The Institution of Structural Engineers

The Structural Plan of Work 2020

v1.0 (26/04/20)

NOTES:

The IStructE Structural Plan of Work 2020 has been developed to coordinate and integrate with the RIBA Plan of Work 2020. It is intended that the Structural Plan of Work provides a complementary framework for organising the structural engineering requirements for building projects to provide structural engineers, clients and other design disciplines with a more collaborative and unified approach to the process planning of projects.

Reference: [i]RIBA Plan of Works 2020

Stages 0 and 1 comprise the Briefing portion where the initial brief and project requirements are determined.

Stages 2, 3 and 4 comprise the Design portion of the project where all of the information required for the Manufacturing and Construction of the project is prepared. A sub-stage 4.5 is included within the Plan of Work for the preparation of the production information required to undertake the construction works. This sub-stage is frequently undertaken by a range of designers and specialist sub-contractors.

Stage 5 starts when the Contractor takes possession of the site (or instruction to commence production in the case of off-site manufacture) and hence there is likely to be significant overlap between Stage 4, Stage 4.5 and Stage 5 for the various structural aspects of the project (e.g. pile design and bending schedules completed and piles installed on site prior to secondary steelwork being fully detailed). Stage 6 starts at Practical Completion and finishes at the end of the defects liability period.

A Responsibility Matrix should be prepared early in the project to identify who is responsible for the various aspects of the structural works, at what levels of details and at which stage in the project.

Note that there may be different organisations appointed for different stages of the project (e.g. one organisation is appointed for Stages 0 and 1, but then a separate organisation is appointed for Stages 2-6), or that separate appointments may be made for the different stages (e.g. a separate appointment is used for Stage 7 services).

*Statutory requirements are given in the Plan of Work as generally applies within the UK. The section should be adapted and amended to suit the relevant requirements of the jurisdiction for the project.

		0 Strategic Definition[i]	1 Preparation and Brief[i]	2 Concept Design[i]	3 Spatial Coordination[i]	4 Technical Design[i]	4.5 Production Information	5 Manufacturing and Construction[i]	6 Handover[i]	7 Use[i]
		Briefing		Design				Delivery		Evaluation
Overview[i]		Client's key requirements defined	Project feasibility confirmed and initial **Project Brief** defined. Related information collated and prepared to enable the project to progress	Architectural and engineering concept information prepared and developed to meet the **Project Brief**	Architectural and engineering information **Spatially Coordinated** between disciplines into a single solution aligned to the **Project Brief**, **Cost Plan** and **Project Strategies**	Architectural and engineering technical design finally coordinated and completed to assemble and construct the project	Engineering information, including specialist sub-contractors' technical information, prepared to enable the manufacture, assembly and construction to proceed	Manufacturing, assembly and construction completed	Project handed over, defects rectified and initial Aftercare completed	Facilities and asset management. Post Occupancy Evaluation of building performance in use as required
Contingency Assessment				Appropriate to a design contingency of 20 - 25%	Appropriate to a design contingency of 10 - 15%	Appropriate to a design contingency of 5 - 10%	Appropriate to a design contingency of 2 - 5%			
Design		Contribute to preparation of **Client Requirements**	Contribute to preparation of **Project Brief** Contribute to the **Site Information** Identify survey information required and provide survey scopes Identify structural constraints Identify information required for structural design	Prepare the structural concept design defining the scope, scale and form of the structure, and integrated with the other design disciplines Review survey information and identify any additional surveys required and provide survey scopes Develop, review and assess structural options Define structural design standards and criteria to be used for design, including: - Loading (static and dynamic) - Durability and design life - Fire resistance (in relation to the fire strategy) - Ground movements - Thermal movements - Serviceability criteria (including deflection and vibration criteria) - Embodied carbon targets Define structural grids and structural zones Develop foundation strategy Consider strategy for in use, maintenance and deconstruction	Develop the structural design for defining the detailed form and function of all components in terms of overall size, typical detail, performance and outline specification Spatially coordinate the structural design and integrate with the architectural and other design disciplines Prepare calculations in sufficient details to facilitate and verify design solutions Confirm structural grids and structural zones Develop strategy for in use, maintenance and deconstruction Design for economy of materials by sufficiently detailed analysis to ensure elements fulfil their role safely but without needless use of excess material Design for load conditions and load combinations that can be justified on current knowledge of intended use and ensure that the client is aware of these	Prepare Structural Technical Design Details and designs of specialist structural contractors coordinated and integrated into the structural design Prepare full setting out information for all structural items, fully coordinated and integrated with other design items Review **Contractor Designed Items** and ensure that they are integrated in the structural design Confirm strategy for in use, maintenance and deconstruction	Development and review of temporary works designs	Review temporary works designs		
Interface			Contribute to the development of the **Responsibility Matrix** Assist in the development of the **Project Information Requirements** (PIR) Identify adjoining landowners' issues	Review, update and confirm agreement of the **Responsibility Matrix** Provide information for preparation of **Cost Plan** and **Project Strategies** Undertake third party consultations	Establish critical construction details, tolerances, performance tolerances and anticipated movements (static and dynamic), defining critical coordination clearances Below ground services and structure integration Undertake third party consultations	Liaise with specialist subcontractors as necessary Integration of builders work items into structural design Undertake third party consultations	Review of Contractor's proposed method statements or sequencing proposals for complex or critical structural items			Conclude as required activities listed in Plan for Use Strategy including **Post-occupancy Evaluation**, review of **Project Performance**, **Project Outcomes** and Research and Development aspects.
Construction				Identify **Contractor Designed Items** Consider constructability issues	Provide **Performance Specification** for **Contractor Designed Items** Develop constructability issues and highlight any project specific criteria including critical temporary works requirements	Develop temporary works briefs	Manufacturing and construction information (e.g. reinforcement drawings and bar bending schedules, steelwork fabrication drawings) prepared	Resolve site queries Undertake site visits and inspections to review the progress of the works on site **'As-constructed' Information**, prepared by relevant parties as agreed/defined in the scope of services		
Management			Provide information for and contribute to **Project Execution Plan** as required Identify and define statutory requirements relevant to the structural design	Consider and contribute to H+S risk management process and develop proposals for risk mitigation Assist **Lead Designer** with preparation of stage **Design Programme**	Develop and contribute to H+S risk management process and develop proposals for risk mitigation Assist with the implementation of **Change Control Procedures** Assist **Lead Designer** with preparation of stage **Design Programme** Provide information for preparation of **Cost Plan**, Project Carbon Tracking and **Project Strategies**	Develop and contribute to H+S risk management process and develop proposals for risk mitigation Assist **Lead Designer** with preparation of stage **Design Programme** Provide information for preparation of **Cost Plan** and **Project Strategies**		Review quality records and assist in the resolution of manufacture and construct non-conformities Assist with the preparation of Building Log Book, O&M Manual etc as required	Undertake tasks listed in Plan for Use Strategy Contribute to post-contract reviews and certification Contribute to Lessons Learnt exercises	Undertake tasks listed in Plan for Use Strategy
Sustainability		Support the strategic definition of the project in relation to the client's needs, including the appropriateness of development versus upgrading or extending existing buildings as an alternative to demolition	Support the client in developing a brief with clear sustainability outcomes that will contribute positively towards mitigating Climate Breakdown Identify potential Climate Change Impact on the design requirements for the project over its intended life span to ensure resilience	Evaluate options to lower the embodied carbon within the structural design, including material choices and efficient building layout Agree embodied-carbon tracking terms and targets Consider design for deconstruction and re-use	Assist with the establishment of a method of carbon tracking that is compatible across the whole design team Track embodied carbon in structural components to an accepted and agreed standard and level of detail Design to achieve the embodied carbon targets agreed at Stage 2	Develop the detailed structural design to minimise wasteful use of resources, both in quantum and in detail Provide **Structural Sustainability Report**	Update **Structural Sustainability Report** from Stage 4 based on more detailed development of the Technical and Production Design	Collaborate with clients, architects, engineers and contractors to further reduce construction waste Ensure that the **Structural Sustainability Report** requirements, including the embodied structural carbon targets, are achieved through construction Assist in the preparation of overall sustainability certification	Document the project Sustainability Targets and achievements (including Carbon) and share on an open source basis	Support as appropriate a **Post-occupancy Evaluation** to understand the embodied and operational resource use, and use the results to inform future work As required, undertake a **Post-occupancy Evaluation** to correlate designed performance and achieved performance of the structural systems Share this data, knowledge and research on an open source basis
Statutory Requirements*			CDM requirements including appointment of Principal Designer	CDM requirements including Designer duties				Assist with the preparation of the Health and Safety File information	Update Health and Safety File information if required	
				Preliminary **Building Regulations** discussions		Submission of information to demonstrate compliance with **Building Regulations**				
				Provide information to support Party Wall Agreements, and other relevant Approval in Principle (AIP) and statutory requirements and agreements						
				Planning Application support						
Stage Outputs Deliverables at end of stage			Initial **Project Brief** **Site Information** Structural Constraints Structural Survey Reports Climate Change Impact Statement	**Basis of Structural Design** Deliverables List Initial Structural Drawings / Model Concept **Structural Sustainability Report**	Structural Drawings / Information Model spatially co-ordinated Movement and Tolerances Report Outline Structural Specification **Performance Specification** for **Contractor Design Items** Outline **Structural Sustainability Report**	Structural Drawings / Information Model suitable for manufacture and construction Structural Specification **Structural Sustainability Report**		Handover documentation		
Information Exchanges			Prepare **Exchange Information Requirements** (EIR)	Review **Exchange Information Requirements** (EIR) and contribute to BIM Execution Plan (BEP)	Preliminary clash detection and resolution	Clash detection and clash resolution		BIM Handover deliverables		
Collaboration Requirements				Integrate with appropriate disciplines including **Lead Designer** to confirm spatial layouts, structural grids and zones	Integrate with design team to assist with the spatial coordination of items	Detailed integration with specialist sub-contractor design and final integration of all design items				
Design Assurance			Initial review of key structural engineering risks impacting on successful delivery of project	Design review of structural principles including stability, loading criteria, load paths, structural assumptions and risks	Detailed reviews of structural principles, stability, soil-structure interaction, load paths, material specifications	Detailed calculation checking (including third party checking if required) Review of specialist sub-contractor designs	Review and checking of manufacturing and construction information	Review of manufacture and construct quality testing and conformity with design specification. Snagging and structural defects		