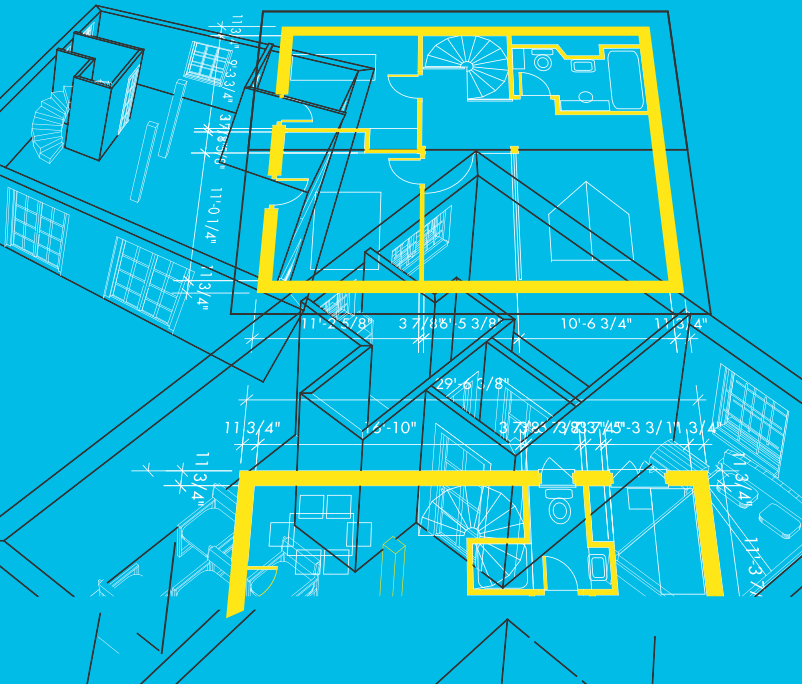


# AFRICA PROPERTY & CONSTRUCTION COST GUIDE 2017

Offering global expertise and tailored local solutions in more than 150 countries



AFRICA PROPERTY & CONSTRUCTION  
COST GUIDE 2017

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## Message from Dean Narainsamy



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### **Director – Project Cost Consulting Africa, Buildings + Places, Africa**

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With six months into the year, I would like to share a few reflections of the progress we have made as a company.

Following on from last year's closing remarks, which highlighted adaptability and change management as critical success factors required to remain relevant in this market, we at AECOM have seen this sentiment resonate across our business.

How so? As an industry, we are currently facing many challenges impacting economic growth and infrastructure development. This includes limited funding, tightening of credit terms and a lack of investment, as well as shifting demographics and political instability, which have all culminated in delayed project start dates.

However, with this in mind, we have also seen great opportunities and a significant shift in our business towards leveraging and integrating new technologies, being more innovative in terms of solutions to our clients, and sharing knowledge and resources across our increasingly globalised markets.

Investment in innovation is a trademark of being a global business, which, in turn, allows knowledge and systems to be shared and transferred. As AECOM, we are taking this even further, working on the development of a global project

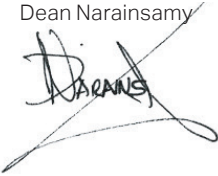
tool that will enable each of our geographies to benefit from sharing global cost, programme, design and key project enablers.

Our passion and commitment to Africa remains. We continue to develop opportunities in the continent across all sectors, with both local and multinational clients. We aim to entrench our role as a trusted advisor in Africa and help our clients unlock uncharted territories with passion, integrity and respect. The African continent remains a key enabler for sustainability and growth for the business sector.

Further, our ability to retain, attract and recruit the best people remains a key focus for us. I am happy to announce that our AECOM Graduate Development / Mentoring 4 Success Programme was successfully launched earlier in the year. I have no doubt that this will go a long way in enhancing our vision of becoming the employer of choice.

To our clients - technical and operational excellence remains our top priority. Our strategic and business plans are aligned to making our continent a better place. In the year ahead, we look forward to being of service to you in delivering your projects and turning your opportunities into a reality.

Best Regards,  
Dean Narainsamy

A handwritten signature in black ink, appearing to read 'NARAINSA', is written over a large, light-colored scribble or watermark that resembles a stylized 'X' or a large signature.

# Section 01

## Built to Deliver a Better World.

It's one thing to imagine a better world. **It's another to deliver it.**

AECOM was built to do just that. With a deep and experienced global team, we design and deliver infrastructure and services that unlock opportunities for clients and communities and protect our environment and improve people's lives.

From urban centres to remote villages, our work is transformative. We make a positive and lasting impact by applying our global reach, connected expertise and delivery excellence to solve complex, evolving challenges.

The difference we help our clients make is felt in every region of the world. Clean water for developing communities, iconic skyscrapers that swell a nation's pride, power and security to fuel economic prosperity, transportation that brings people together and thoughtful planning that sustains cities and natural resources.

Our clients face tough, interrelated challenges that can only be solved by a company like ours - one with deep roots, diverse perspectives and an innovative approach. One with the people, technology and vision to deliver what others can only imagine.

We are **AECOM** — built to deliver a better world.





## Our Core Values

At AECOM, we are guided by six core values that we all share and that underpin everything we do.

**SAFEGUARD** We operate ethically and with integrity, while prioritising safety and security in all that we do.

**COLLABORATE** We build diverse teams that connect expertise to create innovative solutions.

**INSPIRE** We develop and celebrate our people, and elevate the communities we touch.

**ANTICIPATE** We understand the complexity of our clients' challenges and help them see further.

**DELIVER** We grow our business through operational excellence and flawless execution.

**DREAM** We transcend the industry by reimagining what is possible – and realising it.

## Safety First

Safety, Health and Environment (SHE) is a prized component of the AECOM culture.

Safeguarding our people, those we work with and anyone affected by our operations, as well as the environment and communities in which we work, is a business critical responsibility. It is one of our core values and central to our ability to conduct business with integrity at all times.

In order to achieve this, AECOM's senior management team leads the improvement process and continuously demonstrates support and commitment.

Our policies, procedures and processes which form part of our SHE Management System are fully aligned to the international standards for both environmental management - **ISO 14001**, and safety and health management - **BS OHSAS 18001**.



## Quality Excellence

AECOM is a global community of professionals – different in disciplines, backgrounds and perspectives – united by a common goal of solving our clients' most complex challenges.

To achieve this, we have an Integrated Management System (IMS) that provides a consistent documented and auditable platform for operations with the capacity to manage risk and change.

We are committed to promoting a culture of continual improvement in the management of our business through:

- Promoting a workplace in which everyone is encouraged and expected to do the right thing.
- Preventing illness of and injury to our employees who may be affected by our activities.
- Compliance with all legal obligations and other requirements related to our business activities.
- Encouraging a proactive culture of safety, security and quality to keep our people safe, secure and consistently providing quality deliverables for enhanced client satisfaction.
- Providing a secure and resilient workplace for all of our employees and to meeting our obligations, if any, with respect to the protection of others affected by our activities.
- Continually improving all areas of our business while striving to improve the effectiveness of the IMS.
- Providing a Delivery Excellence framework for establishing and reviewing appropriate business objectives and targets.
- Supporting the professional development of our employees.
- Providing services in a manner that meets client requirements and enhances client satisfaction by using our expertise and experience to deliver a quality product.
- Implementing effective pollution prevention and waste reduction programmes.

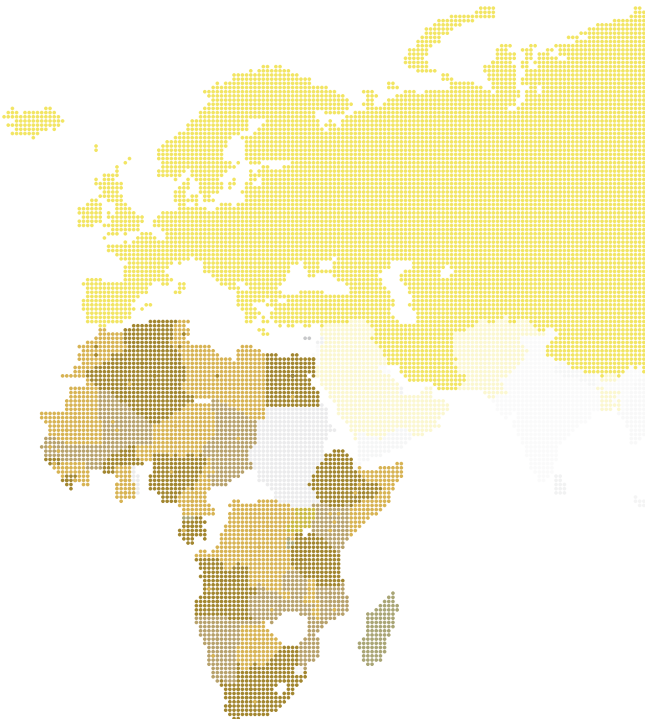
Our IMS is certified to **ISO 9001: 2008**.

## Africa has Risen

Our operations in Africa boast more than 800 people, predominantly in South Africa. However, we have a growing number of permanent offices in key African countries.

We offer services to clients across the continent and maintain a project presence in more than 40 African countries. With top-level professionals in multiple strategic locations, we understand Africa's specific infrastructure needs, as well as its challenges inherent in working on our wonderfully diverse, vibrant and complex continent.

Our multidisciplinary teams of award-winning engineers, planners, architects, environmental specialists, scientists, consultants, quantity surveyors (cost managers) and project and programme managers are committed to delivering projects that improve the quality of life for African communities.



## Improving Lives

AECOM is committed to the principles of good governance and corporate citizenship. As an industry leader with a range of built environment professionals, we strongly believe in investing our resources into improving the quality of life for all.

AECOM works in harmony with the communities from areas in which it operates. As a good corporate citizen, our corporate social investment (CSI) initiatives focus on uplifting disadvantaged communities.

Accepting that sustainable development begins with satisfying basic human needs, we support a range of charitable causes such as shelters for the homeless; homes for the disabled, orphaned and elderly citizens.

### **Growing the pipeline of engineers and technicians for a skills-scarce Africa**

Many people in Africa face development challenges, such as a lack of water and energy security; insufficient and inadequate housing; and a lack of safe and reliable modes of transportation.

Solutions to these challenges call for both financial resources and sufficient engineering expertise to plan, design, programme and build the required infrastructure.

As part of this, we have set up the AECOM SA Bursary Scheme, where we annually award merit bursaries to fund full-time undergraduate students in engineering-related studies at accredited universities.



## Global Unite

Global Unite is AECOM's international benchmarking and project performance indicator database. Large amounts of data of many different formats ranging from estimates, bills of quantities and reports are captured in a central server and analysed on a global scale. It gives us the ability to provide evidence-based, early stage construction cost and design advice based on benchmarks of similar projects – via our interactive GUIDE (Global Unite Indicative Design Estimator) tool.

Collaboration amongst various software platforms allows GUIDE to draw on project information in the Global Unite data warehouse which, given the size, scale and reach of the information library, means we are able to predict early stage construction costs in almost all regions of the world.

We can now instantly analyse parameters that define how effective or efficient an asset is (or is not) against local or global standards for all asset types. This includes:

- Benchmarking against specific sector and asset types
- Comparing cost by element and sub-elements
- Parametric modelling
- Conducting on-site project analysis in real-time
- Benchmark ratios
- Various filtering drivers such as area, functional units and other metrics

Information obtained from GUIDE can be presented in various formats and reports can be personalised to suit our clients' requirements.

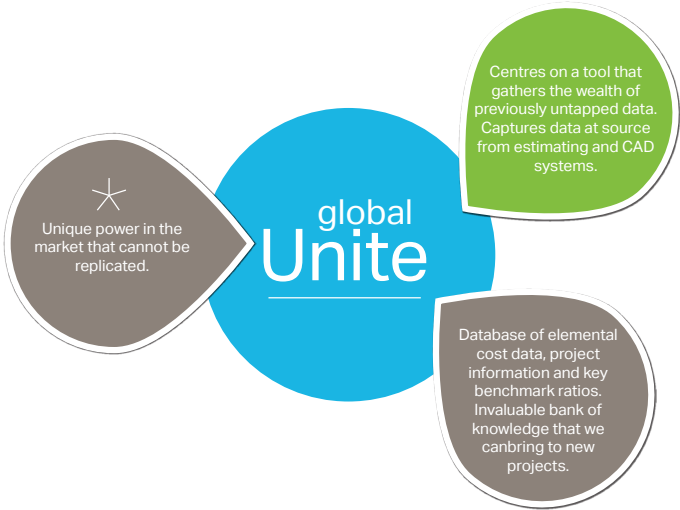
Each region in AECOM's Global Unite network has subtle variations that reflect the elemental breakdown structure to ensure the capture of cost and quantity data is appropriate for local projects, as well as being comparable in terms of international benchmarking.

Although construction cost information is specific to a particular location, design benchmarks can be extracted and analysed for the benefit of driving efficiency across different project types globally.

For clients who have large capital programmes or who undertake numerous construction projects, AECOM can provide Global Unite as a service whereby we can create a tailored solution that will capture and manage their data and configure specific benchmarks and reports that help inform and add value to their decision-making processes.

AECOM is looking at methods of collaborating Building Information Modelling (BIM) and GUIDE to provide smart, intelligent information modelling which results in time and design efficiencies.

GUIDE is available through various electronic platforms including mobile devices. It is also commercially available to clients wanting to benchmark their own projects and can be set up to suit individual needs.



# Building Information Modelling

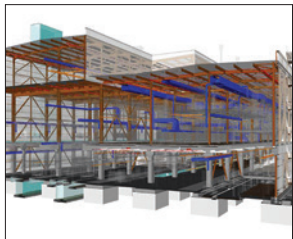
## BIM Defined

Building Information Modelling (BIM) is used to describe the process of designing and managing a building (or other design asset) in collaboration with the entire team, throughout the asset's life-cycle, by using the same system or model as compared to using separate sets of conventional drawings and information sets. BIM software is used in order to plan, design, construct, operate and maintain diverse physical infrastructures.

Whether we are designing or constructing bridges, towers, roads, pipelines, factories or schools, an information model or a database, can be created that contains information about what will be built, how it will be built and how it will perform. Enabled by technology, we can create a synchronised, collaborative, digital representation of assets to virtually construct and test a project before we do so in reality.

A BIM model usually includes the 3D shape of the objects, but can also include things such as their cost, installation date, or operating parameters. We can attach practically infinite additional data to any object or category of objects in a BIM database, and use that data to manage information flow across multiple life-cycle phases and between multiple parties.

By creating a single source of truth and making project information available across the design, construction and operation teams, we increase our accuracy and efficiency, and can realise significant savings on the life-cycle cost of operation for an asset.





## **Benefits of the BIM Process**

- Improved visualisation
- Improved coordination and collaboration
- Improved conflict detection and risk mitigation
- Improved productivity due to easy retrieval of information
- Embedding and linking vital information for tendering scheduling and estimating
- Reduced costs and improved efficiency
- Enhanced performance and increased speed of delivery
- Easy maintenance of building life-cycle

## **The BIM Process**

### **5D BIM**

For the Cost Management team, our focus is on 5D BIM, which refers to the linking of cost information to a 3D model. The letter D in connection with BIM relates to the information associated with the model. It refers to other dimensions, such as time (4D) or cost (5D) that is linked to a model. 2D and 3D essentially refer to 2D and 3D CAD designs. 5D BIM entails the intelligent linking of individual 3D CAD components with schedule (time - 4D BIM) constraints and then with cost-related information.

### **Understanding the Process**

Moving over to the 5D BIM process is an enhancement to our current systems and the implementation thereof will offer a number of benefits. The system aims to automate the measuring, estimating and bill production stages. The value lies in the fact that it will enable us to be more proactive and to rather spend time on cost engineering and management as compared to measurement and cost reporting only.

In brief, shifting our focus towards the 5D BIM process requires the following:

- Involvement with design team prior to the start of design work to communicate our cost extraction design requirements
- Base our measures on both 2D and 3D design information
- Create a unified link between the design information, our measures and our costs
- Adopt automated estimating, bill production and cost management tools

## **Possible benefits of BIM from a cost management perspective**

- Fast, reliable and accurate quantity take-off and cost estimation
- Auto computation of calculations, hence reduced calculation mistakes
- Categorized cost reporting and estimation via the use of zones/locations
- Improved visualisation of the elements for measurement and costing purposes
- Easy project handover between quantity surveyors
- Enhanced communication and collaboration amongst team
- Improved cost database management
- Facilitated change management
- Enables a more proactive outlook from a quantity surveying perspective with regard to cost management, contract management and cost engineering



## Sustainability

AECOM is a company with a vision to build a better world. Our projects transform communities, improve lives and power growth by designing, building, financing and operating infrastructure assets globally.

From our on-site practices to initiatives in our offices, we are committed to implementing sustainability in everything we do. Our purpose is to enhance and sustain the world's built, natural and social environments. Our key goals at the heart of our commitment are:

- Embedding sustainability into all aspects of our work with our clients
- Building our capability to provide sustainable solutions for our clients in creative and innovative ways
- Conducting our business in a way that is consistent with sustainability principles

By embracing sustainability, we aim to produce sustainable outcomes across every aspect of our work including planning, design, development, production, delivery and review.



Sustainability is also at the core of how we manage our company globally. We take our responsibilities seriously, and continue to deliver improvements in our environmental performance across key performance indicators including greenhouse gas emissions, water, waste, energy and preparedness for the impacts of climate change.

For example, AECOM was a "Silver" founding member of the Green Building Council of South Africa (GBCSA), demonstrating our commitment to building sustainably. We maintain this membership each year. We have also assisted the GBCSA on its technical working groups to launch the Green Star South Africa Office rating tool in 2008 and the Green Star South Africa Retail Centre rating tool in 2010.

Employees from across our South African business have completed the Green Star South Africa accredited professional course and are available to help clients and colleagues to achieve their environmental responsibilities, as well as their financial objectives in terms of infrastructure and building development.

Green building ratings currently undertaken by our team of sustainability consultants include: Green Star Office, Green Star Interiors, Green Star Existing Building Performance, LEED Design and Construction and LEED Interior ratings.



## Research Support

Research is a key part of AECOM's aspirations to embrace complex challenges and deliver transformational outcomes.

Through our research and knowledge creation activities, we aim to stimulate beneficial cultural and business changes, resolve industry-specific problems, support our knowledge database and deliver cost-effective, high-quality and relevant services. We also undertake contract research on assignment for clients.

Globally we have a tradition of supporting research collaborations, and in South Africa we are currently pursuing a wide range of research studies with local academic and research institutions, professional bodies and the government. Current research nationally and internationally centres around:

- Local, regional and international influences on construction costs and prices
- BIM cost models
- Sustainability and green buildings - drivers of green design, construction and operations within different building types
- Improving infrastructure project delivery in South Africa
- Tall, large and complex buildings – efficiencies in construction and life-cycle costing
- The triple bottom line in construction and property development
- The soft landings process for buildings

We also have an on-going collaboration with our international offices with specific regard to global infrastructure sentiment surveys, sector-specific research and developing global project-cost databases.

Finally, we aim to work closer with industry on continuing educational workshops and in developing relevant industry reports and publications.

# Section 02

## Our Services

### Quantity Surveying/Cost Management

AECOM provides comprehensive cost-management services from project initiation to completion through all six stages of the project cycle as identified by The South African Council for the Quantity Surveying Profession, Tariff of Professional Fees, Quantity Surveying Profession Act 2000 (Act 49 of 2000), which is summarised as follows:

#### Stage 1

- Assisting in developing a clear project brief
- Advising on the procurement policy for the project
- Advising on other professional consultants and services required
- Advising on economic factors affecting the project
- Advising on appropriate financial design criteria
- Providing necessary information within the agreed scope of the project to the other professional consultants

#### Stage 2

- Agreeing on the documentation programme with the principal consultant and other professional consultants
- Reviewing and evaluating design concepts and advising on viability in conjunction with the other professional consultants



- Preparing preliminary and elemental or equivalent estimates of construction cost
- Assisting the client in preparing a financial viability report
- Auditing space allocation against the initial brief
- Providing services for which the following deliverables are applicable:
  - Preliminary estimates of construction cost
  - Elemental or equivalent estimates of construction cost
  - Space allocation audit for the project

### **Stage 3**

- Reviewing the documentation programme with the principal consultant and other professional consultants
- Reviewing and evaluating design and outline specifications, as well as exercising cost control in conjunction with the other professional consultants
- Preparing detailed estimates of construction cost
- Assisting the client in reviewing the financial viability report
- Commenting on space and accommodation allowances, and preparing an area schedule
- Providing services for which the following deliverables are applicable:
  - Detailed estimates of construction cost
  - Area schedule

### **Stage 4**

- Assisting the principal consultant in the formulation of the procurement strategy for contractors, sub- contractors and suppliers
- Reviewing working drawings for compliance with the approved budget of construction cost and/or financial viability
- Preparing documentation for both principal and sub-contract procurement
- Assisting the principal consultant with calling of tenders and/or negotiation of prices
- Assisting with financial evaluation of tenders
- Assisting with preparation of contract documentation for signature

- Providing services for which the following deliverables are applicable:
  - Budget of construction cost
  - Tender documentation
  - Financial evaluation of tenders
  - Priced contract documentation

## **Stage 5**

- Preparing schedules of predicted cash flow
- Preparing proactive estimates for proposed variations for client decision-making
- Adjudicating and resolving financial claims by contractors
- Assisting in the resolution of contractual claims by contractors
- Establishing and maintaining a financial control system
- Preparing valuations for payment certificates to be issued by the principal agent
- Preparing final accounts for the works on a progressive basis
- Providing services for which the following deliverables are applicable:
  - Schedules of predicted cash flow
  - Estimates for proposed variations
  - Financial control reports
  - Valuations for payment certificates
  - Progressive and draft final accounts

## **Stage 6**

- Preparing valuations for payment certificates to be issued by the principal agent
- Concluding final accounts
- Providing services for which the following deliverables are applicable:
  - Valuations for payment certificates
  - Final accounts



## Engineering Cost Management

Mining and engineering cost management operates as a specialist service within AECOM. It comprises specialist skills and applications that enhance the risk and value management techniques required by the mining, infrastructure, minerals, metallurgical and petro-chemical sectors.

Our mining and engineering cost management group includes dedicated independent teams specialising in and responsible for the estimation, procurement, cost management and contract administration activities relating to the abovementioned sectors.

The mining and engineering cost management team operates throughout Africa using infrastructure support from our other local offices in all major centres in South Africa, Mozambique and Botswana. Our group employs professionally-qualified quantity surveyors, cost managers, cost engineers, contract administrators, construction programmers and building surveyors.

Mining, infrastructure, minerals, metallurgical and petro-chemical projects are generally of a high monetary value. It therefore is most beneficial to involve the mining and engineering cost management team at an early stage in the project cycle.

Imposing robust financial discipline from a very early stage of a project will result in accurate and structured estimating, timely and cost-effective procurement, accurate and up-to-date maintenance of costs to completion, including the cost management of design changes and the prompt close-out of contracts. The implementation of these principles of financial management will thereby deliver maximum shareholder value and it is in this area that the engineering cost management team strives to significantly influence project outcomes to benefit all stakeholders.

Our mining and engineering cost management group provides a depth of experience, expertise and independence which will contribute to and complement the client's team. This is critical, particularly in the early stages of a project, when the opportunity to add value, as well as recognise and define cost, is established. Simultaneously, formalising project principles is equally critical throughout the project, with cost management continuing through to the post-contract period and final closeout.

# Building Services Cost Management

Every client wants rigorous control of overall building costs and to ensure that every Rand spent is optimised. Building services such as electrical, air-conditioning, fire protection and the various electronic installations are part of every building project, and usually comprise 25 to 40 per cent of the total construction cost. It therefore follows that effective cost management of the building services is just as essential as for any other part of the construction costs.

Our building services cost management team draws upon its unique expertise to provide financial management and contract administration of building services. These services include:

- Electrical installation
- Heating, ventilating and air-conditioning (HVAC) installations
- Fire protection systems
- Fire detection and evacuation systems
- Access control
- Closed circuit television (CCTV)
- Lifts, escalators and travellers
- Communication systems
- Building management systems
- Security systems
- Data systems

We have offered cost advice and quantity surveying services for all building services for many years, with a record that includes many major projects. Meticulous procurement and cost management practices are part of our standard methodology. Independent cost management ensures transparency of costs and a dedicated service not linked to the specific design consultant.



Working in close conjunction with the appointed mechanical, electrical and fire protection consultants, our building services team provides a comprehensive service encompassing the following:

- Cost planning at an early stage prior to detailed design
- Cost studies to compare alternative materials and designs in terms of capital, operating, maintenance and depreciation costs
- Monitoring and evaluating design as it evolves to ensure compatibility with the approved cost plan
- Advising on contractual arrangements and preparing tender procurement documents
- Adjudicating tenders in conjunction with the consultant team
- Cash-flow predictions
- Cost management and reporting
- Valuation of work done during construction
- Determining final costs
- Settling final costs with the contractor and sub-contractors



# Section 03

## AECOM in South Africa

### Broad-Based Black Economic Empowerment (B-BBEE)

AECOM recognises and fully endorses B-BBEE as an integral part of our contribution to a better South Africa.

As a responsible business and a leader in the built environment industry, AECOM acknowledges that to be a good corporate citizen we need to embrace fully the principles of transformation.

We strive to advance on our status level through a B-BBEE strategy that sets continuous improvement targets on all the B-BBEE scorecard criteria in order to maintain a leading role in the built environment and our positive impact on society.

AECOM's most recent B-BBEE assessment is indicated hereunder:

<b>B-BBEE Level Status:</b>	<b>Level 3</b>
<b>Procurement Recognition Level</b>	110%
<b>Black Ownership</b>	30% Black-Owned
<b>Black Woman Ownership</b>	10% Black Woman-Owned
<b>Scorecard Information:</b> <ul style="list-style-type: none"> <li>• Ownership</li> <li>• Management Control</li> <li>• Skills Development</li> <li>• Enterprise &amp; Supplier Development</li> <li>• Socio-Economic Development</li> </ul>	25 points 12.78 points 16.39 points 33.80 points 5 points
<b>Total</b>	<b>92.97 points</b>
<b>Empowering Supplier</b>	YES
<b>Designated Group Supplier</b>	NO
<b>Scorecard</b>	Generic – B-BBEE Codes of Good Practice (Gazette no 36928 of 11 October 2013)

# Section 04

## South African Cost Data

### Key Factors Influencing Building Cost Rates

#### Inherent difficulties and pitfalls

This section highlights the inherent difficulties and pitfalls that may occur when inclusive or single rates are used to establish the estimated cost of a particular building.

Construction cost estimation is complex. Comprehensive exercises based on detailed and accurate information are required to achieve reliable levels of comfort. For various reasons, however, decisions are often based on inclusive rate estimates, i.e. rate per square metres ( $m^2$ ) of construction area or rate per unit in number.

The most widely-used method of quick approximate estimating to obtain an indication of the construction cost of a building is by the rate/ $m^2$ -on-plan method. This is often also referred to as the "order of magnitude" method of cost estimation. It certainly is both quick and convenient, but it can be very misleading if used indiscriminately and without taking care when calculating the construction area and selecting the rate.

Cost comparisons of various buildings are often made by comparing the individual rates/ $m^2$  without due consideration of a number of factors that can affect the rate/ $m^2$  to a substantial degree.

Very often the cost of a building is expressed in  $R/m^2$  and the unit cost is ignored, if calculated at all. This rate/ $m^2$  is then used as the sole yardstick



for what the building costs. For example, a security guard's shelter measuring 2m x 2m consisting of brick walls with windows, one door and a simple roof construction may cost R9,000/m<sup>2</sup>. This rate, when compared with the rate for a 200m<sup>2</sup> house containing plumbing, carpets, etc. at R7,000/m<sup>2</sup> would seem very expensive. However, the unit cost of the shelter is R36,000 compared with R1,4 million for the house.

Below are a few criteria to be taken into account when considering rates/m<sup>2</sup> :

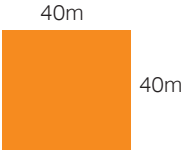
**Specification**

Two buildings of the same shape and with identical accommodation can have vastly different R/m<sup>2</sup> rates should the one building have finishes of a differing standard. For example, expensive carpets in lieu of vinyl floor tiles can increase the rate by R150/m<sup>2</sup>.

**Wall-to-floor ratio — plan shape**

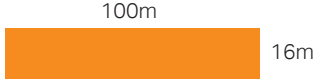
The most economical shape for a building is square. This shape requires the minimum wall length to enclose a given floor area, e.g.

**Case A**



Area	<b>1,600m<sup>2</sup></b>
Wall length	<b>160m</b>
Wall height	<b>3m</b>
Wall area	<b>480m<sup>2</sup></b>
Wall floor ratio	<b>480/1,600</b>
Cost of external façade in terms of R/m <sup>2</sup> of floor area to each R/m <sup>2</sup> of façade area	<b>30.0%</b>

## Case B



Area	1,600m <sup>2</sup>
Wall length	232m
Wall height	3m
Wall area	696m <sup>2</sup>
Wall floor ratio	696/1,600

Cost of external façade in terms of R/m<sup>2</sup> of floor area to each R/m<sup>2</sup> of façade area 43.5%

The rate/m<sup>2</sup> on plan of a façade costing R800/m<sup>2</sup> on elevation in each case is:

- Case A** R800 x 30.0% = R240/m<sup>2</sup>
- Case B** R800 x 43.5% = R348/m<sup>2</sup>

The reader with a good knowledge of mathematics will fault the above argument correctly by stating that a circle is the geometric shape requiring the minimum wall length to enclose a given floor area. In very few cases, however, is this the most economical plan shape of a building as, due to various reasons, the cost of constructing a circular as opposed to a straight external envelope, is generally greater than the saving in terms of the quantities required by the envelope.

### Floor-to-ceiling heights

Two buildings of an identical plan, shape and area but with different floor-to-ceiling heights will have different rates/m<sup>2</sup> due to the additional cost of walling, finishes, etc. in the building with the greater floor-to-ceiling height.

### Plumbing, mechanical and electrical installations

The concentration of plumbing installations has a marked effect on the rate/m<sup>2</sup> of the building. The cost of a toilet block per m<sup>2</sup> is much greater than that of a house containing one bathroom as the high cost of the bathroom area is spread over the less expensive remaining areas of the house.

Similarly, in office blocks, factories, etc., the rate/m<sup>2</sup> will depend greatly on whether air-conditioning, security systems, sprinklers, smoke-detection systems, specialised electrical installations, acoustic treatment or other specialised installations are incorporated into the design.

**Construction areas**

The rate/m<sup>2</sup> for a building with large balconies or access corridors included in the construction area cannot be compared with the rate/m<sup>2</sup> for a building without similar low cost areas.

**Internal subdivisions**

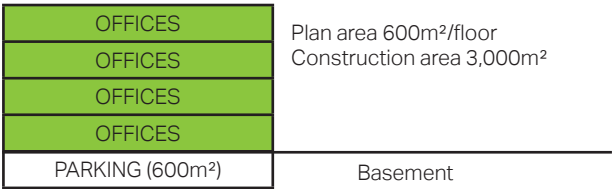
The rate/m<sup>2</sup> for open plan offices should not be compared directly with the rate/m<sup>2</sup> for offices with internal partitions without the relevant adjustments being made. The inclusion of partitions can increase the overall rate/m<sup>2</sup> by up to R300/m<sup>2</sup> of office area.

**Parking**

Should the building in question contain certain parking areas, the average rate/m<sup>2</sup> will be less than for a building with identical accommodation but with parking outside the building structure. See the following example:

**Case A**

Building with parking in the building area



**Cost of building**

Offices	2,400m <sup>2</sup> @ R15,000 = R	<u>36,000,000</u>
Parking	600m <sup>2</sup> @ R6,000 = R	<u>3,600,000</u>
Total		<u>R 39,600,000</u>
Average rate/m <sup>2</sup>		<u>R 13,200</u>



**Case B**

Building having parking outside the building structure and on grade



**Cost of building**

Offices	2,400m <sup>2</sup> @ R15,000 = R	<u>36,000,000</u>
Parking	600m <sup>2</sup> @ R 800 = R	<u>480,000</u>
Total		<u>R 36,480,000</u>
Average rate/m <sup>2</sup>		<u>R 15,200</u>

Under Case B, the parking area is not included as part of the construction area for the purposes of calculating the rate/m<sup>2</sup>. Similarly, the rate/m<sup>2</sup> for supermarket/hypermarket shopping centres should be qualified as to whether the cost of on-site parking and ancillary site development has been included, said cost which could be in the region of R800/m<sup>2</sup> of construction area.

There are numerous further points of consideration in addition to those given above. Amongst these are site works particular to each specific contract, the number of storeys, floor loadings, column spans, concentration of joinery and other fittings, overall height of building, open-atrium upper volumes, etc.

In conclusion, rates/m<sup>2</sup> must be used with circumspection. The degree of accuracy of the answers provided must be in direct proportion to the research and surveys undertaken to establish the rate for the building in question.

## Approximate Inclusive Building Cost Rates

### Building cost rates

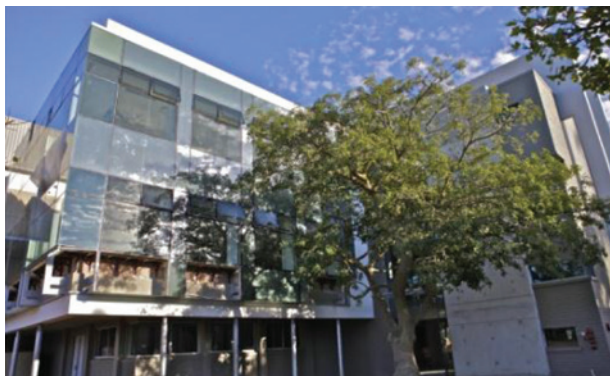
This section provides a list of approximate inclusive building cost rates for various building types in South Africa.

Rates are current to 1 July 2017, and therefore represent the average expected building cost rates for 2017. It must be emphasised that these rates are indicative only, and should be used circumspectly, as they are dependent upon a number of assumptions. See inclusive rate estimates herein.

The area of the building expressed in m<sup>2</sup> is equivalent to the construction area where appropriate, as defined in *Method for Measuring Floor Areas in Buildings, Second Edition* (effective from 7 November 2007), published by the South African Property Owners' Association (SAPOA).

### Regional Variations

Construction costs normally vary between the different provinces of South Africa. Costs in parts of the Western Cape and KwaZulu-Natal, specifically upper class residential, for example, are generally significantly higher than Gauteng due to the demand for this type of accommodation. Rates have therefore been based on data received from Gauteng, where possible. Be mindful, however, that cost differences between provinces at a given point in time are not constant, and may vary over time due to differences in supply and demand or other factors. Specific costs for any region can be provided upon request by any AECOM office in that region.



## Building Rates

Rates include the cost of appropriate building services, e.g. air-conditioning, electrical, etc., but exclude costs of site infrastructure development, parking, any future escalation, loss of interest, professional fees and value-added tax (VAT).

<b>Offices</b>	<i>Rate per m<sup>2</sup> (excl. VAT)</i>
Low-rise office park development with standard specification	R 7,300 - R 9,000
Low-rise prestigious office park development	R 9,500 - R 14,100
High-rise tower block with standard specification	R 10,500 - R 14,100
High-rise prestigious tower block	R 14,100 - R 17,700

*Office rates exclude parking and include appropriate tenant allowances incorporating carpets, wallpaper, louvre drapes, partitions, lighting, air-conditioning and electrical reticulation.*

<b>Parking</b>	<i>Rate per m<sup>2</sup> (excl. VAT)</i>
Parking on grade, including integral landscaping	R 500 - R 600
Structured parking	R 3,600 - R 3,900
Parking in semi-basement	R 3,900 - R 5,300
Parking in basement	R 4,200 - R 6,500

<b>Retail</b>	<i>Rate per m<sup>2</sup> (excl. VAT)</i>
Local convenience centres (Not exceeding 5,000m <sup>2</sup> )	R 7,200 - R 9,500
Neighbourhood centres (5,000 – 12,000m <sup>2</sup> )	R 7,800 - R 10,000
Community centres (12,000 – 25,000m <sup>2</sup> )	R 8,500 - R 11,000
Minor regional centres (25,000 – 50,000m <sup>2</sup> )	R 9,500 - R 11,700
Regional centres (50,000 – 100,000m <sup>2</sup> )	R 10,000 - R 12,200
Super regional centres (exceeding 100,000m <sup>2</sup> )	R 10,500 - R 13,700

*Super regional centres and regional centres are generally inward trading with internal malls, whereas convenient, neighbourhood and community centres are generally outward trading with no internal malls.*

*Retail rates include the cost of tenant requirements and specifications of national chain stores.*

*Retail costs vary considerably depending on the tenant mix and sizing of the various stores.*

## Industrial

*Rate per m<sup>2</sup> (excl. VAT)*

Industrial warehouse, including office and change facilities within structure area (architect/engineer designed):

- Steel frame, steel cladding and roof sheeting (light-duty) R 3,600 - R 5,300
- Steel frame, brickwork to ceiling, steel cladding above and roof sheeting (heavy-duty) R 4,200 - R 6,000
- Administration offices, ablution and change room block R 6,800 - R 8,600
- Cold storage facilities R 12,600 - R 18,000

## Residential

*Rate per site (excl. VAT)*

Site services to low-cost housing stand (250 - 350m<sup>2</sup>)

R 31,000 - R 48,000

*Rate per m<sup>2</sup> (excl. VAT)*

RDP housing	R 1,800 - R 2,100
Low-cost housing	R 2,800 - R 4,600
Simple low-rise apartment block	R 6,700 - R 9,300
Duplex townhouse	
— Economic	R 6,700 - R 9,600
Prestige apartment block	R12,700 - R19,800



**Residential***Rate per m<sup>2</sup> (excl. VAT)*

Private dwelling houses:

— Economic	R 4,600
— Standard	R 6,000
— Middle-class	R 7,200
— Luxury	R 10,300
— Exclusive	R 15,900
— Exceptional ('super luxury')	R 25,000 - R 51,000
Outbuildings	R 3,400 - R 4,800

*Rate per no. (excl. VAT)*

Carport (shaded)	- single	R 4,100
	- double	R 7,900
Carport (covered)	- single	R 6,500
	- double	R 11,800

*Rate per no. (excl. VAT)*

Swimming pool

— Not exceeding 50 kl	R 86,000
— Exceeding 50 kl and not exceeding 100 kl	R 80,000 - R 141,000

Tennis court

— Standard	R 350,000 - R 475,000
— Floodlit	R 420,000 - R 600,000

**Hotels***Rate per key (excl. VAT)*

Budget	R 973,300 - R 1,378,300
Mid-scale (3 star)	R 2,034,200 - R 2,515,900
Luxury (5 star)	R 3,516,700 - R 4,479,900

*Hotel rates include allowances for furniture, fittings and equipment (FF&E).***Studios***Rate per m<sup>2</sup> (excl. VAT)*

Studios - dancing, art exhibitions, etc.	R 12,600 - R 18,000
--	---------------------

<b>Conference centres</b>	<i>Rate per m<sup>2</sup> (excl. VAT)</i>
Conference centre to International standards	R 22,700 - R 29,400
<b>Retirement centres</b>	<i>Rate per m<sup>2</sup> (excl. VAT)</i>
Dwelling houses	
— Middle-class	R 7,500
— Luxury	R 10,500
Apartment block	
— Middle-class	R 7,700
— Luxury	R 12,000
Community centre	
— Middle-class	R 10,100
— Luxury	R 14,800
Frail care	R 12,000
<b>Schools</b>	<i>Rate per m<sup>2</sup> (excl. VAT)</i>
Primary school	R 6,000 - R 6,900
Secondary school	R 7,100 - R 7,600
<b>Hospitals</b>	<i>Rate per m<sup>2</sup> (excl. VAT)</i>
District hospital	R 25,000
<i>Hospital rates exclude allowances for furniture, fittings and equipment (FF&amp;E).</i>	
<b>Stadiums</b>	<i>Rate per seat (excl. VAT)</i>
Stadium to PSL standards	R 31,000 - R 48,000
Stadium to FIFA standards	R71,000 - R 95,000
	<i>Rate per pitch (excl. VAT)</i>
Stadium pitch to FIFA Standards	R 20,000,000 - R 24,000,000

## Prisons

*Rate per inmate (excl. VAT)*

1,000 Inmate prison	R 535,000 - R 569,000
500 Inmate prison	R 569,000 - R 636,000
High/maximum security prison	R 849,000 - R 1,137,000

## Infrastructure airport development costs

Rates exclude any future escalation, loss of interest, professional fees, VAT and ACSA direct costs.

### Apron stands (incl. associated infrastructure)

*Rate per m<sup>2</sup> (excl. VAT)*

Code F Stand (85m long x 80m wide = 6,800m <sup>2</sup> )	R 4,600
Code E Stand (80m long x 65m wide = 5,200m <sup>2</sup> )	R 4,800
Code C Stand (56m long x 40m wide = 2,240m <sup>2</sup> )	R 6,100

### Taxi lanes (incl. associated infrastructure)

*Rate per m (excl. VAT)*

Code F taxi lane (101m wide)	R 151,000
Code E taxi lane (85m wide)	R 128,000
Code C taxi lane (49m wide)	R 74,000

### Service Roads

*Rate per m (excl. VAT)*

Service road (10m wide)	R 15,700
Dual carriage service road (15m wide)	R 20,000



<b>Taxi ways (incl. associated infrastructure)</b>	<i>Rate per m (excl. VAT)</i>
Code F taxi way (70m wide)	R 108,000
<b>Runways (incl. associated infrastructure)</b>	<i>Rate per m (excl. VAT)</i>
Code F Runway (3,885m long x 60m wide = 233,100m <sup>2</sup> )	R 252,000
<b>Parking (excluding bulk earthworks)</b>	<i>Rate per bay (excl. VAT)</i>
Structured parking	R 166,000
Basement parking	R 254,000
<b>Perimeter fencing / Security gates</b>	<i>Rate per m (excl. VAT)</i>
Perimeter walls with perimeter intrusion detection (PIDS), etc.	R 7,700
	<i>Rate per no. (excl. VAT)</i>
Security gate	R 14,500
Super security gate	R 43,500
<b>Terminal &amp; other buildings (excl. bulk earthworks, external site &amp; services works)</b>	<i>Rate per m<sup>2</sup> (excl. VAT)</i>
Terminal building (excl. terminal building baggage & X-ray)	R 25,700
Pier terminal building (excl. telescopic air bridges, seating & aircraft docking system)	R 27,000
	<i>Rate per unit (excl. VAT)</i>
Telescopic air bridges	R 9,872,000
Aircraft docking system	R1,448,000



## Building services

The following rates are for building services (mechanical and electrical), which are applicable to typical building types in the categories indicated. Rates are dependent on various factors related to the design of the building and the requirements of the system.

In particular, the design, and therefore the cost of air-conditioning, can vary appreciably depending on the orientation, shading, extent and type of glazing, external wall and roof construction, etc.

### Electrical installation

*Rate per m<sup>2</sup> (excl. VAT)*

#### Offices

— Standard installation	R 470 - R 760
— Sophisticated installation	R610- R 1,050
— UPS, substations, standby generators to office buildings	R 340 - R 550

Residential	R 500 - R 840
Shopping centres	R 710 - R 950
Hotels	R 840 - R 1,320
Hospitals	R 1,110 - R 1,530

### Electronic installation

*Rate per m<sup>2</sup> (excl. VAT)*

#### Offices

— Standard installation	R 500 - R 660
— Sophisticated installation	R 580 - R 900

Residential	R 260 - R 420
Shopping centres	R 580 - R 840
Hotels	R 530 - R 710
Hospitals	R 530 - R 790

*Electronic installation includes access control, CCTV, public address, fire detection, data installation, WiFi, CATV, PABX (Private Automatic Branch Exchange) and Building Management System (BMS).*

**Fire protection installation  
(offices)***Rate per m<sup>2</sup> (excl. VAT)*Sprinkler system, including  
hydrants and hose reels  
(excluding void sprinklers)

R 210 - R 340

**Air-conditioning installation***Rate per m<sup>2</sup> (excl. VAT)*Ventilation to parking/service  
areas

R 290 - R 530

Offices

— Console units

R 630 - R 970

— Console/split units

R 630 - R 1,110

— Package units

R 1,000 - R 1,680

— Central plant

R 1,420 - R 2,630

— Variable refrigerant flow (VRF)

R 1,260 - R 2,630

Residential - split units

R 1,000 - R 1,680

Shopping centres

— Split units

R 1,000 - R 1,320

— Package units

R 1,110 - R 1,790

— Evaporative cooling

R 500 - R1,000

Hotels - public areas

R 1,470 - R 2,530

Hospitals central plant

R 2,110 - R 3,370

Hotels

*Rate per key (excl. VAT)*

— Console units

R 18,000 - R 24,000

— Split units

R 29,000 - R 42,000

— Central plant

R 51,000 - R 78,000

*Rate per theatre (excl. VAT)*Hospitals - operating  
theatres

R420,000 - R1,160,000

*For guidance with regard to the cost of buildings rated under the Green Star South Africa rating tool system, see the latest edition of the AECOM publication entitled "Quick Guide to Green Design Attributes."*

## Section 05

### Global Sentiment and Building Costs

#### Africa Outlook

Africa generally continues to maintain its economic growth compared to the slow recovery of Western economies. Africa's growth is expected to remain moderate in 2017 due to delays in a number of countries achieving their economic growth, particularly in East Africa. Growth is expected on the continent from 2018.

However, growth in Africa is the result of domestic factors, including private consumption, public infrastructure development and private investment. In the medium term, continued improvement in the business environment and fast expanding regional markets may increasingly become new sources of growth for the continent.

Further, stability of commodity and oil prices, stable macro-economic environments, a growing middle class and rising internal consumer spending will continue to drive growth. GDP growth rates for the continent are forecast to be between 4.5% and 6.0% in 2017 as a result.

This will maintain a number of African countries in the list of top-ten fastest-growing economies globally between 2013 and 2018. This will be contingent on continuing strong foreign investment flows, investment in natural resources and infrastructure, increasingly sound macroeconomic policies and good governance.

Meanwhile, world economic activity is expected to strengthen in 2017, providing positive growth in demand for Africa's imports and exports, and maintaining key relations with a number of countries (such as the United Kingdom, United States, France and the BRICS countries); as well as entering into wider bilateral trade agreements.

While growth is expected to remain stagnant in North African countries, sub-saharan Africa continues to grow. Growth in the oil-exporting economies is projected to remain high, along with increased investment of gas exploration in East Africa. Foreign direct investment and continued growth on the African continent may be influenced by a number of key elections (including those in Kenya, Rwanda, Zambia, DRC, Liberia and Angola).



## Africa in Figures

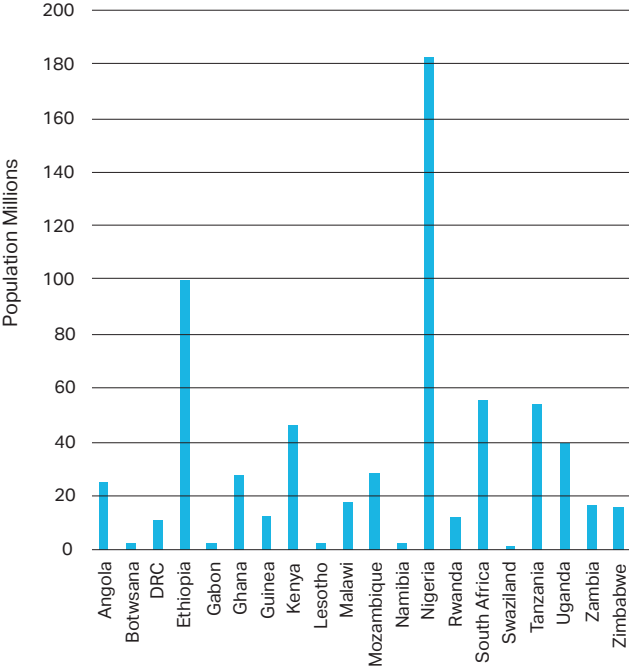
### Area and Population

Country	Land area (000km <sup>2</sup> )	Population			
		Millions, 2015 (est)	Average annual % population growth rate, 2000 - 2015	Density, people per km <sup>2</sup> , 2015	Prevalence of HIV, total (% of population 15 - 49)
Angola	1247	25.02	3.2	20.1	2.2
Botswana	567	2.26	1.9	4	22.5
DRC	48	10.53	1.2	217.9	1
Ethiopia	1000	99.39	2.5	99.4	*
Gabon	258	1.73	2.2	6.7	3.8
Ghana	228	27.41	2.3	120.5	1.6
Guinea	246	12.61	2.7	51.3	1.6
Kenya	569	46.05	2.6	80.9	5.9
Lesotho	30	2.14	1.2	70.3	22.7
Malawi	94	17.22	3.1	182.6	9.1
Mozambique	786	27.98	2.8	35.6	10.5
Namibia	823	2.46	2.3	3	13.3
Nigeria	911	182.20	2.6	200.1	3.1
Rwanda	25	11.61	2.3	470.6	2.9
South Africa	1213	54.96	1.6	45.3	19.2
Swaziland	17	1.29	1.4	74.8	28.8
Tanzania	886	53.47	3.1	60.4	4.7
Uganda	201	39.03	3.3	194.7	7.1
Zambia	743	16.21	3.1	22	12.9
Zimbabwe	387	15.60	2.3	40	14.7

Source: World Development Indicators 2015

\*Figures not available

# Population 2015



Source: World Development Indicators 2015

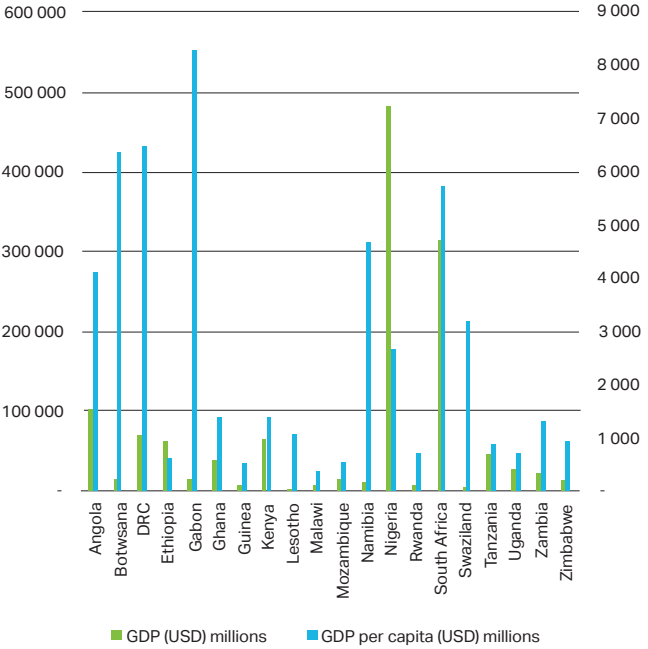
## Gross Domestic Product (At Constant 2000 Prices)

Country	GDP (USD) millions	GDP growth (annual % since 2000)	GDP per capita (USD)	Gross capital formation (% of GDP)	Inflation, consumer price (annual %)
Angola	102 672	3	4 102	9	10.3
Botswana	14 390	-0.3	6 360	31	3.1
DRC	68 103	7.0	6 469	23	0.8
Ethiopia	61 540	9.6	619	39	10.1
Gabon	14 262	4.0	8 266	29	*
Ghana	37 543	3.9	1 370	25	17.1
Guinea	6 699	0.1	531	13	*
Kenya	63 398	5.6	1 377	21	6.6
Lesotho	2 278	1.6	1 067	*	3.2
Malawi	6 404	2.8	372	11	21.2
Mozambique	14 807	6.6	529	42	3.6
Namibia	11 492	5.3	4 674	34	3.4
Nigeria	481 066	2.7	2 640	15	9
Rwanda	8 096	6.9	697	26	2.5
South Africa	314 572	1.3	5 724	21	4.6
Swaziland	4 118	1.9	3 200	*	*
Tanzania	45 628	7.0	879	28	5.6
Uganda	27 529	5.1	705	24	5.2
Zambia	21 154	2.9	1 305	43	10.1
Zimbabwe	14 419	0.5	924	14	-2.4

Source: World Development Indicators 2015

\*Figures not available

# Gross Domestic Product 2015



Source: World Development Indicators 2015



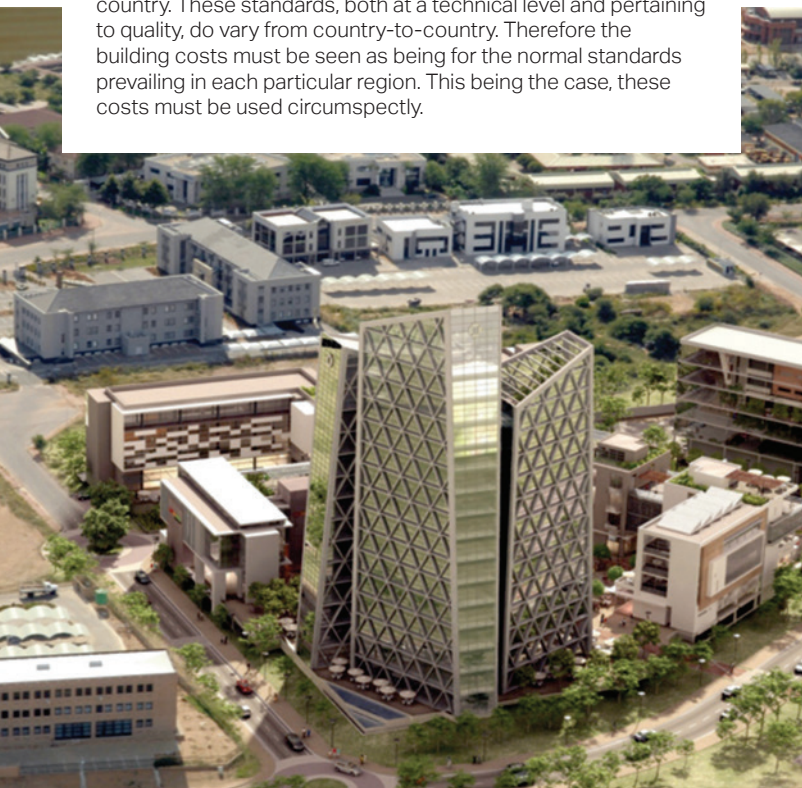
## Africa Building Costs

This section makes provision for comparisons of African building costs, international building costs and international rental rates.

The Africa Building Cost Comparison table (page 50), summarises the approximate estimated building costs for different types of buildings in various locations in Africa. Rates are based on projected 1 July 2017 costs and provide an indicator for the expected building cost rates over 2017. Exchange rates are as at 1 April 2017.

Rates include the cost of appropriate building services, e.g. air-conditioning, electrical, etc. but exclude costs of site infrastructure development, parking, any future escalation, loss of interest, professional fees and VAT. These rates are of an indicative nature and therefore the qualifications dealt with elsewhere in this publication would apply.

These are estimated costs only and should be considered in the context of acceptable building standards in each relevant country. These standards, both at a technical level and pertaining to quality, do vary from country-to-country. Therefore the building costs must be seen as being for the normal standards prevailing in each particular region. This being the case, these costs must be used circumspectly.



Building Type	US DOLLAR											
	Angola Luanda	Botswana Gaborone	Ghana Accra	Kenya Nairobi	Mozambique Maputo	Nigeria Lagos	Rwanda Kigali	Senegal Dakar	South Africa Johannesburg	Tanzania Dar es Salaam	Uganda Kampala	Zambia Lusaka
<b>Residential</b>												
Average Multi Unit High Rise	1 540	918	1 850	740	1 100	2 100	1 185	1 240	821	780	815	1 100
Luxury Unit High Rise	2 500	1 297	2 200	1 100	1 400	2 910	1 580	1 945	1 213	1 040	1 305	1 625
Individual Prestige Houses	4 650	1 952	2 100	1 350	1 500	2 560	1 700	2 970	1 187	1 120	1 540	1 590
<b>Commercial/Retail</b>												
Average Standard Offices High Rise	1 700	970	1 700	1 000	1 050	2 100	1 455	1 265	918	955	1 155	1 230
Prestige Offices High Rise	2 600	1 625	2 500	1 735	1 250	2 910	1 840	2 065	1 187	1 210	1 955	1 590
Major Shopping Centre (CBD)	2 450	1 350	1 400	840	1 250	2 910	1 350	1 660	903	890	965	1 210
<b>Industrial</b>												
Light Duty Factory	1 550	865	1 050	725	950	1 165	1 090	1 135	396	715	805	530
Heavy Duty Factory	2 535	1 329	1 250	1 150	1 100	1 570	1 940	1 820	448	1 280	1 295	600
<b>Hotel</b>												
3 Star Budget	215 000	138 400	325 000	364 000	125 000	290 000	201 325	166 200	203 800	135 520	430 000	273 092
5 Star Luxury	413 000	446 800	455 000	630 000	230 000	525 000	481 500	392 175	358 100	319 750	750 000	479 854
Resort/Style	595 000	499 000	570 000	750 000	450 000	640 000	642 390	495 000	Not available	422 500	909 500	Not available
<b>Other</b>												
Multi-storey CarPark	1 415	675	850	475	850	1 515	865	1 070	280	570	560	375
District Hospital	Not available	Not available	1 250	1 000	2 500	2 095	Not available	Not available	1 866	Not available	1 285	2 500
Primary & Secondary Schools	Not available	Not available	1 250	875	1 050	Not available	Not available	Not available	507	Not available	1 020	680
(As at 1 April 2017)	AOA	BWP	GHS	KES	MZN	NGN	RWF	XOF	ZAR	TZS	UGX	ZMW
US\$1 =	165.90	10.30	4.31	101.10	70.39	309.10	822.01	611.24	13.40	2193.02	3584.13	9.61

Prices exclude land, site works, professional fees, tenant fitout and equipment. Rates exclude GST/VAT. Hotel rates include FF&E

## Global Building Costs

The cost data under the heading International Building Cost Rate Comparison (see page 52) was made available through a survey by the relevant AECOM offices based in these locations. Their assistance in this regard is acknowledged with thanks.



Africa Property & Construction Cost Guide  
International Building Cost Comparison

Costs based on 1 July 2017  
Exchange Rates to US\$ as at 1 April 2017

Building Type	US DOLLAR											Vietnam Ho Chi Minh	
	Australia Sydney	China Hong Kong	China Beijing	China Shanghai	Malaysia Kuala Lumpur	Singapore	South Africa JHB	Thailand Bangkok	UAE Dubai	USA Los Angeles	USA San Francisco		USA New York
<b>Residential</b> (US\$ / m <sup>2</sup> )													
Average Multi Unit High Rise	3 420	3 200	735	725	483	3 074	821	1 057	1 957	3 600	3 900	4 550	3 771
Luxury Unit High Rise	3 996	4 500	1 600	1 500	824	4 440	1 213	1 572	2 373	4 600	5 000	5 900	5 287
Individual Prestige Houses	4 651	6 300	880	870	705	5 074	1 187	1 649	Not available	4 300	5 100	5 500	5 246
<b>Commercial/Retail</b> (US\$ / m <sup>2</sup> )													
Average Standard Offices High Rise	4 258	3 200	1 000	1 000	784	2 976	918	954	1 539	4 000	4 400	4 960	4 218
Prestige Offices High Rise	4 979	4 000	1 450	1 500	1 210	3 952	1 187	1 134	1 963	4 300	4 700	5 200	5 213
Major Shopping Centre (CBD)	3 577	4 600	1 500	1 450	1 273	3 806	903	825	1 679	3 300	3 795	3 960	4 597
<b>Industrial</b> (US\$ / m <sup>2</sup> )													
Light Duty Factory	760	2 500	520	500	472	1 049	396	567	842	1 400	1 500	2 800	1 729
Heavy Duty Factory	956	Not available	Not available	Not available	517	1 293	448	902	981	1 800	1 950	3 600	2 967
<b>Hotel</b> (US\$ / key)													
3 Star Budget	347 199	230 000	127 000	Not available	151 500	97 586	203 800	61 656	52 300	75 000	79 000	84 000	89 000
5 Star Luxury	706 189	480 000	276 000	287 000	281 250	439 136	358 100	282 270	168 411	434 000	460 000	500 000	539 681
Resort Style	Not available	Not available	386 000	Not available	248 300	439 136	Not available	270 621	196 057	271 000	282 000	298 000	331 383
<b>Other</b> (US\$ / m <sup>2</sup> )													
Multi-storey Car Park	983	1 650	Not available	Not available	314	878	280	593	601	1 230	1 550	1 530	847
District Hospital	6 125	6 000	Not available	1 450	932	4 245	1 866	Not available	2 938	6 100	6 700	8 300	4 260
Primary & Secondary Schools	2 516	2 800	Not available	Not available	330	1 293	507	Not available	1 510	3 900	4 010	4 520	2 730
(As at 1 April 2017)	AUD	HKD	CNY	CNY	MYR	SGD	ZAR	THB	AED	USD	USD	USD	GBP
US\$1 =	1.31	7.77	6.89	6.86	4.44	1.40	13.40	34.29	3.68	1.00	1.00	1.00	0.70

Prices exclude land, site works, professional fees, tenant fitout and equipment. Rates exclude GST/VAT. Hotel rates include FF&E

# Section 06

## International Prestigious Office Rental Comparison

Country	City	USD/m <sup>2</sup> per annum
Angola	Luanda	1800 /m <sup>2</sup>
Argentina	Buenos Aires	366 /m <sup>2</sup>
Australia	Adelaide	405 /m <sup>2</sup>
Australia	Brisbane	620 /m <sup>2</sup>
Australia	Melbourne	567 /m <sup>2</sup>
Australia	Perth	395 /m <sup>2</sup>
Australia	Sydney	980 /m <sup>2</sup>
Austria	Vienna	370 /m <sup>2</sup>
Bahrain	Manama	223 /m <sup>2</sup>
Belgium	Brussels	305 /m <sup>2</sup>
Botswana	Gaborone	350 /m <sup>2</sup>
Brazil	Sao Paulo	336 /m <sup>2</sup>
Brazil	Rio de Janeiro	528 /m <sup>2</sup>
Cameroon	Yaoundé	300 /m <sup>2</sup>
Canada	Montreal	354 /m <sup>2</sup>
Canada	Toronto	563 /m <sup>2</sup>
Canada	Vancouver	343 /m <sup>2</sup>
China	Beijing	986 /m <sup>2</sup>
China	Guangzhou	408 /m <sup>2</sup>
China	Hong Kong	1871 /m <sup>2</sup>
China	Shanghai	802 /m <sup>2</sup>
Czech Republic	Prague	325 /m <sup>2</sup>
Democratic Republic of Congo	Kinshasa	360 /m <sup>2</sup>
Denmark	Copenhagen	285 /m <sup>2</sup>
Egypt	Cairo	420 /m <sup>2</sup>
England	Birmingham	435 /m <sup>2</sup>
England	Cambridge	437 /m <sup>2</sup>
England	Leeds	375 /m <sup>2</sup>
England	Liverpool	342 /m <sup>2</sup>
England	London (City)	1037 /m <sup>2</sup>
England	London (West End)	1475 /m <sup>2</sup>
England	Manchester	468 /m <sup>2</sup>
England	Oxford	335 /m <sup>2</sup>
Ethiopia	Addis Ababa	180 /m <sup>2</sup>
France	Paris	780 /m <sup>2</sup>

## International Prestigious Office Rental Comparison

Country	City	USD/m <sup>2</sup> per annum
Germany	Berlin	385 /m <sup>2</sup>
Germany	Frankfurt	450 /m <sup>2</sup>
Germany	Hamburg	385 /m <sup>2</sup>
Germany	Munich	410 /m <sup>2</sup>
Ghana	Accra	431 /m <sup>2</sup>
Greece	Athens	220 /m <sup>2</sup>
Hungary	Budapest	280 /m <sup>2</sup>
India	Bangalore	171 /m <sup>2</sup>
India	Chennai	126 /m <sup>2</sup>
India	Mumbai	479 /m <sup>2</sup>
Indonesia	Jakarta	286 /m <sup>2</sup>
Ireland	Dublin	570 /m <sup>2</sup>
Italy	Rome	480 /m <sup>2</sup>
Italy	Milan	600 /m <sup>2</sup>
Japan	Tokyo	783 /m <sup>2</sup>
Kenya	Nairobi	216 /m <sup>2</sup>
Lebanon	Beirut	388 /m <sup>2</sup>
Malaysia	Kuala Lumpur	121 /m <sup>2</sup>
Mexico	Mexico City	593 /m <sup>2</sup>
Mozambique	Maputo	341 /m <sup>2</sup>
Namibia	Windhoek	178 /m <sup>2</sup>
Netherlands	Amsterdam	475 /m <sup>2</sup>
New Zealand	Auckland	345 /m <sup>2</sup>
New Zealand	Christchurch	314 /m <sup>2</sup>
New Zealand	Wellington	273 /m <sup>2</sup>
Nigeria	Abuja	240 /m <sup>2</sup>
Nigeria	Lagos	960 /m <sup>2</sup>
Norway	Oslo	560 /m <sup>2</sup>
Oman	Muscat	187 /m <sup>2</sup>
Philippines	Manila	236 /m <sup>2</sup>
Poland	Warsaw	335 /m <sup>2</sup>
Portugal	Lisbon	225 /m <sup>2</sup>
Qatar	Doha	538 /m <sup>2</sup>
Romania	Bucharest	255 /m <sup>2</sup>
Russia	Moscow	565 /m <sup>2</sup>
Russia	St Petersburg	355 /m <sup>2</sup>
Rwanda	Kigali	189 /m <sup>2</sup>
Saudi Arabia	Riyadh	390 /m <sup>2</sup>
Saudi Arabia	Jeddah	334 /m <sup>2</sup>

## International Prestigious Office Rental Comparison

Country	City	USD/m <sup>2</sup> per annum
Scotland	Edinburgh	468 /m <sup>2</sup>
Scotland	Glasgow	401 /m <sup>2</sup>
Singapore	Singapore	603 /m <sup>2</sup>
South Africa	Cape Town	148 /m <sup>2</sup>
South Africa	Durban	162 /m <sup>2</sup>
South Africa	Johannesburg	208 /m <sup>2</sup>
South Africa	Port Elizabeth	134 /m <sup>2</sup>
South Africa	Pretoria	189 /m <sup>2</sup>
South Korea	Seoul	486 /m <sup>2</sup>
Spain	Barcelona	250 /m <sup>2</sup>
Spain	Madrid	350 /m <sup>2</sup>
Sweden	Stockholm	615 /m <sup>2</sup>
Switzerland	Zurich	780 /m <sup>2</sup>
Tanzania	Dar Es Salaam	288 /m <sup>2</sup>
Thailand	Bangkok	213 /m <sup>2</sup>
Turkey	Istanbul	249 /m <sup>2</sup>
Uganda	Kampala	240 /m <sup>2</sup>
United Arab Emirates	Dubai (Central Dubai)	673 /m <sup>2</sup>
United Arab Emirates	Dubai (New Dubai)	498 /m <sup>2</sup>
United Arab Emirates	Dubai (Old Dubai)	439 /m <sup>2</sup>
United Arab Emirates	Abu Dhabi	479 /m <sup>2</sup>
United States of America	Atlanta	308 /m <sup>2</sup>
United States of America	Boston	893 /m <sup>2</sup>
United States of America	Chicago	492 /m <sup>2</sup>
United States of America	Houston	480 /m <sup>2</sup>
United States of America	Los Angeles	493 /m <sup>2</sup>
United States of America	Miami	561 /m <sup>2</sup>
United States of America	New York (Manhattan)	1401 /m <sup>2</sup>
United States of America	Philadelphia	442 /m <sup>2</sup>
United States of America	Sacramento	366 /m <sup>2</sup>
United States of America	San Francisco	803 /m <sup>2</sup>
United States of America	Seattle	545 /m <sup>2</sup>
United States of America	Washington DC	728 /m <sup>2</sup>
Zambia	Lusaka	271 /m <sup>2</sup>

*Rates are applicable as at 1 January 2017 and exclude VAT, but include GST where applicable. Above are gross rentals and include operating cost and municipal cost, but exclude VAT and electricity/water consumption.*

# Section 07

## Building Cost Escalations

### Building cost

The meaning of "building cost" depends on the application and context. A building contractor, for example, may refer to the cost of labour, material, plant, fuel and supervision. In contrast, a developer may refer to either the tender price from the contractor or the ultimate cost of the project, which could include professional fees, plan approval fees, escalation, loss of interest, etc.

For the purposes of this document, building cost shall be deemed to mean the tender price (or negotiated price) submitted by the building contractor.

### Escalation rate

There seems to be two popular methods of calculating and expressing percentage annual increases, namely the average rate and the year-on-year rate. The average rate is of no real use in calculating escalation and is of general interest only. The year-on-year rate should be used in escalation calculations, taking cognizance of actual project programmes.



The average rate compares the indices for each month (or quarter) of the year with those of the corresponding months (or quarters) of the preceding year and calculates the average of these, which is then quoted as the average annual increase for that particular year.

The year-on-year rate compares the January (or December) index with the index for the corresponding month of the previous year, and reflects the increase over that year.

There could be a significant difference in the two rates in question. For example, in 2013 the year-on-year rate (January 2013 to January 2014) of building cost inflation in South Africa was only 4.6% while the average annual rate (comparing monthly indices) was 7.3%.

## **Calculation of estimated escalation of construction contracts**

### **Pre-contract**

Construction cost changes on an ongoing basis for various reasons. Provision should therefore be made for changes in tender prices during the period from the date of the estimate to the expected tender date. Adding the estimated current building cost to the total equals the anticipated tender amount.

This is calculated by multiplying the estimated current building cost by the average estimated monthly percentage increase and by the number of months from date of estimate to tender date.

### **Contract price adjustment**

Provision is made for escalation in building cost during the contract period. The Contract Price Adjustment Provisions (CPAP) formula provides for 85% of the contract amount to be subject to escalation adjustment with the remaining 15% fixed. Furthermore, a factor must be introduced to take account of the cash flow of payments during the construction period. 0.6 is usually acceptable if a short method of calculation is employed.

The total escalation during the contract period is therefore calculated by multiplying the anticipated tender amount by 0.85 and 0.6 and then by the estimated monthly percentage increase as indicated by the relevant indices in the CPAP formula and by the contract period expressed in months.

## Tender price escalation

The annual year-on-year increase in building costs (i.e. tender prices) based on the indices published by the Bureau for Economic Research (BER), University of Stellenbosch (January-to-January of each year) and for CPAP formula (Work Group 181 Commercial/Industrial buildings) published by Statistics South Africa (P0151), are as follows:

### Cost Indices applicable to the building industry

YEAR	BER		CPAP		TMI
	Index (Jan=100)	Year on Year increase	Index (Jan=100)	Year on Year increase	
2012	100.0		100.0		1.00
2013	109.4	+9.4%	105.4	+5.4%	1.04
2014	114.4	+4.6%	112.3	+6.5%	1.02
2015	127.5	+11.4%	117.9	+5.0%	1.08
2016	126.7	-0.6%	121.3	+2.9%	1.04
2017	134.8	+6.4%	131.2	+8.2%	1.03
2018	147.2	+9.2%	137.8	+5.0%	1.07
2019	161.9	+10.0%	145.5	+5.6%	1.11
2020	176.4	+8.9%	153.8	+5.7%	1.15
2021	197.5	+12.0%	162.9	+5.9%	1.21

*The average annual increases indicated by the BER in its publications are the average of the quarterly increases for that particular year and will not correspond to the above year-on-year increase.*

*The difference between tender price escalation and escalation according to the indices incorporated in the CPAP formula for any one period may be attributed to the market factor, which incorporates the contractors mark-up, productivity, availability of materials, etc.*

*\* Forecast based on information provided by Medium-Term Forecasting Associates Building Economists, Stellenbosch.*

## Tender climate

The column marked Tender Market Indicator (TMI) gives an indication of the tender climate. The building cost index, as published by the BER, based on tender prices, has been deflated by the index for CPAP Work Group 181, based on the cost of labour and material. The result is the movement of tender prices excluding the influence of market costs of labour and material, giving an indication of competitiveness of tendering. It represents a comparison or rate of change of BER and CPAP indices.

When the TMI (see graph on page 61) shows a downward gradient, this indicates a favourable tender market, i.e. the next point is numerically less, resulting from the calculation of BER divided by CPAP indicating that the increase in BER (tender index) is less than the increase in the CPAP index. Therefore, there is a favourable tender market from the viewpoint of the employer.

Conversely, if the graph has an upward gradient, the increase in BER is greater than the increase in CPAP indices, indicating an unfavourable tender market from the viewpoint of the employer. Thus it would be prudent to recommend negotiation as opposed to tendering.

This tendency is also apparent on the cost indices graph (see page 62). When the two lines (CPAP and BER) converge, i.e. CPAP is dropping and BER is rising, you should negotiate. When the two lines diverge, i.e. CPAP is rising and BER is dropping, proceed to tender instead.

Base dates: To allow for comparison of indices, a factor has been introduced resulting in an equal base for both BER and CPAP indices (i.e. January 2012 = 100).

## Unique large-scale projects

Building cost estimation seems to become more complex when unique circumstances prevail. For example, when a FIFA World Cup, Olympic Games or similar event takes place in a particular country, many new construction works and associated infrastructure projects are awarded.

Projects of such magnitude can only be constructed by major contractors possessing the required expertise and resources. It is often experienced that the unit costs of these projects are significantly higher than anticipated originally. Selected contractors at this level have little competition. Based on a favourable supply and demand, they price costs accordingly, resulting in client cost overruns and severe pressure on budgets.

## Value-added tax

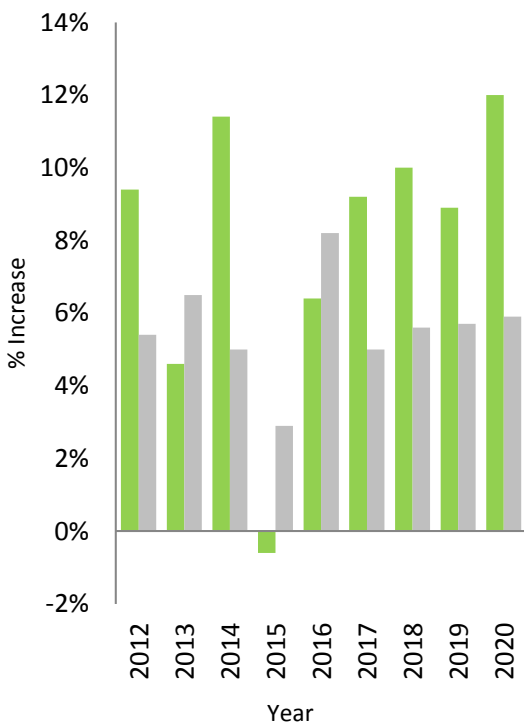
As the majority of developers are registered vendors in the property industry, any VAT on commercial property development is fully recoverable. Therefore, to reflect the net development cost, VAT should be excluded. Should the gross cost (i.e. after VAT inclusion) be required, then VAT at the ruling rate (currently 14%) should be added.

Cognizance should be taken, however, of the effect of VAT on cash flow over a period of time. This will vary according to the payment period of the individual vendor. In all cases, however, it will add to the capital cost of the project to the extent of interest on outstanding VAT for the VAT cycle of the particular vendor.



## GRAPHS: BER AND CPAP

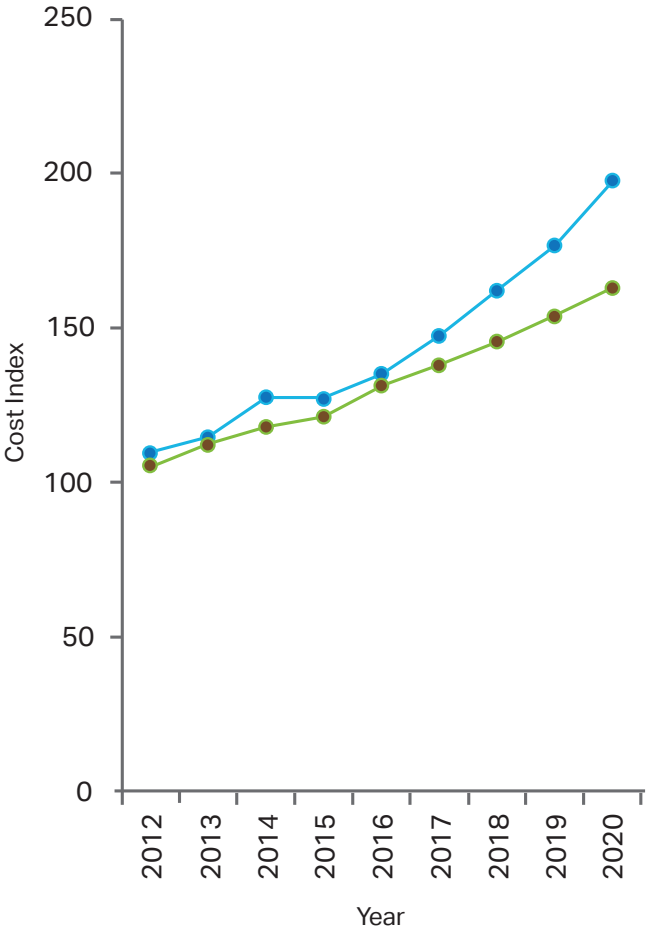
### January to January Building cost % change



■ Bureau for Economic Research

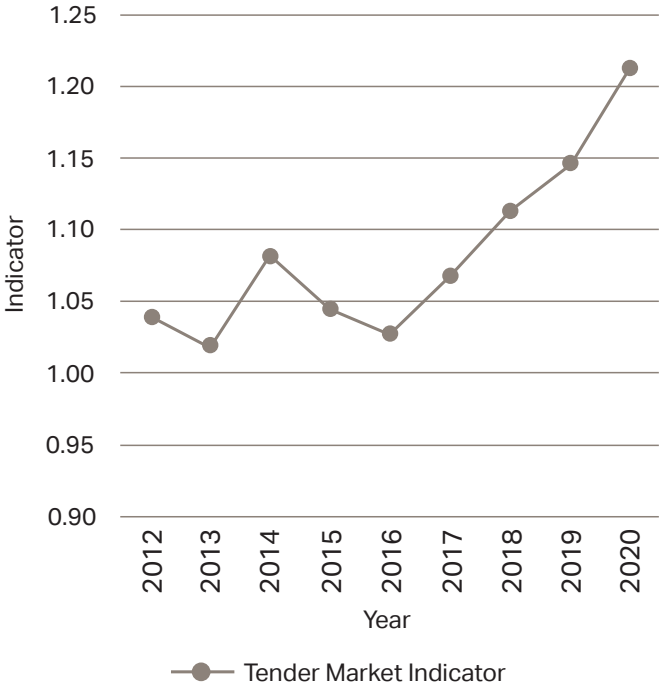
■ Contract Price Adjustment Provisions (CPAP)

# January building cost indices



- Bureau for Economic Research
- Contract Price Adjustment Provisions (CPAP)

**Tender market indicator**  
**BER deflated by CPAP**



*This graph gives an indication of the tender climate. It is the result of the relationship between BER and CPAP. Refer section on tender climate, page 59.*

## Section 08

### Method for Measuring Rentable Areas

#### SAPOA methods

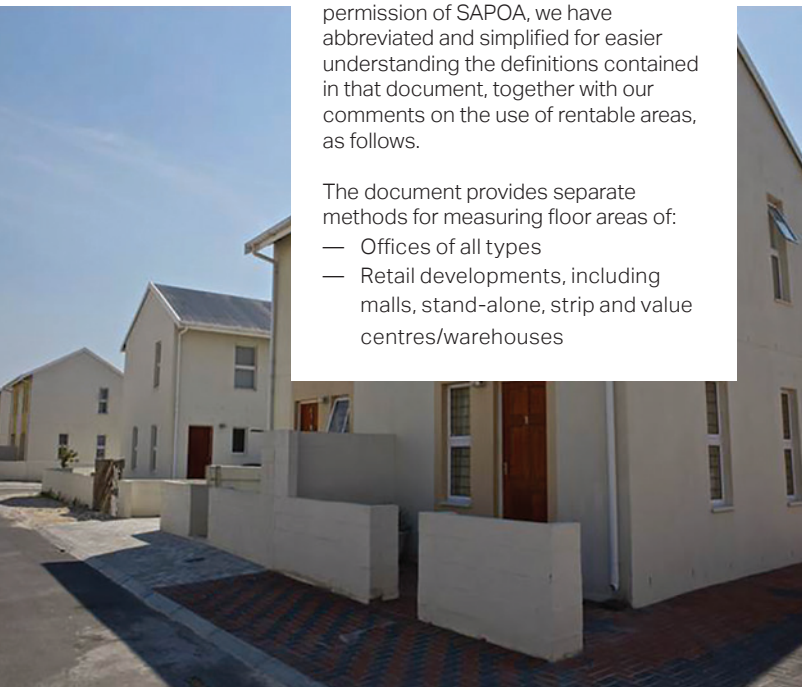
In the past, many landlords and developers have derived methods for calculating the rentable areas of buildings.

Most common is the method recommended by SAPOA entitled *Method for Measuring Floor Areas in Buildings, Second Edition* (effective from 7 November 2007). This replaces the *SAPOA Method for Measuring Floor Areas in Commercial and Industrial Buildings* (updated August 1991). It should be noted, however, that the latest edition is approved for use from 7 November 2007 and should not be applied retrospectively.

Notwithstanding or detracting from the above publication, and by kind permission of SAPOA, we have abbreviated and simplified for easier understanding the definitions contained in that document, together with our comments on the use of rentable areas, as follows.

The document provides separate methods for measuring floor areas of:

- Offices of all types
- Retail developments, including malls, stand-alone, strip and value centres/warehouses





- Industrial developments, including factories, warehouses, mini-units and trading warehouses, multi-storey and the like
- Residential buildings, including houses, flats/apartments, townhouses, cluster houses, etc.

For offices of all types, the following definitions and explanations are applicable:

### **The basis**

The basis used in calculating the rentable area is the measurement of usable area, together with common and supplementary area, as determined at each level. Unless otherwise indicated, the unit of measurement is square metres (m<sup>2</sup>).

### **Area definitions**

#### **Construction area**

The construction area is the entire covered built area. This is the sum of the areas measured at each floor level over any external walls to the external finished surface.

Only the lowest levels of atria are included, and all openings on other levels to form atria are to be excluded.

#### **Rentable area**

The rentable area is the total area of the building enclosed by the dominant face, adjusted by deducting major vertical penetrations. No deduction is made for columns.

Its intended use is in determining the revenue-producing area of a building, which comprises rentable area, supplementary area and parking. It is also used by those analysing the economic potential of a building.

Rentable area has a minimum floor-to-ceiling height of 1.5 metres.

Rentable area comprises useable area plus common area.

Rentable area excludes supplementary area, which may produce additional revenue.

## **Usable area**

The usable area is the area capable of exclusive occupation by the tenant i.e. the total area of the building enclosed by the dominant face, adjusted by deducting all common area and major vertical penetrations. No deduction is made for columns.

Its intended use is to be the essential part of rentable area and the basis for apportioning common area.

## **Common area**

Common area is an area to which the tenant has access and/or use, and is part of the rentable area. The primary common area of the building is apportioned to tenancies pro-rata to the usable area of that tenancy. The secondary common area is apportioned only to tenancies that it services.

The common area has two components:

- The primary common area comprises all rentable area on a given floor that is not useable area, together with remote common area, which comprises entrance foyers, plant and service rooms, or any other portion of rentable area not located on the given floor.
- The secondary common area comprises areas beyond primary common area giving access to multiple tenancies. Accordingly, this may vary over the life of a multiple tenancy building.

## **Supplementary area**

Supplementary area is any additional revenue-producing component that falls outside of the definition of rentable area. Supplementary area need not be weatherproof. For example, it includes storerooms, balconies, terraces, patios, access/service passages and signage/advertising areas and parking areas demarcated for tenant use. Parking bays shall be given in number.

## **General Definitions**

### **Atrium**

An atrium is a weatherproof interior space, accessible and capable of use by the tenant at the lowest level. Voids in floors above the atrium space are not included in the rentable area.

### **Entrance foyer**

The entrance foyer is a portion of remote common area, including associated adjacent rooms and lobby. Lift lobby and entrance foyers that occur together with parking floors (not adjacent to office areas) comprise remote common area.

### **Major vertical penetrations**

Major vertical penetrations, stairs and landings, lift shafts, flues, pipe shafts, vertical ducts, and the like, and their enclosing walls, exceeding 0.5m<sup>2</sup> in area, are deducted from the rentable area.

### **Remote service areas and plant rooms**

Remote refuse rooms, electrical sub-stations, transformer rooms, central air-conditioning plant rooms and lift motor rooms are included in the primary common area.

### **Storage areas**

Dedicated storage areas within the useable area are included as usable area.

Dedicated storage areas are listed separately as supplementary areas.



## Retail, Industrial, Residential and other developments

Similar provisions have been made for measuring the floor areas of retail, industrial and residential buildings referred to on page 66. For detailed information, it is suggested that the relevant sections of the said document be studied carefully.

The above method is designed to accommodate the measurement, as far as practical, of most building types. However, certain building types such as hotels, leisure and sport centres, petrol stations, hospitals, law courts, retirement villages and others may only utilise the underlying principles of this method.

### In General

Developers and financiers are constantly attempting to either reduce building costs or increase rental levels to achieve higher returns. When these parameters are exhausted, it becomes incumbent on the architects and designers to design more efficiently. One must therefore understand the complete SAPOA *Method for Measuring Floor Areas in Buildings, First Edition*, and implement the various facets of the definitions to achieve higher efficiencies between the various areas.

The initial return is more sensitive to an increase in rental income (which can be affected by increasing the rental area) than the corresponding percentage reduction in construction costs.

Once again, the above has been published as a quick guideline only, and should not be used in preference to the SAPOA publication, which is far more comprehensive and detailed. We acknowledge and thank SAPOA for its permission to use extracts from this publication.



# Section 09

## Return on Investment

### Criteria to be employed

There are two distinct criteria generally used for evaluating the financial viability of a property investment, namely:

- The initial return, and
- The cash flow analysis.

### The initial return

The initial return is based on the net income during the first year of operation of the development. The return is expressed as a percentage per annum of the anticipated capital investment. Escalation in construction cost and cost of capital are both taken into account in an effort to incorporate the time value of money.

The major advantage of employing the initial return method is that expenses and income do not have to be escalated too far into the future. Therefore these are relatively accurate and easily understood in today's monetary terms. The fact that the first year of operation may have a higher vacancy factor than subsequent years should be ignored when the initial return is calculated in order to reflect long-term potential more accurately.

The initial return should be qualified as follows:

- All expenses and income have been escalated to the construction completion date
- Interim income received prior to the construction completion date has been deducted from the capital investment after adjusting for operating expenses and cost of capital



- The returns are expressed as percentages of the escalated capital investment and do not take into account loans, loan repayments or interest charges on loans
- The calculated returns are for the first complete year of operation only and do not cater for the following:
  - When the project may not reach full maturity during the first year of operation
  - Vacancies
  - Recoupment of capital during the income-bearing period of the investment or realisation value of the investment at the end of the investment period
  - Income tax

### **Cash flow analysis over a predetermined period**

In the cash flow method, the income and expenditure cash flow over the economic lifespan of the investment is taken into account. Usually an Internal Rate of Return (IRR) and/or a Net Present Value (NPV) is employed to evaluate the financial viability.

The NPV (discounted cash flow) method works as follows: Determine the sum of all cash flows (inflows, outflows and initial investment) and discount to present values at the project's cost of capital. With a positive NPV the project can be accepted and it should be rejected if the NPV is negative.

The IRR is the rate of interest that equates the present value of the expected future net income with the present value of the cost of the investment. The NPV would therefore be exactly zero if the IRR is used as the discount rate. The IRR of an investment is generally used by institutional investors, as it is a comparative indication of the profitability of alternative investment options.

A weakness of the IRR calculation is the fact that an implicit assumption is made that cash flows are reinvested at the project's own IRR. The Modified Internal Rate of Return (MIRR) overcomes this by assuming that cash flows are reinvested at the cost of capital rate (or any other given rate), and may be calculated in addition. As the cost of capital rate is normally determined at a lower rate than the IRR, it can be assumed that the MIRR calculation will always render a lower result.

The assumptions on which the cash flow return is based must be listed. These should include the assumed investment period (e.g. 20 years after the construction completion date), that income has been taken into account at the beginning of each month and expenditure at the end of each month, the terminal value, and escalation in rental and operating expenses over the investment period, etc.

It is suggested that, where applicable, a comprehensive financial viability analysis should incorporate both the initial return and the cash flow method of evaluation. It is significant to note that there is a close relationship between the initial return and the IRR. However, this is to be applied with care by an experienced analyst.

**Example**

Total capital expenditure (investment)	R 100,000,000
Rental in first year (net income)	R 10,500,000
Initial return in first year	10.50%
Escalation in net rental income	9.00% per annum

**Net cash flow**

Year 0		-100,000,000
Year 1		10,500,000
Year 2		11,445,000
Year 3		12,475,050
Year 4		13,597,805
Year 5		14,821,607
Year 6		16,155,552
Year 7		17,609,551
Year 8		19,194,411
Year 9		20,921,908
Year 10		22,804,879
Year 11		24,857,319
Year 12		27,094,477
Year 13		29,532,980
Year 14		32,190,948
Year 15		35,088,134
Year 16		38,246,066
Year 17		41,688,212
Year 18		45,440,151
Year 19		49,529,764
Year 20	53,987,443	
(+ terminal value)	560,441,075	614,428,518

The IRR with a 9.00% annual escalation in rental is 19.50%.

The terminal value is subjective and in this example has been assumed as the capitalised value of the anticipated rental in Year 21 (i.e.  $R53,987,443 + 9.00\% = R58,846,313$ ) capitalised at the initial yield, i.e. 10.50%.

Should the terminal value be assumed to be nil (this is unlikely as the land parcel will always have a value), the IRR drops to 16.92%.

A rule of thumb for the calculation of the approximate IRR of an investment is that it is equal to the sum of the initial return plus the escalation rate (assumed to be constant over the investment period), provided that the terminal value is calculated as in the given example, i.e. the capitalised value of the anticipated rental in the year after disposal, assuming a capitalisation rate equal to the initial return.

Thus, in the given example, the initial return is 10.50%, the escalation rate is 9.00%, and the approximate IRR is the sum of the two, i.e. 19.50%.

*Where Green Star South Africa ratings are a requirement, cash flow analyses over longer time periods have become essential. Capital expenses are normally higher due to investment in "green" technology and more expensive methods employed. Therefore, the long-term effect on the operation and maintenance of buildings due to better energy efficiency and the like should be demonstrated to building owners and tenants in order to determine the viability scientifically.*



# Residual Land Value

## The formula

The calculation of the residual land value for a predetermined rate of return i.e. what a developer can afford to pay for a parcel of land given a specified return for a particular development.

The formula is determined as follows:

$$\begin{aligned} \text{Return} &= \frac{\text{Net Annual Income}}{\text{Total Capital Outlay (TCO)}} \\ &= \frac{\text{Net Annual Income}}{y + x} \end{aligned}$$

(where "y" = TCO excluding land value and its corresponding loss of interest and "x" = land value and its corresponding loss of interest)

$$\text{Therefore } x = \frac{\text{Net Annual Income}}{\text{Return}} - y$$

$$\begin{aligned} \text{Now } x &= \text{Land Value} + \text{Loss of Interest} \\ &= \text{Future Value of Land} \end{aligned}$$

Therefore to obtain the present land value, i.e. land value excluding its corresponding loss of interest, simply discount "x" at the interest rate and period used in the previous TCO calculations.

**Example**

What price should be paid for land to obtain a return of 10.00% p.a. with a net annual income of R6 million and the following capital outlay?

Estimated escalated building cost	R 38,150,000
Professional fees	5,725,000
Legal and plan approval fees	45,000
Interim rates on ground during construction period	265,000
Loss of interest and/or bond interest at 10.5% p.a. compounded monthly over a 15 month construction period	3,180,000
<b>Total capital outlay excluding land cost (y)</b>	<b>R 47,365,000</b>

$$\begin{aligned}
 x &= \frac{\text{Net Annual Income} - y}{\text{Return}} \\
 &= \frac{\text{R6,000,000} - \text{R47,365,000}}{0.10} \\
 &= \text{R12,635,000}
 \end{aligned}$$

Therefore land value is R12,635,000 discounted at 10.5% p.a. over 15 months = R11,087,204 (say) R11 million

The above residual value is very sensitive to changes of the required rate of return, otherwise known as the capitalisation rate (CAP rate), and careful consideration should be considered carefully, taking into account the risk profile of the proposed development.

## Section 10

## Directory of Offices in Africa

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**Africa Corporate Head Office**  
**Centurion, Pretoria**  
**South Africa**  
**T +27 12 421 3500**

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### **SOUTH AFRICAN OFFICES:**

#### **Bloemfontein**

T +27 51 448 2721

#### **Bellville, Cape Town**

T +27 21 950 7500

#### **V&A Waterfront, Cape Town**

T +27 21 418 1405

#### **Umhlanga Ridge, Durban**

T +27 31 204 3800

#### **George**

T +27 44 873 5070

#### **Sandton, Johannesburg**

T +27 11 666 2000

#### **Centurion, Pretoria**

T +27 12 421 3500

#### **Gaborone, Botswana**

T +267 39 007 11

#### **Accra, Ghana**

T +233 575 444 554

#### **Nairobi, Kenya**

T +254 205 137 054

#### **Maputo, Mozambique**

T +258 21 498 797

#### **Lagos, Nigeria**

T +234 802 417 4152

#### **Kampala, Uganda**

T +256 313 673 217

**Principal Author**

Dr. Gerhard Brümmer

**Marketing and Design**

Rashree Maharaj

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