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CELEBRATING GREAT STRIDES MADE BY THE DPWI ENGINEERING SERVICES THROUGH IN-HOUSE DESIGN



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CELEBRATING GREAT STRIDES MADE BY THE ENGINEERING SERVICES THROUGH IN-HOUSE DESIGN PROJECTS



Welcome to the second copy of the Engineering Services In-house Design Special Edition. The edition introduces you, the reader of **WorxNews** to more Engineering Candidates and supervisors, as well as Architectural mentors.

You will read more about the featured Candidates' projects that were taken through a process of annual technical review held by Engineering Services.

These Candidates presented their technical skills during the review and the chosen projects were noted to have added value towards their professional development.

Without dwelling much into each project content, one can note the kind of quality engineering work done by each Candidate.

Each supervisor had been mandated to ensure that they;

1. Bring the best out of a Candidate;
2. Provide high quality guidance;
3. Close any technical gaps and
4. Prepare the Candidate to register.

These Candidates have potential to obtain professional registration with lessons learned from each project. The progress shown by the Candidates who have just started with the Department, proves that within the DPWI, these Candidates can be provided with adequate training to register in the near future.

**Author: Michael Tladi (Pr Eng),
Electro-Mechanical Engineer**



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Pictures: *Supplied by the
Candidates and Interns*

Design & Layout: Tumisang Nisele

MEET CANDIDATE ELECTRICAL ENGINEER TSHEPO MSIMANGA



Mr Tshepo Msimanga is based at Head Office in Pretoria. He says in 2013 a secondary school he attended (Soshanguve South Secondary School) was adopted by the Department of Public Works and Infrastructure (DPWI) to be part of the Schools Programme. Tshepo was then selected as one of the learners who performed well in Maths and Science, who would be funded by the Department to pursue a career within the built and property sectors.

“In 2013, I completed Grade 12 at Soshanguve South Secondary School with distinctions in Maths, Physics and Geography. In 2014 I enrolled for the Bachelor of Engineering (BEng) in Electrical and Electronics at the Stellenbosch University and graduated in 2018. Currently I enrolled for a Master's Degree in Engineering and Technology Management at the University of Pretoria,” explains Tshepo.

Tshepo was then absorbed by the DPWI as a Technical Intern in 2019, and now a Candidate Electrical Engineer. He says his job responsibilities at DPWI entail undertaking work that is aligned to the Engineering Council of South Africa (ECSA) outcomes, to successfully meet the requirements for professional registration; Supervising and monitoring of quality control of appointed consultants and contractors for electrical works; To solve professional technical problems through analysis of information from different information, project undertaking and management, design and drafting of electrical drawings and ensuring good quality drawings are produced for Departmental projects and that they comply with all standards, guidelines and acts such as the Occupational Health and Safety (OHS) Act.

He says he is currently working on 32 projects (excluding projects where there are appointed consultants) and he has saved the Department a total of about R40 million in professional fees through in-house design processes.

Tshepo takes us through the project that stands out for him; “My favourite project involves the refurbishment of the Air Control Tower Complex electrical installation at Ysterplaat Air Force Base, Western Cape. The building has experienced a lot

of structural defects over the years which has prompted the request for major refurbishment of the complex.

“The tower has been in use since 1929, the electrical installations have deteriorated and most of the components are no longer available in the market. This includes the circuit breakers, socket outlets (plugs) and the lighting fixtures.

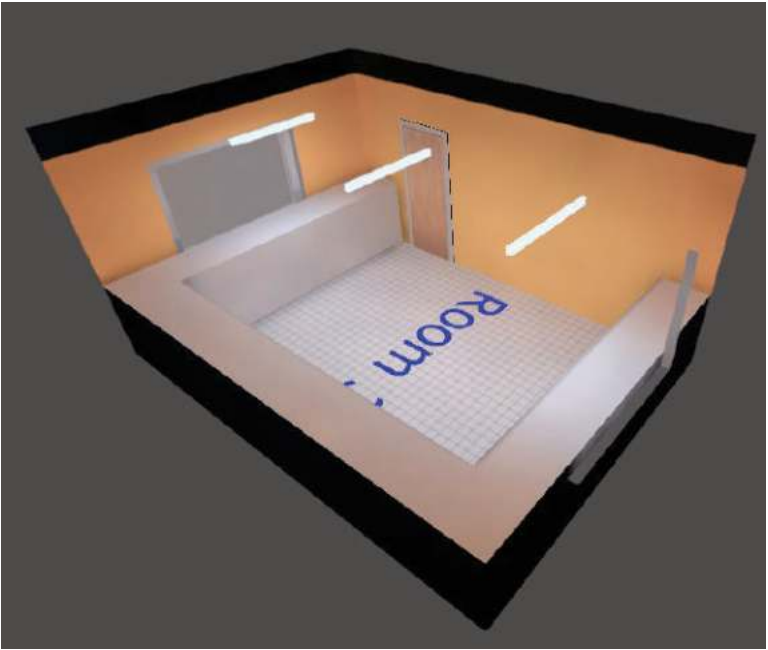
The electrical scope of works identified on the project involved the following;

- Redesign of the lighting layout of the complex by replacing all the fluorescent lights with energy efficient LED luminaires;
- Redesign and Installation of power sockets;
- Design and Installation of a fire detection system;
- Redesigning of the distribution boards.

“The lighting design was done using a simplified method called the lumen method, which is defined as the number of lumens available in a room divided by the area of the room. Lux levels for various areas were used to ensure that each space has sufficient light level as per requirements and complies with the standards as set out on SANS 10114 and 10389. Room index is also considered when doing the calculations, as it describes the ratios of the room's height, width and length.

“To demonstrate my work, I have chosen the kitchen lighting design within the same Ysterplaat Project building whereby I had to determine the number of light fittings required for a measurement of 500lux (as per SANS 10114-1) to be achieved on the design.

KITCHEN	
Inputs	Values
Lux level (lx)	500
Area (m ²)	22,6
Type of light fitting (W)	44
Light fitting lumens (lm)	6002
Room Index (Kr)	1,15
Coefficient of Utilisation (CU)	0,44
Light Loss Factor (LLF)	0,8
Balast Factor (BF)	1
Temperature Factor (TF)	1
Lamp Factor (LF)	0,95
Room Cavity Ratio (RCR)	4,36
Results	Values
Total initial light output (lm)	16029,562
Total number of luminaires required	2,64



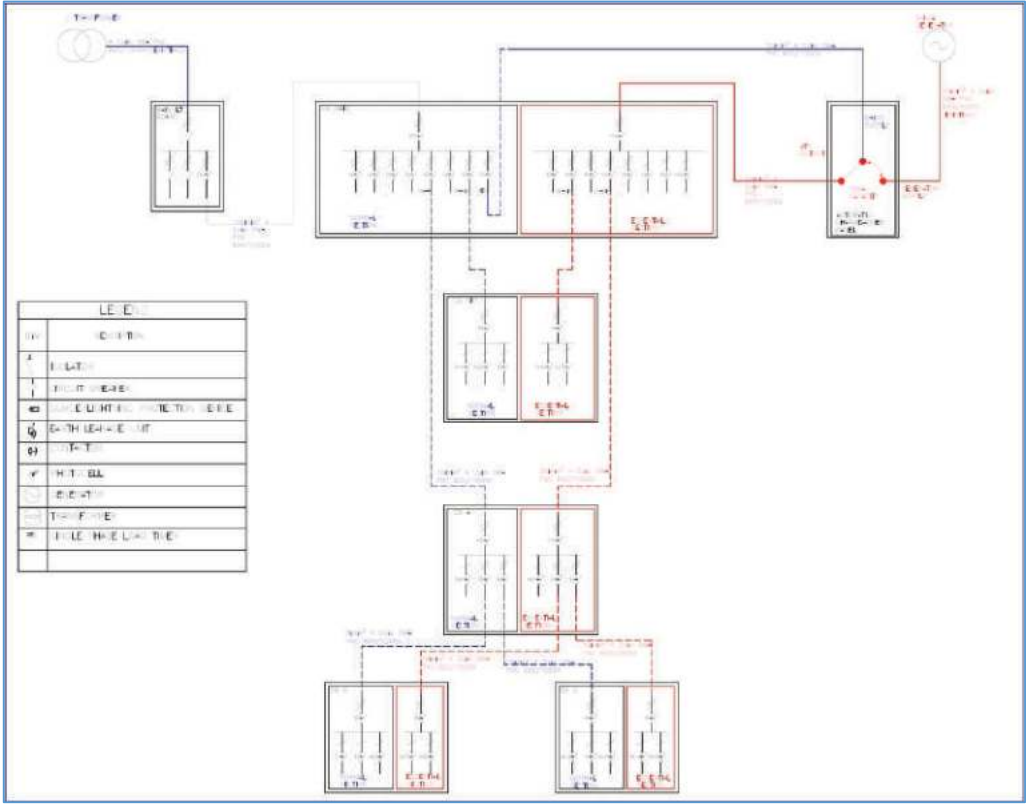
“The kitchen has an area of 22.6m², and using the recommended 44W LED vapour proof (with a luminous output flux of 6002lm). The calculated total number of luminaries resulted to 2.67, which is approximately 3 light fittings. I then ran a simulation on Dialux software to confirm the calculation, which confirmed the results as per the first principle calculation.

“Since this facility is a national key point, it has an emergency backup generator which runs whenever there's a main power supply failure. The generator supplies essential loads.

“The illustration below shows the electrical supply design for the main DB and sub DBs and connection to the generator.

There's an incomer rated 250A three phase from the main LT board which is supplied from the utility power transformer to the base, to supply the main distribution board (DB) in the facility. All the distribution boards in the facility are separated between normal section (utility supply) and essential section (backup generator supply).

The essential section is supplied through an automatic change-over/transfer switch panel which monitors the incoming voltage from the utility line and when there's a power interruption, the transfer switch immediately sense the problem and signals the generator to start.



“The lessons I have gained so far is mostly engineering management and design as I was the lead electrical project engineer for this project. I had to design and draft all the electrical drawings and ensure good quality drawings which comply with all relevant standards and guidelines.

“I was also able to solve professional technical problems through the analysis of information from different sources and levels where engineering judgement is required to evaluate the best course of action. The in-house design process has helped me to achieve most of my expected ECSA outcomes to register as a professional engineer.”

He says working in the public sector has been a great and exciting feeling that he cannot even explain, since it has given

him the opportunity to showcase his capabilities and innovations. “It also should be noted that I was never seconded since my graduation, hence all the technical knowledge I have, I learned through Engineering Services in-house projects where I moved from Intern, Junior Engineer and ultimately Project Engineer i.e. doing projects with less supervision,” clarifies Tshupo.

He has concluded by mentioning that there are quite a number of accomplishments that he is proud of; “but most of all it is being able to transfer the skills to the Interns that I am supervising as I ensure they learn what I have learnt and get them to develop towards their ECSA registration, while also developing myself through engagement with them and my senior supervisors”.



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MEET MECHANICAL ENGINEER (CANDIDATE) GEORGE MOLOMO



Mr George Molomo is based at Head Office in Pretoria. He joined the Department of Public Works and Infrastructure (DPWI) in January 2018 as an Intern.

He is one of the students who were part of the DPWI Bursary Holders Programme and he began his Internship after completing his university studies. "I was initially seconded to a consulting firm in 2018 but I unfortunately wasn't learning much from the firm. I quickly informed my line function manager, Michael Tladi who brought me back from that firm and gave me work that added value towards my ECSA (Engineering Council of South Africa) registration," George explains.

He holds a BEng Degree in Mechanical Engineering from the University of Pretoria and his short-term career goal is to obtain professional registration with the ECSA before the end of 2022. George says his work entails the design and supervision of the installation of mechanical engineering systems in building services; HVAC, Wet Services, Fire Protection, Steam Generation and Distribution for in-house projects. He also reviews the work done by the appointed consultants to ensure the requirements are adhered to and ensure engineering quality control measures are implemented.

George adds; "As a counterpart to the consultants, I oversee the consultant and the contractor during construction for compliance and ensure that all Departmental requirements are met.

"I am also appointed as a chairperson for Mechanical Engineering Standard and Specifications where I am leading other candidates in updating the outdated documentation used by the consultants and ourselves for in-house projects and I'm a member of the In-house Design Manual documentation development team. As an experienced Candidate Engineer, I also mentor and supervise Interns who

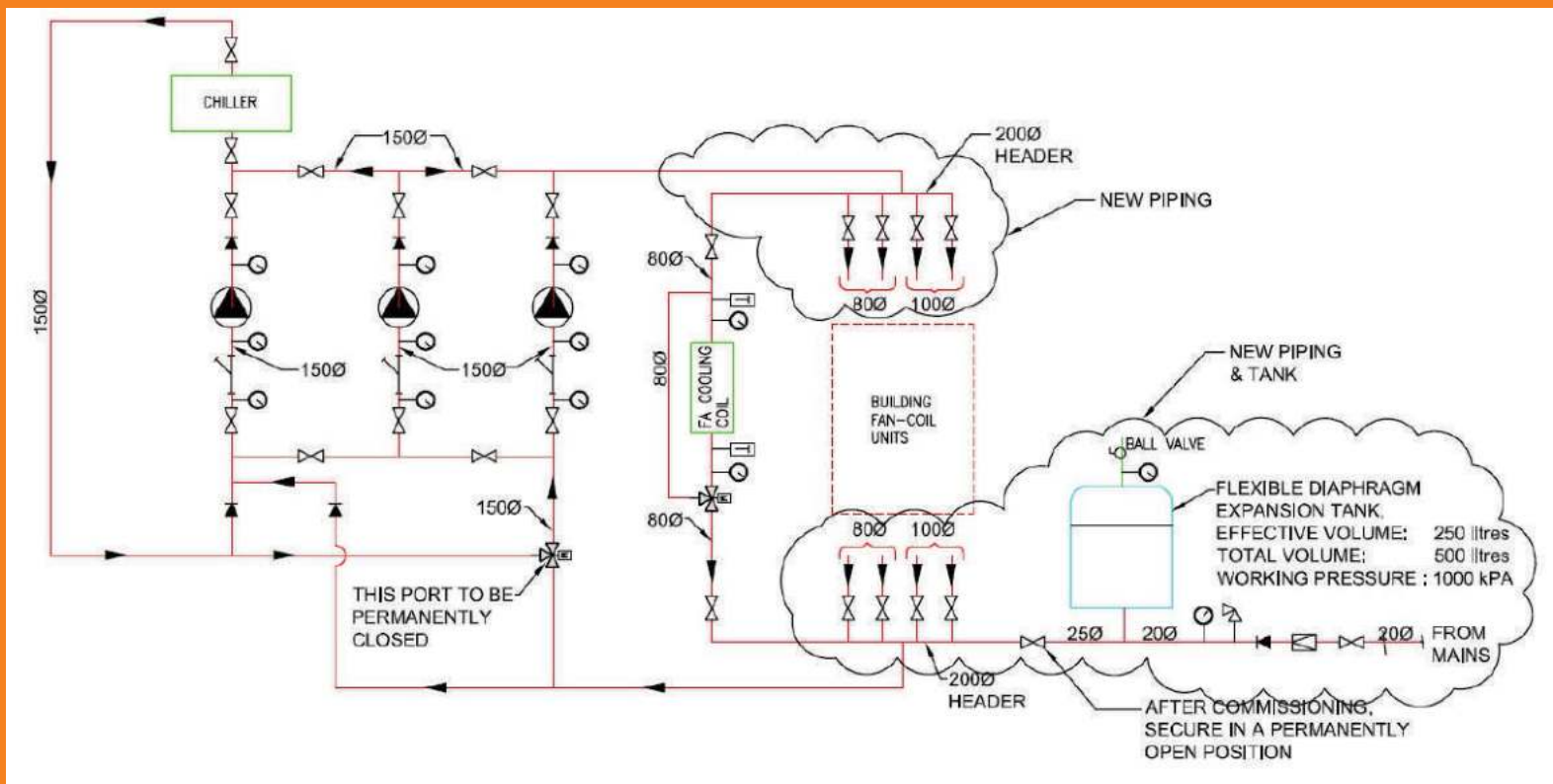
joined the Department to transfer the skills I've developed in the Department."

George says that out of all the projects he has worked on, his favourite has been the design of a chilled water system for the Maize Board Building in Pretoria. This in-house design project involved the design of an HVAC system which aims to provide comfort and compliant working conditions for the staff personnel of the Department of Agriculture, Forestry and Fisheries (DAFF).

The chilled water system provides air-conditioning for 171 offices and 6 boardrooms with a total heat load of 1105.37kW and this must supply conditioned air to comply with SANS 10400 Part O. The heat load was calculated using first principle design and calculations, thereafter compared to Heat Analysis Programme (HAP) software.

The HAP software generates heat loads by using available data, such as solar heat gain, electrical heat gains and heat gain from occupants of the building and produces the expected cooling capacity required on the air conditioning equipment using first principles equations, such as energy calculation, etc.

Below is the design layout showing the chiller system in the plant room.



George says during the design, he learnt how to investigate, define, solve complex engineering problems and apply advanced engineering knowledge in solving engineering problems which form part of ECSA Outcomes and responsibilities levels showing his growth to be ready for professional engineer registration.

He adds that being a public sector engineer gives him great pleasure as he knows that he is making a difference in improving the economic and engineering state of the country, and also giving back to the country's youth through mentorship

and guidance. With all the in-house projects he has been involved in, he has saved the Department an amount of R6 287 554, 24.

George concludes by mentioning that during his 4 years with the Department, he is most proud of having taken part in the Antarctic Programme; representing the Department at the CESA YP Imbizo and being part of the engineering team managing the biggest land port of entry in the country (Beitbridge Land Port of Entry), as the consultant mechanical engineer, through in-house design processes. ■

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MEET CHIEF ARCHITECT KWENZEKILE SIMELANE

Ms Kwenzekile Simelane is based at the Durban Regional Office. She joined the Department of Public Works and Infrastructure (DPWI) in October 2016 as a lateral transfer from the KwaZulu-Natal Department of Human Settlements. "I was already a Professional Architect and there was an opportunity to be transferred to National Public Works. I sent a request and the process was approved," explains Kwenzi.

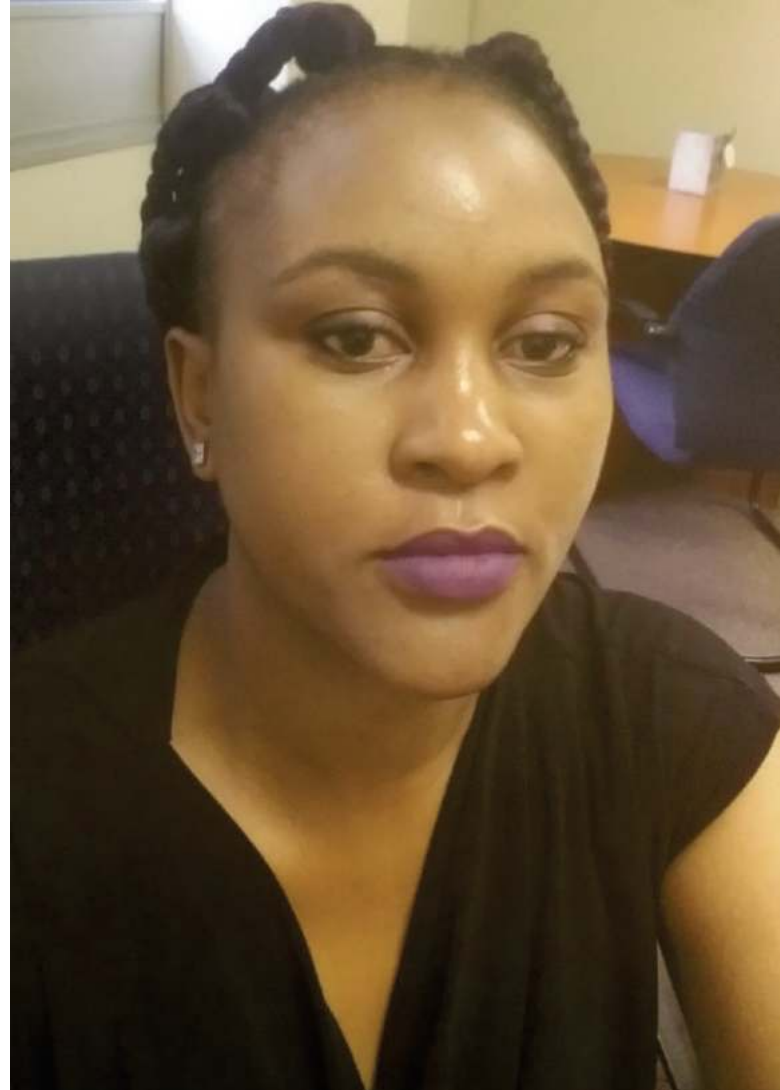
She holds a Masters in Architecture from the University of KwaZulu-Natal and she plans to study further, focusing on project management studies. Her current job responsibilities are as follows;

- Management and control of Architectural Services rendered by consultants;
- Providing technical support and advice to the Departmental sections, clients and Project Managers about completion of Repair and Replacement and Maintenance Services;
- Provide architectural services for in-house project from design to construction stage including close out stages;
- Serve on Regional Bid Specification and Evaluation Committees;
- Serve on Sketch Plan Committee;
- Check fee calculations, verify alterations, sign account and return to Project Manager;
- Manage the work of Architectural staff, Architectural Assistant Officers (AAOs) and interns;
- Mentor and guide development of Directorate / Architectural staff, AAOs and interns including those in the HCI Young Professionals programme.

She says out of the projects she's worked on in the Department, the one that stands out is the Pietermaritzburg Medium B Correctional facility: Provision of Isolation Wards and Quarantine for the COVID-19 accommodation. "This was an emergency requirement in March 2020 during the country's first lockdown Alert Level 5.

"This was entirely designed and documented in-house. It was a combination effort from the Durban Regional Office professionals and the Head Office professionals. The Head of Projects in Durban and Head of Engineering Services at Head Office were directly involved, to assist the design processes.

"I was managing the architectural design and documentation team that included the then Young Professionals Architects Bongeka Mnguni, Nomfundo Mthembu and Nqobile Ngcece



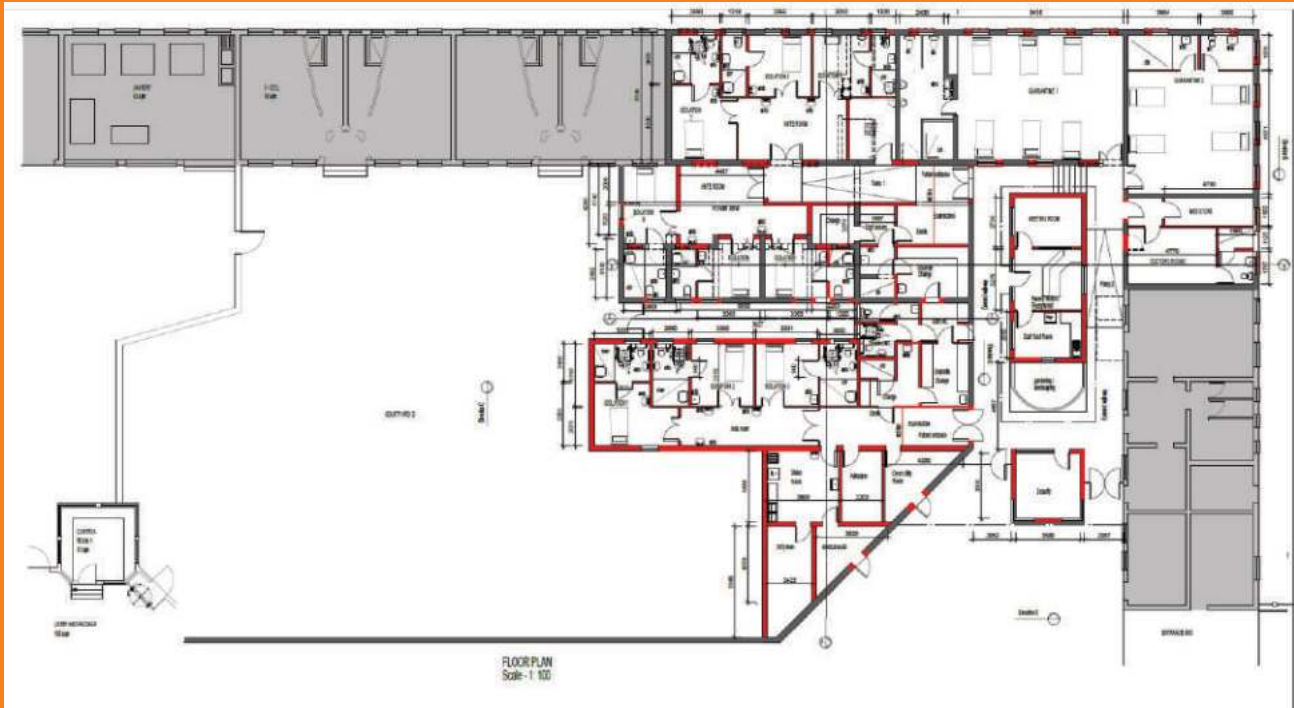
who have since become qualified professionals through the Young Professionals Programme. The rest of the professional team consisted of the Civil / Structural Engineers, Electrical / Mechanical Engineers and the Quantity Surveyor."

The project scope required inspecting existing block of prison cells, design alterations, renovations and additions to accommodate new Isolation and Quarantine Ward as per the Department of Health specifications and standards.

For proper precedent studies, there were site visits to three hospitals that were carrying out renovation project for COVID-19 wards. The NDPWI team consulted with project teams of the hospital projects for knowledge and information to apply to the Napierville project which was very equipping.

The architectural team deliberated and provided the architectural design that was then shared with the rest of the professional disciplines to complete documentation for the tender stage. All the documentation was completed and submitted to the client - the Department of Correctional Services (DCS), where an estimated project cost was R17m and the consultant fees of 18% which is about R3m was a saving.

The project has been on halt with the client, however enormous experience was obtained and the project equipped the Departmental professionals for effective delivery of future projects.



She says since she was mentoring Young Professional during the project, the experience of this project was added to the required training points by the South African Council for the Architectural Profession (SACAP) and the Young Professionals managed to qualify and register as professionals of the architectural council.

She says one of the accomplishments she is most proud of has been to witness the Young Professionals Architects that she mentored becoming professionals.

Kwenzi says with her architectural skills, she is able to capacitate the public sector to provide much needed professional technical input when delivering services to the public in a cost effective manner.

“The architectural skills come with innovative ways of solving challenges in the built environment and it is fulfilling to be part of the innovations needed in our country,” she concludes.



MEET PROFESSIONAL ENGINEER HORISANI MADZIVANE

Mr Horisani Madzivane is based at Head Office in Pretoria. He joined the Department of Public Works and Infrastructure (DPWI) through the Young Professionals Programme on 2 January 2018.

“I left the private sector and joined the DPWI after realising that I was not getting enough design experience. Through the Young Professionals Programme, I was able to gain enough design experience that enabled me to register as a professional engineer.

“I have a BSc in Civil Engineering Degree from the University of the Witwatersrand. My short term goal is to attend short courses offered by the National School of Governance to acquaint myself with all the necessary government processes that are essential to my field,” Horisani explains.

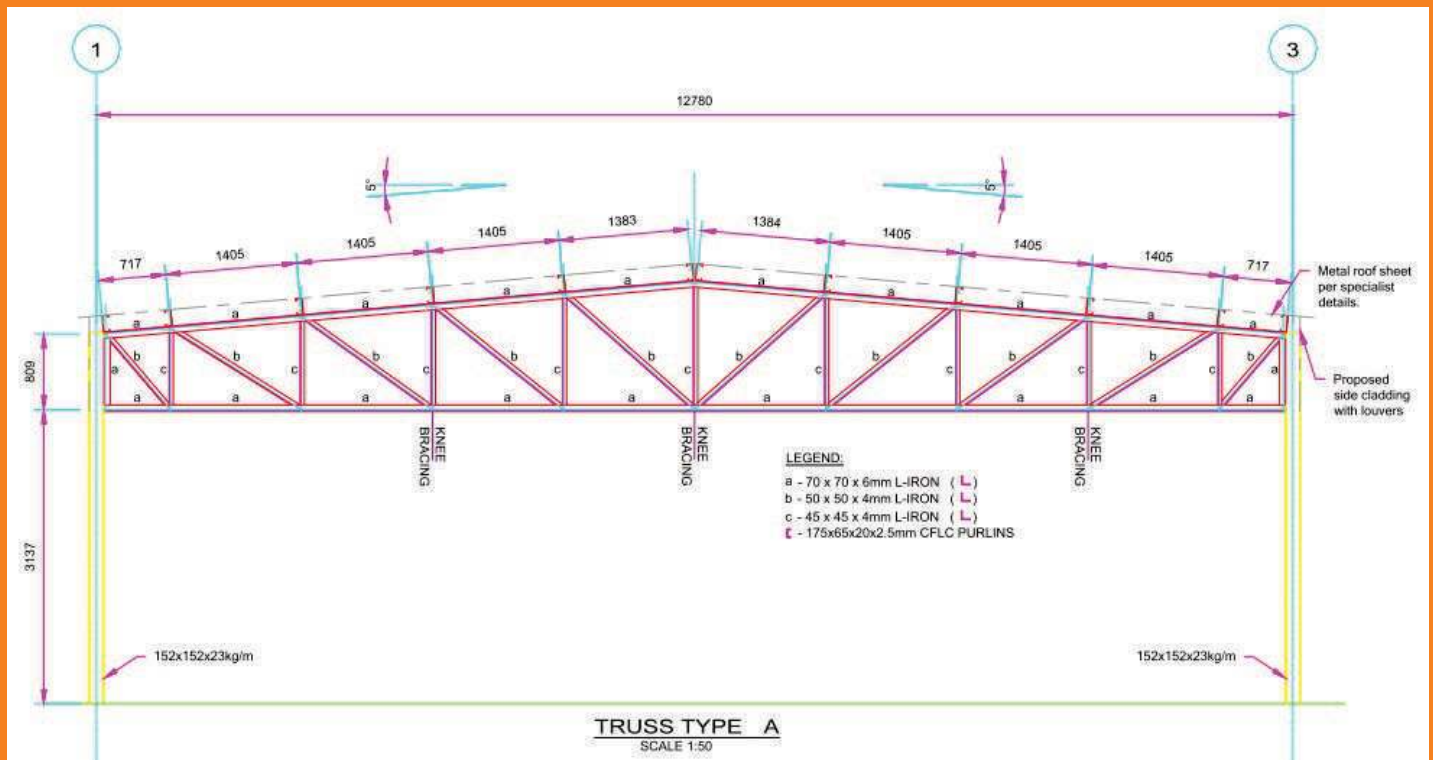
He says currently he supervises 1 Intern and 1 Candidate Engineer, who report to him. Some of the activities that they

perform on a daily basis include: Providing technical structural engineering support to other DPWI units; Design and construction monitoring of both in-house and external projects; Approval of external consultants reports; Members: Bid Specification Committees; Members: Bid Evaluation Committees; Structural inspections of infrastructure within the portfolio of DPWI; Review of existing DPWI structural engineering manuals, etc.

Horisani says the biggest highlight for him has been and continues to be the Soshanguve Magistrate’s Court. “In this project, the Department has entrusted us with performing construction supervision of all structural works in the project, after the structural component was abandoned by the appointed external service provider. This project is a 3-storey building and due to these consultant changes, it resulted in the Department saving approximately R2 500 000 in professional fees.

“This project has some level of complexity which is an opportunity to my candidate subordinates to use, for their professional registration. In completion of this project, my subordinates Babalwa Lekganyane and Khanimamba Ndhlovu, will have full experience on the responsibilities of the residence engineer. Their task will also include developing as-built drawings which will be required for future use.

“Apart from my supervision of candidates, my favourite project is the Department of Agriculture, Forestry and Fisheries Cafeteria. I performed structural elements designs for this project and I used it for my professional registration. Unfortunately due to unavailability of budget, it did not proceed to construction stage, but certainly from my side, it provided me with the much needed experience. Using CAD software, I produced the following design;



“With the above and other in-house projects, I managed to register as professional engineer hence I met all the requirements of ECSA.

“Despite all the challenges faced within the Department, the limited resources available are optimised to assist all

engineering candidates to register professionally. Having experienced this myself, it makes me proud to serve my country with my professional registration and assist other engineering candidates within the Department.” Horisani concludes by mentioning that obtaining his Pr. Eng. status is one of the accomplishments he is most proud of.



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MEET CHIEF ARCHITECT SUMAYA BASHA

Ms Sumaya Basha is based at Head Office in Pretoria. She joined the Department of Public Works and Infrastructure (DPWI) in December 2020 through the Presidential Employment Stimulus Programme. The Stimulus package is part of Government's Economic Reconstruction and Recovery Plan and it is in response to the COVID-19 pandemic and its effects on unemployment and the economy.

Sumaya says she saw a notice that was shared via email through the South African Council of Architectural Professions (SACAP) about the Presidential Employment Stimulus. The notice advised unemployed professionals to upload their information on a government portal and she did. Within 2 months she was contacted by the DPWI and was requested to avail herself for an interview.

She holds a Bachelor of Architectural Technology Degree obtained from the Natal Technikon (which is now known as the Durban University of Technology). Sumaya seeks to contribute her ideas as she gains more experience and eventually guide new employees in the work environment as she believes that helping new employees settle into their work environment will add to her skill set and help the organisation.

Sumaya says the main purpose of her appointment was to assist the Engineering Services in-house projects team with architectural drawings. Her tasks include;

- Providing technical architectural support to engineering services projects;
- Design and construction monitoring of in-house projects;
- Members: Bid Specific and evaluation Committees (project specific only); and
- Development of in-house manuals such as In-house Design Manual.

Here, she reveals a project she has worked on in the Department that stands out for her; "The prevalent highlight has been and continues to be the Telkom Towers IT which is situated in the CBD of Pretoria, being a high protest area with very active community. High levels of social facilitation is required.

"In April 2020, Engineering Services received an urgent request to assist with the SAPS request for the IT Building which is part of the Telkom Towers precinct in the Pretoria CBD. The request was to implement remedial works at Telkom Towers IT building in order to address the prerequisite Occupational Health and Safety Compliance Parameters.

“Due to time constraints, in-house professional team was appointed through Engineering Services and I was fortunate to be part of the team. I was appointed as the Principal Agent and Co-Architect with Abri van Rooyen as an Architect.

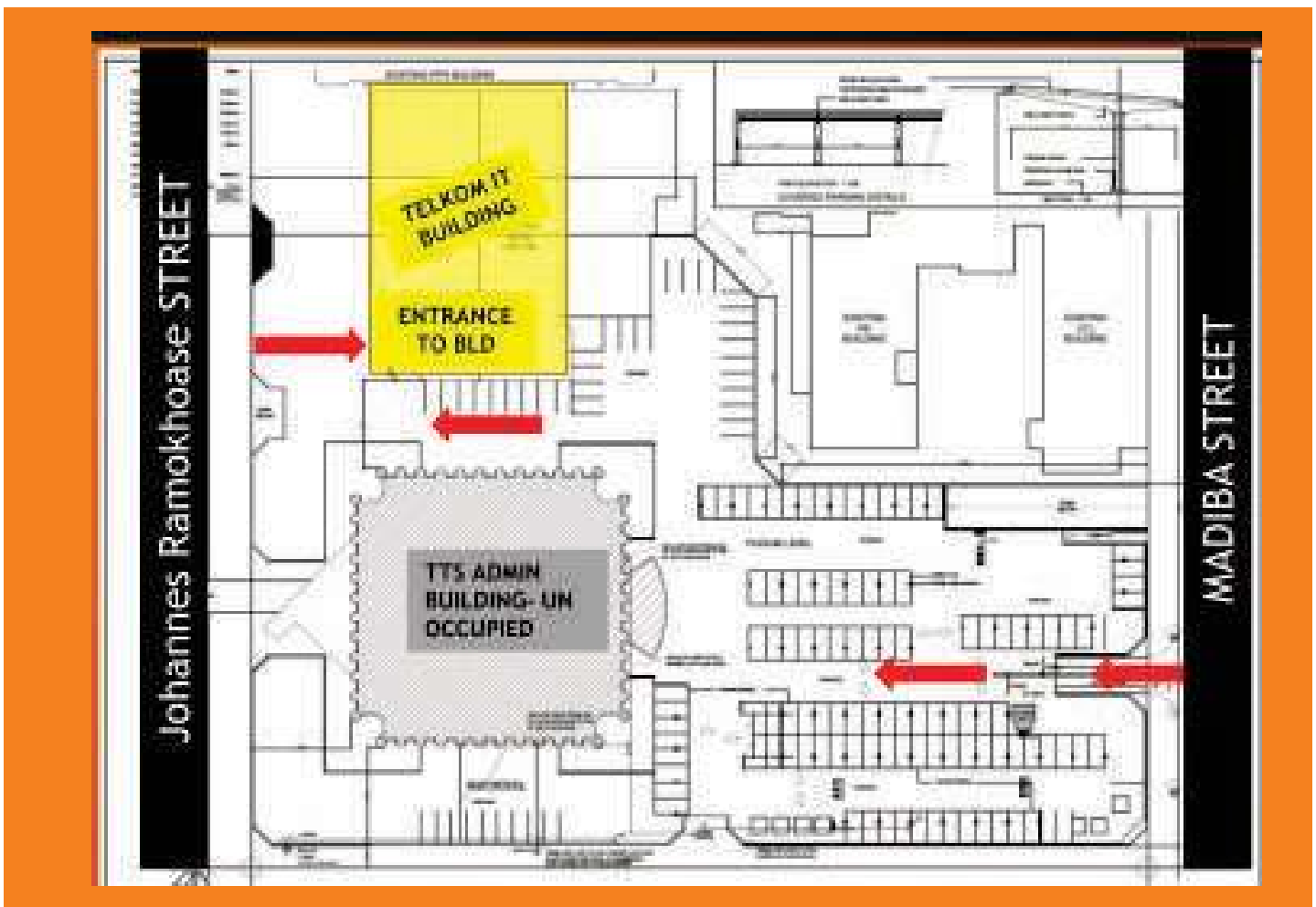
“Due to the sensitivity of this project and extremely tight deadlines, we had to create a very comprehensive and professional document to ensure that the building can be converted to suit the issued PI. The approach was unique to this specific project and under the leadership of our director, it was accepted and sanctioned.

“We challenged the norms of typical working requirements for the building of this nature and delivered instead a thoroughly

comprehensive document from all disciplines. Our reports included the detailed design criteria, specifications, project plans, project risk register, cost estimates and scope of works for the architectural works.

“As the appointed Principal Agent, I felt this was a challenging position and an opportunity to excel and deliver to ensure that our targets are achieved successfully. Currently the project is in process to the next stage which is construction. Being part of the team that does not compromise on quality whilst doing every effort to adhere to the timelines makes me feel happy.”

Below is the site plan for Telkom Towers IT Building:



Describing how it feels for her to be able to provide her architectural professional skills to the country as a public sector Architect, Sumaya says the most positive aspect of working with departmental Engineering Services professionals and candidates is an honour as they get to transfer skills and knowledge whilst providing highest quality service delivery to the departmental clients.

“Knowing that I am part of helping with the improvement of public sector infrastructure and building a healthier community makes me happier.” Sumaya adds that working on different public sector infrastructure portfolios such as healthcare, correctional services, justice and police, to name a few, makes her appreciate the knowledge gained which also makes her proud of herself as an Architect.



MEET CANDIDATE STRUCTURAL ENGINEER ORLANDO DE FARIA

Mr Orlando De Faria is based at Head Office in Pretoria. He says in 2014, he was fortunate to receive a bursary from the Department of Public Works. “The bursary was made available to candidates who were already enrolled at university, who would in turn assist and mentor the first year students who also received bursaries from the Department,” says Orlando.

He completed his BEng degree in November 2016 and thereafter joined the Department in February 2017 as an Intern. Later that year in November 2017, he applied for the Young Professionals Candidate Engineer Programme on a 36-month contract. Orlando matriculated in Limpopo – Louis Trichardt High School in 2010. “In 2012 I joined the University of Pretoria after a working gap year in London, in the United Kingdom as a labourer on the London Underground.

“I successfully completed my bachelor's in engineering (B.Eng.), 5 - year study programme in 2016,” explains Orlando. He says during his enrolment at the University of Pretoria he

received among others, the Golden Key Certificate in 2013, Best Worker in 2012 and Best Plane Table Surveyor in 2012.

Orlando says his short-term career goal is to obtain Professional Registration with the Engineering Council of South Africa (ECSA) as a Structural Engineer and to be offered permanent employment, with the hope of being absorbed by the Department. His current tasks entail performing all aspects of engineering activities that result in progress in technology and engineering applications under supervision as prescribed by ECSA at a level of candidate towards registration as a professional engineer.

His main objective, as per his job description, is: *Design new systems to solve practical engineering challenges and improve efficiency and enhance safety, *Office administration & *Research and development*.

He says his favourite project overall must be the South African National Antarctic Expedition; “however, as an in-house design project, the Department of Correctional Services: Sallyport Security Screening Structure was my favourite. I was involved on the project from inception where I engaged with the user-client and their in-house Architectural Services team.

The project was initiated by a request received from the Department of Correctional Services (DCS). DCS had a need to provide a secured and covered security screening structure where the main purpose was to conduct vehicle and pedestrian inspections prior to allowing access to their prison facilities. “I was requested to design 5 of these structures, also known as Sallyports, across the country. I will be reflecting on one of the five structures I designed, Henneman Correctional services.

The scope of works included:

- Demolition of existing security fence
- New road layer works and paving, by in-house Civil Engineer
- Engineering wet and dry services, by in-house Civil Engineer
- Geo-technical investigations, by in-house Geo-technical engineer
- Foundations and steel superstructure, by in-house Structural Engineer
- Foundations and masonry superstructure, by in-house Structural Engineer
- Reinstating the security fence
- Ensure overall security is not affected by the construction

“As the Structural Engineer, I was able to request the Department's in-house geotechnical services team to conduct soil investigations to determine suitable founding conditions.

“My design approach for all 5 structures were to be similar to ensure a same-look-and-feel when entering each of the 5 facilities. The structure was initially considered as a steel trussed type structure which later evolved into a portal frame structure, see Figure 1 & 2 below, to suite the Architectural impression.

“The need to keep the same type of structure at each facility would reduce the time spent designing each structure individually. I was able to set limits to the minimum and

maximum spans and spacing of the structure portal frames. My design and analysis approach was based on all latest South African National Standards (SANS) and Building Regulations.

“I used first principles to design my structural elements. However, I used Prokon, a structural design software, to compute multiple iteration selecting the most suitable and cost effective members, i.e. value engineering. I was also responsible for all structural drawing layouts and details, *see Figure 2 below.*

Figure 1: Prokon analysis: Portal design structure

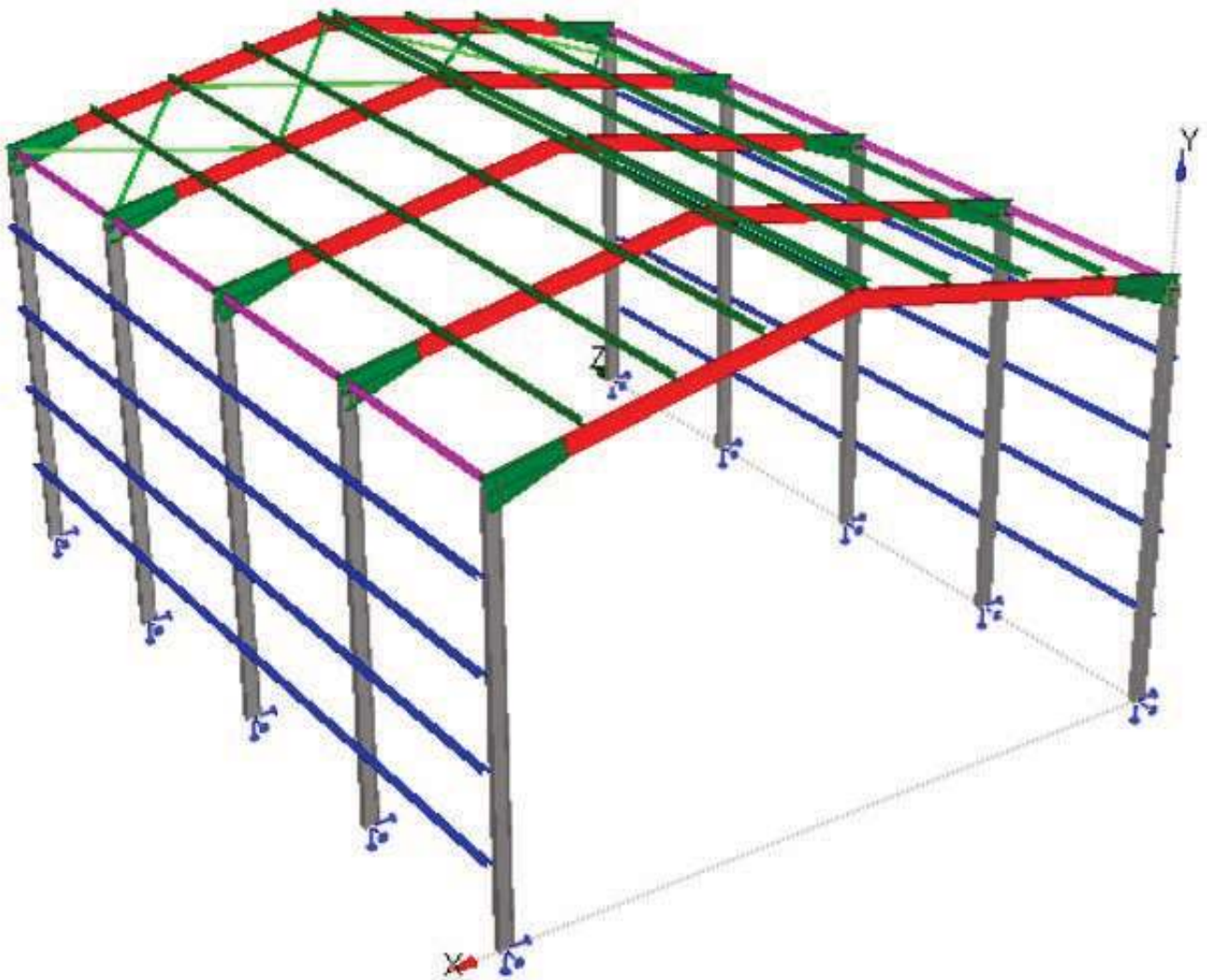
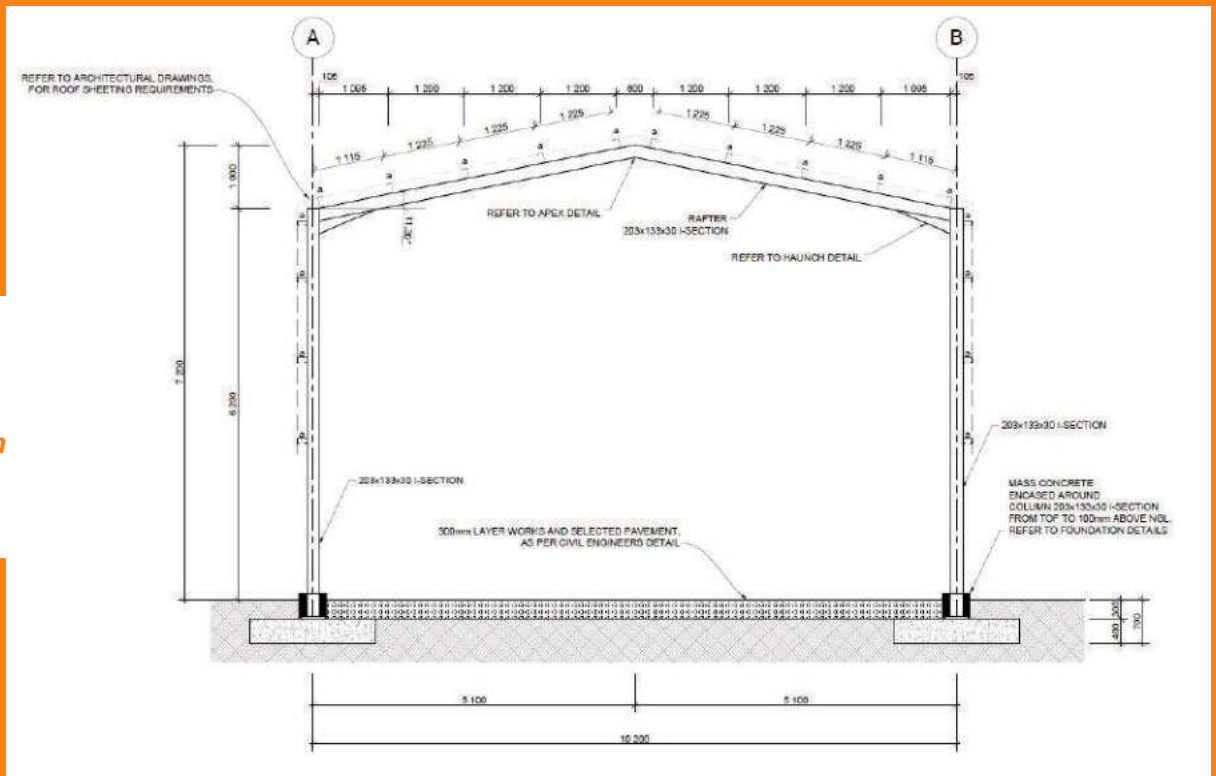


Figure 2: Typical Portal frame section



“This project has resulted in project professional fee savings as there was no need to appoint external professional service providers. It was also time-saving on extensive documentation and inflexibility with regards to a contract set with a specific outcome. I am currently involved with 6 in-house design projects with a professional fee saving estimated at R743 500.00.

“I have completed two projects, one of which was to maintain, perform structural inspections and conduct fee verification works at the SANAE Base IV. I also designed and managed a team of our internal artisans with the demolition and replacement of a ministerial house balcony steel balustrade.

“The following are some of the lessons I learnt for my ECSA registration:

Communication is key, ECSA Outcome 5. Without coordination and concept meetings the team would not have been able to ensure all parties are aware of the aesthetic requirements, visions, structural limitations and general environmental and safety considerations.

“By defining the project requirements, I was able to analyse the structure and provide alternative structural solutions. I was able to set limits to the spacing and spans of the structure should the Architect and client identify additional needs along the design process, which reduced continuous structural iterations.

“I was able to perform all my duties as structural engineer with limited supervision at ECSA level of responsibility E.

“This experience allowed me to discuss and interact with my supervisor at the same level while debating on alternative

methods and solutions through the design and analysis of the structure”.

Orlando says he is grateful to be part of the public sector where he has direct access to solving problems in and around his industry. He says this is not always as easy as it may seem as the expectation is that everything, all issues, are to be solved in one-go, however, as a result of prioritising, some items are delayed and causes unrest and dissatisfaction from the public.

“I am part of the change, it is an exhilarating feeling being part of our country's change and the responsibilities attached to the change is what drives me to accomplish more than what is expected of me each day.

“Having been selected as the project lead engineer of a multi-disciplined team for the South African National Antarctic Expedition for the year 2019/2020 has been the accomplishment I am most proud of. The multi-disciplinary team consisted of Architectural Services; Civil and Structural Engineering; Electrical Engineering; Mechanical Engineering and Water Scientist.

“I would like to use this opportunity to thank my supervisors, directors and our Human Resource department for all their support and continuous involvement during my journey as a Candidate Engineer striving for professional registration. Your after hours, holidays and open door policies have not only assisted me during my development, but also others around me and will be transferred to individuals I will be supervising one day,” he concluded.

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MEET CANDIDATE STRUCTURAL ENGINEER MATSOBANE TEFFO



Matsobane Teffo is based at the Cape Town Regional Office. He joined the Department of Public Works and Infrastructure (DPWI) in January 2018

He holds a Bachelor's Degree in Civil Engineering (BEng) from the University of Pretoria and he plans to register as a Professional Engineer with the Engineering Council of South Africa (ECSA) within the next six months. Matsobane says his responsibilities at DPWI entail providing engineering solutions for distressed, damaged and newly-proposed structures that fall within the DPWI facility portfolio and he also assesses and evaluates value for money on ongoing Departmental building projects.

Out of all the projects he has done in the Department, he says the Ysterplaat Air Force Base has been his favourite project so far due to the fact that he has been actively involved in the project from its initial stages (investigation, inception and design stage).

"I have been tasked with being the Principal Agent where I am leading a full multi-disciplinary design team. The Ysterplaat project is designed 100% in-house and has significantly provided professional fee savings of roughly R679 394.14 and reduced the time delays on administrative processes of appointing external professional service provider," he explains.

The following are other in-house projects that he participated in;

- Boksburg Magistrate's Court with professional fees saving of R852 034.91
- Malmesbury Magistrate's Court with professional fees saving of R177 282.5

As the Principal Agent on the Ysterplaat project, he had to extensively engage with the Architect, User Client and the Quantity Surveyor during the inception stage to define the required scope of works and provide high level cost estimates. The scope of works included the following: *Demolish and Rebuild the new modernised VIP Lounge which is used to accommodate the President and high profile diplomatic delegates. *Repair and Refurbish the existing Air Control Tower. *Repair and Refurbish the existing ancillary buildings that are used to service the Air Control Tower and the VIP Lounge. *Provide decanting facilities for the affected staff members*.

Matsobane says once the scope of works was defined, he briefed Mechanical and Electrical Engineers who were able to conduct the status quo assessment and provide design solutions for the required mechanical and electrical services. "As the Structural Engineer, I requested geotechnical investigation and concrete core test to be conducted on in-situ materials before the design could take place. Once the test results were made available, I was able to define the design approach by coordinating with the Architect.

"I applied South African National Standards (SANS) and Building Regulations to size, analyse and design structural elements by using first principle hand calculations and design software (Prokon). After accomplishing the design of all structural elements, I was able to draft building layouts and elemental details which were coordinated with the design team," expounded Matsobane.

He has singled-out the following as the lessons he gained for ECSA registration:

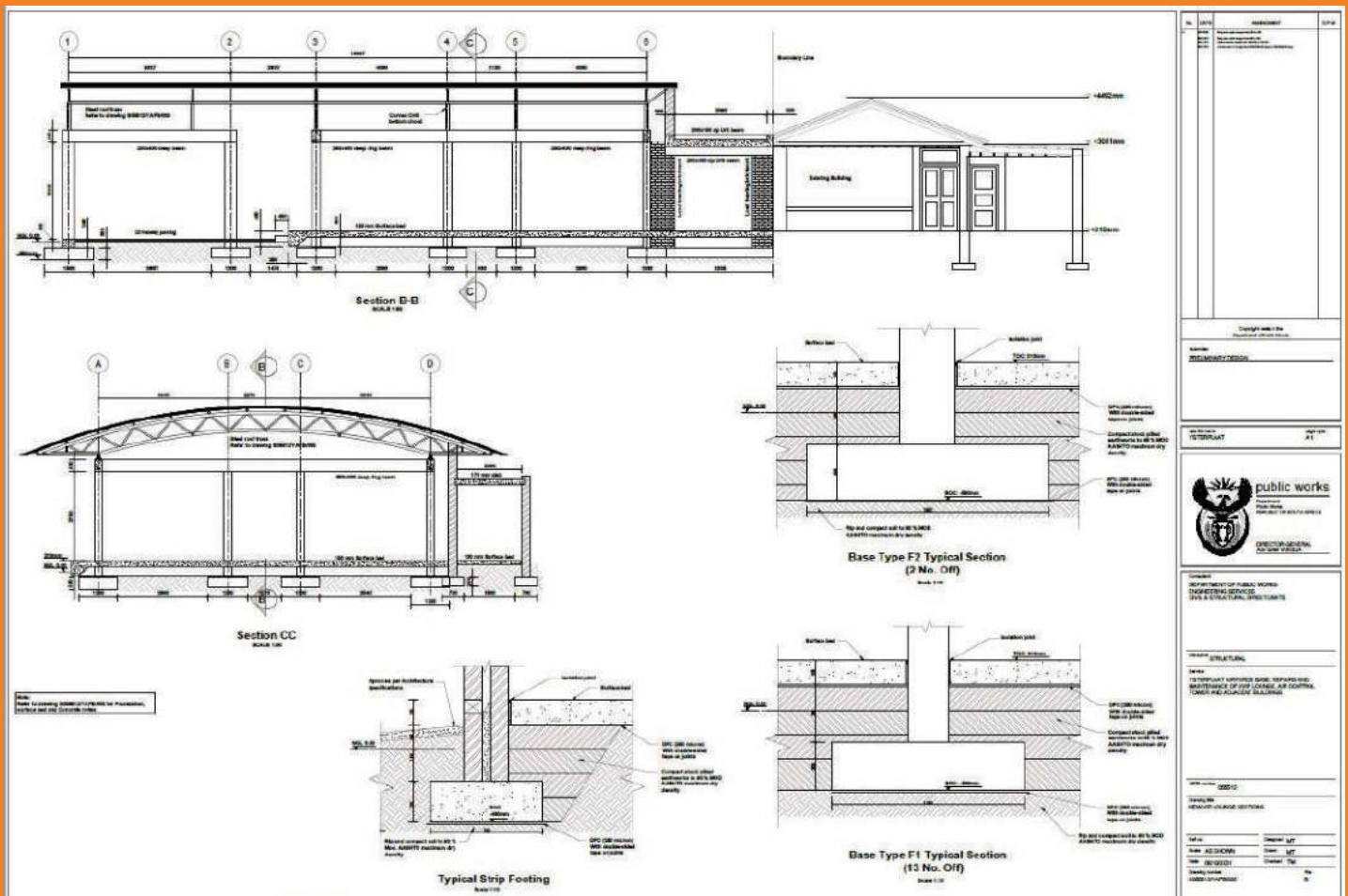
- On Ysterplaat project as the Structural Engineer, I managed to achieve level of responsibility E for engineering problem solving with limited guidance from the supervisor;
- As the Principal Agent, I managed to achieve level of responsibility E for managing engineering activities;

- I was also able to address environmental and safety concerns which provided hazardous working conditions to the end-users.

“Looking back at what I have accomplished on this project and the role it played for my ECSA registration, I am really honoured as a structural candidate for being offered an opportunity to

provide engineering design solutions on facilities that are used by the last line of defence, and also used to cater for the Head of State. I am proud of the experience I have gained from senior colleagues within the Construction Management Services who dedicate their time and skills to develop us as Candidates and guide us in the right direction towards ECSA professional registration,” concluded Matsobane.

NB: See below design drawings for new VIP Lounge at Ysterplaas



ONE CONSTITUTION,
ONE NATION



MEET CANDIDATE MECHANICAL ENGINEER MOHAMED SOOMAR

Mr Mohamed Soomar is based at Head Office in Pretoria. He joined the Department of Public Works and Infrastructure (DPWI) in December 2017 as a Candidate Engineer under the Young Professionals Programme.

Mohamed obtained his BSc Mechanical Engineering Degree from the University of KwaZulu-Natal in 2015, and he worked for a small consulting company in Pretoria for 16 months before joining the DPWI. Mohamed's short term goal is to obtain professional registration with the Engineering Council of South Africa (ECSA).

Here, he takes us through his tasks; "I am currently based in the Engineering Services unit at Head Office, providing technical support to projects in the entire country. My job involves the design and construction management of mechanical systems within buildings, which include fire design, wets design and Heating, Ventilation and Air Conditioning (HVAC) design. I am involved in these projects from inception to construction.

"A majority of my work involves working on existing buildings. I would conduct a site visit, review the existing mechanical equipment within our client department's facility, provide feedback to the client department on the state of the mechanical equipment and provide recommendations on the way forward in order to get the mechanical equipment functional and compliant to South African National Standards (SANS)."

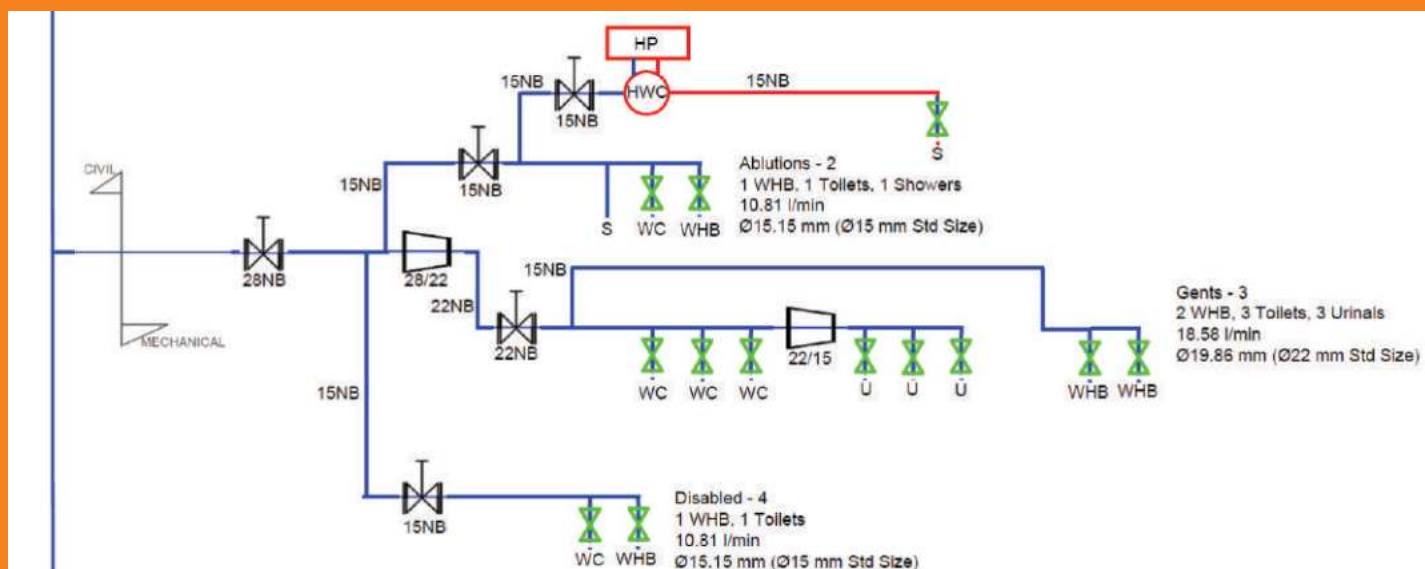
Mohamed says the project that stands out from those he has worked on in the Department is the Vrede SAPS stock theft unit building. "This project was the first one in which I was responsible for the entire mechanical system, the fire, wets and HVAC designs. It was also the first project where I was responsible for all the mechanical designs. In the past, I worked on one or two of the mechanical services and had been supervised.



"My design involved the fire, wets and HVAC services. The fire design is an important part of any building, as it is a life safety service and strictly governed by SANS regulations and local by-laws. The wets design is essentially the plumbing design of the project. In my design, I size all the water piping and pipe routing in the building. I also design the hot water requirements for the building."

"For the HVAC design I used NDPWI latest standards and specifications as well as SANS regulations, in order for me to design the system. I conducted the required calculations and used software called Heat Analysis Programme (HAP) to complete my design.

Below is a schematic calculation for one of the bathrooms;



“During my involvement on this project, I gained experience in 6 of the 11 ECSA outcomes. By being involved in this project and meeting 6 outcomes at an ECSA level E (Performing), I am making progress in my career as a Candidate Mechanical Engineer to soon register as a Professional Engineer.

“I enjoy being a public sector engineer as I get a behind-the-scenes look into facilities that most South Africans would not have access to. NDPWI is the department which manages the state building infrastructure, therefore being the 'internal engineer' in a government building project, I look at the lifecycle of the building differently from 'external consulting engineer', as the building will still fall within my Department after handover.

“By being a public service engineer, I also believe I can save the state money as my continuous experience within government projects enables me to provide our client departments with the best solution based on past experiences.

“I am currently working on 11 in-house design projects with a total value of approximately R51 000 000 and the approximate total professional fee saving, by conducting the project in-house, is R3 900 000.

“I am most proud of my involvement in projects for which the consulting engineer initially appointed resigned from the project and Engineering Services took over the project mid-

way through the design, tender or even construction stage. Once I take over a project, I ensure that it is completed within the time frame.

“If NDPWI had no internal engineers, another consulting engineer would need to be appointed which would cause time delays and financial implications for the client department. My involvement therefore possibly improved service delivery and saved tax-payers money.”



MEET CANDIDATE JUNIOR STRUCTURAL ENGINEER NDZALAMA KHUMALO



Mr Ndzalama Khumalo is based at the Polokwane Regional Office. He joined the Department of Public Works and Infrastructure (DPWI) in April 2021.

He is one of the students who were part of the DPWI Bursary Holders Programme and he joined the DPWI after completing his university studies. He completed Grade 12 in 2015 at E.P.P. Mhinga Secondary School in Malamulele, Limpopo. In 2016 he was accepted at the University of Cape Town to study BSc Civil Engineering and he graduated in February 2021.

“My short-term career goal is to see myself improve in structural engineering productivity and efficiency through the in-house projects. Since joining Engineering Services, I have been receiving projects that keep me on track with my efforts towards being a registered professional engineer,” Ndzalama explains.

He says out of the projects he has been part of, the Grootvlei Watch Tower design project has by far been his favourite project as it introduced him to the real-world practical application of structural engineering principles, to provide solutions for an engineering problem.

Ndzalama takes us through his work in this project; “I was tasked with using first design principles to provide engineering solutions to showcase my understanding of my profession's fundamentals. My structural design included the suspended floor slab, foundation, roof rafters and purlins, to ensure that the architect's designs complied with the South African National Standards.

“The suspended floor slab is designed to be 170mm thick reinforced concrete solid slab whilst considering the circular staircase opening specified by the architect. High-yield

strength reinforcing steel bars were provided to satisfy the bending, shear, deflection, and spacing requirements for a reinforced concrete structure. Additional reinforcement was provided to account for the central staircase opening's negative impact on the slab's structural integrity.

“The architect specified steel channels as rafters and purlins and these members were analysed to ensure that they can safely sustain the applied service loads (i.e. Imposed loads on roofs, wind, self-weight of the structural members). A shallow concrete strip foundation was designed.

“In the absence of geotechnical information and forming ground conditions unknown, reasonable assumptions were made with high-yield strength steel reinforcing bars, provided to combat any differential settlement.

“However, before the project is implemented, a Geo-technical Specialist will be appointed and the results will be completed to ensure the design is optimised.

Below are some of my foundation design sample calculations, and part of my design showing sectional wall foundation;

STRIP FOUNDATION DESIGN

SANS 10100-1: 2000

Ultimate base area load: (q_{ult})

B = 600mm (Foundation width)
 H = 250mm (Foundation depth)
 hc = 230mm (Brick-wall width)
 $q_b = 150 \text{ kN/m}^2$ (Soil bearing Capacity)
 $q_{ult} = 102,6 \text{ kN/m}^2$ (Ultimate Base Area Load)
 $q_{ult} < q_b$ (OK)

Moment: (M)

Base Area = $0,6\text{m}^2$
 $F = q_{ult} \times \text{Base area} = 61,53 \text{ kN}$
 $M = F \frac{B - hc}{4} = 5,69 \text{ kNm}$

Compressive reinforcement check: (k)

Recap: $f_{cu} = 25 \text{ MPa}$; $b=1000\text{mm}$; $d=170\text{mm}$
 $k = \frac{M}{bd^2f_{cu}} = 0,0079 < 0,156$
 \therefore OK, no compressive reinforcement required

Steel provided:

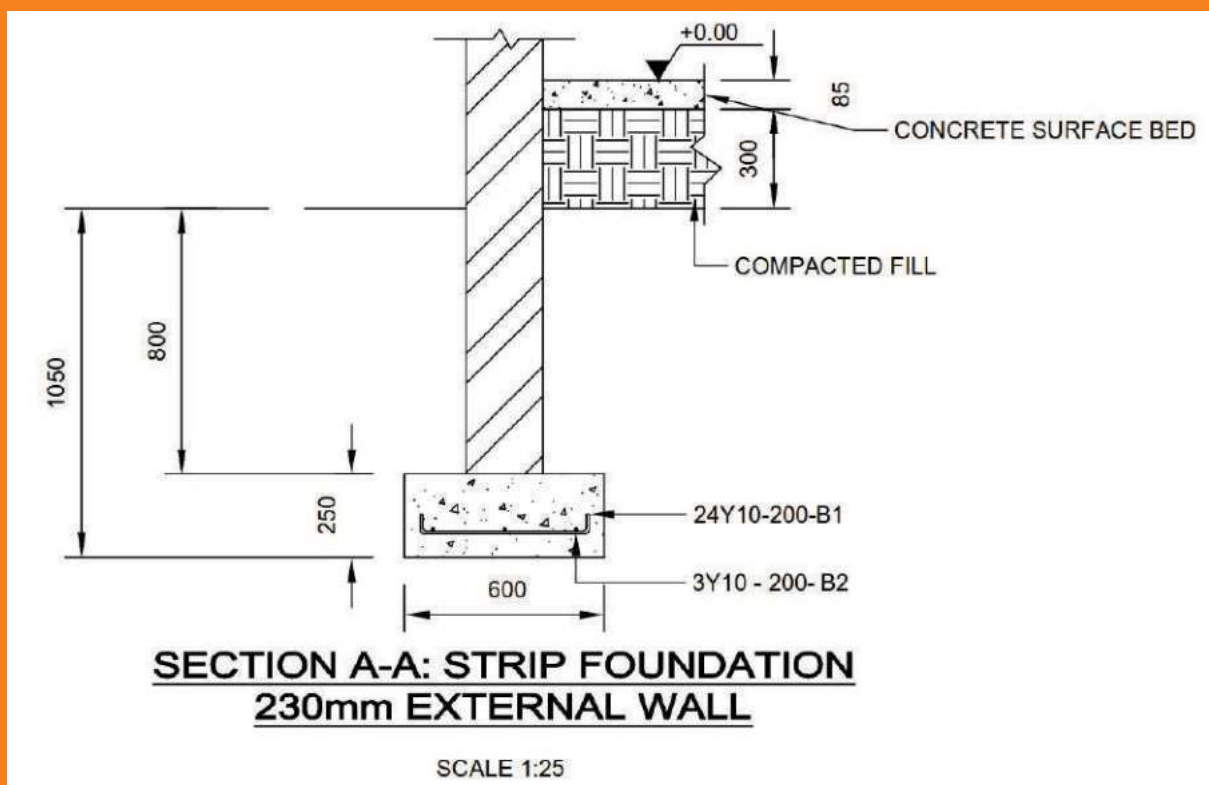
Minimum area of steel required = 325mm^2
 Since $A_s (90 \text{ mm}^2) < A_{s,min} (325\text{mm}^2)$
 \therefore Provide Y10- 200 c/c ($A_{s,provided} = 392\text{mm}^2$)

Required area of steel: (A_s)

$f_y = 450 \text{ MPa}$
 $A_s = \frac{M}{0,87f_yZ} = 90 \text{ mm}^2$

Internal lever arm: (Z)

$Z = \left[0,5 + \sqrt{0,25 - \frac{k}{0,9}} \right] d = 0,99d > 0,95d$
 Use $Z=0,95d = 161,5\text{mm}$



“Through this project, I managed to achieve the Engineering Council of South Africa (ECSA) outcomes 1, 2 and 3 at responsibility level B (Assisting). These relate to identifying an engineering problem, developing solutions, and applying specialist knowledge and principles. I take delight in the idea that the provision of my engineering professional skills play an impactful role in ensuring public safety through infrastructure.

“I am involved in 4 in-house design projects where I've managed to save the Department R 178 874.25 in professional fees. The feedback received from my supervisor regarding the Grootvlei Watch Tower design is what I am most proud of so far. It bolstered my aspirations to succeed and leave behind a positive mark in the industry.”



MEET CHIEF ARCHITECT MOFULATSI RAMPOU

Mr Mofulatsi Rampou is based at Head Office in Pretoria. He takes us through a brief journey before he joined the Department of Public Works; “I worked in the private sector for 10 years. I did 4 years Candidate experience in Namibia and registered as a Professional Architect when I returned to South Africa in 2016.

“When the COVID-19 pandemic hit in 2019, I was left with no job. I was however fortunate to be called by the DPWI for an interview after I had applied online for the Presidential Employment Stimulus Programme. Architects were required for Engineering Services in-house projects. Working under the Engineering Services Chief Directorate with Engineering Candidates on in-house projects has been the best experience to date.”

Mofulatsi holds a BAS Degree and Master of Architecture (Professional) from the Nelson Mandela University. He also plans to attend short courses offered by the National School of Governance to acquaint himself with all the necessary government processes that are essential to his field of work.

He says his current job responsibilities are as follows;

1. Executing projects from start to construction and close out;
2. Administering project finances, timelines and reports;
3. Training and mentoring of interns and graduates through HCI candidacy programme;
4. Provide technical Architectural support in Engineering Services in-house projects;
5. Members: Bid Specification & Evaluation Committees;
6. Using departmental drone for high rising building inspections; and

7. Participant in compilation of DPWI In-house Design Manuals (IDM), templates etc.

Mofulatsi says his goal is to also transfer skills to younger individuals who wish to find rapid experience in the Department. “Since I have vast experience from the private sector and from Namibia, I brought innovative ideas within Engineering Services and I am happy to see that some of my ideas have been adopted and implemented for the improvement of service delivery,” he adds.

He says the most interesting project he has worked on while in the DPWI, is the Groenpunt Correctional Facility. “It addresses the goals of the Department of Correctional Services and addresses the constituted national values as a whole. The new generation prison design is a departure from the traditional prison designs in architecture for interior design and design philosophy. The prison’s state-of-the-art design attempts to create a safer and more humane environment for both the inmates and staff.

“The current Groenpunt Prison was built in 1962. It’s a state-owned facility which accommodates incarcerated inmates at medium B. What was exciting for this project is that I was given full architectural responsibility to design a new prison. We started in December 2020 and using In-house Design Processes, we developed strict timelines as this project was highlighted as urgent.

“Our project programme was such that every two or three months, the client is consulted for design options and we did exactly that. By September 2021, we had successfully completed full acceptable new Groenpunt Prison design which is ready to be accepted by the client so that we can continue, to the next stage. The new Groenpunt Prison design featured at the Engineering Services In-house Design Expo on 2-3 December 2021.”

Mofulatsi takes us through the lessons he gained for his SACAP registration; “The variety of institutional projects that I worked on such as law courts, prisons and border posts, widened my spectrum as an Architect. I have been exposed to extensive use of National Building regulation. This approach helped to steer the project forward and allowed logical referencing to sensible space making.”

He says he has always dreamt of contributing to his country through his profession and he currently gets to do that. He concludes that working with a wider range of professionals in different regions and having a strong multidisciplinary team in the current office has been one of the accomplishments he is most proud of. ■



MEET CANDIDATE ENGINEERING TECHNICIAN NEO RASEALA

Mr Neo Raseala is based at Head Office in Pretoria. He joined the Department of Public Works and Infrastructure (DPWI) in September 2014 through the CETA Internship Programme and subsequently joined the Candidacy Programme in December 2017.

He completed a National Diploma in Civil Engineering at the Vaal University of Technology in 2014 and thereafter obtained a B.Tech. Degree in Civil Engineering, specialising in Transportation Engineering – from the University of Johannesburg. In 2018, he obtained a Post Graduate Diploma in Business Management from the Unisa School of Business Leadership (SBL), and he is currently studying towards a Master of Philosophy degree at the University of Johannesburg's Post Graduate School of Engineering Management.

“My short-term career goals are to obtain my professional registration with the Engineering Council of South Africa (ECSA) as a Pr. Tech (Eng.) and subsequently work in the Department as a Control Technologist in the transportation engineering field,” he adds. Neo takes us through his tasks as an Engineering Technician; “I conduct site visits at various user-department facilities and from this, produce various investigation reports, status quo, preliminary and detailed design reports. I'm also responsible for the drafting of the tender documentation as well as site supervision for departmental civil engineering projects nationally. I supervise a team of Interns comprising of Candidate Technicians, Technologists and Engineers.”

Neo says one of the favourite projects he has worked on is the **Beitbridge Land Port of Entry: Maintenance and Repairs of Buildings, Civil, Electrical and Mechanical Infrastructure and Installations for**

the Period of 12 Months. “This project is one of my favourites because it is a multi-disciplinary project which has thus far exposed/equipped me with knowledge in mechanical, electrical, structural, portable water and wastewater plants, water, sewer roads and storm water infrastructure with respect to operations and maintenance, mainly as a resident engineer.

“Acting as the client representative/Engineer in accordance to the GCC 2010 conditions of contract, the project has allowed me to gain more knowledge and experience in the management of projects, particularly on the financial, quality and risk management aspects which are key ECSA outcomes falling under group B: Managing Engineering Activities as well as Group C: Risk and Impact Mitigation.

“To manage quality and risk on the project, I make use of a maintenance control plan over the various disciplines. This allows the entire professional team to ensure that all maintenance and operations are carried out periodically as specified, with the utmost level of quality. On the financial part, I am responsible for compiling and certifying the value of work done by the contractor on a monthly basis subsequent to which I submit to the project manager for processing.

“To maintain accurate financial monitoring on the project, I make use of the cash flow projections from which information regarding the under or overspending of the project can be extracted, thus allowing me to introduce control measures to mitigate any abnormal under or overspending that may occur on the project. The experience gained further in this particular project is that I can see when the contractor has underspent or overspent in comparison to the contractor's cash projections.

“I have learned that if the contractor underspent, one of the main reasons that can be attributed to this is the delays experienced in the delivery/supply of a number of materials used in the repair works such as electrical and mechanical installations. However, with proper mitigation plans, this can be resolved in the succeeding months by ensuring that the timely delivery and installations of the said materials is completed by the contractor. For this project, an in-house engineering team was appointed in April when the contractor was appointed, thus we were involved from stage 5 to 6 of the project life cycle and the professional fees savings of this project is R2 743 589.05 for the Department.”

Neo says it makes him proud to be able to use his professional skills to deliver services to the public sector clients in the form of value engineering solutions, as well as imparting the knowledge he has gained over the years to fellow colleagues and counterparts within the built environment. “I feel honoured to have been part of the in-house projects initiatives and to have worked with a phenomenal team of individuals in the various disciplines within the built environment in providing excellent service to our end-user at this national key point,” he concludes.

MEET CANDIDATE ELECTRICAL ENGINEER KHANYISANI MLONDO



Mr Khanyisani Mlondo is based at Head Office in Pretoria. He joined the Department of Public Works and Infrastructure (DPWI) in February 2018.

“A friend shared an advert for the DPWI Candidacy Programme with me in mid-2017. I then decided to make an application for the position of Candidate Electrical Engineer. The success of my application for the position led to me being accepted and commencing to work for the DPWI. I completed my BSc: Eng. (Electrical) Degree in 2015 at the University of KwaZulu-Natal and then registered as a Candidate Engineer with the Engineering Council of South Africa (ECSA). My short-term career goal is to become a professionally registered engineer with the ECSA,” Khanyisani explains.

He says his job responsibilities as a Candidate Electrical Engineer within the Department includes planning, design, construction management, appointed consultants design reviews and overseeing of service providers' works on the following aspects of construction projects;

- i. Incoming power supplies
- ii. Small power systems
- iii. Lighting
- iv. Earthing and Lighting
- v. Standby Generator Installations
- vi. Security Installations
- vii. Fire Detection Systems
- viii. Alternative Power Sources and Energy Efficiency

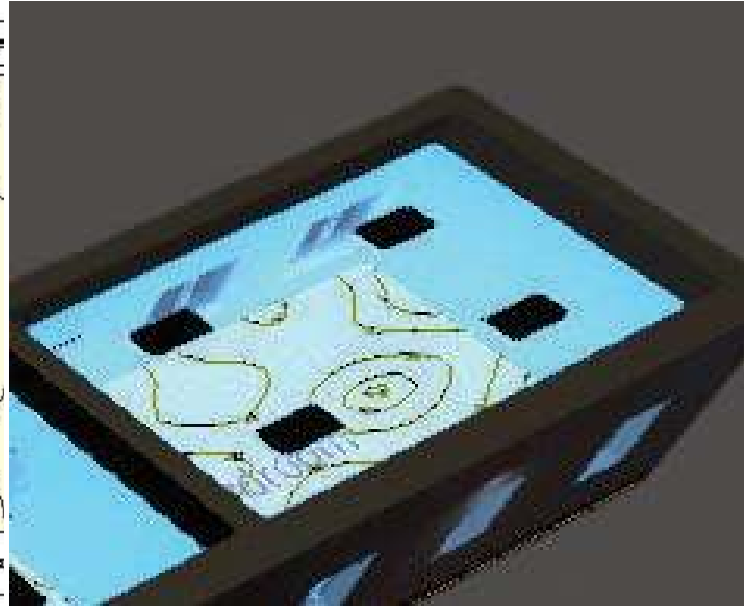
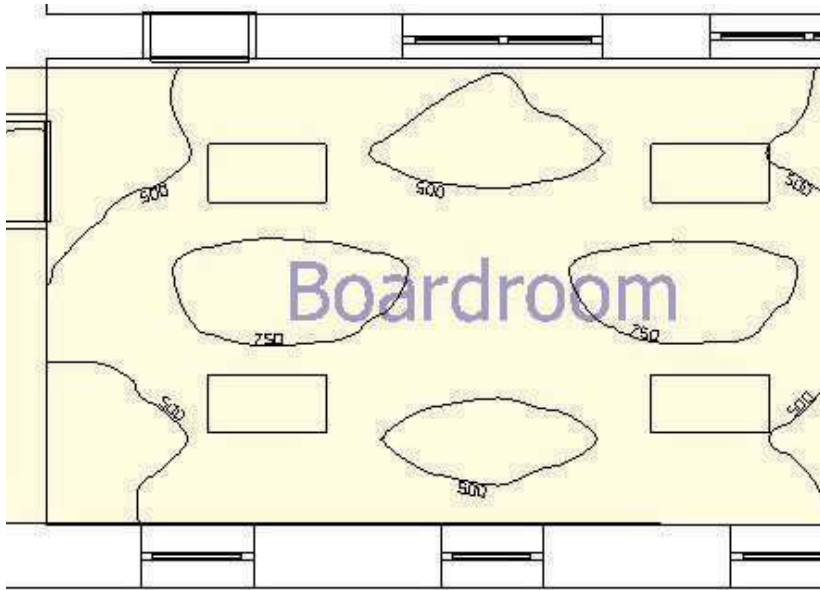
Khanyisani says these responsibilities have played a key role in his professional development, meeting the requirements for professional registration and saving funds for the Department. Apart from designing and reviewing consultant's project documentation, Khanyisani also assists the Department with updating its internal engineering standards for electrical installations where he is appointed as the chairperson of the committee.

Khanyisani takes us through the project he has worked on that stands out for him; “My favourite project is the refurbishment and upgrading of the Mafikeng SAPS complex as I am tasked with developing electrical designs and documentation as per the Procurement Instruction. The Department had challenges with the appointed consultant resulting in appointing in-house electrical engineers and I was appointed as the electrical project engineer working with external consultants for other disciplines.

“In this project, I developed engineering reports aimed at investigating the power, lighting, fire detection and building internal wiring requirements. These investigations have resulted in the clarification of the requirements for the facility and designs also done based on these requirements. Part of the design work includes lighting design which aims to make the lighting installations of the buildings compliant with the South African National Standards (SANS) and also be adequate for the SAPS building users.

“What set this project apart from others is that its scope involves almost all aspects of the electrical engineering discipline, at a complexity level required by ECSA for meeting requirements for professional registration. So the project presents a great opportunity for me to acquire that experience.

The illustration below shows my design solutions for lighting design for the boardroom. “I used dialux software for interior lighting design modelling and simulation for appropriate lighting design.



Room Data	
Room Description:	Boardroom
Room Length:	5
Room Width:	7.25
Ceiling Height:	4
Ceiling Reflectance:	70
Walls Reflectance:	30
Floor Reflectance:	14
Get Room Index	1,56
Coefficient of Utilization:	0.55
Required Average Illuminance:	200

“One of the lessons I gained from the project was the ability to work effectively and professionally in a multi-disciplinary project team and engage with project stakeholders which involve external consultants for other disciplines and Eskom. I had to engage Eskom in this project with regards to the electrical infrastructure expansion and meeting Eskom regulations.

“I feel honoured to be provided the opportunity to play a role in service delivery to our communities. It also brings pleasure and pride as a public sector engineer to put my name on tangible

systems like public infrastructure that can be seen and used by our communities. What I am most proud of is the confidence that I have gained in working with various people from a number of respected organisations.

“I would have certainly felt somehow inferior if I worked with other colleagues in engineering field later in my career without having this experience that I am acquiring now. However, with the experience that the Department has provided me, I am capable of engaging any person in my work with confidence, regardless of their experience.”

MEET CANDIDATE ENGINEER (ELECTRICAL) ANDILE MJOKA



He completed his BSc in Electrical Engineering in 2019 at the University of KwaZulu-Natal (UKZN). Andile says as a Candidate Engineer, his short term goal is to obtain professional registration with the Engineering Council of South Africa (ECSA).

Andile works under the supervision of Hardlife Mathevula (who is also a Candidate) and Chief Engineer Robin Maharaj who is also based at the Durban Regional Office. "I work on in-house projects only. My responsibilities include site investigations, technical reports, design drawings, and electrical works construction supervision as resident engineer. Doing in-house projects helps me a lot with my professional development," he explains. Mjoka says he has worked on 4 projects, saving the department R1 829 103.00 in professional fees.

"Out of all the projects I've done, Madadeni Magistrate's Court in Newcastle, north of KwaZulu-Natal, is my favourite. It is an upgrade and renovations project. It has the complexity I require as a Candidate for development and professional registration.

This project allows me to achieve ECSA outcomes group A, B, C and D. At the moment, the project is at the stage where I'm required to produce a report and design drawing; lighting, small power, CCTV, access control, fire protection, etc. I've done lighting design using relux software, load calculations, cable sizing and fault level calculation. Cable sizing requires me as an engineer to size a cable with the correct current carrying capacity and voltage drop calculations. I do this with the guidance of SANS 10142-1, 2020 and my supervisors."

Mr Andile Mjoka is based at the Durban Regional Office. He joined the Department of Public Works and Infrastructure in June 2020 as an Intern at Facilities Management and later moved to Engineering Services in November 2020.

Below are some of the calculations performed and small portion of lighting layout.

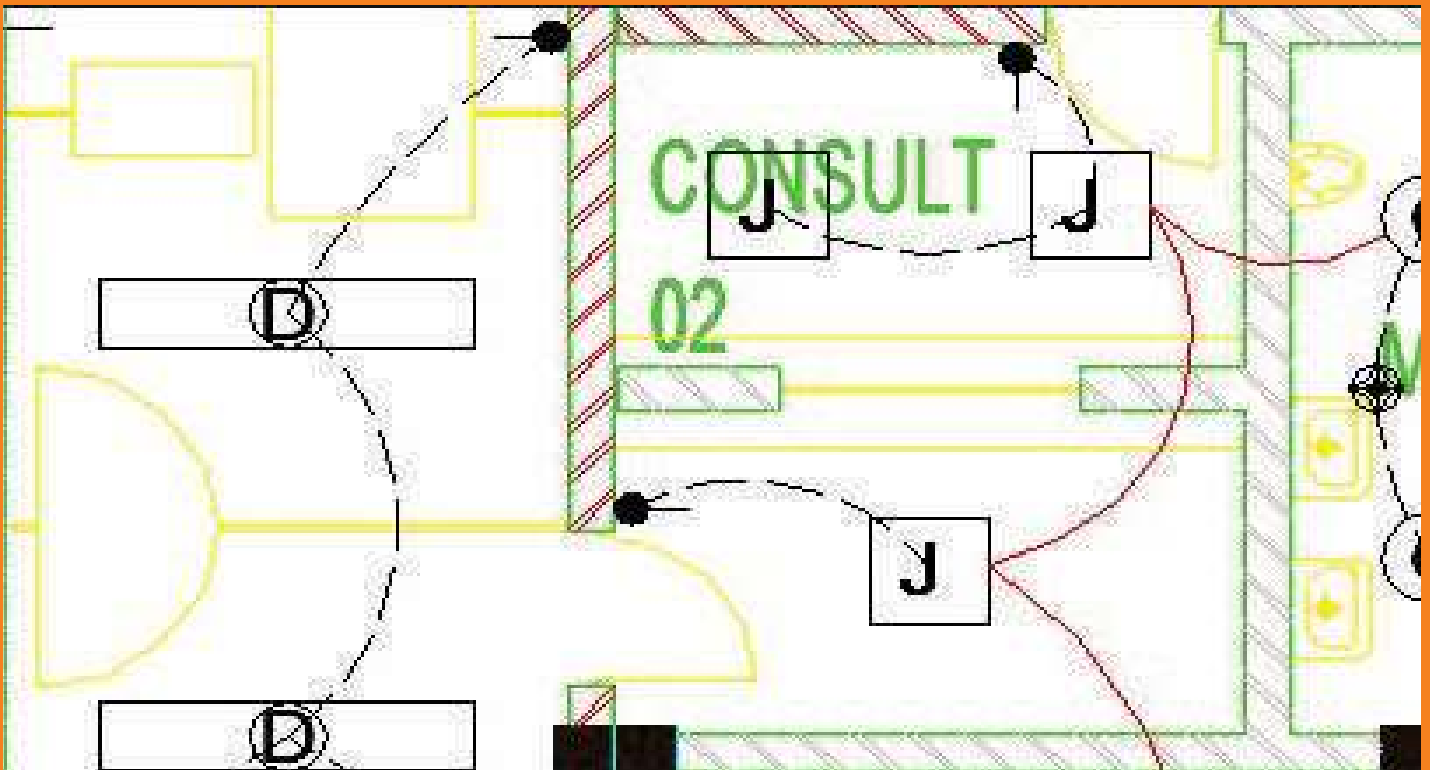
CABLE SIZING

From LV Broad to DB-B/N Choose 10mm ² 4-core cable And verified it to be correct with cable sizing calculations methods.	From LV Broad to DB-B/E Choose 6mm ² 4-core cable And verified it to be correct with cable sizing calculations methods.
--	---

FAULT LEVELS

After the transformer The calculated results 28867.51346A $\approx 30\text{KA}$	DB-B/N The calculated results is = 16293.02741A $\approx 20\text{KA}$
--	--

SMALL PORTION OF A LIGHTING LAYOUT



Andile says in the short time since he moved from Facilities to Engineering Services, he has gained valuable experience resulting in him having the ability to do detailed engineering reports, electrical calculations and designs, as well as practice engineering judgement.

"I'm grateful to the Engineering Services for exposing me to the real world electrical projects through the in-house design processes. It's good to see the Department

investing in young engineers like myself as we are the future of engineering in our country. It also gives me great pleasure that the work we do in the Department contributes massively to the improvement of our country's infrastructure," explains Andile.

He says he is most proud of his ability to do building services electrical designs and he believes that designing is his core skill.

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VARHANDZIWA VA HINA VA HI LAVA A HI TLHAVELENI HI TISIRHELELA EKA COVID -19 KU ENDLELA LESWAKU HI VA KONA KU SEKETELA VARHANDZIWA VA HINA

XANA A WU SWI TIVA?

- Loko u ri na malembe ya 18 ku ya ehenhla, a wa ha fanelanga ku rindza nkarhi woleha! Famba u ya tlhaveriwa endhawini ya le kusuhi na wena.
- U nga ya hi wexe endhawini ya ntlhavelo, hambiloko u nga endlanga xikombelo laha u nga ta tsarisiwa na ku tlhaveriwa.
- U nga hatlisisa endlelo hi ku tsarisa eka <https://vaccine.enroll.health.gov.za> u nga se ya fika endhawini.
- Lava nga koteki ku fikelela online va nga tsarisa hi ku tirhisa SMS hi ku tshikelela *134*832* **nomboro ya wena ya ID#**. Loko u ri hava nomboro ya ID, tshikelela *134*832#.
- Ntsariso wu nga tlhela wu endliwa hi ku tirhisa **nomboro ya WhatsApp ya COVID** hi ku rhumela "REGISTER" eka **0600 123 456**.
- Vukorhokeri byo tsarisa hi SMS na WhatsApp a byi hakerisiwi, **a wu laveki ku va na datara kumbe airtime** ku fikelela vukorhokeri.
- Swi tshama swi ri swa nkoka ku **ambala masiki, ku siya mpfuka loko u yima ekusuhi na vanhu no hlamba mavoko hi xisibi kumbe u tirhisa sanithayiza ya mavoko leyi nga na xihoko no pfula mafasitere ku kuma moya wo tenga.**
- COVID-19 yi ya emahlweni yi hangalaka naswona ku tlhaveriwa i ndlela yi ri yoxe yo hunguta xitsongwatsongwana etindhawini ta hina.
- **Loko u tlhaveriwile, u sirhelekile ehenhla ka ku tshikeleriwa hi vuvabyi**, ku ya exibedlhele na ku fa.
- **Hi ku tlhavela vanhu votala, hi nga hunguta ku laveka ka magoza yo sivele yo fana na lockdown yo tika na swipimelo.**

A HI TLHAVELENI HI TISIRHELELA EKA COVID-19 LESWAKU HI TA TLHELELA EKA KU ENDZELA TINDHAWU LETI HI TI LAVAKA NA KU VONA VANHU LAVA HI VA RHANDZAKA.

