

Flood Consequence Assessment

Leeway House, Newport

For and on behalf of:
Aldustria Ltd

January 2025

Report title:

Flood Consequence Assessment

Site name:

Leeway House, Newport

For and on behalf of:

Aldustria Ltd

Prepared by:

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1 INTRODUCTION

- 1.1 This Flood Consequence Assessment (FCA) has been prepared by Sustain Environmental (SE) for Aldustria Limited and issued in January 2025.
- 1.2 The site has an area of 4,000m² (0.40ha). The proposed development entails the siting of 21MW battery storage system and associated works including formation of onsite parking area and erection of fencing.
- 1.3 The Local Planning Authority (LPA) and SuDS Approval Body (SAB) are Newport City Council (NCC).

Background

- 1.4 This FCA has been provided for the planning application to the LPA for the proposed development, and also to support the application to the SAB.
- 1.5 In addition to the desk-based investigation that was completed, this FCA also makes reference to the following appendices:
- **Appendix A** – Proposed site layout;
 - **Appendix B** – Topographic survey;
 - **Appendix C** – DCWW public sewer map; and
 - **Appendix D** – Drainage layout and calculations.

Aims and Objectives

- 1.6 The aim of this FCA is to understand the consequence of flooding to the proposed development and show that the site can be developed safely, without adversely affecting flooding at the site and also to surrounding areas.
- 1.7 The objectives of this FCA are to:
- Confirm the local sources of flooding present;
 - Undertake an appraisal of the flood consequences to the proposed use of the site and potential impact of the development on flooding elsewhere; and
 - Provide a strategy for mitigating flooding to or resulting from the proposed development of the site with respect to surface water runoff;

- This will be based on the principles of Sustainable Drainage Systems (SuDS).

Limitations of the Assessment

1.8 The general limitations of this assessment are that:

- A number of sources have been used to compile this FCA. Whilst SE believes them to be trustworthy; SE is unable to guarantee the accuracy of the information provided by others.
- This FCA is based on information available at the time of preparation. Consequently, there is potential for further information to become available. This may lead to future alteration to the conclusions that have been drawn in this report, for which SE cannot be held responsible.

2 PLANNING POLICY

National Planning Policy

- 2.1 Technical Advice Note (TAN 15) on Development and Flood Risk provides guidance to supplement the policy set out within Planning Policy Wales in relation to development and flooding.
- 2.2 The guidance relates to sustainability principles and provides a framework to allow risks arising from river flooding, coastal flooding and additional runoff from developments to be assessed.
- 2.3 In relation to flood risk, TAN 15 indicates that the Assembly has a duty to ensure that development is sustainable and does not create problems for future generations.
- 2.4 Managing flooding has an important role to ensure sustainable development by: guiding developments to locations with little or no risk from river, tidal or coastal flooding, managing consequences of flooding where developments can be justified and making provision for climate change.
- 2.5 TAN 15 confirms that each planning authority in Wales must prepare a Development Plan for its area. The development plans provide locational guidance for development, detailed site-specific policies, and identification of proposals for development.
- 2.6 Catchment Flood Management Plans aim to take a holistic approach to flood management at a catchment scale and can provide guidance on managing risk to future developments.

Requirements of TAN 15

- 2.7 A Flood Consequence Assessment (FCA), to support a development application, should be proportionate to the risk and appropriate to the scale, nature and location of the development. The following should be considered:

- The consequences of flooding on the development, the consequences of the development on flood risk elsewhere and if appropriate mitigation measures can be incorporated into the design.
- Mechanisms of flooding, including sources of floodwater, how floodwater enters and flows across a site, height, and speed of floodwaters.
- Uncertainties in estimating flood events including use of historical records and forecasting.
- Security of proposed developments over their lifetime and ensuring those using the development have an awareness of the potential risks from flooding.
- Description of consequences under a range of extreme events including: mechanisms, sources, depths, speed, rate of rise, overland flood routes, velocity, access and egress, impacts on natural heritage, impact on flood risk in surrounding areas.
- Structural adequacy of defences to contain flows and withstand overtopping and if required the suitability of implementing a buffer zone adjacent to defences.
- Measures required to ensure flooding is managed to acceptable levels and ensure that the impact upon flood risk elsewhere in the flood plain is managed.

Emerging TAN 15

- 2.8 In December 2021, the Welsh Government released a new TAN15 which is due to become adopted policy advice on 1 June 2023. This new national strategy is set to recognise the degrees of flooding in the present day and in the future.
- 2.9 Although the emerging TAN15 is yet to be adopted, reference has been made and the new mapping has been included throughout this FCA.

Planning Policy Wales

- 2.10 Planning Policy Wales sets out the land use planning policies of the Welsh Government. Chapter 13 'Minimising and Managing Environmental Risk and Pollution' outlines the Welsh Government's objectives in terms of addressing flood risk.

2.11 Section 13.4 of Planning Policy Wales states:

"Development proposals in areas designed as being of high flood hazard should only be considered where:

New development can be justified in that location, even though it is likely to be at risk from flooding; and

The development proposal would not result in the intensification of existing development which may itself be at risk; and

New development would not increase the potential adverse impacts of a flood event."

2.12 Planning Policy Wales is supplemented by a series of Technical Advice Notes (TAN). TAN 15 provides technical guidance on Development and Flood Risk.

Newport Local Development Plan

2.13 The Newport Local Development Plan 2011-2026 was published January 2015 and contains the following Policies that are relevant to flood risk and drainage:

2.14 SP3 on Flood Risk advises the following:

"Newport's coastal and riverside location necessitates that development be directed away from areas where flood risk is identified as a constraint and ensure that the risk of flooding is not increased elsewhere. Development will only be permitted in flood risk areas in accordance with national guidance. Where appropriate a detailed technical assessment will be required to ensure that the development is designed to cope with the threat and consequences of flooding over its lifetime. Sustainable solutions to manage flood risk should be prioritised."

2.15 SP4 on Water Resources advises the following:

"Development proposals should minimise water consumption, protect water quality during and after construction and result in no net increase in surface water run-off through the sustainable management of water resources by:

- i. The use of sustainable drainage systems;*
- ii. The reuse of water and reduction of surface water run-off through high quality designed developments;*
- iii. Careful consideration of the impact upon finite water resources, particularly in terms of increased pressures on abstraction and the impact of climate change.*
- iv. Ensuring development is appropriately located and phased so that there is capacity in the waste water, sewerage and water supply as well as the protection of water quality."*

Preliminary Flood Risk Assessment

- 2.16 A Preliminary Flood Risk Assessment (PFRA) was produced in 2011 for NCC.
- 2.17 The PFRA is aimed at providing high level overview of flood risk from all sources of flooding within the local area, including consideration of surface water, groundwater and ordinary watercourses.

Local Flood Risk Management Strategy

- 2.18 A Local Flood Risk Management Strategy (LFRMS) was produced in 2014 by NCC.
- 2.19 The LFRMS aims to understand the risks of various flooding sources that Newport may face, take proactive steps to mitigate these risks, raise awareness across communities and prepare for any such event. Local flood risk is any flood risk that derives from surface runoff, groundwater, or ordinary watercourses.

Sustainable Drainage Systems Standards for Wales

- 2.20 The Sustainable Drainage Systems Standards for Wales are a set of guidelines for designing, building, and maintaining drainage systems for new developments. The standards aim to reduce the risk of flooding and protect the environment. These Standards are summarised as follows:

- Standard S1 (Surface Water Runoff Destination): specifies where surface water runoff should go;
- Standard S2 (Surface Water Runoff Hydraulic Control): controls how surface water runoff moves;
- Standard S3 (Water Quality): ensures water quality is maintained;
- Standard S4 (Amenity): considers how the drainage system will benefit the community;
- Standard S5 (Biodiversity): considers how the drainage system will support local wildlife; and
- Standard S6 (Design): considers how the drainage system will be designed, built, and maintained.

Pre-application Consultation

- 2.21 A preliminary flood and drainage appraisal for the proposed development of the site was prepared and sent to the SAB in November 2024 to set out the background understanding and the suggested approach for the management of flood risk and surface water drainage.
- 2.22 This resulted in some pre-application consultation with the SAB and the suggestion for a meeting, which was possible to complete in December 2024.
- 2.23 In the meeting, the approach that the SAB expected to be followed for the Sustainable Drainage Systems Standards for Wales was discussed. The drainage strategy included in Section 5 of this FCA has been provided in accordance with this discussion on what was required to meet these Standards.

3 BACKGROUND UNDERSTANDING

- 3.1 The site address is a land area at Braithwaite Engineers Ltd, Units A and B, Leeway House, Leeway Industrial Estate, Newport, NP19 4SL. The site has an area of 4,000m² (0.40ha). A central NGR for the site is X: 334610, Y: 186435.
- 3.2 The A4810 (Queensway Meadows) is located to the north-east of the site and Leeway Court is to the west. The site is adjacent to existing commercial and industrial units and storage areas.
- 3.3 A location plan of the site is provided as **Figure 3.1**.

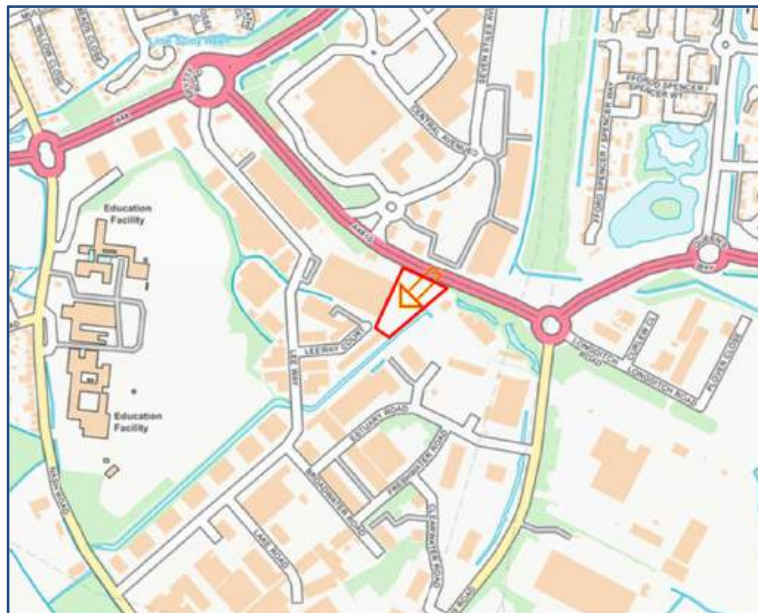


Figure 3.1 – Site Location Plan

Existing Site and Proposed Development

- 3.4 The majority of the site surface will remain in its current form, and therefore with a gravel surface. Site access and onsite parking will make use of the existing gravel surface.
- 3.5 A plan of the proposed development is included as **Appendix A**. It will include rows of battery racks across parts of the site together also with adjacent inverters and transformers. This equipment will be mounted on concrete foundations. There is also a substation within the site. There will be some limited vehicular movement associated with the operation requirements of the site.

Topography

- 3.6 A topographical survey of the site has been completed, with this included as **Appendix B**.
- 3.7 This shows ground levels to be highest in the north-eastern part of the site, at around 6.00m and 6.10m. Although the site is fairly flat, there is a slight fall to the west, with ground levels at around 5.70m and 5.80m, and also to the south, with ground levels at around 5.80m and 5.90m.
- 3.8 The topographical survey records the majority of the site area to currently be surfaced with gravel. There are areas of dense vegetation and woodland along the southern and south-eastern site boundaries, and which the topographic survey was unable to collect any levels. However, OS mapping shows that there is a water feature located within the woodland area to the south-east. At the time of the topographic survey, there were a number of containers, parked vehicles, and stored materials (pipes, scaffolding).

Hydrology

- 3.9 The River Usk is the main watercourse in the area, located approximately 2.0km to the west and 2.2km to the south-west of the site. This watercourse drains from the Brecon Beacons National Park and north into Usk Reservoir, then east and south past the Newport Wetlands and into the River Severn.
- 3.10 There is a water feature located within the woodland area to the south-east. This looks to be part of a wider network of drainage channels, presumably to drain what was previously an area of meadows. Surface water from existing drainage infrastructure for the local area already drains into this water feature.

Geology

- 3.11 The 1 to 50,000 scale British Geological Survey (BGS) online mapping provides an understanding of bedrock geology and whether any superficial deposits have been recorded.

- 3.12 The bedrock geology under the site is classified by the BGS as the Mercia Mudstone Group (mudstone). There are superficial deposits recorded across the site of tidal flat deposits (clay and silt).

Hydrogeology

- 3.13 The BGS also provide a dataset that classifies the aquifer designations that reflect the importance of aquifers in terms of groundwater as a resource and in supporting surface water flows.
- 3.14 The site is located upon a Secondary B Aquifer for the bedrock. These aquifers are mainly lower permeability layers that may store and yield limited amounts of groundwater through characteristics like thin cracks (called fissures) and openings or eroded layers.

Soils

- 3.15 Local soils will be influenced by the underlying geology and by the historical uses of the land. As the site is in a developed area, it is likely that there would be variations resulting from anthropogenic activities.
- 3.16 Information from the Land Information System (LandIS) available from Cranfield Environment Centre has been used to characterise the local soils. This uses a simplified data-set at 1:250,000 scale to provide a general understanding of the variations between different natural soil types across England and Wales.
- 3.17 The local soils are described as loamy and clayey soils of coastal flats with naturally high groundwater, and which would be naturally wet. Also as noted above, the majority of the site area is currently surfaced with gravel.
- 3.18 Based on the understanding of the underlying substrate and as the soils are naturally wet, the infiltration of water into the underlying substrate is anticipated to be limited. It is therefore not proposed to complete soakway testing as part of a ground investigation to confirm the potential for infiltration drainage.

Drainage Infrastructure

- 3.19 The public sewerage authority for this area is Dŵr Cymru Welsh Water (DCWW), with a local sewer map included as **Appendix C**.
- 3.20 There is a concrete 450mm diameter surface water sewer adjacent to the south-western site boundary, with this draining the commercial and industrial units and storage areas to the west. This sewer drains into the water feature that is adjacent to the south-eastern boundary via an outfall (ST34865307).
- 3.21 There is a concrete 600mm diameter foul sewer along the southern site boundary, draining to the south-west. There is a manhole at the upstream end and within the north-eastern part of the site (ST34866401), and another in the south-western (ST34865301).
- 3.22 In addition to the public drainage infrastructure, a private ground drain has been installed on the site for the drainage of surface water runoff. This drains across the site, roughly from the northern part of the site in a south-westerly direction towards the southern boundary.

4 ASSESSMENT OF FLOOD SOURCES

- 4.1 The following summarises the assessment of flood sources that has been completed, to determine potential risks and consequences from flooding.
- 4.2 Information from the Flood Risk Assessment Wales (FRAW) map has been reviewed to understand the level of flood risk to the site. This replaced the Development Advice Map (DAM) from December 2021.
- 4.3 The FRAW Map shows flood risk for three different types of flooding:
- Rivers;
 - The sea; and
 - Surface water and small watercourses.
- 4.4 The assessment takes into account flood defences and combines new national-scale modelling with detailed local-scale models to categories risk into 3 bands, labelled 'High', 'Medium' and 'Low' risk.
- 4.5 For Rivers and Surface Water and Small Watercourses:
- 'High' risk means that each year, this area has a chance of flooding of greater than 1 in 30 (3.3%);
 - 'Medium' risk means that each year, an area has a chance of flooding of between 1 in 100 (1%) and 1 in 30 (3.3%); and
 - 'Low' risk means that each year, an area has a chance of flooding of between 1 in 1000 (0.1%) and 1 in 100 (1%).
- 4.6 For the Sea:
- 'High' risk means that each year, this area has a chance of flooding of greater than 1 in 30 (3.3%);
 - 'Medium' risk means that each year, an area has a chance of flooding of between 1 in 200 (0.5%) and 1 in 30 (3.3%); and
 - 'Low' risk means that each year, an area has a chance of flooding of between 1 in 1000 (0.1%) and 1 in 200 (0.5%).

- 4.7 The risk assessment takes into account the effect of flood defences where NRW have information. Flood defences reduce, but do not completely stop the chance of flooding as they can be overtopped or fail.
- 4.8 In addition, the flood risk levels do not take into account the following, and which could increase the risk and extent of flooding in an area:
- The failure of flood defences; and
 - Blockage of river channels, structures and other drainage systems.
- 4.9 As well as flood risk, the FRAW Map shows other information, including:
- The location of flood defences;
 - The areas benefitting from flood defences;
 - The risk of flooding from reservoirs;
 - Coastal erosion; and
 - Shoreline management plans.
- 4.10 The FRAW Map shows the worst-case scenario for the area that could be flooded if a large reservoir were to fail and release the water it holds. A large reservoir is considered to be one that holds over 10,000 cubic metres of water.
- 4.11 The reservoir flood maps do not indicate the likelihood of a flood occurring. Reservoir flooding is extremely unlikely to happen. There has been no loss of life in the UK from reservoir flooding since 1925. All large reservoirs must be inspected and supervised by reservoir panel engineers. As the enforcement authority for the Reservoirs Act 1975 in Wales, NRW ensure that reservoirs are inspected regularly and essential safety work is carried out.

Flood Risk from Rivers

- 4.12 The FRAW Map showing flood risk from rivers is provided as **Figure 4.1**. Areas at risk of flooding are shown in shades of blue (dark blue for high, light blue for low and no shading for no risk).
- 4.13 The site and immediate surrounds are shown on the FRAW Map with no shading, and therefore it is concluded that there is a no flood risk from rivers.



Figure 4.1 – Flood Risk from Rivers

Flood Risk from the Sea

- 4.14 The FRAW Map showing flood risk from the sea is provided as **Figure 4.2**. Areas at risk of flooding are shown in shades of blue (dark blue for high, light blue for low and no shading for no risk).
- 4.15 The FRAW Map shows there to be a low level of flood risk to the site from the sea. However, the FRAW Map also shows the site to be located in an area that benefits from flood defences.

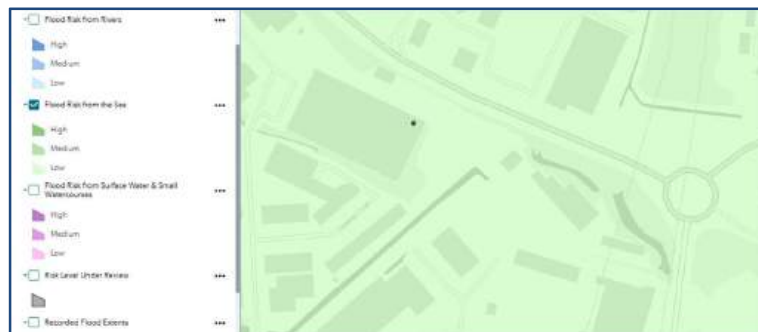


Figure 4.2 – Flood Risk from the Sea

Flood Risk from Surface Water and Small Watercourses

- 4.16 The FRAW Map showing flood risk from surface water and small watercourses is provided as **Figure 4.3**. Areas at risk of flooding are shown in shades of purple (dark purple for high, light purple for low and no shading for no risk).
- 4.17 The site and immediate surrounds are shown on the FRAW Map with no shading, and therefore it is concluded that there is no flood risk in these areas. The FRAW

Map shows that there is a low level of flood risk in areas adjacent to the water feature and also in a part of the site to the west and north-west.

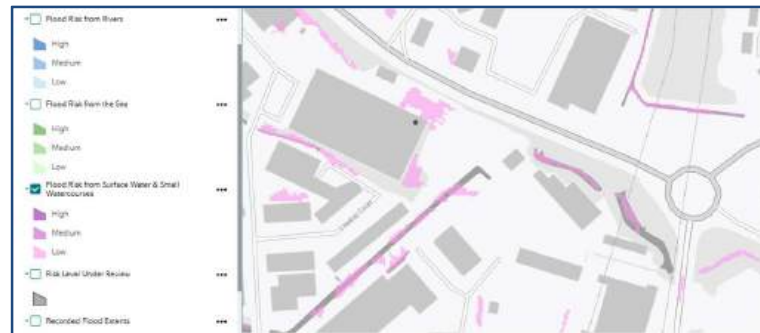


Figure 4.3 – Flood Risk from Surface Water and Small Watercourses

Flood Risk from Reservoirs

- 4.18 The FRAW Map showing flood risk from large reservoirs is provided as **Figure 4.4**. This indicates some of the site to be in the area that could be affected by flooding from large reservoirs, associated with the Sloblands Lagoons.



Figure 4.4 – Flood Risk from Reservoirs

Flood Mitigation

- 4.19 All sources of flooding across the site and surrounds have been identified to be low and specific flood mitigation measures are not therefore required.
- 4.20 However, it is suggested for the finished floor levels of new buildings or structures that could be occupied by operational personnel to be elevated above surrounding ground levels by at least 150mm.

- 4.21 This measure would help to protect against the possibility of shallow ponding, which can sometimes occur after heavy or prolonged periods of rainfall.
- 4.22 A drainage strategy for the surface water runoff would also need to be provided, to ensure that the proposed development does not result in detrimental impact to flooding. This is provided in Section 5 of this FCA.

5 SURFACE WATER DRAINAGE

- 5.1 Guidance on surface water runoff from development is given in TAN15. This advises that all types of land use change will impact on the hydrological cycle in one way or another and flooding is not confined to floodplains, as heavy rain falling on waterlogged ground can cause localised flooding almost anywhere.
- 5.2 In all flood zones, development should not increase the risk of flooding elsewhere. Surface water runoff from developments in these areas can, if not properly controlled, result in flooding at other locations and significantly alter the frequency and extent of floods further down the catchment.
- 5.3 Built development, such as roads, pavements, and roofing, tends to increase the surface area of impermeable ground, thus reducing percolation and increasing rapid surface run-off.
- 5.4 This has the effect of reducing the time it takes for precipitation to enter the watercourse and consequently increasing the peak discharge. SuDS can perform an important role in managing run-off from a site and should be implemented, wherever they will be effective, in all new development proposals, irrespective of the flood zone in which they are located.
- 5.5 Development may increase run-off and hence the risk and consequences of flooding in other areas, therefore, the aim should be for new development not to create additional run-off when compared with the undeveloped situation, and for re-development to reduce run-off where possible.

Methodology

- 5.6 The objective of the drainage strategy is to ensure that there are no residual adverse impacts on flooding over the site and surrounds as a consequence of the proposed development through provision of a sustainable approach to the management of surface water runoff.
- 5.7 This FCA will therefore define a drainage strategy including the measures to mitigate and manage the changes to surface water runoff.

Proposed Discharge Receptor

- 5.8 Standard S1 (Surface Water Runoff Destination) of the Sustainable Drainage Systems Standards for Wales lists the priority for the hierarchy that drainage strategies should be designed to. This is summarised as follows:

Standard S1 (Surface Water Runoff Destination):

- Priority Level 1: Surface water runoff is collected for use;
 - Priority Level 2: Surface water runoff is infiltrated to ground;
 - Priority Level 3: Surface water runoff is discharged to a surface water body;
 - Priority Level 4: Surface water runoff is discharged to a surface water sewer, highway drain, or another drainage system;
 - Priority Level 5: Surface water runoff is discharged to a combined sewer.
- 5.9 This aims to ensure that surface water runoff is treated as a resource and managed in a way that minimises negative impacts of the development on flooding, the morphology and water quality of receiving waters and the associated ecology.
- 5.10 The Sustainable Drainage Systems Standards for Wales states that Priority Levels 4 and 5 should only be used in exceptional circumstances.
- 5.11 In terms of the proposed development, there is no demand for collecting surface water for re-use and so therefore Priority Level 1 has been discounted. This was agreed in the pre-application meeting with the SAB.
- 5.12 Priority Level 2 was also discussed in the pre-application meeting with the SAB. Based on the appraisal of the underlying substrate, it has been assumed that infiltration to ground would be limited and also that there is the potential for a naturally high groundwater table that would restrict the use of infiltration drainage features. Priority Level 2 has therefore been discounted.
- 5.13 The drainage strategy has instead been designed on the assumption that there would be no infiltration into the ground, although also that it would not prevent any naturally occurring soakage. In the pre-application meeting with the SAB,

it was suggested that soakaway testing would still need to be carried out for the SAB submission, but could be done after the planning submission.

- 5.14 Priority Level 3 relates to the discharge of surface water runoff to a surface water body. As described in Section 3 of this FCA, there is a water feature located within the woodland area to the south-east. Surface water from existing drainage infrastructure for the local area already drains into this water feature. The drainage strategy will therefore be designed to discharge to this water feature.

Drainage Strategy

- 5.15 In the pre-application meeting with the SAB, there was a discussion on the surface water runoff rate that the drainage strategy would need to be designed to. Whilst it was agreed that brownfield runoff rates could be used, the SAB advised that the standards of NCC required for there to be a 70% betterment on these rates. The drainage strategy will therefore be designed to provide this level of betterment to the brownfield runoff rates.
- 5.16 A series of rainfall events have been summarised, between the 1 in 1-year and the 1 in 100-year plus a 45% allowance for climate change. The drainage strategy has therefore been designed in accordance with these runoff rates.
- 5.17 These runoff rates are summarised in a table on the drainage strategy plan and they have also been used in the drainage calculations, included as **Appendix D**. This is therefore provided in response to Standard S2 (Surface Water Runoff Hydraulic Control) of the Sustainable Drainage Systems Standards for Wales.
- 5.18 The use of a gravel filled attenuation trench was discussed with the SAB, to provide the required volume of attenuation to manage the surface water runoff. The SAB suggested the addition of a gravel blanket, to provide an additional attenuation volume and other benefits, such as to water quality.
- 5.19 An attenuation trench has therefore been included, along the south-eastern boundary adjacent to the water feature, as shown on the drainage strategy plan, included as **Appendix D**. An outfall from this attenuation trench has been included, with this proposed towards the northern end given the local fall in

ground levels to this point, as shown on the topographic survey included as **Appendix B**. As noted on the drainage strategy plan, the exact location and level of this outfall would be confirmed prior to commencement of the works. A flow control chamber is included between the outfall and the attenuation trench, to achieve the runoff rates as summarised in the table on the drainage strategy plan. In addition to the attenuation trench, the site is to include a permeable surface. Typical details of the attenuation trench and the permeable surface are also included.

Exceedance Events

- 5.20 Flows from the surface water drainage strategy in the event of an exceedance event must be managed in conveyance routes that minimise the risk to people and property.
- 5.21 The drainage strategy has been designed to manage the rainfall from the 1 in 100-year +45% climate change allowance, and therefore provides surplus capacity for current day events. It has been designed to provide a 70% betterment to the existing brownfield runoff rates.
- 5.22 If there were to be a more extreme rainfall event that exceeds the capacity of the drainage strategy, then water would drain across the site in accordance with the topography, south-east and towards the water feature. The existing site would already drain to this water feature in a similar exceedance event, albeit with the proposed drainage strategy now providing 70% betterment.

Water Quality

- 5.23 As discussed with the SAB in the pre-application meeting, water quality has been considered in accordance with the Simple Index Approach, as set out in the CIRIA SuDS Manual.
- 5.24 This advises that a drainage strategy must demonstrate that the hazard index for the particular land use is less than the mitigation index of the proposed SuDS features. This is therefore provided in response to Standard S3 (Water Quality) of the Sustainable Drainage Systems Standards for Wales.

- 5.25 The site includes rows of battery racks across parts of the site together also with adjacent inverters and transformers. This equipment will be mounted on concrete foundations. There is also a substation within the site. There will be some limited vehicular movement associated with the operation requirements of the site.
- 5.26 The pollution hazard indices for the site are summarised in **Table 5.2**. This is based on the water quality management section of the CIRIA SuDS Manual (C753) and the guidance on pollution hazard indices for different land uses provided in Table 26.2. The closest match was considered to be a site with low traffic roads and non-residential car parking with infrequent change.

Land Use	Pollution Hazard Indices		
	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Low Traffic Roads and Non-Residential Car Parking with Infrequent Change	0.50	0.40	0.40
Total	0.50	0.40	0.40

Table 5.2 – Pollution Hazard Indices for the Land Use (SuDS Manual)

- 5.27 The mitigation indices provided by the site are summarised in **Table 5.3**. This is based on the water quality management section of the CIRIA SuDS Manual that provides guidance on the indicative SuDS mitigation indices for discharges to surface water bodies provided in Table 26.3 and groundwater in Table 26.4.

Type of SuDS	Mitigation Indices		
	TSS	Metals	Hydrocarbons
Permeable Surfaces	0.70	0.60	0.70
Filter Drain	$0.40 * 0.5 = 0.20$	$0.40 * 0.5 = 0.20$	$0.40 * 0.5 = 0.20$
Total	0.90	0.80	0.90

Table 5.3 – Pollution Mitigation Indices for the Proposed SuDS (SuDS Manual)

- 5.28 The permeable surface has been assessed using the values for a permeable pavement and the attenuation trench using the values for a filter drain.

- 5.29 As advised in the CIRIA SuDS Manual, a factor of 0.5 has been applied to the pollution mitigation values typically associated with a filter drain. This is required to account for the reduced performance of secondary or tertiary components associated with the already reduced inflow concentration.
- 5.30 The assessment of water quality therefore demonstrates that an adequate level of mitigation would be provided by the features included in the drainage strategy for the potential polluting effects resulting from the proposed development.
- 5.31 During the pre-consultation meeting with the SAB, it was discussed whether there was the potential to include any additional features to provide amenity or biodiversity benefit. This would be in accordance with Standard S4 (Amenity) and Standard S5 (Biodiversity) of the Sustainable Drainage Systems Standards for Wales. Details relating to the achievable biodiversity benefits are contained within the Ecology report submitted with the planning application.

Maintenance Requirements

- 5.32 On-site drainage features would be adopted and managed by the site operator as part of the on-site maintenance activities.
- 5.33 It is anticipated that the operation and maintenance of the surface water drainage features would be undertaken in accordance with the recommendations outlined in the CIRIA SuDS Manual, with the extract for pervious surfaces provided as **Figure 5.2** and for filter drains as **Figure 5.3**.

Maintenance schedule	Required action	Typical frequency
Regular maintenance	Brushing and vacuuming (standard cosmetic sweep over whole surface)	Once a year, after autumn leaf fall, or reduced frequency as required, based on site-specific observations of clogging or manufacturer's recommendations – pay particular attention to areas where water runs onto pervious surface from adjacent impermeable areas as this area is most likely to collect the most sediment
Occasional maintenance	Stabilise and mow contributing and adjacent areas	As required
	Removal of weeds or management using glyphosate applied directly into the weeds by an applicator rather than spraying	As required – once per year on less frequently used pavements
Remedial Actions	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50 mm of the level of the paving	As required
	Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users, and replace lost jointing material	As required
	Rehabilitation of surface and upper substructure by remedial sweeping	Every 10 to 15 years or as required (if infiltration performance is reduced due to significant clogging)
Monitoring	Initial inspection	Monthly for three months after installation
	Inspect for evidence of poor operation and/or weed growth – if required, take remedial action	Three-monthly, 48 h after large storms in first six months
	Inspect silt accumulation rates and establish appropriate brushing frequencies	Annually
	Monitor inspection chambers	Annually

Figure 5.2 – Operation and Maintenance of Pervious Surfaces (SuDS Manual)

Maintenance schedule	Required action	Typical frequency
Regular maintenance	Remove litter (including leaf litter) and debris from filter drain surface, access chambers and pre-treatment devices	Monthly (or as required)
	Inspect filter drain surface, inlet/outlet pipework and control systems for blockages, clogging, standing water and structural damage	Monthly
	Inspect pre-treatment systems, inlets and perforated pipework for silt accumulation, and establish appropriate silt removal frequencies	Six monthly
	Remove sediment from pre-treatment devices	Six monthly, or as required
Occasional maintenance	Remove or control tree roots where they are encroaching the sides of the filter drain, using recommended methods (eg NJUG, 2007 or BS 3998:2010)	As required
	At locations with high pollution loads, remove surface geotextile and replace, and wash or replace overlying filter medium	Five yearly, or as required
	Clear perforated pipework of blockages	As required

Figure 5.3 – Operation and Maintenance of Filter Drains (SuDS Manual)

6 SUMMARY

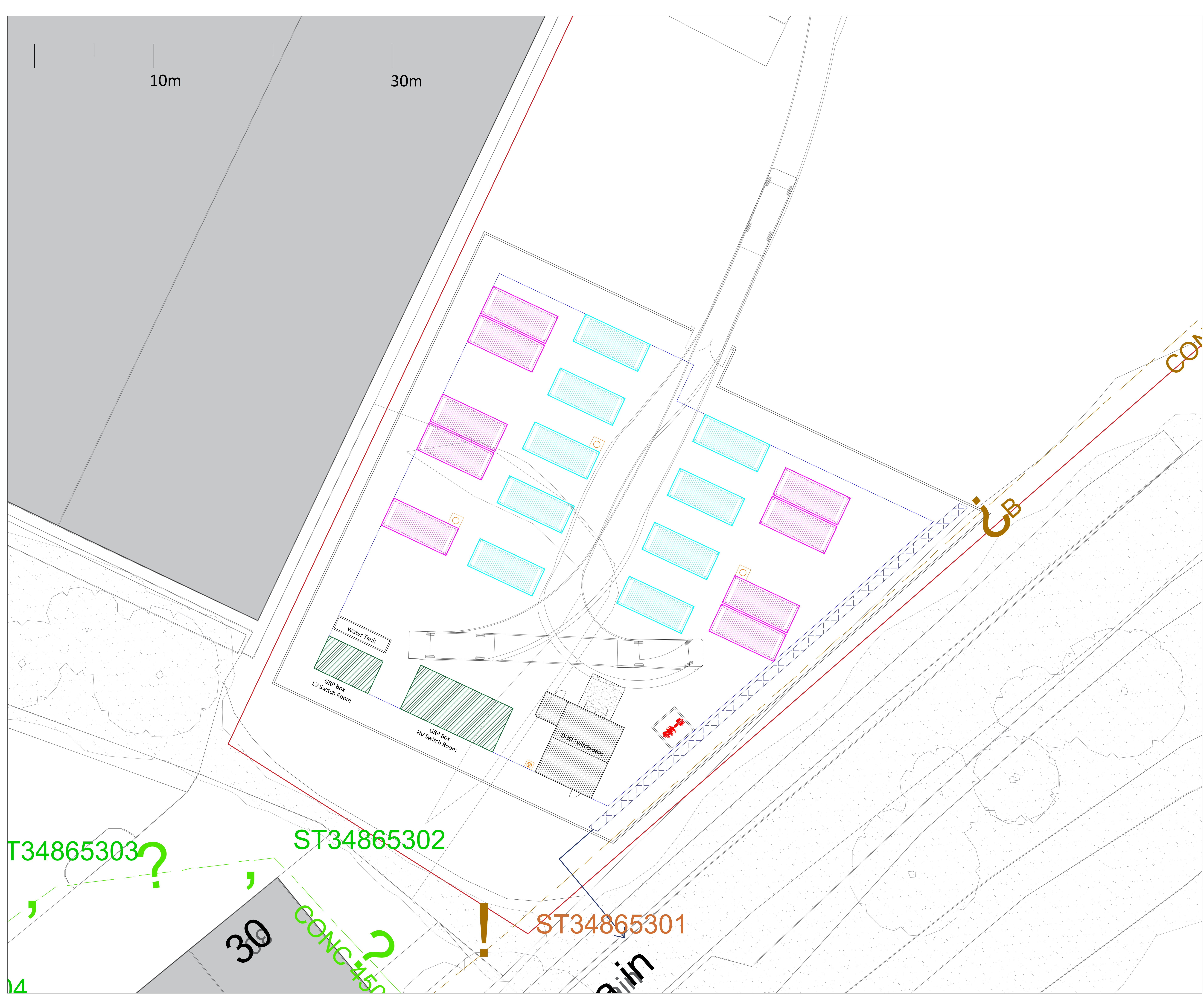
- 6.1 This FCA has been prepared to support the proposed development of a 21MW battery storage system and associated works at a land area at Braithwaite Engineers Ltd, Leeway Industrial Estate, Newport, NP19 4SL.
- 6.2 This FCA aims to understand the consequence of flooding to the proposed development and show that the site can be developed safely, without adversely affecting flooding at the site and also to surrounding areas.
- 6.3 A background understanding from available sources was provided including the site location and land use, the local topography, hydrology, geology, hydrogeology, soils and drainage infrastructure.
- 6.4 A preliminary flood and drainage appraisal for the proposed development was sent to the SAB. Pre-application consultation was then completed with the SAB including a meeting to discuss the approach.
- 6.5 A summary of the relevant flood and drainage planning policy and key design guidance was provided, including at a national and local level. This included the standards in the Sustainable Drainage Systems Standards for Wales, which aim to reduce the risk of flooding and protect the environment.
- 6.6 An assessment of flood sources was provided, to determine flood risk and consequences. This included the potential flood risk from rivers, the sea; from surface water and small watercourses; and from reservoirs.
- 6.7 It was concluded that these flood sources all represented a low level of risk, and therefore that there were no adverse consequences to consider. As such, no specific flood mitigation measures are required.
- 6.8 However, it is suggested for the finished floor levels of new buildings or structures that could be occupied by operational personnel to be elevated above surrounding ground levels by at least 150mm.

- 6.9 A surface water drainage strategy would also be provided, to ensure that the change of land use resulting from the proposed development does not result in detrimental impact to flooding and surface water runoff.
- 6.10 The objective of the surface water drainage strategy is to demonstrate that there would be no residual adverse impacts on flooding over the site and surrounds as a consequence of the proposed development through provision of a sustainable approach to the management of surface water runoff.
- 6.11 The existing surface water drainage regime was described, and then the proposed drainage strategy for managing surface water runoff considered in accordance with the Sustainable Drainage Systems Standards for Wales.
- 6.12 There is a water feature located to the south-east. Surface water from existing drainage infrastructure already drains into this water feature. The drainage strategy will therefore be designed to discharge to this water feature.
- 6.13 In the pre-application meeting, whilst it was agreed that brownfield runoff rates could be used, the SAB advised that the standards of NCC required for there to be a 70% betterment on these rates. The drainage strategy will therefore be designed to provide this level of betterment to the brownfield runoff rates.
- 6.14 An attenuation trench has been included, along the south-eastern boundary with an outfall to the adjacent water feature. A flow control chamber is included between the outfall and the attenuation trench, to achieve the required runoff rates. The site is also to include a permeable surface.
- 6.15 The drainage strategy has been designed to manage the rainfall from the 1 in 100-year +45% climate change allowance, and therefore provide surplus capacity for current day events. It has been designed to provide a 70% betterment to the existing brownfield runoff rates.
- 6.16 In the event of an exceedance event, the flows that are above the design standard of the drainage strategy would drain across the site in accordance with the topography, south-east and towards the water feature.

- 6.17 As discussed with the SAB, water quality has been considered in accordance with the Simple Index Approach, as set out in the CIRIA SuDS Manual. A drainage strategy must demonstrate that the hazard index for the particular land use is less than the mitigation index of the proposed SuDS features.
- 6.18 The assessment of water quality demonstrates that an adequate level of mitigation would be provided by the features included in the drainage strategy for the potential polluting effects resulting from the proposed development.
- 6.19 On-site drainage features would be adopted and managed by the site operator as part of the on-site maintenance activities. It is anticipated that the operation and maintenance of the surface water drainage features would be undertaken in accordance with the recommendations in the CIRIA SuDS Manual.
- 6.20 In summary, this FCA has concluded that the proposed development of the site is considered to be appropriate in terms of flooding and surface water drainage.

Appendix A

Proposed Site Layout



- LEGEND:
- 2.4m galvanised steel palisade fence
 - Lamppost / CCTV
 - Communications Tower
 - Aux Transformer
 - BNG Zone
 - GRP Box
 - Filter Drain
 - Battery
 - MV Skid
 - Land Ownership Boundary
 - Drainage Outfall
 - 2.5m Inner Perimeter to Fence
 - Adjacent Buildings



P1		13.01.25	Fixed Plan for Review	JK / GD
REV	DATE	COMMENTS	AUTHOR / CHECKED	

PROJECT TITLE			
Aldustria Leeway Site			
DETAIL			
Site Layout Diagram			
DRAWING NUMBER (PROJECT-ONSITE-OR-ZONE-LEVEL-TYPE-ROLE-NUMBER)			
24140LEE - LHC - 00 - 00 - DR - AR - 0102			
STATUS		STATUS DESCRIPTION	
S2		FOR INFORMATION	
REVISION	DATE	SCALE	
P1	23/12/24	1:100 @ A0	
CONTRACTORS MUST CHECK ALL DIMENSIONS ON SITE - ONLY FIGURED DIMENSIONS ARE TO BE WORKED FROM - DISCREPANCIES MUST BE REPORTED TO THE ARCHITECT BEFORE PROCEEDING © THIS DRAWING IS COPYRIGHT			LHC PROJECT NUMBER 24140LEE

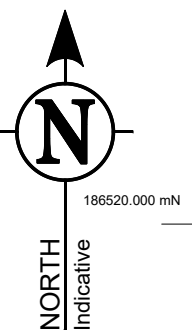
☐ EXETER
01392 444334

☐ PLYMOUTH
01752 669368

☐ LISKEARD
01579 212102
lhc.net

Appendix B

Topographic Site Survey



ABBREVIATIONS & SYMBOLS

[illegible]

DRAWING NOTES

Topographical Surveys

Trees are drawn to scale showing the average canopy spread. Descriptions and heights should be used as a guide only.

All building names, descriptions, number of storeys, construction type including roof line details are indicative only and taken externally from ground level.

All below ground details including drainage, voids and services have been identified from above ground and therefore all details relating to these features including: sizes, depth, description etc will be approximate only. All critical dimensions and connections should be checked and verified prior to starting work.

Detail, services and features may not have been surveyed if obstructed or not reasonably visible at the time of the survey.

Surveyed physical features may not necessarily represent the legal boundary line.

Measured Building Surveys

Measurements to internal walls are taken to the wall finishes at approx 1m above the floor level and the wall assumed to be vertical.

General

The contractor must check and verify all site and building dimensions, levels,

The accuracy of the digital data is the same as the plotting scale implies. All

The survey control listed is only to be used for topographical surveys at the

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This drawing should only be scaled using digital methods.

SURVEY CONTROL CO-ORDINATES				
STATIONS	EASTINGS	NORTHINGS	LEVEL	DESCRIPTION
ST01	334611.552	186422.858	5.883	PK Nail
ST02	334635.282	186465.693	5.917	PK Nail
ST03	334636.528	186435.850	5.974	PK Nail

SURVEY GRID AND LEVEL DATUM

The coordinate system established for this survey is related to Ordnance Survey (OS) National Grid at multiple points using GNSS with a scale factor of 1.000.

The level datum established for this survey is related to Ordnance Survey (OS) using GPS Smartnet.

From the survey, any coordinated data must be directly derived from the original survey control. Survey Solutions are not responsible for any third-party adding new data to the existing information.

V	DESCRIPTION	DRAWN	APPR	DATE
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IPSWICH / BEDFORD / BIRMINGHAM / COVENTRY / CRAWLEY / GLASGOW / LEEDS / LONDON CENTRAL /
LONDON EAST / MANCHESTER / NEWCASTLE / NORWICH / NOTTINGHAM / THAMES VALLEY

PROJECT TITLE
SITE OFF LEE WAY LEE WAY IND. EST.

NEWPORT NP19 4SL

TOPOGRAPHICAL SURVEY
Sheet 1 of 1

CLIENT ALDUSTRIA LTD				SCALE 1:200
SURVEYOR RRH & JM	SURVEY DATE 17/10/2024	CHECKED BY RAH	APPROVED BY RAH	DWG STATUS FINAL
DRAWING NUMBER 58930YOLS-01			REVISION	ISSUE DATE 22/10/2024



Appendix C

DCWW Public Sewer Map

Newport

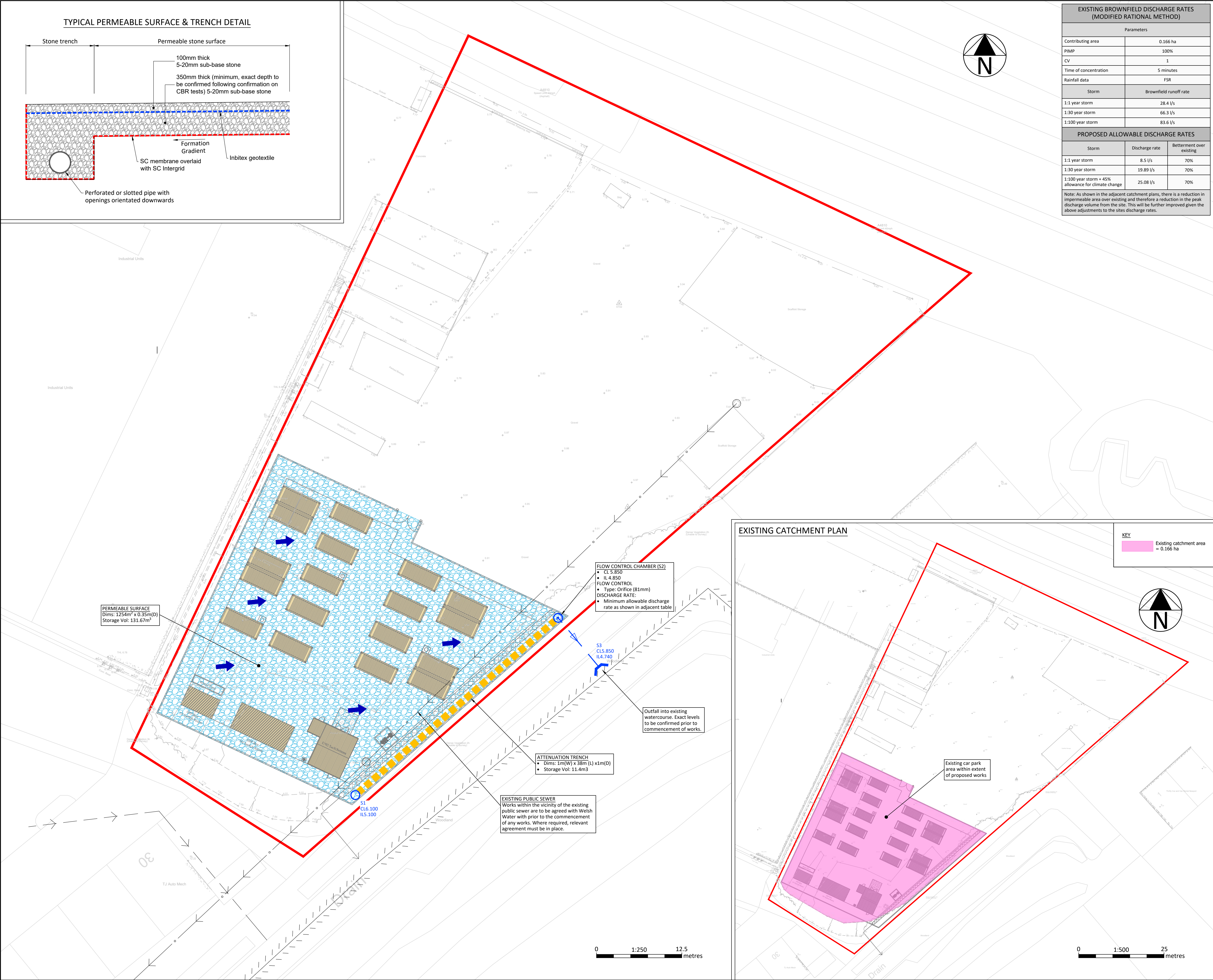


LEGEND(Representative of most common features)

Waste network:																	
																	
																	
																	
																	
																	
																	
																	
																	
																	
																	
																	
																	
																	
																	
																	
																	
																	
																	
																	
																	
																	

Appendix D

Drainage Layout and Calculations



DRAWING STATUS: FOR INFORMATION ONLY			
DESIGN BY:			
CLIENT:			
ARCHITECT:			
PROJECT:			
TITLE:			
SCALE @ A1:			
PROJECT No: 23123			
DRAWING No: PDL-01			
REV: A			



Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	1	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	0.300	Preferred Cover Depth (m)	1.200
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
1		5.00	6.100	1200	334597.159	186394.094	1.000
2	0.162	5.00	5.850	1200	334625.823	186419.148	1.075
3			5.850	1200	334631.886	186410.285	1.182

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	1	2	38.070	0.600	5.100	4.850	0.250	152.3	150	5.78	44.6
1.001	2	3	10.738	0.600	4.775	4.668	0.107	100.0	225	5.92	44.2

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	0.812	14.3	0.0	0.850	0.850	0.000	0.0	0	0.000
1.001	1.307	52.0	19.4	0.850	0.957	0.162	0.0	95	1.216

Simulation Settings

Rainfall Methodology	FSR	Drain Down Time (mins)	240
FSR Region	England and Wales	Additional Storage (m³/ha)	0.0
M5-60 (mm)	20.000	Check Discharge Rate(s)	✓
Ratio-R	0.300	1 year (l/s)	28.4
Summer CV	0.750	30 year (l/s)	66.3
Winter CV	0.840	100 year (l/s)	83.6
Analysis Speed	Normal	Check Discharge Volume	x
Skip Steady State	x		

Storm Durations

15	30	60	120	180	240	360	480	600	720	960	1440
----	----	----	-----	-----	-----	-----	-----	-----	-----	-----	------

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
30	0	0	0
100	40	0	0

Pre-development Discharge Rate

Site Makeup	Brownfield	Time of Concentration (mins)	5.00
Brownfield Method	MRM	Betterment (%)	0
Contributing Area (ha)	0.166	Q 1 year (l/s)	28.4
PIMP (%)	100	Q 30 year (l/s)	66.3
CV	1.000	Q 100 year (l/s)	83.6

Node 2 Online Orifice Control

Flap Valve	x	Invert Level (m)	4.775	Discharge Coefficient	0.600
Replaces Downstream Link	✓	Diameter (m)	0.081		

Node 2 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	4.775	Slope (1:X)	152.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	66	Depth (m)	
Safety Factor	2.0	Width (m)	1.000	Inf Depth (m)	
Porosity	0.30	Length (m)	38.000		

Node 2 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	5.370	Slope (1:X)	100.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	49	Depth (m)	0.350
Safety Factor	2.0	Width (m)	33.000	Inf Depth (m)	
Porosity	0.30	Length (m)	38.000		

Results for 1 year Critical Storm Duration. Lowest mass balance: 99.24%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute winter	1	23	5.201	0.101	2.4	0.1148	0.0000	OK
30 minute winter	2	23	5.198	0.423	16.7	3.8868	0.0000	SURCHARGED
15 minute summer	3	1	4.668	0.000	8.0	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)
30 minute winter	1	1.000	2	-2.4	-0.195	-0.166	0.5765	
30 minute winter	2	Orifice	3	8.5				13.0

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.24%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute winter	1	25	5.513	0.413	5.1	0.4672	0.0000	SURCHARGED
30 minute winter	2	26	5.508	0.733	41.1	16.5066	0.0000	SURCHARGED
15 minute summer	3	1	4.668	0.000	11.1	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)
30 minute winter	1	1.000	2	-5.1	-0.333	-0.354	0.6702	
30 minute winter	2	Orifice	3	11.4				31.9

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.24%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute winter	1	50	5.642	0.542	2.4	0.6128	0.0000	SURCHARGED
60 minute winter	2	49	5.641	0.866	52.6	42.9248	0.0000	FLOOD RISK
15 minute summer	3	1	4.668	0.000	11.9	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 winter	1	1.000	2	-2.4	-0.170	-0.168	0.6702	
60 minute winter	2	Orifice	3	12.4				77.2