I. INTRODUCTION

Procurement is the strategic process of creating, managing, and fulfilling contracts for construction work (Hughes et al., 2015, p.11). Procurement involves a sequence of logically related activities that take place in a definite sequence that leads to the completion of a major milestone (International Organization for Standardisation, 2010). Construction procurement also comprises determining the likelihood of client satisfaction after construction is completed (Ruparathna et al., 2013, p.2). Therefore, it is the primary responsibility of construction managers to satisfy clients to meet project objectives (Ruparathna et al., 2013, p.2).

II. ANALYSIS OF THE KEY PROCUREMENT ISSUES THAT THE CLIENT HAS TO CONSIDER IN SELECTING AN APPROPRIATE PROCUREMENT ROUTE FOR THE PROJECT

The procurement strategy can be selected once the key objectives and constraints of a building project are defined, the risks are identified, the appropriate allocation of risks is determined, and the level of complexity of the project is established (Department of Housing and Public Works, 2008, p.6).

KEY OBJECTIVES (Department of Housing and Public Works, 2008, p.6)

- Scope of the project
- Cost
- Time
- Quality
- Sustainability
- Innovation
- Expectations and needs of the community
- Participation in the advancement of priorities of the government

CONSTRAINTS (Department of Housing and Public Works, 2008, p.6)
They are an aspect of the project that restricts and impacts the objectives of a project.

- Time and budget constraints
- Physical factors
- Access to resources
- Participant skills and capabilities
- Level of knowledge of the client regarding the project
- State of the market
- Standards of policy

RISKS
Risks are both known and unknown events that may occur during the project course and may have a significant impact on its delivery (Department of Housing and Public Works, 2008, p. 6). The procurement route will determine the responsible parties for managing risks (Department of Housing and Public Works, 2008, p.7). Generally, risk management responsibility should be assigned to the party most capable of managing that risk (Department of Housing and Public Works, 2008, p.7).

COMPLEXITY LEVEL (Department of Housing and Public Works, 2008, pp.7-8)

- Project size, duration, and scope
- Stakeholder involvement
- Technological level of the project
- Client needs and wants
- State of the market
- Construction method and equipment needed

III. THE REVIEW OF CLIENT AND PROJECT OBJECTIVES FOR THE PROJECT IN RELATION TO PROCUREMENT PROCESS

A. PROJECT INFORMATION

It involves three existing schools which will undergo major retrofit or redevelopment as part of a major construction programme that was established by the Local Authority (LA) due to being rated condition D, which means they are in a very poor condition. It was also revealed that most of the existing schools were built in the 1960s and 1970s and are now beyond their initial 50-year lifecycle. Due to recent demographic trends and population growth in the area, additional facilities are needed for the local needs to be addressed. The three schools, which have a capacity of approximately 1,500 people, must accommodate middle and high school learners to support this growth.

B. CLIENT INFORMATION

The LA provides people and businesses in defined areas with a variety of vital services such as planning, social care, housing, and education (Local Government Association, 2022). They create and implement local priorities in collaboration with residents and other organisations (Local Government Association, 2022). It is assumed that the LA has insufficient construction knowledge and experience.

C. COST

A total of £100 million will be invested by the LA. It is expected that approximately £200 million will be required to fund these projects. Consequently, the LA must secure the remaining funding through the “Learning Estates Investment Programme” (LEIP). Aligning projects with the guiding principles and goals and ensuring that they serve as model schools for design, quality, and environmental performance will attract additional national funding.

D. TIME

They need to be completed and handed over by the beginning of the academic year (August 2025).

E. QUALITY AND PERFORMANCE

It is vital that the school development projects incorporate green spaces for the community and create attractive and well-connected local community services by co-locating other public services.

F. RISK DISTRIBITION AND ACCOUNTABILITY

The LA is assumed to be unable to fully accept the risks associated with the delivery of the project.

Since public funds are spent on public projects, their accountability is very important (Nicał and Wodyński, 2015, p. 345). This requires complete transparency in the procurement of the project and the awarding process itself should be free of discrimination and injustice (Nicał and Wodyński, 2015, p. 345).

IV. PROCUREMENT ROUTES

A. TRADITIONAL ROUTE

The traditional route (Figure 1) involves the employer agreeing to separate the design and construction work, using consultants to handle design and cost control, and allowing the contractor to complete the construction (Davis et al., 2008, p. 8). Competitive tendering is usually used to select the contractor (Davis et al., 2008, p. 8). The contracts under this route can be classified into three types: lump sum, measurement, and cost reimbursement (Davis et al., 2008, p. 8).

STRENGTHS (Bako, 2016, p. 3)

- It is highly competitive, which allows the client to select among the bidders.
- The method is very familiar to most clients.
- The level of public accountability is satisfactory.
- Before the commencement of work, the bill of quantity is derived.

WEAKNESSES (Bako, 2016, p. 3; Nicał and Wodyński, 2015, p. 347)

- Possible disputes due to the separation of the design and construction processes.
- Contractors are not involved in the design, cost, or risk allocation.
- Inadequate buildability results from appointing a contractor after the design is completed.
- The process is slow.

RISKS

- Cost – Low Risk

Use of lump sum contract

- Time – Medium Risk

A fixed contract date is set

- Quality– Low Risk

Due to the direct involvement of clients in the design process

- Risk Allocation

The design risks are taken by the client while the construction risks are taken by the contractor (Bako, 2016, p. 3)

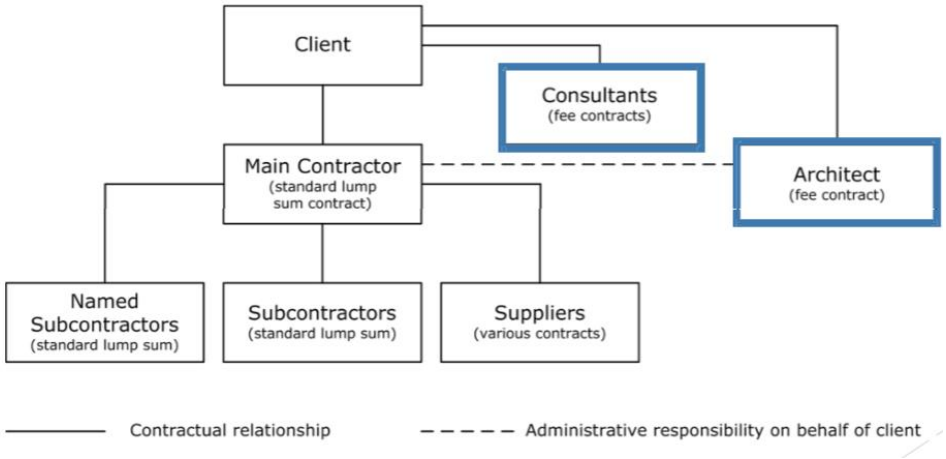

Figure 1. Contractual Relationships in the Traditional Route

B. **DESIGN AND BUILD ROUTE**

This route (Figure 2) involves a single contractor, which is appointed by the client, delivers the design and executes the project on-site (Nicał and Wodyński, 2015, p. 347). The client may hire consultants which will carry out the other parts of the design phase, but the contractor will be kept informed during the process (Davis et al., 2008, p. 5).

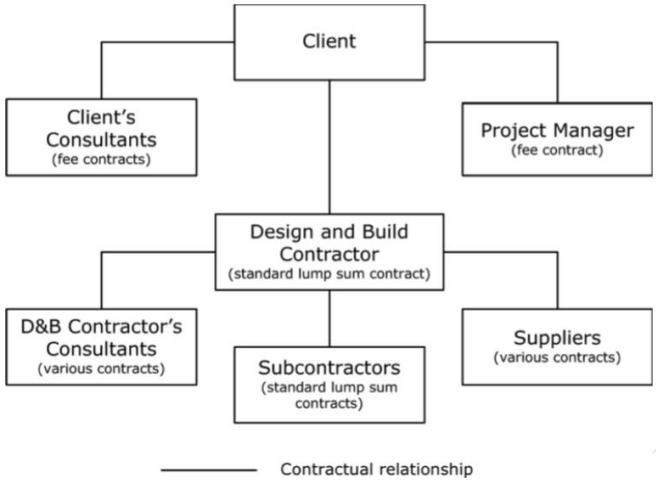

Figure 2. Contractual Relationships in the Design and Build Route

STRENGTHS (Scottish Government, 2019, p. 61; Bako, 2016, p. 3)

- Low cost of tendering and preparation for the client.
- Risks in the design and cost are subject to a single point of responsibility.
- The overall construction and design process could be shortened.
- Early consideration of construction methods may increase buildability
- Strongly preferred among the clients, as it primarily places the risk on the contractor and because it is an easy process to understand.
- It is less adversarial.

WEAKNESSES (Scottish Government, 2019, p. 62)

- Changing the scope of a project can be expensive once it has been contracted.
- After a contract is let, the client has little control over the design since output specifications are used to specify the performance of the building.
- Pursuing the lowest cost design solution may compromise the quality, design, and performance of the completed facility if the output specification is inadequately developed.
- Changes cannot be made.
- It is unsuitable for complex projects.

RISKS

- Cost – Low Risk

Due to a lump sum contract

- Time – Low Risk

Due to set time goals

- Quality – High Risk

The quality of the project may be compromised to meet the deadline.

- Risk Allocation

The contractor is responsible for the entire risks of the project (Bako, 2016, p. 4)

C. MANAGEMENT CONTRACTING ROUTE

A contractor is responsible for managing a series of subcontractors or contractors involved in a particular project (Figure 3) (Hawkes, 2010, p. 6). The managing contractor manages the design process, sources, and engages designers and subcontractors, coordinates, and supervises the preparation of construction documents, executes contracts, and manages the delivery of the work (Australasian Procurement and Construction Council, 2014, p. 26). The design team is not part of the team of the management contractor, but rather a separate team appointed by the client or part of the design team of the client (Scottish Government, 2019, p. 64). The main contractor appoints different contractors to carry out the procurement tasks (Gerardi, 2021). The individual trade contractors and the management contractor negotiate contracts for the various work packages **(**Scottish Government, 2019, p. 64).

STRENGTHS (Hawkes, 2010; Scottish Government, 2019, p. 64; Davis et al., 2008, p. 14)

- The Management contractor is involved in the early process and appoints trusted subcontractors.
- Early work packages are contracted before the overall design is complete, enabling contracts to be placed early in the design process.
- It allows for an early start on-site and completion.
- During construction, the client has the flexibility to modify the design as the work progresses.
- Often, work packages are awarded as lump sum contracts with bills of quantities following competitive tendering.

WEAKNESSES (Scottish Government, 2019, p. 65; Hawkes, 2010, p. 6)

- It is not until the last work package has been let that the final price and timeframe are determined.
- An uncompetitive management contractor could result in package contractors claiming that the client will be responsible if the project does not go smoothly.
- Having access to the appropriate resources and expertise is critical for the client to deal with separate design consultants and the management contractor to scrutinise each tender for the works package.
- Disputes are more likely to arise since both the design and construction phases do not have a single point of responsibility.
- Unsuitable for complex projects.

RISKS

- Cost – Medium Risk

Until the last package is sold, the total cost is unknown.

- Time – Medium Risk

The total duration will depend on the selected package.

- Quality – Low Risk

The client, designers, and contractors work closely together.

- Risk Allocation

The risk associated with the time and cost lies with the client (Bako, 2016, p. 3).

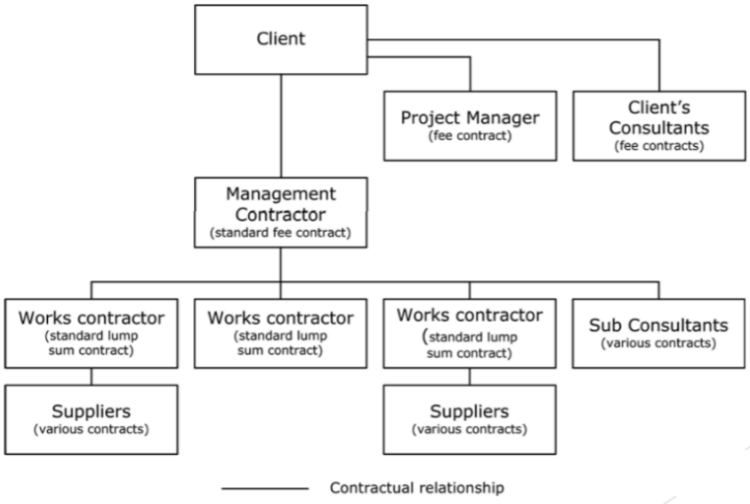

Figure 3. Contractual Relationships in the Management Contracting Route

D. CONSTRUCTION MANAGEMENT ROUTE

In this route (Figure 4), the client hires a design team and engages a construction manager as a fee-earning professional to manage, program, and coordinate design and construction activities to maximize the design's buildability (Morledge and Smith, 2013). Trade contractors perform construction work under direct contracts with the client for distinct trades or work packages

(Morledge and Smith, 2013). The client must maintain a strong presence through a highly skilled and efficient project management team (Morledge and Smith, 2013).

STRENGTHS

- Design and construction procedures overlap, leading to shorter project duration.
- Each participant's role, risk, and relationship are clearly defined.
- There is a direct contract between the client and the trade contractor, and the contractor is paid directly by the client.
- This route facilitates constructor involvement in project planning and design.

WEAKNESSES

- Price certainty cannot be achieved until the final trade packages have been released.
- It is necessary to have a knowledgeable and experienced client.
- A good brief from the client is essential, as the design cannot be completed until the client commits significant resources to the project.
- It depends on the client choosing a capable and committed team.
- It has historically been problematic for clients because they do not understand the risks involved.

RISKS

- Cost – Medium Risk

Until the last package is sold, the total cost is unknown.

- Time – Medium Risk

The rate date completion is not the sole responsibility of a single organisation.

- Quality – Low Risk

The client, designers, and contractors work closely together.

- Risk Allocation:

The client is responsible for the risks associated with the project (Bako, 2016, p. 4).

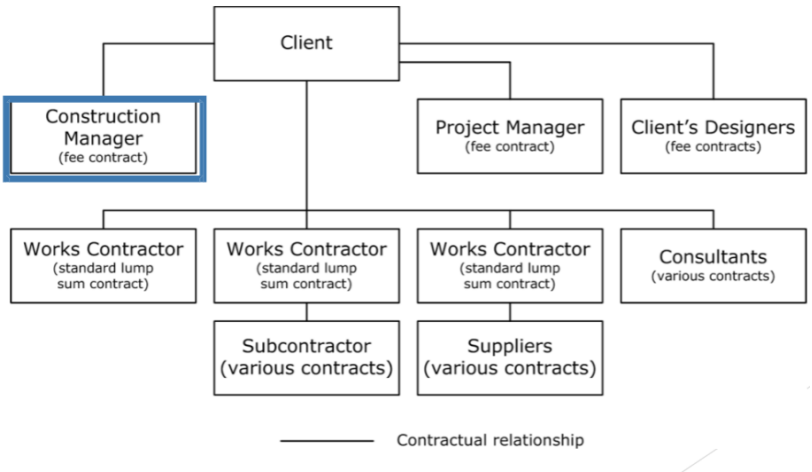

Figure 4. Contractual Relationships in the Construction Management Route

Furthermore, Figure 5 demonstrates a summary of the characteristics of the procurement routes.

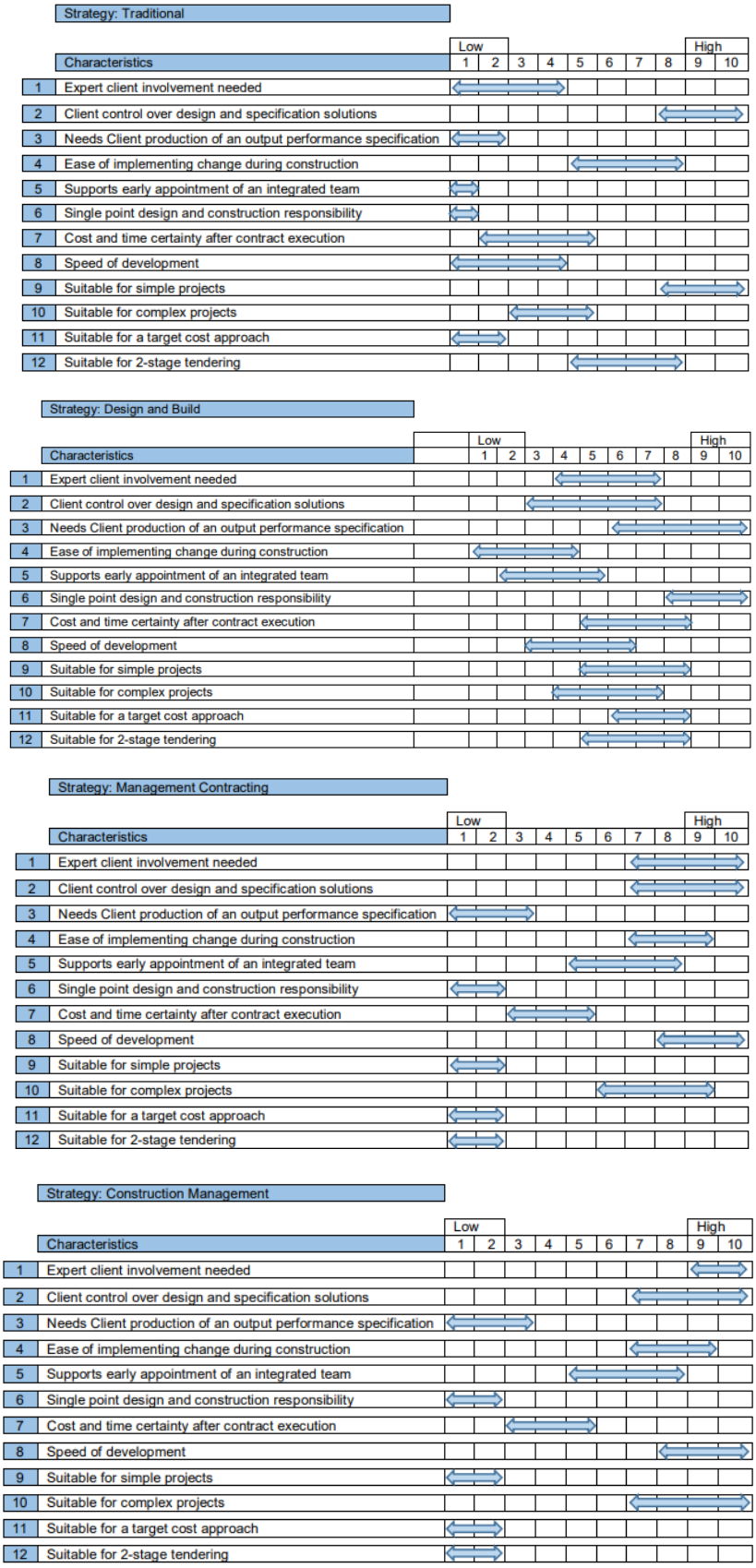

Figure 5. Summary of the Characteristics of the Different Procurement Routes (Scottish Government, 2019, pp. 61-67)

V. CHOSEN ROUTE AND THREE ADDITIONAL MECHANISMS TO ENHANCE THE SELECTED ROUTE

Based on the analysis of the client and project and the characteristics of the different routes, the suitable procurement route for this project is the **Design and Build Route**. It provides time certainty which is important since the project needs to be completed by the specified date and cost certainty due to the usage of the lump sum contract. In addition, there is an engagement of consultants, who can guide the LA since they have insufficient construction knowledge and experience. Moreover, this is a simple project which the design and build route can accommodate. Although change cannot easily be implemented in this route, it will result in cost and time savings. Although there is also high risk in the design quality, this can be overcome through the develop and construct procurement route. Three mechanisms that can be used to enhance this route:

1. **Develop and Construct** – It will develop the design details to a much greater degree. At a partial stage, the building is designed by the consultants then the design and construction of the building will be developed and completed by the contractor (Scottish Government, 2019, p. 62). The LA can also transfer the design risk to the contractor while retaining control over the design and budget.

BENEFITS (Scottish Government, 2019, p. 63).

- In terms of design and cost risks, a single point of responsibility is assigned.
- Early consideration of building methods will result in increased buildability.
- The overall design and construction period could be shorter.

2. **Target Costing** – In this approach, the employer and contractor will agree on a target cost for the work and then the contractor is reimbursed for the work performed (Scottish Government, 2019, p. 71). A comparison is made at the end of the project between the actual costs of the contractor and the final target costs of the contractor (Scottish Government, 2019, p. 71). “Gain sharing” occurs when the actual cost is lower than the target cost and savings which the parties on a prearranged percentage basis will share on (Scottish Government, 2019, p. 71). Alternatively, “pain sharing” occurs when the actual cost exceeds the target cost and the overspend is shared evenly between the parties according to a pre-agreed percentage (Scottish Government, 2019, p. 71).

BENEFITS (Scottish Government, 2019, p. 72)

- Establishes a clearly defined risk allocation at the beginning of the project to promote active and equitable risk sharing.
- With a single target price, both the lump sum and prime cost-reimbursable subcontracts can be incorporated.
- Managing control mechanisms by target costs provides an incentive for timely implementation.

Two-Stage Tendering - The contractor can be appointed before all the information required to offer a fixed price has been collected (Scottish Government, 2019, p. 69). In the first stage, the contractor is allowed to start work, and in the second stage, a fixed price is negotiated (Scottish Government, 2019, p. 69).

BENEFITS (Scottish Government, 2019, p. 70)

- Project completion could be brought forward by early appointment of the contractor.
- It is better to base the final account on more complete information and a better understanding of the scope of work in the second stage tender, so that it is more in line with the contract sum.
- Risk identification improved within a time frame for action.
- Through novation, specialist design contractor packages can be procured ahead of a first-stage main contract tender.

VI. CONCLUSION

The procurement process is crucial to the success of a project. Procurement models have advantages and disadvantages. Therefore, an appropriate procurement strategy should align with the key objectives and constraints of the project, address the identified risks, and suit the complexity level of the project.

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