3. Appendix 1 – Capital Costing Guidelines

This section provides additional methodology and defines the terminology for Capital Costing.

3.1 Capital Costing; Definitions and Methodology

3.1.1 Net Construction Cost or (NCC)

Net Construction Cost is composed of the following:

Departmental (FPU) Costs

These represent the Net Internal Construction cost of each Functional Planning Unit (FPU) otherwise referred to as Departments. The cost per M2 varies for each FPU depending on the level of complexity, density of fitout, level of building services, typical types of finishes etc. Furthermore, the FPU rates are linked to the Role Delineation Level (the level of service being provided) or (RDL), so the cost of the same FPU varies from one RDL to another. A higher RDL is more expensive than a lower RDL.

The FPU rates are applied to Gross areas including the circulation space within each department. The area measurement method is known as the No-Gap method. In this method, the Gross departmental (FPU) area is the simple sum of the individual rooms plus the internal circulation corridors but not Travel and Engineering space.

The room areas are measured as follows:

- To the inside face of outside walls
- To the centre of side walls
- To the outside face of circulation corridors
- Circulation corridors are measured to the face of the walls.

For a better understanding of the measuring method, refer to Part B of these guidelines where clear diagrams of the no-gap measuring method are provided.

Departmental (FPU) Gross areas can be estimated early in the project on the basis of the Briefing Information and Schedules of Accommodation (SOA). Later in the project these can be measured off the plans and compared with the briefing estimates. A variance of more than a few m2 per department would normally be unacceptable in a new building design but tolerable in refurbishment projects.

A special note must be made in relation to “Shell Space”. Some projects include shell space for future internal expansion. This is based on the theory that building shell space for the future now is cheaper than building it in the future. This conclusion is not universally accepted. There should be no automatic assumption that for public or private facilities it is necessary to provide shell spaces for the future. However, if this is the intention, they should be identified and correctly costed.

Travel and Engineering (T&E) Costs

Travel refers to the major corridor links between the Departments (or FPU’s). These are measured to the face of the walls.

Travel also includes Stairs (measured once per floor), Lift lobbies, and internal Ramps but not voids such as lift voids.

Engineering refers to plant rooms, service cupboards, service tunnels etc. Holes in the slabs for risers are not counted.

T&E may be estimated as a percentage of the Gross Areas or measured off the plan depending on the stage of project (before design or after design). If T&E is estimated at briefing time, it is entered as a percentage, separate to FPU areas. If T&E is measured off the plans, it is entered separately as Travel FPU and Engineering FPU. Then the T&E % is entered as 0.

Building Shell and Site Conditions

Each building or building type is designed to an Architectural shell with certain external features responding to the site and design preferences including materials finishes. The Departmental rates cover all the internal costs for the building(s). The "Building Shell and Site Conditions" will estimate the balance of the cost including the following:

- Bulk Earthworks
- Fire Compartmentation
- Demolition Works
- External Works
- Façade
- Infrastructure Services
- Landscaping
- Roof
- Site Preparation
- Special Provisions
- Sub Structure
- Super Structure
- Transportation Services
- Civil Works
- Outbuildings.

The assumptions for each of the above vary from one project to the next. So, unlike the FPU costs, the above costs must be site-specific. However, for many components of the above categories, it is possible to develop benchmarks which are applied to similar facilities. For example, the Façade system or Super Structure in one project may be very similar to another. So, it is possible to simply quote the cost from a recently tendered project, identifying those elements.

Project Specific Costs

A number of project costs are regarded as on-off costs and cannot be estimated based on formulas applied to variables of the project. These costs are entered as cash estimates.

These may include:

- Mains upgrade
- New generators
- Contribution to road extensions or repairs
- Cash already spent towards the project.

FF & FE Costs

Normally the cost of Furniture, Fittings, Fixtures and Equipment (FF&FE) sometimes referred to as FF&E would be estimated separately based on generic equipment lists and the room types present in the brief or design. However, on occasions where such an equipment list does not exist, FF&FE are entered as a percentage of building cost.

3.1.2 Gross Construction Cost (GCC)

Gross Construction Cost (GCC) is composed of NCC plus the following "Contract Costs":

Each procurement contract type has different on-costs which should be applied. These on-costs can be calculated as follows:

Table of on-costs included in GCC based on the intended contract type

1	Net Construction Cost (NCC)	% applied to NCC	Applied to	Cost
2	Preliminaries Cost (1)	e.g. 10%	1	$ cost
3	Contractors Margin	e.g. 10%	1+2	$ cost
4	Design Contingency	e.g. 5%	1+2+3	$ cost
5	Locality Factor (2)	e.g. 0%	1+2+3+4	$ cost
6	Risk Factor	e.g. 5%	1+2+3+4+5	$ cost
7	Project Agreement (3)	e.g. 0%	1+2+3+4+5+6	$ cost
	Subtotal of on-costs			$ subtotal cost

Notes:

1 Preliminaries include site establishment and direct labour by the builder

2 Locality Factor is the cost difference for the same facility if built in a Capital City vs a regional or remote city with special circumstances. Costs are benchmarked to the nearest capital city, then for each other city a Regional Factor is applied to compensate for the difference in costs. Therefore, when costs are done for a Capital City, the regional factor is 0. When costs are done for other cities, the regional factor is a positive or negative % of NCC.

3 Project Agreement refers to any special contractual agreement for labour penalties for harsh conditions, extra hours or similar

Please note the order of calculations shown in the above table. Changing the order will change the results. In order to maintain a central benchmark for costing, these Guidelines require the above order of calculations to be maintained.

The typical contract costs which vary the above on-costs are:

- Prime Contractor
- D&B (Design and Build) also called Design-Construct
- DD&C (Design Develop and Construct)
- Managing Contractor (or Cost +)
- Public Private Partnership (PPP)
- Construction Management
- Direct Contract (or owner-build)
- Other contract types

One of the above generic contract descriptions needs to be selected or assumed in order to arrive at the benchmark percentages. It should also be noted that the benchmark percentages are those achieved over many projects and many years as measured at the end of the project. Initial optimistically low percentages inserted into various contracts are not a good benchmark to use as the impact of variations during the contract must be considered and allowed.

The above benchmarks are usually available to clients and Quantity Surveyors experienced in healthcare projects.

3.1.3 Total Project Cost (TPC)

Total Project Cost (TPC) is composed of the GCC plus the following:

Fees, Charges and Contingencies- These are the balance of the on-costs mentioned above under GCC. The on-costs which are included in the TPC are as follows:

Table of on-costs included in the TPC

		% applied to NCC	Applied to	Cost
8	Construction Contingency	e.g. 5%	1+2+3+4+5+6+7	$ cost
9	Consultants Fees	e.g. 12%	1+2+3+4+5+6+7+8	$ cost
10	Authority Charges	e.g. 2%	1+2+3+4+5+6+7	$ cost
11	Other Charges	e.g. 0%	1+2+3+4+5+6+7	$ cost
	Subtotal of on-costs			$ subtotal cost

The reason these are included in the TPC and not GCC is that on many projects these costs are separated and paid by the Client. So, it is beneficial to separately note these costs.

Project FF&FE Costs- This refers to the cost of Furniture, Fittings, Fixtures and Equipment. The default costing methodology is to estimate these based on briefing information such as Room Data Sheets. If, however, these are not available, they can be entered directly as Project-Specific Costs.

The FF&FE procurement costs are in 6 default categories:

- Group 1- Supplied and Installed by the builder
- Group 2- Supplied by the client and installed by the builder
- Group 3- Supplied and installed by the Client
- Group 1T- Existing items transferred and Installed by the builder
- Group 2T- Existing items supplied by the client and installed by the builder
- Group 3T- Existing items supplied and installed by the Client.

Even if there is no intention to procure the FF&FE according to the above groups, it is beneficial to separate them as such for benchmarking purposes. Obviously items which are supplied and/or installed by the client will not attract a builder's margin. However, the builder is required to make allowances for the building to accommodate and serve them.

3.1.4 Total End Cost (TEC)

The Total End Cost (TEC) is composed of the TPC plus the following:

Escalation

This represents the rise in costs between the time the estimate is prepared and the end of the project when the final payment is made to the builder.

This does not assume that the building contract allows for rise and fall. This is simply a component of cost estimation which will vary from one locality to the next and should be separated for benchmarking purposes. It should in fact be assumed that the TEC is the contracted price.

Escalation is based on several factors:

- Estimate Date: This is the date the estimate is prepared
- Project Commencement: This is the date of the construction commencement
- Project Completion: This is the date of construction completion
- Escalation rate: This is the rate of escalation per annum.

Escalation is calculated as follows:

A = The rate of escalation is applied fully to the TPC for the period between the Estimate Date and Project Commencement

B = The rate of escalation is applied to the escalated cost (including A) for the period between the Construction Commencement and mid-point of construction. This allows for an assumed expenditure curve from the beginning of the construction to the end.

C = A+B is the total project escalation between the Estimate Date and Project Completion

Escalation rate can be expressed in two methods. Both methods can be used for escalation calculation, although method 2 is generally regarded as more accurate. It is usually provided by industry bodies, Municipalities or Governments. When it is not available, then Method 1 is used.

These are described as follows:

Method 1- Escalation % per annum. This is a percentage estimated by quantity surveyors.

Method 2- Building Price Index (BPI). BPI is expressed by numbers which are estimated for the current as well as future years. The difference between the numbers represents the escalation factor.

3.1.5 Cost Summary

The above 4 major categories of Cost need to be summarised and presented similar to the following:

1	NCC	$ cost
2	GCC	$ cost
3	TPC	$ cost
4	TEC	$ cost

3.1.6 Warning

As the logic of the costing methodology described above would indicate, there are many factors which result in the Total End Cost (TEC), the cost that really matters.

Therefore, it is inappropriate to take the end result of this type of costing and convert it into a lower level benchmark such as a simple Cost per Square Meter, or worse, a Cost per Bed. These types of low level cost benchmarks are misguided and inaccurate. We strongly caution against their use, even though they may be convenient in daily conversation. It can be demonstrated that their use actually results in bad decisions and outcomes.

3.2 Cost Benchmarking Issues

This section is not part of the Guidelines, but provides an overview of some of the observed issues in cost benchmarking between projects.

Benchmarking generally refers to an estimate of cost for a project in comparison with other, similar projects or project types. This is usually intended for the verification of costs so that when problems are discovered corrective action may be taken in the future.

An important factor which should be considered in costing is that high-cost building environments tend to justify and reinforce these costs through the entire eco-system of the construction industry. Once, for any reason a City, Country or Industry falls into a pattern of initial high construction costs,

cost escalation during construction or unreliable cost estimates then the following will most likely follow:

For new projects clients employ cost consultants (QS's) to estimate the market cost to within an acceptable margin of accuracy (plus/minus 5%).

- Cost Consultants look at historic, current and future patterns in that City, Country or Industry and give an estimate. This may be an accurate Market estimate but it may not be a fair Price.
- This process does not discover why in certain areas, costs are unusually high.

So, in environments where there are numerous changes to the projects during the construction, the client or head contractors do not pay on-time, designers do not provide adequate detailed information and there is no early signed-off for the project brief, each party within the construction echo-system will add its own contingency. Then each cost consultant advising the various parties anticipates this and allows for the prevailing high market rate. The client's QS does the same, otherwise both the tenders and end project costs will prove him wrong and unreliable.

So, the client gets advice in relation to the costs which, not surprisingly confirms the current high cost environment. So, if a new project is judged by such a benchmark, its high costs appear justifiable, even when in reality they are not.

In order to discover this phenomenon and quantify it, various benchmarking techniques can be used to by-pass the above feedback loop. The results, if lower than the current cost environment, may not be immediately achievable, but they will hopefully highlight the problem to be addressed.