

CASE STUDY

The delivery of the first phase of the two new universities:

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Introduction

The process for establishing the new universities was initiated when the Minister of Higher Education and Training (DHET) appointed two task teams in 2010 to investigate the feasibility and possible models for the establishment of universities in the Mpumalanga and the Northern Cape Provinces. Following extensive consultation with stakeholders in these two provinces, the task teams submitted their reports to the Minister in September 2011, and subsequently to the Council on Higher Education (CHE) for their advice. The Minister of Higher Education decided to proceed with both universities in the conviction that universities are essentially national institutions and that a university in the Northern Cape would attract students from across the country and not only from the school system in the Northern Cape (NUPMT, 2018)

In 2007, stimulated by government infrastructure funding, the University of the Witwatersrand (Wits) embarked upon its first major capital expansion programme in over 20 years. Initially a traditional master-servant approach was pursued, which led to significant cost overruns, the full extent of which was only known months after completion. The client team decided to explore an alternative approach to delivering infrastructure based on long-term, collaborative relationships and early contractor involvement, underpinned by the NEC3 family of contracts. This approach produced a consistently reliable time and cost outcome over the R1,5b infrastructure programme (Laryea and Watermeyer, 2014).

Towards the end of 2011, Wits was approached by the Department of Higher Education and Training (DHET) to provide specialised delivery capacity for the implementation of government's decision to establish new universities in the Mpumalanga and Northern Cape provinces of South Africa. A Memorandum of Agreement (MOA) between Wits and DHET established the New Universities Project Management Team (NUPMT), under the leadership of a client delivery manager, to direct academic and institutional planning as well as the planning, design, construction and handover of infrastructure for the first phase of both universities. The core members of Wits capital expansion programme became the core members of the NUPMT.

The MOA between DHET and Wits required Wits to *“collaborate closely with DHET and identified stakeholders to establish the planning parameters for the two new institutions, including the vision, academic architecture, location, costs, phasing and other relevant considerations pertinent to their spatial and physical planning.”* It also required Wits, through its Campus Planning and Development Unit, to establish a NUPMT to be responsible and accountable for the delivery of an implementation plan. This NUPMT was tasked with the assembling of relevant expertise and the commissioning and management of such capacity to undertake the project management, planning and conceptual design of the new universities in a phased manner for a period of 13 months. The NUPMT was required to consult with the Technical Integration Committee, which was established by DHET, to ensure its related planning requirements were accommodated and integrated within the overall implementation plan. A budget of R 50 m was made available for a 13-month period.

Addendum 1 to the MOA extended the agreement from 27 November 2012 to 15 March 2013 without any change in scope or budget. Addendum 2 extended the MOA to 15 March 2014, increased the budget to R131,3 m and extended the scope to enable the project to continue with the long-term infrastructure planning, to proceed with the renovation of existing buildings and to develop the long term academic programme so that the first academic year could commence during February 2014. Addendum 3 extended the implementation period to 31 March 2015 to enable the ongoing process to procure the services of a delivery team (project managers, designers, specialist services and suppliers) and

increased the budget to R 504,7m. Addendum 3 also introduced the implementation of a handover plan which set out a phased handover of responsibilities to the new universities prior to October 2014 start of the major construction required for the third academic year in 2016. Addendum 4, which was signed in September 2014 when it became evident that the handover to the new universities could not be achieved before the start of the major construction in October 2014, extended implementation to 31 March 2016 and increased the budget to R 1 951,5 m. This Addendum extended the scope of implementation to include major construction. Addendum 5 extended the MOA to 31 July 2017 to implement a close out plan and reduced the budget to R 1 768,5 m.

Figure 1 provides an overview of the approximate development of the four sub-phases comprising the first phase of the new universities project. It also includes the expenditure per phase as well as information on the number of student enrolments during this period. Table 1 indicates the time lines associated with the major deliverables during this first phase of the project.

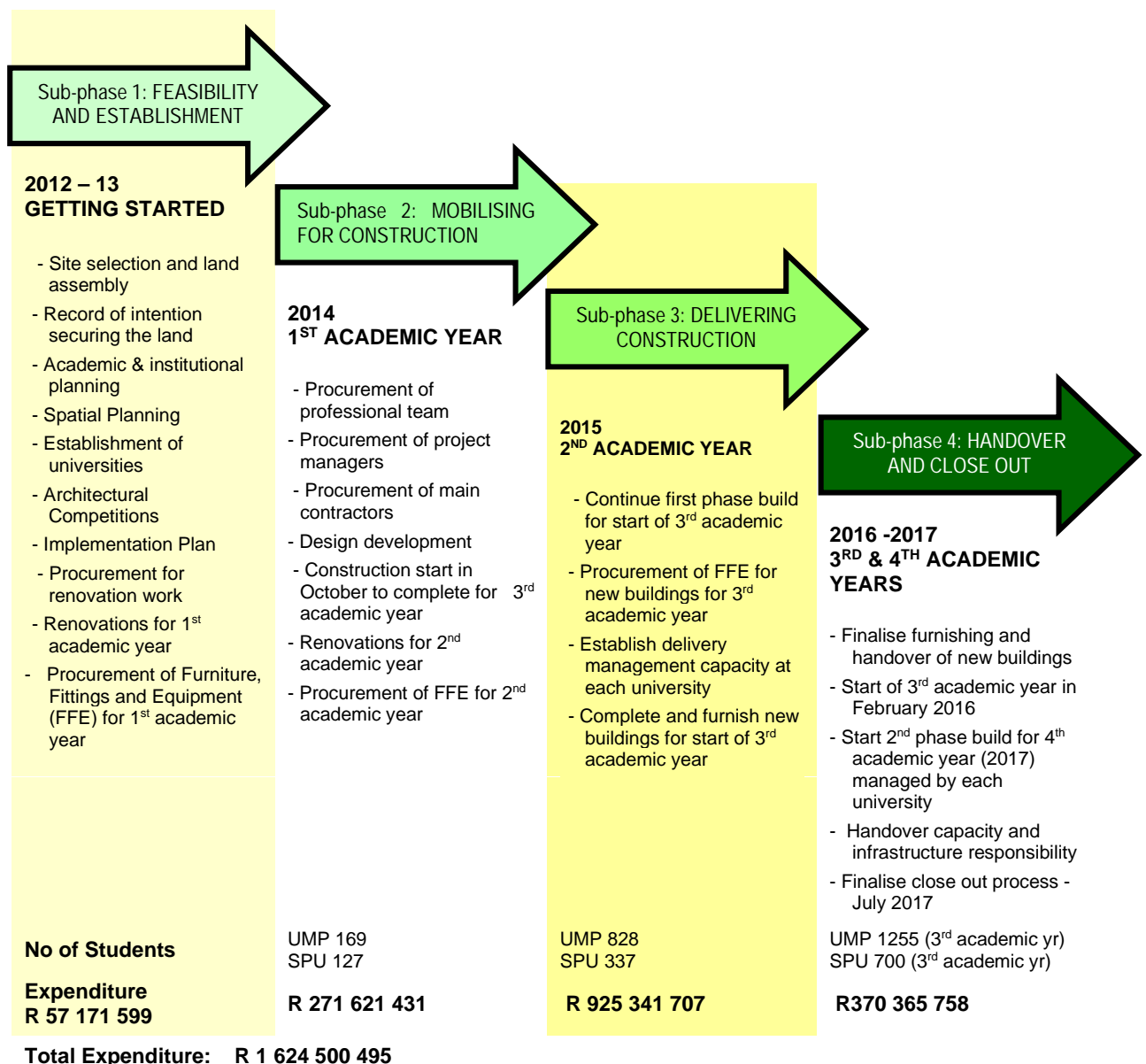


Figure 1: An overview of the approximate development sub-phases (NUPMT, 2018)

Delivery management and governance arrangements

Wits established a core team under the leadership of a client delivery manager reporting to the Wits Director Campus Planning and Development i.e. the NUPMT. Core team members were selected for

their expertise. Wits and DHET collectively formed the client team. Separate delivery teams were contracted to provide the works that were required for each of the universities as indicated in Figure 2. Project governance took place through a Project Steering Committee and a Technical Integration Committee.

Table 1: Time lines for key milestones in the delivery of the new universities (after NUPMT, 2018)

Date	Key milestone
25 March 2010	Minister of Higher Education and Training announced the establishment of two task teams to explore appropriate models for new universities in Mpumalanga and the Northern Cape Provinces.
September 2011	Final Report on the Establishment of the New Universities in the Northern Cape and Mpumalanga Provinces submitted to the Minister
October 2011	NUPMT commences work on identification of sites for UMP and SPU.
5 July 2012	President of the Republic of South Africa announces the seats of the new universities as the inner-city of Kimberley and the Lowveld College of Agriculture in Nelspruit
July 2012	Development Framework for the Establishment of New Universities in the Northern Cape and Mpumalanga Provinces is completed, setting out the unfolding vision for the new universities.
30 September 2012	Submission to National Treasury of detailed feasibility studies for the new universities
November 2012	National Treasury confirmed an allocation of slightly more than R2billion over the 2012/14 – 2015/16 Medium Term Expenditure Framework (MTEF) for development of the new universities
April 2013	Detailed spatial plans for the universities are completed
5 – 6 July 2013	Workshop held to brief the Interim Council of both universities on the planning work that has already been undertaken by the DHET and NUPMT
25 July 2013	President of the Republic of South Africa announces the new Interim Council and names of both universities
22 and 23 August 2013	The Minister of Higher Education and Training, by notice in Government Gazette formally establishes SPU and UM, respectively, as public Universities, announces the names of the Interim Councils and publishes the Record of Intention to Facilitate the Rapid Establishment of the new Universities on Publicly Owned Land
18 September 2013	Winners of the Architectural Competition for Sol Plaatje University announced as a build-up to the main launch event
February 2014	Start of first academic year with a student enrolment of 127 students at SPU and 169 students at UMP
April 2014	Appointment of the project managers to manage construction of new infrastructure for SPU and UMP
14 and 19 August 2014	Appointment of full Council of the University of Mpumalanga and University of Mpumalanga, respectively
September 2014	Main contractors appointed under framework contacts for construction of new buildings
October 2014	Start of construction of new building and infrastructure
1 November 2014	Prof Thoko Mayekiso appointed as first Vice Chancellor and Principal of University of Mpumalanga
February 2015	Start of the second academic year with a student enrolment of 337 students at SPU and 828 students at UMP
1 April 2015	Prof Yunus Ballim appointed as first Vice-Chancellor and Principal of Sol Plaatje University
February 2016	Completion of first new buildings at each university facilitates the enrolment of 700 students at SPU and 1255 students at UMP
1 April 2016	SPU and UMP take over full responsibility for further infrastructure delivery and NUPMT commence close out process

The Project Steering Committee (PSC) originally included representatives from DHET, Wits, the University of Johannesburg, University of Pretoria, the National Institute for Higher Education (NIHE) and the Premier's Office in each province. It was subsequently expanded to include representatives of the new universities, following the signing of a second Memorandum of Agreement between DHET, Wits, the University of Mpumalanga (UMP) and the Sol Plaatje University (SPU) during October 2014. The PSC, which met 15 times between March 2012 and January 2016, provided oversight and guidance to the development of both universities until its last meeting in January 2016.

The Technical Integration Committee (TIC), which met 50 times between February 2012 and March 2016, integrated the planning work and thinking of the DHET, the NUPMT and, following their establishment, the new universities. The monthly TIC Contracts Committee, dealt with budget and procurement approvals. This committee continued to meet beyond March 2016 in order to finalise outstanding contractual commitments. It met a total of 71 times and enabled the development of budgets and the unfolding contractual commitments that resulted in peak expenditure levels of approximately R134 m per month.

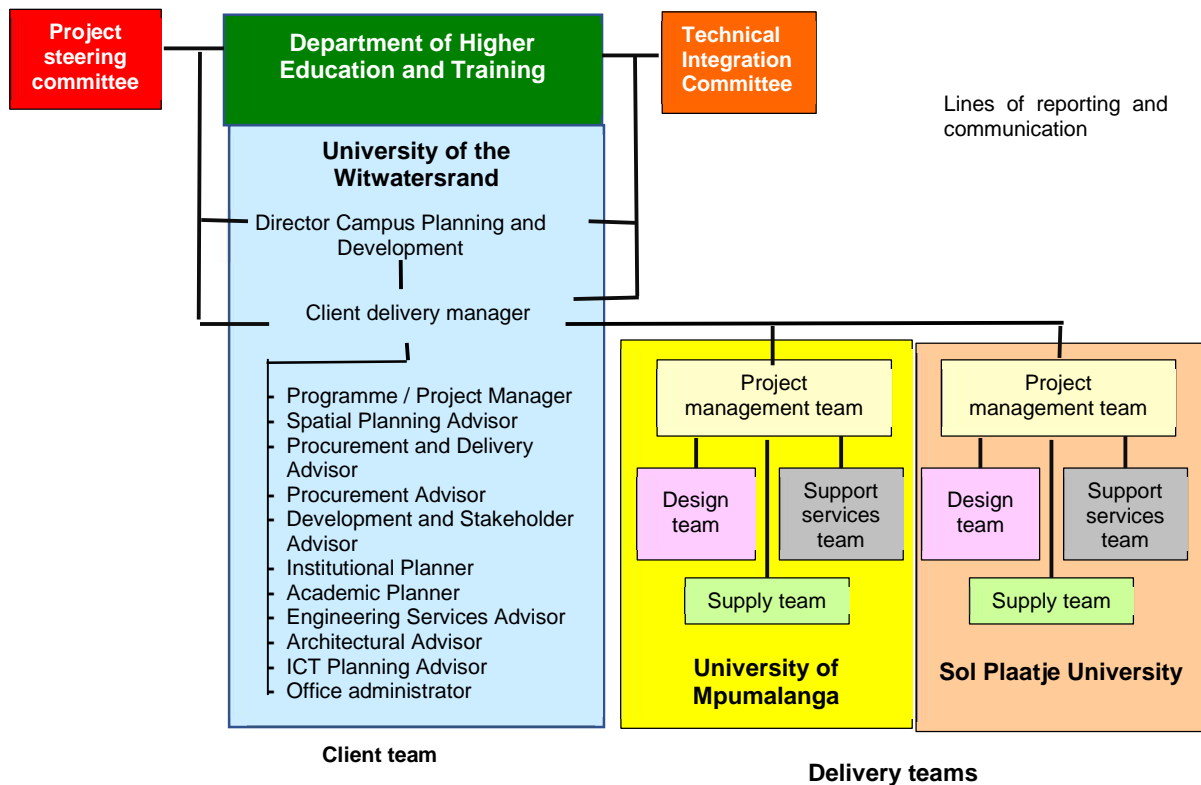


Figure 2: The structure of the client team and the delivery team

Translating vision and values into practice

Vision and values were the two most important leadership tools used by the client team in delivering the two new universities. Vision provided direction and a sense of purpose while values provided trust and appropriate behaviours for team success.

Academic vision determined the institutional, spatial and infrastructure planning for the new universities. Pivotal to the academic planning and development was the publication in the Government Gazette No 35645 of 31 August 2012 of the *Development Framework for two Universities in the Northern Cape and Mpumalanga* for comment by interested individuals and organisations. This document set out government's unfolding vision for the two new institutions and provided a framework within which the diverse elements and activities required for establishing the new universities could be conceptualised, planned, structured, prioritised, integrated and ordered. This Development Framework provided an important means to elicit input from and to consult with stakeholders. It also enabled the alignment of the efforts of stakeholders and informed the design, development and establishment of the two new institutions.

A Spatial Design and Development Framework was established for each university, following engagements with the local authorities in Kimberley and Nelspruit. This framework established the spatial and infrastructural framework within which government's evolving vision and thinking on the establishment of the new institutions could take place. Direction in developing the spatial frameworks was derived from the following three major directives (NUMPT, 2018):

-) Interrogating the DHET mission statement for the establishment of the two new universities, in order to explore the spatial implication of the academic mission.

-) Identifying the desirable performance qualities which universities in South Africa in the 21st Century should be seeking to achieve.
-) Establishing a comprehensive understanding of the contextual informants in accordance with the unique cultural and environmental conditions of the place within which the two universities were to be established.

Table 2 indicates the principles and considerations in the main ideas underpinning the concepts for the two new universities. The Design and Development Frameworks provided a strategic tool within which the diverse elements and activities required for the establishment of the new universities could be conceptualised, planned, structured, and prioritised, creating a context and strategy for implementation.

The spatial development frameworks created the crucial starting point for all further physical planning, including Town Planning and Environment Impact approvals. The Town Planning and Environmental Impact Assessment processes also had a significant impact on the construction start for some portions of the two universities. The spatial development frameworks also informed the basis for multi-year infrastructure implementation plans.

Table 2: Spatial concept and main ideas (NUPMT, 2018)

Principle	Considerations	Principle	Considerations
Sol Plaatje University		University of Mpumalanga	
Principle 1: Promote integration	<ul style="list-style-type: none">) Integration with the city) integration with the city movement structure) integration with modes of movement) social integration) integration of sport and recreational amenities 	Principle 1: Making connections	<ul style="list-style-type: none">) connections with the surrounding context and the city) regional and local movement networks) campus access
Principle 2: Equity of access	<ul style="list-style-type: none">) permeability, particularly pedestrian permeability) balanced movement network and pedestrian dominance, 	Principle 2: Establishing a balanced movement network	<ul style="list-style-type: none">) an integrated network of streets) hierarchy of streets
Principle 3: Promote identity	<ul style="list-style-type: none">) university walks) place making) gateways spaces, landmarks and legibility 	Principle 3: Place bound university to strengthen identity	<ul style="list-style-type: none">) topography to shape campus plan) a defined campus area) gateway spaces. landmark and legibility
Principle 4: Dignity: creating a network of shared spaces	<ul style="list-style-type: none">) linking with the city green structure) landscape possibilities) Oppenheimer memorial park) public space edge consolidation) active public space edges) safety and security 	Principle 4: Network of shared spaces	<ul style="list-style-type: none">) linking with the city green structure) landscape plan) public space edge consolidation: perimeter blocks) safety and security
Principle 5: Variety of use and land form	<ul style="list-style-type: none">) campus functional layout) adopting hierarchy of relative privacy 	Principle 5: Variety of use and form	<ul style="list-style-type: none">) campus functional layout
Principle 6: Efficiency and sustainability	<ul style="list-style-type: none">) leadership in sustainable practices including efficiency of land utilisation) demonstration of best practice 	Principle 6: Flexibility and phasing	<ul style="list-style-type: none">) establish a microcosm of the completed university from day one
Principle 7: Flexibility in phasing and implementation strategies	<ul style="list-style-type: none">) creation a completed portion of the campus and a corresponding sense of identity from the start 		

A decision was taken to conduct a design competition to identify a small group of architects to design these new campuses so that they would not only be responsive to spatial requirements but also result in architectural landmarks symbolic of intellectual aspiration. The architectural competition was envisaged as a means to generate new and exciting ideas and best practice concepts, as well as to identify a pool of talented designers to participate in the design of the university campuses, precincts in

each campus, land parcels or individual buildings. A design competition, despite the costs and the time required, was considered to be a fundamental investment to secure the right team for the job and to bring the highest quality of thinking to the fore (NUPMT, 2018).

Extensive briefings were given to the architects that were appointed which highlighted the mission development frameworks for the universities, the process followed towards their establishment as well as the architectural guidelines and spatial qualities expected. The management of the divergent architects required joint working sessions, open discussions between the architects and the NUPMT and the monitoring and critiquing of proposals of each architect. The architectural guidelines were changed by consensus.

The professional team from the outset were advised that fundamental to the client's concept of "superior quality" was the principle of "design efficiency" in relation to construction cost. Several workshops were held to brief the design teams and contractors on the DHET space and cost norms for universities, against which the designs would be continuously benchmarked. The concept of design efficiency required continuous team reflection on the choices made in terms of space, structure, materials and environmental comfort, sustainability and a sensitive attention to artwork in the context of the local environment and history.

At both universities, designing for environmental sustainability and lifecycle value was integral to the design process aimed at attaining optimum investment benefit. The involvement of an environmental sustainability consultant informed campus wide initiatives such as "green specifications" and extensive "metering and monitoring" of energy and water. Moreover, the design development of each building was shaped by rigorous interaction between the consultant and the relevant architect and design team.

Sustainability approaches to building design include shading control, natural ventilation, mechanical ventilation systems, daylight and solar control, grey water harvesting, evaporative cooling and thermally activated building systems (TABS) for heating and cooling.

Approach to procurement

All procurement for the new universities was based on Wits University's *Construction Procurement Policy, Processes, Procedures, Methods and Delegations*. This university document was almost a carbon copy of the draft National Treasury's *Standard for a Construction Procurement System* which was published in November 2012 for public comment. The Wits professional services contracts were structured around the draft *Standard for an Infrastructure Delivery Management System* which was also released by Treasury for public comment during November 2012. (These two draft Treasury Standards were subsequently combined into one document, namely the *Standard for Infrastructure Procurement and Delivery Management*. The published version of this standard draws upon the experience gained by the New Universities Project Management Team in applying these draft Treasury Standards in practice.)

The NUPMT based its procurement approach on the experience gained by Wits University in delivering its substantial capital works programme over the period (2007 – 2012) preceding the new universities project. Key learning from this experience was that the project objectives can best be achieved when (NUPMT, 2018):

-) *The design of the buildings and associated site works are managed by the employer and his agents, and the main contractor has limited responsibilities for the design;*
-) *Discipline-specific design specialists are appointed by the employer to provide the required design inputs;*
-) *Fragmentation in design is addressed by involving the contractor wherever possible in the development and finalisation of the design;*
-) *A conscious decision is taken to move away from the pre-planned traditional contracting approach ("them-and-us") towards an integrated project team which works together over a number of years, taking learnings from one project to another, and supporting a collaborative team culture;*

- J) *A flexible construction service (three-year contracts are established with the capacity to respond rapidly to changing demands and constraints as the projects unfold);*
- J) *The client leadership and procurement strategy promotes an industry culture shift (see Table 3).*

Table 3: Culture shift promoted through the client’s procurement strategy (Watermeyer, 2009)

From	To
Master-servant relationship of adversity	Collaboration towards shared goals
Fragmentation of design and construction	Integration of design and construction
Allow risks to take their course	Active risk management and mitigation
Meetings focused on past - what has been done, who is responsible, claims, etc.	Meetings focused on “How can we finish project on time and within budget?”
Develop the project in response to a stakeholder wish list	Deliver the optimal project within the budget available
“Pay as you go” delivery culture	Discipline of continuous budget control
Constructability and cost model determined by design team and quantity surveyor <u>only</u>	Constructability and cost model developed with contractor’s insights
Short-term “hit-and-run” relationships focused on one-sided gain	Long-term relationships focused on maximising efficiency and shared value

Based on Wits’ experience and the specific objectives developed by the NUPMT and the integrating and governance structures described elsewhere, the primary procurement objectives for the New Universities project were to:

- Ñ *deliver the universities within a control budget;*
- Ñ *ensure that life cycle costs and sustainability are considered;*
- J) *ensure that expenditure is within the annual allocations of the MTEF;*
- J) *ensure that teaching spaces can be occupied at the start of the academic year;*
- J) *provide works that are capable of being readily maintained;*
- J) *ensure that the design of teaching spaces is aligned with current and future best practice; and*
- J) *ensure a non-negotiable commitment to health and safety.*

The secondary procurement objectives for the New Universities project were to:

- a) *promote broad based black economic empowerment (B-BBEE);*
- b) *promote and support local participation (province wide) throughout the supply chain and local employment through the delivery of the works; and*
- c) *support skills development by increasing the number of people who have part qualifications, national qualifications and professional designations awarded by statutory councils.*

Contracts were negotiated with the members of the client team to ensure that the team had the requisite skills sets and chemistry. Almost all other contracts were put in place following a competitive or competitive negotiation selection method.

The project delivery route as described by Watermeyer (2018) varied. The buildings required for the first and second intake comprised existing public sector buildings (school, college and administrative buildings) that were transferred to the universities or private sector buildings (hotel and block of flats) that were purchased for the Sol Plaatje University. These buildings were thereafter repurposed as

necessary and refurbished. New purpose designed buildings were provided for the third and subsequent intakes. The client team retained in the new build programme design and interface responsibilities i.e. the team pursued a design by client contracting strategy whereby the contractor undertook construction on the basis of production information issued by the client and managed the interfaces between different work packages executed by different contractors.

Participants in the first stage of the architectural competition who expressed interest were provided with a brief which included the Spatial Development Framework and were required to provide a brief outline of their understanding of the five issues listed in Table 4, using sketches, diagrams, images and text, and their proposed methodology and approach. The jury was tasked to select no more than 10 participants to progress to the next stage. Participants in the second stage were required to submit ideas based on a full brief, including detailed precinct plans. The focus during this stage was on the design of buildings and the detailed elaboration of a portion of the campus. Participants were required to outline by way of drawings (plans, sections, elevations and perspectives) and a monotone block model their approach and understanding to a university building in the context of the prescribed Development Framework for the University. The jury was tasked to rank the submission and to decide whether or not to award an honorarium. Those participants who were admitted to the second stage of the competition were invited to associate with architectural practices and to submit tender offers. Tenders were evaluated on the basis of their financial offer, preference and quality in accordance with method 4 of SANS ISO 10845-3. The score for quality was based solely on the ranking of the competition jury. Tenderers who failed to be ranked by the jury were eliminated from contention.

Table 4: Outline of responses required in the first stage of the design competition

Issue	Northern Cape (Kimberley)	Mpumalanga (Nelspruit)
1	Entries need to demonstrate how the university buildings can relate to the public spaces and improve the civic character of the university, without compromising the integrity or functionality of the university buildings.	Entries need to demonstrate and explain how their design approaches embodies a strong link between the university and its environment and also create a distinctive sense of place.
2	The design proposal need to demonstrate how a variety of university functions and city spaces, with public and private interfaces, can be assembled and designed in an integrated manner.	Participants need to present an outline explaining how the new university can express a place-relevant uniqueness in an architecture that pushes the discourse around local identity beyond its current levels.
3	Participants need to demonstrate an awareness of, and possible architectural solutions to, the environmental constraints and challenges found in Kimberley, taking into account the various functions required of the University's buildings and explaining how these can be aligned with environmental conservation.	Participants need to demonstrate: <ul style="list-style-type: none">)] how architecture can enhance the quality of the shared spaces on campus and;)] whether or not the proposed perimeter building form is the appropriate architectural typology
4	Entries need to outline how improved value and quality can be achieved by a carefully considered approach to construction methods, the selection and availability of materials, and the quality of workmanship with specific reference to the financial and time constraints and the heavy demands on residential accommodation.	Participant need to demonstrate through sketches how they would develop an iconic and memorable series of buildings for the new university, which also represents its high ideals.
5	The outline design proposal need to describe a way in which a newly-founded University in post-apartheid South Africa can express its uniqueness in spatial terms, and how the architecture can exhibit a sense of place, of being distinctly African, and of belonging to the South Africa of here and now.	Participants need to demonstrate an awareness of, and possible architectural solutions to, the environmental constraints and challenges found in Nelspruit, taking into account the various functions required of the University's buildings and explaining how these can be aligned with environmental conservation and building efficiency.

Discipline specific appointment were made for the remainder of the professional services required by the delivery team. Stringent eligibility criteria were applied and quality was evaluated alongside financial offer and preference (method 4 of ISO 10845-3) to ensure best value procurement outcomes. An environmental sustainability consultant was appointed to advise the design team on the formulation of strategies within the confines of a control budget relating to the impact of choices on environmental sustainability during its production, construction, in-use and end-of-life stages made in respect of building materials, constructions methods and resources, operating energy, water services, and sanitary systems of a building and construction materials, methods and resources and stormwater management systems for site works.

Table 5 indicates the range of procurement strategies as described by Watermeyer (2018) that were adopted, based on the NEC3 family of contracts. Quality was evaluated alongside financial offer and preference (method 4) in all tenders save for those associated with furniture and equipment.

Table 5: Procurement strategy

Procurement category	Packaging strategy+	Contracting strategy	Selection method (ISO 10845-1)	Targeting strategy
Professional service contract				
Client team support services	Framework agreement	NEC3 Professional Service Contract -Option G (term contract) Time charges or lump sums^	Negotiated procedure	
Discipline specific professional services for the development of the implementation plan (invited July 2012) (SPU and UMP)	Non-framework agreement		Quotation procedure	B-BBEE preference
Architects (design competition commenced during May 2013) (SPU and UMP)	Framework agreement		Qualified procedure	B-BBEE preference KPI relating to black African candidates for professional registration
Discipline specific professional service providers (invited February 2013 to July 2013) (SPU and UMP)	Framework agreement		Open procedure	B-BBEE preference Skills development goal if order exceeds R 2,0m
Construction contract				
Civil engineering works (invited July 2013) (SPU)	Framework agreement	NEC3 Engineering and Construction Short Contract Price list	Open procedure	B-BBEE preference Contract participation goal relating to the use of local resources
Refurbishment of buildings (invited July 2013) (SPU and UMP)	Framework agreement	NEC3 Engineering and Construction Contract – Option F (management contract) Cost plus percentage fee	Open procedure	B-BBEE preference
Construction of new buildings (invited July 2014) (SPU and UMP)	Framework agreement	NEC3 Engineering and Construction Contract – Option C (target contract with activity schedules) Target contract with activity schedules	Restricted competitive negotiations	B-BBEE preference Skills development goal Local participation goal Local direct employment goal B-BBEE spend goal
Supply contract				
ICT network	Non-framework agreement	NEC3 Supply Contract (price schedule) Price schedule	Open competitive negotiations	B-BBEE preference
Furniture and audio visual equipment	Framework agreement	NEC3 Supply Short Contract Price schedule	Open procedure	B-BBEE preference
Equipment and certain types of furniture	Non-framework agreement	NEC3 Supply Short Contract Price schedule	Open procedure	B-BBEE preference

*A percentage of the cost of construction was, where appropriate concerted, to a lump sum

+ Use was made of the task order and batch order provisions of the NEC3 PSC and NEC3 SSC, respectively, to create framework agreements. A z clause, modelled on the NEC3 TSC task order option, was included to enable package orders to be called off from the NEC3 ECC or NEC3 ECSC.

The use of framework agreements (Watermeyer, 2013 and 2018) for all the construction contracts enabled early contractor involvement in contracts despite a (Laryea and Watermeyer, 2016) and enabled suppliers and professional service providers to provide repeat work over time. The use of

framework agreements also enabled a hand over of the competitively tendered contracts to the new universities. The new universities continued to make use of these contracts and issue orders.

An investment was made in the development of a provincial supplier data base to facilitate access by local subcontractors and suppliers. The aim was to use the data base to link the demand for goods and services to the supply within the respective provinces. Information submitted by applicants was verified to enable contractors to make informed commercial decisions regarding the potential capability and capacity of such enterprises.

A breakdown of the final amounts expended on the project expressed as a percentage of the total, broken down into the different selection methods, was as follows:

- Quotation procedure – 0.5%
- Negotiation procedure – 5.8%
- Competitive tenders and competitive negotiations - 90.6%
- Other (Wits system) – 3.1%

The outsourced client team established by Wits, which constituted the planning and delivery management arm of the project cost between 4,5 and 5% of the total expenditure during the peak infrastructure delivery period of 2014, 2015 and 2016. All the contracts of this team were negotiated.

In total some 143 procurements were planned resulting in the award of 219 contracts against which generally two to six orders were issued per framework contract. Approximately 700 orders were issued and approximately 2 734 payment certificates were authorised for a total certified expenditure of R1 624 500 495.

At SPU approximately 19,000 furniture items were procured from 200 unique items. At UMP approximately 7,000 furniture items were procured from 250 unique items.

Project outcomes

The required pace of enrolment and infrastructure delivery was an overarching driving factor in the project's development. All buildings which were required for the planned enrolment for the 2014 and 2015 student intakes were completed just in time. This was made possible through the refurbishment of the William Prescod School and Old Provincial Legislature buildings in Kimberley and the Lowveld College of Agricultural and Mpumalanga Regional Training Trust buildings in Nelspruit and the purchasing of the Whiteways Apartment Block (nine storey block of flats) and Diamond Lodge Hotel in Kimberley.

17 Package Orders were issued to the SPU management contractor totalling R86,1 m with the average difference between the total of prices at award and at completion being - 0,1%. 8 Package Orders were issued to the UMP management contractor totalling R 26,7m with the average difference between the total of prices at award and at completion being -7,4%.

The average refurbishment cost of these buildings expressed as a percentage of the cost norm associated with a new building with the equivalent assignable square metres were as indicated in Table 6. If the purchase price of Whiteways Apartment Block (R15.0 million excluding VAT) and Diamond Lodge Hotel (R 15,0 million excluding VAT) are included as well as the allowance of 13% for site services in the replacement costs, these percentages increase to 63.5% and 90.1%, respectively. (NUPMT, 2018)

The 2016 intake of students required the delivery of new 16 buildings. It was from the outset made clear to the assembled professional team that the budget was derived from DHET cost norms for university buildings, based on the assignable square metres of a building i.e. the amount of space that can be used for people and programmes.

In order to enable the academic programme to commence at the beginning of 2016, work had to start before the designs and production information was complete. Assumptions had to be made regarding the amount of work not priced at the time that the Package Orders were issued. There was accordingly an uncertainty in the pricing of the three buildings of between 69 and 74% and between 23 and 44% of the target price included in the Package Orders issued to contractors for SPU and UMP, respectively. Nevertheless there was an extremely close gap between the expected outturn cost of the contracts at the time that orders were issued and the final outturn cost as indicated in Table 7 i.e. on average within 1% at SPU and 2% at UMP.

Table 6: Cost of refurbishments to existing buildings

Building	Percentage of cost norm for a building with equivalent assignable square metres
Sol Plaatje University	
William Prescod School	33,7%
Old Provincial Legislature buildings	50,7%
Whiteways Apartment Block and Diamond Lodge Hotel	41,1%
University of Mpumalanga	
Lowveld College of Agricultural	17,0%
Mpumalanga Regional Training Trust buildings	34,1%

Table 7: Cost of new buildings

Package orders	Target price at the start of construction with allowance for inflation (Rand)	Final construction cost to client	Final cost including professional fees	Cost norm determined from DHET's cost norms
Buildings and services between buildings at SPU (3 package orders)	R529 m	R 538 m	R 614 m	R 649 m
Buildings at UMP (3 package orders)	R 270 m	R 276 m	R 320 m	R 331 m

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In order to enable the academic programme to commence at the beginning of 2016, work had to start before the designs and production information was complete. Assumptions had to be made regarding the amount of work not priced at the time that the Package Orders were issued. There was accordingly an uncertainty in the pricing of the three buildings of between 69 and 74% and between 23 and 44% of the target price included in the Package Orders issued to contractors for SPU and UMP, respectively. Nevertheless there was an extremely close gap between the expected outturn cost of the contracts at the time that orders were issued and the final outturn cost as indicated in Table 7 i.e. on average within 1% (NUPMT).

The schedule for completion was always optimistic given that there were in several instances two December / January industry shut downs and a late start to construction following the procurement processes. All academic teaching spaces were nevertheless capable of being used at the start of the term despite the Package Orders not achieving the original Completion Dates. Actual completion for the buildings ranged from between 10,0 and 30,9% (average of 17,9%) longer than planned completion. The very late completion of one of the buildings can in the main be attributed to a structural design error whereby a beam was not connected to a column in a stairwell resulting in a delay of 2,5 months. The average professional services costs were 14,1 % for SPU and 15,7% for UMP.

South African legislation recognises that public-sector procurement expenditure needs to enable the state to not only procure what it needs on time at the right quality and for the right price but also to drive national priorities such as localisation and economic transformation. The Preferential Procurement

Policy Framework Act (Act 5 of 2000) provides a price preference mechanism to promote broad based black economic empowerment. The Broad Based Black Economic Empowerment Act (Act 53 of 2003) establishes a legislative framework for the promotion of black economic empowerment. Codes of Good Practice on Black Economic Empowerment issued in terms of the Act measure the overall contribution of entities to broad based black economic empowerment using a score card. Entities are rated in terms of their level of contribution from 1 (highest) to 8 (lowest). 73% and 63% of expenditure went to B-BBEE level 1 and 2 contributors at SPU and UMP, respectively.

The following statistics indicate the outcomes achieved in implementing the targeting strategies:

-) 254 learners were provided with 19 853 hours of structured workplace learning at SPU while 291 learners were provided with 21 684 hours of such learning at UMP;
-) expenditure on local resources expressed as a percentage of construction cost amounted to 38% and 73% at SPU and UMP, respectively;
-) on average, 63% of people employed on the site were local with 10% of the workers being women and 75% being young people; and
-) the B-BBEE spend as a percentage of procurement spend amounted to 78% at SPU and 89% at UMP.

Reported lost time injuries were well below the industry benchmark at both SPU and UMP and none of the reported lost time injuries were as a result of a fatality or a permanent disablement. This is particularly significant at SPU where 3 buildings and site services were in jam-packed proximity to each other and none of the five cranes deployed at peak operation could rotate a full 360°.

One of the SPU buildings was highly commended in the World Architecture Festival, Berlin 2017 in the Higher Education and Research Category.

Observations and conclusions

Project value is the outcome of client decision making to achieve an optimised balance of the project benefits, risk and cost. The client's value proposition was continuously explored at Technical Integration Committee meetings. The value equation was further tested at quarterly Project Steering Committee meetings. Aspects of the client's value proposition are found in the competing priorities of time, cost and quality, together with the important secondary goals of broad-based black economic empowerment, local (provincial) participation in the construction process and skills development.

The World Bank Procurement Regulations for IFP Borrowers (2016) suggest that value for money is the "*effective, efficient, and economic use of resources*". The National Treasury Standard for Infrastructure Procurement and Delivery Management (2015) defines value for money as "*the optimum use of resources to achieve intended outcomes*". Given that the gap between what was planned and what was achieved is very narrow, it may be concluded that value for money was achieved in delivering the first phase of the two new universities. Critical to this achievement was the persistent focus of the client body (DHET and the NUPMT) on its core value proposition – and on ensuring that the project team were similarly focused on the priority goals of this proposition.

The successful outcomes of the project can be attributed to a combination of factors including:

-) strong governance arrangements being in place to enable sound decision making aligned to values to be made with inputs from DHET (client), stakeholders and the client delivery manager;
-) a competent client team being assembled, using the negotiated procurement procedure, who had chemistry and complimentary expert skills and who, without exception, continuously provided the required inputs from their appointment until their demobilisation;
-) a client delivery manager who had single point accountability for delivering the client's value proposition and provided strong leadership to the delivery team (project managers, cost

managers, design professionals and contractors) and who resolved blockages outside of the control of the delivery team;

-) the adoption and implementation of innovative procurement strategy and tactics aligned to the client's procurement and delivery management objectives which enabled competent and capable contractors and consultant to be appointed;
-) high quality of procurement documents and well documented and described procurement processes, procedures, methods and policies which permitted the award of contracts to be made on the basis of financial offer, preference and quality;
-) early contractor involvement (i.e. the appointment in most instances of a contractor before the design was complete) which enabled fragmentation in design to be addressed;
-) clearly defined roles and responsibilities between the client team and the delivery team;
-) framework contracts which incentivised performance in order to secure future orders being issued; and
-) the creation of a collaborative culture where projects were designed and delivered according to a control budget.

References

ISO 10845-1:2010, Construction procurement: Part 1: Processes, methods and procedures. International Organisation for Standardisation, Geneva

Laryea, S and Watermeyer, R. (2014) Innovative Construction Procurement at Wits University. Proceedings of the Institution of Civil Engineers. Management, Procurement and Law, Volume 167 5 October 2014 Issue MP5 pp 220 – 231

Laryea, S. and Watermeyer R (2016). Early contractor involvement in framework contracts. Proceedings of the Institution of Civil Engineers – Management, Procurement and Law 169(1), 4–16

New Universities Project Management Team (2018). Close out Report of the New Universities Project Management Team on the Development of New Universities in Mpumalanga and the Northern Cape 01 November 2011 – 31 July 2017. NUPMT, University of the Witwatersrand, Johannesburg, www.wits.ac.za/ipdm

Watermeyer, R. (2010). Report back on perspectives expressed at the Wits Project Management Symposium (August 2009). Civil Engineering, Jan/Feb, pp34 to 39

Watermeyer, R.B (2013a). Unpacking framework agreements for the delivery and maintenance of infrastructure. Civil Engineering. January / February

Watermeyer, R, Jacquet A and Prinsloo, E (2016) The procurement arrangements for delivering two new universities: July 2012 to December 2014. www.wits.ac.za/ipdm

Watermeyer, R. (2018). Client guide for improving infrastructure project outcomes. University of the Witwatersrand and Engineers Against Poverty. ISBN 978-0-620-79293-6. www.wits.ac.za/ipdm