



METHODOLOGY APPLICATION

APPLICATION NO: VE001

APPLICATION TITLE: Office Building: Finishing Specifications

INDUSTRY: Construction

VALUE METHODOLOGY APPLIED: Value Engineering

INDEX

INTRODUCTION	2
APPLICATION CONCEPT	2
VALUE METHODOLOGIES APPLIED	4
PRE-VALUE ENGINEERING WORKSHOP ACTIVITIES	4
VALUE ENGINEERING APPLICATION TOOLS	4
VE WORKSHOP REPORTING	4
VE PARTICIPANTS:	4
CONCEPT EXPLAINED	5
VALUE ENGINEERING STUDY	5
FUNCTIONAL REQUIREMENTS	6
CATEGORIES OF FINISHES	7
SPECIFICATION SHEET EXAMPLE	9
TYPICAL EXAMPLE OF A RECOMMENDATION SUMMARY	9
ESTIMATED SAVINGS	11
SPECIFICATION MATRIX	12
CONCLUSION	12



INTRODUCTION

The Value Methodology was applied to optimise Functionality and Costs of the Finishing requirements of an Office Building.

The terms of reference of establishing Finishing Specifications for a large Office Building are to recommend the lowest cost of ownership whilst ensuring full functionality.

The Finishing Specifications have been determined through detailed analysis of information obtained from the Client, the Consulting Team / Architects and Supplier's.

Additionally information was obtained through the Internet looking for alternatives, new technology, test reports etc.

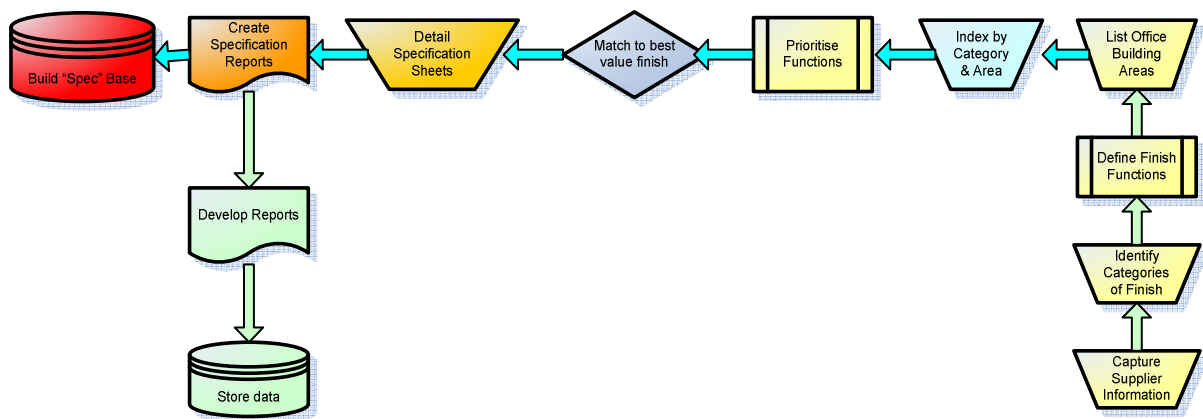
For each Area Type the ideal Functional Requirements was established with the purpose of testing finishing specification against functional conformance to the Area applied. The total number of specifications analysed exceeds 200.

Each Area Type had a detailed Finishing Specifications including Area Type & Coding, Specification & Coding, cost per m²; m; unit, etc., Product Source where pricing was obtained, Product Code when applicable, Functional Requirements for the Area Type and comments when applicable.

It is important to note that the final specification can only be “frozen” after the Client, Architects and other Stakeholders approve the proposed finishes. It is also important that the specifications can be modified and updated through an Audit process at a later stage

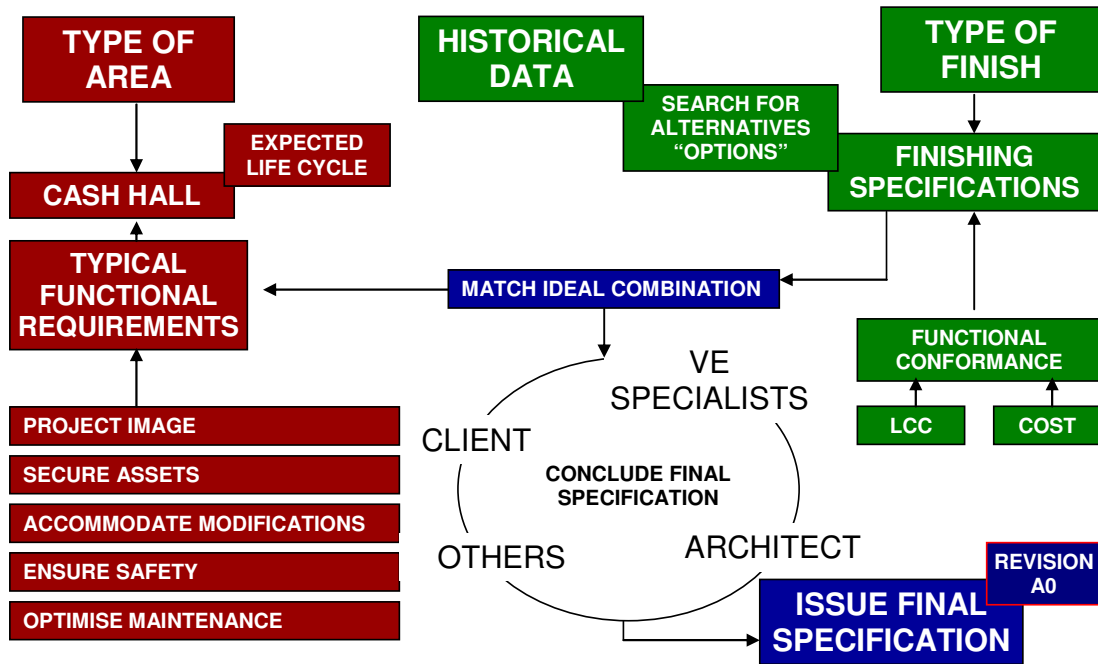
APPLICATION CONCEPT

APPROACH

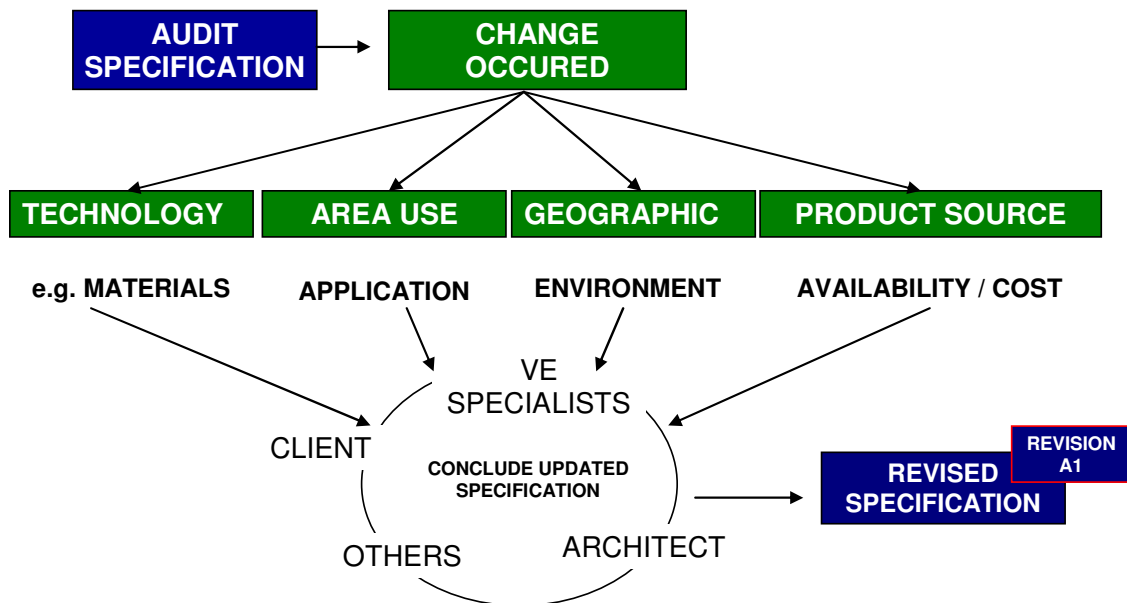




FINAL FINISHING SPECIFICATIONS



AUDIT (UPDATING) OF FINISHING SPECIFICATIONS





VALUE METHODOLOGIES APPLIED

Value Engineering

PRE-VALUE ENGINEERING WORKSHOP ACTIVITIES

(3 days external preparation and 5 days at the Engineering Contractor / Architect Offices
Analysis of Data related to the Project

VALUE ENGINEERING APPLICATION TOOLS

- Selecting areas of investigation
- Listing of specific finishing types
- Listing of functional requirements.
- Prioritising of functional requirements
- Perspective Modelling Matrix (decision matrix)
- Specification / Area Matrix
- Estimated Savings

VE WORKSHOP REPORTING

- Preparation and Issue of VE Report for Review and Comments

VE PARTICIPANTS:

Client

Project Manager
Maintenance Manager
HR Manager
Operational Manager
Financial Manager
IT Manager

Contractor

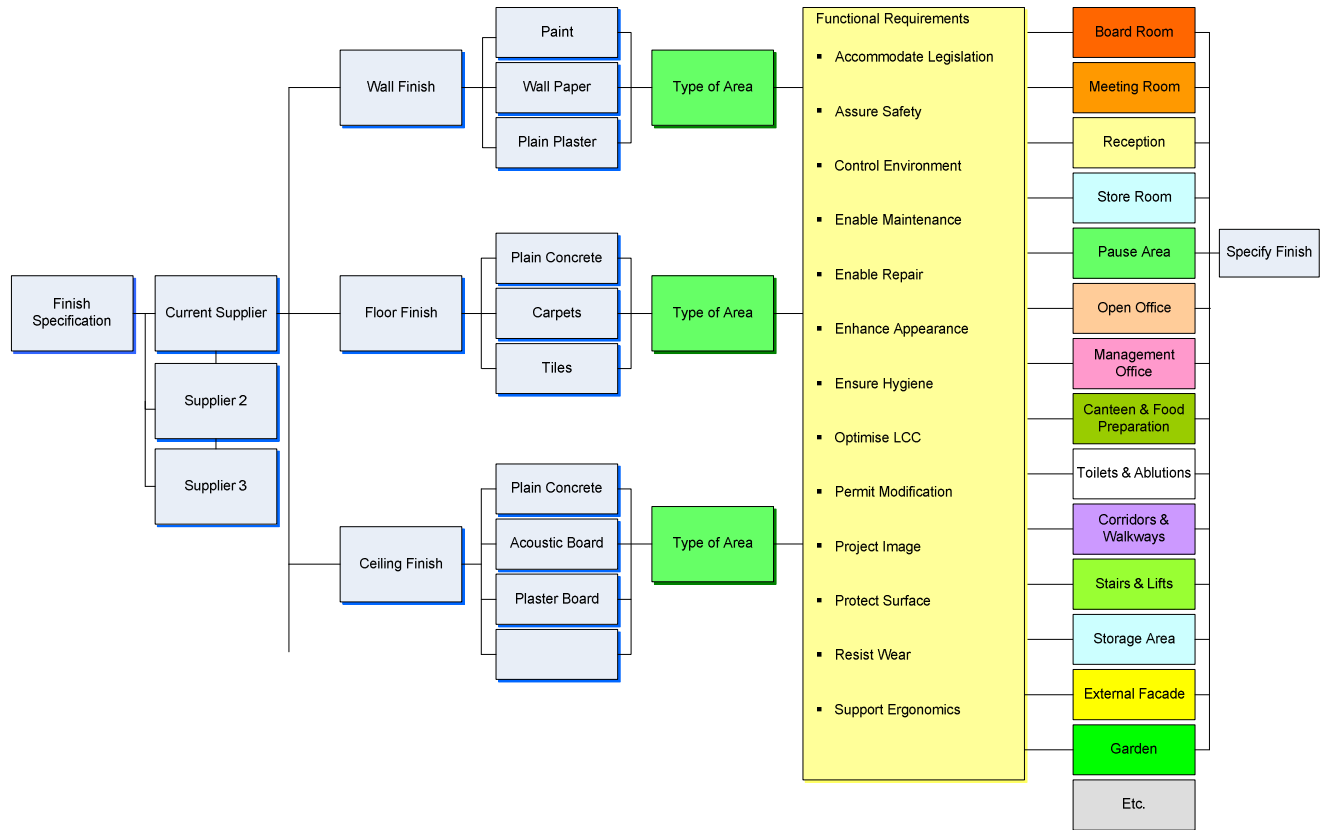
Project Director
Quantity Surveyor
Project Engineering Manager
HVAC Engineer
Lead Discipline Engineers

Consultant:

Architect
Resident Engineer (Project)



CONCEPT EXPLAINED



VALUE ENGINEERING STUDY

The first step was to identify the scope of investigation and it was agreed on to analyse Forty Two (42) defined office building areas e.g. Boardroom, Storage room etc.

1	Centre Manager	21	HR Support
2	Middle Managers	22	Query counter area: Front Office
3	PA	23	Cash Hall
4	Boardroom Management	24	Court Rooms
5	Boardroom in building	25	Library
6	Copy & scan & fax	26	General Office Store Room
7	Storage room	27	Canteen
8	Team Leader	28	Kitchens
9	Team Members	29	Reception
10	Meeting rooms	30	First Aid Room
11	Consultants rooms	31	Systems Support
12	Trolley parking area	32	Server room
13	Pending room	33	Network Rooms
14	Cashier	34	Delivery and Waste collection area



15	Vault area	35	Pause Areas
16	Mail Centre:	36	Smokers rooms
17	Internal Helpline/PABX	37	Security Control office
18	Switchboard	38	Security staff room/locker area
19	Records:	39	Cleaner staff room/locker area
20	Finance Support		

The whole purpose of this study is to apply the VE methodology to internal specifications. As **value** is measured by the combination of prioritised functionality and cost the appropriate functions (13 in total) were identified. Although these functions generically apply to all forms of finish they will take on different priorities for each.

Agreement was obtained that the thirteen (13) following functions will be applicable to all forms of finishes.

FUNCTIONAL REQUIREMENTS

Function	Definition
Accommodate Legislation	To ensure that whatever element is being considered it will always be outweighed by the applicable legislation, standards or accepted proven practices.
Assure Safety	Assure that public & staff safety is maintained by having intrinsic respective characteristics that; resist fire, avoid distortion, are non toxic, non slip, lack sharp edges, resist fracture, well secured,
Control Environment	Any item likely in any way to modify or influence the environment, be it linked to temperature ambient or otherwise, light, be it natural or artificial ,direct or reflected, noise, vibration, odour, air
Enable Maintenance	Enables appropriate commercial maintenance i.e. cleaning, vacuuming, scrubbing, the application of appropriate cleaning abrasives, chemicals and water
Enable Repair	Enable the repair of respective elements necessary due to damage arising from whatever means, by implication this would mean that in most cases repairs would be carried out in situ,
Enhance Appearance	The inclusion of a particular element would enhance the appearance of the immediate vicinity particularly when considered in context.
Ensure Hygiene	Any element that will ensure that the accepted hygiene levels are maintained.
Optimise LCC	All elements considered with a view to maximising value, contextualised in the “total cost of ownership” and considered against a specific time base.



Permit Modification	Elements in this field will allow acceptable levels of change & modification, be they mechanical, physical, electrical, electronic.
Project Image	Projecting the appropriate image to the general public and Staff
Protect Surface (Asset)	Protecting elements that will remove or significantly reduce potential damage to various items within the built environment
Resist Wear	Resists visible wear for an acceptable time period in line with required LCC needs, this would include a resistance to colour and/or texture fading, tearing, distortion, indentation, abrasion, acceptable heat resistance
Support Ergonomics	Any element that enhances “mans” relationship with the working environment

CATEGORIES OF FINISHES

Thereafter the team identified twenty three (23) categories of finishes, e.g. floors etc.

	Finishing Type Description
1	Floors
2	Walls
3	Ceilings
4	Partitions
5	Doors
6	Windows
7	Glazing
8	Ironmongery Handles
9	Ironmongery Locks
10	Ironmongery Panic Doors
11	Ironmongery Accessories
12	Metalwork
13	Signage
14	Assets & Fit-Outs / Desks
15	Assets & Fit-Outs / Chairs
16	Assets & Fit-Outs / Storage
17	Electrical Main-Supply
18	Electrical IT
19	Mechanical Structure
20	Mechanical HVAC
21	Security
22	Window Treatment
23	Sanitary Ware



The next step was to capture data from multiple suppliers for all finishes with respect to product descriptions, codes and budget pricing. e.g. Lexus Grade 4, Medium Commercial, colour squirrel carpeting.

Thereafter each office area and its relevant finishing type was analysed against best alternatives based on selected functional requirements.

Value Engineering: Perspective Modelling Matrix

Office Building XYZ

Element:

Area:

Alternatives

		Accommodate Legislation		Control Environment		Enable Repair		Optimise LCC	
		Assure Safety		Enable Maintenance					
Objective value>									
Alternatives									
1	Marley Norament	0	0	0	0	0	0	0	0
2	Kährs 7mm Wood (real)	0	X	0	✓	0	X	0	0
3	Marley Vinyl Lam.Prem Wood	0	0	0	0	0	0	0	0
4	Kährs Wood laminate (imitation)	0	0	0	0	0	0	0	0
5	Marley Marmoleum	0	0	0	0	0	0	0	0
6	Marley Vinyl Lam.Reflections Wood	0	0	0	0	0	0	0	0
7	Ivory Epoxy	0	0	0	0	0	0	0	0
8	Polyflor 2000 PUR	0	✓	0	✓	0	✓	0	0
9	Spec Ceramic Tiles	0	0	0	0	0	0	0	0

Each coded specification was then singularly Value Engineered using this model, where firstly the functions are prioritised and checked for appropriateness for that specific application and then the best value finish is matched to those functional requirements. In this particular example Polyflor 200, was considered to be the 'best Value' solution.

The results of each of the VE evaluations was then recorded on individually indexed Specification Sheets, where all of the details for each particular Specification are captured.

Although a lot of attention was given to ensuring that these new specifications address the specific needs of the Client it appears that a refinement process was still necessary where each specification is individually reviewed with the Client participation, to establish its accuracy and suitability. (e.g. identifying non-catalogued products manufactured exclusively for the Client but not generally known about) This process was completed prior to the issuing of the new specifications and standards.



Many of the proposed specifications deliberately did not include details such as colours of paint or carpeting, or variations of shading to accommodate dark office spaces, as these elements should form the basis of a Corporate Identity Profile, through which these specifications are interpreted for each project.

SPECIFICATION SHEET EXAMPLE

REFERENCE NO: **HGTU004** BUILDING: **Office Building XYZ** AREA TYPE: **Cash Hall** AREA CODE: **BYFT4** DATE: **200X/04/03**

FINISHING TYPE: **Walls** FINISHING OPTIONS: **Tiles, Sheet/Roll, Paint, Wallpaper, Bumper Rails, Ceramic, Vinyl/PVC, Carpet, Wood, Natural Stone, Grades of Carpeting, PVA, Enamel, Grades of Wallpaper, Wood Particle, Solid Wood, Plastic, Stainless Steel**

CURRENT CLIENT NORM: **Paint** CURRENT PRODUCT SOURCE: **Plascon**

PREFERED SPECIFICATION: **Dulux Wash 'n Wear Silk (PVA)** COMPATABLE PRODUCT SOURCE: **Dulux & Plascon**

FINISHING CODE: **W231** FUNCTIONAL REQUIREMENTS: **Protect Surface
Enhance Appearance
Enable Repair** COST PER m² / UNIT etc. **UD\$0 .49** PICTURE OF PREFERED FINISH

APPROVED BY: NAME _____ ORGANISATION: _____ NOTE ON PREFERED SPEC.: _____
APPROVED ON: DATE _____ SIGNATURE _____

TYPICAL EXAMPLE OF A RECOMMENDATION SUMMARY

Floors:

The flooring finish includes Carpeting - “Nexus BerberPoint 920” selected as most suitably wear resistant for Office areas. The Client currently uses the Nexus Basketweave Plainbac and have indicated that they can obtain this carpet for the same price as the Hercules 550. As this is no longer a Belgotex standard product a minimum order volume is therefore required. It could easily be in the future that the Client may pay a premium for this product. We also note that this Basketweave has by definition an uneven surface that over time has a tendency to “crush & mat” and whilst not physically wearing away losses pile thickness, it could also be somewhat less ergonomically suitable when people sit & move their chairs over the higher pile of the Basketweave. If such an event is likely to occur, another extra cost will be incur, US\$ 30.90/mat x 2000 employees = US\$ 61 800.00) providing a carpet protector mat at each work station to protect the carpet.



Nexus BerberPoint 920 is currently priced at US\$ 8.46/m² with appropriate negotiation it is believed that this price could be reduced to around US\$7.00/m², a verbal quote was obtained for fitting carpets of around US\$ 2.00/m²)

Marleyflex 2.5mm Flooring is recommended for heavy traffic and non office applications i.e. Records, Mail Centre, Security, General Office Rooms, etc.

For the Delivery and Waste Collection Area a Sikafloor 1mm High Epoxy as used generally in Industrial Environments

For the Reception, Cash Hall, Foyer (all high Client interface areas), a Ceramic Tile is recommended to fulfill the Function “Project Image”.

There is an argument of fitting floor Tiles in the Ablution Areas instead of Marleyflex. The negative perception of “substandard” quality being applied in the toilets may be taken by employees, typically Hospitals use this floor covering for hygienic reasons, we accept however that comparisons will be made and if there is a negative reaction the Client management must make the appropriate decision.

For the Server Room a specific raised floor is selected to accommodate the required electrical & electronic cabling beneath it. This will enable access and facilitate required cabling changes.

For the Patch Rooms and Network Rooms anti static carpeting is specified.

Power-skirting, Wood Skirting and an Edging Quadrant Tile are all specifications added to the relevant Floor Specifications.

Ironmongery – Locks:

For most of the office doors not requiring the functional requirement of “Secure Assets” as one of the main functions a simple 2 lever lock is proposed. Specific offices (Managers?) may require a somewhat higher level of security for confidential documents etc., in this case, without knowing the Client confidentiality protocol we propose a Euro Profile Cylinder Lock.

It must be noted that Euro Lock Systems are more expensive than Lever Locks.

In the respective areas where “Secure Assets” is a significant functional requirement i.e. Cash Hall, Server Room, Cashier, Mail Centre etc., an Automatic Deadlock for Wooden Doors (Including Handles) - Blue Range Masterkey System is specified.

Internal Corridor and Passage doors will be equipped with a Knob Lock 2x29.

For the Ablution Facilities an Indicator Bolt Lock for the Toilet cubicle doors is specified.



HVAC - Airconditioning:

As recommended by the HVAC Specialists (XYZ Consultants) Air Cooled chilled water generators are recommended to be used to provide the cooling requirements of the building. These can incorporate energy recovery to heat water for use in the building if required. The units would be similar to a

ESTIMATED SAVINGS

Client Building estimated Capex Savings on the Finishes Specification.										Total Saving	
Elements considered	Original "Spec"	Cost	x factor	Note	Total Cost	VE Spec	Cost	x factor	Note	Total Cost	-USD 336 355.40
Carpet Protectors	<i>Not specified BUT reqd</i>	USD 31 500	1	3	USD 31 500	<i>Specified</i>	USD 0	1	3	USD 0	-USD 31 500
Carpets	<i>Basket weave</i>	USD 192 500	2	1	USD 385 000	<i>Berberpoint 920</i>	USD 175 000	1.2	1	USD 210 000	-USD 175 000
Door Furniture: Handles	<i>Waterbok on rose</i>	USD 7 710	1		USD 7 710	<i>Osprey on Plate</i>	USD 4 300	1		USD 4 300	-USD 3 410
Door Furniture: Hinges	<i>ASSA Abloy</i>	USD 1 890	1		USD 1 890	<i>Alufab</i>	USD 390	1		USD 390	-USD 1 500
Door Furniture: Locks	<i>Euro Locks</i>	USD 5 000	1		USD 5 000	<i>Lever Locks</i>	USD 840	1		USD 840	-USD 4 160
Geysers	<i>Installed 200l</i>	USD 5 940	1		USD 5 940	<i>Instant Hot Water type</i>	USD 1 638	1		USD 1 638	-USD 4 302
Insulation (Basement)	<i>Gunitite type</i>	USD 76 500	1		USD 76 500	<i>Polystyrene 24D</i>	USD 63 000	1		USD 63 000	-USD 13 500
Partition	<i>M/S demountable</i>	USD 14 250	1		USD 14 250	<i>Rhino walling</i>	USD 5 600	1		USD 5 600	-USD 8 650
Toilets: Basins	<i>Vaal Cameo</i>	USD 4 320	1		USD 4 320	<i>Integrated in angled slab</i>	USD 0	1		USD 0	-USD 4 320
Toilets: Flooring	<i>Spec Tiles</i>	USD 24 000	1		USD 24 000	<i>Marleyflex</i>	USD 10 500	1		USD 10 500	-USD 13 500
Toilets: Pans	<i>Orchid c/w Flushmaster</i>	USD 27 200	1		USD 27 200	<i>Hibiscus close suite</i>	USD 16 550	1		USD 16 550	-USD 10 650
Toilets: Taps	<i>Cobra spout "Ixion"</i>	USD 4 330	1		USD 4 330	<i>ISCA Pillar Tap "Palesa"</i>	USD 567	1		USD 567	-USD 3 763
Toilets: Wall tiles	<i>Spec Tiles 2m high</i>	USD 5 760	1		USD 5 760	<i>Johnson tile</i>	USD 2 160	1		USD 2 160	-USD 3 600
Walls	<i>Wallpaper, tiles & Paint</i>	USD 25 500	3	2	USD 76 500	<i>Tiles & Paint</i>	USD 6 000	3	2	USD 18 000	-USD 58 500
Notes:											
1	The Client specified "Basket Weave" has a high profile shape & as such "crushes", this has two negative effects, 1. It flattens, and therefore looks worn in quite a short time, particularly in high traffic areas, & 2. This crushing reduces the effectiveness of any cleaning regime, i.e. dust particles become trapped, (we are told by Belgotex that this design was discontinued because of this characteristic). We believe that this carpeting will therefore need to be replaced well before it has actually worn out due to poor aesthetics and expect it to require replacement after 6 years. i.e. twice in the 12 year life cycle, (a factor of 2 times life cycle). It is also considered that the preferred Berberpoint 920 will require replacement after 10 years, (a factor of 1.2 times life cycle).										
2	An allowance is made for the replacement of Wallpaper every three to four years, for calculation purposes a four year replacement cycle has been applied, this would be the same for Painted surfaces.										
3	In order to reduce the impact of chair castors on the Basket Weave Belgotex recommend using a Carpet Protector, this will also reduce the "drag" factor across the relatively high profile of the Basket Weave, the Carpet Protector is not required for the Berberpoint 920 carpet. For difference calculation purposes this cost is added to the cost of the Basket Weave Carpet.										



SPECIFICATION MATRIX

	Finishing Specifications	AREAS															
		Boardroom in Building	Boardroom Management	Canteen	Cash Hall	Cashier	Centre Manager	Cleaner Staff Room / Locker Area	Consultant Area	Copy & Scan & Fax	Corridors & Walkways	Court Room	Delivery and Waste Collection Area	Finance Support	First Aid Room	General Office Store Room	HR Support
Note: ● shows preferred Spec. A shows Alternative																	
FLOORING	Nexus Hercules 550	●	●				●		●	●	●	●		●			●
	Nexus Basketweave SARS Spec 550																
	Marleyflex 2.5			●				●							●	●	
	Spec Ceramic Tiles				●	●											
	Sikafloor 261 ZA (SS1)												●				
	Antistatic Carpet 500x500mm																
	Marley Metro																
	Marley Vinyl HD Synergy																
	Tile "Edging Quadrant Profile" Tylon / Genesis Skirting 75mm				●	●											
	MIS Access / Raised Floor Min450 - Max 600mm																
	Power Skirting Ivory Std. 3 Tier (power / Data / Voice)	●	●	●	●	●	●		●	●		●		●	●		●
	Meranti Skirting 76x19mm (Light Colour) Sanded/Sealed	●	●	●				●	●	●	●	●	●	●	●	●	●
	WALLS	Dulux Wash'n Wear Silk (PVA)	●	●	●	●	●	●		●	●	●	●	●	●	●	●
Dulux Acrylic PVA								●								●	
Plascon Velvagio Enamel																	
Splash Back Tiles (Johnson White) 3 Tiles High																	
Décor Wall Paper (on Focus Wall only)																	
Slate Tiles (as Background for SARS Signage)																	
Marley Bumper Rail - Pro Trim Mouldings - Chair Rail																	
CEILING	BPB Gypsum Decogyps System 1200x600mm			●				●		●			●		●	●	
	Plaster Bulkhead				●												
	Acrylic Paint (on to Concrete)				●										A		
	MIS Acoustic MIS OWA Acoustic System 1200x600mm	●	●		●	●	●		●		●	●	●			●	
PARTITION	2mm Galvanised Steel Sheet			●	●	●					●	●			●		
	Pelican MIS Space Wall Partioning System (Sound Insulation)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
	Wetwall (Bricks)																

CONCLUSION

For this application we utilised the Value Engineering Process to optimise the finishes of a large office building allowing us to understand the actual requirements of a specific environment (area and finishing type) and align the best cost effective option with the specification of what is actually required.

The savings exceeded the expectation, not only on the CAPEX but on OPEX savings and Revenue optimisation for the organisation.