

<b>Committee(s):</b>	<b>Date(s):</b>
Residents' Consultation Committee Barbican Residential Committee	1 September 2014 15 September 2014
<b>Subject:</b> <b>Barbican Estate Background Underfloor Heating System</b>	<b>For Information</b>
<b>Report of:</b> Director of Community & Children's Services	<b>Public</b>
<b><u>Summary</u></b>	
<ol style="list-style-type: none"> <li>1. This report, which is for information, updates members on the progress made by the Barbican Underfloor Heating Working Party since the last update in January 2014</li> <li>2. The main focus has been to work towards a scope for a consultant to review the various options for the future of the underfloor heating and its control systems.</li> <li>3. Appendix A provides a paper produced by the Working Party and Resident Advisory Group which will be subject to discussion at the next Working Party Meeting.</li> </ol> <p><b>Recommendation</b></p> <ol style="list-style-type: none"> <li>4. That the Committee notes the progress of the Background Underfloor Heating Working Party.</li> </ol>	

### **Main Report**

#### **Background**

5. The electric background underfloor heating system on the Barbican Estate has been in existence for over 40 years and has been an integral part of the electrical services provided to flats during this time.
6. The background underfloor heating system remains unchanged from its original design. A high standard of maintenance, servicing and minor repairs has enhanced the life of the system.
7. With the approval of your committee on 26 February 2004 a full technical survey was undertaken by specialist consultants NIFES Consulting Group following a successful tender bid. The purpose of their survey was to determine the life expectancy of the existing system and to consider possible replacement heating systems taking into consideration latest legislation, best practice and modern techniques. The survey was completed on 19 May 2006.
8. The survey concluded that the existing background heating system, embedded electric heating cables on an off-peak supply, was the most appropriate for the Barbican Estate at that time.

9. EDF Energy and UKPN were formerly part of London Electricity Board (LEB). The current contract for the supply of electricity was taken out in 1982 with LEB and provides for a 13-hour off-peak charging period with prices per kWh fixed every 2 years. However, due to the changes in the electrical supply industry, UKPN and EDF Energy now operate as separate companies.
10. There is no formal agreement between either EDF Energy or UKPN to maintain the Cyclo-Control or indeed between UKPN and CoLC. EDF Energy stated that they intended to withdraw from the electricity supply agreement with the COLC for the supply of electricity to the background underfloor heating system. This is in accordance with the termination notices contained within the original contract set up with LEB

### **Current Position**

11. The working party has met on 4 occasions since the last update report. The main focus has been on working towards a consultants brief to look at the options for the underfloor heating and its controls.
12. A sub-group from the working party along with a Resident Advisory Group have worked together to produce a discussion paper for the working party to consider (Appendix A).
13. The City Solicitor is currently reviewing the options contained within the discussion paper and will provide detailed advice on how each one affect the lease
14. The working party has also been involved in the review of the electricity supply and at the time of writing this report, the opportunity was currently being tendered through LASER energy buying group and being handled by the City of London Procurement Service team.

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## APPENDIX A

# **Barbican Underfloor Heating: Options and Next Steps**

A discussion document

Prepared by resident members of the Underfloor Heating Working Party, a working party of the Barbican Estate Residents' Consultation Committee, in consultation with members of the Underfloor Heating Residents Advisory Group.

August 2014

- 1 Summary
- 2 Current assumptions and constraints
  - Current assumptions
  - Current constraints
  - Concerns widely held by residents
- 3 Desire for greater control
  - Low-cost options
  - Options with medium complexity and cost
- 4 Heating outside the “season”
- 5 Improve the thermal efficiency of the Estate
  - Common parts
  - Improve insulation to roofs and soffits
  - Improve the thermal efficiency of individual flats
  - Investigate the potential for grants or soft financing
- 6 Resident Engagement
  - Before changes are implemented
  - After changes are implemented
- 7 Further work required

## 1. Summary

This discussion document outlines the likely options for improvements to the control mechanisms for the underfloor heating system. It seems likely that the control system could be improved at modest cost.

Additionally, at greater expense, a range of more sophisticated controls could be fitted, up to providing residents with almost complete control of their heating. No financial analysis of the alternatives has yet been carried out, but it seems likely that some solutions will be financially viable within the constraints of the lease.

## 2. Current assumptions and constraints

### **Current assumptions**

- These assumptions are made on the basis of information provided by officers and engineers working for the Barbican Estate Office, as well as from working party members’ understanding of the desires of Barbican Estate residents.

- The infrastructure is largely sound, and relatively cheap and easy to repair.
- The current control mechanism is highly reliable, but the inertia in the system and the crudeness of the controls means that flat temperatures are often too high or too low.
- Residents have expressed the desire for greater personal control of temperatures.
- Residents expect temperatures to be maintained at a level higher than 'background' heating, i.e. not to have to boost their temperatures using extra radiators, etc.
- To preserve the building fabric, the temperature should not fall below 15C.

## **Current constraints**

- The principal constraint is the lease, which is a contract between the landlord (the City of London Corporation) and each long leaseholder.
- Around 94% of the flats on the Estate have been sold on long leases.
- The lease specifies background heating as a landlord-provided service.
- Although the target temperature is not specified in the lease, the Estate Office has always aimed to maintain at least 15C.
- The City's legal advice is that improvement works are not permitted under the lease: only repairs and maintenance can be charged to long leaseholders, and assets replaced only when beyond repair.
- Changing the lease would be very difficult and may not be feasible.
- Improvements at the time of replacement are only permitted to a modern equivalent standard.
- The service and additional costs of any improvements would have to be optional, funded entirely by those who opt in.
- The City Solicitor is to review the various options listed below to determine what the affect each one will have on the lease and the likelihood that costs may be recovered

## **Concerns widely held by residents**

- Several constraints arise from concerns frequently expressed by residents, which any proposal for change would need to address to gain widespread acceptance:
- The overall level of heating provided should not be decreased.
- Heat from one flat often benefits neighbouring flats, especially those on the top floor or lowest floor; changes should not disadvantage any flat, especially those in more exposed positions.
- Costs should not increase significantly. Therefore, the concerns of residents whose flats are too cold need to be addressed in a more intelligent way than by increasing the provision of heating for all.
- Nevertheless, this review provides a once-in-a-generation opportunity to evaluate fully the costs and benefits of making our heating system efficient and appropriate for a future of substantially higher energy costs.

### 3. Desire for greater control

- Residents have often expressed a desire for individual control over heating. A survey by Carrie Behar of University College London in 2011, into Barbican residents' attitudes to their environment (heating, lighting, air quality etc.), revealed that a key issue for residents is lack of control of the heating system. Of the 395 residents who completed the survey, 52% voiced dissatisfaction that they could not increase or decrease the day-to-day winter heating in their flats except by opening windows or turning on supplementary heaters.

#### Low-cost options

- **Leave the existing system as it is**
- Even under this option the system could be improved by adjusting the Cyclo control to shift the load within our current time profile, so charging takes place as late as possible during the off-peak hours, and the system no longer turns on for periods of less than an hour.
- **Advantages:** low capital cost; could probably be done without having to ask for residents' consent; might reduce energy use.
- **Disadvantages:** would not help flats that are too hot or too cold; would not give residents any additional personal control over the temperature in their flats.
- **Lease implications:** none.
- **Add minimal additional controls**
- **Using weather forecasts to determine next 24 hours charging levels**
- It appears that a feed from the Met Office would be feasible and inexpensive. This could work with or override the Cyclo system to provide less load in the night preceding a warm day and perhaps more load in the evening when night temperatures are mild but daytime temperatures are forecast to be low.
- **Advantages:** low cost; should improve comfort, particularly in conditions often experienced at the beginning and end of winter; might reduce energy use.
- **Disadvantages:** would not help flats that are too hot or too cold; would not give residents any additional personal control over the temperature in their flats.
- **Lease implications:** the control mechanism needs replacing: could be a modern equivalent standard, especially as it should make the system more efficient and save some costs.

- **Using feedback**
- There is currently no feedback in the control system; the delivered load takes no account of the current temperature of the blocks. A few monitors embedded in the blocks could be used; failing this a simple model could be developed to simulate the real temperature. Such a system would heat up more quickly during the autumn and cool down more quickly in the late spring.
- **Advantages:** low cost; should improve comfort; might reduce energy use.
- **Disadvantages:** might help only some flats that are too hot or too cold; would not give residents any additional personal control over the temperature in their flats.
- **Lease implications:** the control mechanism needs replacing: could be a modern equivalent standard, especially as it should make the system more efficient and save some costs.
- **Promoting supplementary heating as an option**
- Heat from the underfloor heating system is provided as “background heating” which residents may supplement. Some residents find the system delivers all the heat they require; others need to top up using their own (usually portable) heaters. It would be helpful to provide residents with guidance on the most efficient way to deliver supplementary heating, and on installations and controls that are particularly suitable in the Barbican.
- **Advantages:** gives residents individual control and also individual responsibility for the cost; might reduce pressure for the heating system to be turned on at cost unnecessary to neighbours.
- **Disadvantages:** no improvement over the status quo, or to efficiency.
- **Lease implications:** none.
- **Options with medium complexity and cost**
- **Installing a system of controls based on monitoring the temperature in individual flats<sup>1</sup>**
- **No individual billing**
- Heating costs would continue to be shared by all the residents in the block regardless of how much energy each flat consumed. The system would learn the requirements of the occupants from monitors in each zone or

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<sup>1</sup> UCL and Loughborough universities carried out in the Brunswick Centre for provision of individual control of heating. See <http://www.lolo.ac.uk/project/view/project/69>

room. Residents could reduce their desired temperature, down to a minimum level; a smart system would adjust the loads in neighbouring flats. The system could be tuned to bring flats currently "too cold" up to normal levels. Individual residents would not be able to raise the temperature in their flat above that agreed for the estate as a whole.

- **Advantages:** might help some flats that are too hot or too cold; might reduce energy use.
- **Disadvantages;** would involve capital expense up front, might not reduce energy use significantly; might need improved insulation to be effective.
- **Lease implications:** would probably require residents' consent for a change to the lease.
- **Individual billing**
- The system of controls based on monitoring temperatures in individual flats could be extended to allow residents to increase their desired temperature, through individual metering supplied by the landlord, and separate from residents' domestic supplies. A smart system would adjust the loads delivered to neighbouring flats. Metering could easily log the different times of day, with different prices, at which this additional load was taken.
- **Advantages:** no flats should be too cold.
- **Disadvantages:** hard to decide the upper level of communally paid heating; insulation would need improving.
- **Lease implications:** this should fall outside the scope of the lease, as additional costs only apply to those opting for the additional heating and controls.

## 4. Heating outside the "season"

- With individual metering, residents could choose underfloor heating outside the normal heating season. This need not be part of an improved control system or an estate-wide change. Rather, individual households could choose at their cost to have a meter installed and to pay individually at a market rate for power consumed out of season. The relative cost of different heating methods should be examined and explained to residents.
- **Lease implications:** none.



## 5. Improve the thermal efficiency of the Estate

- **Common parts**

- We need to investigate the air handling in common parts, including draught-proofing external doors.

- **Improve insulation to roofs and soffits**

- Introducing control systems could be inequitable and difficult in practice without improving the insulation of roofs and soffits (the underside of flats located just above podium level), and perhaps some external walls. The current system, boosting the hard-to-heat 'cold' flats, overheats other flats.
- **Lease implications:** potentially difficult; would need specific legal advice.

- **Improve the thermal efficiency of individual flats**

- Long leaseholders could themselves fund a range of improvements to the thermal efficiency of flats, encouraged by a system which transferred some heating costs to individual residents. The Estate Office could establish best practice, setting up a list of approved contractors and a streamlined approval system. The Estate Office could also organize optional double glazing, at individual cost but with economies of scale and simpler administration.
- **Lease implications:** none.

- **Investigate the potential for grants or soft financing**

- Given the listed status of the Barbican Estate it may be possible to obtain either grant aid or financing on soft terms for improvements to the thermal efficiency of the estate. This should be investigated.

## 6. Resident Engagement

- **Before changes are implemented**

- Communication and engagement with residents is essential. The outcome of this process will be to present residents with a menu of possible changes, with objective information about:
  - The benefits that each proposed change would offer to personal comfort and amenity, environmental and sustainability, and potential cost savings;
  - Any direct cost to achieve the change;
  - How the change would be funded;

- Any other implications.
- **After changes are implemented**
- Any system changes would need a funded campaign of resident engagement to be effective. Residents should be given incentives to reduce energy use, such as by turning the heating down when away, or instead of opening windows.

## Further work required

To develop these suggestions into a set of proposals for the landlord and for residents, this Working Party proposes that a specialist consultant is engaged to provide a report and recommendations to the BRC and RCC. We recommend that the consultant should consider each of the options presented in this report, and we set out these principles for the report:

1. The inclusion of a wide range of options in the analysis is very appropriate and each should be maintained for as long as possible, until clearly proved unviable.
2. All analyses should take into account the ease or difficulty of implementation including resident engagement campaigns, and the management, staff and other resources required both to implement the system and to maintain it in the long term.
3. All analyses should also include 'what if' scenarios, to scope out unintended consequences and potential failure modes for the various options.
4. A detailed follow-up of the experience in the Brunswick Centre might prove instructive, especially with regard to individual control.
5. It may be possible to present some of the options as not wholly competitive with one another but as successive or complementary steps in a phased process, leading to incremental changes and improvements.
6. The existing building and electrical infrastructure, including the electrical system, was designed for a certain purpose (background heating) at a certain time: any analysis should evaluate the risk of stretching it too far.
7. It might be worth testing the two minimal addition controls, weather forecast and building feedback, to ascertain which looks more reliable and easy to maintain in practice.
8. In connection with hard-to-heat cold flats, that set the threshold for minimum temperatures, consider what might be done to the electrical infrastructure and control system to improve balance and deliver comfort more equitably than at present.

9. Any changes to insulation or ventilation also need to consider the fire compartmentalisation of the flats, to avoid increasing the risk of smoke being transmitted into other flats or the common parts of the building.