

Design Documentation Guidelines

Hydraulic Services

Concept Design Phase

Design Process	Deliverables	Commentary
<p>Inputs:</p> <ul style="list-style-type: none"> • Client brief and budget. <input type="checkbox"/> • Architectural sketch concept drawings (e.g., bulk and location). <input type="checkbox"/> • Project time schedule. <input type="checkbox"/> • Infra-structure reports, e.g., water-flow tests. <input type="checkbox"/> <p>Design:</p> <ul style="list-style-type: none"> • Review of client requirements. <input type="checkbox"/> • Establish design criteria for hydraulic services. <input type="checkbox"/> • Develop functional services brief – including definition of services. <input type="checkbox"/> • Review applicable authority codes and standards. <input type="checkbox"/> • Establish contacts with local authorities and utility companies. <input type="checkbox"/> • Review concepts for significant and unusual health and safety risks relevant to the design. <input type="checkbox"/> 	<p>Drawings:</p> <ul style="list-style-type: none"> • Sketch drawings (may comprise 'marked-up' architectural drawings) including preliminary plant room requirements and services routes. <input type="checkbox"/> <p>Specifications:</p> <ul style="list-style-type: none"> • Nil. <p>Reports:</p> <ul style="list-style-type: none"> • Concept services brief – to establish available system concepts, a broad report investigating available options and recommendations, and definition of system requirements and key assumptions. <input type="checkbox"/> • Design standards to be used. <input type="checkbox"/> 	<ol style="list-style-type: none"> 1. Ascertain client brief and to review/consider applicable options. 2. Agree roles and responsibilities. 3. Concept and preliminary design phases are often combined on smaller projects. 4. Tendering at this stage unlikely to result in 'like for like' bids. 5. No co-ordination completed at this stage. 6. Costing only on per m² basis.

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Preliminary Design Phase

Design Process	Deliverables	Commentary
<p>Inputs:</p> <ul style="list-style-type: none"> • Client approval of concept service design and budgetary implications. <input type="checkbox"/> • Design time schedule. <input type="checkbox"/> • Client approved architectural, structural, and other services concept design. <input type="checkbox"/> • Assess supply utility requirements and liase with local authorities. <input type="checkbox"/> <p>Design:</p> <ul style="list-style-type: none"> • Develop preliminary load profiles. <input type="checkbox"/> • Develop system concepts and identify special requirements. <input type="checkbox"/> • Confirm plant room space/location requirements. <input type="checkbox"/> • Develop services route requirements, both horizontal and vertical and space co-ordination with other trades. <input type="checkbox"/> • Define interface requirements with other services. <input type="checkbox"/> • Review preliminary design for significant and unusual health and safety risks the design may present during construction and maintenance. <input type="checkbox"/> 	<p>Drawings:</p> <ul style="list-style-type: none"> • Schematic drawings outlining service concepts. <input type="checkbox"/> • Layout drawings locating plant rooms, risers, and primary service routes. <input type="checkbox"/> • Preliminary plant room layouts. <input type="checkbox"/> <p>Specifications:</p> <ul style="list-style-type: none"> • Outline services specifications. <input type="checkbox"/> • Preliminary equipment schedules for major plant. <input type="checkbox"/> <p>Reports:</p> <ul style="list-style-type: none"> • Utility services reports. <input type="checkbox"/> • Design report including key design criteria, proposed system concepts, and features. <input type="checkbox"/> • Preliminary equipment weights. <input type="checkbox"/> • Preliminary building services interface matrix. <input type="checkbox"/> • Highlight 'significant and unusual' buildability and health and safety issues. <input type="checkbox"/> 	<ol style="list-style-type: none"> 1. Cost estimates at this stage generally cannot be on a full elemental basis, as final distribution is not well defined. 2. Systems could be priced by vendors at this stage but unlikely to get like for like comparison.

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Developed Design Phase

Design Process	Deliverables	Commentary
<p>Inputs:</p> <ul style="list-style-type: none"> • Client approval of preliminary services design and budgetary implications. <input type="checkbox"/> • Client approved architectural, structural and other services preliminary design. <input type="checkbox"/> • Final fire and acoustic reports. <input type="checkbox"/> <p>Design:</p> <ul style="list-style-type: none"> • Service load calculations. <input type="checkbox"/> • Major plant and services routes co-ordinated with architecture, structure and other trades. <input type="checkbox"/> • Material selections. <input type="checkbox"/> • Incorporate requirements of the fire, acoustic, or other relevant reports. <input type="checkbox"/> • Develop and expand the services concepts, selection of typical plant, review of plant room, and service space requirements, including sizing of pipe work. <input type="checkbox"/> • Identify utility connections. <input type="checkbox"/> • Verify that significant and unusual health and safety issues have been addressed in the design. <input type="checkbox"/> 	<p>Drawings:</p> <ul style="list-style-type: none"> • Single line pipework layouts. <input type="checkbox"/> • Major plant concepts and layouts with sections as necessary. <input type="checkbox"/> • Piping schematics. <input type="checkbox"/> <p>Specifications:</p> <ul style="list-style-type: none"> • Preliminary technical specifications. <input type="checkbox"/> • Equipment schedules. <input type="checkbox"/> <p>Reports:</p> <ul style="list-style-type: none"> • Updated design features report including options selected. <input type="checkbox"/> • Electrical loadings report. <input type="checkbox"/> • Building services interface matrix. <input type="checkbox"/> • Highlight 'significant and unusual' buildability and health and safety issues. <input type="checkbox"/> 	<ol style="list-style-type: none"> 1. Cost estimates at this stage can be produced by quantity surveyor on elemental basis, with secondary elements estimated on typical details. 2. Developed design generally provides the minimum level of documentation to clearly define the scope of all hydraulic elements

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Detailed Design Phase

Design Process	Deliverables	Commentary
<p>Inputs:</p> <ul style="list-style-type: none"> • Client approval of developed design and budgetary implications. <input type="checkbox"/> • Client approved architectural, structural, and other services developed designs. <input type="checkbox"/> <p>Design:</p> <ul style="list-style-type: none"> • Detailed system design including equipment and pipework. <input type="checkbox"/> • Co-ordination in principle with structure, architecture and other building services. <input type="checkbox"/> • Finalise utility supplies. <input type="checkbox"/> • Detailed layouts of plant rooms. <input type="checkbox"/> • Highlight significant and unusual health and safety risks that were identified through the design process. <input type="checkbox"/> 	<p>Drawings:</p> <ul style="list-style-type: none"> • Completed schematic and layout drawings defining services requirements including plans, elevations, and sections. <input type="checkbox"/> • Detailed pipework duct work layouts for hydraulic services. <input type="checkbox"/> • Plant room layouts including detailed sections. <input type="checkbox"/> • Piping schematics. <input type="checkbox"/> <p>Specifications:</p> <ul style="list-style-type: none"> • Detailed specifications. <input type="checkbox"/> • Detailed equipment schedules. <input type="checkbox"/> <p>Reports:</p> <ul style="list-style-type: none"> • Nil. <input type="checkbox"/> 	<ol style="list-style-type: none"> 1. Detailed design generally provides a level of documentation to clearly define the design of hydraulic services. 2. Design details should be coordinated with other disciplines. However, the documents produced in this phase may not directly be able to be 'built' from. 3. Co-ordination: in ceiling zones identified with appropriate clearance from structure and other services; major penetrations identified; and detailed co-ordination of critical areas. 4. Define in the specification the significant and unusual health and safety risks that were identified in the design.

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Construction Design Phase

Design Process	Deliverables	Commentary
<p>Inputs:</p> <ul style="list-style-type: none"> • For construction design phase, drawings for architectural, structural, and other services. <input type="checkbox"/> • Construction time schedule. <input type="checkbox"/> <p>Design:</p> <ul style="list-style-type: none"> • Production of larger scale detailed shop drawings including seismic details. <input type="checkbox"/> • Co-ordination of all services, structure, and architecture. <input type="checkbox"/> • Equipment selections and technical submissions. <input type="checkbox"/> • Control system programming. <input type="checkbox"/> • Detailed layouts of plant rooms. <input type="checkbox"/> 	<p>Drawings:</p> <ul style="list-style-type: none"> • Revise detailed design documentation to incorporate buildability changes suggested by contractor if they impact on the design intent. <input type="checkbox"/> • Equipment submissions as defined in detailed design. <input type="checkbox"/> • Detailed layouts of plant rooms. <input type="checkbox"/> • Wiring diagrams and points schedule. <input type="checkbox"/> • Equipment plinth details, mounting, and isolation detailing. <input type="checkbox"/> • Fabrication details of pipework, switchboards, etc. <input type="checkbox"/> • Pipe work support and joint detailing. Seismic bracing. <input type="checkbox"/> <p>Review:</p> <ul style="list-style-type: none"> • Review shop/fabrication and layout drawings for compliance with design. <input type="checkbox"/> • Review equipment submission. <input type="checkbox"/> 	<ol style="list-style-type: none"> 1. Normally prepared by the services subcontractor to enable fabrication of the services design. 2. Deliverables contain sufficient details for elements to be manufactured/constructed without reference to other documents, i.e., 'the details have co-ordinated the relevant design information across all disciplines and can be built from'. 3. Equipment ordered. 4. At completion of design as built drawings, manuals and equipment details produced to indicate final installed systems. 5. The contractor is responsible for managing health and safety risks during the construction phase.