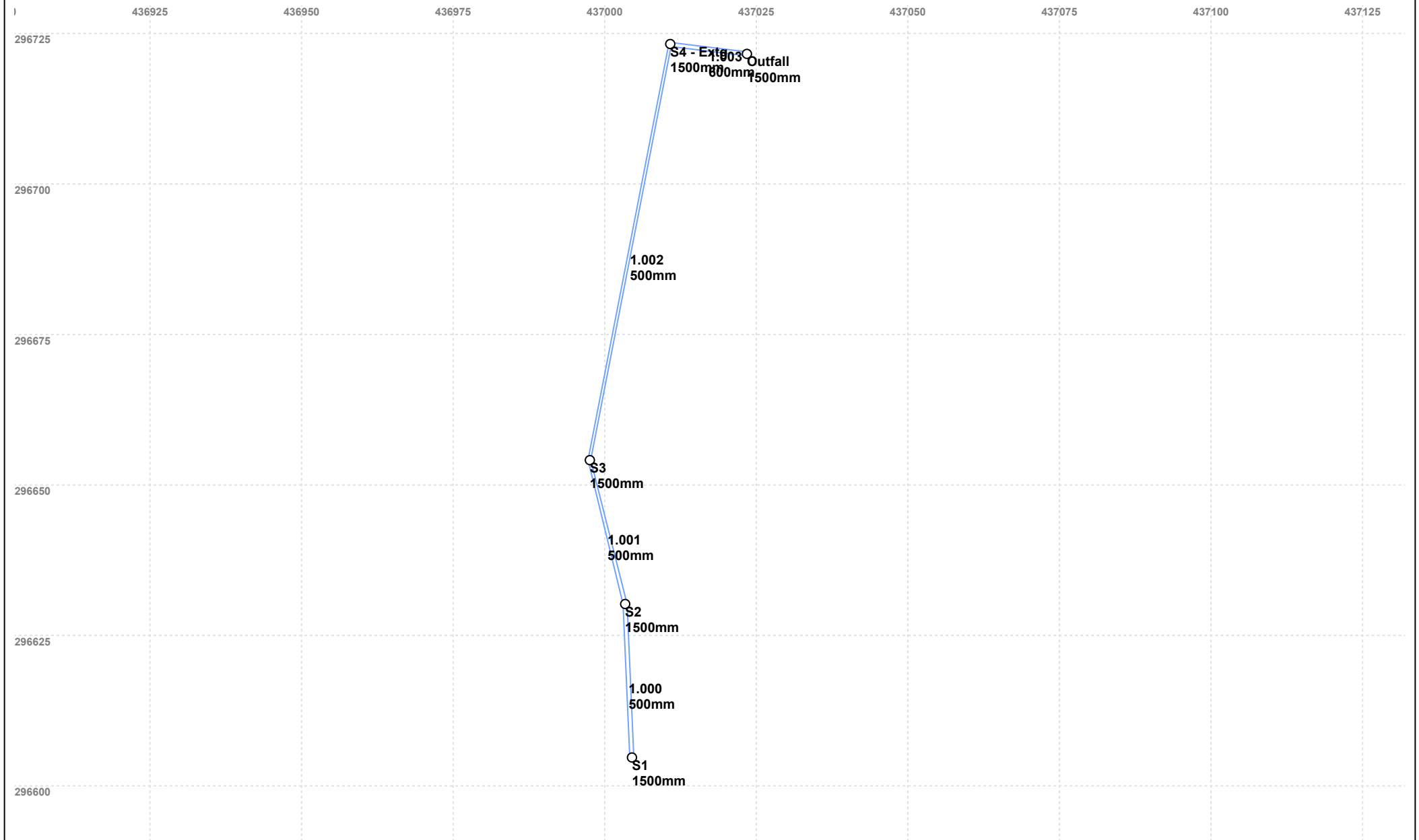
Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	S1	1.000	S2	254.3	1.300	1.188	4.9925	
15 minute winter	S2	1.001	S3	331.9	1.697	1.522	4.8112	
15 minute winter	S3	1.002	S4 - Extg	334.9	1.748	1.584	12.7405	
15 minute winter	S4 - Extg	1.003	Outfall	335.2	1.861	0.636	2.2949	158.5

Appendix J-3

SW Calculations

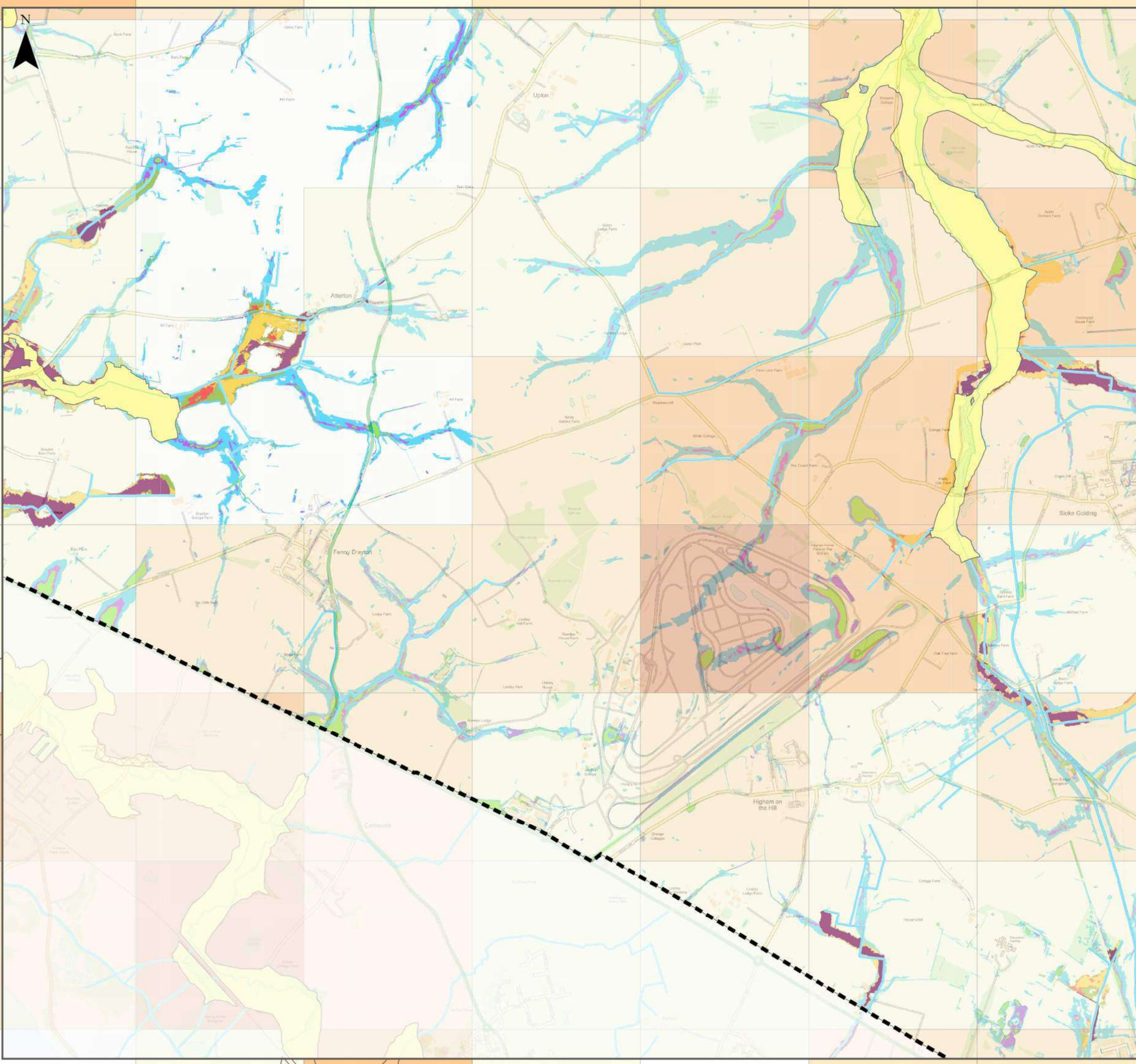
Plan & Sections

Node Name	S1	S2	S3	S4 - Extg Outfall
A4 drawing Hor Scale 1000 Ver Scale 100 Datum (m) 92.000				
Link Name	1.000	1.001	1.002	1.003
Section Type	500mm	500mm	500mm	600mm
Slope (1:X)	392.7	378.4	402.2	170.0
Cover Level (m)	98.250	98.515	98.000	98.000
Invert Level (m)	97.150	97.085	97.020	96.845
Length (m)	25.523	24.596	70.387	12.751



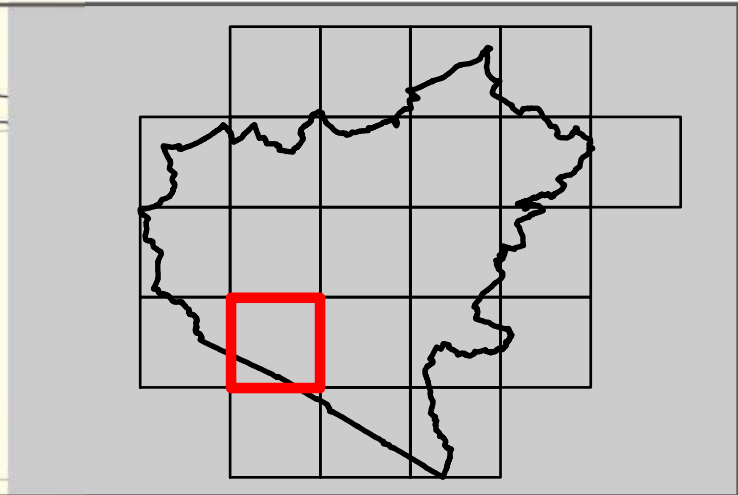
Appendix K

Hinckley and Bosworth Strategic Flood Risk Assessment Map Tile D2



HINCKLEY AND BOSWORTH BOROUGH
LEVEL 1 STRATEGIC FLOOD RISK
ASSESSMENT

APPENDIX A: GEOPDF FLOOD RISK MAPPING
INDEX GRID: D2



**Note: All layers are turned off by default.
Click the box next to the layer of interest to**

Authority Information

☒ Council Boundary

☒ Main Rivers

☒ Detailed River Network

Flood Zones

☒ Flood Zone 3b

☒ Indicative Flood Zone 3b

☒ Flood Zone 3a

☒ Flood Zone 2

Surface Water

☒ RoFfSW 3.3% AEP

☒ RoFfSW 1% AEP

☒ RoFfSW 0.1% AEP

Emergency Planning

☒ Flood Warning Areas

☒ Flood Alert Areas

Climate Change

☒ Climate Change Central

☒ Climate Change Higher Central

☒ Climate Change Upper

☒ Indicative Flood Zone 2

Areas Susceptible to Groundwater Flooding

☒ >= 75%

>= 50% <75%

>= 25% <50%

< 25%

Historical Flooding

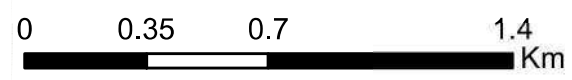
☒ Historic Flooding

Defences

☒ demountable defence

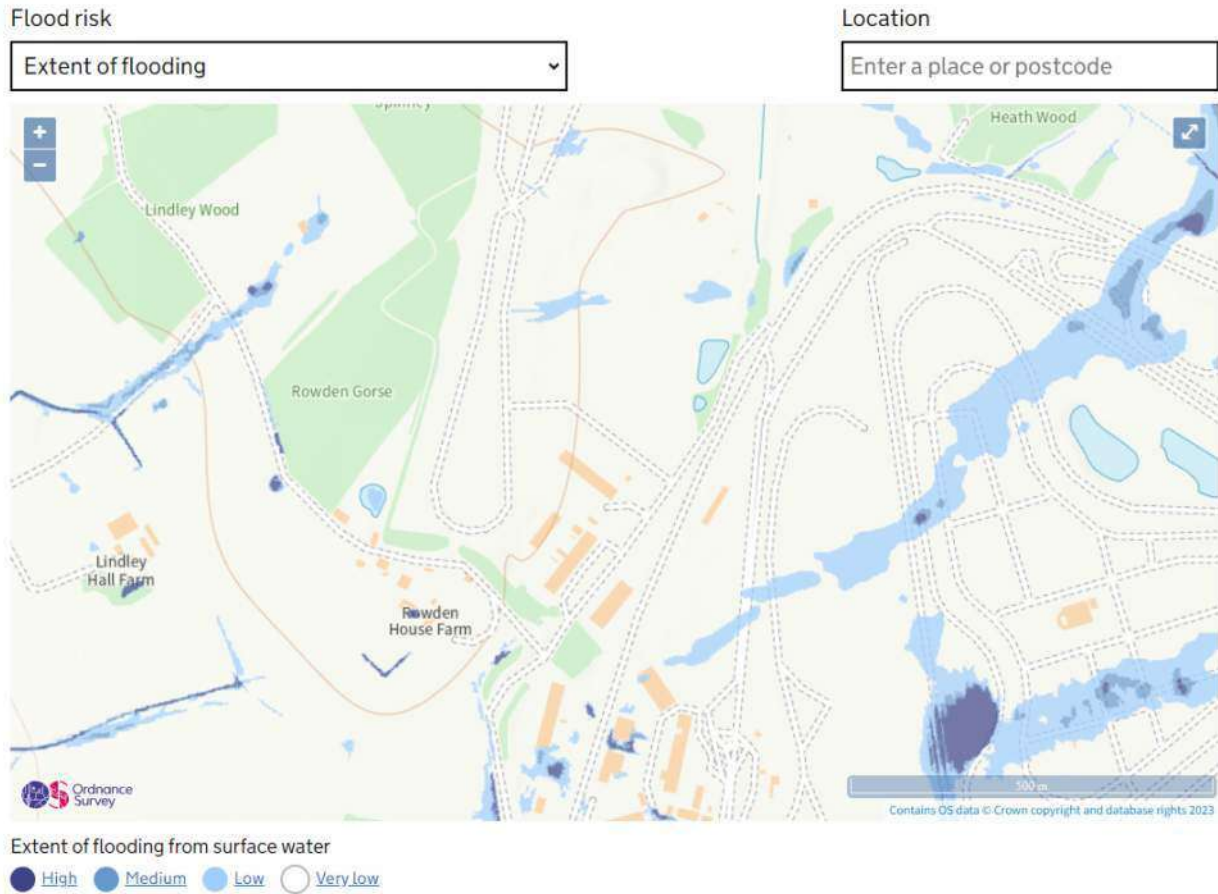
embankment

wall



Appendix L

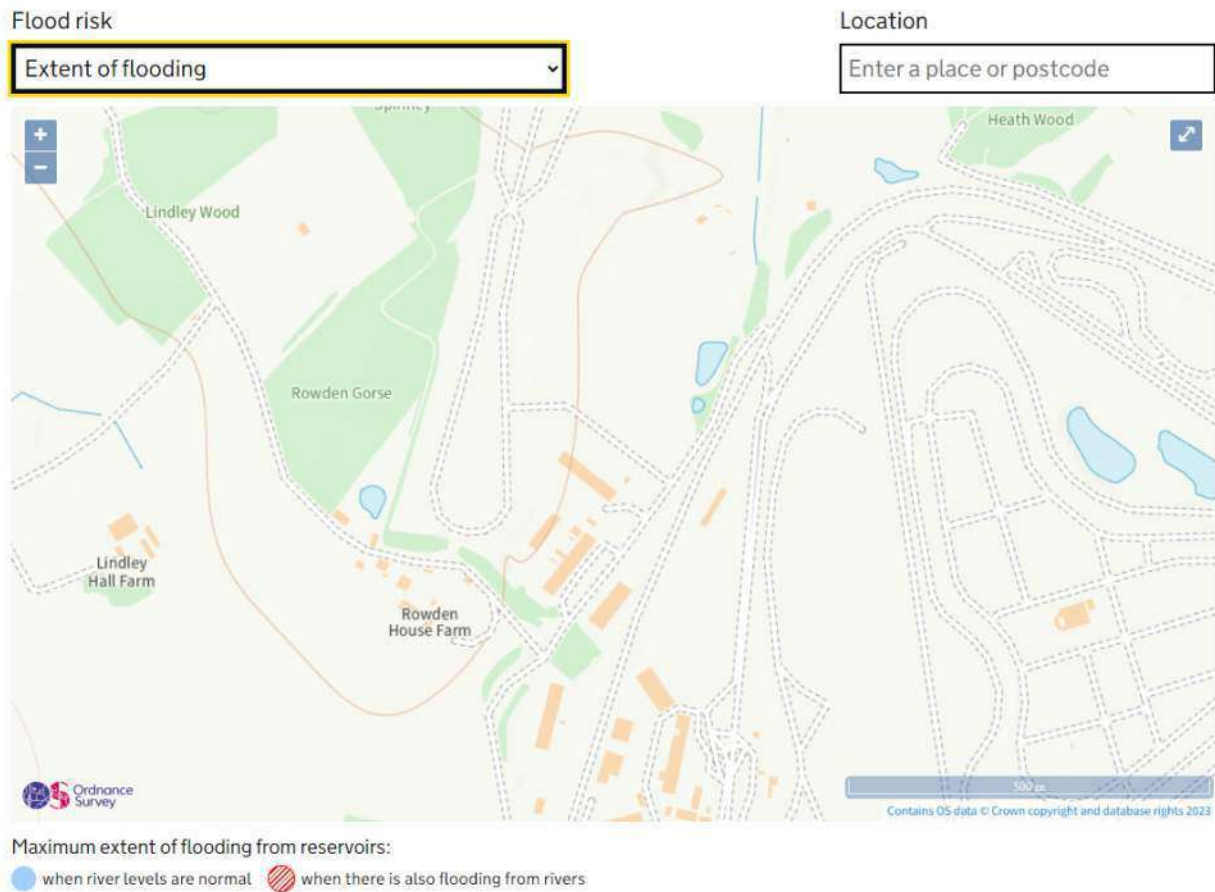
Risk of Flooding from Surface Water Map



Risk of Flooding from Surface Water Map – July 2023

Appendix M

Risk of Flooding from Reservoirs Map



Risk of Flooding from Reservoirs Map – July 2023

Appendix N

Foul Capacity Notes (From wider site FRA/DS)

exceedance storm event or local drainage failure will be eastwards towards existing ditch along the eastern boundary.

Foul Water Drainage

- 4.27. Foul drainage from the proposed Site would be connected via gravity sewer to the existing pump station located to the southwest of the proposed NW07 building. From here, it will be pumped towards the A5.
- 4.28. The outfall from the MIRA Site is a 225mm diameter private gravity sewer. This flows west along the north side of the A5 for some 100m before passing beneath the trunk road and flowing south to a pumping station on Weddington Road, A444. The pumping station is a private facility operated by STW on behalf of MIRA Ltd. A private, pumped sewer connects to the public 225mm diameter sewer in Caldecote village.
- 4.29. Severn Trent Water has confirmed in the meeting held on 17th May 2017 (Appendix H) that the existing adoptable Foul Sewer has capacity to accommodate working population of 1500 within HORIBA MIRA site. The total working population of HORIBA MIRA incorporating the proposed

Building NW07, MIRA Technology Park, Nuneaton CV10 0TU

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WIB13833-105-R-1.3.2-GFSD



NW07 development remains lower than 1500 and as such off-site reinforcement to existing foul sewer will not be required. Please refer to attached minutes of meeting appended in Appendix H.

Appendix O

Simple Index Assessment – Pollution Indices

SUMMARY TABLE		DESIGN CONDITIONS			
		1	2	3	4
Land Use Type Pollution Hazard Level Pollution Hazard Indices TSS Metals Hydrocarbons	Standard commercial yard or delivery area Medium 0.7 0.6 0.7	This classification is not appropriate for haulage yards, lorry parks, waste management areas, or chemical storage/handling zones			
SuDS components proposed					
Component 1	Spel Puraceptor Class 1 Full Retention Separator	Detailed assessment of performance of designed component in reducing inflow concentrations of each pollutant type requires as evidence of adopted indices. Enter indices approved by the environmental regulator in appropriate 'User Defined Indices' row below	SEPA only considers proprietary treatment systems as appropriate in exceptional circumstances where other types of SuDS component are not practicable. Proprietary treatment systems may also be considered appropriate for existing sites that are causing pollution where there is a requirement to retrofit treatment. WAT-RM-08 (SEPA, 2014) also provides a flow chart with a summary of checks on suitability of a proprietary system	See Chapter 15 Proprietary treatment systems for approaches to demonstrate product performance. Note: a British Water/Environment Agency assessment Code of Practice is currently under development that will allow manufacturers to complete an agreed test protocol for systems intended to treat contaminated surface water runoff. Full details can be found at: http://www.britishwater.co.uk/Publications/codes-of-practise.aspx .	
Component 2	Pond or wetland	SuDS components can only be assumed to deliver these indices if they follow design guidance with respect to hydraulic and treatment set out in the relevant technical component chapters of the SuDS Manual. See also checklists in Appendix B	Ponds/wetlands should be preceded by an upstream component(s) that trap(s) silt, or designed specifically to retain sediment in a separate zone, easily accessible for maintenance, such that the sediment will not be re-suspended in subsequent events		
Component 3	None				
SuDS Pollution Mitigation Indices TSS Metals Hydrocarbons	>0.95 0.95 >0.95				
Groundwater protection type Groundwater protection Pollution Mitigation Indices TSS Metals Hydrocarbons	None 0 0 0				
Combined Pollution Mitigation Indices TSS Metals Hydrocarbons Acceptability of Pollution Mitigation TSS Metals Hydrocarbons	>0.95 0.95 >0.95 Sufficient Sufficient Sufficient	Reference to local planning documents should also be made to identify any additional protection required for sites due to habitat conservation (see Chapter 7 The SuDS design process). The implications of developments on or within close proximity to an area with an environmental designation, such as a Site of Special Scientific Interest (SSSI), should be considered via consultation with relevant conservation bodies such as Natural England			

