PROJECT TITLE: 49 PURFLEET ROAD
SOUTH OCKENDON
RM15 4DR

PROJECT NUMBER: 2644

Date: FEBRUARY 2021
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**DOCUMENT INFORMATION:**

THIS PACKAGE INCLUDES STRUCTURAL CALCULATIONS AND DRAWINGS FOR THE PROPOSED WORKS AT:

49 PURFLEET ROAD, SOUTH OCKENDON, RM15 4DR

ITEMS FOR WHICH STRUCTURAL CALCULATIONS ARE TO BE PRODUCED BY A.S CONSTRUCTION & ENGINEERING LTD WITHIN THIS DOCUMENT:

SINGLE STOREY REAR EXTENSION

NO SITE INVESTIGATION REPORT OR TRIAL PIT INFORMATION PROVIDED TO DETERMINE THE GROUND BEARING PRESSURE.

THEREFORE THE FOLLOWING ASSUMPTIONS ARE MADE USING BRITISH GEOLOGICAL SURVEY AND BOREHOLE DATA WITHIN 5 MILES OF PROPERTY:

- SUITABLE GROUND BEARING PRESSURE OF 100 kN/m² TO BE ADOPTED AND SOIL TO BE HIGH VOLUME CHANGE POTENTIAL.

THIS DOCUMENT MUST BE READ IN CONJUNCTION WITH ALL APPENDICES AND RELEVANT DRAWING SHEETS.

THIS DOCUMENT DOES NOT FORM A SPECIFICATION FOR THE PROPOSED WORKS NOR A CONSTRUCTION METHOD STATEMENT AND SHOULD NOT BE USED AS SUCH.

BUILDING REGULATIONS APPLY TO ALL WORKS OF A STRUCTURAL NATURE. THIS DOCUMENT AND ANY OTHER SUPPORTING DOCUMENTATION PROVIDED SHOULD BE SUBMITTED TO THE LOCAL AUTHORITY BUILDING CONTROL DEPARTMENT OR APPROVED BUILDING CONTROL INSPECTORS FOR APPROVAL PRIOR TO COMMENCEMENT OF ANY WORKS. COMMENCEMENT OF WORKS PRIOR TO OBTAINING APPROVAL IS AT THE EXECUTOR’S OWN RISK.

THE OWNER OF THE PROPOSED WORKS SITE IS ADVISED TO SERVE PARTY WALL NOTICE ON ANY ADJOINING OWNER(S) IF WORKS ON OR WITHIN 3.0m OF AN EXISTING PARTY WALL BOUNDARY ARE TO BE UNDERTAKEN.

IF IN ANY DOUBT IN REGARDS TO THE DESIGN AND CALCULATIONS - PLEASE ASK!

A.S CONSTRUCTION & ENGINEERING LTD ACCEPT NO RESPONSIBILITY WITH REGARDS TO ERRORS IN THE SCALING OF DIMENSIONS FROM DRAWINGS SUPPLIED BY OTHERS, ALL DIMENSIONS MUST BE CHECKED AND VERIFIED ON SITE. ANY DISCREPANCIES FOUND MUST BE HIGHLIGHTED TO THE STRUCTURAL ENGINEER AND ALL OTHER PARTIES.

IF THE ARCHITECTURAL OR STRUCTURAL DESIGN IS ALTERED AND/OR LOADS ARE CHANGED AND FURTHER GEOTECHNICAL INFORMATION BROUGHT TO LIGHT, A.S CONSTRUCTION & ENGINEERING LTD TO BE NOTIFIED OF THESE CHANGES SUCH THAT AN ASSESSMENT OF THE IMPACT OF THESE CHANGES CAN BE MADE. SIMILARLY, ANY TREES WITH 30m RADIUS TO BE NOTIFIED TO A.S CONSTRUCTION & ENGINEERING LTD INCLUDING INFORMATION SUCH AS DISTANCE(S) AWAY FROM EXISTING PROPERTY, HEIGHT OF TREE(S) AND TREE SPECIES.

IT IS HELD TO BE THE DUTY OF THE PROJECT MANAGER OR WHOMSOEVER HAS BEEN APPOINTED AS PROJECT OVERSEE TO CHECK THE DATA USED IN THIS ASSESSMENT AND DESIGN FOR CORRELATION WITH CURRENT PROJECT INFORMATION AND PRACTICE PROPER RECORD RETENTION AND DISSEMINATION TO ALL RELEVANT PARTIES.

EXACT SIZE OF OPENING TO BE MEASURED BY BUILDING CONTRACTOR ON SITE AND A MINIMUM 100mm BEARING LENGTH TO BE ADDED TO EACH END OF BEAM & 150mm BEARING LENGTH TO BE ADDED TO EACH END OF LINTEL BEFORE ORDERING MATERIALS UNLESS SPECIFIED OTHERWISE.

ALL STEELWORK, COMPONENTS, AND DETAILS TO BE MANUFACTURED AND/OR FABRICATED TO CE EXECUTION CLASS EXC2.1A EXCEPT WHERE EXPLICITLY STATED IN INDIVIDUAL NOTES.

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**DOCUMENT REVIEW SHEET**

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**DESIGN VARIABLES AND ASSUMPTIONS:**

ALL ASSUMPTIONS ARE TO BE CONFIRMED & APPROVED BY APPROVED BUILDING CONTROL INSPECTOR AND IF NOT CORRECT THEN REPORT BACK TO STRUCTURAL ENGINEER FOR REASSESSMENT. THE SITE CONTRACTOR ARE TO REMAIN VIGILANT DURING ANY EXCAVATIONS AND TO REPORT BACK TO ENGINEER ANY EVIDENCE THAT SUGGESTS OTHERWISE TO THE ASSUMPTIONS CONTAINED WITHIN THIS DOCUMENT.

EXISTING FOUNDATIONS ARE ASSUMED SUFFICIENT TO CARRY THE EXISTING BUILDING UNLESS A REPORT FROM AN APPOINTED ENGINEER HAS IDENTIFIED WEAK FOUNDATIONS. ALL FOUNDATIONS INTENDED TO TAKE ADDITIONAL LOADS, INCLUDING NOTIONAL HORIZONTAL LOADDINGS, ARE TO BE CHECKED BY AN APPROVED BUILDING CONTROL INSPECTOR FOR ADEQUACY.

ALL BRICKWORK INTENDED TO TAKE ADDITIONAL STRUCTURAL LOADS ESPECIALLY ABOUT THE POINT OF LOADING FROM STEEL AND PANDISTONES IS TO BE EXPOSED AND CHECKED BY APPROVED INSPECTOR FOR ADEQUACY TO TAKE ADDITIONAL LOADS. ANY LARGE CRACKS OR WALL DISCONTINUITIES AND/OR EVIDENCE OF ANY PREVIOUS MOVEMENT NOT APPARENT BUT EXPOSED DURING CONSTRUCTION IS TO BE REPORTED TO ENGINEER FOR FURTHER EVALUATION.

UNLESS OTHERWISE STATED FOUNDATIONS ARE DESIGNED FOR A MAXIMUM GROUND BEARING CAPACITY OF 100 kN/m², WHICH IS TO BE VERIFIED ON SITE. ALL MASS CONCRETE FOOTINGS ARE TO BE TAKEN TO A MINIMUM DEPTH OF 1.0m BELOW EXTERNAL GROUND LEVEL UNLESS OTHERWISE STATED OR AS REQUIRED BY THE APPROVED BUILDING INSPECTOR BASED ON LOCAL SITE CONDITIONS INCLUDING THE PRESENCE OR ANY MEDIUM OR HIGH WATER DEMAND TREES IN THE VICINITY, WHEREBY DEPTHS SHALL BE IN ACCORDANCE WITH NBHC GUIDELINES AS TO BUILDING NEARBY TO TREES (OR AS STATED IN THIS DOCUMENT)

**DESIGN NOTES:**

ALL CALCULATIONS ARE DONE IN ACCORDANCE WITH BRITISH STANDARDS (UNLESS STATED OTHERWISE) & ARE LISTED BELOW:

- BS 6399: LOADING
- BS 5950: STRUCTURAL STEELWORK
- BS 5268: STRUCTURAL TIMBER
- BS 5628: STRUCTURAL MASONRY
- BS 8110: STRUCTURAL CONCRETE
- BS 8103, BS8004 & NHBC: FOUNDATIONS

BUILDING REGULATIONS

DESIGN SPANS STATED ARE CLEAR OPENING SIZES BETWEEN END SUPPORTS TAKING END RESTRAINTS IN TO ACCOUNT.
GENERAL NOTES:

PLANNING PERMSSION MAY OR MAY NOT BE REQUIRED IN CONNECTION WITH THE WORKS DESCRIBED HERIN, AND A SUITABLY QUALIFIED ARCHITECT OR PLANNING ADVISOR SHOULD BE CONSULTED BEFORE COMMENCEMENT OF WORKS.

FULL BUILDING APPROVAL SHOULD BE OBTAINED PRIOR TO THE COMMENCEMENT OF WORKS ON SITE/BEBFORE ANY MATERIALS ARE ORDERED (I.E. STEELWORK/TIMBER ETC.). ANY WORKS CARRIED OUT PRIOR TO THIS ARE UNDERTAKEN AT THE CLIENTS/CONTRACTORS OWN RISK.

STRUCTURAL ALTERATIONS TO A PARTY WALL, OR EXCAVATIONS IN THE VICINITY OF A NEIGHBOUR'S PROPERTY, WILL REQUIRE THE ADOJOINING OWNER'S CONSENT UNDER THE PARTY WALL ACT 1996. THIS WILL REQUIRE A PARTY WALL AGREEMENT TO BE MADE BEFORE COMMENCEMENT OF THE WORKS. ADVICE MAY BE OBTAINED FROM THE GOVERNMENT PLANNING PORTAL WWW.PLANNINGPORTAL.GOV.UK OR BY CONTACTING A CHARITED BUILDING SURVEYOR.

THE WORKS ARE TO BE CARRIED OUT TO THE APPROVAL AND SATISFACTION OF THE BUILDING CONTROL OFFICER, TO ACCEPTED GOOD BUILDING PRACTICE AND WITH FULL COMPLIANCE AND IN ACCORDANCE WITH ALL RELEVANT BRITISH STANDARDS AND CODES OF PRACTICE.

THE LENGTHS AND SPANS USED IN THESE CALCULATIONS ARE FOR DESIGN PURPOSES ONLY AND SHOULD NOT BE USED AS A BASIS FOR ORDERING MATERIALS/FABRICATION PURPOSES. NOTE, THE DESIGN SPAN IN THESE CALCULATIONS IS NOT THE SAME AS CLEAR SPAN.

ALL LENGTHS AND SPANS USED IN THESE CALCULATIONS SHOULD BE VERIFIED ON SITE PRIOR TO COMMENCEMENT OF ANY CONSTRUCTION WORKS. CONTRACTOR AND/OR STEEL FABRICATOR TO TAKE THEIR DIMENSIONS ON SITE.

BUILD/CONTRACTOR IS TO CHECK THAT THE STRUCTURAL ENGINEERS PROPOSAL (I.E. LOCATION OF STEEL BEAMS/TRIMMERS ETC) IS FEASIBLE AND NECESSARY BEFORE ORDERING MATERIALS. OPEN UP TOP OF WALLS ETC TO DETERMINE EXISTING SPANS & SUITABILITY OF STEELS/BEAMS.

NO OPEN WORKS WERE UNDERTAKEN AND THEREFORE ANY DEFECTS HIDDEN OR INACCESSIBLE COULD NOT BE REPORTED UPON AND THUS NOT THE ENGINEERS RESPONSIBILITY.

ALL SPECIFIED STRUCTURAL ELEMENTS (I.E. STEEL BEAMS, STEEL COLUMN, TIMBER BEAMS/TRIMMERS, ETC) TO BE INSTALLED IN SINGLE CONTINUOUS LENGTH UNLESS STEATED OTHERWISE.

THE CONDITION AND SUITABILITY OF ALL LOAD BEARING WALLS, EXISTING BEAMS AND SUPPORTS, FOUNDATIONS ETC. SHALL BE CHECKED ON SITE AND AGREED WITH THE LOCAL AUTHORITY.

NO PART OF THIS DOCUMENT MAY BE USED, ISSUED OR COPIED WITHOUT THE EXPRESS CONSENT OF A.S CONSTRUCTION & ENGINEERING LTD.

CALCULATIONS TO BE APPROVED BY LOCAL AUTHORITY OR APPROVER INSPECTOR BEFORE COMMENCEMENT OF WORKS ON-SITE.

CONSTRUCTION NOTES:

EXISTING CONSTRUCTION:
ALL ASSIGNED LOAD BEARING WALLS, FOUNDATIONS AND STRUCTURAL ELEMENTS ARE TO BE EXPOSED AND CHECKED ON SITE WITH THE BUILDING CONTROL OFFICER, PRIOR TO THE COMMENCEMENT OF WORKS FOR SUITABILITY. TRIAL HOLES ARE TO BE EXCAVATED PRIOR TO COMMENCEMENT OF WORKS AND ARE TO BE INSPECTED BY THE BUILDING CONTROL OFFICER/SOILS SPECIALIST. ALL NEW FOUNDATIONS ARE TO BE FOUND OFF NATURAL VIRGIN GROUND.

ANY DEVATION FROM THE DESIGN ASSUMPTIONS IS TO BE REPORTED TO THE ARCHITECT/ENGINEER PRIOR TO COMMENCEMENT OF WORKS.

THE EXISTING BUILDING IS ASSUMED TO BE IN GOOD STRUCTURAL ORDER AND ANY DEFECTS ARE TO BE REPORTED TO THE ARCHITECT/ENGINEER.

THE PERMANENT STABILITY OF THE STRUCTURE DURING ALL STAGES OF THE CONSTRUCTION WORK IS THE RESPONSIBILITY OF THE CONTRACTOR.

NEW CONSTRUCTION:
ALL NEW STEELWORK TO BE GRADE S275, UNLESS NOTED OTHERWISE IN THE CALCULATIONS. STEELWORK TO BE THOROUGHLY WIRE BRUSHED AND COATED WITH TWO COATS OF ZINC PHOSPHATE PRIMER. ALL DAMAGED AREAS OF PAINTED ARE TO BE TOUCHED UP AFTER ERECTION OF THE STEELWORK. ALL BOLTS ARE TO BE GRADE 8.8 UNLESS NOTED OTHERWISE, AND ALL WELDS ARE TO BE 6mm CONTINUOUS FILLET TYPE, UNLESS NOTED OTHERWISE.

ALL NEW TIMBER IS ASSUMED TO BE GRADE C24, UNLESS NOTED OTHERWISE WITHIN THE CALCULATIONS.
ALL STRUCTURAL TIMBER IS TO BE SUITABLY TREATED AGAINST DECADE AND INSECT ATTACK.

TIMBER WALL PLATES ARE TO BE HELD DOWN USING 30x5mm THICK GALVANISED MILD STEEL VERTICAL REINFORCEMENT STRAPS, 1200mm LONG WITH FLAT RETURN, AT 2000mm MAX CENTRES (AND EITHER SIDE OF WIDE WINDOWS). THE STRAP SHOULD BE FIXED TO THE SOLID MASONRY WALL USING SHO. X NO. 12 SCREWS IN PLUGGED HOLES IF EXISTING WALLS AND BUILT INTO THE WALLS IF NEW.

30x5mm THICK GALVANISED MILD STEEL LATERAL RESTRAINT STRAPS, 1200mm LONG WITH 150mm UPSTAND, ARE TO BE PROVIDED BETWEEN EXTERNAL WALLS AND FLOORS AT 2000mm MAX CENTRES. WHERE STRAPS ARE PERPENDICULAR TO THE SPAN OF THE FLOOR, THEY SHALL BE TAKEN ACROSS 30x5mm JOISTS, WITH SOLID TIMBER NOGGIN BETWEEN. THE STRAPS UPSTAND SHALL BE FIXED TO THE SOLID MASONRY WALL USING SHO. X NO. 12 SCREWS IN PLUGGED HOLES IF EXISTING WALLS AND BUILT INTO THE WALLS IF NEW.

MOTION JOINTS ARE TO BE PROVIDED IN ACCORDANCE WITH MASONRY MANUFACTURERS RECOMMENDATIONS (APPROXIMATELY 6mm CENTRES IN BLOCKWORK AND 12mm CENTRES IN BRICKWORK).

CONCRETE GRDES ARE TO BE NOTED WITHIN THE CALCULATIONS AND PLACED, COMPACTED & PROTECTED IN ACCORDANCE WITH BS8110. AS A GUIDE REINFORCED CONCRETE TO BE C25 GRADE; NON REINFORCED CONCRETE TO BE C25 GRADE.

ALL NEW MASONRY PIERS/WALLS ARE TO BE BUILT AS NOTED WITHIN THE CALCULATIONS & THE ARCHITECT/ENGINEERS SPECIFICATIONS.

NOTES TO CONTRACTORS:

THE CONTRACTOR IS RESPONSIBLE FOR ALL OF THE TEMPORARY WORKS FOR THE PROJECT, FOR THE FULL DURATION OF THE PROJECT. NOTE: ACRIO INDICATED THAT "STROMBOYS" ARE NOT MANUFACTURED BY THEM AND DO NOT RECOMMEND THEIR USE GENERALLY. CONTRACTORS SHALL PROVIDE PROPER CONVENTIONAL NEEDLES AND PROPS, ENSURING THAT LOADS ARE ADEQUATELY TRANSFERRED TO THE GROUND.

THE STEELWORK IS TO BE FABRICATED IN ACCORDANCE WITH "NATIONAL STEELWORK SPECIFICATION 5TH EDITION", CE MARKINGS FOR SECTIONS AND BOLTS ARE MANDATORY.

UNLESS NOTED OTHERWISE ON DRAWINGS UNEXPOSED STEELS TO BE DELIVERED TO SITE WITH SINGLE COAT ZINC PHOSPHATE PRIMER. STEELS TO BE CASED ON CONCRETE NOT PAINTED.

THE DIMENSIONS USED IN THE CALCULATIONS ARE NOT CUT LENGTHS OF STEEL. THE CONTRACTOR IS RESPONSIBLE FOR TAKING SITE DIMENSIONS AND APPLYING APPROPRIATE BEARING LENGTHS, WHICH WILL BE A 1000mm MINIMUM, OR AS INDICATED ON THE DRAWINGS.

DUE TO THE WEIGHT OF THE STEEL MEMBERS (UP TO 110KG), THE CONTRACTOR SHALL MAKE PROVISION FOR LIFTING OFF TRANSPORT AND MOVING THEM TO THE LOCATION FOR ERECTION. APPROPRIATE LIFTING EQUIPMENT SHALL BE PROVIDED, E.G. HOSTS, CRANE'S, GENIE LIFTS ET. SUFFICIENT MAN-POWER SHALL BE AVAILABLE TO ENSURE THAT THE STEELWORK CAN SAFELY BE ERECTED.

SITE WELDING IS NOT ALLOWED, UNLESS PRIOR AGREEMENT IS MADE WITH A.S CONSTRUCTION & ENGINEERING LTD AND BUILDING CONTROL. PRIOR TO ANY AGREEMENT THE CONTRACTOR MUST PROVIDE PROOF OF THE WELDING OPERATIVE'S QUALIFICATIONS. ON SITE WELD TESTING MAY BE REQUIRED.

WHERE HSFG BOLTS ARE SPECIFIED, THESE ARE TO BE TIGHTENED USING A TORQUE WRENCH, OR ALTERNATIVELY LOAD-INDICATING WASHERS SHOULD BE USED TO DEMONSTRATE THAT THE BOLTS HAVE BEEN TIGHTENED TO THE DESIRED TENSION. (STANDARDS 4.6 OR 8.8 WILL NOT BE USED WHEN HSFG BOLTS ARE SPECIFIED).

PADSTONES ARE TO BE INSITU OR PRE-CAST CONCRETE UNLESS NOTED OTHERWISE ON DRAWING.

1000mm WIDE BLOCKS SHALL NOT BE LAID FLAT IF LOAD BEARING.

IF TOOTHED PLATE WASHERS ARE SPECIFIED IN TIMBER CONNECTIONS, THE TIMBERS ARE TO BE DRAWN TOGETHER WITH BOLTS/THEADED RODS, WHICH SHALL BE DISCARDED AT THE END OF THE WORK. NEW BOLTS SHOULD BE USED TO CONNECT TIMBER MEMBERS.

THE CONTRACTOR SHALL LIAISE WITH THE BUILDING INSPECTOR. THE CONTRACTOR SHALL ENSURE THAT A CONSTRUCTION NOTICE IS FORWARDED TO THE BUILDING CONTROL 48 HRS PRIOR TO START OF WORK. THE CONTRACTOR SHALL ENSURE THAT THE BUILDING INSPECTOR VISITS BEFORE CONCRETING OR CLOSING UP ANY AREAS, OR AT ANY OTHER TIME THAT THE BUILDING INSPECTOR WISHES.

SHOULD THE BUILDING INSPECTOR ASK FOR ANY VARIATIONS FROM THE STRUCTURAL SCHEME AS DESIGNED, THE CONTRACTOR SHOULD CONTACT A.S CONSTRUCTION & ENGINEERING LTD PRIOR TO MAKING ANY ALTERATIONS.

SHOULD THE CONTRACTOR WISH TO MAKE CHANGES TO THE SCHEME OR INTRODUCE SPICES, HE SHOULD MAKE ENSURE THAT THE CLIENT IS WILLING TO COVER ANY DESIGN AND CONSTRUCTION COSTS.

INSULATION, VENTILATION, DPC/DPM'S ETC SHALL BE THE RESPONSIBILITY OF THE ARCHITECTURAL DESIGNER.

NOTES TO CLIENT:

THE INTRODUCTION OF STRUCTURAL STEELWORK IN TO AN EXISTING BUILDING TO ALLOW REMOVAL OF LOAD BEARING WALLS IS MAJOR INTERUPTION.

NEW STEEL BEAMS WILL DEFLECT UNDER LOAD, THEREFORE WHEN THE TEETH ARE REMOVED THERE MAY BE SOME MOVEMENT OF THE STRUCTURE ABOVE, CAUSING CRACKING IN THE FINISHES. THE DESIGN MINIMISES THIS, HOWEVER CANNOT PREVENT THIS.

THE DESIGN PROVIDED IS BASED ON THE INFORMATION AVAILABLE AT THIS TIME. ONCE THE PROJECT COMMENCES IT IS POSSIBLE THAT CHANGES WILL BE REQUIRED, DUE TO UNFORESEEN CIRCUMSTANCES FOUND BY THE BUILDER/CONTRACTOR.

A.S CONSTRUCTION & ENGINEERING LTD CANNOT BE HELD ACCOUNTABLE FOR ANY MISTAKES, FAILURES OR DAMAGES CAUSED BY ERRONEOUS DATA SUPPLIED BY ANY THIRD PARTY WHERE A.S CONSTRUCTION & ENGINEERING LTD HAS NOT BEEN APPOINTED TO CONDUCT AN INITIAL SURVEY OR INVESTIGATION.
1. The drawings, design and all information contained therein are the sole copyright of A.S Construction & Engineering Ltd (A.S) and reproduction in any form is forbidden unless permission is obtained in writing.

2. All drawings shall be read in conjunction with the Structural Preliminaries, all relevant Specifications, the Architects, Building Services Engineers, Structural Engineers, Civil Engineers, Landscape Architects and specialists drawings including approved builders work drawings, Contractor or Sub-contractor specialist designs, drawings, specifications and project documents.

3. Any discrepancies between the information given by the Engineer and that provided by Others, must be referred to the Engineer before the affected works proceed or elements of work procured/ordered or fabricated.

4. Before TENDERING, the Contractor shall at his own expense, visit and inspect the Site and aquatin/familiarise themselves with the Site constraints, the nature and condition of any existing premises, including all adjoining sites and boundary conditions, the accessibility of the Site, its condition and extent of all services, including hidden services and mains, local conditions, the full extent and character of the works covered by the Contract, the supply of and condition affecting labour, materials and the conditions under which, works is required to be procured and executed.

5. Refer to the Tender/Contract documents for details of overhead and underground services and below ground obstructions. Unless shown on the Project drawings, we have no knowledge of existing overhead and underground services or below ground obstructions. It is the Contractor’s responsibility to carry out any further investigations or tests required to ascertain the location of existing overhead and underground services prior to implementing the works.

6. The Contractor is to take all necessary precautions to ensure the safety of all persons and the works including ascertaining additional information if required and investigating surveys by competent persons prior to commencement of works. The Contractor must take, locate and site survey. Any discrepancies between the drawings and the actual arrangement on Site shall be brought to the attention of the Project/Contractor/Manager/Contract Administrator.

7. The Contractor’s drawings are based on original drawings produced by Others with no verification.

8. All dimensions are in millimetres unless noted otherwise. All levels are in metres and are related either to OS datum, Site datum or an arbitrary datum. Refer to the Architect’s drawings for the level system to use.

9. Use only figured dimensions, do not scale from the Engineer’s drawings or from the computer data digital.

10. All dimensions are given to structural surfaces unless noted otherwise. The structural slab level (SSL) is the top of the slab immediately adjacent to a vertical support. The top of steel (TOS) level is the top of the member immediately adjacent to a vertical support.

11. All beams are referenced by depth x breadth unless noted otherwise

12. Dimensions marked * highlight specific dimensions subject to confirmation by site measurement before construction proceeds and given for guidance only.

13. Refer to the Architect’s drawings for dimensions not shown on the structural drawings.

14. Common abbreviations used:

<table>
<thead>
<tr>
<th>mm</th>
<th>Millimetres</th>
</tr>
</thead>
<tbody>
<tr>
<td>m</td>
<td>Metres</td>
</tr>
</tbody>
</table>

15. For all setting out information refer to Architect’s details. Refer to the Architect’s drawings for the locations of the setting out stations and for details of how to set out the building grid system.

16. The Contractor shall verify all site and setting out dimensions before commencing work or prior to ordering or fabricating any set items. Where dimensions are shown on the Engineer’s drawings, any discrepancies shall be reported to the Engineer.

17. For responsibilities relating to BIM Projects refer to the Project BIM Execution Plan (BEP) and BIM Protocol under the guidance of the Project’s Information Manager (IM). If no IM is appointed, guidance should be sought from the Lead Designer or Project Lead.

18. Unless a drawing is noted as Construction Issue the drawing is suitable for pricing purposes only and subject to design development changes. As construction, fabrication or setting out should be commenced on drawings not labelled as Construction

19. The locations, dimensions and details of retained structures are shown approximately on drawings and all dimensions, etc. shall be confirmed by the Contractor, prior to commencement of the actual arrangement on Site shall be brought to the attention of the Project/Manager/Contract Administrator.

20. Where there are retained existing structures and relevant information on the existing structure is not provided in the Tender, the Contractor is to survey all existing structures and structural elements to establish relevant information including; position, sizes, details and general arrangement and provide this information to the design team. The Contractor is responsible for establishing all on Site conditions and dimensions relating to installation, including tolerances to be allowed before manufacture. All dimensions of existing elements/construction and specific detail in this section, are to be checked on Site by the Contractor. The Contractor shall allow a reasonable variation to the permanent and temporary works as a consequence of changes necessary to incorporate actual existing structure and revised scheme as necessary.

21. Inspections made by the Local Authority, Building Control, warranty provider or other statutory bodies, shall be arranged by the Contractor to suit their programmes, and failing to carry out to the work to the satisfaction of the Checking Authority will be the sole responsibility of the Contractor.

22. Where materials are stored on site, these shall be spread out such that the permanent works design loading allowance is not exceeded. If in doubt consult the Engineer.

23. All proprietary products are to be used, erected and constructed strictly in accordance with the manufacturer’s instructions.

24. Before specific/related works commence the Contractor shall submit a full and detailed method statement and sequence of work (and where appropriate details of temporary works) to the Lead Consultant, Principal Designer and Engineer (A.S) for each area of work.

25. The Contractor is responsible for the design, fabrication, erection and removal of all temporary works including all temporary bracing, earthworks and back propping necessary to maintain structural stability during construction. The permanent works structure is designed for the permanent loads and temporary works are designed to achieve a temporary structure unless specifically indicated/stated. Where temporary works (for example: falsework, scaffolds, hoists, lifting beams, access platforms, etc.) apply excessive loads that excessive loads, the Contractor shall carry out any calculations that are required to demonstrate that the permanent works will not be adversely affected or alternatively providing all necessary temporary works to support construction loading. The Contractor shall demonstrate that temporary works/propping/support systems proposed will not adversely affect the permanent works.

26. Specific construction sequence requirements, which are necessary to achieve structural performance are noted on the Engineer’s structural drawings and specifications. The Contractor shall submit detailed method statements, which fully describe the erection strategy/sequence to be adopted, temporary works systems required and how stability is maintained during construction.

27. The Structural Engineer will examine/review specific structural elements designed by Specialists/Contractors/Others that relate to their Services (steel, concrete, etc.) and the elements/construction (Slabs, Walls, etc.) for the sole purpose of compliance with the design intent and engineering design philosophy/principles, in respect of configuration and general arrangement only in accordance with A.S Construction & Engineering Ltd’s (A.S) engineering details and performance specification. A.S do not check setting-out or dimensions. All setting out dimensions and locations of holes are subject to approval by Others. Any comments made do not absolve the Designer/Contractor from errors, omissions and inconsistencies in the documents or for establishing all on Site conditions and dimensions relating to installation, including tolerances to be allowed before manufacture. Comments or other comments, on the Design/Contractor’s proposals shall in no way relieve them (the Contractor/Designer) of their design liability and obligation to comply with the Contract documents and with the terms of any separate Agreement with the Employer/Main Contractor (and their agreement with the Employer). The documents are also subject to comments which might be raised by Others.

28. Refer to approved builders work drawings for the location of service holes. Generally, only major holes or openings, which affect the concrete reinforcement detailing are shown on the structural drawings. “Major” structural penetrations are defined as penetrations greater than 250mm x 250mm in slabs or structural walls, and any penetration in beams (Steel Services Engineer and Architect) major structural penetrations are shown on the Structural Engineer’s drawings. “Minor” structural penetrations are penetrations 250mm square or less in slabs or structural walls, and are not necessarily shown on the Structural Engineer’s drawings, and are treated as builder’s work. The Architect is responsible for co-ordinating the sizes, locations and setting out of all major structural penetrations.

29. No holes, chases, cut-out, existing or proposed services or the like may be formed in or pass through any beam, column, or load bearing wall unless written permission is obtained from the Engineer.

30. For size and location of all services refer to the Building Service Engineers and Architects drawings.

31. The Contractor is responsible for the design and drawing of builders’ work. Apart from major penetrations, builder’s work is not shown on the Structural Engineer’s drawings. The Contractor shall submit all builders’ work details to the Structural Engineer for review, as these items may have a significant impact on the design of the permanent structure.

32. Refer to the Architects drawings for the location of movement joints in masonry walls. Movement joints involving cladding, waterproofing, services, partitions, etc are to be designed and detailed by the Architect.

33. For D.P.M.s, D.P.C and waterproofing details refer to the Architect’s drawings and details. Where D.P.M.s, D.P.C and waterproofing is shown on the Structural Engineer’s drawings this is only as an aide memoir.

34. Fire resistance penetrations and fire protection details for all elements are shown on the Architect’s drawings. The fire protection of steel framed structural elements is assumed to comprise fire boarding or intumescent paint specified by the Architect/Specialist Contractor.

35. The design of protective barriers is by the Architect and specialist supplier/Sub-contractor. The barrier forms an integral part of the [primary] structural frame it will be designed and shown on the Structural Engineer’s drawings. In other cases, design will be by specialist designers/Sub-contractors (default position) or the Structural Engineer will provide advice to the Architect on structural requirements, and the barriers will be designed and drawn by the Architect or by a specialist supplier to the Architect’s specification.

### PROJECT DETAILS

**Project:** 45 PURFLEET ROAD, SOUTH OXENDEN

**Type:** RM15 4DR

**Drawing:** 2644/SN/1

**Revision:** P1

**Drawing Status:** Planning, Information, Tender, Construction
GENERAL NOTES (CONTINUED)

36. The Structural Engineer is responsible for the design of all primary structural steelwork, which is defined as "steelwork essential to the strength, integrity and robustness of the structural frame". Secondary steelwork items such as handrails, stair balustrades, balcony barriers, lift guides, plant supports, partition frames, etc are the responsibility of the designer of the item, i.e. the Architect, Contractor or specialist supplier.

37. The Contractor's specialist Sub-contractor/Designer is responsible for the structural design of the stairs (default position), whether these are in timber, precast, glass or insitu concrete, unless specifically noted on the drawings. Where the Structural Engineer undertakes the design, the drawings show the structural member sizes, including landing and waist thickness, but do not set out the risers and goings.

38. The design of fixings for items is the responsibility of the designer of the item requiring fixing. Non-structural fixings are generally not shown on the Engineers drawings and if any such detail is indicated it must be confirmed by cross-reference to other specialists before construction. Heavyweight fixings, e.g. cladding fixings and all cast-in fixings, may have a significant impact on the design of the permanent structure. Co-ordination and agreement is required between the designer of the fixings and the Structural Engineer on the locations and details of all heavyweight fixings to the primary structure, and the forces they exert on the primary structure. Lightweight fixings, e.g. fixings for electrical trunking, ceiling panels etc, have a negligible effect on the primary structure, and do not require the involvement of the Structural Engineer.

39. All lightning connectors to be fixed in accordance with specialist details. Internal earthing rods/pits where they affect the structure require the involvement of the Structural Engineer.

40. Where external concrete slabs are indicated, the Structural Engineer's drawings show typical joint layouts to be adopted and joint details for the Contractor to develop the detail design and produce a working slab joint layout.

41. Reinforcing steel is to be bonded in the concrete to the minimum percentages shown on the structural drawings.

42. To refer to the Architect's drawings for:
   • Setting out dimensions not shown on structural drawings
   • Details of all D.P.M. and D.P.C.
   • Setting out dimensions not shown on structural drawings

GROUND BEAMS

1. Dimensions of concrete beams are given as depth overall (including slab) x breadth UNO.

2. Concrete grades shall be as shown in concrete section notes and shall be in accordance with BS EN 206-1, BS 8500-1 and BS 8500-2.

3. Cover to reinforcement to be as shown on the reinforcement drawings. Refer to General Concrete Specification for estimate of reinforcement quantities.

4. All ground beams to be shuttered using BRC PEEAFIL or equivalent permanent formwork unless ground conditions provide good stability of trench sides. Where foundations are cast against an earth face, increase foundation widths to achieve min 75 mm cover.

5. Reinforced concrete shall be compacted by means of a mechanical vibrating poker and the workability shall be such that, when compacted, a dense concrete, free from voids shall be produced.

6. The Contractor is responsible and liable for ensuring the stability of the works at all stages of construction.

7. Any unexpected site conditions are to be reported to the Engineer immediately so that the design can be reviewed and altered if necessary.

8. Bottoms of all foundation excavations shall be trimmed, levelled, protected from inclement weather and kept free of water. Bottoms of excavations to receive reinforced concrete, shall be blinded with not less than 50 mm of designated concrete.

9. All construction joints and pours to sequence that agreed with the Engineer prior to commencement. Construction joints shall be formed against a vertical grout tight shutter and shall be located in the middle third of any beam between piers or supports, subject to being a minimum of 1.5 m from any junction with other ground beams.

10. Concrete blinding 75 mm thick shall be placed under all concrete in contact with the ground.

11. For heave protection board details refer to details' drawings.

SPREAD FOUNDATIONS GENERAL

1. Concrete grades shall be as shown in the Concrete section notes and shall be in accordance with BS EN 206-1, BS 8500-1 and BS 8500-2.

2. The foundation design is based on the assumption that strata capable of providing a suitable design bearing capacity will be found at the depth indicated. Foundations should be founded at the indicated depths and subjected to soft spots, made/surfaces or disturbed ground by a minimum of 150mm into the undisturbed founding strata. The discovery of conditions not in accordance with this assumption shall be reported to the Engineer before proceeding with the construction of the foundations. Should the additional depth of foundation required to penetrate the founding strata exceed 500mm, the Engineer should be consulted before proceeding.

3. Depths shown are to be measured from existing or final ground levels, whichever gives the lowest level, unless otherwise shown on the drawings.

4. Trenches dug down lower than the depths indicated shall, with the approval of the Engineer, be suitably backfilled, or for the Contractor's warrant, approved cover. Backfilling shall be suitably compacted on completion of works.

5. Foundations excavations and the surrounding site shall be kept free of water.

6. In order to suit levels, the bottoms of foundation excavations may be stepped by a maximum of 450 mm high by a minimum 1000 mm long unless otherwise noted on the drawings.

7. The Contractor is responsible and liable for ensuring the stability of the works and services at all stages of construction. Unless shown on the Project drawings, we have no knowledge of existing underground services or obstructions.

8. Construction joints in mass concrete foundations shall be located at least 1.5m from any foundation junction, pad base or step in underside of foundation. Joints to be formed against a vertical grout tight shutter and shall incorporate 400. H16 bars x 900 long (2 top, 2 bottom) with 100 mm cover to sides.

9. Footings to be founded 300 mm below the invert of any adjacent/perpendicular existing or proposed drainage, or as shown on the drawings, whichever is the deeper.

10. Foundations shall be depended to accommodate pipes beneath or within foundations in accordance with the standard details indicated on the drawings.

11. The Contractor is to ensure, so far as is reasonably practical, that the Client has obtained all necessary Building Regulations and/or similar approval before commencing works.

12. Foundations to each structure/building shall bear onto consistent ground conditions throughout.

13. Where foundations bear into non shrinkable soils (such as sands and gravels) which are underlain by shrinkable clay, foundation depths may be varied to suit site conditions subject to the receipt of prior written approval of the Engineer and Local Authority.

14. Where non shrinkable soils (such as sands and gravels) underlie shrinkable clays, foundation depths may be varied to suit site conditions subject to the receipt of prior written approval of the Engineer and Local Authority.

FOUNDERATIONS IN GENERAL

1. Unless noted otherwise, foundations are to be centred under columns and walls.

2. Concrete grades in foundations to be shown in the concrete notes section.

3. Retaining walls and pits are to be proped and braced until permanent support has attained full design strength.

4. Services passing through foundation to be isolated and protected in accordance with the Service Engineer's specification.

GROUND BEARING SLAB

1. All diloatant materials shall be stripped from the sub-strata prior to construction of the slab. The depth of oversite excavation shall not exceed 600mm without the approval of the Engineer.

2. Formations and sub-bases shall be protected from inclement weather and damage caused by construction traffic.

3. Sub-base materials shall be laid and compacted in layers not exceeding 225mm thick (to refer the specification for details of compaction requirements). Obtain instructions from the Engineer where sub-base thickness exceeds 600mm.

4. Welded steel fabric reinforcement in ground bearing floor slabs shall have minimum laps of 225mm at both 500mm x 500mm x the bar diameter whichever is greater. Sheets shall be laid to avoid excessive build up of depths at laps. "Flying Ends" should be considered.

5. Slabs to be founded at 8.0m maximum centres with formed joints incorporating R12 dowel bars x 900mm long at 600mm centres. Joint layout may be revised to suit Contractors working methods but will be subject to the Engineer’s approval.

6. All slabs to be cured in accordance with the specification for not less than 7 days using an approved sprayed curing membrane.

7. On all sites the Contractor shall protect exposed formations for ground bearing slabs to prevent subsequent damage resulting from saturation or drying out of near surface soils.
TRENCH FILL FOUNDATIONS IN CLAY (CONTINUED)

16. Heave protection measures shall be provided to the inside face of perimeter trench fill foundations when deeper than 1500mm to a depth of 500mm above founding level when the heave potential is HIGH or MEDIUM. See typical sections drawing for details.

17. NEW PLANTING - All future landscape planting to the Site must adhere/comply with Part 4.2 of the NHBC Standards in relation to the minimum founding depth and no new trees are to be planted within the zone of influence where deeper foundations would be required.

CONCRETE

1. All concrete is to comply with the National Structural Concrete Specification for Building Construction, latest edition, and these drawings.

2. Dimensions of concrete beams are given as depth overall (including slab) x breadth UNO.

3. Upstands are dimensioned as height above the slab x breadth.

4. All concrete works should comply with the geometric tolerances stipulated in the National Structural Concrete Specification for Building Construction Section 10.

5. Unless noted otherwise, the concrete grades are:

<table>
<thead>
<tr>
<th>Location</th>
<th>Concrete Grade</th>
<th>Consistency Class</th>
<th>Sulphate Class</th>
<th>AEC Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Piling</td>
<td>-</td>
<td>-</td>
<td>DS-X</td>
<td>AC-X</td>
</tr>
<tr>
<td>Mass Concrete Foundations</td>
<td>GEN3</td>
<td>S3</td>
<td>DS-X</td>
<td>AC-X</td>
</tr>
<tr>
<td>Piling</td>
<td>*</td>
<td>*</td>
<td>DS-X</td>
<td>AC-X</td>
</tr>
<tr>
<td>Ground Beams</td>
<td>C32/40</td>
<td>S3</td>
<td>DS-X</td>
<td>AC-X</td>
</tr>
<tr>
<td>Slabs</td>
<td>C32/40</td>
<td>S3</td>
<td>DS-X</td>
<td>AC-X</td>
</tr>
<tr>
<td>Beams</td>
<td>C32/40</td>
<td>S3</td>
<td>DS-X</td>
<td>AC-X</td>
</tr>
<tr>
<td>Columns</td>
<td>C32/40</td>
<td>S3</td>
<td>DS-X</td>
<td>AC-X</td>
</tr>
<tr>
<td>Walls</td>
<td>C32/40</td>
<td>S3</td>
<td>DS-X</td>
<td>AC-X</td>
</tr>
<tr>
<td>Retaining Walls</td>
<td>C32/40</td>
<td>S3</td>
<td>DS-X</td>
<td>AC-X</td>
</tr>
</tbody>
</table>

NOTE: * Piling Contractor design element

6. All Reinforcement shall be from an "ACARE" approved supply/fabricator and shall comply with deformed bars type 2, strength f_y = 500 N/mm².

7. The type and grade of steel reinforcement is indicated in below:

<table>
<thead>
<tr>
<th>Type of Steel Reinforcement</th>
<th>Notation</th>
<th>Project</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>For diameters &lt; 12mm, Grade B500A, Grade B500B or Grade B500C conforming to BS 4449:2005</td>
<td>H</td>
<td>49 PURFLEET ROAD SOUTH OCKSEND RM15 4DR</td>
<td></td>
</tr>
<tr>
<td>Grade B500A conforming to BS 4449:2005</td>
<td>A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grade B500B conforming to BS 4449:2005</td>
<td>B</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grade B500C conforming to BS 4449:2005</td>
<td>C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A specified grade and type of ribbed stainless steel conforming to BS 6744:2001</td>
<td>S</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reinforcement of a type not included in the above list having material properties that are defined in the design or contract specification.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NOTE 1: In the Grade description B500A, etc., "B" indicates reinforcing steel.

NOTE 2: On this project, steel designation "H" means Grade B500B


9. Welding of reinforcement is not permitted without the prior approval of the Engineer.

10. Cover to reinforcement depends upon the fire rating and the exposure classification of the element in consideration.

   - Fire ratings are as follows: 60 Minutes TBC by Architect

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WS Project Team

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Drawing No. 2644/SN/3

Revision P1

INFORMATION

SCHEDULE

CONSTRUCTION
CONCRETE (CONTINUED)

11. Cover to reinforcement to be as shown on the reinforcement drawings.

Refer to the table below for typical cover to reinforcement elements for each individual element. Assumes 5mm fixing tolerance:

<table>
<thead>
<tr>
<th>Element</th>
<th>Concrete Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slabs</td>
<td>C32/40</td>
</tr>
<tr>
<td>Beams</td>
<td>35</td>
</tr>
<tr>
<td>Columns</td>
<td>35</td>
</tr>
<tr>
<td>Walls</td>
<td>35</td>
</tr>
<tr>
<td>Slabs</td>
<td>50 Bottom, 35 Top</td>
</tr>
<tr>
<td>Beams</td>
<td>50 *</td>
</tr>
<tr>
<td>Columns</td>
<td>35</td>
</tr>
<tr>
<td>Walls</td>
<td>35</td>
</tr>
<tr>
<td>Lift Pit Walls</td>
<td>50</td>
</tr>
<tr>
<td>Retaining Walls</td>
<td>50</td>
</tr>
<tr>
<td>With Blinding</td>
<td>50</td>
</tr>
<tr>
<td>Without Blinding</td>
<td>75</td>
</tr>
</tbody>
</table>

* Bottom cover to underside of piles ground beams 75mm

12. The Contractor is responsible for providing adequate support to the top reinforcement during fixing of reinforcement prior to and during placement of concrete.

13. The Contractor shall check the compatibility of the reinforcement bar bending schedules with the drawings and report any discrepancies to the Engineer and obtain instructions before ordering the reinforcement.

14. Unless noted otherwise, the concrete finishes shall be in accordance with The National Structural Concrete Specification Cl 8.6.1.

For formed concrete the default finish for R.C. frame construction not exposed when the building is finished is ordinary finish. For unformed concrete the default position is basic finish. For the location of concrete finishes of higher quality, refer to the Architect’s drawings.

Unformed (ref National Structural Concrete Specification cl 8.6)
- Below ground: Basic
- Above ground not exposed surfaces: Basic
- All exposed surfaces: Ordinary
- Above ground surfaces to receive waterproofing: Plain (or in accordance with the Waterproofing System)

Formed (ref National Structural Concrete Specification cl 8.6)
- Ordinary
- Surfaces to receive waterproofing: Plain

15. All exposed concrete edges to have a 25 x 25 mm chamfer UNO. All concrete surfaces to receive waterproof membrane/spray system to have internal corners, 25 x 25 mm fillet and on external edges 25 x 25 chamfer.

16. For the Waterproofing Strategy and for the full extent of waterproofing and water tight concrete construction refer to Architects drawings.

17. Where Type B structural integral protection, as defined in BS 8110, using water resistant admixture is proposed, admixture’s must comply with BS EN 934-2:2009

18. Concrete to the following areas to be of waterproof/resistant construction as specified:
- Lift pit base slab/place and walls (TBC by Architect)
- Contractor proposal/design complying with BS EN 934-2:2009

19. Type B waterproofing concrete to be installed by suitably experienced and trained concrete operatives who are fully aware of the requirements for placing concrete used in Type B systems. Particular attention is needed at construction joints and care is required to avoid hayingcombing through lack of compaction, contamination and cold joints.

20. In watertight construction ‘chequer board’ and ‘hit and miss’ type construction is prohibited, see Structural Specification. Where infill panels are available panels must be positioned at reinforcement lap locations and extend not more than 200mm either side of the lap joint.

21. The use of proprietary permanent expanded metal formwork shuttering system/stop-ends is prohibited in construction joints in areas where waterproof concrete is required.

22. In waterproof concrete or basement construction, all construction joints in concrete cast against the ground (or void formers) shall be filled with continuous hydrophilic strips at the centre of the section or as indicated on the drawings. Includes lift pit walls at the junction of base and slab.

CONCRETE (CONTINUED)

24. Concrete to receive waterproofing system (membrane/spray/renders/etc.)
- Concrete edges to have a 25x25 chamfer
- Concrete inner corners to have a 25x25 fillet
- Concrete finish to be compatible with proposed waterproofing system

25. Reinforced concrete shall be compacted by means of a mechanical vibrating pokers and the workability shall be such that, when compacted, a dense concrete, free from voids shall be produced.

26. Openings (BWIC) in concrete elements shown on A.S Construction & Engineering Ltd structural drawings are to be checked by the Contractor against relevant service builder’s work drawings and Architects drawings prior to construction. Any discrepancies must be drawn to the attention of the Architect/Project Manager/Contract Administrator. Only openings greater than 200mm DIA. or square are generally shown on A.S drawings. Openings less that 200mm DIA. or square are generally not shown or shown indicatively as an aide memoir and are not set out.

27. All holes in reinforced concrete are to be formed.

28. No cutting or removal of placed concrete is permitted without prior approval of the Structural Engineer.

29. Unless noted otherwise slab openings are to be trimmed with additional reinforcement not shown on the drawings as follows:

<table>
<thead>
<tr>
<th>Opening</th>
<th>Reinforcement Trimming Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Isolated openings of 200mm x 200mm, 200mm diameter or smaller</td>
<td>Displace all bars around the opening. No additional trimming reinforcement is required UNO.</td>
</tr>
<tr>
<td>Larger isolated openings with sides 500mm or less</td>
<td>Additional trimmers and U-bars are required. Cut or slide back affected bars to face of hole. Provide compensating bars of equal area to trim all sides. Trimmers should extend 40 x bar dia. beyond the hole. Ensure required cover is maintained.</td>
</tr>
<tr>
<td>Groups of holes within a boundary of 500mm or less</td>
<td>Trim as a single hole using method described above for openings with sides 500mm or less</td>
</tr>
<tr>
<td>Openings greater than 500mm</td>
<td>Consult the Structural Engineer</td>
</tr>
</tbody>
</table>

30. The Contractor shall determine the positions of construction joints not shown on the Engineers drawings to meet the requirements of the concrete specification. All construction joints (position and details) and pour sequences to be agreed with the Engineer prior to commencement. Construction joints shall be formed against a vertical grout tight shutter and shall be located in the middle third of any beam between supports, subject to being a minimum of 1.5m from any junction with other beams.

31. Starter kickers to all walls, columns etc. to be 100mm high unless otherwise noted. Starter sections in water resisting concrete construction to be 150 mm high and cast integral with the floor slab.

32. All slabs shall be cured in accordance with the specification for not less than 7 days using an approved sprayed curing membrane in accordance with the National Structural Concrete Specification of 8.3.

33. Falsework and formwork shall be struck at a time to comply with the specification. The periods given in CIRIA Report 136, BS 8110-1 Table 6.1 or BS EN 13670 may be taken as a general guide for the removal of formwork. The time periods will very depending on the concret type.

34. All slabs and beams shall be propped and back-proped for a time period and extent in accordance with the specification and have no damaging affect on the permanent works.

35. For details of the lightning protection requirements to be incorporated into concrete works, refer to the Building Services Engineering/MEP Consultant services drawings.

36. Where large or deep concrete piers are required, control of the heat of hydration is of paramount importance. The Contractor is to submit a method statement in accordance with the CIRA Report R135 ‘Concreting Deep Lifts and Large Volume Pours’ including concrete mix design, control of heat of hydration and temperature monitoring proposals for approval four weeks prior to construction.

37. Pre-cast stair units are to be Contractor designed to the loads shown on the loading plans.

38. The Engineer’s reinforcement quantities give only the reinforcement required to satisfy the requirements of the structural design. The Contractor shall add to this any reinforcement required to facilitate construction including, but not limited to, laps/splices, anchorages, chairs, bars for holding cast-in items in place and wadage.

39. Concreting works shall not be carried out if the air temperature is lower than 2 degrees or if frost is expected.

40. All reinforcement to be inspected and approved by Building Control prior to pouring of concrete.

41. Sudden irregularities in concrete finish are not permitted. The variation in surface finish is to be not more than 5mm under a 3m straight edge and/or 2mm under a 1m straightedge.
15. The strengths of wall tie appropriate to the cavity width and strength of masonry units and mortar used should not be less than the values given below:

<table>
<thead>
<tr>
<th>Selection of Strength of Wall Ties</th>
<th>Wall Tie Type to PD6697:2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 2.7</td>
<td>Types 1 to 4</td>
</tr>
<tr>
<td>Greater than 2.7</td>
<td>Types 1 to 2</td>
</tr>
</tbody>
</table>

NOTE: Max wall height set by a BBA certificate should not be exceeded for the appropriate wall tie used.

16. Type 4 ties are suitable for domestic dwellings and small commercial buildings not greater than 10m high.

Type 2 ties are suitable for domestic dwellings and small commercial buildings up to three storeys and not greater than 15m high.

For 4-storey apartments use Heavy Duty Ties.

17. Spacing of Ties

Spacing of all ties to comply with the Architects details but to at least comply with the following:

- First row at least one course below DPC at maximum 600mm centres horizontally.
- Second and subsequent rows to be spaced at maximum 900mm centres horizontally and 450 mm centres vertically and having a density of 2.5 ties/m² in a staggered pattern in bed joints, and have a minimum embedment of 50mm (recommend 75mm) into each leaf.
- Ties at reveals, openings, movement joints and up the slope of gable walls shall be at maximum 225 mm centres vertically.

18. Additional ties shall be provided at openings, sloping unreturned edges, movement joints, etc in accordance with the CoP/BS.

19. Where appropriate the type of tie and embedment lengths, etc. to comply with any specific requirement of the warranty provider such as NHBC, Premier, etc.

20. Metal ties for cavity wall construction shall be stainless steel approved and non-ferrous.

21. Where partial cavity insulation is used, it should be held in place by retaining devices, which may be clipped to the wall ties. These devices should be used only with compatible wall ties and where appropriate comply with the requirements of the warranty provider.

22. The acoustic performance requirements for ties in use in separating walls (Type A) and external walls (Type B) of new build dwellings is specified in Approved Document E: Resistance to the Passage of Sound.

Type A ties must have a measured dynamic stiffness of < 4.8MN/m² for the specified cavity, at a standard density.

In relation to the wall tie requirements for external walls, tie Type A may be used if it satisfies the requirements of Building Regulations Part A - Structure. However, where the tie Type A does not meet these requirements for external walls, tie Type B wall ties should be used.

Type B ties must have a measured dynamic stiffness of < 113MN/m² for the specified cavity, at a standard density.

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Project:
- 49 PURFLEET ROAD
- SOUTH OCKENDON
- RM15 4DR

Title:
- STRUCTURAL ELEMENT NOTES

Drawing No.:
- 2644/SN/5

Revision:
- P1

AS Construction & Structural Engineering
5a Rachel Grove, London, SE1 9TD
020 8470 3355
www.as-structuralengineering.co.uk
STANDARD TIMBER FLOOR

1. All structural timber floor members to be of minimum size as shown on the detail drawings. Sizes shown are nominal timber sizes except as noted on the drawings and will be subject to reductions in finished size to B.S.4471.

2. Timber floor joist shall have minimum bearings of 100mm on masonry and 75mm on steel beams or timber plates except as noted on the drawings. Timber floor joists shall not be built into party wall constructions but shall be supported on proprietary joist hangers at such locations. Restraining type joists hangers capable of resisting tensile forces, in accordance with B.S.5628-1 Appendix C to be used. Alternatively, provide restraint straps at not more than 2.0metres using 30mm x 5mm galvanised traps with a turn down length of 100mm and straight length of 600mm. Straps fixed to floor joists with 60x16 screws at not more than 110mm centres and a minimum of 4 fixings.

3. Double joists shall be provided on non-load bearing studwork partitions running parallel with joist spans, under baths and under airing cupboards.

4. All members supported on proprietary hangers shall be accurately cut to provide a full contact with the base of the hanger and shall be fixed in accordance with the hanger manufacturer’s instructions. Joists shall be rebated to lie flush with underside of hangers.

5. All members fitted into steel beams shall provide a good fit to the web of the beam and shall be notched the minimum amount required to clear the beam flanges. Where steel beams are specified within the floor depth, the underside of joists shall be 5mm below the underside of the beams.

6. External and party walls parallel with joists spans shall be restrained at top of floor joist level at not more than 2.0metres centres with galvanised 30 x 5.0mm straps extending over a minimum of 3 joints. Noggin not less than 75% of joist depth and timber blocking adjacent to walls shall be fixed between joists at all strap locations. Straps shall be fixed to members/noggins with not less than 4no. 32 x 3.5mm galvanised or sheradised square twisted nails.

7. End joists shall be positioned approximately 50mm from masonry walls. Joist centres generally shall be equal and shall not exceed the design centres shown on the drawing. Multiple joists, where shown on the drawings shall be securely screwed together at not more than 600mm centres.

8. Unless specified otherwise, securely fix strutting between joists at centres as follows:
   - Joist span of 2.5m to 4.5m - one row at centre of span.
   - Joist span over 4.5m - two rows equally spaced.

9. Strutting shall take the form of one of the following:
   - 38mm x 38mm softwood herringbone strutting located between 5 & 25mm clear of top and bottom edges of joist.
   - Proprietary galvanised metal strutting fixed in accordance with manufacturer’s instructions.
   - Solid softwood strutting not less than 38mm thick at least three quarters of the depth of the joist.

PROPRIETARY ENGINEERED TIMBER FLOOR

1. All structural timber floor members, and framing connections/hangers to be designed and manufactured by specialist. Design to be in accordance with Building Regulations, current design standards i.e. E.C. BS EN 1995-1-1 and NHBC Standards.

2. The setting out & dimensions shall be in accordance with the Architects & specialists drawings.

3. Timber floor joists shall not be built into party or external wall constructions but shall be supported on proprietary joist hangers to joist suppliers’ requirements at such locations.

4. All members supported on proprietary hangers to have full contact with the base of the hanger and shall be fixed in accordance with the hanger manufacturer’s instructions.

5. All members fitted onto steel beams to be supported on proprietary joist hangers to details by floor joists manufacturer. Where steel beams are specified within the floor depth, the underside of joists shall be 5mm (minimum) below the underside of the beam.

6. External and party walls parallel with joist spans shall be restrained at top of floor joist level at not more than 2.0metres centres in houses and 1.25m in flats with galvanised 30 x 5.0mm straps extending below top flange for a minimum of 3 joints. Noggin not less than 75% of joist depth and timber blocking adjacent to walls shall be fixed between joists at all strap locations. Straps shall be fixed to members/noggings with not less than 4no. 32 x 3.5mm galvanised or sheradised square twisted nails (or alternative detail by joist manufacturer).

7. All nogging/struts/blockings to be in strict accordance with manufacturers details.

8. Overall stability of timber floors during construction to details by floor joist manufacturer.

9. Engineered timber joists to be designed to allow for the following unfactored loadings:
   - Refer to Architects details
   - Imposed Load - 1.5 KN/m² (housing)
   - Timber stud partition loading - 0.5 KN/m² and line load of 2.0 KN/m

10. Reference should be made to the proprietary floor joist designer/manufacturer details regarding the allowable positioning and sizes of service penetrations through the floor members.

ROOF CONSTRUCTION

1. For trussed rafter design and bracing requirements see separate notes.

2. All site pitched roof members to be of minimum size as shown on the project detail drawings. Sizes shown are nominal timber sizes except as noted on the drawings and will be subject to reductions in finished size to B.S.4471.

3. Timber wall plates shall not be less than 50x100mm in cross section (except where otherwise noted on the drawings) and shall be laid to level on a mortar bed on masonry walls or fixed to steel beams by suitable powder actuated fasteners or minimum M8 dia. bolts at not more than 900mm centres.

4. Wall plates shall be strapped down to masonry walls at not more than 2.0metres** in houses and 1.25m** centres in flats with galvanised 30x2.5mm straps having a size of not less than 100 x 900mm. Straps shall be securely fixed to wall plates with not less than 2no. 32x3.5mm galvanised or sheradised square twisted nails, and to walls with not less than 6no. proprietary plastic plugs and 50mm x 12G woodscrews evenly spaced along the strap.

5. All members supported on proprietary hangers shall be accurately cut to provide a full contact with the base of the hanger and shall be fixed in accordance with the hanger manufacturer’s instructions.

6. All loose timber rafters, ceiling joists, prefabricated trussed rafters and the like shall be fixed to timber wall plates, purlins etc. with suitable proprietary galvanised truss clips. All nail holes in truss clips shall be filled with 32x3.5mm galvanised or sheradised square twisted nails.

7. Gable walls, Party Walls and internal partitions extending into the roof space shall be restrained at the top of ceiling joists and underside of rafter level at no more than 2.0metres centres with galvanised 30x5.0mm straps having a size of not less than 100x900mm. Noggin not less than 75mm deep and timber blocking adjacent to walls shall be fixed between members at all strap locations. Straps shall be fixed between members at all strap locations. Straps shall be fixed to members/noggins with not less than 4no.32x3.5mm galvanised or sheradised square twisted nails.

8. Timber members shall not penetrate fire stop walls in roofs. Provide suitable galvanised metal hangers to support trusses, rafters etc., as required to avoid such penetrations.

9. Unless specified otherwise, securely fix strutting between joists at centres as follows:
   - Joist span of 2.5m to 4.5m - one row at centre of span.
   - Joist span over 4.5m - two rows equally spaced.

10. Strutting shall take the form of one of the following:
    - 38mm x 38mm softwood herringbone strutting located between 5 & 25mm clear of top and bottom edges of joist.
    - Proprietary galvanised metal strutting fixed in accordance with manufacturer’s instructions.
    - Solid softwood strutting not less than 38mm thick at least three quarters of the depth of the joist.

BALUSTRADE / HANDRAIL DESIGN

1. This drawing is to be read in conjunction with all relevant Engineers, Architects & Services Engineers drawings, details and specifications.

2. All balustrade/handrails and their fixings into the structure are to be designed by the Clients chosen specialist contractor.

   Horizontal Line Load for Domestic and Residential Areas  = 0.74kN/m (Unfactored)
   Horizontal Line Load for Commercial Areas  = 1.50kN/m (Unfactored)
   Wind Load  = X.XXkN/m² (Unfactored)

CLADDING AND PROPRIETARY ENGINEERED LIGHTWEIGHT WALLS

1. This drawing is to be read in conjunction with all relevant Engineers, Architects & Services Engineers drawings, details and specifications.

2. Cladding panels, and proprietary inner leaf and internal walls are to be designed to support lateral wind loading.

   Wind Load  = X.XXkN/m² (Unfactored)
1. All materials, fabrication, workmanship and erection of steelwork shall be in accordance with the latest edition of the National Steelwork Specification for Building Construction (NS55) as published by the British Constructional Steelwork Association.

2. The Execution Class for the structure is EXC2 to BS EN 1090-2. All fabricated structural steelwork shall be CE marked in accordance with BS EN 1090-1.

3. Site welding shall only be carried out with prior written consent from the Structural Engineer.

4. Where structural steelwork shall be blast cleaned to BS EN ISO 8501-1, preparation grade SA 2 1/2, and except where specified as galvanised, shall be painted with a suitable good quality high build epoxy primer in accordance with CIBA 174 New paint systems for the protection of constructional steelwork. Unless noted otherwise on the drawings; internal steel work shall be specification I3 and external steelwork (not hot dipped galvanised) specification E2. A pre-fabrication primer may be used at the fabricator’s discretion. The contractor shall ensure that the primer used is compatible with subsequent coatings specified by Others. (e.g. Intumescent paint).

5. All lintel beams shall be hot dipped galvanised.

6. Steelwork specified as galvanised shall be blast cleaned as above & hot dip galvanised to BS EN ISO 1461 minimum coating thickness 85 microns. Corrosion category to be C3 BS EN ISO 12944-2.

7. Steelwork below DPC level or built within the masonry wall cavity shall additionally be site painted with a compatible high build epoxy zinc phosphate primer to provide a dry film thickness of not less than 125 microns, to achieve an overall primer coating of 200 microns. i.e. LEIGHS PAINTS EPIGRIP C400 zinc phosphate primer/buildcoat or equal.

8. Steelwork below DPC and adjacent to soil shall be encased in concrete with cover of not less than 100 mm. A reduced cover of 50 mm will be permitted when cast against masonry or additional protection is provided. Concrete to be not weaker than C20/25/35/mm² at 28 days to BS En 206-1, BS 850:11 and BS 8500-2.

9. Where steelwork has any form of paint finish specified, fasteners connecting that steelwork shall be corrosion protected as follows, except where otherwise indicated:

- Strengths up to and including Grade 8.8 - 5pun galvanised to BS EN 1461
- Higher strengths than Grade 8.8 - Class 1 derosered to BS 4921 (minimum thickness 30 Microns)

10. Fasteners, which connect to steelwork requiring fire protection shall receive the paint system(s) applicable to the connecting steel work in addition to the system unspecified for the fasteners.

11. Fasteners that are galvanised and which are to receive any form of paint finish shall be dust primed.

12. The steelwork contractor shall repair any damage to the coatings to the same standard as the original specification.

**LINTELS**

1. All lintels to internal block work to have minimum end bearing of 150mm.

2. All lintels to be precast concrete lintels or stainless steel type with capacites as follows:

- For clear spans up to 1200mm use 100 x 65mm dp lintels with capacity of 1.2kN/m, 140 x 65mm dp lintels with capacity of 1.7 kN/m & 215 x 65mm dp lintels with capacity of 2.5 kN/m.
- For clear spans up to 1800mm use 100 x 140mm dp lintels with capacity of 1.2 kN/m, 140 x 140mm dp lintels with capacity of 1.7 kN/m & 215 x 140mm dp lintels with capacity of 2.5 kN/m.

3. Alterations required to both solid brick walls and cavity walls, the following lintels are to be used for different width and thickness of walls:

   **Solid Walls**

   - 4” thick walls up to 1m wide opening
     - Precast lintel 65x100
     - Precast lintel 100x100
   - 4” thick walls up to 1.5m wide opening
     - Precast lintel 25x100
   - 4” thick walls up to 2.5m wide opening
     - Precast lintel 20x100
   - 9” thick walls up to 1m wide opening
     - Precast lintel 20x 65x100
   - 9” thick walls up to 1.5m wide opening
     - Precast lintel 20x 100x100
   - 9” thick walls up to 2.5m wide opening
     - Precast lintel 20x 25x100
   - 13” thick walls up to 1m wide opening
     - Precast lintel 30x 65x100
   - 13” thick walls up to 1.5m wide opening
     - Precast lintel 30x 100x100
   - 13” thick walls up to 2.5m wide opening
     - Precast lintel 30x 25x100

   **Cavity Walls**

   - 300mm thick walls up to 1m wide opening
     - Caticn lintel CG 90/100
   - 300mm thick walls up to 1.5m wide opening
     - Caticn lintel CG 90/100
   - 300mm thick walls up to 2.5m wide opening
     - Caticn lintel CG 90/100

4. Lintels are not to be used over openings which are created under point loads from existing or proposed beams. Only timber floor can be supported within the zone of influence by these lintels. Engineer is to be informed for lintel design in these cases.
NOTES ON DRAINAGE:
Existing drainage layout is unconfirmed. This is to be investigated and confirmed on site by contractor before commencing any foundation work. Connect all new drainage to existing main sewer, in accordance with Part H of Building Regulations, Thames Water guidelines and to comply with BS 5572. Where any drainage passes through foundations, ensure sufficient clearance is provided on either side of pipe and concrete lintels are provided above pipe, all to building control inspector’s satisfaction. All drainage to be agreed and adapted to Building Control satisfaction on site. Also, Internal drainage and waste pipe routes to be decided on site with client to achieve best possible routes/results with least disruptions.

SURFACE WATER DISPOSAL:
Rainwater from new extensions to drain to soakaways where feasible. Soakaways must be minimum of 6m away from any building foundations and to be built in accordance with BRE digest 365. Where the sub-soil is unsuitable and/or the roof area is too large the rainwater should discharge to the existing surface water system. If there is not separate surface water drainage and foul water drainage systems exist then rainwater to be disposed via trapped drainage gullies connected to existing combined drain.

FOUL, RAIN & STORM WATER DRAINAGE SYSTEMS:
Both storm and foul drainage to consist of 100mm diameter UPVC proprietary underground drainage laid at a minimum gradient of 1:40 surrounded in 100mm pea/single size gravel a minimum of 900mm deep in drives and roads and 400mm elsewhere. Foul water to be discharged to new or existing facilities as shown on plans/specification. Where separate surface water drainage and foul water drainage systems exist they are to be maintained and any water from inclined down pipes to be discharged to separate surface water systems via trapped gullies or in accordance with relevant Building Regulations. Ensure soil is suitable for any new soakaways, and ensure soakaways are constructed to minimum 2m2 clean filled rubble soakaways per rain water pipe serving a roof area upto 30m2, covered with polythene and top soil or to other methods as shown on the drawing / specification.

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TRADITIONAL PRESCRIBED MIX PROPORTIONS

Typical volume batching ratios and the probable strengths achieved (with a slump of 50mm to 75mm)

PARTY WALL etc. Act 1996 building owner has legal duty to serve party wall notices to neighbours under the party wall etc. act 1996 written notice must be given to existing owners prior to start of work on site, two month’s notice for work to party wall or party structure, one month’s notice for all other works.

HEALTH AND SAFETY GENERALLY
All works to be carried out in accordance with the Health and Safety ACT and Dam Regulations 2007 and prevailing Health & Safety requirements in force at the time of the works.

BOUNDARIES
Building owner is advised to ensure that the position of the boundary (line of junction) is confirmed / agreed with the adjoining owner/s before constructing any structure.

DRAINAGE BELOW GROUND NOTES

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FOUL, RAIN & STORM WATER DRAINAGE SYSTEMS:
Both storm and foul drainage to consist of 100mm diameter UPVC proprietary underground drainage laid at a minimum gradient of 1:40 surrounded in 100mm pea/single size gravel a minimum of 900mm deep in drives and roads and 400mm elsewhere. Foul water to be discharged to new or existing facilities as shown on plans/specification. Where separate surface water drainage and foul water drainage systems exist they are to be maintained and any water from inclined down pipes to be discharged to separate surface water systems via trapped gullies or in accordance with relevant Building Regulations. Ensure soil is suitable for any new soakaways, and ensure soakaways are constructed to minimum 2m2 clean filled rubble soakaways per rain water pipe serving a roof area upto 30m2, covered with polythene and top soil or to other methods as shown on the drawing / specification.

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47x175mm DOUBLE TIMBER CONNECTION DETAILS

2No. 47x175mm C24 M12 Coach bolts @ 400 S/C

63Ø Single Sided Tooth Plate Connector

2No. 47x175mm C24 M12 Coach bolts

63Ø Double Sided Tooth Plate Connector

Boths @ 400 375 centres

50x50x3mm Steel washer plate

TYPICAL TIMBER JOIST CONNECTION

100x47 C24 timber stud @ 400cc

100x47 Sole plate

Floor plate

Typical stud jamb

Typical wall stud

TYPICAL STEEL BEAM TO BLOCKWORK LEAF DETAIL

Concrete padstone (see plans for sizes)

Dry packing

Steel beam

TYPICAL TIMBER STUD DETAIL

30x5 galvanised mild steel lateral restraint strap anchored in timber stud and screwed to side of 4no.slab no. 12x50mm long wood screws @150mm crs

1 Layer 12mm Ply On both sides

M12 resin anchor @450mm crs

TYPICAL LATERAL RETRAINT DETAIL

30x5mm Galvanised mild steel or other durable strap held tight against masonry wall and fixed across 3 joints

MAX 2000mm

30x5mm Galvanised mild steel or other durable strap at least 1200mm long and held tight against masonry wall

Internal leaf of external cavity wall or internal wall requiring lateral restraint

Noggins minimum 38mm width to extend at least 1/2 the depth of the joist

Joint blocked to wall

NOTE: The Steel straps and noggins may alternatively be fixed to underside of floor joists

TYPICAL WALL PLATE DETAIL

Wall plate bolted to wall with M12 HILLS HY 270 bolts @500c/c

Timber Studs @ 400c/c

BRICKWORK TO BE ASSESSED FOR THE SUITABILITY OF THIS DETAIL

TYPICAL WALL PLATE DETAIL
Timber packers bolted to beam with M12 coach bolts centers to match joist spacing
Flooring + finishes to Architect’s details
Timber packers fixed to steel beam web with 4 No. 5.5 self tapping screws with M6 large flat washer (alternate noggings)
Ceiling and finishes to Architect’s specification
Timber Joists
Flooring + finishes to Architect’s details
Steel joist hanger Simpson Strong-Tie JHA270 or similar approved
Ceiling and finishes to Architect’s specification
Timber Joists
Flooring + finishes to Architect’s details

NOTICES
- IMMEDIATE VALUES MAY BE OBTAINED BY LINEAR INTERPOLATION
- THE ABOVE VALUES APPLY TO SAWN & REGULATED SOFTWOODS
- SIZES AND/OR POSITIONS OF HOLES AND NOTCHES WHICH ARE NOT IN ACCORDANCE WITH THE ABOVE REQUIREMENTS SHALL BE REFERRED TO THE ENGINEER FOR COMMENT PRIOR TO THE WORK BEING CARRIED OUT ON SITE

JOIST TABLE FOR HOLE NOTCHES

<table>
<thead>
<tr>
<th>JOIST SPAN (mm)</th>
<th>0.07 x SPAN (mm)</th>
<th>0.25 x SPAN (mm)</th>
<th>0.4 x SPAN (mm)</th>
<th>JOIST DEPTH 'D' (mm)</th>
<th>MAXIMUM HOLE DIAMETER (mm)</th>
<th>MAXIMUM NOTCH DEPTH (mm)</th>
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<tbody>
<tr>
<td>1500</td>
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<td>1125</td>
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<td>1250</td>
<td>2000</td>
<td>250</td>
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<td>31</td>
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</tbody>
</table>

NOTES
- IMMEDIATE VALUES MAY BE OBTAINED BY LINEAR INTERPOLATION
- NOTES SIZES AND/OR POSITIONS OF HOLES AND NOTCHES WHICH ARE NOT IN ACCORDANCE WITH THE ABOVE REQUIREMENTS SHALL BE REFERRED TO THE ENGINEER FOR COMMENT PRIOR TO THE WORK BEING CARRIED OUT ON SITE

Location and maximum diameter of holes and location and maximum depth of notches in timber floor and roof beams up to 250mm in depth, in accordance with BS 5268: Part 2: Clause 14.9 and the Building Regulations.

NOTCHES AND HOLES IN TIMBER JOISTS DETAIL

New wall tied back to existing With Stainless Steel Wall starter system. To be capable of resisting a wind load of up to 4.5kN over its height. Allow for flexible movement joint between new and existing walls.
TYPICAL LINTEL DETAIL

Bearing Length:
Use the correct length and width of lintel for the opening and cavity width. The bearing length should be at least 150mm. Do not let masonry overhang lintels by more than 25mm. Continuity of masonry bond should be maintained at supports to beams and lintels.

Do Not:
- Support lintels and beams on short lengths of cut block & make up pieces;
- Apply load to lintels or beam before the masonry supporting it has hardened.

WALL DETAIL AT CORNER OF BUILDING

Additional wall ties @ 300 vert. ctrs provided at each joint.

Cavity wall construction to Architects details.

10mm mastic sealant to Architects details. Flexible joint filler.
TYPICAL FLOOR STRUTTING DETAIL - PLAN VIEW - Strutting of joists with a span between 2.5m and 4.5m

- 2 rows of strutting at one third span positions
- 1 row of strutting at mid span

TYPICAL FLOOR STRUTTING DETAIL - PLAN VIEW - Strutting of joists with a span over 4.5m

- 2 rows of strutting at one third span positions
- 1 row of strutting at mid span

Additional ties at openings/ unbonded edges/ sloping unreturned edges/ movement joints etc. (3-4 ties/m in accordance with CoP/ BS)

Standard spacing of wall ties for cavity brickwork 900mm x 450mm centres in a staggered pattern (2.5 ties per square metre)
<table>
<thead>
<tr>
<th>WALL LOADS</th>
<th>DEAD LOAD (SL)</th>
<th>kN/m²</th>
</tr>
</thead>
<tbody>
<tr>
<td>STUD WORK</td>
<td>Studwork + Tiles + Battens + Felt + Plywood + Insulation + Plasterboard + Skim</td>
<td>0.9</td>
</tr>
<tr>
<td>INTERNAL TIMBER WALLS</td>
<td>Studwork + Insulation + Plasterboard x2 + Skim</td>
<td>0.4</td>
</tr>
<tr>
<td>100mm BRICK WALLS</td>
<td>100mm Brickwork + Plasterboard x2 + Skim</td>
<td>2.4</td>
</tr>
<tr>
<td>215mm BRICK WALLS</td>
<td>215mm Brickwork + Plasterboard + Skim</td>
<td>4.5</td>
</tr>
<tr>
<td>330mm BRICK WALLS</td>
<td>330mm Brickwork + Plasterboard + Skim</td>
<td>6.8</td>
</tr>
<tr>
<td>440mm BRICK WALLS</td>
<td>440mm Brickwork + Plasterboard + Skim</td>
<td>9.0</td>
</tr>
<tr>
<td>100mm BLOCK WALLS</td>
<td>100mm Blockwork + Plasterboard + Skim</td>
<td>1.9</td>
</tr>
<tr>
<td>140mm BLOCK WALLS</td>
<td>140mm Blockwork+Plasterboard+x2+Skim</td>
<td>2.5</td>
</tr>
<tr>
<td>215mm BLOCK WALLS</td>
<td>215mm Blockwork + Plasterboard + Skim</td>
<td>3.4</td>
</tr>
<tr>
<td>330mm BLOCK WALLS</td>
<td>330mm Blockwork + Plasterboard + Skim</td>
<td>5.2</td>
</tr>
<tr>
<td>440mm BLOCK WALLS</td>
<td>440mm Blockwork + Plasterboard + Skim</td>
<td>6.6</td>
</tr>
<tr>
<td>EXTERNAL SFS WALLS</td>
<td>100mm SFS Wall + Plasterboard + Skim + Insulation + Cement Board</td>
<td>1.5</td>
</tr>
<tr>
<td>INTERNAL SFS WALLS</td>
<td>100mm SFS Wall + Plasterboard + Skim + Insulation</td>
<td>0.4</td>
</tr>
<tr>
<td>300mm BRICK/BLOCK CAVITY WALLS</td>
<td>100mm Brickwork + Insulation + 100mm SFS Wall + Plasterboard</td>
<td>3.8</td>
</tr>
<tr>
<td>300mm BRICK/SFS CAVITY WALLS</td>
<td>100mm Brickwork + Insulation + 100mm SFS Wall + Plasterboard</td>
<td>3.3</td>
</tr>
<tr>
<td>300mm BRICK/TIMBER CAVITY WALLS</td>
<td>100mm Brickwork + Insulation + 100mm Timber Studwork + Plasterboard</td>
<td>2.6</td>
</tr>
<tr>
<td>300mm BLOCK/BLOCK CAVITY WALLS</td>
<td>100mm Blockwork + Insulation + 100mm Blockwork + Plasterboard + x2 + Skim</td>
<td>3.5</td>
</tr>
<tr>
<td>300mm BLOCK/SFS CAVITY WALLS</td>
<td>100mm Blockwork + Insulation + 100mm SFS Wall + Plasterboard + x2 + Skim</td>
<td>3.0</td>
</tr>
<tr>
<td>300mm BLOCK/TIMBER CAVITY WALLS</td>
<td>100mm Blockwork + Insulation + 100mm Timber Studwork + Plasterboard + x2 + Skim</td>
<td>2.3</td>
</tr>
<tr>
<td>CHIMNEY</td>
<td>Self-weight of 340mm Chimney + Plasterboard + Skim</td>
<td>3.5</td>
</tr>
<tr>
<td>SPANS</td>
<td></td>
<td>SURFACE LOADS</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>No. OF SPAN</td>
<td>LENGTH (mm)</td>
<td>DESCRIPTION OF LOADS</td>
</tr>
<tr>
<td>1</td>
<td>3000</td>
<td>EXTENSION ROOF</td>
</tr>
<tr>
<td></td>
<td></td>
<td>FLAT ROOF</td>
</tr>
</tbody>
</table>

| PROVIDE | 47 x 175mm @ 400mm C/C | C24 |
ETFRJ TIMBER JOIST DESIGN (BS5268)

TIMBER JOIST DESIGN (BS5268-2:2002)  Tedds calculation version 1.1.04

Joist details
Joist breadth; b = 47 mm; Joist depth; h = 175 mm
Joist spacing; s = 400 mm; Service class of timber; 1
Timber strength class; C24

Span details
Number of spans; Nspan = 1; Length of bearing; Lb = 100 mm
Clear length of span; Ls = 3000 mm;

Section properties
Second moment of area; I = 20990885 mm⁴; Section modulus; Z = 239896 mm³

Loading details
Joist self weight; Fswt = 0.03 kN/m; Dead load; Fd = 0.75 kN/m²
Imposed UDL(Medium term); Fd,udl = 0.75 kN/m²
Imposed point load (Short); Fp = 0.90 kN

Consider medium term loads
Design bending moment; M = 0.707 kNm; Design shear force; V = 0.942 kN
Design support reaction; R = 0.942 kN; Design deflection; δ = 3.075 mm

Check bending stress
Permissible bending stress; \( \sigma_{m,adm} = 13.131 \text{ N/mm}^2 \); Applied bending stress; \( \sigma_{m,max} = 4.353 \text{ N/mm}^2 \)
PASS - Applied bending stress within permissible limits

Check shear stress
Permissible shear stress; \( \tau_{adm} = 1.172 \text{ N/mm}^2 \); Applied shear stress; \( \tau_{max} = 0.254 \text{ N/mm}^2 \)
PASS - Applied shear stress within permissible limits

Check bearing stress
Permissible bearing stress; \( \sigma_{c,adm} = 3.960 \text{ N/mm}^2 \); Applied bearing stress; \( \sigma_{c,max} = 0.296 \text{ N/mm}^2 \)
PASS - Applied bearing stress within permissible limits

Check deflection
Permissible deflection; \( \delta_{adm} = 9.000 \text{ mm} \); Actual deflection; \( \delta = 3.986 \text{ mm} \)
PASS - Actual deflection within permissible limits

Consider short term loads
Design bending moment; M = 1.044 kNm; Design shear force; V = 1.392 kN
Design support reaction; R = 1.392 kN; Design deflection; δ = 3.986 mm
## Timmer Trimmer Design Summary

**Project Ref:** 2644  
**Section:**  
**Date:** Feb 21

### Timmer Trimmed Design Summary

<table>
<thead>
<tr>
<th>Reference</th>
<th>FFT.1</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>No. of Span</th>
<th>Length (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1000</td>
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### Support Conditions

<table>
<thead>
<tr>
<th>Node Reference</th>
<th>Vertical</th>
<th>Rotational</th>
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<tbody>
<tr>
<td>A</td>
<td>Restrained</td>
<td>Free</td>
</tr>
<tr>
<td>B</td>
<td>Restrained</td>
<td>Free</td>
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</table>

### Loadings

#### Full UDL

<table>
<thead>
<tr>
<th>Position of Load from Support A</th>
<th>0 mm - 1000 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description of Loads</td>
<td></td>
</tr>
<tr>
<td>Extension Roof</td>
<td>Flat Roof</td>
</tr>
<tr>
<td>Extension Roof</td>
<td>Glass Sky Lantern</td>
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</table>

<table>
<thead>
<tr>
<th>Design Loads Acting on Element (m)</th>
<th>Unit Load (kN/m²)</th>
<th>Line Load (kN/m)</th>
</tr>
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<tbody>
<tr>
<td>DL</td>
<td>LL</td>
<td>ΔDL</td>
</tr>
<tr>
<td>Extension Roof</td>
<td>1.00</td>
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<tr>
<td>Extension Roof</td>
<td>2.00</td>
<td>1.50</td>
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### Reactions

<table>
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<tr>
<th>Reaction</th>
<th>Dead Load (kN)</th>
<th>Live Load (kN)</th>
<th>DL Bending Moment (kNm)</th>
<th>LL Bending Moment (kNm)</th>
<th>Σ Bending Moment (kNm)</th>
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<tr>
<td>RA</td>
<td>0.60</td>
<td>0.38</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
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<tr>
<td>RB</td>
<td>0.60</td>
<td>0.38</td>
<td>0.00</td>
<td>0.00</td>
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</tr>
</tbody>
</table>

### Provide

- 2No. 47 x 175mm C24 Timbers bolted together via M12 bolts grade 8.8 @ 400mm C/C with double sided tooth plate connector

- Website: www.as-structuraleng.co.uk
- Address: 54 Plashet Grove, Eastham, E6 1AE
- Telephone: 020 8470 5355
- Email: info@as-construction.co.uk
- Project: 49 Purfleet Road, South Ockendon, RM15 4DR
## Position of Load from Support A

### Partial UDL

<table>
<thead>
<tr>
<th>Position of Load</th>
<th>Description of Loads</th>
<th>Design Loads Acting on Element (m)</th>
<th>Unit Load (kN/m²)</th>
<th>Line Load (kN/m)</th>
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</thead>
<tbody>
<tr>
<td>0 mm - 1000 mm</td>
<td>Extension Roof</td>
<td>DL</td>
<td>0.80</td>
<td>0.75</td>
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<td></td>
<td>Flat Roof</td>
<td>LL</td>
<td>0.75</td>
<td>0.75</td>
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<tr>
<td></td>
<td></td>
<td><strong>Total</strong></td>
<td><strong>DL</strong></td>
<td><strong>LL</strong></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td><strong>∑DL</strong></td>
<td><strong>∑LL</strong></td>
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<td>1000 mm - 3000 mm</td>
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<tr>
<td></td>
<td></td>
<td><strong>Total</strong></td>
<td><strong>DL</strong></td>
<td><strong>LL</strong></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td><strong>∑DL</strong></td>
<td><strong>∑LL</strong></td>
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### Point Loads

<table>
<thead>
<tr>
<th>Position of Load</th>
<th>Description of Loads</th>
<th>Reactions (kN)</th>
<th>Σ Reactions (kN)</th>
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</thead>
<tbody>
<tr>
<td>1000 mm</td>
<td>Trimmer</td>
<td>DL</td>
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<td></td>
<td>Support RA</td>
<td>LL</td>
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<tr>
<td></td>
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<td><strong>Total</strong></td>
<td><strong>DL</strong></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td><strong>ΣDL</strong></td>
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</tbody>
</table>

### Reactions

- **DL + LL**
- **RA**
- **RB**

### Provide

- **2No. 47 x 175mm C24 Timbers bolted together via M12 bolts grade 8.8 @ 400mm C/C with double sided tooth plate connector**
**FFT1 TIMBER BEAM ANALYSIS & DESIGN (BS5268)**

**TIMBER BEAM ANALYSIS & DESIGN TO BS5268-2:2002**

TEDDS calculation version 1.7.02

---

**Analysis results**

- **Design moment:** $M = 0.243 \text{ kNm}$; **Design shear:** $F = 0.974 \text{ kN}$
- **Total load on beam:** $W_{\text{t}} = 1.948 \text{ kN}$
- **Reactions at support A:** $R_{\text{A}} = 0.974 \text{ kN}$; $R_{\text{A,max}} = 0.974 \text{ kN}$
- **Reactions at support B:** $R_{\text{B}} = 1.065 \text{ kN}$; $R_{\text{B,min}} = 1.068 \text{ kN}$
- **Unfactored dead load reaction at support A:** $R_{\text{D,dead}} = 0.599 \text{ kN}$
- **Unfactored imposed load reaction at support A:** $R_{\text{I,imposed}} = 0.375 \text{ kN}$
- **Unfactored dead load reaction at support B:** $R_{\text{D,dead}} = 0.599 \text{ kN}$
- **Unfactored imposed load reaction at support B:** $R_{\text{I,imposed}} = 0.375 \text{ kN}$

**Timber section details**

- **Breadth of section:** $b = 47 \text{ mm}$; **Depth of section:** $h = 175 \text{ mm}$
- **Number of sections:** $N = 2$; **Breadth of beam:** $b_b = 94 \text{ mm}$
- **Timber strength class:** C24

**Member details**

- **Service class of timber:** 1; **Load duration:** Long term
- **Length of span:** $L_s = 1000 \text{ mm}$
- **Length of bearing:** $L_b = 100 \text{ mm}$

The beam is part of a load-sharing system consisting of four or more members.

**Lateral support - cl.2.10.8**

- **Permiss. depth-to-breadth ratio:** 3.00; **Actual depth-to-breadth ratio:** 1.86
- **PASS - Lateral support is adequate**

**Check bearing stress**

- **Permissible bearing stress:** $\sigma_{\text{adm}} = 2.640 \text{ N/mm}^2$; **Applied bearing stress:** $\sigma_{\text{A}} = 0.104 \text{ N/mm}^2$
  **PASS - Applied compressive stress is less than permissible compressive stress at bearing**

**Bending parallel to grain**

- **Permissible bending stress:** $\sigma_{\text{adm}} = 8.754 \text{ N/mm}^2$; **Applied bending stress:** $\sigma_{\text{A}} = 0.507 \text{ N/mm}^2$
  **PASS - Applied bending stress is less than permissible bending stress**

**Shear parallel to grain**

- **Permissible shear stress:** $\tau_{\text{adm}} = 0.781 \text{ N/mm}^2$; **Applied shear stress:** $\tau_{\text{A}} = 0.089 \text{ N/mm}^2$
  **PASS - Applied shear stress is less than permissible shear stress**

**Deflection**

- **Permissible deflection:** $\delta_{\text{adm}} = 3.000 \text{ mm}$; **Total deflection:** $\delta_{\text{A}} = 0.108 \text{ mm}$
  **PASS - Total deflection is less than permissible deflection**

---

**FFT2 TIMBER BEAM ANALYSIS & DESIGN (BS5268)**

**TIMBER BEAM ANALYSIS & DESIGN TO BS5268-2:2002**

TEDDS calculation version 1.7.02

---

**Analysis results**

- **Design moment:** $M = 1.520 \text{ kNm}$; **Design shear:** $F = 1.835 \text{ kN}$
- **Total load on beam:** $W_{\text{t}} = 3.523 \text{ kN}$
- **Reactions at support A:** $R_{\text{A}} = 1.835 \text{ kN}$; $R_{\text{A,max}} = 1.835 \text{ kN}$
- **Reactions at support B:** $R_{\text{B}} = 1.688 \text{ kN}$; $R_{\text{B,min}} = 1.688 \text{ kN}$
- **Unfactored dead load reaction at support A:** $R_{\text{D,dead}} = 0.105 \text{ kN}$
- **Unfactored imposed load reaction at support A:** $R_{\text{I,imposed}} = 0.730 \text{ kN}$
- **Unfactored dead load reaction at support B:** $R_{\text{D,dead}} = 1.058 \text{ kN}$
- **Unfactored imposed load reaction at support B:** $R_{\text{I,imposed}} = 0.630 \text{ kN}$

**Timber section details**

- **Breadth of section:** $b = 47 \text{ mm}$; **Depth of section:** $h = 175 \text{ mm}$
- **Number of sections:** $N = 2$; **Breadth of beam:** $b_b = 94 \text{ mm}$
- **Timber strength class:** C24

**Member details**

- **Service class of timber:** 1; **Load duration:** Long term
- **Length of span:** $L_s = 3000 \text{ mm}$
- **Length of bearing:** $L_b = 100 \text{ mm}$

The beam is part of a load-sharing system consisting of four or more members.

**Lateral support - cl.2.10.8**

- **Permiss. depth-to-breadth ratio:** 3.00; **Actual depth-to-breadth ratio:** 1.86
- **PASS - Lateral support is adequate**

**Check bearing stress**

- **Permissible bearing stress:** $\sigma_{\text{adm}} = 2.640 \text{ N/mm}^2$; **Applied bearing stress:** $\sigma_{\text{A}} = 0.195 \text{ N/mm}^2$
  **PASS - Applied compressive stress is less than permissible compressive stress at bearing**

**Bending parallel to grain**

- **Permissible bending stress:** $\sigma_{\text{adm}} = 8.754 \text{ N/mm}^2$; **Applied bending stress:** $\sigma_{\text{A}} = 3.168 \text{ N/mm}^2$
  **PASS - Applied bending stress is less than permissible bending stress**

**Shear parallel to grain**

- **Permissible shear stress:** $\tau_{\text{adm}} = 0.781 \text{ N/mm}^2$; **Applied shear stress:** $\tau_{\text{A}} = 0.167 \text{ N/mm}^2$
  **PASS - Applied shear stress is less than permissible shear stress**

---

Project: 49 PURFLEET ROAD, SOUTH OCKENDON, RM15 4DR

Job Ref: 2644
### Deflection

<table>
<thead>
<tr>
<th>Project</th>
<th>49 PURFLEET ROAD, SOUTH OCKENDON, RM15 4DR</th>
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</thead>
<tbody>
<tr>
<td>Job Ref</td>
<td>2644</td>
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<tr>
<td>Section</td>
<td>TIMBER TRIMMER DESIGN</td>
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<td>Sheet no./rev.</td>
<td>TTD 3</td>
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<td>Calc. by</td>
<td>A</td>
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<tr>
<td>Date</td>
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</tr>
<tr>
<td>Chk'd by</td>
<td>Date</td>
</tr>
<tr>
<td>Date</td>
<td>Date</td>
</tr>
<tr>
<td>App'd by</td>
<td>Date</td>
</tr>
</tbody>
</table>

Permissible deflection: \( \delta_{adm} = 9.000 \) mm;
Total deflection: \( \delta_a = 4.248 \) mm

**PASS - Total deflection is less than permissible deflection**
### STEEL BEAM DESIGN SUMMARY

**PROJECT:**
49 PURFLEET ROAD, SOUTH OCKENDON, RM15 4DR

**PROJECT REF:**
2644

**SECTION:**
STEEL BEAM DESIGN SUMMARY

**DATE:**
Feb 21

---

**REFERENCE**
FFB.1

**SPANS**

<table>
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<th>No. OF SPAN</th>
<th>LENGTH (mm)</th>
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<tr>
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**SUPPORT CONDITIONS**

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<tr>
<th>NODE REF</th>
<th>VERTICAL</th>
<th>ROTATIONAL</th>
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<tbody>
<tr>
<td>A</td>
<td>RESTRAINED</td>
<td>FREE</td>
</tr>
<tr>
<td>B</td>
<td>RESTRAINED</td>
<td>FREE</td>
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**RESTRAINMENT CONDITIONS**

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<thead>
<tr>
<th>BS 5950-1:2000 - TABLE 13</th>
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<tbody>
<tr>
<td>1.0L + 2D</td>
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<tr>
<td>1.2L + 2D</td>
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**LOADINGS:**

**FULL UDL**

<table>
<thead>
<tr>
<th>POSITION OF LOAD FROM SUPPORT A</th>
<th>DESIGN LOADS ACTING ON ELEMENT (m)</th>
<th>UNIT LOAD (kN/m²)</th>
<th>LINE LOAD (kN/m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 mm - 5200 mm</td>
<td>DL</td>
<td>LL</td>
<td>DL</td>
</tr>
<tr>
<td>EXTENSION ROOF</td>
<td></td>
<td>5.70</td>
<td>/</td>
</tr>
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**POINT LOADS**

<table>
<thead>
<tr>
<th>POSITION OF LOAD FROM SUPPORT A</th>
<th>DESCRIPTION OF LOADS</th>
<th>REACTIONS (kN)</th>
<th>∑REACTIONS (kN)</th>
</tr>
</thead>
<tbody>
<tr>
<td>800 mm</td>
<td>TRIMMER</td>
<td>FFT.2</td>
<td>SUPPORT</td>
</tr>
<tr>
<td>1800 mm</td>
<td>TRIMMER</td>
<td>FFT.2</td>
<td>SUPPORT</td>
</tr>
<tr>
<td>3200 mm</td>
<td>TRIMMER</td>
<td>FFT.2</td>
<td>SUPPORT</td>
</tr>
<tr>
<td>4200 mm</td>
<td>TRIMMER</td>
<td>FFT.2</td>
<td>SUPPORT</td>
</tr>
</tbody>
</table>

**REACTIONS**

<table>
<thead>
<tr>
<th>REACTION</th>
<th>DEAD LOAD (kN)</th>
<th>LIVE LOAD (kN)</th>
<th>DL BENDING MOMENT (kNm)</th>
<th>LL BENDING MOMENT (kNm)</th>
<th>∑ BENDING MOMENT (kNm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RA</td>
<td>8.80</td>
<td>6.90</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>RB</td>
<td>8.60</td>
<td>6.80</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>

**PROVIDE**
152 x 152 x 37

UC
S355

---

Address: 54 Plashet Grove, Eastham, E6 1AE
Telephone: 020 8470 5355
Email: info@as-construction.co.uk
Website: www.as-structuraleng.co.uk
FFB1 STEEL BEAM ANALYSIS & DESIGN (BS5950)

STEEL BEAM ANALYSIS & DESIGN (BS5950)

In accordance with BS5950-1:2000 incorporating Corrigendum No.1

TEDDS calculation version 3.0.07

Support conditions
Support A
Vertically restrained
Rotationally free
Support B
Vertically restrained
Rotationally free

Applied loading
Beam loads
Imposed point load 0.63 kN at 4200 mm
Dead point load 1.11 kN at 4200 mm
Imposed point load 0.63 kN at 3200 mm
Dead point load 1.11 kN at 3200 mm
Imposed point load 0.63 kN at 1800 mm
Dead point load 1.11 kN at 1800 mm
Imposed full UDL 2.14 kN/m
Dead full UDL 2.14 kN/m
Dead self weight of beam * 1

Load combinations
Load combination 1
Support A
Dead * 1.40
Imposed * 1.60
Support B
Dead * 1.40
Imposed * 1.60

Analysis results
Maximum moment;
$M_{max} = 30.6$ kNm;
$M_{min} = 0$ kNm

Maximum shear;
$V_{max} = 23.3$ kN;
$V_{min} = -22.9$ kN

Deflection;
$\delta_{max} = 12.9$ mm;
$\delta_{min} = 0$ mm

Unfactored dead load reaction at support A;
$R_{A,dead} = 8.8$ kN

Unfactored imposed load reaction at support A;
$R_{A,imposed} = 23.3$ kN

Unfactored dead load reaction at support B;
$R_{B,dead} = 8.8$ kN

Unfactored imposed load reaction at support B;
$R_{B,imposed} = 22.9$ kN

Section details
Section type;
UC 152x152x37 (BS4-1)

Steel grade;
S355

From table 9: Design strength $p_y$;
Thickness of element;
$\max(T, t) = 11.5$ mm
54 Plashet Grove, Eastham, E6 1AE
Email: info@as-construction.co.uk
Web: www.as-structuraleng.co.uk

Project
49 PURFLEET ROAD, SOUTH OCKENDON, RM15 4DR

Job Ref.
2644

Sheet no./rev.
SBD 3

Calc. by
A
Date
Feb-21

Chk'd by
Date

App'd by
Date

---

Design strength;

\[ \sigma_y = 355 \text{ N/mm}^2 \]

Modulus of elasticity;

\[ E = 205000 \text{ N/mm}^2 \]

---

Lateral restraint

Span 1 has lateral restraint at supports only

Effective length factors

Effective length factor in major axis;

\[ K_x = 1.00 \]

Effective length factor in minor axis;

\[ K_y = 1.00 \]

Effective length factor for lateral-torsional buckling;

\[ K_{LT,x,y} = 1.20 + 2 \times D \]

---

Classification of cross sections - Section 3.5

\[ \varepsilon = \sqrt{275 \text{ N/mm}^2 / \sigma_y} = 0.88 \]

Internal compression parts - Table 11

Depth of section;

\[ d = 123.6 \text{ mm} \]

\[ d / t = 17.6 \times \varepsilon = 80 \times \varepsilon; \quad \text{Class 1 plastic} \]

Outstand flanges - Table 11

Width of section;

\[ b = B / 2 = 77.2 \text{ mm} \]

\[ b / T = 7.6 \times \varepsilon = 9 \times \varepsilon; \quad \text{Class 1 plastic} \]

Section is class 1 plastic

---

Shear capacity - Section 4.2.3

Design shear force;

\[ F_V = \max(\text{abs}(V_{max}), \text{abs}(V_{min})) = 23.3 \text{ kN} \]

\[ d / t < 70 \times \varepsilon \quad \text{Web does not need to be checked for shear buckling} \]

Shear area;

\[ A_v = t \times D = 1284 \text{ mm}^2 \]

Design shear resistance;

\[ P_v = 0.6 \times p_y \times A_v = 275.7 \text{ kN} \]

PASS - Design shear resistance exceeds design shear force

---

Moment capacity - Section 4.2.5

Design bending moment;

\[ M = \max(\text{abs}(M_{x,max}), \text{abs}(M_{y,max})) = 36.6 \text{ kNm} \]

Moment capacity low shear - cl.4.2.5.2;

\[ M_s = \min(p_y \times S_{xx}, 1.2 \times p_y \times D) = 109.6 \text{ kNm} \]

Effective length for lateral-torsional buckling - Section 4.3.5

\[ L_{LT} = 1.2 \times L_{s1} + 2 \times D = 6564 \text{ mm} \]

---

Slenderness ratio;

\[ \lambda = L_{LT} / r_y = 169.523 \]

Equivalent slenderness - Section 4.3.6.7

Buckling parameter;

\[ u = 0.848 \]

Torsional index;

\[ v = 1 / [1 + 0.05 \times (\lambda / x)^{2/5}] = 0.576 \]

Ratio - cl.4.3.6.9;

\[ \beta_u = 1.00 \]

Equivalent slenderness - cl.4.3.6.7;

\[ \lambda_{LT} = u \times \nu \times \lambda \times \sqrt[3]{4} = 82.828 \]

Limiting slenderness - Annex B.2.2;

\[ \lambda_{LT} = 0.4 \times (x^2 \times E / p_y)^{1/3} = 30.198 \]

\[ \lambda_{LT} > \lambda_{LT}; \quad \text{Allowance should be made for lateral-torsional buckling} \]

Bending strength - Section 4.3.6.5

Robertson constant;

\[ a_{LT} = 7.0 \]

Perry factor;

\[ q_{LT} = \max(a_{LT} \times (\lambda_{LT} - \lambda_{LT}) / 1000, 0) = 0.368 \]

Euler stress;

\[ p_e = \pi^2 \times E / (L_{LT} / 2)^2 = 294.9 \text{ N/mm}^2 \]

\[ \phi_{LT} = (p_e + (\eta_{LT} + 1) \times p_e) / 2 = 379.3 \text{ N/mm}^2 \]

Limiting slenderness - Annex B.2.1;

\[ p_e = p_x \times p_y / (x^2 \times E / p_y)^3 = 181.4 \text{ N/mm}^2 \]

---

Check vertical deflection - Section 2.5.2

Consider deflection due to dead and imposed loads

Limiting deflection;

\[ \delta_{lb} = L_{s1} / 250 = 20.8 \text{ mm} \]

Maximum deflection span 1;

\[ \delta = \max(\text{abs}(\delta_{max}), \text{abs}(\delta_{min})) = 12.897 \text{ mm} \]

PASS - Maximum deflection does not exceed deflection limit
**CONCRETE PADSTONE DESIGN**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compressive Strength of Unit</td>
<td>7N</td>
</tr>
<tr>
<td>Mortar Type</td>
<td>M4/(iii): 1:1:5 TO 6</td>
</tr>
<tr>
<td>Masonry Type</td>
<td>100mm HOLLOW BLOCK</td>
</tr>
<tr>
<td>Ultimate Load (Worse Case) ULS</td>
<td>23.3 kN</td>
</tr>
<tr>
<td>Width of Concrete Padstone</td>
<td>100 mm</td>
</tr>
<tr>
<td>Minimum Length of Padstone</td>
<td>134 mm</td>
</tr>
<tr>
<td>Length of Padstone to be Used</td>
<td>440 mm</td>
</tr>
<tr>
<td>Provide</td>
<td>440 mm x 100 x 215 mm</td>
</tr>
<tr>
<td>Concrete Padstone</td>
<td>C30</td>
</tr>
</tbody>
</table>

**Calculation:**

- **Normal Load (Worse Case) ULS = 23.3 kN**
- **Enhancement Factor = NONE**
- **Construction Control = NORMAL**
- **Unit Manufacturing Control = NORMAL**
- **Concrete Mix = C30**
- **Mortar Mix = M4/(iii): 1:1:5 TO 6**
- **Masonry Type = 100mm HOLLOW BLOCK**
- **Width of Padstone = 100 mm**
- **Minimum Length of Padstone = 134 mm**
- **Length of Padstone to be Used = 440 mm**
- **Provide = 440 mm x 100 x 215 mm**
- **Factor Load Pressure on Wall = 1.743 N/mm²**
**WORSE CASE LINTEL SPAN**

<table>
<thead>
<tr>
<th>No. OF SPAN</th>
<th>LENGTH (mm)</th>
<th>DESIGN LENGTH OF LINTEL (mm) BS 5977-1:1981 - FIGURE 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3900</td>
<td>4290</td>
</tr>
</tbody>
</table>

**FULL UDL**

<table>
<thead>
<tr>
<th>DESCRIPTION OF LOADS</th>
<th>DESIGN LOADS ACTING ON ELEMENT (m)</th>
<th>UNIT LOAD (kN/m²)</th>
<th>LINE LOAD (kN/m)</th>
<th>POINT LOAD (kN)</th>
</tr>
</thead>
<tbody>
<tr>
<td>EXTENSION ROOF</td>
<td>3.00 / 2</td>
<td>0.75</td>
<td>0.75</td>
<td>4.93</td>
</tr>
<tr>
<td>WALL BUILD-UP ABOVE</td>
<td>1.00 / 1</td>
<td>3.80</td>
<td>3.80</td>
<td>6.05</td>
</tr>
<tr>
<td>300mm BRICK - BLOCK CAVITY WALL</td>
<td></td>
<td></td>
<td></td>
<td>25.95</td>
</tr>
</tbody>
</table>

**PERMISSIBLE POINT LOAD (SLS)**

- **Design Load** (DL) = 32.00 kN
- **Service Load** (LL) = 1.13 kN

**STEEL / CONCRETE LINTEL DESIGN**

**Extra Heavy Duty**

- Standard lengths are available in 150mm increments up to 3000mm, 300mm at lengths 3000mm to 4800mm (including 4575mm, but excluding 4500mm).

**CX90/100**

- Standard lengths (mm) 900-2700, 2850-3000, 3300-3900, 4200-4800
- SWL 1:1/19:1 (kN) 60, 55, 50, 32
- Weight (kg/m) 16.9, 16.9, 20.5, 20.5
- Nominal height (h) (mm) 232, 232, 232, 232

**Provide** CATNIC STEEL LINTEL CX 90/100 or similar approved.
### WORSE CASE CHECK - SIDE EXTENSION WALL UNDER BEAM FFB.1

<table>
<thead>
<tr>
<th>DESCRIPTION OF LOADS</th>
<th>DESIGN LOADS ACTING ON ELEMENT (m)</th>
<th>UNIT LOAD (kN/m²)</th>
<th>LINE LOAD (kN/m)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>full UDL</td>
<td>DL</td>
<td>LL</td>
</tr>
<tr>
<td>Extension Roof</td>
<td>Flat Roof</td>
<td>0.40 / 2</td>
<td>0.75</td>
</tr>
<tr>
<td>Extension Wall</td>
<td>300mm Brick - Block Cavity Wall</td>
<td>3.00 / 1</td>
<td>3.80</td>
</tr>
<tr>
<td>Dispersed Point Loads (at 45° Angle)</td>
<td>Reactions (kN)</td>
<td>ΣReactions (kN)</td>
<td>Dispersed Width (m)</td>
</tr>
<tr>
<td></td>
<td>DL</td>
<td>LL</td>
<td>SDL</td>
</tr>
<tr>
<td>Beam</td>
<td>FFB.1 Support</td>
<td>RA</td>
<td>8.80</td>
</tr>
</tbody>
</table>

**Provide:**
- 600 mm wide x min. 1000 mm deep

**Strip Foundation with Concrete Grade Gen 3.**

*Depth of foundations to be approved by BC inspector on site according to the ground conditions.*

---

**REFERENCE**
- SF.1

**PROJECT:**
- 49 PURFLEET ROAD, SOUTH OCKENDON, RM15 4DR

**SECTION:**
- STRIP FOUNDATION WIDTH DESIGN SUMMARY

**DATE:**
- Feb 21
SF1 STRIP FOOTING ANALYSIS & DESIGN (BS8110)

**STRIP FOOTING ANALYSIS AND DESIGN (BS8110-1:1997)**

**SF1 STRIP FOOTING ANALYSIS & DESIGN (BS8110)**

- **Width of strip footing:** B = 600 mm
- **Depth of strip footing:** h = 850 mm
- **Depth of soil over strip footing:** hsoil = 150 mm
- **Density of concrete:** $\rho_{conc} = 23.6 \text{ kN/m}^3$
- **Load details:**
  - **Load width:** b = 300 mm
  - **Load eccentricity:** $\varepsilon_r = 150 \text{ mm}$
- **Soil details:**
  - **Density of soil:** $\rho_{soil} = 0.0 \text{ kN/m}^3$
  - **Design shear strength:** $\phi' = 25.0 \text{ deg}$
  - **Design base friction:** $\delta = 19.3 \text{ deg}$
  - **Allowable bearing pressure:** $P_{bearing} = 100 \text{ kN/m}^2$
- **Axial loading on strip footing**
  - **Dead axial load:** $P_d = 13.1 \text{ kN/m}$
  - **Imposed axial load:** $P_i = 1.4 \text{ kN/m}$
  - **Wind axial load:** $P_w = 0.0 \text{ kN/m}$
  - **Total axial load:** $P = 14.5 \text{ kN/m}$
- **Foundation loads**
  - **Dead surcharge load:** $F_{sur} = 0.0 \text{ kN/m}^2$
  - **Imposed surcharge load:** $F_{Qsur} = 0.0 \text{ kN/m}^2$
  - **Strip footing self weight:** $F_{swt} = h \times \rho_{conc} = 20.060 \text{ kN/m}^2$

**Calculate base reaction**

- **Total base reaction:**
  \[ T = F + P = 26.5 \text{ kN/m} \]
- **Eccentricity of base reaction in x:**
  \[ \varepsilon_r = (P \times \varepsilon_r + M + h \times h) / T = 82 \text{ mm} \]

**Base reaction acts within middle third of base**

**Calculate base pressures**

- **Minimum base pressure:**
  \[ q_{min} = \min(q_1, q_2) = 8.018 \text{ kN/m}^2 \]
- **Maximum base pressure:**
  \[ q_{max} = \max(q_1, q_2) = 80.268 \text{ kN/m}^2 \]

**Minimum base pressure:**

- **Total foundation load:**
  \[ F_{ext} = h_{base} \times \rho_{soil} = 0.000 \text{ kN/m}^2 \]

\[ F = F_{ext} + F_{Gsur} + F_{Qsur} + F_{swt} = 12.9 \text{ kN/m} \]

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- Structural Inspection & Site Visits
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