A Design Framework for Building Services 4th Edition

Design activities and drawing and model definitions

by David Churcher and John Sands

BG 6/2014
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INTRODUCTION

This fourth edition of BSRIA Guide BG 6 A Design Framework for Building Services takes account of the latest edition of the RIBA Plan of Work\[1\] published in May 2013. It also updates the design activities related to Building Information Modelling (BIM), especially the production of building information models at different stages of design and the exchange of structured information with a project client.

The section introducing BIM has been rewritten to reflect the current state of development of BIM, but does not attempt to provide a comprehensive text on this subject. For information management processes, readers are directed to PAS 1192-2\[4\], which was published in February 2013.

The pro-formas, drawing/model definitions and exemplars in Appendix A have been restructured to match the RIBA Plan of Work 2013, and also align with the draft digital Plan of Work\[9\] that has been developed by the BIM Task Group (www.bimtaskgroup.org). There are significant changes in the new Stage 3 which incorporates all the design activities from the previous Stage D and many design activities from the previous Stage E. BSRIA has split the pro-forma for this stage into two parts, pro-formas 3a and 3b. This has provided an additional opportunity for design review during a stage when a lot of design development is taking place.

Although RIBA has not split its Stage 4 in the same way that the old Stage F was split into F1 and F2, BSRIA has retained its split of this stage into three sub-stages. The previous pro-formas F1a and F1b are now pro-formas 4a and 4b respectively. The remainder of the previous Stage E that is not in Stage 3 is also incorporated into pro-forma 4a. The previous pro-forma 5c now becomes new pro-forma 4c.

The old RIBA Stages J and K which were covered in the previous pro-forma 6 have now been replaced with new RIBA Stages 5 and 6 although the split between these pairs of Stages has changed significantly. These stages can now be found in the new pro-formas 5 and 6. The new Stage 6 deals with project handover at the end of construction and the first year of aftercare. Stage 7 deals with the remainder of the Soft Landings activities and other feedback and evaluation activities.

With the range of procurement routes and project supply chain structures now available, it is important for clients using BG 6 to remember that their project may not need all the drawing types or models defined in Appendix A to be provided. Even where a particular drawing or model deliverable is not required, the design activities from the relevant pro-forma in Appendix A may still be required and should be indicated as such.
Note that Appendix A includes some very specific items of design activity which are often overlooked in the design, manufacture and construction of mechanical, electrical and public health services. However, the absence of a design activity from Appendix A does not imply that such activity will not be required for a building project. Similarly, there will probably be design activities listed in the standard pro-formas that are not required for a given project. In this case, these activities should be struck through, so that everyone reading the pro-forma for that project knows they are not required.

To complete Appendix B, first tailor the list of building services systems by deleting those not included in the project and adding specialist systems that have not been listed. Second, put the appropriate reference in each cell of the matrix to indicate who is going to produce each appropriate type of drawing and type of builders’ work information associated with each system.

The pro-formas in Appendices A and B are intended to encourage discussion between those procuring design services and those supplying design services. Agreement should be reached on who will provide which design services.

Pro-formas can be used as the basis for a series of bilateral agreements between the client and each consultant regarding which design activities are being covered by that consultant’s terms of appointment and fee. In this case it is the client’s responsibility to make sure that all necessary design activities are properly allocated to a consultant, or clearly identified as being part of the installer’s contract. This use can arise in any form of procurement, but is more likely under traditional forms of contract.

Contractors can also use the pro-formas in this way when specifying the design activities to be carried out by specialist sub-contractors, or by consultants in design and build projects.

Pro-formas can also be used as the basis for agreement between members of the project team (consultants, contractors, and manufacturers) on which design activities are to be carried out by each team member, bearing in mind that one party cannot unilaterally make decisions about what activities other parties will take on. This use is most likely on projects where integrated team working is being used, and when the pro-formas are the basis of early collaborative discussions between all members of the team to identify who is best placed to carry out each design activity. The conclusions of these discussions will need to be reflected in fee discussions and terms of engagement.

Pro-formas can also be used to flag up activities which have not yet been allocated to any project team member. Here, the pro-formas are a part of the project risk management process.
As part of the effort to improve project delivery, new information has been required to help the industry understand BIM and then to be able to implement it within their working environment. The RIBA Plan of Work\(^1\) has been updated to reflect BIM roles. It now consists of eight stages defined by the numbers 0-7, and by eight task bars. The use of numbers for the stages replaces the letters used in previous versions.

Figure 4: Extract from the RIBA Plan of Work 2013 Overview document\(^1\)

Activities related to BIM are covered in task bar 5: Suggested Key Support Tasks.
Heating plant
2431 L x 9145 W x 2500 H
Gas boilers, pumps, headers, pipework and ancillaries, access space

Ventilation plant area
9353 L x 23792 W x 3000 H
AHUs, ductwork and access space

Cooling plant
30882 L x 5645 W x 3000 H
Chillers, pumps, headers, pipework & ancillaries, space for access and airflow. Louvred walls required

Electrical switchgear
18755 L x 5645 W x 2500 H
2 No rooms for essential and no-essential supplies

Electrical distribution zone
4500 L x 24186 W x 3000 H
Main distribution boards and primary cabling

Ventilation plant area
9017 L x 9582 W x 3000 H
AHUs, ductwork and access space

Ventilation plant area
7986 L x 24186 W x 3000 H
AHUs, ductwork and access space

Design Framework for Building Services
Concept design model 1
Note that neither the grouping of design activities within each design stage nor the order in which they are listed are intended to convey a sequence of design activity. Activities which are not required must be struck through.

Pro-forma 7 covers any remaining soft landings or other post-occupancy activities in the second and third years after occupation.

### PRO-FORMA 7: IN USE (RIBA STAGE 7)

<table>
<thead>
<tr>
<th>Ref</th>
<th>Design activity in connection with building services</th>
<th>Allocated to … (one party only)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>General obligations, external liaison (statutory bodies, and utilities)</td>
<td>A B C D E Z</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Client liaison (briefing, handover, and surveys)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.2.1</td>
<td>Carry out Post Occupancy Evaluation.</td>
<td></td>
<td>Specify extent and tools to be used</td>
</tr>
<tr>
<td>7.2.2</td>
<td>Hold regular meetings with user representatives during Years 2 to 3 of occupation.</td>
<td></td>
<td>Specify frequency, e.g. every 6 months in Years 2 and 3</td>
</tr>
<tr>
<td></td>
<td>Team liaison (builders’ work, spatial coordination, energy targeting)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Selection of plant and specialist designers</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mechanical design</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Electrical design</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Public health design</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Commissioning</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Deliverables – including drawings, specifications, reports</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.9.1</td>
<td>Provide written reviews of energy use and system performance (as defined in the Soft Landings framework).</td>
<td></td>
<td>Define frequency of reviews</td>
</tr>
<tr>
<td>7.9.2</td>
<td>Provide updated as-built model incorporating any changes resulting from Years 2 and 3 aftercare.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.9.3</td>
<td>Provide updated record drawings incorporating any changes resulting from Years 2 and 3 aftercare.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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