CRC-CI Project 2005-001-C

Sydney Opera House – FM Exemplar Project

Report Number: 2005 – 001 - C – 2

Initial Research on Procurement

Program Number:	C
Program Title:	Delivery and Management of Built Assets
Project Number:	2005-001-C
Project Title:	Sydney Opera House – FM Exemplar Project
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1 OBJECTTIVES AND SCOPE

1.1 Introduction on SOH Project

The Sydney Opera House Facilities Management Exemplar Project (SOH FM Exemplar Project) aims to develop innovative research on facility management (FM) with the focus on asset maintenance. The project utilises the Sydney Opera House (SOH), one of most unique buildings in Australia, to research and create innovative FM strategies and models that will have a direct beneficial role for the Australian facilities management industry as well as the economy as a whole.

The procurement, benchmarking and digitisation are crucial in improving the performance of FM. The procurement develops strategic plan and deployment framework enabling products, services, etc. meet objectives of performance, economic, environment, etc. Benchmarking is a technology used to compare practice and assess performance against the competitors recognised as industry leaders who achieve most successful activities in the field. Digitisation develops digitized FM modelling that facilitates the integration and automation of facility management. The project carries out the research on all the three areas as well as the relationship between them. It aims to develop an integrated approach for the improvement of FM performance.

A further description of the three research areas carried out in this project is as follows:

The procurement research aims to develop a performance-based procurement framework. Service requirements are defined in terms of performance objectives. Performance assessment and decision making strategies are developed.

The benchmarking research aims to develop an asset maintenance benchmarking system that comprises performance measures, methods and procedures, which enables the company/organisation to identify areas of success and where improvement is needed.

The digital modelling research aims to develop a digital FM model based on the 3D digital building models to assist in the integration and automation of facility management.

This report presents an initial research on the procurement.

1.2 Procurement Research

The following objectives on the procurement research will be achieved through the development of the project:

- Analyse the current SOH procurement strategies and procedures, develop a preliminary procurement framework and identify key issues and principles for future research.
- Develop a performance-based procurement model, which comprises procurement strategies, procedures, multi-dimensional performance assessments for supporting decision making, which enables to achieve the strategic objectives and requirements of the organisation.
- Deliver recommendations and guidelines on implementation of best practice on the procurement required by SOH.

1.3 Deliverable from this Report

This report presents the first deliverable of the procurement research. It provides a preliminary procurement framework and an analysis of the current SOH procurement strategies based on the Strategic Asset Maintenance Plan (SAM) (period 2003/04 – 2027/28), maintenance contract documents, etc. Key issues are identified and some recommendations are provided. The structure of the report is described as follows.

Section 2 presents a preliminary procurement framework.

Section 2.1 provides a description of the preliminary procurement framework, where the relationship of the strategic asset maintenance plan, the operational asset maintenance plan and the performance-based procurement is analysed.

Section 2.2 introduces the strategic asset maintenance plan that defines the overall strategic objectives and requirements of the organisation.

Section 2.3 introduces the operational asset maintenance plan where activities are planed to maintain the assets and systems.

Section 2.4 presents the performance-based procurement strategy development. The procurement strategy, contract arrangement, multi-dimensional performance evaluation system, etc. are discussed.

Section 3 analyses the SOH cases and identifies key issues and principles of the procurement.

Section 3.1 introduces the Strategic Asset Maintenance Plan, maintenance contract documents, etc. provided by SOH and identifies key issues for analysis and discussions.

Section 3.2 analyses the procurement strategies, versions and principles based on the Strategic Asset Maintenance Plan provided by SOH. Recommendations on developing procurement strategies are provided.

Section 3.3 analyses the procurement routes and maintenance types taken by SOH. Recommendations on identifying and categorising procurement items are provided.

Section 3.4 analyses the performance measurement and monitoring provided in the SOH Strategic Asset Maintenance Plan. Recommendations on key performance indicators and gateway reviews are provided.

Section 3.5 analyses the SOH tender evaluation process. Recommendations on tender evaluation criteria and process are provided.

2 PROCUREMENT FRAMEWORK

2.1 Procurement Framework for Asset Maintenance

Performance-based procurement considers the achievement of strategic goals and objectives, and operational requirements and constrains, when deciding, which procurement model is appropriate for providing a service. It identifies the required quality of services and the conditions under which the service is to be conducted.

This section introduces a framework for the implementation of a performance-based procurement process for asset maintenance services and works in the real estate industry and defines its main components. The framework is also able to serve as guideline for the assessment of implemented procurement systems. Within the framework the Strategic Asset Maintenance Plan and the Operational Asset Maintenance Plan provide demand statements as evaluation criteria and strategic and operational requirements for the Performance-based Procurement Process.

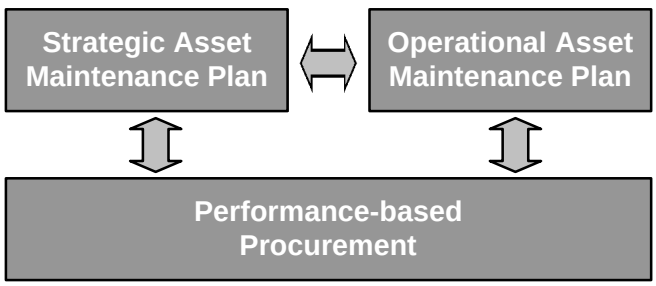

Figure 1: Components of the Procurement Framework

The Strategic Asset Maintenance Plan (SAMP) is a component of the Real Estate Management Plan, which is integrated in the overall management strategies of the organisation under investigation. This part of the framework describes the translation of high-level and other objectives and compulsory requirements into maintenance tasks, service types and service levels on a strategic level of planning.

The Operational Asset Maintenance Plan (OAMP) describes the procedures and techniques, which are necessary to action the strategic plan in operation. It gives guidance how to control the achievement of the strategic goals and the compliance with the requirements and how to manage services and contractual arrangements. The OAMP comprises also procedures for the continuous improvement of its own processes and techniques, as well as for the systematic review of the SAMP. The OAMP describes the part of the asset maintenance strategy, which has to prove its feasibility in the operation phase after implementation.

In the Performance-based Procurement Process provision options for required maintenance services and works are assessed and appropriate options are identified. The criteria of the multi-aspect evaluation process consider the requirements formulated in the SAMP and the OAMP in the context of the prevailing market and the service provision reliability and risk. The criteria are considered in the steps of the tender process by the various stakeholders of the process. During the process procedures and criteria for the evaluation of service and works quality in the later operation phase, developed in the OAMP, are implemented.

Figure 2 shows the parts of the procurement framework. The following sections will describe the different parts of the framework and develop the context for the procurement strategy design.

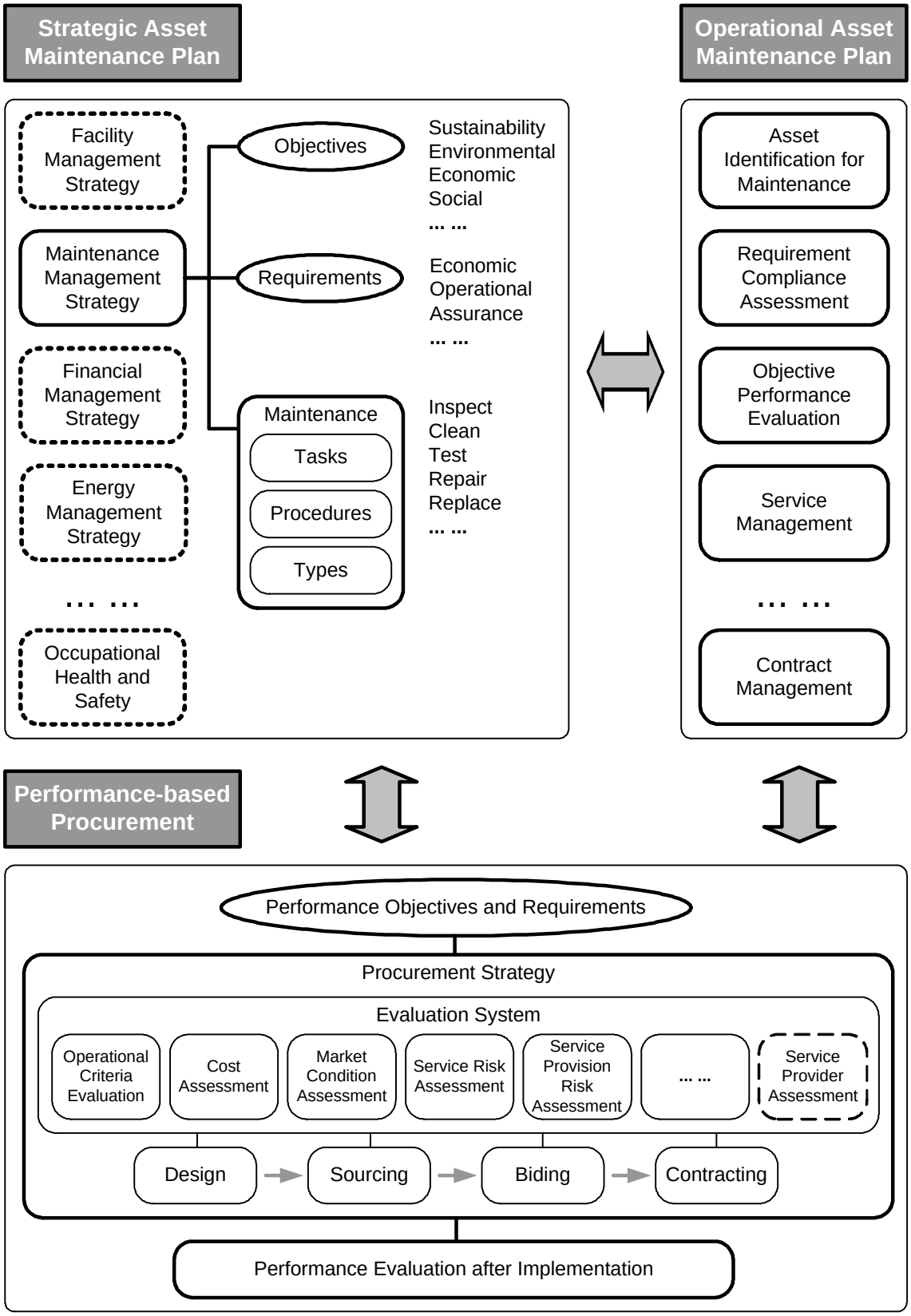

Figure 2: Diagram of the Procurement Framework.

2.2 Strategic Asset Maintenance Plan

The Strategic Asset Maintenance Plan (SAMP) integrates the asset maintenance into the overall business strategy. The SAMP provides the foundation for the maintenance strategy development and the evaluation system for the assessment of the operational asset maintenance plan and the procurement strategy.

In a soundly developed maintenance strategy all techniques, procedures and plans can be tested against the objectives and requirements described in the SAMP.

2.2.1 Objectives

Objectives for the maintenance management strategy are deduced from the higher-level missions and objectives of the organisation, from demands only relevant in the context of the maintenance task or from external issues. Higher-level objectives might reflect the environmental or social commitment of the organisation. Objectives related to the maintenance task might concern certain availability levels of the maintained assets. The service providers' desire to reduce the maintenance effort can be identified as external objective. Objectives can be formulated as evaluation criteria in the strategy development process.

Table 1: Examples for objectives.

Sustainability	e.g. The maintenance strategy should ensure, energy efficient operation and service provision.
Environmental	e.g. Use of hazardous chemicals should be avoided where possible.
Economic	e.g. The maintenance cost should not exceed X% of the achievable rent.
Social	e.g. Over-hours should be avoided. Working hours should allow normal family life.
Operational	e.g. Maintenance work should not interrupt core business activity. e.g. Break-down prevention is preferable to reactive break-down rectification.

It is important to identify and to consider the objectives of the various stakeholders of the maintenance process when developing the maintenance strategy. Some of these objectives can be compromised; others are not adjustable by the strategy developer. Nevertheless control schemes and partnership arrangements between the stakeholders can be implemented to avoid that the individual objectives compromise the achievement of the strategy goal.

2.2.2 Requirements

Requirements are compulsory unconditional specifications and constraints in the strategic asset maintenance plan, which are based on external or internal prescriptions, on higher-level objectives of the organisation or the maintained structure. Requirements are no optimization criteria but constrains in the strategy development process.

Table 2: Examples for requirements.

Economic	e.g. The maintenance cost have to be kept within the budget.
Operational	e.g. The temperature in a freezer room has to be kept below -4°C.
Physical	e.g. The access for maintenance works is constrained, due to insufficient door width.
Laws and Codes	e.g. Maintenance has to ensure operation complying with health and safety regulations.
Assurance	e.g. Insurance contractual arrangements might exceed the requirements posed by laws or codes.

While objectives can be adjusted in case their achievement is identified in the planning stage as not feasible in the context of the project, requirements are not adjustable in the planning process. Nevertheless implications of requirements can be avoided by adjusting the maintained structure and the maintenance strategy. In some cases requirements can be negotiated with external or higher-level instances (e.g. insurance company).

2.2.3 Maintenance Tasks, Procedures and Types

The third component of the Maintenance Management Strategy is the general description of maintenance tasks, maintenance procedures and maintenance types.

The maintenance tasks summarize the maintenance activities for the various assets according to their functions. Examples for maintenance tasks are:

- Clean,
- Test,
- Inspect,
- Replace,
- Repair, etc.

Maintenance procedures assemble several tasks into groups. Such a procedure might contain only tasks, which are necessary to keep the maintained system operational, or it might contain the tasks, which are necessary to preserve its value. Several maintenance procedures can be formulated on a strategic level, to address the requirements of the various maintained assets. For example:

Inspect and Test → Replace if faulty	for a transmission belt, a light bulb, etc.
Inspect and Test → Readjust if faulty	for an air outlet, a control
Inspect and Test → Repair if faulty	for a door handle, a chiller

Maintenance types describe the strategy on which the maintenance plans for the several assets are based on. Maintenance types are selected according to the level of criticality of the asset and the level of its usage. For some assets maintenance types and procedures are prescribed by laws or codes (e.g. regular inspection of lifts, smoke detectors). Examples for maintenance types are:

Reactive Maintenance	service is invoked when a failure occurs
Regular Maintenance	service is performed in regular intervals
Preventive Maintenance	conditions of the asset is measured and monitored and service is performed before the failure occurs

2.3 Operational Asset Maintenance Plan

The framework for the Operational Asset Maintenance Plan (OAMP) describes the activities, which have to be planed to maintain asset and the systems they constitute in the operation phase.

2.3.1 Assets Identification for Maintenance

To plan the maintenance services and works the assets, which are to be maintained, have to be identified. Depending on the intended depth of the plan and the characteristic of the maintenance task either a structured catalogue of items or a catalogue of specifications, or an identification concept in between these options can be used.

The characteristic attributes of an asset answer the questions:

Which item?	e.g. exhaust fan, door handle, wall, etc.
Which amount?	e.g. number, m^2, etc.
Where?	e.g. room 512, building A, etc.

These attributes can be augmented and processed to generate more information to base the planning of the maintenance works on. For example the following information can be added to the database:

- Which service tasks are recommended to maintain this asset?
- Which spare parts and materials do I need to maintain this asset?
- Which codes and safety regulations have to be considered?
- How long does it take to maintain this asset (e.g. paint X m^2 wall)?
- Where do I find the manufacturer specifications?
- Which failures can occur with this asset?
- On which account are maintenance costs for this asset booked at?
- etc.

More augmentations could inform about the relation of the asset and the implication of its maintenance on the operation of other assets and the organisation in general:

- How often and how intensive is the asset used?
- How critical is its operation for the operation of other assets?
- How critical is its operation for the achievement of the overall objectives?
- What would happen, if this asset breaks down? Who and what would be affected?
- What is considered a break down or failures of this asset (e.g. physical destruction, not compliance with requirements, not achievement of objectives)?
- Which are the redundant systems for this asset?
- etc.

Based on the collected information a maintenance strategy for a specific asset can be developed using strategic (see section 2.2.3) and asset specific maintenance tasks, maintenance procedures and maintenance types.

2.3.2 Requirement Compliance Assessment

The OAMP gives advice for the assessment of compliance with compulsory requirements (see section 2.2.2) for the operation of assets and the systems they constitute.

Examples for techniques to assess the compliance are given in the following table:

Economic	accounting financial controlling
Operational	measurements and tests reviews and check lists quality assessment (e.g. as part of quality management)
Physical	measurements
Laws and Codes	measurements and tests internal and external audits reviews and check lists
Assurance	

2.3.3 Objective Performance Evaluation

The performance of the maintained assets and the systems they constitute is evaluated against the objectives formulated in the SAMP (see section 2.2.1). The following techniques can be applied in the evaluation process:

Sustainability	measurement calculations (engineering, simulation) operational controlling benchmarking internal and external audits reviews and check lists surveys and questionnaires
Environmental	
Operational	
Economic	financial controlling benchmarking internal and external audits reviews and check lists
Social	internal and external audits reviews and check lists surveys and questionnaires

In multi-aspect evaluation systems the assessment of various objectives are combined. The performance indicators of the several dimensions of the evaluation system are weighted and integrated in one performance indicator or are assembled in one performance display (diagram or report) to allow discission making on its basis.

The integration and weighting of the different performance indicators is based on the notion that single objectives can be compromised to achieve a higher performance of the overall system in the sense of the higher-level objectives. The compulsory requirements must be considered as constraints in the optimisation process and the levels of objectives must be acknowledged, when designing the Objective Performance Evaluation System (OPES) in the OAMP.

The OPES is the basis for the performance evaluation process after implementation of the developed performance-based procurement strategy (see section 2.4.1).

2.3.4 Service Management

The Service Management Plan in the OAMP describes how maintenance services and works are initiated, documented, controlled and improved. It also involves the management of information flow, the procedures to approve works and service responsibilities arrangements.

The Service Management is planed on basis of the Asset Identification, described in section 2.3.1, and the maintenance tasks, maintenance procedures and types developed in the SAMP (see section 2.2.3).

Typical components of the service management plan are given in the following table:

Service Requests	Service requests are the interfaces between the service providers and their clients; they can be generated automatically by a maintenance management system or are generated when failure of an asset is identified. Service requests can be informal (phone call) or formal (forms, designed procedures or checklists). It is important for the success of asset maintenance strategy that as much information as necessary, to allow the assessment of the problem and to identify the concerned assets, is collected when a service is requested. In some cases it is also necessary to document the requesting instance and the circumstances under which the service was requested (e.g. for accounting and billing purposes).
Work Orders	Work orders specify the necessary task for the service provider and function as approval for a service request. A work order might contain the location and required task, and might be augmented with the additional information identified in the asset maintenance identification process (see section 2.3.1). Work orders might also contain process management information like estimated required work time and due dates.
Service Documentation	After a service was performed, the fact that it was performed and all issues, which might be interesting for future following services, are documented. This information can be used to demonstrate compliance with maintenance schedules and schemes. It can also be evaluated to identify problematic assets and maintenance strategies. For example: The analysis of the required service types (regular, preventive and reactive maintenance) over a period of time can show if a preventive maintenance strategy is successfully implemented.
Controlling of Services	The quality of service provision can be evaluated against the specification identified in the asset identification process (see section 2.3.1) and the strategic objectives and requirements developed in the SAMP (see section 2.2.3). Service Control schemes must be designed according to the specifications and must be negotiated and implemented in the procurement process before hand. Reward and penalty arrangement can be used to encourage appropriate service provision and to enforce necessary

	improvement measures.
Systematic Improvement and Review	The actual maintenance of the assets and the systems they constitute in the operational phase might disclose issues and requirements, which were not anticipated, when the maintenance strategy was developed and implemented. Therefore procedures to capture and to integrate improvement measures in the operation phase and for future development of maintenance strategies should be implemented. The repository developed in section 2.3.1 should be developed accordingly. Also changes of requirements (laws, etc.) and higher-level objectives must be acknowledged in the review process.

2.3.5 Contract Management

The Contract Management activity in the OAMP involves procedures to ensure that the contract conditions are kept, and the services, which are stipulated, are actually claimed and granted by the contract partners. This also might include the management of contract dates and contract terms.

2.4 Performance-based Procurement

The Performance-based Procurement strategy development is based on the performance objectives and requirements introduced in the SAMP (see section 2.2) and the operational arrangements developed in the OAMP (see section 2.3).

2.4.1 Procurement Strategy

The framework for the procurement strategy is to provide advice to develop and to identify the best service provision option for maintenance services in the real estate industry.

It is formulated as a multi-dimensional evaluation process, which is performed repetitively in the successive steps of the asset maintenance strategy development and implementation.

An important notion of this framework is the integration of a common evaluation system, founded on the strategic high-level objectives and the identified operational requirements, into the design phase and the sourcing, biding and contracting phases.

The functions of the performance evaluation system in successive phases are introduced in the following table:

<table>
<tr><td>Design Phase</td><td>The design phase is the phase in which the asset itself or the users demand can be adjusted to reduce the operational maintenance requirements.

The evaluation system provides guidance for the new design of systems and the replacement of system parts. It also gives advice for organisational arrangements and for maintenance reasonable formulation of core-business requirements.</td></tr>
<tr><td>Sourcing Phase</td><td rowspan="2">The analysis on basis of the evaluation system gives advice if in-house personnel can better perform maintenance works or if the service provision should be out-sourced.

The tender documents (or internal job descriptions) in the sourcing phase are developed according to the asset maintenance strategy (SAMP and OAMP). The decision, which procurement and contract arrangement is selected is developed in the evaluation process. Possible contract arrangement options are given in the table this discussion.

The evaluation systems of the OAMP and the evaluation criteria of the procurement evaluation system (see section 0) are given in the tender documents to allow bidders to assess their qualification and to adjust their offer according to the requirements. This avoids unnecessary effort for checking unqualified offers and it might allow developing common understanding of the procurement objectives and partnership arrangements for the service provision.

Open information about the compulsory requirements and higher-level objective in the tender documents, enables the development of alternative, but comparable, solutions by the bidders.</td></tr>
<tr><td>Biding Phase</td></tr>
</table>

Contracting Phase	In the contracting phase the evaluation system is used to identify the best procurement option and to prescribe the service requirements and objectives in the contract documents (or job description, if performed in-house).

The following table gives possible procurement and contract arrangements and their typical applications (based on Jeremy Wu, 12.4.2005):

Fixed Price, Lump Sum	§ For small uncomplicated projects. § For projects that have been fully designed before the contract is placed. § Pays the contract sum for the contract works – not more or less § May include an unqualified Schedule-of-Rate for incidental variations.
Prime Cost or Cost Reimbursement, Cost Plus	§ Usually used when the nature and the extent of works is uncertain, or § When the prior estimation of a lump sum or of unit prices is impracticable.
Bonus / Penalty	§ Usually applied to lump-sum contract where completion or quality of project is absolute necessary to fulfil customer requirements.
Unit Price	§ Is used to provide the financial basis for a simple 'lump sum contract'.
Schedule of Rates	§ Usually used for cases in which the contract is beset with uncertainty such as term contracts for running a programme of small works and maintenance. § Usually used adjunct to 'drawing and specifications' contracts.
Convertible Contracts	§ When the client has confidential project requiring a balance of minimum project time with reasonable cost. § When the client selects particular contractor based on superior past performance.
Time and Material	§ Management engineering services supplied by consulting engineering firm.
Design and Build	§ Lump Sum contract: Contractor's price is fixed even though design is incomplete, although price will be amended to accommodate client's later changes.
Multiple Contracts	§ Two or more contractors working in operational equality. § Usually used by the client who have major works to perform in which there are radically different types of works/installations.
Management Contracting / Construction Management	§ The client or a management contractor manages the work provision by separate contractors. § The separate contractors have contractual relationship with either the management contractor or the client.
Project Management	§ A project manager acts as the client's representative to coordinate, manage and integrate the functions of the design consultants and contractors.

2.4.2 Evaluation System

Examples for evaluation criteria are described in the following table:

Operational Criteria Evaluation	The operational criteria evaluation process determines if the services are able to provide the required functions in an appropriate quality in the later operation phase. The required quality is a function of the requirements and objectives formulated in the SAMP, as well as of operational criteria formulated in the OAMP. This evaluation can comprise the check if all requested items and works are considered in case the services are described on a high level of detail, or it can involve the check of service provision design suggestions against functional requirement specifications.
Cost Assessment	The cost assessment investigates if economic requirements are kept and if the economic objectives can be achieved. Comparative cost assessment investigates if the costs for a service provision option are reasonable compared to other possible solutions (alternative designs, other bidders). Another focus of cost assessment is the identification of economic risks. For example the following questions are investigated: § Which costs are involved in the provision of a service, which may by not covered by a contract? § Which additional unexpected costs can occur? § How will the cost factors develop in future? § Who will cover expected and unexpected expenses? Benchmarking can be used in the comparative cost assessment. Cost databases, market figures and statistical data are used to evaluate the costs of service provision options.
Service Risk Assessment	Service risk assessment evaluates the risk that the quality of the service or work provision violates the achievement of higher-level objectives. For example a 5-star-hotel might consider performing cleaning services with in-house personnel, to ensure that certain standards of discretion and staff-customer interaction are kept. Similar arguments can be valid for maintenance services to ensure the reliability of operation critical assets. When specialized (e.g. handcraft, outdated technologies) skills and services are needed, the future service provision market must be considered. In this case it might be necessary to keep the required knowledge in-house to ensure service provision in future.
Service Provision Risk Assessment	Service provision risk assessment evaluates the risks for the achievement of higher-level objectives when a service cannot be provided as planned. The failure of critical and highly used assets and services must be considered in the asset maintenance strategy. For example the following measures are possible: § financial assurance and security to cover service drop-out costs, § contract penalties to ensure that service providers take precautions to avoid service drop-out, § reaction plans,

	§ replacement plans, § spare part storage and logistics, § redundancy of assets and systems.
Market Conditions Assessment	The market conditions are assessed in the performance based procurement process under several aspects. The availability of services on the market and the service market structure must be considered, especially when special service quality or flexibility, skills, equipment or licences are required. The number of service providers and the number of service users in the market at the place of demand has to be assessed. It could be investigated if a better market position can be achieved by grouping of several services in one contract or by building service partnerships with other organisations with similar or contrary services demand. Another aspect of market condition evaluation is the assessment of the reliability of supply of material, fuel or spare parts and volatility of prices. It might be necessary to secure supply at a predictable price by contractual arrangements or to build up stocks. The demand side of the service and works market can be influenced by review and adjustment (structural and organisational improvements) of the assets, which are to be maintained and the organisation, which is served.
Service Provider Evaluation	The service provider evaluation process investigates if an internal or external service provider is capable to provide the requested services reliable with the necessary quality. This evaluation involves for example: § the review of previous experience with the service provider, § the interview of external referees, § the assessment of the service providers financial situation, § the assessment of accreditations of the service provider by professional and industrial organisation, § the assessment of the suggested organisational arrangement for the service provision, § the available infrastructure for the service provision, and § presentation and personal impression.

2.4.3 Performance Evaluation after Implementation

The Performance Evaluation after Implementation is prepared for in the maintenance strategy development and the procurement process. The value and evaluation systems introduced in the previous sections are used in the operation phase to assess the performance of the implemented systems. It is the objective of this evaluation to secure compliance with requirements, the achievement of objectives and the permanent improvement of the implements strategies.

The techniques for the evaluation are described in the OAMP in section 2.3.

3 ANALYSIS OF SYDNEY OPERA HOUSE CASES

3.1 Introduction

The purpose of this section is primarily to analyse, discuss, raise queries and make preliminary recommendations with regards to the following documents provided by the Sydney Opera House in relation to issues in procurement:

- Strategic Asset Maintenance (SAM) Plan
  (Period 2003/04 to 2027/28; version 1.01- November 6, 2002)
- Building Conservation, Maintenance and Minor Works Management (BCMMWM)
  (Expression of Interest for Applicants to the Tender Process; April 2005)
- Tender Document for Mechanical Building Services Maintenance (MBSM)
  (October 1998; Volume 1)
- Building Maintenance Contract (BMC)
  (Invitation to Tender: Section 3 Informal Market Testing Tender Documentation)
- Cleaning Services (CS) 2000 (September 1999)

The section is sequenced as such: for each of the following issues, relevant portions of the above-mentioned documents provided by the Sydney Opera House is analysed, comments raised and preliminary recommendations made in relation to procurement.

- Procurement Strategies, Visions and Principles
- Procurement Arrangement/Routes, and Maintenance Types for Operational Assets
- Performance Measurement and Monitoring
- Tender Evaluation Process

3.2 Procurement Strategies, Visions and Principles

3.2.1 SOH Procurement Strategies

According to the SOH Strategic Asset Maintenance Plan (SAM), the following strategies have been taken to ensure that the Maintenance Plan supports the Service Delivery Objectives:

- Maintenance Management Strategies linked to Corporate Service Delivery Functions
- Service Delivery Outcomes set-up to support Corporate Objectives

From the Corporate Objectives & Service Delivery Outcomes, the concerns of SOH are:

- Recognition as a leader in the business
- Business performance

- Workplace innovation
- Cultural and architectural representation
- Customer focus
- Building mutual beneficial between major presenting companies and the SOH
- Being an innovative programmer of performing arts products

DISCUSSIONS

From the documents provided, the following are not apparent and needs to be clarified:

- It is not clear how Sydney Opera House's procurement strategies are aligned with their organization's business strategy, SAM Plan?
- How do they align it? (method(s), procedure(s) by which say the business strategy is filtered down to the SAM plan and then to the Procurement Strategy)
- What objectives did not include:
  to achieve better partnership arrangements with their service/work providers (e.g. fairness/equity of contract arrangements with them: is having strong relationship with contractors important to them?)– because this affects the contractual arrangements (level of trust and loyalty) between client and contractor, and even the performances (motivation levels) of the contractors.
- No specific procurement documents (e.g. manuals or guidelines) at hand. Hence, unable to comment specifically on Sydney Opera House's procurement strategies, procedures, visions, principles.

RECOMMENDATIONS

A procurement strategy should outline how the organization approached procurement. To do so, it is necessary that the strategy is capable of:

- Providing clear guidance on making the right procurement decisions for the organization; supported by the organization's contract procedures, and rules, and the procurement policy.
- Providing an improvement plan to ensure that the intentions outlined in the strategy are implemented.

Hence, it is pertinent that in developing a procurement strategy, the following frameworks should be taken into consideration:

- Strategic Framework
- Asset Management Framework

(1) Strategic Framework

The purpose of a strategic framework (Figure 3) helps to ensure that the corporate or facility's procurement visions and/or priorities meets (i.e. are aligned with) its corporate strategies, objectives, values and priorities. For instance, the corporate strategies sets out the organization's values and priorities which are then expressed in a series of commitments

to issues such as customers' and employees' satisfaction, business performance, high standards of quality of service and conduct etc.

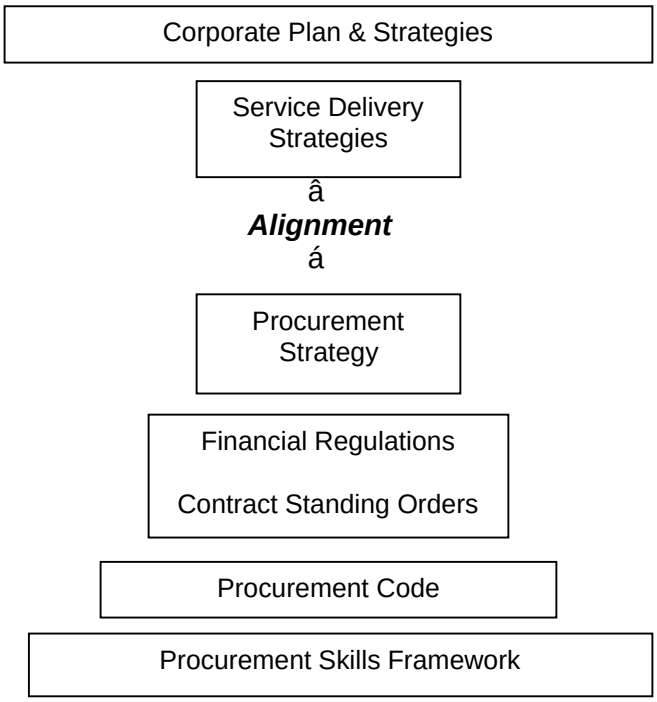

Figure 3. Diagram of a strategic framework.

(2) Asset Management Framework

In line with the strategic framework, an asset management framework is then developed. The following model may be customised to suit the organization's structure and its functions, Figure 4.

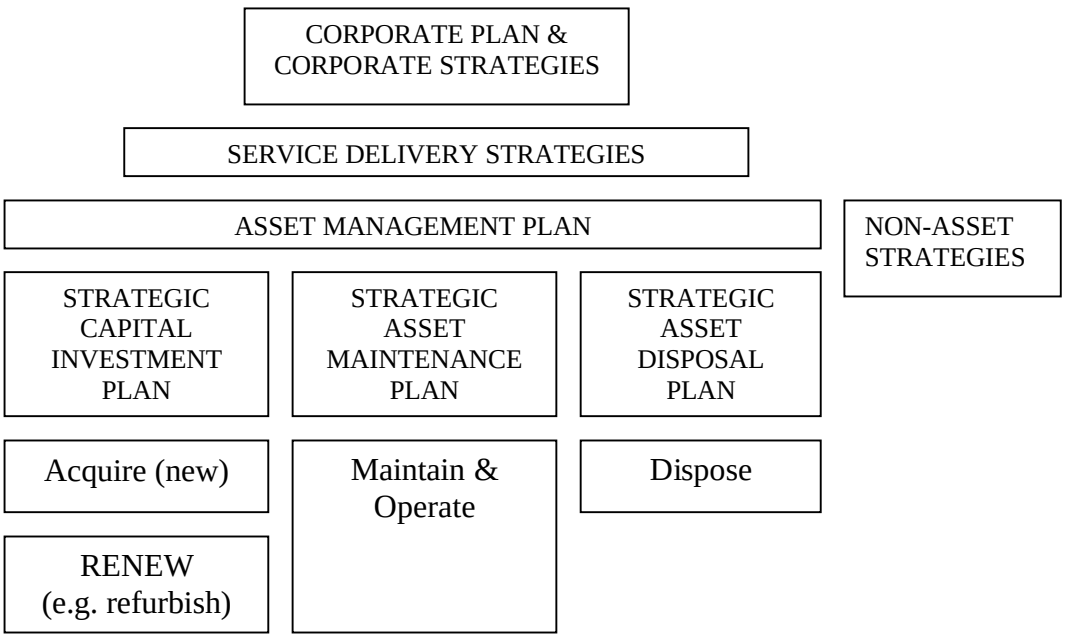

Figure 4. Diagram of an asset management framework.

3.2.2 Procurement Visions and Principles

3.2.2.1 Procurement Vision

In order to ensure that the organization's procurement approach is developed properly, it is necessary to outline how it will procure, i.e. to 'envision' targets against which performance could be judged. Some examples of procurement visions may include the following:

§ To maximise efficiencies and effectiveness in how it makes purchases, avoiding unnecessary purchases

§ To ensure that procurement decisions are made on the basis of whole-life costs, and not solely financial costs.

§ To ensure that purchasing will be coordinated between departments where possible; in order to improve efficiency, appropriately planned and timed so as to increase overall value without increasing cost.

§ To be fair and just in how and what it purchases and how the organizations 'treats' their service providers and contractors.

§ To provide leadership and building capability

§ To improve partnering and collaboration with our peers, and service providers and contractors.

These visions can then be met by applying effective principles that provide strategic direction in how and what it procures, e.g. minimizing risks, being open and accountable, and being informed by customers' needs.

3.2.2.2 Procurement Principles

Some procurement principles that may be developed to support the organization's procurement strategy are:

- Justification of business case
- Developing clear and concise specifications, and good contract administration principles/guidelines
- Appropriate balance between quality and price
- Flexibility in developing alternative procurement and partnering arrangements, e.g. fostering a culture of partnership, collaboration, and cooperation.
- Transparency and accountability
- Compliance with legislation
- Value for money
- Equality of opportunity
- Sustainability of procurement ('whole-life' consideration)
- Inculcate a culture of continuos improvement (i.e. to provide for evaluation, improvement and change of circumstances during contract duration)

- Provision of professional work, moral and ethical attitudes

3.3 Procurement Routes and Maintenance Types

This section details the procurement routes and maintenance types taken (or proposed to be taken) by the Sydney Opera House.

3.3.1 Procurement Routes

According to SOH Recommended Asset Maintenance Framework, the asset maintenance framework will be structured to enable the following to occur:

§ *In-house (Facilities and Precinct Dev Portfolio team):* to focus on strategic issues such as performance analysis, energy, environmental management and other strategies with the aim of resulting in better longer-term operational performance and reduced costs.

§ *Outsourcing (External service providers and contractors):* for issues other than strategic issues, with the aim of achieving long term efficiencies and cost benefits, e.g. maximised or increased life expectancy of plants, structures and major systems.

According to SOH Operational Maintenance Strategies, the procurement routes taken for the following Operational Assets is OUTSOURCING:

Item: Operational Assets
Mechanical
Electrical
Building Monitoring & Control System
Fire Services
Security & Surveillance Systems
Transportation Systems
Stage Machinery Systems
Sanitary Plumbing & Plant
Architectural
Audio Visual/PA/Communications Systems

While according to Section 1; p.1.32-1.41, the following procurement routes currently taken and proposed for the following (other works and services) are/will be:

Item: Other services or works	**Current**	**Future**	**Service Levels**
Waste Management & Asbestos Monitoring:	In-house	Outsource	Service Levels not stated. States Statutory Requirement Framework, Environment Management Process, Environmental Reporting Process
Ground Maintenance Strategy	Outsourced	Not clear (seems to be still outsourced) *- Need to Verify with SOH*	Service Levels: 3 Categories (comprises reactive for category 1 and regular maintenance for category 2 & 3)
Pest Control Mgt Strategy	Outsourced	Not clear (seems to be still outsourced) *- Need to Verify with SOH*	Service Levels: 3 Categories (comprises reactive for level 0, regular maintenance for level 1, and 'enhancement' maintenance for level 2)
Essential Services Mgt Strategy	Not clear what it was previously/currently *- Need to Verify with SOH*	Proposed by SAM to either outsource part or whole of services *- Need to Verify with SOH*	Service Levels not stated. States Compliance Management Responsibilities & Reporting Requirements
Capital Works Mgt Strategy (major and minor)	Outsourced	Proposed by SAM to use **NEW Ppty Mgt System.** *- Need to Verify with SOH what this means and whether the management and works aspects will be in-house or outsourced.*	Service Levels not stated. States Management Responsibilities & Reporting Functions

DISCUSSIONS

From the documents provides, the following are apparent and need to be clarified.

- How the decision as to which 'item' (e.g. Building Services Maintenance or Cleaning Works) should be done in-house or outsourced? i.e. what criteria are used to assess and select which items are more appropriate to be performed 'in-house' or 'outsourced'?
- Are any frameworks or guidelines or criteria used to make the assessment?

3.1.2 Maintenance Types: Operational Assets

The following is an attempt to categorise the operational assets in accordance to each of their level of criticality to the service delivery function and the level of risk SOH is prepared to accept, according to SOH Operational Maintenance Strategies.

Table 3: Levels of criticality (C1-extremely critical to C5- least critical).

Level of Criticality	Maintenance Type
C1	Comprehensive (Inclusive)
C2	Comprehensive (Exclusive)
C3	Preventative
C4	Regular
C5	Reactive

Table 4 (a): Examples to categorise the operational assets.

Operational Assets		**Maintenance Type**	**Level of criticality of the asset to the service delivery function of SOH**
Mechanical	Chillers	Mostly **Preventative**, only a few are changing to Comprehensive	Mostly C3
	FCU & Package Units		
	AHU		
	Pumps		
	Ducting	Mostly **Regular**, only a few are changing to Comprehensive	Mostly C4
	Exhaust and Ventilation Fans	Mostly **Preventative**, only a few are changing to Comprehensive	Mostly C3
	Mixing Boxes	Mostly **Regular**, only a few are changing to Comprehensive	Mostly C4
	Electric Duct Heaters	Mostly **Preventative**, only a few are changing to Comprehensive	Mostly C3
	Motors/fans/VSDs & Distribution Plant		
Electrical	Distribution Plant (Main switchboard & General Lighting)	Mostly **Regular**, only a few are changing to Comprehensive or New Warranty	Mostly C4
	Concert hall, playhouse, opera theatre, drama theatre, green room, studio/western foyer, forecourt, general and emergency lightings		
Building Monitoring & Control System		**Comprehensive**	Either C1 & C2

Table 4 (b): Examples to categorise the operational assets.

Fire Services	Detection Systems	**Comprehensive**	Either C1 & C2
	Auto Sprinkler Systems	Mostly **Regular**, only a few are changing to Comprehensive	Mostly C4
	Hose Reels, hydrants, extinguishers, fire blankets		
	Gas suppression systems		
	Emergency warning and intercom systems		
Security & Surveillance systems		Mostly **Preventative**, only a few are changing to Comprehensive	Mostly C3
Transportation Systems		**Comprehensive**	Either C1 or C2
Stage Machinery Systems	Drama theatre, concert hall, opera house, playhouse	Mostly **Regular**, only a few are changing to Comprehensive	Mostly C4
Sanitary Plumbing & Plant		Mostly **Reactive**, only a few are changing to Comprehensive	Mostly C5
Architectural	All locations stated in SAM Plan	**Reactive**	C5
Audio Visual/PA/ Comms systems	Opera house, concert hall, playhouse, drama theatre, general	Mostly **Regular**, only a few are changing to Comprehensive	Mostly C4

Table 5: Examples of the operational assets to be categorised into the levels of 'Importance' or 'Criticality' to SOH's service delivery functions, based the above elicitation of information.

Either C1 or C2	C3	C4	C5
Building Monitoring & Control System	**Mechanical-** Chillers, FCU & Package Units, AHU, Pumps, Exhaust and Ventilation Fans, Electric Duct Heaters, Motors/fans/VSDs & Distribution Plant	**Mechanical-** Ducting, Mixing Boxes	**Sanitary Plumbing & Plant**
Fire Services- Detection Systems	**Security & Surveillance systems**	**All Electrical**	**Architectural**
Transportation Systems		**Fire Services-** Auto Sprinkler Systems, Hose Reels, hydrants, extinguishers, fire blankets, Gas suppression systems, Emergency warning and intercom systems	
		Stage Machinery Systems	
		Audio Visual/PA/Comms systems	

DISCUSSIONS

From the documents provided, the following are not apparent and needs to be clarified.

- How does SOH assess which item should be allocated to the different Level of Criticality? (i.e. How does SOH ascertain which item is more important than others that are allocated and that the items are allocated to the appropriate Maintenance Type)? Are there frameworks/guidelines/procedures used to make such decision?

- Clearly, Section 2 of the SAM Plan covers only Operational Assets

  - What about 'softer' assets (e.g. furniture and fittings in an office)- how are they maintained?
  - Are they recorded and maintained separately (elsewhere)?

RECOMMENDATIONS

Prior to deciding what item should be performed or procured in-house or outsourced, it is necessary to first identify and categorise the items that should be covered under procurement. An example is appended in Table 6.

Table 6. Categories of Procurement Items

Goods, Materials & Supplies	**Works**	**Services**
Stationary Personal protective equipment & clothing Machinery Energy Telecommunications Information Technology Land Property Transport	Repairs & Maintenance (ongoing or adhoc) Civil & Engineering Construction related projects (new & additions and alterations) Other engineering works Major IT Software Systems (or other items where the cost/value makes the procurement decision strategically important)	Consultancy Marketing Design Advertising Staff Office Services Servicing Horticulture Grounds maintenance Street cleaning Refuse collection Recycling

Once the procurement items have been categorised, strategies can be formulated for each categories of procurement item, i.e. what procurement routes to take, etc. Examples of strategies that may be taken for each of the approaches are outline in Table 7.

Table 7. Examples of strategies.

Goods, Materials & Supplies	**Works (capital and revenue)**	**Services**
1) Identify routine and less-routine items. <u>For routine items</u> More effective and efficient purchasing may be done via collective purchasing power between different departments or similar organization (or facility) and framework agreements with suppliers. <u>For one-off or infrequent items</u> And for one-off, more infrequent purchases and where framework agreements are not suitable, there must be appropriate and knowledgeable personnel to provide guidance. **2) For limited competitive market** If there is a limited competitive market (e.g. niche market) and where framework agreements are not suitable, the price should be negotiated with supplier who has a proven track record. **3) For Non-Consumable items** For non-consumable items, such as desks/office furniture/PCs/photocopiers/vehicles, purchase should be corporately purchased on a bulk basis. For e.g.,	**1) Identify major 'one-off' items and ongoing revenue work works** <u>For Major one-off items</u> o Set up the project management principles to be used for the management of such projects. o Option Appraisals to be carried out to ensure procurement is required and appropriate. o Any major works that needs to be done has incorporate the organization or facility's procurement principles and an assessment methodology for the all the projects involved (e.g. portfolio, program management as opposed to just project management) o Set up clear, concise, logical, unambiguous, and achievable specifications and contract conditions.	1) The service delivery function musty be regularly monitored to ensure that: o The need and level of service delivery is still required o The service offers efficiencies in value for money o The service meets required standards (e.g. in line with customer or staff expectations) 2) Procurement processes to be set out to determine whether a service should be delivered in-house or outsourced: a) <u>Perform a service in-house if:</u> o It is necessary for the organization to maintain a high degree of strategic influence over the function; which would not be possible if performed by external service providers or contractors. o Ceasing the service delivery or function will adversely affect the cohesion of the

coordinated and consolidated orders are taken and goods delivered in a one-off delivery instead of many adhoc orders during the year.	o Determine the appropriate procurement arrangement options available for such works: e.g. traditional design, tender and construct; D&B; Facilitated Program Management, Private Finance Initiative etc. <u>For Ongoing revenue related works</u> o Determine the appropriate procurement arrangement for such works: e.g. competitively arranged fixed term contracts.	organization or facility' core capabilities or/and functionality. b) <u>Perform out-sourcing if</u>: o The organization is not required to influence the actual delivery of the service, other than monitoring or corrective sanctions. o The service is totally regulated by statutory legislation and apart from delivery to be in accordance with the organizational policies, there is little or no discretion required with respect to strategic influence. 3) Also, when a service is no longer required, detailing the appropriate actions to disengage from the service delivery.

- For each of the above categories, it is necessary to identify which procurement items are 'core' or 'non-core' to the function of the business or facility based on a set of criteria. This assists in determining the level of maintenance required for the different assets and its appropriate procurement routes.
- Develop select lists of properly vetted vendors, suppliers, service providers, contractors with regard to the provision of the goods, materials and supplies, works and services.
- Develop the tender evaluation/assessment process of the submitted bids and set out clear and unambiguous tender evaluation criteria to ensure the right provider is selected.
- Establishing standards, terms and conditions
- Establishing standards of performances, expected delivery outputs, methods of ongoing monitoring and evaluating of performances.
- Establish contingency plans in event of failure on part of provider.

3.4 Performance Measurement and Monitoring

Seems that the Performance Measurement and Monitoring in SOH SAM only functions as a tool to record, and analyse trends of the causes and effects arising from maintaining the assets. Apart from the KPIs used to measure each of the operational assets listed in Section 2: Operational Maintenance Strategies in SAM, it is neither apparent (from the documentary materials we have) that these measures are currently used for benchmarking (i.e. comparison against industry standard benchmarks or similar performing arts centre or public facilities) nor is it apparent how these measures (i.e. KPIs) are related to (or enable) the measurement of outsourced service/work providers' and in-house's performances.

DISCUSSION

From the documents provided, the following are not apparent and needs to be clarified.

(1) Performance Measure

- How are the KPIs derived?
- Are the above measures (KPIs) included in the contracts that are awards to the service/work providers?
- How (e.g. procedures) and when (i.e. frequency) are they measured?
- What other performance measures does SOH have (e.g. measures of procurement methods, contractors' performances, staff performances?
- What performances does Property Management manage? (Is it cleanliness/tidiness of amenities (e.g. BPI, BFI) only or manage contractors' performances or SOH's assets' 'financial' (e.g. expenditures) performance?

(2) Contract Administration

- How and which department manages SOH's contracts (contract administration) such as claims, payments, change control (variations), original contract value vs revised contract value? According to p.1.18; item 1.5.1, one of the responsibilities of Facilities Management Department is (g) contract supervision and (h) performance monitoring- is FM in-charge of contract administration?
- Does SOH or the department-in-charge have a contracts register?
- Are there any software (or special hardware) systems used to manage their contracts and project management functions of the things they procure?
- Are what the Property Management and Facilities Management teams measure the same? What does each of them measure or monitor?

For the document: BCMMW- p.4, item 2.1, refers to BCI (apart from BCI/BFI/BPI etc), which is for monitoring the condition of building, discussions are as follows.

- What is used to assess contractors or service providers and how? Any matrix or table used by SOH to do assessments? For instance, if performance measures are placed as part of a contract (and its conditions), how are they used to monitor the contractor?
- How are these measures enforced?
- Is it used to measure only maintenance activities of the building or can it measure that of minor works?
- Is it specifically for measuring performance of contractors? Or only as indirectly as a measure of the condition of a place which it seems to be)?
- What other tools does SOH use to monitor contractors? And how?

RECOMMENDATIONS

(1) Key Performance Indicators

To facilitate a culture of continuous improvement in the tasks (i.e. outputs) (be it those performed by external service providers, in-house staff or/and the operational assets (e.g.

mechanical & electrical equipment) or/and the non-operational assets (e.g. public access areas) or/and the processes (the effectiveness of the procurement process), it is pertinent to have a 'procurement review improvement plan'. This plan should include all the key performance indicators used in the entire organization or facility where targets (that are achievable) should be set for each of the measures and actual measures recorded at the frequency set (e.g. fortnightly, monthly, quarterly). These will provide the organization or facility with a comparison of past measures against new measures as well as comparisons between their targets against their actuals with the aim of working towards improving their performance.

(2) Gateway Reviews

For significant and high-risk procurement projects, it is important to adopt a gateway review process. The gateway review process comprises reviews at key decision-making points within a 'procurement cycle' by a peer review team that is independent of the project team to ensure that the project can proceed successfully to the next project stage. It acts as a tool to assist the organization to review their projects at various stages of the procurement cycle, enabling them to continually improve their performance. An example is shown in Figure 5.

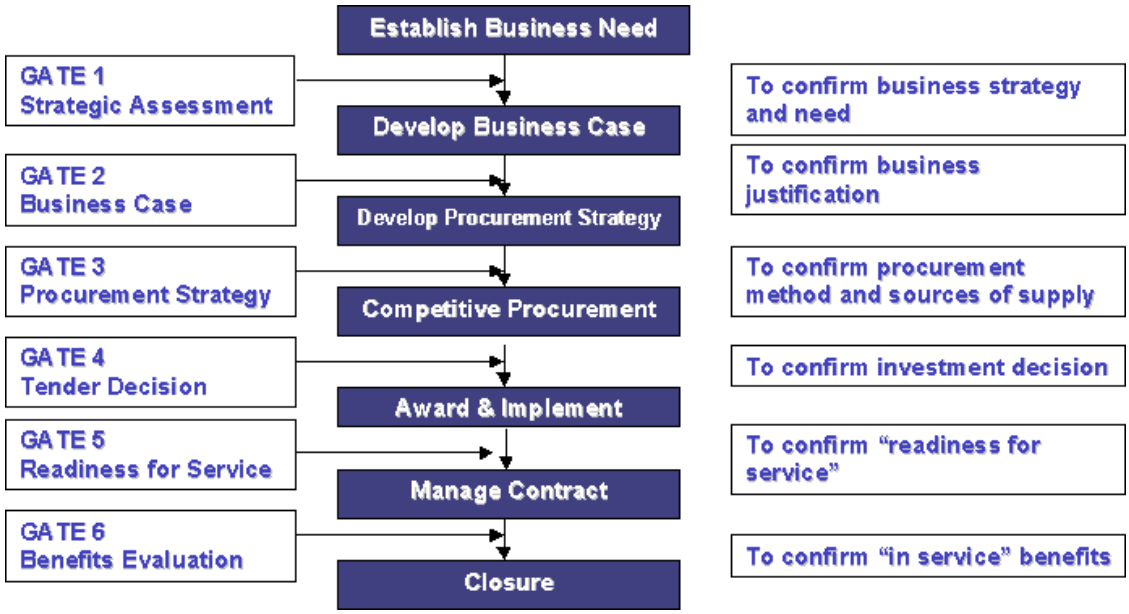

Figure 5. An example of the gateway review process.

3.5 Tender Evaluation Process

3.5.1 Analysis of SOH Building Conservation, Maintenance, and Minor Works Management

Stipulates the stages of the tender process for the above works - the procedures outlined and used are not uncommon in the industry. The part that needs to be better understood is the process of short-listing of contractors and the tender evaluation process.

DISCUSSIONS

- Evaluation Criteria stated but it does not say which one/s has/have higher priority or importance than others (i.e. weightage). How are the weightage for each criteria set? Are the weightage of one procurement item (say Cleaning) the same as the others

(M&E)? Are these criteria the same ones used for other service/work tenders too? Or selective? Any scoring systems used?

- Criteria Listed: price, experience, maintenance, approach to project, philosophy for continued improvement and proactive approach to identify and implement improved work practices.

3.5.2 Analysis of SOH Mechanical Building Services Maintenance Tender

Tender Evaluation Criteria listed in Conditions of Tendering, Clause. 1.28. However, it does not say what's the weighage for each criteria (i.e. which one more or less important), scale of measurement, how the assessment is done.

For monitoring contractor's performances, 4 'KPIs' are stated generally:

- No unauthorised disruption of operations
- Work completed within time
- Work completed to or better standards
- Agreed budgets

3.5.3 Analysis of SOH Cleaning Services Contract

(1) Cleaning Services 2000: Part 1; Conditions of Tendering

Tender Evaluation Criteria in general are:

- Price
- Compliance with specifications
- Understanding requirement of work
- General cleaning and management expertise (such as knowledge, communication skills, OHS, customer relations, standard of cleanliness, experiences, quality of references, capacity).
- Expertise in providing similar services
- Quality of references
- Capability to provide required services

(2) Cleaning Services 2000: Part VIII; Service Providers and Other Services

A list of works that the Tender Evaluation Criteria are applied to are presented in Table 8.

Table 8: A list of works that the Tender Evaluation Criteria are applied to.

Restorative Cleaning Exterior Areas	**Inaccessible glass areas**	**Maintaining and servicing sanitary units, towels, dispensers**	**Pest Control**	**Degreasing & Clearing of Kitchen exhaust system**	**Pumping out & clearing of 4 kitchen grease-traps & sewage**	**Garbage, Rubbish Removal**	**Recycling**
Cost Track Record Quality of Info Env Awareness & Accreditation	Cost Track Record Quality of Info	Cost Track Record Quality of Info	Cost Track Record Quality of Info	Cost Track Record Quality of Info	Cost Track Record Quality of Info	Cost Effectiveness Proven Track Record Innovation	Couldn't find criteria

DISCUSSIONS

- Does all the Tender Evaluation Criteria come from a standard list of criteria (i.e. from same consultant or from SOH itself?); from which appropriate ones are selected for the assessment?

- Are all contracts prepared by different consultants (from the documents, it seems that BUILDING SERVICES documents are written by MCLENNAN-ALMAC and CLEANING CONTRACT by HERIGLADE CLEANING CONSULTANTS). If all contract documents are prepared by different consultants, then who dictates what to set out for the evaluation criteria (SOH or the consultant)?

- From the limited documents, no apparent KPIs used to measure contractors' performances; apart from Service Performance Agreement (measures no. of complaints per month and rated on scale of 1 to 10) indicated in the contract. Does SOH measure contractors' performance?

3.5.4 Analysis of FITOUT AT L5 Document by Stuart Pty Ltd

Services are measured using on a range of Low to High (1-10), whether to continue with the service provider: based on no. of complaints, and a punishment scheme (e.g. deduction of progress claim).

DISCUSSIONS

Regarding contracts for all procurement items,

- Is there consolidated management of service/work contracts (i.e. managed like portfolio management and not as individual projects) by SOH? Or each contract managed individually by the relevant dept and not consolidated overall?

- Does SOH use any project management principles to manage their projects or the items they procure? (E.g. Prince 2 methodology or PMBOK methodology etc.

- What are the criteria (if any) used to assess and decide which procurement and contractual arrangements/methodologies should used for a particular work/service?

- What are the procedures for requesting and approving works (e.g. works order, purchase requisition etc)? Any differing levels of approving authority for different value of works (e.g. <AUD5000 = manager, while > AUD5000 = Director)

RECOMMENDATIONS

In developing a tender evaluation process, it is also necessary to determine the list of evaluation criteria upon which bids can be appropriately assessed. These evaluation criteria should be carefully weighed and allocated on the basis of their relative importance taking into consideration the item to be procured (for e.g. for retrofitting works to interiors of building such as main customer pathways, the quality of a interior contractor's work may be perceived as relatively more important than a garbage collection contract). It is also important to ensure that the evaluation criteria are set out from a single source instead of from many (for e.g. a list of criteria should be mutually agreed within the organization from which say a few or many or all are used to assess various types of tenders), instead of having each tender/contract having their criteria set by different sources.

Tenderers shall then be vetted for the criteria which may include price, financial stability/capability, technical competence, quality of work/service, and managerial capability. However, it is important not to assess tenders based on lowest price alone as this leads to a false economy and a host of problems such as tenderers reducing proposed prices in the hope of making up the difference by cutting corners, inflating prices for variations to contract and pursuance of claims. Instead, tenders should be assessed based on the value for money- i.e. the optimum balance of whole-life costs and benefits that meets the organization's requirement. The selection process can further be improved by setting up lists of preferred suppliers for the various types of procurements that may be performed.

An example of a tender evaluation process and criteria is appended in Figure 6.

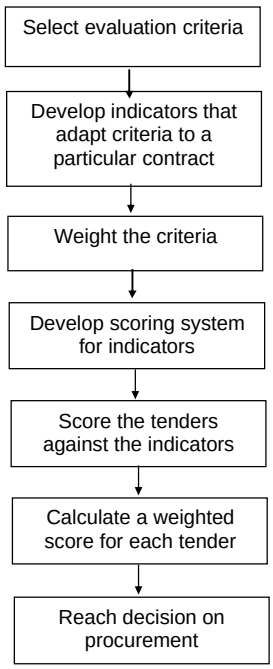

Figure 6. Diagram of tender evaluation process and criteria.

All above analysis and discussions are, at best, made using the existing SOH documents provided as a basis.

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