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**MODEL EMPLOYER’S REQUIREMENTS AND DESIGN BRIEF CLAUSES**

FOR

**REGISTERED PROVIDERS**

RE

**PERFORMANCE STANDARDS FOR ENERGY, EMISSIONS, HEALTH, COMFORT AND**

**BUILDING PERFORMANCE EVALUATION**

Version 3 - June 2021

1. **INTRODUCTION AND DESCRIPTION OF CONTENTS**

The clauses in this document are designed for inclusion in Employer’s Requirements and Design Guides and are principally intended to:

* Drive up standards by placing new build housing developments on a trajectory to net zero carbon and avoiding the need for retrofit work to be undertaken in future.
* Improve and enhance the comfort, health, well-being and satisfaction of occupants while additionally maintaining provision of affordable warmth.
* Ensure that homes are built to perform in accordance with the design stage intentions (or better) by closing the ‘performance gap’.

The clauses provide minimum requirements set out as a performance specification which can be used in connection with both self-promoted and Section.106 developments, they should not be relied upon for any other purpose. Additionally, the clauses seek to clarify the responsibilities of designers and developers in satisfying the requirements.

These clauses have been written on the basis that developments are procured on a ‘Design and Build’ contractual basis. In the case of S.106 schemes, where Development Agreements exist, these will be relevant in terms of negotiating client requirements over and above a standard Developer’s specification.

The model requirements have been developed with reference to the following guidance which they shall be read in conjunction with to enable full interpretation and understanding:

* **London Energy Transformation Initiative (LETI)**
  + ‘Climate Emergency Design Guide’, January 2020 - <https://www.leti.london/cedg>.
* **The Future Homes Standard\***
  + Section B of the of the Future Buildings Standard consultation document:
    - <https://www.gov.uk/government/consultations/the-future-buildings-standard>, and:
    - <https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/956094/Government_response_to_Future_Homes_Standard_consultation.pdf>.
  + Specifically, the draft guidance in relation to Approved Documents L, F: Volume 1 dwellings, and the draft guidance on overheating:
    - <https://www.gov.uk/government/publications/building-regulations-approved-documents-l-f-and-overheating-consultation-version>.
* **Wood Knowledge Wales**
  + Building Performance Evaluation Guide, January 2021.
    - <https://woodknowledge.wales/wkw-resource/building-performance-evaluation-guide>, together with the [downloadable toolkit](https://woodknowledge.wales/wp-content/uploads/2021/03/BPE_Toolpack_doc.pdf).

\*At the time of preparing these clauses revisions to the Building Regulations remain under consultation. Designers and Developers shall work to the latest available version of the consultation and publicised draft guidance as per the Future Homes Standard as it is expected to be introduced in full by 2025.

It is recommended that these clauses are applied to development schemes that are at the pre-planning and conceptual design stage only. Attempting to apply the clauses retrospectively to schemes in detailed design or post planning is highly unlikely to deliver the desired quality outcomes and may result in unintended consequences.

It is stressed that the Model Employer’s Requirements and Design Brief clauses are provided for guidance purposes only. On a scheme-by-scheme basis the client, in agreement with the design team, may opt to adopt these clauses in full, partially or to adapt.

These clauses are not designed to be stand alone or replace existing client requirements, rather they are intended to be complimentary and as such must be appropriately integrated.

1. **PERFORMANCE STANDARDS FOR ENERGY & EMISSIONS**

**2.1 Self promoted development (land led)**

All new housing shall be designed and built to meet the LETI Climate Emergency Design Guide performance standards and as appropriate to small scale (low rise) and medium & large scale (4 stories and above) housing, see <https://www.leti.london/cedg>.

Refer to table 1 appended to this document for a summary of the required performance which is to be met. *TABLE 1 - Minimum energy related design performance requirements (for land led developments)*

The following LETI recommendations are optional under Version 1 of this document and where required to be followed will be instructed by the client to the design team:

* Energy Use Intensity
* Embodied Energy
* Demand response
* Data disclosure and metering[[1]](#footnote-1)

In any instances where design or other constraints are such that it is not possible or practicable to comply with the required performance set out in table 1, any departures or deviations from the minimum performance standards shall be notified by the contractor/developer and agreed in advance between the design team and the client.

Where the client’s development scheme brief sets higher performance requirements than LETI/ table 1, then these shall take precedence. Similarly, in respect of requirements of the Local Plan of the relevant Planning Authority which again shall take precedence.

**2.2 Section 106 developments**

The requirement for S.106 developments is compliance with the Future Homes Standard\* (as at its proposed for full introduction to Building Regulations expected in 2025). In all cases the Future Homes Standard is the required baseline for design and build of developments and this requirement shall be the starting point for client negotiation with developers.

* Draft Government guidance on Approved Documents Part L, F including Overheating and enhanced performance shall be used until such time that the Future Homes Standard is published in full prior to introduction to the Building Regulations, see:
  + <https://www.gov.uk/government/consultations/the-future-buildings-standard>.
  + <https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/956094/Government_response_to_Future_Homes_Standard_consultation.pdf>.
  + <https://www.gov.uk/government/publications/building-regulations-approved-documents-l-f-and-overheating-consultation-version>.

1. **PERFORMANCE STANDARDS FOR OCCUPANT HEALTH & COMFORT**

**3.1 Self promoted development (land led)**

With reference to table 2 appended to this document, all new housing shall be designed and built to as a minimum meet the compulsory ‘Core’ BPE performance in-use standards for internal environmental conditions and in relation to following criteria:

1. Thermal comfort
2. Moisture
3. Air quality
4. Daylight
5. Acoustics

Optional performance requirements and ‘Detailed’ BPE activity indicated in *italics* in table 2 shall be addressed when instructed by the client.

With regard to ‘a’ above, thermal comfort, the following compulsory requirements are to be followed and achieved for all developments as a minimum to mitigate overheating risk:

* Early stage overheating analysis using the GHA guidance and tool (<https://goodhomes.org.uk/overheating-in-new-homes>), carried out by a competent professional.

Where the tool reveals a ‘medium’ or ‘high’ risk of overheating, then:

* A full dynamic thermal modelling assessment is to be undertaken at the design stage and all new housing units must comply with CIBSE TM59 requirements ‘Design methodology for the assessment of overheating risk in homes (2017)’. Modelling shall be carried out using appropriate tools by competent professionals. Revisions shall be made to the design as necessary to satisfactorily mitigate risk and in agreement with the client and design team <https://www.cibse.org/knowledge/knowledge-items/detail?id=a0q0O00000DVrTdQAL>.

In addition to the above, designers and developers shall:

* Refer to and comply with the GHA ‘Overheating Risk Assessment’ clauses for incorporation in Employer’s Requirements and Design Brief (appended to this document).
* Comply with LETI Climate Emergency Design Guidance in relation to overheating mitigation (see also table 1, Window areas guidance and associated design guidance).
* Follow the guidance set out in the ‘Acoustics Ventilation and Overheating’ Residential Design Guide in relation to overheating risk prepared by the Association of Noise Consultants, Jan 2020 v1.1

<https://www.association-of-noise-consultants.co.uk/wp-content/uploads/2019/12/ANC-AVO-Residential-Design-Guide-January-2020-v1.1-1.pdf> and:

* Satisfy the new Part L SAP overheating assessment.

In view that the ‘Space Heating Demand’ performance requirements of LETI are such that dynamic modelling is expected to be required to demonstrate performance, the opportunity to use this modelling routinely also for the purposes of CIBSE TM 59 Overheating risk assessments should be considered by the client and design team.

**3.2 Section 106 developments**

All new homes are required to meet the minimum regulatory standards and requirements in respect of Health and Comfort as proposed in the Future Homes Standard\* (as at its full introduction to Building Regulations expected in 2025).

Draft Government guidance on Approved Documents Part L, F including Overheating and enhanced performance shall be used until such time that the Future Homes Standard is published in full prior to introduction to the Building Regulations, see: <https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/956094/Government_response_to_Future_Homes_Standard_consultation.pdf>.

With regard to mitigating overheating risk, the following compulsory requirements are to be followed for all s.106 developments as a minimum:

* Undertake early stage overheating analysis using the GHA guidance and tool (<https://goodhomes.org.uk/overheating-in-new-homes>), carried out by a competent professional.

Where the tool reveals a ‘medium’ or ‘high’ risk of overheating, then:

* A full dynamic thermal modelling assessment is to be undertaken at the design stage and all units must comply with CIBSE TM59 requirements ‘Design methodology for the assessment of overheating risk in homes (2017)’. Modelling shall be carried out using appropriate tools by competent professionals. Revisions shall be made to the design as necessary to satisfactorily mitigate risk and agreed with the client and design team, see: <https://www.cibse.org/knowledge/knowledge-items/detail?id=a0q0O00000DVrTdQAL>.

In addition:

* Follow the guidance set out in the ‘Acoustics Ventilation and Overheating’ Residential Design Guide in relation to overheating risk prepared by the Association of Noise Consultants, Jan 2020 v1.1

<https://www.association-of-noise-consultants.co.uk/wp-content/uploads/2019/12/ANC-AVO-Residential-Design-Guide-January-2020-v1.1-1.pdf> and:

* Satisfy the new Part L SAP overheating assessment.

1. **BUILDING PERFORMANCE EVALUATION** (not applicable to s.106 unless instructed by the client)

**4.1 Self promoted/ land led development**

All new housing shall undergo a programme of Building Performance Evaluation (BPE) in-use and shall strictly follow the guidance and recommended approach set out in The Wood Knowledge Wales (WKW) - Building Performance Evaluation Guide Jan 2021, see <https://woodknowledge.wales/wkw-resource/building-performance-evaluation-guide>. The BPE shall be supported by testing and monitoring performance in use.

Refer to the compulsory ‘Core’ BPE requirements as set out in table 2. *TABLE 2 - Minimum Building Performance Evaluation (BPE) in-use & Health and Comfort performance requirements (for Land led developments)*

The principal approach to BPE set out in this document is that in addition to satisfying regulatory requirements, the WKW ‘Guidance on ‘Core’ BPE techniques as set out below should be followed:

* Design and documentation review
* Commissioning
* Handover review
* Site visits
* Energy strategy review
* Airtightness review, site checks & tests
* Thermal bridging & moisture review and site checks
* Early stage overheating analysis (GHA) – as above
* Acoustic checks & testing[[2]](#footnote-2) of ventilation system
* User surveys

And optionally, to suit client instructions the following which are recommended:

* Energy use audit
* Water use audit

The client shall issue instructions where optional or ‘Detailed’ BPE is required as set out by WKW, which may be triggered as a result of the findings from the ‘Core’ BPE programme. The costs associated with undertaking additional ‘Detailed’ BPE techniques will be covered by the client.

The objective for BPE is that the client, design team and contractor/ developer work closely together and use all reasonable endeavours and diligence to deliver housing which achieves the performance standards in use (under occupation). Following the WKW guidance will significantly help to deliver this aim. The developer shall be included in the BPE process, its planning and costing at the earliest available opportunity following their identification.

It is not proposed that the contractor/ developer should face penalties in the event that performance standards are not able to be met in full. This is also in recognition that many aspects of actual performance are determined by user behaviour.

In accordance with the WKW guidance, all development projects are required to use - or adapt to make scheme specific - the downloadable WKW ‘Toolkit’ (see p.6) and produce a BPE Project timetable (p.9).

The key stages for BPE activity are listed below and the relevant WKW prompt sheet shall be utilised at each (WKW p.19):

* Design (with consideration to BPE given from the conceptual design stage)
* In construction
* Completion and handover
* In use

and

* Evaluation BPE

Refer to the resources in the downloadable WKW Toolkit (from p.125 in main guidance) for details of:

* Project timeline
* Client sheets (see also table 2)
* Prompt sheets
* Review sheets (including document review)
* Core BPE techniques
* Optional Detailed BPE techniques

**4.2 Overall responsibility for BPE (Appointment of a BPE Champion)**

The client shall, at the earliest possible opportunity in the design stage, appoint a person or consultant who will take overall responsibility for BPE and ensure that the provisions of the clauses here-in are acted upon. This role is referred to as the ‘BPE champion’. The client shall be responsible for meeting the costs of the BPE Champion.

The BPE Champion should ideally be independent of the design team and contractor and must be sufficiently competent to fulfil their responsibilities. If the BPE Champion is a member of the client’s staff or where it is appropriate that they are appointed from within the project design team[[3]](#footnote-3) then they should in so far is possible act impartially. The BPE Champion should neither be appointed by the contractor or be an employee.

Note that the BPE Champion may not necessarily be the same person as that who carries out site checks, evaluates monitoring and prepares the BPE report, they may act in more of a overall BPE coordination and evaluation role.

**4.3 BPE budget and responsibilities**

The contractor is responsible for allowing for all costs associated with ‘Core’ BPE activity, quality control, testing and the like as set out in table 2.

It is the recommended approach that the client in conjunction with the BPE Champion and design team prepare a development specific schedule of all BPE activities, services, testing and monitoring in detail. The schedule should be produced at the earliest possible stage in the design process and updated later as required for issue with the tender documents to contractors so that this may be competitively priced against by all tenderers.

Where it is not possible to issue the schedule of BPE at the tender stage, then for guidance, it is recommended that the following minimum provisional sum allowances are made and shown separately within the contractor’s tender breakdown. This is to ensure that the costs associated with appropriately executing BPE requirements are not overlooked which could otherwise be detrimental to achievement of the desired outcomes.

|  |  |
| --- | --- |
| **Number of homes in development** | **BPE provisional sum allowance as a % of total build costs (£)**  NB: This figure is to be calculated by the Employer’s agent who shall advise all tenderers for the purposes of consistency and shall exclude land and any abnormal costs. The total build costs relate to all units included in the development. |
| <50 | 1.00 % |
| 50 - 100 | 0.75 % |
| >100 | 0.50 % |

For clarity, the contractor is responsible for the costs associated with, but not limited to, covering the following in order to meet the ‘Core’ BPE requirements detailed in table 2:

* All BPE activity including management and coordination
* Quality control including site inspections
* General testing and commissioning
* Specialist testing required for ‘Core’ BPE
* Supply and installation of monitoring equipment to every unit including meters, sensors, data loggers and communication costs
* O&M manual including BPE activity records
* Handover information including easy to understand ‘end user’ guidance
* Attendance and participation in the Development BPE review meeting

The client shall be responsible for the on-costs which should be factored into the client’s development appraisals as required:

* The BPE champion
* Evaluation, analysis and interpretation of monitored performance data
* BPE report
* Additional services required of the design team (other than the contractor) or other consultants to implement the required BPE and to uphold quality standards
* Optional specialist testing over and above ‘Core’ BPE requirements i.e. for ‘Detailed’ BPE activities
* Occupant briefings (this may require new staff resources) and associated materials, videos etc
* Occupant ‘quick start’ guides

The contract sum shall be inclusive of BPE actively regardless of whether this is priced specifically or as a provisional sum.

**4.4 BPE for multiple similar units**

All new units are to undergo the ‘Core’ BPE set out in the WKW guidance. For developments with multiple units which are of an identical/ similar type, once a satisfactory standard of performance has been proven by results, scope may exist through agreement between the client, design team and BPE Champion for a reduction in the scale of the full programme of BPE. Thereafter, for example, it might be appropriate to select representative samples as a percentage (%) of the total number of common units to undergo full BPE - as set out in these clauses and the WKW guidance - without significantly weakening the findings from the overall BPE study or having reason to doubt that performance is not being upheld. Random BPE checks/ spot checks could be deployed.

This approach may also be appropriate for large scale developments subject to phasing in agreement with the client and again where the contractor has demonstrated that the performance standards required have been consistently achieved (following development review meetings).

‘Detailed’ BPE and/ or ‘Deep Dive’ approaches for a limited intensive period to selected units will be beneficial to bring greater insight of actual outcomes. Where these techniques are deployed, it is recommended that at least three comparative examples of the common house types are selected. The findings and results should be included in the final BPE report.

**4.5 BPE report**

All development projects are required to produce a report summarising the learning and findings of the BPE report and user feedback (Post Occupancy Evaluation). This is to follow completion of a 12 month period of monitoring under occupation and will ordinarily coincide with the end of the Defects Liability Period (DLP). Any alternative duration of monitoring periods shall be agreed with the client in advance. The report is the key outcome from BPE activity and as such shall be produced by a competent professional which may be the BPE Champion. Conventions regarding occupancy patterns and hours shall be clearly stated where occupancy monitoring is not undertaken.

The BPE report shall provide honest transparency of results with any problems or deficiencies in performance clearly disclosed in addition to highlighting positive outcomes.

Refer also to WKW clause 3.5 (p.20) ‘Making sense of it all: Gaining a holistic view on Building Performance’ and the associated diagram in the Toolkit.

**4.6 BPE and development review meeting**

Within 3 months of the end of the DLP, the BPE report shall be submitted to the client, members of the design team, the developer and other stakeholders, and at which point a development review meeting shall be held to review the BPE report. It is a condition of all relevant design team member appointments and the contract with the developer that all of these parties shall participate in and actively contribute to this review.

Should the BPE review reveal that further investigation or BPE is necessary, this will be advised by the client who will additionally meet the costs other than in the event of negligent actions by contracted parties.

The above arrangement is expected to represent a new practice and should be viewed as being consistent with ‘soft landings’. The review meeting shall cover not only performance but also BPE process key stage review. Benchmarking against the results of BPE from other developments is recommended.

**4.7 Minimum monitoring package provision and specialist testing**

Refer to table 2 for the minimum requirements for monitoring and specialist testing in support of BPE e.g. Smart meters, sub-metering, renewables/ micro-generation and indoor environment sensors, air pressure testing etc. The developer shall allow for the costs associated with all core physical monitoring and specialist testing. Optional/ recommended monitoring and specialist testing is subject to client instruction.

The locations of all meters and sensors shall be agreed at the earliest possible stage and indicated on a drawing forming part of the M&E design package for tender and also be included in the O&M manual. The specification and design of meters shall be agreed with the client (i.e. visual/ intrusive implications), be adequately tamper proof and appropriately fixed. Where possible the opportunity to use combined indoor environmental sensors shall be taken e.g. temp, RH and IAQ in a single sensor. All indoor environmental sensors shall be provided with protective covers until handover takes place.

The contractor and BPE champion shall confirm all meters and sensors are correctly operational at handover (this may coincide with taking dated start meter readings to mark the commencement of the monitoring period). The contractor shall schedule adequate time for this check in advance of the handover date.

A schedule of all meter and sensor serial numbers shall be taken or labelling shall be provided for identification purposes where serial numbers are not available and be included in the O&M manual.

Additional monitoring and metering considerations will exist for developments with communal communal/ shared/ district heating systems e.g. compliance with the ‘Heat Metering and Billing Regulations’.

Communal areas should ideally have heat and power loads separately monitored. Temperature monitoring in communal areas is recommended (re overheating assessment), refer to table 2. Anti-tamper and removal etc measures for sensors in communal areas shall be carefully considered. Sub metering of EV charging facilities connected to individual dwellings or Landlord’s communal electrical supplies is recommended for the purposes of disaggregation. The costs associated with this clause in relation to communal areas and facilities shall either be covered by the ‘Schedule of BPE’ required or the provisional sum allowance.

**5.0 QUALITY ASSURANCE, TESTING & COMMISSIONING AND HANDOVER**

**5.1 Testing and commissioning of services prior to handover**

In addition to adhering to the WKW guidance, the following general requirements are highlighted.

Testing and commissioning of all services prior to handovershall be routinely undertaken and evidence of satisfactory pass test results and certification included in the O&M manual (Operation and Maintenance manual). This shall be taken to extend beyond minimum regulatory requirements to testing and commissioning actions required by CIBSE Guide F, 2012; TM60, 2019. Refer to WKW guidance (p.54).

Testing and commissioning shall extend but is not limited to:

* Heating systems
* Ventilation and MVHR
* Renewables/ micro-generation/ low carbon technologies

and shall be carried out to best practice guidance; satisfy manufacturers recommendations; comply with MCS requirements for relevant technologies; verify correct and optimum operation efficiencies and that all systems and technologies work together as part of a complimentary strategy.

The evaluation of the actual performance of M&E services and renewables should be included in the final BPE report as part of the ‘Core’ BPE approach.

It is recommended that an independent specialist Testing and Commissioning M&E engineer is appointed to verify tests and commissioning of the main contractor for all projects as part of a ‘Detailed’ BPE approach. This is particularly key in terms of mechanical ventilation (MVHR) systems and may take the form of random independent commissioning checks carried out by an independent specialist BPE Engineer (or the BPE Champion if able to undertake). It is further recommended that selected testing and commissioning be repeated during the monitoring period e.g. as part of a ‘Deep Dive’ BPE investigation, and on random selected units again on completion of the monitoring period. The costs of addressing this clause shall be covered either via the ‘Schedule of BPE’ tendered prices or the provisional sum allowance.

**5.2 Mechanical Ventilation with Heat Recovery units (MVHR)**

The appropriate testing and commissioning of Mechanical Ventilation with Heat Recovery units (MVHR is required for LETI compliance) is particularly important to ensure that flow and extract rates and overall system balancing is correct for satisfactory operation. All MVHR units shall have effective automatic summer bypass. Flexible ductwork is not permitted. In addition to the guidance on MVHR included in the WKW and the requirements of LETI (see table 1), recommendations around design, location, installation, protection, commissioning, handover, controls, maintenance, filters, repair etc can be found here:

* <https://www.slideshare.net/WebadminTSB/characteristics-and-performance-of-mvhr-systems> (section 7.2 onwards).
* <https://www.nhbcfoundation.org/wp-content/uploads/2016/05/NF52-MVHR-systems.pdf>.
* <https://www.zerocarbonhub.org/sites/default/files/resources/reports/Mechanical_Ventilation_with_Heat_Recovery_in_New_Homes_Final%20Report.pdf>.

**5.3 Handover process, information for occupants (end users) and their feedback**

In addition to adhering to the WKW guidance, the following general requirements are highlighted.

Appropriate controls (M&E):

The client, design team and developer shall confirm the following which shall also be appropriate to occupant type(s):

* Overall control strategy - design statement required.
* Easy to use control systems, programmers etc.

and whether provision of

* Effective automatic controls e.g. weather compensation, set back thermostats etc.
* Optional remote access to controls e.g. Smart Apps (piloting and evaluation recommended)

could be utilised where they have potential to improve performance and occupant comfort.

Information and guidance provided at handover to occupants:

* The contractor shall issue digital and physical ‘end user’ guidance which must be easy to follow and provide clear instructions of controls and their operation which is to be included the new home manual or similar.
* A client shall work in conjunction with the design team to design and provide a simple ‘Quick start’ guide for occupants which is to be provided in addition to the more detailed information contained in the home manual. See the following example for guidance:
  + <https://www.gov.scot/publications/how-your-low-carbon-home-works/>.

* Occupants of each household shall receive a walk-through to explain features and advice on optimal operation for regulating the internal environment of their home (client led). This shall be conducted by an ‘Appropriate person’ – e.g. A trained Community Green Advisor - who can communicate in lay person terms, and shall extend to an overview explanation of:
  + The monitoring process, sensors, meter provision; how these are read; importance of not tampering with or removal of; if and when kit they will be removed by Landlord post monitoring period and GDPR compliance.

The ‘Appropriate person’ shall keep records to:

* + Confirm that occupants understand the controls; details of any advice issued to fill knowledge gaps; adaptions to behaviour suggested and if referrals need to be made for further advice and support which may need to be ongoing during the monitoring period.
  + During the handover process to occupants, the requirement for occupants to participate in surveys towards the end of the monitoring period should be made clear and an overview of the nature these will take (1:1 surveys may most effectively and conveniently be organised to coincide with when access is gained to undertake the end of Defects Liability Period survey to ensure good levels of feedback are obtained. This also provides the opportunity for the ‘Appropriate person’ to understand if occupants require any ongoing support having settled into their new home).

Occupancy feedback, satisfaction and BPE

To feed into the final BPE report, the following should be undertaken and will be client led unless specified otherwise:

* Occupant satisfaction survey (1:1) upon 12 months of occupation when draft results of BPE report are known – 1:1 surveys are recommended to be maximised
* Building User Survey (BUS) for multiple homes based on 12 months of occupation
* General customer satisfaction survey with new home
* Any findings from optional ‘deep dive’ BPE e.g. occupant diaries, behavioural surveys and processes (BPE Champion led).

**5.4 Handover stage from Developer to Employer**

In addition to adhering to the WKW guidance, the following general requirements are highlighted which shall be considered in relation to the Employer’s existing processes and requirements at handover.

O&M manual inclusions (not exhaustive):

* As built construction drawing files
* As built SAP calculation
* PHPP modelling
* Overheating risk assessments – e.g. tools and reports
* Test, commissioning and safety certificates for M&E services, renewables etc
* Maintenance and servicing requirements together with instructions and schedules
* A drawing showing location and schedule of all installed monitoring meters and sensors including serial numbers/ reference labels and confirmation that these are operational
* Photographic records of construction progress – including any special attention given to thermal bridging and air tightness for example
* Confirmation that all recommended overheating risk mitigation measures have been installed
* Specialist test reports – e.g. three stage air permeability testing
* Summary of BPE processes followed, the key findings/ learning – including engagement and remit of BPE Engineer
* Relevant instructions and information in relation to gathering monitored performance data – including the date upon which the 12 month monitoring period commences and the start meter readings.
* Where manual meter readings are to be taken then a template for client (or their appointed person) is to be provided for ease of recording data readings with intermediate due dates.
* Where remote meter readings and data downloads from sensors is necessary, details of the format these will be presented in shall be provided
* Designer walk through and summary report including a review of findings.

It is strongly recommended that a Designer (where the Architect was novated) or a BPE Champion ‘walk through’ and summary review report at handover stage is carried out. Where this is undertaken the summary review report should be included in the O&M manual. This would most effectively be carried out on the first new units to be handed over and may not require repeating thereafter depending on findings.

A copy of the O&M manuals, including any summary review reports, shall be provided by the client to the person who will produce the final BPE report e.g. the BPE Champion/ or specialist consultant.

**6.0 GENERAL REQUIREMENTS AND CONSIDERATIONS**

**6.1 Design & Build**

The Model ER and Design Brief clauses have been written on the basis that developments are procured on a Design and Build contract basis. Where traditional contractual approaches are followed, the clauses shall be reviewed prior to procurement to confirm that they are relevant and/ or if alternative or additional requirements are required to meet the client’s objectives.

**6.2 Employer’s Agent review of model clauses**

The Employer’s Agent shall undertake a review of the clauses set out in this Model ER’s and Design Brief document on a scheme-by-scheme basis prior to inclusion in the main Employer’s Requirements and Design Brief and in advance of issuing tender documents to contractors. Any matters of concern, inconsistencies, design constraints and the like shall be reported to the client and wider design team for decision.

**6.3 Unintended consequences**

Should any member of the design team foresee the possibility or risk of unintended consequences of adopting the any of the above Model ER’s and Design Brief clauses, and similarly the combination of performance requirements at either the outline or detailed design stages, they shall inform the client and their Agent without delay and await further instruction. This should be taken to extend to all Health & Safety related matters.

Where existing clauses in the main Employer’s Requirements and Design Brief conflict or are contrary to the performance requirements set out in the Model ER’s and Design Brief, this shall be brought to the attention of the client or their Agent immediately and prior to procurement processes commencing. Discrepancies shall be resolved prior to issue of tender documents to contractors.

**6.4 Change control**

The client, design team and developer shall agree at the outset how change control will be managed throughout the project lifetime covering each key project stage. This shall extend to, for example, changes to the design and provisions for new personnel/ project team members.

**6.5 Data protection**

All data collected, its nature, management, processing, storing and disclosure as part of the BPE process including the final report shall be subject to compliance with the GDPR, the policy of the client, privacy and ethical considerations (see also WKW p.10). The client shall ensure that all necessary consents are secured for occupant participation. Data sharing agreements between members of the project team involved in BPE and general stakeholders are to adhere to similar requirements.

**6.6 Learning loop**

The evaluation and findings of both the BPE together with user surveys at the (following BPE and Development Project Review meetings) shall be feedback into a learning loop and the Employer’s Requirements, Design Brief (including the clauses in this document) shall be revised and updated as required.

There will be individual learning loops for the client, contractor, design team and occupants as well as organisational and collective learning loops. All stakeholders should be involved in the feedback mechanisms process.

**6.7 Ongoing review of performance clauses**

The requirements set out in this document will be kept under review and will evolve with updates over time in relation to learning and the legislative context.

**6.8 BPE continuous management**

BPE shall become a standing agenda item for all feasibility, design and contract stage meetings and receive adequate attention and forward planning of activities.

**6.9 Completion of all BPE actions prior to handover**

Developers shall manage all BPE activities so as to confirm satisfactory completion and compliance with all BPE performance requirements in advance of handover and with a view to avoiding delays to the handover date. Handover will not be accepted by the client until evidence that this requirement has been provided to the satisfaction of the BPE Champion and as such time for potential full recommissioning shall be allowed for.

**6.10 Use of model clauses**

The relevant clauses from this document are intended to be inserted into existing ER’s and Design Briefs, alternatively this document can be appended to the same. In all cases it is necessary to ensure that the clauses are consistent and that no conflicting requirements are present.

**6.11** **DNO and electrical supply**

In view of the transition towards all electric primary heating (LETI requires fossil fuel free heating), provision of EV charging facilities and exporting of surplus on site power generation to grid, the design team are responsible at the design stage for confirming that there is adequate local electrical supply capacity and resilience with the District Network Operator (DNO) prior to the planning application stage. The contractor/ developer is responsible for obtaining all necessary written approvals for connection from the DNO at the earliest opportunity post award of contract.

**7.0 SUPPLEMENTARY NOTES FOR REGISTERED PROVIDERS/ CLIENTS**

*The following are not intended for inclusion in the actual ER’s and Design Brief*

**7.1 Design team**

The design team should be taken to include as a minimum the project Architect, Employer’s Agent, Engineer and the procured Developer (s.106) / Contractor (Land led). It is acknowledged that Architects and Engineers may change from pre to post contract award where not novated. Other specialist consultants shall be taken to be included in the Design team as relevant. Refer to footnote 3 regarding the need for the client to cover the cost of design team members who lead and/ or coordinate BPE activity.

**7.2 Design constraints to achieving LETI standards**

The client should be aware that the performance required for self-promoted developments designed to meet LETI performance standards may necessitate some compromises to be agreed upon. For example, the exemplar external wall ‘U’-value may (depending on the type of development, its design and construction) may lead to a minor increase in building footprint. Similarly, some flexibility on the window glazing to wall ratios may be required to satisfy overall design aims in addition to balancing natural daylight with overheating risk. The client is to approve any compromises that are found to be necessary, however, as the Model clauses will be applied from the conceptual design stage this is less likely to be the case.

**7.3 Thermal imaging**

Infra-red thermal (IRT) imaging is classed in the WKW guidance as a ‘Detailed BPE’ activity rather than ‘Core BPE’. It is strongly recommended to clients that IRT is included in the ‘Core BPE’ package for its usefulness in verifying a uniform thermal envelop and airtight barrier (continuity of insulation and air tightness) and the opportunity to not only learn of the performance achieved, but also in identifying any detailing weaknesses which can be addressed as further units are designed and constructed. As thermal imaging needs to be undertaken during the heating season, it will not always be possible for this activity to be undertaken immediately prior to or shortly after handover. Because the monitoring period required is 12 months, thermal imaging can be undertaken during the appropriate seasonal window and while the new home remains under the Defects Liability Period (DLP). Once performance is proven as satisfactory, it may be appropriate to reduce the number/ % of subsequent units built to be tested using IRT.

**7.4 The BPE development review meeting**

This meeting should be chaired by the BPE champion who shall prepare an agenda and will entail a detailed review of the final BPE report with all design team members present. For the first few development projects to undergo this review meeting, the meetings may initially seem complex, however, the expected learning and feeding this into the ‘learning loop’ should be invaluable. The review meeting should not be limited to evaluating the performance findings but should also include the processes followed at each key construction stage and general communication. The findings should in addition be used with a view to improve the efficiency of development delivery and reveal any upskilling needs of team members.

The BPE review meeting is expected to be a new process for many client’s and marks a change to traditional practices in that the developer/ contractor has an obligation to participate following expiry of the DLP. Contractors are expected to participate with a view to their securing further work and to demonstrate their buy in to the BPE process.

For larger developments which are completed and handed over in phases, it is crucial that a Development review meeting takes place between 12-15 months post practical completion.

**7.5 Project brief**

In additional to issuing the Employer’s Requirements and Design brief - which shall include the relevant clauses here in or appending this document – clients should also provide a clear project brief in relation to all developments for both the design team and the contractor.

**7.6 Liaison with Lettings/ Sales team and Housing Management**

It is recommended that clients explain the purpose and implications of conducting BPE thoroughly to their colleagues in Housing Management and particularly the Lettings team. Depending on contractor performance and their contract management practices, it is possible that delays in accepting handover (and hence first occupation dates) will be experienced to satisfactorily complete all pre handover BPE activity e.g. recommissioning of services may be required. When handover is unable to take place on time this is highly frustrating and inconvenient so BPE must be carefully managed with sufficient time allowances. The contractor should similarly be made aware of these potential implications and that handover will not be accepted until all pre-occupation BPE activity has been satisfactorily completed.

Clients should be mindful of this recommendation when dealing with private shared ownership and units for open market sale where some flexibility or relaxation may be in order as opposed to refusing handover. Similarly with regard to their willingness to have monitoring equipment such as sensors installed which would be visible and arrangements for their removal if this is planned at the end of the monitoring period. Indoor sensors and meters are more likely to be acceptable if of a discreet design. In addition, GDPR and ethical use of data must be carefully managed and controlled with all necessary end user consents obtained. Not the potential for ownership to change during the monitoring period.

**7.7 Occupant feedback**

Obtaining occupant feedback for 1:1 and BUS surveys is an essential element of the BPE process. It is suggested that clients consider making it a requirement of tenancy agreements that end user surveys shall be participated in/ completed, if this is not already the case, to maximise the likelihood of returns. Incentives for timely completion and provision of feedback may be appropriate. Similarly, maximum encouragement should be given to end users of shared ownership and out right purchase sales units. It is recommended that occupants are provided with feedback from BPE studies.

**7.8 Benchmarking performance**

In addition to benchmarking performance of new homes within each individual self-promoted development, it is recommended that BPE findings are compared between different self-promoted developments. It is further strongly recommended that selected performance monitoring and specialist testing of at least a sample of new homes built under s.106 arrangements (to The Future Homes Standard) be undertaken for comparison purposes with self-promoted schemes following similar approaches as closely as possible. The costs of performance monitoring and specialist testing in relation to s.106 would need to be met by the client and agreed with the develop.

**7.9 BPE provisional sum**

If a provisional sum allowance is made for BPE activity and it is later found not to be sufficient to undertake full BPE required on every unit, then the client shall either allocate additional funds to cover or agree with the BPE Champion how the BPE may be scaled back e.g. undertake BPE on a sample of units of a particular type. The aim should be to have energy metering and environmental sensors installed in all new units allowing performance data to be gathered and reviewed.

**7.10 Specialist modelling at design stage**

It is suggested that clients confirm with their framework Architects that they have access to relevant software packages and the requisite skills to enable them to carry out specialist modelling necessary for compliance with the LETI performance standards or if they propose to sub-contract to a specialist modelling consultant. Clients should also consider if additional professional fees will be incurred where dynamic modelling is not currently routinely required.

**7.11 General implications and understanding guidance**

The adoption of the building standards and BPE proposals advocated by these clauses will represent a step change in the design and delivery of new housing. It is suggested that the collective approach between the client, design team and contractor/ developer is one of collaboration, especially so on the earlier schemes to which these clauses are applied to. In pursuit of achieving better standards, a ‘soft landings’ approach with reflective learning is expected to work most effectively than one which is punitive to the contractor and exposes the project to greater risks i.e. a ‘no-blame’ approach should be adopted and one which supports a culture of collective learning and continuous improvement. The expectation is that over time the desired performance outcomes set out herein, will be routinely achieved as they become the new normal of practice. While there is potential in future for penalties in respect of non-compliance with the required performance standards to be used (to achieve exactly what the client is paying for) it is hoped that this will not be necessary.

**7.12 Branding of WKW materials**

It is suggested that clients consider adapting and co-branding theWKW prompt sheets and other materials that are used from the Toolkit to make them development project and team specific.

**7.13 British Standards Institute BPE standard**

Attention is drawn to the BPE standard that the BSi are currently working on and it is recommended that this is referred to following publication.

**APPENDIX:**

TABLE 1 - Minimum energy related design performance requirements (for land led developments)

TABLE 2 - Minimum Building Performance Evaluation (BPE) in use & Health and Comfort performance requirements (for Land led developments)

Issue, version, date and details:

|  |  |  |
| --- | --- | --- |
| v1 | 14th May 2021 | Consultation version issued for MCS-CF comments, peer review and consultation with Registered Providers. |
| v2 | 26th May 2021 | Revisions following feedback from peer review and consultation process. |
| v3 | 1st June 2021 | First published version. |

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*With special thanks to:*

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ENDS.

1. This will effectively be dealt with in the BPE report, see later. [↑](#footnote-ref-1)
2. Noise from external sources is to be design determined and subject to acoustic survey results where required; noise attenuation from adjoining dwellings is similarly to be design determined above the statutory minimums. Noise from M&E e.g. ventilation systems and plant, are compulsory BPE requirements. [↑](#footnote-ref-2)
3. If this responsibility is undertaken as an extension of services provided by the design team, such as the novated Architect or Employer’s Agent, then additional costs to cover this key service activity and/ or its coordination shall be allowed for by the client. [↑](#footnote-ref-3)