

# Towards Net Zero

## a collaborative approach to decarbonising housing and increasing social value

Paper II – A proposed methodology for Post Occupancy Evaluation  
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This paper is the outcome of a collaboration between four leading housing design practices aimed at facilitating the shared endeavour between all members of project teams involved in renovation or development of new housing. It proposes a social research based questionnaire as well as professional and technical processes for post occupancy evaluation.

A companion, Paper I, proposes a framework for effective collaboration amongst members of the development team.



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## SECTION 1: INTRODUCTION & SUMMARY

### A Collaborative Proposal

This paper is to be read in conjunction with a joint proposal by four practices specialising in housing design, HTA Design (HTA), Levitt Bernstein Architects (LBA), Pollard Thomas Edwards (PTE) and PRP Architects (PRP), who are collaborating to enhance our delivery of design and other services to housing clients, enabling them in the process of decarbonising their development and renovation programmes. The related paper is titled: *Towards Net Zero 2050 – a collaborative approach to decarbonising housing and increasing social value. Paper I – Proposed structure for clients and consultants.*

The proposed approach involves the identification of key outcome data at the appointment and briefing stage of the project lifecycle, monitoring and reporting at three successive stages including Post Occupancy Evaluation (POE) at handover and after occupation.

We recognise that most of our clients already undertake surveys of building occupants for a variety of different reasons including experience of sales or letting, building management, repairs service, identification of snags and so on. Whilst our shared objective is consistency of data, our objective is to build on the work already undertaken by our clients and avoid duplication. We envisage that in the case of each project surveyed the standard methodology described here would be tailored to avoid residents being asked the same questions twice. Ideally the approach would be harmonised into one process with guarantees as to the confidentiality of data in accordance with General Data Protection Regulation (GDPR).

This paper sets out in more detail than does paper I a Post Occupancy Evaluation process in four levels of increasing detail and specificity. Our aim is for every project to include Step 1. We recognise that circumstances vary but we would like to move towards an increasing proportion of projects benefitting from more detailed questionnaire based Step 2 & 3. Only certain projects will require the diagnostic focus of Step 4. It is intended that the questionnaire would be adapted to specific circumstances, in particular to take account of any feedback research that clients already routinely undertake on their development projects so as to illuminate duplication of questions. Ideally both sets of data may be agglomerated to achieve a complete picture.



Sutherland Road, Levitt Bernstein



Resident photo, PRP

## SECTION 2: THE PROCESS

The process set out below has been devised by the four practices and agreed as a shared, deliverable response to the principles of sustainable development set out in preceding sections. The proposed POE stages are:

- Step 1.** Initial visit for observational survey and door knocking (with or without introduction to questionnaire dependent on whether Step 2 is envisaged)
- Step 2.** Questionnaire
- Step 3.** Environmental monitoring
- Step 4.** Optional Diagnostic stage

We propose that these enquiries about building performance and environmental wellbeing are integrated with those carried out by building owners or managers which we assume will be focused more on quality of service. The objective would be to ensure residents are not asked the same questions twice.

Our proposal is that in all appropriate future commissions the consultant team would work with clients to carry out STEP 1 as part of the normal service. Steps 2 & 3 would be a recommended additional service priced separately and STEP 4 would only be required as circumstances demand.

The draft of a proposed questionnaire follows.

### **Step 1.**

#### **(i) OBSERVATIONAL SURVEY**

[To be filled out on a tablet or phone during the initial visit. To be investigated further, but we could use a system like Crowd Signal or Typeform for (i) and (ii)].

A space for a response provided for each question.

*(Q's based on BFL 12 and UK Green Building Council SVT and Berkeley Group Social Sustainability Tool)*

<b>OBSERVATIONAL SURVEY</b>		
<b>1.</b>	Does the scheme relate to its context? [BFL12]	
<b>2.</b>	Does it have a distinct character? [UKGBC, BGSST]	
<b>3.</b>	Is there evidence of personalization by residents? [UKGBC, BGSST]	
<b>4.</b>	Do you like the public and private spaces and are they well used? [BFL12]	
<b>5.</b>	Does the scheme have good access to public transport? [BFL12]	
<b>6.</b>	Is the development designed to make it easy to find your way around? [BFL12]	
<b>7.</b>	Do the streets encourage low vehicle speeds and function as social spaces? [BFL12]	
<b>8.</b>	Are public and private spaces well used? [BFL12]	
<b>9.</b>	Are entrances legible?	
<b>10.</b>	Inside, are entrances welcoming?	
<b>11.</b>	Does the exterior appear durable and/or well maintained?	
<b>12.</b>	Do the interior and exterior spaces appear well managed?	
<b>13.</b>	Observations about parking and rubbish	

## Step 2: QUESTIONNAIRE

Prior information to be noted in advance:

Property description: Dwelling type, no. of bedrooms, floor area, heating system, tenure, location.

Introduction (as an example):

We are a design team carrying out research into how the places and homes we have designed work for you, so that we can continue to improve. Thank you for agreeing to take part in this survey. Answering and commenting on these questions will help us understand whether xxxx is a good place to live in. The information we collect will remain anonymous and confidential. You have the right to stop participating in the project at any time.

1. PERSONAL INFORMATION		
a	May I ask you some questions about yourself and your household?	Yes/No
b	Gender:	
c	Age:	18-35
		36-50
		51-65
		66 & over
d	How long have you lived here?	
e	How many over 18yrs live here with you?	
f	How many under 18yrs live here with you?	

## 2. POSITIVE EMOTIONS: Now thinking about the neighbourhood as a whole I'd like to know to what extent you agree, or disagree with the following statements:

a	I feel a sense of pride about this neighbourhood/building	Strongly Agree	
		Agree	
		Neutral	
		Disagree	
		Strongly Disagree	
b	I feel safe in my neighbourhood	Strongly Agree	
		Agree	
		Neutral	
		Disagree	
		Strongly Disagree	
c	Living in this neighbourhood lifts my spirits	Strongly Agree	
		Agree	
		Neutral	
		Disagree	
		Strongly Disagree	
d	I find beauty in my surroundings	Strongly Agree	
		Agree	
		Neutral	
		Disagree	
		Strongly Disagree	
e	I enjoy the green space in my neighbourhood	Strongly Agree	
		Agree	
		Neutral	
		Disagree	
		Strongly Disagree	

3. CONNECTING: Now, I'd like you to consider how well your neighbourhood is connected			
a	My neighbourhood allows convenient access to work	Strongly Agree	
		Agree	
		Neutral	
		Disagree	
		Strongly Disagree	
b	My neighbourhood is close to good schools	Strongly Agree	
		Agree	
		Neutral	
		Disagree	
		Strongly Disagree	
c	There are plenty of opportunities for leisure and shopping near my neighbourhood	Strongly Agree	
		Agree	
		Neutral	
		Disagree	
		Strongly Disagree	
d	I feel at home here[iiii]	Strongly Agree	
		Agree	
		Neutral	
		Disagree	
		Strongly Disagree	
e	People look out for each other here.	Strongly Agree	
		Agree	
		Neutral	
		Disagree	
		Strongly Disagree	
f	I care about this place. [HTA]	Strongly Agree	
		Agree	
		Neutral	
		Disagree	
		Strongly Disagree	
g	Is there anything else on this subject you would like to share?		

4. FREEDOM AND FLEXIBILITY: Please think about whether your home allows you freedom to do as you please both outside and indoors.			
a	I feel it is safe for children to play outside	Strongly Agree	
		Agree	
		Neutral	
		Disagree	
		Strongly Disagree	
b	I feel my home gives me adequate privacy	Strongly Agree	
		Agree	
		Neutral	
		Disagree	
		Strongly Disagree	
c	My neighbourhood gives me opportunities to stop and communicate with people	Strongly Agree	
		Agree	
		Neutral	
		Disagree	
		Strongly Disagree	
d	Is there anything else on this subject you would like to share?		

<b>5.</b>	<b>ABOUT THE SPACES AROUND YOUR HOME:</b> Thinking about the various outside spaces around your home such as communal gardens, playgrounds, parking courts etc. I would like to find out to what extent you agree or disagree with the following statements:		
<b>a</b>	I have access to suitable private space outdoors	Strongly Agree	
		Agree	
		Neutral	
		Disagree	
		Strongly Disagree	
<b>b</b>	I like the spaces around my home	Strongly Agree	
		Agree	
		Neutral	
		Disagree	
		Strongly Disagree	
<b>c</b>	I use the spaces around my home	Strongly Agree	
		Agree	
		Neutral	
		Disagree	
		Strongly Disagree	
<b>d</b>	I think the spaces around my home are well maintained, such as planting, litter picking, bins, repairs etc.	Strongly Agree	
		Agree	
		Neutral	
		Disagree	
		Strongly Disagree	
<b>e.</b>	Is there anything else on this subject you would like to share?		

<b>6.</b>	<b>PARTICIPATION (following projects where residents were consulted): We did our best to create opportunities to influence the design of the neighbourhood and your home</b>		
<b>a</b>	I feel I had a say in the changes to my neighbourhood/liv.	Strongly Agree	
		Agree	
		Neutral	
		Disagree	
		Strongly Disagree	
<b>b</b>	The consultation process helped me to develop relationships with others in my neighbourhood	Strongly Agree	
		Agree	
		Neutral	
		Disagree	
		Strongly Disagree	
<b>c</b>	Is there anything else on this subject you would like to share?		

<b>7.</b>	<b>ABOUT YOUR HOME:</b> Now, thinking about your own home, I'd like to know to what extent you agree, or disagree with the following statements:		
<b>a</b>	The rooms are big enough	Strongly Agree	
		Agree	
		Neutral	
		Disagree	
		Strongly Disagree	
<b>b</b>	There is enough storage space	Strongly Agree	
		Agree	
		Neutral	
		Disagree	
		Strongly Disagree	
<b>c</b>	The layout of rooms in the home suits your way of life	Strongly Agree	
		Agree	
		Neutral	
		Disagree	
		Strongly Disagree	
<b>d</b>	The kitchen is well arranged and easy to use	Strongly Agree	
		Agree	
		Neutral	
		Disagree	
		Strongly Disagree	
<b>e</b>	I am not disturbed by noise from my immediate neighbours	Strongly Agree	
		Agree	
		Neutral	
		Disagree	
		Strongly Disagree	
<b>f</b>	I am not disturbed by other noise from outside my home	Strongly Agree	
		Agree	
		Neutral	
		Disagree	
		Strongly Disagree	
<b>g</b>	Is there anything else on this subject you would like to share?		

8. COMFORT			
a	The heating/water/ventilation systems work well	Strongly Agree	
		Agree	
		Neutral	
		Disagree	
		Strongly Disagree	
b	The bills are affordable	Strongly Agree	
		Agree	
		Neutral	
		Disagree	
		Strongly Disagree	
c	The home is easy to keep warm in winter	Strongly Agree	
		Agree	
		Neutral	
		Disagree	
		Strongly Disagree	
d	The home is easy to keep cool in summer	Strongly Agree	
		Agree	
		Neutral	
		Disagree	
		Strongly Disagree	
e	Overall, my home feels comfortable	Strongly Agree	
		Agree	
		Neutral	
		Disagree	
		Strongly Disagree	
f	My home has enough daylight	Strongly Agree	
		Agree	
		Neutral	
		Disagree	
		Strongly Disagree	
g	There is enough fresh air	Strongly Agree	
		Agree	
		Neutral	
		Disagree	
		Strongly Disagree	
h	Is there anything else on this subject you would like to share?		

9. ENVIRONMENTAL PERFORMANCE: As part of our study we would like to find out whether your home is as economic to run as it should be.		
a	<p>Would you be willing to share your summary gas and electricity bills with us?</p> <p>Make arrangements for sharing gas, electricity energy summaries and water bills.</p>	Yes/No
b	<p>We have some small and unobtrusive air monitoring devices that we would like to leave with you. Would you be willing for us to leave these with you for a while?</p> <p>Show example battery powered monitors and make arrangements to leave and collect these.</p>	

### Step 3: TECHNICAL MONITORING

The approach to technical information is necessarily light and is subject to agreement with client and with residents. The purpose is to understand whether actual real-world performance is in line with expectations. The approach will vary depending on the issue addressed. Ideally a sample would be collected that reflects the variety of typologies in a development and their frequency. If 20% of a development is two bedroom apartments then ideally 20% of the data would come from those types. More work is needed to establish the sample size needed, but the response rates for questionnaires is usually low so setting a minimum sample size may not be helpful. *Note that an academic approach to monitoring normally uses more specialist equipment at much greater expense than in envisaged here.*

**Energy:** This information can be collected on a monthly, quarterly or annual basis, with more data being better than less. This can be collected through agreement with an individual resident but should be accompanied with an interview to understand the residents occupancy profile. How many people live in the home, what are their habits, were they away for long periods, what temperature is their heating system set to and what is the timing for the heating system all have an impact on energy use. All of this information helps to build information on occupancy and behaviour and enables us to compare residents with similar households, rather than comparing a single person household with a large family, for example. In schemes where this has been done, there can be a 200% difference in energy use between households in similar properties. In the case where there is an energy company or ESCO supplying energy centrally, or in a private rented building where metered data tends to be managed centrally, there will be more opportunities to collect information without involving residents, but this will give a picture of overall performance rather than for individual apartments as the management company may not be able to supply details of residents. It may be possible to obtain occupancy numbers, but we will be unlikely to have occupancy data.

**Water Use:** This data can be collected in the same way as energy data, by asking individual householders for their water bills, and an interview to understand their habits. The personal nature of water use makes this even more difficult than energy data collection. Where buildings are managed by a company, the data may be available in bulk with minimal supporting information on household size.

**Daylight:** This can be collected manually if a researcher can visit an apartment, and can be done cheaply using a tool to measure external and internal daylight at the same time. Daylight Factor is a % of available daylight so does not depend on sunlight or weather. A willing resident may be persuaded to collect this data over a period of time, with some compensation.

**Air Quality:** This can be measured using a NetAtmo device (or similar), a cheap internet-enabled device that can be connected to a householders Internet system. They are small and unobtrusive and measure CO2 levels as a proxy for air quality. Residents could agree to host these for a period of time, ideally a full annual cycle. They may need compensation of some kind.

**Temperature:** This can also be measured by a NetAtmo device (or similar) and collects temperature in the home at regular intervals and publishes this to a private web page. Residents could agree to host these for a period of time, ideally a full annual cycle. They may need compensation of some kind.

Data collection and reporting is also further complicated by GDPR requirements to protect data which needs further investigation.

### STEP 4: DIAGNOSTIC INVESTIGATION

We suggest considerable circumspection in the definition of this stage, particularly bearing in mind the concern expressed by some insurers that POE may increase the likelihood of claims. There is a separate working group convened by RIBA involving one of our participating practices, LBA. We propose that a protocol involving insurers will arise as a result of this work. This is working with The Wren mutual insurance to find an acceptable model. In any event, the approach taken would be specific to the particular circumstances encountered on a case by case basis.

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