



# **KIMBERLEY SOL PLAATJE UNIVERSITY**

## **BULK ELECTRICAL SERVICES REPORT**



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## **1. INTRODUCTION**

We were requested by our client, Wits University, to compile a report to summaries the Bulk Electrical Reticulation for the Sol Plaatje University. This report is based on info received from the SPU of estimated sizes of buildings and a possible time frame that will be followed.

## **2. SITE LOCATION**

The proposed sites included all the erwen that will be utilize for the Sol Plaatje University in Kimberley and will consist basically out of the following:

1. South Campus (erf 2511)
2. Central Campus (erwen 2503, 879 and 2513)
3. North Campus (erf 1 and the Luka Jantje Building)
4. Mhudi House
5. Ra Thaga House

## **3. BACK GROUND**

Element Consulting Engineers were involved in the original services report for the bulk connections of the new Sol Plaatje University. They had establish with the municipality a dedicated MV ring for the new university that will run from Hall Street sub-station, passed all the university campuses to Hadison Park sub-station. Too that stage we had a quotation from Sol Plaatje municipality to install a new 185mm<sup>2</sup> MV cable from Hall Street sub-station to erf 2503 at the Central Campus. The rest of the dedicated MV ring will be installed as the new university project progresses. The basic idea were that all the properties that become part of the new university will be fed from this dedicated MV ring, this also included all the existing buildings that are renovated to be part of the university. To include the existing buildings will all depends on available capacity on this dedicated MV cable ring network.

## **4. EXISTING BULK ELECTRICAL SERVICES (Summarized in Annexure A)**

### **4.1 North Campus (Erf 1)**

The dedicated MV cable ring was installed, ending at erf 2503, with a bulk connection point next to erf 2503 in Bishops Street. This MV cable ring runs from the Hall Street sub-station, past erf 1 which will form the center point of the North Campus of the SPU. It runs also past the Luka Jantje building which is currently the head office of the SPU and will be part of the North Campus. When it is determined that there will be capacity available on the MV cable ring, the Luka Jantje building will be connected and take power of this MV cable ring supply. A bulk connection point will be done for the North Campus from where all the buildings will be reticulated. This will be done as soon as they start with the development of the first new building on the North Campus.

The Luka Jantje building had a dedicated room in the basement which is used for an electrical sub-station of the municipality.

## **4.2 Central Campus - Old William Pescod (Erf 879)**

From the North Campus the MV cable ring runs past erf 879, where we had installed a mini-sub on the boundary of the erf to feed all the existing and new buildings on erf 879 (Existing buildings that was renovated, C008 and C009). The existing connection to erf 879 was un-sufficed for all the renovations and new buildings that will be erected on this erf. This mini-sub will be the responsibility of the municipality and we had a registered bulk electrical meter point for erf 879.

## **4.3 Central Campus (Erf 2503)**

A bulk electrical connection point was installed at erf 2503, consisting out of a 11kV outdoor Ring-Main-Unit with a registered bulk electrical meter point for erf 2503. This Ring-Main-Unit will be the responsibility of the municipality to maintain. From this bulk/metered RMU of the municipality it fed to an 11kV outdoor RMU on the inside of the site that will switch to 11kV MV ring system through-out the university site. This arrangement allows that all the different buildings can benefit from the advantage to be able to feed from alternate legs on the ring in the event of a fault on the 11kV cable ring. Five packaged outdoor miniature substations are installed around the site and will provides power to all the buildings of the development on erf 2503.

The current reticulation consists out of the following:

- a. Mini-sub, SPU 1, installed on the roof of building C003 and supply only building C003.
- b. Mini-sub, SPU 3, installed in a room on the ground floor of building C002/Block A and supply building C002 and the future building C006.
- c. Mini-sub, SPU 4 and SPU 5, installed in the Services building and supply building C001, the Services building and power to all the other bulk services (Fire water/Grey water/Domestic cold water/Domestic hot water/TABS)

Mini-sub, SPU 2 is ear-market to be installed in building C004 as soon as the room in building C004 is available. This mini-sub is currently on-site because it was used as the temporary builders connection, it will be discussed further under the Proposed Bulk Electrical Services.

## **4.4 South Campus (Erf 2511)**

The application for the rest of the dedicated MV ring was done and we await the quotation from the municipality.

## **4.5 Ra Thaga House**

This building was renovated in 2015 and the existing bulk electrical connection was upgrade with a registered bulk electrical meter point. The building had a dedicated room on the ground floor which is used for an electrical sub-station of the municipality.

## **4.6 Mhudi House (Erf 12195)**

This building was renovated in 2015/16 and the existing bulk electrical connection was re-used with a registered bulk electrical meter point.

## **5. PROPOSED BULK ELECTRICAL SERVICES (Summarized in Annexure A)**

### **5.1 North Campus (Erf 1)**

The proposed development on erf 1 is planned in the current time frame to start in 2019 with the first building, building LP002. A bulk electrical connection point will be installed at erf 1, consisting out of an 11kV outdoor Ring-Main-Unit with a registered bulk electrical meter point for erf 1. This Ring-Main-Unit will be the responsibility of the municipality to maintain. From this bulk/metered RMU of the municipality it fed to an 11kV outdoor RMU on the inside of the site that will switch to 11kV MV ring system through-out the university site. This arrangement allows that all the different buildings can benefit from the advantage to be able to feed from alternate legs on the ring in the event of a fault on the 11kV ring. With the information available it is estimated to install at least two packaged outdoor miniature substations around the site that will provide power to all the buildings of the development on erf 1.

### **5.2 Central Campus - Old William Pescod (Erf 879)**

From the mini-sub on the boundary of the erf a bulk electrical connection point, a distribution kiosk, was install on the inside the erf to fed all the existing and new buildings on erf 879. The Existing buildings had already a supply cable from this kiosk and the new buildings will be fed from this kiosk as the building projects progresses.

### **5.3 Central Campus (Erf 2503)**

Mini-sub, SPU 2 is currently on-site but not yet installed in its dedicated place in building C004 because building C004 is still under construction. As soon as the mini-sub room in building C004 is finished, mini-sub SPU 2 will be installed and connected into the MV cable ring. This mini-sub, SPU 2, will be installed in a room on the ground floor of building C004 and supply building C004 and the future building C005.

In the original design was no provision for building C007, but it will and can be included in the MV cable ring system. The existing MV cable ring had to be extended and a new mini-sub, SPU 6 had to be installed in building C007.

### **5.4 Central Campus (Erf 2513)**

The proposed development on erf 2513 next to erf 2503 is planned in the current time frame to start in 2018. A bulk electrical connection point will be installed at erf 2513, consisting out of an 11kV outdoor Ring-Main-Unit with a registered bulk electrical meter point for erf 2513. This Ring-Main-Unit will be the responsibility of the municipality to maintain. From this bulk/metered RMU of the municipality it fed to an 11kV outdoor RMU on the inside of the site that will switch to 11kV MV ring system through-out the university site. This arrangement allows that all the different buildings can benefit from the advantage to be able to feed from alternate legs on the ring in the event of a fault on the 11kV ring. With the information available it is estimated to install at least three packaged outdoor miniature substations around the site that will provide power to all the buildings of the development on erf 2513.

## 5.5 South Campus (Erf 2511)

The proposed development on erf 2511 is planned in the current time frame to start in 2023. Currently there is an existing connection on the site from which the JP Hugo House and the other existing building receive electrical power. When the new development of this site will start, a bulk electrical connection point will be installed for all this new development and all the existing buildings. This connection point will consist out of an 11kV outdoor Ring-Main-Unit with a registered bulk electrical meter point. This Ring-Main-Unit will be the responsibility of the municipality to maintain. From this bulk/metered RMU of the municipality it will feed to an 11kV outdoor RMU on the inside of the site that will switch to 11kV MV ring system through-out the university site. This arrangement allows that all the different buildings can benefit from the advantage to be able to feed from alternate legs on the ring in the event of a fault on the 11kV ring. With the information available it is estimated to install at least five packaged outdoor miniature substations around the site that will provide power to all the buildings of the development on erf 2511.

## 6. TECHNICAL INFORMATION

The dedicated MV cable ring system is built with a 185mm<sup>2</sup> x 3-core cable that had a load capacity of 7000 kVA.

A 11kV cable ring feed system works on the bases that it will be open at any given switching point and if some fault occurs, the switching arrangement will be changed to isolate the fault but still allows that all the different buildings be feed from alternate legs on the ring. This means that although the capacity of the dedicated MV cable ring is 7000 kVA we can by having an switched open point in the system, feeding from both legs of the ring system and can accommodate 7000 kVA on each of the two legs of the ring system. The importance of this is that both sub-stations on the two ends of the ring system must have the capacity to feed the ring system. We had also to remember that when switching had to be done for some reason that we had to keep the capacity of each of the two legs of the ring system under the threshold of 7000 kVA.

Currently the 11 kV dedicated feeder are built from Hall Street sub-station to erf 2503 at the central campus, and the application to complete this 11 kV dedicated feeder to Hadis Park sub-station was done and we await their response. The fact of the matter from this is that the Hadison Park sub-station did not have the capacity to feed this 11 kV dedicated feeder. Currently the university power used is still under the threshold of 7000 kVA but as indicated on Annexure B, it is clear that the university will go over the threshold at 2018-2019. With this in mind it will be needed to bring this urgently too the municipalities attention that they can program the upgrade of this sub-station.

## 7. OPERATIONAL RESPONSIBILITY – BULK ELECTRICAL CONNECTIONS

All these developments will be the sole user of these different 11 kV metered bulk electrical connection points. Sol Plaatje Municipality point of responsibility will be limited to their metered points. All further electrical requirements, installation, maintenance and safe operation from the MV infrastructure in-side the university sites with MV cables and mini-sub and/or transformers will be the sole responsibility of the developer or property owner.

## **8. EMERGENCY POWER** (Summarized in Annexure A)

### **8.1 North Campus (Erf 1)**

It is proposed and estimated to install one generator for all the buildings emergency power needs on Erf 1 of the North Campus.

A 250 kVA emergency generator is installed at the Luka Jantje building and provides emergency power for the complete building except for the mechanical loads.

### **8.2 Central Campus - Old William Pescod (Erf 879)**

A 300 kVA emergency generator will be installed at erf 879 of the central campus, with the current project to provides emergency power for the existing buildings and the new buildings C008 and C009. It provides emergency power to essential areas as all the passages, stairs, some of the class rooms and the data communication network.

This generator will be in working order at the end of 2016 with the completion of building C008.

### **8.3 Central Campus (Erf 2503)**

Currently an 800 kVA emergency generator is installed at the central campus and provides emergency power for buildings C001, C002, future building C006 and the Services building that included the main sever rooms mechanical cooling. It provides emergency power to essential areas as the main sever room, all the passages, stairs and study/seminar rooms in the buildings.

The other buildings on this erf will receive emergency power from another generator that will be situated in building C004. It is not sure what the size of this generator will be but it will provides emergency power for buildings C003, C004, future building C005 and future building C007.

This generator will be working at the end of 2016 with the completion of building C004.

### **8.4 Central Campus (Erf 2513)**

It is proposed and estimated to install one generator for all the buildings emergency power needs on Erf 2513.

### **8.5 South Campus (Erf 2511)**

It is proposed and estimated to install one generator for the JP Hugo buildings emergency power needs. For the rest of the South Campus it will be proposed to install two emergency generators because of the size of the erf and the distances between the proposed new buildings.

### **8.6 Ra Thaga House**

A 150 kVA emergency generator is installed at the Ra Thaga House and provides emergency power for the complete building except for the mechanical loads.

### **8.7 Mhudi House (Erf 12195)**

The existing 150 kVA emergency generator will be used for the Mhudi House and will provide emergency power for the complete building.

### **8.8 General**

A 50 kVA emergency generator was installed at the end of 2014 in the Luka Jantje building for the server room. This generator is now removed with the installation of a new 250 kVA generator for the complete Luka Jantje building.

At this stage the plan is to convert this 50 kVA generator to a mobile generator on a trailer for the SPU to use where-ever and when-ever they need it.

## **9. OPERATIONAL RESPONSIBILITY – EMERGENCY POWER GENERATORS**

All these generators will be the property of the SPU. All further electrical requirements, installation, maintenance and safe operation of the emergency generators will be the sole responsibility of the developer or property owner. This included the responsibility of re-fueling, regular testing and maintenance of all the generators.