

PACKING HALL EXTENSION,
WESTFALIA FRUIT,
SPALDING

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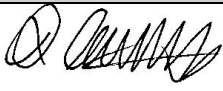
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APPROVALS

	Name	Signature	Position	Date
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Reviewed By	Andrew Mitchell BEng (Hons) MSc		Director / Civil Engineer	16/05/2025

1.0 INTRODUCTION

Carter Design Group (CDG) have been appointed by RG Carter Cambridge Ltd, to develop a site-specific Drainage Strategy, for the proposed packing hall extension to Westfalia Fruit, Spalding. This strategy defines the construction status design, building upon the ARK Ltd Flood Risk Assessment.

The report outlines appropriate measures that have been implemented within the design to address all site constraints. Consultations have taken place with key stakeholders including the Lead Local Flood Authority, Lincolnshire County Council (LCC) Highways and Welland & Deepings Internal Drainage Board (IDB), to inform the design.

This document has been prepared for the purposes of submission to the Local Authority, in support of the discharge of planning conditions.

The contents of this Drainage Strategy are based on the advice set out in the National Planning Policy Framework (NPPF) and the Planning Practice Guidance (PPG), as updated February 2025.

2.0 EXISTING SITE CONDITIONS

The existing Westfalia Fruit UK site is located at West Marsh Road, Spalding. It is bound by the A16 to the north, B1180 to the West, West Marsh Road to the south and Vernatt's Drain to the east. The site is mostly impermeable comprising existing buildings and external hardstandings.

The National Grid reference for the centre of the site is approximately TF 26102 25310.



Figure 1 - Site Location Plan

There is a notional fall across the site from west to east. Ground levels broadly range between 5.090mAOD and 3.780mAOD. A copy of the topographical survey, GPR and CCTV is provided as Appendix A.

The statutory sewerage and potable water provider for the local area is Anglian Water Services. Anglian Water asset records confirm that there is public foul water and surface water infrastructure located approximately 135m away from the site (following the Highway) located within Elsoms Way. A copy of the Anglian Water asset record is provided as Appendix B.

The nearest surface water feature is the IDB controlled Vernatt's Drain which runs directly along the eastern site boundary. This watercourse receives unattenuated surface water flows generated by the existing site. The watercourse also receives treated effluent from a package sewage treatment plant.

From geotechnical investigation works carried out by Ground Technology and published geology, ground conditions broadly comprise a significant thickness of made ground, overlying Tidal Flat Deposits, overlying the Oxford Clay Formation.

From the comprehensive investigations undertaken to date, groundwater underlying the site has been recorded at a shallowest level of 1.37m below existing ground level.

The site does not lie within a Source Protection Zone (SPZ) and the nearest SPZ is approximately 7.50 km to the west.

3.0 PROPOSED DEVELOPMENT

This Drainage Strategy supports an application for full planning permission for a proposed packing hall extension at Westfalia Fruit, Spalding.

The proposed new packhouse and dispatch facility which will also incorporate an area for new offices, is proposed to be constructed over the existing impermeable car park. Works include demolition of the main house office structure. The new facility will have 3 loading docks to allow vehicles to be loaded with the appropriate space for manoeuvring. Access to and from the site will remain as existing.

Given the existing area comprises impermeable car parking and an existing building, the pre-development and post development impermeable areas are very similar.

Refer to the ARK Ltd Flood Risk Assessment for details of the development flood risk vulnerability and flood risk data, provided as Appendix C.

4.0 SURFACE WATER DRAINAGE STRATEGY

4.1 Overall Surface Water Drainage Strategy

This surface water drainage strategy has been developed in response to the above site-specific FRA produced by ARK Ltd along with consultations with key stakeholders. Current design standards and best practice guidance have been strictly followed to effectively manage flood risk. Conveyance and attenuation structures follow a SuDS philosophy in accordance with CIRIA C753 - The SuDS Manual.

Consultations have taken place with key stakeholders, including Dean Whitehead (LCC Highways/LLFA) Development Management Officer and Craig Shinkin (Welland & Deepings Internal Drainage Board) Planning & Enforcement Officer. LCC Pre application correspondence is provided within Appendix D and IDB Pre application correspondence is provided within Appendix E.

Surface water flows generated by the proposed development will be conveyed via gravity into the Vernatt's Drain via a new 450mm diameter headwall, mimicking the existing drainage arrangement. Given the invert level and diameter of the existing headwall, it is not possible to re-use this within the new scheme. A new full retention separator will be provided upstream of a new headwall.

Flows are not proposed to be restricted via a flow control, although the surface water calculations have considered the highest water level within the watercourse in all storm scenarios (summer and winter), providing some restriction and resilience to the design.

Construction of the new extension over the existing parking area, results in a significant portion of the existing surface water drainage network being removed. Therefore, as part of the development flows from the remaining access road/ hardstanding will be collected within the new network. This offers more effective interception and treatment than the historic network.

The existing and proposed impermeable areas are very similar. The existing impermeable area has been calculated as 6541m² and the proposed impermeable area will be 6724m². The minor increase is related to small existing landscaping strips against the existing building, which are generally at a gradient and would generate run-off but have been excluded within the existing impermeable area plan. If run-off from the small existing landscaped areas was included the areas would be equal. CDG drawing 8973-CDG-XX-XX-DR-C-5000, included as Appendix F provides details of the existing network along with an impermeable area plan.

Below ground geocellular attenuation storage has been provided to manage any flooding for the critical design storm events with climate change. Geocellular units will be 'inspectable', to simplify long term inspection and maintenance regimes, maximising functionality. The tank layouts are simplified to minimise the risk of any silt which may enter the system becoming trapped. Vents will be provided to dissipate air pressure within the units, all as per manufacturers requirements.

Full details of the below ground drainage scheme are available within the following appendices:

- Appendix G - Proposed below ground drainage general arrangement, manhole schedules and Impermeable Area Plan.
- Appendix H - Proposed below ground drainage detail drawings.
- Appendix I – Surface water calculations

4.2 Design Parameters

A detailed hydraulic design has been undertaken which forms the basis of the scheme.

During pre-development consultation with the LCC (LLFA/ Highways), key surface water drainage design parameters were established, and have been adhered to in the design of this scheme. These reflect the current requirements outlined within the LCC Guidance Document. These parameters are summarised below:

- Simulation to use a CV value of 1 for both summer and winter storms.
- FEH 2022 Rainfall.
- Design storm of 1 in 100 years.
- Climate change allowance of 40%.
- Half drain time of 24 hours for attenuation structures.
- Outfall to be modelled as surcharged to a level of 3.2mODN to provide additional resilience, as agreed with the IDB.

In consultation with the IDB water level data for the Vernatt's Drain adjacent to the Westfalia Fruit site has been provided. Welland & Deepings Internal Drainage Board have a maximum design level of 3.2m ODN (IDB bank inspection level) and a typical summer level of 1.5m ODN.

When modelling conditions at the outfall we have prudently considered a water level of 3.2mODN, for summer and winter storm returns.

Infiltration has been discounted for the development site due to the presence of made ground, and high groundwater levels which would not achieve a 1.2m unsaturated zone.

4.3 Pollution Risk

At present the area where the new extension will be constructed is predominantly impermeable car park/ vehicular paving. All flows generated by this area pass through a small full retention separator upstream of the headwall into the Vernatt's Drain.

As part of the new extension much of the vehicular paving is removed and replaced with a building roof, which has a much lower pollution hazard level than the vehicular pavement, reducing pollution risk for the scheme and receiving watercourse.

Whilst it has not been possible to provide SuDS as a result of site constraints (no available open space, large volumes of water and flow rates), a new full retention separator has been proposed upstream of the new headwall. This separator has been sized for the total site area (including the building roof) as it is not possible to deliver two separate surface water drainage systems, this provides additional resilience to the scheme including an enhanced silt and oil storage capacity.

4.4 Exceedance Routing

A key objective of the scheme design is definition of appropriate surface water exceedance routing. The site level strategy has been arranged to ensure exceedance routes run east through the site to the adjacent watercourse, away from development on the proposed or surround sites.

Exceedance plan 8973-CDG-XX-XX-DR-C-3010, is contained within Appendix J.

As noted within the earlier sections of this report the surface water network has been designed to contain and discharge all storm returns below ground for the critical 1 in 100 year storm return with a 40% allowance for climate change. For the critical 15 min summer storm (1 in 100 year + 40% CC) small volumes of temporary flooding occur at manholes SW01, SW02, SW03 and SW06, these flows can be stored above ground, specifically within the sunken loading docks (where channels/ gullies are at the lowest levels). We note the building floor level is upto 1m higher than surrounding ground levels, offering a significant factor of safety to any small volumes of flooding.

We highlight that within the hydraulic model only main runs/ manholes have been included, the outfall is assumed to be fully surcharged (which is extremely unlikely for the 15 min summer storm), therefore the likelihood of this temporary flooding occurring in practice is negligible.

5.0 FOUL WATER DRAINAGE STRATEGY

Domestic foul water flows generated by the existing office building which will be demolished as part of the new extension, are conveyed into a private cesspool. Domestic foul water flows generated by an existing modular building which will be removed as part of the new extension are conveyed into a private packaged sewerage treatment plant, with a permitted outfall into the Vernatt's Drain.

With the cesspool being removed as part of the extension works, domestic foul water flows generated by the new extension are proposed to be conveyed into the existing Klargestor BJ Biodisc Package Sewerage Treatment Plant installed on site. Due to site levels a private package pump station will be used to convey flows from the extension into the existing private foul gravity network upstream of the treatment plant. The pump station will include suitable storage provision to provide '24 hour' storage in accordance with Part H of the Building Regulations.

Klargester have confirmed the BJ Biodisc Package Sewage Treatment Plant has sufficient capacity to serve a maximum number of 150 FTE employees within a 24 hour period, which we understand aligns with proposed staff levels.

Discharge of additional flows into the Package Sewage Treatment Plant will be subject to Environment Agency approval and possible amendment to the existing permit by Westfalia Fruit.

6.0 DRAINAGE MAINTENANCE STATEMENT

This section provides guidance for the inspection and maintenance of the below ground foul and surface water drainage network, forming a maintenance strategy to be adopted by the Client. All private infrastructure drainage will be maintained by the Client Westfalia Fruit.

Regular inspection and maintenance are vital to ensure the long term and sustained effectiveness of the site drainage network.

A summary of the key features requiring inspection and maintenance are identified below.

Element	Manufacturer	Owner	Function	Location	Inspection Frequency	Maintenance/ Inspection Requirements
Channel drain silt traps	Aco or similar	Client	Initial interception of silt and debris.	As identified on CDG drawings	Initially after first 12 months then every 24 Months	Clean out silt and debris (disposed off site).
Gully unit silt traps	TBC	Client	Initial interception of silt and debris.	As identified on CDG drawings	Initially after first 12 months then every 24 Months	Clean out silt and debris (disposed off site).
Catch pit/sump manholes	TBC	Client	Secondary silt and debris interception	As identified on CDG drawings	Initially after first 12 months then every 24 Months	Clean out silt and debris (disposed off site).
Geocellular attenuation	TBC	Client	Temporary below ground storage of surface water flows during critical storm returns.	As identified on CDG drawings.	Monthly for 3 months, then annually.	<u>Inspection</u> Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed. <u>Maintenance</u> Inspect and identify any areas that are not operating correctly. If required, take remedial action. Remove debris from the catchment surface (where it may cause risks to performance). Remove sediment from pretreatment structures.

Existing package sewage treatment plant.	Klargester	Client	Treatment of domestic foul water flows.	As identified on CDG drawings	As manufacturer requirements / EA Permit.	As manufacturer requirements/ EA Permit.
Package pump station	Klargester or similar	Client	Conveyance of domestic foul water flows.	As identified on CDG drawings	As manufacturer requirements	As manufacturer requirements.

Table 1 - Inspection and maintenance schedule

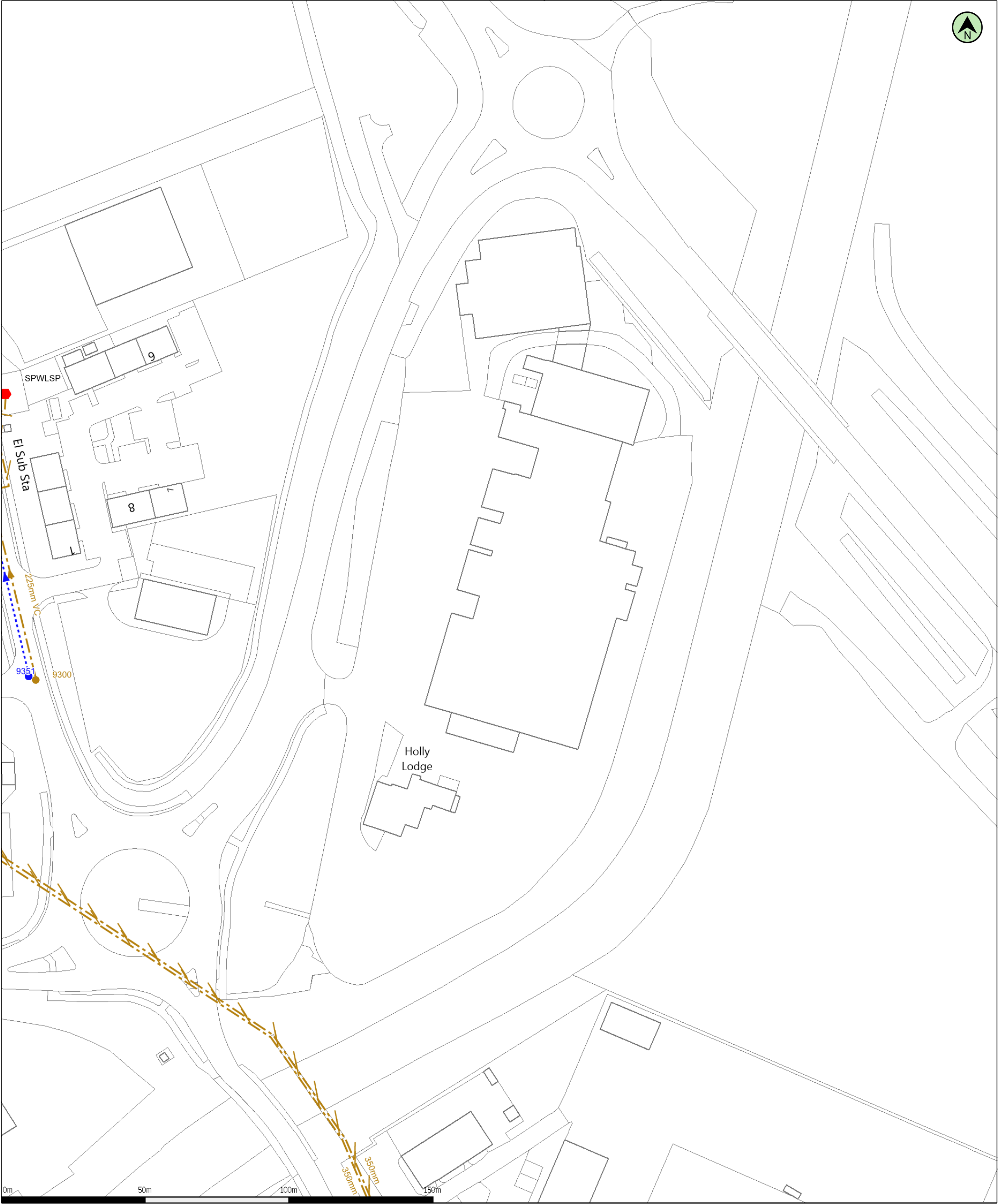


APPENDIX A

TOPOGRAPHICAL SURVEY & GPR/ CCTV DRAWING

APPENDIX B

ANGLIAN WATER ASSET RECORDS



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Data updated: 31/03/23

Scale: 1:1250
Map Centre: 526118,325389

Date: 11/04/23
Our Ref: 1141563 - 2

Wastewater Plan A3
Powered by digdat

Foul Sewer				
Surface Sewer		Outfall*		Sewage Treatment Works
Combined Sewer				Public Pumping Station
Final Effluent		Inlet*		Decommissioned Pumping Station
Rising Main*				
Private Sewer*		Manhole*		
Decommissioned Sewer*				

*(Colour denotes effluent type)



This plan is provided by Anglian Water pursuant its obligations under the Water Industry Act 1991 sections 198 or 199. It must be used in conjunction with any search results attached. The information on this plan is based on data currently recorded but position must be regarded as approximate. Service pipes, private sewers and drains are generally not shown. Users of this map are strongly advised to commission their own survey of the area shown on the plan before carrying out any works. The actual position of all apparatus MUST be established by trial holes. No liability whatsoever, including liability for negligence, is accepted by Anglian Water for any error or inaccuracy or omission, including the failure to accurately record, or record at all, the location of any water main, discharge pipe, sewer or disposal main or any item of apparatus. This information is valid for the date printed. This plan is produced by Anglian Water Services Limited (c) Crown copyright and database rights 2023 Ordnance Survey 100022432. This map is to be used for the purposes of viewing the location of Anglian Water plant only. Any other uses of the map data or further copies is not permitted. This notice is not intended to exclude or restrict liability for death or personal injury resulting from negligence.

APPENDIX C ARK Ltd FLOOD RISK ASSESSMENT

FLOOD RISK ASSESSMENT

&

SUDS Strategy for Planning

NPPF & PPG 2025 addressed
EA new climate change allowances applied

Commercial PPG “Less Vulnerable” extension
No change to site operations or sensitivity

At:

Westfalia Extension, West Marsh Road,
Pinchbeck, Spalding PE11 3UG

March 2025

Flood Response Management Plan “PPG Less Vulnerable”:

- Not being at / avoiding the site during potential flood events
 - EA Flood Warning
- Clear procedure (response and evacuation route) included for when on the site and there is the likelihood of flooding / inundation
- Knowing when it is safe and appropriate to return to the site

ARK Ltd

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1.0 Scope

This report contains the details of a Flood Risk Assessment carried out by Ark Environmental Consultancy Limited ("ARK Ltd") at Greencell Extension, West Marsh Rd, Pinchbeck, Spalding PE11 3UG, henceforth referred to as "the site" in this report.

This report has been prepared for Westfalia and must not be relied upon by any other party without the explicit written permission of ARK Ltd.

All parties to this report do not intend any of the terms of the Contracts (Right of Third Parties Act 1999) to apply to this report.

Please note this report does not purport to provide definitive legal advice nor can it be used to demonstrate that the site will never flood in the future.

The Executive Summary contains an overview of key findings and conclusions. However, no reliance should be placed on the Executive Summary until the whole of the report has been read.

Other sections of the report may contain information which puts into context the findings noted within the Executive Summary.

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2.0 Executive Summary

This FRA has been carried out in accordance with the National Planning Policy Framework (NPPF) & PPG. It is to be used to assist the Local Planning Authority (LPA) and Environment Agency (EA) when considering the flooding issues of the proposed development as part of a planning application.

The proposed development is a commercial extension (attached) on a vacant plot adjacent to existing commercial property located in FZ3 partly defended large tidal floodplain.

This is categorized as a "Less Vulnerable" landuse in accordance with the NPPF / PPG classifications; the NPPF Exception Test does not need to be passed. The main source of flooding is tidal large floodplain managed by the network of drains / watercourses.

- No new footprint within 25m of top of bank of an EA main watercourse
- Ramsey IDB managed area: no high risk areas identified
- Less Vulnerable is appropriate at this location
- No flood impedance or increase in ground levels within the floodplain: no flood compensation considered necessary given tidal principal source
- Reduces flood risk overall: SUDS and flood storage within the site increased

A Flood Response Management Plan is included, which considers people would be safe in the event of the flood, principally by:

- Not being at / avoiding the site during potential flood events using EA Flood Warning
- Having a clear procedure (response and evacuation route) for when on the site and there is the likelihood of flooding / inundation
- Knowing when it is safe and appropriate to return to the site

Given ability to employ a flood response management plan that avoids the hazard, together with suitable evacuation procedures, as long as the flood resilient measures are incorporated, users understand the flood response management procedures and sign up to and understand

the Environment Agency Flood Warning scheme, it is considered likely that the proposed development can be constructed and operated safely in flood risk terms without increasing flood risk elsewhere and is therefore appropriate development in accordance with the NPPF/PPG.

3.0 Introduction

The site boundary is provided in the location plan in Appendix A.

The FRA combined a desktop study, review of available information, consultations and an assessment of all sources of flooding posed to and from the site and proposed development, in accordance with National Planning Policy Framework (NPPF). Appropriate flood mitigation measures were then considered, either as already incorporated within the scheme or recommended for inclusion at detailed design stage. The suitability of the proposed development was also reviewed in the context of the NPPF and the technical guidance accompanying the NPPF.

4.0 Purpose of the Report

This FRA has been carried out in accordance with National Planning Policy Framework (NPPF). It is to be used to assist the Local Planning Authority (LPA) and Environment Agency (EA) when considering the flooding issues of the proposed development as part of a planning application.

The report provides the following information:

- An assessment of the flood risk posed to the site based on flood information and mapping provide by the EA and Strategic Flood Risk Assessment (SFRA);
- An assessment of the proposed development in terms of surface water run-off; and
- Proposals for measures to mitigate the flood risks posed to and from the development where appropriate.

5.0 Report Information Sources

The information source used to undertake this FRA has been collected from the following sources:

- British Geological Survey Website
- EA Website
- South Holland District Council (SHDC) (Joint) Strategic Flood Risk Assessment
- SHDC (Joint) Preliminary Flood Risk Assessment
- Welland and Deepings Area Internal Drainage Board (site not in South Holland IDB as site is on west area of Welland)
- Lincolnshire County Council (LCC) Sustainable Design and Construction Policies
- Internet mapping and searches.

6.0 Overview of British Legislation

6.1 National Planning Policy

The National Planning Policy Framework (NPPF) and PPG supercede all Planning Policy Statements (PPS's) and remaining Planning Policy Guidance (PPG's). Flood risk is retained as a key development consideration.

The Sequential and Exception Tests are retained as part of the NPPF/PPG. The accompanying NPPF Technical Guidance also includes Tables 2 and 3 to assist with flood risk vulnerability classifications and development suitability.

Sequentially the extension must be at this site connected to the existing building.

7.0 Local Policy

Local Authorities consider flood risk through relevant environmental and climate change policies which enforce the requirements of the NPPF.

The Strategic Flood Risk Assessment (SFRA) is a key source of flood risk specific information for the area. The SFRA provides a more detailed review of flood risks and recommendations for ensuring developments can be constructed and operated safely in accordance with the NPPF. Greater detail of the SFRA is provided in the report.

8.0 Site Status and Environmental Setting

8.1 Site Location and Status

The planning application boundary is c. 0.20 hectares in total (plot and access). The site is located on the east side of West Marsh Road, adjacent and south of the roundabout junction of the B1180 and the A16.

The site location plan can be seen in Appendix A.

8.2 Current Site Description

The following description is based on information made available from internet mapping and aerial photography.

The site is currently occupied by a vacant majority porous plot as part of an operating commercial site for ripening natural produce. The site's surrounding is predominantly industrial / commercial / drained marshland / Fens.

The site is in EA FZ3 undefended tidal / fluvial large floodplain: Vernatt's Drain is 40m to the east; 140m further east is River Welland.

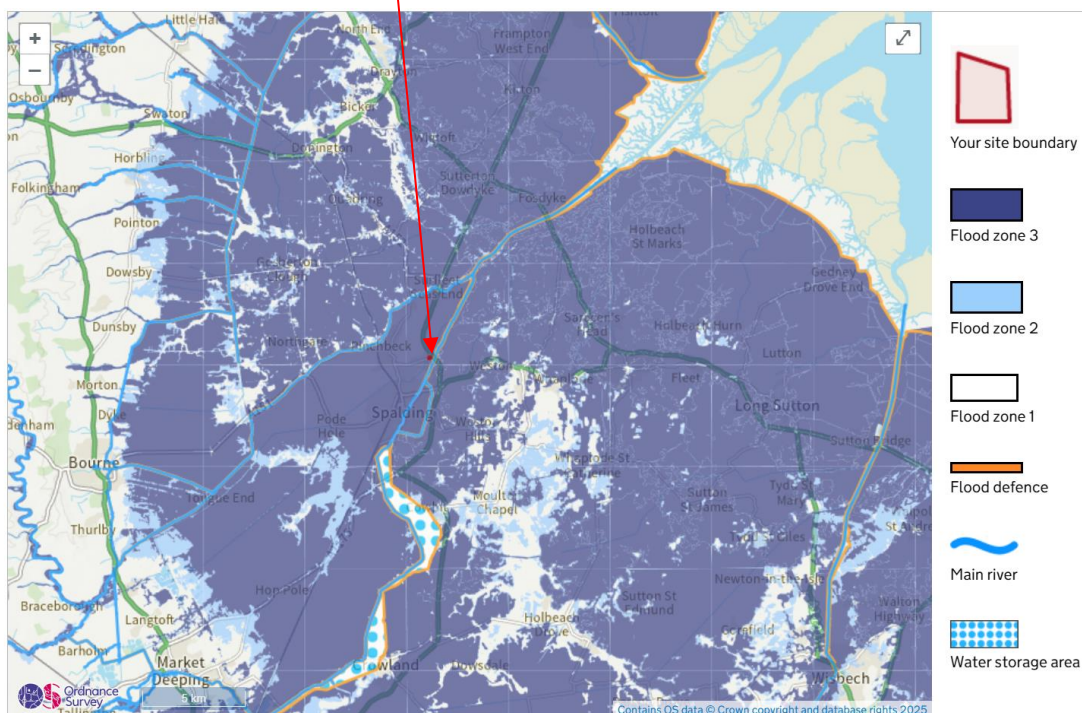
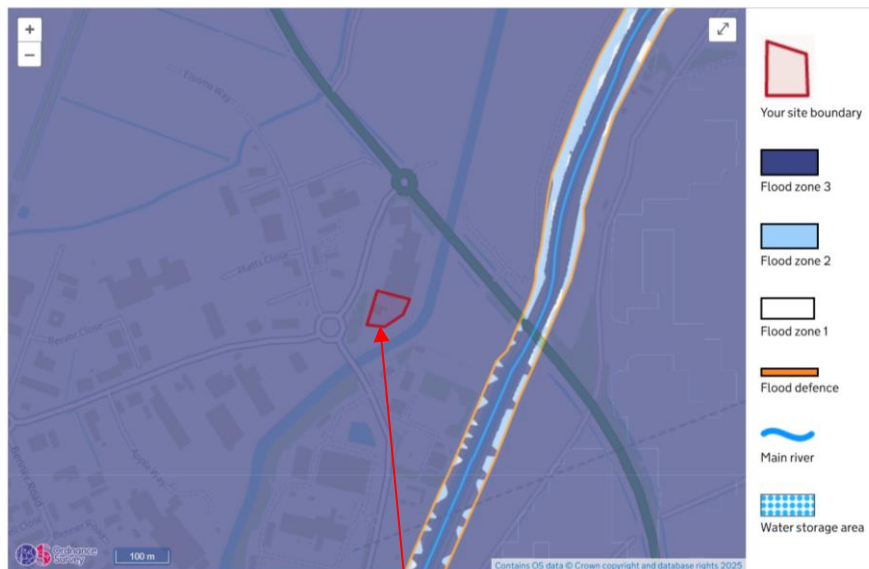
The site is within the large expanse of drained marshland which has enabled urbanization and agriculture in this area using a heavily managed network of drains through pumping stations and storage in the drains and watercourses and controlled overspill as necessary.

SFRA

The SFRA mapping is used where appropriate in the following sections.; the available EA mapping is more up to date and relevant.

8.3 EA Data and SFRA Hazard

The site is in the tidal / fluvial floodplain of drained marshland.



8.4 Welland and Deepings Area Internal Drainage Board

- No works within 16m of top of bank of Vernatt's Drain
 - This is appropriate design and mitigation
- Drainage rates will apply as for existing operation (likely increase in the commercial rates paid to IDB)

No additional modelling is considered necessary based on EA / IDB guidance given the nature and location of the scheme and flood setting at the site.

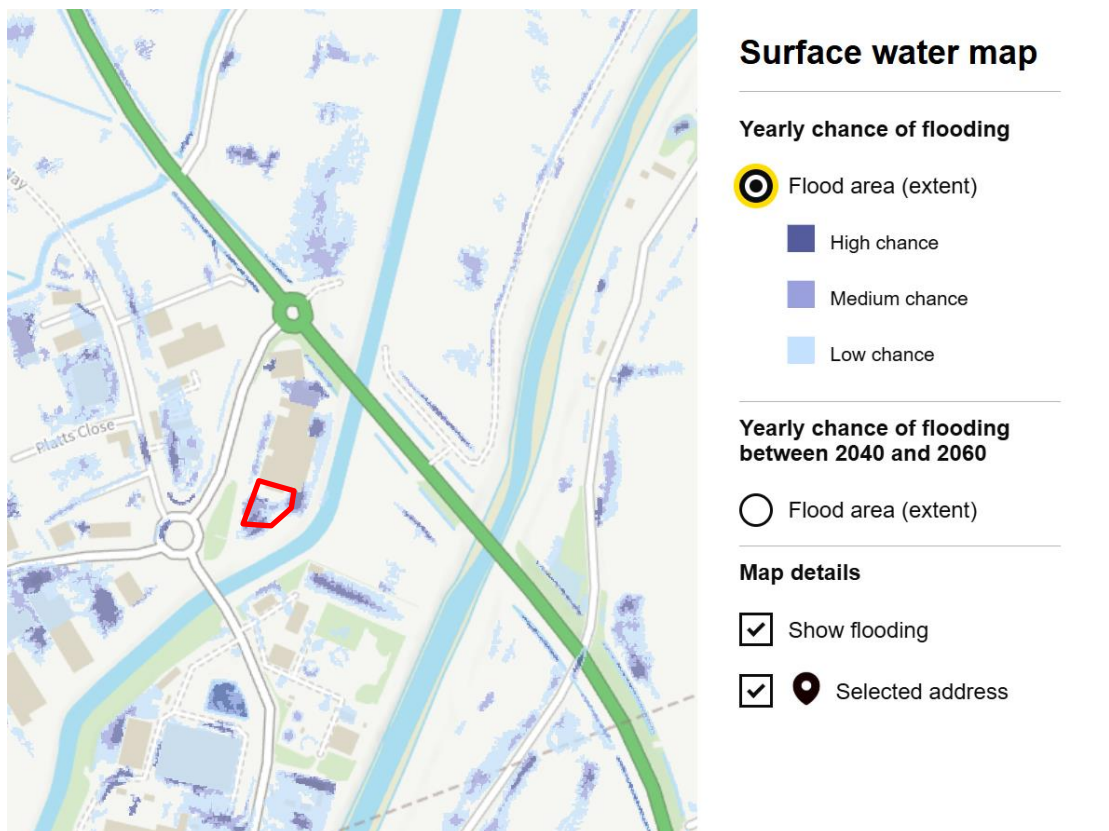
The correct response is to ensure designs are flood resilient (warehouse will be inherently resilient) and also do not impede flood flows so no compensation is required; water entry is inherent in the style of industrial buildings proposed.

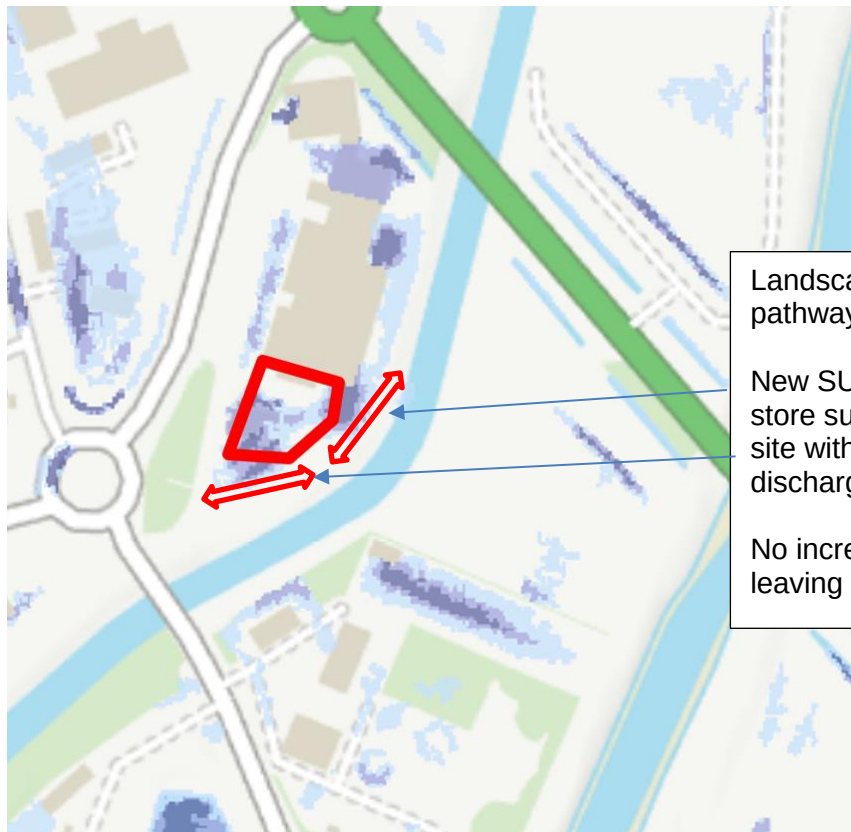
Locate the new buildings in lowest flood risk feasible and assume 600mm depth of flooding: to address fluvial / tidal and also the partial NO - VERY LOW EA hazard surface water risk area:

EA 2025 New Surface Water Hazard Mapping

Note: this is a surface water hazard hence no compensation is required and design responses are not required other than flood resilience and resistance as necessary

- **Access & Egress: always in NO hazard**
- **VERY LOW risk in all EA high risk scenario**
 - Patchy areas of low / medium risk (site is in drained marshland)
 - This is not a flow pathway for surface water
 - This is localized ponding on the site
 - The capacity for storing surface water at the site will increase not decrease as a result of the scheme: landscaping and SUDS





Landscaping to maintain surface water pathway and storage.

New SUDS will provide betterment to store surface water generated at the site within the site with restricted discharge as standard and mandatory

No increase in surface water flows leaving the site

8.5 Summary of other Flood Sources & Scheme

Flood Sources	Site Status	Comment on flood risk posed to / from the development
Groundwater	SFRA Indicates site is an area of lowest groundwater potential hazard	The proposed development will not increase the risk of groundwater flooding. Low Risk
Artificial Sources	Site is not within EA Reservoir Flood Warning area No other artificial sources with likely flood flowpaths that could reach the site	Low Risk
Surface Water / Sewer Flooding	Refer to EA's new surface water hazard data section above SFRA: Site is not located in a Critical Drainage Area and in a EA NO / VERY LOW risk area Condition, depth and location of surrounding infrastructure uncertain	Small increase in impermeable areas easily addressed given flood setting Landscaping to maintain surface water pathway and storage. New SUDS will provide betterment to store surface water generated at the site within the site with restricted discharge as standard and mandatory No increase in surface water flows leaving the site Development will not increase the peak flow or volume of discharge from the site: Access & egress always in NO risk Low Risk
Climate Change	Included in the flood modelling extents	Development will not significantly increase the peak flow and volume of discharge from the site Low risk posed to and from the development

Modelled Hazard

It is assumed that the site could likely flood in the future under varying flood events. The assessment therefore concentrates on the hazard rating and flood warning management including suitability of evacuation.

This is to ensure that people would be safe in the event of the flood, principally by:

- a) Not being at the site during potential flood events**
- b) Having a clear procedure (response and evacuation route) for when on the site and there is the likelihood of flooding**
- c) Knowing when it is safe and appropriate to return to the site**

DESIGN & Operation RESPONSE

Given the flood setting and nature of the scheme being Less Vulnerable, flood levels / depths are still considered instructive for the scheme;

- No change to site operations or sensitivity
- The scheme is not residential; there is no reason for persons to be at the site or return to the site in the event of the extreme future flood events reaching the site.
- The scheme will not have an impact on surrounding areas based on the EA and IDB data and scheme design (no flood compensation is required for new Less Vulnerable footprint)
- Retaining evacuation is considered an appropriate flood response for this type of scheme
- Given scheme is a commercial warehouse, the materials used will be inherently flood resilient

Design Response

- No new footprint within c. 16m of top of bank of IDB or EA watercourse
- No impact on IDB drainage network
- Small increase in impermeable areas easily addressed
- No raising of ground floor levels necessarily required given the type of use and the flood setting; unlikely to flood except in an extreme event

Flood resilient measures are inherent in the scheme and the buildings can be used to return the site to operation as quickly as possible in the event of a flood.

The flood depths and speeds are also instructive for the Flood Response Management Plan and hazard levels, which is the focus of this assessment.

- **Use EA worse case LOW risk surface water depths of <300mm**
- **Appropriate to use also as a precautionary approach for the fluvial / tidal risk**

Given the proposed continued site use this is considered appropriate given the flood response management feasible at the site.

Given the site is not within a rapid inundation area, evacuation is considered feasible and appropriate

9.0 Assessment of Proposed Development

9.1 Proposed Development

The proposed development can be seen in Appendix A.

The proposed development comprises

- commercial extension; all works PPG “Less Vulnerable”
- PPG Less Vulnerable inherently flood resilient
 - No flood compensation required
- Scheme is Less Vulnerable – water entry is considered appropriate hence no flood storage reduction
- Landscaping to maintain surface water pathway and storage.
- New SUDS will provide betterment to store surface water generated at the site within the site with restricted discharge as standard and mandatory
- No increase in surface water flows leaving the site
- Small increase in impermeable areas on the site
 - Addressed by local scale SUDS / discharge to watercourse regardless

Given the location of the building away from the flood source and the nature of the structures, floodwaters will be able to pass through unimpeded.

Preliminary Drainage Strategy

There will be a small increase in impermeable areas overall for the site; no extensive formal SUDS are considered necessary to meet the SUDS Guidance, national or local.

The development will:

- a) continue to discharge water in a controlled manner with new SUDS optimized
- b) Use detailed design stage to confirm the landscaping and incorporation of SUDS

No additional formal drainage strategy is considered necessary given the existing operation to be continued at the site for the planning stage design.

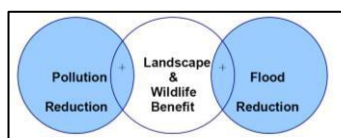
Landscaped swale area adjacent to the new building as an additional storage area of the peak runoff from the roof during storms; further quantification not considered necessary at this stage.

The drainage system will be extended to include the proposed extension as appropriate; this does not present a flood risk posed to or from the scheme.

9.1b SUDS Hierarchy Check

Concept SUDS Strategy

The following diagram indicates the philosophy behind the proposed SUDS strategy, and is taken from the EA's SUDS guidance:



(Source: Environment Agency, 2009)

Table 3 indicates the SUDS Hierarchy Appraisal for the site and proposed development:

Table 3: Site Specific SUDS Appraisal

SUDS Hierarchy	SUDS Technique	Potential Benefits			Site Specific			
		Flood Reduction	Pollution Reduction	Landscape & Wildlife Benefit	?	Scheme Specific SUDS Suitability Appraisal and Comment		
Least Sustainable ↑ Most Sustainable	Living Roofs	•	•	•	*	Lightweight structure however suggests not feasible		
	Ponds / Basins	•	•	•	x	Not considered necessary and also not possible to incorporate on site given nature of site and operations and flood setting		
	Swales	•	•	•	*	Not considered necessary but could easily be landscaped adjacent to the new build if required		
	Infiltration Techniques	•	•		x	Not considered necessary and also not possible to incorporate on site given nature of site, geology, watertable and operations and flood setting		
	Permeable Surfaces and Filter Drains	•	•		*	Not considered necessary and also not possible to incorporate on site given nature of site and operations and flood setting		
	Tanked Systems	•			*	Not considered necessary		

Key:

Potentially suitable at the site: *

Incorporated in the scheme: ✓

Not suitable / possible at the site:

9.2 Flood Resilience

As per previous correspondence with planning officers and as agreed:

The FRA provides the recommended resilient measures that can be incorporated; it will depend on the construction team as to what construction will actually need to be undertaken as part of detailed design.

This does not invalidate the points and recommendations of this FRA. The FRA cannot simply specify the exact measures that need to be changed; they are not required of the assessment at this stage to validate the assessment.

The scheme is a warehouse / commercial building hence inherently flood resilient; it will utilize the flood resilient techniques recommended in the NPPF Technical Guidance where appropriate and also the recommendations that have previously been issued by various councils:

If any of these elements are added:

- Plasterboards if required will be installed in horizontal sheets rather than conventional vertical installation methods to minimise the amount of plasterboard that could be damaged in a flood event
- Wall sockets will be raised to as high as is feasible and practicable in order to minimise damage if flood waters inundate the property
- The ground floor levels will be raised above existing ground level where feasible
- Any wood fixings on ground floor will be robust and/or protected by suitable coatings in order to minimise damage during a flood event
- If required: airbricks / air vents will be raised to as high as is feasible and practicable
- Waterproofing will be installed as necessary and above the main floor slab and tied in to the walls where appropriate, to reduce the turnaround time for returning the property to full operation after a flood event.
- The ground floor waterproofing will be extended to an appropriate level above existing ground levels
- **Sensible storing of any materials easily damaged by water at higher levels within the building as necessary i.e. produce on raised internal structures**

9.3 Refuge and Evacuation

Based on the likely flood risk and nature of the proposed development and non-permanent residence at the site, it is considered the following flood response management will likely mean the site can be operated safely in flood risk terms.

The site is just east of an EA Flood Warning area.

Range of Flood Events

The following section provides the recommended flood response given the different flood scenarios at the site.

It is a clear cut flood response: a) evacuation b) non site attendance and evacuation.

Prior Warning

- 1. Before Attending Site consult the EA / IDB flood warning**
- 2. Do not attend site if Flood Warning in operation**

All site users will consult the EA flood warning before attending site

If upon advice from the EA early warning of potential overtopping from the River Erewash the preferred response is not to attend site, avoiding the hazard at the site.

Late Fluvial Flood Warning and/or Whilst on site Areas Inundating

- 1. Upon observation of inundation, evacuate using access to the west**

The recommended evacuation route to Flood Zone 1:

- North and West on B1180
- Continue west and south heading towards Bourne
- Via Spalding and A151 / Bourne Road
- Continue west and reach Bourne: into unrestricted FZ1

This route does go through lower hazard areas as identified in the EA mapping.

It is recommended that the future tenants understand and sign up to the EA Flood Warning scheme.

No return to site until the EA Flood Warning indicates the all clear and upon observation the floodwaters have receded from the site.

Nighttime Flood Awareness (if security on-site)

If it is known there are / have been wet weather conditions

- a) the site should be evacuated as a precautionary measure
- b) the EA Flood Warning to the west should be checked before retiring for the night
- c) information from Middle Level Commissioners sought also
- d) if warning suggests conditions could deteriorate / weather conditions remain / become "wetter" the site should be evacuated

9.4 Flood Response Management

The EA have a clear set of warning levels. Tenants should read the plan and understand the response requirements.

Flood Safety Pack

All main site users / nighttime users should ensure a flood safety evacuation pack is kept in a safe and easily accessible place. This should include as a minimum:

- First aid kit & Torch

-
- Warm clothing or blanket
 - List of appropriate contact numbers
 - Bottled water
 - Waterproofs / Wellington boots
 - Non-perishable food

The most up to date EA procedural levels should be read and understood by all tenants:

9.5 Annual Monitoring

It is recommended that tenants should contact the EA on an annual basis to confirm the flood status of the property.

If the flood status has changed, this evacuation and refuge plan should be reviewed and updated by suitable flood risk consultants as appropriate.

9.6 Surface Water Runoff – Flood Risk from the Development

In accordance with the NPPF, this FRA also considers the risks posed from the development to surrounding areas.

Where these elements are required: the proposals will incorporate new low-water demand devices such that the increase in peak flow and volume of flow is likely to be negligible.

Given the small scale of the proposed development and SUDS feasible, it is considered likely that the development will have a negligible effect on surrounding infrastructure. There will not be any significant increase in overland flow from the site.

9.7 Climate Change including new Govnt allowances

The impact of climate change in accordance with the NPPF is likely to be an increase in the rainfall intensity in the future, which will increase peak storm flows to sewer. The proposed development will incorporate low flush and reduced water demand showers and toilets, such that the combined flows to sewer are likely to have a negligible impact. It is considered therefore that flows in the future are not likely to have a significant impact, even with an allowance for climate change.

There will not be an unacceptable impact on the receiving sewers.

9.8 Flood Storage

The increase in total footprint will not increase flood risk elsewhere and no flood compensation is required given:

- a) the flood setting and location of the proposed new build
- b) the nature of the new build being “Less Vulnerable” for storage which means water entry is an appropriate strategy as is standard for commercial schemes
- c) the landscaping scheme and SUDS can address surface water management

9.9 Flood Risk Vulnerability

According to the NPPF / PPG retained Flood Risk Vulnerability Classification, the proposed commercial land use would be classified as a worse case as “Less Vulnerable.”

The NPPF also retained Flood Risk Vulnerability and Flood Zone “Compatibility” Classification; this states that a “Less Vulnerable” development in Flood Zone 3a / FZ2 or FZ1 does not require the Exception Test to be passed.

9.10 Sequential Test

Summary: the proposed extension is to an existing operation and hence there are no suitable alternatives as the operation needs to be at this site attached to the existing building.

There is no need for the Exception Test to be passed; the scheme is PPG compliant in principle given scheme type and flood setting.

Based on the data reviewed to date, the flood risk assessment recommends the scheme could be constructed and operated safely in flood risk terms without increasing flood risk elsewhere.

10.0 Conclusion

The site is considered to be generally at a low risk from all sources of flooding except for future fluvial / tidal flood events / general “overspill” from the heavily managed Welland drainage network.

The proposed development is categorised as “Less Vulnerable” in accordance with the NPPF; it is therefore an appropriate type of development within Flood Zone 3, 2 or 1 without the need to pass the Exception Test.

The proposed scheme can incorporate suitable flood resilient measures.

It is considered likely that the proposed development can be constructed and operated safely in flood risk terms without increasing flood risk elsewhere and is therefore appropriate development in accordance with the NPPF.

It is recommended that the property signs up to the EA Flood Warning scheme.

10.1 Recommendations for Further Work

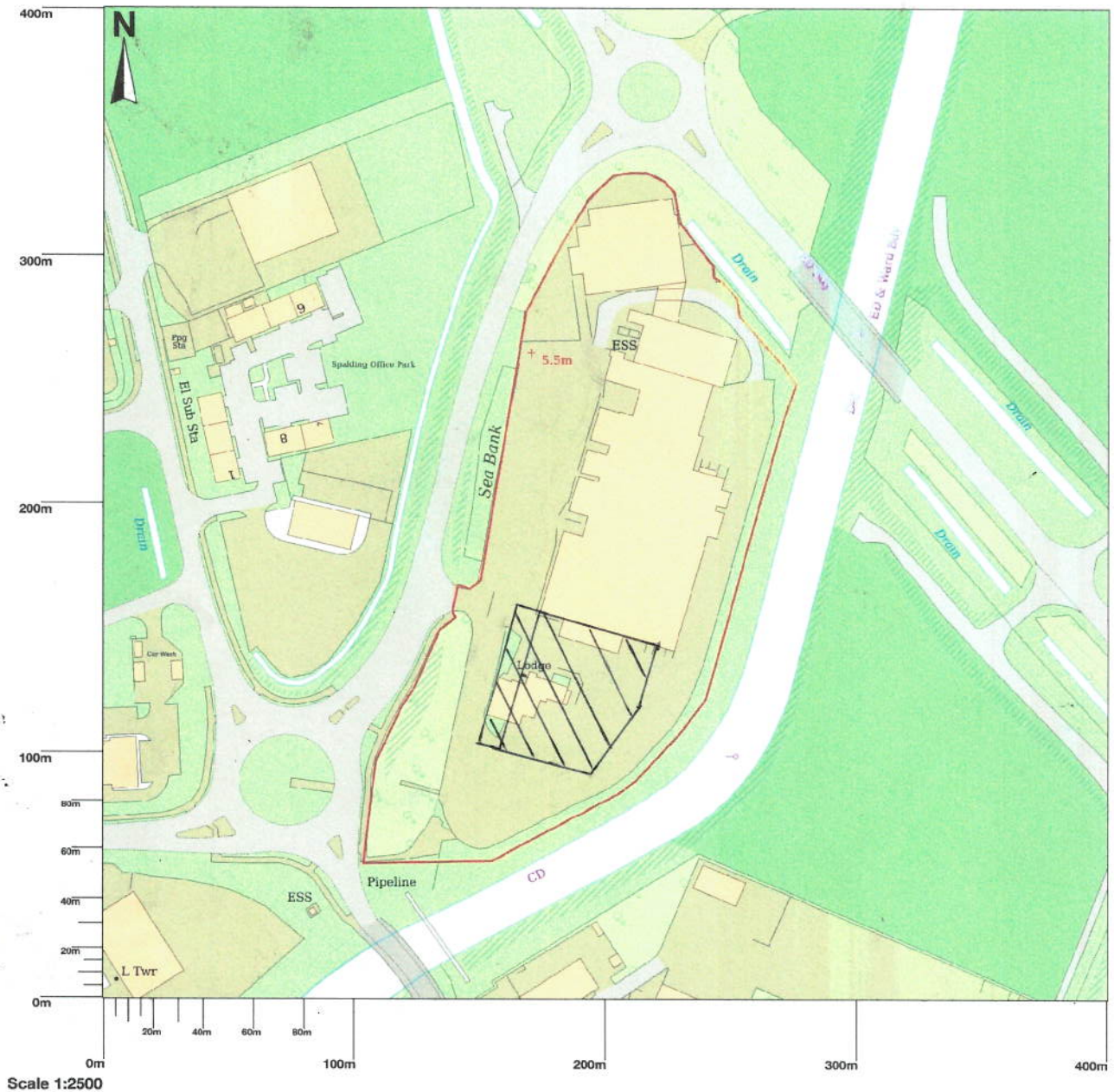
1. Produce a detailed surface water drainage design for the scheme incorporating SUDS and landscaping
2. Produce a Property Flood Evacuation Plan if deemed necessary
3. Secure extension of discharge licence with the EA / IDB
4. Sign up property to EA Flood Warning scheme

11.0 Appendices

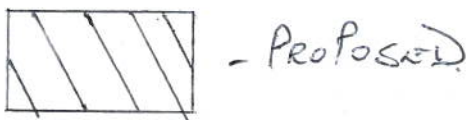
- A. Site Location and Block Plan

Appendix A

Westfaliafruit Ltd Site Map



Map area bounded by: 525918,325196 526318,325596. Produced on 26 July 2022 from the OS National Geographic Database. Reproduction in whole or part is prohibited without the prior permission of Ordnance Survey. © Crown copyright 2022. Supplied by UKPlanningMaps.com a licensed OS partner (100054135). Unique plan reference: p16b/uk/829974/1122033





APPENDIX D

LEAD LOCAL FLOOD AUTHORITY CORRESPONDENCE

John Langley

From: John Langley
Sent: 09 April 2025 13:56
To: 'Dean Whitehead'
Cc: Deniss Lizunovs; WestfaliaFruit@rgcarter.co.uk; Frederick Venzon; Robert McQueen
Subject: P24CD0155 - 8973 - Packing Hall Extension, Westfalia Fruit, Spalding - LCC
Highways/ LLFA Meeting Notes
Attachments: H14-1095-24Response_C_00961_25 LCC SUDs & Transport Response.pdf

Dear Dean,

Thanks for your time last week on 01/04/25, it was good to run through the scheme to enable our outline below ground drainage strategy to progress.

Please see below summary of key items discussed during our Teams Meeting.

Meeting held via Microsoft Teams, with the following attendees:

- Dean Whitehead - Lincolnshire County Council
- John Langley – Carter Design Group
- Deniss Lizunovs – Carter Design Group

Meeting Notes

The meeting was arranged to enable discussion around the letter sent by Lincolnshire County Council, requesting additional information relating to the current information submitted for planning under application reference H14-1095-24.

Surface Water Drainage

As agreed, the overall surface water drainage strategy for proposed packing hall extension is that impermeable areas remain as existing, with the new extension extending over existing impermeable hard standing. All of the external yard area is impermeable and flows from this area are currently positively captured and conveyed into the adjacent Vernatt's Drain unattenuated (as contested by Welland and Deepings IDB). The new extension would follow the same principle and utilise the existing headwalls on a like for like impermeable area basis. A key benefit of the new scheme is that flows generated by the new building roof have a much lower pollution risk than the current external hard standing.

We understand in principle from our meeting that LCC had no objection to this proposal, subject to IDB approval, production of a detailed surface water drainage strategy and existing record information of the outfalls.

- The below ground surface water drainage strategy is to be developed in alignment with the 'Highway and Lead Local Flood Authority – Lincolnshire Development Roads and Sustainable Drainage Design Approach' along with associated documents.
- It was noted that infiltration is not viable on site due to the underlying ground conditions.
- Exceedance flow paths are to be considered and highlighted on the GA drawings.
- The drainage CCTV survey will be provided to the LLFA, this is particularly important where existing elements are to be re-used in order to confirm the integrity of the existing network.
- It was noted FEH 22 data would be used for the design and a CV of 1 for both summer and winter.
- Where below ground drainage is not to be adopted, it is important maintenance responsibilities are clearly defined.

Highways

It was noted that whilst the response letter outlines the additional information to be provided, key items required are:

- Overall parking provision information, i.e. what is lost/ gained and the numbers of staffing.
- Anticipated number of HGV movements and how this compares to the current numbers.
- When vehicle movements are expected to occur and how this corresponds with peak times.
- Details on how deliveries/ vehicles are managed i.e. that they can enter and leave site in a forward gear, provision to prevent waiting on the highway, etc.

If you have any queries or require further information don't hesitate to get in contact.

Kind Regards

John



APPENDIX E IDB CORRESPONDENCE

John Langley

From: Craig Shinkin <Craig@wellandidb.org.uk>
Sent: 23 April 2025 12:44
To: John Langley
Cc: Ben Garside; WestfaliaFruit@rgcarter.co.uk; Robert McQueen; Frederick Venzon; Deniss Lizunovs
Subject: RE: P24CD0155 - 8973 - Packing Hall Extension, Westfalia Fruit, Spalding - Recent Meeting & Watercourse Levels

Follow Up Flag: Follow up
Flag Status: Flagged

Good afternoon John,

No problem, it was good to meet everyone.

I can say to you that in the Vernatts Drain adjacent to the Westfalia Fruit site Welland & Deepings Internal Drainage Board have a maximum design level of 3.8m ODN and a typical summer level of 1.5m ODN. It should be noted however, that levels in this drain can fluctuate depending on pumping operations in response to weather conditions.

If you require any further information please let us know.

Kind regards,

CRAIG SHINKIN
Planning & Enforcement Officer



Deeping House
Welland Terrace
Spalding
PE11 2TD
www.wellandidb.org.uk
Tel: 01775 725861
Fax: 01775 767689

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!! ATTENTION: This email originated outside of the R G Carter Group. Please exercise caution when opening attachments or clicking links !!

From: John Langley <John.Langley@rgcarter.co.uk>
Sent: 08 April 2025 16:39
To: Craig Shinkin <Craig@wellandidb.org.uk>
Cc: Ben Garside <Ben.Garside@rgcarter.co.uk>; WestfaliaFruit@rgcarter.co.uk; Robert McQueen <Robert.McQueen@rgcarter.co.uk>; Frederick Venzon <Frederick.Venzon@rgcarter.co.uk>; Deniss Lizunovs

<Deniss.Lizunovs@rgcarter.co.uk>

Subject: P24CD0155 - 8973 - Packing Hall Extension, Westfalia Fruit, Spalding - Recent Meeting & Watercourse Levels

Dear Craig,

Thanks for your time yesterday, it was good to run through the project and get your initial feedback.

As agreed, the overall surface water drainage strategy for proposed packing hall extension is that impermeable areas remain as existing, with the new extension extending over existing impermeable hard standing. All of the external yard area is impermeable and flows from this area are currently positively captured and conveyed into the adjacent Vernatt's Drain unattenuated (as contested by Welland and Deepings IDB). The new extension would follow the same principle and utilise the existing headwalls on a like for like impermeable area basis. A key benefit of the new scheme is that flows generated by the new building roof have a much lower pollution risk than the current external hard standing.

We understand in principle from our meeting yesterday that the IDB had no objection to this proposal, subject to receipt of a surface water drainage strategy and existing record information of the outfalls.

It would be greatly appreciated if you would be able to share any water level data you have for the Vernatt's Drain so we can use this in our hydraulic model for the site drainage.

Once we receive the drainage CCTV survey (currently being undertaken on site) we will share this with you too.

If you have any queries or require further information don't hesitate to get in contact.

Kind Regards

John

John Langley
Principal Civil Engineer



17a New Road
Thetford
Norfolk, IP24 1AN

☎ 01553 767788

☎ 07730 818311

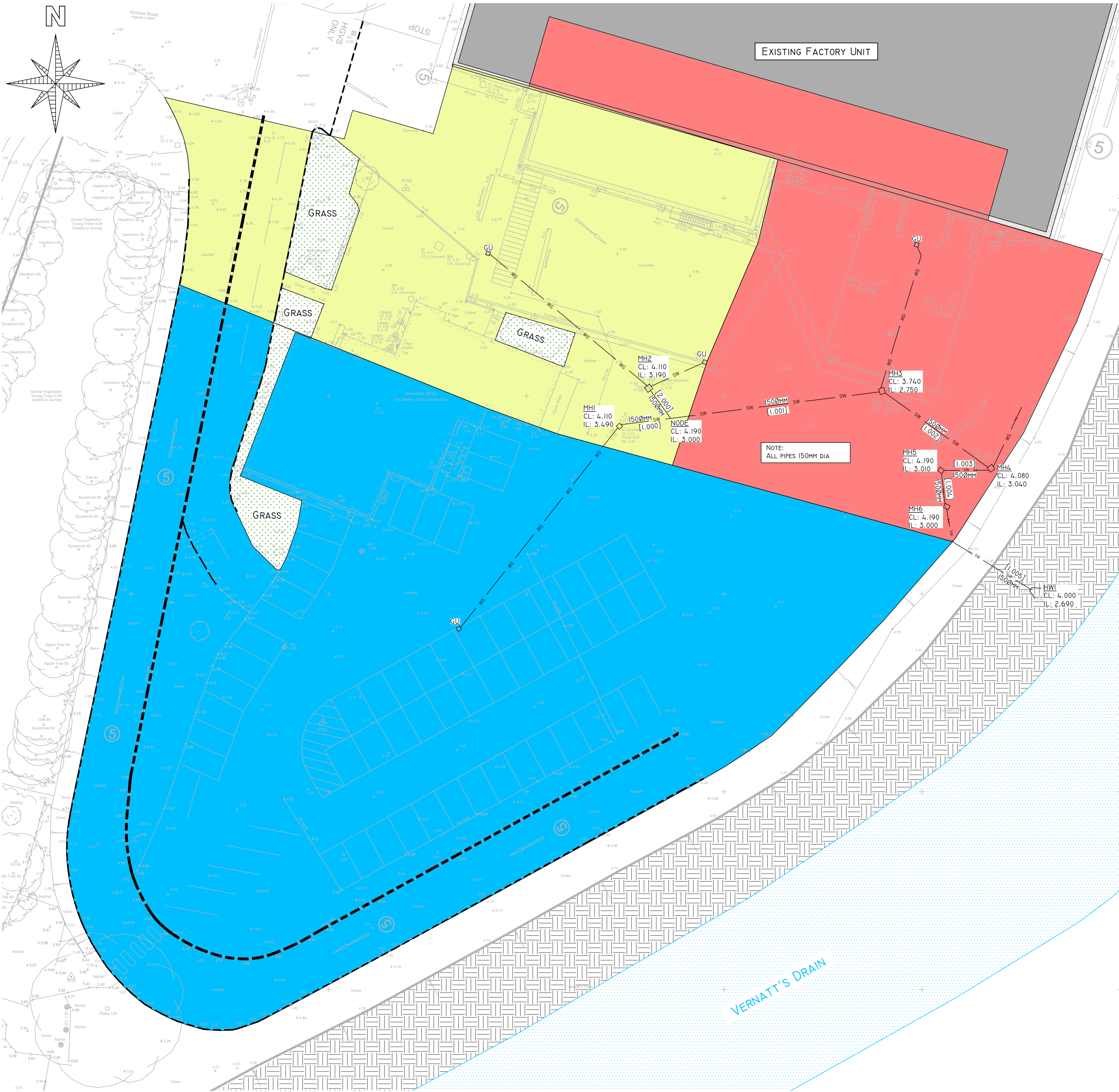
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Registered address: Drayton, Norwich, Norfolk NR8 6AH.



APPENDIX F BROWNFIELD IMPERMEABLE AREAS & EXISTING NETWORK



EXISTING IMPERMEABLE AREA KEY		
IMPERMEABLE AREA		ENTRY MANHOLE
	AREA = 3702M ²	ENTRY MH = MH1
	AREA = 1436M ²	ENTRY MH = MH2
	AREA = 1403M ²	ENTRY MH = MH3

EXISTING GENERAL SERVICES	
SW	DENOTES APPROXIMATE ALIGNMENT OF EXISTING SURFACE WATER SEWER TAKEN FROM SURVEY SOLUTIONS UTILITIES AND CCTV DRAINAGE SURVEY DRAWING NO 76424NGUG-01 DATED 08/04/2025

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DO NOT SCALE FROM THIS DRAWING. USE ONLY FIGURED OR GRID DIMENSIONS

NOTES:
All workmanship is to be in accordance with the latest amendment of the relevant section of BS 8000, to the extent that recommendations define quality of finished work. All materials, products and systems are to be installed and fixed in strict accordance with the latest manufacturers written instructions, in line with the requirements of any relevant British Board of Agreement Certificates, British or European Standards and the section of BS 8000 applicable to that trade.

All dimensions must be checked on site prior to commencement of related works.

Any discrepancies should be notified to the design office immediately.

CONSTRUCTION [DESIGN AND MANAGEMENT] REGULATIONS 2015:
Design, Construction or Residual Risks beyond the expected knowledge of a competent Contractor, End-User/Operator, and/or residual risks that cannot be entirely mitigated through design are identified on this drawing. This drawing should be read alongside any project specific Design Risk Assessments prepared by CDG and/or other designers (including subcontractor or specialist designers).

NOTES

I. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL ARCHITECTS DRAWINGS, SPECIALISTS DRAWINGS AND SPECIFICATIONS, ETC.

EXISTING IMPERMEABLE AREA PLAN
SCALE 1:200 @ A1

revisions		date	source	drawn
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PLANNING

project
PACKING HALL EXTENSION
WESTFALIA FRUIT SPALDING

drawing title
EXISTING IMPERMEABLE AREA PLAN

drawn
D.L.
date
APRIL'25

checked
J.L.
date
APRIL'25

scale: AS NOTED @ A1

status
revision

cdg

8973-CDG-XX-XX-DR-C-5000 S3 P01

VICTORY PARK, LONDON ROAD, ATTLEBOROUGH, NORFOLK, NR17 1ZA. TEL: 01503 767788. E-MAIL: design@carter.co.uk



APPENDIX G
PROPOSED BELOW GROUND DRAINAGE GENERAL ARRANGEMENT, MANHOLE SCHEDULES
AND IMPERMEABLE AREA PLAN



<u>MINIMUM DIAMETER OF SEWERS WHERE NOT SPECIFIED:</u> FOUL WATER - 110Ø (U.N.O.) SURFACE WATER - 150Ø (ROAD GULLY) • 150Ø (RWP) (U.N.O.)
<u>NOTE:</u> INTERNAL LAYOUT INDICATIVE ONLY. REFER TO ARCHITECTURAL DRAWINGS FOR CURRENT LAYOUTS AND SETTING OUT

FW MANHOLE SCHEDULE LEGEND			
MH No.	COVER LEVEL	INVERT LEVEL	TYPE
FW01	4.500	3.500	PPIC-S-D40
FW02	4.600	3.360	PPIC-S-D40
FW03	4.600	3.310	PPIC-S-D40
FW04	4.300	3.160	PPIC-S-D40
FW05	4.200	3.110	PPIC-S-D40
FW06	4.350	2.950	PPIC-S-D40
PIPES LAID SOFFIT TO SOFFIT UNLESS STATED OTHERWISE			
NOTE: WHERE CHAMBER DEPTH IS GREATER THAN 1.2M CHAMBER TO BE FITTED WITH RESTRICTED ACCESS PLATE 350MM X 350MM			

	DESIGN RISK
	ALL DESIGN INFORMATION IS SUBJECT TO RECEIPT OF FORMAL PLANNING CONSENT

- ALL CONNECTIONS TO EXISTING SEWERS ARE TO BE CHECKED ON SITE TO VERIFY PIPE DIAMETERS AND INVERT LEVELS.
5. THE SURFACE WATER SYSTEM DETAILED ON THIS DRAWING HAS BEEN DESIGNED TO CONTAIN AND DISCHARGE A 1/100YR STORM RETURN + 40% ALLOWANCE FOR CLIMATE CHANGE IN ACCORDANCE WITH NPFF AND LLFA REQUIREMENTS.
6. ALL RAINWATER PIPES TO HAVE APPROPRIATE RODDING ACCESS PROVISIONS.
7. ALL DRAIN PIPES TO BE CONNECTED INTO MANHOLES TO MATCH ALL INCOMING PIPE SOFFITS, AND TO MATCH SOFFIT TO SOFFIT WHERE PIPE Ø IS IN SMALLER THAN PIPE Ø OUT. A NOMINAL FALL ACROSS MANHOLES HAS BEEN INCLUDED WHERE APPROPRIATE, IN THE CALCULATION OF INVERT LEVELS.
8. ALL DRAINAGE SYSTEMS TO BE IN ACCORDANCE WITH THIS DRAWING, ALONG WITH BS EN 752 AND THE BUILDING REGULATIONS & PART H
9. ALL MANHOLE AND DRAINAGE CHANNEL COVERS SHALL COMPLY WITH BS.EN124. MANHOLE COVERS WITHIN BLOCK PAVED AREAS & BUILDINGS SHALL BE RECESSED. COVER STRENGTHS TO BE:-
CLASS E600 IN AREAS SUBJECT TO HIGH POINT LOADS (E.G.FORKLIFTS) CLASS D400 IN HEAVY TRAFFICKED AREAS (ACCESS ROADS, SERVICE YARDS ETC.). CLASS C250 IN LIGHTLY TRAFFICKED AREAS (CAR PARKS ETC.)
CLASS B125 (WITH MIN. 100MM DEEP FRAME) IN LANDSCAPE & NON-TRAFFICKED AREAS (PLANTING, PEDESTRIAN AREAS ETC.)
10. GULLIES AND CHANNELS IN VEHICULAR TRAFFIC AREAS TO HAVE A MINIMUM COVER RATING OF D400 AND B125 IN PEDESTRIAN AREAS.
11. ALL COVER LEVELS SHOWN ARE APPROXIMATE ONLY AND MUST SUIT PROPOSED FINISHED LEVELS.
12. WHERE GRADIENT ON SURFACE WATER RUNS ARE NOT PROVIDED MINIMUM GRADIENT TO BE 1 IN 100
13. WHERE FOUL WATER INVERT LEVELS GRADIENTS ARE NOT PROVIDED MINIMUM GRADIENT OF SEWER TO BE 1 IN 80

NOTE:
FOR DRAINAGE DETAILS REFER TO CDG DRAWING NO
8973-CDG-XX-XX-DR-C-3100_3101_3102_3103

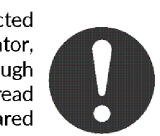
project
**PACKING HALL EXTENSION
 WESTFALIA FRUIT SPALDING**

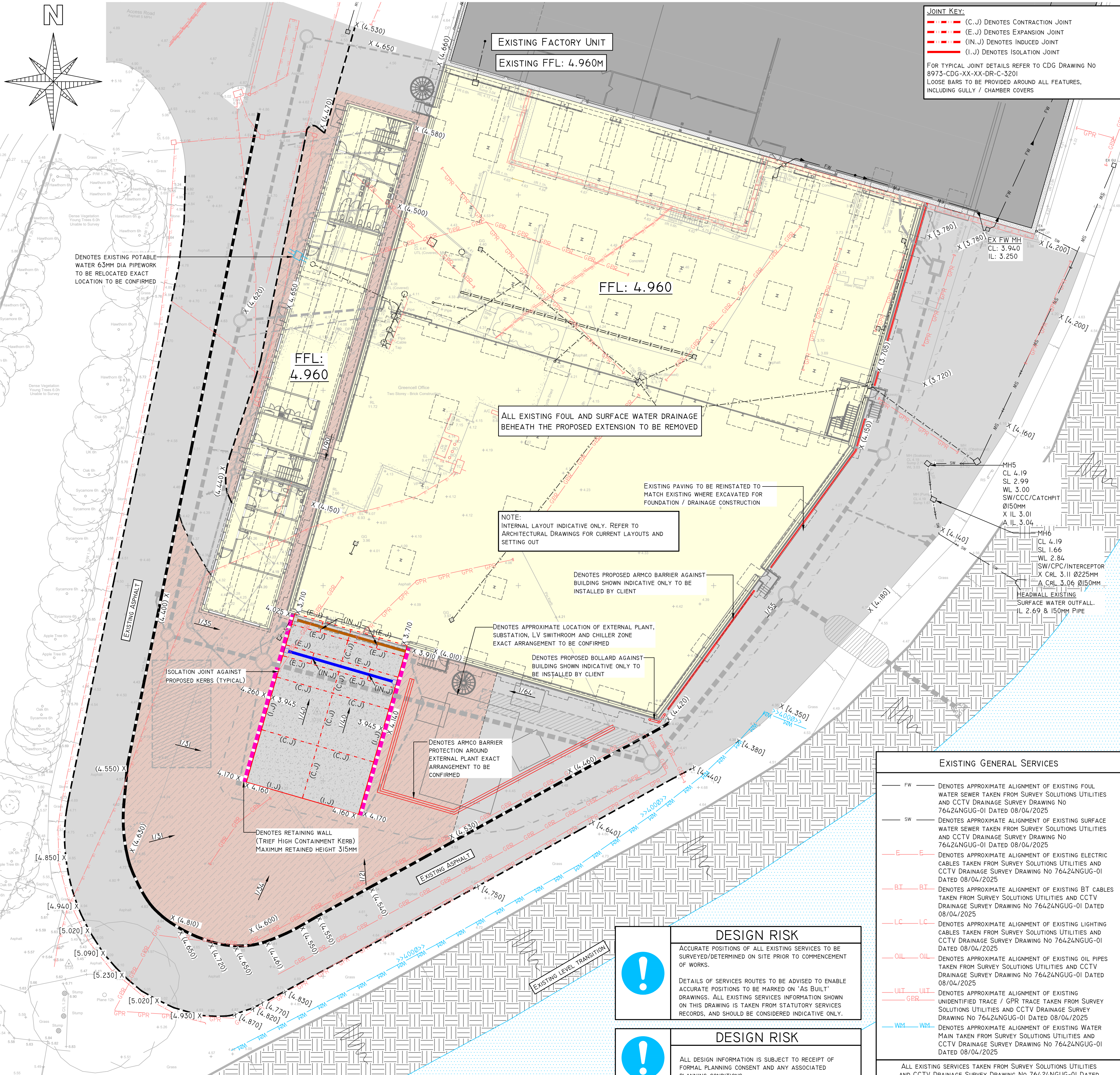
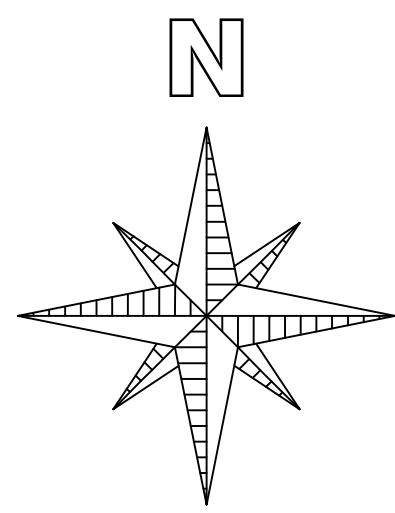
drawing title
**BELOW GROUND DRAINAGE
 GENERAL ARRANGEMENT**

client	D.L.	checked:	J.L.	scale	AS NOTED	at	carter design group
date	APRIL '25						

project	originator	volume	level	type	role	number	status	revision
08793-CDG-XX-XX-DR-C-3000	S3	P03						

ORCHYD PARK | LONDON ROAD | ATT FRODOGA CH NORWICH | NR17 4TA | TEL: 01503 767798 | EMAIL: design@carterdesigngroup.co.uk





JOINT KEY:

- (C.J) DENOTES CONTRACTION JOINT
- (E.J) DENOTES EXPANSION JOINT
- (IN.J) DENOTES INDUCED JOINT
- (I.J) DENOTES ISOLATION JOINT

FOR TYPICAL JOINT DETAILS REFER TO CDG DRAWING NO 8973-CDG-XX-XX-DR-C-3201

LOOSE BARS TO BE PROVIDED AROUND ALL FEATURES, INCLUDING GULLY / CHAMBER COVERS

EXTERNAL KEY

- + 4.000 DENOTES EXISTING LEVELS TAKEN FROM SURVEY SOLUTIONS TOPOGRAPHICAL SURVEY DRAWING NO 30626NOLS-01 DATED 08/02/2021
- X 4.000 DENOTES PROPOSED LEVELS
- X (4.000) DENOTES EXISTING TIE IN LEVEL
- X [4.000] DENOTES EXISTING LEVEL
- DENOTES FALL
- FFL: 4.960 DENOTES PROPOSED FINISHED FLOOR LEVEL TO MATCH EXISTING
- X — X — DENOTES EXISTING SW DRAINAGE TO BE REMOVED / ABANDONED
- DENOTES RETAINING WALL (TRIEF HIGH CONTAINMENT KERB) MAXIMUM RETAINED HEIGHT 315MM
- DENOTES EXISTING ASPHALT / CONCRETE CONSTRUCTION TO REMAIN
- DENOTES EXISTING TREES TAKEN FROM SURVEY SOLUTIONS TOPOGRAPHICAL SURVEY DRAWING NO 30626NOLS-01 DATED 08/02/2021

KERB KEY

- DENOTES PROPOSED HB2 KERB
- DENOTES PROPOSED BN DROP KERB
- DENOTES PROPOSED EDGING KERB
- DENOTES EXISTING KERB REMAIN

CONCRETE HARDSTANDING CONSTRUCTION UP TO 5 MSA

CONCRETE - 200MM THICK
200MM THICK REINFORCED CONCRETE SLAB. CONCRETE TO BE GRADE RC40/50 XF, REINFORCED WITH A393 MESH TOP (50MM COVER), ON 1200G POLYTHENE.

ALL JOINTS IN PAVING TO BE SEALED WITH COLPOR 200 OR EQUAL APPROVED.
ALL JOINTS TO HAVE TROWELLED MARGINS AND BULL NOSED EDGES.
CONCRETE TO RECEIVE A LIGHT BRUSHED FINISH, AND A PROPRIETARY SPRAY CURING AGENT. MESH TO HAVE 300MM MIN. SIDE AND 400MM MIN. END LAPS AND TO BE LOCATED ON SUITABLE SPACER CHAIRS TO ACHIEVE SPECIFIED COVER.

SUB-BASE - 375MM THICK
GRANULAR MATERIAL TYPE 1 SUBBASE BLINDED WITH FINES. SUB-BASE TO BE COMPACTED IN LAYERS NOT EXCEEDING 110MM COMPACTED DEPTH USING A HEAVY VIBRATORY ROLLER. ON TERRAM 1000 SEPARATING LAYER.

FORMATION
PROVIDE TERRAM 1000 SEPARATING LAYER. FORMATION TO BE IN ACCORDANCE WITH SPECIFICATION FOR HIGHWAY WORKS.

BULK FILL (WHERE REQUIRED)
SELECTED GRANULAR MATERIAL CERTIFIED AS TYPE 6F5 TO THE SPECIFICATION FOR HIGHWAY WORKS. LAID AND COMPACTED IN 150MM MAX. LOOSE LAYERS TO SPECIFICATION FOR HIGHWAY WORKS.

SUB-FORMATION
SUB-FORMATION TO BE IN ACCORDANCE WITH SPECIFICATION FOR HIGHWAY WORKS.

PRIVATE BITUMINOUS ROAD CONSTRUCTION - HEAVY DUTY PARKING / ACCESS ROADS UP TO 1 MSA

SURFACE COURSE - 40MM THICK
40MM SMA 10 SURF 40/60, TO PD6691, LAID AND COMPACTED IN ACCORDANCE WITH THE SHW SPECIFICATION.

BINDER COURSE - 60MM THICK
60MM (AC20) DENSE BIN 40/60 TO PD6691. LAID AND COMPACTED IN ACCORDANCE WITH SHW SPECIFICATION.

BASE COURSE - 100MM THICK
100MM (AC32) BASE 40/60 TO PD6691. LAID AND COMPACTED IN ACCORDANCE WITH SHW SPECIFICATION.

SUB-BASE - 375MM THICK
GRANULAR MATERIAL TYPE 1 TO CLAUSE 803 OF THE SHW SPECIFICATION LAID AND COMPACTED TO CLAUSE 802.

FORMATION
PROVIDE TERRAM 1000 SEPARATING LAYER. FORMATION TO BE IN ACCORDANCE WITH D.T.P. SPECIFICATION CLAUSES 601, 616 AND 617.

SUB-FORMATION
SUB-FORMATION TO BE IN ACCORDANCE WITH D.T.P. SPECIFICATION CLAUSES 601, 602, 603, 613 AND 617.

EXISTING GENERAL SERVICES

- FW DENOTES APPROXIMATE ALIGNMENT OF EXISTING FOUL WATER SEWER TAKEN FROM SURVEY SOLUTIONS UTILITIES AND CCTV DRAINAGE SURVEY DRAWING NO 76424NGUG-01 DATED 08/04/2025
- SW DENOTES APPROXIMATE ALIGNMENT OF EXISTING SURFACE WATER SEWER TAKEN FROM SURVEY SOLUTIONS UTILITIES AND CCTV DRAINAGE SURVEY DRAWING NO 76424NGUG-01 DATED 08/04/2025
- E-E DENOTES APPROXIMATE ALIGNMENT OF EXISTING ELECTRIC CABLES TAKEN FROM SURVEY SOLUTIONS UTILITIES AND CCTV DRAINAGE SURVEY DRAWING NO 76424NGUG-01 DATED 08/04/2025
- BT-BT DENOTES APPROXIMATE ALIGNMENT OF EXISTING BT CABLES TAKEN FROM SURVEY SOLUTIONS UTILITIES AND CCTV DRAINAGE SURVEY DRAWING NO 76424NGUG-01 DATED 08/04/2025
- LC-LC DENOTES APPROXIMATE ALIGNMENT OF EXISTING LIGHTING CABLES TAKEN FROM SURVEY SOLUTIONS UTILITIES AND CCTV DRAINAGE SURVEY DRAWING NO 76424NGUG-01 DATED 08/04/2025
- OIL-OIL DENOTES APPROXIMATE ALIGNMENT OF EXISTING OIL PIPE TAKEN FROM SURVEY SOLUTIONS UTILITIES AND CCTV DRAINAGE SURVEY DRAWING NO 76424NGUG-01 DATED 08/04/2025
- UIT-UIT DENOTES APPROXIMATE ALIGNMENT OF EXISTING UNIDENTIFIED TRACE / GPR TRACE TAKEN FROM SURVEY SOLUTIONS UTILITIES AND CCTV DRAINAGE SURVEY DRAWING NO 76424NGUG-01 DATED 08/04/2025
- WM-WM DENOTES APPROXIMATE ALIGNMENT OF EXISTING WATER MAIN TAKEN FROM SURVEY SOLUTIONS UTILITIES AND CCTV DRAINAGE SURVEY DRAWING NO 76424NGUG-01 DATED 08/04/2025

ALL EXISTING SERVICES TAKEN FROM SURVEY SOLUTIONS UTILITIES AND CCTV DRAINAGE SURVEY DRAWING NO 76424NGUG-01 DATED 08/04/2025

DESIGN RISK

ACCURATE POSITIONS OF ALL EXISTING SERVICES TO BE SURVEYED/DETERMINED ON SITE PRIOR TO COMMENCEMENT OF WORKS.

DETAILS OF SERVICES ROUTES TO BE ADVISED TO ENABLE ACCURATE POSITIONS TO BE MARKED ON 'AS BUILT' DRAWINGS. ALL EXISTING SERVICES INFORMATION SHOWN ON THIS DRAWING IS TAKEN FROM STATUTORY SERVICES RECORDS, AND SHOULD BE CONSIDERED INDICATIVE ONLY.

DESIGN RISK

ALL DESIGN INFORMATION IS SUBJECT TO RECEIPT OF FORMAL PLANNING CONSENT AND ANY ASSOCIATED PLANNING CONDITIONS

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All dimensions must be checked on site prior to commencement of related works.

Any discrepancies should be notified to the design office immediately.

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NOTES:

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- THIS DRAWING HAS BEEN DEVELOPED USING:
SURVEY SOLUTIONS TOPOGRAPHICAL SURVEY DRAWING NO 30626NOLS-01 DATED 08/02/2021
- THE PROPOSALS ON THIS DRAWING ARE BASED ON THE SITE / BUILDING LAYOUT PROVIDED ON THE ARCHITECTURAL PLANS.
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- ALL WORK IS TO BE CARRIED OUT IN ACCORDANCE WITH THE CURRENT BRITISH STANDARDS, B.S. CODES OF PRACTICE & BUILDING REGULATIONS.
- ALL PAVEMENT DESIGN THICKNESS ARE BASED ON A MINIMUM SUB-GRADE CBR OF 2% BASED UPON GTS GEO-ENVIRONMENTAL REPORT NO: GT0492 DATED 07/03/2025
SUBJECT TO FINAL TESTING ON PREPARED FORMATION.

OVERSITE PREPARATION

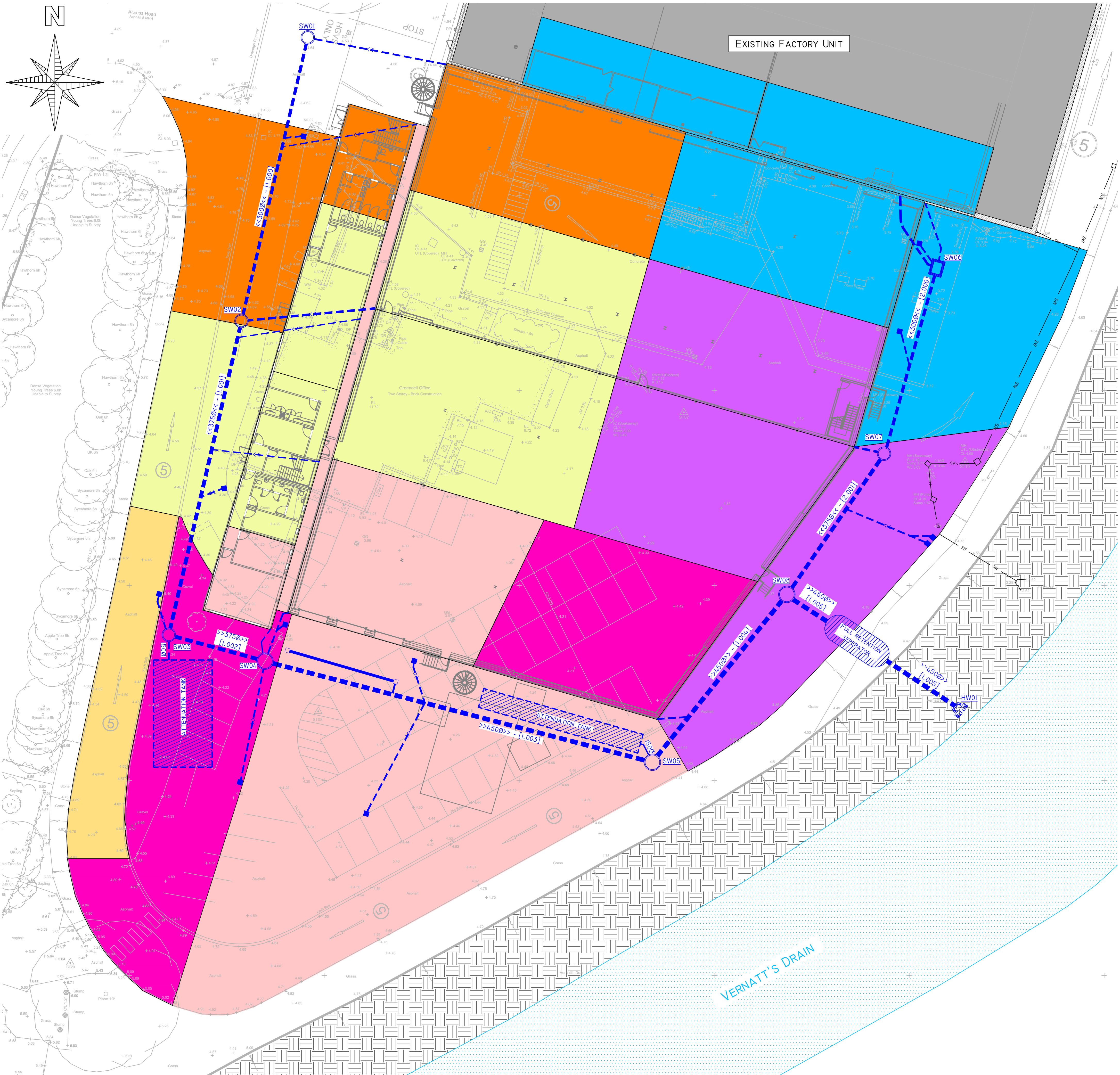
ALL ORGANIC MATERIAL AND TOPSOIL TO BE REMOVED. LEVELS TO BE REDUCED WHERE NECESSARY TO REVEAL AGREED SUBGRADE. PROOF ROLL WITH A HEAVY VIBRATING ROLLER, ANY SOFT SPOTS TO BE REMOVED AND REPLACED WITH COMPACTED GRANULAR MATERIAL.

NOTE:

INTERNAL LAYOUT INDICATIVE ONLY. REFER TO ARCHITECTURAL DRAWINGS FOR CURRENT LAYOUTS AND SETTING OUT

NOTE:

FOR EXTERNAL WORKS DETAIL REFER TO CDG DRAWING NO 8973-CDG-XX-XX-DR-C-3200_3201



PROPOSED IMPERMEABLE AREA PLAN
SCALE 1:200 @ A1

IMPERMEABLE AREA KEY		
IMPERMEABLE AREA		ENTRY MANHOLE
	AREA = 712M ²	ENTRY MH = SW01
	AREA = 1224M ²	ENTRY MH = SW02
	AREA = 194M ²	ENTRY MH = SW03
	AREA = 1584M ²	ENTRY MH = SW04
	AREA = 829M ²	ENTRY MH = SW05
	AREA = 1062M ²	ENTRY MH = SW06
	AREA = 1119M ²	ENTRY MH = SW07
	AREA = 0M ²	ENTRY MH = SW08

DRAINAGE KEY	
	DENOTES PROPOSED SURFACE WATER SEWER 1100 U.N.O
	DENOTES CHANNEL DRAIN WITH RODDING ACCESS PROVISION, TO DISCHARGE VIA SUMP OUTLET BOX
	DENOTES PROPOSED SURFACE WATER ROAD GULLY WITH RODDING ACCESS PROVISION
	DENOTES PP INSPECTION CHAMBER WITH D400 RATED COVERS TO BE SOLID WITHIN ASPHALT AND CONCRETE
	DENOTES APPROXIMATE ALIGNMENT OF EXISTING SURFACE WATER SEWER TAKEN FROM SURVEY SOLUTIONS UTILITIES AND CCTV DRAINAGE SURVEY DRAWING NO 76424NGUG-01 DATED 08/04/2025

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NOTES
1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL ARCHITECTS DRAWINGS, SPECIALISTS DRAWINGS AND SPECIFICATIONS, ETC.

DRAWING STATUS UPDATED TO RIBA STAGE 3		date	10/06/25
revisions		source	D/D
		drawn	D.L.

RIBA STAGE 3

project
PACKING HALL EXTENSION
WESTFALIA FRUIT SPALDING

drawing title
PROPOSED IMPERMEABLE
AREA PLAN

drawn: D.L.
date: APRIL'25

checked: J.L.
date: APRIL'25

scale: AS NOTED @ A1

status: revision

project - originator - volume - level - type - role - number

8973-CDG-XX-XX-DR-C-5001 S3 P03

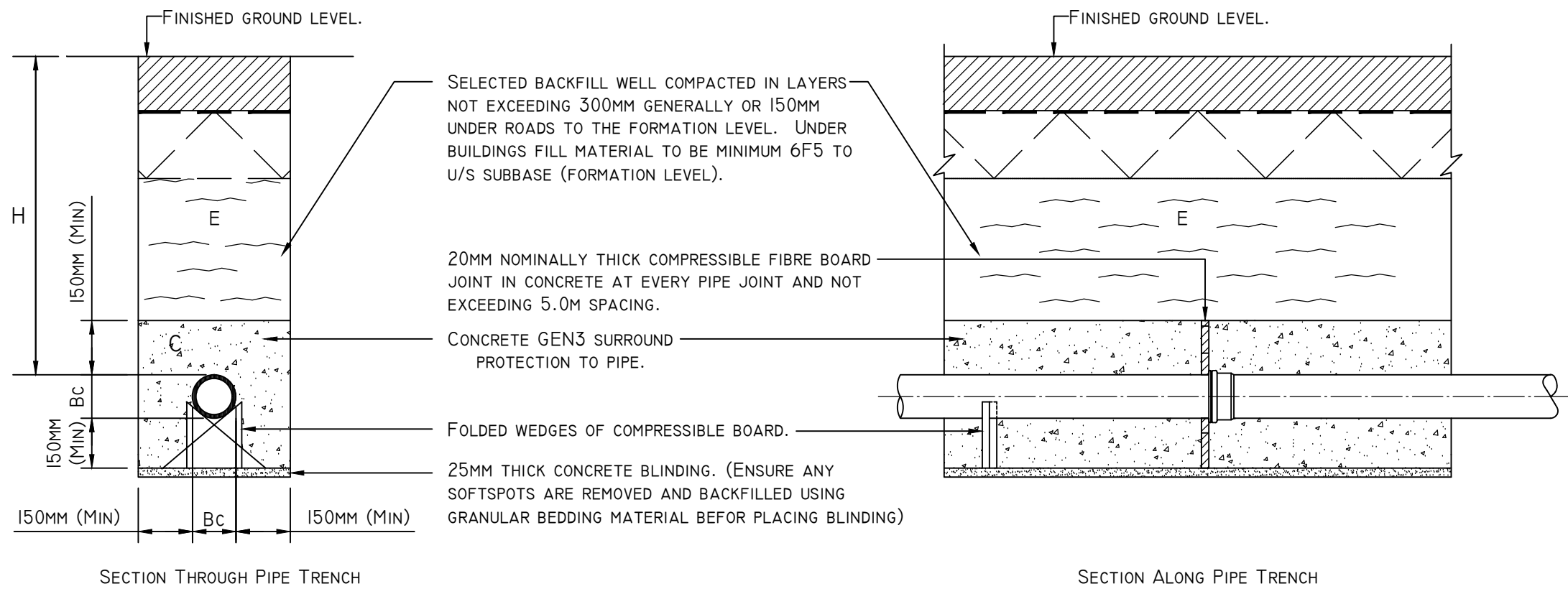
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cdg

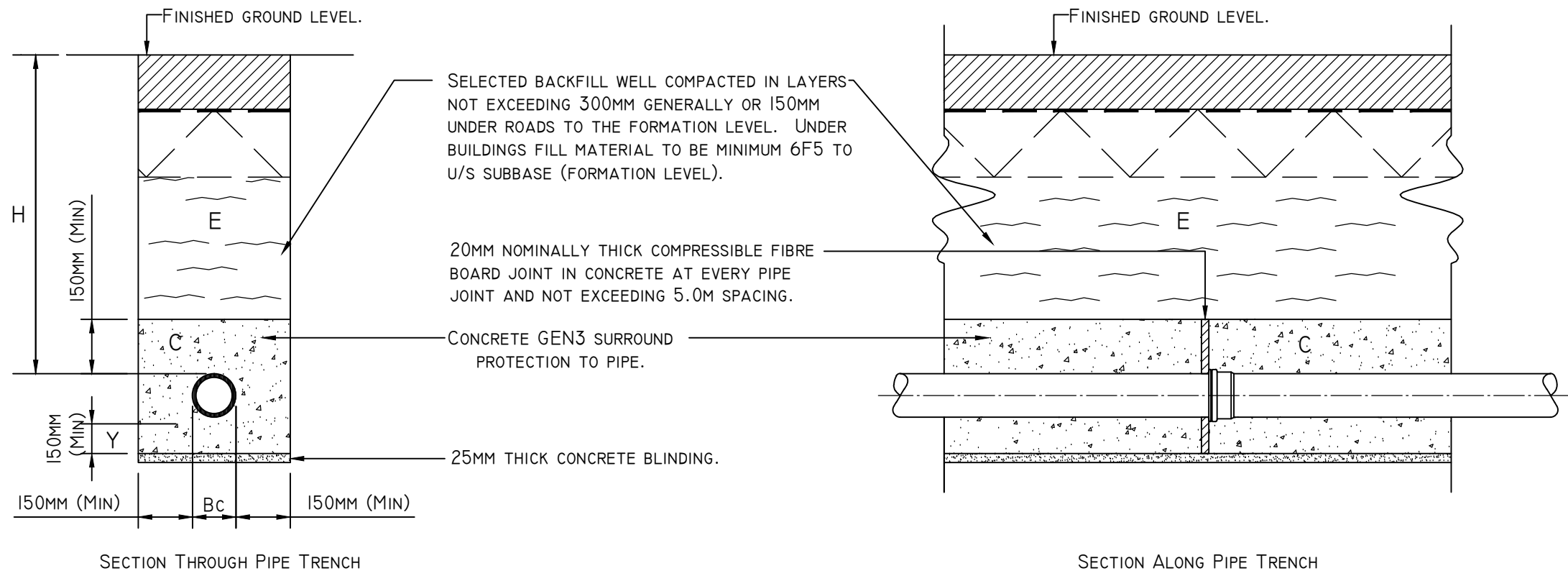


APPENDIX H

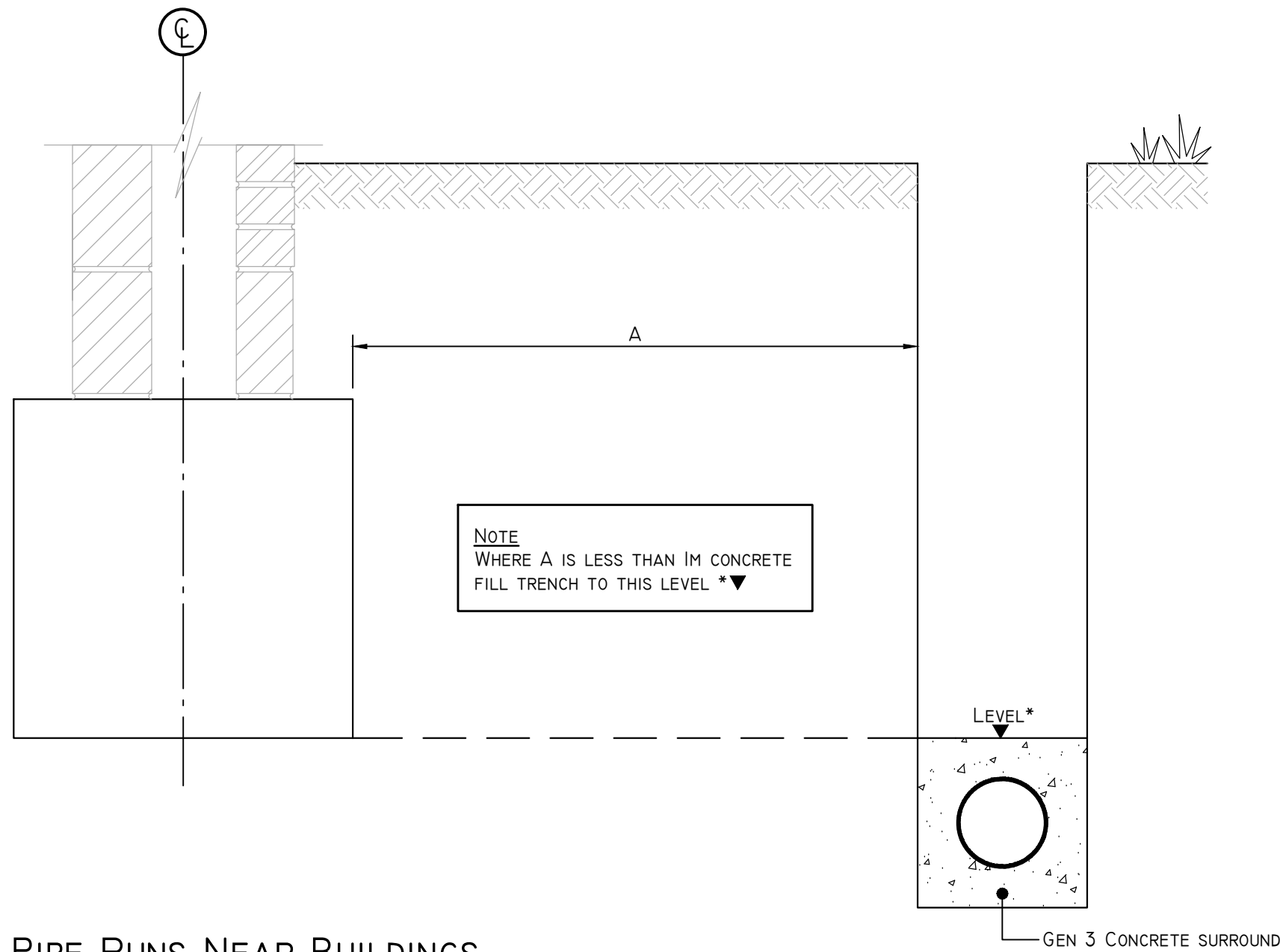
PROPOSED BELOW GROUND DRAINAGE DETAIL DRAWINGS



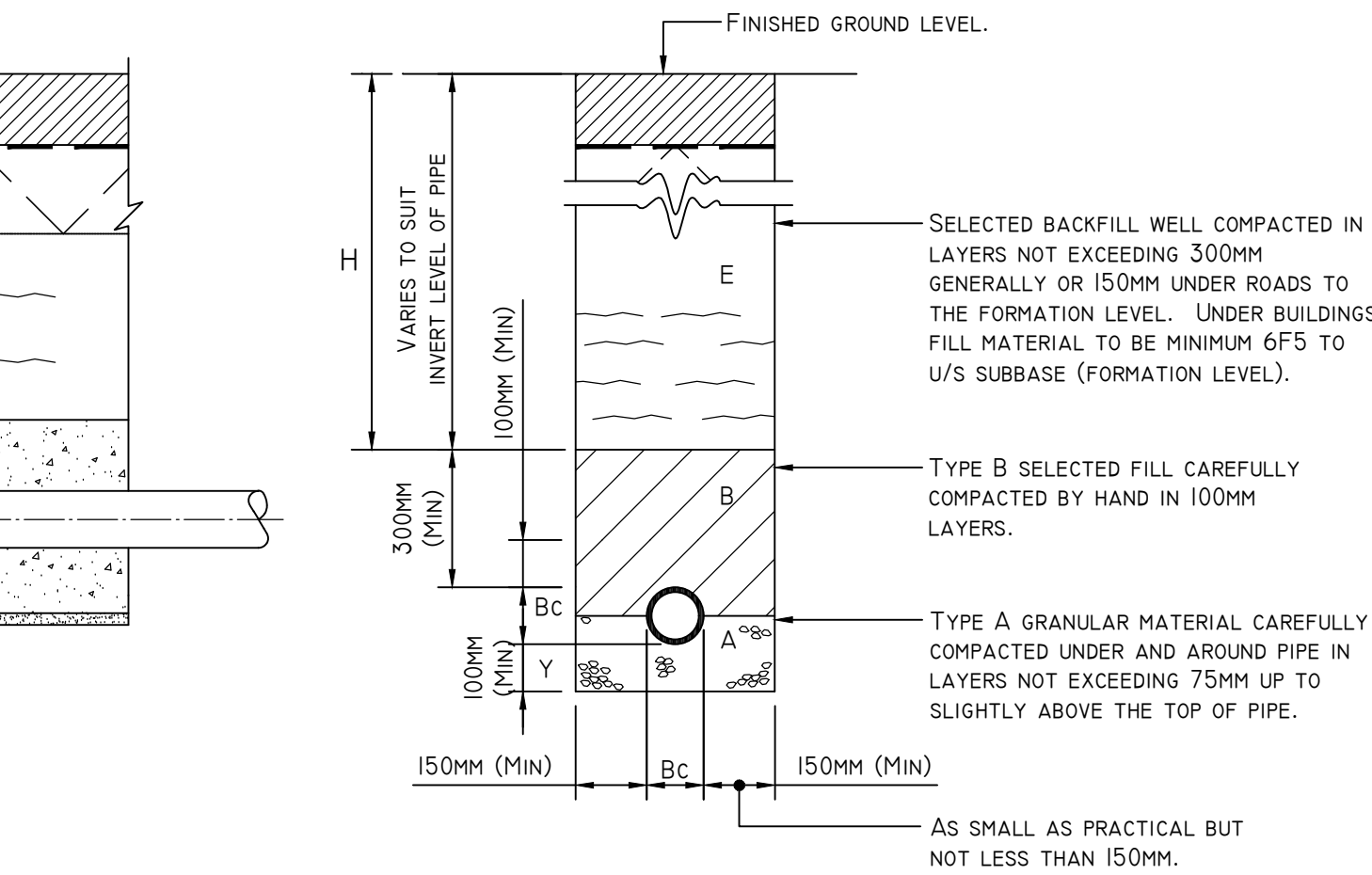
CLASS A PIPE PROTECTION
(FOR PVCu & POLYETHYLENE PIPES)
SCALE 1:20 @ A1



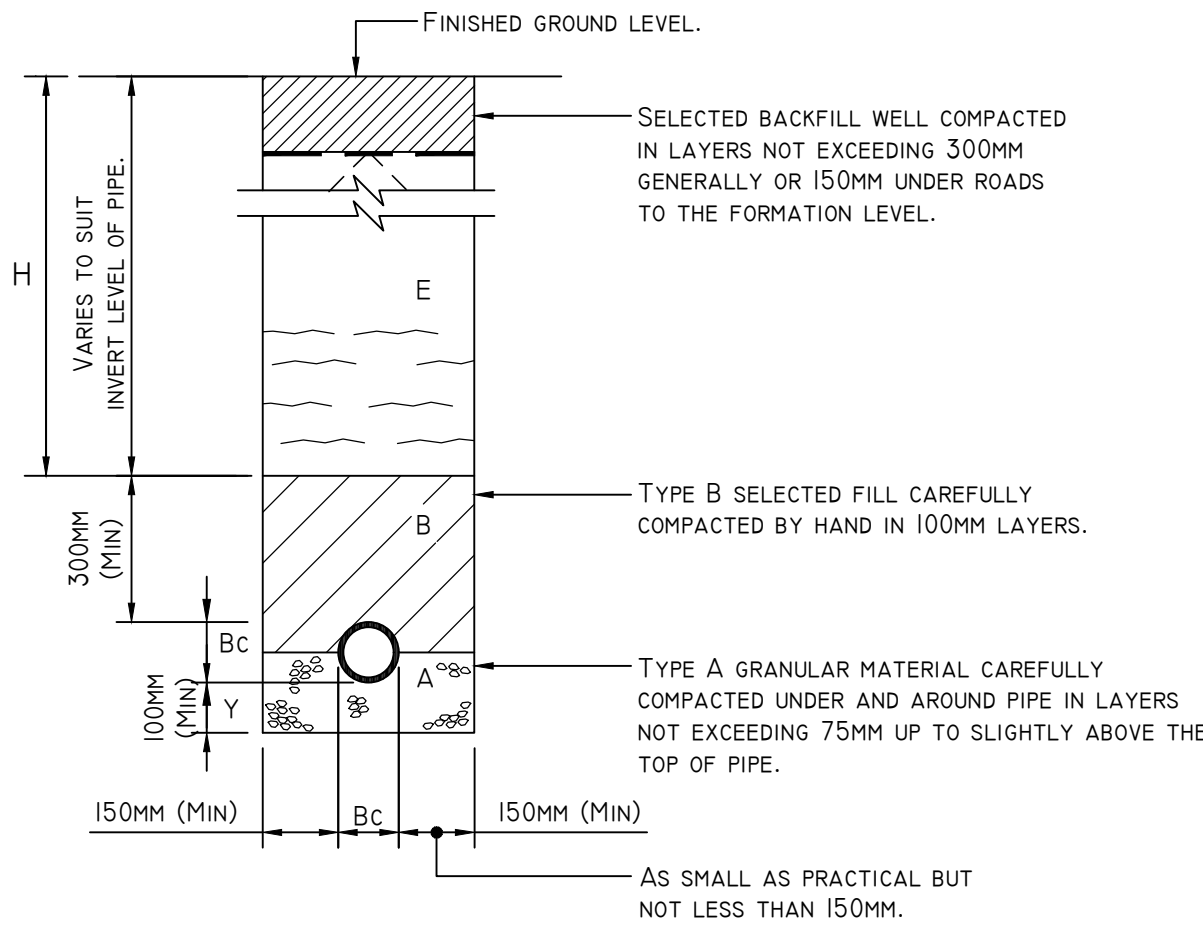
CLASS A PIPE PROTECTION
(FOR ALL PIPES OTHER THAN PVCu & POLYETHYLENE PIPES)
SCALE 1:20 @ A1



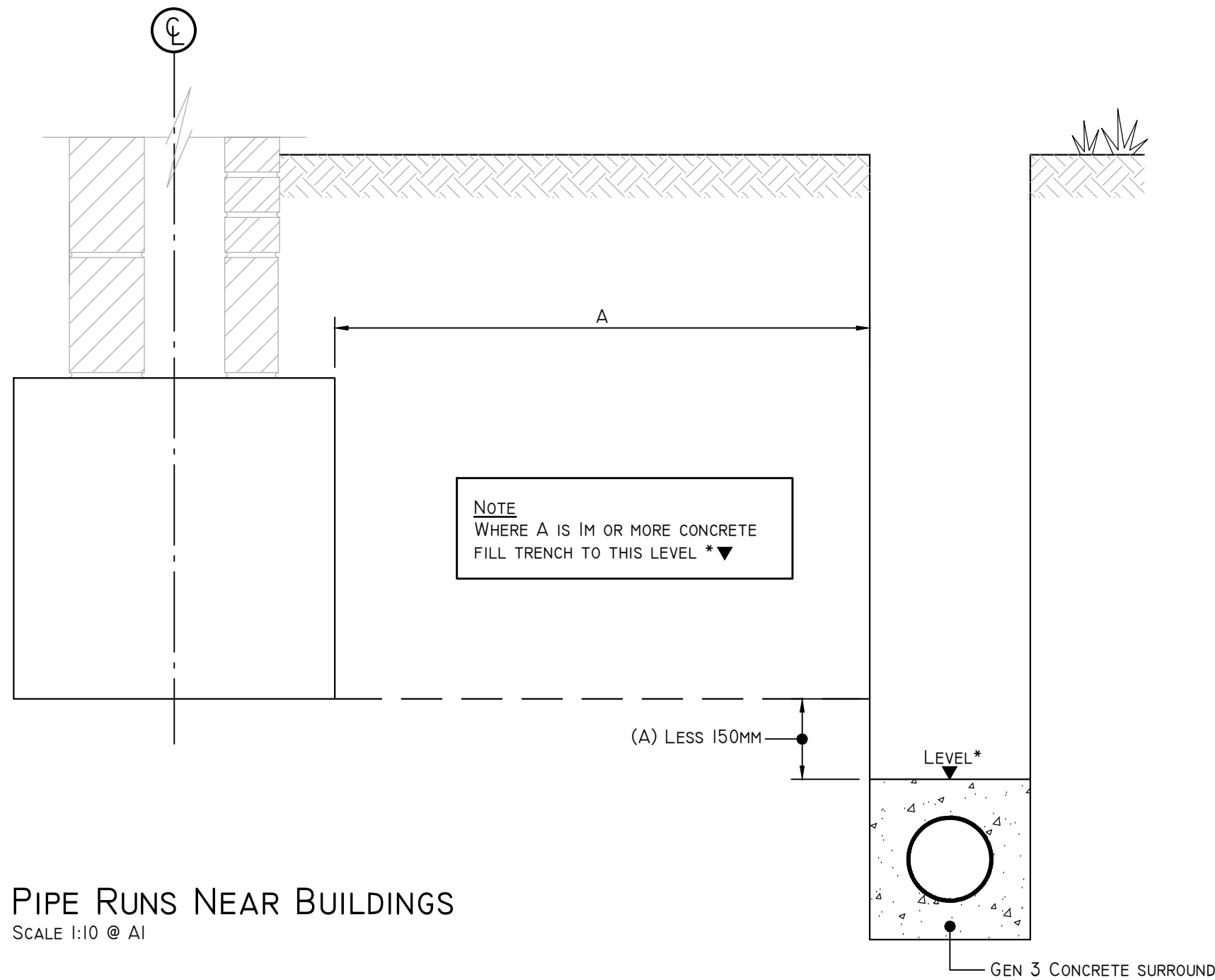
PIPE RUNS NEAR BUILDINGS
SCALE 1:10 @ A1



CLASS B PIPE PROTECTION
(FOR PVCu & POLYETHYLENE PIPES)
SCALE 1:20 @ A1



CLASS B PIPE PROTECTION
(FOR ALL PIPES OTHER THAN PVCu & POLYETHYLENE PIPES)
SCALE 1:20 @ A1



PIPE RUNS NEAR BUILDINGS
SCALE 1:10 @ A1

NOTES ON BEDDING DETAILS

FOR TYPES OF BEDDING CLASS TO USE,
REFER TO NOTE 'H' BELOW.

- A (A) TYPE A GRANULAR MATERIAL SHALL COMPLY WITH WIS No. 4-08-01 AND SHALL BE:
- IMPORTED SINGLE SIZE OR GRADED AGGREGATE IN ACCORDANCE WITH BS 882 AS SHOWN IN TABLE A.
- (B) SELECTED AS-DUG GRANULAR BEDDING AND SIDEFILL MATERIAL SHALL BE FREE FROM ORGANIC MATTER, COMBUSTIBLE MATERIALS, FROZEN SOIL, CLAY LUMPS LARGER THAN 75MM AND STONES LARGER THAN THE MAX. PERMITTED PARTICLE SIZE SPECIFIED IN TABLE A DEPENDING ON PIPE SIZE. THE SELECTED MATERIAL SHALL BE EVALUATED USING THE COMPACTION FRACTION TEST DETAILED IN APPENDIX A OF WIS No. 4-08-01.
- BC MATERIAL EXCAVATED FROM TRENCHED DUG THROUGH LAND CONTAMINATED WITH DOMESTIC, BUILDING OR INDUSTRIAL WASTE SHOULD NOT BE USED. EXTERNAL DIAMETER OF PIPE.
- B TYPE B SELECTED FILL SHALL BE:
UNIFORM READILY COMPATIBLE MATERIAL WHICH IS FREE FROM TREE ROOTS, VEGETABLE MATTER, BUILDING RUBBISH, FROZEN SOIL, CLAY LUMPS AND MATERIAL RETAINED ON A 40MM SIEVE.
- C CONCRETE PROTECTION TO PIPE.
- E SELECTED BACKFILL SHALL BE:
SUITABLE EXCAVATED MATERIAL FROM THE TRENCH (OR IMPORTED) EXCLUDING BOULDERS, LUMPS OF CONCRETE, TIMBER AND VEGETABLE MATTER. DO NOT USE HEAVY COMPACTORS BEFORE THERE IS 600MM COVER OF MATERIAL OVER THE PIPES.
- H WHEN 'H' (DEPTH OF COVER) IS LESS THAN 0.9M BELOW THE FINISHED SURFACE OF THE PAVEMENT OR FLOOR SLAB OR LESS THAN 0.45M ELSEWHERE USE BEDDING CLASS A OR ELSEWHERE USE BEDDING CLASS B
- Y PROVIDE TEMPORARY PROTECTION DURING CONSTRUCTION AGAINST MECHANICAL DAMAGE AND FROST.

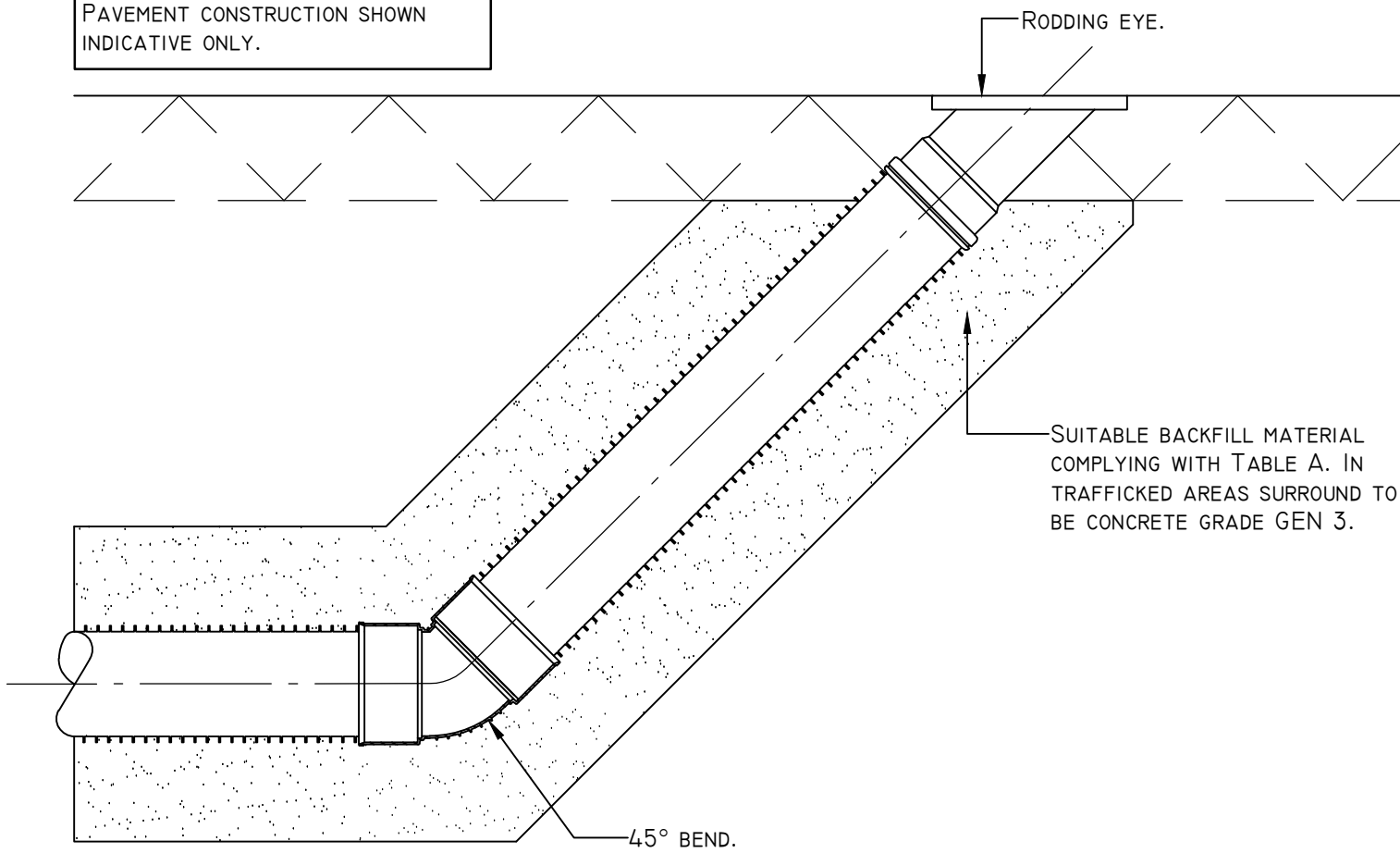
DEPTH OF GRANULAR BEDDING Y SHALL BE NOT LESS THAN 100MM BENEATH PIPE BARRELS AND SHALL BE GREATER IN SOFT OR WET CONDITIONS OR WHERE THE TRENCH BOTTOM IS IRREGULAR.

TABLE A

GRANULAR BEDDING & SIDEFILL MATERIAL FOR FLEXIBLE PIPES.

PIPE SIZE DN (MM)	MAX. PARTICLE SIZE (MM)	NOMINAL SINGLE SIZE (MM)	GRADED SIZE (MM)	MAX. CFE VALUE FOR AS-DUG
110	10	10	NOT PERMITTED	0.15
OVER 110 TO 160	15	10 OR 14	14 TO 5	0.15
OVER 160 TO 300	20	10, 14 OR 20	14 OR 20 TO 5	0.15
OVER 300 TO 600	20	14 OR 20	14 OR 20 TO 5	0.15

NOTE:
PAVEMENT CONSTRUCTION SHOWN
INDICATIVE ONLY.



TYPICAL RODDING EYE DETAIL
SCALE 1:10 @ A1

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NOTES

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- ALL DRAIN PIPES TO BE CONNECTED INTO MANHOLES TO MATCH ALL INCOMING PIPE SOFFITS, AND TO MATCH SOFFIT TO SOFFIT WHERE PIPE Ø IN IS SMALLER THAN PIPE Ø OUT. A NOMINAL FALL ACROSS MANHOLES HAS BEEN INCLUDED WHERE APPROPRIATE, IN THE CALCULATION OF INVERT LEVELS.

OVERSITE PREPARATION

ALL ORGANIC MATERIAL AND TOPSOIL TO BE REMOVED. LEVELS TO BE REDUCED WHERE NECESSARY TO REVEAL AGREED SUBGRADE. PROOF ROLL WITH A HEAVY VIBRATING ROLLER, ANY SOFT SPOTS TO BE REMOVED AND REPLACED WITH COMPACTED GRANULAR MATERIAL.

DRAWING STATUS UPDATED TO RIBA STAGE 3	date	10/06/25	source	D/D	drawn	D.L.
revisions	no					

RIBA STAGE 3

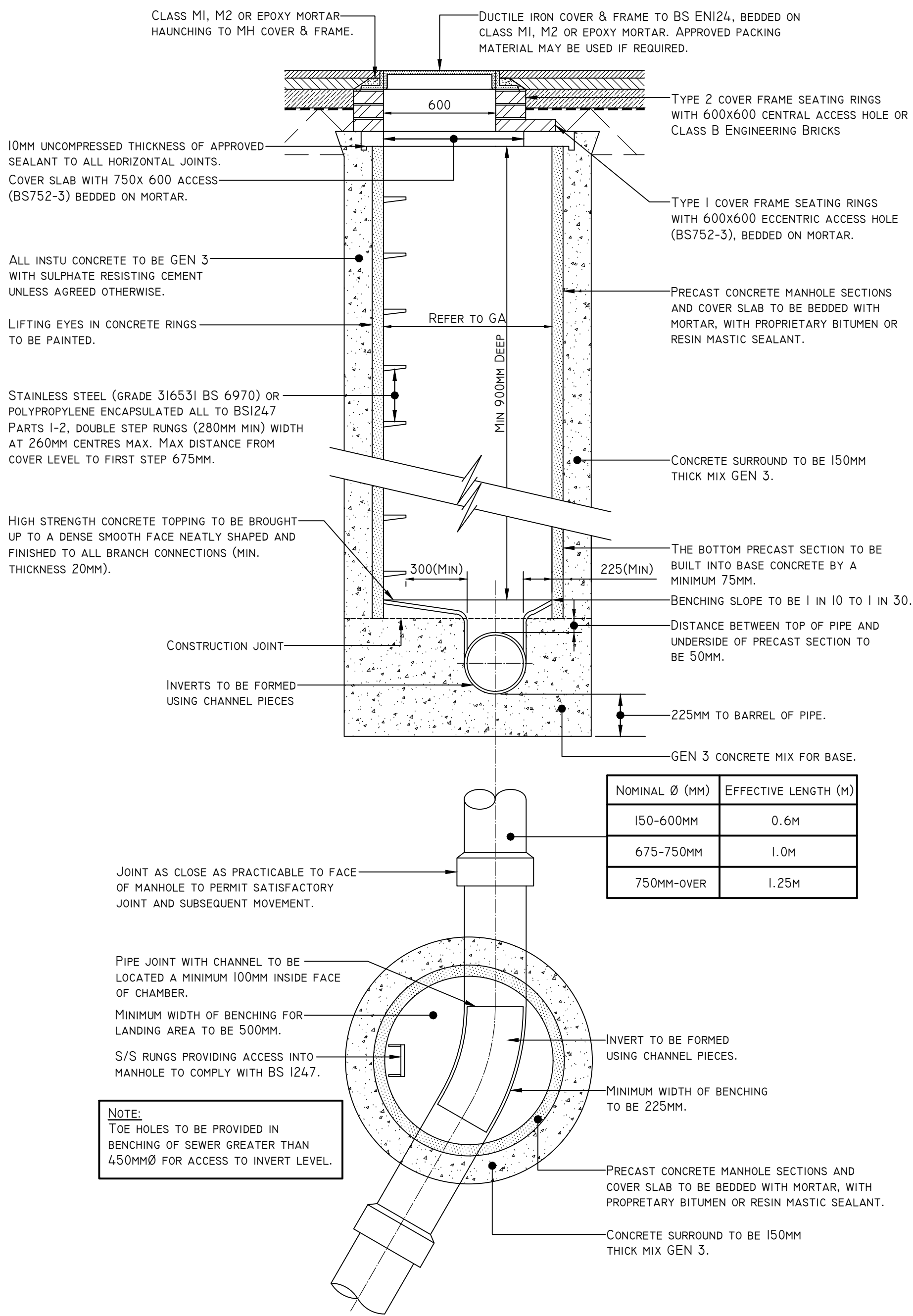
project
PACKING HALL EXTENSION
WESTFALIA FRUIT SPALDING

drawing title
PRIVATE DRAINAGE DETAILS
SHEET 1

drawn: D.J. checked: J.L. scale: AS SHOWN @ A1
date: APRIL 25 date: APRIL 25

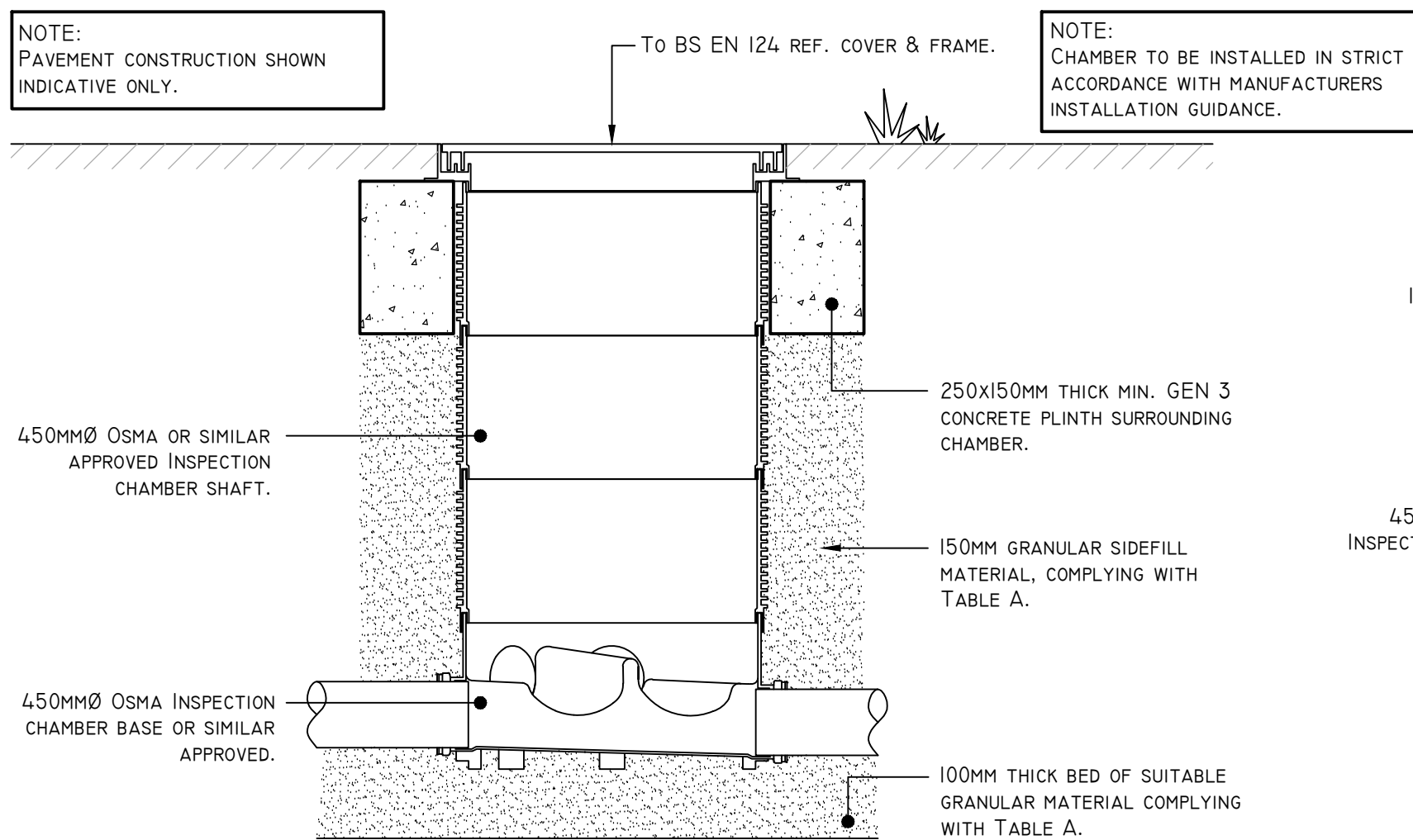
project - originator - volume - level - type - role - number status revision
8973-CDG-XX-XX-DR-C-3100S3 P02

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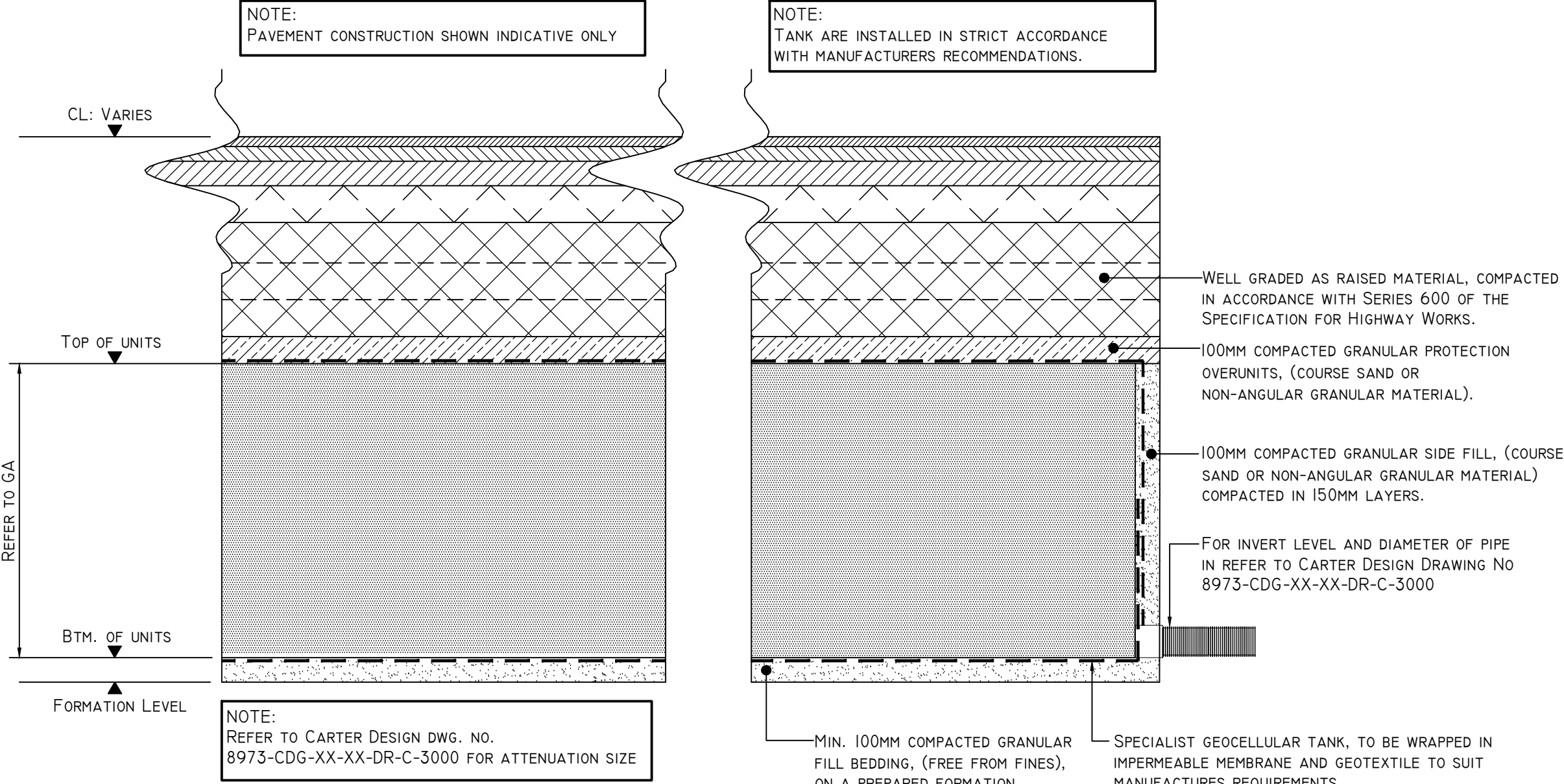
TYPICAL PCC MANHOLE DETAIL

DEPTH TO SOFFIT LESS THAN 3.0M
SCALE 1:20 @ A1



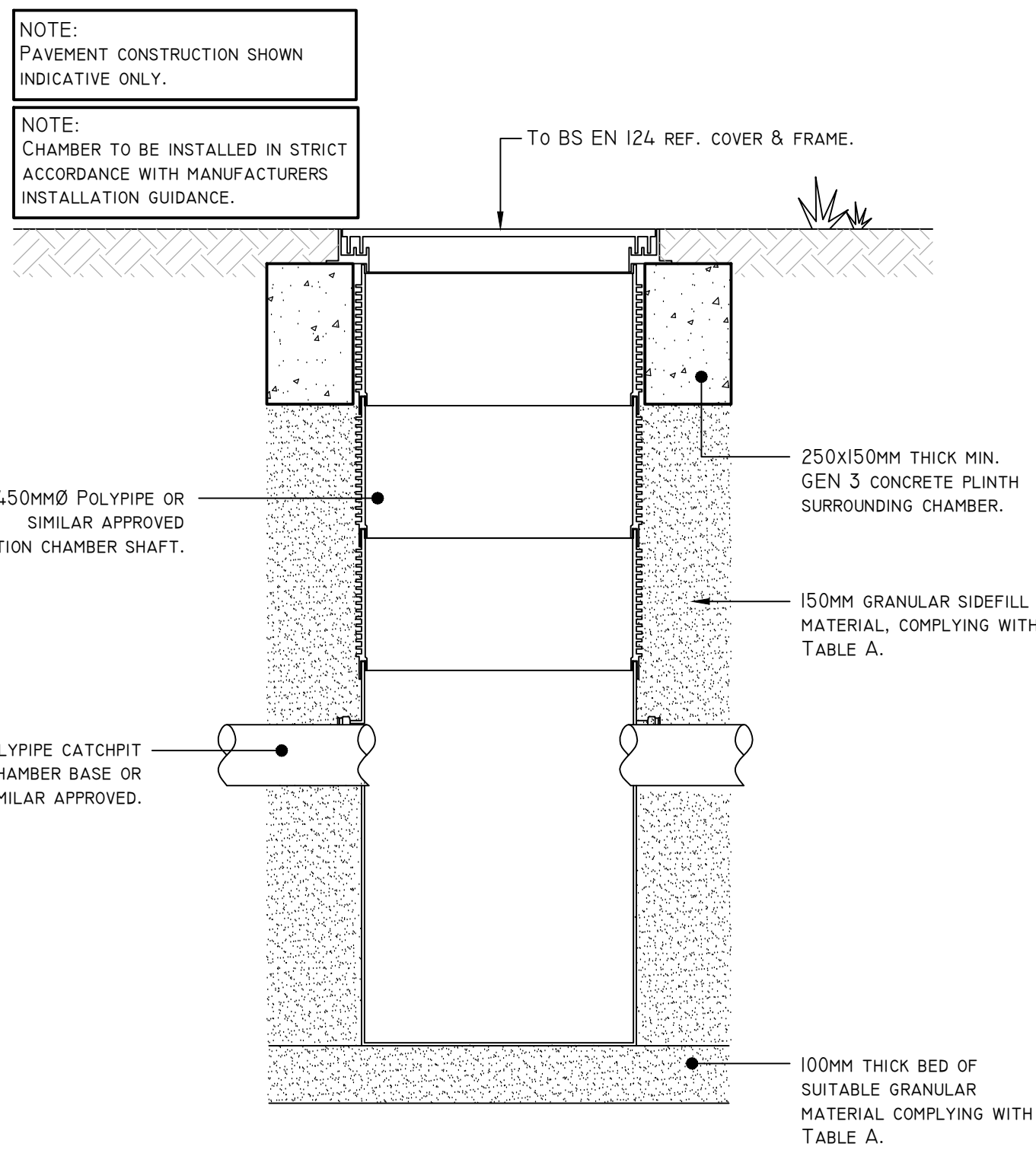
TYPICAL 'OSMA' INSPECTION CHAMBER DETAIL

SCALE 1:10 @ A1



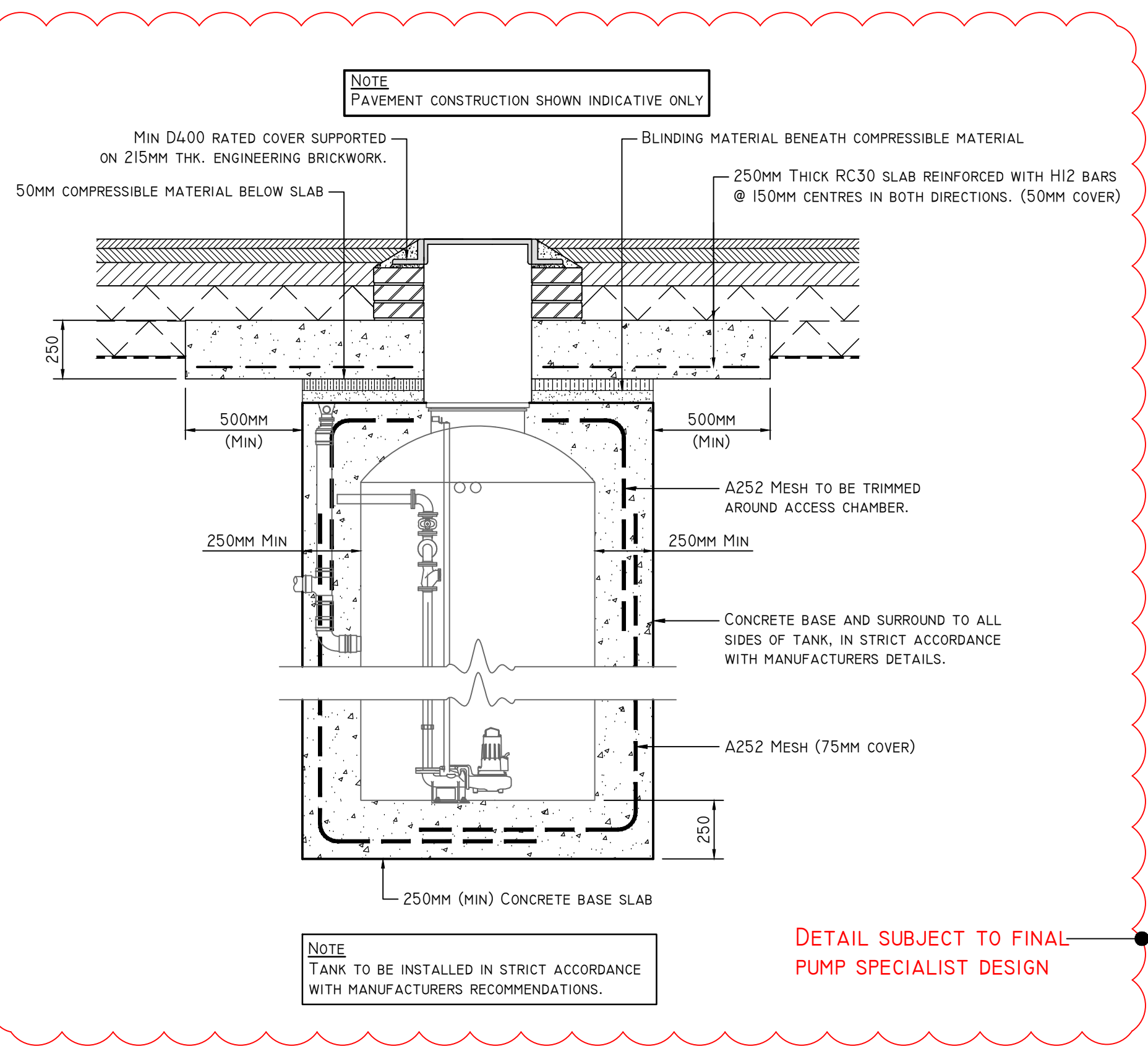
TYPICAL SECTION THROUGH GEOCELLULAR ATTENUATION

SCALE 1:20 @ A1



TYPICAL 'POLYPIPE' CATCHPIT INSPECTION CHAMBER DETAIL

SCALE 1:10 @ A1



TYPICAL SECTION THROUGH S.W. PUMP STATION

SCALE 1:20 @ A1

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All dimensions must be checked on site prior to commencement of related works.

CONSTRUCTION [DESIGN AND MANAGEMENT] REGULATIONS 2015:

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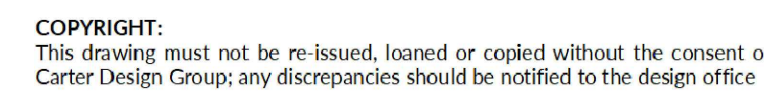
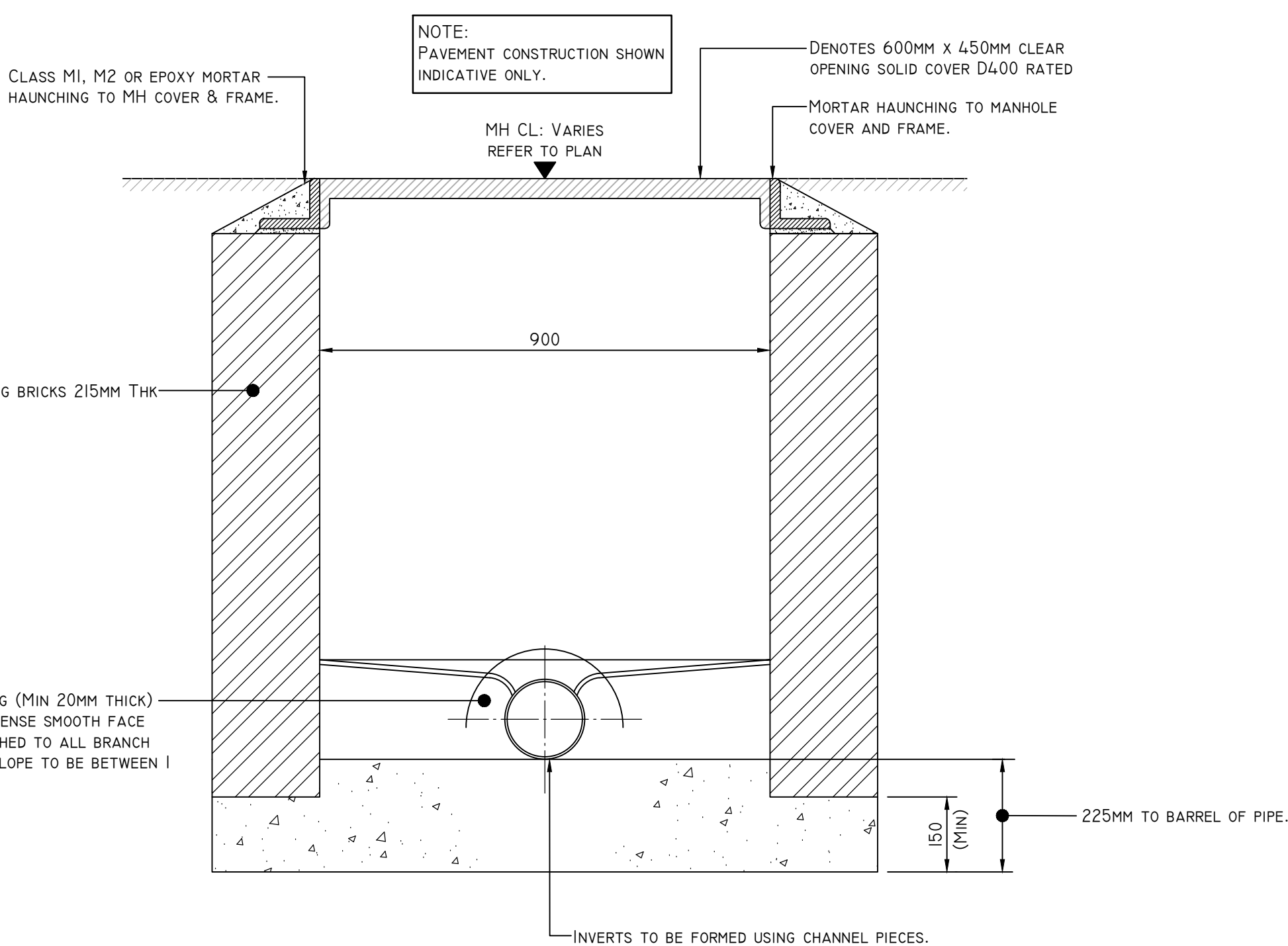
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- ALL SPECIALIST MATERIALS AND PRODUCTS TO BE INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURERS INSTRUCTIONS.
- ALL WORK IS TO BE CARRIED OUT IN ACCORDANCE WITH THE CURRENT BRITISH STANDARDS, B.S. CODES OF PRACTICE & BUILDING REGULATIONS.
- ALL DRAIN PIPES TO BE CONNECTED INTO MANHOLES TO MATCH ALL INCOMING PIPE SOFFITS, AND TO MATCH SOFFIT TO SOFFIT WHERE PIPE Ø IN IS SMALLER THAN PIPE Ø OUT. A NOMINAL FALL ACROSS MANHOLES HAS BEEN INCLUDED WHERE APPROPRIATE, IN THE CALCULATION OF INVERT LEVELS.

OVERSITE PREPARATION

ALL ORGANIC MATERIAL AND TOPSOIL TO BE REMOVED. LEVELS TO BE REDUCED WHERE NECESSARY TO REVEAL AGREED SUBGRADE. PROOF ROLL WITH A HEAVY VIBRATING ROLLER, ANY SOFT SPOTS TO BE REMOVED AND REPLACED WITH COMPACTED GRANULAR MATERIAL.

DRAWING STATUS UPDATED TO RIBA STAGE 3		10/06/25	
PROJECT	PACKING HALL EXTENSION WESTFALIA FRUIT SPALDING	DATE	D/D
DRAWING TITLE	PRIVATE DRAINAGE DETAILS SHEET 2	SOURCE	D/L
DRAWN	D.J.	CHECKED	J.L.
DATE	APRIL 25	DATE	APRIL 25
PROJECT	originator	volume	level
type	role	number	status
revision	revision	revision	revision
8973-CDG-XX-XX-DR-C-3101S3 P02			
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NOTES.

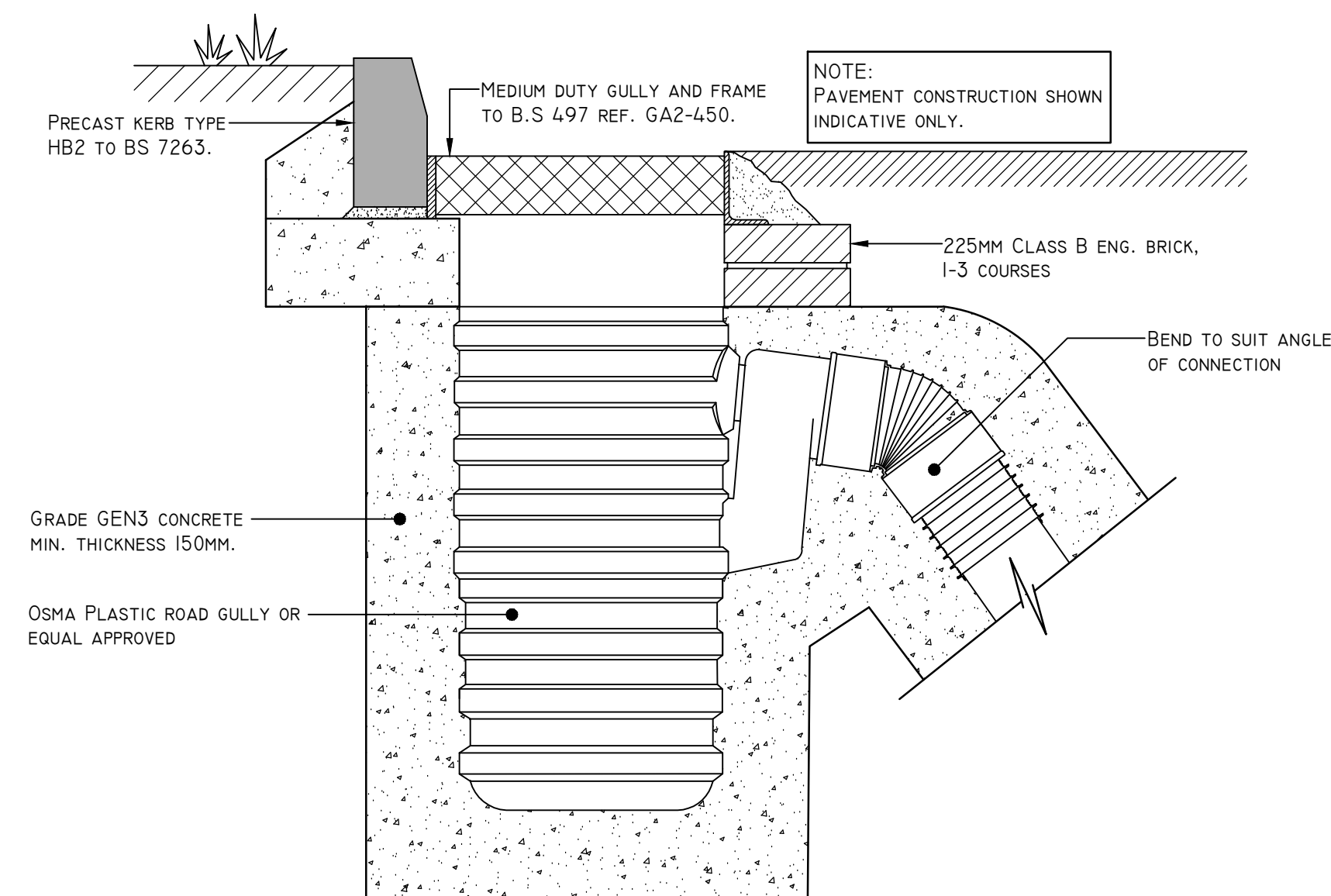
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7. ALL DRAIN PIPES TO BE CONNECTED INTO MANHOLES TO MATCH ALL INCOMING PIPE SOFFITS, AND TO MATCH SOFFIT TO SOFFIT WHERE PIPE Ø IS SMALLER THAN PIPE Ø OUT. A NOMINAL FALL ACROSS MANHOLES HAS BEEN INCLUDED WHERE APPROPRIATE, IN THE CALCULATION OF INVERT LEVELS.

OVERSITE PREPARATION

ALL ORGANIC MATERIAL AND TOPSOIL TO BE REMOVED. LEVELS TO BE REDUCED WHERE NECESSARY TO REVEAL AGREED SUBGRADE. PROOF ROLL WITH A HEAVY VIBRATING ROLLER, ANY SOFT SPOTS TO BE REMOVED AND REPLACED WITH COMPACTED GRANULAR MATERIAL.

SCALE 1:10 @ A1

SCALE 1:10 @ A1



SCALE 1:10 @ A1

SCALE 1:10 @ A1

P02	DRAWING STATUS UPDATED TO RIBA STAGE 3		10/06/25
		source	D/D
no	revisions	date	drawn

RIBA STAGE 3

project
PACKING HALL EXTENSION
WESTFALIA FRUIT SPALDING

drawing title
PRIVATE DRAINAGE DETAILS
SHEET 3

drawn: D.L. checked: J.L. scale: AS SHOWN @ A1 carter design group
date: APRIL'25 date: APRIL'25

project	originator	volume	level	type	role	number	status	revision
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8973-CDG-XX-XX-DR-C-3102 S3 P02

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ALL ORGANIC MATERIAL AND TOPSOIL TO BE REMOVED. LEVELS TO BE REDUCED WHERE NECESSARY TO REVEAL AGREED SUBGRADE. PROOF ROLL WITH A HEAVY VIBRATING ROLLER, ANY SOFT SPOTS TO BE REMOVED AND REPLACED WITH COMPACTED GRANULAR MATERIAL.



RIBA STAGE 3

date: APRIL'25 date: APRIL'25 scale: AS SHOWN @ A1

8973-CDG-XX-XX-DR-C-3103 S3 P03

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APPENDIX I SURFACE WATER CALCULATIONS



Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	2	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	1.000	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	x
Maximum Rainfall (mm/hr)	50.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Width (mm)	Easting (m)	Northing (m)	Depth (m)
SW01	0.071	5.00	4.700	1200		526078.312	325356.231	1.200
SW02	0.122	5.00	4.600	1200		526071.517	325327.140	1.375
SW03	0.019	5.00	4.400	1200		526064.052	325294.936	1.375
SW04	0.158	5.00	4.400	1500		526073.924	325292.240	1.550
SW05	0.083	5.00	4.400	1500		526113.667	325281.863	1.800
SW06	0.106	5.00	4.000	900	1200	526142.186	325332.758	1.050
SW07	0.112	5.00	4.150	1200		526137.109	325313.630	1.375
SW08	0.000		4.370	1500		526127.031	325299.321	1.895
HW01	0.000		4.000	1		526144.702	325287.651	1.625

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	SW01	SW02	29.874	0.600	3.500	3.300	0.200	149.4	300	5.39	50.0
1.001	SW02	SW03	33.058	0.600	3.225	3.025	0.200	165.3	375	5.78	50.0
1.002	SW03	SW04	10.234	0.600	3.025	2.925	0.100	102.3	375	5.87	50.0
1.003	SW04	SW05	41.075	0.600	2.850	2.600	0.250	164.3	450	6.31	50.0
1.004	SW05	SW08	21.986	0.600	2.600	2.475	0.125	175.9	450	6.55	49.4
2.000	SW06	SW07	19.790	0.600	2.950	2.850	0.100	197.9	300	5.30	50.0
2.001	SW07	SW08	17.502	0.600	2.775	2.550	0.225	77.8	375	5.44	50.0
1.005	SW08	HW01	21.177	0.600	2.475	2.375	0.100	211.8	450	6.80	48.5

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	1.284	90.8	12.8	0.900	1.000	0.071	0.0	76	0.916
1.001	1.406	155.3	34.9	1.000	1.000	0.193	0.0	120	1.143
1.002	1.791	197.8	38.3	1.000	1.100	0.212	0.0	111	1.395
1.003	1.583	251.8	66.9	1.100	1.350	0.370	0.0	158	1.347
1.004	1.530	243.3	80.9	1.350	1.445	0.453	0.0	178	1.380
2.000	1.114	78.7	19.2	0.750	1.000	0.106	0.0	100	0.924
2.001	2.056	227.0	39.4	1.000	1.445	0.218	0.0	105	1.556
1.005	1.393	221.5	117.6	1.445	1.175	0.671	0.0	233	1.413

Pipeline Schedule

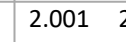
Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	29.874	149.4	300	Circular	4.700	3.500	0.900	4.600	3.300	1.000
1.001	33.058	165.3	375	Circular	4.600	3.225	1.000	4.400	3.025	1.000
1.002	10.234	102.3	375	Circular	4.400	3.025	1.000	4.400	2.925	1.100
1.003	41.075	164.3	450	Circular	4.400	2.850	1.100	4.400	2.600	1.350
1.004	21.986	175.9	450	Circular	4.400	2.600	1.350	4.370	2.475	1.445
2.000	19.790	197.9	300	Circular	4.000	2.950	0.750	4.150	2.850	1.000
2.001	17.502	77.8	375	Circular	4.150	2.775	1.000	4.370	2.550	1.445
1.005	21.177	211.8	450	Circular	4.370	2.475	1.445	4.000	2.375	1.175

Link	US Node	Dia (mm)	Width (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	SW01	1200		Manhole	Adoptable	SW02	1200	Manhole	Adoptable
1.001	SW02	1200		Manhole	Adoptable	SW03	1200	Manhole	Adoptable
1.002	SW03	1200		Manhole	Adoptable	SW04	1500	Manhole	Adoptable
1.003	SW04	1500		Manhole	Adoptable	SW05	1500	Manhole	Adoptable
1.004	SW05	1500		Manhole	Adoptable	SW08	1500	Manhole	Adoptable
2.000	SW06	900	1200	Manhole	Adoptable	SW07	1200	Manhole	Adoptable
2.001	SW07	1200		Manhole	Adoptable	SW08	1500	Manhole	Adoptable
1.005	SW08	1500		Manhole	Adoptable	HW01	1	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Width (mm)	Connections	Link	IL (m)	Dia (mm)
SW01	526078.312	325356.231	4.700	1.200	1200					
							0	1.000	3.500	300
SW02	526071.517	325327.140	4.600	1.375	1200					
							0	1.001	3.225	375
SW03	526064.052	325294.936	4.400	1.375	1200					
							0	1.002	3.025	375
SW04	526073.924	325292.240	4.400	1.550	1500					
							0	1.003	2.850	450
SW05	526113.667	325281.863	4.400	1.800	1500					
							0	1.004	2.600	450
SW06	526142.186	325332.758	4.000	1.050	900	1200				
							0	2.000	2.950	300
SW07	526137.109	325313.630	4.150	1.375	1200					
							0	2.001	2.775	375

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Width (mm)	Connections	Link	IL (m)	Dia (mm)	
SW08	526127.031	325299.321	4.370	1.895	1500			1	2.001	2.550	375
								2	1.004	2.475	450
								0	1.005	2.475	450
HW01	526144.702	325287.651	4.000	1.625	1			1	1.005	2.375	450

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Detailed	Starting Level (m)	
Rainfall Events	Singular	Skip Steady State	x	Check Discharge Rate(s)	x
Summer CV	1.000	Drain Down Time (mins)	1440	Check Discharge Volume	x
Winter CV	1.000	Additional Storage (m³/ha)	0.0		

Storm Durations

15	60	180	360	600	960	2160	4320	7200	10080
30	120	240	480	720	1440	2880	5760	8640	

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
2	0	0	0
30	0	0	0
100	0	0	0
100	40	0	0

Node HW01 Surcharged Outfall

Overrides Design Area	x	Depression Storage Area (m²)	0	Evapo-transpiration (mm/day)	0
Overrides Design Additional Inflow	x	Depression Storage Depth (mm)	0		

Applies to All storms

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
0	0.825	510	0.825	1020	0.825	1530	0.825	2040	0.825	2550	0.825
30	0.825	540	0.825	1050	0.825	1560	0.825	2070	0.825	2580	0.825
60	0.825	570	0.825	1080	0.825	1590	0.825	2100	0.825	2610	0.825
90	0.825	600	0.825	1110	0.825	1620	0.825	2130	0.825	2640	0.825
120	0.825	630	0.825	1140	0.825	1650	0.825	2160	0.825	2670	0.825
150	0.825	660	0.825	1170	0.825	1680	0.825	2190	0.825	2700	0.825
180	0.825	690	0.825	1200	0.825	1710	0.825	2220	0.825	2730	0.825
210	0.825	720	0.825	1230	0.825	1740	0.825	2250	0.825	2760	0.825
240	0.825	750	0.825	1260	0.825	1770	0.825	2280	0.825	2790	0.825
270	0.825	780	0.825	1290	0.825	1800	0.825	2310	0.825	2820	0.825
300	0.825	810	0.825	1320	0.825	1830	0.825	2340	0.825	2850	0.825
330	0.825	840	0.825	1350	0.825	1860	0.825	2370	0.825	2880	0.825
360	0.825	870	0.825	1380	0.825	1890	0.825	2400	0.825	2910	0.825
390	0.825	900	0.825	1410	0.825	1920	0.825	2430	0.825	2940	0.825
420	0.825	930	0.825	1440	0.825	1950	0.825	2460	0.825	2970	0.825
450	0.825	960	0.825	1470	0.825	1980	0.825	2490	0.825	3000	0.825
480	0.825	990	0.825	1500	0.825	2010	0.825	2520	0.825	3030	0.825

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
3060	0.825	4260	0.825	5460	0.825	6660	0.825	7860	0.825	9060	0.825
3090	0.825	4290	0.825	5490	0.825	6690	0.825	7890	0.825	9090	0.825
3120	0.825	4320	0.825	5520	0.825	6720	0.825	7920	0.825	9120	0.825
3150	0.825	4350	0.825	5550	0.825	6750	0.825	7950	0.825	9150	0.825
3180	0.825	4380	0.825	5580	0.825	6780	0.825	7980	0.825	9180	0.825
3210	0.825	4410	0.825	5610	0.825	6810	0.825	8010	0.825	9210	0.825
3240	0.825	4440	0.825	5640	0.825	6840	0.825	8040	0.825	9240	0.825
3270	0.825	4470	0.825	5670	0.825	6870	0.825	8070	0.825	9270	0.825
3300	0.825	4500	0.825	5700	0.825	6900	0.825	8100	0.825	9300	0.825
3330	0.825	4530	0.825	5730	0.825	6930	0.825	8130	0.825	9330	0.825
3360	0.825	4560	0.825	5760	0.825	6960	0.825	8160	0.825	9360	0.825
3390	0.825	4590	0.825	5790	0.825	6990	0.825	8190	0.825	9390	0.825
3420	0.825	4620	0.825	5820	0.825	7020	0.825	8220	0.825	9420	0.825
3450	0.825	4650	0.825	5850	0.825	7050	0.825	8250	0.825	9450	0.825
3480	0.825	4680	0.825	5880	0.825	7080	0.825	8280	0.825	9480	0.825
3510	0.825	4710	0.825	5910	0.825	7110	0.825	8310	0.825	9510	0.825
3540	0.825	4740	0.825	5940	0.825	7140	0.825	8340	0.825	9540	0.825
3570	0.825	4770	0.825	5970	0.825	7170	0.825	8370	0.825	9570	0.825
3600	0.825	4800	0.825	6000	0.825	7200	0.825	8400	0.825	9600	0.825
3630	0.825	4830	0.825	6030	0.825	7230	0.825	8430	0.825	9630	0.825
3660	0.825	4860	0.825	6060	0.825	7260	0.825	8460	0.825	9660	0.825
3690	0.825	4890	0.825	6090	0.825	7290	0.825	8490	0.825	9690	0.825
3720	0.825	4920	0.825	6120	0.825	7320	0.825	8520	0.825	9720	0.825
3750	0.825	4950	0.825	6150	0.825	7350	0.825	8550	0.825	9750	0.825
3780	0.825	4980	0.825	6180	0.825	7380	0.825	8580	0.825	9780	0.825
3810	0.825	5010	0.825	6210	0.825	7410	0.825	8610	0.825	9810	0.825
3840	0.825	5040	0.825	6240	0.825	7440	0.825	8640	0.825	9840	0.825
3870	0.825	5070	0.825	6270	0.825	7470	0.825	8670	0.825	9870	0.825
3900	0.825	5100	0.825	6300	0.825	7500	0.825	8700	0.825	9900	0.825
3930	0.825	5130	0.825	6330	0.825	7530	0.825	8730	0.825	9930	0.825
3960	0.825	5160	0.825	6360	0.825	7560	0.825	8760	0.825	9960	0.825
3990	0.825	5190	0.825	6390	0.825	7590	0.825	8790	0.825	9990	0.825
4020	0.825	5220	0.825	6420	0.825	7620	0.825	8820	0.825	10020	0.825
4050	0.825	5250	0.825	6450	0.825	7650	0.825	8850	0.825	10050	0.825
4080	0.825	5280	0.825	6480	0.825	7680	0.825	8880	0.825	10080	0.825
4110	0.825	5310	0.825	6510	0.825	7710	0.825	8910	0.825		
4140	0.825	5340	0.825	6540	0.825	7740	0.825	8940	0.825		
4170	0.825	5370	0.825	6570	0.825	7770	0.825	8970	0.825		
4200	0.825	5400	0.825	6600	0.825	7800	0.825	9000	0.825		
4230	0.825	5430	0.825	6630	0.825	7830	0.825	9030	0.825		

Node HW01 Offline Orifice Control

Flap Valve x	Invert Level (m)	2.375	Discharge Coefficient	0.600
Loop to Node	Diameter (m)	0.500		

Node SW05 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	2.600
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	5

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	34.0	34.0	0.600	34.0	46.4	0.601	0.0	46.4



Node SW03 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	3.025
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	4

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	66.0	66.0	0.600	66.0	83.3	0.601	0.0	83.3

Results for 2 year Critical Storm Duration. Lowest mass balance: 99.74%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	SW01	10	3.577	0.077	12.8	0.0870	0.0000	OK
15 minute summer	SW02	10	3.351	0.126	34.4	0.1430	0.0000	OK
15 minute summer	SW03	13	3.128	0.103	37.6	6.5450	0.0000	OK
15 minute summer	SW04	11	2.989	0.139	50.4	0.2460	0.0000	OK
15 minute summer	SW05	12	2.758	0.158	63.5	5.3925	0.0000	OK
15 minute summer	SW06	10	3.054	0.104	19.0	0.1123	0.0000	OK
15 minute summer	SW07	10	2.885	0.110	38.8	0.1247	0.0000	OK
15 minute summer	SW08	12	2.700	0.225	89.2	0.3969	0.0000	OK
15 minute summer	HW01	12	2.619	0.244	89.3	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	SW01	1.000	SW02	12.5	0.900	0.137	0.4158	
15 minute summer	SW02	1.001	SW03	34.2	1.472	0.221	0.8803	
15 minute summer	SW03	1.002	SW04	27.8	1.212	0.141	0.2348	
15 minute summer	SW04	1.003	SW05	50.2	1.157	0.199	1.8724	
15 minute summer	SW05	1.004	SW08	56.9	0.935	0.234	1.4160	
15 minute summer	SW06	2.000	SW07	18.7	0.898	0.238	0.4135	
15 minute summer	SW07	2.001	SW08	38.7	1.440	0.171	0.5680	
15 minute summer	SW08	1.005	HW01	89.3	1.071	0.403	1.7668	
15 minute summer	HW01	Orifice		89.0				52.1

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.74%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	SW01	10	3.645	0.145	39.5	0.1638	0.0000	OK
15 minute summer	SW02	10	3.464	0.239	106.9	0.2698	0.0000	OK
15 minute summer	SW03	13	3.275	0.250	115.9	15.9265	0.0000	OK
15 minute summer	SW04	12	3.257	0.407	174.1	0.7194	0.0000	OK
15 minute summer	SW05	12	3.175	0.575	205.3	19.6047	0.0000	SURCHARGED
15 minute summer	SW06	12	3.171	0.221	58.9	0.2386	0.0000	OK
15 minute summer	SW07	12	3.142	0.367	120.5	0.4147	0.0000	OK
15 minute summer	SW08	12	3.086	0.611	261.5	1.0794	0.0000	SURCHARGED
15 minute summer	HW01	12	2.875	0.500	260.8	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	SW01	1.000	SW02	39.1	1.074	0.431	1.0893	
15 minute summer	SW02	1.001	SW03	105.3	1.686	0.678	2.3504	
15 minute summer	SW03	1.002	SW04	90.3	1.575	0.457	0.9182	
15 minute summer	SW04	1.003	SW05	159.2	1.363	0.632	6.3520	
15 minute summer	SW05	1.004	SW08	185.6	1.172	0.763	3.4835	
15 minute summer	SW06	2.000	SW07	58.2	1.181	0.739	1.2418	
15 minute summer	SW07	2.001	SW08	116.2	1.481	0.512	1.9246	
15 minute summer	SW08	1.005	HW01	260.8	1.646	1.177	3.3554	
15 minute summer	HW01	Orifice		260.7				161.3

Results for 100 year Critical Storm Duration. Lowest mass balance: 99.74%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	SW01	10	3.669	0.169	51.6	0.1913	0.0000	OK
15 minute summer	SW02	12	3.628	0.403	139.8	0.4555	0.0000	SURCHARGED
15 minute summer	SW03	13	3.528	0.503	150.8	32.1320	0.0000	SURCHARGED
15 minute summer	SW04	12	3.481	0.631	196.0	1.1154	0.0000	SURCHARGED
15 minute summer	SW05	12	3.384	0.784	227.7	20.7808	0.0000	SURCHARGED
30 minute summer	SW06	18	3.504	0.554	69.0	0.5987	0.0000	SURCHARGED
15 minute summer	SW07	11	3.395	0.620	155.8	0.7012	0.0000	SURCHARGED
15 minute summer	SW08	12	3.272	0.797	309.7	1.4086	0.0000	SURCHARGED
15 minute summer	HW01	12	2.977	0.602	309.6	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	SW01	1.000	SW02	51.2	1.078	0.565	1.5391	
15 minute summer	SW02	1.001	SW03	137.0	1.757	0.882	3.6462	
15 minute summer	SW03	1.002	SW04	141.7	1.654	0.716	1.1288	
15 minute summer	SW04	1.003	SW05	179.0	1.368	0.711	6.5081	
15 minute summer	SW05	1.004	SW08	205.9	1.300	0.846	3.4835	
30 minute summer	SW06	2.000	SW07	71.6	1.176	0.909	1.3936	
15 minute summer	SW07	2.001	SW08	151.7	1.477	0.668	1.9304	
15 minute summer	SW08	1.005	HW01	309.6	1.954	1.398	3.3554	
15 minute summer	HW01	Orifice		309.5				210.6

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.74%

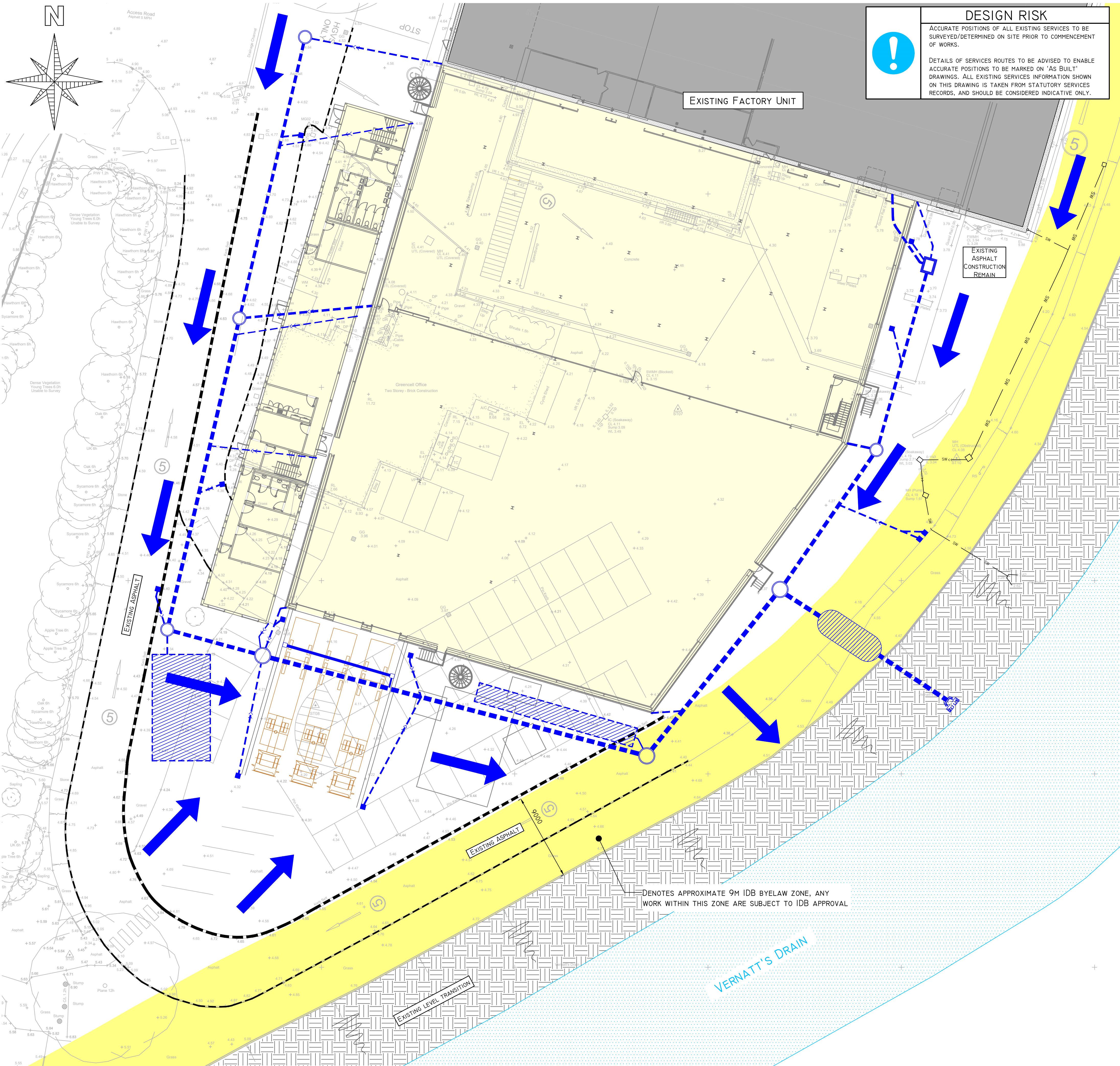
Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	SW01	11	4.700	1.200	67.8	1.3572	1.5811	FLOOD
15 minute summer	SW02	11	4.600	1.375	188.5	1.5551	2.7469	FLOOD
15 minute summer	SW03	11	4.400	1.375	289.9	39.2065	9.8189	FLOOD
15 minute winter	SW04	11	4.389	1.539	223.4	2.7197	0.0000	FLOOD RISK
15 minute winter	SW05	11	4.180	1.580	294.5	22.1878	0.0000	FLOOD RISK
15 minute summer	SW06	10	4.000	1.050	107.8	1.1340	7.7355	FLOOD
15 minute winter	SW07	11	4.007	1.232	204.6	1.3929	0.0000	FLOOD RISK
15 minute winter	SW08	11	3.905	1.430	434.7	2.5260	0.0000	SURCHARGED
15 minute summer	HW01	11	3.322	0.947	433.2	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	SW01	1.000	SW02	61.9	1.077	0.683	2.1037	
15 minute summer	SW02	1.001	SW03	181.4	1.803	1.168	3.6462	
15 minute summer	SW03	1.002	SW04	157.0	1.626	0.794	1.1288	
15 minute winter	SW04	1.003	SW05	227.6	1.437	0.904	6.5081	
15 minute winter	SW05	1.004	SW08	288.3	1.820	1.185	3.4835	
15 minute summer	SW06	2.000	SW07	103.6	1.471	1.315	1.3936	
15 minute winter	SW07	2.001	SW08	201.3	1.825	0.886	1.9304	
15 minute winter	SW08	1.005	HW01	435.9	2.752	1.968	3.3554	
15 minute summer	HW01	Orifice		436.1				276.6



APPENDIX J

EXCEEDANCE ROUTING GENERAL ARRANGEMENT



SURFACE WATER EXCEEDANCE GENERAL ARRANGEMENT
SCALE 1:200 @ A1

DRAINAGE KEY

- DENOTES PROPOSED SURFACE WATER SEWER 1100 U.N.O.
- DENOTES CHANNEL DRAIN WITH RODDING ACCESS PROVISION, TO DISCHARGE VIA SUMP OUTLET BOX
- DENOTES PROPOSED SURFACE WATER ROAD GULLY WITH RODDING ACCESS PROVISION
- DENOTES PP INSPECTION CHAMBER WITH D400 RATED COVERS TO BE SOLID WITHIN ASPHALT AND CONCRETE
- DENOTES EXCEEDANCE FLOW PATH
- DENOTES EXISTING TREES TAKEN FROM SURVEY SOLUTIONS TOPOGRAPHICAL SURVEY DRAWING No 30626NOLS-01 DATED 08/02/2021

EXISTING GENERAL SERVICES

- SW — DENOTES APPROXIMATE ALIGNMENT OF EXISTING SURFACE WATER SEWER TAKEN FROM SURVEY SOLUTIONS UTILITIES AND CCTV DRAINAGE SURVEY DRAWING No 76424NGUG-01 DATED 08/04/2025
- ALL EXISTING SERVICES TAKEN FROM SURVEY SOLUTIONS UTILITIES AND CCTV DRAINAGE SURVEY DRAWING No 76424NGUG-01 DATED 08/04/2025

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DO NOT SCALE FROM THIS DRAWING. USE ONLY FIGURED OR GRID DIMENSIONS

NOTES:
All workmanship is to be in accordance with the latest amendment of the relevant section of BS 8000, to the extent that recommendations define quality of finished work. All materials, products and systems are to be installed and fixed in strict accordance with the latest manufacturers written instructions, in line with the requirements of any relevant British Board of Agreement Certificates, British or European Standards and the section of BS 8000 applicable to that trade.
All dimensions must be checked on site prior to commencement of related works.
Any discrepancies should be notified to the design office immediately.

CONSTRUCTION [DESIGN AND MANAGEMENT] REGULATIONS 2015:
Design, Construction or Residual Risks beyond the expected knowledge of a competent Contractor, End-User/Operator, and/or residual risks that cannot be entirely mitigated through design are identified on this drawing. This drawing should be read alongside any project specific Design Risk Assessments prepared by CDG and/or other designers (including subcontractor or specialist designers).

NOTES:
1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL ARCHITECTS DRAWINGS, SPECIALISTS DRAWINGS AND SPECIFICATIONS, ETC.
2. REFER TO THE LATEST ARCHITECTURAL / M+E PLANS FOR UP TO DATE INTERNAL LAYOUTS AND SETTING OUT OF INTERNAL DRAINAGE 'POP-UP' LOCATIONS AND EXTERNAL RWP LOCATIONS.
3. THE PROPOSALS ON THIS DRAWING ARE BASED ON THE SITE/BUILDING LAYOUT PROVIDED ON CDG ARCHITECTURAL SITE PLAN. REFER TO ARCHITECT'S DRAWINGS FOR ALL SETTING OUT DIMENSIONS, SURFACE FINISH REQUIREMENTS AND BLOCK PAVING PATTERNS ETC.
4. THE SURFACE WATER SYSTEM DETAILED ON THIS DRAWING HAS BEEN DESIGNED TO CONTAIN AND DISCHARGE A 1/100YR STORM RETURN + 40% ALLOWANCE FOR CLIMATE CHANGE IN ACCORDANCE WITH NPPF AND FRA.
5. ALL DRAINAGE SYSTEMS TO BE IN ACCORDANCE WITH THIS DRAWING, ALONG WITH BS EN 752 AND THE BUILDING REGULATIONS & PART H

NOTE:
INTERNAL LAYOUT INDICATIVE ONLY. REFER TO ARCHITECTURAL DRAWINGS FOR CURRENT LAYOUTS AND SETTING OUT

DRAWING STATUS UPDATED TO RIBA STAGE 3		10/06/25		D.L.	
P03	revisions	date	source	drawn	

RIBA STAGE 3

project: PACKING HALL EXTENSION
WESTFALIA FRUIT SPALDING

drawing title: SURFACE WATER EXCEEDANCE
GENERAL ARRANGEMENT

drawn: D.L. checked: D.L. scale: AS NOTED @ A1
date: APRIL'25 date: APRIL'25

project - originator - volume - level - type - role - number status revision

8973-CDG-XX-XX-DR-C-3010 S3 P03

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