
ECMWF

Landscape Hard and Soft Materials Specification

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Note:

This project is controlled by the protective security controls of the Government Security Classifications Policy (GSCP). This Architectural Specification is classified as 'OFFICIAL'. The Architectural Specification is provided as a series of section documents. Each work package consists of a series of system description sections as well as general requirements and workmanship clauses. Reference to the Architectural Specification shall be deemed to include all relevant system description sections and the General Requirements (ECMWF-BDP-MB-XX-SP-A-000123) as well as workmanship sections (Ss_99_99_xx), as previously provided in the BDP Stage 4 final issue.

To be read in conjunction with:**Hard and Soft GA Plans:**

ECMWF-BDP-LA-ZZ-DR-L-000200
ECMWF-BDP-LA-ZZ-DR-L-000201
ECMWF-BDP-LA-ZZ-DR-L-000300
ECMWF-BDP-LA-ZZ-DR-L-000301

Tree Strategy Plans:

ECMWF-BDP-LA-ZZ-DR-L-000400
ECMWF-BDP-LA-ZZ-DR-L-000401

Landscape Sections:

ECMWF-BDP-LA-ZZ-DR-L-000500
ECMWF-BDP-LA-ZZ-DR-L-000501
ECMWF-BDP-LA-ZZ-DR-L-000502
ECMWF-BDP-LA-ZZ-DR-L-000503
ECMWF-BDP-LA-ZZ-DR-L-000504
ECMWF-BDP-LA-ZZ-DR-L-000505

Typical Landscape Details:

ECMWF-BDP-LA-ZZ-DR-L-000603
ECMWF-BDP-LA-ZZ-DR-L-000604

Typical Details - Soft Landscape and Tree Pits:

ECMWF-BDP-LA-ZZ-DR-L-000600
ECMWF-BDP-LA-ZZ-DR-L-000601

Detail Layout:

ECMWF-BDP-LA-ZZ-DR-L-000208
ECMWF-BDP-LA-ZZ-DR-L-000209
ECMWF-BDP-LA-ZZ-DR-L-000210

Water Feature Details:

ECMWF-BDP-LA-ZZ-DR-L-000700
ECMWF-BDP-LA-ZZ-DR-L-000701

Planting Schedule:

ECMWF-BDP-LA-ZZ-SH-L-001001

Gate and Fence Section Details Q1-Q4

ECMWF-BDP-LA-ZZ-DR-L-000002
ECMWF-BDP-LA-ZZ-DR-L-000003
ECMWF-BDP-LA-ZZ-DR-L-000004
ECMWF-BDP-LA-ZZ-DR-L-000005

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SECTION Ss_15_10_30 -- SUBSOIL/ TOPSOIL

To be read in conjunction with Section Ss_00_00_00, other related Sections of the Landscape Specification and the Design Drawings.

PART 1 TYPE, SYSTEMS, MATERIALS AND PERFORMANCE

1.1 LANDSCAPE SPECIFICATION TYPE

A. Prescriptive Work

1. Supply, deliver, install and warrant the Works in compliance with the materials and workmanship requirements of the Landscape Specification.
2. Where required to prepare drawings these shall be limited to final detailing of components and systems indicated on the Design Drawings, necessary to demonstrate their safe installation.
3. Where alternative products are offered by the Subcontractor for acceptance by the Contractor, submit full supporting documentation in respect of the complete system or installation.

1.2 SYSTEM DESCRIPTIONS

Architectural And Functional Requirements

A. General

1. Design and execute the Works in accordance with BS 4428, BS 3882 and the recommendations of the British Association of Landscape Industries (BALI).
2. The Works shall be covered by a single source warranty.
3. Subsoil/ topsoil work shall include soil conditioners, improvers, activators, biostimulators, fertilisers, soil remediation treatment, and other ameliorants/ products and accessories necessary to complete the Works.

Subsoiling/ Topsoiling/ Growing Media

B. Type EXT-501 Subsoil

Preparation of subsoil to receive topsoil.

1. Formation of existing subsoil to grades and profiles indicated on the Design Drawings.
2. Import suitable subsoil as required to achieve the required grades and profiles.
3. Preparation of subsoil as required to achieve the performance requirements.

C. Type EXT-511 Topsoil

Preparation of topsoil to receive planting.

1. Placing and formation of topsoil to grades and profiles indicated on the Design Drawings.
2. Preparation and treatment of existing topsoil as required to achieve the planting requirements as indicated on the Design Drawings and Planting Schedule.
3. Import suitable topsoil as required to achieve the planting requirements as indicated on the Design Drawings and Planting Schedule.

1.3 MATERIALS

A. Imported Topsoil Generally Including Tree Pits

1. Grade: Premium in accordance with BS 3882.
2. Source: To the Contractor's acceptance.
3. Additional analysis shall be carried out as directed by the Contractor.
4. Topsoil shall not be contaminated with subsoil, rubbish or other materials that are:

- a. Corrosive, explosive or flammable.
 - b. Hazardous to human or animal life.
 - c. Detrimental to healthy plant growth, including lime stabilised material.
- B. Bioretention Soil
 - 1. Manufacturer: Bourne Amenity Ltd.
 - 2. Reference: Bioretention Soil.
 - 3. Medium/ Fine Sand: 62%.
 - 4. Organic Matter: 3.5% (LOI).
 - 5. Total Porosity: 47%.
 - 6. SHC Rate: 146mm/ hr.
- C. Imported Subsoil Generally
 - 1. Type: In accordance with BS 8601.
 - 2. Source: To the Contractor's acceptance.

1.4 PERFORMANCE REQUIREMENTS

A. General

Comply with the general performance requirements of Section Ss_00_00_00 of the Landscape Specification and the following specific performance requirements.

B. Subsoil/ Topsoil Performance

The completed work shall be such as to support the planting, establishment and continued flourishing of the plant species indicated on the Design Drawings and Planting Schedule.

PART 2 SUBMITTALS AND TESTING

2.1 SUBMITTALS

Tender Submittals

A. Tender Response

Not required.

Post Contract Award Submittals

B. Post Contract Award Response

- 1. Submit post contract award submittals in accordance with the requirements of Section Ss_00_00_00 of the Landscape Specification.
- 2. Submit a declaration of analysis of each proposed type of topsoil in accordance with BS 3882.
- 3. Submit a sample of the topsoil (max 1kg) together with a Soil Analysis Report for each proposed topsoil type, prepared by a Soil Science Consultancy acceptable to the Contractor.
- 4. Submit calculations as necessary to demonstrate the nature of any amelioration/ fertilising techniques that may be carried out to the topsoil to suit the plant species indicated on the Design Drawings and Planting Schedule.

Samples, Mock-Ups, Prototypes And Quality Benchmarks

C. Pre-contract Samples

Not required.

D. Post Contract Award Samples

In accordance with Section Ss_00_00_00, submit post contract award samples of the following:

1. Sample loads:
 - a. A 5m³ sample load shall be delivered to Site for each accepted topsoil and subsoil source.
 - b. The Subcontractor shall give one week's notice of their intention to import topsoil or subsoil.
 - c. Each sample load 'heap' shall be labelled with the name of the source and its corresponding Soil Analysis Report reference number.
 - d. The report shall be presented to the Contractor for written acceptance prior to any further construction work.
2. Samples of existing topsoil in area of the proposed tree pit shall be collected in accordance with BS 3882.

E. Mock-up Requirements

Not required.

F. Prototype Requirements

Not required.

G. Quality Benchmark Requirements

Submit quality benchmarks, in location(s) to be agreed with the Contractor, in accordance with Section Ss_00_00_00:

1. First completed 20m² of each type.

2.2 TESTING

A. General

1. Refer to Section Ss_00_00_00 for the general requirements for testing and the approach to off-Site and on-Site testing.
2. Submit independently certified tests and Agrément certificates that demonstrate that the proposed systems achieve the performance requirements of the Landscape Specification.
3. Where data from previous independently certified tests and Agrément certificates demonstrate that the proposed systems achieve the performance requirements of the Landscape Specification, off-Site independent testing need not be undertaken.
4. Undertake necessary on-Site testing, which shall be carried out by an independent testing body accredited by the United Kingdom Accreditation Service (UKAS).

B. Existing Topsoil Analysis

1. Soil to be analysed shall be existing soil in area of the proposed tree pit.
2. Soil analyst shall be to the Contractor's acceptance.
3. Submit the following:
 - a. Declaration of analysis in accordance with BS 3882.
 - b. Additional analysis is not required.
 - c. Report detailing soil analyst's recommendations.

C. Imported Topsoil Analysis

1. Each potential source of soil offered by the Subcontractor shall be initially assessed by the Subcontractor for acceptance by the Contractor through the submission of samples and testing prior to delivery.
2. Allow approximately two weeks from the submission of the sample for the results to be available.

3. Samples for analysis shall be representative of soil being offered and 10 equal samples shall be taken and well mixed and quartered. From this mixture 500g of soil shall be placed in a plastic bag, labelled with the name and details of origin and sent to the analyst with a request for the following information:
 - a. Soil reaction and lime requirement.
 - b. Electrical conductivity.
 - c. Mechanical analysis.
 - d. Soil texture.
 - e. Stone content.
 - f. Nutrient levels: Nitrogen, Available Phosphorum, Available Potassium, Available Magnesium.
 - g. Organic matter.
 - h. Recommendations for making good any deficiencies and fertiliser treatment related to the planting proposals.
 4. The Contractor may ask for additional tests for toxicity, water holding capacity or mechanical composition.
- D. Imported Subsoil Analysis
1. Each potential source of subsoil offered by the Subcontractor shall be initially assessed by the Subcontractor for acceptance by the Contractor through the submission of samples and testing prior to delivery.
 2. Submit declaration of analysis in accordance with BS 8601.
- E. Compliance Examination and Testing
1. One composite sample should be taken for every 200m³ of topsoil and every 250m³ of subsoil delivered, with a minimum of three samples per source. A composite sample shall comprise 10 subsamples taken from evenly spaced locations across the field/ stockpile.
 2. Each sample shall be analysed in accordance with the Landscape Specification.
 3. The results of analysis shall be presented in an interpretive report to include:
 - a. A Site plan showing sampling locations.
 - b. Soil depths.
 - c. Soil descriptions.
 - d. A Certificate of Analysis.
 - e. Comments on the compliance of the topsoil/ subsoil with the Landscape Specification.
 - f. Recommendations to improve the soil to address any non-compliances with the Landscape Specification.
 4. The report shall be presented to the Contractor for written acceptance prior to any further construction work.

PART 3 EXECUTION

3.1 WORKMANSHIP

Fabrication

A. General

Fabrication of materials/ components shall, as a minimum, be in accordance with current regulations and standards.

Workmanship

B. General

1. Carry out the Works in accordance with the appropriate parts of BS 3882 and BS 4428.
2. Where applicable, carry out the Works in accordance with the manufacturer's recommendations.

Subsoil Works

C. General

1. The Works shall be carried out such that there is a minimum viable rooting depth of 1m (topsoil and subsoil combined) for trees and shrubs within planting areas.
2. The subsoil horizon shall be free of contamination, compaction and waterlogging.
3. Subsoiled areas shall have smoothly flowing contours of true and even grades free from localised depressions, high spots and abrupt angles at changes of levels, such that the topsoil levels and depths indicated on the Design Drawings can be achieved.
4. Services:
 - a. There shall be no damage to services owing to subsoil ripping or other preparation work.
 - b. Where ripping depths could interfere with services, they shall be reduced, to the acceptance of the Contractor.

D. Subsoil Surface Preparation

1. Loosening:
 - a. Light and non-cohesive subsoils shall be loosened thoroughly to a depth of 300mm.
 - b. Stiff clay and cohesive subsoils shall be loosened thoroughly to a depth of 450mm.
 - c. Rock and chalk subgrades shall be scarified to promote free drainage.
2. Immediately before spreading topsoil, stones larger than 50mm shall be removed.

E. Ripping of Existing In Situ Subsoils

1. Before the application of topsoil, prepare existing in situ subsoil areas by excavating or ripping compacted profiles to a full depth of at least 1m below finished levels.
2. No lumps greater than 250mm diameter shall remain within the profile and extraneous debris shall be removed.
3. Where the Works are to be carried out adjacent to hard landscape, car parks or roadways there shall be no disturbance to kerbs or pavement.
4. Stones, deleterious material and material unsuitable for plant growth shall be removed.
5. Overly compacted, puddled, or waterlogged subsoils shall be removed.
6. Standing water shall be removed from the Works before the placing of topsoil.
7. The subsoil formation level shall be subject to acceptance by the Contractor before topsoiling commences.

F. Spreading of Imported Subsoils

1. Accepted imported/ Site stripped subsoil shall be spread and lightly consolidated in layers not exceeding 250mm finished thickness.
2. No bank or slope shall be steeper than 1:3.
3. There shall be no compaction of placed subsoil prior to placing of topsoil.
4. Stones and other debris or extraneous material exceeding 100mm in any dimension shall be removed from subsoil profiles prior to topsoiling and shall be disposed of away from Site.

Topsoil Work

G. Preparation of Undisturbed Topsoil

1. Areas to receive soft landscaping shall be prepared as necessary, such that the topsoil is in a suitable state for cultivation/ planting operations as indicated in Sections Ss_45_35_45 and Ss_45_35_05 and/ or indicated on the Design Drawings and Planting Schedule.
 2. Hard ground shall be thoroughly broken up, and roots and boulders shall be removed.
 3. Areas covered with turf or thick sward shall be ploughed or dug over to full depth of topsoil.
 4. Fallow period:
 - a. The prepared topsoil shall be left for as long as possible within the construction period.
- H. Temporary Topsoil Storage Heaps
1. Location of temporary storage heaps shall be as indicated on the Design Drawings.
 2. Maximum height of temporary storage heaps shall be 2m.
 3. Width and length of temporary storage heaps shall be to the acceptance of the Contractor.
 4. Protection:
 - a. Do not place any other material on top of temporary storage heaps.
 - b. Do not allow construction plant to pass over temporary storage heaps.
 - c. Prevent compaction and contamination, by fencing and covering as appropriate.
- I. Handling Topsoil
1. Where aggressive weeds are found, give notice to the Contractor and obtain instructions before moving topsoil.
 2. Plant shall be selected and used to minimise disturbance, trafficking and compaction.
 3. Topsoil shall not be mixed with subsoil, stone, hardcore, rubbish/ material from demolition work or other grades of topsoil.
 4. Topsoil shall be handled in the driest condition possible. It shall not be handled during or after heavy rainfall or when it is wetter than the plastic limit. Refer to BS 3882.
- J. Spreading Topsoil
1. Temporary roads/ surfacing shall be removed before spreading topsoil.
 2. Maximum depth of each layer shall be 150mm.
 3. Firm each layer of topsoil before spreading the next.
 4. Depths generally shall be as indicated on the Design Drawings, with the following minimum firmed depths:
 - a. Grass areas: 150mm.
 - b. Trees: 300mm.
 - c. Ground cover areas: 450mm.
 - d. Shrub planting areas: 450mm.
 - e. Hedge trenches: 600mm.
 5. There shall be no compaction of topsoil and a friable texture of separate visible crumbs shall be maintained.
 6. Soil level shall not be raised within the root spread of existing trees that are to be retained.
- K. Surplus Topsoil
- Surplus topsoil shall be spread and levelled on Site in locations to be agreed with the Contractor.
- Protection And Completion**
- L. Protection
1. Finished areas shall be adequately protected from damage until Practical Completion.

2. Finished areas shall not be used for vehicular access or the storage of materials, unless suitable protection has been provided, such that there is no compaction.

M. Completion

1. Leave installed work clean, free from rubbish, debris and loose stones outside the accepted tolerances.
2. The completed work shall be suitable to receive the specified planting.
3. Repair defects without delay to minimise damage and nuisance.

3.2 TOLERANCES

A. General

Measure tolerances against the relevant Base Reference Datum; Location Reference Point; Location Reference Plane; Location Reference Surface or Reference Element as defined in Section Ss_00_00_00.

1. Finished soil surfaces shall be smoothly graded to the correct contours and levels as indicated on the Design Drawings and Civil Engineer's documentation.
2. The following level requirements shall be achieved at interfaces:
 - a. Above adjoining paving or kerbs for grass areas: 30mm.
 - b. Below damp-proof course of buildings: Not less than 150mm.
 - c. Shrub areas: Higher than adjoining grass areas by 30mm.

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SECTION Ss_15_10_30_25 -- EXCAVATING AND FILLING

To be read in conjunction with Section Ss_00_00_00, other related sections of the Landscape Specification and the Design Drawings.

PART 1 TYPE, SYSTEMS, MATERIALS AND PERFORMANCE

1.1 LANDSCAPE SPECIFICATION TYPE

A. Prescriptive Work

1. Supply, deliver, install and warrant the Works in compliance with the materials and workmanship requirements of the Landscape Specification.
2. Where required to prepare drawings these shall be limited to final detailing of components and systems indicated on the Design Drawings, necessary to demonstrate their safe installation.
3. Where alternative products are offered by the Subcontractor for acceptance by the Contractor, submit full supporting documentation in respect of the complete system or installation.

1.2 SYSTEM DESCRIPTIONS

Architectural And Functional Requirements

A. Site Survey

Prior to commencement of the Works, a survey of the Site and adjacent areas shall be carried out.

B. Licences/ Approvals

The Subcontractor shall obtain necessary licences and approvals for street closures, scaffolding and hoarding.

C. Twinwall Structural Geonet

1. Location: Where required to suit the service conditions and in accordance with the Services Engineer's documentation and Civil Engineer's documentation.
2. Manufacturer: Greenblue Urban Ltd.
3. Reference: Twinwall Geonet - GLTWGNA.
4. Type: Loadbearing Twinwall Geonet for structural tree pit requirements.
5. Material: Geotextile.
6. Jointing: 300mm overlap in accordance with the manufacturer's recommendations.

D. Geotextile Sheet Separation Layer

1. Manufacturer: Terram.
2. Reference: Permeable TERRAM 1000.
3. Type: Refer to the Civil Engineer's documentation.
4. Polymer type shall be polyester.
5. Before laying sheet, remove humps and sharp projections and fill hollows in subgrade.
6. Protect from:
 - a. Exposure to light.
 - b. Contaminants.
 - c. Materials listed as potentially deleterious by the geotextile manufacturer.
 - d. Wind uplift.

Excavation

- E. Type ALT-801 Excavation and Fill
 - 1. Excavation of voids and infill with material as indicated on the Design Drawings.
 - 2. Excavate the material and dispose of it off-Site to a licensed disposal facility.

1.3 MATERIALS

A. General

Materials used in the Works shall be to the appropriate British Standards or shall be British Board of Agrément (BBA) certified as appropriate.

Fill Materials

B. Hazardous, Aggressive or Unstable Materials

- 1. Fill materials which would, either in themselves or in combination with other materials or ground water, give rise to a health hazard, damage to building structures or instability in the filling shall not be used. This includes material that is:
 - a. Frozen or containing ice.
 - b. Organic.
 - c. Contaminated or noxious.
 - d. Susceptible to spontaneous combustion.
 - e. Likely to erode or decay and cause voids.
 - f. Containing excessive moisture content, slurry, mud or is from marshes or bogs.
 - g. Clay of liquid limit exceeding 80 L.L and/ or plasticity index exceeding 55 P.I.
 - h. An unacceptable material Class U2, as defined in the Highways Agency 'Specification for Highway Works'.

C. Frost Susceptibility

- 1. Except as allowed below, fill must be non-frost susceptible as defined in the United Kingdom Manual of Contract Documents For Highway Works (MCHW) Volume 1: Specification for Highway Works, Series 0600.
- 2. Frost-susceptible fill may only be used:
 - a. At depths below the finished ground surface greater than 350mm.
 - b. Within the external walls of buildings below spaces that will be heated, protect from frost during construction.
 - c. Where frost heave will not affect structural elements.

D. Highways Agency Type 1 Unbound Mixture

- 1. Fill shall be in accordance with the United Kingdom Manual of Contract Documents For Highway Works (MCHW) Volume 1: Specification for Highway Works, Series 0600.
 - a. Crushed rock (other than argillaceous rock).
 - b. Crushed concrete.
 - c. Recycled aggregates.
 - d. Crushed non-expansive slag.
 - e. Well-burned non-plastic colliery shale.
- 2. Filling shall be in accordance with the United Kingdom Manual of Contract Documents For Highway Works (MCHW) Volume 1: Specification for Highway Works, Series 0600.

E. Highways Agency Type 3 Unbound Mixture

1. Fill shall be in accordance with the United Kingdom Manual of Contract Documents For Highway Works (MCHW) Volume 1: Specification for Highway Works, Series 0600.
 - a. Crushed rock (other than argillaceous rock).
 - b. Crushed concrete.
 - c. Crushed non-expansive slag.
 - d. Well-burned non-plastic colliery shale.
 - e. Natural gravel.
 - f. Natural sand.
 2. Filling shall be in accordance with the United Kingdom Manual of Contract Documents For Highway Works (MCHW) Volume 1: Specification for Highway Works, Series 0600.
- F. Subgrade Improvement Layer (Capping)
1. Fill shall be in accordance with the United Kingdom Manual of Contract Documents For Highway Works (MCHW) Volume 1: Specification for Highway Works, Series 0600, Table 6/1, Class 6F1 or 6F2.
 2. Place and compact filling in accordance with the United Kingdom's Manual of Contract Documents For Highway Works (MCHW) Volume 1: Specification for Highway Works, Series 0600, Table 6/1.

PART 2 SUBMITTALS AND TESTING

2.1 SUBMITTALS

Tender Submittals

- A. Tender Response
- Not required.
- B. Submittals
1. Proposals for the disposal of the toxic waste arising.
 2. Schedules of Conditions:
 - a. A Schedule of Conditions of the existing adjacent areas shall be agreed with the Contractor prior to the commencement of the Works.
 - b. A Schedule of Conditions of the existing adjacent areas shall be agreed with the Contractor after completion of the Works.
 3. Submit a Hazardous Substances Assessment and Safety Method Statement.
- C. Proposed Fill Materials
1. Submit full details of proposed fill materials to demonstrate compliance with the Landscape Specification, including:
 - a. Type and source of imported fill.
 - b. Proposals for processing and re-use of material excavated on Site.
 - c. Test reports as required elsewhere.
 2. Timing shall be at least 21 days before starting filling.

Samples, Mock-Ups, Prototypes And Quality Benchmarks

- D. Pre-contract Samples
- Not required.
- E. Mock-ups
- Not required.

F. Prototype Requirements

Not required.

G. Quality Benchmark Requirements

Submit quality benchmarks, in location(s) to be agreed with the Contractor, in accordance with Section Ss_00_00_00:

1. First completed structural bay of each type of system.

2.2 TESTING

A. General

1. Refer to Section Ss_00_00_00 of the Landscape Specification for the general requirements for testing and the approach to off-Site and on-Site testing.
2. Submit independently certified test data and Agrément certificates that demonstrate that the proposed systems achieve the performance requirements of the Landscape Specification.

B. Testing of Suitability of Fill Materials Before Start of Filling

1. Laboratory shall be UKAS accredited.
2. Submit two copies of the report to the Contractor 21 days before starting filling.
3. Deliver samples to laboratory as required.
4. Deliver 25kg of each sample where requested.
5. Collect and dispose in accordance with the manufacturer's recommendations.
6. Tests shall be as required by the Contractor.
7. Submit with the tender, the proposed rate and frequency of testing to demonstrate continuing compliance of imported or reprocessed fill with specified properties.

C. Plate Loading Tests for Slipway Extension Excavation

1. Formation layer bearing stratum shall be proof loaded and tested by a minimum of 3 No. plate loading tests located evenly around the Slipway Extension Plan Area, to prove a minimum California Bearing Ratio (CBR) of 5%.
2. Plate loading tests shall be completed using a minimum plate diameter of 450mm.

D. Frost Susceptibility Testing

If the following fill materials are proposed, submit a laboratory report confirming that they are non-frost susceptible.

1. Fine grained soil with a plasticity index of less than 20%.
2. Coarse grained soil or crushed granite with more than 10% retained on a 0.063mm sieve.
3. Crushed chalk.
4. Crushed limestone fill with average saturation moisture content in excess of 3%.
5. Burnt colliery shale.

PART 3 EXECUTION

3.1 SITE WORK

A. General

1. Carry out the Works in accordance with BS EN 1997: Part 1 and BS 5975.
2. Operatives shall be trained, experienced and appropriately skilled in safely carrying out excavation and filling work.

3. The Subcontractor shall make good at their own expense any damage done to public roads and footpaths, which may be caused by excavating and filling operations. Public areas shall be kept clean at all times.
 4. The Contractor shall be informed of any benchmarks and other survey information found on structures to be demolished, which shall not be removed unless instructed otherwise by the Contractor.
- B. Burning on Site
- Burning on Site of materials arising from the work shall not be permitted.
- C. Waste
1. Remove rubbish, debris and surplus material and spoil regularly; keep the Site and the Works clean and tidy.
 2. Remove rubbish, dirt and residues from voids and cavities before filling or closing in.
 3. Unwanted, non-hazardous material and rubbish shall be disposed of at a tip approved by the Waste Regulation Authority.
 4. Remove surplus hazardous materials and their containers regularly for disposal off Site in a safe and competent manner as approved by the Waste Regulation Authority and in accordance with relevant regulations.
 5. Retain waste transfer documentation on Site.
- D. Electromagnetic Interference
- Take necessary precautions to avoid excessive electromagnetic disturbance of apparatus inside/ outside the Site.
- E. Variations in Ground Water Level
- If levels encountered are significantly different from levels in the Site Investigation Report or previously measured, give notice to the Contractor.

Health And Safety

- F. General
1. No instruction issued by the Contractor shall relieve the Subcontractor of their responsibility for the safety of the general public, Site personnel and adjoining properties during the course of the excavation and filling work.
 2. Provide temporary screens and other protection as required for safety, control of noise and dust, temporary weather protection and security or to facilitate the Works.
 3. Prevent nuisance due to dust and debris arising from the Works. Dry material shall be dampened periodically to prevent dust rising. No debris shall be deposited on the public roadway or adjoining building, either during the Works or during transport of debris from the Site.
 4. Prevent access of unauthorised persons particularly outside working hours.
- G. Hazards
1. The Contractor shall be informed immediately of any unrecorded voids, tanks, chemicals, or other items discovered during excavation and filling work. Agree with the Contractor methods for safe removal, filling or covering over.
 2. Due to the nature of the Site, underground voids may be located upon opening up. Upon discovering same, these shall be immediately reported to the Contractor and a Site inspection shall be carried out as soon as possible.
- H. Gas or Vapour Risks
- Take adequate precautions to prevent fire or explosion caused by gas or vapour.
- I. Noise
1. Work generally shall be carried out in accordance with BS 5228.

2. Noise levels shall be restricted at reasonable times, to the acceptance of the Contractor.
3. Compressors, percussion tools and vehicles shall be fitted with effective silencers of a type recommended in writing by the manufacturers of the compressors, tools or vehicles.
4. Operatives shall not be permitted to use radios or other audio equipment in ways or at times that may cause a nuisance.

J. Fire

Take necessary precautions to prevent personal injury, death and damage to the Works or other property from fire. Carry out relevant measures and procedures in accordance with the recommendations/ guidance of the Health and Safety Executive (HSE).

Inspection

K. Inspecting Formations

1. Make advance arrangements for inspection of formations for:
 - a. Foundations and filling formations.
 - b. Service trenches, roads and pavings.
2. Give the Contractor an agreed notice period of at least three days prior to the inspection.
3. Just before inspection, remove the last 150mm of excavation.
4. Trim to required profiles and levels.
5. Minor compaction shall be permitted to loose material.
6. Within four hours of inspection, seal formations with concrete.

L. Inspecting Formations in Sand and Gravel

1. Notice for inspection shall be a minimum of three days.
2. Just before inspection, remove the last 150mm of excavation.
3. Trim to required profiles and levels and mechanically compact formation.
4. Within four hours of inspection, seal formations with first layer of fill.

M. Inspection of Formations in Shrinkable Soils

1. Inspect formation for signs of conducting and fine moisture absorbing roots.
2. Give notice if significant quantities of roots are visible in the formation or in the bottom 75mm of the walls of the excavation.

N. Foundations Generally

Give notice if:

1. A natural bearing formation of undisturbed subsoil is not obtained at the depth indicated on the Design Drawings.
2. The formation contains soft or hard spots or highly variable material.

Clearance/ Excavating

O. Tree Roots

1. Refer to the ECMWF - Whiteknights Campus, University of Reading Arboricultural Impact Assessment and Method Statement ECMWF-RPS-ZZ-WS-RP-X-00780.
2. Existing retained trees shall be protected in accordance with BS 5837 including protective barriers.
3. Protection area:
 - a. Roots within precautionary protection area shall not be cut.
 - b. Size of area shall be the branch spread of the tree.

4. Excavation in protected area:
 - a. Method shall be by hand.
 - b. Backfill as soon as possible or temporarily line with polyethylene sheet to reduce evaporation.
 5. Outside of protected area:
 - a. Give notice of roots exceeding 25mm and do not cut without acceptance of the Contractor.
 6. Cutting:
 - a. Make clean smooth cuts with no ragged edges.
 - b. Pare cut surfaces smooth with a sharp knife.
 - c. Treatment of cut roots are not required.
 7. Backfill shall be dug material, enriched with phosphate fertiliser.
- P. Tree Root Barriers in Proximity to Existing Tree
1. Tree root barriers shall be to locations indicated on the Design Drawings.
 2. Sever all roots in trench.
 3. Depth shall be 2m at the edge of the water tank, linear application.
 4. Root barrier:
 - a. Manufacturer: GreenBlue Urban Ltd.
 - b. Reference: ReRoot 1000 Ribbed.
 - c. Thickness shall be 1mm.
 5. Tree root barrier shall be in accordance with the Planning Officer's and Arboriculturalist's recommendations.
 6. Root barrier installation shall be full depth of the excavation and shall fit closely to the trench wall nearest the tree.
 7. Backfill material shall be dug material excavated from trench.
 8. Lay and compact backfilling thoroughly in layers not more than 300mm thick.
- Q. Site Clearance
1. Timing shall be before topsoil stripping.
 2. Clear Site of rubbish, debris and vegetation. Topsoil shall not be compacted.
 3. Apply a suitable non-residual herbicide to areas to receive planting.
- R. Removing Small Trees, Shrubs, Hedges and Roots
1. Clearly mark trees to be removed.
 2. Cut down small trees, shrubs and hedges.
 3. Grub up and dispose of roots without undue disturbance of soil and adjacent areas.
 4. Comply with the HSE/ Arboriculture and Forestry Advisory Group safety leaflets.
- S. Felling Large Trees
1. Fell trees in accordance with BS 3998.
 2. Definition of large tree shall be a girth of over 600mm.
 3. Clearly mark trees to be removed.
 4. Comply with the HSE/ Arboriculture and Forestry Advisory Group safety leaflets.
 5. Felling shall be as close to the ground as possible.

6. Remove all roots to stumps mechanically to the depth of 1m.
 7. Where tree canopies overlap, and in confined spaces generally, take down trees carefully in small sections to avoid damage to adjacent trees that are to be retained.
- T. Stripping Topsoil
1. Before beginning general excavation or filling, strip topsoil from areas where there will be regrading, buildings, pavings/ roads and other areas indicated on the Design Drawings.
 2. Depth:
 - a. Remove to an average depth of 150mm.
 - b. Give notice where the depth of topsoil is difficult to determine.
 3. Handle topsoil for re-use or sale.
 4. Topsoil shall not be removed from below the spread of trees to be retained.
 5. Keep topsoil stored separate on Site from excavated subsoil.
- U. Treating Topsoil
1. Apply a suitable translocated non-residual herbicide.
 2. Timing shall be no less than two weeks before excavating topsoil.
- V. Handling Topsoil
1. Handling topsoil shall be in accordance with BS 3882.
 2. Aggressive weeds:
 - a. Species are those included in the Weeds Act, section 2 or the Wildlife and Countryside Act 1981, Schedule 9, part II.
 - b. Give notice and obtain instructions from the Contractor before moving topsoil.
 3. Do not mix topsoil with:
 - a. Subsoil, stone, hardcore, rubbish or material from demolition work.
 - b. Other soil or material containing aggressive weeds, sharps, plastics and non-soil forming materials and notifiable animal or plant diseases.
 - c. Oil, fuel, cement or other substances harmful to plant growth.
 - d. Other classifications of topsoil.
 4. Keep multiple handling to a minimum.
 5. Use topsoil immediately after stripping.
- W. Adjacent Excavations
1. Where an excavation encroaches below a line drawn at an angle from the nearest formation level of another higher excavation, the lower excavation, all work within it and backfilling thereto, shall be completed before the higher excavation is made.
 2. Angle of line below horizontal shall be 45° for suitable soils, or 30° for wet clay.
 3. Submit proposals for backfill material.
- X. Excavations Adjacent to Existing Foundations
1. Width of undisturbed ground between the two excavations shall be less than 900mm.
 2. Provide side support accordingly, on the assumption that the ground between the trenches is unstable.
- Y. Excavations Adjacent to Existing Foundations
1. Prior to commencing excavation:
 - a. Excavate trial pits adjacent to existing foundations to determine extent and formation levels.

- b. Allow for inspection of trial pits.
 - c. Allow time for amendment of details if required.
 - d. Time period shall be five working days.
 2. Backfill material to new excavation.
- Z. Trial Pits - Extension to Slipway
1. Timing shall be a minimum of 10 working days (excluding Public Holidays and weekends) prior to the commencement of Slipway construction works.
 2. The Subcontractor shall excavate trial pits at the approximate locations indicated on the Design Drawings (precise locations to be agreed with the Contractor).
 3. The excavation shall confirm existing construction details, including the level of the underside of the existing foundations.
 4. The Subcontractor shall record details (levels and dimensions of existing) and forward to the Contractor for review.
- AA. Backfilling Around Foundations
1. Under oversite concrete and pavings shall be hardcore.
 2. Under grassed or soil areas shall be material excavated from the trench, laid and compacted in 300mm maximum layers.
- BB. Backfill to Excavations Lower than Foundations Formation Level
1. Distance between near faces of foundation and lower excavation less than 1m shall be 150mm above foundation formation level or 150mm above level at which line cuts near face of lower excavation.
 2. Backfill material:
 - a. Below critical level shall be lean mix concrete.
 - b. Above critical level shall be compacted general filling as described herein.
- CC. Inspecting Formations in Sand and Gravel
1. Notice for inspection shall be a minimum of three working days.
 2. Just before inspection, remove the last 150mm of excavation, trim to required profiles and levels and mechanically compact formation.
 3. Within four hours of inspection, seal formations with first layer of fill.
- DD. Inspection of Formations in Shrinkable Soils
1. Inspect formation for signs of conducting and fine moisture absorbing roots.
 2. Give notice if significant quantities of roots are visible in the formation or in the bottom 75mm of the walls of the excavation.
- EE. Trench Fill Foundations
1. Form trench down to formation in one operation.
 2. Prepare formation from ground level.
 3. Give notice for inspection of formations before commencing excavation.
 4. Period of notice shall be three working days.
 5. Where inspection of formation is required, provide localised shoring to suit ground conditions.
 6. Place concrete immediately after inspection and no more than four hours after exposing the formation.
- FF. Steps in Foundations Formations
1. Depth of formation below ground level (minimum):

- a. Finished ground level shall be 200mm.
 2. Step dimensions:
 - a. Submit proposals for distance between steps (minimum).
 - b. Submit proposals for height of step (maximum).
- GG. Foundations in Made Up Ground
1. Excavate to a depth of natural formation of undisturbed subsoil.
 2. Give notice if this is greater or less than the depth given.
- HH. Unstable Ground
1. The excavation shall remain stable at all times.
 2. Give notice without delay if any newly excavated faces are too unstable to allow earthwork support to be inserted.
 3. Take appropriate emergency action if instability is likely to affect adjacent structures or roadways.
- II. Recorded Features
1. Submit proposals for recorded foundations, beds, drains, manholes, etc.
 2. Remove and disinfect contaminated earth as required by the Local Authority.
- JJ. Unrecorded Features
- Give notice if unrecorded foundations, beds, voids, basements, filling, tanks, pipes, cables, drains, manholes, watercourses, ditches, etc. not indicated on the Design Drawings are encountered.
- KK. New Foundations Crossing Old Foundations or Walls
1. Break out the old foundation/ wall where it crosses the new foundation/ wall:
 - a. Length of breaking out shall be the width of the new foundation/ wall plus 50mm on either side of new foundation.
 - b. Depth of breaking out shall be as necessary to permit the construction of the new foundation to its design cross-section.
 2. Disturbed/ softened soil shall be when the formation for the old foundation/ wall is deeper than the formation of the new foundation.
 - a. Excavate soil that has been disturbed and/ or softened on either side of the old wall/ foundation, and for 100mm into undisturbed ground on either side.
 3. Do not proceed with the formation of the new foundation on either side of the old foundation/ wall until the formation is at its design level.
 - a. Minimum distance between steps shall be 600mm. Maximum height of step shall be 600mm.
 - b. Backfill beneath design formation level with concrete as foundation is cast.
- LL. Old Foundations or Walls Beneath New Ground Supported Slab
1. Break out the old foundation/ wall to a depth below the slab formation level of at least 300mm.
 2. Excavate soil that has softened on either side of the old wall/ foundation.
 3. Obtain instructions from the Contractor if depth of fill will be greater than 600mm. Otherwise, backfill with compacted hardcore.
- MM. Excess Excavation
1. Excavation taken wider than required:
 - a. Backfill with hardcore as described herein.

2. Excavation taken deeper than required:
 - a. Backfill with well-graded granular material or lean mix concrete.

NN. Underground Structures in Landscape Areas

1. Remove walls, roads, foundations, disused services, drains, manholes and the like to minimum depth.
2. Minimum depth below finished levels:
 - a. Grass, ground cover and perennial planting shall be 500mm.
 - b. Shrub planting shall be 750mm.
 - c. Within 2m of tree planting shall be 1000mm.
3. In every 10m² of wall or slab remaining, make a drainage hole of at least 600mm diameter.

Installation

OO. Placing Fill

1. Surfaces of excavations and areas to be filled shall be free from loose soil, topsoil, organic material, rubbish and standing water.
2. Freezing conditions:
 - a. Do not place fill on frozen surfaces.
 - b. Remove material affected by frost and replace and recompact if not damaged after thawing.
3. Adjacent structures, membranes and buried services:
 - a. Do not overload, destabilise or damage.
 - b. Submit proposals for temporary support necessary to maintain stability during filling.
 - c. Allow 14 days (minimum) before backfilling against in situ concrete structures.
4. Place so that only one type of material occurs in each layer.
5. Vary route to avoid rutting while operating earthmoving equipment.

PP. Compaction Generally

1. Compact fill not specified shall be left loose as soon as possible after placing.
2. After compaction, the surface of each layer shall be well closed, showing no movement under compaction plant, and without cracks, holes, ridges and loose material.
3. Remove and recompact defective areas to full thickness of layer using new material.

QQ. Compacted General Fill

1. Make up shortfall in excavated material with imported material of a similar type.
2. Select suitable excavated material and keep separate.
3. Spread and level material in layers. Thoroughly compact each layer as soon as possible.
4. Required compaction shall be 95% of test density in accordance with BS 1377: Part 9.
5. Well in advance of starting work, submit details of proposed:
 - a. Materials to be used, including quantities of each type.
 - b. Type of plant.
 - c. Maximum depth of each compacted layer.
 - d. Minimum number of passes per layer.

RR. Starter Layer of Compacted Filling

1. Suitable hard granular material fill, compacted thoroughly.

2. Thickness shall be 450mm.

SS. Protection of Compacted Filling

1. Before allowing construction traffic, raise level of compacted cohesive soil filling at least 150mm above formation level using properly compacted temporary filling.
2. Remove temporary protective filling from Site before permanent construction.

TT. Hardcore Filling

1. Granular fill material:
 - a. Free from excessive dust.
 - b. Well graded.
 - c. Pieces less than 75mm in diameter.
2. Test requirements:
 - a. Minimum 10% fines value tested in a soaked condition in accordance with BS 812: Part 111 50kN.
3. In any one layer there shall be only one of the following:
 - a. Crushed rock (other than argillaceous rock) or quarry waste with no more binding material than is required to help hold the stone together.
 - b. Crushed concrete, crushed brick or tile, free from plaster, timber and metal.
 - c. Crushed non-expansive slag.
 - d. Gravel or hoggins with no more clay content than is required to bind the material together, and with no large lumps of clay.
 - e. Well-burned non-plastic colliery shale.
 - f. Natural gravel.
 - g. Natural sand.
4. Spread and level fill in 150mm maximum layers. Thoroughly compact each layer.

UU. Benching in Fill

1. If, during filling, the difference in level between adjacent areas of filling exceeds 600mm, cut into edge of higher filling to form benches 600mm minimum width and height equivalent to depth of a layer of compacted filling.
2. Spread and compact new filling to provide maximum continuity with previous filling.

VV. Compacted Filling for Landscape Areas

1. Fill material shall be capable of compaction by light earthmoving plant.
2. Filling layers shall not be more than 200mm thick.
3. Lightly compact each layer to produce a stable soil structure.

WW. Loose Tip Filling for Landscape Areas

1. Do not firm, consolidate or compact fill when laying.
2. Tip and grade to approximate levels in one operation with minimum movement by plant.

XX. Binding

1. Surfaces shall receive sheet overlays or concrete bind with:
 - a. Sand, fine gravel, or other accepted fine material applied to fill interstices, unless otherwise indicated on the Design Drawings.
 - b. Moisten as necessary before final rolling to provide a flat, closed, smooth surface.
2. Sand for blinding shall be in accordance with BS EN 12620, grade 0/4 or 0/2 (MP).

3. Permissible deviations on surface level shall be $\pm 25\text{mm}$.

Disposal Of Materials

YY. Excavated Topsoil Storage

Submit proposals of stockpile in temporary storage heaps.

ZZ. Topsoil Storage Heaps

1. Submit proposals of locations.
2. Topsoil storage heaps shall be in accordance with BS 3882.
3. Height (maximum) shall be 1.5m.
4. Protection:
 - a. Other materials shall not be placed on top of storage heaps.
 - b. Construction plant shall not pass over storage heaps.
 - c. Prevent compaction and contamination.

AAA. Topsoil Storage Heap Treatment

Apply a suitable herbicide at appropriate times to prevent seeding of weeds.

BBB. Surplus Subsoil

1. Stockpile excavated material in temporary storage heaps.
2. Spread and level surplus subsoil on Site.
3. Locations shall be agreed with the Contractor.
4. Soil level shall not be raised within root spread of trees that are to be retained.
5. Remove remaining material from Site.

CCC. Water

1. Keep all excavations free from water until:
 - a. Formations are covered.
 - b. Below ground constructions are complete.
 - c. Basement structures and retaining walls are able to resist leakage, water pressure and flotation.
2. Form surfaces of excavations and fill to provide adequate falls for drainage.
3. Provide temporary drains, sumps and pumping as necessary for the removal of water.
4. Do not pollute watercourses with silt laden water.

DDD. Ground Water Level, Spring or Running Water

1. Give notice if it is considered that the excavations are below the water table.
2. Give notice immediately if springs/ running water is encountered.

EEE. Pumping

1. Do not disturb excavated faces or stability of adjacent ground or structures.
2. Discharge pumped water without flooding the Site or adjoining property.
3. Construct sumps clear of excavations and fill on completion.
4. Submit proposals for the locations of sumps.

FFF. Permanent Drainage System

Disposal of water from the excavations through system shall not be permitted.

Demolition Work

GGG.Demolition

Refer to the requirements in Section Ss_15_30_02 Demolition Work.

Completion

HHH.Completion

1. Clear away debris and leave the Site in a tidy condition on completion.
2. Repair defects/ damage to the retained structure(s) without delay, where accepted by the Contractor, to minimise damage and nuisance.

3.2 TOLERANCES

A. General

Measure tolerances against the relevant Base Reference Datum, Location Reference Point, Location Reference Plane, Location Reference Surface or Reference Element as defined in Section Ss_00_00_00 of the Landscape Specification.

1. Retained elements shall be maintained in their correct position as shown on the Working Drawings, within $\pm 2\text{mm}$.
2. Refer to the applicable Section for tolerances of new work that may interface with the work.

B. Permissible Deviations from Formation Levels

1. Beneath mass concrete foundations shall be $\pm 25\text{mm}$.
2. Beneath ground bearing slabs and reinforced concrete foundations shall be $\pm 15\text{mm}$.
3. Embankments and cuttings shall be $\pm 50\text{mm}$.
4. Ground abutting external walls shall be $\pm 50\text{mm}$ but finished level shall be not less than 150mm below DPC.

C. Accuracy - Linear Dimensions

Permissible deviations from linear dimensions generally shall be $\pm 15\text{mm}$.

D. Linear Dimension Accuracy

Permissible deviations from linear dimensions generally shall be in accordance with guidance in CIRIA Special Publication SP145 'Setting Out Procedures'.

END OF SECTION

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SECTION Ss_15_30_02 -- DEMOLITION WORK

To be read in conjunction with Section Ss_00_00_00, other related Sections of the Landscape Specification and the Design Drawings.

PART 1 TYPE, SYSTEMS, MATERIALS AND PERFORMANCE

1.1 LANDSCAPE SPECIFICATION TYPE

A. Prescriptive Work

1. Supply, deliver, install and warrant the Works in compliance with the materials and workmanship requirements of the Landscape Specification.
2. Where required to prepare drawings these shall be limited to final detailing of components and systems indicated on the Design Drawings, necessary to demonstrate their safe installation.
3. Where alternative products are offered by the Subcontractor for acceptance by the Contractor, submit full supporting documentation in respect of the complete system or installation.

1.2 SYSTEM DESCRIPTIONS

Architectural And Functional Requirements

A. General

Structure(s) shall be demolished in accordance with:

1. BS 6187, Code of practice for full and partial demolition.
2. Recommendations/ guidance of the Health and Safety Executive.

B. Site Survey

Prior to commencement of the Works, carry out a survey of the Site and adjacent areas.

C. Licences/ Approvals

The Subcontractor shall obtain necessary licences and approvals for street closures, scaffolding and hoarding.

Demolition And Dismantling

D. Type ALT-101 Demolition and Cart Away from Site

General demolition of structure(s) to the areas/ zones as indicated on the Design Drawings.

1. Protect/ retain features, façades, structures, walls and other items as indicated on the Design Drawings.
2. Safely dispose of non-retained materials off Site.
3. Site enabling work shall facilitate the carrying out of the Permanent Works.

E. Type ALT-102 Demolition and Set Aside for Reuse

Dismantle/ take down elements of the building as indicated on the Design Drawings, with selected materials set aside for reuse.

1. Remove architectural features adopting techniques that cause minimal damage to the materials and the existing structure.
2. Stack selected materials using suitable pallets/ crates and provide adequate protection such that they can be transported safely and reused.
3. Agree with the Contractor acceptable samples of retained materials/ items and set aside at an agreed secure location for future reference.

1.3 MATERIALS

A. General

Materials used in the Works shall be to the appropriate British Standards or British Board of Agrément (BBA) certified as appropriate.

PART 2 SUBMITTALS AND TESTING

2.1 SUBMITTALS

Tender Submittals

A. Tender Response

1. Provide tender submittals in accordance with the requirements of Section Ss_00_00_00 of the Landscape Specification.
2. Submit a design response with the tender proposal, to include:
 - a. Samples where specified.
 - b. List of Tests included.
 - c. Quality management programme.
 - d. List of any proposed Working Drawings.
 - e. Summary of deviations from the Design Drawings and the Landscape Specification.
 - f. Outline technical specifications for carrying out the Works.
 - g. A list of proposed manufacturers and subcontractors to be used.
 - h. Reports and method statements containing the following details:
 - i) Form, condition and details of the structure or structures, the Site, and the surrounding area.
 - ii) Type, location and condition of features of historical, archaeological, geological or ecological importance.
 - iii) Type, location and condition of adjoining or surrounding premises that might be adversely affected by removal of the structure or structures, or by noise, vibration and dust generated during deconstruction or demolition.
 - iv) Identity and location of services above and below ground, including those required for the Subcontractor's use, and arrangements for their disconnection and removal.
 - v) Form and location of flammable, toxic or hazardous materials, including lead-based paint, and proposed methods for their removal and disposal.
 - vi) Form and location of materials identified for re-use or recycling, and proposed methods for removal and temporary storage.
 - vii) Proposed programme of work, including sequence and methods of deconstruction or demolition.
 - viii) Details of specific pre-weakening required.
 - ix) Arrangements for protection of personnel and the general public, including exclusion of unauthorised persons.
 - x) Arrangements for control of Site transport and traffic.
 - xi) Special requirements including details of services supplied by the statutory authority and results of tests to determine the precise nature of hazardous materials.
 - xii) Provide a digital copy of reports and method statements with supporting Site photos if permitted (refer to the Security Brief/ Report).

Samples, Mock-Ups, Prototypes And Quality Benchmarks

B. Pre-contract Samples

Not required.

C. Mock-up Requirements

Not required.

D. Prototype Requirements

Not required.

E. Quality Benchmark Requirements

Submit quality benchmarks, in location(s) to be agreed with the Contractor, in accordance with Section Ss_00_00_00:

1. First completed structural bay of each type of system.

Post Contract Award Submittals

F. Post Contract Award Response

1. Submit post contract award submittals in accordance with the requirements of Section Ss_00_00_00 of the Landscape Specification.
2. Schedules of Conditions:
 - a. Submit a Schedule of Conditions of the existing adjacent areas agreed with the Contractor prior to the commencement of the Works.
 - b. Submit a Schedule of Conditions of the existing adjacent areas agreed with the Contractor after completion of the Works.
3. Submit a Hazardous Substances Assessment and Safety Method Statement.

2.2 TESTING

A. General

1. Refer to Section Ss_00_00_00 of the Landscape Specification for the general requirements for testing and the approach to off-Site and on-Site testing.
2. Submit independently certified test data and Agrément certificates that demonstrate that the proposed systems achieve the performance requirements of the Landscape Specification.

PART 3 EXECUTION

3.1 SITE WORK

A. General

1. Carry out the Works in accordance with BS 6187, BS EN 1997: Part 1 and BS 5975.
2. Operatives shall be trained, experienced and appropriately skilled in safely carrying out demolition work.
3. The Subcontractor shall make good at their own expense any damage done to public roads and footpaths, which may be caused by demolition operations. Public areas shall be kept clean at all times.
4. The Contractor shall be informed of any benchmarks and other survey information found on structures to be demolished, which shall not be removed unless instructed otherwise by the Contractor.

B. Decayed or Infested Timber

1. Decayed or infested timber shall be removed to prevent the spread of spores or larvae.
2. Infested timber shall be immediately wrapped before removal from the building and shall be disposed of off Site.

3. Materials adjoining such decayed timber shall, if necessary, be removed and disposed of off Site or treated with an accepted chemical to prevent contamination spreading to adjoining retained structures.
- C. Burning on Site
- Do not burn materials arising from the work on Site.
- D. Waste
1. Remove rubbish, debris and surplus material and spoil regularly; keep the Site and the Works clean and tidy.
 2. Remove rubbish, dirt and residues from voids and cavities before filling or closing in.
 3. Dispose of unwanted, non-hazardous material and rubbish at a tip approved by the Waste Regulation Authority.
 4. Remove surplus hazardous materials and their containers regularly for disposal off Site in a safe and competent manner as approved by the Waste Regulation Authority and in accordance with relevant regulations.
 5. Retain waste transfer documentation on Site.
- E. Electromagnetic Interference
- Take necessary precautions to avoid excessive electromagnetic disturbance of apparatus inside/ outside the Site.
- Health And Safety**
- F. General
1. No instruction issued by the Contractor shall relieve the Subcontractor of their responsibility for the safety of the general public, Site personnel and adjoining properties during the course of the demolition work.
 2. Provide temporary screens and other protection as required for safety, control of noise and dust, temporary weather protection and security or to facilitate the Works.
 3. Prevent nuisance due to dust and debris arising from the Works. Dry material shall be dampened periodically to prevent dust rising. No debris shall be deposited on the public roadway or adjoining building, either during the Works or during transport of debris from the Site.
 4. Prevent access of unauthorised persons to partly demolished structures, particularly outside working hours.
- G. Hazards
1. Any suspected asbestos based materials discovered during the demolition work shall be immediately reported to the Contractor. Such materials shall not be disturbed.
 2. The Contractor shall be informed immediately of any unrecorded voids, tanks, chemicals, or other items discovered during demolition work. Agree with the Contractor methods for safe removal, filling or covering over.
 3. Due to the nature of the Site, underground voids may be located upon opening up. Upon discovering same, these shall be immediately reported to the Contractor and a Site inspection shall be carried out as soon as possible.
- H. Gas or Vapour Risks
- Take adequate precautions to prevent fire or explosion caused by gas or vapour.
- I. Noise
1. Work generally shall be carried out in accordance with BS 5228.
 2. Compressors, percussion tools and vehicles shall be fitted with effective silencers of a type recommended in writing by the manufacturers of the compressors, tools or vehicles.
 3. Operatives shall not be permitted to use radios or other audio equipment in ways or at times that may cause a nuisance.

J. Fire

Take precautions to prevent injury and death, and damage to the Works or other property from fire. Carry out procedures in accordance with Health and Safety Executive (HSE) recommendations/ guidance.

Archaeology

K. General

1. Any features, items or artefacts uncovered/ exposed during the Works which may be of historical interest shall be reported to the Contractor.
2. The Subcontractor shall await inspection by the Contractor's appointed Archaeologist to assess the significance of any such finding prior to removal or further disturbance of same.
3. Any work that would disturb the archaeological items shall be the subject of constant inspection by the Archaeologist. Full co-operation shall be provided to the Archaeologist. Work shall be suspended or reprogrammed to facilitate archaeological investigation that may be deemed necessary by the Contractor and/ or Archaeologist.
4. Any coins, fossils, curiosities, money or articles having a monetary or intrinsic value (including historic, artistic or other values) other than ordinary building materials shall become the property of the Contractor and shall be handed over to the Contractor.

Retained Materials

L. Materials Arising from the Works

1. In general, existing materials removed during the Works shall become the property of the Subcontractor, who will allow credits for any salvage value against the costs of the Works.
2. Materials such as brick, stone and slate identified by the Contractor, which are to be retained for re-use, shall remain the property of the Client, under the direction of the Contractor, and shall be sorted and set aside for re-use.
3. Items of finishes, such as various joinery elements, windows, doors and surrounds and others as indicated on the Design Drawings shall be removed, protected as necessary and set aside for re-use.
4. Where the components of existing masonry are to be retained for re-use, the structures shall be demolished by hand such that no damage is caused to the retained materials. The Subcontractor's responsibility shall be to prevent damage in addition to any that may be visible in the masonry prior to demolition.
5. Retained materials shall be sorted by type, e.g. full bricks, half bricks, damaged bricks capable of re-use, bricks damaged beyond re-use, quoin stones, stone cills, eaves course stones, damaged stone to be trimmed for re-use, stone not suitable for re-use.
6. Material for re-use shall be placed on pallets.
7. Retained materials shall be cleaned to remove old mortar, plaster and render at the time of sorting, so that minimal work is necessary during rebuilding operations.
8. The Subcontractor shall repeat the sorting operation, in case any material suitable for re-use is discovered in the materials designated for disposal.
9. Pallets of retained materials shall be located close to the Works so that handling and transport is kept to a minimum and the sorting, cleaning and rebuilding operations minimise any further damage during transport or other relocation of the materials.
10. Samples of the original mortars, renders and plasters shall be retained for analysis. The Subcontractor shall arrange for samples designated by the Contractor to be forwarded to an accepted laboratory for analysis of properties including shape, sizes, texture, grading, binder type and proportion, which shall be used to replicate the original mixes.
11. No material shall be disposed of off Site until such time as its disposal is accepted by the Contractor. Once this acceptance is given, such material shall be removed immediately from the Site. Similarly, any material found unsuitable during the rebuilding operations shall be piled according to type and only removed with the Contractor's acceptance.

Temporary Support

M. Support Systems/ Shoring

1. Before starting work, carry out a geometric survey to locate any initial positions of structure to be kept in place. Establish a regular grid of survey points on surfaces of structure.
2. At regular intervals throughout the Contract period, or until notified otherwise by the Contractor, carry out further geometric surveys of the supported structure and support systems to measure any movement.
3. Agree with the Contractor when location surveys are to take place, the number and position of survey points, and the method of recording findings.
4. Provide any necessary temporary diversions/ protection to existing and new services that may be affected by support systems.
5. Support systems shall not overload the foundations of the retained structure.
6. Support systems shall be kept in place, taking necessary precautions to prevent damage, taking due account of any movement of the structure, which may occur before, during and after demolition.
7. Report to the Contractor any damage caused to retained façades due to erection or connection of support systems and agree methods of repair.
8. Safe access shall be provided in and around the support systems for inspection and maintenance.
9. The support systems shall be regularly inspected and maintained.
10. The supported structure shall be regularly inspected and monitored. Any movement or deterioration of the fabric of the supported structure shall be reported to the Contractor.
11. Support systems shall be protected from impact damage by vehicles, plant and Site operations.
12. When permanent connections between the supported structure and new constructions have been completed, inform the Contractor and obtain permission to disconnect and dismantle the support systems.
13. After disconnection of support systems, survey and record the state of structure kept in place.
14. Defects caused by or due to support systems, including any connection holes, shall be made good to the acceptance of the Contractor.

Protection

N. Temporary Protection

1. Adequately protect parts of existing structures that are to be kept in place.
2. Structure, components and features not specifically identified for demolition are to be kept in place and adequately protected.
3. The Subcontractor shall provide necessary temporary screens and other protection as required for safety, control of noise and dust, temporary weather protection and security, or to facilitate the Works.
4. Trees/ hedges/ shrubs/ lawns and any other planting shall be protected and maintained, unless specifically indicated for removal and subsequent disposal to waste.

O. Existing Services

1. Notify Service Authorities and/ or adjacent owners of the proposed work not less than one week before commencing Site operations.
2. Where any work will involve Mechanical and/ or Electrical services, carry out inspections in accordance with the Services Engineer's documentation.
3. Protection shall be provided in accordance with the relevant Service Authority's recommendations for work adjacent to existing services. Such services shall not be worked on without the consent of the Service Authorities or other owners.

4. If any damage to services results from the Works, the Contractor and appropriate Service Authority shall be notified without delay. Arrangements for making good shall be made without delay to the satisfaction of the Service Authority or other owner as appropriate.
5. Marker tapes or protective covers disturbed by Site operations shall be re-instated to the Service Authority's recommendations.
6. Arrange with the appropriate authorities for the location and marking of the positions of mains services. The positions of services affected by work shall be marked.
7. Before starting demolition, arrangements shall be made with the appropriate authorities for the disconnection of services and removal of fittings and equipment. Existing services made redundant by the Works shall be disconnected. Redundant pipe runs, manholes and associated infrastructure shall be removed.
8. Live sewers cross the Site. These shall be investigated, located and adequately protected during the course of the work.
9. Disused drain connections shall be located, exposed and sealed within the Site.
10. Drains, manholes, gullies, vent pipes and fittings that are still in use shall be kept free of debris.
11. Bypass connections shall be provided as necessary to maintain continuity of services to occupied areas of the same and adjoining properties. A minimum 72 hours' notice shall be given to occupiers if shutdown is necessary during changeover.

Cleaning And Completion

P. Cleaning

1. At Practical Completion of the Works, or when otherwise agreed with the Contractor, clean areas of retained structure/ fabric.
2. Do not use cleaning materials or methods that could alter the character of the retained structure(s)/ finishes.
3. Protect adjacent surfaces/ areas from damage due to cleaning operations.

Q. Completion

1. Clear away debris and leave the Site in a tidy condition on completion.
2. Repair defects/ damage to the retained structure(s) without delay, where accepted by the Contractor, to minimise damage and nuisance.

3.2 TOLERANCES

A. General

Measure tolerances against the relevant Base Reference Datum, Location Reference Point, Location Reference Plane, Location Reference Surface or Reference Element as defined in Section Ss_00_00_00 of the Landscape Specification.

1. Retained elements shall be maintained in their correct position as shown on the Working Drawings, within $\pm 2\text{mm}$.
2. Refer to the applicable Section for tolerances of new work that may interface with demolition work.

END OF SECTION

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SECTION Ss_25_14_63 -- FENCING/ GATES

To be read in conjunction with Section Ss_00_00_00, other related Sections of the Landscape Specification and the Design Drawings.

PART 1 TYPE, SYSTEMS AND MATERIALS

1.1 LANDSCAPE SPECIFICATION TYPE

A. Prescriptive Work

1. Supply, deliver, install and warrant the Works in compliance with the materials and workmanship requirements of the Landscape Specification.
2. Where required to prepare drawings these shall be limited to final detailing of components and systems indicated on the Design Drawings, necessary to demonstrate their safe installation.
3. Where alternative products are offered by the Subcontractor for acceptance by the Contractor, submit full supporting documentation in respect of the complete system or installation.

1.2 SYSTEM DESCRIPTIONS

Architectural And Functional Requirements

A. General

1. Fencing work generally shall be constructed and installed in accordance with the relevant Parts of BS 1722 and BS 6180.
2. The Works shall be covered by a single source warranty.
3. Fencing/ gates shall be designed and installed as complete integrated systems, including necessary support structure, bracketry, fixings, packers, shims and all other components/ accessories necessary to complete the Works.
4. All secured gates shall unlock upon fire detection or have manual override from the escaped secured side.

B. Fixings

1. Fixings shall be concealed unless accepted otherwise by the Contractor.
2. The type, size and positioning of mechanical fixing devices shall be as recommended by the system manufacturer for proprietary systems or as proposed by the Subcontractor for acceptance by the Contractor.
3. Where necessary, fixing devices shall be capable of three-dimensional adjustment to accommodate building structure and fabrication/ installation tolerances.

C. Framing

1. Framing profiles and other visible components shall be consistent and matching in appearance throughout the Works.
2. Framing profiles shall be of the minimum cross sections necessary to achieve the performance requirements, while complying with the design intent indicated on the Design Drawings.
3. Align joints/ framing with interfacing systems. Gaps within joints shall be uniform.
4. Movement joints shall accommodate movements while maintaining the overall system performance. Movement joints shall appear as similar to the standard system joint as possible.

Fencing

D. Type EXT-303 Metal Fencing (Q1)

Purpose made metal security fencing, configured as indicated on the Design Drawings.

1. Panel size: As indicated on the Design Drawings.
 2. Height: As indicated on the Design Drawings.
 3. Panels:
 - a. Mild steel flats weld fixed to base plate.
 - b. Panel base plate shall be bolted to the concrete foundation.
 - c. Base plate shall be bolt fixed into concrete strip footings and no visible fixings shall be visible.
 4. Finish: Galvanised and polyester powder coat finished to RAL 9005 black colour.
- E. Type EXT-304 Metal Mesh Fencing (Q2, Q3)
- Proprietary welded wire mesh security fencing, configured as indicated on the Design Drawings.
1. Manufacturer: Jacksons.
 2. Reference: 358 Securi-mesh Welded Mesh Panel.
 3. Panel size: As indicated on the Design Drawings.
 4. Height: As indicated on the Design Drawings.
 5. Wire panels:
 - a. Welded wire panels between posts.
 - b. Straight cut finish to the top of the panel.
 - c. Panels shall be bolt fixed to the face of the posts, as indicated on the Design Drawings.
 6. Posts:
 - a. Rectangular hollow section mild steel posts, set at centres indicated on the Design Drawings.
 - b. Posts shall be side fixed into concrete foundations in accordance with the design loading requirements specified by BS 1722: Part 10 for this category of fence and the Structural Engineer's documentation.
 7. Finish: Galvanised and polyester powder coat finished to RAL 9005 black colour.
- F. Type EXT-305 Metal Mesh Fencing (Q4)
- Proprietary welded wire mesh security fencing to ha-ha wall, configured as indicated on the Design Drawings.
1. Manufacturer: Jacksons.
 2. Reference: 358 Securi-mesh Welded Mesh Panel.
 3. Panel size: As indicated on the Design Drawings.
 4. Height: As indicated on the Design Drawings.
 5. Wire panels:
 - a. Welded wire panels between posts.
 - b. Straight cut finish to the top of the panel.
 - c. Panels shall be bolt fixed to the top of the retaining wall EXT-361 described in the Structural Engineer's documentation, Civil Engineer's documentation and indicated on the Design Drawings.
 6. Posts:
 - a. Rectangular hollow section mild steel posts, set at centres indicated on the Design Drawings.
 - b. Posts shall be fixed to base plates bolted to the concrete retaining wall. Refer to the Structural Engineer's documentation.

7. Finish: Galvanised and polyester powder coat finished to RAL 9005 black colour.

Gates

G. Type EXT-342 Vehicle Gate (Q1)

Purpose made steel double leaf swing gates, configured as indicated on the Design Drawings.

1. Gate leaves:
 - a. Mild steel blades to match fencing Type EXT-303.
 - b. Mild steel perimeter frame.
2. Gate posts:
 - a. Square hollow section mild steel posts.
 - b. Posts shall be set into concrete foundations in accordance with the design loading requirements specified by BS 1722: Part 10 and the Structural Engineer's documentation.
3. Mild steel finish: Galvanised and polyester powder coat finished to RAL 9005 black colour.
4. Access:
 - a. Power assisted automatic opening, in accordance with the Services Engineer's documentation.
 - b. Electronic locking in accordance with the Security Brief/ Report.
 - c. Vehicle access shall be via vehicle registration recognition camera (ANPR).
 - d. Video intercom and card reader shall be integrated into the gate framing, at a suitable height for cars, lorries and buses.
 - e. All secured gates shall unlock upon fire detection or have manual override from the escaped secured side.
5. Laser intruder detection device:
 - a. Install device adjacent to the gate, as indicated on the Design Drawings, the location shall be to the acceptance of the Contractor.
 - b. Device shall be installed in accordance with the Security Brief/ Report and the Services Engineer's documentation.
6. Access post:
 - a. Post shall be fixed adjacent to the gate, as indicated on the Design Drawings, the location shall be to the acceptance of the Contractor.
 - b. Post shall include an access control card reader, intercom and push pad, in accordance with the Security Brief/ Report and the Services Engineer's documentation.
 - c. Post shall be polyester powder coated galvanised mild steel, colour and finish shall match the gate.

H. Type EXT-343 Pedestrian Gate (Q1)

Purpose made steel single leaf swing gates, configured as indicated on the Design Drawings.

1. Gate leaves:
 - a. Mild steel blades to match fencing Type EXT-303.
 - b. Mild steel perimeter frame.
2. Gate posts:
 - a. Square hollow section mild steel posts.
 - b. Posts shall be set into concrete foundations in accordance with the design loading requirements specified by BS 1722: Part 10 and the Structural Engineer's documentation.

3. Finish: Galvanised and polyester powder coat finished to RAL 9005 black colour.
4. Access:
 - a. Power assisted automatic opening.
 - b. Electronic locking in accordance with the Security Brief/ Report and the Services Engineer's documentation.
 - c. Video intercom and card reader shall be integrated into the gate framing, to locations indicated on the Design Drawings.
 - d. All secured gates shall unlock upon fire detection or have manual override from the escaped secured side.
5. Laser intruder detection device:
 - a. Install device adjacent to the gate, as indicated on the Design Drawings/ location shall be to the acceptance of the Contractor.
 - b. Device shall be installed in accordance with the Security Brief/ Report.
6. Access post:
 - a. Post shall be fixed adjacent to the gate, as indicated on the Design Drawings, the location shall be to the acceptance of the Contractor.
 - b. Post shall include an access control card reader, intercom and push pad, in accordance with the Security Brief/ Report and the Services Engineer's documentation.
 - c. Post shall be galvanised mild steel, colour and finish shall match the gate.
- I. Type EXT-344 Emergency Access and Maintenance Gate (Q2, Q3)

Proprietary steel double and single leaf swing gates, configured as indicated on the Design Drawings.

 1. Manufacturer: Jacksons.
 2. Reference: 358 Securi-mesh Swing Gate.
 3. Gate leaves:
 - a. Welded wire mesh to match fencing Type EXT-304.
 - b. Mild steel perimeter frame.
 4. Gate posts:
 - a. Rectangular hollow section mild steel posts.
 - b. Posts shall be set into concrete foundations in accordance with the design loading requirements specified by BS 1722: Part 10 and the Structural Engineer's documentation.
 5. Finish: Galvanised and polyester powder coat finished to RAL 9005 black colour.
 6. Manual opening with slide latch to secure with padlock, latch hasp and staple shall be suitable to receive the local fire brigade's emergency access padlock. All secured gates shall unlock upon fire detection or have manual override from the escaped secured side.
- J. Type EXT-361 Concrete Retaining Wall

Concrete retaining wall configured as indicated on the Structural Engineer's documentation, Civil Engineer's documentation and the Design Drawings.

1.3 MATERIALS

Metalwork And Finishes

A. Metalwork

Refer to Section Ss_99_99_11.

B. Finishes

1. Refer to Section Ss_99_99_30 for general finishes to metalwork.
2. Refer to Section Ss_99_99_31 for powder coatings.

Fixings

C. General

1. Refer to Section Ss_99_99_20.
2. Fixing components shall comply with statutory requirements.
3. Fixings shall be inherently corrosion resistant or fully protected to prevent corrosion.
4. Fixings, bolts, anchors, screws, rivets, shear pins, nuts, washers and other components shall be formed from one of the following:
 - a. Mild steel in accordance with BS 4190, BS EN ISO 4016, BS EN ISO 4034 and BS EN ISO 898.
 - b. Austenitic stainless steel in accordance with BS EN ISO 3506: Parts 1 and 2.
 - c. Aluminium alloy of appropriate grade in accordance with BS EN 754: Parts 3-5, BS EN 755: Parts 1-9, BS EN 573: Part 3, BS EN 515 and BS EN 12020: Parts 1 and 2.

Concrete

D. Foundation Concrete for Posts

1. Concrete shall be in accordance with BS 8500: Parts 1 and 2 and BS EN 206.
2. Designated mix shall be not less than GEN 4 or Standard mix not less than ST5.
3. Admixtures shall not be used.

PART 2 SUBMITTALS AND TESTING

2.1 SUBMITTALS

Tender Submittals

A. Tender Response

1. Provide tender submittals in accordance with the requirements of Section Ss_00_00_00 of the Landscape Specification.
2. Submit a design response with the tender proposal, to include profiles of typical conditions, with dimensions for system Types EXT-303, EXT-243 and EXT-343.
3. The tender design response for system Types EXT-303, EXT-243 and EXT-343 shall include:
 - a. Samples where specified.
 - b. List of Tests included.
 - c. Quality management programme.
 - d. List of proposed Working Drawings.
 - e. Summary of deviations from the Design Drawings and the Landscape Specification.
 - f. Outline technical specifications reflecting proposed materials/ systems.
 - g. A list of proposed manufacturers and subcontractors to be used.

Samples, Mock-Ups, Prototypes And Quality Benchmarks

B. Pre-contract Samples

Not required.

C. Post Contract Award Samples

In accordance with Section Ss_00_00_00, submit post contract award samples of the following:

1. 300mm x 200mm sample of each type of fencing/ gate.
2. 1 No. of each type of accepted exposed fixing.

D. Mock-up Requirements

Not required.

E. Prototype Requirements

Not required.

F. Quality Benchmark Requirements

Submit quality benchmarks, in location(s) to be agreed with the Contractor, in accordance with Section Ss_00_00_00:

1. First completed structural bay of each type of system.

2.2 TESTING

A. General

1. Refer to Section Ss_00_00_00 for the general requirements for testing and the approach to off-Site and on-Site testing.
2. Undertake on-Site testing specified herein, which shall be carried out by an independent testing body accredited by the United Kingdom Accreditation Service (UKAS).

Off-Site Testing

B. General

1. Where previous test data is not available, not applicable to the service conditions or not accepted by the Contractor, agree with the Contractor suitable test methods/ procedures to demonstrate that the proposed systems can achieve the performance requirements of the Landscape Specification.
2. Testing shall be carried out by an independent laboratory acceptable to the Contractor.
3. Submit details of the testing procedures to the Contractor for review and comment.

On-Site Testing

C. Safety Tests for Fixings

1. Engage an independent Construction Fixings Association (CFA) accredited testing specialist, acceptable to the Contractor, to undertake safety tests for fixings.
2. Locations of fixings determined by the Subcontractor for testing to be agreed with the Contractor prior to the commencement of testing.
3. Testing of fixings to be witnessed by the Contractor as required.
4. Testing of fixings to be completed prior to the tested fixings being covered/ obscured and becoming no longer visible.
5. Submit to the Contractor detailed records of fixings that have been tested.
6. Site load testing:
 - a. Undertake testing of fixings on-Site to demonstrate that they achieve the loading requirements.
 - b. Apply a proof load of 1.5 times the unfactored design load.
 - c. Test 10% of the installed fixings as a minimum.
7. Torque Site testing:
 - a. Undertake torque testing of fixing to demonstrate that torque requirements are achieved.

- b. Test 100% of the installed fixings.
 - c. Clearly mark fixings to be concealed with red paint if satisfactorily tested.
 - d. Marking of fixings shall not interfere or impact with existing markings and applied finishes.
8. Pull-out testing:
- a. Undertake pull-out tests in accordance with the CFA Guidance Note Procedure for Site Testing Construction Fixings.
 - b. Apply a proof load of 1.5 times the unfactored design load during the pull-out tests.
 - c. Test 10% of the installed fixings as a minimum.

PART 3 EXECUTION

3.1 WORKMANSHIP

Fabrication

A. General

- 1. Fabrication of materials/ components shall, as a minimum, be in accordance with current regulations and standards.
- 2. Where preceding work is complete before fabrication, take site measurements. If these measurements indicate that the dimensions indicated on the Design Drawings are unachievable, seek instruction from the Contractor before proceeding.
- 3. Where applicable and practical, fabrication and assembly of materials/ components shall take place in equipped workshops with Site work restricted to fixing.
- 4. Form sections true to shape, accurate in size, square, free from distortions, irregularities and defects to profiles indicated on the Design Drawings.
- 5. Do not use materials/ components that are damaged or have any other physical imperfections in the Works.
- 6. Fabricate joints so that the assembly shall be tight and close fitting to produce rigid materials/ components free from distortion.

B. Metalwork

Refer to Section Ss_99_99_11.

Workmanship

C. General

- 1. Workmanship shall generally be in accordance with the relevant and applicable parts of BS 8000 and BS 1722.
- 2. Where applicable, carry out the Works in accordance with the manufacturer's recommendations.
- 3. Operatives shall be trained, experienced and appropriately skilled in the installation of the Works and, where applicable, be recommended by the system/ product manufacturer.
- 4. Fencing work shall be set out as follows:
 - a. In straight lines or smoothly flowing curves as indicated on the Design Drawings.
 - b. With the tops of posts following the profile of the ground unless otherwise agreed with the Contractor or indicated on the Design Drawings.

Inspection/ Preparation

D. Inspection

- 1. Before commencing installation, survey the structure. Check dimensions, line, level and fixing points. Report immediately to the Contractor if the structure is unsuitable to receive the Works.

2. If the structure/ substrate is unsuitable, propose remedial action to make the structure suitable.
- E. Suitability of Base/ Backing
1. Bases/ backgrounds shall be rigid, dry, sound, smooth, clean, free from dust, dirt, grease and other contaminants before systems/ products are installed.
 2. Cutting, chasing, plugging, making good and other necessary procedures required to the substrate or to adjacent work, that cannot/ should not be undertaken after the installation of the Works, shall be completed.
 3. Tolerances of the structure/ substrate shall be suitable to permit the required configuration and indicated tolerances of the finished systems/ products.

Installation

- F. General
1. Systems shall accommodate future moisture and temperature movement.
 2. The Works shall be set out and installed square, true to line, level and plane, free from undulations, with lines and joints aligned, straight and parallel unless specified otherwise, within stated tolerances and in the correct relationship with the building structure.
 3. Cutting of materials/ components:
 - a. Where required, cut materials/ components in accordance with the manufacturer's recommendations.
 - b. There shall be no damage to the finished face of the materials/ components or any damage that would adversely affect the performance.
 - c. Keep cut edges to a minimum.
 4. Materials/ components to be installed in 'running lengths' shall be subject to the following:
 - a. Straight runs between angles or ends of runs shall be formed in single unjointed lengths wherever possible. Where running joints are unavoidable, obtain acceptance for location and method of jointing from the Contractor.
 - b. Joints at angles shall be mitred or as otherwise accepted by the Contractor.
 5. Inspect each material/ component of the Works immediately before installation. The Works shall be installed using materials/ components free from marks, defects, flaws, steps, waves, or damage of any nature.
 6. Do not alter materials/ components with prefinished surfaces unless accepted by the Contractor.
 7. Materials/ components from the same production batch shall be used in the same area to prevent banding, patchiness or other visual variations.
 8. Do not cut, drill or otherwise alter work of others to accommodate the installation of the systems unless accepted by the Contractor.
 9. Make provision for movements/ expansion/ contraction in accordance with the system/ product manufacturer's recommendations.
- G. Setting Posts in Concrete
1. Holes shall be excavated with vertical sides.
 2. Posts/ struts shall be positioned centrally in the holes.
 3. The holes shall be filled with concrete to not less than the specified depth, well rammed as filling proceeds, and consolidated.
 4. Where necessary to suit the service conditions, the specified depth shall be exceeded to provide adequate support.
 5. Where holes are indicated on the Design Drawings as not completely filled with concrete, the upper part of the hole shall be backfilled with well rammed and consolidated excavated material.

H. Fixing Requirements

1. Refer to Section Ss_99_99_20.
2. Install and position fixings and fastenings as recommended by the manufacturer. Where visible, positions shall be to the acceptance of the Contractor.
3. The Works shall be fixed securely to prevent pulling away, bowing or other movement during use and without causing stress or distortion. Include additional bracing and stiffening as required.
4. Isolating tape, plastic washers or other suitable means shall be provided to prevent bi-metallic corrosion between dissimilar metals.

I. Packings

1. Provide suitable tight packings at fixing points to take up tolerances and prevent distortion.
2. Packings shall be of non-compressible, rot-proof and non-corrosive materials/ components that maintain the performance of the systems/ products with which they interface.
3. Packings shall not intrude into zones that are to be filled with sealant or areas required for drainage. The performance of the Works and interfacing systems shall be maintained.

Protection And Completion

J. Protection

Finished areas shall be adequately protected from damage until Practical Completion.

K. Cleaning

1. At Practical Completion of the Works, or when otherwise agreed with the Contractor, clean exposed areas/ surfaces of the Works.
2. Cleaning materials and methods shall be as recommended/ accepted by the system/ product manufacturer, where applicable.
3. Do not use materials or methods that could alter the character of the exposed finishes.
4. Protect adjacent surfaces from damage due to cleaning operations.

L. Completion

1. Repair defects without delay to minimise damage and nuisance.
2. Do not use the Works for any purpose, except testing, until Practical Completion.
3. On Practical Completion, check the Works for damage and defects. Replace damaged or defective materials/ components.

Adverse Conditions

M. Working in Adverse Conditions

1. If unavoidable wetting of the Works occurs, prompt action shall be taken to minimise and make good any damage.
2. In severe or continuously wet weather, work shall be suspended unless an effective temporary enclosure is provided over the working areas.
3. Concrete foundations:
 - a. Do not cast foundations, or erect fencing/ gates if the temperature is below 3°C on a falling thermometer or 1°C on a rising thermometer.
 - b. Foundations shall be adequately protected against frost and rapid drying by sun and wind.

3.2 TOLERANCES

A. General

Measure tolerances against the relevant Base Reference Datum; Location Reference Point; Location Reference Plane; Location Reference Surface or Reference Element as defined in Section Ss_00_00_00 of the Landscape Specification.

1. Tolerances for fences shall be in accordance with BS 1722 for the category of fence specified, unless indicated otherwise in this Landscape Specification or as recommended by the system manufacturer.
2. Spacing of posts/ uprights shall be to dimensions indicated on the Design Drawings $\pm 15\text{mm}$.
3. Horizontal alignment of fencing $\pm 15\text{mm}$.
4. Posts and uprights shall be plumb within $\pm 5\text{mm}$ over their height.
5. Fabricated components shall not vary from the dimensions indicated on the Design Drawings by more than 2mm .
6. Vertical elements, other than posts, shall be plumb, within $\pm 2\text{mm}$ or 0.1% of the height, whichever is the lesser.
7. Horizontal elements shall be level, within $\pm 2\text{mm}$ or 0.1% of the length, whichever is the lesser.
8. The maximum variation in gap from a straightedge applied to a flat plane shall be 2mm for a 3000mm straightedge and 1mm for a 1000mm straightedge.
9. The maximum offset in plane, level or section between any two adjacent sections shall be $\pm 1\text{mm}$.
10. The average width of any panel to panel joint shall be within $\pm 2\text{mm}$ of the designed width. Any variation shall be equally distributed with no sudden changes or steps.
11. The maximum deviation between adjacent panel surfaces either side of a joint shall be 1mm .
12. The bow of any flat surface shall not exceed more than $\pm 2\text{mm}$ from a 2000mm straightedge placed against it in any direction.
13. The straightness of any surface of an edge shall not deviate by more than $\pm 2\text{mm}$ from a 2000mm straightedge placed against it in any direction parallel to the long axis of the element.
14. The centre section of any lineal element shall not bow by more than the lesser of $\pm 2\text{mm}$ or 0.075% of the length of the element measured from a straight line between the ends of the element.
15. The cross-section of any element shall not be twisted by more than 1° from the alignment.
16. Cut-outs for interfacing work shall be within $\pm 1\text{mm}$ the dimensions indicated on the Design Drawings.
17. Account shall be taken of the installation tolerance requirements such that repetitive elements are located, relative to gridlines.
18. Tolerances shall not be cumulative.
19. Where an element/ component is subject to more than one applicable tolerance, the most onerous tolerance shall apply.

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SECTION Ss_30_14_05 -- ASPHALT ROADS/ PAVING

To be read in conjunction with Section Ss_00_00_00, other related Sections of the Landscape Specification, the Civil Engineer's documentation and the Design Drawings.

PART 1 TYPE, SYSTEMS, MATERIALS AND PERFORMANCE

1.1 LANDSCAPE SPECIFICATION TYPE

- A. Prescriptive Work
 - 1. Supply, deliver, install and warrant the Works in compliance with the materials and workmanship requirements of the Landscape Specification.
 - 2. Where required to prepare drawings these shall be limited to final detailing of components and systems indicated on the Design Drawings, necessary to demonstrate their safe installation.
 - 3. Where alternative products are offered by the Subcontractor for acceptance by the Contractor, submit full supporting documentation in respect of the complete system or installation.

1.2 SYSTEM DESCRIPTIONS

Architectural And Functional Requirements

- A. General

Unless otherwise specified, system build-ups, Site applied finishes and profiles shall be as indicated on the Design Drawings.
- B. Edgings
 - 1. Submit material to the Contractor for acceptance.
 - 2. Size shall be as indicated on the Design Drawings.
- C. Geotextile Membrane

Geotextile membranes due to the substrate shall be installed where required by the road/paving installer.
- D. Type EXT-151 Hot Rolled Asphalt Pavement (AT)

Hot rolled, reduced emission asphalt (REA) pavement configured as indicated on the Design Drawings and specified in the Civil Engineer's documentation.

 - 1. Manufacturer: Hanson.
 - 2. Reference:
 - a. REA Reduced Emission Asphalt.
 - b. Shell Bitumen Fresh Air specialist binder.

1.3 MATERIALS

Road/ Paving Materials

- A. Bituminous Mixtures

In accordance with the Civil Engineer's documentation.
- B. Aggregates

In accordance with the Civil Engineer's documentation.
- C. Uncoated Chippings for Surface Dressing

In accordance with the Civil Engineer's documentation.

D. Asphalt

In accordance with the Civil Engineer's documentation.

Pavement Markings

E. Pavement Marking to Car Park/ Pedestrian Areas

Provide pavement marking as follows:

1. Paint: In accordance with BS EN 1436 and BS EN 1871, Type A.
2. Reflectorisation: Uniformly apply solid glass beads to Class B of BS EN 1423 on wet paint film at a rate of 400-500 g/ m².
3. Colour: White and yellow.

F. Pavement Marking to Access Roads

Provide pavement marking as follows:

1. Materials and application: In accordance with BS EN 1824 and BS EN 1871, Class A.
2. Reflectorisation: Uniformly apply solid glass beads to Class B of BS EN 1423 on wet paint film at a rate of 400-500 g/ m².
3. Colour: White and yellow.

PART 2 SUBMITTALS AND TESTING

2.1 SUBMITTALS

Tender Submittals

A. Tender Response

Not required.

Samples, Mock-Ups, Prototypes And Quality Benchmarks

B. Pre-contract Samples

Not required.

C. Post Contract Award Samples

In accordance with Section Ss_00_00_00, submit post contract award samples of the following:

1. Samples of the surface treatment.
2. 150mm x 150mm x required thickness of the wearing course.

D. Mock-up Requirements

Not required.

E. Prototype Requirements

Not required.

F. Quality Benchmark Requirements

Submit quality benchmarks of the following, in location(s) to be agreed with the Contractor, in accordance with Section Ss_00_00_00:

1. First completed area of each type of the Works.

2.2 TESTING

A. Test Requirements

Testing shall be in accordance with the Civil Engineer's documentation.

PART 3 EXECUTION

3.1 WORKMANSHIP

A. General

Workmanship generally shall be in accordance with BS 594987 and the Highways Agency Specification for Highway Works.

Inspection/ Preparation

B. Inspection

1. Before commencing installation, survey the sub-base. Check dimensions, line and level. Report immediately to the Contractor if the sub-base is unsuitable to receive the Works.
2. If the sub-base is unsuitable, propose remedial action to make it suitable.

C. Suitability of Sub-base

1. Tolerances of the sub-base shall be suitable to permit the required configuration and indicated tolerances of the surface/ wearing course.
2. The sub-base shall have even falls such that no areas will be subject to ponding.
3. Confirm that drainage and other services that are below the sub-base have been completed.

D. Laying of Paving

1. Remove loose material, foreign matter and standing water from surfaces to receive paving materials.
2. Form neat junctions with and prevent damage to adjacent work. Keep channels, kerbs and inspection covers clean.
3. Rollers shall not be allowed to stand on the paving at any time.
4. Paving shall not be used as a building platform or for storing, mixing or preparing materials.
5. Lines and levels of the finished surface shall be smooth and even, with regular falls to prevent ponding.
6. The finished surface of the paving shall have an even overall texture and shall be left in a clean state on completion.

E. Application of Chippings

1. Uniformly spray binder of a suitable grade at 1 to 1.5 litres/ m², dress with chippings at 6-8kg/ m², roll in without crushing chippings.
2. Cutback bitumen shall not be used at temperatures below 15°C.
3. Remove excess chippings before pedestrian/ road traffic commences.
4. Carry out further removal of loose chippings disturbed by traffic as necessary.

F. Pavement Markings

1. Surfaces to receive markings shall be clean and dry. Remove loose material and apply paint uniformly with no streaks or ragged edges.
2. Use thinners in accordance with the paint manufacturer's recommendations.

Protection

G. Temporary Protection

Finished work shall be adequately protected from damage by subsequent building operations and other factors until Practical Completion.

H. Cleaning

1. At completion of the Works, or when otherwise agreed with the Contractor, clean exposed areas/ surfaces of the Works using agreed cleaning methods and materials.
2. Materials and methods shall be recommended/ accepted by the system/ product manufacturer, where applicable.
3. Do not use materials or methods that could alter the character of the exposed finishes.
4. Protect adjacent surfaces from damage due to cleaning operations.

I. Completion

1. Leave installed work clean.
2. Repair defects without delay to minimise damage and nuisance.
3. Do not use the Works for any purpose, except testing, until Practical Completion.
4. On Practical Completion, check the Works for damage and defects. Replace damaged or defective materials/ components.

3.2 TOLERANCES

A. General

1. Levels of finished surface shall remain within $\pm 6\text{mm}$ of required levels (+6mm -0mm adjacent to gullies and manholes).
2. Regularity: Where appropriate in relation to the geometry of the surface, the variation in gap under a 3m straightedge (with feet) placed anywhere on the surface shall be not more than:
 - a. Wearing course: 7mm.
 - b. Base course: 13mm.
3. Where a straightedge cannot be used, the surface shall be of a comparable standard of accuracy when judged by the eye.

END OF SECTION

SECTION Ss_30_14_15 -- INTERLOCKING BRICK/ BLOCK PAVING 1

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SECTION Ss_30_14_15 -- INTERLOCKING BRICK/ BLOCK PAVING

To be read in conjunction with Section Ss_00_00_00, other related Sections of the Landscape Specification and the Design Drawings.

PART 1 TYPE, SYSTEMS AND MATERIALS

1.1 LANDSCAPE SPECIFICATION TYPE

A. Prescriptive Work

1. Supply, deliver, install and warrant the Works in compliance with the materials and workmanship requirements of the Landscape Specification.
2. Where required to prepare drawings these shall be limited to final detailing of components and systems indicated on the Design Drawings, necessary to demonstrate their safe installation.
3. Where alternative products are offered by the Subcontractor for acceptance by the Contractor, submit full supporting documentation in respect of the complete system or installation.

1.2 SYSTEM DESCRIPTIONS

Architectural And Functional Requirements

A. General

1. Design and execute the Works in accordance with the United Kingdom's Manual of Contract Documents For Highway Works (MCHW) Volume 1: Specification for Highway Works, Series 1100.
2. The Works shall be set out to accurate straight lines and regular gradients as indicated on the Design Drawings.
3. Paving shall be installed as complete integrated systems, including necessary foundations, fixings and other components/ accessories necessary to complete the Works.

B. Formation of Base/ Sub-base

Install the Works on a base/ sub-base prepared in accordance with the Civil Engineer's documentation and the Design Drawings.

Block Paving

C. Type EXT-101 Permeable Block Paving (PB)

Permeable concrete block paving configured as indicated on the Design Drawings.

1. Manufacturer: Hardscape Products Ltd (part of the Hardscape Group Ltd).
2. Reference: Kellen Lavarro, H2O permeable paving system.
3. Bedding in accordance with the Civil Engineer's documentation.
4. Blocks:
 - a. Size: 210mm (W) x 105mm (L) x 100mm (D).
 - b. Colour: Paars.
 - c. Finish: Standard.
 - d. Breaking strength: >3.6 Mpa.
5. Joints:
 - a. 10mm - 15mm width.
 - b. Material shall be suitable for permeable block paving construction in accordance with the Civil Engineer's documentation.

1.3 MATERIALS

Bedding And Reinforcement

- A. Bedding
 - 1. Refer to the Civil Engineer's documentation.
 - 2. Bedding material shall be in accordance with BS EN 13242.

Accessories/ Joints

- B. Jointing Material
 - 1. Refer to the Civil Engineer's documentation.
 - 2. Jointing material shall be in accordance with BS EN 13242.
- C. Geotextile Membrane
 - 1. Manufacturer: Terram.
 - 2. Reference: Permeable TERRAM 1000.
 - 3. Refer to the Civil Engineer's documentation.
- D. Impermeable Geomembrane
 - 1. Manufacturer: Visqueen.
 - 2. Refer to the Civil Engineer's documentation.

PART 2 SUBMITTALS AND TESTING

2.1 SUBMITTALS

Tender Submittals

- A. Tender Response
 - Not required.

Samples, Mock-Ups, Prototypes And Quality Benchmarks

- B. Pre-contract Samples
 - Not required.
- C. Post Contract Award Samples
 - In accordance with Section Ss_00_00_00, submit post contract award samples of the following:
 - 1. 3 No. samples of each type.
 - 2. Jointing sand sample.
- D. Sample Panels
 - Prior to commencement of the Works, sample panels shall be submitted as follows:
 - 1. 1800mm x 1800mm sample panel of each paving type constructed in location(s) to be agreed with the Contractor using randomly selected units but rejecting any that are damaged.
 - 2. The sample panel shall include:
 - a. Laying pattern.
 - b. Colour and profile options of joint material.
 - c. Movement joints of each profile and finish type.

3. Acceptance from the Contractor shall be obtained prior to commencement of construction for each type. If a panel is rejected, construct another sample panel for that type until acceptance is obtained from the Contractor.
- E. Mock-up Requirements
Not required.
- F. Prototype Requirements
Not required.
- G. Quality Benchmark Requirements
Submit quality benchmarks, in location(s) to be agreed with the Contractor, in accordance with Section Ss_00_00_00:
 1. An area of 25m² of each type of paving.

2.2 TESTING

- A. General
Submit manufacturer's details of tests undertaken including:
 1. Compressive strength.
 2. Absorption percentage.
 3. Soluble salt content.
 4. Drying shrinkage or moisture expansion.
 5. Density and tolerance in dimensions.
- B. Slip Resistance Testing
 1. Testing for slip resistance shall be in accordance with the following documents:
 - a. 'Assessing the slip resistance of flooring' by the Health and Safety Executive (latest published version).
 - b. 'The assessment of floor slip resistance, the UK Slip Resistance Group guidelines' by the UK Slip Resistance Group (latest published version).
 2. Testing shall be performed by an independent United Kingdom Accreditation Service accredited laboratory accredited to perform the specified test methods.
 3. Pendulum test: Evaluate external paving in both dry and wet conditions using the TRL Pendulum Tester in accordance with BS EN 16165 and the recommendations of the UK Slip Resistance Group to obtain the pendulum test value (PTV) low slip potential.
 4. Roughness test: Evaluate external paving using a surface roughness meter, in accordance with the recommendations of the UK Slip Resistance Group, to obtain the surface roughness (Rz) value confirmed by the manufacturer's product literature.
 5. Test samples at the following stages of the project:
 - a. Submission to the Contractor for acceptance.
 - b. Production.
 - c. Post-installation (in situ).
 6. Post installation (in situ) test locations shall be agreed with the Contractor.
 7. Submit test results to the Contractor for acceptance in due time, prior to each of the project stages or as agreed with the Contractor.
 8. Test samples shall include any surface sealer or treatment to be applied to the finished external paving.

PART 3 EXECUTION

3.1 WORKMANSHIP

Fabrication

A. General

Fabrication of materials/ components shall, as a minimum, be in accordance with current regulations and standards.

Workmanship

B. General

1. Workmanship shall generally be in accordance with the relevant and applicable parts of BS 8000 and BS 7533.
2. Where applicable, carry out the Works in accordance with the manufacturer's recommendations.
3. Operatives shall be trained, experienced and appropriately skilled in the installation of the Works and, where applicable, be recommended by the system/ product manufacturer.

Inspection/ Preparation

C. Inspection

1. Before commencing installation, survey the structure/ substrate. Check dimensions, line, level and fixing points. Report immediately to the Contractor if the structure is unsuitable to receive the Works.
2. If the structure/ substrate is unsuitable, propose remedial action to make the structure suitable.

D. Suitability of Base/ Backing

1. Tolerances of the structure/ substrate/ sub-base shall be suitable to permit the required configuration and indicated tolerances of the finished systems/ products.
2. Surfaces to be covered shall be firmly fixed, dry, smooth, without depressions, voids or protrusions, clean and free from frost, unacceptable curing compounds, release agents and other surface contaminants.
3. The base shall have even falls such that no areas will be subject to ponding.
4. Solid substrates shall be thoroughly swept prior to application of the Works.

Installation

E. Laying of Paving

1. Paving shall be laid to even gradients/ falls or regular vertical curves, such that there is no ponding.
2. Paving units shall be suitably bedded so that rocking does not occur or develop.
3. Finished paving shall have an even overall appearance with even joint widths.

F. Bedding

Bedding shall be laid and compacted to give the specified final thickness such that the entire area of the paving is fully supported.

G. Joints

1. Paving units shall be placed squarely with minimum disturbance to bedding, laying away from previously laid paving.
2. Mechanical force shall not be used to obtain tight joints.
3. Vacuum cleaning machines shall not be used on the completed paving.

H. Geotextiles

1. Geotextiles shall be laid in accordance with the manufacturer's recommendations to the prepared subgrade. Refer to the Civil Engineer's documentation.
2. Vehicular traffic shall not be allowed over the geotextile until it has been fully covered by the compacted granular sub-base.

Protection And Completion

I. Protection

Finished areas shall be adequately protected from damage until Practical Completion.

J. Protection from Traffic

1. Access to paved areas shall be restricted as necessary to prevent damage from Site traffic and plant.
2. Access shall be prevented to paving bedded on mortar until the mortar has achieved its design strength.
3. Access to areas with geotextile shall be prevented until the upper granular sub-base has been fully laid and compacted.

K. Cleaning

1. At Practical Completion of the Works, or when otherwise agreed with the Contractor, clean exposed areas/ surfaces of the Works.
2. Cleaning materials and methods shall be as recommended/ accepted by the system/ product manufacturer, where applicable.
3. Do not use materials or methods that could alter the character of the exposed finishes.
4. Protect adjacent surfaces from damage due to cleaning operations.
5. Washings and any detritus shall be safely disposed of without discharging this into drainage systems or watercourses.

L. Completion

1. Drainage channels shall be left clean, with outlets clear.
2. On Practical Completion, check the Works for damage and defects. Replace damaged or defective materials/ components.

Adverse Conditions

M. Working in Adverse Conditions

1. If unavoidable wetting of the Works occurs, prompt action shall be taken to minimise and make good any damage.
2. Provide temporary covers as required to keep unfinished areas dry.
3. In severe or continuously wet weather, work shall be suspended unless an effective temporary enclosure is provided over the working areas.
4. Concrete foundations:
 - a. Do not cast foundations, lay units or make joints if the temperature is below 3°C on a falling thermometer or 1°C on a rising thermometer.
 - b. Foundations and bedding shall be adequately protected against frost and rapid drying by sun and wind.

3.2 TOLERANCES

A. General

Measure tolerances against the relevant Base Reference Datum, Location Reference Point, Location Reference Plane, Location Reference Surface or Reference Element as defined in Section Ss_00_00_00.

1. Tolerances generally shall be in accordance with BS 7533: Part 3.

2. The Works shall be set out to the correct position as shown on the Working Drawings, within $\pm 3\text{mm}$.
3. The maximum variation in gap from a 3m straightedge applied to any area of the surface shall be 6mm, while maintaining any drainage requirements such that there is no standing water.
4. The average width of any panel to panel joint shall be within $\pm 2\text{mm}$ of the designed width. Any variation shall be equally distributed with no sudden changes or steps.
5. The offset in plane or level between adjacent paving units shall be not more than 2mm.
6. The straightness of any surface of an edge shall not deviate by more than $\pm 2\text{mm}$ from a 2000mm straightedge placed against it in any direction parallel to the long axis of the element.
7. The centre section of any lineal element shall not bow by more than the lesser of $\pm 2\text{mm}$ or 0.075% of the length of the element measured from a straight line between the ends of the element.
8. The cross-section of any element shall not be twisted by more than 1° from the alignment.
9. Paving shall be set 6mm above drainage outlets and 2mm above kerb tops unless indicated otherwise.
10. Account shall be taken of the installation tolerance requirements such that repetitive elements are located, relative to gridlines.
11. Tolerances shall not be cumulative.
12. Where an element/ component is subject to more than one applicable tolerance, the most onerous tolerance shall apply.

END OF SECTION

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SECTION Ss_30_14_80 -- GRAVEL

To be read in conjunction with Section Ss_00_00_00, other related Sections of the Landscape Specification and the Design Drawings.

PART 1 TYPE, SYSTEMS AND MATERIALS

1.1 LANDSCAPE SPECIFICATION TYPE

- A. Prescriptive Work
 - 1. Supply, deliver, install and warrant the Works in compliance with the materials and workmanship requirements of the Landscape Specification.
 - 2. Where required to prepare drawings these shall be limited to final detailing of components and systems indicated on the Design Drawings, necessary to demonstrate their safe installation.
 - 3. Where alternative products are offered by the Subcontractor for acceptance by the Contractor, submit full supporting documentation in respect of the complete system or installation.

1.2 SYSTEM DESCRIPTIONS

Architectural And Functional Requirements

- A. General

Unless otherwise specified, system build-ups, Site applied finishes and profiles shall be as indicated on the Design Drawings.
- B. Geotextile Membrane
 - 1. Provide suitable geotextile membranes as indicated in the Civil Engineer's documentation and Design Drawings.
 - 2. Geotextile membranes shall achieve the performance requirements and comply with the manufacturer's recommendations to suit the service conditions.
- C. Formation of Base/ Sub-base

Install the Works on a base/ sub-base prepared in accordance with the Civil Engineer's documentation and the Design Drawings.

Gravel Paving

- D. Type EXT-191 Resin Bound Gravel (RBG)

Resin bound gravel paving configured as indicated on the Design Drawings.

 - 1. Subgrade improvement layer: Refer to the Civil Engineer's documentation.
 - 2. Sub-base: Refer to the Civil Engineer's documentation.
 - 3. Binder course: Refer to the Civil Engineer's documentation.
 - 4. Surface course: Refer to the Civil Engineer's documentation.
 - 5. Surface finish course:
 - a. Manufacturer: Addagrip Terraco Ltd.
 - b. Reference: Addabound Resin Bound Surfacing.
 - c. Colour: Golden Beach.
 - d. Aggregate size: 6mm.
 - e. Depth: 20mm.
 - 6. Edging: Refer to the Design Drawings.

E. Type EXT-192 Resin Bound Gravel with Cellweb (RBC)

Porous resin bound gravel paving over cellweb to protect tree roots underneath, configured as indicated on the Design Drawings.

1. Subgrade improvement layer: Refer to the Civil Engineer's documentation.
2. Geotextile membrane:
 - a. Manufacturer: Geosynthetics.
 - b. Reference: Cellweb Fibretex F4M Geotextile Separation Fabric.
3. Sub-base:
 - a. Cellweb confinement system as indicated in the Civil Engineer's documentation and in accordance with the ECMWF - Whiteknights Campus, University of Reading Arboricultural Impact Assessment and Method Statement ECMWF-RPS-ZZ-WS-RP-X-00780.
 - b. Manufacturer: Geosynthetics Limited.
 - c. Reference: Cellweb Tree Root Protection (TRP).
4. Granular sub-base: Refer to the Civil Engineer's documentation.
5. Binder course: Refer to the Civil Engineer's documentation.
6. Surface course: Refer to the Civil Engineer's documentation.
7. Surface finish course:
 - a. Manufacturer: Addagrip Terraco Ltd.
 - b. Reference: Addabound Resin Bound Surfacing.
 - c. Colour: Golden Beach.
 - d. Aggregate size: 6mm.
 - e. Depth: 30mm.
8. Edging: Refer to the Design Drawings.
9. Note: Any work within root protection areas (RPA) of existing trees shall comply with methods of work included in the future Arboricultural Method Statement.

1.3 MATERIALS

Surfacing Materials

A. General

Surface dressings/ wearing courses shall be laid over sub-bases, road bases and base courses in accordance with the Civil Engineer's documentation.

B. Granular Sub-base Material

Granular sub-base material shall comply with BS EN 12620. Refer to the Civil Engineer's documentation.

C. Bituminous Mixtures

Bituminous mixtures shall be in accordance with BS EN 13108: Part 1.

D. Aggregates

Aggregates shall be in accordance with BS EN 13043, unless otherwise indicated on the Civil Engineer's documentation.

E. Impermeable Geomembrane

1. Manufacturer: Visqueen.
2. Refer to the Civil Engineer's documentation.

PART 2 SUBMITTALS AND TESTING

2.1 SUBMITTALS

Tender Submittals

- A. Tender Response

Not required.

Samples, Mock-Ups, Prototypes And Quality Benchmarks

- B. Pre-contract Samples

Not required.

- C. Post Contract Award Samples

In accordance with Section Ss_00_00_00, submit post contract award samples of the following:

1. Samples representative of colour and appearance of accepted gravel. Submit before placing orders.

- D. Mock-up Requirements

Not required.

- E. Prototype Requirements

Not required.

- F. Quality Benchmark Requirements

Provide quality benchmarks of the following, in location(s) to be agreed with the Contractor, in accordance with Section Ss_00_00_00:

1. First completed area of each type of the works, appearance shall be to the acceptance of the Contractor before proceeding.

2.2 TESTING

- A. General

1. Refer to Section Ss_00_00_00 for the general requirements for testing and the approach to off-Site and on-Site testing.
2. Provide independently certified tests and Agrément certificates that demonstrate that the proposed systems achieve the requirements of the Landscape Specification.
3. Undertake on-Site testing specified herein, which shall be carried out by an independent testing body accredited by the United Kingdom Accreditation Service (UKAS).

Slip Resistance Testing

- B. Testing for slip resistance shall be in accordance with the following documents:

1. 'Assessment of floor slip resistance' by the Health and Safety Authority (latest published version).
2. 'The assessment of floor slip resistance, the UK Slip Resistance Group guidelines' by the UK Slip Resistance Group (latest published version).
3. Testing shall be performed at an independent UKAS laboratory accredited to perform the specified test methods.
4. Pendulum test: Evaluate external paving in both dry and wet conditions using the TRL Pendulum Tester in accordance with BS EN 16165 (BS EN 1341 for external natural stone slabs and BS EN 1342 for external natural stone setts) and the recommendations of the UK Slip Resistance Group to obtain the pendulum test value (PTV) specified.

5. Roughness test: Evaluate external paving using a surface roughness meter, in accordance with the recommendations of the UK Slip Resistance Group, to obtain the surface roughness (Rz) value specified.
6. Test samples at the following stages of the project:
 - a. Submission to the Contractor for acceptance.
 - b. Production.
 - c. Post-installation (in situ).
7. Submit test results to the Contractor for acceptance in due time, prior to each of the project stages or as agreed with the Contractor.
8. Test samples shall include any surface sealer or treatment to be applied to the finished external paving.

PART 3 EXECUTION

Workmanship

- A. General
 1. Workmanship/ methods shall be in accordance with the ECMWF - Whiteknights Campus, University of Reading Arboricultural Impact Assessment and Method Statement ECMWF-RPS-ZZ-WS-RP-X-00780.
 2. Where applicable, the Works shall be carried out in accordance with the material manufacturer's recommendations.
 3. Make due allowance for the sequencing of the whole Works and all interfaces.
 4. Operatives shall be trained, experienced and appropriately skilled in the installation of the Works and, where applicable, be recommended by the system/ product manufacturer.
 5. Confirm that all drainage and other services that are below the sub-base have been completed.
- B. Acceptance of Sub-base
 1. The sub-base shall be sound, free of debris, mud and soft spots, and suitably close textured.
 2. The levels and falls of the sub-base shall be as detailed, within the specified tolerances of $\pm 20\text{mm}$ (vehicular areas) and $\pm 12\text{mm}$ (pedestrian areas).
 3. Drainage outlets shall be within $+0$ to -10mm of the required finished level.
 4. Kerbs and edgings shall be complete, adequately bedded and haunched and to the required levels.
- C. Laying of Surfacing
 1. Remove all loose material, foreign matter and standing water from surfaces to receive surfacing materials.
 2. Surfacing materials shall not block channels, gullies, and other components/ accessories.
 3. Form neat junctions with and prevent damage to adjacent work. Keep clean all channels, kerbs and inspection covers.
 4. New surfacing shall be kept free from traffic until it has cooled to the prevailing atmospheric temperature.
 5. Surfacing shall not be used as a building platform or for storing, mixing or preparing materials.
 6. Lines and levels of the finished surface shall be smooth and even, with regular falls to prevent ponding.
 7. The finished surface shall have an even overall texture and shall be left in a clean state on completion.

D. Laying Granular Surfaces in Pedestrian Areas

1. Sub-base: Spread and level in 100mm maximum layers and as soon as possible thereafter compact with a roller weighing not less than 6 tonnes or other acceptable equivalent plant.
2. Wearing course: Spread and level in 100mm maximum layers and as soon as possible thereafter compact with a roller weighing not less than 1 tonnes or other acceptable equivalent plant. Roll to a consolidated thickness of not less than 50mm.
3. In dry weather, lightly water all layers during compaction.

E. Herbicide

No herbicides are to be used.

F. Cold Weather

Do not use frozen materials or lay on frozen or ice covered surfaces.

G. Drainage Falls

Unless specified otherwise, not less than: 1:100.

Protection

H. Temporary Protection

Finished Works shall be adequately protected from damage by subsequent building operations and other factors until Practical Completion.

I. Cleaning

1. At completion of the Works, or when otherwise agreed with the Contractor, clean all exposed areas/ surfaces of the Works using agreed cleaning methods and materials.
2. Materials and methods shall be recommended/ accepted by the system/ product manufacturer, where applicable.
3. Do not use materials or methods that could alter the character of the exposed finishes.
4. Protect adjacent surfaces from damage due to cleaning operations.

J. Completion

1. Installed Works shall be left clean.
2. Defects shall be repaired without delay, to minimise damage and nuisance.
3. The Works shall not be used for any purpose, except testing, until Practical Completion.
4. On Practical Completion, the Works shall be checked for damage and defects. All damaged or defective materials/ components shall be replaced.

K. Protection from Traffic

Restrict access to paved areas as necessary to prevent damage from Site traffic and plant.

3.1 TOLERANCES

A. Loose Gravel Systems

Maximum permissible deviation from required levels, falls and cambers shall be:

1. Vehicular areas: $\pm 20\text{mm}$.
2. Pedestrian areas: $\pm 12\text{mm}$.

B. Resin Bound Gravel Systems

1. Levels of finished surface shall remain within $\pm 6\text{mm}$ of required levels ($+6\text{mm}$ -0mm adjacent to gullies and manholes).

2. Regularity: Where appropriate in relation to the geometry of the surface, the variation in gap under a 3m straightedge (with feet) placed anywhere on the surface shall be not more than:
 - a. Wearing course: 7mm.
 - b. Base course: 13mm.
3. Where a straightedge cannot be used, the surface shall be of a comparable standard of accuracy when judged by the eye.

END OF SECTION

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SECTION Ss_30_14_90 -- SLAB/ SETT PAVING

To be read in conjunction with Section Ss_00_00_00, other related Sections of the Landscape Specification and the Design Drawings.

PART 1 TYPE, SYSTEMS AND MATERIALS

1.1 LANDSCAPE SPECIFICATION TYPE

A. Prescriptive Work

1. Supply, deliver, install and warrant the Works in compliance with the materials and workmanship requirements of the Landscape Specification.
2. Where required to prepare drawings these shall be limited to final detailing of components and systems indicated on the Design Drawings, necessary to demonstrate their safe installation.
3. Where alternative products are offered by the Subcontractor for acceptance by the Contractor, submit full supporting documentation in respect of the complete system or installation.

1.2 SYSTEM DESCRIPTIONS

Architectural And Functional Requirements

A. General

1. Design and execute the Works in accordance with the United Kingdom's Manual of Contract Documents For Highway Works (MCHW) Volume 1: Specification for Highway Works, Series 1100.
2. The Works shall be set out to accurate straight lines and regular gradients as indicated on the Design Drawings.
3. Paving shall be installed as complete integrated systems, including necessary foundations, fixings and other components/ accessories necessary to complete the Works.
4. Substrate shall be as indicated on the Design Drawings.

B. Formation of Sub-base

Preparation and formation of the sub-base shall be by others, as indicated in the Civil Engineer's documentation.

External Paving

C. Type EXT-121 Concrete Slab Paving (CS)

Concrete slab paving configured as indicated on the Design Drawings.

1. Manufacturer: Tobermore.
2. Reference: Braemar.
3. Sub-base: Refer to the Civil Engineer's documentation.
4. Bedding: Refer to the Civil Engineer's documentation.
5. Slabs:
 - a. Composition: Hard-wearing surface layer with a minimum of 4mm and >390kgs/m³ cement.
 - b. Size: 600mm (W) x 300mm (L) x 80mm (D).
 - c. Finish: Ground Textured.
 - d. Colour: Alto Silver.
6. Joints:
 - a. 3mm - 5mm thickness.

- b. Refer to the Civil Engineer's documentation.
- 7. Pattern: As confirmed with the Contractor through sample panel.
- D. Type EXT-122 Concrete Slab Paving - Blister (BS)
Concrete slab blister paving configured as indicated on the Design Drawings.
 - 1. Manufacturer: Hardscape Products Ltd (part of the Hardscape Group Ltd).
 - 2. Reference: Blister Profile Tactile Paving.
 - 3. Sub-base: Refer to the Civil Engineer's documentation.
 - 4. Bedding: Refer to the Civil Engineer's documentation.
 - 5. Slabs:
 - a. Composition: Hydraulically pressed semi-dry concrete.
 - b. Size: 400mm (W) x 400mm (L) x 80mm (D).
 - c. Surface: Blister surface.
 - d. Colour: Charcoal.
 - 6. Joints:
 - a. 3mm - 5mm thickness.
 - b. Refer to the Civil Engineer's documentation.
 - 7. Pattern: As confirmed with the Contractor through sample panel.
- E. Type EXT-131 Concrete Slab Paving (NSP1)
Concrete slab paving configured as indicated on the Design Drawings.
 - 1. Manufacturer: Marshalls plc.
 - 2. Reference: Modal X range.
 - 3. Sub-base: Refer to the Civil Engineer's documentation.
 - 4. Bedding: Refer to the Civil Engineer's documentation.
 - 5. Slabs:
 - a. Type: Concrete slab paving.
 - b. Size: 600mm (W) x 300mm (L) x 80mm (D), refer also to the Design Drawings.
 - c. Finish: Textured.
 - d. Colour: Silver Grey Granite.
 - 6. Joints:
 - a. 2mm - 5mm thickness.
 - b. Refer to the Civil Engineer's documentation.
 - 7. Pattern: As confirmed with the Contractor through sample panel.
- F. Type EXT-141 Concrete Sett Paving (NSP2)
Concrete sett paving configured as indicated on the Design Drawings.
 - 1. Manufacturer: Marshalls plc.
 - 2. Reference: Modal X range.
 - 3. Sub-base: Refer to the Civil Engineer's documentation.
 - 4. Bedding: Refer to the Civil Engineer's documentation.
 - 5. Stone setts:

- a. Type: Concrete setts.
 - b. Size: 100mm (W) x 100mm (L) x 80mm (D), refer also to the Design Drawings.
 - c. Finish: Textured.
 - d. Colour: Silver Grey Granite.
 6. Joints:
 - a. 2mm - 5mm thickness.
 - b. Refer to the Civil Engineer's documentation.
 7. Pattern: As confirmed with the Contractor through sample panel.
- G. Type EXT-142 Concrete Sett Paving (NSP3)
- Concrete sett paving configured as indicated on the Design Drawings.
1. Manufacturer: Marshalls plc.
 2. Reference:
 - a. Modal X range: Silver Grey Granite - Textured (80%).
 - b. Modal X range: Mid Grey Granite - Textured (20%).
 3. Sub-base: Refer to the Civil Engineer's documentation.
 4. Bedding: Refer to the Civil Engineer's documentation.
 5. Stone setts:
 - a. Type: Concrete setts.
 - b. Size: 300mm (W) x 200mm (L) x 80mm (D), refer also to the Design Drawings.
 - c. Finish: Textured.
 - d. Colours: 80/ 20 mix of Oatmeal Granite and Light Cream Granite, as confirmed with the Subcontractor through sample panel.
 6. Joints:
 - a. 2mm - 5mm thickness.
 - b. Refer to the Civil Engineer's documentation.
 7. Pattern: As confirmed with the Contractor through sample panel.

1.3 MATERIALS

General

- A. Slabs/ Setts
1. Concrete paving shall be in accordance with BS EN 1339 or BS EN 1338 as applicable.
 2. Tactile paving shall be in accordance with DD CEN/TS 15209.

Bedding And Reinforcement

- B. Bedding Sand

Bedding shall be naturally occurring clean sharp sand or crushed rock as follows:

1. Grading shall be for coarse laying sand in accordance with BS 7533.
2. Clay, silt and fine dust shall be not more than 3% by mass.
3. Sand shall be free from chlorides or other deleterious salts, contaminants and cement.
4. Moisture content shall be between 3% and 7%.

- C. Bedding Mortar

1. Refer to Section Ss_99_99_21 of the Landscape Specification.
 2. Mortar shall have a compressive strength suitable to accommodate the live load of vehicles acting upon the paving systems.
- D. Reinforcement
1. Reinforcement in mortar bedding shall be in accordance with BS 4483.
 2. Determine the final selection/ type of reinforcement subject to acceptance by the Contractor.

Accessories/ Joints

- E. Jointing Material
1. Jointing material shall be in accordance with BS 7533: Part 4.
 2. Jointing sand: Clean dried sand, graded for jointing sand in accordance with BS 7533: Part 4 and free from deleterious salts, contaminants and cement.

- F. Geotextile Membrane

As indicated in the Civil Engineer's documentation or agreed with the Contractor.

- G. Movement Joint Metal Edgings

Movement joint metal edgings shall be provided as follows:

1. Material/ size as indicated in the Civil Engineer's documentation or agreed with the Contractor.
2. Fixing shall be bedded in cement and sand/ screwed to plugs at 600mm centres, to exact finished level of floor/ pavings.

- H. Sealant Movement Joints

Sealant movement joints shall be provided where necessary:

1. The colour shall match the paving to the acceptance of the Contractor.
2. Preparation and application shall be in accordance with Section Ss_99_99_22 of the Landscape Specification. Joints shall extend through paving and bedding to substrate.

- I. Preformed Strip/ Section Movement Joints

Where indicated on the Design Drawings, preformed strip/ section movement joints, shall be provided and fixed in accordance with the manufacturer's recommendations.

PART 2 SUBMITTALS AND TESTING

2.1 SUBMITTALS

Tender Submittals

- A. Tender Response

Not required.

Samples, Mock-Ups, Prototypes And Quality Benchmarks

- B. Pre-contract Samples

Not required.

- C. Post Contract Award Samples

In accordance with Section Ss_00_00_00, submit post contract award samples of the following:

1. 3 No. samples of each type.
2. Jointing sample.

D. Sample Panels

Prior to commencement of the Works, sample panels shall be submitted as follows:

1. 1800mm x 1800mm sample panel of each paving type constructed in location(s) to be agreed with the Contractor using randomly selected units but rejecting any that are damaged.
2. The sample panel shall include:
 - a. Laying pattern, including mix of colours as applicable.
 - b. Colour and profile options of joint material.
 - c. Movement joints of each profile and finish type.
3. Acceptance from the Contractor shall be obtained prior to commencement of construction for each type. If a panel is rejected, construct another sample panel for that type until acceptance is obtained from the Contractor.

E. Mock-up Requirements

Not required.

F. Prototype Requirements

Not required.

G. Quality Benchmark Requirements

Submit quality benchmarks, in location(s) to be agreed with the Contractor, in accordance with Section Ss_00_00_00:

1. An area of 25m² of each type of module.

2.2 TESTING

A. General

Submit manufacturer's details of tests undertaken including:

1. Compressive strength.
2. Absorption percentage.
3. Soluble salt content.
4. Drying shrinkage or moisture expansion.
5. Density and tolerance in dimensions.
6. Mortar testing.

B. Slip Resistance Testing

1. Testing for slip resistance shall be in accordance with the following documents:
 - a. 'Assessing the slip resistance of flooring' by the Health and Safety Executive (latest published version).
 - b. 'The assessment of floor slip resistance, the UK Slip Resistance Group guidelines' by the UK Slip Resistance Group (latest published version).
2. Testing shall be performed by an independent United Kingdom Accreditation Service (UKAS) accredited laboratory accredited to perform the specified test methods.
3. Pendulum test: Evaluate external paving in both dry and wet conditions using the TRL Pendulum Tester in accordance with BS EN 16165 (BS EN 1341 for external natural stone slabs and BS EN 1342 for external natural stone setts) and the recommendations of the UK Slip Resistance Group to obtain the pendulum test value (PTV) low slip potential.
4. Roughness test: Evaluate external paving using a surface roughness meter, in accordance with the recommendations of the UK Slip Resistance Group, to obtain the surface roughness (Rz) value confirmed by the manufacturer's product literature.

5. Test samples at the following stages of the project:
 - a. Submission to the Contractor for acceptance.
 - b. Production.
 - c. Post-installation (in situ).
6. Post installation (in situ) test locations shall be agreed with the Contractor.
7. Submit test results to the Contractor for acceptance in due time, prior to each of the project stages or as agreed with the Contractor.
8. Test samples shall include any surface sealer or treatment to be applied to the finished external paving.

PART 3 EXECUTION

3.1 WORKMANSHIP

Fabrication

A. General

Fabrication of materials/ components shall, as a minimum, be in accordance with current regulations and standards.

B. Stone

1. Stone shall be cut, dressed, worked and finished before delivery to Site.
2. Cutting, dressing, working and finishing of the stone shall not adversely affect performance and the results obtained through testing.
3. Remedial work such as patching and filling during fabrication shall not be undertaken, without acceptance by the Contractor as part of the sampling process.

Workmanship

C. General

1. Workmanship shall generally be in accordance with the relevant and applicable parts of BS 8000 and BS 7533.
2. Where applicable, carry out the Works in accordance with the manufacturer's recommendations.
3. Operatives shall be trained, experienced and appropriately skilled in the installation of the Works and, where applicable, be recommended by the system/ product manufacturer.

Inspection/ Preparation

D. Inspection

1. Before commencing installation, survey the structure/ substrate. Check dimensions, line, level and fixing points. Report immediately to the Contractor if the structure is unsuitable to receive the Works.
2. If the structure/ substrate is unsuitable, propose remedial action to make the structure suitable.

E. Suitability of Base/ Backing

1. Tolerances of the structure/ substrate/ sub-base shall be suitable to permit the required configuration and indicated tolerances of the finished systems/ products.
2. Surfaces to be covered shall be firmly fixed, dry, smooth, without depressions, voids or protrusions, clean and free from frost, unacceptable curing compounds, release agents and other surface contaminants.
3. The base shall have even falls such that no areas will be subject to ponding.
4. Solid substrates shall be thoroughly swept prior to application of the Works.

Installation

F. Laying of Paving

1. Paving shall be laid to even gradients/ falls or regular vertical curves, such that there is no ponding. Falls shall be in accordance with the Design Drawings and Civil Engineer's documentation.
2. Paving units shall be suitably bedded so that rocking does not occur or develop.
3. Finished paving shall have an even overall appearance with even joint widths.

G. Cutting Slabs

1. When cutting a notch from the corner of a slab which exceeds 25% of the slab area, the remaining shape shall be mitre cut from the internal corner of the notch to the opposite external corner.
2. Slabs or portions of slabs shall be cut to form a mitre at abrupt changes of level at the ends of ramped footpath crossings and the like.

H. Sand Bedding

Sand shall be laid and compacted to give the specified final thickness such that the entire area of the paving is fully supported.

I. Narrow Sand Filled Joints for Sand Bedded Paving

1. Paving units shall be placed squarely with minimum disturbance to bedding, laying away from previously laid paving.
2. Mechanical force shall not be used to obtain tight joints.
3. Vacuum cleaning machines shall not be used on the completed paving.

J. Mortar Joints

1. Mortar joints shall be of a consistent thickness and density.
2. The joints shall be cleaned to the full depth of the paving units before filling with mortar.
3. The mortar shall be in full contact with the paving units on both sides.
4. Jointing shall be carried out as work proceeds.
5. Tooling of joints shall be carried out while the mortar is thumbprint hard.
6. Exposed faces of units shall be kept clean and free from concrete and mortar smears.
7. No washing or scrubbing of the finished surfaces with proprietary cleaners or acids shall be allowed. Smears shall be removed by gentle brushing off with a soft brush and water only.

K. Geotextiles

1. Geotextiles shall be laid in accordance with the manufacturer's recommendations to the prepared subgrade. Refer to the Civil Engineer's documentation.
2. Vehicular traffic shall not be allowed over the geotextile until it has been fully covered by the compacted granular sub-base.

Protection And Completion

L. Protection

Finished areas shall be adequately protected from damage until Practical Completion.

M. Protection from Traffic

1. Access to paved areas shall be restricted as necessary to prevent damage from Site traffic and plant.
2. Access shall be prevented to paving bedded on mortar until the mortar has achieved its design strength.

3. Access to areas with geotextile shall be prevented until the upper granular sub-base has been fully laid and compacted.

N. Cleaning

1. At Practical Completion of the Works, or when otherwise agreed with the Contractor, clean exposed areas/ surfaces of the Works.
2. Cleaning materials and methods shall be as recommended/ accepted by the system/ product manufacturer, where applicable.
3. Do not use materials or methods that could alter the character of the exposed finishes.
4. Protect adjacent surfaces from damage due to cleaning operations.
5. Washings and any detritus shall be safely disposed of without discharging this into drainage systems or watercourses.

O. Completion

1. Drainage channels shall be left clean, with outlets clear.
2. On Practical Completion, check the Works for damage and defects. Replace damaged or defective materials/ components.

Adverse Conditions

P. Working in Adverse Conditions

1. If unavoidable wetting of the Works occurs, prompt action shall be taken to minimise and make good any damage.
2. Temporary covers shall be provided as required to keep unfinished areas dry.
3. In severe or continuously wet weather, work shall be suspended unless an effective temporary enclosure is provided over the working areas.
4. Concrete foundations:
 - a. Do not cast foundations, lay units or make joints if the temperature is below 3°C on a falling thermometer or 1°C on a rising thermometer.
 - b. Foundations and bedding shall be adequately protected against frost and rapid drying by sun and wind.

3.2 TOLERANCES

A. General

Measure tolerances against the relevant Base Reference Datum, Location Reference Point, Location Reference Plane, Location Reference Surface or Reference Element as defined in Section Ss_00_00_00 of the Landscape Specification.

1. Tolerances generally shall be in accordance with BS 7533: Part 3.
2. The Works shall be set out to the correct position as shown on the Working Drawings, within $\pm 3\text{mm}$.
3. The maximum variation in gap from a 3m straightedge applied to any area of the surface shall be 6mm, while maintaining any drainage requirements such that there is no standing water.
4. The average width of any panel to panel joint shall be within $\pm 2\text{mm}$ of the designed width. Any variation shall be equally distributed with no sudden changes or steps.
5. The offset in plane or level between adjacent paving units shall be not more than 2mm.
6. The straightness of any surface of an edge shall not deviate by more than $\pm 2\text{mm}$ from a 2000mm straightedge placed against it in any direction parallel to the long axis of the element.
7. The centre section of any lineal element shall not bow by more than the lesser of $\pm 2\text{mm}$ or 0.075% of the length of the element measured from a straight line between the ends of the element.

8. The cross-section of any element shall not be twisted by more than 1° from the alignment.
9. Paving shall be set 6mm above drainage outlets and 2mm above kerb tops unless indicated otherwise.
10. Account shall be taken of the installation tolerance requirements such that repetitive elements are located, relative to gridlines.
11. Tolerances shall not be cumulative.
12. Where an element/ component is subject to more than one applicable tolerance, the most onerous tolerance shall apply.

END OF SECTION

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SECTION Ss_30_75_45 -- STONE/ CONCRETE/ KERBS/ EDGINGS

To be read in conjunction with Section Ss_00_00_00, other related Sections of the Landscape Specification and the Design Drawings.

PART 1 TYPE, SYSTEMS AND MATERIALS

1.1 LANDSCAPE SPECIFICATION TYPE

A. Prescriptive Work

1. Supply, deliver, install and warrant the Works in compliance with the materials and workmanship requirements of the Landscape Specification.
2. Where required to prepare drawings these shall be limited to final detailing of components and systems indicated on the Design Drawings, necessary to demonstrate their safe installation.
3. Where alternative products are offered by the Subcontractor for acceptance by the Contractor, submit full supporting documentation in respect of the complete system or installation.

1.2 SYSTEM DESCRIPTIONS

Architectural And Functional Requirements

A. General

1. The Works generally shall be constructed and installed in accordance with the United Kingdom's Manual of Contract Documents For Highway Works (MCHW) Volume 1: Specification for Highway Works, Series 1100.
2. If the kerb haunch and log are laid separately the haunch is to be keyed to the log with 200mm x 15mm diameter mild steel pins at 450mm centres. The kerbs shall be laid on a 25mm max. mortar bed in accordance with MCHW Table 24/1 designation, all returns in kerb lines shall be made using quadrant kerb units and or corner return units, mitred joints are not acceptable.
3. The Works shall be set out to accurate straight lines and smooth, regular curves as indicated on the Design Drawings.
4. Kerbs/ edgings shall be installed as complete integrated systems, including necessary foundations, fixings, dowels and other components/ accessories necessary to complete the Works.
5. Kerb and edging systems shall include preformed units for radii, transitions and drop kerbs as indicated on the Design Drawings.

B. Formation and Sub-Base

Preparation of the formation and/ or sub-base shall be in accordance with the Civil Engineer's documentation.

C. Foundations and Haunching

1. Kerbs, edgings and channels shall generally be mortar bedded on to a formed foundation, in accordance with the Civil Engineer's documentation.
2. Systems shall include concrete haunching.

D. Fixings

1. Fixings shall be concealed unless accepted otherwise by the Contractor.
2. The type, size and positioning of mechanical fixing devices shall be as recommended by the system manufacturer to the acceptance of the Contractor.

Precast Concrete Kerbs/ Edgings

E. Type EXT-201 Precast Concrete Kerb (K1A)

Hydraulically pressed precast concrete kerbs/ edging configured as indicated on the Design Drawings.

1. Manufacturer/ reference: To be agreed with the Contractor.
2. Size:
 - a. 150mm width.
 - b. 125mm exposed upstand.
3. Profile: Bullnose (20mm) straight kerb.
4. Colour: Concrete grey.
5. Mortar:
 - a. Type: Cement and sand mortar 1:6 mix proportions.
 - b. Colour: To match kerbs.
 - c. Profile: Flush profiled narrow mortar joints.
 - d. Joint thickness: 3mm - 5mm.
6. Dowel haunching fixing, as recommended by the manufacturer to suit the service conditions.

F. Type EXT-202 Precast Concrete Kerb (K1B)

Hydraulically pressed precast concrete kerbs configured as indicated on the Design Drawings.

1. Manufacturer/ reference: To be agreed with the Contractor.
2. Width: 150mm.
3. Profile: Bullnose (20mm), transition and quadrant profiles where required or as indicated on the Design Drawings.
4. Colour: Concrete grey.
5. Mortar:
 - a. Type: Cement and sand mortar 1:6 mix proportions.
 - b. Colour: To match kerbs.
 - c. Profile: Flush profiled narrow mortar joints.
 - d. Joint thickness: 3mm - 5mm.
6. Dowel haunching fixing, as recommended by the manufacturer to suit the service conditions.

G. Type EXT-203 Precast Concrete Kerb (K1C)

Hydraulically pressed precast concrete flush drop kerbs configured as indicated on the Design Drawings.

1. Manufacturer/ reference: To be agreed with the Contractor.
2. Width: 150mm.
3. Profile: Straight edge, flush kerb.
4. Colour: Concrete grey.
5. Mortar:
 - a. Type: Cement and sand mortar 1:6 mix proportions.
 - b. Colour: To match kerbs.
 - c. Profile: Flush profiled narrow mortar joints.
 - d. Joint thickness: 3mm - 5mm.

6. Dowel haunching fixing, as recommended by the manufacturer to suit the service conditions.
- H. Type EXT-204 Precast Concrete Pin Kerb (K3)
- Hydraulically pressed precast concrete pin kerbs configured as indicated on the Design Drawings.
1. Manufacturer/ reference: To be agreed with the Contractor.
 2. Size: 50mm (W) x 150mm (D) x 914mm (L).
 3. Profile: Flat top.
 4. Colour: Concrete grey.
 5. Mortar:
 - a. Type: Cement and sand mortar 1:6 mix proportions.
 - b. Colour: To match kerbs.
 - c. Profile: Flush profiled narrow mortar joints.
 - d. Joint thickness: 3mm - 5mm.
 6. Dowel haunching fixing, as recommended by the manufacturer to suit the service conditions.

Natural Stone Edgings

- I. Type EXT-213 Natural Stone Edging - Water Feature (K6)
- Bespoke natural stone retaining edge configured as indicated on the Design Drawings.
1. Manufacturer: Hardscape Products Ltd (part of the Hardscape Group Ltd).
 2. Reference: Bespoke natural stone edging to water feature.
 3. Stone type: Granite.
 4. Size: 300mm (W) x 438mm (H), refer to the Design Drawings.
 5. Profile: Flush.
 6. Special profiles: Internal radius kerbs and external radius kerbs as shown on the Design Drawings.
 7. Profile: Refer to the Design Drawings.
 8. Finish:
 - a. Exposed faces shall receive a hammered finish.
 - b. Ends shall be sawn and all faces abutting other surfacing materials.
 - c. Bedding shall be carefully dressed to allow the specified joint widths.
 9. Colour: Silver grey.
 10. Mortar:
 - a. Type: Cement and sand mortar 1:6 mix proportions.
 - b. Colour: To match kerbs.
 - c. Profile: Flush.
 - d. Joint thickness: 3mm - 5mm.
 11. Special shapes shall include internal and external radii.
- J. Type EXT-214 Natural Stone Edging - Water Feature (K7)
- Bespoke natural stone retaining edge configured as indicated on the Design Drawings.
1. The system build-up shall be as Type EXT-213 with the following differences:

- a. Size: 500mm (W) x 565mm (H).

K. Type EXT-215 Natural Stone Edging - Water Feature (K8)

Bespoke natural stone retaining edge configured as indicated on the Design Drawings.

- 1. The system build-up shall be as Type EXT-213 with the following differences:

- a. Size: 250mm (W) x 300mm (H).

L. Type EXT-216 Natural Stone Edging - Transition - Water Feature (K5T)

Bespoke natural stone retaining edge configured as indicated on the Design Drawings.

- 1. The system build-up shall be as Type EXT-213 with the following differences:

- a. Size: 300mm (W) x 565mm - 400mm (H) (transition edge).

Metal Edges

M. Type EXT-231 Metal Edging (K4)

Proprietary flush metal edging configured as indicated on the Design Drawings.

- 1. Manufacturer: Kinley Systems Limited.
- 2. Reference: AluExcel.
- 3. Type: Flexible or rigid, dependent on linearity/ curve indicated on the Design Drawings.
- 4. Material: 6005A grade recycled aluminium.
- 5. Finish: Mill finish.
- 6. Height: 40mm.
- 7. Fixing: Fixed with aluminium spiral fixing stakes in accordance with the manufacturer's recommendations.

1.3 MATERIALS

Metalwork And Finishes

A. Metalwork

Refer to Section Ss_99_99_11.

B. Finishes

Refer to Section Ss_99_99_30 for general finishes to metalwork.

Fixings

C. General

- 1. Refer to Section Ss_99_99_20.
- 2. Fixing components shall comply with statutory requirements.
- 3. Fixings shall be to the acceptance of the Building Control Officer and in accordance with the Structural Engineer's documentation.
- 4. Fixings shall be inherently corrosion resistant or fully protected to prevent corrosion.

Concrete

D. General

- 1. Concrete for foundations and haunching shall be in accordance with BS 8500: Parts 1 and 2 and BS EN 206.
- 2. Designated mix shall generally be C6/ 8 or ST1, unless specified otherwise.
- 3. Admixtures shall not be used.

4. Where required, concrete base foundations shall be C20P concrete.

Mortars

E. General

1. Refer to Section Ss_99_99_21 of the Landscape Specification.
2. Portland cements shall be in accordance with BS EN 197: Part 1.
3. Admixtures, if specified, shall be in accordance with BS EN 934: Part 3.

Kerbs/ Edgings

F. General

1. Precast concrete kerbs shall be in accordance with BS EN 1340.
2. Natural stone kerbs/ channels shall be in accordance with BS EN 1343.

Channels/ Gratings

G. General

Drainage channels shall be in accordance with BS EN 1433 and BS EN 124.

Dowels

H. General

Kerb/ haunching dowels shall be in accordance with BS 4482.

PART 2 SUBMITTALS AND TESTING

2.1 SUBMITTALS

Tender Submittals

A. Tender Response

Not required.

Samples, Mock-Ups, Prototypes And Quality Benchmarks

B. Pre-contract Samples

Not required.

C. Post Contract Award Samples

In accordance with Section Ss_00_00_00, submit post contract award samples of the following:

1. 3 No. samples of each type in accepted finish and colour.

D. Mock-up Requirements

Submit mock-ups in accordance with Section Ss_00_00_00 as follows:

1. Refer to the Contractor's proposals.

E. Prototype Requirements

Submit prototypes in accordance with Section Ss_00_00_00 as follows:

1. Refer to the Contractor's proposals.

F. Quality Benchmark Requirements

Submit quality benchmarks, in location(s) to be agreed with the Contractor, in accordance with Section Ss_00_00_00:

1. The first fully installed unit of each type.

2.2 TESTING

A. General

1. Refer to Section Ss_00_00_00 for the general requirements for testing and the approach to off-Site and on-Site testing.
2. Undertake on-Site testing specified herein, which shall be carried out by an independent testing body accredited by the United Kingdom Accreditation Service (UKAS).

B. Slip Resistance Testing

1. Testing for slip resistance shall be in accordance with the following documents:
 - a. 'Assessing the slip resistance of flooring' by the Health and Safety Executive (latest published version).
 - b. 'The assessment of floor slip resistance, the UK Slip Resistance Group guidelines' by the UK Slip Resistance Group (latest published version).
2. Testing shall be carried out by an independent testing body accredited by UKAS.
3. Pendulum test: Evaluate systems in both dry and wet conditions using the TRL Pendulum Tester in accordance with BS EN 16165 and the recommendations of the UK Slip Resistance Group to obtain the pendulum test value (PTV) low slip potential.
4. Roughness test: Evaluate systems using a surface roughness meter, in accordance with the recommendations of the UK Slip Resistance Group, to obtain the surface roughness (Rz) value confirmed by the manufacturer's product literature.
5. Materials provided with manufacturer's data referring to slipperiness (R) values in accordance with DIN 51130 will not be acceptable unless PTV and Rz values are also provided.
6. Test samples at the following stages of the project:
 - a. Submission to the Contractor for acceptance.
 - b. Production.
 - c. Post-installation (in situ).
7. Post installation (in situ) test locations shall be agreed with the Contractor.
8. Submit test results to the Contractor for acceptance in due time, prior to each of the project stages or as agreed with the Contractor.
9. Test samples shall include any sealer or other treatment to be applied to the finished surface.

PART 3 EXECUTION

3.1 WORKMANSHIP

Fabrication

A. General

1. Fabrication of materials/ components shall, as a minimum, be in accordance with current regulations and standards.
2. Form sections true to shape, accurate in size, square, free from distortions, irregularities and defects to profiles indicated on the Design Drawings.
3. Do not use materials/ components that are damaged or have any other physical imperfections in the Works.

B. Metalwork

Refer to Section Ss_99_99_11.

C. Stone

1. Stone shall be cut, dressed, worked and finished by skilled masons before delivery to Site. Evidence of previous experience and details of work previously carried out shall be submitted.
2. Cutting, dressing, working and finishing of the stone shall not adversely affect performance and the results obtained through testing.
3. Remedial work during fabrication, such as patching and filling, shall not be undertaken unless accepted by the Contractor.
4. No saw marks shall be visible on the finished surface of the stone units, unless accepted otherwise by the Contractor.

Workmanship

D. General

1. Workmanship shall generally be in accordance with the relevant and applicable parts of BS 8000 and BS 7533: Part 101.
2. Where applicable, carry out the Works in accordance with the manufacturer's recommendations.
3. Operatives shall be trained, experienced and appropriately skilled in the installation of the Works and, where applicable, be recommended by the system/ product manufacturer.

Inspection/ Preparation

E. Inspection

1. Before commencing installation, survey the structure. Check dimensions, line, level and fixing points. Report immediately to the Contractor if the structure is unsuitable to receive the Works.
2. If the structure/ substrate is unsuitable, propose remedial action to make the structure suitable.

F. Suitability of Base/ Backing

1. Tolerances of the structure/ substrate shall be suitable to permit the required configuration and indicated tolerances of the finished systems/ products.
2. Surfaces to be covered shall be firmly fixed, dry, smooth, without depressions, voids or protrusions, clean and free from frost, unacceptable curing compounds, release agents and other surface contaminants.
3. The base shall have even falls with no areas subject to ponding.
4. Sweep the substrate thoroughly prior to application of the Works.

Laying

G. General

1. Kerbs, edgings and channels shall be bedded on mortar. Bedding shall be allowed to set before placing haunching.
2. Haunching dowels:
 - a. Dowels shall be inserted vertically into foundations while the concrete is still plastic.
 - b. Dowels shall be set out at 450mm centres, 50mm from back face of kerb and with 75mm projecting.
3. Haunching shall be rectangular cross section cast against formwork, so as to fully enclose and protect dowels.

H. Mortar Joints

1. Joints to kerbs, channels and edgings shall be completely filled with mortar.
2. Slushing of perpend joints or furrowing of bed joints shall not be allowed.
3. Mortar joints shall be of a consistent thickness and density.

4. Perpend joints shall be aligned plumb within vertical tolerance.
5. Tooling of joints shall be carried out while the mortar is thumbprint hard.
6. Exposed faces of units shall be kept clean and free from concrete and mortar droppings.
7. No washing or scrubbing of the finished face with proprietary cleaners or acids shall be allowed. Smears shall be removed by gentle brushing off with a soft brush and water only.

I. Drainage Channels

Set out drainage channels at an even gradient or regular vertical curve, such that there is no ponding or backfall.

J. Geotextiles

1. Geotextiles shall be laid in accordance with the manufacturer's recommendations to the prepared subgrade. Refer to the Civil Engineer's documentation.
2. Vehicular traffic shall not be allowed over the geotextile until it has been fully covered by the compacted granular sub-base.

Protection And Completion

K. Protection

Finished areas shall be adequately protected from damage until Practical Completion.

L. Cleaning

1. At Practical Completion of the Works, or when otherwise agreed with the Contractor, clean exposed areas/ surfaces of the Works.
2. Cleaning materials and methods shall be as recommended/ accepted by the system/ product manufacturer, where applicable.
3. Do not use materials or methods that could alter the character of the exposed finishes.
4. Protect adjacent surfaces from damage due to cleaning operations.
5. Washings and any detritus shall be disposed of without discharging this into drainage systems or watercourses.

M. Completion

1. Drainage channels shall be left clean, with outlets clear.
2. On Practical Completion, check the Works for damage and defects. Replace damaged or defective materials/ components.

Adverse Conditions

N. Working in Adverse Conditions

1. If unavoidable wetting of the Works occurs, prompt action shall be taken to minimise and make good any damage.
2. Temporary covers shall be provided as required to keep unfinished areas dry.
3. In severe or continuously wet weather, work shall be suspended unless an effective temporary enclosure is provided over the working areas.
4. Concrete foundations:
 - a. Do not cast foundations, lay units, place haunching or make joints if the temperature is below 3°C on a falling thermometer or 1°C on a rising thermometer.
 - b. Foundations, bedding and haunching shall be adequately protected against frost and rapid drying by sun and wind.

3.2 TOLERANCES

A. General

Measure tolerances against the relevant Base Reference Datum; Location Reference Point; Location Reference Plane; Location Reference Surface or Reference Element as defined in Section Ss_00_00_00.

1. Tolerances shall generally be as indicated in the United Kingdom's Manual of Contract Documents For Highway Works (MCHW) Volume 1: Specification for Highway Works, Series 0700 and Series 1100, unless indicated otherwise in the Landscape Specification.
2. Elements shall be set out to their correct position as indicated on the Design Drawings, within $\pm 6\text{mm}$.
3. Horizontal elements shall be level, within $\pm 2\text{mm}$ or 0.1% of the length, whichever is the lesser.
4. The maximum variation in gap from a straightedge applied to a flat plane shall be 3mm using a 3000mm straightedge.
5. The average width of any unit to unit joint shall be within $\pm 3\text{mm}$ of the joint. Any variation shall be equally distributed with no sudden changes or steps.
6. The maximum deviation between adjacent surfaces either side of a joint shall be 3mm.
7. Account shall be taken of the installation tolerance requirements such that repetitive elements are located, relative to gridlines.
8. Tolerances shall not be cumulative.
9. Where an element/ component is subject to more than one applicable tolerance, the most onerous tolerance shall apply.

END OF SECTION

SECTION Ss_40_20_30 -- SITE/ STREET FURNITURE/ EQUIPMENT 1

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- E. Type EXT-414 Lighting Bollard (LB and LB1) 2

Cycle Storage 2

- F. Type EXT-421 Cycle Stand (CS) 2

Seats/ Benches/ Tables 2

- G. Type EXT-440 Bench with Backrest (BE) 2

- H. Type EXT-441 Bench with Backrest and Armrests (BE) 3

- I. Type EXT-442 Bench with no Backrest or Armrest (BE2) 3

- J. Type EXT-443 Wide Bench with no Back or Arm Rest (BE3) 3

- K. Type EXT-451 Table - Wheelchair Accessible (TA) 4

Miscellaneous 4

- L. Type EXT-471 Lighting Columns (L8) 4

- M. Type EXT-472 Inground Uplighters (LU) 4

- N. Type EXT-473 CCTV Columns (CCV) 4

- O. Type EXT-474 Active Beam-set Mounting Post (BP) 5

- P. Type EXT-475 Lighting Columns (L6) 5

- Q. Type EXT-491 Flagpole (FP) 5

- R. Type EXT-492 Disabled Parking Bay Signage (SP) 6

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SECTION Ss_40_20_30 -- SITE/ STREET FURNITURE/ EQUIPMENT

To be read in conjunction with Section Ss_00_00_00, other related sections of the Landscape Specification and the Design Drawings.

PART 1 TYPE, SYSTEMS AND MATERIALS

1.1 LANDSCAPE SPECIFICATION TYPE

A. Prescriptive Work

1. Supply, deliver, install and warrant the Works in compliance with the materials and workmanship requirements of the Landscape Specification.
2. Where required to prepare drawings these shall be limited to final detailing of components and systems indicated on the Design Drawings, necessary to demonstrate their safe installation.
3. Where alternative products are offered by the Subcontractor for acceptance by the Contractor, submit full supporting documentation in respect of the complete system or installation.

1.2 SYSTEM DESCRIPTIONS

Architectural And Functional Requirements

A. General

System build-ups shall be as indicated on the Design Drawings.

B. Fixings

1. Fixings shall be concealed unless accepted otherwise by the Contractor.
2. Visible fixings shall be satin finished stainless steel round headed bolts/ Allen bolts, unless otherwise indicated or required by the Contractor.
3. The type, size and positioning of mechanical fixing devices shall be as recommended by the system manufacturer for proprietary systems or as proposed by the Subcontractor for acceptance by the Contractor.
4. Where necessary, fixing devices shall be capable of three-dimensional adjustment to accommodate building structure and fabrication/ installation tolerances.

C. Secondary Support

1. Systems shall include a structural support system, as necessary.
2. Where the Subcontractor deems that visible secondary support is required in addition to that indicated in the Structural Engineer's documentation and on the Design Drawings, the Subcontractor shall inform the Contractor at tender return.
3. Systems shall include necessary sub-constructions/ assemblies including, but not limited to, framing, brackets, cleats, angles and other components.

Bins

D. Type EXT-401 Bin (BI)

Litter bin with rain cover to match benches and table specified herein, configured as indicated on the Design Drawings.

1. Manufacturer: mmicité UK.
2. Reference: Quinbin - QB145.
3. Frame: Mild steel frame.
4. Sheathing finish: Thermally modified wooden slats.
5. Accessories:

- a. Rain cover.
- b. Stainless steel cigarette stubber and ashtray.

Lighting Bollards

E. Type EXT-414 Lighting Bollard (LB and LB1)

Surface-mounted exterior luminaire for ground illumination configured as indicated on the Design Drawings and in accordance with the Lighting Specialist's documentation.

- 1. Manufacturer: Bega.
- 2. Reference: Bollard 84 69 K3 & 84 006.
- 3. Type: Refer to the Lighting Specialist's documentation.
- 4. Width: Refer to the Design Drawings and the Lighting Specialist's documentation.
- 5. Height:
 - a. LB: 495mm.
 - b. LB1: 940mm.
- 6. Colour:
 - a. LB: Dark Grey.
 - b. LB1: Graphite Grey.
- 7. Method of fixing: Surface-mounted in accordance with the manufacturer's recommendations.

Cycle Storage

F. Type EXT-421 Cycle Stand (CS)

Cycle stand configured as indicated on the Design Drawings.

- 1. Manufacturer: Marshalls Mono Ltd.
- 2. Reference: Sheffield Cycle Stand (Essentials Cycle Stand).
- 3. Size: Above Ground Height 750mm x Width 798mm x Overall Height 1000mm.
- 4. Material: 304 grade stainless steel.
- 5. Finish: Brushed satin with anti-graffiti coating.
- 6. Method of fixing: Root fixed as indicated on the Design Drawings and in accordance with the manufacturer's recommendations.

Seats/ Benches/ Tables

G. Type EXT-440 Bench with Backrest (BE)

Proprietary, purpose made bench with backrest configured as indicated on the Design Drawings.

- 1. Manufacturer: mmicité.
- 2. Range: Woody.
- 3. Reference: LWD150.
- 4. Support framing/ legs: Mild steel support framing to sizes and profiles indicated on the Design Drawings.
- 5. Seat and backrest: Thermally modified wooden slats to sizes and profiles indicated on the Design Drawings fixed back to support structure with stainless steel fixings.
- 6. Mild steel finish: All exposed mild steel shall be treated with a protective layer of zinc and powder coated to a RAL 7016 anthracite grey colour.
- 7. Sizes: Refer to the Design Drawings.

8. Method of fixing: Root fixed into concrete in accordance with the manufacturer's recommendations.

H. Type EXT-441 Bench with Backrest and Armrests (BE)

Proprietary, purpose made bench with backrest and armrests configured as indicated on the Design Drawings.

1. Manufacturer: mmicité.
2. Range: Woody.
3. Reference: LWD150.
4. Support framing/ legs: Mild steel support framing to sizes and profiles indicated on the Design Drawings.
5. Seat and backrest: Thermally modified wooden slats to sizes and profiles indicated on the Design Drawings fixed back to support structure with stainless steel fixings.
6. Armrests: Mild steel to sizes and profiles indicated on the Design Drawings.
7. Mild steel finish: All exposed mild steel shall be treated with a protective layer of zinc and powder coated to a RAL 7016 anthracite grey colour.
8. Sizes: Refer to the Design Drawings.
9. Method of fixing: Root fixed into concrete in accordance with the manufacturer's recommendations.

I. Type EXT-442 Bench with no Backrest or Armrest (BE2)

Proprietary, purpose made bench without backrest or armrest configured as indicated on the Design Drawings.

1. Manufacturer: mmicité.
2. Range: Woody.
3. Reference: LWD110.
4. Support framing/ legs: Mild steel support framing to sizes and profiles indicated on the Design Drawings.
5. Mild steel finish: All exposed mild steel shall be treated with a protective layer of zinc and powder coated to a RAL 7016 anthracite grey colour.
6. Seat: Thermally modified wooden slats to sizes and profiles indicated on the Design Drawings fixed back to support structure with stainless steel fixings.
7. Sizes: Refer to the Design Drawings.
8. Method of fixing: Root fixed into concrete base in accordance with the manufacturer's recommendations.

J. Type EXT-443 Wide Bench with no Back or Arm Rest (BE3)

Proprietary, purpose made bench without backrest or armrest configured as indicated on the Design Drawings.

1. Manufacturer: mmicité.
2. Range: Woody.
3. Reference: LWD110.
4. Support framing/ legs: Mild steel support framing to sizes and profiles indicated on the Design Drawings.
5. Mild steel finish: All exposed mild steel shall be treated with a protective layer of zinc and powder coated to a RAL 7016 anthracite grey colour.
6. Seat: Thermally modified wooden slats to sizes and profiles indicated on the Design Drawings fixed back to support structure with stainless steel fixings.
7. Sizes: Refer to the Design Drawings.

8. Method of fixing: Root fixed into concrete base in accordance with the manufacturer's recommendations.
- K. Type EXT-451 Table - Wheelchair Accessible (TA)
- Proprietary wheelchair accessible table, configured as indicated on the Design Drawings.
1. Manufacturer: mmicité.
 2. Range: Woody.
 3. Reference: Wheelchair accessible table rectangular LWD900.
 4. Support framing/ legs: Mild steel support framing to sizes and profiles indicated on the Design Drawings.
 5. Mild steel finish: All exposed mild steel shall be treated with a protective layer of zinc and powder coated to a RAL 7016 anthracite grey colour.
 6. Table top: Thermally modified wooden slats to sizes and profiles indicated on the Design Drawings fixed back to support structure with stainless steel fixings.
 7. Sizes: Refer to the Design Drawings.
 8. Method of fixing: Root fixed into concrete base in accordance with the manufacturer's recommendations.

Miscellaneous

- L. Type EXT-471 Lighting Columns (L8)
- Proprietary lighting columns configured as indicated on the Design Drawings and in accordance with the Lighting Specialist's documentation.
1. Manufacturer: iGuzzini illuminazione S.p.A.
 2. References (refer also to the Lighting Specialist's documentation):
 - a. Lavinia EH22.
 - b. Lavinia EH32.
 - c. Lavinia EH32 double bracket.
 - d. Lavinia EH22 double bracket.
 3. Sizes: Refer to the Design Drawings and Lighting Specialist's documentation.
 4. Material: Aluminium.
 5. Colour: Dark grey.
 6. Accessories (refer to the Lighting Specialist's documentation):
 - a. Allow mounting plate for 1 No. remote DALI presence detector. Details of the PIR, exact position, orientation and mounting height shall be agreed with the Contractor. Estimated weight 25kg.
 - b. Allow mounting plate for 1 No. CCTV camera. Details of the camera, exact position, orientation and mounting height shall be agreed with the Contractor. Estimated weight 25kg.
- M. Type EXT-472 Inground Uplighters (LU)
- Proprietary recessed inground uplighter with a medium flood optic, configured as indicated on the Design Drawings and in accordance with the Lighting Specialist's documentation.
1. Manufacturer: LineaLight.
 2. Reference: Range: Suelo Rx, (Catalog No. 80610W35).
 3. Finish: Stainless steel bezel.
 4. Method of fixing: In accordance with the manufacturer's recommendations.
- N. Type EXT-473 CCTV Columns (CCV)

Proprietary CCTV columns configured as indicated on the Design Drawings and in accordance with the Security Brief/ Report.

1. Manufacturer: WEC CCTV.
2. Reference: Refer to the Security Brief/ Report.
3. Type: 6000mm Parallel Column With CCTV at 5500mm AGL.
4. Height: 6000mm. Exact height required shall be determined when configuring the systems to achieve the functional requirements of the various cameras.
5. Material: Galvanised steel.
6. Finish/ colour: To match adjacent lighting columns, to the acceptance of the Contractor.
7. Equipment loading up to CCTV mounting pole shall accommodate a maximum weight of 25kg.
8. Method of fixing: In accordance with the manufacturer's recommendations and Security Brief/ Report.

O. Type EXT-474 Active Beam-set Mounting Post (BP)

Proprietary post mounted active beam-sets configured as indicated on the Design Drawings and in accordance with the Security Brief/ Report.

1. Manufacturer/ reference: Refer to the Security Brief/ Report.
2. Type:
 - a. Beam-set to monitor area directly above the 1200mm planted hedge row.
 - b. 6000mm parallel column with CCTV at 5500mm AGL.
3. Material and fixing: Refer to the Security Brief/ Report.

P. Type EXT-475 Lighting Columns (L6)

Proprietary lighting columns configured as indicated on the Design Drawings and in accordance with the Lighting Specialist's documentation.

1. Manufacturer: Selux.
2. Reference: Line (Catalogue No. TLC93K).
3. Height: 6000mm.
4. Diameter: 114mm.
5. Material: Mild steel.
6. Finish: Powder coated.
7. Colour: RAL 7016 graphite grey.
8. Accessories: As recommended by the manufacturer to complete the installation.
9. Fixing: Root fixed in accordance with the manufacturer's recommendations.
10. Location: (4 No. in total) to provide light to the drop off area as indicated on the Design Drawings and Lighting Specialist's documentation.

Q. Type EXT-491 Flagpole (FP)

Proprietary aluminium flagpole configured as indicated on the Design Drawings.

1. Manufacturer: Flagpole Express Ltd.
2. Reference: Premier aluminium architectural flagpoles.
3. Type: 8000mm two-part Site assembled flagpole with 90mm diameter base with a step taper to 60mm diameter at the top.
4. Finish/ colour: Powder coated to a white colour.

5. Fixing: Aluminium ground sleeve and fixed in accordance with the manufacturer's recommendations and the Structural Engineer's documentation.
- R. Type EXT-492 Disabled Parking Bay Signage (SP)
- Proprietary bespoke disabled bay signage to EV chargers in disabled parking bay configured as indicated on the Design Drawings and Services Engineer's documentation.
- S. Type EXT-494 Vehicle Stopper
- Proprietary heavy goods vehicle stoppers configured as indicated on the Design Drawings.
1. Manufacturer: Rediweld.
 2. Reference: TruckStop 150.
 3. Material: Recycled rubber with high visibility yellow markings moulded into the material.
 4. Height: 150mm.
 5. Length: 1000mm.
 6. Width: 300mm.
 7. Fixings: 5 No. bolt fixings in accordance with the manufacturer's recommendations.
 8. Weight: 25kg.

1.3 MATERIALS

Metalwork And Finishes

- A. Metalwork
- Refer to Section Ss_99_99_11.
- B. Finishes
1. Refer to Section Ss_99_99_30 for general finishes to metalwork.
 2. Refer to Section Ss_99_99_31 for powder coatings.

Fixings

- C. General
1. Refer to Section Ss_99_99_20.
 2. Fixings shall be in accordance with the system manufacturer's recommendations, to suit the service conditions.
 3. Where necessary, fixing components shall be capable of adequate three-dimensional adjustment to accommodate building structure and system fabrication/ installation tolerances.
 4. Fixings shall be inherently corrosion resistant or fully protected to prevent corrosion.
 5. Visible fixings shall be a type agreed with the Contractor prior to installation.

Adhesives

- D. General
- Refer to Section Ss_99_99_20.

Sealants

- E. General
1. Refer to Section Ss_99_99_22.
 2. Use sealant products in accordance with the system manufacturer's recommendations, to suit the service conditions.

Concrete

- F. Foundation Concrete
 - 1. Concrete shall be in accordance with BS 8500: Parts 1 and 2 and BS EN 206.
 - 2. Designated mix shall be not less than GEN 4 or Standard mix not less than ST5.
 - 3. Admixtures shall not be used.

PART 2 SUBMITTALS AND TESTING

2.1 SUBMITTALS

Tender Submittals

- A. Tender Response

Not required.

Samples, Mock-Ups, Prototypes And Quality Benchmarks

- B. Pre-contract Samples

Not required.

- C. Post Contract Award Samples

In accordance with Section Ss_00_00_00, submit post contract award samples of the following:

- 1. Sample of each lighting bollard type.
- 2. Sample of each bench/ seat.
- 3. Other samples as confirmed by the Contractor.

- D. Mock-up Requirements

Not required.

- E. Prototype Requirements

Not required.

- F. Quality Benchmark Requirements

Submit the following quality benchmarks in accordance with Section Ss_00_00_00:

- 1. An area determined by the Contractor of each element of the Works fully installed, completed and accepted by the Contractor.

2.2 TESTING

- A. Test Requirements

- 1. Submit the manufacturer's testing data to demonstrate compliance with the Landscape Specification.

PART 3 EXECUTION

3.1 WORKMANSHIP

Fabrication

- A. General

- 1. Fabrication of materials/ components shall, as a minimum, be in accordance with current regulations and standards.
- 2. Where preceding work is complete before fabrication, take site measurements. If these measurements indicate that the dimensions indicated on the Design Drawings are unachievable, seek instruction from the Contractor before proceeding.

3. Where applicable and practical, fabrication and assembly of materials/ components shall take place in equipped workshops with site work restricted to fixing.
4. Form sections true to shape, accurate in size, square, free from distortions, irregularities and defects, to profiles indicated on the Design Drawings.
5. Do not use materials/ components that are damaged or have any other physical imperfections in the Works.

Workmanship

B. General

1. Workmanship shall generally be in accordance with the relevant and applicable parts of BS 8000.
2. Where applicable, carry out the Works in accordance with the manufacturer's recommendations.
3. Operatives shall be trained, experienced and appropriately skilled in the installation of the Works and, where applicable, be recommended by the system/ product manufacturer.

Inspection/ Preparation

C. Inspection

1. Before commencing installation, survey the structure. Check dimensions, line, level and fixing points. Report immediately to the Contractor if the structure is unsuitable to receive the Works.
2. If the structure/ substrate is unsuitable, propose remedial action to make the structure suitable.

D. Suitability of Base/ Backing

1. Bases/ backgrounds shall be rigid, dry, sound, smooth, clean, free from dust, dirt, grease and other contaminants before systems/ products are installed.
2. Cutting, chasing, plugging, making good and other necessary procedures required to the substrate or to adjacent work, that cannot/ should not be undertaken after the installation of the Works, shall be completed.
3. Tolerances of the structure/ substrate shall be suitable to permit the required configuration and indicated tolerances of the finished systems/ products.

Installation

E. General

1. Systems shall accommodate future moisture and temperature movement.
2. The Works shall be set out and installed square, true to line, level and plane, free from undulations, with lines and joints aligned, straight and parallel unless specified otherwise, within stated tolerances and in the correct relationship with the building structure.
3. Cutting of materials/ components:
 - a. Where required, cut materials/ components in accordance with the manufacturer's recommendations.
 - b. There shall be no damage to the finished face of the materials/ components or any damage that would adversely affect the performance.
 - c. Keep cut edges to a minimum.
4. Materials/ components to be installed in 'running lengths' shall be subject to the following:
 - a. Straight runs between angles or ends of runs shall be formed in single unjointed lengths wherever possible. Where running joints are unavoidable, obtain acceptance for location and method of jointing from the Contractor.
 - b. Joints at angles shall be mitred or as otherwise accepted by the Contractor.

5. Inspect each material/ component of the Works immediately before installation. The Works shall be installed using materials/ components free from marks, defects, flaws, steps, waves, or damage of any nature.
 6. Do not alter materials/ components with prefinished surfaces unless accepted by the Contractor.
 7. Materials/ components from the same production batch shall be used in the same area to prevent banding, patchiness or other visual variations.
 8. Do not cut, drill or otherwise alter interfacing work to accommodate the system installation unless accepted by the Contractor.
 9. Make provision for movements/ expansion/ contraction in accordance with the system/ product manufacturer's recommendations.
- F. Setting Posts in Concrete
1. Holes shall be excavated with vertical sides.
 2. Posts/ struts shall be positioned centrally in the holes.
 3. The holes shall be filled with concrete to not less than the specified depth, well rammed as filling proceeds, and consolidated.
 4. Where necessary to suit the service conditions, the specified depth shall be exceeded to provide adequate support.
 5. Where holes are indicated on the Design Drawings as not completely filled with concrete, the upper part of the hole shall be backfilled with well rammed and consolidated excavated material.
- G. Fixing Requirements
1. Refer to Section Ss_99_99_20.
 2. Install and position fixings and fastenings as recommended by the manufacturer. Where visible, positions shall be to the acceptance of the Contractor.
 3. The Works shall be fixed securely to prevent pulling away, bowing or other movement during use and without causing stress or distortion. Include additional bracing and stiffening as required.
 4. Isolating tape, plastic washers or other suitable means shall be provided to prevent bi-metallic corrosion between dissimilar metals, or between preservative treated timber and metal.
- H. Packings
1. Provide suitable tight packings at fixing points to take up tolerances and prevent distortion.
 2. Packings shall be of non-compressible, rot-proof and non-corrosive materials/ components that maintain the performance of the systems/ products with which they interface.
 3. Packings shall not intrude into zones that are to be filled with sealant or areas required for drainage. The performance of the Works and interfacing systems shall be maintained.

Protection And Completion

- I. Protection
- Finished areas shall be adequately protected from damage until Practical Completion.
- J. Cleaning
1. At Practical Completion of the Works, or when otherwise agreed with the Contractor, clean exposed areas/ surfaces of the Works.
 2. Cleaning materials and methods shall be as recommended/ accepted by the system/ product manufacturer, where applicable.
 3. Do not use materials or methods that could alter the character of the exposed finishes.
 4. Protect adjacent surfaces from damage due to cleaning operations.

K. Completion

1. Repair defects without delay to minimise damage and nuisance.
2. Do not use the Works for any purpose, except testing, until Practical Completion.
3. On Practical Completion, check the Works for damage and defects. Replace damaged or defective materials/ components.

Adverse Conditions

L. Working in Adverse Conditions

1. If unavoidable wetting of the Works occurs, prompt action shall be taken to minimise and make good any damage.
2. In severe or continuously wet weather, work shall be suspended unless an effective temporary enclosure is provided over the working areas.
3. Concrete foundations:
 - a. Do not cast foundations, or erect fencing/ gates if the temperature is below 3°C on a falling thermometer or 1°C on a rising thermometer
 - b. Foundations shall be adequately protected against frost and rapid drying by sun and wind.

3.2 TOLERANCES

A. General

Measure tolerances against the relevant Base Reference Datum; Location Reference Point; Location Reference Plane; Location Reference Surface or Reference Element as defined in Section Ss_00_00_00 of the Landscape Specification.

1. Tolerances shall be as recommended by the system manufacturer(s) unless indicated otherwise in the Landscape Specification.
2. Posts and uprights shall be plumb within $\pm 5\text{mm}$ over their height.
3. Fabricated components shall not vary from the dimensions indicated on the Design Drawings by more than 2mm.
4. Vertical elements, other than posts, shall be plumb, within $\pm 2\text{mm}$ or 0.1% of the height, whichever is the lesser.
5. Horizontal elements shall be level, within $\pm 2\text{mm}$ or 0.1% of the length, whichever is the lesser.
6. The maximum variation in gap from a straightedge applied to a flat plane shall be 2mm for a 3000mm straightedge and 1mm for a 1000mm straightedge.
7. The maximum offset in plane, level or section between any two adjacent sections shall be $\pm 1\text{mm}$.
8. The average width of any panel to panel joint shall be within $\pm 2\text{mm}$ of the designed width. Any variation shall be equally distributed with no sudden changes or steps.
9. The maximum deviation between adjacent panel surfaces either side of a joint shall be 1mm.
10. The bow of any flat surface shall not exceed more than $\pm 2\text{mm}$ from a 2000mm straightedge placed against it in any direction.
11. The straightness of any surface of an edge shall not deviate by more than $\pm 2\text{mm}$ from a 2000mm straightedge placed against it in any direction parallel to the long axis of the element.
12. The centre section of any lineal element shall not bow by more than the lesser of $\pm 2\text{mm}$ or 0.075% of the length of the element measured from a straight line between the ends of the element.
13. The cross-section of any element shall not be twisted by more than 1° from the alignment.

14. Cut-outs for interfacing work shall be within $\pm 1\text{mm}$ the dimensions indicated on the Design Drawings.
15. Account shall be taken of the installation tolerance requirements such that repetitive elements are located, relative to gridlines.
16. Tolerances shall not be cumulative.
17. Where an element/ component is subject to more than one applicable tolerance, the most onerous tolerance shall apply.

END OF SECTION

SECTION Ss_40_20_30_28 -- SPECIALIST SITE EQUIPMENT 1 (WATER FEATURE)

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SECTION Ss_40_20_30_28 -- SPECIALIST SITE EQUIPMENT (WATER FEATURE)

To be read in conjunction with Section Ss_00_00_00, other related Sections of the Landscape Specification and the Design Drawings.

PART 1 TYPE, SYSTEMS, MATERIALS AND PERFORMANCE

1.1 LANDSCAPE SPECIFICATION TYPE

A. Descriptive Work

1. For general design and performance requirements, refer to Section Ss_00_00_00 of the Landscape Specification. Specific design and performance requirements are provided in this Section.
2. Undertake the Detailed Design, supply, install and warrant the Works complying with the visual intent indicated on the Design Drawings and criteria stated in the Landscape Specification.
3. Where no material, product or manufacturer is indicated in the Landscape Specification, propose suitable materials and systems prior to Contract award which comply with the visual intent and performance criteria stated and remain fully responsible for the Detailed Design of the Works.
4. Where a material, product or manufacturer is indicated in the Landscape Specification, such material, product or manufacturer shall be deemed indicative representing the Contractor's design intent only. The Subcontractor may complete the installation using that product, or such other confirmed as acceptable by the Contractor in writing, but shall remain fully responsible for the Detailed Design and performance of the Works.
5. Interfaces:
 - a. Co-ordinate with the work of others including interfacing as required.
 - b. Maintain performance at interface conditions.
 - c. Undertake the Detailed Design of interfaces with adjoining trades prior to commencement of the Works.

1.2 SYSTEM DESCRIPTIONS

Architectural And Functional Requirements

A. General

1. System build-ups shall be as indicated on the Design Drawings.
2. The Design requirements specified herein are for information only, the Subcontractor shall optimise cost effective construction methods when completing the Detailed Design.

B. Fixings

1. Fixings shall be concealed unless accepted otherwise by the Contractor.
2. Indicate the type, size and positioning of mechanical fixing devices on the Working Drawings.
3. Full details of the fixing installation techniques and torque settings shall be provided.
4. Where necessary, fixing devices shall be capable of three-dimensional adjustment to accommodate building structure and fabrication/ installation tolerances.

C. Secondary Support

1. Systems shall include a structural support system, as necessary.
2. Where the Subcontractor deems that visible secondary support is required in addition to that indicated in the Structural Engineer's documentation and on the Design Drawings, the Subcontractor shall inform the Contractor at tender return.

3. Systems shall include necessary sub-constructions/ assemblies including, but not limited to, framing, brackets, cleats, angles and other components.

Specialist Items

D. Type EXT-495 Water Feature (WF)

Purpose made water feature configured as indicated on the Design Drawings.

1. Water feature kerbs: Natural stone kerbs as indicated on the Design Drawings and specified in Section Ss_30_75_45.
2. The Design requirements for the Subcontractor to comply with, in order to complete the Detailed Design for the Arrival Place water feature shall be as follows:
 - a. Water flow: Water depth shall be minimal (in order to achieve the desired specification), with a variety of water depths and movement. Falling away from the building, gently flowing water shall pass across the feature, some falling into contoured areas, which will allow for still reflection pools.
 - i) Include the integration of bubble fountains in certain locations to help to gently activate the water.
 - ii) The Detailed Design shall include a response to climatic change, for example allowing for an increase in water during heavy rainfall and evaporation, showing dry areas of stone during the drier months (show change with the weather).
 - iii) The water used within the feature shall be recycled on a loop and shall have limited waste with a hidden outlet to accept water.
 - b. Material: Silver grey granite, the thickness and substructure shall be determined. The granite finish shall vary, as indicated on the Design Drawings:
 - i) The concept based on weather isobars, shall be carved into the top of the water feature stone to allow for the desired water flows and effects mentioned above.
 - ii) The sculpting of the stone surface shall also create areas where higher contouring shall cause no water to be held and the top surface shall be dry.
 - iii) A carved ribbon representing the Atlantic Meridional Overturning Circulation (AMOC) of the global ocean warm and cold waters shall be included, and shall include the integration of descriptive labelling.
 - iv) The external face shall be granite to a colour and texture indicated on the Design Drawings, the granite material shall match the kerb edges.
 - v) Provide a granite edge, to sizes and profiles indicated on the Design Drawings.
 - c. Height: Provide a consistent height to the top of the water feature wall. The proposed ground levels shall fall away from the building. The height of these walls shall be various, from 400mm closest to the building to approximately 565mm closest to the road:
 - i) Within the water feature there shall be a minimum 1:200 longitudinal fall.
 - ii) The edge of the water feature shall be designed in a discreet but effective way, angled to deter people from sitting on it.
 - d. Lighting: Include integrated lighting along the base of the water feature, providing a consistent subtle wash. Integrate small LEDs within the top of the water feature, such as where the water pools and the bubblejets are located. Refer also to the Services Engineer's documentation.
 - e. Mechanical and Electrical: The water, electrical and BMS connections shall terminate within the dedicated water feature plant room. Complete the Detailed Design of all aspects of the mechanical and electrical design and installation, this shall include:
 - i) Plant room size and layout requirements including but not limited to access to the plantroom, plant room water requirements, pipework layout and quantities.
 - ii) Pump type and size.
 - iii) Drainage. Determine if there is a need for the plant to be able to drain down completely and if so, where to.

- iv) Tank size, number and access requirements. Determine if any specific considerations are needed to inform the location, what type of maintenance they will require and how often.
 - v) Filters. Determine the potential impact that falling leaves, grass or meadow cuttings will have and how this can be mitigated.
 - vi) Distribution mains electrical load requirements.
 - vii) Future access and maintenance for all elements, pumps, tanks and plant room.
3. The Design requirements for the Subcontractor to follow to complete the Detailed Design for the Wilderness Garden water feature shall be as follows:
- a. Water flow: A gentle sound of water movement shall be created, with water at a depth of 50mm - 100mm within a contained walled channel:
 - i) At the top of the water feature closest to the building, water shall be pushed up and out through a discreet opening running adjacent to the edge of the feature.
 - ii) Provide a variety of water movements falling away from the building, flowing across the seven different levels of various tooled finishes, combine with air jets to create bubbling and rippling animated water, creating different effects ending in a still basin at the bottom, to be recycled back to the top.
 - b. Material:
 - i) Silver grey granite 80mm thick. The granite shall have a unique finish to each of the seven different stepped areas, this shall include grooved, carved and chiselled finishes of various depths, to create interest and variation to the flowing water such as a Cascade, a Swoosh, Stepped Cascade, tumbling and rolling.
 - ii) The external face shall be granite as indicated on the Design Drawings.
 - c. Height: Provide a consistent height to the top of the water feature wall, 300mm above FFL. The proposed ground levels shall be relatively flat within the Wilderness Garden. There shall be a 1:200 longitudinal fall Inside the water feature and a series of seven stepped internal areas to create the fall.
 - d. Lighting: Provide integrated lighting using a continuous LED strip light within a carved hidden channel, 30mm from the top of the water feature inside wall.
 - e. Mechanical and Electrical: The water, electrical and BMS connections shall terminate within the dedicated water feature plant room. Complete the Detailed Design of all aspects of the mechanical and electrical design and installation, this shall include:
 - i) Plant room size and layout requirements including but not limited to access to the plantroom, plant room water requirements, pipework layout and quantities.
 - ii) Pump type and size.
 - iii) Drainage. Determine if there is a need for the plant to be able to drain down completely and if so where to.
 - iv) Tank size, number and access requirements. Determine if any specific considerations are needed to inform the location, what type of maintenance they will require and how often.
 - v) Filters. Determine the potential impact that falling leaves, grass or meadow cuttings will have and how this can be mitigated.
 - vi) Distribution mains electrical load requirements.
 - vii) Future access and maintenance for all elements, pumps, tanks and plant room.
4. Operating tools shall be provided as appropriate, including but not limited to the following:
- a. Supply tools for operation, maintenance and cleaning purposes.
 - b. Supply keys for valves, vents and cabinets.
5. Provide valve labels on isolating and regulating valves on primary circuits, stating their function.

1.3 MATERIALS

Miscellaneous

- A. Anemometer
1. Manufacturer/ reference: To the acceptance of the Contractor.
 2. Locations: Single anemometer mounted on adjacent light column.
 3. Type: To the acceptance of the Contractor.

Metalwork And Finishes

- B. Metalwork
- Refer to Section Ss_99_99_11.
- C. Finishes
1. Refer to Section Ss_99_99_30 for general finishes to metalwork.
 2. Refer to Section Ss_99_99_31 for powder coatings.

Fixings

- D. General
1. Refer to Section Ss_99_99_20.
 2. Fixings shall be in accordance with the system manufacturer's recommendations, to suit the service conditions.
 3. Fixings shall be inherently corrosion resistant or fully protected to prevent corrosion.
 4. Fixings shall be concealed unless accepted otherwise by the Contractor.

Adhesives

- E. General
- Refer to Section Ss_99_99_20.

Sealants

- F. General
1. Refer to Section Ss_99_99_22.
 2. Use sealant products in accordance with the system manufacturer's recommendations, to suit the service conditions.

Concrete

- G. General
1. Concrete for foundations and haunching shall be in accordance with BS 8500: Parts 1 and 2 and BS EN 206.
 2. Designated mix shall generally be C6/ 8 or ST1, unless specified otherwise.
 3. Admixtures shall not be used.
 4. Where required, concrete base foundations shall be C20P concrete.

Natural Stone

- H. Stone Quality
1. Arrangements shall be made for the Contractor, and others as necessary, to inspect samples of stone in the respective quarries, which represent the range of variations in appearance. The acceptance of the Contractor shall be obtained before confirming orders with manufacturers or proceeding with production.

2. Stone shall be free from vents, cracks, fissures, discolouration, or other defects, which may adversely affect strength, durability or appearance. It shall be dressed and worked before delivery to Site as indicated on the Design Drawings.

Bedding/ Joints

I. Mortar Bedding

1. Refer to Section Ss_99_99_21 of the Landscape Specification.
2. Tests on mortar shall be conducted as specified for special construction control.
3. Portland cements shall be in accordance with BS EN 197: Part 1. Unless otherwise stated, the cement shall be Ordinary Portland Cement and delivered in the original sealed bags of the manufacturer or in accepted bulk containers.
4. Any mortar plasticiser used shall be agreed with the Contractor prior to commencement of any work, and shall be used in the proportions recommended in writing by the manufacturer. Mortar mixes shall be utilised in accordance with the manufacturer's recommendations. The suitability of the mixture for use in any particular mortar shall be demonstrated.
5. Admixtures shall not be used in mortar unless specified. Calcium chloride, or any admixtures containing calcium chloride, shall not be used. Admixtures, if specified, shall be in accordance with BS EN 934: Part 3.
6. Mixing plant, tools and banker boards shall be kept clean at all times.
7. Materials shall be measured by volume using clean gauge boxes. Proportions of mixes are for dry sand; allow for bulking if sand is damp.
8. Ingredients shall be mixed thoroughly to a consistency suitable for the work and free from lumps. Mortars containing air-entraining admixtures shall be mixed by machine, but not overmixed.
9. Mortar shall be used within approximately two hours of mixing. Retarded mortar shall be used within the time recommended in writing by the manufacturer. Mortar may be retempered to restore workability, but only within these time limits.
10. The required amount of water shall be determined to achieve a workable mix.
11. If pre-mixed mortars are used, the characteristics, product data, and testing criteria shall be submitted to the Contractor for review.
12. The mortar shall have a suitable strength to withstand the live load of vehicles.

J. Reinforcement

1. Reinforcement in mortar bedding shall be in accordance with BS 4483.
2. Determine the final selection/ type of reinforcement subject to acceptance by the Contractor.

K. Jointing Material

1. Jointing material shall be in accordance with BS 7533: Part 4.
2. Jointing sand: Clean dried sand, graded as for jointing sand in accordance with BS 7533: Part 4 and free from deleterious salts, contaminants and cement.

1.4 PERFORMANCE REQUIREMENTS

A. General

Comply with the general performance requirements of Section Ss_00_00_00 of the Landscape Specification and the following specific performance requirements.

Structural

B. General

1. The system shall accommodate loads imposed on it from movement of the backing/ support structure or substrate and other adjacent elements.

2. Installation of the Works shall transfer loads to the building structure in a statically determined manner. For work requiring mechanical fixing, the failure of any fixing shall not lead to progressive failure of others.

C. Deflections

1. The Works shall not deflect under loading in any way that is detrimental to any element of the Works or adjacent structural or building elements.
2. Components, supports and fixings shall be capable of accommodating the above deflection without permanent distortion, deformation or failure.
3. The Works shall accommodate differential structural movements in backing structures as relevant. Refer to the Structural Engineer's documentation and the Civil Engineer's documentation.

D. Specific Live Loads

The Works shall be capable of accommodating, without any reduction in performance, a horizontal line load applied to the Works in accordance with BS 6180 and BS EN 1991: Part 1-1, as applicable.

E. Design Loads

1. Systems shall be designed to withstand loads specified and shall be in accordance with prevailing relevant British Standards as appropriate.
2. The Works shall be capable of accommodating the self-weight gravity loads of the system including its foundations and any support system.

F. Imposed Gravity Loads

1. The Works shall be capable of accommodating loads imposed by adjacent and/ or attached elements that bear onto, are suspended from or are fixed to the system.
2. Refer to the Design Drawings for information on such elements and/ or required load capacities.
3. Elements from other trades shall not be fixed to and/ or supported by the system, unless specified, indicated on the Design Drawings and/ or agreed with the Contractor.

G. Imposed Loads

The Works shall be capable of accommodating the following imposed loads without any reduction in performance:

1. Loads resulting from movements of the formation/ substructure and any support structure of the Works.
2. Loads applied to the Works in accordance with BS EN 1991: Part 1-1.
3. Increased weight due to water absorption, snow and ice. Snow loads shall be in accordance with BS EN 1991: Part 1-3.
4. Known impact loads, or transferred impact loads, that occur during the service life, without deterioration in performance and without sustaining non-repairable damage.
5. Horizontal and vertical loads of similar magnitude to those that are imposed upon adjacent or attached elements. Refer to the Design Drawings for information on such elements and/ or required load capacities.

Environmental

H. Thermal Movement

1. Components shall provide for such expansion and contraction of component materials as shall be caused by an ambient air temperature range of -5°C to 30°C externally, without causing failure of joint, damaging loads on fasteners, reduction of performance or other detrimental effects.
2. Components shall provide for such expansion and contraction of component materials that are caused by temperature increases due to solar radiation.

3. Surface differential temperature ranges (for components of the external metalwork) of -25°C and +80°C shall be accommodated without causing failure of joint, damaging loads on fasteners, reduction of performance or other detrimental effects.
4. The amount of such movement that is accommodated shall be identified on the Subcontractor's Working Drawings.

I. Moisture Movement

The Works shall withstand movement without permanent deformation or any reduction in the performance:

1. Due to changes in the moisture content of components, resulting from variations in the moisture content of the air.
2. Due to the expansion of absorbed or retained moisture caused by freezing.

Durability

J. General

1. The design life of the Works shall be not less than the design life and service life requirements specified in Section Ss_00_00_00 of the Landscape Specification and require the minimum of maintenance.
2. Submit to the Contractor a schedule for maintenance and for replacement of secondary components.
3. The performance criteria shall be satisfied for the full design life of the Works, provided always that the maintenance has been carried out as specified.
4. The Works shall maintain its original appearance throughout its design life, when maintained in accordance with an agreed programme, without failure and without developing an objectionable appearance as a result of defects in the design, materials or workmanship.
5. Failure shall be defined as breakage, excessive wear, displacement, unevenness, lipping of joints or rattle of any metal.
6. An objectionable appearance shall include discolouration, staining, cracking and/ or displacement of joint material.

PART 2 SUBMITTALS AND TESTING

2.1 SUBMITTALS

Tender Submittals

A. Tender Response

1. Provide tender submittals in accordance with the requirements of Section Ss_00_00_00 of the Landscape Specification.
2. Submit a design response with the tender proposal, to include profiles of typical conditions, with dimensions.
3. The tender design response shall include:
 - a. Samples where specified.
 - b. List of Tests included.
 - c. Quality management programme.
 - d. List of proposed Working Drawings.
 - e. Summary of deviations from the Design Drawings and the Landscape Specification.
 - f. Outline technical specifications reflecting proposed materials/ systems.
 - g. A list of proposed manufacturers and subcontractors to be used.
 - h. Documentation as follows:

- i) Full technical description of each system installed.
- ii) Manufacturers' operating and maintenance instructions for equipment and controls.
- iii) Manufacturers' guarantees and warranties.
- iv) System operating and maintenance instructions for the system as a whole giving optimum settings for controls and maintenance intervals for all equipment.
- v) Record drawings showing the location of circuits, fittings, pipes, apparatus and operating controls.
- vi) List of usual consumable items.
- vii) Electrical inspection and completion certificates.

Samples, Mock-Ups, Prototypes And Quality Benchmarks

B. Pre-contract Samples

In accordance with Section Ss_00_00_00, submit pre-contract samples of the following:

- 1. 3 No. samples of each type of granite in proposed finish and colour.
- 2. Other samples shall be confirmed by the Contractor.

C. Post Contract Award Samples

In accordance with Section Ss_00_00_00, submit post contract award samples of the following:

- 1. 3 No. samples of each type of granite in accepted finish and colour.
- 2. Other samples shall be confirmed by the Contractor.

D. Mock-up Requirements

Submit mock-ups of the following in accordance with Section Ss_00_00_00:

- 1. Refer to the Contractor's proposals.

E. Prototype Requirements

Submit prototypes of the following in accordance with Section Ss_00_00_00:

- 1. Refer to the Contractor's proposals.

F. Quality Benchmark Requirements

Submit quality benchmarks of the following, in locations to be agreed with the Contractor, in accordance with Section Ss_00_00_00:

- 1. The first of each type fully installed, completed and accepted by the Contractor.

2.2 TESTING

A. Test Requirements

Undertake testing by an accredited independent testing specialist or submit independently certified test data to demonstrate compliance with the Landscape Specification.

PART 3 EXECUTION

3.1 WORKMANSHIP

Fabrication

A. General

- 1. Fabrication of materials/ components shall, as a minimum, be in accordance with current regulations and standards.

2. Where preceding work is complete before fabrication, take site measurements. If these measurements indicate that the dimensions indicated on the Design Drawings are unachievable, seek instruction from the Contractor before proceeding.
3. Where applicable and practical, fabrication and assembly of materials/ components shall take place in equipped workshops with site work restricted to fixing.
4. Form sections true to shape, accurate in size, square, free from distortions, irregularities and defects, to profiles indicated on the Design Drawings.
5. Do not use materials/ components that are damaged or have any other physical imperfections in the Works.

B. Stone

1. Stone shall be cut, dressed, worked and finished by skilled masons before delivery to Site. Evidence of previous experience and details of work previously carried out shall be submitted.
2. Cutting, dressing, working and finishing of the stone shall not adversely affect performance and the results obtained through testing.
3. Remedial work during fabrication, such as patching and filling, shall not be undertaken unless accepted by the Contractor.
4. No saw marks shall be visible on the finished surface of the stone units, unless accepted otherwise by the Contractor.

Workmanship

C. General

1. Workmanship shall generally be in accordance with the relevant and applicable parts of BS 8000.
2. Where applicable, carry out the Works in accordance with the manufacturer's recommendations.
3. Operatives shall be trained, experienced and appropriately skilled in the installation of the Works and, where applicable, be recommended by the system/ product manufacturer.

Inspection/ Preparation

D. Inspection

1. Before commencing installation, survey the substrates.
2. Check dimensions, line, level and fixing points.
3. Inform the Contractor immediately if a substrate is unsuitable to receive the Works.
4. If a substrate is unsuitable, propose remedial action to make the substrate suitable.

E. Suitability of Substrates

1. Substrates shall be rigid, dry, sound, smooth, clean, free from dust, dirt, grease and other contaminants before systems/ products are installed.
2. Cutting, chasing, plugging, making good and other necessary procedures required to the substrates or to adjacent work, that cannot/ should not be undertaken after the installation of the Works, shall be completed.
3. Tolerances of the substrates shall be suitable to permit the required configuration and indicated tolerances of the finished systems/ products.

Installation

F. General

1. Systems shall accommodate future moisture and temperature movement.
2. The Works shall be set out and installed square, true to line, level and plane, free from undulations, with lines and joints aligned, straight and parallel unless specified otherwise, within stated tolerances and in the correct relationship with the building structure.

3. Cutting of materials/ components:
 - a. Where required, cut materials/ components in accordance with the manufacturer's recommendations.
 - b. There shall be no damage to the finished face of the materials/ components or any damage that would adversely affect the performance.
 - c. Keep cut edges to a minimum.
 4. Materials/ components to be installed in 'running lengths' shall be subject to the following:
 - a. Straight runs between angles or ends of runs shall be formed in single unjointed lengths wherever possible. Where running joints are unavoidable, obtain acceptance for location and method of jointing from the Contractor.
 - b. Visible joints at angles shall be mitred or as otherwise accepted by the Contractor.
 5. Inspect each material/ component of the Works immediately before installation.
 6. The Works shall be installed using materials/ components free from marks, defects, flaws, steps, waves, or damage of any nature.
 7. Do not alter materials/ components with prefinished surfaces unless accepted by the Contractor.
 8. Materials/ components from the same production batch shall be used in the same area to prevent banding, patchiness or other visual variations.
 9. Obtain acceptance from the Contractor before drilling or cutting parts of the structure, other than where indicated on the Design Drawings.
 10. Do not cut, drill or otherwise alter work of others to accommodate the installation of the systems unless indicated on the Design Drawings, the Working Drawings or as accepted by the Contractor.
 11. Make provision for movements/ expansion/ contraction in accordance with the system/ product manufacturer's recommendations.
 12. Where holes are indicated on the Design Drawings as not completely filled with concrete, the upper part of the hole shall be backfilled with well rammed and consolidated excavated material.
- G. Installation of Break Tanks
1. Outlet positions: Connect lowest outlets at least 30mm above bottom of tank.
 2. Access: Fix tank with a minimum clear space of 350mm above.
- H. Mortar Joints
1. Joints to granite shall be completely filled with mortar.
 2. Slushing of perpend joints or furrowing of bed joints shall not be allowed.
 3. Mortar joints shall be of a consistent thickness and density.
 4. Perpend joints shall be aligned plumb within vertical tolerance.
 5. Tooling of joints shall be carried out while the mortar is thumbprint hard.
 6. Exposed faces of units shall be kept clean and free from concrete and mortar droppings.
 7. No washing or scrubbing of the finished face with proprietary cleaners or acids shall be allowed. Smears shall be removed by gentle brushing off with a soft brush and water only.
- I. Fixing Requirements
1. Refer to Section Ss_99_99_20.
 2. Install and position fixings and fastenings as recommended by the manufacturer. Where visible, positions shall be to the acceptance of the Contractor.
 3. The Works shall be fixed securely to prevent pulling away, bowing or other movement during use and without causing stress or distortion. Include additional bracing and stiffening as required.

4. Isolating tape, plastic washers or other suitable means shall be provided to prevent bi-metallic corrosion between dissimilar metals, or between preservative treated timber and metal.
5. Furniture and equipment shall be so fixed that surfaces designed to falls will drain.

J. Packings

1. Provide suitable tight packings to take up tolerances and prevent distortion.
2. Packings shall be of non-compressible, rot-proof and non-corrosive materials/ components that maintain the performance of the systems/ products with which they interface.
3. Packings shall not intrude into zones that are to be filled with sealant or areas required for drainage.
4. The performance of the Works and interfacing systems shall be maintained.

Protection And Completion

K. Protection

Finished work shall be adequately protected from damage until Practical Completion.

L. Cleaning

1. At completion of the Works, or when otherwise agreed with the Contractor, clean exposed areas/ surfaces of the Works.
2. Cleaning materials and methods shall be as recommended/ accepted by the system/ product manufacturer, where applicable.
3. Do not use materials or methods that could alter the character of the exposed finishes.
4. Protect adjacent surfaces from damage due to cleaning operations.

M. Completion

1. Repair defects without delay to minimise damage and nuisance.
2. Do not use the Works for any purpose, except testing, until Practical Completion.
3. On Practical Completion, check the Works for damage and defects. Replace damaged or defective materials/ components.

Adverse Conditions

N. Working in Adverse Conditions

1. If unavoidable wetting of the Works occurs, prompt action shall be taken to minimise and make good any damage.
2. In severe or continuously wet weather, work shall be suspended unless an effective temporary enclosure is provided over the working areas.
3. Concrete foundations:
 - a. Do not cast foundations if the temperature is below 3°C on a falling thermometer or 1°C on a rising thermometer.
 - b. Foundations shall be adequately protected against frost and rapid drying by sun and wind.

3.2 TOLERANCES

A. General

Measure tolerances against the relevant Base Reference Datum; Location Reference Point; Location Reference Plane; Location Reference Surface or Reference Element as defined in Section Ss_00_00_00 of the Landscape Specification.

1. Tolerances shall be as recommended by the system manufacturer(s) unless indicated otherwise in the Landscape Specification.

2. Posts and uprights shall be plumb within $\pm 5\text{mm}$ over their height.
3. Fabricated components shall not vary from the dimensions indicated on the Design Drawings by more than 2mm.
4. Vertical elements, other than posts, shall be plumb, within $\pm 2\text{mm}$ or 0.1% of the height, whichever is the lesser.
5. Horizontal elements shall be level, within $\pm 2\text{mm}$ or 0.1% of the length, whichever is the lesser.
6. The maximum variation in gap from a straightedge applied to a flat plane shall be 2mm for a 3000mm straightedge and 1mm for a 1000mm straightedge.
7. The average width of any panel to panel joint shall be within $\pm 2\text{mm}$ of the designed width. Any variation shall be equally distributed with no sudden changes or steps.
8. The maximum deviation between adjacent panel surfaces either side of a joint shall be 1mm.
9. The bow of any flat surface shall not exceed more than $\pm 2\text{mm}$ from a 2000mm straightedge placed against it in any direction.
10. The straightness of any surface of an edge shall not deviate by more than $\pm 2\text{mm}$ from a 2000mm straightedge placed against it in any direction parallel to the long axis of the element.
11. The centre section of any linear element shall not bow by more than the lesser of $\pm 2\text{mm}$ or 0.075% of the length of the element measured from a straight line between the ends of the element.
12. The cross-section of any element shall not be twisted by more than 1° from the alignment.
13. Cut-outs for interfacing work shall be within $\pm 1\text{mm}$ the dimensions indicated on the Design Drawings.
14. Account shall be taken of the installation tolerance requirements such that repetitive elements are located, relative to gridlines.
15. Tolerances shall not be cumulative.
16. Where an element/ component is subject to more than one applicable tolerance, the most onerous tolerance shall apply.

END OF SECTION

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SECTION Ss_45_10_01 -- LANDSCAPE MAINTENANCE

To be read in conjunction with Section Ss_00_00_00, other related Sections of the Landscape Specification and the Design Drawings.

PART 1 TYPE, SYSTEMS AND MATERIALS

1.1 LANDSCAPE SPECIFICATION TYPE

A. Prescriptive Work

1. Supply, deliver, install and warrant the Works in compliance with the materials and workmanship requirements of the Landscape Specification.
2. Where required to prepare drawings these shall be limited to final detailing of components and systems indicated on the Design Drawings, necessary to demonstrate their safe installation.
3. Where alternative products are offered by the Subcontractor for acceptance by the Contractor, submit full supporting documentation in respect of the complete system or installation.

1.2 SYSTEM DESCRIPTIONS

Design Criteria

A. General

Execute the Works in accordance with the following:

1. The recommendations of the British Association of Landscape Industries (BALI).
2. BS 8601: Specification for subsoil and requirements for use. (For imported topsoil).
3. BS 3882: Specification for topsoil.
4. BS 4428: Code of practice for general landscape operations.
5. BS 5837: Trees in relation to design, demolition and construction - Recommendations.
6. BS 7370: Grounds maintenance. Recommendations for maintenance of soft landscape.
7. The Works shall be covered by a single source warranty.

Descriptions/ Types

B. Type EXT-551 Landscape Maintenance

Ongoing maintenance of landscaped areas as indicated on the Design Drawings and described in Sections Ss_15_10_30, Ss_45_35_05 and Ss_45_35_45 of the Landscape Specification.

1.3 MATERIALS

A. Generally

Materials used during maintenance works shall be the same as those specified in the relevant Sections used during construction works, unless accepted in writing by the Contractor.

1.4 PERFORMANCE REQUIREMENTS

A. General

Comply with the general performance requirements of Section Ss_00_00_00 of the Landscape Specification.

PART 2 SUBMITTALS AND TESTING

2.1 SUBMITTALS

Tender Submittals

A. Tender Response

Not required.

Samples, Mock-Ups, Prototypes And Quality Benchmarks

B. Pre-contract Samples

Not required.

C. Post Contract Award Samples

Not required.

D. Mock-up Requirements

Not required.

E. Prototype Requirements

Not required.

F. Quality Benchmark Requirements

Not required.

2.2 TESTING

A. General

Submit independently certified tests and Agrément certificates that demonstrate that the proposed systems achieve the performance requirements of the Landscape Specification.

PART 3 EXECUTION

3.1 WORKMANSHIP

Fabrication

A. General

Fabrication of materials/ components shall, as a minimum, be in accordance with current regulations and standards.

General

B. Using Herbicides and Pesticides

The use of herbicides, pesticides or any other chemicals is prohibited without the written permission of the Contractor.

C. Establishment of New Planting - General Requirements

1. The maintenance and defects liability period is 36 months from Practical Completion of all planting and seeding, including semi-mature tree planting, unless otherwise indicated in the Contract documentation.
2. Make visits at monthly intervals, or more frequently during the growing season and as necessary to fulfil the requirements of this Landscape Specification. Make a minimum 26 visits per calendar year.

D. Notice

1. Give at least seven days' notice before:
 - a. Application of fertiliser.
 - b. Watering.
 - c. Each site maintenance visit.

2. Where watering is required, provide reasonable notice of works and proposed methods.
 3. The Site visit shall be deemed not to have occurred if the specified advance notice to the Contractor or written maintenance work sheets describing the work carried out, are not provided within three working days of any site visit.
- E. Reinstatement
- Reinstate damage or disturbance to soil structure, planting, grass, fencing, hard landscaping, structures or buildings to original condition and within a reasonable period of time (according to season).
- F. Replacement Planting
1. Excepting theft or malicious damage and unless otherwise instructed by the Contractor, any defective trees, shrubs or plants shall be replaced by the Subcontractor, to the acceptance of the Contractor.
 2. Replacements shall take into account the increased size due to growth since the completion of planting and match the size of adjacent, or nearby, plants of the same species, or match the original, whichever is the greater.
 3. The source of replacement planting shall be to the acceptance of the Contractor.
 4. Replacement planting is subject to a new maintenance, and defects liability period of 36 months from the time the replacement planting has been completed, unless otherwise indicated in the Contract documentation.
- G. Control of Mammalian Pests
- If required, submit proposals for specialist firms/ methods to the acceptance of the Contractor.
- H. Control of Invasive Animal Species
- If required, submit proposals for specialist firms/ methods to the acceptance of the Contractor.
- I. Control of Japanese Knotweed/ Giant Hogweed
- If required, submit proposals for specialist firms/ methods to the acceptance of the Contractor.
- J. Watering
1. At the start of the Works, agree water supply points with the Contractor. If watering supply points are not available, use a tanker previously filled with potable mains water.
 2. The use of water supplies other than potable mains water such as recycled, treated grey water shall be to the acceptance of the Contractor.
 3. Wet full depth of topsoil to field capacity using potable mains water as required for the continued thriving of all planting.
 4. Do not damage or loosen plants.
 5. Use a fine rose or low pressure hose where appropriate to avoid damaging or loosening plants.
 6. Loosen or scoop out compacted soil, to direct water to rootzone.
 7. Persistence of weeds in planted areas shall be considered a contributory cause of failure due to drought. Prolonged dry weather shall not clear the Subcontractor's responsibility if aftercare operations have not been carried out to the acceptance of the Contractor.
 8. Water as required to achieve the continued thriving of planting.
- K. Water Restrictions
- If water supply is, or is likely to be, restricted by emergency legislation, submit proposals for an alternative suitable source of water, to the acceptance of the Contractor before proceeding.
- L. Watering Trees in Areas Other Than Building Terraces
1. Water only by placing hose in watering tube or Treegator.

2. Water fortnightly during establishment period (18 months after completion of all planting), thereafter as necessary and to the acceptance of the Contractor.
 3. From 1st March to 31st August, water weekly during prolonged periods of dry weather. A prolonged period of dry weather is defined as 14 days or more with less than 10mm of rainfall, to the acceptance of the Contractor.
 4. For each tree watering session, apply 20 litres of water or sufficient water to reach field capacity.
 5. After removing the hose, replace cap on watering pipe, and leave watering pipe and cap clean and free from leaf litter or other material that might block the watering pipe.
- M. Watering Groundcover and Shrub Planting in Areas Other Than Building Terraces
1. Water fortnightly during establishment period (18 months after completion of all planting), thereafter as necessary and to the acceptance of the Contractor.
 2. From 1st March to 31st August, water weekly during prolonged periods of dry weather. A prolonged period of dry weather is defined as 14 days or more with less than 10mm of rainfall, to the acceptance of the Contractor.
 3. Apply water sufficient to reach field capacity.
- N. Disposal of Arisings
1. Unless specified otherwise, dispose of arisings as follows:
 2. Remove biodegradable arisings to recycling facility.
 3. Spread grass cuttings evenly within woodland areas to the acceptance of the Contractor.
 4. Remove tree roots and stumps from Site and place in 'Natural Regeneration Area', providing a non-management habitat.
 5. Chip shrub and tree prunings on Site and spread in woodland areas to the acceptance of the Contractor.
 6. Remove litter and non-biodegradable arisings from Site.
- O. Chipping or Shredding
- Chipping or shredding shall not be permitted on Site.
- P. Mechanical Equipment
1. The use of mechanical equipment shall be kept to a minimum and shall only be used if agreed with the Contractor.
 2. Mechanical chippers shall not be used.
- Q. Litter
1. Collect and remove from Site all extraneous rubbish not arising from the contract work including paper, packaging materials, bottles, cans and similar debris.
 2. Collect litter at a minimum of two-weekly intervals to the acceptance of the Contractor.
 3. Maintain planted areas free from litter at all times.
- R. Vandalism
1. The Subcontractor is not responsible for vandalised or maliciously damaged material. Determine suitable replacement material to the acceptance of the Contractor.
 2. Collect and remove vandalised material from Site immediately, to the acceptance of the Contractor.
 3. Replacement planting shall be to the Contractor's acceptance in advance of the Works being carried out.
 4. Collect and remove all broke, damaged and vandalised plant material immediately.
- S. Protection of Existing Grass

1. Protect areas affected by maintenance operations using boards/ tarpaulins.
2. Do not place excavated or imported materials directly on grass.

T. Cleanliness

Remove soil and arisings from hard surfaces and leave the Works in a clean, tidy condition at completion and after any maintenance operations.

U. Protect Existing Hard Landscape Finish

Protect hard landscape finishes from debris and damage during maintenance operations.

V. Blower Machines

Do not use blower or vacuum machines for leaf collection or any other purpose in or at the edges of planted areas.

Grassed Areas

W. Maintenance of Grassed Areas

1. Generally maintain grassed area in a manner appropriate to minimise the impact on existing vegetation.
2. Soil and grass shall maintain a healthy vigorous sward, free from disease, fungal growth, discolouration, scorch or wilt.
3. Waterlogging and compaction shall be prevented.
4. Repair trampling, abrasion or scalping damage.
5. Carry out maintenance of grassed areas, including objectives, programme and mowing methods, in accordance with BS 7370: Part 3.

X. Grass Cutting Generally

1. Before mowing, remove litter, rubbish and debris.
2. Mowing shall be finished neat and even, without surface rutting, compaction or damage to grass.
3. Leave edges neat and well defined. Neatly trim around obstructions.
4. Adjoining hard areas shall be swept clear and remove arisings off Site.
5. In drought or wet conditions obtain instructions from the Contractor.

Y. Bulbs and Corms in Grassed Areas

1. Do not cut before flowering.
2. Interval between end of flowering and start of grass cutting shall be a minimum of three weeks.

Z. First Cut of Grassed Areas Generally

1. Height of initial growth shall be 40mm - 75mm.
2. Debris and litter shall be removed.
3. Stones and earth clods larger than 25mm in any dimension shall be removed.
4. Height of first cut shall be 50mm.
5. Mower type shall be to the acceptance of the Contractor.
6. Unless otherwise stated by the Contractor, arisings shall be removed from Site.

AA. Maintaining Grassed Areas with Perennial Wild Flowers 'Long Grass' Areas

1. Before each cut remove litter and debris off Site.
2. Height and frequency of cut in first growing season:
 - a. Time of first cut shall be June/ July.

- b. Height of first cut shall be 75mm.
 - c. Frequency of subsequent cutting shall be a minimum of once a year.
 - d. Height of growth permitted shall be maximum 125mm.
3. Height and frequency of cut in second growing season:
 - a. Time of cut shall be a single cut in October.
 - b. Height of cut shall be 75mm.
4. Trim all edges.
5. Arisings shall be removed from Site.
6. Watering shall be when instructed by the Contractor.

BB. Fertiliser - Spring Application

Slow release fertiliser shall be used in accordance with the manufacturer's recommendations.

CC. Fertiliser - Autumn Application

Slow release organic fertiliser shall be used in accordance with the manufacturer's recommendations.

DD. Reinstatement of Damaged Grass

1. Damaged grass shall be removed to a depth of 40mm.
2. Cultivate substrate to a fine tilth.
3. Subcontractor's choice of returfing or topsoiling and reseeding:
 - a. For reseeding, fill with fine topsoil in accordance with BS 3882.
 - b. Soil shall be multi purpose class, free from stones, debris and weeds.
 - c. Reseed with a seed mix to match existing grass in quality and appearance.
4. Provide protection and watering as necessary to promote successful germination and/ or establishment.

EE. Reinstatement of Worn or Damaged Grass

1. Worn or damaged areas shall be made good by returfing or reseeding.
2. Returfing and reseeding shall be in accordance with BS 7370: Part 3.
3. Seed shall match existing in appearance and quality.
4. Provide protection and watering as necessary to promote successful germination and/ or establishment.

Perennials/ Groundcover/ Shrubs/ Trees/ Hedges

FF. Establishment of New Planting

1. Duration shall be one year.
2. Weed control:
 - a. Keep planting beds clear of weeds and maintaining full thickness of mulch as specified.
 - b. Maintain a weed free area around each tree and shrub, minimum diameter the larger of 1m or the surface of the original planting pit.
3. Fork over beds to keep soil loose, with gentle cambers and no hollows. Do not reduce depth or effect of mulch.
4. Carry out weeding at minimum fortnightly intervals from 1st April to 31st October and monthly intervals from 1st November to 31st March. Leave entire Site completely free from weeds after each visit.

5. When in leaf, spray crowns of trees in the evening during warm weather. Carry out in the evening.
6. Watering shall be carried out when instructed by the Contractor.

GG. Establishment of New Planting - Fertiliser

1. Time of year: March or April.
2. Fertiliser shall be a slow release organic type.
3. Spread evenly at an application rate recommended by the manufacturer. Carefully lift and replace any mulch materials.

HH. Beds of Perennials

1. Plant supports:
 - a. Stake and tie plants using bamboo canes.
 - b. Length shall be 1000mm.
 - c. Maintain throughout the growing season.
2. Refill gaps in planting by replanting.
3. Watering:
 - a. New plants: Before and after planting out.
 - b. Ongoing: As necessary for the continued thriving of all planting.
4. Operations at the end of growing season:
 - a. Trim older flowering stems of herbaceous perennials.
 - b. Remove redundant plant supports, litter, debris and arisings.
 - c. Cultivate by forking over the soiling, taking care to not cause undue disturbance to plants.
 - d. Top dress by applying sanitised and stabilised compost dressing.

II. Tree Stakes and Ties

1. Inspection/ maintenance times shall be as scheduled and immediately after strong winds.
2. Stakes:
 - a. Replace loose, broken or decayed stakes to original specification.
 - b. If longer than half of clear tree stem height, cut to this height in spring. Retie to tree firmly but not tightly with a single tie.
3. Ties:
 - a. Adjust, refix or replace loose or defective ties, allowing for growth and to prevent chafing.
 - b. Where chafing has occurred, reposition or replace ties to prevent further chafing.
4. Removal of stakes and ties two years after planting.
5. Fill stake holes with lightly compacted soil.

JJ. Tree Guy Wires

1. Inspection/ maintenance times: Minimum three times per year or as required.
2. Operations:
 - a. Replace or re-secure loose or missing guy wires.
 - b. Adjust to suit stem growth and to provide correct and uniform tension.

KK. Refirming of Trees and Shrubs

1. After strong winds, frost heave and other disturbances, refirm by treading around the base until firmly bedded.
2. Collars in soil at base of tree stems, created by tree movement, shall be broken up by fork, avoiding damage to roots, backfilled with topsoil and refirmed.

LL. Tree Guards

Adjust, refix or replace to match existing loose or defective guards and to prevent chafing.

MM. Nesting Wild Birds

1. Report accidental disturbance immediately.
2. Before starting hedge or tree work during the period of February to August (inclusive), carry out a survey by a qualified ecologist and submit report.
3. Ideal hedge cutting shall be completed outside of nesting season.
4. Accidental disturbance shall be reported immediately.

NN. Pruning Generally

1. Pruning shall be in accordance with good horticultural and arboricultural practice.
2. Do not prune any plants without the prior acceptance of the Contractor.
3. Remove branches without damaging or tearing the stem.
4. Keep wounds as small as possible and cut cleanly back to sound wood.
5. Make cuts above and sloping away from an outward facing healthy bud, angled so that water shall not collect on cut area.
6. Prune larger branches neither flush nor leaving a stub, but using the branch bark ridge or branch collar as a pruning guide.
7. Thin, trim and shape each specimen appropriately to species, location, season, and stage of growth, leaving a well balanced natural appearance.
8. Use clean, sharp secateurs, hand saws or other tools to the acceptance of the Contractor. Trim off ragged edges of bark or wood with a sharp knife.
9. If disease or fungus is detected, notify the Contractor.
10. Do not use growth retardants, fungicide or sealant unless instructed by the Contractor.

OO. Pruning of Excessive Overhang

At least once a year or when instructed by the Contractor remove growth encroaching onto grassed areas, paths, roads, signs, sightlines and road lighting luminaires.

PP. Pruning Trees and Shrubs

Except where specified otherwise, prune in accordance with BS 7370: Part 4.

QQ. Pruning Native Shrubs and Hedges

1. Prune to encourage healthy and bushy growth and desirable ornamental features, e.g. flowers, fruit, autumn colour and stem colour.
2. Remove suckers by cutting back level with the source stem or root.

RR. Trimming Rapidly Establishing Hedges

1. Allow to reach planned height as rapidly as possible.
2. Trim back lateral branches moderately.

SS. Trimming Slowly Establishing Hedges

1. Cut back hard in June and September to encourage bushy growth down to ground level.
2. Allow to reach planned dimensions only by gradual degrees, depending on growth rate and habit.

TT. Trimming Non-tapering Established Hedges

1. Time of year trim once in July or August.
2. Trim carefully and neatly to regular line and shape with vertical sides.
3. Remove current growth rather than old wood.
4. Trimming shall be carried out with shears.

UU. Formative Pruning of Young Trees

1. Type and timing of pruning operations shall suit the plant species.
2. Do not prune during the late winter/ early spring sap flow period.
3. Young trees up to 4m high:
 - a. Crown prune by removing dead branches and reducing selected side branches by one third to preserve a well balanced head and to establish the development of a single strong leader.
 - b. Remove duplicated branches and potentially weak or tight forks. In each case cut back to live wood.
4. Do not prune whips or feathered trees.
5. Extensive pruning of young trees and any surgery to larger trees shall be carried out by an approved member of the Arboricultural Association or other specialist to the acceptance of the Contractor.

VV. Pruning Ornamental Shrubs

Prune to encourage healthy and bushy growth and desirable ornamental features, e.g. flowers, fruit, autumn colour and stem colour. Remove suckers by cutting back level with the source stem or root.

WW. Pruning of Perennial and Herbaceous Groundcover Species

1. Do not prune any plants without the prior acceptance of the Contractor.
2. Remove Hedera helix (ivy) from trees and shrubs. Do not damage or cut tree and shrub bark.
3. Use only sharp, well-maintained secateurs.

XX. Trimming Hedges Generally

1. Maintain to a uniform and neat alignment and height.
2. Allow rapidly establishing hedges to reach planned height as rapidly as possible. Trim back lateral branches moderately to establish required shape.
3. Cut back slowly establishing hedges hard in June and September to encourage bushy growth down to ground level. Allow to reach planned dimensions only by gradual degrees, depending on growth rate and habit.

YY. Trimming Field Hedges

Trim to specified height and profile using suitable mechanical cutters.

ZZ. Tree and Plant Stems

1. Do not allow nylon filament rotary cutters or other mechanical tools closer than 100mm to the stem of any tree or plant. Complete operations close to stems using hand tools.
2. Any tree or plant damaged by contact with machinery shall be replaced immediately by the Subcontractor, to the acceptance of the Contractor.

AAA. Removal of Dead Plant Material

1. At the end of the growing season, check all shrubs and remove all dead foliage, dead wood and broken or damaged branches and stems.
2. Inform the Contractor as soon as the dead plant material is noticed.

3. Remove dead and diseased plants as soon as possible and replace in the next scheduled round of replacement planting, which shall be within one week.

BBB. Climbing Plants

1. Pruning: Remove excess growth, so that signs, light fittings, doors and windows are kept clear at all times.
2. Insecure growth: Attach to supporting wires or structures.

CCC.Reinstatement of Groundcover/ Shrubs/ Perennials/ Herbaceous Areas

1. Remove dead and damaged plants by hand digging.
2. Carefully move any mulch/ matting materials to one side and dig over the soil, leaving it fit for replanting. Take care not to disturb roots of adjacent plants.
3. Replace plants, using pits and plants to the original specification or to match the size of adjacent or nearby plants of the same species, whichever is the greater.
4. Apply the following in addition to any fertilisers or ameliorants specified elsewhere in this Landscape Specification:
 - a. Sierrablen Flora Yellow (Granular) manufactured by Scotts or acceptable equivalent, controlled release fertiliser with 24 month longevity, supplied in sealed bags with the manufacturer's name, net weight and chemical analysis of content clearly marked on the bag.
 - b. Apply evenly over all areas in accordance with the manufacturer's recommendations.
 - c. Agree details of replacement plants with the Contractor before ordering.

DDD.Hand Weeding in Areas Other Than Woodland and Copse Planting

Remove all weeds, including roots, by hand using hoes, trowels or forks, taking care to remove not more than a minimum quantity of soil, causing minimum disturbance to trees, plants, mulched surfaces and bulbs and leaving the area in a neat, raked, clean condition.

EEE.Weed Control

1. Generally:
 - a. Weed tolerance: Weed to clear ground every two weeks.
 - b. At all times, weed cover less than 5% and no weed to exceed 100mm high.
 - c. Do not damage adjacent plants, trees and grass.
2. Hand weeding:
 - a. Remove weeds entirely, including roots.
 - b. Remove the minimum quantity of soil, and disturb plants, bulbs and mulched surfaces as little as possible.
 - c. On completion, rake area to a neat, clean condition.
 - d. Reinstall mulch to original depth.

FFF. Digging Over

Dig over beds. Do not damage existing plants, bulbs and roots. Depth of dig shall be minimum 100mm.

GGG.Soil Aeration

Compacted soil surfaces: Prick up to aerate the soil of root areas. Break surface crust, reduce size of lumps to crumb and level off. Do not damage plants and their roots.

HHH.Soil Level Adjustment

1. Maintain the level of the soil/ mulch at the edges of beds to remain at the same level as the adjacent grass or hard surface. Spread arisings (if any) evenly over the bed.
2. Remove excess material from Site.

III. Maintenance of Loose Mulch

1. Thickness (minimum): 50mm. Top up annually.
2. Mulch spill on adjacent areas: Remove weeds and rubbish and return to planted area.
3. Remove weeds growing on or in mulch by hand and by forking over as necessary.

JJJ. Fertilising Established Trees and Shrubs

Apply Osmocote 5-6 Month 10:11:18 controlled release fertiliser, manufactured by Scotts or acceptable equivalent, to all planted areas in the spring, spreading evenly at a coverage in accordance with the manufacturer's recommendations.

KKK. Snow Removal from Shrubs/ Trees

Remove snow in accordance with BS 7370: Part 4.

LLL. Winter Leaf Removal

1. Collect accumulations of drifted leaves from the vicinity, hard standings and from planting beds by hand.
2. Do not use leaf blowing or vacuum machines in or at the edges of planted areas.
3. Remove arisings.

MMM Woodland Planting Maintenance

1. Watering in exceptional circumstances to prevent plants dying.
2. Loose plants: Re-firm surrounding soil, without compacting.
3. Vegetation: Except trees and coppice shoots to be retained, cut down to 200mm above ground level within the plantation area.
4. Arisings shall be left between rows.
5. Ditches and drains shall be kept clear.

3.2 TREE WORK

Tree Work

A. Tree Work Generally

1. Before starting work agree which trees, shrubs and hedges are to be removed or pruned.
2. Avoid damage to neighbouring trees, plants and property.
3. Carry out the Works in accordance with BS 3998 and the Health & Safety Executive (HSE)/ Arboriculture and Forestry Advisory Group (AFAG) leaflets/ recommendations.
4. Cut vertical branches similarly, with no more slope on the cut surface than is necessary to shed rainwater.
5. Leave trees with a well balanced natural appearance.
6. Operatives shall hold a Certificate of Competence for chainsaw work.
7. Tree work shall be carried out by an approved member of the Arboricultural Association.
8. Defective, diseased, unsafe or weak parts of trees additional to those scheduled for attention: Give notice if detected.
9. Prevention of wound bleeding and disease transmission shall be in accordance with BS 3998.

B. Cleaning Out and Deadwooding

Remove the following:

1. Dead, dying, or diseased wood, broken branches and stubs.
2. Fungal growths and fruiting bodies.

3. Rubbish, wind blown or accumulated in branch forks.
 4. Wires, clamps, boards and metal objects, if removable without causing further damage and not part of a support structure that is to be retained.
 5. Other unwanted objects, for example tree houses, swings.
 6. Climbing plants shall not be applicable.
- C. Cutting and Pruning Generally
1. Tools shall be appropriate, well maintained and sharp.
 2. Final pruning cuts:
 - a. Chainsaws shall not be used on branches of less than 50mm diameter.
 - b. Hand saws shall form a smooth cut surface.
 - c. Anvil type secateurs shall not be used.
 3. Do not damage or tear the stem when removing branches.
 4. Keep wounds as small as possible, cut cleanly back to sound wood leaving a smooth surface, and angled so that water shall not collect on the cut area.
 5. Cut at a fork or at the main stem to avoid stumps wherever possible.
 6. Large branches shall only be removed if this is unavoidable.
 7. Remove branches in small sections and lower to ground with ropes and slings.
 8. When removing dead branches and stubs, do not cut into live wood.
 9. Remove epicormic shoots and potentially weak forks that could fail in adverse weather conditions.
 10. Give notice if disease or fungus is detected. Do not apply fungicide or sealant unless instructed.
- D. Crown Reduction/ Shaping
- Cut back selectively to lateral or sublateral buds or branches to retain flowing branch lines without leaving stumps.
- E. Crown Lifting
1. Remove branch systems to give clearance.
 2. Crown lifting height shall be 2.5m above footpaths.
 3. Remove whole branches back to the stem, or cut lower portions of branches back to lateral or sublateral buds or branches. Do not leave stumps.
- F. Crown Thinning
1. Remove inward growing, crossing, rubbing, dead and damaged branches.
 2. Selectively remove secondary and small live branch growth evenly throughout the crown.
 3. The quantity of crown thinning shall be 10%.
 4. Make no cuts of more than 25mm diameter.
 5. Cut back to lateral or sublateral buds or branches without leaving stumps.
 6. Leave a uniform and well balanced structure of branches and foliage.
- G. Cutting Tree Roots
1. Excavate using hand tools only.
 2. Do not cut roots within an area which is the larger of:
 - a. The branch spread of the tree.
 - b. An area with a radius of half the tree's height, measured from the trunk.

- c. Outside protected area give notice of roots exceeding 50mm in diameter. Do not cut without the acceptance of the Contractor.
 3. Cutting:
 - a. Make clean smooth cuts with a hand saw.
 - b. Minimise wounds and avoid ragged edges.
 - c. Pare cut surfaces smooth with a sharp knife.
 4. Backfilling:
 - a. Cover cut roots with clean sharp sand.
 - b. Backfill with original topsoil.
- H. Removing Trees, Shrubs and Hedges
 1. Removal of trees, shrubs and hedges shall be in accordance with BS 3998 and the Health & Safety Executive (HSE)/ Arboriculture and Forestry Advisory Group (AFAG) leaflets/ recommendations.
 2. Check for below and above ground existing services. Give notice to the Contractor if they may be affected.
 3. Shrubs and smaller trees shall be cut down and grub up roots.
 4. Tree stumps:
 - a. Treatment: Remove mechanically to a minimum depth of 300mm below ground level.
 - b. Give notice to the Contractor before removing tree stumps by winching. Do not use other trees as supports or anchors.
 5. Avoid damage to neighbouring trees, plants and property.
 6. Where tree canopies overlap and in confined spaces generally, take down trees carefully in small sections to avoid damage to adjacent trees that are being retained.
 7. Filling holes:
 - a. Use as-dug material and/ or imported soil as required.
 - b. Consolidate and grade to marry in with surrounding ground level.
- I. Bark Damage
 1. Wounds:
 - a. Do not attempt to stop sap bleeding.
 - b. Remove ragged edges of bark using a sharp knife.
 - c. Remove splintered wood from deep wounds.
 - d. Keep wounds as small as possible.
 2. Give notice to the Contractor if liquid or flux oozes from apparently healthy bark.
- J. Cavities in Trees
 1. Remove rubbish and rotten wood. Probe the cavity to find the extent of any decay, and give notice to the Contractor.
 2. Do not drain water filled cavities.
 3. Do not remove sound wood inside cavities.
 4. Do not cover cavity openings.
- K. Clearance of Watercourses
 1. Confirm requirements with the Contractor.
 2. The trees and shrubs that are being retained in the clearance shall be confirmed by the Contractor.

3. Remove litter, debris, accumulated silt and excessive vegetation causing an obstruction.
4. Frequency shall be in accordance with the management plan accepted by the Contractor.
5. The time of year shall be confirmed by the Contractor.
6. Clearance method shall be by hand.
7. Access shall be from one bank only.
8. The position shall be at least 1m from the top of the bank.
9. Phasing shall not be required.

3.3 HARD LANDSCAPE AREAS

Hard Landscape Areas

- A. Hard Surfaces and Gravel Areas
 1. Hard surfaces: Remove litter, leaves and other debris.
 2. Remove mud, silt and debris from surface gutters and channels.
 3. Empty traps and flush clean drainage gullies.
 4. Rake over gravel areas, remove weeds, litter, leaves and debris, and level off.
 5. Flexible bituminous pavings shall be in accordance with BS 7370: Part 2.
 6. Stain removal shall be in accordance with BS 7370: Part 2.

3.4 PROTECTION AND COMPLETION

Protection And Completion

- A. Protection
 1. Finished areas shall be adequately protected from damage until Practical Completion.
 2. Finished areas shall not be used for vehicular access or the storage of materials, unless suitable protection has been provided, such that there is no compaction.
- B. Completion
 1. Leave installed works clean, free from rubbish, debris and loose stones outside the accepted tolerances.
 2. The completed works shall be suitable to receive the specified planting.
 3. Repair defects without delay to minimise damage and nuisance.

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SECTION Ss_45_35_05 -- PLANTING

To be read in conjunction with Section Ss_00_00_00, other related Sections of the Landscape Specification and the Design Drawings and the Planting Schedule.

PART 1 TYPE, SYSTEMS AND MATERIALS

1.1 LANDSCAPE SPECIFICATION TYPE

- A. Prescriptive Work
1. Supply, deliver, install and warrant the Works in compliance with the materials and workmanship requirements of the Landscape Specification.
 2. Where required to prepare drawings these shall be limited to final detailing of components and systems indicated on the Design Drawings, necessary to demonstrate their safe installation.
 3. Where alternative products are offered by the Subcontractor for acceptance by the Contractor, submit full supporting documentation in respect of the complete system or installation.

1.2 SYSTEM DESCRIPTIONS

Design Criteria

- A. General
1. Execute the Works in accordance with the following:
 - a. The recommendations of the British Association of Landscape Industries (BALI).
 - b. BS 5837: Trees in relation to design, demolition and construction - Recommendations.
 - c. BS 3936: Nursery Stock Specification for Trees and Shrubs.
 - d. BS 4428: Code of practice for general landscape operations.
 2. The Works shall be covered by a single source warranty.
 3. Preparation of planting beds shall include supply of planting materials.
 4. Planting shall include excavation, tilling, mulches, composts, fertilisers, anchors/ supports/ framing and all other accessories/ components necessary to complete the work.
- B. Growing Medium
1. Assess the depth and quality of the growing medium and its fitness for planting the scheduled range of plant species for planting and seeding.
 2. By planting or seeding into the soil, the Subcontractor approves, accepts and takes responsibility for the growing medium.

Tree Pits

- C. Type EXT-531 Tree Pit
- Excavated tree pit systems configured as indicated on the Design Drawings.
1. System shall include materials necessary for the anchoring, health, growth and maintenance of the tree species and suitably contain growth as not to cause damage to surrounding areas.
 2. Sizes as indicated on the Design Drawings.
 3. Excavation:
 - a. Bottom of tree pit thoroughly broken up to depth of 150mm or as indicated on the Design Drawings.
 - b. Maintain horizontal bases and vertical sides with no less than minimum depth throughout.

- c. Tree pits shall be free draining before progressing with planting.
- 4. Root barrier configured as indicated on the Design Drawings:
 - a. Manufacturer: GreenBlue Urban Ltd.
 - b. References: ReRoot 600 and ReRoot 1000.
 - c. Sizes as required to suit the service conditions and as indicated on the Design Drawings:
 - i) RB1: 1000mm depth.
 - ii) RB2: 600mm depth.
 - d. Installation in accordance with the manufacturer's recommendations with sides vertical and sharp objects adjacent to barrier removed.
- 5. Drainage layers as indicated on the Design Drawings.
- 6. Topsoil/ backfill mix material as indicated on the Design Drawings and described in Section Ss_15_10_30.
- 7. Underground guying system where indicated on the Design Drawings:
 - a. Manufacturer: GreenBlue Urban Ltd.
 - b. Reference: ArborGuy AnchorPlate - SASAP06A (for RootSpace Depth 600mm).
 - c. Galvanised steel tree anchoring system.
 - d. The tree shall be positioned correctly and vertically prior to tightening guy line tensioners in accordance with the manufacturer's recommendations.
- 8. Aeration system where indicated on the Design Drawings:
 - a. Provide aeration pipe where indicated on the Design Drawings or as appropriate in accordance with the Services Engineer's documentation and the Civil Engineer's documentation.
 - b. Manufacturer: GreenBlue Urban Ltd.
 - c. Reference: RootRain ArborVent 150 (RRARBV150B).
 - d. Type: Aeration system, includes manifold for connectivity to RootSpace structure. For trees in hard landscaping provide 2 No. vents for each tree.
 - e. Aluminium and recycled HDPE material.
 - f. 150mm inlet size, 700mm pipe length, and 110mm pipe diameter.
 - g. Capped pipe shall finish flush with ground level.
- 9. Tree pit irrigation pipe where indicated on the Design Drawings:
 - a. Manufacturer: GreenBlue Urban Ltd.
 - b. Reference: Urban Irrigation System - RootRain Urban (RRURB3A, 8m pipe).
 - c. Type: Irrigation system with fixed grid inlet for tree planting.
 - d. Polypropylene and HDPE material.
 - e. 300mm inlet height, 80mm inlet diameter, 8m pipe length and 60mm pipe diameter.
 - f. Top cap of inlet shall be finished protruding slightly above finished surround level.
 - g. Lay pipe in loop above root ball with slight fall away from inlet pipe. Trim length to provide a close fit in the tree pit and connect both ends of pipe securely into plastics tee junction on inlet.
- 10. Tree pit inspection pipe where indicated on the Design Drawings:
 - a. Manufacturer: GreenBlue Urban Ltd.
 - b. Reference: To be agreed with the Contractor.
 - c. Type: Slotted pipe with cap.

- d. Polypropylene and HDPE material.
 - e. 300mm inlet height, 80mm inlet diameter, 1400mm pipe length and 60mm pipe diameter.
 - f. Install pipe from the surface down into drainage gravel layer.
 - g. Top cap of inlet shall finish protruding slightly above finished surround level.
11. Root Directors where indicated on the Design Drawings:
- a. Provide root directors where indicated on the Design Drawings or as appropriate in accordance with the Services Engineer's documentation and the Civil Engineer's documentation.
 - b. Manufacturer: GreenBlue Urban Ltd.
 - c. Reference: RootDirector RD640A.
 - d. Type: Tree pit perimeter root control.
 - e. 100% recycled polypropylene material.
 - f. 455mm (H) x 855mm (W).
12. Cellular structural soil system where indicated on the Design Drawings:
- a. Manufacturer: GreenBlue Urban Ltd.
 - b. Reference: RootSpace 600 Upright - GBURAC600A.
 - c. 100% recycled polypropylene material.
 - d. 600mm (H) x 500mm (W).
 - e. Geotextile membrane shall be installed on top of structural soil system prior to installation of hard surfacing, as described in Section Ss_15_10_30.
 - f. Void spaces shall be filled with lightly compacted growing medium prior to installation of further layers or sub-bases.
13. Tree pit drainage:
- a. Increase depth of excavation from specified size to allow for aggregate layer, with base slightly falling to outlet.
 - b. Clean gravel or broken stone aggregate layer, with no fines, graded 40mm to 20mm.
 - c. Drainage pipes shall be laid around perimeter of pit within aggregate layer.
 - d. Suitable geotextile filter shall be laid over aggregate before installing tree or backfill.
 - e. Test completed tree pits for free drainage before planting.
14. The top of pits shall suit dimensions of paving units and joints laid within immediate vicinity as indicated on the Design Drawings.

Planting

D. Type EXT-541 External Planting

External planting as indicated on the Planting Schedule, to areas indicated on the Design Drawings.

E. Shrub Planting Pits

- 1. Excavate 1-2 days (maximum) before planting.
- 2. 150mm wider than roots when fully spread and 200mm deep.
- 3. Break up pit bottom to a depth of 150mm, incorporating soil ameliorant/ conditioner at 50g/m².
- 4. Reuse excavated material for backfilling.

Fertilisers And Ameliorants

F. General

Amendments to specified quantities due to agreed product substitutes shall be acceptable to the Contractor.

G. General Fertiliser - Slow Release

1. Manufacturer/ reference: Submit proposals for the Contractor's acceptance.
2. Locations shall be all planting areas.
3. Timing shall be immediately before cultivation.
4. Spread evenly and in accordance with the manufacturer's recommendations.
5. Rate shall be 50g/ m².
6. Fertiliser shall be in accordance with the Fertiliser Industry Assurance Scheme (FIAS).
7. Fertiliser shall be slow release establishment type.

H. Anti-desiccants

1. Foliar spray.
2. Apply in accordance with the manufacturer's recommendations.
3. The product(s) shall be acceptable to the Contractor.

I. Other Ameliorants

1. A long-life crosslinked polyacrylamide water-storing polymer capable of absorbing 400 times its own weight of water, of which 95% shall be plant available, shall be used.
2. Cultivate into a depth of 200mm - 350mm.
3. Ameliorants shall be applied in accordance with the manufacturer's recommendations.

1.3 MATERIALS

A. Topsoil

Refer to Section Ss_15_10_30.

B. Planting Materials Generally

1. Free from toxins, pathogens or other extraneous substances harmful to plant, animal or human life.
2. Compost shall be sanitised and stabilised and certified as appropriate for the intended use.
3. Provide notice to the Contractor before ordering or using.

1.4 PERFORMANCE REQUIREMENTS

A. General Requirements

The plants shall be healthy, established and thriving upon completion.

PART 2 SUBMITTALS AND TESTING

2.1 SUBMITTALS

Tender Submittals

Tender Response

Not required.

Samples, Mock-Ups, Prototypes And Quality Benchmarks

A. Pre-contract Samples

- Not required.
 - B. Post Contract Award Samples
 - Not required.
 - C. Mock-up Requirements
 - Not required.
 - D. Prototype Requirements
 - Not required.
 - E. Quality Benchmark Requirements
 - Submit quality benchmarks, in location(s) to be agreed with the Contractor, in accordance with Section Ss_00_00_00:
 - 1. First completed planting area of each type of plant.
- Plant/ Tree Substitution**
- F. Plants/ trees unavailable or expected to be unavailable at time of ordering:
 - 1. Submit alternatives, stating:
 - a. Price.
 - b. Difference from specified plants/ trees.
 - 2. Obtain the Contractor's acceptance before making any substitution.

2.2 TESTING

- A. General
 - Submit independently certified tests and Agrément certificates that demonstrate that the proposed systems achieve the performance requirements of the Landscape Specification.
- B. Soil Testing
 - Refer to the requirements as described in Section Ss_15_10_30 Subsoil/ Topsoil.

PART 3 EXECUTION

3.1 SITE INSTALLATION

- A. General
 - 1. The Works shall be carried out in accordance with the appropriate parts of BS 3882 and BS 4428.
 - 2. Where applicable, the Works shall be carried out in accordance with the manufacturer's recommendations.
 - 3. Install components such that they are plumb or horizontal and shall line up with adjacent components, in all directions.
- B. Accepted Suppliers
 - 1. All trees/ plants sourced from outside the UK shall be held and acclimatised at a UK-based nursery for a minimum 12 month period until the delivery to Site. At the time of tender the Subcontractor shall prepare a method statement of the acclimatisation process. The Subcontractor shall submit proposal of nursery for acceptance.
 - 2. Advanced ordering shall be required for all species.
 - 3. Large specimen trees shall require the Subcontractor to submit a method statement of delivery and traffic management plans at time of tender as road closures and prior agreement with council and residents may be required.

C. Woodland Work Generally

1. Check for below and above ground services, including land drainage, in the vicinity, refer also to the Services Engineer's documentation. Give notice to the Contractor if they may be affected and obtain instructions before proceeding.
2. Comply with the Health & Safety Executive (HSE)/ Arboriculture and Forestry Advisory Group (AFAG) leaflets/ recommendations.

Inspection

D. Condition of Material

Plant material shall be healthy, vigorous and sound transplanted nursery stock, with well-formed fibrous roots and heads and shall have been grown at, or grown on, the supply nursery for a minimum of one year.

E. Pre-Delivery Inspection

1. Plant stock shall be inspected by the Contractor before supplying to Site, at least two growing seasons before the date of planting and then clearly identified as being reserved for use on this project.
2. Photos of the proposed trees shall be sent by the Subcontractor for acceptance by the Contractor before the initial nursery visit. The tagged trees shall be inspected by the Contractor at 12 month intervals up until the time of planting. The Contractor shall reserve the right to reselect trees at the nursery visits. The costs of the visits by the Contractor to the nursery shall be borne by the Subcontractor.
3. The quality and health of plant material shall be monitored prior to delivery on Site.
4. Notice shall be given of pre-delivery inspections. The time frame shall be as proposed by the Subcontractor to the acceptance of the Contractor.

Identification Of Plants

F. General Labelling

A plastic label clearly marked with species and variety shall be attached to each group of trees/ shrubs/ plants, indicating:

1. Full botanical name.
2. Total number.
3. Number of bundles.
4. Part bundles.
5. Supplier's name.
6. Contractor's name and project reference.
7. Plant specification, in accordance with scheduled National Plant Specification categories.
8. Additional information: Submit on request the country of origin and date supplied and consignment details or reference.

G. Plants/ Trees Reserved at the Supplier's Premises

1. Types/ species shall be in accordance with the Planting Schedule.
2. Provide notice to the Contractor of predelivery inspection.
3. Identify and label inspected plants/ trees as reserved for use on this project.

Storage

H. General

1. Plants that are not to be planted on the day of delivery to Site shall be stored by accepted methods as recommended by the supply nursery.
2. Plants awaiting planting shall not at any time be exposed to drying winds, sun or drought.

3. Plants so stored shall not be subject to any extra cost. Any losses, damage or vandalism to the material whilst so stored shall be the sole responsibility of the Subcontractor.
4. The location of stored stock shall be agreed with the Contractor.

I. Bulbs/ Corms and Tubers

1. Location shall be well ventilated, dark, covered, rodent proof containers, away from vehicle exhausts and fruit.
2. Temperature shall be between 18°C and 21°C.

Preparation Of Planting Beds

J. Weed Control

No herbicide shall be used, weeds shall be removed by hand or alternative methods shall be proposed by the Subcontractor to the acceptance of the Contractor.

K. Fertilisers and Ameliorants

Quantities/ rates of application of fertilisers and ameliorants shall be in accordance with the manufacturer's recommendations based on the topsoil analysis.

L. Cultivation

1. Any compacted topsoil shall be broken up to full depth.
2. A few days before planting, the top 300mm of all planting beds shall be cultivated by rotovating and/ or double digging. Loosen, aerate and break up soil into particles of 2mm to 8mm.
3. Leave the surface regular and even and to levels indicated on the Design Drawings.
4. Undesirable material brought to the surface, including stones and clay balls larger than 50mm in any dimension, roots, tufts of grass and foreign matter, shall be removed.
5. Soil within root spread of trees and shrubs shall be retained. Do not dig or cultivate.

M. Final Grading

When the topsoil is reasonably dry and workable it shall be graded to smooth, flowing contours, with falls for adequate drainage. Minor hollows and ridges shall be removed.

N. Edges

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

1. 25mm for grass areas above adjoining paving or kerbs.
2. 25mm for shrub areas above adjoining paving or kerbs.
3. Not less than 150mm below the dpc of adjoining buildings.
4. 25mm higher for shrub areas than for adjoining grass areas.
5. Married in with adjoining soil areas.

O. Mulching

1. Mulching planting beds and tree pits.
2. Timing shall be at the end of the maintenance period, to the acceptance of the Contractor.
3. Material shall be sanitised and stabilised compost.
4. Mulching shall be free from pests, disease, fungus, toxins, pathogens and weeds.
5. Preparation shall include clearing weeds and watering soil thoroughly.
6. Coverage:
 - a. Shrubs/ plants: 50mm minimum depth.
 - b. Tree pits: 50 litres per tree position, 50mm minimum depth.

7. Finished level of mulch shall be 30mm below adjacent grassed or paved areas.

P. Acceptance

The acceptance of the Contractor shall be obtained for all levels and grading before grassing or planting.

Contract Grown Material

Q. General

1. Base material for contract growing shall be inspected and tagged according to the relevant Section of the Landscape Specification.
2. The Subcontractor is required to provide a Method Statement with their priced tender, giving full details of their intended sources for all the material and where it is to be held between tagging and delivery to Site, at least two growing seasons before the date of planting.
3. Photos of the plants (taken with a measurement reference in the photo frame) reserved by the Subcontractor shall be sent for acceptance by the Contractor before the initial nursery visit. If the photos are accepted by the Contractor, the Subcontractor shall make arrangements for the plants to be inspected by the Contractor at the nursery.
4. All plants shall be selected by the Contractor and identified in a separate location within the nursery at least two growing season before the date of planting. The Contractor shall reserve the right to reselect plants at the nursery visits. The costs of the visits of the Contractor to the nursery shall be borne by the Subcontractor.
5. Contract-grown material shall comply with the following:
 - a. Shrubs shall have a minimum of 4-5 strong, healthy shoots and shall have been pruned back (depending on the species) to produce a sturdy, well-balanced and bushy plant.
 - b. Shrubs shall be lined out with sufficient space to encourage unrestricted, sturdy growth and shall not be cramped or overshadowed.
 - c. Sizes indicated by the Planting Schedules are the minimum acceptable, measured from the soil level in the container to the outer extent of the general crown.
 - d. Container sizes listed in the Planting Schedules shall be the minimum size acceptable and shall be of rigid plastic or similar.
 - e. Plants grown in plastic grow bags or similar are not acceptable.
 - f. Plants shall be maintained in prime condition for the duration of the contract growing period and shall be available for inspection by the Contractor at all times and on a regular basis to be agreed.
 - g. Plants shall be of the highest quality and free of dead material, fungus, pest and disease.
 - h. At the time of delivery, plants shall be fully established in the containers so that on removal, the entire root ball remains fully intact.
 - i. However, plants shall not, under any circumstances, be supplied in a cramped or potbound condition.
 - j. Climbers shall be grown on timber frame supports at a height of 1.2m and shall be of sufficient sturdiness to withstand handling and transportation to Site.
 - k. Allowance shall be made for delivery of all plants to Site as shall the provision of necessary protection and shelter during transit/ loading. This shall be in full accordance with the latest relevant British Standard.

Planting Generally

R. Soil Conditions

1. Topsoil shall not be stripped and moved when the Site is waterlogged.
2. Soil for cultivating and planting shall be moist, friable and (except in marginal planting) not waterlogged.

3. Give notice before planting in frozen or snow covered soil, provide additional root protection and prevent planting pit sides, bases and backfill materials from freezing.
- S. Climatic Conditions
1. The work shall be carried out while soil and weather conditions are suitable for the relevant operations. Plants moved in warm weather conditions shall be sprayed and watered regularly.
 2. Planting shall not be carried out when persistent drying winds are likely to occur, in strong winds or when soil is waterlogged or excessively dry.
- T. Times of Year for Planting (Refer to the Planting Schedule)
1. Deciduous trees and shrubs: Late October to late March.
 2. Conifers and evergreens: September/ October or April/ May.
 3. Herbaceous plants (including marginal): September/ October or March/ April.
 4. Container grown plants: At any time if ground and weather conditions are favourable.
 5. Watering and weed control: Provide as necessary.
 6. Dried bulbs, corms and tubers: September/ October.
 7. Colchicum (crocus): July/ August.
 8. Green bulbs: After flowering in Spring.
 9. Wildflower plugs: Late August to mid November or March/ April.
 10. Aquatic plants: May/ June or September/ October.
- U. Use of Chemicals Generally
1. Chemicals shall only be used where specified and accepted.
 2. Only chemicals currently approved by the Department for Environment, Food and Rural Affairs (Defra) shall be used.
 3. When near water, drainage ditches or land drains shall comply with the recommendations of the Defra.
 4. A certified operator shall be used to take appropriate safety precautions and to comply with relevant statutory legislation.
 5. The Contractor shall be notified of any intention to apply chemicals, of the product to be used and of the dose rates. Permission to do so shall be received from the Contractor.
 6. Empty or unwanted containers and chemicals shall be disposed of, including unused diluted tank mixture, in a safe way in accordance with relevant statutory legislation. Disposal shall be off Site unless prior arrangements have been made.
- V. Machines and Tools
1. Do not use mechanical tools within 100mm of tree and plant stems.
 2. Only machinery and tools suitable for the Site conditions and the work to be carried out shall be used. Hand tools shall be used around trees, plants and in confined spaces where it is impracticable to use machinery.
- W. Drought Conditions
- If the water supply is or is likely to be restricted by emergency legislation:
1. Inform the Contractor without delay and ascertain the availability and additional cost of water from an alternative source.
 2. If shrub planting has not been carried out, do not do so until instructed.
 3. If shrub planting has been carried out, obtain instructions on supply of water.
- X. Notice to the Contractor

Make advance arrangements with the Contractor to give them the opportunity of being present during:

1. Setting out.
2. First stripping of topsoil.
3. Tree surgery.
4. Application of fertiliser and soil conditioner.
5. Spreading of topsoil and/ or subsoil.
6. Planting of shrubs, herbaceous perennials.
7. Planting of trees into previously dug pits.
8. Installation of semi-permeable membranes.
9. Delivery of plants/ trees.
10. Watering.
11. Visiting Site during maintenance period (where the specified notice is not given, the Site visit shall be deemed not to have occurred).
12. Period of notice: Minimum three working days.
13. Replacement planting.

Y. Setting Out

Clearly mark the position of all trees and the boundaries of shrub beds as set out on the Design Drawings. Invite the Contractor to inspect and agree the setting out before digging tree pits or starting planting work.

Planting Trees

Z. Generally

1. Before lifting, the north side of trees shall be marked so that orientation is the same where replanted.
2. Trees shall be planted upright, unless otherwise instructed, in the centre of a pit and at the original soil depth.
3. Damage to roots, bark or branches shall be removed during pruning and wounds over 25mm diameter treated with fungicidal sealant. The Contractor has the right to reject any tree where pruning has resulted in the loss of the natural form of the tree and where extensive damage may result in the death of the tree.
4. Treatment of tree wounds:
 - a. Keep wounds as small as possible.
 - b. Cut cleanly back to sound wood using sharp, clean tools.
 - c. Leave branch collars. Do not cut flush with stem or trunk.
 - d. Set cuts so that water shall not collect on cut area.
 - e. Fungicide/ sealant shall not be applied unless agreed with the Contractor.
5. Non-perishable containers and rootball wrappings shall be removed prior to planting. Non-galvanised wire mesh cages and timber frames may be left in situ during planting.
6. The area shall be thoroughly watered to field capacity immediately after planting, using a low-pressure hose.
7. When planting trees in grass, an 800mm diameter circle shall be cut and subsequently maintained from the sward. Arisings shall be removed from Site.

AA. Anti-desiccants

1. Plants shall be dipped in or thoroughly sprayed with anti-desiccant before delivering to Site.

2. Apply again soon after planting.
3. Do not apply in rainy weather.
4. Apply full coverage of the underside of the foliage.

BB. Semi-mature Specimen Trees

1. Semi-mature trees shall be in an advanced state of growth, ranging in height as shown in the Planting Schedule. They shall be healthy, self-supporting, of good form and strain, with vigorous stems and well-balanced heads.
2. Where a standard form is specified, it shall have a clear stem height of no more than 2.4m and a minimum girth of 200mm at 1m above the ground level.
3. Where multi-stemmed or bushy trees are specified, they shall be branched to the ground with a form typical of the species.
4. Sizes and form shall be as indicated in the Planting Schedule.
5. Preparation and transplanting shall be in accordance with BS 4043 (Withdrawn) unless specified otherwise in this clause.
6. Pits:
 - a. The appropriate sized holes shall be based on the following rootball sizes:
 - i) Rootballs up to 1000mm diameter and 750mm deep: 1500mm x 1500mm x 1000mm deep.
 - ii) Rootballs 1100-1500mm diameter and 750mm deep: 2000mm x 2000mm x 1000mm deep.
 - iii) Rootballs over 1500mm diameter and 750mm deep: Pit 500mm wider and 250mm deeper than rootball.
 - b. Break up the base of the pit to a depth of 400mm.
 - c. The sides of the pit shall be rough and not smeared in clay soil areas.
 - d. Acceptance of excavated pits shall be sought prior to planting.
 - e. Backfilling material: Refer to clause below.
 - f. Backfill in layers not exceeding 250mm depth consolidating material to remove air pockets.
 - g. Support trees as indicated on the Design Drawings and/ or the Planting Schedule.

CC. Staking Generally

1. Stakes shall be softwood, peeled chestnut, larch or oak, straight, free from projections and large or edge knots and with pointed lower end.
2. Preservative treatment shall provide a 20 year service life.
3. Nails shall be in accordance with BS 1202, galvanised, minimum 25mm long and with 10mm diameter heads.
4. Stake size shall be minimum 50mm diameter.

DD. Long Single Staking for All Trees

1. Position stake close to tree on windward side and drive vertically at least 300mm into bottom of pit before planting.
2. When backfilling, consolidate material around stake.
3. Cut off stakes just below lowest branch of tree.
4. Provide cushioned ties.
5. Secure tree firmly but not rigidly to stake with at least two ties. Use three ties if necessary to prevent tree touching stake.
6. Top tie shall be within 25mm of the top of the stake and the lower tie approximately halfway down.

EE. Advanced Nursery Stock Specimen Trees

1. The Subcontractor shall order the plant materials and shall be responsible for them from the point the material leaves the supply nursery.
2. The advanced stock specimen trees shall be in accordance with BS 3936, size categories as indicated in the Planting Schedule.
3. Plant material that leaves the supply nursery shall be in prime condition and no deterioration shall result from the lifting operation.
4. Any requirements of the supplier shall be fully complied with to maintain the effectiveness of the guarantees.
5. Trees shall be adequately secured and protected in the transit vehicles.
6. Vehicles shall be covered with tarpaulins throughout transportation to protect the stock from exposure to weather.
7. Provide the Contractor with a valid phytosanitary certificate for all of the stock.
8. Plant material shall be maintained in a healthy condition until required on Site.
9. Rootballed trees shall have firm backfilling material around the rootball in 150mm layers, do not disturb the roots.
10. Trees shall be supported as indicated on the Design Drawings and/ or Planting Schedules.

FF. Backfilling Material

1. Semi-mature trees, nursery stock and advanced nursery stock:
 - a. 80% Topsoil.
 - b. 20% Farmyard manure.
 - c. Fertiliser.
 - d. Ameliorants.
2. Backfilling material shall be thoroughly mixed prior to planting the trees.
3. Quantities/ rates of application of fertilisers and ameliorants shall be in accordance with the manufacturer's recommendations, based on the soil analysis.

Planting Shrubs/ Seasonal Plants

GG. Evergreens

Shrubs shall be dipped in or sprayed with anti-desiccant before delivering to Site. Shrubs shall be sprayed with anti-desiccant soon after planting.

HH. Planting Generally

1. Before planting, any non-perishable containers shall be removed.
2. Advise the Contractor of any damaged roots, and obtain instructions.
3. Plants shall be planted upright or well balanced with the best side to the front. Backfilling material shall be carefully packed around evenly spread roots or root ball and heeled well in.
4. Plants shall be watered thoroughly immediately after planting, using a fine rose.
5. Advise the Contractor of any damage to shrubs resulting from planting operations, and obtain instructions.
6. After planting, forked and/ or raked soil shall be to a fine tilth with accepted cambers and with hollows.

II. After Planting

Grass edges of shrub beds in grass areas/ tree pits shall be cut to form a neat flowing margin.

JJ. Shrubs

1. Shrubs shall be in accordance with BS 3936: Part 1.
2. The ground cover shall be in accordance with BS 3936: Part 10.
3. Planting holes for shrubs shall be 150mm wider than container/ root spread and 400mm deep.
4. Planting pits shall be excavated 1-2 days (maximum) before planting.
5. The planting holes for specimen shrubs shall be at least 300mm wider than the root spread and 150mm deeper than the root system. The bottom of the pit shall be broken up to a depth of 150mm.
6. Backfilling material shall be shrub planting backfilling material.
7. The finished level shall be at the original soil mark on shrubs and 25mm above the surrounding level to allow for settlement.
8. Spacing of plants: Plants shall be positioned at spacings and in groupings as indicated on the Design Drawings and the Planting Schedule.
9. Shrub Planting Pits:
 - a. Excavate 1-2 days (maximum) before planting.
 - b. 150mm wider than roots when fully spread and 200mm deep.
 - c. Break up pit bottom to a depth of 150mm, incorporating soil ameliorant/ conditioner at 50g/m².
 - d. Reuse excavated material for backfilling.

KK. Hedges

1. Hedges shall be in accordance with BS 3936: Part 1 and consistent in species, cultivar and clone to form a uniform hedge.
2. Hedges shall be obtained from accepted source(s) with soil and climatic conditions similar to those prevailing on Site.
3. Before planting, protective galvanised mild steel scaffolding support posts in accordance with BS 1722: Part 2 shall be erected by ramming into the ground as indicated in the Landscape Specification.
4. Hedges shall be in 5L and 10L pots at the time of planting.

LL. Seasonal Installations

1. Plants shall be positioned in locations indicated on the Design Drawings and evenly placed to achieve even spacing. Planting holes shall be at least 150mm wider than the root spread.
2. Previous installations shall be lifted and the arisings shall be removed off Site prior to the planting of the new installation.
3. Base fertiliser shall be accepted by the Contractor prior to use. It shall be applied to prepared beds prior to each installation in accordance with the manufacturer's recommendations.
4. Surplus stock shall be held to replace any plants that fail immediately.

Planting Container Grown Plants/ Trees

MM. General

1. Growing medium shall contain adequate nutrients for plants to thrive until permanently planted.
2. Plants shall be centred in containers unless otherwise specified, firmed and well watered.
3. Root growth shall substantially fill containers, but shall not be root bound, and shall be in a condition conducive to successful transplanting.
4. Container grown plants/ trees shall be grown in the open for at least two months before being supplied.

5. Containers shall contain holes adequate for drainage when placed on any substrate commonly used under irrigation systems.

Planting Wild Flower Plugs

NN. General

1. Plants shall be kept watered and in shade until planted and shall not be allowed to dry out.
2. Remove brambles, coarse and invasive weeds from planting sites.
3. Plant in grass that has been closely mowed to approximately 50mm and remove arisings.
4. Bare soil patches of 150-300mm diameter, between tufts of grass. If such patches do not occur as a result of mowing long grass, remove grass and weeds to create two planting sites per m², of 150-300mm diameter.
5. Planting:
 - a. Plant into a hole to suit plug size and shape.
 - b. Create a cleft at bottom of hole to improve rooting.
 - c. Gently firm plant in hole.

Planting Bulbs/ Corms/ Tubers

OO. Bulbs/ Corms/ Tubers

1. Condition shall be firm, entire, not dried out or shrivelled.
2. Bulbs/ corms and tubers shall be free from pests, diseases and fungus.
3. When handling, remove from packaging immediately.

Planting Aquatic/ Marginal Plant Plugs

PP. Planting Aquatic/ Marginal Plant Plugs

1. Keep plants watered and in shade until planted. Do not allow to dry out.
2. Remove coarse weeds etc. from planting sites.
3. Planting sites:
 - a. Do not puncture waterproofing membranes below soil.
 - b. Plant into a hole to suit plug size and shape. Create a cleft at bottom of hole to improve rooting.
 - c. Gently firm plant into hole to ensure good root hold into substrate.

Notch Planting Bare Root Aquatic Plants

QQ. Notch Planting Bare Root Aquatic Plants

1. Make a vertical 'I', 'L', 'T' or 'H' notch.
2. Depth shall accommodate full depth of roots.
3. Do not puncture waterproofing membranes below soil.
4. Insert plant at specified water depth, close notch and firm surrounding soil to ensure good root hold into substrate.

Planting Climbing Plants

RR. General

1. Climbing plants shall be planted 150mm clear of the supporting structure (e.g. wall/ fence) with roots spread outward.
2. Lightly secure branches to supports.
3. Wire mesh climber supports shall be as provided by the nursery.

4. Retain the canes of plants which are too small to reach the climbing wire supports.

Protection Of Plant Material

SS. General

1. Protection shall be in accordance with:
 - a. The Horticultural Trades Association recommendations for handling and establishing landscape plants.
 - b. BS 3936, Nursery Stock.
2. Plants shall be adequately and carefully packed and protected to survive transport to Site without damage.
3. Particular care shall be taken so that roots are not allowed to dry out, and plants shall be protected by damp straw, moss, sacking or the like.
4. Protect plants from frost.
5. Handling:
 - a. Handle plants with care and in accordance with the Horticultural Trades Organisation and the Joint Council for Landscape Industries 'Handling and Establishing Landscape Plants' document (originally published by CPSE).
 - b. Protect from mechanical damage and do not subject to shock, e.g. by dropping from a vehicle.
6. Black polyethylene bags plant packaging.
7. Packaging of bulk quantities: Pallets or bins sealed with polyethylene and shrink wrapped.
8. Planting shall be upright or well balanced with best side to front.

TT. Protect Existing Grass

During planting operations, existing grass shall be protected by laying boards or tarpaulins. Excavated material shall not be placed directly onto grass.

UU. Protect Existing Trees

During planting operations, existing trees where indicated on the Design Drawings shall be retained and protected in accordance with BS 5837.

VV. Protection Generally

1. The work and plants shall be protected from damage by weather, traffic and other causes.
2. Trees and shrubs shall be protected against damage from the use of mowers, nylon filament rotary cutters and similar powered tools.

WW. Surplus Material

Subsoil, stones, debris, wrapping material, canes, ties, temporary labelling, rubbish, prunings and other arisings shall be removed from Site.

Maintenance During Growing On Period

XX. General

1. The health, quality and achievement of the plant prior to delivery to Site shall be monitored. In particular, the plant material to be grown shall be lined out at centres appropriate to the full achievement of the plant, allowing for lateral as well as vertical growth. The roots shall have been properly prepared for lifting and long-term plant development.
2. The supply nursery shall be visited every three months with provision made for the Contractor to also attend. The quality and health of the plant material shall, at the time, be checked.

Maintaining/ Making Good Defects And Completion

YY. Watering (Before Practical Completion)

During the establishment of the plants, watering points in each key location shall be operated to maintain healthy growth of the plants both during establishment as required.

ZZ. Maintenance Before Practical Completion

Plants and planting areas shall be maintained in good condition and in accordance with the Post Completion Maintenance Requirements, undertaking all necessary operations up to the Practical Completion of this Contract.

AAA. Cleanliness

Soil shall be removed from all hard surfaces and grassed areas and the Works shall be left in a clean tidy condition at Practical Completion.

BBB. Failures of Planting

1. Post Practical Completion, maintenance of the planting shall be carried out as specified in this Section.
2. Any trees/ shrubs/ plants/ grass that are dead, dying or otherwise defective at the end of the 12 month Defects Liability Period shall be regarded as defects due to materials or workmanship not being in accordance with the Contract. They shall be replaced by equivalent trees/ shrubs/ plants/ grass at the next suitable planting season unless otherwise instructed.
3. This shall not apply if the defects are caused by damage done by another party after Practical Completion.

CCC. Maintenance of Trees and Planted Areas

1. Plants and planted areas shall be maintained in good condition up to the end of the Defects Liability Period.
2. Maintenance shall include watering, pruning, hedge cutting, dead heading of seasonal installations and immediate replacement of failed material, application of accepted chemicals to combat insect attack, disease and weeds, forking and hoeing of beds, firming plants and stakes, and removal of all rubbish.
3. Maintenance programme:
 - a. Make visits as necessary to fulfil the requirements of the Landscape Specification.
 - b. Carry out provisional/ additional works within 14 days of receiving written instruction from the Contractor or the Contractor's representative.
 - c. Give written notice to the Contractor or the Contractor's representative within seven days to confirm completion of individual maintenance operations.
4. Replacement inspection shall be made by the Subcontractor. Trees, shrubs and other plants that are dead, have failed to show leaf, or are seen to be seriously retarded in growth to such a degree that they are below the standard originally specified, or that are in an unhealthy condition, shall be removed from the Site. These shall be replaced as soon as planting conditions permit during the normal planting season.
5. Replacement: If more than 10% of replacements fail to come into leaf in the following growing season, they shall again be replaced in the appropriate season.
6. Damage caused by others shall be inspected after the planting at monthly intervals to ascertain the extent of any losses or damage resulting from vandalism or other causes. Any such damage shall be immediately brought to the attention of the Contractor or the Contractor's representative. Remedial works shall be carried out as instructed.

DDD. Watering/ Irrigation

1. Sufficient water shall be applied to maintain healthy growth of trees/ shrubs/ plants.
2. During dry periods the crown of plants shall be thoroughly sprayed with water in early mornings or late evenings, but on no account in bright sunny weather.
3. Application shall be evenly spread and without damaging or displacing plants or soil.

EEE. Weed Control

Beds should be kept clear of weeds by forking over as necessary to keep soil loose, with accepted cambers and no hollows.

FFF. Fertiliser

1. A top dressing of an accepted compound fertiliser shall be applied in accordance with the manufacturer's recommendations and at the times and frequency recommended by the manufacturer.
2. Apply fertiliser in March or April unless otherwise agreed with the Contractor.

GGG Pruning

Plants shall be pruned at appropriate times to remove dead, dying and diseased wood and suckers to promote healthy growth and natural shape and to encourage flowering. Cut ends exceeding 25mm diameter shall be dressed with fungicidal sealant.

HHH. Cutting Formal Clipped Shrubs

The tops and sides of shrubs shall be clipped using hand or mechanical shears as required to maintain box shape and to encourage dense growth.

III. Pest Control

1. Accepted pesticides shall be applied as necessary to control any insect or fungal attack.
2. Any signs of insect and/ or fungal attack shall be reported to the Contractor. Accepted pesticides shall be applied immediately as instructed.

JJJ. Refirming

Trees and shrubs, and where appropriate their stakes, shall be regularly checked, particularly after high winds, and refirmed and reset to proper grades or upright positions as necessary.

KKK. Tree Stakes

1. Broken or missing items shall be replaced. Ties shall be adjusted if necessary to prevent rubbing of bark. Any damaged bark shall be cut and wounds shall be treated with fungicidal sealant.
2. The condition of stakes, ties and guards shall be checked. Ties shall be adjusted if necessary to prevent rubbing of bark. Any damaged bark shall be cut back and wounds shall be treated with fungicidal sealant.
3. When directed by the Contractor or the Contractor's representative, stakes and/ or guards shall be removed from plants. Holes shall be backfilled with topsoil.

LLL. Cleanliness

1. Deleterious materials shall be removed from hard surfaces/ planting beds, and the Site shall be maintained in a clean and tidy condition.
2. Litter removal: Litter/ tipped material shall be removed from planted areas during each visit for weed control.

MMM Maintenance Instructions

Before the end of the Defects Liability Period a typewritten and bound maintenance specification for all works shall be submitted for the following five years.

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SECTION Ss_45_35_45 -- SEEDING/ TURFING

To be read in conjunction with Section Ss_00_00_00, other related Sections of the Landscape Specification and the Design Drawings and the Planting Schedule.

PART 1 TYPE, SYSTEMS AND MATERIALS

1.1 SPECIFICATION TYPE

- A. Prescriptive Work
 - 1. Supply, deliver, install and warrant the Works in compliance with the materials and workmanship requirements of the Landscape Specification.
 - 2. Where required to prepare drawings these shall be limited to final detailing of components and systems indicated on the Design Drawings, necessary to demonstrate their safe installation.
 - 3. Where alternative products are offered by the Subcontractor for acceptance by the Contractor, submit full supporting documentation in respect of the complete system or installation.

1.2 SYSTEM DESCRIPTIONS

Design Criteria

- A. General
 - 1. Execute the Works in accordance with the following:
 - a. The recommendations of the British Association of Landscape Industries (BALI).
 - b. BS 3882, Specification for topsoil.
 - c. BS 4428, Code of practice for general landscape operations.
 - d. BS 5837: Trees in relation to design, demolition and construction - Recommendations.
 - 2. The Works shall be covered by a single source warranty.
- B. Seeded and Turfed Areas
 - 1. Seeded and turfed areas shall have a healthy, vigorous grass sward, free from the visible effects of pests, weeds and disease.
 - 2. The appearance shall be closely knit, continuous ground cover of even density, height and colour.

C. Climatic Conditions

Carry out the Works while soil and weather conditions are suitable.

Grass Seeding

D. Type EXT-521 Grass

Grass mixes as indicated on the Planting Schedule and the Design Drawings.

- 1. Grass turf as indicated on the Planting Schedule, to areas indicated on the Design Drawings:
 - a. Application rate shall be in accordance with the manufacturer's recommendations.
 - b. Areas where trees have been removed shall be cultivated and topped up with topsoil prior to turfing.
- 2. Meadow grass seeding mix as indicated on the Planting Schedule, to areas indicated on the Design Drawings:
 - a. Application rate shall be in accordance with the manufacturer's recommendations.

- b. Areas where trees have been removed shall be cultivated and topped up with topsoil prior to seeding.

1.3 MATERIALS

Seeding

A. Seeding Generally

1. Seeds shall be accurately certified varieties complying with UK and/ or EU Seed Regulations.
2. Fresh seed shall be purchased for each growing season. Seed purchased for previous seasons shall not be used.
3. Germination capacity shall be not less than 80%.
4. Purity of mixture shall be not less than 90%.
5. Total weed seed content shall be no more than 0.5%.
6. Total content of other crop seeds shall be no more than 1%.
7. Results of testing for germination, purity and composition, which shall be carried out at an Official Seed Testing Station, shall be submitted when requested by the Contractor.
8. Samples of mixtures shall be submitted when requested.

Turf

B. Turf Generally

1. Turf shall be grown in accordance with BS 3969.
2. Turf shall be free from undesirable grasses and weeds. It shall have been treated with herbicide not less than four weeks and not more than three months before lifting.

PART 2 SUBMITTALS AND TESTING

2.1 SUBMITTALS

Tender Submittals

A. Tender Response

Not required.

Samples, Mock-Ups, Prototypes And Quality Benchmarks

B. Pre-contract Samples

Not required.

C. Post Contract Award Samples

Not required.

D. Mock-up Requirements

Not required.

E. Prototype Requirements

Not required.

F. Quality Benchmark Requirements

Provide quality benchmarks, in location(s) to be agreed with the Contractor, in accordance with Section Ss_00_00_00:

1. First completed 20m² of each type.

2.2 TESTING

A. General

Submit independently certified tests and Agrément certificates that demonstrate that the proposed systems achieve the performance requirements of the Landscape Specification.

PART 3 EXECUTION

Workmanship

A. General

1. The Works shall be carried out in accordance with the appropriate parts of BS 3882 and BS 4428.
2. Where applicable, the Works shall be carried out in accordance with the manufacturer's recommendations.
3. Fabrication of materials/ components shall, as a minimum, be in accordance with current regulations and standards.

Inspection/ Preparation

B. Inspection

1. Before commencing installation, the subgrade shall be surveyed. Dimensions, line, and formation level shall be checked. The Contractor shall be informed immediately if the subgrade is unsuitable to receive the Works.
2. If the subgrade is unsuitable, remedial action to make the structure suitable shall be proposed.

C. Suitability of Subgrade

1. Subgrade shall be sound, and well compacted with no loose material.
2. Procedures required to the subgrade or to the adjacent Works, that cannot/ should not be undertaken after the installation of the Works specified herein, shall be completed.
3. Tolerances of the subgrade shall be suitable to permit the required configuration and specified tolerances of the finished systems/ materials.

D. Seed Bed Cleaning Before Sowing all Grassed Areas

No herbicide shall be used, weeds shall be removed by hand or alternative methods shall be proposed by the Subcontractor to the acceptance of the Contractor.

E. Soil Requirements

Soil for grass swards shall be as described in Section Ss_15_10_30.

F. Notice to the Contractor

Notice of at least 2 days shall be given to allow the Contractor the opportunity of being present during:

1. Setting out.
2. Application of fertiliser.
3. Preparation of seed bed.
4. Seeding or turfing.
5. Site visits during maintenance.

G. Storage and Delivery

1. Lay turf with minimum delay after lifting, if delay occurs lay turf out on topsoil and keep moist.
2. Turf shall not be lifted in frosty weather or waterlogged ground.

3. Arrange delivery to avoid the need for excessive stacking.
 4. Stacking height shall be 1m or as accepted by the Contractor.
 5. Dried out or deteriorated turf shall not be used.
- H. Setting Out
1. Boundaries of grass areas shall be clearly marked and in straight lines or smoothly flowing curves as indicated on the Design Drawings.
 2. Acceptance shall be obtained from the Contractor before starting work.
- I. Use of Chemicals Generally
1. A certified operator shall be used to take appropriate safety precautions and shall comply with all the relevant statutory legislation.
 2. The Contractor shall be notified of any intention to apply chemicals, the product to be used and the dose rates. Permission shall be received from the Contractor before usage.
 3. Empty or unwanted containers and chemicals, including unused diluted tank mixture, shall be disposed of in a safe way in accordance with all relevant statutory legislation. Disposal shall be off Site.
- J. Weed Control
- No herbicide shall be used, weeds shall be removed by hand or alternative methods shall be proposed by the Subcontractor to the acceptance of the Contractor.
- K. Peat
- Peat or products containing peat shall not be used.
- L. Cultivation
- Any compacted topsoil shall be broken up to full depth. The top 100mm of all topsoil shall be reduced to a tilth suitable for blade grading (10mm down particles). Undesirable material brought to the surface, including roots, tufts of grass and foreign matter, shall be removed.
- M. Grading
1. When topsoil is reasonably dry and workable it shall be graded to smooth, flowing contours, with falls for adequate drainage. All minor hollows and ridges shall be removed.
 2. When ground conditions permit, the surface shall be graded to smooth, flowing contours, with falls for adequate drainage, removing all minor hollows and ridges.
- N. Topsoil Levels
- Topsoil levels shall be adjusted by blade grading to maintain no less than 150mm of topsoil in all areas. If the required levels cannot be achieved by movement of the existing soil, notify the Contractor and obtain instructions.
- O. Grass Edges
1. Unless otherwise stated, finished levels after settlement shall be 25mm above adjoining paving, kerbs, manholes, and similar work.
 2. Levels shall be 25mm higher for shrub areas than for adjoining grass areas.
- P. Acceptance
- Acceptance shall be obtained from the Contractor of all levels and grading before grassing or planting.
- Q. Final Cultivation
1. After final grading, the soil shall be firmed lightly and uniformly and the top 25mm shall be reduced to a fine tilth by harrowing with spike/ chain harrows or accepted cultivators. All stones more than 35mm in any dimension shall be removed. Hand operational tools shall be used for adjacent structures/ awkward corners/ areas inaccessible to machinery.

2. Extend cultivation into adjacent grassed areas sufficient to achieve full marrying in of levels.
- R. Sowing Grass
1. Establish good seed contact with the root zone.
 2. Seed shall be sown during the cool season from early September to the end of March or April to October.
 3. Seed shall be spread evenly at the specified rate(s) and applied in two equal sowings in transverse directions.
 4. The ground shall be lightly harrowed or raked.
 5. On light soils the ground shall be rolled and cross-rolled after seeding using a lightweight roller.
- S. Grass Plugs Planting Generally
1. Plugs shall be planted at 150mm centres. Following planting and consolidation of soil around plugs, the soil shall be irrigated to field capacity.
 2. No planting shall take place when persistent drying winds are likely to occur.
- T. Turfing
1. Time of laying:
 - a. In spring and summer shall be within 18 hours of delivery.
 - b. In autumn and winter shall be within 24 hours of delivery.
 2. Do not lay turf when persistent cold or dry winds are likely to occur or the soil is frost bound, waterlogged or excessively dry.
 3. Working access shall be through planks laid on previously laid turf. Do not walk on prepared bed or newly laid turf.
 4. Lay turf with broken joints that are well butted up, do not stretch turf.
 5. Remove high spots and fill hollows with fine soil as accepted by the Contractor.
 6. Lightly and evenly firm as laying proceeds to maintain full contact with substrate. Do not use rollers.
 7. Dressing shall be brushed into joints.
 8. Thoroughly water completed turf immediately after laying. Check that water has completely penetrated into the soil below.
 9. Delivery and storage:
 - a. Timing: Lay turf with minimum possible delay after lifting.
 - b. If delay occurs, lay turf out on topsoil and keep moist.
 - c. Do not lift turf from frozen or waterlogged ground.
 - d. Do not stack turves higher than 1m.
 - e. Do not use dried out or deteriorated turf.
 10. Dressing for turf:
 - a. Type: Sandy loam.
 - b. Application rate: 5kg/ m².
 - c. Apply dressing prior to cultivation.

Protection And Maintenance

- U. Watering
1. During establishment of grass areas, sufficient water shall be applied to keep the turf sufficiently moist for establishment and growth.

2. Wet the full depth of topsoil and apply evenly without displacing seeds, seedlings or soil.
3. Watering frequency shall be every second day during periods of no rainfall, for 12 months following Practical Completion.

V. Drought Conditions

If the water supply is or is likely to be restricted by emergency legislation:

1. The Contractor shall be informed without delay and the availability and the additional cost of water from an alternative source shall be ascertained.
2. If turfing has not been carried out, do not commence until instructed.
3. If turfing has been carried out, instructions shall be obtained about a supply of water.

W. First Cut of Grass Areas

1. When grass is approximately 75mm in height and reasonably dry, it shall be cut to 50mm in height using a rotary mower that has been accepted by the Contractor.
2. Prior to first cut remove debris, litter and stones and earth clods larger than 25mm in any dimension.
3. Remove arisings from Site.

X. Weather

Cutting and root pulling in wet weather shall be avoided.

Y. Maintenance Cutting

Between the first cut and Practical Completion the height of growth shall not exceed the maximum height of the first cut stated above. The grass shall be cut as many times as necessary with machinery and to heights as specified for the first cut.

Z. Cleanliness

Soil shall be removed from all hard surfaces and the Works shall be left in a clean, tidy condition at Practical Completion.

AA. Failures of Grass (Before Practical Completion)

Bare areas and areas of dead grass which are apparent at Practical Completion shall be regarded as defects and shall be made good by recultivation and replanting at times agreed with the Contractor.

BB. Failures of Grass (After Practical Completion)

Bare areas and areas of dead grass which become apparent within the period stated in the Contract shall be regarded as defects due to materials or workmanship not in accordance with the Contract. They shall be made good by recultivation and replanting at times agreed with the Contractor.

CC. Failures of Seeding/ Turfing Generally

1. Carry out the following operations from completion of seeding/ turfing until 12 months following Practical Completion.
2. Defective materials or workmanship shall be defined as areas that have failed to thrive. Theft or malicious damage shall be excluded.
3. Method of making good shall be recultivation and reseeding/ returfing.
4. Timing of making good shall be the next suitable planting season.

DD. Grass Maintenance

1. Generally throughout the Defects Liability Period, maintenance shall be carried out on the grass areas. Visits shall be made as necessary to fulfil the requirements of the Landscape Specification.

2. Provisional/ additional works shall be carried out within 14 days of receiving written instruction from the Contractor.
3. Carry out the following operations from completion of seeding/ turfing until 12 months following Practical Completion.
4. Maximum height of growth at any time shall be 75mm.
5. Before each cut remove all litter and debris.
6. Provide 10 cuts annually (2 cuts per month May-Sept inclusive) to a height of 50mm.
7. Do not cut until bulb foliage has died down in bulb planting areas.
8. All edges shall be trimmed.
9. Carry out weed control, leave grass areas substantially free of broad leaved weeds.
10. Stones brought to the surface exceeding 25mm in any dimension shall be removed regularly.
11. Make good areas of settlement.
12. Remove arisings from Site.

EE. Maintenance Programme

1. When requested by the Contractor, the Subcontractor shall provide a maintenance manual.
2. The maintenance programme shall identify:
 - a. Number of visits.
 - b. Approximate dates.
 - c. Operations to be undertaken at each visit.
 - d. Chemicals used, location and quantities.
 - e. Machinery and labour.
3. Within the programme, space shall be provided for ratification by the Contractor, or their representative, that the work has been completed. Written notice shall be given to the Contractor within seven days to confirm completion of individual maintenance operations. A revised bound maintenance manual shall be prepared at the end of the 12 month Defects Liability Period for the use of the Contractor or their representative.

FF. Grass Cutting for Lawn

1. Grass shall be mowed with a rotary mower to 25mm throughout the maintenance period.
2. The frequency shall allow for the maintenance of a maximum height of 25mm and prevent grass from seeding.
3. Margins to woodland areas shall be maintained at a maximum height of 100mm.
4. All cuttings shall be removed and disposed of off Site.

GG. Trim Edges

Edges of grass bordering planted areas, pavings and similar work shall be cut to clean straight lines or smooth curves.

HH. Weed Control in Lawns

1. No herbicide shall be used and weeds shall be removed by hand or alternative methods shall be proposed by the Subcontractor to the acceptance of the Contractor.
2. Regular inspections shall be made and reports given to the Contractor or their representative. If so directed, accepted chemicals shall be applied in accordance with the manufacturer's recommendations.

II. Watering

Sufficient water shall be applied to maintain healthy growth.

JJ. Lawn Scarification Method

The surface shall be scarified by lightly raking using an accepted fine turf scarifier.

KK. Cleanliness

1. Generally, arisings shall be removed from hard surfaces/ planting beds, and the Site maintained in a clean and tidy condition.
2. Litter Removal:
 - a. During the mowing season litter/ tipped rubbish shall be removed from grass areas prior to each cut.
 - b. During the dormant season the Site shall be visited at weekly intervals and all litter/ tipped rubbish shall be collected and removed.
 - c. Include adjoining fence lines, paving and similar work in litter removal.
 - d. All litter and tipped rubbish shall be collected from the whole Site at regular intervals during the maintenance period.
 - e. Leaf Collection: Fallen leaves shall be raked and collected and removed on a weekly basis.

LL. Fertiliser for Lawns

Fertiliser shall be applied in equal dressings, in transverse directions and at rates and at the frequency prescribed/ recommended in writing by the manufacturer.

1. March application: 25:5:10 spring fertiliser at 25g/ m².
2. September application: 14:5:20 autumn fertiliser at 25g - 40g/ m².

Tolerances

MM. General

Tolerances shall be measured against the relevant Base Reference Datum; Location Reference Point; Location Reference Plane; Location Reference Surface or Reference Element as defined in Section Ss_00_00_00.

END OF SECTION