Active Building RIBA Plan of Work Checklists

Version 2.0, August 2020

Introduction

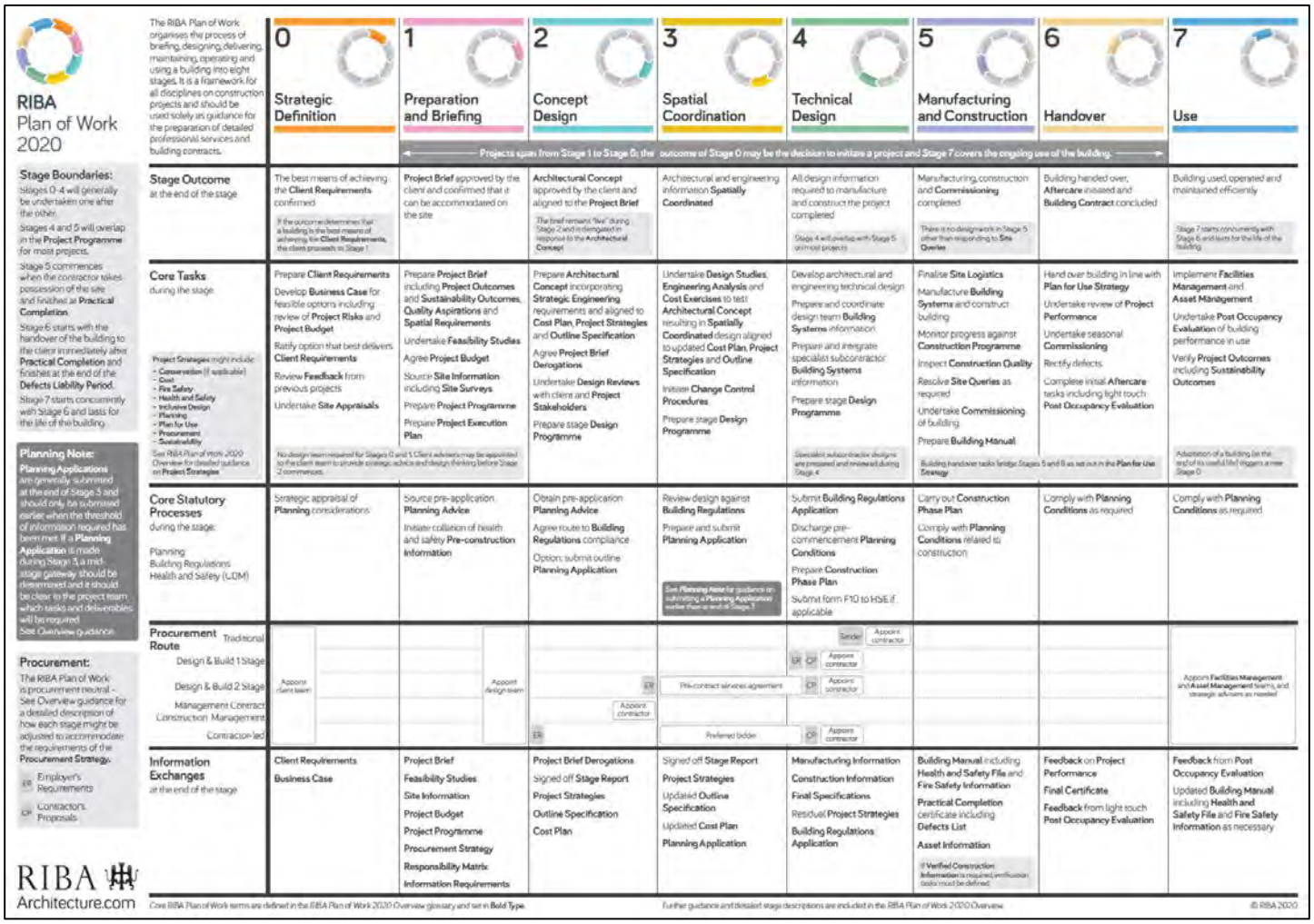
This document is part of a toolkit, providing checklists at each of the RIBA Work Stages to ensure design, delivery and operation of an Active Building.

Purpose

- Provide checklists to ensure Active Building principles have been considered at each stage in the project

The document should be read in conjunction with the following documents:

- RIBA Plan of Work 2020
- Active Building Design Guide
- Active Building Code of Conduct
- Active Building Project Template
- The Active Classroom Case Study
- The Active Office Case Study
- Active Building Technology Showcase
- Planning Policy Documents
- Approved Documents



https://www.architecture.com/-/media/GatherContent/Test-resources-page/Additional-Documents/2020RIBAPlanofWorktemplatepdf.pdf

It is always recommended to use a collaborative procurement route for Active Building projects and to bring the whole Project Delivery Team together at the earliest possible stage in the project.

0 Strategic Definition

Core Tasks: *Prepare **Clients Requirements***

*Develop **Business Case** for feasible options including review of **Project Risks** and **Project Budget***

*Ratify option that best delivers **Client Requirements***

*Review **Feedback** from previous projects*

*Undertake **Site Appraisals***

Note: Tasks identified here are those specific to **Active Building** projects, in addition to the Core Tasks

Key Considerations for Active Building	**Core Active Building Tasks**	**Done**
• Client aspirations (level of 'Active') • Desire for EV charging integration • Business case • Whole Life Cost (WLC) considerations • Site analysis - location, orientation, features • Planning Policy and local vernacular • Key stakeholders • Project Delivery Team	Review Active Building case studies, data and lessons learnt	
	Review Active Building Toolkit documents	
	Define Active Building requirements for project	
	Set objectives for Project Delivery Team	
	Identify key stakeholders	
Ensure Active Building requirements are included in all contractual documents related to the Active Building project		
Stage Outcome	*The best means of achieving the **Client Requirements** confirmed*	
Active Building Outcomes for Stage 0	• Level of Active Building agreed and written into the Project Brief for client sign off • Agreement to share and publish monitoring data throughout the project, at design, construction and in use stages, to enable feedback	
Information Exchanges	• *Project Delivery Team* – ***Active Building Toolkit*** • *Client Requirements* – including **Active Building Project Brief** • *Business Case* – including **Active Building Business Case**	
Comments:		

0 Strategic Definition

Further information:

1 Preparation and Briefing

Core Tasks: *Prepare* ***Project Brief*** *including* ***Project Outcomes*** *and* ***Sustainability Outcomes***, ***Quality Aspirations*** *and* ***Spatial Requirements***

Undertake ***Feasibility Studies***

Agree ***Project Budget***

Source ***Site Information*** *including* ***Site Surveys***

Prepare ***Project Programme***

Prepare ***Project Execution Plan***

Note: Tasks identified here are those specific to Active Building projects, in addition to the Core Tasks

Key Considerations for Active Building	Core Active Building Tasks	Done
• Feasibility: site features, orientation, potential to site environmental features of site • Existing site infrastructure available • Access to local energy networks • Data capabilities of local networks • Data monitoring requirements • Performance specifications • Scope for renewable energy generation on site • Types of energy storage • Types of EVs anticipated for use (may be linked to building type and occupancy)	Develop feasibility study on proposed site(s), incorporating site analysis and constraints – financial, site, other	
	Develop high level data monitoring and performance specifications	
	Arrange early stakeholder engagement sessions	
	Start photographic record	
	Utilise appropriate design tools, such as Passive House Planning Package (PHPP) and Good Homes Alliance (GHA) Overheating tool (for new homes) in early design decision making	
	Identify options for renewable energy generation	
	Identify potential energy storage technologies for heat and electricity	
	Identify potential locations for EV charging facilities	
	Identify options for linking to local and national energy networks	

Ensure Active Building requirements are included in all contractual documents related to the Active Building project

Stage Outcome	***Project Brief*** *approved by the client and confirmed that it can be accommodated on the site*
Active Building Outcomes for Stage 1	• Client approval to develop project to be an Active Building • Level of Active Building agreed
Information Exchanges	• *Feasibility Studies* – including **Active Building Energy Strategy** & Site Analysis • *Site Information* • *Project Budget* – including uplift for **Active Building** measures and early **LCC Report** • *Project Programme* • *Procurement Strategy* – **collaborative route** suggested with early **contractor engagement** • *Early LCA* • *Responsibility Matrix* • *Information Requirements*

1 Preparation and Briefing

Comments:
Further information:

2 Concept Design

Core Tasks: *Prepare* ***Architectural Concept*** *incorporating* ***Strategic Engineering*** *requirements and aligned to* ***Cost Plan***, ***Project Strategies*** *and* ***Outline Specification***

Agree ***Project Brief Derogations***

Undertake ***Design Reviews*** *with client and* ***Project Stakeholders***

Prepare stage ***Design Programme***

Note: Tasks identified here are those specific to Active Building projects, in addition to the Core Tasks

Key Considerations for Active Building	Core Active Building Tasks	Done
• Building form factor • Site positioning • Locations of incoming services • Construction methods and materials – Life Cycle Assessment (LCA) considerations • Energy Strategy • Renewable energy generation capacity • Available generation surfaces – building and site wide • Optimum energy storage capacity • Life Cycle Costing (LCC) • Provision of green infrastructure to reduce run-off and provide biodiversity • Spatial requirements for EV charging bays, adjacent to suitable infrastructure where possible • Types of EV charging facilities required, e.g. for e-bikes, e-scooters, e-cars, e-vans, e-buses	Develop simple massing model and initial energy model based on early design scheme(s) to determine predicted energy consumption and generation	
	Develop a report on early design(s) and recommendations for steps to enable Active Building elements	
	Prepare information to support early Life Cycle Costing (LCC) to support the aim to reduce whole life costs and to aid decision making on specifications	
	Collate information on Active Building technologies to support the Design and Access statement (DAS) for planning application	
	From site analysis, identify optimum site position for building in relation to site features and energy generation	
	Use outputs from energy model to determine optimum size of energy storage systems for both heat and electricity	
	Design for EV integration, including charging facilities, e-bike storage shelters, PV parking canopies	
	Determine electricity network connection locations and positioning of data hub	

Ensure Active Building requirements are included in all contractual documents related to the Active Building project

Stage Outcome	***Architectural Concept*** *approved by the client and aligned to the* ***Project Brief***
Active Building Outcomes for Stage 2	• Active Building elements approved by client • Active Building Strategy developed
Information Exchanges	• *Project Brief Derogations* • *Signed off Stage Report* – including **Active Building Assessment** • *Project Strategies* • *Outline Specifications* – including **Active Building technologies** and early **LCA** considerations • *Cost Plan* – including early **LCC Report** • **Initial massing** and **energy models**

2 Concept Design

Comments:
Further information:

3 Spatial Coordination

Core Tasks: *Undertake* ***Design Studies***, ***Engineering Analysis*** *and* ***Cost Exercise*** *to test* ***Architectural Concept*** *resulting in* ***Spatially Coordinated*** *design aligned to updated* ***Cost Plan***, ***Project Strategies*** *and* ***Outline Specification***

Initiate ***Change Control Procedures***

Prepare stage ***Design Programme***

Note: Tasks identified here are those specific to Active Building projects, in addition to the Core Tasks

Key Considerations for Active Building	Core Active Building Tasks	Done
• Energy strategy based on the reduced energy loads created through building fabric and passive design • Renewable energy strategy – is it possible to generate more than consumed? Can the building form be adapted to increase generation surfaces if needed? • Spatial requirements for energy storage systems and their integration with equipment used for heating, ventilation, cooling, vertical circulation, lighting and small power • Spatial requirements and landscape features associated with EVs • Spatial and power requirements for data monitoring and communication systems	Use evidence from concept model to determine options for renewable energy generation technologies	
	Identify predicted energy loads versus generation capacity	
	Develop an energy strategy	
	Develop performance specifications for an Active Building	
	Undertake early LCA and LCC	
	Design for adaptability – spatial and building services	
	Establish potential energy generation sources and capacity of energy storage required. Determine spatial requirements, including ancillary equipment (such as inverters, charge controllers, meters). Consider access to energy storage for ongoing maintenance	
	Determine number and type of EV charging facilities required depending on client aspirations and building occupancy	
	Start developing software to enable communication between the BMS and the grid to enable smart export and import regimes to be implemented	
	Ensure tendering contractors understand Active Building concepts and how to achieve Active Building requirements	
Ensure Active Building are included in all contractual documents related to the Active Building project		

Stage Outcome	*Architectural and engineering information* ***Spatially Coordinated***
Active Building Outcomes for Stage 3	• Active Building technologies incorporated
Information Exchanges	• *Signed off Stage Report* • *Project Strategies* • *Updated Outline Specifications* - including **Active Building technologies** • *Updated Cost Plan* • *Planning Application* – including **Active Building Energy Strategy**

3 Spatial Coordination

Comments:
Further information:

4 Technical Design

Core Tasks: *Develop architectural and engineering technical design*

Prepare and coordinate design team ***Building Systems*** *information*

Prepare and integrate specialist subcontractor ***Building Systems*** *information*

Prepare stage ***Design Programme***

Note: Tasks identified here are those specific to Active Building projects, in addition to the Core Tasks

Key Considerations for Active Building	Core Active Building Tasks	Done
• Specification of materials – LCA considerations • Form of construction • Use of local resources • Specifications of technologies and systems • Specifications of energy generation technologies and assessment of their compatibility with other building services • Specifications of energy storage systems and their integration with the energy strategy and equipment used for heating, ventilation, cooling, vertical circulation, lighting and small power • Specifications of EV charging facilities • Specifications of communication and monitoring systems	Develop detailed building physics/dynamic thermal model	
	Review design information and Mechanical, Electrical and Plumbing (MEP) strategy	
	Review technical specifications developed to ensure Active Building technologies included – assess equipment required to suit the energy generation and storage, and incorporate into the energy strategy.	
	Consider most appropriate types of energy storage (heat and electrical)	
	Review specifications against LCA and LCC criteria	
	Develop data monitoring specifications	
	Ensure use of Active Building naming schema for BMS	
	Develop a control strategy for EV integration into the BMS	
	Specify control systems to enable controlled interaction of energy with local and national grid networks	

Ensure Active Building requirements are included in all contractual documents related to the Active Building project

Stage Outcome	*All design information required to manufacture and construct the project completed*
Active Building Outcomes for Stage 4	• All information on Active Building technologies incorporated into design information • Active Building data monitoring specifications developed
Information Exchanges	• *Manufacturing Information* • *Construction Information* • *Final Specifications* – including **Active Building Data Monitoring Specification** • *Residual Project Strategies* • *Building Regulations Application* • **Active Building Report** based on energy modelling • **Active Building Information Pack** for toolbox talks

4 Technical Design

Comments:
Further information:

5 Manufacturing and Construction

Core Tasks: *Finalise* ***Site Logistics***

Manufacture ***Building Systems*** *and construct building*

Monitor progress against ***Construction Programme***

Inspect ***Construction Quality***

Resolve ***Site Queries*** *as required*

Undertake ***Commissioning*** *of building*

Prepare ***Building Material***

Note: Tasks identified here are those specific to Active Building projects, in addition to the Core Tasks

Key Considerations for Active Building	Core Active Building Tasks	Done
• Thermal performance of fabric, potential for thermal bridging and level of air-tightness • Retention of low embodied carbon materials and construction techniques • Use of local resources and labour where possible • Correct installation and commissioning of all equipment, renewable energy technologies and energy storage systems to ensure building performs as designed • Correct installation and commissioning of EV charging equipment to enable controlled charging regimes	Deliver Active Building toolbox talks for in-factory and on-site inductions, management and commissioning	
	Undertake regular site inspections to ensure the delivery of an Active Building, including thermography and air-tightness tests	
	Document installation of technologies and equipment, including site photographs	
	Ensure BMS installer has and uses Active Building naming schema, and all necessary monitoring is in place	
	Ensure correct installation of MEP equipment aligned with Active Building philosophy	
	Ensure smart charging facilities are incorporated to enable optimised control	
	Ensure rigorous commissioning and testing to ensure all systems are performing as per the design intent, before building is signed off and handed over	
	Ensure building is connected to local and national grid networks in a manner to enable controlled import and export of energy	

Ensure Active Building requirements are included in all contractual documents related to the Active Building project

Stage Outcome	*Manufacturing, construction and* ***Commissioning*** *completed*
Active Building Outcomes at Stage 5	• Active Building training completed • Active Building technologies installed and commissioned
Information Exchanges	• *Building Manual including Health and Safety File and Fire Safety Information* – plus information on **Active Building technologies** and **Data Monitoring Strategy** • *Practical Completion certificate including Defects List* • *Asset Information*

5 Manufacturing and Construction

Comments:
Further information:

6 Handover

Core Tasks: *Hand over building in line with* ***Plan for Use Strategy***

Undertake review of ***Project Performance***

Undertake seasonal ***Commissioning***

Rectify defects

Complete initial ***Aftercare*** *tasks including light touch* ***Post Occupancy Evaluation***

Note: Tasks identified here are those specific to Active Building projects, in addition to the Core Tasks

Key Considerations for Active Building	Core Active Building Tasks	Done
• Information for building user manual	Provide information for Operation & Maintenance (O & M) manuals, including detailed information on: • the construction materials and methods • building services • renewable energy technologies and associated equipment • energy storage systems, including instructions for shutting down the energy storage system, in the case of emergency or to undertake maintenance • EV charging systems • control systems • monitoring regimes Include clear diagrams	
	Review the whole design and construction process with Project Delivery Team and capture lessons learnt	
	Undertake post-project review workshop with all stakeholders	
	Deliver handover workshops with building owners/occupiers/Facilities Management Team (FMT)	

Ensure Active Building requirements are included in all contractual documents related to the Active Building project

Stage Outcome	*Building handed over,* ***Aftercare*** *initiated and* ***Building Contract*** *concluded*
Active Building Outcomes for Stage 6	• Active Building user manual completed • Active Building data monitoring in place for optimised building operation, planned maintenance regimes, and predictive control strategies
Information Exchanges	• *Feedback on Project Performance* – **Post Project Review**, including Lessons Learnt • *Final Certificate* • *Feedback from light touch Post Occupancy Evaluation (POE)* • **Building User Handbook**

6 Handover

Comments:
Further information:

7 Use

Core Tasks: *Implement Facilities Management and Asset Management*

*Undertake **Post Occupancy Evaluation** of building performance in use*

*Verify **Project Outcomes** including **Sustainability Outcomes***

Note: Tasks identified here are those specific to Active Building projects, in addition to the Core Tasks

Key Considerations for Active Building	Core Active Building Tasks	Done
• Building Performance Evaluation (BPE) • Post Occupancy Evaluation (POE) • Impacts of adaptations, renovations, fit-out • Optimisation of systems	Undertake BPE using installed monitoring equipment	
	Capture data in Active Building database and assess optimised performance of systems	
	Ensure O & M and building user manuals are kept up-to-date as necessary	
	Undertake Whole Life Cost reporting, based on LCC report, cost savings and any income generated from the sharing of energy with local and national grid networks	
	Develop/determine POE assessment method and undertake POE with building users and FMT	
	Ensure generation technologies are working effectively. Monitor generation against consumption – identify any unanticipated discrepancies and resolve	
	Ensure energy storage systems are working effectively.	
	Develop predictive control strategies to optimise use of energy storage in conjunction with energy generation and consumption, and electric vehicle charging	
	Ensure EV charging systems and controls are working effectively	
	Develop planned maintenance regimes to ensure technologies and equipment are working optimally	

Ensure Active Building requirements are included in all contractual documents related to the Active Building project

Stage Outcome	*Building used, operated and maintained efficiently*
Active Building Outcomes for Stage 7	• Active Building data monitoring is working effectively • Active Building technology is monitored and adapted as needed
Information Exchanges	• *Feedback from Post Occupancy Evaluation (POE)* • *Updated Building Manual including Health and Safety File and Fire Safety Information* • **Life Cycle Cost (LCC) Report** • **Life Cycle Analysis (LCA) Report** • Updated **Active Building Database**

7 Use

Comments:
Further information: