

|                 | Appraisal and Brief Development   | Design   | Pre-Construction  | Construction  | In-Use   |
|-----------------|---|--|---|---|--|
|                 | RIBA Stage A-B  | RIBA Stage C-E   | RIBA Stage F-H  | RIBA Stage J-K  | RIBA Stage L   |
| BIM Deliverable | <p>Macro BIM and Optioneering:</p> <ul style="list-style-type: none"> <li>• Production of rapid models to facilitate analysis of multiple design concepts, in order to establish feasibility and develop the brief.</li> <li>• These sketch models linked to environmental and cost data reduce risk and confirm viability.</li> </ul>  | <p>Develop the BIM to include:</p> <ul style="list-style-type: none"> <li>• Conceptual design of the architecture, structural and building services systems.</li> <li>• Outline specification and embedded cost data, in sufficient detail to fix the project brief and obtain planning permission.</li> <li>• Including the integration of information for statutory standards and construction safety.</li> </ul>  | <p>Refine the BIM into a virtual prototype:</p> <ul style="list-style-type: none"> <li>• To include co-ordinate design of building elements in sufficient detail to enable procurement and subsequent construction of trade packages.</li> <li>• Discharge outstanding statutory and code compliance issues.</li> <li>• BIM to include cost (5D) and programme (4D) information, to allow real time value engineering and programme simulations</li> </ul>  | <p>Revise the BIM to reflect site amendments and as built information in order to:</p> <ul style="list-style-type: none"> <li>• Become a source of construction and co-ordination information to site team.</li> <li>• Allow alternative programmes to be run to simulate and analyze the potential impact of changes</li> <li>• Allow simulations to be run to reduce waste on-site and ensure products are delivered when needed and not stored on site.</li> </ul> | <p>Complete the BIM in order to provide:</p> <ul style="list-style-type: none"> <li>• An accurate source of information about the as-built spaces and systems to facilitate the management and operation of the building.</li> <li>• Creating a single coordinated and internally consistent database for the building.</li> </ul>                       |
| Input           | <p>Input required:</p> <ul style="list-style-type: none"> <li>• General outline of client requirements.</li> <li>• Site location, Google map data.</li> </ul> <p>Further input if available:</p> <ul style="list-style-type: none"> <li>• Any existing design proposals, in any format.</li> <li>• Any existing site information.</li> <li>• Site survey, site plan.</li> <li>• Contractors empirical cost data.</li> </ul> | <p>Inputs required from (in a format agreed in the BIM execution plan):</p> <ul style="list-style-type: none"> <li>• Architect.</li> <li>• Structural / civil engineer.</li> <li>• Mechanical and electrical engineer.</li> </ul> <p>Inputs required from other specialists required for statutory or code compliance (to be embedded or linked to the BIM): SBD / CDM / CFSH / HQI's / BREEAM / WRAP.</p>   | <p>Inputs required, in a format agreed in the BIM execution plan from:</p> <ul style="list-style-type: none"> <li>• Architect.</li> <li>• Structural / civil engineer.</li> <li>• Mechanical and electrical engineer</li> </ul> <p>Input required from specialist subcontractors and product suppliers for inclusion in the BIM. Attributes such as thermal performance, design life and maintenance.<br/>Construction programme and costs to be updated as they evolve.</p>  | <p>Input feedback from site team in order to log changes.</p> <p>Input continues from specialist subcontractors and product suppliers for inclusion in the BIM. Attributes such as thermal performance, design life and maintenance.<br/>Construction programme and costs to be updated as they evolve.</p>   | <p>Inputs will have been completed throughout the design and construction phases.</p>  |
| Process         | <p>Option 1:<br/>The initial concepts developed in:</p> <ul style="list-style-type: none"> <li>• Revit / Vasari Project / Ecotech.</li> <li>• D Profiler.</li> </ul> <p>Option 2:<br/>Collaboration in a BIM storm, facilitated by Onuma System with other stakeholders utilising various BIM tools as required.</p>  | <p>BIM manager / lead consultant to organise design team review process:</p> <ul style="list-style-type: none"> <li>• Establish roles and responsibilities.</li> <li>• Clarify in the BIM execution plan.</li> <li>• Establish deliverable schedules and project trackers.</li> </ul> <p>Design team meetings and workshops conducted using the BIM in Navisworks or Vico Office.<br/>The BIM could be hosted on a shared server or assembled in advance of the meeting on agreed milestone dates.</p>   | <p>BIM Manager / lead consultant expands the BIM to include input from:</p> <ul style="list-style-type: none"> <li>• Construction programmers.</li> <li>• Specialist subcontractors.</li> <li>• Specialist suppliers.</li> </ul> <p>Design team meetings and workshops continue to be conducted using the BIM and issues addressed systematically through Navisworks reports.</p> <ul style="list-style-type: none"> <li>• Detailed clash reports.</li> <li>• Design issues.</li> <li>• Residual CDM risks.</li> </ul>          | <p>BIM Manager / lead consultant maintains the BIM through feedback from:</p> <ul style="list-style-type: none"> <li>• Site team.</li> <li>• Specialist subcontractors.</li> </ul> <p>Delivery team meetings and workshops conducted using the BIM and issues addressed systematically through Navisworks reports such as:</p> <ul style="list-style-type: none"> <li>• Compliance.</li> <li>• Derogations.</li> <li>• Residual CDM risks.</li> </ul>                 | <p>BIM manager / lead consultant to co-ordinate an audit of embedded information to ensure completeness.</p>   |
| Output          | <p>Output:</p> <ul style="list-style-type: none"> <li>• Conceptual massing model</li> <li>• Budget cost analysis</li> </ul> <p>In sufficient detail to provide the client with an appraisal to determine:</p> <ul style="list-style-type: none"> <li>• The form in which the project is to proceed.</li> <li>• The financial feasibility.</li> <li>• The technical functionality.</li> </ul>                                | <p>Output includes:</p> <ul style="list-style-type: none"> <li>• Co-ordinated conceptual BIM model.</li> <li>• Energy analysis from Ecotech and Green Studio.</li> <li>• Early clash detection in linked models or Navis.</li> <li>• Early cost data from QTO or Vico.</li> <li>• Preliminary programme from Navis or Vico.</li> <li>• Reviewable design data for client in Navis.</li> <li>• Reviewable design options in Showcase.</li> <li>• Planning drawings outputted from the BIM.</li> <li>• Verified views for planning in 3ds MAX.</li> <li>• Presentation images from the BIM in 3ds MAX.</li> <li>• Rapid prototyping from the BIM.</li> </ul> | <p>Output includes:</p> <ul style="list-style-type: none"> <li>• Detailed co-ordinated BIM model</li> <li>• Energy analysis from Ecotech and Green Studio</li> <li>• Detailed clash detection in linked models or Navis</li> <li>• Detailed cost data from QTO or Vico</li> <li>• Virtual construction programme from Navis or Vico</li> <li>• Digital manufacturing information direct from BIM</li> <li>• Detail component design linked to BIM in Inventor</li> <li>• NERBS surface design imported from Rhino 3D</li> </ul> | <p>Outputs from the BIM can be used:</p> <ul style="list-style-type: none"> <li>• To micro manage teams on site.</li> <li>• To sequence construction phasing.</li> <li>• To sequence temporary works and access.</li> <li>• To locate and manage site storage.</li> <li>• To provide a visual aid to complex assemblies.</li> <li>• To record progress.</li> <li>• To monitor changes.</li> </ul>   | <p>Specific information accessed through Navisworks:</p> <ul style="list-style-type: none"> <li>• Names of manufacturers.</li> <li>• Product catalogues.</li> <li>• Warranty information.</li> <li>• Room areas and room utilization.</li> <li>• Other information that may provide better insight to managing the facility more effectively.</li> </ul> |
| Tools           | <ul style="list-style-type: none"> <li>Autodesk Revit Architecture 2012</li> <li>Autodesk Ecotech 2011</li> <li>Autodesk Project Vasari</li> <li>Beck Technologies D Profiler</li> <li>Onuma System</li> </ul>  | <ul style="list-style-type: none"> <li>Autodesk Revit Architecture 2012</li> <li>Autodesk Revit MEP 2012</li> <li>Autodesk Revit Structure 2012</li> <li>Autodesk Ecotech 2011</li> <li>Autodesk Navisworks Manage</li> <li>Autodesk Quantity Takeoff</li> <li>Autodesk 3ds Max Design</li> <li>Vico Office Suite</li> </ul>   | <ul style="list-style-type: none"> <li>Autodesk Revit Architecture 2012</li> <li>Autodesk Revit MEP 2012</li> <li>Autodesk Revit Structure 2012</li> <li>Autodesk Ecotech 2011</li> <li>Autodesk Navisworks Manage</li> <li>Autodesk Quantity Takeoff</li> <li>Autodesk Inventor</li> <li>McNeel Rhino3D</li> <li>Vico Office Suite</li> </ul>  | <ul style="list-style-type: none"> <li>Autodesk Revit Architecture 2012</li> <li>Autodesk Revit MEP 2012</li> <li>Autodesk Revit Structure 2012</li> <li>Autodesk Ecotech 2011</li> <li>Autodesk Navisworks Manage</li> <li>Autodesk Quantity Takeoff</li> <li>Vico Office Suite</li> </ul>   | <ul style="list-style-type: none"> <li>Autodesk Navisworks</li> </ul>  |