

GENERAL CIVIL & STRUCTURAL SPECIFICATION

572000

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May '26

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PRELIMINARY CLAUSES

1.1 NOTE ON THIS SPECIFICATION

This specification is to be read in conjunction with all other specifications produced by the Architect and other Consultants and all drawings for the project. Where an Architect is not involved on the project, then references to the Architect in this specification may be replaced with the Engineer, the Design Team Lead and/or the Clients Representative. Any conflicts between specifications should be reported immediately to the design team.

This specification is a general specification. Any clauses that are not relevant are deemed not to apply. The project to which this specification applies may have an additional PARTICULAR SPECIFICATION provided as a separate project document. Such items of particular specification should be read in the overall context of this general specification and where a conflict occurs the particular specification will take precedence over the general specification.

Project drawings produced by RKA for this project will contain specification notes. These notes should be treated as particular specification. They are produced for the full interpretation of the general specification with regard to the construction elements to which they apply.

The Contractor should take these notes into consideration as part of the project specification.

1.2 REGULATIONS, STANDARDS, CODES & PUBLICATIONS

All design, construction, materials and workmanship works are to be in accordance with the Architects and Engineers drawings and specifications as well as the current Building Regulations and Technical Guidance Documents and the standards, codes and publications to which they refer. Reference may be made to the current Homebond manual:- House Building Manual and Right on Site Technical Guidance Documents.

Where such Standards, Codes or Publications have been superseded, the most current and up to date version of the document should be used.

Where a British or Irish Standard incorporated in the Contract has been superseded by a Harmonized European Standard, or a European Standard, issued prior to the date stated in the Contract then such Harmonized European Standard or European Standard shall be substituted for the British or Irish Standard and any amendments thereto contained in the Specification.

1.3 UTILITIES

Service provider's specifications are to be read in conjunction with Engineers specification, i.e. - ESB Networks, Gas Networks Ireland, Eircom, UPC/Virgin Media, Irish Water etc. Any conflicts between specifications to be reported immediately to design team for direction.

Liaison with Utility companies with regard to the co-ordination and programming of their works will be the sole responsibility for the contractor. The Contractor shall consult all relevant Statutory Authorities, Public Utility Companies and service owners prior to commencing any excavations. The Contractor shall give the Local Authority and utility providers one month's written notice in advance for the works and not less than seven days notice for the exact start date.

Taking in-charge information to be provided by contractor and approved by relevant service provider or Client prior to any works being taken in charge. Phasing of these works is to be agreed by all parties. See relevant specifications.

All services to existing and occupied dwellings are to be maintained throughout until new services are available. Temporary routing and design is the sole responsibility for the contractor.

1.4 EXISTING CONDITIONS

1.4.1 Inspection of Site and Adjoining Properties

In advance of providing pricing for the work the contractor is required to visit the site and adjoining properties and to ascertain the nature and extent of all of the work involved, and conditions under which the Contract will be carried out. Arrangements to do so should be made with the Architect/Engineer.

1.4.2 Existing Buildings and Structures

Any drawings provided of existing buildings and structures show the assumed structural arrangement at the time of design. The contractor is required to carry out any and all investigations necessary to confirm assumptions, and to allow the safe and organized execution of the works as well as the design of temporary works.

1.4.3 Ground Conditions

Any information provided on the existing ground conditions indicates the assumed ground conditions at the time of design. The contractor is required to carry out any additional ground investigations as required by the Engineer to confirm assumptions, and permit final foundation design and detailing for construction.

1.4.4 Existing Services

Any information provided on existing services below or above the ground are for information only. The contractor should carry out detailed investigations into the location and types of services that exist on the site to allow the safe and organized execution of the works.

1.5 HEALTH & SAFETY

All design and construction works are to be carried out in a safe manner, identifying, communicating and minimizing risks, in accordance with the relevant Regulations and Acts. The contractor is to take all reasonable steps to ensure that these are also met by subcontractors. Where appropriate the Contractor is to act as PSCS in accordance with the current Health, Safety and Welfare at Work (Construction) Regulations.

Maintain on site during the course of the works an adequate amount of Personal Protective Equipment to facilitate the needs of the Engineer and other consultants who will need to visit the site. The equipment should be kept clean and in good working order and should be readily identifiable at the entry to the site.

Any changes by the Contractor (as built) must be fully notified and detailed for inclusion in the Health and Safety File.

1.6 STABILITY & TEMPORARY WORKS

The contractor is to take all necessary precautions to maintain the stability of and protect from damage all existing and new structures within and adjacent to the works, from the date of possession of the site until practical completion of the works. Do not overload completed or partially completed elements of the works.

Take all necessary precautions to prevent damage to existing buildings and structures within and adjacent to the works.

The contractor is to be responsible for the design, installation and maintenance of all necessary temporary works to comply with the above. If requested, submit details of temporary support proposals together with the proposed sequence and method of construction and supporting design calculations to the contract administrator prior to the commencement of the works. The contractor should produce Temporary Works Design Certificates for all such matters to be approved by the PSDP and the Permanent Works Designer.

1.7 SETTING OUT & TOLERANCES

All setting out is to Architect/Engineer's details.

Ensure that sufficient tolerances are provided and integrated throughout all elements of the works. Take account of tolerances detailed elsewhere in the contract documents in complying with this clause.

1.8 COORDINATION WITH ARCHITECT'S AND OTHER INFORMATION

Unless specifically detailed or specified by the Engineer, all insulation, barriers, damp proofing, cladding and linings are to be in accordance with the Architect's details.

All structural works are to be constructed so that they fully coordinate with the Architect's and other information and with the Architectural strategy. Where Engineer's information is noted not to coordinate with Architect's or information by others, bring this to the attention of the Engineer as soon as possible and at least in advance of fabrication / construction of structural elements.

1.9 PRODUCTS MATERIALS & WORKMANSHIP

All products and materials used are to be new unless otherwise specified or approved.

Provide certificates of compliance from manufacturers when requested by the Architect or Engineer. The Architect or Engineer may nominate select material samples for testing.

All construction products used shall comply with EU Construction Products Regulation (No. 305/2011 - CPR).

All materials and products are to be fit for the use for which they are intended and for the conditions in which they are to be used and are to be stored, used and installed in accordance with the manufacturer's recommendations.

1.10 GENERAL QUALITY, ROBUSTNESS & DURABILITY OF FINISHED BUILDING

Only good quality work will be acceptable unless noted otherwise.

1.11 METALS IN CONTACT WITH OR EMBEDDED IN EXTERNAL MASONRY

Only stainless steel metallic products and accessories are to be used in contact with external masonry work and the external leaf of cavity walls.

DO NOT USE GALVANISED OR MILD STEEL STRAPS, EXPANDED METAL, METAL LATH, SCREWS, ANCHORS, NAILS PLASTER STOPS, OR OTHER ACCESSORIES IN CONTACT WITH OR WITHIN THE PLASTERWORK OF EXTERNAL MASONRY WORK.

1.12 CONSTRUCTION PRODUCTS REGULATION (CPR)

As required under EU Construction Products Regulation (No 305/2011 – CPR) all construction products referred to in this specification and used in this project to which CPR Regulations apply and in particular products listed in Annexe 4 of Regulation No 305/2012. The Contractor, with regard to himself and all suppliers and subcontractors, coordinate and provide all evidence to the Engineer and Architect as follows.

Products supplied to the contract shall comply with the minimum performance levels for specific intended use as set out in the NSAI website www.nsai.ie for Irish conditions complying with harmonized European Standards.

All such products bearing this requirement shall be certified by the supplier as conforming and where appropriate shall be marked accordingly.

1.13 DISCREPANCIES / OMISSIONS

Any discrepancies or omissions identified in the drawings or the specification are to be brought to the

attention of the Architect/Engineer in advance of completing the costing and should be allowed for in the costing. The contractor shall check all drawings to ensure that they do not conflict in any respect with the information that they contain, with drawings previously supplied or with actual dimensions measured on site. Any discrepancies or omissions identified at any stage are to be immediately and directly brought to the attention of the Architect/Engineer.

1.14 CONTRACTOR'S FACILITIES

The contractor is to allow in his pricing for all temporary and permanent materials products, installations, services and facilities, whether indicated in the contract documents or not to permit the safe and organized execution of the works.

All public roads should be maintained free of dirt and mud. The contractor should use sweepers and/or wheel wash facilities or similar as required.

1.15 TESTING

Testing shall be carried out as specified in this specification and as specified in the documents this specification refers to.

SPECIFICATION FOR DEMOLITION AND TEMPORARYWORKS

2.1 GENERAL

2.1.1 Standards

The work is to be carried out to a high standard of management, and control in accordance with recommendations of the following standards and all current amendments:

BS EN 6187: Code of Practice for Demolition.

BS 5228: Noise and Vibration Control on Construction and Open Sites. BS EN 12811: Temporary Works Equipment.

Eurocode 7: Geotechnical Design

Health and Safety

The health and safety of all site operatives, visitors, users of adjoining sites, and members of the public is to be given the highest priority. The Contractor is to conform to all statutory Regulations any relevant Acts of the Oireachtais and will be obliged to exercise extreme care in the planning and executing of the various items of work.

2.2 PREPARATORY & SITE SETUP

2.2.1 Condition Survey & Monitoring

Before entering into a Contract, and before carrying out demolition works on site the Contractor is to undertake a Condition Survey of the existing buildings and structures on the site. The extent of the Condition Survey is to be agreed in advance with the Engineer and/or Architect. Condition survey material may have been assembled by the Engineer or Architect prior to tender. Such material should be assessed and taken into account by the Contractor but does not remove the requirement for the contractor to survey. The contractor is responsible for all necessary arrangements with owners/occupiers of properties involved and for coordinating with their technical representatives.

2.2.2 Hoarding

Completely enclose the site with a substantial hoarding as shown on the Architect/Engineer's drawings. The hoarding is to be left in place at the completion of the demolition works unless otherwise agreed with the Architect/Engineer.

2.2.3 Plant

The Contractor is to provide all requisite plant, scaffolding, gangways, planks, gantries, tarpaulins, hoist, etc. and any cartage, workmanship and materials which although not specifically mentioned, may be necessary for the proper protection and execution of the Works.

2.3 PROTECTION

2.3.1 Footpaths

The Contractor should keep all public footpaths adjoining the site available at all times for use by the public unless there is a permanent footway crossing in existence or a temporary footway crossing has been constructed. One such temporary footway crossing of sufficient width shall normally be permitted. The footway crossing shall be the only point at which mechanical plant or vehicles shall enter the site.

Adequate barriers and [after darkness] lamps shall be provided to warn users of the public highway of any obstruction or danger.

2.3.2 Protection

Provide all temporary and permanent hoardings, barriers, screens, scaffolds, fans, gantries, tarpaulins, guard-rails, watching, protective lighting, and the like, of a sufficient substantial nature that

may be required to protect and to prevent damage, nuisance or disturbance by debris or dust to adjoining properties, footpaths, public highways or persons or traffic passing nearby. The contractor will be held responsible for any damage, nuisance or disturbance, however caused, and will be charged for their necessary repair.

The Contractor should provide any protective provisions required by the Local Authority.

The Architect/Engineer shall have the power to require the execution of any measures he may deem necessary to safeguard property. The adequacy of such arrangements shall be the sole responsibility of the Contractor.

2.3.3 Weathering

Provide adequate temporary weathering to party walls with existing buildings by way of high-grade polythene lining fixed with timber battens. Make good roof finishes at the boundary to adjoining properties. Detail junction between roof finishes and weathering to party wall to adjoining properties to provide adequate weathering protection. The details of all weathering provisions are to be agreed in advance with the Architect/Engineer.

2.3.4 Existing Services

Any existing services servicing adjoining properties which may be connected through the site shall be established by the Contractor protected and maintained as directed by the Engineer and Utility Provider.

2.3.5 Shoring & Temporary Works

Contractors are required to inspect adjoining buildings to ascertain the nature of the construction. The Contractor shall be responsible for the design, positioning, installation and maintenance of temporary supports during all stages of the Works. Where in the opinion of the Contractor propping, shoring and tying are required they shall be designed, erected and removed in accordance with recommendations given in *BS EN 12811: Temporary Works Equipment*, as the works may warrant. The Contractor shall engage the services of a Chartered Consulting Engineer experienced in this work to design, detail and inspect all necessary temporary works to the adjoining buildings.

The Contractor shall provide, erect and maintain all necessary needles, dead and raking shores to the entire satisfaction of the Architect and Engineer as well as the Local Authority. The construction location design and efficiency of the shoring and temporary works for the purpose for which it is erected shall be the entire responsibility of the Contractor. Should any subsidence or any other damage occur due to the inefficiency of the shoring or any other support provided, the damage shall be made good by the Contractor at his own expense. Foundations to temporary work shall be adequate to support all temporary loading.

2.3.6 Transfer of Temporary and Permanent Loads

The Contractor's attention is specifically drawn to the utmost importance and necessity of transferring loads initially to temporary works and subsequently to the permanent supporting structure in such a manner whereby no damage shall be caused to the fabric of the supported structure.

The Contractor shall provide all necessary wedging and whatever is necessary to ensure a pre-load condition and the taking up of any deflection in temporary and permanent works at all stages.

2.3.7 Damage to Adjoining Properties

The works are to be carried out without damage to adjoining structures. Should such damage take place, the Contractor shall reinstate and make good the same to the satisfaction of the Architect/Engineer and the adjoining property owner. Repairs to any defects to party walls are to be agreed with the Architect and Engineer.

2.3.8 Damage to Existing Public Road, Footpaths etc.

The Contractor shall be responsible for any damage caused by himself or those under his control to existing roads, footpaths etc. and he is to keep all public roadways and footpaths clear of all obstruction and debris other than that duly permitted by the Gardaí or Local Authority.

2.3.9 Nuisance

The demolition of the property to be carried out in such a manner as to cause as little inconvenience to adjoining property owners and/or the public as possible, and the Contractor will be held responsible for any claims which may arise from disregard of this Clause.

2.3.10 Notices

Notices of adequate size and construction should be erected to warn passersby as appropriate.

2.3.11 Watering

Old materials and debris, arising from the pulling down, shall be watered at frequent intervals so as to prevent the raising of dust.

2.3.12 Measures to prevent site material from being deposited in public areas

Where site conditions make it necessary, before leaving the site, all vehicles are to be hosed down and all mud removed from tyres, and the Contractor will be responsible for ensuring that the surfaces of adjoining roads remain clean at all times during the carrying out of the Contract.

2.3.13 Explosives

No explosives are to be used unless approved in writing by the Engineer.

2.4 SITE OPERATIONS

2.4.1 Protection and Watching

Provide for all necessary watching and protection during the progress of the demolition and be responsible for any damage occasioned by lack of same. The Contractor shall also be responsible for preventing unauthorized persons from trespassing on the site.

A competent watchman is to be appointed by the Contractor and will be required to be in attendance at weekends and during hours of darkness. The whole of the cost is to be included in the Contractors tender.

2.4.2 Fires on Site

The disposal of materials and rubbish by burning on site will not be permitted under any circumstances whatever, and no fires will be permitted on site.

2.4.3 Coins, Antiquities, etc.

Any coins or antiquities found on the site are the property of the Employer and are to be handed over to the Architect/Engineer.

2.4.4 Salvaged Materials

Should the Architect/Engineer decide that parts of any buildings are of historic interest or of particular use to the Employer, these parts shall be carefully dismantled and stored in a convenient area of the site for retention by the Employer and if the Architect/Engineer deems it to be reasonable an allowance will be made for the value thereof.

2.4.5 Unauthorized Entry

The Contractor is to restrict all workmen to the site of the Works and prevent any unauthorized entry upon adjoining owner's properties through the site.

2.4.6 When Contractor is Not on Site

During the period of the contract, no wall or part of the structure shall be left in a dangerous or insecure condition at any time when a representative of the Contractor is not on site.

2.4.7 Access to Work

The Architect and Engineer, or any persons authorized by the Architect/Engineer shall, at all times, have sufficient and convenient access to the site and other places where work is being prepared for the performance of this contract.

2.4.8 Supervision of Personnel

The Contractor shall provide for giving all necessary personnel supervision during the execution of the Works and for keeping at least one good competent general foreman, approved by the Architect/Engineer, who shall be constantly on the Works with power to act in the Contractor's absence and for all purposes as his general agent.

2.4.9 Overtime & Night Work

The Contractor is to allow for the cost of Overtime or night work which may be necessary in order that the Works may be completed within limitations set out by the Local Authority and the Contract period.

2.4.10 Tradesmen

None but fully qualified, competent tradesmen shall be employed by the Contractor.

2.4.11 Carting

Provide for all carting and disposal in connection with the Works and carting away from day to day all surplus materials as they accumulate. On completion, leave the site clean and tidy and in a condition that is satisfactory to the Architect/Engineer. Location of any stock piling of demolition material on site shall be agreed with the Engineer. No surcharging of adjoining walls with demolition material shall be permitted.

2.4.12 Disposal of Materials

Disposal of all hazardous and non-hazardous general and construction and demolition waste materials should be in accordance with the *Waste Management Act 1996* and all of its amendments. Where possible comply with the recommendations of the *National Construction and Demolition Waste Council*.

EARTHWORKS

3.1 GENERAL

All works carried out under this section of the specification should be in accordance with the NRA Specification for Road Works- Series 600 Earthworks, EN1997 Geotechnical design and BS 6031 Code of Practice for Earthworks.

Make all necessary enquiries about the nature of the ground.

The Contractor shall take note of any ground investigation reports or trial hole logs carried out and provided.

Before carrying out excavation works for foundations or other structures, or where deemed necessary for excavations for any other purpose, the Contractor should excavate such exploratory trial holes as are agreed with the Engineer and provide opportunity for inspection by the Engineer.

The Contractor is to locate position and runs of all existing drains and sewers in use, which occur on or near areas to be excavated before start of excavation. These are to be protected, retained and diverted or otherwise dealt with as directed by the Architect/Engineer before the work proceeds

3.2 EXCAVATING WORKS

3.2.1 Definitions & Materials

The definition of soils and rocks shall be as described in BS 5930: Code of Practice for Site Investigations.

"Solid Rock" shall mean any rock met which is of such size or position that it can be removed only by means of wedges, compresses air or other special plant or explosives.

"Thinly Bedded Rock" shall mean stratified rock with bedding planes at not more than at 150mm intervals. "Topsoil" shall mean soil capable of supporting plant growth.

3.2.2 Topsoil Excavation

Excavate topsoil from the non-paved areas indicated to be developed for a depth of 200mm and preserve for re-use.

Stockpile excavated topsoil in temporary spoil heaps where directed. Keep separate from other materials. The maximum haul distance shall not exceed 200m.

Spread and level topsoil in open spaces, surfaces of slopes, verges, margins, central reservations as on the drawings to a minimum depth of 150mm.

3.2.3 General Excavation

The sloping sides of all cuttings shall be cleared of all rock fragments liable to cause injury or damage through falling.

The side slopes of cuttings and embankments shall be trimmed to such inclinations as are shown on the drawings or as directed by the Architect/Engineer. All slopes shall be trimmed and boulders and large stones removed and shall be soiled and sown/landscaped as specified.

To avoid deterioration of the subgrade the final 150mm of excavation to formation level shall not be

effected until the Contractor is ready to place the sub-base material on the prepared formation. The method used to effect the final excavation to formation level shall be approved by the Engineer and the Contractor shall not carry out this work in weather which would cause serious deterioration of the formation. The sub-base material should be placed and compacted immediately following final stripping. The formation shall be finally shaped and regulated to the prescribed level parallel to the finished surface level of the road and thereafter it shall not be subjected to any constructional or other traffic.

The formation shall, where directed by the Engineer, be rolled. It shall be maintained clean and free from mud and slurry. Where any damage is caused to the final formation in strength or level, the damaged area shall be excavated for an area and depth which shall be determined by the Engineer and this area shall be filled to the required levels with a broken stone of 50mm maximum size. The degree of compaction for this area shall be the same as that specified for the remainder of the formation. All this excavation and making good of damaged area shall be carried out at the expense of the Contractor. The Engineer shall determine the areas of formation exposed at any time.

Areas below formation level softened by the excavation of trial pits shall be backfilled in granular material, Type B in accordance with Clause 804 of the National Roads Authority Specification for Road Works.

Where it is required to construct land drains or cut off drains they shall be of a size and at a level and position approved by the Engineer.

Such drains shall consist of a proprietary material consisting of a double layer of 1000 g filter fabric membrane separated by a free draining central core, all to the approval of the Engineer.

To avoid deterioration of the foundation material concrete blinding grade C12/15 shall be laid and compacted immediately on excavating to formation level.

Excavate to dimensions, levels, lines and profiles shown on the drawings, or as directed.

If, in the Contractor's opinion a bearing stratum is obtained at a lesser depth than that shown on drawings, he shall inform the Engineer. If the Contractor considers that satisfactory bearing stratum is not obtained at the levels shown he shall immediately contact the Engineer and suspend excavation until approved by the Engineer.

Level and consolidate the bottoms of excavations in earth as directed. Trim bottoms of excavation in rock.

Excavate the last 75mm of earth above formation level immediately before construction is commenced.

Reinstate to formation level with approved filling surfaces of excavations which have been rendered unsuitable during the progress of the works.

Any additional excavation required to accommodate the temporary support of sides of excavations shall be provided and backfilled at the Contractor's expense

Backfill unauthorized or excess excavations with approved filling at no expense to the Employer. The use of explosives is not permitted.

3.2.4 Disposal of Water

Keep excavations free from surface water.

Keep excavations below ground water level free from ground water in accordance with the Provisional Sum.

Do not pump water from excavations into permanent drainage system. Where continuous pumping is proposed notify the Engineer.

Prevent silt from entering the permanent drainage system when disposing of water from excavation

Where temporary sumps are required construct them clear of excavations for permanent work and fill them with suitable filling when no longer required.

All land drains disturbed during the course of the excavation shall be fully recorded by the Contractor, brought to the notice of the Engineer and properly restored or diverted before construction work commences, as agreed with the Engineer.

3.2.5 Disposal of Materials

Remove surplus excavated materials and excavated materials unsuitable for filling from the site. Trees, shrubs and hedges shall only be removed as per Landscape Architects instructions or as specified on the drawings including grubbing up of roots.

All excavations shall be constructed in a manner meeting H&S requirements with regard to stability. This may involve planking and strutting or grading the embankments. Costs associated with these works are considered to be included by the Contractor at tender stage.

The owner of materials, sand, gravel or archaeological objects discovered in the course of the work shall be deemed to be the Employers.

When archaeological objects are discovered during the course of the work, stop work in the immediate vicinity of the find and inform the Architect/Engineer at once.

Divert all surface water channels and field drains, as shown on the drawings.

Notify the Architect/Engineer and the responsible authority and obtain instructions when underground services other than those shown on the drawings are encountered.

Remove disused drains encountered during excavation work.

Remove disused underground structures encountered during excavation work to 250mm below formation level.

Remove foundations encountered during excavation work.

Notify the Engineer when the excavations are ready for inspection and obtain his approval before proceeding with construction. No claims for delay arising from this requirement will be entertained provided that approval is given within 2 working days of receipt of notice.

3.3 FILLING WORK

3.3.1 Definitions & Materials

All backfill material shall comply with the provisions of S.R. 21:2014/A1:2016 and IS EN 13242:2002 + A1:2007. Testing shall be carried out by the contractor at the source of any material proposed as fill to verify the material complies with the guidance given in SR21. Written confirmation on compliance must be issued by the contractor prior to arrival of material on site.

"Granular material Type 100" shall mean 100mm single size crushed rock.

"Granular material Type B" shall be in accordance with Clause 804 of National Roads Authority Specification for Road Works. The materials shall be well graded, and lie within the grading limits set down in the National Roads Authority Specification for Road Works.

"Suitable Earth Filling" shall mean material either arising from excavation or imported which is capable of being compacted as specified.

"Unsuitable Filling Material" shall mean any of the following:

- Perishable material.
- Material from marshes or bogs
- Logs, stumps, slurry and mud.
- Material susceptible to spontaneous combustion.
- Material in a frozen condition.
- Clay or liquid limit exceeding 55 as determined in accordance with BS 1377.
- Materials with a water soluble sulphate content (as SO₄) in excess of 0.10%.
- Materials having a moisture content greater than the maximum permitted.

For cohesive soils the permitted moisture content shall be not greater than the soils plastic limit multiplied by 1.1.

3.3.2 General Filling

The contractor shall use only accepted material classes permitted in the NRA Specification for Roadworks. Testing shall be done as required to confirm material is within the acceptability limits prescribed in the NRA Specification for Roadworks.

Spread and level earth filling in 250mm loose layers.

Place fill so that water may drain freely from exposed surfaces.

Reinstate compacted fill where damaged during the progress of the Works.

Spread and level granular material Type B and Type 100 Fill in layers of not more than 150mm loose depth.

Backfill foundation trenches and isolated footings with Granular Material Type B and compact in 150mm layers.

Backfill excavations wider than required with granular material Type B in accordance with Clause 804 of the National Roads Authority Specification for Road Works without expense to the Employer.

Backfill excavations deeper than required with concrete grade C12/15 without expense to the Employer.

Backfill working space behind retaining walls with granular material type 100. Compact in 200mm layers. Compact and consolidate each layer of fill thoroughly.

Adjust the moisture content of the fill as instructed. Provide all necessary water sprinkling equipment.

Granular fill shall be compacted in layers not exceeding 150mm thick with mechanically propelled vibrating roller and in accordance with the National Roads Authority Specification for Road Works. Compact and fill by not less than twelve passes of a towed vibratory roller with a static load of at least 150kg per 25mm of roll or a grid roller with a load of at least 225kg per 25mm width of roll.

The rolling shall continue until the hardcore is thoroughly compacted and no visible movement of

hardcore occurs on the passage of the roller.

The hardcore surface shall be finally blinded with limestone dust all to the satisfaction of the Engineer. The compaction and hardcore filling over a land drainage system differs from the general hardcore to formation levels and all care should be taken to avoid damage to ground pipe work.

The Contractor shall check all final hardcore levels and make good any pot holes, ruts, undulations, irregularities, depressions, subsidence's, loose material, standing water and other defects.

Levels of existing hardcore shall be adjusted where necessary to suit finished levels. Any making up of levels shall be carried out in material type 'B'. The surface shall be compacted and fully blinded to the required levels.

FOUNDATIONS & GROUND SUPPORTED STRUCTURES

4.1 STRIP & PAD FOUNDATIONS

Formation level of foundations to be agreed with the Engineer on site. Make advance arrangements for inspection of formations with the Engineer and Architect allowing a minimum notice of one week.

Unless agreed otherwise with the Engineer, to avoid the possibility of softening, all foundation material is to be blinded with 50mm lean concrete immediately on opening up.

Where it is agreed with the Engineer that lean concrete is not required, the concrete foundation depth is to be increased to provide a minimum cover of 75mm to all reinforcement.

Where the formation level is to be lower than the underside of the footing, provide lean concrete between the formation level and the underside of the footings. The contractor shall not excavate below the underside of the footing without prior written instruction from the Engineer.

Unless noted otherwise and provided for on drawings or particular specifications, all concrete strip and pad footings are to be reinforced with A393 steel mesh fabric to the bottom of the footing. Minimum cover to mesh to be 75mm. Minimum mesh laps to be 500mm.

4.1.1 GROUND BEARING CONCRETE FLOOR SLAB

Insulation, barriers and barrier protection are to be in accordance with the Architect/Engineer's details.

Concrete surface finish and regularity is to be agreed in advance with the Architect/Engineer.

Joint details and layout are to be as shown on the Architect/Engineer's drawings or as agreed in advance with the Engineer and Architect.

Drying time for concrete slabs and screeds are to be incorporated into the construction programme.

Only use proprietary reinforcement support systems. Do not use bricks, blocks or other permeable means of supporting reinforcement.

Unless noted otherwise, ground bearing concrete floors are to be as follows:

150mm thick reinforced concrete slab, reinforced with A252 square mesh fabric with appropriate cover on the bottom of the slab. Minimum lap to mesh sheets to be 400mm. Stagger laps to mesh sheets to minimize lap thickness. Refer to Concrete Works section of specification for concrete grade. Provide a minimum of 200mm clause 804 hardcore as a sub-base, compacted in two layers below the ground bearing concrete floor slab, incorporating insulation, barriers and barrier protection as detailed by the Architect/Engineer.

Prepare and compact the subgrade in advance of laying the hardcore sub-base.

The layout of joints in concrete slabs shall be as shown on Engineers Drawings. Joints shall be saw cut within 24 hours of pouring the concrete.

Sawn joints shall be filled with a material as described on drawing notes or on Particular Specifications.

The concrete pouring sequence shall be agreed with the Engineer prior to commencement and movement joints shall be constructed in accordance with the Engineers detail on project drawings.

STRUCTURAL CONCRETE

5.1 GENERAL

All concrete works are to be in accordance with the following codes standards and publications except where amended by this specification:

5.1.1 Design of concrete structures

In accordance with Eurocode 2, IS EN 1992, all parts, including Irish National Annex.

5.1.2 Specification, performance, production and conformity

In accordance with IS EN 206 Part 1 including Irish National Annex.

5.1.3 Execution of concrete structures

To be in accordance with the most recent edition of the NATIONAL STRUCTURAL CONCRETE SPECIFICATION FOR BUILDING CONSTRUCTION (NSCS)

To be in accordance with IS EN 13670, Execution of concrete structures, except where detailed differently by this specification of the Engineer's drawings.

5.1.4 Basement wall construction

To be in accordance with BS EN 8102 Code of practice for protection of below ground structures against water from the ground.

5.2 MATERIALS

5.2.1 Reinforcement

To conform with BS EN 10080 Steel for the reinforcement of concrete. Weldable reinforcing steel, used in conjunction with BS 4449, BS 4482 and BS 4483.

The Contractor shall provide at his own expense all "chairs" etc. and any other reinforcement supports not shown on the drawings.

5.2.2 Spacers

Use only proprietary fibre-cement spacers as necessary to support reinforcement in position. Do not use plastic or other spacers unless approved by the Engineer.

5.3 FORMWORK

To be in accordance with the NSCS.

5.4 FINISHES

To be in accordance with the NSCS.

5.4.1 Formed Finishes

To be in accordance with NSCS as follows:

Basic finish requires compliance with all relevant clauses of NSCS.

Type A finish is as defined by BS 8110: Part 1: 1997, Clause 6.2.7.3 Type A. The resulting finish shall be similar to the regional Reference Panels (NSCS).

Type B finish is as defined by BS 8110: Part 1: 1997, Clause 6.2.7.3 Type B. The resulting finish shall be similar to the regional Reference Panel (NSCS).

Type C finish shall be as specified in NSCS Part 2.

Unless a finish is specified, Type A shall be provided.

5.4.2 Unformed finishes

To be in accordance with NSCS as follows:

Type U1 finish. The concrete shall be leveled to produce a closed uniform surface. No further work shall be carried out.

Type U2 finish shall be produced by floating, or a similar process, to produce a level, uniform surface.

Type U3 finish shall be produced by toweling, or a similar process, to produce a dense, smooth surface.

Type(s) U4 finish shall be produced by further working of either U1, U2 or U3 type of finish, as specified in NSCS Part 2.

Unless a finish is specified Type U1 shall be provided.

5.4.3 Kickers

Do not use kickers.

5.5 FIXING

Place and fix securely all reinforcement in the positions indicated on the drawings. Support top reinforcement in slabs at not more than 1 metre centres. Fix cover spacers to maintain the specified concrete cover except where other methods are required.

Do not without approval, form laps in reinforcement other than those shown on the drawings and as determined from rebar schedules.

Fix reinforcement adequately with tying wire or proprietary fixings.

No metal part of any device for fixing reinforcement shall remain within the concrete provided for cover to reinforcement.

5.6 PLACING, COMPACTING & CURING

To be in accordance with the NSCS.

5.7 TOLERANCES FOR FINISHED WORK

To be in accordance with the NSCS.

5.8 CONFORMITY CUBE TESTING

A project specific testing regime shall be provided in the particular specification. In default of this, 7 day and 28 day cubes shall be taken at the rate of 1 cube pair per 8m³ for the first 25m³ and thereafter for each 25m³ of concrete placed. For pours less than 8m³, one pair of cubes shall be taken.

Concrete cubes shall be tested by an approved laboratory and the results presented to the Engineer immediately after testing.

5.9 CONCRETING IN ADVERSE WEATHER

In normal circumstances do not pour if the thermometer while the air temperature is below 2 degrees C on a rising thermometer or below 5 degrees C on a falling thermometer.

Do not pour concrete onto freezing ground.

5.10 DESIGN MIXES

Designed Mixes in accordance with the relevant clauses of IS EN 206-1 shall be in accordance with the following schedule:

1. Mix reference	A RC below ground level	B external RC	C internal RC columns	D general internal RC	E infill concrete & screeds	F underpinning concrete	G lean concrete
2. Strength class	C32/40	C40/50	C32/40	C30/37	C30/37	C30/37	C12/15
3. Nominal max. aggregate size	20	20	20	20	10	20	20
4. Types of aggregate	IS EN 12620	IS EN 12620	IS EN 12620	IS EN 12620	IS EN 12620	IS EN 12620	IS EN 12620
5. Sulphate class	XA 1	XA 1	XA 1	XA 1	XA 1	XA 1	XA 1
6. Cement type	CEM I N	CEM I N	CEM I N	CEM I N	CEM I N	CEM I N	CEM I N
7. Exposure Class	XC2, XA1	XF3	XC3	XC3	XC3	XC2, XA1	XC2, XA1
8. Chloride class	Cl 0.40	Cl 0.40	Cl 0.40	Cl 0.40	Cl 0.40	Cl 0.40	Cl 0.40
9. Min. cement content kg/m ³	325	325	325	280	280	300	-
10. Max. free water/cement ratio	0.55	0.55	0.55	0.55	0.55	0.55	-
11. Quality assurance requirements	In accordan ce with IS EN 206-1	In accordance with IS EN 206-1	In accordance with IS EN 206-1	In accordance with IS EN 206-1	In accordance with IS EN 206-1	In accordance with IS EN 206-1	In accordan ce with IS EN 206-1
12. Rate of sampling intended by the purchaser for strength testing	To be agreed with the Engineer	To be agreed with the Engineer	To be agreed with the Engineer	To be agreed with the Engineer	To be agreed with the Engineer	To be agreed with the Engineer	To be agreed with the Engineer
13. Other requirements	None	None	None	None	None	None	None
14. Usage	All RC below ground level unless otherwise noted. Ground beams and retaining walls.	All external RC elements, external R.C. walls, columns, beams with exposed corbels, cills, stairs, ramps, slabs, footpaths etc.	All internal columns.	General structure as specified unless noted otherwise on the drawings.	Infill concrete to internal reinforced blockwork. Structural screeds. Concrete bearing pads.	Underpinnin g concrete.	Making up levels under foundatio ns and concrete blinding.

Mix designs shall be submitted for approval at the commencement of the contract. It shall not be permitted to add water on site.

The ratio of aggregate to cement for no fines concrete shall be 8 to 1.

MASONRYWORK

6.1 GENERAL

All masonry work is to conform with:

Technical Guidance Document A, Structure, of the Building Regulations

IS EN 1996 Eurocode 6 (& Irish National Annex): Design of masonry structures.

IS 325: Code of practice for use of masonry.

IS EN 771: Specification for masonry units.

IS EN 772: Methods of test for masonry units.

I.S. EN 845 Specification for ancillary components for masonry

I.S. EN 998 Specification for mortar for masonry

Masonry work detailing, general damp proofing, DPC's, cavity trays, weep holes, cavity closers, insulation, fire stops, sills, copings, dressings, etc. to be as detailed by the Architect/Engineer.

6.2 MASONRY UNITS

6.2.1 General

Unless noted otherwise all structural masonry units to be Category 1 in accordance with IS EN 771 and tested to conform with IS EN 772.

Samples of masonry units are to be sourced for the Architect/Engineer for review. Samples to be kept on site for reference. Sample products of masonry shall be constructed as directed and the acceptable quality shall be determined in relation to this. Required quality shall be maintained throughout the course of the works.

Following guidance note in November 2022 the ACEI Structures Committee recommends the following for blockwork with a high risk of saturation and freezing:

- Blocks used below or near external ground level and in external walls should have a declared mean compressive strength $\geq 13 \text{ N/mm}^2$
- Concrete blocks should be Category 1 masonry units of approved manufacture to I.S. EN 771-3. Solid blocks for all rising walls and external walls, both the inner and outer leaves, should be Group 1 masonry units and should have a declared mean compressive strength of $\geq 13 \text{ N/mm}^2$, tested in accordance with I.S. EN 772-1.
- Refer to Table 14 of S.R. 325 for mortar strength class to meet specific durability requirements. Mortar of a higher strength class than M4, [1: 1: 5 to 6] will frequently be required. (e.g. Mortar of Compressive Strength Class M12, [1: 1 : 3 to 4] should be used in conjunction with concrete blocks of declared mean Compressive Strength of $\geq 13 \text{ N/mm}^2$ where there is a high risk of saturation and freezing for work below or near external ground level.)

Solid blocks for internal walls below or near ground level should also be Group 1 masonry units and should have a declared mean compressive strength of $\geq 13 \text{ N/mm}^2$ unless the Contractor can provide documentary evidence of a control system that will ensure that mixing of blocks of different strengths cannot occur, in which case blocks with a declared mean compressive strength of $\geq 7.5 \text{ N/mm}^2$ would be acceptable.

6.2.2 Clay Masonry Units

As specified by the Architect/Engineer.

6.2.3 Calcium Silicate Masonry Units

As specified by the Architect/Engineer.

6.2.4 Concrete Blocks (aggregate concrete masonry units of dense and lightweight aggregates)

Unless noted otherwise, strength of concrete blockwork to be as follows:

Use	Type	IS325 strength	EN 772 strength (normalized)	Size
General structural blockwork*	Dense Aggregate Concrete Blockwork, solid	7.5N	10N/mm ²	440x10x215 LxWxH
Blockwork to lift shafts	Dense Aggregate Concrete Blockwork, solid	13N	20N/mm ²	440x10x215 LxWxH

*See 6.2.1 for blockwork below or near ground level.

6.2.5 Autoclaved aerated concrete masonry units

Where autoclaved aerated concrete blocks are used in combination with dense concrete blocks within structural masonrywork the autoclaved aerated concrete blocks should have an equal or higher strength classification to the dense concrete blockwork units.

6.2.6 Manufactured Stone Masonry Units

As specified by the Architect/Engineer.

6.2.7 Natural Stone Masonry Units

As specified by the Architect/Engineer.

6.3 MASONRY ACCESSORIES

6.3.1 Cavity Wall Ties

Unless noted otherwise wall ties to be as detailed in Technical Guidance Document A, Structure of the Building Regulations.

6.3.2 Lintels

Proprietary lintels should meet the requirements of IS EN 845-2: Specification for ancillary components for masonry: Lintels.

Precast prestressed lintels should be designed / chosen by the contractor to meet the Architect/Engineer's requirements and for the actions and spans occurring where they are employed and should be installed strictly in accordance with the manufacturers' instructions. The Contractor shall advise the Engineer of how compliance with this requirement is achieved, with relevant reference material. For special proprietary lintels other than concrete lintels the Engineer shall provide loading detail to the contractor and the contractor shall coordinate with the specialist supplier of the proprietary product and advise the Engineer with all relevant reference material. Lintel material / manufacturer / product, or other specific requirements to be in accordance with the Architect/Engineer's details.

Lintels should be solidly built-in at supports with a minimum of 150mm end bearing for spans up to 1.5m or 200mm, or higher where specified, for spans over 1.5m. Lintels to be propped until mortar has set if required by the manufacturer and usage circumstances.

For all lintels ensure that they are installed the correct way up (camber upwards for prestressed concrete lintels).

6.3.3 Masonry Support Systems

Masonry support angles are specified on the drawings. The stainless steel is to be Grade 304 or better. Where the soffit of the angle is to be rendered, the angle shall have stainless steel riblath welded to it to provide a key for the render. The Contractor may propose an alternative subject to the Architects and Engineers approval. Any alternative should be demonstrated to be of the same quality,

standard and load carrying capacity.

6.3.4 Bed Joint Reinforcement

Bed joint reinforcement is to be in accordance with IS EN 845-3, *Specification for ancillary components for masonry, Bed joint reinforcement of steel meshwork*.

Flexible stainless steel mesh crack control bed joint reinforcement is to be provided: as shown on the Engineer's drawings and two layers above and below all openings in all masonry leaves extending a minimum of 600mm horizontally beyond the vertical reveals of the openings. Crack control bed joint reinforcement mesh is to be installed as above and in accordance with the manufacturer's recommendations. Longitudinal wires to have a min 1.25mm diameter, cross wires - 0.65mm diameter with 4 no main wires per 100mm wide masonry leaf.

Rigid stainless steel structural bed joint reinforcement is to be provided as shown on the Engineer's drawings and in accordance with the manufacturer's recommendations. Main bars to be of a flattened profile, with an equivalent diameter to suit design requirements, with a minimum characteristic tensile strength of 500 N/mm².

6.4 CEMENT MORTAR

6.4.1 Sand

Sand for general purpose cement mortars shall comply with IS EN 13139 and shall be stored on a hard self-drained area.

6.4.2 Hydrated Lime

Hydrated lime shall comply with IS 8 and shall be stored under weather-proof conditions on a raised floor or in suitable silos.

6.4.3 Normal Portland Cement

Normal Portland Cement (NPC) shall either be certified as complying with IS EN 197 and shall bear the IS EN Mark or shall be certified to a national standard of another Member State of the European Union which provides an equivalent guarantee of safety and suitability – certification to be by the National Standards Authority of Ireland.

Cement shall be delivered in unbroken bags as dispatched by the manufacturer or in approved bulk cement delivery vehicles and stored under weatherproof conditions on a raised floor or in suitable silos. Air set cement must not be used.

6.4.4 Ready Mixed Sand-Lime

Ready mixed sand-lime mortar shall comply with IS EN 998 and shall be stored on a clean impermeable surface under weatherproof conditions. Prolonged storage before use shall be avoided.

6.4.5 Plasticizer

Plasticizer shall comply with IS EN 934.

6.4.6 Pigment

Do not use pigment unless specifically agreed with the Architect and/or Engineer.

6.4.7 Calcium Chloride

Calcium chloride is not permitted.

6.4.8 Water

The water to be used in the mix shall be clean and free from harmful matter. The source of water supply must be approved by the Engineer's Representative where the supply is not obtained from a public mains supply.

6.4.9 Use of Mortar

Mortar containing cement shall be used within two hours of adding water to the cement.

6.4.10 Mixing Generally

Mortar shall be mixed sufficiently to incorporate all the constituents of the mix. Where machine mixing is used, the mixer shall be cleaned before starting to mix and before changing the mix or mortar type. Where mortar is mixed by hand it shall be mixed on a hard clean platform.

6.4.11 Mortar Mix Proportions

Type Blockwork Cement:Lime:Sand 1:1:5 to 6

Masonry Cement:Sand 1:4 to 5 Cement:Sand:Plasticiser 1:5 to 6 (for dry materials)

6.4.12 Measuring and Adding Water

Measure into a suitable container and do not add more to the mix than necessary to produce mortar of desirable work ability.

6.4.13 Source of Supply

Obtain ready mixed lime : sand from a reputable supplier to B.S. 4721. Obtain dated certificates from supplier, verifying compliance with B.S.4721.

6.4.14 Mixed Retarded Mortar

As above. Do not remix.

6.4.15 Testing

I.S. EN 1015-11 'Methods of test for mortar for masonry – Part 11: Determination of flexural and compressive strength of hardened mortar'.

Pre-mixed mortars to I.S. EN 998-1 & 2 'Specification for mortar for masonry – Part 1: Rendering and plastering mortar & Part 2: Masonry mortar', under a registered Quality Management System to I.S. EN ISO 9001.

6.5 STORING & HANDLING OF MATERIALS & COMPONENTS

To be in accordance with the manufacturer's recommendations.

6.5.1 General

Stack on dry level surface in a manner that provides free air circulation. Prevent contact with site surface material. Protect from rain.

6.5.2 Sand and Cement

Store bulk sand in clean and sufficient silo.

Store dry cement as follows:

In a dry and weatherproof building on a raised floor.

Each type of cement to be stacked separately.

Cover each stack with polythene in close contact and mark with date of delivery.

Do not store on site for more than 4 weeks.

6.5.3 Lime

Store as for cement.

6.6 WORKMANSHIP

6.6.1 Form, Thicknesses and Setting Out

Masonry is to be constructed to the form and dimensions as shown on the Architect/Engineer's drawings. The contractor is to review the Architect's and Engineer's drawings and specifications in detail and is to draw any differences to the attention of the Architect/Engineer well in advance in order to allow the Architect/Engineer adequate time to address the differences.

6.6.2 Bonding

Bonding to be agreed with the Architect/Engineer and arranged to ensure that broken or irregular bond is kept to a minimum. Employ stretcher bond for structural blockwork where blockwork will be hidden behind finishes in the completed building.

6.6.3 Mortar Joints

Masonry units shall be laid on a full bed of mortar and with bed and vertical joints fully filled to a consistent thickness. PARTIAL FILLING OF JOINTS WILL NOT BE ACCEPTED.

Joint thickness to be 10mm throughout unless specifically agreed with the Architect/Engineer.

Joints to be finished flush for structural blockwork to be hidden behind finishes in the completed building.

For fair faced blockwork agree the joint finish with the Architect.

Prevent mortar from spreading onto facing. Joint the work as soon as mortar has stiffened sufficiently. Finished joints are to be consistent in thickness and appearance throughout.

6.6.4 Faced Work

Faced work is to be of the highest quality work.

6.6.5 Cleanliness

Keep all facework clean. Where mortar removal is required, allow to dry before removing with stiff bristled brush. Rubbing to remove marks and stains is not permitted.

Cavity base and faces, ties, insulation and DPC's are to be kept free from mortar and debris.

6.6.6 Vertical Joints with Concrete

All vertical joints between masonry and structural concrete to be provided with 25 x 2.5 x 150mm (min.) proprietary stainless steel channel cast integral with the concrete and with ties at max. 450 centres vertically.

6.6.7 Movement / Control Joints

Movement / control joints to be 10mm wide. Filling / sealing / coverings to be as specified by the Architect/Engineer.

6.6.8 Cutting and Fitting of Units

Masonry units should be cut and fitted neatly to the line and profile of parts of the structure which the walling abuts or surrounds. Minimize cutting by use of standard special blocks.

6.6.9 Top of Partitions

Gaps to be filled with suitable compressible fire resistant mortar.

6.6.10 Ducts, Channels and Openings

Ducts, channels and openings in walling should be formed as the work proceeds.

6.6.11 Stability of Blockwork

The stability of masonry panels is to be maintained by the contractor during erection. Abutting panels are to be fully bonded together as indicated on the drawings to provide stability.

6.6.12 Cutting into Masonry

- a) Delay cutting until mortar has hardened.
- b) Cutting should result in only min. vibration.
- c) Vertical chases formed after construction of masonry should not be deeper than 30mm.

- d) Horizontal or inclined chases should comply with the National Annex to IS EN 1996-1-1.
- e) Do not locate chases back to back.

Chases should not be wider than the guidance given in the National Annex to IS EN 1996-1-1.

6.6.13 Adverse Weather

General: Do not use frozen materials or lay on frozen surfaces.

Air temperature requirements: Do not lay bricks/ blocks:

- In cement gauged mortars when at or below 3°C and falling or unless it is at least 1°C and rising.
- In hydraulic lime: sand mortars when at or below 5°C and falling or below 3°C and rising.
- In thin joint mortar glue when outside the limits set by the mortar manufacturer.

Temperature of walling during curing: Above freezing until hardened.

Newly erected walling: Protect at all times from:

- Rain and snow.
- Drying out too rapidly in hot conditions and in drying winds.

6.6.14 Protecting Masonry

Each lift of facing masonry including the top surfaces shall be kept dry until the commencement of the next lift or other superimposed work.

6.6.15 Efflorescence

Reduce risk of efflorescence by keeping masonry as dry as possible.

6.6.16 Tolerances

The permissible deviation for masonry shall be as follows:

Level: For any nominally horizontal surface when measured from the nearest reference line: +/- 10mm.

Position on Plan: For the position of any nominally vertical surface at the lower edge when measured horizontally from the nearest reference line: +/- 10mm.

Plumbness: The permissible deviation from plumb of the upper and lower edges of any nominally vertical surface shall be : 5mm in any 1M but not more than 10mm in any storey height.

Thickness: The permissible deviation for the thickness of blockwork measured from the nominally vertical surface where the blockwork is more than one block thick shall be: +/- 5mm.

Straightness The permissible deviation from straightness, measured horizontally, shall be + 10mm.

STRUCTURAL STEELWORK

7.1 GENERAL

All structural steelwork is to be fabricated and erected in accordance with the current edition (at time of valuing the work) of the *National Structural Steelwork Specification for Building Construction* published by the *British Constructional Steelwork Association Limited*, hereafter referred to as the *NSSS*.

7.2 MATERIALS

All materials including steelwork, fasteners, welding consumables, protective treatments, material testing and dimensions and tolerances to be in accordance with requirements of *Section 2* of *NSSS*.

Steelwork to be grade S275 or grade S355 only, as referred to on the Engineer's drawings.

7.3 INFORMATION TO BE PROVIDED BY THE STEELWORK CONTRACTOR

All information is to be provided by the steelwork contractor in accordance with *Section 3* of *NSSS*.

Two copies each of the following information is to be provided to the Structural Engineer and the Architect(if applicable) for review:

- General Arrangement Drawings as defined in *Section 3.2.2* of *NSSS*.
- Connection Design Calculations.
- Fabrication Drawings.
- Erection method statement and Erection Drawings where these have been necessarily completed].
- Temporary Steelwork Drawings where these have been necessarily completed.
- Erection Programme.
- Welder's Proficiency Certificates.
- Method Statements for Protective Treatments.

A period of three weeks is to be allowed for review of the information by the Engineer and no fabrication is to commence within this period.

The approval or otherwise of information by the Engineer does not relieve the Steelwork Contractor of the responsibility for any errors in his information.

7.4 'AS ERECTED' STRUCTURE

On completion of the contract the Steelwork Contractor shall provide the Employer with one paper and one PDF set of "As Erected" drawings comprising:

- General Arrangement Drawings
- Fabrication Drawings
- Connection calculations or references to standard connections
- Drawings made after fabrication showing revisions
- The drawing register.

7.5 WORKMANSHIP

Workmanship to be in accordance with the following sections of *NSSS*.

- *Section 4 - General*
- *Section 5 - Welding*
- *Section 6 - Bolting*
- *Section 7 – Accuracy of Fabrication*

- Section 8 - Erection
- Section 9 – Accuracy of Erected Steelwork

7.6 PROTECTIVE TREATMENTS

Protective Treatments to be in accordance with NSSS.

All steelwork coatings are to be protected from damage at all stages. Any damage is to be made good to give a level of corrosion protection equal to the coating system.

Protective treatments to be as follows:

7.6.1 Coating System 1: Internal Steelwork

Blast Clean the surface to a standard equal to Sa 2½ of Swedish Standard SIS 05 5900. Apply one coat epoxy zinc phosphate epoxy primer, 20 microns thick, Fabricate steelwork.

After fabrication, carefully remove all weld flux and spatter, rough edges, etc. by scraping, chipping and grinding to a smooth surface. Remove any unsound 'scorched' primer around weld areas and also, remove all dust, dirt, grease etc. (wash with white spirit where necessary) then spot-prime all bare metal with zinc phosphate primer, 25 microns thick and allow to dry overnight.

Apply one coat epoxy zinc phosphate epoxy primer, 60 microns thick.

Site coatings: as specified by the Architect/Engineer.

7.6.2 Coating System 2: External Steelwork

Blast Clean the surface to a standard equal to Sa 2½ of Swedish Standard SIS 05 5900. Apply one coat epoxy zinc phosphate epoxy primer, 20 microns thick, Fabricate steelwork.

After fabrication, carefully remove all weld flux and spatter, rough edges, etc. by scraping, chipping and grinding to a smooth surface. Remove any unsound 'scorched' primer around weld areas and also, remove all dust, dirt, grease etc. (wash with white spirit where necessary) then spot-prime all bare metal with zinc phosphate primer, 25 microns thick and allow to dry overnight.

Apply one coat epoxy zinc phosphate epoxy primer, 60 microns thick. Apply one coat of high build epoxy micaceous iron oxide, 100 microns.

Site coatings: as specified by the Architect/Engineer.

7.6.3 Coating System 3: Galvanizing

Preparation:

Remove any grease, oil, dirt and other foreign matter by solvent cleaning steam cleaning or high pressure water hosing followed by clean water rinsing.

Remove mill scale and rust by acid pickling.

Remove any paintwork which remains on the surface of the steel by blast cleaning the surface to a standard equal to Sa 2½ of Swedish Standard SIS 05 5900.

NOTE: The use of steelwork with paint on its surface is to be agreed in advance with the Architect/Engineer along with any cost implications for removing paintwork.

7.6.4 Galvanizing:

Galvanizing shall be carried out after fabrication and preparation in accordance with B.S. 729.

Minimum average coating thickness shall be 85µm (610g/m²) unless specified otherwise. Agree all

necessary vent and drain holes in advance with the Architect/Engineer. Submit proposals for locations of vent and drain holes and method of sealing to the Architect/Engineer before galvanizing.

Protection:

Adequately protect galvanized steelwork to avoid damage. Damaged members to be rejected.

7.6.5 Additional Coatings to Galvanized Steelwork:

To be as specified by the Architect/Engineer.

Preparation of galvanized steelwork for painting to be as follows:

Degrease and abrade using white spirit as a lubricant for the abrade (e.g. course nylon pad or similar).

Hose down to remove all debris and dust and allow to dry.

Brush apply British Rail "T Wash" and leave for 15-20 minutes to allow to react. "T Wash" to comprise by weight:

9% of phosphoric acid (d = 1.70)

16.5% ethyl cellusolve

16.5% methylated spirit

57% water.

1% copper carbonate

Hose down to remove all excess solution.

All areas successfully treated will have turned black. Re-treat all other areas as (a) to (c) above.

7.7 FIRE RESISTANT COATINGS

Structural steelwork which is to receive intumescent coating to provide specific fire resistance shall be clearly indicated in the project drawings and/or particular specifications.

The Contractor shall cross reference this with the Fire Cert Documentation drawings and ensure consistency.

The Contractor shall engage specialist applicators for the provision of all Intumescent Coatings.

The Contractor shall plan within his sequence of operations for the application of the Intumescent Coatings.

The Contractor shall agree his proposal for this work with the Engineer or Architect as appropriate.

The proposal shall take account of the limitations on exposure of the material before degradation.

On conclusion the Contractor shall provide certification to the Engineer or Architect as appropriate that the Intumescent Coating achieves the requirement of the specified protection period.

STRUCTURAL TIMBERWORK

8.1 NEW STRUCTURAL TIMBERWORK

General

This section of the specification relates to general structural timberwork for roof structures, floor and ceiling structures, loadbearing walls, partitions and other primarily load carrying applications where the Engineer has a design and/or specification responsibility. For other timberwork in the works refer to the Architect/Engineers details. The Contractor should also ensure that the timberwork is in compliance with guidance in Part A of the Building Regulations.

8.2 STRENGTH CLASSIFICATION

New softwood timber is to be selected structural timber free from wane and shakes and not inferior to strength class C16 to Eurocode 5.

Structural timberwork is to be strength graded and stamped to the requirements of IS 127 and IS EN 14081, with the NSAI logo. Strength grading is only to be carried out by companies on the NSAI Visual Strength Grading (VSG) and Machine Strength Grading (MSG) Schemes.

8.3 PRESERVATIVE TREATMENT

Preservative treatment to be as follows:

Internal partitions Internal first and upper floor joists Internal stairs	No preservative treatment required.
All pitched and flat roof timberwork External timber battens and cladding. External timber framed walls. Timber soleplates and wallplates. Load-bearing external joinery (balconies)	Preservative treatment to EN 599.

8.4 MOISTURE CONTENT

The moisture content of the timber at time of fixing to be 16% plus or minus 2%.

8.5 FIXINGS, STRAPPING, ADHESIVES AND ACCESSORIES

Steel washers to timber shall be extra large type.

Nails shall comply with IS 105 and where not specified, shall be of a suitable size and type. Screws shall comply with BS 1210.

Black hexagon bolts, screws and nuts shall comply with BS 4190 and EN 20898 Part 1. Steel washers shall be Extra Large and comply with BS 4320.

Expanding bolts and nuts shall be of an approved type.

Cup head square neck coach bolts shall comply with BS 4933. Square head coach screws shall comply with BS 1494: Part 2.

Metal timber connectors shall comply with IS EN 192 and shall be hot-dipped galvanized to EN 1461 unless specified otherwise.

Metal restraint straps shall be mild steel galvanized to EN 1461 minimum size 30mm x 5 mm unless noted otherwise on the drawings.

Synthetic resin adhesive shall comply with BS 1204: Part 1, Type: WBP, and shall be compatible with

any preservative treatment to be applied.

8.6 QUALITY CONTROL

All dimensions and levels shall be checked on site before timber lengths are cut.

All timber shall be ordered on commencement of the Contract and shall as far as possible be selected from the same batch.

The timber shall be well cut and free from warp or other deformation and from signs of rot, work, beetle and other infestations and shall not contain large and loose or dead knot shakes, splits or twisted grain. All to be sawn die square and finished to the sizes specified on the drawings.

Timber which is in the opinion of the Engineer or Architect to be inferior in character and condition or is not suitable for the requirements of the work because of the blemishes it contains shall not be used.

All timbers shall be to the Engineers and Architects approval and shall be representative of the best selected quality of the species involved.

If requested, arrangements shall be made for an inspection of all timber by the Engineer and Architect before purchase.

The Engineer and Architect shall be at liberty to select any samples required for testing.

Timber and timber components shall be properly stacked above hard, cleared ground and be protected by a waterproof material while being allowed adequate ventilation.

8.7 INTERACTION OF TIMBER STRUCTURES WITH OTHER ELEMENTS

Provide lateral support restraint strapping, nogging, blocking etc. in accordance with Technical Guidance Document A of the Building Regulations.

8.8 NOTCHING & DRILLING

Notching and drilling of joists to be kept to an absolute minimum and to be in accordance with guidelines detailed in the Homebond manual. At metal joist hangers notch depth to be no greater than metal thickness (i.e. the hanger finishes flush with the timber).

The Contractor shall submit the comprehensive overall proposal for the notching or drilling of timber members in any structural panel for the consideration of the Engineer, having coordinated this information with the services consultants and contractors and having taken account of the allowances for notching and drilling as per Building Regulations, T.G.D.A.

The Engineer will provide approval where the submission is acceptable, or otherwise on measures for further consideration.

8.9 JOINTS

Faces of joints shall be square and driven together to give a close accurate fit. Joints and fixings shall be as shown on the Engineer's drawings or where not shown shall be designed and fixed in accordance with Eurocode 5 and shall be to the Engineers and Architects approval.

8.10 BEARINGS

Only use proprietary joist hangers where timber members require support at external walls:- DO NOT BUILD JOISTS INTO THE INTERNAL LEAF OF EXTERNAL CAVITY WALLS

Where joists, trimmers, etc. do not have direct-bearing support, approved galvanized steel hangers shall be used in accordance with the manufacturer's recommendations.

8.11 PREFABRICATED TRUSSED RAFTER ROOFS

8.11.1 Design & Responsibilities

Prefabricated Trussed Rafter Roofs and their bracing are to be designed, fabricated and installed to comply with Eurocode 1 Actions on Structures, Eurocode 5 Design of Timber Structures, IS 193 Timber Trussed Rafters for Roofs, and the Architect's and Engineer's drawings and specifications. Materials, fabrication, quality control and workmanship are to be in accordance with these documents.

The main contractor is responsible for the supply of the relevant information and site conditions as required by the prefabricated trussed rafter roof designer, the prefabricated trussed rafter roof manufacturer and the prefabricated trussed rafter roof installer and the Architect and Engineer.

The prefabricated trussed rafter roof designer is to be fully responsible for the structural design of the trussed rafter roofs including the identification of design static and variable actions, the form of the structure to suit the proposed roof form, appropriate allowable deflections and stresses, member stability and overall stability of the roof including required bracing.

The design should allow for and facilitate proposed tanks, flues, rooflights, fire compartmentation, ventilation and other features, installations and requirements that impact on the roof design.

All relevant dimensions and other particulars are to be checked and confirmed by the main contractor and fabricator before fabrication commences.

No timber structure, including bracing and binding is to penetrate a separating wall.

Overall construction tolerances of the assembled trussed roof shall be to the Architect/Engineer's satisfaction and shall be such that roof and ceiling finishes can be applied directly to the rafter and tie members without the introduction of any other elements or materials or adjustment.

8.11.2 Bracing & Binding

All temporary bracing required to maintain stability during the erection of the trusses is to be the responsibility of the main contractor.

All joints in braces and binders are to be lapped and nailed over at least two rafters.

8.11.3 Fixing, Support & Uplift

Fix all trusses to the wallplate using proprietary truss clips installed in accordance with the manufacturer's instructions. **DO NOT SKEW NAIL OR SKEW SCREW TRUSSES TO WALL PLATE.**

Fix down the wall plate with straps to mobilize the dead weight of the supporting wall to conform to the requirements of Technical Guidance Document A of the Building Regulations where the finishes of the building will hide the straps.

Where vertical strapping of the wallplate is not permitted due to fair faced internal finishes to the interior of the wall fix down the wallplate in accordance with the Engineer's drawings.

Install ceiling and verge strapping to roof level walls to conform with Technical Guidance Document A of the Building Regulations.

8.11.4 Workmanship

The main contractor is to inspect each individual trussed rafter element on arrival on site, opening bundles and re-stacking. Defective or damaged elements are to be removed from site and replaced with new ones as soon as possible following identification.

Adequate storage and protection facilities shall be provided for the trusses and permanent bracing

members in order to prevent any form of damage whilst awaiting erection.

Protection and finishing on site by the main contractor in accordance with the Architect/Engineer's requirements.

DRAINAGE

9.1 GENERAL

All drainage works is to comply with and be carried out in accordance with the current edition (at time of valuing the work) of the *Recommendations for site development works for Housing Areas* published by the *Department of Environment and Local Government*. All foul drainage works shall comply with Irish Water standard details and code of practice. All storm drainage shall comply with the relevant Local Authority requirements.

9.2 SUBMISSION OF MATERIALS

As soon as possible after the Contract has been awarded the Contractor shall submit to the Engineer for his approval a list of his proposed suppliers and sources of materials required for the execution of the works.

Samples of materials shall be approved by the Engineer and/or the Local Authority/Irish Water.

The materials supplied shall conform with the quality of samples approved by the Engineer and/or the Local Authority/Irish Water.

9.3 CONCRETE SURROUNDS

Where pipes pass through buildings and where shown as indicated on the drawings they shall be laid on a concrete bed and surround in Grade C /15 concrete to give a cover of 150mm minimum on barrels and sockets. Notification to be given in satisfactory time in order to allow supervision by the Drainage Department of the Local Authority if required.

9.4 MANHOLES

Wastewater manholes should be constructed in accordance with Irish Water Standard details. Where details in this specification differ from Irish Water details, the Irish Water details shall apply. Storm water manholes shall be built in accordance with Local Authority requirements and specifications. If there are no relevant specifications from the Local Authority reference can be made to the Department of Environment Guidelines referred to in 9.1 above.

Concrete blocks or bricks to be used in manholes and chambers shall be precast concrete masonry units manufactured in accordance with BS6073 containing a minimum of 360kg/m³ of sulphate resisting cement, having a maximum water cement ratio of 0.45, a minimum compressive strength of 50N/mm², and a maximum water absorption of 7%.

Clay bricks to be used in manholes and chambers shall be Class B engineering complying with the relevant provisions of BS EN 771 and BS EN 772. All bricks shall be frost resistant category F.

The contractor shall ensure that all brick and block work are to IS EN 1744-1 2009, to ensure the brick/blockwork is not susceptible to pyrite.

As required, 1 to 2 courses of Engineering brick/block shall be used to support the frame on the manhole roof. Standard concrete blocks or bricks shall not be permitted. 3 courses or more shall not be permitted.

All frames shall be bedded and haunched in mortar. All Engineering bricks shall be bedded and pointed in mortar. Mortar shall be a high performance bedding mortar which complies with NRA minimum requirements.

9.5 MANHOLE COVERS IN BLOCK/BRICK PAVING

Where manhole covers are located in block/brick paving areas recessed covers are to be used that allow placement of pavers into cover.

9.6 FITTINGS ON DRAINS AND SEWERS

Armstrong junctions, interceptor traps and other fittings on drains shall comply with BS4660 and BS EN 1401-Part 1 and be of uPVC or similar approved with the necessary side or back inlets for pipes and all stoppers, rodding eyes or other standard fittings required or directed. They shall be of approved manufacture and set on and surrounded in concrete Grade C12/15.

9.7 MISCELLANEOUS FITTINGS

Other fittings not specifically mentioned herein or on the Department of Environment

Recommendations document shall be of approved manufacture and comply with the appropriate standard specification. Sizes and patterns shall be as directed and the Engineer shall be consulted before fittings are ordered.

9.8 LOCAL DRAINAGE

Local drainage around dwellings to be provided in accordance with I.S. 752:2008 and with guidance given in Part D and Part H of the Building Regulations.

9.9 LAND DRAINS

Land drains to be provided to rear all retaining walls. Drains to discharge to stormwater sewer with approval by relevant local authority.

Land-drains are to be surrounded in a washed pea-gravel and wrapped in a suitable terram to Engineers approval. The remainder of the trench is to be filled with a permeable fill typically 5-40mm stone, to approval of Engineer, to 300mm below finished ground level. Land-drains are to have a minimum gradient/fall of 1:400.

All land-drain pipes and connections are to be corrugated and perforated PVC-U to BS4962 and must carry the BSI kitemark.

9.10 COMPLETION

On completion of the works, all sewers, drains and manholes shall be cleaned and freed of obstructions. A CCTV survey of the sewers and manholes shall be undertaken and the results of which shall be submitted to the Drainage Section of the Local Authority for approval. These results shall be presented in a written report and on a DVD.

"As Constructed" drawings, in agreed electronic format and in hard copy, showing full details of the drainage system shall be submitted to the Drainage Section of the Local Authority. All dimensions on drawings shall be in metric units and all levels shown on drawings shall be to Ordnance Datum (Malin-Head).

All handover documentation to be in compliance with the Local Authority's Drainage Departments minimum requirements.

WATER SUPPLY

10.1 GENERAL

All water supply works is to comply with and be carried out in accordance with the current edition (at time of valuing the work) of the Irish Water Standard Details for Water Infrastructure and the Irish Water Code of Practice for Water Infrastructure. Where guidance in this document or elsewhere in the specification differs from Irish Water specifications it should be brought to the attention of the Engineer and, unless directed otherwise, the Irish Water specification will take precedence.

10.2 SUBMISSION OF MATERIALS

No materials shall be used without the prior approval of the Local Authority, Water Services Department and/or Irish Water. It is the responsibility of the Contractor that all materials/fittings to be used on the site have been approved for use by the Local Authority/Irish Water in advance of work commencing. The Contractor shall submit to the Engineer prior to commencing any works on site a written report setting out all materials, fixtures and fittings proposed by the Contractor complete with the confirmation by the Local Authority/Irish Water of their approval for these materials.

10.3 SURFACE COVERS

Valves and hydrants when installed shall be covered with approved heavy duty metal surface covers to IS EN 124:1994. These approved metal covers shall conform to the Local Authority and/or Irish Water specification for valve and hydrant covers.

Where a cover is located in a green area it shall be surrounded by 200mm concrete plinth minimum 100mm deep.

10.4 SERVICE PIPES AND FITTINGS

The contractor should refer to the Mechanical and Electrical Specifications for details of the service pipe and installation arrangements.

Normal gauge polyethylene service piping, type 32, and High density polyethylene service piping, type 50, shall be manufactured to the requirements of IS EN 12201.

Joints in the pipe itself shall be per manufacturer's instructions and joints of P.V.C. pipe to metal fittings shall be screwed to the fitting using coupling nuts and tail piece or similar approved.

10.5 BOUNDARY BOX

All service pipes shall include the installation of a boundary box with integral stopcock. The boundary box should be located on the public side of the public/private boundary in an easily accessible location. Boundary boxes should not be located on driveways where they would be susceptible to traffic.

Contractors should consult with the Local Authority/Irish Water in relation to the approved types of boundary box which can be used on the contract.

ROADS AND FOOTWAYS

11.1 GENERAL

All roads and footways works is to comply with and be carried out in accordance with the current edition (at time of valuing the work) of the *Recommendations for site development works for Housing Areas* published by the *Department of Environment and Local Government* and with the current edition (at the time of valuing the work) of the *NRA Specification for Roadworks*.

11.2 MATERIALS

All fill material shall be in compliance with IS EN 13242:2002 + A1:2007- Aggregates for unbound and hydraulically bound materials for use in civil engineering work and road construction ad S.R. 21:2014/A1:2016. Testing shall be carried out by the contractor at the source of any material proposed as fill to verify the material complies with the guidance given in SR21. Written confirmation on compliance must be issued by the contractor prior to arrival of material on site.

11.3 FOOTPATHS

Concrete footpaths shall be constructed with expansion joints, filled with mastic, at 6.0m centres and contraction joints at mid-span of panels. The surface shall be screeded smoothly and the outer 100mm edge floated smooth. Inside the smooth edging the surface shall then be given a uniform texture by means of a spiked roller or brush to Architect/Engineers requirements.