EFFICACY OF PROCUREMENT MANAGMENT IN CONSTRUCTION PROJECTS AND PROPERTY

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Abstract

Everyday clients are continuously seeking for better ways of delivering their projects. It has been outlined that before a client makes his choice, considerations should be given to; the nature of the client, the project scope, project objectives; time, cost, quality, complexity, management, risk transfer, accountability and the likelihood of variations.

A consideration of Baytree Leisure Plc intentions was made on the basis of these objectives. The traditional method, design and build, management contracting, and construction management forms of procurement were benchmarked against these objectives in order to find the most appropriate method for the Salteroyd project. It appeared that Construction management is the most appropriate for Phase I, design and build for the Phase I hotel and Traditional method for the Phase II. Although the client could go ahead to execute to the project only with the chosen procurement method, it was concluded that the procurement strategy that will take Baytree's development and expansion plans forward, will be to adopt partnering within the procurement methods chosen including a supply chain management strategy.

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Which Procurement Method?

1.1 Introduction

All project implementation processes have a life span which begins from when the client decides to build a new facility and end when he/she has chosen the method of managing the design and construction of the project. At that point in time, this 'choice' (method) is considered the most appropriate (Masterman 2002)

There are different variables to consider when attempting to choose a procurement route. Masterman describes this process as consisting of: a thorough understanding of the client – his characteristics, needs and objectives for the project; identifying the project – risks, and the environment in which it will be implemented; then, finally, selecting the most appropriate method of procuring the project.

This part will attempt to describe the client, the project, the client's/project objectives, the likely key project success criteria, types of procurement strategies available and factors to consider when choosing a procurement strategy.

1.2 The Client

Baytree Plc is a large dynamic retail and leisure group which operates in the North of England. It is a private organisation whose businesses focus on mainly large and medium commercial projects. Over the past years it has experienced phenomenal growth and built for itself a reputation of excellent business practice and quality for its goods and services. This achievement can be attributed to its 'best value' culture. It is open to new ideas that can work and promotes innovation.

Baytree's existing operations consist of 2 MSAs in the UK, together with a number of mid-range hotels (one of which is located on MSA 1), a small number of multi-sport clubs and some agricultural interests.

It is a company which is experienced and familiar with the workings of the construction industry (in-house expertise). By virtue of its numerous projects executed in the past, it has built

and maintained a chain of reliable consultants, contractors and subcontractors. However, all works were done in an adversarial manner.

In order to stay ahead of competitors in the market-place, a recent research conducted by PWF management consultants on behalf of Baytree, forecast that significant increased revenues are likely to be generated by more environmentally responsible developments and developers, therefore, Baytree Plc has decided to position itself at the forefront of sustainable building design and construction for all its future developments.

1.3 Project Scope

The proposed new MSA will be located on the M7 motor in an area of outstanding natural beauty at Salteroyd in the county of Yorkshire. The site covers 0.39 square kilometres (0.15 square miles) and is an area of Special Scientific Interest (SSI). Baytree is yet to be secure Planning permission. However, the land owner has agreed to give them exclusive rights to purchase the site at an agreed price, as soon as the planning permission is obtained. The project is planned to include 2 Phases – Northbound and Southbound carriageways for which Phase I must be opened for business in May 2012.

Phase I – Northbound Carriageway

The design and construction includes:

- Service Area – retail, restaurants and WC facilities etc.
- Petrol filling station (PFS) with associated kiosk
- Car parking
- Coach parking
- Long Goods Vehicle (LGV) parking
- Service road
- Motorway slip roads – inbound and outbound
- Pedestrian bridge access to Northbound site and
- New Build Budget Hotel (75 bedrooms)

As part of Baytree's commitment to its vision of being at the forefront of sustainable building design and construction, it has decided to incorporate many environmentally sensitive

design and construction features into the project such as: no earthwork disposal off-site, sustainable urban drainage systems (SUDS) which mimics the way the site naturally deals with surface water, minimizing of energy consumption and a low carbon footprint, partially subterranean buildings, biomass boilers, photovoltaic solar panels, sustainable waste management system including water recycling and the use of local materials and workforce.

Phase I value is £16M total for the MSA Northbound carriageway including slip roads and bridge plus £3M for the hotel.

Phase II – Southbound carriageway

The Phase II project which is as yet unconfirmed is proposed to include, design and construction of the MSA on the Southbound carriageway will mirror the facilities on the Northbound carriageway including motorway slip roads – inbound and outbound. Its estimated value is £15M total for the MSA Southbound.

The reason why Phase I must be opened by 2012 is that the site shares its boundary with Yorkshire Cultural City which is being built to host the Yorkshire cultural festival late 2012 and subsequently will be the largest historical attraction in the UK and a great tourist destination not only for foreigners but also to Britons. The management of Yorkshire Cultural City have also expressed interest in the Salteroyd project because of its intention to host some of its guest in the MSA hotel.

In addition to the proposals at Salteroyd, Baytree are in negotiations with 2 other landowners with a view to developing 2 further MSAs in the UK over the next 5 years or so.

1.4 Client/project objectives

Latham (1994) suggests that clients want a building that represents;

1. value for money
2. pleasing to look at
3. free from defects on completion
4. delivered on time

5. fit for the purpose
6. supported by worthwhile guarantees
7. reasonable running costs, and
8. satisfactory durability

However the three most important considerations for any client are time, cost and quality (Clamp et al., (2007).

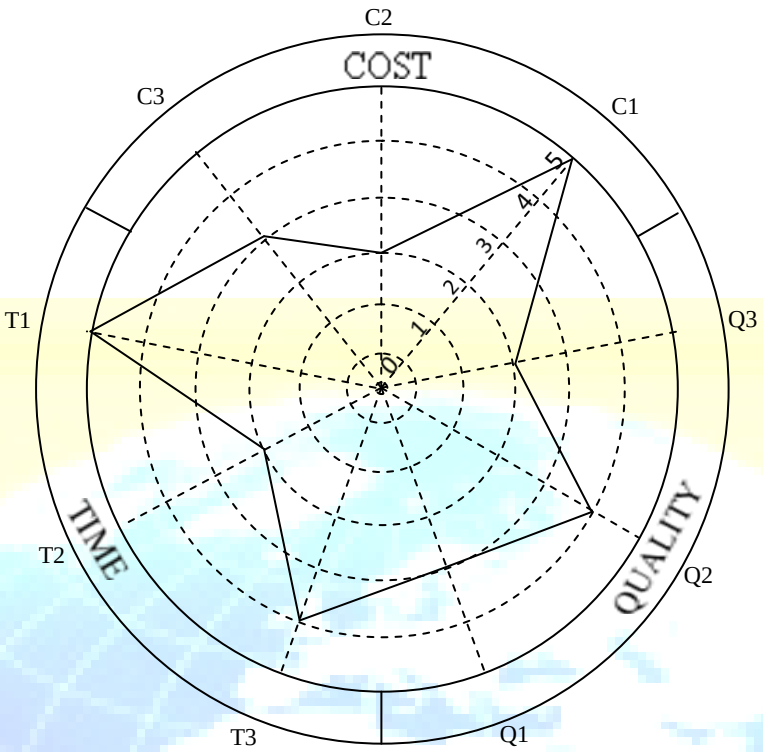
1.4.1 Time, cost and quality relationship

The relative importance of time, cost and quality form key criteria in the selection of a procurement strategy, hence, it calls for some compromise of conscious balancing of these priorities (Clamp et al., 2007; and Kelly et al., 2002). In order to inform judgement, Clamp et al. (2007) proposed a 'radar chart' which aims to balance the level to which the client's prioritizes these factors. In his opinion, the profile that emerges might suggest where design responsibilities are to rest, and even suggest the most suitable procurement methods and construction procedures which will in turn affect tendering arrangements and the amount and format of information needed. Therefore, this radar chart has been adopted for the purpose of balancing Baytree's; time, cost and quality objectives for the Salteroyd project (see Figure 2).

Figure 1: Phase I: Time, Cost and Quality objectives – Scale

	Criteria		Priority (0 lowest – 5 highest scale)				
			1	2	3	4	5
COST	C1	Lowest possible capital expenditure					√
	C2	Certainty over contract price, no fluctuation		√			
	C3	Best value for money overall			√		
TIME	T1	Earliest possible start on site					√
	T2	Certainty over contract duration		√			
	T3	Shortest possible contract period				√	
QUALITY	Q1	Top quality, minimum maintenance			√		
	Q2	Sensitive design, control by employer				√	
	Q3	Detailed design not critical, leave to contractor		√			

Figure 2: Phase I: Time, Cost and Quality objectives – Profile



The profile indicates that, Baytree wants Phase I to; start as soon as possible, be built at the lowest possible capital cost, and have a reasonable control over design quality. At the same time, it desires the project to be finished in the shortest possible time.

	Criteria		Priority (0 lowest – 5 highest scale)				
			1	2	3	4	5
COST	C1	Lowest possible capital expenditure			✓		
	C2	Certainty over contract price, no fluctuation				✓	
	C3	Best value for money overall					✓
TIME	T1	Earliest possible start on site	✓				
	T2	Certainty over contract duration				✓	
	T3	Shortest possible contract period		✓			
QUALITY	Q1	Top quality, minimum maintenance			✓		
	Q2	Sensitive design, control by employer					✓
	Q3	Detailed design not critical, leave to contractor		✓			

Figure 3: Phase II: Time, Cost and Quality objectives – Scale

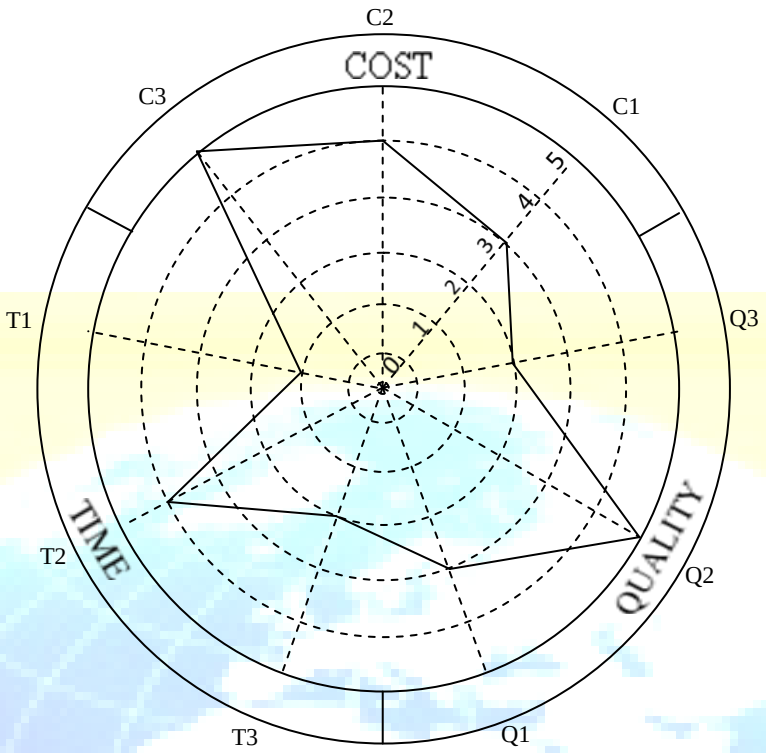


Figure 4: Phase II: Time, Cost and Quality objectives – Profile

The profile of Phase II shows that Baytree is more concerned for an overall best value of the project, certainty over the contract duration and control over the designs and construction as well as some level of certainty over price.

More objectives of the project are considered in section 1.6 below. Seeley (1997) is of the opinion that clients prioritizing of the basic criteria of time, cost and quality is rather to simplistic and the client needs to consider a lot of other factors that can influence the choice of an appropriate procurement method.

1.5 Construction management

Construction management system is usually the case where the client wants to deal with specialists trades contractors directly. Here, a construction manager is engaged on a fee basis to act as a client's consultant for the co-ordination of all the works (Masterman, 2002). The contractual relationship and control can be seen in Figure 9

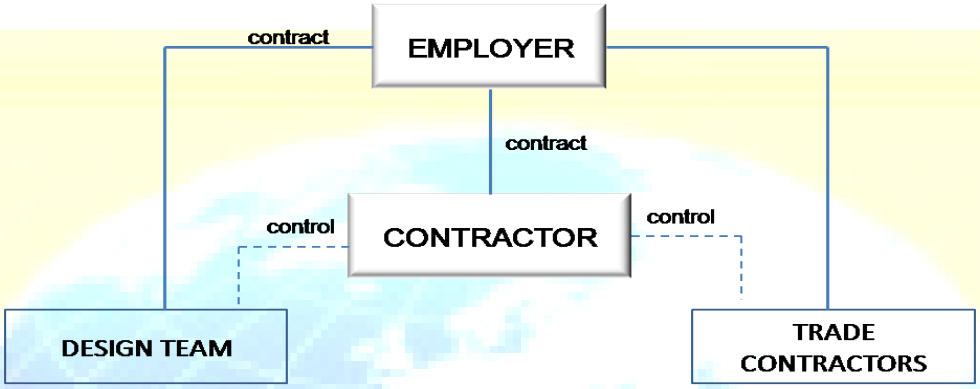


Figure 10: Contractual relationship: Construction management (Brook, 2004)

Use of Construction management

According to Murdoch and Hughes (2000) Construction management is suitable when the characteristics of the project fulfils in part or whole of the following:

1. The employer is familiar with construction, and knows some or all of the professional team.
2. The risks associated with the project are dominated by timeliness and cost (e.g. the employer may be a private sector employer requiring a commercial building).
3. The project is technologically complex involving diverse technologies and sub-systems.
4. The employer wants to make minor variations to requirements, as the project proceeds.
5. There is scope for separating responsibility for design from responsibility for management of the project.
6. The employer requires an early start on site.
7. The price needs to be competitive, but 'value for money' is more important than simply securing the least possible cost.

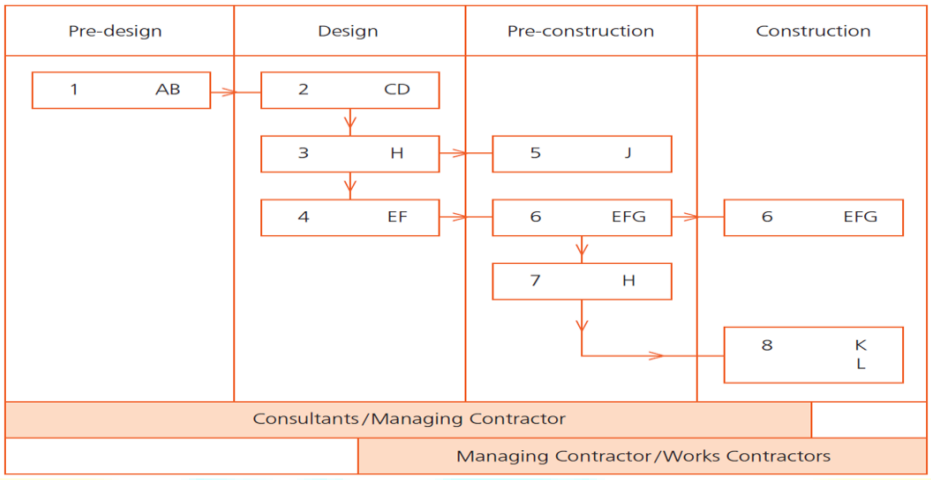


Figure 11: Plan of Work stages: Management procurement (Clamp et al., 2007)

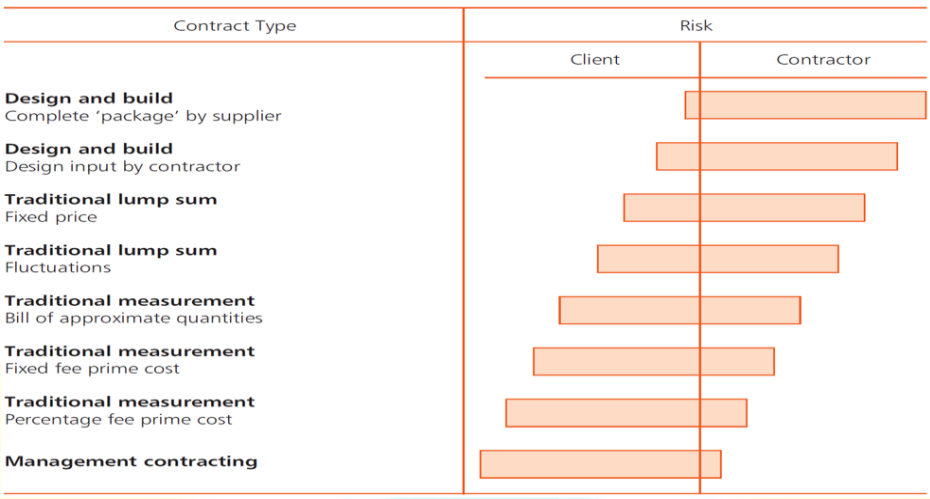
Key

1. Appraisal and strategic briefing by consultants and contractor
2. Outline and detailed proposals
3. Appointment of contractor and agreement on trade or works appointments
4. Final proposals and production information (continuing process)
5. Mobilisation
6. Production information and coordination of works packages
7. Tender action and adjustments (continuing process)
8. Construction to Practical Completion and after completion

1.5.1 Assessing the Risks

In every contract, there is a degree of risk (Clamp et al., 2007). Therefore the client has to decide how much risk he wnats to keep and that he will transfer. However, the different procurement methods have limits to which the client can tranfer risk. A speculative risk chart according to the different procurement methods can be seen below.

Figure 12: Speculative risk (Clamp et al., 2007)



1.6 The Building Team and other Consultants

In general a client aims to appoint a team he can trust and rely on to reduce uncertainties during the building design, construction and use (Brook, 2004). The building team consist of the:

- Employer
- Architect
- Quantity surveyor
- Structural engineer
- Services engineers (electrical and mechanical. Heating, AC, ventilation)
- Sustainability consultants
- Contractor
- Subcontractors and
- Other consultants such as; landscape architects, interior designers, acoustic consultants, project managers, suppliers, clerk of works, resident engineers, building control officers, etc.

1.6.1 Criteria for choosing contractor/consultants

1. *Task knowledge:* the contractor or consultant must have demonstrated appropriate knowledge of the tasks to be undertaken including sustainable procurement.
2. *Health and safety knowledge:* he must be sufficient to perform the task safely, by identifying hazard and evaluating the risk in order to protect self and others.

3. *Experience and ability*: he must be sufficient to perform the task. This will consist of the strength of his workforce, funding, experience in sustainable procurement for at least 10 years.

To aid in the decision making process of selecting the appropriate procurement method, Clamp et al. (2007) drew out a comparison of the different methods based on project objectives of; speed, complexity, quality, flexibility, certainty, competition, responsibility, and risk. See Table 1 below.

	Speed	*Complexity*	*Quality*	*Flexibility*	*Certainty*	*Competition*	*Responsibility*	*Risk*	*Summary*
Traditional	Not the fastest of methods. Desirable to have all information at tender stage. Consider two stage or negotiated tendering.	Basically straightforward, but complications can arise if client requires that certain sub-contractors are used.	Client requires certain standards to be shown or described. contractor is wholly responsible for achieving the stated quality on site.	Client controls design and variations to a large extent.	Certainty in cost and time before commitment to build. Clear accountability and cost monitoring at all stages.	Competitive tenders are possible for all items. Negotiated tenders reduce competitive element.	Can be clear-cut division of design and construction. Confusion possible where there is some design input from contractor or specialist sub-contractors and suppliers.	Generally fair and balanced between the parties.	Benefits in cost and quality but at the expense of time.
Design and build	Relatively fast method. Pre-tender time largely depends on the amount of detail in the client's requirements. Construction time reduced because design and building proceed in parallel.	An efficient single contractual arrangement integrating design and construction expertise within one accountable organisation.	Client has no direct control over the contractor's performance. contractor's design expertise may be limited. Client has little say in the choice of specialist sub-contractors.	Virtually none for the client once the contract is signed, without heavy cost penalties. Flexibility in developing details or making substitutions is to the contractor's advantage.	There is a guaranteed cost and completion date.	Difficult for the client to compare proposals which include for both price and design. Direct design and build very difficult to evaluate for competitiveness. No benefit passes to client if contractor seeks greater competitiveness for specialist work and materials.	Can be a clear division, but confused where the client's requirements are detailed as this reduces reliance on the contractor for design or performance. Limited role for the client's representative during construction.	Can lie almost wholly with the contractor.	Benefits in cost and time but at the expense of quality.
Management	Early start on site is possible, long before tenders have even been invited for some of the Works packages.	Design and construction skills integrated at an early stage. Complex management operation requiring sophisticated techniques.	Client requires certain standards to be shown or described. Managing contractor responsible for quality of work and materials on site.	Client can modify or develop design requirements during construction. Managing contractor can adjust programme and costs.	Client is committed to start building on a cost plan, project drawings and Specification only.	Management contractor is appointed because of management expertise rather than because his fee is competitive. However, competition can be retained for the Works packages.	Success depends on the management contractor's skills. An element of trust is essential. The professional team must be well coordinated through all the stages.	Lies mainly with the client – almost wholly in the case of construction management.	Benefits in time and quality but at the expense of cost.

Table 1: Comparison of Procurement Methods (Clamp et al., 2007)

Phase I: Northbound Carriageway

PHASE I: MSA NORTHBOUND CARRIAGEWAY					Lump sum contracting	Design and build			Fee construction	
					Sequential	Direct	Competitive	Develop and construct	Management contracting	Construction management
A	Timing	How important is early completion to the success of the project? (Section 1.6.6)	Crucial Important Not as important as other factors	1 2 3	• •	• •	•	•	• •	• •
B	Controllable variation	Do you foresee the need to alter the project in any way once it has begun on site? (see section 1.6.3)	Yes Definitely not	4 5	•	• •	• •	• •	• •	• •
C	complexity	Does the project (as distinct from what goes in it) need to be technically advanced or highly serviced? (Section 1.6.5)	Yes Moderately so No just simple	6 7 8	• •	• •	• •	• •	• • •	• • •
D	Quality level	What level of quality do you seek in the design and workmanship? (See section 1.4.4)	Basic competence Good but not special Prestige	9 10 11	• •	• •	• •	• •	• •	• •
E	Price certainty	Do you need to be certain of price for the project construction before can commit it to proceed? (Section 1.4.4)	Yes A target plus or minus will do	12 13	•	•	•	•	•	• •
F	Management	Can you manage separate consultancies and contractors, or do you want just one firm to be responsible after the briefing stage? (section 1.6.1)	Can manage separate firms Must have only one firm for everything	14 15	•	• •	• •	•	•	•
G	Accountability	Do you want direct professional accountability to you from the designers and cost consultants? (section 1.6.2)	Not important Yes	16 17	• •	•	•	•	• •	• •
H	Risk avoidance	Do you want to pay someone to take the risk of cost and time slippage from you in case of default? (section 1.6.4)	No, prefer to retain control and therefore risk Prepared to share agreed risks Yes	18 19 20	• •	• •	• •	• •	• •	• •
	Total				4	2	1	2	6	8

Figure 13: Phase I: Northbound Carriageway

As can be viewed above, the score of the various procurement methods on the matrix are:

- Sequential lump sum contracting – 4
- Direct design and build – 2
- Competitive design and build – 1
- Develop and construct – 2
- Management contracting – 6
- Construction management – 8

This matrix suggests that Construction management and Management contracting are the most appropriate for MSA Northbound carriageway. This result is quite accurate as both methods have met, to a great extent, the client's priorities.

Management contracting: This system is suitable for fairly large projects with complex requirements (Clamp et al., 2007). Here, the client appoints an independent professional team who assist in the preparation of the brief, drawings and project scope; and a management contractor who at the pre-construction stages will be as an adviser to the team. The professional team or design team will consist of the architect, quantity surveyor, structural engineer, services engineers and the sustainability consultant. If Baytree goes along with this procurement method, it will succeed in its objective for an early completion because with management contracting, it is possible to make an early start on site and achieve early completion. It is very flexible as it allows for development of design and the execution of the works to move simultaneously. So that, while construction has started, other details of the project are being designed, adjusted and finalized as the works proceed. It also gives the client ample opportunity to make changes to the designs. The management contractor is appointed early not later than the outline design stage, because, he can advice on design programmes, tender action, delivery of materials and goods and construction programmes. He is appointed on the basis of his experience and on the method he has proposed to manage the project. After this, the management contractor executes the works using works contractors. During the construction period, the management contractor is responsible for supervising the construction operations and ensuring that all of the work is built according to the contract specifications.

However, in management contracting there is some price certainty requirement before work can be commissioned as can be seen on the matrix. This may cause some delays before works start on site and might jeopardise the possibility of an early completion. Furthermore, Baytree is an experienced client and so, its objective is to use its in-house experts to manage the project. This therefore means that Baytree bears all the risk, hence no 'sharing of agreed risk' as shown on the matrix. The fact that management contracting does not meet all the objectives of Baytree does not mean it might not be successfully implemented.

Construction management: this has the same process as management contracting only that in this case, the construction manager is appointed on the basis of a management fee. This procurement method also satisfies the client's requirement for early start on site as it exhibits some flexibility with design and construction as well. The construction manager is appointed very early to coordinate all the trades' contractors who are usually in direct contract with the client. This direct contract relationship can give Baytree plc a great measure of control over design and construction. Which means it reserves the right to make changes as the project proceeds. This also implies that Baytree will accept virtually all the risk as it intends to use in-house expertise. Furthermore, Baytree can make sure that its sustainability requirement for the project is fully achieved.

Drawing from the analysis of the two methods above, it seems that Construction management suits the project requirements better since management contracting has failed to sufficiently satisfy some of the client's objectives. Hence, it is recommended to be the best option for the Salteroyd Northbound carriageway project. The complete process of executing the project is discussed in section 3.3.

Phase I: Hotel

PHASE I: HOTEL					Lump sum contracting	Design and build			Fee construction	
					Sequential	Direct	Competitive	Develop and construct	Management contracting	Construction management
A	Timing	How important is early completion to the success of the project? (Section 1.6.6)	Crucial Important Not as important as other factors	1 2 3	•	• •	•	•	• •	• •
B	Controllable variation	Do you foresee the need to alter the project in any way once it has begun on site? (see section 1.6.3)	Yes Definitely not	4 5	•	•	•	•	•	•
C	complexity	Does the project (as distinct from what goes in it) need to be technically advanced or highly serviced? (Section 1.6.5)	Yes Moderately so No just simple	6 7 8	• •	• •	• •	• •	• •	• •
D	Quality level	What level of quality do you seek in the design and workmanship? (See section 1.4.4)	Basic competence Good but not special Prestige	9 10 11	• •	• •	• •	•	• •	• •
E	Price certainty	Do you need to be certain of price for the project construction before can commit it to proceed? (Section 1.4.4)	Yes A target plus or minus will do	12 13	•	•	•	•	•	•
F	Management	Can you manage separate consultancies and contractors, or do you want just one firm to be responsible after the briefing stage? (section 1.6.1)	Can manage separate firms Must have only one firm for everything	14 15	•	•	•	•	•	•
G	Accountability	Do you want direct professional accountability to you from the designers and cost consultants? (section 1.6.2)	Not important Yes	16 17	•	•	•	•	•	•
H	Risk avoidance	Do you want to pay someone to take the risk of cost and time slippage from you in case of default? (section 1.6.4)	No, prefer to retain control and therefore risk Prepared to share agreed risks Yes	18 19 20	•	•	•	•	•	•
	Total				2	8	7	6	4	3

Figure 14: Phase I: Hotel

It is very clear that the matrix is suggesting the use of design and build for the construction of the hotel. This will means that Baytree has to approach a design and build contractor to execute the hotel project. Baytree's consultants should prepare a scheme design incorporating all sustainability design parameters for the contractor who now has the responsibility of developing the design, and constructing the hotel to meet client's objectives. This is discussed in section 3.4.

hase II: MSA Southbound carriageway

PHASE iI: MSA SOUTHBOUND CARRIAGEWAY					Lump sum contracting	Design and build			Fee construction	
					Sequential	Direct	Competitive	Develop and construct	Management contracting	Construction management
A	Timing	How important is early completion to the success of the project? (Section 1.6.6)	Crucial Important Not as important as other factors	1 2 3	•	• •	•	•	• •	• •
B	Controllable variation	Do you foresee the need to alter the project in any way once it has begun on site? (see section 1.6.3)	Yes Definitely not	4 5	•	•	•	•	•	•
C	complexity	Does the project (as distinct from what goes in it) need to be technically advanced or highly serviced? (Section 1.6.5)	Yes Moderately so No just simple	6 7 8	• •	• •	• •	• •	• •	• •
D	Quality level	What level of quality do you seek in the design and workmanship? (See section 1.4.4)	Basic competence Good but not special Prestige	9 10 11	• •	• •	• •	•	• •	• •
E	Price certainty	Do you need to be certain of price for the project construction before can commit it to proceed? (Section 1.4.4)	Yes A target plus or minus will do	12 13	•	•	•	•	•	•
F	Management	Can you manage separate consultancies and contractors, or do you want just one firm to be responsible after the briefing stage? (section 1.6.1)	Can manage separate firms Must have only one firm for everything	14 15	•	•	•	•	•	•
G	Accountability	Do you want direct professional accountability to you from the designers and cost consultants? (section 1.6.2)	Not important Yes	16 17	•	•	•	•	•	•
H	Risk avoidance	Do you want to pay someone to take the risk of cost and time slippage from you in case of default? (section 1.6.4)	No, prefer to retain control and therefore risk Prepared to share agreed risks Yes	18 19 20	•	•	•	•	•	•
	Total				7	3	3	4	7	5

Figure 15: Phase II: MSA Southbound carriageway

From the matrix above, it appears that lump sum contracting and management contracting are the most suitable for Phase II, the southbound carriageway. However, management contracting might not be the best option because; Phase II is as yet not confirmed. So, there is no hurry to start work on site. Even upon confirmation, Baytree is not in a hurry to meet any deadline and so can decide to take advantage of time and save money using competitive tendering. This will be easy because, designs must have been completed in detail from the Phase I. The use of traditional method will give Baytree the same level of price certainty and to some degree risk transfer.

Recommended strategy for Baytree

A successful appraisal of the various procurement options have been done and chosen; Construction management, Design and build and Traditional lump sum systems as the most appropriate routes for Phase I – MSA Northbound carriageway, hotel and Phase II – Southbound carriageway respectively. The next step is choosing the right form of contract to use and subsequently the commissioning of consultants as it applies under the recommended procurement routes.

There are different forms of contract available in practice for the different procurement methods. In 2002, the Joint Contract Tribunal produced the 'construction management documentation' which consists of an Agreement (C/CM) between the Client and Construction manager; and a Trade Contract (TC/C) between the Client and each of the Trade Contractors. This documentation, provide a good contractual framework for construction management. It logically spells out the obligations of the Construction manager and the Client; the identity of the Planning Supervisor and Principal Contractor; and the methods for Dispute resolution (Clamp et al., 2007).

However, the traditional adversarial nature of the construction industry has caused a rethink on how things should be done (Wood, 2005). Consequently, over the last decade, Latham (1994) and Egan (1998) have championed the need to avoid adversarial conflict through the Partnering approach. Partnering offers direct benefit to the client, consultants, contractor, and the whole supply chain (Wood, 2005). This will requires a formalised agreement between the partners in form of a free-standing non-binding charter or a multiple-party contract for partnering

Therefore it is recommended that Baytree adopts the partnering approach within the procurement method chosen for this project and for the 2 other MSAs it intends to build over the next 5 years.

Conclusions

After a consideration of Baytree's objectives for the Salteroyd project incorporating Phase I and II, and a comprehensive appraisal of potential procurement methods was done, it is recommended that Baytree should use Contruction management system for Phase I, Design and build for the Hotel and Traditional method for the Phase II. However, the procurement strategy that will be suitable to take Baytree's development and expansion plans forward, is the use of

partnering within the procurement routes chosen while adopting the supply chain management principles.

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