

Watling Street, Hinckley

Flood Risk and Drainage Impact Assessment

*Proposed Extension to Food Retail Store
For Aldi Stores Ltd*

Date: 7 June 2023

Doc ref: 28640-ZZ-XX-HYD-RP-C-9000

DOCUMENT CONTROL SHEET

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Client	Aldi Stores Ltd	
Project name	Watling Street, Hinckley	
Title	Flood Risk and Drainage Impact Assessment	
Doc ref	28640-ZZ-XX-HYD-RP-C-9000	
Project no.	28640	
Status	S2	
Date	07/06/2023	

Document Production Record		
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Document Revision Record			
Issue Number	Status	Date	Revision Details
P01	S2	07/06/2023	First Issue – For Comment

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1. INTRODUCTION

This report has been commissioned by Aldi Stores Ltd to examine the flood risk and drainage issues associated with the proposed extensions to their existing food retail store and car park off Watling Street, Hinckley.

The objective of this assessment is to identify any potential risk of flooding to the proposed development and any risk to the adjacent properties as a result of development. This will be undertaken in accordance with the requirements of the National Planning Policy Framework (NPPF) and its associated Technical Guidance. It will also assess the surface and foul water drainage proposals to ensure the development does not increase the risk of flooding elsewhere.

This report is based on the following information;

- Environment Agency (EA) online flood maps
- The Hinckley & Bosworth Council Strategic flood risk assessment (SFRA)
- Site Investigation Report (1997) by CJ Associates
- Severn Trent Water Sewer Records

This report presents the factual information available during the time of appraisal, interpretation of the data obtained and recommendations relevant to the scope of works. It has been assumed in the production of this report that the site is to be developed for a food retail store with associated parking.

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2. SITE DESCRIPTION

2.1 Location

The site, centred on National Grid Reference 439656 , 293328 is located around 3.7km to the north east of Nuneaton and around 9km south east of Atherstone. The existing site area is approximately 0.55 Hectares (Ha) in size with the proposed site area set to increase to 0.75Ha.

The proposed site location plan is included in Appendix A.

2.2 Topography

A topographical survey of the site has been carried out and can be found in Appendix B.

The survey shows that the ground profile of the site generally falls from north east to south west, with a lowest recorded level of 88.810mAOD in the south west corner.

In the north eastern corner of the site, a highest recorded level of 91.400mAOD can be found in the north eastern corner.

Watling Street is located to the southern boundary of the site, running from south east to north west.

A petrol station and residential housing is located within the site directly to the east.

The remaining northern and western boundaries are unoccupied green fields.

2.3 Ground Conditions

A Phase I Geo-environmental Assessment has yet to be undertaken by Hydrock 3E, however the site investigation report from the original store build, completed by CJ Associates in Jan 1997, has been obtained which notes that ground conditions comprise of made ground to depths of around 0.45m Underlain by sandy clay to depths of up to 1.3m which is then underlain by stiff reddish brown clay to depths of 3m.

Water seepage was noted within some trial pits at a depth of around 2.8m.

2.4 Proposed Development

The proposed development layouts are shown in Appendix C. The drawing shows the proposal to extend the existing Aldi food retail store with additional parking areas and associated hard and soft landscaping.

3. EXISTING WATERCOURSE AND DRAINAGE

3.1 Existing Watercourses

There is an unnamed watercourse which intersects the south west corner of the site, this watercourse runs south, crossing below Watling Street, for around 120m where it discharges into the Harrow Brook.

The Harrow Brook then continues in a south west direction for around 1.8km where it merges with the Sketchley Brook near Wheatcroft Farm.

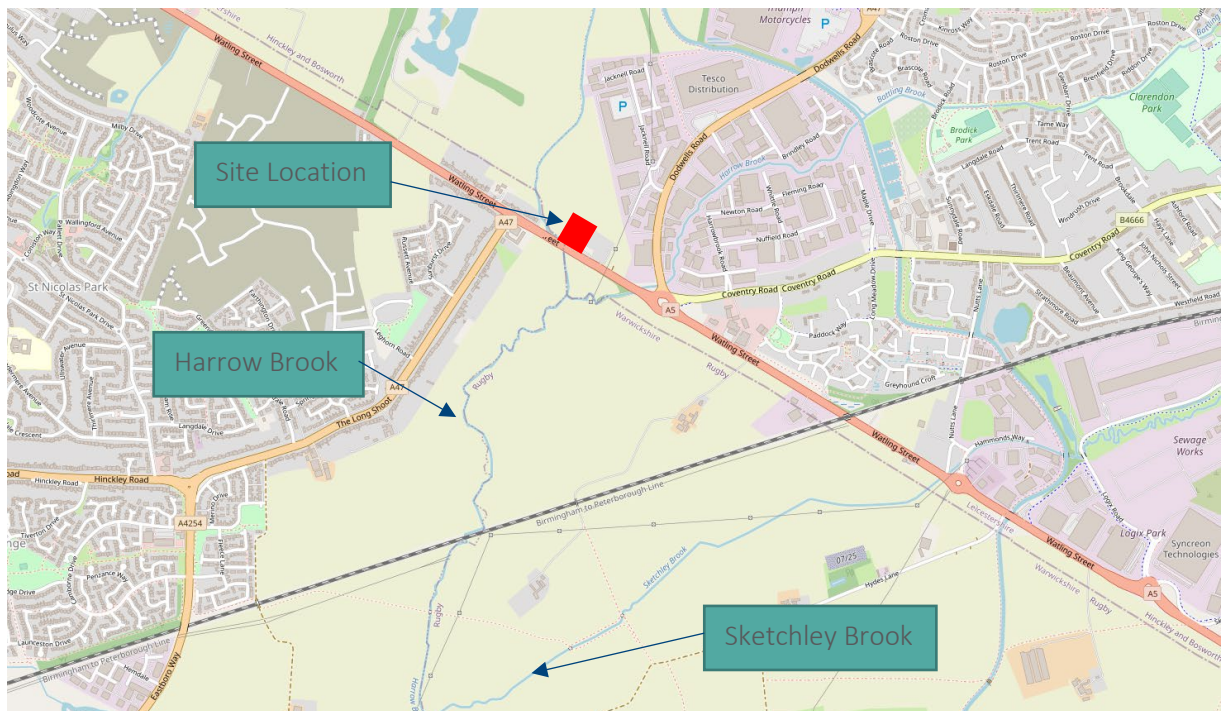


Figure 1 : Existing Water Course Map

3.2 Existing Positive Drainage Networks

A copy of the Severn Trent public sewer map has been obtained and is provided within Appendix D.

The records show a 150mm combined sewer is located within the site and runs from the central parking area to the east through the adjacent residential property.

To the southern boundary of the site, there is a 225mm surface water sewer running from east to west, discharging into the watercourse located within the south west corner of the site.

4. FLOOD ZONE AND RISK TO THE PROPOSED DEVELOPMENT

The site has been assessed for flood risk based on information from online EA Flood Map for Planning and Long term Flood Risk Mapping.

All sources of flooding have been reviewed including fluvial, sea, surface water, groundwater, sewer and artificial sources.

4.1 Fluvial and Sea Flooding

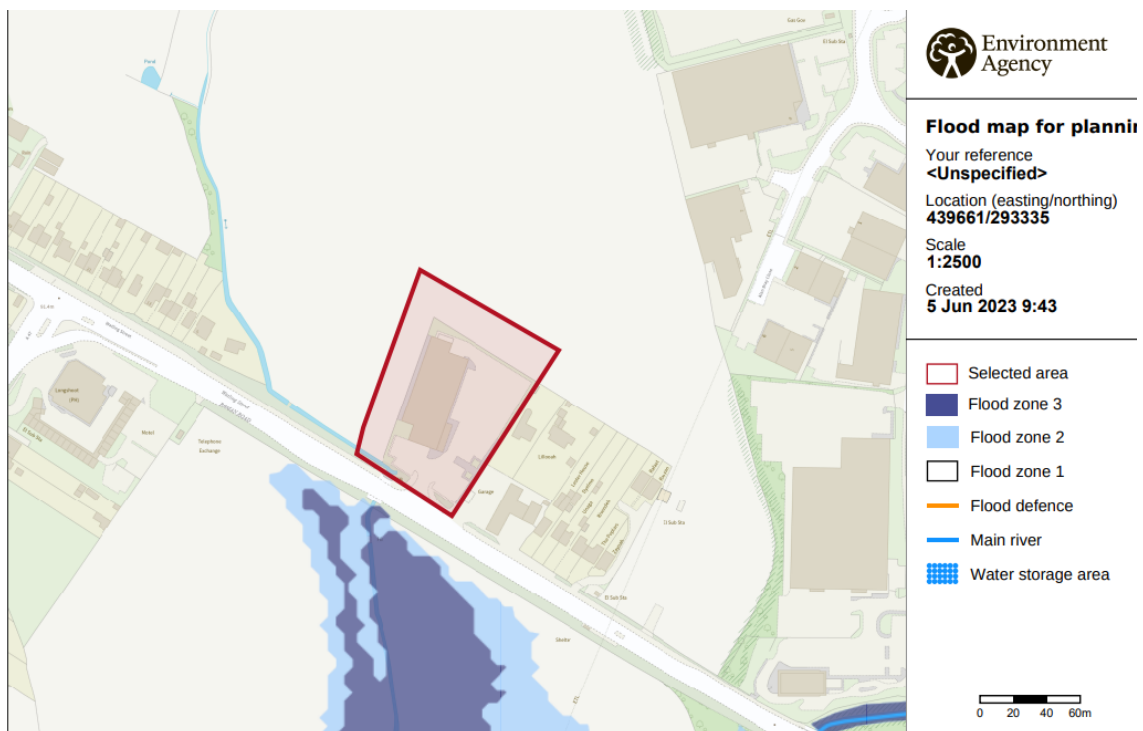
The EA Flood Zones refer to the probability of river and sea flooding. The mapping does not take account of the possible impacts of climate change, or the presence of flood defences. Flood Zone definitions are set out in the National Planning Policy Framework (NPPF) as the following:

- Flood Zone 1: Land assessed as having a less than 1 in 1,000 annual probability of river or sea flooding (<0.1%).

- Flood Zone 2: Land assessed as having between a 1 in 100 and 1 in 1,000 annual probability of river flooding (1% – 0.1%), or between a 1 in 200 and 1 in 1,000 annual probability of sea flooding (0.5% – 0.1%) in any year.
- Flood Zone 3: Land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%), or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year.

4.2 Flood Map for Planning

The EA Flood Map for Planning shows the site to be wholly located within Flood Zone 1. The site is therefore considered to be at a low probability of fluvial flooding based on the EA online flood maps. An extract of the flood map can be found below.



4.3 Historic Flooding

There are no historic records of the site ever having flooded. This does not mean that the site may never have flooded, just that there are no records of any flooding occurring.

4.4 Surface Water Flooding

Surface water flooding occurs when the amount of rainfall exceeds the drainage or infiltration capacity of the surface it falls upon. Surface water runoff can coalesce into surface water flow pathways, especially in urban areas where there is a large proportion of impermeable ground surface due to development, as it flows towards a drainage system or watercourse. Surface water can also pond within areas with inadequate drainage.

The Environment Agency has worked together with Lead Local Flood Authorities who deal with surface water flooding to produce Updated Flood Map for Surface Water mapping which places areas at risk of flooding from surface water into the following categories:

- High risk: The area has a chance of flooding of greater than 1 in 30 (3.3%) each year.
- Medium risk: The area has a chance of flooding of between 1 in 100 (1%) and 1 in 30 (3.3%) each year.
- Low risk: The area has a chance of flooding of between 1 in 1000 (0.1%) and 1 in 100 (1%) each year.
- Very low risk: The area has a chance of flooding of less than 1 in 1000 (0.1%) each year.

An extract of the Flood Map for Surface Water mapping is shown within Figure 2.

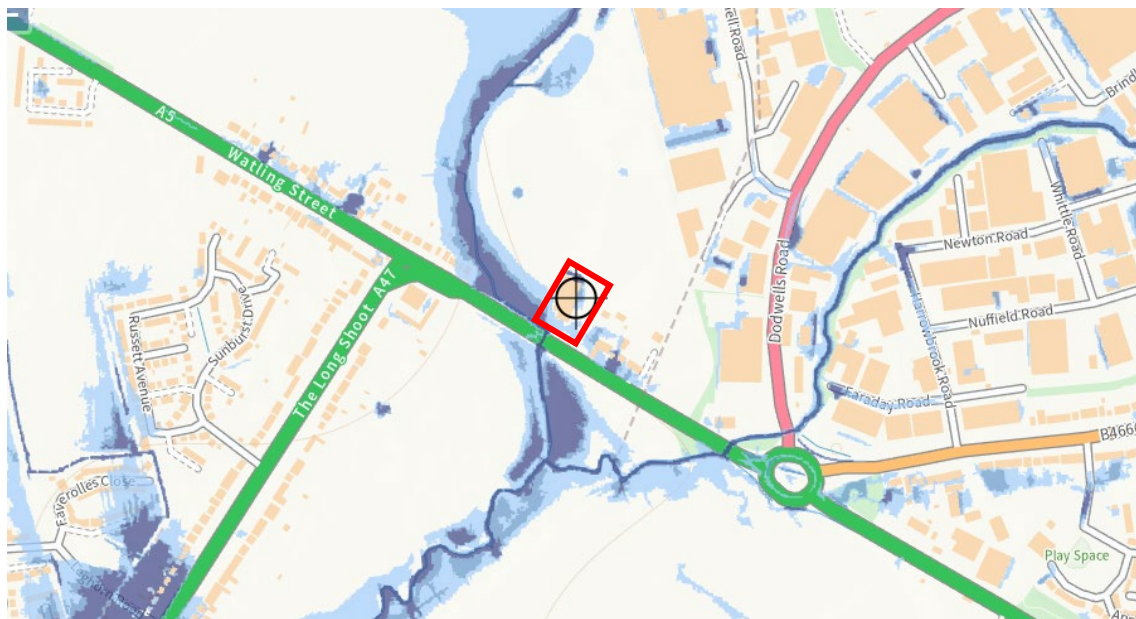


Figure 2 : Extract of the Environment Agency Surface water Flood Map

The flood map shows that the site is at a medium-high risk of surface water flooding.

The high-risk area is shown to be within the loading bay area of the site, this area sits 1.3m below the FFL of the building and surface water is confined by a retaining wall and drain via a channel drain. The channel drain is regularly maintained and it is therefore considered that this area does not pose a significant risk to the property or adjacent properties.

There are medium risk areas shown to the eastern and southern areas of parking adjacent to the building. These areas are due to low lying sections of the car park with insufficient gradients to positive drainage, as part of the extensions works there will be works to these parking areas to ensure suitable gradients to prevent any standing surface water. It is therefore considered that the future risk will be very low.

4.5 Flooding from Artificial sources

The Environment Agency Long Term Flood Risk Mapping has been reviewed to determine the risk of flooding from artificial sources such as reservoirs, canals or flood defences. These maps will show any areas of potential risk of flooding due to failure of such structures.

The below extract of the EA flood maps shows that the site is at very low risk of this type of flooding.

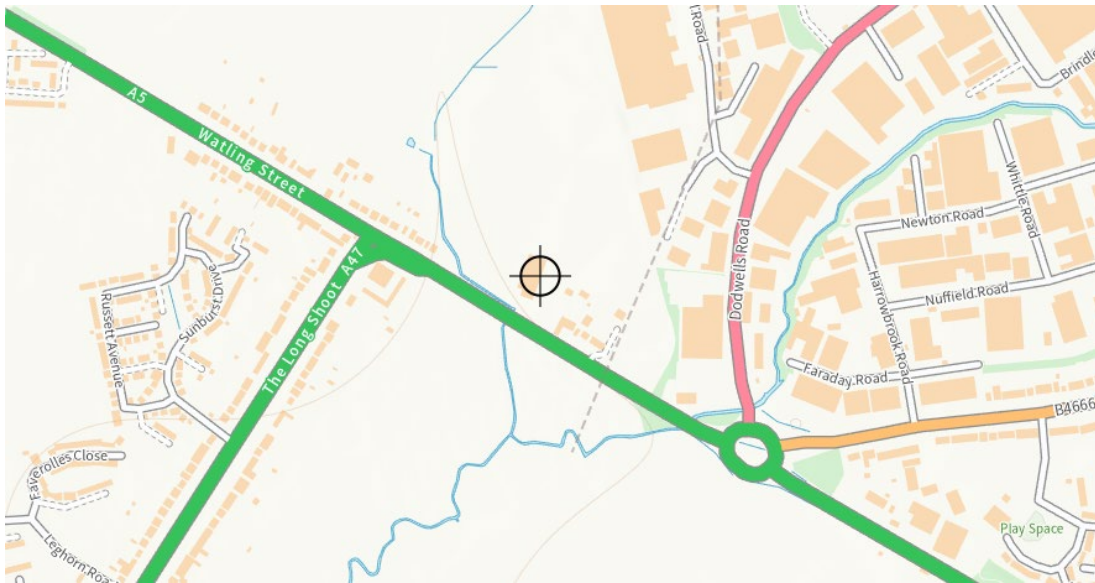


Figure 3 : Extract of the Environment Agency Reservoir Flood Map

4.6 Ground water flooding

The 1997 site investigation report from CJ Associates shows that groundwater was encountered at a depth of 2.8m. It is therefore considered that the risk of groundwater flooding is low.

Any local groundwater ingress encountered within excavations should be resolved with normal pumping methods.

Any residual flood risk from the perched groundwater will be mitigated by intercepting runoff and shaping the site levels towards positive on-site drainage systems.

4.7 Sewer Flooding

A further possible source of flooding is from the flooding of existing/proposed drainage systems and the public sewers. Sewers may be at risk of flooding during times of heavy rainfall, which can cause sewers to surcharge.

The existing public surface water sewer located to the southern boundary is located at the lowest boundary of the site and levels beyond this boundary fall away from the site. If flooding was to occur it would be directed away from the Aldi car park.

The new surface water drainage system within the site will be designed to ensure any flooding occurring from a storm event in excess of this up to a 1 in 100 year + 40% climate change event will be retained on site where possible.

Therefore, the site is considered to be at low risk of flooding from sewers.

5. SURFACE WATER AND FOUL DRAINAGE

5.1 Existing Surface Water

Existing surface water drainage within the site currently makes 2No unrestricted discharges into the watercourse to the south west corner of the site. One connection for roof water and one connection for surface water from external areas, which passes through a petrol interceptor prior to discharge into the watercourse. Surface water within the car park area is currently collected by a range of road gullies and channel drains.

5.2 Proposed Surface Water

In line with the NPPF, the aim should be to discharge surface water run-off from the site in line with the order of priority within the surface water drainage hierarchy;

1. Into the ground (infiltration)
2. To a surface water body
3. To a surface water sewer, highway drain or another drainage system
4. A combined water sewer.

Infiltration to ground is not feasible, due to site being underlain by stiff clay and groundwater found to be present within 3m of the existing ground level.

The nearest named open watercourse is located within the site at the south west corner of the car park, 2No existing connection from the site currently discharge into the watercourse. It is therefore proposed that both connections will be maintained, with new drainage to make a connection upstream of the existing outfalls.

5.3 Surface Water Discharge Rate

The 2No existing discharges from the site currently have no flow restriction. Due to the nature of the two areas served by the existing discharges, the roof area and the additional parking area, it will be necessary to take a slightly different approach to the proposed flows of each.

Roof Area

The new roof area is unable to be installed as a separate drainage system to the existing roof, it is therefore proposed to merge both areas into the proposed system and utilise the existing outfall, ensuring that the existing flow rate for all storm events is not exceeded with the additional area.

Calculations within Appendix G contain the existing and proposed roof flow rates, a table summarising these can be found below:

Storm Event	Existing Flow Rate (l/s)	Proposed Flow Rate (l/s)
1 in 1	9.8	8.2
1 in 30	24	16.6
1 in 100 +20%CC	37.4	29.4
1 in 100 +40%CC	43.7	35.3

This shows that discharge rates for all storm events will reduce in comparison to the existing discharge rate from the roof area. This will be achieved through the installation of 140mm orifice plate within the final manhole prior to discharge and attenuating excess flows upstream.

Additional Parking Area

It is possible to ensure that the proposed parking area is drained via a new system, with a restricted discharge into the head of the existing car park system. It would therefore be proposed to restrict flows to 1 in 1 year storm event greenfield flow rate to mimic the existing flow rate of the current greenfield area.

The 1 in 1 year greenfield flow rate has been calculated using Causeway Flow, the results of this calculation can be seen below.

Pre-development discharge

Site Makeup: Greenfield

Greenfield Method: IH124

Positively Drained Area (ha): 0.101

SAAR (mm): 644

Soil Index: 4

SPR: 0.47

Region: 4

Betterment (%): 0

Calc

QBar (l/s): 0.4

Return Period (years)	Growth Factor	Q (l/s)
1	0.83	0.4
30	1.99	0.9
100	2.57	1.1

It is considered impractical to restrict flows to a discharge rate as low as 0.4l/s and to do so would lead to an increased risk of blockages and flooding within the system. It is therefore proposed to restrict flows to a maximum discharge rate of 5l/s which will be achieved through the use of a hydrobrake chamber and attenuating excess flows upstream.

A copy of the proposed drainage layout can be found in Appendix E.

5.4 Surface Water Treatment

Sustainable Urban Drainage Systems (SUDS) should also be used wherever possible to mimic as far as practicable the natural run off regime, improve water quality, reduce run-off volume and attenuate peak flows. These should be designed in accordance with the current guidance, The SUDS Manual (CIRIA C753) and should meet the required treatment indices levels in line with this guidance.

According to Table 26.2 of the SuDS Manual (C753), the proposed roof area has been rated as having a low pollution hazard with the following pollution hazard indices:

Table 1 Extract of Table 26.2 C753

Pollution Hazard	Total Suspended Solids(TSS)	Metals	Hydrocarbons
Other Roofs - Low	0.3	0.2	0.05

Roof water will pass through filter trenches located within landscaping to the rear of the store and in line with Table 26.3 of the SuDS manual (C753) this will provide the following mitigation indices.

Table 2 Extract of Table 26.3 C753

Type of SuDS	Total Suspended Solids(TSS)	Metals	Hydrocarbons
Filter Drain	0.4	0.4	0.4

These indices are greater than the pollution hazard indices and therefore provide sufficient treatment from the roof area.

According to Table 26.2 of the SuDS Manual (C753), the proposed car park has been rated as having a medium pollution hazard with the following pollution hazard indices:

Table 3 Extract of Table 26.2 C753

Pollution Hazard	Total Suspended Solids(TSS)	Metals	Hydrocarbons
Non-residential car park	0.7	0.6	0.7

Surface water from the car park will pass through a SuDS compliant proprietary treatment system, the ESR Stormceptor from Spel and in line with SPEL's datasheets this will provide the following mitigation indices.

Table 4 Extract of SPEL ESR Stormceptor Datasheet

Type of SuDS	Total Suspended Solids(TSS)	Metals	Hydrocarbons
ESR Stormceptor	0.8	0.6	0.9

These indices are greater than the pollution hazard indices and therefore provides sufficient treatment for the car park area.

5.5 Surface Water Attenuation

In order to maintain the existing discharge rates from the roof drainage system, a volume of 15.5m³ will be required within the drainage system to attenuate excess flows.

This will be provided in the form of a cellular storage tank situated within the existing car park just north-east of the existing watercourse, as detailed on the drainage layout within Appendix E.

Based on a maximum discharge rate of 5l/s from the new parking area, a volume of 32m³ will be required within the drainage system to attenuate excess flows.

This will be provided in the form of a cellular storage tank situated within new area of car park just north east of the loading bay area, as detailed on the drainage layout within Appendix E.

Calculations are provided in Appendix G which demonstrate that no flooding will occur up to the 1in100+40%CC.

5.6 Surface Water Maintenance

Insufficient maintenance of drainage structures can result in increasing the risk of flooding as run off is unable to enter the drainage system. This can result in surcharge due to blockages, or flows being directed elsewhere due to it being unable to enter the system. This also results in insufficient treatment of surface water resulting in an increased risk of pollutants entering the system.

Maintenance of all new private drainage should be undertaken in accordance with the proposed maintenance plan attached in Appendix H.

5.7 Surface Water Exceedance Flows

Storage will be provided for the 1 in 1in100+40%CC storm event with all surface water retained below ground within the drainage system, calculations are contained within Appendix F & G.

Flood exceedance routes have therefore not been considered further in this report.

The proposed additional site area currently comprises of greenfield space comprising of grass. The contractor is to consider risk of surface water run-off, water quality risk and any receptors during construction in accordance with current CIRIA C532 guidance document.

5.8 Foul Water Drainage

It is proposed that any additional foul connections required will utilise existing foul drainage immediately adjacent to the existing building.

6. CONCLUSIONS AND RECOMMENDATIONS

The site has been reviewed in relation to all potential sources of flooding. The proposed development will not exacerbate flooding elsewhere

It is proposed to discharge surface water flows from the additional parking area into the existing drainage system. The existing system will continue to discharge into the adjacent watercourse to the south west corner.

Surface water flows will be restricted to 5l/s from the new parking area, flows will be restricted through a hydrobrake chamber upstream of the existing surface water manhole to the top of the loading bay.

Restricting flows to 5l/s will require a total attenuation volume of 32m³, provided in the form of a cellular storage tank. Details can be found on the drainage layout within Appendix E.

Treatment of surface water flows from the car park will fully satisfy the required treatment indices as per Ciria guidance, this will be in the form of an ESR stormceptor treatment system from SPEL.

The existing drainage system for the existing roof area will be replaced by a new system to accommodate the entire roof area, the existing outfall to the watercourse will be maintained for this system.

Discharge rates from the new roof system will reduce from the existing system for all storm events up to and including the 1 in 100 year +40%CC. This will be achieved through the installation of 140mm orifice plate upstream of the existing outfall

Maintaining the existing discharge rates will require a total attenuation volume of 15.5m³, provided in the form of a cellular storage tank. Details can be found on the drainage layout within Appendix E.

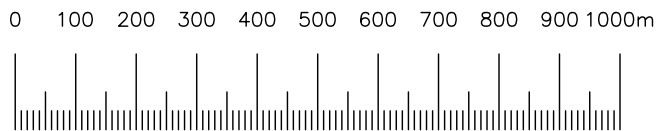
Treatment of surface water flows from the roof area will fully satisfy the required treatment indices as per Ciria guidance, this will be in the form of filter trench to the rear of the store.

No flooding will occur to the surface for all rainfall events up to and including the 1in100yr+40%CC. As demonstrated within the calculations in Appendix F & G.

Appendix A Site Location Plan



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LINEAR SCALE 1:1250

Revision	Description	Date	Drawn	Checked
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STOAS Architects Ltd
PLANNING

CLIENT **ALDI STORES LIMITED**
PROJECT **WATLING STREET,
HINCKLEY, LEICESTERSHIRE**
TITLE **SITE LOCATION PLAN**



STOAS
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1 DUNSTON PLACE - DUNSTON ROAD - CHESTERFIELD - S41 8NL - TEL 01246 389 860

SCALE **1:1250 @ A4** DRAWN **SI**
DATE **05.01.2022** CHECKED **SB**



DWG No.

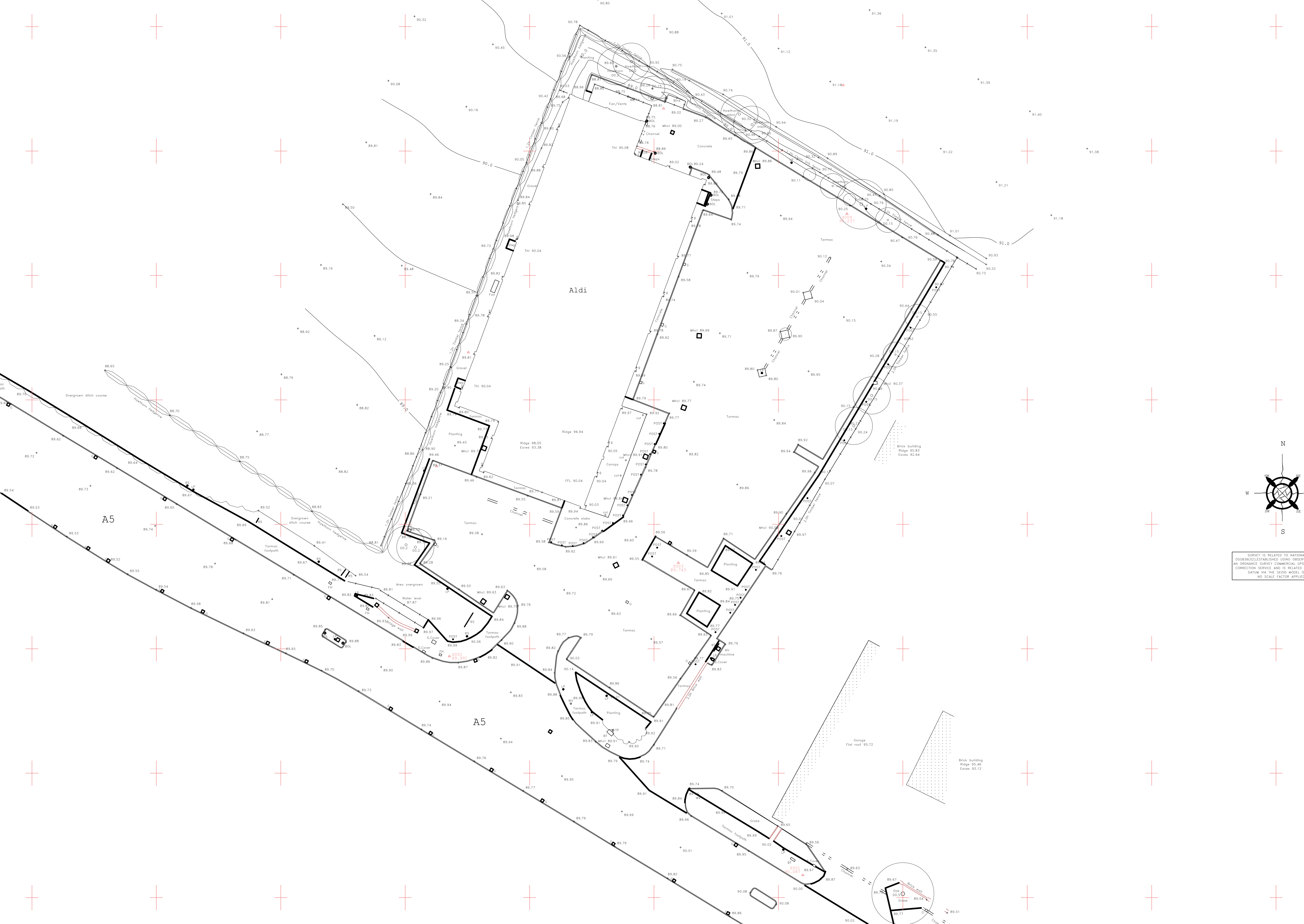
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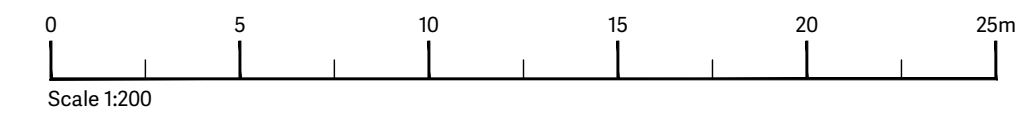
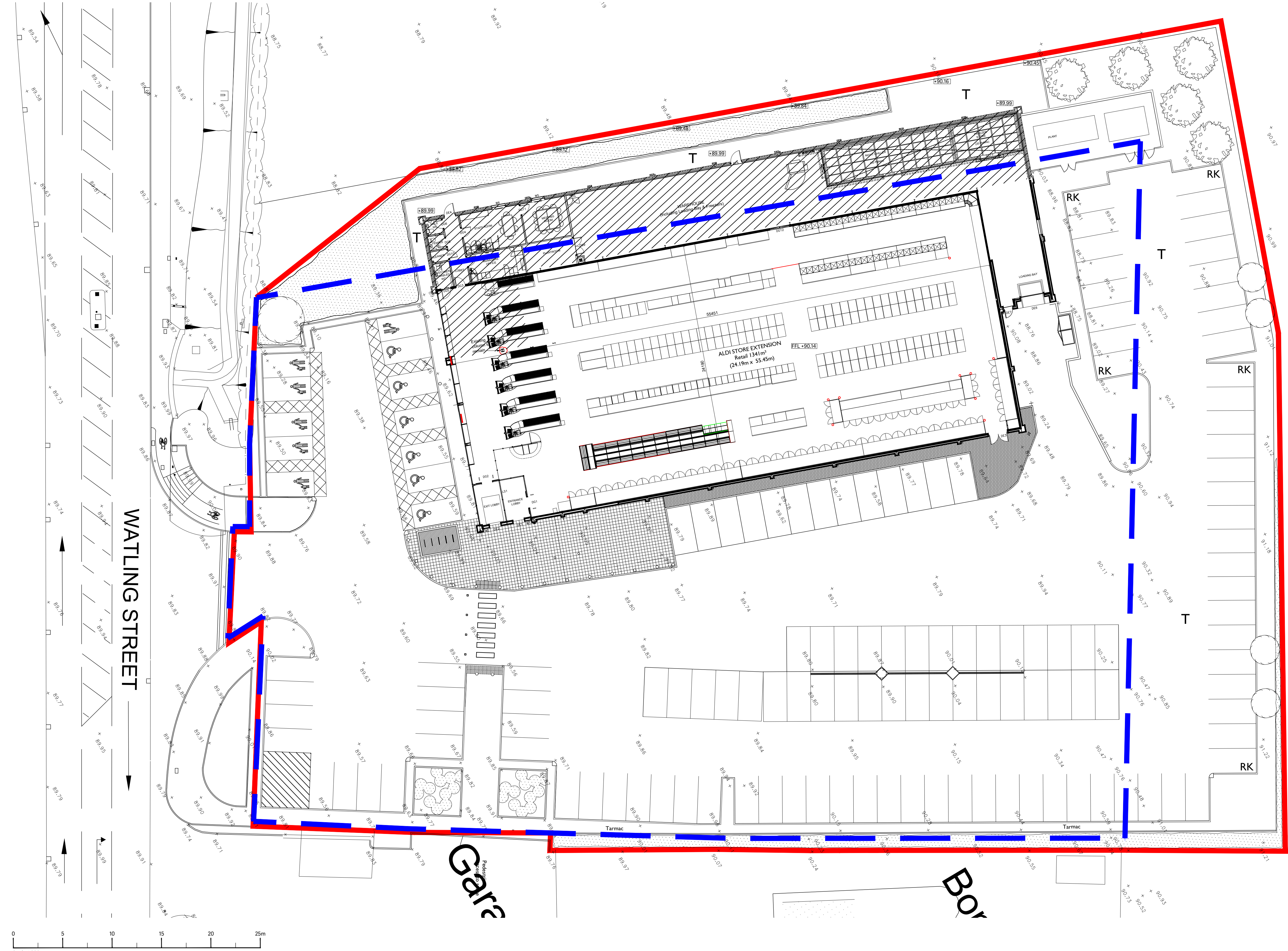
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Appendix B Topographical Survey



Appendix C Proposed Development Layout



ACCESS ARRANGEMENTS

This statement relates to the access arrangements for the Aldi Food Retail Store and details the arrangements for all modes of transport to and from the store. It also includes details of how level access arrangements are achieved and how the entrance to the store operates. This statement is to be read in conjunction with the separate Design and Access statement.

There are a total of 135No. proposed car parking spaces including 6No. Disabled parking spaces and 6No. Parent and Child parking spaces.

The store access is under a glazed canopy with a set automatic sliding entrance doors with a clear opening of 1100 mm and glazing manifestation giving full access to all customers and staff. The junction between the retail store finished floor level and the external floor is a flush transition detail.

The general car parking is laid out to a gradient of no more than 1:40 (1:60 across disabled bays) which prevents any loss of loaded trolleys and also allows for easy access to the store frontage from any area within the car park.

Pedestrian access is provided from Watling St, via footpaths separated from the car parking areas.

Contained within the site is a dedicated delivery yard with loading bay, service areas, bin storage and turning facilities for the HGV and rigid commercial (milk) vehicle.

HARD LANDSCAPING LEGEND	
RK	RAISED KERB
EK	EDGING KERB
FK	FLUSH KERB
DK	DROP KERB
TK	TRANSITION KERB
TRK	TRIEF (SAFETY KERB) KERB
TTK	TRIEF (SAFETY KERB) TRANSITION KERB
TP	TACTILE PAVING
BC	BRUSHED CONCRETE
T	TARMAC
SSB	STAINLESS STEEL BOLLARD
HDB	HEAVY DUTY BOLLARD
TB	TELESCOPIC BOLLARDS AT SITE ENTRANCE
DC	DRAINAGE CHANNEL
G	NEW STORM WATER DRAINAGE GULLY

	SINGLE LIGHT LIGHTING COLUMN
	DOUBLE LIGHT LIGHTING COLUMN
	EXISTING TREES
	NEW TREES
	LOW LEVEL LANDSCAPING
	PROPOSED LEVELS
	EXISTING LEVELS

SITE AREA	7625 sq m (1.8 acres approx)	
CAR PARKING	Existing: 88 no Approx. (2.4 x 4.8m)	
	Proposed: 135 No Approx.	
CYCLE SPACES	10 No.	
GROSS EXTERNAL AREA (GEA)	1907 sq m	20,526 sq ft
GROSS INTERNAL AREA (GIA)	1842 sq m	19,827 sq ft
RETAIL AREA 55.45m (L) x 24.19m (W)	1340 sq m	14,423 sq ft
WELFARE BLOCK (including Plant Room)	101 sq m	1,087 sq ft
WAREHOUSE (including Loading Bay & Freezers)	386 sq m	4154 sq ft

PROPOSED EXTENSION EXISTING SITE BOUNDARY

1	Rev Details.	00/00/00	ABC	ABC
Revision	Description	Date	Drawn	Checked

STOAS Architects Ltd
PLANNING



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1 DUNSTON PLACE - DUNSTON ROAD - CHESTERFIELD - S41 8NL - TEL 01246 389 860

CLIENT **ALDI STORES LTD**

PROJECT **WATLING ST
HINCKLEY
LEICESTERSHIRE**

TITLE **PROPOSED SITE PLAN**

DATE **26.01.2022** SCALE **1:200 @A1**

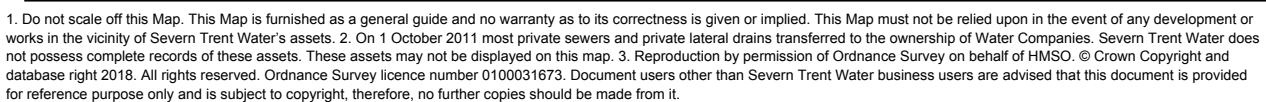
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NORTH

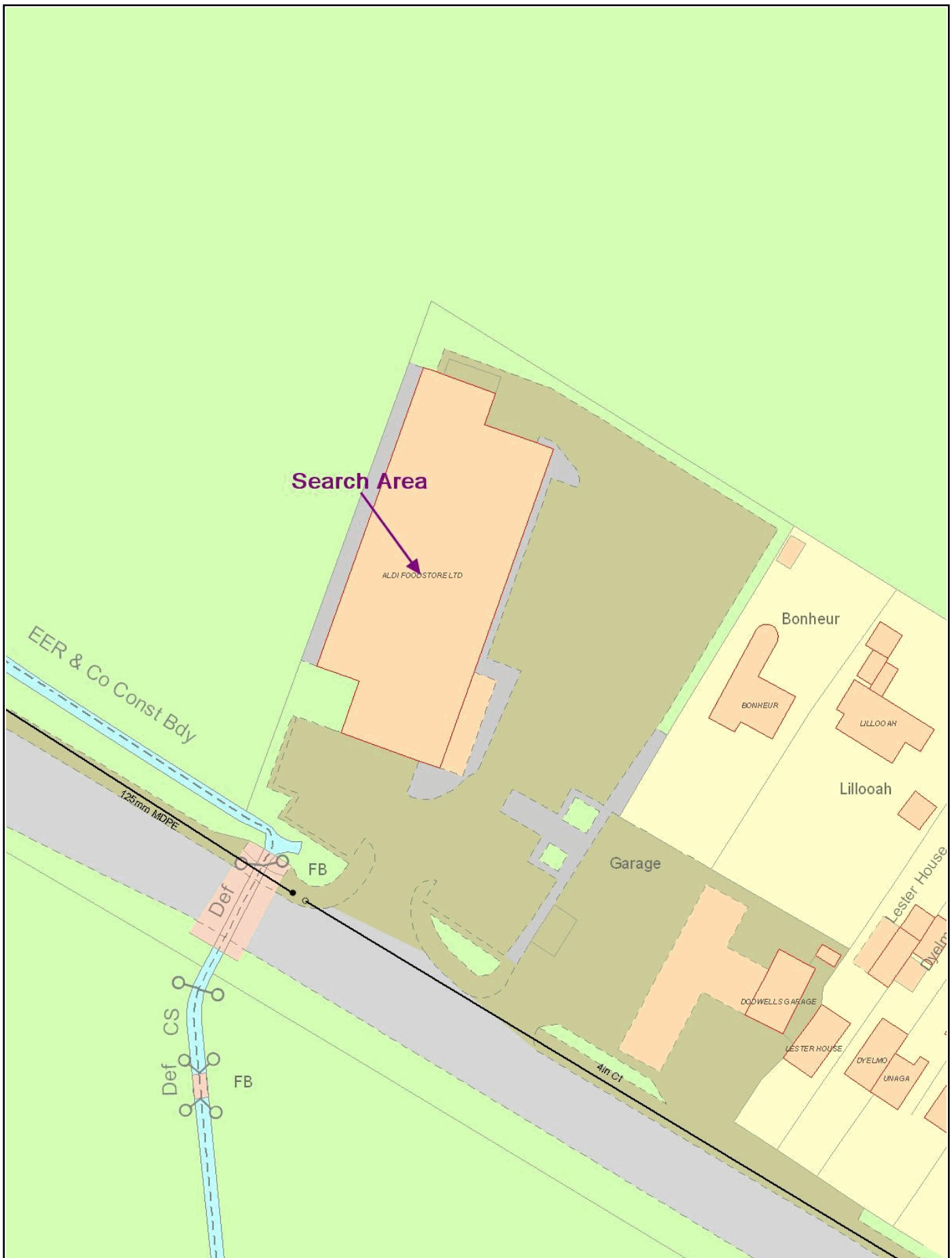
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Appendix D Severn Trent Water Sewer Records



WATER RECORD Aldi site at, Watling Street, HINCKLEY, LE10 3ED



1. Do not scale off this Map. This Map is furnished as a general guide and no warranty as to its correctness is given or implied. This Map must not be relied upon in the event of any development or works in the vicinity of Severn Trent Water's assets. 2. On 1 October 2011 most private sewers and private lateral drains transferred to the ownership of Water Companies. Severn Trent Water does not possess complete records of these assets. These assets may not be displayed on this map. 3. Reproduction by permission of Ordnance Survey on behalf of HMSO. © Crown Copyright and database right 2018. All rights reserved. Ordnance Survey licence number 0100031673. Document users other than Severn Trent Water business users are advised that this document is provided for reference purpose only and is subject to copyright, therefore, no further copies should be made from it.

Appendix E Proposed Drainage Layout

REV	DATE	DESCRIPTION	DRW	CHK
P01	05/06/2023	PRELIMINARY ISSUE	GS	MP

- HEALTH & SAFETY**
1. CONTRACTOR SHOULD BE AWARE OF GENERAL CONSTRUCTION RISKS TO PREVENT SLIPS, TRIPS AND FALLS AND TAKE NECESSARY PRECAUTIONS WITHOUT SPECIAL INSTRUCTION.
- ROADS & DRAINAGE**
2. CONTRACTOR TO PROVIDE TRENCH SUPPORTS AS APPROPRIATE AND ENSURE THAT PLANT REMAINS A SAFE DISTANCE FROM TRENCHES PRIOR TO INSTALLING DRAINAGE.
3. THE TIME THAT EXCAVATIONS ARE OPEN ON SITE SHOULD BE KEPT TO A MINIMUM AND ALL TRENCHES SHOULD BE SURROUNDED BY A BARRIER.
4. CONNECTIONS TO EXISTING SEWERS TO BE MADE BY NWL APPROVED CONTRACTOR ONLY.
5. CONTRACTOR TO MAKE OPERATIVES AWARE OF ASSOCIATED DANGERS TO HEALTH SUCH AS LEPTOSPIROSIS (WELLS DISEASE) AND RECOMMENDED PRECAUTIONS. ADEQUATE WELFARE FACILITIES AND PROTECTIVE CLOTHING TO BE PROVIDED AS REQUIRED.
6. UNFINISHED MANHOLES MUST BE COVERED WITH LOAD BEARING MATERIALS AND SURROUNDED WITH BARRIER.
7. UNFINISHED MANHOLES MUST BE COVERED WITH LOAD BEARING MATERIALS AND SURROUNDED WITH BARRIER.
8. SERVICE RECORDS TO BE REFERRED TO PRIOR TO WORK COMMENCING. CONTRACTOR TO PROCEED WITH CAUTION AND SERVICES TO BE LOCATED BY HAND DIG AND PROTECTED ACCORDINGLY.
- EXCAVATION/FILL**
9. CONTRACTOR TO ENSURE RELEVANT MEASURES ARE TAKEN TO KEEP PLANT AND PEOPLE A SAFE DISTANCE FROM STEEP SLOPES DURING THE WORKS.
10. CONTRACTOR TO ENSURE THAT PROCEDURES ARE IN PLACE TO KEEP PEOPLE A SAFE DISTANCE FROM WORKING PLANT WHERE NECESSARY.
11. CONTRACTOR TO REFER TO GROUND INVESTIGATION REPORT FOR CONTAMINATION TESTS AND TO PROVIDE ADEQUATE WELFARE FACILITIES AND PROTECTIVE CLOTHING AS REQUIRED.

Drainage Key

Proposed Foul drain and manhole	
Proposed Storm drain and manhole	
Proposed Combined drain and manhole	
Existing Foul sewer and manhole	
Existing Surface Water sewer and manhole	
Existing Combined sewer and manhole	
Private storm rodding eye	
450mm dia. private inspection chamber.	
600mm dia. private inspection chamber.	
Proposed road gully & connecting pipe work. 1500 pipe unless noted otherwise	
Proposed channel drain with D400 rated pedestrian type covers and sump outlets	
Condensate Drain 1000 pipe unless noted otherwise	
Soil Stack 1000 pipe unless noted otherwise	

CONTRACTOR TO PROVIDE CCTV SURVEY OF ALL NEW DRAINAGE UPON COMPLETION

Client
Aldi Stores Ltd.

Project Title
Aldi - Hinckley (Extension)

Project Address
Watling Street, Hinckley

Drawing Title
Proposed Drainage Layout

Job No.	Originator	Zone	Level	Type	Role
79-E0xxx H3E	ZZ	XX	DR	C	
System Classification	Drawing No.	Suitability	Revision		
Ro_50_20_11-1000	S2	P01			

Drawn	Checked	Date	Scale	Size
GS	MP	June 23	1:250	A1

Newcastle Office
2 Esh Plaza, Sir Bobby Robson Way
Great Park, Newcastle upon Tyne
NE13 9BA

Hydrock
3E

Tel : 0191 230 2993
newcastle@seconaut.com

Appendix F Proposed Car Park Drainage Calcs

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	0.400	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)
S3	0.101	5.00	90.080	1200	439683.665	293358.334	1.350
TANK	0.000		89.870	600	439684.653	293363.464	1.570
S4	0.000		89.850	1500	439680.120	293362.911	1.567

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	S3	TANK	5.224	0.600	88.730	88.375	0.355	14.7	150	5.03	50.0
1.001	TANK	S4	2.776	0.600	88.300	88.283	0.017	167.0	225	5.08	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	2.639	46.6	13.7	1.200	1.345	0.101	0.0	55	2.294
1.001	1.009	40.1	13.7	1.345	1.342	0.101	0.0	90	0.913

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	5.224	14.7	150	Circular	90.080	88.730	1.200	89.870	88.375	1.345
1.001	2.776	167.0	225	Circular	89.870	88.300	1.345	89.850	88.283	1.342

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	S3	1200	Manhole	Adoptable	TANK	600	Manhole	Adoptable
1.001	TANK	600	Manhole	Adoptable	S4	1500	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
S3	439683.665	293358.334	90.080	1.350	1200				
						0	1.000	88.730	150
TANK	439684.653	293363.464	89.870	1.570	600		1	1.000	88.375
						0	1.001	88.300	225

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
S4	439680.120	293362.911	89.850	1.567	1500	1 	1.001	88.283	225

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Detailed
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	60	120	180	240	360	480	600	720	960	1440
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Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
30	0	0	0
100	20	0	0
100	40	0	0

Node S4 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	88.283	Product Number	CTL-SHE-0106-5000-1000-5000
Design Depth (m)	1.000	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	5.0	Min Node Diameter (mm)	1200

Node TANK Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	88.300	Slope (1:X)	1000.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	79	Depth (m)	0.720
Safety Factor	2.0	Width (m)	4.800	Inf Depth (m)	
Porosity	0.96	Length (m)	9.600		

Results for 1 year Critical Storm Duration. Lowest mass balance: 99.84%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S3	10	88.793	0.063	14.2	0.1667	0.0000	OK
30 minute winter	TANK	24	88.410	0.110	11.0	4.6821	0.0000	OK
30 minute winter	S4	24	88.409	0.126	4.4	0.2229	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	S3	1.000	TANK	14.1	2.141	0.302	0.0344	
30 minute winter	TANK	1.001	S4	4.4	0.351	0.111	0.0586	
30 minute winter	S4	Hydro-Brake®		4.4				8.6

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.84%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S3	10	88.850	0.120	34.9	0.3156	0.0000	OK
60 minute winter	TANK	47	88.624	0.324	17.8	14.2035	0.0000	SURCHARGED
60 minute winter	S4	47	88.623	0.340	5.4	0.6014	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	S3	1.000	TANK	34.5	2.541	0.740	0.0765	
60 minute winter	TANK	1.001	S4	5.4	0.366	0.135	0.1104	
60 minute winter	S4	Hydro-Brake®		5.0				26.1

Results for 100 year +20% CC Critical Storm Duration. Lowest mass balance: 99.84%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S3	11	89.220	0.490	54.4	1.2863	0.0000	SURCHARGED
60 minute winter	TANK	59	88.906	0.606	27.7	26.7454	0.0000	SURCHARGED
60 minute winter	S4	59	88.905	0.622	5.8	1.0995	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	S3	1.000	TANK	49.6	2.817	1.063	0.0920	
60 minute winter	TANK	1.001	S4	5.8	0.384	0.145	0.1104	
60 minute winter	S4	Hydro-Brake®		5.0				41.3

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.84%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S3	11	89.469	0.739	63.5	1.9410	0.0000	SURCHARGED
60 minute winter	TANK	59	89.168	0.868	31.6	31.8977	0.0000	SURCHARGED
60 minute winter	S4	59	89.168	0.885	6.0	1.5629	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	S3	1.000	TANK	57.1	3.244	1.224	0.0920	
60 minute winter	TANK	1.001	S4	6.0	0.396	0.149	0.1104	
60 minute winter	S4	Hydro-Brake®		5.0				48.1

Appendix G Existing & Proposed Roof Area Calculations

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	0.400	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)
RE1	0.000	5.00	89.800	150	439646.460	293369.176	0.300
IC	0.073		88.800	600	439618.954	293292.637	0.780

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	RE1	IC	81.500	0.600	89.500	88.020	1.480	55.1	150	6.00	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	1.358	24.0	0.0	0.150	0.630	0.000	0.0	0	0.000

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	81.500	55.1	150	Circular	89.800	89.500	0.150	88.800	88.020	0.630

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	RE1	150	Manhole	Adoptable	IC	600	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
RE1	439646.460	293369.176	89.800	0.300	150					
						0	1.000	89.500	150	
IC	439618.954	293292.637	88.800	0.780	600		1	1.000	88.020	150

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Detailed
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 (m ³ /ha)	20.0
Summer CV	0.750	Check Discharge Rate(s)	x
Winter CV	0.840	Check Discharge Volume	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	20	0	0
100	40	0	0

Results for 1 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	RE1	1	89.500	0.000	0.0	0.0000	0.0000	OK
15 minute summer	IC	1	88.020	0.000	9.8	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 summer	RE1	1.000	IC	0.0	0.000	0.000	0.0000	0.0

Results for 30 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	RE1	1	89.500	0.000	0.0	0.0000	0.0000	OK
15 minute summer	IC	1	88.020	0.000	24.0	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)
15 minute summer	RE1	1.000	IC	0.0	0.000	0.000	0.0000	0.0

Results for 100 year +20% CC Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	RE1	1	89.500	0.000	0.0	0.0000	0.0000	OK
15 minute summer	IC	1	88.020	0.000	37.4	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 summer	RE1	1.000	IC	0.0	0.000	0.000	0.0000	0.0

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	RE1	1	89.500	0.000	0.0	0.0000	0.0000	OK
15 minute summer	IC	1	88.020	0.000	43.7	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)
15 minute summer	RE1	1.000	IC	0.0	0.000	0.000	0.0000	0.0

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	0.400	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)
RE1	0.000	5.00	89.870	150	439637.270	293366.501	0.600
S1	0.102	5.00	89.550	600	439617.338	293312.001	1.250
TANK	0.020	5.00	89.500	600	439623.185	293309.608	1.250
S2			89.500	1200	439620.874	293298.600	1.270

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	RE1	S1	58.030	0.600	89.270	88.300	0.970	59.8	150	5.74	50.0
1.001	S1	TANK	5.720	0.600	88.300	88.250	0.050	114.4	150	5.84	50.0
1.002	TANK	S2	2.000	0.600	88.250	88.230	0.020	100.0	150	5.88	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	1.302	23.0	0.0	0.450	1.100	0.000	0.0	0	0.000
1.001	0.938	16.6	13.8	1.100	1.100	0.102	0.0	105	1.047
1.002	1.005	17.8	16.5	1.100	1.120	0.122	0.0	115	1.139

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	58.030	59.8	150	Circular	89.870	89.270	0.450	89.550	88.300	1.100
1.001	5.720	114.4	150	Circular	89.550	88.300	1.100	89.500	88.250	1.100
1.002	2.000	100.0	150	Circular	89.500	88.250	1.100	89.500	88.230	1.120

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	RE1	150	Manhole	Adoptable	S1	600	Manhole	Adoptable
1.001	S1	600	Manhole	Adoptable	TANK	600	Manhole	Adoptable
1.002	TANK	600	Manhole	Adoptable	S2	1200	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
RE1	439637.270	293366.501	89.870	0.600	150		0	1.000	89.270	150
S1	439617.338	293312.001	89.550	1.250	600		1	1.000	88.300	150
							0	1.001	88.300	150
TANK	439623.185	293309.608	89.500	1.250	600		1	1.001	88.250	150
							0	1.002	88.250	150
S2	439620.874	293298.600	89.500	1.270	1200		1	1.002	88.230	150

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Detailed
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	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	20	0	0
100	40	0	0

Node S2 Online Orifice Control

Flap Valve	x	Design Depth (m)	1.200	Discharge Coefficient	0.600
Replaces Downstream Link	✓	Design Flow (l/s)	43.7		
Invert Level (m)	88.230	Diameter (m)	0.140		

Node TANK Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	88.250	Slope (1:X)	1000.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	21	Depth (m)	0.360
Safety Factor	2.0	Width (m)	4.000	Inf Depth (m)	
Porosity	0.96	Length (m)	11.200		

Results for 1 year Critical Storm Duration. Lowest mass balance: 99.22%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	RE1	1	89.270	0.000	0.0	0.0000	0.0000	OK
15 minute winter	S1	11	88.411	0.111	14.4	0.2119	0.0000	OK
30 minute winter	TANK	22	88.358	0.108	13.0	4.3932	0.0000	OK
30 minute winter	S2	22	88.346	0.116	8.2	0.1314	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 summer	RE1	1.000	S1	0.0	0.000	0.000	0.3909	
15 minute winter	S1	1.001	TANK	13.8	1.348	0.829	0.0722	
30 minute winter	TANK	1.002	S2	8.2	0.582	0.462	0.0282	
30 minute winter	S2	Orifice		8.2				10.4

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.22%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	RE1	1	89.270	0.000	0.0	0.0000	0.0000	OK
15 minute winter	S1	11	88.703	0.403	35.3	0.7726	0.0000	SURCHARGED
30 minute winter	TANK	23	88.505	0.255	30.3	10.7801	0.0000	SURCHARGED
30 minute winter	S2	23	88.464	0.234	16.6	0.2648	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 summer	RE1	1.000	S1	0.0	0.000	0.000	0.5108	
15 minute winter	S1	1.001	TANK	31.1	1.769	1.878	0.1007	
30 minute winter	TANK	1.002	S2	16.6	0.943	0.935	0.0352	
30 minute winter	S2	Orifice		16.6				25.3

Results for 100 year +20% CC Critical Storm Duration. Lowest mass balance: 99.22%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	RE1	1	89.270	0.000	0.0	0.0000	0.0000	OK
15 minute winter	S1	12	89.141	0.841	55.0	1.6105	0.0000	SURCHARGED
30 minute winter	TANK	22	88.947	0.697	46.6	15.5508	0.0000	SURCHARGED
30 minute winter	S2	22	88.815	0.585	29.7	0.6612	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 summer	RE1	1.000	S1	0.0	0.000	0.000	0.5108	
15 minute winter	S1	1.001	TANK	46.5	2.643	2.805	0.1007	
30 minute winter	TANK	1.002	S2	29.7	1.686	1.672	0.0352	
30 minute winter	S2	Orifice		29.4				39.7

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.22%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute winter	RE1	22	89.520	0.250	7.6	0.0045	0.0000	SURCHARGED
30 minute winter	S1	21	89.467	1.167	49.7	2.2345	0.0000	FLOOD RISK
30 minute winter	TANK	21	89.236	0.986	53.6	15.7248	0.0000	FLOOD RISK
30 minute winter	S2	21	89.044	0.814	35.9	0.9205	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	RE1	1.000	S1	-7.6	-0.478	-0.329	1.0216	
30 minute winter	S1	1.001	TANK	43.9	2.496	2.650	0.1007	
30 minute winter	TANK	1.002	S2	35.9	2.039	2.022	0.0352	
30 minute winter	S2	Orifice		35.3				46.2

Appendix H Proposed Drainage Maintenance Plan

SW DRAINS & MANHOLES	TO BE MAINTAINED BY ALDI	
MAINTENANCE SCHEDULE	REQUIRED ACTION	FREQUENCY
REGULAR MAINTENANCE	INSPECT AND IDENTIFY ANY AREAS THAT ARE NOT OPERATING CORRECTLY. IF REQUIRED TAKE REMEDIAL ACTION	MONTHLY FOR 3 MONTHS THEN ANNUALLY
OCCASIONAL MAINTENANCE	SURVEY INSIDE OF OUTLET PIPES TO CHECK FOR SEDIMENT BUILD UP AND REMOVE IF NECESSARY	EVERY 5 YEARS OR AS REQUIRED
REMEDIAL ACTIONS	REPAIR PHYSICAL DAMAGE IF NECESSARY	AS REQUIRED

FLOW CONTROL	TO BE MAINTAINED BY ALDI	
MAINTENANCE SCHEDULE	REQUIRED ACTION	FREQUENCY
REGULAR MAINTENANCE	INSPECT AND REMOVE SILT ACCUMULATION. ESTABLISH SILT REMOVAL FREQUENCIES	MONTHLY FOR 3 MONTHS THEN ANNUALLY
OCCASIONAL MAINTENANCE	REMOVE SILT WHEN 100MM DEEP IN CHAMBER BASE	EVERY 2 YEARS OR AS REQUIRED
REMEDIAL ACTIONS	REPAIR PHYSICAL DAMAGE IF NECESSARY	AS REQUIRED

SW SILT TRAPS	TO BE MAINTAINED BY ALDI	
MAINTENANCE SCHEDULE	REQUIRED ACTION	FREQUENCY
REGULAR MAINTENANCE	INSPECT ACCESS POINTS FOR SILT ACCUMULATION TO ESTABLISH SILT REMOVAL FREQUENCIES	MONTHLY FOR 3 MONTHS THEN ANNUALLY
OCCASIONAL MAINTENANCE	REMOVE SILT WHEN 100MM DEEP	EVERY 2 YEARS OR AS REQUIRED
REMEDIAL ACTIONS	REPAIR PHYSICAL DAMAGE IF NECESSARY	AS REQUIRED

BYPASS SEPARATOR	TO BE MAINTAINED BY ALDI	
MAINTENANCE SCHEDULE	REQUIRED ACTION	FREQUENCY
REGULAR MAINTENANCE	INSPECT CHAMBERS AND REMOVE SILT ACCUMULATION, LIGHT LIQUIDS AND SEDIMENTS.	EVERY 6 MONTHS OR AS REQUIRED
OCCASIONAL MAINTENANCE	SURVEY OUTLET PIPES TO CHECK FOR SEDIMENT BUILD UP AND REMOVE IF NECESSARY	EVERY 2 YEARS OR AS REQUIRED
REMEDIAL ACTIONS	REPAIR PHYSICAL DAMAGE IF NECESSARY	AS REQUIRED

CELLULAR STORAGE	TO BE MAINTAINED BY ALDI	
MAINTENANCE SCHEDULE	REQUIRED ACTION	FREQUENCY
REGULAR MAINTENANCE	INSPECT AND IDENTIFY ANY AREAS THAT ARE NOT OPERATING CORRECTLY	MONTHLY FOR 3 MONTHS THEN ANNUALLY
	REMOVE DEBRIS FROM THE CATCH MENT SURFACE (WHERE IT MAY CAUSE RISKS TO PERFORMANCE)	MONTHLY
	REMOVE SEDIMENT FROM PRETREATMENT CATCH PITS	ANNUALLY OR AS REQUIRED
REMEDIAL ACTIONS	REPAIR/REHABILITATE INLETS, OUTLETS AND VENTS	AS REQUIRED
MONITORING	INSPECT/CHECK ALL INLETS, OUTLETS AND VENTS	ANNUALLY
	SURVEY INSIDE OF TANK FOR SEDIMENT BUILD UP AND REMOVE IF NECESSARY	EVERY 5 YEARS OR AS REQUIRED

FILTER TRENCH	TO BE MAINTAINED BY ALDI	
MAINTENANCE SCHEDULE	REQUIRED ACTION	FREQUENCY
REGULAR MAINTENANCE	INSPECT INLETS STONE SURFACE FOR SEDIMENT AT SURFACE	QUARTERLY / AFTER STORM EVENTS
	INSPECT GEOTEXTILE MEMBRANE FOR SEDIMENT AT SURFACE	
	INSPECT INLETS, OUTLETS FOR SILT ACCUMULATION. ESTABLISH SILT REMOVAL FREQUENCIES	MONTHLY (AT START, THEN AS REQUIRED)
	GRASS CUTTING AT EDGES	
	MANAGE VEGETATION AND REMOVE NUISANCE PLANTS	MONTHLY (AT START, THEN AS REQUIRED)
OCCASIONAL MAINTENANCE	REMOVE LITTER AND DEAD LEAVES	MONTHLY
	REMOVE SEDIMENT FROM STONE SURFACE	1 - 5 YEARS OR AS REQUIRED
	REMOVE SEDIMENT FROM GEOTEXTILE MEMBRANE	1 - 5 YEARS OR AS REQUIRED
REMEDIAL ACTIONS	REPAIR PHYSICAL DAMAGE OF STONE SURFACE AND GEOTEXTILE MEMBRANE	AS REQUIRED



REV	DATE	DESCRIPTION	DRW	CHK
P01	05/06/2023	PRELIMINARY ISSUE	GS	MP

- HEALTH & SAFETY**
1. CONTRACTOR SHOULD BE AWARE OF GENERAL CONSTRUCTION RISKS TO PREVENT SLIPS, TRIPS AND FALLS AND TAKE NECESSARY PRECAUTIONS WITHOUT SPECIAL INSTRUCTION.
 2. CONTRACTOR TO PROVIDE TRENCH SUPPORTS AS APPROPRIATE AND ENSURE THAT PLANT REMAINS A SAFE DISTANCE FROM TRENCHES PRIOR TO INSTALLING DRAINAGE.
 3. THE TIME THAT EXCAVATIONS ARE OPEN ON SITE SHOULD BE KEPT TO A MINIMUM AND ALL TRENCHES SHOULD BE SURROUNDED BY A BARRIER.
 4. CONNECTIONS TO EXISTING SEWERS TO BE MADE BY NAL APPROVED CONTRACTOR ONLY.
 5. CONTRACTOR TO MAKE OPERATIVES AWARE OF ASSOCIATED DANGERS TO HEALTH SUCH AS LEPTOSPIROSIS (WELLS DISEASE) AND RECOMMENDED PRECAUTIONS. ADEQUATE WELFARE FACILITIES AND PROTECTIVE CLOTHING TO BE PROVIDED AS REQUIRED.
 6. UNFINISHED MANHOLES MUST BE COVERED WITH LOAD BEARING MATERIALS AND SURROUNDED WITH BARRIER.
 - PIPPES & CABLES
 7. SERVICE RECORDS TO BE REFERRED TO PRIOR TO WORK COMMENCING. CONTRACTOR TO PROCEED WITH CAUTION AND SERVICES TO BE LOCATED BY HAND DIG AND PROTECTED ACCORDINGLY.
 - EXCAVATION/FILL
 8. CONTRACTOR TO ENSURE RELEVANT MEASURES ARE TAKEN TO KEEP PLANT AND PEOPLE A SAFE DISTANCE FROM STEEP SLOPES DURING THE WORKS.
 9. CONTRACTOR TO ENSURE THAT PROCEDURES ARE IN PLACE TO KEEP PEOPLE A SAFE DISTANCE FROM WORKING PLANT WHERE NECESSARY.
 10. CONTRACTOR TO REFER TO GROUND INVESTIGATION REPORT FOR CONTAMINATION TESTS AND TO PROVIDE ADEQUATE WELFARE FACILITIES AND PROTECTIVE CLOTHING AS REQUIRED.

Drainage Key

Proposed Foul drain and manhole	
Proposed Storm drain and manhole	
Proposed Combined drain and manhole	
Existing Foul sewer and manhole	
Existing Surface Water sewer and manhole	
Existing Combined sewer and manhole	
Private storm rodding eye	
450mm dia. private inspection chamber.	
600mm dia. private inspection chamber.	
Proposed road gully & connecting pipe work. 1500 pipe unless noted otherwise	
Proposed channel drain with D400 rated pedestrian type covers and sump outlets	
Condensate Drain 1000 pipe unless noted otherwise	
Soil Stack 1000 pipe unless noted otherwise	

CONTRACTOR TO PROVIDE CCTV SURVEY OF ALL NEW DRAINAGE UPON COMPLETION

Client
Aldi Stores Ltd.

Project Title
Aldi - Hinckley (Extension)

Project Address
Watling Street, Hinckley

Drawing Title
Proposed Drainage Maintenance Plan

Job No.	Originator	Zone	Level	Type	Role
79-E0xxx H3E	ZZ	XX	DR	C	
System Classification	Drawing No.	Suitability	Revision		
Ro. 50_20_11 -1100	S2	P01			

Drawn	Checked	Date	Scale	Size
GS	MP	June 23	1:250	A1

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