



CIVIL ENGINEERING SERVICES REPORT

**NEW SHOPPING CENTRE ON
ERVEN 3726, 3727 AND 3728 (CNR
OF R503 LICHTENBURG ROAD
AND BOPHELONG HOSPITAL
ROAD), MAHIKENG**

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(Revision 00)

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1 Introduction

Moedi Consulting Engineers (Pty) Ltd. has been appointed for the investigation and reporting on the Civil Engineering services required for the proposed new Shopping Centre of approximately 6 605m² on Erven 3726, 3727 and 3728, Danville, Mahikeng.

The proposed shopping centre will be located on the south-eastern corner of the intersection of the R503 Lichtenburg Road and Bophelong Hospital Road. The intersection has recently been reconstructed to incorporate a new roundabout as part of the upgrading of the R503 road. The intersection has been identified as a “Gateway Project” in the Mahikeng Local Municipality IDP 2020-21.

The Mahikeng Local Municipality has an estimated population of 305,291 (MLM-IDP2020-21). The Municipality is governed on a district level by the Ngaka Modiri Molema District Municipality.

Mahikeng has a semi-arid climate with warm to hot summers and cold, dry winters. The average annual precipitation is 548mm, with rainfall mainly occurring during the summer.

Approximate coordinates for the Proposed Development are:

Latitude : 25° 52' 40.06" S
Longitude : 25° 39' 47.95" E

The proposed development area is approximately 2.91ha with sufficient space for the provision of adequate parking and access.

Refer to Figure 1 & 2 hereafter, illustrating the location proposed development area in relation to Mahikeng:

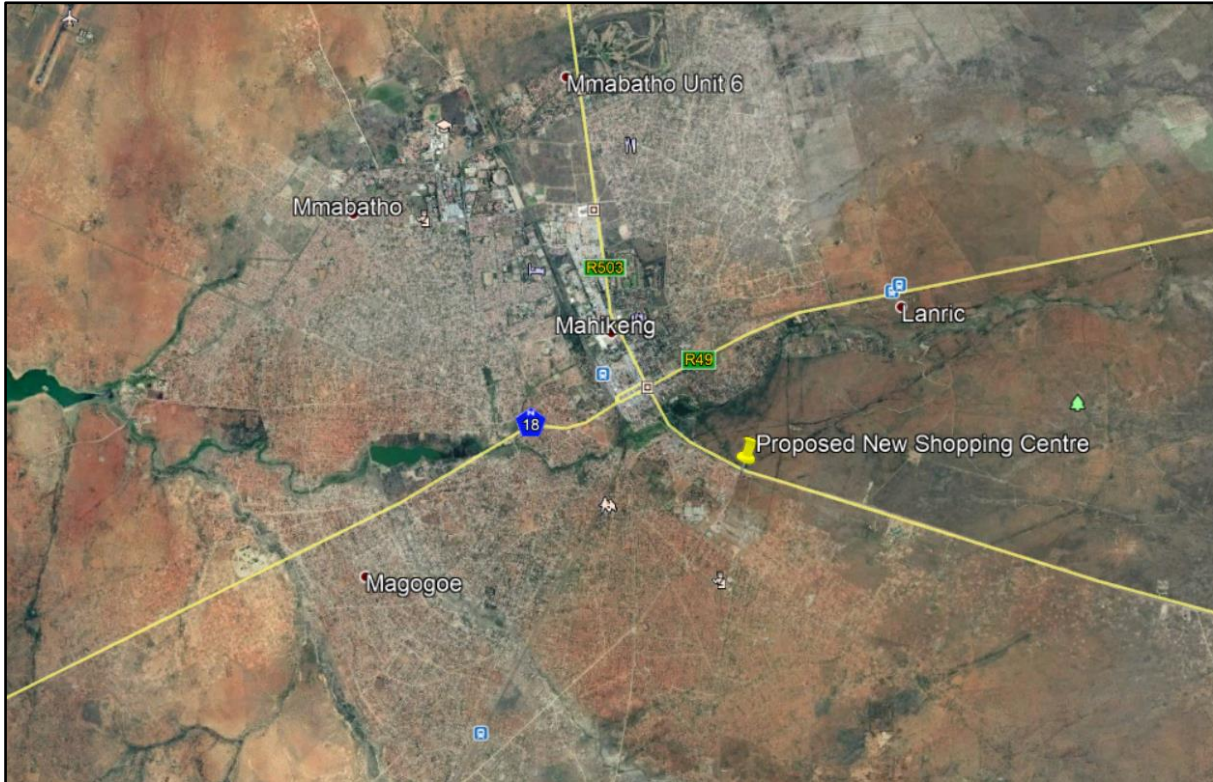


Figure 1: Locality of the Proposed Development



Figure 2: Locality of the Proposed New Shopping Centre in Relation to R503 Road

2 Bulk Services

2.1 Water

The Ngaka Modiri Molema District Municipality is the Water Services Authority (WSA) whereas the Mahikeng Local Municipality is the Water Services Provider (WSP).

In addition to the Modimola Dam located to the west of Mahikeng, bulk water for Mahikeng is abstracted from the Grootfontein wellfields and the Molopo Eye for treatment. The estimated reliable delivery of the water sources amounts to 23 Mℓ/day. The Modimola Dam is the primary water source for the Mmabatho Water Treatment Works operated under contract by Sedibeng Water.

The Mmabatho WTW has a design capacity of 20 Mℓ/day although it currently only treats approximately 16 Mℓ/day. The plant services the Lokaleng Reservoir Site located to the north-west of Mahikeng.

The Proposed Development will have an estimated average daily water demand of 30 kℓ/day. The Erven does not have an existing municipal water connection. Due to the extent of the Proposed Development and future internal water management strategy, it is proposed that a new metered Ø 110mm connection be made to the existing bulk pipeline located in Danville to the west of the Proposed Development.

A new fire booster connection will be incorporated into the design of the metered connection to allow the Fire Brigade to boost the internal network in the case of fire. A sufficient number of strategically located fire hydrants will be supplied as part of the internal water network design.

2.2 Sewer

All sewage generated in the Greater Mmabatho is treated at two Waste Water Treatment Works located to the east and west of the Modimola Dam respectively. The Mmabatho Waste Water Treatment Works is located to the west of Mahikeng on the eastern side of the Modimola Dam. The plant has an estimated treatment capacity of 24 Mℓ/day. Due to limited functionality of flow meters, the exact current inflow could not be provided by the Local Authority however, it is estimated that the current inflow is between 16 and 17 Mℓ/day. Considering the estimated sewer runoff that will be generated by the Proposed Development, the plant has sufficient capacity to treat current and future generated sewer.

All sewage generated on the Proposed Development will follow the natural topography of the site to flow under gravity conditions towards the north-western corner of the site.

The topography of the Proposed Development can be described as relatively flat although sufficient slope is available to install internal sewer pipelines at minimum gradients.

A sewer manhole is located on the corner of the existing township to the west of the Proposed Development where connection to the existing bulk sewer line can be made.

The theoretical sewer runoff of the Proposed Development is approximately 0.9 l/s. Taking into account the peak flow generation periods as well as current size of the existing outfall sewer, the Proposed Development will have a negligible effect on the existing sewer network due to minimal additional flow volumes compared to the existing network.

2.3 Access

The Proposed Development is bordered to the north by the R503 Lichtenburg Road and to the west by the Bophelong Hospital Road. As mentioned in the Introduction Section of this report, the afore mentioned intersection was recently upgraded by means of the full upgrading of the R503 road and construction of a roundabout. The roundabout efficiently calms traffic and allows smooth integration of traffic to and from the Bophelong Hospital Road.

It is proposed that an additional deceleration lane be constructed on the R503 westbound to accommodate westbound access to the new shopping centre while accommodating left turning traffic onto the R503 on an acceleration lane. To avoid right turning eastbound traffic towards the shopping centre, the median of the R503 will be extended at least 30m past the proposed new westbound access. Access for eastbound traffic will therefore be required to turn right at the roundabout to access the shopping centre from Bophelong Hospital Road by means of a left turning access point. Further details of the proposed access as well as envisaged turning radii will be presented on the Traffic Impact Study by a Specialist.

In accordance with the TMH16 - *SA Traffic Impact and Site Traffic Assessment Manual*, the Proposed Development would require a Traffic Impact Assessment due to the fact that more than 50 trips will be generated per hour by the Proposed Development. A Professional Traffic Engineer has been appointed to conduct the traffic count and prepare proposals related to the development impact.

2.4 Storm Water

The natural topography of the Proposed Development slopes towards the north-western corner of the stand (towards the roundabout) where storm water is dispersed in a northern direction crossing the R503 road by means of existing rectangular concrete culverts. Storm water follows natural streams in a north-western direction towards Cookes Lake which in turn overflows into the Molopo River.

In addition to storm water generated on the Proposed Development area, storm water from Danville crosses Bophelong Hospital Road in an eastern direction at the said intersection whereas storm water generated on the southern side of the R503 flows in a western direction to also cross the R503 at the same location next to the roundabout in a northern direction. Open unlined storm water channels in the road reserve convey storm water to the said crossing and it is assumed that the storm water crossing was sufficiently designed upon upgrading of the intersection and roundabout to accommodate existing flow volumes.

All paved areas and roads will be designed to accommodate storm water as surface water towards existing outlets. In addition, sufficiently designed storm water culverts will be installed crossing both proposed new access locations (as mentioned above) to allow unobstructed flow conditions.

All new storm water infrastructure will be designed to avoid additional flow volumes in existing channels while preventing ponding and flooding of any existing or new buildings.

2.5 Solid Waste

Municipal Solid Waste (MSW) removal is a function of the Waste & Environmental Management Division of the Mahikeng Local Municipality. Mahikeng currently generates an estimated MSW volume of 150 tons per day. The Proposed Development will not have any significant impact on the current generated MSW compared to the total volume of solid waste generated in the Municipal area. The MSW removal services of the Municipality will be extended to service the Proposed Development.

3 Internal Services

3.1 Water

The design of internal services will be dependent on the final proposed development layout of the shopping centre mostly guided by the requirements of the Fire Specialist. The following design guidelines will be followed:

- The internal water supply network will consist of uPVC and/or HDPE pipes of varying diameter according to designs of the Civil Engineer.
- Provision of isolating valves, air release valves and fire hydrants to comply with the requirements of the Local Authority and Building Regulations.
- Cognisance will be taken of pipe diameters and water pressure for firefighting purposes.

3.2 Sewer

Depending on the future development layout, an internal sewer network of Ø 110mm and Ø 160mm pipes with related Y-junction connections and inspection eyes will be installed to comply with the minimum specifications stipulated in the SANS 10400 Building Regulations. Manholes and rodding eyes will be constructed at necessary positions to allow for effective maintenance.

The internal sewer network will be connected to the existing gravity sewer network as explained in Section 2.2 above.

3.3 Roads & Storm Water

The proposed development layout will make provision for internal access roads, parking and service roads linking connector roads (R503 and Bophelong Hospital) to the filling station while ensuring smooth transition to and from retail facilities.

The design of the internal access roads and parking shall provide for an appropriate road surface with cross sections designed to accommodate the channelling of storm water generated on the developed area.

Where storm intensity calculations dictate, sufficiently designed concrete channels will be constructed as part of the cross section to channel storm water as described in Section 2.4 above.

Roads and storm water infrastructure will generally be designed to follow the natural runoff patterns (north-west) to avoid ponding and flooding of buildings with associated damage.

3.4 Refuse Removal

Refuse removal is currently conducted by the Local Authority and their services will be extended to the proposed development – refer paragraph 2.5 above. Refuse shall be removed by the Municipality at regular intervals as required.

Where necessary, the design of the retail building will incorporate the provision of a refuse holding area where municipal refuse would be placed until the Local Authority removes such.

4 1 in 100 year Flood Line

The proposed development is not affected by the 1-in-100 year flood line.

5 Geotechnical Conditions

The design of civil and structural engineering components is highly affected by the geotechnical conditions. It is critical to conduct a detailed and thorough investigation to limit the cost of foundation construction while maintaining the structural integrity of the buildings and infrastructure. A Geotechnical Engineer will be appointed to provide a detailed Geotechnical Study and Report.

6 Operation and Maintenance of Services

All external municipal services namely water, sewer, roads and storm water, electricity infrastructure as well as refuse removal functions shall remain the function of the Local Authority which is responsible for the operation and maintenance thereof.

7 Report Status

It is noted that this report is indicative only as part of the Tender Proposal stage of the development. This report is not compiled for formal submission to the Local Authority for approval and further formal engagements should be conducted with the Local Authority to confirm availability of services and conditions (flow, pressure etc.) before a final report could be compiled for submission.

We trust that you will find this report to be in order and avail ourselves to provide further information if required.

Yours faithfully,

JWB HATTINGH (Pr Eng)

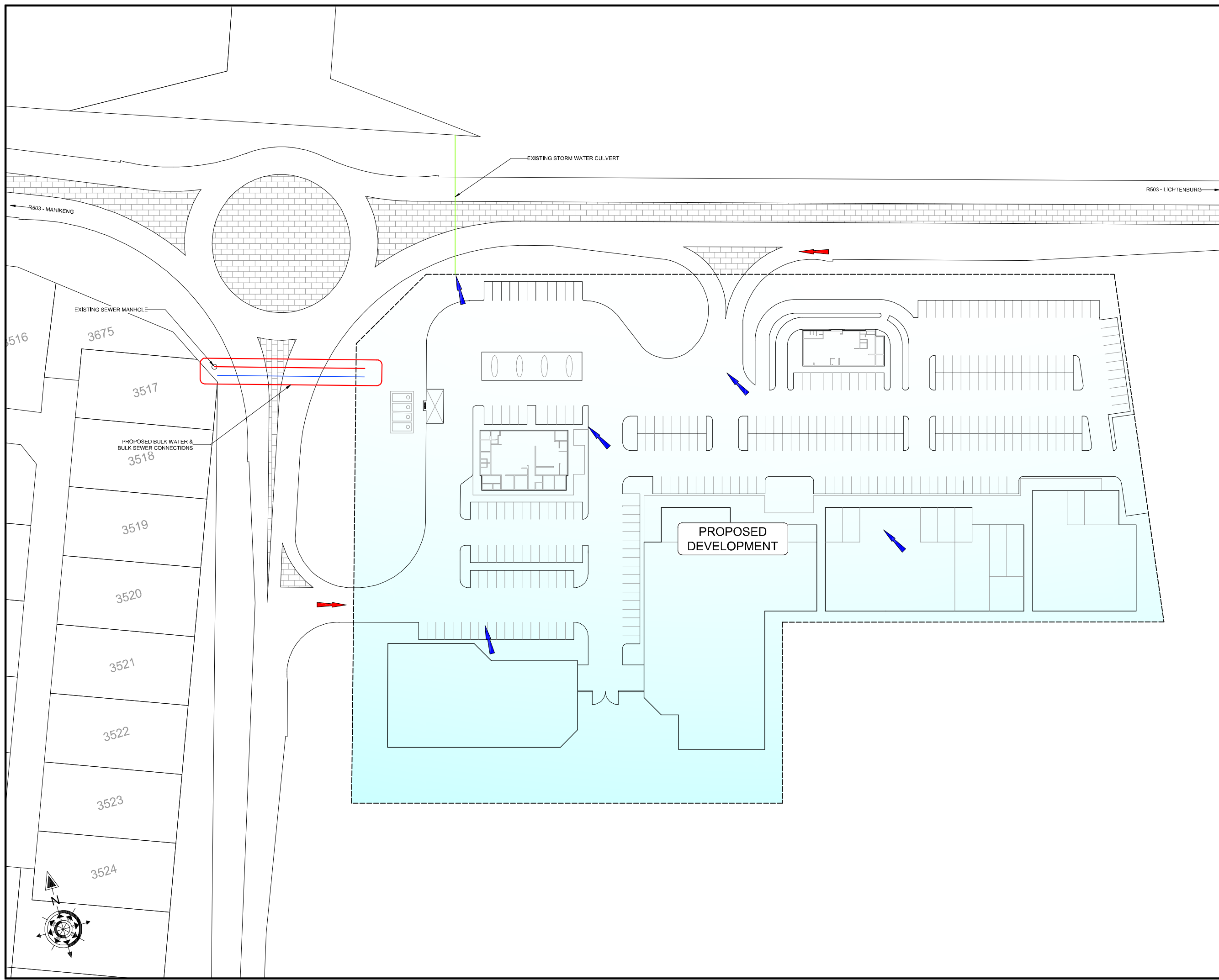
MOEDI CONSULTING ENGINEERS (PTY) LTD

Attachments: Annexure A – Civil Engineering Services Drawing

MD/ 3951/ Reports/ Services Report/ 3951 SR - NH

ANNEXURE A

CIVIL ENGINEERING SERVICES DRAWING



NOTES

- PROPOSED DEVELOPMENT
- NEW BULK SUPPLY MAIN
- NEW SEWER GRAVITY MAIN
- EXISTING STORM WATER CULVERT
- ➔ STORM WATER FLOW DIRECTION
- ➔ PRIMARY ACCESS

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CLIENT	SIGNATURE
	DATE

ARCHITECT: ---

PROPOSED SHOPPING CENTRE IN MAHIKENG

SERVICES DRAWING

RESPONSIBLE PERSON	DATE	PROFESSIONAL ENGINEER
DESIGNED: ---	---	JWB HATTINGH PR No: 20170282
DRAWN: JR VAN DER LINDE	12/20	
SURVEY: ---	---	
CHECKED: ---	---	
CONTACT: ---	---	

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