Purpose of issue:

APPROVAL

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TŶ UNNOS BOX BEAM
TIMBER SPECIFICATION

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2247 TŶ UNNOS BOX BEAM CERTIFICATON

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The quality management system of Burroughs has been approved against ISO 9001.

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Version 2.0

1.0 Introduction

1.1 Scope of Specification

This specification identifies and defines the material parameters for the structural engineering of the Tŷ Unnos box beam for use in structures.

This document shall be read in conjunction with the general conditions of contract and all associated tender documentation, specifications and drawings and shall not preclude the Contractor from any of his responsibilities defined therein. The document contains information specific to the structural engineering of the building and shall be considered to accompany the performance criteria defined in the architectural and building services specifications and drawings included within the tender documentation.

The Contractor shall take full responsibility for providing the specified works and ensuring they comply with the provisions outlined in this performance specification. However, irrespective of any performance requirement within this document, any structure provided or proposed by the Contractor shall conform with the dimensional and visual requirements of the architectural specification and drawings.

1.2 Codes and Standards

The structural design of all timber elements shall conform to the requirements of the relevant European Standards and Codes of Practice current at the time of tender and any others that are applicable. These include:

BS EN 338:2003	Structural Timber – Strength Classes
BS EN 1995-1-1:2004	Eurocode 5: Design of Timber Structures – Part 1-1: General – Common Rules and Rules for Buildings
BS EN 1991-1-1:2002	Eurocode 1: Actions on Structures – Part 1-1:General Actions – Densities, Self Weight, Imposed Loads for Buildings
BS EN 1991-1-4:2002	Eurocode 1: Actions on Structures – Part 1-4: General Actions – Wind Actions
BS EN 1990:2002	Eurocode: Basis of Structural Design
BS EN 12369-1:2001	Wood-based Panels – Characteristic Values for Structural Design – Part 1: OSB, Particleboards and Fibreboards

The design of specific Tŷ Unnos components such as the box beams and ladder beams should be completed in accordance with Burroughs' Tŷ Unnos Design Procedure document.

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1.3 Loadings

All relevant dead loads shall be taken into account where appropriate in the design, including, but not limited to, roof coverings, purlins, insulation, sheeting, ceilings, services, partitions and others as appropriate

All imposed loadings should be applied to the structure as defined by the relevant clauses of BS EN 1991-1:2002.

Wind loads are to be considered in design for stability of the buildings, roof design and the design of all cladding components and supports. Design wind pressures are to be evaluated from the recommendations of BS EN1991 1-4.

2.0 Materials

2.1 Precluded Materials

The following materials are specifically precluded from all specifications pertaining to works carried out under this contract.

(a) High alumina cement or concrete

(b) Woodwool slabs as permanent concrete shuttering

(c) Calcium chloride in admixtures for use in reinforced concrete

(d) Asbestos in any form

(e) Sea dredged aggregates for use in reinforced concrete unless otherwise instructed by the client

(f) Calcium silicate bricks

2.2 Stress Grading of Timber

To be carried out by firms or agencies currently licensed or approved by the quality assurance bodies listed in the Timber Trade Federation Publication: “Approved Certification for the Supply of Strength Graded Timber”.

Structural timber members re-cut from graded sections to be re-graded to approval and marked accordingly.

Timber sections with a cross sectional area less than 2000mm^2 or a thickness less than 25mm should not be stress graded and may only be used in the Tŷ Unnos box beams.

2.3 Preservative Treatment

Timber to be treated with preservative is to be impregnated with an approved preservative complying with use class 2 (BS EN 335-2:1992). The type of preservative used must not affect the strength and stiffness properties of the timber and must be compatible with any adhesives used in built up sections or at glued connections:

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- Moisture content of timber at time of treatment to be as specified in section 3.2
- After treatment, timber to be surface dry before use.
- Application : As specified in BWPA manual.
- Preservative solution manufacturer and reference to be approved by CA.
- Timber treatment to be carried out after all surface treatment such as planning is complete. Therefore it is suggested that fabricated sections are treated.

Two approved options for preservative are Wolsit KD20 (Dr. Wolman/BASF) and Diffusit S (Dr. Wolman/BASF).

2.4 Fire Retardant Treatment

Where required by the fire strategy the following must be satisfied:

- Fire retardants for exterior use to have the manufacturer's guarantee against leaching out for at least 5 years.
- Where a fire retardant treatment affects the strength and stiffness of the timber, this must be taken into account in all aspects of the structural design. The required design life must be maintained.

2.5 Sourcing Of Timber

Excluding any required boarding all timber is to be grown in Brittan and sourced from an approved source such as Pontrilas Timber.

2.6 Graded Softwood For All Locations

All softwood for all aspects of the Tŷ Unnos frame are to be:

- Visually or mechanically graded according to the requirements of BS EN 14081 and so marked
- Strength class: C16 or greater.
- Species and origin: Welsh grown Sitka Spruce, Douglas Fir or other approved
- Type/Desired Service Life: 60 years
- Service Class: 2
- Moisture Content at Time of Erection: As Section 3.2

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3.0 Workmanship Generally

3.1 Processing Treated Timber

- Carry out as much cutting and machining as possible before treatment.
- Retreat all treated timber which is sawn along the length, ploughed, thicknessed, planed or otherwise extensively processed.
- Treat timber surfaces exposed by minor cutting and drilling with two flood coats of a solution recommended for the purpose by main treatment solution manufacturer.

3.2 Moisture Content

At the times of fabrication and erection moisture content of timber to be not more than:

- 12% for connectored structures except that the moisture content should not be more than 7% different from that during service for softwoods and 5% for hardwoods.
- 12% for glued connections or glue laminates except that the moisture content should not be more than 5% different from that during service.
- Unless stated otherwise the equilibrium moisture content under normal service conditions is to be taken as Table 1 of BS 5268 : 1996.

3.3 Site Storage

For the storage of all timber on site or in the workshop:

- Keep timber dry and do not overstress, distort or disfigure sections or components during transit, storage, lifting, erection or fixing.
- Store timber and components under cover, clear of the ground and with good ventilation. Support on regularly spaced, level bearers on a dry, firm base. Open pile to ensure free movement of air through the stack.
- Individual member markings to be visible when members are stacked.
- Arrange sequence of construction and cover timber as necessary during and after erection to ensure that specified moisture content is not exceeded.

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4.0 Jointing Timber

4.1 Jointing and Fixing Generally

Where not specified otherwise, fastenings, fixing and jointing methods and types, sizes and spacing of fastenings to comply with relevant European Standards.

- Mechanical joints to be made to Section 8 of BS EN 1995-1-1.
- Washers to be fitted under the head of each bolt and under each nut.
- When there is risk of vibration loosening nuts to be securely locked. Method of locking to be approved by CA.
- Bolt assemblies to be in a condition that, before installation, the nut turns freely on the bolt.
- Bolt assemblies containing spring washers to be installed in such a way that the spring washer is completely flattened.
- All metal fasteners shall comply with BS EN 14592 and metal connectors shall comply with BS EN 14545
- All metal fasteners installed outside the breather membrane bag are to be hot dip galvanised to class Fe/Zn 25c as per BS EN ISO 1461 (25 micron coating)

4.2 Glued Joints

- Adhesive: To comply with type II specification as defined in BS EN 301
- Obtain manufacturer's confirmation that adhesive is compatible with preservative/flame retardant treatment.
- Fabricate glued structural components in clean, controlled workshop conditions.
- Tongue and grove joints along the length of the beam:
  - No tongue and grove joints are permitted in the flanges.
  - No tongue and grove joints are permitted in beams less than 250mm deep.
  - All web sections to be tongue and grove jointed must be at least 150mm deep.
- Finger joints across the width of the beam.
  - No finger joints are permitted in beams less than 2.4m long.
  - No finger joint is permitted within 500mm of another finger joint in the same beam.
  - No finger joints in the flanges are permitted within 500mm of the mid-span point.
  - No finger joints in the webs are permitted within 500mm of the support.

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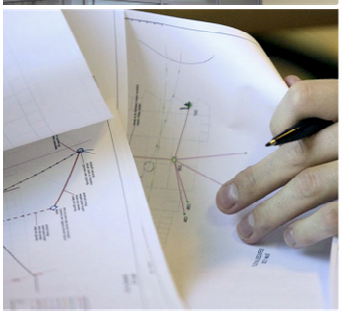

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