

## **TOOL C.8.**

### **PROVING THROUGH LIFE COST: THE COMPLIANCE PLAN AND PROVING ARRANGEMENTS**

#### **1. INTRODUCTION**

The basis for acquiring buildings through the Building Down Barriers approach is to optimise the through life cost. The Prime Contractor needs to show that the end-product will be capable of performing within the parameters which have been set and agreed during the briefing and design development process. This requires a period after handover to the Client in which the building is run as intended, and usage monitored. If the Prime Contractor is responsible for proving compliance, it makes sense for them to have responsibility for most aspects of facilities management during this period. This is not however essential.

This proving period needs to be long enough to allow the building services to be commissioned and at least one full annual cycle of heating and cooling energy usage to be measured. On this premise, it is unlikely that a period of less than 15 months will be adequate. Two seasons would appear to be the absolute minimum, and then allowances would have to be made for inefficiency due to bedding in and initial adjustments.

Ideally, the period should also be long enough to allow the first cyclical maintenance tasks to be undertaken, but if low maintenance finishes have been utilised, then the Prime Contractor may not wish to remain responsible for the maintenance and servicing of the building for the eight or more years that this ideal period would entail. It is therefore up to the Prime Contractor to examine, in conjunction with the Client, the maintenance profile of the building and exercise a judgement on the length of time which appears appropriate.

As the length and scope of the proving period have cost implications, the Prime Contractor will need to decide on the precise facilities management services he wishes to offer the Client prior to agreeing a price for construction and initial facilities management. The extent of the Contractor's liability up to the end of the Proving Period will also need to be clearly agreed.

#### **2. THE COMPLIANCE PLAN**

It is the responsibility of the Prime Contractor to propose the Compliance Plan against which the performance of the building will be assessed, to show the client that the predicted Through Life Cost Profile will probably be achieved, provided the building is managed and run as anticipated. Obviously, not all of the parameters will be met exactly, and it is therefore envisaged that ranges of labour and material inputs will have to be given, or a tolerance either side of a single stated figure for each item.

The following are suggested typical headings for a Compliance Plan, together with examples of the nature of information to be provided.

### ***1.1. Building throughput***

The level of usage of the facility will obviously affect the energy and cleaning costs which will be greater for heavier use. The Prime Contractor will have to calculate the energy usage figures as part of the design development to justify the trade off between capital cost for more efficient plant or more insulation thickness and future savings in energy consumption. These figures will be based on an assumed number of users, internal and external temperatures, and so on. For the predictions to be robust enough to base critical decisions on, various scenarios will need to be examined, and run through the cost model to arrive at the best value choice.

This is likely to show that there is direct relationship between certain costs and the use of some of the building's facilities, such as the hot showers in a sports facilities. The Prime Contractor will therefore have to state the number of users upon which design choices have been made, and the upper and lower limits that allow the building to function at the designed level of efficiency, where these have a significant effect on the through life costs. The Prime Contractor will need to state how it is proposed to measure the throughput, be it in people numbers, water usage or some other measure. This will allow the effect of any increase or decrease in the numbers of users to be taken into account in comparing the actual figures with those in the cost model.

### ***1.2. Assumed energy usage***

The cost of energy to heat, light and ventilate a facility is likely to be a significant proportion of the through life cost. The Compliance Plan will need therefore to provide detailed information on who will monitor energy use, by what means, and who will produce which kinds of reports on different aspects of the energy use. The Prime Contractor will need to provide sufficiently detailed data during the Proving Period for the Client to be certain that the building is operating within the energy usage parameters contained in the cost model. To allow checks to be made, it will probably be necessary to break down the energy usage into different categories by sub-metering the incoming supplies. When an unexpected increase in a particular type of usage has occurred, it should be possible to take some form of corrective action at an early stage.

### ***1.3. Assumed cleaning requirement***

One of the costs of running the building is the cost of cleaning it. All the internal and external finishes can have their lives to replacement extended by the removal of dirt and contamination at regular intervals. These cleaning operations need to be appropriate to the materials and levels of usage involved, and carried out with the correct products if damage to the finishes is to be avoided. The Compliance Plan must therefore state what cleaning has been allowed for in the cost model, and the arrangements put in place to ensure that it is done. These should be given on a time plus materials basis, together with the rates used to build up the cost model. Day to day cleaning may need to be included in this statement of the cleaning regime and in the cost model, if it does not affect

replacement lives and proving arrangements.

#### ***1.4. Assumed cyclical costs***

The Compliance Plan should also state what lives have been allocated to components such as filters, light bulbs etc. which require regular and repeated replacement. No liability can be attached to the Prime Contractor or suppliers for these kinds of components. The cost model should contain the full cost of replacements, including access provision and labour in hours required. Where the replacement intervals fall within the proving period, then it should only be necessary to show the replacement on time in accordance with the predictions maintained the required performance of the building. Where the frequency is such that the first replacement falls outside the proving period, then evidence, such as published data, to support the projected replacement cycle may be necessary to show compliance.

#### ***1.5. Planned maintenance requirement***

The Compliance Plan must state which operations are necessary to maintain the building and its equipment in full operational status. The frequency of operations such as boiler servicing, drain rodding, etc. must be stated, and given as labour and materials above. As before, where these operations fall within the proving period, record of the actions taken together with their cost will be required. Those actions which will occur after the proving period also need to be stated as time and materials required, together with the rate used to build up through life cost model.

#### ***1.6. Assumed lives of replaceable capital elements***

Within the cost model, there will be a number of components that will not last for the full period of the model. These will be identified by a sum of money to be expended at some date to cover materials, labour and access arrangements. There may also be consequential costs arising from any close-down required to allow the work to take place. The date at which replacement is forecast should therefore be explicit, either within the cost model or in a separate statement. At the Scheme Design stage these figures can only be 'best guesses'. However, the costs for replacement should reflect the design as it has been developed for this stage of the project, so that the figures stated are comparing 'like for like'. At the completion of Detail Design firm design decisions on the make up of components will allow firm predictions of their operational lives.

#### ***1.7. Monitoring proposals***

The Prime Contractor has to consider which of the above categories of information are critical to the TLC, and put forward proposals for those items he will monitor during the proving period, in order to provide evidence that the target TLC is being attained. Energy costs will almost invariably be the key item to be monitored. Where a decision is made that an item is not to be monitored, it will be necessary to demonstrate that the probability range over which the cost can vary will not have a significant impact on through life cost.

Conveniently, energy costs are comparatively simple to monitor and provide reliable data

upon. As noted above it may be prudent to provide metering for sub-uses of the energy, so that any areas of non-compliance can be identified separately, and appropriate counter-measures taken to bring the usage back within the intended parameter. Where the gathering of data is not so straightforward, it may be necessary to check the cost and complexity of data collection against the value of the data in being able to adjust the costs post-completion, or identifying the area of non-compliance. It is assumed that most of the equipment used for monitoring will be built-in and paid for as part of the capital cost, but it might be advantageous in cost terms for expensive monitoring equipment to be hired for the term required and removed at the end of the proving period.

The Prime Contractor should show the cost of the monitoring process separately, to allow the Client to assess value for money of the monitoring process, and decide whether to accept certain cost predictions as proven on a calculation basis, without further monitoring. In some cases, the Client may need to recognise that running a Proving Period represents in itself a substantial additional cost. This can only be justified in terms of the certainty it will bring as to future operational expenditure.

### ***1.8. Supporting data***

Where costs are to be incurred beyond the stated proving period, and so cannot be subject to monitoring prior to the end of that period, then it will be necessary for the prime contractor to provide justification for all the assumptions contained in the cost model, with regard to component lives, costs and maintenance cycles, etc. Suitable sources of such data are the Component Life Manual, published by HAPM, and the various agreement certificates for the materials and components being used. Other forms of justification include documented experience in use, accelerated tests carried out by reputable testing authorities and tests carried out by trade bodies. In general, the larger the body of opinion in support of a particular life estimate, the greater the chance of acceptance by the Client or any technical advisors or auditors acting on behalf of the Client. In cases where no reliable data can be found, this should be clearly flagged and the matter discussed with the Client's technical representative.

### ***1.9. Proving period length***

The Prime Contractor is responsible for proposing and agreeing with the Client the Proving Period to be applied to the contract. In the case of energy intensive building types, proof of energy usage in a range of seasons and weather types will be critical. It is therefore unlikely that a period of less than 15 months will be acceptable. Where there are cyclical or repetitive operations, the Client will also wish to establish that these can be carried out effectively for the sums of money incorporated into the cost plan. If this includes, for example, cyclical painting at 3 or 4 year intervals, it may be necessary for the Proving Period to be extended to include this operation. The Prime Contractor's proposals will be studied by the Technical Auditor, the Client and his Advisors, and may be extended by agreement if the period is considered to be insufficient to give reasonable certainty that the target through life cost will be achieved or if the initial results are unsatisfactory. The Prime Contractor must therefore give a price for the extension of the Proving Period, should it be requested.

### ***1.10. Reporting procedure***

The Compliance Plan should state how the results of the Proving Period will be presented to the Client, the frequency of reports and how third party checks (if requested) will be facilitated. Procedures need to be put in place for action should the results fall outside the parameters agreed at this stage. It is assumed that the Compliance Plan will be built around the through life cost model, and that variance will be reported in terms of changes to that model. If this is not to be the chosen approach, then a method of linking reports back to the model will be required.

### ***1.11. Statement of acceptable deviations***

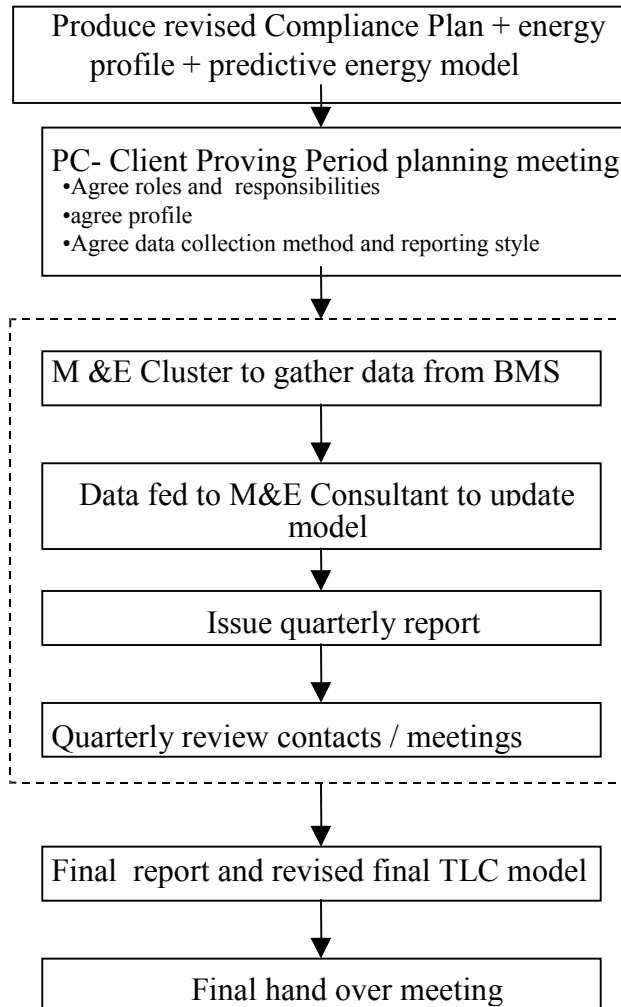
Since the figures contained in the through life cost model represent 'best guesses' of costs to be incurred in the future, and some of these, such as energy costs, are dependent on issues such as the weather that are outside the control of the Prime Contractor, it will be necessary to provide a statement indicating where variance is to be expected, and the range of values which could be anticipated.

These must be stated in a way which will enable the Client and his Advisors to 'correct' any assumptions within the model to represent reality as it unfolds. For example the energy usage will vary with external temperatures and wind speeds, as well as the throughput of occupants. It will therefore be necessary for the energy used to be adjusted by the relevant factors to establish if the actual figures are within the predicted parameters. This means that these external factors need to be measured and recorded, either on site or at an agreed alternate location such as a meteorological record station.

Where the Prime Contractor is aware of any factors which will modify the performance of the building, these should be stated, even if correction factors are not possible, so that the Client is aware of any restrictions which he should place on the use of the building to avoid causing accelerated wear or damage (e.g. avoidance of hobnailed boots in sports halls).

## **3. DEVELOPING THE COMPLIANCE PLAN AND PROVING ARRANGEMENTS**

A Compliance Plan with the above set of headings may be first prepared in outline form at the end of Scheme Design, and then reviewed at the end of Detailed Design. In both BDB Pilot Projects, a more detailed version was compiled during construction. The process adopted for moving into the Proving Period by the Wattisham project was as follows:



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**Collaborative Working Centre – [www.collaborativeworking.co.uk](http://www.collaborativeworking.co.uk)**

The Collaborative Working Centre of Be is a not-for-profit organisation set up from members of the team that facilitated *Building Down Barriers* to provide consultancy, training and other continuous improvement services to support the development and implementation of collaborative working.

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