



Cabinet Office

Government Soft Landings

Section 5 - Environmental Management



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5.0 Environmental Performance (the Environment POE measure)

5.1 Overview

Projects are to measure and record the actual performance figures for energy consumption, carbon dioxide emissions, water usage and waste production:

- **Total Energy use** - including both regulated and unregulated consumption
- **Carbon dioxide emissions** - calculated from the energy use
- **Waste** - this needs to address operational use
- **Water** - consumption and waste figures

These need to be considered against corporate targets and objectives, operating budgets and critical project targets. These will need to be constantly reviewed and evaluated as the project progresses. Handover and fine tuning should be used to assess progress against these and support their achievement.

Central Government targets for the above can be found at <http://sd.defra.gov.uk/gov/green-government/commitments>

GSL requires the use of a recognised energy assessment and reporting method. This should include energy measurement, calculation of carbon dioxide emissions and an advisory report to suggest improvements; this report should consider

Assessment of annual energy use

Analysis of energy demand profiles

Reference to the Occupant satisfaction survey from the Functionality and Effectiveness POE

Investigation of issues arising (especially where there is unusually good, poor or variable performance)

Spot checks and recording measurements as necessary

Technical review of building and equipment performance

Review of the performance and usability of controls and Building Management System (BMS)

Reliability, maintenance and maintainability

Structured reviews with occupants and management

Suggestions for improvement

Comparison with results from other buildings (from within the programme or from a wider benchmark database)

GSL requires the measurement of annual water consumption and measurement of waste disposal supported by an advisory report to suggest improvements.

A reminder that the purpose of GSL and the three years of POE is to:

- Obtain the best operating performance as soon as possible; and
- Align as closely as possible the best operating performance with the performance target set at the start of the construction period.

There are a number of current and anticipated policies which cover energy use and carbon dioxide emissions in the buildings sector and the government departments are already bound by some of these so for GSL and POE the setting of targets and measurement should reflect the method already used by the department to meet its statutory duties.

Prominent amongst these statutory requirements is the annual production of a Display Energy Certificate (DEC) supported by the Operational Rating Calculation (ORCalc) and that method might already be adopted by the department.

Although not mandated as in the case of the DEC, the Technology Strategy Board has developed methodologies for the Building Performance Evaluation of both Non-Domestic and Domestic Buildings. This combines assessment methods from the Chartered Institution Building Services Engineers (TM22) with the Building Use Survey and a well defined reporting method.

The GSL Champion is to understand the performance targets and measures adopted by the department.

Reference Documents

The Chartered Institution of Building Services Engineers Operational Ratings and Display Energy Certificates (TM47:2009).

The Chartered Institution of Building Services Engineers (CIBSE) Energy Assessment and Reporting Method for the evaluation of energy consumption in use (TM22). This document also supports optimisation of performance against these targets.

A link to obtain TM47 and TM22 guides can be seen below:

<https://www.cibseknowledgeportal.co.uk/new-cibse-bookshop>

It is a requirement of Building Regulations that metering is on a zoned basis; the CIBSE Building Energy Metering Guide (TM39) is helpful for this, <http://www.cibse.org/pdfs/partjul2006web.pdf>

The CIBSE Building Log Book TM31 <http://www.cibse.org/pdfs/partjul2006web.pdf> provides useful guidance on how to record how a building is used. This information is essential to assess planned performance against actual design.

The same principles will apply to both water usage and waste production. Both of these have specific design considerations to evaluate consumption; both can be engineered to provide effective, sustainable solutions.

5.2 The Project Stages

5.2.1 Stages 1 – Brief, 2 – Concept

The guiding principles for Environmental Performance need to be considered and set at this stage, e.g., Greening Government Commitments <http://sd.defra.gov.uk/gov/green-government/commitments> and project specific targets that have been set in the business case at the strategy stage.

A draft Environmental Plan needs to be produced. A guide for this can be seen in Section 5.4 Environment – Guidance. The plan will highlight performance objectives, e.g., energy consumption, carbon dioxide emissions, water usage and waste production. This plan and its targets will be informed by the Environmental Impact Analysis, Sustainability Statement, Renewable Energy Strategy and external information sources, inclusive of industry best practice standards and departmental feedback from similar projects.

For refurbishment and remodelling projects, an assessment should be made of the current Environmental performance.

5.2.2 Stage 3 – Definition

Performance objectives should be converted into defined targets; energy consumption, carbon dioxide emissions, water usage and waste disposal and included in the information exchanged with the client at BIM information exchange 2.

A Post Occupancy Evaluation (POE) Plan will need to be designed and approved by the Project Manager. This should address the following:

- Type and frequency of POE reports;
- Procurement of external expertise (if deemed necessary);
- Consultation process throughout the POE period; and
- Continued involvement of consultants and contractors during building occupation and optimisation.

5.2.3 Stages 4 – Design and 5 – Build and Commission

Performance objectives are to be incorporated as part of the BIM data at Information exchange 3.

Outputs from design need to be assessed against the project objectives and targets. Any variance against the objectives in the plan will need to be explained by the design and construction team and then approved by the Project Manager.

Functionality of equipment and controls operating instructions and their ease of use is to be developed closely with the GSL Champion.

The updated and approved plan should be signed off by the Project Sponsor.

5.2.4 Stage 7 – Operation and End of Life

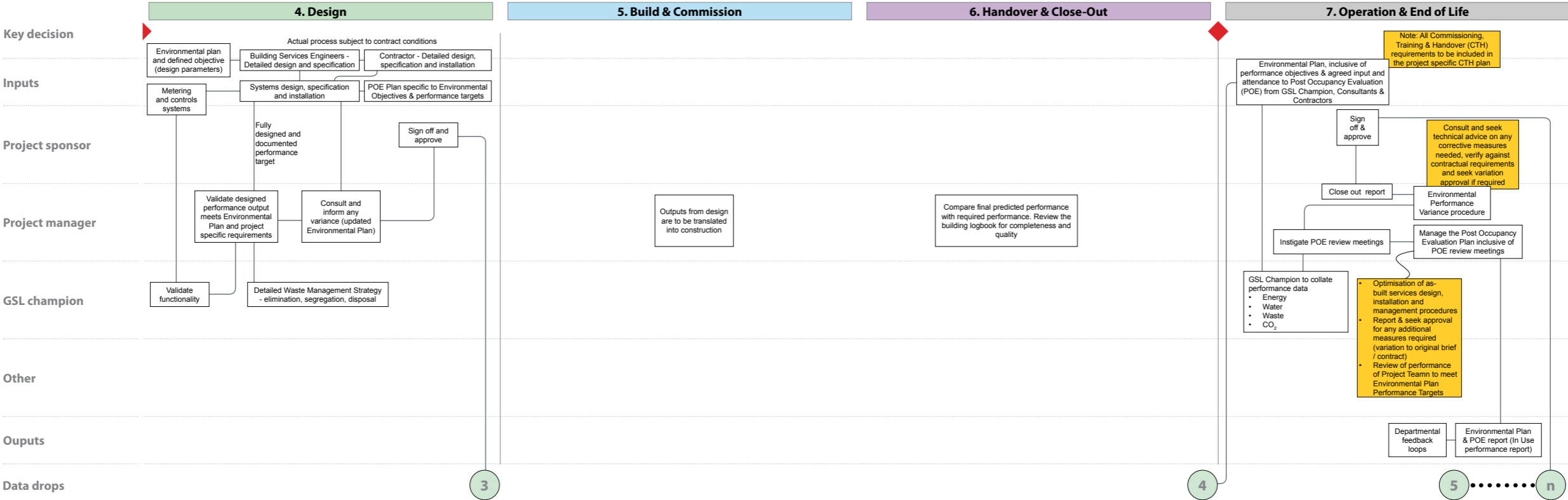
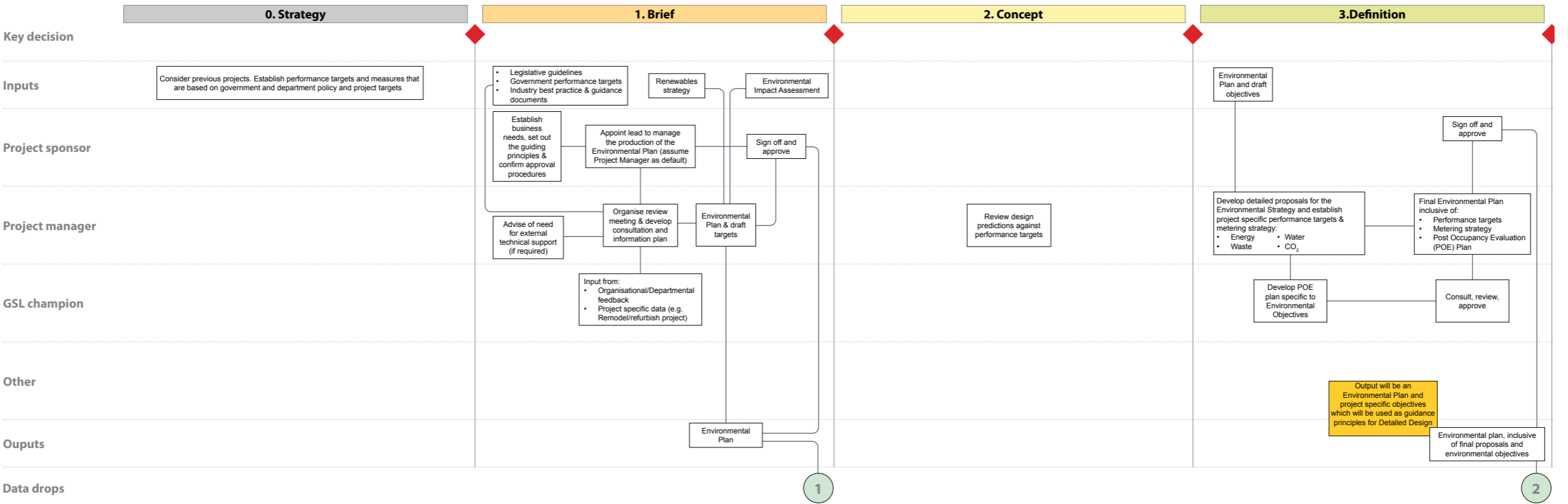
Operational Evaluation should be carried out in accordance with the POE plan. It is the responsibility of the PM to manage the process, but the co-ordination of inputs from the advisory parties and the end users will come through the GSL Champion.

The collection of performance data (meter readings and waste disposal figures)

will need to be co-ordinated by the GSL Champion along with all other data needed for the POE.

Feedback of this information to the department and other projects needs to be through the GSL Champion. Final review and close out of the Environmental Plan with its feedback and suggestions needs to be in consultation with the GSL Champion.

5.3 Process Map – Environmental Management



5.4 Environment – Guidance

Responsibilities for producing, approving, issuing and managing the Project Environmental Plan are set out in the Process Map.

This section is designed to provide supporting information to help in the production of the Plan.

5.4.1 The Environmental Plan

At the Project Brief Stage an outline Environmental Plan should be produced. This establishes specific objectives/targets for the project, operational requirements, and Government and Departmental Policy.

The plan should address the following:

Relevant legislation to be followed;

- Government Environmental Performance Objectives set;
- Evaluation and documentation of projected figures for energy consumption, carbon dioxide emissions, water usage and waste production; and
- Predicted figure for total energy use considering regulated and unregulated energy consumption and the assessment of this in use.

To be published in 2013 - CIBSE TM 99 “Estimating operating energy in use at the design stage” will assist with the prediction figure for total energy use.

The project Environmental Plan is to establish targets for in-use performance of the asset plan for:

- Energy consumption – Electricity and gas (for both regulated and unregulated loads);
- Carbon dioxide emissions, e.g., kgCO₂/m² per year;

- Water consumption, e.g., m³ per full time employee (FTE) ; and
- Waste disposal, e.g., total tonnes per FTE to landfill (designed as part of the waste management strategy).

The Plan will need to be monitored and updated as the design progresses to ensure there is clarity and accountability in the decision making process to ensure that the overall needs of the Operational phase are realised.

Controls and systems are to be designed to meet the needs of the operator and end user. The design should consider the skills of the facilities management team and the occupiers / users, e.g., effectiveness of heating, ventilation and lighting controls.

The Plan should be reviewed and updated through the BIM Information Exchanges with the client. The Plan must also set out how and when the targets will be monitored and evaluated after occupancy.

The roles of the Project Sponsor, Project Manager and Soft Landings Champion in producing this Plan are shown on the Process Map.

5.4.2 Sources of information for Objectives

These should be considered using the following sources of information

- Statutory requirements
- Government performance targets
- Departmental targets (if different to the above)
- Benchmarking (internal and external)
- Existing performance data (on refurbishment/remodelling projects)
- Best practice guidelines

The following links are useful points of reference in developing the Environmental Plan;

Building Regulations Part L Conservation of Fuel and Power, a link for this can be seen below:

<http://www.planningportal.gov.uk/buildingregulations/approveddocuments/partl/>

Approved Documents L2A (New buildings other than dwellings) L2B (for refurbished buildings) also need to be addressed.

http://www.planningportal.gov.uk/uploads/br/AD_L2A_wm.pdf

Inclusive within this is the requirement to calculate the Target CO2Emission Rate (TER) and later validate with the calculation of the actual Building Emission Rate (BER); ref Section 4: Design Standards of ADL2A and ADL2B.

There are also statutory requirements for the production of Energy Performance Certificates and Display Energy Certificates.

<http://www.communities.gov.uk/planningandbuilding/sustainability/energyperformance/ndepcs/>

5.4.3 Government Performance Targets

The Greening Government Commitments of February 2011 identifies Government Environmental targets and their measurement: "Guidance on measurement and reporting".

"The Greening Government Commitments are the UK Government's commitments for delivering sustainable operations and procurement. The commitments apply to the office and non-office estate of central government departments and their Executive Agencies (EAs), Non-Ministerial Departments (NMDs) and executive Non-Departmental Public Bodies (NDPBs).

The purpose of this guidance is to provide an overview of reporting requirements for the Greening Government Commitments, as published in February 2011, and to enable consistency on reporting across government. This guidance will be useful for Sustainability Managers and Practitioners, Building Managers, Estate Managers, Facilities Managers and procurement teams. The Cabinet Office will be assessing and reporting on government performance in line with the criteria in this guidance"

These targets are also contained on the Department for Environment Food and Rural Affairs (DEFRA) using the link below:

<http://sd.defra.gov.uk/gov/green-government/commitments/>

5.4.4 CIBSE Guidance Documents

The principle set of documents on energy design and measurement are contained in the following CIBSE documents:

- CIBSE Guide A Environmental Design
- CIBSE Guide G Water
- CIBSE TM 31 Building Log Book
- CIBSE TM 39 Building Energy Metering
- CIBSE TM 46 Energy Benchmarks
- CIBSE TM 22 Energy Assessment and Reporting Methodology

The BSRIA; Operation and Maintenance Benchmarking Review document should also be considered for target setting; <http://www.bsria.co.uk/news/benchmarking09-10/>.

5.4.5 Metering strategy and design

The metering strategy needs to be produced to support the monitoring and evaluation of the energy performance of the building in use. This requires understanding of the use of the buildings, what influences energy consumption and how this is to be measured.

CIBSE Building Energy Metering Guide (TM39) advises that the breakdown of end-uses and therefore metering can be done by:

- Area: e.g. floor 1, 2, 3 ... or zone 1, 2, 3 ... etc.
- System: e.g. AHU 1, 2, 3 ... or boiler 1, 2, 3 ... etc.
- Circuit: e.g. circuit 1, 2, 3 ... or distribution board 1,2, 3 ... etc
- Tenancy: e.g. tenancy 1, 2, 3 ... etc.

The strategy for this is to be agreed and approved as early as possible.

Standardisation of metering design across a Department would lead to improved performance evaluation and benchmarking and should be considered in establishing the metering strategy.

The metering strategy is also influenced by the Operational profile and the potential for this to be phased and/or variable.

Water consumption should also be addressed. This is particularly important where grey water usage and rain water harvesting are used.

It is already a legislative requirement that all waste must be categorised and records of disposal recorded. Again, these figures should be collated for use in the POE reports.

5.4.6 Post Occupancy Evaluation (POE)

Responsibility for producing the Post Occupancy Evaluation plan sits with the Project Manager, working in conjunction with the GSL Champion. This should include the format and timing of the surveys, confirmation as to who will undertake them and liaison with the design team, building operators and end users.

Energy consumption for POE should be assessed in accordance with a recognised Energy Assessment and Reporting Method as discussed in Section 5.1.

Part of the Environmental Plan requirements will be to establish when and by whom these assessment(s) should be carried out. There is a degree of specialist knowledge and experience that is required, which may well be contained within departments, project consultants and suppliers. These surveys should be delivered through an impartial body. This could be central capability which is "independent" of the specific Project Team.

The timing of the evaluation will be project specific, designed around phased completion and Operational levels.

Water consumption and waste production should all be recorded and incorporated into the POE Reports.

5.4.7 Using the information

Having collated the information through POE Reports, it is essential that the information is used to:

- Assess actual performance against required performance targets; energy, water and waste targets to see how effective the project team were at turning design objectives into a working model;
- Obtain optimum performance as quickly as possible;
- Obtain best possible alignment of actual performance with the required performance target;
- Determine if improvement/corrective measures are required;
- Arrange for implementation of corrective measures; and
- Provide constructive feedback beyond the immediate project team. Structured design and evaluation reporting is extremely useful in disseminating the information gained and any lessons learnt.

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This document is available for download at <http://www.bimtaskgroup.org/reports>

