



GROSSART ASSOCIATES
CONSULTING CIVIL AND STRUCTURAL ENGINEERS

GUALA CLOSURES, GARTCOSH NORTH LANARKSHIRE COUNCIL

DRAINAGE ASSESSMENT

Grossart Associates Ref: 12000

Revision: P00

Issue Date: 01 July 2022

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Grossart Associates Limited is an Employee Owned Company
Incorporated in Scotland: Company No. 224604



Control Sheet

Rev	Description	Issued by	Checked	Date
0	First Issue	CVB	HM	01/07//2022

Author	Signature	Date
Carlos Vazquez Besada Ingeniero de Caminos, Canales y Puertos, CEng, MICE		01/07//2022

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1.0 Introduction

1.1 Project Background

- 1.1.1 Grossart Associates have been appointed by Guala Closures to prepare a Drainage Assessment (DA) to support a planning application for an industrial development at Craignethan Drive, Gartcosh, North Lanarkshire Council.
- 1.1.2 Proposals contained or forming part of this report represent the design intent and may be subject to alteration or adjustment in completing the detailed design for this project. Where such adjustments are undertaken as part of the detailed design and are deemed a material deviation from the intent contained in this document, prior approval shall be obtained from the relevant authority in advance of commencing such works.
- 1.1.3 Where the proposed works to which this report refers are undertaken more than twelve months following the issue of this report, Grossart Associates shall reserve the right to re-validate the findings and conclusions by undertaking appropriate further investigations at no cost to Grossart Associates.

1.2 Scope of Assessment

- 1.2.1 This Drainage Assessment has been undertaken in accordance with the standing advice and requirements of the Scottish Environment Protection Agency (SEPA), Scottish Planning Policy, North Lanarkshire Council's planning guidance and Sewer for Scotland 4th Edition.
- 1.2.2 The report prepares outline design proposals for foul and surface water drainage of the site.
- 1.2.3 The report reviews the following information:
- North Lanarkshire Council local development plan and guidance;
 - Scottish Water Public Sewer Records;
 - Scottish Planning Policy (SPP) (June 2014);
 - Sewer for Scotland 4th Edition;
 - CIRIA Manual c753;

1.3 Proposed Development

- 1.3.1 The proposed industrial development is for a manufacturing facility with associated parking, landscaping and infrastructure at Gartcosh Industrial Park, Craignethan Drive, Gartcosh.

2.0 Existing Site Details

2.1 History and Current Use

- 2.1.1 The Ordnance Survey grid reference for the site is 270460, 668146. The site location is shown in Figure 2-1.
- 2.1.2 The site comprises an undeveloped area of approximately 1.60ha.
- 2.1.3 The site is bounded by the M73 embankments on the north-western site boundary, by Auldyards Road and Craignethan Drive on the north and south-eastern boundary and for existing undeveloped land on the south-western boundary.

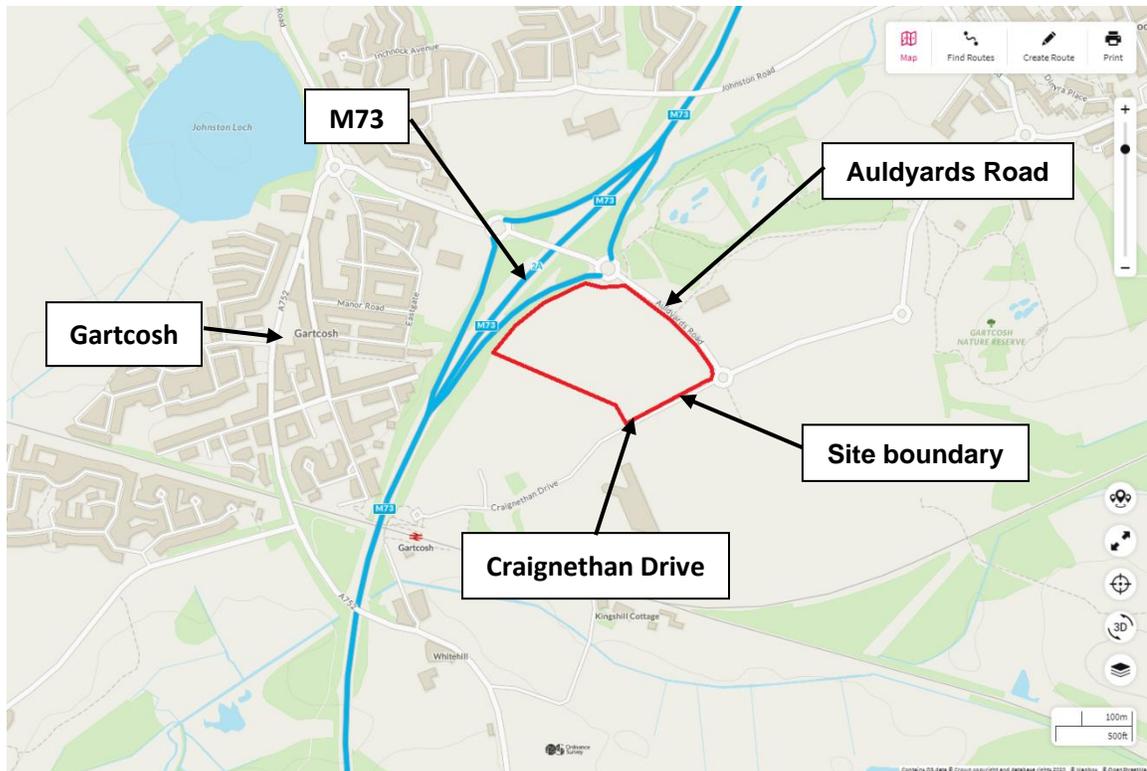


Figure 2-1. site location (source: osmaps.ordnancesurvey).

2.2 Existing Drainage

- 2.2.1 The public sewer and water records have been obtained from the Scottish Water (SW) GIS plans. The records show an existing Scottish Water foul sewer 225mm uPVC pipe running from south to north on the eastern area of the site, to then cross Auldyards Road and discharge into an existing Scottish Water combined 225mm VC sewer at the north-east of the site. The records also show a Scottish Water foul water sewer running along the south

verge of Craignethan Drive from west to east, with no pipe dimension indicated, and a 975mm concrete surface water pipe, also along the south verge but in opposite direction, that becomes a 1050mm concrete pipe to finally discharge into the Bothlin Burn, to the south of Craignethan Drive.

2.2.2 The Scottish Water records are included within Appendix B.

2.3 Topography

2.3.1 A Topographical Survey was carried for the site Ardmore Point in April 2022 and indicates levels generally peaking at 87.40mAOD at the approximate centre of the site, falling gently down to the north-western site boundary where levels range from 86.0mAOD to 85.0mAOD. Site levels also fall to north-east via an embankment and crossing an existing site track up to a minimum level of 83.4mAOD at Auldyard Road. The Ardmore Point topographical survey shows a slope down from the centre to Craignethan Drive, at the south-eastern site boundary, where levels are indicated to be between 86.3mAOD to 85.4mAOD at the roundabout with Auldyard Road.

2.3.2 The topographical survey is included in Appendix C.

2.4 Existing Watercourses

2.4.1 The Bothlin Burn crosses the site area and the M73, Junction 2a culverted following a north-easterly direction, to run open again from at the north area of the M73 Junction 2a. The Bothlin Burn has been culverted in 2001 with a pipe arch shape, the project and design information has been prepared by Halcrow and has been included within Appendix D.

2.4.2 The indicative line of the culvert alignment crossing the site has been extracted from this documentation and appears to be approximately 10m deep within the site boundary, please refer to Halcrow drawing GSSS-12. The exact culvert location and depth is, at the time of writing, being checked and confirmed by Scottish Enterprise.

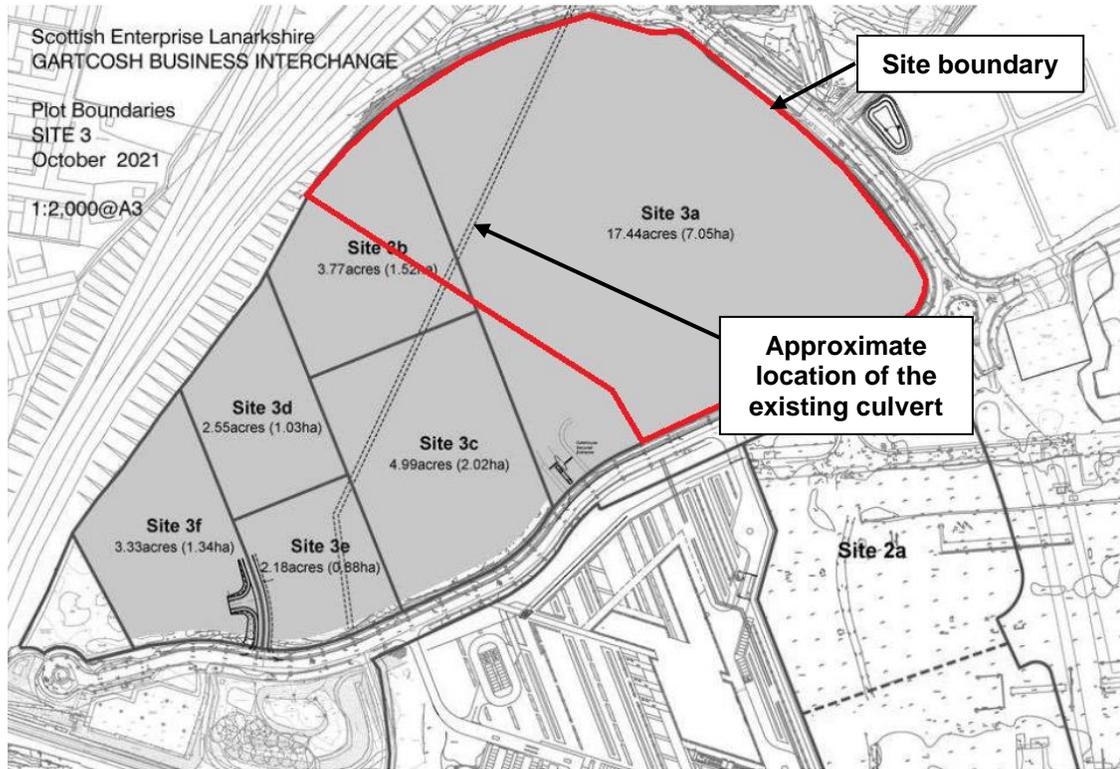


Figure 0-2. existing culvert location (source: Scottish Enterprise).

2.5 Ground Conditions

- 2.5.1 Johnson Poole & Bloomer have is, at the time of writing, undertaking a Site Investigation. Some preliminary borehole information has been shared and they reflect consistent layers of topsoil varying from 0.1m to 0.5m bgl, a layer of made ground up to 5.1m bgl and sandy gravelly CLAY with boreholes being generally dry.

3.0 Development and Flood Risk

3.1 Scottish Planning Policy

3.1.1 The Scottish Planning Policy (SPP) is a statement of Scottish Government policy on nationally important land use. The SPP was published in 2014 and consolidated a series of topic specific policy statements into a single statement. This document is intended to be used in conjunction with the National Planning Framework (NPF) (2014), Planning Advice Notes (PANs), and Design Advice Guidance (DAG).

3.1.2 The guidance relating to flooding (SPP) is summarised in terms of the flood risk to a proposed development in the following extracts.

3.2 Risk Framework

3.2.1 Little to no risk area.

Definition: Annual probability of watercourse, tidal or coastal flooding: less than 0.1% (1:1000), i.e. less frequently than the so-called 1 in 1000 year flood.

Appropriate Planning Response:

No constraints due to watercourse, tidal or coastal flooding.

3.2.2 Low to medium risk area.

Definition: Annual probability of watercourse, tidal or coastal flooding: in the range 0.1% - 0.5% (1:1000 – 1:200).

Appropriate Planning Response:

Suitable for most development. A flood risk assessment may be required at the upper end of the probability range (i.e. close to 0.5%), and for essential infrastructure and the most vulnerable uses. Water resistant materials and construction may be required.

Generally, not suitable for civil infrastructure. Where civil infrastructure must be located within these areas or is being substantially extended, it should be designed to be capable of remaining operational and accessible during extreme flood events.

3.2.3 Medium to high risk area.

Definition: Annual probability of watercourse, tidal or coastal flooding: greater than 0.5% (1:200).

Appropriate Planning Response:

May be suitable for:

- Residential, institutional, commercial and industrial development within built-up areas provided flood protection measures to the appropriate standard already exist and are maintained, are under construction, or are a planned measure in a current flood risk management plan;
- Essential infrastructure within built-up areas, designed and constructed to remain operational during floods and not impede water flow;
- Some recreational, sport, amenity and nature conservation uses, provided appropriate evacuation procedures are in place and;
- Job-related accommodation, e.g. for caretakers or operational staff.

Generally not suitable for:

- Civil infrastructure and the most vulnerable uses;
- Additional development in undeveloped and sparsely developed areas, unless allocation is essential for operational reason, e.g. for navigation and water based recreation, agriculture, transport or utilities infrastructure (which should be designed and constructed to be operational during floods and not impede water flow), and an alternative, lower risk location is not available; and
- New caravan and camping sites.

3.2.4 Where built development is permitted, measures to protect against or manage flood risk will be required and any loss of flood storage capacity mitigated to achieve a neutral or better outcome.

3.2.5 Water resistant materials in construction should be used where appropriate. Elevated buildings on structures such as stilts are unlikely to be acceptable.

3.3 Interpretation of the Risk Framework

- 3.3.1 The annual probabilities relate to the land at the time an application is submitted or a land allocation is made.
- 3.3.2 In the longer term, the calculated probabilities of flooding may be affected by climate change, improved data/methods and land uses elsewhere in the catchment.
- 3.3.3 This framework is a simplification of the situation as noted in SPP paragraph 258.

3.4 Local Development Plan

- 3.4.1 The proposed development site is included in the current North Lanarkshire Council local development plan and it is indicated as land use “Industrial and Business Sites”.

3.5 Local Planning Policy

- 3.5.1 North Lanarkshire Council “Flooding & Drainage Supplementary Planning Guidance: SPG 09 NLLP Policy DSP 4”, published in July 2010 outline requirements for development proposals to manage flood risk and surface drainage, safeguard the functional floodplain and improve the quality of the water environment.

3.6 Climate Change

- 3.6.1 The latest Climate Change Allowances for Flood Risk Assessment in Land Use Planning published by SEPA and updated in April 2022 recommends a 41% uplift for peak rainfall intensity for the Clyde Catchment.

4.0 Drainage Strategy

4.1 Scottish Planning Policy Requirements

4.1.1 SPP requires that:

“Infrastructure and buildings should generally be designed to be free from surface water flooding in rainfall events where the annual probability of occurrence is greater than 0.5% (1:200 years).”

4.1.2 To achieve this, the drainage system will be required to either fully attenuate and store the surface water runoff in such an event, or if it does surcharge then the site should be designed to accommodate the water in surface storage without allowing it to leave the site overland, or to flood buildings or infrastructure. The design should include an allowance for an increase in rainfall because of climate change.

4.1.3 SPP also states:

“Surface Water drainage measures should have a neutral or better effect on the risk of flooding both on and off the site, taking account of rain falling on the site and run-off from adjacent areas.”

4.1.4 This provides a general requirement that new developments do not increase the risk of surface water flooding, above the existing level of risk.

4.1.5 Under the Water Environment Controlled Activity (Scotland) Regulations 2011, SuDS are a statutory requirement for almost all development and must be considered during the site design to ensure adequate space will be available.

4.2 Local Planning Policy

4.2.1 North Lanarkshire Council “Flooding & Drainage Supplementary Planning Guidance: SPG 09 NLLP Policy DSP 4” states that the following documentation will usually be required at planning stage:

- Drainage Strategy;
- List of SuDS features and their role in the SuDS system;
- Layout of the drainage system including, where relevant, the final discharge point;

- Background calculations including drainage parameters and attenuation calculations;
- Confirmation that extreme event out of apparatus drainage and flooding flows will not adversely affect existing or proposed buildings;
- Confirmation that the proposed drainage systems meet the latest SuDS guidelines from SEPA;
- Long term maintenance responsibilities for the drainage system;
- Confirmation, that foul drainage proposed are satisfactory to Scottish Water;
- Confirmation that surface water drainage proposal are satisfactory to SEPA or NLC Building Standards;
- Certified that the surface water drainage system meets the principles of sustainable drainage SuDS as expressed through the latest SEPA guidance;
- And certified that foul drainage meets the requirements of SfS 2, SEPA or Building Standards as appropriate.

4.3 Proposed Surface Water Drainage

4.3.1 Any new development site drainage has been designed in accordance with North Lanarkshire Council drainage guidance and Sewer for Scotland v4.0 to provide enough network capacity up to and including the 1 in 30 year event plus 41% allowance for climate change, latest SEPA climate change allowance for the Clyde catchment. Additionally, the system has been checked for the 1 in 200 year event plus 41% allowance with any predicted flooding to be accommodated within the application site without detriment to properties and providing safe access from and to the site at all times. Please refer to Appendix F for the proposed drainage general arrangement plan.

4.4 Allowable Discharge Rate

4.4.1 The surface water will be attenuated within the surface water drainage system to the equivalent existing pre-development greenfield runoff rate (QBAR).

4.4.2 Using the ICP SuDS method in the Micro Drainage software package, the pre-development green-field rural discharge was calculated for the catchment area. The Q rural values are summarised in Table 4-4 along with the runoff for the 30 year event + 41% climate change.

Catchment Area:	Total Area (ha):	QBAR green-field runoff rural (l/s):	Pre Development runoff Q30 year + 41% (l/s):	Total Attenuation provided (m ³):	Discharge to:
Site impermeable area	4.8	29.6	79.1	4,022	Existing Scottish Water surface water pipe

Table 4-4. QBAR greenfield runoff, existing Q30 +41%, attenuation and discharge for the site.

4.4.3 MicroDrainage output sheets are included within Appendix E.

4.4.4 The strategy shows reduction in peak flow at the 30 year event + 41% Climate Change the post development stage of 49.5 l/s.

4.4.5 The proposed drainage scheme shows a surface water discharge, treated and attenuated, into the existing Scottish Water surface water system along Craignethan Drive.

4.5 Surface Water Attenuation Volume

4.5.1 To restrict the surface water discharge, sufficient storage volume will be required in the drainage system to attenuate the flow without surcharging the system and causing flooding.

4.5.2 The total attenuation volume provided for the new impermeable areas has been calculated as 4,022m³ via 2No of swales plus filter drains, a SuDS basin, porous paving and cellular tanks. This provides enough capacity to store with no flooding the 1 in 30 year event + 41% climate change (CC) and with any predicted flooding for the 1 in 200 year event + 41% CC to be accommodated within the site boundary without adversely impacting any existing or proposed building.

4.6 Surface Water Treatment Levels

4.6.1 SEPA highlights the legal requirement for the treatment of surface water by sustainable drainage systems (SUDS) for most types of development and encourage surface water runoff from developments to be treated in line with Scottish Planning Policy.

- 4.6.2 Consideration of SUDS requirements early in the planning process allows for greater flexibility and means the layout can be adopted to accommodate SUDS features, avoiding potential expense to the developer at a later stage.
- 4.6.3 CIRIA report C753 ‘The SUDS Manual’ (2015) provides guidance on assessing pollution hazard indices for various land uses and the type of SUDS solutions required to mitigate those hazards. Each activity or land use has pollution indices, whilst each SUDS component has corresponding mitigation indices, for total suspended solids, metals and hydrocarbons. Sufficient treatment measures should be provided, such that the mitigation indices are greater than or equal to the pollution indices.
- 4.6.4 Per the manual, standard commercial yard or delivery area have a pollution hazard level of ‘Medium’. The hazard index for total suspended solids (TSS) is 0.7, for metals is 0.6 and for hydrocarbons is 0.7. Treatment will be provided via swale plus filter drains.
- 4.6.5 Per the manual, commercial/industrial roofing: inert materials have a pollution hazard level of ‘Very Low’. The hazard index for total suspended solids (TSS) is 0.3, for metals is 0.2 and for hydrocarbons is 0.05. Treatment will be provided via SuDS basin.
- 4.6.6 Per the manual, roads and non-residential parking with frequent change have a pollution hazard level of ‘Medium’. The hazard index for total suspended solids (TSS) is 0.7, for metals is 0.6 and for hydrocarbons is 0.7. Treatment will be provided via permeable paving.
- 4.6.7 And low traffic roads (road access to the northern yard) have a pollution hazard level of ‘Low’. The hazard index for total suspended solids (TSS) is 0.5, for metals is 0.4 and for hydrocarbons is 0.4. Treatment will be provided via SuDS basin.

Pollution Hazard Indices				
Land Use Type	Hazard Level	Suspended Solids	Metals	Hydrocarbons
Standard commercial yard or delivery area	Medium	0.7	0.6	0.7
Commercial/Industrial roofing: Inert materials	Very Low	0.3	0.2	0.05
Roads	Medium	0.7	0.6	0.7
Non-residential parking with frequent change	Medium	0.7	0.6	0.7
Low traffic roads (<300 traffic movements/day)	Low	0.5	0.4	0.4
Pollution Mitigation Indices				
SuDS Component Description		Suspended Solids	Metals	Hydrocarbons
Swale plus filter drain		0.7	0.8	0.8
SuDS basin		0.5	0.5	0.6
Pervious pavement		0.7	0.6	0.7

Table 4-6. Simple Index Approach (SIA).

4.6.8 All mitigation indices exceed the pollution hazards indices as per SIA index table shown above.

4.7 Proposed Foul Water Drainage

4.7.1 The new proposed foul drainage from the development, will discharge into the existing 225 uPVC Scottish Water foul sewer present at the east of the site.

4.7.2 A Pre-Development Enquiry has been submitted to Scottish Water to confirm acceptance in flows, please refer to Appendix I. They have confirmed that there is currently sufficient capacity in the Balmore Water and Dalmuir Waste Water treatment works to service the development, however, they have also advised that further studies are required to be carried out to determine if the existing water/sewer can adequately service the demands of the proposed development.

4.7.3 The developer has appointed Scottish Water to carry out the network assessment and the outcome is awaited.

4.8 Conflict with Existing Sewers and water mains

- 4.8.1 Sewers for Scotland 4th Edition states, under the terms of the Building Regulations 2004 (as amended), there is a requirement to avoid construction over existing sewers, or to otherwise cause damage to them through construction nearby.
- 4.8.2 There is an existing Scottish Water wayleave area along the existing 225mm uPVC foul sewer running on the east side of the site. As per Sewers for Scotland 4th Edition, the width of the wayleave area is subject to depth of the system, as a conservatory approach it is recommended 3.5m measured from edge of the pipe, where no structures and other obstruction are proposed, to maintain this wayleave area.
- 4.8.3 The proposed development shows a standoff distance measured from the edge of the existing Bothlin burn culvert of 10m, although the proposed building is shown approximately 20m from the edge of the structure. No major structures are proposed within this 10m standoff area.

4.9 Maintenance Requirements

- 4.9.1 The proposed new surface water sewer network, including the SuDS elements, will remain private and maintained by the developer (Guala Closures UK Ltd).
- 4.9.2 The existing culvert crossing the site it is own by North Lanarkshire Council, therefore they are responsible for the asset's maintenance.
- 4.9.3 A suitable maintenance strategy should be adopted to ensure the drainage network is cleaned regularly and the routine maintenance and cleansing regime should be documented. Unless under management of a factor or management company, the SUDS solutions will require to satisfy the requirements of North Lanarkshire Council and SEPA.
- 4.9.4 It is recommended that the drainage system is inspected a minimum of twice per year, or, as per the manufacturers guidelines, with the system also being inspected after any major storm event. Significant sediment deposition is likely in areas used for storage, so a post clean-up operation may be required including the removal of litter, vegetation, sewerage debris and larger objects.
- 4.9.5 The CIRIA SUDS Manual 2015 provides guidance on the maintenance requirements for SUDS features.

5.0 Conclusions and Recommendations

5.1 Conclusions

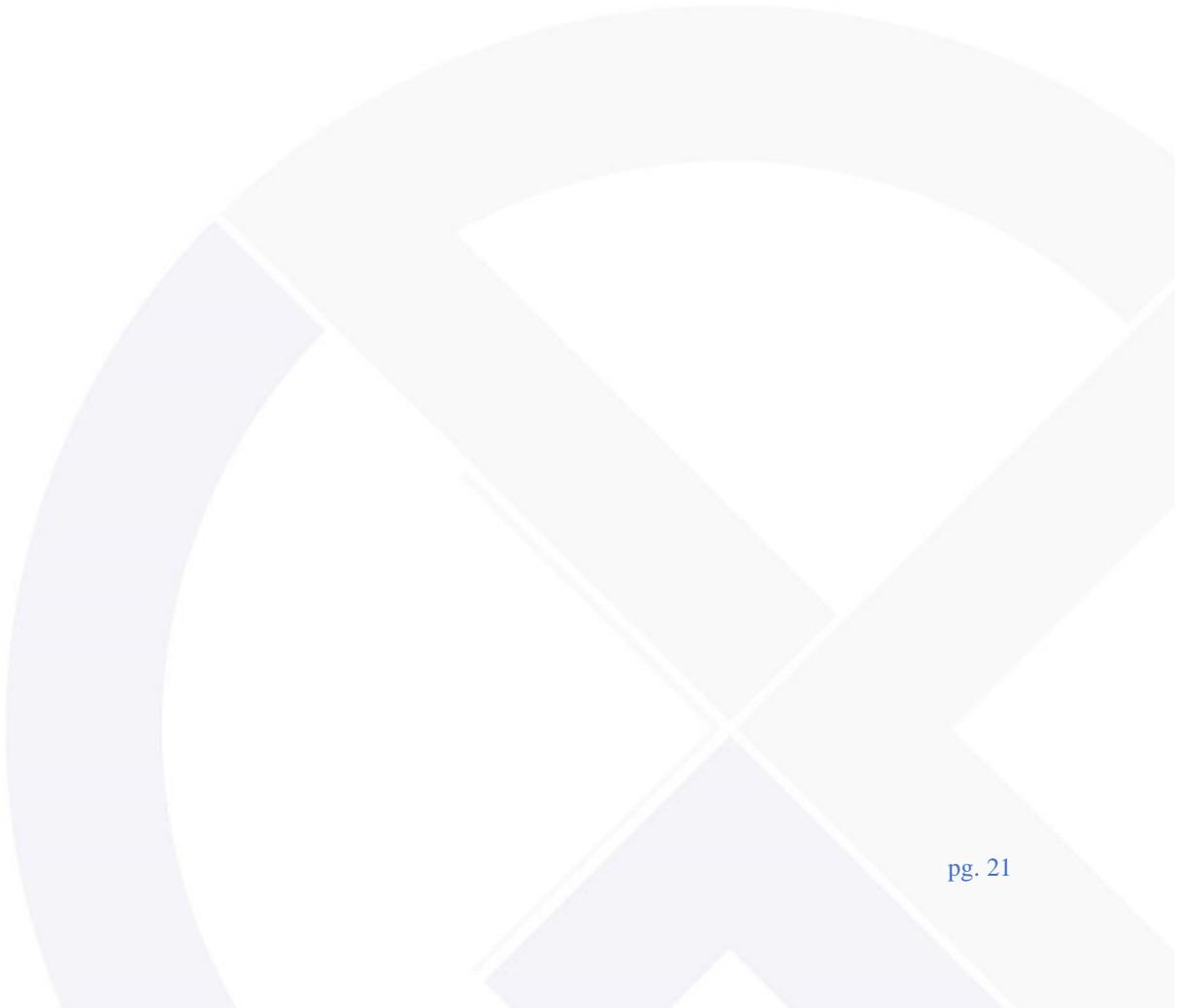
- 5.1.1 Grossart Associates have been appointed by Guala Closures to prepare a Drainage Assessment (DA) to support a planning application for an industrial development at Craignethan Drive, Gartcosh, North Lanarkshire Council.
- 5.1.2 The proposed industrial development is for a manufacturing facility with associated parking, landscaping and infrastructure at Gartcosh Industrial Park, Craignethan Drive, Gartcosh.
- 5.1.3 The public sewer and water records have been obtained from the Scottish Water (SW) GIS plans. The records show an existing Scottish Water foul sewer 225mm uPVC pipe running from south to north on the eastern area of the site, to then cross Auldyards Road and discharge into an existing Scottish Water combined 225mm VC sewer at the north-east of the site. The records also show a Scottish Water foul water sewer running along the south verge of Craignethan Drive from west to east, with no pipe dimension indicated, and a 975mm concrete surface water pipe, also along the south verge but in opposite direction, that becomes a 1050mm concrete pipe to finally discharge into the Bothlin Burn, to the south of Craignethan Drive. The indicative line of the existing culvert alignment crossing the site has been extracted from the Halcrow documentation and appears to be approximately 10m deep within the site boundary, please refer to Halcrow drawing GSSS-12. The exact culvert location and depth is, at the time of writing, being checked and confirmed by Scottish Enterprise
- 5.1.4 Any new development site drainage has been designed in accordance with North Lanarkshire Council drainage guidance and Sewer for Scotland v4.0 to provide enough network capacity up to and including the 1 in 30 year event plus 41% allowance for climate change, latest SEPA climate change allowance for the Clyde catchment. Additionally, the system has been checked for the 1 in 200 year event plus 41% allowance with any predicted flooding to be accommodated within the application site without detriment to properties and providing safe access from and to the site at all times. Please refer to Appendix F for the proposed drainage general arrangement plan.
- 5.1.5 The proposed drainage scheme shows a surface water discharge, treated and attenuated, into the existing Scottish Water surface water system along Craignethan Drive.

- 5.1.6 The surface water will be attenuated within the surface water drainage system to the equivalent existing pre-development greenfield runoff rate (QBAR).
- 5.1.7 The total attenuation volume provided for the new impermeable areas has been calculated as 4,022m³ via 2No of swales plus filter drains, a SuDS basin, porous paving and cellular tanks. This provides enough capacity to store with no flooding the 1 in 30 year event + 41% climate change (CC) and with any predicted flooding for the 1 in 200 year event + 41% CC to be accommodated within the site boundary without adversely impacting any existing or proposed building.
- 5.1.8 Treatment will be provided via swales plus filter drains, a SuDS basin and permeable paving. All mitigation indices, in accordance with the SIA index tool, exceed the pollution hazards indices.
- 5.1.9 A Pre-Development Enquiry has been submitted to Scottish Water to confirm acceptance in flows, please refer to Appendix I. They have confirmed that there is currently sufficient capacity in the Balmore Water and Dalmuir Waste Water treatment works to service the development, however, they have also advised that further studies are required to be carried out to determine if the existing water/sewer can adequately service the demands of the proposed development.
- 5.1.10 There is an existing Scottish Water wayleave area along the existing 225mm uPVC foul sewer running on the east side of the site. As per Sewers for Scotland 4th Edition, the width of the wayleave area is subject to depth of the system, as a conservatory approach it is recommended 3.5m measured from edge of the pipe, where no structures and other obstruction are proposed, to maintain this wayleave area.
- 5.1.11 The proposed new surface water sewer network, including the SuDS elements, will remain private and maintained by the developer (Guala Closures UK Ltd).

5.2 Recommendations

- 5.2.1 On the receipt of the Scottish Enterprise further information regarding the existing Bothlin burn culvert, this should be incorporated into future design stages, maintaining the minimum 10m standoff area from the edge of the culvert and making any appropriate consideration to the coordinated location and true dimensions of the culvert for any structural design.

- 5.2.2 It is recommended to undertake a CCTV survey to understand the condition and to obtain the coordinated location of the existing 225mm uPVC SW foul sewer crossing the east side of the site, as well as the existing SW surface water system along Craignethan Drive.
- 5.2.3 A suitable maintenance strategy should be adopted to ensure the drainage network is cleaned regularly and the routine maintenance and cleansing regime should be documented. Unless under management of a factor or management company, the SUDS solutions will require to satisfy the requirements of North Lanarkshire Council.



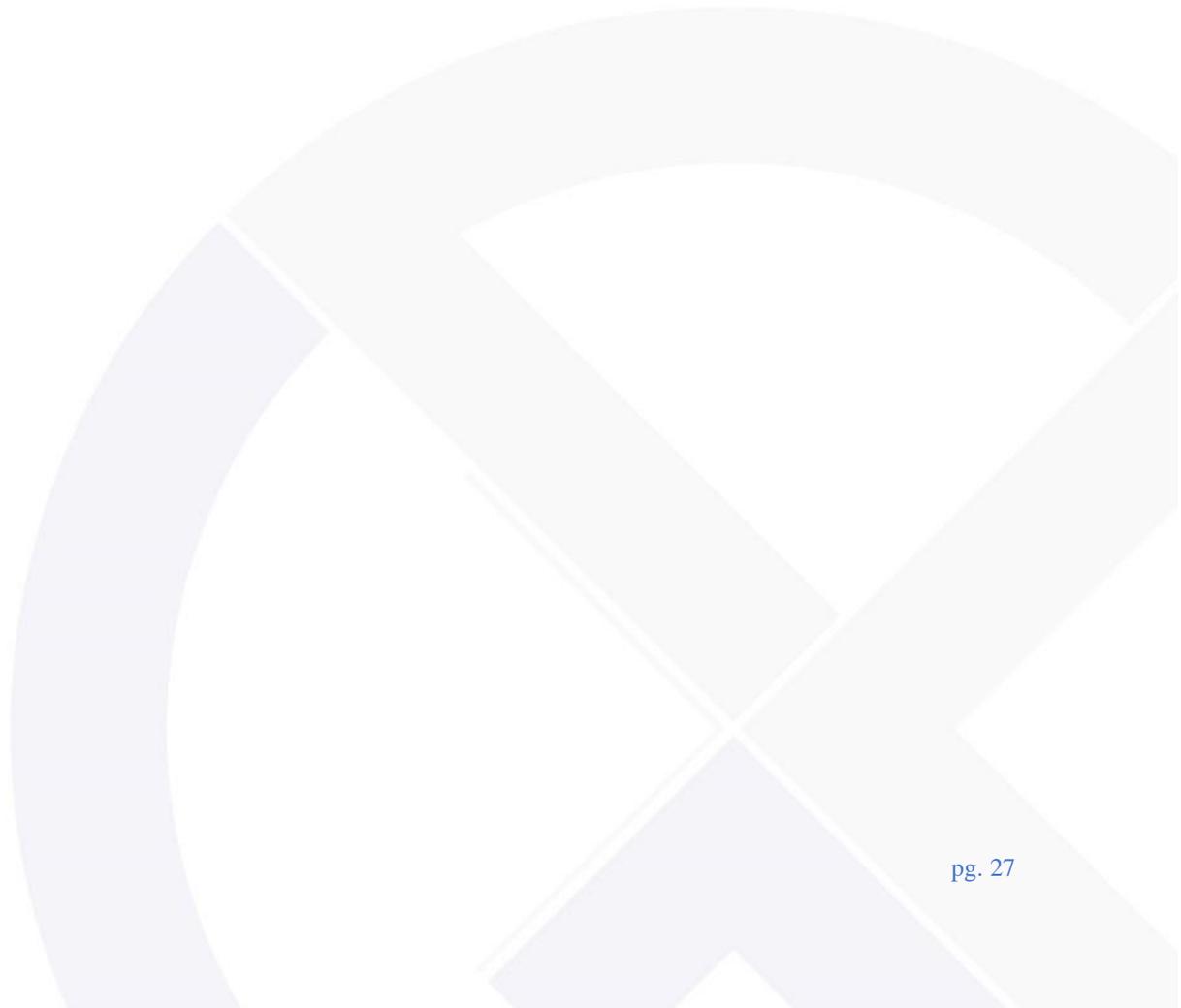
Appendix A – Proposed Site Plans



Appendix B – Public Sewer Records



Appendix C – Topographical Survey



Appendix D – Scottish Enterprise Bothlin Burn Culvert Information



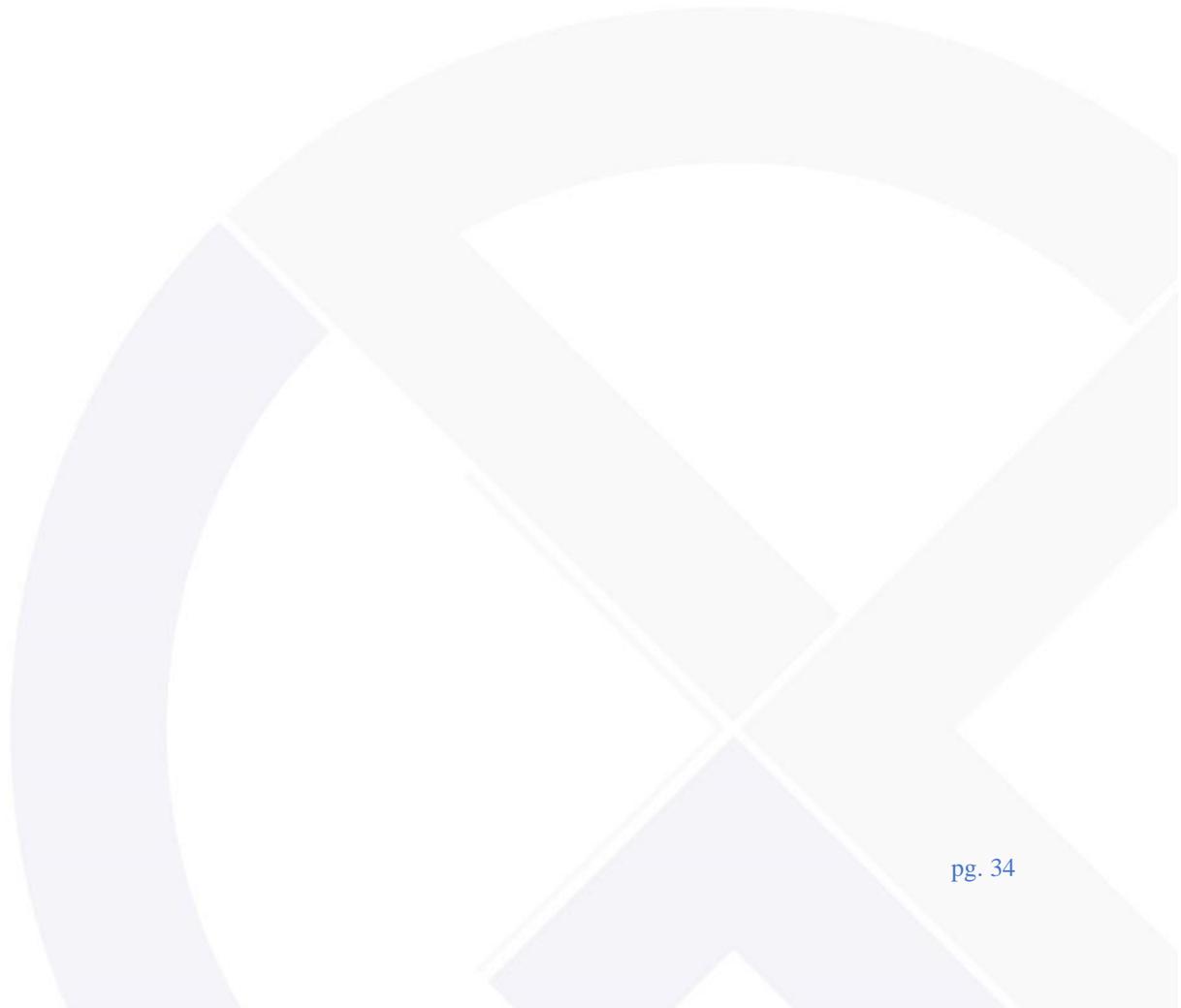
Appendix E – MicroDrainage Outputs



Appendix F – Proposed Drainage General Arrangement



Appendix G – Pre-Development Flow Routes





Appendix G – Post-Development Flow Routes





Appendix I – PDE Response

