AECOM Imagine it. Delivered.

AFRICA

# PROPERTY & CONSTRUCTION COST GUIDE

19′
20′

AECOM AFRICA PROPERTY &
CONSTRUCTION COST GUIDE 2019/20

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## Imagine it. Delivered.

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 that 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. Imagine it. Delivered.

# Contents

# Message from Dean Narainsamy

**Director - PCC, Africa**

Welcome to our Africa Property & Construction Cost Guide 2019/20. As a company committed to building a better world, we're always looking to improve and strengthen how we do things from our delivery of projects to the research we conduct and conversations we share with colleagues, clients and organisations. Our goal is to unlock the transformational change and innovation required to move the industry forward.

From a Cost Management point of view, we continue to develop and enhance our 5D BIM capabilities. With access to industry leading software already in our toolkit, our focus over the last year has been one of collaborating with the various design disciplines at AECOM. Through this, we have been able to further our understanding of the requirements of each discipline, and in turn, we are able to advise the design teams on the requirements to achieve a 5D-friendly design environment. This collaboration has been enhanced by our global reach, with our teams sharing knowledge and developing our capabilities alongside our colleagues in the US, UK, and the Middle East. Our commitment to innovative collaboration has already resulted in practical solutions to some of the challenges of moving into a digital world and has allowed our teams to focus on providing a fuller service offering for our clients.

We are proud to report that we have maintained our Level 1 B-BBEE Scorecard in terms of the Department of Trade and Industry's Revised Codes; a reaffirmation of our commitment to contribute to a better South Africa. AECOM fully embraces diversity and inclusion and sees this as a fundamental ingredient in support of the National Transformation Agenda. I am happy to report that we have made key appointments in our Commercial, Oil & Gas and East Africa business which support the creation of a diverse workforce.

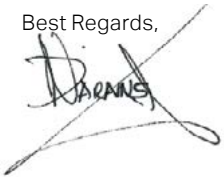
Corporate Social Responsibility (CSR) is an area that we hold dearly to our hearts with various members of our teams involved in charitable giving and with key social projects on a pro-bono basis. The health and safety of our staff and commitment to delivering a quality service to our clients remain a cornerstone of our business ethos.

In late 2018, our Africa operations merged with those of the Middle East, a move that has been well received by our employees and clients alike. Pooling our resources over a broader region is allowing us to bring the best of AECOM to our clients and accelerate growth in our key markets. We remain invested in Africa and are expanding our reach and local knowledge that we have gained over the years with a measured and focused approach aimed at developing opportunities throughout the continent in all sectors.

I would also like to take the opportunity to include a brief introduction to the Bureau for Economic Research (BER) at the Stellenbosch University whom we deem as a strategic partner, in our yearly publication. Their respected Building Cost Reports provide credibility to our cost escalation forecasting.

To conclude I would like to convey the message that whilst our business has evolved over the years, we continue to offer services that influence the key drivers of value, cost and time in all our clients' projects, a commitment that we value as we move into the future.

Best Regards,



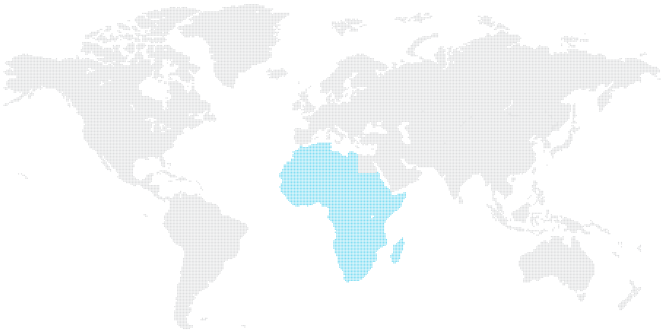
# 01 Section

## Africa has Risen

Our operations in Africa boast around 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 Africa's 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 to improve the quality of life for all.

Our corporate social investment approach includes programmes undertaken to uplift communities in general and those that have a strong developmental and educational approach.

Our strategy is aimed at facilitating the empowerment of talented individuals within a variety of interventions through university and into the workplace. We believe that in providing these opportunities to the identified individuals, they will realise their potential and be able to successfully enter the built environment profession.

In 2017, AECOM established the AECOM Educational Trust with the objective of providing bursaries to young, black women to further their tertiary education in the built environment field.

**Bridging the skills divide**

**Disabled Learnership Programme**
AECOM's Learning and Development department, in partnership with Enigma Skills College, launched its second 12-month Disabled Learnership Programme in 2018. Learnerships are intended to address the gap between education, training provision and the needs of the labour market. To date AECOM has sponsored 59 disabled learners on this work-based approach to learning that will culminate in a Business Administration NQF level 2 and 3 qualifications.

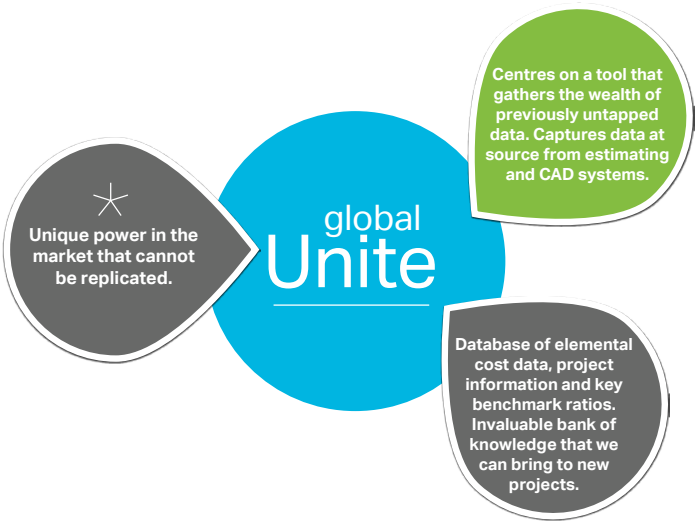
**AECOM's Bursary Programme**
As part of our commitment to improve skills, experience and excellence in the built environment, AECOM offers bursaries each year to aid full-time employees and meritorious students that are studying towards the main fields of our core business.

## Global Unite

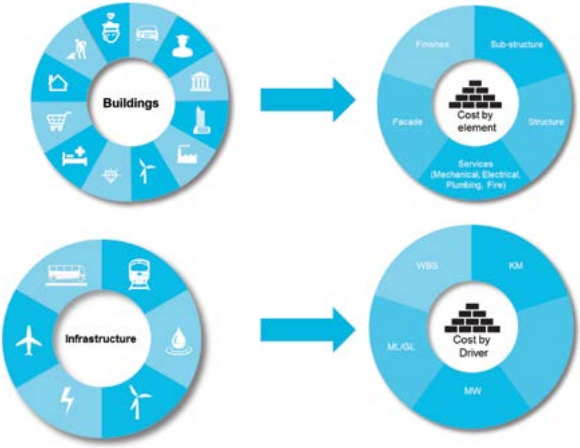
**What is Global Unite?**

Historically, cost data has existed in many different forms ranging from cost estimates to reports, spreadsheets etc.

The **Global Unite** system was designed and developed to allow us to capture and benchmark this cost data in a central location.

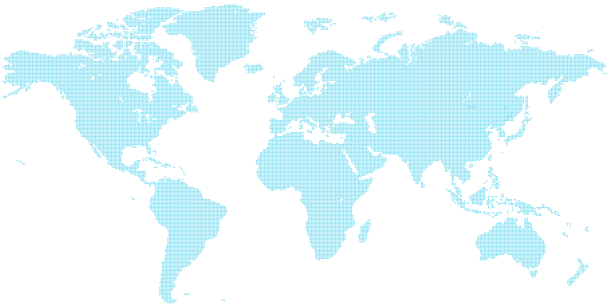



**What information can Global Unite hold?**



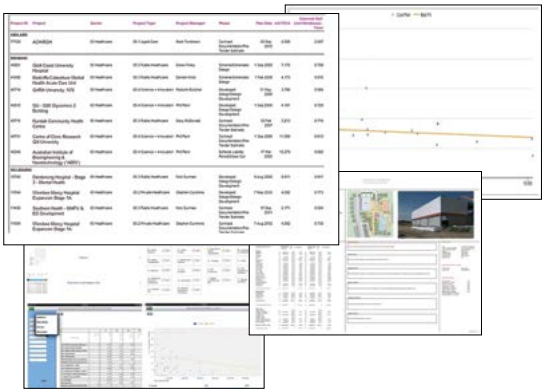
**Where does Global Unite data come from?**

Everywhere! **Global Unite** allows the capture of data from all of the AECOM key geographies into one central database.



**How is Global Unite data presented?**

The system has a number of output/reporting options ranging from a tablet-based app, GUIDE (online web-based access) to inbuilt reports, charts and graphs, MS Excel and access via Analysis Services or other data analyses tools.



## 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 to plan, design, construct, operate and maintain diverse physical infrastructures.

Whether designing or constructing bridges and roads, office towers and apartment blocks, 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 project information and by making this 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 operating an asset.

**Benefits of BIM**

- 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 rework costs and improved design efficiency.
- Improved access to maintenance information over a building's life-cycle.

**The 5D BIM process**

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 type of 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 CAD 2D plans and 3D Model, while 5D BIM entails the intelligent linking of individual 3D CAD components to 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 several benefits. The process aims to automate the measuring, estimating and bill production stages. The value lies in the fact that it will enable Cost Managers 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:

- Cost Manager contribution and buy-in to the development of the BIM execution plan
- Involvement with the design team prior to the start of design work to communicate our cost extraction design requirements
- The application of a cost database as a parameter to the objects contained in the 3D model
- Base our measures primarily on 3D design information
- Creating a unified link between the design information, our measures and our costs
- Adoption of 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.

— Categorised cost reporting and estimation via the use of zones/locations.

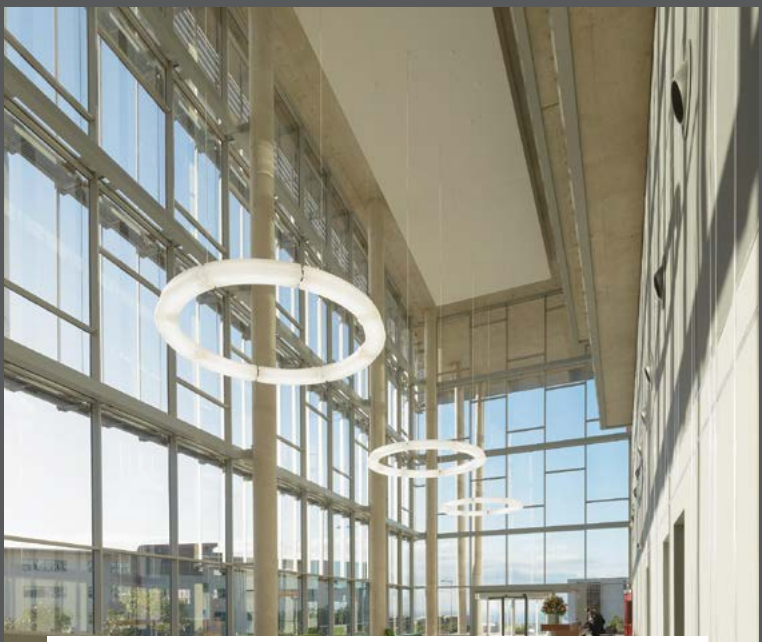
— Improved visualisation of the elements for measurement and costing purposes.

— Easy project handover between quantity surveyors.

— Enhanced communication and collaboration amongst the professional and project team.

— Improved cost database management.

— Enables a more proactive outlook from a quantity surveying perspective regarding 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 with 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 have ongoing 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 closely with industry on continuing educational workshops and in developing relevant industry reports and publications.

## Mobile App enabled AECOM Candidacy Support and Mentoring Programme

The AECOM Africa Candidacy Support and Mentoring Programme has been uniquely designed for AECOM Africa by Mentoring 4 Success (M4S) to cater for the specific professional registration requirements of the whole built environment (encompassing six professional bodies) as well as two additional professional bodies relevant to the AECOM End Markets.

This programme has also been designed to comply with the stringent requirements of the DTI Skills Matrix "Category C" programme requirements and has received approval from two of the most respected SANAS accredited B-BBEE verification agencies in South Africa — Empowerlogic and Platinum Verifications.

The programme design includes six categories for graduates and applicants:

— "Bridging" applicants who need to increase their minimum academic requirements.

— New graduates — prior to their candidacy application.

— Recently registered or more experienced candidates.

— Mature candidates (work experience exceeds the normal timeframe to registration).

— Internationally qualified and experienced candidates.

— RPL candidates.

The programme has been designed to incorporate a careful balance between the "process" of professional registration and the "path" to professional development — thus accelerating the development of confident, capable and competent young professionals within AECOM.

The programme is supported by the unique M4S Professional Registration Mentoring Handbook which has been aligned in conjunction with each of the professional bodies to demystify the road to registration and answer the many consistent questions that young graduates and candidates have.

M4S provides a completely outsourced professional registration support mentoring programme methodology, as well as the full programme management, facilitation and administration resources required to support such a complex and multi-regional/multi-office project of this nature, with over 100 participants. This includes managing, monitoring and maintaining all the compliance and administration requirements for B-BBEE "Category C" and CETA verification.

The programme is further enabled via the unique M4S Mobile Knowledge Mentoring Apps and Analytic Dashboards, which enable constant collaboration between candidates and their mentors as well as their colleague candidates on common knowledge themes related to their jobs as well as professional registration. These unique technology platforms allow for M4S to gather, monitor and report on the rich engagement analytics so critical to validating effective impact and accelerated professional development.

02
Section

## 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 petrochemical 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 and contract administrators.

Mining, infrastructure, minerals, metallurgical and petrochemical 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 that contributes to and complements 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

**The importance of cost management**

Building services such as electrical, air-conditioning, fire protection and the various electronic installations are part of every building project, and usually comprise 25 per cent to 40 per cent of the total construction cost, thus effective cost management of the building services is essential to ensure the client's budget is met.

Independent cost management of building services ensures transparency of costs and a dedicated service not linked to the specific design consultant.

**Expertise**

Our building services cost management team draws upon its unique expertise to provide financial management and contract administration of all building services including:

— Electrical installation.

— Heating, ventilating and air-conditioning (HVAC) installations.

— Fire protection systems.

— Fire detection and evacuation systems.

— Electronic systems such as access control, surveillance, and structured cabling.

— Lifts and escalators.

Our track record stretches over 30 years, during which we have cost-managed the full complement of building services on many major projects.

**Services provided**

Working in close conjunction with the appointed mechanical, electrical and fire protection consultants, our building services team provides a comprehensive service that covers all aspects of procurement and cost management including:

— Cost planning at an early stage prior to detailed design.

— Cost studies to compare alternative materials and designs.

— Evaluating the design as it evolves to ensure compatibility with the approved cost plan.

— Procurement from tender documentation to adjudication.

— Cost management, monitoring and reporting.

— Valuation of work done during construction.

— Settling final costs with the contractor.

# 03 Section

## AECOM in South Africa Broad-Based Black Economic Empowerment (B-BBEE)

Transformation is an important factor in South Africa's democratic transition towards the vision of a non-racial, non-sexist, democratic and prosperous society as summarised in the Freedom Charter. AECOM believes that to realise the vision of the Constitution, South Africa needs transformation that opens a path to inclusive economic growth and development.

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 to maintain a leading role in the built environment.

For a second year in succession, AECOM has achieved a Level 1 B-BBEE status level.

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

| B-BBEE Level Status: | Level 1 |
|---|---|
| Procurement Recognition Level | 135% |
| Black Ownership | 30% Black-Owned |
| Black Women Ownership | 21.4% Black Women-Owned |
| Scorecard Information:<br>• Ownership<br>• Management Control<br>• Skills Development<br>• Enterprise & Supplier Development<br>• Socio-Economic Development | <br>21.01 points<br>16.2 points<br>31.32 points<br>18.77 points<br>6 points |
| Total | 103.31 points |
| Empowering Supplier | YES |
| Designated Group Supplier | NO |
| Scorecard | Generic – Amended Construction Sector Charter (1 December 2017) |

# 04 Section

## South African Cost Data

## Key Factors Influencing Building Cost Rates

**Inherent difficulties and pitfalls**

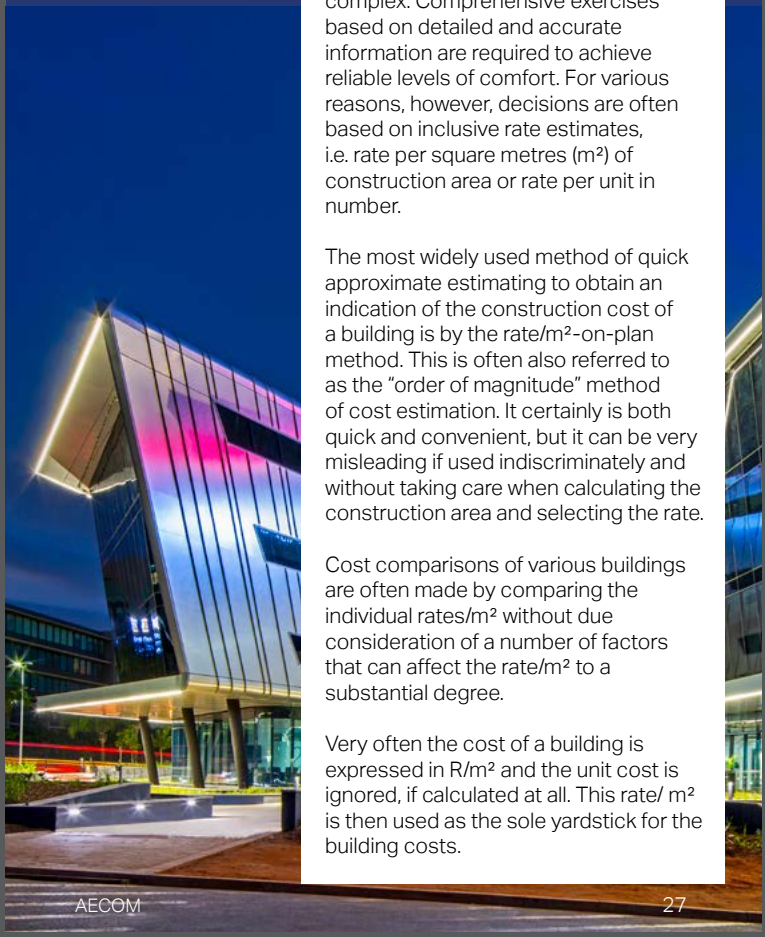
This section highlights the inherent difficulties and pitfalls that may occur when inclusive or single rates are used to establish the estimated cost of a particular building.

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 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/m². This rate, when compared with the rate for a 200m² house containing plumbing, carpets, etc., at R7,000/m² 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 considered when determining rates/m²:

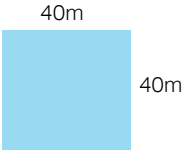
**Specification**

Two buildings of the same shape and with identical accommodation can have vastly different R/m² rates should one building have finishes of a differing standard. For example, expensive carpets in lieu of vinyl floor tiles can increase the rate by R150/m².

**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. For example:

**Case A**




| | |
|---|---|
| Area | 1,600m² |
| Wall length | 160m |
| Wall height | 3m |
| Wall area | 480m² |
| Wall floor ratio | 480/1,600 |
| Cost of external façade in terms of R/m² of floor area to each R/m² of façade area | 30.0% |

**Case B**


| | |
|---|---|
| Area | 1,600m² |
| Wall length | 232m |
| Wall height | 3m |
| Wall area | 696m² |
| Wall floor ratio | 696/1,600 |
| Cost of external façade in terms of R/m² of floor area to each R/m² of façade area | 43.5% |

The rate/m² on plan of a façade costing R800/m² on elevation in each case is:

**Case A** R800 x 30.0% = R240/m²
**Case B** R800 x 43.5% = R348/m²

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, this is 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/m² 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/m² of the building. The cost of a toilet block per square metre 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 commercial and industrial buildings the rate/m² will depend greatly on which air-conditioning, security systems, sprinklers, smoke-detection systems, electrical installations, acoustic treatment or other specialised installations are incorporated into the design.

**Construction areas**

The rate/m² for a building with large balconies or access corridors included in the construction area cannot be compared with the rate/m² for a building without similar low cost areas.

**Internal subdivisions**

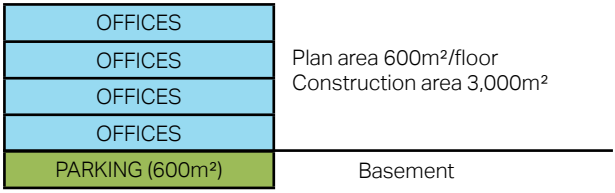
The rate/m² for open plan offices should not be compared directly with the rate/m² for offices with internal partitions without the relevant adjustments being made. The inclusion of partitions can increase the overall rate/m² by up to R300/m² of office area.

**Parking**

Should the building contain parking areas, the average rate/m² 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

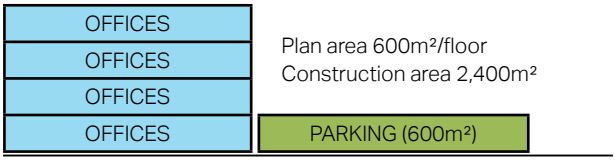



**Cost of building**

| | | | |
|---|---|---|---|
| Offices | 2,400m² @ R15,000 | = R | 36,000,000 |
| Parking | 600m² @ R6,000 | = R | 3,600,000 |
| Total | | R | 39,600,000 |
| Average rate/m² | | R | 13,200 |

**Case B**

Building having parking outside the building structure and on grade




**Cost of building**

| | | | |
|---|---|---|---|
| Offices | 2,400m² @ R15,000 | = R | 36,000,000 |
| Parking | 600m² @ R 800 | = R | 480,000 |
| Total | | R | 36,480,000 |
| Average rate/m² | | R | 15,200 |

Under Case B, the parking area is not included as part of the construction area for the purposes of calculating the rate/m². Similarly, the rate/m² for supermarket/hypermarket shopping centres should be qualified as to whether the cost of on-site parking and ancillary site development has been included, a said cost which could be in the region of R800/m² of construction area.

There are numerous further points of consideration in addition to those given above. Amongst these are site works particular to each 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/m² 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 2019, and therefore represent the average expected building cost rates for 2019. 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 square metres 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, however, been based on data received from Gauteng, where possible. Be mindful 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, but exclude costs of site infrastructure development, parking, any future escalation, loss of interest, professional fees and value-added tax (VAT).

| **Offices** | *Rate per m² (excl. VAT)* |
|---|---|
| Low-rise office park development with standard specification | R 8,000 – R 9,800 |
| Low-rise prestigious office park development | R 10,300 – R 15,300 |
| High-rise tower block with standard specification | R 11,500 – R 15,300 |
| High-rise prestigious tower block | R 15,300 – R 19,200 |

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

| **Parking** | *Rate per m² (excl. VAT)* |
|---|---|
| Parking on grade, including integral landscaping | R 500 – R 600 |
| Structured parking | R 3,900 – R 4,200 |
| Parking in semi-basement | R 4,200 – R 5,800 |
| Parking in basement | R 4,500 – R 7,000 |

| **Retail** | *Rate per m² (excl. VAT)* |
|---|---|
| Local convenience centres (Not exceeding 5,000m²) | R 7,900 – R 10,300 |
| Neighbourhood centres (5,000 – 12,000m²) | R 8,500 – R 10,900 |
| Community centres (12,000 – 25,000m²) | R 9,300 – R 12,000 |
| Minor regional centres (25,000 – 50,000m²) | R 10,300 – R 12,700 |
| Regional centres (50,000 – 100,000m²) | R 10,900 – R 13,200 |
| Super regional centres (exceeding 100,000m²) | R 11,500 – R 14,900 |

*Super regional centres and regional centres are generally inward trading with internal malls, whereas convenience, 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 m² (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 3,900 – R 5,800 |
| — Steel frame, brickwork to ceiling, steel cladding above and roof sheeting (heavy-duty) | R 4,500 – R 6,500 |
| — Administration offices, ablution and change room block | R 7,400 – R 9,400 |
| — Cold storage facilities | R 13,800 – R 19,600 |

| **Residential** | *Rate per site (excl. VAT)* |
|---|---|
| Site services to low-cost housing stand (250 - 350m²) | R 50,000 – R 80,000 |
| | *Rate per m² (excl. VAT)* |
| RDP Housing | R 2,000 – R 2,300 |
| Low-cost housing | R 3,000 – R 5,200 |
| Simple low-rise apartment block | R 7,300 – R 10,100 |
| Duplex townhouse | |
| — Economic | R 7,300 – R 10,400 |
| Prestige apartment block | R 13,900 – R 21,500 |

| **Residential** | | *Rate per m² (excl. VAT)* |
|---|---|---|
| Private dwelling houses: | | |
| — Economic | | R 5,200 |
| — Standard | | R 6,500 |
| — Middle-class | | R 7,900 |
| — Luxury | | R 11,200 |
| — Exclusive | | R 17,600 |
| — Exceptional ('super luxury') | | R 27,000 – R 56,000 |
| Outbuildings | | R 3,700 – R 5,300 |
| | | *Rate per no. (excl. VAT)* |
| Carport (shaded) | – single | R 4,400 |
| | – double | R 8,600 |
| Carport (covered) | – single | R 7,000 |
| | – double | R 12,800 |
| | | *Rate per no. (excl. VAT)* |
| Swimming pool | | |
| — Not exceeding 50 kl | | R 93,000 |
| — Exceeding 50 kl and not exceeding 100 kl | | R 86,900 – R 153,000 |
| Tennis court | | |
| — Standard | | R 380,000 – R 517,000 |
| — Floodlit | | R 457,000 – R 650,000 |

| **Hotels** | *Rate per key (excl. VAT)* |
|---|---|
| — Budget | R 620,000 – R 1,000,000 |
| — Mid-scale (3 Star) | R 1,000,000 – R 1,500,000 |
| — Upper scale (4 Star) | R 1,500,000 – R 2,100,000 |
| — Luxury (5 Star) | R 2,100,000 – R 3,000,000 |

*Hotel rates include allowances for furniture, fittings and equipment (FF&E).*

| **Studios** | *Rate per m² (excl. VAT)* |
|---|---|
| Studios — dancing, art exhibitions, etc. | R 13,800 – R 19,600 |

| **Conference centres** | *Rate per m² (excl. VAT)* |
|---|---|
| Conference centre to international standards | R 25,000 – R 32,000 |
| **Retirement centres** | *Rate per m² (excl. VAT)* |
| Dwelling houses | |
| — Middle-class | R 8,200 |
| — Luxury | R 11,500 |
| Apartment block | |
| — Middle-class | R 8,400 |
| — Luxury | R 13,000 |
| Community centre | |
| — Middle-class | R 11,000 |
| — Luxury | R 16,100 |
| Frail care | R 13,000 |
| **Schools** | *Rate per m² (excl. VAT)* |
| Primary school | R 6,500 – R 7,500 |
| Secondary school | R 7,800 – R 8,300 |
| **Hospitals** | *Rate per m² (excl. VAT)* |
| District hospital | R 26,900 |

*Hospital rates exclude allowances for furniture, fittings and equipment (FF&E).*

| **Stadiums** | *Rate per seat (excl. VAT)* |
|---|---|
| Stadium to PSL standards | R 34,000 – R 52,000 |
| Stadium to FIFA standards | R78,000 – R 103,000 |
| | *Rate per pitch (excl. VAT)* |
| Stadium pitch to FIFA standards | R 22,000,000 – R 26,000,000 |

| **Prisons** | *Rate per inmate (excl. VAT)* |
|---|---|
| 1,000 inmate prison | R 582,000 – R 619,000 |
| 500 inmate prison | R 619,000 – R 693,000 |
| High/maximum security prison | R 924,000 – R 1,238,000 |

**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 m² (excl. VAT)* |
|---|---|
| Code F Stand (85m long x 80m wide = 6,800m²) | R 5,100 |
| Code E Stand (80m long x 65m wide = 5,200m²) | R 5,400 |
| Code C Stand (56m long x 40m wide = 2,240m²) | R 6,800 |

| **Taxi lanes (incl. associated infrastructure)** | *Rate per m (excl. VAT)* |
|---|---|
| Code F taxi lane (101m wide) | R 169,000 |
| Code E taxi lane (85m wide) | R 143,000 |
| Code C taxi lane (49m wide) | R 83,000 |

| **Service roads** | *Rate per m (excl. VAT)* |
|---|---|
| Service road (10m wide) | R 17,000 |
| Dual carriage service road (15m wide) | R 22,000 |

| **Taxi ways (incl. associated infrastructure)** | *Rate per m (excl. VAT)* |
|---|---|
| Code F taxi way (70m wide) | R 121,000 |
| **Runways (incl. associated infrastructure)** | *Rate per m (excl. VAT)* |
| Code F runway (3,885m long x 60m wide = 233,100m²) | R 281,000 |
| **Parking (excluding bulk earthworks)** | *Rate per bay (excl. VAT)* |
| Structured parking | R 186,000 |
| Basement parking | R 283,000 |
| **Perimeter fencing / Security gates** | *Rate per m (excl. VAT)* |
| Perimeter walls with perimeter intrusion detection (PIDS) | R 8,600 |
| | *Rate per no. (excl. VAT)* |
| Security gate | R 16, 200 |
| Super security gate | R 48,500 |
| **Terminal & other buildings (excl. bulk earthworks, external site & services works)** | *Rate per m² (excl. VAT)* |
| Terminal building (excl. terminal building baggage & X-ray) | R 28,700 |
| Pier terminal building (excl. telescopic air bridges, seating & aircraft docking system) | R 30,100 |
| | *Rate per unit (excl.VAT)* |
| Telescopic air bridges | R 11,000,000 |
| Aircraft docking system | R 1,620,000 |

## 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 significantly depending on the orientation, shading, extent and type of glazing, external wall and roof construction.

| **Electrical installation** | *Rate per m² (excl. VAT)* |
|---|---|
| Offices | |
| — Standard installation | R 575 – R 800 |
| — Sophisticated installation | R 800 – R 1,050 |
| — UPS, substations, standby generators to office buildings | R 375 – R 525 |
| Residential | R 525 – R 800 |
| Shopping centres | R 800 – R 1,050 |
| Hotels | R 900 – R1,200 |
| Hospitals | R 1,250 – R 1,700 |

| **Electronic installation** | *Rate per m² (excl. VAT)* |
|---|---|
| Offices | |
| — Standard installation | R 375 – R 525 |
| — Sophisticated installation | R 525 – R 750 |
| Residential | R 325 – R 500 |
| Shopping centres | R 750 – R 950 |
| Hotels | R 700 – R 900 |
| Hospitals | R 750 – R 950 |

*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 m² (excl. VAT)* |
|---|---|
| Sprinkler system, including hydrants and hose reels (Excluding void sprinklers) | R 275 – R 375 |
| **Air-conditioning installation** | *Rate per m² (excl. VAT)* |
| Ventilation to parking/service areas | R 425 – R 575 |
| Offices | |
| — Console units | R 800 – R 1,000 |
| — Console/split units | R 950 – R 1,400 |
| — Package units | R 1,275 – R 1,900 |
| — Central plant | R 1,850 – R 2,900 |
| — Variable refrigerant flow (VRF) | R 1,700 – R 2,900 |
| Residential - split units | R 950 – R 1,500 |
| Shopping centres | |
| — Split units | R 1,050 – R 1,500 |
| — Package units | R 1,275 – R 1,900 |
| — Evaporative cooling | R 800 – R1,175 |
| Hotels — public areas | R 1,850 – R 2,900 |
| Hospitals central plant | R 2,400 – R 3,750 |
| Hotels | *Rate per key (excl. VAT)* |
| — Console units | R 20,000 – R 27,500 |
| — Split units | R 27,500 – R 42,000 |
| — Central plant | R 63,000 – R 90,000 |
| | *Rate per theatre (excl. VAT)* |
| Hospitals — operating theatres | R 525,000 – R 850,000 |

*For guidance regarding 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."*

05
Section

# Global Sentiment and Building Costs

## Africa outlook 2019

Through the implementation of sound macroeconomic policies, Africa's economies have generally remained resilient, thus enabling the continent to maintain its expected growth in recent years.

Although Africa's overall growth is expected to be moderate, it remains one of the fastest growing continents with Ethiopia, Ghana and Côte d'Ivoire being three of the fastest growing economies globally in terms of increased GDP. Africa's growth is being further helped with a number of East African countries contributing collectively through increased exports and cross border trade to grow this region's economy.

There is an ever growing need to finance infrastructure on the continent. A number of countries are now prioritising this following a realisation of the importance of industrialisation to not only maintain growth in their economies but to also diversify through the exportation of goods and services. Consequently, creating jobs that are needed for an increasing, younger population. A developing industrial sector on the continent will require more infrastructure investment, particularly in power, water and transportation services that are already over stretched.

An increase in oil prices and stabilisation of commodity prices have helped strengthen the forecast for GDP growth on the continent with predictions of collective growth of 3 per cent to 4 per cent for 2019/20, with individual countries increasing by as much as 7 per cent to 8 per cent.

Although we have seen some growth in the construction sector in North Africa, this has been restricted to a few countries that have stabilised following the Arab Spring. In sub-Saharan Africa, we are seeing steady growth in the infrastructure and construction sectors, as well as in East and West Africa.

Over recent years we have seen several national elections across Africa that have been free and fair, and the transition of leadership has been stable; including for some of Africa's more high-profile leaders. This has shown the world Africa's willingness to implement good governance and curb corruption at all levels.

These changes will help to encourage further foreign direct investment across the continent, which has been increasing steadily over a number of years and is a catalyst for positive growth in demand for Africa's imports and exports.

Africa continues to grow and there is a steady increase of larger infrastructure and construction projects coming to market that will provide the opportunities for investment and service providers for 2019 and beyond.

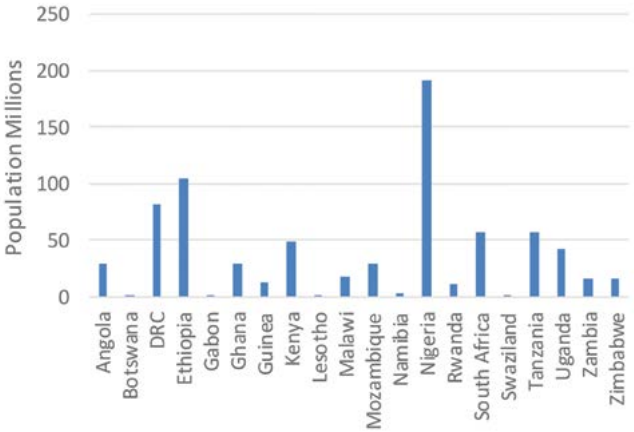
# Africa in Figures

## Area and Population

| Country | Land area (000km²) | Population | | | |
|---|---|---|---|---|---|
| | | Millions, 2017 (est) | Average annual % population growth rate, 2000 -2017 | Density, people per km², 2017 | Prevalence of HIV, total (% of population 15-49) |
| Angola | 1247 | 29.78 | 3.3 | 24 | 1.9 |
| Botswana | 567 | 2.29 | 1.8 | 4 | 22.8 |
| DRC | 2267 | 81.34 | 3.3 | 35.9 | 0.7 |
| Ethiopia | 1000 | 104.95 | 2.5 | 105 | 0.9 |
| Gabon | 258 | 2.03 | 2.3 | 8 | 4.2 |
| Ghana | 228 | 28.83 | 2.2 | 127 | 1.7 |
| Guinea | 246 | 12.72 | 2.6 | 52 | 1.5 |
| Kenya | 569 | 49.70 | 2.5 | 87 | 4.8 |
| Lesotho | 30 | 2.23 | 1.3 | 74 | 23.8 |
| Malawi | 94 | 18.62 | 2.9 | 198 | 9.6 |
| Mozambique | 786 | 29.67 | 2.9 | 38 | 12.5 |
| Namibia | 823 | 2.53 | 2.2 | 3 | 12.1 |
| Nigeria | 911 | 190.89 | 2.6 | 210 | 2.8 |
| Rwanda | 25 | 12.21 | 2.4 | 495 | 2.7 |
| South Africa | 1213 | 56.72 | 1.2 | 47 | 18.8 |
| Swaziland | 17 | 1.34 | 1.8 | 78.1 | 27.2 |
| Tanzania | 886 | 57.31 | 3.1 | 65 | 4.5 |
| Uganda | 201 | 42.86 | 3.3 | 214 | 5.9 |
| Zambia | 743 | 17.09 | 3.0 | 23 | 11.5 |
| Zimbabwe | 387 | 16.53 | 2.3 | 43 | 13.3 |

**Source: World Development Indicators 2017**

## Population 2017




**Source: World Development Indicators 2017**

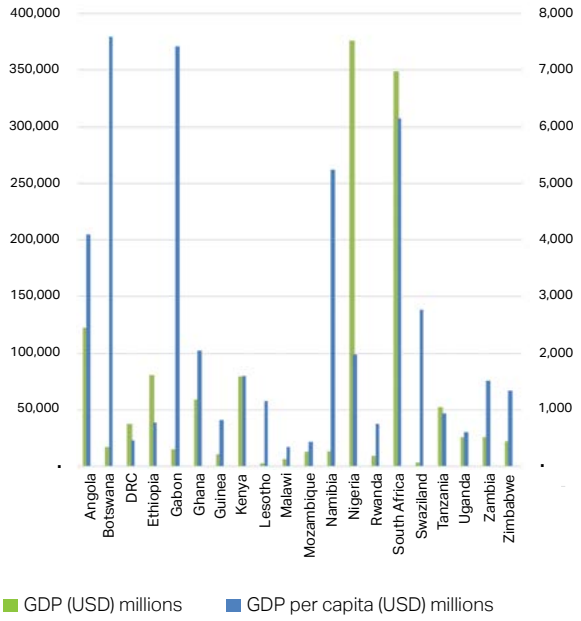
## Gross Domestic Product (At Constant 2000 Prices)

| Country | GDP (USD) millions | GDP growth (annual % since 2000) | GDP per capita (USD) | Gross capital formation (% of GDP) | Inflation, consumer price (annual %) |
|---|---|---|---|---|---|
| Angola | 122,124 | -0.1 | 4100 | 24 | 31.7 |
| Botswana | 17,407 | 2.4 | 7596 | 28 | 3.3 |
| DRC | 37,642 | 3.7 | 463 | 20.8 | * |
| Ethiopia | 80,562 | 10.2 | 768 | 39 | 9.8 |
| Gabon | 15,014 | 0.5 | 7414 | 21 | * |
| Ghana | 58,997 | 8.1 | 2046 | 22 | 12.4 |
| Guinea | 10,473 | 10.6 | 824 | 74 | 8.9 |
| Kenya | 79,263 | 4.9 | 1595 | 18 | 8 |
| Lesotho | 2,578 | -2.3 | 1154 | * | 5.3 |
| Malawi | 6,303 | 4.0 | 339 | 13 | 11.5 |
| Mozambique | 12,646 | 3.7 | 426 | 39 | * |
| Namibia | 13,254 | -0.9 | 5231 | 18 | 6.1 |
| Nigeria | 375,745 | 0.8 | 1968 | 15 | 16.5 |
| Rwanda | 9,135 | 6.1 | 748 | 23 | 8.3 |
| South Africa | 348,872 | 1.3 | 6151 | 19 | 5.2 |
| Swaziland | 3,721 | 1.4 | 2770 | 12.4 | 7.8 |
| Tanzania | 52,090 | 7.1 | 936 | 26 | 5.3 |
| Uganda | 25,995 | 3.9 | 607 | 24 | 5.2 |
| Zambia | 25,868 | 3.4 | 1513 | * | 6.6 |
| Zimbabwe | 22,041 | 4.7 | 1333 | 10 | 0.9 |

**Source: World Development Indicators 2017**

***Figures not available**

## Gross Domestic Product 2017




**Source: World Development Indicators 2017**

## Africa Building Costs

This section makes provision for comparisons of Africa's building costs, international building costs and international rental rates.

The Africa Building Cost Comparison table (page 48), summarises the estimated building costs for different types of buildings in various locations in Africa. Rates are based on projected 1 July 2019 costs and provide an indicator for the expected building cost rates during 2019. Exchange rates are as at 1 April 2019.

Rates include the cost of appropriate building services, e.g. air-conditioning, electrical, 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.

# Africa Property & Construction Cost Guide
## Africa Building Cost Comparison

Costs based on 1 July 2019
Exchange Rates to US$ as at 1 April 2019

| Building Type | Botswana Gaborone | Ghana Accra | Kenya Nairobi | Lesotho Maseru | Mozambique Maputo | Namibia Windhoek | Nigeria Lagos | Rwanda Kigali | Senegal Dakar | South Africa Johannesburg | Tanzania Dar es Salaam | Uganda Kampala | Zambia Lusaka |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Residential** (US$ / m²) | | | | | | | | | | | | | |
| Average Multi Unit High Rise | 943 | 1,950 | 809 | 1,175 | 1,325 | 979 | 2,620 | 1,269 | 1,430 | 979 | 843 | 864 | 1,100 |
| Luxury Unit High Rise | 1,333 | 2,300 | 1,201 | 1,496 | 1,695 | 1,246 | 3,635 | 1,694 | 2,250 | 1,246 | 1,125 | 1,384 | 1,560 |
| Individual Prestige Houses | 2,005 | 2,200 | 1,474 | 1,487 | 1,825 | 1,239 | 3,193 | 1,823 | 2,430 | 1,239 | 1,212 | 1,634 | 1,500 |
| **Commercial/Retail** (US$ / m²) | | | | | | | | | | | | | |
| Average Standard Offices High Rise | 997 | 1,785 | 1,092 | 1,132 | 1,275 | 944 | 2,620 | 1,560 | 1,460 | 944 | 1,033 | 1,226 | 1,050 |
| Prestige Offices High Rise | 1,669 | 2,625 | 1,894 | 1,458 | 1,525 | 1,215 | 3,635 | 1,972 | 2,400 | 1,215 | 1,308 | 2,074 | 1,520 |
| Major Shopping Centre (CBD) | 1,388 | 1,470 | 918 | 1,115 | 1,525 | 930 | 3,630 | 1,447 | 1,920 | 930 | 963 | 1,024 | 1,450 |
| **Industrial** (US$ / m²) | | | | | | | | | | | | | |
| Light Duty Factory | 888 | 1,050 | 792 | 410 | 875 | 342 | 1,451 | 1,169 | 1,315 | 342 | 774 | 854 | 525 |
| Heavy Duty Factory | 1,366 | 1,300 | 1,256 | 710 | 1,325 | 592 | 1,955 | 2,081 | 2,107 | 592 | 1,384 | 1,374 | 620 |
| **Hotel** (US$ / key) | | | | | | | | | | | | | |
| 3 Star Budget | 142,198 | 340,000 | 397,488 | 68,451 | 152,500 | 57,042 | 358,800 | 215,682 | 192,500 | 57,042 | 146,579 | 456,187 | 278,000 |
| 5 Star Luxury | 459,059 | 477,750 | 687,960 | 215,493 | 275,000 | 179,577 | 655,200 | 516,030 | 453,200 | 179,577 | 345,842 | 795,675 | 508,000 |
| Resort Style | 512,691 | 598,500 | 819,000 | Not available | 545,500 | Not available | 795,600 | 690,100 | 572,000 | Not available | 456,976 | 964,889 | Not available |
| **Other** (US$ / m²) | | | | | | | | | | | | | |
| Multi Storey Car Park | 694 | 890 | 524 | 342 | 850 | 285 | 1,872 | 891 | 1,240 | 285 | 617 | 594 | 450 |
| District Hospital | Not available | 1,785 | 1,102 | 2,273 | 3,025 | 1,894 | 2,616 | Not available | Not available | 1,894 | Not available | 1,364 | 1,850 |
| Primary & Secondary Schools | Not available | 1,155 | 965 | 625 | 1,185 | 521 | Not available | Not available | Not available | 521 | Not available | 1,083 | 735 |
| (As at 1 April 2019) | BWP | GHS | KES | LSL | MZN | NAD | NGN | RWF | XOF | ZAR | TZS | UGX | ZMW |
| US$1 = | 10.77 | 5.35 | 100.85 | 14.17 | 63.98 | 14.17 | 359.50 | 900.38 | 585.06 | 14.17 | 2314.97 | 3714.84 | 12.12 |

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

## Global Building Costs

The cost data under the heading International Building Cost Comparison (see page 50) was made available through a survey by the relevant AECOM offices based in these locations. Their assistance in this regard is acknowledged with thanks.

**ICD Brookfield Place, Dubai, UAE**
Image courtesy of ICD Brookfield

# Africa Property & Construction Cost Guide
## International Building Cost Comparison

Costs based on 1 July 2019
Exchange Rates to US$ as at 1 April 2019

| Building Type | China Hong Kong | China Beijing | China Shanghai | KSA Riyadh | Malaysia Kuala Lumpur | Singapore | South Africa JHB | Thailand Bangkok | UAE Dubai | USA Los Angeles | USA San Francisco | USA New York | United Kingdom London | Vietnam Ho Chi Minh |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Residential (US$ / m²)** | | | | | | | | | | | | | | |
| Average Multi Unit High Rise | 3,300 | 829 | 835 | 1,650 | 544 | 1,900 | 979 | 1,057 | 1,975 | 4,100 | 4,200 | 4,850 | 4,166 | 733 |
| Luxury Unit High Rise | 4,600 | 1,624 | 1,560 | 2,100 | 913 | 3,300 | 1,246 | 1,572 | 2,400 | 5,200 | 5,300 | 6,250 | 5,841 | 918 |
| Individual Prestige Houses | 6,300 | 922 | 920 | Not available | 788 | 3,100 | 1,239 | 1,649 | Not available | 4,900 | 5,500 | 5,850 | 5,795 | 658 |
| **Commercial/Retail (US$ / m²)** | | | | | | | | | | | | | | |
| Average Standard Offices High Rise | 3,150 | 1,071 | 1,055 | 1,575 | 875 | 2,400 | 944 | 954 | 1,750 | 4,500 | 4,700 | 6,000 | 4,659 | 834 |
| Prestige Offices High Rise | 3,950 | 1,527 | 1,600 | 1,900 | 1,338 | 3,100 | 1,215 | 1,134 | 2,100 | 4,870 | 5,000 | 6,500 | 5,759 | 1,265 |
| Major Shopping Centre (CBD) | 4,600 | 1,320 | 1,532 | 1,425 | 1,400 | 3,400 | 930 | 905 | 1,700 | 3,700 | 4,000 | 4,300 | 5,078 | 860 |
| **Industrial (US$ / m²)** | | | | | | | | | | | | | | |
| Light Duty Factory | 2,450 | Not available | 550 | 750 | 525 | 700 | 342 | 567 | 850 | 1,600 | 1,600 | 2,900 | 1,910 | 361 |
| Heavy Duty Factory | Not available | Not available | Not available | 900 | 575 | 900 | 592 | 902 | 1,000 | 2,000 | 2,100 | 3,800 | 3,277 | 464 |
| **Hotel (US$ / key)** | | | | | | | | | | | | | | |
| 3 Star Budget | 225,000 | Not available | Not available | 80,000 | 166,900 | 57,100 | 57,042 | 65,000 | 90,000 | 85,000 | 85,000 | 89,000 | 98,316 | Not available |
| 5 Star Luxury | 480,000 | 292,330 | 304,500 | 300,000 | 310,000 | 321,400 | 179,577 | 250,000 | 350,000 | 493,000 | 485,000 | 535,000 | 596,169 | 1195,051 |
| Resort Style | Not available | 483,115 | Not available | Not available | 281,300 | 214,300 | Not available | 300,000 | 650,000 | 308,000 | 304,000 | 318,000 | 366,068 | 236,334 |
| **Other (US$ / m²)** | | | | | | | | | | | | | | |
| Multi Storey Car Park | 1,700 | Not available | Not available | 675 | 345 | 700 | 285 | 593 | 600 | 1,400 | 1,680 | 1,500 | 936 | 364 |
| District Hospital | 5,800 | Not available | 1,530 | Not available | 1,025 | 2,900 | 1,894 | Not available | 2,700 | 6,890 | 7,500 | 8,900 | 4,706 | Not available |
| Primary & Secondary Schools | 2,800 | Not available | Not available | 1,075 | 375 | Not available | 521 | Not available | 1,525 | 4,500 | 4,300 | 4,800 | 3,015 | Not available |
| (As at 1 April 2019) | HKD | CNY | CNY | SAR | MYR | SGD | ZAR | THB | AED | USD | USD | USD | GBP | VND |
| US$1 = | 7.85 | 6.71 | 6.71 | 3.75 | 4.08 | 1.35 | 14.17 | 31.71 | 3.67 | 1.00 | 1.00 | 1.00 | 0.76 | 23197.24 |

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

# 06 Section

## International Prestigious Office Rental Comparison

| Continent | Country | City | USD/m² per annum |
|---|---|---|---|
| Africa | Angola | Luanda | 1260 |
| | Botswana | Gaborone | 551 |
| | Cameroon | Yaoundé | 299 |
| | Democratic Republic of Congo | Kinshasa | 382 |
| | Egypt | Cairo | 336 |
| | Ethiopia | Addis Ababa | 176 |
| | Ghana | Accra | 463 |
| | Kenya | Nairobi | 168 |
| | Mozambique | Maputo | 358 |
| | Namibia | Windhoek | 250 |
| | Nigeria | Abuja | 255 |
| | | Lagos | 1018 |
| | Rwanda | Kigali | 240 |
| | South Africa | Cape Town | 182 |
| | | Durban | 164 |
| | | Johannesburg | 231 |
| | | Port Elizabeth | 154 |
| | | Pretoria | 212 |
| | Tanzania | Dar Es Salaam | 176 |
| | Uganda | Kampala | 192 |
| | Zambia | Lusaka | 284 |
| | | | |
| Asia | China | Beijing | 1033 |
| | | Guangzhou | 484 |
| | | Hong Kong | 2113 |
| | | Shanghai | 821 |
| | India | Bangalore | 180 |
| | | Chennai | 141 |
| | | Mumbai | 465 |
| | | New Delhi | 269 |
| | Indonesia | Jakarta | 221 |
| | Japan | Tokyo | 872 |
| | Malaysia | Kuala Lumpur | 136 |
| | Philippines | Manila | 328 |
| | South Korea | Seoul | 509 |
| | Singapore | Singapore | 1188 |
| | Thailand | Bangkok | 248 |

## International Prestigious Office Rental Comparison

| Continent | Country | City | USD/m² per annum |
|---|---|---|---|
| Australia | Australia | Adelaide | 150 |
| | | Brisbane | 211 |
| | | Melbourne | 311 |
| | | Perth | 207 |
| | | Sydney | 618 |
| | New Zealand | Auckland | 327 |
| | | Christchurch | 272 |
| | | Wellington | 337 |
| | | | |
| Europe | Austria | Vienna | 350 |
| | Belgium | Brussels | 356 |
| | Czech Republic | Prague | 299 |
| | Denmark | Copenhagen | 320 |
| | England | Aberdeen | 431 |
| | | Birmingham | 503 |
| | | Cardiff | 359 |
| | | Leeds | 431 |
| | | London (City) | 869 |
| | | London (West End) | 1223 |
| | | London (Docklands) | 560 |
| | | Manchester | 532 |
| | | Sheffield | 359 |
| | France | Paris | 917 |
| | Germany | Berlin | 462 |
| | | Frankfurt | 584 |
| | | Hamburg | 380 |
| | | Munich | 530 |
| | Greece | Athens | 227 |
| | Hungary | Budapest | 333 |
| | Ireland | Dublin | 761 |
| | Italy | Rome | 517 |
| | | Milan | 662 |
| | Netherlands | Amsterdam | 537 |
| | Norway | Oslo | 565 |
| | Poland | Warsaw | 319 |
| | Portugal | Lisbon | 242 |
| | Romania | Bucharest | 251 |
| | Russia | Moscow | 786 |
| | | St Petersburg | 359 |
| | Scotland | Edinburgh | 496 |

## International Prestigious Office Rental Comparison

| Continent | Country | City | USD/m² per annum |
|---|---|---|---|
| Europe | | Glasgow | 445 |
| | Spain | Barcelona | 343 |
| | | Madrid | 414 |
| | Sweden | Stockholm | 837 |
| | Switzerland | Zurich | 828 |
| | | | |
| Middle East | Bahrain | Manama | 270 |
| | Lebanon | Beirut | 394 |
| | Oman | Muscat | 156 |
| | Qatar | Doha | 541 |
| | Saudi Arabia | Jeddah | 252 |
| | | Riyadh | 333 |
| | | Makkah | 146 |
| | Turkey | Istanbul | 247 |
| | United Arab Emirates | Dubai (Central Dubai) | 599 |
| | | Dubai (New Dubai) | 366 |
| | | Dubai (Old Dubai) | 366 |
| | | Abu Dhabi | 440 |
| | | | |
| North America | Canada | Montreal | 329 |
| | | Toronto | 642 |
| | | Vancouver | 443 |
| | Mexico | Mexico City | 396 |
| | USA | Atlanta | 312 |
| | | Boston | 417 |
| | | Chicago | 456 |
| | | Houston | 339 |
| | | Los Angeles | 470 |
| | | Miami | 436 |
| | | New York (Manhattan) | 834 |
| | | Philadelphia | 347 |
| | | Richmond | 225 |
| | | San Francisco | 880 |
| | | Seattle | 456 |
| | | Washington DC | 644 |
| | | | |
| South America | Argentina | Buenos Aires | 336 |
| | Brazil | Sao Paulo | 257 |
| | | Rio de Janeiro | 495 |

*Rates are applicable as at 1 January 2019 and exclude VAT, but include GST where applicable. Above are gross rentals and include operating cost and municipal cost, but exclude electricity and water consumption.*

07
Section

# 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 for 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 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 2015 the year-on-year rate (January 2015 to January 2016) of building cost inflation in South Africa was only -0.6 per cent while the average annual rate (comparing monthly indices) was 4.0 per cent.

**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 costs during the contract period. The Contract Price Adjustment Provisions (CPAP) formula provides for 85 per cent of the contract amount to be subject to escalation adjustment with the remaining 15 per cent fixed. Furthermore, a factor must be introduced to take account of the cash flow payments during the construction period and 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), is 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 | |
| 2014 | 100.0 | | 100.0 | | 1.00 |
| 2015 | 111.4 | +11.4% | 105.0 | +5.0% | 1.06 |
| 2016 | 110.7 | -0.6% | 108.0 | +2.9% | 1.03 |
| 2017 | 117.8 | +6.4% | 116.9 | +8.2% | 1.01 |
| 2018 | 126.1 | +7.0% | 123.5 | +5.6% | 1.02 |
| 2019 | 134.8 | +6.9% | 128.5 | +4.1% | 1.05 |
| 2020 | 138.4 | +2.7% | 135.7 | +5.6% | 1.02 |
| 2021 | 154.3 | +11.5% | 142.4 | +4.9% | 1.08 |
| 2022 | 171.1 | +10.9% | 151.8 | +6.6% | 1.13 |
| 2023 | 182.9 | +6.9% | 160.3 | +5.6% | 1.14 |

*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 contractor's mark-up, productivity, availability of materials, etc.*

*Forecast based on information provided by the Bureau for Economic Research, Stellenbosch University.*

**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 60). 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 2014 = 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 events take 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. Often the unit costs of these projects are significantly higher than originally anticipated. 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.

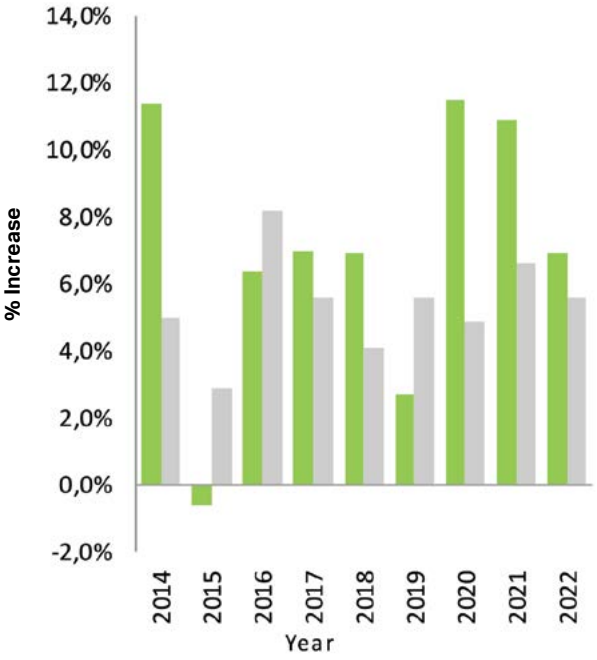
**Value-added tax**

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 15%) should be added.

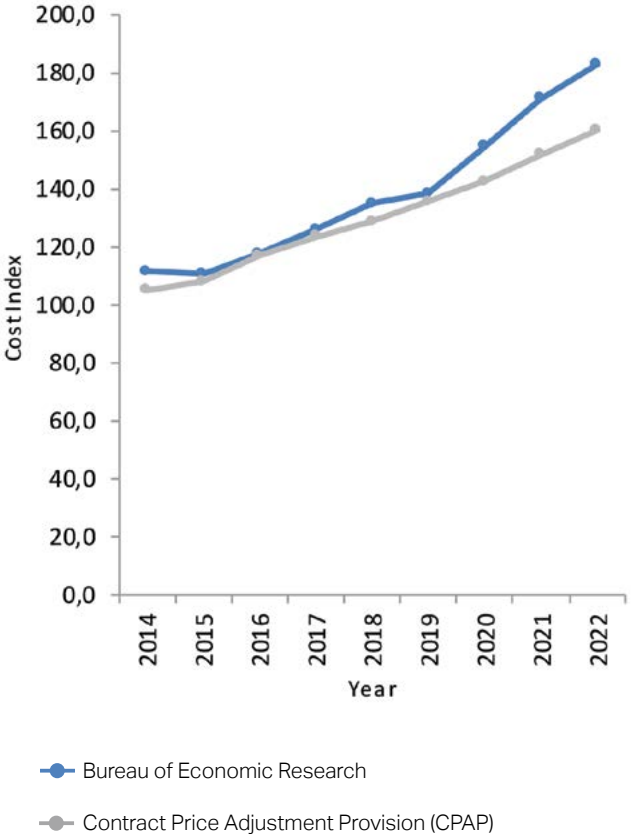
Cognizance should be taken, however, of the effect of VAT on cash flow over a period of time. This will vary according to the payment period of the individual vendor. In all cases, however, it will add to the capital cost of the project to the extent of interest on outstanding VAT for the VAT cycle of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

## GRAPHS: BER AND CPAP

**January-to-January building cost % change**

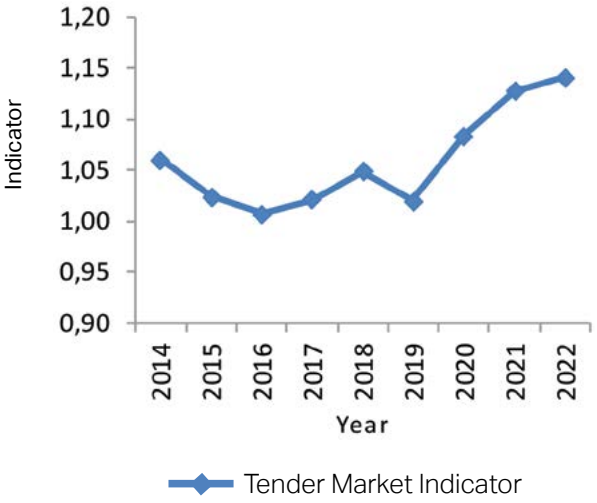


**January building cost indices**



**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 to the section on tender climate, page 57.*

08
Section

# Method for Measuring Rentable Areas

## SAPOA methods

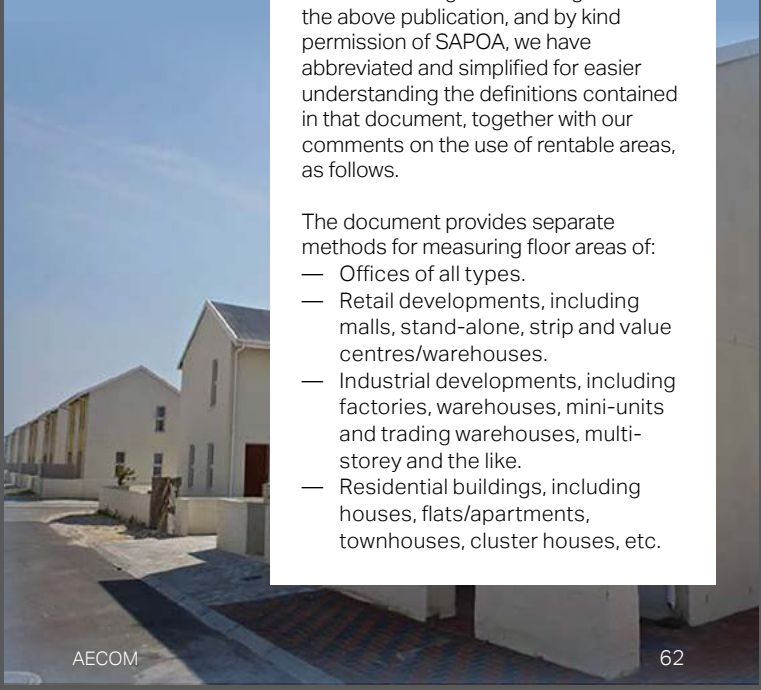
In the past, many landlords and developers have derived methods for calculating the rentable areas of buildings.

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 ($m^2$).

**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 usable 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 usable 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 0.5m² in area, are deducted from the rentable area.

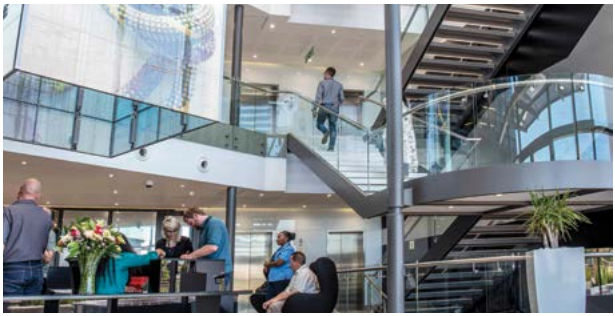
**Remote service areas and plant rooms**

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 usable 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 62. 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, Second 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.

09
Section

## 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 considered 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 per cent.

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 per cent.

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 per cent, the escalation rate is 9.00%, and the approximate IRR is the sum of the two, i.e. 19.50 per cent.

*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:

$$\text{Return} = \frac{\text{Net Annual Income}}{\text{Total Capital Outlay (TCO)}}$$

$$= \frac{\text{Net Annual Income}}{y + x}$$

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

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

$$\text{Now } x = \text{Land Value + Loss of Interest}$$
$$= \text{Future Value of Land}$$

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 |
| Total capital outlay excluding land cost (y) | R 47,365,000 |

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

$$= \frac{R6{,}000{,}000}{0.10} - R47{,}365{,}000$$

$$= R12{,}635{,}000$$

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). Consideration should be given carefully, taking into account the risk profile of the proposed development.

# 10 Section

## Directory of Offices in Africa

**Africa Corporate Head Office**
**Centurion, Pretoria**
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**Kampala, Uganda**
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**Maseru, Lesotho**
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**Maputo, Mozambique**
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**Nairobi, Kenya**
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# 11 Section

BUREAU FOR ECONOMIC RESEARCH

**Background**

The Bureau for Economic Research (BER) is one of the oldest economic research institutes in South Africa. It was established in 1944 and is part of the Faculty of Economics and Management Sciences (EMS) at Stellenbosch University. Over the years, the BER has built a local and international reputation for independent, objective and authoritative economic research and forecasting.

**Primary Activities**

The BER primarily focuses on the South African macro economy and selected economic sectors. It monitors and forecasts macroeconomic and sector trends and identifies and analyses local and international factors that affect South African businesses.

The organisation has built up and continues to expand its business tendency surveys and macroeconomic forecasting capabilities. Both are used for analysing and projecting South African macroeconomic trends. The BER uses a variety of internationally accepted methodologies and econometric models for the generation and analysis of the data, as well as techniques developed specifically for the unique South African environment.

The BER also compiles the **BER Building Cost Index** and produces the quarterly report on building costs.

**The BER Building Cost Index (BCI)**

The BER Building Cost Index (BCI) is compiled from information collected quarterly by means of a standard questionnaire from the same group of quantity surveyors. These quantity surveyors supply information on the scope of the project, some amounts and the tariffs (rates) of a number of items from the bills of quantities of accepted tenders.

The index is compiled by analysing current price movements of 22 representative cost components that are common to all buildings relative to the prevailing base prices. Data for items from most of the categories of the Standard System of Measuring Building Work are collected. A weight is accorded to each item based on considerations such as basic design criteria. In order to ensure comparability, certain adjustments in the calculation process are made.

The research can be accessed by subscribing to the BER Building Cost information service for a nominal annual fee. Members of the Association of South African Quantity Surveyors (ASAQS) get a 20 per cent discount if they register via the ASAQS membership portal.

Subscribers get access to a quarterly report consisting of:

— The historical BER BCI, along with a 5-year forecast (pre-tender escalation).
— A 5-year forecast of the Contract Price Adjustment Index (Haylett index) for workgroups 180 and 181 (post-tender escalation).
— The rates of the 22 representative items on which the BER BCI is based.

For more information visit their site at www.ber.ac.za or email Craig Lemboe at cjl@sun.ac.za

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**AECOM is built to deliver a better world. We design, build, finance and operate critical infrastructure assets for governments, businesses and organisations. As a fully integrated firm, we connect knowledge and experience across our global network of experts to help clients solve their most complex challenges. From high-performance buildings and infrastructure, to resilient communities and environments, to stable and secure nations, our work is transformative, differentiated and vital. A *Fortune 500* firm, AECOM had revenue of approximately $20.2 billion during fiscal year 2018. See how we deliver what others can only imagine at aecom.com and @AECOM.**

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