




PROPOSED ERF 23, PRESIDENT PARK X6, EMALAHLENI, MPUMALANGA

COORDINATES – LAT: 25°52'56.91"S, LONG: 29°15'25.48"E

CIVIL SERVICES REPORT

SEPTEMBER 2020



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Prepared by	H.B. Senekal (B. Eng)			
Checked by	E.D. Kotze (Pr. Tech Eng)			
Signature				
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EDL Engineers (Pty) Ltd

1st Floor, Block D
The Village Office Park
c/o Glenwood Rd & Oberon Ave,
Fearie Glen, 0043
Cell: +27 (0)83 564 1563
Tel: +27 (0)87 897 5074/5/6
Email: eben@edlengineers.co.za
Website: www.edlengineers.co.za



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Drawing no: 20055/SW/01 (Stormwater infrastructure layout)

Drawing no: 20023/AL/01 (Concept Access Layout)

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Annexure A Town Planning Consolidation Sketch Plan

1 Project Background and Scope

EDL Engineers (Pty) Ltd have been appointed by the client to compile a civil services report for the proposed filling station situated on the south eastern corner of the intersection of Mandela Drive and Nita Avenue, on Portion 1 of Erf 20 and Portion 1 of Erf 21, to be consolidated and known as Erf 23, President Park X6, in Emalahleni, Mpumalanga. This site is located within the borders of the Emalahleni Local Municipality.

The erf is currently undeveloped and is situated just opposite (east) of the existing Nissan Dealership, as per the Locality. Please refer to **Figure 1** for the locality showing where the site is located in relation to various other landmarks.

The study site, to be consolidated and known as Erf 23, President Park X6, measures 4 479m² in extent. The Town Planning Consolidation Sketch Plan is appended as **Annexure A** at the back of this report, showing more detail about the Erf boundary lengths and their respective orientation.

The purpose of this report is to assess whether the proposed filling station development can be serviced economically in terms of water and sewerage outflow, as well as stormwater and access, and as part of the investigation, evaluates the current availability of municipal services near the site and possible connection points and also proposes possible upgrades to these and on-site services, where required. The proposed design principles and standards for the civils infrastructure are based on the Emalahleni Local Municipality standards as well as Sections J, K and L of the “The Neighbourhood Planning and Design Guide” Part 2, developed by the Department of Human Settlements, in 2019. Please refer to **Drawing No. 20055/WS/01** for Water and Sewer Service details. **Drawing No. 20055/SW/01** shows the proposed infrastructure required to cope with the increased stormwater flow as a result of the development.

2 Site Location

2.1 Site Location

As shown in **Figure 1** below (and attached), the development is situated at the intersection of Mandela Drive and Nita Avenue about 1.5km north west of where the N4 Freeway, and 500m west of the Highveld Mall, within the borders of the Emalahleni Local Municipality on Portion 1 of Erf 20 and Portion 1 of Erf 21, to be consolidated and known as Erf 23, President Park X6.

The approximate coordinates of the development site are:

Latitude: 25°52'56.91"S

Longitude: 29°15'25.48"E

The site is mainly surrounded by residential and business developments to the west and south, with undeveloped land open to the north and south east of where the study site is located. Noticeable attractions near the site include the Nissan Dealership opposite the site and the Highveld Mall and The Ridge Casino, about 500m and 1km to the east, respectively.



Figure 1: Locality Plan

3 Water Infrastructure & Services Layout

3.1 Existing Bulk Water Infrastructure

The nearest existing bulk water supply pipe is situated along the western boundary of the study site in Nita Avenue, as set out on **Drawing No. 20055/WS/01**. This is an old 150mm diameter AC water main connected to a larger 400mm diameter AC water main running parallel to and north of Mandela Drive. It was mentioned however, that the water pipe in Nita Avenue is old and not reliable enough for a new development. It was proposed that a section of 350m in length, between Del Judor X4 and Mandela Drive, be replaced with a Class 16 160mm uPVC pipe. This needs to be confirmed on site once construction to the development commences.

3.2 Proposed Water Infrastructure

The development is proposed to comprise a filling station with a minimum of four (4) pump islands, along with a convenience store of about 300m² and a total of 23 parking bays on site. As per The Town Planning Consolidation Sketch Plan, appended as **Annexure A** at the back of this report, the site measures a total area of 4 479m² in extent.

As per the standards set out within Section J, Table J.4 of the Neighbourhood Planning and Design Guide, the projected Annual Average Daily Demand (AADD) for a typical Filling Station is, as a worst case taken at 0.8 kilolitres / 100m². It is expected that, for developments with a Business / Commercial or Industrial type of land use, a Peak Hourly Factor of about 3 is normally adopted. It is therefore calculated that a total of 7.2 kilolitres / day is expected as a worst case for this development.

Table 1: Water demand for the development

Area (m ²) (Building)	Units	Peak Hourly Factor (PHF)	Water Demand (kl/d)	Water Demand (l/s)
± 300	kl / 100m ²	3	7.2	0.083

This development falls into a moderate risk category for firefighting, and therefore the water infrastructure must be capable of delivering a total fire flow of **25 litres / second / hydrant** for 4 hours with a minimum pressure head at the fire node of 15m. A total of two (2) hydrants are proposed for the development, as set out on **Drawing No. 20055/WS/01** at the back of this report.

It is therefore proposed that this development be serviced by means of a 110mm diameter uPVC pipe running from the existing water main in Nita Avenue, entering the site from the west. From this pipe, a 75mm diameter pipe is proposed to service each of the two (2) hydrants situated on the site. A 50mm diameter pipe is proposed for water reticulation to the building.

A rational fire design will also be required to be submitted to the council for approval and this includes the appropriate fire hydrant / hose reel numbers and positions and will also include testing for fire flow conditions.

Please refer to **Drawing No. 20055/WS/01** for a layout showing all the existing and proposed infrastructure for the study site.

4 Sewerage Infrastructure

4.1 Existing Sewerage Infrastructure

The nearest sewer main is a 160mm diameter uPVC pipe which runs along the western side of Nita Avenue, northwards to Mandela Drive, where it connects to another 160mm diameter uPVC sewer main, which supplies sewerage services to the Highveld Mall and other developments as well. Please see **Drawing No. 20055/WS/01** for details.

4.2 Proposed Sewerage Infrastructure

Sewerage production at the development originates from daily activities such as the usage of latrine facilities etc. from the employees on site. Sewage effluent discharge will include 15% stormwater infiltration as required by the Waterborne Sanitation Design Guidelines.

Table 2: Sewage production for the total development

Area (m ²) (Building)	Units	Sewage flow (kl/unit prod.)	Calculated flow (l/day)
± 300m ²	kl / 100m ²	0.52	2 380

As per the Waterborne Sanitation Design Guidelines as well as Section K of the Neighbourhood Planning and Design Guide, an average daily sewage production (outflow) rate is taken at 0.52 kilolitres / 100m². Considering a peak factor of 1.3, and allowing for a stormwater infiltration of 15%, this calculates to an Average Daily Dry Weather Sewage Flow (AADWF) of 2 380 l/day, as per **Table 2** above.

It is therefore proposed that the sewage on site be transported from the site by means of a 110mm diameter Class 34 uPVC pipe at minimum gradients of 1:60, connecting to the proposed 110mm diameter pipe running from the oil separator (described in the paragraph below) by means of a manhole. Manholes are proposed as set out on the attached drawing. Invert levels of the proposed pipes and manholes will be determined during the detailed design and can therefore not be confirmed within this study but must be a minimum depth of 0.8m.

An oil separator is proposed near the northern erf boundary. From this oil separator, another 110mm diameter Class 34 uPVC pipe is to be installed to run toward the existing sewer pipe in Mandela Drive.

Please refer to **Drawing 20055/WS/01** for details.

5 Stormwater Infrastructure

5.1 Existing Stormwater Infrastructure

Considering that this is an undeveloped Erf, there is currently no form of stormwater mitigation measures nor infrastructure on the study site. Given the existing topography and slope across the erf, and from information gathered during a site inspection held by EDL Engineers (Pty) Ltd in September of 2020, it can be concluded that the stormwater currently flows over the site, towards the north, to Mandela Drive. The nearest stormwater kerb inlet and associated pipe (450mm diameter) is in Nita Avenue, in front of the Nissan Dealership. This stormwater pipe discharges the stormwater onto the undeveloped land just north of the intersection of Mandela Drive and Nita Avenue. Refer to **Drawing no. 20055/SW/01**.

5.2 Proposed Stormwater Infrastructure

The site measures 4 479m² in extent and is currently undeveloped. Please find below the tabled values for a typical existing scenario (pre-development 1:5-year storm event) and the 1:25-year storm event scenario (post-development) showing the total volume of stormwater that will be required to be transported from the site.

Table 3: Catchment parameters

Description	Parameter
Total size of Catchment	0.004479km ²
Longest Watercourse	0.07km
Average Slope	0.03809m/m
Mean Annual Rainfall	726mm
Region	Inland

Table 4: Pre-Development Flow (1:5 Year)

Erf	Area (ha)	Area Distribution Factor	Ave. Slope (m/m)	Tc (min)	Combined run-off coefficient	Rainfall Intensity (mm/hr)	Peak Flow (m ³ /s)
Erf 23	0.04479	Rural: 100% Urban: 0%	0.03809	15	0.342	84.376	0.036

Table 5: Post-Development Flow (1:25 Year)

Erf	Area (ha)	Area Distribution Factor	Ave. Slope (m/m)	Tc (min)	Combined run-off coefficient	Rainfall Intensity (mm/hr)	Peak Flow (m ³ /s)
Erf 23	0.04479	Rural: 0% Urban: 100%	0.03809	6	0.864	211.580	0.227

As set out in **Tables 4** and **5** above, it can be concluded that the stormwater infrastructure on site will have to be sized to accommodate a total flow of 0.227m³/s during the 25-year storm event. A total of two (2) 5m long kerb inlets are proposed on strategic positions on this site. The site is therefore proposed to be sloped as set out on **Drawing No. 20055/SW/01**.

Furthermore, regarding proposed stormwater infrastructure on the study site, the following is proposed:

- Running from each kerb inlet as described on the previous page, two (2) 375mm diameter concrete stormwater pipes are proposed to assist in the runoff of stormwater from the site.
- A shallow channel is proposed in the paving on the northern side of the convenience store to guide stormwater from the site to the north eastern kerb inlet near the access from Mandela Drive. Refer to **Drawing No. 20055/SW/01**.
- The proposed stormwater pipe, running from the two (2) proposed kerb inlets on the study site, is proposed to be connected to the existing stormwater pipe in Nita Avenue, with an associated manhole, and by means of a proposed 450mm 100D concrete pipe as shown on **Drawing no. 20055/SW/01**.
- To minimise any risk of possible capacity restraints and overflow, the existing stormwater pipe in Nita Avenue is proposed to be upgraded to a 600mm 100D concrete pipe from the position of the proposed manhole in front of the Nissan Dealership, running north toward the existing outlet structure north of Mandela Drive.
- All pipes are to be installed at the existing slopes present on the study site as these gradients are more than the minimum required gradients for these stormwater pipes.

6 Roads & Accesses

The existing road network includes Mandela Drive, running in a north west / south east direction, along the northern boundary of the study site. Nita Avenue, which borders the study site to the west, runs in a north east / south west direction past the site.

The site is envisaged to be accessed by means of a Left-in, Left-out access from Mandela Drive, with 5m wide IN and OUT lanes, respectively. This access is proposed about 100m south east of the intersection of the two abovementioned roads. A 45m taper lane is required on Mandela Drive to accommodate traffic turning left into the site, ultimately promoting safety on site and on Mandela Drive.

A new lane of 3.5m wide is proposed on the eastern side of Nita Avenue, which is proposed to run from the intersection of Mandela Drive and Nita Avenue, forming a left slip lane for the full access into the study site. This full access, which is planned opposite the existing access to the Nissan Dealership, is proposed to have 5m wide IN and OUT lanes as well and is proposed 80m south west of the intersection of the abovementioned two roads. This full access is proposed to have a "STOP" condition at Nita Avenue, with the latter having the Right-of-Way.

Both accesses have bell-mouth radii large enough to account for the manoeuvring of larger vehicles such as fuel tanker trucks. Please refer to **Drawing no. 20023/AL/01 Rev 2** as prepared by EDL Engineers (Pty) Ltd in August of 2020.

Both accesses must be surfaced and must have road markings and signage complying with the most relative standards of the Emalahleni Local Municipality and the South African Road Traffic Signs Manual (SARTSM).

7 Conclusions & Recommendations

- The stands on which the development is situated, which is to be consolidated to one erf and to be known as Erf 23, President Park X6, measures 4 479m² extent and is situated within the borders of the Emalahleni Local Municipality, in Mpumalanga.
- The nearest existing bulk water supply pipe is situated along the western boundary of the study site in Nita Avenue, as set out on **Drawing No. 20055/WS/01**. This is an old 150mm diameter AC water main connecting to a larger 400mm diameter AC water main running parallel to and north of Mandela Drive.
- For water reticulation and for Fire Flow Conditions, it is proposed that this development be serviced by means of a 110mm diameter uPVC pipe running from the existing water main in Nita Avenue, entering the site from the west. From this pipe, a 75mm diameter pipe is proposed to service each of the two (2) hydrants situated on the site. A rational fire design must be done for approval by the Emalahleni Local Municipality. Please refer to Chapter 3.
- The nearest sewer main is a 160mm diameter uPVC pipe which runs along the western side of Nita Avenue, northwards to Mandela Drive, where it connects to another 160mm diameter uPVC sewer main. Please refer to **Drawing No. 20055/WS/01**.
- It is proposed that the sewage on site be transported from the site by means of a 110mm diameter Class 34 uPVC pipe at minimum gradients of 1:60, connecting to the existing 160mm diameter uPVC pipe, situated along the southern side of Mandela Drive.
- Regarding stormwater, two (2) kerb inlets are proposed as described in Chapter 5.2, with (2) 375mm diameter concrete stormwater pipes also proposed to assist with the runoff of stormwater from the site, with a 450mm diameter 100D stormwater pipe below Nita Avenue.
- A shallow channel is proposed in the paving on the northern side of the convenience store to guide stormwater from the site to the north eastern kerb inlet near the access from Mandela Drive. Refer to **Drawing No. 20055/SW/01**.
- A new manhole is proposed next to Nita Avenue and in front the existing Nissan Dealership, creating a connection point to the existing stormwater infrastructure for the 450mm diameter 100D stormwater pipe running from the study site, as shown on **Drawing no. 20055/SW/01**.
- The existing stormwater pipe in Nita Avenue is proposed to be upgraded to a 600mm diameter 100D concrete pipe from the proposed manhole in front of the Nissan Dealership, running north toward the existing outlet structure north of Mandela Drive.
- The site is proposed to be accessed by means of one Left-in, Left-out access from Mandela Drive, and one Full Access from an access road, running from Nita Avenue. For further details please refer to **Drawing No. 20023/AL/01** and Chapter 6.

It can therefore be concluded that all services including water, sewer, stormwater and roads (accesses) can be provided (acceptably and economically) for the filling station development located on what will be known as Erf 23, President Park X6, Emalahleni, Mpumalanga, with the proposed improvements to the infrastructure required by the filling station development as set out in this report.

Figures

Figure 1 Locality Plan



20055

● SITE LOCATION
○ KEY INTERSECTION

SITE:
PRESIDENT PARK X6

TITLE:
LOCALITY

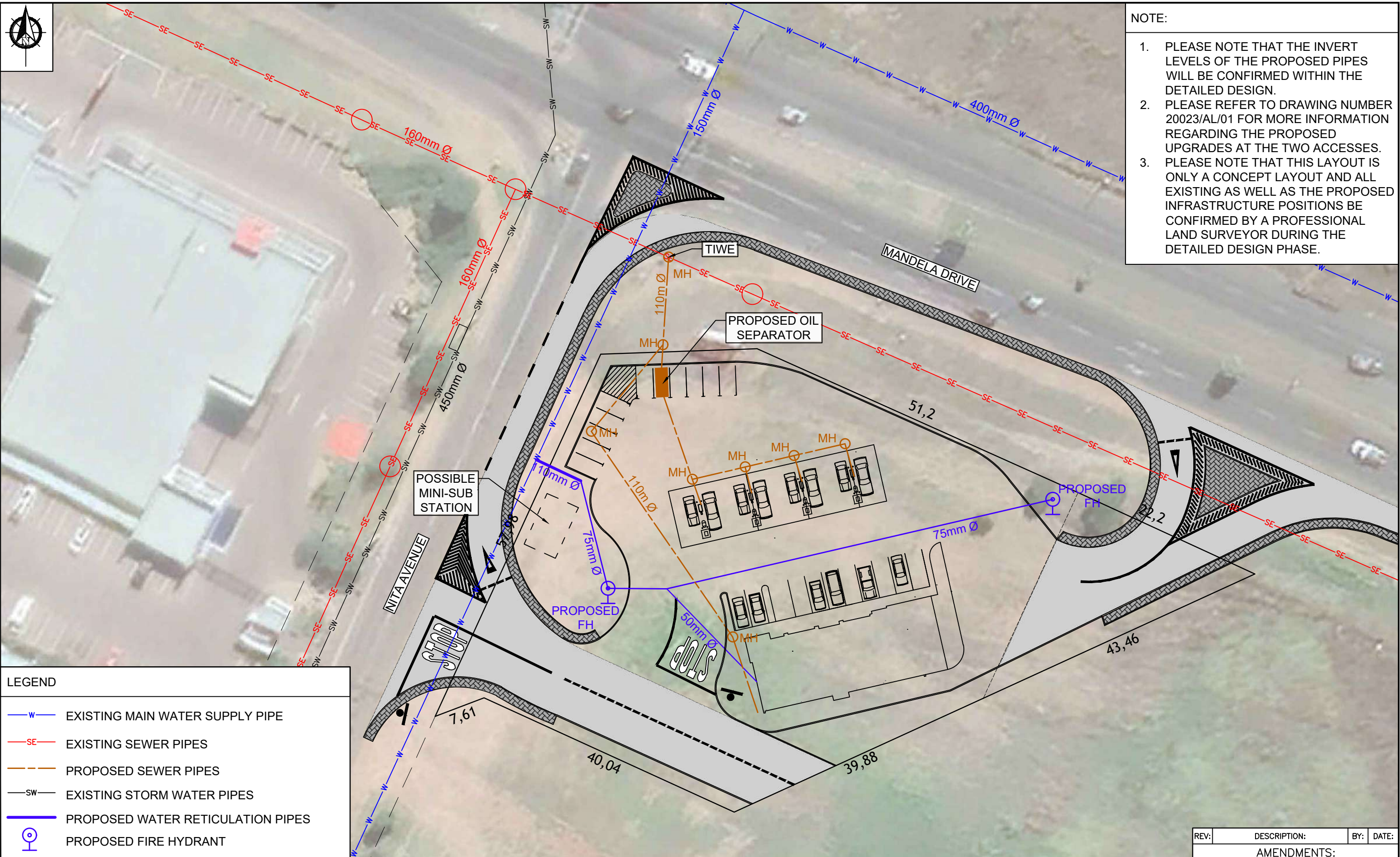
FIG 1

Drawings

Drawing no: 20055/WS/01
(Water and sewerage network layout)

Drawing no: 20055/SW/01
(Stormwater infrastructure layout)

Drawing no: 20023/AL/01
(Concept access layout)



NOTE:

- PLEASE NOTE THAT THE INVERT LEVELS OF THE PROPOSED PIPES WILL BE CONFIRMED WITHIN THE DETAILED DESIGN.
- PLEASE REFER TO DRAWING NUMBER 20023/AL/01 FOR MORE INFORMATION REGARDING THE PROPOSED UPGRADES AT THE TWO ACCESSES.
- PLEASE NOTE THAT THIS LAYOUT IS ONLY A CONCEPT LAYOUT AND ALL EXISTING AS WELL AS THE PROPOSED INFRASTRUCTURE POSITIONS BE CONFIRMED BY A PROFESSIONAL LAND SURVEYOR DURING THE DETAILED DESIGN PHASE.

LEGEND

	EXISTING MAIN WATER SUPPLY PIPE
	EXISTING SEWER PIPES
	PROPOSED SEWER PIPES
	EXISTING STORM WATER PIPES
	PROPOSED WATER RETICULATION PIPES
	PROPOSED FIRE HYDRANT

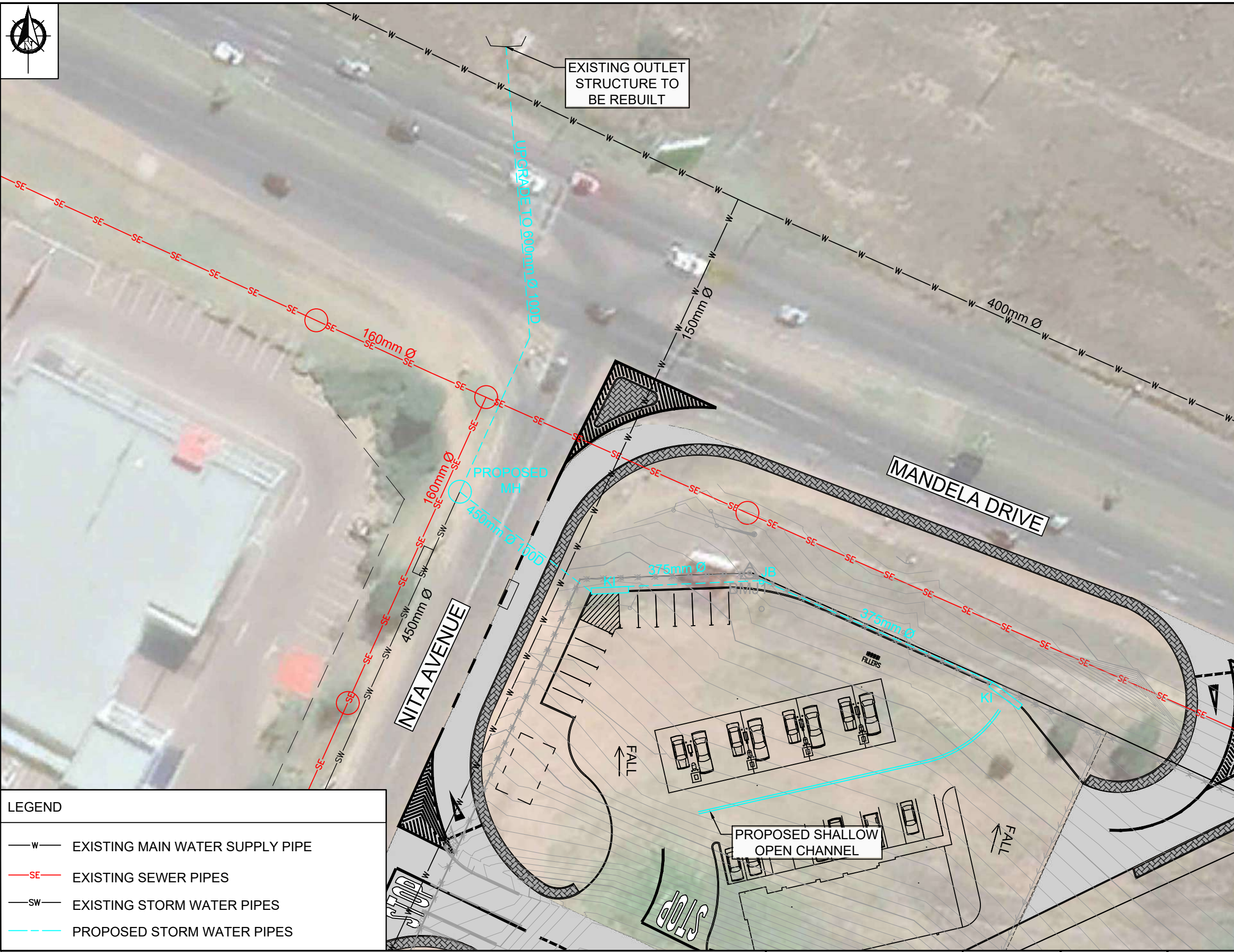
REV:	DESCRIPTION:	BY:	DATE:
AMENDMENTS:			

SITE: ERF 23 PRESIDENT PARK X6	DRAWING NO. 20055/WS/01		PROJECT NO. 20055	DATE. SEPT '20	 EDL CONSULTING ENGINEERS 1st Floor, Block D The Village Office Park C/O Glenwood Rd & Oberon Ave, Fearie Glen, 0043 Tel: 087 897 5074/5/6 eben@edlengineers.co.za www.edlengineers.co.za
	TITLE: WATER AND SEWERAGE NETWORK LAYOUT (EXISTING AND PROPOSED)	SCALE AT A3. 1:500	DRAWN. HB SENEKAL	CHECKED. ED KOTZE	



NOTE:


- PLEASE NOTE THAT THE INVERT LEVELS OF THE PROPOSED PIPES AND KERB INLETS WILL BE CONFIRMED WITHIN THE DETAILED DESIGN.
- PLEASE REFER TO DRAWING NUMBER 20023/AL/01 FOR MORE INFORMATION REGARDING THE PROPOSED UPGRADES AT THE TWO ACCESSES.
- PLEASE NOTE THAT THIS LAYOUT IS ONLY A CONCEPT LAYOUT AND ALL EXISTING AS WELL AS THE PROPOSED INFRASTRUCTURE POSITIONS BE CONFIRMED BY A PROFESSIONAL LAND SURVEYOR DURING THE DETAILED DESIGN PHASE.

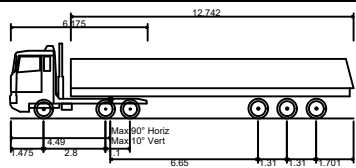


LEGEND

—W—	EXISTING MAIN WATER SUPPLY PIPE
—SE—	EXISTING SEWER PIPES
—SW—	EXISTING STORM WATER PIPES
—---	PROPOSED STORM WATER PIPES

REV:	DESCRIPTION:	BY:	DATE:
AMENDMENTS:			

SITE: ERF 23 PRESIDENT PARK X6	DRAWING NO. 20055/SW/01		PROJECT NO. 20055		DATE. SEPT '20	
	SCALE AT A3. 1:500	DRAWN. HB SENEKAL	CHECKED. ED KOTZE	REVISION. 0		
TITLE: STORMWATER INFRASTRUCTURE LAYOUT	 EDL CONSULTING ENGINEERS 1st Floor, Block D The Village Office Park C/O Glenwood Rd & Oberon Ave, Fearie Glen, 0043 Tel: 087 897 5074/5/6 eben@edlengineers.co.za www.edlengineers.co.za					




Oil Tanker
 Overall Length 15.481m
 Overall Width 2.500m
 Overall Body Height 3.396m
 Min Body Ground Clearance 0.320m
 Max Track Width 2.500m
 Lock to lock time 4.00s
 Kerb to Kerb Turning Radius 6.500m



REMAINDER OF PORTION 121
 ZEEKOEWATER 311JS

PORTION 120 ZEEKOEWATER
 311JS

REV:	DESCRIPTION:	BY:	DATE:
AMENDMENTS:			

SITE: PRESIDENT PARK X6	DRAWING NO. 20023/AL/01		PROJECT NO. 20023	DATE. 25/08/2020	 EDL CONSULTING ENGINEERS 1st Floor, Block D The Village Office Park C/O Glenwood Rd & Oberon Ave, Fearie Glen, 0043 Tel: 087 897 5074/5/6 eben@edlengineers.co.za www.edlengineers.co.za
	TITLE: CONCEPT ACCESS LAYOUT	SCALE AT A3. 1 : 1 000	DRAWN. JMvR	CHECKED. ED KOTZE	

Annexure A

Town Planning Consolidation Sketch Plan

CONSOLIDATION SKETCH PLAN

CONSOLIDATION OF
 PORTION 1 OF ERF 20 AND PORTION 1 OF
 ERF 21 PRESIDENT PARK EXTENSION 6
 TOWNSHIP REGISTRATION DIVISION J.S.,
 PROVINCE MPUMALANGA

REPRESENTED BY FIGURE
 ABCDEFGH

LEGEND

	Area (m ²)	%
Portion 1 of Erf 20	4 012 m ²	89.57
Portion 1 of Erf 21	467 m ²	10.43
Proposed Erf 23	4 479 m ²	100



NOTES

Laurette Swarts Pr. Pln. 25/08/2020
BY/DEURSKRYWER: SWARTS PR. PLN. DATE/DAATUM:

Scale 1 : 1000

Korsman & Associates
 Private Bag X7294
 Suite 295
 WITBANK
 1035



Tel: (013) 650 0408
 E-Mail : admin@korsman.co.za

