murray & associates
landscape architecture

Landscape Architect's Report

incorporating

Landscape Design Statement,

Landscape & SuDS Management Plan, Landscape Specification

for

Warehousing / Logistics and Office Development
Calmount Road & Ballymount Avenue, Dublin 12

CLIENT:

Blackwin Ltd.

April 2022

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CONTROL SHEET

Project No.	**1878**
Project Name	**Warehousing / Logistics and Office Development** **Calmount Road & Ballymount Avenue, Dublin 12**
Document Title:	**Landscape Architect's Report**

Version Control

Rev. No.	Issue Status	Date	Prepared By	Checked By
0	Draft	01/04/22	MJP	MB

Introduction

Murray & Associates, Landscape Architecture were commissioned by Blackwin Ltd. as Landscape Architect for the proposed development of this site at Calmount Road / Ballymount Avenue, Dublin 12. This report is intended to explain the rationale behind the landscape proposals and provides an outline landscape management plan and specification for the proposed development. This report should be read in conjunction with the landscape plans and drawings, as follows:

1878_PL_P_00	Landscape Masterplan
1878_PL_P_01	Soft Landscape Plan and Details
1878_PL_P_02	Hard Landscape Plan and Details
1878_PL_S_01	Landscape Sections Sheet 1 of 4
1878_PL_S_02	Landscape Sections Sheet 2 of 2
1878_PL_S_03	Landscape Sections Sheet 3 of 4
1878_PL_S_04	Landscape Sections Sheet 4 of 4
1878_PL_D_01	Landscape Details Sheet 1 of 3
1878_PL_D_02	Landscape Details Sheet 2 of 3
1878_PL_D_03	Landscape Details Sheet 3 of 3

The report is structured with the following three sections:

A. LANDSCAPE DESIGN STATEMENT

B. LANDSCAPE & SuDS MANAGEMENT PLAN

C. OUTLINE LANDSCAPE SPECIFICATION

A. LANDSCAPE DESIGN STATEMENT

Description of Site and Context

The site of the proposed development has a total application area of 7.45 hectares. It is located c.3km northeast of Tallaght town centre at the intersection of Calmount Road with Ballymount Avenue.

The site is currently greenfield, but is clear of vegetation or landscape features of note. It is zoned '*EE To provide for enterprise and employment related uses*' and has extensive road frontage on the eastern and southern boundaries with Ballymount Avenue and Calmount Road, respectively.

Aerial photo of the site, showing the grassed surface, devoid of trees, hedges or other landscape features.

The land-use immediately surrounding the site is almost entirely industrial, warehousing and commercial, comprising buildings with large footprints in campus settings or serviced sites. The quality of the landscape and visual setting would be considered low.

Brief Description of the Proposed Development

The proposed development comprises the provision of 5 no. warehousing / logistics units including ancillary office floorspace, 3 no. own-door office buildings, 1 no. café / restaurant unit, associated access roads, car and cycle parking, service yards, landscaping, ESB substations and all associated development.

The proposed development consists of the following:

- Construction of 5 no. warehouse / logistics units (Units 1, 2 3, 4 and 6), including ancillary office use and entrance / reception areas over two levels, with maximum heights of c. 17.09 metres and a combined total gross floor area (GFA) of 20,158 sq.m;
- Each warehouse / logistics unit includes car parking to the front, and service yards, including HGV loading bays, to the rear of each unit. Signage zones are proposed for each unit. A total of 200 no. car parking spaces and 110 no. cycle spaces are provided for the 5 no. warehouse / logistics units;
- Construction of 3 no. 3 storey own-door office buildings (Block 5A, 5B and 5C) with maximum heights of c. 13.45 metres and a combined GFA of 4,194 sq.m. Signage zones are proposed at the entrances to the buildings. A total of 77 no. car parking spaces and 50 no. cycle parking spaces are provided for the proposed office buildings;
- Construction of a café/restaurant unit with a maximum height of c. 6.09m and a GFA of 213 sq.m to be located in the south western section of the site. The proposal includes signage for the unit, associated outdoor seating and a bin store. 14 no. car parking spaces and 10 no. cycle spaces are provided for the café/restaurant unit;
- The proposal includes 5 no. ESB substation buildings;
- The development is to be accessed off Ballymount Avenue and Calmount Road and includes for alterations and upgrades to the public footpaths and road. The development provides for vehicular and service access points, associated internal access roads, circulation areas and footpaths: and
- The proposal includes landscaping and planting, entrance signage, boundary treatments, lighting, PV panels, green roofs, underground foul and storm water drainage network, including connections to the foul and surface water drainage network on the public roads, attenuation areas and all associated site works and development.

The remainder of this report is concerned with describing and explaining the rationale behind the landscape proposals which includes considerations related to site layout and urban design, biodiversity and ecology, sustainable drainage (SuDS), hard and soft landscape materials and the sustainable management and maintenance of the landscape

Landscape Plan for the proposed development

Key to primary landscape areas:

1. *Civic Space at junction and entrance to office area*
2. *Site Vehicular Entrances with feature surfacing and signage; shared surfaces for pedestrian / cycle routes*
3. *Site Road – designed with consideration of potential long-term future contextual change*
4. *Café with SuDS Garden, outdoor seating*

For full details of landscape treatments, please see landscape drawings as listed in the introduction

Landscape Design Overview

For details of landscape proposals, please refer to the landscape drawings as listed in the introduction.

Planning Considerations

In developing the proposed design, regard has been had to the South Dublin County Development Plan 2016-22 (SDCDP) and other relevant planning policies, including the recently published South Dublin Co. Council *SuDS Explanatory. Design and Evaluation Guide 2022* and taking in charge guidance. A pre—planning meeting was held on held on the 25th January and advice and guidance from the Parks and Planning Officers has been taken into account, including further consultations undertaken following the pre-planning meeting. The City Edge Project has also informed the design proposals.

Key Relevant Landscape Policies from South Dublin Development Plan 2016-22

The most relevant policies to the landscape design of the site are as follows, taken from Chapter 11 Implementation and Chapter 8 Green Infrastructure.

table 11.18 sets out the key principles for development within enterprise and employment zones, several of which are relevant to landscape design. The following table sets out the text of the table from the SDCDP and includes the design response adjacent.

Table 11.18: Key Principles for Development within Enterprise and Employment Zones

CDP Theme	CDP Requirement	Design Response
Access and Movement	Major links to and through a site are provided as identified within a local plan, Masterplan and/or as determined by a site analysis process.	Road layout based on consultation between Roads Dept. and DBFL Engineers, providing for future links to lands to the north.
	The street network is easy to navigate and a clear a hierarchy is applied, identifying the function of each street.	The street network comprises of two streets and is simple to navigate, with clear hierarchy. Note there is no through-road for vehicles, only for pedestrians and cyclists.
	Individual streets are designed in accordance with the requirements of the Design Manual for Urban Roads and Streets.	Streets have been designed in accordance with the requirements of the Design Manual for Urban Roads and Streets, with the aim of creating a sustainable, adaptable streetscape that can adapt to future changes in context, in the Development Plan, and longer term under the emerging City Edge proposals.
	Large areas of parking (in particular staff parking) are located to the rear of buildings and screened from the street. Smaller areas of parking can be located to the front of buildings provided they are well designed (including areas of planting) and do not result in excessive setbacks from the street.	Parking areas are relatively small and are screened from views from the public realm, with shrub and hedge planting. Service and logistics yards are larger and to the rear of units.
	The design and layout of new business parks should promote walking, cycling and the use of public transport, including	Cycling and walking are clearly prioritised with paths, cycleways, crossing points and dedicated through-routes proposed. Cycle parking provision is also provided.

	adequate provision of cycle and pedestrian linkages.	
Open Space and Landscape	Creation of an open space network with a hierarchy of spaces suited to a variety of functions and activities.	Several open spaces are proposed, particularly along the public realm, addressing Calmount Road and the roundabout, and at the entrance to the café and site entrances generally. The public realm, includes a public plaza space at Calmount Road / Ballymount Avenue of 700sq.m and a café garden and terrace of 800sq.m.
	Development within business parks maintain and promote a parkland-like setting with high quality landscaping.	Street and internal planting will create an urban parkland environment with pockets or diverse trees and woods throughout, as well as the more structured urban planting along the streets. The site will have approximately 37% coverage of green and SuDS finishes (includes permeable paving). If the buildings are excluded, this figure is 49% of the ground surface of the proposed development site. Visible fencing and security measures typical of these sites have been designed out along the public realm boundaries, to give a more open and accessible character. Significant depths of planting on the Ballymount Avenue and Calmount Road boundaries will have a strong modern parkland character, with extensive tree planting. Planting spaces are a minimum of 6m wide on all public boundaries and often up to 25m in depth, with buildings set back and screened.
	Important nature features of the site such as trees, hedgerows and watercourses are retained, integrated within the landscape plan and reinforced with the planting of native species.	The site is greenfield but has no trees, hedgerows, watercourses or any landscape features of note. *Ecological review is ongoing.*
	Natural buffer zones and defensive planting are used to define private space and the use of fencing to the front of buildings minimised. Where fences interface with the public domain they should be of a high quality and incorporate elements of landscaping (for screening).	In order to create a positive relationship with the public realm, fencing is avoided along the main site frontages with Calmount Road and Ballymount Avenue through the proposed planting and the line of security is effectively the building line. Internal fencing will be planted with hedging to screen and soften.
Built Form & Corporate Identity	*See Architect's Submissions*	

From Chapter 8 Green Infrastructure the most relevant policies relating to this site are set out below, together with a response as to how they have been addressed in the design.

GREEN INFRASTRUCTURE (G) Policy 1 Overarching

It is the policy of the Council to protect, enhance and further develop a multifunctional Green Infrastructure network by building an interconnected network of parks, open spaces, hedgerows, grasslands, protected areas, and rivers and streams that provide a shared space for amenity and recreation, biodiversity protection, flood management and adaptation to climate change.

- The proposed design includes open spaces, and areas of diverse planting, as well as planted boundary corridors that will contribute to green networks

GREEN INFRASTRUCTURE (G) Policy 5 Sustainable Urban Drainage Systems

It is the policy of the Council to promote and support the development of Sustainable Urban Drainage Systems (SUDS) in the County and to maximise the amenity and biodiversity value of these systems.

- SUDS is a major factor in the landscape design of the site and the SUDS systems proposed include: integrated tree pits, rain gardens, swales, bioretention areas and permeable paving. These are integrated into the design to enhance biodiversity and create a parkland landscape.

GREEN INFRASTRUCTURE (G) Policy 6 New Development in Urban Areas

It is the policy of the Council to support the protection and enhancement of Green Infrastructure in all new development in urban areas. to strengthen Green Infrastructure linkage across the wider urban network and to achieve the highest standards of living and working environments.

G6 Objective 1: To protect and enhance existing ecological features including tree stands, woodlands, hedgerows and watercourses in all new developments as an essential part of the design process.

- The site is greenfield but has no trees, hedgerows, watercourses or any landscape features of note.

G6 Objective 2: To require new development to provide links into the wider Green Infrastructure network, in particular where similar features exist on adjoining sites.

- The proposed design includes open spaces, and areas of diverse planting, as well as planted boundary corridors that will contribute to the wider Green Infrastructure network. It should be noted that there are limited opportunities for connection due to the historic pattern of design in this industrialised area. However, the area is likely to change over the coming years and this site can set the example for others to follow.

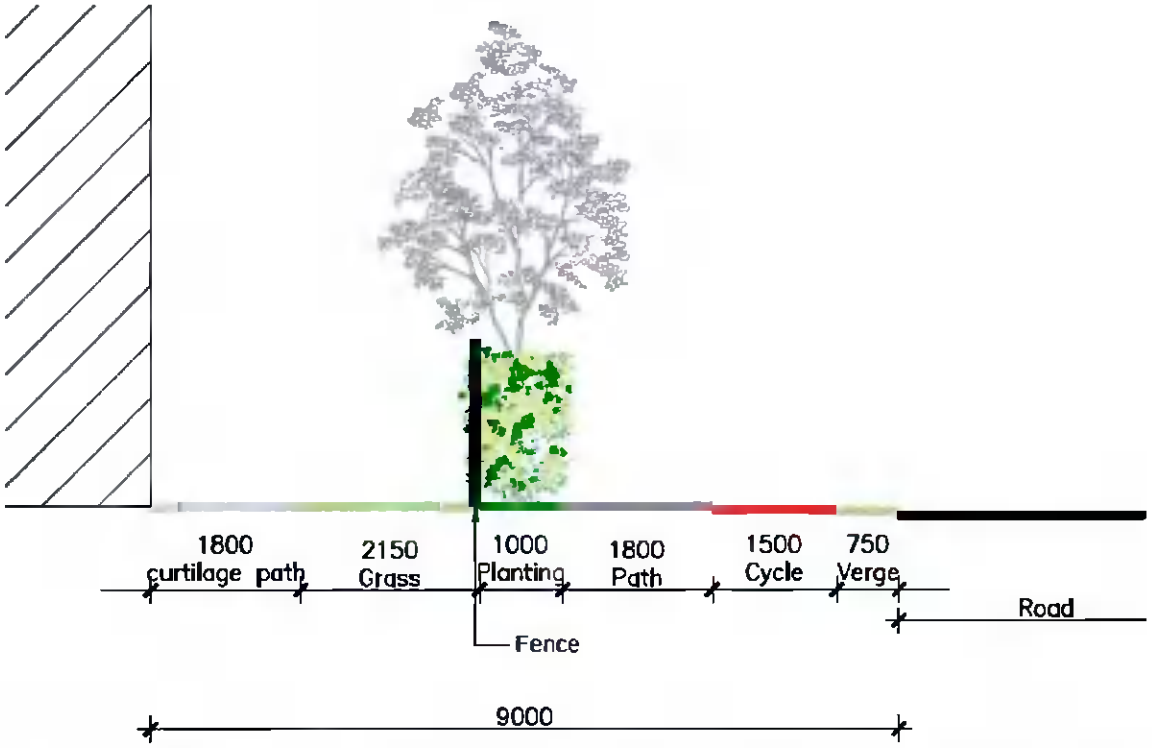
G6 Objective 3: To require multifunctional open space provision within all new developments that includes provision for ecology and sustainable water management.

- Ecology and sustainable water management have been considered as central to the landscape design of the site. SUDS systems proposed include integrated tree pits, rain gardens, swales, bioretention areas and permeable paving. These are integrated into the design to enhance biodiversity and create a parkland landscape.

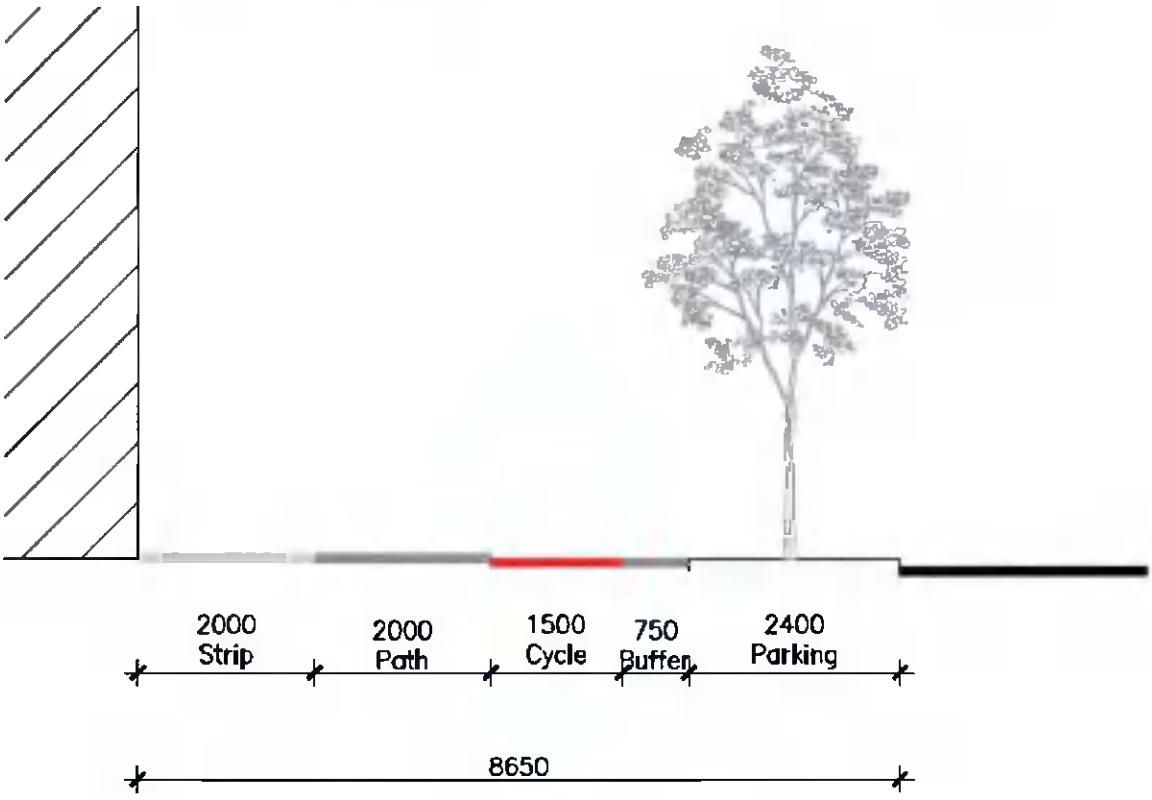
The City Edge Project has also been considered, in the sense that it is acknowledged that this area is likely to change in the coming years, over a long-term horizon. Thus, the development as proposed has incorporated measures that will be adaptable and can be integrated into a future landscape, as the zoning and landuses around change. In particular, the north-south street has been aligned with the long-term objective of establishing new infrastructure. The spatial layout and proposed tree planting along it have been designed as per the requirements of the *Design Manual for Urban Roads and Streets* (DMURS), to allow for reconfiguration in the future. The illustrations taken from DMURS below illustrate the design intent for a modular landscape layout that can be re-purposed, where the hard landscape elements are laid out in the optimal DMURS arrangement, more closely related to the streetscape than in a typical commercial office or logistics park.

Figures above taken from DMURS that have informed the design of the road / cycleway / path / tree planting section through the site.
Left – Figure 4.32: Illustration of the area generally thought of as the footpath. This area should be viewed and designed as three areas of activity.
Right: Figure 4.53: Example of a narrow verge between a cycle track and on-street parking. The verge provides a buffer that protects cyclists from opening doors

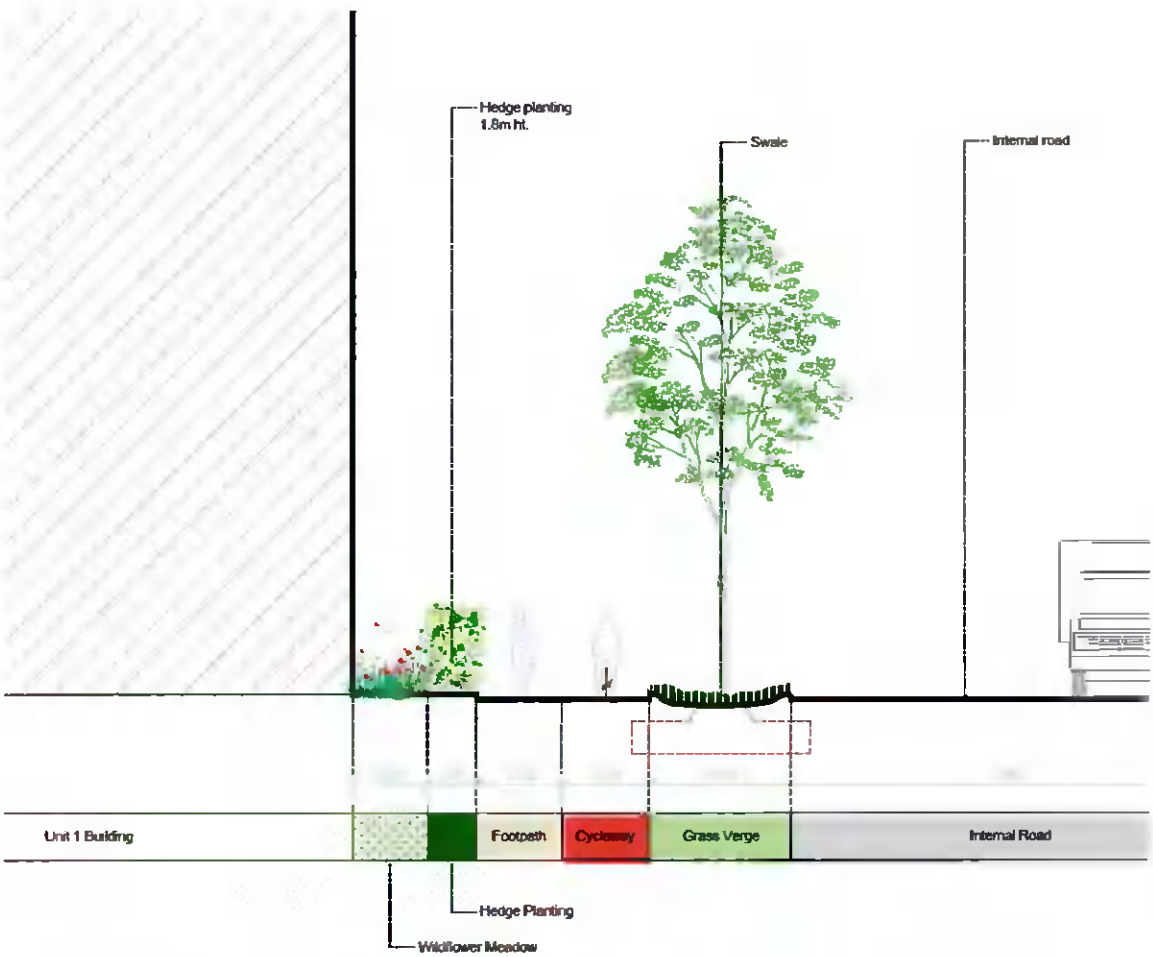
The trees are spaced within wide verges, with current swale function for SuDS, but are proposed to be constructed with structural soil tree pits below ground. which would allow for their retention in a future urban or residential streetscape. The following schematic sections illustrate a typical commercial park layout and how that has been altered for this project through consideration of DMURS and the City Edge Project. in order to make it adaptable for the future. It is – of course – acknowledged that it is not certain that this layout will remain useful in a future layout, the form of which is unknown, but this does allow for a modular repurposing of the street with minimal potential disruption, if it is compatible. This would mean that the new street would benefit from mature trees, around which construction of the new street layout could progress without disturbing the roots protected by the proposed structural soils and root barriers.



Typical Commercial Park layout – note separation between built edge and circulation paths / cycleway / road, as would be the norm in such projects in the area around the site.



Typical DMURS section devised with regard to the figures 4.32 and 4.53 above, as well as other guidance in DMURS. Note direct relationship between building and public realm.



Proposed section (taken from drawing no. 1878_PL_S_04) with:

- *footpaths and cycleways in the optimal position relative to the building line, in accordance with DMURS*
- *wide verge (swale) with trees in structural soil tree pit, which would protect the roots in any future construction works on the street (see also tree pit detail on 1878_PL_D_03)*
- *narrow planted buffer zone at building edge which could be re-purposed in the future as paving / public realm*
- *fencing and stand-alone security measures avoided at the front of buildings.*

Response to Pre-Planning Meeting

The mix of development was changed from that presented at the Pre-Planning Meeting to respond to the comments of the planning authority and now includes office units and a cafe, as well as logistics / warehouse units. A civic space is now proposed at the junction of Calmount Road and Ballymount Avenue, in response to the office units in that location and to respond to planned infrastructural improvements in the area. The north-south internal site road has been designed as outlined above in response to comments raised at the meeting.

Feedback from the Parks Department noted the following key points relating to landscape design, in summary:

1. Strong edge planting to Calmount Road and Ballymount Road– consider use of native hedge planting with semi-mature native trees such as Oak.
2. Water attenuation where possible should be by means of SuDS and that contributes to Blue-Green Infrastructure; refer to recently published SDCC SUDS Design Guide.
3. Street tree planting important within this scheme.
4. Where possible planting should be predominantly native and pollinator friendly.

5. Improving Green Infrastructure and biodiversity within the site considering its size.
6. Details of the proposed Green roofs including sections and elevations. (Noted that there are the limitations with load bearing on logistics units.)
7. Detailed specification and details of tree planting pits incorporating SUDS.
8. Detailed Planting Plan including details of Living Wall.
9. Details of proposed boundary treatments.
10. Additional items such as seating/picnic areas for staff, exercise equipment and circular walking routes.

Details as requested have been included in the submission. The only element suggested that hasn't been incorporated in some form are circular walking routes and exercise equipment.

Landscape Architectural Proposals

The landscape design proposals for this development aims to achieve the following:

- Create a strongly vegetated boundary with the public realm to enclose the site and screen or soften the proposed buildings
- Create public space and positive public realm interfaces along the external road boundaries
- Develop a strong internal infrastructure planting which creates new tree-lined avenues
- Contribute to sustainable drainage by including measures integrated into the landscape scheme
- Enhance the biodiversity value of the development site through pollinator and tree planting where possible
- Create spaces which enhance the working environment
- Form a garden space around the proposed café unit
- Provide human-scale and visually interesting spaces for the future workers and visitors to the site
- All planting proposed will have pollinator value, unless unavoidable for some functional reason (not currently foreseen) and will be in accordance with the All Ireland Pollinator Plan

The landscape architectural proposals include a series of innovative and best practice concepts with regard to spatial planning, SuDS and boundary treatments in particular.

Public Realm and Boundary Treatments

The primary intervention in the public realm is a new civic space proposed at the junction of Calmount Road and Ballymount Avenue. This responds to the office units in that location and planned infrastructural improvements in the area, as well as addressing the corner with a positive usable space. The space is simple, with patterned resin-bound aggregate surfacing and seating and planting elements, as well as street trees. It also encompasses

Aerial CGI View by others showing office units on corner of Calmount Road and Ballymount Avenue, showing civic space, and boundary structure, as well as intensive green (brown) roofs to the office buildings
(Please note this is an Artists' Impression; planting proposals are not accurate as per the species proposed, but show an overall impression in spatial and visual terms)

The public realm boundary of the site with Calmount Road and Ballymount Avenue will be open and soft, with any necessary security integrated or minimised so that there is a positive engagement with the public realm, and the landscape proposals enhance the public area. The boundary edge is defined by a series of linear bands, which are terraced where there is a level difference along Ballymount Avenue, and flat where the site is level, but the same language of distinctive planted bands, defined by edging is continued. The outer band is groundcover pollinator shrubs, while the second band is a native hedgerow (diverse mix including Hawthorn, Blackthorn, etc.) with Oak trees behind, defining a strongly planted street edge.

The planting mix will include the following native species at a minimum: Blackthorn (*Prunus spinosa*), Hawthorn (*Crataegus monogyna*), Holly (*Ilex aquifolium*), Dogwood (*Cornus sanguinea*), Guelder Rose (*Viburnum opulus*) and Spindle (*Euonymus europaeus*). Trees on this boundary are proposed to be Oak (*Quercus robur* 'Regal Prince' or similar).


Mixed native hedgerow / Upright Oak street tree - Quercus robur *'Regal Prince' – to form boundary with site*

Internal streets will also avoid fencing in front of buildings and 2.4m bar railings with evergreen hedging is proposed to enclose yards and screen the activity from the public/semi-public realm. Street trees are proposed as a select form of the native Alder – *Alnus glutinosa* 'Imperialis' – which has a particularly graceful, pyramidal, weeping form and will create a distinctive aesthetic. Alders are also compatible with SuDS and bioretention. Planting has been coordinated with car park lighting to ensure that the site is adequately lit and the trees do not impede the light spill.

CGI View by others showing internal street, and relationship of buildings to street with minimal visible security measures and soft verges (swale), street trees and hedging.
(Please note this is an Artists' Impression; planting proposals are not accurate as per the species proposed, but show an overall impression in spatial and visual terms)

Indicative images of proposed street trees: Alnus glutinosa *'Imperialis' – tree and leaf detail*

New cycle routes are proposed along the road edges of Calmount Road and Ballymount Avenue, to connect in with the existing on Ballymount Avenue. The site design layout allows for a vehicular entrance for the logistics units off Camount Road with a separate vehicular entrance from Ballymount Avenue. There is no vehicular connection between these two roads. but cycleways and footways are provided, demonstrating the emphasis on cycle and pedestrian priority inherent in the site layout. These routes are planted with native trees and wildflower verges.

As noted elsewhere, boundary treatments are intended to be as minimal as possible in visual terms, with the buildings acting as the primary line of defence. The boundary treatment details are shown on 1878_PL_P02. Signage is minimal, with a small sign at each of the entrances into the site off Calmount Road and Ballymount Avenue.

CGI View by others showing entrance from Calmount Road with subtle signage and boundary treatment, green roof. (Please note this is an Artists' Impression; planting proposals are not accurate as per the species proposed, but show an overall impression in spatial and visual terms)

The proposed car parks are surrounded by planting and vegetation. Car parking will be in permeable paving. At the front entrance to the buildings, feature spaces are proposed with specimen planting.

Around the building frontage areas and car parking areas, additional native and ornamental pollinator planting is proposed to break up the car parking spaces, with additional native trees in the islands where feasible – including diverse native trees and shrubs. Bioretention areas are integrated with a specific planting mix capable of withstanding occasional standing water. Footpaths are generally functional and practical concrete or reinforced gravel from emergency exits, with gravel areas along building edges and reinforced grass (e.g. grasscrete) where necessary for fire access.

Internal Green Infrastructure, SuDS and Biodiversity

The design aims to maximise opportunities for environmentally friendly measures and greening wherever possible. This includes extensive boundary planting, natural SuDS features planted with appropriate wetland species, trees, green roofs to the office and café elements of the scheme and a living wall to Unit 6, along Calmount Road.

The green roofs proposed are not the standard sedum blanket type. We have proposed sufficiently deep soil buildups (c.500mm) on the office and café buildings to support diverse habitat, with native shrubby plants and climbers such as Wild Rose, Blackthorn, Honeysuckle, Guelder Rose, etc. as well as wild flora ground layer – effectively an intensive brown roof. A 'brown roof' re-uses existing soil / subsoil from the site and is proposed to be undulating to create niche habitats with different native plants favouring different substrates and / or rooting depths available.

Extract from Aerial CGI View by others showing office units on Ballymount Avenue, with intensive green (brown) roofs to the office buildings. As described here, sufficient soil depth is proposed to allow for biodiverse planting on the roofs. (Please note this is an Artists' Impression; planting proposals are not accurate as per the species proposed, but show an overall impression in spatial and visual terms)

The warehouse buildings have lightweight roofs so green roofs are not feasible for structural reasons and in terms of embedded carbon, but the architectural proposals have extended the office elements of the buildings to allow for green roof planting to at least a component of most of the buildings, where possible. For the office and café elements, the percentage of green cover is c.50%. Some roof space is also required for photocells, which will further improve the carbon footprint of the proposed development.

There is also a green facade facing onto Calmount Road which will help to break down and soften the façade. Details of the green wall façade system will be agreed post-planning, if granted. The selection of an appropriate type of green façade requires detailed structural and façade analysis. The green façade will either be a cellular system with native and non-native ferns, grasses and perennials or a steel wire trellis-type system which will utilise native and non-native climbers with biodiversity value. Such a feature will create a biodiverse and meaningful contribution to local biodiversity Collected rainwater will be used for irrigation.

Green façade system utilising climbers on wire trellis (left) and alternative cellular 'living wall' system to right

Considering the extensive planting, public realm civic spaces, green roofs to the stand-alone offices and café, green façade and roofs to the office components of the warehouse buildings, and the lack of visible security fencing or measures, the impression of the site from the road will be far from a typical logistics or business park. There will be a strong sense of ecological design, and genuine biodiversity gains compared with the current site of improved grassland, which has no trees, hedges or landscape features of note.

The site will have approximately 37% coverage of green and SuDS finishes (includes permeable paving). If the buildings are excluded, this figure is 49% of the ground surface of the proposed development site.

As discussed earlier, in more detail, the internal road has been designed to adapt in the future to a different type of streetscape, as envisaged in the City Edge plan, and to reflect the relevant policies and objectives of the 2016-2022 Development Plan. The wide verges can be adapted to include on-street parking, 'parklets' or other streetscape elements and the trees are planted at centres which will be compatible with such uses, all based on DMURS street design guidance The tree pits will be detailed with root directors and structural soil tree pits which will allow the trees to mature and develop and then be retained in a future streetscape.

The SuDS details have been coordinated with DBFL Engineers and comply with the requirements of 'South Dublin Co Council SuDS Explanatory, Design and Evaluation Guide 2022'. The specific SuDS measures proposed include:

- Green roofs
- Rain gardens
- Swales
- Bioretention areas
- Permeable paving.

Please see drawing no. 1878_PL_D_03 for full details. Maintenance specifications for SuDS elements are included in the Landscape Management Plan, Part B of this document. The cafe unit incorporates a biodiverse, SuDS 'garden' area and will be accessible from the public realm as well as from the interior of the site. It will also have a green roof (not drawn yet) with native shrubs. Outdoor tables are included at the café and where feasible in the internal units to create break-out spaces for the future workers.

Extract from Aerial CGI View by others showing café unit off Calmount Road, with intensive green (brown) roofs and SuDS Garden with Bioretention areas and swales to the road verges.
(Please note this is an Artists' Impression; planting proposals are not accurate as per the species proposed, but show an overall impression in spatial and visual terms)

B. LANDSCAPE & SuDS MANAGEMENT PLAN

Contents:

1. Introduction

The purpose of this Landscape & SuDS Management Plan is to provide guidance and specifications for the maintenance requirements of the landscape elements of the proposed development of this site. This will cover all of the landscape typologies, both existing (hedgerows and mature trees, scrub and grasslands) and proposed (trees, shrubs, hedging, grass, etc.) on-site to ensure that all maintenance operations required for the efficient and effective management of the landscape are characterised and defined. The plan will provide a set of measurable performance standards that can be applied to evaluate landscape maintenance works carried out on the site. Measures for the management of SUDS features are also included in this plan.

2. Nature of Site

The site of the proposed development has a total application area of 7.45 hectares. It is located c.3km northeast of Tallaght town centre at the intersection of Calmount Road with Ballymount Avenue. The land-use immediately surrounding the site is almost entirely industrial, warehousing and commercial, comprising buildings with large footprints in campus settings or serviced sites. The quality of the landscape and visual setting would be considered low.

The site has extensive road frontage on the eastern and southern boundaries with Ballymount Avenue and Calmount Road, respectively. The proposed development includes a campus-style landscape with boundary areas, and a variety of planting typologies, SuDS features and hard landscape areas for maintenance.

3. Timeframe & Programming

The landscape works will be carried out in the first planting season following construction of the proposed services and associated works. The site will be privately managed by Blackwin Ltd.in accordance with the specification contained herein. A detailed programme of works will be agreed with the Contractor prior to maintenance operations commencing, in each year.

4. Aims & Objectives

4.1 General

Fundamentally, the aim of landscape management is to ensure that all external areas are kept in good condition, as perceived and expected by the users. The Landscape Management Plan aims to provide a manual for the maintenance requirements of the road network and adjacent landscapes. It will define and specify all necessary operations for the efficient and effective management of the landscape in order to ensure that each area is appropriately and sustainably maintained.

4.2 Horticultural / Sylvicultural Objectives

Horticultural and sylvicultural aims relate to the appropriate management operations for all plants and trees. The specific horticultural objectives are as follows:

- All plants to be maintained so that they remain in good health.
- All plants to have a habit and form consistent with species type and aesthetic objectives.
- Specialist operations for particular types of plants where necessary to achieve the aesthetic or functional objectives, e.g., pruning and formative clipping, etc. are included in the plan.
- Areas surrounding plants are to be maintained in such a way that potential threats to plant viability are addressed, e.g., weed control (particularly invasive and noxious weeds).
- Recognition of planting (including trees) at the end of its viable life is important to ensure that it is removed and replaced in a timely manner to avoid eyesores.

4.3 Performance Standards

Performance Standards can be defined as follows in the context of this plan: written specifications of the conditions that will exist when satisfactory works are completed. Performance standards will be measurable against the specified outcomes required for a particular operation, within a particular area. Performance standards must be upheld by the contractor at all times and will be monitored on an ongoing basis through regular site inspections.

Performance standards are specified in section 5 of this document. All required maintenance operations are defined and detailed to provide both specifications for the landscape contractor to follow and a set of measurable outcomes to appraise and value the contractor's performance against the requirements of the contract.

4.4 Environmental Considerations

Responsible and sustainable landscape management is about balancing the performance standards with the required standard of maintenance. The following principles have guided the development of the specification:

- **Minimise use of non-renewable resources**
    - e.g., reduce lawn areas to reduce consumption of fossil fuels, reduce use of chemical inputs such as pesticides, where possible.
- **Utilise low input systems**
    - Includes measures such as: mulching instead of herbicide use, where possible; encourage rough-cut or meadow grass where appropriate to avoid regular mowing.
- **Green waste recycling / mulching / composting**

- Avoids excessive transportation and use of landfill

- **Use of environmentally friendly products where possible**
  - e.g., biodegradable herbicides, biodegradable tree ties, timber stakes.
- **Control of Invasive Species**
  - It is an objective of this plan to control and prevent the spread of invasive species in order to protect the biodiversity of the landscape.
- **Protection of site resources**
  - Appropriate maintenance will result in the protection of the proposed hedgerows and trees, vegetation and soil resource of the site.

5. Specifications for Landscape Management Operations

- **5.1 Grass Areas**

I. General

At all times grass to look lush, vigorous and of fine quality with a minimum weed content, and a minimum variation in height of the sward during the growing season. Cutting should take place on a regular basis. Grass cutting areas shall be cleared of litter and rubbish prior to grass-cutting taking place.

No ruts are to be caused due to poor ground conditions. During periods of poor weather, no grass is to remain lodged following cutting. In periods of prolonged wet weather or where ground is waterlogged, consult with Property Manager prior to engaging in grass cutting operations.

Noxious and competitive weeds such as Ragwort, Gorse, Thistle, Dock, Nettle, Briar, Horsetail and Dandelion shall not be allowed to establish in any grass areas.

-

II. Rough Cut Grass Areas

Criterion	Performance Standards
Aesthetic/functional requirements	Rough cut grass areas are those grass areas which will not usually be accessed by users and will usually be in low priority areas, or in the background. These areas are to be maintained to create a grass area which is healthy and with minimal weed content, with grass allowed to grow relatively long between infrequent and regular cuts.
Permitted mower type	Strimmer, Rotary mower, ride-on mower, tractor-pulled gang mower (note: subject to ground conditions; strimming required in designated areas, areas of slope gradient greater than 1:3 and/or where ground is soft)
Height of Cut	Grass areas shall be cut to a height of c. 75mm
Frequency	5no. times during the growing season, at regular intervals of approximately 6 weeks
Finish	Rough cut shall mean grass of minimum height 75mm, with informal appearance
Clippings	To be gathered at every cut and disposed of in designated area or off-site.
Fertiliser	In mid-spring (late March to April), use a proprietary lawn fertiliser at the manufacturer's recommended rates, to be approved by the ER. Apply fertilisers when the soil is moist, or when rain is expected.
Weed Control	Minimum weed content permitted i.e.: (1) <5% of species content; (2) <15% of total grass area. When necessary and agreed with ER, use a selective herbicide, with the active ingredient Mecoprop-C, MCPA, 2-4-D or Dicamba to control broad-leaved weeds in the sward. Noxious or invasive weeds to be spot treated by controlled droplet applicator or glove with Glyphosate (Round-Up or equal) in May, June and August and prevented from flowering.
Edging	Rough-cut grass areas to be edged by hand or edging machine regularly to leave an even, straight edge and to ensure that the grass or soil does not protrude over the edge by more than 25mm

Indicators of under-performance:
Excessive weeds or occurrence of noxious or invasive weeds unacceptable; rutting of the surface, wheel marks or poor drainage may indicate compaction of soil caused by mowing in wet weather or use of unsuitable mower type.

III. Meadow Grass / Wildflower Areas

Criterion	Performance Standards
Aesthetic / functional requirements	Meadow grass or wildflower areas are those areas which will not usually be accessed by users and will usually be in low priority areas or kept for biodiversity reasons. These areas are to be maintained to create a meadow area which is healthy and with minimal noxious or invasive weed content. with grass allowed to grow relatively long between infrequent and regular cuts.
Permitted mower type	Strimmer, Rotary mower, ride-on mower, tractor-pulled gang mower (note: subject to ground conditions; strimming required in designated areas, areas of slope gradient greater than 1:3 and/or where ground is soft)
Height of Cut	Meadow grass areas shall be cut to a height of c. 75mm
Frequency	3no. times during the growing season, in May, July and September
Finish	Meadow
Clippings	To be gathered at every cut and disposed of in designated area or off-site
Weed Control	Noxious or invasive weeds to be spot treated by controlled droplet applicator or glove with Glyphosate (Round-Up or equal) in May, June and August and prevented from flowering
Edging	Meadow grass areas to be edged by hand or edging machine regularly to leave an even, straight edge and to ensure that the grass or soil does not protrude over the edge by more than 25mm

Indicators of under-performance:
Occurrence of noxious or invasive weeds unacceptable.

5.2 Shrub Planting

I. Groundcover / Hedge / Mass Shrub Plantation

Criterion	Performance Standards
Aesthetic / functional requirements	Shrub planting areas shall be kept clean at all times, with an even finish. Plants to have a healthy, lush appearance, typical for plant species and time of year.
Weed Control	Weeds shall not be allowed to cover more than 5% of the ground at any one time, neither shall weeds exceed 50mm in height. Residual herbicide permitted for established shrub areas.
Bark Mulch	Required – min. 50mm deep; to be kept topped up at all times.
Fertiliser	Annual feeding with 50g/sq. m of general-purpose fertiliser in February. (Rake back mulch prior to application.)
Pruning / Clipping	Pruning once per annum to maintain the typical size and form of the plant, for sightlines and for plant health; all clippings to be gathered at every pruning and disposed of in designated area or off-site.
Edging	Beds to be edged by hand or edging machine twice per annum to leave an even, straight edge. Shrubs or soil not to protrude past the edge by more than 50mm.
Watering	Watering required only in periods of prolonged drought (i.e. after more than 2 weeks)
Dead-heading	Not required.

II. Hedge – Free Growing- Existing & Proposed

Criterion	Performance Standards
Aesthetic / functional requirements	Even, clean finish to ground plane. Hedge to have a healthy, lush appearance, typical for plant species and time of year. Relatively informal habit acceptable.
Weed Control	No weeds permitted in the hedge area. Established hedge areas may be treated with an approved residual herbicide to provide year-round weed control.
Bark Mulch	Required – 50mm deep; to be kept topped up at all times.
Fertiliser	Annual feeding with 50g/sq.m of general-purpose fertiliser in February. (Rake back mulch prior to application.)
Pruning / Clipping	Pruning once per annum as necessary to maintain the required height and width and prevent "leggy" growth; all clippings to be gathered at every pruning and disposed of in designated area or off-site. Laying may be required for Hawthorn and Blackthorn hedges if hedge growth becomes thin at the base.
Watering	Watering required only in periods of prolonged drought (i.e., after more than 2 weeks)

III. Native Shrub Plantation

Criterion	Performance Standards
Aesthetic / functional requirements	Even, clean finish to ground plane. Hedge to have a healthy, lush appearance. typical for plant species and time of year. Relatively informal habit acceptable.
Weed Control	Weeds shall not be allowed to cover more than 5% of the ground at any one time, neither shall weeds exceed 50mm in height. Residual herbicide permitted for established areas.
Bark Mulch	Required for high prominence areas; recommended for medium areas – 50mm deep; to be kept topped up at all times.
Fertiliser	Not required.
Pruning / Clipping	Pruning once per annum for shrubs such as Dogwood and Guelder Rose or to control height and spread when necessary.
Watering	Watering required only in periods of prolonged drought (i.e. after more than 2 weeks)

IV. Scrub - naturally occurring

No maintenance operations required, except to ensure that any edge plants are kept cut back at least 1m from road edges and tidy where visible or prominent.

5.3 Trees

I. General:

- Canopies overhanging a pedestrian path to be maintained to 2.2m and canopies overhanging vehicular access to 4m.
- Limb damage caused by wind, passing traffic, etc. to be pruned resulting in a clean even wound.
- No signs, security boxes, etc. to be attached to trees.
- Surface tree roots not to cause a trip or mowing hazard. In grass areas, top up soil over roots and re-seed.
- Raised paviours or cracked/bulging walls due to root growth are to be reported to the Contract Administrator.
- Exposed roots from construction works to be kept moist by wrapping damp hessian around roots until soil is backfilled and then apply a one-off generous application of water. Root damage to be pruned resulting in a clean even wound prior to backfilling / topsoiling.
- Control of ivy and suckering on the trunks of trees within falling distance of activity
- Informal monitoring of trees for change of condition or evidence of a fungal fruiting body.

II. Specimen, Solitary and Avenue Trees

- All trees to be maintained in accordance with requirements for species and habit to be maintained in accordance typical form for tree. Tree trunk will be kept visible for defect inspection with control of ivy and removal of suckering. Mulch 1m diameter will be maintained around all individual trees within grassed areas. Stakes and ties to be retained for a maximum period of 3 years, with tie loosened annually and both stake and tie to be removed after 3-year period. All nursery marking, bamboo and labels to be removed off all trees. Any visible change in condition to be reported.

III. Tree Groups, Hedgerow Trees

- Such areas shall be kept free of noxious and pernicious weeds at all times. Mulch or spray rings 1m diameter will be maintained along group perimeter and around all plants in young woodland areas where canopy cover has not been achieved. Established woodland areas shall not be treated with herbicide except where necessary for the removal of noxious and invasive weeds including Ragwort, Gorse, Thistle, and Dock, hogweed, bramble and any others. Japanese knotweed shall not be allowed to establish in any woodland areas. Bramble should not exceed 20% of ground cover of any woodland. Ivy shall be controlled and shall not be allowed to establish itself on trees along the perimeter and within falling distance of activity within woodland areas. Understorey (excluding saplings) not to exceed 1m in height in order to retain visibility for user safety in areas of activity. Tree numbers not to exceed 4 per sq. m of trees with a girth of less than 250mm and numbers not to exceed 2 per sq. m for trees with a girth of over 300mm. Fallen or felled trees in woodland areas to be removed.

5.4 Vacant Plot Areas/Rough Ground Areas

These areas shall be kept free of noxious, invasive and other pernicious weeds, including ragwort, thistle, dock, gorse, hogweed, bramble and Japanese Knotweed at all times.

- **5.5 Weed Control**
- ***5.5.1 General***

Minimal amount of herbicidal chemicals is to be utilised on the site, with non-chemical means of weed control to be preferred (mulching, mechanical control, hand weeding, etc. where feasible). Biodegradable herbicides are to be preferred where herbicide use is required. Prior to executing weed control involving the use of herbicides, details of the products to be used including a Material Safety Data Sheet (MSDS) for each product is to be provided to the Contract Administrator for each of the herbicides proposed. A sample herbicide information chart is included in Addendum A.

Where translocated herbicides are applied, spray drift should be avoided, and spray guards fitted to apparatus. Where feasible, spot treatment using CDA (Controlled Droplet Applicator) or glove preferred. Use of residual herbicides shall not be used in areas of herbaceous planting, in the initial year following planting of new shrubs or over areas of bare ground within shrub beds where replacement planting is to be carried out. Hand weeding in planting beds will be required where there is a large component of herbaceous material, bulbs or prostrate groundcover plants.

- ***5.5.2 Invasive/Noxious Weeds***

Invasive weeds of any kind, most particularly Japanese Knotweed, Winter Heliotrope, Giant Hogweed and Himalayan Balsam shall not be allowed to establish in any area of the site. It will be the responsibility of the contractor to be able to identify same and treat at first sign of emergence. The site to be monitored on an ongoing basis for any invasive weeds. Any occurrence to be reported to management and control strategies engaged. Noxious weed to be controlled as required by the Noxious Weeds Act 1936 (as amended).

6. Specifications for SuDS Maintenance Operations

The approach to the SuDS design is a process based on dynamic events that are unique to the site. To understand and manage the potential rainfall runoff within the development, a series of studies that cross-reference the hydrogeological structure, topographic features and architectural/engineering structures need to be established at detailed design stage:

1. **Runoff flow route analysis**
2. **Discharge of site drainage strategy**
3. **Management train and sub-catchments strategy to provide the collection, treatment, storage and conveyance of runoff across the site**

The main landscape elements elected for this strategy are bio-attenuation area, swales, rain gardens / bio-retention channels, green roofs and permeable paving. Additional engineering structures, such as trapped road gullies, silt traps, petrol/oil interceptor and surface water attenuation chambers and flow control devices, contribute greatly to the Sustainable Drainage System approach.

- **Bio-attenuation Tree Pits** – enhanced performance tree pit with a drainage layer and drain down piping within the root zone. These structures facilitate water interception, infiltration and groundwater recharge, dissipation of rainfall-runoff energy and temperature reduction of runoff water.
- **Bio-retention Linear Planting Pits / Rain Gardens / Swales** – reduce runoff rates, volumes and biofilter polluting agents by using engineered soils and vegetation. These bio-retention systems are design for relatively small catchments, filtering smaller rainfall events – thus reducing the volume of the runoff.
- **Permeable Paving** – efficient mean of managing surface water runoff, facilitating the interception and infiltration to the underlying structural layers of the paving. This process also contributes to reduce the volume and frequency of the water runoff, as well as facilitating a passive water treatment throughout the subsurface matrix. Grasscrete, block paving and porous asphalt were the selected surfaces for the SuDS strategy.
- **Trapped Road Gullies** – means for intercepting surface water runoff from the paved/impervious surfaces. These elements are distributed along the hard landscape surfaces and minimize the risk of sediments and pollutants contaminate the surface water network, thus improving the overall quality of the discharge.
- **Silt Traps** – filtering system that facilitate capturing and remove silt and other sediments from the surface water network, contributing for an improvement of the rainfall water discharge.
- **Surface Water Attenuation** – reduce the flow and the of discharge of the water runoff, as well as facilitate a passive water treatment, with the introduction of flow control devices and water attenuation chambers. These engineering structures also minimize the risk of sediments and pollutants contaminate the surface water network, thus improving the overall quality of the discharge.
- **Petrol/oil interceptor** – means for separating and capture oil and other pollutants from the surface water runoff. These engineering devices are distributed along the asphalt surface and will securely store the oil until its safe disposal. This contributes to reduce the risk of contamination of surface water, and improves the quality of the discharged water.

The table below outlines the proposed maintenance plan for the SuDs components that integrate the Landscape Proposal of the proposed development, as well as highlighting the designated party responsible, the required actions, timeframe and frequency for maintaining these landscape features.

SuDS component	Responsibility	Schedule	Action	Frequency
Tree Pits	**Landowner / tenant**	**Regular maintenance**	Litter and debris removal	Monthly / as required
			Grass cutting, weeding and nuisance control	Monthly / as required
			Inlet and outlet inspection	Monthly
		Occasional maintenance	Tree health inspection and treatment	Annually
			Silt build-up removal from inlets and surface, re-mulch	Annually / as required
			Irrigation	As required
		Monitoring	Silt accumulation rates, and schedule appropriate removal frequencies	Semesterly
Swales / Bio-retention Areas / Rain Gardens	**Landowner / tenant**	**Regular inspections**	Silting and ponding on infiltration surfaces	Quarterly
			Recording de-watering time and assess standing water levels in underdrain to determine the need for maintenance	Quarterly
			Underdrain flow inspection after rain events	Annually
			Assess plants for disease infection, undergrowth, invasive species, weeding, etc. and replace as needed	Quarterly
			Inspect inlets and outlets for blockage	Quarterly
		Regular maintenance	Litter and debris removal	Quarterly / as required
			Planting replacement to maintain established density	As required
			Litter, sediment and debris build-up removal around inlets	Quarterly to biannually
		Occasional maintenance	Infill any holes or scour in the filter medium, improve erosion protection if required	As required
			Repair minor accumulations of silt by raking away surface mulching, scarifying surface of medium and mulch replacement	As required
		Remedial actions	Remove and replace filter medium and vegetation above	As required
Permeable paving: - Grasscrete - Block paving - Porous resin-bound aggregate	**Landowner / tenant**	**Regular maintenance**	Regular brushing and remove sweepings from all hard landscape surfaces	Monthly / after autumn leaf fall / as required
		Occasional maintenance	Brush and vacuum surfaces to prevent silt blockage and enhance the design life span	Annually
			Stabilise and mow contributing and adjacent areas	As required
			Weed, litter and debris removal	As required
		Remedial actions	Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or hazard to users	As required
			Rehabilitation of surface and upper substructure	As required

		Monitoring	Initial inspection	Monthly for 3 months after installation
			Inspect silt accumulation rates and establish appropriate brushing frequencies	Annually
			Monitor effectiveness of permeable paving. Possible reinstatement of top layers or specialist cleaning (jet washing and suction cleaning recommended)	As required
			Inspect for evidence or weed growth. Take remedial actions if needed	As required
Trapped road gullies	**Landowner / tenant**	**Regular maintenance**	Litter and debris removal	Monthly / as required
		Occasional maintenance	Removal and treatment of silt, oils and other contaminants	As required / after a heavy rainfall event
		Monitoring	Visual inspection	Monthly for 3 months after installation, triennially afterwards
			Inspect silt accumulation rates and establish appropriate maintenance frequencies	As required
			Recording structural integrity of components to establish appropriate maintenance frequencies	As required
Silt traps	**Landowner / tenant**	**Regular maintenance**	Litter and debris removal	Monthly / as required
		Occasional maintenance	Removal and treatment of silt, oils and other contaminants	As required / after a heavy rainfall event
		Monitoring	Visual inspection	Monthly for 3 months after installation, annually afterwards
			Inspect silt accumulation rates and establish appropriate maintenance frequencies	As required
			Recording structural integrity of components to establish appropriate maintenance frequencies	As required
Surface water attenuation	**Landowner / tenant**	**Regular maintenance**	Inspect and identify any areas that are not performing optimally. Take remedial actions if needed	Monthly for 3 months after installation, annually afterwards
			Litter and debris removal form the catchment surface	Monthly / as required
			Check surface of filter for blockage by sediment, algae or other matter. Remove and replace surface infiltration medium as needed	Annually
			Remove sediments from pre-treatment surfaces and/or internal forebays	Annually / as required
		Remedial actions	Repair/rehabilitate inlets, outlets, overflows and vents	As required
		Monitoring	Inspect all inlets, outlets and overflows to ensure optimal performance	Annually / as required
			Survey inside tank for sediment build-up and remove if needed	Every 5 years / as required
Petrol/oil interceptor	**Landowner / tenant**	**Regular maintenance**	Full inspection and maintenance performed by an authorised and certified specialist	Quarterly / as required
		Occasional maintenance	Litter and debris removal	As required / after a heavy rainfall event

			Removal and treatment of silt, oils and other contaminants	As required / after a heavy rainfall event
		Monitoring	Inspect silt accumulation rates and establish appropriate maintenance frequencies	As required

Requirements for Green Roof Maintenance

In order to protect the validity of the waterproofing system guarantee and any other maintenance requirements for the green roof areas, the contractor is required to retain a maintenance contractor for a period of not less than one year. It is essential that all maintenance requirements and recommendations of the Green Roof Components supplier(s) are taken into account, therefore the following is provided for guidance only.

- Remove any dead vegetation, leaf litter or debris from the roof surface, ensuring that any gutters, outlets, chutes and downpipes are free from blockages and that water can flow away freely.
- Open the lids of all inspection chambers. to inspect and ensure that all rainwater outlets and downpipes are free from any blockages and that water can flow away freely.
- Ensure that any protective metal flashings and termination bars remain securely fixed in place. Renew or repair as necessary.
- Examine all mastic sealant and mortar pointing for signs of degradation. Repair or replace as necessary.
- Check that all proprietary surfacing and paving slabs are securely fixed/adhered to the roof surface and in good condition.
- Ensure any new items of plant/equipment that may have been introduced to the roof are mounted on suitable isolated slabs and any fixings used to secure the plant in place do not penetrate the waterproofing. If in doubt, please contact Green Roof Components supplier(s) to advise.
- During the Defects Liability Period the Contractor must keep a record of all inspections and maintenance carried out on the roof. Any signs of damage, contamination or degradation to visible elements of the waterproofing installation should be reported to Green Roof Components supplier(s) immediately, in order for arrangements to be made for remedial work to be carried out if necessary.
- When carrying out any maintenance to adjoining roof areas, care must be taken to prevent damage to both the landscaping or the waterproofing system. If it is considered that either element has been effected, then the Green Roof Components supplier(s) should be contacted for advice.
- Any unauthorised alterations to the waterproofing system will invalidate the guarantee. If such a situation should arise, the Green Roof Components supplier(s) should be contacted to advise on the alteration and how it should be incorporated without effecting the guarantee.
- The cultivation of intensive green roof substrate may be carried out in the same way as with any normal horticultural growing medium. However, care must be taken not to mechanically damage either the waterproofing system or any of the green roof components, as this would invalidate the guarantee. The use of fertilizers and weedkillers should have no detrimental effect on either the waterproofing or the green roof system, but the Green Roof Components supplier(s) should be consulted before use.

C. OUTLINE LANDSCAPE SPECIFICATION

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SPECIFICATIONS FOR SUPPLY OF NURSERY STOCK

Supply of nursery stock:

The nursery stock material will be delivered following consultation between the employer's representative, landscape Contractor and the selected nursery. It is intended to serve notice of delivery by means of phased orders at least two months prior to commencement of the dormant season in November of that year. Delivery will be at all times by means of covered vehicles, and all plant material will be clearly labelled. The source of origin must be from the selected nursery, as no other additional stock from other nurseries will be permitted without prior inspection and approval

Nursery stock:

All plant material shall be good quality nursery stock, free from fungal, bacterial or viral infection, aphids, red spider or other insect pests and any physical damage. It shall comply with the requirements of B.S. 3936: Parts 1-10: 1965 Specification for Nursery Stock, where applicable.

All plants shall have been nursery grown in accordance with good practice and shall be supplied through the normal channels of the wholesale nursery trade. They shall have the habit of growth that is normal for the species. Country of origin must be shown in all cases for species grown from seed.

Unless otherwise stated, the plant materials shall be supplied in accordance with the following codes where stated:

1+0	1 Year old seedling
1+1	1 Year old seedling lined out for 1 year
1+2	1 Year old seedling lined out for 2 years
1+1+1	1 Year old seedling lined out for 1 year, lifted and lined out for one further year
2+2	2 Year old seedling lined out for 2 years
0/1	1 Year old Hardwood cutting
0/2	2 Year old Hardwood cutting
2X	Twice transplanted tree
3X	Three times transplanted tree
4X	Four times transplanted tree
P9	Containerised plant in 9cm pot
CG / c/g	Containerised plant
gt.	Girth
ht.	Height
RB / r/b	Rootball
BR / b/r	Bareroot
MS	Multi-stemmed
Ftd	Feathered trees

Species:

All plants supplied shall be exactly true to name as shown in the plant schedules. Unless stipulated, varieties with variegated and/or coloured leaves will not be accepted, and any plant found to be of this type upon leafing out shall be replaced by the contractor at his/her own expense.

Bundles of plants shall be marked in conformity with B.S. 3936: Part 1: 1965 and B.S. 3936: part 4: 1966. The nursery supplier shall replace any plants which, on leafing out, are found not to conform to the labels. Definitions of all terms used are in accordance with the following British Standards: -

B.S. No. 3936: Part 1: 1992 entitled "Nursery Stock- Trees and Shrubs"

B.S. No. 3936: Part 4: 1984 entitled "Nursery Stock- Forest Trees"

B.S. No. 3936: 1992 entitled "Specification for Nursery Stock"

Tree and Shrub Specifications:

Trees shall have a sturdy, reasonably straight stem, and a well-defined straight and upright central leader, with branches growing out of the stem with reasonable symmetry. The crown and root systems shall be well formed. Roots shall be in reasonable balance with the crown and shall be conductive to successful transplantation. All trees shall be clearly labelled.

Root-Balled Trees

Trees shall have a clear stem from ground level to the lowest branch and a total height as appropriate to the girth size, and the minimum girth as specified shall be measured at 1.0m above ground level– all as required under BS3936: Part 1. Trees shall be well furnished with lateral fibrous roots, and shall be lifted without severance of major roots. All nursery stock trees shall have been undercut and provided with a rootball of min. diameter appropriate to girth and height. All rootballs shall be wire and hessian-wrapped.

Multistem Trees - Rootballed

Multistem trees shall have a minimum of 3no. stems originating from or near ground level (<0.3m) and be of reasonable bushiness and health, with a well grown root system and a total height as specified on the drawings and schedules. Trees shall be well furnished with lateral fibrous roots, and shall be lifted without severance of major roots. All rootballs shall be wire and hessian-wrapped. All multistem trees stock trees shall have been undercut a minimum of 3no. times and provided with a rootball of sufficient size and diameter to enable healthy transplanting and successful establishment and growth. All rootballs shall be wire and hessian-wrapped.

Container grown Shrubs, Hedging

Containerised Shrubs and Climbers shall be of the size specified in the schedules, with several stems originating from or near ground level and of reasonable bushiness, healthy, vigorous and with a sound root system. Pots or containers shall be appropriate to the size of shrub supplied and clearly labelled. Shrubs shall not be pot bound or with girdled or restricted roots. Shoots and aerial parts shall be free of disease, and/or damaged leaves or shoots.

Hedging Stock – Bare-Root

Hedging stock shall be of size specified in the schedules, with several stems originating from or near ground level, with reasonable bushiness, healthy, vigorous and with a sound root system. Shoots, roots and aerial parts shall be free of disease, and/or damaged leaves or shoots. Transplants shall be not less than one year old. Trees of species not listed in B.S. 3936: Part 4: shall be sturdy, with a balanced root and shoot development. Size shall conform to the schedules. Trees shall be well furnished with lateral fibrous roots, and shall be lifted without severance of major roots. Roots shall be of the habit normal for the species, without deformation. Transplants shall be clearly labelled and wrapped in polythene from the time of lifting until planting to conserve moisture. Shoots, roots and aerial parts shall be free of disease, and/or damaged leaves or shoots.

Hedging Stock – Rootballed

Hedging stock shall be of size specified in the schedules, with several stems originating from or near ground level, with reasonable bushiness, healthy, vigorous and with a sound root system. Shoots, roots and aerial parts shall be free of disease, and/or damaged leaves or shoots. Such hedging shall be provided with a rootball of sufficient size and diameter to enable healthy transplanting and successful establishment and growth. Rootballs shall be hessian-wrapped only for any plant under 1m in height.

SPECIFICATIONS FOR CARE OF NURSERY STOCK

Protection:

The interval between the lifting of stock at the nursery and planting on site is to be kept to an absolute minimum. Plants shall be protected from drying out and from damage in transport. All stock awaiting transport shall be protected from the wind and frost and from drying out.

Damage

On completion of lifting of plants in the nursery, any broken shoots or severed roots shall be pruned, areas of damaged bark neatly pared back to sound tissue.

Inspections

The Employer's representative will inspect the hardy nursery stock during the execution of the works. **Only plants selected and approved in the landscape contractors selected nursery will be accepted on the site**.

Delivery and heeling in

All plants will be delivered on a phased basis as called up in advance in agreement with the Employer's representative and the appointed Landscape Contractor. In the event of the Employer's representative being dissatisfied with the care and attention given to the stocks, following heeling-in or arrival on site, he shall notify the Landscape Contractor who shall take steps to ensure careful heeling-in procedures. Any damaged plants must be replaced by the Landscape Contractor entirely at his own expense.

The preparation of the heeling-in area and its subsequent maintenance is the sole responsibility of the Landscape contractor. No responsibility for the maintenance of stock delivered to site will attach to the employer whilst stock is protected on site, even if the stock requires protection beyond the normal planting season.

SPECIFICATIONS FOR SITE OPERATIONS

Setting out:

Setting out shall be in accordance with site meetings with the Employer's Representative, and the drawings listed in the preliminaries. No planting works shall take place when the soil /fill is in a waterlogged condition or the ground is frozen. Transplants in mixtures shall be planted in staggered rows. Species shall be planted in groups, as indicated in the planting drawings. No planting shall take place until all planting holes (with ameliorants) have been inspected and approved by the Employer's Representative, or a person appointed by him as a representative, to ensure accordance with the specifications. No planting shall take place when ground conditions are frozen or waterlogged. All planting holes shall be opened and closed on the same day.

Earthworks, Soil and Grading

Stripping and storage of existing soil on-site

All soil removed during grading works is to be placed in storage bunds on-site. Topsoil must be stripped separately from subsoil for re-use in landscape works and must be fit for purpose. Topsoil would be defined as soil that has a high content of organic material, usually corresponding to the 'O' and/or 'A' horizon of the soil profile. Subsoil would be all mineral soils that do not have a substantial organic component. Where the difference between topsoil and subsoil is unclear, consult the Employer's Representative.

Topsoil shall be stripped using a tracked vehicle to avoid subsoil compaction. Avoid tracking over or compaction of the topsoil. Topsoil should be stripped and dumped to form the berms using the dump and back-actor method. Double handling of topsoil is to be avoided. Topsoil that has been compacted shall be removed off site and replaced at the contractor's expense.

Topsoil shall be stored in stockpiles of dimensions no greater than 10m long x 5m wide x 0.5m high, such that a long, narrow and low berm is created to preserve the intrinsic qualities (structure and soil life) of the topsoil whilst in storage. The topsoil shall be loose tipped to create the berm and lightly compacted with the back of a digger bucket to create a degree of compaction suitable for storage, with side slopes of gradient no more than 1:2. No machinery shall be run over the soil berm. Berms shall be seeded with grass seed as per clause 3.3.2.

Subsoil

(a) Supply of Subsoil

Existing subsoil shall be used for all grading works.

Imported subsoil – if required - shall be sourced from a reputable source and be free of waste, chemicals, large stones, builder's rubble and any other detritus.

(b) Formation of Slopes/Mounds

Subsoil to be used to form even slopes or mounding to contours shown on drawings. Subsoil to be formed to smooth contours to 150mm below finished levels indicated on drawings, where the area is to be grassed or 300mm.

(c) Formation of Grassed Areas

Subsoil to be graded accurately to contours / levels / falls / crossfalls shown on drawings.

Topsoil

(a) Supply of Topsoil

Existing topsoil may be used for all grading and planting works, if it complies with the following specification, which would also apply to imported topsoil, as required. It is expected that imported topsoil will be required for all planting areas. Topsoil shall be sourced from a reputable source and be free of waste, chemicals, large stones, builder's rubble and any other detritus. Topsoil shall have good structure, be friable, fresh and free-draining with at least 20% organic content. Imported topsoil shall comply with BS3882: 1994, and shall be free draining sandy loam, clay or other approved. It shall be free of stones over 40 mm diameter, and stones over 10 mm diameter shall not exceed 5% by weight. It shall be free from subsoil, sods, roots of trees and shrubs, and rubbish. Topsoil shall be from the original surface layer of grassland or cultivated land, to a maximum depth of 200 mm. Soils from woodland, heathland, bog or contaminated land will not be acceptable.

(b) Removal of topsoil:

In areas to be regraded, all topsoil should be stripped and stored as per following clauses.

(c) Weather and Soil Conditions

All work involving topsoil shall not be carried out, unless the Employer's Representative permits otherwise:
Where areas have been exposed to a cumulative rainfall exceeding 60mm over the preceding 28 days measured at a point approved by the Employer's Representative; or

- Where soil moisture content is wetter than the Plastic Limit (PL) of the soil less 3%. The PL of the soil can be assessed in the field as the minimum moisture content at which the soil can be rolled and moulded into a thin thread approximately 3mm in diameter without breaking or cracking and in a laboratory according to BS 1377:Part 2.
- When heavy rain is falling;
- During periods of severe frost when the soil is frozen. Handling frozen soil will cause damage to the soil structure.

(d) Topsoil Spreading

Topsoil shall be moved and spread only in dry weather. Before topsoiling, remove all stones, rubble and rubbish over 75mm diameter from the surface of the subsoil formation. Dig out any areas polluted by oil or chemicals and make up with clean soil. Loaders shall load from the base of the soil storage berm only. Placement of soil should be carried out using a tracked vehicle to avoid subsoil compaction. Reinstated areas of topsoil shall not to be tracked over. The topsoil shall be allowed to settle to a thickness of 300mm and the contractor shall make full allowance for such settlement in applying the topsoil. Uneven areas shall be topped up as necessary.

(e) Topsoil Depths & Provision

The following depths should be provided for topsoiled areas:

(i) Grassed Areas:	150mm
(ii) Bare-root planting:	300mm
(iii) Shrub planting:	450mm
(iv) Tree planting:	Pit to specified size, depending on size of tree (see relevant Clauses)

(f) Grading

Topsoil to be graded accurately to contours / levels / falls / crossfalls shown on drawings. Glazed / compacted areas of subsoil to be roughened or ripped as necessary. (Drainage to be installed where necessary to Engineer's specification.) Any compacted areas to be ripped after placing of soil.

(g) Compacted areas

Any areas identified as compacted following completion shall be deep ripped and re-graded or re-soiled as necessary, to ensure a free-draining soil gradient and to avoid anaerobic conditions developing in the topsoil.

Surface cultivation

Surface cultivation will consist of ploughing or rotovating the topsoil to a minimum depth of 450mm over shrub areas or 150mm over grass areas. Care to be taken to ensure that the subsoil is not brought to the surface. It shall then be worked to reduce the topsoil to a fine tilth. After cultivation, all debris, perennial weeds and stones over 25mm in any dimension are to be removed off site.

Final grading is to be carried out to ensure the true specified level and slope and to avoid minor ridges, dishing or other depressions where water may collect.

Unless otherwise stated, finished levels of grass and shrub planting areas will be 50mm above adjoining paving or kerbs, retaining wall copings, manhole covers etc. and levels will be arranged to give gentle falls for drainage and to avoid ponding hollows. Any area unduly compacted during the work of grading will be loosened by forking or harrowing. The use of heavy rollers to roll out mounds will not be permitted.

Unless otherwise stated, finished levels of topsoil, after settlement, to be:

1. 50mm above adjoining pavements and kerbs
2. 300mm higher for shrubs than for adjoining grass areas
3. married in with adjoining soil areas
4. all stones above 50mm diameter to be removed off site by the landscape contractor.

Seeding:

Meadow Grass Areas

Meadow grass seedling to take place where specified on drawing. The site should be weed free, once weeds have died the ground should be lightly renovated to create a fine even seed bed. Seeding should take place between March – May

and August – September. Fertiliser should not be used either prior to or after sowing. The first cut should take place in April, with cutting no lower than 4 inches minimum using a strimmer or lawnmower. The second cut should take place in mid September – mid October and cut vegetation should not be removed until two weeks after mowing. Meadows to be sowed at a rate of 60:40, 60% Irish native Wildflower and 40% ornamental grasses. Contractor must visit site to confirm soil type and best mixes.

SPECIFICATIONS FOR PLANTING OPERATIONS

Tree Support:

Stakes:

Round stakes shall be of peeled larch, pine or Douglas fir, preserved with a water-borne copper chrome arsenic composition in accordance with I.S. 131. All trees to be double staked with crossbar 100x25mm securely attached to uprights with galvanised nails. Stakes shall be round, 1.8m long, 75mm in diameter. Stakes shall be pointed at the butt end. Set stakes vertically in the pit and drive before planting. Drive stake with a wooden maul or cast-iron headed drive. Sledgehammer should not be used. Stakes shall be driven into the excavated planting pit to a depth of 1000mm.

Tree ties:

Tree ties shall be of rubber, PVC or proprietary fabric laminate composition and shall be strong and durable enough to hold the tree securely in all weather conditions for a period of three years. They shall be flexible enough to allow proper tightening of the tie. Ties shall be min. 25mm wide for 120cms – 150cm height trees and min. 38mm for larger sizes. They shall be fitted with a simple collar spacer to prevent chafing. Two ties per tree shall be applied to standards; for staked transplants, one tie per tree is required.

Protection:

The interval between the lifting of stock at the heeling-in area and planting on site is to be kept to an absolute minimum. Plants shall be protected from drying out and from damage in transport. All stock awaiting planting on site shall be stored in a sheltered place ***protected from the wind and frost and from drying out.***

All transplants shall be wrapped in polythene from the time of lifting to conserve moisture. Except when heeled-in, they shall be protected in polythene at all times until planted into their final position on site.

Damage:

On completion of planting any broken branches shall be pruned, areas of damaged bark neatly pared back to sound tissue.

Watering / Fertilisers:

All trees and shrubs shall be soaked in water for one hour prior to planting. Fertilisers shall conform to BS 5581: 1981. Fertiliser must be mixed through and incorporated into the base of the planting hole and covered with soil in order to avoid roots of plants coming in direct contact. Follow manufacturer's instructions for all chemical products.

Tree planting:

Trees shall be planted at the same depth as in the nursery, indicated by the soil mark on the stem of the tree. They shall be planted in the centre of the planting pit and planted upright. Stones or other rubbish over 75mm shall be removed. Supply and install the staking / guying system as per clauses 4.1-4.4. Backfill planting hole with excavated topsoil, and remove all stones and debris, firming plant into position. Upon completion of planting, all pits shall be raked over lightly to leave an even surface and neat appearance. All stones greater than 25mm dia. to be removed. Provision should be made for the watering of root-balled trees in the first year following planting.

Specimen Trees

Excavate tree pits to 1200mm x 1200mm x 1000mm deep. Farmyard manure 80mm deep and 100g of 0.10.20 shall be applied to each tree pit prior to planting. Farmyard manure shall consist predominantly of faecal matter and shall be free of loose, dry straw and undigested hay. It shall be free of surplus liquid effluent. Install tree support system as per clause 4.1. Fill planting hole with topsoil as per clause 3.2.2, and remove all stones and debris, firming plant into position.

Small Trees / Large Shrubs

Excavate tree pits to 750mm x 750mm x 750mm deep. Farmyard manure 60mm deep and 100g of 0.10.20 shall be applied to each tree pit prior to planting. Farmyard manure shall consist predominantly of faecal matter and shall be free of loose, dry straw and undigested hay. It shall be free of surplus liquid effluent. Install tree support system as per clause 4.1. Fill planting hole with topsoil as per clause 3.2.2, and remove all stones and debris, firming plant into position.

Containerised Shrubs, 40-60cm

Excavate planting hole to a depth of 500mm x 500mm x 500mm deep; the base to be broken to a depth of 50mm and glazed sides roughened. Apply FYM to base of hole to a depth of 150mm and 50g of 0:10:20 per planting pit. Backfill planting hole with excavated topsoil, and remove all stones and debris, firming plant into position.

Hedging 25-30cm, 40-60cm

Excavate trench to a depth of 300mm x 300mm wide: the base to be broken to a depth of 50mm and glazed sides roughened. Incorporate 200mm depth of well-rotted FYM into base and cover with 150mm soil min. Apply 100g 0:10:20 per metre into backfill. Backfill planting hole with excavated topsoil. and remove all stones and debris. firming plants into position.

Hedging 90-120cm

Excavate trench to a depth of 500mm x 500mm wide; the base to be broken to a depth of 50mm and glazed sides roughened. Incorporate 200mm depth of well-rotted FYM into base and cover with 150mm soil min. Apply 100g 0:10:20 per Sq.m into backfill. Backfill planting hole with excavated topsoil, and remove all stones and debris, firming plants into position.

Ground finish:

Upon completion of planting, all ground finish shall include for the removal of stones greater than 25mm excavated during the course of the digging for planting purposes. All soil surfaces should be even and free of mounds, rutting or hollows.

Spraying:

Following planting, weed free circles to be formed around individual plants, as directed, using an approved broad-spectrum contact herbicide, as approved by the Employer's representative, in mid-spring following planting. Herbicide to be applied using controlled drop applicator. The contractor shall be responsible for keeping the ground (1m diameter circle) around all planted material weed free by means of herbicidal application, using approved sprays, during the course of the contract. Weeds to be removed include grasses ,broad-leaved annual and perennial weeds and all noxious weeds.

Weed control fabric

The weed control fabric shall be 105gsm and shall suppress weeds whilst allowing water, air and nutrients to pass through. Mypex™, Plantex® or equal woven fabric product acceptable. Cut with a scissors or knife. All sharp objects should be removed from the surface soil prior to laying the weed suppressing geotextile. Overlap adjacent rolls by at least 10cm. Membrane to be pegged to ground using proprietary plastic pegs.

When planting into the geotextile membrane an 'X' shaped notch should be cut into the membrane for each individual plant, to allow for excavation. Planting should resume as per species specification. Excavated material should not be stored on geotextile and the membrane area should be thoroughly swept of any residual material prior to application of finished aggregate or mulch.

Membrane to be applied to all planting and gravel areas.

Bark mulch

Bark Mulch to be 'Golden Pine Bark' by Growise or equal and approved. The product shall consist of matured Conifer Bark with an even nominal particle size distribution of 5-75mm with less than 5% dust and fines and less than 15% wood content. The pH to be between 4.5 and 5.5. The product shall be pest, disease and weed free and not have been treated with Methyl Bromide or any additives. The product shall have been tested in accordance with the requirements of BS 4790:1987, for fire resistance.

The natural heat treatment maturing process shall have been sufficient to ensure that excess volatile substances are driven from the product. During the process, temperatures within the product heaps must exceed 50°C for a minimum 14 day period, followed by a further period of stabilisation.

Lay Bark Mulch to a finished depth of 75mm allowing at least 10% for settlement after 30 days. All such mulch of good quality from an approved source will be inspected by the Employer's representative prior to delivery. All product volumes to be calculated using The Bulk Density method, as set out in BS EN 12579:2000 and BS EN 12580:2000. Slow release Nitrogen fertiliser to be applied to soil prior to mulching.